

E58-CIFM1

Simple Communications Unit

OPERATION MANUAL

OMRON

E58-CIFM1

Simple Communications Unit


Operation Manual


Produced March 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.

Reference 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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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.

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About this Manual:

This manual describes the installation and operation of the E58-CIFM1 Simple Communications Unit and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the E58-CIFM1 Simple Communications Unit.

Section 1 describes the features and system configuration of the E58-CIFM1 Simple Communications Unit.

Section 2 provides specifications for the E58-CIFM1 Simple Communications Unit and describes the functions of each component.

Section 3 describes preparatory procedures from installation of the E58-CIFM1 Simple Communications Unit to operation of the Unit.

Section 4 explains the functions of the CPU Unit's Device Memory that is used to exchange data with the E58-CIFM1 Simple Communications Unit.

Section 5 shows the system configuration and settings of an example system to help explain how to use the Simple Communications Unit.



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

PRECAUTIONS

This section provides general precautions for using the E58-CIFM1 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

Observe the following precautions when using the Simple Communications Unit.

- Always use the original packaging to transport or ship the Unit. Do not subject the Unit to excessive vibration or shock during shipment and do not drop the Unit or handle it roughly.

- Store the Unit within the following temperature and humidity ranges. There must be no condensation, which can result from sudden temperature changes within these ranges.

Temperature: –20 to 75°C

Humidity: 10% to 90%

- When installing the Unit, check that the DIN Track will not fall and the Unit itself cannot fall from the track.
- Always use the power supply voltages specified in this manual.
- The communications distances must be within the ranges specified in this manual.
- Do not install the communications cables near or parallel to high-voltage lines or power lines.
- When wiring, apply the protective label included with the Unit or an equivalent protective tape that will prevent wire strands or other contaminants from entering the Unit through the cooling vents.
- After completing the wiring, always remove the protective label to uncover the cooling vents and prevent overheating.
- Check the direction and polarity of all terminals and connectors carefully before connecting wires or connectors.
- Double-check all wiring and switch settings before turning ON the power supply.
- Before touching the Unit, discharge any static by touching a grounded metal object.
- Do not attempt to disassemble, repair, or modify the Simple Communications Unit.
- Always use the connectors and wire that meets specifications.

Terminal type: 16 to 28 AWG, strip 7 mm


- Always turn OFF the power supply before attempting any of the following.
 - Installing or removing the Unit.
 - Connecting cables or wiring the system.
 - Connecting or disconnecting the connectors.
- Use communications cable that meets the specifications provided in this manual.
- Always double-check the polarity of the communications cables before connecting the RS-422/485 cables. The actual polarity of the signals for the abbreviations SDA/SDB and RDA/RDB varies from device to device.
- When using RS-422/485 communications, always check the terminator settings before starting operation.
- Do not pull or bend the system's cables and wires excessively.
- Do not place objects on the cables or wires.
- If terminal blocks or connectors can be locked, always lock them before operation.
- Never use the Unit without its cover in place.
- Wire the Unit properly, as described in this manual.

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

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 machines. 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 in which the OMRON devices are installed. The customer must, therefore, perform final checks 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)

SECTION 1

Features and System Configuration

This section describes the features and system configuration of the E58-CIFM1 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	2
1-2	Processing Component Data	4

1-1 Introduction

1-1-1 Features

Transfer Data between Mitsubishi PCs and OMRON Components

The Simple Communications Unit handles data transfers between compatible Mitsubishi PCs and OMRON components, so communications programming isn't required. A Mitsubishi communications interface module is needed to connect the PC's CPU Unit to the Simple Communications Unit.

Compatible with Many OMRON Components

Components such as Temperature Controllers, Timers, Counters, and Digital Panel Meters can be connected if they are equipped with OMRON communications functions (SYSWAY or CompoWay/F protocol).

Monitor Connected Components from the PC

The present values and status of Temperature Controllers, Timers, Counters, and Digital Panel Meters can be monitored in the PC's Device Memory, so all of the connected components can be monitored together.

Easily Change SVs in Connected Components

The settings in connected components can be changed just by editing data in the Device Memory of the PC (CPU Unit).

Connect up to 32 Components

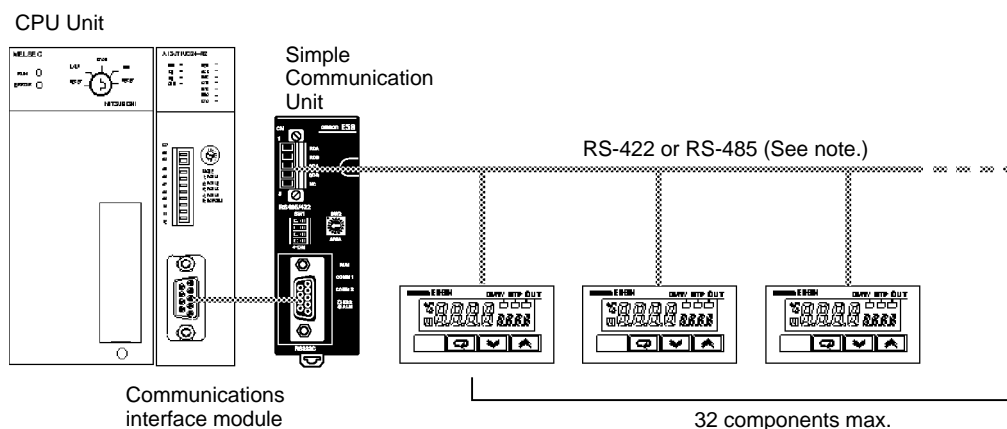
Up to 32 components can be connected with unit numbers from 0 to 31.

Select the Device Memory to be Used

The Device Memory used for data transfers can be allocated in data registers (D), file registers (R), or link registers (W). This flexibility provides more freedom in system design.

1-1-2 System Configuration

Connect a Mitsubishi PC with OMRON components through the E58-CIFM1 Simple Communications Unit as shown in the following diagram.



Note Use either RS-422 or RS-485.
The two cannot be combined.

1-1-3 Compatible PCs and Components

Host (PC)

Use a Mitsubishi communications interface module for the Mitsubishi AnU-series or AnA-series PCs. The E58-CIFM1 Simple Communications Unit can be connected to any communications interface module that is equipped with an RS-232C port and supports the AnU or AnA commands in Mitsubishi's proprietary MELSEC communications protocol.

Components

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

Product name	Series name	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	Valve system communications 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	---	
Timers	Electronic Timer/Counter	H8GN	No	---	OK	---
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.)

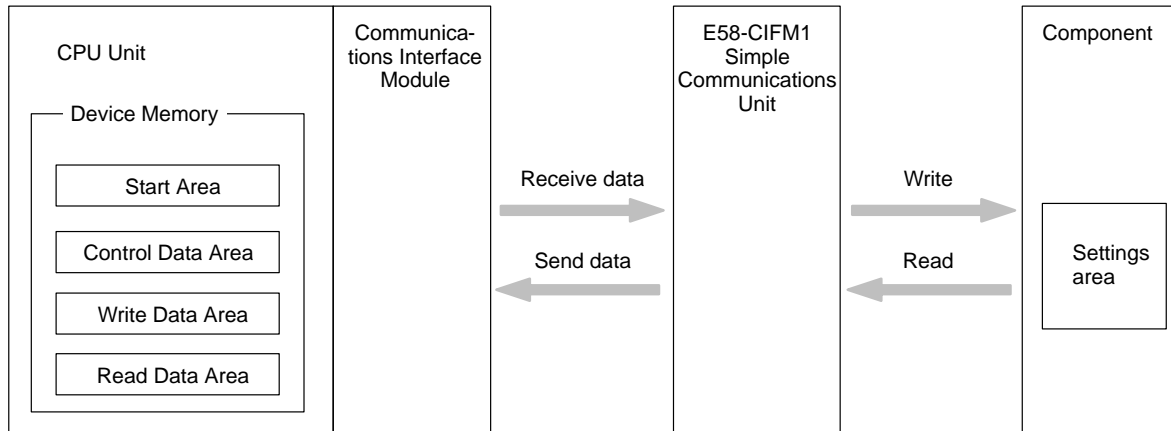
- Note**
1. Components that support only SYSWAY or CompoWay/F communications must be connected with that communications protocol.
 2. When a K3TS is connected, connect the other components by SYSWAY as well. The K3TS cannot be combined with components that communicate by CompoWay/F communications.
 3. 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.)
 4. There are some SYSWAY commands that are not supported by OMRON components. Refer to the component's Manual and confirm the contents of E58-CIFM1 command groups before using SYSWAY communications.

- 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* on page 34 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 the CPU Unit

The Simple Communications Unit interfaces with the CPU Unit through the CPU Unit’s Device Memory using a communications interface module that is connected to the CPU Unit. The communications interface module’s RS-232C port must be used to connect the Simple Communications 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 variable groups. Select the variable group of the data that 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.

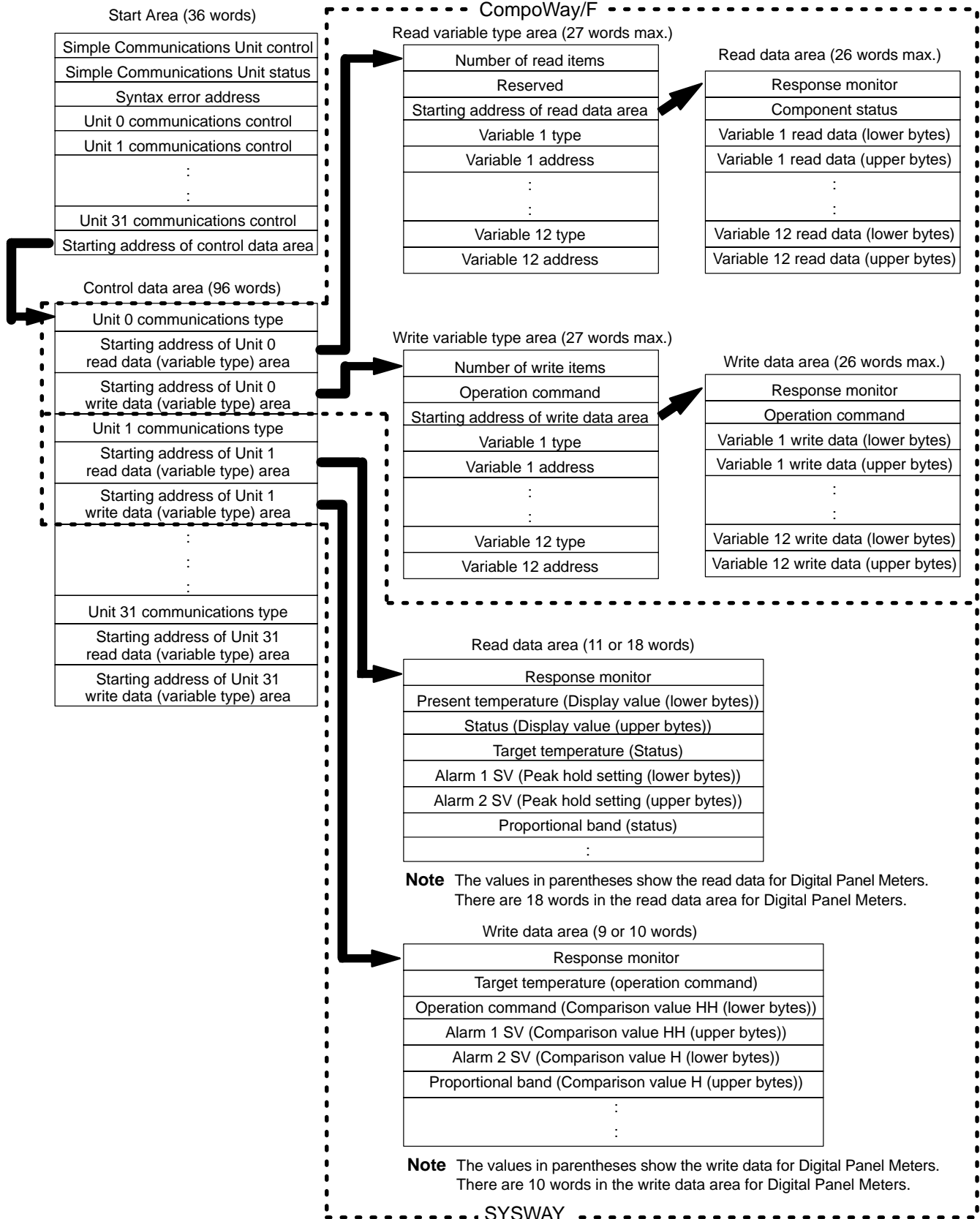
CompoWay/F Communications

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.

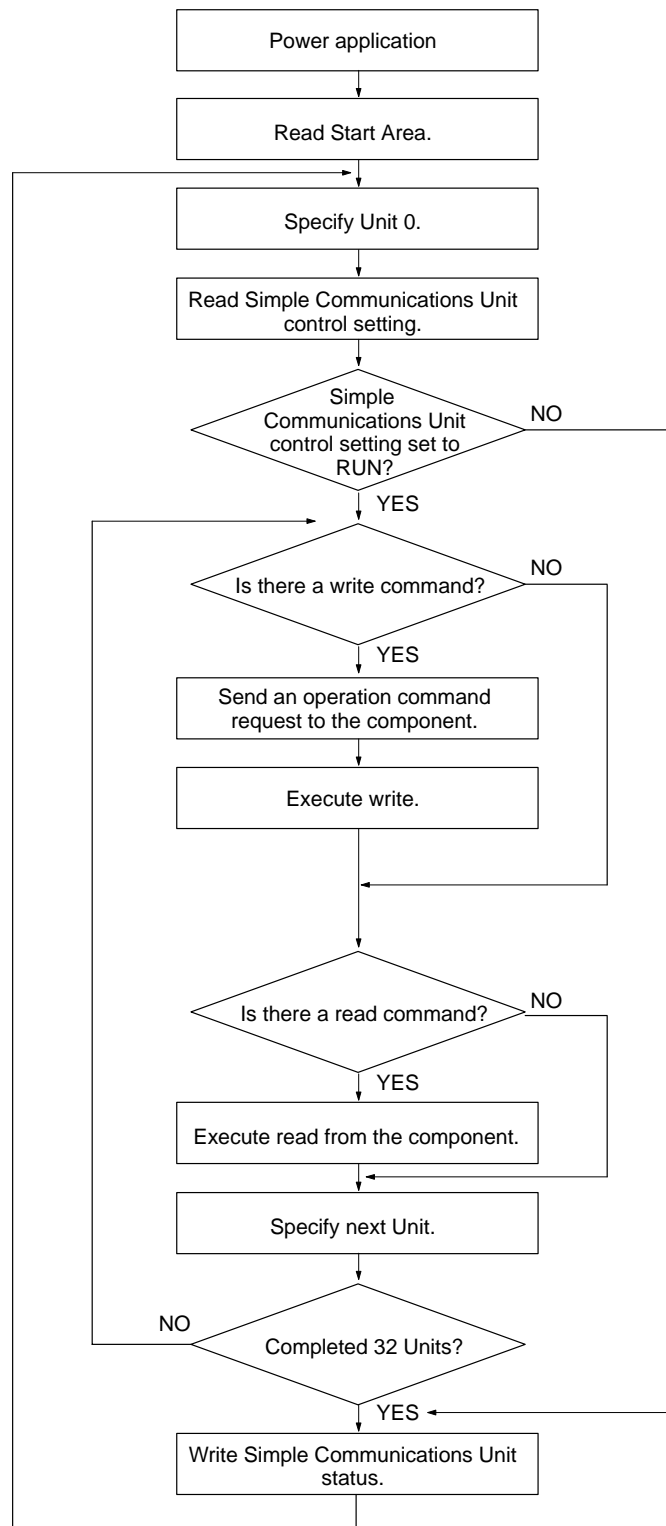
Device Memory Structure

The following diagram shows the structure of the Device Memory 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 E58-CIFM1 Simple Communications Unit and describes the functions of each component.

