# MELSEC Q

Programmable Logic Controllers

User's Manual

# Profibus/DP Slave
# QJ71PB93D

Art. no.: 145597
01 03 2002
SH 080318E-A

# • 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) so that the system can operate safely.
  Erroneous outputs and mis-operation could cause accidents.
  (1) The input data from the master station remains unchanged from the data prior to the communication error.
  (2) When the master station becomes faulty, the output status of the QJ71PB93D will be as in the parameter settings of the master station.
  (3) When any QJ71PB93D is down, the output state of other slave stations will be in accordance with the parameter settings of the master station.
- Do not output (turn on) the "prohibited to use" signal as the output signal to an intelligent function module from the CPU module.
  Writing data into the "system area" or outputting a signal for "prohibited to use" may cause system malfunction in the PLC.

### ⚠ 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 the environment that meets the general specifications given in the CPU Module 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.
- To mount the module correctly, insert the module fixing hook into the corresponding fixing hole on the base unit while pressing the module mounting lever on the bottom of the module.
  The module may misoperate, fail or drop if it is not correctly mounted.
  The module should be securely screwed in the environment where the vibration frequently occurs.
- 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.
- A label is installed at the upper part of a module to prevent the entry of foreign matters. Do not remove the label during wiring. However, be sure to remove it for heat dissipation during system operation.

## [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.

## [DISPOSAL PRECAUTIONS]

### ⚠ CAUTION

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


A - 3

REVISIONS

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

| Print Date | * Manual Number | Revision |
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Japanese Manual Version SH-080317-A

# INTRODUCTION

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

CONTENTS

## 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 |
|---|---|
| Type AJ71PB92D/A1SJ71PB92D PROFIBUS-DP Interface module User's Manual<br>Describes the system configuration, specifications, functions and programming of the AJ71PB92D/A1SJ71PB92D. (Option) | IB-66773<br>(13JL20) |
| PROFIBUS-DP Interface module User's Manual<br>Describes the system configuration, specifications, functions and programming of the QJ71PB92D. (Option) | SH-080127<br>(13JR22) |

## Comformation to the EMC Directive and Low Voltage Instruction

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instructionwhen installing it in your product,please refer to Chapter 3,"EMC Directive and Low VoltageInstruction"of the PLC CPU User's Manual (Hardware).The CE logo is printed on the rating plate onthe main body of the PLC that conforms to the EMC directive and low voltage instruction.
You need not take any specific measures to make this product compliant with the EMC Directive and Low Voltage Directive.

## Generic Terms and Abbreviations

Unless otherwise specified, this manual uses the following generic terms and abbreviations to describe the Type QJ71PB93D PROFIBUS-DP slave module.

| Generic Term/Abbreviation | Description of the abbreviation/general terms |
|---|---|
| QJ71PB93D | Abbreviated name of Type QJ71PB93D PROFIBUS-DP slave module |
| QJ71PB92D | Abbreviated name of Type QJ71PB92D PROFIBUS-DP interface module |
| AJ71PB92D | Abbreviated name of Type AJ71PB92D PROFIBUS-DP interface module |
| A1SJ71PB92D | Abbreviated name of Type A1SJ71PB92D PROFIBUS-DP interface module |
| Base unit | Generic name of MELSEC-A series main base unit and extension base unit compatible with QJ71PB93D |
| PROFIBUS-DP | Abbreviated name of PROFIBUS-DP network |
| Class 1 master station | Abbreviated name of class 1 master station (master/device) in PROFIBUS-DP network |
| Class 2 master station | Abbreviated name of class 2 master station (master/device) in PROFIBUS-DP network |
| Master station | Generic name of class 1 and class 2 master stations |
| Slave station | Abbreviated name of slave station (slave device) inside PROFIBUS-DP network |

## Definitions of the Terms

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

| Term | Definition |
|---|---|
| Station number | "FDL Address" in the PROFIBUS specification |
| Expansion trouble information | "Extended Diagnostic Information" in the PROFIBUS specification |
| I/O configuration information (Data module) | "Configuration Data" in the PROFIBUS specification |
| Input data | Data sent by the QJ71PB93D and received by the master station (data input by the master station) |
| Output data | Data sent by the master station and received by the QJ71PB93D (data output by the master station) |
| Communication WDT | Watchdog timer set in the slave parameter of the master station |
| Module WDT | Watchdog timer in the QJ71PB93D |

## Product Structure

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

| Model | Quantity |
|---|---|
| QJ71PB93D | 1 |

# 1 OVERVIEW



This is the user's manual for the QJ71PB93D PROFIBUS-DP slave module (hereafter abbreviated as "QJ71PB93D"), which is used to connect a MELSEC-Q series programmable controller to a PROFIBUS-DP network.
The QJ71PB93D operates as a slave station in the PROFIBUS-DP network.

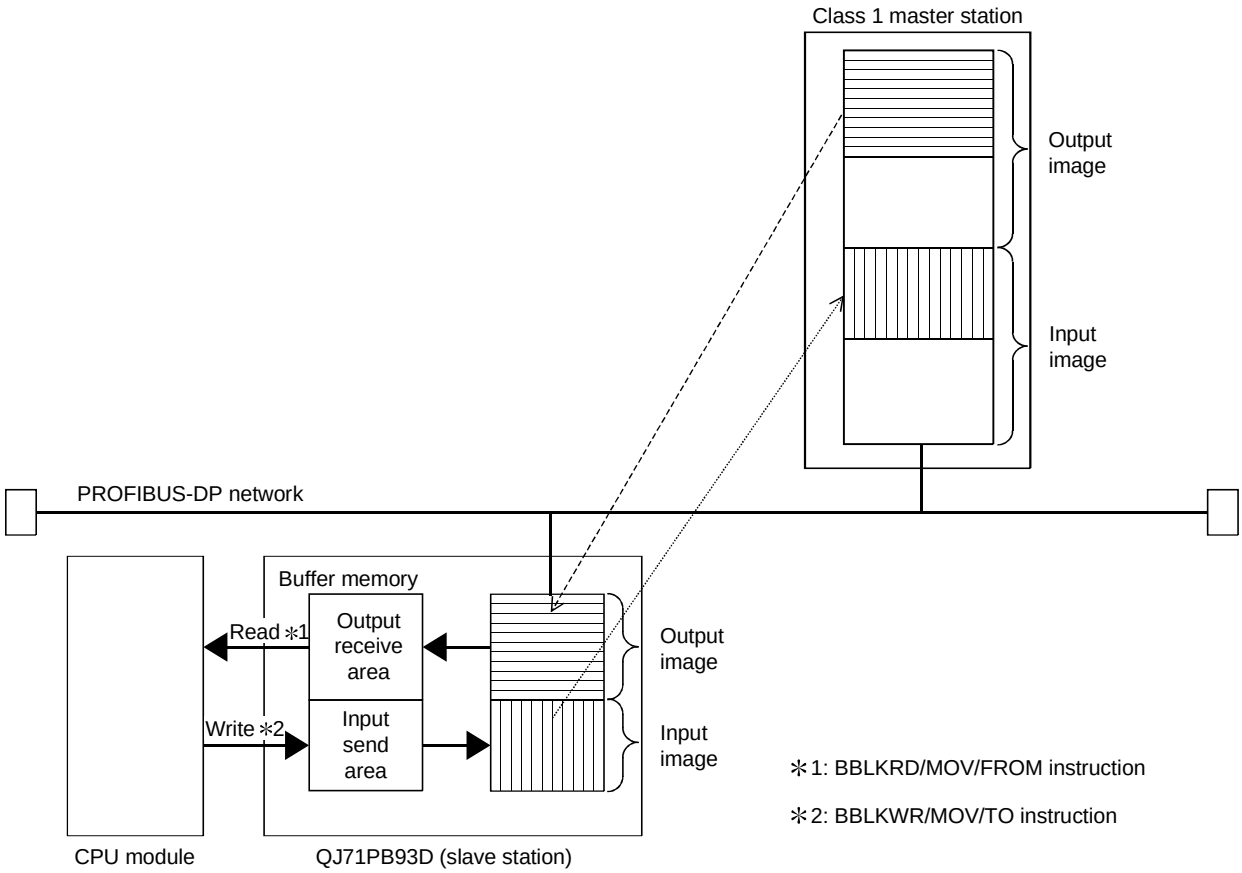
## 1.1 QJ71PB93D Features

### (1) Conformance with EN50170 Volume 2 (Part 1, 2, 3, 4, 8)

The module conforms with EN50170 Volume 2 (Part 1, 2, 3, 4, 8) and can communicate with the master station as a PROFIBUS-DP slave station.

### (2) I/O data communication with class 1 master station

The module can communicate I/O data with the class 1 master station (master station that makes data communication cyclically with a slave station) of PROFIBUS-DP.
One QJ71PB93D can communicate up to 122 words of input or output data or a total of 192 words of input and output data.




### (3) Communication can be made by merely setting the master station parameters

After you have set the parameters at the master station, the QJ71PB93D can make communication by merely setting the station number.

(4) Swapping of I/O data

When I/O data is sent/received from/to the master station, their upper and lower bytes can be swapped.

Though PROFIBUS-DP handles the upper and lower bytes of I/O data differently depending on the master station type, the I/O data need not be swapped in a sequence program.

(5) Start/stop of refreshing the input send area

Refreshing of send data from the QJ71PB93D to the master station is controllable by an output signal (Y00).

Providing an interlock disables the buffer memory data from being sent to the master station at error occurrence.

(6) Extended fault notification function

Data stored in the extended fault information area of the buffer memory can be sent to the master station as extended fault information* when the host is faulty, for example.

When the host is not faulty anymore, notify the master station that there is no fault.

*: Diagnostics Information (device-related fault information set by the user as desired)

(7) Compatibility with global control function

Compatibility with the global control function allows the updating of I/O data at the QJ71PB93D to be controlled from the class 1 master station using the command (SYNC, UNSYNC, FREEZE, UNFREEZE) sent by the class 1 master.

(8) Communication with class 2 master station

The following communications can be made with the class 2 master station (master station designed for network management to perform booting, maintenance and diagnostics) of PROFIBUS-DP.

- Read from input send area/output receive area
- Read of I/O configuration information
- Station number change

For the way to use each function, refer to the manual of the class 2 master station used.

(9) For data transmission between the CPU module and buffer memory of QJ71PB93D, dedicated instruction is used to prevent I/O data from being separated*.

*: The data of specified sizes are not matched with each other.

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

# 2 SYSTEM CONFIGURATION

## 2.1 Applicable Systems

This section describes the system configuration for the QJ71PB93D.



### (1) Applicable module and the number of mountable modules

The following are the CPU modules compatible with the QJ71PB93D and the number of mountable modules.

| Applicable module | | Number of mountable modules | Remarks |
|---|---|---|---|
| CPU module | Q00JCPU | Maximum 16 | (*) |
| | Q00CPU<br>Q01CPU | Maximum 24 | |
| | Q02CPU<br>Q02HCPU<br>Q06HCPU<br>Q12HCPU<br>Q25HCPU | Maximum 64 | Q mode only (*) |
| | Q12PHCPU<br>Q25PHCPU | Maximum 64 | (*) |

* See User's Manual (Function Explanation, Program Fundamentals) for the CPU module to use.

### (2) Cautions for mounting the modules on the base unit

QJ71PB93D can be mounted in any I/O slot of the base unit. However, a power shortage may occur depending on the combination with other mounted modules and the number of modules used, so always take into consideration the power supply capacity when mounting modules.

### (3) Compatibility with a multiple PLC system

When using the QJ71PB93D in a multiple PLC system, first read the user's manual (function explanation/program fundamentals) of the used CPU module.

(a) Compatible QJ71PB93D

Use a QJ71PB93D with function version B or later if using the module in a multiple PLC system.

### (4) Compatibility with online module change

The QJ71PB93D cannot be changed online.

### (5) Applicable software packages

Please configure the system by combining QJ71PB93D and software package as forrows:

| | Software Version |
|---|---|
| | GX Developer |
| If mounted in the Q00J/Q00/Q01CPU | Version 7 or later |
| If mounted in the Q02/Q02H/Q06H/ Q12H/Q25HCPU | Version 4 or later |
| If mounted in the Q12PH/Q25PHCPU | Version 7.10L or later |
| If mounted in a multiple PLC system | Version 6 or later |

## 2.2 Precautions for Configuring a System

(1) The separation prevention function is available for the CPU module with the first five digits of serial No. are 02092∗∗∗∗∗∗∗∗∗.
If this function is performed for the product other than above, incorrect I/O data will appear.

(2) When performing the following operations, ensure that the module READY signal X1D of QJ71PB93D is turned ON in advance.
- To create the program that switch the operation mode by Y11/X11, using the sequence program.

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.

(3) The QJ71PB93D does not work on a remote I/O station of MELSECNET/H.

## 2.3 Confirmation of Function Version and Serial No.

The serial Nos. of CPU module capable of using the separation prevention function of QJ71PB93D and their confirmation method are shown below.

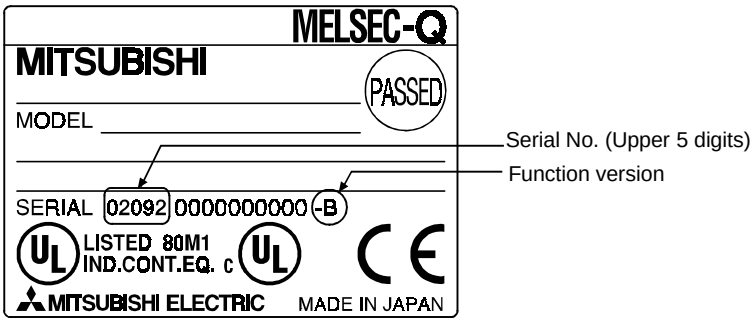
### (1) Serial Nos. of CPU module capable of using the separation prevention function

- Products with serial No. 02092∗∗∗∗∗∗∗∗∗and subsequent

### (2) Confirmation of function version and 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 and function version of the Rating indication plate.

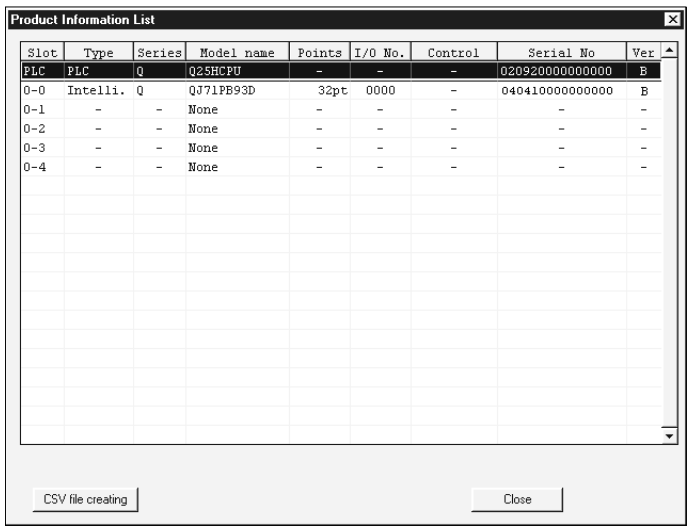



(b) When confirming on GX Developer

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., Ver.]

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

# 3 SPECIFICATIONS

This chapter describes the performance specifications, network configuration, I/O signals, buffer memory, parameters and operation modes of the QJ71PB93D.
For the general specifications of the QJ71PB93D, refer to the user's manual of the used CPU module.

## 3.1 Performance Specifications



| Item | | Specifications | | |
|---|---|---|---|---|
| Model | | QJ71PB93D | | |
| PROFIBUS-DP station type | | Slave station (Complies with EN50170 Volume2 (Part 1, 2, 3, 4, 8)) | | |
| Station numbers that may be set | | 0 to 125 ＊3 | | |
| Max. number of data that may be communicated | | Number of I/O data is 192 words in total. (Number of input or output data is up to 122 words.) | | |
| Transmission specifications | Electrical standards and characteristics | Complies with EIA-RS485 | | |
| | Medium | Shielded twisted cable (Type A) | | |
| | Network configuration | Bus (however, tree type when a repeater is used) | | |
| | Data link method | Polling method | | |
| | 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 [m/network] |
| | | 9.6 [kbps] | 1200 | 4800 |
| | | 19.2 [kbps] | | |
| | | 45.45 [kbps] | | |
| | | 93.75 [kbps] | | |
| | | 187.5 [kbps] | 1000 | 4000 |
| | | 500 [kbps] | 400 | 1600 |
| | | 1500 [kbps] | 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 (including repeaters) | | |
| | Number of connection nodes/segments | 32 | | |
| Termination resistor | | User prepared | | |
| Flash ROM write count | | Max. 10000 times | | |
| Number of occupied I/O | | 32 points (I/O assignment : 32 intelligent points) | | |
| 5VDC Internal power consumption | | 0.44 [A] | | |
| External dimensions | | 98(3.86) (H) × 27.4(1.08) (W) × 90(3.55) (D) [mm(inch)] | | |
| Weight | | 0.11 [kg] | | |

＊1 Transmission speed control within +/- 0.3% (EN50170 Volume 2 compliant)

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

＊3 Factory-set to "126" (EN50170 Volume 2 compliant)

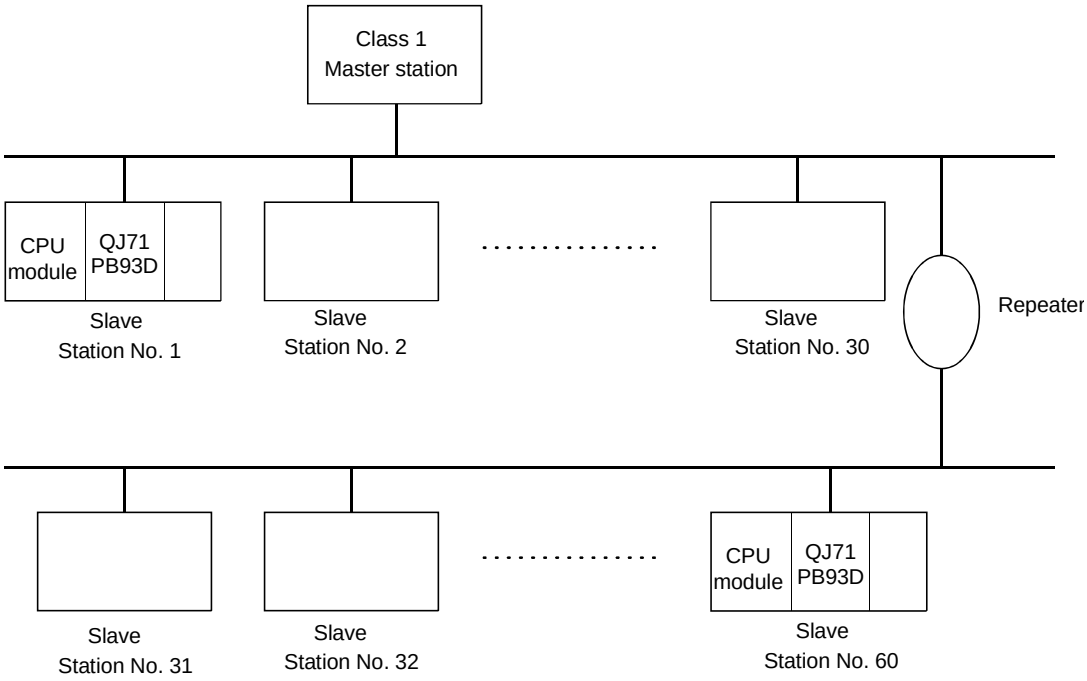
For the noise immunity, withstand voltage, insulation resistance and others in the PLC system using this module, refer to the power supply module specifications given in the used CPU module user's manual.

## 3.2 Network Configuration

This section provides the basic network configuration of PROFIBUS-DP including the QJ71PB93D.

### 3.2.1 Basic configuration

1) Equipment types
   - QJ71PB93D (slave station)
   - Class 1 master station
   - 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 slave stations that may be connected to one master station depends on the specifications of the master station.




- Prepare the PROFIBUS-DP cable and termination resistor on the user side.

## 3.3 I/O Signal

### 3.3.1 I/O signal list

The I/O signal configuration used in the QJ71PB93D and the data communications with the CPU module are described below.
The I/O numbers (X/Y) indicated in this chapter and later assume that 0 is set as the first I/O number of the QJ71PB93D.

| Signal direction: QJ71PB93D → CPU module | | Signal direction: CPU module → QJ71PB93D | |
|---|---|---|---|
| Device No. | Description | Device No. | Description |
| X00 | Watch dog timer error | Y00 | Input send area refresh directive |
| X01 | I/O communication signal | Y01 | Not usable |
| X02 | Extension trouble notification completion signal | Y02 | Extension trouble notification request signal |
| X03 | Module error signal | Y03 | Module error reset request signal |
| X04 | Not usable | Y04 | Not usable |
| X05 | SYNC mode signal | Y05 | |
| X06 | SYNC receive signal | Y06 | |
| X07 | FREEZE mode signal | Y07 | |
| X08 | Not usable | Y08 | |
| X09 | | Y09 | |
| X0A | BBLKRD start request acceptance completion signal | Y0A | BBLKRD start request signal |
| X0B | BBLKWR start request acceptance completion signal | Y0B | BBLKWR start request signal |
| X0C | Not usable | Y0C | Not usable |
| X0D | | Y0D | |
| X0E | | Y0E | |
| X0F | | Y0F | |
| X10 | | Y10 | |
| X11 | Operation mode change completion signal | Y11 | Operation mode change request signal |
| X12 | Not usable | Y12 | Not usable |
| X13 | Station number change completion signal | Y13 | Station number change request signal |
| X14 | Not usable | Y14 | Not usable |
| X15 | | Y15 | |
| X16 | | Y16 | |
| X17 | | Y17 | |
| X18 | | Y18 | |
| X19 | | Y19 | |
| X1A | | Y1A | |
| X1B | | Y1B | |
| X1C | | Y1C | |
| X1D | Module ready signal | Y1D | |
| X1E | Not usable | Y1E | |
| X1F | | Y1F | |

**POINT**

If a device which is not usable is accidentally turned on and off in the sequence program, it cannot guarantee as the QJ71PB93D function.

### 3.3.2 I/O signal detail description

#### (1) Module WDT error signal (X00)

(a) This signal turns on when a module WDT error occurs.

(b) This signal turns off when the PLC CPU is reset or the QJ71PB93D power is switched from OFF to ON.
The module WDT error signal (X0D) is not turned off by an error reset made by the error reset request signal (Y03).

#### (2) I/O communication signal (X01)

(a) This signal turns on when the module is ready to communicate with the master station properly.

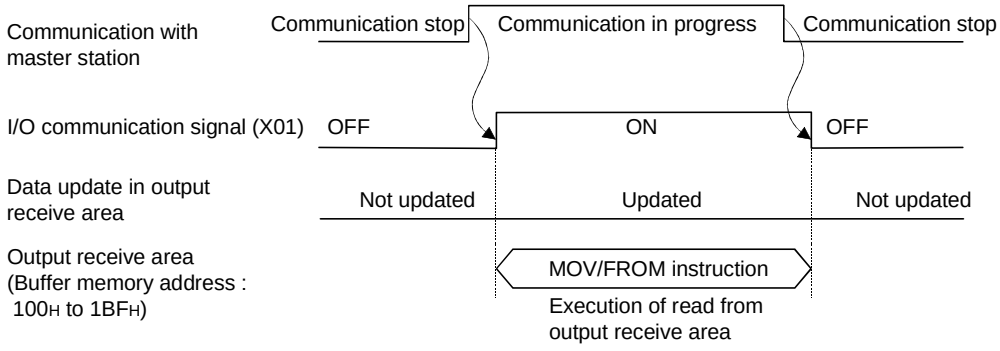
(b) While the I/O communication signal (X01) is on, the output receive area is updated to the output data sent from the master station.
(It is independent of the status of the input send refresh directive signal (Y00).)

(c) The I/O communication signal (X01) turns off when a communication time-out error occurs due to a stop of communication with the master station. However, if the communication WDT setting in the master station side parameters is "invalid", the I/O communication signal does not turn off since a communication time-out error does not occur.
(The output data in the output receive area is held.)

| Communication WDT Setting in Master Station Side Parameters | Operation at Master Station Fault |
|---|---|
| 0: Invalid | No error<br>(I/O communication signal (X01) remains on) |
| 1 to 65000: Valid | Communication time-out error occurrence<br>(I/O communication signal (X01) turns off) |

The communication WDT setting can be confirmed in the "Current communication WDT value (buffer memory address: 8D1H)" of the QJ71PB93D.

