# SYSMAC WS02-SPTC1-V2 SPU-Console Ver. 2.2

# **OPERATION MANUAL**

# OMRON

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# **Operation Manual**

Revised February 2018

## Notice:

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

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

- **DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.
- **WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.
- **Caution** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

## **OMRON Product References**

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

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

The abbreviation "PLC" means Programmable Controller. "PC" is used, however, in some Programming Device displays to mean Programmable Controller.

## Visual Aids

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

- **Note** Indicates information of particular interest for efficient and convenient operation of the product.
- *1,2,3...* 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

# Unit Versions of SPU-Console

#### **Relation Between Unit Version and SPU-Console**

- (1) SPU-Console Ver.1 .X cannot connect to SYSMAC SPU Units with a unit version of 2.0 or later.
- (2) SPU-Console Version 2.X can connect to SYSMAC SPU Units with a unit version of 2.X. In this case, the SPU-Console will operate in the version that corresponds to the version of the SYSMAC SPU Unit.
- (3) Different versions of SPU-Console can be installed and coexist on the same computer.

#### CS1W-SPU01/02-V2 and CJ1W-SPU01-V2

O: Connectable, △: Connectable (Initial Setting Wizard cannot be used), ×: Not connectable

Unit version of SYSMAC SPU Unit SPU-Console SPU Basic Software		2.1	2.2
SPU-Console version 1.X	×	X	х
SPU-Console version 2.0	0	Δ	$\triangle$
SPU-Console version 2.1	Δ	0	Δ
SPU-Console version 2.2	$\triangle$	Δ	0

**Note** The Initial Setting Wizard that is provided with SPU-Console Version 2.X cannot be used for a different version of the Unit. To configure initial settings on a unit version different from SPU-Console, use the Highfunction Unit settings of CX-Programmer.

#### SPU-Console Version Upgrade

The following table shows the changes made in the upgrade.

Item	SPU-Console version 2.0	SPU-Console version 2.1	SPU-Console version 2.2
Recipe function	Supported	Supported	Supported
Expanded recipe function	Not supported	Supported	Supported
Copy option	Supported	Supported	Supported
Collection status display (Data Storage Mode)	Supported	Supported	Supported
Error log display	Supported	Supported	Supported
Export/import of variable settings to CSV files	Supported	Supported	Supported
Report function	Supported	Supported	Supported
FTP transfer	Not supported	Supported	Supported
Record counters and copy flags	Not supported	Not supported	Supported

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## About this Manual:

This manual describes the installation and operation of the WS02-SPTC1-V2 SPU-Console Version 2.2 (setting and monitoring software) for the CS1W-SPU01-V2 and CS1W-SPU02-V2 SYSMAC SPU Units and includes the sections described below.

Please read this manual and all related manuals listed in the following table, and be sure you understand the information provided before attempting to install or operate an SYSMAC SPU Unit using the SPU-Console. Be sure to read the precautions provided in the following section.

Precautions provides general precautions for using the SPU-Console, SYSMAC SPU Unit, Programmable Controller, and related devices.

Name	Cat. No.	Contents
WS02-SPTC1-V2 SPU-Console Ver. 2.2 Operation Manual (this manual)	V237	Describes the installation and operation of the SYSMAC SPU-Console Ver. 2.2
CS1W-SPU01-V2/SPU02-V2 CJ1W-SPU01-V2 SYSMAC SPU Units Operation Manual	V236	Describes the installation and operation of the SYSMAC SPU Units.
WS02-EDMC1-V2 SYSMAC SPU Data Management Mid- dleware User's Manual	V232	Describes the SYSMAC SPU Data Management Mid- dleware (EDMS).

*Precautions* provide general precautions for using the SPU-Console and the CS1W-SPU01-V2 and CS1W-SPU02-V2 SYSMAC SPU Units.

*Section 1* provides an overview of the SPU-Console and describes the operating environment, including computer system requirements.

*Section 2* describes procedures for installing and uninstalling the SPU-Console, SPU-Console starting methods, and the basic SPU-Console window configuration.

Section 3 describes how to make initial settings for SYSMAC SPU Units.

*Section 4* describes the SYSMAC SPU Unit's operating modes, including procedures for confirming and changing the operating mode.

*Section 5* describes the methods used for connecting the SPU-Console to SYSMAC SPU Units, managing SYSMAC SPU Unit connections, editing settings offline, transferring setting files between the SPU-Console and SYSMAC SPU Units, and recording files.

Section 6 describes the methods used to execute commands for SYSMAC SPU Units.

Section 7 describes the data provided in the CPU Bus Unit Areas.

*Section 8* introduces the SYSMAC SPU Unit's Data Storage Mode.

Section 9 describes how to monitor SYSMAC SPU Unit operating status and error status.

Section 10 explains how to make the data collection settings for Data Storage Mode operation.

Section 11 explains how to make the event settings for Data Storage Mode operation.

**Section 12** describes the settings required to use the recipe function, which can be used in Data Storage Mode to write numeral and textual data, e.g., production parameters, to the memory areas of the CPU Unit.

**Section 13** describes the settings required to use the expanded recipe function, which can be used in Data Storage Mode to write numeral and textual data, e.g., production parameters, to the memory areas of the CPU Unit. The expanded recipe function is an expansion of the existing recipe function with the addition of recipe key searching.

Section 14 describes how to set the system settings and FINS network settings.

*Section 15* provides a list of the commands that are supported by the SYSMAC SPU Unit in Data Storage Mode.

Section 16 introduces the SYSMAC SPU Unit's Sampling Mode.

Section 17 describes how to monitor SYSMAC SPU Unit operating status and error status.

Section 18 explains how to make the sampling settings for Sampling Mode operation.

Section 19 provides information on Unit settings for data collection.

Section 20 provides a list of the commands that can be executed for SYSMAC SPU Units.

Section 21 describes how to display trend graphs based on sampling files that have been collected.

*Section 22* describes the report function, which can be used to create reports from data collected by SYSMAC SPU Units.

The *Appendices* provide troubleshooting methods for SYSMAC SPU Unit errors and troubleshooting connections between the SPU-Console and SYSMAC SPU Units, and describes the SYSMAC SPU Unit's network-shared folder configuration. Information is also provided on changing from SPU-Console Ver. 1.0, Ver. 1.2, or Ver. 1.3 and refreshing the system program.

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.

# **Terms and Conditions Agreement**

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

• WARRANTY	<ul> <li>The warranty period for the Software is one year from the date of purchase, unless otherwise specifically agreed.</li> <li>If the User discovers defect of the Software (substantial non-conformity with the manual), and return it to OMRON within the above warranty period, OMRON will replace the Software without charge by offering media or download from OMRON's website. And if the User discovers defect of media which is attributable to OMRON and return it to OMRON within the above warranty period, OMRON is unable to replace defective media or correct the Software, the liability of OMRON and the User's remedy shall be limited to the refund of the license fee paid to OMRON for the Software.</li> </ul>
• LIMITATION OF LIABILITY	<ul> <li>THE ABOVE WARRANTY SHALL CONSTITUTE THE USER'S SOLE AND EXCLUSIVE REMEDIES AGAINST OMRON AND THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. IN NO EVENT, OMRON WILL BE LIABLE FOR ANY LOST PROFITS OR OTHER INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF USE OF THE SOFTWARE.</li> <li>OMRON SHALL HAVE NO LIABILITY FOR DEFECT OF THE SOFTWARE BASED ON MODIFICATION OR ALTERNATION TO THE SOFTWARE BY THE USER OR ANY THIRD PARTY.</li> <li>OMRON SHALL HAVE NO LIABILITY FOR SOFTWARE DEVELOPED BY THE USER OR ANY THIRD PARTY BASED ON THE SOFTWARE OR ANY CONSEQUENCE THEREOF.</li> </ul>
APPLICABLE CONDITIONS	USER SHALL NOT USE THE SOFTWARE FOR THE PURPOSE THAT IS NOT PROVIDED IN THE ATTACHED USER MANUAL.
CHANGE IN     SPECIFICATION	The software specifications and accessories may be changed at any time based on improvements and other reasons.
ERRORS AND OMISSIONS	The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors, or omissions.

## PRECAUTIONS

This section provides general precautions for using the SPU-Console and the CS1W-SPU01-V2 and CS1W-SPU02-V2 SYSMAC SPU Units.

The information contained in this section is important for the safe and reliable application of SPU-Console and SYSMAC SPU Units. You must read this section and understand the information contained before attempting to set up or operate an SYSMAC SPU Unit using the SPU-Console.

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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).

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

### 3 Safety Precautions

- WARNING Do not attempt to take any Unit apart while the power is being supplied. Doing so may result in electric shock.
- WARNING Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.
- WARNING Do not attempt to disassemble, repair, or modify any Units. Any attempt to do so may result in malfunction, fire, or electric shock.
  - Caution Execute online editing only after confirming that no adverse effects will be caused by extending the cycle time. Otherwise, the input signals may not be readable.
  - Caution Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.
  - Caution Tighten the screws on the terminal block of the AC Power Supply Unit to the torque specified in the operation manual. The loose screws may result in burning or malfunction.

## 4 Operating Environment Precautions

**Caution** Do not operate the Unit 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 as the result of severe changes in temperature.
- Locations subject to corrosive or flammable gases.
- Locations subject to dust (especially iron dust) or salts.
- Locations subject to exposure to water, oil, or chemicals.
- Locations subject to shock or vibration.
- Caution Install the SYSMAC SPU Unit correctly as described in the CS Series PLC Operation Manual or CJ Series PLC Operation Manual.
- Caution Take appropriate and sufficient countermeasures when installing systems in the following locations:
  - Locations subject to static electricity or other forms of noise.
  - Locations subject to strong electromagnetic fields.
  - Locations subject to possible exposure to radioactivity.
  - Locations close to power supplies.

## 5 Application Precautions

Observe the following precautions when using the SYSMAC SPU Unit.

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

- Always connect to a ground of 100 Ω or less when installing the Units. Not connecting to a ground of 100 Ω or less may result in electric shock.
- Always turn OFF the power supply to the CPU Unit, Slaves, and Communications Units before attempting any of the following. Not turning OFF the power supply may result in malfunction or electric shock.
  - Mounting or dismounting I/O Units, CPU Units, Memory Packs, or Master Units.
  - Assembling the Units.
  - Setting DIP switches or rotary switches.
  - Connecting cables or wiring the system.
- Caution Failure to abide by the following precautions could lead to faulty operation of the SYSMAC SPU Unit or the system, or could damage the SYSMAC SPU Unit. Always heed these precautions.
  - Fail-safe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes.
  - Interlock circuits, limit circuits, and similar safety measures in external circuits (i.e., not in the Programmable Controller) must be provided by the customer.
  - Always use the power supply voltages specified in the operation manuals. An incorrect voltage may result in malfunction or burning.
  - Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable. An incorrect power supply may result in malfunction.
  - Install external breakers and take other safety measures against short-circuiting in external wiring. Insufficient safety measures against short-circuiting may result in burning.
  - Install the PLC away from devices that generate high-frequency noise.
  - Disconnect the Power Supply Unit's LG terminal from the GR terminal before conducting an insulation resistance test or withstand voltage test.
  - Do not drop the SPU Unit or subject it to excessive vibration or shock.
  - Make sure that all the Backplane mounting screws, terminal block screws, and cable connector screws are tightened to the torque specified in the relevant manuals. Incorrect tightening torque may result in malfunction.
  - Leave the label attached to the Unit when wiring. Removing the label may result in malfunction if foreign matter enters the Unit.
  - Remove the label after the completion of wiring to ensure proper heat dissipation. Leaving the label attached may result in malfunction.

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- Use crimp terminals for wiring. Do not connect bare stranded wires directly to terminals. Connection of bare stranded wires may result in burning.
- Double-check all wiring and switch settings before turning ON the power supply. Incorrect wiring may result in burning.
- Wire all connections correctly.
- Mount Units only after checking terminal blocks and connectors completely.
- Make sure that the terminal blocks, expansion cables, and other items with locking devices are locked in place.
- When transporting the Unit, use special packing boxes and protect it from being exposed to excessive vibration or impacts during transportation.
- Check the user program for proper execution before actually running it on the Unit. Not checking the program may result in unexpected operation.
- Observe the following precautions when wiring the communications cable.
  - Separate the communications cables from the power lines or high-tension lines.
  - Do not bend the communications cables past their natural bending radius.
  - Do not pull on the communications cables.
  - Do not place heavy objects on top of the communications cables.
  - Always lay communications cable inside ducts.
  - Use appropriate communications cables.
- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up. Not doing so may result in malfunction or damage.
- Confirm that no adverse effect will occur in the system before attempting any of the following. Not doing so may result in an unexpected operation.
  - Changing the operating mode of the PLC (including the setting of the startup operating mode).
  - Force-setting/force-resetting any bit in memory.
  - Changing the present value of any word or any set value in memory.
  - Touch the Unit only after first touching a grounded metal object to discharge any static electricity from your body.
  - Do not remove the Memory Card while the CARD indicator is lit. Doing so may damage the files on the Memory Card.
  - Do not turn OFF the power supply while Memory Card data is being accessed. Doing so may damage the files on the Memory Card.
  - Maintain the operating environment for the Memory Cards (such as the ambient operating temperature and other conditions). Request operating environment conditions from the manufacture of the card.
  - OMRON is not responsible for the operation of any memory cards produced by other manufacturers.
  - We recommend making a backup of the PC Card or Memory Card to prevent loosing the data inadvertently, e.g., by mistakenly deleting it.

- Only Memory Cards can be used in the PC Card slot in a CS-series SYSMAC SPU Unit. Modem cards and Ethernet cards, which are not Memory Cards, cannot be used. Do not insert anything but Memory Cards into the Memory Card slot.
- Make sure that the PC card or Memory Card is in the guides when inserting it. Faulty operation may result if the card is not in the guides.
- Always lock the Memory Card in place with the card holder or card cover after inserting it. The Memory Card may become disconnected if it is not locked in place, causing faulty operation.
- Always confirm that the Memory Card is facing the correct direction before inserting it. If a Memory Card is forced into the slot in the wrong direction, the Memory Card or guides may be damaged.
- Always confirm the command code displayed on the 7-segment display before pressing the ENTER Button. Faulty operation may result if the command code is incorrect.
- Never restart or turn OFF the power to the SYSMAC SPU Unit while changing data collection settings or other settings. "P1," "P2," and through "PE" will be displayed on the 7-segment display while data collection settings are being changed. If the SYSMAC SPU Unit is restarted or turned OFF before completing the change operation, the system file being changed may be damaged.
- Do not turn OFF the power supply to the Unit while transferring the Unit parameters or other data. Doing so may result in incorrect data being transferred to the Unit or the Unit may malfunction.
- With the CJ1W-SPU01-V2 SYSMAC SPU Unit, do not connect anything other than a UPS connection to the COMM port. Doing so may inadvertently shut down the SYSMAC SPU Unit.
- Before sending or receiving data using FTP, use the CONFIRM FTP CONNECTION command (command 61) to check whether FTP communications are enabled. If FTP communications are not enabled, data may be lost.
- Do not disconnect the Ethernet cable while data is being sent or received using FTP. Do not turn OFF the power supply to the hub. Doing either may corrupt the file that is sent or received using FTP or result in a malfunction.
- Make sure that there is sufficient free memory on the Memory Card before sending or receiving a recipe file using FTP. Insufficient free memory may result in a malfunction.
- If executing the CONFIRM FTP CONNECTION command (command 61) shows that FTP communications are not enabled, there may be restrictions on the FTP server. Check the FTP server settings.
- Do not disconnect the Ethernet cable or stop the FTP server while data is being sent or received using FTP. Otherwise, the FTP data may not be completely sent or received. If this occurs, execute command 62 to terminate sending and receiving data using FTP.

## 6 Conformance to EC Directives

#### 6-1 Applicable Directives

- EMC Directives
- Low Voltage Directive

#### 6-2 Concepts

#### **EMC Directives**

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

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

**Note** Applicable EMS (Electromagnetic Susceptibility) and EMI (Electromagnetic Interference) Standards in the EMC (Electromagnetic Compatibility) standards are as follows:

Unit	EMS	EMI
CS1W-SPU01-V2	EN61000-6-2	EN61000-6-4
CS1W-SPU02-V2		(Radiated emission: 10-m
CJ1W-SPU01-V2		regulations)

#### Low Voltage Directive

Always ensure that devices operating at voltages of 50 to 1,000 V AC and 75 to 1,500 V DC meet the required safety standards for the PLC (EN61131-2).

## SECTION 1 Overview of Features and Functions

This section provides an overview of the SPU-Console and describes the operating environment, including computer system requirements.

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## 1-1 Overview of the SYSMAC SPU Unit

The SYSMAC SPU Unit is a CS-series CPU Bus Unit that collects the specified I/O memory data from the CPU Unit using specified collection methods (called collection patterns) and stores the data as CSV-format files (commadelimited). This function enables the SYSMAC SPU Unit to be used for applications such as analyzing the operation of the PLC and I/O connected to the PLC, recording manufacturing data and other information, and much more.

The SYSMAC SPU Unit has two modes that can be selected to suit the application: Data Storage Mode and Sampling Mode. Data Storage Mode is the default operating mode for SYSMAC SPU Units with unit version 2.0 or later.

Data Storage Mode

In this mode, the SYSMAC SPU Unit records the specified I/O memory data from the CPU Unit when a particular event occurs. This mode can record data when a particular bit turns ON or at a particular time. In addition, it is also possible to record data at a fixed time after the event occurs, although the time interval is not as precise as it is in Sampling Mode.

A recipe function is also supported to enable writing numeral and textual data to the memory areas of the CPU Unit at the same time. Recipe data can be written to the PLC when retooling, with no need to create a ladder program.

Sampling Mode

In this mode, the SYSMAC SPU Unit samples the specified I/O memory data from the CPU Unit at regular time intervals. The time intervals are nearly constant, so the data can be recorded at particular times, and more reliable information can be reproduced from the collected data.

Either of these modes can be selected after the SYSMAC SPU Unit is installed.

The settings and display in SPU-Console SPU Basic Software depend on the operating mode. For this reason, this manual is divided into a Data Storage Mode part and a Sampling Mode part. In this manual, "Data Storage Mode" is used to indicate information applicable to Data Storage Mode only, and "Sampling Mode" is used to indicate information applicable to Sampling Mode only.

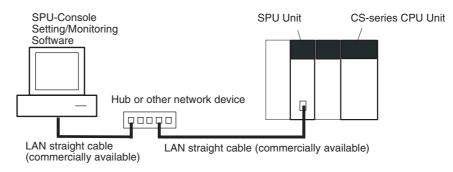
- The sampling capability of the SYSMAC SPU Unit depends on the sampling settings. For details, refer to *1-4-3 SYSMAC SPU Unit Sampling Specifications* in *SYSMAC SPU Units Operation Manual* (Cat. No. V236).
  - For restrictions and precautions regarding the SYSMAC SPU Unit, refer to *Restrictions and Precautions* in *SYSMAC SPU Units Operation Manual* (Cat. No. V236).

## 1-2 SPU-Console

The SPU-Console is a software product used for OMRON's Storage and Processing Unit (called the SYSMAC SPU Unit) to set and operate the SYSMAC SPU Unit, monitor operating status/errors, display trend graphs, and perform other operations from a personal computer. The SPU-Console functions are explained next.

#### 1-2-1 Unit Connections

The SPU-Console is connected to the SYSMAC SPU Unit via a LAN. The SPU-Console dynamically creates windows based on the ID information in the SYSMAC SPU Unit that is connected, eliminating the need to set the model in the software.



#### 1-2-2 Unit Settings

SYSMAC SPU Unit settings are performed by setting the time according to the SYSMAC SPU Unit's location (time zone settings), network settings, such as the name and IP address on the Window network, and FINS network settings.

#### 1-2-3 Data Collection Settings (Data Storage Mode)

The data in the CPU Unit memory to be collected by the SYSMAC SPU Unit in Data Storage Mode and the collection method to be used must be specified. Data collection is specified using variables. Variables have attributes, such as addresses and data types. Scale conversion of variables is also possible. The collection method in Data Storage Mode is called the data collection pattern. Two data collection patterns are supported: basic collection for single data, and data collection for multiple data. For each collection pattern, the length of the sampling time interval, number of records, name of the file to be saved, and number of files are specified.

#### 1-2-4 Event Settings (Data Storage Mode)

In Data Storage Mode, the event settings that specify the time for data collection to start are set. Events are either memory events, which occur when specific conditions are satisfied by values in memory, or schedule events, which occur at specific times or time intervals.

Schedule events occur at set times, such as every minute, every hour, every day, or every week (e.g., every Monday). The event rules for data collection execution or other rules for event processing can be defined. Working days and the end of the month can also be specified for these events.

The combination of these events with the processing that is performed when the events occur are called event rules. Event rules such as "data is recorded in a CSV file whenever a certain bit turns ON" or "data is recorded in a CSV file every day at 8:00" can be set.

A list of the memory events and schedule events can be displayed. The list displays which events are set and the operations that will be executed when these events occur.

#### 1-2-5 Recipe Settings (Data Storage Mode)

In Data Storage Mode, a recipe function is supported to enable writing numeric data (such as production parameters) and text strings to the memory areas of the CPU Unit. The SPU Unit specifies how the recipe data is to be written.

Recipes can be written in either variable format or contiguous area format. In variable format, data is written to non-contiguous memory areas. The data type and scaling method can be specified for writing to multiple non-contiguous memory addresses. In contiguous area format, data is written to a contiguous area at one time. The data type cannot be specified, but more data can be written at high speed than in variable format.

Starting with version 2.1, the SPU-Console includes an expanded recipe function. With the expanded recipe function, you can search for a desired recipe key and write data to the memory areas of the CPU Unit. With the previous recipe function (Ver. 2.0), a recipe key set with Support Software remained constant unless changed, but with the expanded recipe function, it is possible to register recipe keys in files or as file names.

#### **1-2-6** Sampling Settings (Sampling Mode)

The data in I/O memory of the CPU Unit that is to be sampled by the SYS-MAC SPU Unit is set in Sampling Mode. Sampling data is specified using variables. Variables have attributes, such as addresses and data types. Scale conversion of variables is also possible. The collection pattern in Sampling Mode is called the sampling pattern. Four sampling patterns (realtime sampling and sampling 1 to 3) are available. For each sampling pattern, the length of the sampling time interval, number of records, name of the file to be saved, and the number of files are specified.

#### 1-2-7 Executing SYSMAC SPU Unit Commands

Commands such as those for starting/stopping sampling for the SYSMAC SPU Unit can be executed from the SPU-Console.

#### 1-2-8 Monitoring SYSMAC SPU Unit Operating Status

The SYSMAC SPU Unit operating status and error information can be displayed on the SPU-Console.

#### 1-2-9 Historical Trend Graphs

Data recorded in CSV files by the SYSMAC SPU Unit can be displayed on trend graphs.

#### 1-2-10 Realtime Trend Graphs (Sampling Mode)

Sampling data collected by the SYSMAC SPU Unit can be displayed on trend graphs in realtime.

#### 1-2-11 Report Function

The report function is used to display in Microsoft Office Excel a CSV file that is collected by the SPU Unit. This is different from simply opening the CSV file in Microsoft Office Excel. Variable data collected by the SPU Unit can be displayed in any specified cells.

The report function can be used to easily create reports, such as daily reports from CSV files collected by the SPU Unit. Sample templates, such as daily manufacturing reports and error logs, are provided to make it easier to create various kinds of reports.

#### 1-2-12 FTP Transfers

You can send files collected by the SYSMAC SPU Unit to the FTP server or receive recipe files from the host computer. Up to ten settings can be used to send data and another ten settings can be used to receive data. Transferring data using FTP is used with the advanced settings for data collection patterns. Transferring data using FTP is used with the expanded recipe function.

## **1-3 System Requirements**

The system requirements to use the SPU-Console are described in this section.

# 1-3-1 SPU-Console Specifications

Item			Specification	
Model number			WS02-SPTC1-V2 (SPU-Console Ver. 2.2)	
System require-	Computer hardware		Computer that meets the system requirements for Microsoft Windows	
ments	CD-ROM drive		Required for installation.	
	Display		Super VGA (800 $\times$ 600) or better high-resolution video adapter and monitor	
	Mouse		Must conform to the models supported by the applicable OS.	
	Network card		A separate Ethernet network card is required for computers that do not have a LAN port.	
	OS		Microsoft Windows 7 (32bit/64bit)	
			Microsoft Windows 8 (32bit/64bit)	
			Microsoft Windows 8.1 (32bit/64bit)	
			Microsoft Windows 10 (32bit/64bit)	
	Application platform		Microsoft .NET Framework 4.6	
Communications platform		rm	FinsGateway Version 2003	
Functions			Unit information, Unit setup, variable settings, collection pattern settings, even settings, recipe settings, trend graphs, and reports	
Unit information Monitor Operation		Monitor	SYSMAC SPU Unit operating status and error information are displayed.	
		Operation	Operations, such as starting sampling	
Unit setup			IP network settings	
			FINS network settings	
Variable settings			Setting items to sample (by specifying I/O memory addresses using variable	
Collection pattern settings			Collection pattern settings (period, file designations for saving, etc.)	
Recipe settings (Data Storage Mode)			Recipe settings (recipe file, write destination, key, etc.)	
Event settings (in Storage Mode)	Data	Memory event settings	Settings for conditions according to changes in memory (e.g., bits turning ON)	
		Scheduler set- tings	Settings for schedules (e.g., specific times, time intervals)	
Trend graphs		Historical trends	CSV files are read and displayed.	
		Realtime trends (Sampling Mode)	Current sampling data is read and displayed in trend graphics in real time.	

## 1-3-2 Package Contents

	The WS02-SPTC1-V2 contains the following software and data.
SPU-Console Execution Program	The program that performs SYSMAC SPU Unit settings and operations.
Microsoft .NET Framework Version 1.1 Redistribution Package	Microsoft .NET Framework Version 4.6 is required to run the SPU-Console. The Microsoft .NET Framework Version 4.6 Redistribution Package provided in the package can be used to install Microsoft .NET Framework in the com- puter.
SYSMAC SPU Unit System Data	This system data is transferred to the SYSMAC SPU Unit.
FinsGateway Version 2003	This communications middleware is required to run the SPU-Console.
Manual Data	The manual data includes this manual, the <i>SYSMAC SPU Unit Operation Manual</i> (Cat. No. V236) in PDF (portable document format).

## SECTION 2 Setting Up, Starting, and Exiting the SPU-Console

This section describes procedures for installing and uninstalling the SPU-Console, SPU-Console starting methods, and the basic SPU-Console window configuration.

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## 2-1 Installation

#### 2-1-1 Preparations for Installation

Before installing the SPU-Console, check the requirements given in *1-3 System Requirements* to be sure that all requirements have been met. The following basic steps are required to set up the SPU-Console.

- *1,2,3...* 1. Installing Microsoft .NET Framework
  - 2. Installing FinsGateway
  - 3. Installing SPU-Console

#### 2-1-2 Installing Microsoft .NET Framework

Microsoft .NET Framework Version 4.6 is required to run the SPU-Console.

**Installing Microsoft** Microsoft .NET Framework Version 4.6 can be installed from the .NET Framework Work Redistribution Package included in the SPU-Console installation disk.

#### Installing the Redistribution Package

*1,2,3...* 1. Start the computer and log in as a user with administrator rights.

2. The installation program will start automatically. If it does not start automatically, execute the following executable file:

<CD-ROM drive>:\SetupLauncher.exe

- 3. Click Microsoft .NET Framework 4.6.
- Follow the installation program instructions to proceed.
   If .NET Framework 4.6 or later is already installed, installation will not be executed.
   Proceed to the next task.

#### 2-1-3 Installing FinsGateway

FinsGateway Version 2003 is required to run the SPU-Console.

If a version lower than FinsGateway Version 2003 is already installed, uninstall it first.

The computer must be restarted after installing FinsGateway.

- *1,2,3...* 1. Start the computer and log in as a user with administrator rights.
  - The installation program will start automatically. If it does not start automatically, execute the following executable file: <CD-ROM drive>:\SetupLauncher.exe
    - 3. Click FinsGateway2003.
    - 4. Follow the instructions provided by the installation program.
    - 5. Restart the computer when installation has been completed.

#### 2-1-4 Installing SPU-Console

Use the following procedure to install the SPU-Console.

- *1,2,3...* 1. Start the computer and log in as a user with administrator rights.
  - Place the SPU-Console installation disk in the CD-ROM drive. The installation program will start automatically. If it does not start, execute the following executable file from the SPU-Console installation disk: <CD-ROM drive>:\SetupLauncher.exe
  - 3. Click Install SPU-Console.
  - 4. Follow the instructions provided by the installation program.

## 2-2 Uninstalling SPU-Console

Use the following procedure to uninstall the SPU-Console program and thus delete it from the computer.

#### 2-2-1 Uninstalling SPU-Console

Use the following procedure to uninstall the SPU-Console.

- *1,2,3...* 1. Start the computer and log in as a user with administrator rights.
  - 2. Select Start Control Panel.
  - 3. Select *Add or Remove Programs* (*Programs Programs and Features* in Windows Vista/7).
  - 4. Select OMRON SPU-Console Version 2.2 from the list and click the **Add or Remove** Button (the **Uninstall** Button in Windows Vista/7).
  - 5. Select *Remove* from the Setup Maintenance Program and then click the **Next** Button.

Follow the instructions provided by the uninstallation program.

#### 2-2-2 Uninstalling FinsGateway

Do not uninstall FinsGateway if it is being used by an application other than SPU-Console.

The computer must be restarted after uninstalling FinsGateway.

- *1,2,3...* 1. Start the computer and log in as a user with administrator rights.
  - 2. Select Start Control Panel.
  - 3. Select *Add or Remove Programs* (*Programs Programs and Features* in Windows Vista/7).
  - 4. Select OMRON FinsGateway Version 2003 from the list and click the **Add or Remove** Button (the **Uninstall** Button in Windows Vista/7).
  - 5. Select *Remove* from the Setup Maintenance Program and then click the **Next** Button.

Follow the instructions provided by the uninstallation program.

- 6. Restart the computer.
- Execute the following executable file from the SPU-Console installation disk: <CD-ROM drive>:\FgwUtils\FgwRemover2003.exe

Follow the instructions provided by the uninstallation program.

8. Restart the computer.

## 2-3 Starting and Exiting SPU-Console

#### 2-3-1 Starting SPU-Console

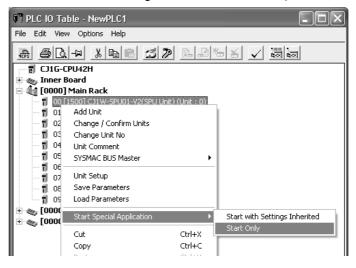
#### Select Start - All Program - OMRON - SPU Console 2.2 - SPU Console.

The SPU-Console will be started and the following window will be displayed.

PU Unit List	Project List		New SPU Unit		
	Name	Mode	Description	Updated	
					New <u>G</u> roup
					New Project
					Сору
					Edit
					Delete
					Up Do <u>w</u> r
					Options
nregistered SPU Unit List					
SPU-Default					
	<			>	Confirm
ask					
o connect to an SPU Unit, sel o work offline, select a project	Connect	Offline Edit			

#### Note

- (1) The user must have administrator rights to run the SPU-Console. Log in as a user that has administrator rights.
  - (2) More than one copy of SPU-Console can be started at the same time.
  - (3) The SPU-Console can be started from CX-Programmer (version 7.2 or higher). To do so, right-click a SYSMAC CPU Unit in the PLC I/O Tables Window and select *Start Special Application - Start Only*. The SPU-Console will start. (The SPU-Console will not start with settings inherited even if *Start with Settings Inherited* is selected.)



- **Note** If the following message appears when starting the SPU-Console, use the following procedure to reinstall the SPU-Console: "File or assembly name of FgwDotne, or one of its dependencies, was not found."
  - Start the Setup Maintenance Program using the following procedure in 2-2-1 Uninstalling SPU-Console.

• Select *Repair* from the Setup Maintenance Program and then click the **Next** Button.

Follow the instructions provided by the uninstallation program.

# 2-3-2 Exiting SPU-Console

Select *File - Exit* from the SPU-Console menus. The SPU-Console will be closed.

# 2-4 SPU-Console Window Configuration

The SPU-Console Window consists of several distinct areas. This section describes the various parts that make up the SPU-Console Window.

## 2-4-1 Startup Window

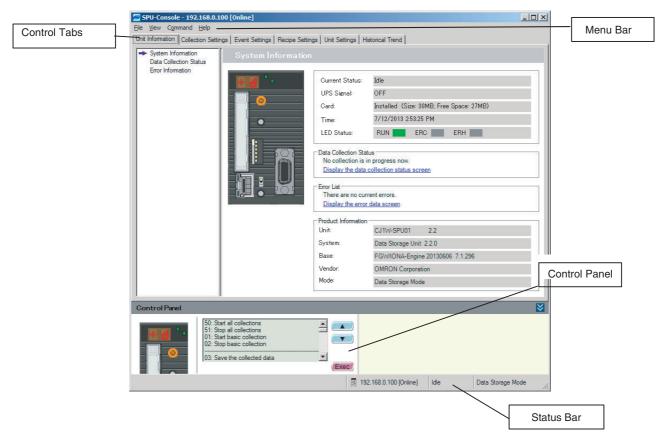
The following window is displayed when the SPU-Console is started. Connected SPU Units and projects are managed in this window.

Project Explorer				Menu Bar		
SPU Unit List	Project List				New 9	PU Unit
	Name	Mode	Description	Updated	New	Group
						Project
						Tioloci
						ору
					E	dit
					De	elete
					Цр	Down
					ΩP	
					Opt	ions
Jnregistered SPU Unit List	_					
SPU-Default	_	\				
	<			>	Co	nfirm
Task	N.					
To connect to an SPU Unit, selec To work offline, select a project fr	t a destination from the SPU on the Project List and click (	Unit List and click C Offline Edit	onnect.	Connect	Offi	ine Edit
To work online, select a project in		Shine Edic	$\sim$			
				$\backslash$		
						_
				Project Exp	olorer	

Item	Function
Menu Bar	Provides menus to perform SPU-Console operations. Menu commands are grouped into related functions. The name of each group is displayed on the menu bar. The commands within each group are accessed on pull-down menus.
Project Explorer	Manages connected SPU Units and the projects where their settings are saved.

# 2-4-2 SPU Unit Online Connection Window

The following window is displayed when the SPU Unit is connected online.



Item	Function
Menu Bar	Provides menus to perform SPU-Console operations. Menu com- mands are grouped into related functions. The name of each group is displayed on the menu bar. The commands within each group are accessed on pull-down menus.
Control Tabs	The control tabs are used to switch between SPU-Console tab pages. The name of each tab page is given on the control tab. When a tab is clicked, the corresponding tab page will be displayed.
Control Panel	The Control Panel is used to start sampling and execute com- mands to control SPU Unit operation.
Status Bar	The Status Bar displays information, such as the status of the con- nected SPU Unit.

# SECTION 3 Initial Settings of the SYSMAC SPU Unit

This section describes how to make initial settings for SYSMAC SPU Units.

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# 3-1 Outline of Initial Settings

Initial settings must be performed to use a SYSMAC SPU Unit.

In the initial settings, you set the IP address and other network settings, the time zone, and other settings. You can use the SYSMAC CS/CJ-series CX-Programmer Support Software or the Initialization Wizard that comes with the SPU-Console to make the initial settings. Set the initial settings of the SYS-MAC SPU Unit using either method.

# 3-2 Making Unit Settings Using the CX-Programmer

Aside from using the SPU-Console Initialization Wizard, it is also possible to use the CX-Programmer to make the SYSMAC SPU Unit settings. The procedure is shown below.

**Note** In order to use this settings function, CX-Programmer Version 7.2 or later and a SYSMAC SPU Unit of unit version 2.0 or later are required.

## 3-2-1 Inputting the Settings

- *1,2,3...* 1. Place the CX-Programmer online and open the PLC I/O Table Window.
  - In the I/O Table Window, select *Transfer from PLC* from the Option Menu in the I/O Table Window and transfer the CPU Bus Unit settings from the PLC.
  - In the PLC I/O Table Window, select the SYSMAC SPU Unit. Right-click and select *Edit CPU Bus Unit Settings*. The SYSMAC SPU Unit's Edit Parameters Dialog Box will be displayed.
  - 4. Input the settings in the Edit Parameters Dialog Box.

CJ1W-SPU01-V2 [Edit Parameters]	
Unit Unit Name: SPU-default Workgroup WORKGROUP Time zone: (GMT +00:00) Greenwich Mear	n Time (UTC)
Interface ✓ Automatically obtain IP addre IP Address: 192 . 168 . 0 . 100 Subnet Mask 255 . 255 . 255 . 0 ✓ Specify default gateway.	FINS Network Settings       Network Address       100
Trans <u>f</u> er[Unit to PC] Iransfer[PC to U	nit] Co <u>m</u> pare <u>R</u> estart
Set D <u>e</u> faults	OK Cancel

The following table shows the meanings of the items to be set.

Item	Setting
Unit	
Unit Name	This is the name displayed under My Network on the Windows computer. The default is "SPU-default." Input a maximum of 64 characters.
	Set a unique name for each SYSMAC SPU Unit connected to the same network.
	Unit names of more than 15 characters cannot be found from Windows Explorer.

Item	Setting			
Work group	Input the work group name for the Windows network.			
Time zone	Set the time zone for the SYSMAC SPU Unit. The factory set- ting is UTC (Coordinated Universal Time). Be sure to set the time zone for the region where the Unit is to be used.			
Interface				
Obtain an IP address automatically	Select this setting to automatically obtain an IP address using the DHCP (Dynamic Host Configuration Protocol).			
	Note A DHCP server must exist on the network/system to use this setting. If you do not know if a DHCP server exists, ask your system administrator.			
IP address	Input the IP address.			
	Set a unique IP address for each SYSMAC SPU Unit con- nected to the same network.			
Subnet mask	Set the same subnet mask as the one set on the network com- puter to be connected.			
Specify the default gateway	To specify the default gateway, select this option and set the IP address for the default gateway.			
FINS Network Setting	S			
Network address	Input the FINS network address for the Ethernet communica- tions service that is built into the SYSMAC SPU Unit. The set- ting must match the FINS network address for the computer's FinsGateway ETN_UNIT service.			
Node address	Input the FINS node address for the Ethernet communications service that is built into the SYSMAC SPU Unit. It cannot be input if the automatic generation method is enabled. In that case, the host portion of the IP address becomes the FINS node address.			
Enable automatic generation.	When this setting is selected, automatic generation is set as the FINS-IP address conversion method and the host portion of the IP address becomes the FINS node address.			
UDP port	Set the UDP port to be used.			

## 3-2-2 Enabling the Settings in the SYSMAC SPU Unit

- *1,2,3...* 1. With the CX-Programmer connected online, display the SYSMAC SPU Unit's Edit Parameters Dialog Box.
  - 2. Click the Transfer to Unit Button.

If the PLC operating mode is MONITOR or RUN mode, change it to PRO-GRAM mode.

- 3. A dialog box will be displayed to restart the Unit. Click the **Yes** Button. The settings will be enabled after the Unit has been restarted.
- **Note** Close the Edit Parameters Dialog Box before restarting the SYSMAC SPU Unit. If the Unit is restarted while the dialog box is open, the connection with the Unit will be broken. Close the Edit Parameters Dialog Box and then display it again.

## **3-2-3** Reading Settings from the SYSMAC SPU Unit

- *1,2,3...* 1. With the CX-Programmer connected online, display the SYSMAC SPU Unit's Edit Parameters Dialog Box.
  - 2. Click the **Transfer to Computer** Button. The Unit settings will be displayed in the Edit Parameters Dialog Box.

**Note** Be sure to execute command 24 (Enable Unit settings) after making the Unit settings. If this command is not executed, the actual settings may not be the same as the settings displayed in the Edit Parameters Dialog Box.

## 3-2-4 Verifying the SYSMAC SPU Unit Settings

- *1,2,3...* 1. With the CX-Programmer connected online, display the SYSMAC SPU Unit's Edit Parameters Dialog Box.
  - 2. Click the **Compare** Button. The verification results will be displayed.

## 3-2-5 Restoring the Default Settings

- *1,2,3...* 1. Display the SYSMAC SPU Unit's Edit Parameters Dialog Box.
  - 2. Click the **Set Defaults** Button. The default settings will be entered.
  - **Note** The CPU Unit and CX-Programmer can be connected online using the Fins-Gateway message service that is included with the SYSMAC SPU Unit, but do not connect the CPU Unit online via the SYSMAC SPU Unit when making the Unit settings. In that case, use a protocol such as the Toolbus protocol to connect the CX-Programmer and the CPU Unit.

# **3-3** Making Initial Settings Using the Initialization Wizard.

Use the following procedures to make the initial settings with the Initialization Wizard.

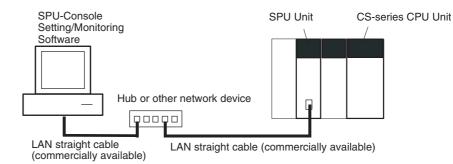
	Connect the SYSMAC SPU Unit and computer with a LAN cable.	3-3-1
	$\downarrow$	
	Start the SYSMAC SPU Unit in Maintenance Mode.	3-3-2
	$\downarrow$	·
	Set the IP address of the computer.	3-3-3
	$\downarrow$	
	Make the initial settings for the SYSMAC SPU Unit with the Initialization Wizard.	3-3-4
Note	The model number and lot number of the SYSMAC SPU Unit are make the initial settings for the SYSMAC SPU Unit. Before mount MAC SPU Unit, record the information on the sticker on the side The model number and lot number are also printed on the sticker age.	ing the SYS- e of the Unit.
Note	If you perform the setup with the SYSMAC SPU Unit's Initialization	n Wizard. all

**Note** If you perform the setup with the SYSMAC SPU Unit's Initialization Wizard, all settings (such as the Data Collection Settings and Unit Settings) will be initialized. Confirm that it is OK to initialize all settings before you make the initial settings.

# 3-3-1 Connecting the SYSMAC SPU Unit and Computer with a LAN Cable

The SYSMAC SPU Unit is connected to the computer with a LAN cable. The connection can be made either through a hub or other network device. (If the connection cannot be made, refer to *Appendix B Troubleshooting Connections*.)

Connect the LAN cable to the LAN1 port on the SYSMAC SPU Unit.



**Note** Do not connect to the network more than one SYSMAC SPU Unit for which initial settings have not been made. IP addresses will be duplicated, and communications may not be possible. Disconnect the LAN cable from all SYSMAC SPU Units except for one and set one SYSMAC SPU Unit at a time.

## 3-3-2 Starting the SYSMAC SPU Unit in Maintenance Mode

Use the following procedure to start the SYSMAC SPU Unit in Maintenance Mode.

- 1,2,3... 1. Connect the LAN cable to the LAN1 port on the SYSMAC SPU Unit.
  - 2. Turn ON pins 4 and 6 on the DIP switch on the SYSMAC SPU Unit and then turn ON the power supply to the PLC. The SYSMAC SPU Unit will start in Maintenance Mode.

Pin 4 ON = IP address set to 192.168.0.100.

Pin 6 ON = Start in Maintenance Mode.

When the SYSMAC SPU Unit has started in Maintenance Mode, "NM" will be displayed on the 7-segment display on the SYSMAC SPU Unit.



- 3. Check the IP address of the SYSMAC SPU Unit using the following procedure.
  - Press the **SELECT** Switch to select command 05 and then press the **ENTER** Button twice. The IP address will be displayed on the 7-segment display.
  - Confirm that 192.168.0.100 is displayed as the IP address.
  - If the IP address is not 192.168.0.100, check the DIP switch setting and repeat the procedure from step 2.

## 3-3-3 Setting the IP Address of the Computer

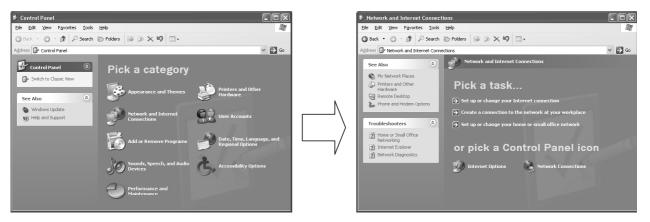
To enable connecting to the SYSMAC SPU Unit in Maintenance Mode, the IP address of the computer must be temporarily set to 192.168.0.200.

The method for setting the IP address depends on the operating system of the computer. Refer to user documentation provided with your computer for details.

The following procedure is for Windows XP Professional.

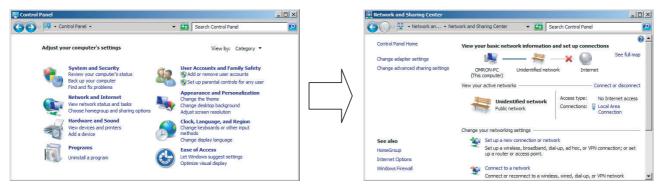
*1,2,3...* 1. Connect the LAN cable to the LAN port on the computer and turn ON the power supply to the computer.

- 2. Log in using the account of the computer administrator.
- 3. Select Start Control Panel.
- 4. Click *Network and Internet Connections* and then click *Network Connections*.

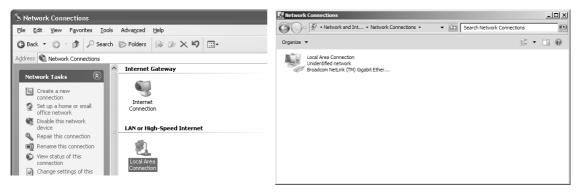


If the control panel is set for classic display, click *Network Connections* from the Control Panel.

• For Windows 7, click View Network Status and Tasks in the Control Panel and then click Change adapter settings.



5. Right-click the network to be set and select *Properties* from the menu, as shown below.



The Local Area Connection Properties Dialog Box of the network that was selected will be displayed.

- Local Area Connection Properties
General Authentication Advanced
Connect using:
III 3Com EtherLink XL 10/100 PCI TX NIC (3C905B-TX) #2
Configure
Install Uninstall Properties
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
Show icon in notification area when connected
OK Cancel

- Select Internet Protocol (TCP/IP) and then click the Properties Button. The Internet Protocol (TCP/IP) Properties Dialog Box shown below will be displayed.
- 7. Recording the Current IP Address

If *Use the following address* is set, record the current IP address of the computer so that it can be set again later.

IP address			
Subnet mask		•	
Default gateway			

8. Temporarily Changing the IP Address

Select *Use the following address* and change the IP address to the values given below.

- IP address = 192.168.0.200
- Subnet mask = 255.255.255.0

nternet Protocol (TCP/IP) Properties		
General		
this capability. the appropriate	<sup>9</sup> settings assigned automatically if your network supports Otherwise, you need to ask your network administrator for IP settings. IP address automatically	
	The address automatically	
	ollowing IP address:	
● U <u>s</u> e the f IP address:	ollowing IP address: 192 . 168 . 0 . 200	
-	192.168.0.200	

9. Click the **OK** Button to change the setting

It may be necessary to restart the computer to make the new settings valid. This completes setting the IP address of the computer.

# 3-3-4 Making the Initial Settings for the SYSMAC SPU Unit

*1,2,3...* 1. Select *Start - All Program - OMRON - SPU Console 2.2 - Initialization Wizard.* 

The Initialization Wizard will be started.

- 2. Input the SYSMAC SPU Unit product information.
  - Input the model number and lot number of the SYSMAC SPU Unit and click the **Next** Button.

The model number and lot number can be found on the sticker on the side of the SYSMAC SPU Unit or on the sticker on the package.

3. Make the Unit settings.

The following items are set.

Item	Setting
Unit Name	This is the name displayed under My Networks on the Windows computer. The default is "SPU-default." Input a maximum of 64 characters.
	Set a unique name for each SYSMAC SPU Unit con- nected to the same network.
	Unit names of more than 15 characters cannot be found from Windows Explorer.
Time zone	Set the time zone of the applicable region.

Set all of the required items and then click the **Next** Button.

4. Make the network settings.

Set the following items.

Item	Setting
Obtain an IP address automatically	Select this setting to automatically obtain an IP address using the DHCP (Dynamic Host Configuration Protocol).
	<b>Note</b> A DHCP server must exist on the network/system to use this setting. If you do not know if a DHCP server exists, ask your system administrator.
Use the following IP address	Select this setting when not automatically obtaining an IP address using the DHCP and then set the IP address and subnet mask.
IP address	Input the IP address.
	Set a unique IP address for each SYSMAC SPU Unit con- nected to the same network.
Subnet mask	Set the same subnet mask as the one set on the network computer to be connected.
Network address	Input the FINS network address for the Ethernet commu- nications service that is built into the SYSMAC SPU Unit. The setting must match the FINS network address for the computer's FinsGateway ETN_UNIT service.
Node address	Input the FINS node address for the Ethernet communi- cations service that is built into the SYSMAC SPU Unit. The node address does not need to be input if the auto- matic generation method is enabled. In that case, the host portion of the IP address becomes the FINS node address.
Enable automatic generation.	When this setting is selected, automatic generation is set as the FINS-IP address conversion method and the host portion of the IP address becomes the FINS node address.

Set all of the required items and then click the Next Button.

Transferring System Data
 Check that the settings are correct and then click the Execute Button.
 System data will be transferred to the SYSMAC SPU Unit.

6. Exiting the Initialization Wizard

The following window will be displayed if the Wizard is exited normally.

🔄 Initialize setup wi	zard
	SYSMACSPU Initialization Wizard Initialize the SYSMAC SPU Unit. Be sure to initialize the unit after purchase. This program sets networks, registers product information and transfers system data.
Welcome	Initialization of SYSMAC SPU Unit complete.
Product Information	
Network Configration	
Transfers	
Complete	
	Click [Finish] to finish the wizard.
	Continue setting. <u>F</u> inish

Click the Finish Button to exit.

- **Note** The Initialization Wizard cannot be connected to the SYSMAC SPU Unit in the following cases.
  - When the computer log-on destination is taken as the domain: Change the computer log-on destination to the computer rather than the domain.
  - When firewall software is used: Set the firewall so that the SYSMAC SPU Unit IP address can be used, or disable the firewall.

# 3-4 Confirming Connections

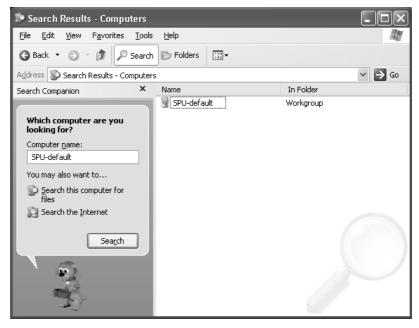
After making the initial settings, use the following procedure to confirm that the SYSMAC SPU Unit on the network can be recognized from the computer.

- *1,2,3...* 1. Return the computer's network settings to their previous values using the procedure in *3-3-3 Setting the IP Address of the Computer* as a guide.
  - 2. Turn OFF the power supply to the PLC and then turn OFF all pins on the DIP switch on the SYSMAC SPU Unit.
  - 3. Turn ON the power supply to the PLC to start the SYSMAC SPU Unit.
  - 4. Search for SYSMAC SPU Units on the network using the Windows Search for Computers command.
    - For Windows XP, right-click *My Network Places* on the Start Menu and then select *Search for Computers.*
    - For Windows 7, select **Network** from the Explorer and enter the unit name of the SYSMAC SPU Unit in the *Search* Box.

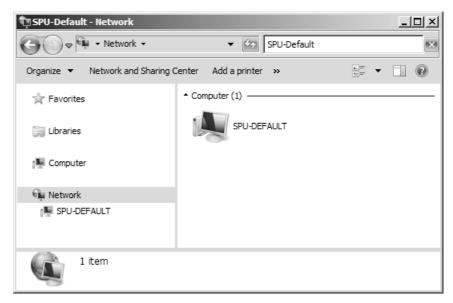
5. Input the Unit Name or IP address for the *Computer name* and then click the **Search** Button.

The following display will appear if the SYSMAC SPU Unit is found.

• Windows XP



• Windows 7



# SECTION 4 Changing the SYSMAC SPU Unit's Operating Mode

This section provides information on the SYSMAC SPU Unit's operating modes, including procedures for confirming and changing the operating mode.

4-1	Operation Overview	26
4-2	Confirming the Operating Mode	26
4-3	Changing the Operating Mode	27

# 4-1 Operation Overview

The SYSMAC SPU Unit provides two operating modes: Data Storage Mode and Sampling Mode. For an overview of operating modes, refer to *SECTION 1 Overview of Features and Functions*. Either of these operating modes can be selected.

The Data Storage Mode is the default operating mode for a SYSMAC SPU Unit with unit version 2.0 or later.

To select an operating mode, stop all SYSMAC SPU Unit operations. The operating mode cannot be changed while the SYSMAC SPU Unit is operating. Use the following procedure to change the SYSMAC SPU Unit operating mode.

- *1,2,3...* 1. Change the DIP switch setting on the SYSMAC SPU Unit and restart using the restart command.
  - 2. After restarting, execute the command to change the operating mode.
  - 3. When the command to change the operating mode has completed executing, change the DIP switch setting on the SYSMAC SPU Unit and restart the Unit. The SYSMAC SPU Unit will use the newly set operating mode.

# 4-2 Confirming the Operating Mode

The following three methods can be used to confirm the operating mode.

#### Using 7-segment display on Front of the SYSMAC SPU Unit

The operating mode is displayed on the 7-segment display on the front of the SYSMAC SPU Unit.

7-segment display	Operating mode		
	Data Storage Mode		
	Sampling Mode		

#### Using SPU-Console Status Bar

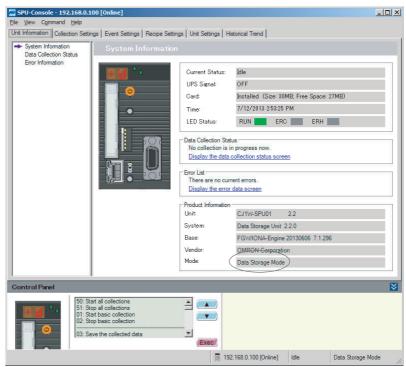
- 1. Connect to the SYSMAC SPU Unit using the SPU-Console. For details on connection methods, refer to *5-1 Connecting and Disconnecting*.
  - 2. The operating mode is displayed in the Status Bar at the bottom right of SPU-Console.

		⊠
•		
Exec		
📳 10.6.139.202 [Online]	Idle	Data Storage Mode

#### Using SPU-Console: Unit Information - System Information - Mode

1. Connect to the SYSMAC SPU Unit using the SPU-Console. For details on connection methods, refer to *5-1 Connecting and Disconnecting*.

- 2. Select the **Unit Information** Tab and **System Information** to display the system information.
- 3. The operating mode is displayed in the *Mode* Field in the System Information Window.



# 4-3 Changing the Operating Mode

Use the following procedure to change the operating mode.

- *1,2,3...* 1. First, record the SYSMAC SPU Unit's currently set DIP switch setting.
  - 2. Turn ON pins 4 and 6 only of the SYSMAC SPU Unit's DIP switch.
  - Select command 12 (Restart Unit) using the SELECT Switch, and then press the ENTER Button. For details on command execution methods, refer to 6-3 Executing Commands from the SYSMAC SPU Unit. The Unit will restart. Check that "NM" is shown on the 7-segment display.



4. Change the SYSMAC SPU Unit's operating mode. Select the number of the operating mode to be changed to using the **SELECT** Switch, and then press the **ENTER** Button.

Operating mode change operation	Number to select using the SELECT Switch
Changing to Data Storage Mode	53
Changing to Sampling Mode	68

- 5. The display will change from "M1" in order. Wait until "F" is displayed.
- 6. When "F" is displayed in the 7-segment display, return the DIP switch to the status recorded in step 1.

- 7. Select command 12 (Restart Unit) using the **SELECT** Switch and press the **ENTER** Button. The SYSMAC SPU Unit will restart and operate in the newly set operating mode.
- 8. Check that the operating mode has changed. Refer to the confirmation methods in *4-2 Confirming the Operating Mode*.

# SECTION 5 Connecting to an SYSMAC SPU Unit

This section provides information on connecting the SPU-Console to SYSMAC SPU Units, managing SYSMAC SPU Unit connections, editing settings offline, transferring setting files between the SPU-Console and SYSMAC SPU Units, and recording files.

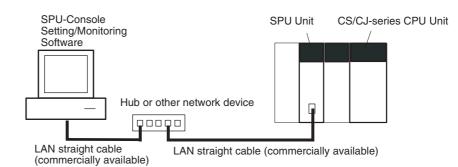
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# 5-1 Connecting and Disconnecting

This section describes how to connect/disconnect the SPU-Console to/from SYSMAC SPU Units.

# 5-1-1 Connecting the SYSMAC SPU Unit and Computer with a LAN Cable

The SYSMAC SPU Unit is connected to the computer with a LAN cable. The connection can be made either through a hub or other network device. Connect the LAN cable to the LAN1 port on the SYSMAC SPU Unit.



Note

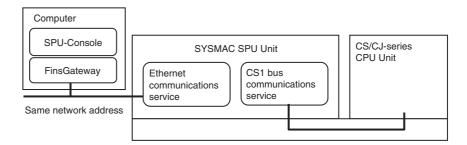
(1) Do not connect to the network more than one SYSMAC SPU Unit for which initial settings have not been made. IP addresses will be duplicated, and communications may not be possible. Disconnect the LAN cable from all SYSMAC SPU Units except for one and set one Unit at a time. Initial settings for the SYSMAC SPU Unit are made using the Initialization Wizard. Refer to SECTION 3 Initial Settings of the SYSMAC SPU Unit.

- (2) Connecting to the SYSMAC SPU Unit is not possible in the following cases.
  - When the computer log-on destination is taken as the domain: Change the computer log-on destination to the computer rather than the domain.
  - When firewall software is used: Set the firewall so that the SYSMAC SPU Unit IP address can be used, or disable the firewall.

## 5-1-2 FINS Network Settings

FinsGateway, OMRON's communications middleware, is included with the SYSMAC SPU Unit, and the SPU-Console is connected to the SYSMAC SPU Unit using the FINS message service. If the SPU-Console cannot be connected, set the FINS network addresses for the computer's FinsGateway and the SYSMAC SPU Unit's Ethernet communications service to the same value. The FINS network default address for the SYSMAC SPU Unit's Ethernet communications service is 2.

The network address for the SYSMAC SPU Unit can be set in the initial settings. For details, refer to SECTION 3 Initial Settings of the SYSMAC SPU Unit.



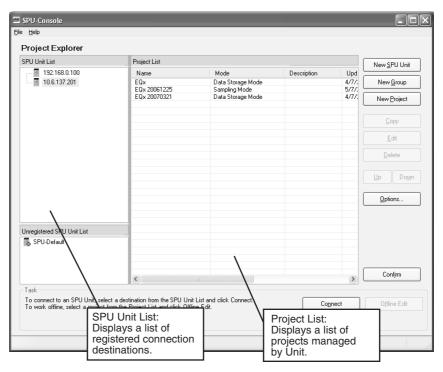
- **Note** The procedure for checking the FINS network address for the FinsGateway at the computer is given below.
- 1. Start the FinsGateway Setting utility by selecting All Programs Fins-Gateway - FinsGateway Setting.
  - 2. On the Basic Tab Page in the FinsGateway Setting Window, check under Service to confirm that the ETN\_UNIT service has started. If the service has not started, start it by selecting ETN\_UNIT and clicking the **Start** Button in the Service Setting Panel.
  - 3. On the Basic Tab Page in the FinsGateway Setting Window, select Network and Unit to display the Network and Unit Setting Panel The Ethernet communications service network will be displayed as "local network n (Ethernet)," with "n" representing the network address. Confirm that it is identical to the FINS network address (default: 2) for the SYSMAC SPU Unit's Ethernet communications service. If it is different, click the **Properties** Button to display the ETN\_UNIT Properties Dialog Box. In the Network Tab Page, input the identical network address. After the new network address has been input, restart the ETN\_UNIT to enable the new address.

B OMRON FinsGateway Settings		- <b>- x</b>
<u>File N</u> etwork <u>E</u> ventMemory \	vjew Iool Help Tool Bar ≺ 😁 📲 💭	
	Network and Unit Settings	Work
Hetworks     Hetworks and Units     Hetworks and Units     Hetworks	Networks Properties Coal Network 2 [Ethernet]	
CPU_UNIT GWSocketProxy MapAgent NameSpaceServer	Ether UDP Nodes   TCP Nodes   Duplex Settings   Network status	e l
	About Network Settings Communication Unit Settings Network Number: 2	
	Local Node Address: 209	
	Communication Unit No.: 17	
	User-defined:	
Configure the useable networks.	OK Cancel Apply	

#### 5-1-3 Starting the SPU-Console

When the SPU-Console is started, the Project Explorer Window is displayed as shown below. SYSMAC SPU Unit connection destinations can be managed from the SPU-Console. SYSMAC SPU Unit settings are called "projects," and they can be edited and managed individually. SYSMAC SPU Unit connection destinations and projects are managed using the Project Explorer. The Project Explorer Window configuration is shown below.

#### Section 5-1



The meanings of the column headings in the Project List are as follows:

Heading	Meaning
Name	Displays the project name.
Mode	Displays the operating mode for the project.
Description	Displays a description of the project.
Date changed	Displays the date on which the project was changed.
Folder	Displays the path of the local folder where the project is saved.
Version	Displays the unit version of the SYSMAC SPU Unit.

# 5-1-4 Registering SYSMAC SPU Units

*1,2,3...* 1. Click the **New SPU Unit** Button. The Connection Settings Dialog Box will be displayed.

20 Unit List	Project List			(	New <u>S</u> PU Unit
	Name	Mode	Description	Updated	$\geq$
					New <u>G</u> roup
					New Project
					Сору
					<u>E</u> dit
					<u>D</u> elete
					Up Down
					Options
registered SPU Unit List					
SPU-Default					
					Carta
	<			>	Confirm

2. In the *IP Address* field, specify the IP address for the SYSMAC SPU Unit that is to be connected.

In the Name field, specify a text string to identify the SPU Unit.

ļs 🛛 🗙
t IP address. Enter a unit name if desired.
10.6.139.202
Example: 192.168.0.1 or SPU-Default.
SPU-Unit1
Advanced OK Cancel

3. Click the **OK** Button to register the new Unit to the SPU Unit List. The newly registered Unit will be displayed in the SPU Unit List as shown below.

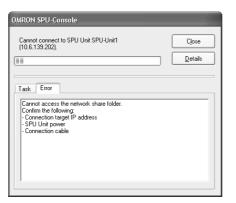
Project Explorer						
PU Unit List	Project List					New <u>S</u> PU Unit
SPU-Unit1 (10.6.139.202)	Name		Mode	Description	Up	New Group
$\smile$						
						New Project
						Сору
						<u>E</u> dit
						Delete
						Up Do <u>w</u> n
						Options
Inregistered SPU Unit List						
sPU-Default						
	<				>	Confirm
Task						
To connect to an SPU Unit, select a To work offline, select a project from	destination from th the Project List an	e SPU Unit List a diclick: Offline Ed	ind click Co	onnect.	Connect	Offline Edit

# 5-1-5 Checking the Connections

To check whether it is possible to connect to a SYSMAC SPU Unit, select the Unit in the SPU Unit List and then click the **Confirm** Button.

