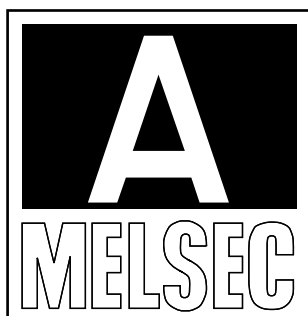
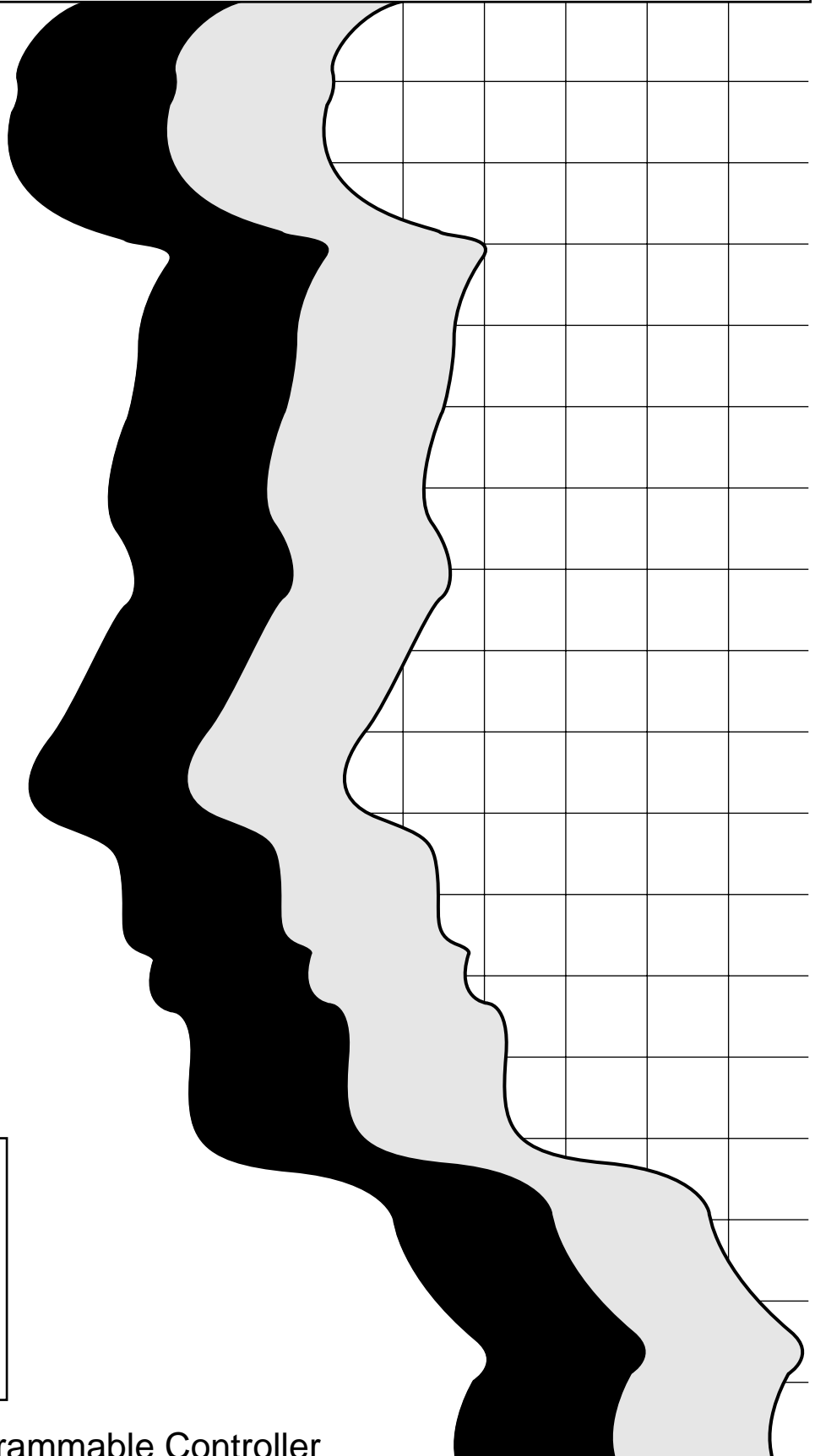


MITSUBISHI

PROFIBUS-DP Interface Module
Type AJ71PB92D/A1SJ71PB92D

User's Manual



Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

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

The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the user's manual of the CPU module used.

In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

 **DANGER**

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

 **CAUTION**

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the  CAUTION level may lead to a serious consequence according to the circumstances.

Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[DESIGN PRECAUTIONS]

DANGER

- When a communication error occurs in the PROFIBUS-DP, the status of the faulty station is as follows.
Configure an interlock circuit in the sequence program using the communication status information (input X1, buffer memory 2040 (7F8H) to 2079 (81FH)) so that the system can operate safely. Erroneous outputs and mis-operation could cause accidents.
 - (1) The input data of the master station maintains the data before abnormality of the communication.
 - (2) When the master station is down, the output state of each slave station will be in accordance with the parameter settings.
 - (3) When any slave station is down, the output state of other slave stations will be in accordance with the parameter settings of the master station.
- If a stop error occurs in the CPU module, the communication status is as described below.
 - (1) Communication with the slave station is stopped.
 - (2) For the input data received from the slave station, the values at CPU module stop error occurrence are held.
 - (3) For the output data sent from the A1SJ71PB92D/AJ71PB92D to the slave station are cleared.

[DESIGN PRECAUTIONS]

CAUTION

- When the PROFIBUS cable is laid, do not lay it close to main circuits or power lines.
They should be installed 100mm(3.9inch) or more from each other. Not doing so could result in noise that would cause malfunctioning.

[INSTALLATION PRECAUTIONS]

CAUTION

- Use the PLC in an environment that meets the general specifications contained in the CPU user's manual.
Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- Insert the tabs at the bottom of the module into the mounting holes in the base unit before installing the module. (The AnS series module shall be fastened by screws in the base unit at the specified torque.)
Not installing the module correctly could result in malfunctioning, breakdowns or pieces of the product falling.
- Tighten the fixing screws of the PROFIBUS cable with the specified torque.
If the screws are loose, it could result in malfunction of the module.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.
Not doing so may cause electric shock or damage to the module.
- Do not touch the conductive area or electric parts of the module.
Doing so may cause module malfunctioning or breakdowns.

[WIRING PRECAUTIONS]

CAUTION

- Be sure to shut off all phases of the external power supply used by the system before wiring PROFIBUS cables. If you not switch off the external power supply, it will cause failure or malfunction of the module.
- Be careful not to let foreign matter such as filings or wire chips get inside the module. These can cause fire, breakdowns and malfunctioning.
- Be sure to place the PROFIBUS cables in a duct or clamp them. If not, dangling cables may be shifted or inadvertently pulled, resulting in damages to the module or cables or malfunctions due to poor cable contact.
- When disconnecting the PROFIBUS cable from the module, do not pull by holding the cable section. To disconnect the cable, make sure to hold the connector which is coupled with the module. Do not attempt to pull the cable to disconnect it from the module. It could damage the module or the cable, or cause malfunction due to a poor contact of the cable.

[STARTING AND MAINTENANCE PRECAUTIONS]

DANGER

- Before cleaning, be sure to shut off all phases of the external power supply used by the system. Not doing so could cause electric shock.

CAUTION

- Never disassemble or modify the module.
This may cause breakdowns, malfunctioning, injury and/or fire.
- Be sure to shut off all phases of the external power supply before mounting or removing the module. If you do not switch off the external power supply, it will cause breakdowns or malfunction of the module.
- Set the ON/OFF select switch of the terminal resistor before the operation. If the setting is switched during the operation, network error may occur, or error detection may not be performed by error.
- Before handling the module, always touch grounded metal, etc. to discharge static electricity from the human body. Failure to do so can cause the module to fail or malfunction.

[OPERATING PRECAUTIONS]

DANGER

- Do not write data into the "System area (use prohibited)" of the buffer memory of special function modules. Also, do not output the "Use prohibited" signal as the output signal to a special function module from the PLC CPU. Writing data into the "System area (use prohibited)" or outputting an "Use prohibited" signal may cause system malfunctions in the programmable controller.

CAUTION

- The online operations conducted for the CPU module being operated (especially when changing data or operation status), shall be conducted after the manual has been carefully read and a sufficient check of safety has been conducted.
Operation mistakes could cause breakdowns to or malfunction of the module.

[DISPOSAL PRECAUTIONS]

CAUTION

- When disposing of this product, treat it as industrial waste.

Revisions

* The manual number is noted at the lower left of the back cover.

Print Date	*Manual Number	Revision
May, 1997	IB (NA)-66773-A	First printing
Sep., 1997	IB (NA)-66773-B	<p>Correction</p> <p>Section 2.3, Chapter 3</p> <p>Addition</p> <p>Appendix 2</p>
Oct., 1998	IB (NA)-66773-C	<p>Model Addition</p> <p>AJ71PB92D</p> <p>Correction</p> <p>SAFTY PRECAUTIONS, Chapter 1, 2, 3, 4, Section 5.1, 5.2, 5.3, 5.5.1, 5.5.2, 5.6, 6.1, Chapter 7, 8, 9</p> <p>Addition</p> <p>Appendix 1</p> <p>Chapter Alteration</p> <p>Appendix 1 → Appendix 3</p>
Jun., 2000	IB (NA)-66773-D	<p>Correction</p> <p>Chapter 1, Section 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 4.2.1, 4.2.2, 4.3.1, 5.5.1, Appendix 1</p> <p>Addition</p> <p>Section 2.6, 4.4, 4.5, 8.6</p>
Jun., 2003	IB (NA)-66773-E	<p>Correction</p> <p>SAFTY PRECAUTIONS, Section 4.3.2, 6.1, 8.2.1, 8.2.2</p> <p>Addition</p> <p>Section 3.3.3, Appendix 2</p>
Apr., 2004	IB (NA)-66773-F	<p>Correction</p> <p>Section 1.2, 3.2, 3.3.3, 4.2.2, 4.3.1, 4.3.2, 4.6, 5.1, 5.3, 6.1, 6.2</p> <p>Addition</p> <p>SAFTY PRECAUTIONS, Chapter 9</p>
Aug., 2004	IB (NA)-66773-G	<p>Correction</p> <p>SAFTY PRECAUTIONS, Section 2.2, 3.3.2, 3.3.3, 4.3.2, 5.5.1, Chapter 8, Section 8.2.2</p>
Nov., 2006	IB (NA)-66773-H	The entire manual was reviewed.

Japanese Manual Version SH-3330-H

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INTRODUCTION

Thank you for purchasing the Mitsubishi Programmable Controller MELSEC-A Series.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the graphic operation terminal you have purchased, so as to ensure correct use.

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ABOUT THIS MANUAL

The following are manuals related to this product.

Request for the manuals as needed according to the chart below.

Related Manual

Manual Name	Manual Number
MELSEC ProfiMap Configuration System for Open Networks Software Manual Explains the overview, installation and operating methods, etc. of MELSEC ProfiMap. (Sold separately)	65778-B
GX Configurator-DP Version 7 Operating Manual Explains the overview, installation method, screen operations, etc. of GX Configurator-DP Version 7. (Sold separately)	SH-080579ENG (13JU54)

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Phone : +49(21 02)486-0
Fax : +49(21 02)486-717

COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES

When incorporating the Mitsubishi programmable controller into other machinery or equipment and keeping compliance with the EMC and low voltage directives, refer to Chapter 3 "EMC Directive and Low Voltage Instruction" of the User's Manual (hardware) supplied with your CPU module or base unit.

The CE logo is printed on the rating plate of the programmable controller, indicating compliance with the directives.

Note that no additional measures are necessary for this product to make compliance with the directives.

ABOUT THE GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations to describe the Type A1SJ71PB92D/AJ71PB92D PROFIBUS-DP interface module.

Generic Term/Abbreviation	Description of the abbreviation/general terms
A1SJ71PB92D/AJ71PB92D	Abbreviation of the model A1SJ71PB92D, PROFIBUS-DP interface module Abbreviation of the model AJ71PB92D, PROFIBUS-DP interface module
PROFIBUS-DP	Abbreviation of PROFIBUS-DP network
ACPU	Generic term for A1SCPUC24-R2, A1SJHCPU, A1SHCPU, A2SHCPU, A1NCPU, A1NCPUP21, A1NCPUP21-S3, A1NCPUR21, A2NCPU, A2NCPUP21, A2NCPUP21-S3, A2NCPUR21, A2NCPU-S1, A2NCPUP21-S1, A2NCPUP21-S4, A2NCPUR21-S1, A3NCPU, A3NCPUP21, A3NCPUP21-S3, A3NCPUR21, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A2ACPU, A2ACPUP21, A2ACPUP21-S3, A2ACPUR21, A2ACPU-S1, A2ACPUP21-S1, A2ACPUP21-S4, A2ACPUR21-S1, A3ACPU, A3ACPUP21, A3ACPUP21-S3, A3ACPUR21, A2UCPU, A2UCPU-S1, A3UCPU, A4UCPU, A1SCPUC24-R2, A1SJHCPU, A1SHCPU, A2SHCPU, A2USCPU, A2USCPU-S1 and A2USHCPU-S1
QnACPU	Generic term for Q2ACPU, Q2ACPU-S1, Q3ACPU, Q4ACPU, Q4ARCPU, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU and Q2ASHCPU-S1
QCPU (A mode)	Generic term for Q02CPU-A, Q02HCPU-A and Q06H-ACPU
CPU module	Generic term for ACPU, QnACPU and QCPU (A mode)
GX Configurator-DP	Configuration tool for A1SJ71PB92D/AJ71PB92D Generic term of the product model SWnD5C-PROFID-E (n=4 or later)
MELSEC ProfiMap	Configuration tool for A1SJ71PB92D/AJ71PB92D Generic term of the product model SW0D5F-PROFIMAP

MEANINGS AND DEFINITIONS OF TERMS

The following explains the meanings and definitions of the terms used in this manual.

Term	Description
PROFIBUS-DPV0	A basic version of PROFIBUS-DP. The following functions are executable: <ul style="list-style-type: none"> • I/O data exchange • Trouble information notification etc.
PROFIBUS-DPV1	A PROFIBUS-DP version for which the following functions have been added to the basic functionality of PROFIBUS-DPV0 <ul style="list-style-type: none"> • Acyclic communication • Alarm function etc.
PROFIBUS-DPV2	A PROFIBUS-DP version for which the following functions have been added to the PROFIBUS-DPV1 functionality <ul style="list-style-type: none"> • Time stamping etc.
Class 1 master station	A device exchanging I/O data with a slave stations. (A1SJ71PB92D, AJ71PB92D, etc)
Class 2 master station	A device that communicates with slave stations and checks their FDL address settings and/or operation states The class 2 master station is used as a master station for supervising the network, which can start, maintain, and diagnose the system.
Slave station	A device that exchanges I/O data with a class 1 master station. (A1SJ71PB93D, ST1H-PB, etc)
Repeater	A device used to connect different segments of PROFIBUS-DP
Bus terminator	A terminating resistor that is connected to either end of each segment on PROFIBUS-DP
Configuration tool	Software used to set bus parameters, slave parameters, etc. and to write them to a master station (GX Configurator-DP, MELSEC ProfiMap, etc.)
GSD file	An electronic file that contains parameters of a slave station The GSD file is used to set up the slave parameters on GX Configurator-DP or MELSEC ProfiMap.
Station number	The numbers assigned to a master station and slave station The station number is set within the range from 0 to 125.
Bus parameter	The parameter used for the communication setting of PROFIBUS-DP The bus parameter is set up on the GX Configurator-DP or MELSEC ProfiMap.
Master parameter	The parameter used for the settings (FDL address, transmission speed, etc.) of the A1SJ71PB92D/AJ71PB92D. The master parameter is set up on the GX Configurator-DP or MELSEC ProfiMap.
Slave parameter	The parameter for a slave station, which is set on the master station. The slave parameter is set up on the GX Configurator-DP or MELSEC ProfiMap. The setting items are described on the GSD File.
I/O CONFIGURATION DATA	Information on I/O configuration of a slave station
I/O data exchange	This function allows I/O data exchange between a class 1 master station and slave stations.
Global control	This function enables synchronization command transmission for I/O data from a class 1 master station to slave station.
Trouble information	Trouble information of PROFIBUS-DP, which is detected by a master station or notified by a slave station
Expansion communication trouble information	Trouble information specific to each slave station Each of slave stations notifies of it to the master station when an error is detected.
Bus cycle time	PROFIBUS-DP processing time for the master station to perform cyclic transfer with each slave station.

PRODUCT STRUCTURE

The product structure of this product is given in the table below.

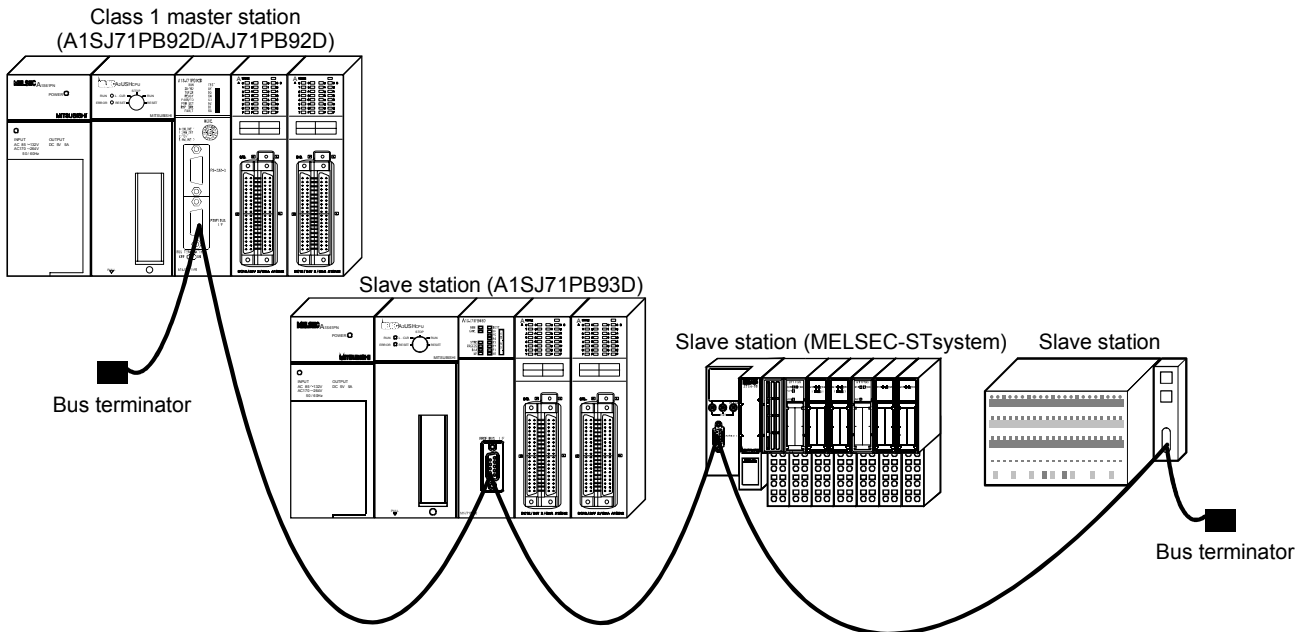
Model	Product Name	Quantity
A1SJ71PB92D	A1SJ71PB92D PROFIBUS-DP interface module	1
AJ71PB92D	AJ71PB92D PROFIBUS-DP interface module	1

1. OVERVIEW

This is the user's manual for the A1SJ71PB92D/AJ71PB92D PROFIBUS-DP interface module (hereafter abbreviated as "A1SJ71PB92D/AJ71PB92D" Note that when a specific model is explained, it is referred to as A1SJ71PB92D or AJ71PB92D accordingly.).

When explain separately, which is used to connect a MELSEC-A/QnA/Q series programmable controller to a PROFIBUS-DP network.

The A1SJ71PB92D/AJ71PB92D operates as a class 1 master station in the PROFIBUS-DP network.



REMARK

The A1SJ71PB92D/AJ71PB92D is set up using GX Configurator-DP or MELSEC ProfiMap. Descriptions of this manual are based on the case where it is set up with GX Configurator-DP. For the setup with MELSEC ProfiMap, refer to the MELSEC ProfiMap Configuration System for Open Networks Software Manual.

1.1 A1SJ71PB92D/AJ71PB92D Features

- (1) Class 1 master station on PROFIBUS-DP
 The A1SJ71PB92D/AJ71PB92D complies with EN50170, and operates as a class 1 master station on PROFIBUS-DP systems.
 The A1SJ71PB92D/AJ71PB92D supports the PROFIBUS-DPV0 function. PROFIBUS-DPV1 and PROFIBUS-DPV2, which are extended versions of PROFIBUS-DP, are not supported.
- (a) Up to 60 slave stations are connectable
 Up to 60 slave stations can be connected to a single A1SJ71PB92D/AJ71PB92D, enabling the I/O data exchange of max. 3840 bytes. (Input data: max.1920 bytes, Output data: max.1920 bytes) (Refer to Section 4.1.1)
- (b) Trouble information can be easily acquired
 Trouble or extended trouble information of an error occurred on a slave station during I/O data exchange can be easily acquired using the buffer memory and I/O signals. (Refer to Section 4.2, 4.3)
- (c) Supporting the global control function
 By sending services (SYNC, UNSYNC, FREEZE, UNFREEZE) to each slave station in a group, synchronous control of slave station I/O data is available. (Refer to Section 4.1.2)

Service Name	Description
SYNC	This service is for synchronizing the output status of slave stations. In the SYNC mode, the output status of a slave station is refreshed each time it receives the SYNC service. While no SYNC service is received, the output status is held.
UNSYNC	This service is for ending the SYNC mode.
FREEZE	This service is for synchronizing the input status of slave stations. In the FREEZE mode, the input status of a slave station is refreshed each time it receives the FREEZE service. While no FREEZE service is received, the input status is held.
UNFREEZE	This service is for ending the FREEZE service.

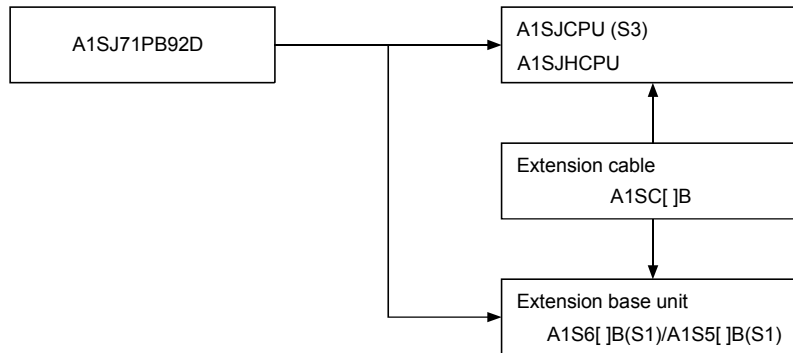
- (2) Easy parameter setup
 Use of GX Configurator-DP or MELSEC ProfiMap enables bus parameters, master parameters, slave parameters, and various other parameters to be easily set up. (Refer to Section 5.1.1 to 5.1.4)
- (3) Self-diagnosis function included
 The self-diagnosis function allows testing of hardware such as internal memories.

2. SYSTEM CONFIGURATION

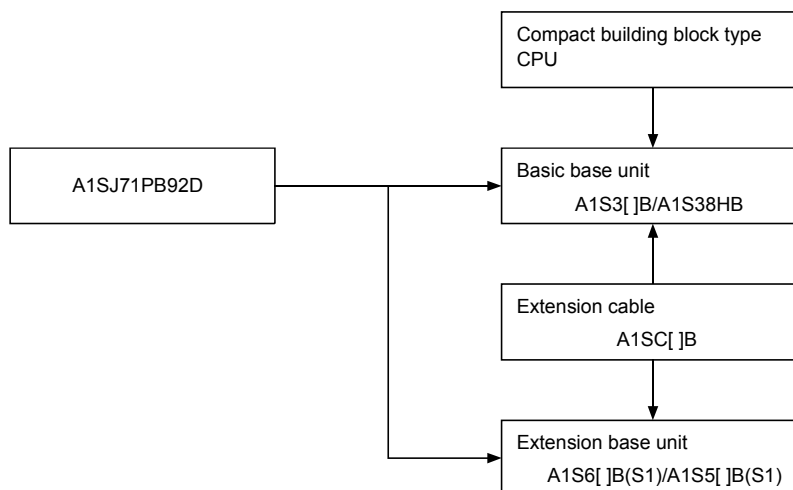
This chapter describes the system configuration of A1SJ71PB92D/AJ71PB92D.

2.1 Whole System Configuration

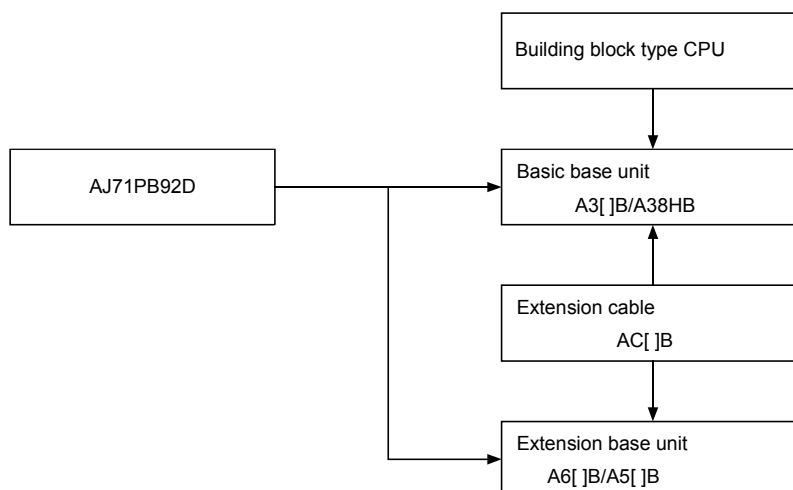
(1) For the A1SJCPU



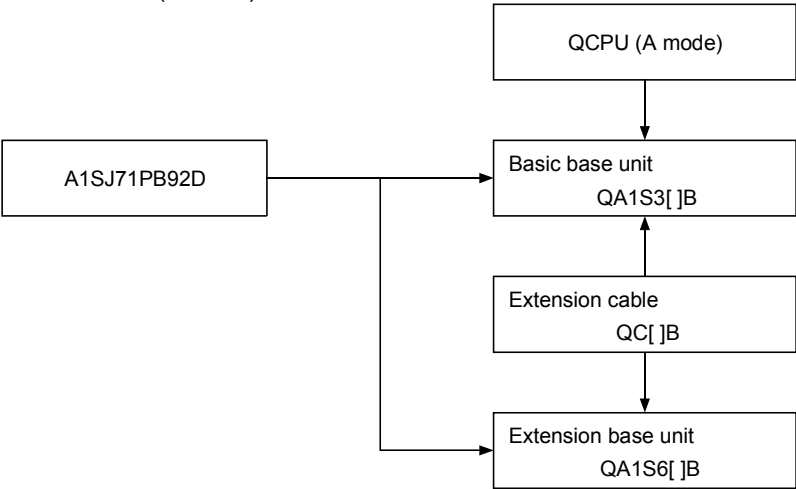
(2) For the compact building block type CPU



(3) For the building block type CPU



(4) For the QCPU (A mode)



2.2 Applicable System

The modules and software programs used on A1SJ71PB92D/AJ71PB92D are shown below.

(1) Applicable CPU modules

The following table indicates the CPU modules that can be used with the A1SJ71PB92D/AJ71PB92D.

(a) A1SJ71PB92D

Applicable CPU Modules
A1SCPUC24-R2
A1SJHCPU, A1SHCPU, A2SHCPU, A2SHCPU-S1
A2ASCPU, A2ASCPU-S1, A2ASCPU-S30, A2USHCPU-S1
Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1
Q02CPU-A, Q02HCPU-A, Q06HCPU-A

(b) AJ71PB92D

Applicable CPU Modules
A1SCPUC24-R2
A1SJHCPU, A1SHCPU, A2SHCPU, A2SHCPU-S1, A1NCPUP21, A1NCPUP21-S3, A1NCPUR21, A2NCPUP21, A2NCPUP21-S3, A2NCPUR21, A2NCPUP21-S1, A2NCPUP21-S1, A2NCPUP21-S4, A2NCPUR21, A3NCPUP21, A3NCPUP21-S3, A3NCPUR21
A2ASCPU, A2ASCPU-S1, A2ASCPU-S30, A2USHCPU-S1 A2ACPU, A2ACPUP21, A2ACPUP21-S3, A2ACPUR21, A2ACPU-S1, A2ACPUP21-S1, A2ACPUP21-S4, A2ACPUR21, A3ACPU, A3ACPUP21, A3ACPUP21-S3, A3ACPUR21, A2UCPU, A2UCPU-S1, A3UCPU, A4UCPU
Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q2ACPU, Q2ACPU-S1, Q3ACPU, Q4ACPU, Q4ARCPU

(2) Applicable base units

The following table indicates the base units that can be used with the A1SJ71PB92D/AJ71PB92D.

(a) A1SJ71PB92D

Installable Base Units	
Basic base unit	Extension base unit *1
A1S32B, A1S33B, A1S35B, A1S38B, A1S38HB, QA1S33B, QA1S35B, QA1S38B	A1S52B (S1), A1S55B (S1), A1S58B (S1), A1S65B (S1), A1S68B (S1), QA1S65B, QA1S68B

*1 The no power supply module extension base unit A1S5 [] B (S1) may not have sufficient power supply capacity, so use the A1S6 [] B (S1) when installing a A1SJ71PB92D /AJ71PB92D in the extension base unit.

When the A1S5 [] B (S1) must be installed, do so after referring to the chapter covering power supplies in the respective CPU Module User's Manual.

(b) AJ71PB92D

Installable Base Units	
Basic base unit	Extension base unit
A32B, A32B-S1, A35B, A38B, A38HB	A52B, A55B, A58B, A62B, A65B, A68B

(3) Compatible software packages

The following shows the compatibility between software packages and the system using the A1SJ71PB92D/AJ71PB92D.

There are the following restrictions on the A1SJ71PB92D/AJ71PB92D applied CPU module and used configuration software.

CPU Module	Configuration Software	Parameter Write Path		Max. I/O Data Length	
		Via A1SJ71PB92D /AJ71PB92D RS-232 interface	Via CPU module RS-232/RS-422 interface	Normal service mode (MODE 0)	Extended service mode (MODE E) *2
Q series CPU	SW0D5F-PROFIMAP	Write enabled	Write disabled	32 bytes each for input and output	32 bytes each for input and output
	MELSEC-PROFIMAP Version 2				244 bytes each for input and output
	MELSEC-PROFIMAP Version 3				244 bytes each for input and output
	GX Configurator-DP Version 4				244 bytes each for input and output
	GX Configurator-DP Version 5 or later	Write disabled	Write enabled*1	32 bytes each for input and output	32 bytes each for input and output
A/QnA series CPU	SW0D5F-PROFIMAP	Write enabled	Write disabled	32 bytes each for input and output	32 bytes each for input and output
	MELSEC-PROFIMAP Version 2				244 bytes each for input and output
	MELSEC-PROFIMAP Version 3				244 bytes each for input and output
	GX Configurator-DP Version 4				244 bytes each for input and output
	GX Configurator-DP Version 5 or later	Write disabled	Write enabled*1	32 bytes each for input and output	244 bytes each for input and output

*1 The software version usable by the A1SJ71PB92D/AJ71PB92D is A1SJ71PB92D (F or later) or AJ71PB92D (B or later).

When A1SJ71PB92D (software version E or earlier) is used, write is disabled.

*2 For the A1SJ71PB92D of software version D or earlier, the extended service mode (MODE E) is not applicable.

(4) Combining with MELSECNET/10, MELSECNET/B, and MELSECNET(II)

The A1SJ71PB92D/AJ71PB92D does not work on a remote I/O station of MELSECNET/10, MELSECNET/B, and MELSECNET(II).

2.3 Precautions for Configuring a System

- (1) Precaution for parameter writing
- If a parameter is written to the A1SJ71PB92D/AJ71PB92D that is exchanging I/O data, the I/O data communication is suspended.
It is restarted after completion of parameter writing.
 - Do not change the operation mode from the sequence program during parameter writing.
Doing so may disable proper station number setting or mode change.
 - Do not write parameters from multiple GX Configurator-DPs and MELSEC ProfiMap to a single A1SJ71PB92D/AJ71PB92D at the same time.
Doing so makes the parameter values of the A1SJ71PB92D/AJ71PB92D incorrect.
 - Do not write parameter settings at the same time via the RS-232 interface of the A1SJ71PB92D/AJ71PB92D and via the RS-232/RS-422 interface of the CPU module.
Doing so may result in incorrect parameter setting and if this is attempted, parameters cannot be written.
In such a case, write the parameters again after 15 seconds or more has elapsed.
- (2) Precautions for using the parameters preset for extended service mode (MODE E) to operate the module in normal service mode (MODE 0).
The A1SJ71PB92D/AJ71PB92D enters normal service mode (MODE 0) and operates using exchange data of up to 32 bytes per slave station.
When using a data length of 33 bytes or more per slave station, set the A1SJ71PB92D/AJ71PB92D to the extended service mode (MODE E).

