MELSEC System Q

Programmable Logic Controllers

User's Manual

QJ71PB92D
PROFIBUS/DP Interface Module

Art. no.: 136267
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SH (NA) 08012
Version C

MITSUBISHI ELECTRIC INDUSTRIAL AUTOMATION

• 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 CPU module user's manual.
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 network, 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 to 2079) 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.
- Do not output the "prohibited to use" signal as the output signal to an intelligent function module from the PLC CPU.
  Writing data into the "system area" or outputting a signal for "prohibited to use" may cause system malfunction in the PLC.
- If a stop error occurs in the CPU module, the communication status is as described below.
  (1) Communication with the slave station is continued.
  (2) The input data received from the slave station are updated in the buffer memory of the QJ71BP92D.
  (3) For the output data sent from the QJ71PB92D to the slave station, the values at CPU module stop error occurrence are held.

[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. • When installing the module, securely insert the module fixing tabs into the mounting holes of the base module while pressing the installation lever located at the bottom of the module downward. Improper installation may result in malfunction, breakdown or the module coming loose and dropping. Securely fix the module with screws if it is subject to vibration during use. • Tighten the screws within the range of specified torque. If the screws are loose, it may cause the module to fallout, short circuits, or malfunction. If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction. • Switch all phases of the external power supply off when mounting or removing the module. Not ding 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

- Switch all phases of the external power supply of the PLC system off before connecting the PROFIBUS cable. 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.
- The PROFIBUS cable which is connected to the module must be protected with a duct or secured in position with clamps.
  Unless the cable is thus protected or secured, the module or the cable could be damaged when the cable swings, moves or it is strained with careless pulls, or it could cause malfunction when the cable contacts with any undesirable objects.
- 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.
- Be sure to fix communication cables or power supply cables leading from the module by placing them in the duct or clamping them.
  Cables not placed in the duct or without clamping may hang or shift, allowing them to be accidentally pulled, which may cause a module malfunction and cable damage.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠ DANGER

- Switch all phases of the external power supply off before cleaning.
  Not doing so could cause electric shock.

⚠ CAUTION

- Never disassemble or modify the module.
  This may cause breakdowns, malfunctioning, injury and/or fire.
- Switch all phases of the external power supply off 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.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.
  Failure to do so may cause a failure or malfunctions of the module.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION
• When disposing of this product, treat it as industrial waste.

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REVISIONS

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

Print Date	* Manual Number	Revision
Dec., 2000	SH (NA) 080127-A	First printing
May, 2001	SH (NA) 080127-B	Corrections About the Generic Terms and Abbreviations, Section 2.1, 2.4, 4.1.3, 4.1.4, 5.1, 5.1.1, 5.4, 8.1, 8.2
Apr., 2004	SH (NA) 080127-C	Corrections Section 1.2, 2.1, 2.4, 3.1, 3.2.3, 3.3.2, 3.4.2, 4.1.4, 5.1, 5.1.1, 5.2.1, 5.3, 5.5.3, 6.1, 6.2, Chapter 7, Section 7.1, Chapter 9, Appendix 1, Appendix 3 Additions SAFETY PRECAUTIONS, About Manuals, Conformation to the EMC Directive and Low Voltage Instruction, Section 7.1, Chapter 9

Japanese Manual Version SH-080126-C

INTRODUCTION

Thank you for purchasing the Mitsubishi Programmable Controller MELSEC-Q Series.
Before using the equipment, plese 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.
Please forward a copy of this manual to the end user.

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About Manuals

The following are manuals related to this product.

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

Related Manuals

Manual Name	Manual Number
MELSoft GX Configurator-DP 4.00 Configuration System for Open Networks Software Manual Explains the overview, installation method, screen operations, etc. of GX Configurator-DP Version 4. (Sold separately)	IB-65778
GX Configurator-DP Version 6 Operating Manual Explains the overview, installation method, screen operations, etc. of GX Configurator-DP Version 6. (Sold separately)	SH-080463ENG

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Conformation to the EMC Directive and Low Voltage Instruction

For details on making the Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, refer to Chapter 3 "EMC Directive and Low Voltage Instruction" of the used CPU module User's Manual (Hardware).
The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.
No specific measures are required to make this product conform to the EMC directive and low voltage instruction.

About the Generic Terms and Abbreviations

Unless otherwise specified, this manual uses the following generic terms and abbreviations to describe the Type QJ71PB92D PROFIBUS-DP interface module.

Generic Term/Abbreviation	Description of the abbreviation/general terms
QJ71PB92D	Abbreviated name of Type QJ71PB92D PROFIBUS-DP interface module
QCPU (Q mode)	Generic name of MELSEC-Q series PLC CPU module compatible with QJ71PB92D
Base unit	Generic name of MELSEC-Q series main base unit and extension base unit compatible with QJ71PB92D
GX Configrator-DP	Abbreviated name of configurator for PROFIBUS-DP
PROFIBUS	Abbreviated name of PROFIBUS-DP network
Master station	Abbreviated name of master station (class 1) (master device) inside PROFIBUS-DP network
Slave station	Abbreviated name of slave station (slave device) inside PROFIBUS-DP network
Peripheral device	Generic name of personal computer capable of using GX Configuration-DP

Product Structure

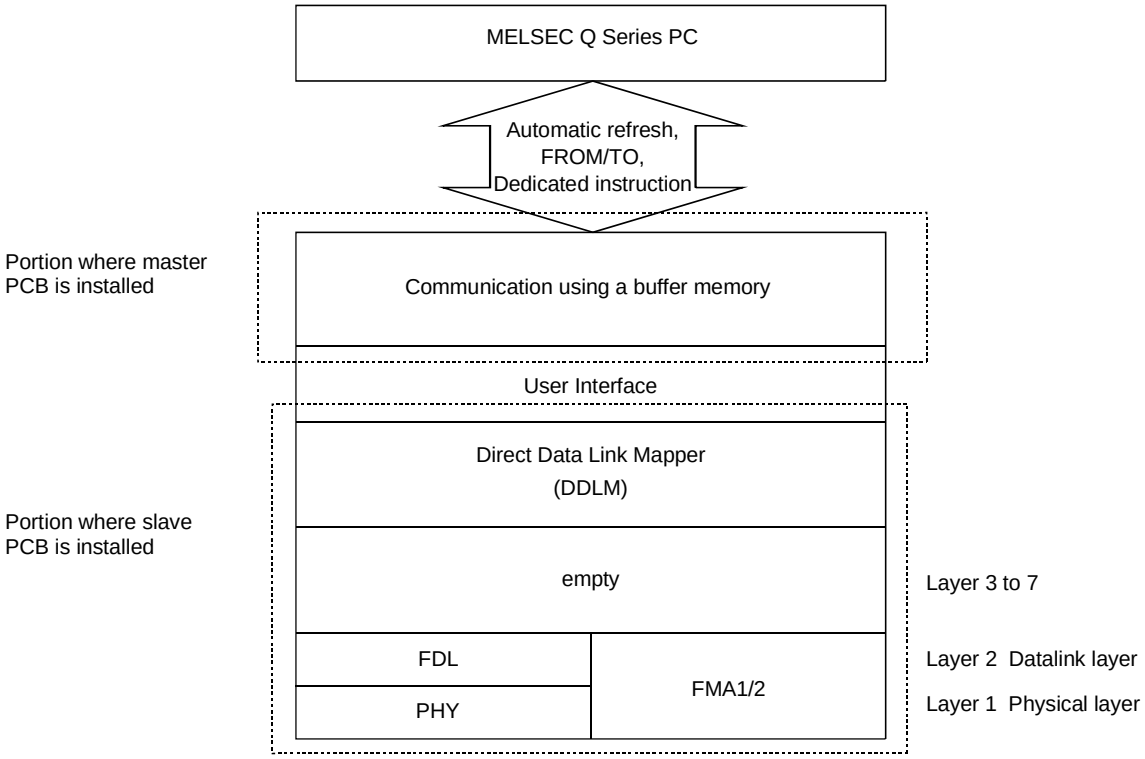
The product structure of this product is given in the table below.

Model	Product Name	Quantity
QJ71PB92D	Type QJ71PB92D PROFIBUS-DP interface module	1

1. OVERVIEW

This is the user's manual for the QJ71PB92D PROFIBUS-DP interface module (hereafter abbreviated as " QJ71PB92D. When explain separately, however, abbreviated as QJ71PB92D), which is used to connect a MELSEC-Q series programmable controller to a PROFIBUS-DP network.
The QJ71PB92D operates as a master station (class 1) in the PROFIBUS-DP network.

1.1 Software Configuration



The QJ71PB92D has a physical layer, data link layer, DDLM, and user interface that conform to PROFIBUS-DP, and communicates data with the PLC CPU by using a buffer memory.
The main application of PROFIBUS-DP is networks that execute high-speed communication at the level of sensors and actuators.

1.2 QJ71PB92D Features

(1) Operates as a PROFIBUS-DP master (class 1) station.

(2) Makes possible the exchange of input and output data to and from the slave station without the need to be aware of the PROFIBUS-DP protocol by using I/O signals X/Y and the buffer memory.

(3) Supports 3M, 6M, 12M [bps] network communication speeds in addition to the 9.6k, 19.2k, 93.75k, 187.5k, 500k, and 1.5M [bps] supported by the QJ71PB92D. These can be selected using a configurator.

(4) Trouble information can be read from the slave station using the I/O signal X/Y and the buffer memory.

(5) The global control function makes it possible to maintain all slave I/O at the same time. In addition, this can also be canceled.

(6) The module contains a self-diagnosis function that can be used to test the hardware such as the internal memory.

(7) The upper and lower bytes of I/O data can be swapped on the buffer memory. When word data is handled, these bytes need not be swapped using the sequence program.

(8) For data transmission between the PLC CPU and buffer memory of QJ71PB92D, the automatic refresh setting and dedicated instruction are used to prevent I/O data from being separated∗.
∗: The data of specified sizes are not matched with each other.

(9) Even when a plurality of PLC CPU modules are installed through the multi-CPU system, this model can be controlled by any PLC CPU module.

2. SYSTEM CONFIGURATION

This chapter describes the system configuration of QJ71PB92D.

2.1 Adaptive System

The modules and software programs used on QJ71PB92D are shown below.

(1) Applicable modules and number of mountable modules

The following table indicates the CPU modules that can be used with the QJ71PB92D and the number of mountable modules.

Applicable module		Number of mountable modules	Remarks
CPU module	Q00JCPU	Max. 16 modules	(*1)
	Q00CPU Q01CPU	Max. 24 modules	
	Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	Max. 64 modules	Available in Q mode only. (*1)
	Q12PHCPU Q25PHCPU	Max. 64 modules	(*1)

*1: Refer to the user's manual (function explanation/program fundamentals) of the used CPU module.

(2) Mountable base units

The QJ71PB92D can be mounted on any I/O slot of the base unit.
However, since the power supply capacity may be insufficient depending on the combination with the other mounted modules and the number of mounted modules, be sure to check the power supply capacity when mounting the modules.

(3) Compatibility with multiple CPU system

When using the QJ71PB92D in a multiple CPU system, first refer to the user's manual (function explanation/program fundamentals) of the used CPU module.

(a) Compatible QJ71PB92D

When using the QJ71PB92D in a multiple CPU system, use the QJ71PB92D of function version B or later.

(4) Online module change

The QJ71PB92D does not support the online module change.

(5) Essential configuration software

Set the parameters of the QJ71PB92D using the following configuration software.

System configuration	Configuration software
For use with the Q00J/Q00/Q01CPU	GX Configurator-DP Version 5.00A or later
For use with the Q02/Q02H/Q06H/Q12H/Q25HCPU	GX Configurator-DP Version 4.00A or later
For use with the Q12PH/Q25PHCPU	

POINT

Do not use the separation prevention function in CPU modules which do not support this function or incorrect I/O data will result.

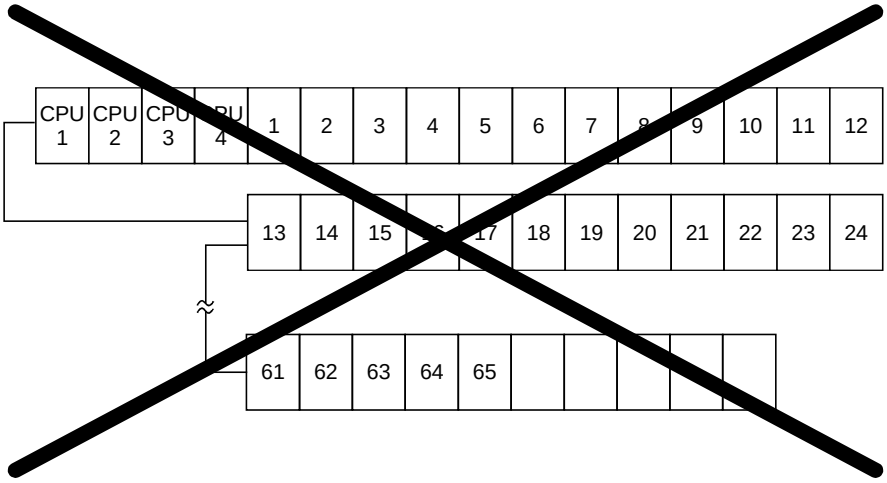
2 - 2

2.2 When Used in Multi-CPU System

When using QJ71PB92D in the multi-CPU system, take care of the following.

- The control of QJ71PB92D is performed by any CPU.

- A total of merely 64 sheets of QJ71PB92D is installed for each system. It is not the mountable number of sheets for each controlled CPU, but the total number of sheets controlled by all CPUs.



2.3 Precautions for Configuring a System

(1) The following configuration software programs cannot be used on QJ71PB92D.
- SW05F-PROFIMAP
- MELSEC-PROFIMAP 1.0
- MELSEC-PROFIMAP 2.0
- MELSEC-PROFIMAP 3.0

(2) The separation prevention function can be used only on those products having QCPU (Q mode) with serial No. 02092∗∗∗∗∗∗∗∗∗∗and subsequent.
If this function is used on products that do not support it, incorrect I/O data will result.

(3) When performing the following operations, ensure that the module READY signal X1D of QJ71PB92D is turned ON beforehand.
- To switch over the operation mode with Y11/X11, using the sequence program.
- To set parameters.

If the status of X1D is ignored and data is read from or written in the buffer memory, the CPU module may detect an error to stop the sequence calculation.

(4) Do not write parameters in QJ71PB92D simultaneously from a plurality of GX Configurator-DPs.
The parameter values of QJ71PB92D will become incorrect ones.

(5) If remote parameter setting is performed from GX Configrator-DP to the QJ71PB92D which is making data exchange, note that PROFIBUS data exchange will stop during parameter setting.

(6) When setting parameters in GX Configurator-DPs, do not perform the mode selection using a program.
The parameter setting or mode selection may not be performed correctly.

(7) Combination with MELSECNET/H
QJ71PB92D can be mounted on the MELSECNET/H administrative station and general stations, but cannot be mounted on MELSECNET/H remote stations.

2.4 Confirmation of Serial No.

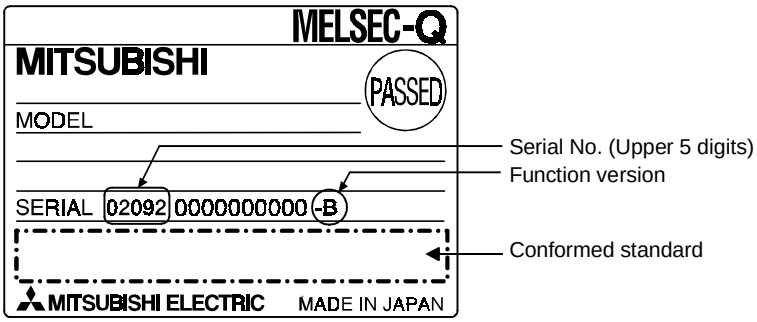
The serial Nos. of QCPUs (Q mode) capable of using the separation prevention function of QJ71PB92D and their confirmation method are shown below.

(1) Serial Nos. of QCPUs (Q mode) capable of using the separation prevention function
- Products with serial No. 02092∗∗∗∗∗∗∗∗∗and subsequent

(2) Confirmation of serial Nos. of Q-series PLC

(a) When confirming on the Rating indication plate on the side surface of the module

The serial No. of the applicable module is given in SERIAL column of the Rating indication plate.

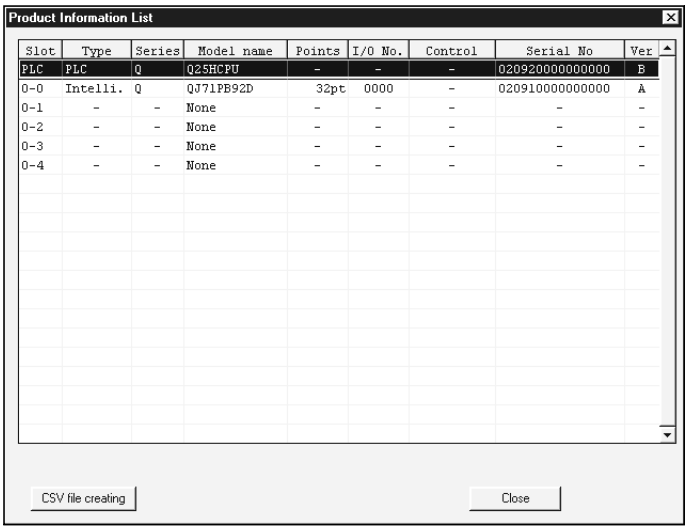


(b) When confirming on GX Developer

The method for confirming the serial No. of the applicable module on GX Developer is shown for the case using GX Developer Version 6. The serial No. appears in the [Product information list] or [Module detail information] window of GX Developer. The method of confirming the serial No. on the Production information list window is shown below.

[Start Procedure]

"Diagnosis" → "System monitor" → "Product information list"



[Serial No.]
- The serial No. of the applicable module appears in the Serial No. field.

3. SPECIFICATIONS

This section explains the QJ71PB92D the general specifications, performance specifications, and transmission specifications.
For the general specifications of the QJ71PB92D, refer to the user's manual for the CPU module to be used.

3.1 Performance Specifications

Item		Specifications		
Model		QJ71PB92D		
PROFIBUS-DP station type		Master station (class 1)		
Transmission specifications	Electrical standards and characteristics	Complies with EIA-RS485		
	Medium	Shielded twisted cable		
	Network configuration	Bus (however, tree type when a repeater is used)		
	Data link method	• Token passing method (Master-to-master) • Polling method (Master-to-slave)		
	Transmission encoding method	NRZ		
	Transmission speed/maximum transmission distance ＊1 ＊2	Transmission speed	Transmission distance [m/segment]	Maximum transmission distance when 3 repeaters are used
		9.6 [kbps]	1200	4800
		19.2 [kbps]		
		93.75 [kbps]		
		187.5 [kbps]	1000	4000
		500 [kbps]	400	1600
		1.5 [Mbps]	200	800
		3 [Mbps]	100	400
		6 [Mbps]		
		12 [Mbps]		
	Maximum number of repeaters/network	3 units ＊2		
	Maximum number of stations/segment	32 stations ＊3		
	Maximum number of slave stations/master station	60 slaves ＊3		
	Number of connection nodes (number of repeaters)	32, 62 (1), 92 (2), 126 (3) ＊3		
	Transmittable data	32 bytes/1 station (Normal service mode) 244 bytes/1 station (Extended service mode)		
Number of occupied I/O		32 points (I/O assignment : 32 Intelligent points)		
5VDC internal current consumption		0.57A		
External dimensions		105(H) × 27.4(W) × 975(D) [mm]		
Weight		0.15kg		

＊1 Transmission speed control within +/- 0.3% (PROFIBUS part 1)

＊2 Distance that the transmission distance can be expanded by (m/network) using repeaters
Maximum transmission distance (m/network) = (number of repeaters + 1) × transmission distance (m/segment)

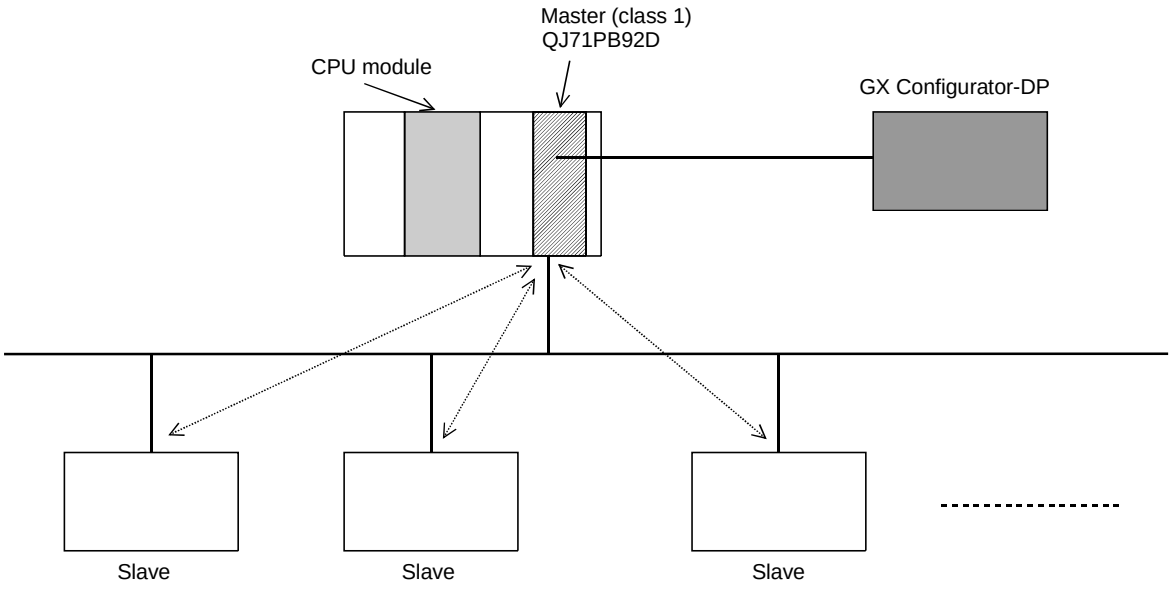
＊3 When a slave used is greater than 32 bytes in the maximum data length of the error information, the maximum number of stations, the maximum number of slave stations and the number of connection nodes may be less than the above values.
This is because the maximum data length of the slave station error information that the QJ71PB92D can receive varies with the minimum station number and maximum station number of the slave stations set in the parameters. Refer to Section 3.2.3 for details.

For the noise immunity, withstand voltage, insulation resistance and others in the PLC system using this module, refer to the power supply module specifications given in the used CPU module user's manual.

3.2 Network Configuration

3.2.1 Basic configuration

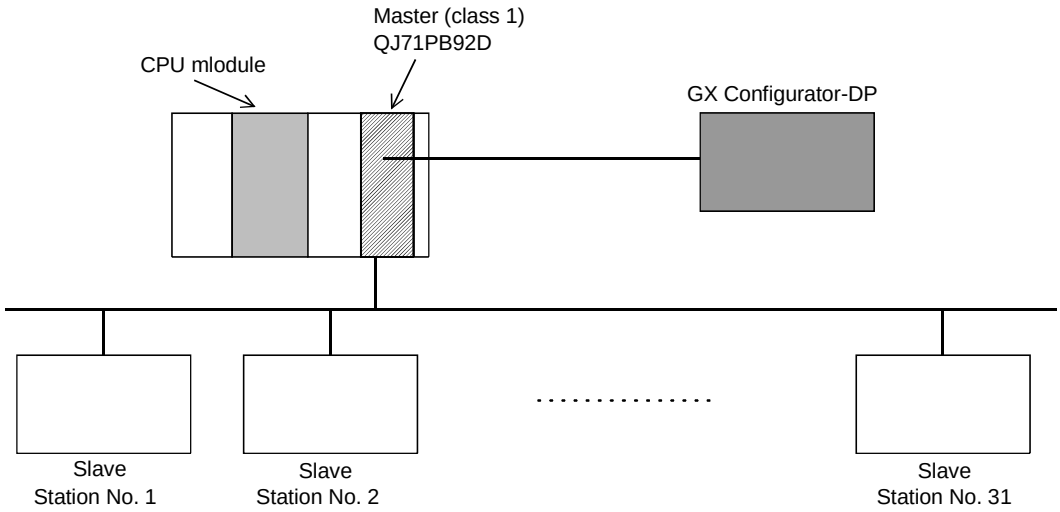
1) Equipment types
   - Class 1 master
   - GX Configurator-DP
   - Slave
   - Repeater
2) Number of units that can be connected to the entire network (when repeaters are used)
   Master+slave ≤ 126 units
3) Number that can be connected for 1 segment
   Master+slave+repeaters ≤ 32 units
4) Communications can be conducted via a maximum of 3 repeaters from an arbitrary master or arbitrary slave to an arbitrary master or arbitrary slave (Not 3 units in the entire network).
5) The maximum number of slaves that can be connected to 1 QJ71PB92D is 60 stations.



- The PROFIBUS-DP cable is provided by the user.

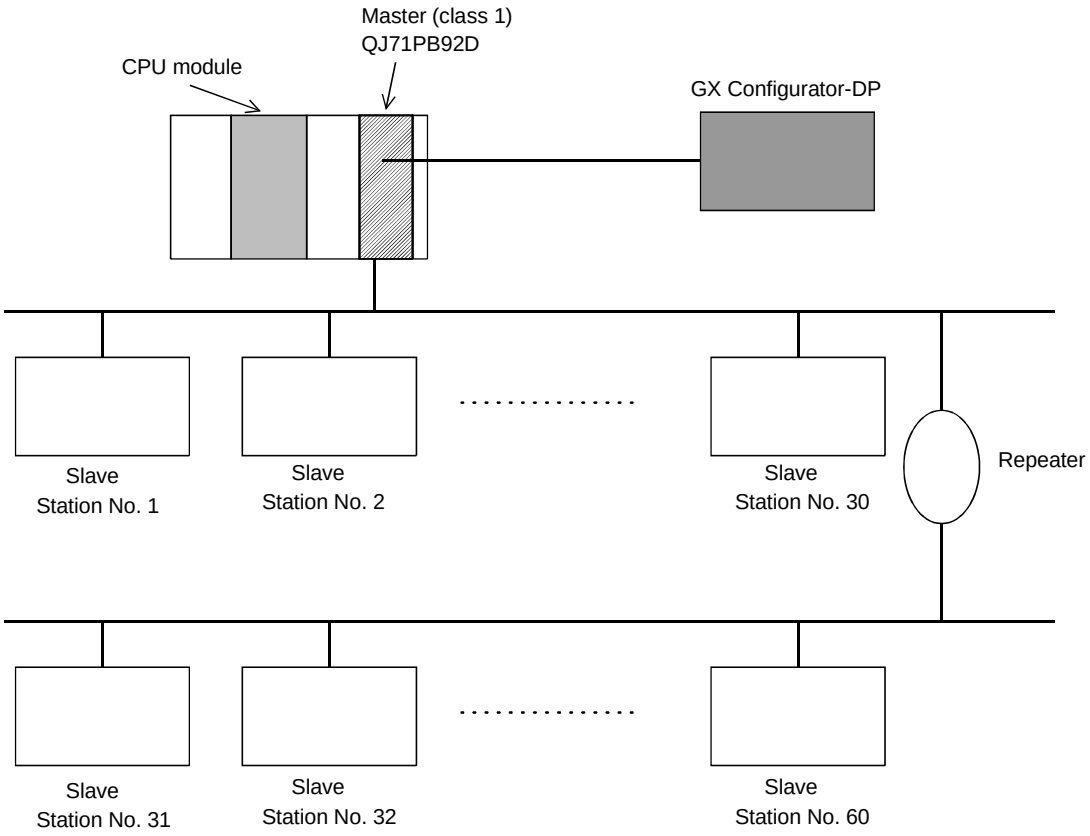
3.2.2 Applicable configuration

1) When 1 master (class 1) station is connected



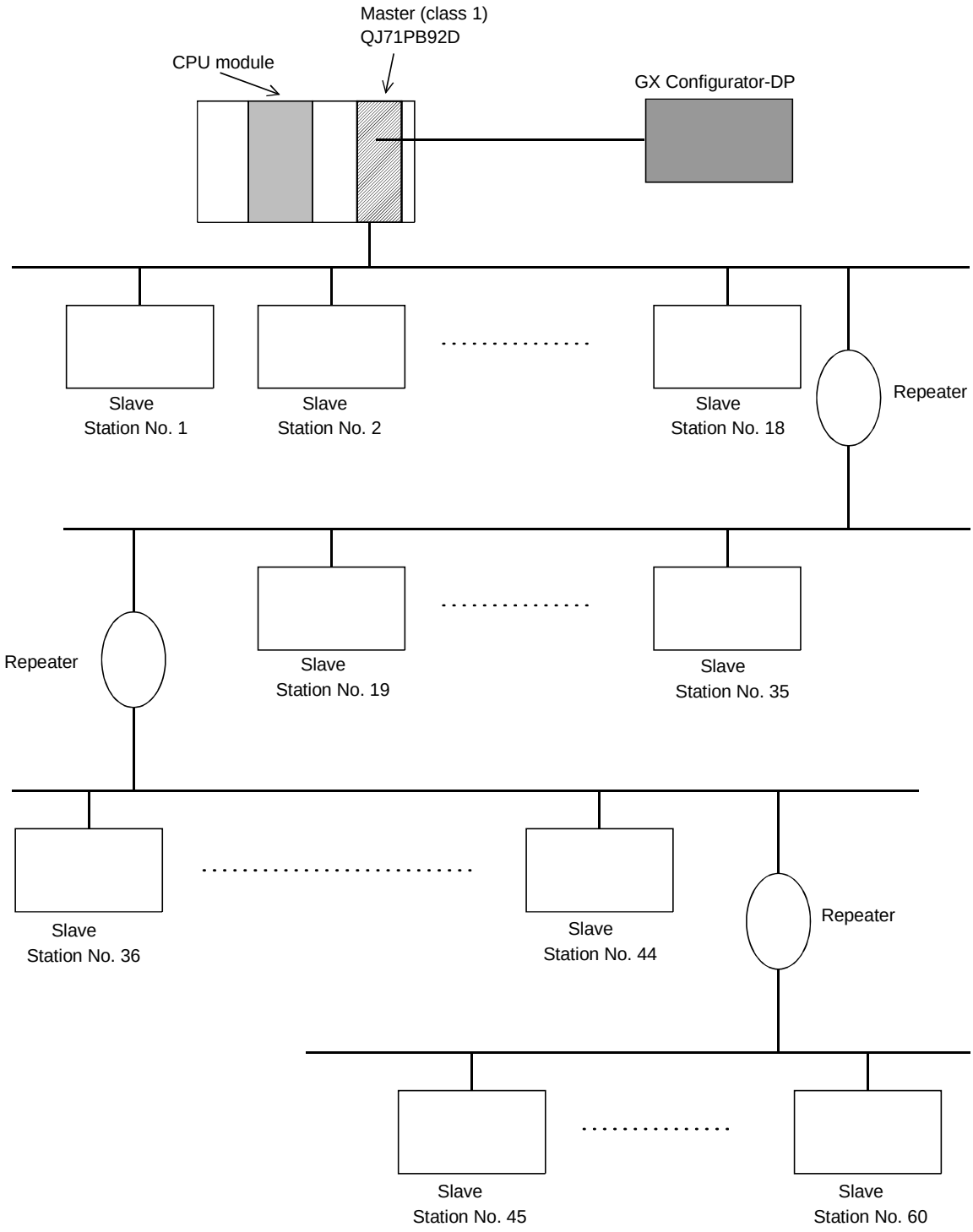
* A maximum of 32 stations can be connected to 1 segment.

