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SYSMAC CJ Series
CJ1W-CIF21
Simple Communications Unit
Operation Manual


Produced September 2001


Notice:

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

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

 **DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

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

OMRON Product References

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

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

The abbreviation “PC” means Programmable Controller and is not used as an abbreviation for anything else.

Visual Aids

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

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

Indicates supplementary information on related topics that may be of interest to the user.

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

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About this Manual:

This manual describes the installation and operation of the CJ1W-CIF21 Simple Communications Unit and includes the sections described below.

Please read this manual and all of the related manuals carefully and be sure you understand the information provided before attempting to install and operate the CJ1W-CIF21 Simple Communications Unit.

Section 1 describes the features and system configuration of the CJ1W-CIF21 Simple Communications Unit.

Section 2 provides specifications for the CJ1W-CIF21 Simple Communications Unit and describes the functions of each component.

Section 3 describes preparatory procedures from installation of the CJ1W-CIF21 Simple Communications Unit to operation of the Unit.

Section 4 describes the interface with the Components provided in the DM Area of the CPU Unit.

The **Appendices** provide information on the data refresh cycle, an application example, and DM Area settings assignment sheets.

Details on CPU Unit, Serial Communications Board, and Serial Communications Unit operation can be found in the following manuals.

Manual	Cat. No.
SYSMAC CJ Series CJ1G-CPU□□/CJ1G/H-CPU□□H Programmable Controllers Operation Manual	W393
SYSMAC CS Series CS1G/H-CPU□□-EV1, CS1G/H-CPU□□H Programmable Controllers Operation Manual	W339
SYSMAC CS/CJ Series CS1W-SCB21/41, CS1W-SCU21, CJ1W-SCU41 Serial Communications Boards/Units Operation Manual	W336
SYSMAC CQM1H Series CQM1H-CPU□□ Programmable Controllers CQM1H-□□□□□ Inner Boards Operation Manual	W363
SYSMAC CQM1H Series CQM1H-SCB41 Serial Communications Boards Operation Manual	W365
SYSMAC CPM2A Programmable Controllers Operation Manual	W352

PRECAUTIONS

This section provides general precautions for using the CJ1W-CIF21 Simple Communications Unit.

The information contained in this section is important for the safe and reliable application of Programmable Controllers. You must read this section and understand the information contained before attempting to set up or operate a PC system.

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1 Intended Audience

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

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


2 General Precautions

The user must operate the product according to the performance specifications described in the operation manuals.


Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines, and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.


Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.


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


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

3 Safety Precautions


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

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

 **Caution** Tighten the terminal screws on the communication cable screws to the torque specified in this manual.

 **Caution** Refer to this manual when making settings and set the Simple Communications Unit correctly. Incorrect settings can cause unexpected operation and may result in property damage or injury.

4 Application Precautions

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

- When transporting the Unit, use special packing boxes. Be careful not to allow excessive vibration or shock to be applied during transportation and not to drop the products.
- Store the Unit within the following temperature and humidity ranges:
Storage temperature: –20 to 75°C
Storage humidity: 10% to 90% (with no icing or condensation)
- Install the Unit properly so that it does not fall.
- Always use the power supply voltage specified in the operation manual. An incorrect voltage may result in malfunction or burning.
- Set the communications distance to within the range specified in the operation manual.
- Do not place communications cables close to or parallel to high-voltage lines or power lines.
- Be sure to attach the labels supplied with the Unit or provide other protective covers when wiring in order to prevent dust or wire cuttings from entering the Unit.
- Remove the label after the completion of wiring to ensure proper heat dissipation. Leaving the label attached may result in malfunction.
- Wire terminals or connectors with the correct polarity and direction.
- Double-check all the wiring or the setting switches before turning ON the power supply. Incorrect wiring may result in burning.
- Before touching the Unit, be sure to first touch a grounded metallic object in order to discharge any static built-up. Not doing so may result in malfunction or damage.
- Use the specified connectors or wires.
Terminal block for RS-422/485: AWG 28 to AWG 16, stripped wire length: 7 mm
- Always turn OFF the power supply to the PC before attempting any of the following. Not turning OFF the power supply may result in malfunction or electric shock.
 - Assembling the Units
 - Connecting or wiring the cables
 - Connecting or disconnecting the connectors
- Use the communications cables specified in the operation manual.
- Always use the power supply voltages specified in the operation manual. An incorrect voltage may result in malfunction or burning.
- Double-check the polarity when connecting the RS-422/485. Some devices may have reverse polarity (+/–) for SDA/SDB and RDA/RDB.
- When using the RS-422/485, operate only after confirming that terminating resistance has been set correctly.
- Do not pull on the cables or bend the cables beyond their natural limit. Doing either of these may break the cables.
- Do not place objects on the cables. Doing so may break the cables.


