MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

SECS/GEM Communication Software Reference Manual (For GEM300 Standards)

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully, and pay full attention to safety to handle the product correctly.

The precautions in this manual concern this product only. Regarding the safety precautions as a programmable controller system, refer to the user manual of the module to be used.

CONDITIONS OF USE FOR THE PRODUCT

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;

i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and

ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

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("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi Electric may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi Electric and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi Electric representative in your region.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

INTRODUCTION

Thank you for purchasing SECS/GEM communication software.
This manual describes the necessary system configuration, specifications, wiring, and troubleshooting to use SECS/GEM communication software.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of SECS/GEM communication software to handle the product correctly.
Note that the menu names and operating procedures may differ depending on an operating system in use and its version. When reading this manual, replace the names and procedures with the applicable ones as necessary.
Please make sure that the end users read this manual.

About this manual

This manual describes SECS/GEM communication software that has been installed on a C Controller module or C intelligent function module. Before using SECS/GEM communication software, carefully read the relevant manuals of the C Controller module or C intelligent function module to thoroughly understand the functions and performance of the module.
For details of the SEMI® standards, please check the SEMI standards.

Relevant product

RD55UP12-V-BZ15

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
SECS/GEM Communication Software Reference Manual (For GEM300 Standards) [SH-082616ENG] (this manual)	GEM300 standards supported by SECS/GEM communication software	e-Manual PDF
C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual [SH-082483ENG]	Specifications, procedure before operation, wiring, functions, and troubleshooting of a C Controller module pre-installed model	e-Manual PDF

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- Hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Buffer memory	Memory in an intelligent function module to store data such as setting values and monitor values. For CPU modules, it refers to memory to store data such as setting values and monitor values of the Ethernet function, or data used for data communication of the multiple CPU system function.
Global label	A label that is valid for all the program data when multiple program data are created in the project. There are two types of global label: a module specific label (module label), which is generated automatically by GX Works3, and an optional label, which can be created for any specified device.

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
SECS/GEM communication software pre-installed model module	Q12DCCPU-V-BZ11, Q12DCCPU-V-BZ13, Q12DCCPU-V-BZ15, RD55UP06-V-BZ11, RD55UP06-V-BZ13, RD55UP06-V-BZ15, RD55UP12-V-BZ11, RD55UP12-V-BZ13, RD55UP12-V-BZ15
SECS/GEM communication software	A generic product name for the following software pre-installed on SECS/GEM communication software pre-installed model modules: SW1PVC-Q12V-EBZ11, SW1PVC-Q12V-EBZ13, SW1PVC-Q12V-EBZ15, SW1PVC-RD55-EBZ11, SW1PVC-RD55-EBZ13, SW1PVC-RD55-EBZ15
Object	A generic term for GEM300-related objects managed by SECS/GEM communication software pre-installed models
Setting tool	A SECS/GEM communication software setting tool pre-installed on a personal computer

MEMO

1 OVERVIEW

SECS/GEM communication software is software that allows a C Controller module or C intelligent function module to communicate with manufacturing equipment using SECS without a gateway personal computer used for communication between the equipment and MES.

For details on SECS/GEM communication software, refer to the following:

C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual

This manual explains GEM300 standards that SECS/GEM communication software is compliant with.

Compliance with GEM300 standards

SECS/GEM communication software (for GEM300 standards) allows RD55UP12-V-BZ15, which is compliant with SEMI E30 (GEM), to communicate using SECS for semiconductor manufacturing equipment handling 300 mm wafers.

■ GEM300 standard support functions

SECS communication-related general functions, which are compliant with GEM300 standards, can be performed simply by SECS/GEM communication software settings and commands from a control CPU.

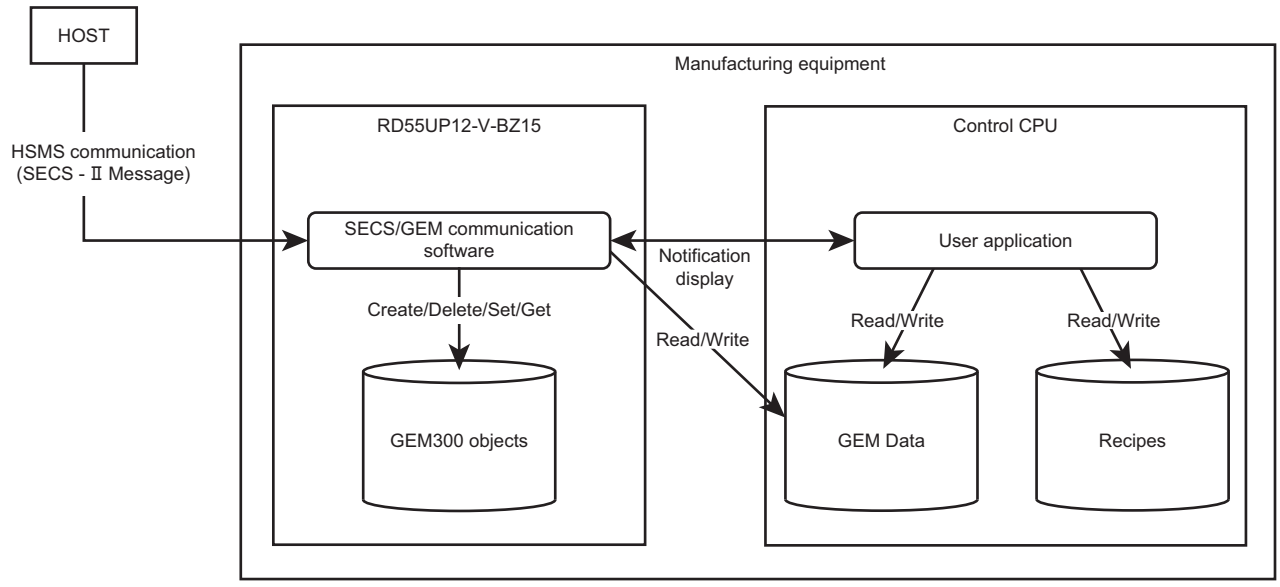
- Unnecessary to assign devices related for GEM300.*1
- Available to exchange data with a control CPU by offset specification.*2

*1 Assignment settings of devices related for SEMI E30 (GEM) are required.

*2 Data can be read and written for each structure label using an engineering tool. However, offset needs to be defined according to the label.

■ Management of GEM300 objects

GEM300 objects are managed by RD55UP12-V-BZ15. Therefore, GEM300 objects do not need to be managed by a user application.



Point

Recipes and data for SEMI E30 (GEM) are managed by devices of a control CPU.

MEMO

2 SPECIFICATIONS

This chapter explains specifications for GEM300 standard support functions.

Point

This manual does not explain the following specifications:

- SEMI standards compliance
- GEM300 standards compliance
- GEM300-related specifications

For details, refer to the following:

C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual

2.1 Data and Signal Exchange

GEM300 standard support functions use the buffer memory of RD55UP12-V and exchange data with a control CPU and external devices in an event message format.

The fixed buffer memory areas for 'CITL to CPU (when SECS/GEM communication software issues an event message)' and 'CPU to CITL (when a control CPU issues an event message)' are used to exchange data. (Each area is comprised of the following sections: status flag, header, and data.)

For details on the buffer memory, refer to the following:

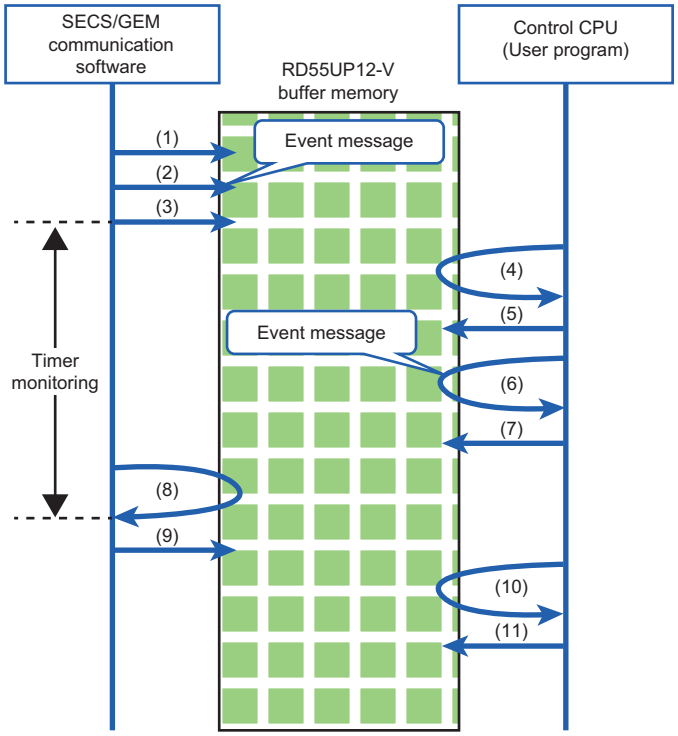
Page 82 Buffer Memory

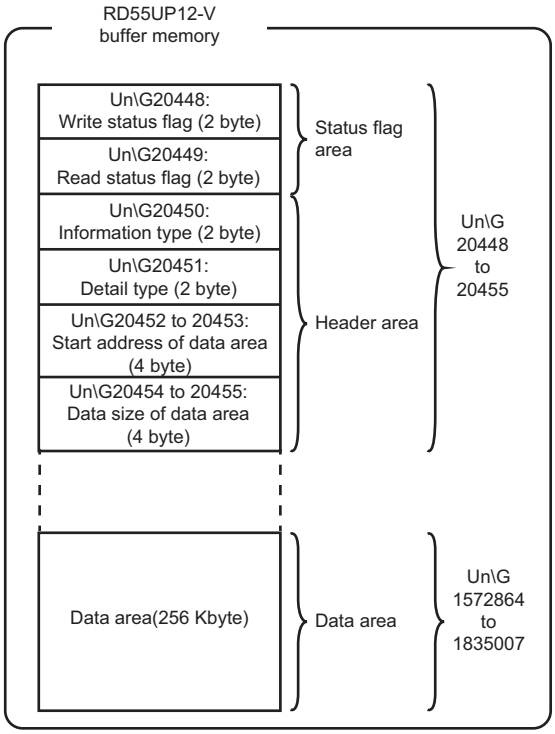
Configuration of buffer memory for data exchange

The following explains the configuration of buffer memory for data exchange and the operation flow when SECS/GEM communication software or a control CPU issues a message.

CITL to CPU (when SECS/GEM communication software issues an event message)

The following shows the operation flow for 'CITL to CPU.'





No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	SECS/GEM communication software turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20448). (OFF→ON control)*1	—
(2)	The software writes data of the header area in the event message according to ❶ to ❸, and also writes data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): Information type • ❷ 'Detail type' (Un\G20451): Detail type • ❸ 'Data size of data area' (Un\G20454 to 20455): Data size of data area • ❹ Data of the data area starting from 'Data reading area' (Un\G1572864)	—
(3)	The software turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20448). (OFF→ON control)*1	—
(4)	—	A control CPU detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20448) is turned ON.
(5)	—	The CPU turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20449). (OFF→ON control)*2
(6)	—	The CPU reads data of the header area in the event message according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): Information type • ❷ 'Detail type' (Un\G20451): Detail type • ❸ 'Data size of data area' (Un\G20454 to 20455): Data size of data area • ❹ Data of the data area starting from 'Data reading area' (Un\G1572864) For details on exchanged data identifiers of 'CITL to CPU,' refer to the following: ☞ Page 14 CITL to CPU (10000), Page 15 CITL to CPU (10087)
(7)	—	The CPU turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20449) after acquiring event data. (OFF→ON control)*2

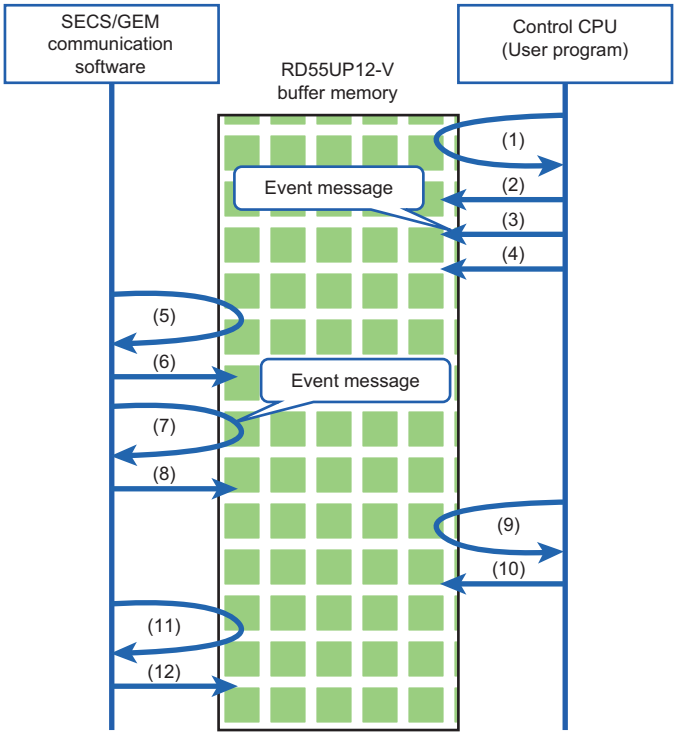
No.	SECS/GEM communication software	Control CPU (controlled by user program)
(8)	The software detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20449) is turned ON.	—
(9)	The software clears 'Write status flag' (Un\G20448). (3→0 control)	—
(10)	—	The CPU detects that 'Write status flag' (Un\G20448) is cleared.
(11)	—	The CPU clears 'Read status flag' (Un\G20449). (3→0 control)*2

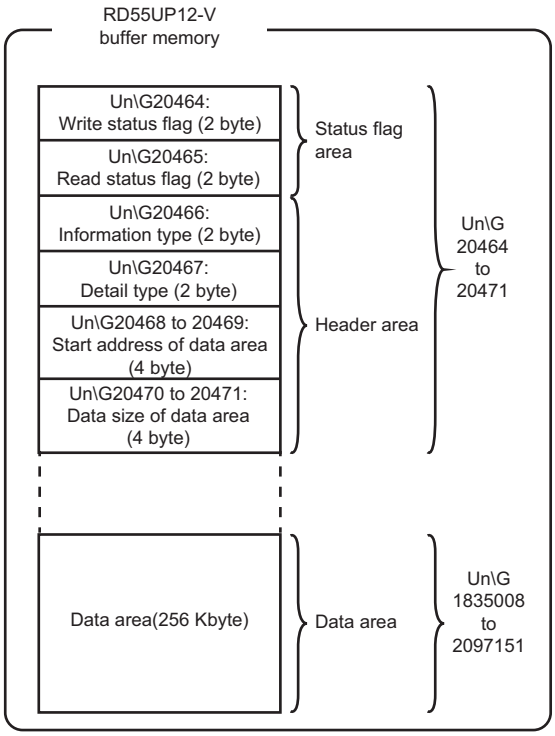
*1 The flag is turned OFF after the time set for "CPU Interface Timer" elapses. (☞ Page 25 CPU interface)

*2 The control is not required if 'Write status flag' (Un\G20448) is cleared (3→0 control) due to timeout.

CPU to CITL (when a control CPU issues an event message)

The following shows the operation flow for 'CPU to CITL.'





No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	—	A control CPU checks that 'Queue full of event messages for CPU to CITL' (b7) of 'CA-SECS status' (Un\G16384) and 'In-use flag' (b0) of 'Read status flag' (Un\G20465) are turned OFF.
(2)	—	The CPU turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20464). (OFF→ON control)
(3)	—	The CPU writes data of the header area in the event message according to ❶ to ❸, and also writes data of the data area according to ❹. • ❶ 'Information type' (Un\G20466): Information type • ❷ 'Detail type' (Un\G20467): Detail type • ❸ 'Data size of data area' (Un\G20470 to 20471): Data size of data area • ❹ Data of the data area starting from 'Data writing area' (Un\G1835008) For details on exchanged data identifiers of 'CPU to CITL,' refer to the following: ☞ Page 14 CPU to CITL (00000), Page 14 CPU to CITL (00087)
(4)	—	The CPU turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20464). (OFF→ON control)
(5)	SECS/GEM communication software detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20464) is turned ON.	—
(6)	The software turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(7)	The software reads data of the header area in the event message according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20466): Information type • ❷ 'Detail type' (Un\G20467): Detail type • ❸ 'Data size of data area' (Un\G20470 to 20471): Data size of data area • ❹ Data of the data area starting from 'Data writing area' (Un\G1835008)	—
(8)	The software turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(8)	—	The CPU detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20465) is turned ON.

No.	SECS/GEM communication software	Control CPU (controlled by user program)
(9)	—	The CPU clears 'Write status flag' (Un\G20464). (3→0 control)
(10)	The software detects that 'Write status flag' (Un\G20464) is cleared.	—
(11)	The software clears 'Read status flag' (Un\G20465). (3→0 control)	—

Point

If an error occurs in event data stored by a control CPU, SECS/GEM communication software will store the information type, detail type, and data size to the following buffer memory range: 'Latest CPU to CITL I/F error-detected information (Un\G20432)' to 'Data size at latest error detection' (Un\G20435 to 20436).

Restriction

- The number of message queues for events of 'CPU to CITL (when a control CPU issues an event message)' exchanged via buffer memory are fixed to five.
- The number of message queues for events of 'CITL to CPU (when SECS/GEM communication software issues an event message)' exchanged via buffer memory are fixed to five.

Exchanged data identifier

The following table lists information types and detail types to identify data exchanged in an event message format.
For each format of exchanged data, refer to the following:
☞ Page 64 Control CPU Interface Formats

General

■ CPU to CITL (00000)

Write source	Information type	Detail type	Name	Description	Reference
Control CPU	00000	00001	GEM300 Initial request	Requests to activate and initialize GEM300 functions.	☞ Page 64 00001: GEM300 Initial request
		00002	LoadPort initial request	Requests to initialize a load port.	☞ Page 65 00002 : LoadPort initial request

■ CITL to CPU (10000)

Write source	Information type	Detail type	Name	Description	Reference
SECS/GEM communication software	10000	00001	GEM300 Initial acknowledge	Returns the processing result of 'GEM300 Initial request.'	☞ Page 66 00001: GEM300 Initial acknowledge
		00002	LoadPort initial acknowledge	Returns the processing result of 'LoadPort initial request.'	☞ Page 67 00002 : LoadPort initial acknowledge

Related to CMS

■ CPU to CITL (00087)

Write source	Information type	Detail type	Name	Description	Reference
Control CPU	00087	00201	IN SERVICE request	Requests to change status to 'IN SERVICE.'	☞ Page 69 00201: IN SERVICE request
		00202	OUT OF SERVICE request	Requests to change status to 'OUT OF SERVICE.'	☞ Page 70 00202: OUT OF SERVICE request
		00301	LOAD started notification	Notifies the start of loading a carrier.	☞ Page 71 00301: LOAD started notification
		00302	LOAD complete notification	Notifies the completion of loading a carrier.	☞ Page 72 00302: LOAD complete notification
		00303	UNLOAD available notification	Notifies that a carrier can be unloaded.	☞ Page 73 00303: UNLOAD available notification
		00304	UNLOAD started notification	Notifies the start of unloading a carrier.	☞ Page 74 00304: UNLOAD started notification
		00305	UNLOAD completed notification	Notifies the completion of unloading a carrier.	☞ Page 75 00305: UNLOAD completed notification
		00306	TRANSFER failed notification	Notifies that transferring a carrier is failed.	☞ Page 76 00306: TRANSFER failed notification

■ CITL to CPU (10087)

Write source	Information type	Detail type	Name	Description	Reference
SECS/GEM communication software	10087	00201	IN SERVICE acknowledge	Returns the processing result of 'IN SERVICE request.'	☞ Page 77 00201: IN SERVICE acknowledge
		00202	OUT OF SERVICE acknowledge	Returns the processing result of 'OUT OF SERVICE request.'	☞ Page 78 00202: OUT OF SERVICE acknowledge
		00901	Bind service notification	Notifies the processing result of the 'Bind' service.	☞ Page 79 00901: Bind service notification
		00903	CancelBind service notification	Notifies the processing result of the 'CancelBind' service.	☞ Page 80 00903: CancelBind service notification
		00917	ChangeServiceStatus service notification	Notifies the processing result of the 'ChangeServiceStatus' service.	☞ Page 81 00917: ChangeServiceStatus service notification

3 PROCEDURE BEFORE OPERATION

This chapter shows the procedure before the operation of GEM300 standard support functions.