○ : Operable × : Not operable

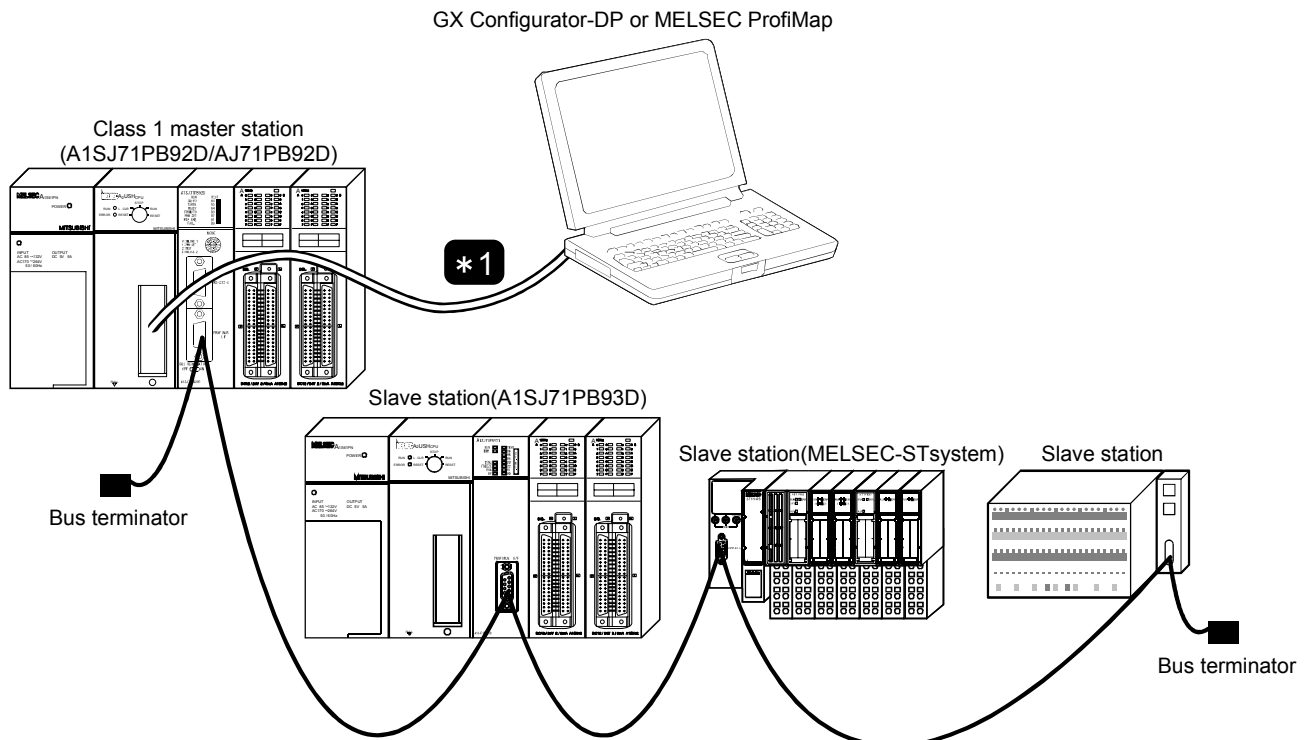
Software Version		Operation Mode	Exchange Data Length	
			32 bytes max.	244 bytes max.
A1SJ71PB92D	D or earlier	Normal service mode (MODE 0)	○	×
		Extended service mode (MODE E)	N/A	
	E or later	Normal service mode (MODE 0)	○	×
		Extended service mode (MODE E)	○	○
AJ71PB92D	A or later	Normal service mode (MODE 0)	○	×
		Extended service mode (MODE E)	○	○

- (3) When reading/writing the buffer memory
Make sure that the READY signal (X1D) is ON when reading/writing the A1SJ71PB92D/AJ71PB92D buffer memory from the sequence program for the following:
- To switch over the operation mode with Y11/X11, using the sequence program.
 - To set GX Configurator-DP or MELSEC ProfiMap parameters through the RS-232/RS-422 interface of the CPU module

If the status of module READY signal (X1D) is ignored and data is read from or written in the buffer memory, the CPU module may detect an "SP UNIT DOWN" error to stop the sequence calculation.

2.4 System Configuration Example

This section explains a system configuration example of the A1SJ71PB92D/AJ71PB92D.

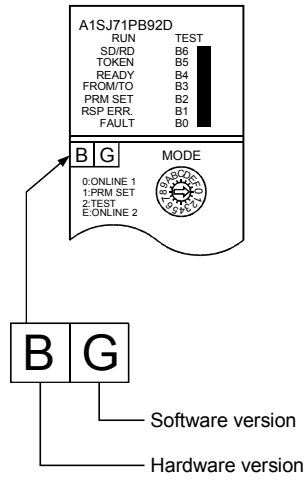


*1 Depending on the software package, the access path available for parameter writing varies.
(Refer to Section 2.2 (3))

- (1) PROFIBUS-DP network configuration
For the PROFIBUS-DP network equipment and details of the network configuration, refer to Section 3.3.
- (2) Applicable cables and terminating resistors
For applicable cables and terminating resistors, refer to Section 5.5.1.

2.5 Checking the version of the A1SJ71PB92D/AJ71PB92D

The hardware and software versions of the A1SJ71PB92D/AJ71PB92D can be checked as shown below.



3. SPECIFICATIONS

This section explains the A1SJ71PB92D/AJ71PB92D the general specifications, performance specifications, and transmission specifications.

3.1 General Specification

This section explains the A1SJ71PB92D/AJ71PB92D general specifications.

Table 3.1 General Specification

Item	Specification				
Usage environment temperature	0 to 55°C				
Storage environment temperature	-20 to 75°C				
Usage environment humidity	10 to 90%RH, No condensation formation				
Storage environment humidity	10 to 90%RH, No condensation formation				
Anti-vibration	Complies with JIS B 3502, IEC61131-2	When there is intermittent vibration			10 times in each direction for X, Y, Z (80 minutes)
		Frequency	Acceleration	Amplitude	
		10 to 57Hz	—	0.075mm (0.003in.)	
		57 to 150Hz	9.8m/s ²	—	
		Where there is continuous vibration			
		10 to 57Hz	—	0.035mm (0.001in.)	
57 to 150Hz	4.9m/s ²	—			
Anti-shock	Complies with JIS B 3502, IEC61131-2 (147m/s ² , 3 times in the direction for each of X, Y, Z)				
Usage environment	No corrosive gas, etc.				
Usage altitude ^{*3}	2000m or less				
Installation location	Inside the control panel				
Over voltage category ^{*1}	II or less				
Pollution level ^{*2}	2 or less				
Cooling method	Self cooling				

*1 Shows if an estimate has been made for which distribution areas the connections will be done for the equipment from the public power grid to the equipment installation area inside the configuration.

Category II applies to equipment that receives its power from fixed facilities. The surge resistance voltage for equipment rated to 300V is 2500V

*2 Shows the index for inductive matter generation in the environment in which the equipment is used. Pollution level 2 is for dirt that is non-inductive. However, occasionally inductance can be generated in the environment by condensation.

*3 Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0m. Doing so can cause a malfunction. When using the programmable controller under pressure, please contact your sales representative.

3.2 Performance Specifications

Item		Specifications	
		A1SJ71PB92D	AJ71PB92D
PROFIBUS-DP station type		Class 1 master station	
Transmission specifications	Electrical standard/characteristics	EIA-RS485 compliant	
	Medium	Shielded twisted pair cable (Refer to Section 5.5.1)	
	Network topology	Bus topology (Tree topology when repeaters are used)	
	Data link method	<ul style="list-style-type: none"> Between master station and master station: Token passing method Between master station and slave station: Polling method 	
	Encoding method	NRZ	
	Transmission speed ^{*1}	9.6 kbps to 12 Mbps (Refer to (1) in this section)	
	Transmission distance	Differs depending on the transmission speed (Refer to (1) in this section)	
	Max. No. of repeaters	3 repeaters (Refer to (1) in this section)	
	Max. No. of stations	32 per segment (including repeater(s)) ^{*2}	
	Max. No. of slave stations	60 per A1SJ71PB92D/AJ71PB92D ^{*2}	
	I/O data size	Input data	<ul style="list-style-type: none"> Normal service mode: 32 bytes per slave station Extended service mode: Max. 1920 bytes (Max. 244 bytes per slave station)
Output data		<ul style="list-style-type: none"> Normal service mode: 32 bytes per slave station Extended service mode: Max. 1920 bytes (Max. 244 bytes per slave station) 	
Number of writes to flash E ² PROM		Max. 10000 times	
No. of occupied I/O points		32 (I/O assignment: 32 special points)	
Internal current consumption (5VDC)		0.56 A	0.54 A
External dimensions		130(5.12 in.) (H) × 34.5(1.36 in.) (W) × 97.6(3.84 in.) (D) [mm]	250(9.84 in.) (H) × 37.5(1.48 in.) (W) × 106(4.17 in.) (D) [mm]
Weight		0.27 kg	0.37 kg

*1 The transmission speed is controlled within $\pm 0.3\%$. (PROFIBUS part1)

*2 When the A1SJ71PB92D hardware version A is used at the transmission speed of 12Mbps, the Max. No. of stations and the station-to-station cable length are restricted.

For details, refer to section (2).

For the noise immunity, withstand voltage, insulation resistance, etc. in the programmable controller system using this module, refer to the power supply module specifications given in the User's Manual of the CPU module used.

(1) Transmission distance

Transmission Speed	Transmission Distance	Max. Transmission Distance when Repeater is Used *1
9.6 kbps	1200 m (3937 ft.)/segment	4800 m (15748 ft.)/network
19.2 kbps		
93.75 kbps		
187.5 kbps	1000 m (3281 ft.)/segment	4000 m (13123 ft.)/network
500 kbps	400 m (1312 ft.)/segment	1600 m (5249 ft.)/network
1.5 Mbps	200 m (656 ft.)/segment	800 m (2625 ft.)/network
3 Mbps	100 m (328 ft.)/segment *2	400 m (1312 ft.)/network
6 Mbps		
12 Mbps		

*1 The max. transmission distance in the table above is based on the case where 3 repeaters are used.

The calculation formula for the transmission distance extended using a repeater(s) is:

$$\text{Max. transmission distance [m/network]} = (\text{Number of repeaters} + 1) \times \text{Transmission distance [m/segment]}$$

*2 When the A1SJ71PB92D hardware version A is used at the transmission speed of 12Mbps, the Max. No. of stations and the station-to-station cable length are restricted.

For details, refer to section (2).

(2) Precautions for using the A1SJ71PB92D hardware version A

When using the transmission speed of 12Mbps in the A1SJ71PB92D hardware version A, configure the network within the following conditions.

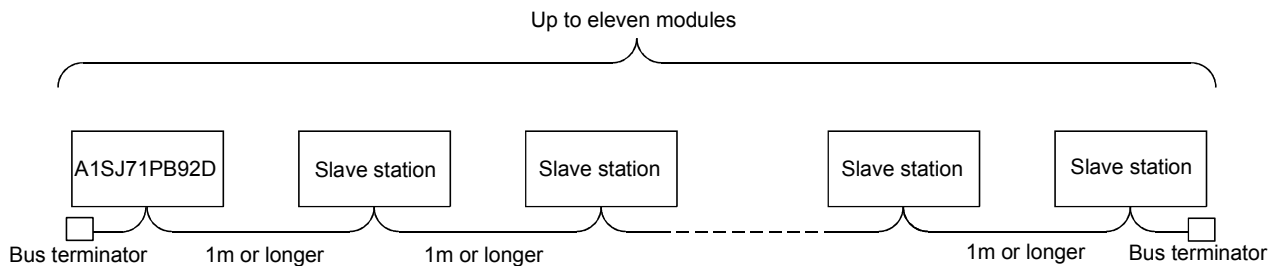
- (a) Number of connectable modules in an entire network

$$\text{Master station}^*1 + \text{Slave station} \leq 11$$

*1 Including the A1SJ71PB92D

- (b) Cable length between stations

Use a PROFIBUS cable of 1m or longer.



3.3 Network Configuration

3.3.1 Basic configuration

This section explains the basic PROFIBUS-DP configuration for using the A1SJ71PB92D/AJ71PB92D as a class 1 master station.

(1) System equipment

The following table shows the equipment required for the PROFIBUS-DP system.

System Equipment	Description
Class 1 master station	A1SJ71PB92D/AJ71PB92D
Configuration tool	GX Configurator-DP Version 4 or later SW0D5F-PROFIMAP MELSEC ProfiMap Version 2 MELSEC ProfiMap Version 3
Slave station	A1SJ71PB93D, ST1H-PB, etc.
Repeater	Required when 32 or more slave station are connected
PROFIBUS cable	Refer to Section 5.5.1
Bus terminator	

(2) Network configuration

In the PROFIBUS-DP system configuration, the following conditions must be satisfied:

(a) Number of connectable modules in an entire network (With repeaters are used)

Master station ^{*1} + Slave station ≤ 126

*1 Including the A1SJ71PB92D/AJ71PB92D

(b) Number of connectable modules per segment

Master station ^{*1} + Slave station + repeaters ^{*2} ≤ 32

*1 Including the A1SJ71PB92D/AJ71PB92D

*2 A repeater is counted for both segments.

(c) No. of repeaters

Up to 3 repeaters can be used for communication between the A1SJ71PB92D/AJ71PB92D and any slave station.

(d) Number of connectable slave stations per A1SJ71PB92D/AJ71PB92D

Up to 60 slave stations can be connected to a single A1SJ71PB92D/AJ71PB92D.

(e) Multi-master system

When using other vendor's products as master stations

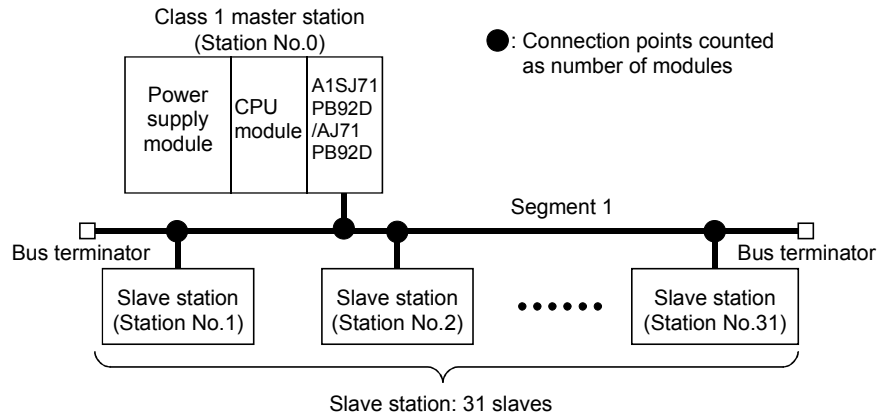
When a communication chip of ASPC2 STEP C mode or equivalent is used, the master station cannot be connected to the PROFIBUS-DP in which the A1SJ71PB92D/AJ71PB92D is included.

To use a master station with such a communication chip, configure another network.

For the communication chip currently used, consult its manufacturer.

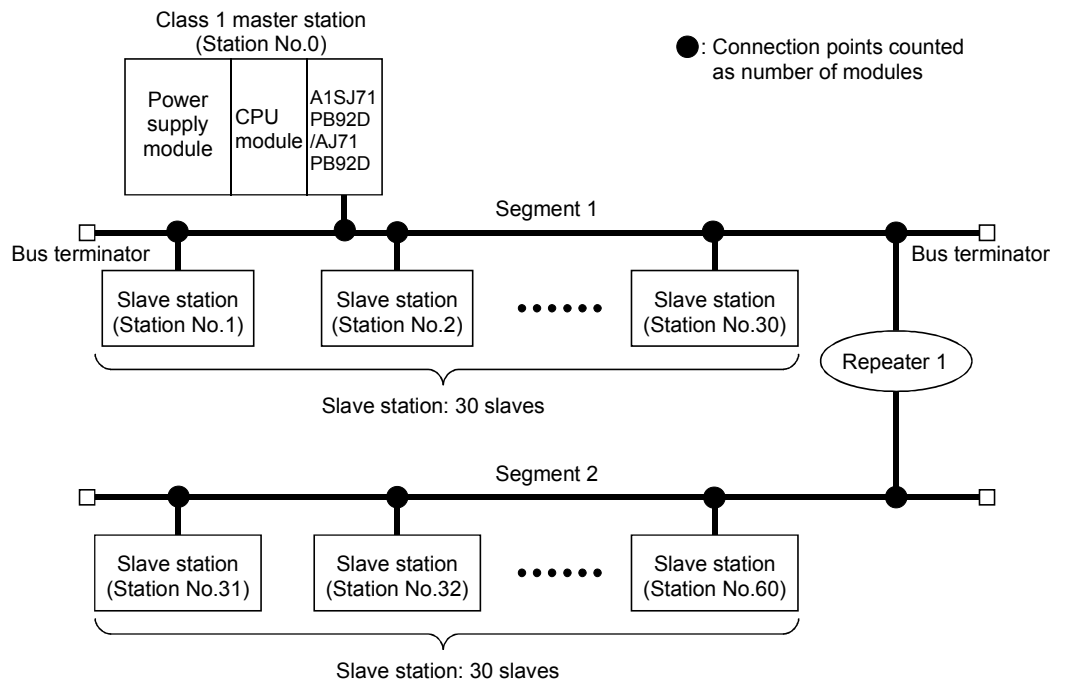
3.3.2 Applicable configuration

- (1) Maximum configuration with no connected
 Master station (A1SJ71PB92D/AJ71PB92D): 1
 Slave station: 31



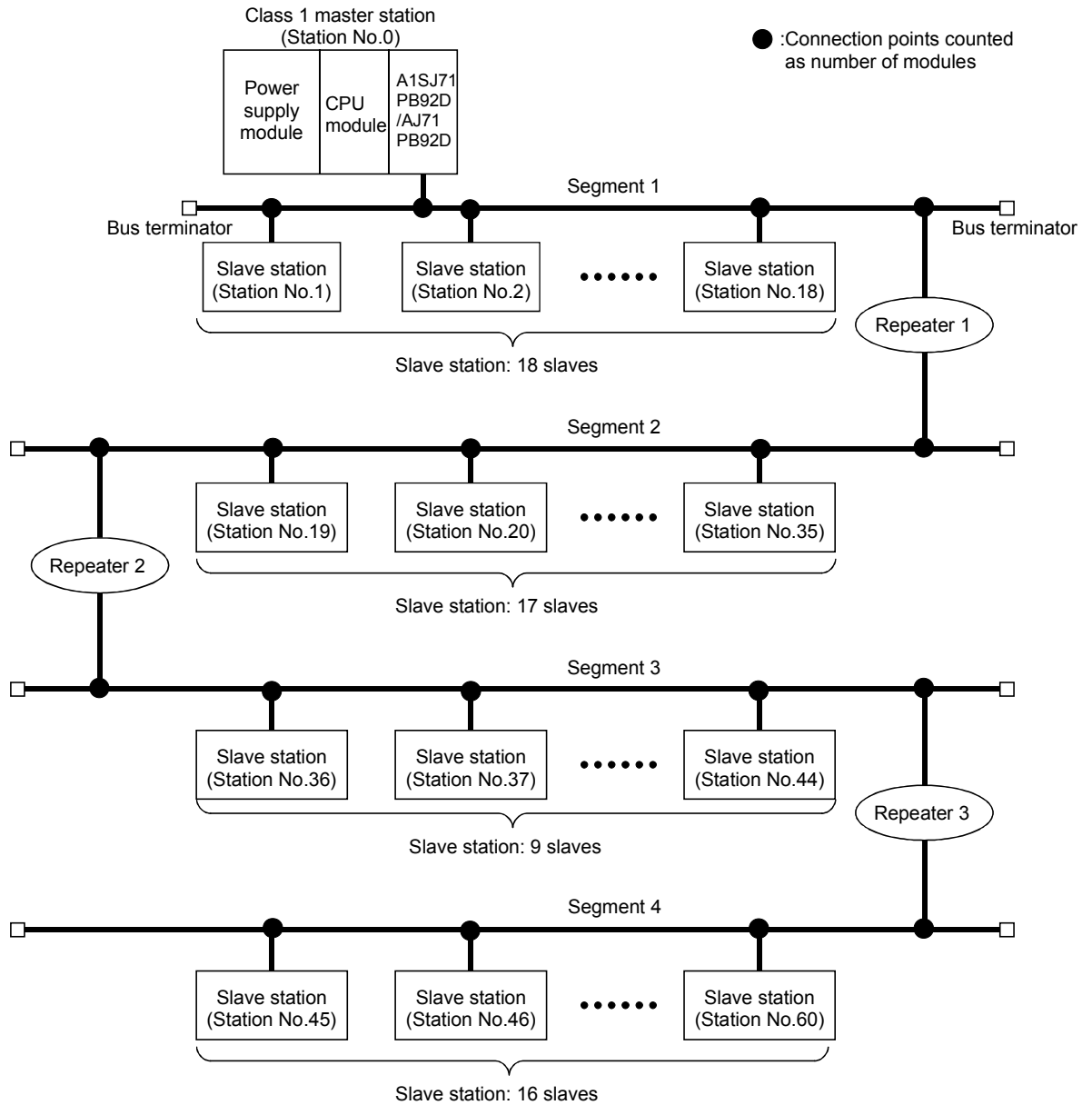
* A maximum of 32 slaves can be connected to 1 segment.

- (2) Maximum configuration with a repeater connected
 Master station (A1SJ71PB92D/AJ71PB92D): 1
 Slave station: 60
 Repeater: 1



* In the above configuration a maximum of 60 slaves can be connected.

- (3) Maximum configuration with 3 repeaters connected
- Master station (A1SJ71PB92D/AJ71PB92D): 1
- Slave station: 60
- Repeaters: 3



* In the above configuration, up to 60 slave stations can be connected.
 The above configuration is different from the one in (2) in the fact that its transmission distance can be extended.

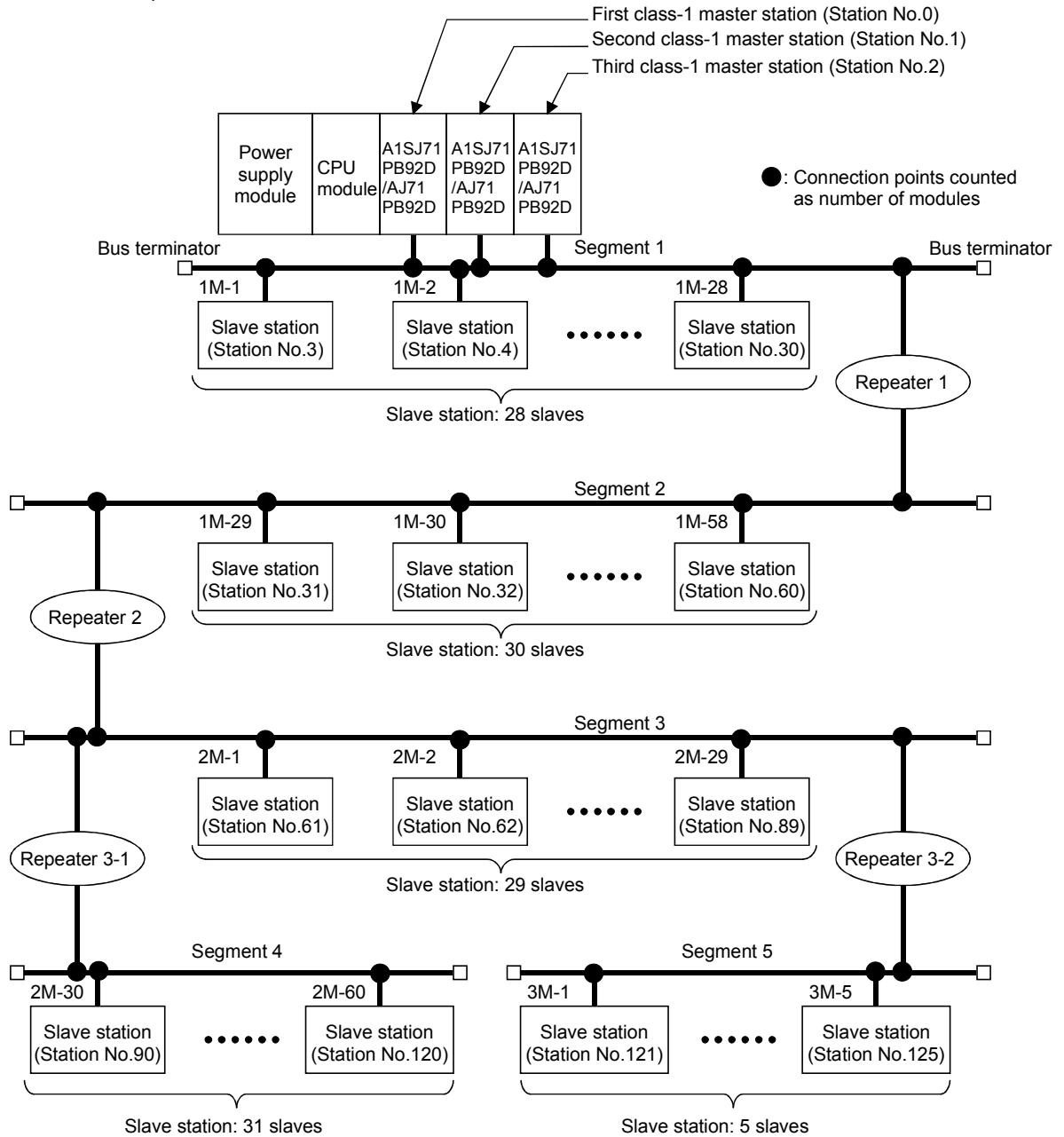
- (4) Maximum configuration with multiple master stations connected (Multi-master system)
More than one master station with different station numbers can be connected to the same network.

By using three A1SJ71PB92D/AJ71PB92Ds as shown below, up to 123 slave stations can be connected.

Master station (A1SJ71PB92D/AJ71PB92D): 3

Slave station: 123

Repeaters: 4



1M-□ : Slave station controlled by the 1st class-1 master station (Station No. 0). (□ indicates count No.)

2M-□ : Slave station controlled by the 2nd class-1 master station (Station No. 1). (□ indicates count No.)

3M-□ : Slave station controlled by the 3rd class-1 master station (Station No. 2). (□ indicates count No.)

POINT
<p>In configurations that use multiple master stations (multimaster configuration), when reconnecting a cable after disconnecting a PROFIBUS cable for 1 master that is exchanging data at a low baud rate, the communications of the master for which the cable is not disconnected could stop and the slave output could be turned off.</p> <p>To prevent this, the master PROFIBUS cable must be secured with a screw.</p> <p>In addition, there is a high possibility that the above phenomena can be avoided if care is taken with the following points when configuring a system.</p> <p>(1) Set the slave watchdog timer setting value to larger than $(TTR \times G)/BR$. However, T_{TR} : Target token rotation time (Unit: Bit Time) G : Gap update factor BR : Baud rate (Unit: bps)</p> <p>(2) Use a high baud rate.</p> <p>(3) The HSA (Highest Station Address) value is made to match the maximum station No. that is actually connected.</p>

3.3.3 Number of connectable slaves

Please calculate the number of the slave which can be connected under the following (1) and (2) conditions.

(1) Restrictions on maximum data length of slave station error information

The maximum data length of the slave station error information that the A1SJ71PB92D/AJ71PB92D can receive varies with the minimum station number and maximum station number of the slave stations set in the parameters, and can be calculated using the following expression.

$$\text{Maximum data length of acceptable error information [bytes]} = \text{Min} \left(\frac{12600}{N - 10}, 244 \right)$$

$$N = \text{Min}((a - b + 1) \times 5, 300)$$

a: Maximum station number of slave station

b: Minimum station number of slave station

* $\text{Min}(a, b) = A \text{ or } B$, whichever is smaller

If the maximum data length (Max_Diag_Data_Len) of the error information described in the GSD file of a slave station is greater than the value calculated by the above expression, normal communication may not be made with that slave station.

If normal communication cannot be made, try the following methods:

(a) Set the station numbers of the slave stations with no unused numbers in between.

(b) Make setting on the slave station side to shorten the maximum data length of the error information. (If possible)

(c) Using two or more A1SJ71PB92D/AJ71PB92D, reduce the number of slave stations per module.

(2) Restrictions on parameter data length of slave station

The parameter size which can be set in AJ71PB92D/A1SJ71PB92D should meet the following formula.

Note that the system construction which does not meet the following formula causes the error of 1302H.

$$5 + \sum_{i=1}^n (\text{number of parameter blocks of each slave station}) \leq 128$$

n = number of slave stations

Σ (number of parameter blocks of each slave station) = sum total of the numbers of parameter blocks calculated by each slave station

The number of parameter blocks for each station is decided by the parameter size of the station as follows.

Parameter size of each slave station	Number of blocks of each slave station
246 bytes or less	1 block
247 to 480 bytes	4 blocks
481 to 720 bytes	5 blocks
721 to 762 bytes	6 blocks

Calculate the parameter size of each slave station using the following formula.

$$\text{Parameter size of each slave station} = 31 + (\text{User_Param data length}) + (\text{configuration data length}) + \alpha$$

(a) User_Param data length

The value of User_Prm_Data usage on the screen displayed when Select Modules is selected on the slave station setting screen of GX Configurator-DP.

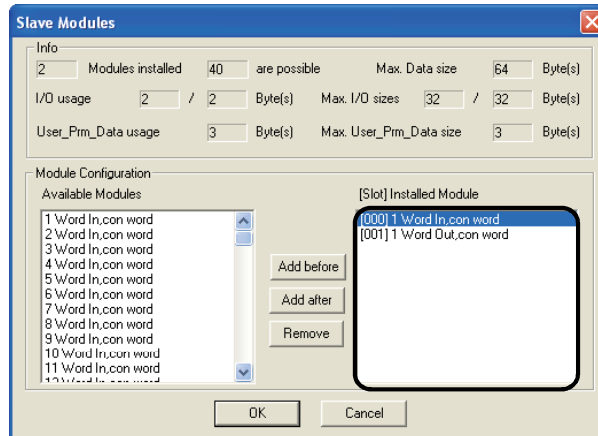
(b) Configuration data length

The value differs depending on the slave station type as shown below.

1) Module type slave station

Sum of the number of Module set values, which are described in the GSD file of the slave station, of the modules registered to the [slot] Installed Module list.

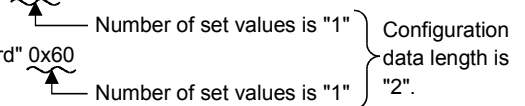
(Example) [Slot] Installed Module registration status of GX Configurator-DP



SD file description

Module="1 Word In,con word" 0x50

Module="1 Word Out,con word" 0x60



2) Block type slave station

Number of Module set values described in the GSD file of the slave station.

(Example) GSD file description

Module="1 Byte Out,3 Byte In" 0x20,0x12

As the number of set values is "2", the configuration data length is "2".

(c) α (constant)

$\alpha = 2$: When the slave station has only input or output

$\alpha = 4$: When the slave station has both input and output

(example)

When the system is constructed using only the slave stations with 520 bytes parameter, A1SJ71PB92D/AJ71PB92D can be connected up to the following number of the slave stations.

When the parameter size is 520 bytes, the number of the parameter block is five.

$$5 + (5 \times n) \leq 128 \quad : n = \text{number of slaves}$$

$$n \leq \frac{128 - 5}{5} = 24.6$$

$$n = 24$$

The calculation mentioned above tells that A1SJ71PB92D/AJ71PB92D can be connected up to 24 slave stations.

When 25 slave stations or more are set by the parameter, A1SJ71PB92D/AJ71PB92D detects the error of 1302H.

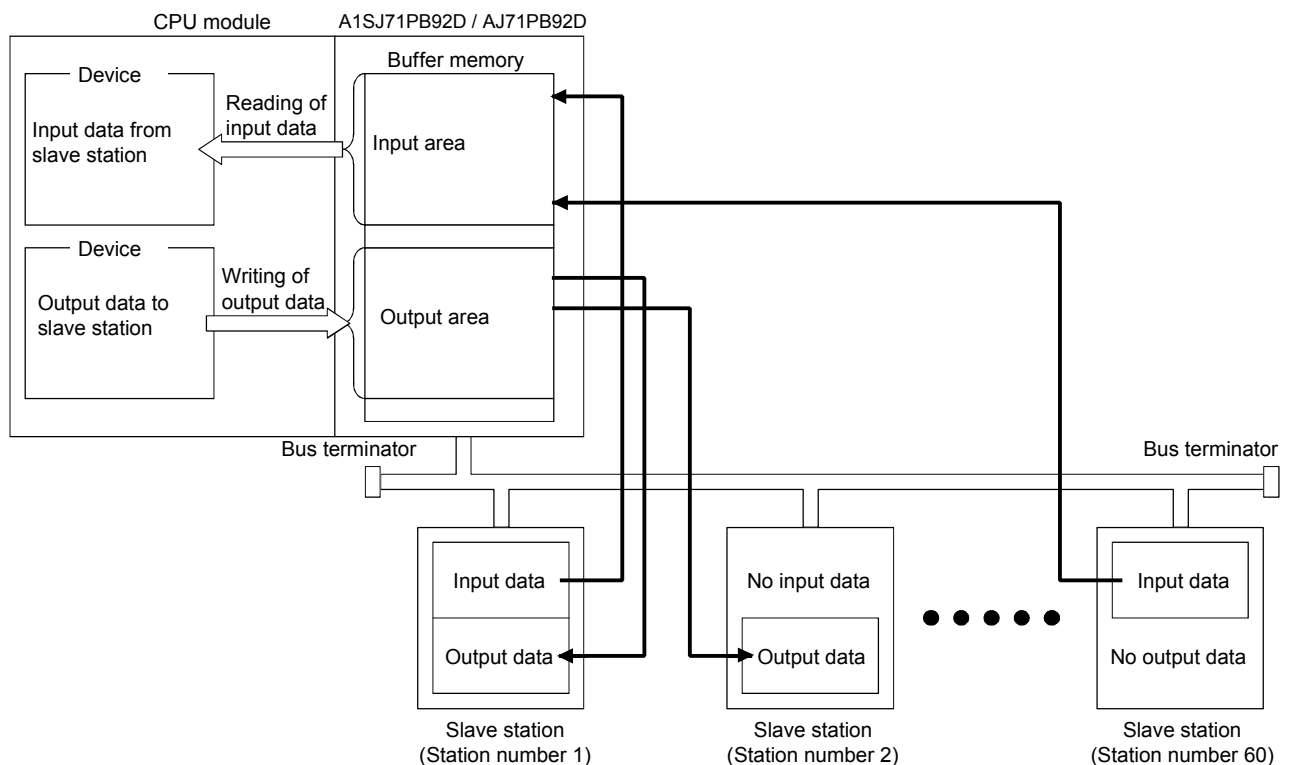
4. FUNCTIONS

4.1 Functions for Exchanging with Slaves

4.1.1 I/O data exchange

The A1SJ71PB92D/AJ71PB92D can operate as a class 1 master station on the PROFIBUS-DP system and perform I/O data exchange with slave stations.

Up to 60 slave stations can be connected to a single A1SJ71PB92D/AJ71PB92D, enabling the exchange of I/O data up to 3840 bytes (Input data: Max. 1920 bytes, Output data: Max. 1920 bytes).



