

Machine Automation Controller  
CJ-series  
**Analog I/O Units**

**Operation Manual  
for NJ-series CPU Unit**

CJ1W-PDC15  
CJ1W-PH41U  
CJ1W-AD04U

Analog I/O Units



© **OMRON, 2011**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of OMRON.

No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

# Introduction

---

Thank you for purchasing an CJ-series Analog I/O Units .

This manual contains information that is necessary to use with the NJ-series CPU Unit. Please read this manual and make sure you understand the functionality and performance of the NJ-series CPU Unit before you attempt to use it in a control system.

Keep this manual in a safe place where it will be available for reference during operation.

## 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 introducing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and maintaining FA systems.
- Personnel in charge of managing FA systems and facilities.

For programming, this manual is intended for personnel who understand the programming language specifications in international standard IEC 61131-3 or Japanese standard JIS B3503.

## Applicable Products

This manual covers the following products.

- CJ-series Analog I/O Units
  - CJ1W-PDC15
  - CJ1W-AD04U
  - CJ1W-PH41U

# Relevant Manuals

There are three manuals that provide basic information on the NJ-series CPU Units: the *NJ-series CPU Unit Hardware User's Manual*, the *NJ-series CPU Unit Software User's Manual*, and the *NJ-series Instructions Reference Manual*.

Most operations are performed from the Sysmac Studio Automation Software. Refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for information on the Sysmac Studio.

Other manuals are necessary for specific system configurations and applications.

Read all of the manuals that are relevant to your system configuration and application to make the most of the NJ-series CPU Unit.

	NJ-series User's Manuals								CJ-series Special Unit Operation Manuals for NJ-series CPU Unit
	Basic information								
	NJ-series CPU Unit Hardware User's Manual	NJ-series CPU Unit Software User's Manual	NJ-series Instructions Reference Manual	NJ-series CPU Unit Motion Control User's Manual	NJ-series CPU Unit Built-in EtherCAT Port User's Manual	NJ-series Motion Control Instructions Reference Manual	NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual	NJ-series Troubleshooting Manual	
Introduction to NJ-series Controllers	●								
Setting devices and hardware									
Using motion control				●					
Using EtherCAT	●				●				
Using EtherNet/IP							●		
Using CJ-series Units									●
Software settings									
Using motion control		●		●					
Using EtherCAT					●				
Using EtherNet/IP							●		
Programming		●	●						
Using motion control				●		●			
Using EtherCAT					●				
Using CJ-series Units									●
Programming error processing								●	
Testing operation and debugging									
Using motion control		●		●					
Using EtherCAT					●				
Using EtherNet/IP							●		
Troubleshooting and managing errors in an NJ-series Controller	△	△		△			△	●	
Use the relevant manuals for references according to any error that occurs.									
Maintenance									
Using EtherCAT	●				●				
Using EtherNet/IP							●		
Using CJ-series Units									●

# Manual Configuration

## NJ-series CPU Unit Hardware User's Manual (Cat. No. W500)

Section	Description
<b>Section 1 Introduction</b>	This section provides an introduction to the NJ-series Controllers and their features, and gives the NJ-series Controller specifications.
<b>Section 2 System Configuration</b>	This section describes the system configuration used for NJ-series Controllers.
<b>Section 3 Configuration Units</b>	This section describes the parts and functions of the configuration devices in the NJ-series Controller configuration, including the CPU Unit and Configuration Units.
<b>Section 4 Installation and Wiring</b>	This section describes where and how to install the CPU Unit and Configuration Units and how to wire them.
<b>Section 5 Troubleshooting</b>	This section describes the event codes, error confirmation methods, and corrections for errors that can occur.
<b>Section 6 Inspection and Maintenance</b>	This section describes the contents of periodic inspections, the service life of the Battery and Power Supply Units, and replacement methods for the Battery and Power Supply Units.
<b>Appendices</b>	The appendices provide the specifications of the Basic I/O Units, Unit dimensions, load short-circuit protection detection, line disconnection detection, and measures for EMC Directives.

## NJ-series CPU Unit Software User's Manual (Cat. No. W501)

Section	Description
<b>Section 1 Introduction</b>	This section provides an introduction to the NJ-series Controllers and their features, and gives the NJ-series Controller specifications.
<b>Section 2 CPU Unit Operation</b>	This section provides information that is necessary to use the CPU Unit, including how the CPU Unit works and the operations that it performs depending on the status of the CPU Unit.
<b>Section 3 I/O Ports, Slave Configuration, and Unit Configuration</b>	This section describes how to use I/O ports, how to create the slave configuration and unit configuration and how to assign functions.
<b>Section 4 Controller Setup</b>	This section describes the initial settings of the function modules.
<b>Section 5 Designing Tasks</b>	This section describes the task system and types of tasks.
<b>Section 6 Programming</b>	This section describes programming, including the programming languages and the variables and instructions that are used in programming.
<b>Section 7 Checking Operation and Actual Operation</b>	This section describes the items and procedures for checking the operation of an NJ-series Controller, including offline debugging procedures.
<b>Section 8 CPU Unit Functions</b>	This section describes the functionality provided by the CPU Unit.
<b>Section 9 Communications Setup</b>	This section describes how to go online with the CPU Unit and how to connect to other devices.
<b>Section 10 Example of Actual Application Procedures</b>	This section describes the procedures that are used to actually operate an NJ-series Controller.
<b>Section 11 Troubleshooting</b>	This section describes the event codes, error confirmation methods, and corrections for errors that can occur.
<b>Appendices</b>	The appendices provide the CPU Unit specifications, task execution times, specifications of individual system-defined variables, data attribute lists, CJ-series Unit memory information, CJ-series Unit memory allocation methods, and version information.

## Sysmac Studio Version 1 Operation Manual (Cat. No. W504)

Section	Description
<b>Section 1 Introduction</b>	This section provides an overview and lists the specifications of the Sysmac Studio and describes its features and components.
<b>Section 2 Installation and Uninstallation</b>	This section describes how to install and uninstall the Sysmac Studio.
<b>Section 3 System Design</b>	This section describes the basic concepts for designing an NJ-series System with the Sysmac Studio and the basic operating procedures.
<b>Section 4 Programming</b>	This section describes how to create programs with the Sysmac Studio.
<b>Section 5 Online Connections to a Controller</b>	This section describes how to go online with a Controller.
<b>Section 6 Debugging</b>	This section describes how to debug the programs online on the Controller or debug it offline with the Simulator.
<b>Section 7 Other Functions</b>	This section describes other functions that are supported by the Sysmac Studio, including security functions and troubleshooting functions.
<b>Section 8 Reusing Programming</b>	This section describes how to reuse the programs that you create with the Sysmac Studio.
<b>Section 9 Support Software Provided with the Sysmac Studio</b>	This section describes the Support Software that is provided with the Sysmac Studio.
<b>Section 10 Troubleshooting</b>	This section describes the error messages that are displayed when you check a program on the Sysmac Studio and how to correct those errors.
<b>Appendices</b>	The appendices describe the following: Driver Installation for Direct USB Cable Connection Specifying One of Multiple Ethernet Interface Cards Online Help Simulation Instructions

## CJ-series Analog I/O Units Operation Manual for NJ-series CPU Unit (Cat. No. W498) (This manual)

Section	Description
<b>Section 1 Overview and Features</b>	This section describes the features and functionality of the Analog I/O Units. It also explains where and how to install the Units and their operating procedure.
<b>Section 2 Isolated-type Direct Current Input Unit</b>	This section provides the specifications of the CJ-series Isolated-type Direct Current Input Unit (CJ1W-PDC15), and describes the operating procedure and how to wire the Unit.
<b>Section 3 Isolated-type Universal Input Units</b>	This section provides the specifications of the CJ-series Isolated-type Universal Input Units (CJ1W-AD04U/PH41U), and describes the operating procedure and how to wire the Unit.
<b>Appendices</b>	---

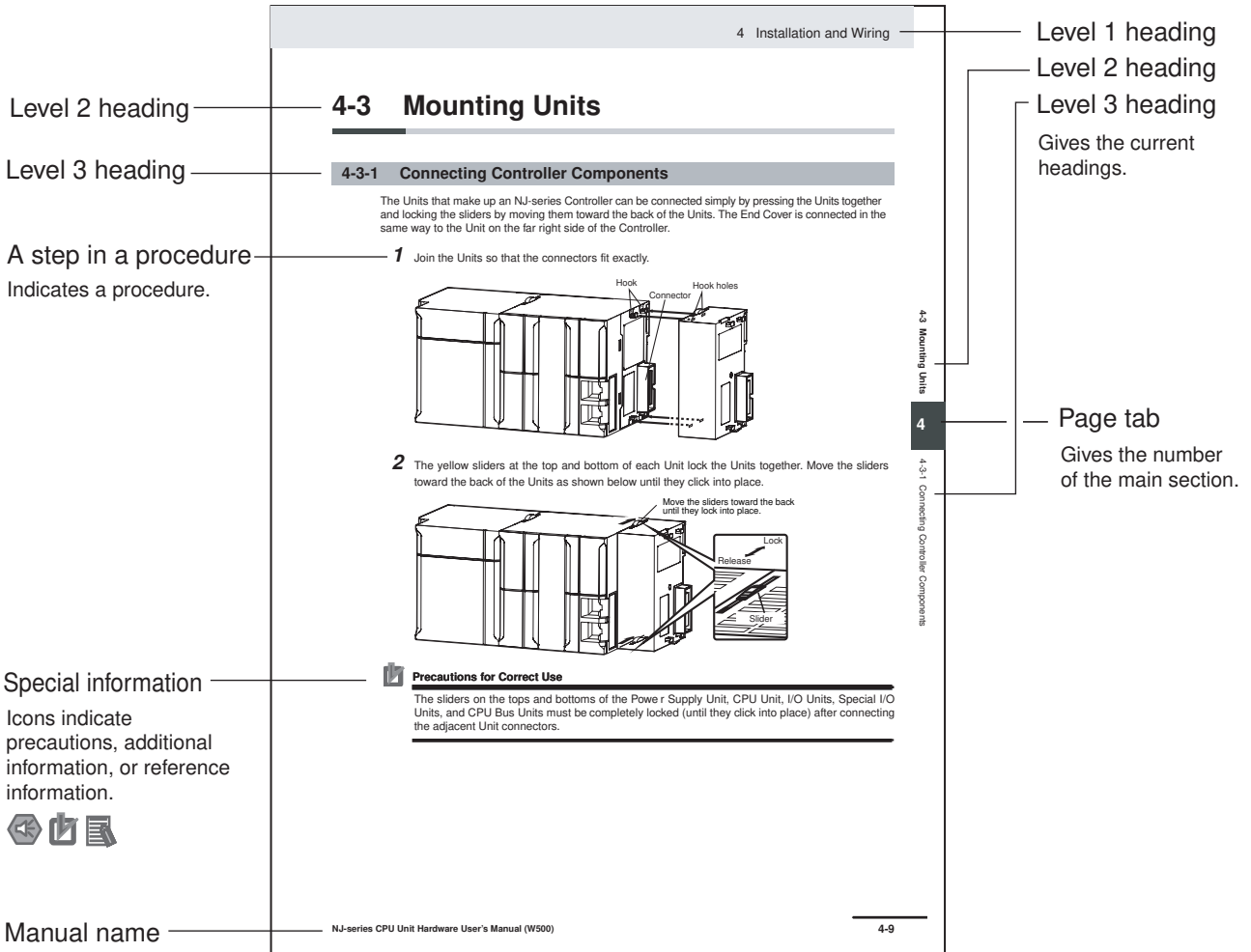
## CJ Series Analog I/O Unit Operation Manual (Cat. No. W368)

Section	Description
<b>Section 1 Overview and Feature</b>	This section presents an overview of the CS/CJ-series Analog I/O Units and outlines their features.
<b>Section 2 Individual Unit Descriptions for CS Series</b>	This section describes each of the CS-series Analog I/O Units in detail.
<b>Section 3 Individual Unit Descriptions for CJ Series</b>	This section describes each of the CJ-series Analog I/O Units in detail.
<b>Appendix</b>	---

# Manual Structure

## Page Structure

The following page structure is used in this manual.



This illustration is provided only as a sample. It may not literally appear in this manual.

## Special Information

Special information in this manual is classified as follows:



### Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.



### Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



### Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

**Note** References are provided to more detailed or related information.

## Precaution on Terminology

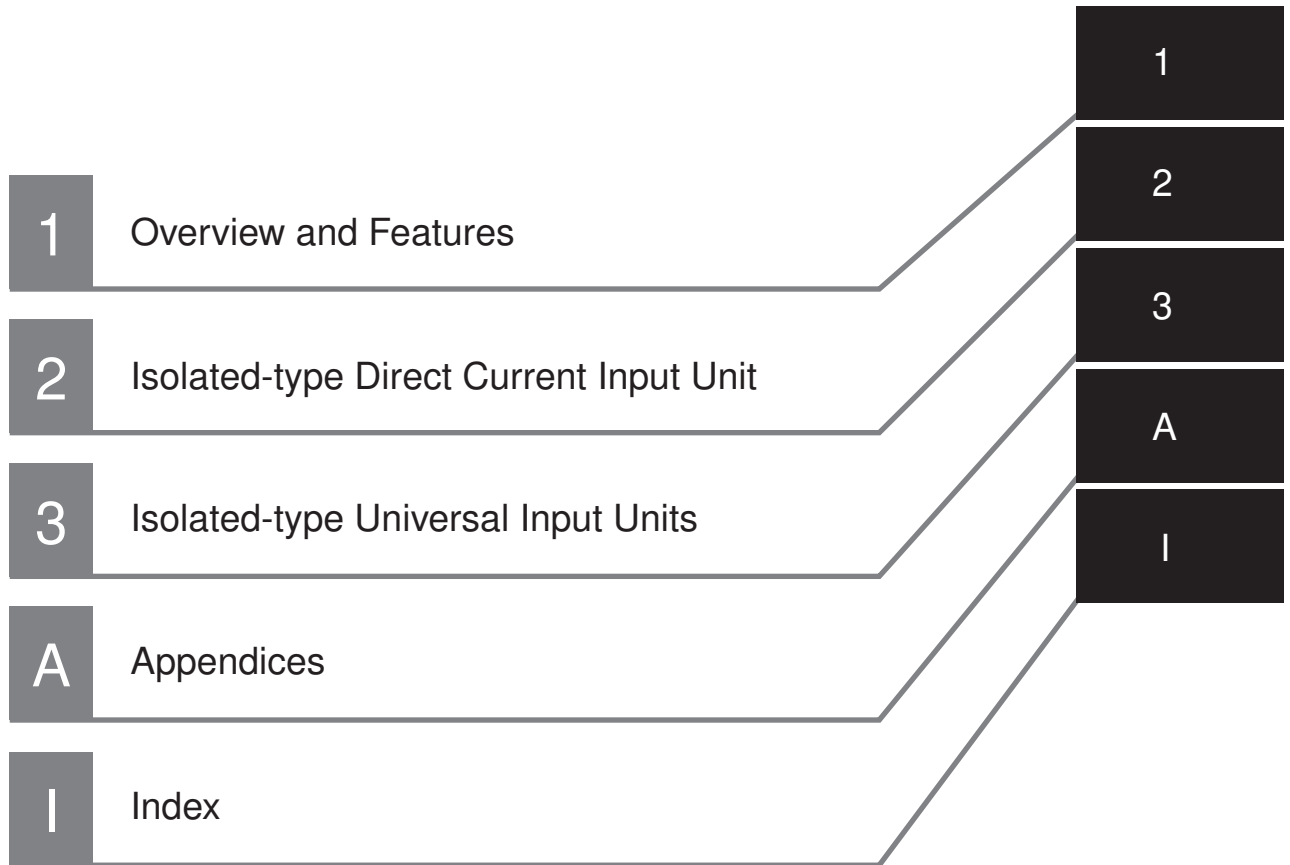
In this manual, “download” refers to transferring data from the Sysmac Studio to the physical Controller and “upload” refers to transferring data from the physical Controller to the Sysmac Studio.

For the Sysmac Studio, synchronization is used to both upload and download data. Here, “synchronize” means to automatically compare the data for the Sysmac Studio on the computer with the data in the physical Controller and transfer the data in the direction that is specified by the user.



# Sections in this Manual

---



# CONTENTS

---

<b>Introduction .....</b>	<b>1</b>
<b>Relevant Manuals .....</b>	<b>2</b>
<b>Manual Configuration .....</b>	<b>3</b>
<b>Manual Structure .....</b>	<b>5</b>
<b>Sections in this Manual .....</b>	<b>7</b>
<b>CONTENTS.....</b>	<b>8</b>
<b>Read and Understand this Manual .....</b>	<b>11</b>
<b>Safety Precautions .....</b>	<b>14</b>
<b>Precautions for Safe Use .....</b>	<b>19</b>
<b>Precautions for Correct Use.....</b>	<b>25</b>
<b>Regulations and Standards.....</b>	<b>29</b>
<b>Unit Versions .....</b>	<b>31</b>
<b>Related Manuals .....</b>	<b>33</b>
<b>Revision History .....</b>	<b>34</b>

## Section 1 Overview and Features

---

<b>1-1 Overview of Analog I/O Units .....</b>	<b>1-3</b>
<b>1-2 Features and Functions .....</b>	<b>1-5</b>
1-2-1 Isolation between Channels .....	1-5
1-2-2 Variable Input Range Setting .....	1-5
1-2-3 Process Value Scaling to Industrial Units.....	1-6
1-2-4 Offset Compensation .....	1-7
1-2-5 Process Value Alarm.....	1-7
1-2-6 Rate-of-change Calculation and Alarm .....	1-8
1-2-7 Alarm Hysteresis .....	1-9
1-2-8 Alarm ON-Delay .....	1-9
1-2-9 Mean Value Processing .....	1-10
1-2-10 Input Disconnection Detected .....	1-11
1-2-11 Input Error Detection .....	1-11
1-2-12 Cold Junction Sensor Errors Detection .....	1-12
1-2-13 Square Root Calculation .....	1-12
1-2-14 Zero/Span Adjustment .....	1-12
1-2-15 Adjustment Period Control .....	1-14
1-2-16 Peak and Bottom Detection .....	1-15
1-2-17 Top and Valley Detection.....	1-16
1-2-18 Integral Value Calculation .....	1-17
1-2-19 Cold Junction Compensation Method .....	1-17
1-2-20 Platinum Resistance Thermometers Input Compensation.....	1-17
<b>1-3 System Configuration .....</b>	<b>1-18</b>

<b>1-4</b>	<b>Specifications and Installation</b> .....	<b>1-19</b>
1-4-1	Specifications .....	1-19
1-4-2	Nomenclature and Functions .....	1-20
<b>1-5</b>	<b>Mounting the Units</b> .....	<b>1-23</b>
1-5-1	Mounting the Units (Common) .....	1-23
1-5-2	Precautions when Handling Units .....	1-25
1-5-3	Connecting Crimp Terminals .....	1-26
1-5-4	Dimensions .....	1-26
<b>1-6</b>	<b>Exchanging Data with the CPU Unit</b> .....	<b>1-27</b>
1-6-1	Exchanging Data with the CPU Unit .....	1-27
1-6-2	CJ1W-PDC15 .....	1-29
1-6-3	CJ1W-AD04U .....	1-33
1-6-4	CJ1W-PH41U .....	1-36
<b>1-7</b>	<b>Operating Procedures</b> .....	<b>1-40</b>
<b>1-8</b>	<b>Error Processing</b> .....	<b>1-42</b>
1-8-1	Errors Detected by the Analog I/O Unit .....	1-42
1-8-2	Errors Related to the CPU Unit .....	1-44
1-8-3	Event Logs .....	1-45

## Section 2 Isolated-type Direct Current Input Unit

<b>2-1</b>	<b>CJ1W-PDC15 Isolated-type Direct Current Input Unit</b> .....	<b>2-2</b>
2-1-1	Overview .....	2-2
2-1-2	System Configuration .....	2-2
2-1-3	Features .....	2-3
2-1-4	Model Information .....	2-3
2-1-5	Block Diagram (Order of Processing) .....	2-4
2-1-6	Specifications .....	2-5
2-1-7	Setting Parameters (Device Variables for CJ-series Unit) .....	2-7
2-1-8	Operation Data (Device Variables for CJ-series Unit) .....	2-9
2-1-9	Expansion Setting Parameters (User-defined Variables: <i>_sCJPDC15_Ex_Param</i> Type) .....	2-10
2-1-10	Expansion Operation Data (User-defined Variables: <i>_sCJPDC15_Ex_CmdSta</i> Type) .....	2-11
2-1-11	Terminal Connection Diagram .....	2-12
2-1-12	Terminal Block Diagram .....	2-14
2-1-13	Error Processing .....	2-14

## Section 3 Isolated-type Universal Input Units

<b>3-1</b>	<b>CJ1W-AD04U Universal Input Units</b> .....	<b>3-2</b>
3-1-1	Overview .....	3-2
3-1-2	System Configuration .....	3-2
3-1-3	Features .....	3-3
3-1-4	Model Information .....	3-3
3-1-5	Block Diagram (Order of Processing) .....	3-4
3-1-6	Specifications .....	3-5
3-1-7	Setting Parameters (Device Variables for CJ-series Unit) .....	3-8
3-1-8	Operation Data (Device Variables for CJ-series Unit) .....	3-10
3-1-9	Expansion Operation Data (User-defined Variables) .....	3-11
3-1-10	Terminal Connection Diagram .....	3-11
3-1-11	Terminal Block Diagram .....	3-12
3-1-12	Error Processing .....	3-13

<b>3-2</b>	<b>CJ1W-PH41U Isolated-type Universal Input Unit</b> .....	<b>3-14</b>
3-2-1	Overview .....	3-14
3-2-2	System Configuration.....	3-14
3-2-3	Features .....	3-15
3-2-4	Model Information .....	3-15
3-2-5	Block Diagram (Order of Processing) .....	3-16
3-2-6	Specifications .....	3-17
3-2-7	Setting Parameters (Device Variables for CJ-series Unit).....	3-25
3-2-8	Operation Data (Device Variables for CJ-series Unit) .....	3-28
3-2-9	Expansion Setting Parameters (User-defined Variables: <i>_sCJPH41U_Ex_Param</i> Type) .....	3-30
3-2-10	Expansion Operation Data (User-defined Variables: <i>_sCJPH41U_Ex_CmdSta</i> Type).....	3-32
3-2-11	Terminal Connection Diagram.....	3-33
3-2-12	Block Diagram.....	3-35
3-2-13	Error Processing .....	3-36

## Appendices

<b>A-1</b>	<b>Supplementary Explanation of Functions</b> .....	<b>A-2</b>
A-1-1	Changing Set Values during Output of Process Value Alarm or Rate-of-change Alarm.....	A-2
A-1-2	Alarm Operation when Upper Limit Is Less Than Lower Limit .....	A-3
A-1-3	Alarm Output Operation when Falling Back from Alarm Condition Before Alarm ON-Delay Time Elapses.....	A-4
A-1-4	Setting Process Value Scaling with Negative Bias.....	A-4
A-1-5	Alarm Operation during Process Value Scaling with Negative Bias.....	A-5
A-1-6	Maximum/Minimum Value for when Input Disconnection Occurs during Process Value Scaling with Negative Bias.....	A-6
A-1-7	Hysteresis during Square Root Calculations .....	A-6
A-1-8	Adjustment Period Control .....	A-7
A-1-9	Integral Value Calculation .....	A-8
<b>A-2</b>	<b>Zero/Span Adjustment Example</b> .....	<b>A-10</b>
<b>A-3</b>	<b>Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses</b> .....	<b>A-13</b>
A-3-1	CJ1W-PDC15.....	A-14
A-3-2	CJ1W-AD04U.....	A-20
A-3-3	CJ1W-PH41U.....	A-23

## Index

# Read and Understand this Manual

---

Please read and understand this manual before using the products. 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.

# Safety Precautions

---

## Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of a CJ-series Analog I/O Unit. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions. The following notation is used.



### **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.



### **Precautions for Safe Use**

Indicates precautions on what to do and what not to do to ensure safe usage of the product.



### **Precautions for Correct Use**

Indicates precautions on what to do and what not to do to ensure proper operation and performance.



## Symbols



The circle and slash symbol indicates operations that you must not do. The specific operation is shown in the circle and explained in text. This example indicates prohibiting disassembly.



The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a precaution for electric shock.



The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a general precaution.



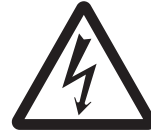
The filled circle symbol indicates operations that you must do. The specific operation is shown in the circle and explained in text. This example shows a general precaution for something that you must do.

---

 **WARNING**

**During Power Supply**

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



Do not attempt to take any Unit apart. In particular, high-voltage parts are present in the Power Supply Unit while power is supplied or immediately after power is turned OFF. Touching any of these parts may result in electric shock. There are sharp parts inside the Unit that may cause injury.



**Fail-safe Measures**

Provide safety measures in external circuits to ensure safety in the system if an abnormality occurs due to malfunction of the CPU Unit, other Units, or slaves or due to other external factors affecting operation. Not doing so may result in serious accidents due to incorrect operation.



Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.



The Controller 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 safe operation of the system.



The CPU Unit will turn OFF all outputs from Basic Output Units in the following cases. The remote I/O slaves will operate according to the settings in the slaves.

- If an error occurs in the power supply
- If the power supply connection becomes faulty
- If a CPU watchdog timer error or CPU reset occurs
- If a major fault level Controller error occurs
- While the CPU Unit is on standby until RUN mode is entered after the power is turned ON



External safety measures must be provided to ensure safe operation of the system in such cases.

If external power supplies for slaves or other devices are overloaded or short-circuited, the voltage will drop, outputs will turn OFF, and the system may be unable to read inputs. Provide external safety measures in controls with monitoring of external power supply voltage as required so that the system operates safely in such a case.



## **WARNING**

### **Fail-safe Measures**

Unintended outputs may occur when an error occurs in variable memory or in memory used for CJ-series Units. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.



Provide measures in the communications system and user program to ensure safety in the overall system even if errors or malfunctions occur in data link communications or remote I/O communications.



If there is interference in remote I/O communications or if a major fault level error occurs, output status will depend on the products that are used. Confirm the operation that will occur when there is interference in communications or a major fault level error, and implement safety measures. Correctly set all of the EtherCAT slaves.



The NJ-series Controller continues normal operation for a certain period of time when a momentary power interruption occurs. This means that the NJ-series Controller may receive incorrect signals from external devices that are also affected by the power interruption. Accordingly, take suitable actions, such as external fail-safe measures and interlock conditions, to monitor the power supply voltage of the external device as required.



You must take fail-safe measures 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 due to incorrect operation.



### **Voltage and Current Inputs**

Make sure that the voltages and currents that are input to the Units and slaves are within the specified ranges. Inputting voltages or currents that are outside of the specified ranges may cause accidents or fire.



### **Downloading**

Always confirm safety at the destination before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio. The devices or machines may perform unexpected operation regardless of the operating mode of the CPU Unit.



 **Caution**

**Application**

---

Do not touch any Unit when power is being supplied or immediately after the power supply is turned OFF. Doing so may result in burn injury.



**Wiring**

---

Be sure that all terminal screws and cable connector screws are tightened to the torque specified in the relevant manuals. The loose screws may result in fire or malfunction.



**Online Editing**

---

Execute online editing only after confirming that no adverse effects will be caused by deviations in the timing of I/O. If you perform online editing, the task execution time may exceed the task period, I/O may not be refreshed with external devices, input signals may not be read, and output timing may change.



**Using Analog I/O Units**

---

Do not connect a Relay Contact Output Unit in the same CPU Rack or Expansion Rack as the CJ1W-PH41U Isolated-type Universal Input Unit. Doing so may cause the process values to be abnormal, resulting in unexpected operation in machinery or equipment.



# Precautions for Safe Use

---

## Disassembly and Dropping

---

- Do not attempt to disassemble, repair, or modify any Units. Doing so may result in malfunction or fire.
- Do not drop any Unit or subject it to abnormal vibration or shock. Doing so may result in Unit malfunction or burning.

## Mounting

---

- The sliders on the tops and bottoms of the Power Supply Unit, CPU Unit, I/O Units, and other Units must be completely locked (until they click into place) after connecting the adjacent Unit connectors.

## Installation

---

- Always connect to a ground of 100  $\Omega$  or less when installing the Units. A ground of 100  $\Omega$  or less must be installed when shorting the GR and LG terminals on the Power Supply Unit.

## Wiring

---

- Follow the instructions in this manual to correctly perform wiring.  
Double-check all wiring and switch settings before turning ON the power supply.
- Use crimp terminals for wiring.  
Do not connect bare stranded wires directly to terminals.
- Do not pull on the cables or bend the cables beyond their natural limit.  
Do not place heavy objects on top of the cables or other wiring lines. Doing so may break the cables.
- Mount terminal blocks and connectors only after checking the mounting location carefully.
- Be sure that the terminal blocks, expansion cables, and other items with locking devices are properly locked into place.
- Always remove any dustproof labels that are on the top of the Units when they are shipped before you turn ON the power supply. If the labels are not removed, heat will accumulate and malfunctions may occur.
- Before you connect a computer to the CPU Unit, disconnect the power supply plug of the computer from the AC outlet. Also, if the computer has an FG terminal, make the connections so that the FG terminal has the same electrical potential as the GR terminal on the Power Supply Unit. A difference in electric potential between the computer and Controller may cause failure or malfunction.
- If the external power supply to an Output Unit or slave has polarity, connect it with the correct polarity. If the polarity is reversed, current may flow in the reverse direction and damage the connected devices regardless of the operation of the Controller.

## Power Supply Design

---

- Do not exceed the rated supply capacity of the Power Supply Units in the NJ-series Controller. The rated supply capacities are given in the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).  
If the capacity is exceeded, operation may stop, malfunctions may occur, or data may not be backed up normally for power interruptions.  
Use NJ-series Power Supply Units for both the NJ-series CPU Rack and Expansion Racks.  
Operation is not possible if a CJ-series Power Supply Unit is used with an NJ-series CPU Unit or an NJ-series Power Supply Unit is used with a CJ-series CPU Unit.

- Do not apply voltages or connect loads to the Output Units or slaves in excess of the maximum ratings.
- Surge current occurs when the power supply is turned ON. When selecting fuses or breakers for external circuits, consider the above precaution and allow sufficient margin in shut-off performance. Refer to the relevant manuals for surge current specifications. Refer to the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500) for surge current specifications.
- If the full dielectric strength voltage is applied or turned OFF using the switch on the tester, the generated impulse voltage may damage the Power Supply Unit. Use the adjustment on the tester to gradually increase and decrease the voltage.
- Apply the voltage between the Power Supply Unit's L1 or L2 terminal and the GR terminal when testing insulation and dielectric strength.
- Do not supply AC power from an inverter or other device with a square-wave output. Internal temperature rise may result in smoking or burning. Always input a sinusoidal wave with the frequency that is given in the *NJ-series CPU Unit Hardware User's Manual* (Cat. No. W500).
- Install external breakers and take other safety measures against short-circuiting in external wiring.

### Turning ON the Power Supply

- It takes up to approximately 10 to 20 s to enter RUN mode after the power is turned ON. During that time, outputs will be OFF or will be the values specified in the Unit or slave settings, and external communications cannot be performed. Use the RUN output on the Power Supply Unit, for example, to implement fail-safe circuits so that external devices do not operate incorrectly.
- Configure the external circuits so that the power supply to the control system turns ON only after the power supply to the Controller has turned ON. If the power supply to the Controller is turned ON after the control power supply, temporary errors may result in incorrect control system signals because the output terminals on Output Units may momentarily turn ON when power supply is turned ON to the Controller.
- If you transfer data from a backup file on an SD Memory Card to the Controller when the power supply is turned ON, properly select the data groups to transfer. If the data for an unintended data group is transferred to the Controller, it may cause the equipment to operate unpredictably.

### Actual Operation

- Check the user program, data, and parameter settings for proper execution before you use them for actual operation.

### Turning OFF the Power Supply

- Never turn OFF the power supply to the Controller when the BUSY indicator is flashing. While the BUSY indicator is lit, the user program and settings in the CPU Unit are being backed up in the built-in non-volatile memory. This data will not be backed up correctly if the power supply is turned OFF. Also, a major fault level Controller error will occur the next time you start operation, and operation will stop.
- Do not turn OFF the power supply or remove the SD Memory Card while SD Memory Card access is in progress (i.e., while the SD BUSY indicator flashes). Data may become corrupted, and the Controller will not operate correctly if it uses corrupted data. To remove the SD Memory Card from the CPU Unit while the power supply is ON, press the SD Memory Card power supply switch and wait for the SD BUSY indicator to turn OFF before you remove the SD Memory Card.
- Do not disconnect the cable or turn OFF the power supply to the Controller when downloading data or the user program from Support Software.
- Always turn OFF the power supply to the Controller before you attempt any of the following.
  - Mounting or removing I/O Units or the CPU Unit
  - Assembling the Units
  - Setting DIP switches or rotary switches

- Connecting cables or wiring the system
- Connecting or disconnecting the connectors

The Power Supply Unit may continue to supply power to the rest of the Controller for a few seconds after the power supply turns OFF. The PWR indicator is lit during this time. Confirm that the PWR indicator is not lit before you perform any of the above.

## Operation

- Confirm that no adverse effect will occur in the system before you attempt any of the following.
  - Changing the operating mode of the CPU Unit (including changing the setting of the Operating Mode at Startup)
  - Changing the user program or settings
  - Changing set values or present values
  - Forced refreshing
- Always sufficiently check the safety at the connected devices before you change the settings of an EtherCAT slave or Special Unit.
- If two different function modules are used together, such as when you use CJ-series Basic Output Units and EtherCAT slave outputs, take suitable measures in the user program and external controls to ensure that safety is maintained in the controlled system if one of the function modules stops. The relevant outputs will stop if a partial fault level error occurs in one of the function modules.
- Always confirm safety at the connected equipment before you reset Controller errors with an event level of partial fault or higher for the EtherCAT Master Function Module.  
When the error is reset, all slaves that were in any state other than Operational state due to a Controller error with an event level of partial fault or higher (in which outputs are disabled) will go to Operational state and the outputs will be enabled.  
Before you reset all errors, confirm that no Controller errors with an event level of partial fault have occurred for the EtherCAT Master Function Module.
- Always confirm safety at the connected equipment before you reset Controller errors for a CJ-series Special Unit. When a Controller error is reset, the Unit where the Controller error with an event level of observation or higher will be restarted.  
Before you reset all errors, confirm that no Controller errors with an event level of observation or higher have occurred for the CJ-series Special Unit. Observation level events do not appear on the Controller Error Tab Page, so it is possible that you may restart the CJ-series Special Unit without intending to do so.  
You can check the status of the `_CJB_UnitErrSta[0,0]` to `_CJB_UnitErrSta[3,9]` error status variables on a Watch Tab Page to see if an observation level Controller error has occurred.

## Battery Backup

- The user program and initial values for the variables are stored in non-volatile memory in the CPU Unit. The present values of variables with the Retain attribute and the values of the Holding, DM, and EM Areas in the memory used for CJ-series Units are backed up by a Battery. If the Battery is not connected or the Battery is exhausted, the CPU Unit detects a Battery-backup Memory Check Error. If that error is detected, variables with a Retain attribute are set to their initial values and the Holding, DM, and EM Areas in memory used for CJ-series Units are cleared to all zeros. Perform thorough verifications and provide sufficient measures to ensure that the devices perform safe operation for the initial values of the variables with Retain attributes and the resulting operation.

## Debugging

- Forced refreshing ignores the results of user program execution and refreshes I/O with the specified values. If forced refreshing is used for inputs for which I/O refreshing is not supported, the inputs will first take the specified values, but they will then be overwritten by the user program. This operation differs from the force-set/reset functionality of the CJ-series PLCs.

- You cannot upload or download information for forced refreshing with the Sysmac Studio. After downloading data that contains forced refreshing, change to RUN mode and then use the Sysmac Studio to perform the operation for forced refreshing. Depending on the difference in the forced status, the control system may operate unexpectedly.
- Do not specify the same address for the AT specification for more than one variable. Doing so would allow the same entity to be accessed with different variable names, which would make the user program more difficult to understand and possibly cause programming mistakes.

### General Communications

- When you use data link communications, check the error information that is given in *ErrSta* (Controller Error Status) to make sure that no error has occurred in the source device. Write the user program to use the received data only if there is no error. If there is an error in the source device, the data for the data link may contain incorrect values.
- Unexpected operation may result if inappropriate data link tables are set. Even if appropriate data link tables have been set, confirm that the controlled system will not be adversely affected before you transfer the data link tables. The data links start automatically after the data link tables are transferred.
- All CPU Bus Units are restarted when routing tables are transferred from Support Software to the CPU Unit. Confirm that the system will not be adversely affected by restarting before you transfer the routing tables.
- Tag data links will stop between related nodes while tag data link parameters are transferred during Controller operation. Confirm that the system will not be adversely affected before you transfer the tag data link parameters.

### EtherNet/IP Communications

- All related EtherNet/IP nodes are reset when you transfer settings for the built-in EtherNet/IP port (including IP addresses and tag data links settings). Confirm that the system will not be adversely affected by resetting nodes before you transfer the settings.
- If EtherNet/IP tag data links (cyclic communications) are used with a repeating hub, the communications load on the network will increase. This will increase collisions and may prevent stable communications. Do not use repeating hubs on networks where tag data links are used. Use an Ethernet switch instead.

### EtherCAT Communications

- Make sure that the communications distance, number of nodes connected, and method of connection for EtherCAT are within specifications. Do not connect EtherCAT communications to EtherNet/IP, a standard in-house LAN, or other networks. An overload may cause the network to fail or malfunction.
- Malfunctions or unexpected operation may occur for some combinations of EtherCAT revisions of the master and slaves. If you disable the revision check in the network settings, use the Sysmac Studio to check the slave revision settings in the master and the actual slave revisions, and then make sure that functionality is compatible in the slave manuals or other references. You can check the actual slave revisions from the Sysmac Studio or on slave nameplates.
- After you transfer the user program, the CPU Unit is restarted and communications with the EtherCAT slaves are cut off. During that period, the slave outputs behave according to the slave settings. The time that communications are cut off depends on the EtherCAT network configuration. If the EtherCAT network configuration contains only OMRON EtherCAT slaves, communications are cut off for a maximum of 45 seconds. Before you transfer the user program, confirm that the system will not be adversely affected.



- If the Fail-soft Operation parameter is set to stop operation, process data communications will stop for all slaves when an EtherCAT communications error is detected in a slave. For this reason, if Servo Drives are connected, the Servos for all axes will be turned OFF. Make sure that the Fail-soft Operation parameter setting results in safe operation when a device error occurs.
- EtherCAT communications are not always established immediately after the power supply is turned ON. Use the system-defined variables in the user program to confirm that communications are established before attempting control operations.
- If frames sent to EtherCAT slaves are lost due to noise or other causes, slave I/O data is not communicated, and the intended operation is sometimes not achieved. If noise countermeasures are required, use the `_EC_InDataInvalid` (Input Data Disable) system-defined variable as an interlock condition in the user program.  
Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details.  
The slave outputs behave according to the slave settings. Refer to the manuals for the slaves for details.
- When an EtherCAT slave is disconnected, communications will stop and control of the outputs will be lost not only for the disconnected slave, but for all slaves connected after it. Confirm that the system will not be adversely affected before you disconnect a slave.
- If you disconnect the cable from an EtherCAT slave to disconnect it from the network, any current communications frames may be lost. If frames are lost, slave I/O data is not communicated, and the intended operation is sometimes not achieved. Perform the following processing for a slave that needs to be replaced.
  - Program the `_EC_InDataInvalid` (Input Data Disable) system-defined variable as an interlock condition.
  - Set the Impermissible Number of Continuous Timeouts setting in the EtherCAT master to at least 2.
 Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details.

## Motion Control

- Confirm the axis number carefully before you perform an MC Test Run.
- The motor is stopped if communications are interrupted between the Sysmac Studio and the CPU Unit during an MC Test Run. Connect the communications cable between the computer and CPU Unit securely and confirm that the system will not be adversely affected before you perform an MC Test Run.
- Always execute the Save Cam Table instruction if you change any of the cam data from the user program in the CPU Unit or from the Sysmac Studio. If the cam data is not saved, the previous condition will be restored when the power is turned ON again, possibly causing unexpected machine operation.
- The positive drive prohibit input (POT), negative drive prohibit input (NOT), and home proximity input (DEC) of the Servo Drive are used by the MC Function Module as the positive limit input, negative limit input, and home proximity input. Make sure that the signal widths for all of these input signals are longer than the control period of the MC Function Module. If the input signal widths are shorter than the control period, the MC Function Module may not be able to detect the input signals, resulting in incorrect operation.

## Battery Replacement

- The Battery may leak, rupture, heat, or ignite. Never short-circuit, charge, disassemble, heat, or incinerate the Battery or subject it to strong shock.
- 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 require that only an experienced engineer replace the Battery. Make sure that an experienced engineer is in charge of Battery replacement.

- Apply power for at least five minutes before changing the Battery. Install a new Battery within five minutes (at 25°C) of turning OFF the power supply. If power is not supplied for at least 5 minutes, the saved data may be lost.

### Unit Replacement

- We recommend replacing the Battery with the power turned OFF to prevent the CPU Unit's sensitive internal components from being damaged by static electricity and to prevent malfunctions. The Battery can be replaced without turning OFF the power supply. To do so, always touch a grounded piece of metal to discharge static electricity from your body before you start the procedure. After you replace the Battery, connect the Sysmac Studio and clear the Low Battery Voltage error.
- Make sure that the required data, including the user program, configurations, settings, variables, and memory used for CJ-series Units, is transferred to a CPU Unit that was replaced and to externally connected devices before restarting operation. Be sure to include the routing tables, network parameters, and other CPU Bus Unit data, which are stored in the CPU Unit.

### Disposal

- Dispose of the product and Batteries according to local ordinances as they apply.



廢電池請回收

- The following information must be displayed for all products that contain primary lithium batteries with a perchlorate content of 6 ppb or higher when shipped to or transported through the State of California, USA.  
Perchlorate Material - special handling may apply.  
See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate).
- The CPU Unit contains a primary lithium battery with a perchlorate content of 6 ppb or higher. Place the above information on the individual boxes and shipping boxes when shipping finished products that contain a CPU Unit to the State of California, USA.

### Using Analog I/O Units

- If any one of cold junction compensating elements is disconnected, no compensation will be performed, resulting in improper temperature measurement. Do not disconnect cold junction compensating elements. (Applicable to the CJ1W-PH41U Isolated-type Universal Input Unit only)
- Each cold junction compensation element is calibrated for the individual Unit and connected circuit; do not use elements from other Units. Doing so will result in improper temperature measurement. Use elements attached at the time of product delivery. (Applicable to the CJ1W-PH41U Isolated-type Universal Input Unit only)
- If the external 24-V power supply for the CJ1W-PDC15 drops below the specified voltage range, the Power Supply Flag will turn OFF, the Sensor Error Flag will turn ON, and the conversion data will be fixed at the upper limit or lower limit values. Prevent this effect on the control system operation by using these flags in the input data read conditions or implement other measures in the user program. When using the CJ1W-PDC15, make sure that the external 24-VDC power supply is isolated.

# Precautions for Correct Use

---

## Storage, Mounting, and Wiring

---

- Do not operate or store the Controller in the following locations. Operation may stop or malfunctions may occur.
  - 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
- Take appropriate and sufficient countermeasures when installing the Controller in the following locations.
  - Locations subject to strong, high-frequency noise
  - 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 lines
- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up.
- Install the Controller away from sources of heat and ensure proper ventilation. Not doing so may result in malfunction, in operation stopping, or in burning.
- An I/O bus check error will occur and the Controller will stop if an I/O Connecting Cable's connector is disconnected from the Rack. Be sure that the connectors are secure.
- Do not allow foreign matter to enter the openings in the Unit. Doing so may result in Unit burning, electric shock, or failure.
- 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.
- For EtherCAT and EtherNet/IP, use the connection methods and cables that are specified in the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) and the *NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual* (Cat. No. W506). Otherwise, communications may be faulty.
- Use the rated power supply voltage for the Power Supply Units. Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied in places where the power supply is unstable.
- Make sure that the current capacity of the wire is sufficient. Otherwise, excessive heat may be generated. When cross-wiring terminals, the total current for all the terminals will flow in the wire. When wiring cross-overs, make sure that the current capacity of each of the wires is not exceeded.
- Do not touch the terminals on the Power Supply Unit immediately after turning OFF the power supply. Residual voltage may cause electrical shock.
- If you use reed switches for the input contacts for AC Input Units, use switches with a current capacity of 1 A or greater.  
If the capacity of the reed switches is too low, surge current may fuse the contacts.

## Error Processing

- In applications that use the results of instructions that read the error status, consider the affect on the system when errors are detected and program error processing accordingly. For example, even the detection of a minor error, such as Battery replacement during operation, can affect the system depending on how the user program is written.
- If you change the event level of a Controller error, the output status when the error occurs may also change. Confirm safety before you change an event level.

## Restoring and Automatically Transferring Data

- When you edit the restore command file or the automatic transfer command file, do not change anything in the file except for the “yes” and “no” specifications for the selectable data groups. If you change anything else in the file, the Controller may perform unexpected operation when you restore or automatically transfer the data.

## Unit Replacement

- If you replace a CPU Bus Unit or Special I/O Unit, refer to operation manual for the Unit for information on the data required for individual Units and redo the necessary settings.
- The absolute encoder home offset is backed up with a Battery in the CPU Unit.  
When you change the combination of the CPU Unit and Servomotor, e.g., when you add or replace a Servomotor, define home again.  
To restore the information without changing the CPU Unit-Servomotor combination, remove the absolute encoder home offset from the data to restore.

## Task Settings

- If a Task Period Exceeded error occurs, shorten the programs to fit in the task period or increase the setting of the task period.

## Motion Control

- Use the system-defined variable in the user program to confirm that EtherCAT communications are established before you attempt to execute motion control instructions. Motion control instructions are not executed normally if EtherCAT communications are not established.
- Use the system-defined variables to monitor for errors in communications with the slaves that are controlled by the motion control function module. Motion control instructions are not executed normally if an error occur in slave communications.
- Before you start an MC Test Run, make sure that the operation parameters are set correctly.
- Do not download motion control settings during an MC Test Run.

## EtherCAT Communications

- Do not disconnect the EtherCAT slave cables during operation. The outputs will become unstable.
- Set the Servo Drives to stop operation if an error occurs in EtherCAT communications between the Controller and a Servo Drive.
- Make sure that all of the slaves to be restored are participating in the network before you reset a Network Configuration Verification Error, Process Data Communications Error, or Link OFF Error in the EtherCAT Master Function Module. If any slave is not participating when any of these errors is reset, the EtherCAT Master Function Module may access slave with a different node address than the specified node address or the error may not be reset correctly.

## Battery Replacement

---

- Be sure to install a replacement Battery within two years of the production date shown on the Battery label.
- Turn ON the power after replacing the Battery for a CPU Unit that has been unused for a long time. Leaving the CPU Unit unused again without turning ON the power even once after the Battery is replaced may result in a shorter Battery life.
- When you replace the Battery, use the CJ1W-BAT01 Battery Set.

## **SD Memory Cards**

---

- Insert the SD Memory Card all the way.
- Do not turn OFF the power supply to the Controller during SD Memory Card access. The files may be corrupted.  
If there is a corrupted file in the SD Memory Card, the file is automatically deleted by the restoration function when the power supply is turned ON.

# Regulations and Standards

## Conformance to EC Directives

### Applicable Directives

- EMC Directives
- Low Voltage Directive

### Concepts

#### ● EMC Directive

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.\*

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.

\* Applicable EMC (Electromagnetic Compatibility) standards are as follows:

EMS (Electromagnetic Susceptibility): EN 61131-2 and EN 61000-6-2

EMI (Electromagnetic Interference): EN 61131-2 and EN 61000-6-4 (Radiated emission: 10-m regulations)

#### ● Low Voltage Directive

Always ensure that devices operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC meet the required safety standards. The applicable directive is EN 61131-2.

#### ● Conformance to EC Directives

The NJ-series Controllers comply with EC Directives. To ensure that the machine or device in which the NJ-series Controller is used complies with EC Directives, the Controller must be installed as follows:

- The NJ-series Controller must be installed within a control panel.
- You must use reinforced insulation or double insulation for the DC power supplies connected to DC Power Supply Units and I/O Units.
- NJ-series Controllers that comply with EC Directives also conform to the Common Emission Standard (EN 61000-6-4). 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.

### Conditions for Complying with EC Directives

The following condition was used in the immunity test of the CJ1W-PDC15 and CJ1W-PH41U Analog I/O Units.

- Standard accuracy:  $\pm 5\%$

## Conformance to Shipbuilding Standards

The NJ-series Controllers comply with the following shipbuilding standards. Applicability to the shipbuilding standards is based on certain usage conditions. It may not be possible to use the product in some locations. Contact your OMRON representative before attempting to use a Controller on a ship.


### Usage Conditions for NK and LR Shipbuilding Standards

- The NJ-series Controller must be installed within a control panel.
- Gaps in the door to the control panel must be completely filled or covered with gaskets or other material.
- The following noise filter must be connected to the power supply line.

#### Noise Filter

Manufacturer	Model
Cosel Co., Ltd.	TAH-06-683

## Trademarks

- Sysmac and SYSMAC are trademarks or registered trademarks of OMRON Corporation in Japan and other countries for OMRON factory automation products.
- Windows, Windows 98, Windows XP, Windows Vista, and Windows 7 are registered trademarks of Microsoft Corporation in the USA and other countries.
- EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- The SD logo is a trademark of SD-3C, LLC. 

Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.



# Unit Versions

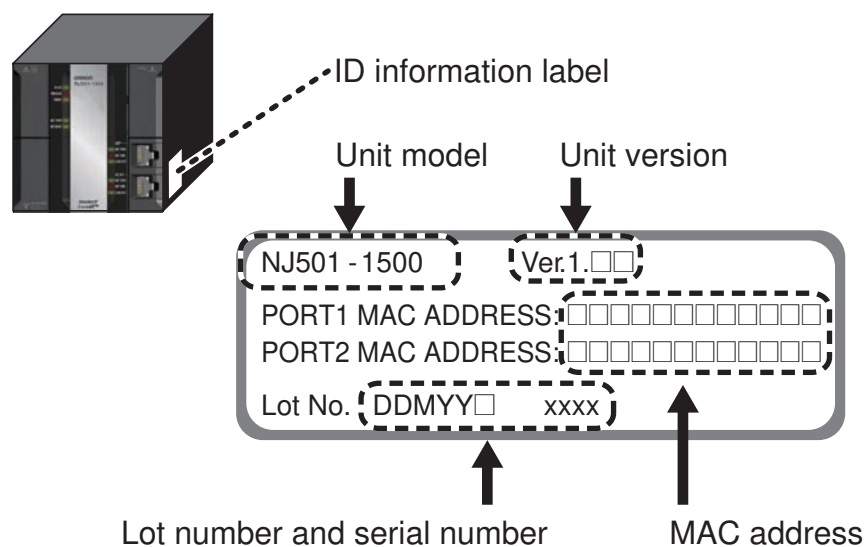
## Unit Versions

A “unit version” has been introduced to manage CPU Units in the NJ Series according to differences in functionality accompanying Unit upgrades.

### Notation of Unit Versions on Products

The unit version is given on the ID information label of the products for which unit versions are managed, as shown below.

Example for NJ-series NJ501-□□□□ CPU Unit:



The following information is provided on the ID information label.

Item	Description
Unit model	Gives the model of the Unit.
Unit version	Gives the unit version of the Unit.
Lot number and serial number	Gives the lot number and serial number of the Unit. DDMY□ □: Lot number, □: For use by OMRON, xxxx: Serial number “M” gives the month (1 to 9: January to September, X: October, Y: November, Z: December)
MAC address	Gives the MAC address of the built-in port on the Unit.