Point

To use the functions, settings are required according to the pre-operation procedure for a SECS/GEM communication software pre-installed model module. For details, refer to the following:
📖C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual

1. Setting equipment specifications

Set an equipment name and the number of load ports using a setting tool.

☞ Page 22 EQUIPMENT SPECIFICATION SETTINGS

For setting equipment, select the "Use GEM300 standard support function" checkbox in the "Equipment Setting" screen.

After setting equipment specifications, update the setting file stored on the SECS/GEM communication software pre-installed model module.

2. Starting the operation of GEM300 standard support functions

Command '00000-00001: GEM300 Initial request' to start the operation of GEM300 standard support functions.

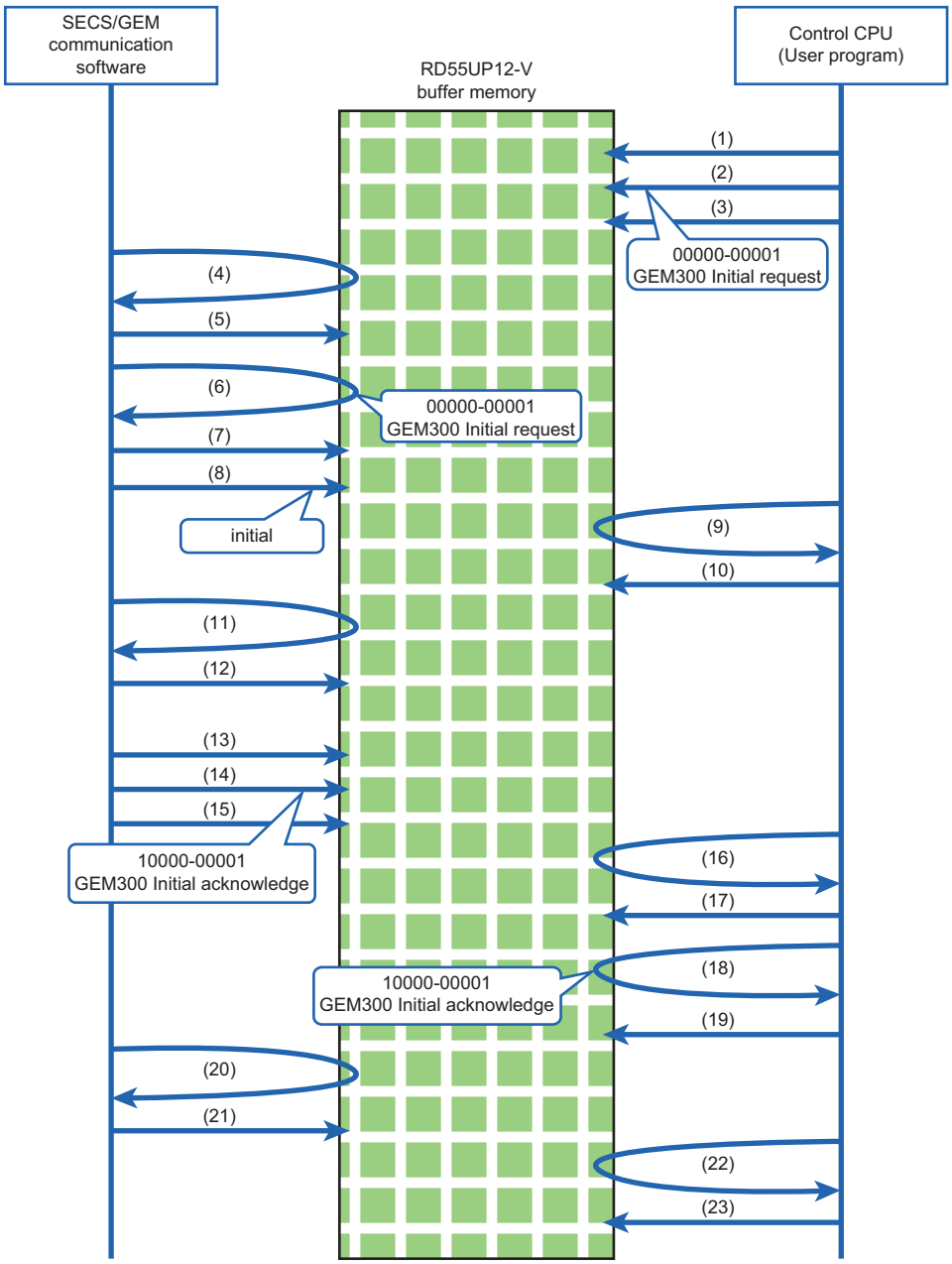
3.1 Starting the Operation of GEM300 Standard Support Functions

The command '00000-00001: GEM300 Initial request' is required to start the operation of GEM300 standard support functions. (☞ Page 14 CPU to CITL (00000))

The operation status of the functions can be checked in 'GEM300 status' (b5) of 'CA-SECS status information' (Un\G16384). (☞ Page 84 CA-SECS status (Un\G16384))

The following shows the operation flow.

- For on-line operation: Communication establishment function and online transition function of SECS/GEM communication software are used.



No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	—	A control CPU turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20464). (OFF→ON control)
(2)	—	The CPU writes data of the header area in '00000-00001: GEM300 Initial request' according to ❶ to ❸. • ❶ 'Information type' (Un\G20466): 0 • ❷ 'Detail type' (Un\G20467): 1 • ❸ 'Data size of data area' (Un\G20470 to 20471): 0 (byte units) There is no data to be written for the data area of '00000-00001: GEM300 Initial request.' For details, refer to the following: ☞ Page 64 00001: GEM300 Initial request
(3)	—	The CPU turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20464). (OFF→ON control)
(4)	SECS/GEM communication software detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20464) is turned ON.	—
(5)	The software turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(6)	The software reads data of the header area in '00000-00001: GEM300 Initial request' according to ❶ to ❸. • ❶ 'Information type' (Un\G20466): 0 • ❷ 'Detail type' (Un\G20467): 1 • ❸ 'Data size of data area' (Un\G20470 to 20471): 0 (byte units)	—
(7)	The software turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(8)	The software turns ON 'GEM300 status' (b5) of 'CA-SECS status' (Un\G16384). (OFF→ON control)	—
(9)	—	The CPU detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20465) is turned ON.
(10)	—	The CPU clears 'Write status flag' (Un\G20464). (3→0 control)
(11)	The software detects that 'Write status flag' (Un\G20464) is cleared.	—
(12)	The software clears 'Read status flag' (Un\G20465). (3→0 control)	—
(13)	The software turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20448). (OFF→ON control)[*1*2]	—
(14)	The software writes data of the header area in '10000-00001: GEM300 Initial acknowledge' according to ❶ to ❸, and also write data of the data area according to ❹.[*1] • ❶ 'Information type' (Un\G20450): 10000 • ❷ 'Detail type' (Un\G20451): 1 • ❸ 'Data size of data area' (Un\G20454 to 20455): 2 (byte units) • ❹ Data of '10000-00001: GEM300 Initial acknowledge' starting from 'Data reading area' (Un\G1572864) (for 2 bytes)	—
(15)	The software turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20448). (OFF→ON control)[*1*2]	—
(16)	—	The CPU detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20448) is turned ON.
(17)	—	The CPU turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20449). (OFF→ON control)[*3]
(18)	—	The CPU reads data of the header area in '10000-00001: GEM300 Initial acknowledge' according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): 10000 • ❷ 'Detail type' (Un\G20451): 1 • ❸ 'Data size of data area' (Un\G20454 to 20455): 2 (byte units) • ❹ Data of '10000-00001: GEM300 Initial acknowledge' starting from 'Data reading area' (Un\G1572864) For details on '10000-00001: GEM300 Initial acknowledge,' refer to the following: ☞ Page 66 00001: GEM300 Initial acknowledge
(19)	—	The CPU turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20449). (OFF→ON control)[*3]
(20)	The software detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20449) is turned ON.	—
(21)	The software clears 'Write status flag' (Un\G20448). (3→0 control)	—

No.	SECS/GEM communication software	Control CPU (controlled by user program)
(22)	—	The CPU detects that 'Write status flag' (Un\G20448) is cleared.
(23)	—	The CPU clears 'Read status flag' (Un\G20449). (3→0 control)*3

*1 It is executed without waiting for 'Write status flag' (Un\G20464) to be cleared.
*2 The flag is turned OFF after the time set for "CPU Interface Timer" elapses. (☞ Page 25 CPU interface)
*3 The control is not required if 'Write status flag' (Un\G20448) is cleared (3→0 control) due to timeout.

4 FUNCTION LIST

This chapter explains GEM300 standard support functions.

Function		Description	Reference
Equipment specification setting		To set equipment specifications (such as the number of load ports and carrier slots)	☞ Page 22 EQUIPMENT SPECIFICATION SETTINGS
Object management	Carrier object	To manage objects compliant with E87-CMS	☞ Page 44 Carrier Objects
	Load port object	To manage the load port status*1	☞ Page 32 Load port object
Object attribute variable definition	CMS variable	To define variables with object attributes. Object attributes can be used as discrete variables (DVVAL).	☞ Page 56 CMS Variables
State model compliance	Carrier State Model	To transition the status of 'Carrier ID Status (CIDS),' 'Carrier Slot Map Status (CSMS),' and 'Carrier Accessing Status (CAS)'	☞ Page 47 Carrier State Model
	Load Port Transfer State Model	To transition the status of 'Load Port Transfer State (LTS)'	☞ Page 50 Load Port Transfer State Model
	Load Port Reservation State Model	To transition the status of 'Load Port Reservation State (LRS)'	☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment)
	Load Port/Carrier Association State Model	To transition the status of 'Load Port/Carrier Association State (LCAS)'	☞ Page 54 Load Port/Carrier Association State Model
	Access Mode State Model	To transition the status of 'Access Mode State (AMS)'	☞ Page 55 Access Mode State Model
GEM300 service message	CMS service message	To help service processing which is compliant with service messages from the host	☞ Page 46 CMS Service Messages
Event notification	CMS event	To notify the host automatically or manually of an event requested by GEM300	☞ Page 59 CMS Events and Reports
Control CPU interface		To exchange GEM300-related data with a control CPU in an event message format via the fixed buffer memory (maximum 256 KB)	☞ Page 9 Data and Signal Exchange

*1 A proprietary object which is compliant with GEM300 standards

MEMO

5 EQUIPMENT SPECIFICATION SETTINGS

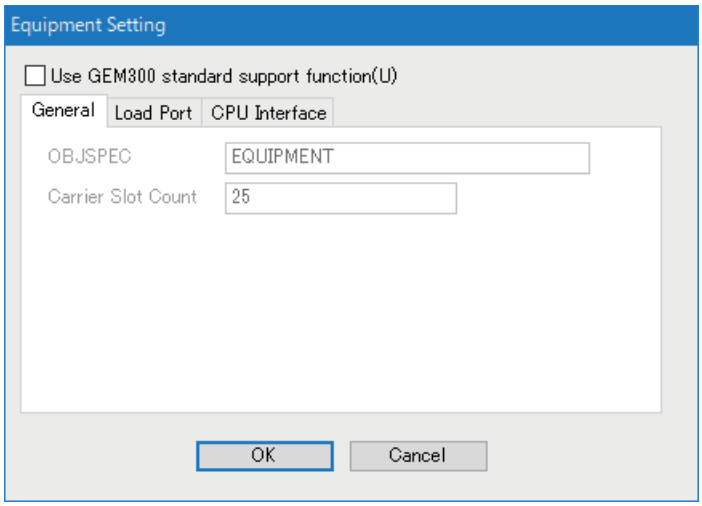
This function can set equipment specifications, such as the number of load ports and carrier slots.

5.1 Equipment Settings

This section explains the method for setting whether to use GEM300 standard support functions.

Window

Main screen ⇨ [GEM300Function] ⇨ [Equipment Setting]



Displayed items

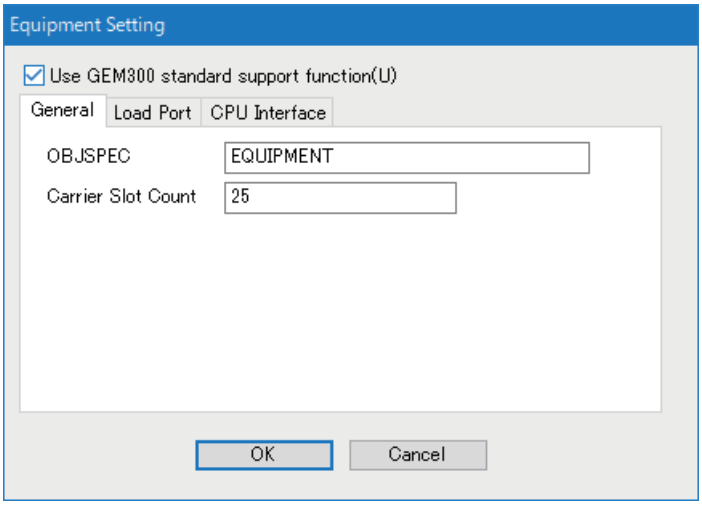
Item	Description	Setting range	Default
Use GEM300 standard support function	Select whether to use GEM300 standard support functions.	• Unselected • Selected	Unselected
[General] tab	Set OBJSPEC and the number of carrier slots. (☞ Page 23 General)	—	—
[Load Port] tab	Set the number of load ports and the load port ID list. (☞ Page 24 Load port)		
[CPU Interface] tab	Set the monitoring timer for a control CPU interface. (☞ Page 25 CPU interface)		

General

The following explains the method for setting parameters specific to equipment.

Window

[Equipment Setting] ⇨ [General] tab



Displayed items

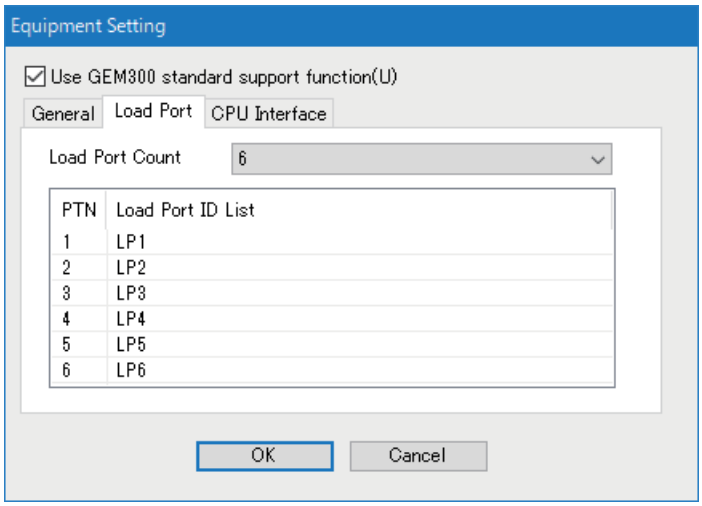
Item	Description	Setting range	Default
OBJSPEC	Set OBJSPEC.	1 to 80 characters	EQUIPMENT
Carrier Slot Count	Specify the number of slots of a carrier handled by equipment.	1 to 25	25

Load port

The following explains the method for setting a load port ID.

Window

[Equipment Setting] ⇨ [Load Port] tab



Displayed items

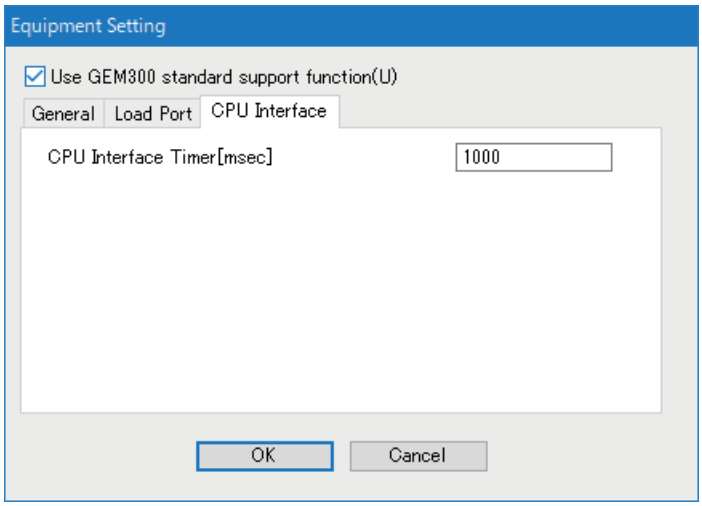
Item	Description	Setting range	Default
Load Port Count	Specify the number of load ports on equipment.	1 to 6	6
Load Port ID List	Specify ObjID linked to PTN (material port number) of a load port. The specified ObjID is applied to the instance of a load port object.	1 to 80 characters	• LP1 • LP2 • LP3 • LP4 • LP5 • LP6

CPU interface

The following explains the method for configuring settings for a control CPU interface.

Window

[Equipment Setting] ⇨ [CPU Interface] tab



Displayed items

Item	Description	Setting range	Default
CPU Interface Timer[msec]	Set a monitoring time (milliseconds) from when SECS/GEM communication software turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20448) in a control CPU interface to when a control CPU turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20449). If the specified time is elapsed, SECS/GEM communication software turns OFF 'Write status flag' (Un\G20448).	10 to 120000	1000

MEMO

6 E39-OSS COMPLIANT FUNCTION

This chapter explains the E39-OSS compliant function.
All GEM300 standard-related objects supported by SECS/GEM communication software are inherited from the top object defined by E39-OSS.

6.1 Usage Method

This section explains the method for using this function.