(1) Reading/writing I/O data

(a) Buffer memory

Read or write I/O data from the following buffer memory in the A1SJ71PB92D/AJ71PB92D:

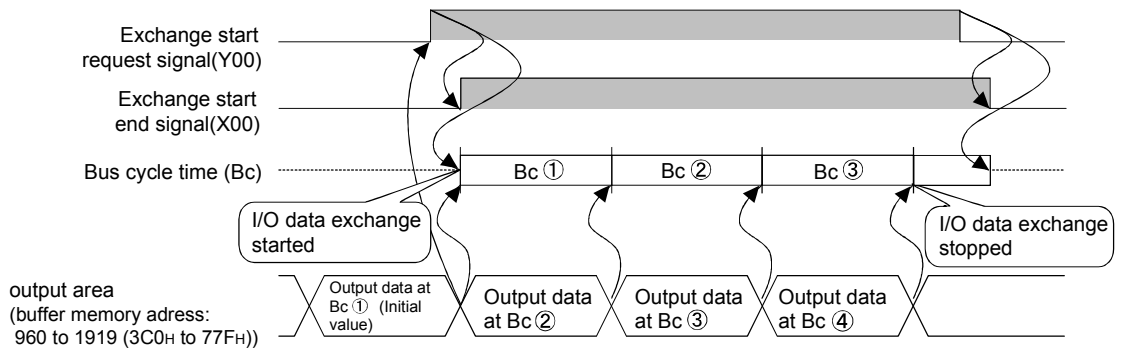
- Input data: Input area (buffer memory address: 0 to 959 (0H to 3BFH))
- Output data: Output area (buffer memory address: 960 to 1919 (3C0H to 77FH))

(b) Read/write methods

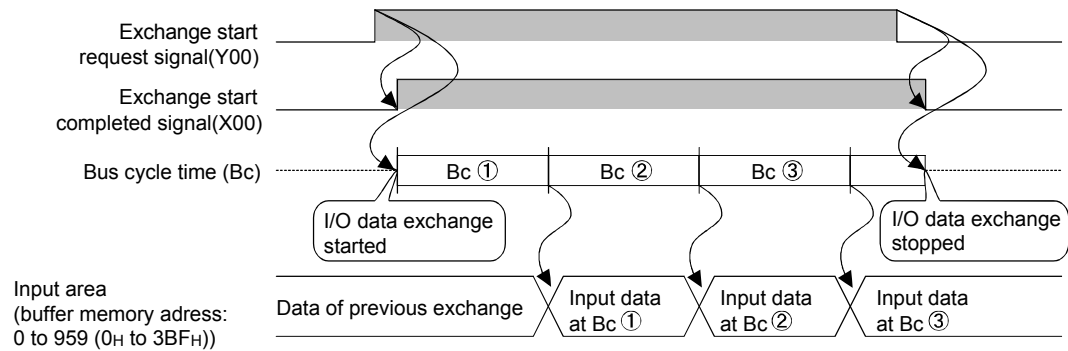
Read or write I/O data (from the buffer memory) to devices in CPU module by the FROM/TO instruction.

- (2) Starting and stopping I/O data exchange
 - (a) Write the initial value of the output data to the Output area.
 - (b) Turn ON the exchange start request signal (Y00).
 - (c) When I/O data exchange is started after turning ON the exchange start request signal (Y00), the exchange start end signal (X00) turns ON.
 - (d) Input data from slave stations are stored in the Input area.
 - (e) When the exchange start request signal (Y00) is turned OFF, the exchange start end signal (X00) turns OFF, and then I/O data exchange stops.

[Output data exchange]



[Input data exchange]

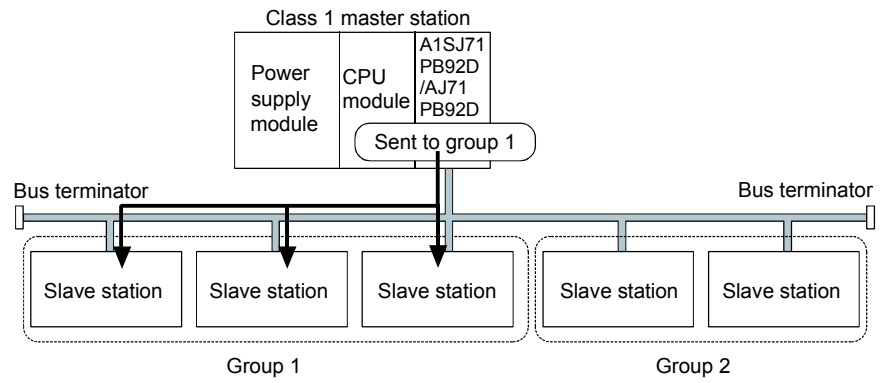


REMARK

For program examples for the I/O data exchange function, refer to Sections 8.2.

4.1.2 Global control functions

By multicasting (broadcasting) data, the A1SJ71PB92D/AJ71PB92D can simultaneously control I/O data of each slave station in a specified group.



(1) Global control services

(a) SYNC, UNSYNC

1) SYNC

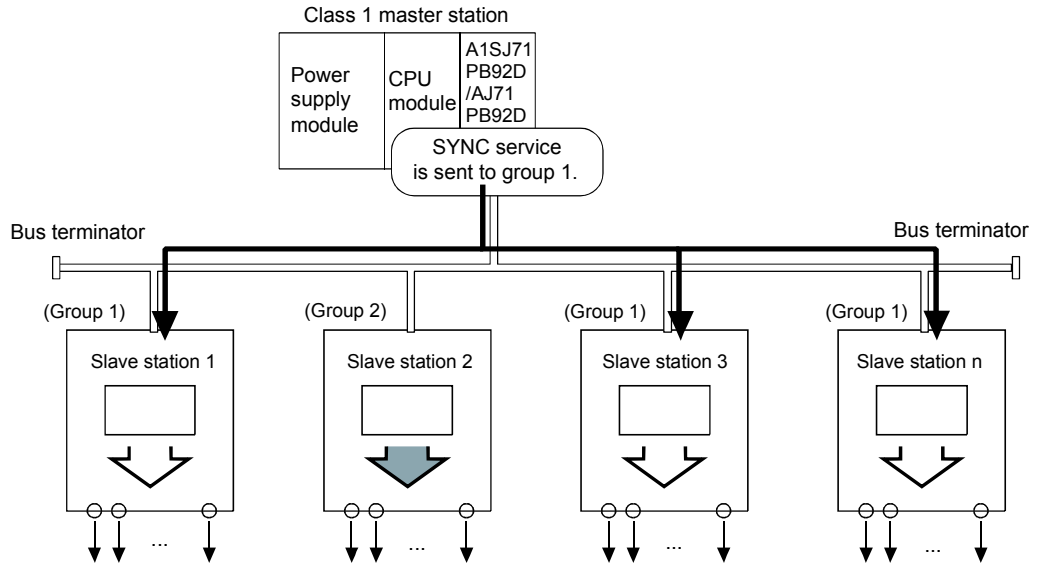
This service starts the SYNC (output synchronization) mode.


In the SYNC mode, the output status is refreshed every time a slave station receives the SYNC service.


If no SYNC service is received, the output status is held.


2) UNSYNC


This service ends the SYNC (output synchronization) mode.




 ... Output image memory: Data are refreshed at all times by polling.

 ... <During UNSYNC execution/Default>The output image memory values are output without being changed. (Normal status)

 ... <During SYNC execution>The output image memory values are output only once at the timing of the SYNC service.

 ... SYNC service (Issued within the same group)

 ... Output to external device

(b) FREEZE, UNFREEZE

1) FREEZE

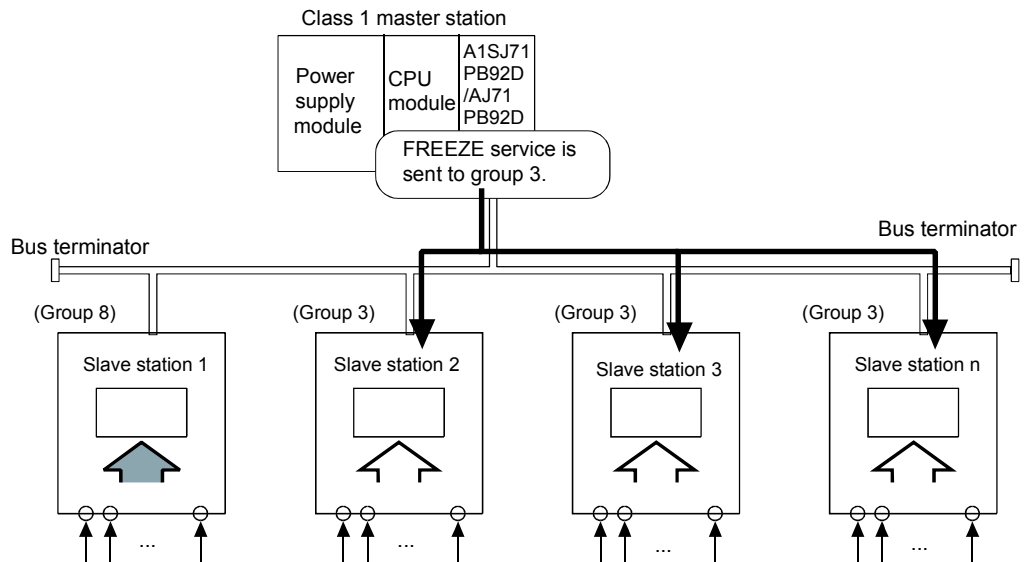
This service starts the FREEZE (input synchronization) mode.

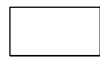




In the FREEZE mode, the input status is refreshed every time a slave station receives the FREEZE service.

If no FREEZE service is received, the input status is held.

2) UNFREEZE

This service ends the FREEZE (input synchronization) mode.



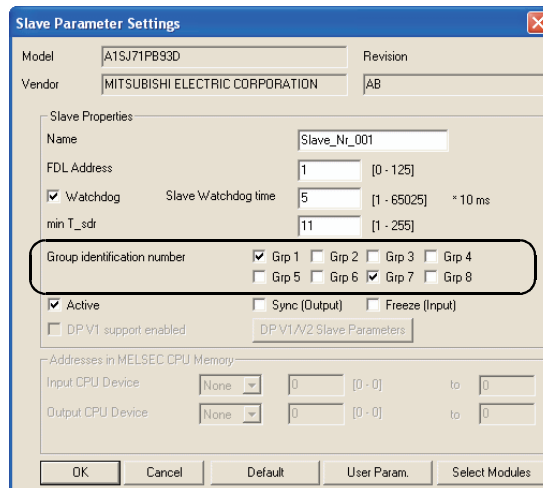
-  ... Input image memory: Data are refreshed at all times by polling.
-  ... <During UNFREEZE execution/Default>Actual input data are input to the input memory without being changed. (Normal status)
-  ... <During FREEZE execution>Actual input data are input only once to the input image memory at the timing of the FREEZE service.
-  ... FREEZE service (Issued within the same group)
-  ... Input from external device

(2) Group setting

The group setting can be made with the slave parameters ("Slave Parameter Settings" in GX Configurator-DP or MELSEC ProfiMap).

Up to eight groups, groups 1 to 8, can be set.

Multiple groups can also be assigned to a single slave station.



(3) Executing the global control function

Execute the global control function by the following procedure:

- (a) Write the service to be sent and the target group to the Global control area (buffer memory address: 2081 (821H)).
- (b) Turn ON the Global control request signal (Y04).
- (c) When global control processing is completed, the Global control end signal (X04) turns ON. If the processing failed, the Global control error end signal (X05) turns ON.
- (d) After confirming completion of the global control, turn OFF the Global control request signal (Y04).

POINT

To execute the global control function to all slave stations (including slave stations for which group No. is not set), set 0s to all of b15 to b8 in the Global control area (buffer memory address: 2081 (821H)).

REMARK

For a program example for global control function, refer to Section 8.5.

4.2 I/O Signal

4.2.1 I/O signal list

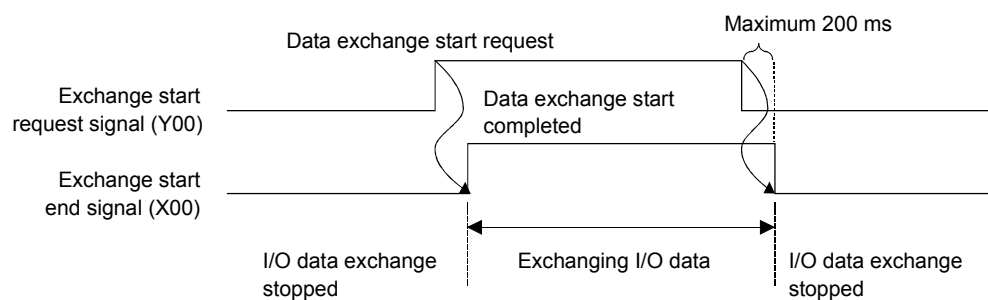
The following I/O signal assignment is based on the case where the start I/O No. of the A1SJ71PB92D/AJ71PB92D is "0000" (installed to slot 0 of the main base unit).
 Device X represents input signals from A1SJ71PB92D/AJ71PB92D to the CPU module.
 Device Y represents output signals from the CPU module to the A1SJ71PB92D/AJ71PB92D.
 The following shows the I/O signals to/from the CPU module.

Signal direction: A1SJ71PB92D/AJ71PB92D → CPU module		Signal direction: CPU module → A1SJ71PB92D/AJ71PB92D	
Device No.	Description	Device No.	Description
X00	Exchange start end signal	Y00	Exchange start request signal
X01	Communication trouble detection signal	Y01	Communication trouble detection signal reset
X02	Communication trouble area clear end signal	Y02	Communication trouble area clear request signal
X03	Use prohibited	Y03	Communication trouble area type selection
X04	Global control end signal	Y04	Global control request signal
X05	Global control error end	Y05	Use prohibited
X06	Use prohibited	⋮	
⋮		⋮	
X0C		Y0C	
X0D	Watchdog timer error signal	Y0D	Restart request signal
X0E	Use prohibited	Y0E	Use prohibited
X0F		⋮	
X10	Operation mode signal	Y10	
X11	Operation mode change completion signal	Y11	Operation mode change request signal
X12	Use prohibited	Y12	Use prohibited
⋮		⋮	
X1A		⋮	
X1B		⋮	
X1C	⋮	⋮	
X1D	⋮	⋮	
X1E to X1F	Use prohibited	Y1F	

POINT
Do not output (turn ON) the "Use prohibited" signals. Doing so may cause the programmable controller system malfunction.

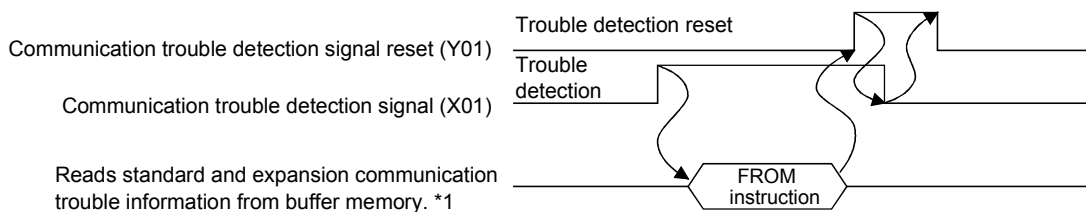
4.2.2 I/O signal detail description

- (1) Exchange start request signal (Y00), exchange start end signal (X00)
- (a) Turn ON the exchange start request signal (Y00) to start I/O data exchange.
 - (b) When I/O data exchange is started after turning ON the exchange start request signal (Y00), the exchange start end signal (X00) turns ON.
 - (c) The exchange start end signal (X00) turns OFF in any of the following cases:
 - When the exchange start request signal (Y00) is turned OFF
 - When an error causing stop of I/O data exchange occurs
 - When parameters are currently being written to the A1SJ71PB92D/AJ71PB92D from GX Configurator-DP or MELSEC ProfiMap
 - When the operation mode of the A1SJ71PB92D/AJ71PB92D has been changed
 - When a communication error has occurred on a slave station. (Only when the master parameter, "Error action flag" is checked)

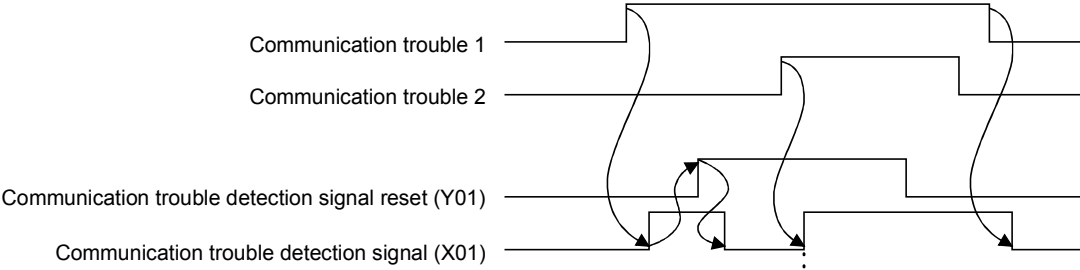
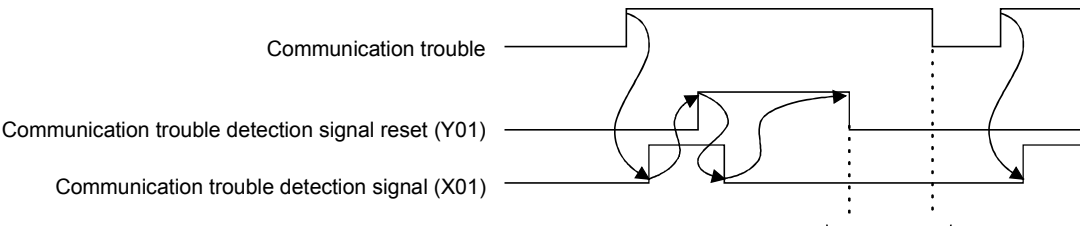


- (d) Use these signals as interlock signals when reading/writing I/O data.
- (e) Write the initial values of the output data to the buffer memory before turning ON the exchange start request signal (Y00).

- (2) Communication trouble detection signal reset (Y01), communication trouble detection signal (X01)
- (a) The communication trouble detection signal (X01) turns ON when a communication failure is detected after the time preset in the trouble no information time setting area (buffer memory address: 2084 (824H)) has elapsed.
- The following processing is performed at the same time that the communication trouble detection signal (X01) turns ON:
- The RSP ERR. LED turns ON.
 - The trouble information is stored in the communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH)).
 - The expansion trouble information is stored in the expansion communication trouble area (buffer memory address: 2096 to 2110 (830H to 83EH)).
 - The corresponding bit in the Slave status area (buffer memory address: 2112 to 2116 (840H to 844H)) of the station that sent the trouble information turns ON.
- (b) The communication trouble detection signal (X01) is turned off when the communication trouble detection signal reset signal (Y01) is turned ON or when communication failure is all resolved. At this time, the RSP ERR. LED turns off.
- (c) The communication trouble detection signal reset (Y01) is turned OFF after it has been confirmed that the communication trouble detection signal (X01) has been turned off.
- (d) The following sequence is used.



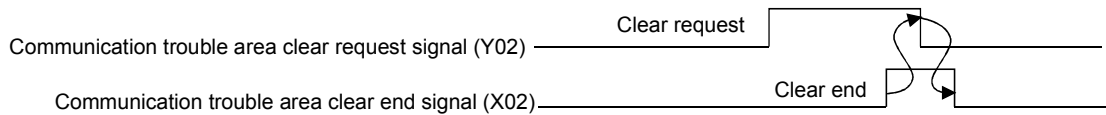
* 1 Communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH))
 Expansion communication trouble area (buffer memory address: 2096 to 2110 (830H to 83EH))

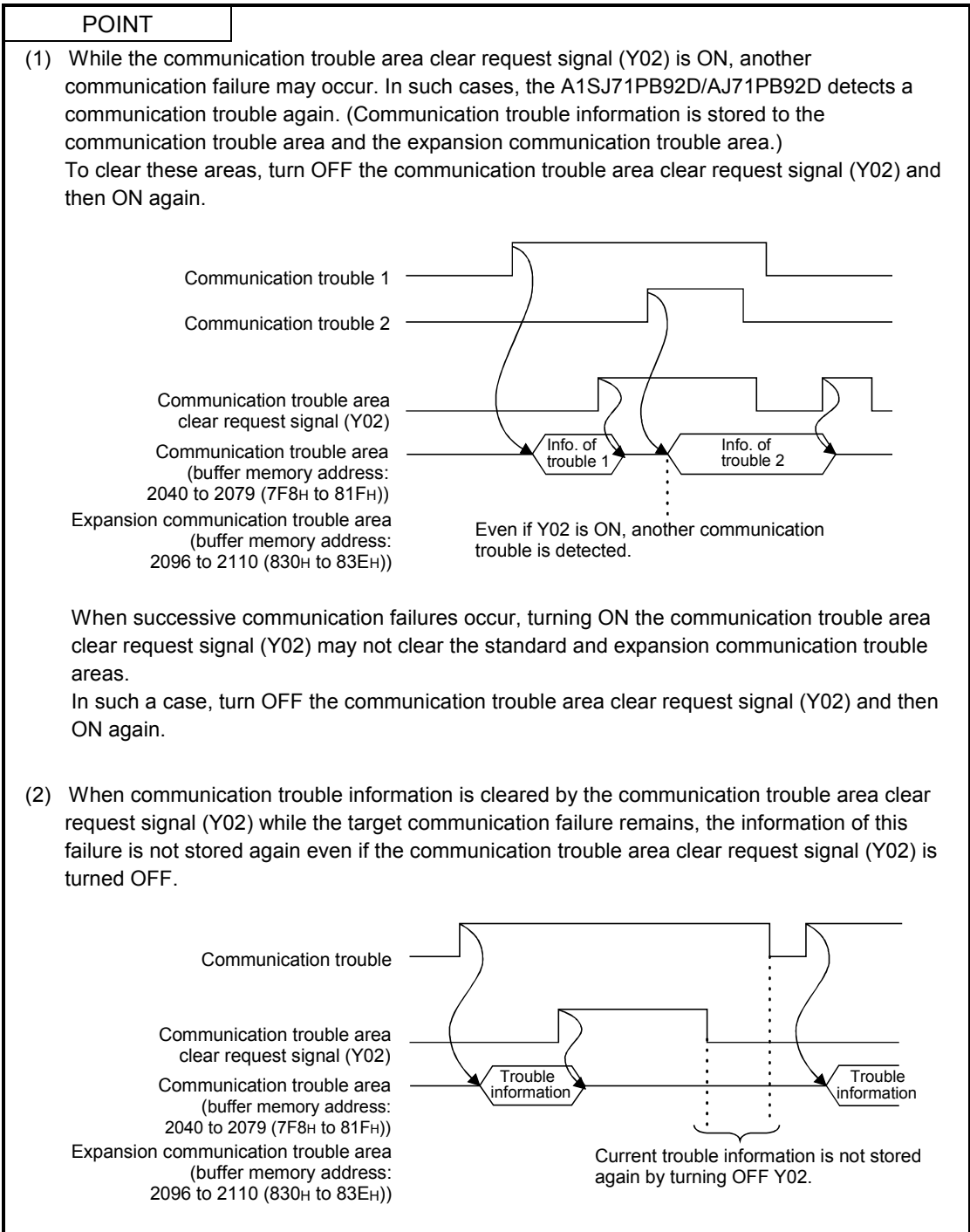
POINT	
<p>(1) While the communication trouble detection signal reset (Y01) is ON, another communication failure may occur. In such cases, the A1SJ71PB92D/AJ71PB92D detects a communication trouble again. (The communication trouble detection signal (X01) turns ON and the RSP ERR. LED lights up.) To turn OFF the communication trouble detection signal (X01), switch the communication trouble detection signal reset (Y01) from OFF to ON, or remove the communication error cause.</p>	 <p style="text-align: center;">Even if Y01 is ON, another communication trouble is detected.</p> <p>When successive communication failures occur, turning ON the communication trouble detection signal reset (Y01) may not turn OFF the communication trouble detection signal (X01). In such a case, turn OFF the communication trouble detection signal reset (Y01) and then ON again.</p>
<p>(2) When the communication trouble detection signal (X01) is turned OFF by the communication trouble detection signal reset (Y01) while the target communication failure remains, this failure is not detected again even if the communication trouble detection signal reset (Y01) is turned OFF.</p>	 <p style="text-align: center;">Current trouble is not detected again by turning OFF Y01.</p>

REMARK

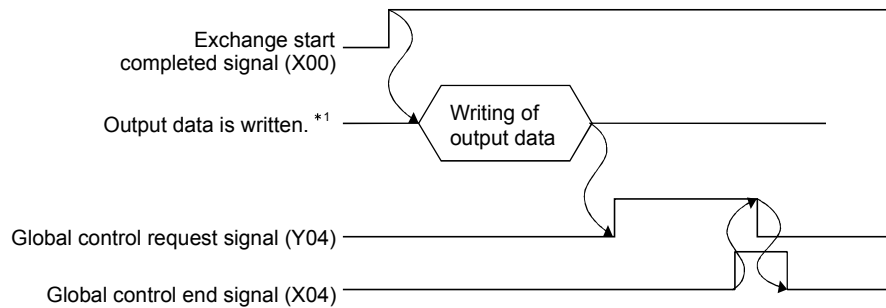
The slave status area is automatically cleared when a communication failure is removed. Turning ON the communication trouble detection signal reset (Y01) does not clear this area.

- (3) Communication trouble area clear request signal (Y02), communication trouble area clear end signal (X02)
- (a) Turn ON the communication trouble area clear request signal (Y02) when clearing the following information:
- Communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH))
 - Expansion communication trouble area (buffer memory address: 2096 to 2110 (830H to 83EH))
- (b) When the communication trouble area clear request signal (Y02) is turned ON, and the processing at clear is completed, the communication trouble area clear end signal (X02) turns ON.
- (c) After the communication trouble area clear end signal (X02) has turned ON, turn OFF the communication trouble area clear request signal (Y02).
- (d) Taking corrective actions for the error and turning OFF the communication trouble area clear request signal (Y02) turns OFF the communication trouble area clear end signal (X02).
- (e) A sequence like the one below is used.



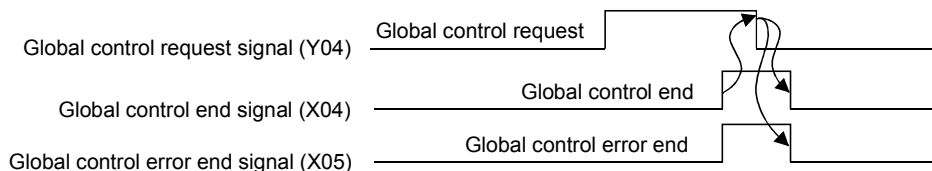


- (4) Global control request signal (Y04), global control end signal (X04)
 - (a) Turn ON the Global control request signal (Y04) when executing the global control.
 - (b) When the Global control request signal (Y04) is turned ON, and global control processing is completed, the Global control end signal (X04) turns ON.
 - (c) After the Global control end signal (X04) has turned ON, turn OFF the Global control request signal (Y04).
 - (d) Turning OFF the Global control request signal (Y04) turns OFF the Global control end signal (X04).
 - (e) Turn ON the Global control request signal (Y04) while the exchange start completed signal (X00) is ON.
 If the Global control request signal (Y04) is turned ON with the exchange start completed signal (X00) OFF, both of the Global control end signal (X04) and Global control error end signal (X05) turn ON.



* 1 Output area (buffer memory address: 960 to 1919 (3C0H to 77FH))

- (5) Global control error end signal (X05)
 - (a) If the Global control request signal (Y04) is turned ON while the exchange start completed signal (X00) is OFF, both the Global control end signal (X04) and Global control error end signal (X05) turn ON.
 - (b) The ON status of the Global control error end signal (X05) means that the global control has failed.
Remedy the cause of the error, and execute the global control again.
 - (c) The slave I/O is not held/deleted when the global control error end signal (X05) is on.
 - (d) Turning OFF the Global control request signal (Y04) turns OFF the Global control error end signal (X05).



REMARK

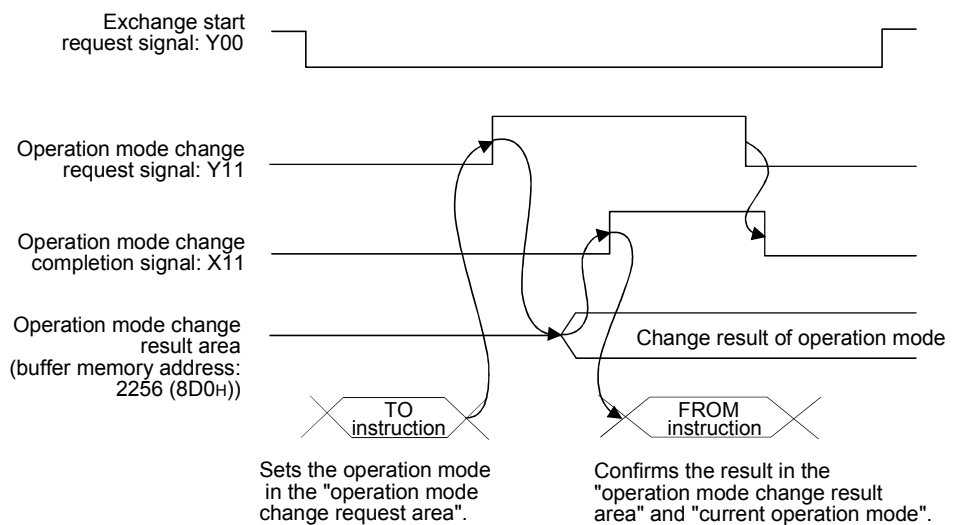
For details on the global control, refer to Section 4.1.2.

- (6) Watchdog timer error signal (X0D)
 - (a) This signal turns ON when a watchdog timer error occurs on the A1SJ71PB92D/AJ71PB92D.
 - (b) The Watchdog timer error signal (X0D) does not turn OFF until:
 - The programmable controller is turned OFF and back ON again
 - The CPU module is reset.
- (7) Operation mode signal (X10)

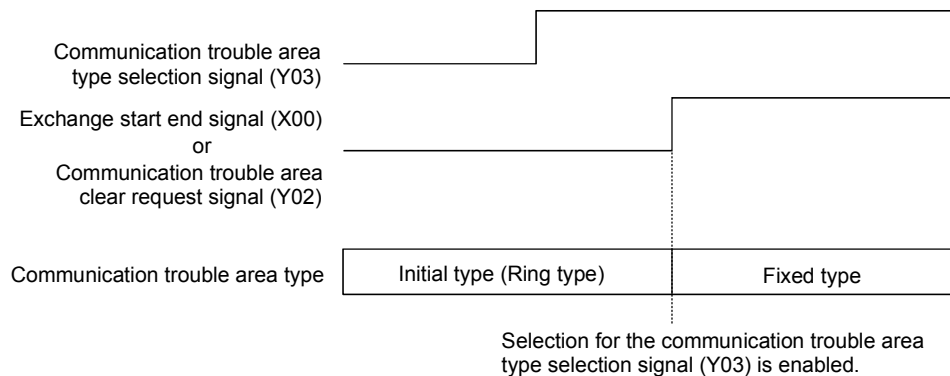
Indicates whether the current operation mode is the parameter setting mode (MODE 1) or not.

ON: Parameter setting mode (MODE 1)

OFF: Normal service mode (MODE 0), extended service mode (MODE E), self- diagnosis mode (MODE 2), E²PROM initialization function
- (8) Operation mode change request signal (Y11), operation mode change completion signal (X11)
 - (a) Turn ON the Operation mode change request signal (Y11) when changing the operation mode to the one set in the Operation mode change request area (buffer memory address: 2255 (8CFH)).
The operation mode can be changed without resetting the QCPU.
 - (b) This function is valid only when a start is made with the mode setting switch in the 0, 1 or E position.
 - (c) Turning ON the Operation mode change request signal (Y11) clears the information of the Operation mode change result area (buffer memory address: 2256 (8D0H)).
 - (d) The Operation mode change completion signal (X11) turns ON when the operation mode is changed, and the result of the change is stored to the Operation mode change result area (buffer memory address: 2256 (8D0H)).
 - (e) Make sure that 0H is stored in the Operation modechange result area (buffer memory address: 2256 (8D0H)), and turn OFF the Operation mode changerequest signal (Y11).
 - (f) Turning OFF the Operation mode change request signal (Y11) turns OFF the Operation mode change completion signal (X11).



- (9) Communication READY signal (X1B)
 - (a) The Communication READY signal (X1B) turns ON when the Module READY signal (X1D) turns ON and I/O data exchange is ready to be started. (The signal turns ON only in the Normal service mode (MODE 0) and Extended service mode (MODE E).)
 - (b) The signal turns OFF when an error disabling I/O data exchange occurs on the A1SJ71PB92D/AJ71PB92D.
 - (c) Use the signal as an interlock signal for when turning ON the exchange start request signal (Y00).
- (10) Module READY signal (X1D)
 - (a) This signal turns ON when the A1SJ71PB92D/AJ71PB92D is started up. (This signal turns ON regardless of the operation mode.)
 - (b) This is turned off when the A1SJ71PB92D/AJ71PB92D goes down.
- (11) Communication trouble area type selection signal (Y03)
 - (a) This signal is used to select the communication trouble area type (ring type or fixed type).
ON: Fixed type
OFF: Ring type
 - (b) This signal becomes valid when the exchange start (Exchange start end signal is ON) or communication trouble area clear request (Y02) is ON.



- (12) Restart request signal (Y0D)
 - (a) If the A1SJ71PB92D/AJ71PB92D has gone down for some reason (the FAULT LED: ON, the module READY signal (X1D): OFF), turning the Restart request signal (Y0D) OFF, ON and OFF again restarts the A1SJ71PB92D/AJ71PB92D.
 - (b) After the A1SJ71PB92D/AJ71PB92D is restarted, the status is the same as after:
 - The programmable controller is turned OFF and back ON again
 - The CPU module is reset.

4.3 Buffer Memory List

4.3.1 Buffer memory/configuration

The configuration of the buffer memory used to receive and send data with the A1SJ71PB92D/AJ71PB92D and the CPU module is described below.

Buffer memory address decimal (Hexadecimal)	Area name	Description
0 (0H)	Input area	This is the area that stores the input data from the slave.
959 (3BFH)		
960 (3C0H)	Output area	This is the area that stores the output data to the slave.
1919 (77FH)		
1920 (780H)	Address information area	This is the area that shows the station number of slave station and I/O data length.
2039 (7F7H)		
2040 (7F8H)	Communication trouble area	This is the area that shows the trouble information that occurred during communication.
2079 (81FH)		
2080 (820H)	Slave trouble information cancel area	This is the area that sets the data that masks the slave trouble information.
2081 (821H)	Global control area	This is the global control function hold/cancel selection area.
2082 (822H)	System area (Use prohibited)	—
2083 (823H)		
2084 (824H)	Trouble no information time setting area	This is used to set the time that does not inform the communication trouble after the exchange start.
2085 (825H)	System area (Use prohibited)	—
2095 (82FH)		
2096 (830H)	Expansion communication trouble area	This area shows the expansion information of the trouble information which is occurred during the communication.
2110 (83EH)		
2111 (83FH)	System area (Use prohibited)	—
2112 (840H)	Slave status area	This is the area that shows the status information of each slave.
2116 (844H)		
2117 (845H)	System area (Use prohibited)	—
2127 (84FH)		
2128 (850H)	Input/Output start address area (Extended service mode (MODE E) only)	This is the area that shows the addresses to start the input area and output area of each slave.
2247 (8C7H)		
2248 (8C8H)	System area (Use prohibited)	—
2253 (8CDH)		
2254 (8CEH)	Current operation mode area	This area indicates the operation mode of the A1SJ71PB92D/AJ71PB92D when it has started up.
2255 (8CFH)	Operation mode change request area	In this area, set the operation mode of the A1SJ71PB92D/AJ71PB92D which you want to choose.
2256 (8D0H)	Operation mode change result area	This area indicates the execution result of the operation mode change request.
2257 (8D1H)		
3775 (EBFH)	System area (Use prohibited)	—

POINT

Do not write any data in the "system area (Use prohibited)" of the buffer memory.