2) When 1 master (class 1) station and 1 repeater are connected



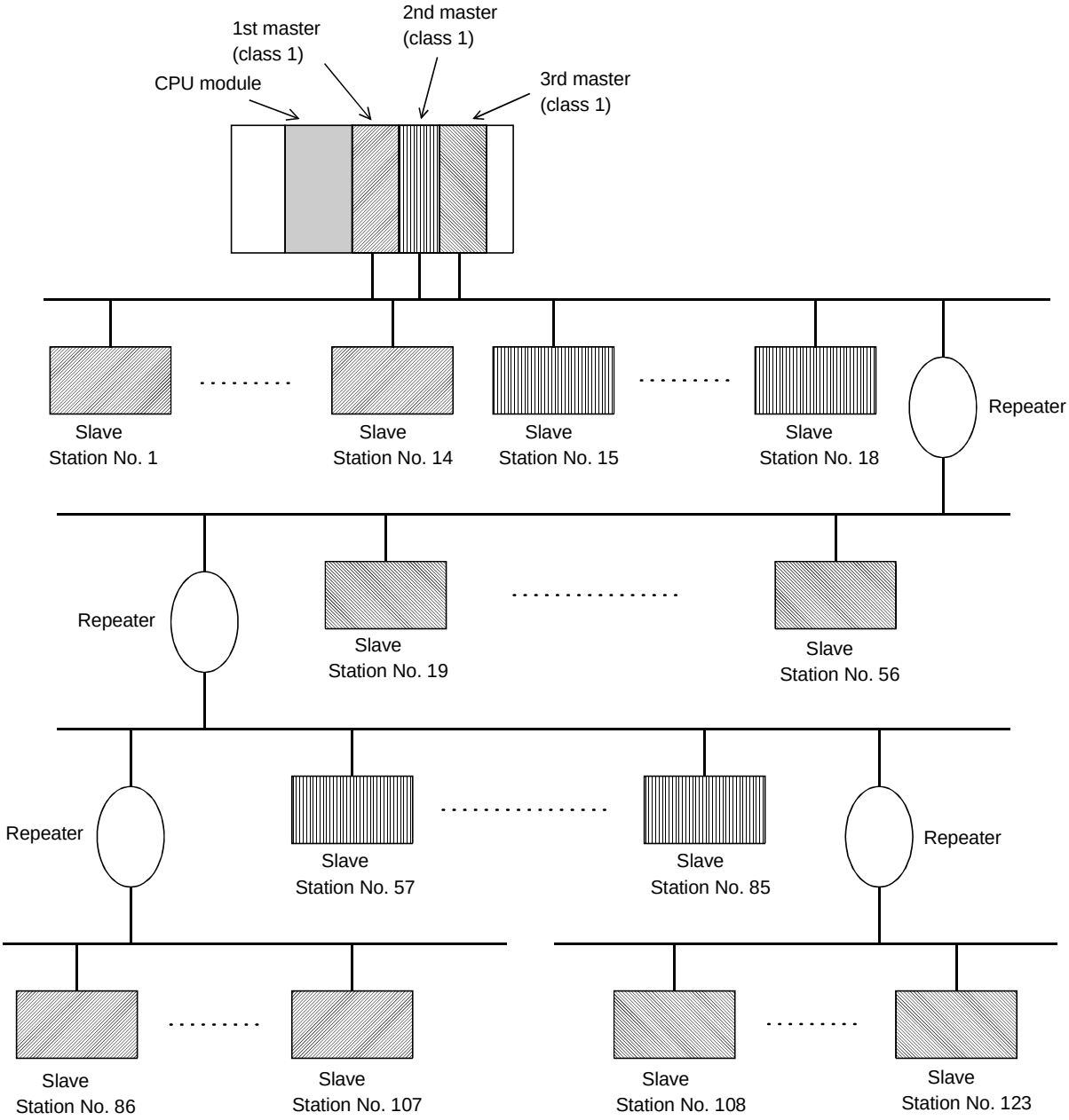
* In the above configuration a maximum of 60 slaves can be connected.

3) When 1 master (class 1) station and 3 repeaters are connected



* In the above configuration a maximum of 60 slaves can be connected. The difference between this configuration and the one in 2) is that the possible communication distance can be extended.

4) When 126 master (class 1) and slave stations are connected
(When 60 or more slaves are connected)



: This slave is controlled by the 1st master (class 1).

: This slave is controlled by the 2nd master (class 1).

: This slave is controlled by the 3rd master (class 1).

∗ In the above configuration a maximum of 123 slave stations can be connected.

POINT

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. To prevent this, the master PROFIBUS cable must be secured with a screw.

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.

(1) Set the slave watchdog timer setting value to larger than (TTr × G)/BR.
However,
TTr : Target token rotation time (Unit: Bit Time)
G : Gap update factor
BR : Baud rate (Unit: bps)

(2) Use a high baud rate.

(3) The HSA (Highest Station Address) value is made to match the maximum station No. that is actually connected.

3.2.3 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 QJ71PB92D 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.

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

N = Min((a - b + 1) × 5, 300)

a: Maximum station number of slave station

b: Minimum station number of slave station

∗ Min(a, b) = A 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 QJ71PB92D's, 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 QJ71PB92D should meet the following formula.

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

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

n = number of slave stations

∑(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

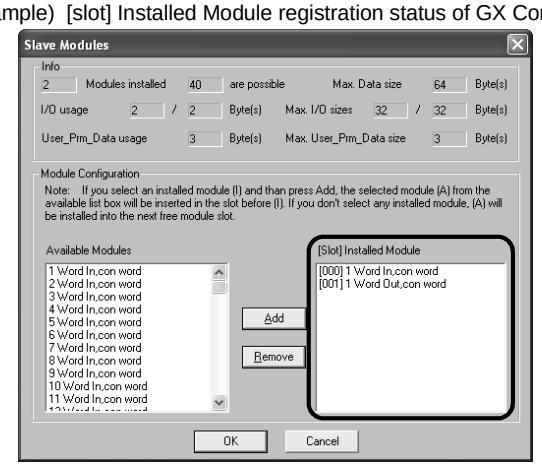
Calculate the parameter size of each slave station using the following formula.
Parameter size of each slave station = 31 + (User_Param data length)
+ (configuration data length) + α