Creating proprietary objects

Proprietary objects can be created by SECS/GEM communication software with the following service:

- Service

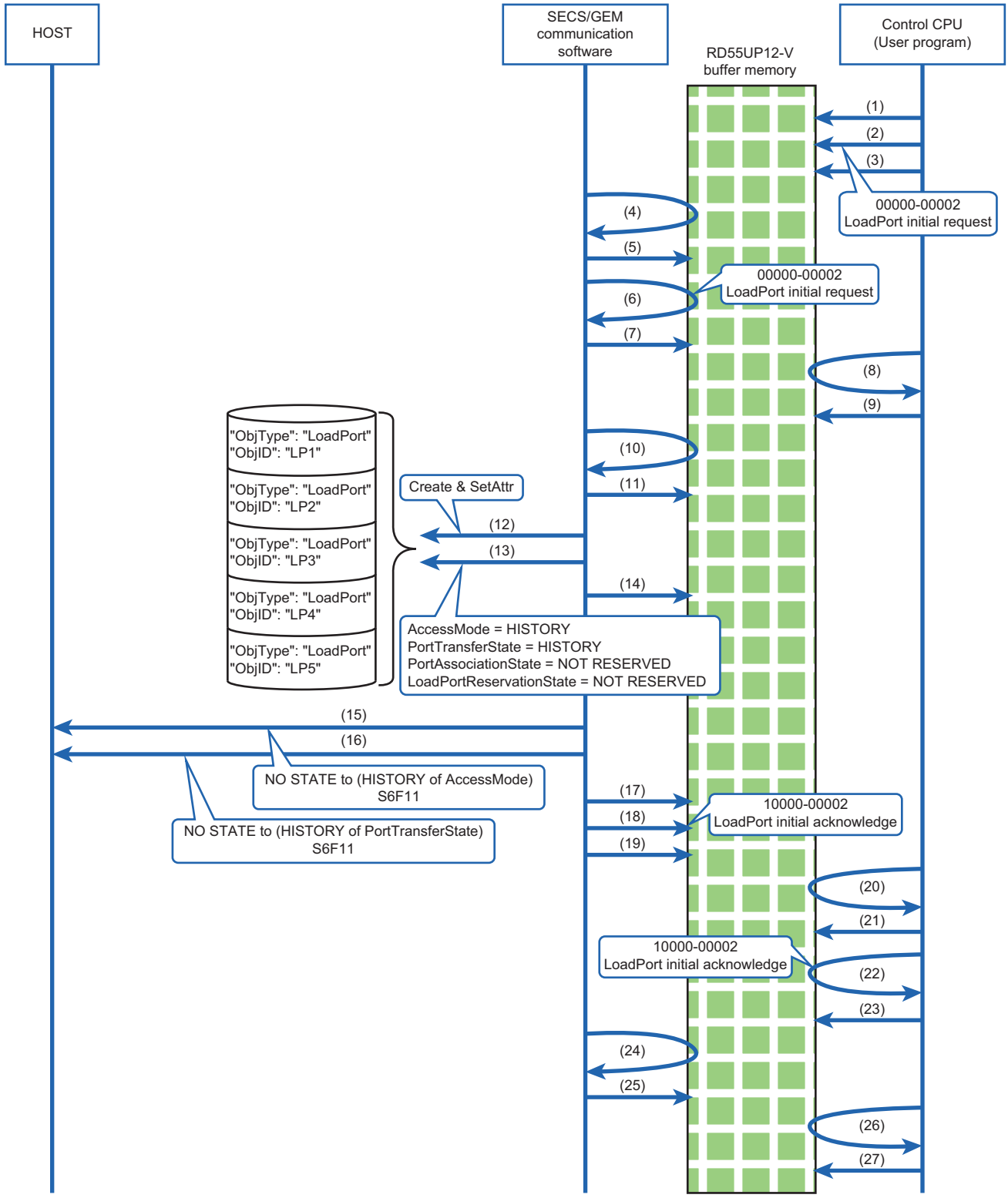
Name	Host	Control CPU
Create (S14F9)	—	—
LoadPort initial request (00000-00002)	—	○

Load port objects are created by SECS/GEM communication software according to the initialization request command '00000-00002: LoadPort initial request' from a control CPU. The objects cannot be created from the host.

Sending 'LoadPort initial request' from a control CPU

The command '00000-00002: LoadPort initial request' is required after starting the operation of a GEM300 standard support function.

The description of 'Event Report Acknowledge (S6F12)' is omitted in the following figure.



No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	—	A control CPU turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20464). (OFF→ON control)
(2)	—	The CPU writes data of the header area in '00000-00002: LoadPort initial request' according to ❶ to ❸, and also writes data of the data area according to ❹. • ❶ 'Information type' (Un\G20466): 0 • ❷ 'Detail type' (Un\G20467): 2 • ❸ 'Data size of data area' (Un\G20470 to 20471): 34 (byte units) • ❹ Data of '00000-00002: LoadPort initial request' starting from 'Data writing area' (Un\G1835008) (for 34 bytes) For details on '00000-00002: LoadPort initial request,' refer to the following: ☞ Page 65 00002 : LoadPort initial request
(3)	—	The CPU turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20464). (OFF→ON control)
(4)	SECS/GEM communication software detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20464) is turned ON.	—
(5)	The software turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(6)	The software reads data of the header area in '00000-00002: LoadPort initial request' according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20466): 0 • ❷ 'Detail type' (Un\G20467): 2 • ❸ 'Data size of data area' (Un\G20470 to 20471): 34 (byte units) • ❹ Data of '00000-00002: LoadPort initial request' starting from 'Data writing area' (Un\G1835008) (for 34 bytes)	—
(7)	The software turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(8)	—	The CPU detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20465) is turned ON.
(9)	—	The CPU clears 'Write status flag' (Un\G20464). (3→0 control)
(10)	The software detects that 'Write status flag' (Un\G20464) is cleared.	—
(11)	The software clears 'Read status flag' (Un\G20465). (3→0 control)	—
(12)	The software creates load port objects and sets the attributes.*1	—
(13)	The software transitions the status of Load Port Transfer State Model, Load Port Reservation State Model, and Load Port/Carrier Association State Model.*1	—
(14)	The software applies the status of a load port to the buffer memory from 'Port access mode' (Un\G24576) to 'Port reservation state' (Un\G24598).*1	—
(15)	The software sends the state transition event of Access Mode State Model.*1	—
(16)	The software sends the state transition event of Load Port Transfer State Model.*1	—
(17)	The software turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20448). (OFF→ON control)*1*2	—
(18)	The software writes data of the header area in '10000-00002: LoadPort initial acknowledge' according to ❶ to ❸, and also writes data of the data area according to ❹.*1 • ❶ 'Information type' (Un\G20450): 10000 • ❷ 'Detail type' (Un\G20451): 2 • ❸ 'Data size of data area' (Un\G20454 to 20455): 32 (byte units) • ❹ Data of '10000-00002: LoadPort initial acknowledge' starting from 'Data reading area' (Un\G1572864) (for 32 bytes)	—
(19)	The software turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20448). (OFF→ON control)*1*2	—
(20)	—	The CPU detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20448) is turned ON.
(21)	—	The CPU turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20449). (OFF→ON control)*3

No.	SECS/GEM communication software	Control CPU (controlled by user program)
(22)	—	The CPU reads data of the header area in '10000-00002: LoadPort initial acknowledge' according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): 10000 • ❷ 'Detail type' (Un\G20451): 2 • ❸ 'Data size of data area' (Un\G20454 to 20455): 32 (byte units) • ❹ Data of '10000-00002: LoadPort initial acknowledge' starting from 'Data reading area' (Un\G1572864) (for 32 bytes) For details on '10000-00002: LoadPort initial acknowledge,' refer to the following: ☞ Page 67 00002 : LoadPort initial acknowledge
(23)	—	The CPU turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20449). (OFF→ON control)*3
(24)	The software detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20449) is turned ON.	—
(25)	The software clears 'Write status flag' (Un\G20448). (3→0 control)	—
(26)	—	The CPU detects that 'Write status flag' (Un\G20448) is cleared.
(27)	—	The CPU clears 'Read status flag' (Un\G20449). (3→0 control)*3

*1 It is executed without waiting for 'Write status flag' (Un\G20464) to be cleared.

*2 The flag is turned OFF after the time set for "CPU Interface Timer" elapses. (☞ Page 25 CPU interface)

*3 The control is not required if 'Write status flag' (Un\G20448) is cleared (3→0 control) due to timeout.

Deleting proprietary objects

Load port objects cannot be deleted.

- Service

Name	Host	Control CPU
Delete (S14F11)	—	—

6.2 Top Object

This section explains the top object provided by SECS/GEM communication software.

Attributes

The following table shows the attributes of the top object.

Name	Format	Access from host	Description
ObjType	ASCII[1..80]*1	Read Only	Object type
ObjID	ASCII[1..80]*1	Read Only	Object ID

*1 Excluding the control characters.

6.3 GEM300-Related Object List

This section shows objects managed by SECS/GEM communication software.

Name	ObjType	Description
Carrier object	Carrier	E87 compliant object
Load port object	LoadPort	Proprietary object of SECS/GEM communication software. It is used for the E87-CMS compliant function.

6.4 Proprietary Object List

This section explains proprietary objects of SECS/GEM communication software.
Load port objects are not defined as objects in SEMI standards. In SECS/GEM communication software, the objects are provided as proprietary objects to improve operability from a control CPU. Use them as necessary.

Load port object

SECS/GEM communication software instantiates load port-related information to an object and provides the function for exchanging data between the host and equipment using E39-OSS and E87-CMS services. The software creates the same number of load port objects as the number of load ports set in "Load Port Count" of "Equipment Setting." Load port objects cannot be created or deleted from the host and a control CPU. The status of each load port is applied to the buffer memory from 'Port access mode' (Un\G24576) to 'Port reservation state' (Un\G24598).

Attributes

The following table shows the attributes of a load port object provided by SECS/GEM communication software.

Name	Format	Access from host	Description	Linked buffer memory
ObjType	ASCII[8]*1	Read Only	Object type "LoadPort"	None
ObjID	ASCII[1..80]*1	Read Only	Object ID	None
PTN	U1[1]	Read Only	PortID Material port number (material location) of a load port (positive integer)	None
AccessMode	U1[1]	Read Only	Access mode of a load port • 0: MANUAL • 1: AUTO	'Port access mode' (Un\G24576)
PortAssociationState	U1[1]	Read Only	Association status of a load port • 0: NOT ASSOCIATED • 1: ASSOCIATED	'Port association state' (Un\G24597)
LoadPortReservationState	U1[1]	Read Only	Reservation status of a load port • 0: NOT RESERVED • 1: RESERVED	'Port reservation state' (Un\G24598)
PortTransferState	U1[1]	Read Only	Transfer status of a load port*2 • 0: OUT OF SERVICE • 1: TRANSFER BLOCKED • 2: READY TO LOAD • 3: READY TO UNLOAD	'Port transfer state' (Un\G24577 to 24593)
ServiceStatus	U1[1]	Read Only	Service status of a load port • 0: OUT OF SERVICE • 1: IN SERVICE	'Service status' (Un\G24594)
InServiceStatus	U1[1]	Read Only	Lower state of IN SERVICE • 0: TRANSFER READY • 1: TRANSFER BLOCKED	'In service status' (Un\G24595)
TransferReadyStatus	U1[1]	Read Only	Lower state of TRANSFER READY • 0: READY TO LOAD • 1: READY TO UNLOAD	'Transfer ready status' (Un\G24596)

*1 Excluding the control characters.
*2 Only lower state is included. (Upper state is excluded.)

Format for interface with a control CPU (structure labels)

The following table shows the format (structure labels) for an interface with a control CPU.

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ st_LoadPortObject

Offset	Label name	Name	Data type	Applicable range
+0 to 39	u40_ObjType	ObjType	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+40 to 79	u40_ObjID	ObjID	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+80	u_PTN	PTN(PortID)	Word [Unsigned]	1 to 6
+81	u_AccessMode	AccessMode	Word [Unsigned]	• 0: MANUAL • 1: AUTO
+82	u_PortAssociationState	PortAssociationState	Word [Unsigned]	• 0: NOT ASSOCIATED • 1: ASSOCIATED
+83	u_LoadPortReservationState	LoadPortReservationState	Word [Unsigned]	• 0: NOT RESERVED • 1: RESERVED
+84	u_PortTransferState	PortTransferState	Word [Unsigned]	• 0: OUT OF SERVICE • 1: TRANSFER BLOCKED • 2: READY TO LOAD • 3: READY TO UNLOAD
+85	u_ServiceStatus	ServiceStatus	Word [Unsigned]	• 0: OUT OF SERVICE • 1: IN SERVICE
+86	u_InServiceStatus	InServiceStatus	Word [Unsigned]	• 0: TRANSFER READY • 1: TRANSFER BLOCKED
+87	u_TransferReadyStatus	TransferReadyStatus	Word [Unsigned]	• 0: READY TO LOAD • 1: READY TO UNLOAD

*1 Excluding the control characters.

MEMO

7 E87-CMS COMPLIANT FUNCTION

This chapter explains the E87-CMS compliant function.

7.1 Usage Method

This section explains the method for using this function.

Creating carrier objects

Carrier objects can be created by the host and a control CPU with the following service:

- Service

Name	Host	Control CPU
Bind (S3F17)	○	—

Receiving 'Bind (S3F17)' from the host

The figure below shows the method for creating a carrier object and performing the following operations by receiving 'Bind (S3F17)' from the host.

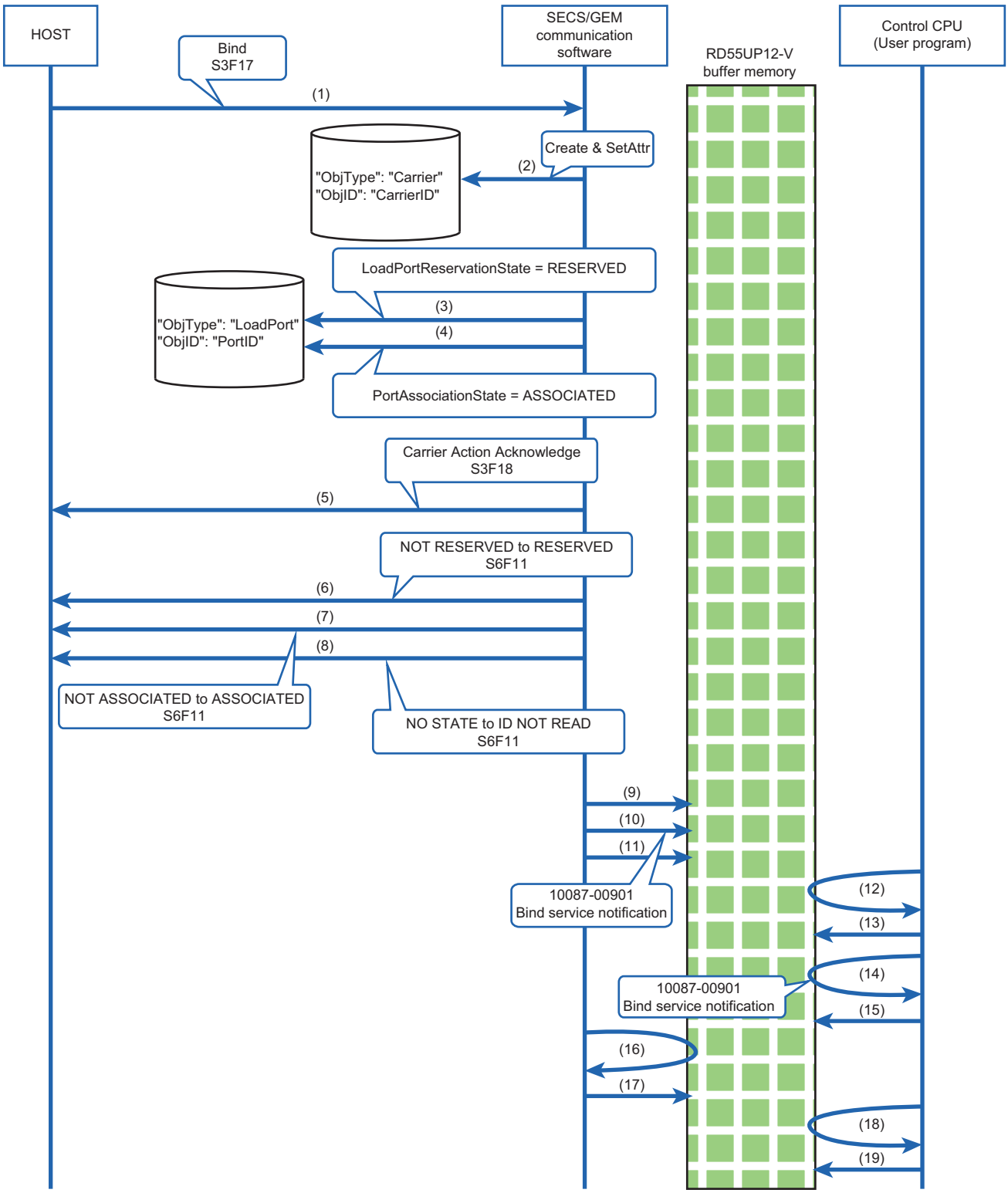
- Reserving a load port
- Associating between CarrierID and a load port

In 'Bind (S3F17),' the initial value of a carrier object can be provided by the host.

Point

These operations can be performed only when PortTransferState of a target load port is '2: READY TO LOAD.'

The description of 'Event Report Acknowledge (S6F12)' is omitted in the following figure.


HOST
Bind
S3F17
SECS/GEM
communication
software
RD55UP12-V
buffer memory
Control CPU
(User program)
(1)
"ObjType": "Carrier"
"ObjID": "CarrierID"
Create & SetAttr
(2)
LoadPortReservationState = RESERVED
"ObjType": "LoadPort"
"ObjID": "PortID"
(3)
(4)
PortAssociationState = ASSOCIATED
Carrier Action Acknowledge
S3F18
(5)
NOT RESERVED to RESERVED
S6F11
(6)
(7)
(8)
NOT ASSOCIATED to ASSOCIATED
S6F11
NO STATE to ID NOT READ
S6F11
(9)
(10)
(11)
10087-00901
Bind service notification
(12)
(13)
(14)
10087-00901
Bind service notification
(15)
(16)
(17)
(18)
(19)

No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	SECS/GEM communication software receives a primary message from the host.	—
(2)	The software creates a carrier object and sets the attributes.	—
(3)	The software changes the reservation status of a load port to 'RESERVED.'	—
(4)	The software changes the association status of the load port and carrier to 'ASSOCIATED.'	—
(5)	The software sends a secondary message.	—
(6)	The software sends the state transition event of Load Port Reservation State Model.	—
(7)	The software sends the state transition event of Load Port/Carrier Association State Model.	—
(8)	The software sends the state transition event of Carrier State Model.	—
(9)	The software turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20448). (OFF→ON control)*1	—
(10)	The software writes data of the header area in '10087-00901: Bind service notification' according to ❶ to ❸, and also writes data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): 10087 • ❷ 'Detail type' (Un\G20451): 901 • ❸ 'Data size of data area' (Un\G20454 to 20455): 4466 (byte units) • ❹ Data of '10087-00901: Bind service notification' starting from 'Data reading area' (Un\G1572864) (for 4466 bytes)	—
(11)	The software turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20448). (OFF→ON control)*1	—
(12)	—	A control CPU detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20448) is turned ON.
(13)	—	The CPU turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20449). (OFF→ON control)*2
(14)	—	The CPU reads data of the header area in '10087-00901: Bind service notification' according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): 10087 • ❷ 'Detail type' (Un\G20451): 901 • ❸ 'Data size of data area' (Un\G20454 to 20455): 4466 (byte units) • ❹ Data of '10087-00901: Bind service notification' starting from 'Data reading area' (Un\G1572864) (for 4466 bytes) For details on '10087-00901: Bind service notification,' refer to the following: ☞ Page 79 00901: Bind service notification
(15)	—	The CPU turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20449). (OFF→ON control)*2
(16)	The software detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20449) is turned ON.	—
(17)	The software clears 'Write status flag' (Un\G20448). (3→0 control)	—
(18)	—	The CPU detects that 'Write status flag' (Un\G20448) is cleared.
(19)	—	The CPU clears 'Read status flag' (Un\G20449). (3→0 control)*2

*1 The flag is turned OFF after the time set for "CPU Interface Timer" elapses. (☞ Page 25 CPU interface)

*2 The control is not required if 'Write status flag' (Un\G20448) is cleared (3→0 control) due to timeout.