If data is written to the "system area (Use prohibited)", there is a risk that the programmable controller system may malfunction.

4.3.2 Buffer memory detailed description

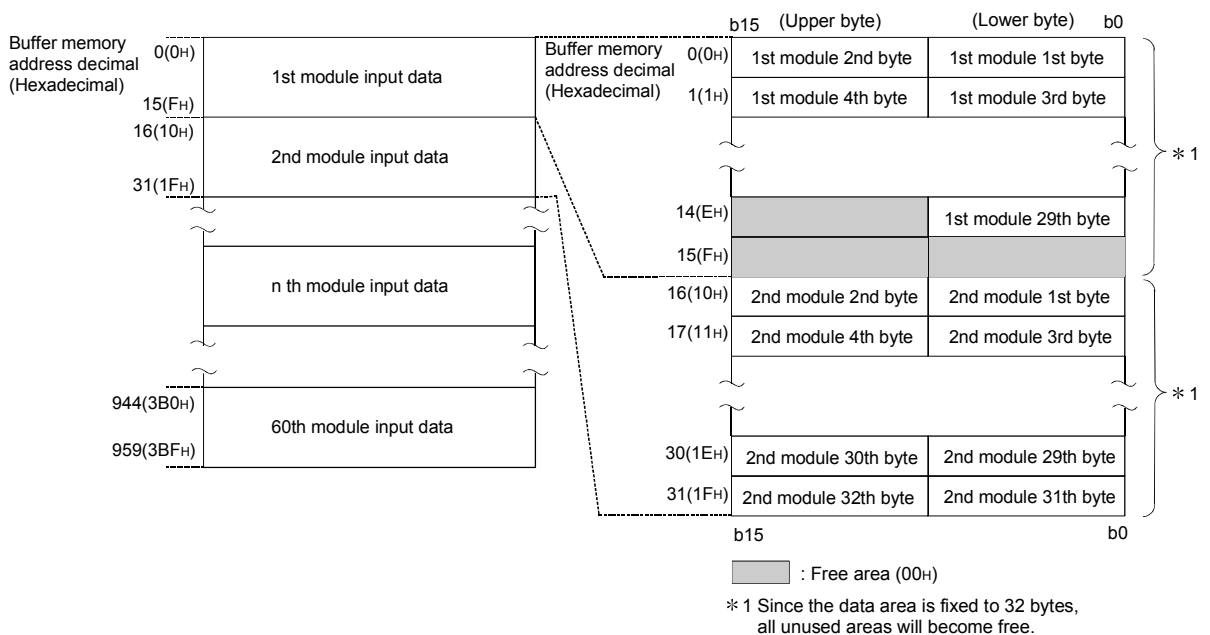
- (1) INPUT area (buffer memory address: 0 to 959 (0H to 3BFH))
 Data input from slave stations are stored in this area.
 The specifications of the input area differ depending on the operation mode of the A1SJ71PB92D/AJ71PB92D.

POINT
(1) Data are assigned to the input area in the order of GX Configurator-DP or MELSEC ProfiMap parameter settings (in the order of station numbers).
(2) The buffer memory is reassigned if parameters are modified (deletion or addition of some slave stations) in GX Configurator-DP or MELSEC ProfiMap. Check the sequence program after modifying the parameters. If there are slave stations to be connected in the future, set them as reserved stations in the parameter setting. Doing so eliminates the need to check the sequence program.
(3) The input area of the A1SJ71PB92D/AJ71PB92D does not store input data of the slave station that has become incapable of exchanging I/O data and whose bit in the slave status area (buffer memory address: 2113 to 2116 (841H to 844H)) has turned ON. For the slave station, the input area holds the data that were stored before the failure of I/O data exchange.

- (a) Normal service mode (MODE 0)
 In the normal service mode (MODE 0), 60 stations are allocated to the input area with 32 bytes (16 words) reserved for each station.
 An unused input area for each slave station stores 00H.

1) Example

In the example shown below, the input data lengths for the first and the second stations are set to 29 bytes and 32 bytes respectively.
 Since the input data length for the first slave station is 29 bytes, 00H is stored to the unused area (the upper byte of buffer memory address 14 (EH), and 15 (FH)).



(b) Extended service mode (MODE E)

In the extended service mode (MODE E), the input area is allocated based on the variable data length (in byte units) for each slave station.

1) Setting data length

The data length (in byte units) for each slave station is set in the slave parameter setting (Slave Modules) of GX Configurator-DP or MELSEC ProfiMap.

Note that this slave parameter (Slave Modules) does not have to be set for slave stations with fixed data lengths.

2) Setting range for data length

The maximum data length per module is 244 bytes, and the total data length for all slave station can be set up to 1920 bytes.

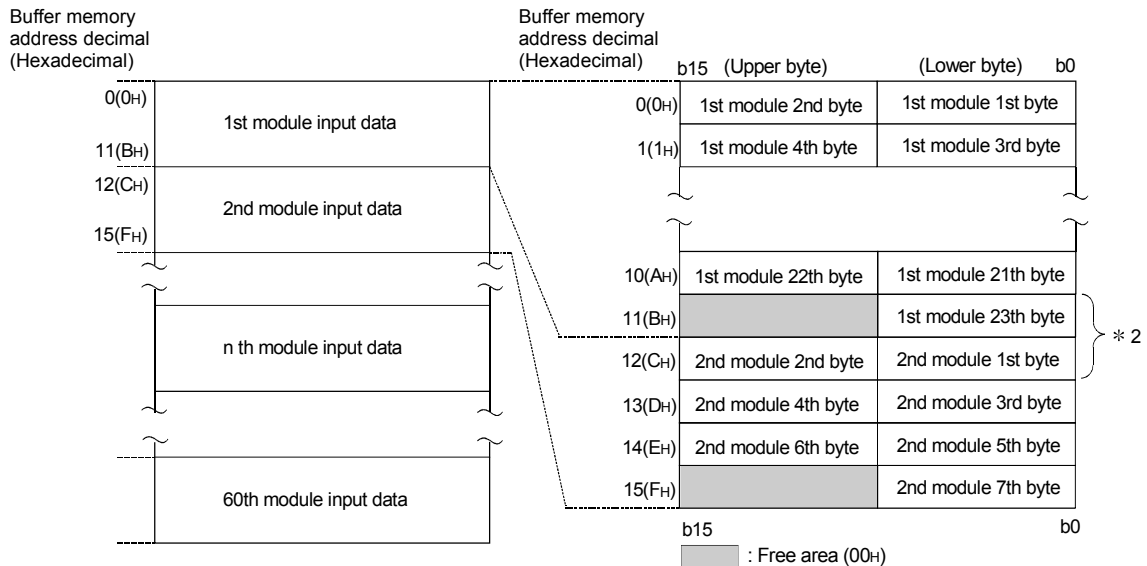
When the data length is an odd number of bytes, 00H is stored to the final high byte.

3) Example

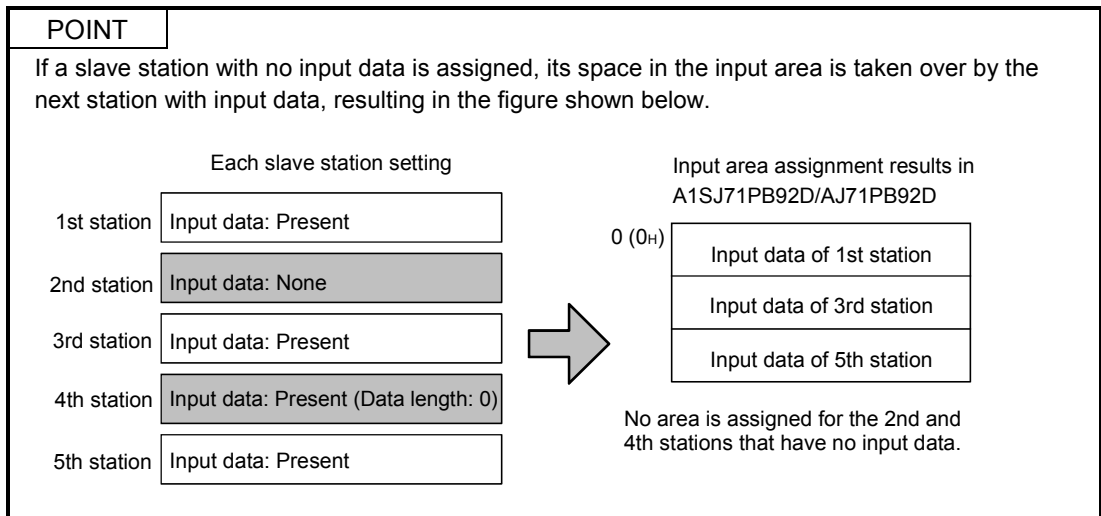
In the example shown below, the input data lengths for the first and the second stations are set to 23 bytes and 7 bytes respectively.

Since the input data length for the first slave station is 23 bytes, the upper byte of buffer memory address 11 (BH) is occupied by 00H.

The input data of the next station is assigned starting from the next buffer memory address.



* 2 When the data length is set to an odd number of bytes, the last upper byte becomes a free area and data for the next station is assigned from the next address.



- (2) OUTPUT area (buffer memory address: 960 to 1919 (3C0H to 77FH))
 Data output from slave stations are stored in this area.
 The specifications of the output area differ depending on the operation mode of the A1SJ71PB92D/AJ71PB92D.

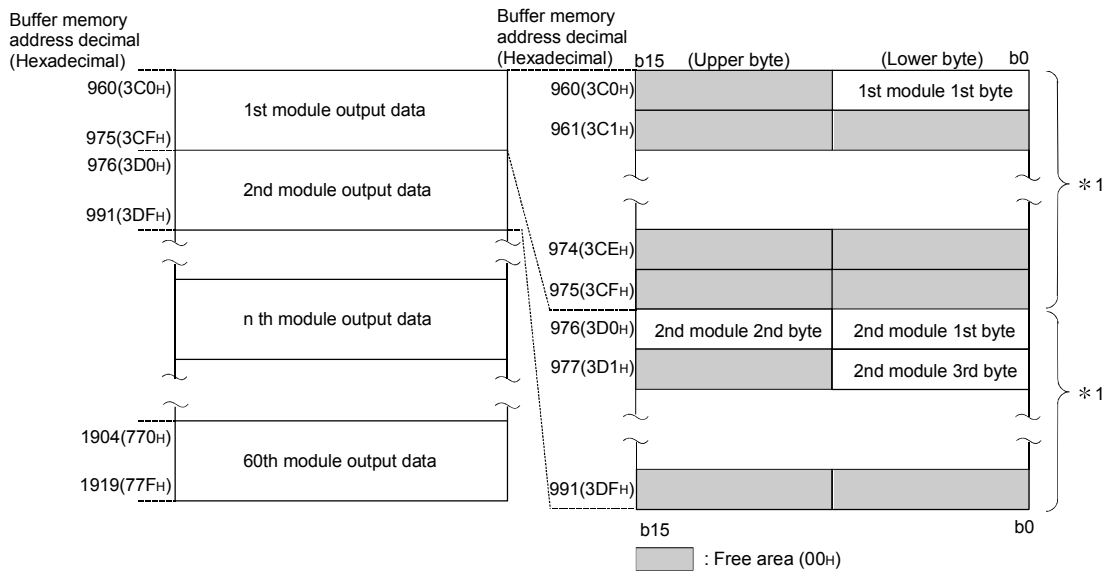
POINT
(1) Data are assigned to the output area in the order of GX Configurator-DP or MELSEC ProfiMap parameter settings (in the order of station numbers).
(2) The buffer memory is reassigned if parameters are modified (deletion or addition of some slave stations) in GX Configurator-DP or MELSEC ProfiMap. Check the sequence program after modifying the parameters. If there are slave stations to be connected in the future, set them as reserved stations in the parameter setting. Doing so eliminates the need to check the sequence program.

- (a) Normal service mode (MODE 0)
 In the normal service mode (MODE 0), 60 stations are allocated to the output area with 32 bytes (16 words) reserved for each station.
 Set 00H in an unused output area assigned to each slave station.

1) Example

In the example shown below, the output data lengths for the first and the second stations are set to 1 byte and 3 bytes respectively.

Since the output data length for the first slave station is 1 byte, set 00H in the unused area (the upper byte of buffer memory address 960 (3C0H), and 961 (3C1H) to 975 (3CFH)).



* 1 Since the data area is fixed to 32 bytes, all unused areas will become free.

(b) Extended service mode (MODE E)

In the extended service mode (MODE E), the output area is allocated based on the variable data length (in byte units) for each slave station.

1) Setting data length

The data length (in byte units) for each slave station is set in the slave parameter setting (Slave Modules) of GX Configurator-DP or MELSEC ProfiMap.

Note that this slave parameter (Slave Modules) does not have to be set for slave stations with fixed data lengths.

2) Setting range for data length

The maximum data length per module is 244 bytes, and the total data length for all slave station can be set up to 1920 bytes.

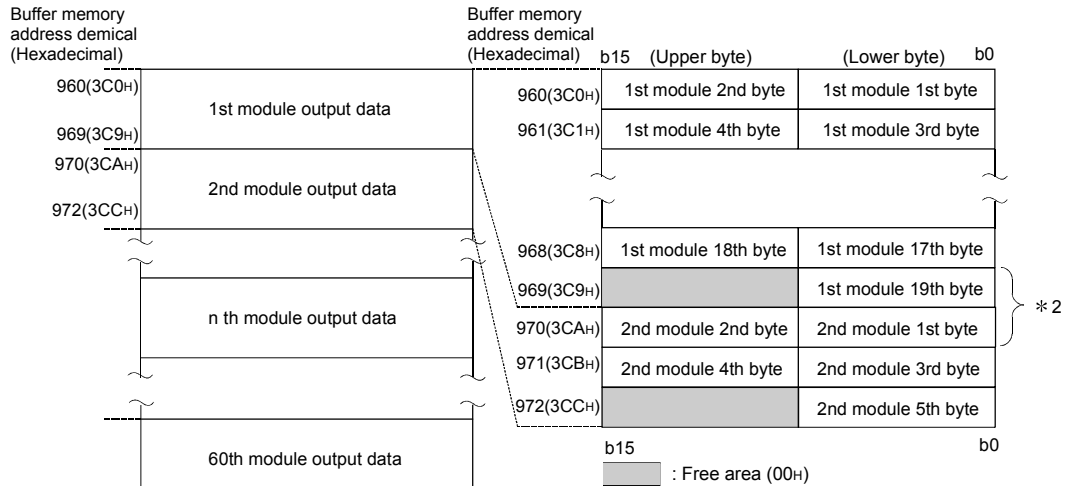
When the data length is an odd number of bytes, 00H is stored to the final high byte.

3) Example

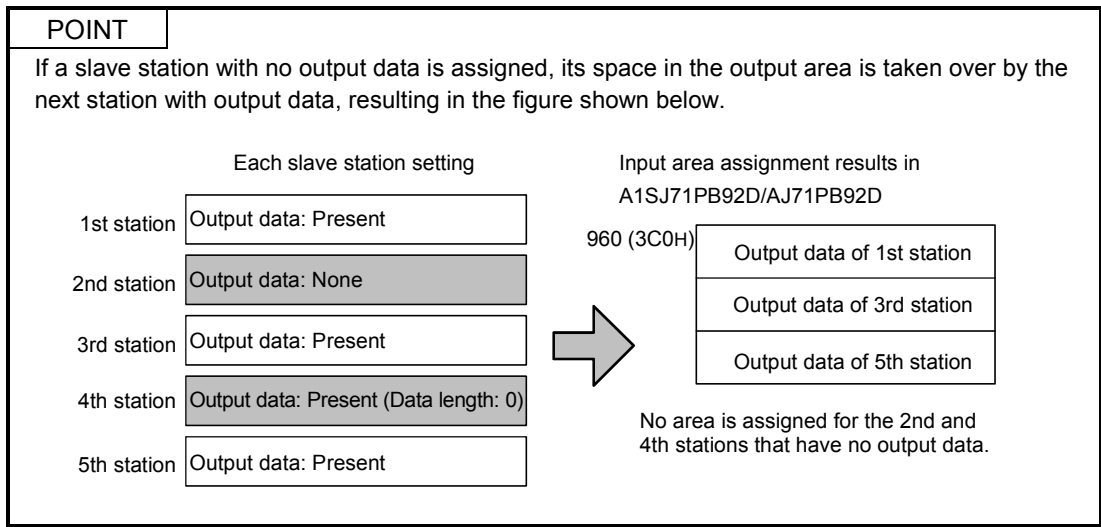
In the example shown below, the output data lengths for the first and the second stations are set to 19 bytes and 5 bytes respectively.

Since the output data length for the first slave station is 19 bytes, the upper byte of buffer memory address 969 (3C9H) is occupied by 00H.

The output data of the next station is assigned starting from the next buffer memory address.



* 2 When the data length is set to an odd number of bytes, the last upper byte becomes a free area and data for the next station is assigned from the next address.



- (3) Address information area (buffer memory address: 1920 to 2039 (780H to 7F7H))
 The station number and I/O data length of each slave station are stored in this area.
 Information of 60 modules is stored in the Address information area in the same order for each module.

Information for reserved stations is also stored.

- (a) Address information area configuration

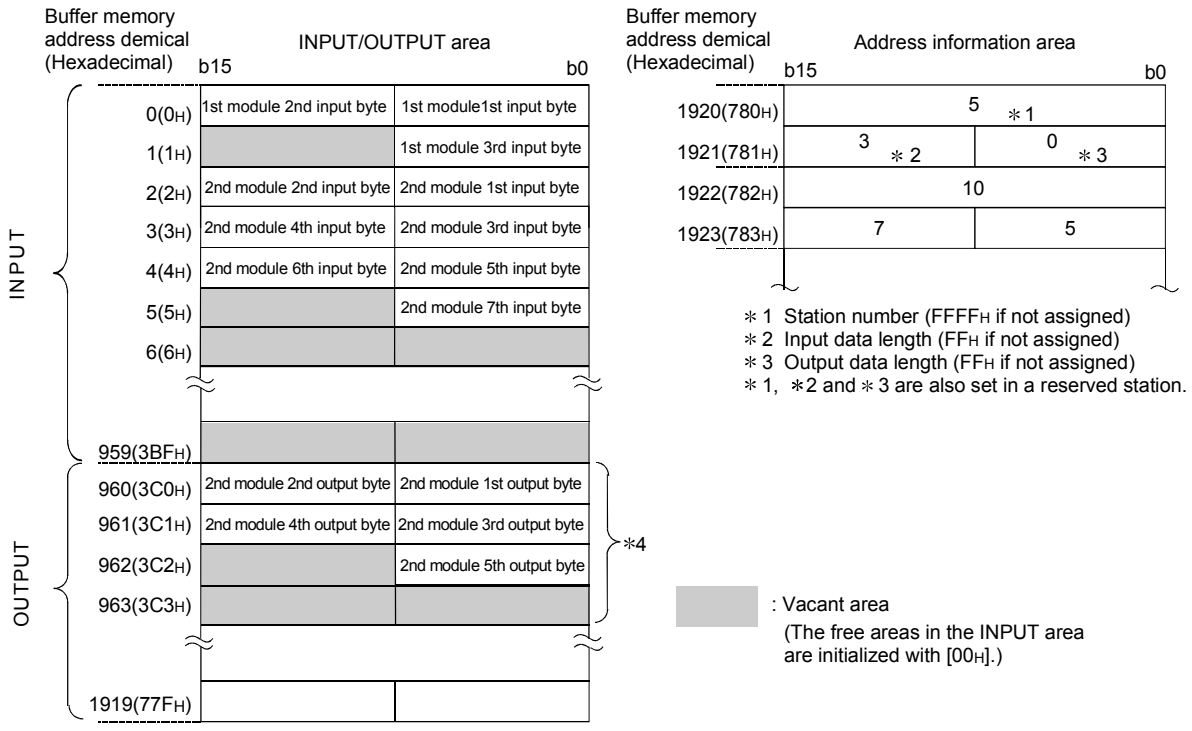
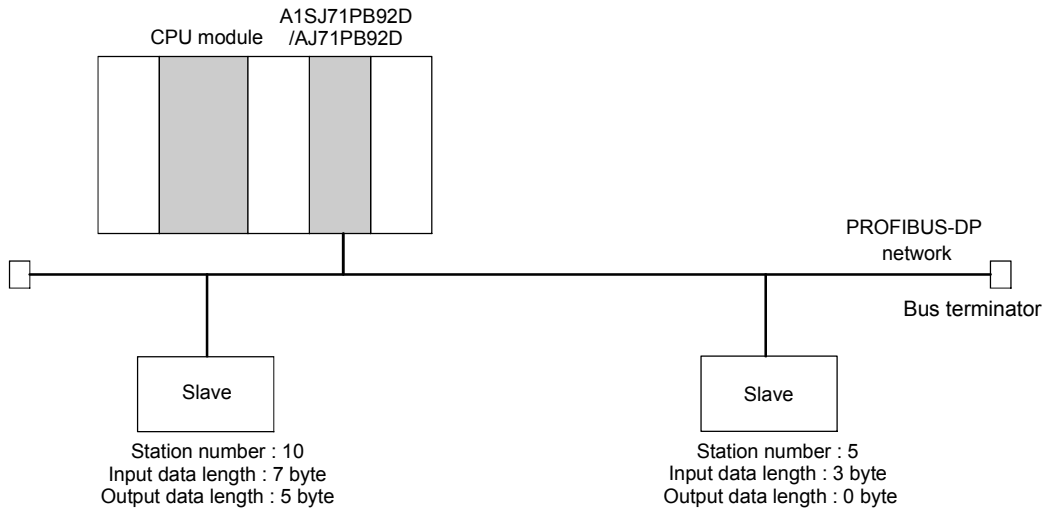
The address information area configuration is shown below.

Buffer memory Address DEC (HEX)		b15	b8 b7	b0
1920(780H)	Station number of 1st module	1920(780H)	The station number of the 1st module is stored. (Initial value: FFFF _H)	
1921(781H)	I/O data length of 1st module		0000 _H to 007D _H (0 to 125): station number FFFF _H : No station number assigned	
1922(782H)	Station number of 2nd module	1921(781H)	The input data length of the 1st module is stored. (Initial value: FF _H)*1	The output data length of the 1st module is stored. (Initial value: FF _H)*1
1923(783H)	I/O data length of 2nd module			
to			00 _H to F4 _H : Input data length (unit: byte) FF _H : Input data not assigned	00 _H to F4 _H : Output data length (unit: byte) FF _H : Output data not assigned
2038(7F6H)	Station number of 60th module			
2039(7F7H)	I/O data length of 60th module			

*1 The difference between 00H and FFH is as follows:
 00H: The set data length is 0 although input or output data is assigned.
 FFH: Input or output data are not assigned.

The A1SJ71PB92D/AJ71PB92D assigns the input and output areas according to the information stored in the address information area.

Example: At extended service mode (MODE E)



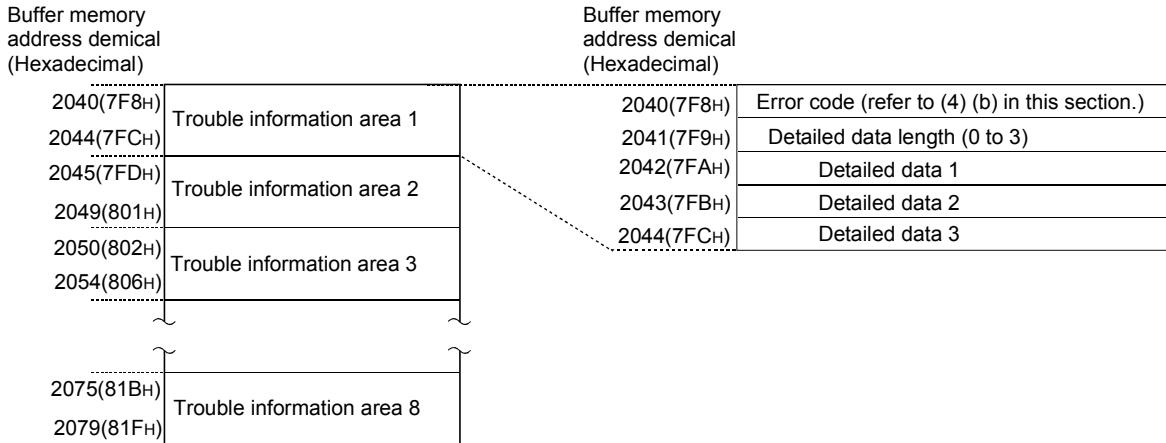
* 4 Since output from the first station has a data length of 0, no area is allocated in the OUTPUT area.

POINT

(1) Data are assigned to the address information area in the order of GX Configurator-DP or MELSEC ProfiMap parameter settings (in the order of station numbers).

(2) The buffer memory is reassigned if parameters are modified (deletion or addition of some slave stations) in GX Configurator-DP or MELSEC ProfiMap. Check the sequence program after modifying the parameters. If there are slave stations to be connected in the future, set them as reserved stations in the parameter setting. Doing so eliminates the need to check the sequence program.

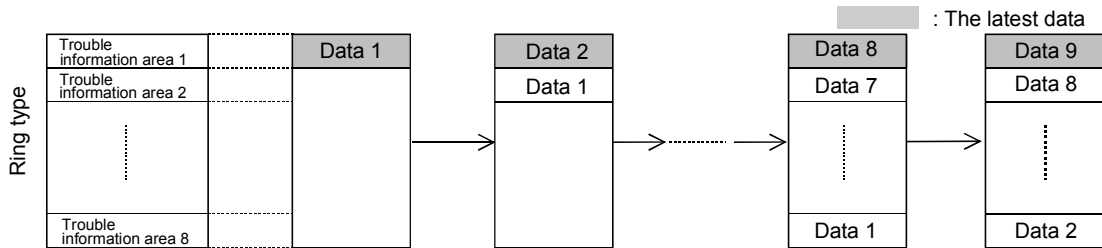
- (4) Communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH))
When some kind of trouble occurs during communication the A1SJ71PB92D/AJ71PB92D stores the contents of the trouble in this area.
 - (a) Communication trouble area configuration
As shown in the following diagram, a total of 8 pieces of trouble information that consist of the trouble code, detailed data length, and detailed data can be stored.



How to store the trouble information can be selected from the ring type and the fixed type by turning ON or OFF the communication trouble area type selection signal (Y03).

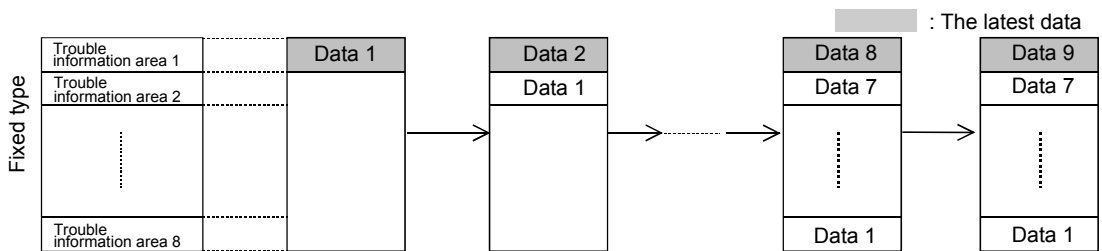
1) Ring type

Trouble information is stored in order from the head area of the communication trouble area.
The latest trouble information is always stored in the head area of the communication trouble area.



2) Fixed type

Trouble information data in areas 2 to 8 (data 1 to 7) are fixed even if the 9th or later trouble information is generated.
The data of the 9th trouble or later is stored in area 1. (Area 1 only is updated.)



All the trouble information in either type can be cleared by turning ON the communication trouble area clear request signal (Y02).

When the communication trouble detection signal reset (Y01) is turned ON, the communication trouble detection signal (X01) turns OFF with the data in the communication trouble area retained.

(b) Error codes

The error codes are shown below.

Error Code	Data length	Detailed data			Description	Communication state	User processing
		1	2	3			
0200H	(c) Ref.	(c) Ref.	(c) Ref.	(c) Ref.	(c)Ref.	△	(c)Ref.
1211H	1	03h	—	—	The slave address specified in the parameter is the same as that of the master. This error occurs immediately after the power supply is turned on or the CPU module is reset. Even though this error is occurring, if the exchange start (Y00) is on then error of error code 3000H will occur, the FAULT LED will turn on, and operation will stop.	×	Change the slave station address parameter.
1300H	1	Contents ref.	Contents ref.	—	Not even 1 active slave station is set in the parameter. (The slave station is a reserved station.) When this error occurs the detailed data is set to: Detailed data 1: Number of slaves set in the parameter. Detailed data 2: Number of active slaves set in the parameter. This error occurs immediately after the power supply is turned on or the CPU module is reset. Even though this error is occurring, if the exchange start (Y00) is on then error of error code 3000H will occur, the FAULT LED will turn on, and operation will stop.	×	1) Set 1 or more active slaves in the parameter. 2) When the FAULT LED is turned on, reset is enabled by turning OFF→ON→OFF the Restart request signal (Y0D)
3000H	1	Ignored	—	—	1) When the above errors 1211H or 1300H have occurred before this error: Refer to errors 1211H, 1300H above. 2) Otherwise An unexpected error has occurred.	×	For 1) Refer to the above 1211H, 1300H errors. For 2) Consult your local Mitsubishi representative, explaining a detailed description of the problem.

×: Exchange stops after the error occurs.

△: Exchange continues.

(c) When the error code = 0200H

For a slave trouble information occurrence (error code = 0200H), the slave trouble information is stored in the detailed data.

The communication trouble area configuration for this case is shown below.

In addition, the expansion communication trouble information is stored in buffer memory 2096 (830H) to 2110 (83EH) for only the latest trouble information of the error code = 0200H trouble information.

For information regarding the expansion communication trouble information refer to Section 4.3.2 (5).

	Error code = slave trouble information occurrence	
	Detailed data length = 3	
Detailed data 1	Master address * ¹	Slave address * ²
Detailed data 2	Trouble information	
Detailed data 3	Slave ID * ³	

*1 The station address of the master station that controls the slave station in which this trouble information occurred is stored. However, FFH is stored when the trouble information shows the exchange with the slave is failed.

*2 The station address of the slave station in which this trouble information occurred is stored.

*3 Individual slave inherent ID No. from the PNO is stored. However, FFH is stored for trouble information that shows that the exchange with the slave failed.

The trouble information is shown in a 16-bit bit string, and the bits that correspond to the respective trouble occurrences are ON (1).

I/O data exchange between a master station and slave stations is continued even if any of the errors described in the next page occurs.

The table on the next page lists the meaning of each bit, actions to be taken, and the station where the trouble information is detected.

Bit	Description	Action	Detected in
b0	Parameter transmission request from a slave station	(1) When I/O data exchange is started Normally operating (This occurs every time I/O data exchange is started.) (2) While I/O data are exchanged Check the slave station status and communication line.	slave station
b1	Trouble information read request	Check the slave station status.	slave station
b2	0 (Fixed)	—	—
b3	The slave station is monitored by the watchdog timer.	Normally operating	slave station
b4	The slave station entered FREEZE mode.	Normally operating	slave station
b5	The slave station entered SYNC mode.	Normally operating	slave station
b6	0 (Reserved)	—	—
b7	Excluded from I/O data exchange according to the parameter settings	(1) When I/O data exchange is stopped Normally operating (This occurs every time I/O data exchange is stopped.) (2) While I/O data are exchanged Check if any parameter has been changed from the class 2 master station on the network.	master station
b8	Unable to exchange I/O data with slave station.	Check the slave station status and communication line. Check the parameters.	master station
b9	The slave station is not ready to exchange I/O data.	(1) When I/O data exchange is started Normally operating (This occurs every time I/O data exchange is started.) (2) While I/O data are exchanged Check the slave station status and communication line.	slave station
b10	The parameter (No. of I/O bytes) received from the master station does not match that of the slave station.	Check the slave station parameters.	slave station
b11	There is some expansion trouble information.	Check the slave station status.	master station
b12	The function requested by the master station is not supported.	Check if the slave station supports the global control function or not. Verify the slave station specifications.	slave station
b13	Illegal response from slave station	Check the slave station or network status.	master station
b14	Illegal parameter(s) sent from the master station	Check the parameters.	slave station
b15	Controlled by another master station.	Check if more than one master station are communicating with the same slave station. Check the parameters.	master station

- (5) Slave trouble information cancel area (buffer memory address: 2080 (820H))
Setting some values to this area can mask (invalidate) any data of the trouble information that is sent from a slave station during communication. (Initial value: 02B9H)

0: Validates the trouble information.
1: Invalidates the trouble information.



bit	Description	Initial value
b0	Parameter transmission request from a slave station	1
b1	Trouble information read request	0
b2	Fixed to 0	0
b3	The slave station is monitored by the watchdog timer	1
b4	Slave station entered FREEZE mode.	1
b5	Slave station entered SYNC mode.	1
b6	0 (Reserved)	0
b7	Excluded from I/O data exchange according to the parameter settings	1
b8	Unable to exchange I/O data with slave station.	0
b9	The slave station is not ready to exchange I/O data.	1
b10	The parameter (No. of I/O bytes) received from the master station does not match that of the slave station.	0
b11	Expansion communication trouble information exists.	0
b12	The function requested by the master station is not supported.	0
b13	Illegal response from slave station	0
b14	Illegal parameter(s) sent from the master station	0
b15	Controlled by another master station	0

Even if trouble information corresponding to each bit is generated on a slave station, it is not recognized as trouble information, and the status of the A1SJ71PB92D/AJ71PB92D is as follows:

- The communication trouble detection signal (X01) does not turn ON.
- The RSP ERR. LED does not turn ON.
- No error code and detailed data is stored in the communication trouble area (2040 to 2079 (7F8H to 81FH)) and/or expansion communication trouble area (2096 to 2110 (830H to 83EH)).
- The bit corresponding to the station that sent the trouble information does not turn ON in the Slave status area (2112 to 2116 (840H to 844H)).