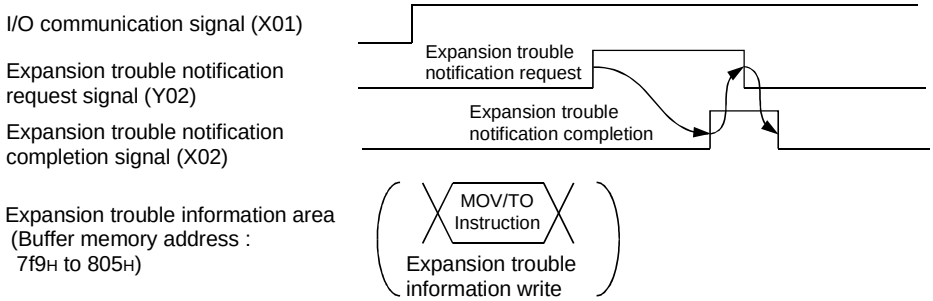
(d) Use this signal as a signal for interlocking output receive area read performed with the MOV/FROM instruction.



### (3) Expansion trouble notification completion signal (X02)

(a) The extension trouble notification completion signal (X02) turns on when the extension trouble information is read from the master station by turning on the expansion trouble notification request signal (Y02).
(While the I/O communication signal (X01) is off, the extension trouble notification completion signal (X02) does not turn on since an extension trouble notification request is ignored.)

(b) Turning off the expansion trouble notification request signal (Y02) turns off the expansion trouble notification completion signal (X02).



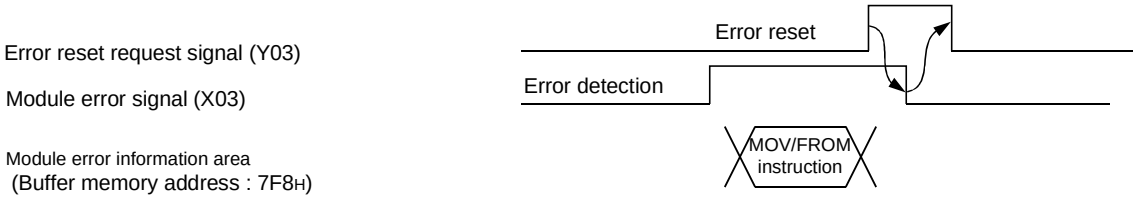

| POINT |
|---|
| When performing the expansion trouble notification requests consecutively, provide an interlock using the extension trouble notification completion signal (X02) in the procedure shown above. |

### (4) Module error signal (X03)

(a) This signal turns on when an error occurs.
At this time, an error code is stored into the module error information area (buffer memory address: 7F8H)).

(b) This signal turns off when the error is reset by turning on the error reset request signal (Y03) or resetting the CPU, for example. At this time, the ERR. LED goes off and the error code is cleared.

(c) The error reset request signal (Y03) turns off after confirming that the module error signal (X03) have turned off.




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

### (5) SYNC mode signal (X05)

(a) This signal turns on when the QJ71PB93D is placed in the SYNC mode by a SYNC request from the master station.

(b) The SYNC mode signal (X05) turns off when the SYNC mode is terminated by an UNSYNC request from the master station, a communication stop or a CPU reset.

(c) The SYNC LED turns on/off in synchronization with the on/off of the SYNC mode signal (X05).

(d) The SYNC mode signal (X05) turns off if a communication time-out error occurs due to a stop of communication with the master station while the SYNC mode signal (X05) is on.
However, if the communication WDT setting in the master station side parameters is "invalid", the SYNC mode signal (X05) does not turn off since a communication time-out error does not occur. (The output data in the output receive area is held.)

| Communication WDT Setting in Master Station Side Parameters | Operation at Master Station Fault |
|---|---|
| 0: Invalid | No error (SYNC mode signal (X05) remains on) |
| 1 to 65000: Valid | Communication time-out error occurrence (SYNC mode signal (X05) turns off) |

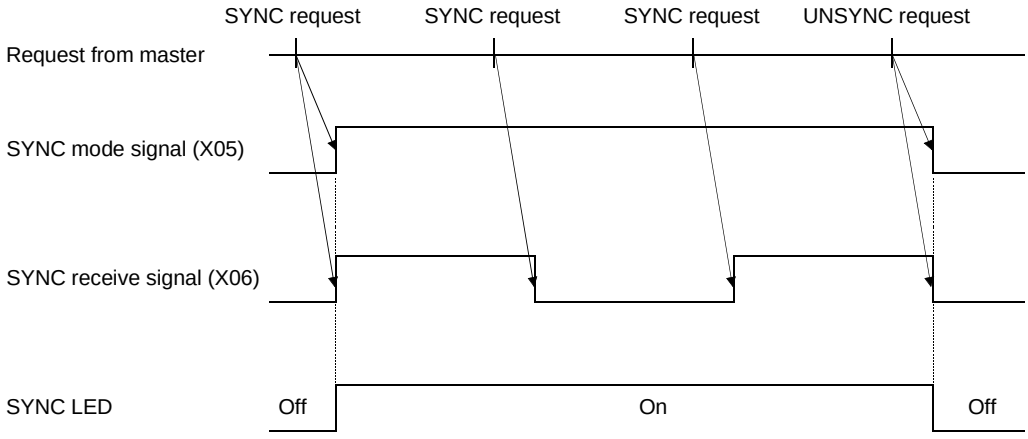
The communication WDT setting can be confirmed in the "Current communication WDT value (buffer memory address: 8D1H)" of the QJ71PB93D.

### (6) SYNC receive signal (X06)

(a) The SYNC receive signal (X06) turns on on receipt of a SYNC request from the master station.

(b) While the SYNC mode signal (X05) is on, the receipt of a SYNC request from the master station changes the on/off state of the SYNC receive signal (X06).
At this time, the SYNC mode signal (X05) remains on.

(c) The SYNC receive signal (X06) turns off when the SYNC mode is terminated by an UNSYNC request from the master station, a communication stop or a CPU reset.



(d) The SYNC receive signal (X06) turns off if a communication time-out error occurs due to a stop of communication with the master station while the SYNC receive signal (X06) is on.
However, if the communication WDT setting in the master station side parameters is "invalid", the SYNC receive signal (X06) does not turn off since a communication time-out error does not occur. (The output data in the output receive area is held.)

| Communication WDT Setting in Master Station Side Parameters | Operation at Master Station Fault |
|---|---|
| 0: Invalid | No error (SYNC receive signal (X06) remains on) |
| 1 to 65000: Valid | Communication time-out error occurrence (SYNC receive signal (X06) turns off) |

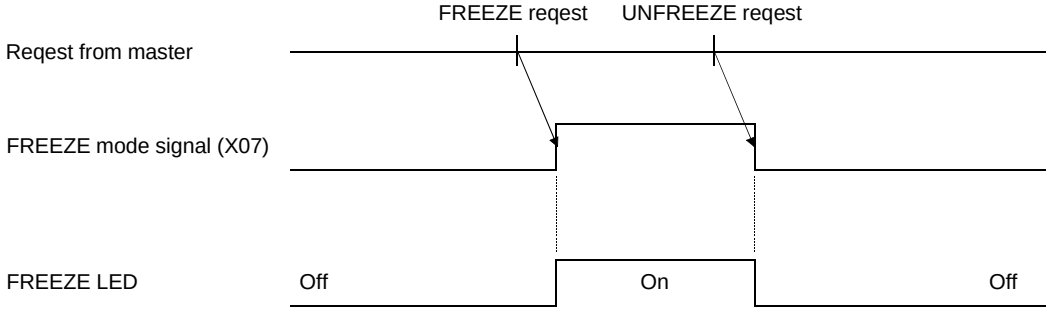
The communication WDT setting can be confirmed in the "Current communication WDT value (buffer memory address: 8D1H)" of the QJ71PB93D.

### (7) FREEZE mode signal (X07)

(a) The FREEZE mode signal (X07) turns on when the QJ71PB93D is placed in the FREEZE mode by a FREEZE request from the master station.

(b) The FREEZE mode signal (X07) turns off when the FREEZE mode is terminated by an UNFREEZE request from the master station, a communication stop or a CPU reset.

(c) The FREEZE LED turns on/off in synchronization with the on/off of the FREEZE mode signal (X07).



(d) The FREEZE mode signal (X07) turns off if a communication time-out error occurs due to a stop of communication with the master station while the FREEZE mode signal (X07) is on.
However, if the communication WDT setting in the master station side parameters is "invalid", the FREEZE mode signal (X07) does not turn off since a communication time-out error does not occur. (The output data in the output receive area is held.)

| Communication WDT Setting in Master Station Side Parameters | Operation at Master Station Fault |
|---|---|
| 0: Invalid | No error (FREEZE mode signal (X07) remains on) |
| 1 to 65000: Valid | Communication time-out error occurrence (FREEZE mode signal (X07) turns off) |

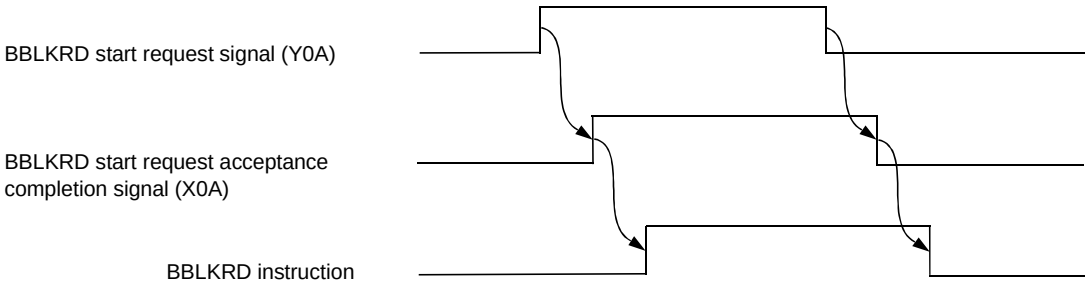
The communication WDT setting can be confirmed in the "Current communication WDT value (buffer memory address: 8D1H)" of the QJ71PB93D.

### (8) BBLKRD start request acceptance completion signal (X0A)

(a) This signal is used as an interlock condition signal to execute the dedicated instruction BBLKRD.

(b) When the BBLKRD start request signal (Y0A) is turned on in the sequence program, the BBLKRD start request acceptance completion signal (X0A) turns on.

(c) When the BBLKRD start request signal (Y0A) is turned off in the sequence program, the BBLKRD start request acceptance completion signal (X0A) also turns off.

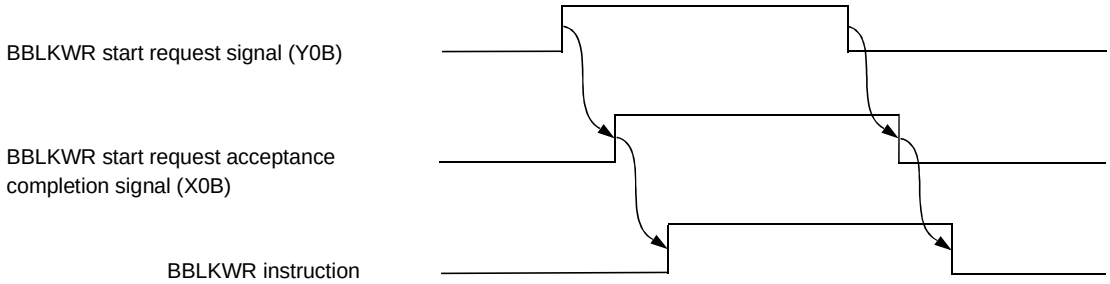



### (9) BBLKWR start request acceptance completion signal (X0B)

(a) This signal is used as an interlock condition signal to execute the dedicated instruction BBLKWR.

(b) When the BBLKWR start request signal (Y0B) is turned on in the sequence program, the BBLKWR start request acceptance completion signal (X0B) turns on.

(c) When the BBLKWR start request signal (Y0B) is turned off in the sequence program, the BBLKWR start request acceptance completion signal (X0B) also turns off.

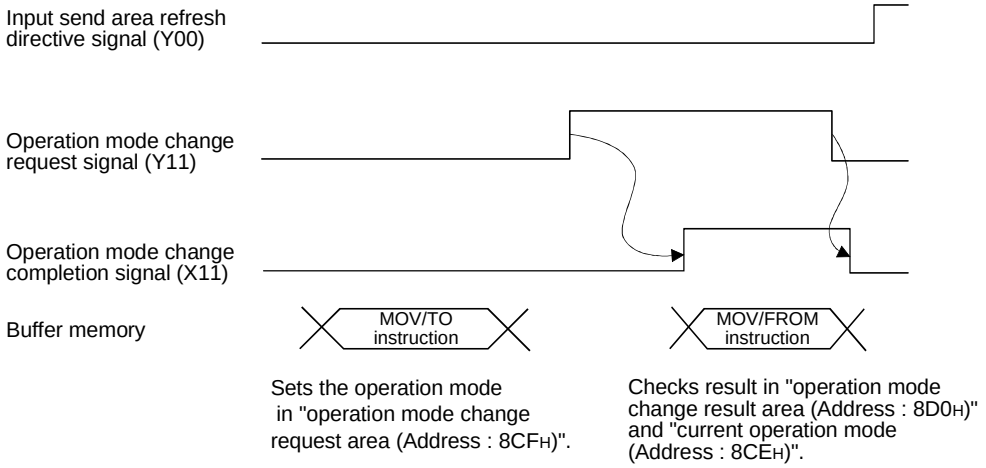



## (10) Operation mode change completion signal (X11)

(a) This signal turns on when an operation mode change is completed by setting the required operation mode to the operation mode change request area (buffer memory address: 8CFH) and turning on the operation mode change request signal (Y11).
At this time, the result is stored into the operation mode change result area (buffer memory address: 8D0H).

(b) Turning off the operation mode change request signal (Y11) after confirmation of the result turns off the operation mode change completion signal (X11).

(c) This signal turns on at either normal or abnormal completion of an operation mode change.
At abnormal completion, the operation mode change request is made invalid and operation continues in the operation mode that had been used before the change request was given.



### (11) Station number change completion signal (X13)

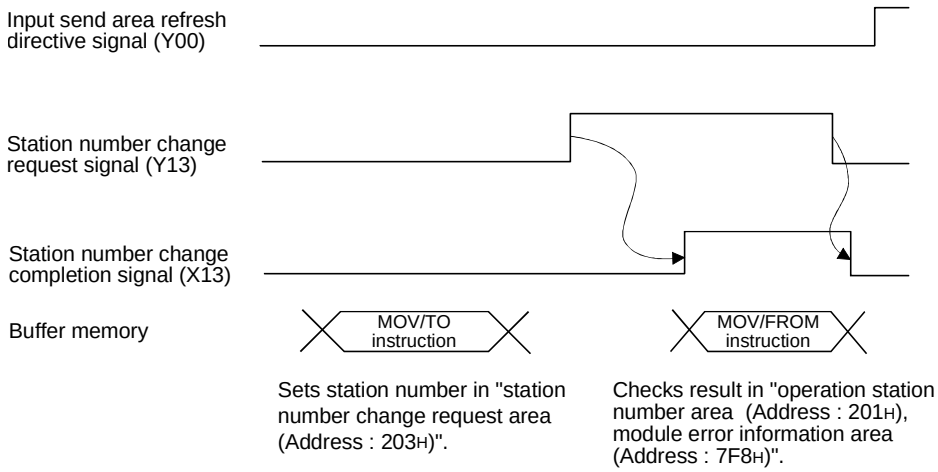
(a) This signal turns on when the station number setting is completed by setting the station number to the station number change request area (buffer memory address: 203H) and turning on the station number change request signal (Y13).

(b) Check the setting result in the operation station number area (buffer memory address: 201H) and module error information area (buffer memory address: 7F8H) of the buffer memory.

(c) Turning off the station number change request signal (Y13) after confirmation of the result turns off the station number change completion signal (X13).

(d) If a station number error (error code: 1002H) has occurred, the station number setting request is made invalid and operation continues with the station number that had been used before the change request was given.

(e) Turning on the station number setting request signal (Y13) suspends I/O communication.
Turning on the station number setting completion signal (X13) resumes I/O communication.




### (12) Module ready signal (X1D)

(a) This signal turns on when the QJ71PB93D is enabled for access from the CPU module. It is independent of the operation mode at a start.

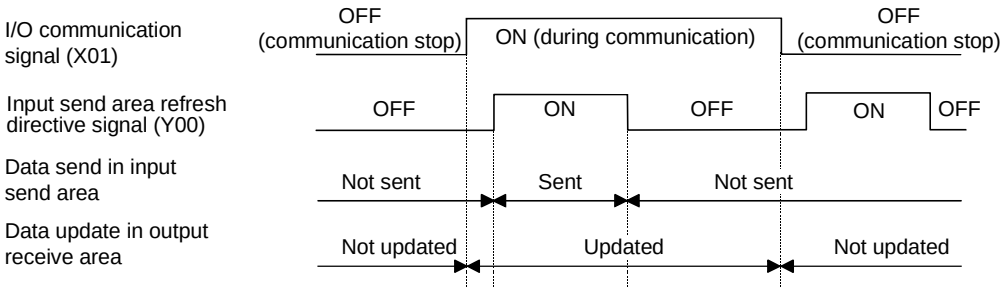
(b) This signal turns off when the QJ71PB93D is disabled for access from the CPU module due to a module WDT error, hardware fault or like.

### (13) Input send area refresh directive signal (Y00)

(a) Turning on this signal during communication with the master station (I/O communication signal (X01) = ON) resumes data communication of the input send area (buffer memory addresses: $100_H$ to $1BF_H$) in the buffer memory.

(b) Turning this signal off stops sending of the data in the input send area to the master station. (0 data are sent.)

(c) While the I/O communication signal (X01) is off, ON of the input send area refresh directive signal (Y00) is invalid.




**POINT**

The following are the relationships between data send and receive of the QJ71PB93D, which vary with the states of the I/O communication signal (X01) and input send area refresh directive signal (Y00).

| X01 State | Y00 State | Data in Output Receive Area/Input Send Area |
|---|---|---|
| OFF | ON/OFF | Master station (Input area / Output area) — No communication / Not updated — QJ71PB93D (Input send area / Output receive area) |
| ON | ON | Master station (Input area / Output area) — Sent / Updated — QJ71PB93D (Input send area / Output receive area) |
| | OFF | Master station (Input area / Output area) — 0 data sent / Updated — QJ71PB93D (Input send area / Output receive area) |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### (14) Extension trouble notification request signal (Y02)

(a) Turning on the expansion trouble notification request signal (Y02) sends the data set in the expansion trouble information area (buffer memory address: 7F9H to 805H) to the master station as expansion trouble information. (The expansion trouble notification request is ignored while the I/O communication signal (X01) is off.)

(b) When you have checked that the expansion trouble notification completion signal (X02) is on, turn off the expansion trouble notification request signal (Y02).

(c) Refer to X02 for the on/off timing.

| POINT |
|---|
| To turn on/off Y02, provide an interlock using X02. |

### (15) Module error reset request signal (Y03)

(a) Turning on the module error reset request signal (Y03) resets the error of the QJ71PB93D. (The module error signal (X03) turns off and the ERR. LED goes off.)

(b) When you have checked that the module error signal (X03) is off, turn off the module error reset request signal (Y03).

(c) Making an error reset clears the error code in the module error information area (buffer memory address: 7F8H).

(d) Refer to X03 for the on/off timing.

### (16) BBLKRD start request signal (Y0A)

(a) This signal is used to start the processing of the dedicated instruction BBLKRD.
When executing the dedicated instruction BBLKRD, always turn on the BBLKRD start request signal (Y0A) to turn on the BBLKRD start request acceptance completion signal (X0A) so that it is used as an interlock condition.

(b) When the BBLKRD start request signal (Y0A) is turned on in the sequence program, the QJ71PB93D starts the processing of the dedicated instruction BBLKRD.

(c) When the BBLKRD start request signal (Y0A) is turned off from the sequence program, the processing of the dedicated instruction BBLKRD is ignored.

(d) Note that if the dedicated instruction BBLKRD is not executed after the BBLKRD start request signal (Y0A) has been turned on, the refresh of the I/O data will delay several sequence scan times.

### (17) BBLKWR start request signal (Y0B)

(a) This signal is used to start the processing of the dedicated instruction BBLKWR.
When executing the dedicated instruction BBLKRD, always turn on the BBLKRD start request signal (Y0B) to turn on the BBLKRD start request acceptance completion signal (X0B) so that it is used as an interlock condition.

(b) When the BBLKWR start request signal (Y0B) is turned on in the sequence program, the QJ71PB93D starts the processing of the dedicated instruction BBLKWR.

(c) When the BBLKWR start request signal (Y0B) is turned off from the sequence program, the processing of the dedicated instruction BBLKWR is ignored.

(d) Note that if the dedicated instruction BBLKWR is not executed after the BBLKWR start request signal (Y0B) has been turned on, the refresh of the I/O data will delay several sequence scan times.

### (18) Operation mode change request signal (Y11)

(a) Turning on the operation mode change request signal (Y11) gives a request to change to the operation mode set in the operation mode change request area (buffer memory address: 8CF$_H$).

(b) When you have checked that the operation mode change completion signal (X11) is on, turn off the operation mode change request signal (Y11).

(c) Refer to X11 for the on/off timing.

### (19) Station number change request signal (Y13)

(a) Turning on the station number change request signal (Y13) requests to change to the station number set in the station number change request area (buffer memory address: 203$_H$) of the buffer memory.

(b) When you have checked that the station number change completion signal (X13) is on, turn off the station number change request signal (Y13).

(c) Refer to X13 for the on/off timing.

| POINT |
| --- |
| When setting the station number from class 2 master station, specifying "TRUE" for "No_Add_Chg" disables the station number from being changed until the station number is cleared by a station number setting request. |

## 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 QJ71PB93D and the CPU module is described below.

| Buffer memory address | | Area name | Description | Read/Write |
|---|---|---|---|---|
| Hexadecimal | decimal | | | |
| $0_H$<br>$BF_H$ | 0<br>191 | Output receive area | Stores the output data received from the master station.<br>(Max. usable range 122 words) | Read |
| $C0_H$<br>$FF_H$ | 192<br>255 | Not usable | — | — |
| $100_H$<br>$1BF_H$ | 256<br>447 | Input send area | Used to set the input data to be sent to the master station.<br>(Max. usable range 122 words) | Write |
| $1C0_H$<br>$1FF_H$ | 448<br>511 | Not usable | — | — |
| $200_H$ | 512 | Operation baud rate | Stores the baud rate in current operation. | Read |
| $201_H$ | 513 | Operation station number | Stores the station number in current operation. | Read |
| $202_H$ | 514 | Station number set on flash ROM | Stores the station number saved on the flash ROM. | Read |
| $203_H$ | 515 | Station number change request | Used to set a new station number to be set in response to the station number change request signal (Y13). | Write |
| $204_H$ | 516 | Station number rewritable count to flash ROM | Stores the remaining number of times when the station number can be saved onto the flash ROM during continuous operation. | Read |
| $205_H$<br>$7F7_H$ | 517<br>2039 | Not usable | — | — |
| $7F8_H$ | 2040 | Module error information | Stores the error code detected by the QJ71PB93D. | Read |
| $7F9_H$<br>$805_H$ | 2041<br>2053 | Expansion trouble information area | Used to set the expansion trouble notification data to the master station. | Write |
| $806_H$ | 2054 | Expansion trouble information send result area | Stores the result of sending the expansion trouble result to the master station. | Read |
| $807_H$<br>$8CD_H$ | 2055<br>2253 | Not usable | — | — |
| $8CE_H$ | 2254 | Current operation mode | Stores the operation mode in current operation. | Read |
| $8CF_H$ | 2255 | Operation mode change request area | Used to set a new operation mode to be set in response to the operation mode change request signal (Y11). | Write |
| $8D0_H$ | 2256 | Operation mode change result | Stores the result of changing the operation mode in response to the operation mode change request signal (Y11). | Read |
| $8D1_H$ | 2257 | Current communication WDT value | Stores the communication WDT value in current operation. | Read |
| $8D2_H$ | 2258 | Self-diagnostic status type code display area | Stores the diagnostic status type code at the time of self-diagnostics. | Read |
| $8D3_H$ | 2259 | Swapping function setting status | Stores the setting status of the swapping function in current operation. | Read |
| $8D4_H$<br>$8DF_H$ | 2260<br>2271 | Not usable | — | — |
| $8E0_H$<br>$8EB_H$ | 2272<br>2283 | Output receive area used status area | Stores the current used status of the output receive area. | Read |
| $8EC_H$<br>$8EF_H$ | 2284<br>2287 | Not usable | — | — |
| $8F0_H$<br>$8FB_H$ | 2288<br>2299 | Input send area used status area | Stores the current used status of the input send area. | Read |
| $8FC_H$<br>$AFF_H$ | 2300<br>2815 | 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 QJ71PB93D function.