(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
```

0x50: Number of set values is "1"
0x60: Number of set values is "1"
Configuration data length is "2".

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)
α = 2: When the slave station has only input or output
α = 4: When the slave station has both input and output

(example)
When the system is constructed using only the stave stations with 520 bytes parameter, QJ71PB92D can connect with up to the following number of the slave stations.
When the parameter size is 520 bytes, the number of the parameter block is five blocks.

$5 + (5 \times n) \leq 128$: n = number of slaves

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

$n = 24$

The calculation mentioned above tells that QJ71PB92D can connect with up to 24 slave stations.
Therefore, when 25 slave bureau or more are set by the parameter, QJ71PB92D detects the error of 1302_H.

3.3 I/O Signal

3.3.1 I/O signal list

The I/O signal configuration used in the QJ71PB92D and the data communications with the PLC CPU are described below.

Signal direction: QJ71PB92D → PLC CPU		Signal direction: PLC CPU → QJ71PB92D	
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	Not usable	Y03	Communication trouble area type selection
X04	Global control end signal	Y04	Global control request signal
X05	Global control error end	Y05 ⋮ Y0B	Not usable
X06 ⋮ X0F	Not usable	Y0C	Dedicated instruction valid signal
		Y0D	Startup request signal
X10	Operation mode signal	Y0E ⋮ Y10	Not usable
X11	Operation mode change completion signal	Y11	Operation mode change request signal
X12 ⋮ X1A	Not usable	Y12 ⋮ Y1F	Not usable
X1B	Communication READY signal		
X1C	Not usable		
X1D	Module READY signal		
X1E	Not usable		
X1F	Watchdog timer error signal		

POINT

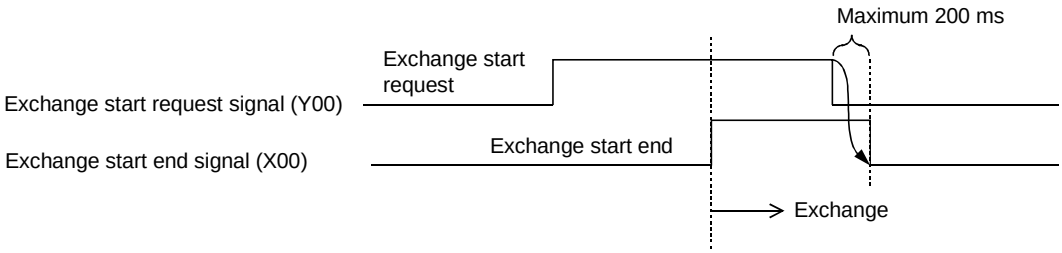
If a device which is not usable is accidentally turned on and off in the sequence program, it cannot guarantee as the QJ71PB92D function.

3.3.2 I/O signal detail description

(1) Exchange start request signal (Y00), exchange start end signal (X00)

(a) After the exchange start request signal (Y00) is turned on by the sequence program the exchange start end signal (X00) is turned on when cyclic exchange starts.

(b) The exchange start end signal (X00) turns off in either of the following cases.
- When the exchange start request signal (Y00) is turned off
- When the parameters are written from GX Configurator-DP to the QJ71PB92D



(c) An interlock is used for FROM/TO of the I/O data.

(d) Before the exchange start request signal is turned on the output data initial value must be written to the buffer memory.

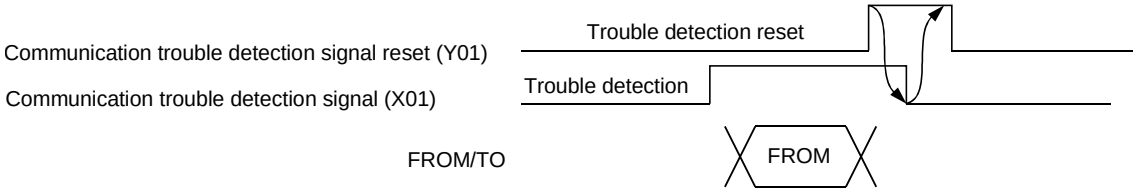
(2) Communication trouble detection signal (X01), communication trouble detection signal reset (Y01)

(a) The communication trouble detection signal (X01) is turned on when a communication trouble occurs. At the same time the RSP ERR.'s LED turns on. At this time the error code and detailed data are stored in the buffer memory communication trouble area.

(b) The communication trouble detection signal (X01) is turned off when the communication trouble detection signal reset signal (Y01) is turned on from the sequence program 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 by the sequence program after it has been confirmed that the communication trouble detection signal (X01) has been turned off.

(d) The following sequence is used.



The error code is read from the buffer memory to the PLC CPU.

(3) Communication trouble area clear request (Y02), communication trouble area clear end (X02)

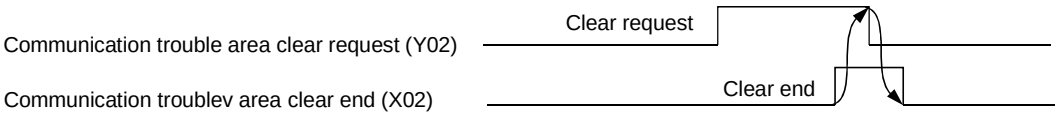
(a) The communication trouble area clear request (Y02) is turned on by the sequence program when all of the communication trouble areas and extension trouble areas are cleared.

(b) The communication trouble clear end signal (X02) is turned on after all of the communication trouble area and extension trouble areas are cleared by turning on the communication trouble area clear request signal (Y02).

(c) The communication trouble area clear request (Y02) is turned off by the sequence program after it has been confirmed that the communication trouble area clear end signal (X02) has been turned on.

(e) When the communication trouble area clear request signal (Y02) is turned off the communication trouble area clear end signal is turned off.

(d) A sequence like the one below is used.



(4) Global control request signal (Y04), global control end signal (X04)

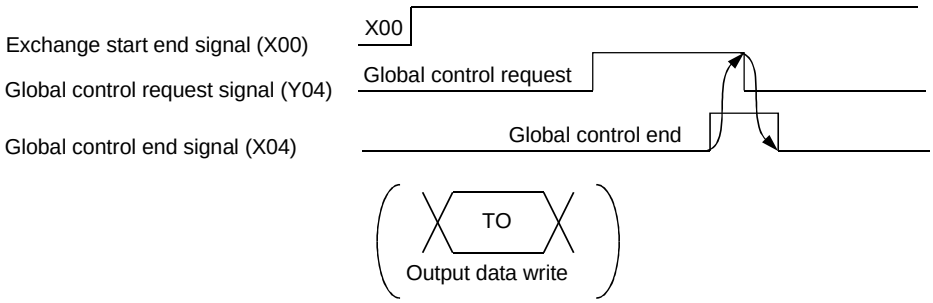
(a) The global control end signal (X04) is turned on after service processing has ended when the global control request signal (Y04) is turned on by the sequence program.

(b) The global control request signal (Y04) is turned off by the sequence program after it has been confirmed that the global control service end signal (X04) has turned on.

(c) When the global control request signal (Y04) is turned off the global control end signal (X04) turns off.

(d) The global control request signal (Y04) cannot be received if the exchange starting (X00) is not on. If Y04 is turned on when X00 is off then both X04 and X05 will turn on.

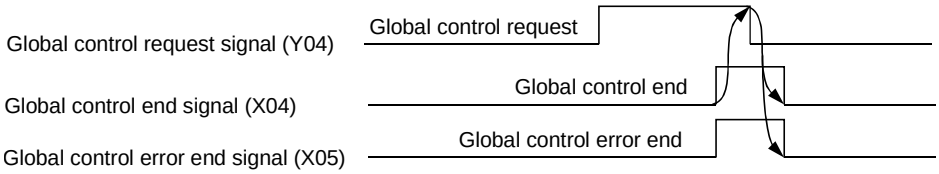
(e) A sequence like the one below is used.



(5) Global control error end signal (X05)

(a) If global control is requested when exchange start (X00) is not on then global control error end (X05) and the global control service end signal (X04) will turn on at the same time.

(b) The slave I/O is not held/deleted when the global control error end signal (X05) is on.



(6) Operation mode signal (X10)

Indicates whether the current operation mode is the parameter setting mode or not.

ON: Parameter setting mode

OFF: Normal service mode/extended service mode

(7) Operation mode change request signal (Y11), operation mode change completion signal (X11)

Used to change the operation mode without resetting the CPU module.

(a) Operation mode change request signal (Y11)

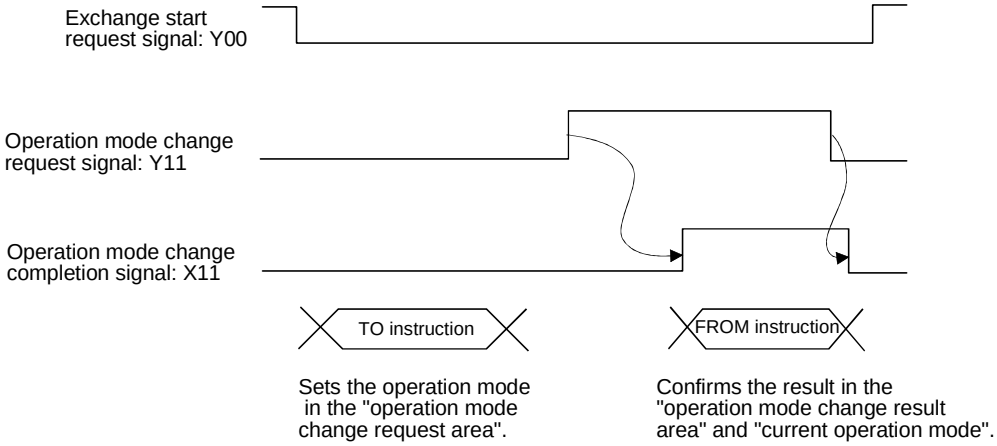
OFF ¨ON: Requests the operation mode to be switched to the one specified in the operation mode change request area (address 2255/8CFh) of the buffer memory.

ON ¨OFF: Turns off X11.

(b) Operation mode change completion signal (X11)

Turns on when the result is stored into the operation mode change result area (address 2256/8D0h) of the buffer memory. This signal also turns on on normal or abnormal completion of an operation mode change.

This signal turns off when Y11 turns from ON to OFF.



IMPORTANT

When the operation mode change request signal (Y11) is on, do not turn off the power or reset the CPU module during registration of the operation mode to the flash ROM.
To do so may result in repair of the QJ71PB92D.
Turn the power off or reset the CPU module after the operation mode change completion signal (X11) has turned on.

(8) Communication READY signal (X1B)

(a) This is turned on when the station enters the exchange start possible state after the QJ71PB92D has started up and the module READY signal (X1D) has turned on. (Only during the normal service mode (MODE O) and extended service mode (MODE E).)

(b) This turns off when a exchange continuation impossible error occurs.

(c) The exchange start request signal (Y00) is used as an interlock when turned on by the sequence program.

(9) Module READY signal (X1D)

(a) This is turned on when the QJ71PB92D is started up. regardless of the operation mode at the time of starting.

(b) This is turned of when the QJ71PB92D goes down.

(10) Watchdog timer error end (X0D)

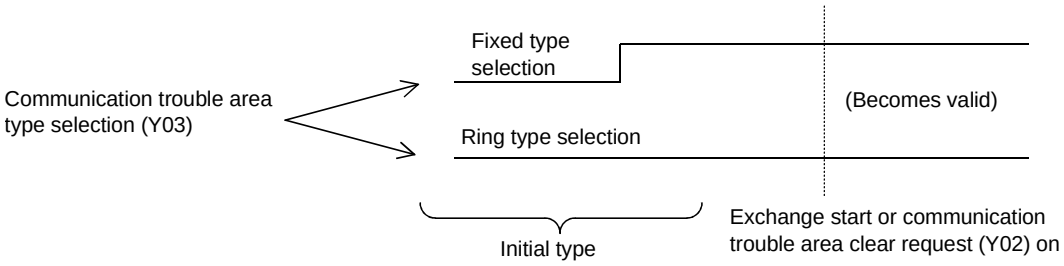
(a) This turns on when a Watchdog timer error occurs.

(b) The signal will not be turned off until the module is reset or the power of QJ71PB92D is turned ON.

(11) Communication trouble area type selection (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 or communication trouble area clear request (Y02) is ON.



(12) Dedicated instruction valid signal (Y0C)

(a) This signal is used when the dedicated instruction for separation prevention is validated.
ON: Read/Write by dedicated instruction is validated.
OFF: Read/Write by dedicated instruction is invalidated.

(b) Keep the signal turned ON while the dedicated instruction is being used.

(13) Restart request signal (Y0D)

(a) When the QJ71PB92D goes down for some reason (when the FAULT LED turns on and X1D is off) then turning Y0D from off to on to off again will make it possible to restart the QJ71PB92D.

(b) The same state will be entered if after start up the power supply is turned off and then on again.

3.4 Buffer Memory List

3.4.1 Buffer memory/configuration

The configuration of the buffer memory used to receive and send data with the QJ71PB92D and the PLC CPU is described below.

Buffer memory address decimal (Hexadecimal)	Area name	Description
0 (0_H) 959 ($3BF_H$)	Input area	This is the area that stores the input data from the slave.
960 ($3C0_H$) 1919 ($77F_H$)	Output area	This is the area that stores the output data to the slave.
1920 (780_H) 2039 ($7F7_H$)	Address information area	This is the area that shows the slave address and I/O data length.
2040 ($7F8_H$) 2079 ($81F_H$)	Communication trouble area	This is the area that shows the trouble information that occurred during communication.
2080 (820_H)	Slave error information cancel area	This is the area that sets the data that masks the slave trouble information.
2081 (821_H)	Global control area	This is the global control function hold/cancel selection area.
2082 (822_H)	Not usable	—
2083 (823_H)	Time out time setting area (Closed to users because this is a debugging function.)	This is used to set the time out time when an exchange start/stop is executed.
2084 (824_H)	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 (825_H) 2095 ($82F_H$)	Not usable	—
2096 (830_H) 2110 ($83E_H$)	Expansion communication trouble area	This area shows the expansion information of the trouble information which is occurred during the communication.
2111 ($83F_H$)	Not usable	—
2112 (840_H) 2116 (844_H)	Slave status area	This is the area that shows the status information of each slave.
2117 (845_H) 2127 ($84F_H$)	Not usable	—
2128 (850_H) 2247 ($8C7_H$)	Input/Output start address area (Extended service mode only)	This is the area that shows the addresses to start the input area and output area of each slave.
2248 ($8C8_H$) 2253 ($8CD_H$)	Not usable	—
2254 ($8CE_H$)	Current operation mode area	This area indicates the operation mode of the QJ71PB92D when it has started up.
2255 ($8CF_H$)	Operation mode change request area	In this area, set the operation mode of the QJ71PB92D which you want to choose.
2256 ($8D0_H$)	Operation mode change result area	This area indicates the execution result of the operation mode change request.
2257 ($8D1_H$)	Local station address display area	Area in which the station address of the local station is stored.
2258 ($8D2_H$)	Self-diagnosis status code area	Area in which the code indicating the status of the self-diagnosis during the execution of the diagnosis is stored.
2259 ($8D3_H$) 3775 (EBF_H)	Not usable	—

POINT

Don't read and write to the buffer memory which is not usable.
If you perform it, it cannot guarantee as the QJ71PB92D function.

3.4.2 Buffer memory detailed description

(1) INPUT area (Buffer memory address: 0 (0_H) to 959 ($3BF_H$))

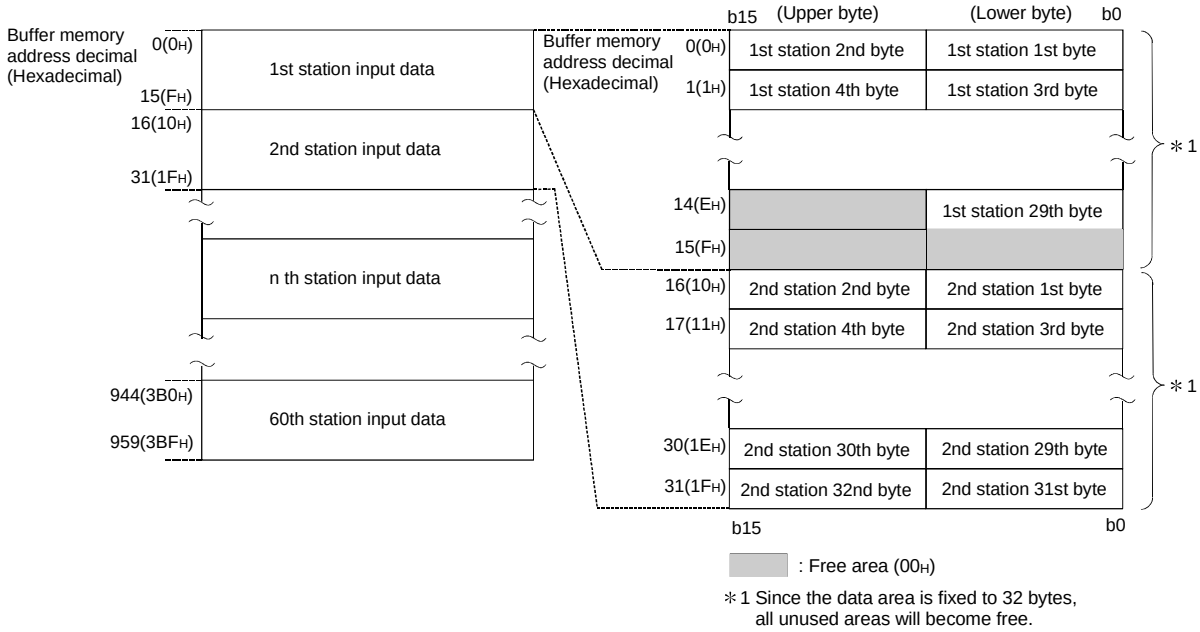
Either the normal service mode (Mode 0) or extended service mode (Mode E) can be selected using GX Configurator-DP.

(a) Normal service mode (MODE 0)

This is the area that stores the input data from the slave station.

This area is fixed to an allocation of 32 bytes (16 words) per station for a total of 60 stations worth. This input area configuration is as follows.

Example : When the input data length for the first station is set to 29 bytes and that for the second station to 32 bytes



POINT

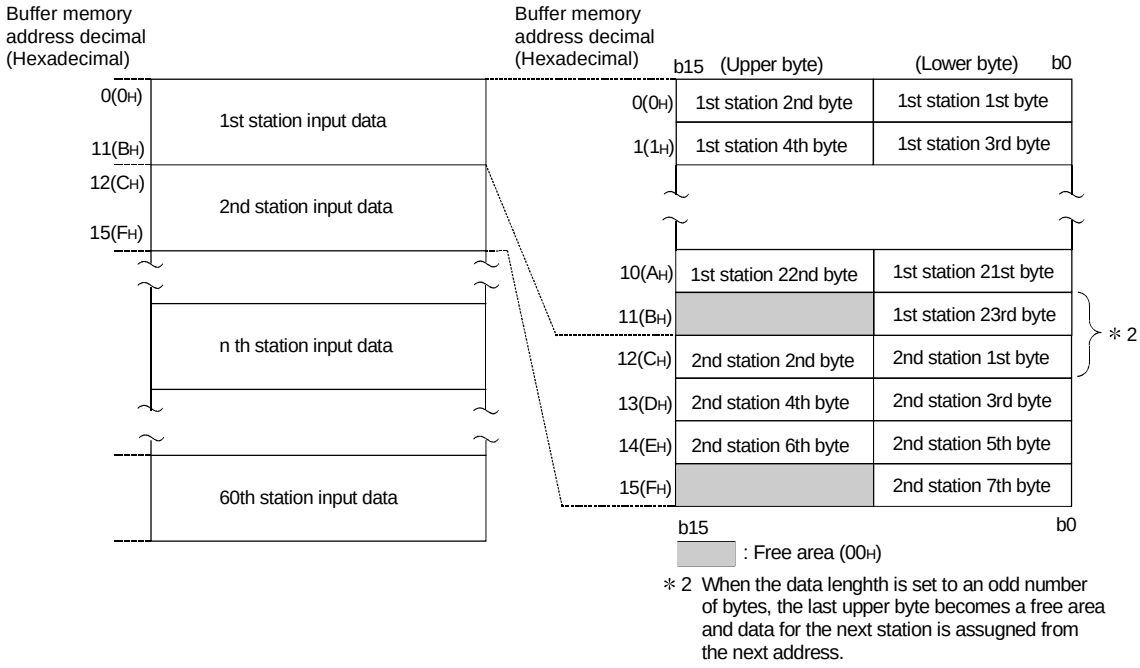
The input data of the slave station, which was disabled from communication during normal communication and whose corresponding bit of the communication status area*1 turned ON (1), is not stored into the input area of the QJ71PB92D.
In the input area of the corresponding slave station, the data before communication failure is held.

*1: Indicates the area of buffer memory addresses 2113 (841_H) to 2116 (844_H) in the slave status area.

(b) Extended service mode (MODE E)

This is the area that stores the input data from the slave station.
In this area, the data length (in byte units) for each station is assigned in variable length according to the parameter file set in the GX Configrator-DP.
The data length can be set in the range of 0 to 244 bytes.
Number of stations that can be set will vary in the range of 1 to 60, depending on the specified data length. For example, seven stations can be set if the data length for each station is 244 bytes, and 60 stations if the data length is 32 bytes.

Example : When the input data length for the first station is set to 23 bytes and that for the second station to 7 bytes



POINT

The input data of the slave station, which was disabled from communication during normal communication and whose corresponding bit of the communication status area∗1 turned ON (1), is not stored into the input area of the QJ71PB92D.
In the input area of the corresponding slave station, the data before communication failure is held.

∗1: Indicates the area of buffer memory addresses 2113 (841H) to 2116 (844H) in the slave status area.

(2) OUTPUT area (Buffer memory address: 960 (3C0H) to 1919 (77FH))

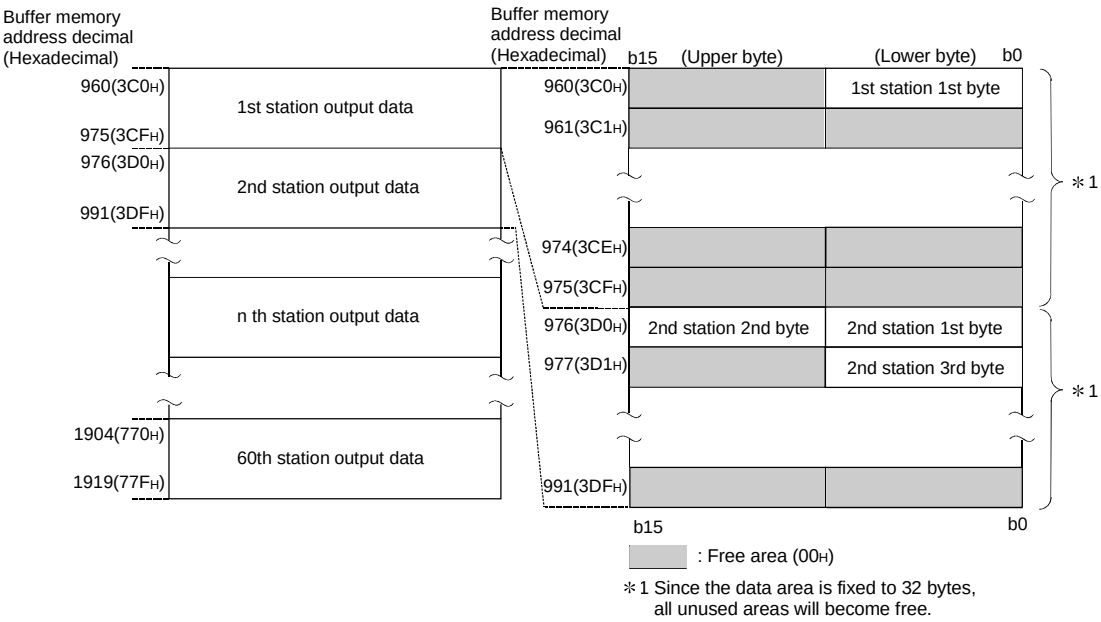
Either the normal service mode (Mode 0) or extended service mode (Mode E) can be selected using GX Configurator-DP.

(a) Normal service mode (MODE 0)

This is the area that stores the output data to the slave station.

This area is fixed to an allocation of 32 bytes (16 words) per station for a total of 60 stations worth. This output area configuration is as follows.

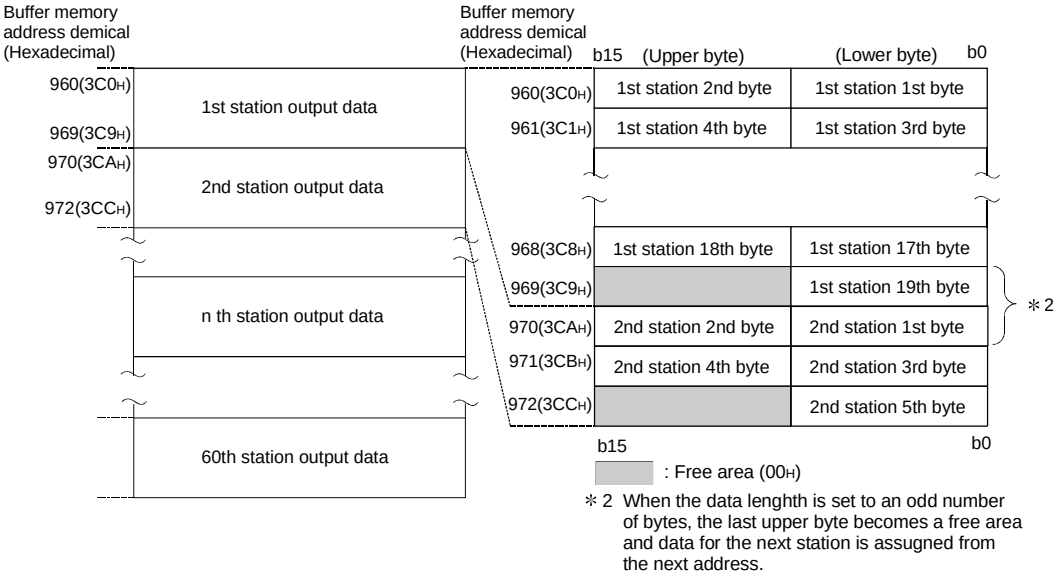
Example : When the output data length for the first station is set to 1 bytes and that for the second station to 3 bytes