POINT	Set values into the slave trouble information cancel area when the exchange start request signal (Y00) is OFF. Values set with the exchange start request signal (Y00) ON are ignored.
--------------	---

(b) Setting global control services (b5 to b2)

The following service combinations are not executable at the same time.

- SYNC and UNSYNC (If both services are attempted concurrently, UNSYNC only is enabled.)
- FREEZE and UNFREEZE (If both services are attempted concurrently, UNFREEZE only is enabled.)

The following shows the services and their set values for b5 to b2.

1) Setting for execution of the SYNC and UNSYNC services

Service to be Executed	Set Value	
	b5	b4
SYNC	1	0
UNSYNC	0* ¹	1

*1 When 1 is set to this bit, it is handled as an invalid value. (The operation is the same as when the value is set to 0.)

2) Setting for execution of the FREEZE and UNFREEZE services

Service to be Executed	Set Value	
	b3	b2
FREEZE	1	0
UNFREEZE	0* ¹	1

*1 When 1 is set to this bit, it is handled as an invalid value. (The operation is the same as when the value is set to 0.)

(c) Setting the target group No. (b15 to b8)

Multiple group Nos. can be set for the target group No.

When 0s are set to all of b8 to b15, the set global control service is sent to all slave stations (including slave stations for which group No. is not set).

REMARK

For details on the global control, refer to 4.1.2.

- (7) Trouble no information time setting area (buffer memory address: 2084 (824H))
The time during which no trouble information is notified after communication start (after exchange start end signal (X00) turns ON) is set in this area. (Initial value: 20 seconds)

Set Value	Description
0 to 65535	Set the time during which trouble information is not notified. (Unit: seconds)

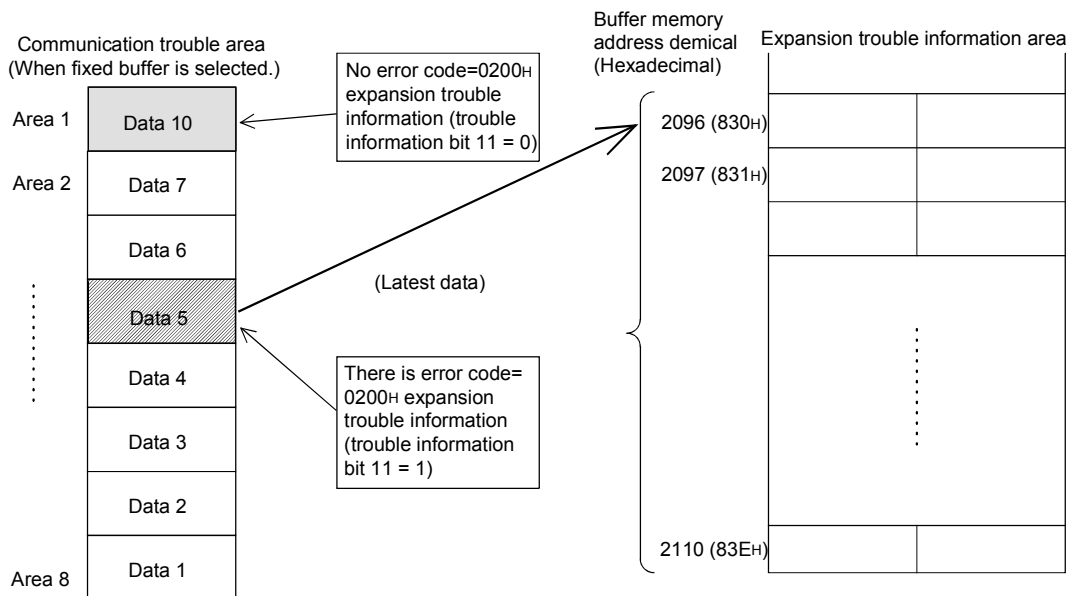
This setting prevents temporary error detection. (e.g. when turning ON a slave station after turning ON the A1SJ71PB92D/AJ71PB92D)

When trouble information is generated within the time duration set by this setting, the conditions are as follows:

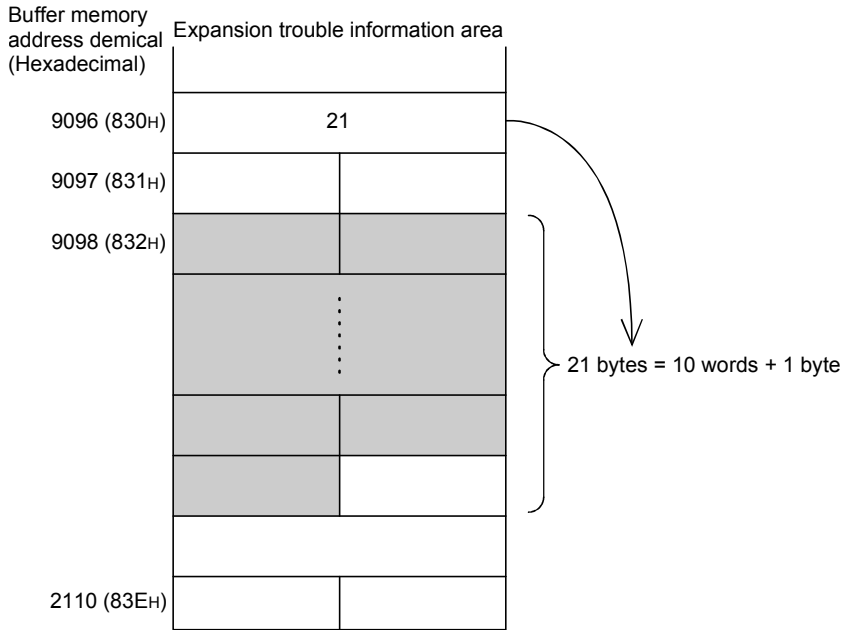
- The communication trouble detection signal (X01) does not turn ON.
- The RSP ERR. LED does not turn ON.
- No error code and detailed data is stored in the communication trouble area (2040 to 2079 (7F8H to 81FH) and/or expansion communication trouble area (2096 to 2110 (830H to 83EH)).
- The bit corresponding to the station that sent the trouble information does not turn ON in the Slave status area (2112 to 2116 (840H to 844H)).

POINT
Set a value into the trouble no information time setting area when the exchange start request signal (Y00) is OFF. Values set with the exchange start request signal (Y00) ON are ignored.

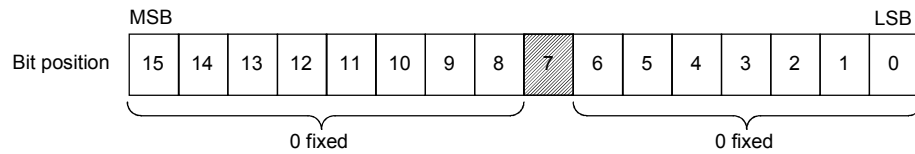
- (8) Expansion communication trouble area (buffer memory address: 2096 to 2110 (830H to 83EH))
This area shows the latest expansion trouble information for only one of the latest expansion trouble information in the error code 0200H error information stored in buffer memory 2040 (7F8H) to 2079 (81FH) communication error area (Refer to Section 4.3.2 (4)).
For details of the expansion trouble information, refer to the manual of the slave station.



- (a) Buffer Memory 2096 (830H)
The latest expansion communication trouble information length stored from buffer memory 2098 (832H) is stored as a byte length unit.



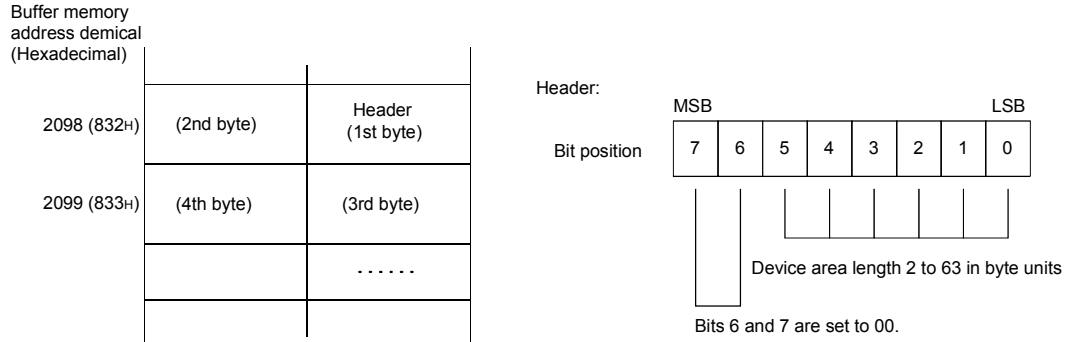
- (b) Buffer memory 2097 (831H)
Only bit 7 is valid. Other bit is fixed in 0. Bit 7 is turned on when the slave sends expansion trouble information that is 27 bytes or more.



- (c) Buffer memory 2098 to 2110 (832H to 83EH)
The following informations are stored in this area:
 - Device related trouble information
This area stores the slave station inherent self-diagnostic information that is not set by the PROFIBUS-DP standards.
 - Identifier related trouble information
For module type slave stations, whether or not a module error has occurred is stored as bit information.
 - Channel related trouble information
For module type slave station, this stores the, error information of all modules outputting an error.

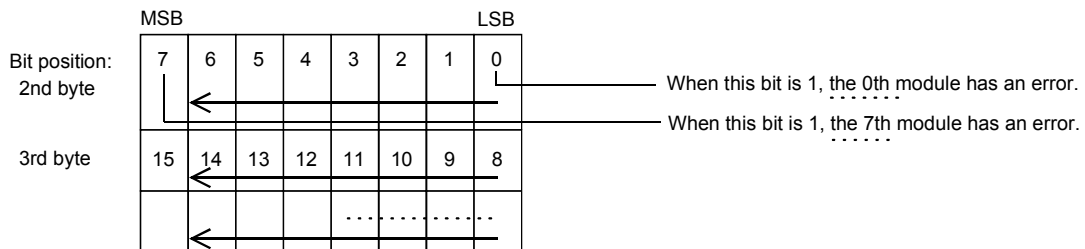
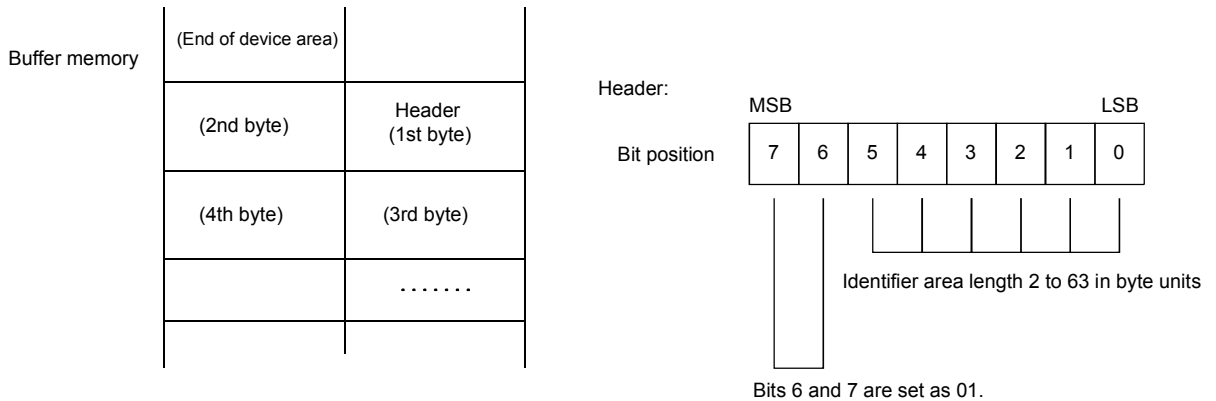
1) Device Related trouble information

This stores the slave module inherent trouble information that is not set by the PROFIBUS-DP standards. The device related trouble can be divided by header and trouble information. This area stores a 2 bit value that is the device related trouble information in the header, including the header (1 byte), and the device related trouble information for this area.



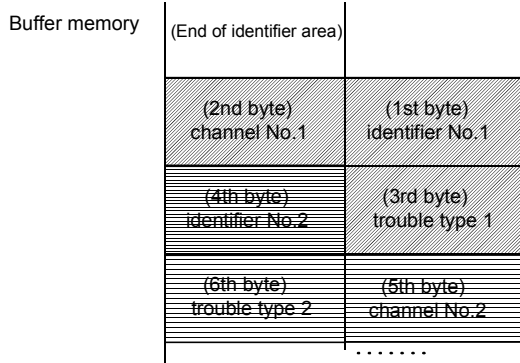
2) Identifier related trouble information

For module type slave stations, this stores as bit information whether or not a module is outputting an error. The identifier related trouble information can be divided into header and trouble information. This area stores a 2 bit value that is the identifier related trouble information in the header, including the header (1 byte), and the device related trouble information for this area.

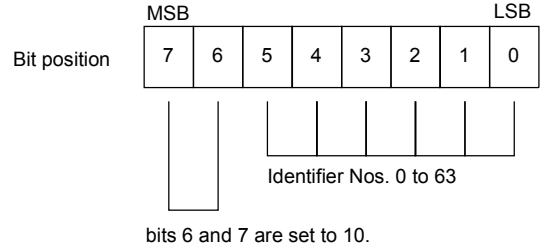


3) Channel related trouble information

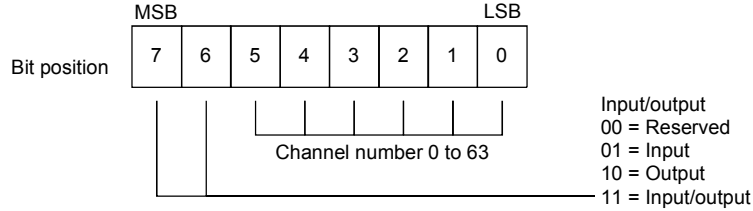
When a module type slave station, this area stores the trouble information for each module that is outputting an error. This area does not have a header and stores this information at the end of the identifier related trouble information. Each channel trouble information consists of an identifier No., channel No., and error type of 3 bytes.



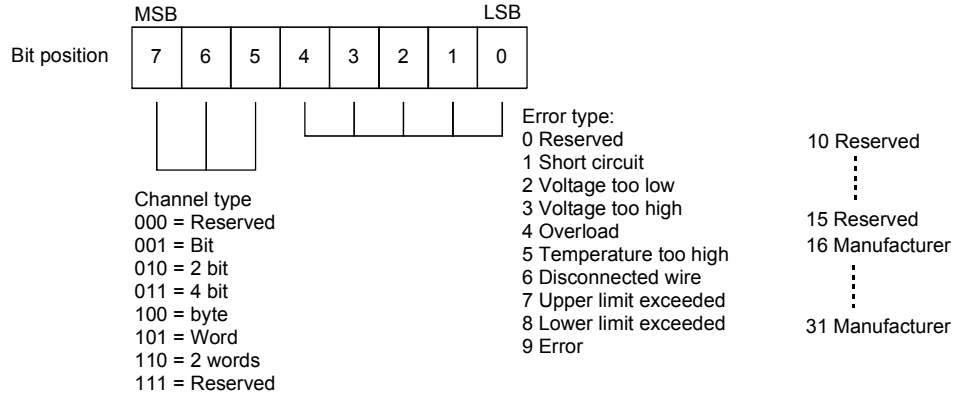
1st byte: Identifier No.



2nd byte: Channel No.

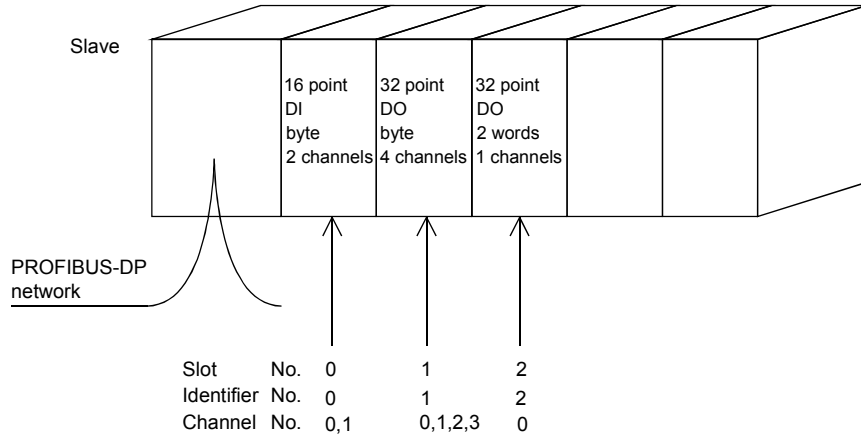


3rd byte: Trouble type

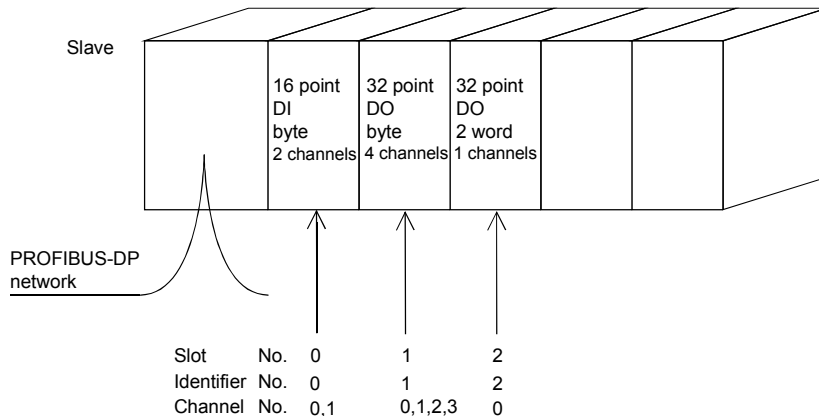
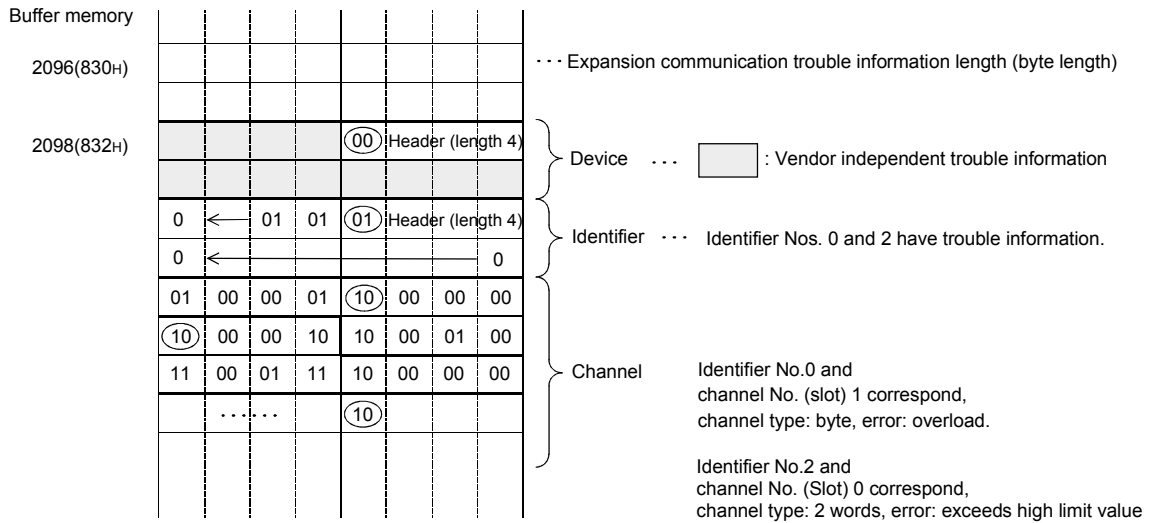


4) Identifier No., channel No.

The slave identifier No. and channel No. are discussed below. The identifier No. is the No. that is attached from the header of each slave module. Each module can have multiple channels. Refer to the each slave specifications regarding to the channel numbering method.

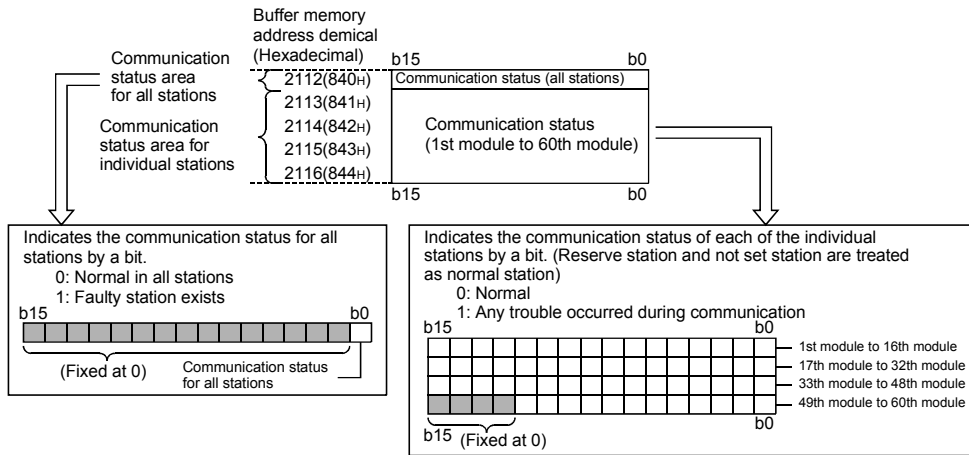


(d) Example expansion communication trouble area



- (9) Slave status area (buffer memory address: 2112 to 2116 (840H to 844H))
 This is the area that stores the status of each slave station.

The following figure shows the configuration:



- The communication status of each slave station under communication is set up.
- This area is operated when either the normal service mode (MODE 0) or extended service mode (MODE E) is set up.

POINT
(1) Data are assigned to the slave station area in the order of GX Configurator-DP or MELSEC ProfiMap parameter settings (in the order of station numbers).
(2) The buffer memory is reassigned if parameters are modified (deletion or addition of some slave stations) in GX Configurator-DP or MELSEC ProfiMap. Check the sequence program after modifying the parameters. If there are slave stations to be connected in the future, set them as reserved stations in the parameter setting. Doing so eliminates the need to check the sequence program.

- (10) Input/Output start address area (Extended service mode (MODE E) only)
(buffer memory address: 2128 to 2247 (850H to 8C7H))

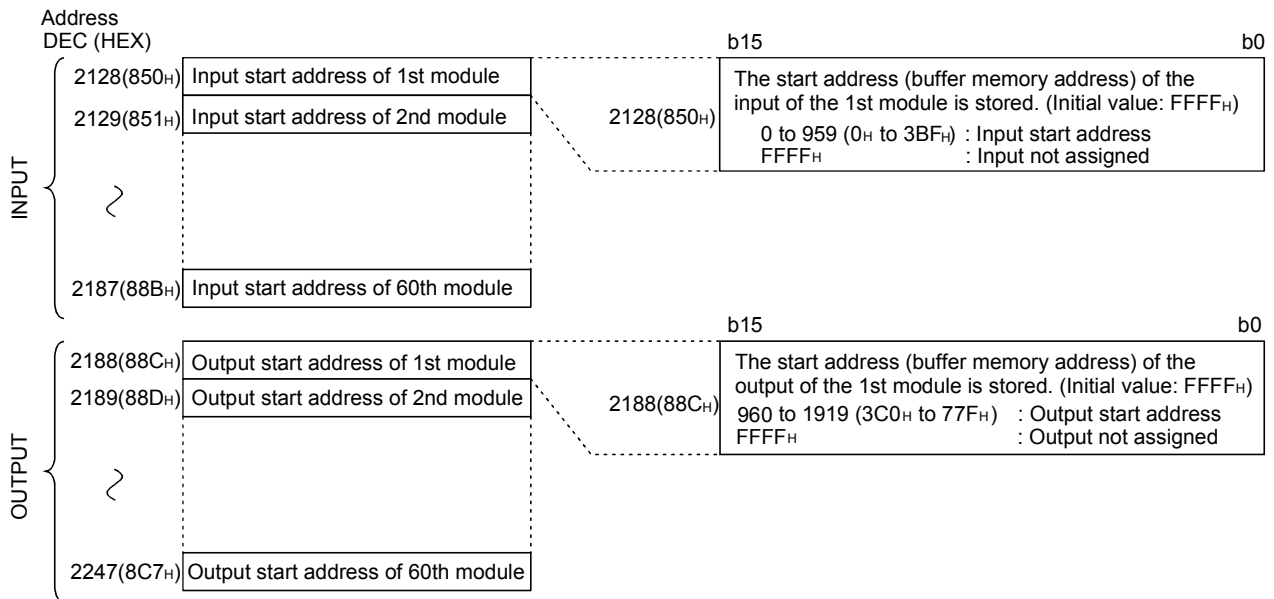
When the operation mode is extended service mode (MODE E), the start address (buffer memory address) for each slave station I/O data is stored in this area.

Creating a sequence program using this area allows address specification for the input and output areas without considering the number of I/O points for each slave station. (Refer to Section 8.2.2.)

In the normal service mode (MODE 0), 0s are stored in all areas.

- (a) Configuration of I/O start address area

In this area, input data and output data of 60 stations are stored in the same order.



- (b) Setup timing

The input start address and the output start address are stored when the module is started up.

- (c) Start address

The start address is set in 1 word units for both input and output.

The start addresses are stored in the input area or output area, starting from the head.

POINT
(1) Data are assigned to the I/O start address areas in the order of GX Configurator-DP or MELSEC ProfiMap parameter settings (in the order of station numbers).
(2) The buffer memory is reassigned if parameters are modified (deletion or addition of some slave stations) in GX Configurator-DP or MELSEC ProfiMap. Check the sequence program after modifying the parameters. If there are slave stations to be connected in the future, set them as reserved stations in the parameter setting. Doing so eliminates the need to check the sequence program.

(d) Example

The following shows an example of assignment in the input and output areas, together with values that are stored in the I/O start address area as a result of the example assignment.

1) Assignment in the input and output areas

Input area

0(0H)	1st module 2nd input byte	1st module 1st input byte
1(1H)		1st module 3rd input byte
2(2H)	2nd module 2nd input byte	2nd module 1st input byte
3(3H)	2nd module 4th input byte	2nd module 3rd input byte
4(4H)	2nd module 6th input byte	2nd module 5th input byte
5(5H)		2nd module 7th input byte

Output area

960 (3C0H)	1st module 2nd output byte	1st module 1st output byte
961 (3C1H)	1st module 4th output byte	1st module 3rd output byte
962 (3C2H)		1st module 5th output byte
963 (3C3H)	2nd module 2nd output byte	2nd module 1st output byte
964 (3C4H)		2nd module 3rd output byte

2) Resulting values stored in the I/O start address area

Address DEC(HEX)		Values stored
2128(850H)	Input start address for 1st module	• • • 0(0H)
2129(851H)	Input start address for 2nd module	• • • 2(2H)
2188(88CH)	Output start address for 1st module	• • • 960(3C0H)
2189(88DH)	Output start address for 2nd module	• • • 963(3C3H)

REMARK

For a program example that uses the I/O start address area, refer to Section 8.2.2.

(11) Current operation mode area (buffer memory address: 2254(8CEH))

The operation mode of the A1SJ71PB92D/AJ71PB92D is stored.

A value is stored in this area only in normal service mode (MODE 0), parameter setting mode (MODE 1), or extended service mode (MODE E).

No value is stored in self-diagnosis mode (MODE 2) or when the E²PROM initialization function is active.

Value	Description	
	Operation mode setting	Operation mode
0000H	When having changed the operation mode in the sequence program	Normal service mode (MODE 0)
0001H		Parameter setting mode (MODE 1)
000EH		Extended service mode (MODE E)
0100H	When A1SJ71PB92D/AJ71PB92D has started in the operation mode preset in E ² PROM	Normal service mode (MODE 0)
0101H		Parameter setting mode (MODE 1)
010EH		Extended service mode (MODE E)
1000H	When A1SJ71PB92D/AJ71PB92D has started with the operation mode set with the mode setting switch	Normal service mode (MODE 0)
1001H		Parameter setting mode (MODE 1)
100EH		Extended service mode (MODE E)

REMARK

For details on operation mode, refer to Section 4.4.

(12) Operation mode change request area (buffer memory address: 2255 (8CFH))

For execution of the operation mode change request, set a desired operation mode. (Initial value: FFFE_H)

The initial value (FFFE_H) is used for malfunction prevention.

If the Operation mode change request signal (Y11) is turned ON with the initial value stored in the Operation mode change request area, 0001_H is stored in the Operation mode change result area (buffer memory address: 2256 (8D0H)) and the operation mode is not changed.

Setting value	Description
0000 _H	The mode is changed to normal service mode (MODE 0).
0001 _H	The mode is changed to parameter setting mode (MODE 1).
000E _H	The mode is changed to extended service mode (MODE E).
0100 _H	The mode is changed to normal service mode (MODE 0). The normal service mode (MODE 0) is registered to the E ² PROM at the same time as the operation mode change.
0101 _H	The mode is changed to parameter setting mode (MODE 1). The parameter setting mode (MODE 1) is registered to the E ² PROM at the same time as the operation mode change.
010E _H	The mode is changed to extended service mode (MODE E). The parameter setting mode (MODE 1) is registered to the E ² PROM at the same time as the operation mode change.
FFFF _H	Erases the mode setting set in the E ² PROM, and switches the mode to the one set with the mode setting switch.

At the time of power-ON or CPU reset, if the mode setting switch is set to 0, 1, or E with an operation mode preset in the E²PROM, the setting of the mode setting switch is ignored and the operation mode saved in the E²PROM is valid.

REMARK

For details on operation mode, refer to Section 4.4.

(13) Operation mode change result area (buffer memory address: 2256 (8D0H))

This area stores the execution result of the operation mode change request.

0: Normal completion.

1: Abnormal completion. (A mode change request of the unauthorized value was given.)

On abnormal completion, the A1SJ71PB92D/AJ71PB92D does not change the operation mode. It maintains the same operation mode as before the change request was given.

4.4 Operation Mode

This section describes A1SJ71PB92D/AJ71PB92D operation modes and the procedure for setting the operation mode.

The operation mode of the A1SJ71PB92D/AJ71PB92D can be changed by using the Operation mode change request area (buffer memory address: 2255 (8CFH)) or on the mode setting switch.

(1) Types of operation modes

The following lists the operation modes of the A1SJ71PB92D/AJ71PB92D.

Operation mode	Description	Operation mode change		Reference
		Operation mode change request area (buffer memory address: 2255 (8CFH))	Mode setting switch	
Normal service mode (MODE 0)	I/O data exchange with slave stations is performed in this mode. The I/O area assigned to each slave station has a fixed capacity of 32 bytes.	○	○	Section 4.3.2 (1), (2)
Extended service mode (MODE E)	I/O data exchange with slave stations is performed in this mode. The I/O area for each slave station is assigned based on the variable data length (in byte units) for each station. The data length (in byte units) for each station is set as a slave parameter (Slave Modules) in GX Configurator-DP or MELSEC ProfiMap.	○	○	Section 4.3.2 (1), (2)
Parameter setting mode (MODE 1)	The parameters set on GX Configurator-DP or MELSEC ProfiMap are written to A1SJ71PB92D/AJ71PB92D in this mode.	○	○	—
Self-diagnosis mode (MODE 2)	The unit test on the A1SJ71PB92D/AJ71PB92D is performed in this mode.	×	○	Section 5.4
E ² PROM initialization function	This mode is used to return the A1SJ71PB92D/AJ71PB92D to the factory default status.	×	○	Section 4.5

○ : Changeable, × : Not changeable

(2) Changing the operation mode

The operation mode can be changed in Operation mode change request area (buffer memory address: 2255 (8CFH)) or with the mode setting switch.

(a) Changing the operation mode in Operation mode change request area (buffer memory address: 2255 (8CFH))

By changing the data in the Operation mode change request area (buffer memory address: 2255 (8CFH)), the operation mode can be changed without resetting the CPU module.

To do this, perform the following steps.

- 1) Write a value for a desired operation mode into the Operation mode change request area (buffer memory address: 2255 (8CFH)).
- 2) Turn ON the Operation mode change request signal (Y11).
- 3) The Operation mode change completion signal (X11) turns ON when the operation mode is changed, and the result of the change is stored in the Operation mode change result area (buffer memory address: 2256 (8D0H)).
- 4) Make sure that 0H (Normally completed) is stored in the Operation mode change result area (buffer memory address: 2256 (8D0H)), and turn OFF the Operation mode change request signal (Y11).
- 5) Turning OFF the Operation mode change request signal (Y11) turns OFF the Operation mode change completion signal (X11).

- (b) Changing the operation mode with the mode setting switch
Selecting a desired operation mode with the mode setting switch and turning the power OFF and ON or resetting the CPU module changes the operation mode to the desired one. (Refer to Section 5.3.)

POINT
(1) If an operation mode has been registered in the E ² PROM, the registered mode becomes active at the time of powering OFF and ON or resetting the CPU module. When the mode setting switch is set to any other than 0, 1, and E, however, the mode selected with the switch becomes active.
(2) When no operation mode has been registered in the E ² PROM, the mode selected with the mode setting switch becomes active at the time of powering OFF and ON or resetting the CPU module.

- (3) Storage value for the operation mode change failure
If the operation mode change is unsuccessfully completed, an 1H (Abnormally completed) is stored in the Operation mode change result area (buffer memory address: 2256(8D0H)) on the A1SJ71PB92D/AJ71PB92D.
- (4) Precautions when changing the operation mode
When the operation mode change is attempted during I/O data exchange, the A1SJ71PB92D/AJ71PB92D stops I/O data exchange before changing the operation mode. The exchange start end signal (X00) turns OFF.

4.5 E²PROM initialization function

This function clears the parameters stored in the E²PROM of the A1SJ71PB92D/AJ71PB92D. When the PRM SET LED is ON and the RSP ERR. LED has turned OFF, the parameters in the E²PROM may have been corrupted. (Refer to Chapter 9.)

In such a case, modify the parameters or initialize the E²PROM by the following steps.