2-1	Specifications	8
2-1-1	Specifications	8
2-1-2	Dimensions	8
2-2	Component Names and Functions	8

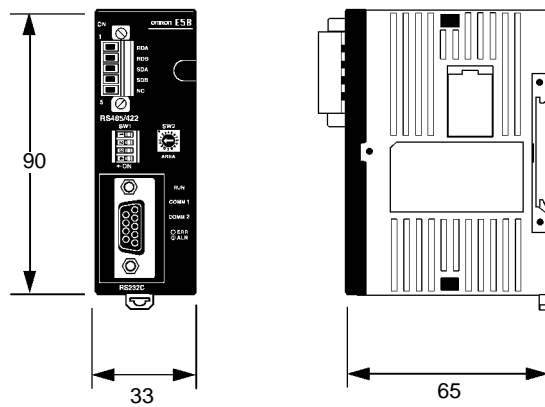
2-1 Specifications

2-1-1 Specifications

Item	Specification
Power supply voltage	24 VDC
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

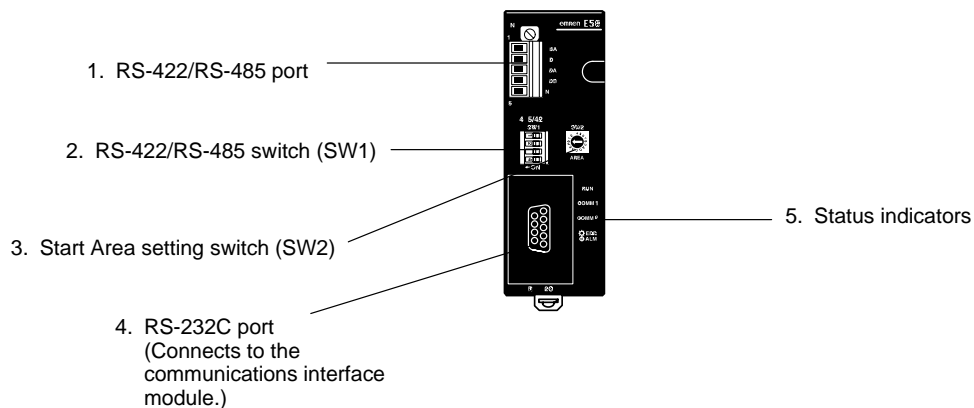
2-1-2 Dimensions

The following diagram shows the external dimensions of the E58-CIFM1 Simple Communications Unit. All dimensions are in mm.

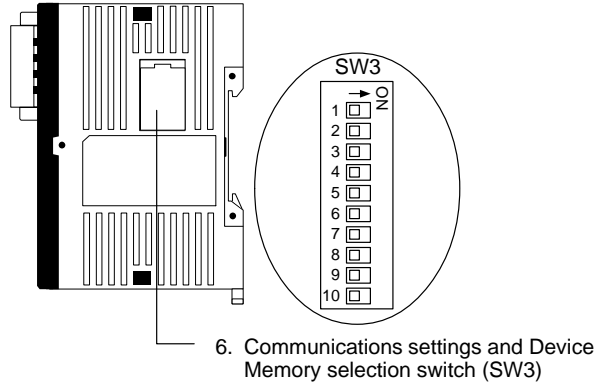


2-2 Component Names and Functions

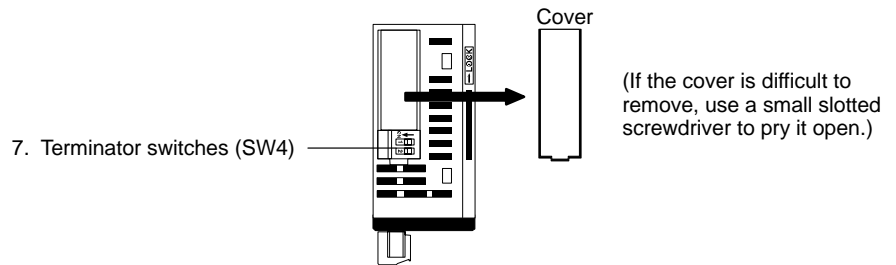
Front View



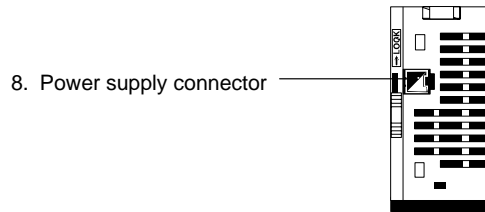
Side View



Top View



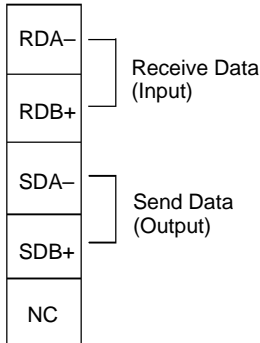
Bottom View



1. RS-422/RS-485 Port

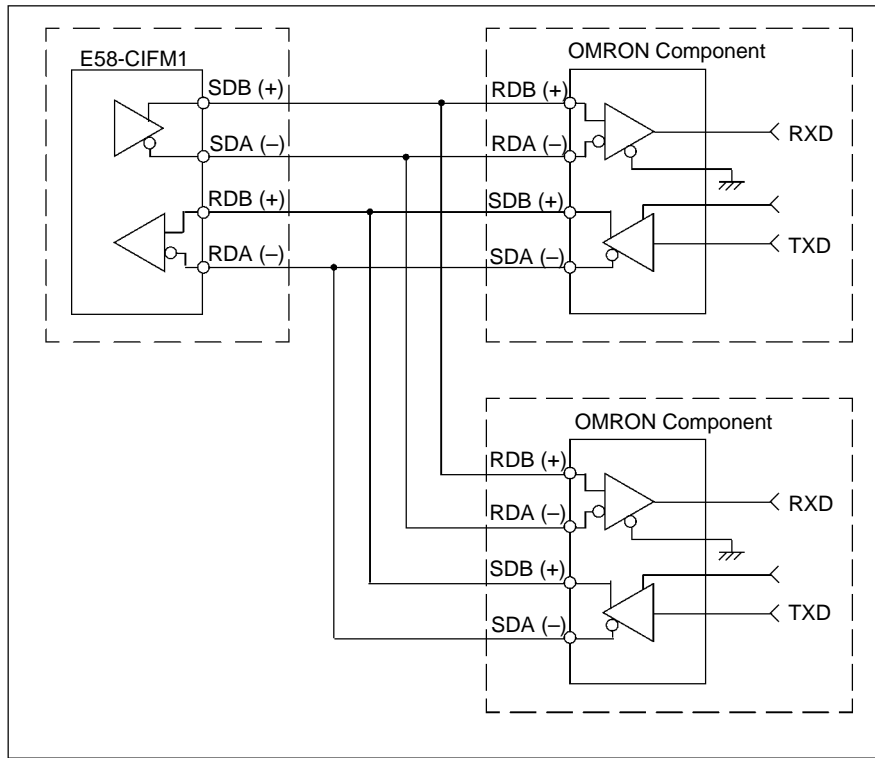
Connects to the Temperature Controllers, Electronic Timer/Counters, and Digital Panel Meters. Use either RS-422 or RS-485 connections; the two methods cannot be combined in a single E58-CIFM1.

Terminal Usage with an RS-422 Connection

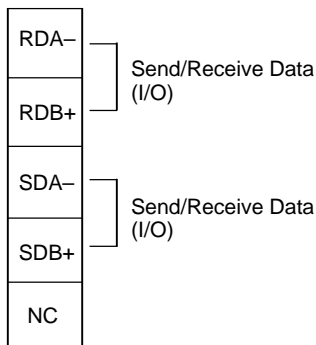


Note The maximum wire length is 500 m.

RS-422 Connection Example

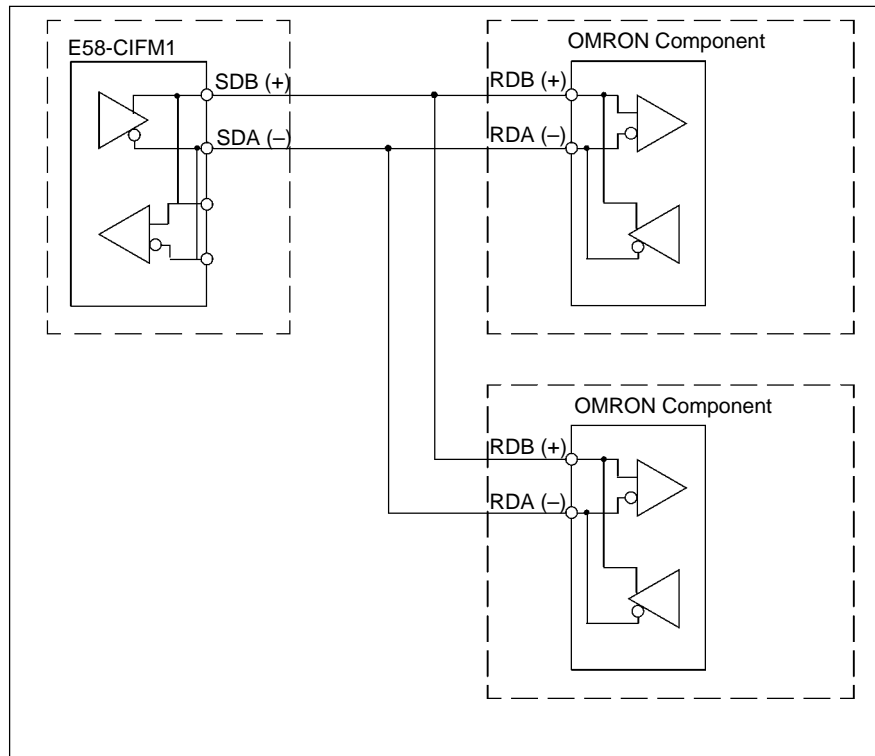


Terminal Usage with an RS-485 Connection

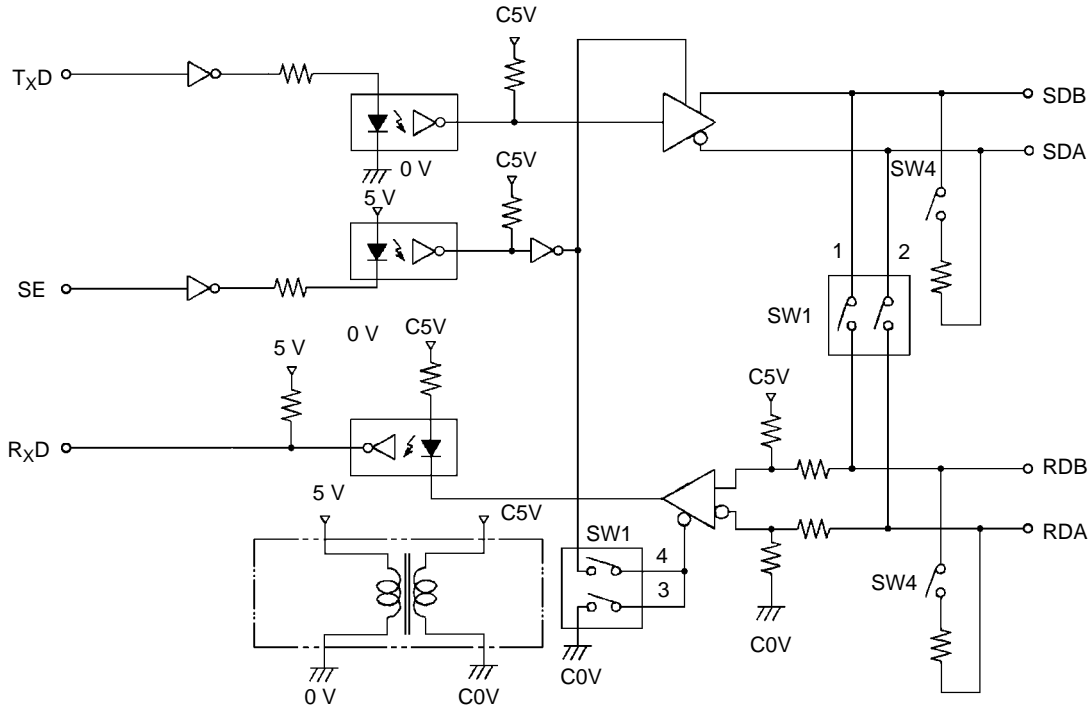


Note The maximum wire length is 500 m.

RS-485 Connection Example



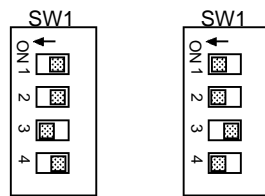
RS-422 Interface Block Diagram



2. RS-422/RS-485 Switch (SW1)

Selects RS-422 or RS-485 communications.

RS-422 setting RS-485 setting



SW1	RS-422	RS-485
1	OFF	ON
2	OFF	ON
3	ON	OFF
4	OFF	ON

Note The factory setting is set for RS-485 (two-wire) communications. Do not turn ON both SW1-3 and SW1-4 at the same time. Doing so may destroy internal circuits.

3. Start Area Setting Switch (SW2)

Sets the starting word of the “Start Area” that contains the Simple Communications Unit’s operational settings. Pins 9 and 10 of SW3 (located on the side of the Unit) determine which register area in Device Memory are used. The following tables show the possible settings for rotary-switch SW2 and DIP switch SW3.



Setting range: 0 to F

Data Registers 1 Selected (SW3–9 OFF and SW3–10 OFF)

SW2 setting	Starting address of Start Area (See note.)
0	D0000
1	D0250
2	D0500
3	D0750
4	D1000
5	D1250
6	D1500
7	D1750
8	D2000
9	D2250
A	D2500
B	D2750
C	D3000
D	D3250
E	D3500
F	D3750

Note The data register area’s addresses are expressed in decimal.

Data Registers 2 Selected (SW3–9 ON and SW3–10 OFF)

SW2 setting	Starting address of Start Area (See note.)
0	D4000
1	D4250
2	D4500
3	D4750
4	D5000
5	D5250
6	D5500
7	D5750
8	D6000
9	D6250
A	D6500
B	D6750
C	D7000
D	D7250
E	D7500
F	D7750

Note The data register area’s addresses are expressed in decimal.

Link Registers Selected (SW3–9 OFF and SW3–10 ON)

SW2 setting	Starting address of Start Area (See note.)
0	W0000
1	W0200
2	W0400
3	W0600
4	W0800
5	W0A00
6	W0C00
7	W0E00
8	W1000
9	W1200
A	W1400
B	W1600
C	W1800
D	W1A00
E	W1C00
F	W1E00

Note The link register area’s addresses are expressed in hexadecimal.

File Registers Selected (SW3–9 ON and SW3–10 ON)

SW2 setting	Starting address of Start Area (See note.)
0	R0000
1	R0500
2	R1000
3	R1500
4	R2000
5	R2500
6	R3000
7	R3500
8	R4000
9	R4500
A	R5000
B	R5500
C	R6000
D	R6500
E	R7000
F	R7500

Note The file register area’s addresses are expressed in decimal.

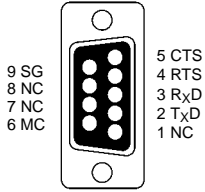
4. RS-232C Port

Connects to the communications interface module's RS-232C port.

RS-232C Cable Wiring

The following table shows the cable wiring when there is a 9-pin D-Sub connector on communications interface module.

Connector Pin Allocation



(On Simple Communications Unit)

Comm. Interface Module		Cable connections and Signal directions	Simple Comm. Unit	
Signal	Pin		Signal	Pin
CD	1		---	1
RD (RXD)	2		TXD (SD)	2
SD (TXD)	3		RXD (RD)	3
DTR (ER)	4		RS	4
SG	5		CS	5
DSR (DR)	6		---	6
RS (RTS)	7		---	7
CS (CTS)	8		---	8
---	9		SG	9
Hood		Shield		

The following table shows the cable wiring when there is a 25-pin D-Sub connector on communications interface module.

Comm. Interface Module		Cable connections and Signal directions	Simple Comm. Unit	
Signal	Pin		Signal	Pin
FG	1		---	1
SD (TXD)	2		TXD (SD)	2
RD (RXD)	3		RXD (RD)	3
RS	4		RS	4
CS	5		CS	5
DSR (DR)	6		---	6
SG	7		---	7
CD	8		---	8
DTR (ER)	20		SG	9
Hood		Shield		

5. Status Indicators

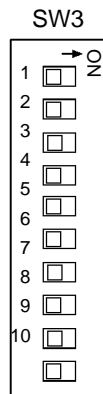
Indicate the operating status of the Simple Communications Unit.

Label	Status	Meaning
RUN	Lit	Communications have been established between the Simple Communications Unit and the communications interface module. The Simple Communications Unit is operating.
	Not lit	The Simple Communications Unit is not operating with the communications interface module.
	Flashing	Communications between the Simple Communications Unit and the communications interface module are not established or were interrupted.
ERR/ALM	Lit	A fatal error occurred. (See note 1.)
	Flashing	A non-fatal error occurred. (See note 2.)
	Not lit	Unit operating normally.
COMM1	Flashing	Data is being transferred between the Simple Communications Unit and the communications interface module.
	Not lit	Not transferring data
COMM2	Flashing	Data is being transferred between the Simple Communications Unit and connected components.
	Not lit	Not transferring data

- Note**
1. The Simple Communications Unit stops operating when a fatal error occurs. Clear the cause of the error and turn the power ON again.
 2. The Simple Communications Unit continues operating when a non-fatal error occurs. Just clear the cause of the error or clear the error and stop/start operation to restore operation.

6. Communications Settings and Device Memory Selection Switch (SW3)

Sets communications conditions used to communicate with the connected components and the communications interface module. Remove the cover on the side of the Unit to access SW3.