### 3.4.2 Buffer memory detail description

(1) Output receive area
(buffer memory address 0H to BFH: Un\G0 to Un\G191)

Stores the output data received from the master station.
The structure varies with the data module setting and data assignment mode setting in the parameters. (Refer to Section 3.5.1, Section 3.5.2 and Section 3.5.3)

(2) Input send area
(buffer memory address 100H to 1BFH: Un\G256 to Un\G447)

Used to store the input data to be sent to the master station.
The structure varies with the data module setting and data assignment mode setting in the parameters. (Refer to Section 3.5.1, Section 3.5.2 and Section 3.5.3)

(3) Operation baud rate (buffer memory address 200H: Un\G512)

Stores the baud rate in current operation.

| Baud Rate | Stored Value |
|---|---|
| Baud rate not yet recognized | 0000H |
| 9.6 kbps | 96E2H |
| 19.2 kbps | 19E3H |
| 45.45 kbps | 45E3H |
| 93.75 kbps | 93E3H |
| 187.5 kbps | 18E4H |
| 500 kbps | 05E5H |
| 1500 kbps | 15E5H |
| 3 Mbps | 03E6H |
| 6 Mbps | 06E6H |
| 12 Mbps | 12E6H |

The stored value while the I/O communication signal (X01) is on is valid.
Use the master station parameter to set the baud rate of the PROFIBUS-DP.

(4) Operation station number (buffer memory address 201H: Un\G513)

Stores the station number of the QJ71PB93D in current operation.
The storage range is 0 to 126.
If the station number is not set (the station number is as set in the factory or has been cleared), "126" is stored.
I/O data cannot be communicated if the station number is not set.
When the station number setting request (buffer memory address: 203H) was used to write the station number to the flash ROM, switching power on or resetting the CPU module will store the value written to the flash ROM.

### (5) Station number set on flash ROM
(buffer memory address 202H: Un\G514)

Stores the station number of the QJ71PB93D set to the flash ROM.
The storage range is 0 to 125.
If the station number is not set to the flash ROM (the station number is as set in the factory or has been cleared), "65535 (FFFFH)" is stored.

### (6) Station number change request
(buffer memory address 203H: Un\G515)

Used to set any of the following values when setting a new station number of the QJ71PB93D in response to the station number change request signal (Y13).

| Set Value | Description |
|---|---|
| 0 (0000H)<br>≀<br>125 (007DH) | Sets a new station number. (Not saved onto the flash ROM) |
| 256 (0100H)<br>≀<br>381 (017D0H) | Sets 256 (0100H) + new station number. (Saved onto the flash ROM)<br>Example: To change to station No. 12<br>256 (0100H) + 12 (new station number) = 268 (010CH) |
| 65535 (FFFFH) | Clears the station number.<br>After clearing, the operation station number is "126".<br>The station number set to the flash ROM is "FFFEH". |

"65534 (FFFEH)" is stored at power-on or CPU reset.
If a station number change request is executed with a value other than any of the above, a station number error (error code: 1002H) occurs.

### (7) Station number rewritable count to flash ROM
(buffer memory address 204H: Un\G516)

Stores the remaining number of times when the station number setting can be saved onto the flash ROM during operation.
When the CPU is reset, the QJ71PB93D is powered on, or the station number is cleared, the remaining number of times is set to 60. Every time the station number is saved onto the flash ROM, the remaining number of times is decremented by 1.
If an attempt is made to rewrite the station number on the flash ROM at the remaining count of 0, a station number rewritable count excess error (error code: 2001H) occurs and the station number on the flash ROM is not changed.
If the station number rewritable count excess error has occurred, switch power on again, reset the CPU, or clear the station number on the flash ROM using the station number change request signal (Y13). (This returns the remaining count to 60 times.)
(When the station number for a station number setting request is the same as the one saved on the flash ROM (buffer memory address: 202H), the remaining count does not decrease.)

**POINT**

When a station number rewritable count excess error has occurred, the remaining count remains 0 if an error reset request (Y03) is given. (The module error signal (X03) and ERR. LED turn off.)
After clearing the station number, make an error reset request (Y03).

(8) Module error information (buffer memory address 7F8H: Un\G2040)

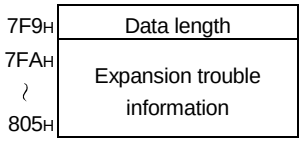
Stores the error code of the error that occurred in the QJ71PB93D.
Refer to Section 9.4 for the error codes.

(9) Expansion trouble information area
(buffer memory address 7F9H to 805H: Un\G2041 to Un\G2053)

Used to set the expansion trouble information to be sent to the master station.
(The expansion trouble information sent by the QJ71PB93D is the Device Related Diagnostic specified in PROFIBUS.)
The expansion trouble information can be set in a sequence program.

Data length : Data length of the data to be sent as expansion trouble information (bytes units)

Expansion trouble information : Any data to be set to the master station (max. 24 bytes)




The extended fault information area is used as described below when an extended fault occurs and when the extended fault is removed.

(a) When extended fault occurs

When the host becomes faulty, for example, the data stored in the extended fault information area of the buffer memory is sent to the master station as extended fault information.
In the following procedure, the QJ71PB93D can notify the master station of the extended fault of the host.

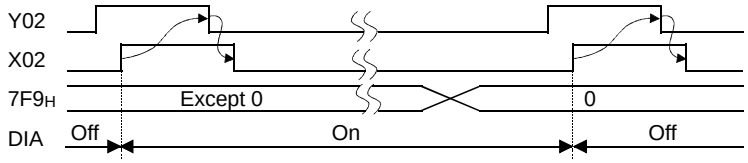
1) In the buffer memory 7FAH, set the data to be sent to the master station.
2) In the buffer memory 7F9H, set the length of the data to be sent to the master station.
3) Turn ON the extended fault information notification request (Y02).
4) After the extended fault information notification completion (X02) has turned ON, turn OFF the extended fault information notification request (Y02).

(b) When extended fault is removed

When the host is not faulty anymore, notify the master station that there is no fault.
In the following procedure, the QJ71PB93D can notify the master station that the extended fault of the host has been removed.

1) In the buffer memory 7F9H, set the data length 0.
2) Turn ON the extended fault information notification request (Y02).
3) After the extended fault information notification completion (X02) has turned ON, turn OFF the extended fault information notification request (Y02).

(c) DIA LED of QJ71PB93D front panel is turned on as follows.




### (10) Current operation mode (buffer memory address 8CEH: Un\G2254)

Stores the current operation mode.
Refer to Section 3.6 for the operation mode.

| Stored Value | Mode |
|---|---|
| 0000H | Normal operation mode |
| 0002H | Self-diagnostic mode |

At power-on or CPU reset, the module starts in the normal operation mode.

### (11) Operation mode change request (buffer memory address 8CFH: Un\G2255)

Set any of the following values when changing the operation mode of the QJ71PB93D with the operation mode change request signal (Y11).

| Set Value | Description |
|---|---|
| 0000H | Normal operation mode |
| 0002H | Self-diagnostic mode |

At power-on or CPU reset, "FFFEH" is stored.
If an operation mode change request is executed with any value other than the set value, the operation cannot be guaranteed.

### (12) Operation mode change result (buffer memory address 8D0H: Un\G2256)

Stores the result of changing the operation mode in response to the operation mode change request signal (Y11).

0 : Normal completion
1 : Abnormal completion (A change request was made with an illegal value set in the operation mode change request area)

### (13) Current communication WDT value (buffer memory address 8D1H: Un\G2257)

Stores the communication WDT value set in the master side parameters.
The stored value is invalid if the I/O communication signal (X01) is off.

0 : Communication WDT setting invalid
Other than 0 : Communication WDT setting (in increments of 10ms)

When the master station becomes faulty, the send/receive data and I/O communication signal (X01) statuses change depending on the communication WDT setting.

| Communication WDT Setting | Send/Receive Data and X01 Statuses at Master Station Fault |
|---|---|
| Other than 0 | Send data to master station ∗1 : Cleared |
| | Data update in output receive area: Cleared |
| | X01 : OFF |
| 0 | Send data to master station ∗1 : Retained ∗2 |
| | Data update in output receive area: Retained ∗2 |
| | X01 : ON ∗2 |

∗1: The send data to the master station indicates the data that flows on the PROFIBUS-DP actually. It differs from the data in the input send area of the QJ71PB93D.

∗2: If the communication WDT setting is 0 (invalid), the data is retained since the communication WDT does not count up if the master station becomes faulty during communication.

### (14) Self-diagnostic status type code display area (buffer memory address 8D2H: Un\G2258)

The diagnostic status type code at the time of self-diagnostics is stored.
The following type code can be confirmed during self-diagnostics or at abnormal termination.

| Status | Type Code | Description |
|---|---|---|
| During self-diagnostics | 0001H to 0009H | During self-diagnostics |
| At normal termination | 0H | Normal termination |
| At abnormal termination | 8001H to 8006H | Hardware fault |
| | 8007H | Swap test error |

Refer to Section 5.4 for the way to run the self-diagnostics.

### (15) Swapping function setting status (buffer memory address 8D3H: Un\G2259)

Stores the setting status of the swapping function set in the master side parameter.

0 : Without swap setting
1 : With swap setting

The stored value while the I/O communication signal (X01) is on is valid.

### (16) Output receive area used status area (buffer memory address 8E0H to 8EBH: Un\G2272 to Un\G2283)

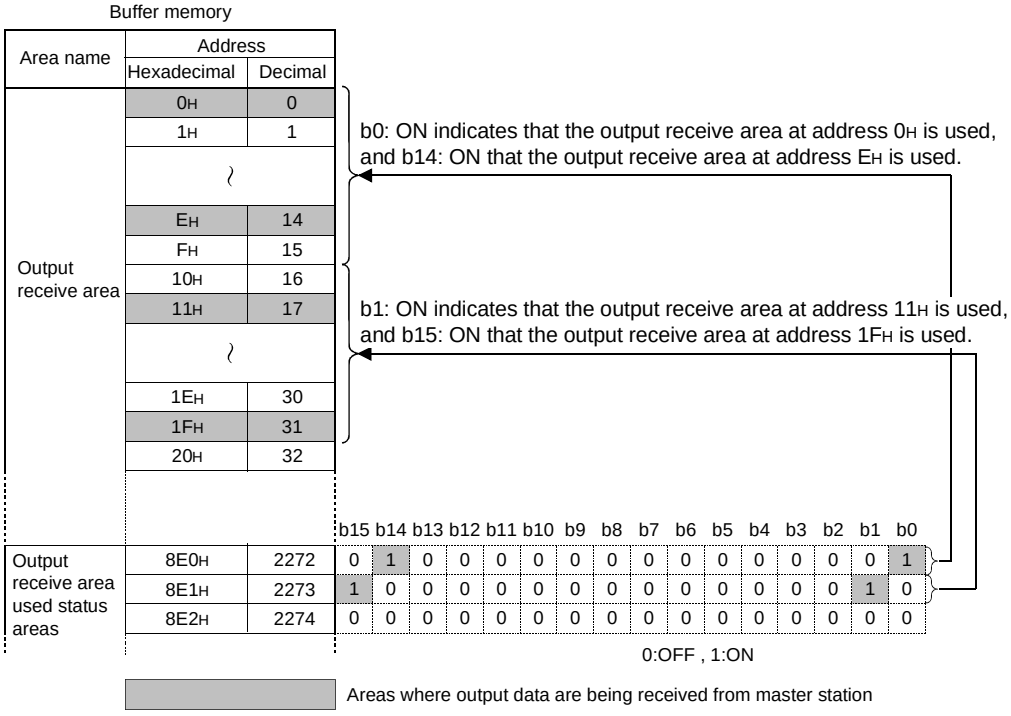
Stores the used status of the output receive area.

The bits corresponding to the buffer memory addresses in output receive area set by the master station parameters turn on.

The stored value while the I/O communication signal (X01) is on is valid.

| Buffer Memory Address | | Corresponding Buffer Memory Addresses (Hexadecimal) in output receive area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexadecimal | Decimal | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
| 8E0H | 2272 | FH | EH | DH | CH | BH | AH | 9H | 8H | 7H | 6H | 5H | 4H | 3H | 2H | 1H | 0H |
| 8E1H | 2273 | 1FH | 1EH | 1DH | 1CH | 1BH | 1AH | 19H | 18H | 17H | 16H | 15H | 14H | 13H | 12H | 11H | 10H |
| 8E2H | 2274 | 2FH | 2EH | 2DH | 2CH | 2BH | 2AH | 29H | 28H | 27H | 26H | 25H | 24H | 23H | 22H | 21H | 20H |
| 8E3H | 2275 | 3FH | 3EH | 3DH | 3CH | 3BH | 3AH | 39H | 38H | 37H | 36H | 35H | 34H | 33H | 32H | 31H | 30H |
| 8E4H | 2276 | 4FH | 4EH | 4DH | 4CH | 4BH | 4AH | 49H | 48H | 47H | 46H | 45H | 44H | 43H | 42H | 41H | 40H |
| 8E5H | 2277 | 5FH | 5EH | 5DH | 5CH | 5BH | 5AH | 59H | 58H | 57H | 56H | 55H | 54H | 53H | 52H | 51H | 50H |
| 8E6H | 2278 | 6FH | 6EH | 6DH | 6CH | 6BH | 6AH | 69H | 68H | 67H | 66H | 65H | 64H | 63H | 62H | 61H | 60H |
| 8E7H | 2279 | 7FH | 7EH | 7DH | 7CH | 7BH | 7AH | 79H | 78H | 77H | 76H | 75H | 74H | 73H | 72H | 71H | 70H |
| 8E8H | 2280 | 8FH | 8EH | 8DH | 8CH | 8BH | 8AH | 89H | 88H | 87H | 86H | 85H | 84H | 83H | 82H | 81H | 80H |
| 8E9H | 2281 | 9FH | 9EH | 9DH | 9CH | 9BH | 9AH | 99H | 98H | 97H | 96H | 95H | 94H | 93H | 92H | 91H | 90H |
| 8EAH | 2282 | AFH | AEH | ADH | ACH | ABH | AAH | A9H | A8H | A7H | A6H | A5H | A4H | A3H | A2H | A1H | A0H |
| 8EBH | 2283 | BFH | BEH | BDH | BCH | BBH | BAH | B9H | B8H | B7H | B6H | B5H | B4H | B3H | B2H | B1H | B0H |

- Example of output receive area used status





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### (17) Input send area used status area (buffer memory address 8F0H to 8FBH: Un\G2288 to Un\G2299)

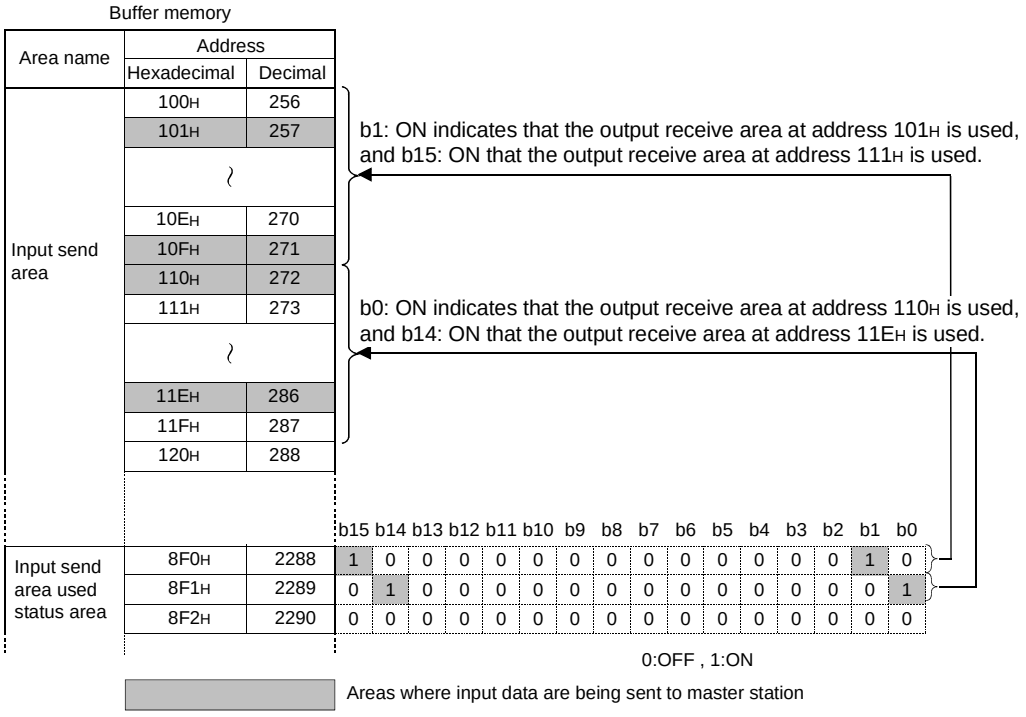
Stores the used status of the input send area.

The bits corresponding to the buffer memory addresses of the input send area set in the master station parameters turn on.

The stored value while the I/O communication signal (X01) is on is valid.

| Buffer Memory Address | | Corresponding Buffer Memory Addresses of Input Send Area (Hexadecimal) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexadecimal | Decimal | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
| 8F0H | 2288 | 10FH | 10EH | 10DH | 10CH | 10BH | 10AH | 109H | 108H | 107H | 106H | 105H | 104H | 103H | 102H | 101H | 100H |
| 8F1H | 2289 | 11FH | 11EH | 11DH | 11CH | 11BH | 11AH | 119H | 118H | 117H | 116H | 115H | 114H | 113H | 112H | 111H | 110H |
| 8F2H | 2290 | 12FH | 12EH | 12DH | 12CH | 12BH | 12AH | 129H | 128H | 127H | 126H | 125H | 124H | 123H | 122H | 121H | 120H |
| 8F3H | 2291 | 13FH | 13EH | 13DH | 13CH | 13BH | 13AH | 139H | 138H | 137H | 136H | 135H | 134H | 133H | 132H | 131H | 130H |
| 8F4H | 2292 | 14FH | 14EH | 14DH | 14CH | 14BH | 14AH | 149H | 148H | 147H | 146H | 145H | 144H | 143H | 142H | 141H | 140H |
| 8F5H | 2293 | 15FH | 15EH | 15DH | 15CH | 15BH | 15AH | 159H | 158H | 157H | 156H | 155H | 154H | 153H | 152H | 151H | 150H |
| 8F6H | 2294 | 16FH | 16EH | 16DH | 16CH | 16BH | 16AH | 169H | 168H | 167H | 166H | 165H | 164H | 163H | 162H | 161H | 160H |
| 8F7H | 2295 | 17FH | 17EH | 17DH | 17CH | 17BH | 17AH | 179H | 178H | 177H | 176H | 175H | 174H | 173H | 172H | 171H | 170H |
| 8F8H | 2296 | 18FH | 18EH | 18DH | 18CH | 18BH | 18AH | 189H | 188H | 187H | 186H | 185H | 184H | 183H | 182H | 181H | 180H |
| 8F9H | 2297 | 19FH | 19EH | 19DH | 19CH | 19BH | 19AH | 199H | 198H | 197H | 196H | 195H | 194H | 193H | 192H | 191H | 190H |
| 8FAH | 2298 | 1AFH | 1AEH | 1ADH | 1ACH | 1ABH | 1AAH | 1A9H | 1A8H | 1A7H | 1A6H | 1A5H | 1A4H | 1A3H | 1A2H | 1A1H | 1A0H |
| 8FBH | 2299 | 1BFH | 1BEH | 1BDH | 1BCH | 1BBH | 1BAH | 1B9H | 1B8H | 1B7H | 1B6H | 1B5H | 1B4H | 1B3H | 1B2H | 1B1H | 1B0H |

- Example of input send area used status





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## 3.5 Parameters

PROFIBUS-DP requires the parameters of other than the station number of the slave station to be set to the master station as slave parameters.
The following table indicates the slave parameters for the QJ71PB93D to be set to the master station.

| Setting Destination | Item | Description | Refer To |
|---|---|---|---|
| QJ71 PB93D | FDL Address | Set the station number of the QJ71PB93D.<br>• Setting range<br>0 to 125 | Section 3.3.2 (9) |
| Master station | Watchdog | Set the watchdog timer period of the communication WDT.<br>• Setting range<br>0 : Communication WDT setting invalid<br>2 to 65000 : Communication WDT setting valid (set value 10ms) | — |
| | Min T_sdr | Set the minimum response time until the reply frame can be sent to the master station.<br>• Setting range<br>0 to 125 | — |
| | Group identification number | Set the group to which the module belongs.<br>The module can belong to multiple groups (Grp1 to Grp8). | — |
| | Data module setting | Set the I/O configuration information (set to "Cfg_Data" of the master station).<br>• Setting type<br>96 pattern<br>• Number of setting<br>1 to 40 | Section 3.5.1 |
| | Data assignment mode setting | Set the data layout of the output send area/input receive area of the buffer memory (set to "User_Prm_Data" of the master station).<br>• Setting range<br>0 : Batch assignment mode (default)<br>1 : Split assignment mode | Section 3.5.2 |
| | Swap setting | Set whether the word data sent/received on the QJ71PB93D side will be swapped or not (set to "User_Prm_Data" of the master station).<br>• Setting range<br>0 : Without swap (default)<br>1 : With swap | Section 3.5.3 |

Set the parameters to the master station with the configurator corresponding to the master station used. (Refer to Section 5.1.1.)


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## 3.5.1 Data module setting

Set the I/O configuration information of the master station and QJ71PB93D.

### (1) Number of data modules to be set

Set the data modules per QJ71PB93D within the following range.

- Number of data modules: Max. 40 modules
- Total data size

  Input data: Max. 122 words
  Output data: Max. 122 words
  } Total max. 192 words

### (2) Data module setting pattern

For data module setting, choose the corresponding one from among 96 patterns made available by combining I/O designation (3 types), data size (16 types) and separation prevention setting (2 types).

| Setting Item | Types |
|---|---|
| I/O designation | Input, output, input/output |
| Data size | 1 to 16 words |
| Separation prevention setting | Word unit, data module unit |

### (3) Data module setting example

The data module setting example given here assumes the following configuration.

- Configuration example

| | | Data module 0 | Data module 1 | Data module 2 |
|---|---|---|---|---|
| CPU module | QJ71PB93D | Input module 64 points (4 words) X20 to X5F | Output module 64 points (4 words) Y60 to Y9F | I/O module 32 points (2 words) XA0 to XBF YA0 to YBF |

- Setting example

| Data Module Setting | QJ71PB93D Buffer Memory |
|---|---|
| Data module 0 (Input, 4 words, word unit) | Data module 0 area (4 words) is reserved in the input send area. |
| Data module 1 (Output, 4 words, word unit) | Data module 1 area (4 words) is reserved in the output receive area. |
| Data module 2 (Input/output, 2 words, word unit) | Data module 2 areas (2 words each) are reserved in the output receive area and input send area. |

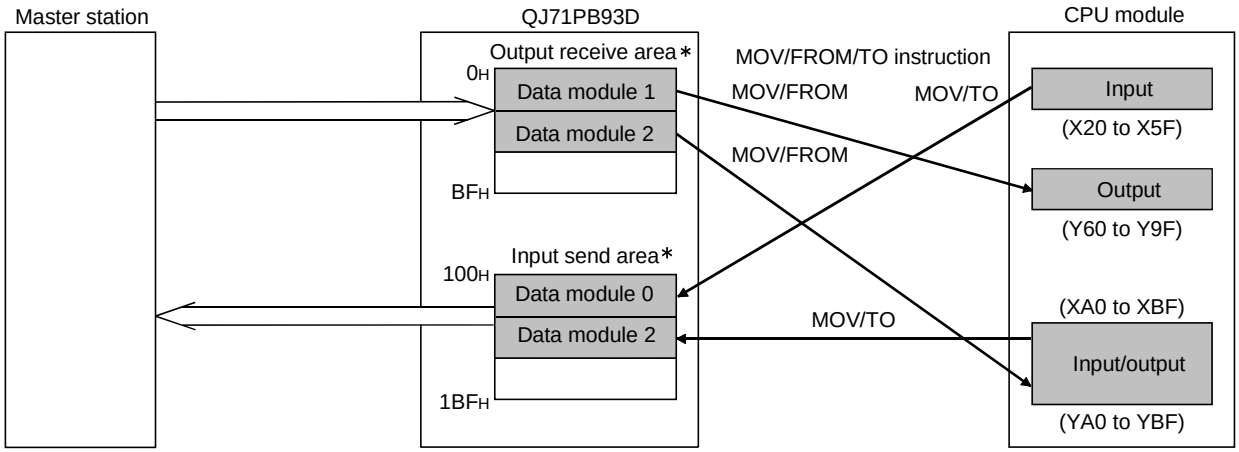
#### (a) Total data size

The total data size of the data modules 0 to 2 is as follows.