PU Unit List	Project List	Project List						
📳 SPU-Unit1 (10.6.139.202)	Name	Mode	Description	Up	New <u>S</u> PU Unit New <u>G</u> roup			
					New <u>G</u> roup			
					New Project			
					<u>С</u> ору			
					Edit			
					<u>D</u> elete			
					<u>U</u> p Do <u>w</u> n			
					Options			
nregistered SPU Unit List								
SPU-Default								

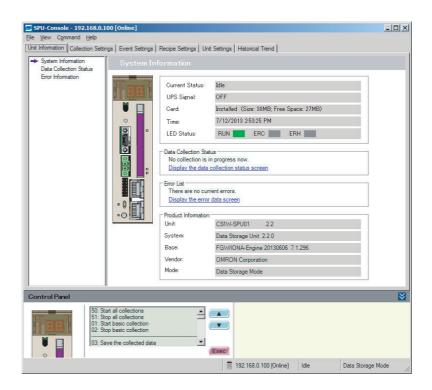
If it is not possible to connect, an error message will be displayed. Refer to *Appendix B Troubleshooting Connections* and apply countermeasures.



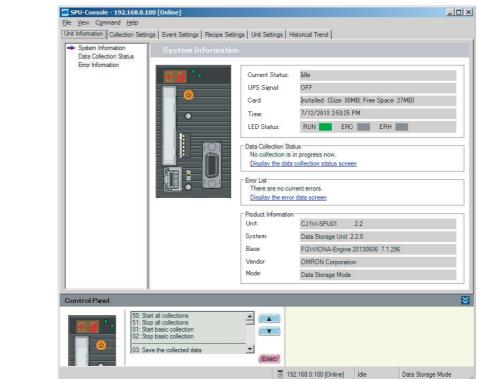
# 5-1-6 Connecting to a SYSMAC SPU Unit

From the SPU Unit List, select the SYSMAC SPU Unit to which to connect and then click the **Connect** Button. The following window will be displayed when the connection is made.

CS-series SYSMAC SPU Unit



CJ-series SYSMAC SPU Unit



## 5-1-7 Disconnecting

#### Select File - Disconnect.

The connection to the SYSMAC SPU Unit will be broken.

# 5-2 Managing Connection Destinations

This section describes how to manage connections from the SPU-Console to multiple SYSMAC SPU Units.

## 5-2-1 Changing and Deleting SYSMAC SPU Unit Registrations

- To change a SYSMAC SPU Unit's registered information, select that SPU Unit from the Project Explorer's SPU Unit List and click the **Edit** Button.
- To delete a connected SYSMAC SPU Unit, select that Unit from the Project Explorer's SPU Unit List and click the **Delete** Button.

# 5-2-2 Managing SYSMAC SPU Units by Group

As shown in the following window, SYSMAC SPU Units can be managed in groups.

SPU-Console					
<u>File H</u> elp					
Project Explorer					
SPU Unit List	Project List			ſ	New SPU Unit
🖃 💼 Line 1	Name	Mode	Description	Up	New Group
Line 2					New Project
				(	Сору
				(	<u>E</u> dit
				(	<u>D</u> elete
Unregistered SPU Unit List					<u>U</u> p Do <u>w</u> n
SPU-Default	1			(	Options
	<			> (	Confirm
Task To connect to an SPU Unit, select a de To work offline, select a project from the	stination from the SPU Project List and click	Unit List and click C Offline Edit.	onnect.	Connect	Offline Edit
				dan .	

- To create a group, select the Units from the SPU Unit List and click the **New Group** Button.
- To delete a group, select the group to delete from the *SYSMAC SPU Unit list* and click the **Delete** Button. If a group is deleted, all the SYSMAC SPU Units registered in the group will also be deleted.
- To change a group name, select the group from the *SYSMAC SPU Unit list* and click the **Edit** Button.

# 5-2-3 Moving SYSMAC SPU Unit Registrations

Registered SYSMAC SPU Units can be individually moved to groups. To move a Unit to a group, select that Unit in the SPU Unit List, press and hold the Ctrl Key, and drag and drop it in the destination group.

# 5-2-4 Advanced SPU Unit Settings

The SPU-Console can communicate with SYSMAC SPU Units using the Fins-Gateway ETN\_UNIT service. The FINS address of an SYSMAC SPU Unit is set in the advanced settings.

To make advanced settings, click the **Advanced** Button from the Destination Setting Dialog Box. (Refer to *5-1-4 Registering SYSMAC SPU Units.*) Knowledge of FinsGateway and FINS is required to make advanced settings.

Destination Setting	×						
Specify either the IP a	address for the SPU unit and the name.						
IP address:	192.168.39.142						
	ex.) 192.168.0.1 or SPU-Default.						
Name:	SPU-Unit1						
Specify the FINS add	ress for the SPU unit. NS address with an IP address.						
	ving FINS address.						
FINS address:							
Specify either a	Specify either a FINS address (ex.2.45.0).						
Register for the I	Ethernet IP address table.						
Click the [FinsG	iateway Configuration] to set the FinsGateway						
	EinsGateway Configuration						
	OK Cancel						

# Identify the FINS Address with an IP Address

This method is normally selected.

For it, the rightmost byte of the host ID of the IP address is used as the FINS node address.

*FINS-IP Conversion* for the FinsGateway ETN\_UNIT service is set to either *Automatic Generation* or *IP Table + Automatic Generation.* 

Use the Following FINS Address

This method is used to specify the FINS node address of an SYSMAC SPU Unit.

Section 5-2

Specify the FINS node address in the *FINS address* Field. *FINS-IP Conversion* for the FinsGateway ETN\_UNIT service is set to either *IP Address Table* or *IP Table + Automatic Generation*.

Specify the FINS address for the SPU unit.						
Identify the FINS address with an IP address.						
O Use the following FINS address.						
FINS address: 2.142.0						
Specify either a FINS address (	ex.2.45.0).					
Register for the Ethernet IP address table.						
Click the [FinsGateway Configuration] to set the FinsGateway of the computer.						
	EinsGateway Configuration					

Register for the Ethernet IP Address Table

If *Register for the Ethernet IP address table* is selected, the IP address and FINS node address will be registered in the FinsGateway IP address table when connecting to an SYSMAC SPU Unit.

To change FinsGateway settings on the computer, click the **FinsGateway Configuration** Button.

# 5-2-5 Importing and Exporting Destination SYSMAC SPU Unit Registration

Exporting

Use the following procedure to export the registered contents of the destination SYSMAC SPU Unit to a file.

- *1,2,3...* 1. In the SPU-Console, select *Export* from the File Menu.
  - 2. In the Export Dialog Box, enter the file name where indicated.
  - 3. Click the Save Button.

Importing Use the following procedure to import the registered contents for the destination SYSMAC SPU Unit from a file.

- *1,2,3...* 1. In the SPU-Console, select *Import* from the File Menu.
  - 2. In the Import Dialog Box, find the file to be imported and click on the file.
  - 3. Click the **Open** Button.

#### 5-2-6 Project Save Location

A project is saved in the following folder configuration.

- Root folder: The root folder where the project is saved
- SPU Unit name: The name of the registered SYSMAC SPU Unit

• Project name: The name of the project registered in the SYSMAC SPU Unit

Project Options	×
Project Save Location Root Folder: D:\Documents and Settings\tanoue\My	Documents\SPU-Console Library
	Browse Set Defaults
Project save locations are applied to a Projects are saved as follows:	ill SPU Units.
(Root Folder)\ (SPU Unit Name)\ (Troject Name)\	
-	OK Cancel

The root folder can be changed to any location.

- *1,2,3...* 1. Click the **Option** Button in the Project Explorer Window to display the Project Option Dialog Box.
  - 2. Click the **Browse** Button and select the folder from the dialog box.
  - 3. Click the **OK** Button.

# 5-3 Editing Settings Offline (Unconnected)

The SPU-Console can be used to edit settings without being connected to the SYSMAC SPU Unit. This operation is called offline editing. With offline editing, settings can be edited by project. Projects that are set can be saved in the personal computer and transferred to the SYSMAC SPU Unit when the SYS-MAC SPU Unit is connected to the personal computer.

## 5-3-1 Adding or Deleting a Project

As shown in the following window, projects can be managed for individual SYSMAC SPU Units.

iPU Unit List	Project List					New SPU Unit
	Name EQx		Mode Data	Description	Up 4/7	New Group
- Cil Line 2	New Project		Data		4/7	New <u>d</u> roup
SPU-Unit2 (10.6.139.203)					(	New <u>P</u> roject
					(	<u>С</u> ору
					(	<u>E</u> dit
					(	<u>D</u> elete
Jnregistered SPU Unit List						Up Do <u>w</u> n
R SPU-Default						
SPO-Default						Options
						Confirm
Task	<				> (	
To connect to an SPU Unit, select a de	astination from the CDI	- المثالية -	nd aliak Ca			
To work offline, select a project from the	e Project List and click	: Offline Ed	ina ciick ce it.	Janeec.	Connect	Offline Edit

• To add a project, select the Unit in the SPU Unit List and click the **New Project** Button.

• To delete a project, select the project in the Project List and click the **Delete** Button.

When an SPU Unit is deleted from the SPU Unit List, a dialog box will be displayed to confirm that the projects for that SPU Unit are to be deleted. If No is selected in the dialog box, the projects can be managed in the Unregistered SPU Unit List.

SPU Unit List	Project List			(	New SPU Unit
Eine 1	Name	Mode	Description	Up	New <u>G</u> roup
Line 2					New <u>P</u> roject
					Сору
				(	<u>E</u> dit
				(	Delete
Unregistered SPU Unit List				(	Up Down
SPU-Default SPU-Unit2				(	Options
	×			>	Confirm
To conne <del>ct to an SPU Unit</del> , select a de To work offline, select a project from th	estination from the SPU U	nit List and click C	onnect.	Connect	Offline Edit

# 5-3-2 Changing or Copying a Project

- To change a project's name or description, select that project in the Project List and click the **Edit** Button.
- To copy a project, select that project in the Project List and click the **Copy** Button. The copy of the project will be added to the same SYSMAC SPU Unit.
- To copy a project to a different SYSMAC SPU Unit, select that project in the Project List and drag and drop it at the destination Unit.

# 5-3-3 Starting Offline Editing

*1,2,3...* 1. In the Project List, select the project to be edited and then click the **Offline Edit** Button.

Project Explorer					
SPU Unit List	Project List				New <u>S</u> PU Unit
□ Line 1 □ Line 1 □ □ □ II SPU-Unit1 (10.6.139.202)	Name EQx New Project	Mode Data Data	Description	Up 4/7 4/7	New <u>G</u> roup
- 📄 Line 2	New Floject	Data		4/7	New Project
				(	<u>С</u> ору
				(	<u>E</u> dit
				[	<u>D</u> elete
Unregistered SPU Unit List					Up Do <u>w</u> n
🕵 SPU-Default				(	Options
	<			> (	Confirm
Task					
To connect to an SPU Unit, select a de To work offline, select a project from the	stination from the SPU Un Project List and click Off	it List and click Co line Edit.	onnect.	Co <u>n</u> nect	Offline Edit

- **Note** There are initial settings projects and sample projects under *SPU-Default*. Use them for purposes such as creating new projects.
  - 2. Tabs for the items that can be set offline will be displayed, and *Offline* will be displayed in the Title Bar and Status Bar. The tabs that are displayed depend on the project operating mode.

Collection Settings Event Settings Re	ecipe S	Settings Unit Settings Historical Trend	>			
Variable Settings 🔹	Colle	ction Pattern Settings 👻				
		Name	∆ Address	Data Type	Elements Scali	
	Þ	Taq0000	D00000	UINT	1	
		Tag0001	D00001	UINT	1	
		Tag0002	D00002	UINT	1	
		Tag0003	D00003	UINT	1	
		Tag0004	D00004	UINT	1	
		Tag0005	D00005	UINT	1	
		Tag0006	D00006	UINT	1	
		Tag0007	D00007	UINT	1	
		Tag0008	D00008	UINT	1	
		Tag0009	D00009	UINT	1	
		Tag0010	D00010	UINT	1	
			Tag0011	D00011	UINT	1
		Tag0012	D00012	UINT	1	
		Tag0013	D00013	UINT	1	
		Tag0014	D00014	UINT	1	
		Tag0015	D00015	UINT	1	
		Tag0016	D00016	UINT	1	
		Tag0017	D00017	UINT	1	
		Tag0018	D00018	UINT	1	
		Tag0019	D00019	UINT	1	
		Tag0020	D00020	UINT	1	
		Tag0021	D00021	UINT	1	

## 5-3-4 Saving and Exiting a Project

1,2,3...1. Select Save or Save As from the File Menu to save a project. The edited project will be saved to the personal computer.

2. Select *Offline Close* to end offline editing. The saved settings can be transferred to the SYSMAC SPU Unit after the SYSMAC SPU Unit is connected using the method described next in *5-4 Saving and Transferring Settings*.

# 5-4 Saving and Transferring Settings

# 5-4-1 Transferring Settings from the SYSMAC SPU Unit to the Personal Computer

The SPU-Console automatically reads Unit settings when the SYSMAC SPU Unit is connected. Therefore, transferring settings to the personal computer is not required. Use the following procedure to transfer settings explicitly from the SYSMAC SPU Unit to the personal computer in cases such as when settings are read again at the Unit after the settings that were originally read are changed at the SPU-Console and then discarded.

- *1,2,3...* 1. First connect the SPU-Console to the relevant SYSMAC SPU Unit to transfer the current SYSMAC SPU Unit settings to the personal computer.
  - 2. In the SPU-Console, select *From Unit* from the File Menu.

#### 5-4-2 Saving Settings to the Computer

The settings edited using the SPU-Console or the settings read from the SYS-MAC SPU Unit can be saved to the personal computer as a project. The saved settings can also be used in offline editing.

- *1,2,3...* 1. In the SPU-Console, select *Save to PC* from the File Menu.
  - 2. In the Save in Computer Dialog Box, enter the name and description of the settings to be saved.

If *Display all projects* is selected, all of the projects managed by the Project Explorer will be displayed.

Save in Com	puter 🛛 🗙
	I-Unit2 EQx New Project
•	•
🔲 Display a	Il projects
Name:	New Project
Description:	
Location:	D:\Documents and Settings\tanoue\My Documents\SPU-Console Library
Specify the n	ame and click OK.
	OK Cancel

3. Click the OK Button to save the project.

# 5-4-3 Reading Settings from the Computer

SYSMAC SPU Unit settings (projects) saved in the personal computer can be read to the SPU-Console. Projects performed using offline editing can also be read to the SPU-Console using a similar procedure.

Load from C	Computer 🛛
	J-Unit2 E0x New Project
•	•
🗐 Display a	all projects
Name:	New Project
Description:	
Location:	D:\Documents and Settings\tanoue\My Documents\SPU-Console Library
Select the ite	m and click OK.
	Specify Files DK Cancel

*1,2,3...* 1. In the SPU-Console, select *Load from PC* from the File Menu.

- 2. In the Load from Computer Dialog Box, select the project to be read and click the **OK** Button. If *Display all projects* is selected, all of the projects managed by the Project Explorer will be displayed. Select this checkbox when reading projects of other SYSMAC SPU Units.
- Click the Specify Files... Button in the Load from Computer Dialog Box to display the Load Settings File Dialog Box and select the settings to be read.

For example, to use settings that have already been saved as collection settings without setting the IP address in the current SYSMAC SPU Unit at the time of saving, deselect **Unit Settings**.

ead Settings File	×
Save Location D:\Documents and Settings\tanoue\My Documents\SPU-Console Library\S Specify the folder where the file is saved. The file in this folder will be read.	OK Cancel
✓ Variable Settings     IONAVariable.xml	
Collection Settings Sampling.xml	
Event Settings EventService.xml	
✓ Recipe Settings Recipe.xml	
Unit Settings SPUSystemConfig.xml	

# 5-4-4 Transferring Settings from the Personal Computer to the SYSMAC SPU Unit

Use the following procedure to transfer settings edited on the personal computer to the SYSMAC SPU Unit.

- *1,2,3...* 1. Connect the SPU-Console to the SYSMAC SPU Unit to which the settings will be transferred.
  - 2. In the SPU-Console, select *To Unit* from the File Menu.

## 5-4-5 Transferring Projects Edited Offline to the SYSMAC SPU Unit

Projects edited offline can be transferred to the Unit without needing to execute the *Connect* command from the File Menu in the SYSMAC SPU Unit. The SPU-Console will automatically read the current Unit settings when it is connected to the SYSMAC SPU Unit.

Therefore, projects set using offline editing will be overwritten by the current SYSMAC SPU Unit settings, so the saved projects must be transferred again after being read. Use the following procedure to transfer settings being edited offline to the Unit without performing the connection, read, and transfer operations.

- *1,2,3...* 1. Start the offline editing for the project to be transferred.
  - 2. Select *To Unit* from the File Menu. The file transfer will start.
  - 3. To enable the transferred project in the SYSMAC SPU Unit, execute the SYSMAC SPU Unit's Change the Data Collection Settings (Change the Sampling Settings) command, the Change the Recipe Settings command, or the Change the Unit Settings command. For details on executing commands, refer to *SECTION 6 Executing Commands*.
  - **Note** The transferred settings will be saved in the SYSMAC SPU Unit, but will not be enabled until the Change the Sampling Settings (Change the Data Collection Settings) command, the Change the Recipe Settings command, or the Change the Unit Settings command is executed.

# 5-5 Recording Files

## 5-5-1 Location of Record Files

The data files resulting from recording are saved in a Memory Card mounted in the SYSMAC SPU Unit. The record files are placed in a folder called "Journal." The file names are specified when setting data collection settings (sampling settings).

**Note** Do not delete the files inside the Journal folder. The SYSMAC SPU Unit will not operate correctly without these files.

# 5-5-2 Accessing Record Files on a Windows Network

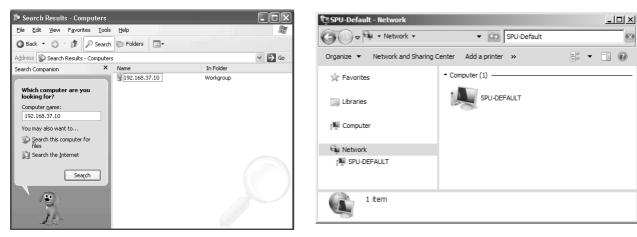
The data files saved in a Memory Card mounted in the SYSMAC SPU Unit can be accessed using a shared folder on a Windows network. The shared folder on the Memory Card is \pccards\PCCard1. Use the following procedure to access the record files from the computer.

- *1,2,3...* 1. Search for network SYSMAC SPU Units using the Search for Computers command.
  - For Windows XP, right-click *My Network Places* on the Start Menu and then select *Search for Computers.*
  - For Windows 7, select **Network** from the Explorer and enter the unit name of the SYSMAC SPU Unit in the *Search* Box.

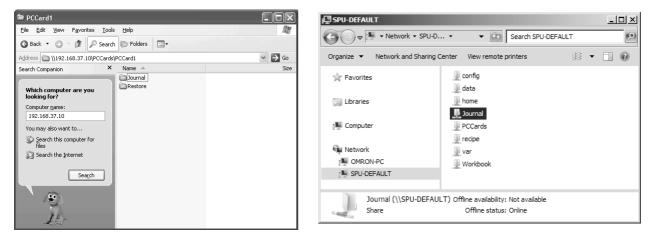
 $\mathbf{x}$ 

2. Input the Unit Name or IP address for the Computer name and then click the Search Button.

The following display will appear if the SYSMAC SPU Unit is found.



3. Double-click the SYSMAC SPU Unit that was found and open the following folders in order: PCCards - PCCard1 - Journal.



- Note
- The following method can also be used to easily access the SYSMAC SPU Unit shared folder from the computer.
  - (1) Select View Display the Unit Folder Journal Folder in the SPU-Console.
  - (2) Input the UNC address of the shared folder in the SYSMAC SPU Unit in the address bar of Explorer. For example, input \\192.168.0.100\.

#### **Format of Record Files** 5-5-3

The record files are text files in CSV format, as shown below.

index,clocktime,nano,SampleInd	dex,Tag-0000,Tag-0001,Tag-0002,Tag-0003
0,2004-06-16 11:16:40.443,0443	3637440,1, 502,18196,32983,18948,
1,2004-06-16 11:16:40.453,0453	3636704,2, 548,18196,33024,18948,
2,2004-06-16 11:16:40.463,0463	3635968,3, 607,18196,33077,18948,
3,2004-06-16 11:16:40.473,0473	3635232,4, 667,18196,33131,18948,
4,2004-06-16 11:16:40.483,0483	3634496,5, 727,18196,33185,18948,
5,2004-06-16 11:16:40.493,0493	3633760,6, 777,18196,33229,18948,
6,2004-06-16 11:16:40.503,0503	3633024,7, 836,18196,33282,18948,
7,2004-06-16 11:16:40.513,0513	3632288,8, 900,18196,33339,18948,
8,2004-06-16 11:16:40.523,0523	3631552,9, 950,18196,33384,18948,
9,2004-06-16 11:16:40.533,0533	3630816,10, 1006,18196,33434,18948,

A header code is placed on the first line. Data codes are placed on the remaining lines. The data code is described in the following table.

Field	Item	Meaning
1st field	Index	The index number for the data code.
		The index is reset to 0 when sampling (data collection) settings or record files are cleared.
2nd field	Time stamp	The time at which recording was performed.
		YYYY-MM-DD hh:mm:ss.ms
3rd field	Nanoseconds	The nanoseconds at which recording was per- formed.
		The value is given in nanoseconds.
4th field	Sampling index	An index number started from 1 when recording is started.
Remaining fields	Sampling data	The 5th and later fields contain the sampling data in order.
Return		A line feed code, CR+LF (0x0D 0x0A), is placed at the end of the line.

Note Each sampling file has a maximum size of 2 GB.

Note REAL and LREAL numerical values will show a decimal point when there is at least one digit after the decimal point. If there are no digits after the decimal point (example: "10.00"), the value will be recorded in the CSV file as an integer (example: "10").

#### **Saving Record Files** 5 - 5 - 4

Saving in One File

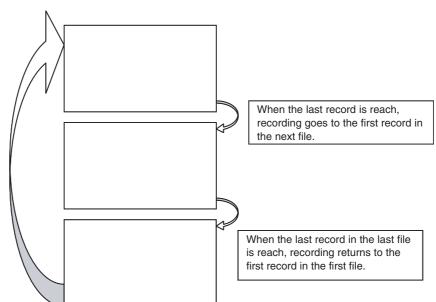
The number of records saved in one file is specified in advance in the sampling (data collection) settings. When enough data codes have been saved to reach the last line, data codes are saved starting at the first record.

index		] _	(When there are 100 records)
100		КЧ	(When there are 100 records)
1			
2		] \\	
:		1 1	When the last record is reached,
:		1 /	records are recorded again from the first row.
97		] //	
98		1 //	
99			

47

#### Saving in Multiple Files

When saving data in multiple files, if the data record reaches the last line, recording will continue from the beginning of the next file. When the last line of the final file is reached, recording will resume from the beginning of the first file.



- **Note** Even if the last record is not reached, a switch is made to the next file at the following times.
  - (1) When collection is stopped
  - (2) When the SYSMAC SPU Unit is restarted
  - (3) When the Memory Card is removed
  - (4) When the file is switched by event processing (switch file)
- **Note** The settings for record files (e.g., format and saving method) are saved in the Journal folder in the Memory Card containing the record files. To enable the saved settings in the Unit, execute 20 (Change the data collection settings (Change the sampling settings)).

If record file settings on the Memory Card differ from those in the SYSMAC SPU Unit, sampled data will not be recorded correctly. This can happen, for example, when a Memory Card created for a different SYSMAC SPU Unit is used. If this happens, update the record file settings by executing command 20 (Change the data collection settings (Change the sampling settings)).

When data is saved without specifying the number of records, recording starts from the first record when collection begins. Data is recorded in one file until data collection stops. The data collected from starting to stopping collection can be saved in a single file.

Index	Recording starts from the beginning of the file when	
0	collection is started.	
1		
2		
3	Records are added to the end	
:	of the file until collection is stopped.	

Saving without Specifying

the Number of Records

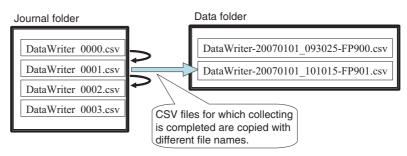
- Note (1) When data is saved without specifying the number of records, the size of the file will continue to increase until collection stops. Make sure that the capacity of the Memory Card is sufficient when saving using this method.
  - (2) When data is saved in a single file without specifying the number of records, the previous data in the file is cleared when collection starts. When not specifying the number of records, saving in multiple files is recommended.

## 5-5-5 File Copy Options (Data Storage Mode)

In Data Storage Mode, CSV files saved in the Journal folder can be automatically copied with changed file names. The copied files are saved in a folder called "data" on a Memory Card mounted in the SYSMAC SPU Unit.

Date, time, and variable values can be included with the file names of the copied files. By specifying information such as lot IDs for variable values, collected data can be managed by file name for each lot. For details on copy options, refer to *10-5-4 Setting Copy Options*.

The "data" folders can be accessed as a shared folder in the Windows network. Copied files can be referenced or deleted from a personal computer. For details, refer to *5-5-2 Accessing Record Files on a Windows Network*.



# SECTION 6 Executing Commands

This section describes how to execute commands for SYSMAC SPU Units.

6-1	Command Types and Execution	52
6-2	Executing Commands from the SPU-Console	52
6-3	Executing Commands from the SYSMAC SPU Unit	52
6-4	Executing Commands from the CPU Unit	53

# 6-1 Command Types and Execution

The SYSMAC SPU Unit supports various commands. For example, *Display the IP address, Start all samplings*, and *Restart Unit* commands are supported. The following methods can be used to execute commands.

Execute the commands from the SPU-Console connected to the SYSMAC SPU Unit.

Executing Commands from the SYSMAC SPU Unit

**Executing Commands** 

from the SPU-Console

Execute the commands using the SYSMAC SPU Unit's **SELECT** Switch and **ENTER** Button.

Executing Commands from the CPU Unit Execute SYSMAC SPU Unit commands from the I/O memory in the CPU Unit. The supported commands depend on the operating mode.

For details on supported commands in each operating mode, refer to SEC-TION 15 Data Storage Mode Commands and SECTION 20 Supported Commands.

# 6-2 Executing Commands from the SPU-Console

Commands are executed from SPU-Console's Control Panel. Select the command to execute in the Command Selection Box and then click the **Exec** Button.

50: Start all collections 51: Stop all collections 01: Start basic collection 02: Stop basic collection 	
05. Save the collected data	Exec ,
	🗖 срицьм ма с
	SPU-Unit1 (10.6.

Note

Commands can also be executed by selecting Command - Execute a Command.

# 6-3 Executing Commands from the SYSMAC SPU Unit

The **SELECT** Switch and **ENTER** Button are used to execute commands from the SYSMAC SPU Unit.

**Selecting the Command** with the SELECT Switch Press the switch up to increase the command code.

Press the switch down to decrease the command code.

The currently selected command code will be displayed on the 7-segment display.

**Executing the Command** with the ENTER Button Use the ENTER Button to execute the command selected with the SELECT Switch, as described in the following procedure.

- *1,2,3...* 1. Confirm that the command number to be executed is displayed on the 7-segment display.
  - Press the ENTER Button once. The command code will flash on the 7-segment display.

3. Press the ENTER Button again.

"A" will be displayed on the 7-segment display and the command will be executed.

To cancel executing the command, wait for 10 seconds before pressing the **ENTER** Button the second time.

# 6-4 Executing Commands from the CPU Unit

SYSMAC SPU Unit commands can be executed from the CPU Unit.

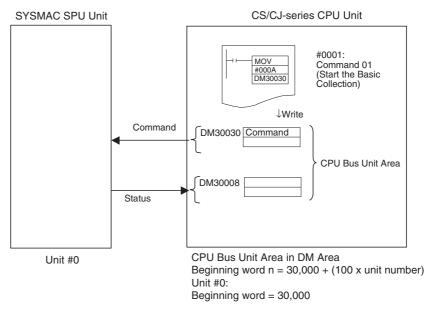
By setting SYSMAC SPU Unit commands in the CPU Bus Unit Area of the CPU Unit, the SYSMAC SPU Unit can be operated from the CPU Unit. This enables the SYSMAC SPU Unit to be operated from the CPU Unit by means such as ladder programs.

To set a SYSMAC SPU Unit command, specify the command number in the Command Area of the CPU Bus Unit Area (in the DM Area). The Command Area address can be calculated using the following equation:

Command Area address = 30,000 + (100 x unit number of SYSMAC SPU Unit) + 30

For details on the CPU Bus Unit Area, refer to SECTION 7 CPU Bus Unit Area.

The commands shown in *15-1 List of Data Storage Mode Commands* and *20-1 Commands* can be specified. Specify in hexadecimal the command number written to the Command Area. For example, write 000C to specify command 12 (Restart Unit).



This method can be used, for example, to start and stop data collection from the ladder program in the CPU Unit.

Note Status Area

Starting with SYSMAC SPU Units with unit version 2.0, the previous Status Area has been integrated with the words allocated in the CPU Bus Unit Area. The Status Area has been eliminated for SYSMAC SPU Units with unit version 2.2 or later. To execute commands, use the CPU Bus Unit Area.

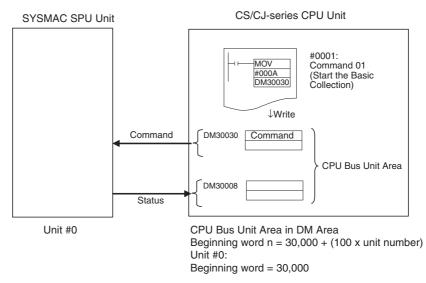
# SECTION 7 CPU Bus Unit Area

This section describes the data provided in the CPU Bus Unit Areas.

7-1	CPU Bus Unit Area	56
7-2	CIO Area	56
7-3	DM Area	62

# 7-1 CPU Bus Unit Area

For each SYSMAC SPU Unit, a CPU Bus Unit Area is allocated in CPU Unit memory. The operating status of the SYSMAC SPU Unit is reflected in the CPU Bus Unit Area of the CPU Unit. Using the CPU Bus Unit Area makes it possible for a SYSMAC SPU Unit to be operated from a ladder program in the CPU Unit.



For example, SYSMAC SPU Unit commands can be used to specify operations such as starting and stopping data collection.

# 7-2 CIO Area

For each SYSMAC SPU Unit, a CPU Bus Unit Area is allocated in the CIO Area in the CPU Unit. Information is stored in offset locations from the beginning word of each area, as shown in the table below. Beginning word n can be calculated using the following equation:

Beginning word address $n = 1,500 + ($	25 x unit number of SYSMAC SPU Unit)

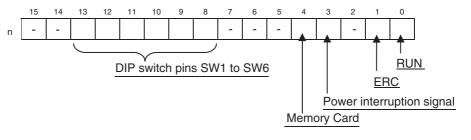
•		,
Offset	Memory area name	Data transfer direction
n	System information	SPU Unit to CPU Unit
n+1	Collection status for basic collection and collection patterns 1 to 15	SPU Unit to CPU Unit
n+2	Collection status for collection patterns 16 to 31	
n+3	Collection status for collection patterns 32 to 47	
n+4	Collection status for collection patterns 48 to 63	
n+5	Collection status for collection pattern 64	
n+6	Collection start specification for basic collection and collection patterns 1 to 15	CPU Unit to SPU Unit
n+7	Collection start specification for collection patterns 16 to 31	
n+8	Collection start specification for collection patterns 32 to 47	
n+9	Collection start specification for collection patterns 48 to 63	
n+10	Collection start specification for collection pattern 64	

Offset	Memory area name	Data transfer direction
n+11	Collection stop specification for basic collection and collection patterns 1 to 15	CPU Unit to SPU Unit
n+12	Collection stop specification for collection patterns 16 to 31	
n+13	Collection stop specification for collection patterns 32 to 47	
n+14	Collection stop specification for collection patterns 48 to 63	
n+15	Collection stop specification for collection pattern 64	
n+16	Collection request	CPU Unit to SPU Unit
n+17	File Copy Flags 1/2	SPU Unit to CPU Unit
n+18	File Copy Flags 3/4	
n+19	File Copy Flags 5/6	
n+20	File Copy Flags 7/8	
n+21	File Copy Flags 9/10	
n+22	Recipe Command Area	CPU Unit to SPU Unit
n+23	Recipe Status Area	SPU Unit to CPU Unit
n+24	(Not used.)	

Note Do not used the areas indicated "not used."

#### System Information (SPU Unit to CPU Unit)

SYSMAC SPU Unit status is reflected in memory as follows:



Bit	Name	Description
0	RUN	ON when Unit is operating normally.
1	ERC	ON when a Controller error occurs.
2	(Not used.)	
3	Power inter- ruption signal	ON when the power interruption signal turns ON.
4	Memory Card	ON when a Memory Card is mounted.
5 to 7	(Not used.)	
8	DIP-SW1	ON when DIP switch pin SW1 is ON.
9	DIP-SW2	ON when DIP switch pin SW2 is ON.
10	DIP-SW3	ON when DIP switch pin SW3 is ON.
11	DIP-SW4	ON when DIP switch pin SW4 is ON.
12	DIP-SW5	ON when DIP switch pin SW5 is ON.
13	DIP-SW6	ON when DIP switch pin SW6 is ON.
14, 15	(Not used.)	

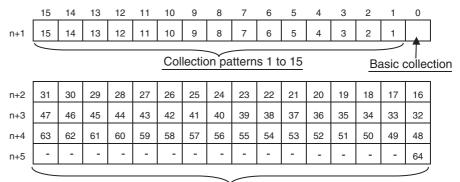
#### Collection Status (SPU Unit to CPU Unit)

The operating status of basic collections and collection patterns is reflected in the corresponding bits.

Bit	Operating status
ON	Collecting
OFF	Idling

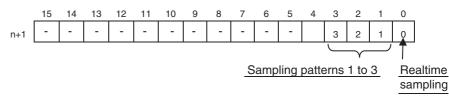
The following table shows the bit positions corresponding to the collection patterns.

#### Data Storage Mode



Collection patterns 16 to 64

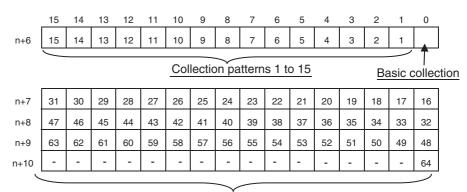
#### Sampling Mode



#### <u>Collection Start Specification, Collection Stop Specification, Collection Request (CPU</u> <u>Unit to SPU Unit)</u>

Starts or stops the specified basic collection or collection pattern. Can be used in Data Storage Mode.

Collection Start Specification The SYSMAC SPU Unit begins collecting data when the bit for a collection request turns ON after the bit for the collection pattern for starting collection has turned ON. After the SYSMAC SPU Unit has begun collecting data, the respective collection pattern bits turn OFF. The following table shows the bit arrangement for basic collection and the collection patterns.



Collection patterns 16 to 64

# Section 7-2

#### **Collection Stop** Specification

The SYSMAC SPU Unit stops collecting data when the bit for a collection request turns ON after the bit for the collection pattern for stopping collection has turned ON. After the SYSMAC SPU Unit has stopped collecting data, the respective collection pattern bits turn OFF. The following table shows the bit arrangement for basic collection and the collection patterns.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n+11	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
	$\overline{}$							$\sim$							$\sim$	
Collection patterns 1 to 15 Basic collection																
n+12	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
n+13	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
n+14	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
n+15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64
~																

Collection patterns 16 to 64

#### **Collection Request**

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n+16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Request bit

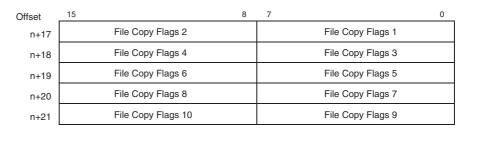
Bit	Name	Description
0	Request bit	The following collection actions are requested when this bit turns ON.
		<ul> <li>Start the collection pattern that is turned ON by the collection start specification.</li> </ul>
		<ul> <li>Stop the collection pattern that is turned ON by the collection stop specification.</li> </ul>
		After data collection has started or stopped, the SYS- MAC SPU Unit turns OFF the respective collection specification bit. If both the start and stop bits turn ON for a collection pattern neither specification will be executed.

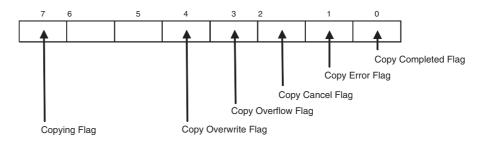
Note

In Sampling Mode, collecting can be started or stopped by executing the command from the CPU Bus Unit Area DM Area (command area (n+30)).

File Copy Flags (SPU If the copy option is enabled, the status of copy processing is shown by the Unit to CPU Unit) File Copy Flags. The File Copy Flags are allocated in words n+17 to n+21 in the CPU Bus Unit Area in the CIO Area. One byte is allocated for each collection pattern for which the copy option is enabled. The File Copy Flags are allocated in ascending order of the collection pattern numbers. The words where the File Copy Flags are allocated and the bit configuration are shown below.

Section 7-2





Bit	Name	Description
0	Copy Completed Flag	Turns ON when copy processing is completed nor- mally.
1	Copy Error Flag	Turns ON when an error occurs in copy processing.
2	Copy Cancel Flag	Turns ON when the CSV file in the copy source journal folder is overwritten during copy processing.
3	Copy Overflow Flag	Turns ON when file copying cannot be performed because the number of files in the data folder exceeded the limit during copy processing.
		Note: This occurs only when overwriting files in the data folder is disabled in the copy options.
4	Copy Overwrite Flag	Turns ON when a file is overwritten (i.e., deleted) because the number of files in the data folder exceeded the limit during copy processing. In this case, the file is copied, so the Copy Completed Flag will turn ON at the same time.
		Note: This occurs only when overwriting files in the data folder is enabled in the copy options.
5 to 6	(Not used.)	
7	Copying Flag	Turns ON when copying is processed. All other bits will turn OFF. Turns OFF when copy processing is completed normally or when copy processing ends due to an error.

Note

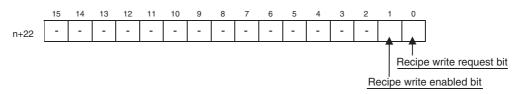
- (1) The File Copy Flag numbers are allocated in ascending order of the collection pattern numbers for which the copy option is enabled.
  - (2) If the order of the pattern numbers changes because you change a pattern number, the File Copy Flag numbers will also change.
  - (3) With SPU-Console version 2.2 or higher, you can check the File Copy Flag numbers on the list that is displayed when you select all data collection patterns.

	Name	File Copy Flag Index	Pattem Index
Enable	Basic Collection	-	Sampling
Enable	Data Collection Pattern1	4	DataWriter_63
Enable	Data Collection Pattern2	5	DataWriter_64
Enable	Data Collection Pattern3	1	DataWriter_3
Enable	Data Collection Pattern4	2	DataWriter_4
Enable	Data Collection Pattern5	3	DataWriter_5
Enable	Data Collection Pattern6	-	DataWriter_6
Enable	Data Collection Pattern7	-	DataWriter_7

- **Note** All of the File Copy Flags are turned OFF at the following times.
  - (1) When the SPU Unit is started
  - (2) When command 04 (clear the collection data) or command 31 (format the Memory Card) is executed
  - (3) When data collection settings are changed
- **Note** If copy processing requires little time because the size of the copied files is small and if the cycle time of the CPU Unit is long, the File Copy Flags may not change. As a guideline, we recommend a CPU Unit cycle time of 50 ms or less for a file size of 1 KB or less. Use caution when you monitor the File Copy Flags from the program.

#### Recipe Command Area (CPU Unit to SPU Unit)

Writes recipes. For details on the recipe function, refer to 12-1 Recipe Function.



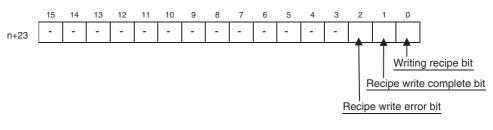
Bit	Name	Description
0	Recipe write request bit	When this bit turns ON, the SYSMAC SPU Unit writes the recipe. After the recipe write operation has been completed, the operation for turning the bit OFF depends on the recipe environment settings (hand- shaking).
		<ul> <li>When turned OFF by the SYSMAC SPU Unit, there is a 1-bit handshake.</li> </ul>
		<ul> <li>When turned OFF by the CPU Unit, there is a 2-bit handshake.</li> </ul>
		For details on recipe environment settings (hand- shaking), refer to <i>12-4 Setting the Recipe Environ-</i> <i>ment</i> .
1	Recipe write enabled bit	When this flag is OFF, recipes cannot be written. Keep this bit OFF when equipment is being operated and when recipes are not to be written.
2 to 15	(Not used.)	

Note

te If the expanded recipe function is used, do not turn ON bit 00 from the CPU Unit. When you use recipes set using the expanded recipe function, turn ON the bit in the area set for the Recipe Request Bits in the recipe reception settings. Manipulate bit 00 to use recipes set using the version-2 recipe function.

#### Recipe Status Area (SPU Unit to CPU Unit)

The recipe write status is reflected in this area as shown below. Refer to *12-11 Executing Recipes* for details on writing recipes.



Bit	Name	Description
0	Writing recipe bit	ON while a recipe is being written.
1	Recipe write complete bit	ON when the recipe writing operation is completed.
2	Recipe write error bit	ON when a recipe writing error occurs.
3 to 15	(Not used.)	

# 7-3 DM Area

For each SYSMAC SPU Unit, a CPU Bus Unit Area is allocated in the DM Area in the CPU Unit. Information is stored in offset locations from the beginning word of each memory area, as shown in the table below. Beginning word n can be calculated using the following equation:

Beginning word address n = 30,000 + (100 x unit number of SYSMAC SPU Unit)

Offset	15 8	7 0			
	IP address 1 (ww	ww. xxx. yyy. zzz )			
n	www	ххх			
n+1	ууу	ZZZ			
	IP address 2 (wv	vw. xxx. yyy. zzz )			
n+2	www	WWW XXX			
n+3	ууу	ZZZ			
n+4	FINS address (ETN) Network address	FINS address (ETN) Node address	Status information (SPU		
n+5	UDF	P port	Unit to CPU Unit)		
n+6	FINS address (CS1 bus) Network address	FINS address (CS1 bus) Node address			
n+7	CPU Unit node a	address in CS1 bus			
n+8	Syste	m status			
n+9	(Not	used.)			
n+10	Memory Care				
n+11	Memory Card av				
n+12	Status of services (FTP transfe	Status of services (FTP transfers and expanded recipe function)			
n+13	(Not				
… n+19	(Not	used.)	]		
n+20	Program	m number			
n+21	Errc	or level	Error information		
n+22	Erro	or code	(SPU Unit to CPU Unit)		
n+23	Error	subcode			
n+24	(Not	used.)			
… n+29	(Not	used.)	]		
n+30	Comm	Command Area			
n+31	(Not	t used.)			
n+34	(Not	t used.)	]		
n+35	Record Counter				
n+35	Record Counter for	r Collection Pattern 1	Record Counters		
n+35	Record Counter fo	or Collection Pattern 2	(SPU Unit to CPU Unit)		
··· n+99	Record Counter for	r Collection Pattern 64			

Note Do not used the areas indicated "not used."

### System Status (n+8)

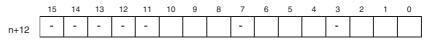
The operating status of the SYSMAC SPU Unit is reflected here. The following table shows the values and their meanings (SYSMAC SPU Unit status).

Value	Status	Meaning
0	Idle	The SYSMAC SPU Unit is in idle status.
1	Settings change	Data collection settings or Unit settings are being changed.
2	Sampling	Data is being collected.
3	Initialization	The SYSMAC SPU Unit is being initialized.
4	Archive	Collected data is being saved or data collection set- tings are being recovered.

#### Status of Services (FTP Transfers and Expanded Recipe Function) (n+12)

The following bits show the operating status of sending and receiving using FTP and the operating status of the expanded recipe function.

The following table describes the bits.



Bit	Status	Name	Description
0	Standby	FTP send sta-	Executable status.
		tus (used for	ON when settings 0 to 9 are all on standby.
1	Changing	settings 0 to 9)	The settings are being changed.
			ON when the data collection settings or the FTP settings are being changed.
2	Executing		Data is being sent using FTP.
			ON when any setting from 0 to 9 is being executed.
3	(Not used.)		
4	Standby	Expanded rec-	Executable status.
5		ipe status (used	ON when settings 0 to 9 are all on standby.
	Changing Executing	for settings 0 to 9)	The settings are being changed.
			ON when the recipe settings are being changed.
6			Expanded recipe function is being pro- cessed.
			ON when any setting from 0 to 9 is being executed.
7	(Not used.)		
8	Standby	FTP receive	Executable status.
		status (used for	ON when settings 0 to 9 are all on standby.
9	Changing	settings 0 to 9)	The settings are being changed.
			ON when the recipe settings or the FTP settings are being changed.
10	Executing		Expanded recipe function is being pro- cessed.
			ON when any setting from 0 to 9 is being executed.
11	(Not used.)	1	
12 to 15	(Not used.)	(Not used.)	

Error Information (n+20 to n+23)	Information on the most recent errors to occur in the SYSMAC SPU Unit is reflected here. These values are not cleared even when the errors are cleared. The values are cleared when the Unit is restarted or when command 11 (Forced Clear of Error) is executed. For a list of error codes, refer to <i>Appendix A Troubleshooting with Error Codes</i> .
<u>Command Area</u> <u>(n+30)</u>	A command can be executed by specifying the command number (in hexa- decimal) in this area. It is not possible, however, to continuously execute the same command in this way. To repeat a command, specify "0" (no command) and then again specify the command.
	The commands that can be executed depend on the operation mode. For details on commands, refer to 15-1 List of Data Storage Mode Commands and 20-1 Commands.
<u>Record Counters</u> (n+35 to n+99)	A record counter is incremented each time a record is added to a CSV file. An area of 65 words from n+35 to n+99 in the CPU Bus Unit Area in the DM Area is allocated to the record counters for basic collection and for Data Collection Mode (64 patterns). The record counters contain 2-byte unsigned integers (0 to 65,535). A record counter is incremented each time a record is added to a CSV file. If the value exceeds the maximum value of 65,535, it returns to 0.
Note	(1) The offset positions of the record counters are in order of the collection pattern numbers. This is different from the order in which they are dis- played on the SPU-Console.
	(2) With SPU-Console version 2.2 or higher, you can change the collection pattern number of each collection pattern. Refer to <i>10-5-2 Setting Collection Options</i> for details.
	(3) The record counter values return to 0 at the following times.
	(a) When the SPU Unit is started
	(b) When cyclic collection for the collection pattern is stopped
	(c) When the CSV file in which records are recorded for the collection pattern changes to the next CSV file
	(d) When data collection settings are changed
Note	<ul> <li>(1) If the number of records recorded in a file is set to 1 in the data collection pattern settings, the next file is changed to each time a record is record- ed. Therefore, the value in the record counter will change between 0 and 1.</li> </ul>
	<ul> <li>(2) If the collection cycle is short or the cycle time of the CPU Unit is long, changes in the value of the record counter may not be synchronously up- dated in the CPU Bus Unit Area.</li> <li>Examples:</li> </ul>
	• If the collection cycle is 10 ms, the record counter may change as follows: 0, 5, 11, 16, 23, etc.
	• If the number of records recorded in a file is set to 1, the record counter may remain at 0.
	Use caution when you monitor the record counters from the program.

# **Data Storage Mode**

This part of the manual describes using the SPU-Console with the SYSMAC SPU Unit in Data Storage Mode. Refer to 4-2 *Confirming the Operating Mode* to confirm that the SYSMAC SPU Unit is in Data Storage Mode. Refer to 4-3 *Changing the Operating Mode* to change the SYSMAC SPU Unit to Data Storage Mode.

# SECTION 8 Data Storage Mode

This section introduces the SYSMAC SPU Unit's Data Storage Mode.

8-1Data Storage Mode Introduction.70

# 8-1 Data Storage Mode Introduction

Data Storage Mode is used to record specific portions of PLC I/O memory when a specified event occurs. For example, this mode can be used to record data when a certain bit turns ON or at a certain time. After an event occurs, data recording can be continued for a specified time interval. Compared with Sampling Mode, however, the time interval is less accurate.

The Data Storage Mode settings set the data in the CPU Unit's I/O memory to be collected by the SYSMAC SPU Unit and the collection method to be used.

The data to be collected is specified in units called variables. The PLC's I/O memory addresses and data types are specified in the variables. Data is converted to the specified data type values and recorded. Scale conversion of these values is also possible. In Data Storage Mode, collected CSV files can be copied automatically to separate folders. Date, time, and variable values can be included with the file names of the copied files. Specifying information such as this for variable values enables files to be managed.

Data collection patterns consist of basic collection for single data, and data collection for multiple data (64 max.). For each data collection pattern, the length of the data collection time interval, number of records, name of the file to be saved, and whether a single file or multiple files are to be used (saving format) are specified.

The event settings that specify the time for data collection to start are also set. Events are either memory events, which occur when specific conditions are satisfied by values in memory, and schedule events, which occur at specific times or time intervals. The combination of these events with the processing that is performed when the events occur are called event rules. Event rules such as "data is recorded in a CSV file whenever a certain bit turns ON" or "data is recorded in a CSV file every data at 8:00" can be set.

Of the available data collection patterns, only basic collection will read PLC I/O memory data in the CPU Unit. Basic collection reads to the SYSMAC SPU Unit variable data recorded in all data collection patterns for a specific cycle.

This processing is always executed even with basic collection stopped, so there is no need to start basic collection.

Other data collection patterns use data read to the SYSMAC SPU Unit and record that data according to the settings. Basic collection enables a time interval to be set of between several milliseconds to several ten's of milliseconds, whereas the time interval for other data collection patterns is normally 100 milliseconds or longer.

In addition, Data Storage Mode has a recipe function for writing numeric and text data, such as production parameters, to a memory area in the CPU Unit. Using recipes simplifies tasks such as retooling. Numeric and text data can be created in advance in a CSV file and stored in the SYSMAC SPU Unit. This data can be changed even while the SYSMAC SPU Unit is operating. With the recipe function in version 2.0, it is possible to change numeric and text data while the SYSMAC SPU Unit is in operation. With the expanded recipe function in version 2.1, the data collection settings must be changed to register the Recipe Request Bit to a variable.

The status of a machine at a certain point in time can be reproduced by using collected data and the recipe function. For example, the machine's master data and inspection data are collected as recipe data. The machine's status can be reproduced by using a recipe to write the collected data to a PLC memory area. In this way, collected data can be handled not only as a daily report, but also as parameters for feedback to the machine.

**Note** If you set up the expanded recipe function, the Recipe Request Bits are automatically registered to variables and to memory events. This requires that you change the data collection settings.

# 8-2 Data Collection Timing

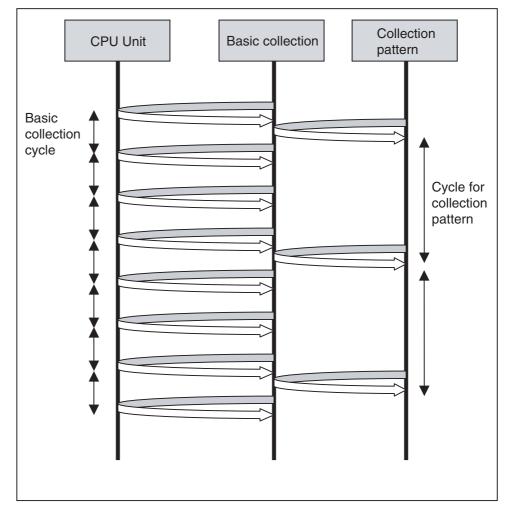
Basic CollectionIn Data Collection Mode, the SYSMAC SPU Unit loads all of the registeredCyclevariable data from the CPU Unit on the cycle that is set for basic collection.

However, the actual cycle on which the SYSMAC SPU Unit loads data is never shorter than the cycle time of the CPU Unit. The data collection cycle will always be at least as long as the cycle time even if the cycle that is specified for basic collection is shorter than the cycle time of the CPU Unit.

**Note** Processing to transfer variable data from the CPU Unit to the SYSMAC SPU Unit on the basic collection cycle is always performed, even when basic collection is stopped (i.e., when writing to CSV files is stopped). It is not necessary to start basic collection.

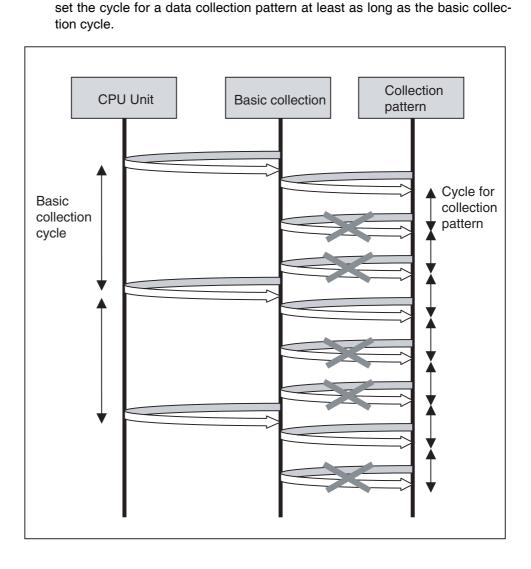
#### Cycles for Data Collection Patterns

Data collection patterns use the data that is transferred to the SYSMAC SPU Unit for basic collection to record the data according to the settings for individual patterns. Therefore, the cycle for a data collection pattern must be at least as long as the basic collection cycle.



Note

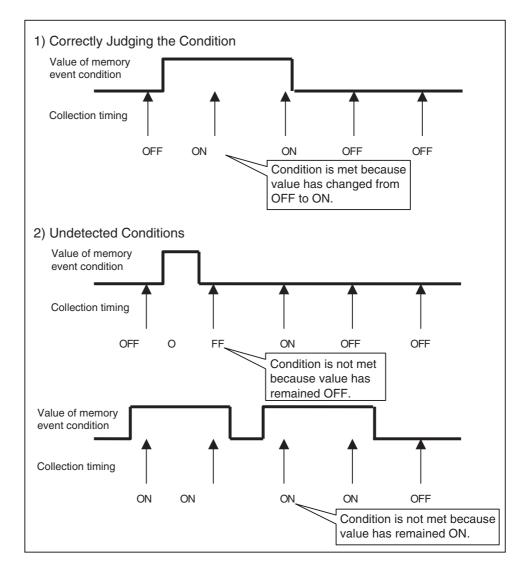
If you set the cycle for a data collection pattern that is shorter than the basic collection cycle, records will not be recorded for the data collection pattern until basic collection has been performed. Therefore, we recommend that you



#### Timing of Judging Memory Events

The SYSMAC SPU Unit judges the conditions for memory events. The SYS-MAC SPU Unit judges memory events as soon as it loads the data from the CPU Unit of the PLC for basic collection. Therefore, the values for memory event conditions must be held for longer than the basic collection cycle.

The following example is for when the memory event condition is *When the bit is ON*.



**Note** The data collection cycle will always be at least as long as the cycle time even if the basic collection cycle is shorter than the cycle time of the CPU Unit. To ensure that memory event conditions are correctly judged, we recommend that the settings satisfy the following guideline.

Time to hold value of memory event condition > Basic collection cycle  $\times$  2 + Cycle time

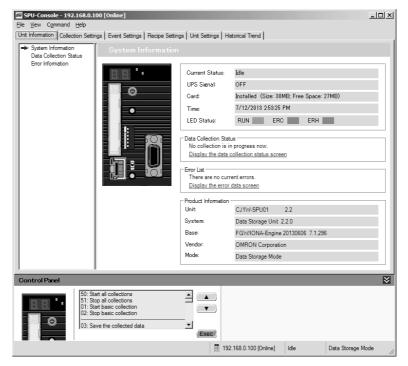
# SECTION 9 Monitoring SYSMAC SPU Unit Operating Status

This section describes how to monitor SYSMAC SPU Unit operating status and error status.

9-1	Display	ing System Information	76
9-2	Display	ing Data Collection Status	77
	9-2-1	Starting a Collection Pattern	77
	9-2-2	Stopping a Collection Pattern	77
9-3	Display	ring Error Information	78

# 9-1 Displaying System Information

The operating status of an SYSMAC SPU Unit can be monitored from the System Information display on the Unit Information Tab Page.



#### System Information Display Items

Item	Content
Current Status	Operating status of the current SYSMAC SPU Unit
PF-IN Signal	Status of the power failure signal
Card	Whether a Memory card is inserted in the SYSMAC SPU Unit Memory Card capacity and available space
Time	The time in the SYSMAC SPU Unit
LED	The status of the RUN, ERC, and ERH indicators
Data collection sta- tus	Collection pattern currently in use
Error list	Current errors
Product Information	The SYSMAC SPU Unit model number and system program version

#### **Current Status**

The SYSMAC SPU Unit current status contains the following status.

Status	Meaning
Idle	SYSMAC SPU Unit is in idle status.
Collecting	Basic collection or a collection pattern is being executed.
Change the settings	Data collection settings or Unit settings are being changed.
Archive	Record data is being saved or data collection settings are being recovered.
Initialization	The SYSMAC SPU Unit is being initialized.

# 9-2 Displaying Data Collection Status

The status of data collection can be monitored in the Data Collection Status Window, from the Unit Information Tab Page. Collection patterns can also be started and stopped.

SPU-Console - 192.168.0.1 le View Command Help			nan 🛙 Hait Sattinan 🗍 k	interioral Trand			_10		
System Information	gs   Event Settings   Recipe Settings   Unit Settings   Historical Trend   Data Collection Status								
Error Information	Status	Name	Description	Interval	Period	Total Size	Filename		
	Stopped	Basic Collection		7ms	28	703.1KB	DataWriter.csv		
51: Sto 01: Sta 02: Sto	art all collecti p all collecti art basic colle p basic collecti ve the collection	ons ection ection	× Exec	Start/stop the s	selected collec				

The following table shows the meanings of the column headers.

Column header	Contents				
Status	Collection pattern operating status				
Name	Name of collection pattern				
Description	Description of collection pattern				
Interval	Interval for collecting data				
Period	Time required to record data in all files				
Total size	Total size the data collection files and the files to copy to the data folder				
File name	Name of file in which the results of the collection pattern are saved				

### 9-2-1 Starting a Collection Pattern

- *1,2,3...* 1. Select the collection pattern to be started.
  - 2. Click the Start Button.

### 9-2-2 Stopping a Collection Pattern

- *1,2,3...* 1. Select the collection pattern to be stopped.
  - 2. Click the **Stop** Button.

#### 9-3 **Displaying Error Information**

The error status of an SYSMAC SPU Unit can be monitored from the Error Information Window on the Unit Information Tab Page.

Refer to Appendix A Troubleshooting with Error Codes for details on error codes.

#### **Displaying Current Errors**

- 1. Select the Show Current Errors Option. The current errors in the SYS-1,2,3... MAC SPU Unit will be displayed.
  - To forcibly clear the current errors, click the Clear Errors Button.
  - . To save information on the current errors to a file, click the Save to File Button.

SPU-Console - 192.168.0 File View Command Help Unit Information Collection Setti			tings [ Unit Settings	Historical	Trend )		_	<u>.     ×</u>
System Information Data Collection Status	r	orInformation						
🗰 Error Information	No.	Program	Code	Subcode	Description			
	09	Unit lom	95	00	The Memory	Card is not mounted		
		ow current errors				1	<u>C</u> lear Errors	
	O She	ow error history				1	Sav <u>e</u> to File	
Control Panel								≷
51: S 01: S 02: S	tart all collectop all collector tart basic co top basic co ave the colle	tions llection llection	Exec					
				192.168.0.	100 [Online]	ldle	Data Storage Mode	e

Note

Error information is deleted in the following cases.

- (1) When the SYSMAC SPU Unit is restarted
- (2) When errors are eliminated
- (3) When data collection settings or unit settings are made
- (4) When command 11 (Forced Clear of Error) is executed
- (5) When the Clear Errors Button is clicked from Error Information in the Unit Information Tab Page of the SPU-Console.

#### **Displaying Error History**

- 1,2,3... 1. Select the Show error history Option. The error history at the SYSMAC SPU Unit will be displayed.
  - To update to the most recent information, click the **Refresh** Button.
  - To clear the error history, click the Clear Errors Button.
  - . To save the error history information to a file, click the Save to File Button.

System Information Data Collection Status	Erro	or Information				
Error Information	No.	Program	Date/Time	Code	Subcode	Description
	14	DataWriter_1	2013/07/12 09:35:42	8A	291	Data folder copy failure.
	14	DataWriter_1	2013/07/12 09:34:35	8A	291	Data folder copy failure.
	14	DataWriter_1	2013/07/12 09:34:34	8A	291	Data folder copy failure.
	14	DataWriter_1	2013/07/12 09:34:32	8A	291	Data folder copy failure.
	U Sho	w current errors				<u>Clear</u> Errors
	Sho	w error history	<u>R</u> efresh			Sav <u>e</u> to File
	1	-				
	1					
ontrol Panel	1					
	tart all collect	ions				
51: 5	tart all collect top all collect tart basic coll	ions				

- **Note** The error history holds a maximum of 80 records. If this number is exceeded, the oldest item in the history is deleted. The error history is saved to the Memory Card. It is deleted in the following cases:
  - (1) When the Clear Errors Button is clicked.
  - (2) When the Memory Card is formatted.
  - (3) When the Memory Card is replaced.

# SECTION 10 Data Collection Settings for Data Storage Mode

This section explains how to make the data collection settings for Data Storage Mode operation.

10-1	Data Co	Illection Setting Procedure	8
10-2	Data Co	llection Settings Window and Operation	8
	10-2-1	Window Configuration	:
	10-2-2	Operations in the Classification Panel	
	10-2-3	Basic Operations in the Variable Panel.	
10-3	Setting	Variables	
	10-3-1	Adding Variables	
	10-3-2	Operations in the Variable Properties Dialog Box	
	10-3-3	Setting the Scaling Function for a Variable	
	10-3-4	Adding Multiple Variables Together.	
	10-3-5	Operations in the Add Consecutive Variables Dialog Box	
	10-3-6	Using the CX-Programmer's Variables	
	10-3-7	Importing and Exporting Variables.	
	10-3-8	Changing Variables	
	10-3-9	Deleting Variables	
	10-3-10	Selecting a Data Collection Pattern and Adding Variables	
	10-3-11	Deleting Variables from a Data Collection Pattern	
	10-3-12	Registering an Existing Variable in a Data Collection Pattern	
		Managing Variables in Groups	
		Changing the Order of Variables in a Data Collection Pattern	
	10-3-15	Variables Automatically Registered for the Expanded Recipe Function or FTP Transfers	
10.4	C		
10-4		Data Collection Patterns	
	10-4-1	Adding a Data Collection Pattern	
	10-4-2	Deleting a Data Collection Pattern	
	10-4-3	Copying Data Collection Patterns.	
10-5	-	Advanced Data Collection Pattern Settings.	
	10-5-1	Advanced Data Collection Pattern Settings	
	10-5-2	Setting Collection Options	
	10-5-3	Setting File Options	
	10-5-4	Setting Copy Options	1
	10-5-5 10-5-6	Setting Record Conditions	1 1
10.6		FTP Send Settings	
		g the Data Collection Settings	1
10-7		ng Data Collection	1
	10-7-1	Starting Data Collection	1
10-8		ing the Collection Result Folder	1
	10-8-1	Collection Result Folders	1
	10-8-2	Copied Collection Result Folders	1
10-9	Saving (	Collection Data	1

# **10-1 Data Collection Setting Procedure**

An outline of the basic procedure from making data collection settings to executing data collection is as follows:

- *1,2,3...* 1. Make the variable and data collection pattern settings.
  - 2. Set the events. (Refer to SECTION 11 Event Settings for Data Storage Mode.)
  - 3. Enable the settings in the SYSMAC SPU Unit.
  - 4. Execute data collection.
  - 5. Display the data collection results folder.