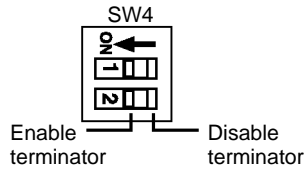


Pin	Function	OFF	ON
1	Baud rate for communications with communications interface module	Normal	9,600 bps
		High-speed	19,200 bps
2	Baud rate for communications with connected components	Normal	38,400 bps
		High-speed	57,600 bps
3	Data length (See notes 2 and 3.)	7 bits	8 bits
4	Parity enable bit (See notes 2 and 3.)	Use parity	No parity
5	Parity (See notes 2 and 3.)	Even	Odd
6	Stop bits (See notes 2 and 3.)	2 bits	1 bit
7	Communications with communications interface module	Normal	High-speed
8	Communications with connected components	Normal	High-speed
9	Device Memory Area Selection	---	Pin 10 OFF
10		Pin 9 OFF	D1 (Data registers 1)
		Pin 9 ON	D2 (Data registers 2)

- Note**
1. All pins are set to OFF at the factory.
 2. Pins 3, 4, 5, and 6 set communications conditions between the Simple Communications Unit and connected components only.
 3. The communications conditions with the communications interface module are fixed to the following: 7 data bits, even parity, and 2 stop bits.

7. Terminator Switches (SW4)

Turn ON pins 1 and 2 if the Simple Communications Unit is at the end of the RS-422/RS-485 transmission path. Remove the cover on the top of the Unit to access SW4. If the cover is difficult to remove, use a small slotted screwdriver to pry it open.



	Pin 1	Pin 2
Enable terminator	ON	ON
Disable terminator	OFF	OFF

- Note**
1. Both pins are set to OFF at the factory.
 2. The terminating resistance is 235 Ω with RS-422 communications. Keep the total combined terminating resistance above 110 Ω.
 3. The terminating resistance is 118 Ω with RS-485 communications. Keep the total combined terminating resistance above 54 Ω.

8. Power Supply Connector

Connects to the 24-VDC power supply. Supply +24 V to the red wire and 0 V to the black wire of the power supply cord provided with the Unit.

SECTION 3

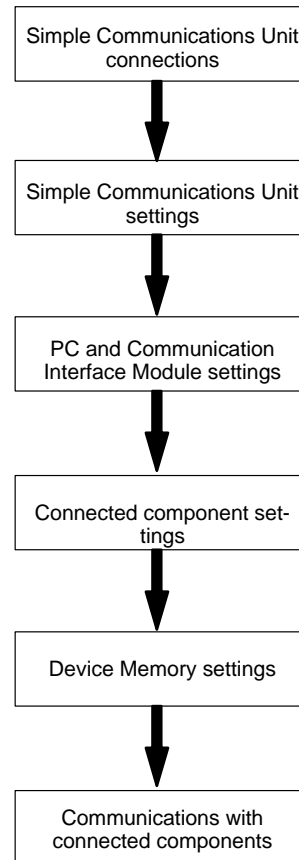
Preparation for Operation

This section describes preparatory procedures from installation of the E58-CIFM1 Simple Communications Unit to operation of the Unit.

3-1	Procedure Outline	18
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3-9-1	Fatal Errors (ERR Indicator Lit)	27
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3-1 Procedure Outline

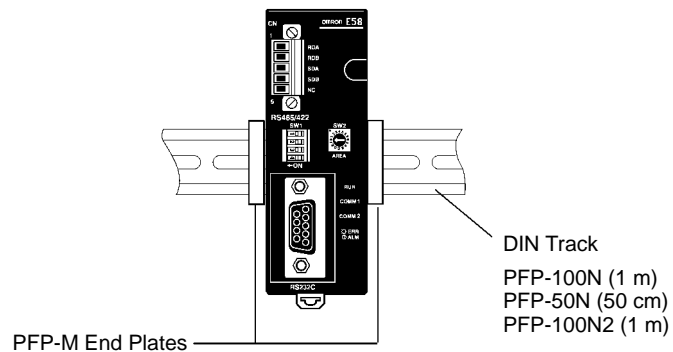
The following diagram outlines the procedures required to prepare for communications with the connected OMRON components.



3-2 Installation and Power Supply Wiring

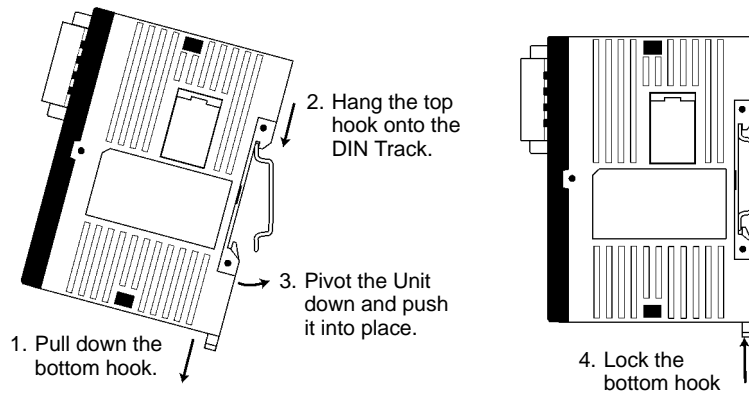
3-2-1 Installation

Install the E58-CIFM1 Simple Communications Unit on a DIN Track that is 35-mm wide. The Unit must not be mounted directly to a panel or other surface.



Installing the Unit on DIN Track

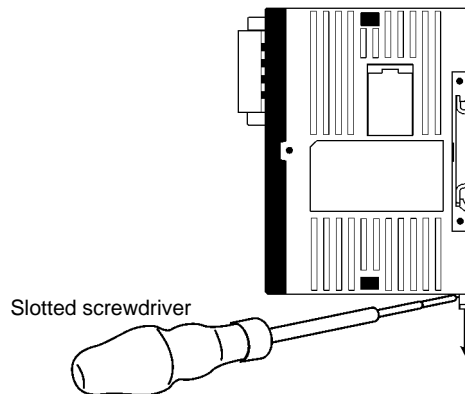
Hook the top of the Unit's mounting bracket onto the top of the DIN Track, pivot the Unit down completely, and lock the Unit to the bottom of the DIN Track.



Note The DIN Track must be installed horizontally. If the Track is installed vertically, air will not flow properly through the Unit and the Unit may overheat.

Removing the Unit from the DIN Track

Use a standard slotted screwdriver to release the Unit's bottom hook. Pull the bottom of the Unit off of the DIN Track.

**3-2-2 Power Supply Wiring**

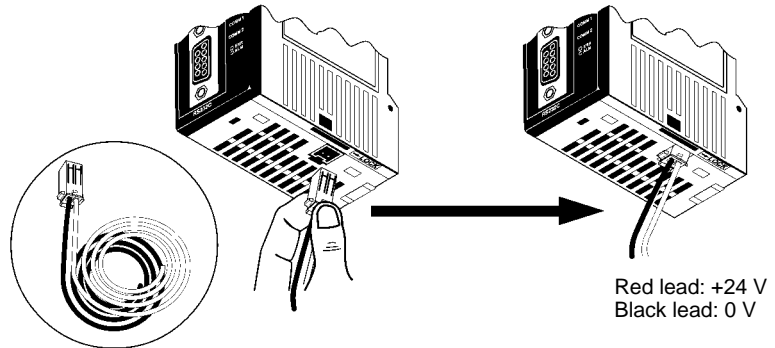
Use a DC power supply with sufficient capacity and low ripple. We recommend using the OMRON CPM2C-PA201 AC Power Supply Unit.

Caution Do not perform a voltage withstand test on the Unit's DC power supply terminals. The test might damage the Unit's internal components.

Using a General-purpose DC Power Supply

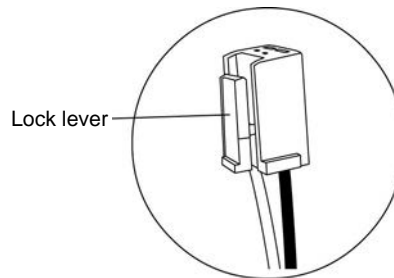
Connect the E58-CIFM1 Simple Communications Unit to a 24-VDC power supply with the power supply cord included with the Unit.

- 1, 2, 3... 1. Align the power supply cord's connector with the connector on the bottom of the Unit and insert it into the Unit.



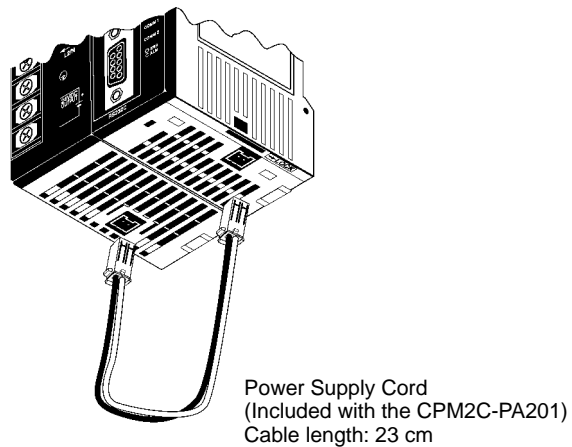
Power supply cord (Included with the Simple Communications Unit)
Cable length: 100 cm

2. To remove the power supply cord, hold the cord's connector, press on the lock lever to release the connector's lock, and pull out the connector. Do not pull on the wires.



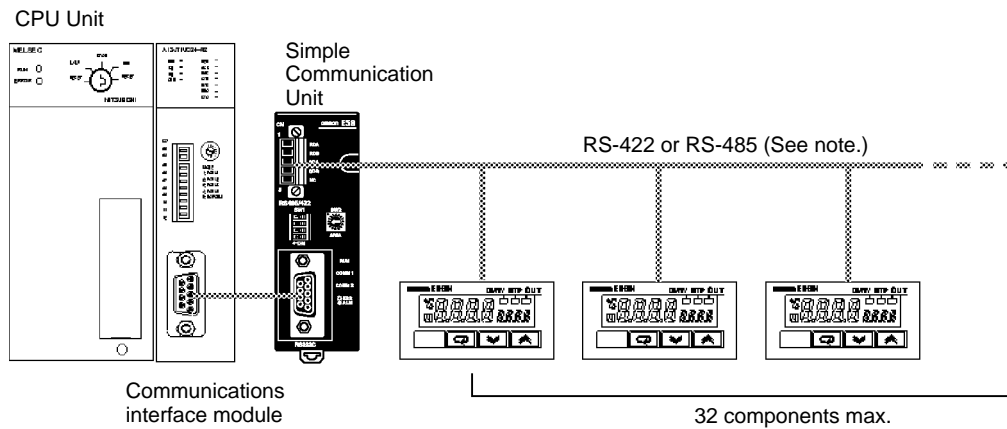
Using a CPM2C-PA201 AC Power Supply Unit

If you are using a CPM2C-PA201 Power Supply Unit, use the power supply cord included with the CPM2C-PA201 to connect to the E58-CIFM1 Simple Communications Unit.



3-3 Simple Communications Unit Connections

Connect the E58-CIFM1 Simple Communications Unit to the Mitsubishi communications interface module and connect up to 32 OMRON components through the Unit's RS-422/RS-485 interface.



Note Use either RS-422 or RS-485. The two methods cannot be combined.

RS-232C Wiring (9-pin D-Sub on Communications Interface Module)

The following table shows the cable wiring between the Simple Communications Unit and the communications interface module when there is a 9-pin D-Sub connector on the communications interface module. (The Simple Communications Unit has a 9-pin D-Sub connector.)

Comm. Interface Module		Cable connections and Signal directions	Simple Comm. Unit	
Signal	Pin		Signal	Pin
CD	1	<p>Shield</p>	---	1
RD (RXD)	2		TXD (SD)	2
SD (TXD)	3		RXD (RD)	3
DTR (ER)	4		RS	4
SG	5		CS	5
DSR (DR)	6		---	6
RS (RTS)	7		---	7
CS (CTS)	8		---	8
---	9		SG	9
Hood				

RS-232C Wiring (25-pin D-Sub on Communications Interface Module)

The following table shows the cable wiring between the Simple Communications Unit and the communications interface module when there is a 25-pin D-Sub connector on the communications interface module. (The Simple Communications Unit has a 9-pin D-Sub connector.)

Comm. Interface Module		Cable connections and Signal directions	Simple Comm. Unit	
Signal	Pin		Signal	Pin
FG	1		---	1
SD (TXD)	2		TXD (SD)	2
RD (RXD)	3		RXD (RD)	3
RS	4		RS	4
CS	5		CS	5
DSR (DR)	6		---	6
SG	7		---	7
CD	8		---	8
DTR (ER)	20		SG	9
Hood			Shield	

3-4 Simple Communications Unit Settings

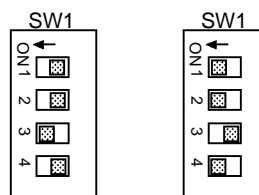
Observe the following two precautions when changing the Unit's switch settings.

- Always turn OFF the power before changing the Simple Communications Unit's settings.
- To prevent malfunctioning from static discharge, never touch the setting switches when the power is ON.

RS-422/RS-485 Switch (SW1)

Selects whether RS-422 or RS-485 communications are used for communications with the connected OMRON components.

RS-422 setting RS-485 setting



The following table shows the factory settings (RS-485 communications).

SW1 pin	Factory setting	Function
1	ON	Selects RS-485 communications (two-wire communications).
2	ON	
3	OFF	
4	ON	

Note See page 11 for more details on the function of SW1.

Start Area Setting Switch (SW2)

Sets the starting word of the "start area" that contains the Simple Communications Unit's operational settings. Pins 9 and 10 of SW3 (located on the side of the Unit) determine which register area in Device Memory are used.



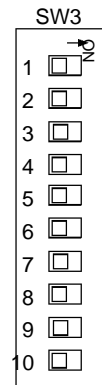
The following table shows the factory settings for SW2 and SW3 pins 9 and 10.

SW2	SW3 pin 9	SW3 pin 10	Starting word of the "start area"
0	OFF	OFF	D0000

Note See page 12 for tables showing all of the possible settings of SW2 and SW3 pins 9 and 10.

Communications Settings and Device Memory Selection Switch (SW3)

Sets communications speed with the communications interface module, communications speed and communications conditions with the connected components, and the location in Device Memory used by the Module. Set the same communications speeds and communications settings in the Module and communications components. (The Module's communications conditions are fixed to the following: 7 data bits, even parity, and 2 stop bits.)

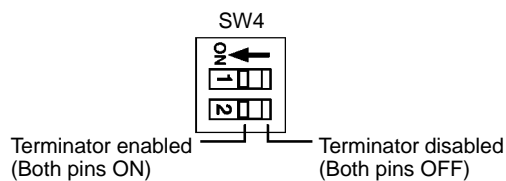


Pin	Factory setting	Function	Applicable communications
1	OFF	Baud rate = 9,600 bps	Communications interface module
2	OFF	Baud rate = 9,600 bps	Connected components
3	OFF	Data length = 7 bits	
4	OFF	Parity = Enabled	
5	OFF	Parity = Even	
6	OFF	Stop bits = 2 bits	
7	OFF	Communications mode = Normal (not high-speed)	Communications interface module
8	OFF	Communications mode = Normal (not high-speed)	Connected components
9	OFF	Use D1 (Data registers 1) in the PC's Device Memory.	---
10	OFF		

Note See page 14 for more details on SW3 pin settings.

Terminator Switches (SW4)

Turn ON pins 1 and 2 if the Simple Communications Unit is at the end of the RS-422/RS-485 transmission path. The factory setting for SW4 is both pins OFF (no terminating resistance.)



- Note**
1. The terminating resistance is 235 Ω with RS-422 communications. Keep the total combined terminating resistance above 110 Ω.
 2. The terminating resistance is 118 Ω with RS-485 communications. Keep the total combined terminating resistance above 54 Ω.

3-5 PC and Communications Interface Module Settings

Make the following settings in the PC and communications interface module.

Setting name	Setting	Remarks
Communications mode	MELSEC proprietary communications protocol method 1 (See note 2.)	Uses the shared AnA/AnU commands.
Communications speed	9,600/19,200/38,400/57,600	Set to match the Simple Communications Unit's setting.
Data length	7 bits	---
Parity enable/disable	Enable parity	---
Parity even/odd setting	Even	---
Stop bits	2 bits	---
Checksum enable/disable	Enable checksum	---
Write during RUN	Allowed	---
Communications method	Half duplex	---
Node number (See note 1.)	00	Only for models with a node number switch

- Note**
1. The node number setting is required only with models equipped with a node number setting switch.
 2. The usable component number setting range depends upon the component being used, as shown in the following table.
Allocate Device Memory using a component number range that can actually be used by the sequencer CPU being accessed.

Component	Component number range	Format
Data register D	D0000 to D8191	Decimal
Link register W	W0000 to W1FFF	Hexadecimal
File register R	R0000 to R8191	Decimal

3-6 Connected Component Settings

Make the following settings in the components connected to the Simple Communications Unit. Refer to the component's manuals for details on these settings.

- Unit Number** Set the component's unit number between 0 and 31. Set a unique unit number on each component.
- Communications Settings** Set the same communications settings that were set for the Simple Communications Unit in *3-4 Simple Communications Unit Settings*.
- Enable Remote Communications Writing** Specify "Enable Communications Writing (Remote)" for the setting mode. If "Disable Communications Writing (Local)" is specified, it won't be possible to change the component's SVs.
- Terminating Resistance** Terminating resistance must be set on the components at the ends of the RS-422/RS-485 communications cable. Turn on the termination resistance switch on the last component.