Deleting carrier objects

Carrier objects can be deleted by the host and a control CPU with the following service:

- Service

Name	Host	Control CPU
CancelBind (S3F17)	○	—
UNLOAD completed notification (00087-00305)	—	○

Receiving 'CancelBind (S3F17)' from the host

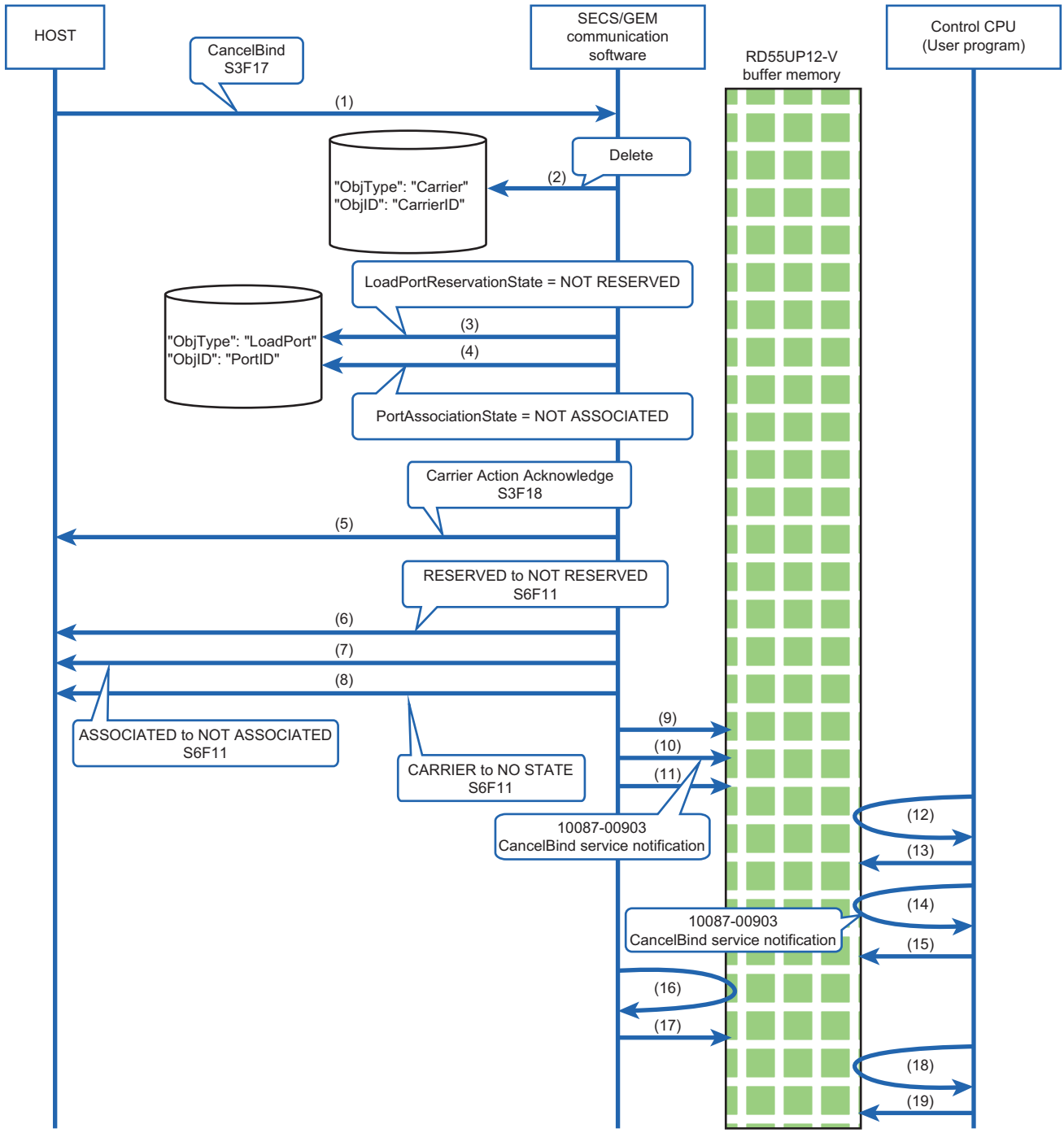
The figure below shows the method for deleting a carrier object and performing the following operations by receiving 'CancelBind (S3F17)' from the host.

- Canceling a load port reservation
- Dissociating between CarrierID and a load port

Point

These operations can be performed only when PortTransferState of a target load port is '2: READY TO LOAD.'

The description of 'Event Report Acknowledge (S6F12)' is omitted in the following figure.



No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	SECS/GEM communication software receives a primary message from the host.	—
(2)	The software deletes a carrier object.	—
(3)	The software changes the reservation status of a load port to 'NOT RESERVED.'	—
(4)	The software changes the association status of the load port and carrier to 'NOT ASSOCIATED.'	—
(5)	The software sends a secondary message.	—
(6)	The software sends the state transition event of Load Port Reservation State Model.	—
(7)	The software sends the state transition event of Load Port/Carrier Association State Model.	—
(8)	The software sends the state transition event of Carrier State Model.	—
(9)	The software turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20448). (OFF→ON control)*1	—
(10)	The software writes data of the header area in '10087-00903: CancelBind service notification' according to ❶ to ❸, and also writes data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): 10087 • ❷ 'Detail type' (Un\G20451): 903 • ❸ 'Data size of data area' (Un\G20454 to 20455): 84 (byte units) • ❹ Data of '10087-00903: CancelBind service notification' starting from 'Data reading area' (Un\G1572864) (for 84 bytes)	—
(11)	The software turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20448). (OFF→ON control)*1	—
(12)	—	A control CPU detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20448) is turned ON.
(13)	—	The CPU turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20449). (OFF→ON control)*2
(14)	—	The CPU reads data of the header area of '10087-00903: CancelBind service notification' according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20450): 10087 • ❷ 'Detail type' (Un\G20451): 903 • ❸ 'Data size of data area' (Un\G20454 to 20455): 84 (byte units) • ❹ Data of '10087-00903: CancelBind service notification' starting from 'Data reading area' (Un\G1572864) (for 84 bytes) For details on '10087-00903: CancelBind service notification,' refer to the following: ☞ Page 80 00903: CancelBind service notification
(15)	—	The CPU turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20449). (OFF→ON control)*2
(16)	The software detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20449) is turned ON.	—
(17)	The software clears 'Write status flag' (Un\G20448). (3→0 control)	—
(18)	—	The CPU detects that 'Write status flag' (Un\G20448) is cleared.
(19)	—	The CPU clears 'Read status flag' (Un\G20449). (3→0 control)*2

*1 The flag is turned OFF after the time set for "CPU Interface Timer" elapses. (☞ Page 25 CPU interface)

*2 The control is not required if 'Write status flag' (Un\G20448) is cleared (3→0 control) due to timeout.

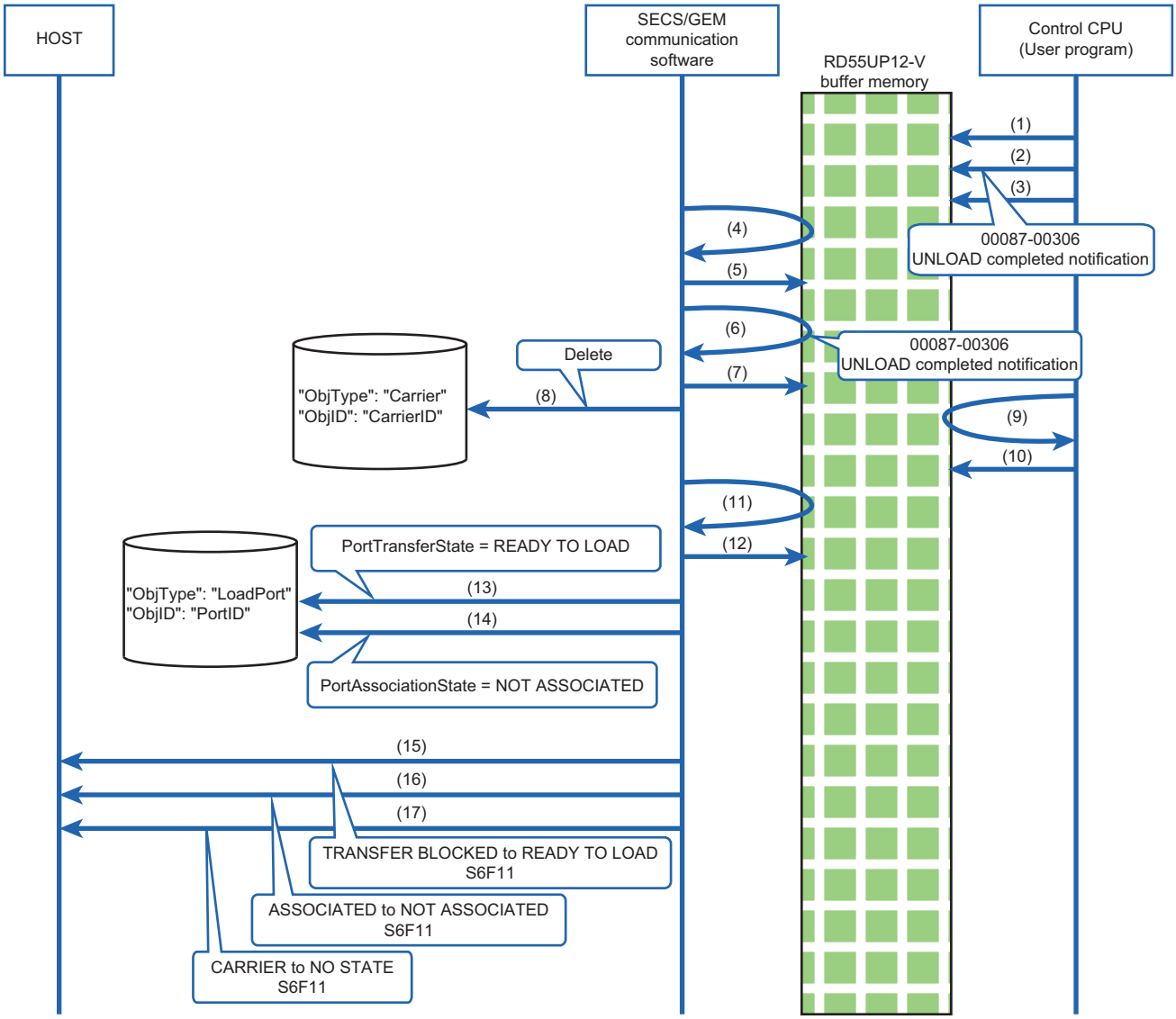
Sending 'UNLOAD completed notification (00087-00305)' from a control CPU

The figure below shows the method for deleting a carrier object and performing the following operations by sending 'UNLOAD completed notification (00087-00305)' from a control CPU.

- Transitioning the status of a load port to 'READY TO LOAD'
- Dissociating between CarrierID and a load port

It is intended for the case when unloading a carrier is completed.

The description of 'Event Report Acknowledge (S6F12)' is omitted in the following figure.



No.	SECS/GEM communication software	Control CPU (controlled by user program)
(1)	—	A control CPU turns ON 'In-use flag' (b0) of 'Write status flag' (Un\G20464). (OFF→ON control)
(2)	—	The CPU writes data of the header area in '00087-00305: UNLOAD completed notification' according to ❶ to ❸, and also writes data of the data area according to ❹. • ❶ 'Information type' (Un\G20466): 87 • ❷ 'Detail type' (Un\G20467): 305 • ❸ 'Data size of data area' (Un\G20470 to 20471): 2 (byte units) • ❹ Data of '00087-00305: UNLOAD completed notification' starting from 'Data writing area' (Un\G1835008) (for 2 bytes) For details on '00087-00305: UNLOAD completed notification,' refer to the following: ☞ Page 75 00305: UNLOAD completed notification
(3)	—	The CPU turns ON 'Write completion flag' (b1) of 'Write status flag' (Un\G20464). (OFF→ON control)
(4)	SECS/GEM communication software detects that 'Write completion flag' (b1) of 'Write status flag' (Un\G20464) is turned ON.	—
(5)	The software turns ON 'In-use flag' (b0) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(6)	The software reads data of the header area in '00087-00305: UNLOAD completed notification' according to ❶ to ❸, and also reads data of the data area according to ❹. • ❶ 'Information type' (Un\G20466): 87 • ❷ 'Detail type' (Un\G20467): 305 • ❸ 'Data size of data area' (Un\G20470 to 20471): 2 (byte units) • ❹ Data of '00087-00305: UNLOAD completed notification' starting from 'Data writing area' (Un\G1835008) (for 2 bytes)	—
(7)	The software turns ON 'Read completion flag' (b1) of 'Read status flag' (Un\G20465). (OFF→ON control)	—
(8)	The software deletes the instance of a carrier object.	—
(9)	—	The CPU detects that 'Read completion flag' (b1) of 'Read status flag' (Un\G20465) is turned ON.
(10)	—	The CPU clears 'Write status flag' (Un\G20464). (3→0 control)
(11)	The software detects that 'Write status flag' (Un\G20464) is cleared.	—
(12)	The software clears 'Read status flag' (Un\G20465). (3→0 control)	—
(13)	The software changes the transfer status of a load port to 'READY TO LOAD.'*1	—
(14)	The software changes the association status of the load port and carrier to 'NOT ASSOCIATED.'*1	—
(15)	The software sends the state transition event of Load Port/Carrier Association State Model.*1	—
(16)	The software sends the state transition event of Load Port Transfer State Model.*1	—
(17)	The software sends the state transition event of Carrier State Model.*1	—

*1 It is executed without waiting for 'Write status flag' (Un\G20464) to be cleared.

7.2 Carrier Objects

This section explains carrier objects provided by SECS/GEM communication software.
SECS/GEM communication software instantiates carrier-related information to an object and exchanges the information between the host and equipment using E39-OSS and E87-CMS services. The number of instantiated carrier objects is stored in 'Carrier object count' (Un\G24599) (☞ Page 82 Buffer Memory)

Attributes

The following table shows the attributes of a carrier object.

Name	Format	Access from host	Description
ObjType	ASCII[1..80]*1	Read Only	Object type (Carrier)
ObjID	ASCII[1..80]*1	Read Only	Carrier ID (CarrierID)
Capacity	U1[1]	Read Only	Capacity (the maximum number of wafers a carrier can hold)*2
SubstrateCount	U1[1]	Read Only	The number of wafers currently in the carrier*3
ContentMap	LIST[1..Capacity]	Read Only	List of slot contents LIST[1..Capacity] LIST[2] ASCII[0..80] LotID*1 ASCII[0..80] SubstrateID*1 ⋮
SlotMap	LIST[1..Capacity]	Read Only	List of slot statuses LIST[1..Capacity] U1[1]SlotStatus ⋮ • 0: UNDEFINED • 1: EMPTY • 2: NOT EMPTY • 3: CORRECTLY OCCUPIED • 4: DOUBLE SLOTTED • 5: CROSS SLOTTED
Usage	ASCII[0..80]*1	Read Only	Intended use (Example: PRODUCT, DUMMY, and TEST)
CarrierIDStatus	U1[1]	Read Only	Verification status of a carrier ID • 0: ID NOT READ • 1: WAITING FOR HOST • 2: ID VERIFICATION OK • 3: ID VERIFICATION FAILED
CarrierAccessingStatus	U1[1]	Read Only	Access status to a carrier • 0: NOT ACCESSED • 1: IN ACCESS • 2: CARRIER COMPLETE • 3: CARRIER STOPPED
SlotMapStatus	U1[1]	Read Only	Verification status of a slot map • 0: SLOT MAP NOT READ • 1: WAITING FOR HOST • 2: SLOT MAP VERIFICATION OK • 3: SLOT MAP VERIFICATION FAILED
LocationID	ASCII[0..80]*1	Read Only	ID indicating the location of a carrier in equipment
Reason	U1 [1]	Read Only	Reason for the occurrence of the state transition No.(14) in Carrier State Model • 0: VERIFICATION NEEDED • 1: VERIFICATION BY EQUIPMENT UNSUCCESSFUL • 2: READ FAIL • 3: IMPROPER SUBSTRATE POSITION

*1 Excluding the control characters.
*2 Up to the maximum number of carrier slots set for equipment specification settings are available. (☞ Page 23 General)
*3 Can be stored within the range of 'Capacity.'

Format for interface with a control CPU (structure labels)

The following table shows the format (structure labels) for an interface with a control CPU.

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

Precautions

If an imported structure has hierarchical structure, import structures included in the structure as well.

■ st_CarrierObject

Offset	Label name	Name	Data type	Applicable range
+0 to 39	u40_ObjType	ObjType	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+40 to 79	u40_ObjID	ObjID (CarrierID)	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+80	u_Capacity	Capacity	Word [Unsigned]	1 to 25
+81	u_SubstrateCount	SubstrateCount	Word [Unsigned]	1 to 25
+82 to 2081	st25_ContentMap	ContentMap	st_ContentMap(0..24)	☞ Page 45 st_ContentMap
+2082 to 2106	st25_SlotMap	SlotMap	st_SlotStatus(0..24)	☞ Page 45 st_SlotStatus
+2107 to 2146	u40_Usage	Usage	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+2147	u_CarrierIDStatus	CarrierIDStatus	Word [Unsigned]	• 0: ID NOT READ • 1: WAITING FOR HOST • 2: ID VERIFICATION OK • 3: ID VERIFICATION FAILED
+2148	u_CarrierAccessingStatus	CarrierAccessingStatus	Word [Unsigned]	• 0: NOT ACCESSED • 1: IN ACCESS • 2: CARRIER COMPLETE • 3: CARRIER STOPPED
+2149	u_SlotMapStatus	SlotMapStatus	Word [Unsigned]	• 0: SLOT MAP NOT READ • 1: WAITING FOR HOST • 2: SLOT MAP VERIFICATION OK • 3: SLOT MAP VERIFICATION FAILED
+2189	u40_LocationID	LocationID	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+2190	u_Reason	Reason	Word [Unsigned]	• 0: VERIFICATION NEEDED • 1: VERIFICATION BY EQUIPMENT UNSUCCESSFUL • 2: READ FAIL • 3: IMPROPER SUBSTRATE POSITION

*1 Excluding the control characters.

■ st_ContentMap

Offset	Label name	Name	Data type	Applicable range
+0 to 39	u40_LotID	LotID	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1
+40 to 79	u40_SubstrateID	SubstrateID	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)*1

*1 Excluding the control characters.

■ st_SlotStatus

Offset	Label name	Name	Data type	Applicable range
+0	u_SlotStatus	SlotStatus	Word [Unsigned]	• 0: UNDEFINED • 1: EMPTY • 2: NOT EMPTY • 3: CORRECTLY OCCUPIED • 4: DOUBLE SLOTTED • 5: CROSS SLOTTED

7.3 CMS Service Messages

SECS/GEM communication software supports CMS service messages and automatically replies to the messages. Sent or received CMS service messages can be checked in the communication log.
Additionally, the software notifies the processing result of each service message to a control CPU in the form of an event message via buffer memory.
For details on issuing an event message, refer to the following:
☞ Page 15 CITL to CPU (10087)
For messages supported by SECS/GEM communication software, refer to the following:
☞ Page 89 Service Messages

7.4 CMS Service for a Control CPU

SECS/GEM communication software provides a CMS service interface for a control CPU in the form of an event message via buffer memory.
For details on issuing an event message, refer to the following:
☞ Page 14 CPU to CITL (00087)
For the usage method of a CMS service for a control CPU, refer to the following:
☞ Page 35 Usage Method

7.5 CMS State Model Management

SECS/GEM communication software supports the following state models:

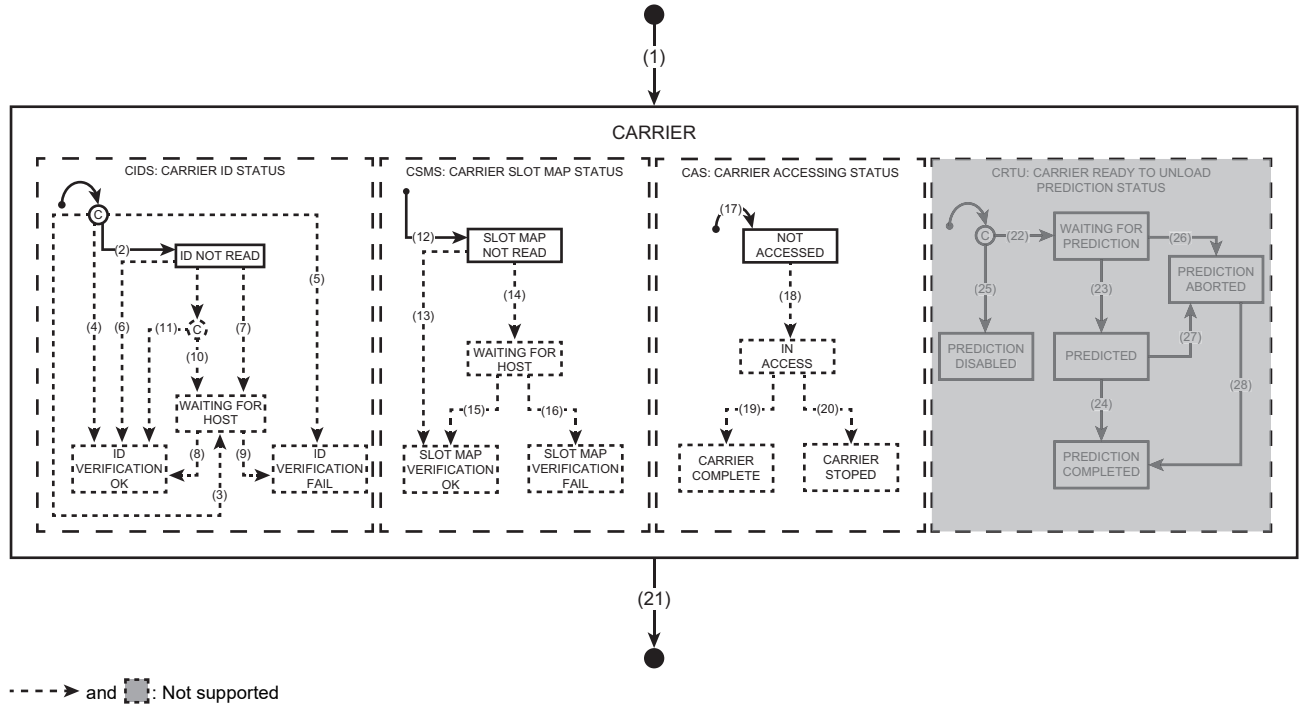
- ☞ Page 47 Carrier State Model
- ☞ Page 50 Load Port Transfer State Model
- ☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment)
- ☞ Page 54 Load Port/Carrier Association State Model
- ☞ Page 55 Access Mode State Model

Carrier State Model

Values of carrier object attributes (CarrierIDStatus, SlotMapStatus, and CarrierAccessingStatus) are managed according to the diagram of Carrier State Model and the event report (S6F11) is sent to the host at each state transition.