# **10-2 Data Collection Settings Window and Operation**

#### 10-2-1 Window Configuration

Select the **Collection Settings** Tab in SPU-Console to display the setting window for data collection.

	ollection Pattern Settings				
OAll Variables	Name	Address	Data Type	Elements Scaling	Unit
- ● All Data Collection Patterns	Tag0000	D00000	UINT 🔻	1	
Basic Collection	Tag0001	D00001	UINT	1	
	Tag0002	D00002	UINT	1	
	Tag0003	D00003	UINT	1	
	Tag0004	D00004	UINT	1	
	Tag0005	D00005	UINT	1	
1	Tag0006	D00006	UINT	1	
	Tag0007	D00007	UINT	1	
	Tag0008	D00008	UINT	1	
	Tag0009	D00009	UINT	1	
	Tag0010	D00010	UINT	1	
	Tag0011	D00011	UINT	1	
	Tag0012	D00012	UINT	1	
	Tag0013	<b>b</b> 00013	UINT	1	
	•				•
ontrol Panel					
50: Start all co 51: Stop all co 01: Start basic 02: Stop basic 03: Save the o	ollections collection collection	- A V	Click Send Set	tings to transfer the settin	_
variable(s) 1 line(s)			▲   100 [Online]	dle Data Sto	rage Mode

## 10-2-2 Operations in the Classification Panel

The following table explains the basic operations in the Classification Panel.

SPU-Console - SPU-Unit1 (10.6.139.202) [Onli File View Command Variable Settings Collection Patterns

Die Tett eStimate 181	0010 001011go	
Unit Information Collection	Settings Ev	ent Settings Recipe
Variable Settings	oups 100 101 up> ata Type emory Area	Collection Pattern Set
Data Collection	on Pattern1	Tag0010 Tag0012
		Tag0013
Item		Operation method and function
All Variables If this opti played.		on is selected, all of the set variables will be dis-
Display in Groups		ables have been grouped, this option can be o organize and display the variables by group.
Display by Data Types		on is selected, variables will be organized and by data type, such as UINT and REAL.
Display by Memory		on is selected, variables will be organized and

	Display by Memory Area	If this option is selected, variables will be organized and displayed by the variables' data area addresses, such as DM.
All [ tern		If this option is selected, all of the collection pattern infor- mation will be displayed.
	Data Collection Pat- terns	If this option is selected, the variables for which data col- lection is to be performed will be displayed.
		For example, if variable X is displayed under <i>Basic Collec-</i> <i>tion</i> , variable X will be recorded using <i>Basic Collection</i> .

## **10-2-3** Basic Operations in the Variable Panel

This section describes the name and meaning of each part of the Variable Panel.

		Name	۵	Address	Data Type 🛝	Element	
	Þ	Var_0000		D00000	UINT	1	
Row headers		Var_0001		D00001	UINT	1	
$\backslash$		Var_0002		D00002	UINT	f	Column headers
		Var_0003		D00003	UINT	1	
	Ì	Var_0004		D00004	UINT	1	
		Var_0005		D00005	UINT	1	

#### Section 10-2

		•• •
	Column	Meaning
	Name	Shows the variable's name.
	Address	Shows the variable's I/O memory address in the PLC.
	Data Type	Shows the variable's data type. Data from the PLC's I/O mem- ory is converted to this data type and recorded.
	Element	Displays the number of elements in the data array. When the data type is STRING, the number of characters is shown. When the data type is CHANNEL_BLOCK, the number of consecutive areas is shown.
	Scaling	Displays the conversion method when scaling is set.
	Engineering	Specifies the industrial units as the user-set text string.
	Data Collection Pat- tern	Specifies the data collection pattern in which this variable is recorded.
	Description	Shows a user-set description of the variable.
Oben sing the News	_	operations can be performed in the Variable Panel.
Changing the Name, Number of Elements, Units, or Description	Click the cell to be c	hanged and directly input the new text.
Changing the Address		changed, click the Button, input the new address in the and click the <b>OK</b> Button. The new address can also be cell as a text input.
Changing the Data Type	Select the cell to be drop-down list.	changed and select the new data type from the displayed
Changing the Data Collection Pattern		changed, click the Button to display the dialog box, and data collection patterns used for collecting data for the
Selecting Variables	Selecting a Single	<u>Variable</u> riable's row header cell.
	Coloctine Multiple	Veriables
	Selecting Multiple Press and hold the variables.	<b>Ctrl</b> Key while clicking the row header cells of multiple
		of Consecutive Variables le's row header cell. Press the Shift Key while and click w header cell.
	Selecting All Varial Press the Ctrl+A Ke	
Note		d when you right-click on the Variable Panel will include rol character, but this command cannot be used.
10-3 Setting Varia	bles	

The following table describes the column headers.

The data to be sampled is specified with variables. Before collection, register each variable with the desired variable name, CPU Unit address, data type, and number of elements. Set the variables in the Variable Panel.

The variables can also be set with OMRON's CX-Programmer Support Software (version 2.0 or later) on the Variable Tab Page.

## 10-3-1 Adding Variables

The procedure for adding variables depends on the point clicked in the Classification Panel.

Directory tree under All Variables	The variable will be added, but it will not be registered in the data collection pattern. To register the variable in a data collection pattern, it is necessary to separately select <i>Register</i> to the Collection Pattern.
Directory tree under All Sampling Patterns	The added variable will be registered in the selected data collection pattern.

- *1,2,3...* 1. Click the SPU Console's **Collection Setting** Tab.
  - 2. Select *Variable Setting Add Variable* or right-click the Variable Panel and select *Add Variable* from the popup menu.

The Variable Properties Dialog Box will be displayed. For details, refer to *10-3-2 Operations in the Variable Properties Dialog Box*.

## 10-3-2 Operations in the Variable Properties Dialog Box

Use the Variable Properties Dialog Box to make variable settings such as the variable's address and data type. Enter the new settings in the dialog box and click the **OK** Button to change the variable's settings.

Variable Properties	×
Name: Tag000	10
Group Name: (None)	V
Description:	
Variable Data Scaling	
Address	
Memory Area:	✓ D00000
DM: 0	) - 32767
Word:	0÷ Bit:
Data Type:	UINT
	Unsigned integer: 0 - 65535
No. of Elements:	1
Unit	V (Optional)
	OK Cancel

The following table describes the variable's settings.

Item	Function
Name	Sets the variable's name.
Group name	Specifies the group in which the variable belongs.
Description	Input a description of the variable. This entry can be omitted.

The following table describes the settings on the Variable Information Tab Page.

Item	Function
Address	Specifies the variable's memory location.
	Specify the data area in the <i>Memory type</i> Field and specify the offset from the beginning of the data area in the <i>Channel</i> Field.
	If the variable represents a bit, specify the bit number (0 to 15) in the <i>Bit</i> Field. If the variable does not represent a bit, leave this field empty.
Data type	Specifies the data type.
Number of elements	Specifies the number of elements of data for a data array.
	A number of consecutive data elements with the same proper- ties can be handled as a single variable. When the data type is set to <i>STRING</i> , the <i>Number of elements</i> sets the length of the string. When the data type is set to CHANNEL_BLOCK, the data in the consecutive areas set in <i>Number of elements</i> is handled as a single data item with no commas.
Engineering units	Specify a text string that shows the variable's units. This entry can be omitted.

**Note** The following characters cannot be used in the variable's *Name* or *Groupname*: /, \, commas, spaces, quotation marks (' or "), carriage returns, or tab codes.

The following table describes the types of data.

Data type	Description
BOOL	BOOL format: 0 to 1
UINT	Unsigned integer: 0 to 65,535
UDINT	Unsigned 2-word integer: 0 to 2 <sup>32–1</sup> (0 to 4,294,967,295)
INT	Integer: -32,768 to 32,767
DINT	2-word integer: $-2^{31}$ to $2^{31-1}$ (-2,147,483,648 to 2,147,483,647)
UINT_BCD	Unsigned BCD: 0 to 9,999
UDINT_BCD	Unsigned 2-word BCD: 0 to 99,999,999
REAL	Real number: -10 <sup>-38</sup> to 10 <sup>+38</sup>
LREAL	4-word real number: -10 <sup>-308</sup> to 10 <sup>+308</sup>
CHANNEL	Channel: #0 to #FFFF
WORD	16-bit text string: #0 to #FFFF
DWORD	32-bit text string: #0 to #FFFFFFF
CHANNEL_BLOCK	Channel block: Consecutive channels
STRING	ASCII text string

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *10-3-3 Setting the Scaling Function for a Variable*.

## 10-3-3 Setting the Scaling Function for a Variable

If a variable requires scaling, the scaling method can be specified on the Variable Properties Dialog Box's Scaling Tab Page. If a variable does not require scaling, it isn't necessary to specify scaling function.

Variable Prope	erties 🔀
Name:	Tag0000
Group Name:	(None)
Description:	
Variable Data	Scaling
Scaling Metho	d: LinerFunction 🗸
Linear Fund	stion Conversion
Scaling v	alue = a x Value + b
a =	1 b = 0
F	Post-conversion Data Type: double 👻
	OK Cancel

The following table describes the Scaling methods on the Scaling Tab Page.

Item	Function
Linear function con- version	The memory value is converted with a linear equation and the result is recorded as the <i>Post-conversion Data Type</i> . Specify a floating-point data type (float or double) for the <i>Data type after conversion</i> .
	The result is calculated from the specified constants (a and b) as follows: Result = $a \times memory value + b$
	This can be used, for example, in converting numbers from inches to centimeters.
Maximum/Minimum conversion	Memory values with a predetermined upper and lower limit are converted according to that upper and lower limit range and the result is recorded as the <i>Post-conversion Data Type</i> . Specify a floating-point data type (float or double) for the <i>Data</i> <i>type after conversion</i> .
	This can be used, for example, to convert numbers from 0 to 6,000 input by an AD Unit to a temperature.
Decimal position conversion	The memory value's decimal point can be moved from left to right to the specified position. The result is recorded as the <i>Post-conversion Data Type</i> . Specify a floating-point data type (float or double) for the <i>Data type after conversion</i> .

## 10-3-4 Adding Multiple Variables Together

A number of consecutive variables with the same properties can be registered together.

- *1,2,3...* 1. Click the SPU Console's **Collection Setting** Tab.
  - 2. Select *Variable Setting Add Consecutive Variables* or right-click the Variable Panel and select *Add Consecutive Variables*.

The Add Consecutive Variables Dialog Box will be displayed. For details, refer to *10-3-5 Operations in the Add Consecutive Variables Dialog Box*.

## **10-3-5** Operations in the Add Consecutive Variables Dialog Box

Use the Add Consecutive Variables Dialog Box to set a number of consecutive variables with the same properties. make variable settings such as the variable's address and data type. Enter the settings in the dialog box and click the **OK** Button to register the consecutive variables.

Add Consecuti	ve Variables 🛛 🗙
Name:	Tag Tag0000 - Tag0009
Start Number:	0 * No. of Variables: 10 *
Group Name:	(None)
Description:	
Variable Data	Scaling
Address	
Memory Area	a DM 🗸 D00000
	DM: 0 - 32767
Word:	0 <u></u> → Bit:
Data Type:	UINT 🗸
	Unsigned integer: 0 - 65535
No. of Eleme	nts: 1÷
Unit:	V (Optional)
	OK Cancel

The following table describes the array variable's settings.

Item	Function
Name	Sets the variable's name. An index number will be attached after the variable name.
Start number	Specifies the starting number of the index number that appears after the variable name.
Number of variables	Specifies the number of variables being added.
Group name	Specifies the group in which the variable belongs.
Description	Input a description of the variable. This entry can be omitted.

The following table describes the settings on the Variable Information Tab Page.

Item	Function
Address	Specifies the variable's memory location.
	Specify the data area in the <i>Memory type</i> Field and specify the offset from the beginning of the data area in the <i>Channel</i> Field.
	If the variable represents a bit, specify the bit number (0 to 15) in the <i>Bit</i> Field. If the variable does not represent a bit, leave this field empty.
Data type	Specifies the data type. For details, refer to 10-3-2 Operations in the Variable Properties Dialog Box.

Item	Function
Number of elements	Specifies the number of elements of data for a data array.
	A number of consecutive data elements with the same proper- ties can be handled as a single variable. When the data type is set to <i>STRING</i> , the <i>Number of elements</i> sets the length of the string. When the data type is set to CHANNEL_BLOCK, the data in the consecutive areas set in <i>Number of elements</i> is handled as a single data item with no commas.
Engineering units	Specify a text string that shows the variable's units. This entry can be omitted.

**Note** The following characters cannot be used in the variable's *Name* or *Groupname*: /, \, commas, spaces, quotation marks (' or "), carriage returns, or tab codes.

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *10-3-3 Setting the Scaling Function for a Variable*.

## 10-3-6 Using the CX-Programmer's Variables

Variables set with the CX-Programmer can be used.

- *1,2,3...* 1. Start the CX-Programmer and display the variable table.
  - 2. Select the variables to be used in the SPU-Console and select Edit Copy.
  - 3. Click the SPU-Console's **Collection Settings** Tab and display the Variable Panel.
  - 4. Select *Variable Settings Paste from the Clip Board*. If the variable does not have a variable name, a variable name will be allocated automatically based on the variable's address and comment information.
- **Note** This function is supported by CX-Programmer version 2.0 and later versions. The following variables cannot be pasted.
  - Variables with data type LINT, ULINT, ULINT\_BCD, or NUMBER
  - Variables with automatically allocated addresses
  - Function block variables

## 10-3-7 Importing and Exporting Variables

Variable definitions can be exported to CSV files. Variable settings can be edited in programs such as spreadsheets.

#### Exporting to a CSV File

- *1,2,3...* 1. Click the SPU-Console's **Collection Settings** Tab.
  - 2. Select Export To CSV File from the Variable Setting Menu.

#### Importing from a CSV File

- *1,2,3...* 1. Click the SPU-Console's **Collection Settings** Tab.
  - 2. Select Import From CSV File from the Variable Setting Menu.

## 10-3-8 Changing Variables

- *1,2,3...* 1. Click the SPU Console's **Collection Settings** Tab and display the Variable Panel.
  - 2. Select the variable to be changed by clicking that variable's row header cell.

- 3. Select *Variable Setting Variable Properties* or right-click the Variable Panel and select *Variable Properties* from the popup menu.
- 4. Enter the new settings in the Variable Properties Dialog Box and click the **OK** Button. For details on these operations, refer to *10-3-2 Operations in the Variable Properties Dialog Box*.

## 10-3-9 Deleting Variables

- *1,2,3...* 1. Click the SPU Console's **Collection Settings** Tab to display the Classification Panel.
  - 2. Select All Variables.
  - 3. Select the variable to be deleted by clicking that variable's row header cell in the list. To select more than one variable, select the first variable, press and hold the **Ctrl** or **Shift** Key, and click the row header cell of the other variables to be deleted.
  - 4. Select *Variable Setting Delete Variable* or right-click the Variable Panel and select *Delete Variable* from the popup menu.

## 10-3-10 Selecting a Data Collection Pattern and Adding Variables

When the data collection pattern has been decided in advance, the data collection pattern can be selected and a variable can be added to that pattern. The added variable will be automatically collected and recorded in the specified data collection pattern.

- *1,2,3...* 1. Click the SPU Console's **Collection Settings** Tab and display the Classification Panel.
  - 2. Select one of the data collection patterns in the *All Data Collection Patterns* directory tree (such as *Basic Collection*) by clicking that pattern.
  - 3. Select *Variable Setting Add Variable* or right-click the Variable Panel and select *Add Variable* from the popup menu.

The Variable Properties Dialog Box will be displayed. For details on the dialog box operations, refer to *10-3-2 Operations in the Variable Properties Dialog Box*.

## **10-3-11 Deleting Variables from a Data Collection Pattern**

A registered variable can be deleted from a data collection pattern. The variable's settings are not deleted even though the variable is deleted from the data collection pattern. The deleted variable can still be found and reused in the Variable Panel's *All Variables* directory.

- *1,2,3...* 1. Click the SPU Console's **Collection Settings** Tab and display the Classification Panel.
  - 2. Select one of the data collection patterns in the *All Data Collection Patterns* directory tree (such as *Basic Collection*) by clicking that pattern.
  - 3. Select the variable to be deleted by clicking that variable's row header cell.
  - 4. Select *Variable Settings Delete Variable* or right-click the Variable Panel and select *Delete Variable* from the popup menu.

## 10-3-12 Registering an Existing Variable in a Data Collection Pattern

A variable that was set previously can be specified and registered in a data collection pattern. A variable can also be registered in multiple data collection patterns, which allows the same variable to be sampled under different collection conditions.

- *1,2,3...* 1. Click the SPU Console's **Collection Setting** Tab and display the Variable Panel corresponding to the Classification Panel's *All Variables* directory.
  - 2. Click the desired variable's cell in the *Data Collection Pattern* column and click the ... Button.
  - 3. A popup window will be displayed. Select the data collection patterns in which the variable will be registered (by adding checks next to those patterns) and click the **OK** Button.

	Name 🛛 🔺	Address	Data Type	Element	Data Collection Pat	t Scaling		Engineerin	De
Þ	Tag-0000	D00000	UINT	1	Basic Collection [	)			
	Tag-0001	D00001	UINT	1	🔽 Basic Collectio	n			
	Tag-0002	D00002	UINT	1					
	Tag-0003	D00003	UINT	1					
	Tag-0004	D00004	UINT	1					
	Tag-0005	D00005	UINT	1					
	Tag-0006	D00006	UINT	1					
	Tag-0007	D00007	UINT	1					
	Tag-0008	D00008	UINT	1					
	Tag-0009	D00009	UINT	1					
	Tag-0010	D00010	UINT	1					
	Tag-0011	D00011	UINT	1					
	Tag-0012	D00012	UINT	1	<				
	Tag-0013	D00013	UINT	1	<	1	1		
	Tag-0014	D00014	UINT	1	New Collecti	on Pattern			
	Tag-0015	D00015	UINT	1			-		
	Tag-0016	D00016	UINT	1	OK	Cancel			
	Tag-0017	D00017	UINT	1			_		

Note There are two other ways to register the variables:

- Register the variables by selecting *Variable Setting Register to the Collection Pattern*.
- Register the variables by dragging and dropping them.

## 10-3-13 Managing Variables in Groups

Variables can be organized and managed in groups.

**Creating a Group** To create a group, select the *Display in Groups* Option in the Classification Panel and select *Variable Setting - Add Group*.

- 1,2,3...
- .. 1. The Group Property Dialog Box will be displayed.

Group Prope	rty		×
Name:	Group0000		
Parent group:	(None)		▼
Description:			
		OK Can	cel

2. Add the group's name in the Name Field. In the *Parent group* Field, select the group to be the parent of the group level. (This does not need to be specified.) A description of the group can be entered in the *Description* Field. (This entry can be omitted.)

Note	The following characters cannot be used in the variable's <i>Name</i> or <i>Groupname</i> : /,  commas, spaces, quotation marks (' or "), carriage returns, or tab codes.
Deleting a Group	To delete a group, select the group to be deleted in the Classification Panel and select <i>Variable Setting - Delete Group</i> .
	If a group is deleted, all of the settings under the group will be deleted.
Changing the Group Name	To change a group's name, select the group and select <i>Variable Setting - Group Properties</i> .
Copying to a Group	To copy a variable to another group, select the variable row header to be cop- ied in the Variable Panel, press and hold the <b>Ctrl</b> Key, and drag and drop the variable in the destination group in the Classification Panel.
Moving a Group	To move a variable to another group, select the variable row header to be moved in the Variable Panel and drag and drop the variable in the destination group in the Classification Panel.

## 10-3-14 Changing the Order of Variables in a Data Collection Pattern

Variable data is recorded in a file in the order in which the variables appear in the Variable Panel. The recording order can be changed by moving a variables to a different position in the list.

- *1,2,3...* 1. Click the SPU Console's **Collection Settings** Tab and display the Classification Panel.
  - 2. Select one of the data collection patterns in the *All Data Collection Patterns* directory tree (such as *Basic Collection*) by clicking that pattern.
  - 3. Select the variable to be moved by clicking that variable's row header cell in the list.
  - 4. Drag the selected variable and drop it in the destination location.

## 10-3-15 Variables Automatically Registered for the Expanded Recipe Function or FTP Transfers

Variables will be automatically registered when the expanded recipe function or FTP transfer is set. These automatically registered variables are used by memory events. Do not delete them.

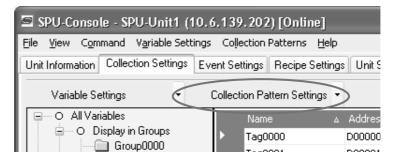
Function	Group name	Variable name	
Expanded recipe	AutoRecipeExpandedFunction	AutoRecipen_Request	
FTP receive		AutoRecipen_ReceiveRequest	
FTP send	AutoFTPSendFunction	AutoFTPSend <i>n</i> _Request	

A number from 0 to 9 is added for "*n*".

## **10-4 Setting Data Collection Patterns**

## 10-4-1 Adding a Data Collection Pattern

1,2,3...
 1. To add a data collection pattern, click the SPU Console's Collection Settings Tab and select Collection Pattern Settings.
 The Collection Pattern Settings Dialog Box will be displayed.



2. Click the New Button in the Data Collection Pattern Settings Dialog Box.

ata Collection Pattern Setti	ngs	
Data Collection Pattern Basic Collection	Name: Basic ( Description:	Collection
		llection Pattern. n details. This reads the PLC 1/0 memory data at the specified interval.
	Specify the number of Interval:	f records
	No. of Files:	3 <u>÷</u> taWriter.csv
	File Size: Data Folder: Total Size: No. of Variables:	703.1KB (1File:234.4KB) - 703.1KB 0
	No. of Records: Interval: Collection Period:	4000 1m24s (1File:28s)
-		Advanced

3. Input the data collection pattern settings such as the *Name* and *Description*.

The following table describes the settings.

Item	Function			
Name	Enter the data collection pattern's name.			
Description	Enter a description of the data collection pattern.			
Enable this data col-	If the pattern is disabled, data will not be collected.			
lection pattern.	Selections on the Copy Option Tab Page and the FTP Send Settings Dialog Box in the advanced settings will not change. Any options that are selected will be counted in the number of settings.			
Interval	Specify the data collection cycle.			
No. of records	Specify the number of records that will be stored in a single file. (Specify the <i>No. of Records</i> when <i>Specify by the number of records</i> is selected.)			
Period	Specify a period of time in which records will be stored in a single file. (Specify the <i>Interval</i> when <i>Specify by the collection period</i> is selected.)			
No. of files	Specify the number of files to be stored between 1 and 1,200. When multiple files are specified, the files are stored in a folder with the same name as the specified <i>File name</i> . The file names will be the specified <i>File name</i> with an attached index number.			
File name	Specify the name of the file in which the results will be stored with a maximum of 96 single-byte alphanumeric characters.			

The following information is displayed according to the settings of the data collection pattern settings.

Item	Function
File size	Displays the required file size for data collection.
Data folder	When copy options are enabled, displays the maximum num- ber of files copied to the data folder, and the total file capacity.
Total size	Displays the total size of the data collection files and the files copied to the data folder.
No. of variables	Displays the number of variables set for data collection.
No. of records	Displays the number of records saved for one file.
Interval	Displays the time until the data is recorded in all of the files set in <i>No. of files.</i>
Collection period	Displays the period required to collect the specified number of collections.

## Specifying the Number of Records

When *Specify by the number of records* is selected, the number of records recorded in a single file is fixed at the specified number.

Data Collection Pattern Settings							
Data Collection Pattern							
Basic Collection	Name: Basic	Collection					
Basic Collectori	Description:						
	Enable this Data Collection Pattern.						
		on details. This reads the PLC I/O memory data					
	for the specified period	d at the specified interval.					
	Specify the number	of records					
	Interval:	7 🛨 millisecond(s) 🗸 🗸					
	No. of Records:	4000-					
	No. or records.						
	No. of Files:	3 -					
	Filename: D	ataWriter.csv					
	File Size:	703.1KB (1File:234.4KB)					
	Data Folder:						
	Total Size:	703.1KB					
	No. of Variables:	0					
	No. of Records:	4000					
	Interval:	1m24s (1File:28s)					
	Collection Period:						
<u>N</u> ew <u>C</u> opy <u>R</u> emove		Advanced					
		OK Cancel Apply					

## Specifying the Collection Period

When *Specify the collection period* is selected, the number of records recorded in a single file is determined by the period and cycle settings. The number of records recorded in a single file is fixed.

Data Collection Pattern Setting	s				×
Data Collection Pattern Basic Collection	Name: Description:	Basic Collec	tion		
	for the specifie	collection deta	ails. This rea e specified		O memory data
	Interval: Period:		7 <u>÷</u> 28 <u>÷</u> Becords:	millisecond(s)	×
	No. of Files: Filename:	No. of DataWri	3 <u>÷</u>	4000	
	File Size: Data Folder Total Size: No. of Varia No. of Rec	r: - 7 ables: 0	03.1KB	le:234.4KB)	
New Copy Remove	Interval: Collection F	1	m24s (1File:	28s)	Advanced
			ОК	Cancel	Agvanceu

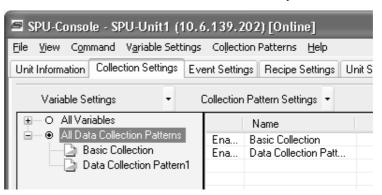
## Unspecified Number of Records

When *No specification* is selected, data will be added to the file until data collection is stopped. With this method, all of the records from the start to the end of sampling can be recorded in a single file.

Data Collection Pattern Settings			
Data Collection Pattern Basic Collection	Name: [ Description: [ IV Enable this D Set the basic co	Basic Collection Tata Collection Pattern. Delection details. This reads the PLC I/O memory data period at the specified interval.	
		an 7 millisecond(s) idded until callection is stopped. The file size to volume of data collected. 3 DataWriter.csv	
New Copy Bemove	File Size: Data Folder: Total Size: No. of Variab No. of Recor Interval: Collection Pe	ds: -	
		OK Cancel Apply	

- **Note** (a) When saving data without a specified number of records, the file size will continuously increase until data collection is stopped. Be sure that there is enough memory available in the Memory Card.
  - (b) When saving data in a single file and leaving the number of records unspecified, existing data in the file will be cleared when collection starts. We recommend saving data in multiple files when leaving the number of records unspecified.
- 4. After inputting the settings, click the **OK** or **Apply** Button.

5. Confirm that the data collection pattern has been added to the Classification Panel's *All Data Collection Patterns* directory tree.



## 10-4-2 Deleting a Data Collection Pattern

Use the following procedure to delete a data collection pattern.

- 1. Click the SPU Console's Collection Settings Tab and select Data Collection Pattern Settings.
  - 2. Select the data collection pattern to be deleted in the pane on the left side of the Data Collection Pattern Settings Dialog Box and click the **Remove** Button.

Data Collection Pattern Settings		
Data Collection Pattern Basic Collection Data Collection Pattern1	Name: Description:	Data Collection Pattern1
	🗹 Enable this I	Data Collection Pattern.
	Set the data c collection.	ollection details. This records the data read by the basic
	Specify the number of records	
	Interval:	
	No. of Reco	ds: 3600 ÷
	No. of Files:	3 +
	Filename:	DataWriter_1.csv
	File Size:	632.8KB (1File:210.9KB)
	Data Folder Total Size:	
	No. of Varia	
	No. of Reco	rds: 3600 3h (1File:1h)
	Collection P	
New Copy Remove	)	A <u>d</u> vanced
		OK Cancel Apply

## 10-4-3 Copying Data Collection Patterns

1,2,3...1. To copy a data collection pattern, open the Data Collection Tab Page and select *Data Collection Pattern Settings*.

2. In the pane on the left side of the Data Collection Pattern Settings Dialog Box, select the data collection pattern to be copied and click the **Copy** Button.

Data Collection Pattern Settings		$\mathbf{ imes}$
Data Collection Pattern Basic Collection Data Collection Pattern1	Name: Description:	Data Collection Pattern1
		Data Collection Pattern. Illection details. This records the data read by the basic
	Specify the n	umber of records
	No. of Record	ds: 3600 <u>*</u>
	No. of Files: Filename:	3÷ DataWriter_1.csv
	File Size: Data Folder:	
	Total Size: No. of Varial No. of Reco	rds: 3600
$\square$	Interval: Collection Pe	3h (1File:1h) eriod: ·
New Copy Hemove	_	Advanced
		OK Cancel Apply

## **10-5 Making Advanced Data Collection Pattern Settings**

## 10-5-1 Advanced Data Collection Pattern Settings

Advanced settings can be made for data collection patterns. In the advanced settings, it is possible to specify parameters such as the number of data collections to make and the conditions to be satisfied for data to be recorded. It is also possible to save files under different names.

The advanced settings are made in the Advanced Settings Dialog Box. The Advanced Settings Dialog Box is displayed by clicking the **Advanced** Button in the Data Collection Pattern Settings Dialog Box.

Data Collection Pattern			
Basic Collection	Name: Data Collection Pattern1		
Data Collection Pattern1	Description:		
	Enable this Data Collection Pattern.		
	Set the data collection details. This records the data read by the ba collection.	isic	
	Specify the number of records	Specify the number of records	
	Interval: 1 = second(s)		
	No. of Records: 3600-		
	No. of Files: 3+		
	No. of Files: 3: Filename: DataWriter_1.csv		
	Filename: DataWriter_1.csv		
	Filename:         DataWriter_1.csv           File Size:         632.8KB (1File:210.9KB)		
	Filename:         DataWriter_1.csv           File Size:         632.8KB (1File:210.9KB)           Data Folder:         -		
	Filename:         DataWriter_1.csv           File Size:         632.8KB (1File:210.9KB)           Data Folder:         -           Total Size:         632.8KB		
	Filename:         DataWriter_1.csv           File Size:         632.8KB (1File:210.9KB)           Data Folder:         -           Total Size:         632.8KB           No. of Variables:         0		
	Filename:         DataWriter_1.csv           File Size:         632.8KB (1File:210.9KB)           Data Folder:         -           Total Size:         632.8KB           No. of Variables:         0           No. of Records:         3600		
	Filename:         DataWriter_1.csv           File Size:         632.8KB (1File:210.9KB)           Data Folder:         -           Total Size:         632.8KB           No. of Variables:         0           No. of Pacords:         3600           Interval:         3h (1File:1h)		

## 10-5-2 Setting Collection Options

The Advanced Settings Dialog Box's Collection Options Tab Page contains settings that can specify the number of collections (recording times) as well as whether or not collection will start automatically when the SYSMAC SPU Unit starts operating.

	Advanced Settings
	Collection Options   File Options   Copy Options   Record Conditions   FTP Options
	Specify the collection options.
	☐ Start collecting at SPU startup
	Number of Collections
	No specification
	C Specify 3600 record(s)
	C Same as the number of records 3600 record(s)
	Pattern Index: DataWriter_1
	OK Cancel
Starting Data Collection on SYSMAC SPU Unit Start-up	When the <i>Start collecting at SPU startup</i> Check Box is selected, The data collection pattern will be started automatically when the SYSMAC SPU Unit starts operating.
Specifying the Number of Collections	Collection can be stopped automatically when the specified number of collec- tions have been performed. When <i>No specification</i> Option is selected, collec- tion will continue. When <i>Specify</i> is selected, collection will stop automatically when the specified number of collections has been recorded. When <i>Same as</i> <i>number as of records</i> Option is selected, collection will stop automatically when the number of collections equals the number of data collection pattern records specified with the <i>Record count</i> setting.
Collection Pattern	A unique number is assigned to each collection pattern.
Numbers	When you add a collection pattern, the lowest unused number is assigned as the collection pattern number. If you repeatedly add and delete collection pat- terns, the order in which the collection patterns are displayed on the SPU- Console will not be consistent with the collection pattern numbers. You can change the collection pattern numbers on the Collection Options Tab Page. When you change a collection pattern number, the offsets that are linked to the collection pattern numbers in the CPU Bus Unit Area also change.
	<ul> <li>CIO Area: Collection status, collection start specifications, collection stop specifications, and file copy flags.</li> </ul>
	DM Area: Record counters
	Refer to SECTION 7 CPU Bus Unit Area for details on the CPU Bus Unit Area.
Note	(1) The collection pattern number for basic collection cannot be changed. The collection pattern numbers cannot be changed for Sampling Mode.
	(2) In the SPU-Console's data collection pattern tree, collection patterns are displayed in the order that they were registered. The order in which the data collection patterns are displayed will not change even if you change

a collection pattern number.

## 10-5-3 Setting File Options

Settings related to collection result files are made on the File Options Tab Page accessed in the Advanced Settings Dialog Box.

Advanced Settings
Collection Options File Options Copy Options Record Conditions FTP Options
Specify the file options.
Record Size: V Auto 60 🛨 Bytes
Normally, check Auto to record all of the data with no excess size.
Prepare the area in advance
Selecting this option will create a file of the necessary size.
Advanced Sttings
OK Cancel

<u>Setting Record Size</u> Normally *Auto* should be selected. When *Auto* is selected, record sizes are calculated automatically. To specify record size, specify the size (in bytes) of one record in the file to be saved.

**Preparing File Space in Advance** When a setting is changed, a file is created on the Memory Card for storing collection data. If *Prepare the area in advance* is selected, a file of the size required for recording the data is created. Because the required space is reserved before data collection begins, the file will not run out of available space while data is being collected.

Note

- (1) When the *Prepare the area in advance* Option is ON, it takes time to create the files when settings are changed.
  - (2) When the *Prepare the area in advance* Option is ON, file space is reserved for data that is copied using the copy option.

## 10-5-4 Setting Copy Options

Settings related to copying are made in the Copy Options Tab Page in the Advanced Settings Dialog Box.

Advanced Settings	x
Collection Options   File Options   Copy Options   Record Conditions   FTP Options	
☑ Save in data folder	
Selecting this option will save completed collection files in the "data" folder of the Memory Card.	
Settings	
Maximum File Size: 10 🛨 File Size: 2.1MB	
✓ Overwrite file in data folder	
Filename	
Specify filename	
Add date/time	
Add variable	
Variable:	
Sample	
DataWriter_1-20130712_160550_001.csv	
OK Cancel	1

<u>Copying to Data</u> <u>Folders</u>	co Th ple	<ul> <li>nen Save in data folder is selected, files for which data collection has been mpleted are copied automatically under data folders on the Memory Card. e files are copied as the data collection is completed. The timing for cometing data collection is as follows:</li> <li>When set to save to multiple files, and data records have been saved to the final row.</li> <li>When data collection stops.</li> </ul>
		<ul> <li>When a file to which data is saved is switched by event processing.</li> </ul>
r	(	<ol> <li>Copy options cannot be enabled for basic collection.</li> <li>Copy options cannot be enabled when the data collection pattern file count is 1.</li> </ol>
	(	<ol> <li>Copy options can be enabled for a maximum of 10 data collection pat- terns.</li> </ol>
	(	4) Files cannot be copied if there is insufficient available space on the Memory Card.
	(	5) You can use the WS02-EDMC1-V2 SYSMAC SPU Data Management Middleware to automatically copy collection data files from the Journal Folder to a computer.
	(	6) You can use FTP transfers to send the files that are copied to the data folder to an FTP server.
	(	<ul> <li>7) If copying fails because there is not enough free space in the memory card or copy processing is too slow, error code 8A "Failed to copy to data folder" will occur.</li> <li>Even if this error occurs, data collection will continue normally.</li> </ul>
Specifying the Maximum Number	•	ecify the maximum number of files to store in the data folder to between 1 d 120.
Specifying the Maximum Number Files to be Saved	of an If y da If y if y er	ecify the maximum number of files to store in the data folder to between 1 d 120. you select the <i>Overwrite file in data folder</i> Check Box, the oldest file in the ta folder will be deleted and then the data will be copied if the maximum mber of files has already been saved to the data folder. you clear the <i>Overwrite file in data folder</i> Check Box, data will not be copied the maximum number of files has already been saved to the data folder. you clear the <i>Overwrite file in data folder</i> Check Box, data will not be copied the maximum number of files has already been saved to the data folder, you could be a saved to copy to data folder) will occur, and the Copy Overflow ag will turn ON.
Maximum Number Files to be Saved	of an If y da If y if er Fla	d 120. you select the <i>Overwrite file in data folder</i> Check Box, the oldest file in the ta folder will be deleted and then the data will be copied if the maximum mber of files has already been saved to the data folder. you clear the <i>Overwrite file in data folder</i> Check Box, data will not be copied the maximum number of files has already been saved to the data folder, for code 8A (failed to copy to data folder) will occur, and the Copy Overflow
Maximum Number Files to be Saved	of and	<ul> <li>d 120.</li> <li>you select the Overwrite file in data folder Check Box, the oldest file in the ta folder will be deleted and then the data will be copied if the maximum mber of files has already been saved to the data folder.</li> <li>you clear the Overwrite file in data folder Check Box, data will not be copied the maximum number of files has already been saved to the data folder, for code 8A (failed to copy to data folder) will occur, and the Copy Overflow ag will turn ON.</li> <li>1) To check if files have been overwritten, do not use the file dates, but rather use the serial numbers that are attached to the copy destination file</li> </ul>
Maximum Number Files to be Saved	of and	<ul> <li>d 120.</li> <li>you select the Overwrite file in data folder Check Box, the oldest file in the ta folder will be deleted and then the data will be copied if the maximum mber of files has already been saved to the data folder.</li> <li>you clear the Overwrite file in data folder Check Box, data will not be copied the maximum number of files has already been saved to the data folder, for code 8A (failed to copy to data folder) will occur, and the Copy Overflow ag will turn ON.</li> <li>1) To check if files have been overwritten, do not use the file dates, but rather use the serial numbers that are attached to the copy destination file names.</li> <li>2) If you change the data collection settings or clear the collection data, the serial number returns to 0. If there is an old file in a data folder, a file with the same serial number will be deleted even if the maximum number of</li> </ul>
Maximum Number Files to be Saved	of and fight of the second sec	<ul> <li>d 120.</li> <li>you select the Overwrite file in data folder Check Box, the oldest file in the ta folder will be deleted and then the data will be copied if the maximum mber of files has already been saved to the data folder.</li> <li>you clear the Overwrite file in data folder Check Box, data will not be copied the maximum number of files has already been saved to the data folder, for code 8A (failed to copy to data folder) will occur, and the Copy Overflow ag will turn ON.</li> <li>1) To check if files have been overwritten, do not use the file dates, but rather use the serial numbers that are attached to the copy destination file names.</li> <li>2) If you change the data collection settings or clear the collection data, the serial number returns to 0. If there is an old file in a data folder, a file with the same serial number will be deleted even if the maximum number of files has not been reached.</li> <li>If you clear the Overwrite file in data folder Check Box, an error will occur if a file with the serial number of files has not been reached.</li> <li>Delete unnecessary files from the data folder as required, e.g., by using</li> </ul>
Maximum Number Files to be Saved	of if y da If y if y if i err Fla Note (	<ul> <li>d 120.</li> <li>you select the Overwrite file in data folder Check Box, the oldest file in the ta folder will be deleted and then the data will be copied if the maximum mber of files has already been saved to the data folder.</li> <li>you clear the Overwrite file in data folder Check Box, data will not be copied the maximum number of files has already been saved to the data folder, for code 8A (failed to copy to data folder) will occur, and the Copy Overflow ag will turn ON.</li> <li>1) To check if files have been overwritten, do not use the file dates, but rather use the serial numbers that are attached to the copy destination file names.</li> <li>2) If you change the data collection settings or clear the collection data, the serial number returns to 0. If there is an old file in a data folder, a file with the same serial number will be deleted even if the maximum number of files has not been reached.</li> <li>If you clear the Overwrite file in data folder Check Box, an error will occur if a file with the serial number of the next file to write already exists, even if the maximum number of files has not been reached.</li> <li>Delete unnecessary files from the data folder as required, e.g., by using command 35 (clear the data folder).</li> </ul>

Item	Contents
Specify filename	If you clear the <i>Specify filename</i> Check Box, the file name that is specified in the data collection pattern settings is used.
	If you select the <i>Specify filename</i> Check Box, you can specify the copy destination file name. Specify a text string consisting of 0 to 64 ASCII characters.
	Example: File Name set to "LineA."
	LineA-20130701_1200_001.csv
	LineA_001.csv
	Example: File Name set to " " (blank).
	20130701_1200_001.csv
	001.csv
Add date/time	Adds the date and time to the file name when a file is copied.
Add variable	Adds the specified variable value. The variable value is the value from when a file is copied. If the lot number is stored in the specified variable, the file can be managed by lot number.

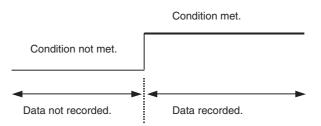
The following table shows the setting items.

The serial number at the end of the file name will be from 000 to one less than the maximum number of files saved. The serial number is always attached.

- Note (1) Files copied to a data folder are not deleted even when the settings are changed. Files that are not needed can be deleted using Windows Explorer.
  - (2) Copying files may affect data collection performance. Prior to actual operation, perform tests to determine the appropriate settings.
  - (3) If SYSMAC SPU Unit power is turned OFF while data is being collected, the data may not be correctly copied into the data folder.
  - (4) Files that are sent using FTP will be deleted.

## 10-5-5 Setting Record Conditions

A record condition can be set in advance so that data will be recorded only when the condition is met. Using record conditions enables data collecting according to the application, recording data only while the bit is ON.



Record conditions are set on the Record Conditions Tab Page accessed in the Advanced Settings Dialog Box.

Section 10-5

Advanced Settings				
Record only when the condition is met				
Selecting this option will record data only when the specified conditions are met. Data collection must be started manually.				
Name	Variable	Condition		
Add Properties Delete				
			ОК	Cancel

**Note** (1) To use record conditions, periodic data collection must be started in advance.

(2) For data collection patterns 1 to 64, data is recorded to the file in batches rather than one record at a time. This is the case even when a record condition is used, so the data will not be recorded to the file until multiple records satisfying the condition have been collected.

#### **Adding Conditions**

*1,2,3...* 1. Select *Record only when the condition is met* and then click the **Add** Button.

The Recording Condition Wizard shown in step 2 will be displayed.

- 2. Input the condition name and select the variable to use to set the condition. Input an alphanumeric text string for the condition name.
- **Note** The variable used to set a condition must be registered in advance in the data collection pattern.

Recording Condition Wizard			
Start Recording Condition Wizard			
Enter a condition na	me and select a target v	variable name.	
Condition name:	Condition1		
Target variable:	Variable Name	Address	^
	Var.         0001           Var.         0001           Var.         0003           Var.         0003           Var.         0004           Var.         0006           Var.         0006           Var.         0006           Var.         0008           Var.         0009           Var.         0011           Var.         0011           Var.         0013	D00000 D00001 D00002 D00003 D00004 D00006 D00006 D00007 D00009 D00009 D00010 D00011 D00012 D00012	~
	< <u>B</u>	ack <u>N</u> ext >	Cancel

3. Click the Next Button.

Recording Condition Wizard	X
Enter a Condition	
After entering a condition, press the F	inish.
Set the condition evaluation	
Condition evaluation type:	BITOR
ON when at least one bit is the	e same as the argument 1.
Argument 1:	0
Argument 2:	0
Record data when [T->T].	True
Record data when [F->T].	True
Record data when [T->F].	False
Record data when [F->F].	
[	< <u>B</u> ack <u>Finish</u> Cancel

#### 4. Input the condition and then click the Finish Button.

For *Set the condition evaluation*, set the condition evaluation type and arguments for comparison with memory contents. The following table shows the condition evaluation types and arguments.

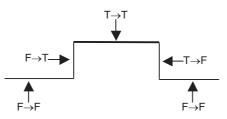
Condition evaluation type	Argument 1	Argument 2	Meaning
BITOR	Required		One of the same bits is ON as in argument 1.
BITAND	Required		All of the same bits are ON as in argument 1.
TRUE			Always true
NoneZero			Value ≠ 0
EQ	Required		Value = Argument 1
LT	Required		Value < Argument 1
LE	Required		Value ≤ Argument 1
GT	Required		Value > Argument 1
GE	Required		Value ≥ Argument 1
GELE	Required	Required	Argument $1 \le Value \le Argument 2$
GTLT	Required	Required	Argument 1 < Value < Argument 2
GELT	Required	Required	Argument $1 \le Value < Argument 2$
GTLE	Required	Required	Argument 1 < Value $\leq$ Argument 2
PrevBITOR			One of the same bits is ON as in previous value.
PrevBITAND			All of the same bits are ON as in previous value.
PrevEQ			Value = Previous value
PrevLT			Value < Previous value
PrevLE			Value ≤ Previous value
PrevGT			Value > Previous value
PrevGE			Value $\geq$ Previous value

---: Not required.

The pattern for which sampling data is to be recorded for the current evaluation in comparison to the previous evaluation is also set.

Item	Meaning
$True \to True$	Data is recorded when the evaluation remains true.
$True \to False$	Data is recorded when the evaluation changes from true to false.
$False \to True$	Data is recorded when the evaluation changes from false to true.
$False \to False$	Data is recorded when the evaluation remains false.

The following diagram illustrates these settings.



For example, the following settings are used to record data only when bit 4 is ON.

Recording Condition Wizard	$\mathbf{x}$
Enter a Condition	
After entering a condition, press the F	ïnish.
Set the condition evaluation	
Condition evaluation type:	BITOR
ON when at least one bit is the	e same as the argument 1.
Argument 1:	8
Argument 2:	0
☑ [Record data when [T→T]] ☑ Record data when [F→T].	True
Record data when [T->F].	False
Record data when [F->F].	
[	< <u>B</u> ack <u>F</u> inish Cancel

Note (1) Evaluations are calculated based on the word contents of the address specified for the variable, not on the converted value for the data type of the variable.

Example: INT (Integer: (-32,768 to 32,767) and WORD (16-bit text string: #0 to #FFFF)

If the condition judgement is to be a non-negative INT integer (0 to 32,767), then the following settings are required: GELT for the condition judgement type, 0 for argument 1, and 33,768 (8000 hex) for argument 2.

Memory value	0x000	0x7FFF	0x8000	0xFFF
Data type				
WORD	0	32,767	32,768	65,535
INT	0	-32,767	-32,768	-1

(2) Data will not be recorded for collection patterns with either or both False→True or True→False set as the record condition, and with neither True→True or False→False set, because the condition will not be satisfied for one shot collections by events.

## **Deleting a Condition**

To delete a condition, select the Condition and click the **Delete** Button.

٨d	vanced Sett	ings	
	Record on Selecting this	ns File Options ly when the condition option will record n must be started r	ion is met I data only when the specified conditions are met.
	Name	Variable	Condition
	Condition1	AutoFTPSend0	BITOR,0.0,""
			Add Properties Delete
			OK Cancel

Changing a Condition To ch

To change a condition, select the Condition and click the **Properties** Button.

Condition Recording Property 🛛 🛛 🗙				
Condition name:	Condition1			ОК
Target variable: Set the condition e	Variable Name           Var_0000           Var_0001           Var_0002           Var_0003           Var_0004           Var_0006           var_0006			Cancel
Record data v     Record data v     Record data v     Record data v     Record data v	vhen [F->T]. vhen [T->F]. —	→	· True -False	

## 10-5-6 FTP Send Settings

Make the settings on the FTP Options Tab Page of the Advanced Settings Dialog Box to send files collected in the SYSMAC SPU Unit to an FTP server. You can enable sending data with the FTP to send the record files that are copied to the data folder to an FTP server.

Advanced Settings
Collection Options File Options Copy Options Record Conditions FTP Options
✓ Send files to host           FTP Send Settings           FTP Send Settings
Set the copy options before using FTP.
Settings
Host User ID: SPU_User Folder: DataWriterFolder/Data
Request and Response
Request Bit: D00000.00
Response Area: D00001
OK Cancel

# <u>Send Files to Host</u> Set whether to enable the function for the data collection patterns. This parameter can be set only if saving data is enabled in the Copy Options Dialog Box.

FTP Host Settings

The following settings are displayed.

Display item	Description
FTP Host Settings	Set the FTP host
FTP Request/ Response Settings	Set the request and response bits for sending with FTP.

Click the **FTP Send Settings** Button. The FTP Send Settings Dialog Box will be displayed.

**Note** Files that are sent using FTP will be automatically deleted once the transfer has been completed.

## FTP Host Settings

#### Make the settings for the FTP host.

FTP Send Settings	×
FTP Host Settings	
Server name:	192.168.0.1
Port	21 🔅
User ID:	SPU_User
Password:	XHXXXX
Folder on server:	SPUData/Line1
	Create the folder on the server
SPU source folder:	DataWriter_1
FTP Request/Response Settings Request Bit D00000 Memory Area: DM Word: 0-32767 Bit: 0-3	) (0-32767)
	OK Cancel

Setting	Description
Server name	Sets the IP address of the FTP server.
Port	Sets the port number of the FTP server (default: 21).

Setting	Description
User ID	Sets the user ID registered to the FTP server.
Password	Sets a password for the user ID registered to the FTP server.
Folder on server	Sets the path from the root folder of the FTP server.
Create the folder on the server	If selected, automatically creates a new folder if there is no folder on the server.
SPU source folder	Displays the SPU source folder.

**Note** The FTP function of the SPU Unit connects in the standard active mode of FTP. The mode cannot be changed to passive mode in the settings.

#### FTP Request/ Response Settings

Make these settings for the request bit and response area for FTP send.

Setting item	Description
Request Bit	Sets the data area, word, and bit number of the request bit that is manipulated from the CPU Unit.
Response Area	Sets the data area and word address of the Response Area to which the execution result is written from the SPU Unit.

The FTP send address settings will be automatically reflected (i.e., added, revised, or deleted) in the variable settings and event settings when they are registered, revised, or deleted and the OK Button is clicked on the setting screen for data collection patterns.

**Note** Some variables and memory events will be automatically registered when the request bit is set. Do not delete these variables and memory events. For details, refer to 10-3-15 Variables Automatically Registered for the Expanded Recipe Function or FTP Transfers.

Consult the FTP server administrator for information on FTP server settings.

#### Request Area Bit Configuration

The following figure shows the bit configuration for the response area word.

-		-			-	-	-	6	-	-		-
	-	-	-	-	-	-	-	-	-	-		

Bit	Name	Description
0	FTP send completed	ON when FTP sending has been completed.
1	Setting error	ON when there is a setting error.
2	SPU folder error	ON when there is no path to the copy folder.
4	FTP send error	ON when there is an FTP send error.
7	No SPU send file	ON when there is no file to send from the SPU.
15	FTP sending	ON when files collected from the SPU are being sent. OFF after sending the files has been completed.

All response area bits will turn OFF when the FTP Send Request Bit is turned ON.

**Note** It is not possible to execute more than one FTP send at the same time. If Request Bits are turned ON at the same time, they will all be processed sequentially, but execution of each Request Bit will start at a different time.

## **10-6 Enabling the Data Collection Settings**

Use the following procedure to enable the data collection settings. Always perform this procedure after the data collection settings have been changed. In addition to the variable settings and the data collection pattern settings, this operation enables the event settings described in *SECTION 11 Event Settings for Data Storage Mode*.

Note

- (1) Confirm that the SYSMAC SPU Unit is connected before enabling the settings.
  - (2) When the changed settings are transferred, the existing SYSMAC SPU Unit settings will be overwritten. All of the collection files in the Journal Folder on the Memory Card will be deleted, and new files will be created with the new settings.
  - (3) Never turn OFF the Unit's power supply while the Unit's settings are being transferred. If the power supply is turned OFF during a transfer, incorrect information may be transferred to the SYSMAC SPU Unit, possibly causing the SYSMAC SPU Unit to malfunction.
  - (4) If too many variables are registered in the data collection pattern, the settings may not be transferred correctly. In this situation, reduce the number of variables and re-transfer the settings.
- *1,2,3...* 1. Confirm that variable settings and data collection pattern settings have been completed.
  - 2. Click the SPU Console's Collection Settings Tab.
  - 3. The following dialog box will be displayed to confirm the settings file transfer and the change to the settings.

Collecti	Collection Settings					
?	Transfer the settings file to the SPU Unit. Execute the Change Data Collection Settings command to activate the settings. Executing this command will clear the data file. Are you sure?					
	<u>Yes</u> <u>N</u> o					

4. Click the **Yes** Button to change the settings file transfer and the change to the settings. A dialog box will be displayed to show the file transfer, and the command will be executed to change the data collection settings.

## **10-7 Executing Data Collection**

## 10-7-1 Starting Data Collection

Data collection status can be monitored and collection patterns can be started or stopped in the Data Collection Status Window on the Unit Information Tab Page. For details, refer to *9-2 Displaying Data Collection Status*.

System Information Data Collection Status	Data						
Error Information	Status	Name	Description	Interval	Period	Total Size	Filenam
	Stopped	Basic Collection		7ms	28s	7.6MB	DataWr
	Stopped	Data Collection Patt		1s	1h	2.7MB	DataWr
ontrol Panel							
1			_				
	art all collection top all collection			Start/stop the	selected collect	ion pattern.	
	top all collections and basic collections and the second sec						
	op basic colle		-	<u>S</u> tart	Stor	)	
103: S	ave the collec	ted data	- (Turnel)				
© 03: S	ave the collec	ted data	Exec)				

Note

- (1) To start basic collection, execute command 01 (Start the Basic Collection).
  - (2) To start basic collection and data collection patterns 1 to 64 that have been set, execute command 50 (Start All Collections).
  - (3) For details on how to execute commands, refer to SECTION 6 Executing Commands.
  - (4) Data collection patterns 1 to 64 cannot be started individually by commands. They can be started and stopped individually in the Data Collection Status Window on the Unit Information Tab Page.
  - (5) Data collection can be started for data collection patterns 1 to 64 without executing command 01 (Start the Basic Collection).

## **10-8 Displaying the Collection Result Folder**

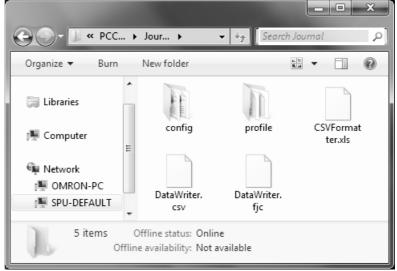
The collection files can be accessed from the computer by using a shared folder on a Windows network. Here, an example using Microsoft Office Excel is described. In this example, it is assumed that Excel is already installed and that CSV files are associated with it.

## **10-8-1 Collection Result Folders**

 Select View - Display the Unit Folder - Journal Folder from the SPU-Console menus. Windows Explorer will be started and the folder containing the collection results (i.e., the Journal folder) will be displayed.

#### Section 10-8





 Double-click the collection result file that is to be displayed. Excel will be started and the contents of the collection result file will be displayed. If the CSV file extension is associated with an application other than Excel, the associated application will be started.

$\propto$ M	icrosoft E	xcel - Sam	pling.o	:sv												_		
18	<u>File E</u> dit <u>V</u>	/iew <u>I</u> nsert	F <u>o</u> rmat	Tools	<u>D</u> ata	<u>W</u> in	dow <u>H</u> el	р									_16	P ×
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2	0	57:16.3	34194	8862		1		0		0		0			0		0	
3	1	57:16.3	35069	98812		2		0		0		0			0		0	
4	2	57:16.4	35734	8774		3		0		0		0			0		0	
5	3	57:16.4	36434	8734		4		0		0		0			0		0	
6	4	57:16.4	37134	8694		5		0		0		0			0		0	
7	5	57:16.4	37834	8654		6		0		0		0			0		0	
8	6	57:16.4	38534	8614		7		0		0		0			0		0	
9	7	57:16.4	39234	8574		8		0		0		0			0		0	
10	8	57:16.4	39934	8534		9		0		0		0			0		0	
11	9	57:16.4	40634	8494		10		0		0		0			0		0	
12	10	57:16.4	41334	8454		11		0		0		0			0		0	
13	11	57:16.4	42034	8414		12		0		0		0			0		0	
14	12	57:16.4	42734	8374		13		0		0		0			0		0	
15	13	57:16.4	43434	8334		14		0		0		0			0		0	
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Rea	dy				)]								1	MU				1

**Note** Collection result files are saved to the SYSMAC SPU Unit in the folder configuration shown below.

#### When Multiple Files Are Set to Be Saved (When the File Count Is Greater than 1)

- Files are saved to folders of the same file names as those set for the data collection patterns.
- Files are saved under file names with serial numbers at the end of the text string that is set in the File name Field for the data collection pattern.

In the example below, the file count is 3 and "DataWriter.csv" is set as the file name.

- Dournal
  - DataWriter
    - DataWriter\_0000.csv
    - DataWriter\_0001.csv
    - DataWriter\_0002.csv

#### When a Single File Is Set to Be Saved (When the File Count Is 1)

• The file is saved in the Journal Folder, under the file name set in the *File name* Field for the data collection pattern.

In the example below, the file count is 1 and "DataWriter.csv" is set as the file name.

- Journal
  Journal
  DataWriter.csv
- **Note** Do not delete files from the Journal Folder. The SYSMAC SPU Unit will not operate correctly if these files are deleted.
- **Note** When displaying data collection files with Excel, the Excel macro CSVFormatter.xls is used to display items such as times in a more readable form.

This macro can be used for the following.

- (1) Organize the Excel display of the collection file contents, e.g., make the time field easier to read.
- (2) Calculate the difference in time between records and display it in an Excel column (column heading: diff[ms]). This can be used to evaluate the difference in the collection cycle that was set and the actual collection behavior of the SYSMAC SPU Unit.
  - **Note** The *diff* value is calculated from the nano fields of two records, so the *diff* value will not be accurately shown if the record period for the records is greater than 1 s.)
- (3) Large CSV files with more than 256 columns can be divided into sheets of 256 columns each for display (with Microsoft Office Excel 2003 or earlier).

The CSVFormatter.xls macro is used as follows:

Double-click the CSVFormatter.xls file in the Journal Folder (i.e., the shared folder in the SYSMAC SPU Unit). This will add a menu called SYS-MAC-SPU to the Excel toolbars.

#### Microsoft Office Excel 2003 or Earlier

∞.⊮	licrosoft E:	xcel - Samj	pling.csv								
8	<u>File E</u> dit <u>V</u>	jew <u>I</u> nsert	Format <u>T</u> oo	ls <u>D</u> ata <u>W</u> ir	ndow <u>H</u> elp						_ 8 ×
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4	3		3.57E+08	2	0	0	0	0	0	0	0
5	4		3.64E+08	3	0	0	0	0	0	0	0
6	5		3.71E+08	4	0	0	0	0	0	0	0
7	6		3.78E+08	5	0	0	0	0	0	0	0
8	7		3.85E+08	6	0	0	0	0	0	0	0
9	8		3.92E+08	7	0	0	0	0	0	0	0
10	9		3.99E+08	8	0	0	0	0	0	0	0
11	10		4.06E+08	9	0	0	0	0	0	0	0
12	11		4.13E+08	10	0	0	0	0	0	0	0
13	12	57:16.4	4.2E+08	11	0	0	0	0	0	0	0
14	13		4.27E+08	12	0	0	0	0	0	0	0
15	14		4.34E+08	13	0	0	0	0	0	0	0
16	15		4.41E+08	14	0	0	0	0	0	0	0
17	16	57:16.4	4.48E+08	15	0	0	0	0	0	0	0 🔽
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Note It may not be possible to execute this macro depending on the settings of Excel security. If the macro cannot be executed, select *Options - Macro Security - Security Level* from the Excel menus and set the security level to *Medium*.

#### **Microsoft Office Excel 2007**

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Note Macros may not be enabled with the Microsoft Office Excel 2007 security settings. In that case, click the Office Button in Excel and then select *Excel Options* to display the Excel Options Dialog Box. From the Excel Options Dialog Box, click the Security Center Settings Button in the Security Center Window to display the Security Center Dialog Box. From the Macro Settings Window to display a warning and disable all macros. When a dialog box related to Microsoft Office Excel security is displayed after a macro is opened, click the Enable Macros Button.

2. Click the SYSMAC-SPU Button on the toolbar and select Formatting.

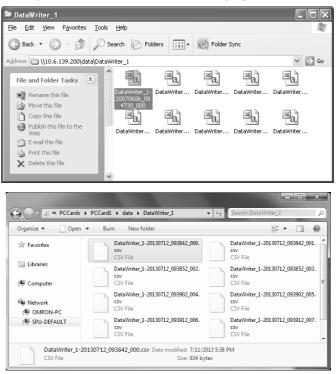
After this procedure is performed, the time display will be organized and the *diff[ms]* column will be displayed as shown below.

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3	2 2004/07/30 10:			5.649962	1	0	0	0	0	
4	B 2004/07/30 10:			6.99996	2	0	0	0	0	
5	4 2004/07/30 10:	57:16.364 3	4348734	6.99996	3	0	0	0	0	
6	5 <b>2004/07/30 10</b> 3		1348694	6.99996	4	0	0	0	0	
7	5 2004/07/30 10:	57:16.378 3	8348654	6.99996	5	0	0	0	0	
8	7 2004/07/30 10:	57:16.385 3	5348614	6.99996	6	0	0	0	0	
9	3 2004/07/30 10:		2348574	6.99996	7	0	0	0	0	
10	3 2004/07/30 10:			6.99996	8	0	0	0	0	
11	0 2004/07/30 10:	57:16.406 4	6348494	6.99996	9	0	0	0	0	
12	1 2004/07/30 10:	57:16.413 4	3348454	6.99996	10	0	0	0	0	
13	2 2004/07/30 10:	57:16.420 4	0348414	6.99996	11	0	0	0	0	
14	B 2004/07/30 10:	57:16.427 4	7348374	6.99996	12	0	0	0	0	
15	4 2004/07/30 10:	57:16.434 4	4348334	6.999 <b>9</b> 6	13	0	0	0	0	
16	5 2004/07/30 10:	57:16.441 4	1348294	6.99996	14	0	0	0	0	
17	6 2004/07/30 1 <sub>0</sub> :	57:16.448 4	8348254	6.99996	15	0	0	0	0	
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## 10-8-2 Copied Collection Result Folders

When copy options are enabled in Data Collection Mode, collection result files are automatically copied to data folders when data collection is completed. The following procedure describes how to open the copies of the files.