3-7 Component Memory Settings and Component Communications

This section explains the basic steps required to establish communications with the connected components. See *Section 4 Device Memory* for details on the actual Device Memory settings.

Write the following program sections in the user program to make the settings necessary for communications with the connected components.

3-7-1 Device Memory Settings

Verify that the components that you want to connect are supported by the E58-CIFM1. Determine whether the components can communicate by SYSWAY or CompoWay/F communications.

Write the following program sections at the beginning of the user program so that the necessary Device Memory settings are made when the power is turned ON.

- 1, 2, 3...**
1. Set the Start Area
 - Set the number of connected components (32 max.)
 2. Set Parameters in the Control Data Area
 - When using SYSWAY communications, set each component's segment information.
 - When using SYSWAY communications, select and set a command group that contains the values that you want to read or write.
 - Set the communications protocol.
 - When using SYSWAY communications, set the starting addresses of each component's read/write areas.
 - When using CompoWay/F communications, set the starting addresses of each component's read/write variable type areas.
 3. When using CompoWay/F communications, set the variable type and variable address of each variable that you want to read or write. (Set this information in the read/write variable type area.)
 4. When writing data, set the data that you want to write in the write data area.

3-7-2 Starting Communications with the Components

Use the following procedure to start communications with the connected components.

- 1, 2, 3...**
1. Set the RUN/Stop control digit to 1 (RUN).

The RUN/Stop control digit is in the first word (the Simple Communications Unit control word) in the Start Area. See *Simple Communications Unit Control* on page 31 for details.
 2. Turn ON the Read Command Bit or Write Command Bit of the desired components. These communications control bits are in the Start Area. See *Communications Control Words* on page 33 for details.

Changes to the following values are recognized only when the Simple Communications Unit control word's RUN/Stop digit is switched from Stop to RUN. When one of these values has been changed, switch the Simple Communications Unit from RUN to Stop and then back to RUN again.

- Segment information
- Command group
- Communications protocol
- Starting addresses of read/write data areas
- Starting addresses of read/write variable type areas

3-8 Precautions for Component Communications

Time Required to Refresh Read/Write Data	Observe the following precautions when communicating with components. The time required to refresh read or write data varies with the PC's cycle time. In addition, the refreshing interval is not fixed.
Establishing Communications with the PC	Turn ON the Simple Communications Unit and the PC at the same time or turn ON the Simple Communications Unit after the PC has started. The Unit's RUN indicator will flash until communications are established with the PC. After communications are established, the RUN indicator will be lit or not lit depending on the Unit's control status.
No Response from PC after Communications were Established	If communications were established with the PC and later there is no response from the PC, the Unit will retry communications with the PC for 2 minutes. If there is no response after 2 minutes, a fatal error will occur and the ERR indicator will light.
Communications with Connected Components	When an error occurs in communications between the Simple Communications Unit and a connected component, a non-fatal error will occur in the Unit and the Unit will stop communications with that component. The Unit writes the corresponding error code in the Response Monitor Area and the ERR indicator flashes, but the Unit continues operating and proceeds to communications with the next component. The ERR indicator will stop flashing if the Unit communicates successfully with the next component.
Mode of the Communications Interface Module	It is not possible for the Simple Communications Unit to write data to the PC if the communications interface module's mode disables writing while in RUN mode. Always set the communications interface module's mode to enable writing while in RUN mode.
Switching the Simple Communications Unit from "Stop" to "RUN"	The Simple Communications Unit must be switched from Stop to RUN just once to validate changes made in Control Data Area. After editing these words, always switch the Unit from RUN to Stop and then back to RUN again.
	Note The Start Area and the CompoWay/F Read and Write Variable Type Areas are read every cycle, so it is not necessary to switch the Unit from Stop to RUN after these areas have been edited.
Syntax Errors	When a syntax error occurs in the Simple Communications Unit, switch the Unit from RUN to Stop, edit the location that caused the syntax error, and then switch the Unit back to RUN. Syntax errors are non-fatal errors that are cleared by switching the Unit from RUN to Stop. Non-fatal errors are not cleared just by eliminating the cause of the error.
Device Memory Allocation Errors	When a Device Memory allocation error occurs, it is possible that the allocated area exceeded the boundary of the PC's Device Memory. After correcting the Device Memory allocation, reset the power supply for the Simple Communications Unit. Device Memory allocation errors are fatal errors that are cleared by turning the power supply OFF and then ON again. Fatal errors are not cleared just by eliminating the cause of the error.
Delaying the Communications Response with Connected Components	The communications timeout setting must be extended if you are using a system configuration that causes a significant delay in the communications response between the Simple Communications Unit and the components, such as wireless communications between the Unit and components. The communications timeout setting can be set in multiples of 500 ms, up to the maximum monitoring time of 5.0 s. Set a monitoring time appropriate for your system. Note Under normal conditions, it is not necessary to change the communications timeout setting. In general use a setting of 0, which sets a response monitoring

time of 500 ms. Refer to *Simple Communications Unit Control* on page 31 for details on the communications timeout setting.

Selecting RAM Write Mode or RAM Backup Mode

When selecting the RAM write mode or backup mode, program the selection operation command so that it is sent in only one scan. Some components write to non-volatile memory when this command is received, so the service life of the non-volatile memory will be reduced if the command is received every scan.

3-9 Error Processing

The Simple Communications Unit can detect two kinds of errors: fatal errors that cause the ERR indicator to light and non-fatal errors that cause the ERR indicator to flash. The following tables show the likely causes of these errors and the error processing required.

3-9-1 Fatal Errors (ERR Indicator Lit)

Error	Likely cause and correction
Communications cannot be established with the communications interface module.	Check the communications baud rate and other communications settings in the communications interface module and Simple Communications Unit. Correct the settings and turn ON the Simple Communications Unit again.
There was a communications error with the communications interface module.	Noise can cause communications errors. If noise is suspected, use cables and wiring methods that will reduce noise in the communications lines and turn ON the Simple Communications Unit again.
Cannot write data while the communications interface module is in RUN mode.	Check whether the communications interface module is set to disable writing in RUN mode. If so, change the communications interface module's settings to allow writing in RUN mode and turn ON the power again.
A watchdog timer error occurred. (Watchdog timer errors are indicated in the Simple Communications Unit status word.)	It is possible for noise to affect the Simple Communications Unit's processing. If noise is suspected, take steps to reduce noise around the Unit or shield the Unit. The watchdog timer error can be cleared by turning the power supply OFF and then ON again.
Device Memory allocation error (Device Memory allocation errors are indicated in the Simple Communications Unit status word.)	The allocated Device Memory area may exceed the boundary of the PC's Device Memory. When a Device Memory allocation error is detected, error code "15" is written to the Simple Communications Unit Status word. To restore normal operation, correct the Device Memory allocation and turn the Simple Communications Unit OFF and then ON again.

3-9-2 Non-fatal Errors (ERR Indicator Flashing)

Error	Likely cause and correction
There was a communications error with a component. (Details on communications errors can be found in the Response Monitor Area.)	Check whether the communications settings in the components match the settings in the Simple Communications Unit. Correct the settings if necessary. Normal operation will be restored when the cause of the communications error is corrected.
	Noise can cause communications errors. If noise is suspected, use cables and wiring methods that will reduce noise in the communications lines. Normal operation will be restored when the cause of the communications error is corrected.
Syntax error (Syntax errors are indicated in the Simple Communications Unit status word.)	A syntax error occurs when there is an error in the Device Memory settings. When a syntax error is detected, error code "02" is written to the Simple Communications Unit Status word and the Device Memory address is written to the Syntax Error Address word. To restore normal operation, correct the setting in the indicated Device Memory address and switch the Unit from RUN to Stop and then back to RUN again.

SECTION 4

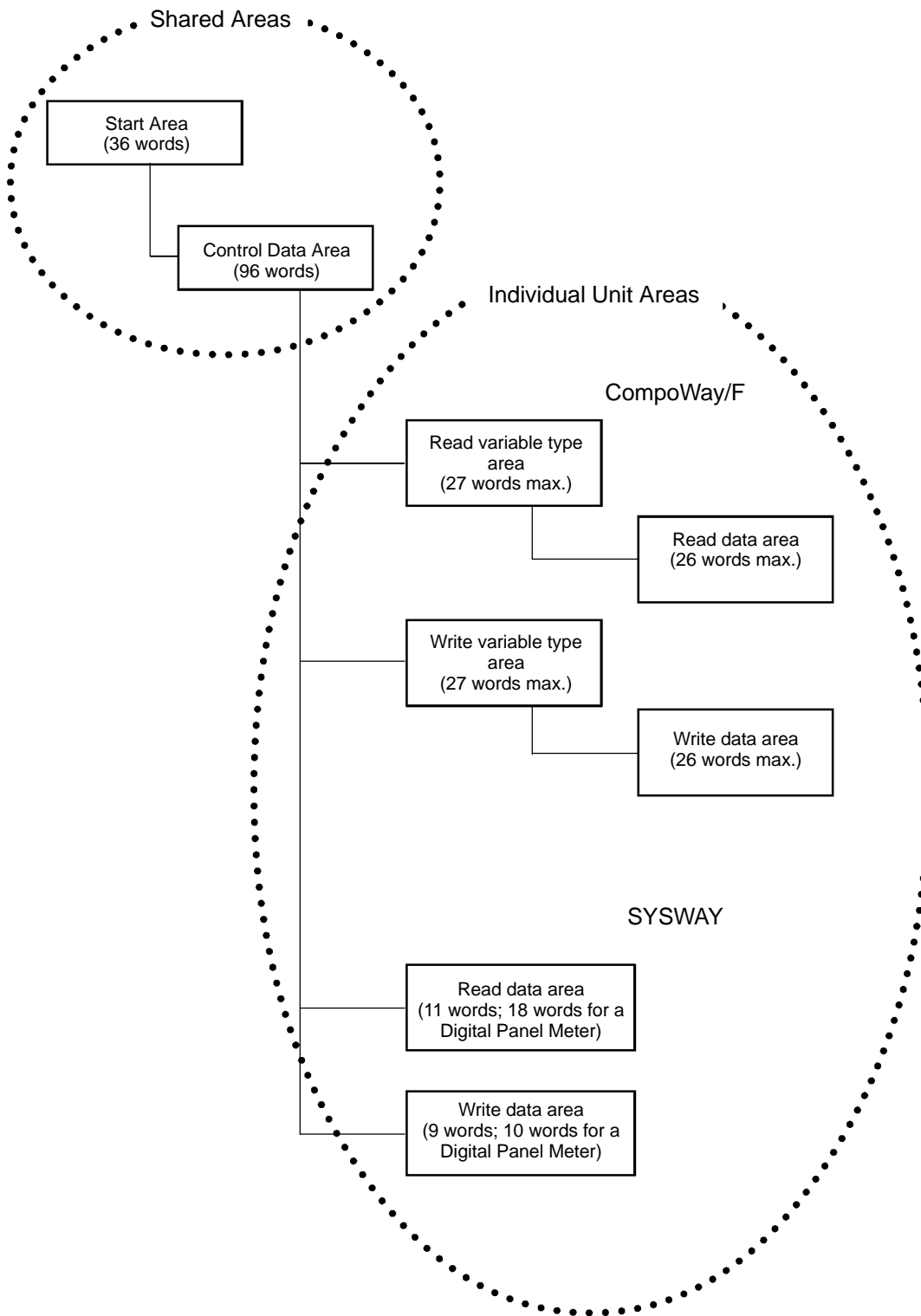
Device Memory

This section explains the functions of the CPU Unit's Device Memory that is used to exchange data with the E58-CIFM1 Simple Communications Unit.

4-1	Device Memory Configuration	30
4-2	Shared Areas	31
4-2-1	Start Area (36 Words)	31
4-2-2	Control Data Area (96 Words)	33
4-3	Individual Unit Areas	37
4-3-1	Area Structure for CompoWay/F Communications	37
4-3-2	Area Structure for SYSWAY Communications	43

4-1 Device Memory Configuration

The following diagram shows the configuration of the Device Memory.



4-2 Shared Areas

The Start Area and Control Data Area are shared by all of the Units (components).

4-2-1 Start Area (36 Words)

The starting address of the Start Area is set with switch SW2 and SW3 pins 9 and 10. Refer to *Start Area Setting Switch (SW2)* on page 12 for tables showing the possible settings for the starting address of the Start Area.

Word	Function
+0	Simple Communications Unit control
+1	Simple Communications Unit status (See note 1.)
+2	Syntax error Device Memory address (See note 1.)
+3	Communications control for Unit 0
+4	Communications control for Unit 1
+5	Communications control for Unit 2
+6	Communications control for Unit 3
:	:
:	:
+32	Communications control for Unit 29
+33	Communications control for Unit 30
+34	Communications control for Unit 31
+35	Starting address of Control Data Area (See note 2.)

- Note**
1. These words are used to notify the CPU Unit of the Simple Communications Unit's status, so do not overwrite the contents of these words.
 2. Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.)

Simple Communications Unit Control (Offset: +0)

Bits	Setting	Range	Function
0 to 3 (Digit 10 ⁰)	RUN/Stop	0: Stop 1: RUN	If this digit is set to 1 after the power is turned ON, the Simple Communications Unit will start communications with components and the CPU Unit. (If a fatal error has occurred, the Unit will not start communications with connected components even if this digit is set to 1.) The Simple Communications Unit will not communicate with components if this digit is set to 0.
4 to 7 (Digit 10 ¹)	Communications timeout	0 to 9 (BCD)	Sets the response monitoring time for access from the Simple Communications to connected components. The timeout time is set in multiples of 500 ms ((Set value + 1) × 500 ms). This setting is usually set to 0, which sets a response monitoring time of 500 ms.
8 to 15 (Digits 10 ² and 10 ³)	Number of connected components	00 to 32 (BCD)	Specifies the number of components connected to the Simple Communications Unit. The Simple Communications Unit will not communicate with components if the number of connected components is set to 0.

Simple Communications Unit Status (Offset: +1)

Error condition	Bits	Setting	Range	Function
An error occurred (Bit 15 ON)	0 to 7 (Digits 16 ⁰ and 16 ¹)	Error code	01, 02, or 15	The rightmost 2 digits contain the error code. 01: Watchdog timer error (fatal error) When this error occurs, the Simple Communications Unit will stop all communications and light the ERR indicator after writing the "Simple Communications Unit Status" word. 02: Syntax error (non-fatal error) When this error occurs, the Simple Communications Unit will stop communications with the components and light the ERR indicator after writing the Device Memory address where the error occurred in the "Syntax Error Device Memory Address" word. 15: Device Memory allocation error (fatal error) This error occurs when the Unit attempts to read or write a Device Memory address that does not exist in the PC. After the error occurs, the Simple Communications Unit will stop communications with the components and light the ERR indicator. Check the range of the PC's Device Memory area and keep Device Memory allocation within that range.
	8 to 11 (Digit 16 ²)	Stop flag	0	Operation will stop if an error occurs, and this flag will be set to 0.
	12 to 15 (Digit 16 ³)	Error flag	8	A value of 8 (bit 15 ON) indicates that a fatal error has occurred in the Simple Communications Unit.
No error occurred (Bit 15 OFF)	0 to 7 (Digits 16 ⁰ and 16 ¹)	Unit number	00 to 31 (BCD)	Indicates the unit number of the last component with which the communications were completed. The Unit read data from this component and transferred that data to the CPU Unit. These digits contain 00 when the power is first turned ON and communications haven't been completed for any of the components. These digits will also contain 00 in the following cases: 1) The "number of connected components" in the Simple Communications Unit Control word (Offset: +0) is set to 00. 2) The "RUN/Stop" digit in the Simple Communications Unit Control word (Offset: +0) is set to 0. 3) "No Unit connected" is set in the Unit's Communications Type word.
	8 to 11 (Digit 16 ²)	Run/Stop flag	0 or 1	This flag will be ON when the Simple Communications Unit is running and OFF when it is stopped.
	12 to 15 (Digit 16 ³)	Error flag	0	A value of 0 (bit 15 OFF) indicates that a fatal error has not occurred in the Simple Communications Unit. The Unit will not be able to notify the CPU Unit that a fatal error has occurred in the following cases: 1) The communications interface module is set to disable writing while in RUN mode. 2) An error occurred in communications with the communications interface module. When one of these 2 errors occurs, the Simple Communications Unit will stop all communications and light the ERR indicator.

Syntax Error Device Memory Address (Offset: +2)

Range	Function
0000 to 9999 (BCD) or 0000 to FFFF (Hex)	The Simple Communications Unit indicates the Device Memory address where the syntax error occurred. When two or more syntax errors have been detected, the Unit will indicate the Device Memory address that was detected first. The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.