For details on the event report (S6F11), refer to the following:

☞ Page 90 CMS Reports, Page 91 CMS Events



State transition of a model diagram

The following table shows the state transition of the Carrier State Model diagram.

Point

Numbers in the table indicate numbers (1) to (28) of state transition described in the model diagram.

—: State transition which is not supported by this product

No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(1)	(NO STATE)	A carrier object is instantiated. (Refer to the state transition No.(2).)	CARRIER	Refer to the action of state transition No.(2), (12), and (17).
(2)	(NO STATE)	A 'Bind (S3F17)' service message is received from the host.	ID NOT READ	• Generating the instance of a carrier object • Changing the CarrierIDStatus attribute value to '0: ID NOT READ' • Sending 'Carrier Action Acknowledge (S3F18)' to the host • Sending the 'CEID30000: NO STATE to ID NOT READ' event (S6F11) to the host • Sending '10087-00901: Bind service notification' to a control CPU
(3)	(NO STATE)	—	WAITING FOR HOST	—
(4)	(NO STATE)	—	ID VERIFICATION OK	—
(5)	(NO STATE)	—	ID VERIFICATION FAIL	—
(6)	ID NOT READ	—	ID VERIFICATION OK	—
(7)	ID NOT READ	—	WAITING FOR HOST	—
(8)	WAITING FOR HOST	—	ID VERIFICATION OK	—
(9)	WAITING FOR HOST	—	ID VERIFICATION FAIL	—
(10)	ID NOT READ	—	WAITING FOR HOST	—
(11)	ID NOT READ	—	ID VERIFICATION OK	—
(12)	(NO STATE)	A carrier is instantiated. (Refer to the state transition No.(2).)	SLOT MAP NOT READ	Changing the SlotMapStatus attribute value to '0: SLOT MAP NOT READ'
(13)	SLOT MAP NOT READ	—	SLOT MAP VERIFICATION OK	—
(14)	SLOT MAP NOT READ	—	WAITING FOR HOST	—
(15)	WAITING FOR HOST	—	SLOT MAP VERIFICATION OK	—
(16)	WAITING FOR HOST	—	SLOT MAP VERIFICATION FAIL	—
(17)	(NO STATE)	A carrier is instantiated. (Refer to the state transition No.(2).)	NOT ACCESSED	Changing the CarrierAccessingStatus attribute value to '0: NOT ACCESSED'
(18)	NOT ACCESSED	—	IN ACCESS	—
(19)	IN ACCESS	—	CARRIER COMPLETE	—

No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(20)	IN ACCESS	—	CARRIER STOPPED	—
(21)	CARRIER	• ❶ '00087-00305: UNLOAD completed notification' is received from a control CPU. • ❷ A 'CancelBind (S3F17)' service message is received from the host.	(NO STATE)	■Common action for ❶ and ❷ • Deleting an instance. • Sending the 'CEID30017: CARRIER to NO STATE' event (S6F11) to the host ■Action only for ❷ • Sending 'Carrier Action Acknowledge (S3F18)' to the host (prior to the event (S6F11)) • Sending '10087-00903: CancelBind service notification' to a control CPU
(22)	(NO STATE)	—	WAITING FOR PREDICTION	—
(23)	WAITING FOR PREDICTION	—	PREDICTED	—
(24)	PREDICTED	—	PREDICTION COMPLETED	—
(25)	(NO STATE)	—	PREDICTION DISABLED	—
(26)	WAITING FOR PREDICTION	—	PREDICTION ABORTED	—
(27)	PREDICTED	—	PREDICTION ABORTED	—
(28)	PREDICTION ABORTED	—	PREDICTION COMPLETED	—

Precautions

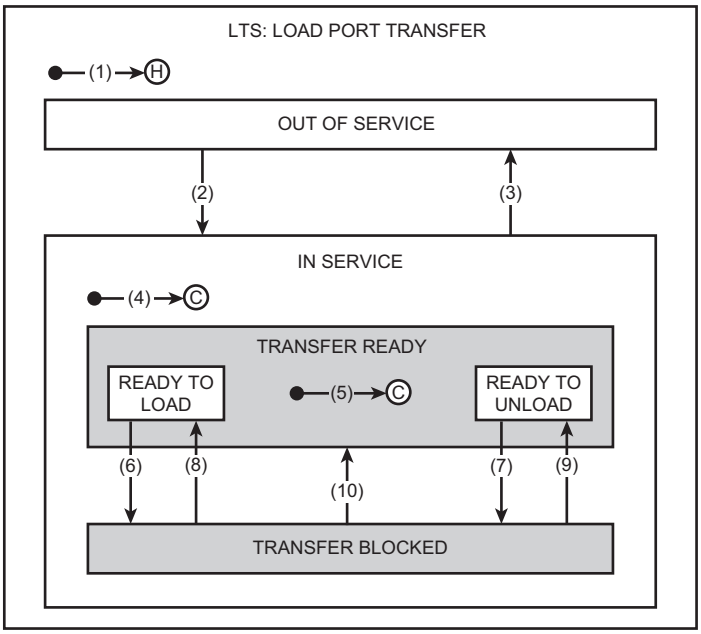
SECS/GEM communication software does not support 'Carrier Ready To Unload (CRTU).'

Load Port Transfer State Model

Values of the load object attribute (PortTransferState) are managed according to the diagram of a load port transport status model and the event report (S6F11) is sent to the host at each state transition.

For details on the event report (S6F11), refer to the following:

☞ Page 90 CMS Reports, Page 91 CMS Events



State transition of a model diagram

The following table shows the state transition of the load port transport status model diagram.

Point

Numbers in the table indicate numbers (1) to (10) of state transition described in the model diagram.

No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(1)	(NO STATE)	'00000-00002: LoadPort initial request' is received from a control CPU.	OUT OF SERVICE, TRANSFER BLOCKED, or READY TO LOAD (History)	• Generating an instance • Changing the value of the PortTransferState attribute to that of PortTransferHistory specified in '00000-00002: LoadPort initial request' • Sending '10000-00002: LoadPort initial acknowledge' to a control CPU ■When PortTransferHistory is '0: OUT OF SERVICE' • Sending the 'CEID30025: NO STATE to OUT OF SERVICE' event (S6F11) to the host ■When PortTransferHistory is '1: TRANSFER BLOCKED' • Sending the 'CEID30026: NO STATE to IN SERVICE' event (S6F11) to the host • Sending the 'CEID30030: IN SERVICE to TRANSFER BLOCKED' event (S6F11) to the host ■When PortTransferHistory is '2: READY TO LOAD' • Sending the 'CEID30026: NO STATE to IN SERVICE' event (S6F11) to the host • Sending the 'CEID30029: IN SERVICE to TRANSFER READY' event (S6F11) to the host • Sending the 'CEID30031: TRANSFER READY to READY TO LOAD' event (S6F11) to the host

No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(2)	OUT OF SERVICE	• ❶ A 'ChangeServiceStatus (S3F25)' service message, which instructs to change the current status to 'IN SERVICE,' is received from the host. • ❷ '00087-00201: IN SERVICE request' is received from a control CPU.	IN SERVICE	■Common action for ❶ and ❷ • Changing the ServiceStatus attribute value to '1: IN SERVICE' • Sending the 'CEID30027: OUT OF SERVICE to IN SERVICE' event (S6F11) to the host • Transitioning to the state transition No.(4) ■Action only for ❶ • Sending 'Port Action Acknowledge (S3F26)' to the host (prior to the event (S6F11)) • Sending '10087-00917: ChangeServiceStatus service notification' to a control CPU ■Action only for ❷ • Sending '10087-00201: IN SERVICE acknowledge' to a control CPU
(3)	IN SERVICE	• ❶ The ChangeServiceStatus service message (S3F25), which instructs to change the status to 'OUT OF SERVICE,' is received from the host. • ❷ '00087-00202: OUT OF SERVICE request' is received from a control CPU.	OUT OF SERVICE	■Common action for ❶ and ❷ • Changing the PortTransferState attribute value to '0: OUT OF SERVICE' • Changing the ServiceStatus attribute value to '0: OUT OF SERVICE' • Sending the 'CEID30028: IN SERVICE to OUT OF SERVICE' event (S6F11) to the host ■Action only for ❶ • Sending 'Port Action Acknowledge (S3F26)' to the host (prior to the event (S6F11)) • Sending '10087-00917: ChangeServiceStatus service notification' to a control CPU ■Action only for ❷ • Sending '10087-00202: OUT OF SERVICE acknowledge' to a control CPU
(4)	IN SERVICE	The state transition is changed from No.(2).	TRANSFER READY or TRANSFER BLOCKED	■When the InServiceStatus attribute value is '0: TRANSFER READY' • Sending the 'CEID30029: INSERVICE to TRANSFER READY' event (S6F11) to the host • Transitioning to the state transition No.(5) ■When the InServiceStatus attribute value is '1: TRANSFER BLOCKED' • Changing the PortTransferState attribute value to '1: TRANSFER BLOCKED' • Sending the 'CEID30030: IN SERVICE to TRANSFER BLOCKED' event (S6F11) to the host
(5)	TRANSFER READY	• ❶ The state transition is changed from No.(4). • ❷ The state transition is changed from No.(10).	READY TO LOAD or READY TO UNLOAD	■When the TransferReadyStatus attribute value is '0: READY TO LOAD' • Changing the PortTransferState attribute value to '2: READY TO LOAD' • Sending the 'CEID30031: TRANSFER READY to READY TO LOAD' event (S6F11) to the host ■When the TransferReadyStatus attribute value is '1: READY TO UNLOAD' • Changing the PortTransferState attribute value to '3: READY TO UNLOAD' • Sending the 'CEID30032: TRANSFER READY to READY TO UNLOAD' event (S6F11) to the host
(6)	READY TO LOAD	'00087-00301: LOAD started notification' is received from a control CPU.	TRANSFER BLOCKED	• Changing the PortTransferState attribute value to '1: TRANSFER BLOCKED' • Changing the InServiceStatus attribute value to '1: TRANSFER BLOCKED' • Sending the 'CEID30033: READY TO LOAD to TRANSFER BLOCKED' event (S6F11) to the host
(7)	READY TO UNLOAD	'00087-00304: UNLOAD started notification' is received from a control CPU.	TRANSFER BLOCKED	• Changing the PortTransferState attribute value to '1: TRANSFER BLOCKED' • Changing the InServiceStatus attribute value to '1: TRANSFER BLOCKED' • Sending the 'CEID30034: READY TO UNLOAD to TRANSFER BLOCKED' event (S6F11) to the host

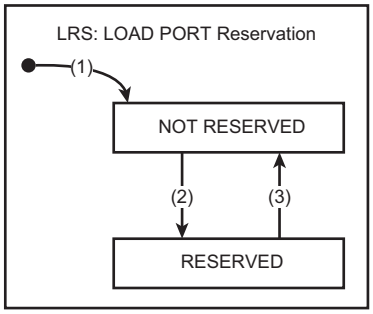
No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(8)	TRANSFER BLOCKED	'00087-00305: UNLOAD completed notification' is received from a control CPU.	READY TO LOAD	• Changing the PortTransferState attribute value to '2: READY TO LOAD' • Changing the InServiceStatus attribute value to '0: TRANSFER READY' • Changing the TransferReadyStatus attribute value to '0: READY TO LOAD' • Sending the 'CEID30035: TRANSFER BLOCKED to READY TO LOAD' event (S6F11) to the host
(9)	TRANSFER BLOCKED	'00087-00303: UNLOAD available notification' is received from a control CPU.	READY TO UNLOAD	• Changing the PortTransferState attribute value to '3: READY TO UNLOAD' • Changing the InServiceStatus attribute value to '0: TRANSFER READY' • Changing the TransferReadyStatus attribute value to '1: READY TO UNLOAD' • Sending the 'CEID30036: TRANSFER BLOCKED to READY TO UNLOAD' event (S6F11) to the host
(10)	TRANSFER BLOCKED	'00087-00306: TRANSFER failed notification' is received from a control CPU.	TRANSFER READY	• Changing the InServiceStatus attribute value to '0: TRANSFER READY' • Sending the 'CEID30037: TRANSFER BLOCKED to TRANSFER READY' event (S6F11) to the host • Transitioning to the state transition No.(5)

Load Port Reservation State Model (internal buffer equipment/ fixed buffer equipment)

Values of the load port object attribute (LoadPortReservationState) are managed according to the diagram of Load Port Reservation State Model and the event report (S6F11) is sent to the host at each state transition.

For details on the event report (S6F11), refer to the following:

☞ Page 90 CMS Reports, Page 91 CMS Events



State transition of a model diagram

The following table shows the state transition of the Load Port Reservation State Model diagram.

Point

Numbers in the table indicate numbers (1) to (3) of state transition described in the model diagram.

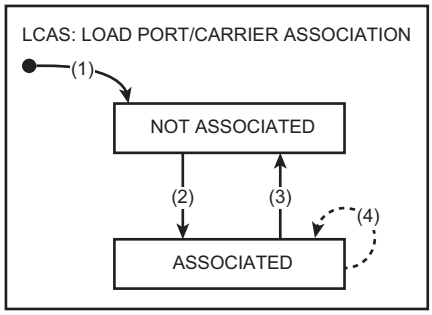
No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(1)	(NO STATE)	'00000-00002: LoadPort initial request' is received from a control CPU.	NOT RESERVED	• Changing the LoadPortReservationState attribute value to '0: NOT RESERVED' • Sending '10000-00002: LoadPort initial acknowledge' to a control CPU
(2)	NOT RESERVED	A 'Bind (S3F17)' service message is received from the host.	RESERVED	• Changing the LoadPortReservationState attribute value to '1: RESERVED' • Sending the 'CEID30038: NOT RESERVED to RESERVED' event (S6F11) to the host • Sending 'Carrier Action Acknowledge (S3F18)' to the host (prior to the event (S6F11)) • Sending '10087-00901: Bind service notification' to a control CPU
(3)	RESERVED	• ❶ A 'CancelBind (S3F17)' service message is received from the host. • ❷ '00087-00302: LOAD complete notification' is received from a control CPU.	NOT RESERVED	■Common action for ❶ and ❷ • Changing the LoadPortReservationState attribute value to '0: NOT RESERVED' • Sending the 'CEID30039: RESERVED to NOT RESERVED' event (S6F11) to the host ■Action only for ❶ • Sending 'Carrier Action Acknowledge (S3F18)' to the host (prior to the event (S6F11)) • Sending '10087-00903: CancelBind service notification' to a control CPU

Load Port/Carrier Association State Model

Values of the load port object attribute (PortAssociationState) are managed according to the diagram of Load Port/Carrier Association State Model and the event report (S6F11) is sent to the host at each state transition.

For details on the event report (S6F11), refer to the following:

☞ Page 90 CMS Reports, Page 91 CMS Events



- - - - ➤: Not supported

State transition of a model diagram

The following table shows the state transition of the Load Port/Carrier Association State Model diagram.

Point

Numbers in the table indicate numbers (1) to (4) of state transition described in the model diagram.

—: State transition which is not supported by this product

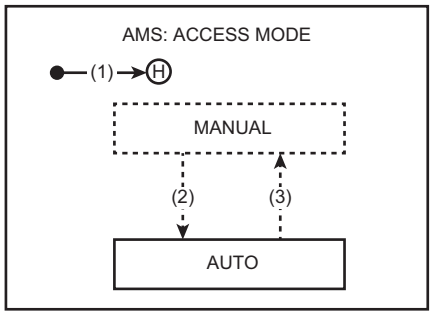
No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(1)	(NO STATE)	'00000-00002: LoadPort initial request' is received from a control CPU.	NOT ASSOCIATED	• Changing the PortAssociationState attribute value to '0: NOT ASSOCIATED' • Sending '10000-00002: LoadPort initial acknowledge' to a control CPU
(2)	NOT ASSOCIATED	A carrier object is instantiated. (Refer to the state transition No.(1) of Carrier State Model, except for when receiving a CarrierNotification service message (S3F17) from the host.)	ASSOCIATED	• Changing the PortAssociationState attribute value to '1: ASSOCIATED' • Sending the 'CEID30040: NOT ASSOCIATED to ASSOCIATED' event (S6F11) to the host
(3)	ASSOCIATED	• ❶ A CancelBind service message (S3F17) is received from the host when the value of LoadPortReservationState and PortTransferState of a target load port is '1: RESERVED' and '2: READY TO LOAD,' respectively. • ❷ '00087-00305: UNLOAD completed notification' is received from a control CPU.	NOT ASSOCIATED	■Common action for ❶ and ❷ • Changing the PortAssociationState attribute value to '0: NOT ASSOCIATED' • Sending the 'CEID30041: ASSOCIATED to NOT ASSOCIATED' event (S6F11) to the host ■Action only for ❶ • Sending 'Carrier Action Acknowledge (S3F18)' to the host (prior to the event (S6F11)) • Sending '10087-00903: CancelBind service notification' to a control CPU
(4)	ASSOCIATED	—	ASSOCIATED	—

Access Mode State Model

Values of the load port object attribute (AccessMode) are managed according to the diagram of Access Mode State Model and the event report (S6F11) is sent to the host at each state transition.
For details on the event report (S6F11), refer to the following:
☞ Page 90 CMS Reports, Page 91 CMS Events

Point

A change request is denied when the reservation status (LoadPortReservationState) of a target load port is 'RESERVED' or when the transfer status (PortTransferState) of the load port is 'TRANSFER BLOCKED.'



- - - - ➤: Not supported

State transition of a model diagram

The following table shows the state transition of the Access Mode State Model diagram.

Point

Numbers in the table indicate numbers (1) to (3) of state transition described in the model diagram.