 Select Display Unit Folder - Data Folder from the View Menu in the SPU-Console. Windows Explorer will be started, and the folder (data folder) with the copied collection results will be displayed.



- Double-click the collection result folder to be displayed. Excel will be started and the collection result folder will be displayed. If a file with a CSV extension is associated with a program other than Excel, that application will be opened.
- **Note** The SYSMAC SPU Unit saves copied collection results in the folder configurations shown below.
  - (1) Files are saved to folders of the same file names as those set for the data collection patterns.
  - (2) Files are copied under file names with the serial number added at the end of the naming rule that is set.

In the example below, the file name for the data collection pattern is set to "DataWriter\_1.csv," the file count in the copy options is 3, and the date and time are enabled for the file name.

问 data

- DataWriter \_1
  - BataWriter\_1 -20070516\_211327\_000.csv
  - DataWriter\_1 -20070516\_211333\_001.csv
  - DataWriter\_1 -20070516\_211354\_002.csv
- **Note** Files copied to a data folder are not deleted even when the settings are changed. Files that are not needed can be deleted using Windows Explorer.

## **10-9 Saving Collection Data**

Collection data collected by the SYSMAC SPU Unit can be saved in one file. The file will contain the data collection settings, all collection files, and the SYSMAC SPU Unit operating status in a compressed format. This file can be used to save specific collection results.

- Save the data to a file by executing command 03 (Save the Collection Data).
- The file will be saved in the SYSMAC SPU Unit network-shared folder \pccards\PCCard1\Archive with a timestamp for a name and the file name extension tgz (example: 20040727150505.tgz).
- The file that is saved is in tar and gzip format.
- To obtain the saved files, a compression application, such as WinZip, is required to extract the files.
- **Note** When command 03 (Save the Collection Data) is executed on the SYSMAC SPU Unit, a temporary file is created when creating the file to save. Saving the file may fail if there is not sufficient memory on the PC card. As a guide, available space will be required that is equivalent to the total size of all of the collection files.

## SECTION 11 Event Settings for Data Storage Mode

This section explains how to make the event settings for Data Storage Mode operation.

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## 11-1 Events

In Data Storage Mode, events are set to specify when data is to be collected. Events are either memory events, which occur when specific conditions are satisfied by values in memory, or schedule events, which occur at specific times or time intervals.

Schedule events are set to occur at set times, such as every minute, every hour, every day, or every week (e.g., every Monday), and the processing for these events (such as data collection execution) can be defined. Working days and the end of the month can also be specified for schedule events.

The combination of these events with the processing that is performed when the events occur are called event rules. Event rules such as "data is recorded in a CSV file whenever a certain bit turns ON" or "data is recorded in a CSV file every day at 8:00" can be set.

## 11-2 Setting Memory Events

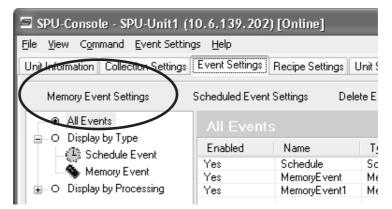
The procedures used to set rules for memory events that occur when values in memory satisfy specific conditions are described here.

To set memory events, variables are set in advance for the memory elements that will be used as the conditions. Memory event rules are set for variables. Set the data collection patterns used for processing when the memory event conditions are met in advance.

## 11-2-1 Adding Memory Event Rules

Use the following procedure to add memory event rules.

*1,2,3...* 1. Click the Event Settings Tab and select *Memory Event Settings*.



Memory Event Settings [Varia	
Memory Event List	Memory Event Rules
All Rules	Rule Name: MemoryEvent     Enable this rule
Bule Name	Description:
MemoryEvent	Memory Event Conditions
MemoryE vent1	Variable: Taq0000
	C When the bit is DFF When the specified bit is DN, the event will be processed.
	C When the value is greater Specify a bit from 0 to 15.
	C When the value is less
	C Custom
	Event Processing
	When the event condition is satisfied
	Basic Collection     will     Start data collection
	C Execute Custom Action Set Custom Action
Add Copy Bemove	
Tienove	
	OK Cancel Apply

The Memory Event Settings Dialog Box will be displayed.

- 2. Click the **Add** Button.
- 3. Enter the memory event rule name, event conditions, and event processing. For details on settings refer to *11-2-2 Setting Memory Event Rules*.
- 4. After entering the settings, click the **OK** Button or the **Apply** Button.
- 5. Check that the memory event has been added

🔄 SPU-Console - SPU-Unit1 (	SPU-Console - SPU-Unit1 (10.6.139.202) [Online]							
jle yjew Command Event Settings Help Jnit Information    Collection Settings    Event Settings    Recipe Settings    Unit Settings    Historical Trend								
Memory Event Settings	Scheduled Even	2	ete Event					
<ul> <li>O Display by Type</li> <li>              ⊕ Schedule Event ⊕ Memory Event      </li> <li>             ⊕ O Display by Processing         </li> </ul>	Enabled Yes Yes Yes	Name Schedule MemoryEvent MemoryEvent1	Type Schedule Ev Memory Event Memory Event	Processing Basic Collection Basic Collection Basic Collection	Summary Every 1 hour(s) and 0 minute(s)lexe Tag0000: When the bit is ON., exe Tag0001: When the bit is ON., exe			

## 11-2-2 Setting Memory Event Rules

Memory event rules are set for the variables selected in the list of variables.

**Note** The memory event conditions are determined by the contents of the addresses, and not by the values specified by the variable data type.

The settings are as follows:

Item	Description
Rule name	Enter the rule name.
Description	Enter the rule description (can be omitted)
Enable this rule	Deselect to disable the memory event rule.

Item		Description
Memory Event Con- dition	When the bit is ON	The event is processed when the bit specified in the <i>Bit offset</i> Field turns ON.
	When the bit is OFF	The event is processed when the bit specified in the <i>Bit offset</i> Field turns OFF.
	When the value is larger	The event is processed when the value is larger than the value specified in the <i>Argument value</i> Field.
	When the value is smaller	The event is processed when the value is smaller than the value specified in the <i>Argument value</i> Field.
	Custom	Enter user-specified condition settings when required.
Event Processing		Specify the processing to be performed when the memory event condition is satisfied.

#### *1,2,3...* 1. Enter the rule name and description.

Rule name: MemoryEvent	Enable this rule

2. Specify the memory event condition.

#### • Example: When the bit is ON

Memory Event Condition Variable: Trigger_0001	Address: D00000
When the bit is ON     When the bit is OFF     When the value is larger     When the value is smaller     C Ustom	Bit offset: 0 == 0 When the bit is turned on, the event is processed. The bit offset is specified within the range of 0-15.

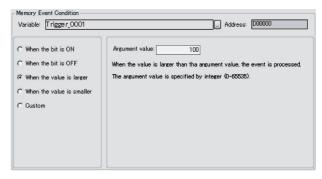
Specify the bit offset of the address specified for the *Variable* Field between 0 and 15.

• Example: When the bit is OFF

Memory Event Condition Variable: Trigger_0001	Address: [D00000
C When the bit is ON When the bit is OFF C When the value is larger C When the value is smaller	Bit offset: 0
(* Custom	ON OFF



• Example: When the value is larger



Specify the argument value between 0 and 65535.

• Example: When the value is smaller

Memory Event Condition	
Variable: Trigger_0001	Address: D00000
<ul> <li>When the bit is ON</li> <li>When the bit is OFF</li> <li>When the value is larger</li> <li>When the value is smaller</li> </ul>	Argument value: 100 When the value is smaller than tha argument value, the event is processed The argument value is specified by integer (0-65535).
← Custom	

Specify the argument value between 0 and 65535.

• Example: Custom

Variable: Trigger_0001	Address: D00000
<ul> <li>○ When the bit is ON</li> <li>○ When the bit is OFF</li> <li>○ When the value is larger</li> <li>○ When the value is an applier</li> </ul>	Set the condition evaluation Condition evaluation type: GTLT Value is between argument 1 to 2 Argument 1: 100 Argument 2: 200
<ul> <li>○ When the value is larger</li> <li>○ When the value is smaller</li> <li>○ Custom</li> </ul>	Record data when [F->F]     Record data when [F->F]     Record data when [F->F]

Enter the condition evaluation type and arguments. The following table lists the condition evaluation types and arguments.

Condition evaluation type	Argument 1	Argument 2	Meaning	
BITOR	Required		One of the same bits is ON as in argument 1.	
BITAND	Required		All of the same bits are ON as in argument 1.	
TRUE			Always true	
NoneZero			Value ≠ 0	
EQ	Required		Value = Argument 1	
LT	Required		Value < Argument 1	
LE	Required		Value ≤ Argument 1	
GT	Required		Value > Argument 1	
GE	Required		Value ≥ Argument 1	
GELE	Required	Required	Argument $1 \le Value \le Argument 2$	

Condition evaluation type	Argument 1	Argument 2	Meaning	
GTLT	Required	Required	Argument 1 < Value < Argument 2	
GELT	Required	Required	Argument $1 \le Value < Argument 2$	
GTLE	Required	Required	Argument 1 < Value $\leq$ Argument 2	
PrevBITOR			One of the same bits is ON as in previous value.	
PrevBITAND			All of the same bits are ON as in previous value.	
PrevEQ			Value = Previous value	
PrevLT			Value < Previous value	
PrevLE			Value ≤ Previous value	
PrevGT			Value > Previous value	
PrevGE			Value $\geq$ Previous value	

---: Not required.

The pattern for which event processing is to be executed for the current evaluation in comparison to the previous evaluation is also set.

Item	Meaning
$True \to True$	Event processing is executed when the evaluation remains true.
$True \to False$	Event processing is executed when the evaluation changes from true to false.
$False \to True$	Event processing is executed when the evaluation changes from false to true.
$False \to False$	Event processing is executed when the evaluation remains false.

Note

Judgements are calculated based on the word contents of the address specified for the variable, and not on the converted value for the data type of the variable.

Example: INT (Integer: (-32,768 to 32,767) and WORD (16-bit text string: #0 to #FFFF)

If the condition judgement is to be for a non-negative INT (0 to 32,767), then the following settings are required: GELT for the condition judgement type, 0 for argument 1, and 33,768 (8000 hex) for argument 2.

	Memory value	0x000	0x7FFF	0x8000	0xFFF
Data type					
WORD		0	32,767	32,768	65,535
INT		0	32,767	-32,768	-1

 Specify the event processing to be executed. Specify the collection pattern and processing to execute at the event destination when the event condition is satisfied.

he event condition is satisfied			
Basic Collection	to execute	Start data collection	~
Execute custom action	Custom A	ction	

The following table shows the event destination and processing that can be performed.

Destination	Processing			
Basic collection	Select from the following processing operations.			
	Start data collection	Starts basic collection. Same as the Start Basic Collection command.		
	Stop data collection	Stops basic collection. Same as the Stop Basic Collection command.		
	Switch file	Switches to the next file when data is being saved in multiple files.		
Data collection	Select from the following processing operations.			
(1 to 64)	Start cyclic collection	Starts cyclic collection.		
	Stop cyclic collection	Stops cyclic collection.		
	Acquisition of data (one shot)	Records data once only when the con- dition is satisfied.		
	Switch file	Switches to the next file when data is being saved in multiple files.		

**Note** When *Custom* is selected, the event destination, event ID, and other settings can be specified by the user. This option is for expansion purposes and is not normally used.

# 11-2-3 Deleting Memory Event Rules

Use the following procedure to delete memory event rules.

- 1,2,3...1. Click the Event Settings Tab and select *Memory Event Settings*. The Memory Event Settings Dialog Box will be displayed.
  - 2. In the Memory Event List, select the memory event rule that is to be deleted and click the **Remove** Button.

Memory Event Settings [Variable:	Tag0001]
Memory Event Settings (Variables Memory Event List All Rules v Rule Name MemoryEvent MemoryEvent2 MemoryEvent3 MemoryEvent4	Memory Event Rules         Rule Name:       MemoryEvent1         Description:         Memory Event Conditions         Variable:       Tag0001         When the bit is 0N         When the bit is 0FF         When the value is greater         When the value is less         Custom
Add Lopy Bemove	E vent Processing When the event condition is satisfied Basic Collection will Start data collection Execute Custom Action Set Custom Action
	OK Cancel Apply

## 11-2-4 Copying Memory Event Rules

Use the following procedure to copy memory event rules.

- 1,2,3...1. Click the Event Settings Tab and select *Memory Event Settings*. The Memory Event Settings Dialog Box will be displayed.
  - 2. In the Memory Event List, select the memory event rule that is to be copied and click the **Copy** Button.
  - **Note** The Memory Event List displays the rules for the selected variable only. To display rules for other variables, select *All Rules* from the Memory Event List to display all the registered rules.

#### 11-2-5 Memory Events Automatically Registered with Expanded Recipe Function and FTP Transfers

Memory events will be automatically registered when the expanded recipe function or FTP transfer is set. This data is used for internal processing. Do not delete it.

Function	Rule name
Expanded recipe	AutoRecipe n_ (expanded recipe method name)
FTP receive	AutoRecipen_RecipeReceive
FTP send	AutoFTPSendn_ (data collection pattern name)

A number from 0 to 9 will be inserted for "*n*".

## 11-3 Setting Schedule Events

The procedure for setting rules for schedule events that occur at specific times or time intervals is described here.

## 11-3-1 Schedule Event Setting Dialog Box Configuration

Click the **Event Settings** Tab in the SPU-Console, and select **Schedule Event Settings**. The Schedule Event Dialog Box will be displayed.



	Scheduled Event Settings	$\mathbf{X}$
List of	Scheduled Event List All schedules Name Summary Start Schedule Every 1 ho 2007/05/2	- Scheduled Event Rules Rule Name: Schedule
schedule events	Add         Copy         Bemove           Add         Copy         Bemove           Sun Mon Tue Wed Thu Fri Sat         29         30         1         2         3         4         5           6         7         8         9         11         12         13         14         15         16         17         18         19         20         21         22         22         24         25         26         27         28         29         30         1         2         1         1         2         13         14         15         16         17         18         19         20         21         22         22         24         25         26         27         28         29         30         1         2         2         24         25         26         27         28         29         30         3         1         2         2         24         25         26         27         28         29         31         1         2         2         24         25         26         27         28         29         30         31         1         2         2         24         25	O baily       Every       Hour(s)       Minute(s)         Weekly       Skip holidays       Working hours only         Custom       Done-time       Start Date/Time       5/23/2007
	3 4 5 6 7 8 9 	Event Processing     Setting rules for schedule events       When the event condition is satisfied     Image: Start data collection       Image: Basic Collection     Image: will       Image: Start data collection     Image: Start data collection       Image: Start data collection     Image: Start data collectio
	Panel for validating	schedule event settings

### 11-3-2 Adding Schedule Event Rules

Use the following procedure to add schedule event rules.

1,2,3...
 Click the Event Settings Tab in the SPU-Console, and select Schedule Event Settings. The Schedule Event Dialog Box will be displayed.

	Schodulad Event Sattings					
	Scheduled Event Settings					
	Scheduled Event List					
	All schedules		~			
	Name	Summary	Start			
	Schedule	Every 1 ho	2007/05/2			
	<		>			
0	Add	Copy Remove				
~						
	<	May, 2007	>			

- 2. Click the Add Button in the Schedule Event List.
- 3. Set the name of the schedule event rule, the schedule event conditions, etc. For details on settings, refer to *11-3-3 Setting Schedule Event Rules*.

## 11-3-3 Setting Schedule Event Rules

The setting items for schedule events are as follows:

Item	Details
Rule name	Used to enter the rule name
Description	Used to enter a description of the rule (can be omitted).

Item		Details
Enable this rule		When deselected, the schedule event rule is disabled.
Schedule event	Hour/Minute	Specifies in hours/minutes.
condition	Daily	Specifies in days.
	Weekly	Specifies in weeks.
	Monthly	Specifies in months.
	Custom	Sets user-specified schedule event conditions.
	One time only	Specifies the date and time for a once-only event.
Event processing	1	Specifies the processing to be performed when the schedule event conditions are satisfied.

#### *1,2,3...* 1. Enter the rule name and description.

- Schedule event	rule
Rule name:	Schedule 🛛 🖾 Enable this rule
Description:	

2. Specify the schedule event conditions.

#### Hour/Minute Pattern

Schedule event condition – Pattern Hour/Minute Daily	every 1 hour(s) and 0 minute(s) Execute "Start data collection" using "Sampling".
Weekly Monthly Custom	Every 1 v hours 0 v minutes
O One time only	Start date : 6/ 1/2005 💌 13:52 💌

Use this setting to specify the schedule event in hour/minute intervals.

Item	Details
Hour/Minute	Specifies the schedule event interval.
Activate Holiday setting	When selected, the event will not be executed on holidays specified in the holiday settings.
Effective in working hours	When selected, the event will be executed from the start time until the finish time specified in the holiday settings.
Start date	Specifies the start date and time for executing the first schedule event.

#### **Daily Pattern**

Schedule event condition	
Pattern O Hour/Minute	at 13:52 every day Execute "Start data collection" using "Sampling".
⊙ Daily O Weekly	
Monthly	O Every 1 days
Custom	Set to 13:52 V Activate Holiday setting
One time only	
	Start date: 6/ 1/2005

Item	Details
Weekdays	Executes every weekday except for holidays specified in the holiday setting.
Every [number] days	Specifies the schedule event interval in days.
Set to	Specifies the time for executing the schedule event.
Activate Holiday setting	When selected, the schedule event is executed except on holidays specified in the holiday setting.
Start date	Specifies the start date for executing the first schedule event.

Use this setting to specify the schedule event in daily intervals.

#### Weekly Pattern

Schedule event condition		
Pattern O Hour/Minute	at 11:30 on every Wednesday Execute "Start data collection" using "Sampling".	
Daily  Meekly Monthly Custom One time only	Every     Image: weeks       Every week     Very Week	
	Set to 11:30 V Activate Holiday setting	
	Start date: 6/ 1/2005	

Use this setting to specify the schedule event in weekly intervals.

Item	Details
Every [number] weeks	Specifies the schedule event interval in weeks.
Every week	Specifies the day of the week to execute the schedule event.
Set to	Specifies the time for executing the schedule event.
Activate Holiday setting	When selected, the schedule event is not executed on holidays specified in the holiday setting.
Start date	Specifies the start date for executing the first schedule event.

#### Monthly Pattern

Schedule event condition	
Pattern O Hour/Minute	at 13:52 on 1 every month. Execute "Start data collection" using "Sampling".
🔿 Daily	Every 1÷ months Day: 1 v
⊖ Weekly	Every 🔤 months Day: 1
Monthly	Execute at the last day of the month if it is before the setting above.
Custom	Set to 13:52 🗸 🖸 Activate Holiday setting
One time only	
	Start date: 6/ 1/2005

Use this setting to specify the schedule event in monthly intervals.

Item	Details
Every [number] months	Specifies the schedule event interval in months and the day.
Execute at the last day of the month if it is before the setting above	When selected, if the specified day does not exist in that month, the schedule event will be executed on the last day of the month.
	Example: If "31" is specified for the day, the event will be executed on February 28.
Set to	Specifies the time for executing the schedule event.

#### Setting Schedule Events

#### Section 11-3

Item	Details
Activate Holiday setting	When selected, the schedule event is not executed on holidays specified in the holiday setting.
Start date	Specifies the start date for executing the first schedule event.

#### **Custom Pattern**

Schedule event condition-	
Pattern O Hour/Minute	at 0Yearand0Monthand0Dayand0Hourand0Minute Execute "Start data collection" using "Sampling".
🔿 Daily	Cycle
◯ Weekly	0 ★ Year 0 ★ Month 0 ★ Day 0 ★ Hour 0 ★ Minute
Monthly	Activate holiday setting Add non-execution day
Custom	Activate working hours only
One time only	
	Start date : 6/ 1/2005 • 13:52 •

Use this setting to set user-specified schedule event conditions.

Item	Details
Cycle	Specifies the schedule event interval in years/months or in days/hours/minutes. The cycle must be completely within the same month or the same day, i.e., boundaries between two different months or two different days cannot be crossed.
Activate holiday setting	When selected, the schedule event is not executed on holidays specified in the holiday setting.
Activate working hours only	When selected, the event will be executed from the start time until the finish time specified in the holiday settings.
Add non-execution day	Additional non-execution days can be specified by click- ing the adjacent arrow button. The non-execution setting will apply to this rule only.
Start date	Specifies the start date for executing the first schedule event.

#### **One Time Only Pattern**

- Schedule event condition-							
Pattern O Hour/Minute	at 6/1/2005 13:52 Execute "Start data collection" using "Sampling".						
🔿 Daily	Start date : 6/ 1/2005 💌 13:52 🗸						
◯ Weekly							
O Monthly							
O Custom							
One time only							
One time only     One time only							

Use this setting to set a schedule event to occur once only

Item	Details
	Specifies the start date and time for executing the schedule event.

3. Specify the event processing.

Specify the collection pattern at the event destination and processing to be executed when the event conditions are satisfied.

Event processing

When the event condition is satisfied				
Sampling	*	to execute	Start data collection	*
O Execute custom action		Custom <u>A</u> d	ction	

The event destinations and processing are described in the following table.

Destination	Processing					
Basic collection	Select from the following processing operations.					
	Start data collection	Starts basic collection. Same as the Start Basic Collection command.				
	Stop data collection	Stops basic collection. Same as the Stop Basic Collection command.				
	Switch file	Switches to the next file when data is being saved in multiple files.				
Data collection	Select from the following processing operations.					
(1 to 64)	Start cyclic collection	Starts cyclic collection.				
	Stop cyclic collection	Stops cyclic collection.				
	Acquisition of data (one shot)	Records data once only when the con dition is satisfied.				
	Switch file	Switches to the next file when data is being saved in multiple files.				

- **Note** When *Custom* is selected, the event destination, event ID, and other settings can be specified by the user. This option is for expansion purposes and is not normally used.
  - 4. Click the **OK** Button to register the settings.

## 11-3-4 Deleting Schedule Event Rules

Use the following procedure to delete schedule event rules.

- 1. Click the Event Settings Tab and select Schedule Event Settings. The Schedule Event Settings Dialog Box will be displayed.
  - 2. Select the schedule event rule to be deleted from the *Schedule Event List* and click the **Remove** Button.

Scheduled E	vent Settings	
Sch	eduled Event	List
All schedules		~
Name	Summary	Start
Schedule	Every 1 ho	2007/05/2
<		>
Add	<u>C</u> opy <u>R</u> emov	
<	May, 2007	>

## 11-3-5 Copying Schedule Event Rules

1. Click the Event Settings Tab in the SPU-Console, and select Schedule Event Settings. The Schedule Event Dialog Box will be displayed.

2. In the Schedule Event List, select the schedule event rule that is to be copied and click the **Copy** Button.

#### 11-3-6 Changing Schedule Event Rules

Use the following procedure to change schedule events.

- 1. Click the Event Settings Tab in the SPU-Console, and select Schedule Event Settings. The Schedule Event Dialog Box will be displayed.
  - 2. Select the schedule event rule to be changed from the *Schedule Event List*.
  - 3. Change the schedule event rule. For details on settings, refer to *11-3-3 Setting Schedule Event Rules.*
  - 4. Click the **OK** Button to register the settings.

#### 11-3-7 Setting Holidays

Set the holidays to be used and the operating times for the *Activate Holiday setting, Effective in working hours*, and *Activate working hours only* settings using the following procedure.

- 1. Click the **Event Settings** Tab in the SPU-Console, and select **Schedule Event Settings**. The Schedule Event Dialog Box will be displayed.
- 2. Click the **Holiday** Button.

	< June, 2005 🗲								
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	l	
	29	30	31	1	2	3	4	I	
	5	6	7	8	9	10	11	I	
	12	13	14	15	16	17	18	I	
	19	20	21	22	23	24	25	I	
	26	27	28	29	30	1	2	I	
	3	4	5	6	- 7 -	8	9	I	
e					-			1	
		<u>H</u>	oliday		J				

The Holiday (Non-working Day) Setting Dialog Box will be displayed.

Holiday (Non-working day	r) setting
Working day	
🗌 Sun. 🗹 Mon 🗹 T	ue. 🗹 Wed. 🗹 Thu. 🗹 Fri. 🗌 Sat.
Start time: 8:00	✓ End time: 17:00 ✓
Other holidays(non-working da	
Date Last Ye 🔨	Property  Set by date
1/1         2029           2/11         2029           4/29         2029           5/3         2029           5/4         2029           5/5         2029           11/3         2029           11/23         2029           12/23         2029           1/10         2005	June       01       ✓         ● Every year       2028 ÷       until         ○ Once       2005 ÷
3/21 2005 •	June 01 💌 to 🛛 June 01 💌
<u>N</u> ew <u>E</u> dit	Update Back Delete
	OK Cancel

3. Specify the working days, and work start and end times.

Working day	ı — — — — — — — — — — — — — — — — — — —						
🗌 Sun.	Mon.	🗹 Tue.	🗹 Wed.	🗹 Thu.	🗹 Fri.	🗌 Sat.	
Start time:	8:00	~	End time	e 17	:00	*	

4. Specify holidays (non-working days).

Date 1/1 2/11 4/29 5/3 5/4 5/5 11/3 11/23	Last Ye  2029 2029 2029 2029 2029 2029 2029 202	Property Set by date June 01 Every year Once 2005
12/23 1/10 3/20 3/21	2029 2005 2005 2005 ♥	O Set by period
<u>N</u> ew	<u>E</u> dit	Update Back Delete

To add holidays, click the **New** Button, and specify the holiday date or period under *Property*.

• When setting the date, set the date of the holiday. If the year is set, the holiday is only valid for that year.

- When setting the period, set the start and end dates of the holiday period. This setting is valid every year.
- 5. Click the **Update** Button to add the holiday.

# 11-4 Enabling Event Settings

To enable the event settings, select **Send Settings** in the Event Settings Dialog Box. This operation enables not only the event settings, but also variable settings and data collection pattern settings. For details on the procedure, refer to 10-6 Enabling the Data Collection Settings.

To enable only the schedule event settings without stopping data collecting, select *Scheduled Events* in the Event Settings Dialog Box. The schedule events will be enabled without stopping data collecting.

	≥
Click Send Settings to transfer the settings to the Unit. (The data collection settings will also be sent.)	^
Click Scheduled Events to send only the scheduled event settings. <u>S</u> cheduled Events	*
📓 SPU-Unit1 (10.6.139.202) [Online] Idle Data Storage Mode	

## 11-5 Displaying the List of Events

A list of all the currently set events can be displayed on SPU-Console.

*1,2,3...* 1. Select the **Event Settings** Tab in SPU-Console.

∃ile ⊻iew Command Event Sett	ings <u>H</u> elp				
Unit Information Collection Setting	Event Settings	Recipe Settings	Unit Settings His	torical Trend	
Memory Event Settings	Scheduled Ever	nt Settings Dele	ete Event		
All Events	All Even				
O Display by Type	All Even Enabled	ts Name	Туре	Processing	Summary
O Display by Type B Schedule Event			Type Schedule Ev	Processing Basic Collection	Summary Every 1 hour(s) and 0 minute(s)]ex
O Display by Type	Enabled	Name			

2. Click the sections in the left directory tree to display the following lists.

Item	List display		
All Events	Displays all events.		
Display by Type	Displays events by type. Schedule events: Displays schedule events. Memory events: Displays memory events.		
Display by Process- ing	Displays event processing for each event.		

Note

(1) The following rule names are automatically registered for the expanded recipe function and FTP transfers. This data is used for internal processing. Do not delete it.

Function	Rule name		
Expanded recipe	AutoRecipe n_ (expanded recipe method name)		
FTP receive	AutoRecipen_Receive		
FTP send	AutoFTPSend <i>n</i> _ (data collection pattern name)		

A number from 0 to 9 will be inserted for the "n".

(2) The following message box will be displayed when the expanded recipe settings are made. To enable events, it is necessary to apply data collection settings.

OMRON SPU-Console				
Į.	Events and variables were registered automatically. To apply the recipe expansion settings, apply the data collection settings.			
	ОК			

# SECTION 12 Recipe Settings (Data Storage Mode)

This section describes the settings required to use the recipe function, which can be used in Data Storage Mode to write numeral and textual data, e.g., production parameters, to the memory areas of the CPU Unit.

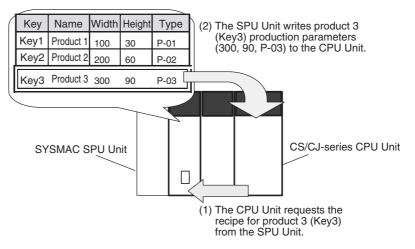
12-1	Recipe	Function
	12-1-1	Recipe Function
	12-1-2	Data Structure of Recipe Files
	12-1-3	Recipe Writing Formats
	12-1-4	Procedure for Using Recipes
	12-1-5	Differences between the Previous Recipe Function and the Expanded Recipe Function
12-2	Recipe	Files
	12-2-1	Writing Formats
	12-2-2	Variable Format Recipe File
	12-2-3	Contiguous Area Format Recipe File
	12-2-4	Storage Location of Recipe Files
12-3	Recipe	Function Setting Procedure
12-4	Setting	the Recipe Environment
	12-4-1	Setting the Key Area
	12-4-2	Handshake Settings
12-5	Setting	Recipes
	12-5-1	Displaying Recipe Settings
	12-5-2	Adding Recipes
	12-5-3	Setting Recipes
	12-5-4	Copying Recipes
	12-5-5	Deleting Recipes
12-6	Setting	Recipe Files
	12-6-1	Adding Recipe Files
	12-6-2	Deleting Recipe Files
	12-6-3	Changing Recipe Files
12-7	Setting	the Recipe Writing Addresses for Variable Format
	12-7-1	Setting the Writing Address for Each Field
	12-7-2	Field Settings Dialog Box
	12-7-3	Setting Variables in Fields
	12-7-4	Setting Data Collection Pattern Variables in Fields
	12-7-5	Changing Field Settings
	12-7-6	Clearing the Field Settings
12-8	Setting	the Recipe Writing Addresses for Contiguous Area Format
	12-8-1	Setting the Recipe Writing Address
12-9	Setting	Recipe Keys
	12-9-1	Setting the Recipe Key
	12-9-2	Key Entry Details Dialog Box
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# 12-1 Recipe Function

### 12-1-1 Recipe Function

The recipe function enables writing numeral and textual data, e.g., production parameters, to the memory areas of the CPU Unit. The recipe function can be used to easily change the setup of the system. The data must be created in a CSV file and store it in the SYSMAC SPU Unit Memory Card in advance. This data can be changed while the SYSMAC SPU Unit is operating.



The recipe function has the following features.

- CPU Unit memory can be saved because there is no need to store recipe data in the CPU Unit.
- Recipe data is in CSV format. (It must be created and edited on a computer in advance. The SPU-Console cannot be used to create or edit actual recipe data.)
- Recipe data is stored in the Memory Card of the SYSMAC SPU Unit. The Memory Card can be accessed from a computer by using a shared folder on a Windows network.
- The recipe write function can be executed by turning ON a bit in the CPU Bus Unit Area in the DM Area of the CPU Unit. This bit, however, is not used with the expanded recipe function. Refer to *SECTION 13 Expanded Recipe Settings (Data Storage Mode)* for information on the expanded recipe function. FINS commands can also be used to write recipes, enabling writing recipes from the host system, e.g., a personal computer.
- Up to 10,000 data items can be written as one batch. There is no limit to the total number of recipes that can be managed, so large quantities of recipe data, such as is required for production of many models, can be managed. (There will be a limit to the size of the CSV files due to the capacity of the Memory Card.)
- When a recipe is written, the data type and scale are automatically converted.
- Data collected by the SYSMAC SPU Unit can be made into a recipe. By doing this, the status of the system at a certain point in time can be reproduced. For example, the system master data or inspection data can be collected and written to a CPU Unit memory area as recipe data to reproduce the system status.
- The recipe write function can be used in Data Storage Mode only.

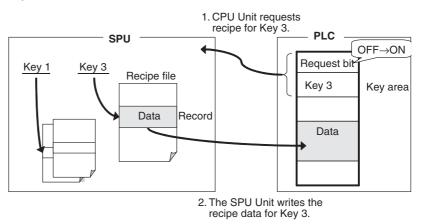
• It is possible to use the expanded recipe function with SYSMAC SPU Units with unit version 2.1 or later. Refer to *12-1-5 Differences between the Previous Recipe Function and the Expanded Recipe Function* for information on differences in functions. Refer to *SECTION 13 Expanded Recipe Settings (Data Storage Mode)* for information on functions.

## 12-1-2 Data Structure of Recipe Files

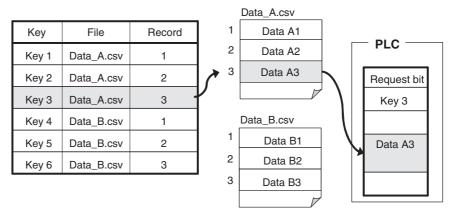
Recipe data is in CSV format. A file that contains recipe data is called a recipe file. Recipe data consists of fields and records. The writing address and data format are set for each field. A record is a group of fields.

	Field 1	Field 2	Field 3	Field 4
	<ul> <li>Address</li> </ul>	<ul> <li>Address</li> </ul>	<ul> <li>Address</li> </ul>	<ul> <li>Address</li> </ul>
	<ul> <li>Data type</li> </ul>			
Record 1				
Record 2				
Record 3				
Record 4				

Recipe data is managed by keys, which are unique record identifiers. When there is a recipe write request, the record corresponding to the requested key is written to the CPU Unit memory area as recipe data. The requested key is stored in the CPU Unit memory area. This area of the memory is called the key area.



Recipe data is internally managed in the following structure. Each recipe is characterized by a recipe file and a record. In the example shown in the following figure, recipe data for Key 3 is record 3 of the recipe file Data\_A.csv.



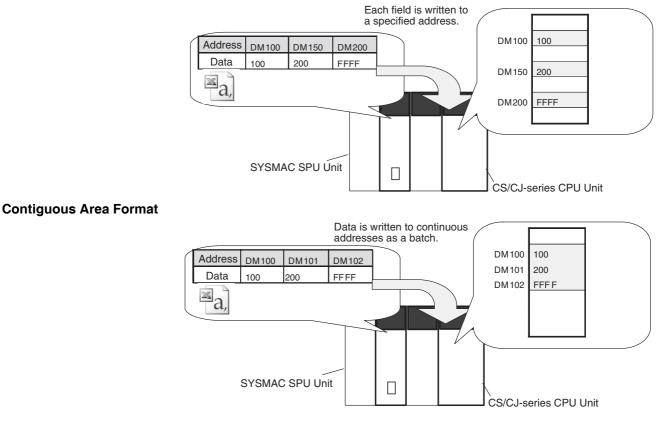
## 12-1-3 Recipe Writing Formats

There are two formats that can be used to write recipes, the Variable Format and the Contiguous Area Format.

The Variable Format writes to multiple non-contiguous memory addresses. It is a flexible writing format because the data type and scaling can be specified. Recipe data of each field is written one at a time, so time is required to write all of the recipe data.

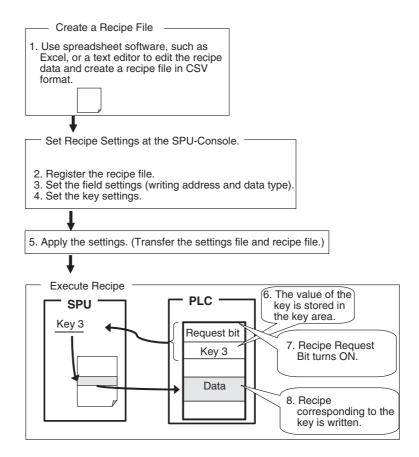
The Contiguous Area Format writes data to contiguous memory addresses. The data type cannot be specified but all recipe data is written at once, so it is faster than the Variable Format. It is suitable for cases where a large amount of data is written at once.

#### Variable Format



## 12-1-4 Procedure for Using Recipes

The following figure shows the steps from creating the recipe file to executing the recipe.



### 12-1-5 Differences between the Previous Recipe Function and the Expanded Recipe Function

The following table gives the main differences between the recipe function provided with version 2.0 and the expanded recipe function provided with version 2.1 or later.

Additional functions	Ver.2.0	Ver.2.1
Recipe key searches	Supported	Supported.
	Key list searches	Recipe key searches added.
		<ul> <li>Searches in files</li> </ul>
		<ul> <li>Searches for file names</li> </ul>
Registering recipe keys in files	Not supported	Supported
Specifying recipe keys as file names	Not supported	Supported

Refer to SECTION 13 Expanded Recipe Settings (Data Storage Mode) for information on the expanded recipe function.

## 12-2 Recipe Files

The recipe function writes data in the form of a CSV file. The writing method can be either the Variable Format or the Contiguous Area Format. The data type of the recipe file is different for each method.

## 12-2-1 Writing Formats

There are two recipe writing formats, the Variable Format and the Contiguous Area Format. The features of each method are listed below.

#### Variable Format

- Recipe data is written to non-contiguous memory areas.Data is written with a specified data type.
- Data can be converted by scaling.
- Recipe data is written one at a time, so time is required to write all data.

#### Contiguous Area Format

- Recipe data is written to contiguous memory areas.
- All data has a fixed data type.
- The data type cannot be specified but all recipe data is written at once, so it is faster than the Variable Format. It is suitable for cases where a large amount of data is written at once.

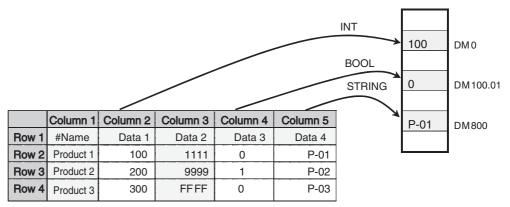
#### 12-2-2 Variable Format Recipe File

Recipe files for the Variable Format are text files in CSV format. An example is shown below.

#Name	Data 1	Data 2	Data 3	Data 4
Product 1	100,	1111,	0,	P-01
Product 2	200,	9999,	1,	P-02
Product 3	300,	FFFF,	0,	P-03

In the Variable Format, each field is written to the specified address in the specified data type. Use the appropriate data format for each data type.

Example for Writing to DM0 (INT), DM100.01 (BOOL), and DM800 (STRING) in Memory  $% \left( A_{1}^{2}\right) =0$ 



You can specify not to write certain columns, such as column 1 and 3 in the example above.

Note

(1) Use the appropriate data format for each data type. (Refer to the following table.) If the BOOL format is set for values other than 0 or 1, or the UNIT format is set for hexadecimal numbers like A05C, a recipe data type conversion error message will be displayed.

Data type	Recipe data
BOOL	0 or 1
UNIT	0 to 65535
INT	-32768 to 32767
UNIT_BCD	0 to 9999

Data type	Recipe data		
WORD	0 to FFFF		
CHANNEL	0 to FFFF		
STRING	ASCII character string		
UDINT	0 to 4294967295		
UDINT_BCD	0 to 99999999		
DWORD	0 to FFFFFFF		
REAL	$-10^{-38}$ to $10^{+38}$		
LREAL	$-10^{-308}$ to $10^{+308}$		
CANNEL_BLOCK	Continuous channels (4 digits $\times$ No. of elements)		

(2) Recipe data that specifies scaling with the data type is usually within the range a floating-point data type (float or double). If the scaled data is not within the range of the specified data type, a recipe data type conversion error message will be displayed.

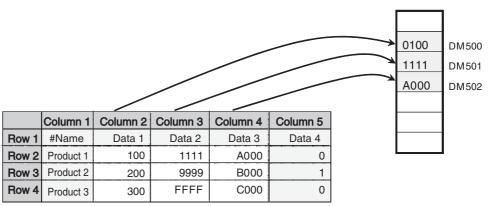
### 12-2-3 Contiguous Area Format Recipe File

Recipe files for the Contiguous Area Format are text files in CSV format. An example is shown below.

#Name	Data 1	Data 2	Data 3	Data 4
Product 1	100,	1111,	A000,	0
Product 2	200,	9999,	B000,	1
Product 3	300,	FFFF,	C000,	0

In the Contiguous Area Format, the channel data is in binary format (hexadecimal). Data is written to contiguous memory addresses starting from the specified head address. The number of columns to write can be specified.

Example for Writing to Contiguous Memory Addresses from D500 (3 columns).

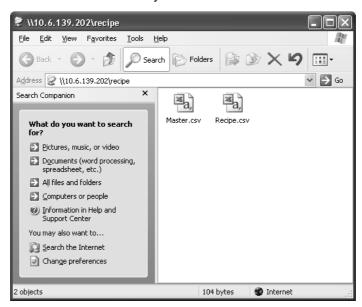


You can specify not to write certain columns, such as column 1 and 5 in the example above. The fields that are written must be contiguous.

## 12-2-4 Storage Location of Recipe Files

To use a recipe file that has been edited on a computer, the recipe file must be stored in a folder named "recipe" on the SYSMAC SPU Unit Memory Card.

Recipe files can be transferred to this folder using the procedures described in *12-10 Enabling Recipe Settings*, but the folder can also be accessed from the computer by using a shared folder on a Windows network. This way the file can be transferred by drag and drop. Recipe files already stored in this folder can also be directly edited.



The method to access the recipe folder in the SYSMAC SPU using a computer is described below.

- Select *View Display Unit Folder Recipe Folder* in the SPU-Console. Windows Explorer will be started and the SPU Unit's shared folder will be displayed (Data Storage Mode).
- Enter the UNC address of the SPU Unit's shared folder in the address bar of Windows Explorer (e.g., \\192.168.0.100\recipe\).
- Note
- (1) Unused recipe files will not be automatically deleted by the SYSMAC SPU Unit or SPU-Console. When required, manually delete the files using Windows Explorer.
  - (2) Do not edit or save updated recipe files while recipes are being written. The recipe may not function properly.
  - (3) Versions of Microsoft Office Excel earlier than 2003 cannot create or edit CSV data that exceeds 256 columns. For CSV files that contain more than 256 columns, a special macro file "CSVFormatter.xls" can be used. The following steps describe how to use the macro file. The CSVFormatter.xls macro is used as follows:
- Double-click the CSVFormatter.xls file in the Journal folder (i.e., the shared folder in the SYSMAC SPU Unit). This will add a toolbar called SYSMAC-SPU to Excel.

∞ №	licrosoft Ex	kcel - Samj	pling.csv								.0	
8	<u>File E</u> dit <u>V</u>	jew <u>I</u> nsert	F <u>o</u> rmat <u>T</u> oo	ols <u>D</u> ata <u>W</u> ir	ndow <u>H</u> elp						_ 8	×
	🖻 🖬 🤞	3 d. 🖤	X 🖻 🛙	1 💅 🗠	- Ci + 🖗	φ 🖗 Σ		101 🖉 4	3 100% -	2		
Aria	al .	- 10	0 <b>- B</b>	<i>I</i> U ≣	三 三 臣	\$ %	*.0 .00 •.4 00. •		- 🕭 -	A SY	SMAC-SPU +	
	A1	•	= index	(	_					- <		/
	Α	В	С	D	E	F	G	Н		J	K	
1	index	clocktime	nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105	Tag-0106	Tag-0107	Τ
2	1			0	0	0	0	0	0	0	0	
3	2	57:16.3	3.51E+08	1	0	0	0	0	0	0	0	
4	3		3.57E+08	2	0	0	0	0	0	0	0	
5	4				0	0	0	0	0	0	0	
6	5		3.71E+08	4	0	0	0	0	0	0	0	
7	6		3.78E+08	5	0	0	0	0	0	0	-	
8	7		3.85E+08	-	0	0	0	0	0	0	0	
9	8		3.92E+08	7	0	0	0	0	0	0	0	
10	9		3.99E+08	8	0	0	0	0	0	0	0	
11	10	57:16.4		9	0	0	0	0	0	0	0	
12	11		4.13E+08	10	0	0	0	0	0	0	0	
13	12	57:16.4	4.2E+08	11	0	0	0	0	0	0	0	
14	13		4.27E+08	12	0	0	0	0	0	0	0	
15	14		4.34E+08	13	0	0	0	0	0	0	0	
16	15		4.41E+08		0	0	0	0	0	0	0	
17	16	57:16.4	4.48E+08	15	0	0	0	0	0	0	0	-
44	► ► Sat	mpling /					1				•	
Rea	dy									NUM		

- Note The macro may not be enabled depending on the security settings of Microsoft Office Excel. If this is the case, select *Options Macro Security Security Level* from the Excel menus and set the security level to *Medium*.
- CSV files exceeding 256 columns can be displayed using Microsoft Office Excel by selecting SYSMAC-SPU - Open CSV file from the toolbar. Select a CSV file to edit in the Open File Dialog Box. If the file exceeds 256 columns, the data will be divided at every 256 columns and placed on separate worksheets. Up to 256 columns can be edited in one worksheet.
- Save the data to a CSV file.
   Data edited on separate worksheets can be saved as a single CSV file. Select SYSMAC-SPU Save CSV file from the toolbar. Specify the filename and save the CSV file. The worksheets will be joined together to form a single CSV file.

# 12-3 Recipe Function Setting Procedure

The basic procedure from making recipes settings to executing recipes is outlined below. Before following the procedure, a recipe file containing recipe data must be created using a computer. Refer to *12-2 Recipe Files* for details on recipe files.

- *1,2,3...* 1. Set up the recipe environment settings. (Refer to *12-4 Setting the Recipe Environment*.)
  - 2. Set the recipe settings.
    - 2.1 Create a recipe. (Refer to 12-5 Setting Recipes.)
    - 2.2 Configure the recipe file. (Refer to 12-6 Setting Recipe Files.)
    - 2.3 Set the writing addresses. (Refer to *12-7 Setting the Recipe Writing Addresses for Variable Format*, and *12-8 Setting the Recipe Writing Addresses for Contiguous Area Format*.)
    - 2.4 Set the key. (Refer to 12-9 Setting Recipe Keys.)
  - 3. Transfer the settings to the SYSMAC SPU Unit. (Refer to *12-10 Enabling Recipe Settings*.)
  - 4. Execute the recipe. (Refer to 12-11 Executing Recipes.)

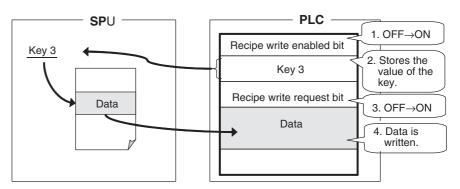
5. Check the recipe execution history. (Refer to *12-12 Displaying the Recipe Execution History*.)

# **12-4** Setting the Recipe Environment

Set the environment for the recipe function. The environment settings will apply to all recipes.

The recipe function is internally processed by the SYSMAC SPU Unit in the following order.

- *1,2,3...* 1. CPU Unit turns ON the Recipe write enabled bit in the recipe command area.
  - 2. CPU Unit stores the value of the key in the key area.
  - 3. CPU Unit turns ON the Recipe write request bit in the recipe command area.
  - 4. The SPU Unit reads the value of the key from the key area and writes the corresponding recipe data to the CPU Unit.



The memory area where the value of the key is stored can be set in Key Area of the environment settings.

The flag operation (as in step 3) can be set in Handshake of the environment settings.

**Note** Make sure that the environment settings are properly set before setting the recipe settings.

#### 12-4-1 Setting the Key Area

Set the CPU Unit memory area where the recipe key is stored.

1. Click the Environment Settings Tab in the SPU-Console Recipe Settings Tab Page. The Environment Settings Window will be displayed.

#### 2. Click the Key Area Tab.

🖻 SPU-Console - aaa (19	92.168.0.101) [Online]		
File View Command Help Unit Information Collection Se	ettings Event Settings Recipe Settings Unit :	Settings Historical Trend	
Recipe List	<ul> <li>Environment Settings</li> <li>Key Area P Handshake</li> <li>Set the key storage area. The specified</li> </ul>	d area size from the start address will be area value will be read in the specified Format	
Control Panel			
<b>B B I I O</b> 1: 01: 02:	Start all collections Stop all collection Stat basic collection Stop basic collection Save the collected data	Click. Send Settings to transfer the settings to the Unit. Click. Send Settings To apply the request/response settings in the recipe expansion Apply Collection Settings active	>

The following table describes the setting parameters.

	Item	Description
Start Address		Sets the start address of the memory area where value of the key is stored.
Format		Data is read into the specified memory area as one of the following data types. Data is recognized as the key.
	ASCII character string	The area corresponding to the number of bytes specified by <i>Key Size</i> is read in as an ASCII character string. Null $(0 \times 00)$ terminates the string.
	BCD: Binary- coded decimal	The area corresponding to the number of bytes speci- fied by <i>Key Size</i> is read in as BCD values.
	BIN: Decimal	The area corresponding to two bytes is read in as dec- imal values.
Key Size		Data contained in the memory area specified by the number of bytes (key size) from the start address is recognized as the key. If the data type is BIN, the key size is always 2 bytes.

The following table shows an example of a key.

CPU Unit memory	Кеу					
	ASCII (2 bytes)	BCD (2 bytes)	BIN			
0x0000	Null	0000	0			
0x3132	12	3132	12594			
0x9999	Error	9999	39321			

# 12-4-2 Handshake Settings

Handshake settings determine the recipe writing procedure.

*1,2,3...* 1. Click the **Environment Settings** Tab in the SPU-Console Recipe Settings Tab Page.

#### 2. Click the Handshake Tab.

🗐 SPU-Console - aaa (19	92.168.0.101)	[Online]						×
<u>File View Co</u> mmand <u>H</u> elp								
Unit Information Collection Se	ettings Event Sett	ngs Recipe S	ettings Unit Se	ttings Historical T	rend			
Recipe List	Environment Settings							
Execution History	🧬 Key Area	Handshake						
	Set the recipe	write method.						
	Handshake							
	⊙ One-p	oint Handshake	e O Tu	vo-point Handshak	е			
	Recipe wi request bi		PLC	SPU 2. WI	e write.	lecipe write request plete, the SPU turn:		
	Intelligent U CI01500 + 25	nit Memory M * Unit No.	ap					
	Offset	Bit	N	lame		Description		
		0	Recipe write re	quest	Recipe write is a	executed at the OF	F->ON transition.	
	~	1	Desine urite es		Lifbon His floo is	OCC ranina urita		
	<						>	
Control Panel								×
51: 01: 02:	Start all collections Stop all collections Start basic collecti Stop basic collection Save the collected	n 		Ser To apply	nd Se <u>i</u> tings		he Unit. recipe expansion setting	~
				📳 aaa (192.168	.0.101) [Online]	Idle	Data Storage Mode	

The following table describes the setting parameters.

Handshake	Recipe writing procedure			
One-point Handshake	The recipe write function is executed by turning ON the Recipe write request bit. When writing has been completed, the bit will be turned OFF.			
Two-point Handshake	The recipe write function is executed by turning ON the Recipe write request bit. When writing has been completed, the Recipe write complete bit will turn ON. The Recipe write request bit must be turned OFF in the CPU Unit.			

Refer to 12-11 Executing Recipes for detailed information on handshaking.

# 12-5 Setting Recipes

## 12-5-1 Displaying Recipe Settings

- *1,2,3...* 1. Click the **Recipe Settings** Tab in the SPU-Console.
  - 2. Select the Recipe List.
    - The Recipe List Window will be displayed.

SPU-Console - aaa (19 Eile <u>Vi</u> ew C <u>o</u> mmand <u>H</u> elp Unit Information Collection St		Unit Settings Hist	orical Trend								
Recipe List	Recipe List										
Environment Settings	Environment Settings	Recipe									
	Display all recipe settings. Key Type: ASCII Size: 10 (Bytes) Address: D00520 Handshake Type: Gne-point Type: Handshake Set environment	orspidy and on International All International A	Key2 Key3 Keipe Recipe	Key Descri File Key1 Data_A.csv Key2 Data_A.csv Key3 Data_A.csv		Record 2 3 4	Me				
		<u>A</u> dd		ails Key: ommand:		<u>S</u> ettings					
Control Panel							≥				
51: 01: 02:	Start all collections Stop all collections Start basic collection Stop basic collection Save the collected data		ck Send Settings to tran Send Settings apply the request/resp Apply Coll <u>e</u> ction 5	onse setting	-		setting:				
			92.168.0.101) [Online]	Idle	Data 9	Storage Mod	(1410)				

The following table describes the column headers.

Column header	Description
Key	Key that uniquely identifies the recipe data.
Description	Description of the key.
Recipe Name	Name of recipe.
File	Name of recipe data file. Recipe files are stored in the recipe folder in the SYSMAC SPU Unit.
Record	Record number corresponding to the recipe data in the recipe file.
Note	If the recipe key cannot be recognized, an error message will be displayed. If it is blank, the key is set correctly.

The following table describes each parameter.

Item		Description
Recipe Details		Displays details of the selected recipe.
	Name	Displays the recipe name.
	Description	Displays the recipe description.
	Write Format	Displays the recipe writing method.
Key Det	ails	Displays the selected key information.
	Key	Displays the key.
	FINS Command	Displays the FINS command to execute a recipe specified by the key.

## 12-5-2 Adding Recipes

- 1,2,3... 1. Click the Recipe Settings Tab in the SPU-Console.
  - 2. Select *Recipe List* to display the Recipe List Window.

SPU-Console - aaa (1 Elle <u>View</u> Command <u>Help</u> Unit Information Collection S		<sup>38</sup> Unit Settings Historical Tre	nd						
Recipe List	🚰 Recipe List								
Recpe List	Environment Settings Display all recipe settings. Key Type: ASCII Size: 10 (Bytes) Address: D00520 Handshake Type: One point Type: Handshake Set environmen	Recipe Display all of the registe	ed recipes.           Key         Descri         Recipe Name         File           No enabled keys are set.         Image: set of the set of						
Control Panel		Add Delete Copy	Key Det FINS Ca	ails Key: [ ommand: [					
	: Start all collections : Stop all collections : Start basic collection : Stop basic collection : Stop basic collected data	Send	Settings e request/resp oply Collection	onse setting	ings to the Unit.				

- 3. Click the Add Button. The Create New Recipe Dialog Box will be displayed.
- 4. Select Searches data in recipe key list (version 2.0).

reate Ne	w Recipe 🔀
Name:	Recipe0
Description	
Recipe	key search method
Find i	
Find i Sear	n file names hes data in recipe key list (version 2.0) e
6	xtracted as recipe data.
Write Fo	urmat
Varia	ole Format 🗸 🗸
f	Writes the recipe data in the address specified for each ield. The data type and scale conversion can be set for ach recipe.
File Che	ck
En En	able
0	f File Check is enabled, the recipe file integrity will be confirmed. If there is a problem with the recipe file, recipe wite will not be executed.
	OK Cancel

5. Enter the recipe details.

The following table describes the setting parameters.

Item		Description			
Name		Sets the recipe name.			
Descrip	otion	Description of the recipe. Can be omitted.			
Recipe	key search method	Sets the search method for recipe keys.			
	Find in files	Searches for the target string as the search key in the recipe files.			
	Find in file names	Searches for the target string as the search key in the recipe file names.			
Search data in rec- ipe key list		Searches for the target string in the recipe key list.			
Write F	ormat	Sets the write format of the recipe data.			
	Variable Format	Writes the recipe data in the address specified for each field. The data type and scaling can be set for each recipe.			
	Contiguous Area Format	Writes the recipe data in contiguous memory addresses starting from the start address. The data type cannot be specified.			
File Check		If the file check is enabled, the recipe file integrity will be confirmed. If there is a problem with the recipe file, the recipe will not be written.			

6. When input has been completed, click the **OK** Button. Make sure that the new recipe has been added.

SPU-Console - aaa (19 <u>Elle View Command H</u> elp	2.168.0.101) [Online]	Unit Cotting	s Historical Trend	1	-	-	_	
Recipe List	Recipe List	One Second	Thistolical Trend					
Environment Settings	Environment Settings Display all recipe settings.	Recipe	<u>all of</u> the registere	d recipes.				
	Key Type: ASCII Size: 10 (Bytes) Address: D00520 Handshake		lay All Recipe0	Key Key1 Key2 Key3	Descri	File Data_A.csv Data_A.csv Data_A.csv	Record 2 3 4	Me
	Type: Une-point Handshake Set environment	Dele	Add e Copy	Wrib	Name: escription: e Format:	Recipe0 Variable Format	Settings	
Control Panel								≥
51: 01: 02:	Stop all collections Start basic collection Stop basic collection	Exec	Send Se To apply the	ettings request/resp ly Collection S	onse setting	ings to the Unit. gs in the recipe	expansion :	>

# 12-5-3 Setting Recipes

- *1,2,3...* 1. Select a recipe from the Recipe List.
  - 2. Click the Settings Button.

SPU-Console - aaa (1) <u>File Vi</u> ew C <u>o</u> mmand <u>H</u> elp	92.168.0.101) [Online]	_		
Unit Information Collection S	ettings Event Settings Recipe Settings	Unit Settings Historical Tre	nd	
Recipe List	🚰 Recipe List			
Environment Settings	Environment Settings	Recipe		
	Display all recipe settings. Key	Display all of the registe		File Record Me
	Type: ASCII	Recipe0		
	Size: 10 (Bytes)		No enabled	d keys are set.
	Address: D00520			
	Handshake			
	Type: One-point Handshake		<	>
	Set environment	Add	Recipe Details       Name: Recipe Description:       Write Format: Var       Key Details       Key:       FINS Command:	tiable Format
		Delete Copy		
Control Panel				<b>X</b>
	Start all collections Stop all collections Start basic collection Stop basic collection Save the collected data	Send	Settings to transfer the setting Settings e request/response settings i pply Coll <u>e</u> ction Settings	gs to the Unit. in the recipe expansion setting: ↓ ↓
		ааа (192.168.0.	101) [Online] Idle	Data Storage Mode

3. The Recipe Settings Dialog Box will be displayed.

Recipe Settings	
Name: Resigned Perform file check	
Description:	
	Set Field Details
	Clear Settings
Recipe Files:	
Delete Change	Enter Key
File Size;	
ОК	Close

Name: Recipe0							Perfo	orm file check	
Description:									
					1	2	3	4	Set Field Details
				Field Name		Field2	Field3	Field4	
				Address		D00100	D00120	D00200	Clear Settings
				Data Type		UINT	UINT	STRING	
				Scaling					
Recipe Files:		Enable	Key	Description					
🛣 Data_A.csv	1				Name	Width	Height	Туре	
	2	$\leq$	Key1		Product	100	30	P-001	
	3	$\checkmark$	Key2		Product	200	60	P-002	
	4	$\checkmark$	Key3		Product	300	90	P-003	
<u>A</u> dd Delete	File Size:	931	Bytes (R	ecords: 4 , Fields	4]			ОК	Enter Key

4. Enter the settings in the Recipe Settings Dialog Box.

Contents of the file selected from the Recipe File List will be displayed in the Recipe Data Settings Panel. Refer to *12-6 Setting Recipe Files* for details on the Recipe File List.

Set the recipe data writing address (memory address and data type) and the key in the Recipe Data Settings Panel. Refer to 12-7 Setting the Recipe Writing Addresses for Variable Format and 12-8 Setting the Recipe Writing Addresses for Contiguous Area Format for details on how to set the recipe writing address. Refer to 12-9 Setting Recipe Keys for details on how to set the recipe key.

The following table describes the setting parameters.

Item	Description
Name	Sets the recipe name.
Description	Description of the recipe. Can be omitted.
File Check	Sets the recipe file integrity check function. If there is a problem with the recipe file, recipe write will not be exe- cuted.
Recipe File	Specifies the recipe data file. The recipe file must be created in advance.
Recipe File Data Setting Panel	Displays the contents of the recipe file. Sets the recipe data writing address for each field, and recipe data key for each record.

5. Set the parameters and click the **OK** Button to save the recipe settings.

6. Check the Recipe List Window to see that the recipe settings have been added.

🖻 SPU-Console - aaa (1	92.168.0.101) [Online]							
<u>File View Co</u> mmand <u>H</u> elp								
Unit Information Collection S	ettings Event Settings Recipe Settings	Unit Settings Historical Trend						
Recipe List	🚰 Recipe List							
Execution History	Environment Settings Display all recipe settings.	Recipe Display all of the registered registers.						
	Key	Display all of the registered reg						
	Type: ASCII	Recipe0 Key1 Data_A.csv 2 Key2 Data_A.csv 3						
	Size: 10 (Bytes)	Key3 Data_A.csv 4						
	Address: D00520							
	Handshake							
	Type: One-point Handshake	<						
		Recipe Details						
	Set environment	Name: Recipe0						
		Write Format Variable Format						
		Key Details						
		Add Key:						
		Delete Copy FINS Command:						
Control Panel		E						
	Start all collections Stop all collections	Click Send Settings to transfer the settings to the Unit.						
	Start basic collection Stop basic collection	Send Settings						
O 03	Save the collected data	To apply the request/response settings in the recipe expansion settings     Apply Collection Settings						
		(Exec)						
		📓 aaa (192.168.0.101) [Online] Idle Data Storage Mode						

#### 12-5-4 Copying Recipes

- *1,2,3...* 1. Select a recipe to copy from the Recipe List Window.
  - 2. Click the **Copy** Button. A copy of the selected recipe will be added.

#### 12-5-5 Deleting Recipes

- *1,2,3...* 1. Select a recipe to delete from the Recipe List Window.
  - 2. Click the **Delete** Button.

## 12-6 Setting Recipe Files

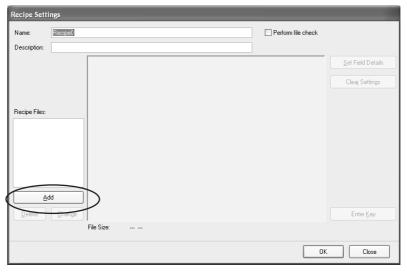
Recipe data is in CSV format. A file that contains recipe data is called a recipe file. Recipe data consists of fields and records. The address and data format are set for each field. A record is a group of fields.

A recipe file must be created in advance using an application such as Microsoft Office Excel. Refer to *12-2 Recipe Files* for details on recipe files. In this section it is assume that a CSV file (as shown in figure below) has already been created to be used as the recipe file.

× 1	🖾 Microsoft Excel - Data_A							
:2)	Eile Edit	⊻iew Ins	ert F <u>o</u> rmat	Tools	Data	Window		
: 🗋 😂 🗐 🚽 🞯 🍟 Arial 🔹 10								
	A1	•	<i>f</i> ⊮ Name					
	A	В	С	D		E		
1	Name	Width	Height	Туре				
2	Product1	100	30	P-001				
3	Product2	200	60	P-002				
4	Product3	Product3 300		P-003				
5								
6								

#### 12-6-1 Adding Recipe Files

- *1,2,3...* 1. Select a recipe file from the Recipe List Window.
  - Click the Settings Button. The Recipe Settings Dialog Box will be displayed.
    - 3. Click the **Add** Button. Select a file to use as the recipe in the Open File Dialog Box. (The recipe file must be created in advance.)



4. The selected file will be added to the Recipe File List and the contents of the file will be displayed in the Recipe Settings Panel.