- Input date size: Data module 0 (input, 4 words)
  + data module 2 (input, 2 words)
  = 6 words
- Output date size: Data module 1 (output, 4 words)
  + data module 2 (output, 2 words)
  = 6 words
- Total date size: Input date size (6 words)
  + output data size (6 words)
  = 12 words

(b) Flows of data

The following indicates the flows of data between the modules.




*: Use the data assignment mode setting to set the layout on the buffer memory. (Refer to Section 3.5.2)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## 3.5.2 Data assignment mode setting

Set how to assign the modules in the output receive area/input send area of the buffer memory.

| Data Assignment Mode | Description |
|---|---|
| 0 : Batch assignment mode | Input data and output data are assigned to the input send area and output receive area, respectively, in order of the data modules from top to bottom, starting with the top address. |
| 1 : Split assignment mode | Input data and output data are assigned to the input send area and output receive area as-is in order of the data modules.<br>Data in the I/O and special function modules can be batch-read/written. |

The following is the example of the used status of the output receive area and input send area in the following data module setting.

| Data Module Setting | | Output Data | Input Data |
|---|---|---|---|
| Data module 0 | 1 word, input | | 1 word |
| Data module 1 | 2 words, output | 2 words | |
| Data module 2 | 1 word, input/output | 1 word | 1 word |
| Data module 3 | 1 word, output | 1 word | |
| Data module 4 | 2 words, input | | 2 words |
| Data module 5 | 1 word, output | 1 word | |

• Batch assignment mode

| Buffer memory address | Output receive area | Buffer memory address | Input send area |
|---|---|---|---|
| 0H | Used by data module 1 | 100H | Used by data module 0 |
| 1H | | 101H | Used by data module 2 |
| 2H | Used by data module 2 | 102H | Used by data module 4 |
| 3H | Used by data module 3 | 103H | |
| 4H | Used by data module 5 | 104H | |
| 5H | | 105H | |
| 6H | | 106H | |
| 7H | | 107H | |
| 8H | | 108H | |
| 9H | | | |
| ≀ | | ≀ | |
| BFH | | 1BFH | |

• Split assignment mode

| Buffer memory address | Output receive area | Buffer memory address | Input send area |
|---|---|---|---|
| 0 | | 100H | Used by data module 0 |
| 1H | Used by data module 1 | 101H | |
| 2H | | 102H | |
| 3H | Used by data module 2 | 103H | Used by data module 2 |
| 4H | Used by data module 3 | 104H | |
| 5H | | 105H | Used by data module 4 |
| 6H | | 106H | |
| 7H | Used by data module 5 | 106H | |
| 8H | | 107H | |
| 9H | | 108H | |
| ≀ | | ≀ | |
| BFH | | 1BFH | |


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### 3.5.3 Swap setting

Set whether the word data swapping function will be used or not.

| Set Value | Description |
|---|---|
| 0 : Not swapped | At the time of data transfer to/from the master station, the I/O data are transferred as-is. |
| 1 : Swapped | At the time of data transfer to/from the master station, the I/O data are transferred with their upper and lower bytes exchanged. |

Refer to Section 4.1.4 for the word data swapping function.

## 3.6 Operation Mode

The QJ71PB93D has two operation modes, normal operation mode and self-diagnostic mode.
The modes will be described.

| Operation Mode | Description | Refer To |
|---|---|---|
| Normal operation mode | In this mode, communication is made as in the slave parameters set to the master station.<br>Communication can be made if the slave parameters are within the setting ranges.<br>(Set only the station number in a sequence program.) | Section 4.1.1 |
| Self-diagnostic mode | In this mode, the QJ71PB93D is tested alone to diagnose a hardware fault.<br>No communication is made with the master station. | Section 5.4 |

Set the operation mode using the operation mode change request signal (Y11).
After power is switched on or the PLC CPU is reset, the QJ71PB93D operates in the normal operation mode.

# 4 FUNCTIONS

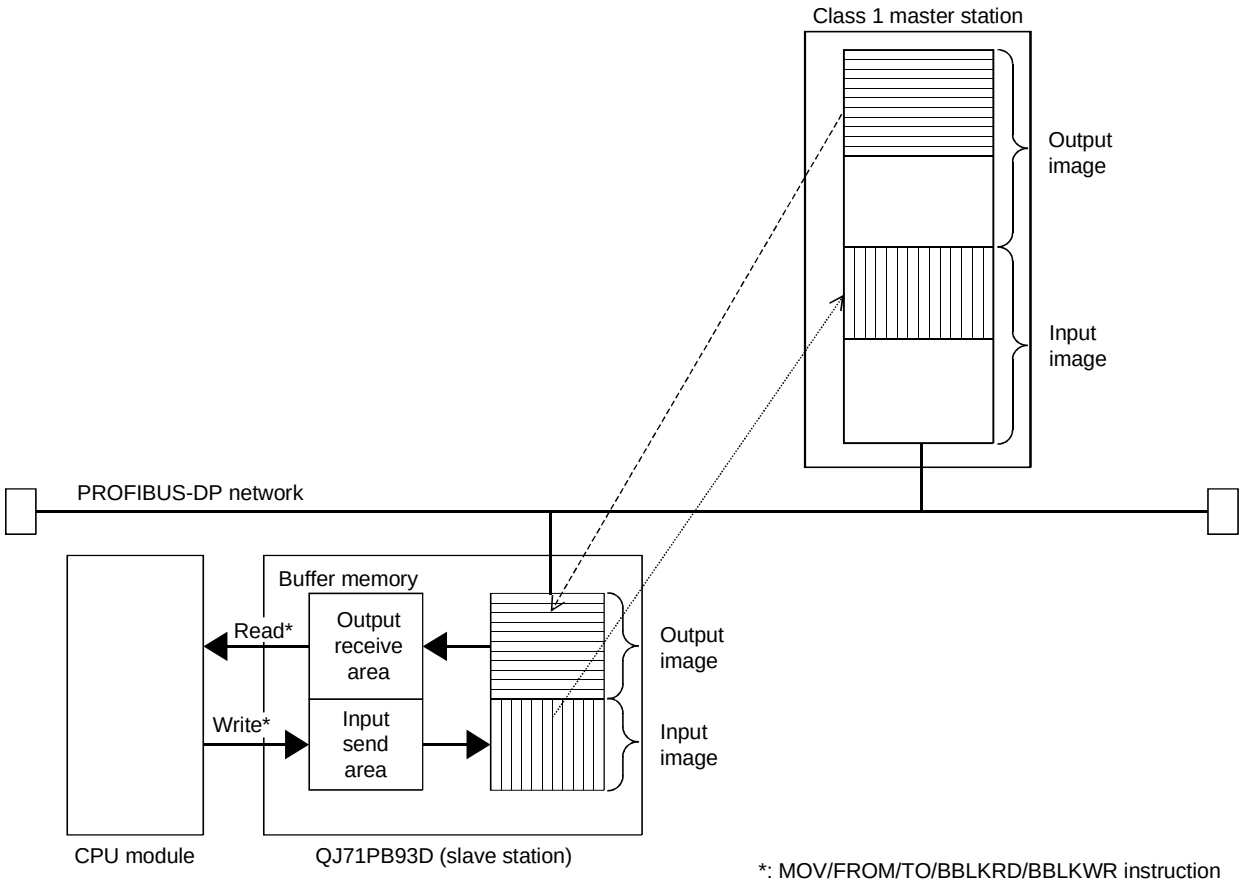
## 4.1 Functions for Communication with Class 1 Master

This section explains the functions provided for communication between the QJ71PB93D and class 1 master station.

### 4.1.1 I/O data communication function

The chief function of the QJ71PB93D is to communicate I/O data with the master station connected to the PROFIBUS-DP network.
The data received from the master station are stored into the output receive area of the buffer memory.
Using the MOV/TO instruction, the data written to the input send area of the buffer memory are sent to the master station.
The outline of this communication function is shown below.





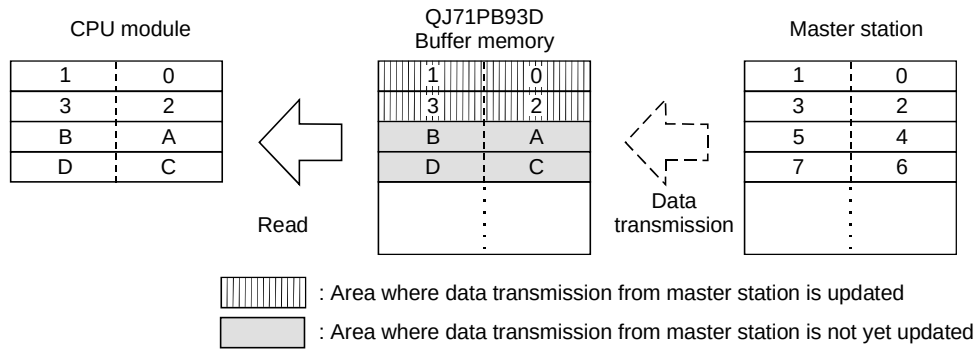


4 - 1

### 4.1.2 I/O data separation prevention function

The I/O data separation prevention function is a function to prevent the I/O data of the CPU unit from being unmatched with the I/O data of the master station.
The following shows the example of the separation occurred when the data is read from the CPU module during the data transmission from the master station to the buffer memory.

Example of separation of I/O data




#### (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 CPU module during the data transmission between the buffer memory of QJ71PB93D and the master station.

(b) When the separation prevention function is used, the reading from the CPU model is waited during the data transmission from the master station to the buffer memory (input area ) of QJ71PB93D, and executed after the data transmission has been completed.
Also, the data transmission to the master station is waited until the writing from the CPU module to the buffer memory (output area) of QJ71PB93D is completed, and executed after the writing has been completed.

(c) To activate the I/O data separation prevention function, a method to use the dedicated instruction (BBLKRD/BBLKWR) in the sequence program.
When a refresh is performed between the buffer memory of QJ71PB93D and the CPU module using the MOV/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 2.4).
QCPU (Q mode): Serial No. 02092＊＊＊＊＊＊＊＊＊＊or later.

(e) When the separation prevention function is used, there is a wait for read/write from/to the CPU module and the data transmission between the CPU module and master station, therefore, the transmission between the CPU module and master station is delayed.
For the transmission delay time, refer to Chapter 6 Transmission Delay Time.

### (2) Separation prevention by dedicated instruction

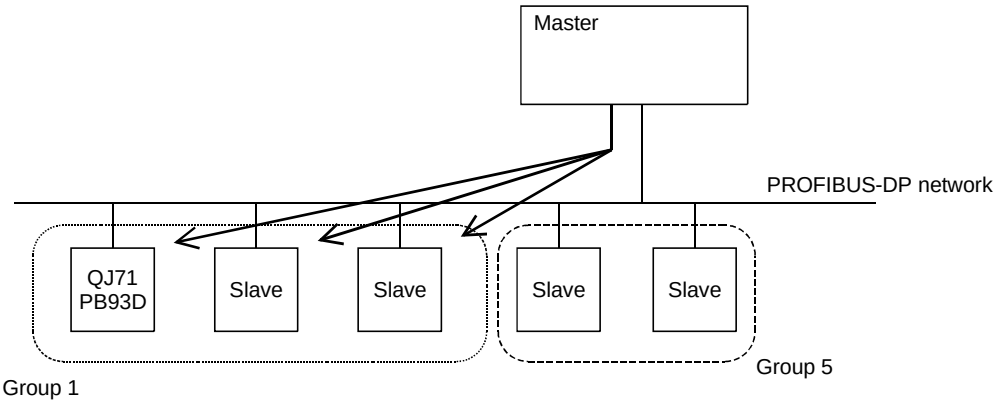
The separation prevention function is executed using the BBLKRD instruction (read) and BBLKWR instruction (write) which are the dedicated instructions for reading/writing of the buffer memory from and to QJ71PB93D.
When the writing/reading of the buffer memory are executed using the FROM/TO instruction, 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.

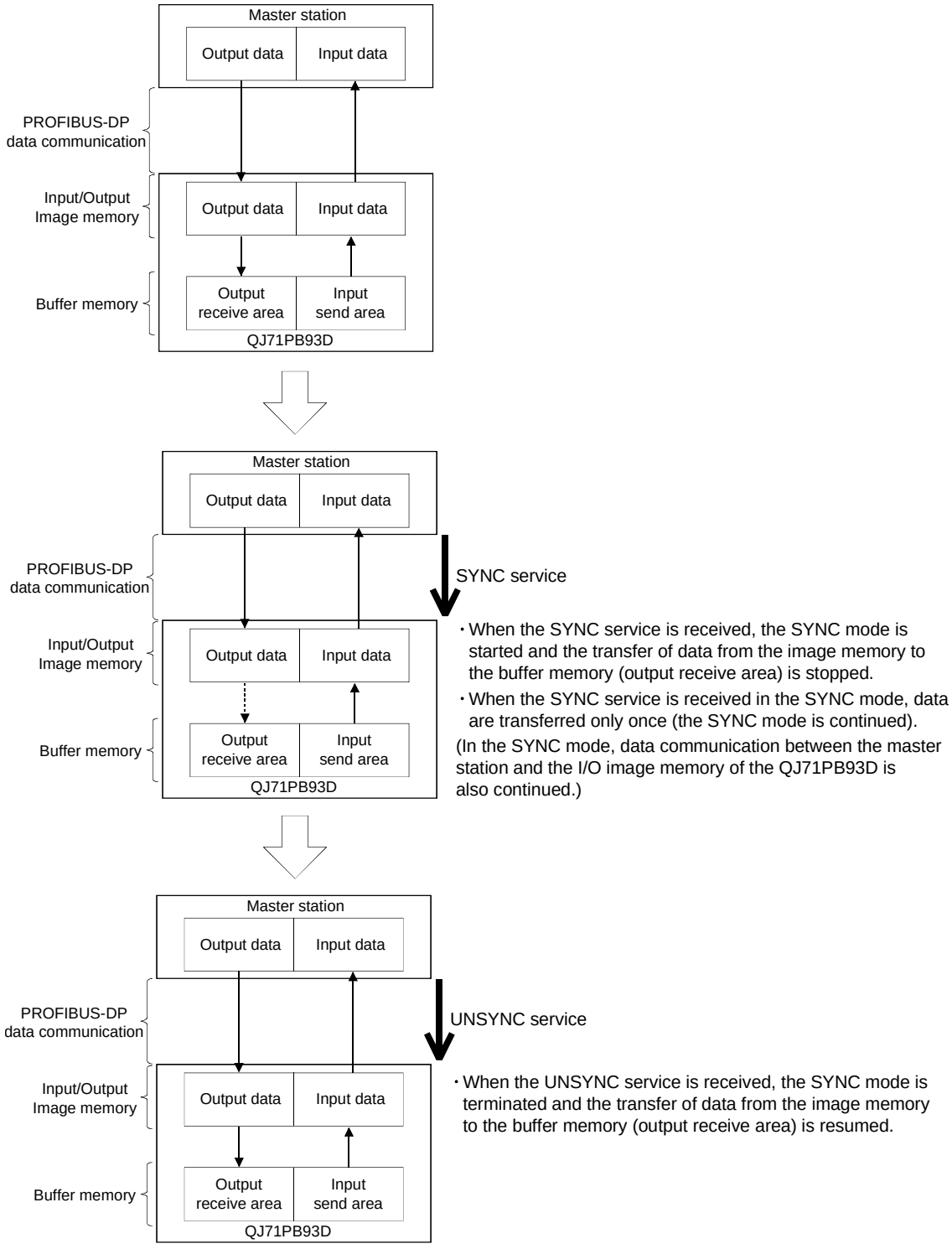
(b) Before the dedicated instruction (BBLKRD/BBLKWR) is executed, the BBLKRD start request signal (Y0A)/BBLKWR start request signal (Y0B) must have turned on.
If the BBLKRD start request signal (Y0A)/BBLKWR start request signal (Y0B) is off, the dedicated instruction (BBLKRD/BBLKWR) becomes invalid.

## 4.1.3 Global control functions

Global control has four functions: SYNC, UNSYNC, FREEZE and UNFREEZE. These functions are designed to maintain/cancel the I/O of each slave station on a group basis by multicast communication.
The QJ71PB93D that execute the global control function is those located in one or more groups of the eight groups.
The group number of the QJ71PB93D is set to the slave parameters of the master station.



## (1) At receive of SYNC and UNSYNC services





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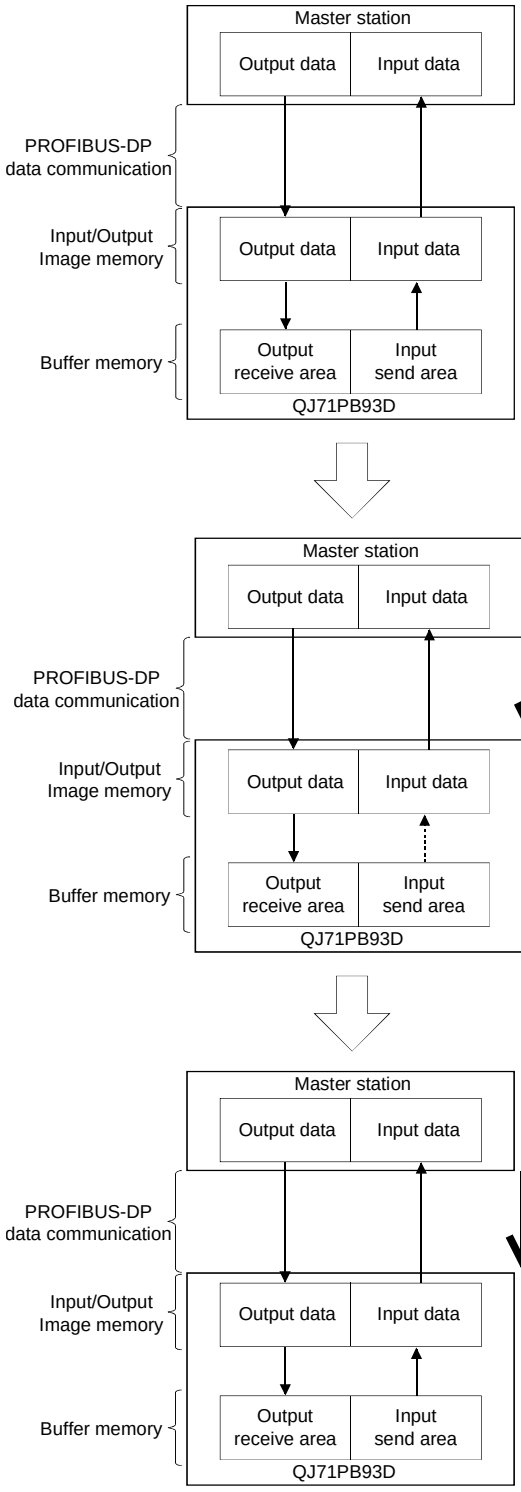
## (2) At receive of FREEZE and UNFREEZE services




FREEZE service

・When the FREEZE service is received, the FREEZE mode is started and the transfer of data from the buffer memory (input send area) to the image memory is stopped.

(In the FREEZE mode, data communication between the master station and the I/O image memory of the QJ71PB93D is also continued.)

UNFREEZE service

・When the UNFREEZE service is received, the FREEZE mode is terminated and the transfer of data from the buffer memory (input send area) to the image memory is resumed.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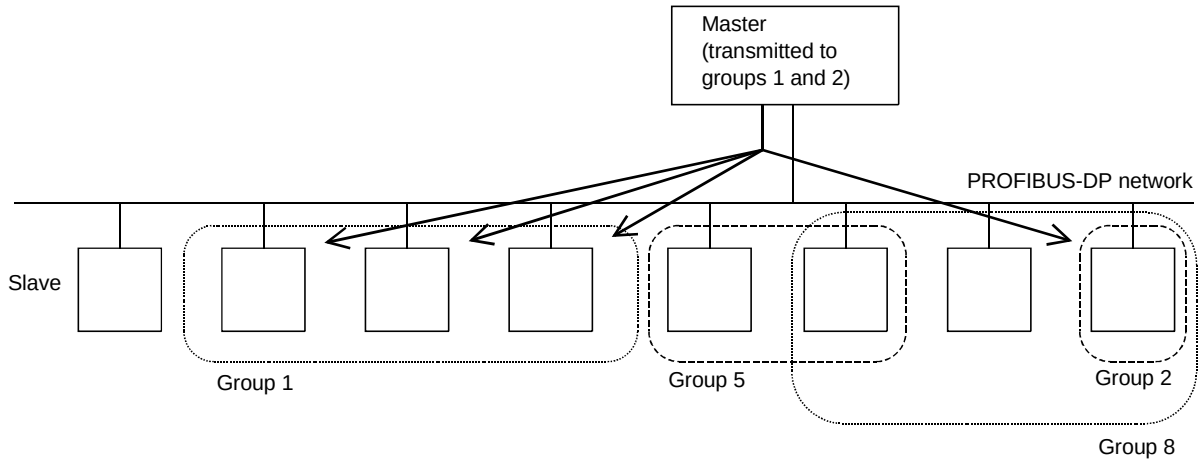
(3) Group selection

- The number of groups is from 1 to 8 if with a total of 8 groups.
- The QJ71PB93D 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.)



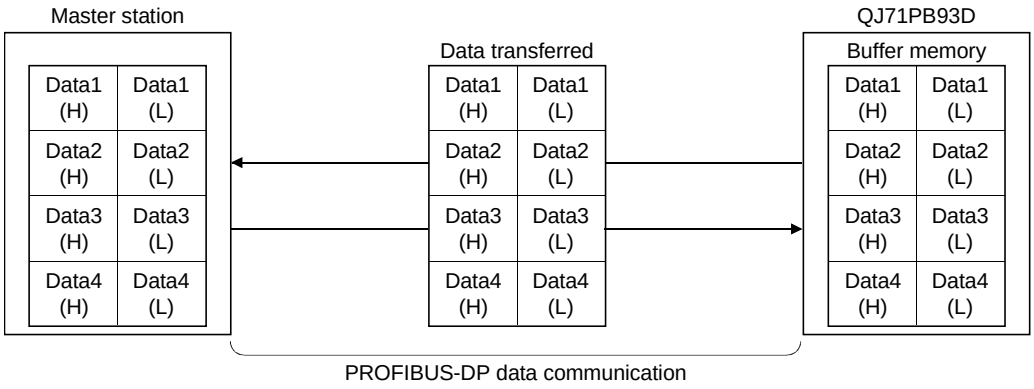
## 4.1.4 Word data swapping function

This function is designed to exchange (swap) the upper and lower bytes of the word data transferred between the master station and QJ71PB93D.
When Yes has been specified as swap setting, the received output data are stored into the output receive area after their upper and lower bytes have been swapped, and the data stored in the input send area are sent to the master station after their upper and lower bytes have been swapped.
If the QJ71PB93D is used with the master station whose upper and lower bytes are reversed in word data handling, using this function eliminates the need for swapping in a sequence program.