- Be sure that the terminal blocks, connectors, and other items with locking devices are properly locked into place. Improper locking may result in malfunction.
- Use the Unit with the cover mounted properly.
- Wire correctly as specified in the operation manual.
- Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in malfunction.

5 Operating Environment Precautions

 **Caution** Install the Unit properly, as described in this manual.

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

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

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

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

6 Conformance to EC Directives

6-1 Applicable Directives

- EMC Directives
- Low Voltage Directive

6-2 Concepts

EMC Directives

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

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

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

EMS (Electromagnetic Susceptibility): EN61131-2

EMI (Electromagnetic Interference): EN50081-2

(Radiated emission: 10-m regulations)

Low Voltage Directives

Always ensure that devices operating at voltages of 50 to 1,000 VAC or 75 to 1,500 VDC meet the required safety standards for the PC (EN61131-2).

The CJ-series PCs comply with EC Directives. To ensure that the machine or device in which a CJ-series PC is used complies with EC Directives, the PC must be installed as follows:

- The PC must be installed within a control panel.
- Reinforced insulation or double insulation must be used for the DC power supplies.
- PCs complying with EC Directives also conform to the Common Emission Standard (EN50081-2). When a PC is built into a machine, however, the structure of the control panel, the affects of other devices, wiring, and other factors can affect performance, particularly in respect to radiated emission (10-m regulations). Even when using CJ-series PCs, which comply with EC Directives, the customer must, therefore, perform final checks to confirm that devices and the overall machine conform to EMC standards.

SECTION 1

Features and System Configuration

This section describes the features and system configuration of the CJ1W-CIF21 Simple Communications Unit.

1-1	Introduction	2
1-1-1	Features	2
1-1-2	System Configuration	2
1-1-3	Compatible PCs and Components	3
1-2	Processing Component Data	5

1-1-3 Compatible PCs and Components

Host (PC)

The CJ1W-CIF21 can be connected to a CJ-series, CS-series, CQM1H, or CPM2A CPU Unit, as well as to a CJ-series, CS-series, or CQM1H Serial Communications Board/Unit.

PC	Model number	Name
CJ Series	CJ1G-CPU□□ CJ1G/H-CPU□□H	CPU Unit
	CJ1W-SCU41	Serial Communications Unit
CS Series	CS1G/H-CPU□□(-EV1) CJ1G/H-CPU□□H	CPU Unit
	CS1W-SCB21	Serial Communications Board
	CS1W-SCU21/41	Serial Communications Unit
CQM1H	CQM1H-CPU□□	CPU Unit
	CQM1H-SCB41	Serial Communications Board
CPM2A	CPM2A-□□C□□	CPU Unit

Components

The following table shows the OMRON components equipped with SYSWAY or CompoWay/F communications that can be connected.

Name	Series	Model number	SYSWAY		CompoWay/F connection	Comments
			Connection	Segment information (See note 5.)		
Temperature Controllers	Temperature Controllers	E5GN	OK	1	OK	---
		E5CN	OK	1	OK	---
		E5EN	OK	1	OK	---
		E5AN	OK	1	OK	---
	Digital Controllers, Standard Models	E5CK	OK	1	No	---
		E5EK	OK	1	No	---
		E5AK	OK	1	No	---
	Digital Controllers (Valve Control)	E5EK	OK	1	No	Communications specialized for valve control are not supported.
		E5AK	OK	1	No	
	Digital Controllers (Programmable)	E5CK-T	No	---	No	---
		E5EK-T	No	---	No	---
		E5AK-T	No	---	No	---
	Digital Controllers (Programmable, Valve Control)	E5EK-T	No	---	No	---
		E5AK-T	No	---	No	---
	Temperature Controllers	E5EJ	OK	1	No	---
E5AJ		OK	1	No	---	
Fuzzy Temperature Controller	E5AF	OK	1	No	---	
Modular Temperature Controller	E5ZN	No	---	OK	---	
Digital Controller Board	E5ZM	No	---	OK	---	
Timers	Digital Timer/Counter	H8GN	No	---	OK	---