### Confirming Unit Versions with Sysmac Studio

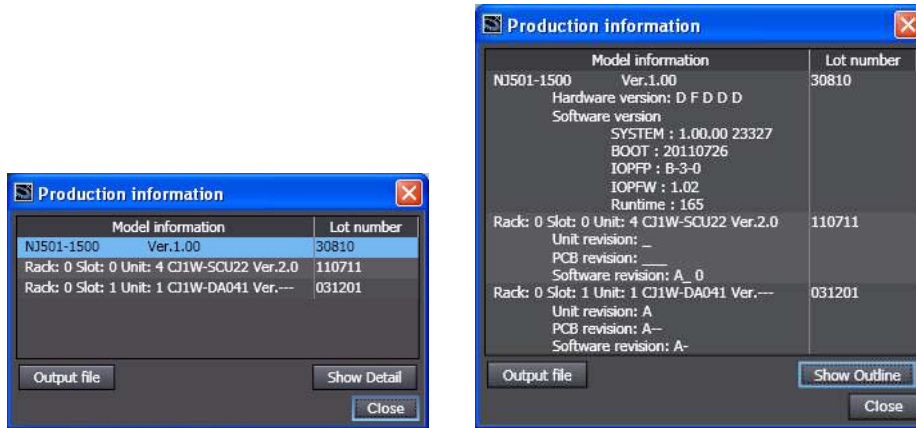
You can use the Unit Production Information on the Sysmac Studio to check the unit version of the CPU Unit, CJ-series Special I/O Units, CJ-series CPU Bus Units, and EtherCAT slaves. The unit versions of CJ-series Basic I/O Units cannot be checked from the Sysmac Studio.

#### ● CPU Unit and CJ-series Units

- 1 Double-click **CPU/Expansion Racks** under **Configurations and Setup** in the Multiview Explorer. Or, right-click **CPU/Expansion Racks** under **Configurations and Setup** and select **Edit** from the menu.

The Unit Editor is displayed for the Controller Configurations and Setup layer.

- Right-click any open space in the Unit Editor and select **Production Information**.  
The Production Information Dialog Box is displayed.



Simple Display

Detailed Display

In this example, "Ver.1.00" is displayed next to the unit model.

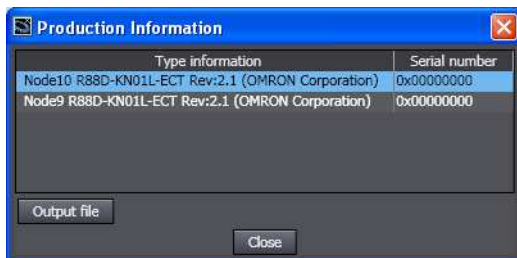
The following items are displayed.

CPU Unit	CJ-series Units
Unit model	Unit model
Unit version	Unit version
Lot number	Lot number
	Rack number, slot number, and unit number

● **EtherCAT Slaves**

- Double-click **EtherCAT** under **Configurations and Setup** in the Multiview Explorer. Or, right-click **EtherCAT** under **Configurations and Setup** and select **Edit** from the menu.  
The EtherCAT Configuration Tab Page is displayed for the Controller Configurations and Setup layer.
- Right-click the master in the EtherCAT Configurations Editing Pane and select **Display Production Information**.

The Production Information Dialog Box is displayed.



The following items are displayed.

- Node address
- Type information\*
- Serial number

\* If the model number cannot be determined (such as when there is no ESI file), the vendor ID, product code, and revision number are displayed.

# Related Manuals

The following manuals are related to the NJ-series Controllers. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NJ-series CPU Unit Hardware User's Manual	W500	NJ501-□□□□ NJ301-□□□□	Learning the basic specifications of the NJ-series CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NJ-series system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul> Use this manual together with the <i>NJ-series CPU Unit Software User's Manual</i> (Cat. No. W501).
NJ-series CPU Unit Software User's Manual	W501	NJ501-□□□□ NJ301-□□□□	Learning how to program and set up an NJ-series CPU Unit. Mainly software information is provided.	The following information is provided on a Controller built with an NJ501 CPU Unit. <ul style="list-style-type: none"> <li>• CPU Unit operation</li> <li>• CPU Unit features</li> <li>• Initial settings</li> <li>• Programming based on IEC 61131-3 language specifications</li> </ul> Use this manual together with the <i>NJ-series CPU Unit Hardware User's Manual</i> (Cat. No. W500).
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC-SE2□□□	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.
CJ-series Analog I/O Units Operation Manual for NJ-series CPU Unit (This manual)	W498	CJ1W-PDC15 CJ1W-AD04U CJ1W-PH41U	Learning about the functions and operating procedures when CJ-series Analog I/O Unit is used in the NJ Series system configuration.	The functions and operating procedures when CJ-series Analog I/O Unit is used in the NJ Series system configuration are described.
CJ-series Analog I/O Unit Operation Manual	W368	CJ1W-PTS□□ CJ1W-PDC□□ CJ1W-AD04U CJ1W-PH41U	Learning about the functions and operating procedures for the CJ-series Analog I/O Unit Operation Manual.	The functions and operating procedures when CJ-series Analog I/O Unit is used in the CJ-series system configuration are described.

# Revision History

---

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.

**Cat. No. W498-E1-03**

↑  
Revision code

Revision code	Date	Revised content
01	July 2011	Original production
02	March 2012	Corrected errors.
03	August 2012	Made changes accompanying release of unit version 1.03 of the CPU Unit.

# 1

## Overview and Features

This section presents an overview of the CJ-series Analog I/O Units and outlines their features.

---

<b>1-1</b>	<b>Overview of Analog I/O Units</b>	<b>1-3</b>
<b>1-2</b>	<b>Features and Functions</b>	<b>1-5</b>
1-2-1	Isolation between Channels	1-5
1-2-2	Variable Input Range Setting	1-5
1-2-3	Process Value Scaling to Industrial Units	1-6
1-2-4	Offset Compensation	1-7
1-2-5	Process Value Alarm	1-7
1-2-6	Rate-of-change Calculation and Alarm	1-8
1-2-7	Alarm Hysteresis	1-9
1-2-8	Alarm ON-Delay	1-9
1-2-9	Mean Value Processing	1-10
1-2-10	Input Disconnection Detected	1-11
1-2-11	Input Error Detection	1-11
1-2-12	Cold Junction Sensor Errors Detection	1-12
1-2-13	Square Root Calculation	1-12
1-2-14	Zero/Span Adjustment	1-12
1-2-15	Adjustment Period Control	1-14
1-2-16	Peak and Bottom Detection	1-15
1-2-17	Top and Valley Detection	1-16
1-2-18	Integral Value Calculation	1-17
1-2-19	Cold Junction Compensation Method	1-17
1-2-20	Platinum Resistance Thermometers Input Compensation	1-17
<b>1-3</b>	<b>System Configuration</b>	<b>1-18</b>
<b>1-4</b>	<b>Specifications and Installation</b>	<b>1-19</b>
1-4-1	Specifications	1-19
1-4-2	Nomenclature and Functions	1-20
<b>1-5</b>	<b>Mounting the Units</b>	<b>1-23</b>
1-5-1	Mounting the Units (Common)	1-23
1-5-2	Precautions when Handling Units	1-25
1-5-3	Connecting Crimp Terminals	1-26
1-5-4	Dimensions	1-26

- 1-6 Exchanging Data with the CPU Unit . . . . . 1-27**
  - 1-6-1 Exchanging Data with the CPU Unit . . . . . 1-27
  - 1-6-2 CJ1W-PDC15 . . . . . 1-29
  - 1-6-3 CJ1W-AD04U . . . . . 1-33
  - 1-6-4 CJ1W-PH41U . . . . . 1-36
- 1-7 Operating Procedures . . . . . 1-40**
- 1-8 Error Processing . . . . . 1-42**
  - 1-8-1 Errors Detected by the Analog I/O Unit . . . . . 1-42
  - 1-8-2 Errors Related to the CPU Unit . . . . . 1-44
  - 1-8-3 Event Logs . . . . . 1-45

# 1-1 Overview of Analog I/O Units

The CJ Series includes two types of Analog I/O Units available in three models as shown in the following table.

Name	Model	I/O type	Number of I/O	Resolution	Conversion cycle	Field I/O isolation	Main functions
Isolated-type Direct Current Input Unit	CJ1W-PDC15	<ul style="list-style-type: none"> <li>DC voltage 0 to 1.25 V, -1.25 to +1.25 V, 0 to 5 V, 1 to 5 V, -5 to +5 V, 0 to 10 V, -10 to +10 V, ±10 V user set range</li> <li>DC current 0 to 20 mA 4 to 20 mA</li> </ul>	2 inputs	1/64000	10 ms/ 2 inputs	All inputs are isolated.	<ul style="list-style-type: none"> <li>Variable input range setting</li> <li>Process value scaling</li> <li>Square root calculation</li> <li>Mean value processing</li> <li>Rate-of-change calculation and alarm</li> <li>Alarm ON-delay</li> <li>Input error detection</li> <li>Adjustment period control</li> <li>Peak and bottom value detection</li> <li>Top and valley detection</li> <li>Zero/span adjustment</li> <li>Integral value calculation</li> <li>External 24-VDC power supply</li> </ul>

Name	Model	I/O type	Number of I/O	Resolution	Conversion cycle	Field I/O isolation	Main functions
Isolated-type Universal Input Unit	CJ1W-AD04U	<ul style="list-style-type: none"> <li>Resistance thermometer: Pt100, Pt1000, JPt100</li> <li>Thermocouple: K, J, T, L, R, S, B</li> <li>DC voltage: 1 to 5 V, 0 to 5 V, 0 to 10 V</li> <li>DC current: 0 to 20 mA, 4 to 20 mA</li> </ul>	4 inputs	1/12,000	250 ms/4 inputs	All inputs are isolated.	<ul style="list-style-type: none"> <li>Process value scaling (voltage/current input only)</li> <li>Process value alarm</li> <li>Alarm hysteresis</li> <li>Alarm ON-delay</li> <li>Input error detection</li> <li>Zero/span adjustment</li> <li>Cold junction sensor errors detection</li> </ul>
	CJ1W-PH41U	<ul style="list-style-type: none"> <li>Resistance thermometer: Pt100 (3-wire), JPt100, Pt1000, Pt100 (4-wire)</li> <li>Thermocouple K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII</li> <li>DC voltage: 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, <math>\pm 100</math> mV, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V</li> <li>DC current: 0 to 20 mA, 4 to 20 mA</li> <li>Potentiometer</li> </ul>	4 inputs	Select from the following three modes: Mode 1: Resolution: 1/256,000 Conversion cycle: 60 ms/4 inputs Mode 2: Resolution: 1/64,000 Conversion cycle: 10 ms/4 inputs Mode 3: Resolution: 1/16,000 Conversion cycle: 5 ms/4 inputs	All inputs are isolated.	<ul style="list-style-type: none"> <li>Variable input range setting</li> <li>Process value scaling</li> <li>Offset compensation</li> <li>Process value alarm</li> <li>Rate-of-change calculation and alarm</li> <li>Alarm ON/OFF delay</li> <li>Square root calculation</li> <li>Mean value processing</li> <li>Input error detection</li> <li>Adjustment period control</li> <li>Peak and bottom value detection</li> <li>Top and valley detection</li> <li>Zero/span adjustment</li> <li>Integral value calculation</li> </ul>	

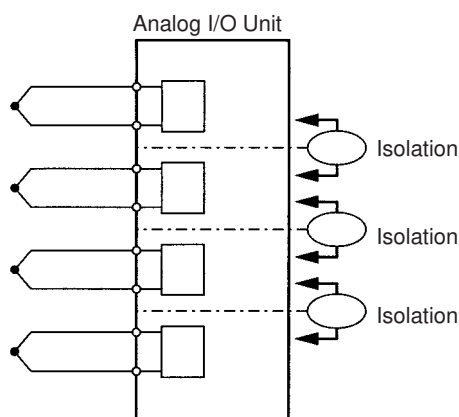


# 1-2 Features and Functions

## 1-2-1 Isolation between Channels

The Analog I/O Units listed below have isolation between inputs. Therefore sneak circuits do not occur between thermocouples or between the power supply's common voltage inputs, so there is no need to utilize a signal converter to prevent sneak circuits.

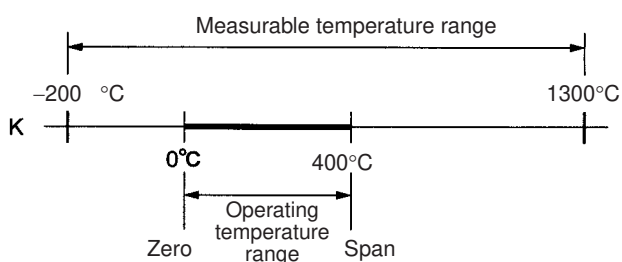
Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U, CJ1W-PH41U



## 1-2-2 Variable Input Range Setting

For the Analog I/O Units listed below, the input range can be set by the user according to the application. This function applies to the following Units:

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U

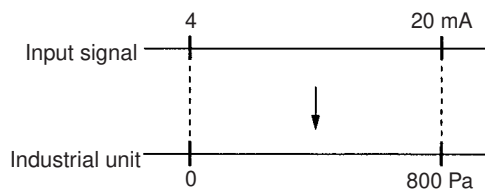


### 1-2-3 Process Value Scaling to Industrial Units

This function takes the value scaled to industrial units with respect to the input signal's zero point and span point, and outputs it to the CPU Unit as the process value. Because of this, no user program is required at the CPU Unit for scaling.

It also possible to set the process value scaling zero/span point in reverse to create an inverse relationship.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U (voltage/current input) CJ1W-PH41U

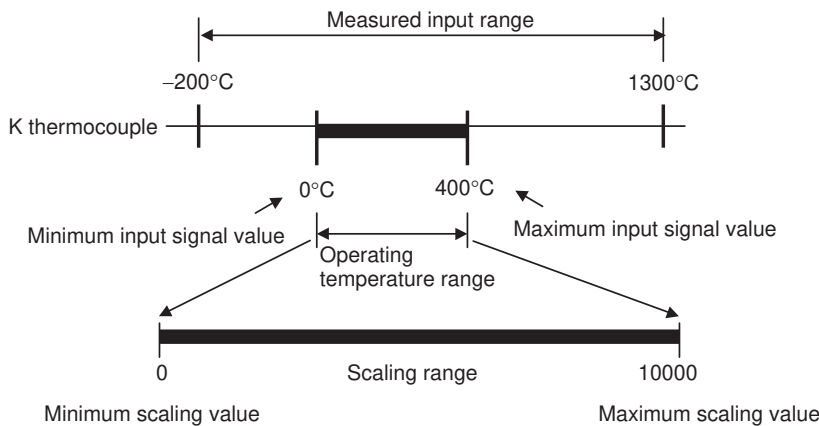


#### ● CJ1W-PDC15, PH41U

With the CJ1W-PDC15/-PH41U, the input range for thermocouple inputs, and platinum-resistance thermometer inputs, or the user-set range for DC inputs can be set directly, and scaling can be set for the range in industrial units. This eliminates the need for processing scaling in the user program.

It also possible to set the process value scaling zero/span points in reverse to create an inverse relationship.

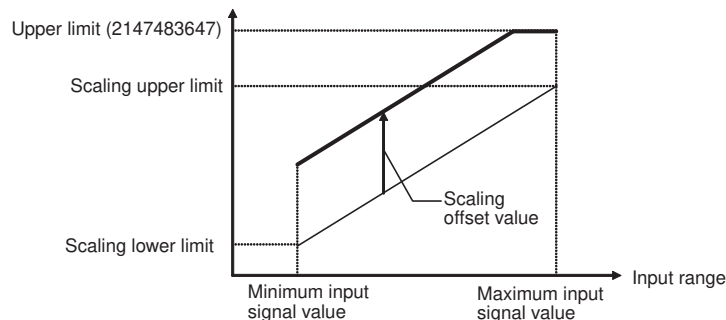
With the CJ1W-PH41U, potentiometer input scaling is also possible.



### 1-2-4 Offset Compensation

Offset compensation is possible for process value errors. The amount of the error is added to the process value.

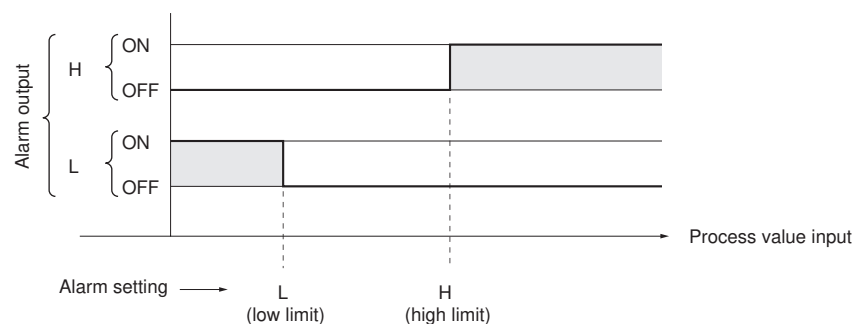
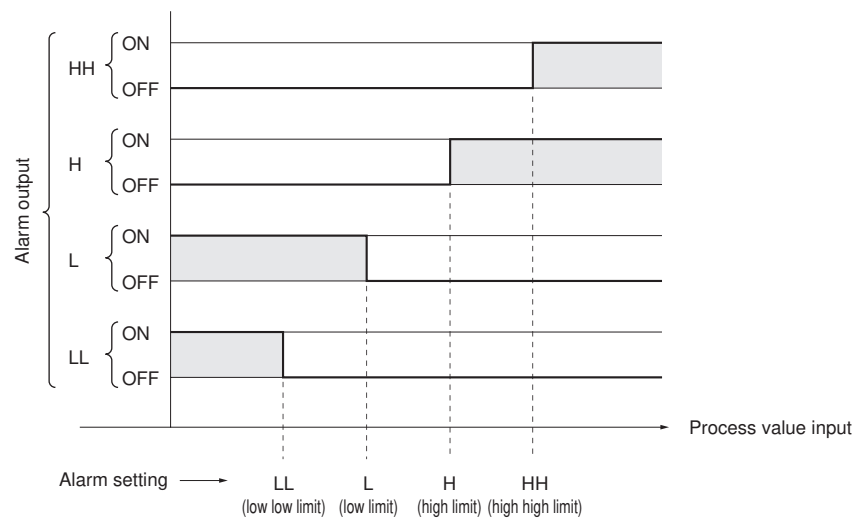
Applicable Units	Isolated-type Universal Input Unit	CJ1W-PH41U
------------------	------------------------------------	------------



### 1-2-5 Process Value Alarm

Either a 2-point alarm (H and L limits) or a 4-point alarm (HH, H, L, and LL limits) is possible for the process value.

Applicable Units	4-point alarm	Isolated-type Direct Current Input Unit	CJ1W-PDC15
		Isolated-type Universal Input Unit	CJ1W-PH41U
	2-point alarm	Isolated-type Universal Input Unit	CJ1W-AD04U

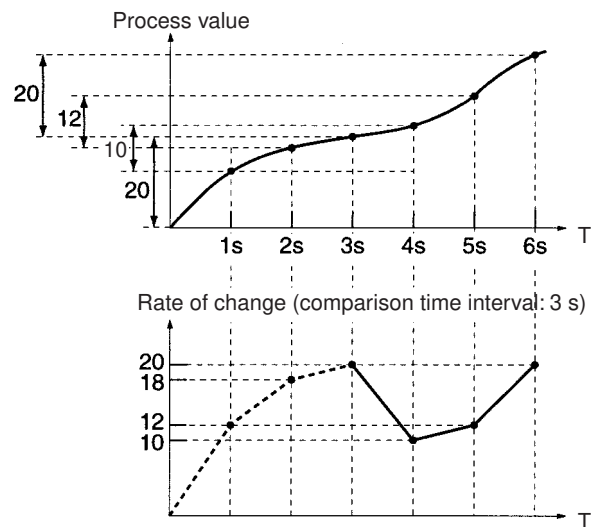
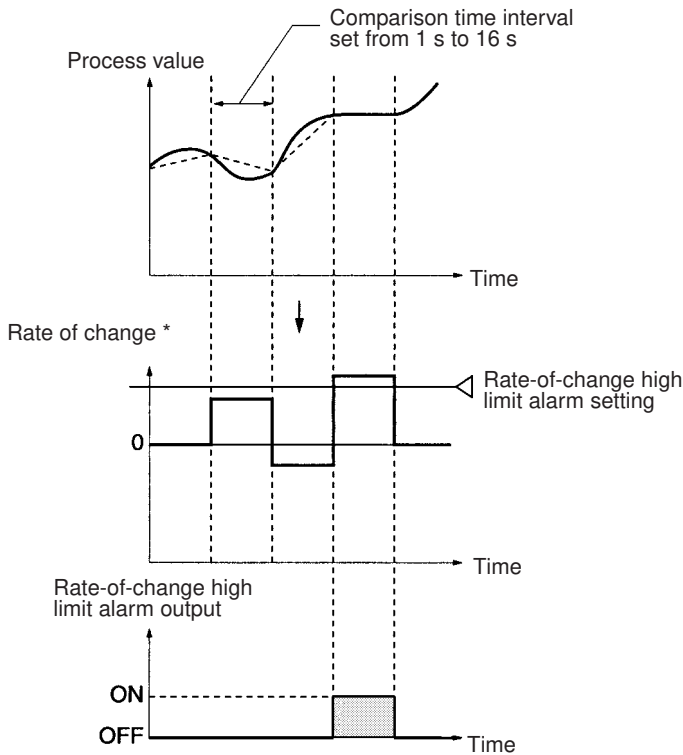


### 1-2-6 Rate-of-change Calculation and Alarm

The Analog I/O Units listed below calculate the rate of change for the process value, and output an alarm when the high or low limit is exceeded. The rate-of-change value is derived by taking the difference each second between the process value at that time and the process value before the comparison time interval \*1. The comparison time interval can be set from 1 to 16 seconds \*2. This allows even a small process value rate of change to be detected.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U

- \*1 With the CJ1W-PH41U, a setting can be made to enable calculating the rate of change each conversion cycle.
- \*2 The following comparison time interval is applied when the CJ1W-PH41U is set to calculate the rate of change each conversion cycle.  
 When the conversion cycle is 60 ms: 60 to 960 ms  
 When the conversion cycle is 10 ms: 10 to 160 ms  
 When the conversion cycle is 5 ms: 5 to 80 ms

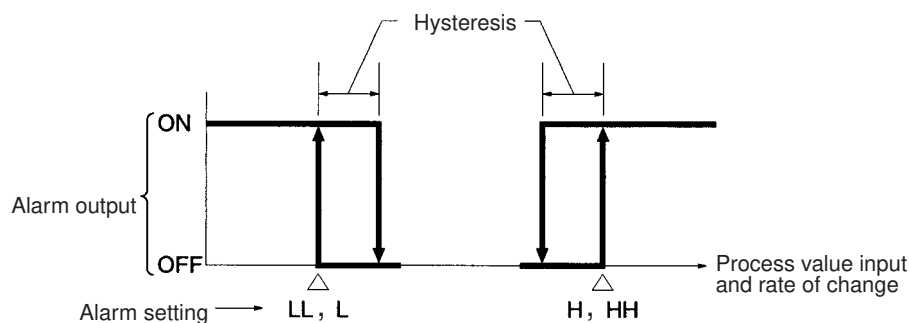


\* The rate-of-change value is derived by taking the difference each second between the process value at that time and the process value before the comparison time interval, rather than the difference calculated at each comparison time interval. This allows even a very small process value change to be detected.

### 1-2-7 Alarm Hysteresis

An hysteresis can be set for the process value alarm and the rate-of-change alarm. The operation is as shown in the following diagram.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U



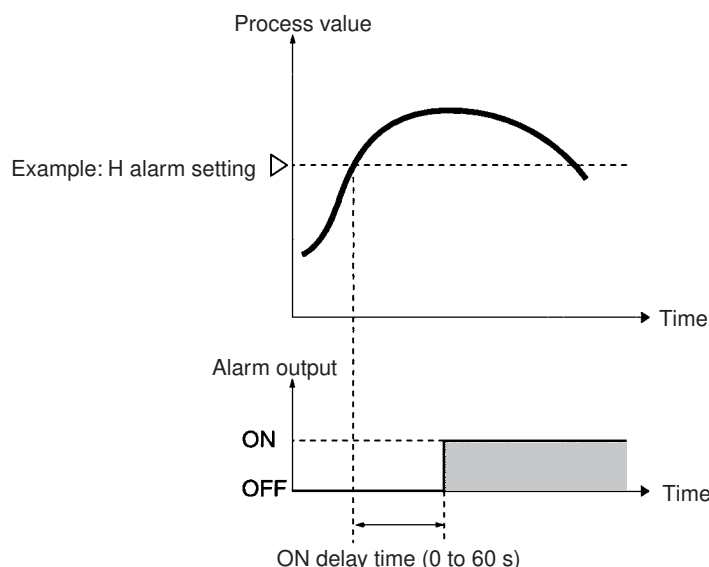
### 1-2-8 Alarm ON-Delay

#### ● ON-delay Outputs

This function can be used to set a given time period (0 to 60 s) for delaying the turning ON of the alarm after the process value alarm status or the alarm setting is reached.

One alarm ON-delay is set for each input. The same setting is used for all process value alarms (HH, H, L, LL) and rate-of-change alarms (H, L).

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U

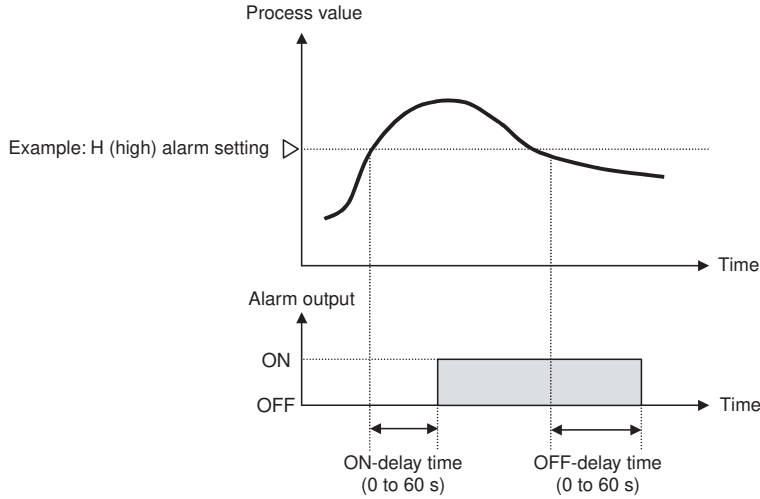


● OFF-delay Outputs

This function makes it possible to turn OFF the alarm signal after a set time period (0 to 60 s) has elapsed after alarm status is cleared, rather than having the alarm turned OFF immediately.

An alarm OFF-delay time can be set for each input. The process value alarms (HH, H, L, LL) and rate-of-change alarms (H, L) will all use the same OFF-delay time.

Applicable Units	Isolated-type Universal Input Unit	CJ1W-PH41U
------------------	------------------------------------	------------

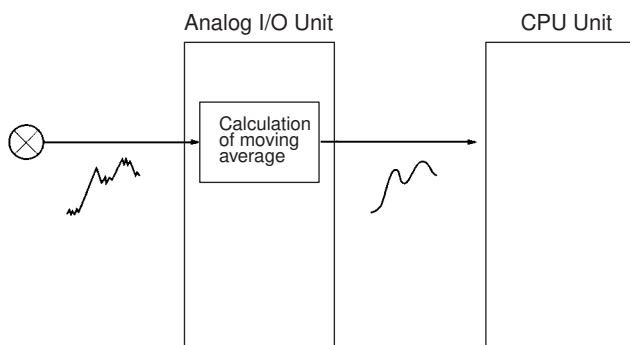


**1-2-9 Mean Value Processing**

The moving average of a specified number (from 1 to 128) of past process values can be calculated and stored as the process value.

An input noise filter can be installed if erroneous process values are obtained due to noise, or if the system has sudden voltage or current fluctuations.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U



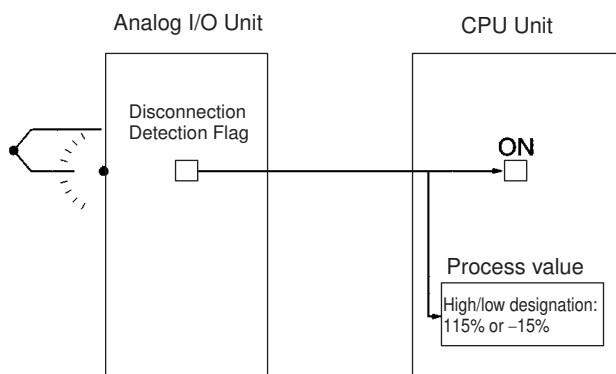
### 1-2-10 Input Disconnection Detected

Sensor disconnections can be detected for thermocouple input and resistance thermometer input.

When a disconnection occurs, Input Error in the Operation Data becomes 1.

Either the high (115%) or low (-15%) direction can be specified for when a disconnection is detected.

Applicable Units	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U
------------------	-------------------------------------	--------------------------



The following applies for the CJ1W-AD04U.

- Temperature input  
High: Upper limit of temperature input range +20°C or +20°F  
Low: Lower limit of temperature input range -20°C or -20°F
- Voltage/current input (limited to input of 1 to 5 V and 4 to 20 mA)  
High: 105%  
Low: -5%

### 1-2-11 Input Error Detection

An errors resulting from exceeding the high or low limits can be detected.

When an input error occurs, Input Error in the Operation Data becomes 1.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U

An input error will be detected for CJ1W-PDC15 only when an external power supply is used and only in a range of 4 to 20 mA and 1 to 5 V.

When an external power supply is not used, Input Error in the Operation Data becomes 1.

The following applies for the CJ1W-AD04U.

With thermocouple and platinum resistance thermometer inputs, an input error is detected if the temperature exceeds the high or low limit of the sensor range by 20°C or 20°F.

With voltage and current inputs, an error is detected only for the following values in the 1 to 5 V and 4 to 20 mA ranges:

- 1 to 5 V range: Converted AD value < 0.3 V
- 4 to 20 mA range: Converted AD value < 1.2 mA

### 1-2-12 Cold Junction Sensor Errors Detection

If a Universal Input Unit cold junction sensor is disconnected, if a short-circuit occurs, or if an error occurs at the cold junction sensor, Cold Junction Sensor Error in the Operation Data is set to 1 and the temperature process value with no cold junction compensation is stored.

There are four cold junction sensors built in for the CJ1W-AD04U and one mounted on the terminal-block for the CJ1W-PH41U.

Applicable Units	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U
------------------	-------------------------------------	--------------------------

### 1-2-13 Square Root Calculation

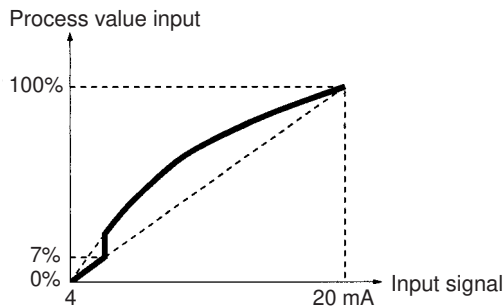
For direct current input, this function takes as the process value the square root of the analog input value. It is used for operations such as calculating momentary flow based on the differential pressure input from a differential pressure transmitter.

With linear characteristics at an output of approximately 7% or less, an on-site differential pressure transmitter's zero-point adjustment can be performed with this function enabled.

The square root calculation function is enabled only when the maximum scaling value is greater than the minimum scaling value. Square root calculation will not be possible if the minimum scaling value is greater.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U *

\* Enabled for DC input only.



### 1-2-14 Zero/Span Adjustment

The zero point and span point can be adjusted for a process value.

The zero adjustment offsets the line plotting values before and after adjustment parallel to the original line. The span adjustment changes the slope of the line (i.e., the gain) around the minimum value in the range (i.e., the minimum value is not changed). The zero adjustment value and span adjustment gain value are set in Zero Adjustment Value and Gain for Span Adjustment in the setting parameters. These settings are refreshed during operation in real-time, so the values can be adjusted under normal operating conditions.

Also, with the CJ1W-PDC15/-PH41U, the zero point and span point can be adjusted for a specified point (position) other than 0% or 100%.

The zero adjustment value and span adjustment gain value for specified points are set in Zero Adjustment Position and Span Adjustment Position in the expansion setting parameters.

Refer to A-2 Zero/Span Adjustment Example for details.

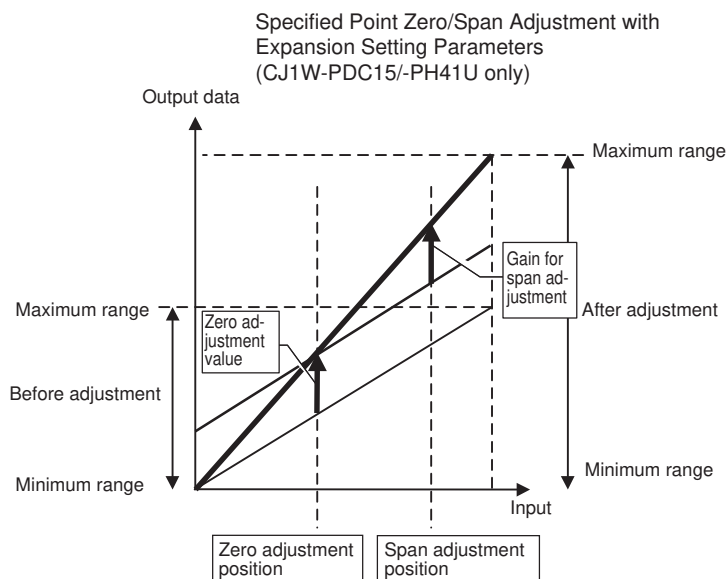
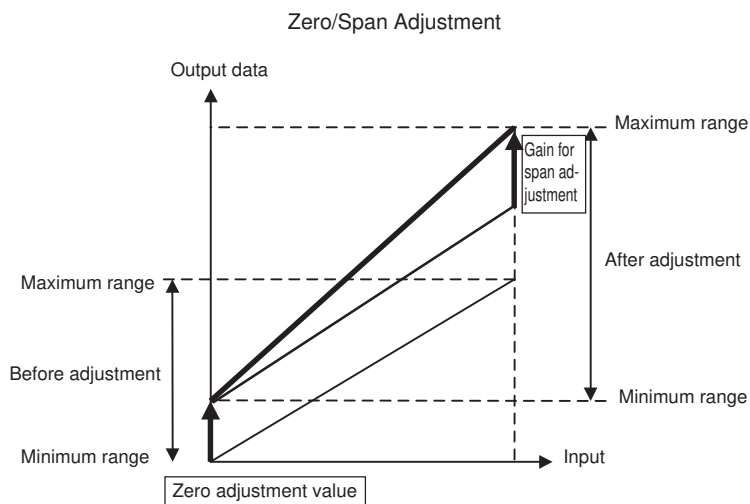
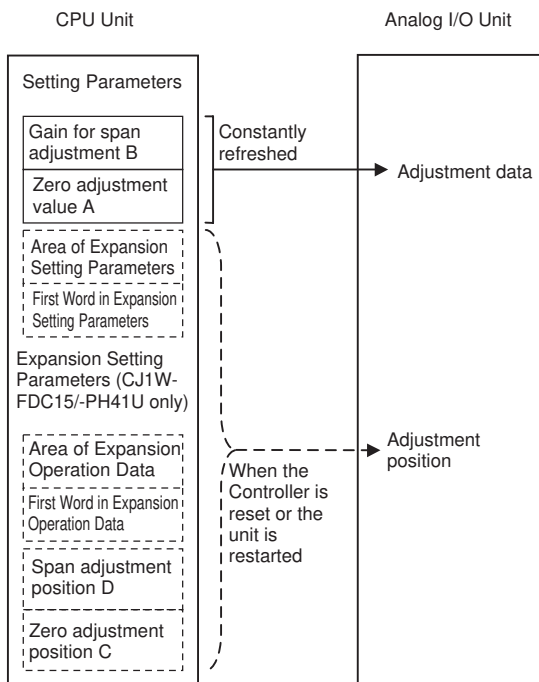


● Zero/Span Adjustment Only

Applicable Units	Isolated-type Universal Input Unit	CJ1W-AD04U
------------------	------------------------------------	------------

● Zero/Span Adjustment and Zero/Span Adjustment for Specified Points

Applicable Units	Isolated-type Analog Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U

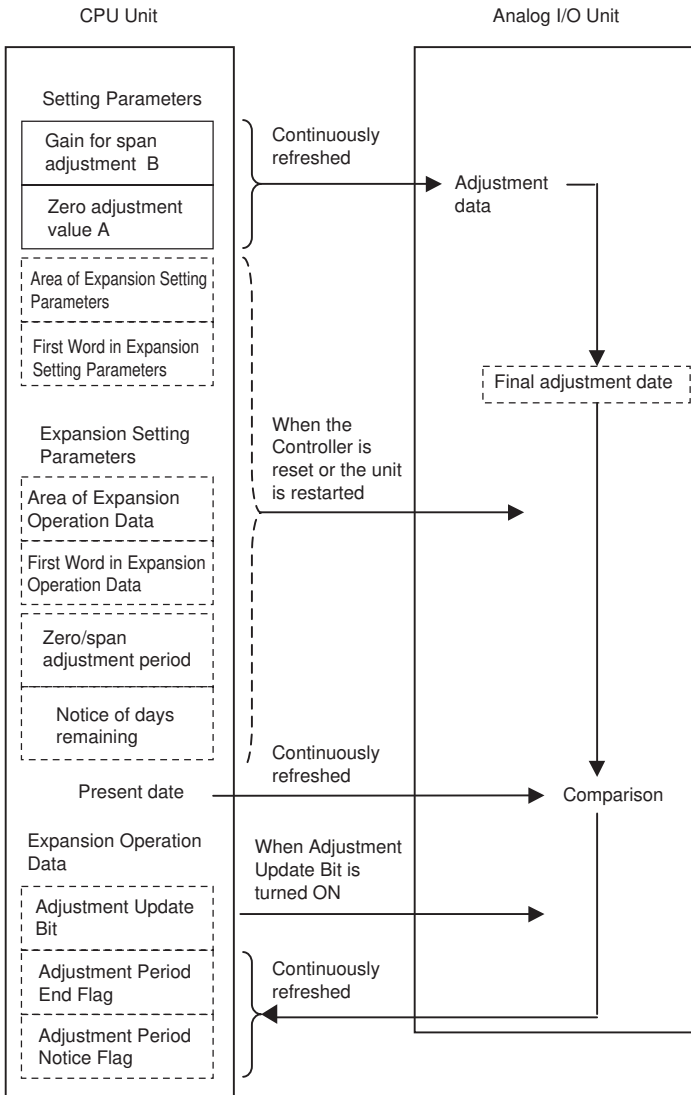


## 1-2-15 Adjustment Period Control

When zero/span adjustment is executed and the Adjustment Update Bit is set, the date is internally recorded at the Unit.

When the preset Zero/Span Adjustment Period End and Notice of Days Remaining in the expansion setting parameters have elapsed, this function turns ON a warning flag to give notice that it is time for readjustment.

Applicable Units	Isolated-type Analog Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U



Example:

Zero/span adjustment period = 180 days  
 Notice of days remaining before zero/span adjustment period end = 30 days

July 3, 2002: Zero/span adjustment executed.  
 Turns Adjustment Update Flag from OFF to ON.

November 30, 2002: Zero/Span Adjustment Period Notice Flag  
 December 30, 2002: Zero/Span Adjustment Period End Flag

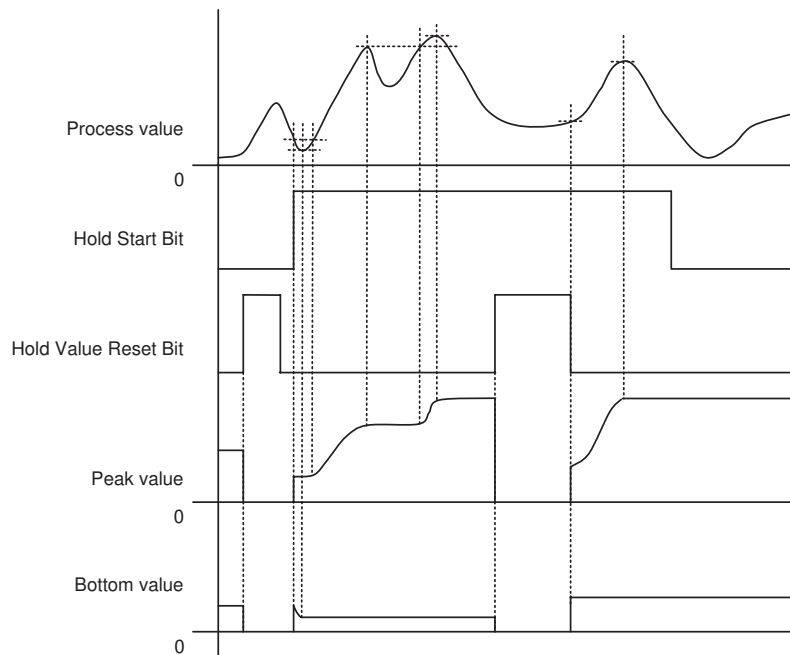
## 1-2-16 Peak and Bottom Detection

This function detects the peak (maximum) and bottom (minimum) process values.

This function detects the maximum and minimum analog input values, from when the Hold Start in the Expansion Operation Data turns ON until it turns OFF.

The "Peak/Top Value" and "Bottom/Valley Value" in the Expansion Operation Data are constantly refreshed, and the peak value and the bottom value are cleared to 0 while Hold Value Reset is ON.

Applicable Units	Isolated-type Analog Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U



### Additional Information

The top and valley detection function and the peak and bottom detection function cannot be used simultaneously.

## 1-2-17 Top and Valley Detection

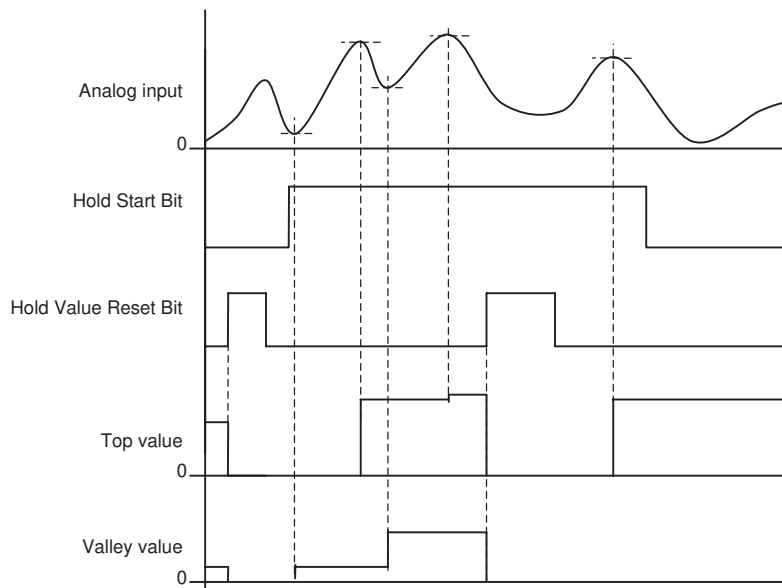
This function detects the top and valley values of the process value.

This function detects the top and valley input values from when the Hold Start in the Expansion Operation Data turns ON until it turns OFF.

A detection hysteresis can be set so that minute changes are not detected.

The "Peak/Top Value" and "Bottom/Valley Value" in the Expansion Operation Data are constantly refreshed, and the top value and the valley value are cleared to 0 while Hold Value Reset is ON.

Applicable Units	Isolated-type Analog Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U



### Additional Information

Either peak and bottom values or top and valley values can be selected for detection. This selection is made by using the Hold Function Selection Flag in the Expansion Operation Data to select either the top and valley detection function or the peak and bottom detection function. These two functions cannot be used simultaneously.

## 1-2-18 Integral Value Calculation

This function calculates the integral of the process value over time.

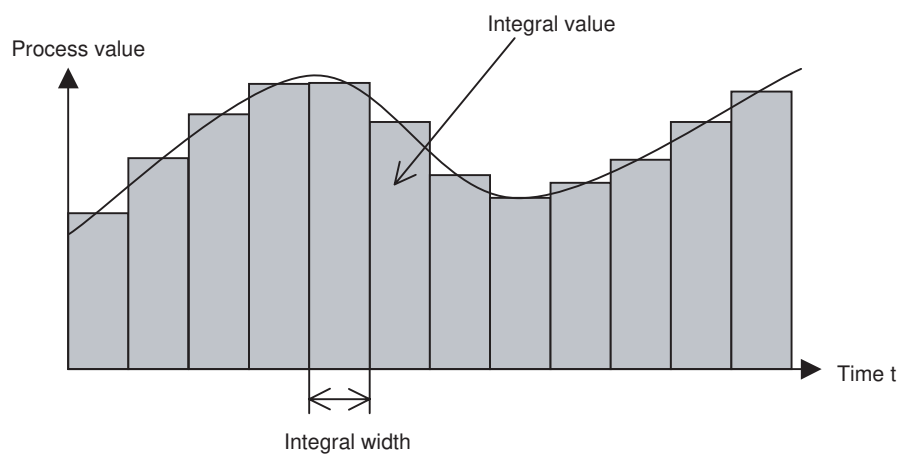
The unit can be selected as either "hour" or "minute" with the Integer Unit setting in the Expansion Setting Parameters.

The integral value can be output to "Integral Value" by turning ON the Integral Value Calculation Start in the Expansion Operation Data.

It can also be cleared to 0 by turning ON the Integral Value Reset in the Expansion Operation Data.

In addition, with the CJ1W-PH41U, the integral value can be calculated using an integral value coefficient to prevent integral value overflow.

Applicable Units	Isolated-type Analog Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U



## 1-2-19 Cold Junction Compensation Method

This function specifies whether cold junction compensation for thermocouple inputs is to be performed in the Analog I/O Unit or externally. The external method is enabled when the temperature difference is measured using two thermocouples or when an external cold-junction compensator is used for greater precision.

Applicable Units	Isolated-type Universal Input Unit	CJ1W-PH41U
------------------	------------------------------------	------------

## 1-2-20 Platinum Resistance Thermometers Input Compensation

This function performs compensation for resistance thermometer inputs according to the reference resistance for a connected resistance thermometer. Set the Temperature resistance thermometer input compensation setting in the Expansion Setting Parameters to Enable (1) and then set the Temperature Resistance Thermometer Reference Resistance (i.e., the resistance at 23°C) in the Expansion Setting Parameters.

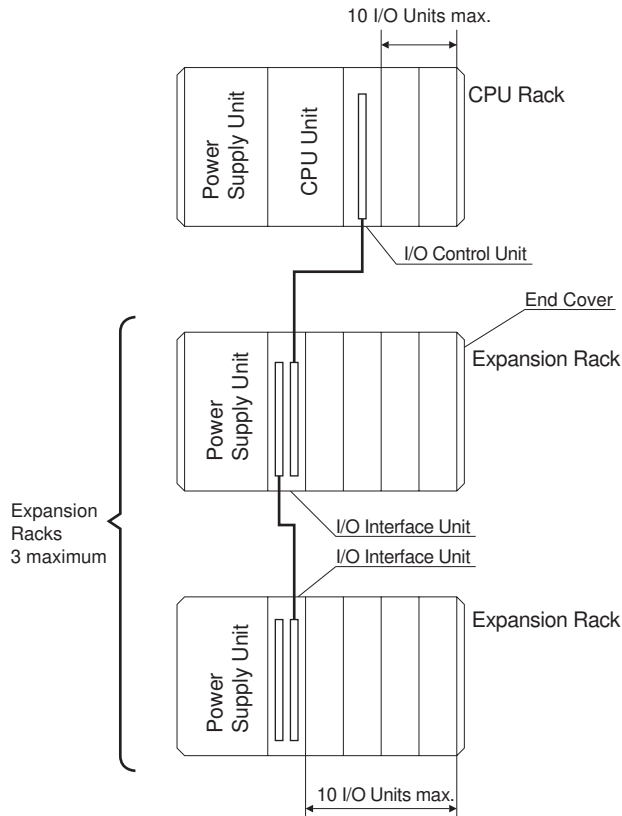
Applicable Units	Isolated-type Universal Input Unit	CJ1W-PH41U
------------------	------------------------------------	------------

# 1-3 System Configuration

These Analog I/O Units belong to the NJ-series CJ Special I/O Unit group. You can mount them to NJ-series CPU Racks or Expansion Racks.

The number of Units that you can mount to one Rack (either a CPU Rack or an Expansion Rack) depends upon the maximum current supplied by the Power Supply Unit and the current consumption by the other Units.

There are no restrictions on Rack position.



# 1-4 Specifications and Installation

## 1-4-1 Specifications

The specifications shown in the following table apply to all the Analog I/O Units.

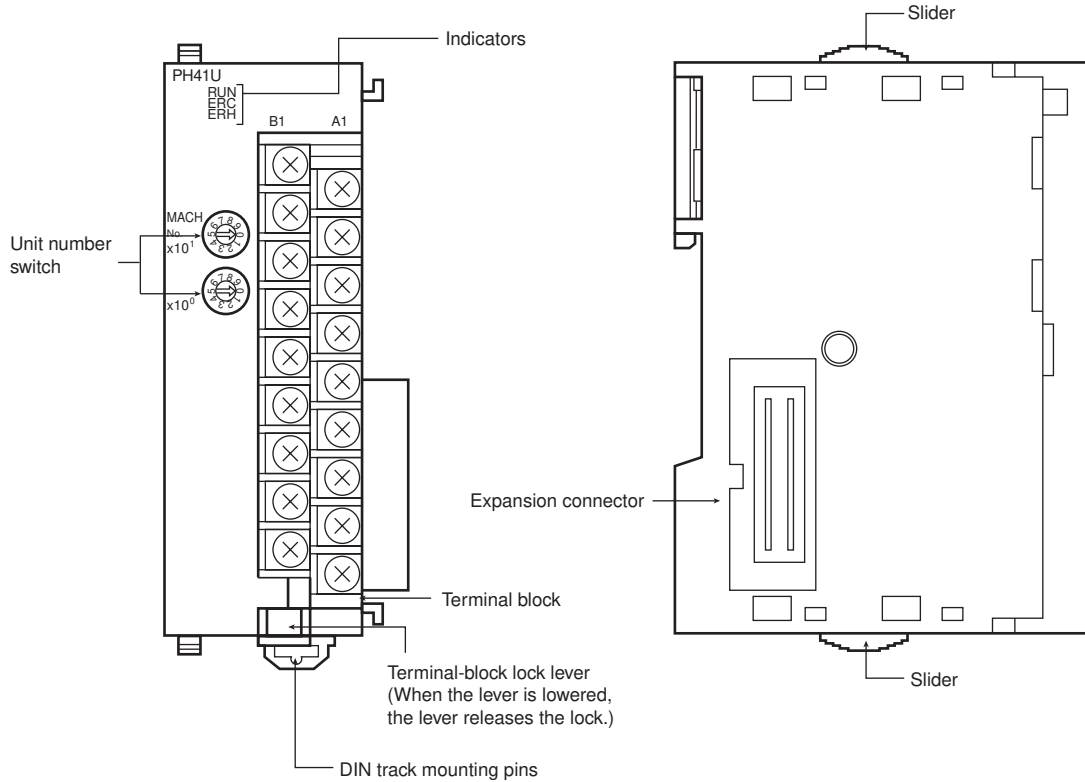
For specifications specific to each Unit, refer to *2-1-6 Specifications* for CJ1W-PDC15, *3-1-6 Specifications* for CJ1W-AD04U, and *3-2-6 Specifications* for CJ1W-PH41U.