Name:	Recipe0							Perf	orm file check	
	Treepee						_			
Description:							_			
						1	2	3	4	<u>S</u> et Field Details
					Field Name					
					Address					Clear Settings
					Data Type					
					Scaling					
Recipe Files:			Enable	Key	Description					
🛣 Data_A	.csv	) 1				Name	Width	Height	Туре	
$\sim$		2				Product	100	30	P-001	
		3				Product	200	60	P-002	
		4				Product	300	90	P-003	
▲  	.¢dd 					Cor file	ntents are d	s of the	e recipe ed.	Enter <u>K</u> ey
		File Size:	93E	Bytes (R	ecords: 4 , Fields	:4)				

#### 12-6-2 Deleting Recipe Files

- 1,2,3... 1. Select a recipe from the Recipe List.
  - 2. Click the **Settings** Button. The Recipe Settings Dialog Box will be displayed.
  - 3. Select a recipe file that you want to delete and click the **Delete** Button.

#### 12-6-3 Changing Recipe Files

The recipe data can be changed by selecting another recipe file, while leaving the field settings and key settings unchanged.

- *1,2,3...* 1. Select a recipe from the Recipe List.
  - 2. Click the **Settings** Button. The Recipe Settings Dialog Box will be displayed.
  - 3. Select the recipe file that you want to change and click the Change Button.
  - 4. Select a different recipe file from the Open Field Dialog Box. The recipe data will be changed according to the contents of the selected file.

# **12-7** Setting the Recipe Writing Addresses for Variable Format

Set recipe writing addresses in the CPU Unit memory area.

There are two recipe writing formats, the Variable Format and the Contiguous Area Format. This section describes the Variable Format.

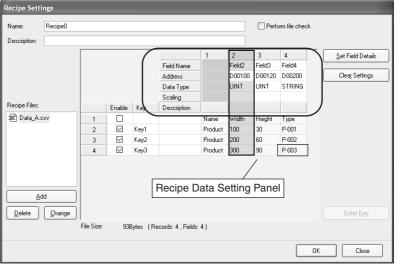
## 12-7-1 Setting the Writing Address for Each Field

In the Variable Format, recipe data is written to the specified address for each field. For each field, the data type and scaling can be specified.

- 1,2,3... 1. Select a recipe from the Recipe List.
  - 2. Click the Settings Button.

The Recipe Settings Dialog Box will be displayed.

- Select a recipe file from the Recipe File List. The contents of the selected recipe file will be displayed in the Recipe Data Settings Panel.
- 4. Set the recipe data writing address in the Recipe Data Settings Panel.



The following table describes the row headers.

Item	Description
Field Name	Sets the field name. Can be omitted.
Address	Sets the CPU Unit address where the recipe data is written.
Data Type	Sets the data type of the recipe data.
Scaling	Writes recipe data that has been converted by a speci- fied formula.

Details of the Recipe Data Settings Panel are described below.

Changing the Field Name

Double-click the cell that you want to change. Enter the new name.

**Changing the Address** 

Double-click the cell that you want to change. Click the ... Button and enter the new address in the displayed window. Click the **OK** Button. Alternatively, you can directly enter the new address in the cell.

Changing the Data Type

Double-click the cell that you want to change. Select a data type from the drop-down list.

		1	2	3		1	2	3	4
Field Name			Field2				Field2		
Address			D00000 🛄				D00000		
Data Typ	D00	000					UINT -		
Scaling	Mem	iory Area:	DM 🗸				BOOL		
Descriptio	Wor	+					UINT		
	W 00	J.	0÷	Height	· · · ·	Name	DINT		Туре
			(0 · 32767)	30		Product	UINT_BCD		P-001
				60		Product	UDINT_BCD		P-002
		<u>ar</u>		90		Product	LREAL		P-003
		OK	Cancel				CHANNEL WORD DWORD CHANNEL_BLO STRING	ск	

Changing the Address

Changing the Data Type

Note (1) Use the appropriate data type for the recipe data. (Refer to following table.) If the BOOL format is set for values other than 0 or 1, or the UNIT format is set for hexadecimal numbers like A05C, a recipe data type conversion error message will be displayed.

Data type	Recipe data
BOOL	0 or 1
UNIT	0 to 65535
INT	-32768 to 32767
UNIT_BCD	0 to 9999
WORD	0 to FFFF
CHANNEL	0 to FFFF
STRING	ASCII character string
UDINT	0 to 4294967295
UDINT_BCD	0 to 99999999
DWORD	0 to FFFFFFF
REAL	$-10^{-38}$ to $10^{+38}$
LREAL	$-10^{-308}$ to $10^{+308}$
CANNEL_BLOCK	Continuous channels (4 digits $\times$ No. of elements)

(2) Recipe data that specifies scaling with the data type is usually within the range a floating-point data type (float or double). If the scaled data is not within the range of the specified data type, a recipe data type conversion error message will be displayed.

#### **Selecting Fields**

• Selecting a Single Field Click the desired field's column header cell.

 Selecting a range of Consecutive Fields Click the first field's column header cell. Press Shift Key while clicking the last field's column header cell.

#### 12-7-2 Field Settings Dialog Box

Set the writing address and data type of the recipe for each field. Detailed settings can be made for each field in the Field Settings Dialog Box.

 Select a field and click the Set Field Details Button. Select Set with Dialog. Alternatively, double-click the column header, or right-click the selected field and select the Set with Dialog. The Field Settings Dialog Box will be displayed

The Field Settings	Dialog Box will b	e displayed.	
Recipe Settings			

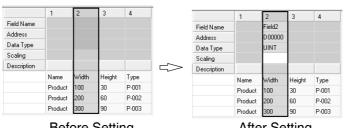
Description:									
					1	2	3	4	Set Field Details
				Field Name					
				Address					Clear Settings
				Data Type					
				Scaling					
Recipe Files:		Enable	Key	Description			Set with D Set with V		
🛣 Data_A.csv	1				Name	Wid		ollection Pattern	
	2				Product	100			-
	3				Product	200	Clear Field		-
	4				Product	300	Enter Key		
							Enable Ke Disable Ke		
							DISODIO NO	4	
Add									
Delete Change									Enter Key
	File Size:	926	lutes (P	ecords: 4 , Fields	(A)				
	110 0120.	0.01	iyies (11	600103. 4 , 1 16103	. 4 )				
								ОК	Close
Field Name:       Field         Address:       D000         Data Type:       UINT         No. of Elements       Image: Conversion of Elements         Perform scale conversion       Reverse calculate the solution the solution of the so	on caling valu inversion rision 'alue + b 1 b = [		e the resu	<i>i</i> k. ▼					
		ОК		Cancel					

2. Set the field parameters in the Field Settings Dialog Box. The following table describes the field parameters.

Item	Description
Field Name	Sets the field name. Can be omitted.
Address	Sets the writing address of the recipe data.
Data Type	Sets the data type of recipe data.
No. of Elements	Sets the number of elements of recipe data.
Scaling	Writes recipe data that has been converted by a speci- fied formula. There is no need to specify the scaling parameters for recipe data that do not require scaling.

Equation	Description
Linear function con- version	The values of the recipe data are converted using a lin- ear function. Specify a floating-point data type (float or double).
	Calculate the values in the following manner: Memory value = (Recipe data value $- \mathbf{b}$ ) $\div \mathbf{a}$ (Recipe data value = $\mathbf{a} \times \text{Memory value } + \mathbf{b}$ ) (Where $\mathbf{a}$ and $\mathbf{b}$ are specified constants)
Maximum/Minimum conversion	Recipe data with a specified upper and lower limit is converted to a value with a new upper and lower limit. Specify a floating-point data type (float or double).
Decimal position conversion	Moves the decimal point of the memory data to a spe- cific point. Specify a floating-point data type (float or double).

3. Set the parameters and click the **OK** Button. The writing address will be set in the field.



Before Setting

After Setting

### 12-7-3 Setting Variables in Fields

Variables that were set in the data collection settings can be set in fields. Refer to 10-3 Setting Variables for details on the data collection settings.

1,2,3... 1. Select a field and click the Set Field Settings Button. Select Set with Variables. Alternatively, right-click the field and select Set with Variables. The Select Variable Dialog Box will be displayed.

àroup	*			N	umber ol	f variables:	(10/50)	
All variables		Group0000/T ag0001 Group0000/T ag0002 Group0000/T ag0003 Group0000/T ag0004 Group0000/T ag0005 Group0000/T ag0005 Group0000/T ag0007 Group0000/T ag0008		Address D00000 D00001 D00002 D00002 D00004 D00005 D00005 D00005 D00007 D00008 D00009			Elements 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Description
		K Variable Name:						Select

2. Select a variable to set in the field in the Select Variable Dialog Box. Click the Select Button.

The selected variable will be set as the field.

Note Variables with address memory type SPU/CIO or SPU/DM cannot be set in fields. Recipes cannot write recipe data to SPU/CIO or SPU/DM variables.

### 12-7-4 Setting Data Collection Pattern Variables in Fields

Variables that were set in the data collection pattern settings can be set in fields. This is used when a file containing data collected by the SYSMAC SPU Unit is used as a recipe. Refer to *10-4 Setting Data Collection Patterns* for details on the data collection settings.

Select a field and click the Set Field Settings Button. Select Set with Collection Pattern. Alternatively, right-click the field and select Set with Collection Pattern.

The Select Collection Pattern Dialog Box will be displayed.

ata Collection	Pattern1	*		
Name	Address	Data Type	Elements	Description
Tag0010	D00010	UINT	1	
Tag0011	D00011	UINT	1	
Tag0012	D00012	UINT	1	
Tag0013	D00013	UINT	1	
Tag0014	D00014	UINT	1	
Tag0015	D00015	UINT	1	
Tag0016	D00016	UINT	1	
Tag0017	D00017	UINT	1	
Tag0018	D00018	UINT	1	
Tag0019	D00019	UINT	1	

- Select a collection pattern (group of variables) to set as the field in the Select Collection Pattern Dialog Box. Click the **OK** Button. All variables in the collection pattern will be set as fields.
- **Note** Variables with address memory type SPU/CIO or SPU/DM cannot be set in fields. Recipes cannot write recipe data to SPU/CIO or SPU/DM variables.

## 12-7-5 Changing Field Settings

Use the Field Settings Dialog Box to change the field settings.

- Select the field that you want to change and click the Set Field Details Button. Select Set with Dialog. Alternatively, double-click the column header, or right-click the selected field. Select Set with Dialog. The Field Settings Dialog Box will be displayed.
  - 2. Enter the new settings in the Field Settings Dialog Box.
  - Set the parameters and click the OK Button. The writing address will be set to the field. Refer to 12-7-2 Field Settings Dialog Box for details on the Field Settings Dialog Box.

### 12-7-6 Clearing the Field Settings

Clear the field settings of unused fields.

Select the fields that you want to clear and click the Clear Settings Button.



## 12-8 Setting the Recipe Writing Addresses for Contiguous Area Format

Set recipe writing addresses in the CPU Unit memory area.

There are two recipe writing formats, the Variable Format and the Contiguous Area Format. This section describes the Contiguous Area Format.

## 12-8-1 Setting the Recipe Writing Address

In the Contiguous Area Format, recipe data is written all at once to the specified range of addresses starting from the head address. Data type cannot be specified. All recipe data is read in and written to the memory as hexadecimal channel.

#### 1,2,3... 1. Click the Recipe Settings Tab.

- 2. Select the Recipe List Dialog Box.
- Click the Settings Button. The Recipe Settings Dialog Box will be displayed.
- 4. Select a recipe file from the Recipe File List.

Recipe Settings												
Name: Recipe1								Per	form file ch	eck		
Description:												
					1	2	3	4	5	Address		
Recipe Files:				Address		D00000	D00001	D00002	D00003	D00000		
ContiguousArea.csv		Enable	Key	Description						Memory Area:	DM 🗸	1
APRIL CONTIGUOUSATED.CSV	1					0	1	2	3	Word	0÷	1
	2					0000	0000	0000	0000	in ord.		
	3					FFFF	FFFF	FFFF	FFFF		(0-32767)	J
	4				Product	3031	3132	3334	3536	No. of Fields		h
	5				Product	6283	A007	B488	FFFF	No. of Fields	4	
	6				Product	8880	7630	AB66	0000		- 32768 1	
								/		Recipe Data St Skip columns: Data after the column will be	2	
<u>A</u> dd	K File Size:	1,6	92Bytes	(Records: 6 , Fie	elds: 101 )	/		_	>	Enter	≦ey	
			R	lecipe Da	ita Set	ttings	Pane			ОК	Close	

5. Set the recipe data writing address in the Recipe Data Settings Panel. The following table describes the row header.

Item	Description
Address	Displays the CPU Unit memory address where the rec- ipe data is written.

Item	Description
Address	Sets the header address of the memory where the rec- ipe data will be written.
No. of Fields	Sets the size of the recipe data that will be written.
	When the checkbox is selected, the specified number of fields are written to memory as recipe data. If the number of fields available to write as the recipe data are less than the specified number of fields, the missing fields will not be written to memory.
	When the checkbox is not selected, all the fields (excluding the header) will be written to memory.
Recipe Data Storage	Sets the first column to be used as the recipe data.

The following table describes the setting parameters.

# 12-9 Setting Recipe Keys

### 12-9-1 Setting the Recipe Key

- 1,2,3... 1. Click the Recipe Settings Tab.
  - 2. Select the **Recipe List** Dialog Box.
  - 3. Select a recipe.
  - 4. Click the **Settings** Button. The Recipe Settings Dialog Box will be displayed.
  - 5. Select a recipe file from the Recipe File List. The contents of the selected recipe file will be displayed in the Recipe Data Settings Panel.

Recipe Settings									
Name: Recipe0							Perf	orm file check	
Description:									
					1	2	3	4	Set Field Details
				Field Name		Field2			
				Address		D00000			Clea <u>r</u> Settings
				Data Type		UINT			
				Scaling					
Recipe Files:	1	Enable	Key	Description					
🛣 Data_A.csv	1				Name	Width	Height	Туре	
	2		key1		Product	100	30	P-001	
	3		key2		Product	200	60	P-002	
	4		key3		Product	300	90	P-003	
	$\vdash$				$\sim$	_			
							_		
						r	<u> </u>		
Add							Reci	pe Data	a Settings Panel
Delete Change									Enter <u>K</u> ey
	File Size:	938	Bytes (Re	ecords: 4 , Fields	: 4 )				
									OK Close

6. Set the recipe data key in the Recipe Data Settings Panel.

Item	Description
Enable	Enables/disables the key settings.
	If disabled, the key settings will not affect the recipe set- tings.
Key	Sets the recipe data key (alphanumeric characters).
Description	Describes the recipe data. (Can be omitted.)

Details of the Recipe Data Settings Panel are described below.

Setting Recipe Keys	Section 12-9
Changing the Enable Status	Click the cell that you want to change. If there is a key, it will be enabled. If there is no key, a dialog box will be displayed prompting the input of a key.
Changing the Key and Description	Double-click the cell that you want to change. Input the new text.
Selecting Records	<ul> <li>Selecting a Single Record Click the desired record's row header cell.</li> <li>Selecting a range of Consecutive Records Click the first record's row header cell. Press Shift Key while clicking the last record's row header cell.</li> </ul>
Note	<ul> <li>(1) The following symbols cannot be used as part of a key. = , []; (space)</li> <li>(2) Japanese characters cannot be used as part of a key.</li> <li>(3) All keys (except for disabled keys) must be unique within a recipe.</li> </ul>
12-9-2 Key Entry De	etails Dialog Box
	To set keys for multiple recipe data, use the Key Entry Details Dialog Box.
1,2,3	<ol> <li>Click the Recipe Settings Tab.</li> <li>Select the Recipe List Dialog Box.</li> <li>Select a recipe.</li> <li>Click the Settings Button. The Recipe Settings Dialog Box will be displayed.</li> <li>Select a recipe from the Recipe File List. The contents of the file will be displayed in the Recipe Data Settings Panel.</li> <li>Select a record to enter key details.</li> <li>Click the Enter Key Button. Alternatively, right-click while the records are selected. Select <i>Enter Key</i>. The Key Entry Details Dialog Box will be displayed.</li> </ol>
String and Consecutive Number	Adds consecutive numbers after the prefix.

String and Record Number

Adds the record number after the prefix.

No. of Digits

ſ

OK Cancel

key

0

1÷

Key Entry Details	
Specify the key format.	
String and record number	~
key2 - key4	
Prefix key +	Record Number No. of Digits: 1
	OK Cancel

#### **Recipe File Field Value**

The value of the specified field is set as the key.

Key Entry Details		
Specify the key format.		
Recipe file field value	~	The drop-down
Field:	4: Туре 💌	list shows each field header (first
Record Key		row in recipe file).
2 P-001 3 P-002		
4 P-003		
	OK Cancel	

 Click the **OK** Button. The settings will be entered as the key.

## 12-10 Enabling Recipe Settings

The procedure for enabling recipe settings in the SYSMAC SPU Unit is described below. Use this procedure if the recipe settings are changed. The recipe settings and recipe file will be transferred to the SYSMAC SPU Unit.

Note

- Make sure that the SPU-Console is connected to the SYSMAC SPU Unit before enabling the settings.
  - (2) When settings are transferred, the current SYSMAC SPU Unit settings will be overwritten. When a recipe file with the same name exists in the Memory Card, the recipe file will also be overwritten.
  - (3) Do not turn OFF the power to the Unit while settings are being transferred. Doing so will transfer corrupted information to the Unit and may cause malfunction.
  - (4) Do not enable recipe settings while the recipe is being written.
- *1,2,3...* 1. Check that recipe settings have been completed.

Shik momadon Collection 5	ettings Event Settings Recipe Settings	Unit Settings Historical Tren	id				
Recipe List Environment Settings	🚰 Recipe List						
Execution History	Environment Settings	Recipe					
	Display all recipe settings.	Display all of the register					
	Key	Pisplay All	Key	Descri	File	Record	M
	Type: ASCII	Recipe0	Key1 Key2		Data_A.csv Data_A.csv	2 3	
	Size: 10 (Bytes)		Key3		Data_A.csv	4	
	Address: D00520						
	Handshake						
	Type: One-point Handshake		<				>
			Recipe	Details			-
	Set environment			Name: F	lecipe0		
				escription:			
			Write Format: Variable Format				
						<u>S</u> ettings	
			Key De	tails			
		Add		Key:			
		Delete Copy	FINS C	Command:			
Control Panel							
51	: Start all collections : Stop all collections : Start basic collection	Send 9	ettings to tra Se <u>t</u> tings	nsfer the setti	ngs to the Unit.		
	Stop basic collection				s in the recipe		

2. Click the Recipe Settings Tab in the SPU-Console.

 Click the Send Settings Button in the SPU-Console Control Panel. The following dialog box will be displayed to confirm the settings transfer.

Recipe	Settings
?	Transfer the settings file to the SPU Unit, and execute the Change Recipe Settings command. Continue?
	Yes No

4. To execute the settings transfer, click the Yes Button. When the Change Recipe Settings command is executed, "A" will be displayed in the 7-segment display on the SYSMAC SPU Unit. When it has finished, the display will return to "-D".
The neuron settings will be an effected when the displayed beauting to "D".

The new settings will be enabled when the display shows "-D".

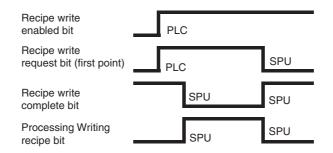
## 12-11 Executing Recipes

This section describes how to execute recipes.

### 12-11-1 Executing Recipes with One-point Handshake

The recipe write function is executed when the bit is ON. Refer to 7-2 CIO Area for information about bits used for single-point handshakes.

The following figure shows the flag operation when the recipe write function is executed with a one-point handshake. The CPU Unit turns ON and the SYS-MAC SPU Unit turns OFF the Recipe write request bit.

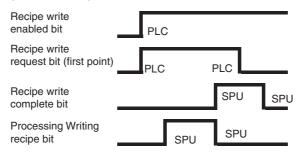


- *1,2,3...* 1. The CPU Unit turns ON the Recipe write request bit.
  - 2. The SYSMAC SPU Unit turns OFF the Recipe write complete bit, turns ON the Writing recipe bit, and starts writing recipe data.
  - 3. When the recipe data has been written, the SYSMAC SPU Unit turns ON the Recipe write complete bit, and turns OFF the Writing recipe bit.
  - 4. The SYSMAC SPU Unit turns OFF the Recipe write request bit.

### 12-11-2 Executing a Recipe with Two-point Handshake

The recipe write function is executed when the bit is ON. Refer to 7-2 CIO Area for information about bits used for two-point handshakes.

The following figure shows the flag operation when the recipe write function is executed with a two-point handshake. The CPU Unit turns ON and OFF the Recipe write request bit. The SYSMAC SPU Unit turns ON and OFF the Recipe write complete bit.



- *1,2,3...* 1. The CPU Unit turns ON the Recipe write request bit.
  - 2. The SYSMAC SPU Unit turns ON the Writing recipe bit, and starts writing recipe data.
  - 3. When the recipe data has been written, the SYSMAC SPU Unit turns ON the Recipe write complete bit, and turns OFF the Writing recipe bit.
  - 4. The CPU Unit turns OFF the Recipe write request bit.
  - 5. The SYSMAC SPU Unit turns OFF the Recipe write complete bit.

### 12-11-3 Executing the Recipe with FINS Commands

Recipes can be written using a FINS command. To execute a recipe with FINS command, the Recipe write enabled bit must be ON when the SYSMAC SPU Unit receives the FINS command. Refer to *7-2 CIO Area* for details on the Recipe write enabled bit.

The following figure shows the FINS command format and response format.

#### **Command format**

32	25				00	01					
Commar	nd code	UUID (	16 bytes)		Disp-ID		Key by	te length	Key		
Respo	nse for	mat			 						_
32	25						00	01			₽
Comma	nd code	Completi	on code	UUID	 		Disp-ID		Status		
						$\Diamond$					

Area	Description
Command code	Sets the FINS command code. Fixed at 3225.
UUID	Fixed at "6856BA4208CD430DA66BEE22A6C07FFC"
Disp-ID	Fixed at 0001.
Key byte length	Sets the key byte length.
Кеу	Set the key in ASCII.
Completion code	Sets the completion code for command execution.
Status	Sets the end status code for command execution.

Completion code	Error
0000	Normal completion.
0401	Undefined command.
1001	The command is too long.
1002	The command is too short.
110C	The parameter settings are incorrect. (Refer to the sta- tus code.)

Status code	Error
0101	The UUID is incorrect.
0102	The DispID is incorrect.
0201	There is no recipe corresponding to the key.
0202	There is no recipe file.
0302	The Recipe write enabled bit is OFF.

Note

(1) Send the FINS command to the SYSMAC SPU Unit. Refer to 14-2 FINS Network Settings for the FINS address of the SYSMAC SPU Unit.

(2) Set the Unit address to 0.

Example: 2.100.0

# 12-12 Displaying the Recipe Execution History

### 12-12-1 Displaying the Execution History

*1,2,3...* 1. Click the **Recipe Settings** Tab to display the Recipe Settings Window.

2. Select *Execution History*.

3. To update the history, click the **Refresh** Button. Up to 500 events can be recorded.

If the number of events exceeds 500, old events will be overwritten.

🖻 SPU-Console - aaa (19	92.168.0.101) [Onlin	e]			
<u>File View Co</u> mmand <u>H</u> elp					
Unit Information Collection Se	ettings Event Settings R	ecipe Settings Unit Settings	Historical Trend		
Recipe List	Execution Histo	ny			
Environment Settings	Event	Date/Time	Key		
Execution History					
	Log Records: 0	<u>R</u> efresh		<u>C</u> lear Log	Save to File
Control Panel					
50:	Start all collections	^	Click Send Setting:	s to transfer the settings to th	
51:	Stop all collections Start basic collection		Send Setting	15	
02:	Stop basic collection	<b></b> )	To apply the requ	est/response settings in the	recipe expansion setting:
03:	Save the collected data	×	Apply Col	llection Settings	*
		Exec	<		>
		1.1 1.1 1.1	aaa (192.168.0.101) [C	Idle Idle	Data Storage Mode

The following table describes the listed parameters.

Header	Description
Event	Name of event that occurred when executing recipe.
Date/Time	Date and time when the event occurred.
Key	Key of executed recipe.

The following table describes the events displayed in the recipe execution history.

Event	Meaning
Write Start	Started writing the recipe.
Write Complete	Completed writing recipe.
Error Completion	Cancelled writing recipe because an error occurred.

### 12-12-2 Deleting the Execution History

- *1,2,3...* 1. Click the **Clear Log** Button.
  - A confirmation dialog box will be displayed.
  - 2. Click the **Yes** Button. The execution history will be deleted.

### 12-12-3 Saving the Execution History

- 1,2,3... 1. Click the Save to File Button.
  - 2. Select a file from the Save As Dialog Box. The selected file will be saved in the execution history.

# SECTION 13 Expanded Recipe Settings (Data Storage Mode)

This section describes the settings required to use the expanded recipe function, which can be used in Data Storage Mode to write numeral and textual data, e.g., production parameters, to the memory areas of the CPU Unit. The expanded recipe function is an expansion of the existing recipe function with the addition of recipe key searching.

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# **13-1 Expanded Recipe Function**

### 13-1-1 Expanded Recipe Function

The expanded recipe function is an expansion of the existing recipe function with the addition of recipe key searching. Using recipe key search reduces work in registering and revising recipes. With the expanded recipe function, you can search for a desired recipe key and write the recipe data to CPU Unit memory. With the recipe function provided with version 2.0, a recipe key set with Support Software remained constant unless changed, but with the expanded recipe function, it is possible to register recipe keys in files or as file names.

The following three search methods can be used for recipe key searches. The method is set for each recipe.

#### ■ Searching in Recipe Files

Searches are performed in recipe files using a target string as the search key.

#### Searching Recipe File Names

Searches are performed using a recipe file name as the search key.

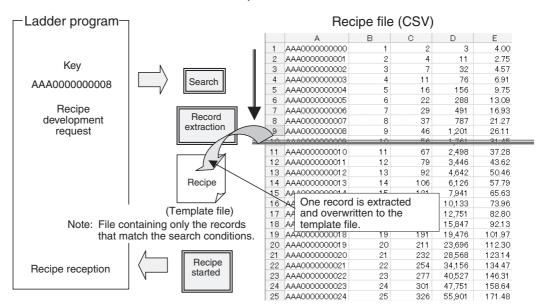
**Note** A maximum of ten expanded recipe registrations can be made for both methods combined.

#### Searching Key List (Version 2)

There is no limit to the number of registrations for the previous method (version 2.0).

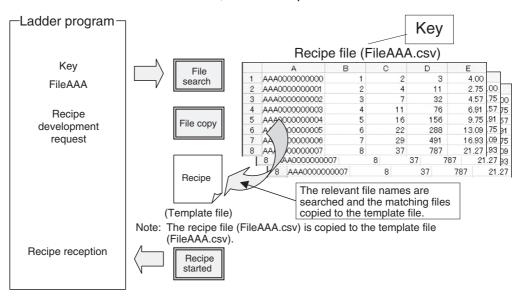
### Searching Recipe Files

A search is performed in user-created recipe files using the text string that is passed as the search key. The recipe files that are created in the data folders created for the recipe settings (default: AutoRecipe n\_RecipeDB) are searched. Any rows where matches are found will be extracted to a new recipe file (i.e., a template file) containing only the records found by the search. Recipe data is written by starting the existing recipe function using the extracted recipe file. If there are no recipe files or the relevant key is not found in the recipe files (i.e., if there is no match), a No Requested Recipe Data Error will occur, and the recipe function will not start.



#### Searching Recipe File Names

A search is made for the text string that is passed as the search key in recipe file names (user-created files: *key*.csv) in the folders created as the data folder (default: AutoRecipe  $n_RecipeFile$ ) for the recipe settings. Any files where matches are found will be extracted as recipe files (i.e., template files) and copied. Recipe data is written by starting the existing recipe function using the extracted recipe files. If no recipe files are found, a No Requested Recipe Data Error will occur, and the recipe function will not start.



Note

- (1) A template file is required when recipe settings are made.When searching in recipe files, a file with one row is required for the recipe file (usercreated file). When searching file names, one recipe file (user-created file) is required.
  - (2) The extension for the recipe files must be lowercase "csv." Specify the extension of the recipe file created in the SPU Unit or FTP server as "csv" in lowercase.

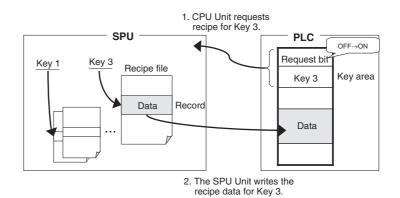
## 13-1-2 Recipe File Data Structure and File Organization

### **Data Structure**

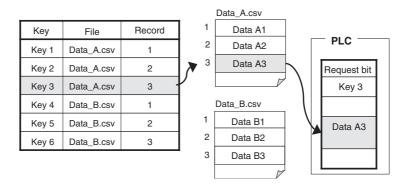
Recipe data is in CSV format. A file that contains recipe data is called a recipe file. Recipe data consists of fields and records. The writing address and data format are set for each field. A record is a group of fields.

	Field 1	Field 2	Field 3	Field 4
	<ul> <li>Address</li> </ul>	<ul> <li>Address</li> </ul>	<ul> <li>Address</li> </ul>	<ul> <li>Address</li> </ul>
	<ul> <li>Data type</li> </ul>			
Record 1				
Record 2				
Record 3				
Record 4				

Recipe data is managed by keys, which are unique record identifiers. When there is a recipe write request, the record corresponding to the requested key is written to the CPU Unit memory area as recipe data. The requested key is stored in the CPU Unit memory area. This area of the memory is called the key area.

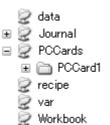


Recipe data is internally managed in the following structure. Each recipe is characterized by a recipe file and a record. In the example shown in the following figure, recipe data for Key 3 is record 3 of the recipe file Data\_A.csv.



#### **File Organization**

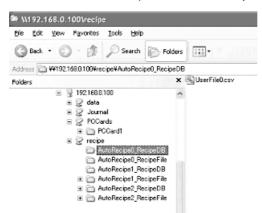
Files on a Memory Card that is mounted in the SYSMAC SPU Unit can be accessed in a folder shared on a Windows network. The following figure shows the organization of the network folder in the SYSMAC SPU Unit.



The folder set as the data folder in the recipe settings will be created in the recipe folder.

#### **Searching in Recipe Files**

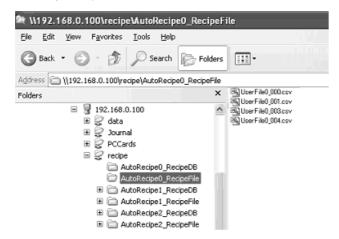
The recipe files (user-created file: UserFile0.csv in the following figure) must be in the data folders (default: AutoRecipe *n*\_RecipeDB).



Once the expanded recipe settings have been made, the data folders (default: AutoRecipe  $n_{\text{RecipeDB}}$ ) will be automatically created when the SPU Unit is restarted or the recipe settings are enabled.

Searching Recipe FileThe recipe toNamesfollowing fig

The recipe files (user-created file: UserFile0\_000 to UserFile0\_004.csv in the following figure) must be in the data folders (default: AutoRecipe  $n_{\text{RecipeFile}}$ ).



Once the expanded recipe settings have been made, the data folders (default: AutoRecipe  $n_{\text{RecipeFile}}$ ) will be automatically created when the SPU Unit is restarted or the recipe settings are enabled.

Note

- (1) It is not possible to create new data folders in the recipe folders from Windows Explorer. Folders that are created by the SPU Unit can be deleted or their names can be changed.
  - (2) Data folders that are automatically created by the SPU Unit are not automatically deleted. Manually delete any folders that are no longer required. Leaving the data folders may excessively limit the available memory.

#### **Template Files**

Template files are used for recipe files for the recipe function provided with version 2.0 of the SPU Unit. With the expanded recipe function, recipe files are created to search in recipe files and to search recipe file names. The following are examples of templates for searching in recipe files and searching recipe file names.

#### Template Names

Searching in recipe files: TemplateRecipe n\_RecipeDB.csv

\\192.168.0.100\recipe		
Ble Edit Wew Favorites Iools Help		<u>A</u>
Address (1192.168.0.100/recipe Folders X Folders X F	AutoRacipe0_Racipe0B AutoRacipe0_Racipe0B AutoRacipe0_Racipe0B AutoRacipe1_Racipe0B AutoRacipe1_Racipe0B AutoRacipe1_Racipe0B AutoRacipe1_Racipe0B AutoRacipe2_Racipe0B AutoRacipe3_Racipe0B AutoRacipe3_Racipe0B AutoRacipe3_Racipe0B AutoRacipe3_Racipe0B AutoRacipe5_Racipe0B AutoRacipe5_Racipe0B AutoRacipe5_Racipe0B AutoRacipe5_Racipe0B AutoRacipe6_Racipe0B	✓ ♪ 60

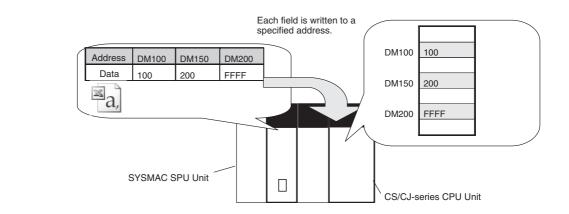
Searching recipe file names: TemplateRecipe *n*\_RecipeFile.csv

### 13-1-3 Recipe Writing Formats

There are two formats that can be used to write recipes, the Variable Format and the Contiguous Area Format.

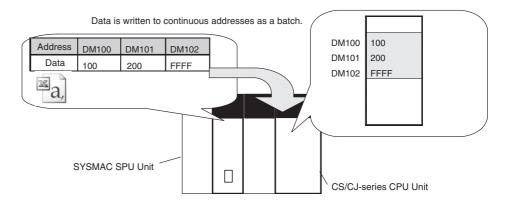
The Variable Format writes to multiple non-contiguous memory addresses. It is a flexible writing format because the data type and scaling can be specified. Recipe data of each field is written one at a time, so time is required to write all of the recipe data.

The Contiguous Area Format writes data to contiguous memory addresses. The data type cannot be specified but all recipe data is written at once, so it is faster than the Variable Format. It is suitable for cases where a large amount of data is written at once.



#### Variable Format

#### **Contiguous Area Format**



# 13-1-4 Procedure for Using Recipes

The following figure shows the steps from creating the recipe file to execute the recipe.

Create a Recipe File	
<ol> <li>Use spreadsheet software, such as Excel, or a text editor to edit the recipe data and create a recipe file in CSV format.</li> </ol>	
+	
Create a Template File	
2. Searching in recipe files: Create a recipe file with one record.	
3. Searching recipe file names: Copy the recipe file to the desired folder.	
•	
Obtaining the Recipe File from the Host Computer	
Set the FTP Server	
4. Set the FTP server.	
5. Create a folder to store the recipe files.	
•	
Set Recipe Settings at the SPU-Console	
6. Register the Recipe File, Data Folder, and Template File.	
7. Set the field settings (writing address and data type).	
8. Set the key settings. (Format: ASCII text string (fixed))	
Apply the settings	
<ol> <li>Apply the settings on the Recipe Settings Tab Page.</li> <li>Apply the collection settings on the Recipe Settings Tab Page.</li> </ol>	
↓ ·	
Execute Recipe	
SPU PLC stored in the key area.	
Key 3 Request bit	
12. Recipe corresponding to the written. The CPU Bus Unit A	rea,
however, is not used (i.e., bi the Recipe Command Area	t 0 in n CIO
Data n+22 is not used).	
13. Recipe corresponding to	
the key is written.	

Variable Format

**Contiguous Area Format** 

## 13-2 Recipe Files

The recipe function writes data in the form of a CSV file. The writing method can be either the Variable Format or the Contiguous Area Format. The data type of the recipe file is different for each method.

## 13-2-1 Writing Formats

There are two recipe writing formats, the Variable Format and the Contiguous Area Format. The features of each method are listed below.

#### • Recipe data is written to non-contiguous memory areas.

- Data is written with a specified data type.
- Data can be converted by scaling.
- Recipe data is written one at a time, so time is required to write all data.

#### • Recipe data is written to contiguous memory areas.

- All data has a fixed data type.
- The data type cannot be specified but all recipe data is written at once, so it is faster than the Variable Format. It is suitable for cases where a large amount of data is written at once.

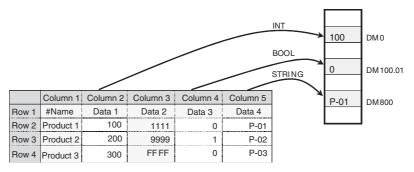
### 13-2-2 Variable Format Recipe File

Recipe files for the Variable Format are text files in CSV format. An example is shown below.

#Name,	Data 1,	Data 2,	Data 3,	Data 4
Product 1,	100,	1111,	0,	P-01
Product 2,	200,	9999,	1,	P-02
Product 3,	300,	FFFF,	0,	P-03

In the Variable Format, each field is written to the specified address in the specified data type. Use the appropriate data format for each data type.

Example for Writing to DM0 (INT), DM100.01 (BOOL), and DM800 (STRING) in Memory



You can specify not to write certain columns, such as column 1 and 3 in the example above.

Note

(1) Use the appropriate data format for each data type. (Refer to the following table.) If the BOOL format is set for values other than 0 or 1, or the UNIT

Data type	Recipe data
BOOL	0 or 1
UINT	0 to 65535
INT	-32768 to 32767
UNIT_BCD	0 to 9999
WORD	0 to FFFF
CHANNEL	0 to FFFF
STRING	ASCII character string
UDINT	0 to 4294967295
UDINT_BCD	0 to 99999999
DWORD	0 to FFFFFFF
REAL	$-10^{-38}$ to $10^{+38}$
LREAL	$-10^{-308}$ to $10^{+308}$
CHANNEL_BLOCK	Continuous channels (4 digits $\times$ No. of elements)

format is set for hexadecimal numbers like A05C, a recipe data type conversion error message will be displayed.

(2) Recipe data that specifies scaling with the data type is usually within the range a floating-point data type (float or double). If the scaled data is not within the range of the specified data type, a recipe data type conversion error message will be displayed.

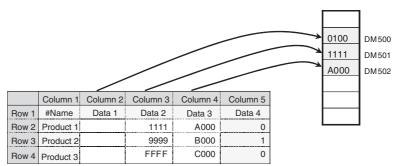
### 13-2-3 Recipe Files for Contiguous Area Format

Recipe files for the Contiguous Area Format are text files in CSV format. An example is shown below.

#Name,	Data 1,	Data 2,	Data 3,	Data 4	
Product 1,	100,	1111,	A000,	0	
Product 2,	200,	9999,	B000,	1	
Product 3,	300,	FFFF,	C000,	0	

In the Contiguous Area Format, the channel data is in binary format hexadecimal). Data is written to contiguous memory addresses starting from the specified head address. The number of columns to write can be specified.

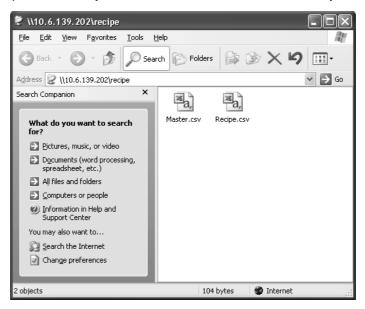
Example for Writing to Contiguous Memory Addresses from DM500 (3 columns).



You can specify not to write certain columns, such as column 1 and 5 in the example above. The fields that are written must be contiguous.

## 13-2-4 Storage Location of Recipe Files

To use a recipe file on a SYSMAC SPU Unit after it has been edited on a computer, the recipe file must be stored in the default folder that is automatically generated in a folder named *recipe* on the Memory Card mounted in the SYSMAC SPU Unit. Recipe files can be transferred to this folder using the procedure described in *13-10 Enabling Recipe Settings*, but the folder can also be accessed from the computer by using a shared folder on a Windows network. This way the file can be transferred by dragging and dropping. Recipe files already stored in this folder can also be directly edited.



The method to access the recipe folder in the SYSMAC SPU UNIT using a computer is described below.

- Select *View Display Unit Folder Recipe Folder* in the SPU-Console. Windows Explorer will be started and the SPU Unit's shared folder will be displayed (Data Storage Mode).
- Enter the UNC address of the SPU Unit's shared folder in the address bar of Windows Explorer (e.g., \\192.168.0.100\recipe\).
- Note
- (1) Unused recipe files will not be automatically deleted by the SYSMAC SPU Unit or SPU-Console. When required, manually delete the files using Windows Explorer.
  - (2) Do not edit or save updated recipe files while recipes are being written. The recipe may not function properly.
  - (3) It is not possible to create new data folders in the recipe folders using Windows Explorer. The data folders will be automatically created when the SPU Unit is restarted or the recipe settings are enabled.
  - (4) Versions of Microsoft Office Excel earlier than 2003 cannot create or edit CSV data that exceeds 256 columns. For CSV files that contain more than 256 columns, a special macro file "CSVFormatter.xls" can be used. The following steps describe how to use the macro file.

The CSVFormatter.xls macro is used as follows:

Double-click the CSVFormatter.xls file in the Journal folder (i.e., the shared folder in the SYSMAC SPU Unit). This will add a toolbar called SYSMAC-SPU to Excel.

× 1	licrosoft Ex	xcel - Samj	pling.csv								- DX
	<u>File E</u> dit <u>V</u>	jew <u>I</u> nsert	F <u>o</u> rmat <u>T</u> oo	ls <u>D</u> ata <u>W</u> ir	idow <u>H</u> elp						_ 8 ×
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	Α	В	С	D	E	F	G	Н		J	K 🔺
	index		nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104   1	Fag-0105	Tag-0106	Tag-0107 T
2	1			0	0	0	0	0	0	0	0
3	2			1	0	0	0	0	0	0	0
4	3		3.57E+08	2	0	0	0	0	0	0	0
5	4		3.64E+08	3	0	0	0	0	0	0	0
6	5		3.71E+08	4	0	0	0	0	0	0	0
7	6		3.78E+08	5	0	0	0	0	0	0	0
8	7		3.85E+08	6	0	0	0	0	0	0	0
9	8		3.92E+08	7	0	0	0	0	0	0	0
10	9		3.99E+08	8	0	0	0	0	0	0	0
11	10		4.06E+08	9	0	0	0	0	0	0	0
12	11		4.13E+08	10	0	0	0	0	0	0	0
13	12	57:16.4	4.2E+08	11	0	0	0	0	0	0	0
14	13	57:16.4		12	0	0	0	0	0	0	0
15	14	57:16.4	4.34E+08	13	0	0	0	0	0	0	0
16	15		4.41E+08	14	0	0	0	0	0	0	0
17	16		4.48E+08	15	0	0	0	0	0	0	
	▶ N\Sa	mpling /					<b>I</b>				• •
Rea	dy									NUM	

Versions of Microsoft Office Excel Earlier Than 2003

- Note The macro may not be enabled depending on the security settings of Microsoft Office Excel. If this is the case, select *Options Macro Security Security Level* from the Excel menus and set the security level to *Medium*.
- CSV files exceeding 256 columns can be displayed using Microsoft Office Excel by selecting SYSMAC-SPU - Open CSV file from the toolbar. Select a CSV file to edit in the Open File Dialog Box. If the file exceeds 256 columns, the data will be divided at every 256 columns and placed on separate worksheets. Up to 256 columns can be edited in one worksheet.
- 3. Save the data to a CSV file.

Data edited on separate worksheets can be saved as a single CSV file. Select **SYSMAC-SPU - Save CSV file** from the toolbar. Specify the filename and save the CSV file. The worksheets will be joined together to forma single CSV file.

### Managing Recipe Folders with the Expanded Recipe Function

Recipe files that are used with the expanded recipe function must be stored in the folders that are set as the data folders for expanded recipe settings. The folders are created and located in the recipe folder of the SPU Unit. The folders set as the data folders will be automatically created when the SPU Unit is started or the recipe settings are enabled.
 Manually Storing Recipe Files

- **Files** automatically created when the SPU Unit is started or the recipe settings are enabled. After the data folders are created, you can register the recipe file.
- Storing Recipe Files Using<br/>FTPThe folders set as the data folders for the expanded recipe function will be<br/>automatically created unless data is saved when FTP is used. In this case it is<br/>not necessary to restart the SPU Unit.
  - **Note** The data folders that are automatically created with the SPU Unit are not automatically deleted. Manually delete any data folders that are no longer required. Leaving the data folders may excessively limit the available memory.

# 13-3 Expanded Recipe Function Setting Procedure

The basic procedure from making recipes settings to executing recipes is outlined below. Before following the procedure, a recipe file containing recipe data must be created using a computer. Refer to *13-2 Recipe Files* for details on recipe files.

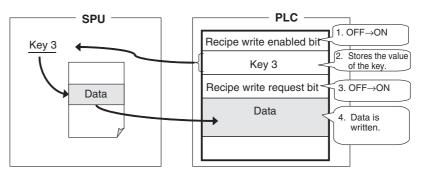
- **1,2,3...** 1. Set up the recipe environment settings. (Refer to *13-4 Setting the Recipe Environment*.)
  - 2. Set the recipe settings.
    - 2-1. Create a recipe. (Refer to 13-5 Making Recipes Expansion Settings.)
    - 2-2. Configure the recipe file. (Refer to *13-6 Setting Recipe and Template Files.*)
    - 2-3. Set the writing addresses. (Refer to 13-7 Setting the Recipe Writing Addresses for Variable Format, and 13-8 Setting the Recipe Writing Addresses for Contiguous Area Format.)
    - 2-4. Set the key. (Refer to 13-9 Setting Recipe Keys.)
  - 3. Transfer the settings to the SYSMAC SPU Unit. (Refer to *13-10 Enabling Recipe Settings*.)
  - 4. Execute the recipe. (Refer to 13-11 Executing Recipes.)
  - 5. Check the recipe execution history. (Refer to *13-12 Displaying the Recipe Execution History*.)
  - **Note** FTP server settings must be made if recipe files are received using FTP from the host computer. Refer to the FTP server manual for information on FTP server settings.

## 13-4 Setting the Recipe Environment

Set the environment for the recipe function. The environment settings will apply to all recipes.

The recipe function is internally processed by the SYSMAC SPU Unit in the following order.

- *1,2,3...* 1. CPU Unit turns ON the Recipe write enabled bit in the recipe command area.
  - 2. CPU Unit stores the value of the key in the key area.
  - 3. The CPU Unit turns ON the Recipe Write Request Bit.
  - 4. The SPU Unit reads the value of the key from the key area and writes the corresponding recipe data to the CPU Unit.



The memory area where the value of the key is stored can be set in Key Area of the environment settings.

- **Note** (1) Make sure that the environment settings are properly set before setting the recipe settings.
  - (2) The handshake setting in the environment settings is not used for the bit operation in step 3 described above.

### 13-4-1 Setting the Key Area

Set the CPU Unit memory area where the recipe key is stored.

- *1,2,3...* 1. Click the **Environment Settings** Tab in the SPU-Console Recipe Settings Tab Page. The Environment Settings Window will be displayed.
  - 2. Click the Key Area Tab.

SPU-Console - aaa (19 File View Command Help	92.168.0.101) [Online]		- DX
Unit Information Collection Se	ettings Event Settings Recipe Settings Ut	nit Settings Historical Trend	
Recipe List Environment Settings		ied area size from the start address will be the area value will be read in the specified ■ SCII character string ■ BCD: Binay-coded decimal ■ BIN: Decimal Key Size Size: 10 = Bytes (1 - 512) ASCII: Specify size BIN: Fixed at 2 bytes	
51: 01: 02:	Start all collections Stop all collections Start basic collection Stop basic collection Save the collected data	Click. Send Settings to transfer the settings to the L Send Settings To apply the request/response settings in the rec Apply Collection Settings	=
		📑 aaa (192.168.0.101) [Online] Idle Da	ata Storage Mode

The following table describes the setting parameters.

	Item	Description	
Start Addr	ess	Sets the start address of the memory area where value of the key is stored.	
Format		Data is read into the specified memory area as one of the following data types. Data is recognized as the key.	
	ASCII character string	The area corresponding to the number of bytes specified by <i>Key Size</i> is read in as an ASCII character string. Null $(0 \times 00)$ terminates the string.	
	BCD: Binary- coded Decimal	This parameter cannot be used as a key in the expanded recipe function.	
	BIN: Decimal	This parameter cannot be used as a key in the expanded recipe function.	
Key Size		Data contained in the memory area specified by the number of bytes (key size) from the start address is recognized as the key.	

The following table shows an example of a key.

CPU Unit memory	Key
	ASCII (2 bytes)
0x3132	12

# **13-5 Making Recipes Expansion Settings**

### 13-5-1 Displaying and Making Expanded Recipe Settings

- *1,2,3...* 1. Click the **Recipe Settings** Tab in the SPU-Console.
  - 2. Select the Recipe List. The Recipe List Window will be displayed. Change the settings as required.

50: Start all collections 51: Stop all collections 01: Start basic collection 01: Start basic collection	🔄 SPU-Console - aaa (1	92.168.0.101) [Online]				
Recipe Lid         Environment Settings         Display all recipe settings         Very         Very         Size 10 (Bytes)         Address: D00520         Handshake         Set environment         Set environment         Set environment         Recipe Beception         Recipe Display All         Recipe Reception         Recipe Display All         Recipe Reception         Recipe Display All         Recipe Reception         Recipe Details         Recipe Details         Name:         Set environment             Address: D00000             Set environment             Biglay All             Recipe Details             Recipe Details             Name:       Recipe One             Biglay all distance       ETP settings             Recipe Details       Name:         Write Format:       Veriable Format             Biglay Collections       Cick: Send Settings to transfer the settings to the Unt. </th <th><u>File ⊻iew Co</u>mmand <u>H</u>elp</th> <th></th> <th></th> <th></th> <th></th> <th></th>	<u>File ⊻iew Co</u> mmand <u>H</u> elp					
Environment Settings       Environment Settings         Display all orcipe settings.       Size: 10 (Bytes)         Address: D00520       Handshake         Type: ASCII       Size: 10 (Bytes)         Address: D00520       Becipe Beception         Handshake       Set environment         Set environment       Request Bit: D00000.00         Recipe Details       Recipe Beception         Recipe Details       Recipe Details         Recipe Details       Name: Recipe0         Description:       Find in files         Data folder:       AutoRecipe0.Recipe0B         File to search:       Vite Format         Vite Format       Vite Format         Control Panel       Stat all collections         Stat basic collections       Stat basic collections	Unit Information Collection S	ettings Event Settings Recipe Settings I	Unit Settings Historical Trend			
Execution History       Environment Settings         Display all ocipe settings.       Display all of the registered recipes.         V       Type: ASCII         Size: 10 (Bytes)       Address: D00520         Handshake       Bisplay All         Type: Drepoint       Recipe Bisception         Recipe Reception       Request Bit: D00000.00         Recipe Reception       Request Bit: D00000.00         Recipe Reception       Recipes by FTP: Disabled         Recipe Reception       Request Bit: D00000.00         Request Bit: D00000.00       Response Area: D00000         Recipe Reception       Recipes by FTP: Disabled         Recipe Reception       Recipe Reception         Recipe Reception       Request Bit: D00000.00         Response Area: D00000       Response Area: D00000         Bit Industriation       Bit Industriation         Add       Detetion         Bit Industriation       Add         Display all other charter the settings to the Unit.       Send Settings         Start all collections       Etck. Send Settings to transfer the settings to the Unit.         Send Settings       Send Settings		🚰 Recipe List				
Display all recipe settings.         Kay         Type: ASCII         Size: 10 (Bytes)         Address: D00520         Handshake         Type: Handshake         Set environment         Set environment         Add         Display all of the registered recipes.         Request Bit: D00000.00         Recipe Reception         Recipe Reception         Recipe Details         Recipe Details         Name: Recipe0         Description:         Key search method:         Add         Details         Recipe Details         Name: Recipe0         Description:         Key search method:         Add         Detete       Cory         Recipe Settings            Control Panel            O: Start all collections            D: Start all collections </th <th></th> <th>- Environment Settings</th> <th>Recipe</th> <th></th> <th></th> <th></th>		- Environment Settings	Recipe			
Type:       ASCII         Size:       10 (Bytes)         Address:       D00520         Handshake			Display all of the registered			
Size: 10 (Bytes)         Address: D00520         Handshake         Type: One-point         Type: Handshake         Set environment         Set environment         Add         Description:         File to search:         Key search method:         File to search:         File to search:         Statt all collections         D: Statt all collections						^
Size: 10 (00/520         Address: D00520         Handshake         Type: Handshake         Set environment         Recipe Reception					D 00000.00	
Handshake       Address Settings         Becipe Reception       Receiving recipes by FTP:         Set environment       Receive Reception         Set environment       Recipe Details         Name:       Recipe0         Description:       FTP settings         Recipe Details       Name:         Name:       Recipe0         Description:       Find in files         Data tolde:       AutoRecipe0.RecipeDB         File to search:       **         Vrite Format:       Variable Format         Delete       Copy         Recipe 2 ettings       *						-
Type:       Drepoint Handshake         Set environment       Receiving recipes by FTP:         Disabled       Request Bit:         Dotto       Response Area:         Dotto       Recipe Details         Name:       Recipe0         Description:       Find in files         Data folder:       Add         Delete       Copy         Write Format:       Variable Format         Write Format:       Variable Format         Start all collections       Click Send Settings to thensifer the settings to the Unit.		Address: D00320			Address Settings	
Set environment       Response Area       000000.00         Set environment       ETP settings         Recipe Details       Name; Recipe0         Description:       Find in files         Data folder:       AutoRecipe0_RecipeDB         File to search:       1         Delete       Copy         Write Format       Variable Format         Variable Format       Recipe Settings         So: Start all collections       Click Send Settings to the Unit.         Start bais collections       Click Send Settings				Recipe Reception		
Set environment       Response Area: D00000         ETP settings         Recipe Details         Name: Recipe0         Description:         Key search method: Find in files         Data folder: Audrecipe0.RecipeDB         File to search:         Key column: 1         Template: "         Write Format:         Variable Format:         So: Start all collections:         Start basic collections:         Send Settings		Type: Handshake		Receiving recipes by FT	P: Disabled	
Jest entroduction       ETP settings         ETP settings       Recipe Details         Name: Recipe0       Description:         Key search method:       Find in files         Data tolder:       AutoRecipe0.Recipe0B         File to search:       Key column:         Leete       Copy         Recipe format       Write Format         Variable Format       Vite Format         Vite Format       Vite Format         Start all collections       Click. Send Settings to transfer the settings to the Unit.         Start all collections       Click. Send Settings						-
Recipe Details         Name: Recipe0         Description:         Key search method:         Find in files         Data folder:         Add         Details:         File to search:         Key colum:         1         Template:         Write Format:         Variable Format:         So: Start all collections:         51: Stop all collections:         51: Stop all collections:         51: Stop all collections:         Start bait collections:         Send Settings		Set environment		Hesponse Ar		1
Add       Description:         Add       Description:         Letter       Copy         Recipe0       Description:         Key search method:       Find in files         Data folder:       AutORecipe0_RecipeDB         File to search:       Key column:         Usete       Copy         Recipe Settings       Recipe Settings         Control Panel       Cick Send Settings to transfer the settings to the Unit.         Si: Start all collections       Cick Send Settings         Send Settings       Send Settings					ETP settings	
Control Panel						
Control Panel       Send Settings         50: Stat all collections       Click. Send Settings         51: Stop all collections       Click. Send Settings					ipe0	-
File to search:       File to search:         Add       Key column:         Delete       Copy         Write Format       Waisble Format         Write Format       Recipe Settings         Start all collections       Click Send Settings to transfer the settings to the Unit.         Start all collections       Send Settings					in files	-
Control Panel  Control Panel  Cick Send Settings to transfer the settings to the Unit.  Send Settings				Data folder: Auto	Recipe0_RecipeDB	
Add     Template:       Delete     Copy       Write Format:     Variable Format:       Verify Berlings     Recipe Settings						
Control Panel						-
Control Panel			Add		able Format	
50: Start all collections 51: Stop all collections 01: Start basic collection Send Settings			Delete Copy		Recipe Settings	<b>1</b> •
50: Start all collections 51: Stop all collections 01: Start basic collection Send Settings						
51: Stop all collections 01: Start basic collection	Control Panel					≥
01: Start basic collection Send Settings					he Unit.	1
02: Stop basic collection	01	Start basic collection		-		
To apply the request/response settings in the recipe expansion settings, click th					recipe expansion settings,	click the
This is a second s			(True a)	collection Settings		>
aaa (192.168.0.101) [Online] Idle Data Storage Mode				168.0.101) [Online] Idle	Data Storage Mo	

The following table describes the column headers.

	Item	Description
Environment Settings		Displays the settings of all the selected recipes.
Key		
	Туре	Displays the type of key area. The type for the key area is always an ASCII character string.
	Size	Key byte length
	Address	Start address of the key area
Handshake	e	
	Туре	This parameter cannot be used as a key in the expanded recipe function.

	Item	Description
Recipe		Displays information for all registered recipes.
Expanded	Settings	
Request a	nd Response	
	Request Bit	Displays the Request Bit that is set in Address Set- tings.
	Response Area	Displays the Response Area that is set in Address Settings.
Recipe Re	ception	
	Receiving reci- pes by FTP	Displays whether recipe reception is enabled or dis- abled.
	Request Bit	Displays the Request Bit that is set in Recipe Reception Request/Response Settings.
	Response Area	Displays the Response Area that is set in Recipe Reception Request/Response Settings.
Recipe De	tails	
	Name	Sets the recipe name.
	Description	Displays the recipe description.
	Key search method	Displays the search method, i.e., searching in the recipe file or searching file names.
	Data folder	Displays the folder names in the recipe folder. Default name: AutoRecipe n_RecipeDB
	File to search	Displays the file names to be searched in the folders set as the data folders. This is not displayed when recipe file names are searched.
	Key column	Displays the column in which to search for the key. This is not displayed when recipe file names are searched.
	Template	Displays the template file for creating recipe files.
	Write format	Displays the recipe write format.

# 13-5-2 Adding Recipes

- *1,2,3...* 1. Click the **Recipe Settings** Tab in the SPU-Console.
  - 2. Select *Recipe List* to display the Recipe List Window.
  - 3. Click the Add Button.

The Create New Recipe Dialog Box will be displayed.

🖻 SPU-Console - aaa (1	92.168.0.101) [Online]				_	
<u>File View Command H</u> elp						
	ettings Event Settings Recipe Settings	Unit Settings Historical T	rend			
Recipe List	🖓 Recipe List					
Execution History	Environment Settings	Recipe				
	Display all recipe settings.	Display all of the regis	tered recipes.			
	Type: ASCII	isplay All	Key	Descri I	Recipe Name File	
	Size: 10 (Bytes)			No enabled	keus are est	
	Address: D00520			NU enableu	keys are set.	
	Address: D00020					
	Handshake					
	Type: Une-point Handshake					
	Set environment					
			<			>
		Add	Key Det	ails Key:		
		Au		ommand:		
		Delete <u>C</u> opy	FINS CC	ominiariu.		
Control Panel						×
50	t Start all collections	Click Sen	d Settings to tran	isfer the settings	to the Unit.	^
01	: Stop all collections : Start basic collection	Sen	d Settings			
	: Stop basic collection		the request/resp	onse settings in	the recipe expansion	setting
	t: Save the collected data		Apply Collection !	Settings		V
		aaa (192.168.	0.101) [Online]	Idle	Data Storage Mo	>
		iii aaa (132.168.	u. Tu Tj [Unline]	Idle	Data Storage Mo	ide ,;
Create New Recipe		×				
Name: Recipe0						
Incipeo						
Description:						
Recipe key search method	1	_				
Find in files Find in files	×					
Find in file names Searches data in recipe	ey to ed key					
extracted as recipe						

Name:	RecipeO
Description:	
Recipe key	search method
Find in fil	es 🗸
Find in file	
Find in file Searches	e names s data in recipe key list (version 2.0) ed key
	acted as recipe data.
- Write Form	at
Variable	Format 🗸
field	es the recipe data in the address specified for each The data type and scale conversion can be set for hecipe.
- File Check	
Enable	e
cont	le Check is enabled, the recipe file integrity will be firmed. If there is a problem with the recipe file, recipe will not be executed.
	OK Cancel

4. Enter the recipe details.

The following table describes the setting parameters.

	Item	Description
Name		Sets the recipe name.
Description	ו	Description of the recipe. Can be omitted.
Recipe key search method		Sets the search method for recipe keys.
	Find in files	Searches for the target string as the search key in the recipe files.
	Find in file names	Searches for the target string as the search key in the recipe file names.
Search data in recipe key list		Searches for the target string in the recipe key list.
Write Form	nat	Sets the write format of the recipe data.
	Variable Format	Writes the recipe data in the address specified for each field. The data type and scaling can be set for each recipe.
	Contiguous Area Format	Writes the recipe data in contiguous memory addresses starting from the start address. The data type cannot be specified.
File Check		This parameter cannot be used as a key in the expanded recipe function.

5. Enter the settings and then click the **OK** Button. Check that the new recipe has been added.

🔄 SPU-Console - aaa (19	2.168.0.101) [Online]			- D X
<u>Fi</u> le ⊻iew C <u>o</u> mmand <u>H</u> elp				
Unit Information Collection Se	ttings Event Settings Recipe Settings	Unit Settings Historical Trend		
Recipe List	🚰 Recipe List			
Erwitionment Settings	Environment Settings	Recipe		
	Display all recipe settings.	Display all of the registered		
	Key	Display All	Expanded Settings ( ID: 0 )	^
	Type: ASCII	Recipe0	Request and Response Request Bit: D00000	00
	Size: 10 (Bytes)		Response Area: D00000	
	Address: D00520			Address Settings
	Handshake		Recipe Reception	
	Type: One-point Handshake		Receiving recipes by FTP: Disa	bled
			Request Bit: D00	000.00
	Set environment		Response Area: D00	000
				ETP settings
			Recipe Details	
			Name: Recipe0	
			Description:	
			Key search method: Find in files	<u></u>
			Data folder: AutoRecipe0 File to search:	_HecipeUB
			Key column: 1	
		Add	Template:	
			Write Format: Variable Form	at
		Delete Copy		Recipe <u>S</u> ettings
Control Panel				×
	Start all collections Stop all collections	Click Send Set	tings to transfer the settings to the Unit.	^
01:	Start basic collection	Send Se	ttings	
	Stop basic collection		equest/response settings in the recipe e	expansion settings, click the
03:	Save the collected data		Collection Settings	~
		Exec		>
		📳 aaa (192	2.168.0.101) [Online] Idle	Data Storage Mode

## 13-5-3 Setting the Request Bit and Response Area

1,2,3...

- 1. Click the **Recipe Settings** Tab in SPU-Console.
- 2. Click the **Address Settings** Button in the *Expansion Settings* Area.

3. The Address Settings Dialog Box will be displayed.

Address Settin	ngs		×
Request Bit		Response Area	
D 00000		D 00001	
Memory Area:	DM 🗸	Memory Area:	DM 🗸
Word:	0	Word:	1
Bit:	(0·32767)		( 0 - 32767 )
		ОК	Cancel

The following table describes the setting parameters.

Parameter	Description
Request Bit	Sets the data area, word, and bit number of the Request Bit that is manipulated from the CPU Unit.
Response Area	Sets the data area and word address of the Response Area to which the execution result is written from the SPU Unit.