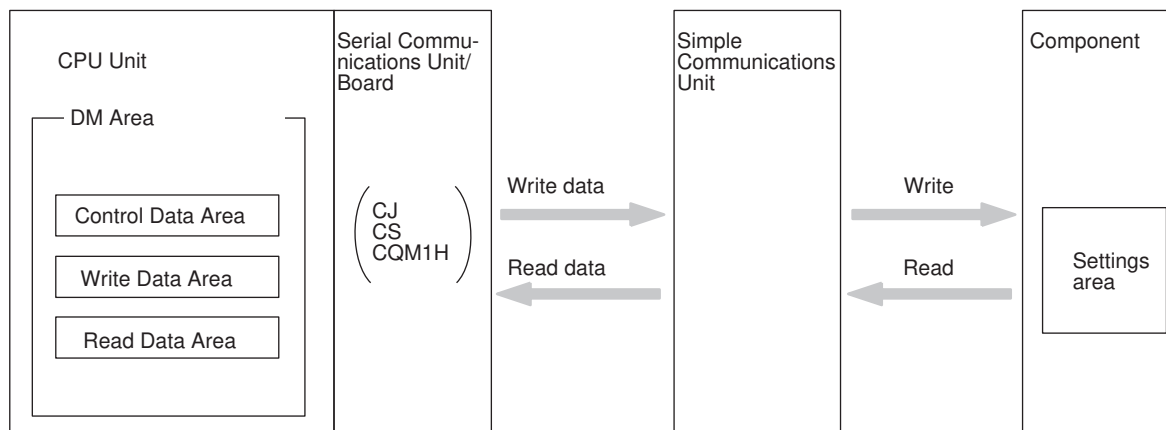
Name	Series	Model number	SYSWAY		CompoWay/F connection	Comments
			Connection	Segment information (See note 5.)		
Digital Panel Meters	Digital Panel Meter	K3GN	No	---	OK	---
	Process Meter	K3NX	Limited functionality	2	Limited functionality	Some commands cannot be used. Only the CompoWay/F variable area can be read. (See note 3.)
	Weighing Meter	K3NV				
	Frequency/Rate Meter	K3NR				
	Period Meter	K3NP				
	Up/Down Counting Meter	K3NC				
	Temperature Meter	K3NH				
	Intelligent Signal Processor	K3TS	Limited functionality	2	No	SYSWAY connection only (See note 2.)

- Note**
1. Components that support only SYSWAY or CompoWay/F communications must be connected with that communications protocol.
 2. When a K3TS is connected, connect the other components by SYSWAY as well. The K3TS cannot be combined with components that communicate by CompoWay/F communications.
 3. When CompoWay/F communications are used for some Digital Panel Meters, present values and set values are stored in BCD format, unlike Temperature Controllers and Timers. (These values are stored in binary format with Temperature Controllers and Digital Timer/Counters.)
 4. There are some SYSWAY commands that are not supported by OMRON components. Refer to the component's manual and confirm the contents of CJ1W-CIF21 command groups before using SYSWAY communications.
 5. When SYSWAY communications are being used, it is necessary to set the "segment information" to indicate whether Temperature Controllers or Digital Panel Meters are connected. Refer to *Unit Communications Type (Offset: +7, +10, +13, ... , +97, and +100)* on page 38 for details on setting the segment information.

1-2 Processing Component Data

Data Processing Basics

Reading and writing are performed cyclically when the Read and Write Command Bits are ON.



Interface between the Simple Communications Unit and PC

The Simple Communications Unit interfaces with the CPU Unit through the CPU Unit's DM Area using the RS-232C or peripheral port on the CPU Unit or an RS-232C port on a Serial Communications Board or Unit.

Interface between the Simple Communications Unit and the Components

The Simple Communications Unit interfaces with the OMRON components by transferring data with SYSWAY or CompoWay/F communications.

Differences between SYSWAY and CompoWay/F

Data can be written between the Simple Communications Unit and OMRON components with SYSWAY or CompoWay/F communications. The methods used to read and write data are different in these communications protocols. (Some components are not limited to just one of these protocols.)