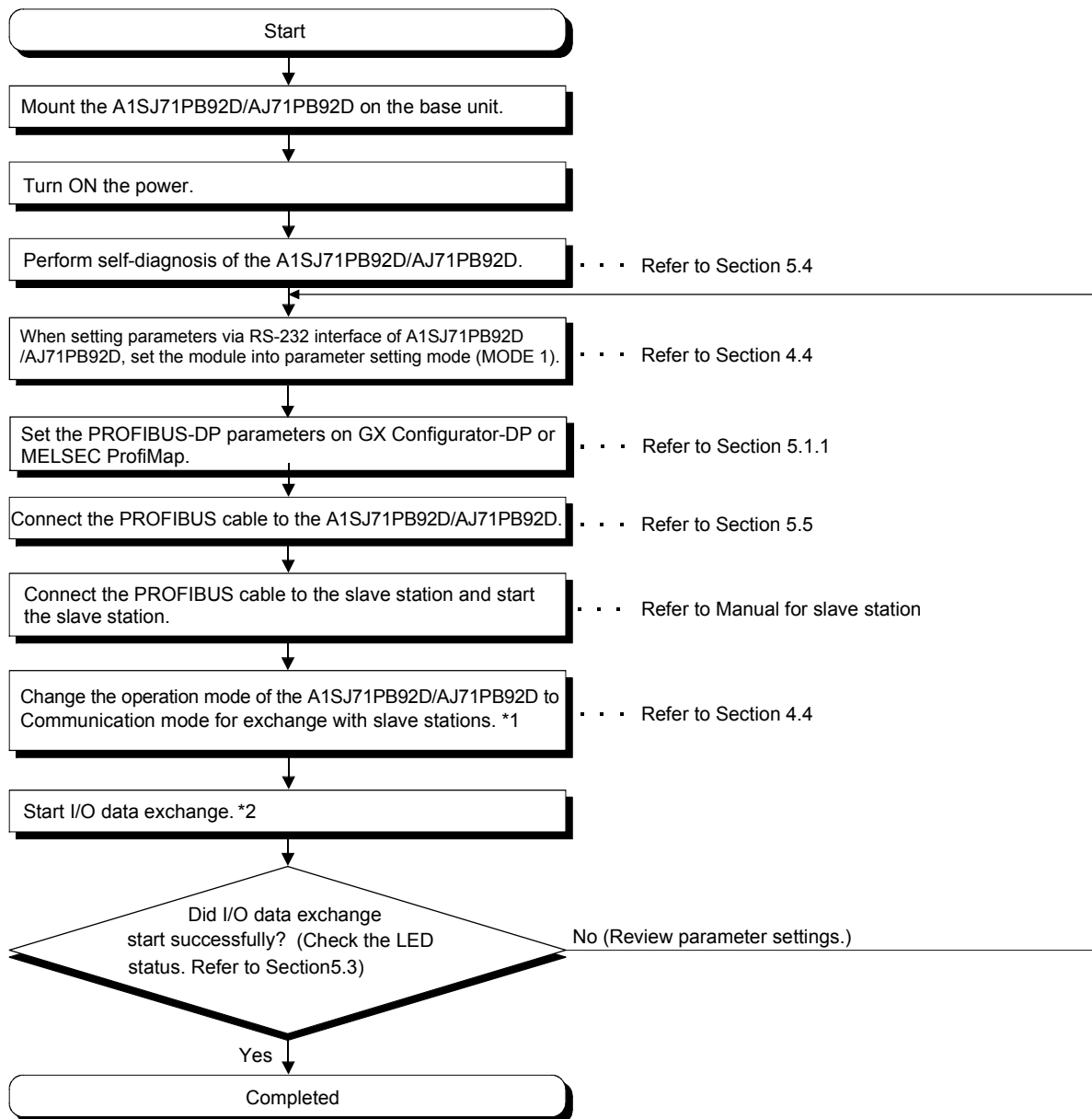
- (1) Power off the CPU module.
- (2) Using the mode setting switch, perform the following operations in Steps 1) to 7) to initialize the E²PROM.
 - 1) Set the mode setting switch to "9" and power on the CPU module.
 - 2) The FAULT LED turns on for four seconds and then turns off.
 - 3) While the FAULT LED is off (within four seconds), set the mode setting switch to "F".
If the mode setting switch position is not changed within four seconds after the FAULT LED has turned off, E²PROM initialization is canceled.
 - 4) The FAULT LED turns on for four seconds and then turns off.
 - 5) While the FAULT LED is off (within four seconds), set the mode setting switch to "A".
If the mode setting switch position is not changed within four seconds after the FAULT LED has turned off, E²PROM initialization is canceled.
 - 6) The B0 LED to B6 LED turn on, indicating that E²PROM initialization has started.
 - 7) When the B0 LED to B6 LED turn off, E²PROM initialization is completed.
- (3) Set the mode setting switch to "1" and switch the power on again or reset the CPU module.
- (4) When the PRM SET LED turns on, E²PROM initialization is normally completed.
(The A1SJ71PB92D/AJ71PB92D has returned to the initial status.)
Set parameters again.

If the PRM SET LED does not light up, please consult your local Mitsubishi representative, explaining the detailed description of the problem.

5. PROCEDURES BEFORE SYSTEM OPERATION

5.1 Procedures before Operation

The following diagram illustrates the procedure before system operation.



*1 Change the operation mode by either of the following methods:

- Change it with the mode setting switch.
- Use the operation mode change request area (buffer memory address: 2255(8CFH)) and Operation mode change request signal (Y11).

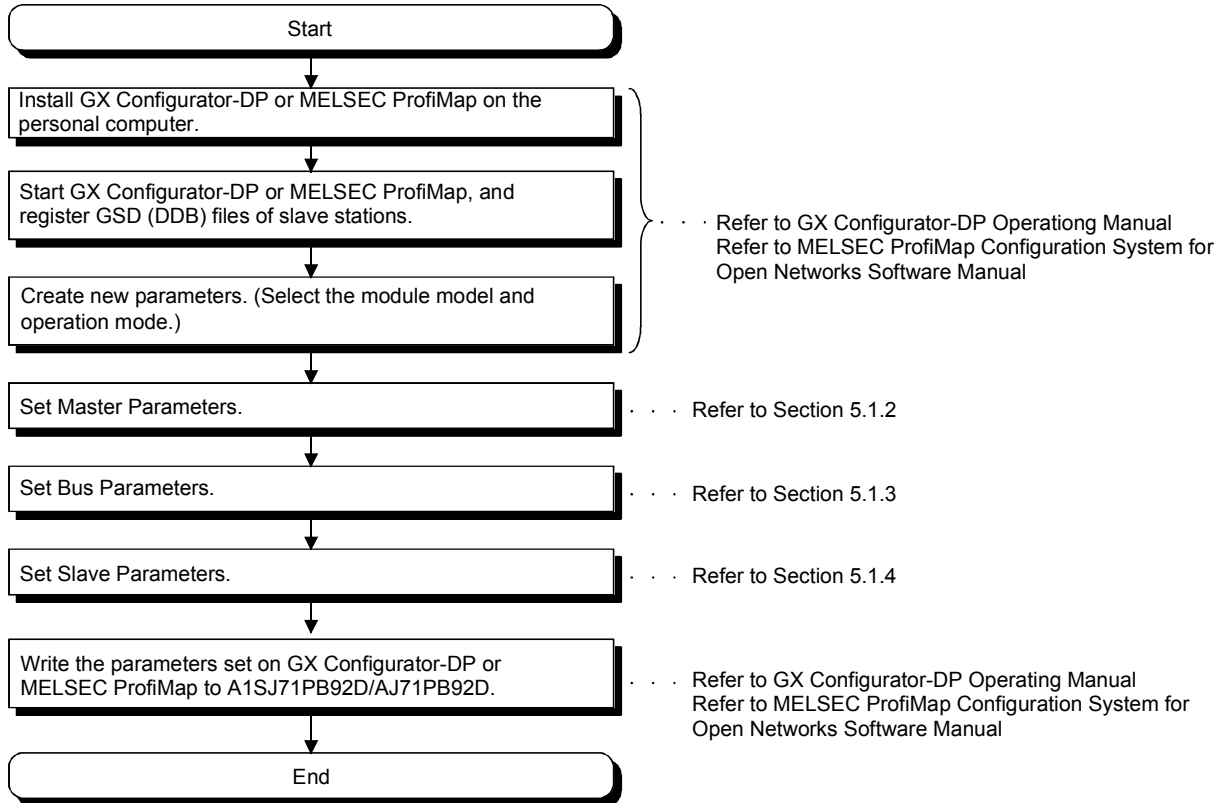
*2 Start I/O data exchange by either of the following methods:

- Turn ON the exchange start request signal (Y00).
- Start it from GX Configurator-DP or MELSEC ProfiMap.

5.1.1 Parameter setting procedure

(1) Setting procedure

The following describes the A1SJ71PB92D/AJ71PB92D parameter setting procedure.



IMPORTANT
<p>Do not turn off the power or reset the CPU module while the parameters are being written using GX Configurator-DP or MELSEC ProfiMap. To do so may result in repair of the A1SJ71PB92D/AJ71PB92D. Follow the screen instructions of GX Configurator-DP or MELSEC ProfiMap.</p>

(2) Parameter write path

Depending on the configuration software, the parameter write path varies.

The paths for parameter writing are listed below by configuration software.

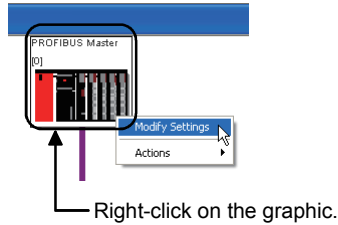
CPU Module	Configuration Software	Parameter File Write Path	
		Via A1SJ71PB92D /AJ71PB92D RS-232 Interface	Via CPU Module RS-232/ RS-422 Interface
Q series CPU	SW0D5F-PROFIMAP		
	MELSEC-PROFIMAP Version 2	○	×
	MELSEC-PROFIMAP Version 3		
	GX Configurator-DP Version 4		
	GX Configurator-DP Version 5 or later	×	○
A/QnA series CPU	SW0D5F-PROFIMAP		×
	MELSEC-PROFIMAP Version 2	○	
	MELSEC-PROFIMAP Version 3		
	GX Configurator-DP Version 4		○
	GX Configurator-DP Version 5 or later	×	

○: Write enabled ×: Write disabled

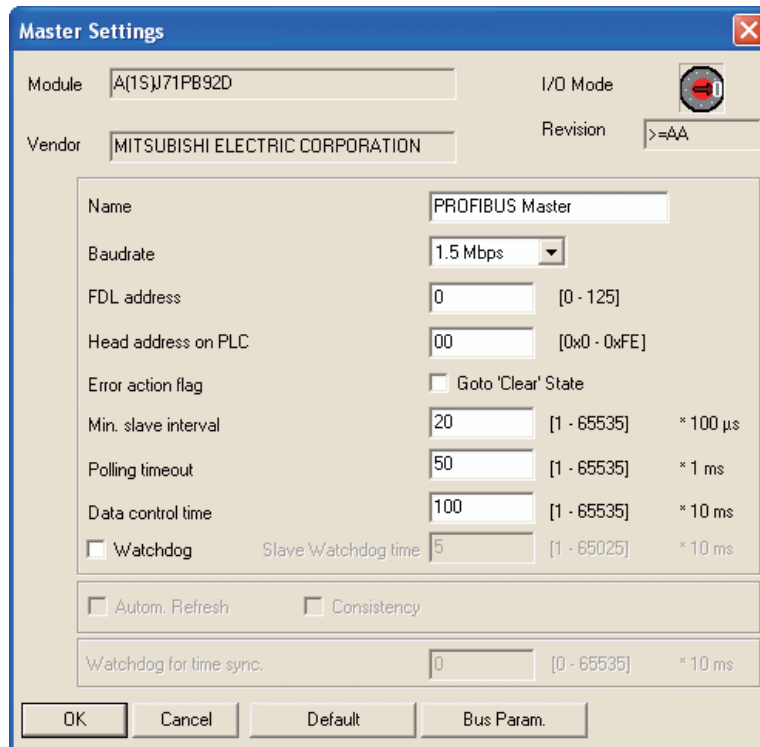
5.1.2 Master Parameters

Set the A1SJ71PB92D/AJ71PB92D's transmission speed, station number and other parameters.

- (1) Start procedure
 - (a) Right-click on the master station graphic → [Modify Settings].



- (2) Setting items



Item	Description
Name	Set the name of the master station. Setting range: Up to 17 alphanumeric characters
Baudrate	Set the transmission speed of the PROFIBUS-DP. Setting range: 9.6 kbps to 12 Mbps (Default: 1.5 Mbps)
FDL address	Set the FDL address (station number). Setting range: 0 to 125 (Default: 0)

(To the next page)

Item	Description
Head address on PLC	Set the upper two digits of the start I/O number of the A1SJ71PB92D/AJ71PB92D. Set this item when using the "Create POU" command of the GX Configurator-DP or MELSEC ProfiMap. Setting range: 00H to *1 (Refer to *1) (Default: 00H)
Error action flag	Check this checkbox when sending a clear request to all slave stations from the master station. When a communication error occurs even in one slave station, the clear request is sent to all slave stations. Not checked: The clear request is not sent to all slave stations. Checked: The clear request is sent to all slave stations.
Min. slave interval	Set the minimum required time from the slave polling cycle to the next one. This set value is enabled on all connected slave stations. Set a value for the slave station that needs the longest time. Setting range: 1 to 65535 (Unit: $\times 100\mu\text{s}$, Default: $20 \times 100\mu\text{s}$)
Polling timeout	Set the maximum time required for a requester to receive the response in communication between master stations. Setting range: 1 to 65535 (Unit: $\times 1 \text{ ms}$, Default: $50 \times 1 \text{ ms}$)
Data control time	Set the time during which the A1SJ71PB92D/AJ71PB92D notifies of the slave station operation status. Set a value of 6 times or more the watchdog control set value of the slave station. Setting range: 1 to 65535 (Unit: $\times 10 \text{ ms}$, Default: $100 \times 10 \text{ ms}$)
Watchdog	Check this checkbox to enable the watchdog timer on all slave stations. When the "Watchdog" checkbox is checked in the master parameter setting, "Watchdog" in the slave parameters cannot be set. Not checked: The watchdog timer setting of all slave stations is disabled. Checked: The watchdog timer setting of all slave stations is enabled.
Slave Watchdog time	Set a watchdog timer value for all slave stations. This setting is available when "Watchdog" is checked. Setting range: 1 to 65025 (Unit: $\times 10 \text{ ms}$, Default: $5 \times 10 \text{ ms}$)
<u>Bus Param.</u> button	Displays the Bus Parameter screen. (Refer to Section 5.1.3)

- *1 The upper limit of the setting range for "Head address on PLC" varies depending on the CPU module for which the master module is installed.
For details, refer to the manual of the CPU module.

POINT
When "Error action flag" is checked, outputs of all slave stations are cleared when a communication error occurs even in one slave station. To restart output, perform either of the following operations. <ul style="list-style-type: none"> • Turn OFF the exchange start request signal (Y00) and then turn it ON. • Reset the CPU module.

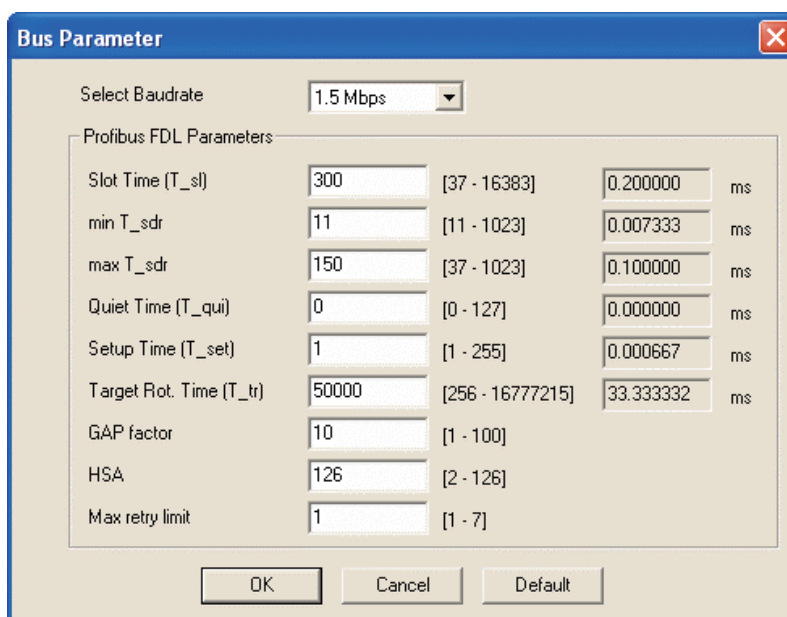
5.1.3 Bus Parameters

Set the PROFIBUS-DP parameters.

Normally, the bus parameters are used as default values.

When changing some of the bus parameters, make sure of the PROFIBUS-DP standard in advance.

- (1) Start procedure
 - (a) Right-click on the graphic of cable → [Modify Settings].
 - (b) Click the **Bus Param.** button in the Master Settings screen.
- (2) Setting items



Item	Description
Select Baudrate	Sets the transmission speed of the PROFIBUS-DP. When the set value is changed on this screen, the "Baudrate" value in the master parameter settings is also changed automatically. Setting range: 9.6 kbps to 12 Mbps (Default: 1.5 Mbps)
Slot Time (T_sl)	Set the slot time (maximum time for waiting for a response). If this set time is exceeded, an error will be detected. Setting range: 37 to 16383 (Unit: $\times T_{Bit}$, Default: $300 \times T_{Bit}$)
min T_sdr	Set the minimum response time of responders. Setting range: 11 to 1023 (Unit: $\times T_{Bit}$, Default: $11 \times T_{Bit}$)
max T_sdr	Set the maximum response time of responders. Setting range: 37 to 1023 (Unit: $\times T_{Bit}$, Default: $150 \times T_{Bit}$)
Quiet Time (T_qui)	Set the repeater switching time (the time required for switching the transmission direction of the repeater). Set 0 when the network does not contain a repeater. Setting range: 0 to 127 (Unit: $\times T_{Bit}$, Default: $0 \times T_{Bit}$)

(To the next page)

Item	Description
Setup Time (T_set)	Set the setup time. Setting range: 1 to 255 (Unit: $\times T_{\text{Bit}}$, Default: $1 \times T_{\text{Bit}}$)
Target Rot. Time (T_tr)	Set the target token rotation time. Setting range: 256 to 16777215 (Unit: $\times T_{\text{Bit}}$, Default: $50000 \times T_{\text{Bit}}$)
GAP factor	Set a constant for controlling the GAP update time (T_gud). Setting range: 1 to 100 (Default: Depends on the transmission speed)
HSA	Set the highest station number of slave stations that exist on the network. Setting range: 2 to 126 (Default: 126)
Max retry limit	Set the maximum number of retries for individual data transmission. Setting range: 1 to 7 (Default: Depends on the transmission speed)

REMARK

[T_{Bit}] (Bit Time) is a unit that expresses the time required for 1-bit data transmission as "1".
The actual processing time differs as shown below depending on the transmission speed.

- In the case of 1.5 Mbps, $1[T_{\text{Bit}}] = 1 / (1.5 \times 10^6) = 0.667 \times 10^{-6}[\text{s}]$

- In the case of 12 Mbps, $1[T_{\text{Bit}}] = 1 / (12 \times 10^6) = 0.083 \times 10^{-6}[\text{s}]$

T_{Bit} is converted into ms automatically on GX Configurator-DP and MELSEC ProfiMap.

The results of the conversion (ms) are displayed on the right side of the screen.

(3) Precautions for bus parameter setting

For each set value of the max T_{sdr}, Quiet Time (T_{qui}) and Setup Time (T_{set}), set the maximum value among those of the stations connected to PROFIBUS-DP (including the master station).

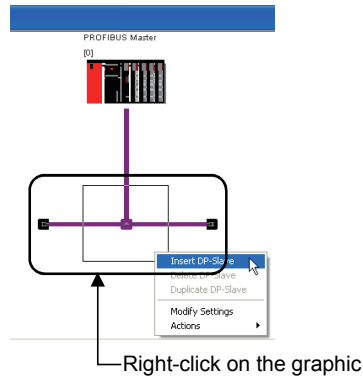
The default value of the A1SJ71PB92D/AJ71PB92D varies depending on the transmission speed.

Item	Default Values of A1SJ71PB92D/AJ71PB92D					
	187.5kbps or less	500kbps	1.5Mbps	3Mbps	6Mbps	12Mbps
max T _{sdr}	60	100	150	250	450	800
Quiet Time (T _{qui})	0	0	0	3	6	9
Setup Time (T _{set})	1	1	1	4	8	16

5.1.4 Slave Parameters

Set parameters for each slave station.

- (1) Start procedure
 - (a) Right-click on the graphic of cable → [Insert DP-Slave].



- (b) Select a slave station in the Device Database screen.

- (2) Setting items

The screenshot shows the 'Slave Parameter Settings' dialog box. It contains the following fields and options:

- Model: xxxxxxxxxxxx
- Revision: xxxxx
- Vendor: xxxxxxxxxxxx
- Slave Properties:
 - Name: Slave_Nr_001
 - FDL Address: 125 [0 - 125]
 - Watchdog Slave Watchdog time: 5 [1 - 65025] * 10 ms
 - min T_sdr: 11 [1 - 255]
 - Group identification number:
 - Grp 1 Grp 2 Grp 3 Grp 4
 - Grp 5 Grp 6 Grp 7 Grp 8
 - Active Sync (Output) Freeze (Input)
 - DP V1 support enabled
- Addresses in MELSEC CPU Memory:
 - Input CPU Device: None [0 - 0] to [0]
 - Output CPU Device: None [0 - 0] to [0]

Buttons at the bottom: OK, Cancel, Default, User Param., Select Modules.

Item	Description
Name	Set the name of the slave station. Setting range: max. 17 alphanumeric characters
FDL Address	Set the FDL address (station number). Setting range: 0 to 125
Watchdog	Check this checkbox to use a watchdog timer. When this setting is enabled, a communication error is detected if no data are received from the A1SJ71PB92D/AJ71PB92D within the time specified in "Slave Watchdog time". (When disabled, a communication error is not detected even if data are no longer received from the A1SJ71PB92D/AJ71PB92D.) Once the "Watchdog" checkbox has been checked in the master parameter setting, "Watchdog" in the slave parameters cannot be set. Not checked: Watchdog timer disabled (Default) Checked: Watchdog timer enabled
Slave Watchdog time	Set the time of the watchdog timer. This setting is available when "Watchdog" is checked. The set value must satisfy the following condition: Bus cycle time \leq Set value of "Slave Watchdog time" \leq (Set value of "Data control time") / 6 Setting range: 1 to 65025 (Unit: $\times 10$ ms or $\times 1$ ms, Default: 5×10 ms)
min T_sdr	Set the minimum response time required for a slave station to send a response frame to the A1SJ71PB92D/AJ71PB92D. Normally, use the default value. Setting range: 1 to 255 (Unit: \times TBit, Default: $11 \times$ TBit)
Group identification number	Set the group No. (Grp 1 to Grp 8) of the slave station. Multiple groups Nos. can also be set. Not checked: Not belonging to the group No. Checked: Belonging to the group No.
Active	Uncheck the box when the slave station is to be set as a reserved station. Not checked: Set as a reserved station. Checked: Set as a station performing I/O data exchange.
Sync (Output)	Check the box to check if the slave station supports the Sync function or not in communication for initialization. When the slave station does not support the Sync function, trouble information is stored in the communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH)) of the A1SJ71PB92D/AJ71PB92D. Not checked: No function check Checked: Function check performed
Freeze (Input)	Check the box to check if the slave station supports the Freeze function or not in communication for initialization. When the slave station does not support the Freeze function, the trouble information is stored in the communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH)) of the A1SJ71PB92D/AJ71PB92D. Not checked: No function check Checked: Function check performed
<input type="checkbox"/> User Param button	Used when setting parameters specific to the slave station. For details, refer to the manual for the slave station.
<input type="checkbox"/> Select Modules button	Used when setting equipment mounted on the slave station. For details, refer to the manual for the slave station.

5.2 Handling Precautions

This section explains handling precautions for A1SJ71PB92D/AJ71PB92D.

⚠ CAUTION

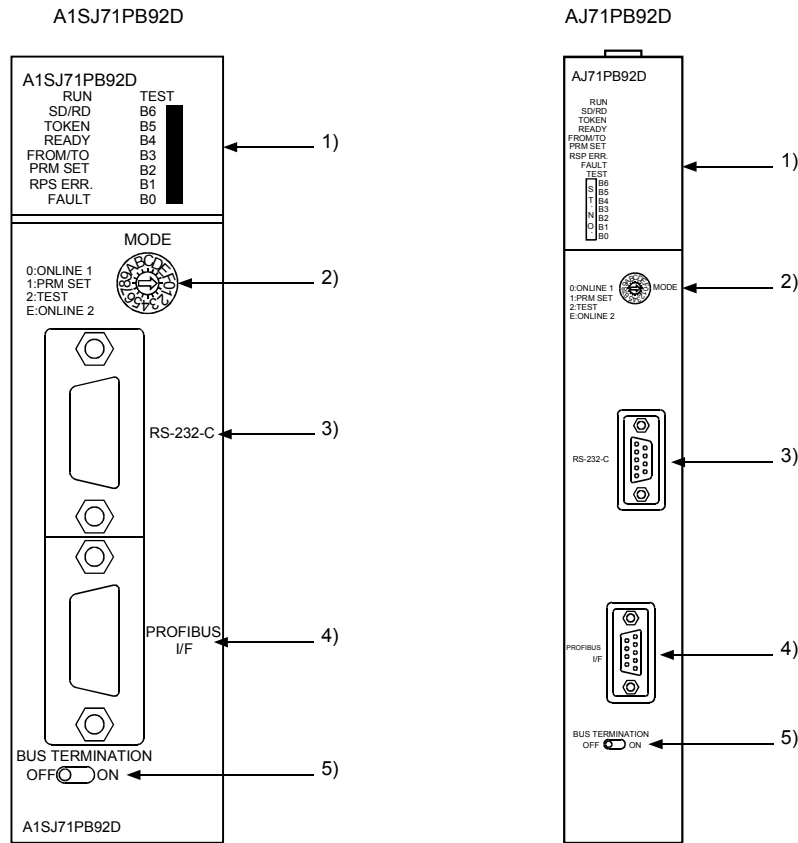
- Use the programmable controller in an environment that meets the general specifications contained in the CPU user's manual.
Using this programmable controller in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- Do not touch the conductive area or the electronic parts of the module. Doing so may cause malfunctioning or breakdowns.
- Be sure to shut off all phases of the external power supply used by the system before wiring PROFIBUS cables. If you not switch off the external power supply, it will cause failure or malfunction of the module.
- Be careful not to let foreign matter such as filling or wire chips get inside the module. These can cause fire, breakdowns and malfunctioning.
- Never disassemble or modify the module.
This may cause breakdowns, malfunctioning, injury and/or fire.
- Insert the tabs at the bottom of the module into the mounting holes in the base unit before installing the module. (The AnS series module shall be fastened by screws in the base unit at the specified torque.)
Not installing the module correctly could result in malfunctioning, breakdown or pieces of the product falling.
- Be sure to shut off all phases of the external power supply before mounting or removing the module. If you do not switch off the external power supply, it will cause breakdowns or malfunction of the module.
- Set the ON/OFF select switch of the terminal resistor before the operation.
If the setting is switched during the operation, network error may occur, or error detection may not be performed by error.
- Before handling the module, always touch a grounded metal to discharge the static electricity from the human body.
A failure to do so can cause the module to fail or malfunction.

- (1) Do not drop the A1SJ71PB92D/AJ71PB92D case or subject it to heavy impact since it is made of resin.
- (2) Tighten the module fixing screws and connector mounting screws using torque within the following ranges.

Screw location	Tightening torque range
Module fixing screw (M4 screws)	78.4 to 117.6 N • cm
PROFIBUS cable connector mounting screws (#4 - 40UNC screws)	20 to 28 N • cm

5.3 Part Names and Settings

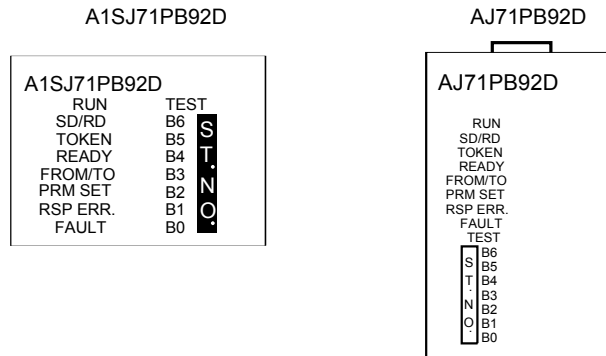
Following is an explanation of the AISJ71PB92D/AJ71PB92D part names and settings.



No.	Name	Description
1)	LED	These LEDs indicate the operation status of the A1SJ71PB92D/AJ71PB92D. For details, refer to (1) in this section.
2)	Mode setting switch	Set the operation mode of the A1SJ71PB92D/AJ71PB92D. (Factory default: 0) For details, refer to Section (2).
3)	RS-232C interface connector*1*2	Connector for connecting GX Configurator-DP or MELSEC ProfiMap to the A1SJ71PB92D/AJ71PB92D for parameter setting.
4)	PROFIBUS interface connector*3	This connector connects the PROFIBUS cable to the A1SJ71PB92D/AJ71PB92D.
5)	PROFIBUS network terminal resistance setting switch*4	The switch for setting the bus terminator built in the A1SJ71PB92D/AJ71PB92D. (Factory default: OFF) ON : Bus terminator OFF : No bus terminator

- *1: When setting parameters in MELSEC ProfiMap, use the RS-232 cable included with the MELSEC ProfiMap.
- *2: Some versions of GX Configurator-DP and MELSEC ProfiMap do not accept the RS-232 interface connector. (Refer to Section 5.1.1 (2).)
- *3: For the connector type, use a male D-Sub 9 pin. The user creates the PROFIBUS cable. (for information regarding the cable wiring, refer to Item 5.5.1.)
The size of the screw which can be used for the connector is as follows. #4-40 UNC.
- *4: Operate the PROFIBUS network terminating resistor setting switch with your fingertips. Do not use a screwdriver or similar tool. To do so may damage the switch.

(1) LED



LED	Status	Description	Reference
RUN	ON	Normally operating	—
	OFF	Hardware error (watchdog timer error) or power failure	Chapter 9
SD/RD	ON	Exchanging I/O data*1	Chapter 9
	Flashing		
	OFF	Not communicating with slave station	
TOKEN	ON	Token being passed*2	Chapter 9
	Flashing		
	OFF	Token being passed or no token passing*2	
READY	ON	Ready to communicate or communication being performed	Chapter 9
	OFF	Not ready to communicate or no communication	
FROM /TO	ON	In access to the A1SJ71PB92D/AJ71PB92D buffer memory.	—
	OFF	Not in access to the A1SJ71PB92D/AJ71PB92D buffer memory.	—
PRM SET	ON	Operating in Parameter setting mode (MODE 1)	Section 4.4, Chapter 9
	Flashing	The operation mode was changed to the normal service mode (MODE 0) or the extended service mode (MODE E) with no parameters written to the A1SJ71PB92D/AJ71PB92D.	
	OFF	Operating in operation mode other than Parameter setting mode (MODE 1)	
RSP ERR.	ON	A communication error has occurred.	Section 4.2.2 (2), 4.3.2 (4)
	OFF	No communication error	
FAULT	ON	An error has occurred.	Section 4.5, Chapter 9
	OFF	Normally operating	
TEST	ON	Executing self-diagnosis or E ² PROM initialization	Section 5.4
	Flashing	Executing self-diagnosis	
	OFF	Not executing self-diagnosis or E ² PROM initialization	
B0 to B6	—	<p>• In normal operation, the host station number is indicated as a binary value. Example) For station No.52 (34H)</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;"><input type="checkbox"/> B6</div> <div style="display: flex; align-items: center;"><input checked="" type="checkbox"/> B5</div> <div style="display: flex; align-items: center;"><input checked="" type="checkbox"/> B4</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> B3</div> <div style="display: flex; align-items: center;"><input checked="" type="checkbox"/> B2</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> B1</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> B0</div> </div> <div style="margin-left: 10px;"> <p>3H</p> <p>4H</p> </div> </div> <p style="margin-left: 100px;">OFF : <input type="checkbox"/> ON : <input checked="" type="checkbox"/></p> <p>• In self-diagnosis, the test type is indicated. (Refer to Section 5.4.)</p>	—

*1 The LED flashes at intervals based on the value set in "Data control time" in Master Parameters.
 *2 The LED status during token passing varies depending on the number of master stations within the same network and the transmission speed setting.
 (Refer to (3) in this section.)

(2) Mode setting switch

For the operation mode switching using the mode setting switch, refer to Section 4.4.

MODE

0:ONLINE 1
 1:PRM SET
 2:TEST
 E:ONLINE 2



Switch No.	Description	Reference
0	Normal service mode (MODE 0)	Section 4.3.2(1), 4.3.2(2)
1	Parameter setting mode (MODE 1)	Section 4.4
2	Self-diagnosis mode (MODE 2)	Section 5.4
3 to 8	Not usable	—
9, A	E ² PROM initialization function* ¹	Section 4.5
B to D	Not usable	—
E	Extended service mode (MODE E)	Section 4.3.2(1), 4.3.2(2)
F	E ² PROM initialization function* ¹	Section 4.5

*1 The E²PROM is initialized using any of three switch settings (9, A, and F).
 For the E²PROM initialization method, refer to Section 4.5.

(3) TOKEN LED status

No. of master station within the Same Network	Transmission Speed	
	19.2kbps or less	93.75kbps or more
1	ON	
More than 1	Flashing	ON or OFF

5.4 Execution Method for Self-diagnosis

The self-diagnosis of the A1SJ71PB92D/AJ71PB92D performs a unit test on the A1SJ71PB92D/AJ71PB92D.

It takes about 10 seconds to complete the self-diagnostics.

(1) Self-diagnosis procedure

Self-diagnosis is automatically executed by setting the mode setting switch of the A1SJ71PB92D/AJ71PB92D to 2 and turning the power OFF and ON or resetting the CPU module.

(2) Execution result of self-diagnosis

(a) When normally terminated

When the B0 LED turns ON and the B3 LED turns ON and then OFF, all of the self-diagnosis is terminated normally.

In self-diagnosis, the following tests (a) to (d) are repeated.

Change the setting of the mode setting switch on the A1SJ71PB92D/AJ71PB92D, and turn the power OFF and ON or reset the CPU module to terminate the self-diagnosis.

Description	B6	B5	B4	B3	B2	B1	B0	TEST
(a) MPU test	○	○	○	○	○	●	●	●
(b) Timer test	○	○	○	○	●	○	●	●
(c) Interrupt test	○	○	○	○	●	●	●	●
(d) DRAM test	○	○	○	●	○	●	●	●
	○	○	○	●	●	○	●	●

○ : OFF ● : ON

(b) When abnormally terminated

The B6 LED turns ON, and the self-diagnosis stops.

The error source can be found by the LED status at the time of the self-diagnosis stop.