- 4. Enter the settings and then click the **OK** Button.
- **Note** Some variables and memory events will be automatically registered when the Request Bit is set. Do not delete these variables and memory events. For details, refer to 10-3-15 Variables Automatically Registered for the Expanded Recipe Function or FTP Transfers and 11-2-5 Memory Events Automatically Registered with Expanded Recipe Function and FTP Transfers.

#### Response Area Bit Configuration

The following figure shows the bit configuration of the Response Area.

15		-				-	-		-	-		-		-
	-	-	-	-	-	-	-	-	-	-	-	-		

Bit	Name	Description
0	Recipe start	ON when the recipe function for version 2.0 is executed from the expanded recipe function. To execute the rec- ipe function for version 2.0, turn ON the Recipe Write Request Bit (CPU Bus Unit Area CIO n+22 bit 00).
1	Setting error	ON when there is a setting error.
2	SPU folder error	ON when there is no path for the recipe data folder.
6	Recipe duplication error	ON when an attempt is made to execute the expanded recipe function and the previous recipe function (Ver. 2.0) at the same time.
7	No request recipe data	ON when the recipe data to be searched is not in the SPU Unit.
15	Expanded recipe function in operation	ON when the expanded recipe is in operation. This bit turns OFF when bit 00 is ON.

All the Response Area bits will turn OFF when the Expanded Recipe Request Bit is turned ON.

**Note** It is not possible to execute more than one recipe (including the expanded recipe function) at a time. If Request Bits are turned ON at the same time, they will all be processed sequentially, but execution of each bit Request Bit will start at a different time.

### 13-5-4 Setting Recipe Reception

Make the settings for recipe reception.

- 1,2,3... 1. Click the **Recipe Settings** Tab in SPU-Console.
  - 2. Click the **Recipe Reception Settings** Button in the *Expansion Settings* Field.
  - 3. The Recipe Reception Settings Dialog Box will be displayed.

-	ettings	
Receive recipes	by FTP	
Connection Setting	gs	
	Server name:	192.168.0.1
	Port:	21 ÷
	User ID:	SPU_User
	Password:	RANKER
Source fold	der on server:	Recipe/Data
SPU destinati	ion folder/file:	AutoRecipe0_RecipeDB/
Recipe Reception		ed, the previous recipe is deleted. ponse Settings
Request Bit		Response Area
Request Bit		Response Area
·	DM 🗸	
D 00000	DM 🗸	D00001 Memory Area: DM
D 00000 Memory Area:		D00001 Memory Area: DM v Word: 1 (0 - 32767)
D00000 Memory Area: Word:	0 ÷	D00001 Memory Area: DM v Word: 1 (0 - 32767)

The following table describes the setting parameters.

Item		Description				
Receive recipes by FTP		Enables or disables recipe reception (default: OFF).				
Conn	ection Settings					
	Server name	Specifies the IP address of the FTP server.				
	Port	Sets the port number of the FTP server (default: 21).				
	User ID	Sets user ID registered to the FTP server.				
	Password	Sets the password for the user ID that is registered to the FTP server.				
	Source folder on server	Sets the path from the root folder of the FTP server.				
	SPU destination folder/file	Displays the reception folder and file that are automati- cally created in the SPU Unit.				
	When a new recipe is received, the previous recipe is deleted.	Sets whether to delete the recipe file before the recipe is received.				
	e Reception Request/ onse Settings					
	Request Bit	Sets the data area, word, and bit number of the Request Bit that is manipulated from the PLC.				
	Response Area	Sets the data area and word address of the Response Area to which the execution result is written from the SPU Unit.				

4. Enter the settings and then click the **OK** Button.

**Note** Some variables and memory events will be automatically registered when the request bit is set. Do not delete these variables and memory events. For details, refer to 10-3-15 Variables Automatically Registered for the Expanded Recipe Function or FTP Transfers and 11-2-5 Memory Events Automatically Registered with Expanded Recipe Function and FTP Transfers.

- If the Receive recipes by FTP Option is not selected on the Recipe Reception Settings Tab Page, it will be grayed out, and it will not be possible to make the other settings.
- The maximum number of registrations for recipe reception is ten, which is the same as the maximum number of registrations for the expanded recipe function.
- Recipe reception and request response settings are automatically added. revised, and deleted when events or variables are set for registration, revision, and deletion.

The following figure shows the bit configuration of the response area. 7

15 14	13 12 11 10 9 8	7 6 5 4 3 2 1 0				
-						
Bit	Name	Description				
00	Recipe reception com- pleted	ON after the recipe has been received.				
1	Setting error	ON when there is a setting error.				
2		ON when there is no path for the recipe data folder.				
4	Recipe reception error	ON when there is a recipe reception error.				
15	1	ON while the recipe file is being received from the FTP server. OFF after reception has been completed.				

All the response area bits will turn OFF when the Expanded Recipe Request Bit is turned ON

Note It is not possible to execute more than one recipe (including the expanded recipe function) at a time. If Request Bits are turned ON at the same time, they will be all processed sequentially, but the execution of each Request Bit will start at a different time.

#### Response Area Bit Configuration

# 13-5-5 Setting Recipes

- 1,2,3... 1. Select a recipe from the Recipe List.
  - 2. Click the Recipe Settings Button.

🔄 SPU-Console - aaa (1	92.168.0.101) [Online]			
<u>F</u> ile ⊻iew C <u>o</u> mmand <u>H</u> elp				
Unit Information Collection S	ettings Event Settings Recipe Settings I	Unit Settings Historical Trend		
Recipe List	🚰 Recipe List			
Environment Settings	Environment Settings	Recipe		
	Display all recipe settings.	Display all of the registered	Expanded Settings (ID: 0)	A
	Type: ASCII	Display All Recipe0	Request and Response	
	Size: 10 (Bytes)		Request and Request Bit	D00000.00
			Response Area:	
	Address: D00520			Address Settings
	Handshake			
	Turner One-point		Recipe Reception	
	Type: Handshake		Receiving recipes by FT	
				Bit: D00000.00
	Set environment		Response Are	
				ETP settings
			Recipe Details	
			Name: Reci	pe0
			Description:	<u> </u>
			Key search method: Find	in files
			Data folder: Auto	Recipe0_RecipeDB
			File to search:	
			Key column: 1	
		Add	Template:	
		Delete Copy	Write Format: Varia	able Format
				(Recipe Settinas 💙
	JL			
Control Panel				≥
	: Start all collections	Click Send Sett	tings to transfer the settings to t	ne Unit.
	: Stop all collections : Start basic collection	Send Set	tings	
	Stop basic collection			recipe expansion settings, click the
	: Save the collected data		Collection Settings	
		(Exec) <		>
		📳 aaa (192	.168.0.101) [Online] Idle	Data Storage Mode

3. The Recipe Settings Dialog Box will be displayed.

Recipe Setting	38		
Name:	RecipeO		
Description:			
Data folder:	AutoRecipe0_RecipeDB	File to search:	
			Set Field Details
			Clear Settings
			Recipe Key Setting Column
Template file:			1.
Add			
Delete	Change		Enter <u>K</u> ey
201310	File Size:		Error Zoy
			OK Cancel

Recipe Setting	s							_		
Name:	Recipe0									
Description:										
Data folder:	AutoReci	pe0_Recipe	DB					File to s	earch:	abc.csv
						1	2	3	4	Set Field Details
					Field Name		Field2[0]	Field2[1]	Field2[2	
					Address		D 000000	D00001	D0000	2 Clear Settings
					Data Type		UINT	UINT	UINT	Recipe Key Setting Column
					Scaling					
Template file:			Enable	Key	Description					1
🛣 Data_A.csv		1	$\sim$	AutoRec		Name	Width	Height	Туре	
		2				Item1	100	30	P-001	
		3				Item2	300	60	P-002	
		4				Item3	300	90	P-003	
Delete	<u>Change</u>	K File Size:	848	Bytes (Re	cords: 4 , Fields	: 4)				Enter Key
										OK Cancel
Template File List Recipe Data Settings Panel				File Lis	st			Recip	e Da	ata Settings Panel

4. Enter the settings in the Recipe Settings Dialog Box.

Contents of the file selected from the Template File List will be displayed in the Recipe Data Settings Panel. Refer to *13-6 Setting Recipe and Template Files* for details on the Template File List.

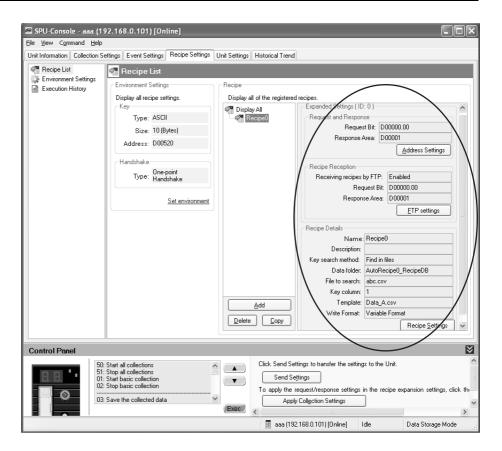
Set the recipe data writing address (memory address and data type) and the key in the Recipe Data Settings Panel. Refer to 13-7 Setting the Recipe Writing Addresses for Variable Format and 13-8 Setting the Recipe Writing Addresses for Contiguous Area Format for details on how to set the recipe writing address. Refer to 13-9 Setting Recipe Keys for details on how to set the recipe key.

The following table describes the setting parameters.

Item	Description				
Name	Sets the recipe name.				
Description	Description of the recipe. Can be omitted.				
Data folder	Sets the folder names to be created in the recipe fold- ers.Default name: AutoRecipe n_RecipeDB				
Template file	Sets the file to which the recipe data is written. The template file must be created in advance. Refer to 13-1-2 Recipe File Data Structure and File Organization for information on template files.				
File to search	Sets the file to search in the folders set as the data folders.				
Recipe Key Setting Column	Sets the column in which to search for the recipe key.				
Recipe File Data Setting Panel	Displays the contents of the recipe file. Sets the recipe data writing address for each field, and recipe data key for each record.				

- 5. Set the parameters and click the **OK** Button to save the recipe settings.
- 6. Check the Recipe List Window to see that the recipe settings have been added.

### Section 13-6



### 13-5-6 Copying Recipes

*1,2,3...* 1. Select a recipe to copy from the Recipe List Window.

2. Click the Copy Button. A copy of the selected recipe will be added.

#### 13-5-7 Deleting Recipes

- 1,2,3... 1. Select a recipe to delete from the Recipe List Window.
  - 2. Click the Delete Button.

# 13-6 Setting Recipe and Template Files

#### Overview of Recipe and Template Files

What is a Recipe File?

- A file that has recipe data written on it is called a recipe file.
- Recipe data is comprised of fields and records.
  - Field: Used to set the write address and the data type.
  - Record: Contains collection of data for each field.
- Recipe data is written to a CSV file.

What is a Template File?

- A file that has written recipe data (records only) that is copied or extracted from a recipe file is called a template file.
- Template data is comprised of records only.
- Template data is written to a CSV file.

A recipe file must be created in advance using an application such as Microsoft Office Excel. Refer to *13-1-2 Recipe File Data Structure and File Organization* for details on recipe files and template files. In this section it is assume that a CSV file (as shown in figure below) has already been created to be used as the recipe file.

🖾 Microsoft Excel - Data_A								
:2	Eile Edit	⊻iew Ins	ert F <u>o</u> rmat	<u>T</u> ools [	⊇ata <u>W</u> indow			
10	: 🗋 😭 🛃 👌 🖃 🕡 😲 : Arial 🔹 10							
	A1	•	<i>f</i> ⊮ Name					
	A	В	C	D	E			
1	Name	Width	Height	Туре				
2	Product1	100	30	P-001				
3	Product2	200	60	P-002				
4	Product3	300	90	P-003				
5								
6								

### 13-6-1 Adding Template Files

- *1,2,3...* 1. Select a recipe file from the Recipe List Window.
  - 2. Click the Recipe Settings Button.

The Recipe Settings Dialog Box will be displayed.

3. Click the **Add** Button. Select a file to use as the recipe in the Open File Dialog Box. (The template file must be created in advance.)

Recipe Setting	25		
Name:	Recipe0		
Description:			
Data folder:	AutoRecipe0_RecipeDB	File to search:	
			<u>S</u> et Field Details
			Clea <u>r</u> Settings
Template file:			Recipe Key Setting Column
<u>à</u> dd <u>D</u> elete	Thenge File Size:		Enter Key
		Γ	OK Cancel
			UK Cancel

4. The selected file will be added to the Template File List and the contents of the file will be displayed in the Recipe Settings Panel.

Field Name Address	
Data folder:         AutoRecipe0_Recipe0B         File to search           I         2         3         4           Field Name         Address         I         2         3         4           Image: Control of the search         Image	
Data folder:         AutoRecipe0_RecipeDB         File to search:           I         2         3         4           Address         Address         Address         Image: Comparison of the search of the	
Template file:         Enable         Key         Description         Recipion           Image: Solar of the second seco	
Field Name         Address         Participation         Participation <td></td>	
Address         Address         Pata Type           Data Type         Scaling         Fecipion           Template file:         Enable         Key         Description         Name         Width         Height         Type           1         Name         Width         Height         Type         Type <td>Set Field Details</td>	Set Field Details
Data Type         Data Type         Recip           Scaling         1         Name         Width         Height         Type           1         1         Name         Width         Height         Type         Type           2         1         100         30         P-001         Type         Type<	
Image: Scaling         Image:	Clear Settings
Scaling         Scaling           Template file:         Enable         Key         Description         I         I           Image: Image	e Key Setting Column
Image         Image <th< td=""><td>1+</td></th<>	1+
2      Item1 100 30 P-001     3      Item2 300 60 P-002	,
3 Item2 300 60 P-002	
4 L Item3 300 90 P-003	
Add Delete Change File Size: 84Bytes (Records: 4, Fields: 4) Contents of the template file are	Enter Key
displayed.	Cancel

### 13-6-2 Deleting Template Files

- 1,2,3... 1. 1Select a recipe from the Recipe List.
  - Click the Recipe Settings Button.
     The Recipe Settings Dialog Box will be displayed.
  - 3. Select a template file that you want to delete and click the **Delete** Button.

### 13-6-3 Changing Template Files

The recipe data can be changed by selecting another recipe file, while leaving the field settings and key settings unchanged.

- *1,2,3...* 1. Select a recipe from the Recipe List.
  - 2. Click the **Recipe Settings** Button.

The Recipe Settings Dialog Box will be displayed.

- 3. Select the template file that you want to change and click the **Change** Button.
- 4. Select a different recipe file from the Open Field Dialog Box. The recipe data will be changed according to the contents of the selected file.

# 13-7 Setting the Recipe Writing Addresses for Variable Format

Set recipe writing addresses in the CPU Unit memory area.

There are two recipe writing formats, the Variable Format and the Contiguous Area Format. This section describes the Variable Format.

### 13-7-1 Setting the Writing Address for Each Field

In the Variable Format, recipe data is written to the specified address for each field. For each field, the data type and scaling can be specified.

- 1,2,3... 1. Select a recipe from the Recipe List.
  - 2. Click the Recipe Settings Button.

The Recipe Settings Dialog Box will be displayed.

- 3. Select a template file from the Recipe File List.
  - The contents of the selected template file will be displayed in the Recipe Data Settings Panel.
- 4. Set the recipe data writing address in the Recipe Data Settings Panel.

Recipe Setting	5									
Name:	Recipe0							)isnla	ved fo	or searching in files
Description:									youn	
Data folder:	AutoRecip	e0_Recip	eDB					File to s	earch: a	bc.csv
						1	2	3	4	Set Field Details
					Field Name		Field2[0]	Field2[1]	Field2[2	
					Address		D 00000	D00001	D00002	Clear Settings
					Data Type		UINT	UINT	UINT	- Recipe Key Setting Column
					Scaling		_			2
Template file:			Enable	Key	Description					
🛣 Data_A.csv		1	$\checkmark$	AutoRec		Name	Width	Height	Туре	Displayed for
		2				Item1	100	30	P-001	searching in files
		3				Item2	300	60	P-002	searching in mes
		4				Item3	300	90	P-003	
Add Delete	▶ Change	File Size:			a Setting		el /	/	>	Enter Key
									Г	OK Cancel

The following table describes the row header.

Item	Description
Field Name	Sets the field name. Can be omitted.
Address	Sets the CPU Unit address where the recipe data is written.
Data Type	Sets the data type of the recipe data.
Scaling	Writes recipe data that has been converted by a specified formula.

Details of the Recipe Data Settings Panel are described below.

Double-click the cell that you want to change. Enter the new name.

Changing the Field Name

**Changing the Address** 

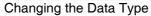
Double-click the cell that you want to change. Click the ... Button and enter the new address in the displayed window. Click the **OK** Button. Alternatively, you can directly enter the new address in the cell.

**Changing the Data Type** Double-click the cell that you want to change. Select a data type from the drop-down list.

	1	2		3
е		Field2		
		D00000		
D00	0000			
Mer	nory Area:	DM	~	
We	rd.			
**0	iu.	1		Height
		(0 - 327	67)	30
				60
				90
	UK	Cane	e	
	Mer	D00000 Memory Area: Word:	Field2         D00000           D00000         Memory Area:         DM           Word:         (0 - 327)	e Field2 000000 Memory Area: DM ♥ Word: 0 (0 - 32767)

1	2	3	4
	Field2		
	D00000		
	UINT 👻		
	BOOL		
	UINT		
Name	INT	-	Туре
Product	UINT_BCD		P-001
Product	UDINT_BCD BEAL		P-002
Product	LREAL		P-003
	WORD DWORD CHANNEL_BLC STRING	ск	

Changing the Address



- Note
- (1) Use the appropriate data type for the recipe data. (Refer to following table.) If the BOOL format is set for values other than 0 or 1, or the UNIT format is set for hexadecimal numbers like A05C, a recipe data type conversion error message will be displayed.

Data type	Recipe data
BOOL	0 or 1
UINT	0 to 65535
INT	-32768 to 32767
UNIT_BCD	0 to 9999
WORD	0 to FFFF
CHANNEL	0 to FFFF
STRING	ASCII character string
UDINT	0 to 4294967295
UDINT_BCD	0 to 99999999
DWORD	0 to FFFFFFF
REAL	$-10^{-38}$ to $10^{+38}$
LREAL	$-10^{-308}$ to $10^{+308}$
CHANNEL_BLOCK	Continuous channels (4 digits $\times$ No. of elements)

(2) Recipe data that specifies scaling with the data type is usually within the range a floating-point data type (float or double). If the scaled data is not within the range of the specified data type, a recipe data type conversion error message will be displayed.

**Selecting Fields** 

- Selecting a Single Field
- Click the desired field's column header cell.
- Selecting a range of Consecutive Fields
  - Click the first field's column header cell. Press **Shift** Key while clicking the last field's column header cell.

### 13-7-2 Field Settings Dialog Box

Set the writing address and data type of the recipe for each field. Detailed settings can be made for each field in the Field Settings Dialog Box.

Select a field and click the Set Field Details Button. Select the Set with Dialog. Alternatively, double-click the column header, or right-click the selected field and select the Set with Dialog.

The Field Settings Dialog Box will be displayed.

Name:	Recipe0										
Description:											
Data folder:	AutoRecip	e0_Recip	eDB					File to s	earch:	abc.cs	v
						1	2	3	4	ſ	Set Field Details
					Field Name			Field2[1]	-		
					Address		D 00000	D00001	D00002		Clea <u>r</u> Settings
					Data Type		UINT		HINT		pe Key Setting Column
					Scaling			with Dialoç with Variat			2 -
Template file:			Enable	Key	Description			with Collec		ern	1 *
🛣 Data_A.csv		1		AutoRec		Name	Clas	r Field Set	tings		-
		2				Item1	p		ungs		-
		3				Item2	× -	er Key ble Key			
		4				Item3		ble Key			
Add	▶ <u>C</u> hange	4 K File Size:		Bytes (Re	cords: 4 , Fields				>		Enter Key

Field Settings	×
Set the write data an	ddress and data conversion.
Field Name:	Field2
Address:	D00000
Data Type:	UINT
No. of Elements	1
Perform scale c	onversion
Reverse calculat	e the scaling value and store the result.
Linear Fund	tion Conversion
Linear Function	Conversion
Scaling value	= a x Value + b
a =	1 b = 0
	conversion Data Tupe: double
Post-	conversion Data Type: double 🔍
	OK Cancel

2. Set the field parameters in the Field Settings Dialog Box.

The following table describes the field parameters.

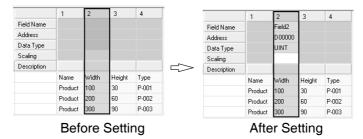
Item	Description
Field Name	Sets the field name. Can be omitted.
Address	Sets the writing address of the recipe data.
Data Type	Sets the data type of recipe data.
No. of Elements	Sets the number of elements of recipe data.
Scaling	Writes recipe data that has been converted by a specified for- mula. There is no need to specify the scaling parameters for recipe data that do not require scaling.

Equation	Description
Linear function con- version	The values of the recipe data are converted using a linear function. Specify a floating-point data type (float or double). Calculate the values in the following manner: Memory value = (Recipe data value – b) $\div$ a Recipe data value = a × Memory value + b) Where a and b are specified constants)
Maximum/Minimum Conversion	Recipe data with a specified upper and lower limit is converted to a value with a new upper and lower limit. Specify a floating- point data type (float or double).
Decimal position conversion	Moves the decimal point of the memory data to a specific point. Specify a floating-point data type (float or double).

The following table describes the scaling settings.

#### 3. Set the parameters and click the **OK** Button.

The writing address will be set in the field.



### 13-7-3 Setting Variables in Fields

Variables that were set in the data collection settings can be set in fields. Refer to *10-3 Setting Variables* for details on the data collection settings.

1,2,3...
 Select a field and click the Set Field Details Button. Select Set with Variables. Alternatively, right-click the field and select Set with Variables. The Select Variable Dialog Box will be displayed.

Group	~	, i	Number of variables:	(10/50)	
📁 All variables	Name	Address	Data Type	Elements	Descriptio
🗊 Group0000	Group0000/Tag00	00 D00000	UINT	1	
📁 Group0001	Group0000/Tag00		UINT	1	
Group0002	Group0000/Tag00	D2 D00002	UINT	1	
	Group0000/Tag00	D3 D00003	UINT	1	
	Group0000/Tag00		UINT	1	
	Group0000/Tag00		UINT	1	
	Group0000/Tag00	DODOD6	UINT	1	
	Group0000/Tag00		UINT	1	
	Group0000/Tag00 Group0000/Tag00		UINT	1	
	<				>
	Variable Name:				Select
				× [	_

2. Select a variable to set in the field in the Select Variable Dialog Box. Click the **Select** Button.

The selected variable will be set as the field.

**Note** Variables with address memory type SPU/CIO or SPU/DM cannot be set in fields. Recipes cannot write recipe data to SPU/CIO or SPU/DM variables.

# 13-7-4 Setting Data Collection Pattern Variables in Fields

Variables that were set in the data collection pattern settings can be set in fields. This is used when a file containing data collected by the SYSMAC SPU Unit is used as a recipe. Refer to *10-4 Setting Data Collection Patterns* for details on the data collection settings.

1,2,3...
 Select a field and click the Set Field Details Button. Select Set with Collection Pattern. Alternatively, right-click the field and select Set with Collection Pattern.

The Select Collection Pattern Dialog Box will be displayed.

	Pattern1	~		
ame	Address	Data Type	Elements	Description
ag0010	D00010	UINT	1	
ag0011	D00011	UINT	1	
ag0012	D00012	UINT	1	
ag0013	D00013	UINT	1	
aq0014	D00014	UINT	1	
aq0015	D00015	UINT	1	
aq0016	D00016	UINT	1	
aq0017	D00017	UINT	1	
aq0018	D00018	UINT	1	
ag0019	D00019	UINT	1	
0018	D00018	UINT		

2. Select a collection pattern (group of variables) to set as the field in the Select Collection Pattern Dialog Box. Click the **OK** Button.

All variables in the collection pattern will be set as fields.

**Note** Variables with address memory type SPU/CIO or SPU/DM cannot be set in fields. Recipes cannot write recipe data to SPU/CIO or SPU/DM variables.

# 13-7-5 Changing Field Settings

Use the Field Settings Dialog Box to change the field settings.

- Select the field that you want to change and click the Set Field Details Button. Select Set with Dialog. Alternatively, double-click the column header, or right-click the selected field. Select Set with Dialog.
   The Field Settings Dialog Box will be displayed.
  - 2. Enter the new settings in the Field Settings Dialog Box.
  - Set the parameters and click the **OK** Button. The writing address will be set to the field. Refer to *13-7-2 Field Settings Dialog Box* for details on the Field Settings Dialog Box.

# 13-7-6 Clearing the Field Settings

Clear the field settings of unused fields.

Select the fields that you want to clear and click the **Clear Settings** Button.



# 13-8 Setting the Recipe Writing Addresses for Contiguous Area Format

Set recipe writing addresses in the CPU Unit memory area.

There are two recipe writing formats, the Variable Format and the Contiguous Area Format. This section describes the Contiguous Area Format.

# 13-8-1 Setting the Recipe Writing Address

In the Contiguous Area Format, recipe data is written all at once to the specified range of addresses starting from the head address. Data type cannot be specified. All recipe data is read in and written to the memory as hexadecimal channel.

#### *1,2,3...* 1. Click the **Recipe Settings** Tab.

- 2. Select the Recipe List Dialog Box.
- 3. Click the **Settings** Button.

The Recipe Settings Dialog Box will be displayed.

4. Select a recipe file from the Recipe File List.

Details will be displayed on the Recipe Data Settings Panel.

Recipe Setting	s												
Name:	Recipe0												
Description:								Di	splay	ed f	or searching	g in f	files
Data folder:	AutoRecip	e0_Recip	eDB						File to se	earch:	abc.csv		
						1	2	3	4		Address		
Template file:					Addres		D00000	D0000		02	D00000		
Data_A.csv			Enable	Key	Descrip						Memory Area:	DM	~
AL Data_A.csv		1	$\vee$	AutoRec		Name	Width	Heigh	: Туре		Word:		0÷
		2				ltem1	100	30	P-001				
		3				Item2	300	60	P-002			(0.32	2767 ]
		4				Item3	300	90	P-003	:	No. of Fields		
											No. of Fields		4
											(1	- 32768	0
											- Recipe Data Sto	rade	
											Skip columns:		2÷
											Data after the column will be	specifie stored.	
											Recipe Key Sett	ing Colu	non -
												ing cola	1
													_
Add											Displayed		
									/		searching		les
Delete 1	Change										Enter <u>k</u>	ey	
		File Size:	84E	Bytes (Re	cords: 4 , I	ields: 4)			/				
			R	ecipe	Data	Settir	ig Pan	el	/	(			_
							0			l	<u> </u>	Cancel	

5. Set the recipe data writing address in the Recipe Data Settings Panel.

The following table describes the row header.

Item	Description
Address	Displays the CPU Unit memory address where the recipe data is written.

The following table describes the setting parameters.

Item	Description
Address	Sets the header address of the memory where the recipe data will be written.
No. of Fields	Sets the size of the recipe data that will be written.
	When the checkbox is selected, the specified number of fields are written to memory as recipe data. If the number of fields available to write as the recipe data are less than the specified number of fields, the missing fields will not be written to mem- ory.
	When the checkbox is not selected, all the fields (excluding the header) will be written to memory.
Recipe Data Storage	Sets the first column to be used as the recipe data.

# 13-9 Setting Recipe Keys

# 13-9-1 Setting the Recipe Key

- 1,2,3... 1. Click the Recipe Settings Tab.
  - 2. Select the **Recipe List** Dialog Box.
  - 3. Select a recipe.
  - 4. Click the **Recipe Settings** Button.
    - The Recipe Settings Dialog Box will be displayed.
  - Select a template file from the Template File List.
     The contents of the selected template file will be displayed in the Recipe

Data Settings Panel.

Recipe Setting	s									
Name:	Recipe0									
Description:										
Data folder:	AutoReci	ipe0_Recip	eDB					File to s	earch:	
						1	2	3	4	Set Field Details
					Field Name		Field2[0]	Field2[1]		Class Cathing
					Address Data Type		D00000 UINT	D00001 UINT	D00002 UINT	Clear Settings
					Scaling			OINT	UNAT	Recipe Key Setting Column
Template file:	(		Enable	Key	Description					2
🛣 Data_A.csv		1	$\checkmark$	AutoRec		Name	Width	Height	Туре	
		2				Item1	100	30	P-001	
		3				Item2	300	60	P-002	
		4				Item3	300	90	P-003	
						$\mathbf{i}$				
								Dooin		a Setting Panel
							Ľ	recipe	Dal	a Setting Faller
Add										
Delete	Change	<							>	Enter Key
		File Size:	84E	lytes (Re	cords: 4 , Fields:	4)				
										OK Cancel

6. Set the recipe data key in the Recipe Data Settings Panel.

**Changing the Enable** 

**Selecting Records** 

Status

The following table describes the column headers.

9	
Item	Description
Enable	Enables/disables the key settings.
	If disabled, the key settings will not affect the recipe settings.
Key	Sets the recipe data key (alphanumeric characters).
Description	Cannot be set.

Details of the Recipe Data Settings Panel are described below.

Click the cell that you want to change. When the cell is enabled, the key will be automatically registered.

- Searching in Recipe Files Setting is possible for the first line only.
- Searching Recipe File Names

Only one record can be set from multiple records.

Different recipe setting windows will be displayed depending on the recipe search method.

#### Two Types of Recipe Setting Windows

Searching in Recipe Files

Variables:

Recipe Setting	;												
Name:	Recipe0												
Description:													
Data folder:	AutoRecip	Recipe0_Recipe0B File to search: abc.csv											
			Set Field Details										
					Field Name		Field2[0]	Field2[1]					
					Address Data Type		D00000 UINT	D00001 UINT	D00002 UINT	Clear Settings			
					Scaling			UNI	UNI	Recipe Key Setting Column			
Template file:			Enable	Key	Description					2			
🛣 Data_A.csv		1	$\checkmark$	AutoRec		Name	Width	Height	Туре				
		2				ltem1	100	30	P-001				
		3				Item2	300	60	P-002				
		4				Item3	300	90	P-003				
•	►												
Add													
Delete	hange	<							>	Enter Key			
		File Size:	94E	luter (Re	cords: 4 , Fields:	41			/	mines Tash			
		1 10 0120.	046	ylos (ne	Jorda, 4 , Fielda.	<b>,</b>							
										OK Cancel			

#### Contiguous Area:

Recipe Setting	s			_							
Name:	Recipe0										
Description:											
Data folder:	AutoRecip	e0_Recip	eDB					F	ile to search:	abc.csv	
						1	2	3	4	Address	
Template file:					Addres		D00000	D00001	D00002	D00000	
Data_A.csv			Enable	Key	Descrip					Memory Area:	DM 🗸
		1		AutoRec		Name Itera1	Width	Height	Type P-001	Word:	0
		2				Item1 Item2	100 300	30 60	P-001 P-002		(0.32767)
		4				Item3	300	90	P-003	No. of Field	18
										No. of Fields	4÷
										(	1 - 32768 )
										Recipe Data 9	torage
										Skip columns:	2
										Data after th column will b	e specified e stored.
										Recipe Key Se	
											1.
Add											
	<u>C</u> hange									Enter	<u>K</u> ey
		File Size:	848	)ytes (Re	cords: 4 , I	Fields: 4 )					
										ОК	Cancel

# Searching Recipe File Names

#### Variables:

Recipe Setting	s											
Name:	Recipe0											
Description:												
Data folder:	AutoRecip	pe0_Recip	eFile									
						1	2	3	4		Set Field Details	
					Field Name	-	Field2[0]	Field2[1]	Field2[2		<u>set rielu Details</u>	
					Address		D00000	D00001	D00002		Clear Settings	
					Data Type		UINT	UINT	UINT			- 1
					Scaling							
Template file:			Enable	Key	Description							
🛣 Data_A.csv		1				Name	Width	Height	Туре			
		2				Item1	100	30	P-001			
		3	$\geq$	AutoRec		Item2	300	60	P-002			
		4				Item3	300	90	P-003			
Add Delete	<u>C</u> hange	<							>		Enter <u>K</u> ey	
		File Size:	848	Bytes (Re	cords: 4 , Fields	: 4 )						
										OK	Cancel	

Contiguous	Area:
------------	-------

Recipe Settings	;										-
Name:	Recipe0							]			
Description:											
Data folder:	AutoRecip	e0_Recip	eFile								
						1	2	3	4	Address	
Template file:					Addres		D00000	D00001	D00002	D00000	
Data_A.csv			Enable	Key	Descrip					Memory Area:	DM 🗸
ALL Data_ALCSV		1				Name	Width	Height	Туре	Word:	0÷
		2				ltem1	100	30	P-001		
		3	$\sim$	AutoRec		Item2	300	60	P-002		(0 - 32767)
		4				Item3	300	90	P-003	No. of Fields	
										No. of Fields	4
										(1	I - 32768 )
										Recipe Data Str	orage
										Skip columns:	2
										Data after the	appairied
										Data after the column will be	stored.
Add											
800											
<u>D</u> elete <u>(</u>	Change									Enter <u>k</u>	Sey
		File Size:	84E	Bytes (Re	cords: 4 , F	Fields: 4 )					
										ОК	Cancel

# 13-10 Enabling Recipe Settings

The procedure for enabling recipe settings in the SYSMAC SPU Unit is described below. Use this procedure if the recipe settings are changed. The recipe settings and recipe file will be transferred to the SYSMAC SPU Unit.

Note

- Make sure that the SPU-Console is connected to the SYSMAC SPU Unit before enabling the settings.
  - (2) When settings are transferred, the current SYSMAC SPU Unit settings will be overwritten. When a recipe file with the same name exists in the Memory Card, the recipe file will also be overwritten.
  - (3) Do not turn OFF the power to the Unit while settings are being transferred. Doing so will transfer corrupted information to the Unit and may cause malfunction.
  - (4) Do not enable recipe settings while the recipe is being written.
- *1,2,3...* 1. Check that recipe settings have been completed.
  - 2. Click the Recipe Settings Tab in the SPU-Console.

#### **Executing Recipes**

### Section 13-11

🗐 SPU-Console - aaa (1	92.168.0.101) [Online]		
<u>File View Command H</u> elp			
Unit Information Collection S	ettings Event Settings Recipe Settings	Unit Settings Historica	al Trend
Recipe List	🚰 Recipe List		
		Recipe Display all of the re M Display All	Expanded Settings (ID: 0) Request and Response Request Bit: D00000.00 Response Area: D00001 Address Settings Reciving recipes by FTP: Enabled Request Bit: D00000.00 Response Area: D00001 ETP settings
		Add Delete Co	Recipe Details     Name: Recipe0       Description:
	: Start all collections	Click S	Send Settings to transfer the settings to the Unit.
	Stop all collections Start basic collection Stop basic collection Save the collected data		Send Settings ply the request/response settings in the recipe expansion settings, click th Apply Collection Settings
		a a	aaa (192.168.0.101) [Online] Idle Data Storage Mode

3. Click the **Send Settings** Button in the SPU-Console Control Panel.

The following dialog box will be displayed to confirm the settings transfer.



4. To execute the settings transfer, click the Yes Button.

When the Change Recipe Settings command is executed, "A" will be displayed in the 7-segment display on the SYSMAC SPU Unit. When it has finished, the display will return to "-D".

The new settings will be enabled when the display shows "-D".

 Click the Apply Collection Settings Button to apply the expanded recipe request and response settings to the variables and memory events. The settings will be applied and will be enabled after "-D" is displayed.

# 13-11 Executing Recipes

This section describes how to execute recipes.

### 13-11-1 Normal Operation

The recipe write function is executed when the bit is ON.

Refer to 7-2 CIO Area and 13-5-3 Setting the Request Bit and Response Area for information on the bit to use.

The following figure shows the bit operation when the recipes are written. The CPU Unit turns ON the Expanded Recipe Request Bit, and the SYSMAC SPU Unit turns it OFF.

Sequence Diagram for Normal Operation	
---------------------------------------	--

Recipe Write Enabled Bit (CPU Bus Unit Area)	↑ PLC-ON		
Request Bit (Expanded Recipe Request Area)	↓ PLC-OFF		
Pasing Start Pit (Expanded	ON		
Recipe Start Bit (Expanded Recipe Response Area)	↓ SPU-OFF	↑ SPU-ON	
Expanded Recipe Function in Operation Bit (Expanded Recipe Response Area)	↑ SPU-ON	↓ SPU-OFF	
Recipe Write Completed Bit (CPU Bus Unit Area)		↓ SPU-OFF	↑ SPU-ON
Writing Recipe Bit		↑ SPU-ON	↓ SPU-OFF
(CPU Bus Unit Area)			

- *1,2,3...* 1. The CPU Unit turns ON the Recipe Write Request Bit.
  - 2. The CPU Unit turns ON the Request Bit.
  - 3. The SPU Unit turns OFF the Recipe Start Bit (bit 00), turns ON the Expanded Recipe Function in Operation Bit (bit 15), searches for the recipe data, and creates the template.
  - 4. Once the template file has been created, the Recipe Start Bit (bit 00) turns ON, and the Expanded Recipe Function in Operation Bit (bit 15) turns OFF.
  - 5. The SPU Unit turns OFF the Recipe Write Completed Bit (CIO n+23 bit 01), turns ON the Writing Recipe Bit (CIO n+23 bit 01), and starts to write the recipe data of the template file.
  - Once the recipe data has been written, the SPU turns ON the Recipe Write Completed Bit (CIO n+23 bit 01) and turns OFF the Writing Recipe Bit (CIO n+23 bit 00).

# 13-11-2 Operation without Request Recipe

Sequence Diagram	n for Operation w	vithout Request Recipe
------------------	-------------------	------------------------

Recipe Write Enabled Bit (CPU Bus Unit Area)	↑ PLC-ON
Request Bit (Expanded Recipe Request Area)	↑ ↓ PLC-OFF
Recipe Start Bit (Expanded Recipe Response Area)	ON ↓ SPU-OFF
Expanded Recipe Function in Operation Bit (Expanded Recipe Response Area)	↑ SPU-ON ↓ SPU-OFF
No Requested Data Bit (Expanded Recipe Response Area)	↓ SPU-OFF ↑ SPU-ON

- *1,2,3...* 1. The CPU Unit turns ON the Recipe Write Request Bit.
  - 2. The CPU Unit turns ON the Request Bit.
  - 3. The SPU Unit clears the Response Area, and then turns ON the Expanded Recipe Function in Operation Bit (bit 15) and searches for the recipe data.

- 4. If the requested data does not exist, the No Requested Data Bit (bit 07) turns ON, and the Expanded Recipe Function in Operation Bit (bit 15) turns OFF.
- Note The Recipe Write Completed Bit, Writing Recipe Bit, and Recipe Writing Error Bit in the CPU Bus Unit Area will not change.

# 13-11-3 Operation at Recipe Error

#### ■ Sequence Diagram for Operation at Recipe Error

Recipe Write Enabled Bit (CPU Bus Unit Area)	Î PLC-ON
Request Bit (Expanded Recipe Request Area)	 PLC- ↓ PLC-OFF
Recipe Start Bit (Expanded Recipe Response Area)	ON ↓ SPU-OFF ↑ SPU-ON
Expanded Recipe Function in Operation Bit (Expanded Recipe Response Area)	↑ SPU-ON ↓ SPU-OFF
Recipe Write Completed Bit (CPU Bus Unit Area)	↓ SPU-OFF ↑ SPU-ON
Writing Recipe Bit (CPU Bus Unit Area)	↑ SPU-ON ↓ SPU-OFF
Recipe Write Error Bit (CPU Bus Unit Area)	↓ SPU-OFF ↑ SPU-ON

1,2,3... 1. The CPU Unit turns ON the Recipe Write Request Bit.

- 2. The CPU Unit turns ON the Request Bit.
- 3. The SPU Unit turns OFF the Recipe Start Bit (bit 00), turns ON the Expanded Recipe Function in Operation Bit (bit 15), searches for the recipe data, and creates the template.
- 4. Once the template file has been created, the Recipe Start Bit (bit 00) turns ON, and the Expanded Recipe Function in Operation Bit (bit 15) turns OFF.
- 5. The SPU Unit turns OFF the Recipe Write Completed Bit (CIO n+23 bit 01), turns ON the Writing Recipe Bit (CIO n+23 bit 00), and starts to write recipe data to the template file.
- 6. If a recipe data writing error occurs, the SPU Unit will turn ON the Recipe Write Error Bit (CIO n+23 bit 02), turn ON the Recipe Write Completed Bit (CIO n+23 bit 00), and turn OFF the Writing Recipe Bit (CIO n+23 bit 00).

# 13-12 Displaying the Recipe Execution History

### 13-12-1 Displaying the Execution History

- 1,2,3... 1. Click the **Recipe Settings** Tab to display the Recipe Settings Window.
  - 2. Select Execution History.
  - 3. To update the history, click the **Refresh** Button. Up to 500 events can be recorded.

If the number of events exceeds 500, old events will be overwritten.

Section 13-12

	SPU-Console - aaa (192.168.0.101) [Online]				
Unit Information Collection Se	ettings Event Settings F	Recipe Settings Unit Settings	Historical Trend		
Recipe List	Execution Hist	ory			
<ul> <li>Environment Settings</li> <li>Execution History</li> </ul>	Event	Date/Time	Кеу		
	Log Records: 0	<u>R</u> efresh		<u>C</u> lear Log	Save to File
Control Panel					
<b>B B B B D D D D D D D D D D</b>	Start all collections Stop all collections Start basic collection Stop basic collection Save the collected data	Exec	Send Set	tings to transfer the settings to tings equest/response settings in th Collection Settings	
		and a second sec	aa (192.168.0.101	I) [Online] Idle	Data Storage Mode

The following table describes the listed parameters.

Header	Description
Event Name of event that occurred when executing recipe.	
Date/Time Date and time when the event occurred.	
Key	Key of executed recipe.

The following table describes the events displayed in the recipe execution history.

Event	Description		
Write Start	Started writing the recipe.		
Write Complete	Completed writing recipe.		
Error Completion	Cancelled writing recipe because an error occurred.		

### 13-12-2 Deleting the Execution History

*1,2,3...* 1. Click the **Clear Log** Button.

A confirmation dialog box will be displayed.

2. Click the Yes Button.

The execution history will be deleted.

# 13-12-3 Saving the Execution History

- 1,2,3... 1. Click the Save to File Button.
  - 2. Select a file from the Save As Dialog Box. The selected file will be saved in the execution history.

# SECTION 14 Unit Settings

This section describes how to set the system settings and FINS network settings.

14-1	System Settings 2		
	14-1-1	Unit Settings	210
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# 14-1 System Settings

The System Setting Panel on the Unit Setting Tab Page is used to set the Unit name, IP address, and power failure input (PF-IN) shutdown.

**Note** Confirm that the destination SYSMAC SPU Unit is connected before making the settings.

### 14-1-1 Unit Settings

Select System Setting - Unit on the Unit Setting Tab Page.

SPU-Console - 192.1	68.0.23 [Online	1				
Eile <u>V</u> iew C <u>o</u> mmand <u>U</u> nit	Settings <u>H</u> elp					
Unit Information Collection 9	ettings Event Setti	ngs Recipe Settings	Unit Settings	Historical Tre	end	
Unit Information Collection S System Setting UP Network UPS FINS Network Setting Ethernet CSTBUS	System S Unit Use the following Unit Name: Unit Description: Workgroup:	information to identify th SPU-default WORKGROUP Set the workgroup name a for the location.	is unit on the	network.		-
	Require u:	< shared folder security. er authorization thorization is enabled, a	a password wi	ll be required.		
	Read-only Checking	this option disables writ	ing to the ne	twork shared f	older.	
	Disable br Checking	owse this option disables bro	owsing from E	xplorer.		
Control Panel						
		192.168.0.23 [0	)nline] Idl	e	Data Storag	e Mode

The following settings can be made.

Item	Meaning
Unit Name	This is the name displayed under My Networks on the Windows computer.
	Input an alphanumeric name with a maximum of 64 characters.
	Set a unique name for each SYSMAC SPU Unit connected to the same network.
	Unit names of more than 15 characters cannot be found from Windows Explorer.
Unit Description	A description of the SYSMAC SPU Unit. The description may be omitted.
Workgroup	The workgroup name on the Windows network.
Time Zone	Set the SYSMAC SPU Unit's time zone. The SYSMAC SPU Unit is factory set to UTC (Coordinated Universal Time). Always adjust the clock to the local time zone.
Security	Sets the security level for shared network folders.

**Note** If *Enable the User Authorization* is selected, the SPU-Console may fail to connect to the SYSMAC SPU Unit, e.g., an error message saying the network path cannot be found may be displayed. If this happens, connect the SPU-Console to the SYSMAC SPU Unit using the following procedure.

1,2,3... 1. Exit the SPU-Console.

- 2. Access the SYSMAC SPU Unit's shared network folder from Windows Explorer. Input *root* (all lower case) as the user name and *OMRON* (all upper case) as the password.
- 3. Confirm that the SYSMAC SPU Unit folder is displayed in the networkshared folders.
- 4. Start the SPU-Console and connect to the SYSMAC SPU Unit.

### 14-1-2 IP Network Settings

Select System Setting - IP Network on the Unit Setting Tab Page.

SPU-Console - 192.1	68.0.23 [Online]	- D X
Eile View Command Unit Unit Information Collection S	Settings Help ettings Event Settings Recipe Settings Unit Settings Historical Trend	
System Setting Unit P Network UPS FINS Network Setting Ethernet CS1BUS	System Setting  IP Network  Interface Set the network connection data.  IMNI LAN2  IP Address: 192 168 0 100 Subnet Mask: 255 255 0	
	IP Routing     Specify the default gateway     Gateway:     Enable IP forwarding     This option enables transferring IP packets     between LAN1 and LAN2.     By default, this option is disabled.	×
Control Panel		
	📳 192.168.0.23 [Online] Idle Dat	a Storage Mode

The following settings can be made.

Item	Meaning	
Obtain the IP address automati-	Select this setting to automatically obtain an IP address using the DHCP (Dynamic Host Configuration Protocol).	
cally.	<b>Note</b> A DHCP server must exist on the network/system to use this setting. If you do not know if a DHCP server exists, ask your system administrator.	
IP Address	Input the IP address.	
	Set a unique IP address for each SYSMAC SPU Unit con- nected to the same network.	
Subnet Mask	Set the same subnet mask as the one set on the network computer to be connected.	
IP Routing	Set the default gateway and IP forwarding to use for IP packet routing.	
	Note The IP forwarding setting is supported for CS1W- SPU02 SYSMAC SPU Units only.	

**Note** For the CS1W-SPU02, an IP address can also be set for LAN2. If an IP address is set for LAN2, use different network addresses for LAN1 and LAN2. If the same network address is used, correct communications may not be possible.

### 14-1-3 Shutdown Setting for the Power Failure Input

Select System Setting - UPS on the Unit Setting Tab Page.

SPU-Console - 192.168.0.23 [Online]				
Eile View Command Unit	Eile Yiew Command Unit Settings Help			
Unit Information Collection	Settings Event Settings Recipe Settings Unit Settings Historical Trend			
<ul> <li>System Setting Unit IP Network</li> <li>→ UPS</li> <li>FINS Network Setting Ethernet CS1BUS</li> </ul>	System Setting UPS Power Failure Shutdown Enable Time from power failure signal ON to recognition: Time from power failure recognition to shutdown: D00-mm ms Negate (reverse) the power failure signal			

The following settings can be made.

Item	Meaning
Enable	Select this option to enable the SYSMAC SPU Unit shut- down function when the power failure signal is detected from the uninterruptible power supply (UPS).
Time from power failure signal ON to recognition	Specify the time in millimeters from 1 to 999,999,999 between when the power failure signal turns ON and a power failure is assumed. Determine this value based on factors such as the backup time of the UPS.
Time from power failure recognition to shutdown	Specify the time in milliseconds from 1 to 999,999,999 between assuming a power failure (i.e., after the power failure signal has remained ON for the specified time) and starting execution of the shutdown process.
Negate (reverse) the power failure signal	A power failure is detected when the power failure signal is OFF (negative logic). The SYSMAC SPU Unit is factory set to detect a power failure when the power failure signal goes ON.

**Note** The SYSMAC SPU Unit will execute shutdown processing after it has assumed a power interruption even if the power failure signal turns OFF. The SYSMAC SPU Unit will also not restart automatically once a shutdown has been executed even if the power failure signal turns OFF. Confirm that the power supply has been restored and then restart the SYSMAC SPU Unit.

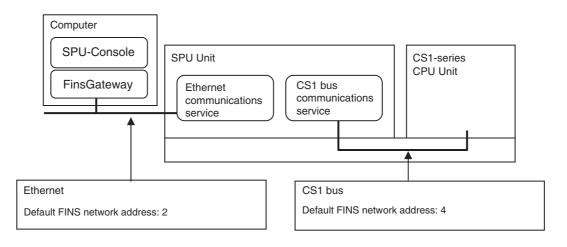
#### Note (1) UPS Connection

With a CS-series SYSMAC SPU Unit, the power failure signal is connected to the PF-IN terminal. With a CJ-series SYSMAC SPU Unit, the power failure signal is connected to the COMM port. For details, refer to *2-4 Connecting the Power Failure Signal* in the *SYSMAC SPU Units Operation Manual* (Cat. No. V236).

(2) Shutdown Processing Time When the SPU Unit performs shutdown processing for the power failure input from an uninterruptible power supply (UPS), the time required for shutdown processing depends on the number of enabled collection patterns. As a guideline, several seconds to several tens of seconds is required.

# 14-2 FINS Network Settings

The SYSMAC SPU Unit contains OMRON'S FinsGateway communications middleware, enabling it to use FINS messages. FINS network settings are made on the FINS Network Setting Panel of the Unit Setting Tab Page.



# 14-2-1 Ethernet Settings

Select FINS Network Setting - Ethernet on the Unit Setting Tab Page.

🖻 SPU-Console - 192.1	68.0.23 [Online]	
<u>File View Co</u> mmand <u>U</u> nit	Settings Help	
Unit Information Collection 9	Settings Event Settings Recipe Settings Unit Settings Historical Trend	
System Setting Unit IP Network	FINS Network Setting	
UPS	Ethernet	
FINS Network Setting  Fins Ethernet CS1BUS	FINS Address Set the FINS address of the communication unit.	
	Network Address: 2	
	Node Address: 23 -	
	Unit Address: 17 🛨	
	Communications Set the communication UDP port number, interface, etc.	
	UDP Port Number: 9600	
	Priority Interface: LAN1 🗸	
	FINS-IP Address Conversion Set the FINS and IP address conversion method. Generating automatically uses the FINS node address as the host portion of the IP address.	
	Generate automatically	
	IP Address Table	
	Node Addr IP Address Add	
	66 192.168.37.66 61 192.168.1.61 Properties	
	62 192.168.1.62	
	If it is necessary to establish a hard relationship between the FINS node addresses and IP addresses, register them in the IP Address Table. This is not normally necessary.	
Control Panel		
Control Parel	👔 192.168.0.23 [Online] Idle Data Storag	_
	132.100.0.23 [Unline] Tule Data storag	je moue

**Note** Set the same Ethernet network address for the FinsGateway on the computer and in the SYSMAC SPU Unit.

Item	Meaning
FINS Address	The FINS address of the Ethernet Communications Unit.
	If the IP address is obtained automatically, the node address will be automatically set to the rightmost byte of the IP host segment.
	The unit address cannot be changed.
UDP Port Number	Set the UDP port number to execute the FINS communica- tions service. The default setting is 9600.
Priority Interface	Specify LAN1.
FINS-IP Address Conversion	Specify the method to use to convert the FINS node address to an IP address.
	If <i>Enable the Automatic Generation</i> is selected, the FINS node address will be used unaltered as the rightmost byte of the host segment when converting.
	If a node address is registered in IP address table (which shows the corresponding IP addresses and FINS node addresses), the IP address table will be given priority. If <i>Enable the Automatic Generation</i> is not selected, only the IP address table will be used for conversion.

The following settings can be made.

# 14-2-2 CS1 Bus Settings

The CS1 bus communications service uses the CS1 bus as a network to communicate with the CPU Unit.

■ SPU-Console - 192.10 file View Command Unit S		
	ettings Event Settings Recipe Settings Unit Settings Historical Trend	
System Setting Unit IP Network UPS ■ FINS Network Setting ■ FINS Network Setting ■ CS18US	FINS Network Setting CS1BUS FINS Address Set the FINS address of the communication unit. Network Address:	^
	Unit Address: 23	
	Use the following address to communicate between the PLC CPU and the computer through the SPU Unit. CPU FINS Address: 4.2.0 Register the CS1 bus network in the computer routing table to communicate between the PLC CPU and the computer through the SPU Unit. Begister in Routing Table	
		~
Control Panel		
	📳 192.168.0.23 [Online] Idle	Data Storage Mode

*1,2,3...* 1. Select *FINS Network Setting - CS1BUS* on the Unit Settings Tab Page.

The following settings can be made.

Item	Meaning
FINS Address	The FINS address of the CS1 Bus Communications Unit.
	The unit address cannot be changed.
CPU Node Address	Set the FINS node address for the CPU Unit of the PLC, which will be treated as a node.

To communicate with the CPU Unit from the computer through the SYSMAC SPU Unit, the CS1 bus network must be registered in the routing tables in the computer.

Click the **Register in Routing Table** Button to register the CS1 bus in the routing tables on the computer.

Note

(1) If the **Register in Routing Table** Button is clicked, applications using FinsGateway on the computer can use the address set for the *FINS address* for the CPU unit to perform FINS message communications with the CPU Unit via the SYSMAC SPU Unit. (The operation of the application, however, cannot be assured by the SYSMAC SPU Unit.)

For example, with the CX-Programmer, set the network type to FinsGateway, set the FINS destination address in the network settings to the CPU Unit FINS address displayed on the SPU-Console, and set the frame length to 1900. This will enable using the CX-Programmer to operate the CPU Unit via the SYSMAC SPU Unit.

CX-Programmer's	Change F	PLC Dia	log Box
-----------------	----------	---------	---------

Change PLC	×
Device Name	
NewPLC1	
Device Type	
C\$1G/CJ1G 🗨	<u>S</u> ettings
Network Type	
FinsGateway 💌	S <u>e</u> ttings
Comment	
OK Cancel	Help

- (2) Warning on FINS Message Communications via SPU Units SYSMAC SPU Unit processing (data editing, recipe writing, changes to settings, etc.) is given priority over processing for FINS message communications. Therefore, SYSMAC SPU Unit processing performance will not be lowered by FINS message communications. When the SYSMAC SPU Unit is performing high-load processing such as the following, however, FINS message timeouts may occur.
  - Collecting data
  - Writing a recipe
  - · Changing settings

(3) CPU Unit Routing Tables

• It is not necessary to register the SYSMAC SPU Unit in the routing tables in the CPU Unit.

• Unit Version 2.1 or Earlier

If the network address for any Communications Unit other than the SYSMAC SPU Unit is the same as the CS1 bus network address of the SYSMAC SPU Unit (default: 4), change one of the network addresses so that all addresses are unique.

# 14-3 Enabling Changes in Unit Settings

This section describes the procedure used to enable changes in unit settings. Always perform this procedure when changing unit settings.

- Confirm that the destination SYSMAC SPU Unit is connected before starting a transfer.
  - Do not turn OFF the power supply to the PLC while an SYSMAC SPU Unit settings file is being transferred. If the power supply is turned OFF during a transfer, incorrect information may be transferred to the SYSMAC SPU Unit, possibly causing the SYSMAC SPU Unit to malfunction.
- *1,2,3...* 1. Confirm that the unit settings have been completed.
  - 2. Click the SPU Console's Unit Settings Tab.
  - Click the Transfer to Unit Button in the SPU-Console's Control Panel. The following dialog box will be displayed to confirm the file transfer or change to the settings.

Unit Set	Unit Setting		
2	Transfer the setting file to the SPU unit. Execute the command "Changing the Unit setting" to enable the changes, and restart the SPU Unit.		
	Do you want to do it?		
	Yes No		

4. Click the **Yes** Button to proceed with the file transfer or change to the settings. The command will then be executed.

A dialog box will be displayed to indicate that the data is being transferred and then the following dialog box will be displayed to confirm that the SYS-MAC SPU Unit's unit settings will be changed.

Unit Setting		
?	The setting has been completed. Do you want to restart the SPU unit?	
	Yes No	

- 5. To restart the SYSMAC SPU Unit, click the Yes Button.
- **Note** If the unit name or IP address are changed, select *File Disconnect* and disconnect from the SYSMAC SPU Unit. Then reconnect to the SYSMAC SPU Unit using the new unit name or IP address.

# SECTION 15 Data Storage Mode Commands

This section provides a list of the commands that are supported by the SYSMAC SPU Unit in Data Storage Mode.

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# 15-1 List of Data Storage Mode Commands

SYSMAC SPU Unit commands can be executed from SPU-Console, using SYSMAC SPU Unit switches, or from the CPU Unit memory. For details on command execution methods, refer to *SECTION 6 Executing Commands*. The SYSMAC SPU Unit commands that are supported depend on the operating mode.

The following table lists the commands that are supported when SPU-Console is in Data Storage Mode.

Command No.	Command	Meaning			
01	Start the Basic Collection	Starts basic collection.			
02	Stop the Basic Collection	Stops basic collection.			
03	Save the collection data	Saves the collection data files and settings file in zip format. (An archive folder is created on the Memory Card, and the files are saved in that folder.)			
04	Clear the collection data	Deletes all the collection files in the Journal Folder on the Memory Card, and creates a new collection folder.			
05	Display the IP address (LAN1)	Displays the IP address of LAN1 on the 7-segment display.			
06	Display the IP address (LAN2)	Displays the IP address of LAN2 on the 7-segment display.			
07	Display the unit name	Displays unit name on the 7-segment display.			
08	Display the FINS address	Displays the FINS address of the Ethernet Communications Unit on the 7-segment display.			
09	Display Memory Card used space (%)	Displays the percentage of Memory Card space that is being used.			
10	Error display	Displays any current error.			
11	Forced clear of error	Deletes the record of any current errors.			
12	Restart unit	Restarts the SYSMAC SPU Unit.			
20	Change the data collection set- tings	Changes the data collection settings.			
21 Save the settings to the Memory Card		Backs up the SYSMAC SPU Unit settings. This command must be exe- cuted beforehand to enable using command 22 (Read the settings from the Memory Card). For details, refer to <i>Appendix F Reproducing a SYS-</i> <i>MAC SPU Unit</i> .			
22	Read the settings from the Mem- ory Card	Restores the data collection settings that were backed up by command 21 (Save the settings to the Memory Card). For details, refer to <i>Appendix F Reproducing a SYSMAC SPU Unit</i> .			
24	Change the unit settings	Changes the unit settings.			
25	Undo the unit setting changes	Undoes changes to the unit settings.			
26	Change the scheduler setting	Changes the Scheduler settings.			
27	Change the recipe settings	Changes the recipe settings only (including FTP reception settings).			
28	Read the settings from the CPU Unit	Reads the settings that were saved using the CPU Unit's easy backup function. For details, refer to <i>Appendix F Reproducing a SYSMAC SPU Unit</i> .			
30	Start the serial terminal	Used for maintenance. Do not execute this command.			
31	Format the Memory Card (FAT32)	Formats the Memory Card in FAT32 format. All the files in the Memory Card are deleted.			
32	Clear the Logfile	Deletes the system log. Used for maintenance.			
33	Processing information record	Used for maintenance. Do not execute this command.			
34	Clear the error history	Clears the error history.			
35	Clear the data folder	Clears files in the data folder.			
36	Clear the recipe execution history	Clears the recipe execution history.			
50	Start all collections	Starts the basic collection and all collection patterns.			
51	Stop all collections	Stops the basic collection and all collection patterns.			

Command No.	Command	Meaning
60	CHANGE FTP SETTINGS	Changes the FTP receive settings for the expanded recipe function or the FTP send settings for data collection files.
61	CONFIRM FTP CONNECTION	Checks the connection between the SPU Unit and the FTP server.
62	END FTP TRANSFER	Ends sending or receiving data using FTP.
90 to 99	Execute the external command (90 to 99)	Used for maintenance.

**Note** Data may not be completely sent or received if the Ethernet cable is disconnected or the FTP server stops while data is being sent or received using FTP. If this occurs, execute command 62 to end sending or receiving data using FTP.

### 15-1-1 Confirming FTP Connections

The FTP CONFIRM FTP CONNECTION command (command 61) can be used for SPU Units. The CONFIRM FTP CONNECTION command verifies the operation of communications with the FTP server that is set for sending data and receiving recipes using FTP (including FTP reception settings).

The progress and results of checking operation will be displayed on the SPU Unit. If normal operation cannot be confirmed, an error code will be output so you can check the results with the SPU-Console. An FTP connection check log is saved as a file in the SPU Unit.

In addition to executing these commands from the SPU-Console, they can also be executed using the select switch on the SPU Unit and can be executed from instructions in the ladder programming of the CPU Unit.

No.	Check	Description	Remarks
0	Ping check	Checks reception at the IP address.	
1	FTP login	Checks the login on the FTP server.	
2	Move to folder	Moves to the specified folder on the FTP server or in the SPU Unit.	
3	Create folder	Creates a folder if it does not already exist.	
		FTP send: Creates a folder if there is not one when automatic file generation is performed for the FTP server.	
		Recipe receive: Creates a folder if there is not one in the SPU Unit.	
4	Get folder list	Gets the list of folders in the FTP server.	Executed only for rec- ipe receive settings.
5	Copy file	Copies a CSV file.	
		FTP send: Copies a dummy CSV file.	
		Recipe receive: Copies the actual CSV file as a dummy.	
6	Overwrite folder	Copies a dummy CSV file.	Executed only for FTP send settings.
7	Delete file Deletes a copied CSV file from the SPU Unit.		

#### FTP Connection Checks

The following items can be checked based on the FTP send settings and the recipe receive settings that are stored in the SPU Unit.

No.	Check	Description	Remarks
8	Delete folder	Deletes a dummy CSV file.	Executed only for reci- pes for which a recipe file name search is selected for the recipe key search method.
9	FTP logout	Logs out from the FTP server.	

The FTP send settings and recipe receive settings are checked in the following order.

- FTP send settings:  $0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 5 \rightarrow 6 \rightarrow 7 \rightarrow 9$
- Recipe receive settings:  $0 \rightarrow 3 \rightarrow 1 \rightarrow 2 \rightarrow 4 \rightarrow 5 \rightarrow 7 \rightarrow 8 \rightarrow 9$

#### Sequential Display

The connection will be checked in order of the functions from FTP Send (SD) to Recipe Receive (RV). With a sequential display, the function name is displayed on the SPU Unit and then the setting number and check item of each function are displayed with two digits. The function setting number is displayed with a single digit from 0 to 9. If a function ends normally, two digits will be displayed (00), and the next function will be checked. If normal operation cannot be confirmed, two digits will flash: the setting number (ID) and "E".

The following gives an example of the sequential display flow and displays.