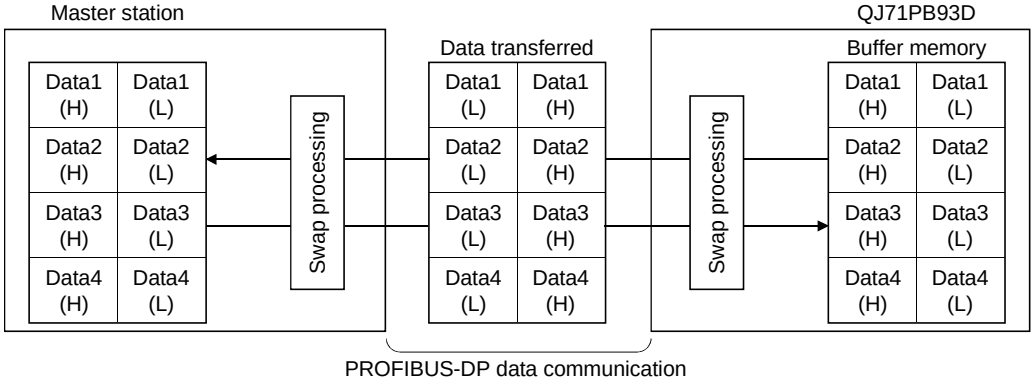
Guideline of Swapping Function Setting Depending on Master Station Type

| Master Station Type | | Setting of Swapping Function on QJ71PB93D |
|---|---|---|
| AJ71PB92D,A1SJ71PB92D | | Not swapped |
| QJ71PB92D | When swap is not performed on the master station side (default setting) | Not swapped |
| | When swap is performed on the master station side | swapped |
| Master station other than above | | Set according to the specifications of the used master station. |

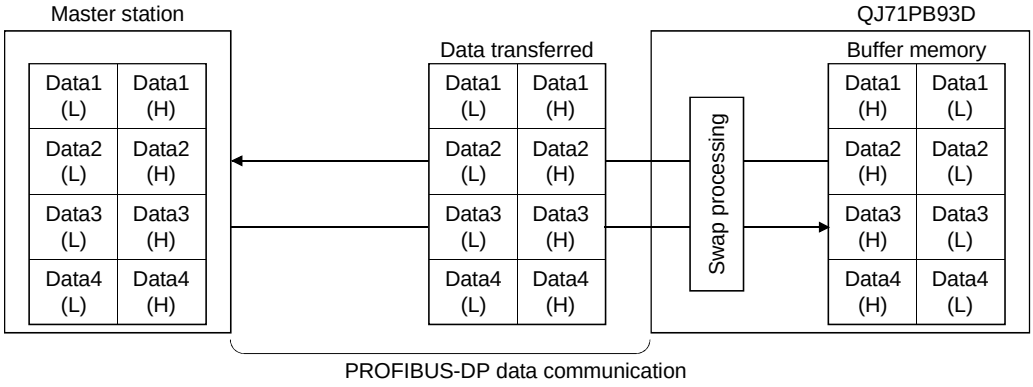
- When the master station is the A1SJ71PB92D/AJ71PB92D/QJ71PB92D (Not swapped)




- When the master station is the QJ71PB92D (Swapped)



- When the upper and lower bytes of the word data are handled inversely between the master station and QJ71PB93D





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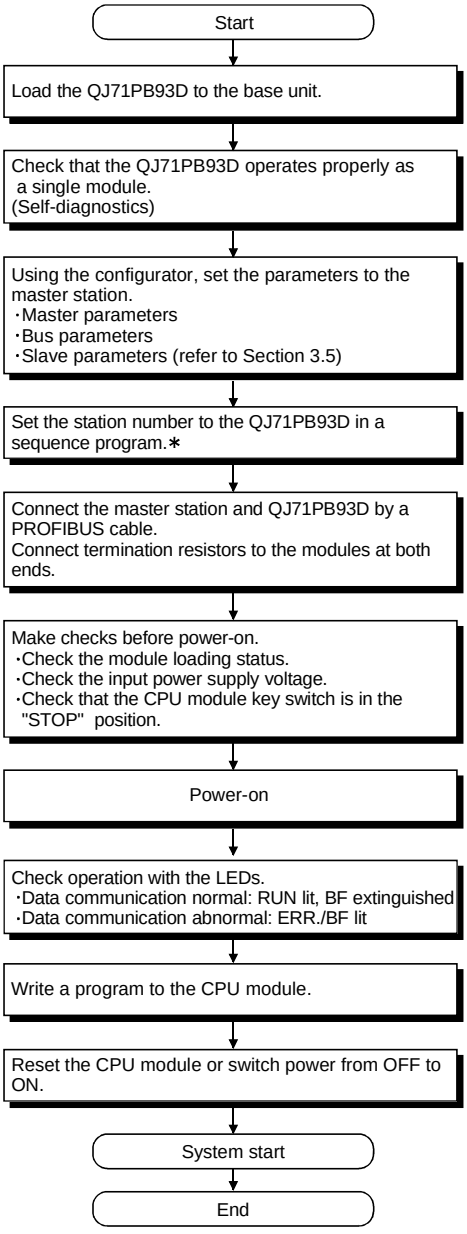
# 5 PROCEDURES BEFORE SYSTEM OPERATION

## 5.1 Procedures before Operation

The procedure for newly connecting QJ71PB93D to an existing PROFIBUS-DP network is explained below.




REMARK

When setting the station number from class 2 master station, specifying "TRUE" for "No_Add_Chg" disables the station number from being changed until the station number is cleared by a station number setting request.

### 5.1.1 Parameter setting to master station

To use the QJ71PB93D, set the following parameters to the master station.

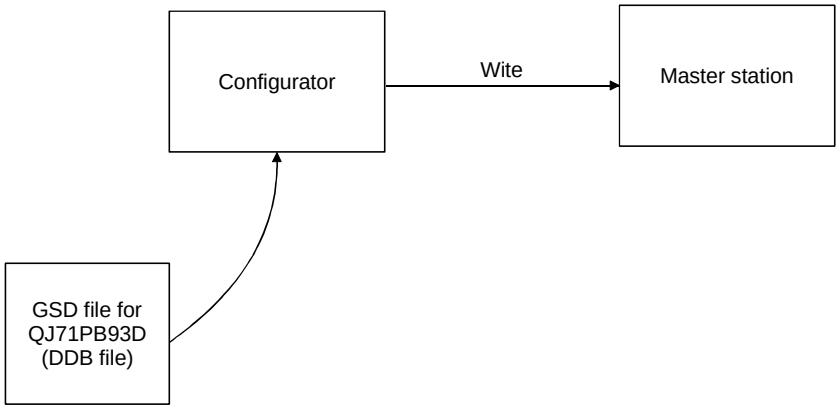
| Parameters Set to Master Station | | Refer To |
|---|---|---|
| Master parameters (parameters of master station itself) | | — ∗1 |
| Bus parameters (communication parameters of PROFIBUS-DP network) | | — ∗1 |
| Slave parameters (for QJ71PB93D) | FDL Address | Section 3.5 |
| | Watchdog | |
| | Min t_sdr | |
| | Group identification number | |
| | Data module setting | Section 3.5.1 |
| | Data assignment mode setting | Section 3.5.2 |
| | Swap setting | Section 3.5.3 |

∗1 : Refer to the manual of the master station for the setting items.
Refer to the manual of the used configurator for the setting method.

#### (1) Procedure for setting the slave parameters for QJ71PB93D to the master station

1. Read the GSD (DDB) file of the QJ71PB93D to the configurator corresponding to the master station used.
2. Set the QJ71PB93D slave parameters using the configurator.
3. Write the parameters to the master station.

Refer to Section 3.5 for the items and data of the QJ71PB93D slave parameters.
Refer to the manual of the used configurator for the operation of the configurator.




#### (2) GSD (DDB) file

Please contact your local system service or representative for the GSD (DDB) file for the QJ71PB93D.

## 5.2 Installation

The following section explains the precautions when handling the QJ71PB93D, from the time they are unpacked until they are installed.
For more details on the module installation, see the user's manual for the CPU module 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 mounting screws and connector mounting screws using torque within the following ranges.

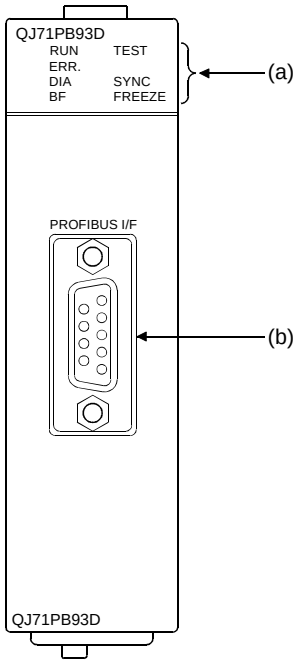
| Screw location | Tightening torque range |
|---|---|
| Module mounting screws (M3 screws) | 36 to 48 N · cm |
| PROFIBUS cable connector mounting screws (#4 - 40UCN) | 20 to 28 N · cm |

### 5.2.2 Installation environment

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

## 5.3 Part Names

This section explains the part names of the QJ71PB93D.




| No. | Name | Description | | Remark |
|---|---|---|---|---|
| (a) | LED | Displays the QJ71PB93D status. | | |
| | | Name | Display description | |
| | | RUN | On: Normal<br>Off: Watch dog timer error occurrence | |
| | | ERR. | On: Parameter setting error or module error occurrence<br>Off: Normal | |
| | | SYNC | On: During SYNC mode | |
| | | FREEZE | On: During FREEZE mode | |
| | | DIA | On: Extended fault information present<br>Off: Extended fault information absent<br>(Related item: Section 3.4.2 (9)) | |
| | | BF | On: Before data communication or communication error detected<br>Off: During data communication | |
| | | TEST | On: During execution of self-diagnostics | |
| (b) | PROFIBUS interface connector | Connector for connecting the table for the PROFIBUS-DP network. | | ＊1 |

＊1: For the connector type, use a male D-Sub 9 pin. The PROFIBUS cable must be created by the user. (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 the CPU module to STOP.
2) In the device test of the debugging mode of GX Developer, set 2H (self-diagnosis mode) in the operation mode change request area (buffer memory address: 8CFH) and turn on the operation mode change request signal (Y11) to start the self-diagnosis automatically.
3) The TEST LED on QJ71PB93D will flash during the self-diagnosis.
4) When the results of the self-diagnosis are normal: The TEST LED and ERR. LED go off.
   If the results of the self-diagnosis are abnormal (an error occurs): The TEST LED and ERR. LED will light up.
5) When the results of the self-diagnosis are normal, return the QJ71PB93D to the normal operation mode.
   In the device test of the debugging mode of GX Developer, set 0H (normal mode) in the operation mode change request area (buffer memory address: 8CFH) and turn on the operation mode change request signal (Y11) to place the QJ71PB93D in a wait status for parameters from the master station.

If the self-diagnostic result is an error, any of the following type codes is stored into the self-diagnostic status type code display area (buffer memory address: 8D2H).
The type code can be checked in the buffer memory batch monitor of GX Developer.

| Result of Self-diagnostics | Type code |
|---|---|
| Normal | 0H |
| Hardware fault | 8001H to 8006H |
| Swap test error | 8007H |

### (2) Corrective action for error occurrence

If the self-diagnostic result is an error, consult your local service center or representative.

### (3) Cautions

During the self-diagnosis, do not monitor the QJ71PB93D buffer memory from the GX Developer.
Monitor may stop if the buffer memory is monitored during the self-diagnosis.

## 5.5 Wiring

### 5.5.1 PROFIBUS cable wiring

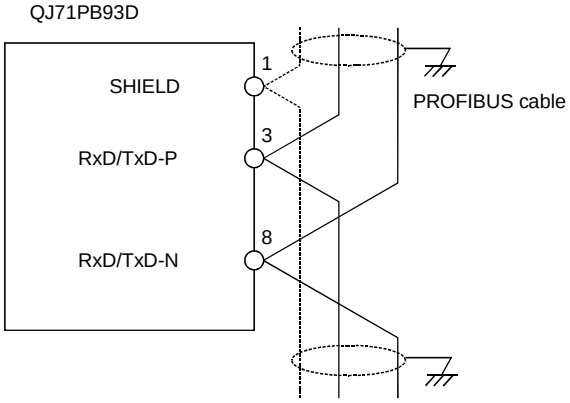
This section explains the wiring to PROFIBUS connector for the QJ71PB93D

#### (1) Pin assignments for the connector

| Pin No. | Name | Application |
|---|---|---|
| 1 | SHIELD | Shield, Protective Ground |
| 2 | Vacancy | — |
| 3 | RxD/TxD-P | Receive/Transmit Data-P |
| 4 | Vacancy | — |
| 5 | DGND ＊1 | Data Ground |
| 6 | VP ＊1 | Voltage-Plus |
| 7 | Vacancy | — |
| 8 | RxD/TxD-N | Receive/Transmit Data-N |
| 9 | Vacancy | — |

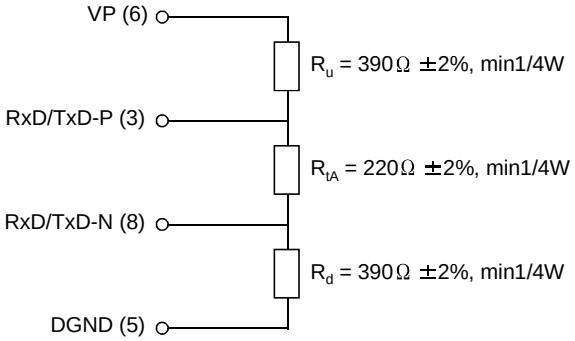
＊1 The signals are used when termination resistors are connected.

#### (2) Wiring




#### (3) Termination resistor

The termination resistor is to be user-prepared.




REMARK

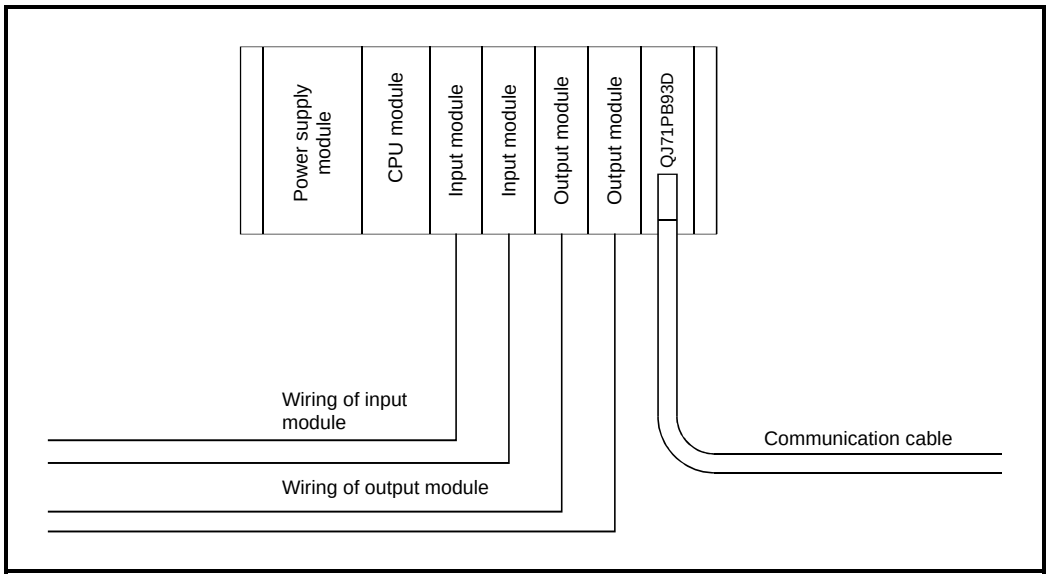
- Please use the PROFIBUS cable (Type A) with braided shield.

## 5.5.2 Wiring precautions

As one of the requirements to give full play to QJ71PB93D'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 QJ71PB93D is described below.

(1) Do not route the wire of QJ71PB93D 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) The wires from the input/output modules of the PLC should be away from the communication cable as far as possible as shown in the figure below.




(3) Grounding

(a) When using the QJ71PB93D, basically ground the FG and LG terminals of the power supply module of the PLC.

(b) Grounding the module and other device with the same FG terminal may apply noise through the FG terminal and result in a communication error. If this error occurs, disconnect the FG terminal from the module.

# 6 TRANSMISSION DELAY TIME

## 6.1 Transmission Delay Time of Output Receive (Master station → QJ71PB93D)

### (1) When BBLKRD instruction is used

Transmission delay time of output receive = 1 bus cycle time + 1 sequence scan time + 0.2 [ms]

### (2) When MOV/FROM instruction is used

Transmission delay time of output receive = 1 sequence scan time + 0.2 [ms]

## 6.2 Transmission Delay Time of Input Send (QJ71PB93D → Master station)

### (1) When BBLKWR/MOV/TO instruction is used

Transmission delay time of input send = 2 bus cycle times + 0.2 [ms]

| POINT |
| --- |
| For the calculation expression of the bus cycle time, refer to the manual of the PROFIBUS-DP module used on the master station. |




6 - 1

# MEMO




6 - 2

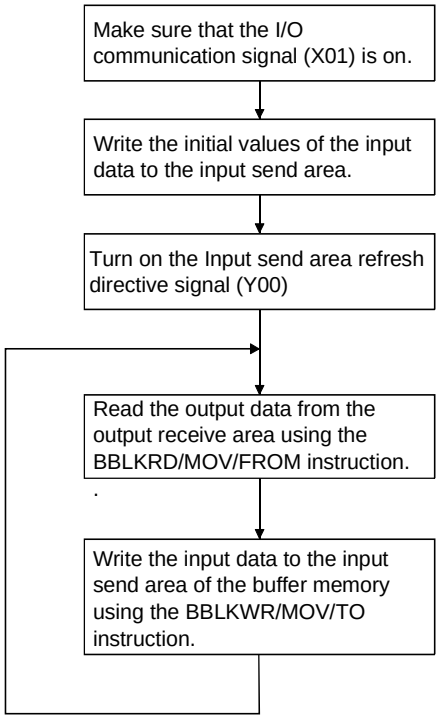
# 7 PROGRAMMING

This chapter gives program examples of station number setting, I/O data communication, and global control-driven program execution.

## 7.1 Communication Sequence

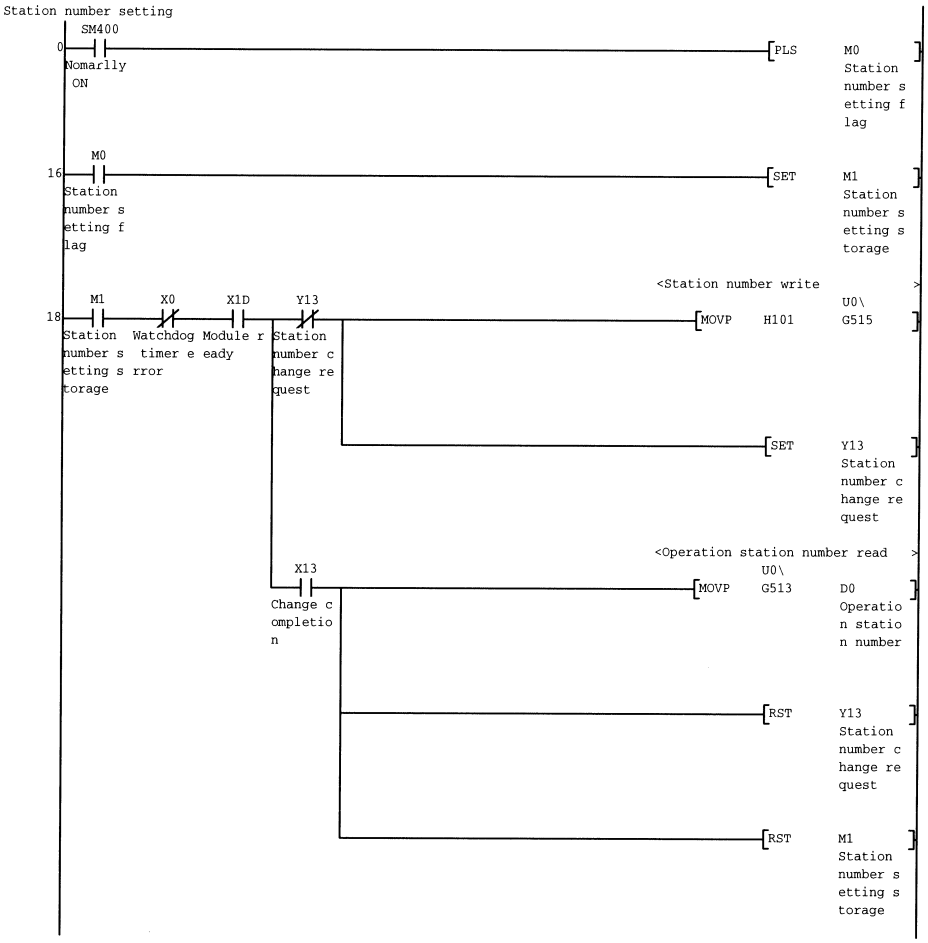
The following is the sequence of I/O data communication with the master station.

- Refresh between the PLC CPU and QJ71PB93D and refresh of the QJ71PB93D buffer memory (output receive area, input send area) are executed asynchronously.



## 7.2 Station Number Setting (Set to station number 1)

The following is the example of a station number setting program.



## 7.3 Communication of I/O Data

### 7.3.1 Batch assignment mode

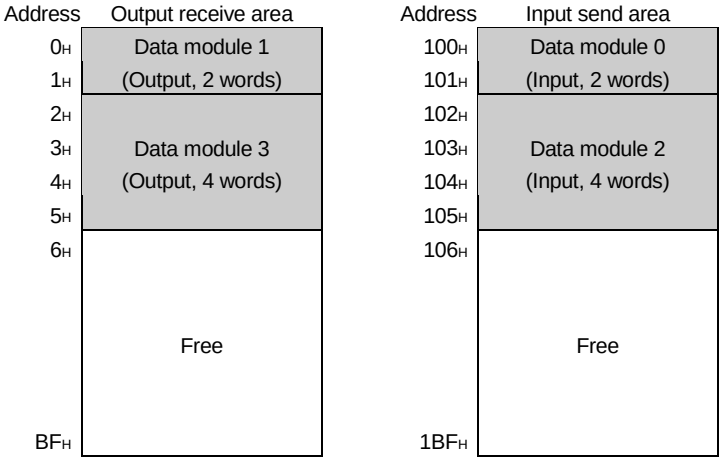
The following is the example of an I/O data communication program for use in the batch assignment mode of the data assignment modes in the following configuration.

| CPU | QJ71 PB93D | QX41 | QY41P | Q64AD | Q64DA |
|---|---|---|---|---|---|

• Data module setting of QJ71PB93D

| | |
|---|---|
| Data module 0 | Input, 2 words, word unit |
| Data module 1 | Output, 2 words, word unit |
| Data module 2 | Input, 4 words, word unit |
| Data module 3 | Output, 4 words, word unit |

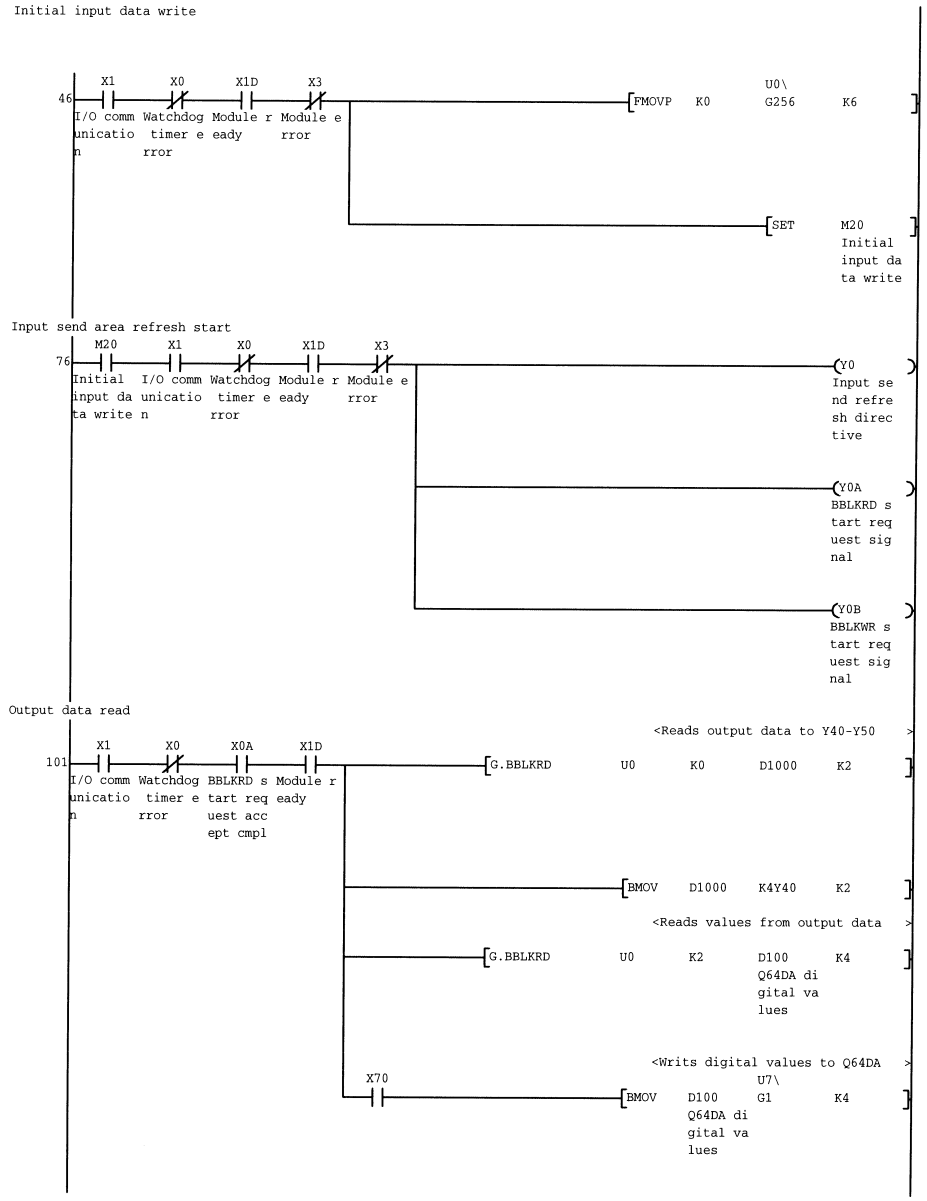
• Used states of QJ71PB93D output receive area and input send area