Communications Control Words (Offset: +3 to +34)

Communications control for Unit 0 (Offset: +3)	---	---	Digit 10 ¹ (bits 4 to 7)	Digit 10 ⁰ (bits 0 to 3)
	---		Write Command	Read Command
Communications control for Unit 1 (Offset: +4)	---	---	Digit 10 ¹ (bits 4 to 7)	Digit 10 ⁰ (bits 0 to 3)
	---		Write Command	Read Command
:	:	:	:	:
Communications control for Unit 30 (Offset: +33)	---	---	Digit 10 ¹ (bits 4 to 7)	Digit 10 ⁰ (bits 0 to 3)
	---		Write Command	Read Command
Communications control for Unit 31 (Offset: +34)	---	---	Digit 10 ¹ (bits 4 to 7)	Digit 10 ⁰ (bits 0 to 3)
	---		Write Command	Read Command

Bit	Range	Function
Write Command	0: Writing prohibited 1: Writing allowed	Setting this digit to 1 allows operation commands and data writes to the component with the corresponding unit number. Data is not written when this bit is set to 0. When an error occurs while writing data, the appropriate error code is written to the write data area's response monitor area. (See <i>Response Monitor Area</i> on page 42 for details.)
Read Command	0: Reading prohibited 1: Reading allowed	Setting this digit to 1 allows data to be read from the component with the corresponding unit number. Data is not read when this bit is set to 0. When an error occurs while reading data, the appropriate error code is written to the read data area's response monitor area. (See <i>Response Monitor Area</i> on page 40 for details.)

Note A Temperature Controller's non-volatile memory can be overwritten a limited number of times. If data is being written to a Temperature Controller frequently, either set the Write Command Bit to 0 after writing is completed, or set the write mode for the Temperature Controller to RAM write mode to preserve the service life of the non-volatile memory.

Similarly when the operation command selects the RAM write mode or backup mode, program the operation command so that it is sent in only one scan. Some components write to non-volatile memory when this command is received, so the service life of the component's non-volatile memory will be reduced if the command is received every scan.

Starting Address of Control Data Area (Offset: +35)

Range	Function
0000 to 9999 (BCD) or 0000 to FFFF (Hex)	This word specifies the starting address of the Control Data Area. Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.) The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.

4-2-2 Control Data Area (96 Words)

The control data area contains 96 words that are used to control operation of the Simple Communications Unit and monitor the Unit's operating status. Ensure that there are 96 words available for the Control Data Area regardless of the number of connected Units. Set the Control Data Area's starting Device Memory address in the last word of the Start Area.

The following table shows the functions of the words in the Control Data Area. (The functions in parentheses are for CompoWay/F communications.)

Word	Function
+0	Unit 0 communications type
+1	Starting address of Unit 0 read data area (Starting address of Unit 0 read variable type area)
+2	Starting address of Unit 0 write data area (Starting address of Unit 0 write variable type area)
+3	Unit 1 communications type
+4	Starting address of Unit 1 read data area (Starting address of Unit 1 read variable type area)
+5	Starting address of Unit 1 write data area (Starting address of Unit 1 write variable type area)
:	:
:	:
+93	Unit 31 communications type
+94	Starting address of Unit 31 read data area (Starting address of Unit 31 read variable type area)
+95	Starting address of Unit 31 write data area (Starting address of Unit 31 write variable type area)

Unit Communications Type (Offset: +0, +3, +6, ... , +90, and +93)

Use the following equation to calculate the offset for a given unit number:

$$\text{Offset} = 3 \times \text{unit number}$$

Bits	Setting	Range	Function
0 to 7 (Digits 16 ⁰ and 16 ¹)	Communications protocol	00, 01, or 02	Specifies the communications protocol (SYSWAY or CompoWay/F) of the connected component if a component is connected. 00: No Unit connected 01: SYSWAY 02: CompoWay/F A syntax error will occur if a value other than 00, 01, or 02 is specified.
8 to 11 (Digit 16 ²)	Command group (valid with SYSWAY only)	1 to 5	This setting is valid only when SYSWAY (01) is specified for the communications protocol. When SYSWAY is specified, the command group determines which values are read/written when reading or writing data. The command group setting will be invalid in the following cases: 1) The communications protocol is set to 02 (CompoWay/F). 2) The communications protocol is set to 00 (No Unit connected). 3) The communications protocol is set to 01 (SYSWAY), but the command group setting is not within the allowed range (1 to 5). A syntax error will occur in this case.
12 to 15 (Digit 16 ³)	Segment information (valid with SYSWAY only)	0, 1, or 2	This setting is valid only when SYSWAY (01) is specified for the communications protocol. The segment information specifies whether a Temperature Controller or Digital Panel Meter is connected with the SYSWAY protocol. The segment information setting will be invalid in the following cases: 1) The communications protocol is set to 02 (CompoWay/F). 2) The communications protocol is set to 00 (No Unit connected). 3) The communications protocol is set to 01 (SYSWAY), but the segment information setting is not 1 or 2. A syntax error will occur in this case.

Note The command group and segment information settings are valid only when the communications protocol is set to SYSWAY. These settings are not valid when the communications protocol is set to CompoWay/F.

The following table shows the data that will be read and written for each combination of the command group and segment information settings.

Segment information	Access	Data	Command group				
			1	2	3	4	5
1: Temperature Controller	Read	Present temperature	YES	YES	YES	YES	YES
		Present temperature read status	YES	YES	YES	YES	YES
		Target temperature	YES	YES	YES	YES	YES
		Alarm 1 SV	---	---	YES	YES	YES
		Alarm 2 SV	---	---	YES	YES	YES
		Proportional band	---	---	---	YES	YES
		Reset time	---	---	---	YES	YES
		Derivative time	---	---	---	YES	YES
		Heater current	---	---	---	---	YES
		Heater current read status	---	---	---	---	YES
	Write	Target temperature	YES	YES	YES	YES	YES
		Operation command	---	YES	YES	YES	YES
		Alarm 1 SV	---	---	YES	YES	YES
		Alarm 2 SV	---	---	YES	YES	YES
		Proportional band	---	---	---	YES	YES
		Reset time	---	---	---	YES	YES
Derivative time		---	---	---	YES	YES	
Heater burnout detection value		---	---	---	---	YES	
2: Digital Panel Meter	Read	Display value	YES	YES	YES	YES	YES
		Display value read status	YES	YES	YES	YES	YES
		Peak hold	---	YES	YES	---	YES
		Peak hold read status	---	YES	YES	---	YES
		Bottom hold	---	YES	YES	---	YES
		Bottom hold read status	---	YES	YES	---	YES
		Comparison value (HH)	---	---	---	YES	YES
		Comparison value (H)	---	---	---	YES	YES
		Comparison value (L)	---	---	---	YES	YES
		Comparison value (LL)	---	---	---	YES	YES
	Write	Operation command	---	---	YES	---	YES
		Comparison value (HH)	---	---	---	YES	YES
		Comparison value (H)	---	---	---	YES	YES
		Comparison value (L)	---	---	---	YES	YES
		Comparison value (LL)	---	---	---	YES	YES

Starting Address of Read Data Area or Read Variable Type Area (Offset: +1, +4, ... , +91, and +94)

Use the following equation to calculate the offset for a given unit number:
 $Offset = 1 + (3 \times \text{unit number})$

Setting	Range*	Function
Starting Address of Read Data Area (SYSWAY protocol)	0000 to 9999 (BCD) or 0000 to FFFF (Hex)	<p>Specifies the starting address in the CPU Unit's Device Memory area where the data read from the component will be stored.</p> <p>Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.)</p> <p>The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.</p>
Starting Address of Read Variable Type Area (CompoWay/F protocol)	0000 to 9999 (BCD) or 0000 to FFFF (Hex)	<p>Specifies the starting address of the words that show which variables will be read from the component.</p> <p>The data that will be read from the component is determined by the variable type and address written in the variable type area.</p> <p>Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.)</p> <p>The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.</p>

Starting Address of Write Data Area or Write Variable Type Area (Offset: +2, +5, ... , +92, and +95)

Use the following equation to calculate the offset for a given unit number:
 $Offset = 2 + (3 \times \text{unit number})$

Setting	Range	Function
Starting Address of Write Data Area (SYSWAY protocol)	0000 to 9999 (BCD) or 0000 to FFFF (Hex)	<p>Specifies the starting address in the CPU Unit's Device Memory area containing the data to be written to the component.</p> <p>Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.)</p> <p>The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.</p>
Starting Address of Write Variable Type Area (CompoWay/F protocol)	0000 to 9999 (BCD) or 0000 to FFFF (Hex)	<p>Specifies the starting Device Memory address of the words that show which component variables will be written.</p> <p>The data that will be written to the component is determined by the variable type and address written in the variable type area.</p> <p>Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.)</p> <p>The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.</p>

4-3 Individual Unit Areas

The individual Unit areas are used to monitor and set data for individual connected components. The structure of the individual area is different for CompoWay/F and SYSWAY communications.

4-3-1 Area Structure for CompoWay/F Communications

Read Variable Type Area (27 Words Max.)

When CompoWay/F has been specified as the communications protocol for communications with connected components, this “read variable type area” specifies the variable type and variable address settings for the SVs and PVs that will be read. Up to 12 SVs and PVs can be read for one component at a time.

Offset	Contents
+0	Number of read items
+1	Reserved
+2	Starting address of read data area
+3	Variable 1 type
+4	Variable 1 address
+5	Variable 2 type
+6	Variable 2 address
:	:
:	:
+23	Variable 11 type
+24	Variable 11 address
+25	Variable 12 type
+26	Variable 12 address

Number of Read Items (Offset: +0)

Range	Function
0001 to 0012 (BCD)	Specify the number of variables that you want to read. For example, the variables set in variable 1 type and variable 2 type will be read if the “number of read items” is set to 0002. A syntax error will occur if the number of items specified in this word is not between 0001 and 0012 BCD.

Reserved (Offset: +1)

Range	Function
0000	Always set this word to 0000.

Starting Address of Read Data Area (Offset: +2)

Range	Function
0000 to 9999 (BCD) or 0000 to FFFF (Hex)	Specifies the starting Device Memory address in the CPU Unit's Device Memory area where the data read from the component will be stored. Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.) The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.

Variable Types (Offset: +3, +5, ... , +23, and +25)

Use the following equation to calculate the offset for a given variable number:

$$\text{Offset} = 1 + (2 \times \text{variable number})$$

Range	Function
00C0 to 00CF (Hex)	<p>Sets the type of variable data that you want to read.</p> <p>The variable types are predetermined in each component, so refer to the component's manual to find the actual variable type.</p> <p>A syntax error will occur if the variable type specified in this word is not between 00C0 and 00CF Hex.</p>

Variable Addresses (Offset: +4, +6, ... , +24, and +26)

Use the following equation to calculate the offset for a given variable number:

$$\text{Offset} = 2 + (2 \times \text{variable number})$$

Range	Function
0000 to FFFF (Hex)	<p>Sets the variable address of the data that you want to read.</p> <p>The variable addresses are predetermined in each component, so refer to the component's manual to find the actual variable address.</p>

Write Variable Type Area (27 Words Max.)

When CompoWay/F has been specified as the communications protocol for communications with connected components, this "write variable type area" contains the variable type and variable address settings for the SVs that will be written. Up to 12 SVs can be written for one component at a time.

Offset	Contents
+0	Number of write items
+1	Operation command
+2	Starting address of write data area
+3	Variable 1 type
+4	Variable 1 address
+5	Variable 2 type
+6	Variable 2 address
:	:
:	:
+23	Variable 11 type
+24	Variable 11 address
+25	Variable 12 type
+26	Variable 12 address

Number of Write Items (Offset: +0)

Range	Function
0000 to 0012 (BCD)	<p>Specify the number of variables that you want to write.</p> <p>For example, the variables set in variable 1 type and variable 2 type will be written if the "number of write items" is set to 0002.</p> <p>Variables will not be written if the "number of write items" is set to 0000; in this case, only the operation command is valid.</p> <p>A syntax error will occur if the number of items specified in this word is not between 0000 and 0012 BCD.</p>

Operation Command (Offset: +1)

Range	Function
0000 or 0001	<p>The write data area's operation command is disabled when 0000 is specified.</p> <p>The write data area's operation command will be carried out at the component when 0001 is specified.</p> <p>A syntax error will occur if the Operation Command is not 0000 or 0001.</p>

Note When the operation command selects RAM write mode or backup mode, program the operation command so that it is sent in only one scan. Some components write to non-volatile memory when this command is received, so the service life of the component's non-volatile memory will be reduced if the command is received every scan.

Starting Address of Write Data Area (Offset: +2)

Range	Function
0000 to 9999 (BCD) or 0000 to FFFF (Hex)	<p>Specifies the starting Device Memory address in the CPU Unit's Device Memory area containing the data that you want to write to the component.</p> <p>Specify a starting address within the region of Device Memory selected with switch SW2 and SW3 pins 9 and 10. (If Data Registers 1 or Data Registers 2 has been selected, it is all right to set a value that overlaps these areas.)</p> <p>The data format (BCD or Hex) of the address depends on the region of Device Memory that was selected with switch SW2 and SW3 pins 9 and 10. The link register addresses are expressed in hexadecimal while the data registers and file registers are expressed in BCD. Refer to <i>Start Area Setting Switch (SW2)</i> on page 12 for more details.</p>

Variable Types (Offset: +3, +5, ... , +23, and +25)

Use the following equation to calculate the offset for a given variable number:

$$\text{Offset} = 1 + (2 \times \text{variable number})$$

Range	Function
00C0 to 00CF (Hex)	<p>Sets the type of variable data that you want to write.</p> <p>The variable types are predetermined in each component, so refer to the component's manual to find the actual variable type.</p> <p>A syntax error will occur if the variable type specified in this word is not between 00C0 and 00CF Hex.</p>

Variable Addresses (Offset: +4, +6, ... , +24, and +26)

Use the following equation to calculate the offset for a given variable number:

$$\text{Offset} = 2 + (2 \times \text{variable number})$$

Range	Function
0000 to FFFF (Hex)	<p>Sets the variable address of the data that you want to write.</p> <p>The variable addresses are predetermined in each component, so refer to the component's manual to find the actual variable address.</p>

Read Data Area (26 Words Max.)

The starting address of the “read data area” is specified in the “read variable type area.” This “read data area” stores the variable data read from the component.

Offset	Contents
+0	Response monitor area
+1	Component status
+2	Variable 1 read data (lower bytes)
+3	Variable 1 read data (upper bytes)
+4	Variable 2 read data (lower bytes)
+5	Variable 2 read data (upper bytes)
:	:
:	:
+24	Variable 12 read data (lower bytes)
+25	Variable 12 read data (upper bytes)

Response Monitor Area (Offset: +0)

This area contains the results of communications when communicating with the component to read variables.

1, 2, 3... 1. End Code = 00

When the function’s end code is 00, the “response monitor area” contains the CompoWay/F response code.

Response code	Meaning
0000	Indicates normal completion.
0401	Unsupported command
1001	Command length too long
1002	Command length too short
1101	Area type error
1103	Starting address out-of-range error
1104	End address out-of-range error
1003	Number of elements doesn’t match amount of data
110B	Response length too long
1100	Parameter error
2203	Operating error

2. End Code ≠ 00

When an error occurs and the function’s end code is a value other than 00, the “response monitor area” contains the end code (error code). The value of FF in the first two digits indicates that an error occurred during transmission of the CompoWay/F command.

Error code	Meaning
FF04	Address overflow
FF0D	Could not execute command
FF10	Parity error
FF11	Framing error
FF12	Overrun error
FF13	BCC error
FF14	Format error
FF15	Numeric data error
FF16	Sub-address error
FF18	Frame length error
FF97	Response data BCC error

3. Timeout error occurred

Timeout code	Meaning
E999	Indicates that there was no response from the component.

Component Status (Offset: +1)

This word contains the component's controller status in four-digit hexadecimal.

Read Data (Offset: +2, +4, ... , +22, and +24)

The read data is contained in two words starting at offset $2 \times n$ (n = variable number.)

Offset	Range	Function
$2 \times n$ (n = variable number)	0000 to FFFF (Hex)	Contains the lower (rightmost) two bytes of the data. Data is expressed in 2's complement signed binary format.
$(2 \times n) + 1$ (n = variable number)	0000 to FFFF (Hex)	Contains the upper (leftmost) two bytes of the data. Data is expressed in 2's complement signed binary format.

The variable data read from a component can have a value ranging from 0000 0000 to FFFF FFFF. The read data will be 0000 0000 if a communications error occurred. The following example shows the contents of the read data area when a communications error occurred while reading the variable 2 read data.

- Response Monitor Area: Contains the error code.
- Status: Contains the controller status.
- Read data 1: Contains the data read from the component.
- Read data 2: Contains 0000 0000.
- Remaining read items: Contain 0000 0000.

- Note**
1. The decimal point position has to be managed by the user since the component's decimal point position is not transferred in CompoWay/F communications.
 2. BCD format is used with Digital Panel Meters (K3N□). For details, refer to the manual for the model used.

Write Data Area (26 Words Max.)

The starting address of the "write data area" is specified in the "write variable type area." Store the variable data that you want to write to the component in this "write data area."

Offset	Contents
+0	Response monitor area
+1	Operation Command
+2	Variable 1 write data (lower 2 bytes)
+3	Variable 1 write data (upper 2 bytes)
+4	Variable 2 write data (lower 2 bytes)
+5	Variable 2 write data (upper 2 bytes)
:	:
:	:
+24	Variable 12 write data (lower 2 bytes)
+25	Variable 12 write data (upper 2 bytes)

Response Monitor Area (Offset: +0)

This area contains the results of communications when communicating with the component to write variables.