(b) Extended service mode (MODE E)

This is the area that stores the output data to the slave station.
In this area, the data length (in byte units) for each station is assigned in variable length according to the parameter file set in the GX Configrator-DP.
The data length can be set in the range of 0 to 244 bytes.
Number of stations that can be set will vary in the range of 1 to 60, depending on the specified data length. For example, seven stations can be set if the data length for each station is 244 bytes, and 60 stations if the data length is 32 bytes.

Example : When the output data length for the first station is set to 19 bytes and that for the second station to 5 bytes



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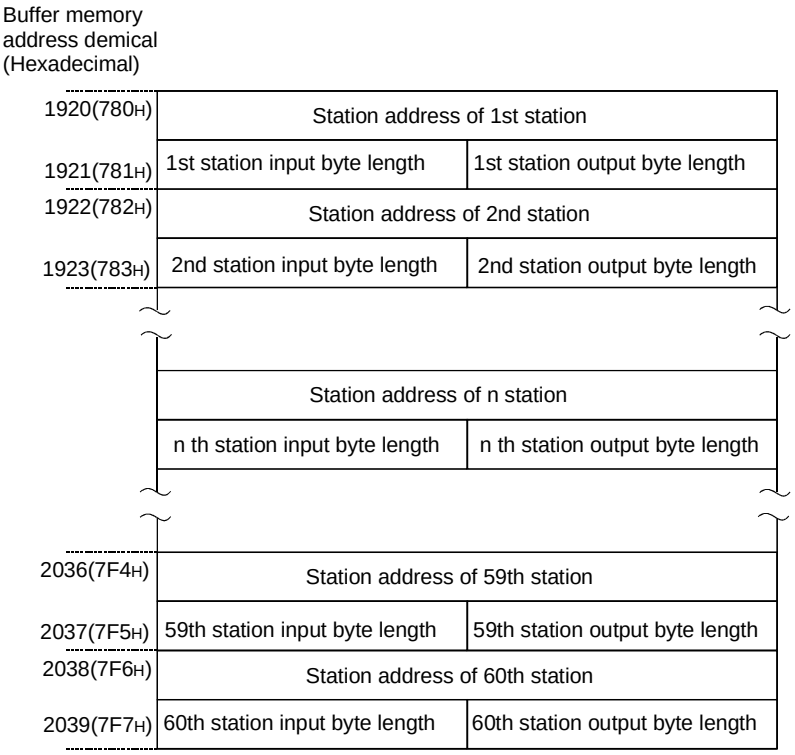
(3) Address information area (Buffer memory address: 1920 (780H) to 2039 (7F7H))

This area shows the station address, input byte length, and output byte length for each slave station. This allocation is set by the GX Configrator-DP. The station addresses for the 1st through the 60th stations are stored in the order of registration in the GX Configrator-DP. (Station addresses: 1 to 126, do not need to be sequential numbers.)

The address information area configuration is shown below. For details refer to Section 3.4.2 (4).



(a) The station address of unallocated stations is FFFFH, and the I/O byte is FFH.

(b) When the I/O byte length of allocated stations is 0, a 0 is stored for the byte length.

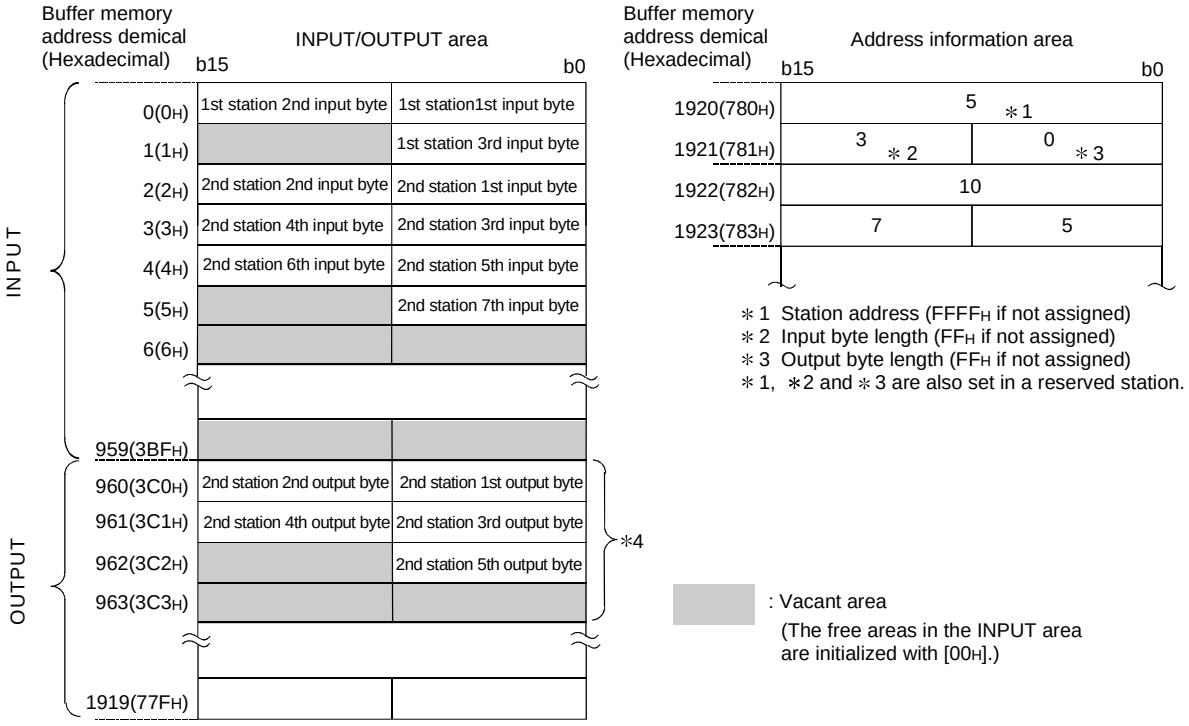
(c) The n does not show the station address but represents a number (the nth number) used for the input/output area.

(4) Example address information area, INPUT area, and OUTPUT area

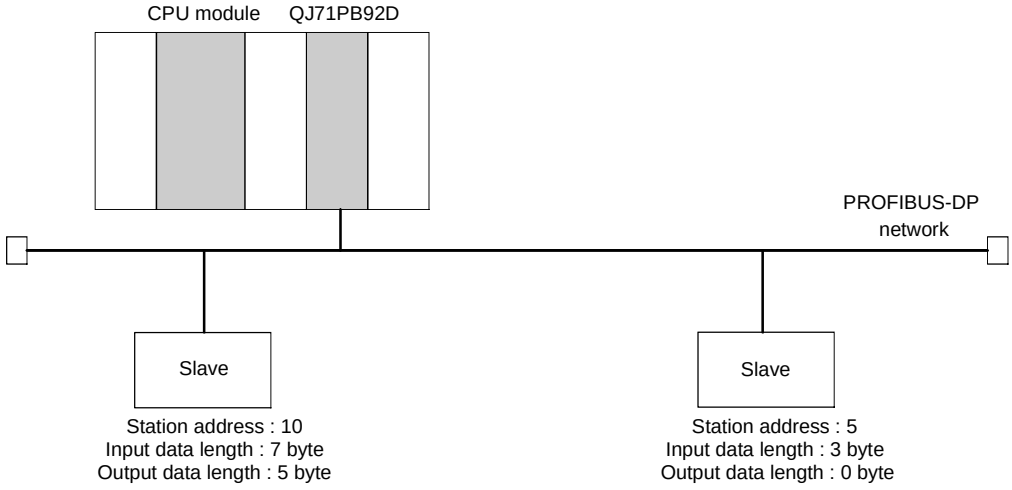
The QJ71PB92D reads the slave station address and I/O byte length set by the parameter file which is set by the GX Configrator-DP and stores these in the buffer memory address information area.

With the QJ71PB92D, I/O areas are assigned to each slave station based on the I/O byte length information in the address information area, and each I/O data will be stored in the corresponding buffer memory area (MODE E).

Example : At extended service mode



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



(5) Communication trouble area (Buffer memory address: 2040 (7F8H) to 2079 (81FH))

When some kind of trouble occurs during communication the QJ71PB92D stores the contents of the trouble in this area. Fixed type or ring type can be selected for this area by turning the communication trouble area type selection (Y03) on or off (refer to Section 3.3.2 (11)).

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 in the basic configuration regardless of whether for fixed or ring data.

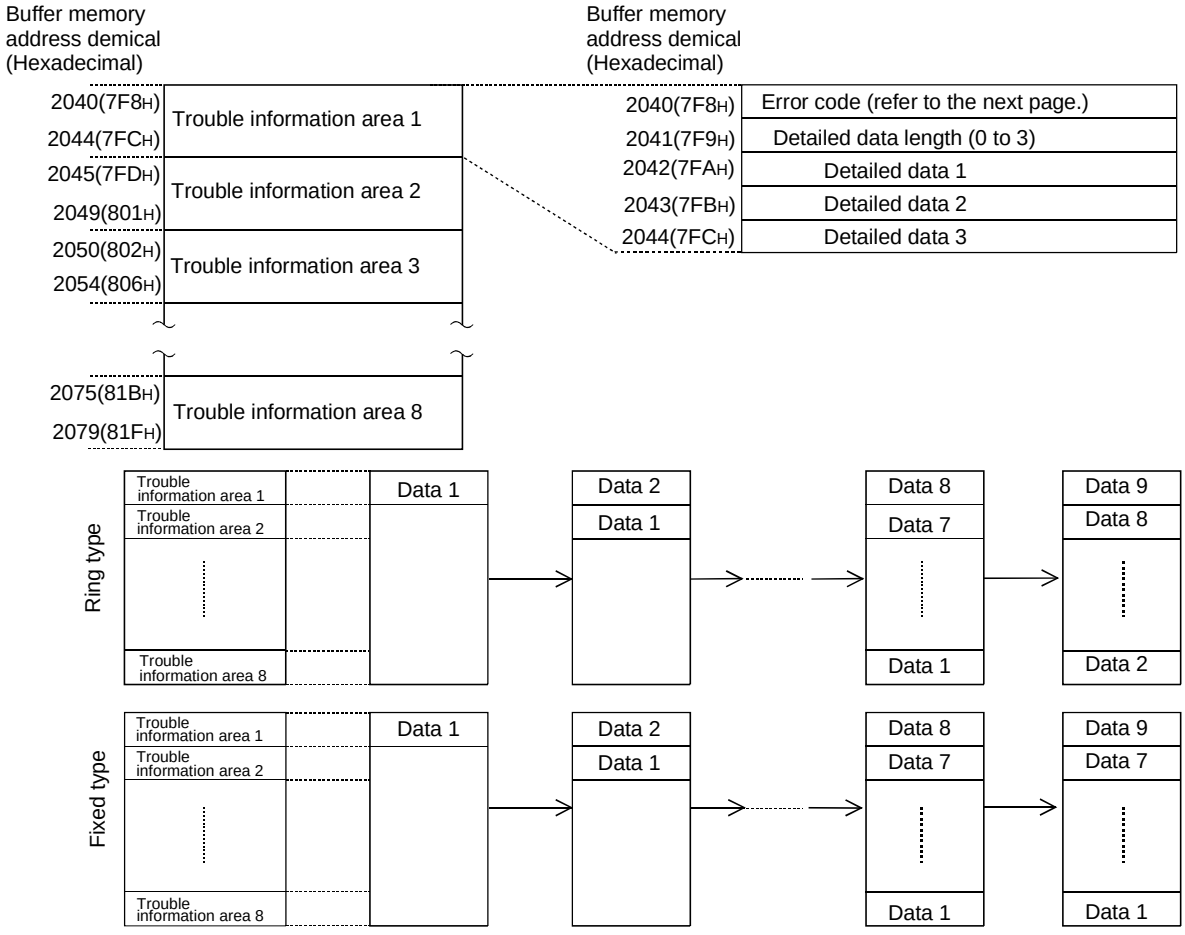
Ring type data is stored in order from the header with the header always being the latest trouble information.

With fixed type data, when 8 pieces of trouble information are stored the areas 2 to 8 (data 1 to 7) are fixed, so when the next new trouble occurs only header area 1 (data 8) is updated.

All trouble information for either type can be cleared by turning on the communication trouble detection signal reset (X01). Communication trouble area clear request (Y02) is on, the contents of the communication trouble area are hold though the communication trouble detection signal (X01) turns off.

The communication trouble area configuration is as follows.

(a) Communication trouble area configuration



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(b) Error codes

The error codes are shown below.

Error Code	Data length	Detailed data 1	Detailed data 2	Detailed data 3	Description	Communi-cation state	User processing
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 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.	×	
1300H	1	Contents ref.	Contents ref.	—	Not even 1 active slave station is set in the parameter. When this error occurs the detailed data is set to: Detailed data 1: Number of slaves set in the parameter. This error occurs immediately after the power supply is turned on or the CPU 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 Y0D
1301H	1	Ignored	—	—	The parameter area space is insufficient.	×	Reduce the number of connected stations or change the slave station type.
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) Contact the nearest Mitsubishi Electric branch office or dealer.

×: Exchange stops after the error occurs. △: Exchange continues.

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(c) When the trouble 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 to 2110 for only the latest trouble information of the error code = 0200H trouble information. For information regarding the expansion communication trouble information refer to Section 3.4.2 (6).

	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.

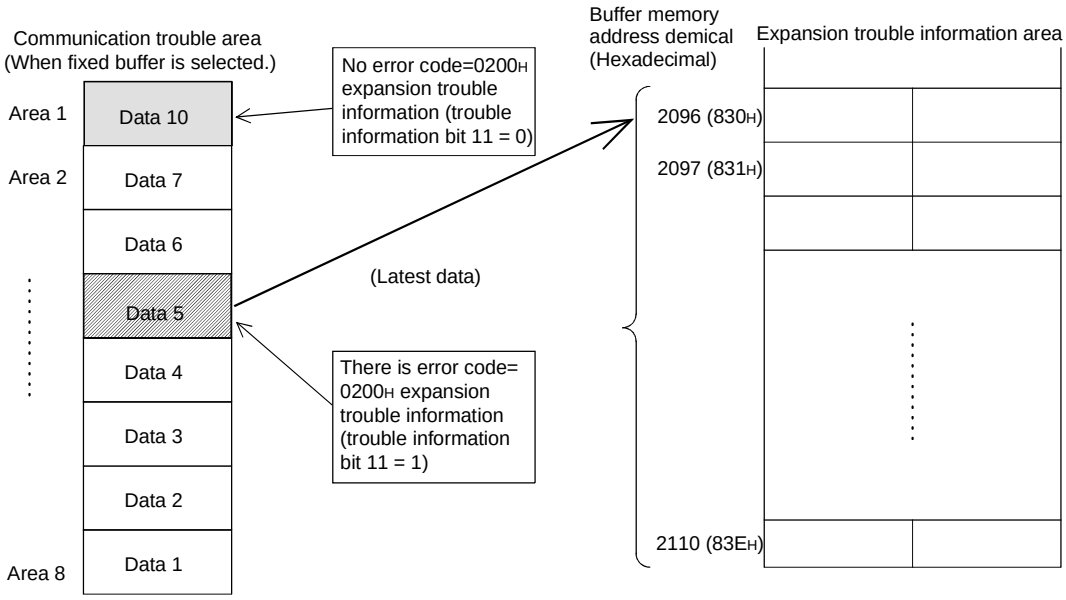
The trouble information is shown in a 16-bit bit string, and the bits that correspond to the respective trouble occurrences are set. A description of the error information is given below.

bit	Description	Communi-cation state	Processing	Setting station
15	Controlled by another master.	△	Multiple masters are trying to communicate with the same slave, so recheck the parameter.	Master
14	The parameter transmitted by the master is incorrect.	△	Check the parameter.	Slave
13	The response from the slave is incorrect.	△	Check the slave or network status.	Master
12	The function requested by the master is not supported.	△	Check the slave specifications. Especially if global control is supported.	Slave
11	Expansion trouble information exists.	△	Check the slave status. (refer to Section 3.4.2 (6).)	Master
10	The I/O byte size parameter received from the master does not match that of the slave.	△	Check the slave parameter.	Slave
9	The slave is not ready to exchange.	△	This trouble information will always occur at exchange start, so it can be ignored. If this trouble occurs during exchange, check the slave status and communication circuit.	Slave
8	Exchange with the slave cannot be conducted.	△	Check the slave status and communication circuit. And check the parameter.	Master
7	Separated from the cyclic exchange by the parameter setting.	△	This trouble information will always occur at exchange start, so it can be ignored. Check if the parameter on the network was changed by a class 2 master.	Master
6	0 (reserved)	—	—	Slave
5	The slave has entered the SYNC mode.	△	(Normal operation)	Slave
4	The slave has entered the FREEZE mode.	△	(Normal operation)	Slave
3	Watchdog monitoring is being conducted in the slave.	△	(Normal operation)	Slave
2	0 (fixed)	—	—	Slave
1	Diagnostic data read request.	△	Check the slave statue.	Slave
0	Parameter allocation request from a slave.	△	This error information will always occur at exchange start, so it can be ignored. If this error occurs during exchange, check the slave status and communication circuit.	Slave

△ : Exchange continues even if trouble occurs.

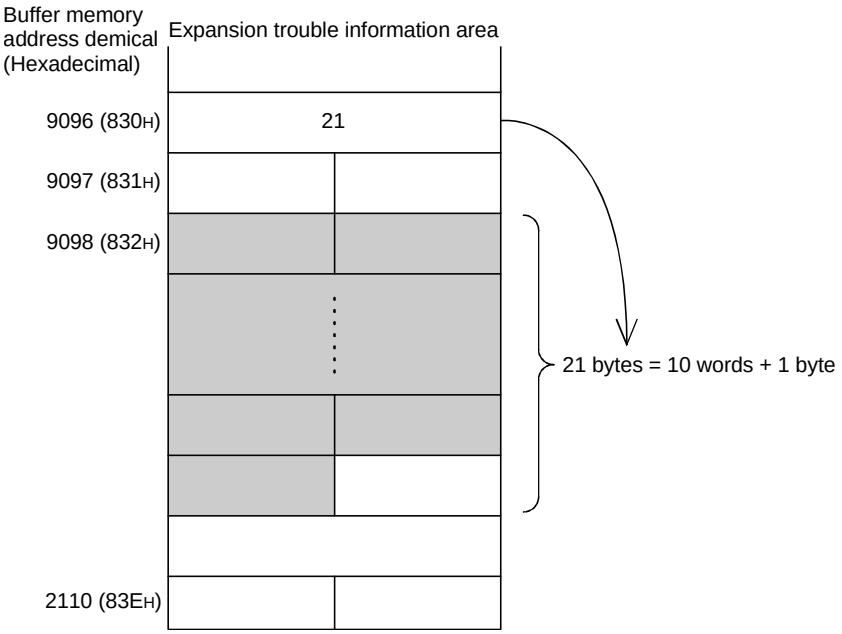
(6) Expansion communication trouble area (Buffer memory address: 2096 (830H) to 2110 (83EH))

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 to 2079 communication error area (Refer to Section 3.4.2 (5)).



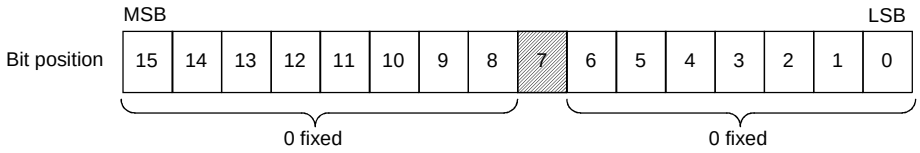
(a) Buffer Memory 2096 (830H)

The latest expansion communication trouble information length stored from buffer memory 2098 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.



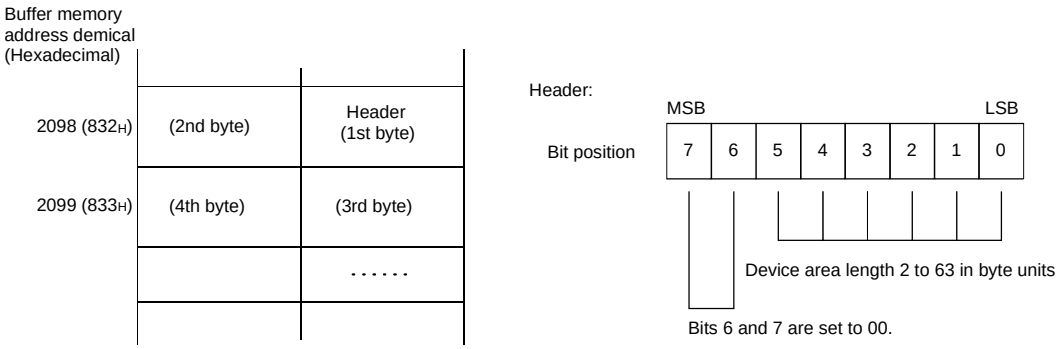
(c) Buffer memory 2098 to 2110 (832H to 83EH)

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.



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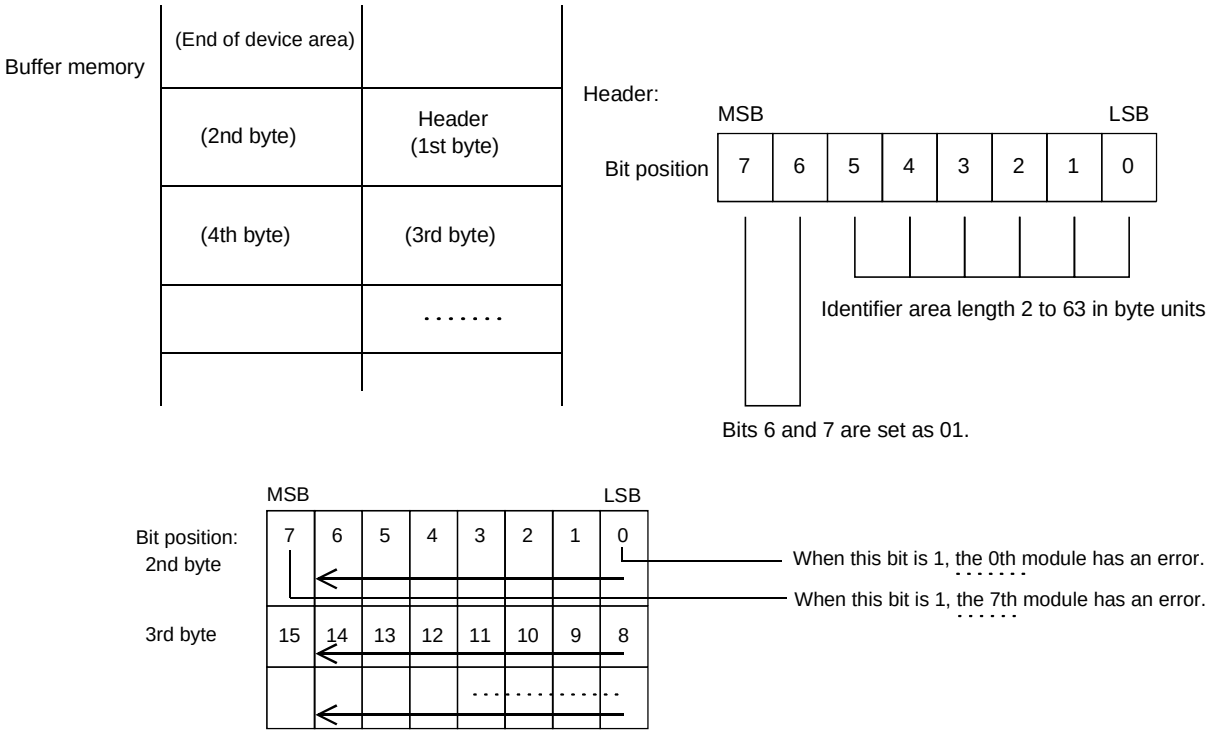
2) Identifier related trouble information

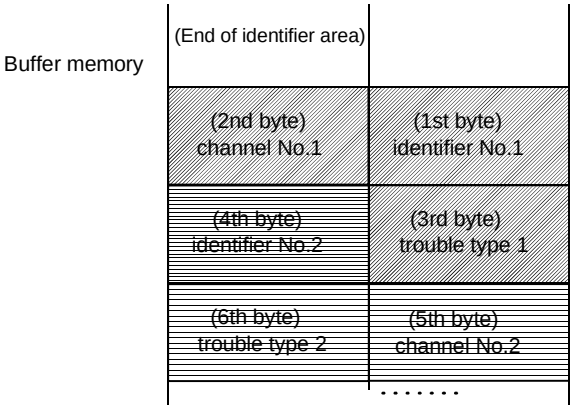
For module type slave stations, this stores as bit information whether or not a module is outputting an error. The identifier related trouble information can be divided into header and trouble information. This area stores a 2 bit value that is the identifier related trouble information in the header,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



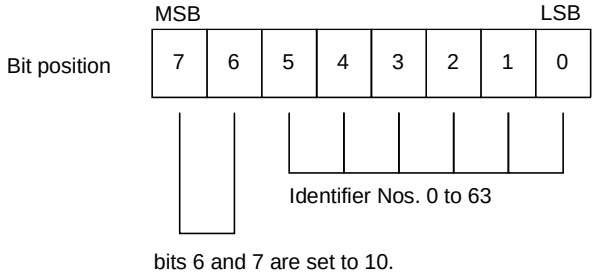
3 - 27

3) Channel related trouble information

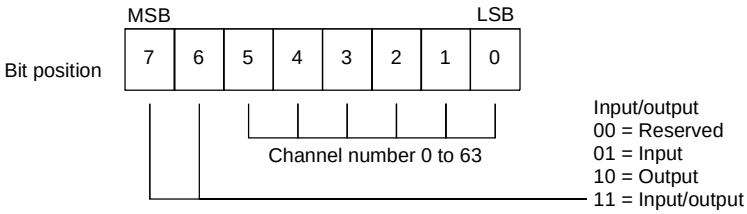
When a module type slave station, this area stores the trouble information for each module that is outputting an error. This area does not have a header and stores this information at the end of the identifier related trouble information. Each channel trouble information consists of an identifier No.,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



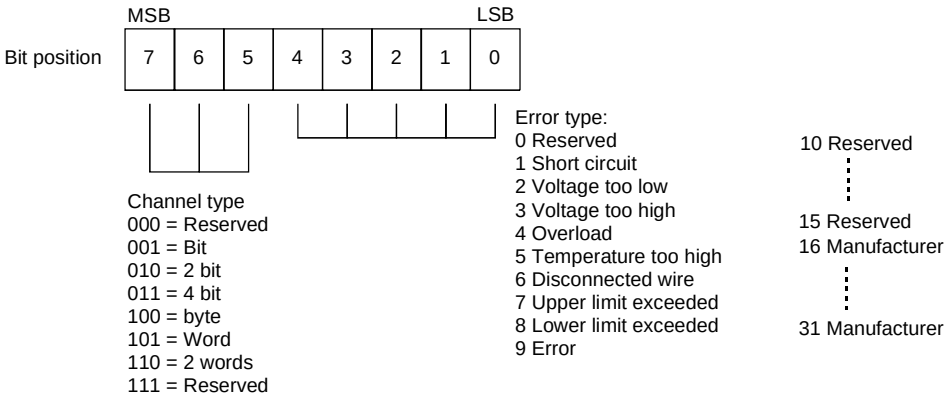
1st byte: Identifier No.



2nd byte: Channel No.



3rd byte: Trouble type



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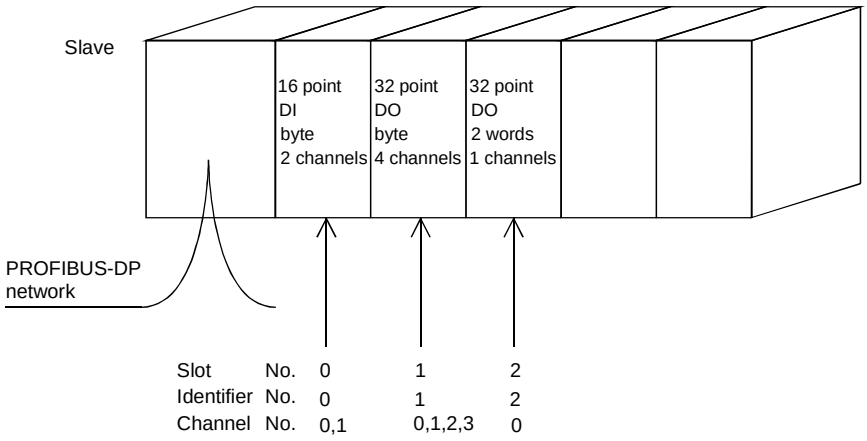
4) Identifier No., channel No.

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.



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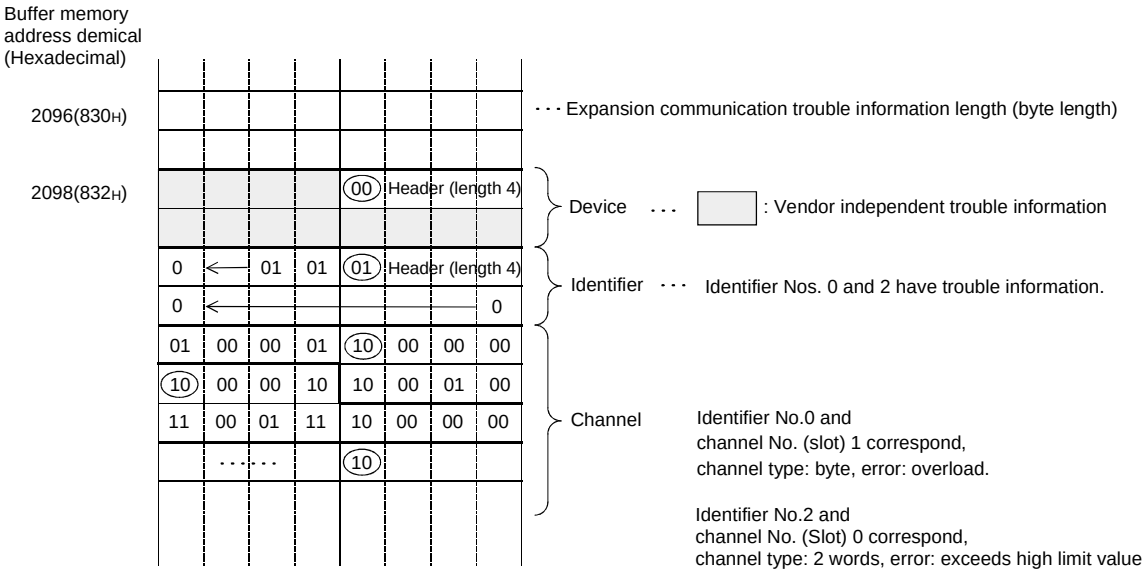
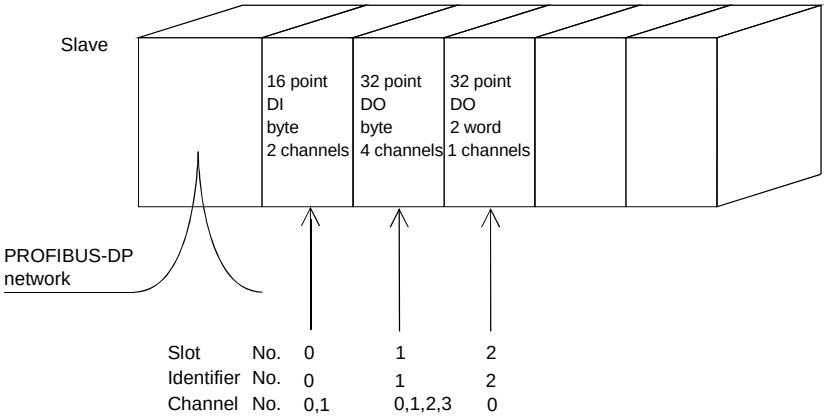
(7) Example expansion communication trouble area





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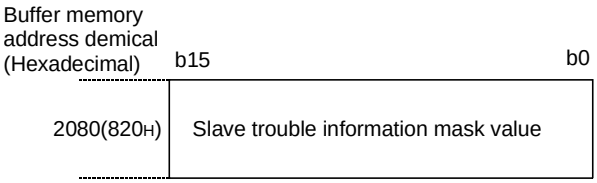
(8) Slave trouble information cancel area (Buffer memory address: 2080 (820H))

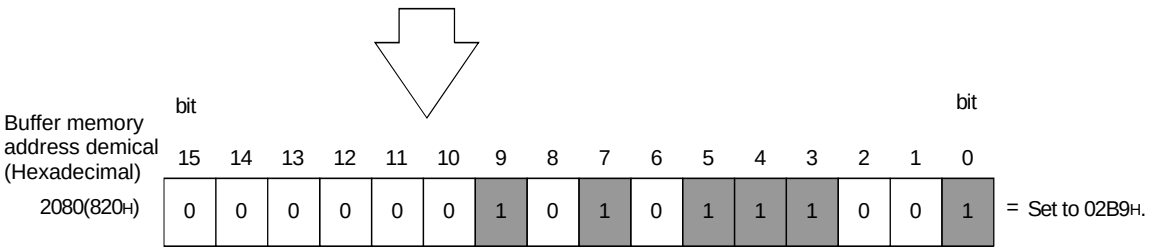
This stores the value that masks the slave trouble information (error code = 0200H detailed data 2). Even if the slave trouble information corresponding to this area bit occurs the slave trouble information detection signal (X01) and RSP ERR. LED do not turn on. In addition, the trouble information is not stored in the trouble information area. The default value is 02B9H.
This 02B9H trouble information also occurs during normal situations and is masked. This value can only be changed when exchange start is off. (When on, changes are ignored.)



Slave trouble information

bit	Description
15	Controlled by another master.
14	The parameter sent by the master is incorrect.
13	The response from the slave is incorrect.
12	The function requested by the master is not supported.
11	Expansion trouble information exists.
10	The environment data received from the master does not match that of the slave.
9	The slave is not ready to exchange.
8	Cannot exchange with slave.
7	Separated from the cyclic exchange by the parameter.
6	0 (reserved)
5	The slave has entered the SYNC mode.
4	The slave has entered the FREEZE mode.
3	Watchdog timer monitoring is being conducted in the slave.
2	0 (fixed)
1	Diagnostic data read request
0	Parameter allocation request from the slave

To mask this trouble information



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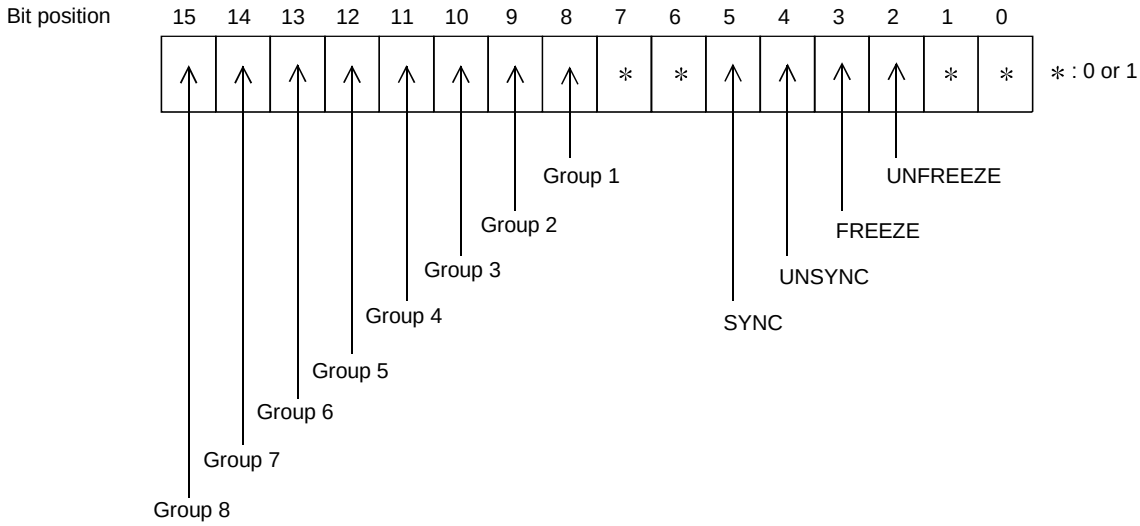
(9) Global control area (Buffer memory address: 2081 (821H))

The buffer memory (2081(821H)) value and corresponding command table are shown below.

Bit position	Value (valid/invalid)	Command	Description
8 to 15	1/0	Group 1 to 8 selection	Bits 8 to 15 correspond respectively to groups 1 to 8 and shows that the bit value is transmitted by the global control command to the 1 group (refer below). More than one group at a time can be selected from groups 1 to 8. When all bits 8 to 15 are 0, global control commands are sent to all the slaves.
5	1/0	SYNC	The actual output data is written and held.
4	1/0	UNSYNC	The actual output data hold is canceled.
3	1/0	FREEZE	The actual input data is held and read.
2	1/0	UNFREEZE	The actual input data hold is canceled.



∗ Bit specifications for UNSYNC/SYNC and UNFREEZE/FREEZE

Bit position				Command			
5	4	3	2	SYNC	UNSYNC	FREEZE	UNFREEZE
0	0	0	0	×	×	×	×
0	0	∗	1	×	×	×	○
0	0	1	0	×	×	○	×
∗	1	0	0	×	○	×	×
1	0	0	0	○	×	×	×
∗	1	∗	1	×	○	×	○
∗	1	1	0	×	○	○	×
1	0	∗	1	○	×	×	○
1	0	1	0	○	×	○	×

∗: 0 or 1
○: Conducted
×: Not conducted

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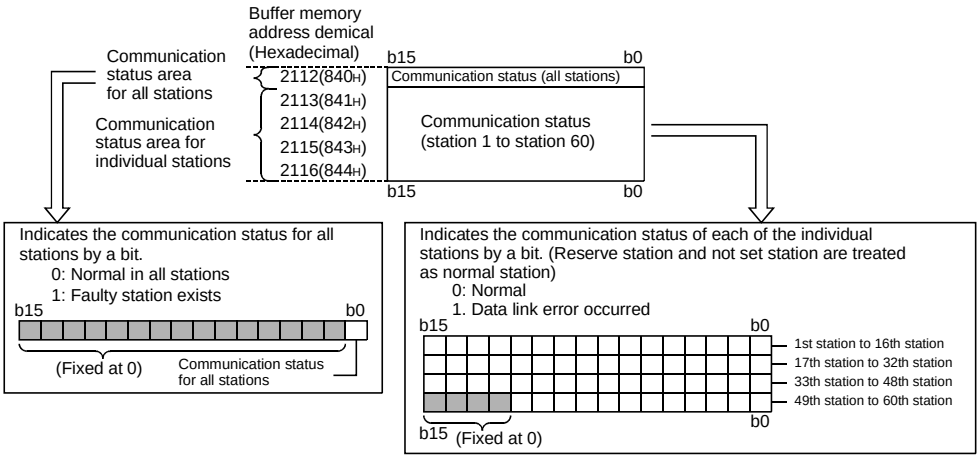
(10) Trouble no information time setting area (Buffer memory address: 2084 (824H))

Set the time at seconds unit, which does not inform the communication trouble after the exchange start. Default value is 20 seconds so the communication trouble is not informed for 20 seconds after the exchange start. By this setting, in case the master power supply ON is faster than the slave power supply ON etc., it makes possible to prohibit an error that occurs temporary when system starts up.

(11) Slave status area (Buffer memory address: 2112 (840H) to 2116 (844H))

This is the area that stores the status of each slave station.

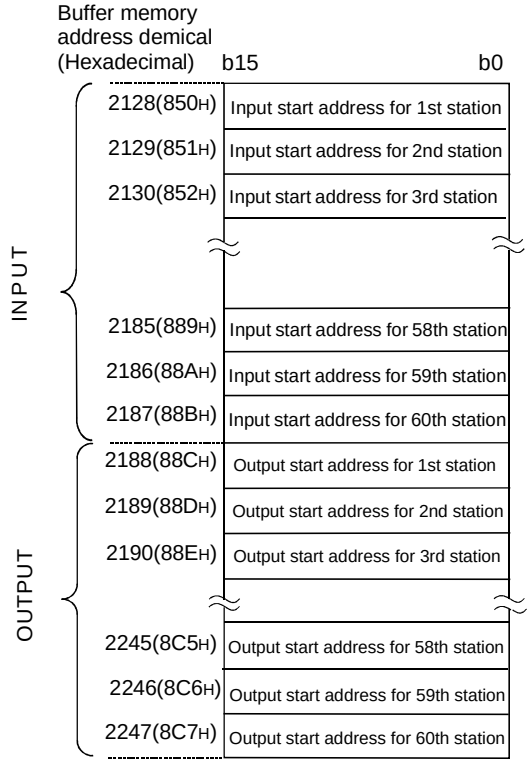
The following figure shows the configuration:



- 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.

(12) I/O start address area (Extended service mode (MODE E) only) (Buffer memory address: 2128 (850H) to 2247 (8C7H))

This area stores the start addresses of I/O areas for each slave station.



- This area is used while in the extended service mode (MODE E) only. When in the normal service mode (MODE 0), 0 is stored in all areas.
- Data is set in this area during module startup according to the parameters stored in the master station.
- The start address is set in 1 word units for both input and output. The data range is from 0 to 1919 (0 to 77FH).
- The start addresses are stored in the INPUT area, starting from the head.
- When nothing is assigned, -1 (FFFFH) will be set.

Example: When the input byte length and output byte length for the first station are 3 bytes and 5 bytes, and those for the second station are 7 bytes and 3 bytes, respectively:

Address 2128 (850H) : 0 (0H)
Address 2129 (851H): 2 (2H) } Input start address

Address 2188 (88CH): 960 (3C0H)
Address 2189 (88DH): 963 (3C3H) } Output start address

- Input area

Address
Decimal (Hexadecimal)

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

- Output area

Address
Decimal (Hexadecimal)

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

(13) Current operation mode area(Buffer memory address: 2254 (8CF$_H$))

This area stores the value which indicates the operation mode of the QJ71PB92D when it has started up.