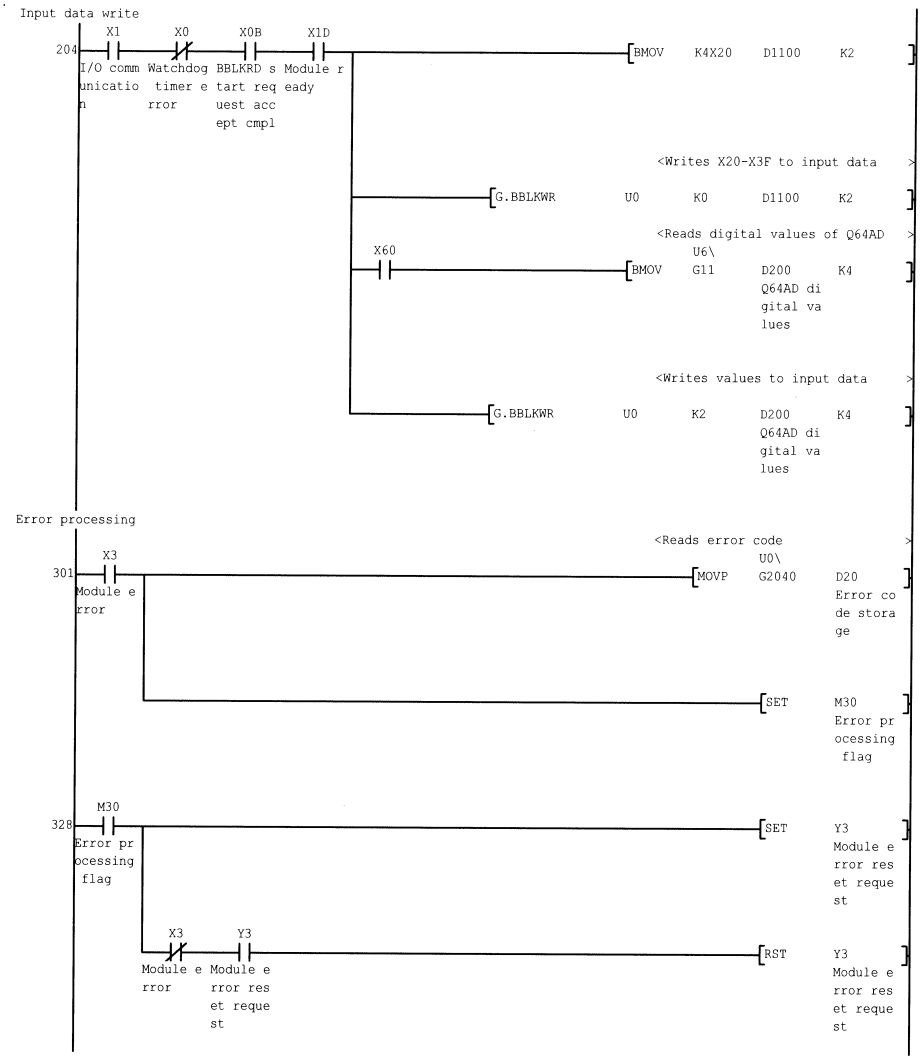


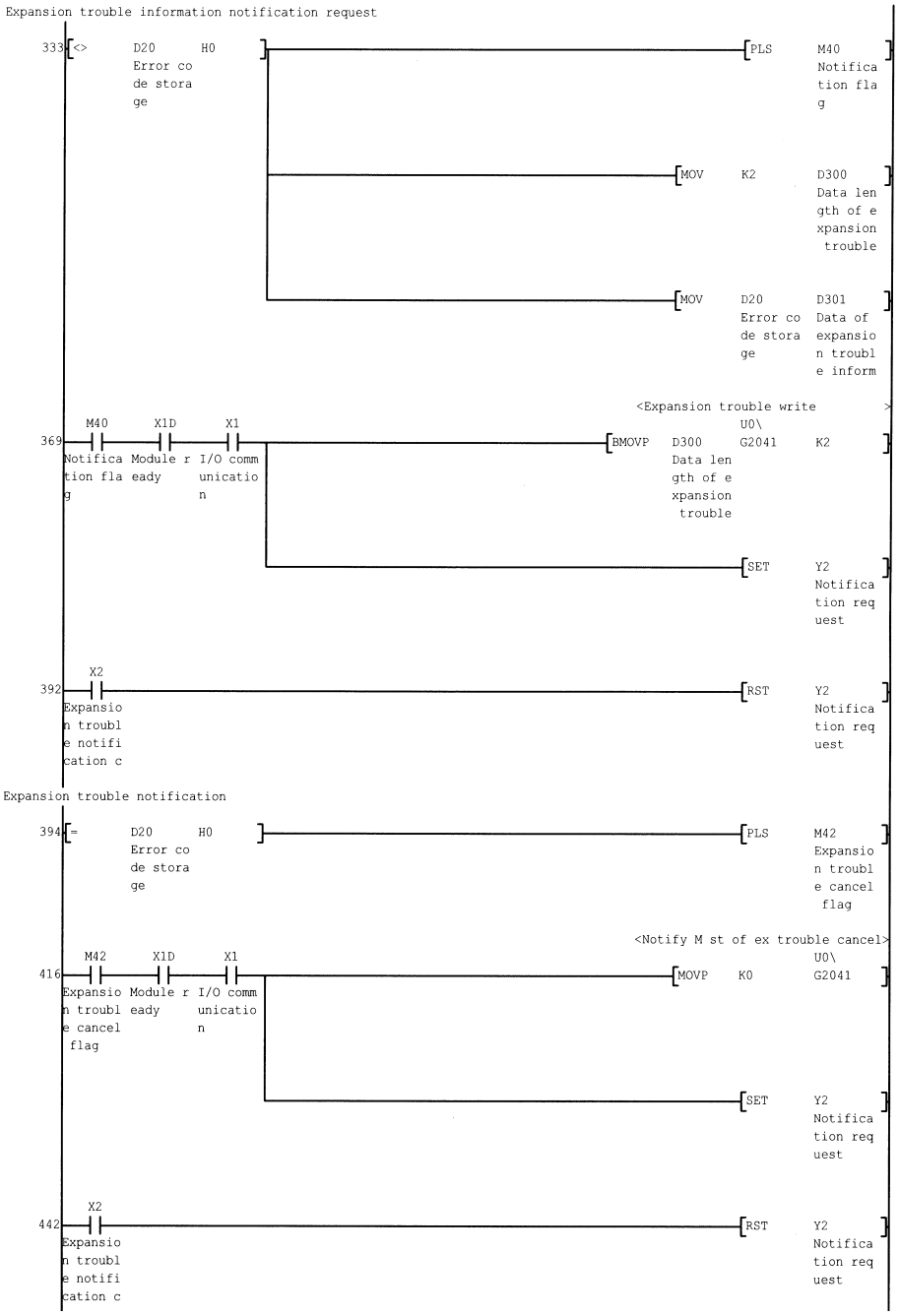

• Device assignment

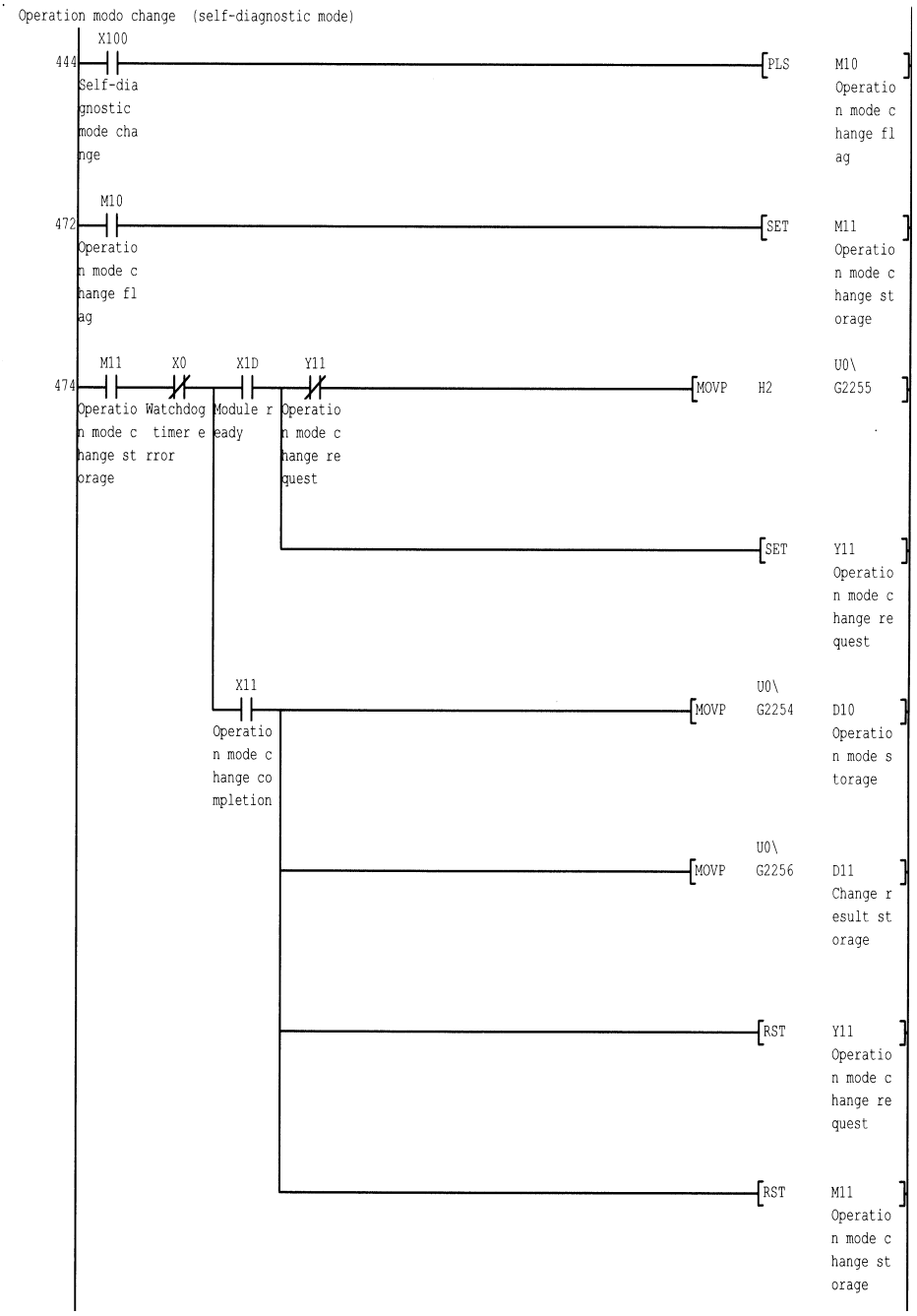
| | | |
|---|---|---|
| X00 to X1F | Y00 to Y1F | QJ71PB93D I/O signals |
| X20 to X3F | — | QX41 input signals |
| — | Y40 to Y5F | QY41P output signals |
| X60 to X6F | Y60 to Y6F | Q64AD I/O signals |
| X70 to X7F | Y70 to Y7F | Q64DA I/O signals |
| D10 | | Operation mode storage |
| D11 | | Operation mode change result |
| D20 | | Error code storage |
| D100 to D103 | | Digital-analog conversion values output to Q64DA (CH1. to 4) |
| D200 to D203 | | Analog-digital conversion values input from Q64AD (CH1. to 4) |

## (1) When using dedicated instructions (BBLKRD/BBLKWR)

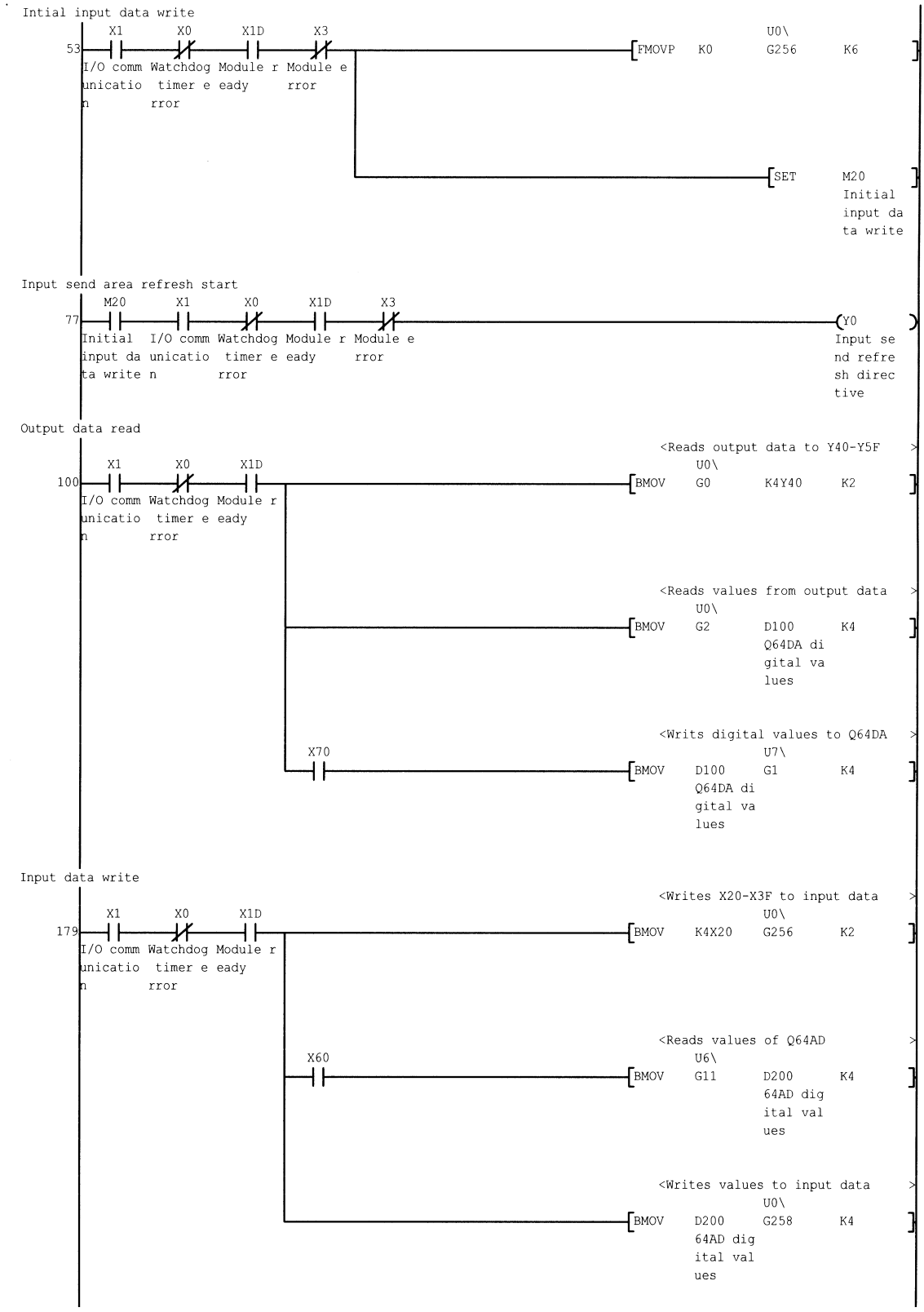


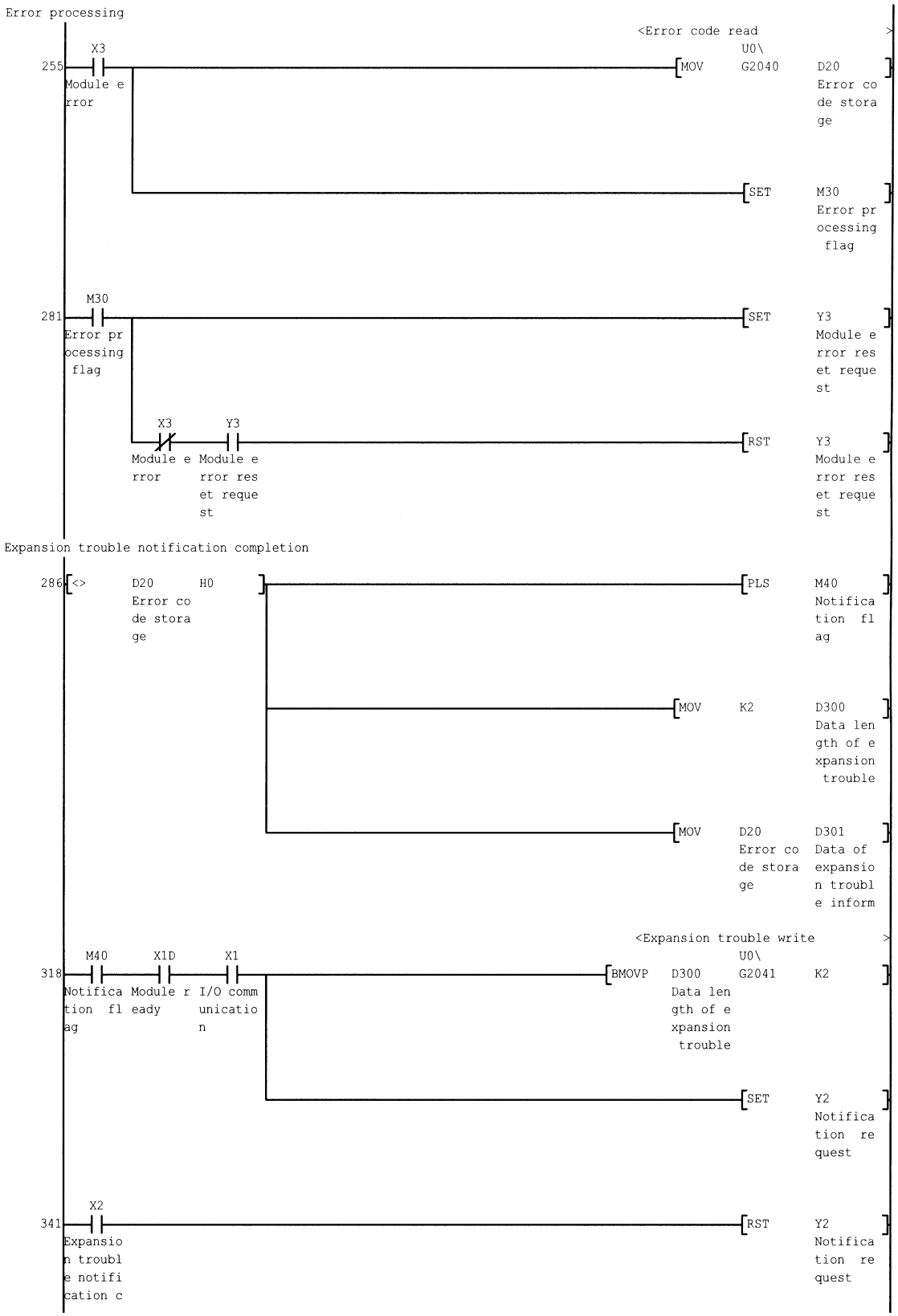

Input data write
X1
X0
X0B
X1D
204
I/O comm unicatio n
Watchdog timer e rror
BBLKRD s tart req uest acc ept cmpl
Module r eady
BMOV K4X20 D1100 K2
<Writes X20-X3F to input data
G.BBLKWR U0 K0 D1100 K2
<Reads digital values of Q64AD
X60
BMOV U6\ G11 D200 Q64AD di gital va lues K4
<Writes values to input data
G.BBLKWR U0 K2 D200 Q64AD di gital va lues K4
Error processing
<Reads error code
X3
301
Module e rror
MOVP U0\ G2040 D20 Error co de stora ge
SET M30 Error pr ocessing flag
M30
328
Error pr ocessing flag
SET Y3 Module e rror res et reque st
X3
Y3
Module e rror
Module e rror res et reque st
RST Y3 Module e rror res et reque st

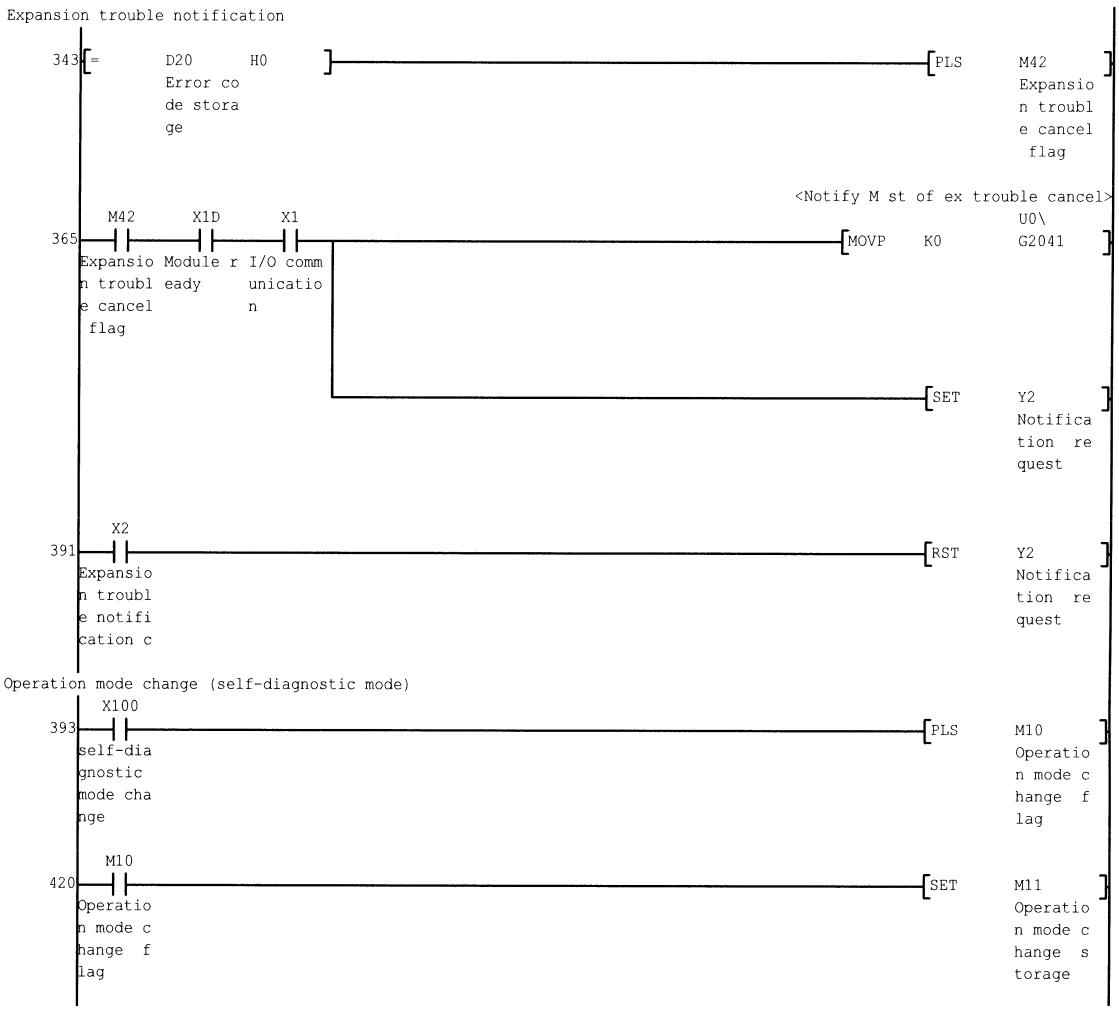

Expansion trouble information notification request
333
<>
D20
Error co
de stora
ge
H0
PLS
M40
Notifica
tion fla
g
MOV
K2
D300
Data len
gth of e
xpansion
trouble
MOV
D20
Error co
de stora
ge
D301
Data of
expansio
n troubl
e inform
<Expansion trouble write >
M40
Notifica
tion fla
g
X1D
Module r
eady
X1
I/O comm
unicatio
n
369
BMOVP
D300
Data len
gth of e
xpansion
trouble
U0\
G2041
K2
SET
Y2
Notifica
tion req
uest
X2
Expansio
n troubl
e notifi
cation c
392
RST
Y2
Notifica
tion req
uest
Expansion trouble notification
394
=
D20
Error co
de stora
ge
H0
PLS
M42
Expansio
n troubl
e cancel
flag
<Notify M st of ex trouble cancel>
M42
Expansio
n troubl
e cancel
flag
X1D
Module r
eady
X1
I/O comm
unicatio
n
416
MOVP
K0
U0\
G2041
SET
Y2
Notifica
tion req
uest
X2
Expansio
n troubl
e notifi
cation c
442
RST
Y2
Notifica
tion req
uest