SYSWAY Communications

When SYSWAY communications are being used, there are 5 possible command groups. Select one of five command groups with which specified data will be transferred.

Also, the type of component being connected (Temperature Controller Unit or Digital Panel Meter) must be set when using SYSWAY communications. Different variables are transferred with Temperature Controller Units and Digital Panel Meters.

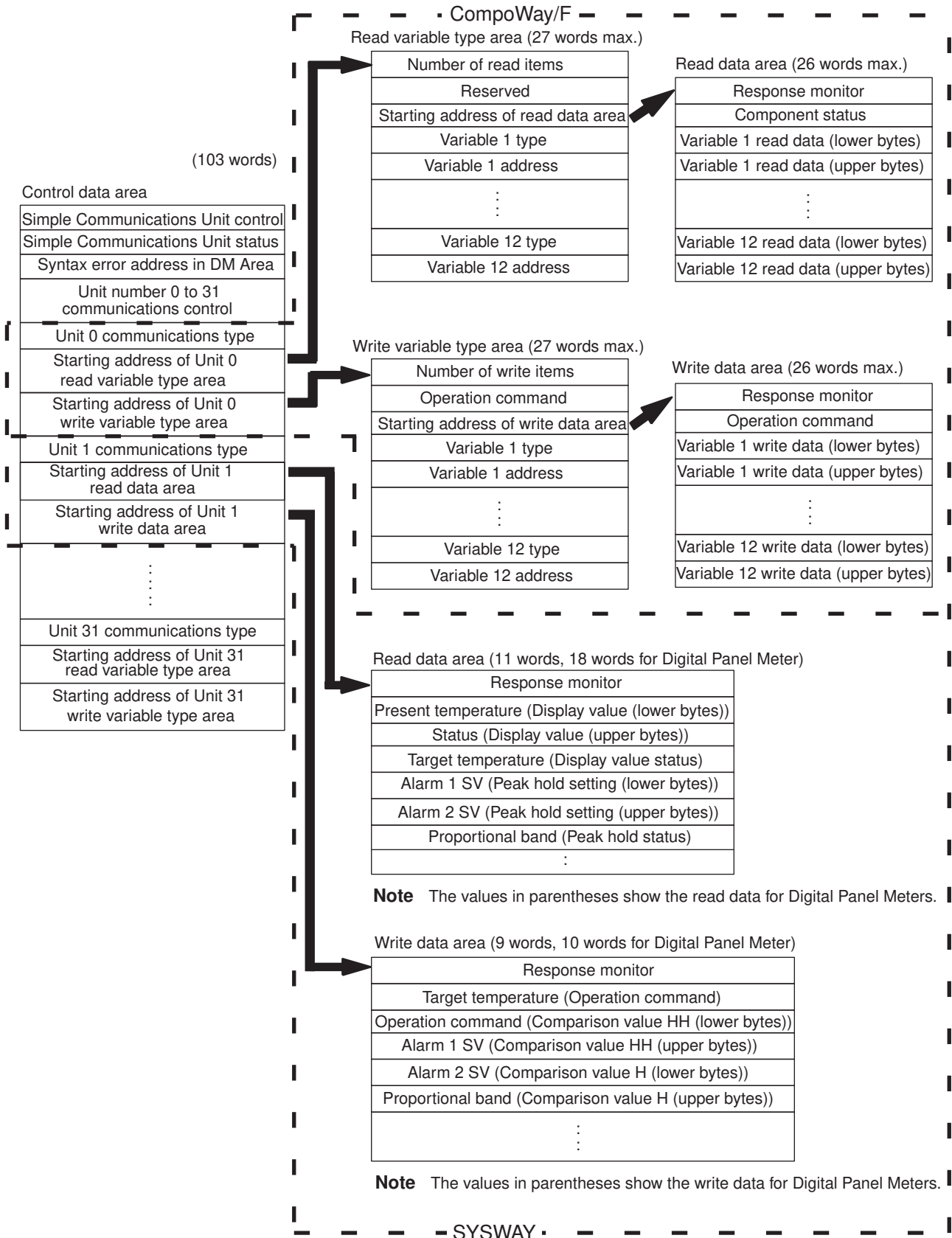
CompoWay/F Communications

When CompoWay/F communications are being used, the variables that will be transferred must be registered beforehand one-by-one. Up to 12 variable types can be registered. Register the variables that you want to write/read in the write variable type area and read variable type area.