Stored Value	Detail	
0000$_H$	Normal service mode (MODE 0)	Where switched temporarily (not registered in a Flash ROM) using GX Configurator-DP or operation mode change request signal (Y11).
0001$_H$	Parameter setting mode (MODE 1)	
0002$_H$	Self-diagnosis mode (MODE 2)	
000E$_H$	Extended service mode (MODE E)	
0100$_H$	Normal service mode (MODE 0)	Where registered in Flash ROM.
0101$_H$	Parameter setting mode (MODE 1)	
0102$_H$	Self-diagnosis mode (MODE 2)	
010E$_H$	Extended service mode (MODE E)	

(14) Operation mode change request area (Buffer memory address: 2255 (8CF$_H$))

You can change the operation mode of the QJ71PB92D by writing the required operation mode to this area and turning on the operation mode change request signal Y11.
You can also specify whether that setting is registered onto Flash ROM or not.
To choose the required operation mode, set any of the following values to the operation mode change request area.
(At power-on or CPU reset, the invalid value = FFFE$_H$ enters the operation mode change request area. If you have accidentally turned on the operation mode change request signal Y11, the QJ71PB92D detects an error and the operation mode is not changed.)

Setting Value	Detail	
0000$_H$	Normal service mode (MODE 0)	Changes only the current mode (does not register in Flash ROM).
0001$_H$	Parameter setting mode (MODE 1)	
0002$_H$	Self-diagnosis mode (MODE 2)	
000E$_H$	Extended service mode (MODE E)	
0100$_H$	Normal service mode (MODE 0)	Changes the current mode, and registers as a startup mode in Flash ROM.
0101$_H$	Parameter setting mode (MODE 1)	
0102$_H$	Self-diagnosis mode (MODE 2)	
010E$_H$	Extended service mode (MODE E)	
FFFF$_H$	Parameter setting mode (MODE 1)	Changes to the normal service mode, and deletes the registration in Flash ROM. The default is the parameter setting mode (MODE 1).

When the power is turned ON or the CPU is reset, the operation mode registered in the Flash ROM is started.
When the mode registered in the Flash ROM using FFFF$_H$ is erased, the parameter setting mode (MODE1) is started.

(15) Operation mode change result area (Buffer memory address: 2256 (8D0$_H$))

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 QJ71PB92D does not change the operation mode. It maintains the same operation mode as before the change request was given.

(16) Local station address display area (Buffer memory address: 2257 (8D1H))

Used to store the number of the local station.
The storage area is 0 to 125.

(17) Self-diagnosis status code area (Buffer memory address: 2258 (8D2H))

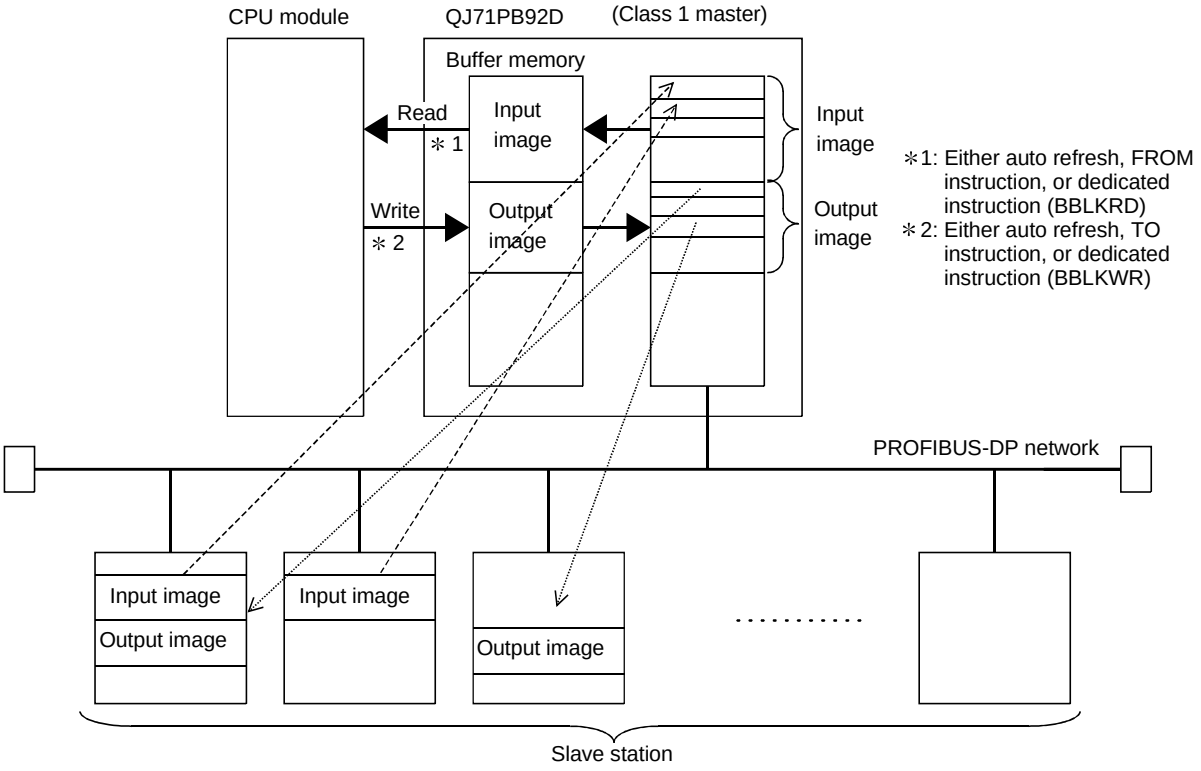
Used to store the test status of the offline test using codes.
The types of the codes are as listed below.

Code	Status
0001H	Under MPU test.
0002H	Under time test.
0003H	Under interruption test.
0004H	Under RAM1 test.
0005H	Under RAM2 test.
0010H	Under swap circuit test
0011H	Under Flash ROM test.
8001H	An MPU test error occurs.
8002H	A timer test error occurs.
8003H	An interruption test error occurs.
8004H	A RAM1 test error occurs.
8005H	A RAM2 test error occurs.
8010H	A swap circuit test error occurs.
8011H	A Flash ROM test error occurs.

4. FUNCTIONS

4.1 Functions for Exchanging with Slaves

The main function in the QJ71PB92D is for exchanging I/O data with slave stations connected to the PROFIBUS-DP network. The method used for this exchange is to read/write the I/O image in the buffer memory using auto refresh setting, FROM/TO instruction, or dedicated instruction.
A schematic drawing of this exchange function is as follows.

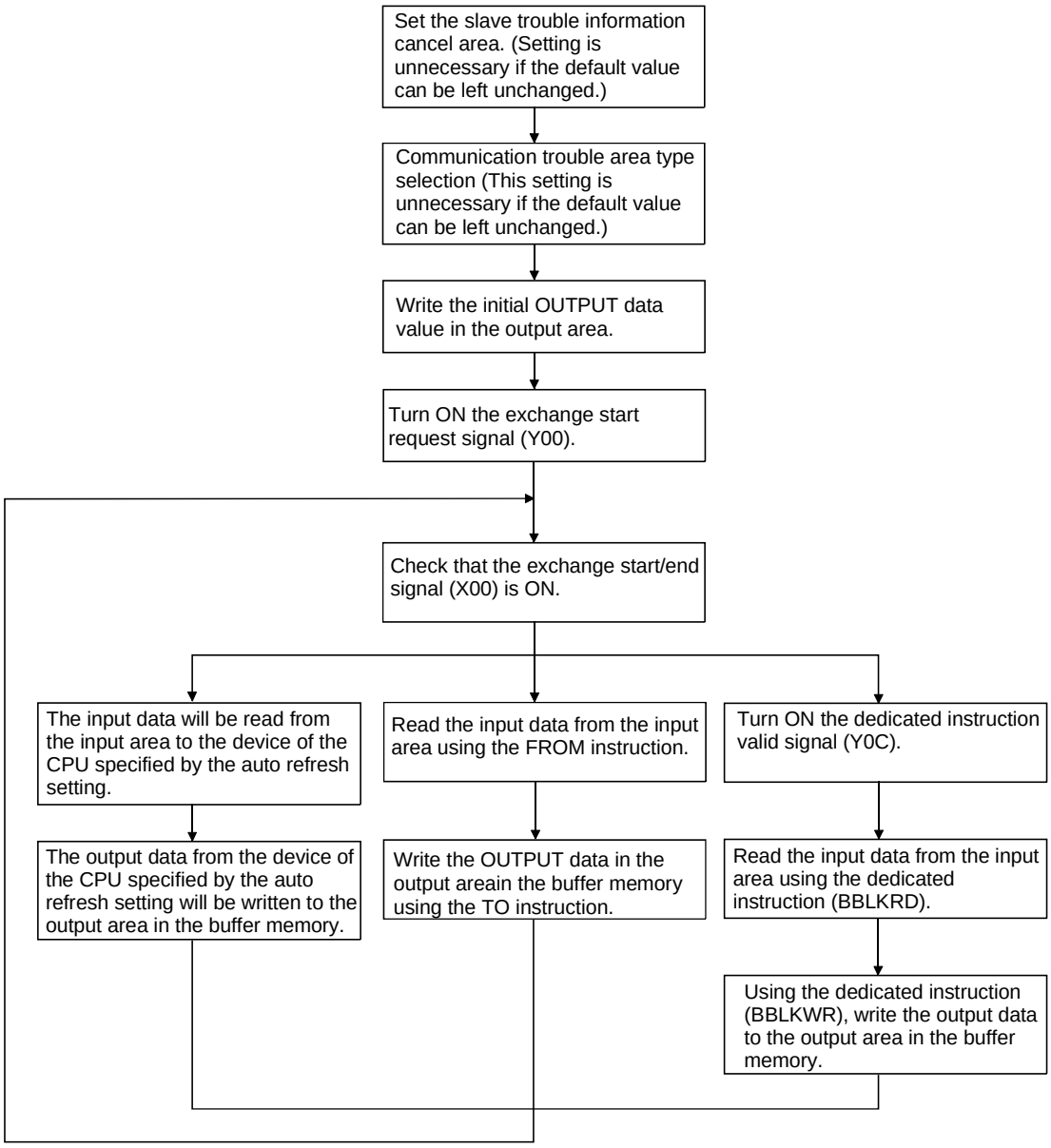


4 - 1

4.1.1 Exchange flow

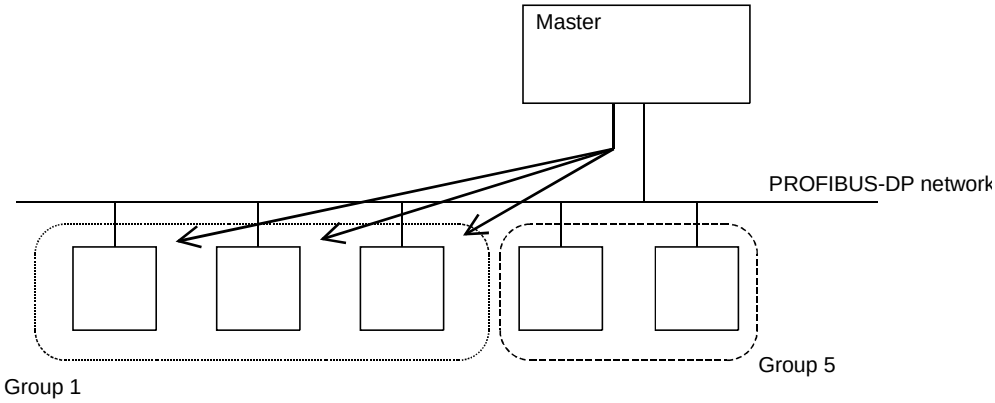
The I/O data exchange flow with slave station is shown below.

- The refresh between the CPU and QJ71PB92D and the refresh of buffer memory of QJ71PB92D are executed asynchronously with each other.



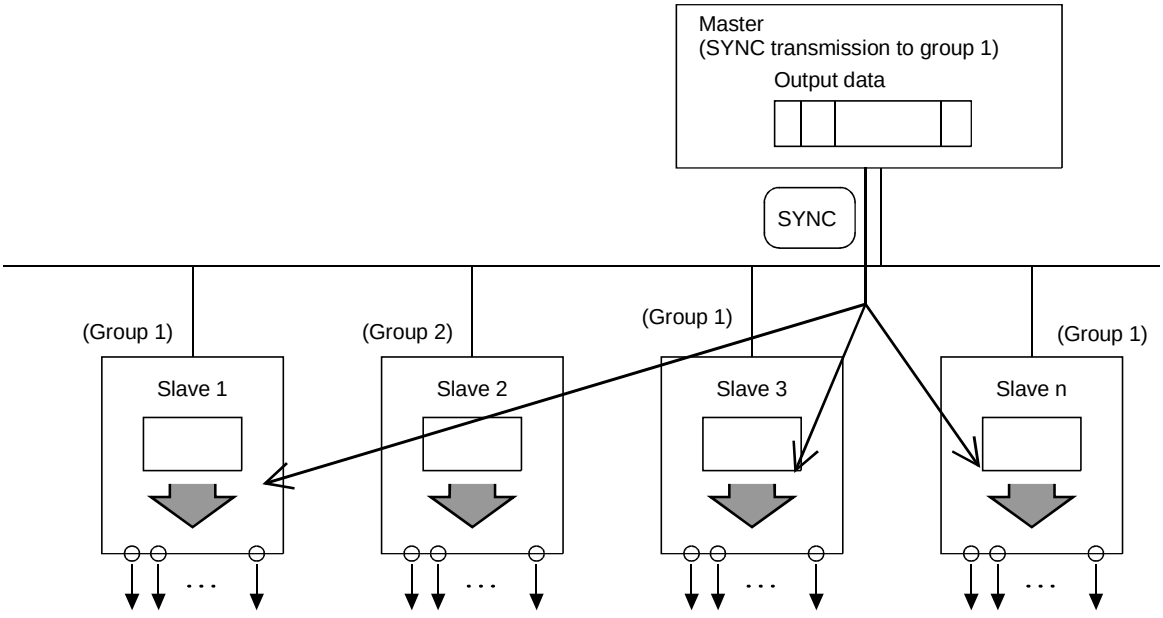
4.1.2 Global control functions

Global control contains the four functions of SYNC, UNSYNC, FREEZE, and UNFREEZE, which are functions that are used to maintain/cancel slave I/O for which multicast communication is conducted at the same time.
The slaves that execute the global control function are those located in one or more groups of the eight groups. The group No. of the group containing the slaves is set by the configurator. In the QJ71PB92D the group can be arbitrary specified and the global control commands transmitted using multicast communication. This makes is possible to select a slave and conduct global control.



The global control function is executed using X, Y, and FROM/TO instructions from the sequence program.

(1) Service SYNC, UNSYNC

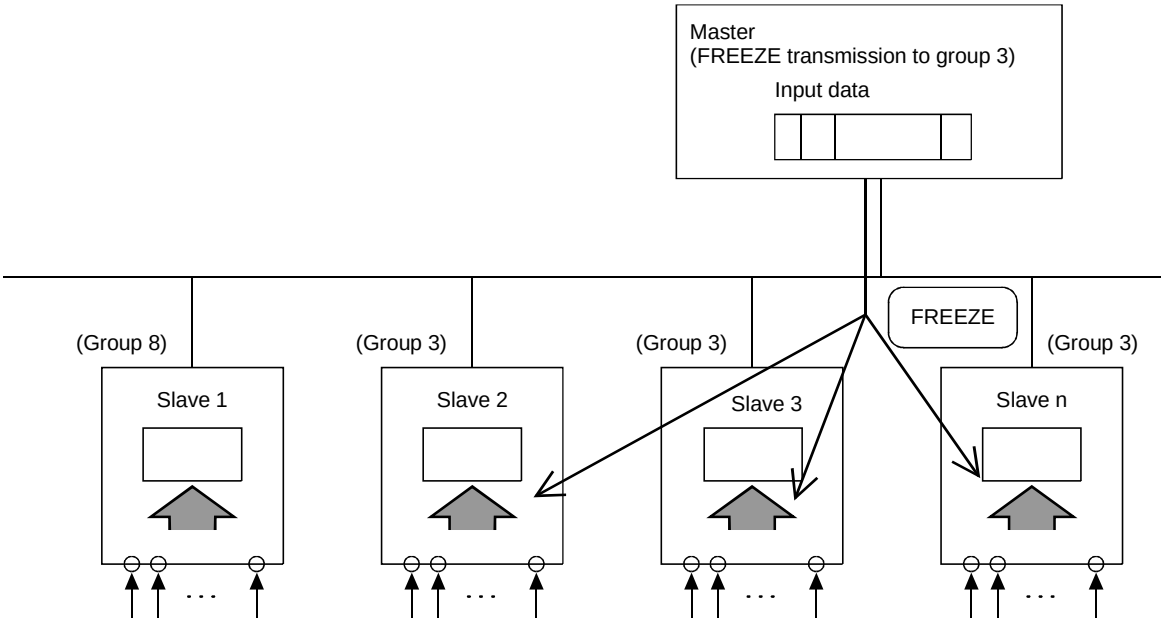


- - - Output image memory: Data is always refreshed using polling.

. . . <During UNSYNC execution/default>The output image memory value is output unchanged (normal condition)
<During SYNC execution>The output image memory value is only output once during the SYNC service timing.

- - - Service SYNC (issued in the same group)

(2) Service FREEZE, UNFREEZE



- - - Input image memory: The data is always refreshed by polling.

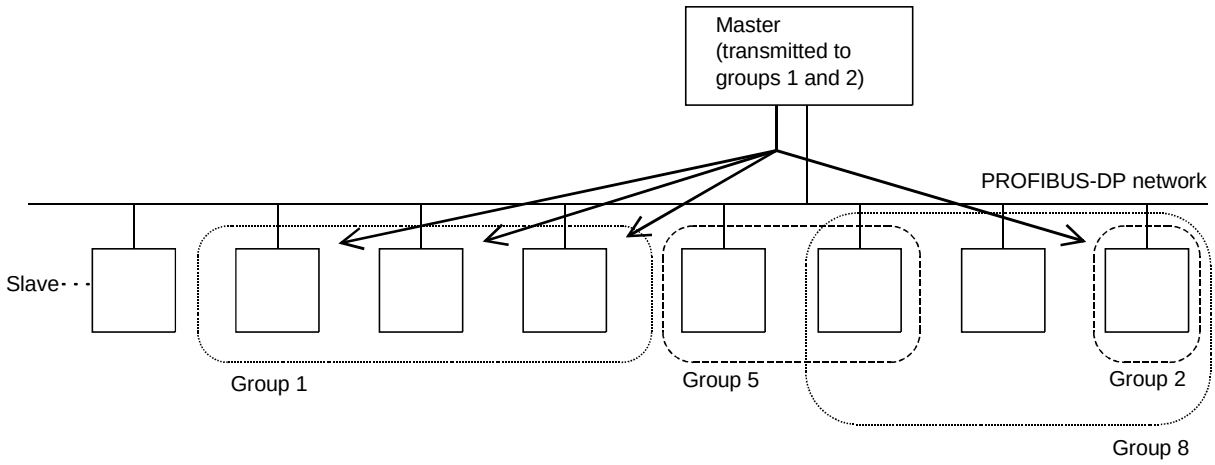
- - - <during FREEZE cancel/default>The actual input is input to the input memory unchanged (normal condition)

<during FREEZE execute>The actual input is input once into the input image memory at the FREEZE service timing.

- - - Service FREEZE (issued within the same group)

(3) Group selection

- The number of groups is from 1 to 8 if with a total of 8 groups.
- The slave can exist in arbitrary group of the 8 groups. They can also exist in multiple groups. (The configurator specifies in which group which slaves exist.)
- Multiple groups can be arbitrarily selected from the sequence program and global control executed.
- When selecting group 0 and transmitting the service is transmitted to all slave stations.



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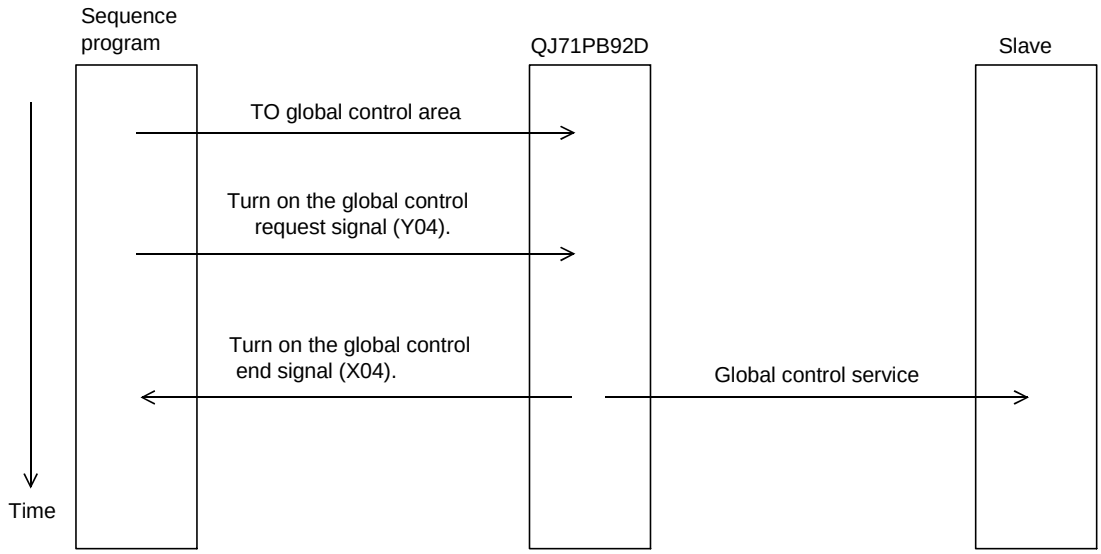
(4) Procedure for issuing a global service.



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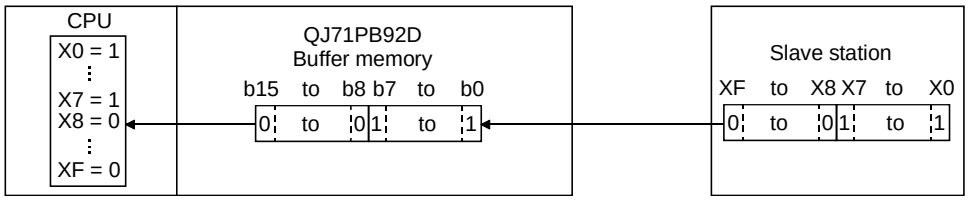
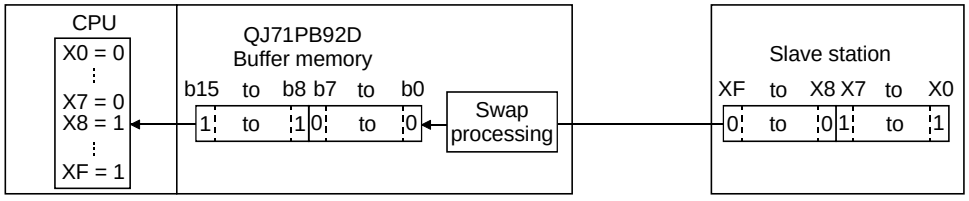
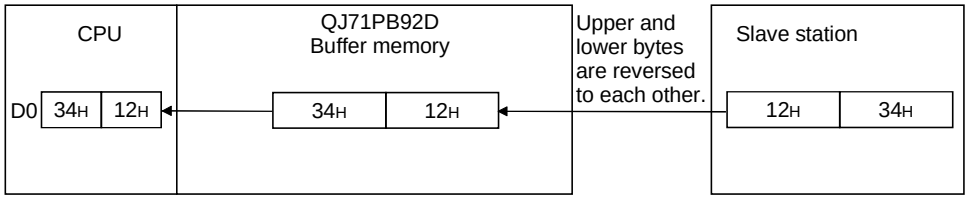
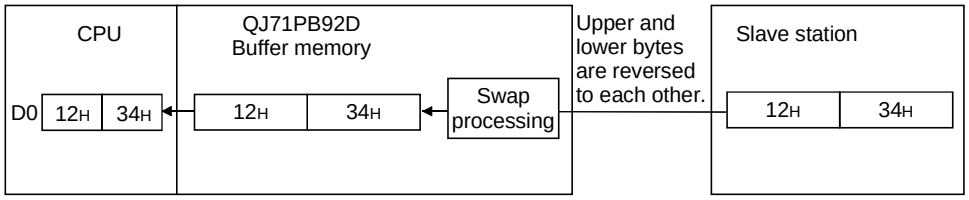
4.1.3 Word data swap function

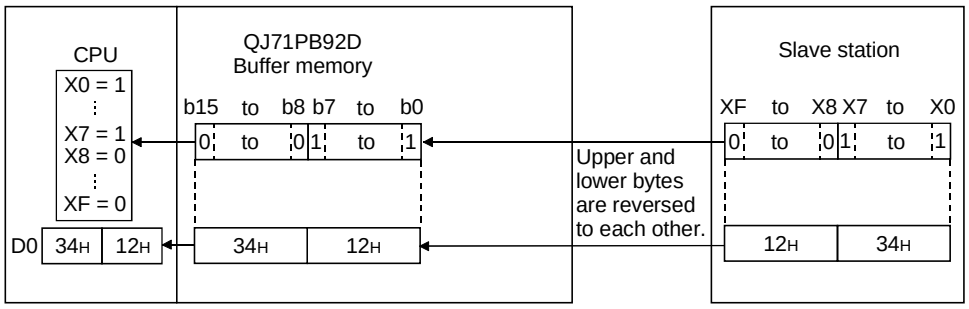
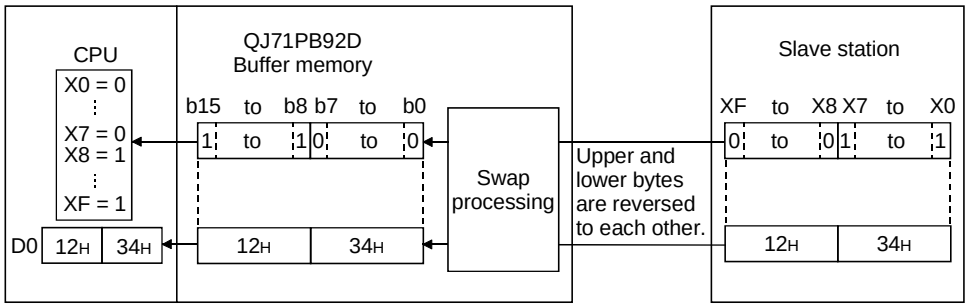
This is the function to exchange (swap) the upper and lower bytes of the I/O data stored in the buffer memories of the CPU and QJ71PB92D.
For the PROFIBUS-DP and MELSEC series, the function is used to input and output word data into and from the slave because the upper and lower bytes are reversed to each other in the processing of the word data.
The function enables the upper and lower bytes to be swapped in the area for each station, and the word data processing need not swap the bytes using the sequence program.
For the swap function setting method for word data, refer to the GX Configurator-DP operating manual.

Standard Swap Function Settings Classified by Slave Station

Classification by slave station	Swap function setting
Byte (I/O) data only	Not swapped
Word data only	Swapped
Mixture of byte (I/O) data and word data	Not swapped (Only for word data, swapped using the sequence program)

The following shows the examples of data transmission for non-execution/execution of swap function classified by processed data.

Slave station	Examples of data transmission (for input)
Byte data (I/O) only	Nonexecution of swap (Initial setting)  Execution of swap 
Word data only	Nonexecution of swap (Initial setting)  Execution of swap 

<table>
<tr><th>Slave station</th><th>Examples of data transmission (for input)</th></tr>
<tr><td rowspan="2">Byte data (I/O) is mixed with word data∗.</td><td>Nonexecution of swap (Initial setting)
 
</td></tr>
<tr><td>Execution of swap
 
</td></tr>
</table>

∗: For a slave station where byte data (I/O) is mixed with word data, it is recommended to swap-process only the word data using the sequence program without executing the swap function.

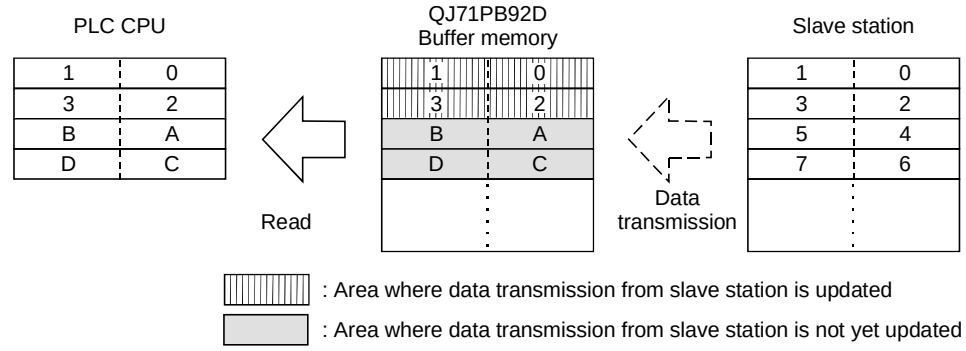
4.1.4 I/O data separation prevention function

The I/O data separation prevention function is a function to prevent the I/O data of the PLC CPU from being unmatched with the I/O data of the slave station.

(1) I/O data separation prevention function

(a) The separation of I/O data occurs when the buffer memory is also read from/written to the PLC CPU during the data transmission between the buffer memory of QJ71PB92D and the slave station.
The following shows the example of the separation occurred when the data is read from the PLC CPU during the data transmission from the slave station to the buffer memory.

Example of separation of I/O data



(b) When the separation prevention function is used, the reading from the PLC CPU is waited during the data transmission from the slave station to the buffer memory (input area) of QJ71PB92D, and executed after the data transmission has been completed.
Also, the data transmission to the slave station is waited until the writing from the PLC CPU to the buffer memory (output area) of QJ71PB92D is completed, and executed after the writing has been completed.

(c) To activate the I/O data separation prevention function, two methods are available: a method to select the Separation Prevention in setting the auto refresh and a method to use the dedicated instruction (BBLKRD/BBLKWR) in the sequence program.
When a refresh is performed between the buffer memory of QJ71PB92D and the PLC CPU using the FROM/TO instruction, the separation prevention function cannot be used.

(d) The separation prevention function can be used when the CPU module has the following serial No. (See section 2.5).
QCPU (Q mode): Serial No. 02092∗∗∗∗∗∗∗∗∗∗and subsequent.

(e) When the separation prevention function is used, there is a wait for reading from /writing to the PLC CPU and the data transmission between the CPU and the slave station, therefore, the transmission between the PLC CPU and the slave station is delayed.
For the transmission delay time, refer to section 6.2 Transmission delay time.

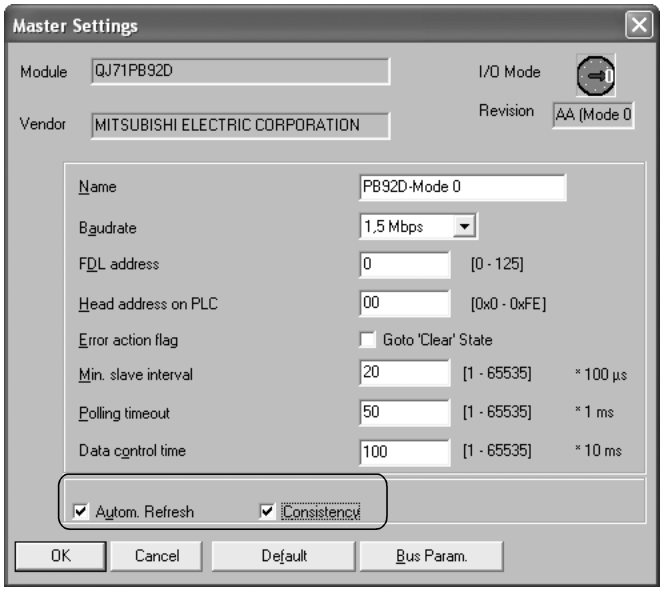
(2) Separation prevention by auto refresh setting

When a data transmission between the buffer memory of QJ71PB92D and the PLC CPU is performed by auto refresh setting, the separation is selected to function the separation prevention.

To activate the separation prevention function, two methods are available: a method to select the Separation Prevention in setting the I/O data batch auto refresh and a method to select it in setting the auto refresh for each station.

The auto refresh is set to a parameter of QJ71PB92D using GX Configurator-DP. For GX Configurator-DP setting operation, refer to the GX Configurator-DP operating manual.

[Master Settings Screen]

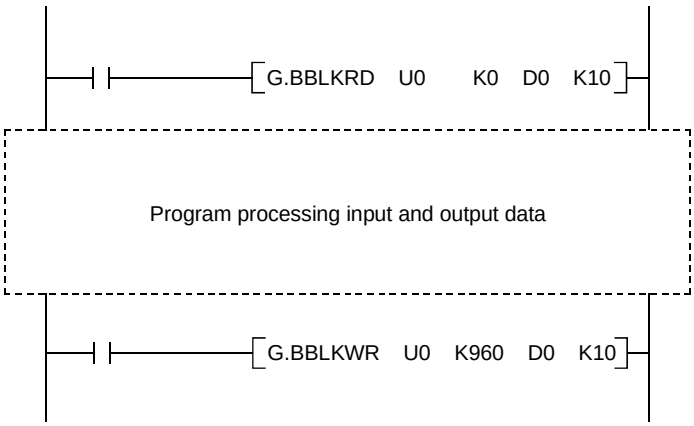


(3) Separation prevention by dedicated instruction

The separation prevention function is executed using the BBLKRD instruction (read) and BBLKWR (write) which are the dedicated instructions for reading/writing of the buffer memory from and to QJ71PB92D.
When the writing/reading of the buffer memory are executed using the FROM/TO instruction, the separation prevention function cannot be used.

(a) For detail of the BBLKRD instruction, refer to section 8.1.
For detail of the BBLKWR instruction, refer to section 8.2.

(b) Use the BBLKRD instruction and BBLKWR instruction in pairs, and ensure to execute for each sequence scan (Refer to the program example in section 7.4).
Even when either of the reading of input data and writing of output data is not required, read/write the dummy input data or output data using the BBLKRD/BBLKWR instructions.
When only either of the BBLKRD instruction and BBLKWR instruction is used, the transmission delay time becomes longer.



(c) Before the dedicated instructions (BBLKRD/BBLKWR) are executed, the dedicated instruction valid signal (Y0C) must be turned ON.
If the dedicated instruction valid signal (Y0C) is turned OFF, the dedicated instructions (BBLKRD/BBLKWR) will become invalid.

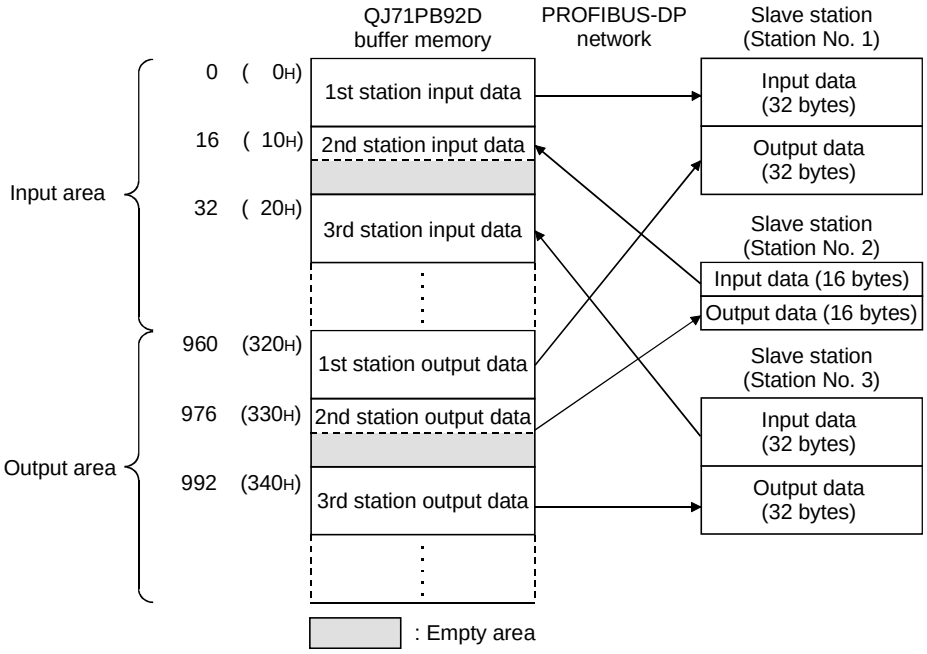
4.2 Operation Mode

QJ71PB92D has four operation modes: Normal service mode (MODE 0), Extended service mode (MODE E), Parameter setting mode (MODE 1), and Self-diagnosis mode (MODE 2).
The operating modes are set using the GX Configurator-DP.
Each of these modes is explained as follows.

Operation mode	Description	Reference section
Normal service mode (MODE 0)	Mode in which a communication is made with the slave station. The I/O areas for each slave station are allocated to a fixed 32 bytes.	Section 4.2.1
Extended service mode (MODE E)	Mode in which a communication is made with the slave station. The I/O areas for each slave station are allocated to the areas of any size (The I/O area size for each slave station is set using GX Configurator-DP).	Section 4.2.2
Parameter setting mode (MODE 1)	Mode in which parameters are set in QJ71PB92D. Normally, GX Configurator-DP switches the operation mode automatically to this mode when setting parameters, and after setting the parameters, switches to the mode set in the flash ROM. When the mode is set to the Parameter setting mode using the operation mode change signal (Y11), the mode is changed to the other operation mode using the GX Configurator-DP. A communication with the slave station is not performed.	—
Self-diagnosis mode (MODE 2)	Mode in which the test for diagnosing the QJ71PB92D module for hardware error. A communication with the slave station is not performed.	Section 5.4

4.2.1 Normal service mode (MODE 0)

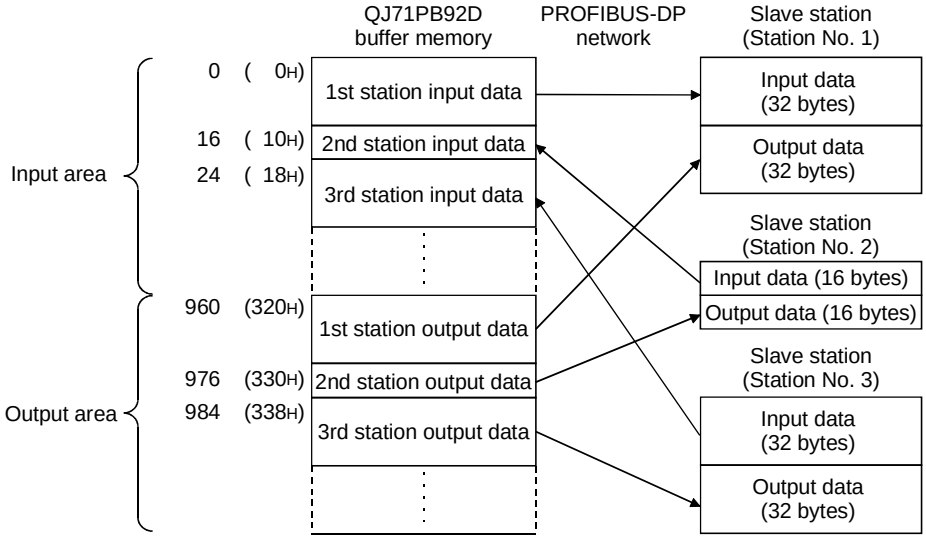
This is the mode for communicating with the slave station by allocating 32 bytes (16 words) of I/O area of the QJ71PB92D buffer memory to each slave station.
Because the I/O area size of each slave station is fixed, the buffer memory address is easier to understand, and the size need not be set to the parameters for each slave station.