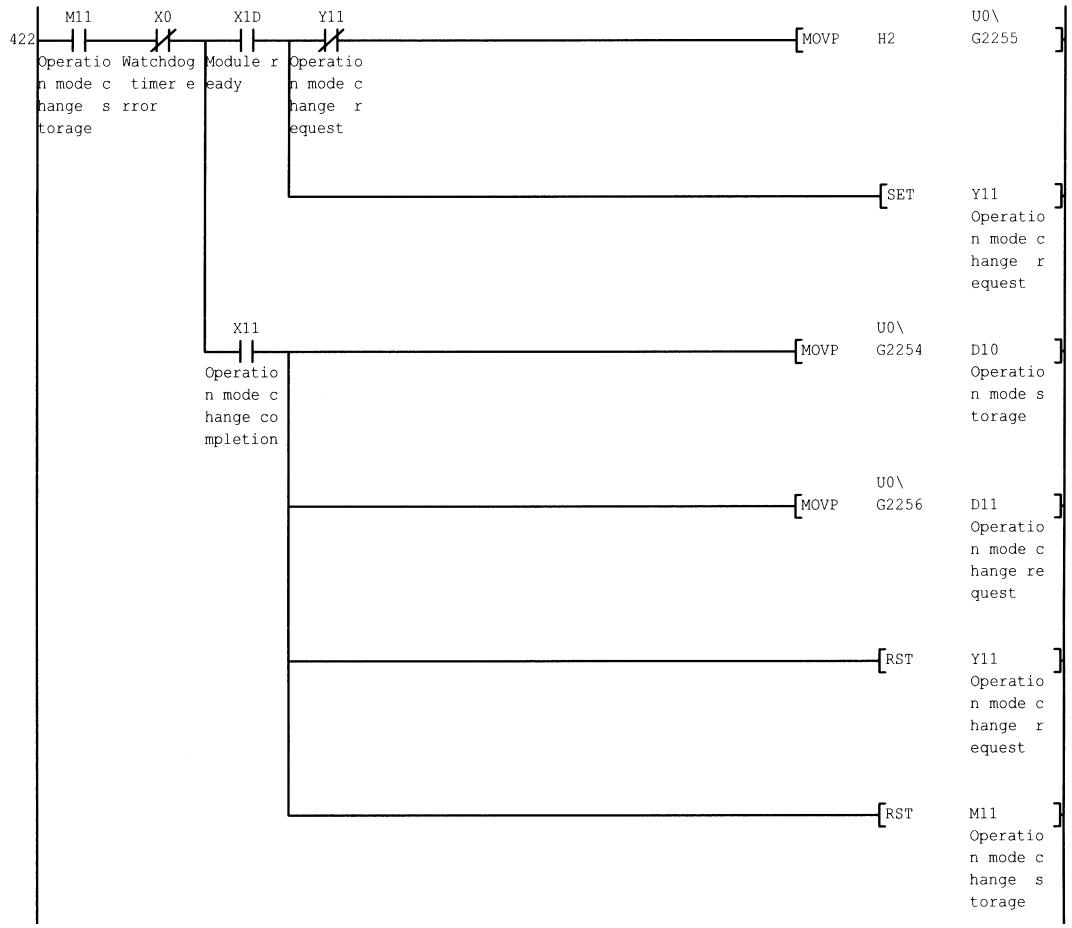

Operation modo change (self-diagnostic mode)
X100
444
Self-dia gnostic mode cha nge
PLS
M10
Operatio n mode c hange fl ag
M10
472
Operatio n mode c hange fl ag
SET
M11
Operatio n mode c hange st orage
M11
X0
X1D
Y11
474
Operatio n mode c hange st
Watchdog timer e rror
Module r eady
Operatio n mode c hange re quest
MOVP
H2
U0\ G2255
SET
Y11
Operatio n mode c hange re quest
X11
Operatio n mode c hange co mpletion
MOVP
U0\ G2254
D10
Operatio n mode s torage
MOVP
U0\ G2256
D11
Change r esult st orage
RST
Y11
Operatio n mode c hange re quest
RST
M11
Operatio n mode c hange st orage

## (2) When using MOV instruction




Error processing
<Error code read >
255
X3
Module e rror
MOV U0\ G2040 D20 Error co de stora ge
SET M30 Error pr ocessing flag
281
M30
Error pr ocessing flag
SET Y3 Module e rror res et reque st
X3 Module e rror
Y3 Module e rror res et reque st
RST Y3 Module e rror res et reque st
Expansion trouble notification completion
286
<> D20 Error co de stora ge H0
PLS M40 Notifica tion fl ag
MOV K2 D300 Data len gth of e xpansion trouble
MOV D20 Error co de stora ge D301 Data of expansio n troubl e inform
<Expansion trouble write >
318
M40 Notifica tion fl ag
X1D Module r eady
X1 I/O comm unicatio n
BMOVP D300 Data len gth of e xpansion trouble U0\ G2041 K2
SET Y2 Notifica tion re quest
341
X2
Expansio n troubl e notifi cation c
RST Y2 Notifica tion re quest


Expansion trouble notification
343
=
D20
Error co
de stora
ge
H0
PLS
M42
Expansio
n troubl
e cancel
flag
<Notify M st of ex trouble cancel>
365
M42
Expansio
n troubl
e cancel
flag
X1D
Module r
eady
X1
I/O comm
unicatio
n
MOVP
K0
U0\
G2041
SET
Y2
Notifica
tion re
quest
391
X2
Expansio
n troubl
e notifi
cation c
RST
Y2
Notifica
tion re
quest
Operation mode change (self-diagnostic mode)
393
X100
self-dia
gnostic
mode cha
nge
PLS
M10
Operatio
n mode c
hange f
lag
420
M10
Operatio
n mode c
hange f
lag
SET
M11
Operatio
n mode c
hange s
torage


M11
X0
X1D
Y11
422
Operatio n mode c hange s rror torage
Watchdog timer e
Module r eady
Operatio n mode c hange r equest
MOVP
H2
U0\ G2255
SET
Y11 Operatio n mode c hange r equest
X11
Operatio n mode c hange co mpletion
MOVP
U0\ G2254
D10 Operatio n mode s torage
MOVP
U0\ G2256
D11 Operatio n mode c hange re quest
RST
Y11 Operatio n mode c hange r equest
RST
M11 Operatio n mode c hange s torage

## 7.3.2 Split assignment mode

The following is the example of an I/O data communication program for use in the split assignment mode of the data assignment modes in the following configuration.

| CPU | QJ71 PB93D | QX41 | QY41P | QH42P | QY41P |
|---|---|---|---|---|---|

• Data module setting of QJ71PB93D

| | |
|---|---|
| Data module 0 | Input, 2 words, word unit |
| Data module 1 | Output, 2 words, word unit |
| Data module 2 | Input/output, 2 words, word unit |
| Data module 3 | Output, 2 words, word unit |

• Used states of QJ71PB93D output receive area and input send area

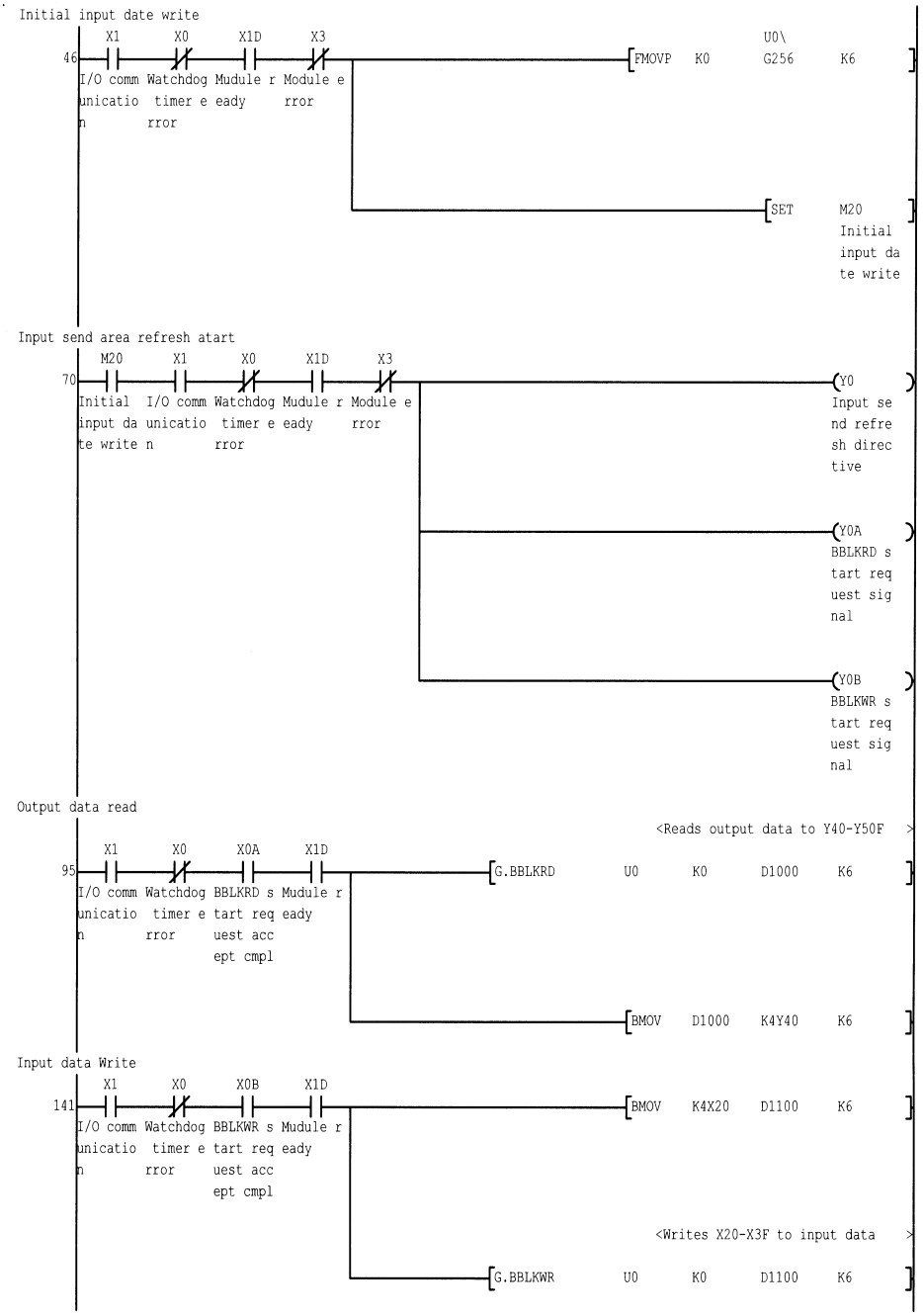
| Address | Output receive area |
|---|---|
| 0H | Free |
| 1H | |
| 2H | Data module 1 (Output, 2 words) |
| 3H | |
| 4H | Data module 2 (Output, 2 words) |
| 5H | |
| 6H | Data module 3 (Output, 2 words) |
| 7H | |
| 8H | Free |
| BFH | |

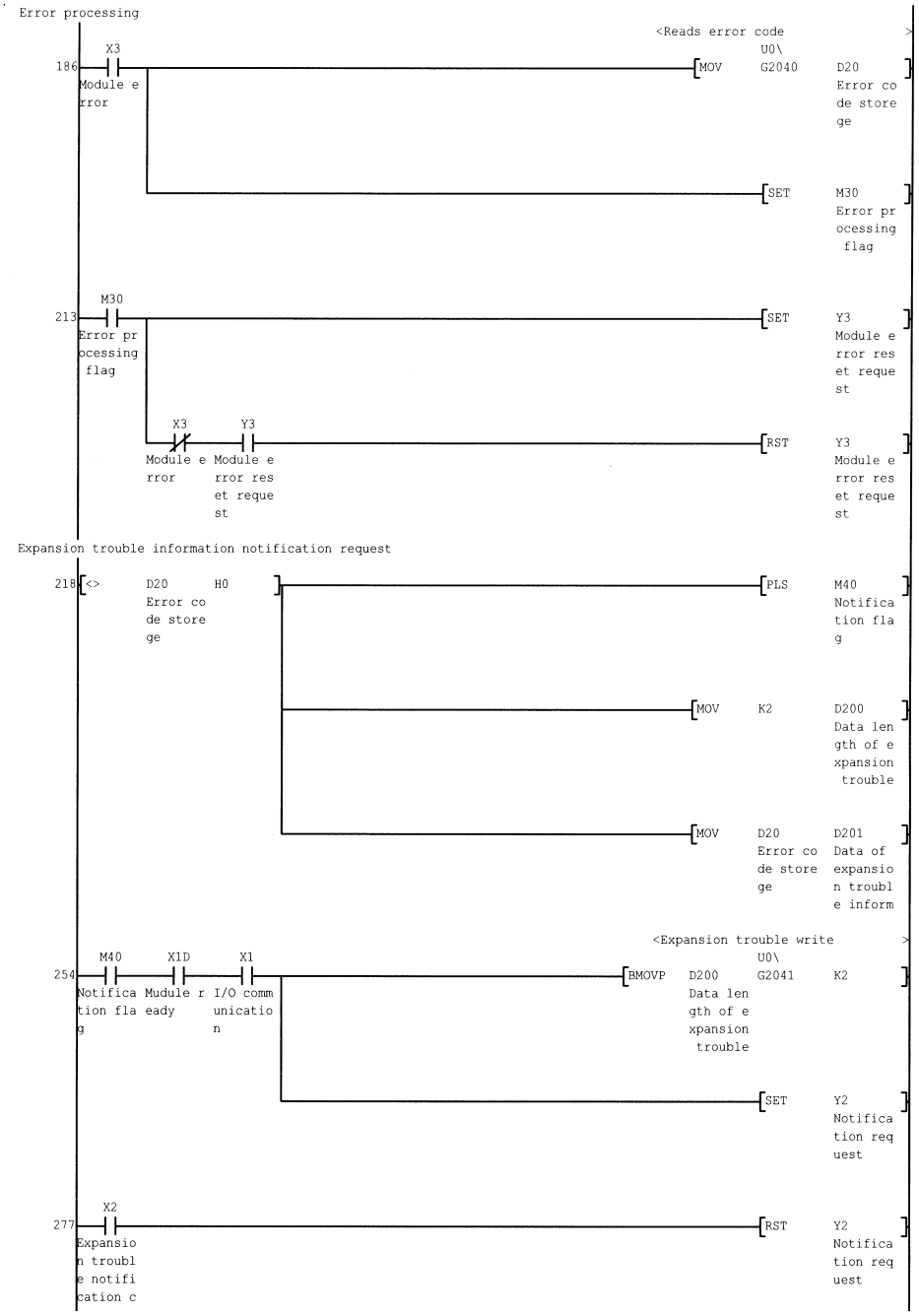
| Address | Input send area |
|---|---|
| 100H | Data module 0 (Input, 2 words) |
| 101H | |
| 102H | Free |
| 103H | |
| 104H | Data module 2 (Input, 2 words) |
| 105H | |
| 106H | Free |
| 1BFH | |

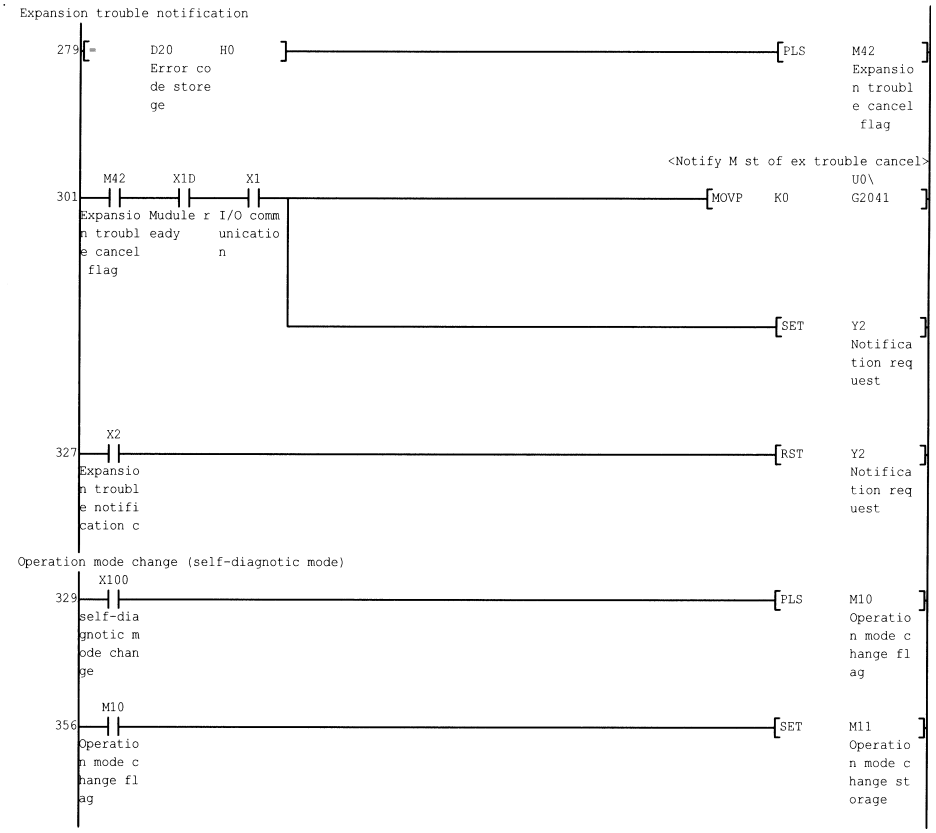
• Device assignment

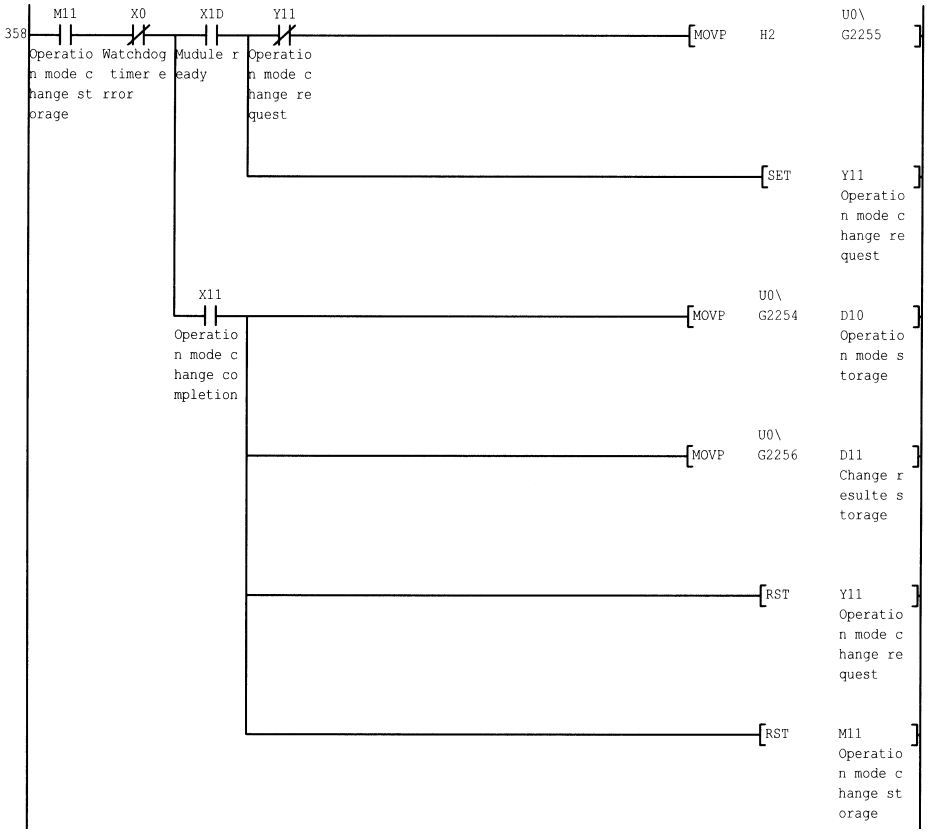
| | | |
|---|---|---|
| X00 to X1F | Y00 to Y1F | QJ71PB93D I/O signals |
| X20 to X3F | — | QX41 input signals |
| — | Y40 to Y5F | QY41P output signals |
| X60 to X7F | Y60 to Y7F | QH42P input/output signals |
| — | Y80 to Y9F | QY41P output signals |
| D10 | | Operation mode storage |
| D11 | | Operation mode change result |
| D20 | | Error code storage |