—: State transition which is not supported by this product

No.	Current state	Trigger	New state	Action by SECS/GEM communication software
(1)	(NO STATE)	'00000-00002: LoadPort initial request' is received from a control CPU.	AUTO (History)	• Changing the value of the AccessMode attribute to that of AccessModeHistory specified in '00000-00002: LoadPort initial request' • Sending '10000-00002: LoadPort initial acknowledge' to a control CPU ■When the AccessModeHistory attribute value is '1: AUTO' • Sending the 'CEID30044: NO STATE to AUTO' event (S6F11) to the host
(2)	MANUAL	—	AUTO	—
(3)	AUTO	—	MANUAL	—

7.6 CMS Variables

SECS/GEM communication software provides variables required for E87-CMS.
A value of each variable whose class is SV or DVVAL refers to the attributes of an object provided by SECS/GEM communication software.
○: Complied

VID	Class	Variable name	Format	Access from host	Target object	Description	E87 standard
30000	DVVAL	AccessMode	U1[1]	ReadOnly	Load port object	Access mode of a load port • 0: MANUAL • 1: AUTO	○
30001 to 30006	SV	AccessMode_1 to AccessMode_6	U1[1]	ReadOnly	Load port object	Access modes[*1] of load port 1 to 6 • 0: MANUAL • 1: AUTO	○
30007	ECV	BypassReadID	BOOL[1]	• Read • Write	None	Switching the state transition of Carrier State Model between No.(10) and No.(11) when a carrier ID reader is not available • true: Transitioned to 'ID VERIFICATION OK' (No.(11)) • false: Transitioned to 'WAITING FOR HOST' (No.(10)) This variable is not used in SECS/GEM communication software.	○
30008	DVVAL	CarrierAccessingStatus	U1[1]	ReadOnly	Carrier object	Access status to a carrier • 0: NOT ACCESSED • 1: IN ACCESS • 2: CARRIER COMPLETE • 3: CARRIER STOPPED	○
30009	DVVAL	CarrierID	ASCII[1..80][*2]	ReadOnly	Carrier object	Carrier ID (ObjID)	○
30010 to 30041	SV	CarrierID_1 to CarrierID_32	ASCII[1..80][*2]	ReadOnly	Location object	CarrierID exists in the carrier location 1 to 32 This variable is not used in SECS/GEM communication software.	○
30042	DVVAL	CarrierIDStatus	U1[1]	ReadOnly	Carrier object	Verification status of a carrier ID • 0: ID NOT READ • 1: WAITING FOR HOST • 2: ID VERIFICATION OK • 3: ID VERIFICATION FAILED	○
30043	SV	CarrierLocationMatrix	LIST[1..32]	ReadOnly	Location object	List of LocationID and CarrierID LIST[1..32] LIST [2] LocationID CarrierID ⋮ This variable is not used in SECS/GEM communication software.	○
30044	DVVAL	LocationID	ASCII[1..80][*2]	ReadOnly	Carrier object	ID indicating the location of a carrier in equipment	○
30045 to 30076	SV	LocationID_1 to LocationID_32	ASCII[1..80][*2]	ReadOnly	Location object	LocationID of carrier location 1 to 32 This variable is not used in SECS/GEM communication software.	○
30077	DVVAL	LoadPortReservationState	U1[1]	ReadOnly	Load port object	Reservation status of a load port • 0: NOT RESERVED • 1: RESERVED	○
30078 to 30083	SV	LoadPortReservationState_1 to LoadPortReservationState_6	U1[1]	ReadOnly	Load port object	Reservation statuses[*1] of load port 1 to 6 • 0: NOT RESERVED • 1: RESERVED	○
30084	SV	LoadPortReservationStateList	LIST[1..6]	ReadOnly	None	List of reservation statuses of all load ports LIST[1..6] LoadPortReservationState ⋮	○

VID	Class	Variable name	Format	Access from host	Target object	Description	E87 standard
30085	DVVAL	PortAssociationState	U1[1]	ReadOnly	Load port object	Association status of a load port • 0: NOT ASSOCIATED • 1: ASSOCIATED	○
30086 to 30091	SV	PortAssociationState_1 to PortAssociationState_6	U1[1]	ReadOnly	Load port object	Association statuses[*1] of load port 1 to 6 • 0: ASSOCIATED • 1: NOT ASSOCIATED	○
30092	SV	PortAssociationStateList	LIST[1..6]	ReadOnly	None	List of association statuses of all load ports LIST[1..6] PortAssociationState ⋮	○
30093	DVVAL	PortID	U1[1]	ReadOnly	Load port object	PTN: Material port number (material location) of a load port (positive integer) • 1 to 6	○
30094 to 30099	SV	PortID_1 to PortID_6	U1[1]	ReadOnly	Load port object	PTN: Material port numbers (material locations) of load port 1 to 6 (positive integer)[*1] • 1 to 6	○
30100	DVVAL	PortStateInfo	LIST[2]	ReadOnly	Load port object	Association and transfer status of a load port LIST[2] PortTransferState PortAssociationState	○
30101 to 30106	SV	PortStateInfo_1 to PortStateInfo_6	LIST[2]	ReadOnly	Load port object	Association and transfer statuses[*1] of load port 1 to 6 LIST[2] PortTransferState PortAssociationState	○
30107	SV	PortStateInfoList	LIST[1..6]	ReadOnly	None	List of association and transfer statuses of all load ports LIST[1..6] PortStateInfo ⋮	○
30108	DVVAL	PortTransferState	U1[1]	ReadOnly	Load port object	Transfer status of a load port • 0: OUT OF SERVICE • 1: TRANSFER BLOCKED • 2: READY TO LOAD • 3: READY TO UNLOAD	○
30109 to 30114	SV	PortTransferState_1 to PortTransferState_6	U1[1]	ReadOnly	Load port object	Transfer statuses[*1] of load port 1 to 6 • 0: OUT OF SERVICE • 1: TRANSFER BLOCKED • 2: READY TO LOAD • 3: READY TO UNLOAD	○
30115	SV	PortTransferStateList	LIST[1..6]	ReadOnly	None	List of transfer statuses of all load ports LIST[1..6] PortTransferState ⋮	○
30116	DVVAL	Reason	U1[1]	ReadOnly	Carrier object	Reason for the occurrence of the state transition No.(14) in Carrier State Model • 0: VERIFICATION NEEDED • 1: VERIFICATION BY EQUIPMENT UNSUCCESSFUL • 2: READ FAIL • 3: IMPROPER SUBSTRATE POSITION	○
30117	DVVAL	SlotMap	LIST[1..25]	ReadOnly	Carrier object	List of slot statuses[*3] LIST[1..25] U1[1] SlotStatus ⋮ ■SlotStatus • 0: UNDEFINED • 1: EMPTY • 2: NOT EMPTY • 3: CORRECTLY OCCUPIED • 4: DOUBLE SLOTTED • 5: CROSS SLOTTED	○

VID	Class	Variable name	Format	Access from host	Target object	Description	E87 standard
30118	DVVAL	SlotMapStatus	U1[1]	ReadOnly	Carrier object	Verification status of a slot map • 0: SLOT MAP NOT READ • 1: WAITING FOR HOST • 2: SLOT MAP VERIFICATION OK • 3: SLOT MAP VERIFICATION FAILED	○

*1 Up to the maximum number of load ports set for equipment specification settings are available. (☞ Page 24 Load port)

*2 Excluding the control characters.

*3 Up to the maximum number of carrier slots set for equipment specification settings are available. (☞ Page 23 General)

7.7 CMS Events and Reports

SECS/GEM communication software supports state transition events, supplementary events, and reports of state models for CMS state model management.

Supported events and reports are subjected to the dynamic event report setting function, which is compliant with GEM (E30).

For the dynamic event report setting, refer to the "Dynamic Setting Change" of the following manual:

📖C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual

For supported events and reports, refer to the following:

☞ Page 90 CMS Reports, Page 91 CMS Events

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8 TROUBLESHOOTING

This chapter shows the troubleshooting related to the supported GEM300 standards.
For the troubleshooting of SECS/GEM communication software, refer to the following:
📖C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual

8.1 Troubleshooting by Symptom

This section shows the troubleshooting related to the supported GEM300 standards by the symptom.

Symptom	Check item	Corrective action
Fails to save a file.	Does a file of the open project exist?	When the file of the open project is deleted, the file cannot be saved. Create a project again.
GEM300 functions cannot be enabled.	Is a license registered?	Check the registration status of a license, and register it. For details, refer to the following: 📖C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual
	Is the "Use GEM300 standard support function" checkbox in the "Equipment Setting" screen unselected?	Select the "Use GEM300 standard support function" checkbox. (☞ Page 22 Equipment Settings)

8.2 Error Code List

The following table shows the codes for errors that occur in GEM300 standards.
The error codes can be checked in the labels (error codes) included in 'acknowledge' from SECS/GEM communication software.
For details, refer to the following:
☞ Page 64 Control CPU Interface Formats

Error code	Error name	Error description	Corrective action
0	No error	—	—
12	Parameters improperly specified	• The specified attribute value is invalid. • The specified parameter is invalid.	A value or parameter out of the applicable range is specified. Set a value within the applicable range.
17	Command not valid for current state	• The specified command is not executable. • No more the specified object can be created.	• Check the status of GEM300 functions. • Check the status of the specified object.
48	Load port does not exist	The specified load port does not exist.	Specify PortID(PTN) that exists.
32770	Action failed due to errors	An error occurred in SECS/GEM communication software.	Check the contents of the following error information in the event history of SECS/GEM communication software pre-installed model module. • An error information whose "Source" is "RD55UP12-V" and name starts with 'detail information: [CAS]' in "Detailed event log information"

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APPENDIX

Appendix 1 Available Characters

This section shows the available characters for the equipment specification settings.

Screen	Item	Available/inhibited character	Reference
[General] tab	OBJSPEC	■Available character • ASCII character*1	☞ Page 23 General
	Carrier Slot Count	■Available character • Unsigned integer	
[Load Port] tab	Load Port Count	■Available character • Unsigned integer	☞ Page 24 Load port
	Load Port ID List	■Available character • ASCII character*1	
[CPU Interface] tab	CPU Interface Timer[msec]	■Available character • Unsigned integer	☞ Page 25 CPU interface

*1 Excluding the control characters.

Appendix 2 Control CPU Interface Formats

This section shows the control CPU interface formats.

00000: CPU to CITL

The following shows the format of CPU to CITL.

00001: GEM300 Initial request

■ Information type

00000

■ Detail type

00001

■ Data size of data area (Byte units)

0 byte

■ Processing

Activating and initializing GEM300 functions is requested.

■ Relevant state transition

None

■ Data

None

■ Relevant item

☞ Page 66 00001: GEM300 Initial acknowledge

00002 : LoadPort initial request

■ Information type

00000

■ Detail type

00002

■ Data size of data area (Byte units)

34 byte

■ Processing

Initializing all load ports is requested.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(1)
  (☞ Page 50 Load Port Transfer State Model)
- Load Port Reservation State Model state transition No.(1)
  (☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment))
- Load Port/Carrier Association State Model state transition No.(1)
  (☞ Page 54 Load Port/Carrier Association State Model)
- Access Mode State Model state transition No.(1)
  (☞ Page 55 Access Mode State Model)

■ Data

Structure label

- st_00000-00002

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_AccessModeHistory	AccessModeHistory	Bit String [16-bit]	1: AUTO	Specify the initial value of AccessMode of each load port. • b0: AccessMode of PortID(PTN)1 • b1: AccessMode of PortID(PTN)2 • b2: AccessMode of PortID(PTN)3 • b3: AccessMode of PortID(PTN)4 • b4: AccessMode of PortID(PTN)5 • b5: AccessMode of PortID(PTN)6 • b6 to b15: System area
+1 to 16	u16_PortTransferHistory	PortTransferHistory	Word [Unsigned] (0..15)	• 0: OUT OF SERVICE • 1: TRANSFERBLOCKED2: READYTO LOAD • 2: READYTO LOAD	Specify the initial value of PortTransferState of each load port. • (+0): PortTransferState of PortID(PTN)1 • (+1): PortTransferState of PortID(PTN)2 • (+2): PortTransferState of PortID(PTN)3 • (+3): PortTransferState of PortID(PTN)4 • (+4): PortTransferState of PortID(PTN)5 • (+5): PortTransferState of PortID(PTN)6 • (+6 to 15): System area

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

☞ Page 67 00002 : LoadPort initial acknowledge

10000: CITL to CPU

The following shows the format of CITL to CPU.

00001: GEM300 Initial acknowledge

■ Information type

10000

■ Detail type

00001

■ Data size of data area (Byte units)

2 byte

■ Processing

- The processing result of 'GEM300 Initial request' is returned.
- A processing result is reflected to 'GEM300 status' (b5) of 'CA-SECS status' (Un\G16384).

■ Relevant state transition

None

■ Data

Structure label

- st_10000-00001

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_ErrorCode	Error code	Word [Unsigned]	0 to 65535	The code for an error occurred for the request is returned.

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

Error code

Error code	Error name
0	No error
17	Command not valid for current state

For details on the error codes, refer to the following:

☞ Page 61 Error Code List

■ Relevant item

☞ Page 64 00001: GEM300 Initial request

00002 : LoadPort initial acknowledge

■ Information type

10000

■ Detail type

00002

■ Data size of data area (Byte units)

32 byte

■ Processing

The processing result of 'LoadPort initial request' is returned.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(1)
  (☞ Page 50 Load Port Transfer State Model)
- Load Port Reservation State Model state transition No.(1)
  (☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment))
- Load Port/Carrier Association State Model state transition No.(1)
  (☞ Page 54 Load Port/Carrier Association State Model)
- Access Mode State Model state transition No.(1)
  (☞ Page 55 Access Mode State Model)

■ Data

Structure label

- st_10000-00002

Offset	Label name	Name	Data type	Applicable range	Description
+0 to 15	u16_ErrorCode	Error code array	Word [Unsigned] (0..15)	0 to 65535	The code for an error occurred for the request is returned. • (+0): Error code of PortID(PTN)1 • (+1): Error code of PortID(PTN)2 • (+2): Error code of PortID(PTN)3 • (+3): Error code of PortID(PTN)4 • (+4): Error code of PortID(PTN)5 • (+5): Error code of PortID(PTN)6 • (+6 to 15): System area

Structure labels defined in this product are provided in a structure label definition file.
For the usage method of a structure label definition file, refer to the following:
☞ Page 95 Importing a Label

Error code

Error code	Error name
0	No error
12	Parameters improperly specified
17	Command not valid for current state
48	Load port does not exist
32770	Action failed due to errors

For details on the error codes, refer to the following:
☞ Page 61 Error Code List

Precautions

Outside the range of the number of load ports that can be set in "Load Port Count" in the [Load Port] tab is system area. An error code (48) is always sent. (☞ Page 24 Load port)

Example: When the number of load ports is 4, and the parameter of load port number (PTN) which is set to 3 is incorrect

- u16_ErrorCode[0, 0, 12, 0, 48, 48, 48, 48, 48, 48, 48, 48, 48, 48, 48][*1]

*1 If even one error code (12) exists, all load ports cannot be initialized.

Example: When the number of load ports is 4, and all load ports are initialized

- u16_ErrorCode[17, 17, 17, 17, 48, 48, 48, 48, 48, 48, 48, 48, 48, 48, 48]

■ Relevant item

☞ Page 65 00002 : LoadPort initial request

00087: CPU to CITL

The following shows the format of CPU to CITL.

00201: IN SERVICE request

■ Information type

00087

■ Detail type

00201

■ Data size of data area (Byte units)

2 byte

■ Processing

Changing 'PortTransferState' which is an attribute of a load port specified in PortID(PTN) to 'IN SERVICE' is requested.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(2)

  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_00087-00201

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

☞ Page 77 00201: IN SERVICE acknowledge

00202: OUT OF SERVICE request

■ Information type

00087

■ Detail type

00202

■ Data size of data area (Byte units)

2 byte

■ Processing

Changing 'PortTransferState' which is an attribute of a load port specified in PortID(PTN) to 'OUT OF SERVICE' is requested.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(3)
  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_00087-00202

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

☞ Page 78 00202: OUT OF SERVICE acknowledge

00301: LOAD started notification

■ Information type

00087

■ Detail type

00301

■ Data size of data area (Byte units)

2 byte

■ Processing

The start of loading a carrier in a load port specified in PortID(PTN) is notified.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(6)

  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_00087-00301

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

00302: LOAD complete notification

■ Information type

00087

■ Detail type

00302

■ Data size of data area (Byte units)

2 byte

■ Processing

The completion of loading a carrier in a load port specified in PortID(PTN) is notified.

■ Relevant state transition

- Load Port Reservation State Model state transition No.(3)

  (☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment))

■ Data

Structure label

- st_00087-00302

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

00303: UNLOAD available notification

■ Information type

00087

■ Detail type

00303

■ Data size of data area (Byte units)

2 byte

■ Processing

The completion of the preparation for unloading a carrier in a load port specified in PortID(PTN) is notified.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(9)

  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_00087-00303

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

00304: UNLOAD started notification

■ Information type

00087

■ Detail type

00304

■ Data size of data area (Byte units)

2 byte

■ Processing

The start of unloading a carrier in a load port specified in PortID(PTN) is notified.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(7)

  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_00087-00304

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

00305: UNLOAD completed notification

■ Information type
00087

■ Detail type
00305

■ Data size of data area (Byte units)
2 byte

■ Processing
The completion of unloading a carrier in a load port specified in PortID(PTN) is notified.

■ Relevant state transition
- Carrier State Model state transition No.(21)
  (☞ Page 47 Carrier State Model)
- Load Port Transfer State Model state transition No.(8)
  (☞ Page 50 Load Port Transfer State Model)
- Load Port/Carrier Association State Model state transition No.(3)
  (☞ Page 54 Load Port/Carrier Association State Model)

■ Data
Structure label

- st_00087-00305

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.
For the usage method of a structure label definition file, refer to the following:
☞ Page 95 Importing a Label

■ Relevant item
None

00306: TRANSFER failed notification

■ Information type

00087

■ Detail type

00306

■ Data size of data area (Byte units)

2 byte

■ Processing

The failure of the transfer of a carrier in a load port specified in PortID(PTN) is notified.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(10)

  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_00087-00306

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	Specify PortID(PTN).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

10087: CITL to CPU

The following shows the format of CITL to CPU.

00201: IN SERVICE acknowledge

■ Information type

10087

■ Detail type

00201

■ Data size of data area (Byte units)

4 byte

■ Processing

The processing result of 'IN SERVICE request' is returned.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(2)
  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_10087-00201

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	A required PortID(PTN) is returned.
+1	u_ErrorCode	Error code	Word [Unsigned]	0 to 65535	The code for an error occurred for the request is notified.

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

Error code

Error code	Error name
0	No error
17	Command not valid for current state
48	Load port does not exist
32770	Action failed due to errors

For details on the error codes, refer to the following:

☞ Page 61 Error Code List

■ Relevant item

☞ Page 69 00201: IN SERVICE request

00202: OUT OF SERVICE acknowledge

■ Information type

10087

■ Detail type

00202

■ Data size of data area (Byte units)

4 byte

■ Processing

The processing result of 'OUT OF SERVICE request' is returned.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(3)
  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_10087-00202

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	A required PortID(PTN) is returned.
+1	u_ErrorCode	Error code	Word [Unsigned]	0 to 65535	The code for an error occurred for the request is notified.

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

Error code

Error code	Error name
0	No error
17	Command not valid for current state
48	Load port does not exist
32770	Action failed due to errors

For details on the error codes, refer to the following:

☞ Page 61 Error Code List

■ Relevant item

☞ Page 70 00202: OUT OF SERVICE request

00901: Bind service notification

■ Information type

10087

■ Detail type

00901

■ Data size of data area (Byte units)

4466 byte

■ Processing

The processing result of 'Bind' service is notified.

■ Relevant state transition

- Carrier State Model state transition No.(1), (2), (12), and (17)
  (☞ Page 47 Carrier State Model)
- Load Port Reservation State Model state transition No.(2)
  (☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment))
- Load Port/Carrier Association State Model state transition No.(2)
  (☞ Page 54 Load Port/Carrier Association State Model)

■ Data

Structure label

- st_10087-00901

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	PortID(PTN) requested by the host is notified.
+1 to 40	u40_CarrierID	CarrierID	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)	CarrierID requested by the host is notified.
+41	u_CAACK	CAACK	Word [Unsigned]	• 0: Acknowledge, command has been performed. • 1: Invalid command • 2: Can not perform now. • 3: Invalid data or argument. • 4: Acknowledge, request will be performed with completion signaled later by an event. • 5: Rejected. Invalid state. • 6: Command performed with errors.	A Confirmation code of a carrier action responses to the host is notified.
+42 to 2232	st_CarrierObject	CarrierObject	st_CarrierObject	Page 45 st_CarrierObject	A carrier object of the result of the processing service is notified when CAACK is 0 (check).