Description	B6	B5	B4	B3	B2	B1	B0	TEST
(a) MPU test	●	○	○	○	○	●	○	●
(b) Timer test	●	○	○	○	●	○	○	●
(c) Interrupt test	●	○	○	○	●	●	○	●
(d) DRAM test	●	○	○	●	●	●	○	●

○ : OFF ● : ON

If an error is identified, re-execute the self-diagnosis.

If the diagnosis fails again, a A1SJ71PB92D/AJ71PB92D hardware error is probable.

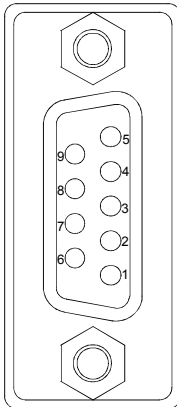
Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

5.5 Wiring

5.5.1 PROFIBUS cable wiring

The following describes the pin assignments of the PROFIBUS interface connector on the A1SJ71PB92D/AJ71PB92D, the PROFIBUS cable wiring specifications, bus terminator and other information.

- (1) Pin assignments of the PROFIBUS interface connector
 The following shows the pin assignments of the PROFIBUS interface connector (D-sub 9-pin female connector) on the A1SJ71PB92D/AJ71PB92D.



Pin No.	Signal Code	Name	Description	Cable color
1	—	SHIELD*1	Shield, Protective Ground	—
2	—	—	Open	—
3	B/B'	RxD/TxD-P	Receive/send data-P	Red
4	—	—	Open	—
5	C/C'	DGND*2	Data Ground	—
6	—	VP*2	Voltage +	—
7	—	—	Open	—
8	A/A'	RxD/TxD-N	Receive/send data-N	Green
9	—	—	Open	—

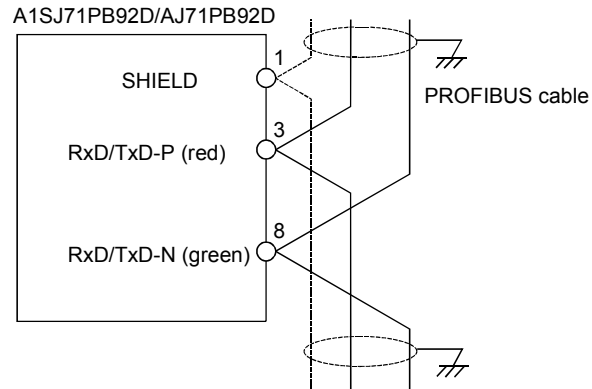
- *1 Optional signal.
- *2 When the terminal resistance value of building into is mode it is, signal is used. Wiring is not needed.

- (2) PROFIBUS cable
 The following shows the PROFIBUS cable and wiring specifications.

- (a) PROFIBUS cable
 Use a PROFIBUS cable that meets the following specifications (EN 50170 Volume 2 Type A compliant).

Item	Transmission line
Applicable cable	Shielded twisted pair cable
Impedance	135 to 165 Ω (f=3 to 20 MHz)
Capacity	Less than 30 pF/m
Conductor resistance	Less than 110 Ω /km
Cross-sectional area	0.34mm ² or more (22AWG)

(b) Wiring specifications



(3) Connector

Use a D-sub 9-pin male connector for the PROFIBUS cable.
The applicable screw size is #4-40 UNC.

(4) PROFIBUS equipment

The PROFIBUS cables, connectors and other PROFIBUS equipment must be purchased or obtained at user's discretion.

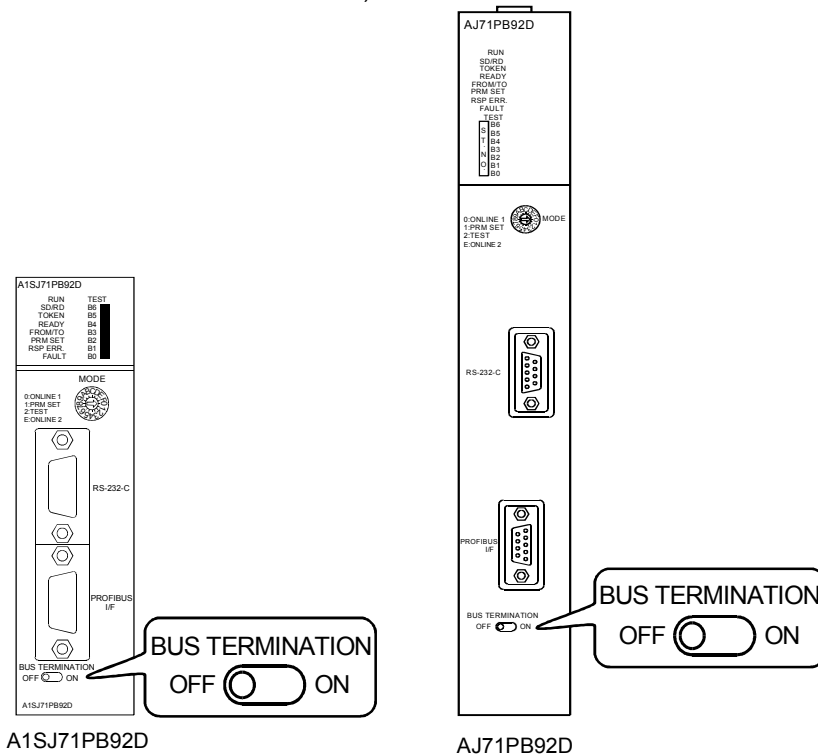
For details on PROFIBUS equipment, access the following website.

- PROFIBUS International: <http://www.profibus.com/>

5.5.2 Terminator switch

(1) Terminator switch

Whether or not to set the built-in module terminal resistance (1/2W 220Ω x 2 units) can be selected by connecting a switch. (The stations on both ends of the PROFIBUS segment must be connected with terminal resistor.)



Silk display	OFF	ON
BUS TERMINATION	Disconnects terminal resistor (setting at time of shipment)	Connects terminal resistor

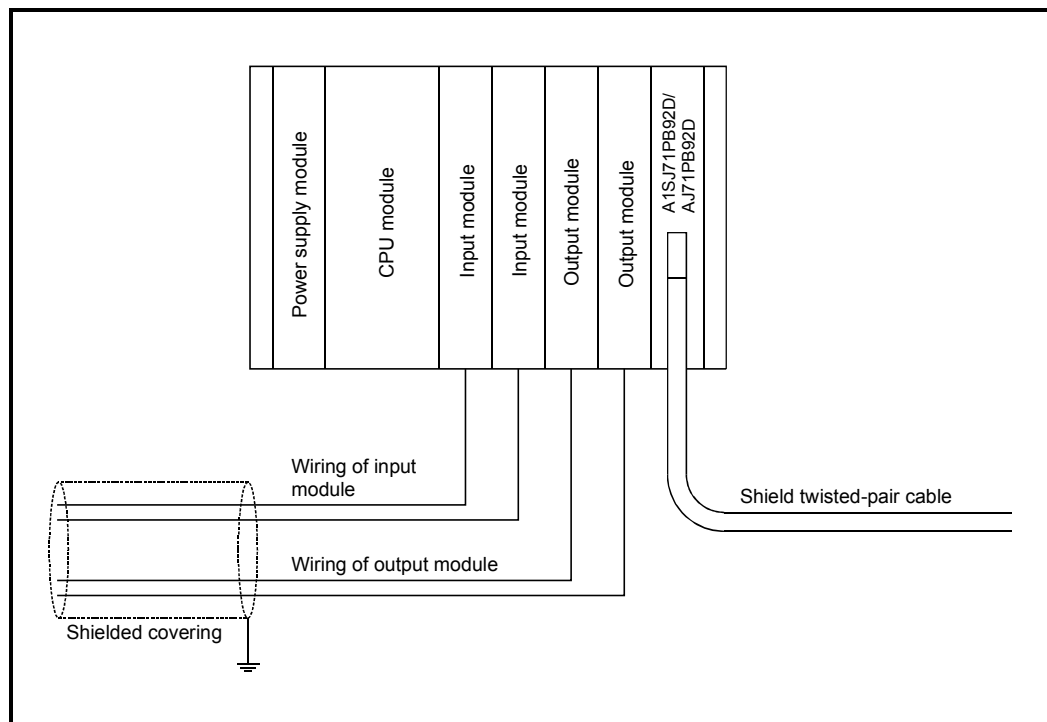
(2) When the A1SJ71PB92D/AJ71PB92D's bus termination switch is set to on (has terminal resistor).

Do not remove the PROFIBUS cable from the A1SJ71PB92D/AJ71PB92D during PROFIBUS-DP network operation. If the cable is removed, then the terminal resistor in the network will disappear, causing an error and bringing down the network.

5.5.3 Precautions against wiring

As one of the requirements to give full play to A1SJ71PB92D/AJ71PB92D's functions and make up the system with high reliability, it is necessary to have an external wiring unsusceptible to an influence of noise. Precautions against external wiring of A1SJ71PB92D/AJ71PB92D is described below.

- (1) Communication cable wiring
Do not route the wire of A1SJ71PB92D/AJ71PB92D close to or bundle it together with the main circuit and high-tension lines, or the load-carrying lines from other than the programmable controller. Doing so may cause the A1SJ71PB92D/AJ71PB92D to be affected by noise and surge induction.
- (2) Wiring from I/O modules among programmable controllers
Keep the PROFIBUS cable away from I/O module cables as much as possible.



- (3) Grounding
 - (a) When using the A1SJ71PB92D/AJ71PB92D, ground the FG and LG terminals of the power supply module of the programmable controller.
 - (b) Grounding the module and other device with the same FG terminal may apply noise through the FG terminal and result in a communication error. If this error occurs, disconnect the FG terminal from the module.
- (4) When the A1SJ71PB92D/AJ71PB92D's BUS TERMINATION SWITCH is set to on (has terminal resistor)
Do not remove the PROFIBUS cable from the A1SJ71PB92D/AJ71PB92D during PROFIBUS-DP network operation. If the cable is removed, then the terminal resistor in the network will disappear, causing an error and bringing down the network.

5.6 Maintenance and Inspection

For the A1SJ71PB92D/AJ71PB92D, eliminate the check of cable connection and looseness and do not include it as an inspection item. Otherwise, follow the inspection item instructions in the CPU module User's Manual to always use the system in good condition.

DANGER

- Before cleaning, be sure to shut off all phases of the external power supply used by the system. Not doing so could cause electric shock.

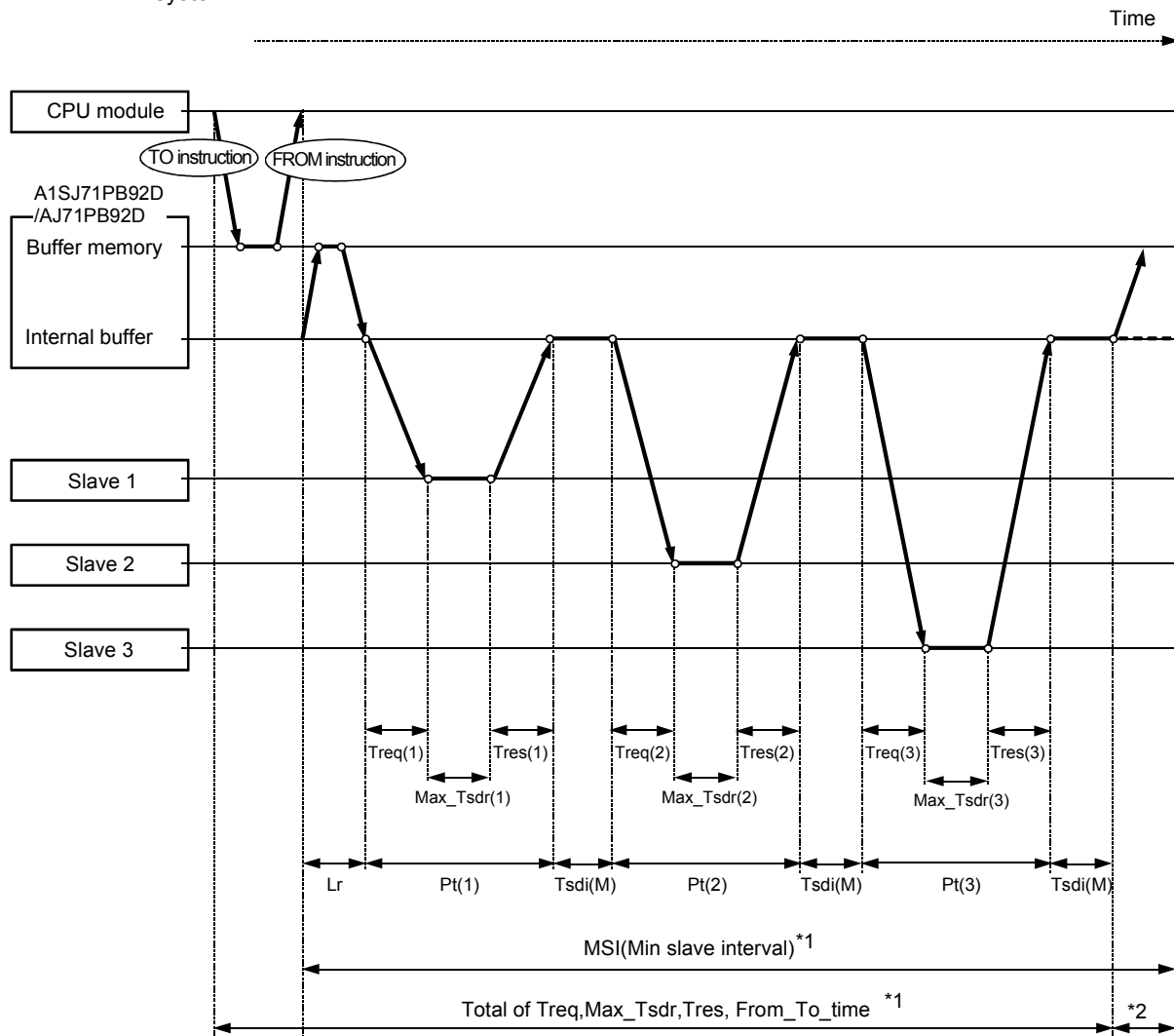
CAUTION

- Never disassemble or modify the module.
This may cause breakdowns, malfunctioning, injury and/or fire.
- Be sure to shut off all phases of the external power supply before mounting or removing the module. If you do not switch off the external power supply, it will cause breakdowns or malfunction of the module.
- Do not touch the conductive area or the electronic parts of the module.
Doing so may cause malfunctioning or breakdowns.

6. COMMUNICATION TIME

6.1 Transmission Delay Time When There is One Master Station

The following shows the transmission delay time for the case where one master station is used in the system.



*1 "MSI (Minimum polling cycle)" or "Total of Treq, Max_Tsdr, Tres and From_To_time", whichever is greater, is Bc (Bus cycle time). (Refer to (1).)

*2 If "MSI (Minimum polling cycle)" is greater than "Total of Treq, Max_Tsdr, Tres and From_To_time", the A1SJ71PB92D/AJ71PB92D transfers data from the internal buffer to the buffer memory at intervals of the "MSI (Minimum polling cycle)".

POINT

In above, the FROM/TO instruction and bus cycle time are drawn as if they are synchronous, but they are actually asynchronous.
 If the buffer memory data are overwritten by the TO instruction during the bus cycle time, the overwritten buffer memory values are transferred to the internal buffer at the next transfer time.

- (1) Bus cycle time (Bc) calculation formula
 Calculate the bus cycle time (Bc) of the master station with the following expression.
 The symbols within [] indicate units.

$$Bc[s] = \text{Max} (MSI, \sum_{i=1}^n (Pt(i) + Tsdi(M)) + Lr + \text{From_To_time})$$

n = number of slave stations

Max (A, B) = A or B, whichever is greater

Item	Description
MSI[s]	Minimum polling cycle (Min. slave interval)*1
Pt(i)[s]	(Polling time of No. i station) = Treq(i) + Max_Tsdr(i) + Tres(i) * Treq(i)[s] = (Request transmission time of No. i station) = [{(Number of bytes output to No. i station) + 9} × 11[bit]] ÷ (transmission speed [bps]) * Max_Tsdr(i)[s] = (response time [TBit] of No. i station) *2, *3 ÷ (transmission speed [bps]) * Tres(i)[s] = (Response transmission time of No. i station) = [{(Number of bytes input from No. i station) + 9} × 11[bit]] ÷ (transmission speed [bps])
Tsdi(M)[s]	(Request/response processing time [TBit] of master station (A1SJ71PB92D/AJ71PB92D)) *4 ÷ (transmission speed [bps])
Lr[s]	(data refresh time) = 1.2 × 10 ⁻³ + {(number of slave stations) × 1.2 × 10 ⁻⁶ }
From_To_time[s]	(time necessary for FROM/TO instruction) = (number of FROM/TO instruction execution times within one sequence scan) × 3.3 × 10 ⁻³

*1 The value set on the "Master Settings" screen of GX Configurator-DP or MELSEC ProfiMap.

*2 MaxTsdr value described in the GSD (DDB) file of the slave station.

*3 [TBit] (Bit Time) is a unit that expresses the time required for 1-bit data transmission as "1".
 The actual processing time differs as described below depending on the transmission speed.

[1.5Mbps]

$$1[\text{TBit}] = 1 \div (1.5 \times 10^6) = 0.667 \times 10^{-6}[\text{s}]$$

[12Mbps]

$$1[\text{TBit}] = 1 \div (12 \times 10^6) = 0.083 \times 10^{-6}[\text{s}]$$

*4 Tsdi value described in the GSD (DDB) file of the A1SJ71PB92D/AJ71PB92D.

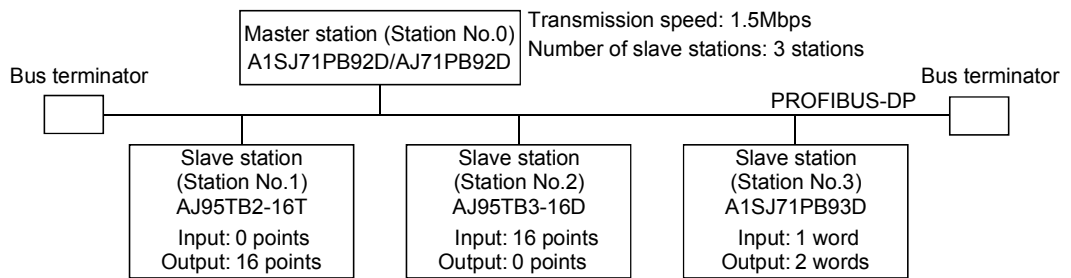
The Tsdi value varies as described below depending on the transmission speed.

Refer to 3 for the unit [TBit].

Transmission speed	Request/response processing time of master station
9.6kbps, 19.2kbps, 93.75kbps, 187.5kbps	70TBit
500kbps	150TBit
1.5Mbps	200TBit
3Mbps	250TBit
6Mbps	450TBit
12Mbps	800TBit

(2) Bus cycle time calculation example

The calculation example of the bus cycle time is shown below.



	AJ95TB2-16T	AJ95TB3-16D	A1SJ71PB93D
Output data size [byte]	2	0	4
Input data size [byte]	0	2	2

(a) MSI[s] value

$$MSI[s] = 20 \times 100 \times 10^{-6} = 2.0 \times 10^{-3}$$

(b) Pt(i) [s] value

Item	Slave station		
	AJ95TB2-16T (Station No.1)	AJ95TB3-16D (Station No.2)	A1SJ71PB93D (Station No.3)
1 Treq(i) [s]	$\{(2 + 9) \times 11\} / (1.5 \times 10^6)$ $= 0.081 \times 10^{-3}$	$\{(0 + 9) \times 11\} / (1.5 \times 10^6)$ $= 0.066 \times 10^{-3}$	$\{(4 + 9) \times 11\} / (1.5 \times 10^6)$ $= 0.095 \times 10^{-3}$
Response time [T _{Bit}] of No. i station	150	150	150
2 Max_Tsdr(i) [s]	$150 / (1.5 \times 10^6) = 0.1 \times 10^{-3}$	$150 / (1.5 \times 10^6) = 0.1 \times 10^{-3}$	$150 / (1.5 \times 10^6) = 0.1 \times 10^{-3}$
3 Tres(i) [s]	$\{(0 + 9) \times 11\} / (1.5 \times 10^6)$ $= 0.066 \times 10^{-3}$	$\{(2 + 9) \times 11\} / (1.5 \times 10^6)$ $= 0.081 \times 10^{-3}$	$\{(2 + 9) \times 11\} / (1.5 \times 10^6)$ $= 0.081 \times 10^{-3}$
Pt(i) [s] (1 + 2 + 3)	$0.081 \times 10^{-3} + 0.1 \times 10^{-3} + 0.066 \times 10^{-3}$ $= 0.247 \times 10^{-3}$	$0.066 \times 10^{-3} + 0.1 \times 10^{-3} + 0.081 \times 10^{-3}$ $= 0.247 \times 10^{-3}$	$0.095 \times 10^{-3} + 0.1 \times 10^{-3} + 0.081 \times 10^{-3}$ $= 0.276 \times 10^{-3}$

(c) Tsd_{i(M)}[s] value

Request/response processing time [T_{Bit}] of master station (A1SJ71PB92D/AJ71PB92D)

$$= 200$$

$$Tsd_{i(M)}[s] = 200 / (1.5 \times 10^6) = 0.13 \times 10^{-3}$$

(d) Lr[s] value

$$Lr[s] = 1.2 \times 10^{-3} + (3 \times 1.2 \times 10^{-6}) = 1.20 \times 10^{-3}$$

(e) From_To_time[s] value

Number of FROM/TO instruction execution times within one sequence scan = 2

$$From_To_time[s] = 2 \times 3.3 \times 10^{-3} = 6.6 \times 10^{-3}$$

6.2 Transmission Delay Time When There are Multiple Master Stations

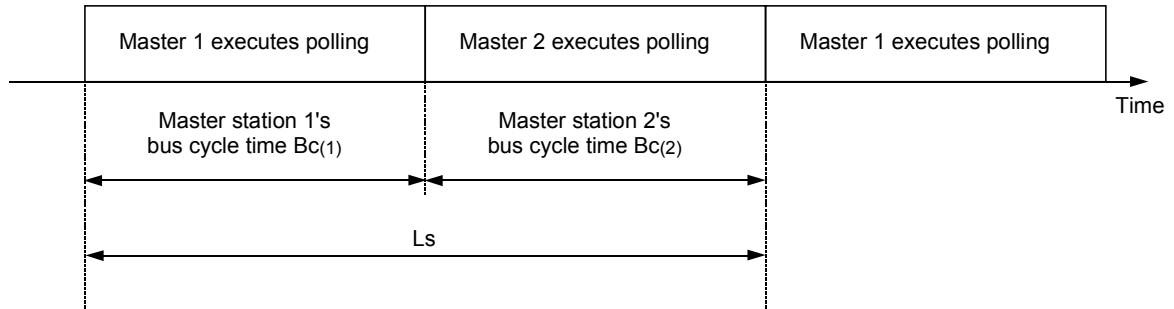
The bus cycle time (Bc) can be obtained by the following calculation formula when there are multiple master stations on the same network:

$$Ls = \sum_{i=1}^n Bc(i)$$

n = Number of master stations

Bc = Bus cycle time of each master station (Refer to Section 6.1)

The following shows an example where two master stations exist on the same network.



7. DDB FILE

To create communication parameters for the A1SJ71PB92D/AJ71PB92D using GX Configurator-DP or MELSEC ProfiMap, a DDB file for the A1SJ71PB92D/AJ71PB92D is required.

- (1) When using GX Configurator-DP
GSD(DDB) files have been incorporated into GX Configurator-DP.
GSD(DDB) file installation is, therefore, unnecessary.
- (2) When using MELSEC ProfiMap
Create the following data using a commercially available editor.

```

.*****
;
; Device Data Base for A1SJ71PB92D
.*****
;

#Profibus_DP

Vendor_Name       = "MITSUBISHI ELECTRIC CORPORATION"
Model_Name        = "A1SJ71PB92D"
Revision          = "AA"
Ident_Number      = 0xF036
Protocol_Ident    = 0
Station_Type      = 1
FMS_supp          = 0
Hardware_Release  = "A"
Software_Release  = "A"

9.6_supp          = 1
19.2_supp         = 1
93.75_supp        = 1
187.5_supp        = 1
500_supp          = 1
1.5M_supp         = 1
3M_supp           = 1
6M_supp           = 1
12M_supp          = 1

MaxTsd_r_9.6      = 60
MaxTsd_r_19.2     = 60
MaxTsd_r_93.75    = 60
MaxTsd_r_187.5    = 60
MaxTsd_r_500      = 100
MaxTsd_r_1.5M     = 150
MaxTsd_r_3M       = 250
MaxTsd_r_6M       = 450
MaxTsd_r_12M      = 800

Redundancy        = 0
Repeater_Ctrl_Sig = 0
24V_Pins          = 0

Download_supp     = 0
Upload_supp       = 0
Act_Para_Brct_supp = 0
Act_Param_supp     = 0

```

(To the next page)

Max_MPS_Length	= 32736
Max_Lsdu_MS	= 244
Max_Lsdu_MM	= 244
Min_Poll_Timeout	= 50
Trdy_9.6	= 1
Trdy_19.2	= 1
Trdy_93.75	= 1
Trdy_187.5	= 1
Trdy_500	= 1
Trdy_1.5M	= 1
Trdy_3M	= 1
Trdy_6M	= 1
Trdy_12M	= 1
Tqui_9.6	= 0
Tqui_19.2	= 0
Tqui_93.75	= 0
Tqui_187.5	= 0
Tqui_500	= 0
Tqui_1.5M	= 0
Tqui_3M	= 3
Tqui_6M	= 6
Tqui_12M	= 9
Tset_9.6	= 1
Tset_19.2	= 1
Tset_93.75	= 1
Tset_187.5	= 1
Tset_500	= 1
Tset_1.5M	= 1
Tset_3M	= 4
Tset_6M	= 8
Tset_12M	= 16
LAS_Len	= 127
Tsdi_9.6	= 10
Tsdi_19.2	= 15
Tsdi_93.75	= 15
Tsdi_187.5	= 80
Tsdi_500	= 80
Tsdi_1.5M	= 150
Tsdi_3M	= 150
Tsdi_6M	= 150
Tsdi_12M	= 150
Max_Slaves_supp	= 126

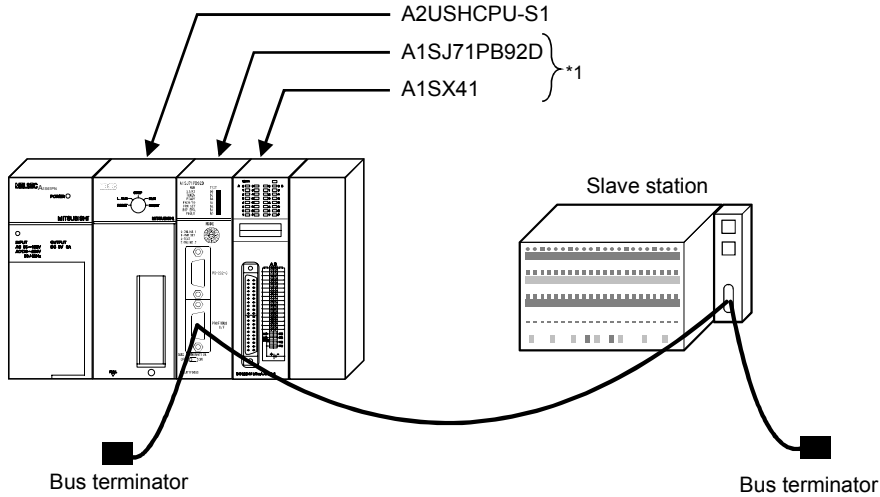
8. PROGRAMMING

A programming example is detailed below.

Before using the program examples introduced in this chapter in an actual system, fully check that there is no problem in control on the target system.

(1) System configuration example

The following system configuration is used as an example for explanations in Sections 8.1 to 8.6.



*1 The modules shall be installed to the slots in order from slot 0.

Module	Input signal	Output signal
A1SJ71PB92D	X0 to X1F	Y0 to Y1F
A1SX41	X20 to X3F	—

(2) Settings

(a) A1SJ71PB92D settings

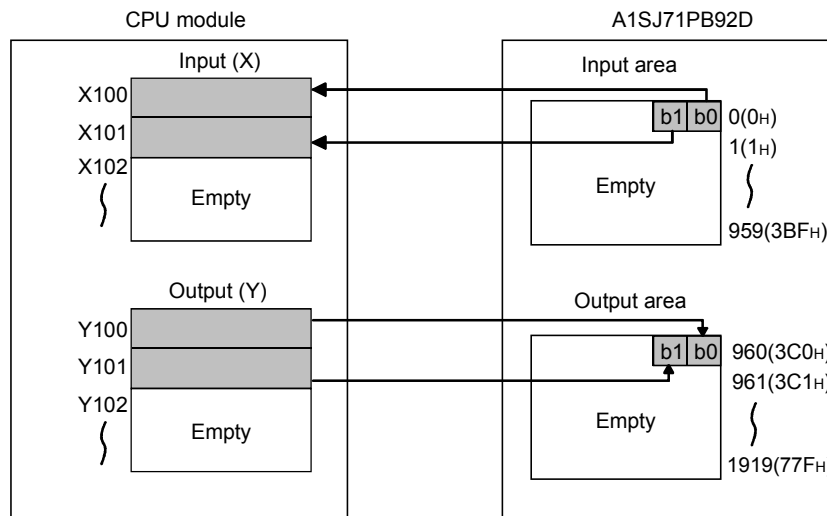
Item		Description
FDL address (Station number)		FDL address 0
Transmission speed		1.5Mbps
I/O area for FDL address 1 (Buffer memory)	Input area	0 (0H)
	Output area	960 (3C0H)

(b) Slave station settings

Item		Description
FDL address (Station number)		FDL address 1
I/O data size	Input data size	1 word (2 bytes)
	Output data size	1 word (2 bytes)

(3) Usage status of input area and output area

The following shows the usage status of the input area (buffer memory address: 0 to 959 (0H to 3BFH)) and output area (buffer memory address: 960 to 1919 (3C0H to 77FH)).



(4) Assignment of devices in program examples

The program examples given in Sections 8.1 to 8.6 use the following device assignments.