However, when the number of devices is 32 bytes or less, an empty space is produced between the areas of the slave stations, and additional number of devices is required for the batch reading/writing of the I/O area.
The fixedly set number of slave stations is 60.
After the communication start is completed (X00=ON), the data allocated to the fixed area is transmitted to each slave station.
Before the communication is started or when it is interrupted, the I/O data is not updated.



4 - 12

4.2.2 Extended service mode (MODE E)

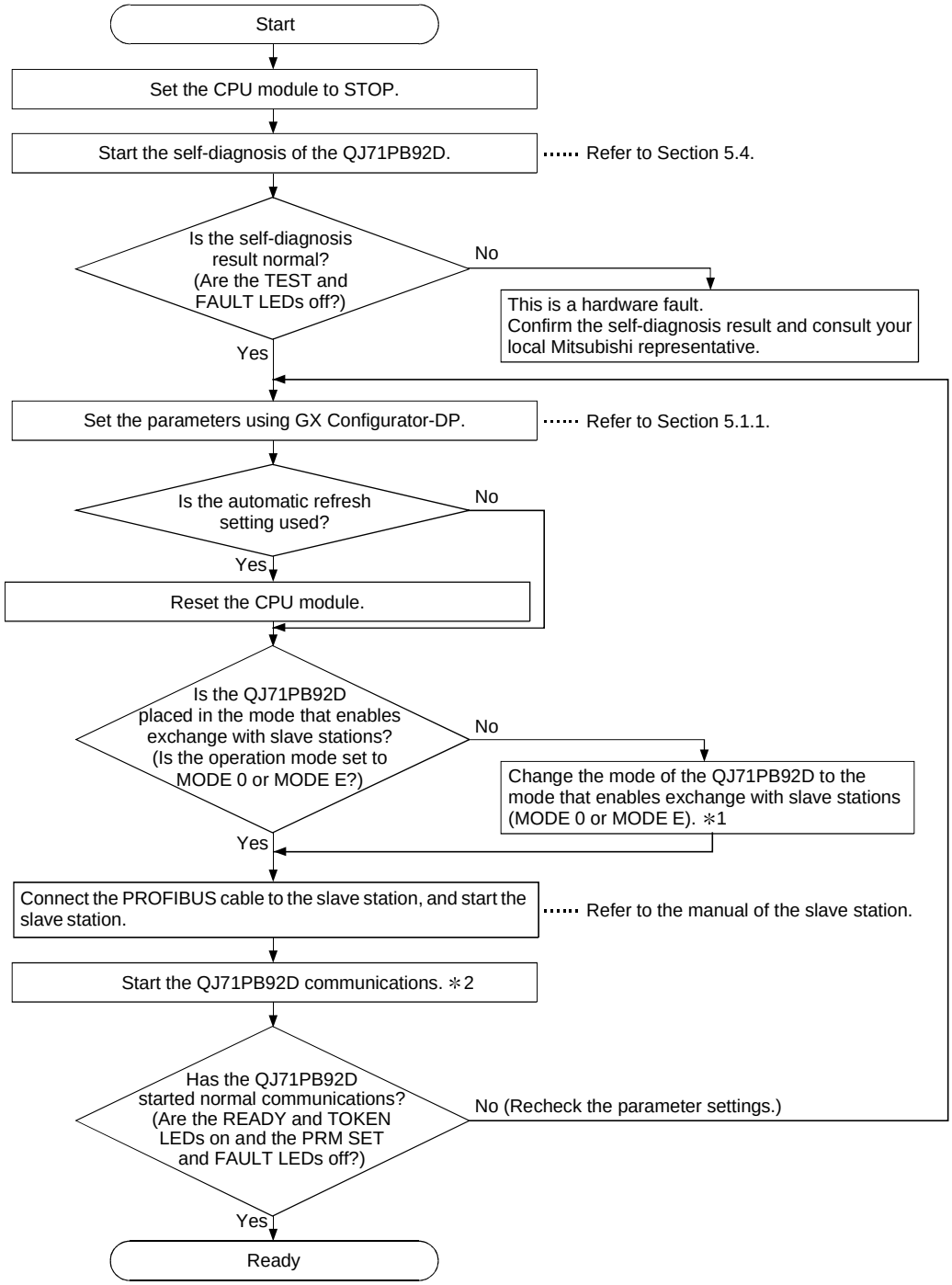
This is the mode for communicating with the slave station by allocating any I/O area of the QJ71PB92D buffer memory to each slave station.
Because the I/O area size can be set for each slave station, an empty space is not produced in the buffer memory of QJ71PB92D. Therefore, the data can be read from/write to the continuous area of the PLC CPU.
The area of allocation for each slave station is set using the GX Configurator-DP.
The area of allocation in the input and output areas for each station is 0 to 244 bytes (0 to 122 words).
The set number of slave stations 1 to 60.
When an area of 244 bytes (max) is allocated for each station, up to seven stations can be set up.
After the communication start is completed (X00=ON), the allocated area data equivalent to an amount of specified number of bytes is transmitted to each slave station.
Before the communication is started or when it is interrupted, the I/O data is not updated.



5. PROCEDURES BEFORE SYSTEM OPERATION

5.1 Procedures before Operation

The procedure for newly connecting QJ71PB92D to an existing PROFIBUS-DP network is explained below.
For the operation of GX Configurator-DP, refer to the PROFIBUS-DP configuration operating manual.



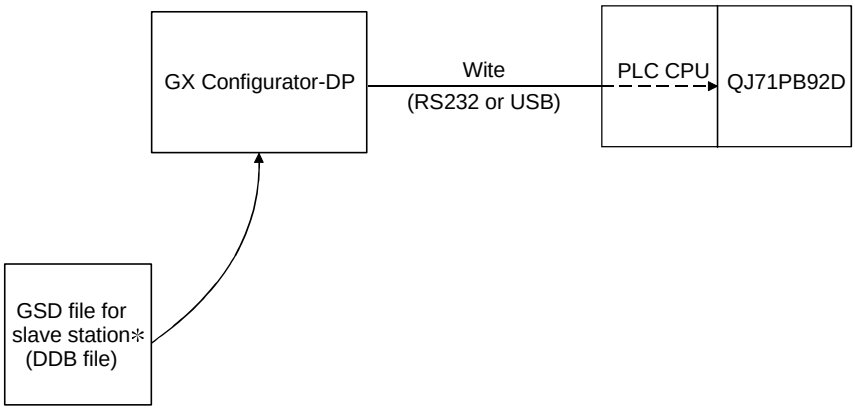
∗1: Change the operation mode in either of the following methods.
- Change from GX Configurator-DP.
- Use the operation mode change request area (buffer memory address: 2255) and operation mode change request signal (Y11).

∗2: Start the communications in either of the following methods.
- Turn on the exchange start request signal (Y00).
- Start from GX Configurator-DP.

5.1.1 Parameter setting procedure

The procedure for setting the QJ71PB92D parameters is described below.

(1) Start GX Configurator-DP, and select the module type and mode from the [File]-[New] menu.
(2) In the [Setup]-[GSD Device-Database] menu, register the GSD file (DDB file) for each slave.
(3) Set the master parameters and bus parameters.
(4) Right-click on the symbolic graphics of the network, and select the [Insert DP-Slave] from the menu, and set the slave type and slave parameters.
(5) On the [Actions]-[Write to PB92D] menu, write parameters to QJ71PB92D.



Max ST delay resp (Max Tsdr), Quiet Time (Tqui), Setup Time (Tset) in the parameter to be set by the GX Configurator-DP ProfiMap must be match the maximum value connected to the network, including master station.
The value of the QJ71PB92D is shown below.

	Below 187.5Kbps	500Kbps	1.5Mbps	3Mbps	6Mbps	12Mbps
Max Tsdr	60	100	150	250	450	800
Tqui	0	0	0	3	6	9
Tset	1	1	1	4	8	16

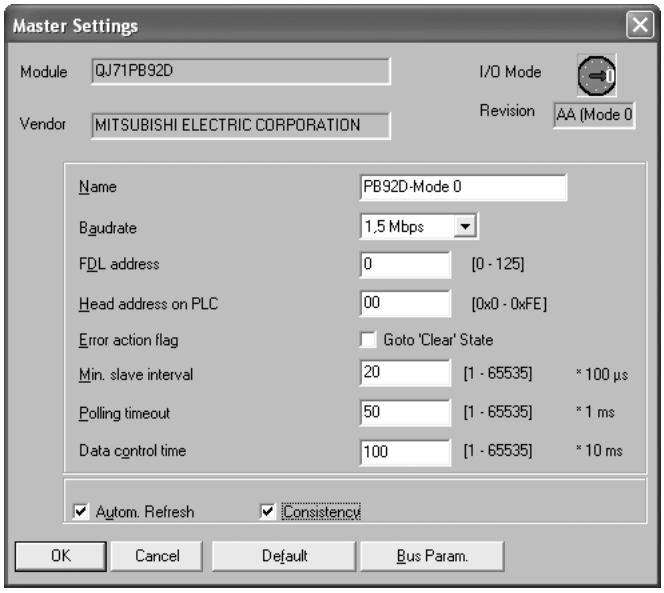
* : The GSD file (DDB file) for a slave station is supplied from the manufacturer of the slave station.

IMPORTANT

Do not turn off the power or reset the CPU module while the parameters are being written using GX Configurator-DP.
To do so may result in repair of the QJ71PB92D.
Follow the screen instructions of GX Configurator-DP.

The parameter items set in QJ71PB92D using GX Configurator-DP are shown below.

(1) Master Parameter



Parameter	Range	Meaning
Name	—	States that the QJ71PB92D is a master.
Baud Rate	9.6 kbps to 12 Mbps	Transfer rate for the communication. Define a baud rate that is supported by all slaves.
FDL address	0 to 125	FDL address (station number)
Head address on PLC	0 to FE	Module head address on the base unit
Error action flag	—	Output processing after error. Check to shut off an output when an error occurs (recommended for drivers and inverters).
Min.slave interval	0 to 65535 × 100 µs	Smallest allowed period of time between two slave poll cycles. This ensures that the sequence of function requests from the DP master can be handled by the DP slave. This value is valid for all installed slaves. The slowest slave defines this value.
Polling timeout	0 to 65535 × 1 ms	In case of master-master communication this parameter specifies the max. Amount of time it may take the requestor to fetch the response.
Data control time	0 to 65535 × 10 µs	This parameter defines the period of time during which the QJ71PB92D notifies the slave operation status. This time is 6 times longer than the watch-dog control of slaves.
Autom.Refresh	—	Check when performing the auto refresh of the CPU device and QJ71PB92D buffer memory.
Consistency	—	Check when executing the separation prevention function at the time of auto refresh (Invalid when the auto refresh is not executed).

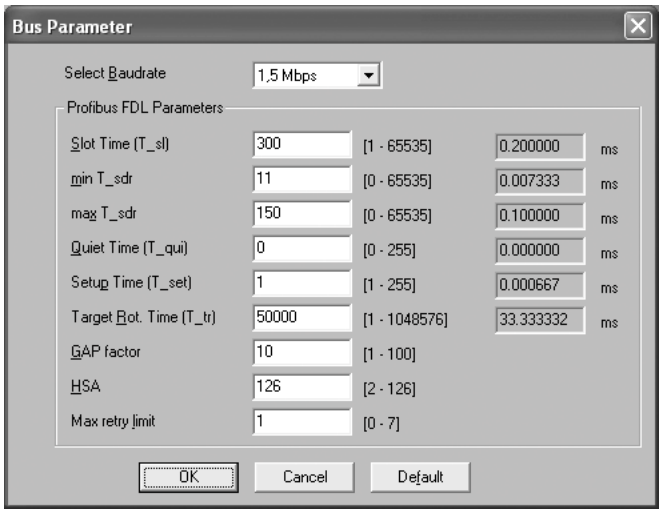
POINT

When the Error action flag is set to be enabled, a fault of only one slave will clear all slave outputs. To start outputs again, perform either of the following.

- Turn the exchange start request signal (Y00) off once and then on again.
- Reset the CPU module.

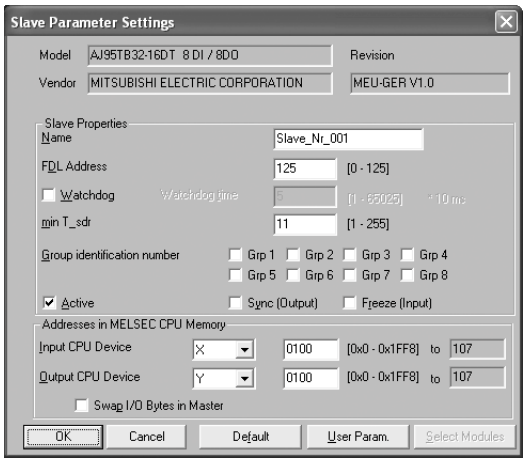
(2) Bus Parameter

Usually, the bus parameters need not be changed.
When changing these parameters, understand the PROFIBUS-DP standards beforehand.



Parameter	Range	Description	Remark
Baud rate	see selection	Transfer rate	Must be supported by all slaves
Slot Time (T_sl)	1 to 65535 × t_bit	Slot time	Max.Interval to wait for response If the time is exceeded, an error will be detected
min T_sdr	0 to 65535 × t_bit	Min. Station delay of responder	—
max T_sdr	0 to 65535 × t_bit	Max. Station delay of responder	—
Quiet_Time (T-qui)	0 to 255 × t_bit	Quiet time	Time needed to switch the transmission direction of the repeater T = 0, if no repeater present
Setup Time (T-set)	1 to 255 × t_bit	Setup time	—
Target Rot. Time (T_tr)	1 to 1048576 × t_bit	Target rotation time	—
GAP factor	1 to 100	Controls the GAP update time (T_gud)	—
HSA	2 to 126	Highest station address	—
Maxretry limit	0 to 7	Max.number of retries	—

(3) Slave Parameter



parameter	Range	Meaning
Name	—	The name of the slave can be defined.
FDL address	0 to 125	This parameter is used to define the station address of the slave.
Watchdog	—	Check (enable) the check box to use the watchdog timer. • When enabled If data is not received from the master station during the time set to Watchdog time, the slave station with this setting detects a communication error. The output status of the slave station at communication error detection varies depending on the slave station specifications. • When disabled Even if data is not received from the master station, the slave station with this setting does not detect any communication error. The output status of the slave station remains unchanged from the output data that the slave station received last.
Watchdog time	1 to 65025 × 10 ms	Set the time when using the watchdog timer. The set value is to be equal to or greater than the bus cycle time and equal to or less than 1/6 of [Data control time].
min T_sdr	1 to 255	This is the minimum waiting time for a DP slave until it is allowed to send response frames to the DP master. Do not change this value.
Group identification number	Grp 1 to Grp 8	Click on the white boxes to allocate the group for the slave. A slave can belong to several groups (Grp1 to Grp8).
Active	—	When this option is activated, you can get information whether the defined slave really exists. With this function, you can define slaves which are not really existent but should be added physically later on.
Sync (Output)	—	When this option is activated, it is checked whether the slave supports or not the SYNC function during the communication for initialization. If the slave does not support the SYNC function, the error code (0200H) will be stored in the communication trouble area of QJ71PB92D.
Freeze (Input)	—	When this option is activated, it is checked whether the slave supports the Freeze function during the communication for initialization. If the slave does not support the Freeze function, the error code (0200H) will be stored in the communication trouble area of QJ71PB92D.
Input CPU Device	Depending on slave	This section is used to define the CPU side device and head number corresponding to the input data
Output CPU Device	Depending on slave	This section is used to define the CPU side device and head number corresponding to the output data
Swap I/O Bytes	—	Click on the white box if you want to swap the I/O data on the buffer memory of QJ71PB92D.
User Param.	—	Use this button if you want to handle the word data. Press this button and the slave user parameter setting window will appear on the screen. Do not change the slave user parameter.

5.2 Installation

The following section explains the precautions when handling the QJ71PB92D, from the time they are unpacked until they are installed.
For more details on the module installation, see the user's manual for the PLC CPU used.

5.2.1 Handling precautions

(1) Do not drop the module case or subject it to heavy impact since it is made of resin.

(2) Do not remove the PCB of each module from its case. This may cause a failure in the module.

(3) Be careful not to let foreign objects such as wire burrs enter the module during wiring. In the event any foreign object enters, remove it immediately.

(4) The top surface of the module is covered with a protective film to prevent foreign objects such as wire burrs from entering the module during wiring. Do not remove this film until the wiring is complete. Before operating the system, be sure to remove the film to provide adequate heat ventilation.

(5) Tighten the module fixing screws and connector mounting screws using torque within the following ranges.

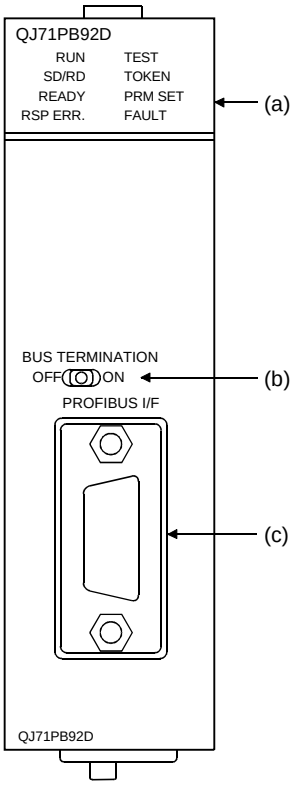
Screw location	Tightening torque range
Module fixing screw (M3 screws)	36 to 48 N · cm
PROFIBUS cable connector mounting screws (#4 - 40UCN)	20 to 28 N · cm

5.2.2 Installation environment

Refer to user’s manual of the CPU module used.

5.3 Part Names and Settings

Following is an explanation of the QJ71PB92D part names and settings.



No.	Name	Description		Remark
(a)	LED	Displays the QJ71PB92D status.		—
		Name	Display description	
		RUN	Displays the QJ71PB92D operation status. ON : During normal operation OFF : When there is an error	
		TEST	Turns on when a self-diagnosis is executing.	
		SD/RD	Flashing during communication with the slave station on the PROFIBUS network. The flashing interval is the one set to Data control time of the Master Parameter.	
		TOKEN	Turns on when token is maintained.	
		READY	Turns on when the PROFIBUS-DP network subscription preparation is completed and during subscription.	

No.	Name	Description		Remark
(a)	LED	PRMSET	Turns on when the operation is in the Parameter setting mode (MODE 1)(PARAMETER.SET). If this is lit when the operation is in the Normal service mode (MODE O) or Extended service mode (MODE E), the parameters will not be written.	—
		RSP ERR.	Turns on when communication error is occured.	
		FAULT	Turns on when an error occurs.	
(b)	PROFIBUS network terminal resistance setting switch∗1	This sets whether or not there is terminal resistance inside the QJ71PB92D. (at time of shipment: OFF) ON : has terminal resistance OFF : no terminal resistance		Always ON for both ends of the station on the PROFIBUS-DP network.
(c)	PROFIBUS interface connector	Connector for connecting the table for the PROFIBUS-DP network.		∗2

∗1: 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.

∗2: 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.) The size of the screw which can be used for the connector is #4-40 UNC.

5.4 Execution Method for Self-diagnosis

This section describes the procedure for self-diagnosis, status during self-diagnosis, and results after self-diagnosis.

(1) Procedure for self-diagnosis

The procedure for self-diagnosis is as follows.

1) Set QJ71PB92D to the Self-diagnosis mode (MODE 2) using GX Configurator-DP or operation mode change request signal (Y11).
   For the operation mode change operation, refer to the GX Configurator-DP operating manual.
   The self-diagnosis will start automatically.
2) The TEST LED on QJ71PB92D will flash during the self-diagnosis.
3) When the results of the self-diagnosis are normal: The TEST LED and FAULT LED go off.
   If the results of the self-diagnosis are abnormal (an error occurs): The TEST LED and FAULT LED will light up.

If the results of the self-diagnosis are abnormal, the self-diagnosis status code will be stored in the self-diagnosis status area (buffer memory address: 2258 (8D2H)) of the buffer memory.

Self-diagnosis status code	Type of error
8001H	MPU test error
8002H	Timer test error
8003H	Interruption test error
8004H	RAM1 test error
8005H	RAM2 test error
80FFH	Flash ROM test error

5.5 Wiring

5.5.1 PROFIBUS cable wiring

This section explains the wiring to PROFIBUS connector for the QJ71PB92D

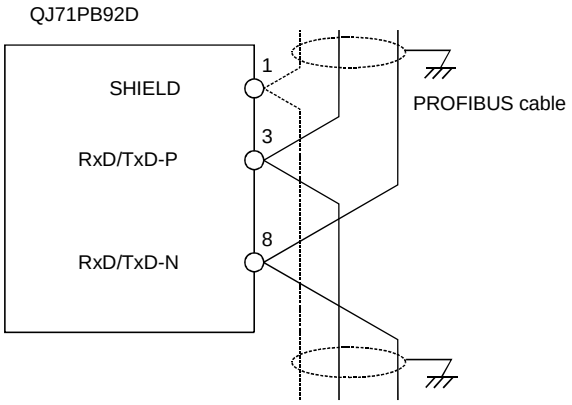
(1) Pin assignments for the connector

Pin No.	Symbol	Name	Application
1		SHIELD	Shield, Protective Ground
2		RP ＊1	Reserved for Power
3	B/B'	RxD/TxD-P	Receive/Transmit Data-P
4		CNTR-P ＊1	Control-P
5	C/C'	DGND	Data Ground
6		VP ＊2	Voltage-Plus
7		RP ＊1	Reserved for Power
8	A/A'	RxD/TxD-N	Receive/Transmit Data-N
9		CNTR-N *1	Control-N

＊1 Signal is optional.

＊2 When the terminal resistance value of building into is made it is, signal is used. Wiring is not needed.

(2) Wiring



REMARK

- For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please see Chapter 3,"EMC Directive and Low Voltage Instruction" of the PLC CPU User's Manual (Hardware).
- Please use the PROFIBUS cable with braided shield.

5.5.2 Terminator switch

(1) Whether or not to set the built-in module terminal resistance (1/2W 220 Ω 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	ON	OFF
BUS TERMINATION	Connects terminals resistor	Disconnects terminal resistor (setting at time of shipment)

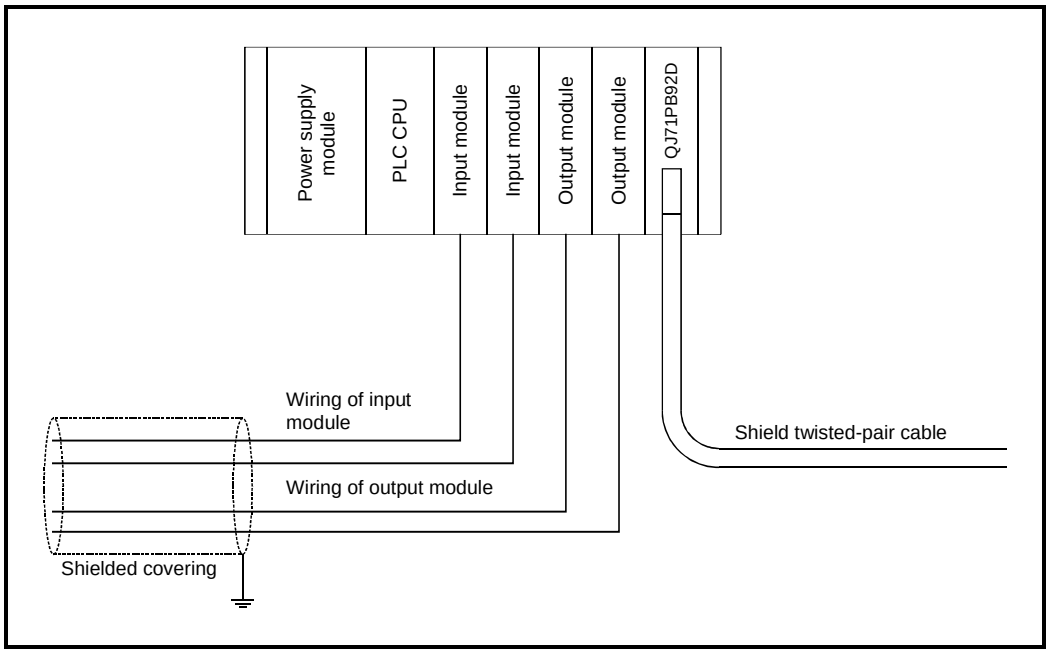