Display	Description
SD	FTP send check started.
00	Function setting number (ID: 0) – Check item 0: Ping check
01	Function setting number (ID: 0) – Check item 1: FTP login
:	:
09	Function setting number (ID: 0) – Check item 9: FTP logout
10	Function setting number (ID: 1) – Check item 0: Ping checking
:	:
90	Function setting number (ID: 9) – Check item 0: Ping checking
:	:
99	Function setting number (ID: 9) – Check item 9: FTP logout
00	FTP send check normal end
RV	Recipe receive check start
00	Function setting number (ID: 9) – Check item 0: Ping checking
:	:
99	Function setting number (ID: 9) – Check item 9 FTP logout
1E	Function setting number (ID: 1) – Not possible to confirm nor- mal operation (flashing)
9E	Function setting number (ID: 9) – Not possible to confirm nor- mal operation (flashing)

Use the following procedure to find the setting number (ID).

#### ■ FTP Send

- *1,2,3...* 1. Select the memory event in the tree on the left side of the Event Settings Tab Page.
  - 2. "AutoFTPSend*n*\_[data collection pattern name]" will be displayed for the name in the memory event rule list.
  - 3. The number after "AutoFTPSend" is the setting number (ID).

#### Recipe Receive

*1,2,3...* 1. Select the recipe list on the Recipe Settings Tab Page.

**Syslog Display** 

- 2. Select the recipe from the list. "Expansion Settings (ID: x)" will be displayed.
- 3. The number displayed for the ID is the setting number.

Checking ExecutionThe results of execution are logged in the system log (syslog). The syslog is in<br/>a folder (var) shared on the network. Refer to Appendix C Structure of the<br/>Shared Network Folders for information on folders shared on the network.

You can check the execution results for each step for individual settings by using the syslog. The following tables show the display details and the basic format of the syslog.

SD0:	OK,	OK/OK,	-,	-,	OK,	OK,	OK,	-,	OK,	: 0.0% packet loss
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

Step Display item number		Description		
(1) Function name and setting num- ber		Function name (DS, RV) and setting number (0 to 9)		
(2)	FTP login result	Checks if it is possible to log on to the FTP server.		
(3)	Move to folder	Checks if it is possible to move to the SPU Unit's Mem- ory Card or FTP server folder after FTP logon (SPU folder/FTP server). (See note.)		
(4)	Create folder	Checks if it is possible to create a folder on the SPU Unit's Memory Card or FTP server after FTP logon.		
(5)	Get folder list	Checks if it is possible to get the list of files from the FTP server after FTP logon.		
(6)	Copy file	Checks if it is possible to send a CSV file to the SPU Unit's Memory Card or FTP server after FTP logon.		
(7)	Overwrite file	Checks if it is possible to overwrite and send to the dummy file on the FTP server after FTP logon.		
(8)	Delete file Checks if it is possible to delete a file from the Unit's Memory Card or FTP server after FTP to			
(9)	Delete folder	Checks if it is possible to delete a dummy folder from the SPU Unit's Memory Card after FTP logon.		
(10)	FTP logout	Checks if it is possible to log out of FTP after FTP logon.		
(11) PING check Checks the percentage check is executed.		Checks the percentage of packets lost when the ping check is executed.		

**Note** The results of execution will be NG if the file does not exist when an attempt is made to move to a file in step 3. The results of the entire process will be OK, however, if the results of creating a folder in step 4 is OK.

on will be NG if the f

#### Execution Result Examples

•
Date, time (task name) SD0:OK,OK/OK,-,-,OK,OK,OK,-,OK:0.0% packet loss
Date, time (task name) SD1:OK,OK/OK,-,-,OK,OK,OK,-,OK:0.0% packet loss
:
Date, time (task name) SD9:OK,OK/OK,-,-,OK,OK,OK,-,OK:0.0% packet loss
Date, time (task name) RV0:OK,OK/OK,OK,OK,OK,-,OK,-,OK:0.0% packet loss
Date, time (task name) RV1:OK,OK/OK,OK,OK,OK,-,OK,-,OK:0.0% packet loss
Date, time (task name) RV2:OK,OK/NG,OK,-,-,-,-,-:0.0% packet loss
Date, time (task name) RV2:Can't check normal status.
Date, time (task name) RV3:OK,OK/OK,OK,OK,NG,-,OK,-,OK:0.0% packet loss
Date, time (task name) RV3:Can't check normal status.

Date, time (task name) RV9:OK,OK/OK,OK,OK,OK,OK,OK,OK,OK:0.0% packet loss

#### SPU-Console Error Display

The most recent result (one only) will be displayed in the error data during connection with the SPU-Console.

	or Informa			
No.	Program	Code	Subcode	Description
<u>A</u> 59	FTP	22	19	Cannot check normal operation in recipe receive settings.

Note

- (1) Time may be required waiting for a timeout from the FTP server if multiple settings (ten maximum) are checked when the connection with the FTP server is unstable. First check a small number of settings.
  - (2) The recipe files that are actually set can be received using FTP from the FTP server using the recipe receive function. This will not be possible if the file does not exist on the FTP server.
  - (3) Dummy files (DUMMY.csv) will remain on the server if deleting files is prohibited in the FTP server settings.
  - (4) Actual operation may not be hindered even if an error is displayed when the connection is checked. Consult the FTP server administrator to determine if actual operation will be hindered, such as by prohibiting deletion of files sent using FTP.

# **Sampling Mode**

This part of the manual describes using the SPU-Console with the SYSMAC SPU Unit in Sampling Mode. Refer to 4-2 *Confirming the Operating Mode* to confirm that the SYSMAC SPU Unit is in Sampling Mode. Refer to 4-3 *Changing the Operating Mode* to change the SYSMAC SPU Unit to Sampling Mode.

# **SECTION 16** Sampling Mode

This section introduces the SYSMAC SPU Unit's Sampling Mode.

The following sections provide information on the SPU-Console operation methods when using the SYSMAC SPU Unit's Sampling Mode.

For information on the methods used to check whether the SYSMAC SPU Unit is operating in Sampling Mode, refer to 4-2 *Confirming the Operating Mode*. For information on changing the SYSMAC SPU Unit's operating mode to Sampling Mode, refer to 4-3 *Changing the Operating Mode*.

16-1Sampling Mode Introduction226

# 16-1 Sampling Mode Introduction

The Sampling Mode is used to sample part of the PLC's I/O memory at regular intervals and record the sampled data. The time intervals are nearly constant, so the data can be recorded at particular times and more reliable information can be reproduced from the collected data.

The Sampling Mode settings specify the data that will be sampled from the PLC's I/O memory and how the data will be sampled.

The data that will be sampled is specified in units called variables. The variables specify the PLC's I/O memory address and data type. The data is converted to the specified data type and recorded. The value can also be scaled during the data-type conversion.

The Sampling Mode's collection pattern is called the sampling pattern. There are four sampling patterns: the realtime sampling pattern and sampling patterns 1 to 3. Each sampling pattern has independent specifications for the sampling time interval, number of records, save filenames, and number of files.

Of these four sampling patterns, the realtime sampling pattern's time interval can be nearly constant. Also, the realtime sampling pattern provides high-speed sampling with intervals from a few ms to about 50 ms. (The speed depends on the number of bits being sampled.)

# SECTION 17 Monitoring SYSMAC SPU Unit Operating Status

This section describes how to monitor SYSMAC SPU Unit operating status and error status.

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# 17-1 Displaying System Information

The operating status of an SYSMAC SPU Unit can be monitored from the System Information display on the Unit Information Tab Page.

🔄 SPU-Console - 192.168.0.100	[Online]			_ 🗆 ×			
Eile View Command Help							
Unit Information Sampling Settings	Unit Settings Historical Trend	d Real-time Trend					
System Information Error Information	System Information	n					
	8.8.	Current Status:	Idle				
		UPS Signal:	OFF				
		Card:	Installed (Size: 30MB; Free	Space: 29MB)			
		Time:	7/12/2013 2:45:54 PM				
		LED Status:	RUN ERC	ERH			
		There are no curn <u>Display the error</u> Product Information Unit: System:	data screen	0			
		Base:	FGW/IONA-Engine 2013070	8 7.1.298			
		Vendor:	OMRON Corporation				
		Mode:	Sampling Mode				
Control Panel							
Real-time sampling	01: Start all 02: Stop all 03: Save th 04: Clear th	sampling sampling ne sample data ne sample data	× Exec				
		and the second s	192.168.0.100 [Online] Idle	Sampling Mode			

### **System Information Display Items**

Item	Content
Current Status	Operating status of the current SYSMAC SPU Unit
PF-IN Signal	Status of the power failure signal
Card	Whether a Memory card is inserted in the SYSMAC SPU Unit, Memory Card capacity, and available space
Time	The time in the SYSMAC SPU Unit
LED Status	The status of the RUN, ERC, and ERH indicators
Error List	Current errors
Product Information	The SYSMAC SPU Unit model number and system program version

### **Current Status**

The SYSMAC SPU Unit current status contains the following status.

Status	Meaning
Idle	SYSMAC SPU Unit is in idle status.
Sampling	Sampling is being performed.
Change the settings	Sampling or Unit settings are being changed.
Archive	Sampling data is being saved or sampling settings are being recovered.
Initialization	The SYSMAC SPU Unit is being initialized.

# 17-2 Displaying Error Information

The error status of an SYSMAC SPU Unit can be monitored from the Error Information Window on the Unit Information Tab Page.

Refer to Appendix A Troubleshooting with Error Codes for details on error codes.

### Displaying Current Errors

Select the **Show current errors** Option. The current errors in the SYSMAC SPU Unit will be displayed.

- To forcibly clear the current errors, click the Clear Errors Button.
- To save information on the current errors to a file, click the **Save to File** Button.

SPU-Console - SPU-Unit1 (10.6.139.202) [Online]									
Elle Yiew Command Help									
Unit Information Sampling Setting	gs Unit Se	ttings Histor	ical Trend	Real-time Trer	nd				
System Information	Error Information								
	No.	Program		Code	Subcode	Description			
	<u>A</u> 04	Sampling_R	ealtime	3D	OB	Data transfer fa	iled because file write is busy		
	<						>		
		w current erro w error history					<u>C</u> lear Errors Sav <u>e</u> to File		
• •									
Control Panel									
Real-time sampling	3	02 03 04	: Save the sam : Clear the sam	ling 1ple data 1ple data					
			SPU-	Unit1 (10.6.13	39.202) (Online	] Idle	Sampling Mode		

**Note** Error information is deleted in the following cases.

- (1) When the SYSMAC SPU Unit is restarted
- (2) When errors are eliminated
- (3) When sampling settings or unit settings are made
- (4) When command 11 (Forced Clear of Error) is executed
- (5) When the **Clear Errors** Button is clicked, from Error Information in the Unit Information Tab Page of the SPU-Console.

### Displaying Error History

Select the **Show error history** Option. The error history at the SYSMAC SPU Unit will be displayed.

ile <u>V</u> iew Command <u>H</u> elp Jnit Information Sampling Se	ettings   Unit Se	ettings Historical Trend	Beal-time Trend				
System Information	r	or Information					
P End monitorio	No.	Program	Date/Time	Code	Subcode	Description \land	
	A DA	Sampling Realtime	2007/05/23 18:21:48	3D	1C1000B	Data transfer fa	
	A 04	Sampling_Realtime	2007/05/23 18:21:46	3D	1C1000B	Data transfer fa	
	A 04	Sampling_Realtime	2007/05/23 18:21:45	3D	1C1000B	Data transfer fa	
	A DA	Sampling_Realtime	2007/05/23 18:21:43	3D	1C1000B	Data transfer fa	
	A DA	Sampling Realtime	2007/05/23 18:21:42	3D	1C1000B	Data transfer fa	
	A 04	Sampling Realtime	2007/05/23 18:21:40	3D	1C1000B	Data transfer fa	
	A 🔬	Sampling_Realtime	2007/05/23 18:21:38	3D	1C1000B	Data transfer fa	
		Sampling_Realtime	2007/05/23 18:21:37	3D	1C1000B	Data transfer fa	
	A0 (A)	Sampling_Realtime	2007/05/23 18:21:35 3	3D	1C1000B	B Data transfer fa	
	A 04	Sampling_Realtime	2007/05/17 18:41:24	3D	1C1000B	Data transfer fa	
	54	recipe	2007/05/17 17:39:47 2007/05/17 09:30:32	8E 36	44A	Recipe key ma	
	A 04	SpuManager			00	The Memory Ca	
	\Lambda 🕰	Sampling_Realtime	2007/05/16 21:15:34	3D	1C1000B	Data transfer fa	
	A (A	Sampling_Realtime	2007/05/16 21:15:33	3D	1C1000B	Data transfer fa	
						~	
	<			>			
	C Show current errors Clear Error						
		_					
	She	w error history	<u>R</u> efresh			Sav <u>e</u> to File	
•	•						
Control Panel						F	
		1				•	
Real-time sampling							
03: Save the sample data 04: Clear the sample data							
RT 1 2	_ 3 )			(B	ec)		

- To update to the most recent information, click the **Refresh** Button.
- To clear the error history, click the Clear Error Button.
- To save the error history information to a file, click the **Save to File** Button.
- **Note** The error history holds a maximum of 80 items. As this number is exceeded, the oldest item in the history is deleted. The error history is saved to the Memory Card. It is deleted in the following cases:
  - (1) When the **Clear Errors** Button is clicked.
  - (2) When the Memory Card is formatted.
  - (3) When the Memory Card is replaced.

# SECTION 18 Sampling Settings for Sampling Mode

This section explains how to make the sampling settings for Sampling Mode operation.

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# 18-1 Making the Sampling Settings

The following list shows the basic steps to follow from making the sampling settings to sampling data.

- *1,2,3...* 1. Set the variables and sampling patterns.
  - 2. Reflect the settings in the SYSMAC SPU Unit.
  - 3. Perform sampling.
  - 4. Display the sampling results folder.

# **18-2 Sampling Setting Windows and Operations**

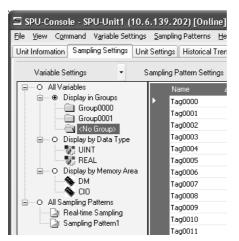
## 18-2-1 Window Structure

Click the SPU-Console's **Sampling Settings** Tab to display the Sampling Setting Window.

🔄 SPU-Console - SPU-Unit1 (10.6	i.139	. 202) [Online]					
Elle View Command Variable Settings Sampling Patterns Help							
Unit Information Sampling Settings Unit Settings Historical Trend Real-time Trend							
	amplin	g Pattern Settings	•				
O All Variables			Address	Data Type	Elements Scaling	Unit 🔺	
<ul> <li>Display in Groups</li> <li>Group0000</li> </ul>		Tag0000	D00000	UINT	1		
Group0001		Tag0001	D00001	REAL	1		
All Cho Group>		Tag0002	D00002	UINT	1		
O Display by Data Type		Tag0003	D00003	UINT	1		
- 💱 UINT		Tag0004	D00004	UINT	1		
REAL		Tag0005	D00005	UINT	1		
O Display by Memory Area		Tag0006	0006	UINT	1		
DM CIO		Tag0007	D00007	UINT	1		
O All Sampling Patterns		Tag0008	D00008	UINT	1		
Real-time Sampling		Tag0009	D00009	UINT	1		
Sampling Pattern1		Tag0010	D00010	UINT	1		
		Tag0011	D00011	UINT	1		
		Tag0012	D00012	UINT	1		
		Tag0013	D00013	UINT	1		
		Tag0014	D00014	UINT	1		
		Tag0015	D00015	UINT	1		
		Tag0016	D00016	UINT	1		
		Tag0017	D00017	UINT	1	<u>~</u>	
	<			1		>	
Control Panel							
Real-time sampling     DisSerical sampling     Click Send Settings to transfer       02: Stop all sampling     Sampling     Send Settings       03: Save the sample data     Send Settings     Send Settings       04: Clear the sample data     Send Settings     Send Settings       04: Clear the sample data     Send Settings     Send Settings       20 variable(s)     1 line(s)     Send Settings							
Classification Panel Variable Panel							

## 18-2-2 Operations in the Classification Panel

The following table explains the basic operations in the Classification Panel.



	Item	Operation method and function
All Variables		If this option is selected, all of the set variables will be displayed.
Display in Groups		When variables have been grouped, this option can be selected to organize and display the variables by group.
	Display by Data Types	If this option is selected, variables will be organized and displayed by data type, such as UINT and REAL.
	Display by Memory Area	If this option is selected, variables will be organized and displayed by the variables' data area addresses, such as DM.
All Sampling Patterns		If this option is selected, all of the sampling pattern infor- mation will be displayed.
Sampling patterns		If this option is selected, the variables to be sampled will be displayed.
		For example, if variable X is displayed under <i>Realtime Sampling</i> , variable X will be recorded in realtime sampling.

## 18-2-3 Basic Operations in the Variable Panel

This section describes the name and meaning of each part of the Variable Panel.

Row headers	

	Name	۵	Address	Data Type	E	ilement
Þ	Var_0000		D00000	UINT	$\backslash$	1
	Var_0001		D00001	UINT		1
	Var_0002		D00002	UINT		J
	Var_0003		D00003	UINT		1
Ì	Var_0004		D00004	UINT		1
	Var_0005		D00005	UINT		1

	Column	Meaning		
	Name	Shows the variable's name.		
	Address	Shows the variable's I/O memory address in the PLC.		
	Data Type	Shows the variable's data type. Data from the PLC's I/O memory is converted to this data type and recorded.		
	Element Scaling	Displays the number of elements in the data array. When the data type is STRING, the number of characters is shown. When the data type is CHANNEL_BLOCK, the number of consecutive areas is shown.		
	Scaling	Displays the conversion method when scaling is set.		
	Engineering	Specifies the industrial units as the user-set text string.		
	Sampling Pattern	Specifies the sampling pattern in which this variable is recorded.		
	Description	Shows a user-set description of the variable.		
	The following basic	operations can be performed in the Variable Panel.		
Changing the Name, Number of Elements, Units, or Description	Click the cell to be c	hanged and directly input the new text.		
Changing the Address	changed, click the Button, input the new address in the and click the <b>OK</b> Button. The new address can also be cell as a text input.			
Changing the Data Type	Select the cell to be changed and select the new data type from the disp drop-down list.			
Changing the Sampling Pattern		changed, click the Button to display the dialog box, and sampling patterns in which the selected variable will be		
Selecting Variables	Selecting a Single	<u>Variable</u> riable's row header cell.		
	Selecting Multiple Press and hold the variables.	<b>Ctrl</b> Key while clicking the row header cells of multiple		
	Selecting a Range of Consecutive Variables Click the first variable's row header cell. Press the Shift Key while ar the last variable's row header cell.			
	Selecting All Varia	bles		
	Press the Ctrl+A Ke			
<b>Note</b> When using Windows XP, the menu displayed when you right-c Variable Panel will include <i>Insert Unicode control character</i> , but this cannot be used.				
10.2 Cotting Varia	hlee			

The following table describes the column headers.

# **18-3 Setting Variables**

The data to be sampled is specified with units called variables. Before sampling, register each variable with the desired variable name, CPU Unit address, data type, and number of elements. Set the variables in the Variable Panel.

The variables can also be set with OMRON's CX-Programmer Support Software (version 2.0 or later) on the Variable Tab Page.

## 18-3-1 Adding Variables

The procedure for adding variables depends on the point clicked in the Classification Panel.

Directory tree under All Variables	The variable will be added, but it will not be registered in the sampling pattern. To register the variable in a sampling pattern, it is necessary to separately select <i>Register to the Sampling Pattern</i> .
Directory tree under	The added variable will be registered in the selected sam-
All Sampling Patterns	pling pattern.

### *1,2,3...* 1. Click the SPU Console's **Sampling Setting** Tab.

2. Select *Variable Setting - Add Variable* or right-click the Variable Panel and select *Add Variable* from the popup menu.

The Variable Properties Dialog Box will be displayed. For details, refer to *18-3-2 Operations in the Variable Properties Dialog Box*.

## 18-3-2 Operations in the Variable Properties Dialog Box

Use the Variable Properties Dialog Box to make variable settings such as the variable's address and data type. Enter the new settings in the dialog box and click the **OK** Button to change the variable's settings.

Variable Prope	erties 🗙
Name:	Тад0000
Group Name:	(None)
Description:	
Variable Data	Scaling
Address Memory Area	x DM V D00000
Word:	DM: 0 - 32767
Data Type:	UINT 🗸
	Unsigned integer: 0 - 65535
No. of Eleme	nts: 1 +
Unit:	V (Optional)
	OK Cancel

The following table describes the variable's settings.

Item	Function					
Name	Sets the variable's name.					
Group Name	Specifies the group in which the variable belongs.					
Description	Input a description of the variable. This entry can be omitted.					

The following table describes the settings on the Variable Information Tab Page.

Item	Function
Address	Specifies the variable's memory location.
	Specify the data area in the <i>Memory type</i> Field and specify the offset from the beginning of the data area in the <i>Channel</i> Field.
	If the variable represents a bit, specify the bit number (0 to 15) in the <i>Bit</i> Field. If the variable does not represent a bit, leave this field empty.
Data Type	Specifies the data type.
No. of Elements	Specifies the number of elements of data for a data array.
	A number of consecutive data elements with the same proper- ties can be handled as a single variable. When the data type is set to <i>STRING</i> , the <i>Number of elements</i> sets the length of the string. When the data type is set to CHANNEL_BLOCK, the data in the consecutive areas set in <i>Number of elements</i> is handled as a single data item with no commas.
Unit	Specify a text string that shows the variable's units. This entry can be omitted.

**Note** The following characters cannot be used in the variable's *Name* or *Groupname*: /, \, commas, spaces, quotation marks (' or "), carriage returns, or tab codes.

The following table describes the types of data.

Data type	Description					
BOOL	300L format: 0 to 1					
UINT	Unsigned integer: 0 to 65,535					
UDINT	Unsigned 2-word integer: 0 to 2 <sup>32–1</sup> (0 to 4,294,967,295)					
INT	Integer: -32,768 to 32,767					
DINT	2-word integer: -2 <sup>31</sup> to 2 <sup>31-1</sup> (-2,147,483,648 to 2,147,483,647)					
UINT_BCD	Insigned BCD: 0 to 9,999					
UDINT_BCD	Unsigned 2-word BCD: 0 to 99,999,999					
REAL	Real number: –10 <sup>–38</sup> to 10 <sup>+38</sup>					
LREAL	4-word real number: -10 <sup>-308</sup> to 10 <sup>+308</sup>					
CHANNEL	Channel: #0 to #FFFF					
WORD	16-bit text string: #0 to #FFFF					
DWORD	32-bit text string: #0 to #FFFFFFF					
CHANNEL_BLOCK	Channel block: Consecutive channels					
STRING	ASCII text string					

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *18-3-3 Setting the Scaling Function for a Variable*.

## 18-3-3 Setting the Scaling Function for a Variable

If a variable requires scaling, the scaling method can be specified on the Variable Properties Dialog Box's Scaling Tab Page. If a variable does not require scaling, it isn't necessary to specify scaling function.

Variable Prope	erties 🔀
Name:	Tag0000
Group Name:	(None)
Description:	
Variable Data	Scaling
Scaling Metho	d: LinerFunction 🗸
Linear Fund	ction Conversion
Scaling v	alue = a x Value + b
a =	1 b = 0
F	Post-conversion Data Type: double
	OK Cancel

The following table describes the Scaling methods on the Scaling Tab Page.

Scaling method	Function
Linear Function	The memory value is converted with a linear equation and the result is recorded as the <i>Data type after conversion</i> . Specify a floating-point data type (float or double) for the <i>Data type after conversion</i> .
	The result is calculated from the specified constants (a and b) as follows: Result = $a \times memory \ value + b$
Maximum/Minimum conversion	Memory values with a predetermined upper and lower limit are converted according to that upper and lower limit range and the result is recorded as the <i>Data type after conversion</i> . Specify a floating-point data type (float or double) for the <i>Data type after conversion</i> . Specify a floating-point data type (float or double) for the <i>Data type after conversion</i> .
Decimal position conversion	The memory value's decimal point can be moved from left to right to the specified position. The result is recorded as the <i>Data type after conversion</i> . Specify a floating-point data type (float or double) for the <i>Data type after conversion</i> .

# 18-3-4 Adding Multiple Variables Together

A number of consecutive variables with the same properties can be registered together.

- *1,2,3...* 1. Click the SPU Console's **Sampling Settings** Tab.
  - 2. Select *Variable Settings Add Consecutive Variables* or right-click the Variable Panel and select *Add Consecutive Variables*.

The Add Consecutive Variables Dialog Box will be displayed. For details, refer to *18-3-5 Operations in the Add Consecutive Variables Dialog Box*.

## 18-3-5 Operations in the Add Consecutive Variables Dialog Box

Use the Add Consecutive Variables Dialog Box to set a number of consecutive variables with the same properties. make variable settings such as the variable's address and data type. Enter the settings in the dialog box and click the **OK** Button to register the consecutive variables.

Add Consecutive Variables 🛛 🗙								
Name:	Tag Tag0000 - Tag0009							
Start Number:	0 * No. of Variables: 10 *							
Group Name:	(None)							
Description:								
Variable Data	Scaling							
Address								
Memory Area	Memory Area: DM D00000							
DM: 0 - 32767								
Word:	Word: 0 * Bit:							
Data Type:	UINT 🗸							
	Unsigned integer: 0 - 65535							
No. of Eleme	nts: 1÷							
Unit:	V (Optional)							
	OK Cancel							

The following table describes the array variable's settings.

Item	Function						
Name	Sets the variable's name. An index number will be attached after the variable name.						
Start Number	Specifies the starting number of the index number that appears after the variable name.						
No. of Variables	Specifies the number of variables being added.						
Group Name	Specifies the group in which the variable belongs.						
Description	Input a description of the variable. This entry can be omitted.						

The following table describes the settings on the Variable Data Tab Page.

Item	Function
Address	Specifies the variable's memory location.
	Specify the data area in the <i>Memory type</i> Field and specify the offset from the beginning of the data area in the <i>Channel</i> Field.
	If the variable represents a bit, specify the bit number (0 to 15) in the <i>Bit</i> Field. If the variable does not represent a bit, leave this field empty.
Data Type	Specifies the data type. For details, refer to 18-3-2 Operations in the Variable Properties Dialog Box.

Item	Function						
No. of Elements	Specifies the number of elements of data for a data array.						
	A number of consecutive data elements with the same proper- ties can be handled as a single variable. When the data type is set to <i>STRING</i> , the <i>Number of elements</i> sets the length of the string. When the data type is set to CHANNEL_BLOCK, the data in the consecutive areas set in <i>Number of elements</i> is handled as a single data item with no commas.						
Unit	Specify a text string that shows the variable's units. This entry can be omitted.						

Note The following characters cannot be used in the variable's *Name* or *Groupname*: /, \, commas, spaces, quotation marks (' or "), carriage returns, or tab codes.

The Scaling Tab Page can be used to set the scaling function for variables that require scaling. For details, refer to *18-3-3 Setting the Scaling Function for a Variable*.

## 18-3-6 Using the CX-Programmer's Variables

Variables set with the CX-Programmer can be used.

- 1,2,3... 1. Start the CX-Programmer and display the variable table.
  - 2. Select the variables to be used in the SPU-Console and select *Edit Copy*.
  - 3. Click the SPU-Console's **Sampling Settings** Tab and display the Variable Panel.
  - 4. Select *Variable Settings Paste from the Clip Board*. If the variable does not have a variable name, a variable name will be allocated automatically based on the variable's address and comment information.
- **Note** This function is supported by CX-Programmer version 2.0 and later versions. The following variables cannot be pasted.
  - Variables with data type LINT, ULINT, ULINT\_BCD, or NUMBER
  - · Variables with automatically allocated addresses
  - Function block variables

### **18-3-7** Importing and Exporting Variables

Variable definitions can be exported to CSV files. Variable settings can be edited in programs such as spreadsheets.

### Exporting to a CSV File

- *1,2,3...* 1. Click the SPU-Console's **Sampling Settings** Tab.
  - 2. Select *Export To CSV File* from the Variable Setting Menu.

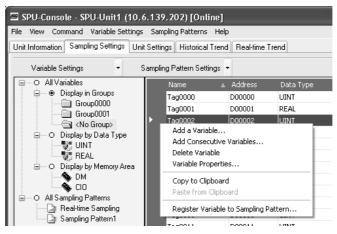
### Importing from a CSV File

- *1,2,3...* 1. Click the SPU-Console's **Sampling Settings** Tab.
  - 2. Select Import From CSV File from the Variable Setting Menu.

### 18-3-8 Changing Variables

*1,2,3...* 1. Click the SPU Console's **Sampling Settings** Tab and display the Variable Panel.

- 2. Select the variable to be changed by clicking that variable's row header cell.
- 3. Select *Variable Settings Variable Properties* or right-click the Variable Panel and select *Variable Properties* from the popup menu.



4. Enter the new settings in the Variable Properties Dialog Box and click the **OK** Button. For details on these operations, refer to *18-3-2 Operations in the Variable Properties Dialog Box*.

## 18-3-9 Deleting Variables

- *1,2,3...* 1. Click the SPU Console's **Sampling Settings** Tab to display the Classification Panel.
  - 2. Select All Variables.
  - 3. Select the variable to be changed by clicking that variable's row header cell in the list. To select more than one variable, select the first variable, press and hold the **Ctrl** or **Shift** Key, and click the row header cell of the other variables to be deleted.
  - 4. Select *Variable Settings Delete Variable* or right-click the Variable Panel and select *Delete Variable* from the popup menu.

## 18-3-10 Selecting a Sampling Pattern and Adding Variables

When the sampling pattern has been decided in advance, the sampling pattern can be selected and a variable can be added to that pattern. The added variable will be automatically sampled and recorded in the specified sampling pattern.

- *1,2,3...* 1. Click the SPU Console's **Sampling Settings** Tab and display the Classification Panel.
  - 2. Select one of the sampling patterns in the *All Sampling Patterns* directory tree (such as *Realtime Sampling*) by clicking that pattern.
  - 3. Select *Variable Settings Add Variable* or right-click the Variable Panel and select *Add Variable* from the popup menu.

The Variable Properties Dialog Box will be displayed. For details on the dialog box operations, refer to *18-3-2 Operations in the Variable Properties Dialog Box*.

## **18-3-11 Deleting Variables from a Sampling Pattern**

A registered variable can be deleted from a sampling pattern. The variable's settings are not deleted even though the variable is deleted from the sampling pattern. The deleted variable can still be found and reused in the Variable Panel's *All Variables* directory.

- *1,2,3...* 1. Click the SPU Console's **Sampling Settings** Tab and display the Classification Panel.
  - 2. Select one of the sampling patterns in the *All Sampling Patterns* directory tree (such as *Realtime Sampling*) by clicking that pattern.
  - 3. Select the variable to be deleted by clicking that variable's row header cell.
  - 4. Select *Variable Settings Delete Variable* or right-click the Variable Panel and select *Delete Variable* from the popup menu.

## 18-3-12 Registering an Existing Variable in a Sampling Pattern

A variable that was set previously can be specified and registered in a sampling pattern. A variable can also be registered in multiple sampling patterns, which allows the same variable to be sampled under different collection conditions.

- *1,2,3...* 1. Click the SPU Console's **Sampling Settings** Tab and display the Variable Panel corresponding to the Classification Panel's *All Variables* directory.
  - 2. Click the desired variable's cell in the *Sampling Pattern* column and click the ... Button.
  - 3. A popup window will be displayed. Select the sampling patterns in which the variable will be registered (by adding checks next to those patterns) and click the **OK** Button.

	Name 🛛 🛆	Address	Data Type	Address	Data Type	Element Sca	ling	Engineerin	Sampling
	Var_0000	D00000	UINT	1		R	ealtime Sampling		
Þ	Var_0001	D00001	UINT	1		R	ealtime Samplin 🛄		
	Var_0002	D00002	UINT	1			🗹 Realtime Sam	pling	
	Var_0003	D00003	UINT	1			Sampling 1		
	Var_0004	D00004	UINT	1			Sampling 2		
	Var_0005	D00005	UINT	1			Sampling 3		
	Var_0006	D00006	UINT	1					
	Var_0007	D00007	UINT	1					
	Var_0008	D00008	UINT	1					
	Var_0009	D00009	UINT	1					
	Var_0010	D00010	UINT	1					
	Var_0011	D00011	UINT	1					
	Var_0012	D00012	UINT	1					
	Var_0013	D00013	UINT	1			• 10		
	Var_0014	D00014	UINT	1		1			>
	Var_0015	D00015	UINT	1		1	New Collec	tion Pattern	
	Var_0016	D00016	UINT	1		2			
	Var_0017	D00017	UINT	1			OK	Cance	*
	Var_0018	D00018	UINT	1		R	ealtime Sampling		

Note There are two other ways to register the variables:

- Register the variables by selecting *Variable Settings Register to the Sampling Pattern*.
- Register the variables by dragging and dropping them.

## 18-3-13 Managing Variables in Groups

Variables can be organized and managed in groups.

### **Creating a Group** To create a group, select the Display in Groups Option in the Classification Panel and select Variable Settings - Add Group. The Group Property Dialog Box will be displayed. **Group Property** Name: Group0000 (None) Parent group: Description: OК Cancel Add the group's name in the Name Field. In the Parent Group Field, select the group to be the parent of the group level. (This does not need to be specified.) A description of the group can be entered in the *Description* Field. (This entry can be omitted.) Note The following characters cannot be used in the variable's Name or Groupname: /, \, commas, spaces, quotation marks (' or "), carriage returns, or tab codes. **Deleting a Group** To delete a group, select the group to be deleted in the Classification Panel and select Variable Settings - Delete Group. If a group is deleted, all of the settings under the group will be deleted. Changing the Group Name To change a group's name, select the group and select Variable Settings -Group Properties. Copying to a Group To copy a variable to another group, select the variable row header to be copied in the Variable Panel, press and hold the **Ctrl** Key, and drag and drop the variable in the destination group in the Classification Panel. Moving a Group To move a variable to another group, select the variable row header to be moved in the Variable Panel and drag and drop the variable in the destination group in the Classification Panel. 18-3-14 Changing the Order of Variables in a Sampling Pattern

Variable data is recorded in a file in the order in which the variables appear in the Variable Panel. The recording order can be changed by moving a variables to a different position in the list.

- 1. Click the SPU Console's **Sampling Settings** Tab and display the Classification Panel.
- 2. Select one of the sampling patterns in the *All Sampling Patterns* directory tree (such as *Realtime Sampling*) by clicking that pattern.
- 3. Select the variable to be moved by clicking that variable's row header cell in the list.
- 4. Drag the selected variable and drop it in the destination location.

# **18-4 Setting Sampling Patterns**

## 18-4-1 Adding a Sampling Pattern

1. To add a sampling pattern, click the SPU Console's Sampling Settings Tab and select Sampling Pattern Settings.

The Sampling Pattern Settings Dialog Box will be displayed.

🔄 SPU-Console - SPU-Unit1 (1	10.6.139.202) [Online]					
<u>File View Command Variable Sett</u>	ttings <u>S</u> ampling Patterns <u>H</u> elp					
Unit Information Sampling Settings	Unit Settings Historical Trend Real-time	Trend				
Variable Settings	Variable Settings   Sampling Pattern Settings					
O All Variables	Marria 🛛 🔺 Address	Da				
O Display in Groups	▶ Tag0000 D00000	٨IU				
Group0000	Tag0001 D00001	RE/				
No Group>	Tag0002 D00002	UIN				
O Display by Data Type	Tag0003 D00003	AIU				
l l l l l l l l l l l l l l l l l l l	T0004 D00004	1.175				

2. Click the New Button in the Sampling Pattern Settings Dialog Box.

Sampling Pattern Settings		×
Sampling Pattern Real-time Sampling Sampling Pattern1	Description:	Hime Sampling
	Specify the number Interval: [ No. of Records: [ No. of Files: [	r of records
	File Size: Data Folder: Total Size: No. of Variables: No. of Records: Interval: Collection Period:	703.1KB (1File:234.4KB) - 703.1KB 0 4000 1m24s (1File:28s)
New Copy Remove		Advanced

3. Input the settings such as the *Name* and *Description*.

The following table describes the settings.

Item	Function
Name	Input the name of the sampling pattern. Commas, carriage returns, and tab codes cannot be used in the name.
Description	Input a description of the sampling pattern. Commas, carriage returns, and tab codes cannot be used in the description.
Enable this Sampling Pattern.	If the pattern is disabled, sampling will not be performed.
Interval	Specify the sampling cycle.
No. of Record	Specify the number of records that will be stored in a single file. (Specify the <i>Record count</i> when <i>Specify by the number of records</i> is selected.)
Period	Specify a period of time in which records will be stored in a single file. (Specify the <i>Period</i> when <i>Specify by the collection period</i> is selected.)

Item	Function
No. of Files	Specify the number of files to be stored. When multiple files are being stored, the files are stored in a folder with the same name as the specified <i>File name</i> . The file names will be the specified <i>File name</i> with an attached index number.
Filename	Specify the name of the file in which the results will be stored.

The following information is displayed according to the settings of the sampling pattern settings.

Item	Function
File Size	Displays the required file capacity for sampling.
Data Folder	Not displayed. (There are no copy options for sampling pat- terns.)
Total Size	Displays the total size of the sampling data files and files cop- ied to the data folder.
No. of Variables	Displays the number of variables set for the sampling pattern.
No. of Records	Displays the number of records saved for one file.
Interval	Displays the time until the data is recorded in all of the files set in <i>File count</i> .
Collection Period	Displays the period required to save the specified number of collections.

# Specifying the Number of Records

When *Specify by the number of records* is selected, the number of records recorded in a single file is fixed at the specified number.

Sampling Pattern Settings		$\mathbf{x}$
Sampling Pattern Real-time Sampling Sampling Pattern1	Description: [ Enable this S Set the real-time	sampling details. High-speed and fixed interval
	sampling is poss Specify the nu Interval: No. of Record No. of Files:	mber of records
New Copy Remove	Filename: File Size: Data Folder: Total Size: No. of Variab No. of Recor Interval: Collection Pe	ds: 4000 1m24s (1File:28s)
New Copy Remove		OK Cancel Apply

Specifying the Collection Period

When *Specify the collection period* is selected, the number of records recorded in a single file is determined by the period and cycle settings. The number of records recorded in a single file is fixed.

Sampling Pattern Settings					X
Sampling Pattern Real-time Sampling	Name:	Real-time Sa	ampling		
Sampling Pattern1	Description:				
	🗹 Enable this :	Sampling Patt	ern.		
	Set the real-tin sampling is pos		details. High	-speed and fix	ked interval
	Specify the collection period				
	Interval:		7÷	millisecond(s	) 🗸
	Period:		28	second(s)	*
		No. of	Records:	4000	
	No. of Files:		3÷		
	Filename:	Samplin	g.csv		
	File Size:		03.1KB (1Fi	le:234.4KB)	
	Data Folder Total Size:		03.1KB		
	No. of Varia				
	No. of Reco	ords: 4	000		
	Interval:		m24s (1File:	28s)	
	Collection P	'eriod: ·			
New Copy Remove					Advanced
			OK	Cancel	Apply

# Unspecified Number of Records

When *No specification* is selected, data will be added to the file until data collection is stopped. With this method, all of the records from the start to the end of sampling can be recorded in a single file.

Sampling Pattern Settings	-	X	
Sampling Pattern Real-time Sampling Sampling Pattern1	Name: Description:	Real-time Sampling	
	🗹 Enable this S	Sampling Pattern.	
	Set the real-tim sampling is pos	ne sampling details. High-speed and fixed interval ssible.	
	No specification		
	Interval:	7 🕂 millisecond(s) 💌	
		added until collection is stopped. The file size the volume of data collected.	
	No. of Files:	3-	
	Filename:	Sampling.csv	
	File Size:		
	Data Folder:	c •	
	Total Size:		
	No. of Varia		
	No. of Reco	ords: -	
	Interval:	·	
	Collection P	Period: -	
New Copy Remove		Advanced	
		OK Cancel Apply	

- **Note** (a) When saving data without a specified number of records, the file size will continuously increase until data collection is stopped. Be sure that there is enough memory available in the Memory Card.
  - (b) When saving data in a single file and leaving the number of records unspecified, existing data in the file will be cleared when collection starts. We recommend saving data in multiple files when leaving the number of records unspecified.
- 4. After inputting the settings, click the **OK** or **Apply** Button.

5. Confirm that the sampling pattern has been added to the Classification Panel's *All Sampling Patterns* directory tree.

∃ile ⊻iew Command Variable Settin	ngs ≦ampling Patterns <u>H</u> elp					
Unit Information Sampling Settings L	Jnit Settings Historical Trend Rea	l-time Trend				
Variable Settings 🔹	Sampling Pattern Settings 🝷					
	Name	Interval	Period	Total Size	Data F	Filenan
All Sampling Patterns	Name Ena Real-time Sampling	Interval 7ms	Period 28s	Total Size 703.1KB	Data F	
All Sampling Patterns     All Sampling Patterns     Beal-time Sampling						Samplin
All Sampling Patterns	Ena Real-time Sampling	7ms	28s	703.1KB	•	Filenan Samplir Samplir Samplir

## 18-4-2 Deleting a Sampling Pattern

- 1,2,3...1. To delete a sampling pattern, click the SPU Console's Sampling Settings Tab and select Sampling Pattern Settings.
  - 2. Select the sampling pattern to be deleted in the pane on the left side of the Sampling Pattern Settings Dialog Box and click the **Remove** Button.

Sampling Pattern Settings			$\mathbf{X}$
Sampling Pattern Real-time Sampling Sampling Pattern1	Name: Samp Description:	ing Pattern1	
	🗹 Enable this Samplin	g Pattern.	
	Set the normal sampli	ng details.	
	Specify the number Interval: No. of Records:	of records	~
	No. of Files:	3 <u>+</u> ampling_1.csv	
	File Size:	632.8KB (1File:210.9KB)	
	Data Folder: Total Size:	632.8KB	
	No. of Variables:	0	
	No. of Records:	3600	
	Interval:	3h (1File:1h)	
	Collection Period:		
New Copy Remove	)		Advanced
		OK Cancel	Apply

### 18-4-3 Copying Sampling Patterns

1,2,3...1. To copy a sampling pattern, open the Sampling Settings Tab Page and select Sampling Pattern Settings.

2. In the pane on the left side of the Sampling Pattern Settings Dialog Box, select the sampling pattern to be copied and click the **Copy** Button.

Sampling Pattern Settings			$\mathbf{X}$
Sampling Pattern Real-time Sampling Sampling Pattern1	Name: Samplin Description: I Enable this Sampling Set the normal sampling		
	Specify the number of Interval:	1 - second(s) 3600	×
	Filename: Sar File Size: Data Folder: Total Size: No. of Variables: No. of Records: Interval: Collection Period:	mpling_1.csv 632.8KB (1File:210.9KB) - 632.8KB 0 3600 3h (1File:1h) -	
New Copy Bemove		OK Cancel	Advanced

# **18-5 Making Advanced Sampling Pattern Settings**

## 18-5-1 Advanced Sampling Pattern Settings

Advanced settings can be made for sampling patterns. In the advanced settings, it is possible to specify parameters, such as the number of data collections, to make and the conditions to be satisfied for data to be recorded. It is also possible to save files under different names.

The advanced settings are made in the Advanced Settings Dialog Box. The Advanced Settings Dialog Box is displayed by clicking the **Advanced** Button in the Sampling Pattern Settings Dialog Box.

Sampling Pattern Settings			X
Sampling Pattern Real-time Sampling Sampling Pattern1	Description:	Sampling Pattern1 Sampling Pattern. sampling details.	
	Specify the ni Interval: No. of Record No. of Files: Filename:	number of records	
	File Size: Data Folder: Total Size: No. of Variat No. of Reco Interval: Collection Pe	632.8KB bles: 0 ords: 3600 3h (1File:1h)	
New Copy Remove		Advanced	J

# 18-5-2 Setting Collection Options

The Collection Options Tab Page accessed in the Advance Settings Dialog Box contains settings for specifying the number of samples as well as whether or not sampling is to start automatically when the SYSMAC SPU Unit starts operating.

Advanced Settings
Collection Options File Options Record Conditions
Specify the collection options.
Start collecting at SPU startup
Number of Collections
No specification
◯ Specify 3600 - record(s)
Same as the number of records 3600 record(s)
OK Cancel

Starting Sampling on SYSMAC SPU Unit Startup When the *Start collecting at SPU startup* is selected, The sampling pattern will be started automatically when the SYSMAC SPU Unit starts operating.

Specifying the Number of Samples

Sampling can be stopped automatically when the specified number of samples have been recorded.

When No specification is selected, sampling will continue.

When *Specify* is selected, sampling will stop automatically when the specified number of samples have been recorded.

When *Same as the number of records* is selected, sampling will stop automatically when the number of recorded sample equals the number of sampling pattern records specified with the *Record count setting*.

## 18-5-3 Setting File Options

Settings related to collection results files are made on the **File Options** Tab Page accessed in the Advanced Settings Dialog Box.

Advanced Settings
Collection Options File Options Record Conditions
Specify the file options.
Record Size: V Auto
Prepare the area in advance
Selecting this option will create a file of the necessary size.
OK Cancel

### Setting Record Size

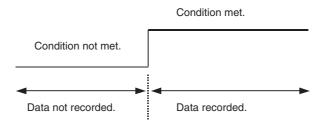
Normally *Auto* should be selected. When *Auto* is selected, record sizes are calculated automatically. To specify the record size, specify (in bytes) the size of one record in the file to be saved.

#### **Preparing File Space in Advance** When a setting is changed, a file is created on the Memory Card for storing sampling data. If *Prepare the area in advance* is selected, a file of the size required for recording the data is created. Because the required space is reserved before sampling begins, the file will not run out of available space while sampling is in progress.

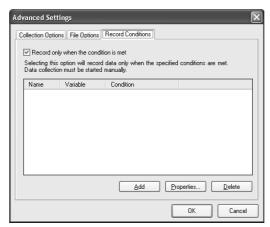
**Note** When the *Prepare the area in advance* option is ON, it takes time to create the files when settings are changed.

## 18-5-4 Sampling Condition Designation

A record condition can be set in advance so that data will be recorded only when the condition is met. Using record conditions enables sampling according to the application, recording data only while the bit is ON.



Record conditions are set on the Record Conditions Tab Page accessed in the Advanced Settings Dialog Box.



**Note** To use record conditions, sampling must be started in advance.

### **Adding Conditions**

- Select the Record only when the condition is met, data is recorded Option and then click the Add Button. The Add Recording Condition Wizard will be started.
  - 2. Input the sampling condition name and select the variable to use to set the condition. Input a text string for the condition name. Commas, carriage returns, and tab codes cannot be used in the condition name.
  - **Note** The variable used to set a condition must be registered in advance as a sampling variable.

Recording Condition	Wizard		$\left \right>$
Start Recordi	ng Condition	Wizard	
Enter a condition na	me and select a target v	ariable name.	
Condition name:	Condition1		
Target variable:	Variable Name	Address	^
	Var_00001           Var_0001           Var_0002           Var_0002           Var_0004           Var_0005           Var_0006           Var_0007           Var_0009           Var_0010           Var_0011           Var_0012           Var_0013	D00000 D00001 D00002 D00002 D00004 D00005 D00006 D00007 D00006 D00007 D00008 D00007 D00008 D000010 D00011 D00011 D00012 D00013 T	~
	< <u>B</u> a	ck <u>N</u> ext >	Cancel

3. Click the Next Button.

Recording Condition Wizard	×
Enter a Condition	
After entering a condition, press the Finish.	
Condition evaluation type: BITOR	
ON when at least one bit is the same as the argument 1.	
Argument 2:	
□ Record data when [T→T]. □ Record data when [F→T].	
Record data when [T->F].     False     Record data when [F->F].	
<u>Einish</u>	Cancel

4. Input the condition and then click the **Finish** Button.

For *Set the condition evaluation*, set the condition evaluation type and arguments for comparison with memory contents. The following table shows the condition evaluation types and arguments.

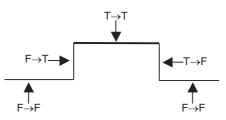
Condition evaluation type	Argument 1	Argument 2	Meaning
BITOR	Required		One of the same bits is ON as in argument 1.
BITAND	Required		All of the same bits are ON as in argument 1.
TRUE			Always true
NoneZero			Value ≠ 0
EQ	Required		Value = Argument 1
LT	Required		Value < Argument 1
LE	Required		Value ≤ Argument 1
GT	Required		Value > Argument 1
GE	Required		Value ≥ Argument 1
GELE	Required	Required	Argument 1 $\leq$ Value $\leq$ Argument 2
GTLT	Required	Required	Argument 1 < Value < Argument 2
GELT	Required	Required	Argument $1 \leq Value < Argument 2$
GTLE	Required	Required	Argument 1 < Value $\leq$ Argument 2
PrevBITOR			One of the same bits is ON as in previous value.
PrevBITAND			All of the same bits are ON as in previous value.
PrevEQ			Value = Previous value
PrevLT			Value < Previous value
PrevLE			Value ≤ Previous value
PrevGT			Value > Previous value
PrevGE			Value $\geq$ Previous value

---: Not required.

The pattern for which sampling data is to be recorded for the current evaluation in comparison to the previous evaluation is also set.

Item	Meaning
$True \to True$	Data is recorded when the evaluation remains true.
$True \to False$	Data is recorded when the evaluation changes from true to false.
$False \to True$	Data is recorded when the evaluation changes from false to true.
$False \to False$	Data is recorded when the evaluation remains false.

The following diagram illustrates these settings.



For example, the following settings are used to record data only when bit 4 is ON.

Recording Condition Wizard	$\mathbf{X}$
Enter a Condition	
After entering a condition, press the f	-inish.
Set the condition evaluation	
Condition evaluation type:	BITOR
ON when at least one bit is the	e same as the argument 1.
Argument 1:	8
Argument 2:	0
Fecord data when [T->T]	True
Record data when [F->T].	
Record data when [T->F].	
Record data when [F->F].	
	< <u>B</u> ack <u>F</u> inish Cancel

**Note** Evaluations are calculated based on the word contents of the address specified for the variable, not on the converted value for the data type of the variable.

Example: INT (Integer: (-32,768 to 32,767) and WORD (16-bit text string: #0 to #FFFF)

If the condition judgement is to be a non-negative INT integer (0 to 32,767), then the following settings are required: GELT for the condition judgement type, 0 for argument 1, and 33,768 (8000 hex) for argument 2.

Memory value	0x000	0x7FFF	0x8000	0xFFF
Data type				
WORD	0	32,767	32,768	65,535
INT	0	32,767	-32,768	-1

### **Deleting a Condition**

To delete a condition, select the condition and click the **Delete** Button.

Ad	vanced Sett	ings	×
	Record on Selecting this	ns File Options ly when the condit option will record n must be started	data only when the specified conditions are met.
	Name	Variable	Condition
	Condition1	Tag0000	BITOR.0.0,"TT.FT"
			Add Properties Delete
			OK Cancel

### **Changing a Condition**

To change a condition, select the condition and click the **Properties** Button.

Condition Reco	rding Property			X
Condition name:	Condition1			ОК
Target variable:	Variable Name           Var_0000           Var_0001           Var_0002           Var_0003           Var_0004           Var_0005           Var_0006	Address D00000 D00001 D00002 D00003 D00004 D00005 D00006		Cancel
Condition evalu ON when at lea Argument 1: Argument 2:	aation type: BITC ast one bit is the same		<b>∨</b> 1.	
Record data     Record data     Record data     Record data     Record data	when [F->T]. when [T->F].	→	- True - False	

## 18-6 Enabling the Sampling Settings

Use the following procedure to enable the sampling settings. Always perform this procedure after the sampling settings have been changed.

Note

- Confirm that the SYSMAC SPU Unit is connected before enabling the settings.
  - (2) When the changed settings are transferred, the existing SYSMAC SPU Unit settings will be overwritten. All of the sampling files in the Journal folder on the Memory Card will be deleted, and new files will be created with the new settings.
  - (3) Never turn OFF the Unit's power supply while the Unit's settings are being transferred. If the power supply is turned OFF during a transfer, incorrect information may be transferred to the SYSMAC SPU Unit, possibly causing the SYSMAC SPU Unit to malfunction.
  - (4) If too many variables are registered in the sampling pattern, the settings may not be transferred correctly. In this situation, reduce the number of variables and re-transfer the settings.
- *1,2,3...* 1. Confirm that variable settings and sampling pattern settings have been completed.
  - 2. Click the SPU Console's Sampling Settings Tab.
  - 3. Click the **Transfer to Unit** Button in the SPU-Console's *Control Panel*. The following dialog box will be displayed to confirm the settings file transfer and the change to the settings.



4. Click the **Yes** Button to change the settings file transfer and the change to the settings. A dialog box will be displayed to show the file transfer, and then the command will be executed to change the sampling settings.

The SYSMAC SPU Unit's 7-segment display will read "P1" through "PE" while the sampling settings are being changed. The display will return to "-S" when the change is completed. The new settings will be effective when the "-S" display appears.

# **18-7 Executing Sampling**

This section describes how to start and stop sampling from the SPU-Console.

## 18-7-1 Controlling Sampling

Sampling is started by clicking a Sampling Selection Button and then clicking the Sampling Start Button.

Sampling is stopped by clicking the Sampling Stop Button.

Control Panel	Sampling Start/Stop Buttons
Realtime sampling	
RT 1 2 3	

# 18-7-2 Controlling All Sampling

To start all sampling at the same time, select **01:** Start all samplings from the Command Selection Box and then click the **Exec** Button. To stop all sampling at the same time, select **02:** Stop all samplings and then click the **Exec** Button.

02: Step all sampling 03: Save the sample data 04: Clear the sample data Exec Command Selection Buttons	Command Selection Box		
		02: Step all sampling 03: Save the sample data 04: Clear the sample data	

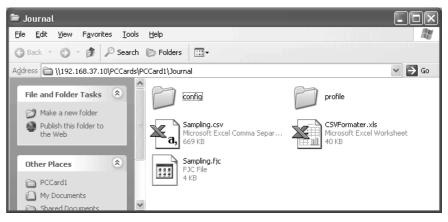
Alternately, select *Start All the Samplings* or *Stop All the Samplings* from the Command Menu.

- Note
- (1) To automatically start sampling as soon as the SYSMAC SPU Unit starts, select the Start collecting at SPU startup Check Box on the Collection Options Tab Page. (Refer to 18-5-2 Setting Collection Options.)
  - (2) As long as I/O memory can be read from the CPU Unit, sampling will be performed by the SYSMAC SPU Unit regardless of the status of the CPU Unit, even for fatal errors and load OFF status.

# 18-8 Displaying the Sampling Result Folder

The sampling files can be accessed from the computer by using a shared folder on a Windows network. Here, an example using Microsoft Office Excel is described. In this example, it is assumed that Excel is already installed and that CSV files are associated with it

 Select View - Display the Unit Folder - Journal Folder from the SPU-Console menus. Windows Explorer will be started and the Journal Folder containing the sampling results will be displayed.



2. Double-click the sampling file that is to be displayed. Excel will be started and the contents of the sampling file will be displayed. If the CSV file extension is associated with an application other than Excel, the associated application will be started.

× 14	licrosoft E	ixcel - Sam	pling	.CSV									
8	<u>Eile E</u> dit y	<u>v</u> iew <u>I</u> nsert	F <u>o</u> rm	at <u>T</u> ools	<u>D</u> ata <u>W</u> in	Window Help							
	🖻 🖬 🛛	a 🗞 💖	Ж	Þ 🛍	N •	ा न 🐁	😤 Σ 🔊	× Z↓ Z↓	10 9 2	100% -	2)		
Arial • 10 • <b>B Z</b> ]				<u>u</u> ≣	= = <b>=</b>	\$%	00. 0.+ 0.+ 00. g		- 🕭 -	<u>A</u> -			
11	A1	-	=	index									
	Α	В		С	D	E	F	G	Н				
1	index	clocktime	nand	)	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105	Tac		
2	1	57:16.3	3419	948862	0	0	0	0	0	0			
3	2				1	0	0	0	0	0			
4	3		_		2	0	0	0	0	0			
5	4				3	0	0	0	0	0			
6	5				4	0	0	0	0	0			
7	6				5	0	0	0	0	0			
8	7				6	0	0	0	0	0			
9	8				7	0	0	0	0	0			
10	9				8	0	0	0	0	0			
11	10			348494	9	0	0	0	0	0			
12	11			348454	10	0	0	0	0	0			
13	12				11	0	0	0	0	0			
14	13				12	0	0	0	0	0			
15	14			348334	13 14	0	0	0	-	0			
						0	0	0	0	0	<b>-</b>		
		mpling /				_	•						
Rea	dy					J			NUM				

Note

Collection result files are saved to the SYSMAC SPU Unit in the folder configuration shown below.

### When Multiple Files Are Set to Be Saved (When the File Count Is Greater than 1)

• Files are saved to folders of the same file names as those set for the sampling patterns.

• Files are saved under file names with serial numbers at the end of the text string that is set in the *File name* Field for the sampling pattern.

In the example below, the file count is 3 and "Sampling.csv" is set as the file name.

	Jour	nal				
	$\square$	Sam	npling			
		м,	Sampling	_0000.csv		

- Sampling \_0001.csv
- Sampling \_0002.csv

#### When a Single File Is Set to Be Saved (When the File Count Is 1)

• The file is saved in the Journal folder, under the file name set in the *File name* Field for the sampling pattern.

In the example below, the file count is 1 and "Sampling.csv" is set as the file name.

Journal
Sampling .csv

- **Note** Do not delete files from the Journal Folder. The SYSMAC SPU Unit will not operate correctly if these files are deleted.
- **Note** When displaying sampling files with Excel, the Excel macro CSVFormatter.xls is used to display items such as time in a more readable form.

This macro can be used for the following.

- (1) Organize the Excel display of the sampling file contents, e.g., make the time field easier to read.
- (2) Calculate the difference in time between records and display it in an Excel column (column heading: diff[ms]). This can be used to evaluate the difference in the sampling cycle that was set and the actual sampling behavior of the SYSMAC SPU Unit.
  - **Note** The *diff* value is calculated from the nano fields of two records, so the *diff* value will not be accurately shown if the record period for the records is greater than 1 s.
- (3) Large CSV files with more than 256 columns can be divided into sheets of 256 columns each for display (with Microsoft Office Excel 2003 or earlier).

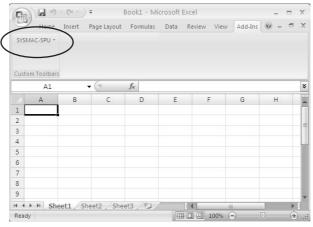
The CSVFormatter.xls macro is used as follows:

Double-click the CSVFormatter.xls file in the Journal folder (i.e., the shared folder in the SYSMAC SPU Unit). This will add a toolbar called SYSMAC-SPU to the Excel toolbars.

### Microsoft Office Excel 2003 or Earlier

∞м	icrosoft Ex	xcel - Samj	pling.csv								- DX
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	A	B	С	D	E	F	G	Н		J	K
1	index	clocktime	nano	SampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-0105	Tag-0106	Tag-0107 T
2	1	57:16.3	3.42E+08	. 0	0	0	0	0	0	0	
3	2	57:16.3	3.51E+08	1	0	0	0	0	0	0	0
4	3	57:16.4	3.57E+08	2	0	0	0	0	0	0	0
5	4	57:16.4	3.64E+08	3	0	0	0	0	0	0	0
6	5	57:16.4	3.71E+08	4	0	0	0	0	0	0	0
7	6	57:16.4	3.78E+08	5	0	0	0	0	0	0	0
8	7	57:16.4	3.85E+08	6	0	0	0	0	0	0	0
9	8	57:16.4	3.92E+08	7	0	0	0	0	0	0	0
10	9		3.99E+08	8	0	0	0	0	0	0	0
11	10		4.06E+08	9	0	0	0	0	0	0	- 300
12	11	57:16.4	4.13E+08	10	0	0	0	0	0	0	
13	12	57:16.4		11	0	0	0	0	0	0	
14	13		4.27E+08	12	0	0	0	0	0	0	
15	14		4.34E+08	13	0	0	0	0	0	0	
16	15		4.41E+08	14	0	0	0	0	0	0	
17	16	57:16.4	4.48E+08	15	0	0	0	0	0	0	0
44	▶ N\Sa	mpling /					•				•
Read	dy									NUM	

Note It may not be possible to execute this macro depending on the settings of Excel security. If the macro cannot be executed, select *Options - Macro Security - Security Level* from the Excel menus and set the security level to *Medium*.



Note Macros may not be enabled with the Microsoft Office Excel 2007 security settings. In that case, click the Office Button in Excel and then select Excel Options to display the Excel Options Dialog Box. From the Excel Options Dialog Box, click the Security Center Settings Button in the Security Center Window to display the Security Center Dialog Box. From the Macro Settings Window to display a warning and disable all macros. When a dialog box related to Microsoft Office Excel security is displayed after a macro is opened, click the Enable Macros Button.

### Microsoft Excel 2007

2. Click the SYSMAC-SPU Button on the toolbar and select Formatting.

After this procedure is performed, the time display will be organized and the *diff[ms]* column will be displayed as shown below.

Microsoft Excel - Sampling.csv										
📑 Eile Edit	view insert Format		a <u>w</u> indow ⊳≁റ≀		$\Sigma f_{\mathbf{x}} = \frac{1}{2}$		<b>@</b> 🚯 1	.00% - 2	9	
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A1 = index										
A	В		С	D	E	F	G	Н		J
1 index	clocktime	n	no	iff[ms]	ampleInd	Tag-0101	Tag-0102	Tag-0103	Tag-0104	Tag-010;
2	1 2004/07/30 10:57:	16.341 3	1948862	8.74995	0	0	0	0	0	
3	2 2004/07/30 10:57:	16.350 3	0698812	5.649962	1	0	0	0	0	
4	3 2004/07/30 10:57:	16.357 3	7348774	6.99996	2	0	0	0	0	
5	4 2004/07/30 10:57:	16.364 3	4348734	6.99996	3	0	0	0	0	
6	5 2004/07/30 10:57:		1348694	6.99996	4	0	0	0	0	
7	6 2004/07/30 10:57:	16.378 3	8348654	6.99996	5	0	0	0	0	
8	7 2004/07/30 10:57:	16.385 3	5348614	6.99996	6	0	0	0	0	
9	8 2004/07/30 10:57:	16.392 3	2348574	6.99996	7	0	0	0	0	
10	9 2004/07/30 10:57:		9348534	6.99996	8	0	0	0	0	
11	0 2004/07/30 10:57:			6.99996	9	0	0	0	0	
12	1 2004/07/30 10:57:	16.413 4	3348454	6.99996	10	0	0	0	0	
13	2 2004/07/30 10:57:	16.420 4	0348414	6.99996	11	0	0	0	0	
14 1	8 2004/07/30 10:57:			6.99996	12	0	0	0	0	
15 1	4 2004/07/30 10:57:			6.99996	13	0	0	0	0	
16	5 2004/07/30 10:57:		1348294	6.99996	14	0	-	0	0	
17	6 2004/07/30 10:57:	16.448 4	8348254	6.\$99996	15	0	0	0	0	
Ready	Ready / /							N	JM	
	/									
	/									
Organiz	ed column	Addi	tional co	lumn						

## 18-9 Saving Sampling Data

Sampling data collected by the SYSMAC SPU Unit can be saved in one file. The file will contain the sampling settings, all sampling files, and the SYSMAC SPU Unit operating status in a compressed format. This file can be used to save specific sampling results.