Item	Specification
Unit classification	NJ-series CJ Special I/O Unit
Dimensions	31 × 90 × 65 mm (W × H × D)
Weight	150 g max.
External terminal connections	18-point removable terminal block (M3 screws, Tightening torque: 0.5 N·m)
Unit number switch	00 to 95
Self-diagnostic function	Results of self-diagnosis shown on indicators.
Mounting position	NJ-series CPU Rack or Expansion Rack
Maximum number of Units	40 Units (10 Units × 4 Racks) Confirm that the total current consumption of all the Units (including the CPU Unit) mounted to a single CPU Rack or Expansion Rack does not exceed the maximum power supplied by the Power Supply Unit.
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (with no condensation)

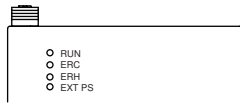
### Current consumption

Name	Model	Current consumption (power)	
		5 V	24-V external
Isolated-type Direct Current Input Unit	CJ1W-PDC15	0.18 A (0.9 W)	0.09 A
Isolated-type Universal Input Units	CJ1W-AD04U	0.32 A (1.6 W)	Not used.
	CJ1W-PH41U	0.30 A (1.5 W)	Not used.

1-4-2 Nomenclature and Functions



CJ1W-PDC15

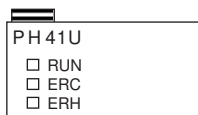


Indicator	Meaning	Status	Operating status
RUN (green)	Operating	Lit	Operating normally.
		Not lit	Unit has stopped exchanging data with the CPU Unit.
ERC (red)	Error detected by Unit	Lit	Data setting is out of range in a parameter.
		Not lit	Operating normally.
ERH (red)	Error in the CPU Unit	Lit	Error has occurred during data exchange with the CPU Unit, or Analog I/O Unit's unit number is set incorrectly, or there is a mounting error.
		Not lit	Operating normally.
EXT PS	External power supply	Lit	External 24-VDC power supply
		Not lit	No external power supply



**CJ1W-AD04U**

Indicator	Meaning	Status	Operating status
RUN (green)	Operating	Lit	Operating normally.
		Not lit	Unit has stopped exchanging data with the CPU Unit.
ERC (red)	Error detected by Unit	Lit	Data setting is out of range in a parameter or Input Error has occurred.
		Not lit	Operating normally.
ERH (red)	Error in the CPU Unit	Lit	Error has occurred during data exchange with the CPU Unit, or Analog I/O Unit's unit number is set incorrectly, or there is a mounting error.
		Not lit	Operating normally.

**CJ1W-PH41U**

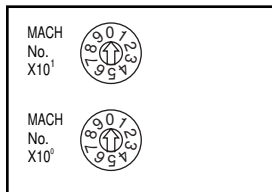
Indicator	Meaning	Status	Operating status
RUN (green)	Operating	Lit	Operating normally.
		Not lit	Unit has stopped exchanging data with the CPU Unit.
ERC (red)	Error detected by Unit	Lit	Data setting is out of range in a parameter.
		Not lit	Operating normally.
ERH (red)	Error in the CPU Unit	Lit	Error has occurred during data exchange with the CPU Unit, or Analog I/O Unit's unit number is set incorrectly, or there is a mounting error.
		Not lit	Operating normally.

## ● Unit Number Switches

Use the unit number switches to set the specific unit number for each Special I/O Unit mounted in a CPU Rack or Expansion Rack. The unit number must be the one registered in the Unit Configuration.

Turn OFF the Controller before changing the unit number setting.

Unit Number Switches



Switch Settings	Unit No.
00	0
01	1
02	2
03	3
04	4
05	5
06	6
07	7
08	8
09	9
10	10
to	to
95	95



### Additional Information

- If two or more Special I/O Units are assigned the same unit number, a "Duplicate Unit Number" major fault level Controller error is generated and the Controller will not operate.
- After correcting the unit number setting, cycle the power to the Controller.

# 1-5 Mounting the Units



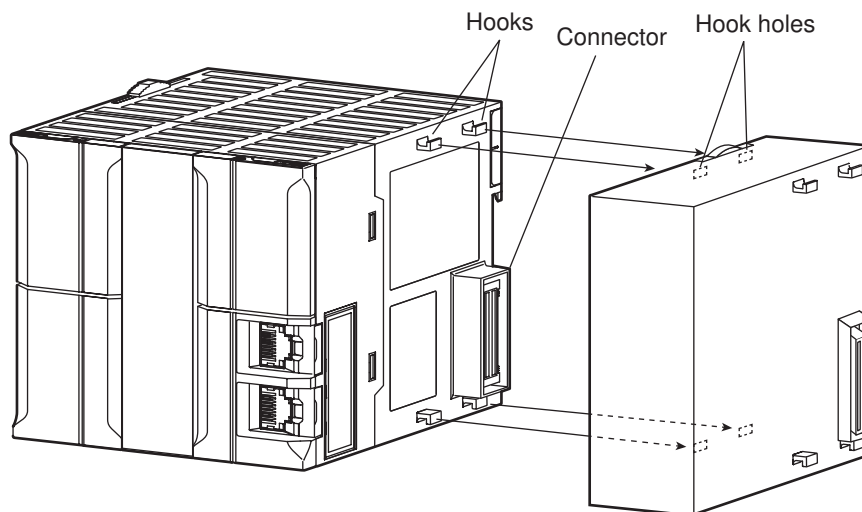
## Precautions for Correct Use

- Do not connect a Relay Output Unit (CJ1W-OC□□□□) to a CPU Rack or Expansion Rack when using the CJ1W-PH41U. Because the CJ1W-PH41U measures at high resolution, there is possibility of normal measurement being impossible due to noise generated during relay output switching.
- If the CPU Rack and an Expansion Rack are lined up horizontally in the control panel, keep at least 70 mm space between the Rack on which the Relay Output Unit is mounted and the Rack on which the CJ1W-PH41U is mounted.
- If for some reason it is not possible to avoid mounting the Relay Output Unit and the CJ1W-PH41U on the same Rack, mount the Relay Output Unit as far from the CJ1W-PH41U as possible and take measures such as installing a surge suppressor in the relay output circuit wiring.

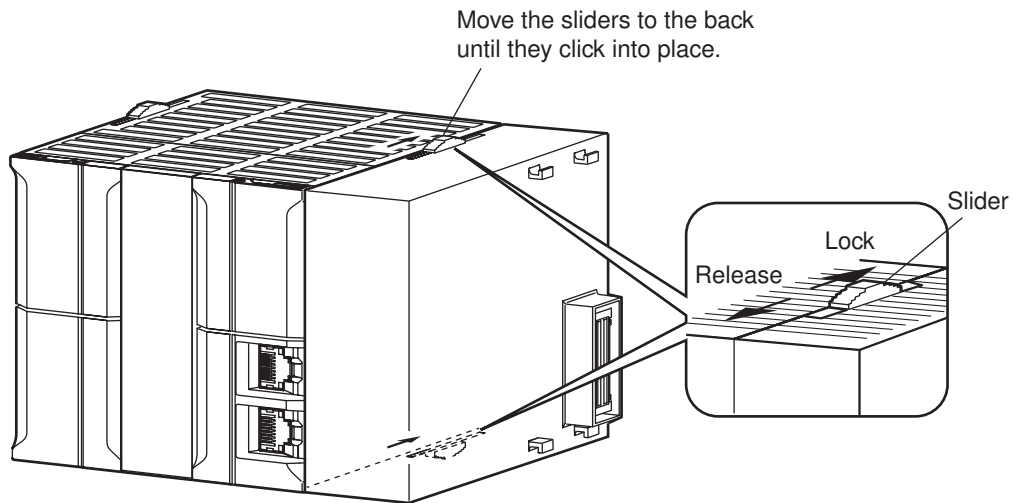
### 1-5-1 Mounting the Units (Common)

Perform connection of the Units before mounting them on the DIN rail.

- 1 Align the connectors and press in firmly on the Units to connect them completely.



- 2** Move the sliders on the top and bottom of the Unit to the lock position to secure the Units. The sliders should click into place.



- 3** Attach an End Cover to the Unit on the right end of the Rack.



**Precautions for Safe Use**

---

If the locking tabs are not secured properly, the connectors may become loose and not function properly. Be sure to slide the locking tabs until they are securely in place.

---



**Precautions for Correct Use**

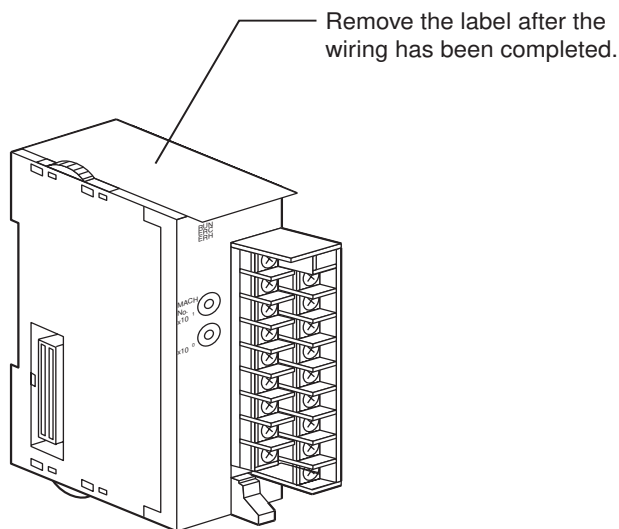
---

The End Cover that comes with the CPU Unit must be installed on the right end of the Unit. If the End Cover is not installed, the Controller will not function properly.

---

## 1-5-2 Precautions when Handling Units

- Be sure to turn OFF the power supply to the Controller before Units or connecting lines are installed or disconnected.
- To reduce the risk of malfunctioning due to electrical noise, wire input and output lines in separate ducts from high-voltage and power lines.
- Prevent wire clippings, cutting chips or other materials from getting inside the Unit. They could cause scorching, failure, and malfunction. Pay particular attention to this during installation and take measures such as covering with a cover.
- If the Unit was shipped from the factory with the dust protection label on top of the unit, be sure to remove that label before switching ON the power. The label prevents heat dissipation and could cause a malfunction.



### ● Precautions in Handling Removable Terminal Blocks

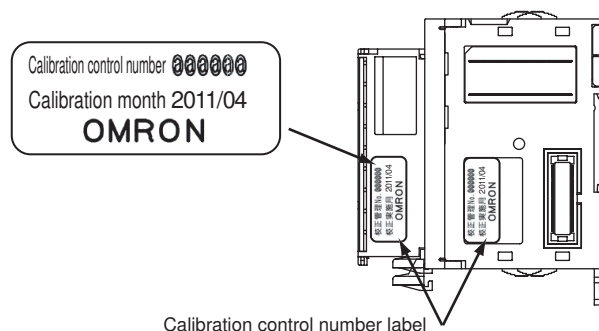
- The terminal block is removable. Press the lever on the bottom of the terminal block to remove the terminal block.
- During normal use, check that the lever is raised and the terminal block is locked in place.



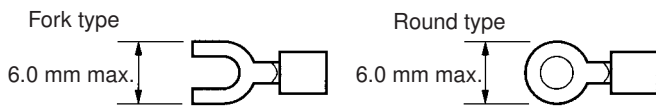
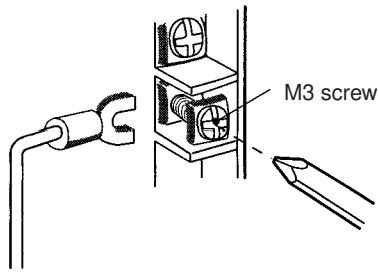
### Precautions for Safe Use

#### Precautions for Terminal Blocks on CJ1WPH41U Universal Input Units

- CJ1W-PH41U Universal Input Units have cold junction sensors. The accuracy will be specified only when the cold junction sensor (i.e., the terminal block) and the Unit are used as a set. Always use the terminal block and the Unit as a set. Both the terminal block and the Unit have labels on them that provide the calibration control number.
- If repairs are required to the Unit, always return the terminal block (which includes the cold junction sensor) with the Unit.



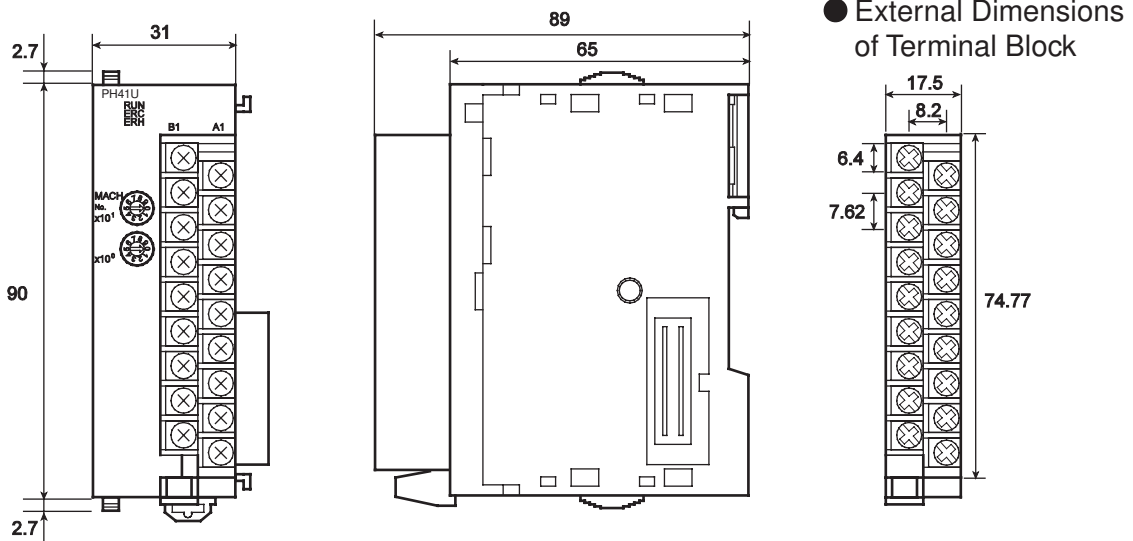
### 1-5-3 Connecting Crimp Terminals



#### Precautions for Correct Use

Tighten the terminal screws securely to a torque of 0.5 N·m. Loose screws may result in conversion errors.

### 1-5-4 Dimensions



**Note** The appearance may be different with each model.

# 1-6 Exchanging Data with the CPU Unit

## 1-6-1 Exchanging Data with the CPU Unit

### Overview of Data Exchange

The CPU Unit and Analog I/O Unit exchange data, such as Operation Data and initial settings parameters, via I/O ports created for Analog I/O Units or as necessary via the memory used for CJ-series Units.

The following table shows the data exchange method for each data type.

- Data exchange type

Unit data type	Access methods from a user program	AT specification destination	Data exchange timing
Operation Data	Device variable for CJ-series Unit	I/O port (operation data)	During I/O refresh
Expansion Operation data	User-defined variables	Memory used for CJ-series Unit	
Setting parameter 1	Device variable for CJ-series Unit	I/O port (setting parameters) *1	When the Controller is reset or the unit is restarted
Setting parameter 2			
Expansion setting parameter *2	User-defined variables	Memory used for CJ-series Unit	
Unit restart flag, etc.	System-defined variables	None	During I/O refresh

\*1 The setting parameters are retained in the CPU unit by the battery even during power interruptions.

\*2 The CJ1W-AD04U has no expansion setting parameter.

Whether or not expansion setting parameters are retained even during power interruptions depends on the AT specification area specification.

### Device Variables for CJ-series Unit

Device variables for CJ-series Unit are variables used for data exchange between a user program and Special I/O Units. The user program uses device variables for CJ-series Units to control the Analog I/O Unit. Use device variables for CJ-series Units with AT specification for the I/O port, which is explained below.

#### ● I/O port

An "I/O port" is a logical interface to enable the CPU Unit to exchange data with configuration units such as the Analog I/O Unit.

An I/O port has a unique predefined name for each unit model and function.

An I/O port is automatically created by preparing the unit configuration with Sysmac Studio.

#### ● How to specify device variables for CJ-series Units

Allocate variables for CJ-series Unit to an I/O port from *I/O map* in the Sysmac Studio.

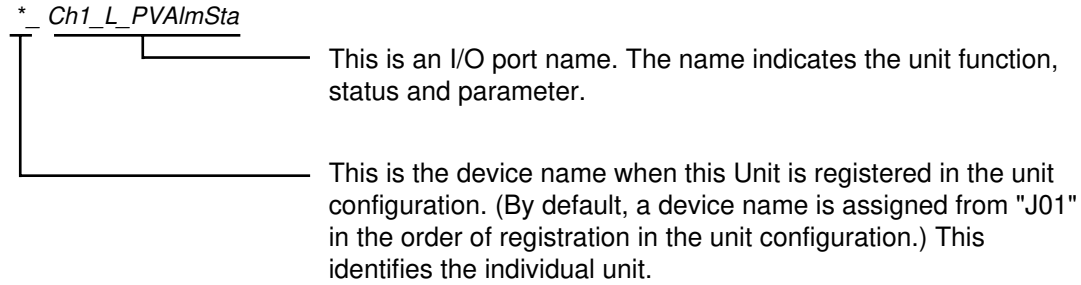
Specify the variable name for the AT specification with the following method.

1. Select a variable already registered in the variable table
2. Input a new variable name
3. Automatically create a variable name with "Device variable creation"

When a device variable name for CJ-series Unit is assigned with method 2 or 3, the variable input by Sysmac Studio is automatically registered in the variable table.

The following is the configuration of variable names created with method 3.

Device variable (name) for CJ-series Unit



In the explanations from here on, the device name automatically created is used as the device variable for CJ-series Unit, for example \*\_Ch1\_L\_PVAlmSta.

For details on creation of device variables for CJ-series Unit, refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

## User-defined Variables

User-defined variables are necessary to access Expansion Operation Data and Expansion Setting Parameters data.

With the CJ1W-PDC15/-PH41U, structure data types for Expansion Operation Data and Expansion Setting Parameters are pre-defined. To use one of these data types, register the structure data type specified for each unit on the CPU/Expansion Racks screen in Configurations and Setup.

Create user-defined variables by using the above structures so that the user program can access Expansion Operation Data and Expansion Setting Parameters.

The user program uses user-defined variables to control the Analog I/O Unit.

Model	Data type	Structure name
CJ1W-PDC15	Expansion Setting Parameters	_sCJPDC15_Ex_Param
	Expansion Operation Data	_sCJPDC15_Ex_CmdSta
CJ1W-PH41U	Expansion Setting Parameters	_sCJPH41U_Ex_Param
	Expansion Operation Data	_sCJPH41U_Ex_CmdSta

### ● How to create user-defined variables for Expansion Setting Parameters and Expansion Operation Data

**1** Register the Analog I/O Units in the Unit Configuration.

Then, register the structure data type specified for each unit on the CPU/Expansion Racks screen in Configurations and Setup. With the unit selected, right click **Register Data Types for Units**. The data type is registered and becomes usable.

**2** With **Special Unit Setup Editing** in Sysmac Studio, set addresses of memory used for CJ-series Unit for Expansion Setting Parameters and Expansion Operation Data. Transfer the settings to the CPU Unit, and then restart the Unit to enable the settings.

At this time, make sure that the allocated areas do not exceed the available ranges in the CPU memory so that the addresses already in use are not duplicated.



- 3** Create user-defined variables in Sysmac Studio's variable table by using the structures defined for Expansion Setting Parameters of each Unit. Assign to these variables, via AT specification, the addresses of memory used for CJ-series Unit for Expansion Setting Parameters specified in 2.

The names of variables used in the user program are listed below.

**Example:**

When a variable with the name "aaaa" is created by using the structure for CJ1W-PDC15 Expansion Setting Parameters `_sCJPDC15_Ex_Param`.

Variable (name)	Data type	Item
aaaa	<code>_sCJPDC15_Ex_Param</code>	CJ1W-PDC15 Expansion Setting Parameter
<code>aaaa.ExtIOArea</code>	UINT	Area of Expansion Operation Data
<code>aaaa.ExtIOAdr</code>	UINT	First Word in Expansion Operation Data Area
<code>aaaa.Ch1_GainAdjFVCfg</code>	UINT	Input No. 1 Span Adjustment Position (Input span percentage)
<code>aaaa.Ch1_ZeroAdjFVCfg</code>	INT	Input No. 1 Zero Adjustment Position (Input span percentage)
<code>aaaa.Ch1_AdjPrd</code>	UINT	Input No. 1 Zero/Span Adjustment Period
<code>aaaa.Ch1_AdjNoticeDay</code>	UINT	Input No. 1 Notice of Days Remaining
<code>aaaa.Ch1_TopVlyHystrs</code>	UINT	Input No. 1 Top and Valley Detection Hysteresis
<code>aaaa.Ch1_IntgUnit</code>	WORD	Input No. 1 Integer Unit
<code>aaaa.Ch2_GainAdjFVCfg</code>	UINT	Input No. 2 Span Adjustment Position (Input span percentage)
<code>aaaa.Ch2_ZeroAdjFVCfg</code>	INT	Input No. 2 Zero Adjustment Position (Input span percentage)
<code>aaaa.Ch2_AdjPrd</code>	UINT	Input No. 2 Zero/Span Adjustment Period
<code>aaaa.Ch2_AdjNoticeDay</code>	UINT	Input No. 2 Notice of Days Remaining
<code>aaaa.Ch2_TopVlyHystrs</code>	UINT	Input No. 2 Top and Valley Detection Hysteresis
<code>aaaa.Ch2_IntgUnit</code>	WORD	Input No. 2 Integer Unit

In the explanations from here on, the variable name portion "aaaa." attached to the structure is omitted such as with `Ch1_GainAdjFVCfg`.

For details on operations to create user-defined variables, refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

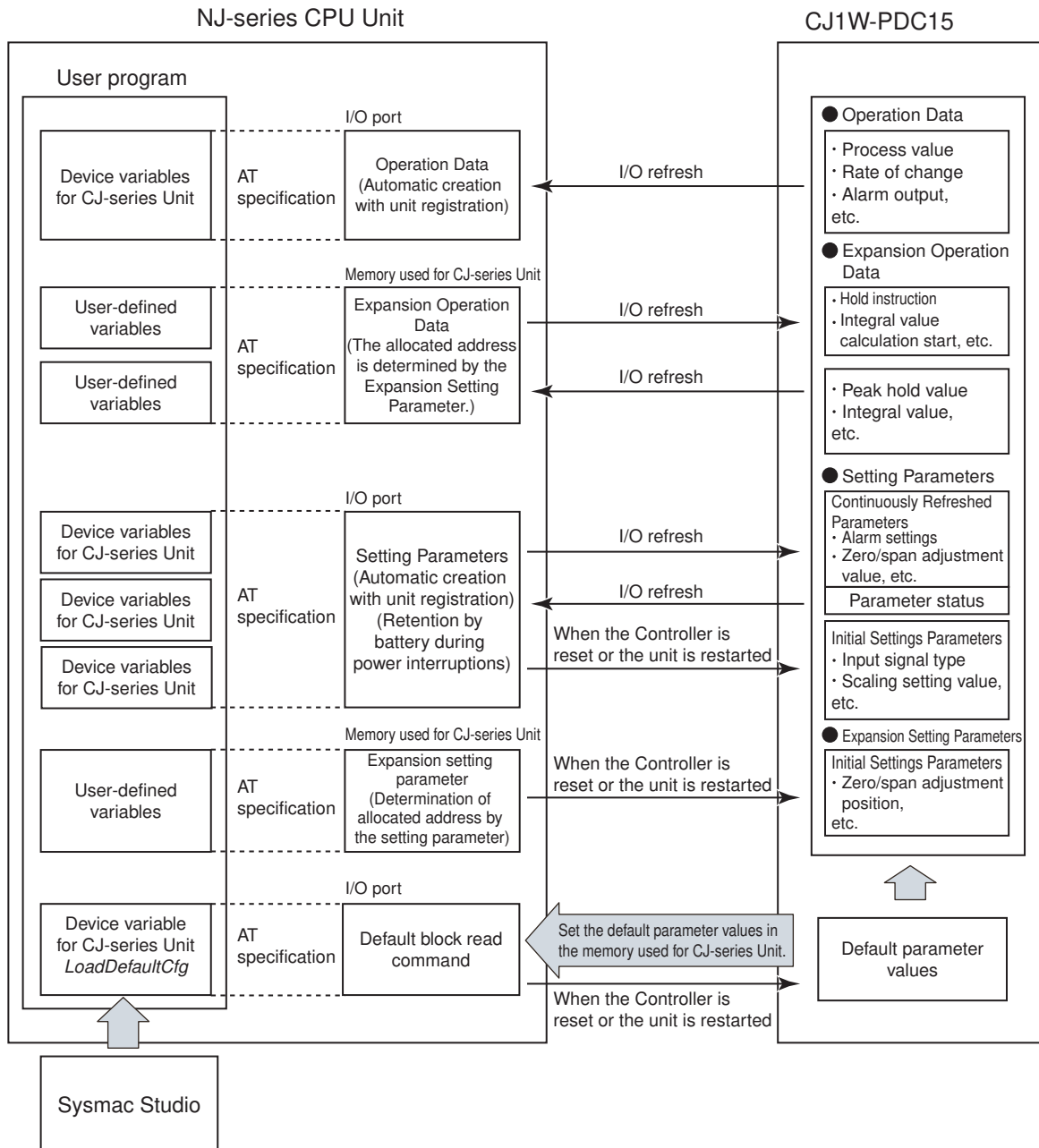
## 1-6-2 CJ1W-PDC15

These Units exchange data by using the CPU unit I/O port and memory used for CJ-series Unit.

- Operation Data
- Expansion Operation Data
- Setting Parameter
- Expansion Setting Parameter

AT specification of variables accessing these parameters/data is determined with the following.

Parameter/data	AT specification	Setting method
Operation Data	I/O port	Creates automatically when the unit is registered to the unit configuration.
Expansion Operation Data	Memory used for CJ-series Unit	Set the allocated address with one of the following methods. (After this setting, reset the Controller or restart the unit.) <ol style="list-style-type: none"> <li>Set with Expansion Operation Data Area Allocation and Start Address of Expansion Operation Data Area of the <b>Edit Special Unit Settings</b> in Sysmac Studio and transfer the data setup file to the unit.</li> <li>Set using the following user-defined variables: <i>ExtIOArea, ExtIOAdr</i> (within expansion setting parameter)</li> </ol>
Setting parameter	I/O port	Creates automatically when the unit is registered to the unit configuration.
Expansion setting parameter	Memory used for CJ-series Unit	Set the allocated address with one of the following methods. (After this setting, reset the Controller or restart the unit.) <ol style="list-style-type: none"> <li>Set with Expansion Setting Parameter Area Allocation and Start Address of Expansion Setting Parameter Area of the <b>Edit Special Unit Settings</b> in Sysmac Studio and transfer the data setup file to the unit.</li> <li>Set using the following device variables for CJ-series Unit: <i>*_ExtMemArea, *_ExtMemAdr</i> (within setting parameter)</li> </ol>



- Note 1** When specifying Expansion Setting Parameters or Expansion Operation Data, be sure that the area does not overlap with other areas that are in use. If areas overlap, the memory may be overwritten and unexpected operation may occur.
- 2** When specifying the start address of Expansion Setting Parameters or Expansion Operation Data, be sure that the allocated area does not exceed the range of the memory used for CJ-series Unit in the CPU Unit.

The following functions are available with respect to Setting Parameters and Operation Data of the CJ1W-PDC15.

Operation Data	<p>The data is continuously refreshed.</p> <p>The following types of data are output: Values scaled to industrial units for process values and rate-of-change values, alarm contact data, Input Error Flag, etc.</p>			
Expansion Operation Data	<p>The data is continuously refreshed.</p> <p>CPU to Unit</p> <p>Bits for beginning or resetting the hold function selection, adjustment period control, control bits, etc.</p> <p>Unit to CPU</p> <p>Adjustment period notices, peak and bottom values, top and valley values, etc.</p>			
Setting Parameters	<p>Various parameters are set in this area.</p> <p>The setting parameters are retained in the CPU unit by the battery even during power interruptions.</p> <p>There are 5 types of parameter as follows:</p>			
	<p>1. Default Block Read Command</p> <p>Device variable for CJ-series Unit</p> <p><i>*_LoadDefaultCfg</i></p>	<p>When the Controller is reset or the Unit is restarted, you can automatically set the default data in the Analog I/O Unit.</p> <ul style="list-style-type: none"> <li>Variable at the left is 12345: The default data stored in this Unit are set to the parameters for operation. (The default data are written to the device variables for CJ-series Unit.)</li> <li>Variable at the left is 0: The device variables for CJ-series Unit are set from the CPU Unit for operation.</li> </ul>		
	<p>2. Setting Parameter Group 1 (Continuously Refreshed Parameters)</p>	<p>Regardless of the CPU Unit's modes, these parameters are continuously refreshed. They are refreshed when the Controller is reset or the Unit is restarted.</p> <p>Alarm settings, zero/span adjustment values, and so on, are set here.</p>		
	<p>3. Setting Parameter Group 2 (Initial Settings Parameters)</p>	<p>These are the parameters in which the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Input signal types, process value scaling, advanced alarm functions, etc. are set here.</p>		
	<p>4. Parameter Status</p>	<p>Data range error addresses are output here. *</p>		
<p>5. Expansion Setting Parameter Settings</p>	<p>These are the parameters in which the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Expansion Setting Parameter settings are made here.</p>			
Expansion Setting Parameters	<p>Various parameters are set in this area.</p> <table border="1" data-bbox="499 1693 1455 1856"> <tr> <td data-bbox="499 1693 879 1856"> <p>Setting Parameter Group 3 (Initial Settings Parameters):</p> </td> <td data-bbox="879 1693 1455 1856"> <p>If the Expansion Setting Parameters are allocated, the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Expansion Operation Data settings, zero/span adjustment function, and so on, are set here.</p> </td> </tr> </table>		<p>Setting Parameter Group 3 (Initial Settings Parameters):</p>	<p>If the Expansion Setting Parameters are allocated, the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Expansion Operation Data settings, zero/span adjustment function, and so on, are set here.</p>
<p>Setting Parameter Group 3 (Initial Settings Parameters):</p>	<p>If the Expansion Setting Parameters are allocated, the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Expansion Operation Data settings, zero/span adjustment function, and so on, are set here.</p>			

\* The ERC indicator on the Unit's front panel will light if an out-of-range setting is made in either Setting Parameter Group 1 (Continuously Refreshed Parameters) or Setting Parameter Group 2 (Initial Settings Parameters). The offset (the number of words) from the start address to the lowest address that has the range error will be output in the Address of Data Range Error. If the lowest address that has the range error is an Expansion Setting Parameter, the offset value shown in the

Address of Data Range Error will be 100 or greater. (The value will be 100 if the first word of the Expansion Setting Parameters is erroneous.)

For the correspondence between range error addresses and setting parameter or expansion setting parameter addresses, refer to *A-3 Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses*. "m" in the table indicates the first word allocated in DM.  $m = D20000 + (N \times 100)$  (N: Unit number)

## ● Unit Restart

To restart the Unit after the Initial Settings Parameters are changed or an error is corrected, restart the Unit with the following methods.

The changes in the Initial Settings Parameters are reflected after restart.

- Reset the Controller from Sysmac Studio
- Restart from Sysmac Studio when initial settings parameters are transferred from Sysmac Studio.
- Reconnect the Controller power supply to reset the Controller.
- Restart from the program by a ResetUnit instruction.
- Restart using the system-defined variable. (Restart by changing the value from 0 to 1.)

A unit number from 00 to 95 is included in place of \*\* in `*_CJB_SIO**Restart`.



### Precautions for Safe Use

When you restart the Unit after you change the Unit setting, first carefully check the safety of the target device connected to.



### Precautions for Correct Use

If the error persists after the restart, replace this Unit.

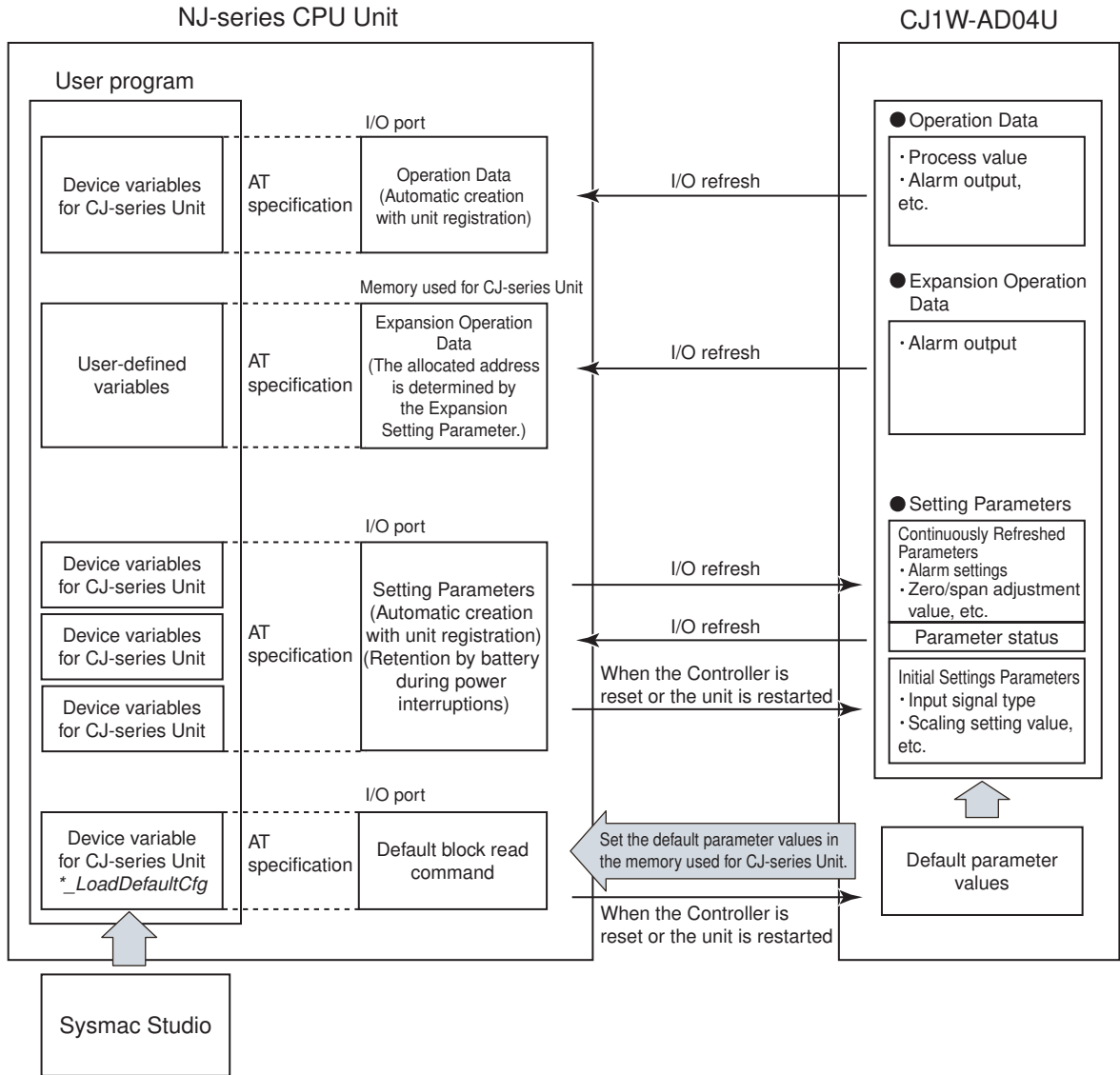
## 1-6-3 CJ1W-AD04U

These Units exchange data by using the CPU unit I/O port and memory used for CJ-series Unit.

- Operation Data
- Expansion Operation Data
- Setting Parameter

AT specification of variables accessing these parameters/data is determined with the following.

Parameter/data	AT specification	Setting method
Operation Data	I/O port	Creates automatically when the unit is registered to the unit configuration.
Expansion Operation Data	Memory used for CJ-series Unit	Set the allocated address with one of the following methods. (After this setting, reset the Controller or restart the unit.) 1. Set with Expansion Setting Parameter Area Permission and Address of Expansion Setting Parameter Area of the <b>Edit Special Unit Settings</b> in Sysmac Studio and transfer the data setup file to the unit. 2. Set using the following device variables for CJ-series Unit: <code>*_ExtIOCfg</code> , <code>*_ExtIOAdr</code> (within setting parameter)
Setting parameter	I/O port	Creates automatically when the unit is registered to the unit configuration.



**Note** When specifying Expansion Operation Data, be sure that the area does not overlap with other areas that are in use.  
If areas overlap, the memory may be overwritten and unexpected operation may occur.

The following functions are available with respect to Setting Parameters and Operation Data of the CJ1W-AD04U.

Operation Data	The data for operation is continuously refreshed. The following types of data are output: Values scaled to industrial units for process values alarm contact data, Input Error Flag, etc.	
Expansion Operation Data	The data is continuously refreshed. Process Value Alarm	
Setting Parameters	Various parameters are set in this area. The setting parameters are retained in the CPU unit by the battery even during power interruptions. There are 5 types of parameter as follows:	
	1. Default Block Read Command Device variable for CJ-series Unit *_LoadDefaultCfg	When the Controller is reset or the Unit is restarted, you can automatically set the default data in the CJ1W-AD04U. • Variable at the left is 12345: The default data stored in this Unit are set to the parameters for operation. (The default data are written to the device variables for CJ-series Unit.) • Variable at the left is 0: The device variables for CJ-series Unit are set from the CPU Unit for operation.
	2. Parameter Status	Data range error addresses are output here. *
	3. Setting Parameter Group 1 (Continuously Refreshed Parameters)	Regardless of the CPU Unit's modes, these parameters are continuously refreshed. They are refreshed when the Controller is reset or the Unit is restarted. Alarm settings, zero/span adjustment values, and so on, are set here.
	4. Setting Parameter Group 2 (Initial Settings Parameters)	These are the parameters in which the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted. Input signal types, process value scaling, advanced alarm functions, etc. are set here.
	5. Expansion Operation Data Settings	These are the parameters in which the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted. Expansion Operation Data settings are made here.

\* The ERC indicator on the Unit's front panel will light if an out-of-range setting is made in either Setting Parameter Group 1 (Continuously Refreshed Parameters) or Setting Parameter Group 2 (Initial Settings Parameters). The offset (the number of words) from the start address to the lowest address that has the range error will be output in the Address of Data Range Error.  
For the correspondence between range error addresses and setting parameter addresses, refer to A-3 *Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses*. "m" in the table indicates the first word allocated in DM.  $m = D20000 + (N \times 100)$  (N: Unit number)

● **Unit Restart**

To restart the Unit after the Initial Settings Parameters are changed or an error is corrected, restart the Unit with the following methods.

The changes in the Initial Settings Parameters are reflected after restart.

- Reset the Controller from Sysmac Studio
- Restart from Sysmac Studio when initial settings parameters are transferred from Sysmac Studio.
- Reconnect the Controller power supply to reset the Controller.
- Restart from the program by a ResetUnit instruction.
- Restart using the system-defined variable. (Restart by changing the value from 0 to 1.)

A unit number from 00 to 95 is included in place of \*\* in `*_CJB_SIO**Restart`.



**Precautions for Safe Use**

When you restart the Unit after you change the Unit setting, first carefully check the safety of the target device connected to.



**Precautions for Correct Use**

If the error persists after the restart, replace this Unit.

**1-6-4 CJ1W-PH41U**

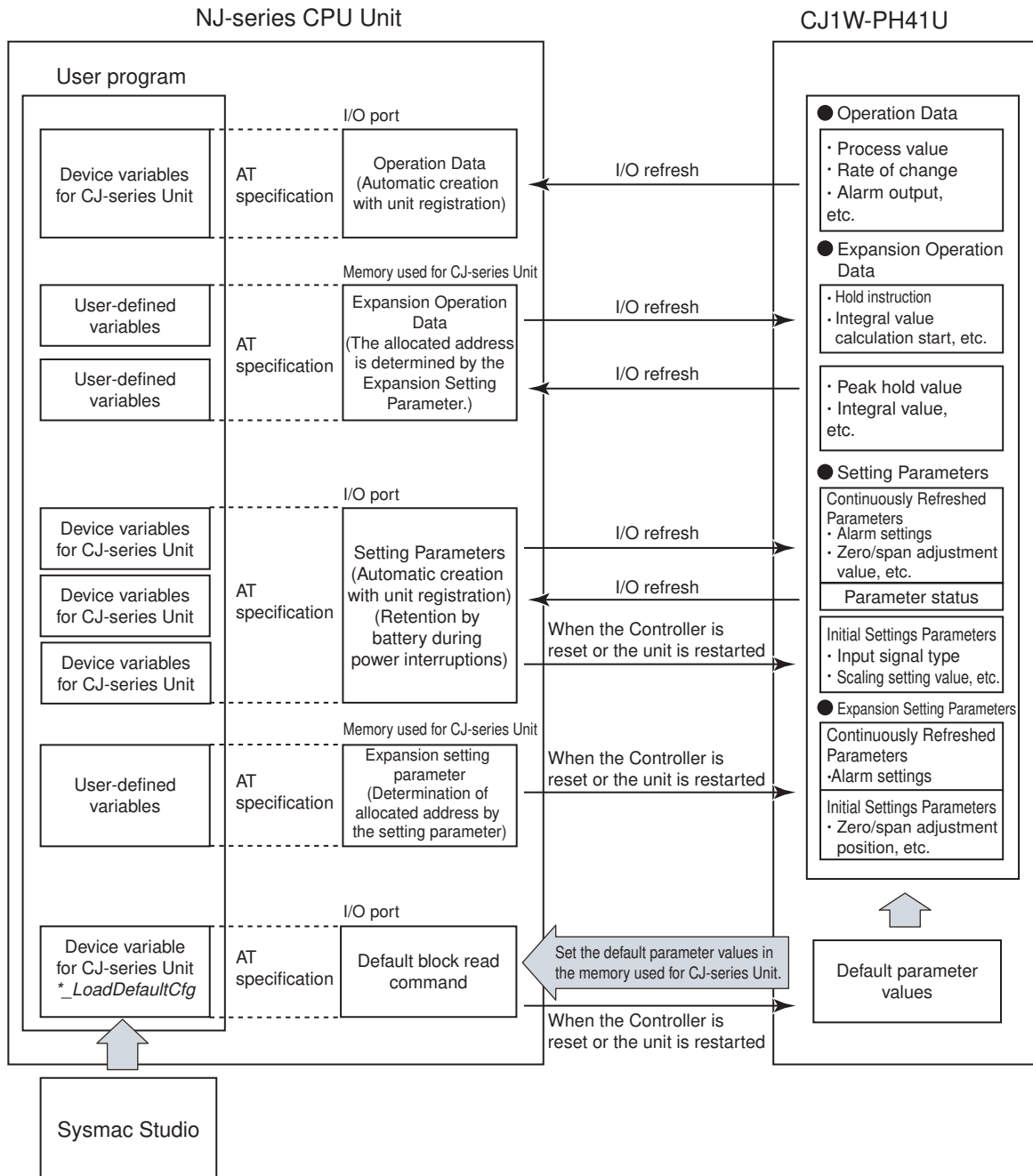
These Units exchange data by using the CPU unit I/O port and memory used for CJ-series Unit.

- Operation Data
- Expansion Operation Data
- Setting Parameter
- Expansion Setting Parameter

AT specification of variables accessing these parameters/data is determined with the following.

Parameter/data	AT specification	Setting method
Operation Data	I/O port	Creates automatically when the unit is registered to the unit configuration.
Expansion Operation Data	Memory used for CJ-series Unit	Set the allocated address with one of the following methods. (After this setting, reset the Controller or restart the unit.) 1. Set with Expansion Operation Data Area Allocation and Start Address of Expansion Operation Data Area of the <b>Edit Special Unit Settings</b> in Sysmac Studio and transfer the data setup file to the unit. 2. Set using the following user-defined variables: <i>ExtIOArea, ExtIOAdr</i> (within expansion setting parameter)
Setting parameter	I/O port	Creates automatically when the unit is registered to the unit configuration.
Expansion setting parameter	Memory used for CJ-series Unit	Set the allocated address with one of the following methods. (After this setting, reset the Controller or restart the unit.) 1. Set with Expansion Setting Parameter Area Allocation and Start Address of Expansion Setting Parameter Area of the <b>Edit Special Unit Settings</b> in Sysmac Studio and transfer the data setup file to the unit. 2. Set using the following device variables for CJ-series Unit: <i>*_ExtMemArea, *_ExtMemAdr</i> (within setting parameter)





- Note 1** When specifying Expansion Setting Parameters or Expansion Operation Data, be sure that the area does not overlap with other areas that are in use. If areas overlap, the memory may be overwritten and unexpected operation may occur.
- 2** When specifying the start address of Expansion Setting Parameters or Expansion Operation Data, be sure that the allocated area does not exceed the range of the memory used for CJ-series Unit in the CPU Unit.

The following functions are available with respect to Setting Parameters and Operation Data of the CJ1W-PH41U.

Operation Data	<p>The data is continuously refreshed.</p> <p>The following types of data are output: Values scaled to industrial units for process values alarm contact data, Input Error Flag, etc.</p>	
Expansion Operation Data	<p>The data is continuously refreshed.</p> <p>Bits for beginning or resetting the hold function selection, adjustment period control, control bits, etc.</p> <p>Adjustment period notices, peak and bottom values, top and valley values, etc.</p>	
Setting Parameters	<p>Various parameters are set in this area.</p> <p>The setting parameters are retained in the CPU unit by the battery even during power interruptions.</p> <p>There are 5 types of parameter as follows:</p>	
	<p>1. Default Block Read Command</p> <p>Device variable for CJ-series Unit *_LoadDefaultCfg</p>	<p>When the Controller is reset or the Unit is restarted, you can automatically set the default data in the Analog I/O Unit.</p> <ul style="list-style-type: none"> <li>Variable at the left is 12345: The default data stored in this Unit are set to the parameters for operation. (The default values are written to the device variables for CJ-series Unit.)</li> <li>Variable at the left is 0: The device variables for CJ-series Unit are set from the CPU Unit for operation.</li> </ul>
	<p>2. Setting Parameter Group 1 (Continuously Refreshed Parameters)</p>	<p>Regardless of the CPU Unit's modes, these parameters are continuously refreshed. They are refreshed when the Controller is reset or the Unit is restarted.</p> <p>Alarm settings, zero/span adjustment values, and so on, are set here.</p>
	<p>3. Setting Parameter Group 2 (Initial Settings Parameters)</p>	<p>These are the parameters in which the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Input types, process value scaling, advanced alarm functions, etc. are set here.</p>
	<p>4. Parameter Status</p>	<p>Data range error addresses are output here. *</p>
	<p>5. Expansion Setting Parameter Settings</p>	<p>These are the parameters in which the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Expansion Setting Parameter settings are made here.</p>
Expansion Setting Parameters	<p>Various parameters are set in this area.</p>	
	<p>1. Setting Parameter Group 3 (Continuously Refreshed Parameters)</p>	<p>Regardless of the CPU Unit's modes, these parameters are continuously refreshed. They are refreshed when the Controller is reset or the Unit is restarted.</p> <p>Settings, such as the rate-of-change value alarm setting, are set here.</p>
	<p>2. Setting Parameter Group 4 (Initial Settings Parameters)</p>	<p>If the Expansion Setting Parameters are allocated, the data from the CPU Unit is refreshed once when the Controller is reset or the Unit is restarted.</p> <p>Expansion Operation Data settings, rate-of-change function, zero/span adjustment function, and so on, are set here.</p>

- \* The ERC indicator on the Unit's front panel will light if an out-of-range setting is made in either Setting Parameter Group 1 (Continuously Refreshed Parameters) or Setting Parameter Group 2 (Initial Settings Parameters). The offset (the number of words) from the start address to the lowest address that has the range error will be output in the Address of Data Range Error. If the lowest address that has the range error is an Expansion Setting Parameter, the offset value shown in the Address of Data Range Error will be 100 or greater. (The value will be 100 if the first word of the Expansion Setting Parameters is erroneous.) For the correspondence between range error addresses and setting parameter or expansion setting parameter addresses, refer to *A-3 Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses*. "m" in the table indicates the first word allocated in DM.  $m = D20000 + (N \times 100)$  (N: Unit number)

## ● Unit Restart

To restart the Unit after the Initial Settings Parameters are changed or an error is corrected, restart the Unit with the following methods.

The changes in the Initial Settings Parameters are reflected after restart.

- Reset the Controller from Sysmac Studio
- Restart from Sysmac Studio when initial settings parameters are transferred from Sysmac Studio.
- Reconnect the Controller power supply to reset the Controller.
- Restart from the program by a ResetUnit instruction.
- Restart using the system-defined variable. (Restart by changing the value from 0 to 1.)

A unit number from 00 to 95 is included in place of \*\* in `*_CJB_SIO**Restart`.



### Precautions for Safe Use

When you restart the Unit after you change the Unit setting, first carefully check the safety of the target device connected to.



### Precautions for Correct Use

If the error persists after the restart, replace this Unit.

## 1-7 Operating Procedures

Use the following procedures to operate the Analog I/O Unit. The procedures are the same for all models.

### Initial Setup (Hardware)

- 1** Set the unit number by using the rotary switches on the front panel of the Unit.  
Set the same number as in the Unit Configuration settings.
- 2** Mount the Unit to either a CPU Rack or Expansion Rack.
- 3** Connect sensors.
- 4** Turn ON the power to the Controller.
- 5** Allow time for warmup.

Analog I/O Units require time to warm up after the power to the Controller is turned ON. Warmup times differ for each Unit, as shown in the following table.

Model	Warmup time
CJ1W-AD04U	30 min
CJ1W-PH41U	Platinum Resistance Thermometer Inputs: 30 min Thermocouple, $\pm 100$ -mV user-set range inputs: 45 min Current and voltage inputs (except for $\pm 100$ -mV user-set range inputs): 30 min Potentiometer inputs: 10 min
CJ1W-PDC15	10 min

## Initial Software Setup

---

Use Sysmac Studio to create and set programs.

For operations of Sysmac Studio, refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

### 1 Create the Unit Configuration.

Create it on the CPU/Expansion Racks screen in Configurations and Setup of Sysmac Studio. At this time, set both the device name and the unit number of the unit to be registered.

The "device name" assigned to the Unit when it was registered is appended at the beginning of the device variable name for CJ-series Unit. To use the Expansion Setting Parameters and Expansion Operation Data, register the structure data type specified for each unit on the CPU/Expansion Racks screen in Configurations and Setup. With the unit selected, right click **Register Unit Data Type**. The data type is registered and becomes usable.

### 2 Create initial setting parameters using **Special Unit Setup Editing** of Sysmac Studio to set input signal levels, scaling settings, advanced alarm functions, etc. When you use a rate-of-change function, zero/span adjustment function, or the like, set the addresses of CJ-series Unit memory for the Expansion Setting Parameters and Expansion Operation Data.

### 3 Create the device variables for a CJ-series Unit. Create the variable from **I/O map** in Sysmac Studio.

### 4 When you use a rate-of-change function, zero/span adjustment function, or the like, set the addresses of CJ-series Unit memory for the Expansion Setting Parameters and Expansion Operation Data. Use data structures for the Expansion Setting Parameters and Expansion Operation Data to create user-defined variables. Assign these via AT specification to the addresses of memory used for CJ-series Units for Expansion Setting Parameter and Expansion Operation data specified in step 2.