When CompoWay/F communications are being used, only these registered variables can be written and read.

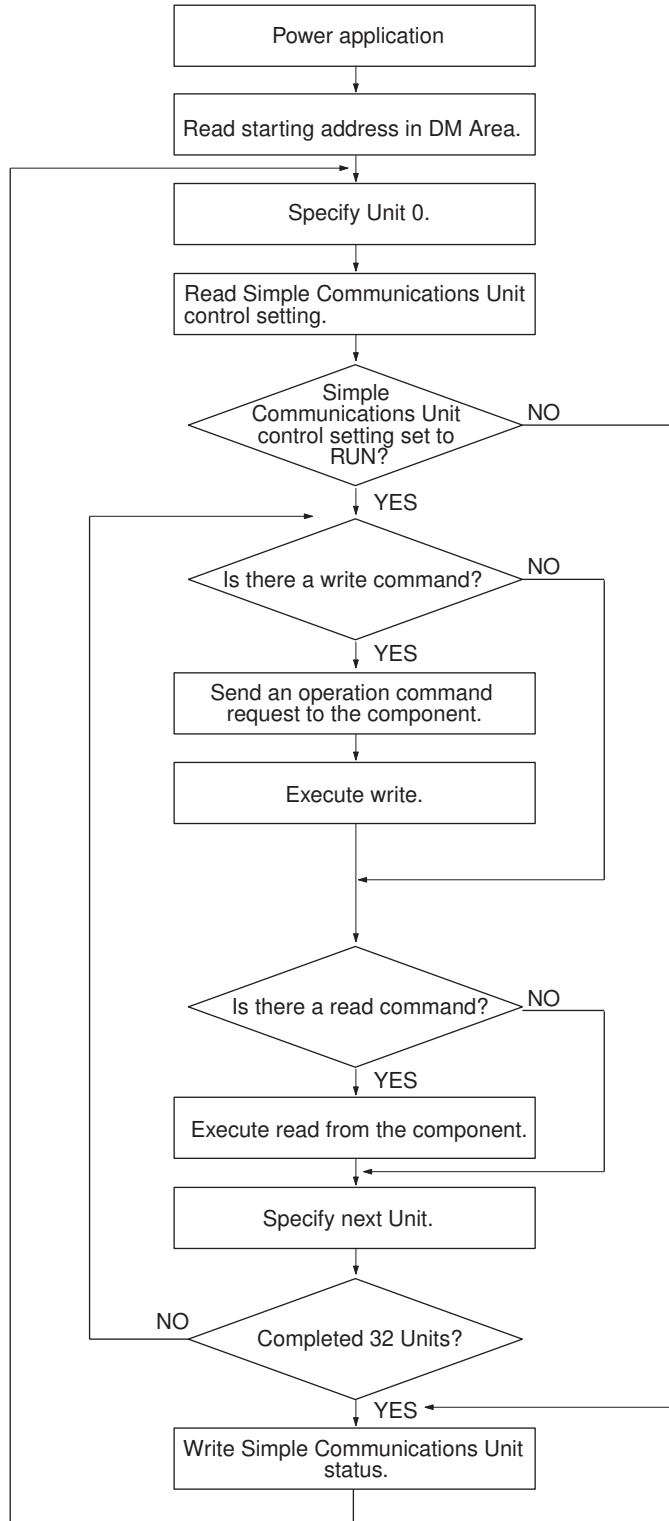
DM Area Structure

The following diagram shows the structure of the DM Area used for communications with the Simple Communications Unit.



Flow of Data Processing

The following flowchart shows the flow of data processing.



SECTION 2

Unit Components and Specifications

This section provides specifications for the CJ1W-CIF21 Simple Communications Unit and describes the functions of each component.