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

00903: CancelBind service notification

■ Information type

10087

■ Detail type

00903

■ Data size of data area (Byte units)

84 byte

■ Processing

The processing result of 'CancelBind' service is notified.

■ Relevant state transition

- Carrier State Model state transition No.(21)
  (☞ Page 47 Carrier State Model)
- Load Port Reservation State Model state transition No.(3)
  (☞ Page 53 Load Port Reservation State Model (internal buffer equipment/fixed buffer equipment))
- Load Port/Carrier Association State Model state transition No.(3)
  (☞ Page 54 Load Port/Carrier Association State Model)

■ Data

Structure label

- st_10087-00903

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	PortID(PTN) requested by the host is notified.
+1 to 40	u40_CarrierID	CarrierID	Word [Unsigned] (0..39)	1 to 80 characters (ASCII)	CarrierID requested by the host is notified.
+41	u_CAACK	CAACK	Word [Unsigned]	• 0: Acknowledge, command has been performed. • 1: Invalid command • 2: Can not perform now. • 3: Invalid data or argument. • 4: Acknowledge, request will be performed with completion signaled later by an event. • 5: Rejected. Invalid state. • 6: Command performed with errors.	A Confirmation code of a carrier action responses to the host is notified.

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

00917: ChangeServiceStatus service notification

■ Information type

10087

■ Detail type

00917

■ Data size of data area (Byte units)

8 byte

■ Processing

The processing result of 'ChangeServiceStatus' service is notified.

■ Relevant state transition

- Load Port Transfer State Model state transition No.(2) and (3)
  (☞ Page 50 Load Port Transfer State Model)

■ Data

Structure label

- st_10087-00917

Offset	Label name	Name	Data type	Applicable range	Description
+0	u_PortID	PortID(PTN)	Word [Unsigned]	1 to 6	PortID(PTN) requested by the host is notified.
+1	u_ServiceStatus	ServiceStatus	Word [Unsigned]	• 0: OUT OF SERVICE • 1: IN SERVICE	ServiceStatus requested by the host is notified.
+2	u_CAACK	CAACK	Word [Unsigned]	• 0: Acknowledge, command has been performed. • 1: Invalid command. • 2: Can not perform now. • 3: Invalid data or argument. • 4: Acknowledge, request will be performed with completion signaled later by an event. • 5: Rejected. Invalid state. • 6: Command performed with errors.	A Confirmation code of a carrier action responses to the host is notified.
+3	u_AllServiceStatus	AllServiceStatus	Bit String [16-bit]	• 0: OUT OF SERVICE • 1: IN SERVICE	A snapshot of ServiceStatus of all load ports right after the service execution is notified. (Same as 'Service status'(Un\G24594)) • b0: ServiceStatus of PortID(PTN)1 • b1: ServiceStatus of PortID(PTN)2 • b2: ServiceStatus of PortID(PTN)3 • b3: ServiceStatus of PortID(PTN)4 • b4: ServiceStatus of PortID(PTN)5 • b5: ServiceStatus of PortID(PTN)6 • b6 to b15: System area

Structure labels defined in this product are provided in a structure label definition file.

For the usage method of a structure label definition file, refer to the following:

☞ Page 95 Importing a Label

■ Relevant item

None

Appendix 3 Buffer Memory

This section shows the buffer memory list and its detailed information.

Buffer memory list

The following table shows the buffer memory list.

R: Read-only, W: Write-only

Address decimal (hexadecimal)	Application	Name	Initial value	R/W
16384 (4000H)	CA-SECS status	CA-SECS status information	0	R
16385 (4001H)		CA-SECS error-detected information	0	R
16386 to 20431 (4002H to 4FCFH)	System area	—	—	—
20432 (4FD0H)	CPU to CITL I/F error-detected information	Latest CPU to CITL I/F error-detected information	0	R
20433 (4FD1H)		Information type at latest error detection	0	R
20434 (4FD2H)		Detail type at latest error detection	0	R
20435 to 20436 (4FD3H to 4FD4H)		Data size at latest error detection	0	R
20437 to 20447 (4FD5H to 4FDFH)	System area	—	—	—
20448 (4FE0H)	CITL to CPU I/F	Write status flag	0	R
20449 (4FE1H)		Read status flag	0	W
20450 (4FE2H)		Information type	0	R
20451 (4FE3H)		Detail type	0	R
20452 to 20453 (4FE4H to 4FE5H)		Start address of data area	1572864 (180000H)	R
20454 to 20455 (4FE6H to 4FE7H)		Data size of data area	0	R
20456 to 20463 (4FE8H to 4FEFH)	System area	—	—	—
20464 (4FF0H)	CPU to CITL I/F	Write status flag	0	W
20465 (4FF1H)		Read status flag	0	R
20466 (4FF2H)		Information type	0	W
20467 (4FF3H)		Detail type	0	W
20468 to 20469 (4FF4H to 4FF5H)		Start address of data area	1835008 (1C0000H)	R
20470 to 20471 (4FF6H to 4FF7H)		Data size of data area	0	W
20472 to 24575 (4FF8H to 5FFFH)	System area	—	—	—

Address decimal (hexadecimal)	Application	Name	Initial value	R/W
24576 (6000H)	Load port status	Port access mode	0	R
24577 to 24593 (6001H to 6011H)		Port transfer state	0	R
24594 (6012H)		Service status	0	R
24595 (6013H)		In service status	0	R
24596 (6014H)		Transfer ready status	0	R
24597 (6015H)		Port association state	0	R
24598 (6016H)		Port reservation state	0	R
24599 (6017H)	Carrier	Carrier object count	0	R
24600 to 1572863 (6018H to 17FFFFH)	System area	—	—	—
1572864 to 1835007 (180000H to 1BFFFFH)	CITL to CPU I/F	Data reading area	0	R
1835008 to 2097151 (1C0000H to 1FFFFFH)	CPU to CITL I/F	Data writing area	0	W

Buffer memory details

The following shows the details of buffer memories.

CA-SECS status

■ CA-SECS status (Un\G16384)

Name	Address	Bit	Description
CA-SECS status	Un\G16384	0 to 15	The CA-SECS status is stored. • b0: CIM control READY (0: NOT READY, 1: READY) • b1: HSMS line communication status (0: Disconnected, 1: Connected) • b2: HSMS reconnection retry (0: Retried, 1: Retrying) • b3: GEM communication establishment status (0: Not established, 1: Establishing) • b4: GEM online status (0: Offline, 1: Online) • b5: GEM300 status (0: Invalid, 1: Valid) • b6: Transaction queue full for PLC Transmission (0: Queue is mot full, 1: Queue is full) • b7: Queue full of event messages for CPU to CITL (0: Queue is mot full, 1: Queue is full) • b8 to b15: System area

■ CA-SECS error-detected information (Un\G16385)

Name	Address	Bit	Description
CA-SECS status	Un\G16385	0 to 15	CA-SECS error-detected information is stored. • b0: System area • b1: SD memory card file access error detection (0: Normal, 1: Error detected) • b2 to b15: System area

CPU to CITL I/F error-detected information

■ Latest CPU to CITL I/F error-detected information (Un\G20432)

Name	Address	Bit	Description
Latest CPU to CITL I/F error-detected information	Un\G20432	0 to 15	The latest error-detected information of CPU to CITL I/F is stored. • b0: Information type error detection (0: Normal, 1: Error detected) • b1: Detail type error detection (0: Normal, 1: Error detected) • b2: Data size error detection (0: Normal, 1: Error detected) • b3 to b15: System area

■ Information type at latest error detection (Un\G20433)

Name	Address	Bit	Description
Information type at latest error detection	Un\G20433	0 to 15	The information type at the latest error detection is stored. For details on the information type, refer to the following: ☞ Page 14 Exchanged data identifier

■ Detail type at latest error detection (Un\G20434)

Name	Address	Bit	Description
Detail type at latest error detection	Un\G20434	0 to 15	The detail type at the latest error detection is stored. For details on the detail type, refer to the following: ☞ Page 14 Exchanged data identifier

■ Data size at latest error detection (Un\G20435 to 20436)

Name	Address	Bit	Description
Data size at latest error detection	Un\G20435 to 20436	0 to 31	The data size at the latest error detection is stored in byte units. • Data size: 0 to 4294967295 (0H to FFFFFFFFH)

CITL to CPU I/F

■ Write status flag (Un\G20448)

Name	Address	Bit	Description
Write status flag	Un\G20448	0 to 15	A write status flag is stored. • b0: In-use flag (0: Not used, 1: In use) • b1: Write completion flag (0: Writing, 1: Writing completed) • b2 to b15: System area

■ Read status flag (Un\G20449)

Name	Address	Bit	Description
Read status flag	Un\G20449	0 to 15	Store a read status flag. • b0: In-use flag (0: Not used, 1: In use) • b1: Read completion flag (0: Reading, 1: Reading completed) • b2 to b15: System area

■ Information type (Un\G20450)

Name	Address	Bit	Description
Information type	Un\G20450	0 to 15	An information type is stored. For details on the information type, refer to the following: ☞ Page 14 Exchanged data identifier

■ Detail type (Un\G20451)

Name	Address	Bit	Description
Detail type	Un\G20451	0 to 15	A detail type is stored. For details on the detail type, refer to the following: ☞ Page 14 Exchanged data identifier

■ Start address of data area (Un\G20452 to 20453)

Name	Address	Bit	Description
Start address of data area	Un\G20452 to 20453	0 to 31	The start address of the data area is stored. Start address: Fixed to 1572864 (180000H)

■ Data size of data area (Un\G20454 to 20455)

Name	Address	Bit	Description
Data size of data area	Un\G20454 to 20455	0 to 31	The data size of the data area is stored in byte units. Data size: 0 to 262144 (0H to 40000H) (maximum 256 KB)

CPU to CITL I/F

■ Write status flag (Un\G20464)

Name	Address	Bit	Description
Write status flag	Un\G20464	0 to 15	Store a write status flag. • b0: In-use flag (0: Not used, 1: In use) • b1: Write completion flag (0: Writing, 1: Writing completed) • b2 to b15: System area

■ Read status flag (Un\G20465)

Name	Address	Bit	Description
Read status flag	Un\G20465	0 to 15	A read status flag is stored. • b0: In-use flag (0: Not used, 1: In use) • b1: Read completion flag (0: Reading, 1: Reading completed) • b2 to b15: System area

■ Information type (Un\G20466)

Name	Address	Bit	Description
Information type	Un\G20466	0 to 15	Store an information type. For details on the information type, refer to the following: ☞ Page 14 Exchanged data identifier

■ Detail type (Un\G20467)

Name	Address	Bit	Description
Detail type	Un\G20467	0 to 15	Store a detail type. For details on the detail type, refer to the following: ☞ Page 14 Exchanged data identifier

■ Start address of data area (Un\G20468 to 20469)

Name	Address	Bit	Description
Start address of data area	Un\G20468 to 20469	0 to 31	The start address of the data area is stored. Start address: Fixed to 1835008 (1C0000H)

■ Data size of data area (Un\G20470 to 20471)

Name	Address	Bit	Description
Data size of data area	Un\G20470 to 20471	0 to 31	Store the data size of the data area in byte units. Data size: 0 to 262144 (0H to 40000H) (maximum 256 KB)

Load port status

■ Port access mode (Un\G24576)

Name	Address	Bit	Description
Port access mode	Un\G24576	0 to 15	The access mode of a load port is stored. • b0: AccessMode of PortID(PTN)1 (0: MANUAL, 1: AUTO) • b1: AccessMode of PortID(PTN)2 (0: MANUAL, 1: AUTO) • b2: AccessMode of PortID(PTN)3 (0: MANUAL, 1: AUTO) • b3: AccessMode of PortID(PTN)4 (0: MANUAL, 1: AUTO) • b4: AccessMode of PortID(PTN)5 (0: MANUAL, 1: AUTO) • b5: AccessMode of PortID(PTN)6 (0: MANUAL, 1: AUTO) • b6 to b15: System area

■ Port transfer state (Un\G24577 to 24593)

Name	Address	Bit	Description
PortTransferState of PortID(PTN)1	Un\G24577	0 to 15	The transfer status of a load port is stored. • 0: OUT OF SERVICE • 1: TRANSFER BLOCKED • 2: READY TO LOAD • 3: READY TO UNLOAD
PortTransferState of PortID(PTN)2	Un\G24578	0 to 15	
PortTransferState of PortID(PTN)3	Un\G24579	0 to 15	
PortTransferState of PortID(PTN)4	Un\G24580	0 to 15	
PortTransferState of PortID(PTN)5	Un\G24581	0 to 15	
PortTransferState of PortID(PTN)6	Un\G24582	0 to 15	
System area	Un\G24583 to 24593	—	

■ Service status (Un\G24594)

Name	Address	Bit	Description
Service status	Un\G24594	0 to 15	The service status of a load port is stored. • b0: Servicestatus of PortID(PTN)1 (0: OUT OF SERVICE, 1: IN SERVICE) • b1: Servicestatus of PortID(PTN)2 (0: OUT OF SERVICE, 1: IN SERVICE) • b2: Servicestatus of PortID(PTN)3 (0: OUT OF SERVICE, 1: IN SERVICE) • b3: Servicestatus of PortID(PTN)4 (0: OUT OF SERVICE, 1: IN SERVICE) • b4: Servicestatus of PortID(PTN)5 (0: OUT OF SERVICE, 1: IN SERVICE) • b5: Servicestatus of PortID(PTN)6 (0: OUT OF SERVICE, 1: IN SERVICE) • b6 to b15: System area

■ In service status (Un\G24595)

Name	Address	Bit	Description
In service status	Un\G24595	0 to 15	The lower state of IN SERVICE is stored. • b0: InServiceStatus of PortID(PTN)1 (0: TRANSFER READY, 1: TRANSFER BLOCKED) • b1: InServiceStatus of PortID(PTN)2 (0: TRANSFER READY, 1: TRANSFER BLOCKED) • b2: InServiceStatus of PortID(PTN)3 (0: TRANSFER READY, 1: TRANSFER BLOCKED) • b3: InServiceStatus of PortID(PTN)4 (0: TRANSFER READY, 1: TRANSFER BLOCKED) • b4: InServiceStatus of PortID(PTN)5 (0: TRANSFER READY, 1: TRANSFER BLOCKED) • b5: InServiceStatus of PortID(PTN)6 (0: TRANSFER READY, 1: TRANSFER BLOCKED) • b6 to b15: System area

■ Transfer ready status (Un\G24596)

Name	Address	Bit	Description
Transfer ready status	Un\G24596	0 to 15	The lower state of TRANSFER READY is stored. • b0: TransferReadyStatus of PortID(PTN)1 (0: READY TO LOAD, 1: READY TO UNLOAD) • b1: TransferReadyStatus of PortID(PTN)2 (0: READY TO LOAD, 1: READY TO UNLOAD) • b2: TransferReadyStatus of PortID(PTN)3 (0: READY TO LOAD, 1: READY TO UNLOAD) • b3: TransferReadyStatus of PortID(PTN)4 (0: READY TO LOAD, 1: READY TO UNLOAD) • b4: TransferReadyStatus of PortID(PTN)5 (0: READY TO LOAD, 1: READY TO UNLOAD) • b5: TransferReadyStatus of PortID(PTN)6 (0: READY TO LOAD, 1: READY TO UNLOAD) • b6 to b15: System area

■ Port association state (Un\G24597)

Name	Address	Bit	Description
Port association state	Un\G24597	0 to 15	The port association status is stored. • b0: PortAssociationState of PortID(PTN)1 (0: NOT ASSOCIATED, 1: ASSOCIATED) • b1: PortAssociationState of PortID(PTN)2 (0: NOT ASSOCIATED, 1: ASSOCIATED) • b2: PortAssociationState of PortID(PTN)3 (0: NOT ASSOCIATED, 1: ASSOCIATED) • b3: PortAssociationState of PortID(PTN)4 (0: NOT ASSOCIATED, 1: ASSOCIATED) • b4: PortAssociationState of PortID(PTN)5 (0: NOT ASSOCIATED, 1: ASSOCIATED) • b5: PortAssociationState of PortID(PTN)6 (0: NOT ASSOCIATED, 1: ASSOCIATED) • b6 to b15: System area

■ Port reservation state (Un\G24598)

Name	Address	Bit	Description
Port reservation state	Un\G24598	0 to 15	The port reservation status is stored. • b0: LoadPortReservationState of PortID(PTN)1 (0: NOT RESERVED, 1: RESERVED) • b1: LoadPortReservationState of PortID(PTN)2 (0: NOT RESERVED, 1: RESERVED) • b2: LoadPortReservationState of PortID(PTN)3 (0: NOT RESERVED, 1: RESERVED) • b3: LoadPortReservationState of PortID(PTN)4 (0: NOT RESERVED, 1: RESERVED) • b4: LoadPortReservationState of PortID(PTN)5 (0: NOT RESERVED, 1: RESERVED) • b5: LoadPortReservationState of PortID(PTN)6 (0: NOT RESERVED, 1: RESERVED) • b6 to b15: System area

Carrier

■ Carrier object count (Un\G24599)

Name	Address	Bit	Description
Carrier object count	Un\G24599	0 to 15	The number of carrier objects is stored. • Number of objects: 0 to 6

Appendix 4 Service Messages

This section shows the service message list.

Service name	Target primary message	Name	Description
Bind	S3F17	Carrier Action Request	Reserving a load port and associating CarrierID with the load port is requested. This is enabled only when PortTransferState of the target load port is '2: READY TO LOAD.'
CancelBind	S3F17	Carrier Action Request	Canceling the reservation of a load port and canceling the association of CarrierID with the load port is requested. This is enabled only when PortTransferState of the target load port is '2: READY TO LOAD.'
ChangeServiceStatus	S3F25	Port Action Request	Switching the service status of the specified load port is requested. • PORTACTION: ChangeServiceStatus

Point

In 'Bind' service, when specifying CarrierID for both '"CARRIERID" of M (Mandatory Parameter)' and '"ObjID" of "PropertiesList"(=CATTRID) of C (Conditional Parameter),' "CARRIERID" takes priority.

A

Appendix 5 CMS Reports

This section shows the CMS report list.

RPTID	Report name	Used variable
300	CMS_CarrierIDStatusChange_1	• VID 30009: CarrierID • VID 30042: CarrierIDStatus
301	CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
302	CMS_SlotMapStatusChange_1	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30008: CarrierAccessingStatus • VID 30118: SlotMapStatus
303	CMS_SlotMapStatusChange_2	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30117: SlotMap (When the variable is enable) • VID 30116: Reason • VID 30118: SlotMapStatus
304	CMS_SlotMapStatusChange_3	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30118: SlotMapStatus
305	CMS_CarrierAccessingStatusChange_1	• VID 30009: CarrierID • VID 30008: CarrierAccessingStatus
306	CMS_CarrierAccessingStatusChange_2	VID 30009: CarrierID
310	CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
311	CMS_PortTransferStateChange_2	VID 30093: PortID
312	CMS_PortTransferStateChange_3	• VID 30093: PortID • VID 30009: CarrierID • VID 30108: PortTransferState
313	CMS_LoadPortReservationStateChange_1	• VID 30093: PortID • VID 30077: LoadPortReservationState • VID 30009: CarrierID
314	CMS_LoadPortReservationStateChange_2	• VID 30093: PortID • VID 30077: LoadPortReservationState
315	CMS_PortAssociationStateChange_1	• VID 30093: PortID • VID 30009: CarrierID • VID 30085: PortAssociationState
316	CMS_PortAssociationStateChange_2	• VID 30093: PortID • VID 30085: PortAssociationState
320	CMS_PortAccessModeChange	• VID 30093: PortID • VID 30000: AccessMode

Appendix 6 CMS Events

This section shows the CMS event list.