### 5 Create the user program and necessary user-defined variables.

### 6 Transfer the created user program, variable information, and unit configuration and setup to the CPU Unit.

### 7 Reset the Controller or restart the unit.



#### Precautions for Safe Use

---

- When initial settings parameters are set in Sysmac Studio and transferred, Sysmac Studio checks whether or not the unit must be restarted. Restart the unit after you confirm the safety of the connected destination.
  - The initial settings parameters will be transferred to the unit when the Controller is reset or when the unit restarts.
-

# 1-8 Error Processing

The following table shows the meanings of the indicator displays of the Analog I/O Unit. The contents shown here are the same for all models. For error processing specific to each Unit, refer to *2-1-13 Error Processing* for CJ1W-PDC15, *3-1-12 Error Processing* for CJ1W-AD04U, and *3-2-13 Error Processing* for CJ1W-PH41U.

## 1-8-1 Errors Detected by the Analog I/O Unit

ERC Indicator (red)	RUN Indicator (green)	Meaning	Probable cause	Unit operation	Remedy
Lit	Lit	Setting Parameter Group 1 (Continuously Refreshed Parameters) error	The Analog I/O Unit started up and was operating properly, but an out-of-range setting was made in Setting Parameter Group 1 (Continuously Refreshed Parameters) of the Setting Parameters.	The Unit continues the operation with the Setting Parameter Group 1 (Continuously Refreshed Parameters) data prior to the change.	Restore the set value to within the allowable range. (There is no need to reset the Controller or restart the Unit.)
	Not lit	Setting Parameter Group 1 (Continuously Refreshed Parameters) or Setting Parameter Group 2 (Initial Settings Parameters) error. Or, Expansion Setting Parameters error.	An out-of-range setting was made for either Setting Parameter Group 1 (Continuously Refreshed Parameters) or Setting Parameter Group 2 (Initial Settings Parameters) of the Setting Parameters.	The Unit will not start up.	Restore the set value to within the allowable range, and then either reset the Controller or restart the Unit.

The following table shows the processing and results for Setting Parameter Group 1 (Continuously Refreshed Parameters).

Processing	Result	Indicators on Unit	Device variable for CJ-series Unit *_CfgErrAdr
When an out-of-range setting is made while power is ON	The Unit continues operating with the Setting Parameter Group 1 (Continuously Refreshed Parameters) data prior to the change.	ERC indicator is lit. RUN indicator remains lit.	The offset value from the first word of the parameter storing address where the range error occurred is output.
↓			
When the setting is changed within the allowable range during operation	The Unit operates with the Setting Parameter Group 1 (Continuously Refreshed Parameters) data after the change.	ERC indicator is not lit. RUN indicator remains lit.	If there is no other error, 0 is output. (If there is another error, the offset value for that parameter storing address is output.)

Processing	Result	Indicators on Unit	Device variable for CJ-series Unit *_CfgErrAdr
When the Controller is reset or the Unit is restarted with an error still in effect	The Unit will not start up.	ERC indicator is lit. RUN indicator is not lit.	The offset value from the first word of the parameter storing address where the range error occurred is output.
↓			
When the setting is made within the allowable range, and the Controller is reset or the Unit is restarted	The Unit starts up normally.	ERC indicator is not lit. RUN indicator is lit.	If there is no other error, 0 is output. (If there is another error, the offset value for that parameter storing address is output.)

The following table shows the processing and results for Setting Parameter Group 2 (Initial Settings Parameters).

Processing	Result	Indicators on Unit	Device variable for CJ-series Unit *_CfgErrAdr
When an out-of-range setting is made while power is ON	The Unit operates with the Setting Parameter Group 2 (Initial Settings Parameters) data prior to the change.	ERC indicator is not lit. RUN indicator remains lit.	If there is no error in the set value, 0 is output. (If the set value has an error, the offset value for that parameter storing address is output.)
↓			
When the Controller is reset or the Unit is restarted with an error still in effect	The Unit will not start up.	ERC indicator is lit. RUN indicator is not lit.	The offset value from the first word of the parameter storing address where the range error occurred is output.
↓			
When the setting is made within the allowable range, and the Controller is reset or the Unit is restarted	The Unit starts up normally.	ERC indicator is not lit. RUN indicator is lit.	If there is no other error, 0 is output. (If there is another error, the offset value for that parameter storing address is output.)

## 1-8-2 Errors Related to the CPU Unit

ERH Indicator (red)	RUN Indicator (green)	Meaning	Probable cause	Error type	Detailed cause	Unit status	Remedy
Lit	Lit	Error in data exchange with the CPU Unit	During normal operation, an I/O bus check error, CPU Unit monitoring error, or WDT error occurred at the CPU Unit.	I/O bus check error	A data transmission error occurred between the CPU Unit and the Analog I/O Unit.	Conversion data becomes 0.	Turn OFF the power supply and check the installation conditions and the cable connections between devices. Then turn the power back ON.
				CPU Unit monitoring error	The CPU Unit did not respond within a fixed period of time.	Maintains the status existing before the error.	
				CPU Unit WDT error	WDT error occurred at CPU Unit.	Changes to undefined state.	
Not lit	Not lit	Error in Analog I/O Unit's unit number or mounting	Either the unit number is set incorrectly or the Unit is mounted incorrectly.	Duplicate Unit Number	The same unit number was assigned to more than one Unit or the unit number was set to a value other than 00 to 95.	Conversion does not start.	Reset the unit number so that it will not duplicate any other, then reset the Controller.
				I/O Setting Check Error	The Analog I/O Units registered in the Unit Configuration are different from the ones actually mounted.		Check the mounting locations, and either mount the Units according to the Unit Configuration in the CPU Unit or correct the Unit Configuration, and then reset the Controller.
				A major fault level Controller error occurred in the CPU Unit when the power was turned ON.			



### Precautions for Correct Use

If either of the following changes is made for the Expansion Setting Parameters for the CJ1W-PDC15/-PH41U, the previous data will be retained in the addresses even after the change is made.

Clear the previous data to change either of these settings.

- The area of expansion setting parameter is disabled.
- The internal I/O memory address of S is changed while the area of expansion setting parameter is enabled.

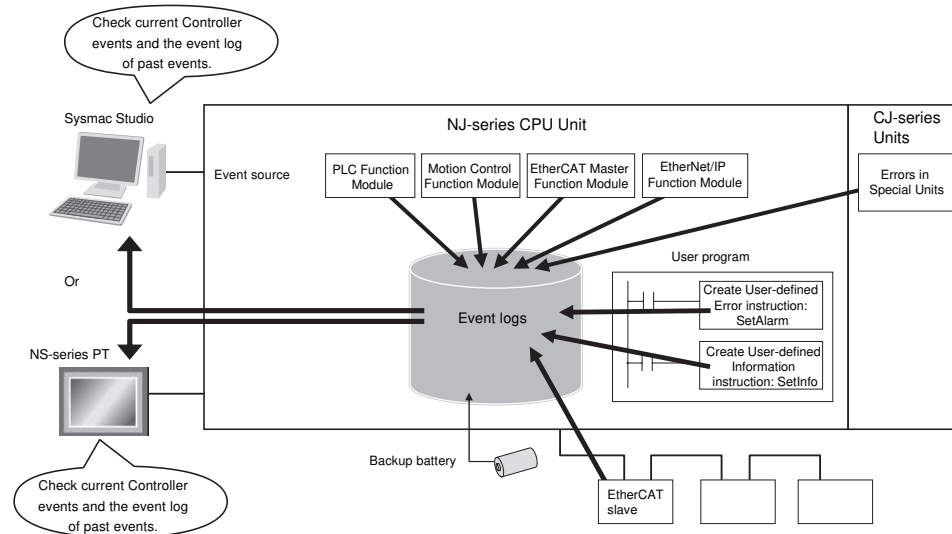


## 1-8-3 Event Logs

### Overview of the Event Logs

You use the same methods to manage all of the events that occur on the NJ-series Controller. (The events include errors and information.) You can use the Sysmac Studio or an NS-series PT to confirm current Controller events and the logs of events that have occurred. These logs are called event logs. Controller errors that occur for this Unit are also reported as events in the NJ-series CPU Unit.

Refer to the *NJ-series CPU Unit Software User's Manual* (Cat. No. W501) for details on the event logs in an *NJ-series CPU Unit*. Refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503) for details on Controller errors, confirmation methods, and corrections.



To use an NS-series PT to check events, connect the PT to the built-in EtherNet/IP port on the CPU Unit.

## Error Table

The errors that may occur for this Unit are listed below.

The following abbreviations and symbols are used in the event level column.

Abbreviation	Name
Maj	Major fault level
Prt	Partial fault level
Min	Minor fault level
Obs	Observation
Info	Information

Symbol	Meaning
S	Event levels that are defined by the system.
U	Event levels that can be changed by the user.*

\* This symbol appears only for events for which the user can change the event level.

A version in parentheses in the *Event code* column is the unit version of the CPU Unit when the event was added.

Refer to the *NJ-series Troubleshooting Manual* (Cat. No. W503) for all of the event codes that may occur in an NJ-series Controller.

Event code	Event name	Meaning	Assumed cause	Level					Reference
				Maj	Prt	Min	Obs	Info	
04600000 hex	A/D Conversion Error	An error occurred in A/D conversion.	<ul style="list-style-type: none"> <li>There is a source of noise nearby.</li> <li>A/D converter failed.</li> </ul>			S	U		Page 1-48
04610000 hex	Cold Junction Sensor Error	An error occurred in the cold junction sensor.	<ul style="list-style-type: none"> <li>Faulty connection to the cold junction sensor for the CJ1W-PH41U.</li> <li>The cold junction sensor failed.</li> </ul>			S	U		Page 1-48
04620000 hex	Non-volatile Memory Error	An error occurred in non-volatile memory.	<ul style="list-style-type: none"> <li>There is a source of noise nearby.</li> <li>Non-volatile memory failed.</li> </ul>			S			Page 1-49
348D0000 hex	Data Range Error	A set value is out of range.	<ul style="list-style-type: none"> <li>A set value is out of range.</li> </ul>			S			Page 1-49
647A0000 hex	Input Error	An input error occurred.	<ul style="list-style-type: none"> <li>The analog input signal is out of range.</li> <li>Input wiring is broken.</li> <li>Input wiring disconnection or loose terminal</li> </ul>			S	U		Page 1-50
647D0000 hex	Zero/Span Adjustment Period End	The zero/span adjustment period expired.	<ul style="list-style-type: none"> <li>The zero/span adjustment period expired.</li> </ul>			U	S		Page 1-50
647E0000 hex	Zero/Span Adjustment Period Notice	The zero/span adjustment period is close to expiring.	<ul style="list-style-type: none"> <li>The notification period for the expiration of zero/span adjustment occurred.</li> </ul>			U	S		Page 1-51

## Error Descriptions

This section describes the information that is given for individual errors.

### ● Controller Error Descriptions

The items that are used to describe individual errors (events) are described in the following copy of an error table.

Event name	Gives the name of the error.			Event code	Gives the code of the error.	
Meaning	Gives a short description of the error.					
Source	Gives the source of the error.		Source details	Gives details on the source of the error.	Detection timing	Tells when the error is detected.
Error attributes	Level	Tells the level of influence on control.*1	Recovery	Gives the recovery method.*2	Log category	Tells which log the error is saved in.*3
Effects	User program	Tells what will happen to execution of the user program.*4	Operation	Provides special information on the operation that results from the error (event).		
System-defined variables	Variable	Data type		Name		
	Lists the variable names, data types, and meanings for system-defined variables that provide direct error notification, that are directly affected by the error, or that contain settings that cause the error.					
Cause and correction	Assumed cause		Correction		Prevention	
	Lists the possible causes, corrections, and preventive measures for the error.					
Attached information	This is the attached information that is displayed by the Sysmac Studio or an NS-series PT.					
Precautions/Remarks	Provides precautions, restrictions, and supplemental information. If the user can set the event level, the event levels that can be set, the recovery method, operational information, and other information are also provided.					

\*1 One of the following:

Major fault: Major fault level  
 Partial fault: Partial fault level  
 Minor fault: Minor fault level  
 Observation  
 Information

\*2 One of the following:

Automatic recovery: Normal status is restored automatically when the cause of the error is removed.  
 Error reset: Normal status is restored when the error is reset after the cause of the error is removed.  
 Cycle the power supply: Normal status is restored when the power supply to the Controller is turned OFF and then back ON after the cause of the error is removed.  
 Controller reset: Normal status is restored when the Controller is reset after the cause of the error is removed.  
 Depends on cause: The recovery method depends on the cause of the error.

\*3 One of the following:

System: System event log  
 Access: Access event log

\*4 One of the following:

Continues: Execution of the user program will continue.  
 Stops: Execution of the user program stops.  
 Starts: Execution of the user program starts.

## ● Error Descriptions

Event name	A/D Conversion Error		Event code	04600000 hex		
Meaning	An error occurred in A/D conversion.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	Immediately previous values are held in the Unit and data is not updated.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is a source of noise nearby.		Implement noise countermeasures.		Use the Unit away from sources of noise. Implement noise countermeasures.	
	A/D converter failure.		If the above cause does not apply, replace the Unit.		None	
Attached information	None					
Precautions/Remarks	PH41U: If this error occurs three periods in a row, there is an error in the Special I/O Unit. You can change the event level to the observation level. If you change the level to the observation level, recovery procedures are not required.					

Event name	Cold Junction Sensor Error		Event code	04610000 hex		
Meaning	An error occurred in the cold junction sensor.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	The measurement value for the input will not include cold-junction compensation.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	Faulty connection to the cold junction sensor for the CJ1W-PH41U.		Check the connection of the cold junction sensor (i.e., terminal block) and reconnect it if the connection is faulty.		Securely connect the cold junction sensor (i.e., terminal block).	
	The cold junction sensor failed.		Replace the Unit.		None	
Attached information	CJ1W-AD04U: Input number where error was detected, CJ1W-PH41U: None					
Precautions/Remarks	You can change the event level to the observation level. If you change the level to the observation level, recovery procedures are not required.					

Event name	Non-volatile Memory Error			Event code	04620000 hex	
Meaning	An error occurred in non-volatile memory.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Cycle the power supply.	Log category	System
Effects	User program	Continues.	Operation	The Unit will stop if this error is detected in self-diagnosis when the power supply is turned ON. Operation continues if the error occurs during operation.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	There is a source of noise nearby.		Implement noise countermeasures.		Use the Unit away from sources of noise. Implement noise countermeasures.	
	Non-volatile memory failure		If the above cause does not apply, replace the Unit.		None	
Attached information	None					
Precautions/Remarks	None					

Event name	Data Range Error			Event code	348D0000 hex	
Meaning	A set value is out of range.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	<p>The operation depends on the parameter in which the error occurred.</p> <p>If there is an error in set values 1 (normally updated parameters): Operation continues with the previous setting of the parameter. After the power supply is cycled, the Controller is reset, or the Unit is restarted, conversion does not start for the Unit and the data is 0.</p> <p>If there is an error in set values 2 (initial setting parameters): After the power supply is cycled, the Controller is reset, or the Unit is restarted, conversion does not start for the Unit and the data is 0.</p>		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	A set value is out of range.		Correct the set value of the address offset that is given in device variable <code>*(Ch#_)CfgErrAdr</code> so that it is within the specified range. “#” in the variable name is the input number.		Set a value so that it is within the specified range.	
Attached information	<p>Attached information 1: CJ1W-AD04U: None CJ1W-PDC15 or CJ1W-PH41U: Input number where error was detected</p> <p>Attached information 2: Offset from the first word of the parameter address where the range error occurred.</p>					
Precautions/Remarks	None					

Event name	Input Error		Event code	647A0000 hex		
Meaning	An input error occurred.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Error reset	Log category	System
Effects	User program	Continues.	Operation	CJ1W-PDC15: The measurement value will be the minimum value (-15%) CJ1W-AD04U or CJ1W-PH41U: The measurement value depends on the parameter settings and will be the maximum value (115%) or minimum value (-15%).		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The analog input signal is out of range.		If the analog input signal level is not appropriate, set the correct signal level.		Check to see if the analog input signal level is correct.	
	Input wiring is broken.		Check the input wiring and replace it if it is broken.		Check the cable to see if it is broken.	
	Input wiring disconnection or loose terminal		Confirm that the wiring is connected securely. Reconnect the wiring if the contact is faulty.		Confirm that the wiring is connected securely.	
Attached information	Input number where error was detected					
Precautions/Remarks	You can change the event level to the observation level. If you change the level to the observation level, recovery procedures are not required.					

Event name	Zero/Span Adjustment Period End		Event code	647D0000 hex		
Meaning	The zero/span adjustment period expired.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Observation	Recovery	---	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The zero/span adjustment period expired.		Perform zero/span adjustment.		Perform zero/span adjustment before the valid period for zero/span adjustment expires.	
Attached information	Input number					
Precautions/Remarks	You can change the event level to the minor fault level. If you change the level to the minor fault level, the <i>Recovery</i> column above will be changed to "Error reset."					

Event name	Zero/Span Adjustment Period Notice			Event code	647E0000 hex	
Meaning	The zero/span adjustment period is close to expiring.					
Source	PLC Function Module		Source details	CJ-series Unit	Detection timing	Continuously
Error attributes	Level	Observation	Recovery	---	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The notification period for the expiration of zero/span adjustment occurred.		Perform zero/span adjustment.		---	
Attached information	Input number					
Precautions/Remarks	You can change the event level to the minor fault level. If you change the level to the minor fault level, the <i>Recovery</i> column above will be changed to "Error reset."					





# 2

## Isolated-type Direct Current Input Unit

This section describes each of the CJ-series Isolated-type Direct Current Input Units in detail.

---

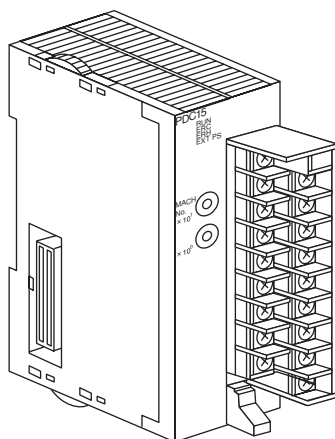
<b>2-1</b>	<b>CJ1W-PDC15 Isolated-type Direct Current Input Unit</b>	<b>2-2</b>
2-1-1	Overview	2-2
2-1-2	System Configuration	2-2
2-1-3	Features	2-3
2-1-4	Model Information	2-3
2-1-5	Block Diagram (Order of Processing)	2-4
2-1-6	Specifications	2-5
2-1-7	Setting Parameters (Device Variables for CJ-series Unit)	2-7
2-1-8	Operation Data (Device Variables for CJ-series Unit)	2-9
2-1-9	Expansion Setting Parameters (User-defined Variables: <code>_sCJPDC15_Ex_Param Type</code> )	2-10
2-1-10	Expansion Operation Data (User-defined Variables: <code>_sCJPDC15_Ex_CmdSta Type</code> )	2-11
2-1-11	Terminal Connection Diagram	2-12
2-1-12	Terminal Block Diagram	2-14
2-1-13	Error Processing	2-14

## 2-1 CJ1W-PDC15 Isolated-type Direct Current Input Unit

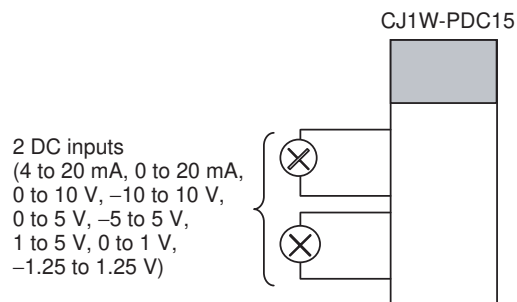
### 2-1-1 Overview

The CJ1W-PDC15 Isolated-type Direct Current Input Unit provides two direct-current inputs. All inputs are isolated.

#### ● CJ1W-PDC15



### 2-1-2 System Configuration



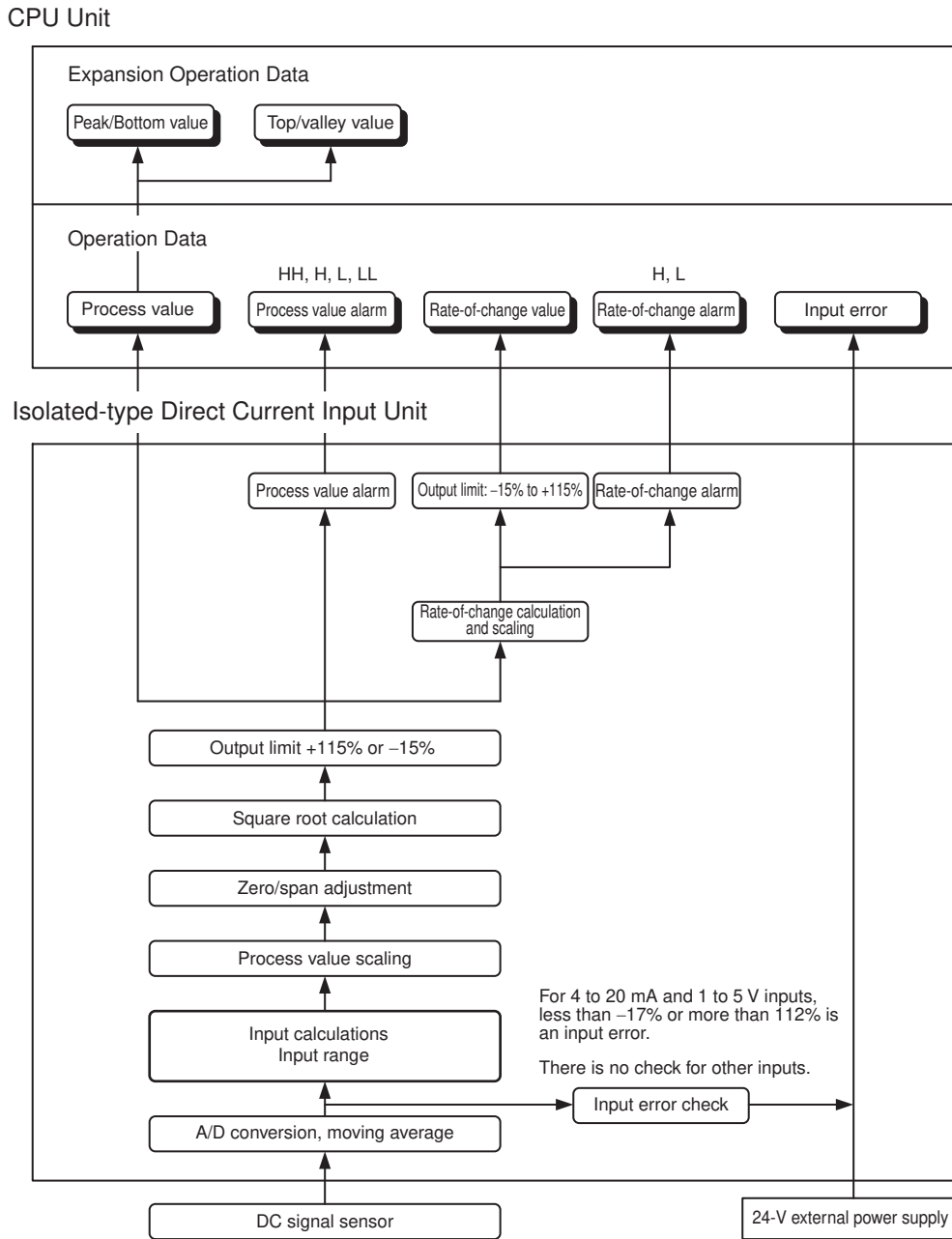
### 2-1-3 Features

- Up to two DC inputs can be made to each Unit.  
4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, or -1.25 to 1.25 V can be selected separately for each input.
- Resolution of 1/64,000 for all input range specifications.
- High-speed conversion, at 10 ms/2 inputs.
- Scaling to industrial unit is possible.
- There is isolation between channels, so unwanted signal paths between input signals can be prevented.
- Square root calculation.
- Four values for each process value alarm input.
- ON-delay timer for process value alarm.
- Mean value processing.
- Rate-of-change calculation.
- Two values for each rate-of-change alarm input.
- Input error detection.
- Zero/span adjustment capability during operation.
- Adjustment period control.
- Peak and bottom detection.
- Top and valley detection.
- Integral value calculation.

### 2-1-4 Model Information

Unit classification	Model number	Inputs	Input types
CJ-series Special I/O Unit	CJ1W-PDC15	2	4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, and -1.25 to 1.25 V (separate for each input)

2-1-5 Block Diagram (Order of Processing)



## 2-1-6 Specifications

Item		Specifications
Model		CJ1W-PDC15
Applicable PLC		NJ Series
Unit classification		CJ-series Special I/O Unit
Mounting position		NJ-series CPU Rack, Expansion Rack
Maximum number of Units		40 (within the allowable current consumption and power consumption range)
Unit numbers		00 to 95 (Cannot duplicate Special I/O Unit numbers.)
Areas for data exchange	Operation Data	10 words/Unit (device variables for CJ-series Unit)
		Direct Current Input Unit to CPU Unit: All process values, process value alarms (LL, L, H, HH), rate-of-change values, rate-of-change alarms (L, H), disconnection alarms, cold junction sensor errors, adjustment period end/notice.
	Setting Parameters *1	100 words/Unit (device variables for CJ-series Unit)
		CPU Unit to Direct Current Input Unit: Input types, input range (user setting), process value scaling, rate-of-change input range, rate-of-change value scaling, number of items for moving average, process value alarm setting (LL, L, H, HH), rate-of-change alarm setting (L, H), zero/span adjustment value, square root calculation function, Expansion Setting Parameters settings.
Expansion Operation Data	35 words/Unit (user-defined variables: <i>_sCJPDC15_Ex_CmdSta</i> type)	
	CPU Unit to Direct Current Input Unit: Bits for beginning or resetting the hold function selection, adjustment period control, control bits Direct Current Input Unit to CPU Unit: Adjustment period notices, peak and bottom values, top and valley values, integral values	
Expansion Setting Parameters *1	46 words/Unit (user-defined variables: <i>_sCJPDC15_Ex_Param</i> type)	
	CPU Unit to Direct Current Input Unit: Expansion Operation Data settings, adjustment period control, peak and bottom detection, top and valley detection, integral value calculation	
Number of inputs		2
Input signal type		4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, -1.25 to 1.25 V (separate for each input), and $\pm 10$ -V user-set range (specified range within -10.000 V to 10.000 V)
Scaling		It is possible to scale process data. (Any minimum and maximum values can be set.) (2 inputs set separately.) Data can be converted at 0% to 100%.
Process data		The value derived from carrying out the following processing in order of the actual process data in the input range is output as a 16-bit integer (INT). 1) Mean value processing → 2) Scaling → 3) Zero/span adjustment → 4) Square root calculation → 5) Output limits
Accuracy (25°C)		$\pm 0.05\%$
Temperature coefficient		$\pm 0.008\%/^{\circ}\text{C}$
Resolution		1/64,000
Input signal range		For 4 to 20 mA, 0 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V, 0 to 1.25 V inputs: -15 to 115% For -10 to 10 V, -5 to 5 V, -1.25 to 1.25 V inputs: -7.5 to 107.5%
Maximum input rating		Voltage: $\pm 15$ V Current: $\pm 30$ mA
Input impedance		For current inputs: 250 $\Omega$ (typical) For voltage inputs: 1 M $\Omega$ min.
Response time		100 ms max. (travel time from input 0% to 90%, for $\pm 10$ V step input and with moving average for 4 samples)
Warmup time		10 min
Conversion cycle		10 ms/2 inputs

## 2 Isolated-type Direct Current Input Unit

Item		Specifications
Maximum time to store data in CPU Unit		Conversion cycle + CPU Unit one task period
Input error detection		Check only for 4 to 20 mA and 1 to 5 V. Error detected for -17.2% (1.25 mA, 0.3125 V) or less and 112.5% (22 mA, 5.5 V) or more.
Operation at input disconnection		For 4 to 20 mA and 1 to 5 V: Stores -15% process value. For all other ranges: Stores same process value as 0-V or 0-mA inputs.
Input disconnection detection delay time		Approx. 1 s.
Function	Mean value processing (input filter)	Calculates the moving average for the specified number of past process values (1 to 128).
	Process value alarm	Process value 4-point alarm (LL, L H, HH), hysteresis, and ON-delay timer (0 to 60 s) are available.
	Rate-of-change calculation	Calculates the amount of change per comparison time interval (1 to 16 s).
	Rate-of-change alarm	Rate-of-change 2-point alarm (H, L), alarm hysteresis, and ON-delay timer (0 to 60 s are available, shared with process value alarm).
	Square root calculation *2	When the maximum value for process value scaling is A and the minimum value is B, $\text{Output} = \sqrt{(A - B) \times (\text{input} - B)} + B$ Drop-out: Output approx. 7% max. linear (output = input) characteristic
	Adjustment period control	When zero/span adjustment is executed, the date is internally recorded at the Unit. When the preset "zero/span adjustment period" and the "notice of days remaining" have elapsed, this function turns ON a warning flag to give notice that it is time for readjustment.
	Peak and bottom detection	This function detects the maximum and minimum values for analog inputs while the Hold Start Flag is ON and outputs the data.
	Top and valley detection	This function detects the top and valley values for analog inputs while the Hold Start Flag is ON and outputs the data.
	Integral value calculation	This function calculates the analog input value's time integral. The integral value is calculated and output when the Integral Value Calculation Start Bit is turned ON.
Isolation		Between inputs and internal signals, and between inputs: Power supply = Transformer, Signal = Photocoupler
Insulation resistance		20 MΩ (at 500 V DC) between all inputs
Dielectric strength		Between inputs: 1,000 V AC, at 50/60 Hz, for 1 min, leakage current 10 mA max.
External terminal connections		Terminal block (detachable)
Unit number settings		Set by rotary switches on front panel, from 0 to 95.
Indicators		Four LED indicators on front panel (for normal operation, errors detected at the Direct Current Input Unit, and errors detected at the CPU Unit).
Front panel connector		Sensor input connector terminal block (detachable)
Current consumption		5 V DC at 180 mA max.
External power supply		24 V DC +10%/-15% 90 mA max., inrush current: 20 A for 1 ms max. (The external 24-VDC power supply must be isolated.)
Dimensions		31 × 90 × 65 mm (W × H × D)
Weight		150 g max.
Standard accessories		Short bars (for current input)

\*1 The setting parameters are retained in the CPU unit by the battery even during power interruptions. Whether or not expansion setting parameters are retained even during power interruptions depends on the AT specification area specification.

\*2 The square root calculation function can only be used when the maximum scaling value is greater than the minimum scaling value. The square root will not be found if the maximum is smaller than the minimum. When the square root calculation function is used, set the scaling values after square root calculation (e.g., for flow rates or other values) for the process value scaling A and B settings.

## Accuracy and Resolution in $\pm 10$ -V User-set Range

The  $\pm 10$ -V user-set range allows the input signal's input range to be set to any range within  $-10.000$  V to  $10.000$  V. Accuracy and resolution, however, are not determined by the input range, but rather by the measurable input range ( $-10.000$  V to  $10.000$  V). Therefore, accuracy and resolution do not change even if a narrow input range is set.

### 2-1-7 Setting Parameters (Device Variables for CJ-series Unit)

Device variable (name) (1 or 2 is included in place of #.)	Type	R/W	Data range	Default	Parameter contents
*_LoadDefaultCfg	UINT	RW	0/12345	0	Default Block Read Command Once this parameter is set, the following will occur when the Controller is reset or the Unit is restarted. 0: Operation is performed according to the Setting Parameters set from the CPU Unit. 12345: Default values are automatically set in the Setting Parameters.

#### ■ Setting Parameter Group 1: Continuously Refreshed Parameters (parameters that can be changed regardless of the CPU Unit mode)

##### ● Process value alarm settings

*_Ch#_PVAlmValCfg_HH	INT	RW	-32728 to +32767	+4200	Process Value HH (high high limit) Alarm Setting (Set at process value scaling value.)
*_Ch#_PVAlmValCfg_H	INT	RW	-32728 to +32767	+4000	Process Value H (high limit) Alarm Setting (Set at process value scaling value.)
*_Ch#_PVAlmValCfg_L	INT	RW	-32728 to +32767	0	Process Value L (low limit) Alarm Setting (Set at process value scaling value.)
*_Ch#_PVAlmValCfg_LL	INT	RW	-32728 to +32767	-200	Process Value LL (low low limit) Alarm Setting (Set at process value scaling value.)

##### ● Rate-of-change value alarm settings

*_Ch#_RateAlmValCfg_H	INT	RW	-32728 to +32767	+4000	Rate-of-change Value H (high limit) Alarm Setting (Set at rate-of-change scaling value.)
*_Ch#_RateAlmValCfg_L	INT	RW	-32728 to +32767	0	Rate-of-change value L (low limit) alarm setting (Set at rate-of-change scaling value.)

##### ● Zero/span adjustment

*_Ch#_GainAdjPVCfg	UINT	RW	0 to 32000	10000	Gain for Span Adjustment (set value $\times$ 0.0001)
*_Ch#_ZeroAdjPVCfg	INT	RW	-32000 to +32000	0	Zero Adjustment Value (Set at process value scaling value.)

#### ■ Setting Parameter Group 2: Initial Settings Parameters (Parameters that are changed when the Controller is reset or the Unit is restarted)

##### ● Input signal types

*_Ch#_SensTypCfg	UINT	RW	0 to 9	1	0: $\pm 10$ V      5: 4 to 20 mA 1: 0 to 10 V    6: $\pm 10$ -V user-set range 2: $\pm 5$ V        7: 0 to 20 mA 3: 0 to 5 V     8: $\pm 1.25$ V 4: 1 to 5 V     9: 0 to 1.25 V
------------------	------	----	--------	---	---

##### ● Process value input range settings

*_Ch#_InSpanValCfg_H	INT	RW	-10000 to +10000	+10000	Maximum Value in Range (set value $\times$ 0.001 V) for $\pm 10$ -V User-set Range
*_Ch#_InSpanValCfg_L	INT	RW	-10000 to +10000	0	Minimum Value in Range (set value $\times$ 0.001 V) for $\pm 10$ -V User-set Range

##### ● Process value scaling

Device variable (name) (1 or 2 is included in place of #.)	Type	R/W	Data range	Default	Parameter contents
*_Ch#_PVScIValCfG_H	INT	RW	-32000 to +32000	+4000	Scaling Value for Maximum Value in Range (Span)
*_Ch#_PVScIValCfG_L	INT	RW	-32000 to +32000	0	Scaling Value for Minimum Value in Range (Zero)
<b>● Square root calculation function</b>					
*_Ch#_SqrtCfG	WORD	RW	16#0000/16#0001	16#0000	Square Root Extraction (only enabled when maximum scaling value > minimum scaling value) 16#0000: Disable 16#0001: Enable
<b>● Mean value processing function</b>					
*_Ch#_AveCfG	UINT	RW	1 to 128	25	Number of Values for Calculating Moving Average for Mean Value Processing
<b>● Advanced alarm functions</b>					
*_Ch#_AlmHysTrsValCfG	UINT	RW	0 to 32000	40	Alarm Hysteresis Settings (Shared with process value alarm and rate-of-change alarm.) (Set at process value scaling value.)
*_Ch#_AlmOnDelayTmCfG	UINT	RW	0 to 60	0	Alarm ON-delay Time (Shared with process value alarm and rate-of-change alarm.) Unit: s
<b>● Rate-of-change measurement function</b>					
*_Ch#_InRateSpanValCfG_H	INT	RW	-32000 to +32000	+4000	Maximum Rate-of-change Range Value (Setting scaling value/comparison time interval)
*_Ch#_InRateSpanValCfG_L	INT	RW	-32000 to +32000	-4000	Minimum Rate-of-change Range Value (Setting scaling value/comparison time interval)
*_Ch#_RateScIValCfG_H	INT	RW	-32000 to +32000	+4000	Scaling Value for Maximum Rate-of-change Range Value
*_Ch#_RateScIValCfG_L	INT	RW	-32000 to +32000	-4000	Scaling Value for Minimum Rate-of-change Range Value
*_Ch#_RateCmpIntvlTm	UINT	RW	1 to 16	1	Rate-of-change Comparison Time Interval Unit: s
<b>■ Expansion Setting Parameter settings</b>					
*_ExtMemArea	UINT	RW	0 to 5	---	Area of Expansion Setting Parameter 0: Not used; 1: DM Area; 2: CIO Area; 3: Work Area; 4: Holding Area; 5: EM Area bank 0
*_ExtMemAdr	UINT	RW	0 to 32767	---	First Word in Expansion Setting Parameters Area
<b>■ Parameter status</b>					
*_Ch#_CfGErrAdr	UINT	R	0 to 63	0	Address of Data Range Error

**Note 1** The ERC indicator on the Unit's front panel will light if an out-of-range setting is made in Setting Parameter Group 1 (Continuously Refreshed Parameters), Setting Parameter Group 2 (Initial Settings Parameters), or the Expansion Setting Parameters.

The offset (the number of words) from the start address to the lowest memory address that has the range error will be stored in the Address of Data Range Error.

If the lowest memory address that has the range error is an Expansion Setting Parameter, the offset value shown in the Address of Data Range Error will be 100 or greater. (The value will be 100 if the first word of the Expansion Setting Parameters is erroneous.)

For the correspondence between range error addresses and setting parameter or expansion setting parameter addresses, refer to *A-3 Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses*. "m" in the table indicates the first word allocated in DM.  $m = D20000 + (N \times 100)$  (N: Unit number)

**2** When specifying Expansion Setting Parameters, be sure that the area does not overlap with other areas that are in use.

If areas overlap, the memory may be overwritten and unexpected operation may occur.



- 3 When specifying the start address of Expansion Setting Parameters, be sure that the allocated area does not exceed the range of the memory used for CJ-series Unit in the CPU Unit.

## 2-1-8 Operation Data (Device Variables for CJ-series Unit)

Device variable (name) (1 or 2 is included in place of #.)	Type	R/W	Data range	Data contents	
*_Ch#_AllnPV	INT	R	-32768 to +32767	Process Value Outputs data scaled with the setting parameters.	
*_Ch#_RateVal	INT	R	-32768 to +32767	Rate-of-change Value Outputs data scaled with the setting parameters.	
*_PVAImSta	BYTE	R	16#00 to 16#FF	A BYTE-type variable that includes the following BOOL-type variables:	
*_Ch1_LL_PVAImSta	BOOL	R	0/1	Input No. 1 Process Value LL (low low limit) Alarm 0: No alarm 1: An alarm occurred (Process value exceeds set value.)	00
*_Ch1_L_PVAImSta	BOOL	R	0/1		01
*_Ch1_H_PVAImSta	BOOL	R	0/1		02
*_Ch1_HH_PVAImSta	BOOL	R	0/1		03
*_Ch2_LL_PVAImSta	BOOL	R	0/1		04
*_Ch2_L_PVAImSta	BOOL	R	0/1		05
*_Ch2_H_PVAImSta	BOOL	R	0/1		06
*_Ch2_HH_PVAImSta	BOOL	R	0/1		07
*_RateAlmSta	BYTE	R	16#00 to 16#0F	A BYTE-type variable that includes the following BOOL-type variables:	
*_Ch1_L_RateAlmSta	BOOL	R	0/1	Input No. 1 Rate-of-change Value L (low limit) Alarm 0: No alarm 1: An alarm occurred (Process value exceeds set value.)	00
*_Ch1_H_RateAlmSta	BOOL	R	0/1		01
*_Ch2_L_RateAlmSta	BOOL	R	0/1		02
*_Ch2_H_RateAlmSta	BOOL	R	0/1		03
*_ErrSta	BYTE	R	16#00 to 16#C3	A BYTE-type variable that includes the following BOOL-type variables:	
*_Ch1_Sens_ErrSta	BOOL	R	0/1	Input No. 1 Input Error *1 0: Normal 1: Error (-17.2% max., 112.5% min.) When "External Power Supply (*_ExtPwrValid_ ErrSta)" is "1" and inputs of 4 to 20 mA and 1 to 5 V	00
*_Ch2_Sens_ErrSta	BOOL	R	0/1		01

Device variable (name) (1 or 2 is included in place of #.)	Type	R/W	Data range	Data contents		
*_AdjPrdEnd_ErrSta	BOOL	R	0/1	Zero/Span Adjustment Period End	0: Adjustment valid 1: Adjustment period end	05
*_AdjPrevNotice_ErrSta	BOOL	R	0/1	Zero/Span Adjustment Period Notice	0: Adjustment valid 1: Notice period	06
*_ExtPwrValid_ErrSta	BOOL	R	0/1	External Power Supply *2	0: External power is not supplied 1: External power is supplied	07

\*1 An input error will be detected when External Power Supply (\*\_ExtPwrValid\_ErrSta) is 1 (Used) and inputs of 4 to 20 mA and 1 to 5 V. It becomes 1 (Error) when External Power Supply (\*\_ExtPwrValid\_ErrSta) is 0 (Not used).

\*2 The External Power Supply Flag turns ON after external power is supplied and the internal voltage stabilizes (which requires approximately 2 seconds).  
The indicator on the front panel of the Unit will turn ON as soon as external power is supplied.

### 2-1-9 Expansion Setting Parameters (User-defined Variables: \_sCJPDC15\_Ex\_Param Type)

Member name (1 or 2 is included in place of #.)	Type	R/W	Data range	Default	Parameter contents
<b>■ Setting Parameter Group 3: Initial Settings Parameters (Parameters that are changed when the Controller is reset or the Unit is restarted)</b>					
<b>● Setting of Expansion Operation Data</b>					
ExtIOArea	UINT	RW	0 to 5	---	Area of Expansion Operation Data 0: Not used; 1: DM Area; 2: CIO Area; 3: Work Area; 4: Holding Area; 5: EM Area bank 0
ExtIOAdr	UINT	RW	0 to 32767	---	First Word in Expansion Operation Data Area
<b>● Zero/span adjustment function</b>					
Ch#_GainAdjFVCfg	UINT	RW	0 to 32000	10000	Span Adjustment Position (Input span percentage)
Ch#_ZeroAdjFVCfg	INT	RW	-32000 to +32000	0	Zero Adjustment Position (Input span percentage)
Ch#_AdjPrd	UINT	RW	0 to 9999	365	Zero/Span Adjustment Period Unit: Days
Ch#_AdjNoticeDay	UINT	RW	0 to 9999	30	Notice of Days Remaining Unit: Days
<b>● Top and valley hold</b>					
Ch#_TopVlyHysts	UINT	RW	0 to 32000	40	Top and Valley Detection Hysteresis
<b>● Integral value calculation</b>					
Ch#_IntgUnit	WORD	RW	16#0000/16#0001	16#0000	Integer Unit 0: Minutes; 1: Hours

**Note 1** When specifying Expansion Operation Data, be sure that the area does not overlap with other areas that are in use.  
If areas overlap, the memory may be overwritten and unexpected operation may occur.

**2** When specifying the start address of Expansion Operation Data, be sure that the allocated area does not exceed the range of the memory used for CJ-series Unit in the CPU Unit.

For how to create and use user-defined variables, refer to *User-defined Variables* in 1-6-1 *Exchanging Data with the CPU Unit*.

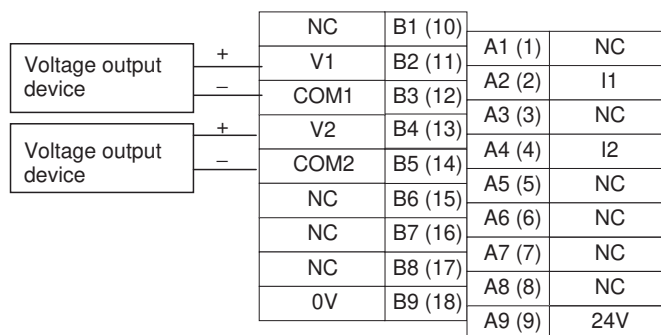
## 2-1-10 Expansion Operation Data (User-defined Variables: \_sCJPD15\_Ex\_CmdSta Type)

Member name (1 or 2 is included in place of #.)	Type	R/W	Data range	Data contents		Bit number
<i>HdMd</i>	BYTE	RW	16#00 to 16#03	A BYTE-type variable that includes the following BOOL-type variables.		Bit number
<i>Ch1_HdMd</i>	BOOL	RW	0/1	Input No. 1 Hold Function Selection	0: Peak and bottom	00
<i>Ch2_HdMd</i>	BOOL	RW	0/1	Input No. 2 Hold Function Selection	1: Top and valley	01
<i>HdCmd</i>	BYTE	RW	16#00 to 16#33	A BYTE-type variable that includes the following BOOL-type variables:		Bit number
<i>Ch1_StartHdCmd</i>	BOOL	RW	0/1	Input No. 1 Hold Start	0: Do not hold	00
<i>Ch2_StartHdCmd</i>	BOOL	RW	0/1	Input No. 2 Hold Start	1: Hold	01
<i>Ch1_RstHdCmd</i>	BOOL	RW	0/1	Input No. 1 Hold Value Reset	0: Normal operation 1: Reset hold value	04
<i>Ch2_RstHdCmd</i>	BOOL	RW	0/1	Input No. 2 Hold Value Reset		05
<i>IntgCmd</i>	BYTE	RW	16#00 to 16#33	A BYTE-type variable that includes the following BOOL-type variables.		Bit number
<i>Ch1_StartIntgCmd</i>	BOOL	RW	0/1	Input No. 1 Integral Value Calculation Start	0: Do not start calculation	00
<i>Ch2_StartIntgCmd</i>	BOOL	RW	0/1	Input No. 2 Integral Value Calculation Start	1: Start calculation	01
<i>Ch1_RstIntgCmd</i>	BOOL	RW	0/1	Input No. 1 Integral Value Reset	0: Normal operation 1: Reset integral value	04
<i>Ch2_RstIntgCmd</i>	BOOL	RW	0/1	Input No. 2 Integral Value Reset		05
<i>AdjCmd</i>	BYTE	RW	16#00 to 16#03	A BYTE-type variable that includes the following BOOL-type variables.		Bit number
<i>Ch1_Upd_AdjCmd</i>	BOOL	RW	0/1	Input No. 1 Zero/Span Adjustment Update	0: Normal operation 1: Update adjustment date	00
<i>Ch2_Upd_AdjCmd</i>	BOOL	RW	0/1	Input No. 2 Zero/Span Adjustment Update		01
<i>Ch#_AdjPrdEnd</i>	BOOL	R	0/1	Zero/Span Adjustment Period End	0: Adjustment valid 1: Adjustment period end	
<i>Ch#_AdjPrevNotice</i>	BOOL	R	0/1	Zero/Span Adjustment Period Notice	0: Adjustment valid 1: Notice period	
<i>MemErr</i>	BOOL	R	0/1	Non-volatile Memory Error	0: Normal 1: Non-volatile Memory Error	
<i>Ch#_LastAdjDate</i>	DWORD	R	16#00010100 to 16#99123100	Final adjustment date (YY-MM-DD-00)		
<i>Ch#_PkTopVal</i>	INT	R	-32768 to +32767	Peak/Top Value Outputs data scaled with the Setting Parameters.		
<i>Ch#_BtmVlyVal</i>	INT	R	-32768 to +32767	Bottom/Valley Value Outputs data scaled with the Setting Parameters.		
<i>Ch#_IntgVal</i>	DINT	R	-2147483648 to 2147483647	Integral Value An integral value of data scaled according to the Setting Parameter is output.		

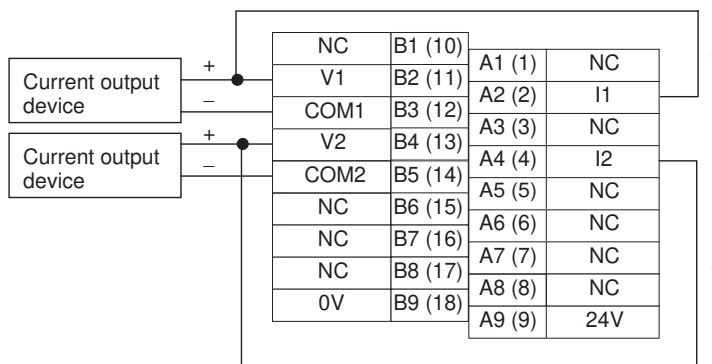
For how to create and use user-defined variables, refer to *User-defined Variables* in 1-6-1 *Exchanging Data with the CPU Unit*.

### 2-1-11 Terminal Connection Diagram

● Voltage Inputs



● Current inputs

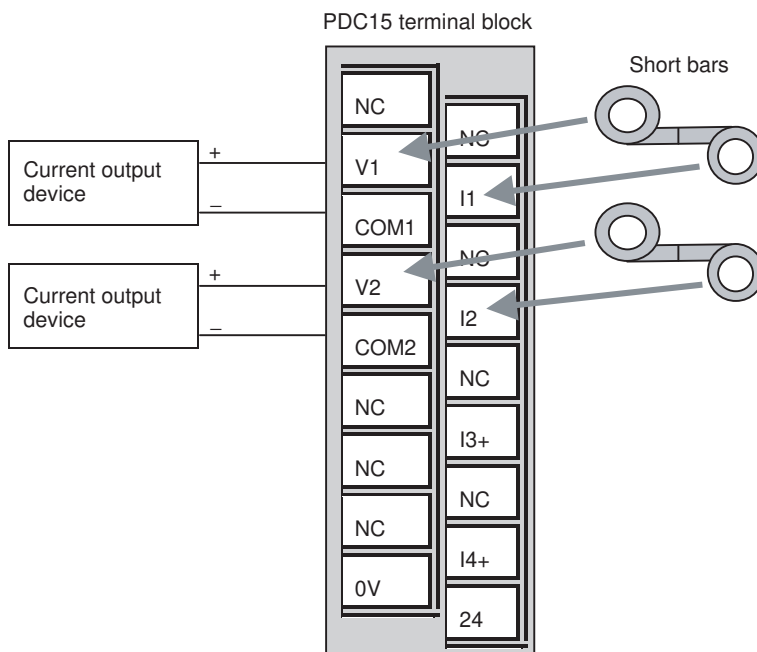


\* Always short-circuit the V and I terminals with the provided short-circuit fitting when using current input.

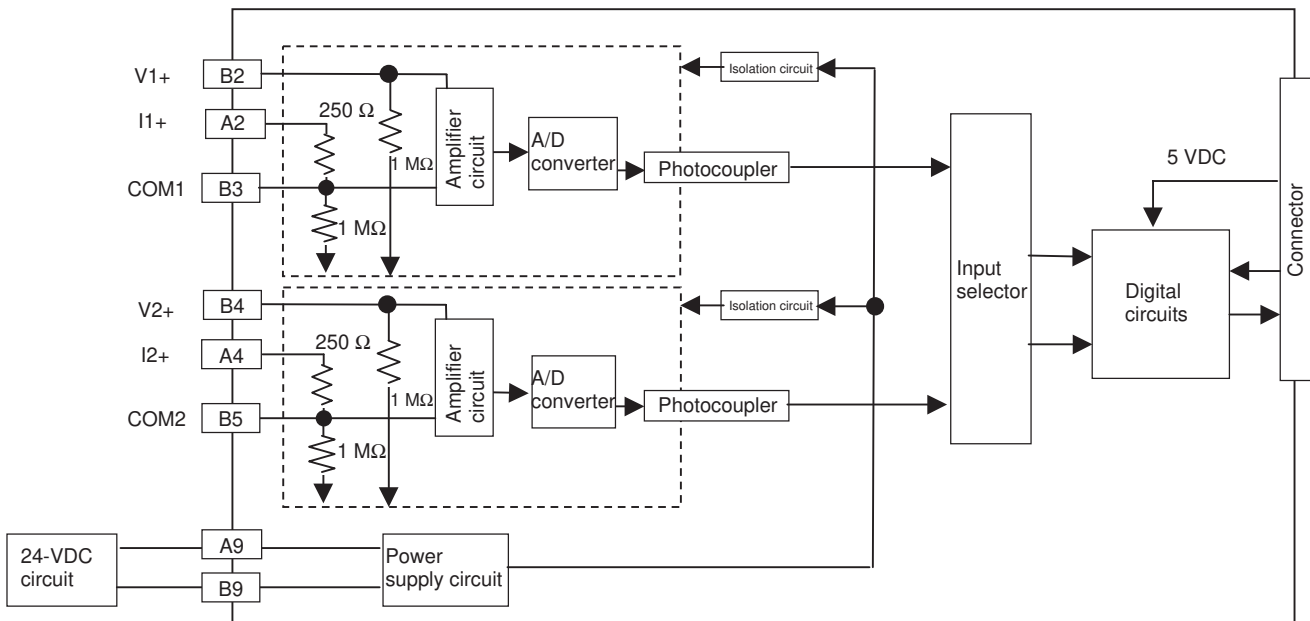


**Precautions for Correct Use**

- In both of the above cases, leave all unused inputs open between the positive and negative terminals (e.g., between B2 and B3 for voltage input No. 1).
- Always ground the GR terminal on the Power Supply Unit.
- If the input device uses a voltage generator, ground terminal, or similar device, then ground the input device.
- Always short-circuit the V and I terminals with the provided short-circuit fitting when using current input.
- Tighten the short-circuit fitting securely to the torque of 0.5 N·m. A loose fitting could cause conversion error.