(2) When the QJ71PB92D's bus termination switch is set to on (has terminal resistor), do not remove the PROFIBUS cable from the QJ71PB92D during PROFIBUS-DP network operation. If the cable is removed, then the terminal resistor in the network will disappear, causing an error and bringing down the network.

5.5.3 Precautions against wiring

As one of the requirements to give full play to QJ71PB92D'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 QJ71PB92D is described below.

(1) Do not route the wire of QJ71PB92D close to or bundle it together with the main circuit and high-tension lines, or the load-carrying lines from other than the PLC. Otherwise, the module may be susceptible to an influence of noise and surge induction.

(2) Keep the wires from the input/output modules of the PLC away from the communication cable as much as possible as shown below.



(3) Grounding

(a) When using the QJ71PB92D, ground the FG and LG terminals of the power supply module of the PLC.

(b) If communication cannot be performed after grounding because of abnormal voltage applied to the FG terminal, the module may be used without grounding.

5.6 Maintenance and Inspection

For the QJ71PB92D, 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 PLC CPU User's Manual to always use the system in good condition.

DANGER

- Switch all phases of the external power supply off before cleaning.
  If you do not switch off the external power supply, it will cause failure or malfunction of the module.

CAUTION

- Never disassemble or modify the module.
  This may cause breakdowns, malfunctioning, injury and/or fire.
- Switch all phases of the external power supply off before mounting or removing the module. If you do not switch off the external power supply, it will cause failure 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 Bus Cycle Time

(1) Bus cycle time when there is one master station

An explanation of the bus cycle time when there is one master station is given in the following diagram.

The following diagram (Fig. 6.1) shows an example for when there are 3 slave stations.

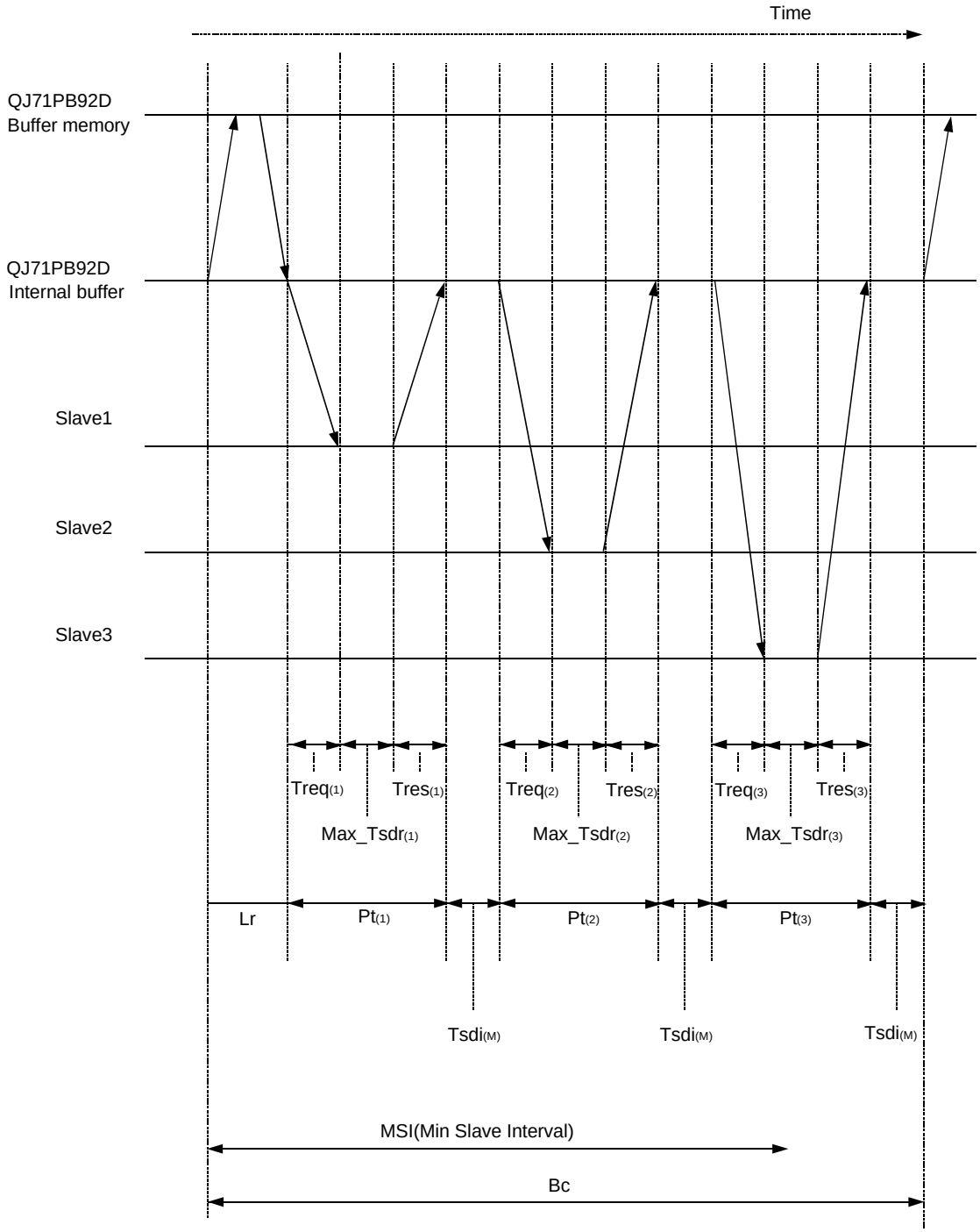


Fig. 6.1 The bus cycle time when there is one master station

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

$$Bc[s] = Max\left(MSI, \sum_{i=1}^{n} (Pt_{(i)} + Tsdi_{(M)}) + Lr\right)$$

n = number of slave stations

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

(a) MSI[s] = Minimum polling cycle (Min. slave interval) ∗1
∗1: The value set on the "Master Setting" screen of GX Configurator-DP

(b) $Pt_{(i)}$[s] = (Polling time of No. i station) = $Treq_{(i)}$ + $Max\_Tsdr_{(i)}$ + $Tres_{(i)}$

1) $Treq_{(i)}$[s] = Request transmission time of No. i station
= [{(Number of bytes output to No. i station) + 9} × 11[bit]] / (transmission speed[bps])

2) $Max\_Tsdr_{(i)}$[s] = (response time [T_{Bit}] of No. i station) ∗2, ∗3 / (transmission speed[bps])
∗2: MaxTsdr value described in the GSD (DDB) file of the slave station.
∗3: [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 described below depending on the transmission speed.
[1.5Mbps]
1 [T_{Bit}] = 1 / (1.5 × 10^{-6}) = 0.667 [µs]
[12Mbps]
1 [T_{Bit}] = 1 / (12 × 10^{-6}) = 0.083 [µs]

3) $Tres_{(i)}$[s] = (Response transmission time of No. i station)
= [{(Number of bytes input from No. i station) + 9} × 11[bit]] / (transmission speed[bps])

(c) $Tsdi_{(M)}$[s] = (Request/response processing time [T_{Bit}] of master station (QJ71PB92D)) ∗4 / (transmission speed[bps])

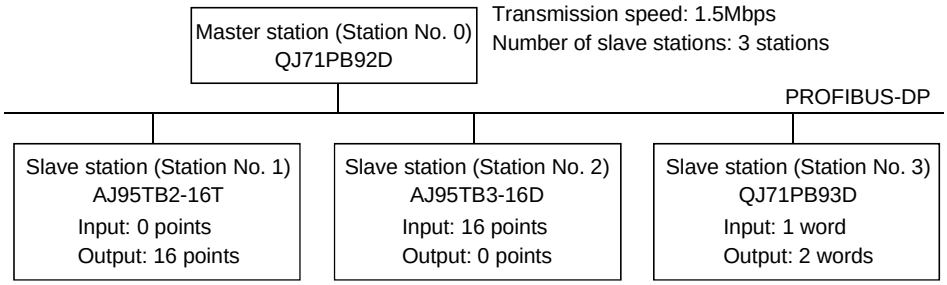
∗4: Tsdi value described in the GSD (DDB) file of the QJ71PB92D.
The Tsdi value varies as described below depending on the transmission speed.
Refer to ∗3 for the unit [T_{Bit}].

	Transmission speed [bps]								
	9.6k	19.2k	93.75k	197.5k	500k	1.5M	3M	6M	12M
Request/response processing time [T_{Bit}] of master station	10	15		80		150			

(d) Lr[s] = (data refresh time) = (number of slave stations) × 150 × 10^{-6}

6 - 2

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



	AJ95TB2-16T	AJ95TB3-16D	QJ71PB93D
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)	AJ71PB93D (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]	$0.081 \times 10^{-3} + 0.1 \times 10^{-3} + 0.066 \times 10^{-3} = 0.247 \times 10^{-3}$	$0.1 \times 10^{-3} + 0.066 \times 10^{-3} + 0.081 \times 10^{-3} = 0.247 \times 10^{-3}$	$0.095 \times 10^{-3} + 0.1 \times 10^{-3} + 0.081 \times 10^{-3} = 0.276 \times 10^{-3}$

(c) $Tsdi_{(M)}$[s] value

Request/response processing time [T_{Bit}] of master station (QJ71PB92D) = 150

$Tsdi_{(M)}[s] = 150 / (1.5 \times 10^6) = 0.1 \times 10^{-3}$

(d) Lr[s] value

$Lr[s] = 3 \times 150 \times 10^{-6} = 0.45 \times 10^{-3}$

From the values in above (b) to (d)

$$\sum_{i=1}^{3} (Pt_{(i)} + Tsdi_{(M)}) + Lr = \{(Pt_{(1)} + Tsdi_{(M)}) + (Pt_{(2)} + Tsdi_{(M)}) + (Pt_{(3)} + Tsdi_{(M)})\} + Lr$$
$$= \{(0.347 \times 10^{-3}) + (0.347 \times 10^{-3}) + (0.376 \times 10^{-3})\} + 0.45 \times 10^{-3}$$
$$= 1.07 \times 10^{-3} + 0.45 \times 10^{-3}$$
$$= 1.52 \times 10^{-3}$$

Hence, the bus cycle time (Bc) value is as follows.

$$Bc[s] = Max\left(MSI, \sum_{i=1}^{3} (Pt_{(i)} + Tsdi_{(M)}) + Lr\right)$$
$$= Max(2.0 \times 10^{-3}, 1.52 \times 10^{-3})$$
$$= 2.0 \times 10^{-3}\ [s]$$

(2) Bus cycle time when there are multiple master stations

Following is an explanation of the bus cycle time when multiple masters are connected to the same network. The following diagram (Fig. 6.2) shows when 2 masters are connected to the same network. Bc(1) and Bc(2) in the following diagram (Fig. 6.2) are the master 1 and master 2 bus cycle times respectively, and their total time is calculated using the formula presented in Section 6.1.

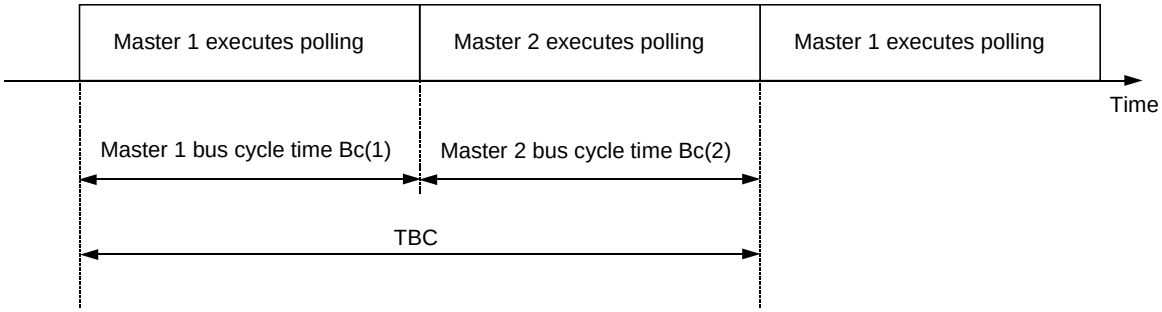


Fig. 6.2 The Bus Cycle time when multiple masters are connected

As shown in this diagram, each master total bus cycle time is calculated as:

$$TBc = \sum_{n=1}^{\text{Number of the master stations}} Bc\,(n)$$

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6.2 Transmission Delay Time

The transmission delay time of the input data and output data varies depending on the separation prevention setting. The calculation expressions for the transmission delay time are given in (1) and (2).
The following are used in the calculation expressions in (1) and (2).
Bc: Bus cycle time
Scan: Scan time

(1) Without separation prevention function

A transmission delay time when I/O data is read/written using the automatic refresh setting (without separation prevention function) or FROM/TO instruction.

(a) Output delay

	Transmission delay time
Normal value	Bc
Max. value	Bc × 2

(b) Input delay

	Transmission delay time
Normal value	$\frac{\text{Scan} + \text{Bc}}{2}$
Max. value	Scan + Bc

(2) With separation prevention function

A transmission delay time when I/O data is read/written using the automatic refresh setting (with separation prevention function) or dedicated instruction.

(a) Output delay

	Conditions	Transmission delay time
Normal value	—	Scan × 1.5 + Bc × 0.5
Max. value	Scan × 2 ≤ Bc	Bc × 2
	Scan × 2 > Bc	Scan × 2 + Bc

(b) Input delay

	Conditions	Transmission delay time
Normal value	—	$\frac{\text{Scan} + \text{Bc}}{2}$
Max. value	Scan × 2 ≤ Bc	Scan + Bc
	Scan × 2 > Bc and Scan × 3 ≤ Bc × 2	Scan + Bc × 2
	Scan > Bc	Scan × 3

7. PROGRAMMING

The following shows the program examples used to execute the global control and execute the separation prevention function using the dedicated instruction during the communication in the Normal service mode (MODE 0) and Extended service mode (MODE E).
The device allocation in the program example is as shown below
(QJ71PB92D head I/O number: 00H)

Device	Description
X20 to X2F	User command signal
X100 to X14F	Destination of input data transfer from slave station
Y100 to Y14F	Source of output data transfer to slave station
D0	Mode change result storage
D1	Current mode storage
D100	Slave station 1 input address storage (in Extended service mode (MODE E))
D101	Slave station 1 output address storage (in Extended service mode (MODE E))
D1000	Communication trouble information storage

7.1 Communication Using Automatic Refresh Setting

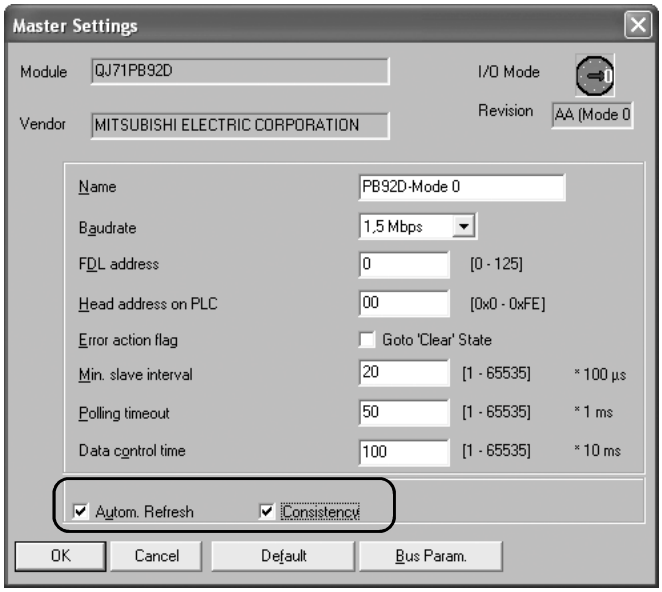
The following shows the setting and program example used when the I/O data is read/written using the automatic refresh setting.

(1) Automatic refresh setting

The following setting example assumes that the automatic refresh setting of I/O data is made per slave.

(a) When using GX Configurator-DP Version 6

1) Make the automatic refresh setting in the master parameters.
[Master Settings] Autom. Refresh: Check.
When executing separation prevention in the automatic refresh mode, check Consistency.



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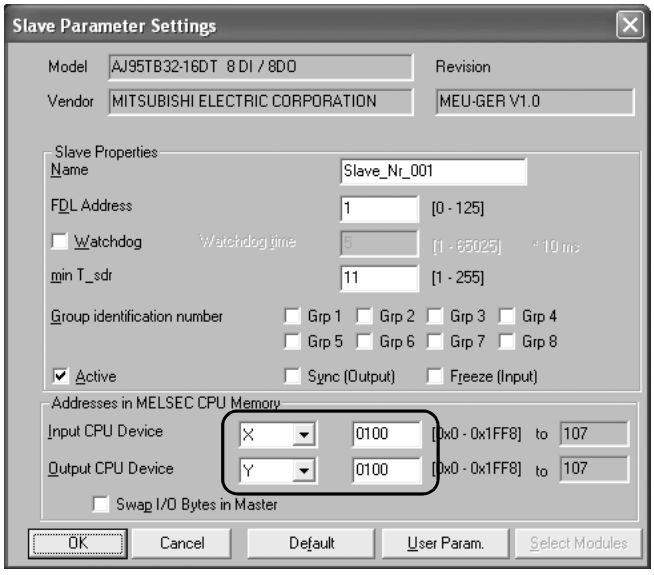
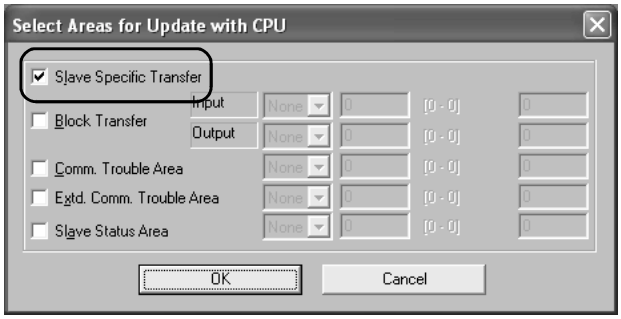
2) Set the devices used for automatic refresh in the slave parameters.
[Slave Parameter Settings]: Set the devices to Addresses in MELSEC CPU Memory.
The refresh point settings are not required because GX Configurator-DP automatically calculates from the slave parameters.
When the devices set to the input and output are bit devices, set their head numbers in increments of 16 points.



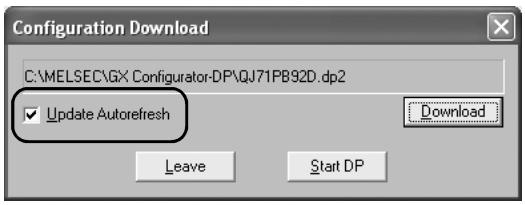
3) Enable the auto refresh settings made in the slave parameters.
Open [AutoRefresh Setting] in the [Setup] menu.
As the following screen appears, check Slave Specific Transfer.



POINT

You can use automatic block transfer to speed up I/O data transfer processing. To use this function, set I/O devices for Block Transfer in the above dialog box. At this time, the auto refresh setting preset with the slave parameters is disabled.
When the I/O devices set for Block Transfer are bit devices, set their head numbers in increments of 16 points.

4) Write the project file (*.DP2) of GX Configurator-DP, where the master parameters, slave parameters and auto refresh settings (IPARAM file) have been set, to the CPU module.
Open [Write to PB92D] in the [Action] menu.
As the following screen appears, check Update Autorefresh and click the Download button.



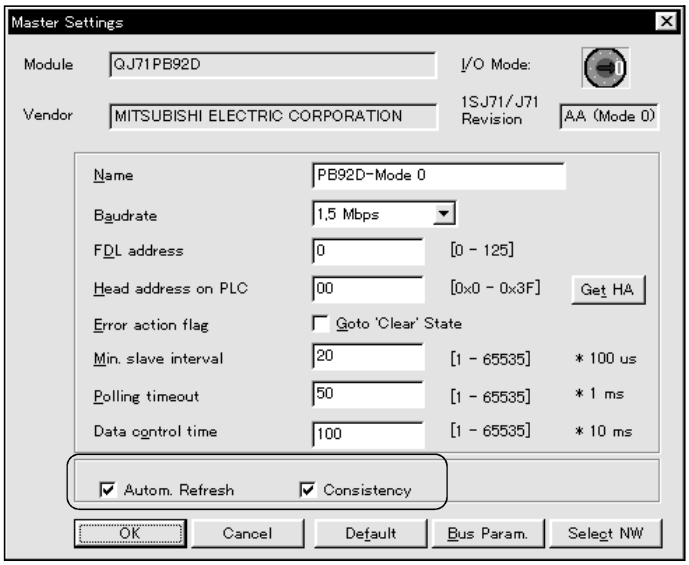
POINT

When the auto refresh settings (IPARAM file) are written to the CPU module using this package during GX Developer start-up, they are not displayed in "Read from PLC" or "Delete PLC data" and other file list of GX Developer.
Therefore, update the file list using the "Refresh view" button on the "Read from PLC" or "Delete PLC data" screen of GX Developer.

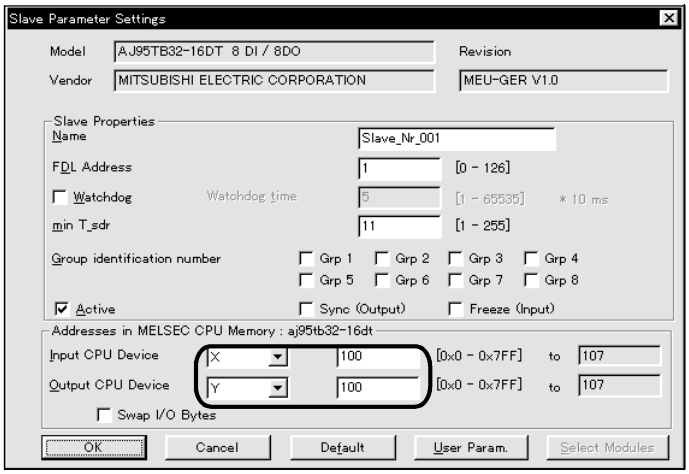
5) After writing the project file (*.DP2) of GX Configurator-DP, reset the CPU module.

(b) When using GX Configurator-DP Version 4

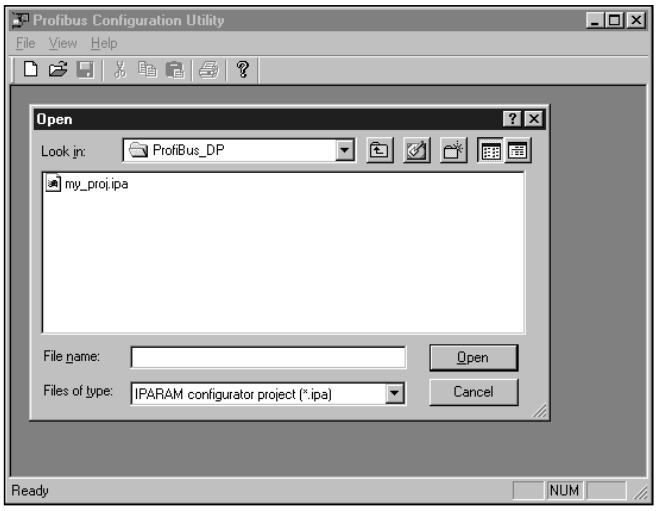
1) Make the automatic refresh setting in the master parameters.
[Master Settings] Autom. Refresh : Check
When executing separation prevention in the automatic refresh mode, check Consistency.



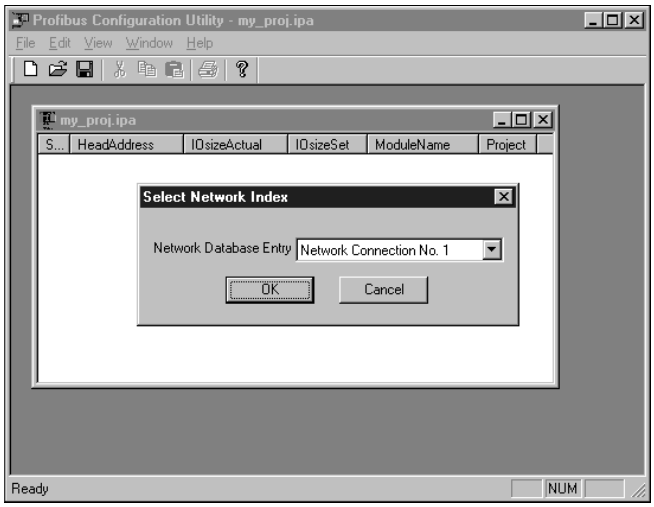
2) In the slave parameters, set the devices and head numbers used for automatic refresh.
Make settings using [Slave Parameter Settings]: Addresses in MELSEC CPU Memory.You need not set the numbers of refresh points since they are automatically calculated by GX Configurator-DP from the slave parameters.
When the devices set for input and output are bit devices, set the head numbers in increments of 16 points.



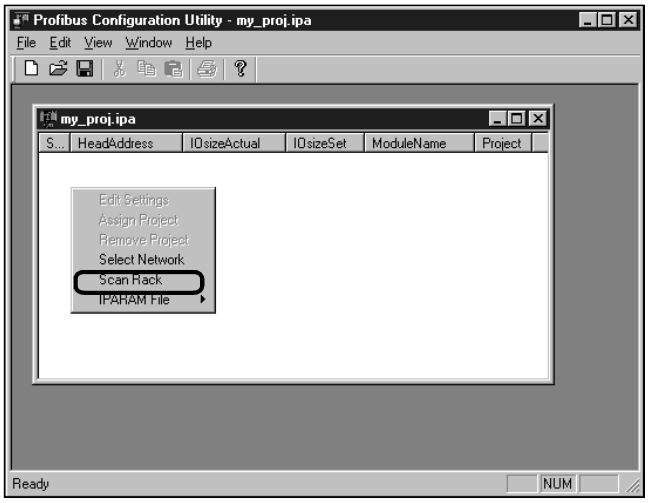
3) In the [Tools] menu, open [Profibus Configuration Utility].
In the PROFIBUS Configuration Utility main menu select File/New to create a new IPARAM configurator project or File/Open to open an existing project. Enter the file name for a new project or select an existing project from the browse list.



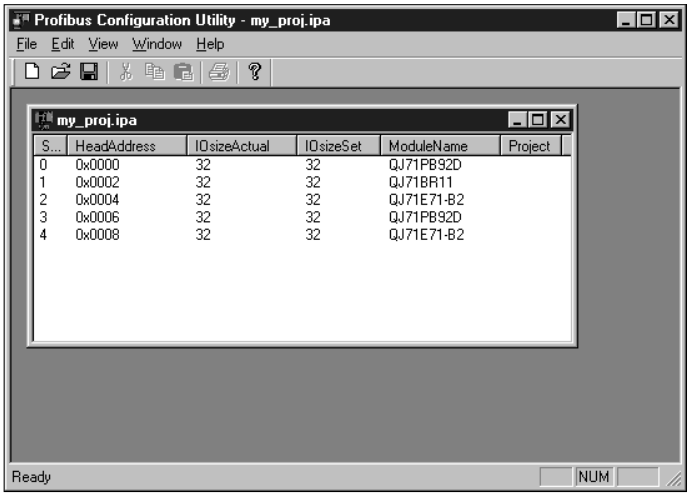
4) Before starting the communication with the PLC an entry in the network configuration atabase must be selected. Right-click on the project window to open the context menu and select Select Network to open the Select Network Index dialog.



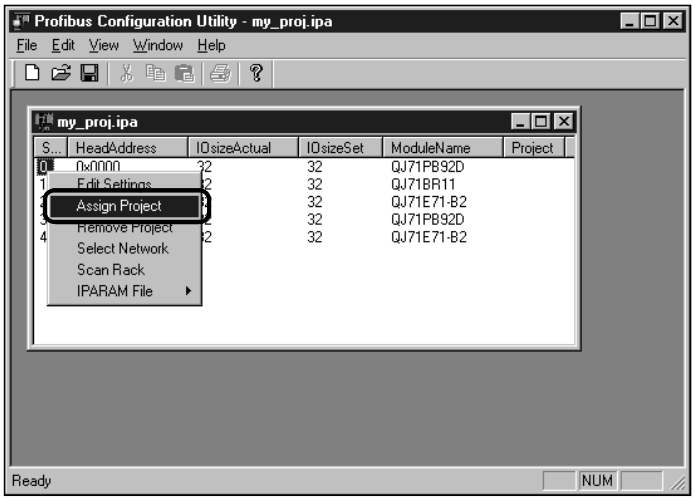
5) Right-click on the project window to open the context menu and select Scan Rack to obtain the list of boards in the rack.



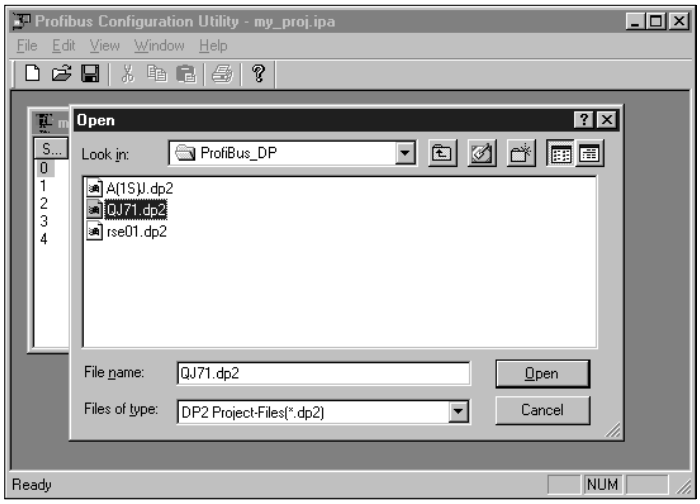
6) The information obtained from the CPU contains slot, head address, the actual IO length of the module as well as a preset IO length and module name.



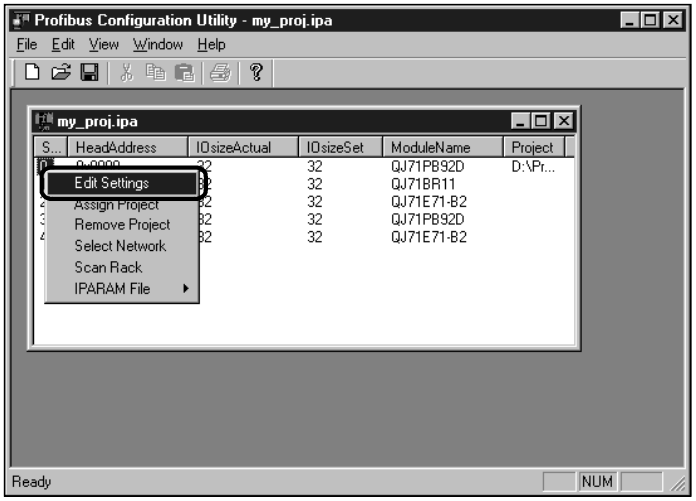
7) You have to assign a GX Configurator file to each master, for which you intend to include autorefresh settings in the IPARAM file.
Right-click on a DP master entry to select it and to open the context menu. From the context menu select Assign Project.
(The menu item Remove Project removes the assignment of a GX Configurator file to a master.)



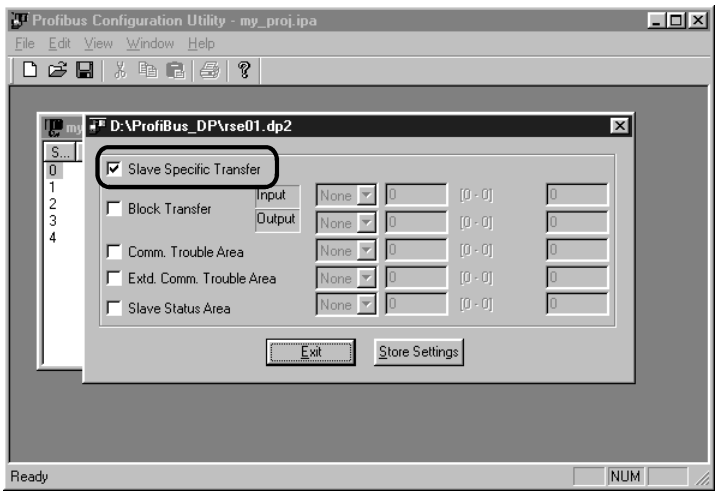
8) A file browser dialog opens where you can select a GX Configurator-DP file to be assigned to the selected DP master.



9) Right-click on a DP master entry to select it and to open the context menu. From the context menu select Edit Settings.



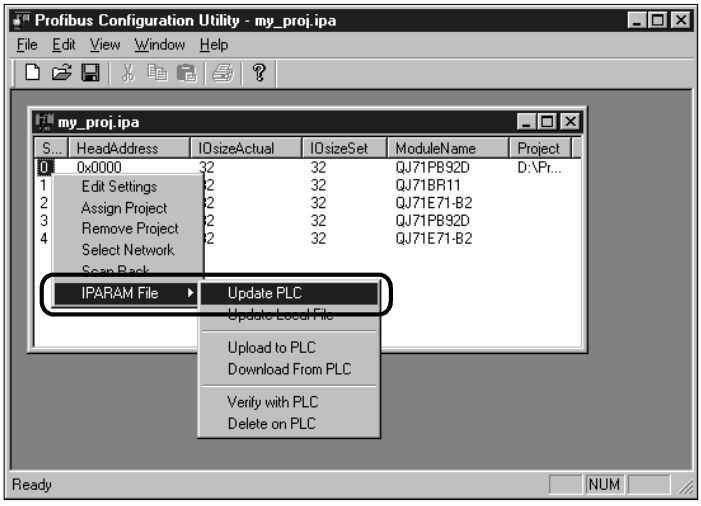
10) The autorefresh settings editor dialog box appears. Check Slave Specific Transfer.



POINT

You can use automatic block transfer to speed up I/O data transfer processing. To use this function, set I/O devices for Block Transfer in the above dialog box. At this time, the auto refresh setting preset with the slave parameters is disabled.
When the I/O devices set for Block Transfer are bit devices, set their head numbers in increments of 16 points.

11) Choose IPARAM File - Upload to PLC from the context menu and write the IPARAM parameters to the PLC CPU.



POINT

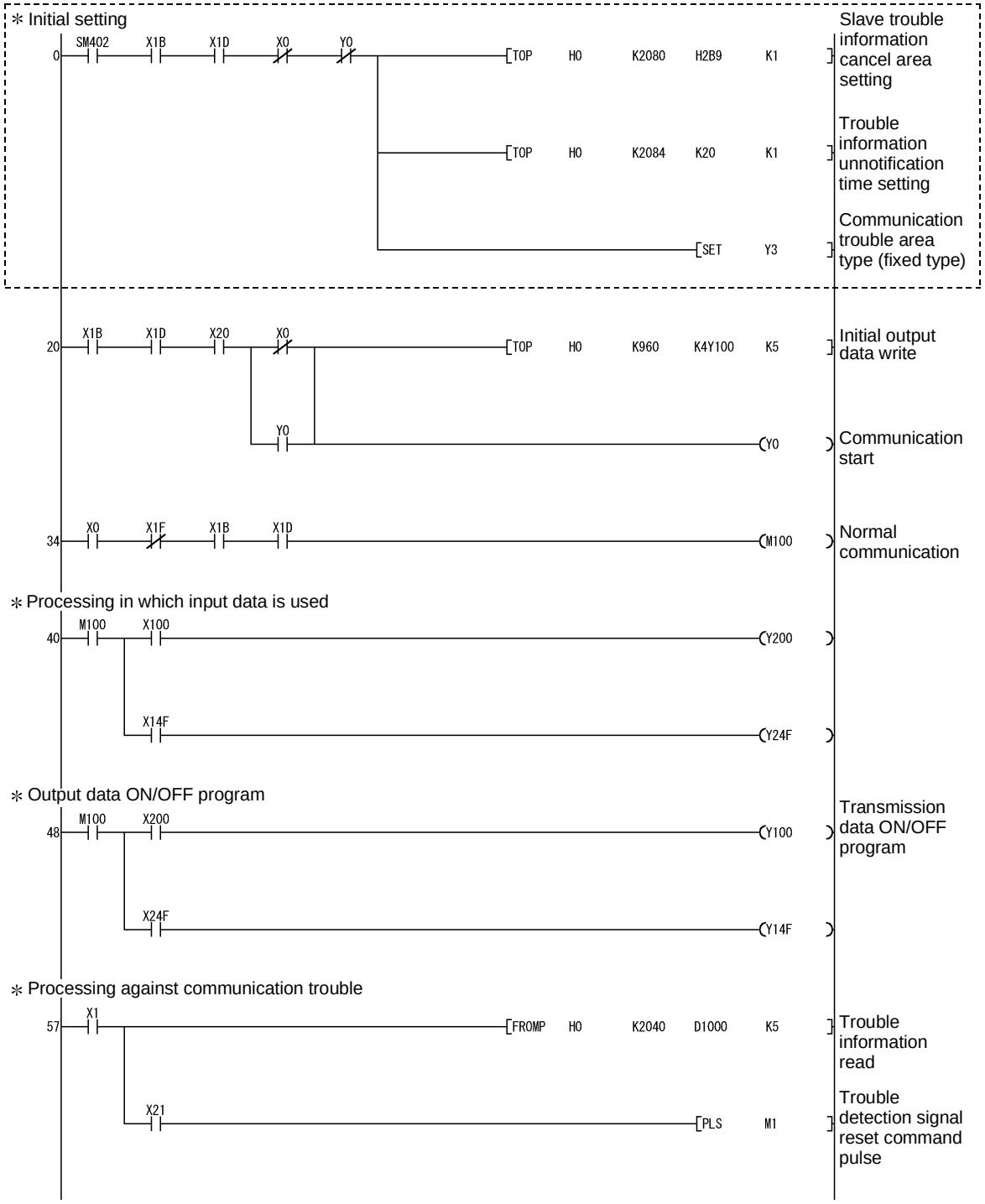
When IPARAM is written to the CPU module using this package during GX Developer start-up, it is not displayed in "Read from PLC" or "Delete PLC data" and other file list of GX Developer.
Therefore, update the file list using the "Refresh view" button on the "Read from PLC" or "Delete PLC data" screen of GX Developer.

12) After setting the IPARAM parameters, reset the CPU module.