'Carrier State Model' state transition events

—: Not supported

CEID	Event name	Trigger	Linked report	Used variable
30000	NO STATE to ID NOT READ	Carrier State Model state transition No.(2)	RPTID 300: CMS_CarrierIDStatusChange_1	• VID 30009: CarrierID • VID 30042: CarrierIDStatus
30001	NO STATE to WAITING FOR HOST	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30002	NO STATE to ID VERIFICATION OK	—	RPTID 300: CMS_CarrierIDStatusChange_1	• VID 30009: CarrierID • VID 30042: CarrierIDStatus
30003	NO STATE to ID VERIFICATION FAIL	—	RPTID 300: CMS_CarrierIDStatusChange_1	• VID 30009: CarrierID • VID 30042: CarrierIDStatus
30004	ID NOT READ to ID VERIFICATION OK	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30005	ID NOT READ to WAITING FOR HOST	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30006	WAITING FOR HOST to ID VERIFICATION OK	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30007	WAITING FOR HOST to ID VERIFICATION FAIL	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30008	ID NOT READ to WAITING FOR HOST	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30009	ID NOT READ to ID VERIFICATION OK	—	RPTID 301: CMS_CarrierIDStatusChange_2	• VID 30093: PortID • VID 30009: CarrierID • VID 30042: CarrierIDStatus
30010	SLOT MAP NOT READ to SLOT MAP VERIFICATION OK	—	RPTID 302: CMS_SlotMapStatusChange_1	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30008: CarrierAccessingStatus • VID 30118: SlotMapStatus
30011	SLOT MAP NOT READ to WAITING FOR HOST	—	RPTID 303: CMS_SlotMapStatusChange_2	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30117: SlotMap (When the variable is enable) • VID 30116: Reason • VID 30118: SlotMapStatus
30012	WAITING FOR HOST to SLOT MAP VERIFICATION OK	—	RPTID 304: CMS_SlotMapStatusChange_3	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30118: SlotMapStatus
30013	WAITING FOR HOST to SLOT MAP VERIFICATION FAIL	—	RPTID 302: CMS_SlotMapStatusChange_1	• VID 30093: PortID (When the variable is enable) • VID 30009: CarrierID • VID 30044: LocationID • VID 30008: CarrierAccessingStatus • VID 30118: SlotMapStatus
30014	NOT ACCESSED to IN ACCESS	—	RPTID 305: CMS_CarrierAccessingStatusChange_1	• VID 30009: CarrierID • VID 30008: CarrierAccessingStatus

CEID	Event name	Trigger	Linked report	Used variable
30015	IN ACCESS to CARRIER COMPLETE	—	RPTID 305: CMS_CarrierAccessingStatusChange_1	• VID 30009: CarrierID • VID 30008: CarrierAccessingStatus
30016	IN ACCESS to CARRIER STOPPED	—	RPTID 305: CMS_CarrierAccessingStatusChange_1	• VID 30009: CarrierID • VID 30008: CarrierAccessingStatus
30017	CARRIER to NO STATE	Carrier State Model state transition No.(21)	RPTID 306: CMS_CarrierAccessingStatusChange_2	VID 30009: CarrierID

'Load Port Transfer State Model' state transition events

CEID	Event name	Trigger	Linked report	Used variable
30025	NO STATE to OUT OF SERVICE	Load Port Transfer State Model state transition No.(1)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30026	NO STATE to IN SERVICE	Load Port Transfer State Model state transition No.(1)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30027	OUT OF SERVICE to IN SERVICE	Load Port Transfer State Model state transition No.(2)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30028	IN SERVICE to OUT OF SERVICE	Load Port Transfer State Model state transition No.(3)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30029	IN SERVICE to TRANSFER READY	Load Port Transfer State Model state transition No.(4)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30030	IN SERVICE to TRANSFER BLOCKED	Load Port Transfer State Model state transition No.(4)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30031	TRANSFER READY to READY TO LOAD	Load Port Transfer State Model state transition No.(5)	RPTID 311: CMS_PortTransferStateChange_2	VID 30093: PortID
30032	TRANSFER READY to READY TO UNLOAD	Load Port Transfer State Model state transition No.(5)	RPTID 312: CMS_PortTransferStateChange_3	• VID 30093: PortID • VID 30009: CarrierID • VID 30108: PortTransferState
30033	READY TO LOAD to TRANSFER BLOCKED	Load Port Transfer State Model state transition No.(6)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30034	READY TO UNLOAD to TRANSFER BLOCKED	Load Port Transfer State Model state transition No.(7)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30035	TRANSFER BLOCKED to READY TO LOAD	Load Port Transfer State Model state transition No.(8)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState
30036	TRANSFER BLOCKED to READY TO UNLOAD	Load Port Transfer State Model state transition No.(9)	RPTID 312: CMS_PortTransferStateChange_3	• VID 30093: PortID • VID 30009: CarrierID • VID 30108: PortTransferState
30037	TRANSFER BLOCKED to TRANSFER READY	Load Port Transfer State Model state transition No.(10)	RPTID 310: CMS_PortTransferStateChange_1	• VID 30093: PortID • VID 30108: PortTransferState

'Load Port Reservation State Model (internal buffer equipment/ fixed buffer equipment)' state transition events

CEID	Event name	Trigger	Linked report	Used variable
30038	NOT RESERVED to RESERVED	Load Port Reservation State Model state transition No.(2)	RPTID 313: CMS_LoadPortReservationStateChange_1	• VID 30093: PortID • VID 30077: LoadPortReservationState • VID 30009: CarrierID
30039	RESERVED to NOT RESERVED	Load Port Reservation State Model state transition No.(3)	RPTID 314: CMS_LoadPortReservationStateChange_2	• VID 30093: PortID • VID 30077: LoadPortReservationState

'Load Port/Carrier Association State Model' state transition events

—: Not supported

CEID	Event name	Trigger	Linked report	Used variable
30040	NOT ASSOCIATED to ASSOCIATED	Load Port/Carrier Association State Model state transition No.(2)	RPTID 315: CMS_PortAssociationStateChange_1	• VID 30093: PortID • VID 30009: CarrierID • VID 30085: PortAssociationState
30041	ASSOCIATED to NOT ASSOCIATED	Load Port/Carrier Association State Model state transition No.(3)	RPTID 316: CMS_PortAssociationStateChange_2	• VID 30093: PortID • VID 30085: PortAssociationState
30042	ASSOCIATED to ASSOCIATED	—	RPTID 315: CMS_PortAssociationStateChange_1	• VID 30093: PortID • VID 30009: CarrierID • VID 30085: PortAssociationState

'Access Mode State Model' state transition events

—: Not supported

CEID	Event name	Trigger	Linked report	Used variable
30043	NO STATE to MANUAL	—	RPTID 320: CMS_PortAccessModeChange	• VID 30093: PortID • VID 30000: AccessMode
30044	NO STATE to AUTO	Access Mode State Model state transition No.(1)	RPTID 320: CMS_PortAccessModeChange	• VID 30093: PortID • VID 30000: AccessMode
30045	MANUAL to AUTO	—	RPTID 320: CMS_PortAccessModeChange	• VID 30093: PortID • VID 30000: AccessMode
30046	AUTO to MANUAL	—	RPTID 320: CMS_PortAccessModeChange	• VID 30093: PortID • VID 30000: AccessMode

Appendix 7 Importing a Label

In this product, structure labels and global labels are defined for the control CPU interface formats.
By using a label, data can be exchanged easily with a GEM300 standard support function.

Structure labels

The following explains the structure labels defined in this product.

Precautions

For a structure label, make sure to use it as a global label. When using a structure label as a local label, the members are not arranged in the defined order due to the memory assignment by a packing block. Therefore, data cannot be exchanged properly with SECS/GEM communication software.

Importing a structure definition

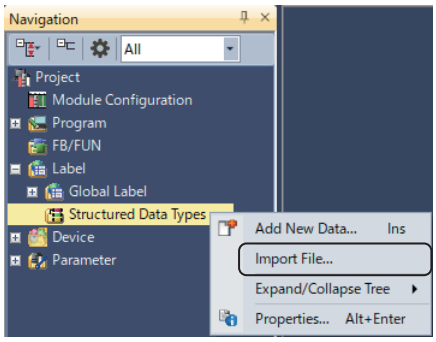
The following explains the procedure to import a structure definition from a structure label definition file with an engineering tool.
A structure label definition file (structure label data name.csv) is stored in the following folder in the installation destination of this product.

- Storage folder: (SECS/GEM communication software installation folder)\SAMPLE\RD55UP12-V\LABEL

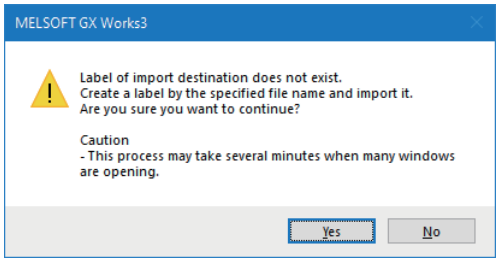
Repeat the following procedure for a number of structure label definitions to be used.

Operating procedure

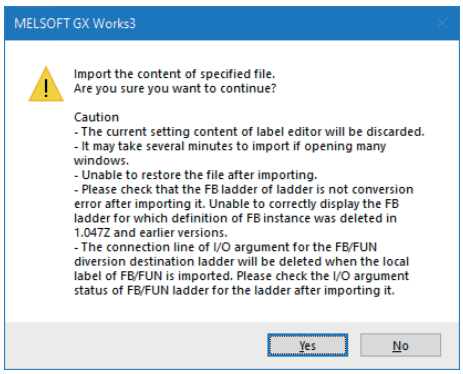
1. [Navigation window] ⇨ [Label] ⇨ right-click [Structured Data Types] and select [Import File] from the shortcut menu.



2. Select a structure label definition file (structure label data name.csv) with the name of the structure label data to be used. (☞ Page 96 Structure label list)
3. When the following message appears, click the [Yes] button.



4. When the following message appears, click the [Yes] button.



Precautions

If the imported structure has a hierarchical structure, import the structures included in that structure as well.

Structure label list

The following table shows the structure labels used in the control CPU interfaces.

Structure label data name	Data structure
st_00000-00002	☞ Page 65 00002 : LoadPort initial request
st_00087-00201	☞ Page 69 00201: IN SERVICE request
st_00087-00202	☞ Page 70 00202: OUT OF SERVICE request
st_00087-00301	☞ Page 71 00301: LOAD started notification
st_00087-00302	☞ Page 72 00302: LOAD complete notification
st_00087-00303	☞ Page 73 00303: UNLOAD available notification
st_00087-00304	☞ Page 74 00304: UNLOAD started notification
st_00087-00305	☞ Page 75 00305: UNLOAD completed notification
st_00087-00306	☞ Page 76 00306: TRANSFER failed notification
st_10000-00001	☞ Page 66 00001: GEM300 Initial acknowledge
st_10000-00002	☞ Page 67 00002 : LoadPort initial acknowledge
st_10087-00201	☞ Page 77 00201: IN SERVICE acknowledge
st_10087-00202	☞ Page 78 00202: OUT OF SERVICE acknowledge
st_10087-00901*1	☞ Page 79 00901: Bind service notification
st_10087-00903	☞ Page 80 00903: CancelBind service notification
st_10087-00917	☞ Page 81 00917: ChangeServiceStatus service notification
st_CarrierObject*1*2	☞ Page 45 st_CarrierObject
st_ContentMap	☞ Page 45 st_ContentMap
st_LoadPortObject	☞ Page 33 st_LoadPortObject
st_SlotStatus	☞ Page 45 st_SlotStatus

*1 When importing a label definition file of this structure label, import a structure label in the hierarchical structure.
*2 When a structure which is not imported is used as an array, a data type is displayed in upper-case.

Global labels

The following explains the global labels defined in this product.

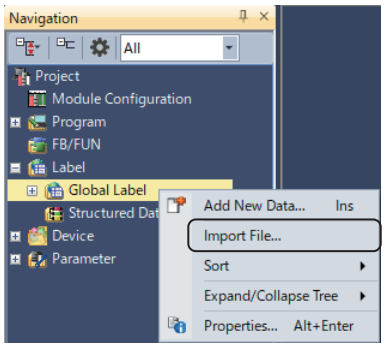
Importing a global label

The following explains the procedure to import a label definition from a global label definition file with an engineering tool.
A global label definition file (GEM300_CtrlCpuIf.csv) is stored in the following folder in the installation destination of this product.

- Storage folder: (SECS/GEM communication software installation folder)\SAMPLE\RD55UP12-V\LABEL

Operating procedure

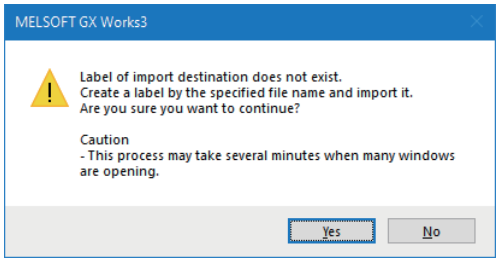
1. [Navigation window] ⇨ [Label] ⇨ right-click [Global Label] and select [Import File] from the shortcut menu.



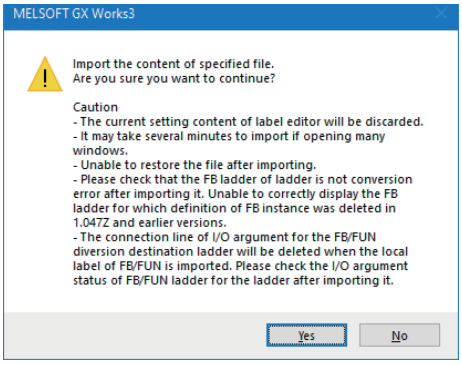
2. Select a global label definition file (GEM300_CtrlCpuIf.csv).

When importing a global label definition file, all global labels supporting the structure labels shown in the structure label list are imported. Therefore, import all structure labels or delete unused global labels; otherwise an error occurs at the program conversion. Convert a program after importing a structure label to be used and deleting unnecessary global label.

3. When the following message appears, click the [Yes] button.



4. When the following message appears, click the [Yes] button.

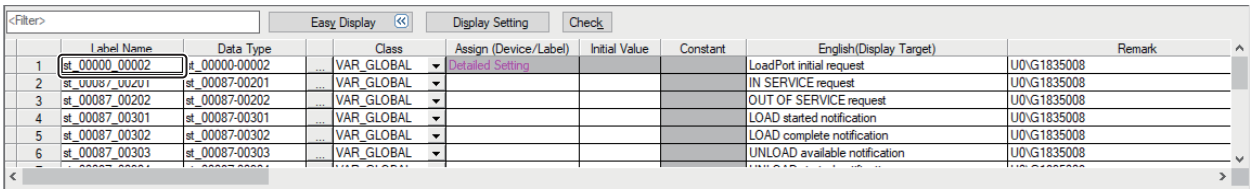


5. Display the detailed information of the label and extension display area in a global label editor.

Click the [Show Details] button in a global label editor.

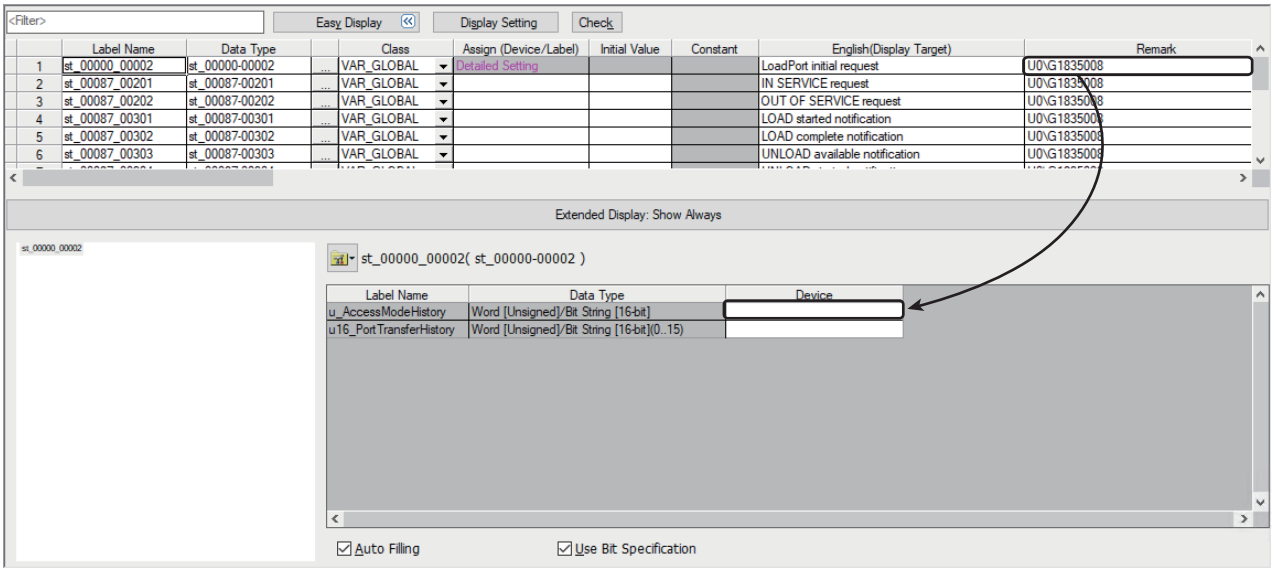
[Display Setting] in a global label editor ⇨ select "Show Always" for "Display Area" in "Extended Display Setting"

6. Select a label name of a global label to assign a device.



7. Copy a device in the "Remark" column of a global label and paste it to "Device" column of the start label in the expand display area in a global label editor. (☞ Page 99 Global label list)

- For a device in "Remark" column, '0' is specified for I/O number. Correct the I/O number according to the target module.
- When assigning a device, enable "Auto Filling."



Global label list

The following table shows the global labels used in the control CPU interface.

Label name	Data type	Class	Comment
st_00000-00002	st_00000-00002	VAR_GLOBAL	LoadPort initial request
st_00087-00201	st_00087-00201	VAR_GLOBAL	IN SERVICE request
st_00087-00202	st_00087-00202	VAR_GLOBAL	OUT OF SERVICE request
st_00087-00301	st_00087-00301	VAR_GLOBAL	LOAD started notification
st_00087-00302	st_00087-00302	VAR_GLOBAL	LOAD complete notification
st_00087-00303	st_00087-00303	VAR_GLOBAL	UNLOAD available notification
st_00087-00304	st_00087-00304	VAR_GLOBAL	UNLOAD started notification
st_00087-00305	st_00087-00305	VAR_GLOBAL	UNLOAD completed notification
st_00087-00306	st_00087-00306	VAR_GLOBAL	TRANSFER failed notification
st_10000-00001	st_10000-00001	VAR_GLOBAL	GEM300 Initial acknowledge
st_10000-00002	st_10000-00002	VAR_GLOBAL	LoadPort initial acknowledge
st_10087-00201	st_10087-00201	VAR_GLOBAL	IN SERVICE acknowledge
st_10087-00202	st_10087-00202	VAR_GLOBAL	OUT OF SERVICE acknowledge
st_10087-00901	st_10087-00901	VAR_GLOBAL	Bind service notification
st_10087-00903	st_10087-00903	VAR_GLOBAL	CancelBind service notification
st_10087-00917	st_10087-00917	VAR_GLOBAL	ChangeServiceStatus service notification

REVISIONS

* The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
May 2023	SH(NA)-082616ENG-A	First edition

Japanese manual number: SH-082615-A

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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

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For the open source software used in this product, refer to the following:
📖C Controller/C Intelligent Function Module SECS/GEM Communication Software Pre-installed Model User's Manual

SH(NA)-082616ENG-A(2305)
MODEL:SECSGEM-300-R-E

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