### 2-1-12 Terminal Block Diagram



### 2-1-13 Error Processing

#### Conversion Data Does Not Change

Probable cause	Remedy
The gain for span adjustment is set to 0.	Set the gain for span adjustment to a value other than 0.
The minimum and maximum values for process value scaling are either the same or are set extremely close.	Set the minimum and maximum values correctly.
The input signal type or process value range is set incorrectly.	Check and reset the input signal type and the process value range settings.
An input device is malfunctioning, input wiring is faulty, or wiring is disconnected.	Check whether the input voltage or current has changed. Check for faulty or disconnected wiring. Check whether an input error has been detected in the I/O Area.

#### Values are Not Converted as Intended

Probable cause	Remedy
The input signal type or process value scaling is set incorrectly.	Check and reset the input signal type and the process value scaling settings.
The zero/span adjustment data is incorrect.	Check and correct the zero/span adjustment settings.
The square root calculation function is operating.	Set the square root calculation function so that it does not operate.

## Converted Values are Unstable

Probable cause	Remedy
Input signals are being affected by external noise.	Change the connection paths of the input signal lines. (Separate them from sources of noise or use shielded cable.)
	Insert 0.01- $\mu$ F to 0.1- $\mu$ F ceramic capacitors between the I+ and COM input terminals.
	Increase the number of values for calculating the moving average in mean value processing.
The scaling value is greater than the Unit's resolution.	Reduce the scaling value.





# 3

## Isolated-type Universal Input Units

This section describes each of the CJ-series Isolated-type Universal Input Units in detail.

---

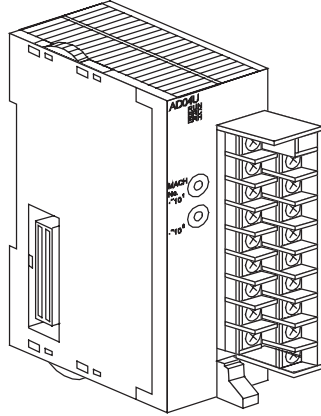
<b>3-1</b>	<b>CJ1W-AD04U Universal Input Units</b>	<b>3-2</b>
3-1-1	Overview	3-2
3-1-2	System Configuration	3-2
3-1-3	Features	3-3
3-1-4	Model Information	3-3
3-1-5	Block Diagram (Order of Processing)	3-4
3-1-6	Specifications	3-5
3-1-7	Setting Parameters (Device Variables for CJ-series Unit)	3-8
3-1-8	Operation Data (Device Variables for CJ-series Unit)	3-10
3-1-9	Expansion Operation Data (User-defined Variables)	3-11
3-1-10	Terminal Connection Diagram	3-11
3-1-11	Terminal Block Diagram	3-12
3-1-12	Error Processing	3-13
<b>3-2</b>	<b>CJ1W-PH41U Isolated-type Universal Input Unit</b>	<b>3-14</b>
3-2-1	Overview	3-14
3-2-2	System Configuration	3-14
3-2-3	Features	3-15
3-2-4	Model Information	3-15
3-2-5	Block Diagram (Order of Processing)	3-16
3-2-6	Specifications	3-17
3-2-7	Setting Parameters (Device Variables for CJ-series Unit)	3-25
3-2-8	Operation Data (Device Variables for CJ-series Unit)	3-28
3-2-9	Expansion Setting Parameters (User-defined Variables: <code>_sCJPH41U_Ex_Param Type</code> )	3-30
3-2-10	Expansion Operation Data (User-defined Variables: <code>_sCJPH41U_Ex_CmdSta Type</code> )	3-32
3-2-11	Terminal Connection Diagram	3-33
3-2-12	Block Diagram	3-35
3-2-13	Error Processing	3-36

## 3-1 CJ1W-AD04U Universal Input Units

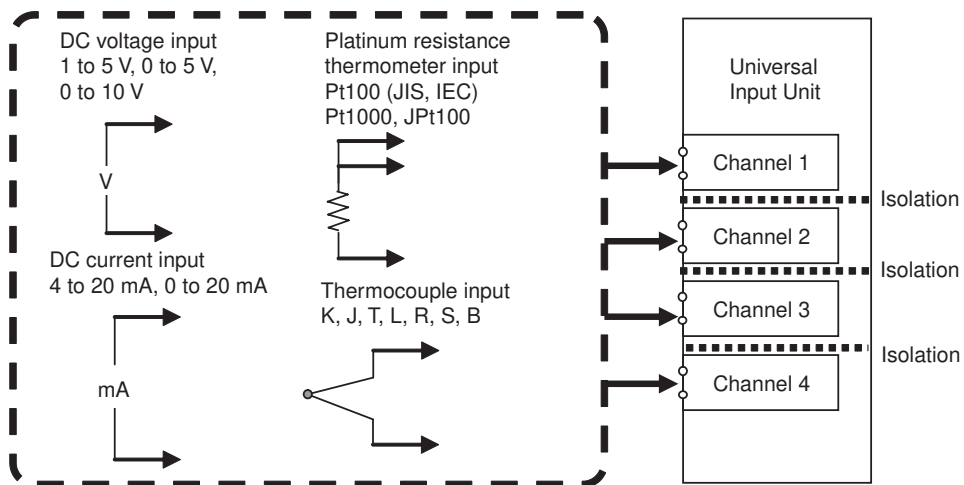
### 3-1-1 Overview

The CJ1W-AD04U Isolated-type Universal Input Unit supports four input channels, each of which can be set to a platinum resistance thermometer, thermocouple, or DC signal input. All inputs are isolated.

CJ1W-AD04U



### 3-1-2 System Configuration



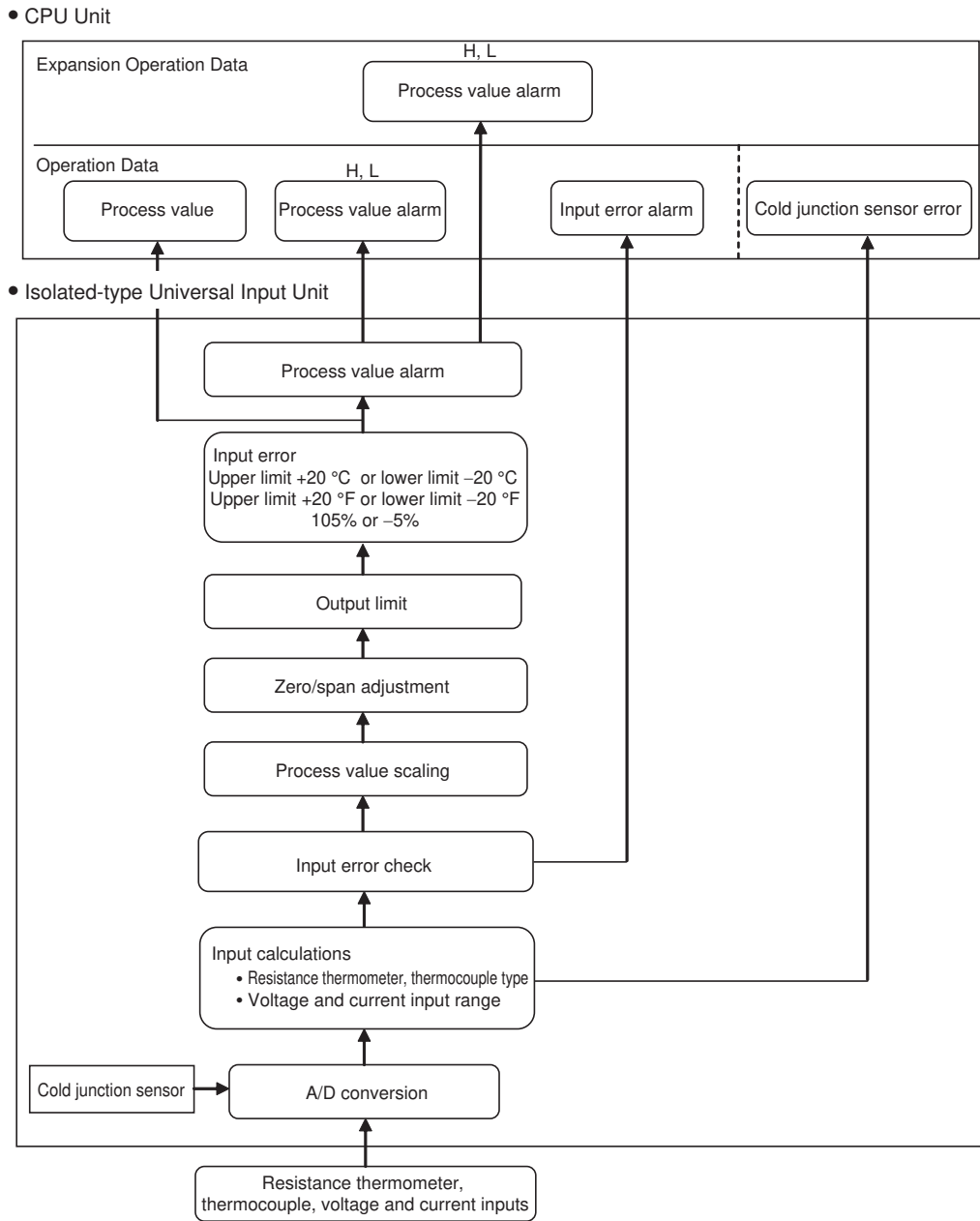
### 3-1-3 Features

- A single Unit supports a maximum of four inputs: platinum resistance thermometer, thermocouple, and DC voltage and current.  
(The input type is set separately for each input.)  
Platinum resistance thermometer input Pt100 (JIS, IEC), Pt1000, or JPt100 can be selected.  
Thermocouple input K, J, T, L, R, S, or B can be selected.  
For DC signal, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, or 0 to 10 V can be selected.
- Isolation between channels prevents unwanted current paths between input signals.
- With voltage or current input, scaling to industrial units is possible.
- Process value alarms (two alarms for each point) are provided.
- ON-delay Timer and hysteresis function are provided for process value alarms.
- Zero and span adjustment during operation is supported.
- Input error detection is supported.
- High or low process value overrange direction can be specified for input error.

### 3-1-4 Model Information

Type of Unit	Model	Number of inputs	Input types
CJ-series Special I/O Units	CJ1W-AD04U	4	Platinum resistance thermometer : Pt100 (JIS, IEC), Pt1000, JPt100 Thermocouple: K, J, T, L, R, S, B Current: 4 to 20mA, 0 to 20mA Voltage: 1 to 5V, 0 to 5V, 0 to 10V The input type can be set separately for each input.

### 3-1-5 Block Diagram (Order of Processing)



3-1-6 Specifications		
Item	Specifications	
Model	CJ1W-AD04U	
Applicable PLC	NJ Series	
Type of Unit	CJ-series Special I/O Unit	
Mounting position	NJ-series CPU Rack, Expansion Rack	
Maximum number of Units	40 (within the allowable current consumption and power consumption range)	
Unit numbers	00 to 95 (Cannot duplicate Special I/O Unit numbers.)	
Areas for exchanging data with the CPU Unit	Operation Data	10 words/Unit (device variables for CJ-series Unit) Isolated-type Universal Input Unit to CPU Unit: All process values, process value alarms (L, H), Conversion Data Enabled Flag, all input errors, cold junction sensor errors
	Setting Parameters *	100 words/Unit (device variables for CJ-series Unit) CPU Unit to Isolated-type Universal Input Unit: Input type, scaling upper limit or lower limit, process value alarm setting (L, H), zero and span adjustment value, alarm ON-delay time, alarm hysteresis, Expansion Operation Data allocation settings
	Expansion Operation Data	1 word/Unit (user-defined variables) Isolated-type Universal Input Unit to CPU Unit: Process Value Alarm
Number of inputs	4	
Input type	Platinum resistance thermometer: Pt100 (JIS, IEC), Pt1000, JPt100 Thermocouple: K, J, T, L, R, S, B Current: 4 to 20 mA, 0 to 20 mA Voltage: 1 to 5 V, 0 to 5 V, 0 to 10 V The input type can be set for individual inputs.	
Scaling (Voltage or current input)	With voltage or current input, process data can be scaled (with user-set minimum and maximum values for data). (4 inputs are set individually.)	
Process data	Voltage or current input: The values derived from carrying out the following processing in order of the actual process data in the input range is output as a 16-bit integer (INT). 1) Scaling → 2) Zero and span adjustment → 3) Output limits Temperature input: The values derived from carrying out the following processing in order of the actual process data in the input range is output as a 16-bit integer (INT). 1) °C and °F conversion → 2) Zero and span adjustment → 3) Output limits (Temperatures are always multiplied by 10 and stored.)	
Accuracy (25 °C) (Sensor error is not included.)	Platinum resistance thermometer input: (±0.3% of PV or ±0.8 °C, whichever is greater) ±1 digit max. Thermocouple input: (±0.3% of PV or ±1.5 °C, whichever is greater) ±1 digit max. However, The accuracy of L is ±2 °C ±1 digit max. The accuracy of K and T at -100°C or lower is ±2 °C ±1 digit max. The accuracy of R and S at 200°C or lower is ±3 °C ±1 digit max. The accuracy of B at 400 °C or lower is not specified. Voltage or current input: (±0.3% FS) ±1 digit max.	

Item	Specifications
Temperature coefficient	±100 ppm FS/°C max.
Resolution	For 1/12,000 (voltage or current input) temperature input, refer to <i>Input Types and Input Ranges</i> on page 3-7.
Input signal range	Voltage or current input: –5% to 105% of the input range set by scaling Temperature input: ±20 °C or ±20 °F in relation to the high or low limit for each sensor range.
Maximum rated input	Voltage input: ±15 V, current input: 30 mA
Input impedance	Temperature input: 10 kΩ max., voltage input: 1 MΩ max., current input: 250 Ω (fixed)
Warmup time	30 min
Thermocouple input	Internal sensors are used for cold junction compensation.
Platinum resistance thermometer input	<ul style="list-style-type: none"> <li>• Sensing method: 3-wire method</li> <li>• Allowable lead wire resistance: 20 Ω max. per wire</li> <li>• Input detection current: 1.1 mA</li> </ul>
Conversion cycle	250 ms/ 4 inputs
Maximum time to store data in CPU Unit	Conversion time + CPU Unit one task period
Input error detection	<p>An input error can be detected for each input (excluding voltage or current input of 0 to 20 mA, 0 to 5 V and 0 to 10 V).</p> <p>Detection level</p> <ul style="list-style-type: none"> <li>• Temperature input: When the upper or lower limit of each sensor range is exceeded by 20°C or 20°F</li> <li>• 1 to 5 V: Input signal &lt; 0.3 V</li> <li>• 4 to 20 mA: Input signal &lt; 1.2 mA</li> </ul> <p>Input Error Flag turns ON when a disconnection occurs or the input range is exceeded.</p> <p>The process value overrange direction for when an input error occurs can be specified.</p>
Process value alarm	<p>Two process value alarms (L, H), hysteresis, and ON-delay Timer (0 to 60 s) can be set.</p> <p>Process value alarm bits can be copied to selectable addresses of Expansion Operation Data.</p>
Isolation	Between inputs and internal signals, and between inputs: Power supply = Transformer, Signal = Photocoupler
Insulation resistance	20 MΩ (at 500 V DC) between all inputs
Dielectric strength	Between all inputs: 500 V AC, at 50 or 60 Hz, for 1 min, leakage current 1 mA max.
External terminal connections	Terminal block (detachable)
Indicators	Three LED indicators on front panel (for normal operation, errors detected at the Universal Input Unit, and errors detected at the CPU Unit).
Unit number settings	Set by rotary switches on front panel, from 0 to 95.
Current consumption (supplied by Power Supply Unit)	5 VDC at 320 mA max.
Dimensions	31 × 90 × 65 mm (W × H × D)
Weight	150 g max.

\* The setting parameters are retained in the CPU unit by the battery even during power interruptions.

## Input Types and Input Ranges

The input types are set in the Setting Parameter for each input.

Input type		Setting parameter	Measurable input range	
Resistance thermometer	Pt100	0	-200.0 to 650.0 °C	-300.0 to 1200.0 °F
	JPt100	3	-200.0 to 650.0 °C	-300.0 to 1200.0 °F
	Pt1000	7	-200.0 to 650.0 °C	-300.0 to 1200.0 °F
Thermocouple	K	21	-200.0 to 1300.0 °C	-300.0 to 2300.0 °F
	J	23	-100.0 to 850.0 °C	-100.0 to 1500.0 °F
	T	25	-200.0 to 400.0 °C	-300.0 to 700.0 °F
	L	33	-100.0 to 850.0 °C	-100.0 to 1500.0 °F
	R	36	0.0 to 1700.0 °C	0.0 to 3000.0 °F
	S	37	0.0 to 1700.0 °C	0.0 to 3000.0 °F
	B	38	100.0 to 1800.0 °C	300.0 to 3200.0 °F
DC signal	4 to 20 mA	48	4 to 20 mA	
	0 to 20 mA	49	0 to 20 mA	
	1 to 5 V	50	1 to 5 V	
	0 to 5 V	53	0 to 5 V	
	0 to 10 V	54	0 to 10 V	

The measured temperature error is calculated as shown in the following example.

Example:

Item	Details
Ambient temperature	30 °C
Thermocouple type	K
Measurable input range (PV)	500°C
Reference accuracy (25°C)	±0.3% of PV or ±1.5 °C, whichever is greater, ±1 digit. In this example, ±1.5 °C.
Temperature characteristics	±100 ppm FS/°C In this example, 100 ppm × 1,300°C = 0.13°C.
Change in ambient temperature	5 °C (25 to 30 °C)

Overall accuracy = Reference accuracy + Temperature characteristic × Change in ambient temperature  
= ±1.5 °C + ±0.13 °C × 5 = Approx. ±2.2 °C ±1 digit.

### 3-1-7 Setting Parameters (Device Variables for CJ-series Unit)

Device variable (name)	Type	R/W	Data range	Default	Parameter contents	
*_LoadDefaultCfg	UINT	RW	0 or 12345	0	Default Block Read Command Once this parameter is set, the following will occur when the Controller is reset or the Unit is restarted. 0: Operates with the setting parameters set from the CPU Unit. 12345: Automatically sets the default values for the setting parameters.	
<b>■ Setting Parameter Group 1: Continuously Refreshed Parameters (parameters that can be changed regardless of the CPU Unit mode) *1</b>						
<b>● Process value alarm settings</b>						
*_Ch#_PVAlmValCfg_H	INT	RW	-32728 to +32767	+32767	Process Value H (high limit) Alarm Setting (Set at process value scaling value.)	
*_Ch#_PVAlmValCfg_L	INT	RW	-32728 to +32767	-32768	Process Value L (low limit) Alarm Setting (Set at process value scaling value.)	
<b>• Zero/span adjustment</b>						
*_Ch#_GainAdjPVCfg	UINT	RW	0 to 32000	10000	Gain for Span Adjustment (set value × 0.0001)	
*_Ch#_ZeroAdjPVCfg	INT	RW	-9999 to +9999	0	Zero Adjustment Value (Set at process value scaling value.) • Temperature input: Set value × 0.1 °C, or 0.1 °F • Voltage or current input: Set value × 1 digit	
<b>■ Setting Parameter Group 2: Initial Settings Parameters (Parameters that are changed when the Controller is reset or the Unit is restarted) *1</b>						
<b>● Operation Settings</b>						
*_PVUnitCfg	BYTE	RW	16#00 to 16#0F	16#00	A BYTE-type variable that includes the following BOOL-type variables:	Bit number
*_Ch1_PVUnitCfg	BOOL	RW	0 or 1	0	Input No. 1 Temperature unit	0: °C 1: °F
*_Ch2_PVUnitCfg	BOOL	RW	0 or 1	0	Input No. 2 Temperature unit	
*_Ch3_PVUnitCfg	BOOL	RW	0 or 1	0	Input No. 3 Temperature unit	
*_Ch4_PVUnitCfg	BOOL	RW	0 or 1	0	Input No. 4 Temperature unit	
*_SensErrCfg	BYTE	RW	16#00 to 16#0F	16#00	A BYTE-type variable that includes the following BOOL-type variables:	Bit number
*_Ch1_SensErrCfg	BOOL	RW	0 or 1	0	Input No. 1 Data Overrange Direction for Sensor Error	0: Upper 1: Lower
*_Ch2_SensErrCfg	BOOL	RW	0 or 1	0	Input No. 2 Data Overrange Direction for Sensor Error	
*_Ch3_SensErrCfg	BOOL	RW	0 or 1	0	Input No. 3 Data Overrange Direction for Sensor Error	
*_Ch4_SensErrCfg	BOOL	RW	0 or 1	0	Input No. 4 Data Overrange Direction for Sensor Error	



Device variable (name)	Type	R/W	Data range	Default	Parameter contents
<b>● Input Signal Type</b>					
*_Ch#_SensTypCfg	UINT	RW	0 to 54	54	0: RTD-Pt100    21: TC-K    48: 4 to 20mA 3: RTD-JPt100    23: TC-J    49: 0 to 20mA 7: RTD-Pt1000    25: TC-T    50: 1 to 5V 33: TC-L    53: 0 to 5V 36: TC-R    54: 0 to 10V 37: TC-S 38: TC-B
<b>● Advanced alarm functions</b>					
*_Ch#_AlmHystersValCfg	UINT	RW	0 to 9999	0	Alarm Hysteresis • Temperature input: Set value × 0.1 °C, or 0.1 °F • Voltage or current input: Set value × 1 digit
*_Ch#_AlmOnDelayTmCfg	UINT	RW	0 to 60	0	Alarm ON-delay Time Unit: s
<b>● Process value scaling</b>					
*_Ch#_PVScIValCfg_H	INT	RW	-32000 to +32000	+4000	Scaling Value for Maximum Value in Range (Span)
*_Ch#_PVScIValCfg_L	INT	RW	-32000 to +32000	0	Scaling Value for Minimum Value in Range (Zero)
<b>● Expansion Operation Data allocation settings *2</b>					
*_ExtIOCfg	WORD	RW	16#0000 or 16#0001	16#0000	Expansion Operation Data Setting 0: Not used, 1: Used
*_ExtIOAdr	UINT	RW	0 to 6143	0	First Word in Expansion Operation Data Area In the Expansion Operation Data, the same data as PVAlmSta is output.
<b>■ Parameter status</b>					
*_CfgErrAdr	UINT	R	0 to 40	0	Address of Data Range Error

- \*1 The ERC indicator on the Unit's front panel will light if an out-of-range setting is made in either Setting Parameter Group 1 (Continuously Refreshed Parameters) or Setting Parameter Group 2 (Initial Settings Parameters). The offset (the number of words) from the start address to the lowest memory address that has the range error will be stored in the Address of Data Range Error.  
For the correspondence between range error addresses and setting parameter addresses, refer to *A-3 Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses*. "m" in the table indicates the First Word allocated in DM.  $m = D20000 + (N \times 100)$  (N: Unit number)
- \*2 When specifying Expansion Operation Data, be sure that the area does not overlap with other areas that are in use.  
If areas overlap, the memory may be overwritten and unexpected operation may occur.

## 3-1-8 Operation Data (Device Variables for CJ-series Unit)

Device variable (name) (1 or 4 is included in place of #.)	Type	R/W	Data range	Data contents		
*_Ch#_AllnPV	INT	R	-32768 to +32767	Process value Data scaled according to the Setting Parameter is output.		
*_PVAlmSta	WORD	R	16#00 to 16#FF	A WORD-type variable that includes the following BOOL-type variables.		Bit number
*_Ch1_L_PVAlmSta	BOOL	R	0 or 1	Input No. 1 Process Value L (low limit) Alarm	0: No alarm 1: An alarm occurred (Process value exceeds set value.)	00
*_Ch1_H_PVAlmSta	BOOL	R	0 or 1	Input No. 1 Process Value H (high limit) Alarm		01
*_Ch2_L_PVAlmSta	BOOL	R	0 or 1	Input No. 2 Process Value L (low limit) Alarm		02
*_Ch2_H_PVAlmSta	BOOL	R	0 or 1	Input No. 2 Process Value H (high limit) Alarm		03
*_Ch3_L_PVAlmSta	BOOL	R	0 or 1	Input No. 3 Process Value L (low limit) Alarm		04
*_Ch3_H_PVAlmSta	BOOL	R	0 or 1	Input No. 3 Process Value H (high limit) Alarm		05
*_Ch4_L_PVAlmSta	BOOL	R	0 or 1	Input No. 4 Process Value L (low limit) Alarm		06
*_Ch4_H_PVAlmSta	BOOL	R	0 or 1	Input No. 4 Process Value H (high limit) Alarm		07
*_ErrSta	WORD	R	16#00 to 16#8F0F	A WORD-type variable that includes the following BOOL-type variables.		Bit number
*_Ch1_Sens_ErrSta	BOOL	R	0 or 1	Input No. 1 Input Error	0: Normal 1: Error	00
*_Ch2_Sens_ErrSta	BOOL	R	0 or 1	Input No. 2 Input Error		01
*_Ch3_Sens_ErrSta	BOOL	R	0 or 1	Input No. 3 Input Error		02
*_Ch4_Sens_ErrSta	BOOL	R	0 or 1	Input No. 4 Input Error		03
*_Ch1_CJ_ErrSta	BOOL	R	0 or 1	Input No. 1 Cold Junction Sensor Error	0: Normal 1: Error	08
*_Ch2_CJ_ErrSta	BOOL	R	0 or 1	Input No. 2 Cold Junction Sensor Error		09
*_Ch3_CJ_ErrSta	BOOL	R	0 or 1	Input No. 3 Cold Junction Sensor Error		10
*_Ch4_CJ_ErrSta	BOOL	R	0 or 1	Input No. 4 Cold Junction Sensor Error		11
*_PVValid_ErrSta	BOOL	R	0 or 1	Conversion Data Enabled Flag *	0: Data invalid 1: Data valid	15

\* The Conversion Data Enabled Flag becomes 0 after the Controller is reset or the Unit is restarted until the AD conversion data becomes stable (approximately 2 to 4 seconds), then becomes 1 during operation.

### 3-1-9 Expansion Operation Data (User-defined Variables)

First word: o = Address specified by the device variable for CJ-series Unit *\*\_ExtIOAdr* in the Setting Parameter

Channel	Bit	Name		Data item	Contents
o	00	Input No. 1	Process Value L (low limit) Alarm	0 or 1	0: Process value > Set value 1: Process value ≤ Set value
	01		Process Value H (high limit) Alarm	0 or 1	0: Process value < Set value 1: Process value ≥ Set value
	02	Input No. 2	Process Value L (low limit) Alarm	0 or 1	Same as for input No. 1.
	03		Process Value H (high limit) Alarm		
	04	Input No. 3	Process Value L (low limit) Alarm	0 or 1	Same as for input No. 1.
	05		Process Value H (high limit) Alarm		
	06	Input No. 4	Process Value L (low limit) Alarm	0 or 1	Same as for input No. 1.
	07		Process Value H (high limit) Alarm		
08 to 15	Not used.				

**Note 1** When specifying Expansion Operation Data, be sure that the area does not overlap with other areas that are in use.  
If areas overlap, the memory may be overwritten and unexpected operation may occur.

**Note 2** These contents are the same as those output to device variables for CJ-series Unit *\*\_PVAlmSta*, *\*\_Ch#\_L\_PVAlmSta*, and *\*\_Ch#\_H\_PVAlmSta* for Operation Data.

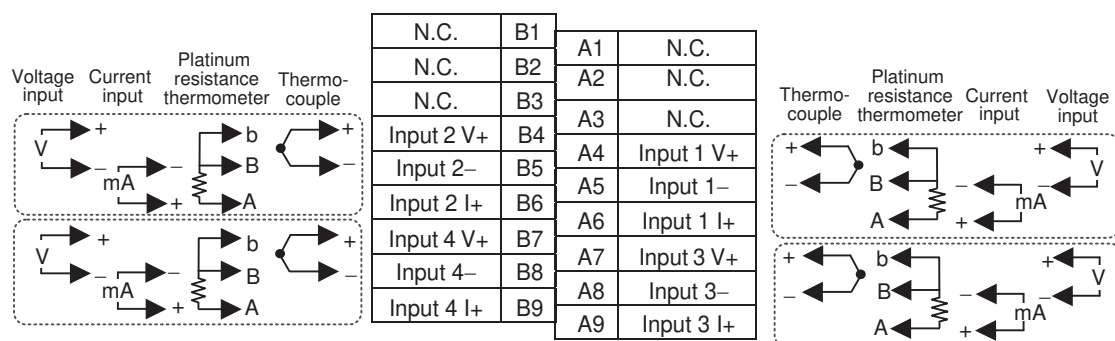
**Note 3** The CJ1W-AD04U does not have structure data types for Expansion Operation Data.

**Note 4** The CJ1W-AD04U does not have structure data types for Expansion Operation Data.

### 3-1-10 Terminal Connection Diagram

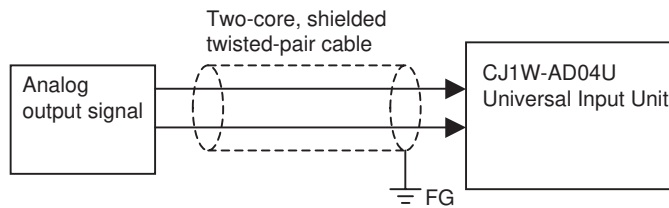
#### Terminal Arrangement

The following diagram shows the signal names associated with the connecting terminals.



## Wiring Analog Inputs

Ground the shield of the shielded cable to protect against the affects of noise.

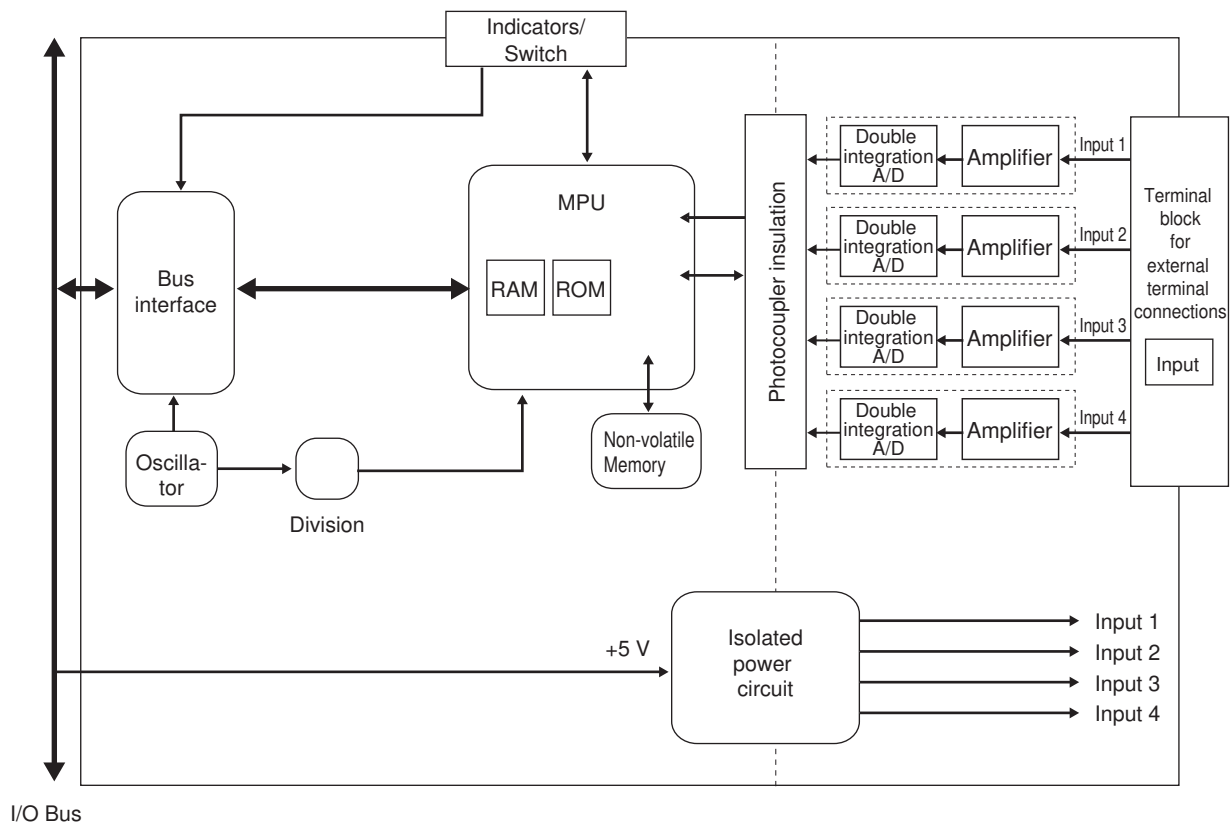


### Precautions for Correct Use

- Be sure to wire the correct terminals when wiring voltage inputs. The Unit may fail if a voltage-input is wired incorrectly.
- Do not connect anything to terminals that are not being used.
- Do not connect anything to NC terminals.
- Wire the same lengths to A, B, and b so that the impedance will be the same. In particular, do not short circuit between B and b at the terminal block. (in the case of resistance thermometer)
- Always ground the GR terminal on the Power Supply Unit.
- Be sure to ground all input devices (such as voltage generators, temperature calibrators, and resistors) that have ground terminals.

## 3-1-11 Terminal Block Diagram

### Internal Configuration



## 3-1-12 Error Processing

### Conversion Data Does Not Change

Probable cause	Remedy
The gain for span adjustment is set to 0.	Set the gain for span adjustment to a value other than 0.
The input type setting is incorrect.	Check and correct the input type setting.
An input device is faulty, input wiring is incorrectly wired, or wiring is disconnected.	Check whether the input value is changing. Check for faulty or disconnected wiring. Check whether a sensor error has been detected.
The minimum and maximum values for process value scaling are either the same or are set too close together.	Set the minimum and maximum process value scaling values correctly.

### Values are Not Converted as Intended

Probable cause	Remedy
The zero/span adjustment values are incorrect.	Check and correct the zero/span adjustment settings.
There is an error in the scaling settings.	Check and correct the scaling settings.
A resistance thermometer's input wiring is incorrect.	Check and correct the input wiring.
The compensating wire is too long and affecting operation.	Use a thicker thermocouple compensating wire.
The input type or process value scaling setting is incorrect.	Check the input type or process value scaling settings and correct if necessary.
Cold junction sensor is not operating.	Check the Cold Junction Sensor Error Flag.
No compensating wire is being used, or another type of compensating wire is being used.	Use the correct thermocouple compensating wire.
The input wiring is faulty. (The polarity is incorrect in the thermocouple or compensating wire.)	Check and correct the input wiring.

### Conversion Values are Unstable

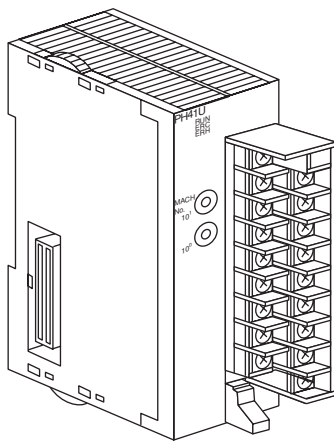
Probable cause	Remedy
The input signals are being affected by external noise.	Change the connection paths of the input signal lines. (Separate them from sources of noise or use shielded twisted cable.) Insert a 0.01- $\mu$ F to 0.1- $\mu$ F ceramic capacitor or film capacitor between the input's (+) and (-) terminals.
The process value is being scaled beyond the Unit's resolution.	Reduce the process value's scaling value.

## 3-2 CJ1W-PH41U Isolated-type Universal Input Unit

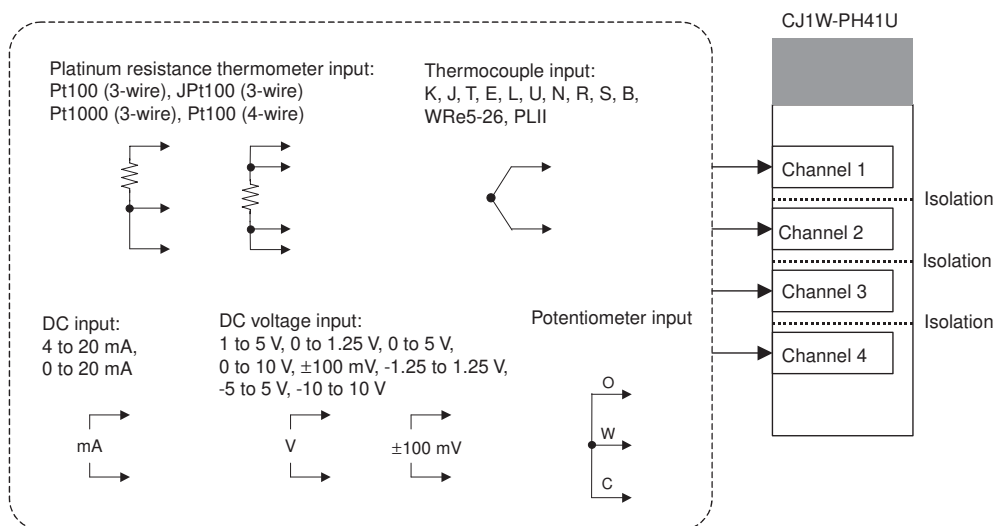
### 3-2-1 Overview

The CJ1W-PH41U Isolated-type Universal Input Unit supports four input channels, each of which can be set to a resistance thermometer, thermocouple, DC signal, or potentiometer input. All inputs are isolated.

#### ● CJ1W-PH41U



### 3-2-2 System Configuration



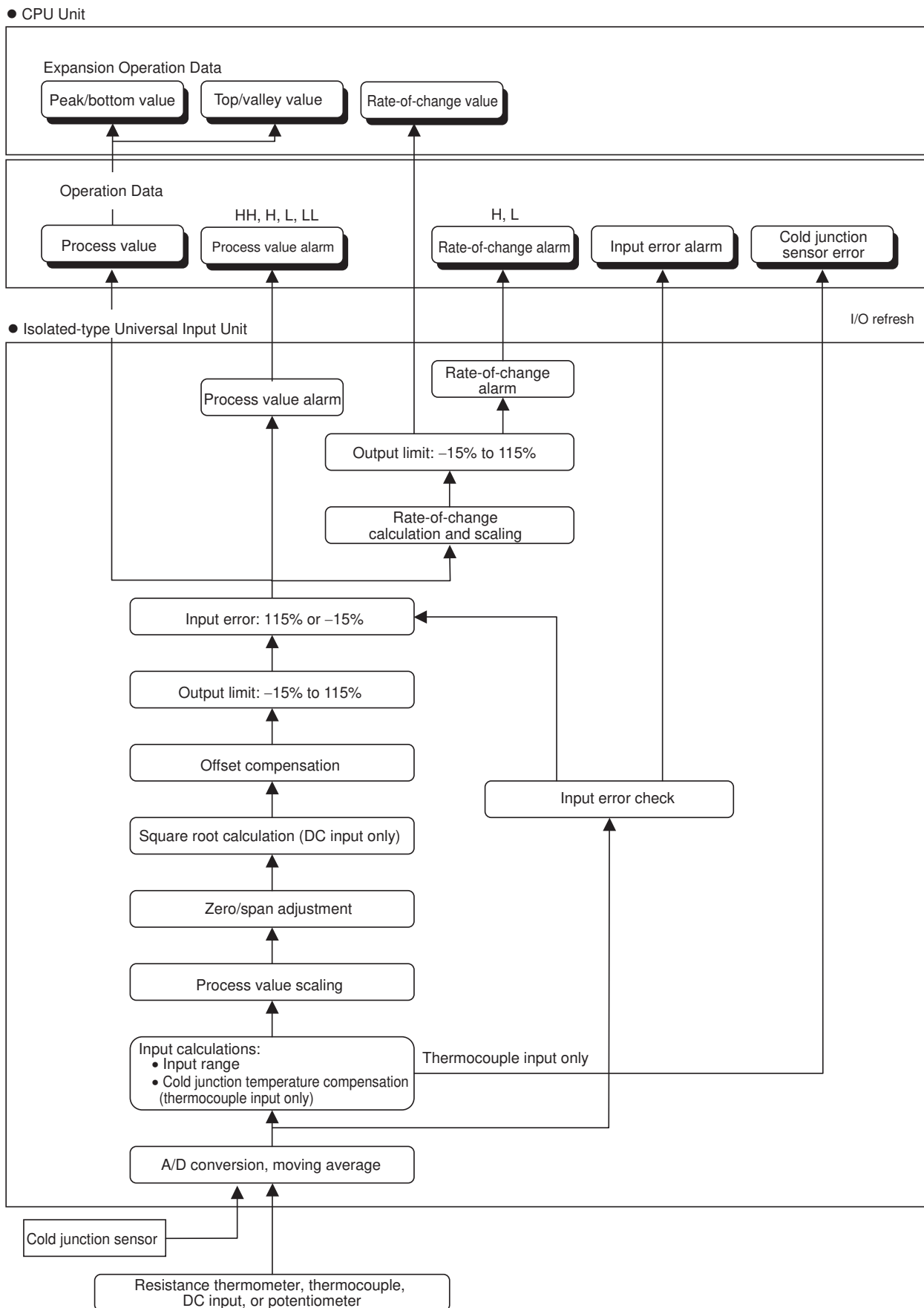
### 3-2-3 Features

- A single Unit supports a maximum of four inputs: resistance thermometer, thermocouple, DC current/voltage, and potentiometer. The input type is set separately for each input. Platinum resistance thermometer input Pt100 (JIS, IEC 3-wire), JPt100 (3-wire), Pt1000 (3-wire), or Pt100 (JIS, IEC 4-wire) can be selected. Thermocouple input K, J, T, E, L, U, N, R, S, B, WRe5-26, or PLII can be selected. For DC signal, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V,  $\pm 100$  mV,  $-1.25$  to  $1.25$  V,  $-5$  to  $5$  V, or  $-10$  to  $10$  V can be selected. In addition, a potentiometer input can be selected.
- Isolation between input channels prevents unwanted current paths between input channels.
- A minimum resolution of  $1/256,000$  is achieved.
- The conversion cycle is 60 ms/4 points at a resolution of  $1/256,000$ , 10 ms/4 points at  $1/64,000$  (Pt1000 or a potentiometer input cannot be selected), and 5 ms/4 points at  $1/16,000$  (K and E thermocouple inputs only can be selected). The fastest conversion cycle is automatically set for the resolution.
- Scaling to industrial unit is possible.
- Input ranges can be set to any values.
- Process value alarms (four alarms for each point) are provided.
- Alarm ON/OFF delay timer and hysteresis are provided for process values.
- Averaging function is provided.
- Rate-of-change function is provided.
- Rate-of-change alarms (two alarms for each point) are provided.
- Zero/span adjustment during operation is supported.
- Input error detection is supported.
- Specification of the data overrange direction during disconnection is supported.
- Adjustment period control is provided.
- Peak and bottom value detection is supported.
- Top and valley value detection is supported.
- Square root calculation (DC input only) is supported.
- Integral value calculation is supported.

### 3-2-4 Model Information

Type of Unit	Model	Number of inputs	Input types
CJ-series Special I/O Unit	CJ1W-PH41U	4	Resistance thermometer: Pt100 (JIS, IEC 3-wire), JPt100 (3-wire), Pt1000 (3-wire), Pt100 (JIS, IEC 4-wire) Thermocouple: K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII Current: 4 to 20 mA, 0 to 20 mA Voltage: 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, $\pm 100$ mV, $-1.25$ to $1.25$ V, $-5$ to $5$ V, $-10$ to $10$ V Potentiometer: The input type is set separately for each input.

### 3-2-5 Block Diagram (Order of Processing)





## 3-2-6 Specifications

Item		Specifications
Model		CJ1W-PH41U
Applicable PLC		NJ Series
Type of Unit		CJ-series Special I/O Unit
Mounting position		NJ-series CPU Rack, Expansion Rack
Maximum number of Units		40 (within the allowable current consumption and power consumption range)
Unit numbers		00 to 95 (Cannot duplicate Special I/O Unit numbers.)
Areas for exchanging data with the CPU Unit	Operation Data	10 words/Unit (device variables for CJ-series Unit) Isolated-type Universal Input Unit to CPU Unit: All process values, process value alarms (LL, L, H, HH), rate-of-change alarms (L, H), input errors (such as disconnection alarms), cold junction sensor errors, and zero/span adjustment period end/notices.
	Setting Parameters *1	100 words/Unit (device variables for CJ-series Unit) CPU Unit to Isolated-type Universal Input Unit: Operation settings, input type, input range (user setting), temperature unit, data over-range direction for sensor error, scaling upper and lower limits, scaling offset value, alarm hysteresis, alarm ON/OFF delay time, number of items for moving average, Expansion Setting Parameter settings, process value alarm settings (L, H), zero/span adjustment value.
	Expansion Operation Data	46 words/Unit (user-defined variables: <code>_sCJPH41U_Ex_CmdSta</code> type) CPU Unit to Isolated-type Universal Input Unit: Hold function selection start/reset, integral value calculation start/reset, zero/span adjustment period flag Isolated-type Universal Input Unit to CPU Unit: All rate-of-change values, zero/span adjustment period notices (all inputs), Non-volatile Memory Error, final adjustment date, top and valley detection flags, peak and bottom values, top and valley values, integral value.
	Expansion Setting Parameters *1	100 words/Unit (user-defined variables: <code>_sCJPH41U_Ex_Param</code> type) CPU Unit to Isolated-type Universal Input Unit: Expansion Operation Data settings, square root calculation enable, rate-of-change input range, rate-of-change comparison time interval, rate-of-change scaling upper and lower limits, zero/span adjustment position, zero/span adjustment period and notice of days remaining, top and valley hysteresis, integral value calculation integer unit and integer coefficient, resistance thermometer compensation enable, platinum resistance thermometers thermometer reference resistance, cold junction compensation method, process value alarm settings (LL, HH), rate-of-change alarm settings (L, H).
Number of inputs		4
Input type	Resolution: 1/256,000 (Conversion cycle: 60 ms)	Pt100 (JIS, IEC 3-wire), JPt100 (3-wire), Pt1000 (3-wire), Pt100 (JIS, IEC 4-wire), K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, $\pm 100$ mV user-set range, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V, $\pm 10$ V user-set range, potentiometer (all inputs). The input type, input range, and scaling can be set for individual inputs. The input range for DC inputs, however, can be set only for input types with user-set input ranges.
	Resolution: 1/64,000 (Conversion cycle: 10 ms)	Pt100 (JIS, IEC 3-wire), JPt100 (3-wire), Pt100 (JIS, IEC 4-wire), K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, $\pm 100$ mV user-set range, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V, $\pm 10$ V user-set range (all inputs). The input type, input range, and scaling can be set for individual inputs. The input range for DC inputs, however, can be set only for input types with user-set input ranges.
	Resolution: 1/16,000 (Conversion cycle: 5 ms)	K, E

Item	Specifications
Applicable standards for resistance thermometer and thermocouple inputs	Pt100: JIS C1604-1997, IEC 60751-95 JPt100: JIS C1604-1989 K, J, T, E, N, R, S, B: JIS C1602-1995 L, U: DIN 43710-1985 WRe5-26: ASTM E988-96 PLII: ASTM E1751-00
Scaling	It is possible to scale process data (with user-set minimum and maximum values for data and offsets). The inputs are set individually. Data can be converted at 0% to 100%.
Process data	The values derived from carrying out the following processing in order of the actual process data in the input range are output as a 16-bit integer (INT) or 32-bit integer (DINT). 1) Averaging → 2) Scaling → 3) Zero/span adjustment → 4) Square root calculation → 5) Offset compensation → 6) Output limits
Accuracy (25°C)	Resistance thermometer or thermocouple input: ±0.05% (The accuracy depends on the input type and the measured temperature. For details, refer to the <i>Accuracy and Temperature Coefficient According to Resistance Thermometer and Thermocouple Input Types and Measured Temperatures</i> on page 3-24.) Current or voltage input: ±0.05% Potentiometer input: ±1%
Temperature coefficient	Resistance thermometer or thermocouple input: The temperature coefficient depends on the input type and the measured temperature. For details, refer to the <i>Accuracy and Temperature Coefficient According to Resistance Thermometer and Thermocouple Input Types and Measured Temperatures</i> on page 3-24. Current or voltage input: ±80 ppm/°C (for full scale) Potentiometer input: ±100 ppm/°C (for full scale)
Cold junction compensation error	Thermocouple input: ±1.2°C
Resolution	1/256,000 (Conversion cycle: 60 ms) *, 1/64,000 (Conversion cycle: 10 ms), 1/16,000 (Conversion cycle: 5 ms) * The resolution for a potentiometer input is 1/4,000.
Input signal range	Resistance thermometer, thermocouple, ±100 mV user-set input: -15% to 115% of measurable input range 4 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V input: -15% to 115% 0 to 20 mA input: 0% to 115% -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V, ±10 V user-set range input: -7.5% to 107.5% Potentiometer input: -15% to 115% of 0 to 2,500 Ω
Influence of lead wire resistance	Platinum resistance thermometer input: 0.06°C/Ω (20 Ω max.) (3-wire) 0.006°C/Ω (20 Ω max.) (4-wire)
Input detection current	Platinum resistance thermometer input: Approx. 0.21 mA (3-wire), approx. 0.42 mA (4-wire) Potentiometer input: Approx. 0.21 mA
Absolute maximum ratings	Thermocouple, ±100 mV user-set range input: ±130 mV Current input: 30 mA Voltage input (excluding ±100 mV user-set range): ±15 V
Input impedance	Thermocouple, ±100 mV user-set range input: 20 kΩ min. Current input: 150 Ω max. Voltage input (excluding ±100 mV user-set range): 1 MΩ min.
Input disconnection detection current	Thermocouple, ±100 mV user-set range input: Approx. 0.1 μA

Item	Specifications
Warmup time	Platinum resistance thermometer input: 30 min Thermocouple, $\pm 100$ mV user-set range input: 45 min Current or voltage input (excluding $\pm 100$ mV user-set range): 30 min Potentiometer input: 10 min
Response time	1/256,000 resolution: Platinum resistance thermometer input: 180 ms max. (travel time from input 0% to 90%, for step input and with moving average for 1 sample) Thermocouple, $\pm 100$ mV user-set range input: 180 ms max. (travel time from input 0% to 90%, for $\pm 100$ mV step input and with moving average for 1 sample) Current or voltage input: 180 ms max. (travel time from input 0% to 90%, for $\pm 10$ V step input and with moving average for 1 sample) Potentiometer input: 180 ms max. (travel time from input 0% to 90%, for step input and with moving average for 1 sample) 1/64,000 resolution: Platinum resistance thermometer input: 100 ms max. (travel time from input 0% to 90%, for step input and with operating average for 4 samples) Thermocouple, $\pm 100$ mV user-set range input: 100 ms max. (travel time from input 0% to 90%, for $\pm 100$ mV step input and with moving average for 4 samples) Current or voltage input: 100 ms max. (travel time from input 0% to 90%, for $\pm 10$ V step input and with moving average for 4 samples) 1/16,000 resolution: Thermocouple input: 100 ms max. (travel time from input 0% to 90%, for $\pm 100$ mV step input and with moving average for 4 samples)
Conversion cycle	60 ms/4 inputs (1/256,000 resolution), 10 ms/4 inputs (1/64,000 resolution), 5 ms/4 inputs (1/16,000 resolution)
Maximum time to store data in CPU Unit	Conversion cycle + CPU Unit one task period

Item	Specifications	
Input disconnection and input error detection	<p>Resistance thermometer, thermocouple, <math>\pm 100</math> mV user-set range, potentiometer input:</p> <p>Input Error Flag turns ON when a disconnection occurs or when 115% or <math>-15\%</math> of the measurable input range is exceeded.</p> <p>The process value overrange direction for when a disconnection occurs can be specified. (High: 115% of set input range. Low: <math>-15\%</math> of set input range.)</p> <p>Disconnection detection time:</p> <p>Approx. 5 s max. (4-wire Pt100)  Approx. 1 s max. (<math>\pm 100</math> mV user-set range)  Approx. 0.5 s max. (not 4-wire Pt100 or <math>\pm 100</math> mV user-set range)</p> <p>4 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V input:</p> <p>An error is detected and the Input Error Flag turns ON when a disconnection occurs or when 115% or <math>-15\%</math> of the measurable input range is exceeded.</p> <p>When a disconnection occurs in the 4 to 20 mA/1 to 5 V range, the <math>-15\%</math> process value is stored. When a disconnection occurs in any other range, the same process value as for a 0 V input is stored.</p> <p>0 to 20 mA input:</p> <p>An error is detected and the Input Error Flag turns ON when 115% of the measurable input range is exceeded. When a disconnection occurs, the same process value as for a 0 mA input is stored.</p> <p><math>-1.25</math> to <math>1.25</math> V, <math>-5</math> to <math>5</math> V, <math>-10</math> to <math>10</math> V, <math>\pm 10</math> V user-set range input:</p> <p>An error is detected and the Input Error Flag turns ON when 107.5% or <math>-7.5\%</math> of the measurable input range is exceeded. When a disconnection occurs, the same process value as for a 0 V input is stored.</p>	
Function	Process value alarm	Four process value alarms (HH, H, LL, L), hysteresis, and ON/OFF-delay timer (0 to 60 s) can be set.
	Rate-of-change calculation	Calculates the amount of change per process value comparison time interval (Either 1 to 16 s or the conversion cycle can be set.)
	Rate-of-change alarm	Two rate-of-change alarms (H, L), hysteresis, and ON/OFF-delay timer (0 to 60 s) can be set (shared with process value alarm).
	Process value averaging (input filter)	Calculates the moving average for the specified number of past process values (1 to 128).
	Square root calculation *2	<p>When the process value scaling maximum value is A and the minimum value is B:</p> $Output = \sqrt{<A - B> \times <Input - B>} + B$ <p>Dropout: Output approx. 7% maximum linear (output = input) characteristics</p>
	Adjustment period control	When zero/span adjustment is executed, the date is internally recorded at the Unit. When the Zero/Span Adjustment Period and Notice of Days Remaining in the Expansion Setting Parameter have elapsed, this function turns ON a warning flag to give notice that it is time for readjustment.
	Peak and bottom detection	This function detects the maximum and minimum values for process data while the Hold Start Flag is ON and outputs the data.
	Top and valley detection	This function detects the top and valley values for process data while the Hold Start Flag is ON and outputs the data.
	Integral value calculation	<p>This function calculates the process value's time integral.</p> <p>The integral value is calculated and the result is output by using the Integral Value Calculation Start Bit.</p>
	Cold junction compensation method	Specifies whether cold junction compensation is to be executed internally or externally. This function is supported only for thermocouple inputs.
	Platinum resistance thermometer input compensation	<p>Compensation is enabled for a connected resistance thermometer by setting the resistance for <math>23^{\circ}\text{C}</math>.</p> <p>This function is supported only for platinum resistance thermometer inputs.</p>
Isolation		Between inputs and internal signals, and between inputs: Power supply = Transformer, Signal = Digital isolator

Item	Specifications
Insulation resistance	20 MΩ (at 500 V DC) between all inputs
Dielectric strength	Between all inputs: 500 V AC, at 50 or 60 Hz, for 1 min, leakage current 10 mA max.
External terminal connections	Terminal block (detachable)
Unit number settings	Set by rotary switches on front panel, from 0 to 95.
Indicators	Three LED indicators on front panel (for normal operation, errors detected at the Universal Input Unit, and errors detected at the CPU Unit).
Front panel connector	Input connector terminal block (detachable)
Current consumption (supplied by Power Supply Unit)	5 VDC at 300 mA max.
Dimensions	31 × 90 × 65 mm (W × H × D)
Weight	150 g max.
Standard accessories	One cold junction sensor (mounted to terminal block)

- \*1 The setting parameters are retained in the CPU unit by the battery even during power interruptions. Whether or not expansion setting parameters are retained even during power interruptions depends on the AT specification area specification.
- \*2 The square root calculation function can only be used when the maximum scaling value is greater than the minimum scaling value. The square root will not be found if the maximum is smaller than the minimum. When the square root calculation function is used, set the scaling values after square root calculation (e.g., for flow rates or other values) for the process value scaling A and B settings.