(2) Program example

When the automatic refresh function is used, the read/write program is not required for the input/output areas.

Not required if the initial setting is not changed.



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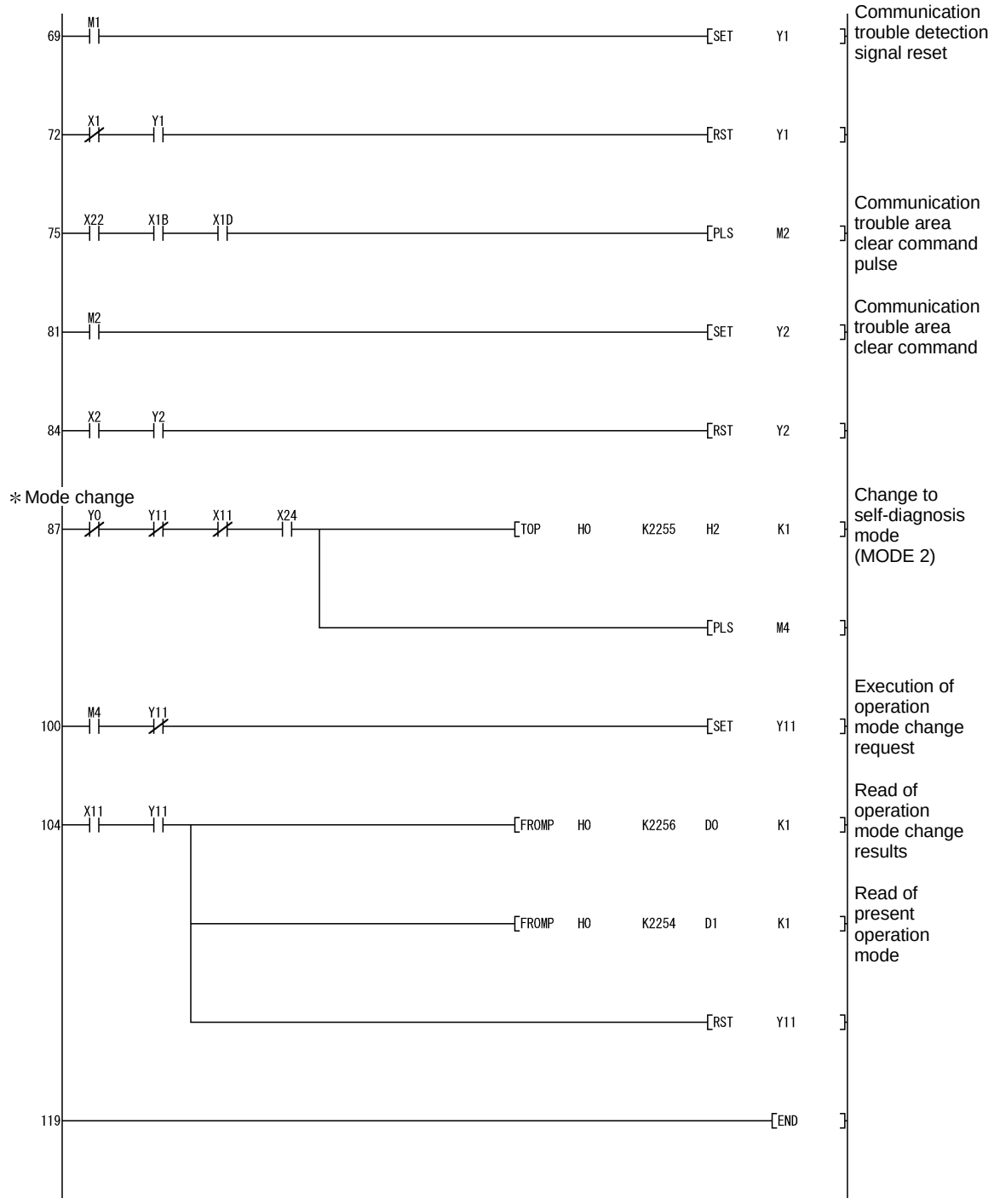
69 M1 SET Y1
Communication trouble detection signal reset
72 X1 Y1 RST Y1
75 X22 X1B X1D PLS M2
Communication trouble area clear command pulse
81 M2 SET Y2
Communication trouble area clear command
84 X2 Y2 RST Y2
* Mode change
87 Y0 Y11 X11 X24 TOP H0 K2255 H2 K1
Change to self-diagnosis mode (MODE 2)
PLS M4
100 M4 Y11 SET Y11
Execution of operation mode change request
104 X11 Y11 FROMP H0 K2256 D0 K1
Read of operation mode change results
FROMP H0 K2254 D1 K1
Read of present operation mode
RST Y11
119 END

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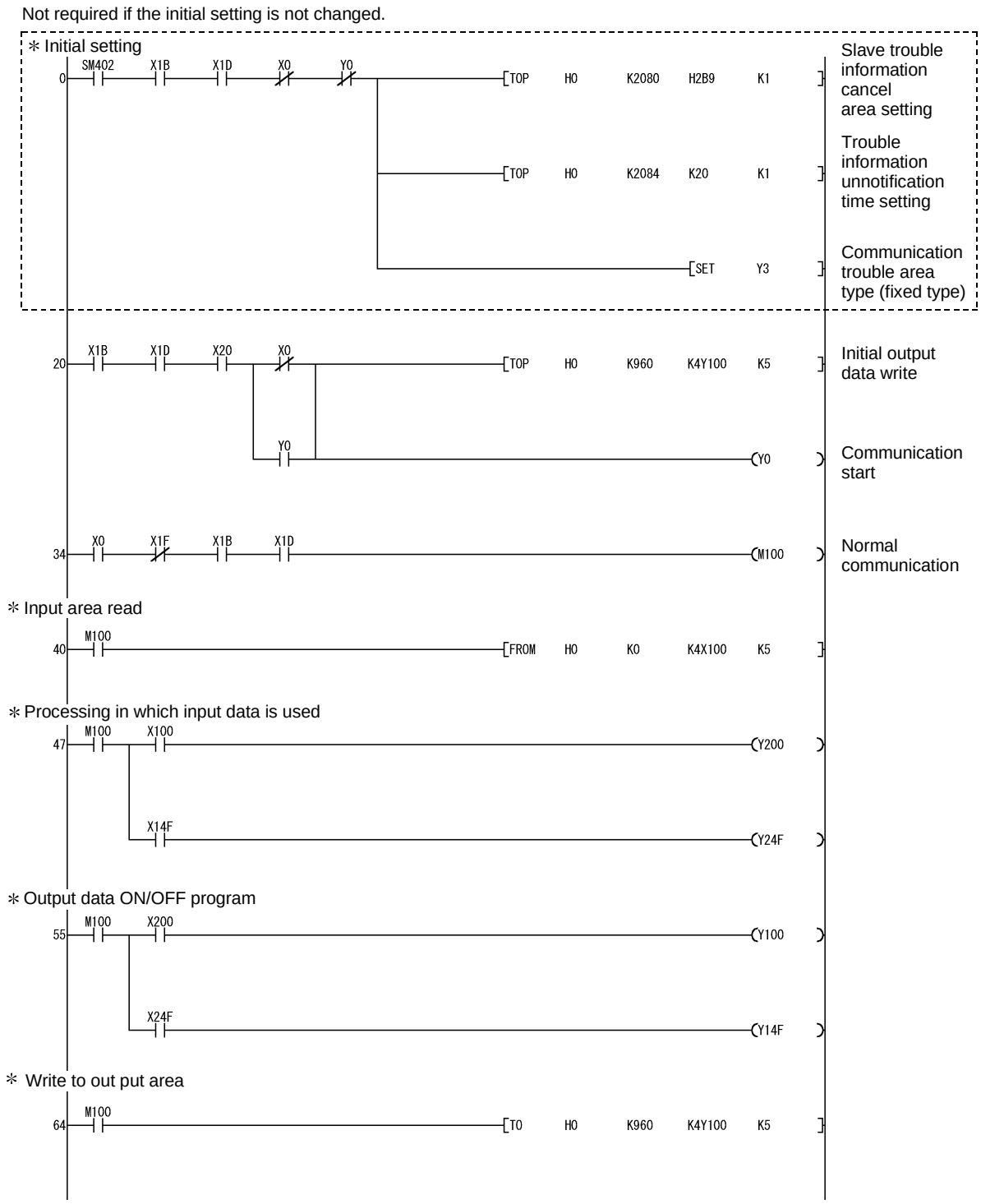
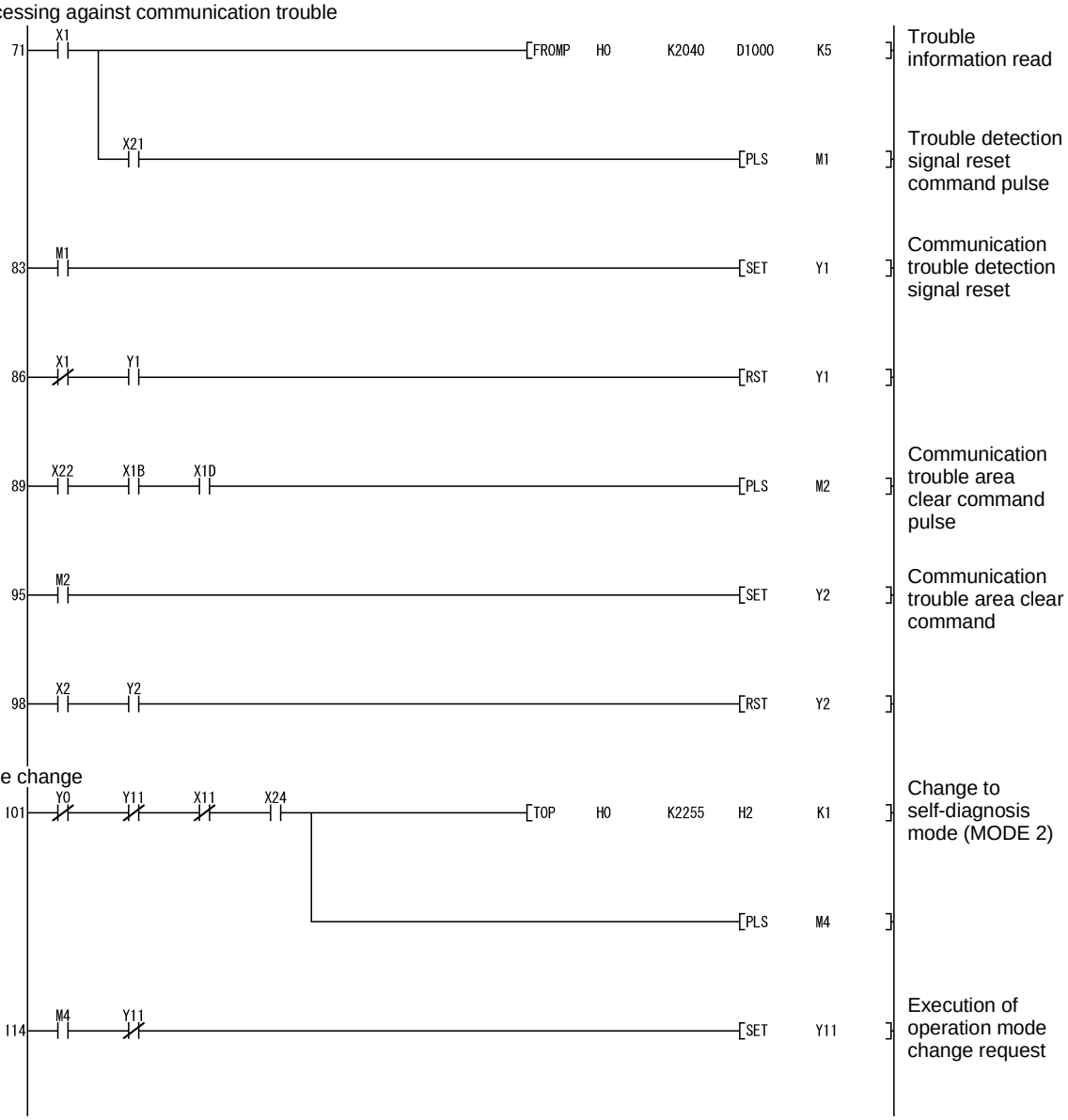
7.2 Normal Service Mode (MODE 0) Using FROM/TO Instruction

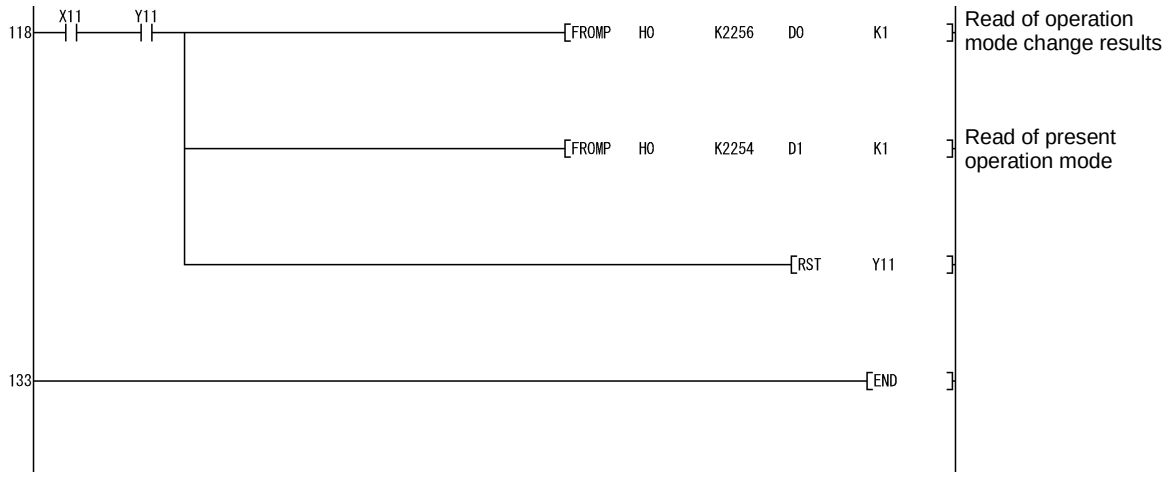
The following shows the program example used when the I/O data is read/written using the FROM/TO instruction in the Normal service mode (MODE 0).



* Processing against communication trouble

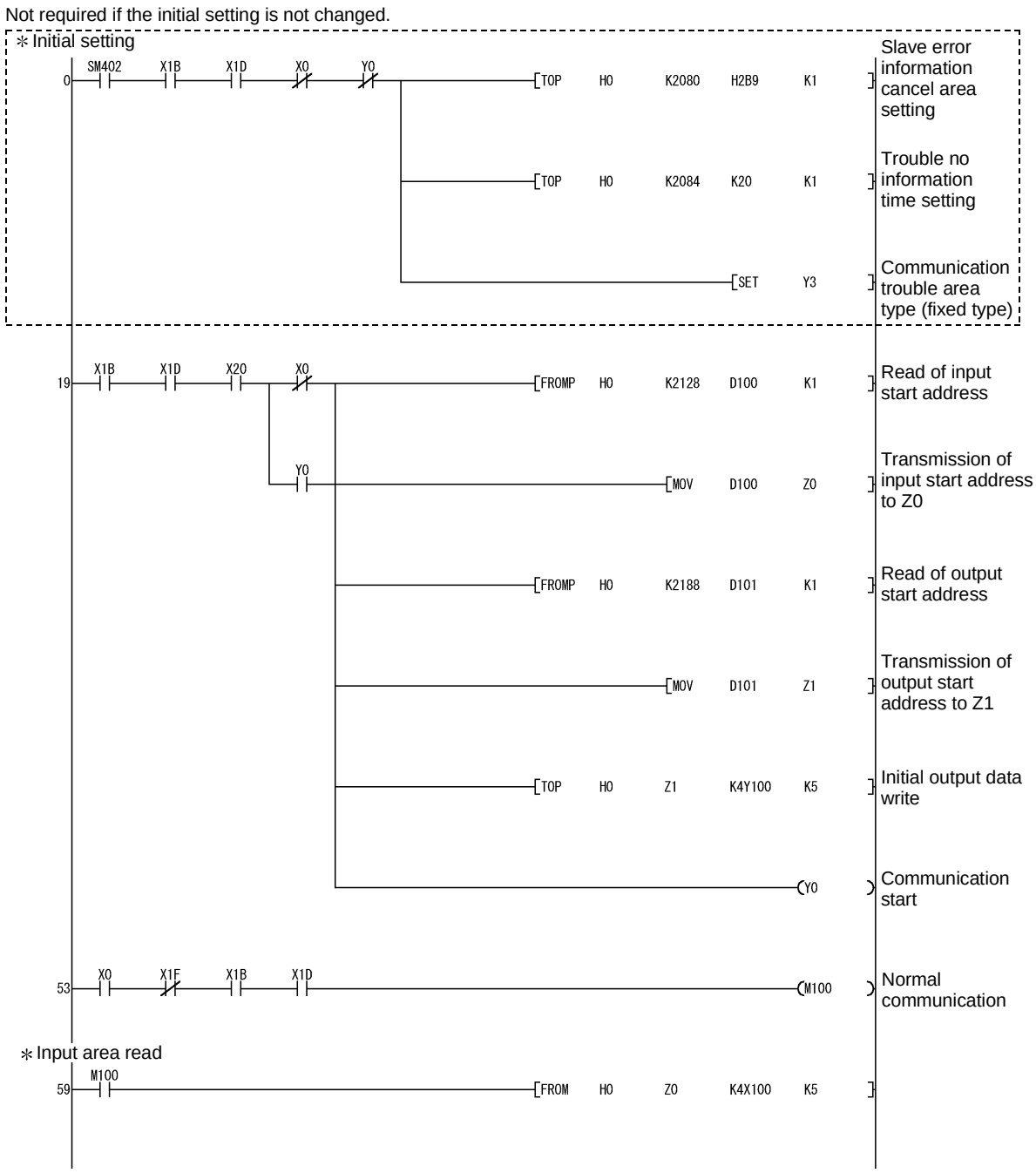


* Mode change


X11
Y11
118
FROMP H0 K2256 D0 K1
Read of operation mode change results
FROMP H0 K2254 D1 K1
Read of present operation mode
RST Y11
133
END

7.3 Extended Service Mode (MODE E) Using FROM/TO Instruction

The following shows the program example used when the I/O data is read/written using the FROM/TO instruction in the Extended service mode (MODE E).



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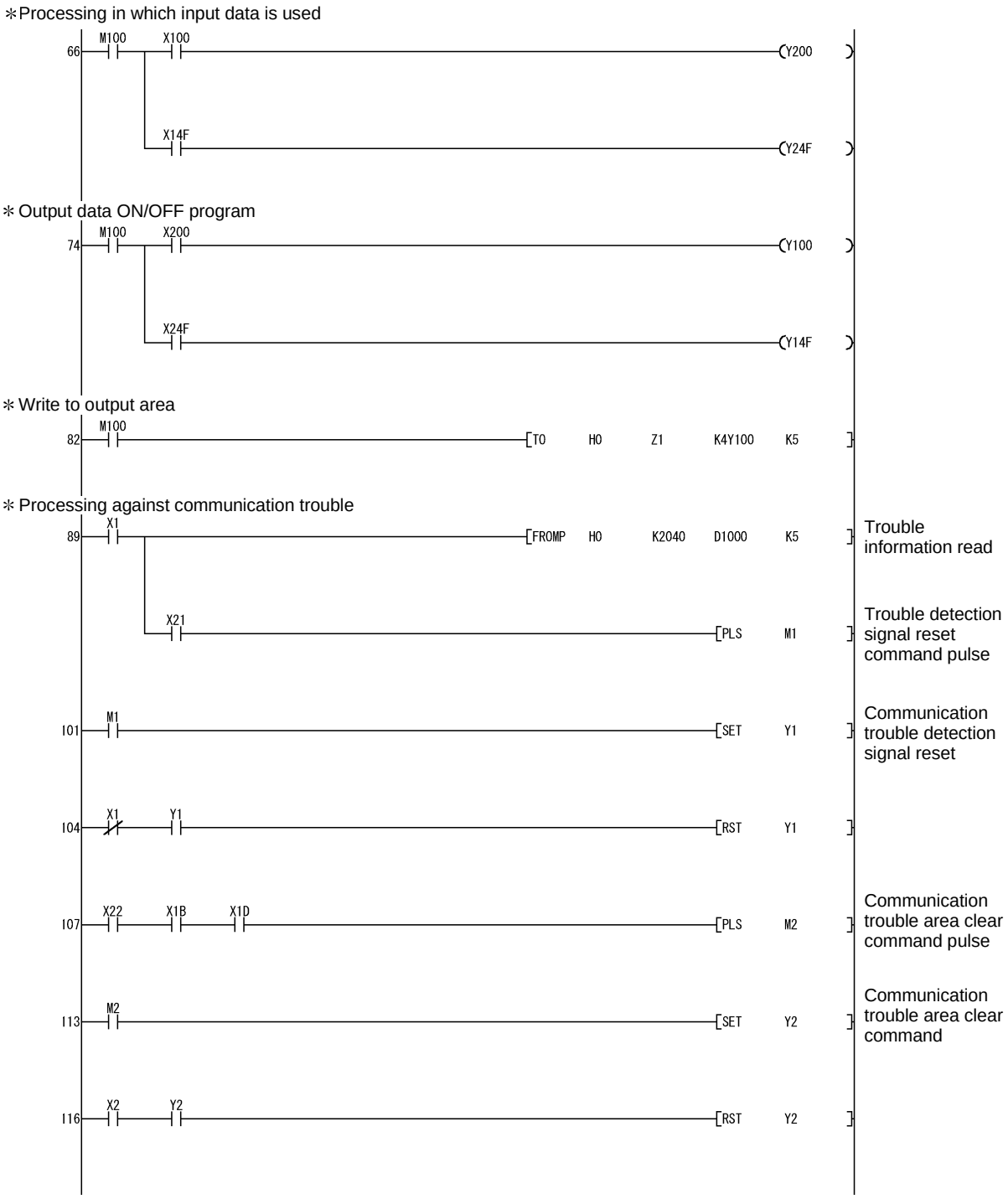
*Processing in which input data is used
66
M100
X100
Y200
X14F
Y24F
* Output data ON/OFF program
74
M100
X200
Y100
X24F
Y14F
* Write to output area
82
M100
TO H0 Z1 K4Y100 K5
* Processing against communication trouble
89
X1
FROMP H0 K2040 D1000 K5
Trouble information read
X21
PLS M1
Trouble detection signal reset command pulse
101
M1
SET Y1
Communication trouble detection signal reset
104
X1
Y1
RST Y1
107
X22
X1B
X1D
PLS M2
Communication trouble area clear command pulse
113
M2
SET Y2
Communication trouble area clear command
116
X2
Y2
RST Y2

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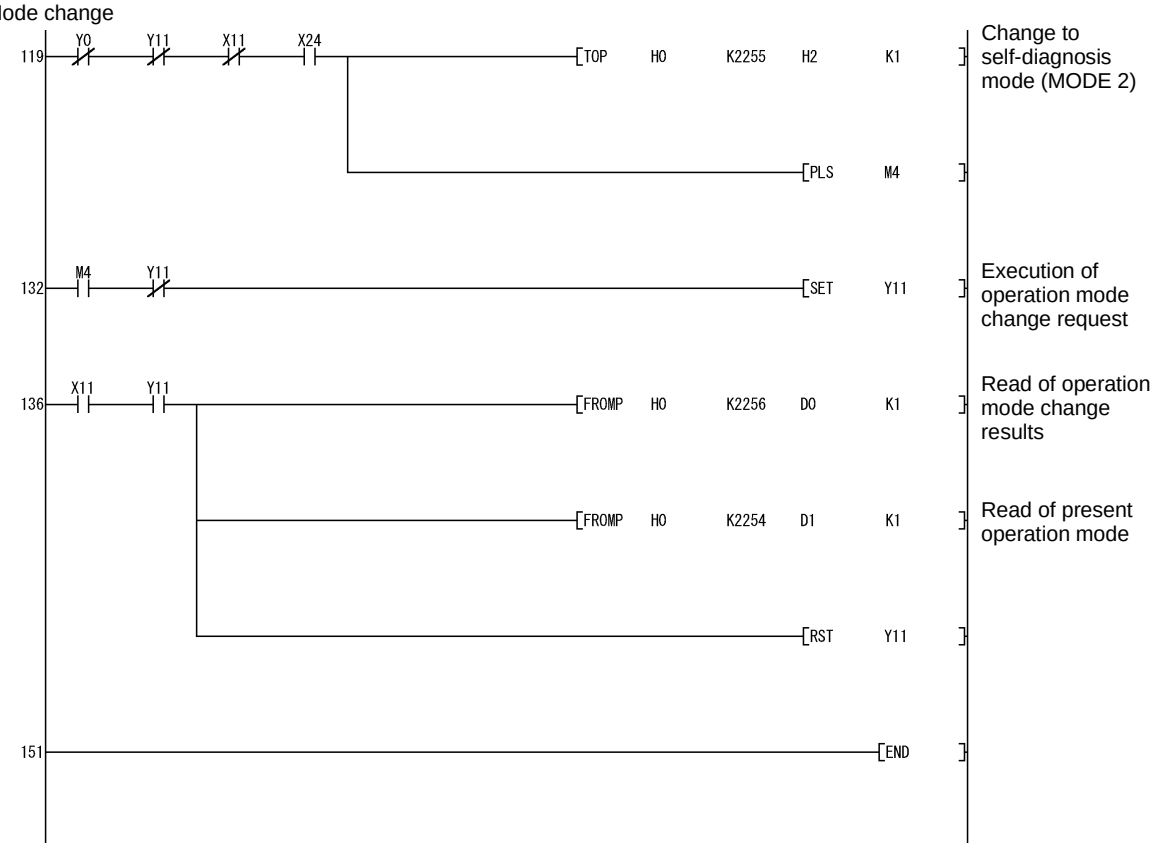
* Mode change



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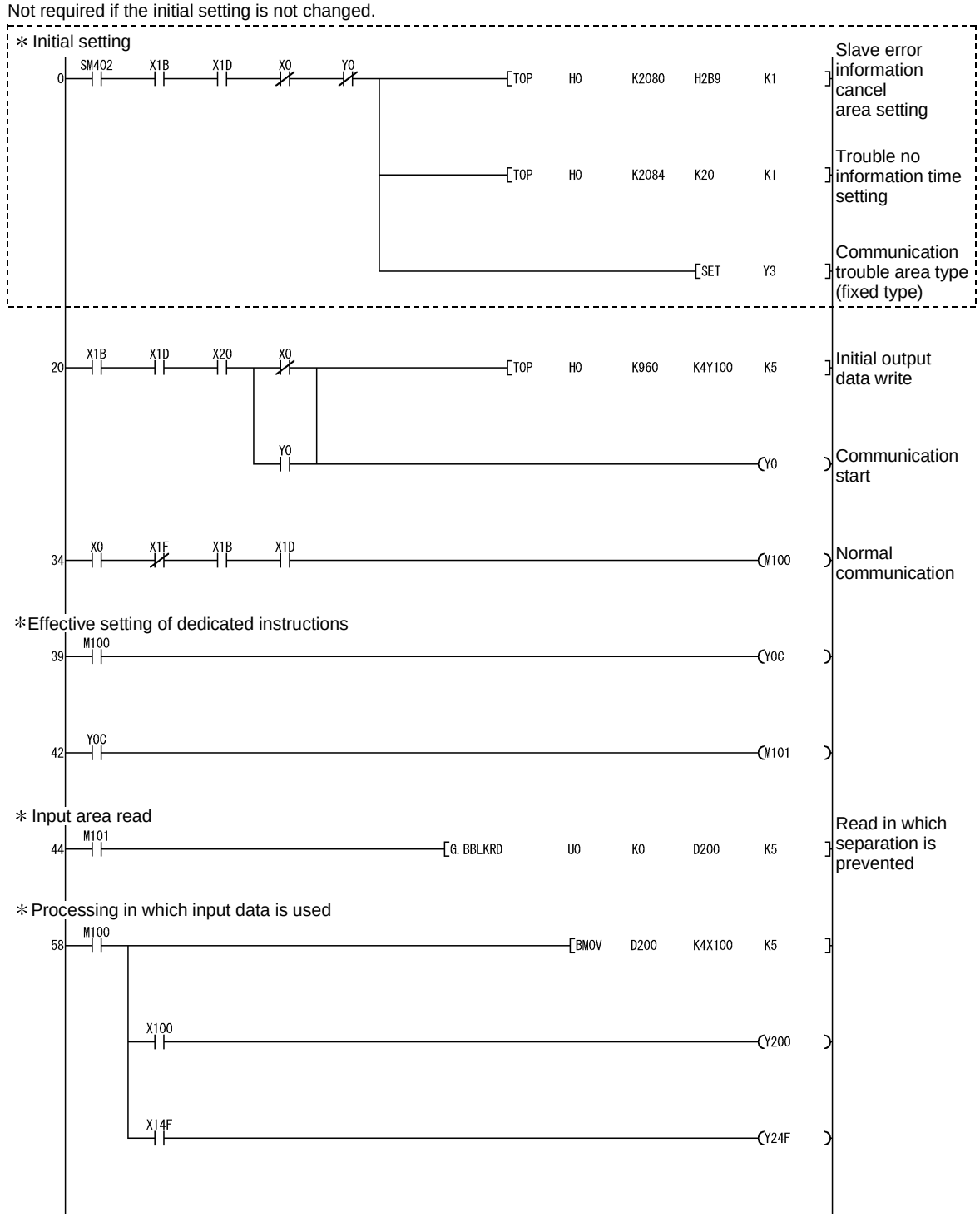
7.4 Normal Service Mode (MODE 0) Using Dedicated Instruction

The following shows the program example used when the I/O data is read/written using the dedicated instruction for separation prevention in the Normal service mode (MODE 0).

Not required if the initial setting is not changed.



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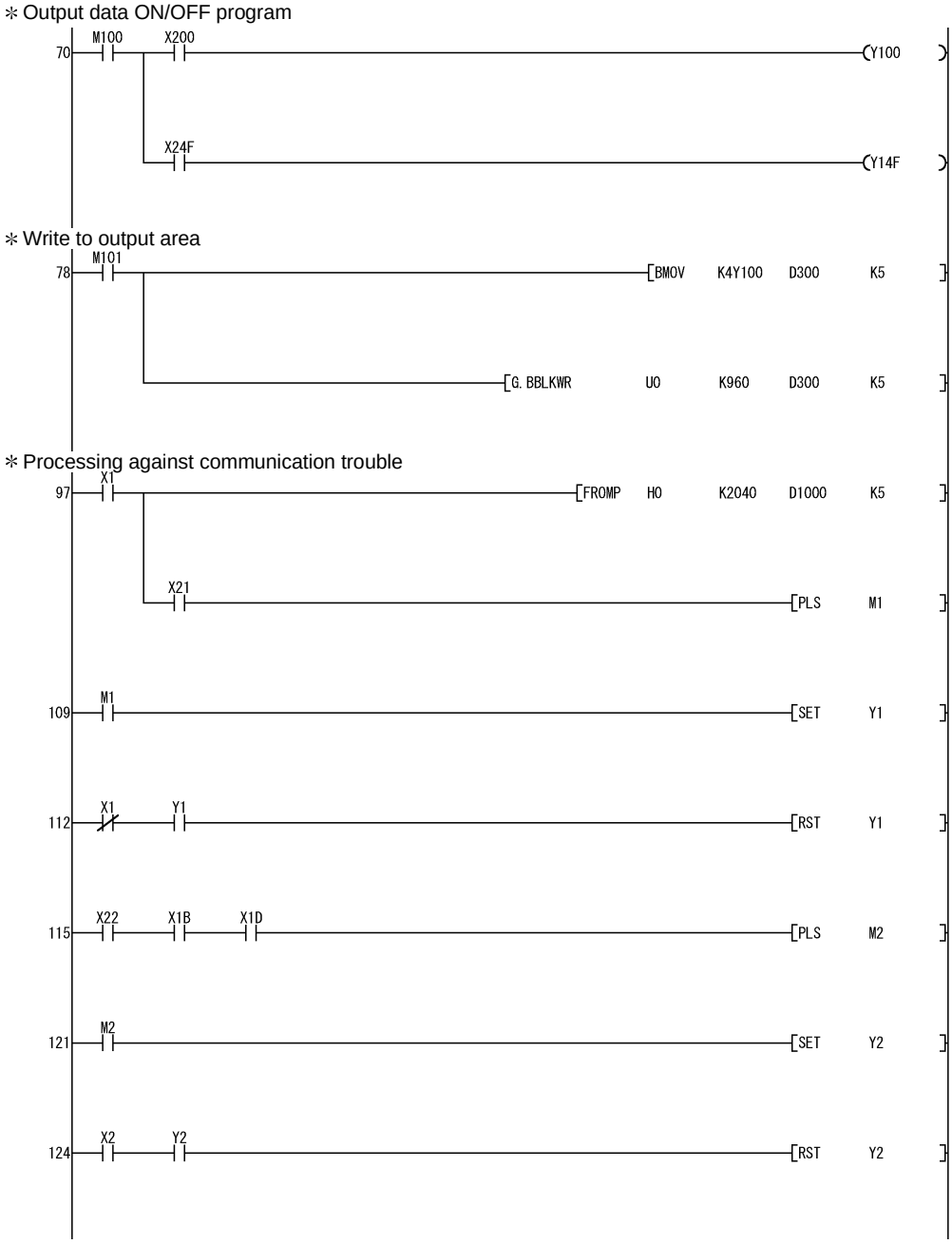
∗ Output data ON/OFF program



∗ Write to output area

∗ Processing against communication trouble

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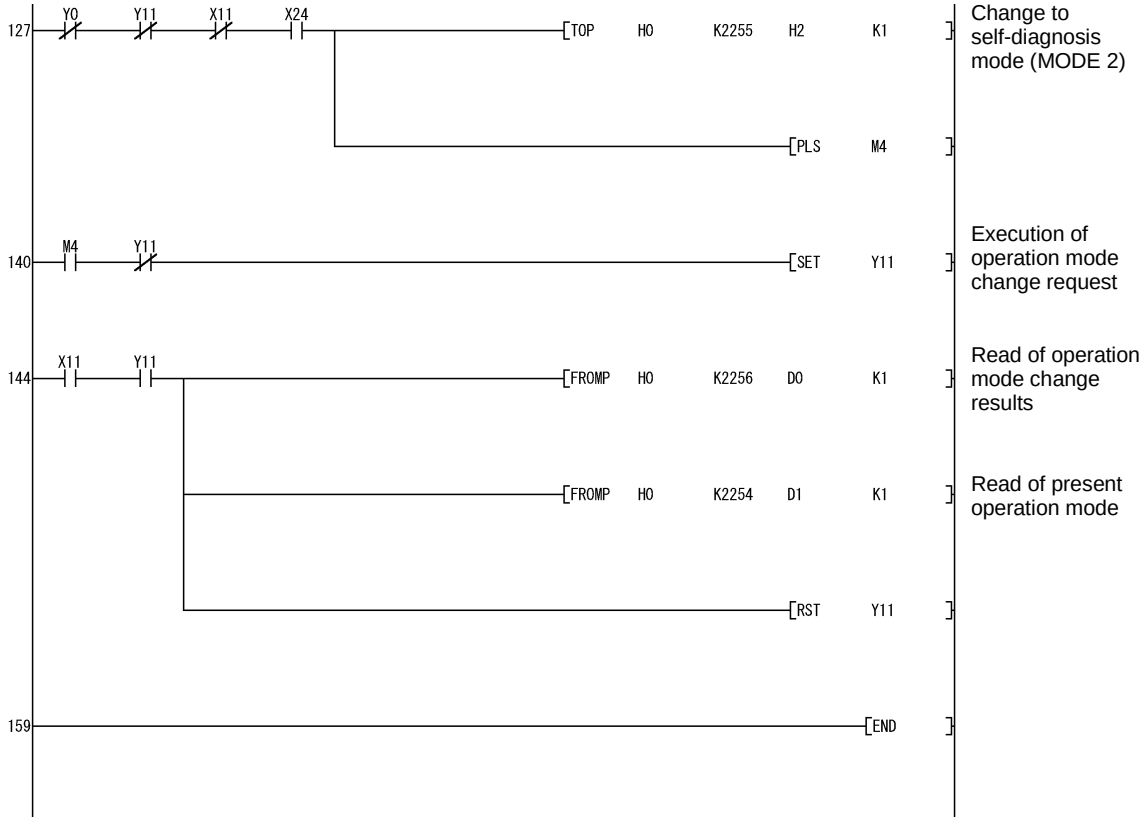
＊Mode change



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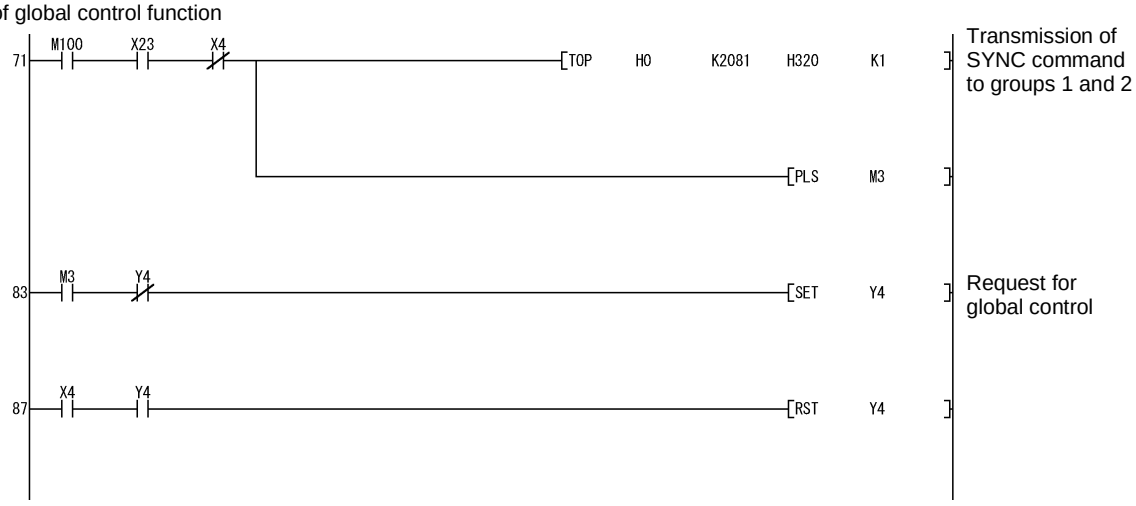
7.5 Execution of Global Control

The following shows the program example added when the global control is executed. The operation mode and I/O data read/write methods are not related to this program example.

* Use of global control function



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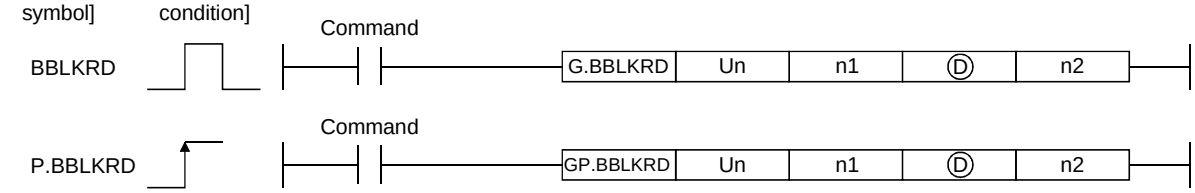
8. DEDICATED INSTRUCTIONS

8.1 BBLKRD Instruction

Set data	Usable devices								
	Internal device (System, user)		File register	MELSECNET/H Direct J□\□		Special function module U□\G□	Index register Z□	Constant K, H	Other
	Bit	Word		Bit	Word				
n1	—	○		—			—	○	—
Ⓓ	—	○		—			—	—	—
n2	—	○		—			—	○	—

[Instruction symbol] [Execution condition]



Setting Data

Setting data	Detail	Set Range	Data Type
Un	Module head I/O number of QJ71PB92D	0 to FFH	BIN16 bit
n1	Head address of data to be read	Specified device area	
Ⓓ	Head number of device in which read data is stored	Specified device area	Device name
n2	Number of reading data	1 to 1920 (1 to 780H)	BIN16 bit

Function

The data is read from the buffer memory of the specified module with the signals prevented from being separated.

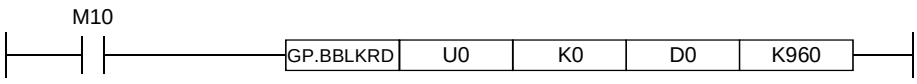
Error

If the following event is encountered, an operation error will occur (Error code: 4101).

- A value out of the set range is set for the set data.
- The size of the data obtained by adding the number of data to be read to the head address of the data to be read exceeds the buffer memory size.
- The number of data to be read for the head address and subsequent is less than the number of reading data.

Program Example

Program for reading, with M10 = ON, the data amounting to 0 to 960 buffer memory addresses of QJ71PB92D (module head I/O number: 0) to D0 to D959 with the signals prevented from being separated.



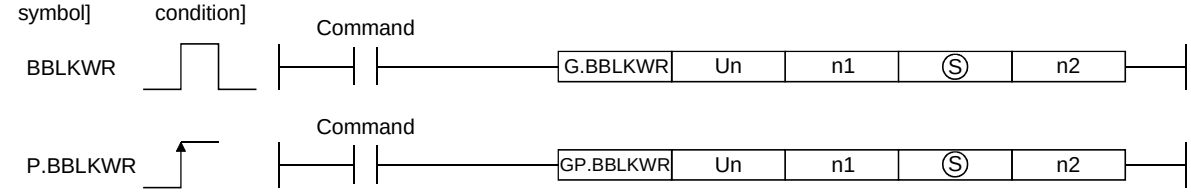
POINT

Execute BBLKRD and BBLKWR for each scanning, respectively.
If either of BBLKRD and BBLKWR is used, the transmission delay time will be longer.

8.2 BBLKWR Instruction

Set data	Usable devices								
	Internal device (System, user)		File register	MELSECNET/H Direct J□\□		Special function module U□\G□	Index register Z□	Constant K, H	Other
	Bit	Word		Bit	Word				
n1	—	○		—			—	○	—
Ⓢ	—	○		—			—	—	—
n2	—	○		—			—	○	—

[Instruction symbol] [Execution condition]



Setting Data

Setting data	Detail	Set Range	Data Type
Un	Module head I/O number of QJ71PB92D	0 to FFH	BIN16 bit
n1	Head address for data writing	Specified device area	
Ⓢ	Head number of device in which write data is stored	Specified device area	Device name
n2	Number of writing data	1 to 960 (1 to 3C0H)	BIN16 bit

Function

The data is written to the buffer memory of the specified module with the signals prevented from being separated.

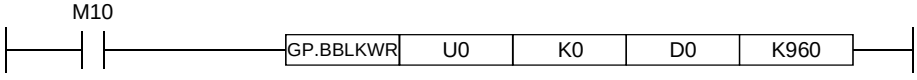
Error

If the following event is encountered, an operation error will occur (Error code: 4101).

- A value out of the set range is set for the set data.
- The size of the data obtained by adding the number of data to be written to the head address for data writing exceeds the buffer memory size.
- The number of data to be written for the head address and subsequent is less than the number of writing data.

Program Example

Program for writing, with M10 = ON, the data amounting to 0 to 960 buffer memory addresses of QJ71PB92D (module head I/O number: 0) to D0 to D959 with the signals prevented from being separated.



POINT

Execute BBLKRD and BBLKWR for each scanning, respectively.
If either of BBLKRD and BBLKWR is used, the transmission delay time will be longer.

9. TROUBLESHOOTING

For troubleshooting in the Normal service mode (MODE 0) and Extended service mode (MODE E), the causes of errors, which are located using the status of LEDs, and measures against the errors are described below.
When the operation is in the Normal service mode (MODE 0) or Extended service mode (MODE E), the TEST LED indicator and PRM SET LED indicator of QJ71PB92D go off.

LED	Status	Cause	Corrective Action
RUN	Goes OFF	The watchdog timer monitoring time is exceeded.	Please consult your sales representative.
SD/RD	Flashes at a high rate	There is a slave station with which the initial communication cannot be performed (The parameter does not match the actual slave station).	Please consult your sales representative.
TOKEN	Goes OFF	The token is not cycled.	• Make sure that the PROFIBUS-DP cable is connected. • Check the terminating resistance set switch for correct function. • Make sure that the station addresses are not overlapped with each other. • Make sure that the HSA does not exceed the maximum station address of the network.
PRM SET	Flashes	The parameter is not set.	Set the parameters using the GX Configurator-DP.
		The parameters in the flash ROM have been corrupted.	Refer to Section 9.1.
RSP ERR	Goes ON	A communication trouble occurs.	Read the trouble information from the communication trouble information area of the buffer memory.
FAULT	Goes ON	• An active slave station is not set for the parameter. • A slave station having a station address overlapped with that of the master station is set for the parameter.	Correct the parameters.
		The parameters in the flash ROM have been corrupted.	Refer to Section 9.1.
		• An unexpected error other than those specified above occurs.	Please consult your sales representative.

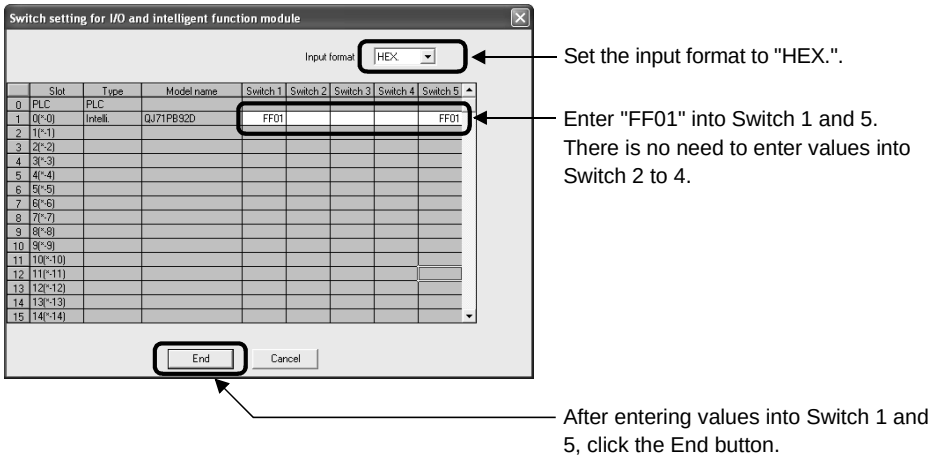
9.1 Initialization of Flash ROM When Parameters are Corrupted

When the PRM SET LED is flickering or the FAULT LED has turned on, the parameters in the flash ROM may have been corrupted.
If the parameters in the flash ROM have been corrupted, initialize the flash ROM by performing the following steps (1) to (10).

(1) Set the CPU module to the STOP status.

(2) Read the file (PLC parameter) from the CPU module using GX Developer.

(3) In the I/O assignment settings of the PLC parameter dialog box, make the switch settings of the QJ71PB92D as shown below.

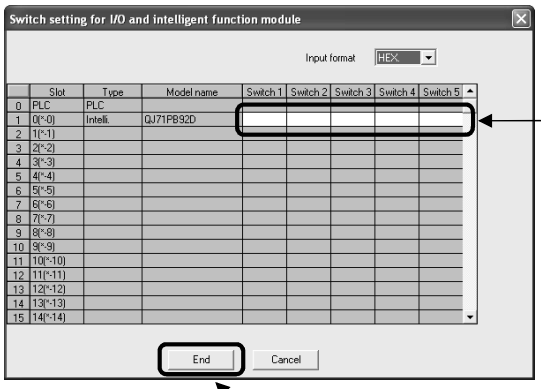


(4) Write the new PLC parameters to the CPU module, and reapply the power or reset the CPU module.

(5) When the processing in Step (4) is performed, the QJ71PB92D starts up in the parameter setting mode (MODE 1).
Perform the following steps 1) to 11) by the Device test of GX Developer to initialize the flash ROM.
1) Write "9_H" to the buffer memory address 2255 ($8CF_H$) of the QJ71PB92D.
2) Turn ON the operation mode change request signal (Y11).
3) When the operation mode change completion signal (X11) has turned ON, turn OFF the operation mode change request signal (Y11).
4) Write "F_H" to the buffer memory address 2255 ($8CF_H$) of the QJ71PB92D.
5) Turn ON the operation mode change request signal (Y11).
6) When the operation mode change completion signal (X11) has turned ON, turn OFF the operation mode change request signal (Y11).
7) Write "A_H" to the buffer memory address 2255 ($8CF_H$) of the QJ71PB92D.
8) Turn ON the operation mode change request signal (Y11).
9) When the operation mode change completion signal (X11) has turned ON, turn OFF the operation mode change request signal (Y11).
10) The TEST LED turns ON and the initialization of the flash ROM starts.
11) When the TEST LED turns OFF, the initialization of the flash ROM is completed.

(6) Read the file (PLC parameter) from the CPU module using GX Developer.

(7) In the I/O assignment settings of the PLC parameter dialog box, delete the switch settings of the QJ71PB92D.



Delete settings of Switch 1 and 5.

After deleting settings of Switch 1 and 5, click the End button.

(8) Write the PLC parameters, whose switch settings have been deleted, to the CPU module, and reapply the power or reset the CPU module.

(9) When the PRM SET LED turns ON, the initialization of the flash ROM is normally completed. (The QJ71PB92D has returned to the initial status.)
If the PRM SET LED does not turn ON, please contact your local Mitsubishi representative.

(10) When the PRM SET LED has turned ON, write the parameters of the QJ71PB92D using GX Configurator-DP.

APPENDIX

Appendix 1 Differences between QJ71PB92D and AJ71PB92D/A1SJ71PB92D

The differences between QJ71PB92D of MELSEC-Q series and AJ71PB92D/A1SJ71PB92D of MELSEC-A series are shown below.
The AJ71PB92D and A1SJ71PB92D to be used here are of software version C and subsequent and software version G and subsequent, respectively.
For the modules of the software versions earlier than those stated above, refer to the AJ71PB92D/A1SJ71PB92D type PROFIBUS-DP interface module user's manual (SH-3330) to confirm the difference between these software versions.

(1) Functions and specifications

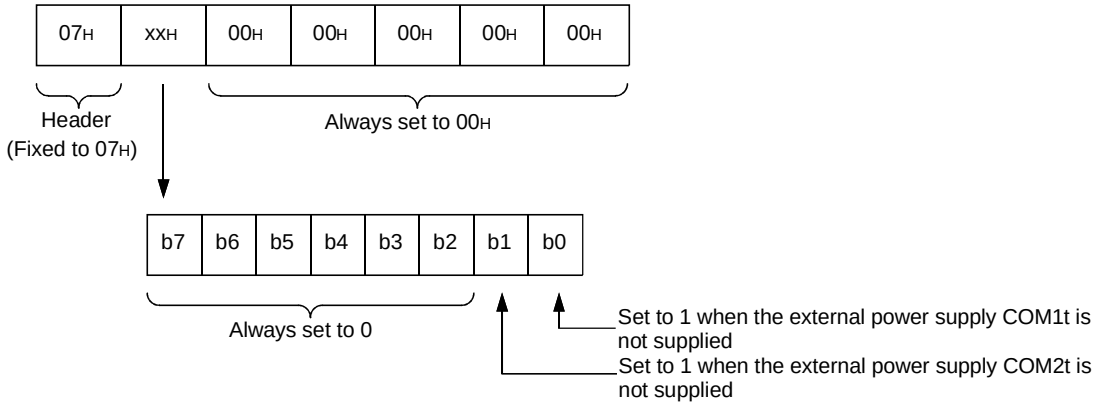
Item \ Model name	QJ71PB92D	AJ71PB92D/A1SJ71PB92D
Separation prevention function (auto refresh, dedicated instruction)	Present	Absent
Separation prevention function (FROM/TO instruction)	Absent	Present
Auto refresh setting	Present	Absent
Word data swap function	Present	Absent
Operation mode setting method	• GX Configurator-DP • Sequence program	• Sequence program • Mode set switch
Parameter writing by configuration software	Connected to RS-232 connector of QCPU (Q mode) or USB connector	• Connected to RS-232C interface of AJ71PB92D/A1SJ71PB92D • Connected to RS-422 of CPU module
Remote parameter setting	via. MELSECNET/H and Ethernet	via. MELSECNET/10 and Ethernet
Compatible configuration software	GX Configurator-DP	SW05F-PROFIMAP MELSEC-PROFIMAP 1.0 MELSEC-PROFIMAP 2.0 MELSEC-PROFIMAP 3.0 GX Configurator-DP

App

Appendix 2 Extended Trouble Information of Mitsubishi's Slaves

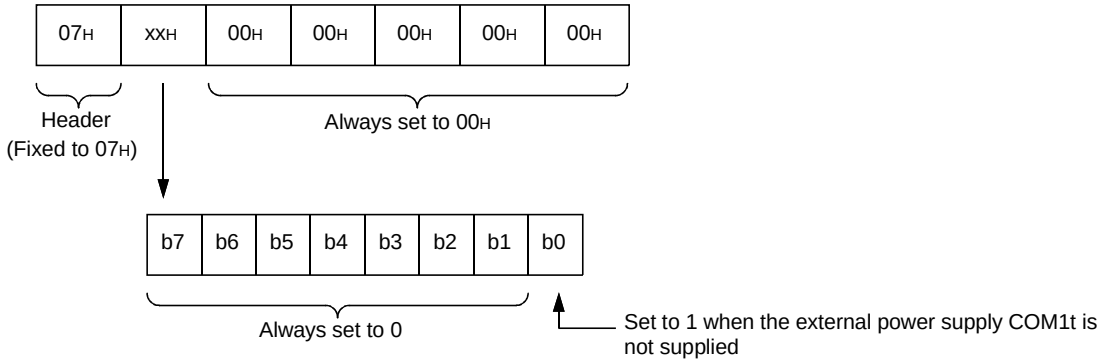
(1) AJ95TB2-16T

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



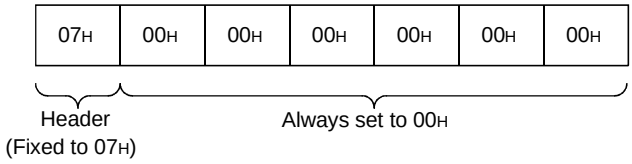
(2) AJ95TB32-16DT

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



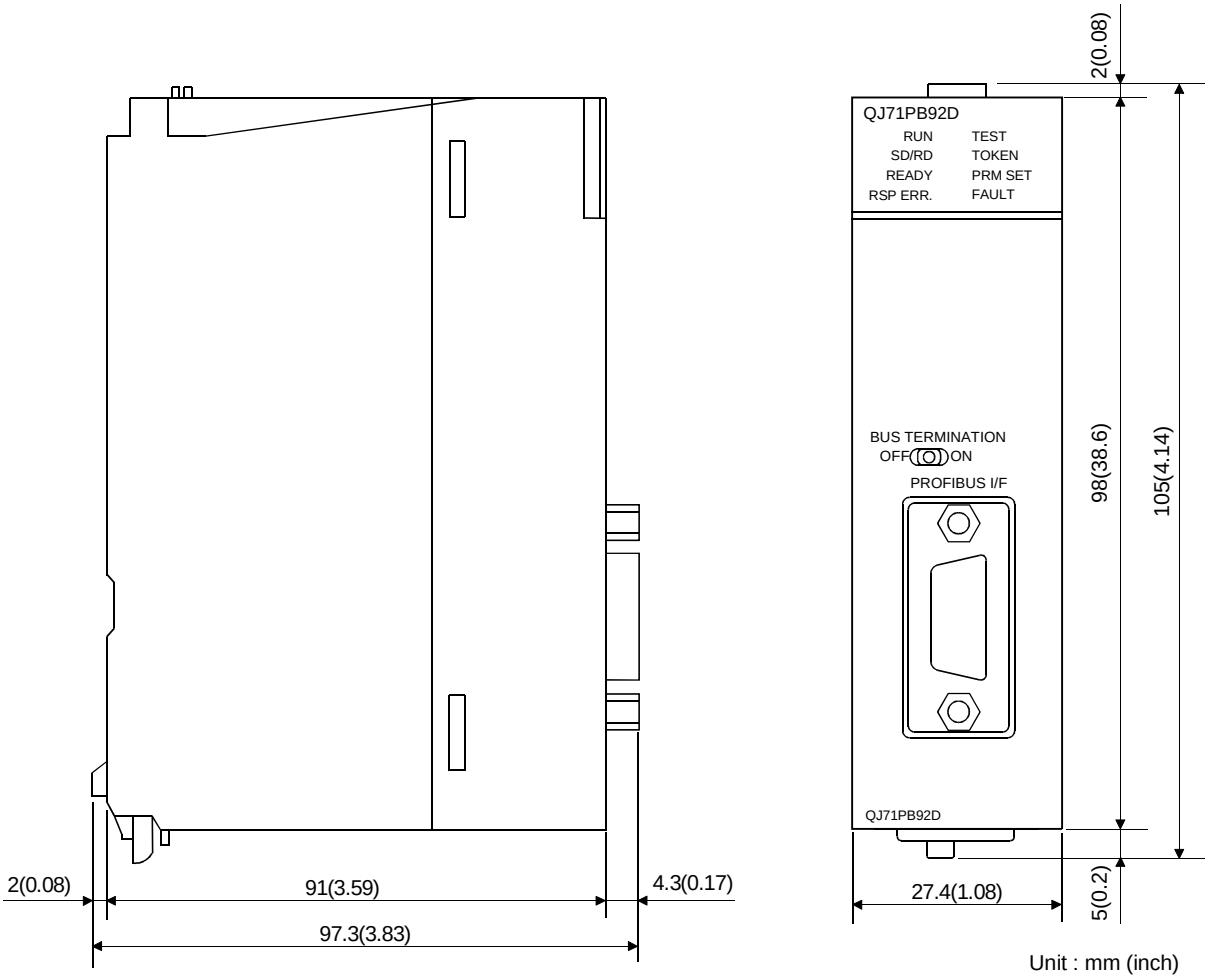
(3) AJ95TB3-16D

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



App

Appendix 3 Outline Drawings



Unit : mm (inch)

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WARRANTY

Please confirm the following product warranty details before starting use.

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 dealer or Mitsubishi Service Company. Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

[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 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 possible 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 chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

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 logic 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 logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi general-purpose programmable logic 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 National Defense purposes shall be excluded from the programmable logic controller applications.

Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.

When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

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