2-1	Specifications	10
2-1-1	Specifications	10
2-1-2	Dimensions	10
2-2	Component Names and Functions	10

2-1 Specifications

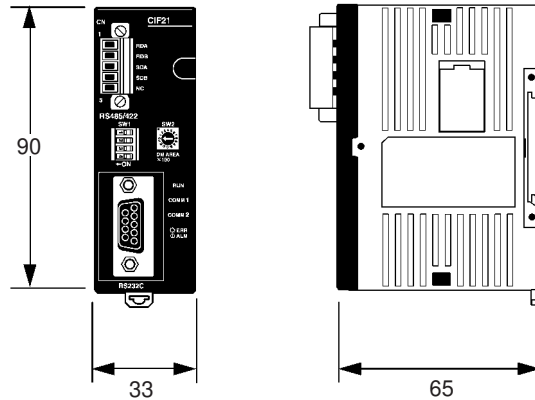
2-1-1 Specifications

Item	Specification
Power supply voltage	24 VDC (See note.)
Allowable voltage range	20.4 to 26.4 VDC
Power consumption	1.5 W
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (no condensation)
Ambient storage temperature	-20 to 75°C
Weight	150 g

Note Provide a 24-VDC power supply to the power supply connector. Refer to 3-2-2 Power Supply Wiring for details.

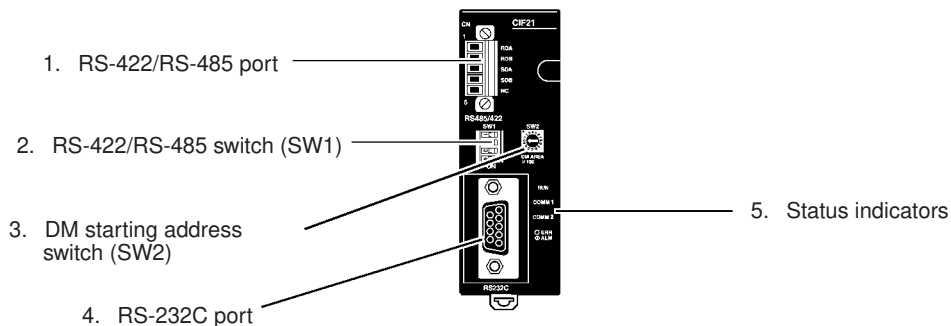
2-1-2 Dimensions

The following diagram shows the external dimensions of the CJ1W-CIF21 Simple Communications Unit. All dimensions are in millimeters.

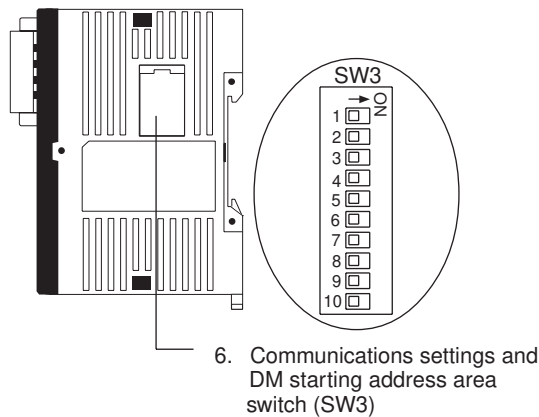


2-2 Component Names and Functions

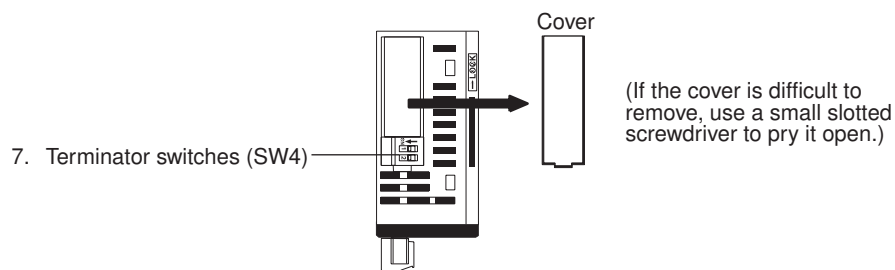
Front View



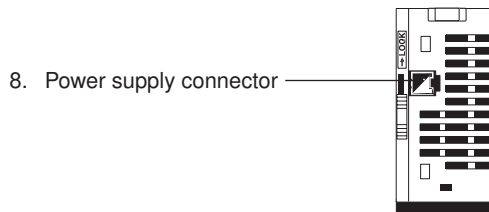
Side View



Top View



Bottom View



1. RS-422/RS-485 Port

Connects to the Temperature Controllers, Digital Timer/Counters, and Digital Panel Meters. Use either RS-422 or RS-485 connections; the two methods cannot be combined in a single CJ1W-CIF21.