## Input Types and Input Ranges

The input type and range for each input are set in the device variables for CJ-series Unit which are the Setting Parameters. Each input range can be set within the measurable input range shown in the following table. (DC input ranges are user-set.) The accuracy and resolution are determined by the measurable input ranges shown in the table, and not by the set input ranges. The accuracy and resolution are not changed by narrowing the input range.

### Resolution: 1/256,000

Input type	Parameter settings	Measurable input range
Pt100 (3-wire)	0	-200.00 to 850.00°C
JPt100 (3-wire)	3	-200.00 to 500.00°C
Pt1000 (3-wire)	7	-200.00 to 850.00°C
Pt100 (4-wire)	9	-200.00 to 850.00°C
	10	0.000 to 50.000°C
K	15	-200.0 to 1300.0°C
	16	-20.00 to 600.00°C
J	17	-200.0 to 1200.0°C
	18	-20.00 to 600.00°C
T	19	-200.00 to 400.00°C
E	20	-200.0 to 1000.0°C
L	21	-200.0 to 900.0°C
U	22	-200.0 to 600.0°C
N	23	-200.0 to 1300.0°C
R	24	-50.0 to 1700.0°C
S	25	-50.0 to 1700.0°C
B	26	0.0 to 1800.0°C
WRe5-26	27	0.0 to 2300.0°C
PLII	28	0.0 to 1300.0°C

Input type	Parameter settings	Measurable input range
4 to 20 mA	30	4 to 20 mA
0 to 20 mA	31	0 to 20 mA
1 to 5 V	32	1 to 5 V
0 to 1.25 V	34	0 to 1.25 V
0 to 5 V	35	0 to 5 V
0 to 10 V	36	0 to 10 V
±100 mV user-set range	37	-100 to 100 mV
±1.25 V	38	-1.25 to 1.25 V
±5 V	39	-5 to 5 V
±10 V	40	-10 to 10 V
±10 V user-set range	41	-10 to 10 V
Potentiometer	50	0 to (100 to 2500) Ω

**Resolution: 1/64,000**

Input type	Parameter settings	Measurable input range
Pt100 (3-wire)	0	-200.00 to 850.00°C
JPt100 (3-wire)	3	-200.00 to 500.00°C
Pt100 (4-wire)	9	-200.00 to 850.00°C
K	15	-200.0 to 1300.0°C
J	17	-200.0 to 1200.0°C
T	19	-200.00 to 400.00°C
E	20	-200.0 to 1000.0°C
L	21	-200.0 to 900.0°C
U	22	-200.0 to 600.0°C
N	23	-200.0 to 1300.0°C
R	24	-50.0 to 1700.0°C
S	25	-50.0 to 1700.0°C
B	26	0.0 to 1800.0°C
WRe5-26	27	0.0 to 2300.0°C
PLII	28	0.0 to 1300.0°C
4 to 20 mA	30	4 to 20 mA
0 to 20 mA	31	0 to 20 mA
1 to 5 V	32	1 to 5 V
0 to 1.25 V	34	0 to 1.25 V
0 to 5 V	35	0 to 5 V
0 to 10 V	36	0 to 10 V
±100 mV user-set range	37	-100 to 100 mV
±1.25 V	38	-1.25 to 1.25 V
±5 V	39	-5 to 5 V
±10 V	40	-10 to 10 V
±10 V user-set range	41	-10 to 10 V

**Resolution: 1/16,000**

Input type	Parameter settings	Measurable input range
K	15	-200.0 to 1300.0°C
E	20	-200.0 to 1000.0°C

## Accuracy and Temperature Coefficient According to Resistance Thermometer and Thermocouple Input Types and Measured Temperatures

Input classification		Measured temperature (°C)	Standard accuracy °C (%)	Temperature coefficient *1 °C/°C (ppm/°C) * 2
Temperature sensor type	Temperature range (°C)			
Pt100 (3-wire)	-200.00 to 850.00	-200.00 to -50.00	±0.5°C (±0.05%)	±0.08°C/°C (±78 ppm/°C)
		-50.00 to 150.00	±0.21°C (±0.02%)	±0.03°C/°C (±29 ppm/°C)
		150.00 to 850.00	±0.5°C (±0.05%)	±0.08°C/°C (±78 ppm/°C)
JPt100 (3-wire)	-200.00 to 500.00	Same as on the left.	±0.4°C (±0.05%)	±0.07°C/°C (±96 ppm/°C)
Pt1000 (3-wire)	-200.00 to 850.00	Same as on the left.	±0.5°C (±0.05%)	±0.09°C/°C (±85 ppm/°C)
Pt100 (4-wire)	-200.00 to 850.00	Same as on the left.	±0.5°C (±0.05%)	±0.02°C/°C (±17 ppm/°C)
	0.000 to 50.000	Same as on the left.	±0.025°C (±0.05%)	±0.005°C/°C (±90 ppm/°C)
K	-200.0 to 1300.0	Same as on the left.	±0.75°C (±0.05%)	±0.08°C/°C (±50 ppm/°C)
	-20.00 to 600.00	Same as on the left.	±0.3°C (±0.05%)	±0.03°C/°C (±48 ppm/°C)
J	-200.0 to 1200.0	-200.0 to 0.0	±0.7°C (±0.05%)	±0.13°C/°C (±96 ppm/°C)
		0.0 to 1200.0		±0.06°C/°C (±42 ppm/°C)
	-20.00 to 600.00	Same as on the left.	±0.3°C (±0.05%)	±0.04°C/°C (±72 ppm/°C)
T	-200.00 to 400.00	-200.00 to -180.00	±1.3°C (±0.22%)	±0.05°C/°C (±75 ppm/°C)
		-180.00 to 0.00	±0.7°C (±0.12%)	
		0.00 to 400.00	±0.33°C (±0.055%)	
E	-200.0 to 1000.0	-200.0 to 0.0	±0.6°C (±0.05%)	±0.12°C/°C (±100 ppm/°C)
		0.0 to 1000.0		±0.06°C/°C (±50 ppm/°C)
L	-200.0 to 900.0	Same as on the left.	±0.5°C (±0.05%)	±0.04°C/°C (±40 ppm/°C)
U	-200.0 to 600.0	-200.0 to -100.0	±0.7°C (±0.09%)	±0.06°C/°C (±75 ppm/°C)
		-100.0 to 0.0	±0.5°C (±0.07%)	
		0.0 to 600.0	±0.4°C (±0.05%)	
N	-200.0 to 1300.0	-200.0 to -150.0	±1.6°C (±0.11%)	±0.11°C/°C (±70 ppm/°C)
		-150.0 to -100.0	±0.75°C (±0.05%)	
		-100.0 to 1300.0		±0.08°C/°C (±50 ppm/°C)
R	-50.0 to 1700.0	-50.0 to 0.0	±3.2°C (±0.19%)	±0.13°C/°C (±77 ppm/°C)
		0.0 to 100.0	±2.5°C (±0.15%)	±0.11°C/°C (±60 ppm/°C)
		100.0 to 1700.0	±1.75°C (±0.1%)	
S	-50.0 to 1700.0	-50.0 to 0.0	±3.2°C (±0.19%)	±0.13°C/°C (±77 ppm/°C)
		0.0 to 100.0	±2.5°C (±0.15%)	±0.11°C/°C (±60 ppm/°C)
		100.0 to 1700.0	±1.75°C (±0.1%)	
B	0.0 to 1800.0	0.0 to 400.0	May not be accurate.	May not be accurate.
		400.0 to 800.0	±3°C (±0.17%)	±0.12°C/°C (±66 ppm/°C)
		800.0 to 1800.0	±1.8°C (±0.1%)	
WRe5-26	0.0 to 2300.0	0.0 to 1500.0	±1.15°C (±0.05%)	±0.13°C/°C (±58 ppm/°C)
		1500.0 to 2200.0		±0.21°C/°C (±91 ppm/°C)
		2200.0 to 2300.0	±1.4°C (±0.07%)	
PLII	0.0 to 1300.0	Same as on the left.	±0.65°C (±0.05%)	±0.07°C/°C (±57 ppm/°C)

\*1 Error in process value when ambient temperature changes by 1°C.

\*2 For full-scale.



### 3-2-7 Setting Parameters (Device Variables for CJ-series Unit)

Device variable (name)	Type	R/W	Data range	Default	Parameter contents
*_LoadDefaultCfg	UINT	RW	0 or 12345	0	Default Block Read Command Once this parameter is set, the following will occur when the Controller is reset or the Unit is restarted. 0: Operates with the setting parameters set from the CPU Unit. 12345: Automatically sets the default values for the setting parameters.
● Operation settings					
*_ResolutionCfg	WORD	RW	16#0000 to 16#0012	0	Resolution and Process Data Length Setting Bits 00 to 03: Resolution/conversion cycle 0: 256,000/60 ms 1: 64,000/10 ms 2: 16,000/5 ms Bits 04 to 07: Process data length 0: DINT (32 bits) 1: INT (16 bits)
■ Setting Parameter Group 1: Continuously Refreshed Parameters (parameters that can be changed regardless of the CPU Unit mode)					
● Process value alarm settings					
*_Ch#_PVAlmValCfg_H	DINT	RW	-2147483648 to +2147483647	+40000	Process Value H (high limit) Alarm Setting (Set at process value scaling value.)
*_Ch#_PVAlmValCfg_L	DINT	RW	-2147483648 to +2147483647	0	Process Value L (low limit) Alarm Setting (Set at process value scaling value.)
● Zero/span adjustment					
*_Ch#_GainAdjPVCfg	UDINT	RW	1 to 100000000	10000000	Gain for Span Adjustment (set value × 0.0000001)
*_Ch#_ZeroAdjPVCfg	DINT	RW	-2147483648 to +2147483647	0	Zero Adjustment Value (Set at process value scaling value.)
■ Setting Parameter Group 2: Initial Settings Parameters (Parameters that are changed when the Controller is reset or the Unit is restarted)					
● Input Signal Type					
*_Ch#_SensTypCfg	UINT	RW	0 to 50	36	Resistance thermometer (RTD) Thermocouple (TC) Voltage/current, etc. 0: Pt100 (3-wire) 15: K (1) 30: 4 to 20 mA 3: JPt100 (3-wire) 16: K (2) 31: 0 to 20 mA 7: Pt1000 (3-wire) 17: J (1) 32: 1 to 5 V 9: Pt100 (4-wire) (1) 18: J (2) 34: 0 to 1.25 V 10: Pt100 (4-wire) (2) 19: T 35: 0 to 5 V 20: E 36: 0 to 10 V 21: L 37: ±100-mV user-set range 22: U 38: ±1.25 V 23: N 39: ±5 V 24: R 40: ±10 V 25: S 41: ±10 V user-set range 26: B 50: Potentiometer 27: WRe5-26 28: PLII * The parameters that can be set depend on the resolution set by *_ResolutionCfg. Refer to <i>Input Types and Input Ranges</i> in 3-2-6 Specifications.

Device variable (name)	Type	R/W	Data range	Default	Parameter contents	
*_Ch#_PVUnitCfg	WORD	RW	16#0000 or 16#0001	16#0000	Temperature Unit	0: °C 1: °F
<b>● Data overrange direction at input error</b>						
*_Ch#_SensErrCfg	WORD	RW	16#0000 or 16#0001	16#0000	0: Upper 1: Lower	
<b>● Mean value processing function</b>						
*_Ch#_AveCfg	UINT	RW	0 to 128	25	Number of Values for Calculating Moving Average for Mean Value Processing 0: 4 (for 1/256,000) 25 (for 1/64,000 or 1/16,000) 1 to 128: Number of Values for Calculating Moving Average Unit: number of values	
<b>● Process value input range settings</b>						
*_Ch#_InSpanValCfg_H	INT	RW	-32000 to +32000	+10000	Maximum Value in Range	<ul style="list-style-type: none"> <li>For a temperature input: Set value × 0.1 °C or °F</li> <li>For ±100 mV user-set range: Set value × 0.1 mV</li> <li>For ±10 V user-set range: Set value × 0.001 V</li> <li>For potentiometer: Set value × 1 Ω</li> </ul>
*_Ch#_InSpanValCfg_L	INT	RW	-32000 to +32000	0	Minimum Value in Range	
<b>● Process value scaling</b>						
*_Ch#_PVScIValCfg_H	DINT	RW	-2147483648 to +2147483647	+10000	Scaling Value for Maximum Value in Range (Span)	
*_Ch#_PVScIValCfg_L	DINT	RW	-2147483648 to +2147483647	0	Scaling Value for Minimum Value in Range (Zero)	
*_Ch#_PVScIOfsValCfg	DINT	RW	-2147483648 to +2147483647	0	Scaling Offset	
<b>● Advanced alarm functions</b>						
*_Ch#_AlmHysTrsValCfg	UINT	RW	0 to 32767	40	Alarm Hysteresis (Shared with process value alarm and rate-of-change alarm.) (Set at process value scaling value.)	
*_Ch#_AlmOnDelayTmCfg	UINT	RW	0 to 60	0	Alarm ON-delay Time (Shared with process value alarm and rate-of-change alarm.) Unit: s	
*_Ch#_AlmOffDelayTmCfg	UINT	RW	0 to 60	0	Alarm OFF-delay Time (Shared with process value alarm and rate-of-change alarm.) Unit: s	
<b>■ Expansion parameter settings</b>						
*_ExtMemArea	UINT	RW	0 to 5	---	Area of Expansion Setting Parameter 0: Not used; 1: DM Area; 2: CIO Area; 3: Work Area; 4: Holding Area; 5: EM Area bank 0	
*_ExtMemAdr	UINT	RW	0 to 32767	---	First Word in Expansion Setting Parameter Area	
<b>■ Parameter status</b>						
*_Ch#_CfgErrAdr	UINT	R	0 to 145	0	Address of Data Range Error	

**Note 1** The ERC indicator on the Unit's front panel will light if an out-of-range setting is made in Setting Parameter Group 1 (Continuously Refreshed Parameters), Setting Parameter Group 2 (Initial Settings Parameters), or the Expansion Setting Parameters. The offset (the number of words) from the start address to the lowest memory address that has the range error will be stored in the Address of Data Range Error. If the lowest memory address that has the range error is an Expansion Setting Parameter, the offset value shown in the Address of Data Range Error will be 100 or greater. (The value will be 100 if the first word of the Expansion Setting Parameters is erroneous.)

For the correspondence between range error addresses and setting parameter or expansion setting parameter addresses, refer to *A-3 Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses*. "m" in the table indicates the first word allocated in DM.  $m = D20000 + (N \times 100)$  (N: Unit number)

- 2** When specifying Expansion Setting Parameters, be sure that the area does not overlap with other areas that are in use.  
If areas overlap, the memory may be overwritten and unexpected operation may occur.
- 3** When specifying the start address of Expansion Setting Parameters, be sure that the allocated area does not exceed the range of the memory used for CJ-series Unit in the CPU Unit.
- 4** Set the start address of Expansion Operation Data to an even-numbered address.

## 3-2-8 Operation Data (Device Variables for CJ-series Unit)

Device variable (name)	Type	R/W	Data range	Data contents		
*_Ch#_AllnPV	INT	R	-32768 to +32767	Process Value		
*_Ch#_AllnPVDint	DINT	R	-2147483648 to +2147483647	Data scaled according to the Setting Parameter is output. Set the data length with the device variable for CJ-series Unit *_ResolutionCfg, which is a Setting Parameter.		
*_PVAlmSta	WORD	R	16#0000 to 16#FFFF	A WORD-type variable that includes the following BOOL-type variables.		Bit number
*_Ch1_LL_PVAlmSta	BOOL	R	0 or 1	Input No. 1 Process Value LL (low low limit) Alarm	0: No alarm 1: An alarm occurred (Process value exceeds set value.) *1	00
*_Ch1_L_PVAlmSta	BOOL	R	0 or 1	Input No. 1 Process Value L (low limit) Alarm		01
*_Ch1_H_PVAlmSta	BOOL	R	0 or 1	Input No. 1 Process Value H (high limit) Alarm		02
*_Ch1_HH_PVAlmSta	BOOL	R	0 or 1	Input No. 1 Process Value HH (high high limit) Alarm		03
*_Ch2_LL_PVAlmSta	BOOL	R	0 or 1	Input No. 2 Process Value LL (low low limit) Alarm		04
*_Ch2_L_PVAlmSta	BOOL	R	0 or 1	Input No. 2 Process Value L (low limit) Alarm		05
*_Ch2_H_PVAlmSta	BOOL	R	0 or 1	Input No. 2 Process Value H (high limit) Alarm		06
*_Ch2_HH_PVAlmSta	BOOL	R	0 or 1	Input No. 2 Process Value HH (high high limit) Alarm		07
*_Ch3_LL_PVAlmSta	BOOL	R	0 or 1	Input No. 3 Process Value LL (low low limit) Alarm		08
*_Ch3_L_PVAlmSta	BOOL	R	0 or 1	Input No. 3 Process Value L (low limit) Alarm		09
*_Ch3_H_PVAlmSta	BOOL	R	0 or 1	Input No. 3 Process Value H (high limit) Alarm		10
*_Ch3_HH_PVAlmSta	BOOL	R	0 or 1	Input No. 3 Process Value HH (high high limit) Alarm		11
*_Ch4_LL_PVAlmSta	BOOL	R	0 or 1	Input No. 4 Process Value LL (low low limit) Alarm		12
*_Ch4_L_PVAlmSta	BOOL	R	0 or 1	Input No. 4 Process Value L (low limit) Alarm		13
*_Ch4_H_PVAlmSta	BOOL	R	0 or 1	Input No. 4 Process Value H (high limit) Alarm		14
*_Ch4_HH_PVAlmSta	BOOL	R	0 or 1	Input No. 4 Process Value HH (high high limit) Alarm		15

Device variable (name)	Type	R/W	Data range	Data contents		
*_RateAlmSta	BYTE	R	16#00 to 16#FF	A BYTE-type variable that includes the following BOOL-type variables:		Bit number
*_Ch1_L_RateAlmSta	BOOL	R	0 or 1	Input No. 1 Rate-of-change Value L (low limit) Alarm	0: No alarm 1: An alarm occurred (Process value exceeds set value.) *2	00
*_Ch1_H_RateAlmSta	BOOL	R	0 or 1	Input No. 1 Rate-of-change Value H (high limit) Alarm		01
*_Ch2_L_RateAlmSta	BOOL	R	0 or 1	Input No. 2 Rate-of-change Value L (low limit) Alarm		02
*_Ch2_H_RateAlmSta	BOOL	R	0 or 1	Input No. 2 Rate-of-change Value H (high limit) Alarm		03
*_Ch3_L_RateAlmSta	BOOL	R	0 or 1	Input No. 3 Rate-of-change Value L (low limit) Alarm		04
*_Ch3_H_RateAlmSta	BOOL	R	0 or 1	Input No. 3 Rate-of-change Value H (high limit) Alarm		05
*_Ch4_L_RateAlmSta	BOOL	R	0 or 1	Input No. 4 Rate-of-change Value L (low limit) Alarm		06
*_Ch4_H_RateAlmSta	BOOL	R	0 or 1	Input No. 4 Rate-of-change Value H (high limit) Alarm		07
*_ErrSta	BYTE	R	16#00 to 16#C3	A BYTE-type variable that includes the following BOOL-type variables:		Bit number
*_Ch1_Sens_ErrSta	BOOL	R	0 or 1	Input No. 1 Input Error	0: Normal 1: Error	00
*_Ch2_Sens_ErrSta	BOOL	R	0 or 1	Input No. 2 Input Error		01
*_Ch3_Sens_ErrSta	BOOL	R	0 or 1	Input No. 3 Input Error		02
*_Ch4_Sens_ErrSta	BOOL	R	0 or 1	Input No. 4 Input Error		03
*_CJ_ErrSta	BOOL	R	0 or 1	Cold Junction Sensor Error		04
*_AdjPrdEnd_ErrSta	BOOL	R	0 or 1	Zero/Span Adjustment Period End	0: Adjustment valid 1: Adjustment period end *2	05
*_AdjPrevNotice_ErrSta	BOOL	R	0 or 1	Zero/Span Adjustment Period Notice	0: Adjustment valid 1: Notice period *2	06
*_Conv_ErrSta	BOOL	R	0 or 1	A/D Conversion Error	0: Normal 1: Error *3	07

- \*1 If the Expansion Setting Parameters are not used, the Process Value HH (High High Limit) Alarm and Process Value LL (Low Low Limit) Alarm will be 0.
- \*2 This value will be 0 if neither the Expansion Setting Parameters nor the Expansion Operation Data are used.
- \*3 This value will be 1 if an error occurs in the A/D conversion. If the error is not cleared after the Unit restarts or the Controller is reset, including when the power is turned OFF and back ON, check whether there is a source of noise nearby. For details, refer to 3-1-12 Error Processing.

### 3-2-9 Expansion Setting Parameters (User-defined Variables: \_sCJPH41U\_Ex\_Param Type)

Member name	Type	R/W	Data range	Default	Parameter contents
<b>■ Setting Parameter Group 3: Continuously Refreshed Parameters (parameters that can be changed regardless of the CPU Unit mode)</b>					
● Process value alarm settings					
<i>Ch#_PVAlmValCfg_HH</i>	DINT	RW	-2147483648 to +2147483647	+42000	Process Value HH (high high limit) Alarm Setting (Set at process value scaling value.)
<i>Ch#_PVAlmValCfg_LL</i>	DINT	RW	-2147483648 to +2147483647	-2000	Process Value LL (low low limit) Alarm Setting (Set at process value scaling value.)
● Rate-of-change value alarm settings					
<i>Ch#_RateAlmValCfg_H</i>	DINT	RW	-2147483648 to +2147483647	+40000	Rate-of-change Value H (high limit) Alarm Setting (Set at rate-of-change scaling value.)
<i>Ch#_RateAlmValCfg_L</i>	DINT	RW	-2147483648 to +2147483647	0	Rate-of-change value L (low limit) Alarm Setting (Set at rate-of-change scaling value.)
<b>■ Setting Parameter Group 4: Initial Settings Parameters (Parameters that are changed when the Controller is reset or the Unit is restarted)</b>					
● Setting of Expansion Operation Data					
<i>ExtIOArea</i>	UINT	RW	0 to 5	---	Area of Expansion Operation Data 0: Not used; 1: DM Area; 2: CIO Area; 3: Work Area; 4: Holding Area; 5: EM Area bank 0
<i>ExtIOAdr</i>	UINT	RW	0 to 32767	---	First Word in Expansion Operation Data Area
● Platinum Resistance thermometer input compensation function					
<i>RTDCompensate</i>	WORD	RW	16#00 to 16#0F	16#00	Temperature resistance thermometer input compensation setting Bit 00: Input No. 1, Bit 01: Input No. 2, Bit 02: Input No. 3, Bit 03: Input No. 4 0: Disable 1: Enable
● Cold junction compensation method settings					
<i>CJCompensate</i>	WORD	RW	16#0000 or 16#0001	16#0000	Cold Junction Compensation Method for Thermocouple Input 16#0000: Internal (Uses Unit's Cold Junction sensor) 16#0001: External (Does not use Unit's Cold Junction sensor)
● Square root calculation function					
<i>Ch#_SqrtCfg</i>	WORD	RW	16#0000 or 16#0001	16#0000	Square Root Extraction (when maximum scaling value > minimum scaling value) 16#0000: Disable 16#0001: Enable
● Rate-of-change measurement function					
<i>Ch#_InRateSpanValCfg_H</i>	INT	RW	-32000 to +32000	+10000	Maximum Rate-of-change Range Value (setting scaling value/comparison time interval)
<i>Ch#_InRateSpanValCfg_L</i>	INT	RW	-32000 to +32000	-10000	Minimum Rate-of-change Range Value (setting scaling value/comparison time interval)
<i>Ch#_RateCmplntvTm</i>	USINT	RW	1 to 16	1	Rate-of-change Comparison Time Interval
<i>Ch#_RateCmpUnit</i>	BYTE	RW	16#00 or 16#01	16#00	Rate-of-change Comparison Time Interval Unit 16#00: s 16#01: Conversion time

Member name	Type	R/W	Data range	Default	Parameter contents
Ch#_RateSciValCfg_H	DINT	RW	-2147483648 to +2147483647	+10000	Scaling Value for Maximum Rate-of-change Range Value
Ch#_RateSciValCfg_L	DINT	RW	-2147483648 to +2147483647	-10000	Scaling Value for Minimum Rate-of-change Range Value
● Zero/span adjustment function					
Ch#_GainAdjFVCfg	UINT	RW	0 to 32000	10000	Span Adjustment Position Set value × 0.01% (Input span percentage)
Ch#_ZeroAdjFVCfg	INT	RW	-32000 to +32000	0	Zero Adjustment Position Set value × 0.01% (Input span percentage)
Ch#_AdjPrd	UINT	RW	0 to 9999	365	Zero/Span Adjustment Period Unit: Days
Ch#_AdjNoticeDay	UINT	RW	0 to 9999	30	Notice of Days Remaining Unit: Days
● Top and valley hold					
Ch#_TopVlyHystrs	UINT	RW	0 to 32767	40	Top and Valley Detection Hysteresis
● Integral value calculation					
Ch#_IntgUnit	BYTE	RW	16#00 or 16#01	16#00	Integer Unit 0: Minutes 1: Hours
Ch#_IntgCoef	BYTE	RW	16#00 to 16#04	16#00	Integral Value Coefficient 16#00: 1 16#01: 1/10 16#02: 1/100 16#03: 1/1,000 16#04: 1/10,000
Ch#_RTDRefVal	DINT	RW	-2147483648 to +2147483647	+1089585403	Temperature Resistance Thermometer Reference Resistance (resistance at 23 °C) Pt100, JPt100: Set value × 0.0000001 Ω Pt1000: Set value × 0.000001 Ω

- Note 1** When specifying Expansion Operation Data, be sure that the area does not overlap with other areas that are in use.  
If areas overlap, the memory may be overwritten and unexpected operation may occur.
- 2** When specifying the start address of Expansion Operation Data, be sure that the allocated area does not exceed the range of the memory used for CJ-series Unit in the CPU Unit.
- 3** Set the start address of Expansion Operation Data to an even-numbered address.

For how to create and use user-defined variables, refer to *User-defined Variables* in 1-6-1 *Exchanging Data with the CPU Unit*.

### 3-2-10 Expansion Operation Data (User-defined Variables: \_sCJPH41U\_Ex\_CmdSta Type)

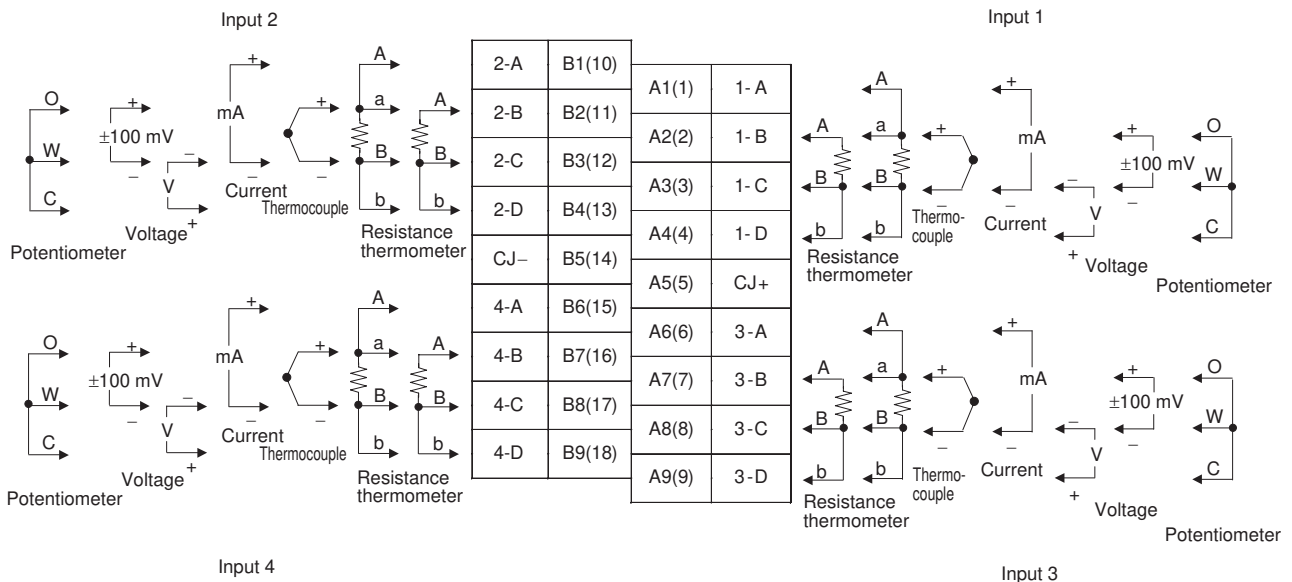
Member name	Type	R/W	Data range	Data contents		
<i>HdMd</i>	BYTE	RW	16#00 to 16#0F	A BYTE-type variable that includes the following BOOL-type variables:		
<i>Ch1_HdMd</i>	BOOL	RW	0 or 1	Input No. 1 Hold Function Selection	0: Peak and bottom 1: Top and valley	00
<i>Ch2_HdMd</i>	BOOL	RW	0 or 1	Input No. 2 Hold Function Selection		01
<i>Ch3_HdMd</i>	BOOL	RW	0 or 1	Input No. 3 Hold Function Selection		02
<i>Ch4_HdMd</i>	BOOL	RW	0 or 1	Input No. 4 Hold Function Selection		03
<i>HdCmd</i>	BYTE	RW	16#00 to 16#FF	A BYTE-type variable that includes the following BOOL-type variables:		
<i>Ch1_StartHdCmd</i>	BOOL	RW	0 or 1	Input No. 1 Hold Start	0: Do not hold 1: Hold	00
<i>Ch2_StartHdCmd</i>	BOOL	RW	0 or 1	Input No. 2 Hold Start		01
<i>Ch3_StartHdCmd</i>	BOOL	RW	0 or 1	Input No. 3 Hold Start		02
<i>Ch4_StartHdCmd</i>	BOOL	RW	0 or 1	Input No. 4 Hold Start		03
<i>Ch1_RstHdCmd</i>	BOOL	RW	0 or 1	Input No. 1 Hold Value Reset	0: Normal operation 1: Reset hold value	04
<i>Ch2_RstHdCmd</i>	BOOL	RW	0 or 1	Input No. 2 Hold Value Reset		05
<i>Ch3_RstHdCmd</i>	BOOL	RW	0 or 1	Input No. 3 Hold Value Reset		06
<i>Ch4_RstHdCmd</i>	BOOL	RW	0 or 1	Input No. 4 Hold Value Reset		07
<i>IntgCmd</i>	BYTE	RW	16#00 to 16#FF	A BYTE-type variable that includes the following BOOL-type variables:		
<i>Ch1_StartIntgCmd</i>	BOOL	RW	0 or 1	Input No. 1 Integral Value Calculation Start	0: Do not start calculation 1: Start calculation	00
<i>Ch2_StartIntgCmd</i>	BOOL	RW	0 or 1	Input No. 2 Integral Value Calculation Start		01
<i>Ch3_StartIntgCmd</i>	BOOL	RW	0 or 1	Input No. 3 Integral Value Calculation Start		02
<i>Ch4_StartIntgCmd</i>	BOOL	RW	0 or 1	Input No. 4 Integral Value Calculation Start		03
<i>Ch1_RstIntgCmd</i>	BOOL	RW	0 or 1	Input No. 1 Integral Value Reset	0: Normal operation 1: Reset integral value	04
<i>Ch2_RstIntgCmd</i>	BOOL	RW	0 or 1	Input No. 2 Integral Value Reset		05
<i>Ch3_RstIntgCmd</i>	BOOL	RW	0 or 1	Input No. 3 Integral Value Reset		06
<i>Ch4_RstIntgCmd</i>	BOOL	RW	0 or 1	Input No. 4 Integral Value Reset		07
<i>AdjCmd</i>	BYTE	RW	16#00 to 16#0F	A BYTE-type variable that includes the following BOOL-type variables:		
<i>Ch1_Upd_AdjCmd</i>	BOOL	RW	0 or 1	Input No. 1 Zero/Span Adjustment Update	0: Normal operation 1: Update adjustment date	00
<i>Ch2_Upd_AdjCmd</i>	BOOL	RW	0 or 1	Input No. 2 Zero/Span Adjustment Update		01
<i>Ch3_Upd_AdjCmd</i>	BOOL	RW	0 or 1	Input No. 3 Zero/Span Adjustment Update		02
<i>Ch4_Upd_AdjCmd</i>	BOOL	RW	0 or 1	Input No. 4 Zero/Span Adjustment Update		03
<i>Ch#_RateVal</i>	DINT	R	-2147483648 to +2147483647	Rate-of-change Value		



Member name	Type	R/W	Data range	Data contents
Ch#_AdjPrdEnd	BOOL	R	0 or 1	Zero/Span Adjustment Period End 0: Adjustment valid 1: Adjustment period end
Ch#_AdjPrevNotice	BOOL	R	0 or 1	Zero/Span Adjustment Period Notice 0: Adjustment valid 1: Notice period
MemErr	BOOL	R	0 or 1	Non-volatile Memory Error 0: Normal 1: Non-volatile Memory Error
Ch#_LastAdjDate	DWORD	R	16#00010100 to 16#99123100	Final adjustment date (YY-MM-DD-00)
Ch#_VlyDetectSta	BOOL	R	0 or 1	Valley Detection Timing Flag Turns ON when a valley is detected for the valley hold function. Turns OFF in the next cycle.
Ch#_TopDetectSta	BOOL	R	0 or 1	Top Detection Timing Flag Turns ON when a top is detected for the top hold function. Turns OFF in the next cycle.
Ch#_PkTopVal	DINT	R	-2147483648 to +2147483647	Peak/Top Value
Ch#_BtmVlyVal	DINT	R	-2147483648 to +2147483647	Bottom/Valley Value Outputs data scaled with the setting parameters. Set the data length with the device variable for CJ-series Unit <i>ResolutionCfg</i> , which is a Setting Parameter.
Ch#_IntgVal	DINT	R	-2147483648 to 2147483647	Integral Value Outputs the integral value of data scaled with the setting parameters.

For how to create and use user-defined variables, refer to *User-defined Variables* in 1-6-1 *Exchanging Data with the CPU Unit*.

### 3-2-11 Terminal Connection Diagram





### Precautions for Safe Use

- Do not remove the cold junction sensors that are connected to the CJ+ and CJ– terminals. If they are removed, compensation will not be executed and temperatures will not be correctly measured.
- Use the cold junction sensors that are included with the product. Cold junction sensors are calibrated for particular Units. If a sensor from another Unit is used, temperatures cannot be correctly measured.



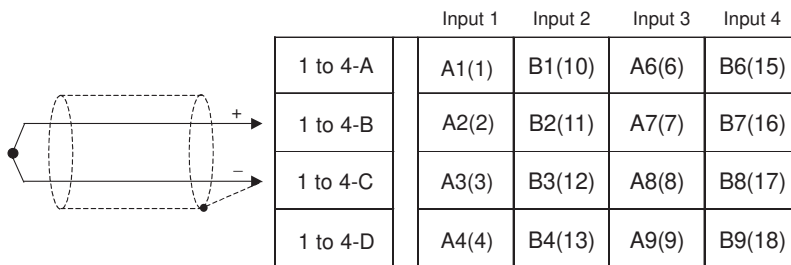
### Precautions for Correct Use

- When wiring voltage inputs, be careful not to connect the wrong terminals. Incorrect wiring may damage the Unit.
- Use the same wiring length for connecting to A, B, a, and b, so that the impedance will be the same. In particular (for resistance thermometers), do not connect the A-a and B-b terminals.
- Do not connect anything to unused terminals.
- Always ground the GR terminal on the Power Supply Unit.
- Be sure to ground all input devices (such as voltage generators, temperature calibrators, and resistors) that have ground terminals.

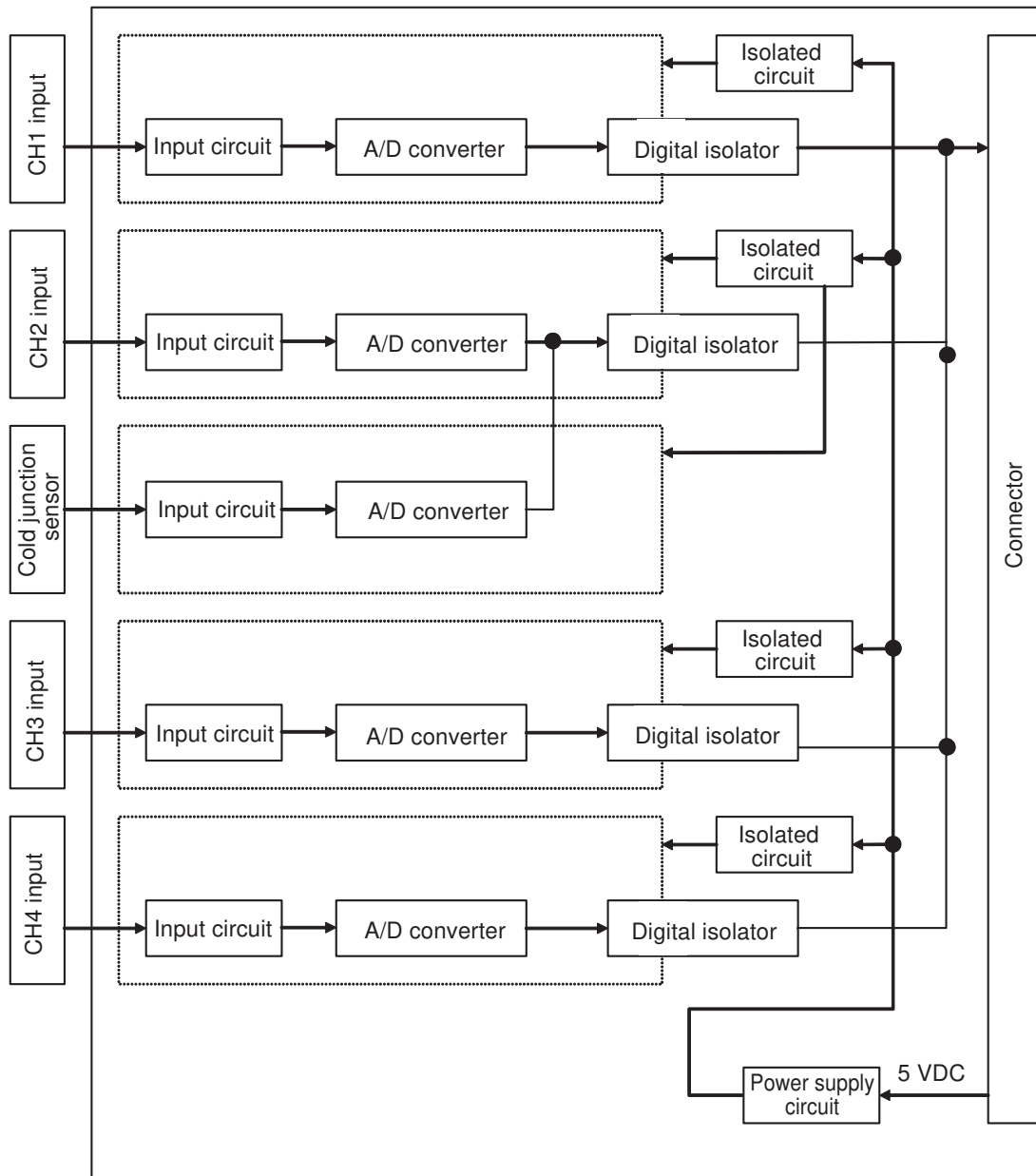
## Shielded Cable

When the Resolution and Process Data Length Setting is set to 1/16,000·5ms, connect shielded cable as shown in the following figure.

### Thermocouple Input



3-2-12 Block Diagram



### 3-2-13 Error Processing

#### ● Conversion data does not change.

Probable cause	Remedy
The gain for span adjustment is set to 0.	Set the gain for span adjustment to a value other than 0.
The maximum and minimum values set for process value scaling are identical or extremely close.	Set suitable maximum and minimum values for process value scaling.
The input type, input range, or process value scaling is not set correctly.	Check and correct the settings.
An input device is malfunctioning or input wiring is faulty or disconnected.	Check whether input values have changed. Check for faulty or disconnected wiring. Check whether an input error has been detected.

#### ● Values are not converted as intended.

Probable cause	Remedy
The input type, input range, or process value scaling is not set correctly.	Check and correct the settings.
The zero/span adjustment data is incorrect.	Check and correct the zero adjustment value and the span adjustment gain settings.
The platinum resistance thermometer input wiring is incorrect.	Correct the input wiring.
Thermocouple or compensation conductor polarity is incorrect.	
DC input polarity is incorrect.	
Potentiometer input wiring is incorrect.	
Cold junction compensation is not operating.	Check the Cold Junction Error Flag.
A compensation conductor has not been used, or the wrong type of compensation conductor is used.	Use the correct compensation conductor for the thermocouple.
The offset compensation function is operating.	Set the scaling offset value to an appropriate value.
The square root calculation is operating.	Disable the square root calculation.

#### ● Conversion values are unstable.

Probable cause	Remedy
Input signals are being affected by external noise.	Change the connection paths of the input signal lines. (Separate them from sources of noise or use shielded twisted-pair cable.)
	Increase the number of items for moving average processing.
	Set the resolution to 1/256,000 (conversion cycle: 60 ms).
Process values greater than the resolution are being scaled.	Reduce the process value scaling value.

#### ● An A/D conversion error occurred.

Probable cause	Remedy
There is influence from ambient noise.	Install surge suppressors and noise filters for noise-generating devices.
	Separate the Unit from the noise source.

#### ● The ERC indicator is lit.

Probable cause	Remedy
A setting for a Setting Parameter or the Expansion Setting Parameters is out of range.	Set the value within the optimum range. For Setting Parameter Group 2 or 4 (Initial Settings Parameters), reset the Controller or restart the Unit.
	Set even-numbered addresses for the start address of the Expansion Setting Parameters Area and Expansion Operation Data.

# App

## Appendices

---

<b>A-1</b>	<b>Supplementary Explanation of Functions</b>	<b>A-2</b>
A-1-1	Changing Set Values during Output of Process Value Alarm or Rate-of-change Alarm	A-2
A-1-2	Alarm Operation when Upper Limit Is Less Than Lower Limit	A-3
A-1-3	Alarm Output Operation when Falling Back from Alarm Condition Before Alarm ON-Delay Time Elapses	A-4
A-1-4	Setting Process Value Scaling with Negative Bias	A-4
A-1-5	Alarm Operation during Process Value Scaling with Negative Bias	A-5
A-1-6	Maximum/Minimum Value for when Input Disconnection Occurs during Process Value Scaling with Negative Bias	A-6
A-1-7	Hysteresis during Square Root Calculations	A-6
A-1-8	Adjustment Period Control	A-7
A-1-9	Integral Value Calculation	A-8
<b>A-2</b>	<b>Zero/Span Adjustment Example</b>	<b>A-10</b>
<b>A-3</b>	<b>Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses</b>	<b>A-13</b>
A-3-1	CJ1W-PDC15	A-14
A-3-2	CJ1W-AD04U	A-20
A-3-3	CJ1W-PH41U	A-23

# A-1 Supplementary Explanation of Functions

The following supplements the explanation given in *1-2 Features and Functions*.

## A-1-1 Changing Set Values during Output of Process Value Alarm or Rate-of-change Alarm

### HH (High High Limit) and H (High Limit) Alarms

When the alarm set value is raised while the alarm output is ON, the alarm output will be turned OFF when the following condition is satisfied.

$$\text{Input value} < (\text{alarm set value after change} - \text{hysteresis})$$

The alarm output will first turn OFF when the input value falls below the set value (with the hysteresis included).

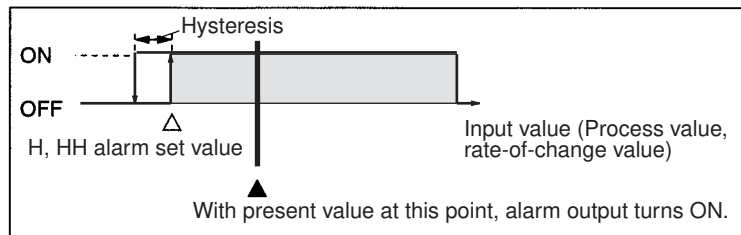
### LL (Low Low Limit) and L (Low Limit) Alarms

When the alarm set value is lowered while the alarm output is ON, the alarm output will be turned OFF when the following condition is satisfied.

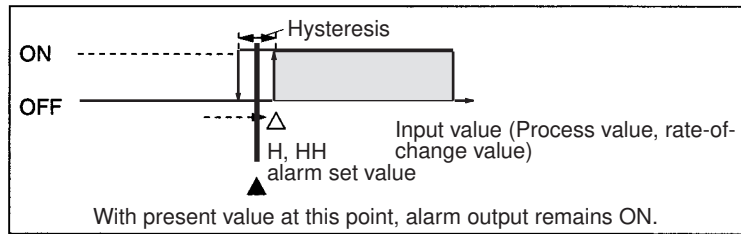
$$\text{Input value} > (\text{alarm set value after change} + \text{hysteresis})$$

When the hysteresis part alone of the input value is greater than the set value, the alarm output will turn OFF for the first time.

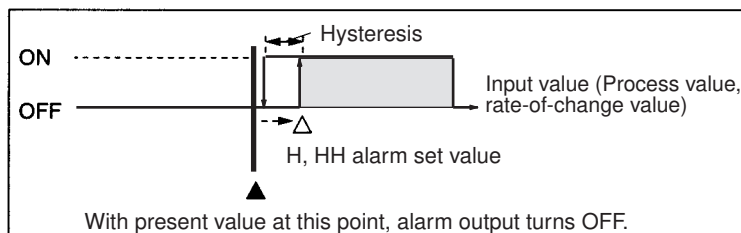
Example: HH and H Limit Alarms



Alarm set value raised.



Alarm set value further raised.



Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U

## A-1-2 Alarm Operation when Upper Limit Is Less Than Lower Limit

Process value and rate-of-change value alarm set values can be set freely regardless of the relative sizes of  $HH > H > L > LL$ .

Example:  $H < L$ , or  $HH < H$ .