- 1, 2, 3...** 1. End Code = 00
When the function's end code is 00, the "response monitor area" contains the response code.

Response code	Meaning
0000	Indicates normal completion.
0401	Unsupported command
1001	Command length too long
1002	Command length too short
1101	Area type error
1103	Starting address out-of-range error
1104	End address out-of-range error
1003	Number of elements doesn't match amount of data
110B	Response length too long
1100	Parameter error
3003	Read-only error
2203	Operating error

2. End Code \neq 00
When an error occurs and the function's end code is a value other than 00, the "response monitor area" contains the end code (error code). The value of FF in the first two digits indicates that an error occurred during transmission of the CompoWay/F command.

Error code	Meaning
FF04	Address overflow
FF0D	Could not execute command
FF10	Parity error
FF11	Framing error
FF12	Overrun error
FF13	BCC error
FF14	Format error
FF15	Numeric data error
FF16	Sub-address error
FF18	Frame length error
FF21	Non-volatile memory write error
FF97	Response data BCC error

3. Timeout error occurred

Timeout code	Meaning
E999	Indicates that there was no response from the component.

Operation Command (Offset: +1)

Refer to the component's Operation Manual for details on the command codes for the various CompoWay/F communications functions.

Bits	Function
0 to 7 (Digits 16 ⁰ and 16 ¹)	Related information Set any related information required by the CompoWay/F command code as described in the component's manual.
8 to 15 (Digits 16 ² and 16 ³)	Command code Set the CompoWay/F command code as described in the component's manual.

- Note**
- SVs cannot be written in a cycle in which operation command "0600" has been specified.
 - When the operation command selects RAM write mode or backup mode, program the operation command so that it is sent in only one scan. Some components write to non-volatile memory when this command is received, so the service life of the component's non-volatile memory will be reduced if the command is received every scan.

Write Data (Offset: +2, +4, ... , +22, and +24)

The write data is contained in two words starting at offset $2 \times n$ (n = variable number.)

Offset	Range	Function
$2 \times n$ (n = variable number)	0000 to FFFF (Hex)	Store the lower (rightmost) two bytes of the SV data that you want to write to the corresponding component. Data is expressed in 2's complement signed binary format.
$(2 \times n) + 1$ (n = variable number)	0000 to FFFF (Hex)	Store the upper (leftmost) two bytes of the SV data that you want to write to the corresponding component. Data is expressed in 2's complement signed binary format.

If a communications error occurs, the write operation that is in progress will be stopped and the next write operation will be executed. The Write Command Bit will be reset to 0.

The following example shows the results of the write operation when a communications error occurred while writing variable 2.

- Response Monitor Area: Contains the error code.
- Operation Command: The operation command won't be executed.
- Variable 1 write data: The SV will be written normally.
- Variable 2 write data: The SV won't be written.
- Remaining write items: SVs won't be written.

- Note**
- The decimal point position has to be managed by the user since the component's decimal point position is not transferred in CompoWay/F communications.
 - BCD format is used with Digital Panel Meters (K3N□). For details, refer to the manual for the model used.

4-3-2 Area Structure for SYSWAY Communications**Read Data Area: Temperature Controllers (11 Words)**

The following data will be read from a Temperature Controller when SYSWAY has been specified as the communications protocol.

The starting address of the "read data area" is specified in the "control data area." Select any one of the 5 command groups to specify which PVs and SVs

will be read, although 11 Device Memory words will be allocated to the read data area regardless of the command group selected.

Offset	Data	Command group				
		1	2	3	4	5
+0	Response monitor area	Read	Read	Read	Read	Read
+1	Present temperature	Read	Read	Read	Read	Read
+2	Status	Read	Read	Read	Read	Read
+3	Target temperature	Read	Read	Read	Read	Read
+4	Alarm 1 SV	---	---	Read	Read	Read
+5	Alarm 2 SV	---	---	Read	Read	Read
+6	Proportional band	---	---	---	Read	Read
+7	Reset time	---	---	---	Read	Read
+8	Derivative time	---	---	---	Read	Read
+9	Heater current monitor	---	---	---	---	Read
+10	Heater current status	---	---	---	---	Read

Response Monitor Area (Offset: +0)

The structure of the response monitor area is the same whether SYSWAY or CompoWay/F communications are used. See *Response Monitor Area* on page 40 for details on the response monitor area.

Read Data (Offset: +1, +3, +4, +5, +6, +7, +8, and +9)

The read data values can include the present temperature, target temperature, alarm 1 SV, alarm 2 SV, proportional band, reset time, derivative time, and heater current monitor. The values read from the Temperature Controller are stored as 2's complement signed binary data and can range from 0000 to FFFF.

The words will contain 0000 if a communications error occurred. The following example shows the contents of the read data area when a communications error occurred while reading the target temperature in command group 1.

- Response Monitor Area: Contains the error code.
- Present temperature: Contains data read from Temperature Controller.
- Status: Contains status read from Temperature Controller.
- Target temperature: Contains 0000.

Note The decimal point position has to be managed by the user since the Temperature Controller's decimal point position is not transferred in SYSWAY (X format) communications.

Status (Offset: +2 and +10)

The read data area's +2 offset word contains the status when reading the present temperature. The +10 offset word contains the heater current status when reading the heater current.

The values and can range from 0000 to FFFF. Refer to the Temperature Controller's Operation Manual for details on the status values.

Read Data Area: Digital Panel Meters (18 Words)

The following data will be read from a Digital Panel Meter when SYSWAY has been specified as the communications protocol.

The starting address of the "read data area" is specified in the "control data area." Select any one of the 5 command groups to specify which PVs and SVs will be read, although 18 Device Memory words will be allocated to the read data area regardless of the command group selected.

Offset	Data	Command group				
		1	2	3	4*	5
+0	Response monitor area	Read	Read	Read	Read	Read
+1 and +2	Display value	Read	Read	Read	Read	Read

Offset	Data	Command group				
		1	2	3	4*	5
+3	Display value status	Read	Read	Read	Read	Read
+4 and +5	Peak hold	---	Read	Read	---	Read
+6	Peak hold status	---	Read	Read	---	Read
+7 and +8	Bottom hold	---	Read	Read	---	Read
+9	Bottom hold status	---	Read	Read	---	Read
+10 and +11	Comparison value (HH)	---	---	---	Read	Read
+12 and +13	Comparison value (H)	---	---	---	Read	Read
+14 and +15	Comparison value (L)	---	---	---	Read	Read
+16 and +17	Comparison value (LL)	---	---	---	Read	Read

Note When command group 4 is selected, words with offsets +4 through +9 will be cleared to 0000.

Response Monitor Area (Offset: +0)

The structure of the response monitor area is the same whether SYSWAY or CompoWay/F communications are used. See *Response Monitor Area* on page 40 for details on the response monitor area.

Read Data

The read data values can include the display value, peak hold, bottom hold, comparison value (HH), comparison value (H), comparison value (L), and comparison value (LL). The values read from the Temperature Controller are stored as 2's complement signed binary data and can range from 0000 to FFFF.

Offsets: +1, 4, 7, 10, 12, 14, 16	16 ³	16 ²	16 ¹	16 ⁰
	Read data lower 2 bytes (Binary, 2's complement)			
	0000 to FFFF Hex			
Offsets: +2, 5, 8, 11, 13, 15, 17	16 ³	16 ²	16 ¹	16 ⁰
	Read data upper 2 bytes (Binary, 2's complement)			
	0000 to FFFF Hex			

If a communications error occurs, the remaining words will contain 0000 0000. The following example shows the contents of the read data area when a communications error occurred while reading the display value in command group 1.

- Response Monitor Area: Contains the error code.
- Display value: Contains 0000 0000.
- Status: Contains 0000.

Note The decimal point position has to be managed by the user since the Digital Panel Meter's decimal point position is not transferred in SYSWAY (X format) communications.

Status (Offset: +3, +6, and +9)

The read data area's +3, +6, and +9 offset words contain the status when reading the display value, peak hold value, or bottom hold value, respectively.

The values and can range from 0000 to FFFF. Refer to the Digital Panel Meter's Operation Manual for details on the status values.

Write Data Area: Temperature Controllers (9 Words)

The following data will be written to a Temperature Controller when SYSWAY has been specified as the communications protocol.

The starting address of the "write data area" is specified in the "control data area." Select any one of the 5 command groups to specify which SVs will be writ-

ten, although 9 Device Memory words will be allocated to the write data area regardless of the command group selected.

Offset	Data	Command group				
		1	2	3	4	5
+0	Response monitor area	Written	Written	Written	Written	Written
+1	Target temperature	Written	Written	Written	Written	Written
+2	Operation command	---	Written	Written	Written	Written
+3	Alarm 1 SV	---	---	Written	Written	Written
+4	Alarm 2 SV	---	---	Written	Written	Written
+5	Proportional band	---	---	---	Written	Written
+6	Reset time	---	---	---	Written	Written
+7	Derivative time	---	---	---	Written	Written
+8	Heater burnout detection value	---	---	---	---	Written

Response Monitor Area (Offset: +0)

The structure of the response monitor area is the same whether SYSWAY or CompoWay/F communications are used. See *Response Monitor Area* on page 42 for details on the response monitor area.

Write Data (Offset: +1, +3, +4, +5, +6, +7, and +8)

The write data values can include the target temperature, alarm 1 SV, alarm 2 SV, proportional band, reset time, derivative time, and heater burnout detection monitor. Set the words of data to be written to the Temperature Controller as 2's complement signed binary data.

If a communications error occurs while writing data, the remaining write data will not be written. The error code will be written to the response monitor area and processing will proceed to the next connected component.

The following example shows the results of the write operation when a communications error occurred while writing the target temperature in command group 2.

- Response Monitor Area: Contains the error code.
- Target temperature: The SV won't be written.
- Operation Command: The operation command won't be written.

Note The decimal point position has to be managed by the user since the Temperature Controller's decimal point position is not transferred in SYSWAY (X format) communications.

Operation Command (Offset: +2)

Store the operation command code (0000 to 0005) in this word. When a command group that includes the operation command is selected, the corresponding operation command will be sent to the Temperature Controller.

Command code	Operation
0000	Don't perform operation command. (No operation)
0001	Stop auto-tuning.
0002	Start auto-tuning.
0003	Select backup mode.
0004	Select RAM write mode.
0005	Hold the Run/Adjust SV.

- Note**
1. SVs cannot be written in a cycle in which "start auto-tuning" has been specified.
 2. Starting and stopping auto-tuning is possible for E5EK, E5AK, and E5AF models only.

3. When the operation command selects RAM write mode or backup mode (command code 0003 or 0004), program the operation command so that it is sent in only one scan. Some components write to non-volatile memory when this command is received, so the service life of the component's non-volatile memory will be reduced if the command is received every scan.

Write Data Area: Digital Panel Meters (10 Words)

The following data will be written to a Digital Panel Meter when SYSWAY has been specified as the component's communications protocol.

The starting address of the "write data area" is specified in the "control data area." Select any one of the 5 command groups to specify which SVs will be written, although 10 Device Memory words will be allocated to the write data area regardless of the command group selected.

Offset	Data	Command group				
		1	2	3	4	5
+0	Response monitor area	Written	Written	Written	Written	Written
+1	Operation command	---	---	Written	---	Written
+2 and +3	Comparison value (HH)	---	---	---	Written	Written
+4 and +5	Comparison value (H)	---	---	---	Written	Written
+6 and +7	Comparison value (L)	---	---	---	Written	Written
+8 and +9	Comparison value (LL)	---	---	---	Written	Written

Response Monitor Area (Offset: +0)

The structure of the response monitor area is the same whether SYSWAY or CompoWay/F communications are used. See *Response Monitor Area* on page 42 for details on the response monitor area.

Write Data

The write data values include the comparison value (HH), comparison value (H), comparison value (L), and comparison value (LL). Set the words of data to be written to the Digital Panel Meter as 2's complement signed binary data.

Offsets: +2, 4, 6, 8	16 ³	16 ²	16 ¹	16 ⁰
	Write data lower 2 bytes (Binary, 2's complement)			
	0000 to FFFF Hex			
Offsets: +3, 5, 7, 9	16 ³	16 ²	16 ¹	16 ⁰
	Write data upper 2 bytes (Binary, 2's complement)			
	0000 to FFFF Hex			

If a communications error occurs while writing data, the remaining write data will not be written. The error code will be written to the response monitor area and processing will proceed to the next connected component.

The following example shows the results of the write operation when a communications error occurred while writing comparison value (H) in command group 4.

- Response Monitor Area: Contains the error code.
- Comparison value (HH): The SV will be written normally.
- Comparison value (H): The SV won't be written.
- Comparison value (L): The SV won't be written.
- Comparison value (LL): The SV won't be written.

Note The decimal point position has to be managed by the user since the Digital Panel Meter's decimal point position is not transferred in SYSWAY (X format) communications.

Operation Command (Offset: +2)

Store the operation command code (0000 to 0004) in this word. When a com-

mand group that includes the operation command is selected, the corresponding operation command will be sent to the Digital Panel Meter.

Command code	Operation
0000	Don't perform operation command. (No operation)
0001	Reset.
0002	Select backup mode.
0003	Select RAM write mode.
0004	Hold the Setting/Adjust values.

Note When the operation command selects backup mode or RAM write mode (command code 0002 or 0003), program the operation command so that it is sent in only one scan. Some components write to non-volatile memory when this command is received, so the service life of the component's non-volatile memory will be reduced if the command is received every scan.

SECTION 5

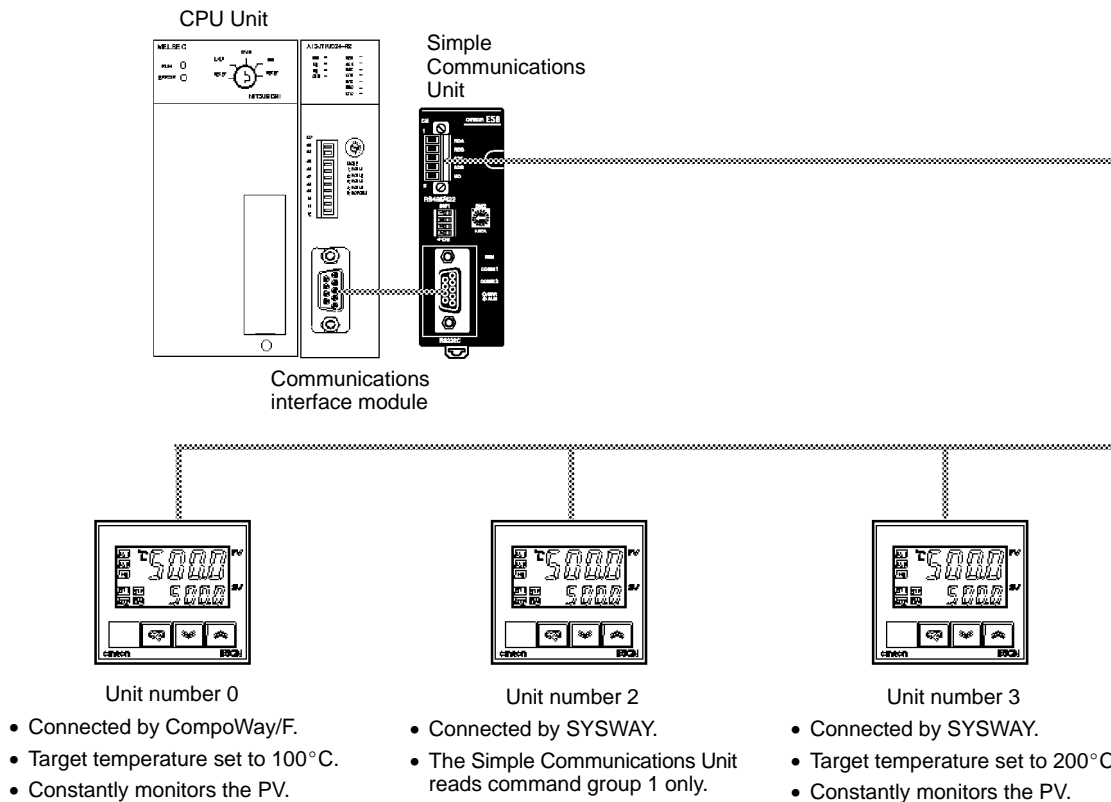
Example Application

This section shows the system configuration and settings of an example system to help explain how to use the Simple Communications Unit.

5-1	System Configuration	50
5-2	System Preparation	51
5-3	Device Memory Settings	51

5-1 System Configuration

The example system has three E5CN Temperature Controllers connected to the Simple Communications Unit.



Device Memory Allocation

In this example, the Data Registers are selected.