(a) Devices used by modules

1) A1SJ71PB92D

Device	Description	Device	Description
X0	Exchange start end signal	Y0	Exchange start request signal
X1	Communication trouble detection signal	Y1	Communication trouble detection signal reset
X2	Communication trouble area clear end signal	Y2	Communication trouble area clear request signal
—	—	Y3	Communication trouble area type selection signal
X4	Global control end signal	Y4	Global control request signal
X0D	Watching timer error signal	—	—
X11	Operation mode change completion signal	Y11	Operation mode change request signal
X1B	Communication READY signal	—	—
X1D	Module READY signal	—	—

2) A1SX41

Device	Description	Device	Description
X20	Exchange start command	—	—
X21	Communication trouble detection reset command		
X22	Communication trouble area clear command		
X23	Global control command		
X24	Operation mode change command		
X25	Address information read command		
X30 to X31	Data transmission command to slave stations		

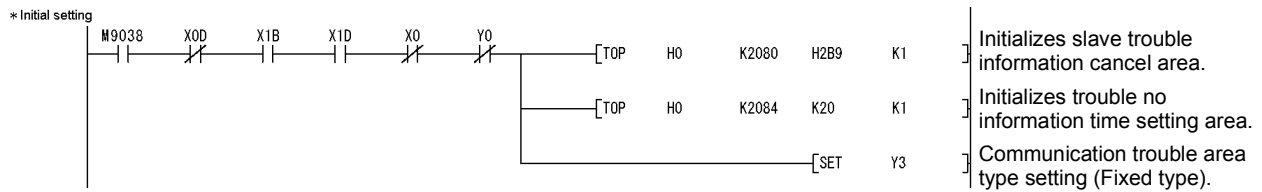
(b) Devices used by the user

Device	Description	Device	Description
M1	Communication trouble detection reset flag	M101	Dedicated instruction execution enable flag
M2	Communication trouble area clear flag	Z1	Index register for input start address
M3	Global control request flag	Z2	Index register for output start address
M4	Operation mode change request flag	M9038	After RUN, ON for 1 scan only
M5	Operation mode change result read flag	—	—

(c) Devices used as buffer memory read target

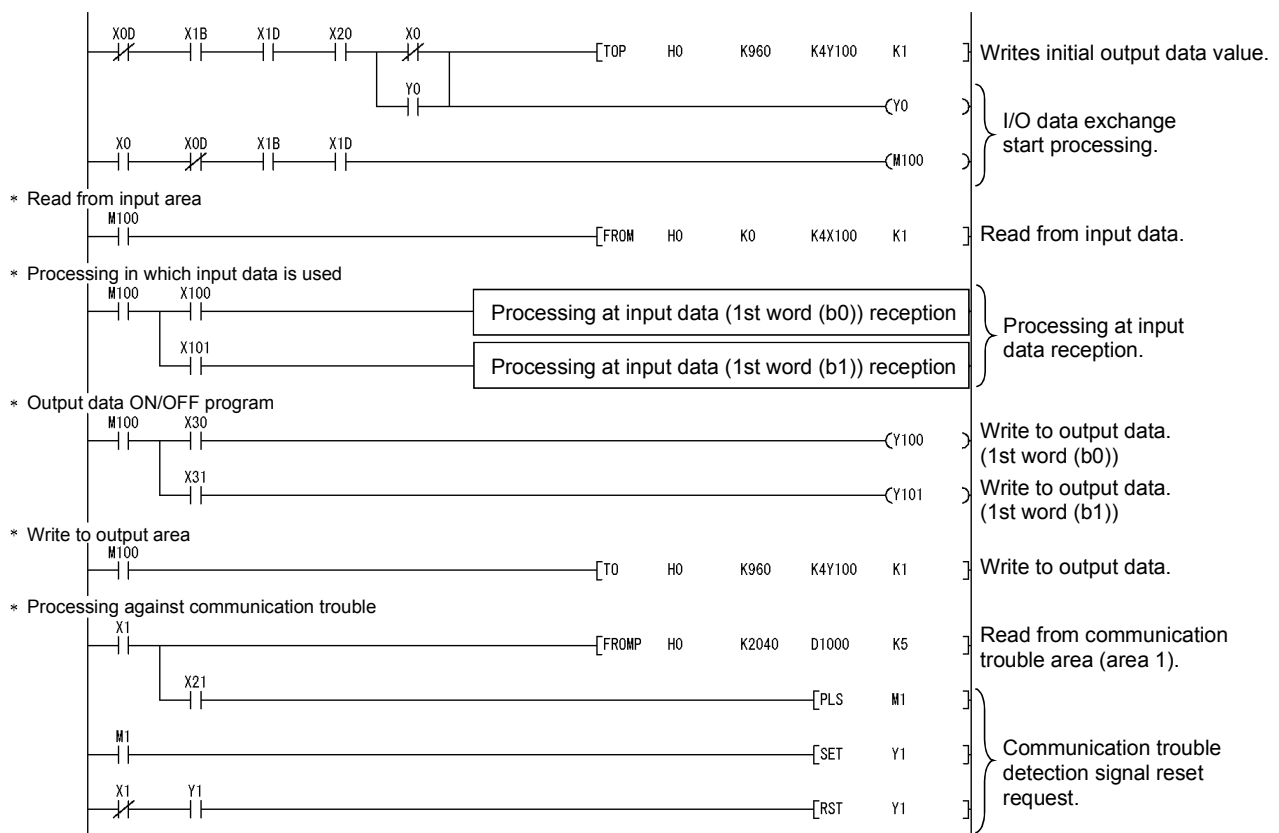
Device	Description	Device	Description
X100 to X101	Transfer destination for data input from slave stations	D100	Storing input start address
Y100 to Y101	Transfer destination for data output to slave stations	D101	Storing output start address
D0	Storing operation mode change result	D200	Storing address information
D1	Storing current operation mode	D1000 to D1004	Storing trouble information storage device data

8.1 Initial Program



8.2 Data I/O with Slave

8.2.1 Normal service mode (MODE 0)

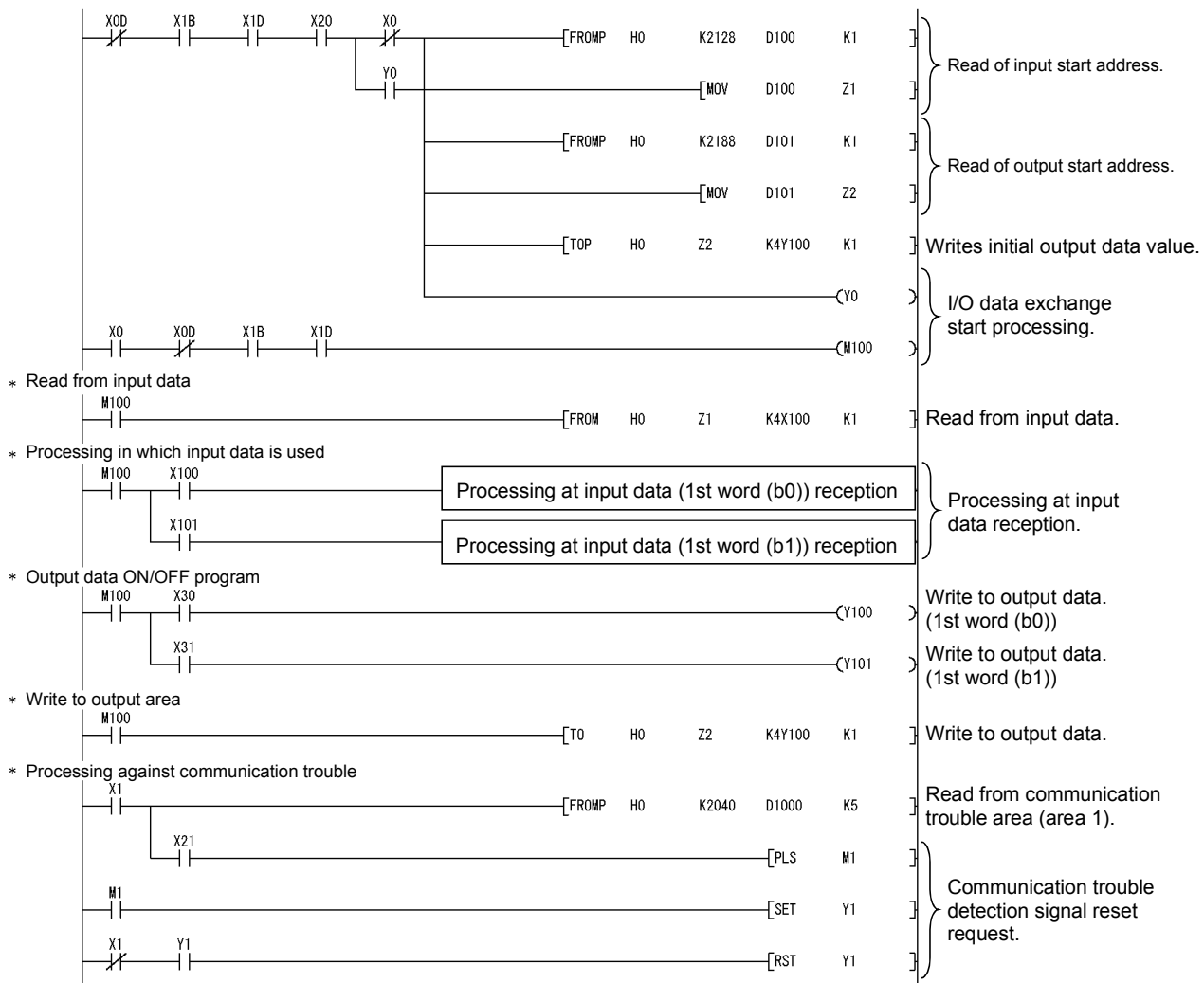


POINT

Pay attention to the increase of the scan time since it will take at least 3.3ms to process the FROM/TO instruction.
It is recommended to perform the FROM/TO instruction for the A1SJ71PB92D/AJ71PB92D only once in each sequence scan.

8.2.2 Extend service mode (MODE E)

*1: Exchange start request for user

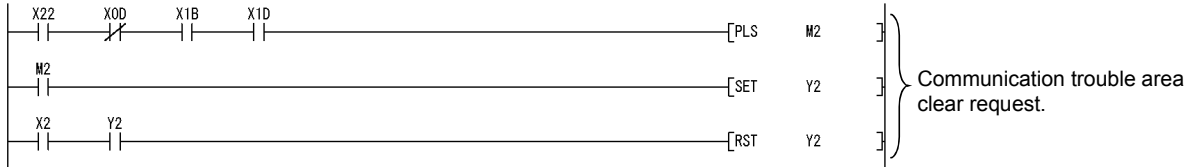


POINT

- Pay attention to the increase of the scan time since it will take at least 3.3ms to process the FROM/TO instruction. It is recommended to perform the FROM/TO instruction for the A1SJ71PB92D/AJ71PB92D only once in each sequence scan.
- If the network configuration allows the power supplies to the A1SJ71PB92D/AJ71PB92D and to the slave station to be on simultaneously, there may be cases in which the slave side is not completely started at the time the X1B turns on. In this case, consider the time lag for the slave station to completely start up when estimating the time period from the point the X1B turns on until the communication start "Y00" turns on.

8.3 Communication Trouble Area and Expansion Communication Trouble Area Clear

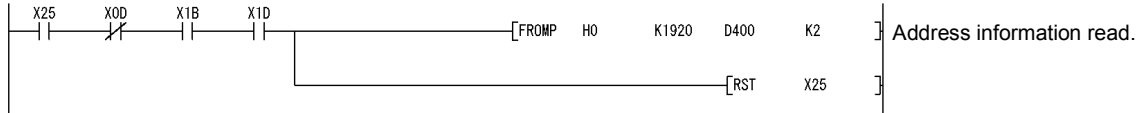
* Communication trouble area clear request.



8.4 Address Information Read

Example: When reading the No.1 station address

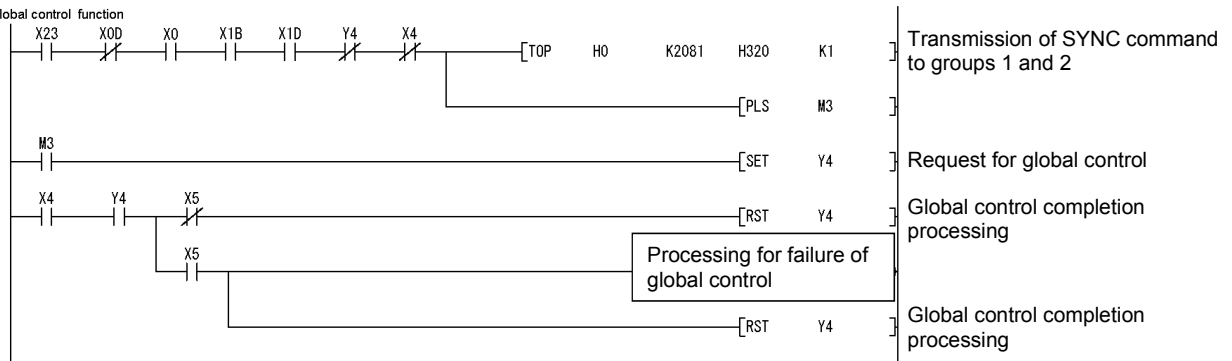
* Address information read.



8.5 Global Control

Following is shown an example of when a global control service (SYNC) is transmitted to each slave station in groups 1 and 2. (For information regarding service commands refer to Section 4.1.2.)

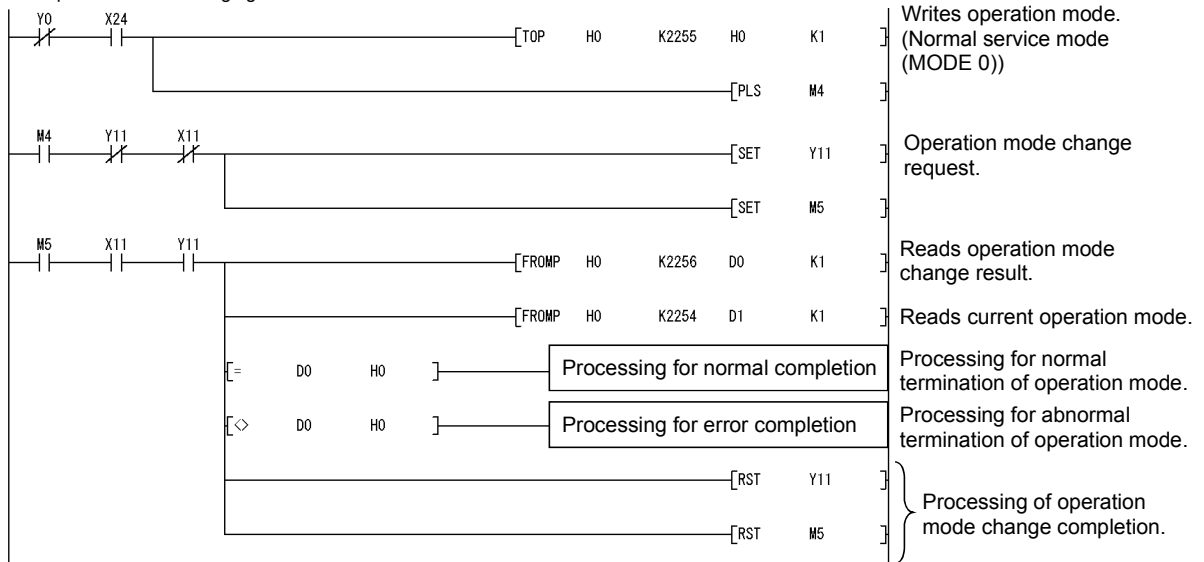
* Use of global control function



8.6 While-Run Operation Mode Changing

The operation mode is changed by writing "0000H" (the service mode is changed to the normal operation mode without the mode registered onto E²PROM) to the operation mode change request area of the buffer memory.

* While-run operation mode changing



9. TROUBLESHOOTING

This chapter explains the troubleshooting for the use of the A1SJ71PB92D/AJ71PB92D.

(1) Error check by LEDs and corrective measures

LED	Status	Cause	Measures
RUN	OFF	The watchdog timer timed out.	Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
READY	ON	Parameter setting mode (MODE 1), self-diagnosis mode (MODE 2), or the E ² PROM initialization function could not be executed. (Normal in the case of normal service mode (MODE 0) or extended service mode (MODE E))	Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
	OFF	Normal service mode (MODE 0) or extended service mode (MODE E) could not be executed. (Normal in the case of parameter setting mode (MODE 1), self-diagnosis mode (MODE 2), or E ² PROM initialization function)	Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
SD/RD	OFF	No exchange.	Check the exchange start request signal (Y00).
TOKEN	OFF	Token does not cycle. *1	<ul style="list-style-type: none"> • Check the PROFIBUS cable connections. • Check the terminating resistance set switch for correct function. • Check if the station number of each station is unique. • Check if the station number does not exceed the HSA.
PRM SET	Flash	No parameter written in the module.	Write the parameter in the module.
		The E ² PROM parameters are corrupted.	Initialize the E ² PROM with the E ² PROM initialization function. (Refer to Section 4.5)
RSP ERR.	Failure of the A1SJ71PB92D/AJ71PB92D varies depending on the combination of the RSP ERR. and FAULT LED states. For details, refer to Section (2).		
FAULT			

*1 Depending on the number of master stations within the same network and the transmission speed setting, the TOKEN LED seems to be unlit even in execution of token passing.

- (2) A1SJ71PB92D/AJ71PB92D failure indicated by combination of RSP ERR. and FAULT LEDs
The following table lists the error details indicated by combination of RSP ERR. and FAULT LEDs.

The RSP ERR. LED status must be checked after exchange start (Exchange start end signal (X0) turned ON) and when the time set in the trouble no information time setting area (buffer memory address: 2084 (824H)) has elapsed. (Refer to Section 4.3.2 (8).)

Even if a communication fault has occurred, the RSP ERR. LED does not turn on until the time set in the trouble no information time setting area (buffer memory address: 2084 (824H)) has elapsed.

RSP ERR.	FAULT	Description		Measures
ON	OFF	<ul style="list-style-type: none"> An abnormal station identified. A communication trouble identified. 		Refer to the communication trouble area (buffer memory address: 2040 to 2079 (7F8H to 81FH)).
OFF	ON	Occurred when powering OFF and ON or resetting CPU module	<ul style="list-style-type: none"> Parameters meaning that no active slave stations exist (reserve slave stations only) were written, and then the exchange start request signal (Y0) was turned ON. The station number of a slave station is duplicated with that of the master station in parameter settings. Parameters in E²PROM are corrupted. 	Modify the parameters. If the problem persists in spite of parameter modification, initialize the E ² PROM with the E ² PROM initialization function. (Refer to Section 4.5.)
		Occurred during operation	The A1SJ71PB92D/AJ71PB92D went down for some reason.	Turn ON the restart request signal (Y0D) to restart the A1SJ71PB92D/AJ71PB92D.
		An unexcepted error other than those specified above occurs.		Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
	OFF	Normal	—	

APPENDIX

Appendix 1 Differences between A1SJ71PB92D/AJ71PB92D Software Versions

Appendix 1.1 Differences between A1SJ71PB92D Software Versions

- (1) Additional new functions in software version E
The areas showing the extended service mode (MODE E) and slave station status have been added.

Buffer Memory	Software Version E or Later	Software Version D or Earlier
Input area (buffer memory address: 0 to 959 (0H to 3BFH))	Normal service mode (MODE 0): 32 bytes, fixed length Extended service mode (MODE E): 244 bytes, variable length	Normal service mode (MODE 0): 32 bytes, fixed length
Output area (buffer memory address: 960 to 1919 (3C0H to 77FH))	Normal service mode (MODE 0): 32 bytes, fixed length Extended service mode (MODE E): 244 bytes, variable length	Normal service mode (MODE 0): 32 bytes, fixed length
Slave status area (buffer memory address: 2112 to 2116 (840H to 844H))	The status of each slave station is indicated.	Use Prohibited
Input/Output start address area (Extended service mode(MODE E) only) (buffer memory address: 2112 to 2116 (840H to 844H))	The I/O area starting address of each slave station is indicated.	Use Prohibited

POINT

Since the extended service mode (MODE E) is a function that has been added to software version E or later, do not set the mode setting switch to E when using the A1SJ71PB92D of software version D or earlier.

- (2) Additional new functions in software version F
The operation mode change function and the parameter writing via the RS-232/422 interface of a CPU module have been added.

Buffer Memory	Software Version F or Later	Software Version E or Earlier
Address: 2254	• Current operation mode (The current operation mode is indicated.)	• Use Prohibited
Address: 2255	• Operation mode change request area (Set the required operation mode.)	• Use Prohibited
Address: 2256	• Operation mode change result area (The operation mode change request result is indicated.)	• Use Prohibited

I/O Signal	Software Version F or Later	Software Version E or Earlier
X10	• Operation mode signal	• Use Prohibited
X11	• Operation mode change completion signal	• Use Prohibited
Y11	• Operation mode change request signal	• Use Prohibited

GX Configurator-DP and MLESEC ProfiMap	Software Version G or Later	Software Version F or Earlier
Parameter writing via RS-232/422 interface of CPU module	• Write enabled	• Write disabled

Appendix 1.2 Restrictions on Use of A1SJ71PB92D Software Versions in the Same System

Use of the A1SJ71PB92D software versions in the same system will pose no problems.
In addition, replacing the old software version with a new software version will pose no problems.

Appendix 1.3 Differences between AJ71PB92D Software Versions

- (1) Additional new functions in software version B
The operation mode change function and the parameter writing via the RS-232/422 interface of a CPU module have been added.

Buffer Memory	Software Version B or Later	Software Version A
Address: 2254	<ul style="list-style-type: none"> Current operation mode (The current operation mode is indicated.) 	<ul style="list-style-type: none"> Not usable
Address: 2255	<ul style="list-style-type: none"> Operation mode change request area (Set the required operation mode.) 	<ul style="list-style-type: none"> Not usable
Address: 2256	<ul style="list-style-type: none"> Operation mode change result area (The operation mode change request result is indicated.) 	<ul style="list-style-type: none"> Not usable

I/O Signal	Software Version B or Later	Software Version A
X10	<ul style="list-style-type: none"> Operation mode signal 	<ul style="list-style-type: none"> Not usable
X11	<ul style="list-style-type: none"> Operation mode change completion signal 	<ul style="list-style-type: none"> Not usable
Y11	<ul style="list-style-type: none"> Operation mode change request signal 	<ul style="list-style-type: none"> Not usable

GX-Configurator- DP and MELSEC ProfiMap	Software Version B or Later	Software Version A
Parameter writing via RS-232/422 interface of CPU module	<ul style="list-style-type: none"> Write enabled 	<ul style="list-style-type: none"> Write disabled

Appendix 1.4 Restrictions on Use of AJ71PB92D Software Versions in the Same System

Use of the A71PB92D software versions in the same system will pose no problems.
In addition, replacing the old software version with a new software version will pose no problems.

Appendix 2 When Replacing AJ71PB92 with A1SJ71PB92D/AJ71PB92D

Appendix 2.1 Precautions

Pay attention to the following points when replacing the AJ71PB92 with the A1SJ71PB92D/AJ71PB92D.

- (1) Sequence programs and cable wiring created for the AJ71PB92
They can be used for the A1SJ71PB92D/AJ71PB92D without change.
- (2) Parameters for the AJ71PB92
Use of the AJ71PB92 parameters is not allowed for the A1SJ71PB92D/AJ71PB92D because the file format is different.
Obtain the EN50170-compliant device definition file (GSD file) for your device from the device manufacturer, and re-create the parameters using GX Configurator-DP or MELSEC ProfiMap.
- (3) Software package used for parameter setting of the AJ71PB92
It cannot be used for the A1SJ71PB92D/AJ71PB92D.
The parameter setting software packages differ between the AJ71PB92 and A1SJ71PB92D/AJ71PB92D as indicated in the following table.

Item	AJ71PB92	A1SJ71PB92D/AJ71PB92D
Parameter creation software package	Siemens COM ET 200	MELSEC ProfiMap MELSEC ProfiMap2
Parameter write software package	SW0IX-DPLDPE	MELSEC ProfiMap3 GX Configurator-DP Version 4 or later
Device definition file	COM ET 200-dedicated device definition file (*DT.200)	EN50170-compliant device definition file (*.gsd)
Parameter write software package connection target	RS-422 port of AJ71PB92	<ul style="list-style-type: none"> • RS-232 interface of A1SJ71PB92D/AJ71PB92D • RS-232/RS-422 interface of CPU module (when GX Configurator-DP or MELSEC ProfiMap Version3 is used)

- (4) Differences in the switch setting
Though the switch setting of the AJ71PB92 was made with the rotary and DIP switches, that of the A1SJ71PB92D/AJ71PB92D is made with the rotary switch only.
The switch setting differs between the AJ71PB92 and A1SJ71PB92D/AJ71PB92D as indicated in the following table.

Switch	AJ71PB92	A1SJ71PB92D/AJ71PB92D
Rotary switch	Standard service mode Self-diagnosis mode 1 Self-diagnosis mode 2	Normal service mode (MODE 0) Parameter setting mode (MODE 1) Self-diagnosis mode (MODE 2) Extended service mode (MODE E)
DIP switch	Parameter setting mode	(No switch)

(5) Differences in the LEDs

Some LED setting differs between the AJ71PB92 and A1SJ71PB92D/AJ71PB92D.

LED Name	AJ71PB92	A1SJ71PB92D/AJ71PB92D
SD/RD	Flashes fast during communication.	Flashes during communication with a slave station on the PROFIBUS network. The flashing interval is the time set in the "data control time" of master parameter.
LED 1 to 8	In standard service mode: Indicates the preset transmission speed and the AJ71PB92's station number. In self-diagnosis mode: Indicates the self-diagnosis status.	(No LEDs)
B0 to B7	(No LEDs)	IN normal service mode (MODE 0) or extended service mode (MODE E): Indicates the A1SJ71PB92D/AJ71PB92D station number. In self-diagnosis mode (MODE 2): Indicates the self-diagnosis status.
TEST	(No LEDs)	In self-diagnosis mode (MODE 2): On In other modes: Off

(6) Differences in the internal current consumption and weight

The 5VDC internal current consumption and weight differ between the AJ71PB92 and A1SJ71PB92D/AJ71PB92D.

However, since the both values of the A1SJ71PB92D/AJ71PB92D are smaller than those of the AJ71PB92, power supply module replacement, base unit mounting screw reinforcement, etc. are not necessary.

LED Name	AJ71PB92	AJ71PB92D	A1SJ71PB92D
5VDC internal current consumption	1.3A	0.54A	0.56A
Weight	0.5kg	0.37kg	0.27kg

(7) Differences in resetting

Resetting operation differs.

LED Name	AJ71PB92	A1SJ71PB92D/AJ71PB92D
Reset operation	The RESET switch of the module is used for reset operation.	The key switch of the CPU module is used for reset operation.

Appendix 2.2 Additional new functions in the A1SJ71PB92D/AJ71PB92D

The following functions have been added to the the A1SJ71PB92D/AJ71PB92D.

(1) Mode

As compared to the AJ71PB92, the extended service mode (MODE E) has been added to the A1SJ71PB92D/AJ71PB92D *1. In the extended service mode (MODE E), up to 244 bytes of data can be sent/received per slave station.

In the extended service mode (MODE E), the layout of the I/O areas of the slave stations in the buffer memory changes depending on the sent/received data length.

*1 The extended service mode (MODE E) of the A1SJ71PB92D has been added to software version E. (Refer to Appendix 1.1.)

(2) Communication with slave station

As compared to the AJ71PB92, the global control function has been added to the A1SJ71PB92D/AJ71PB92D.

(3) Transmission specifications

The A1SJ71PB92D/AJ71PB92D differs in some transmission specifications from the AJ71PB92.

Item	AJ71PB92	A1SJ71PB92D/AJ71PB92D
Transmission speed and maximum transmission distance	3[Mbps]	Not supported
	6[Mbps]	
	12[Mbps]	
Setting range of host station number	1 to 2	0 to 125

(4) I/O signals

As compared to the AJ71PB92, the following I/O signals have been added to the A1SJ71PB92D/AJ71PB92D.

Input Signal	Description
X04	Global control end signal
X05	Global control error end signal
X10	Operation mode signal
X11	Operation mode change completion signal

Output Signal	Description
Y04	Global control request signal
Y11	Operation mode change request signal

(5) Buffer memory

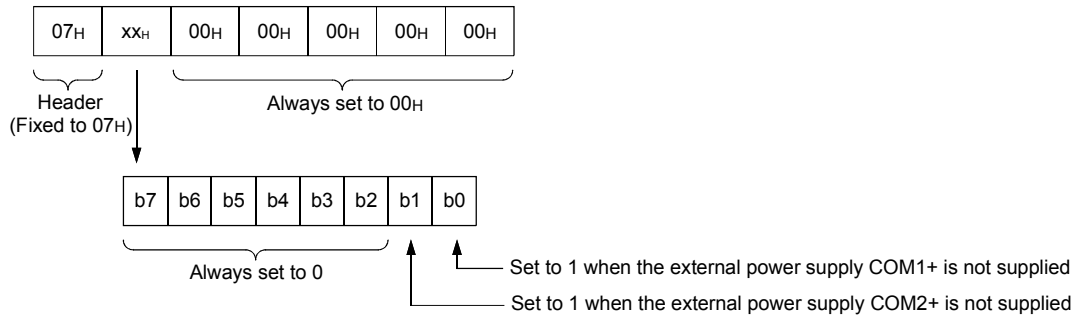
As compared to the AJ71PB92, the following buffer memory areas have been added or modified to the A1SJ71PB92D/AJ71PB92D.

Buffer Memory Address (Decimal/hexadecimal)	Addition/Modification	Explanation
0 / 0H 959 / 3BFH	Modification	Input area In extended service mode (MODE E) of the A1SJ71PB92D/AJ71PB92D, the input area allocation for each slave station changes depending on the length of received data. In the case of normal service mode (MODE 0), the input area allocation is the same as that of the AJ71PB92.
960 / 3C0H 1919 / 77FH	Modification	Output area In extended service mode (MODE E) of the A1SJ71PB92D/AJ71PB92D, the output area allocation for each slave station changes depending on the length of sending data. In the case of normal service mode (MODE 0), the output area allocation is the same as that of the AJ71PB92.
2081 / 821H	Addition	Global control area
2084 / 824H	Addition	Trouble no information time setting area
2096 / 830H 2110 / 83EH	Addition	Expansion communication trouble area
2112 / 840H 2116 / 844H	Addition	Slave status area
2128 / 850H 2247 / 8C7H	Addition	Input/Output start address area (Extended service mode (MODE E) only)
2254 / 8CEH	Addition	Current operation mode
2255 / 8CFH	Addition	Operation mode change request area
2256 / 8D0H	Addition	Operation mode change result area

Appendix 3 Extended Trouble Information of Mitsubishi's Slaves

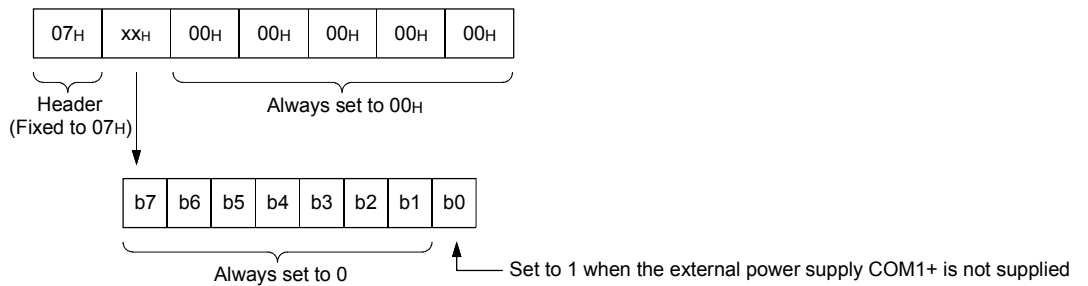
(1) AJ95TB2-16T

AJ95TB2-16T notifies device-related trouble information to the master. The information consists of seven bytes including the header (one byte) as shown below:



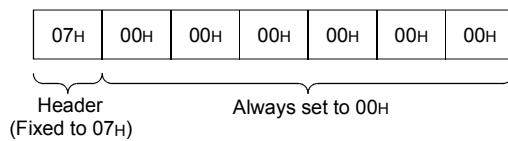
(2) AJ95TB32-16DT

AJ95TB32-16DT notifies device-related trouble information to the master. The information consists of seven bytes including the header (one byte) as shown below:



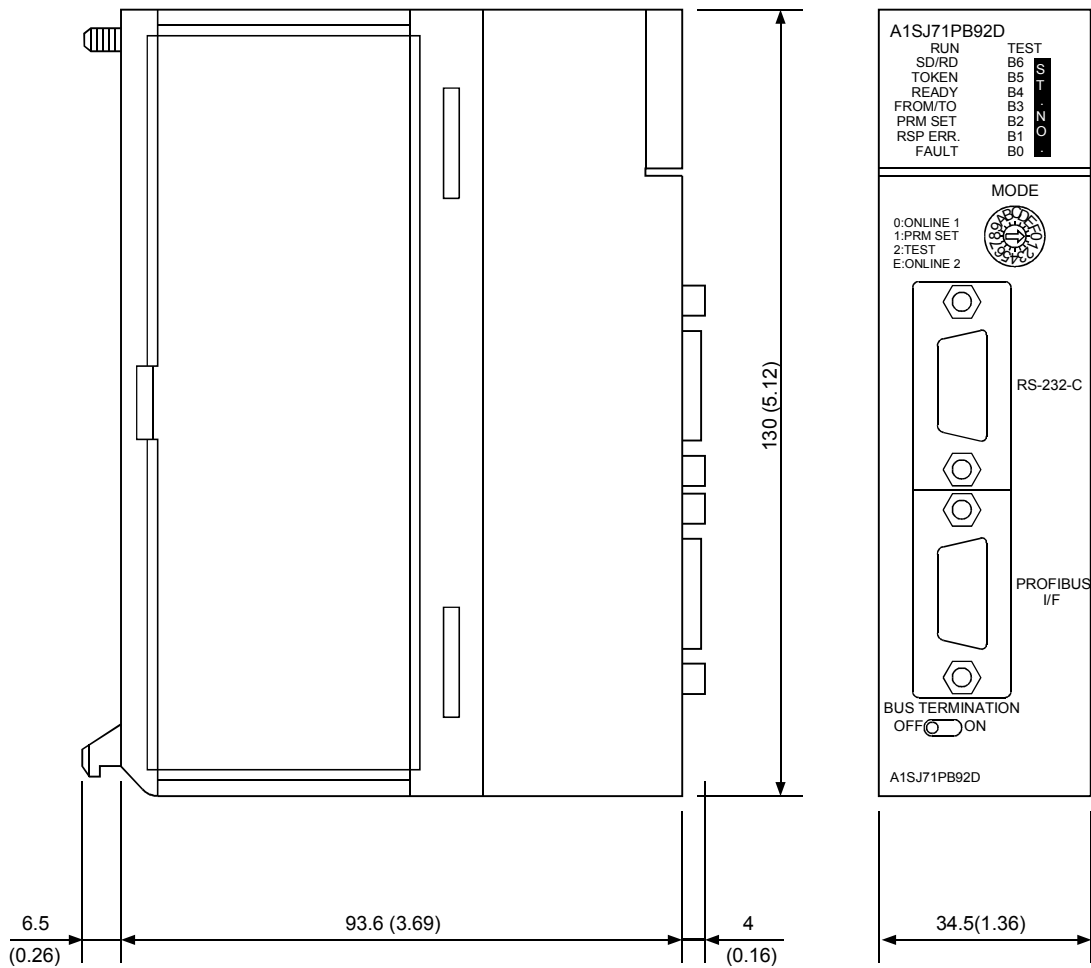
(3) AJ95TB3-16D

AJ95TB3-16D notifies device-related trouble information to the master. The information consists of seven bytes including the header (one byte) as shown below:



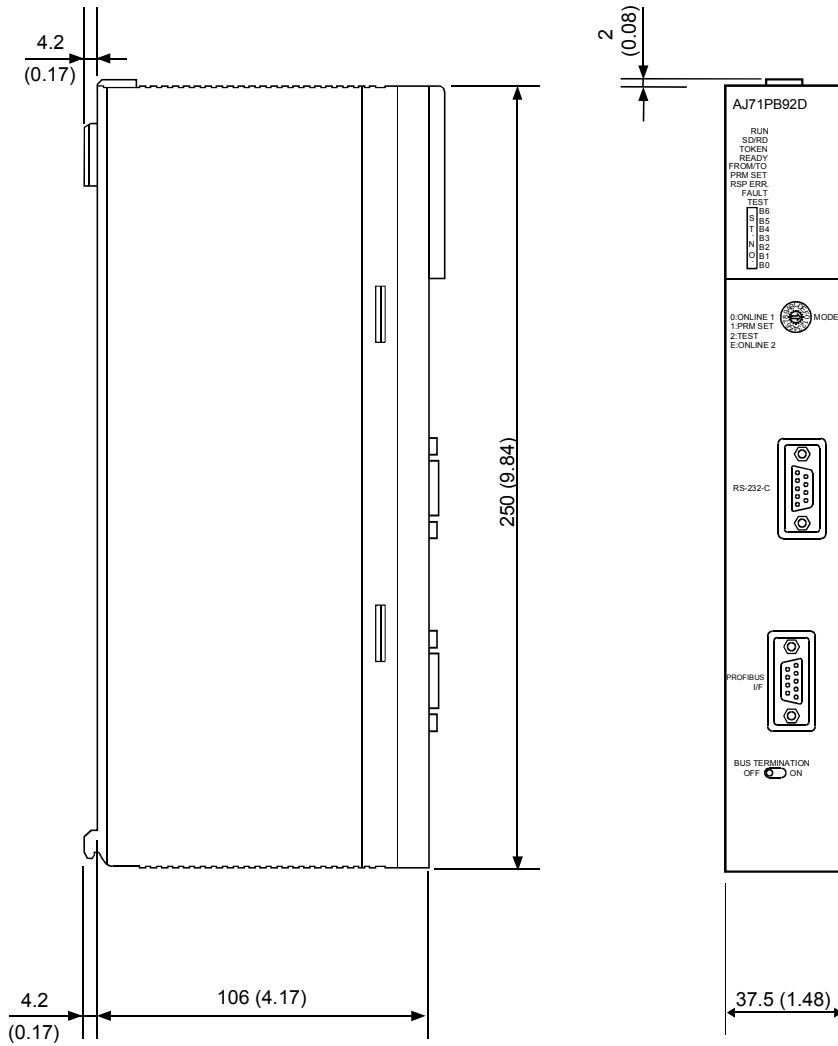
Appendix 4 External Dimensions

(1) A1SJ71PB92D



Unit : mm (inch)

(2) AJ71PB92D



Unit : mm (inch)

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 of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, 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.

6. Product application

- (1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.

In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.

However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

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PROFIBUS-DP Interface Module
Type AJ71PB92D/A1SJ71PB92D

User's Manual

MODEL	A1SJ71PB92D-U-S-E
MODEL CODE	13JL20
IB(NA)-66773-H(0611)MEE	

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