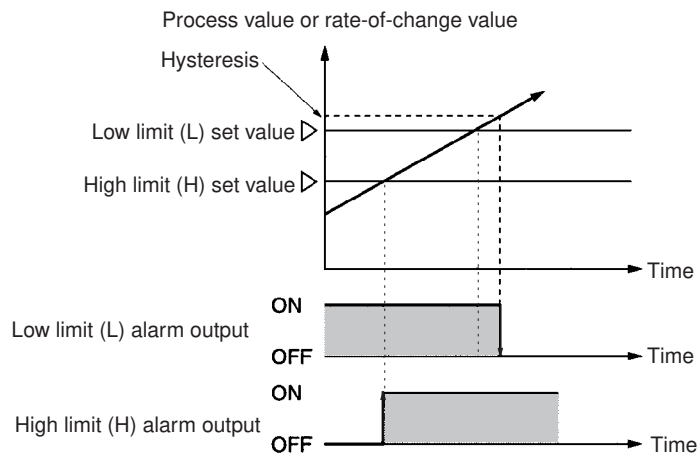
The alarm output operation is determined purely by the value comparison of the input value (scaling value) and alarm set value, as shown below.

### HH and H Limit Alarms

When the input value is greater than the alarm set value, the alarm output is turned ON.

### LL and L Limit Alarms

When the input value is less than the alarm set value, the alarm output is turned ON.

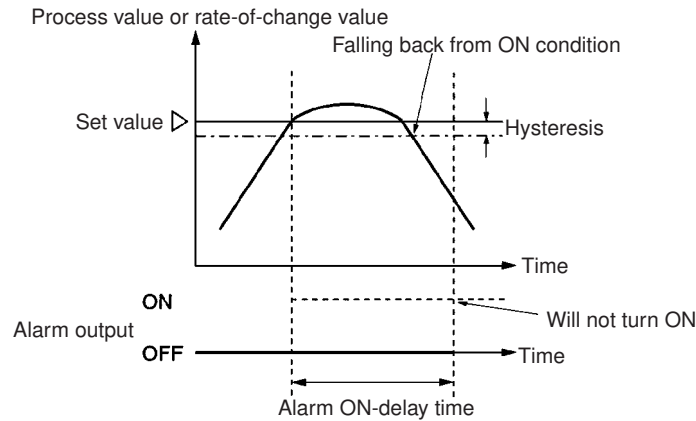


Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U * CJ1W-PH41U

\* Only process value alarm is available for the CJ1W-AD04U. Rate-of-change alarm function is not available.

### A-1-3 Alarm Output Operation when Falling Back from Alarm Condition Before Alarm ON-Delay Time Elapses

If inputs fall back from the alarm-ON condition (including hysteresis) before the alarm ON-delay time has elapsed, the alarm output will not turn ON.



Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U CJ1W-PH41U *

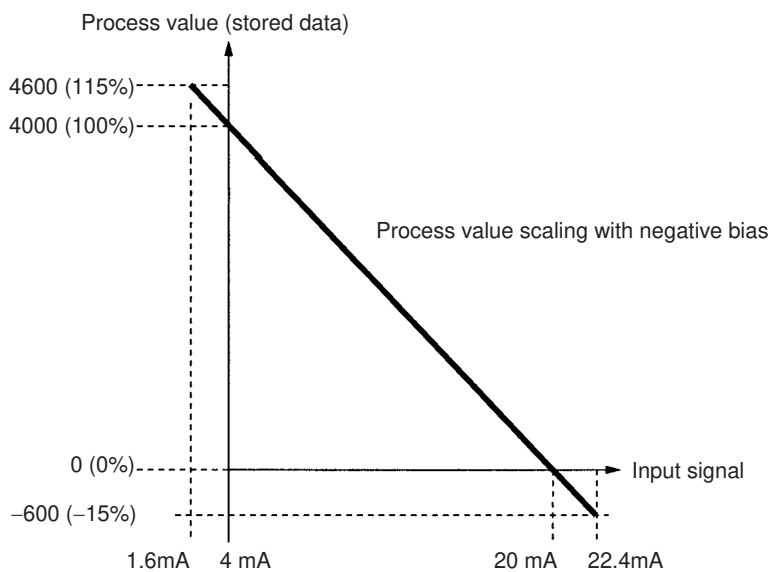
\* The alarm will not be turned OFF if the alarm OFF condition is no longer met before the alarm OFF-delay time expires.

### A-1-4 Setting Process Value Scaling with Negative Bias

With process value scaling to industrial units, a negative bias can be set by reversing the maximum and minimum values in the range.

Example: CJ1W-PDC15 Isolated-type Direct Current Input Unit

The following values can be set for an input signal of 4 to 20 mA: Maximum process value in range = 0, minimum process value in range = 4000.



Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U * CJ1W-PH41U



\* With the CJ1W-AD04U, the upper and lower limits of process values are 4200 (105%) and -200 (-5%), respectively.

## A-1-5 Alarm Operation during Process Value Scaling with Negative Bias

During process value scaling with negative bias, the alarm operates on the process value after scaling, and not on the input signal. Consequently, the operation is the same as for normal bias, as shown below.

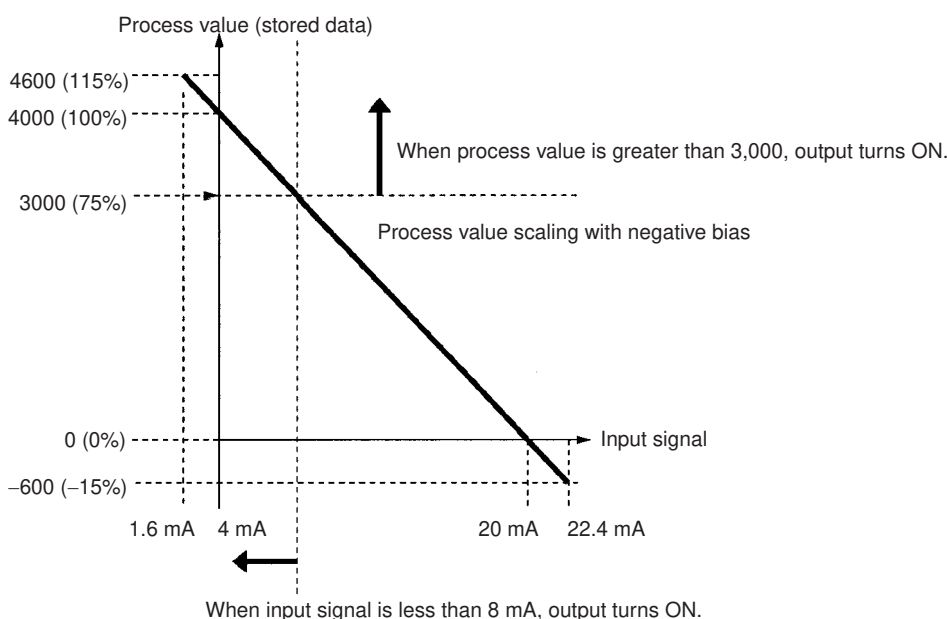
### HH and H Limit Alarms

When the input value is greater than the alarm set value, the alarm output is turned ON.

### LL and L Limit Alarms

When the input value is less than the alarm set value, the alarm output is turned ON.

Example: If the maximum process value in the range is 0 and minimum process value in the range is 4,000 for an input signal of 4 to 20 mA, and if the H (high limit) alarm set value is 3,000, the alarm output will turn ON when the process value is greater than 3,000 (when the input signal is less than 8 mA).



Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-AD04U * CJ1W-PH41U

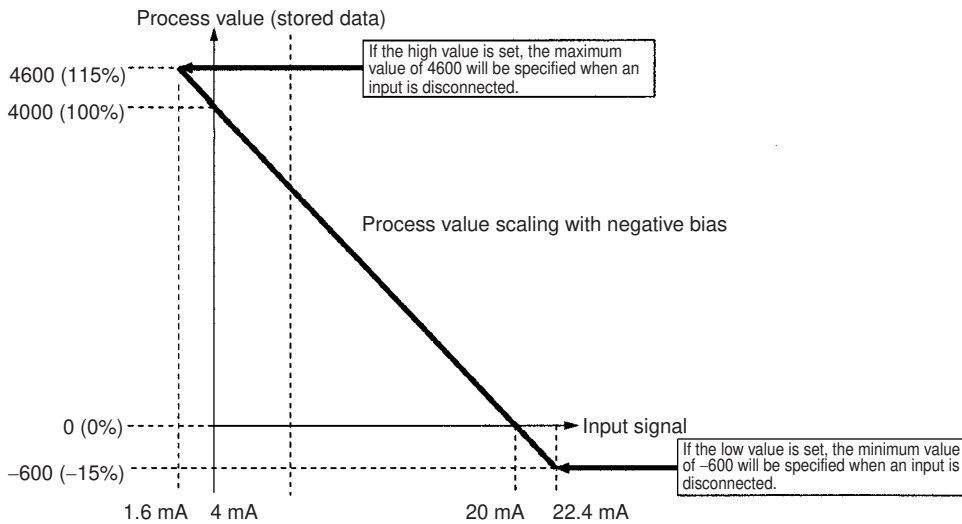
\* With the CJ1W-AD04U, the upper and lower limits of process values are 4200 (105%) and -200 (-5%), respectively.

### A-1-6 Maximum/Minimum Value for when Input Disconnection Occurs during Process Value Scaling with Negative Bias

If an input is disconnected during process value scaling with negative bias, either the maximum or minimum process value will be specified.

If the data overrange direction is high, the maximum process value will be specified.

If the data overrange direction is low, the minimum process value will be specified.



Applicable Units	Isolated-type Universal Input Units	CJ1W-AD04U * CJ1W-PH41U
------------------	-------------------------------------	----------------------------

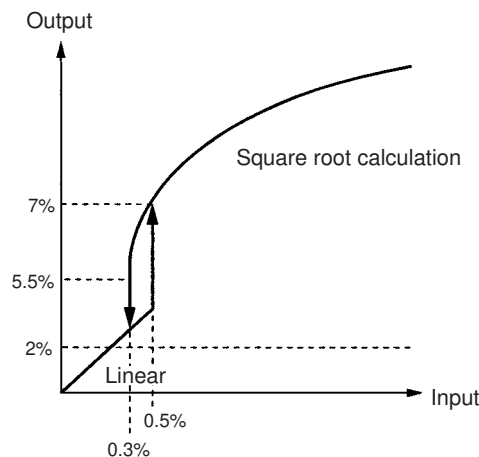
\* With the CJ1W-AD04U, the upper and lower limits of process values are 4200 (105%) and -200 (-5%), respectively.

### A-1-7 Hysteresis during Square Root Calculations

During square root calculation function, outputs of approximately 7% or less have linear characteristics (i.e., output = input). Hysteresis exists, however, when switching between square root characteristics and linear characteristics, as shown below.

During input rise: Switching from linear characteristics to square root characteristics at 0.5% input (output of approximately 7%).

During input fall: Switching from square root characteristics to linear characteristics at 0.3% input (output of approximately 5.5%).



Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U

## A-1-8 Adjustment Period Control

### **Final Adjustment Date Not Stored in the Unit's Non-volatile Memory (Initial Status)**

The set values are as follows:

- The data for the final adjustment date is set to 16#00000000.
- The Zero/span Adjustment Period Notice is set to 1 (notice period).
- The Zero/span Adjustment Period End is set to 1 (adjustment period end).

### **Error in Final Adjustment Date Stored in Unit's Non-volatile Memory when Power is Turned ON**

The ERC indicator is ON and the adjustment period control function does not operate properly. Restart the Unit. The set values are as follows.

- The Non-volatile Memory Error is set to 1 (non-volatile memory error).
- The data for the final adjustment date is set to 16#FFFFFFF.
- The Zero/span Adjustment Period Notice is set to 1 (notice period).
- The Zero/span Adjustment Period End is set to 1 (adjustment ended).

### **Error in Unit's Non-volatile Memory when Updating Final Adjustment Date**

The ERC indicator is lit. Even after the Controller is reset or the Unit is restarted, adjustment period control function does not operate normally. Update the final adjustment date again.

The set values are as follows.

- The Non-volatile Memory Error is set to 1 (non-volatile memory error).

If the CPU Unit's internal clock information is refreshed after updating the final adjustment date, the warning will not be accurate. The Zero/span Adjustment Update Bit remains ON (1: Update adjustment date) while writing non-volatile memory, so do not turn OFF the Controller.

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Units	CJ1W-PH41U

## A-1-9 Integral Value Calculation

### Integral Value Unit: Hour

The process value is calculated using an integral width of 3.6 s (1/1,000th of an hour), and the total is output to the integral value in the Expansion Operation Data.

An integral value of 1,000 indicates that a process value of 1,000 has continued for one hour.

### Integral Value Unit: Minute

The process value is calculated using an integral width of 60 ms (1/1,000th of a minute), and the total is output to the integral value in the Expansion Operation Data.

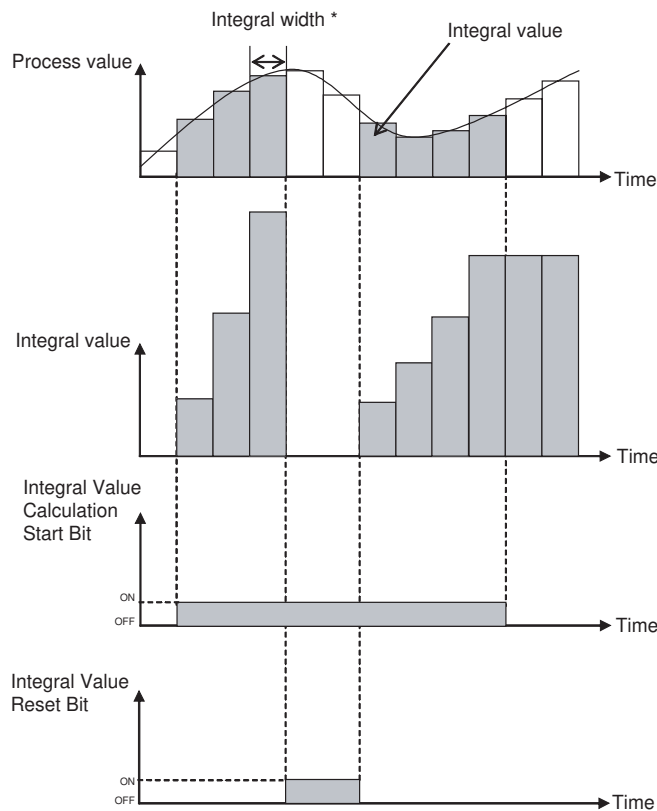
An integral value of 1,000 indicates that a process value of 1,000 has continued for one minute.

Example:

Process value: 1,000 (constant)

Integral unit: hour

Time lapsed (hours)	Integral value
0.5	500
1	1,000
2	2,000
3	3,000



\* The integral width for one integral value is as follows:

Unit	Integral width
Hour	3.6 s (1/1,000th of an hour)
Minute	60 ms (1/1,000th of a minute)

## Integral Value Overflow

The integral value will become undefined if the integral value exceeds the data range (–2147483648 to 2147483647) during integral calculation. For the CJ1W-PDC15, an integral value overflow will occur after a minimum of 45 days has lapsed from the start of integral calculation.

Use the Integral Value Calculation Start, Integral Value Reset and (for the CJ1W-PH41U only) Integral Value Coefficient so that an integral value overflow does not occur.

Example: Integral value overflow (minimum conditions). The table shows the integral values for the following minimum conditions.

- Process value: –32768 (constant)
- Integral unit: Minute

Number of days lapsed (days)	Integral value
0	0
1	–47185920
2	–94371840
to	to
45	–2123366400
46	Undefined

Applicable Units	Isolated-type Direct Current Input Unit	CJ1W-PDC15
	Isolated-type Universal Input Unit	CJ1W-PH41U

## A-2 Zero/Span Adjustment Example

The Analog I/O Unit's zero/span adjustment can be performed as described below using a calibration device.

- 1** Connect Sysmac Studio to the CPU Unit.
- 2** Connect a suitable calibration device as shown in the following table to the Analog I/O Unit.

Model	Input	Calibration device
CJ1W-PDC15	DC voltage and current	Voltage and current generator
CJ1W-AD04U	DC voltage and current	Voltage and current generator
	Thermocouple	
	Platinum resistance thermometer	Variable resistor
CJ1W-PH41U	DC voltage and current	Voltage and current generator
	Thermocouple	
	Platinum resistance thermometer	Variable resistor
	Potentiometer	

- 3** Turn ON the power to the Controller, and wait approximately 10 minutes for the Unit to warm up. The CJ1W-AD04U requires approximately 30 minutes to warm up. The CJ1W-PH41U requires approximately 45 minutes to warm up.
- 4** Make the adjustments.
  - (1) Input a signal equivalent to 0% from the calibration device, and check the "process value" in the Operation Data by using the Sysmac Studio. If the value is abnormal, change the "zero adjustment value" in the Setting Parameter, and adjust the offset (parallel movement) value.
  - (2) Input a signal equivalent to 100% from the calibration device, and check the "process value" in the Operation Data by using the Sysmac Studio. If the value is abnormal, change the "gain for span adjustment" in the Setting Parameter, and adjust the gain (bias).

For the CJ1W-PH41U Isolated-type Universal Input Unit, create a short-circuit between the terminals of the cold junction sensor. This will make the Isolated-type Universal Input Unit discontinue cold junction compensation. Then input a standard thermocouple value of 0°C (electromotive force data described in IEC 60584-1:1977) to the calibration mV signal.

## Zero/span Adjustment Example for Any Points (CJ1W-PDC15, PH41U)

Use the following adjustment equation to perform zero/span adjustment for any points.

$$\text{Process value after adjustment} = (X - B) \times ((C - A) \times E - B + A) / (C - B) + D + B$$

X: Input value

A: Zero Point \* *\_Ch#\_PVScIValCfg\_L*

B: Zero Adjustment Position *Ch#\_ZeroAdjFVCfg*

C: Span Adjustment Position *Ch#\_GainAdjFVCfg*

D: Zero Adjustment Value \* *\_Ch#\_ZeroAdjPVCfg*

E: Gain for Span Adjustment \* *\_Ch#\_GainAdjPVCfg*

The zero adjustment position and span adjustment position are percentages of the input span in the variable settings, so they can be obtained by using the following equations.

Zero Adjustment Position = (Span point set in \* *\_Ch#\_PVScIValCfg\_H* - Zero point set in \* *\_Ch#\_PVScIValCfg\_L*) × Zero adjustment position set in *Ch#\_ZeroAdjFVCfg* + Zero point set in \* *\_Ch#\_PVScIValCfg\_L*

Span Adjustment Position = (Span point set in \* *\_Ch#\_ScIValCfg\_H* - Zero point set in \* *\_Ch#\_PVScIValCfg\_L*) × Span adjustment position set in *Ch#\_GainAdjFVCfg* + Zero point set in \* *\_Ch#\_PVScIValCfg\_L*

Example: The values are calculated for the conditions in the following table.

Item	Value
Zero Point: * <i>_Ch#_PVScIValCfg_L</i>	0
Span Point: * <i>_Ch#_PVScIValCfg_H</i>	4000
Gain for Span Adjustment: * <i>_Ch#_GainAdjPVCfg</i>	10060 (10060 × 0.0001 = 1.0060) *
Zero Adjustment Value: * <i>_Ch#_ZeroAdjPVCfg</i>	5
Zero Adjustment Position: * <i>_Ch#_ZeroAdjFVCfg</i>	500 (500 × 0.0001 = 5%)
Span Adjustment Position: * <i>_Ch#_GainAdjFVCfg</i>	9500 (9500 × 0.0001 = 95%)
Input value	500

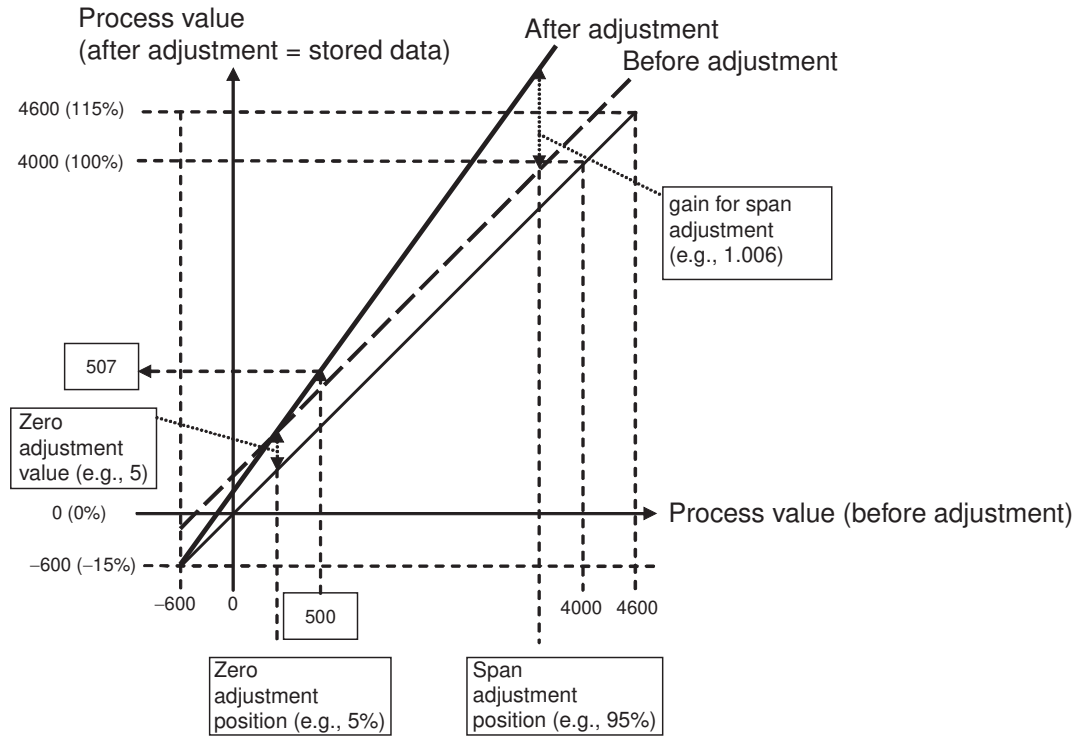
\* For the CJ1W-PH41U, the space adjustment gain setting is 10060000 (10060000 × 0.0000001 = 1.0060000).

After adjustment, the process value is as follows:

$$\text{Zero adjustment position} = (4000 - 0) \times 0.0500 + 0 = 200$$

$$\text{Span adjustment position} = (4000 - 0) \times 0.9500 + 0 = 3800$$

$$\text{Process value after adjustment} = (500 - 200) \times ((3800 - 0) \times 1.0060 - 200 + 0) / (3800 - 200) + 5 + 200 = 506.9$$





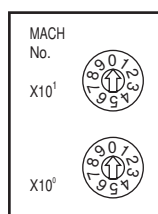
# A-3 Correspondence Table of Analog I/O Unit Variables and CJ-series CPU Addresses

When this Unit is used with an NJ-series CPU Unit, the user program uses device variables for CJ-series Unit with AT specification for the memory used for CJ-series Unit and user-defined variables to use the Unit functions.

Correspondences regarding word addresses, bit number and device variables for CJ-series Unit and user-defined variables between the I/O memory of the CJ-series CPU Unit and memory used for CJ-series Unit of the NJ-series CPU Unit are shown below.

Start address of the words allocated in Special I/O Unit in CIO Area:  $n = 2000 + \text{Unit number} \times 10$  (Unit number: 0 to 95)

Start address of the words allocated in Special I/O Unit in DM Area:  $m = D20000 + \text{Unit number} \times 100$  (Unit number: 0 to 95)



The unit number switch on the front panel of the Unit is used to set the words in the CIO and DM Areas allocated to the Analog I/O Unit.

Switch No.	Unit No.	Words allocated in Special I/O Unit Area in CIO Area	DM numbers allocated in Special I/O Unit in DM Area
0	0	CIO 2000 to CIO 2009	D20000 to D20099
1	1	CIO 2010 to CIO 2019	D20100 to D20199
2	2	CIO 2020 to CIO 2029	D20200 to D20299
3	3	CIO 2030 to CIO 2039	D20300 to D20399
4	4	CIO 2040 to CIO 2049	D20400 to D20499
5	5	CIO 2050 to CIO 2059	D20500 to D20599
6	6	CIO 2060 to CIO 2069	D20600 to D20699
7	7	CIO 2070 to CIO 2079	D20700 to D20799
8	8	CIO 2080 to CIO 2089	D20800 to D20899
9	9	CIO 2090 to CIO 2099	D20900 to D20999
⋮	⋮	⋮	⋮
n	n	CIO 2000 + (n × 10) to CIO 2000 + (n × 10) + 9	D20000 + (n × 100) to D20000 + (n × 100) + 99
⋮	⋮	⋮	⋮
94	94	CIO 2940 to CIO 2949	D29400 to D29499
95	95	CIO 2950 to CIO 2959	D29500 to D29599



### Additional Information

- If the same unit number is set for more than one Special I/O Unit, a "Duplicate Unit Number" major fault level Controller error occurs and the Unit will not operate.
- After correcting the unit number setting, cycle the power to the Controller.

**A-3-1 CJ1W-PDC15**

**Special I/O Unit Area (Device Variables for CJ-series Unit)**

I/O	CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	n	00 to 07	*_PVAlmSta	Process Value Alarm	BYTE
		00	*_Ch1_LL_PVAlmSta	Input No. 1 Process Value LL (low low limit) Alarm	BOOL
		01	*_Ch1_L_PVAlmSta	Input No. 1 Process Value L (low limit) Alarm	BOOL
		02	*_Ch1_H_PVAlmSta	Input No. 1 Process Value H (high limit) Alarm	BOOL
		03	*_Ch1_HH_PVAlmSta	Input No. 1 Process Value HH (high high limit) Alarm	BOOL
		04	*_Ch2_LL_PVAlmSta	Input No. 2 Process Value LL (low low limit) Alarm	BOOL
		05	*_Ch2_L_PVAlmSta	Input No. 2 Process Value L (low limit) Alarm	BOOL
		06	*_Ch2_H_PVAlmSta	Input No. 2 Process Value H (high limit) Alarm	BOOL
		07	*_Ch2_HH_PVAlmSta	Input No. 2 Process Value HH (high high limit) Alarm	BOOL
	n+1	00 to 15	*_Ch1_AllnPv	Input No. 1 Process Value	INT
	n+2	00 to 15	*_Ch2_AllnPv	Input No. 2 Process Value	INT
	n+5	00 to 15	*_Ch1_RateVal	Input No. 1 Rate-of-change Value	INT
	n+6	00 to 15	*_Ch2_RateVal	Input No. 2 Rate-of-change Value	INT
	n+9	00 to 07	*_RateAlmSta	Rate-of-change Value Alarm	BYTE
		00	*_Ch1_L_RateAlmSta	Input No. 1 Rate-of-change Value L (low limit) Alarm	BOOL
		01	*_Ch1_H_RateAlmSta	Input No. 1 Rate-of-change Value H (high limit) Alarm	BOOL
		02	*_Ch2_L_RateAlmSta	Input No. 2 Rate-of-change Value L (low limit) Alarm	BOOL
		03	*_Ch2_H_RateAlmSta	Input No. 2 Rate-of-change Value H (high limit) Alarm	BOOL
		08 to 15	*_ErrSta	Error Status	BYTE
		08	*_Ch1_Sens_ErrSta	Input No. 1 Input Error	BOOL
		09	*_Ch2_Sens_ErrSta	Input No. 2 Input Error	BOOL
		13	*_AdjPrdEnd_ErrSta	Zero/Span Adjustment Period End	BOOL
		14	*_AdjPrevNotice_ErrSta	Zero/Span Adjustment Period Notice	BOOL
15		*_ExtPwrValid_ErrSta	External Power Supply	BOOL	

## Special I/O Unit DM Area (Device Variables for CJ-series Unit)

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m)	00 to 15	*_LoadDefaultCfg	Default Block Read Command	UINT
D(m+2)	00 to 15	*_Ch1_PVAlmValCfg_HH	Input No. 1 Process Value HH (high high limit) Alarm Setting	INT
D(m+3)	00 to 15	*_Ch1_PVAlmValCfg_H	Input No. 1 Process Value H (high limit) Alarm Setting	INT
D(m+4)	00 to 15	*_Ch1_PVAlmValCfg_L	Input No. 1 Process Value L (low limit) Alarm Setting	INT
D(m+5)	00 to 15	*_Ch1_PVAlmValCfg_LL	Input No. 1 Process Value LL (low low limit) Alarm Setting	INT
D(m+6)	00 to 15	*_Ch1_RateAlmValCfg_H	Input No. 1 Rate-of-change Value H (high limit) Alarm Setting	INT
D(m+7)	00 to 15	*_Ch1_RateAlmValCfg_L	Input No. 1 Rate-of-change Value L (low limit) Alarm Setting	INT
D(m+8)	00 to 15	*_Ch1_GainAdjPVCfg	Input No. 1 Gain for Span Adjustment	UINT
D(m+9)	00 to 15	*_Ch1_ZeroAdjPVCfg	Input No. 1 Zero Adjustment Value	INT
D(m+10)	00 to 15	*_Ch2_PVAlmValCfg_HH	Input No. 2 Process Value HH (high high limit) Alarm Setting	INT
D(m+11)	00 to 15	*_Ch2_PVAlmValCfg_H	Input No. 2 Process Value H (high limit) Alarm Setting	INT
D(m+12)	00 to 15	*_Ch2_PVAlmValCfg_L	Input No. 2 Process Value L (low limit) Alarm Setting	INT
D(m+13)	00 to 15	*_Ch2_PVAlmValCfg_LL	Input No. 2 Process Value LL (low low limit) Alarm Setting	INT
D(m+14)	00 to 15	*_Ch2_RateAlmValCfg_H	Input No. 2 Rate-of-change Value H (high limit) Alarm Setting	INT
D(m+15)	00 to 15	*_Ch2_RateAlmValCfg_L	Input No. 2 Rate-of-change Value L (low limit) Alarm Setting	INT
D(m+16)	00 to 15	*_Ch2_GainAdjPVCfg	Input No. 2 Gain for Span Adjustment	UINT
D(m+17)	00 to 15	*_Ch2_ZeroAdjPVCfg	Input No. 2 Zero Adjustment Value	INT
D(m+34)	00 to 15	*_Ch1_SensTypCfg	Input No. 1 Input Signal Type Setting	UINT
D(m+35)	00 to 15	*_Ch1_InSpanValCfg_H	Input No. 1 Maximum Value in Range	INT
D(m+36)	00 to 15	*_Ch1_InSpanValCfg_L	Input No. 1 Minimum Value in Range	INT
D(m+37)	00 to 15	*_Ch1_SqrtCfg	Input No. 1 Square Root Extraction	WORD
D(m+38)	00 to 15	*_Ch1_PVScIValCfg_H	Input No. 1 Scaling Value for Maximum Value in Range (Span)	INT
D(m+39)	00 to 15	*_Ch1_PVScIValCfg_L	Input No. 1 Scaling Value for Minimum Value in Range (Zero)	INT
D(m+40)	00 to 15	*_Ch1_AlmHystersValCfg	Input No. 1 Alarm Hysteresis	UINT
D(m+41)	00 to 15	*_Ch1_AlmOnDelayTmCfg	Input No. 1 Alarm ON-delay Time	UINT
D(m+42)	00 to 15	*_Ch1_InRateSpanValCfg_H	Input No. 1 Maximum Rate-of-change Range Value	INT
D(m+43)	00 to 15	*_Ch1_InRateSpanValCfg_L	Input No. 1 Minimum Rate-of-change Range Value	INT
D(m+44)	00 to 15	*_Ch1_RateCmplIntvlTm	Input No. 1 Rate-of-change Comparison Time Interval	UINT
D(m+45)	00 to 15	*_Ch1_RateScIValCfg_H	Input No. 1 Scaling Value for Maximum Rate-of-change Range Value	INT

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m+46)	00 to 15	*_Ch1_RateSciValCfg_L	Input No. 1 Scaling Value for Minimum Rate-of-change Range Value	INT
D(m+47)	00 to 15	*_Ch1_AveCfg	Input No. 1 Number of Values for Calculating Moving Average for Mean Value Processing	UINT
D(m+48)	00 to 15	*_Ch2_SensTypCfg	Input No. 2 Input Signal Type Setting	UINT
D(m+49)	00 to 15	*_Ch2_InSpanValCfg_H	Input No. 2 Maximum Value in Range	INT
D(m+50)	00 to 15	*_Ch2_InSpanValCfg_L	Input No. 2 Minimum Value in Range	INT
D(m+51)	00 to 15	*_Ch2_SqrtCfg	Input No. 2 Square Root Extraction	WORD
D(m+52)	00 to 15	*_Ch2_PVSciValCfg_H	Input No. 2 Scaling Value for Maximum Value in Range (Span)	INT
D(m+53)	00 to 15	*_Ch2_PVSciValCfg_L	Input No. 2 Scaling Value for Minimum Value in Range (Zero)	INT
D(m+54)	00 to 15	*_Ch2_AlmHysTrsValCfg	Input No. 2 Alarm Hysteresis	UINT
D(m+55)	00 to 15	*_Ch2_AlmOnDelayTmCfg	Input No. 2 Alarm ON-delay Time	UINT
D(m+56)	00 to 15	*_Ch2_InRateSpanValCfg_H	Input No. 2 Maximum Rate-of-change Range Value (setting scaling value/comparison time interval)	INT
D(m+57)	00 to 15	*_Ch2_InRateSpanValCfg_L	Input No. 2 Minimum Rate-of-change Range Value (setting scaling value/comparison time interval)	INT
D(m+58)	00 to 15	*_Ch2_RateCmplntvlTm	Input No. 2 Rate-of-change Comparison Time Interval	UINT
D(m+59)	00 to 15	*_Ch2_RateSciValCfg_H	Input No. 2 Scaling Value for Maximum Rate-of-change Range Value	INT
D(m+60)	00 to 15	*_Ch2_RateSciValCfg_L	Input No. 2 Scaling Value for Minimum Rate-of-change Range Value	INT
D(m+61)	00 to 15	*_Ch2_AveCfg	Input No. 2 Number of Values for Calculating Moving Average for Mean Value Processing	UINT
D(m+90)	00 to 15	*_Ch1_CfgErrAdr	Input No. 1 Address of Data Range Error	UINT
D(m+91)	00 to 15	*_Ch2_CfgErrAdr	Input No. 2 Address of Data Range Error	UINT
D(m+98)	00 to 15	*_ExtMemArea	Area of Expansion Setting Parameter	UINT
D(m+99)	00 to 15	*_ExtMemAdr	First Word in Expansion Setting Parameter Area	UINT

## Expansion Special I/O Unit Area (User-defined Variables: *\_sCJPD15\_Ex\_CmdSta* Type)

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Output (CPU to Unit)	p+1	00 to 07	<i>HdMd</i>	Hold Function Selection	BYTE
		00	<i>Ch1_HdMd</i>	Input No. 1 Hold Function Selection	BOOL
		01	<i>Ch2_HdMd</i>	Input No. 2 Hold Function Selection	BOOL
		08 to 15	<i>HdCmd</i>	Hold Direction	BYTE
		08	<i>Ch1_StartHdCmd</i>	Input No. 1 Hold Start	BOOL
		09	<i>Ch2_StartHdCmd</i>	Input No. 2 Hold Start	BOOL
		12	<i>Ch1_RstHdCmd</i>	Input No. 1 Hold Value Reset	BOOL
		13	<i>Ch2_RstHdCmd</i>	Input No. 2 Hold Value Reset	BOOL
	p+2	00 to 07	<i>IntgCmd</i>	Integral Direction	BYTE
		00	<i>Ch1_StartIntgCmd</i>	Input No. 1 Integral Value Calculation Start	BOOL
		01	<i>Ch2_StartIntgCmd</i>	Input No. 2 Integral Value Calculation Start	BOOL
		04	<i>Ch1_RstIntgCmd</i>	Input No. 1 Integral Value Reset	BOOL
		05	<i>Ch2_RstIntgCmd</i>	Input No. 2 Integral Value Reset	BOOL
	p+3	00 to 07	<i>AdjCmd</i>	Zero/Span Adjustment Update	BYTE
		00	<i>Ch1_Upd_AdjCmd</i>	Input No. 1 Zero/Span Adjustment Update	BOOL
		01	<i>Ch2_Upd_AdjCmd</i>	Input No. 2 Zero/Span Adjustment Update	BOOL

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	p+4	00	<i>Ch1_AdjPrdEnd</i>	Input No. 1 Zero/Span Adjustment Period End	BOOL
		01	<i>Ch1_AdjPrevNotice</i>	Input No. 1 Zero/Span Adjustment Period Notice	BOOL
		02	<i>Ch2_AdjPrdEnd</i>	Input No. 2 Zero/Span Adjustment Period End	BOOL
		03	<i>Ch2_AdjPrevNotice</i>	Input No. 2 Zero/Span Adjustment Period Notice	BOOL
		08	<i>MemErr</i>	Non-volatile Memory Error	BOOL
	p+5	00 to 15	<i>Ch1_LastAdjDate</i>	Input No. 1 Day of Final adjustment date	DWORD
	p+6	00 to 15		Input No. 1 Year and Month of Final adjustment date	
	p+7	00 to 15	<i>Ch2_LastAdjDate</i>	Input No. 2 Day of Final adjustment date	DWORD
	p+8	00 to 15		Input No. 2 Year and Month of Final adjustment date	
	p+17	00 to 15	<i>Ch1_PkTopVal</i>	Input No. 1 Peak/Top Value	INT
	p+18	00 to 15	<i>Ch1_BtmVlyVal</i>	Input No. 1 Bottom/Valley Value	INT
	p+19	00 to 15	<i>Ch2_PkTopVal</i>	Input No. 2 Peak/Top Value	INT
	p+20	00 to 15	<i>Ch2_BtmVlyVal</i>	Input No. 2 Bottom/Valley Value	INT
	p+25	00 to 15	<i>Ch1_IntgVal</i>	Input No. 1 Integral Value (Lower Digit)	DINT
	p+26	00 to 15		Input No. 1 Integral Value (Upper Digit)	
	p+27	00 to 15	<i>Ch2_IntgVal</i>	Input No. 2 Integral Value (Lower Digit)	DINT
	p+28	00 to 15		Input No. 2 Integral Value (Upper Digit)	

## Expansion Special I/O Unit Area (User-defined Variables: *\_sCJPDC15\_Ex\_Param* Type)

CJ-series I/O memory address		NJ-series User-defined Variable		
DM No.	Bit No.	Variable (name)	Description	Data type
o	00 to 15	<i>ExtIOArea</i>	Area of Expansion Operation Data	UINT
o+1	00 to 15	<i>ExtIOAdr</i>	First Word in Expansion Operation Data Area	UINT
o+2	00 to 15	<i>Ch1_GainAdjFVCfg</i>	Input No. 1 Span Adjustment Position (Input span percentage)	UINT
o+3	00 to 15	<i>Ch1_ZeroAdjFVCfg</i>	Input No. 1 Zero Adjustment Position (Input span percentage)	INT
o+4	00 to 15	<i>Ch1_AdjPrd</i>	Input No. 1 Zero/Span Adjustment Period	UINT
o+5	00 to 15	<i>Ch1_AdjNoticeDay</i>	Input No. 1 Notice of Days Remaining	UINT
o+9	00 to 15	<i>Ch1_TopVlyHysTrs</i>	Input No. 1 Top And Valley Detection Hysteresis	UINT
o+10	00 to 15	<i>Ch1_IntgUnit</i>	Input No. 1 Integer Unit	WORD
o+13	00 to 15	<i>Ch2_GainAdjFVCfg</i>	Input No. 2 Span Adjustment Position (Input span percentage)	UINT
o+14	00 to 15	<i>Ch2_ZeroAdjFVCfg</i>	Input No. 2 Zero Adjustment Position (Input span percentage)	INT
o+15	00 to 15	<i>Ch2_AdjPrd</i>	Input No. 2 Zero/Span Adjustment Period	UINT
o+16	00 to 15	<i>Ch2_AdjNoticeDay</i>	Input No. 2 Notice of Days Remaining	UINT
o+20	00 to 15	<i>Ch2_TopVlyHysTrs</i>	Input No. 2 Top and Valley Detection Hysteresis	UINT
o+21	00 to 15	<i>Ch2_IntgUnit</i>	Input No. 2 Integer Unit	WORD

**A-3-2 CJ1W-AD04U**

**Special I/O Unit Area (Device Variables for CJ-series Unit)**

I/O	CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	n	00 to 07	*_PVAImSta	Process Value Alarm	WORD
		00	*_Ch1_L_PVAImSta	Input No. 1 Process Value L (low limit) Alarm	BOOL
		01	*_Ch1_H_PVAImSta	Input No. 1 Process Value H (high limit) Alarm	BOOL
		02	*_Ch2_L_PVAImSta	Input No. 2 Process Value L (low limit) Alarm	BOOL
		03	*_Ch2_H_PVAImSta	Input No. 2 Process Value H (high limit) Alarm	BOOL
		04	*_Ch3_L_PVAImSta	Input No. 3 Process Value L (low limit) Alarm	BOOL
		05	*_Ch3_H_PVAImSta	Input No. 3 Process Value H (high limit) Alarm	BOOL
		06	*_Ch4_L_PVAImSta	Input No. 4 Process Value L (low limit) Alarm	BOOL
		07	*_Ch4_H_PVAImSta	Input No. 4 Process Value H (high limit) Alarm	BOOL
	n+1	00 to 15	*_Ch1_AllnPv	Input No. 1 Process Value	INT
	n+2	00 to 15	*_Ch2_AllnPv	Input No. 2 Process Value	INT
	n+3	00 to 15	*_Ch3_AllnPv	Input No. 3 Process Value	INT
	n+4	00 to 15	*_Ch4_AllnPv	Input No. 4 Process Value	INT
	n+9	00 to 15	*_ErrSta	Error Status	WORD
		00	*_Ch1_Sens_ErrSta	Input No. 1 Input Error	BOOL
		01	*_Ch2_Sens_ErrSta	Input No. 2 Input Error	BOOL
		02	*_Ch3_Sens_ErrSta	Input No. 3 Input Error	BOOL
		03	*_Ch4_Sens_ErrSta	Input No. 4 Input Error	BOOL
		08	*_Ch1_CJ_ErrSta	Input No. 1 Cold Junction Sensor Error	BOOL
		09	*_Ch2_CJ_ErrSta	Input No. 2 Cold Junction Sensor Error	BOOL
10		*_Ch3_CJ_ErrSta	Input No. 3 Cold Junction Sensor Error	BOOL	
11		*_Ch4_CJ_ErrSta	Input No. 4 Cold Junction Sensor Error	BOOL	
	15	*_PVValid_ErrSta	Conversion Data Enabled Flag	BOOL	



## Special I/O Unit DM Area (Device Variables for CJ-series Unit)

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m)	00 to 15	*_LoadDefaultCfg	Default Block Read Command	UINT
D(m+1)	00 to 15	*_CfgErrAdr	Address of Data Range Error	UINT
D(m+2)	00 to 15	*_Ch1_PVAlmValCfg_H	Input No. 1 Process Value H (high limit) Alarm Setting (Set at Process Value scaling value.)	INT
D(m+3)	00 to 15	*_Ch1_PVAlmValCfg_L	Input No. 1 Process Value L (low limit) Alarm Setting (Set at Process Value scaling value.)	INT
D(m+4)	00 to 15	*_Ch1_GainAdjPVCfg	Input No. 1 Gain for Span Adjustment	UINT
D(m+5)	00 to 15	*_Ch1_ZeroAdjPVCfg	Input No. 1 Zero Adjustment Value (Set at process value scaling value.)	INT
D(m+6)	00 to 15	*_Ch2_PVAlmValCfg_H	Input No. 2 Process Value H (high limit) Alarm Setting (Set at Process Value scaling value.)	INT
D(m+7)	00 to 15	*_Ch2_PVAlmValCfg_L	Input No. 2 Process Value L (low limit) Alarm Setting (Set at Process Value scaling value.)	INT
D(m+8)	00 to 15	*_Ch2_GainAdjPVCfg	Input No. 2 Gain for Span Adjustment	UINT
D(m+9)	00 to 15	*_Ch2_ZeroAdjPVCfg	Input No. 2 Zero Adjustment Value (Set at process value scaling value.)	INT
D(m+10)	00 to 15	*_Ch3_PVAlmValCfg_H	Input No. 3 Process Value H (high limit) Alarm Setting (Set at Process Value scaling value.)	INT
D(m+11)	00 to 15	*_Ch3_PVAlmValCfg_L	Input No. 3 Process Value L (low limit) Alarm Setting (Set at Process Value scaling value.)	INT
D(m+12)	00 to 15	*_Ch3_GainAdjPVCfg	Input No. 3 Gain for Span Adjustment	UINT
D(m+13)	00 to 15	*_Ch3_ZeroAdjPVCfg	Input No. 3 Zero Adjustment Value (Set at process value scaling value.)	INT
D(m+14)	00 to 15	*_Ch4_PVAlmValCfg_H	Input No. 4 Process Value H (high limit) Alarm Setting (Set at process value scaling value.)	INT
D(m+15)	00 to 15	*_Ch4_PVAlmValCfg_L	Input No. 4 Process Value L (low limit) Alarm Setting (Set at process value scaling value.)	INT
D(m+16)	00 to 15	*_Ch4_GainAdjPVCfg	Input No. 4 Gain for Span Adjustment	UINT
D(m+17)	00 to 15	*_Ch4_ZeroAdjPVCfg	Input No. 4 Zero Adjustment Value (Set at process value scaling value.)	INT

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m+18)	00 to 07	*_PVUnitCfg	Temperature Unit	BYTE
	00	*_Ch1_PVUnitCfg	Input No. 1 Temperature Unit	BOOL
	01	*_Ch2_PVUnitCfg	Input No. 2 Temperature Unit	BOOL
	02	*_Ch3_PVUnitCfg	Input No. 3 Temperature Unit	BOOL
	03	*_Ch4_PVUnitCfg	Input No. 4 Temperature Unit	BOOL
	08 to 15	*_SenErrCfg	Data Overrange Direction for Sensor Error	BYTE
	12	*_Ch1_SensErrCfg	Input No. 1 Data Overrange Direction for Sensor Error	BOOL
	13	*_Ch2_SensErrCfg	Input No. 2 Data Overrange Direction for Sensor Error	BOOL
	14	*_Ch3_SensErrCfg	Input No. 3 Data Overrange Direction for Sensor Error	BOOL
15	*_Ch4_SensErrCfg	Input No. 4 Data Overrange Direction for Sensor Error	BOOL	
D(m+19)	00 to 15	*_Ch1_SensTypCfg	Input No. 1 Input Signal Type Setting	UINT
D(m+20)	00 to 15	*_Ch1_AlmHysTrsValCfg	Input No. 1 Alarm Hysteresis	UINT
D(m+21)	00 to 15	*_Ch1_AlmOnDelayTmCfg	Input No. 1 Alarm ON-delay Time	UINT
D(m+22)	00 to 15	*_Ch1_PVScIValCfg_H	Input No. 1 Scaling Value for Maximum Value in Range (Span)	INT
D(m+23)	00 to 15	*_Ch1_PVScIValCfg_L	Input No. 1 Scaling Value for Minimum Value in Range (Zero)	INT
D(m+24)	00 to 15	*_Ch2_SensTypCfg	Input No. 2 Input Signal Type Setting	UINT
D(m+25)	00 to 15	*_Ch2_AlmHysTrsValCfg	Input No. 2 Alarm Hysteresis	UINT
D(m+26)	00 to 15	*_Ch2_AlmOnDelayTmCfg	Input No. 2 Alarm ON-delay Time	UINT
D(m+27)	00 to 15	*_Ch2_PVScIValCfg_H	Input No. 2 Scaling Value for Maximum Value in Range (Span)	INT
D(m+28)	00 to 15	*_Ch2_PVScIValCfg_L	Input No. 2 Scaling Value for Minimum Value in Range (Zero)	INT
D(m+29)	00 to 15	*_Ch3_SensTypCfg	Input No. 3 Input Signal Type Setting	UINT
D(m+30)	00 to 15	*_Ch3_AlmHysTrsValCfg	Input No. 3 Alarm Hysteresis	UINT
D(m+31)	00 to 15	*_Ch3_AlmOnDelayTmCfg	Input No. 3 Alarm ON-Delay Time	UINT
D(m+32)	00 to 15	*_Ch3_PVScIValCfg_H	Input No. 3 Scaling Value for Maximum Value in Range (Span)	INT
D(m+33)	00 to 15	*_Ch3_PVScIValCfg_L	Input No. 3 Scaling Value for Minimum Value in Range (Zero)	INT
D(m+34)	00 to 15	*_Ch4_SensTypCfg	Input No. 4 Input Signal Type Setting	UINT
D(m+35)	00 to 15	*_Ch4_AlmHysTrsValCfg	Input No. 4 Alarm Hysteresis	UINT
D(m+36)	00 to 15	*_Ch4_AlmOnDelayTmCfg	Input No. 4 Alarm ON-delay Time	UINT
D(m+37)	00 to 15	*_Ch4_PVScIValCfg_H	Input No. 4 Scaling Value for Maximum Value in Range (Span)	INT
D(m+38)	00 to 15	*_Ch4_PVScIValCfg_L	Input No. 4 Scaling Value for Minimum Value in Range (Zero)	INT
D(m+39)	00 to 15	*_ExtIOCfg	Expansion Operation Data Setting	WORD
D(m+40)	00 to 15	*_ExtIOAdr	First Word in Expansion Operation Data Area	UINT

## Expansion Special I/O Unit Area

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	0	00	The CJ1W-AD04U does not have structure data types for Expansion Operation Data.	Input No. 1 Process Value L (low limit) Alarm	---
		01		Input No. 1 Process Value H (high limit) Alarm	
		02		Input No. 2 Process Value L (low limit) Alarm	
		03		Input No. 2 Process Value H (high limit) Alarm	
		04		Input No. 3 Process Value L (low limit) Alarm	
		05		Input No. 3 Process Value H (high limit) Alarm	
		06		Input No. 4 Process Value L (low limit) Alarm	
		07		Input No. 4 Process Value H (high limit) Alarm	

### A-3-3 CJ1W-PH41U

## Special I/O Unit Area (Device Variables for CJ-series Unit)

I/O	CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	n	00 to 15	*_Ch1_AllnPV *_Ch1_AllnPVDint	Input No. 1 Process Value (Lower)	INT/DINT
				Input No. 1 Process Value (Upper)	
	n+2	00 to 15	*_Ch2_AllnPV *_Ch2_AllnPVDint	Input No. 2 Process Value (Lower)	INT/DINT
				Input No. 2 Process Value (Upper)	
	n+4	00 to 15	*_Ch3_AllnPV *_Ch3_AllnPVDint	Input No. 3 Process Value (Lower)	INT/DINT
				Input No. 3 Process Value (Upper)	
	n+6	00 to 15	*_Ch4_AllnPV *_Ch4_AllnPVDint	Input No. 4 Process Value (Lower)	INT/DINT
				Input No. 4 Process Value (Upper)	

I/O	CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	n+8	00 to 15	*_PVAlmSta	Process Value Alarm	WORD
		00	*_Ch1_LL_PVAlmSta	Input No. 1 Process Value LL (low low limit) Alarm	BOOL
		01	*_Ch1_L_PVAlmSta	Input No. 1 Process Value L (low limit) Alarm	BOOL
		02	*_Ch1_H_PVAlmSta	Input No. 1 Process Value H (high limit) Alarm	BOOL
		03	*_Ch1_HH_PVAlmSta	Input No. 1 Process Value HH (high high limit) Alarm	BOOL
		04	*_Ch2_LL_PVAlmSta	Input No. 2 Process Value LL (low low limit) Alarm	BOOL
		05	*_Ch2_L_PVAlmSta	Input No. 2 Process Value L (low limit) Alarm	BOOL
		06	*_Ch2_H_PVAlmSta	Input No. 2 Process Value H (high limit) Alarm	BOOL
		07	*_Ch2_HH_PVAlmSta	Input No. 2 Process Value HH (high high limit) Alarm	BOOL
		08	*_Ch3_LL_PVAlmSta	Input No. 3 Process Value LL (low low limit) Alarm	BOOL
		09	*_Ch3_L_PVAlmSta	Input No. 3 Process Value L (low limit) Alarm	BOOL
		10	*_Ch3_H_PVAlmSta	Input No. 3 Process Value H (high limit) Alarm	BOOL
		11	*_Ch3_HH_PVAlmSta	Input No. 3 Process Value HH (high high limit) Alarm	BOOL
		12	*_Ch4_LL_PVAlmSta	Input No. 4 Process Value LL (low low limit) Alarm	BOOL
		13	*_Ch4_L_PVAlmSta	Input No. 4 Process Value L (low limit) Alarm	BOOL
		14	*_Ch4_H_PVAlmSta	Input No. 4 Process Value H (high limit) Alarm	BOOL
15	*_Ch4_HH_PVAlmSta	Input No. 4 Process Value HH (high high limit) Alarm	BOOL		