Area name	Device Memory words (Data registers)
Start Area	D0000 to D0035
Control Data Area	D0040 to D0135
Unit 0 Read Variable Type Area	D0150 to D0154
Unit 0 Write Variable Type Area	D0160 to D0164
Unit 0 Read Data Area	D0170 to D0173
Unit 0 Write Data Area	D0180 to D0183
Unit 2 Read Data Area	D0200 to D0210
Unit 2 Write Data Area	D0220 to D0228
Unit 3 Read Data Area	D0240 to D0250
Unit 3 Write Data Area	D0260 to D0268

Communications with the Communications Interface Module

The communications speed is set to 19,200 bps. (The Module's other communications conditions are fixed to the following: 7 data bits, even parity, and 2 stop bits.)

Communications with the Components

The following table shows the communications conditions used for communications with the connected components.

Item	Setting
Communications method	RS-485
Communications speed	19,200 bps
Data length	7 bits
Parity	Even
Stop bits	2 bits

5-2 System Preparation

Refer to *Section 3 Preparation for Operation* and make the following preparations.

- Connect the Simple Communications Unit.
- Make required settings in the Simple Communications Unit.
- Make required settings in the PC and Communication Interface Unit.
- Make required settings in the components.

5-3 Device Memory Settings

The following tables show the Device Memory settings for this example. Words are shown in bold if they contain required settings. Other words are generally used to monitor operation.

Start Area

Word	Bit(s)	Function	Setting	Word setting
D0000	0 to 3	RUN/Stop command	1	0301
	4 to 7	Communications timeout setting (0: 500 ms)	0	
	8 to 15	Number of connected components (3)	03	
D0001	0 to 15	Simple Communications Unit status	---	---
D0002	0 to 15	Syntax Error Device Memory Address	---	---
D0003	0 to 3	Unit 0 Read Command Digit	1	0011
	4 to 7	Unit 0 Write Command Digit	1	
	8 to 15	Not used	00	
D0004	0 to 3	Unit 1 Read Command Digit	0	0000
	4 to 7	Unit 1 Write Command Digit	0	
	8 to 15	Not used	00	
D0005	0 to 3	Unit 2 Read Command Digit	1	0001
	4 to 7	Unit 2 Write Command Digit	0	
	8 to 15	Not used	00	
D0006	0 to 3	Unit 3 Read Command Digit	1	0011
	4 to 7	Unit 3 Write Command Digit	1	
	8 to 15	Not used	00	
D0007	0 to 3	Unit 4 Read Command Digit	0	0000
	4 to 7	Unit 4 Write Command Digit	0	
	8 to 15	Not used	00	
:	:	:	:	:
:	:	:	:	:
D0034	0 to 3	Unit 31 Read Command Digit	0	0000
	4 to 7	Unit 31 Write Command Digit	0	
	8 to 15	Not used	00	
D0035	0 to 15	Starting address of Control Data Area ¹	0040	0040

- Note**
1. Link register addresses are expressed in hexadecimal (0000 to FFFF). Data register and file register addresses are expressed in BCD (0000 to 9999).
 2. Words D0007 through D0034 all contain 0000.

Control Data Area

Word	Bit(s)	Function	Setting	Word Setting
D0040	0 to 7	Unit 0 Communications protocol	02	0002
	8 to 11	Unit 0 Command group	0	
	12 to 15	Unit 0 Segment information	0	
D0041	0 to 15	Starting address of Unit 0 read variable type area ¹	0150	0150
D0042	0 to 15	Starting address of Unit 0 write variable type area ¹	0160	0160
D0043	0 to 7	Unit 1 Communications protocol	00	0000
	8 to 11	Unit 1 Command group	0	
	12 to 15	Unit 1 Segment information	0	
D0044	0 to 15	Starting address of Unit 1 read data area ¹	0000	0000
D0045	0 to 15	Starting address of Unit 1 write data area ¹	0000	0000
D0046	0 to 7	Unit 2 Communications protocol	01	1101
	8 to 11	Unit 2 Command group	1	
	12 to 15	Unit 2 Segment information	1	
D0047	0 to 15	Starting address of Unit 2 read data area ¹	0200	0200
D0048	0 to 15	Starting address of Unit 2 write data area ¹	0220	0220
D0049	0 to 7	Unit 3 Communications protocol	01	1101
	8 to 11	Unit 3 Command group	1	
	12 to 15	Unit 3 Segment information	1	
D0050	0 to 15	Starting address of Unit 3 read data area ¹	0240	0240
D0051	0 to 15	Starting address of Unit 3 write data area ¹	0260	0260
D0052	0 to 7	Unit 4 Communications protocol	00	0000
	8 to 11	Unit 4 Command group	0	
	12 to 15	Unit 4 Segment information	0	
D0053	0 to 15	Starting address of Unit 4 read data area ¹	0000	0000
D0054	0 to 15	Starting address of Unit 4 write data area ¹	0000	0000
:	:	:	:	:
D0133	0 to 7	Unit 31 Communications protocol	00	0000
	8 to 11	Unit 31 Command group	0	
	12 to 15	Unit 31 Segment information	0	
D0134	0 to 15	Starting address of Unit 31 read data area ¹	0000	0000
D0135	0 to 15	Starting address of Unit 31 write data area ¹	0000	0000

- Note**
1. Link register addresses are expressed in hexadecimal (0000 to FFFF). Data register and file register addresses are expressed in BCD (0000 to 9999).
 2. Words D0052 through D0135 all contain 0000.

Unit 0 Read Variable Type Area (CompoWay/F)

Word	Bit(s)	Function	Setting
D0150	0 to 15	Number of read items	0001
D0151	0 to 15	Reserved	0000
D0152	0 to 15	Starting address of read data area ¹	0170
D0153	0 to 15	Variable 1 type ^{*2}	00C0
D0154	0 to 15	Variable 1 address ^{*2}	0000

- Note**
1. Link register addresses are expressed in hexadecimal (0000 to FFFF). Data register and file register addresses are expressed in BCD (0000 to 9999).
 2. Variable type 00C0 and variable address 0000 indicate the PV.

Unit 0 Write Variable Type Area (CompoWay/F)

Word	Bit(s)	Function	Setting
D0160	0 to 15	Number of write items	0001
D0161	0 to 15	Operation Command	0000
D0162	0 to 15	Starting address of write data area ^{*1}	0180
D0163	0 to 15	Variable 1 type ^{*2}	00C1
D0164	0 to 15	Variable 1 address ^{*2}	0003

- Note**
1. Link register addresses are expressed in hexadecimal (0000 to FFFF). Data register and file register addresses are expressed in BCD (0000 to 9999).
 2. Variable type 00C1 and variable address 0003 indicate the target temperature.

Unit 0 Read Data Area (CompoWay/F)

Word	Bit(s)	Function
D0170	0 to 15	Response monitor area Contains 0000 when component communications are normal.
D0171	0 to 15	Status The component's status is read to this word.
D0172	0 to 15	Variable 1 read data (lower 2 bytes)
D0173	0 to 15	Variable 1 read data (upper 2 bytes)

- Note** The Temperature Controller's PV is read to D0172 and D0173 because the "Unit 0 read variable type area" specified the PV.

Unit 0 Write Data Area (CompoWay/F)

Word	Bit(s)	Function	Setting
D0180	0 to 15	Response monitor area Contains 0000 when communications with the component are normal.	---
D0181	0 to 7	Operation Command: command code ^{*1}	---
	8 to 15	Operation Command: related information ^{*1}	---
D0182	0 to 15	Variable 1 write data (lower bytes) ^{*2}	0064
D0183	0 to 15	Variable 1 write data (upper bytes) ^{*2}	0000

- Note** 1. The operation command is set to 0000 (disabled) in the Unit 0 write variable type area, so the command code and related information are not used.
- Note** 2. Sets the hexadecimal equivalent of the target temperature (100°C) which is the variable that was registered in the Unit 0 write variable type area.

**Unit 2 Read Data Area
(SYSWAY)**

The segment information is 1 and the command group is 1.

Word	Function
D0200	Response monitor area Contains 0000 when component communications are normal.
D0201	Present temperature Contains the PV in 2's complement signed binary format.
D0202	Status Contains the status when the PV was read.
D0203	Target temperature (See note.) Contains the target temperature in 2's complement signed binary format.
D0204	Alarm 1 SV (See note.) Contains the alarm 1 set value in 2's complement signed binary format.
D0205	Alarm 2 SV (See note.) Contains the alarm 2 set value in 2's complement signed binary format.
D0206	Proportional band (See note.) Contains the proportional band setting in binary.
D0207	Reset time (See note.) Contains the reset time setting in binary.
D0208	Derivative time (See note.) Contains the derivative time setting in binary.
D0209	Heater current monitor (See note.) Contains the heater's electrical current in binary.
D0210	Heater current status (See note.) Contains the status when the heater's electrical current was read.

Note Since command group 1 is selected, only the present temperature and status data is refreshed. Data in words D0203 to D0210 is not refreshed. When communicating with a Temperature Controller through SYSWAY, always allocate 11 words to the read data area even if the selected command group limits the number of words actually read. (Allocate 18 words for a Digital Panel Meter's read data area.)

**Unit 2 Write Data Area
(SYSWAY)**

The segment information is 1 and the command group is 1.

Allocate words D0220 through D0228 to the Unit 2 write data area. In this example data isn't written to Unit 2, so it isn't necessary to set data in the Unit 2 write data area.

Unit 3 Read Data Area (SYSWAY)

The segment information is 1 and the command group is 1.

Word	Function
D0240	Response monitor area Contains 0000 when component communications are normal.
D0241	Present temperature Contains the PV in 2's complement signed binary format.
D0242	Status Contains the status when the PV was read.
D0243	Target temperature (See note.) Contains the target temperature in 2's complement signed binary format.
D0244	Alarm 1 SV (See note.) Contains the alarm 1 set value in 2's complement signed binary format.
D0245	Alarm 2 SV (See note.) Contains the alarm 2 set value in 2's complement signed binary format.
D0246	Proportional band (See note.) Contains the proportional band setting in binary.
D0247	Reset time (See note.) Contains the reset time setting in binary.
D0248	Derivative time (See note.) Contains the derivative time setting in binary.
D0249	Heater current monitor (See note.) Contains the heater's electrical current in binary.
D0250	Heater current status (See note.) Contains the status when the heater's electrical current was read.

Note Since command group 1 is selected, only the present temperature and status data is refreshed. Data in words D0243 to D0250 is not refreshed. When communicating with a Temperature Controller through SYSWAY, always allocate 11 words to the read data area even if the selected command group limits the number of words actually read. (Allocate 18 words for a Digital Panel Meter's read data area.)

Unit 3 Write Data Area (SYSWAY)

The segment information is 1 and the command group is 1.


Word	Function
D0260	Response monitor area Contains 0000 when component communications are normal.
D0261	Target temperature 00C8 (200°C)
D0262	Operation command (See note.) 0000
D0263	Alarm 1 SV (See note.) Set the alarm 1 set value in 2's complement signed binary format.
D0264	Alarm 2 SV (See note.) Set the alarm 2 set value in 2's complement signed binary format.
D0265	Proportional band (See note.) Set the proportional band setting in binary.
D0266	Reset time (See note.) Set the reset time setting in binary.
D0267	Derivative time (See note.) Set the derivative time setting in binary.
D0268	Heater burnout detection value (See note.) Set the heater burnout detection value in binary.

Note Since command group 1 is selected, only the target temperature can be written to the Temperature Controller. When communicating with a Temperature Controller through SYSWAY, always allocate 9 words to the write data area even if the selected command group limits the number of words actually written. (Allocate 10 words for a Digital Panel Meter's write data area.)

Appendix A

Standard Models

Simple Communications Unit

Appearance	Name	Specifications
	E58-CIFM1 Simple Communications Unit	Connects OMRON components such as Temperature Controllers and Digital Panel Meters to a Mitsubishi communications interface module. Up to 32 components that support the SYSWAY or CompoWay/F protocol can be connected.

Compatible Mitsubishi PLCs

Use a Mitsubishi AnU-series or AnA-series PLC. The E58-CIFM1 Simple Communications Unit can be connected to a Mitsubishi communications interface module that is equipped with an RS-232C port and supports the AnU or AnA commands in Mitsubishi's proprietary MELSEC communications protocol.

Compatible OMRON Components

The following table shows the OMRON components equipped with SYSWAY or CompoWay/F communications that can be connected to the E58-CIFM1 Simple Communications Unit.

Product name	Series name	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	Valve system communications 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	---	
Timers	Electronic Timer/Counter	H8GN	No	---	OK	---

Product name	Series name	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	Limited functionality	2	No	SYSWAY connection only (See note 2.)
	Intelligent Signal Processor	K3TS				

- Note** 1. Components that support only SYSWAY or CompoWay/F communications must be connected with that communications protocol.
- Note** 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.
- Note** 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.)
- Note** 4. There are some SYSWAY commands that are not supported by OMRON components. Refer to the component's Manual and confirm the contents of E58-CIFM1 command groups before using SYSWAY communications.
- Note** 5. When SYSWAY communications are being used, it is necessary to indicate whether Temperature Controllers or Digital Panel Meters are connected. Refer to *Unit Communications Type* on page 34 for details on setting the segment information.

Appendix B

Data Refresh Intervals (Reference)

The following table shows typical data refresh periods for various communications conditions. The actual period depends upon the system configuration and size of the user program, so these values are approximate.

Communications protocol	Number of components connected	Communications speed (bps)	Read data items	Write data items	Command group	Refresh period
CompoWay/F	16	9,600	$12 \times 16 = 192$	$12 \times 16 = 192$	---	52 s
		9,600	$12 \times 16 = 192$	0	---	25 s
		19,200	$12 \times 16 = 192$	$12 \times 16 = 192$	---	35 s
		19,200	$12 \times 16 = 192$	0	---	18 s
		19,200	$1 \times 16 = 16$	0	---	4 s
		9,600	0	$1 \times 16 = 16$	---	6 s
		19,200	0	$1 \times 16 = 16$	---	4 s
	4	19,200	$1 \times 4 = 4$	0	---	1.5 s
	19,200	0	$1 \times 4 = 4$	---	1 s	
SYSWAY	16	9,600	Yes	Yes	4	18 s
		9,600	Yes	No	4	10 s
		19,200	Yes	Yes	4	14 s
		19,200	Yes	No	4	7 s
		9,600	No	Yes	1	3 s
		19,200	No	Yes	1	2 s
	4	19,200	Yes	No	1	1 s
		19,200	No	Yes	1	1 s

- Note**
1. The refresh period is not fixed because the communications response times of the components and the communications interface unit are not fixed. The refresh periods shown in the table above are average times for the given conditions.
 2. When SYSWAY communications are used, the number of items is determined by the command group that has been selected.
 3. The refresh periods shown in the table above were measured with Data Registers used as the Device Memory area.