- Save the data to a file by executing command 03 (Save the Sampling Data).
- The file will be saved in the SYSMAC SPU Unit network-shared folder \pccards\PCCard1\Archive with a timestamp for a name and the file name extension tgz (example: 20040727150505.tgz).
- The file that is saved is in tar and gzip format.
- To obtain the saved files, a compression application, such as WinZip, is required to extract the files.
- Note When command 03 (Save the Sampling Data) is executed on the SYSMAC SPU Unit, a temporary file is created when creating the file to save. Saving the file may fail if there is not sufficient memory on the PC card. As a guide, available space will be required that is equivalent to the total size of all of the sampling files.

# SECTION 19 Unit Settings (Sampling Mode)

This section provides information on Unit settings for data collection.

 19-1
 Unit Settings
 260

# 19-1 Unit Settings

The unit settings in Sampling Mode are the same as for Data Storage Mode. For details on operation methods, refer to *SECTION 14 Unit Settings*.

# SECTION 20 Supported Commands

This section provides a list of the commands that can be executed for SYSMAC SPU Units.

 20-1
 Commands
 262

# 20-1 Commands

Commands can be executed from the SYSMAC SPU Unit, the SPU-Console, or the ladder program. For details on executing commands, refer to *SECTION 6 Executing Commands*.

The commands supported by the SYSMAC SPU Unit differ slightly in the SYSMAC SPU Unit's two operating modes. The following commands are supported.

Command	Command	Meaning
<b>No.</b> 01	Start all samplings	Starts all sampling that has been set.
01	Stop all samplings	Stops all sampling that has been set.
02	Save the sampling data	Saves the sampling files and settings file in zip format. (An archive folder
03		is created on the Memory Card, and the files are saved in that folder.)
04	Clear the sampling data	Deletes all of the sampling files inside the Journal folder on the Memory Card and creates a new sampling file.
05	Display the IP address (LAN1)	Displays the IP address of LAN1 on the 7-segment display.
06	Display the IP address (LAN2)	Displays the IP address of LAN2 on the 7-segment display.
07	Display the unit name	Displays unit name on the 7-segment display.
08	Display the FINS address	Displays the FINS address of the Ethernet Communications Unit on the 7-segment display.
09	Display Memory Card used space (%)	Displays the percentage of Memory Card space that is being used.
10	Error display	Displays any current error.
11	Forced clear of error	Deletes the record of any current errors.
12	Restart unit	Restarts the SYSMAC SPU Unit.
20	Change the sampling settings	Changes the sampling settings.
21	Save the settings to the Memory Card	Backs up the SYSMAC SPU Unit settings. This command must be exe- cuted beforehand to enable using command 22 (Read the settings from the Memory Card). For details, refer to <i>Appendix F Reproducing a SYS-</i> <i>MAC SPU Unit</i> .
22	Read the settings from the Mem- ory Card	Restores the data collection settings that were backed up by command 21 (Save the settings to the Memory Card). For details, refer to <i>Appendix F Reproducing a SYSMAC SPU Unit</i> .
24	Change the unit settings	Changes the unit settings.
28	Read the settings from the CPU Unit	Reads the settings that were saved using the CPU Unit's easy backup function. For details, refer to <i>Appendix F Reproducing a SYSMAC SPU Unit</i> .
30	Start the serial terminal	Used for maintenance. Do not execute this command.
31	Format the Memory Card (FAT32)	Formats the Memory Card in FAT32 format. All the files in the Memory Card are deleted.
32	Clear the Logfile	Deletes the system log. Used for maintenance.
33	Processing information record	Used for maintenance. Do not execute this command.
34	Clear the error history	Clears the error history.
50	Start realtime sampling	Starts realtime sampling.
51	Stop realtime sampling	Stops realtime sampling.
52	Start sampling 1	Starts sampling 1.
53	Stop sampling 1	Stops sampling 1.
54	Start sampling 2	Starts sampling 2.
55	Stop sampling 2	Stops sampling 2.
56	Start sampling 3	Starts sampling 3.
57	Stop sampling 3	Stops sampling 3.
ψ.		

# **Operation and Maintenance**

This part of the manual describes information required to operate the SYSMAC SPU Unit to collect data and to maintain the SYSMAC SPU Unit.

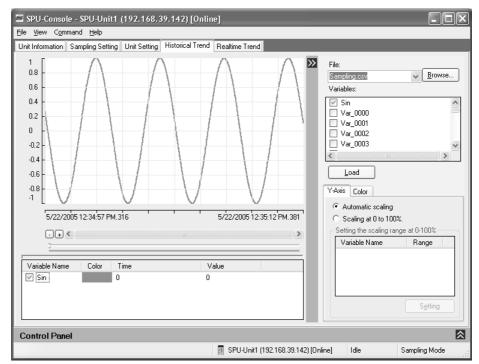
### **SECTION 21 Trend Graphs**

This section describes how to display trend graphs based on sampling files that have been collected.

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	21-1-1	Displaying Historical Trends	266
	21-1-2	Specifying the Y Axis Scale	266
21-2	Realtim	e Trends (Sampling Mode)	267
	21-2-1	Displaying Realtime Trends	267
	21-2-2	Stopping Realtime Trends	267

### 21-1 Historical Trends

An historical trend graph, such as the one shown below, can be displayed based on a file containing collected data.



#### 21-1-1 Displaying Historical Trends

*1,2,3...* 1. Click the **Historical Trend** Tab on the SPU-Console.

2. Select the sampling data to display in the *File* Field.

Click the **Browse** Button to browse through the file directories and specify the file containing the collected data.

- 3. Select the variables to display in the Variables Field.
- 4. Click the **Load** Button.

#### 21-1-2 Specifying the Y Axis Scale

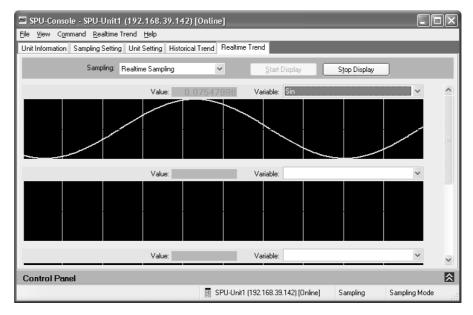
The scale of the Y axis can be specified on the Y-Axis Tab Page. If *Automatic scaling* is selected, the maximum and minimum values of the displayed variable will be used as the maximum and minimum values of the Y axis.

If *Scaling at 0 to 100%* is selected, the maximum and minimum values of the displayed variable will be converted to 0% and 100% on the display.

The maximum and minimum values of the variable to use for scale conversion can also be specified. After first loading the variable, select the variable under *Scaling at 0 to 100%* and click the **Setting** Button.

### 21-2 Realtime Trends (Sampling Mode)

The data currently being sampled can be displayed in realtime on a trend graph. Realtime trends can be used only in Sampling Mode. To use realtime trends, start the SYSMAC SPU Unit in Sampling Mode.



#### 21-2-1 Displaying Realtime Trends

- *1,2,3...* 1. Click the **Realtime Trend** Tab on the SPU-Console.
  - 2. Select the sampling pattern to display in the Sampling Field.
  - 3. Select the variable to display in the Variable Field.
  - 4. Click the Start Display Button.

#### 21-2-2 Stopping Realtime Trends

Click the **Stop Display** Button. The realtime trend display will stop.

Caution The realtime trend graph displays the status of sampling executed by the SYSMAC SPU Unit. Do not use the realtime trend display as a basis for control or judgments.

The SYSMAC SPU Unit transfers sampled data in realtime, sometimes at intervals of only a few milliseconds, and it may not be possible to display all sampling data depending on the operating environment of the SPU-Console.

## SECTION 22 Report Function

This section describes the report function, which can be used to create reports from data collected by SYSMAC SPU Units.

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### 22-1 Report Function

#### 22-1-1 Report Function Overview

This report function is used to display in Microsoft Office Excel a CSV file that was collected by the SPU Unit. This is different from simply opening the CSV file in Microsoft Excel. Variable data collected by the SPU Unit can be displayed in any specified cells.

The report function can be used to easily create reports, such as daily reports, from CSV files collected by the SPU Unit. Sample templates, such as daily manufacturing reports and error logs, are provided to make it easier to create various kinds of reports.

Display in Excel

Production Report

B / U = = = = = \$ %

#### **Records File**

53:03.8 7.57E+( 53:03.8 53:03.8 7.75E+0 53:03.8 7.9E+0 53:03.8 8.03E+0

53:03.8 8.17E+0

index	clocktime	nano	SampleInde	Tag0000	Tag0001	Tag0002	Tag0003
0	53:03.8	7.57E+08	1	39172	391.72	58133	1823
1	53:03.8	7.64E+08	2	39172	391.72	58133	1823
2	53:03.8	7.75E+08	3	39172	391.72	58133	1823
3	53:03.8	7.9E+08	4	39172	391.72	58133	1823
4	53:03.8	8.03E+08	5	39172	391.72	58133	1823
5	53:03.8	8.17E+08	6	39172	391.72	58133	1823
6	53/03/8	8 31 E+08	7	39172	391.72	58133	1873

SampleIndeTagUUUU TagUUU1 TagUUU2 TagUUU3	
08 1 39172 391.72 58133 1823	3 4 Date 5/30/2007
08 2 39172 391.72 58133 1823	4 Date 5/30/2007 =
08 3 39172 391.72 58133 1823	6 Machine Name
08 4 39172 391.72 58133 1823	7
08 5 39172 391.72 58133 1823	9
08 6 39172 391.72 58133 1823	10
	380 m
Specified variable data is	12 13 Tool Change Stop Time 45 m
-	15 Error Stop Time 10 m
displayed in specified cell.	16 Des dusting Quantity 00
	17 Production Quantity 90
	H + + H Report food Droducto
	Ready NUM
	Microsoft Excel - SPUInspection2
	[변화] Elle Edit Wew Insert Format Iools Data Window Help Type a question for help • _ 문 ×
	□
	SPU Reports - E 2 2 5
SampleIndeTag0000 Tag0001 Tag0002 Tag0003	A B C D E F G H L
08 1 391 2 391.72 58133 1823	1 2 Inspection Results
08 2 391 2 391.72 58133 1823	3
08 3 391 2 391.72 58133 1823	4 Date 5/30/2007
08 4 391 2 391.72 58133	6
08 5 391 2 391.72 58133 1823	7 8 Date/Time Produc ID Lot No. Result Data 1 Data 2 Data 3 Data 4
08 6 391 2 391.72 58133 1823	9 1 2007/1/20 18:22:23 1 1001 TVUE 100 200 300 2 2007/1/20 18:22:33 2 1002 FALSE 50 50 50
08 7 301 <b>30</b> 301 70 581 33 1803	11 a TRIAGO 18:22:3 3 1003 TRUE 100 200 300
Specified variable data is	12 4 2007/17/20 18:22: 4 1004 FALSE 50 50 50 13 5 2007/1/20 18:22: 5 1005 TRUE 100 200 300
•	14 6
displayed in specified cells	16 8
as history data.	19 11
	21 13
	22 14 23 15
	H ↔ H Sheet1 / K
	Ready NUM

The report function uses Excel. It cannot be used unless Excel is installed. Note

#### 22-1-2 Report Procedure

The following steps outline the basic procedure from making report function settings to creating a report.

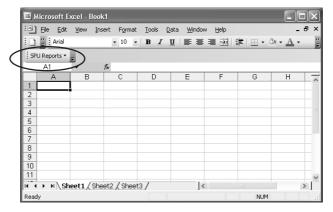
- 1,2,3... 1. Collect data with the SYSMAC SPU Unit and create a CSV file.
  - 2. Start the report function. Excel will start.
  - Create a report book.
  - 4. Set the cells to display data.
  - 5. Data in the CSV file will be read in and displayed in Excel.

### 22-2 Starting and Exiting the Report Function

#### 22-2-1 Starting the Report Function

Select Start - All Programs - OMRON - SPU-Console 2.2 - Create Report. Excel will start and the SPU Reports Menu will be added.

**Microsoft Office Excel** 2003



Note The report function uses Excel macros. Make sure that macros are enabled by setting the macro security level to medium or low. To change the security level, select Tools - Macro - Security from the Excel menus. Refer to Excel Help for details.

**Microsoft Office Excel** 2007

63	)				_	_			-
-	Home	Insert	Page Layout	Formulas	Data	Review View	v Add-Ins	@ - t	~
SPU	Reports *	$\mathcal{I}$							
		-							
Custo	m Toolbars								
	A1	25	• (0	$f_{\mathcal{K}}$					
	А	В	С	D	E	F	G	Н	
1									
2									
3									
4									
5									
6									
7									
8									
9									
	► ► She		eet2 / She	1	2	4		_	Þ

Note The report function uses Excel macros. Macros may not be enabled depending on the security settings of Microsoft Office Excel 2007. If they are not enabled, click the Office Button and select Excel Options to open the Excel Options Dialog Box. Click the Security Center Settings Button in the Security Center Window to open the Security Center Dialog Box. Select the Display warning and disable all macro Option in the Macro Settings Window.

> If the Microsoft Office Excel Security Warning Dialog Box is displayed when a macro file is opened, click the Enable Macro Button.

### 22-2-2 Exiting the Report Function

Select File - Exit from the Excel menus to exit Excel.

### 22-3 Creating Report Books

This section describes the procedure for creating report books. The report function creates a special Excel workbook called a Report Book. There must be a CSV file to display in the report book before you can create a report book.

#### 22-3-1 Creating a New Report Book

- 1,2,3... 1. Select SPU Reports New File.
  - 2. Select *Blank Report Book* from the New Report Book Dialog Box and click the **OK** Button.
  - 3. The new report book will be displayed in Excel.
  - **Note** Report books contain macros used to display data. Workbooks created using Excel cannot be used. Select *SPU Reports New* to create a new report book.

#### 22-3-2 Specifying CSV Files

- 1,2,3... 1. Select SPU Reports Specify CSV File.
  - Select a CSV file to display in the report book in the CSV File Dialog Box. CSV files can be selected from a Memory Card inserted in the SYSMAC SPU Unit or from a computer where the EDMS Data Management Middleware (WS02-EDMC1-V2) was used to import CSV files to the computer. The CSV file specified in the following window is an example of a CSV file stored on a Memory Card.

CSV File		×
CSV File:	201\Journal\DataWriter\DataWriter_0000.csv	
Folder:   Filename	N10.6.139.201 Journal DataWriter DataWriter_0000.csv	
	OK	Cancel

- 3. Click the **OK** Button to close the dialog box.
- **Note** Information of the CSV file specified here will be saved in the report book.

Data in the specified CSV file will be used to display the cell settings and cell data.

#### 22-3-3 Adding Cell Settings

- *1,2,3...* 1. Select a cell to display data.
  - Select SPU Report Cell Settings. The Cell Setting Dialog Box will be displayed.
  - 3. In the Cell Setting Dialog Box, specify the variable to be displayed.

4. Set all parameters and click the **OK** Button.

Cell Setting
Cell Position
Position: Sheet3!\$B\$2
Data Settings Select the data to display.
Variable: 1: Var_0001
No. of Data: 1
History Settings Set the history display details.
Enable
Specify the number of records 100
🔽 Display time 🔍 Left C Right
🔽 Display the variable name
OK Cancel

The following table describes the setting parameters.

Item	Description
Cell Position	Specifies the range of cells where data will be displayed.
Data Settings	Specifies the data that will be displayed in the cells.
	<i>Variable</i> shows a list of variable names that are in the header row of the CSV file. Select a variable to display in the variable cell.
History Settings	• Selecting Enable will display the history in the cells speci- fied in <i>Position</i> .
	<ul> <li>When the Specify the number of records Option is disabled, all records of the CSV file will be displayed as history data.</li> </ul>
	<ul> <li>Selecting the Display time Option will display the timestamp of the history data either to the Left or Right of the cells.</li> </ul>
	• Selecting the <i>Display the variable name</i> Option will display the variable name above the cells specified in <i>Position</i> .

#### Consecutive variables starting at the variable specified in Variable will be displayed.

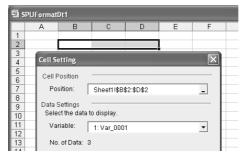
If multiple cells are specified in *Position*, a sequence of consecutive variables starting at the variable specified in *Variable* can be displayed at once.

As an example, select cells from B2 to D2 in *Position*. The corresponding cell setting and displays are shown in the figures below.

• The following figure shows the CSV file used in this example.

91	)ataWriter	_0000						
	A	В	С	D	E	F	G	Н
1	index	clocktime	nano	SampleInd	Var_0001	Var_0002	Var_0003	
2	0	39:41.6	6.1E+08	1	18533	27756	28448	
3	1	39:41.7	7.1E+08	2	18533	27756	28448	
4	2	39:41.8	8.1E+08	3	18533	27756	28448	
5	3	39:41.9	9.1E+08	4	18533	27756	28448	
6	4	39:42.0	10125000	5	18533	27756	28448	
7	5	39:42.1	1.1E+08	6	18533	27756	28448	
8	6	39:42.2	2.1E+08	7	18533	27756	28448	
9	7	39:42.3	3.1E+08	8	18533	27756	28448	
10	8	39:42.4	4.1E+08	9	18533	27756	28448	
11	9	39:42.5	5.1E+08	10	18533	27756	28448	

*1,2,3...* 1. Select cells from B2 to D2 in *Position*, and set *Var\_0001* as the variable.



2. Click the OK Button.

Variables Var\_0001, Var\_0002, Var\_0003 will be displayed in the cells B2 to D2.

템 5	PUFormatDt1				
	A	В	С	D	E
1		Var 0001	Var 0002	Var 0003	
2	2007/05/23 14:39:44.110	18533	27756	28448	
3	2007/05/23 14:39:44.210	18533	27756	28448	
4	2007/05/23 14:39:44.309	18533	27756	28448	
5	2007/05/23 14:39:44.409	18533	27756	28448	
6	2007/05/23 14:39:44.510	18533	27756	28448	
7	2007/05/23 14:39:44.609	18533	27756	28448	
8	2007/05/23 14:39:44.709	18533	27756	28448	
9	2007/05/23 14:39:44.809	18533	27756	28448	

#### 22-3-4 Changing the Cell Settings

1,2,3...1. Select SPU Reports - Change Cell Settings. The Cell Setting List Dialog Box will be displayed.

ell Setting List Select the cell setti	ng to change.		_	
Variable	Sheet	Position	No. of D	History
1: Var_0001	Sheet1	\$E\$2	1	False
1: Var_0001	Sheet1	\$B\$2:\$D\$2	3	True
2: Var_0002	Sheet1	\$E\$6	1	False
<				>
			ок	Cancel

2. Select the cell setting to change in the Cell Setting List Dialog Box and click the **OK** Button.

The Cell Settings Dialog Box will be displayed.

3. Change the settings and click the **OK** Button.

#### 22-3-5 Deleting Cell Settings

*1,2,3...* 1. Select *SPU Reports - Delete Cell Settings*.

The Cell Setting List Dialog Box will be displayed.

2. Select the cell setting to delete in the Cell Setting List Dialog Box. Click the **OK** Button.

#### 22-3-6 Saving Report Books

To save a report book, select *File - Save As* from the Excel menu.

**Note** A report book can be saved in the Workbook Folder of the SYSMAC SPU Unit. By saving it in the Workbook Folder, it can be accessed from other com-

puters. To save it to the Workbook Folder, set the path and name of the Workbook Folder.

Example: \\192.168.0.100\Workbook\

#### 22-3-7 Opening Report Books

To open a report book, select *File - Open* from the Excel menu.

- Note Report books contain macros. Macros must be enabled.
  - Microsoft Office Excel 2003 or Earlier Make sure that macros are enabled by setting the macro security level to medium or low. To change the security level, select *Tools - Macro - Security* from the Excel menus. Refer to Excel Help for details.
  - (2) Microsoft Office Excel 2007
    The macros may not be enabled depending on the security settings of Microsoft Office Excel 2007. If macros are not enabled, click the Office Button and select *Excel Options* to open the Excel Options Dialog Box. Click the Security Center Settings Button in the Security Center Window to open the Security Center Dialog Box. Select the *Display warning and disable all macro* Option in the Macro Settings Window. If the Microsoft Office Excel Security Warning Dialog Box is displayed when a macro file is opened, click the Enable Macro Button.

### 22-4 Displaying Data

#### 22-4-1 Updating Data

- 1,2,3...1. Select *File Open* from the Excel menus and open a report book. Alternatively, select a report book that is already open in Excel.
  - 2. Select *SPU Reports Update Data*. Data of the CSV file will be displayed in the cells.

#### Section 22-5

#### Normal Cell Settings

index		clocktime	nano	SampleInde	Tag0000	Tag0001	Tag0002	Tag0003
	0	53:03.8	7.57E+08	1	39172	391.72	58133	1823
	1	53:03.8	7.64E+08	2	39172	391.72	58133	1823
	2	53:03.8	7.75E+08	3	39172	391.72	58133	1823
	3	53:03.8	7.9E+08	4	39172	391.72	58133	1823
	4	53:03.8	8.03E+08	5	39172	391.72	58133	1823
	5	53:03.8	8.17E+08	6	39172	391.72	58133	1823
	ĥ	53:03.8	8 31 E+08	7	39172	391.72	58133	10/0

The latest record will be displayed in the specified cell.

#### **Displaying as a History**

index	clocktime	nano	SampleInde	Tag0000,	Tag0001	Tag0002	Tag0003
0	53:03.8	7.57E+08	1	3911	2 391.72	58133	1823
1	53:03.8	7.64E+08	2	3917	2 391.72	58133	1823
2	53:03.8	7.75E+08	3	3917	2 391.72	58133	1823
3	53:03.8	7.9E+08	4	3917	2 391.72	00100	1003
4	53:03.8	8.03E+08	5	3917	2 391.72	58133	1823
5	53:03.8	8.17E+08	6	3917	2 391.72	58133	1823
6	E2-02.0	8 31 E+08	7	3017	2 301 72	591 33	1823

Multiple records will be displayed in cells downward from the specified cell.

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A	В	С	D		E	F	G	Н	1
1									+
2	Produ	ction Report							4
3	Date	5/30/2007							+
5	Date	0/30/2007							t
6	Machine	Name							1
7									1
8									
9			•	-			-		
10				_	38	0	-		
12				~	30	0	$\mathbb{D}$		
12		Tool Chan	ao Ston T	ima	45		m		
14		1001 Chan	ge otop i	me	4.	,			
15		Error Stop	Time	- 1	10	)	m		
16		Enor Stop	mile	-	T.	,			
17		Production	Quantity	- 1	90	)			
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1										
2		Inspection Re	sults							
3										
4		Date	5/30	/2007						
5										
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7	_		-			-				-
8	-	Date/Time 2007/1/20 18		UCHID:	Lot No. 1001	Result	Data 1 100	Data 2 200	Data 3 300	Data 4
10	2	2007/1/20 18		2	1001	FALSE	50	200	50	
10	2	2007/1/20 18		3	1002	TRUE	100	200	300	
12		2007/1/20 18		4	1004		50	50	50	
13	5	4144		5	1005	TRUE	100	200	300	
14	6			-						
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16	8									
17	9									
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22	14									
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#### 22-4-2 Displaying Data from a Different CSV File

- 1,2,3... 1. Select *File Open* from the Excel menu and open a report book.
  - 2. Select SPU Reports Specify File and Update.
  - Select a different CSV file in the Open File Dialog Box. Data of the specified CSV file will be displayed in the cells.
  - **Note** When selecting a different CSV file, make sure that the collection pattern is the same as the previous CSV file. If it is different, the variable information may not match, causing incorrect information to be displayed.

#### 22-5 Templates

A template can be used as a prototype of a report book when creating new report books.

#### 22-5-1 Creating a Report Book from a Template

1,2,3... 1. Select SPU Reports - New File.

2. Select a template in the New Report Book Dialog Box. Click the **OK** Button.

ew Report Book	$\mathbf{>}$
Select the template to u	ise for the new report book.
Blank Report Book	
Machine Operation	
Production Report	
Inspection Results	
Error History	
Stop Factors	
	OK Cancel
	OK Cancel

- 3. A new report book will be created using the template as a prototype.
- 4. Change the layout if required.
- 5. Follow the procedures described in *22-3 Creating Report Books* to set the cells.

Template	Description
Blank Report Book	A blank report book.
Machine Operation	Template that displays a log of operating results.
Production Report	Template that displays daily information, such as operat- ing time and quantity of production.
Inspection Results	Template that displays a log of inspection results for each product.
Error History	Template that displays a log of system errors.
Stop Factors	Template that displays the system stop factors as a Pareto chart.

The following table describes the type of templates that are available.

#### 22-5-2 Adding a Customized Template

Report books that you created can be added as customized templates. Use the following procedure to add a report book as a template.

- *1,2,3...* 1. Create a report book to add as a template.
  - 2. Select File Save As from the Excel menu.
  - 3. Select File Type Template.
  - Specify the Save Location as the Workbook Folder where the SPU-Console was installed. InstallationFolder\Workbook

Example: C:\Program Files\OMRON\SPU-Console2.2\Workbook

5. Enter the file name for the template in *File Name* and click the **Save** Button. The template will be added as shown below.

New Report Book	×
Select the template to us	se for the new report book.
Machine Operation Production Report Inspection Results Error History Stop Factors	<u> </u>
User Template	MyReport.xlt 💌
	OK Cancel

Note The template will be saved in the Workbook Folder where the SPU-Console was installed. To delete the template, delete the saved file. Do not delete the following files. Doing so will prevent you from using the sample templates.

- SPUFormatDt.xlt
- SPUFormatter.xls
- SPUInspection.xlt
- SPUParetoChart.xlt
- SPUReport1.xlt
- SPUReport2.xlt
- SPUErrorLog.xlt

If any of these files are accidentally deleted, reinstall SPU-Console to restore them.

#### 22-6 Other Functions

This section describes other useful functions.

#### 22-6-1 Saving Files Using Excel

*SPU Reports - Save in Excel Format* can be selected to cancel the cell settings and macro in the report workbook, and save the file as an Excel workbook file.

The specified CSV file data will not be displayed like a normal report book. The data that is displayed in the report will be saved as a normal Excel workbook.

#### 22-6-2 Setting the Cell Outline and Color

The outline or color of a cell can be changed by selecting *SPU Reports - Cell Outline* or *SPU Reports - Cell Color*.

Cells can be easily identified by using outlines and colors.

#### 22-6-3 Changing the Sheet Name

The sheet name can be changed by selecting *SPU Reports - Change Sheet Name*.

**Note** Data will not be displayed properly if the sheet name is changed using normal Excel functions.

If the sheet name was changed using Excel functions, change it back to its original name, then select *SPU Reports - Change Sheet Name* to change the Sheet Name.

#### 22-6-4 Clearing the Data

Select SPU Reports - Clear All Data to clear all the data in the selected cells.

# Appendix A Troubleshooting with Error Codes

The SYSMAC SPU Unit provides program numbers, error codes, and error details for each program. There are two ways to check for current errors.

- 1. Displaying Error Information on the SPU-Console Display the Error Information Panel on the Unit Information Tab Page of the SPU-Console.
- Executing Command 10 (Error Display)
   Errors will be displayed on the 7-segment display in the order they occurred. The display will change as follows: Program number (2 digits) Æ \_\_\_ (underbar) Æ Error code (two digits).

The program numbers and error codes are displayed in hexadecimal.

The main error and corrections for them are listed in the following table.

Program number	Error code	Message	Assumed cause	Correction
02	2B	CS1 board initialization failure: IO table error.	The I/O tables were not created, or the I/O tables are not correct.	Create the I/O tables correctly.
02	44	Total cyclic size exceeds the range.	The total size of collected variable data exceeded the limit of 7,776 words.	Reduce the number of variables registered under <i>All Variables</i> .
04	36	Possible error in PC card.	The file system is not cor- rect because the power supply was turned OFF while data was being saved to files, e.g., during data collection.	Restart the SPU Unit. If the error occurs again, format the Memory Card. If the error occurs again even after formatting the Mem- ory Card, replace the Memory Card.
04	3E	Failed to get IP address.	This error occurs when the <i>Obtain the IP address</i> <i>automatically</i> Check Box is selected and an IP address cannot be obtained from the DHCP server.	Connect to a network with a DHCP server. Or, change the IP address setting.
04 09	88	A Memory Card is not mounted.	The error occurs when a Memory Card is not mounted.	Mount a Memory Card.
04	9B	There is insufficient space available on the Memory Card.	This error occurs when there is not sufficient sys- tem space available.	Restart the SPU Unit.
*	06	An error occurred in ini- tialization.	This error occurs when starting a process was	Restart the SPU Unit.
*	0B	Failed to register a pro- cess.	stopped because an error occurred in process ini- tialization.	
*	17	Failed to read the event memory.	An error may have occurred in accessing the CS1 bus.	Correct the error according to the error con- tent of the program FGW-CS1BUS displayed in the Error Information Panel of the SPU-
*	18	Failed to write the event memory.	Access was not possible to the CS1 bus.	Console.
*	20	Cannot execute the oper- ation within a sampling interval.	This error is recorded when sampling cannot be performed within the time set for realtime sampling. This is not a fatal error.	Increase the realtime sampling period. Reduce the load caused by other sampling (e.g., the sampling cycle or number of vari- ables).

Program number	Error code	Message	Assumed cause	Correction
*	36	Failed to initialize the recorder.	Access was not possible to the CS1 bus.	Correct the error according to the error con- tent of the program FGW-CS1BUS displayed in the Error Information Panel of the SPU- Console.
*	3D	Data transfer failed	The cycle is too fast or	Increase the cycle.
		because writing a file is	too much data is being	Reduce the number of variables.
		busy.	sampled, making it impossible to write the file.	Use a high-speed memory card.
*	44	No file found.	A file could not be found for execution.	Execute command 20 (Change the Sampling Settings, or Change the Data Collection Settings) again.
				Send the setting again and then execute com- mand 20 (Change the Sampling Settings, or Change the Data Collection Settings).
*	45	Failed to load document.	There is a problem in the settings file.	Send the setting again and then execute com- mand 20 (Change the Sampling Settings).
				Restore the sampling settings that were backed up.
				Executing the Initialization Wizard from the SPU-Console.
			The number of variables or the number of col- lected variables is too large.	Reduce the number of variables or the num- ber of collected variables.
*	59	Sampling setting file for- mat error.	There is a problem in the settings file.	Check to be sure that variables registered in the collection pattern are set correctly.
				Send the setting again and then execute com- mand 20 (Change the Sampling Settings).
				Restore the sampling settings that were backed up.
				Executing the Initialization Wizard from the SPU-Console.
*	5B	Failed to open a journal.	A file to save data could not be created.	Insert a Memory Card into the PC card slot and be sure the CARD indicator is lit.
				Make sure the Memory Card is formatted in the FAT32 format.
				Make sure the Memory Card has sufficient capacity.
*	5D	No free space in storage.	There is not sufficient space available in the Memory Card.	Make sure the Memory Card has sufficient capacity.
*	7E	Not enough free space for saving sampling data.	There is not sufficient space available in the Memory Card.	Make sure the Memory Card has sufficient capacity.
*	82	There are a lot of num- bers of channels of sam- pling settings.	There are too many vari- able words to be col- lected or too many memory areas.	Reduce the number of variables or variable elements.

#### Troubleshooting with Error Codes

#### Appendix A

Program number	Error code	Message	Assumed cause	Correction
*	8A	Copy processing to data folder failed.	This error occurs when a failure occurred in copy- ing data to the data folder. 1. Overwriting was attempted when the <i>Overwrite file in data folder</i> Check Box was not selected. 2. There is insufficient space on the Memory Card. 3. Copy processing required too much time.	<ol> <li>Change the setting of the Overwrite file in data folder Check Box. Delete files from the data folder.</li> <li>Replace the Memory Card with one with a larger capacity. Delete unnecessary files.</li> <li>Change the collection pattern settings, such as the collection cycle or number of records.</li> </ol>
*	97	A memory event was discarded.	This error occurs when more than one memory event occurs at an inter- val that is shorter than the collection process- ing. If more than one memory event occurs, only the last one is pro- cessed. The first one is discarded. 1. More than one memory event occurred at the same time. 2. The next memory event occurred while pro- cessing a previous mem- ory event.	<ol> <li>Change the application so that no more than one condition is met at the same time. Or, change the settings so that the same con- dition is used for the memory events.</li> <li>Increase the interval between memory events.</li> </ol>
54	8E	Recipe key manipulation failure.	<ol> <li>The wrong key may have been specified in the write request.</li> <li>The key registered with the recipe setting may be wrong.</li> </ol>	<ol> <li>Specify the correct key.</li> <li>Check and, if necessary, reset the recipe setting.</li> </ol>
	91	Recipe data format con- version failure.	Recipe data has been written that does not match the format of the set data.	Check and, if necessary, reset the recipe set- ting. Check the data file, and correct the data if necessary.
	92	Recipe data write failure.	The writing of recipe data was specified for a mem- ory area in which data cannot be written.	Check and, if necessary, reset the recipe set- ting.
	93	Recipe data read failure.	<ol> <li>The recipe file has not been transferred to the SPU Unit.</li> <li>The record for the rec- ipe data specified by key is not in the file.</li> </ol>	Check the recipe file, and transfer the correct recipe file to the SPU Unit.
	94	Recipe data CRC error.	The file check option is enabled. Also, the recipe data was changed after changing the recipe set- ting.	When the file check option is enabled, the rec- ipe setting must be reset after changing recipe data.
57	04	Failed to execute shell.	FTP transfer or expanded recipe processing may have failed.	Check if FTP send and expanded recipe are set correctly and that processing was completed normally.

Program number	Error code	Message	Assumed cause	Correction
58	01	A setting error occurred with the expanded recipe function.	There is an error in the settings.	Correct the settings.
58	02	An SPU folder error occurred with the expanded recipe func- tion.	The Memory Card may be removed or faulty.	Check the status of the Memory Card.
58	03	An attempt was made to execute more than one recipe at the same time.	The expanded recipe function and the previous recipe function (version 2.0) were turned ON at the same time.	More than one recipe cannot be executed at the same time. Stagger the times at which the recipes are executed.
58	04	No requested recipe data.	Recipe data that matches the recipe key was not found.	Check that the recipe file to be searched exists or that the recipe data that matches the key exists.
59	01	A setting error occurred with FTP receive.	There is an error in the settings.	Correct the settings.
59	02	An SPU folder error occurred with FTP send.	The Memory Card may be removed or faulty.	Check the status of the Memory Card.
59	03	An FTP send error occurred.	An error occurred in FTP sending. Causes of FTP Send Errors	Check if the Ethernet cable is disconnected, the FTP server is operating, it is possible to log on to the FTP server, and it is possible to access the FTP server.
			1. A connection to the FTP server could not be established. (Send time- out time = Approx. 75 s)	
			2. The IP address of the FTP server is not cor- rect. (For example, the network could not be reached.)	
			<ol> <li>The user ID or password was not correct.</li> <li>The send destination folder does not exist on the server.</li> </ol>	
59	04	No SPU send file	There are no files in the copy folder.	This is not an error.
59	11	A setting error occurred in receiving a recipe.	The settings are incor- rect.	Correct the settings.
59	12	An SPU folder error occurred with the recipe send function.	The Memory Card may be removed or faulty.	Check the status of the Memory Card.
59	13	An error occurred in receiving a recipe.	An error occurred in receiving a recipe.	Check if the Ethernet cable is disconnected, the FTP server is operating, it is possible to log on to the FTP server, and it is possible to access the FTP server.
59	21	Some items in FTP send settings could not be con- firmed as operating nor- mally when the FTP connection was checked.	An error occurred with an FTP connection check command.	Check the details in the system log (syslog). Refer to <i>15-1-1 Confirming FTP Connections</i> for information on how to check the log.
59	22	Some items in recipe receive settings could not be confirmed as operat- ing normally when the FTP connection was checked.	An error occurred with an FTP connection check command.	Check the details in the system log (syslog). Refer to <i>15-1-1 Confirming FTP Connections</i> for information on how to check the log.

\* There is more than one program number.

The following table gives the names of processes for the program numbers.

Program number	Process	Function
02	CS1BUS	CS1 Bus Unit
04	SpuManager	SPU Manager
09	UnitIom	(System management)
0A	Samping_Realtime	Realtime sampling
0C	Sampling_1	Sampling 1
0D	Sampling_2	Sampling 2
0E	Sampling_3	Sampling 3
13	DataWriter	Basic collection
14 to 53	DataWriter_1 to DataWriter_64	Collection patterns 1 to 64
54	recipe	Recipe
57	TrapAction	Event send/receive
58	ExpandedRecipe	Expanded recipe
59	FTP	FTP (FTP send, recipe receive, FTP con- nection check)

# Appendix B Troubleshooting Connections

The SPU-Console connects to the SYSMAC SPU Unit through FINS communications and through the Windows network-shared folder. This section describes troubleshooting when the SPU-Console cannot connect to the SYSMAC SPU Unit.

### General Network and Network-shared Folder Troubleshooting

If a warning dialog box saying "A network share folder cannot be connected" appears on the SPU-Console or if too much time is required for connection, there may be problems on the network or in the Windows network-shared folder.

Problem	Assumed cause	Correction
The SPU-Console warning dialog box say- ing "A network share folder cannot be con- nected" is displayed.	Login failed when user authori- zation was enabled.	Close all programs that open the shared folder and access the SYSMAC SPU Unit network-shared folder from the Explorer. Then start the SPU-Console again.
Access is possible with the IP address but not with the unit name.	The SYSMAC SPU Unit net- work functions have not finished starting.	Wait for a while and then try accessing the SYSMAC SPU Unit again.
	Login failed when user authori- zation was enabled.	Close all programs that open the shared folder and access the SYSMAC SPU Unit network-shared folder from the Explorer. Then start the SPU-Console again.
	Time is required to search for the unit name because a proxy	Turn OFF the Windows proxy server. OR, do not use a proxy to search for the SYSMAC SPU Unit.
	server is enabled.	The Windows proxy server setting can be changed under the following from Internet Explorer: <i>Tools - Internet Options - Connections Tab - LAN Settings.</i>
	The unit name being searched for consists of more than 15 characters.	A unit name of up to 64 characters can be set, but Windows Explorer searches are limited to 15 characters.
Time is required to connect.	Time is required to search for the unit name because a proxy	Turn OFF the Windows proxy server. OR, do not use a proxy to search for the SYSMAC SPU Unit.
	server is enabled.	The Windows proxy server setting can be changed under the following from Internet Explorer: <i>Tools - Internet Options - Connections Tab - LAN Settings.</i>
	Connection is not possible because the sampling load is too high.	Stop sampling and then connect the SPU-Console.

The main problems and corrections for them are listed in the following table.

#### **Troubleshooting Connections**

Problem	Assumed cause	Correction		
Connection is not possi-	The unit name is wrong.	Check the unit name.		
ble. The connection is not		The unit name can be checked by executing command 07 (Display the Unit Name).		
stable.	The IP address is wrong.	Check the IP address.		
		The IP address can be checked by executing command 05 (Display the IP address (LAN1)).		
	A firewall is running on the computer.	Set the firewall to enable using the IP address of the SYSMAC SPU Unit. Refer to user documentation provided with your software for details. Another correction method is to disable the firewall setting.		
	The same IP address is used by another node on the LAN.	Do not use the same IP address more than once on the same LAN.		
	There is a problem with the cable or hub.	Check the LAN indicator on the front of the SYSMAC SPU Unit to see if it is lit or flashing. (A problem exists if the LAN indicator is not lit.)		
	A cross cable is being used, but communications settings do not agree between the computer and SYSMAC SPU Unit.	Try changing the baud rate of the network card driver on the computer from 100M to 10M.		
	The log-on destination of the personal computer is a domain.	When the log-on destination is a domain, connect the per- sonal computer or SPU Unit to a network that includes a domain controller. When connecting with a network that does not include a domain controller, change the log-on destination from a domain to a computer.		

### **Troubleshooting FinsGateway**

If a message saying that communications with the SYSMAC SPU Unit are not possible is displayed in the SPU-Console's Guide Panel, there may be a problem with FINS communications. The SPU-Console can communicate with SYSMAC SPU Units using the FinsGateway ETN\_UNIT service.

The main pro	blems and corr	ections for them	hare listed in the	e following table.
The main pre				, ionowing table.

Problem	Assumed cause	Correction
Communications are not pos- sible with an SYSMAC SPU Unit on the same Ethernet network.	The ETN_UNIT FINS-IP address conversion method is set to use the IP address table.	Set FINS-IP Conversion in the ETN_UNIT Properties of the OMRON FinsGateway Settings Program to Auto- matic Generation (Dynamic).
Communications are not pos- sible with an SYSMAC SPU Unit through a router.	The ETN_UNIT FINS-IP address conversion method is set to use automatic generation.	Set FINS-IP Conversion in the ETN_UNIT Properties of the OMRON FinsGateway Settings Program to IP Address Table.
	The IP address is not registered in the IP address table.	Click the <b>Advanced</b> Button in the SPU-Console's Destination Setting Panel and select <i>Register for the Ethernet IP address table.</i> Refer to <i>5-2-4 Advanced SPU Unit Settings.</i>
Communications are not pos- sible with a SYSMAC SPU Unit from a computer with more than one network card.	The priority settings for the net- work cards are not correct.	Set the <i>Primary Network Card</i> in the <i>ETN_UNIT Proper-</i> <i>ties</i> of the <i>OMRON FinsGateway Settings</i> Program to the network card of the network to which the SYSMAC SPU Unit is connected.
Network services other than ETN_UNIT are being used.	The FINS network address of ETN_UNIT is set to 0.	Set the same network address as the one used by the SYSMAC SPU Unit in the ETN_UNIT Properties of the OMRON FinsGateway Settings Program.
The error message "FINS communication failure" is dis- played when trying to connect to a SYSMAC SPU Unit.	The ETN_UNIT network address is different from the SYSMAC SPU Unit network address.	The SYSMAC SPU Unit network address is factory set to 2. Set the same network address as the one used by the SYSMAC SPU Unit in the <i>ETN_UNIT Properties</i> of the <i>OMRON FinsGateway Settings</i> Program.
	A direct Ethernet connection is enabled and FINS communica- tions are being performed with	1. Use the Direct Ethernet Utility that is included with the CX-One FA Integrated Tool Package to disable the direct Ethernet connection.
	the IP address for direct connec- tion.	2. Set the FINS-IP address conversion method to use the IP address table in the <i>ETN_UNIT Properties</i> of the <i>OMRON FinsGateway Settings</i> Program, and register the IP address of the SPU Unit in the IP address table.
The SYSMAC SPU UnitThe computer's IP address isFINS-IP address conversionnot registered in the SYSMACmethod is not set to use auto-SPU Unit's IP address table, or itmatic generation.is registered incorrectly.		With the SYSMAC SPU Unit's Ethernet FINS network setting, correctly register the computer's IP address and the FinsGateway ETN_UNIT node address in the IP address table.
	The FINS address is incorrectly set in the destination setting.	Click the <b>Advanced</b> Button in the SPU-Console's Destination Setting Panel, and correctly register the SYS-MAC SPU Unit's FINS address.

Select *Start - All Program - FinsGateway - FinsGateway Setting.* Refer to the online help for the FinsGateway Setting program that is started for operating methods.

### **FinsGateway ETN\_UNIT Properties**

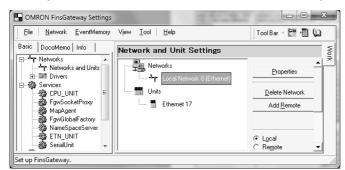
If FINS communications fail, as shown in the following dialog box, there may be a mistake in the FinsGateway *ETN\_UNIT Properties*. This section describes the FinsGateway *ETN\_UNIT Properties*.



#### **<u>1. FinsGateway ETN UNIT Properties Dialog Box</u></u>**

To display the FinsGateway ETN\_UNIT Properties, select **Programs - FinsGateway - FinsGateway Settings** from the Windows Start Menu.

Click the Properties Button on the Network and Unit Settings View.



#### 2. Network Settings Tab Page

This tab page is used to set the FINS network address and local node address of the FinsGateway ETN\_UNIT. Set the *Network Number* Box to 0 or to the same value as the network address of the SPU Unit (default: 2).

ETN	N_UNIT Properties
	UDP Nodes   TCP Nodes   Duplex Settings   Network status   About Network Settings   Communication Unit Settings
	Network Number: 0
	Local Node Address: 200
	Communication Unit No.: 17
	User-defined:
	OK Cancel Apply

#### 3. Communication Unit Settings Tab Page

This tab page is used to set the primary network card and the FINS-IP conversion method. If there is more than one network, such as for a notebook computer, select the network to which the SPU Unit is connected as the primary network card.

#### **Troubleshooting Connections**

#### **Appendix B**

Specify the conversion method to use between FINS node addresses and IP addresses in the FINS-IP Conversion Area. If the SPU Unit and computer are on the same network, select one of the Automatic Generation Options. If there is a router between the SPU Unit and computer, select the *IP Table + Automatic Generation* Option or the *IP Address Table* Option for the IP address conversion method. Then register the connection destination SPU Unit on the UDP Nodes Tab Page.

		plex Settings   Communicati	
UDP Port Number: 9600	Peer	JDP Port Numbe	r: 9600
Primary Network Card:			
IPAddress: 192.168.0.200	DH	ICP: FALSE	
[192.168.0.200] - Broadc	om NetLink	(TM) Gigabit Etł	nemet 💌
FINS-IP Conversion			
<ul> <li>Automatic Generation</li> </ul>	(Dynamic)		
C Automatic Generation		not support DHC	P client)
C IP Table + Automatic (	Generation		
C IP Address Table			
Generate node address f	rom IP	.ocal node addre	ss: 200
address Enable Custom-Auto Ger	eration	Custor	nize

#### 4. UDP Nodes Tab Page

If you select the *IP Table + Automatic Generation* Option or the *IP Address Table* Option for the IP address conversion method, register the FINS-IP address conversion table on this tab page. Register the FINS node numbers of the connection destination SPU Units and their IP addresses.

N_UNIT Proper	ties	24.84		X
About UDP Nodes	Network Set TCP Nodes			on Unit Settings Network status
<b>Network Numbe</b> User-defined:		letwork Type:		
Node IP a 100 192	ddress .168.0.100	Model ETN_UNIT/I	Veutrino	
				•
Add	Delete	III Proper	ties	► Explore

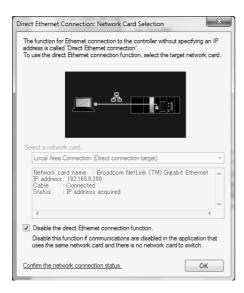
#### **Direct Ethernet Connection Settings**

Use the Direct Ethernet Utility that is included with the CX-One FA Integrated Tool Package to change direct Ethernet connection settings.

Select **Programs - OMRON - Communications Middleware Utilities - Direct Ethernet Utility** from the Windows Start Menu.

To disable a direct Ethernet connection, select the Disable the direct Ethernet connection function Check Box.

#### **Troubleshooting Connections**

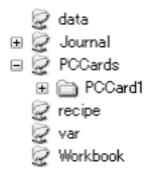


# Appendix C

### **Structure of the Shared Network Folders**

The files on a Memory Card inserted into the SYSMAC SPU Unit can be accessed from the computer using a shared Windows network folder.

The structure of the SYSMAC SPU Unit network folder is shown below.



Folder	Contents
Journal	Contains the recorded files.
data	Contains files copied using the copy option.
recipe	Contains recipe files.
Workbook	Contains Excel workbooks created using the report function.
PCCards/PCCard1/Archive	Contains files from command 3 (Save collection data).
PCCards/PCCard1/Journal	Contains recorded files.
	The same as the Journal folder described above.
var	Contains system log files.

### **Appendix D**

### Changing from SYSMAC SPU Unit Ver. 1.0/1.2/1.3

### Connecting to the SYSMAC SPU Unit Ver. 1.0/1.2/1.3

When connecting to the SYSMAC SPU Units with unit version 1.0, 1.2, or 1.3, the setting windows for SPU-Console version 1.0, 1.2, or 1.3 is displayed. For details on operating the SPU-Console version 1.0 setting windows, refer to *SYSMAC WS02-SPTC1 SPU-Console Operation Manual* (Cat. No. V230). For details on operating the SPU-Console version 1.2 or 1.3 setting windows, refer to *SYSMAC WS02-SPTC1 SPU-Console Ver. 1.3 Operation Manual* (Cat. No. V231).

- **Note** (1) It is not possible to connect to SYSMAC SPU Units with unit version 2.0 or later from SPU-Console versions 1.0, 1.2. or 1.3.
  - (2) SPU-Console version 2.0 can connect to SYSMAC SPU Units with unit versions of 2.0 or later.

### **Moving Setting Files**

Use the following procedure to use the settings from a SYSMAC SPU Unit with unit version 1.0, 1.2, or 1.3 with a SYSMAC SPU Unit with unit version 2.0.

- 1. Use the Project Explorer to connect to the SYSMAC SPU Unit with unit version 1.0, 1.2, or 1.3 in which the settings files are located.
- 2. Select *File Save to PC* and save the unit version 1.0, 1.2, or 1.3 settings files to the personal computer.
- 3. Use the Project Explorer to connect to the SYSMAC SPU Unit with unit version 2.0 to which the settings files are to be moved.
- 4. Select *File Load from PC* and load the settings files saved in step 2. If the following dialog box is displayed, click the **YES** Button.



- 5. Confirm the settings in the Sampling Settings (or Collection Settings Tab Page).
- 6. Click the Transfer to Unit Button to change the setting of the SYSMAC SPU Unit with unit version 2.0.
- Note (1) Do not recover settings that were backed up by executing command 21 (Save settings to Memory Card) by using command 22 (Read settings from Memory Card) from a different unit version of the SYSMAC SPU Unit. Otherwise, the SYSMAC SPU Unit will not operate normally.
  - (2) The settings of a SYSMAC SPU Unit with unit version 2.0 cannot be used with a SYSMAC SPU Unit with unit version 1.0, 1.2, or 1.3. Do not transfer settings from an SYSMAC SPU Unit with unit version 2.0 to a SYSMAC SPU Unit with unit version 1.0, 1.2, or 1.3.

### **Updating System Programs to Unit Version 2.0**

The system program in a SYSMAC SPU Unit with unit version 1.0, 1.2, or 1.3 system program can be updated to unit version 2.0. For details on the system program refresh procedure, refer to *Appendix E Updating the System Program*.

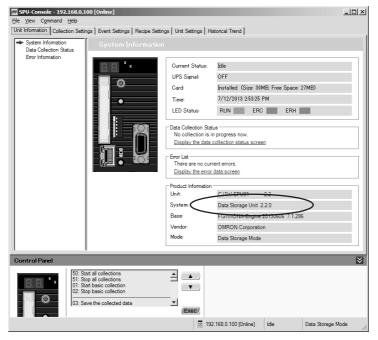
# Appendix E Updating the System Program

### **Updating the System Program**

The procedure for updating the SYSMAC SPU Unit system program is explained here.

A Memory Card is used to update the system program. Transfer the system data to be updated to the Memory Card, mount the Memory Card containing the update data in the SYSMAC SPU Unit and start the SYSMAC SPU Unit to execute updating.

- Note (1) All the settings will be initialized when the system program is updated. If required, execute *Save to PC* from the SPU-Console to back up the settings files.
   When the system program is updated, the system program of the SYSMAC SPU Unit will be the same version as the updated system program, regardless of the model or version of SYSMAC SPU Unit that was originally purchased. Be sure to consider this in managing the SYSMAC SPU Unit version.
  - (2) The system program version can be confirmed in the System Information Window from the **Unit Information** Tab Page of the SPU-Console.



- (3) To update the system program, the SYSMAC SPU Unit must be restarted. For details on restarting the SYSMAC SPU Unit only without turning OFF the power to the CPU Unit, refer to *3 -4 Restarting the SYSMAC SPU Unit* in the *SYSMAC SPU Units Operation Manual* (Cat. No. V236).
- (4) The CS1W-SPU01/02 and CS1W-SPU01/02-V2 use to the same hardware. Updating the system program of the CS1W-SPU01/02 to version 2.0 will give it the same functionality as the CS1W-SPU01/02-V2.

The CJ1W-SPU01 and CJ1W-SPU01-V2 also use to the same hardware. Updating the system program of the CJ1W-SPU01 to version 2.0 will give it the same functionality as the CJ1W-SPU01-V2.

### System Program Update Procedure

#### Step 1: Preparation

Prepare a Memory Card with at least 64 MB formatted in FAT32. Make sure that the Memory Card does not contain important files. The Memory Card can be formatted using SYSMAC SPU Unit command 31 (PC card format (FAT32)). System programs for updating are transferred via Ethernet. A network environment and personal computer that can be connected to the SYSMAC SPU Unit are required.

- 1. Mount the prepared Memory Card in the SYSMAC SPU Unit.
- 2. Turn ON DIP switch pins 4 and 6 only. Turn OFF all other DIP switch pins.
- 3. Restart the SYSMAC SPU Unit in Maintenance Mode. The SYSMAC SPU Unit's IP address will be 192.168.0.100. For details, refer to *3-3-2 Starting the SYSMAC SPU Unit in Maintenance Mode*.
- 4. Set the personal computer's IP address to 192.168.0.\*. For details, refer to *3-3-3 Setting the IP Address of the Computer*.

#### Step 2: Transferring System Data to the Memory Card

- 1. Select Start All Program OMRON SPU-Console 2.2 System Program Update.
- 2. Check that the preparation in Step 1 is completed, and click the Continue Button.
- 3. Click the **Execute** Button for SYSMAC SPU Version 2.2. The system program data will be transferred to the Memory Card.
- 4. Exit the program when the procedure is completed.
- **Note** (1) While system program data for updating is being transferred to the Memory Card, make sure that SYSMAC SPU Unit power is not turned OFF and that the LAN cable is not disconnected. Otherwise, transfer to the Memory Card will fail. In this situation, perform step 2 again.
  - (2) You can use the same procedure to return a SYSMAC SPU Unit with unit version 2.2 to a Unit with unit version 2.0 or 2.1. To do so, click the **Execute** Button for SYSMAC SPU Version 2.0 or SYSMAC SPU Version 2.1.

#### Step 3. Updating the System Program

- 1. Mount the Memory Card created in step 2 in the SYSMAC SPU Unit.
- 2. Turn ON the SYSMAC SPU Unit's DIP switch pins 1, 4, and 6 only. Turn OFF all other DIP switch pins.
- 3. Restart the SYSMAC SPU Unit. Updating the system program is started automatically after the Unit is restarted. The 7-segment display on the front panel will change as follows: When the update is finished, "F" is displayed on the 7-segment display. Approximately 2 minutes is required to update the system program.

(Startup) ... NM -> S -> 01 -> 02 -> ... -> 62 -> F

- 4. Turn OFF the power supply to the SYSMAC SPU Unit and return the DIP switch to the previous settings.
- 5. Remove the Memory Card used for the system program update.
- Note (1) When system program updating is finished, until "F" is displayed by the 7-segment display, be sure not to turn OFF the power to the SYSMAC SPU Unit. Otherwise, the SYSMAC SPU Unit will not operate normally.

"E" followed by a number will be displayed on the 7-segment display if updating the system program failed.

E0: DIP switch settings are incorrect. Make sure that DIP switch pins 1, 4, and 6 are ON and repeat the procedure from step 3.

E1: The capacity of the Memory Card used for the system update was not sufficient. Check the capacity of the Memory Card and repeat the procedure from step 1.

(2) Format to clear the contents of the Memory Card used to update the system program.

#### Step 4. Initializing the SYSMAC SPU Unit Settings

After updating the system program, the IP address settings are initialized. Be sure to initialize the settings of the SYSMAC SPU Unit before use. For details on initializing settings, refer to SECTION 3 Initial Settings of the SYSMAC SPU Unit.

# Appendix F Reproducing a SYSMAC SPU Unit

This section describes how to reproduce a SYSMAC SPU Unit, i.e., how to create a new SYSMAC SPU Unit with the same settings as an existing SYSMAC SPU Unit.

To reproduce a SYSMAC SPU Unit, use a Memory Card. The existing SYSMAC SPU Unit's settings can be saved to a Memory Card, and then the settings can be copied to a new SYSMAC SPU Unit. This enables copying the settings without using the SPU-Console.

#### Step 1: Preparing a Memory Card for Reproduction

Prepare a Memory Card of at least 32 MB formatted for FAT32. Check to confirm that there are no important files stored on the Memory Card.

- 1. Insert the Memory Card in the SYSMAC SPU Unit that is to be reproduced.
- 2. Turn ON DIP switch pins 4 and 6 on the SYSMAC SPU Unit and turn OFF all the other DIP switch pins.
- 3. Restart the SYSMAC SPU Unit. It will start in Maintenance Mode. Refer to *3-3-2 Starting the SYSMAC SPU Unit in Maintenance Mode*.
- 4. Select command 21 using the **SELECT** Switch on the front of the SYSMAC SPU Unit, and then press the **ENTER** Button.
- 5. The 7-segment display will display in order starting with "B1." When "BE" is displayed, the Memory Card is ready (i.e., the settings have been copied to it).
- 6. Turn OFF the power to the SYSMAC SPU Unit.
- 7. Remove the Memory Card.
- 8. Return the DIP switch pins to their original settings.

#### Step 2: Copying the Settings to a New SYSMAC SPU Unit

Copy the settings to a new SYSMAC SPU Unit using the Memory Card prepared in Step 1.

- 1. Insert the Memory Card prepared in Step 1 into the new SYSMAC SPU Unit.
- 2. Turn ON DIP switch pins 4 and 6 on the SYSMAC SPU Unit and turn OFF all the other DIP switch pins.
- 3. Restart the SYSMAC SPU Unit. It will start in Maintenance Mode. Refer to *3-3-2 Starting the SYSMAC SPU Unit in Maintenance Mode*.
- 4. Select command 22 using the **SELECT** Switch on the front of the SYSMAC SPU Unit, and then press the **ENTER** Button.
- 5. The 7-segment display will display in order starting with "R1." When "RE" is displayed, copying the settings to the new SYSMAC SPU Unit has been completed.
- 6. Turn OFF the power to the SYSMAC SPU Unit.
- 7. Remove the Memory Card.
- 8. Return the DIP switch pins to their original settings.
- **Note** (1) If the unit versions are difference, "NG" is displayed on the 7-segment display on the front of the SPU Unit and the data is not copied.
  - (2) If copying the data fails, "NG" is displayed on the 7-segment display on the front of the SPU Unit and the data is not copied. (The settings from before attempting the copy are retained.) Repeat the procedure from step 1 (preparing a Memory Card for copying).
  - (3) The recipe files are contained in the recipe folder of the Memory Card and cannot be backed up. To save a copy of the recipe files, use Windows Explorer or some other means to copy them to a personal computer.
  - (4) Do not change the settings while executing a simplified backup.

- (5) The simplified backup function of the CS/CJ Series can be used to save the SYSMAC SPU Unit settings together with the CPU Unit settings in a backup file on a Memory Card in the CPU Unit. This backup file can then be loaded to eliminate the need for resetting the SYSMAC SPU Unit. For details on the simplified backup function, refer to the *Operation Manual* of the CS/CJ-series CPU Unit.
- (6) Settings cannot be read from a simplified CPU Unit backup file if the special recognition retry function is turned ON. Because the special recognition retry function is constantly ON in the CJ-series CPU Units, the settings cannot be read using the simplified backup function. Execute command 28 (Read settings from CPU Unit) in the SYSMAC SPU Unit to load the settings saved in the Memory Card of the CPU Unit. For details on the special recognition retry function, refer to the SYSMAC SPU Units Operation Manual.

# Appendix G SYSMAC SPU Unit Time Compensation

At startup, the SYSMAC SPU Unit sets its clock with the time obtained from the CPU Unit. The SYSMAC SPU Unit then continues to monitor the CPU Unit time during operation, and uses the following compensation methods if a time discrepancy occurs between the SYSMAC SPU Unit and the CPU Unit.

- Discrepancies of 5 s or Less The time is adjusted in extremely fine time units to gradually adjust the SYSMAC SPU Unit time to the CPU Unit time. This allows the adjustment to be made without any sudden time changes.
- Discrepancies of More than 5 s The SYSMAC SPU Unit time is forcibly matched to the CPU Unit time. This immediately adjusts the SYS-MAC SPU Unit to match the CPU Unit whenever the CPU Unit time is changed.
- **Note** When the time is being compensated, the time interval recorded in the clocktime field will sometimes not match the sampling period. This occurs because the SYSMAC SPU Unit time is being adjusted, while the sampling continues according to the set sampling period. The following methods can be used to record data without being affected by the adjustment of the time compensation. Both methods are effective only in Sampling Mode.
  - Using Schedule Events

When collecting data with a relatively long sampling period, such as 1 minute, the *Collect Data (One Shot)* Command can be executed as a schedule event each minute to record time data without being affected by the adjustment of the time compensation. The shortest time unit for schedule events is 1 minute, however, and data cannot be collected in shorter periods, such as 1 s.

• Using Memory Events

The CPU Unit clock (A351 to A353) can be registered as a variable, and the *Collect Data (One Shot)* Command can be executed as a memory event at each change of A351 (minutes and seconds). Time data can also be recorded without being affected by the adjustment of the time compensation by collecting the A351 to A353 values and converting them to recorded time.

# Appendix H FTP Commands

Command	Function	Available	Usage example	Remarks
user	Logs in to the connected FTP server with the spec- ified user name.	Yes		
cd	Moves the directory on the server to a specified position.	Yes		
ls	Displays the files on the server.	Yes	ls -l	
lcd	Moves the directory on the client. Yes			
pwd	Displays the present directory position on the server.	No		
get	Obtains the specified file.	Yes	get server-file local-file	
put	Places the specified file.	Yes	put local-file server-file	
mget	Gets the specified file. Multiple files can be speci- fied by using spaces or wildcards.	Yes	mget *.csv	Used to obtain the CSV file from the specified folder with the recipe file method for receiving rec- ipes.
mput	Places the specified file. Multiple files can be spec- ified by using spaces or wildcards.	No		
binary	Sets the file transfer mode to binary.	Yes		
ascii	Sets the file transfer mode to ASCII.	No		
mkdir	Creates a directory on the server.	Yes		
rmdir	Deletes a directory on the server.	No		
delete	Deletes a file on the server.	Yes		
chmod	Changes the file rights on the server.	No		
quote	Sends arguments to the server. Executes server FTP commands.	Yes	quote NOOP	NOOP (no operation) is used to check operation with the server.
quit	Ends the connection.	No		

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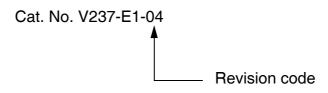
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#### **Revision History**

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



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

Revision code	Date	Revised content
01	June 2007	Original production
02	November 2008	Enhanced functionality (expanded recipe function and sending/receiving data using FTP)
03	August 2013	Enhanced functionality (record counters and file copy flags)
04	February 2018	Corrected mistakes.

### **Revision History**

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