I/O	CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	n+9	00 to 07	<i>*_RateAlmSta</i>	Rate-of-change Value Alarm	BYTE
		00	<i>*_Ch1_L_RateAlmSta</i>	Input No. 1 Rate-of-change L (low limit) Alarm	BOOL
		01	<i>*_Ch1_H_RateAlmSta</i>	Input No. 1 Rate-of-change H (high limit) Alarm	BOOL
		02	<i>*_Ch2_L_RateAlmSta</i>	Input No. 2 Rate-of-change L (low limit) Alarm	BOOL
		03	<i>*_Ch2_H_RateAlmSta</i>	Input No. 2 Rate-of-change H (high limit) Alarm	BOOL
		04	<i>*_Ch3_L_RateAlmSta</i>	Input No. 3 Rate-of-change L (low limit) Alarm	BOOL
		05	<i>*_Ch3_H_RateAlmSta</i>	Input No. 3 Rate-of-change H (high limit) Alarm	BOOL
		06	<i>*_Ch4_L_RateAlmSta</i>	Input No. 4 Rate-of-change L (low limit) Alarm	BOOL
		07	<i>*_Ch4_H_RateAlmSta</i>	Input No. 4 Rate-of-change H (high limit) Alarm	BOOL
		08 to 15	<i>*_ErrSta</i>	Error Status	BYTE
		08	<i>*_Ch1_Sens_ErrSta</i>	Input No. 1 Input Error	BOOL
		09	<i>*_Ch2_Sens_ErrSta</i>	Input No. 2 Input Error	BOOL
		10	<i>*_Ch3_Sens_ErrSta</i>	Input No. 3 Input Error	BOOL
		11	<i>*_Ch4_Sens_ErrSta</i>	Input No. 4 Input Error	BOOL
		12	<i>*_CJ_ErrSta</i>	Cold Junction Sensor Error	BOOL
		13	<i>*_AdjPrdEnd_ErrSta</i>	Zero/Span Adjustment Period End	BOOL
14	<i>*_AdjPrevNotice_ErrSta</i>	Zero/Span Adjustment Period Notice	BOOL		
15	<i>*_Conv_ErrSta</i>	A/D Conversion Error	BOOL		

## Special I/O Unit DM Area (Device Variables for CJ-series Unit)

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m)	00 to 15	*_LoadDefaultCfg	Default Block Read Command	UINT
D(m+1)	00 to 15	*_ResolutionCfg	Resolution and Process Data Length Setting	WORD
	00 to 03		Resolution/Conversion Cycle Setting	
	04 to 07		Process Data Length Setting	
D(m+2)	00 to 15	*_Ch1_PVAlmValCfg_H	Input No. 1 Process Value H (high limit) Alarm Setting (Lower)	DINT
D(m+3)	00 to 15		Input No. 1 Process Value H (high limit) Alarm Setting (Upper)	
D(m+4)	00 to 15	*_Ch1_PVAlmValCfg_L	Input No. 1 Process Value L (low limit) Alarm Setting (Lower)	DINT
D(m+5)	00 to 15		Input No. 1 Process Value L (low limit) Alarm Setting (Upper)	
D(m+6)	00 to 15	*_Ch1_GainAdjPVCfg	Input No. 1 Gain for Span Adjustment (Lower)	UDINT
D(m+7)	00 to 15		Input No. 1 Gain for Span Adjustment (Upper)	
D(m+8)	00 to 15	*_Ch1_ZeroAdjPVCfg	Input No. 1 Zero Adjustment Value (Lower)	DINT
D(m+9)	00 to 15		Input No. 1 Zero Adjustment Value (Upper)	
D(m+10)	00 to 15	*_Ch2_PVAlmValCfg_H	Input No. 2 Process Value H (high limit) Alarm Setting (Lower)	DINT
D(m+11)	00 to 15		Input No. 2 Process Value H (high limit) Alarm Setting (Upper)	
D(m+12)	00 to 15	*_Ch2_PVAlmValCfg_L	Input No. 2 Process Value L (low limit) Alarm Setting (Lower)	DINT
D(m+13)	00 to 15		Input No. 2 Process Value L (low limit) Alarm Setting (Upper)	
D(m+14)	00 to 15	*_Ch2_GainAdjPVCfg	Input No. 2 Gain for Span Adjustment (Lower)	UDINT
D(m+15)	00 to 15		Input No. 2 Gain for Span Adjustment (Upper)	
D(m+16)	00 to 15	*_Ch2_ZeroAdjPVCfg	Input No. 2 Zero Adjustment Value (Lower)	DINT
D(m+17)	00 to 15		Input No. 2 Zero Adjustment Value (Upper)	
D(m+18)	00 to 15	*_Ch3_PVAlmValCfg_H	Input No. 3 Process Value H (high limit) Alarm Setting (Lower)	DINT
D(m+19)	00 to 15		Input No. 3 Process Value H (high limit) Alarm Setting (Upper)	
D(m+20)	00 to 15	*_Ch3_PVAlmValCfg_L	Input No. 3 Process Value L (low limit) Alarm Setting (Lower)	DINT
D(m+21)	00 to 15		Input No. 3 Process Value L (low limit) Alarm Setting (Upper)	
D(m+22)	00 to 15	*_Ch3_GainAdjPVCfg	Input No. 3 Gain for Span Adjustment (Lower)	UDINT
D(m+23)	00 to 15		Input No. 3 Gain for Span Adjustment (Upper)	
D(m+24)	00 to 15	*_Ch3_ZeroAdjPVCfg	Input No. 3 Zero Adjustment Value (Lower)	DINT
D(m+25)	00 to 15		Input No. 3 Zero Adjustment Value (Upper)	

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m+26)	00 to 15	*_Ch4_PVAlmValCfg_H	Input No. 4 Process Value H (high limit) Alarm Setting (Lower)	DINT
D(m+27)	00 to 15		Input No. 4 Process Value H (high limit) Alarm Setting (Upper)	
D(m+28)	00 to 15	*_Ch4_PVAlmValCfg_L	Input No. 4 Process Value L (low limit) Alarm Setting (Lower)	DINT
D(m+29)	00 to 15		Input No. 4 Process Value L (low limit) Alarm Setting (Upper)	
D(m+30)	00 to 15	*_Ch4_GainAdjPVCfg	Input No. 4 Gain for Span Adjustment (Lower)	UDINT
D(m+31)	00 to 15		Input No. 4 Gain for Span Adjustment (Upper)	
D(m+32)	00 to 15	*_Ch4_ZeroAdjPVCfg	Input No. 4 Zero Adjustment Value (Lower)	DINT
D(m+33)	00 to 15		Input No. 4 Zero Adjustment Value (Upper)	
D(m+34)	00 to 15	*_Ch1_SensTypCfg	Input No. 1 Input Signal Type Setting	UINT
D(m+35)	00 to 15	*_Ch1_InSpanValCfg_H	Input No. 1 Maximum Value in Range	INT
D(m+36)	00 to 15	*_Ch1_InSpanValCfg_L	Input No. 1 Minimum Value in Range	INT
D(m+37)	00 to 15	*_Ch1_PVUnitCfg	Input No. 1 Temperature Unit	WORD
D(m+38)	00 to 15	*_Ch1_SensErrCfg	Input No. 1 Data Overrange Direction for Sensor Error	WORD
D(m+39)	00 to 15	*_Ch1_PVScIValCfg_H	Input No. 1 Scaling Value for Maximum Value in Range (Span) (Lower)	DINT
D(m+40)	00 to 15		Input No. 1 Scaling Value for Maximum Value in Range (Span) (Upper)	
D(m+41)	00 to 15	*_Ch1_PVScIValCfg_L	Input No. 1 Scaling Value for Minimum Value in Range (Zero) (Lower)	DINT
D(m+42)	00 to 15		Input No. 1 Scaling Value for Minimum Value in Range (Zero) (Upper)	
D(m+43)	00 to 15	*_Ch1_PVScIOfsValCfg	Input No. 1 Scaling Offset (Lower)	DINT
D(m+44)	00 to 15		Input No. 1 Scaling Offset (Upper)	
D(m+45)	00 to 15	*_Ch1_AlmHystsValCfg	Input No. 1 Alarm Hysteresis	UINT
D(m+46)	00 to 15	*_Ch1_AlmOnDelayTmCfg	Input No. 1 Alarm ON-delay Time	UINT
D(m+47)	00 to 15	*_Ch1_AlmOffDelayTmCfg	Input No. 1 Alarm OFF-delay Time	UINT
D(m+48)	00 to 15	*_Ch1_AveCfg	Input No. 1 Number of Values for Calculating Moving Average for Mean Value Processing	UINT
D(m+49)	00 to 15	*_Ch2_SensTypCfg	Input No. 2 Input Signal Type Setting	UINT
D(m+50)	00 to 15	*_Ch2_InSpanValCfg_H	Input No. 2 Maximum Value in Range	INT
D(m+51)	00 to 15	*_Ch2_InSpanValCfg_L	Input No. 2 Minimum Value in Range	INT
D(m+52)	00 to 15	*_Ch2_PVUnitCfg	Input No. 2 Temperature Unit	WORD
D(m+53)	00 to 15	*_Ch2_SensErrCfg	Input No. 2 Data Overrange Direction for Sensor Error	WORD
D(m+54)	00 to 15	*_Ch2_PVScIValCfg_H	Input No. 2 Scaling Value for Maximum Value in Range (Span) (Lower)	DINT
D(m+55)	00 to 15		Input No. 2 Scaling Value for Maximum Value in Range (Span) (Upper)	

CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m+56)	00 to 15	*_Ch2_PVScIValCfG_L	Input No. 2 Scaling Value for Minimum Value in Range (Zero) (Lower)	DINT
D(m+57)	00 to 15		Input No. 2 Scaling Value for Minimum Value in Range (Zero) (Upper)	
D(m+58)	00 to 15	*_Ch2_PVScIOfsValCfG	Input No. 2 Scaling Offset (Lower)	DINT
D(m+59)	00 to 15		Input No. 2 Scaling Offset (Upper)	
D(m+60)	00 to 15	*_Ch2_AlmHystrsValCfG	Input No. 2 Alarm Hysteresis	UINT
D(m+61)	00 to 15	*_Ch2_AlmOnDelayTmCfG	Input No. 2 Alarm ON-delay Time	UINT
D(m+62)	00 to 15	*_Ch2_AlmOffDelayTmCfG	Input No. 2 Alarm OFF-delay Time	UINT
D(m+63)	00 to 15	*_Ch2_AveCfG	Input No. 2 Number of Values for Calculating Moving Average for Mean Value Processing	UINT
D(m+64)	00 to 15	*_Ch3_SensTypCfG	Input No. 3 Input Signal Type Setting	UINT
D(m+65)	00 to 15	*_Ch3_InSpanValCfG_H	Input No. 3 Maximum Value in Range	INT
D(m+66)	00 to 15	*_Ch3_InSpanValCfG_L	Input No. 3 Minimum Value in Range	INT
D(m+67)	00 to 15	*_Ch3_PVUnitCfG	Input No. 3 Temperature Unit	WORD
D(m+68)	00 to 15	*_Ch3_SensErrCfG	Input No. 3 Data Overrange Direction for Sensor Error	WORD
D(m+69)	00 to 15	*_Ch3_PVScIValCfG_H	Input No. 3 Scaling Value for Maximum Value in Range (Span) (Lower)	DINT
D(m+70)	00 to 15		Input No. 3 Scaling Value for Maximum Value in Range (Span) (Upper)	
D(m+71)	00 to 15	*_Ch3_PVScIValCfG_L	Input No. 3 Scaling Value for Minimum Value in Range (Zero) (Lower)	DINT
D(m+72)	00 to 15		Input No. 3 Scaling Value for Minimum Value in Range (Zero) (Upper)	
D(m+73)	00 to 15	*_Ch3_PVScIOfsValCfG	Input No. 3 Scaling Offset (Lower)	DINT
D(m+74)	00 to 15		Input No. 3 Scaling Offset (Upper)	
D(m+75)	00 to 15	*_Ch3_AlmHystrsValCfG	Input No. 3 Alarm Hysteresis	UINT
D(m+76)	00 to 15	*_Ch3_AlmOnDelayTmCfG	Input No. 3 Alarm ON-delay Time	UINT
D(m+77)	00 to 15	*_Ch3_AlmOffDelayTmCfG	Input No. 3 Alarm OFF-delay Time	UINT
D(m+78)	00 to 15	*_Ch3_AveCfG	Input No. 3 Number of Values for Calculating Moving Average for Mean Value Processing	UINT
D(m+79)	00 to 15	*_Ch4_SensTypCfG	Input No. 4 Input Signal Type Setting	UINT
D(m+80)	00 to 15	*_Ch4_InSpanValCfG_H	Input No. 4 Maximum Value in Range	INT
D(m+81)	00 to 15	*_Ch4_InSpanValCfG_L	Input No. 4 Minimum Value in Range	INT
D(m+82)	00 to 15	*_Ch4_PVUnitCfG	Input No. 4 Temperature Unit	WORD
D(m+83)	00 to 15	*_Ch4_SensErrCfG	Input No. 4 Data Overrange Direction for Sensor Error	WORD
D(m+84)	00 to 15	*_Ch4_PVScIValCfG_H	Input No. 4 Scaling Value for Maximum Value in Range (Span) (Lower)	DINT
D(m+85)	00 to 15		Input No. 4 Scaling Value for Maximum Value in Range (Span) (Upper)	
D(m+86)	00 to 15	*_Ch4_PVScIValCfG_L	Input No. 4 Scaling Value for Minimum Value in Range (Zero) (Lower)	DINT
D(m+87)	00 to 15		Input No. 4 Scaling Value for Minimum Value in Range (Zero) (Upper)	



CJ-series I/O memory address		NJ-series device variable for CJ-series Unit		
DM No.	Bit No.	Variable (name)	Description	Data type
D(m+88)	00 to 15	*_Ch4_PVScIOfsValCfg	Input No. 4 Scaling Offset (Lower)	DINT
D(m+89)	00 to 15		Input No. 4 Scaling Offset (Upper)	
D(m+90)	00 to 15	*_Ch4_AlmHystersValCfg	Input No. 4 Alarm Hysteresis	UINT
D(m+91)	00 to 15	*_Ch4_AlmOnDelayTmCfg	Input No. 4 Alarm ON-delay Time	UINT
D(m+92)	00 to 15	*_Ch4_AlmOffDelayTmCfg	Input No. 4 Alarm OFF-delay Time	UINT
D(m+93)	00 to 15	*_Ch4_AveCfg	Input No. 4 Number of Values for Calculating Moving Average for Mean Value Processing	UINT
D(m+94)	00 to 15	*_Ch1_CfgErrAdr	Input No. 1 Address of Data Range Error	UINT
D(m+95)	00 to 15	*_Ch2_CfgErrAdr	Input No. 2 Address of Data Range Error	UINT
D(m+96)	00 to 15	*_Ch3_CfgErrAdr	Input No. 3 Address of Data Range Error	UINT
D(m+97)	00 to 15	*_Ch4_CfgErrAdr	Input No. 4 Address of Data Range Error	UINT
D(m+98)	00 to 15	*_ExtMemArea	Area of Expansion Setting Parameter	UINT
D(m+99)	00 to 15	*_ExtMemAdr	First Word in Expansion Setting Parameter Area	UINT

### Expansion Special I/O Unit Area (User-defined Variables: \_sCJPH41U\_Ex\_CmdSta Type)

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Output (CPU to Unit)	p+1	00 to 07	HdMd	Hold Function Selection	BYTE
		00	Ch1_HdMd	Input No. 1 Hold Function Selection	BOOL
		01	Ch2_HdMd	Input No. 2 Hold Function Selection	BOOL
		02	Ch3_HdMd	Input No. 3 Hold Function Selection	BOOL
		03	Ch4_HdMd	Input No. 4 Hold Function Selection	BOOL
		08 to 15	HdCmd	Hold Direction	BYTE
		08	Ch1_StartHdCmd	Input No. 1 Hold Start	BOOL
		09	Ch2_StartHdCmd	Input No. 2 Hold Start	BOOL
		10	Ch3_StartHdCmd	Input No. 3 Hold Start	BOOL
		11	Ch4_StartHdCmd	Input No. 4 Hold Start	BOOL
		12	Ch1_RstHdCmd	Input No. 1 Hold Value Reset	BOOL
		13	Ch2_RstHdCmd	Input No. 2 Hold Value Reset	BOOL
		14	Ch3_RstHdCmd	Input No. 3 Hold Value Reset	BOOL
		15	Ch4_RstHdCmd	Input No. 4 Hold Value Reset	BOOL

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Output (CPU to Unit)	p+2	00 to 07	<i>IntgCmd</i>	Integral Direction	BYTE
		00	<i>Ch1_StartIntgCmd</i>	Input No. 1 Integral Value Calculation Start	BOOL
		01	<i>Ch2_StartIntgCmd</i>	Input No. 2 Integral Value Calculation Start	BOOL
		02	<i>Ch3_StartIntgCmd</i>	Input No. 3 Integral Value Calculation Start	BOOL
		03	<i>Ch4_StartIntgCmd</i>	Input No. 4 Integral Value Calculation Start	BOOL
		04	<i>Ch1_RstIntgCmd</i>	Input No. 1 Integral Value Reset	BOOL
		05	<i>Ch2_RstIntgCmd</i>	Input No. 2 Integral Value Reset	BOOL
		06	<i>Ch3_RstIntgCmd</i>	Input No. 3 Integral Value Reset	BOOL
		07	<i>Ch4_RstIntgCmd</i>	Input No. 4 Integral Value Reset	BOOL
	p+3	00 to 07	<i>AdjCmd</i>	Zero/Span Adjustment Update	BYTE
		00	<i>Ch1_Upd_AdjCmd</i>	Input No. 1 Zero/Span Adjustment Update	BOOL
		01	<i>Ch2_Upd_AdjCmd</i>	Input No. 2 Zero/Span Adjustment Update	BOOL
		02	<i>Ch3_Upd_AdjCmd</i>	Input No. 3 Zero/Span Adjustment Update	BOOL
		03	<i>Ch4_Upd_AdjCmd</i>	Input No. 4 Zero/Span Adjustment Update	BOOL

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	p+4	00 to 15	<i>Ch1_RateVal</i>	Input No. 1 Rate-of-change Value (Lower)	DINT
	p+5	00 to 15		Input No. 1 Rate-of-change Value (Upper)	
	p+6	00 to 15	<i>Ch2_RateVal</i>	Input No. 2 Rate-of-change Value (Lower)	DINT
	p+7	00 to 15		Input No. 2 Rate-of-change Value (Upper)	
	p+8	00 to 15	<i>Ch3_RateVal</i>	Input No. 3 Rate-of-change Value (Lower)	DINT
	p+9	00 to 15		Input No. 3 Rate-of-change Value (Upper)	
	p+10	00 to 15	<i>Ch4_RateVal</i>	Input No. 4 Rate-of-change Value (Lower)	DINT
	p+11	00 to 15		Input No. 4 Rate-of-change Value (Upper)	
	p+12	00	<i>Ch1_AdjPrdEnd</i>	Input No. 1 Zero/Span Adjustment Period End	BOOL
		01	<i>Ch1_AdjPrevNotice</i>	Input No. 1 Zero/Span Adjustment Period Notice	BOOL
		02	<i>Ch2_AdjPrdEnd</i>	Input No. 2 Zero/Span Adjustment Period End	BOOL
		03	<i>Ch2_AdjPrevNotice</i>	Input No. 2 Zero/Span Adjustment Period Notice	BOOL
		04	<i>Ch3_AdjPrdEnd</i>	Input No. 3 Zero/Span Adjustment Period End	BOOL
		05	<i>Ch3_AdjPrevNotice</i>	Input No. 3 Zero/Span Adjustment Period Notice	BOOL
		06	<i>Ch4_AdjPrdEnd</i>	Input No. 4 Zero/Span Adjustment Period End	BOOL
		07	<i>Ch4_AdjPrevNotice</i>	Input No. 4 Zero/Span Adjustment Period Notice	BOOL
		08	<i>MemErr</i>	Non-volatile Memory Error	BOOL
	p+13	00 to 15	<i>Ch1_LastAdjDate</i>	Input No. 1 Day of Final adjustment date	DWORD
	p+14	00 to 15		Input No. 1 Year and Month of Final adjustment date	
	p+15	00 to 15	<i>Ch2_LastAdjDate</i>	Input No. 2 Day of Final adjustment date	DWORD
p+16	00 to 15	Input No. 2 Year and Month of Final adjustment date			
p+17	00 to 15	<i>Ch3_LastAdjDate</i>	Input No. 3 Day of Final adjustment date	DWORD	
p+18	00 to 15		Input No. 3 Year and Month of Final adjustment date		
p+19	00 to 15	<i>Ch4_LastAdjDate</i>	Input No. 4 Day of Final adjustment date	DWORD	
p+20	00 to 15		Input No. 4 Year and Month of Final adjustment date		

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	p+21	00	<i>Ch1_VlyDetectSta</i>	Input No. 1 Valley Detection Timing Flag	BOOL
		01	<i>Ch1_TopDetectSta</i>	Input No. 1 Top Detection Timing Flag	BOOL
		02	<i>Ch2_VlyDetectSta</i>	Input No. 2 Valley Detection Timing Flag	BOOL
		03	<i>Ch2_TopDetectSta</i>	Input No. 2 Top Detection Timing Flag	BOOL
		04	<i>Ch3_VlyDetectSta</i>	Input No. 3 Valley Detection Timing Flag	BOOL
		05	<i>Ch3_TopDetectSta</i>	Input No. 3 Top Detection Timing Flag	BOOL
		06	<i>Ch4_VlyDetectSta</i>	Input No. 4 Valley Detection Timing Flag	BOOL
		07	<i>Ch4_TopDetectSta</i>	Input No. 4 Top Detection Timing Flag	BOOL
	p+22	00 to 15	<i>Ch1_PkTopVal</i>	Input No. 1 Peak/Top Value (Lower)	DINT
	p+23	00 to 15		Input No. 1 Peak/Top Value (Upper)	
	p+24	00 to 15	<i>Ch1_BtmVlyVal</i>	Input No. 1 Bottom/Valley Value (Lower)	DINT
	p+25	00 to 15		Input No. 1 Bottom/Valley Value (Upper)	
	p+26	00 to 15	<i>Ch2_PkTopVal</i>	Input No. 2 Peak/Top Value (Lower)	DINT
	p+27	00 to 15		Input No. 2 Peak/Top Value (Upper)	
	p+28	00 to 15	<i>Ch2_BtmVlyVal</i>	Input No. 2 Bottom/Valley Value (Lower)	DINT
	p+29	00 to 15		Input No. 2 Bottom/Valley Value (Upper)	
	p+30	00 to 15	<i>Ch3_PkTopVal</i>	Input No. 3 Peak/Top Value (Lower)	DINT
	p+31	00 to 15		Input No. 3 Peak/Top Value (Upper)	
	p+32	00 to 15	<i>Ch3_BtmVlyVal</i>	Input No. 3 Bottom/Valley Value (Lower)	DINT
	p+33	00 to 15		Input No. 3 Bottom/Valley Value (Upper)	

I/O	CJ-series I/O memory address		NJ-series User-defined Variable		
	Word No.	Bit No.	Variable (name)	Description	Data type
Input (Unit to CPU)	p+34	00 to 15	<i>Ch4_PkTopVal</i>	Input No. 4 Peak/Top Value (Lower)	DINT
	p+35	00 to 15		Input No. 4 Peak/Top Value (Upper)	
	p+36	00 to 15	<i>Ch4_BtmVlyVal</i>	Input No. 4 Bottom/Valley Value (Lower)	DINT
	p+37	00 to 15		Input No. 4 Bottom/Valley Value (Upper)	
	p+38	00 to 15	<i>Ch1_IntgVal</i>	Input No. 1 Integral Value (Lower)	DINT
	p+39	00 to 15		Input No. 1 Integral Value (Upper)	
	p+40	00 to 15	<i>Ch2_IntgVal</i>	Input No. 2 Integral Value (Lower)	DINT
	p+41	00 to 15		Input No. 2 Integral Value (Upper)	
	p+42	00 to 15	<i>Ch3_IntgVal</i>	Input No. 3 Integral Value (Lower)	DINT
	p+43	00 to 15		Input No. 3 Integral Value (Upper)	
	p+44	00 to 15	<i>Ch4_IntgVal</i>	Input No. 4 Integral Value (Lower)	DINT
	p+45	00 to 15		Input No. 4 Integral Value (Upper)	

### Expansion Special I/O Unit Area (User-defined Variables: *\_sCJPH41U\_Ex\_Param* Type)

CJ-series I/O memory address		NJ-series User-defined Variable		
DM No.	Bit No.	Variable (name)	Description	Data type
o	00 to 15	<i>Ch1_PVAlmValCfg_HH</i>	Input No. 1 Process Value HH (high high limit) Alarm Setting (Lower)	DINT
o+1	00 to 15		Input No. 1 Process Value HH (high high limit) Alarm Setting (Upper)	
o+2	00 to 15	<i>Ch1_PVAlmValCfg_LL</i>	Input No. 1 Process Value LL (low low limit) Alarm Setting (Lower)	DINT
o+3	00 to 15		Input No. 1 Process Value LL (low low limit) Alarm Setting (Upper)	
o+4	00 to 15	<i>Ch1_RateAlmValCfg_H</i>	Input No. 1 Rate-of-change Value H (high limit) Alarm Setting (Lower)	DINT
o+5	00 to 15		Input No. 1 Rate-of-change Value H (high limit) Alarm Setting (Upper)	
o+6	00 to 15	<i>Ch1_RateAlmValCfg_L</i>	Input No. 1 Rate-of-change Value L (low limit) Alarm Setting (Lower)	DINT
o+7	00 to 15		Input No. 1 Rate-of-change Value L (low limit) Alarm Setting (Upper)	

CJ-series I/O memory address		NJ-series User-defined Variable		
DM No.	Bit No.	Variable (name)	Description	Data type
o+8	00 to 15	<i>Ch2_PVAlmValCfg_HH</i>	Input No. 2 Process Value HH (high high limit) Alarm Setting (Lower)	DINT
o+9	00 to 15		Input No. 2 Process Value HH (high high limit) Alarm Setting (Upper)	
o+10	00 to 15	<i>Ch2_PVAlmValCfg_LL</i>	Input No. 2 Process Value LL (low low limit) Alarm Setting (Lower)	DINT
o+11	00 to 15		Input No. 2 Process Value LL (low low limit) Alarm Setting (Upper)	
o+12	00 to 15	<i>Ch2_RateAlmValCfg_H</i>	Input No. 2 Rate-of-change Value H (high limit) Alarm Setting (Lower)	DINT
o+13	00 to 15		Input No. 2 Rate-of-change Value H (high limit) Alarm Setting (Upper)	
o+14	00 to 15	<i>Ch2_RateAlmValCfg_L</i>	Input No. 2 Rate-of-change Value L (low limit) Alarm Setting (Lower)	DINT
o+15	00 to 15		Input No. 2 Rate-of-change Value L (low limit) Alarm Setting (Upper)	
o+16	00 to 15	<i>Ch3_PVAlmValCfg_HH</i>	Input No. 3 Process Value HH (high high limit) Alarm Setting (Lower)	DINT
o+17	00 to 15		Input No. 3 Process Value HH (high high limit) Alarm Setting (Upper)	
o+18	00 to 15	<i>Ch3_PVAlmValCfg_LL</i>	Input No. 3 Process Value LL (low low limit) Alarm Setting (Lower)	DINT
o+19	00 to 15		Input No. 3 Process Value LL (low low limit) Alarm Setting (Upper)	
o+20	00 to 15	<i>Ch3_RateAlmValCfg_H</i>	Input No. 3 Rate-of-change Value H (high limit) Alarm Setting (Lower)	DINT
o+21	00 to 15		Input No. 3 Rate-of-change Value H (high limit) Alarm Setting (Upper)	
o+22	00 to 15	<i>Ch3_RateAlmValCfg_L</i>	Input No. 3 Rate-of-change Value L (low limit) Alarm Setting (Lower)	DINT
o+23	00 to 15		Input No. 3 Rate-of-change Value L (low limit) Alarm Setting (Upper)	
o+24	00 to 15	<i>Ch4_PVAlmValCfg_HH</i>	Input No. 4 Process Value HH (high high limit) Alarm Setting (Lower)	DINT
o+25	00 to 15		Input No. 4 Process Value HH (high high limit) Alarm Setting (Upper)	
o+26	00 to 15	<i>Ch4_PVAlmValCfg_LL</i>	Input No. 4 Process Value LL (low low limit) Alarm Setting (Lower)	DINT
o+27	00 to 15		Input No. 4 Process Value LL (low low limit) Alarm Setting (Upper)	
o+28	00 to 15	<i>Ch4_RateAlmValCfg_H</i>	Input No. 4 Rate-of-change Value H (high limit) Alarm Setting (Lower)	DINT
o+29	00 to 15		Input No. 4 Rate-of-change Value H (high limit) Alarm Setting (Upper)	
o+30	00 to 15	<i>Ch4_RateAlmValCfg_L</i>	Input No. 4 Rate-of-change Value L (low limit) Alarm Setting (Lower)	DINT
o+31	00 to 15		Input No. 4 Rate-of-change Value L (low limit) Alarm Setting (Upper)	
o+32	00 to 15	<i>ExtIOArea</i>	Area of Expansion Operation Data	UINT
o+33	00 to 15	<i>ExtIOAdr</i>	First Word in Expansion Operation Data Area	UINT

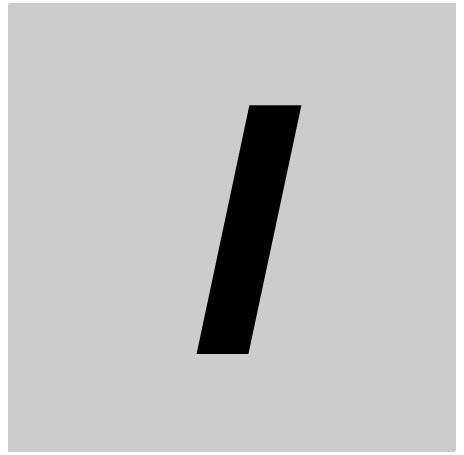
CJ-series I/O memory address		NJ-series User-defined Variable		
DM No.	Bit No.	Variable (name)	Description	Data type
o+34	00 to 15	<i>Ch1_SqrtCfg</i>	Input No. 1 Square Root Extraction	WORD
o+35	00 to 15	<i>Ch1_InRateSpanValCfg_H</i>	Input No. 1 Maximum Rate-of-change Range Value	INT
o+36	00 to 15	<i>Ch1_InRateSpanValCfg_L</i>	Input No. 1 Minimum Rate-of-change Range Value	INT
o+37	00 to 07	<i>Ch1_RateCmplntvITm</i>	Input No. 1 Rate-of-change Comparison Time Interval	USINT
	08 to 15	<i>Ch1_RateCmpUnit</i>	Input No. 1 Rate-of-change Comparison Time Interval Unit	BYTE
o+38	00 to 15	<i>Ch1_RateScIValCfg_H</i>	Input No. 1 Scaling Value for Maximum Rate-of-change Range Value (Lower)	DINT
o+39	00 to 15		Input No. 1 Scaling Value for Maximum Rate-of-change Range Value (Upper)	
o+40	00 to 15	<i>Ch1_RateScIValCfg_L</i>	Input No. 1 Scaling Value for Minimum Rate-of-change Range Value (Lower)	DINT
o+41	00 to 15		Input No. 1 Scaling Value for Minimum Rate-of-change Range Value (Upper)	
o+42	00 to 15	<i>Ch1_GainAdjFVCfg</i>	Input No. 1 Span Adjustment Position	UINT
o+43	00 to 15	<i>Ch1_ZeroAdjFVCfg</i>	Input No. 1 Zero Adjustment Position	INT
o+44	00 to 15	<i>Ch1_AdjPrd</i>	Input No. 1 Zero/Span Adjustment Period	UINT
o+45	00 to 15	<i>Ch1_AdjNoticeDay</i>	Input No. 1 Notice of Days Remaining	UINT
o+46	00 to 15	<i>Ch1_TopVlyHysters</i>	Input No. 1 Top and Valley Detection Hysteresis	UINT
o+47	00 to 07	<i>Ch1_IntgUnit</i>	Input No. 1 Integer Unit	BYTE
	08 to 15	<i>Ch1_IntgCoef</i>	Input No. 1 Integral Value Coefficient	BYTE
o+48	00 to 15	<i>Ch2_SqrtCfg</i>	Input No. 2 Square Root Extraction	WORD
o+49	00 to 15	<i>Ch2_InRateSpanValCfg_H</i>	Input No. 2 Maximum Rate-of-change Range Value	INT
o+50	00 to 15	<i>Ch2_InRateSpanValCfg_L</i>	Input No. 2 Minimum Rate-of-change Range Value	INT
o+51	00 to 07	<i>Ch2_RateCmplntvITm</i>	Input No. 2 Rate-of-change Comparison Time Interval	USINT
	08 to 15	<i>Ch2_RateCmpUnit</i>	Input No. 2 Rate-of-change Comparison Time Interval Unit	BYTE
o+52	00 to 15	<i>Ch2_RateScIValCfg_H</i>	Input No. 2 Scaling Value for Maximum Rate-of-change Range Value (Lower)	DINT
o+53	00 to 15		Input No. 2 Scaling Value for Maximum Rate-of-change Range Value (Upper)	
o+54	00 to 15	<i>Ch2_RateScIValCfg_L</i>	Input No. 2 Scaling Value for Minimum Rate-of-change Range Value (Lower)	DINT
o+55	00 to 15		Input No. 2 Scaling Value for Minimum Rate-of-change Range Value (Upper)	
o+56	00 to 15	<i>Ch2_GainAdjFVCfg</i>	Input No. 2 Span Adjustment Position	UINT
o+57	00 to 15	<i>Ch2_ZeroAdjFVCfg</i>	Input No. 2 Zero Adjustment Position	INT
o+58	00 to 15	<i>Ch2_AdjPrd</i>	Input No. 2 Zero/Span Adjustment Period	UINT
o+59	00 to 15	<i>Ch2_AdjNoticeDay</i>	Input No. 2 Notice of Days Remaining	UINT
o+60	00 to 15	<i>Ch2_TopVlyHysters</i>	Input No. 2 Top and Valley Detection Hysteresis	UINT

CJ-series I/O memory address		NJ-series User-defined Variable		
DM No.	Bit No.	Variable (name)	Description	Data type
o+61	00 to 07	<i>Ch2_IntgUnit</i>	Input No. 2 Integer Unit	BYTE
	08 to 15	<i>Ch2_IntgCoef</i>	Input No. 2 Integral Value Coefficient	BYTE
o+62	00 to 15	<i>Ch3_SqrtCfg</i>	Input No. 3 Square Root Extraction	WORD
o+63	00 to 15	<i>Ch3_InRateSpanValCfg_H</i>	Input No. 3 Maximum Rate-of-change Range Value	INT
o+64	00 to 15	<i>Ch3_InRateSpanValCfg_L</i>	Input No. 3 Minimum Rate-of-change Range Value	INT
o+65	00 to 07	<i>Ch3_RateCmplntvlTm</i>	Input No. 3 Rate-of-change Comparison Time Interval	USINT
	08 to 15	<i>Ch3_RateCmpUnit</i>	Input No. 3 Rate-of-change Comparison Time Interval Unit	BYTE
o+66	00 to 15	<i>Ch3_RateScIValCfg_H</i>	Input No. 3 Scaling Value for Maximum Rate-of-change Range Value (Lower)	DINT
o+67	00 to 15		Input No. 3 Scaling Value for Maximum Rate-of-change Range Value (Upper)	
o+68	00 to 15	<i>Ch3_RateScIValCfg_L</i>	Input No. 3 Scaling Value for Minimum Rate-of-change Range Value (Lower)	DINT
o+69	00 to 15		Input No. 3 Scaling Value for Minimum Rate-of-change Range Value (Upper)	
o+70	00 to 15	<i>Ch3_GainAdjFVCfg</i>	Input No. 3 Span Adjustment Position	UINT
o+71	00 to 15	<i>Ch3_ZeroAdjFVCfg</i>	Input No. 3 Zero Adjustment Position	INT
o+72	00 to 15	<i>Ch3_AdjPrd</i>	Input No. 3 Zero/Span Adjustment Period	UINT
o+73	00 to 15	<i>Ch3_AdjNoticeDay</i>	Input No. 3 Notice of Days Remaining	UINT
o+74	00 to 15	<i>Ch3_TopVlyHysTrs</i>	Input No. 3 Top and Valley Detection Hysteresis	UINT
o+75	00 to 07	<i>Ch3_IntgUnit</i>	Input No. 3 Integer Unit	BYTE
	08 to 15	<i>Ch3_IntgCoef</i>	Input No. 3 Integral Value Coefficient	BYTE
o+76	00 to 15	<i>Ch4_SqrtCfg</i>	Input No. 4 Square Root Extraction	WORD
o+77	00 to 15	<i>Ch4_InRateSpanValCfg_H</i>	Input No. 4 Maximum Rate-of-change Range Value	INT
o+78	00 to 15	<i>Ch4_InRateSpanValCfg_L</i>	Input No. 4 Minimum Rate-of-change Range Value	INT
o+79	00 to 07	<i>Ch4_RateCmplntvlTm</i>	Input No. 4 Rate-of-change Comparison Time Interval	USINT
	08 to 15	<i>Ch4_RateCmpUnit</i>	Input No. 4 Rate-of-change Comparison Time Interval Unit	BYTE
o+80	00 to 15	<i>Ch4_RateScIValCfg_H</i>	Input No. 4 Scaling Value for Maximum Rate-of-change Range Value (Lower)	DINT
o+81	00 to 15		Input No. 4 Scaling Value for Maximum Rate-of-change Range Value (Upper)	
o+82	00 to 15	<i>Ch4_RateScIValCfg_L</i>	Input No. 4 Scaling Value for Minimum Rate-of-change Range Value (Lower)	DINT
o+83	00 to 15		Input No. 4 Scaling Value for Minimum Rate-of-change Range Value (Upper)	
o+84	00 to 15	<i>Ch4_GainAdjFVCfg</i>	Input No. 4 Span Adjustment Position	UINT
o+85	00 to 15	<i>Ch4_ZeroAdjFVCfg</i>	Input No. 4 Zero Adjustment Position	INT
o+86	00 to 15	<i>Ch4_AdjPrd</i>	Input No. 4 Zero/Span Adjustment Period	UINT
o+87	00 to 15	<i>Ch4_AdjNoticeDay</i>	Input No. 4 Notice of Days Remaining	UINT



CJ-series I/O memory address		NJ-series User-defined Variable		
DM No.	Bit No.	Variable (name)	Description	Data type
o+88	00 to 15	<i>Ch4_TopVlyHysters</i>	Input No. 4 Top and Valley Detection Hysteresis	UINT
o+89	00 to 07	<i>Ch4_IntgUnit</i>	Input No. 4 Integer Unit	BYTE
	08 to 15	<i>Ch4_IntgCoef</i>	Input No. 4 Integral Value Coefficient	BYTE
o+90	00 to 15	<i>RTDCompensate</i>	Temperature resistance thermometer input compensation setting	WORD
	00		Input No. 1 Temperature resistance thermometer input compensation setting	
	01		Input No. 2 Temperature resistance thermometer input compensation setting	
	02		Input No. 3 Temperature resistance thermometer input compensation setting	
	03		Input No. 4 Temperature resistance thermometer input compensation setting	
o+91	00 to 15	<i>Ch1_RTDDRefVal</i>	Input No. 1 Temperature Resistance Thermometer Reference Resistance (Lower)	DINT
o+92	00 to 15		Input No. 1 Temperature Resistance Thermometer Reference Resistance (Upper)	
o+93	00 to 15	<i>Ch2_RTDDRefVal</i>	Input No. 2 Temperature Resistance Thermometer Reference Resistance (Lower)	DINT
o+94	00 to 15		Input No. 2 Temperature Resistance Thermometer Reference Resistance (Upper)	
o+95	00 to 15	<i>Ch3_RTDDRefVal</i>	Input No. 3 Temperature Resistance Thermometer Reference Resistance (Lower)	DINT
o+96	00 to 15		Input No. 3 Temperature Resistance Thermometer Reference Resistance (Upper)	
o+97	00 to 15	<i>Ch4_RTDDRefVal</i>	Input No. 4 Temperature Resistance Thermometer Reference Resistance (Lower)	DINT
o+98	00 to 15		Input No. 4 Temperature Resistance Thermometer Reference Resistance (Upper)	
o+99	00 to 15	<i>CJCompensate</i>	Cold Junction Compensation Method for Thermocouple Input	WORD





# Index



# Index

---

- A**
- 
- A/D conversion error ..... 1-48
  - Absolute maximum rating ..... 3-18
  - Accuracy ..... 2-5, 3-5, 3-18
  - Accuracy and temperature coefficient according to resistance thermometer and thermocouple input type and measured temperature ..... 3-24
  - Adjustment period control ..... 1-14, A-7
  - Adjustment update bit ..... 1-14
  - Alarm hysteresis ..... 1-9
  - Alarm ON-delay ..... 1-9
  - Alarm ON-delay time ..... 1-9, A-4
  - Alarm output ..... 1-7, A-3, A-5
  - Ambient operating humidity ..... 1-19
  - Ambient operating temperature ..... 1-19
  - An A/D conversion error occurred ..... 3-36
  - Applicable standard for resistance thermometer and thermocouple input ..... 3-18
  - Assumed cause ..... 1-46
  - AT specification ..... 1-27
  - AT specification destination ..... 1-27
- B**
- 
- Block diagram ..... 3-35
  - Block diagram (Order of processing) ..... 2-4, 3-4, 3-16
  - Bottom value ..... 1-15
  - Bottom/Valley value ..... 1-15, 1-16
- C**
- 
- CIO area ..... A-13
  - Cold junction compensation method ..... 1-17
  - Cold junction sensor error ..... 1-48, 2-5, 3-5, 3-17
  - Cold junction sensor errors detection ..... 1-12
  - Configuration and setup ..... 1-28, 1-41
  - Continuously refreshed parameter ..... 1-32, 1-35, 1-38
  - Controller errors ..... 1-45
  - Conversion cycle ..... 1-3, 2-5, 3-6, 3-19
  - Conversion data does not change ..... 2-14, 3-36
  - Converted values are unstable ..... 2-15, 3-36
  - CPU unit monitoring error ..... 1-44
  - CPU unit WDT error ..... 1-44
  - Current consumption ..... 1-19
- D**
- 
- Data Range Error ..... 1-49
  - Data range error ..... 1-32, 1-35, 1-38
  - Default block read command ..... 1-32, 1-35, 1-38
  - Detection hysteresis ..... 1-16
  - Device name ..... 1-41
  - Device variable creation ..... 1-27
  - Device variable for CJ-series unit ..... 1-27
  - Dielectric strength ..... 2-6, 3-6, 3-21
  - DM area ..... A-13
  - Duplicate unit number ..... 1-44
- E**
- 
- ERC ..... 1-20, 1-21
  - ERC indicator ..... 1-20, 1-21, 1-42
  - ERH ..... 1-20, 1-21
  - ERH indicator ..... 1-20, 1-21, 1-44
  - Error in data exchange with the CPU unit ..... 1-44
  - Event ..... 1-45
  - Event code ..... 1-46
  - Event log ..... 1-45
  - Event name ..... 1-46
  - Exchanging data with the CPU unit ..... 1-27
  - Expansion operation ..... 1-28
  - Expansion operation data ..... 1-27, 2-11, 3-32
  - Expansion operation data setting ..... 1-35
  - Expansion setting parameter ..... 1-27, 1-28, 2-10, 3-30
  - Expansion setting parameter error ..... 1-42
  - Expansion setting parameter setting ..... 1-32
  - Expansion setting parameter settings ..... 1-38
  - EXT PS ..... 1-20
  - External 24-VDC power supply ..... 1-3, 2-6
  - External power supply ..... 2-6
  - External terminal connections ..... 1-19
- G**
- 
- Gain for span adjustment ..... 1-12, A-10
- H**
- 
- H ..... 1-7
  - HH ..... 1-7
  - High ..... 1-11
  - Hold start ..... 1-15, 1-16
  - Hold value reset ..... 1-15, 1-16
- I**
- 
- I/O bus check error ..... 1-44
  - I/O map ..... 1-27, 1-41
  - I/O port ..... 1-27
  - I/O setting check error ..... 1-44
  - Initial settings parameter ..... 1-32, 1-35, 1-38
  - Input disconnection detected ..... 1-11
  - Input disconnection detection delay time ..... 2-6
  - Input Error ..... 1-50
  - Input error ..... 3-20
  - Input error detection ..... 1-11, 2-6, 3-6
  - Input impedance ..... 2-5, 3-6, 3-18

Input signal range ..... 2-5, 3-6, 3-18  
 Input signal type ..... 2-5  
 Input type ..... 3-5, 3-17  
 Input type and input range ..... 3-7, 3-21  
 Insulation resistance ..... 2-6, 3-6, 3-21  
 Integer unit ..... 1-17  
 Integral value ..... 1-17  
 Integral value calculation ..... 1-17  
 Integral value calculation start ..... 1-17  
 integral value coefficient ..... 1-17  
 Integral value overflow ..... A-9  
 Integral value reset ..... 1-17  
 Isolation ..... 2-6, 3-6, 3-20  
 Isolation between channels ..... 1-5

## L

L ..... 1-7  
 LL ..... 1-7  
 Low ..... 1-11

## M

Major fault level controller error ..... 1-44  
 Maximum input rating ..... 2-5  
 Maximum number of units ..... 1-19  
 Maximum rated input ..... 3-6  
 Maximum time to store data in CPU unit ..... 2-6, 3-6, 3-19  
 Maximum/Minimum value for when disconnection occurs ..... A-6  
 Mean value processing ..... 1-10  
 Measured temperature error ..... 3-7  
 Memory used for CJ-series units ..... 1-27  
 Mounting error ..... 1-44  
 Mounting position ..... 1-19  
 Mounting the unit ..... 1-23  
 Moving average calculation ..... 1-10

## N

Non-volatile Memory Error ..... 1-49  
 Non-volatile memory error ..... 2-11, 3-33  
 Notice of days remaining before zero/span adjustment period end ..... 1-14

## O

OFF-delay output ..... 1-10  
 Offset compensation ..... 1-7  
 ON-delay output ..... 1-9  
 Operating procedure ..... 1-40  
 Operation data ..... 1-27, 2-5, 3-5, 3-17

## P

Parameter status ..... 1-32, 1-35, 1-38  
 Peak and bottom detection ..... 1-15  
 Peak value ..... 1-15  
 Peak/Top value ..... 1-15, 1-16

Platinum resistance thermometer ..... 3-6  
 Power OFF retention ..... 1-27  
 Process data ..... 2-5, 3-5, 3-18  
 Process value alarm ..... 1-7, 1-9  
 Process value scaling to industrial units ..... 1-6  
 Process value scaling with negative bias ..... A-4

## R

Rate-of-change calculation and alarm ..... 1-8  
 Register unit data type ..... 1-28, 1-41  
 Resistance thermometers input compensation ..... 1-17  
 Resolution ..... 1-3, 2-5, 3-6, 3-18  
 Response time ..... 2-5, 3-19  
 Restart ..... 1-33, 1-36, 1-39  
 RUN ..... 1-20, 1-21  
 RUN indicator ..... 1-20, 1-21, 1-42, 1-44

## S

Scaling ..... 1-6  
 Scaling to industrial units ..... 1-6  
 Self-diagnostic function ..... 1-19  
 Setting parameter ..... 2-5, 3-5, 3-17  
 Setting parameter group 1 ..... 1-32, 1-35, 1-38  
 Setting parameter group 1 (Continuously refreshed parameter) error ..... 1-42  
 Setting parameter group 2 ..... 1-32, 1-35, 1-38  
 Setting parameter group 2 (Initial setting parameter) error ..... 1-42  
 Setting parameter group 3 ..... 1-32, 1-38  
 Setting parameter group 4 ..... 1-38  
 Span adjustment position ..... 1-12, A-11  
 Span point ..... 1-6, 1-12  
 Special unit setup editing ..... 1-41  
 Square root calculation ..... 1-12, A-6  
 Structure data type ..... 1-28, 1-41  
 Sysmac Studio ..... 1-27, 1-39  
 System-defined variable ..... 1-27

## T

Temperature coefficient ..... 2-5, 3-6, 3-18  
 Temperature resistance thermometer input compensation ..... 1-17  
 Temperature resistance thermometer reference resistance ..... 1-17  
 Terminal block diagram ..... 2-14, 3-12  
 Terminal connection diagram ..... 2-12, 3-11, 3-33  
 Thermocouple input ..... 3-6  
 Top and valley detection ..... 1-16  
 Top value ..... 1-16

## U

Unit configuration ..... 1-28  
 Unit number setting error ..... 1-44  
 Unit number switch ..... 1-20, 1-22  
 Unit restart ..... 1-33, 1-36, 1-39

Unstable ..... 2-15  
User-defined variable ..... 1-28

**V**

---

Valley value ..... 1-16  
Values are not converted as intended ..... 2-14, 3-36  
Variable input range setting ..... 1-5

**W**

---

Warmup time ..... 1-40  
Width ..... A-8

**Z**

---

Zero adjustment position ..... 1-12, A-11  
Zero adjustment value ..... 1-12, A-10  
Zero point ..... 1-6, 1-12  
Zero/Span adjustment ..... 1-12, A-10  
Zero/span adjustment period ..... 1-14  
Zero/Span adjustment period end ..... 1-50, 2-11, 3-33  
Zero/Span adjustment period notice ..... 1-51, 2-10, 3-29



**OMRON Corporation Industrial Automation Company**  
Tokyo, JAPAN

Contact: [www.ia.omron.com](http://www.ia.omron.com)

**Regional Headquarters**

**OMRON EUROPE B.V.**

Wegalaan 67-69-2132 JD Hoofddorp  
The Netherlands  
Tel: (31)2356-81-300/Fax: (31)2356-81-388

**OMRON ELECTRONICS LLC**

One Commerce Drive Schaumburg,  
IL 60173-5302 U.S.A.  
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

**OMRON ASIA PACIFIC PTE. LTD.**

No. 438A Alexandra Road # 05-05/08 (Lobby 2),  
Alexandra Technopark,  
Singapore 119967  
Tel: (65) 6835-3011/Fax: (65) 6835-2711

**OMRON (CHINA) CO., LTD.**

Room 2211, Bank of China Tower,  
200 Yin Cheng Zhong Road,  
PuDong New Area, Shanghai, 200120, China  
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

**Authorized Distributor:**

© OMRON Corporation 2011 All Rights Reserved.  
In the interest of product improvement,  
specifications are subject to change without notice.

**Cat. No. W498-E1-03**

0812