Appendix C

Device Memory Settings Assignment Sheets

Start Area

	Contents	Data
_____ (+0)	Simple Communications Unit control	
_____ (+1)	Simple Communications Unit status	
_____ (+2)	Syntax Error Device Memory address	
_____ (+3)	Communications control for Unit 0	
_____ (+4)	Communications control for Unit 1	
_____ (+5)	Communications control for Unit 2	
_____ (+6)	Communications control for Unit 3	
_____ (+7)	Communications control for Unit 4	
_____ (+8)	Communications control for Unit 5	
_____ (+9)	Communications control for Unit 6	
_____ (+10)	Communications control for Unit 7	
_____ (+11)	Communications control for Unit 8	
_____ (+12)	Communications control for Unit 9	
_____ (+13)	Communications control for Unit 10	
_____ (+14)	Communications control for Unit 11	
_____ (+15)	Communications control for Unit 12	
_____ (+16)	Communications control for Unit 13	
_____ (+17)	Communications control for Unit 14	
_____ (+18)	Communications control for Unit 15	
_____ (+19)	Communications control for Unit 16	
_____ (+20)	Communications control for Unit 17	
_____ (+21)	Communications control for Unit 18	
_____ (+22)	Communications control for Unit 19	
_____ (+23)	Communications control for Unit 20	
_____ (+24)	Communications control for Unit 21	
_____ (+25)	Communications control for Unit 22	
_____ (+26)	Communications control for Unit 23	
_____ (+27)	Communications control for Unit 24	
_____ (+28)	Communications control for Unit 25	
_____ (+29)	Communications control for Unit 26	
_____ (+30)	Communications control for Unit 27	
_____ (+31)	Communications control for Unit 28	
_____ (+32)	Communications control for Unit 29	
_____ (+33)	Communications control for Unit 30	
_____ (+34)	Communications control for Unit 31	
_____ (+35)	Starting address of Control Data Area	

Control Data Area

	Contents	Data
_____ (+0)	Unit 0 communications type	
_____ (+1)	Starting address of Unit 0 read data area (Starting address of Unit 0 read variable type area)	
_____ (+2)	Starting address of Unit 0 write data area (Starting address of Unit 0 write variable type area)	
_____ (+3)	Unit 1 communications type	
_____ (+4)	Starting address of Unit 1 read data area (Starting address of Unit 1 read variable type area)	
_____ (+5)	Starting address of Unit 1 write data area (Starting address of Unit 1 write variable type area)	
_____ (+6)	Unit 2 communications type	
_____ (+7)	Starting address of Unit 2 read data area (Starting address of Unit 2 read variable type area)	
_____ (+8)	Starting address of Unit 2 write data area (Starting address of Unit 2 write variable type area)	
_____ (+9)	Unit 3 communications type	
_____ (+10)	Starting address of Unit 3 read data area (Starting address of Unit 3 read variable type area)	
_____ (+11)	Starting address of Unit 3 write data area (Starting address of Unit 3 write variable type area)	
_____ (+12)	Unit 4 communications type	
_____ (+13)	Starting address of Unit 4 read data area (Starting address of Unit 4 read variable type area)	
_____ (+14)	Starting address of Unit 4 write data area (Starting address of Unit 4 write variable type area)	
_____ (+15)	Unit 5 communications type	
_____ (+16)	Starting address of Unit 5 read data area (Starting address of Unit 5 read variable type area)	
_____ (+17)	Starting address of Unit 5 write data area (Starting address of Unit 5 write variable type area)	
_____ (+18)	Unit 6 communications type	
_____ (+19)	Starting address of Unit 6 read data area (Starting address of Unit 6 read variable type area)	
_____ (+20)	Starting address of Unit 6 write data area (Starting address of Unit 6 write variable type area)	
_____ (+21)	Unit 7 communications type	
_____ (+22)	Starting address of Unit 7 read data area (Starting address of Unit 7 read variable type area)	
_____ (+23)	Starting address of Unit 7 write data area (Starting address of Unit 7 write variable type area)	
_____ (+24)	Unit 8 communications type	
_____ (+25)	Starting address of Unit 8 read data area (Starting address of Unit 8 read variable type area)	
_____ (+26)	Starting address of Unit 8 write data area (Starting address of Unit 8 write variable type area)	
_____ (+27)	Unit 9 communications type	
_____ (+28)	Starting address of Unit 9 read data area (Starting address of Unit 9 read variable type area)	
_____ (+29)	Starting address of Unit 9 write data area (Starting address of Unit 9 write variable type area)	
_____ (+30)	Unit 10 communications type	
_____ (+31)	Starting address of Unit 10 read data area (Starting address of Unit 10 read variable type area)	
_____ (+32)	Starting address of Unit 10 write data area (Starting address of Unit 10 write variable type area)	
_____ (+33)	Unit 11 communications type	
_____ (+34)	Starting address of Unit 11 read data area (Starting address of Unit 11 read variable type area)	
_____ (+35)	Starting address of Unit 11 write data area (Starting address of Unit 11 write variable type area)	
_____ (+36)	Unit 12 communications type	
_____ (+37)	Starting address of Unit 12 read data area (Starting address of Unit 12 read variable type area)	
_____ (+38)	Starting address of Unit 12 write data area (Starting address of Unit 12 write variable type area)	
_____ (+39)	Unit 13 communications type	
_____ (+40)	Starting address of Unit 13 read data area (Starting address of Unit 13 read variable type area)	
_____ (+41)	Starting address of Unit 13 write data area (Starting address of Unit 13 write variable type area)	
_____ (+42)	Unit 14 communications type	
_____ (+43)	Starting address of Unit 14 read data area (Starting address of Unit 14 read variable type area)	
_____ (+44)	Starting address of Unit 14 write data area (Starting address of Unit 14 write variable type area)	
_____ (+45)	Unit 15 communications type	
_____ (+46)	Starting address of Unit 15 read data area (Starting address of Unit 15 read variable type area)	
_____ (+47)	Starting address of Unit 15 write data area (Starting address of Unit 15 write variable type area)	
_____ (+48)	Unit 16 communications type	
_____ (+49)	Starting address of Unit 16 read data area (Starting address of Unit 16 read variable type area)	
_____ (+50)	Starting address of Unit 16 write data area (Starting address of Unit 16 write variable type area)	
_____ (+51)	Unit 17 communications type	
_____ (+52)	Starting address of Unit 17 read data area (Starting address of Unit 17 read variable type area)	
_____ (+53)	Starting address of Unit 17 write data area (Starting address of Unit 17 write variable type area)	

	Contents	Data
(+54)	Unit 18 communications type	
(+55)	Starting address of Unit 18 read data area (Starting address of Unit 18 read variable type area)	
(+56)	Starting address of Unit 18 write data area (Starting address of Unit 18 write variable type area)	
(+57)	Unit 19 communications type	
(+58)	Starting address of Unit 19 read data area (Starting address of Unit 19 read variable type area)	
(+59)	Starting address of Unit 19 write data area (Starting address of Unit 19 write variable type area)	
(+60)	Unit 20 communications type	
(+61)	Starting address of Unit 20 read data area (Starting address of Unit 20 read variable type area)	
(+62)	Starting address of Unit 20 write data area (Starting address of Unit 20 write variable type area)	
(+63)	Unit 21 communications type	
(+64)	Starting address of Unit 21 read data area (Starting address of Unit 21 read variable type area)	
(+65)	Starting address of Unit 21 write data area (Starting address of Unit 21 write variable type area)	
(+66)	Unit 22 communications type	
(+67)	Starting address of Unit 22 read data area (Starting address of Unit 22 read variable type area)	
(+68)	Starting address of Unit 22 write data area (Starting address of Unit 22 write variable type area)	
(+69)	Unit 23 communications type	
(+70)	Starting address of Unit 23 read data area (Starting address of Unit 23 read variable type area)	
(+71)	Starting address of Unit 23 write data area (Starting address of Unit 23 write variable type area)	
(+72)	Unit 24 communications type	
(+73)	Starting address of Unit 24 read data area (Starting address of Unit 24 read variable type area)	
(+74)	Starting address of Unit 24 write data area (Starting address of Unit 24 write variable type area)	
(+75)	Unit 25 communications type	
(+76)	Starting address of Unit 25 read data area (Starting address of Unit 25 read variable type area)	
(+77)	Starting address of Unit 25 write data area (Starting address of Unit 25 write variable type area)	
(+78)	Unit 26 communications type	
(+79)	Starting address of Unit 26 read data area (Starting address of Unit 26 read variable type area)	
(+80)	Starting address of Unit 26 write data area (Starting address of Unit 26 write variable type area)	
(+81)	Unit 27 communications type	
(+82)	Starting address of Unit 27 read data area (Starting address of Unit 27 read variable type area)	
(+83)	Starting address of Unit 27 write data area (Starting address of Unit 27 write variable type area)	
(+84)	Unit 28 communications type	
(+85)	Starting address of Unit 28 read data area (Starting address of Unit 28 read variable type area)	
(+86)	Starting address of Unit 28 write data area (Starting address of Unit 28 write variable type area)	
(+87)	Unit 29 communications type	
(+88)	Starting address of Unit 29 read data area (Starting address of Unit 29 read variable type area)	
(+89)	Starting address of Unit 29 write data area (Starting address of Unit 29 write variable type area)	
(+90)	Unit 30 communications type	
(+91)	Starting address of Unit 30 read data area (Starting address of Unit 30 read variable type area)	
(+92)	Starting address of Unit 30 write data area (Starting address of Unit 30 write variable type area)	
(+93)	Unit 31 communications type	
(+94)	Starting address of Unit 31 read data area (Starting address of Unit 31 read variable type area)	
(+95)	Starting address of Unit 31 write data area (Starting address of Unit 31 write variable type area)	

Read Variable Type Area (CompoWay/F)

_____	Contents	Data	Variable name	Setting range
_____ (+0)	Number of read items		---	0001 to 0012 BCD
_____ (+1)	Reserved	Always 0000	---	---
_____ (+2)	Starting address of read data area		---	0000 to 9999 BCD or 0000 to FFFF Hex
_____ (+3)	Variable 1 type			Variable type: 00C0 to 00CF Hex Variable address: 0000 to FFFF Hex
_____ (+4)	Variable 1 address			
_____ (+5)	Variable 2 type			
_____ (+6)	Variable 2 address			
_____ (+7)	Variable 3 type			
_____ (+8)	Variable 3 address			
_____ (+9)	Variable 4 type			
_____ (+10)	Variable 4 address			
_____ (+11)	Variable 5 type			
_____ (+12)	Variable 5 address			
_____ (+13)	Variable 6 type			
_____ (+14)	Variable 6 address			
_____ (+15)	Variable 7 type			
_____ (+16)	Variable 7 address			
_____ (+17)	Variable 8 type			
_____ (+18)	Variable 8 address			
_____ (+19)	Variable 9 type			
_____ (+20)	Variable 9 address			
_____ (+21)	Variable 10 type			
_____ (+22)	Variable 10 address			
_____ (+23)	Variable 11 type			
_____ (+24)	Variable 11 address			
_____ (+25)	Variable 12 type			
_____ (+26)	Variable 12 address			

Write Variable Type Area (CompoWay/F)

_____	Contents	Data	Variable name	Setting range
_____ (+0)	Number of write items		---	0000 to 0012 BCD
_____ (+1)	Operation Command		---	0000: None 0001: Command set
_____ (+2)	Starting address of write data area		---	0000 to 9999 BCD or 0000 to FFFF Hex
_____ (+3)	Variable 1 type			Variable type: 00C0 to 00CF Hex Variable address: 0000 to FFFF Hex
_____ (+4)	Variable 1 address			
_____ (+5)	Variable 2 type			
_____ (+6)	Variable 2 address			
_____ (+7)	Variable 3 type			
_____ (+8)	Variable 3 address			
_____ (+9)	Variable 4 type			
_____ (+10)	Variable 4 address			
_____ (+11)	Variable 5 type			
_____ (+12)	Variable 5 address			
_____ (+13)	Variable 6 type			
_____ (+14)	Variable 6 address			
_____ (+15)	Variable 7 type			
_____ (+16)	Variable 7 address			
_____ (+17)	Variable 8 type			
_____ (+18)	Variable 8 address			
_____ (+19)	Variable 9 type			
_____ (+20)	Variable 9 address			
_____ (+21)	Variable 10 type			
_____ (+22)	Variable 10 address			
_____ (+23)	Variable 11 type			
_____ (+24)	Variable 11 address			
_____ (+25)	Variable 12 type			
_____ (+26)	Variable 12 address			

Read Data Area (CompoWay/F)

_____	Contents	Data	Variable name
_____ (+0)	Response monitor area		---
_____ (+1)	Component status		---
_____ (+2)	Variable 1 read data (lower bytes)		
_____ (+3)	Variable 1 read data (upper bytes)		
_____ (+4)	Variable 2 read data (lower bytes)		
_____ (+5)	Variable 2 read data (upper bytes)		
_____ (+6)	Variable 3 read data (lower bytes)		
_____ (+7)	Variable 3 read data (upper bytes)		
_____ (+8)	Variable 4 read data (lower bytes)		
_____ (+9)	Variable 4 read data (upper bytes)		
_____ (+10)	Variable 5 read data (lower bytes)		
_____ (+11)	Variable 5 read data (upper bytes)		
_____ (+12)	Variable 6 read data (lower bytes)		
_____ (+13)	Variable 6 read data (upper bytes)		
_____ (+14)	Variable 7 read data (lower bytes)		
_____ (+15)	Variable 7 read data (upper bytes)		
_____ (+16)	Variable 8 read data (lower bytes)		
_____ (+17)	Variable 8 read data (upper bytes)		
_____ (+18)	Variable 9 read data (lower bytes)		
_____ (+19)	Variable 9 read data (upper bytes)		
_____ (+20)	Variable 10 read data (lower bytes)		
_____ (+21)	Variable 10 read data (upper bytes)		
_____ (+22)	Variable 11 read data (lower bytes)		
_____ (+23)	Variable 11 read data (upper bytes)		
_____ (+24)	Variable 12 read data (lower bytes)		
_____ (+25)	Variable 12 read data (upper bytes)		

Write Data Area (CompoWay/F)

_____	Contents	Data	Variable name
_____ (+0)	Response monitor area		---
_____ (+1)	Operation Command		---
_____ (+2)	Variable 1 write data (lower bytes)		
_____ (+3)	Variable 1 write data (upper bytes)		
_____ (+4)	Variable 2 write data (lower bytes)		
_____ (+5)	Variable 2 write data (upper bytes)		
_____ (+6)	Variable 3 write data (lower bytes)		
_____ (+7)	Variable 3 write data (upper bytes)		
_____ (+8)	Variable 4 write data (lower bytes)		
_____ (+9)	Variable 4 write data (upper bytes)		
_____ (+10)	Variable 5 write data (lower bytes)		
_____ (+11)	Variable 5 write data (upper bytes)		
_____ (+12)	Variable 6 write data (lower bytes)		
_____ (+13)	Variable 6 write data (upper bytes)		
_____ (+14)	Variable 7 write data (lower bytes)		
_____ (+15)	Variable 7 write data (upper bytes)		
_____ (+16)	Variable 8 write data (lower bytes)		
_____ (+17)	Variable 8 write data (upper bytes)		
_____ (+18)	Variable 9 write data (lower bytes)		
_____ (+19)	Variable 9 write data (upper bytes)		
_____ (+20)	Variable 10 write data (lower bytes)		
_____ (+21)	Variable 10 write data (upper bytes)		
_____ (+22)	Variable 11 write data (lower bytes)		
_____ (+23)	Variable 11 write data (upper bytes)		
_____ (+24)	Variable 12 write data (lower bytes)		
_____ (+25)	Variable 12 write data (upper bytes)		

Read Data Area (SYSWAY: Temperature Controllers)

_____	Contents	Data	Command group				
			1	2	3	4	5
_____ (+0)	Response monitor area		Read	Read	Read	Read	Read
_____ (+1)	Present temperature		Read	Read	Read	Read	Read
_____ (+2)	Status		Read	Read	Read	Read	Read
_____ (+3)	Target temperature		Read	Read	Read	Read	Read
_____ (+4)	Alarm 1 SV		---	---	Read	Read	Read
_____ (+5)	Alarm 2 SV		---	---	Read	Read	Read
_____ (+6)	Proportional band		---	---	---	Read	Read
_____ (+7)	Reset time		---	---	---	Read	Read
_____ (+8)	Derivative time		---	---	---	Read	Read
_____ (+9)	Heater current monitor		---	---	---	---	Read
_____ (+10)	Heater current status		---	---	---	---	Read

Read Data Area (SYSWAY: Digital Panel Meters)

_____	Contents	Data	Command group				
			1	2	3	4	5
_____ (+0)	Response monitor area		Read	Read	Read	Read	Read
_____ (+1)	Display value (Lower bytes)		Read	Read	Read	Read	Read
_____ (+2)	Display value (Upper bytes)						
_____ (+3)	Display value status		Read	Read	Read	Read	Read
_____ (+4)	Peak hold (Lower bytes)		---	Read	Read	---	Read
_____ (+5)	Peak hold (Upper bytes)						
_____ (+6)	Peak hold status		---	Read	Read	---	Read
_____ (+7)	Bottom hold (Lower bytes)		---	Read	Read	---	Read
_____ (+8)	Bottom hold (Upper bytes)						
_____ (+9)	Bottom hold status		---	Read	Read	---	Read
_____ (+10)	Comparison value HH (Lower bytes)		---	---	---	Read	Read
_____ (+11)	Comparison value HH (Upper bytes)						
_____ (+12)	Comparison value H (Lower bytes)		---	---	---	Read	Read
_____ (+13)	Comparison value H (Upper bytes)						
_____ (+14)	Comparison value L (Lower bytes)		---	---	---	Read	Read
_____ (+15)	Comparison value L (Upper bytes)						
_____ (+16)	Comparison value LL (Lower bytes)		---	---	---	Read	Read
_____ (+17)	Comparison value LL (Upper bytes)						

Write Data Area (SYSWAY: Temperature Controllers)

_____	Contents	Data	Command group				
			1	2	3	4	5
_____ (+0)	Response monitor area		Written	Written	Written	Written	Written
_____ (+1)	Target temperature SV		Written	Written	Written	Written	Written
_____ (+2)	Operation Command		---	Written	Written	Written	Written
_____ (+3)	Alarm 1 SV		---	---	Written	Written	Written
_____ (+4)	Alarm 2 SV		---	---	Written	Written	Written
_____ (+5)	Proportional band		---	---	---	Written	Written
_____ (+6)	Reset time		---	---	---	Written	Written
_____ (+7)	Derivative time		---	---	---	Written	Written
_____ (+8)	Heater burnout detection value		---	---	---	---	Written

Write Data Area (SYSWAY: Digital Panel Meters)

_____	Contents	Data	Command group				
			1	2	3	4	5
_____ (+0)	Response monitor area		Written	Written	Written	Written	Written
_____ (+1)	Operation Command		---	---	Written	---	Written
_____ (+2)	Comparison value HH (Lower bytes)		---	---	---	Written	Written
_____ (+3)	Comparison value HH (Upper bytes)						
_____ (+4)	Comparison value H (Lower bytes)		---	---	---	Written	Written
_____ (+5)	Comparison value H (Upper bytes)						
_____ (+6)	Comparison value L (Lower bytes)		---	---	---	Written	Written
_____ (+7)	Comparison value L (Upper bytes)						
_____ (+8)	Comparison value LL (Lower bytes)		---	---	---	Written	Written
_____ (+9)	Comparison value LL (Upper bytes)						

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