## (1) When using dedicated instructions (BBLKRD/BBLKWR)

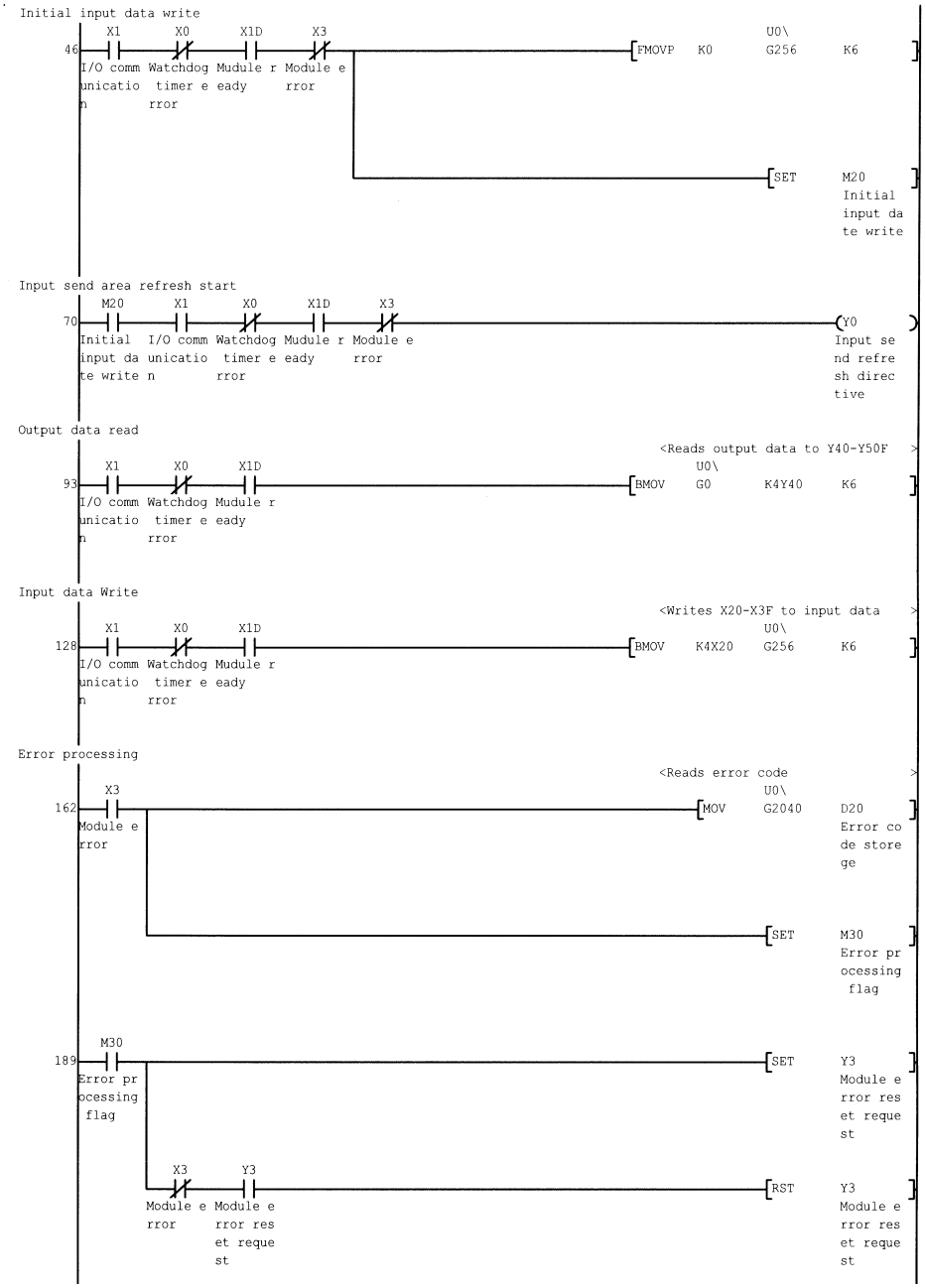


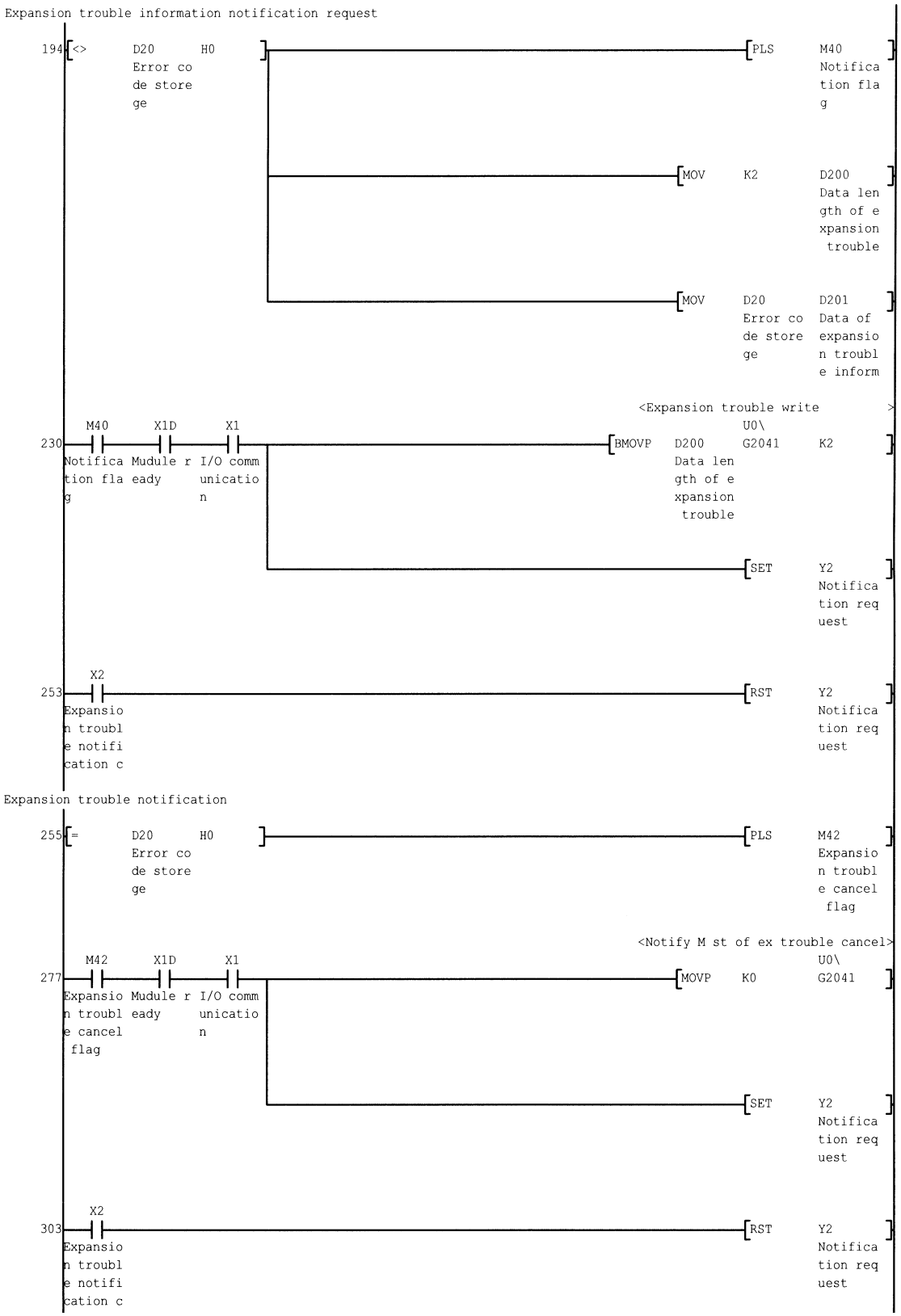

Error processing
<Reads error code
186
X3
Module e rror
MOV U0\ G2040 D20 Error co de store ge
SET M30 Error pr ocessing flag
213
M30
Error pr ocessing flag
SET Y3 Module e rror res et reque st
X3 Module e rror
Y3 Module e rror res et reque st
RST Y3 Module e rror res et reque st
Expansion trouble information notification request
218
<>
D20 Error co de store ge
H0
PLS M40 Notifica tion fla g
MOV K2 D200 Data len gth of e xpansion trouble
MOV D20 Error co de store ge D201 Data of expansio n troubl e inform
<Expansion trouble write
254
M40 Notifica tion fla g
X1D Mudule r eady
X1 I/O comm unicatio n
BMOVP D200 Data len gth of e xpansion trouble U0\ G2041 K2
SET Y2 Notifica tion req uest
277
X2
Expansio n troubl e notifi cation c
RST Y2 Notifica tion req uest

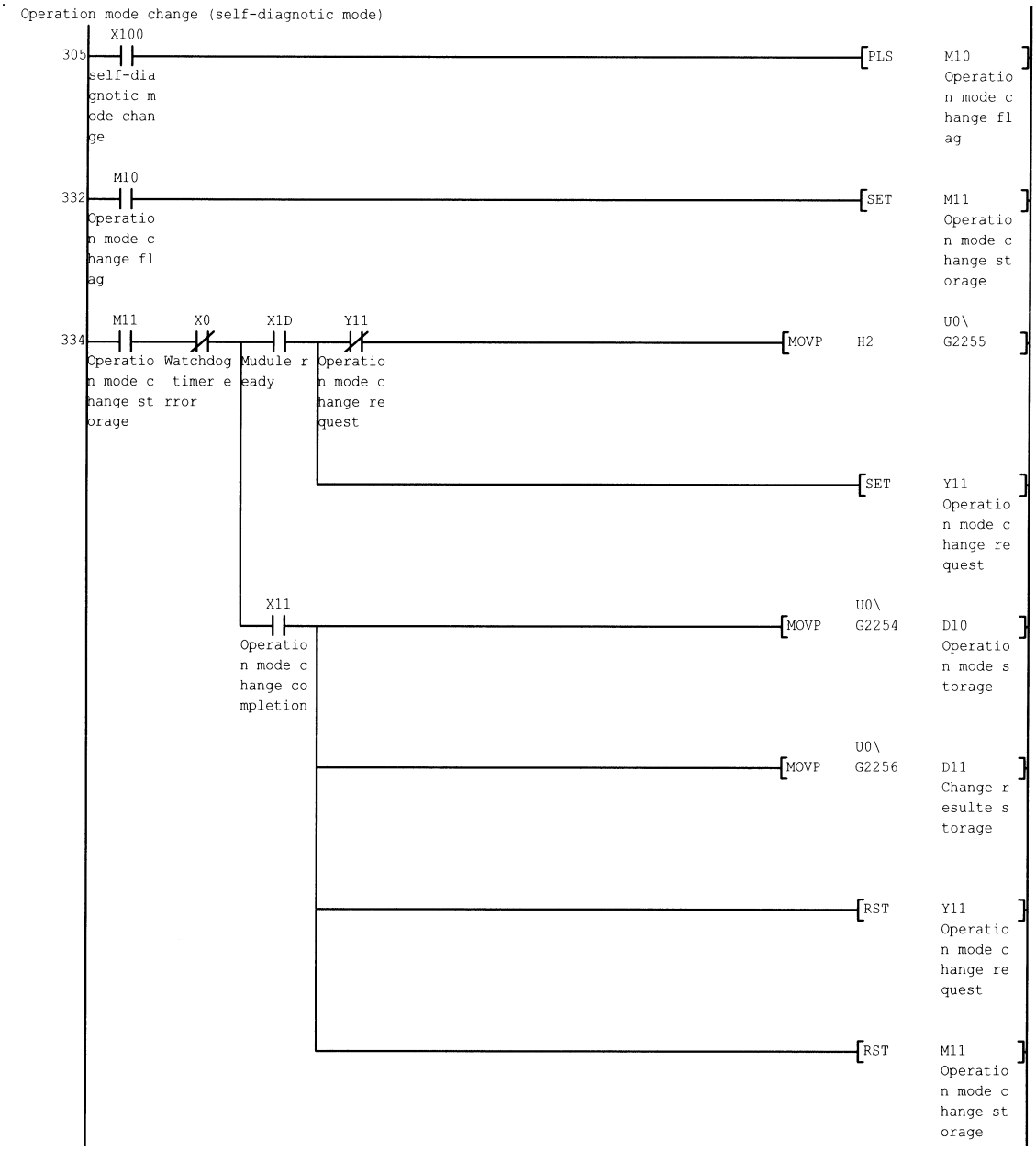

Expansion trouble notification
279
D20
Error co
de store
ge
H0
PLS
M42
Expansio
n troubl
e cancel
flag
<Notify M st of ex trouble cancel>
M42
Expansio
n troubl
e cancel
flag
301
X1D
Mudule r
eady
X1
I/O comm
unicatio
n
MOVP
K0
U0\
G2041
SET
Y2
Notifica
tion req
uest
X2
327
Expansio
n troubl
e notifi
cation c
RST
Y2
Notifica
tion req
uest
Operation mode change (self-diagnotic mode)
X100
329
self-dia
gnotic m
ode chan
ge
PLS
M10
Operatio
n mode c
hange fl
ag
M10
356
Operatio
n mode c
hange fl
ag
SET
M11
Operatio
n mode c
hange st
orage


358
M11
Operatio n mode c hange st rror orage
X0
Watchdog timer e
X1D
Mudule r eady
Y11
Operatio n mode c hange re quest
MOVP
H2
U0\ G2255
SET
Y11 Operatio n mode c hange re quest
X11
Operatio n mode c hange co mpletion
MOVP
U0\ G2254
D10 Operatio n mode s torage
MOVP
U0\ G2256
D11 Change r esulte s torage
RST
Y11 Operatio n mode c hange re quest
RST
M11 Operatio n mode c hange st orage

(2) When using MOV instruction

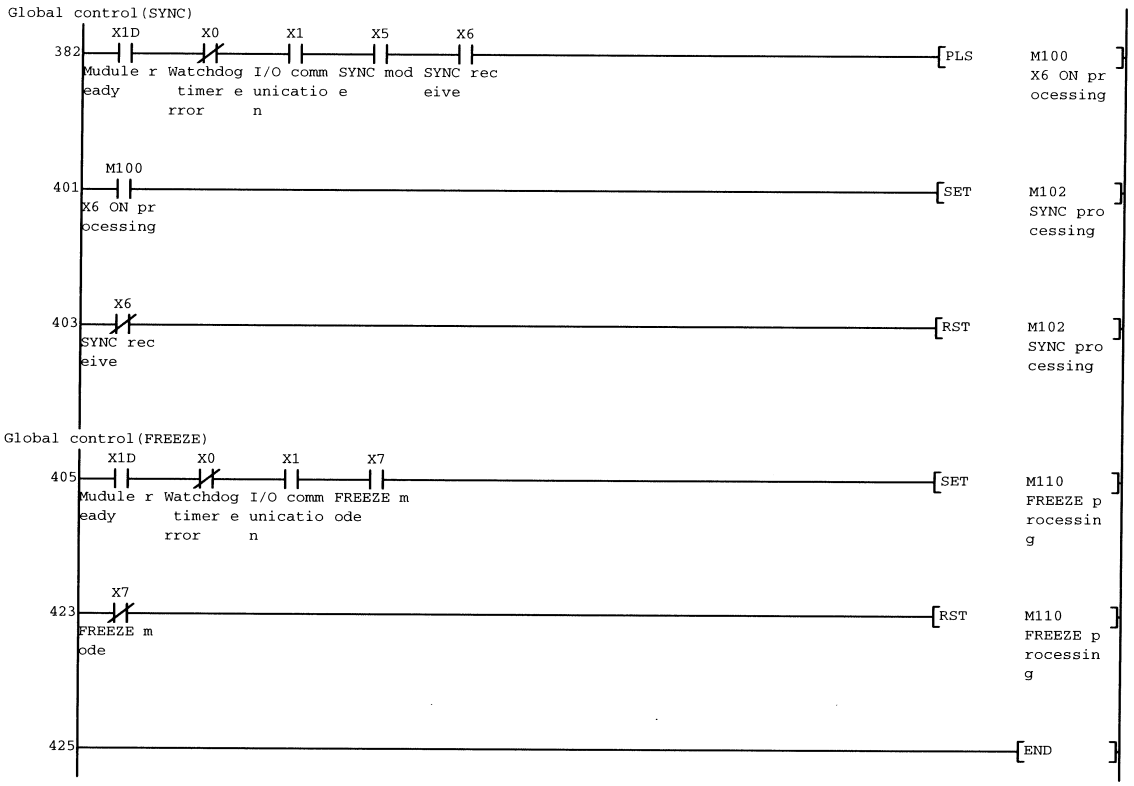



Expansion trouble information notification request
194
<>
D20
Error co
de store
ge
H0
PLS
M40
Notifica
tion fla
g
MOV
K2
D200
Data len
gth of e
xpansion
trouble
MOV
D20
Error co
de store
ge
D201
Data of
expansio
n troubl
e inform
<Expansion trouble write >
M40
Notifica
tion fla
g
X1D
Mudule r
eady
X1
I/O comm
unicatio
n
230
BMOVP
D200
Data len
gth of e
xpansion
trouble
U0\
G2041
K2
SET
Y2
Notifica
tion req
uest
X2
Expansio
n troubl
e notifi
cation c
253
RST
Y2
Notifica
tion req
uest
Expansion trouble notification
255
=
D20
Error co
de store
ge
H0
PLS
M42
Expansio
n troubl
e cancel
flag
<Notify M st of ex trouble cancel>
M42
Expansio
n troubl
e cancel
flag
X1D
Mudule r
eady
X1
I/O comm
unicatio
n
277
MOVP
K0
U0\
G2041
SET
Y2
Notifica
tion req
uest
X2
Expansio
n troubl
e notifi
cation c
303
RST
Y2
Notifica
tion req
uest


Operation mode change (self-diagnotic mode)
305
X100
self-dia gnotic m ode chan ge
PLS
M10 Operatio n mode c hange fl ag
332
M10
Operatio n mode c hange fl ag
SET
M11 Operatio n mode c hange st orage
334
M11
Operatio n mode c hange st orage
X0
Watchdog timer e rror
X1D
Mudule r eady
Y11
Operatio n mode c hange re quest
MOVP
H2
U0\ G2255
SET
Y11 Operatio n mode c hange re quest
X11
Operatio n mode c hange co mpletion
MOVP
U0\ G2254
D10 Operatio n mode s torage
MOVP
U0\ G2256
D11 Change r esulte s torage
RST
Y11 Operatio n mode c hange re quest
RST
M11 Operatio n mode c hange st orage

## 7.4 Global Control-driven Program Execution

The following is the example of a program to be added for program execution triggered by the receipt of global control.

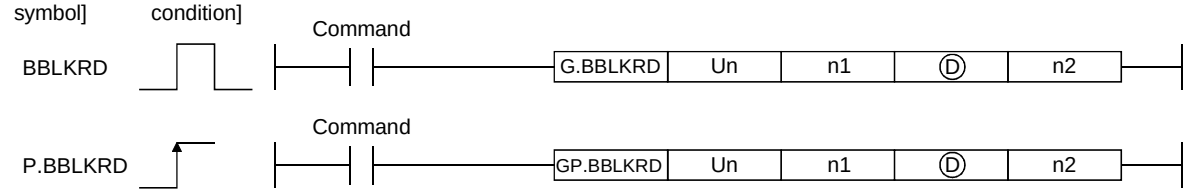


# 8. DEDICATED INSTRUCTIONS

## 8.1 BBLKRD Instruction

| Set data | Usable devices | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Internal device (System, user) | | File register | MELSECNET/10(H) Direct J□\□ | | Special function module U□\G□ | Index register Zn | 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 QJ71PB93D | 0 to FFH | BIN16 bit |
| n1 | Head address of buffer memory in output receive area | 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 122 (1H to 7AH) | BIN16 bit |

### Function

Reads the data of the output receive area (buffer memory) while simultaneously preventing data separation.

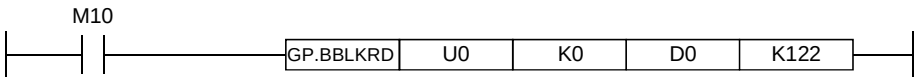
### Error

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 122-point data, starting at the buffer memory address 0 in the output receive area of the QJ71PB93D (module head I/O number 0), to D0 - D959 when M10 turns on.



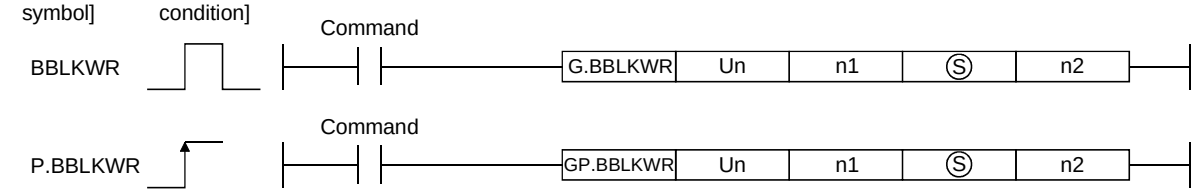

**POINT**

(1) Execute BBLKRD only once in one scan.
(2) BBLKRD and BBLKWR work independently.
(3) The transmission delay time increases when BBLKRD is used.
(4) BBLKRD is inactive when the output module has not been set in the data module setting in the master station parameter.

## 8.2 BBLKWR Instruction

| Set data | Usable devices | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Internal device (System, user) | | File register | MELSECNET/10(H) Direct J□\□ | | Special function module U□\G□ | Index register Zn | 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 QJ71PB93D | 0 to FFH | BIN16 bit |
| n1 | Head address of buffer memory in input send area<br>Set the head address as the offset address from 0H.<br>Example: Set "100H" as "0H", and "120H" as "20H". | 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 122 (1 to 7AH) | BIN16 bit |

### Function

Writes data to the input send area (buffer memory) while simultaneously preventing data separation.

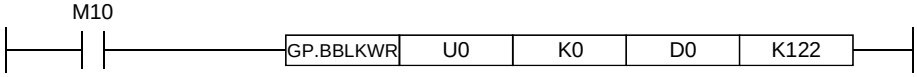
### Error

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 the 122-point data of D0 - D959 to the addresses, starting at the buffer memory address 100H in the input send area of the QJ71PB93D (module head I/O number 0) when M10 turns on.




**POINT**

(1) Execute BBLKWR only once in one scan.
(2) BBLKRD and BBLKWR work independently.
(3) The transmission delay time increases when BBLKWR is used.
(4) BBLKWR is not executed if the input module has not been set in the data module setting in the master station parameter.

# 9 Troubleshooting

The following is the troubleshooting of the QJ71PB93D.
When any error has occurred, first check the CPU module or power supply module for a fault.
When the CPU module has no fault, refer to Sections 9.1 to 9.4.

## 9.1 LED-indicated Error Causes and Actions

The following indicates the causes of the errors indicated by the LEDs and the actions to be taken.

| LED | Status | Cause | Action |
|---|---|---|---|
| RUN | Off | WDT error occurred. | Consult the nearest system service or representative. |
| ERR. | On | Parameter setting error or module error occurred. | Correct the parameter. |
| BF | On | Communication error was detected or data communication is not yet started. | • Check the parameter setting and cable wiring and check for open cable and like. (Refer to Section 9.2)<br>• Start data communication.<br>• Set the station number. |

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## 9.2 Checks and Actions for Network-related Faults

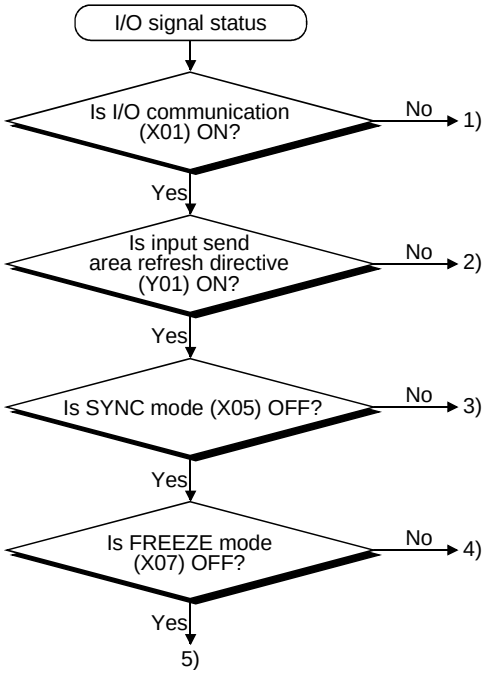
| Checked Area | Action |
|---|---|
| Transmission path | Use three or less repeaters to be relayed (refer to Section 3.1). |
| | Use each segment within the specified length (refer to Section 3.1). |
| | Install one termination resistor at each end (refer to Section 3.1). |
| | Use within the specified number of devices connected in each segment (refer to Section 3.1). |
| | Check the cable wiring and check for open cable. |
| | Check whether the cables are of Type A or not. |
| LED | Confirm the error with the on/off status of the LEDs and take the corrective action (refer to Section 9.1). |
| Module error information area of buffer memory (Buffer memory address: 7F8H) | Confirm the error with the error code and take the corrective action (refer to Section 9.4). |
| Master station | Confirm the error of the master station and take the corrective action (refer to the master station manual). |




9 - 2

## 9.3 Causes of Failure to Make Normal Data Communication and Actions to Be Taken

The following I/O signal status flowchart indicates the causes of a failure to make normal data communication and the actions to be taken.




| Status | | Cause | Action |
|---|---|---|---|
| 1) | No I/O communication | A communication start request is not given from the master station. | • Check the master station.<br>• Check the transmission path (refer to Section 9.2). |
| 2) | Output data is not sent to master. | • The output refresh directive is not given.<br>• Any of the slave parameters of the master station is wrong. | • Turn on the output refresh directive signal (Y00).<br>• Check the slave parameters of the master station. |
| 3) | Output data is held and data does not change. | In the SYNC mode | Execute the UNSYNC service from the master station. |
| 4) | Input data is held and data does not change. | In the FREEZE mode | Execute the UNFREEZE service from the master station. |
| 5) | Data is not communicated to a correct area. | The buffer memory address of the MOV/FROM/TO instruction is wrong. | • Check the used status of the data modules in the input send area used status (buffer memory address: 8F0H to 8FBH and output receive area used status (buffer memory address: 8E0H to 8EBH) * .<br>• Check the sequence program. |
| | Error does not occur in QJ71PB93D when master station becomes faulty. | The communication WDT setting in the parameter is 0. | • Check the current setting with the current communication WDT value (buffer memory address: 8D1H) * .<br>• Set the communication WDT in the master station parameter. |
| | Upper and lower bytes of data sent and received are inverse. | The swap setting in the slave parameter of the master station is not appropriate for the data sent/received by the master. | • Check the current setting with the swap function setting status (buffer memory address: 8D3H) * .<br>• Set "Yes/No" of swap setting in the master station parameter according to the data sent/received by the master station. |

*: Check during I/O communication (when X01 is ON).

## 9.4 Error Code List

The following are the error codes of the QJ71PB93D.
Any of the error codes is stored into the module error information area (buffer memory address: 7F8H) at error occurrence.

| Error Code | Error Name | Description | Corrective Action |
|---|---|---|---|
| 1001H | Station number error | The station number saved on the flash ROM is outside the range. | Set the station number to within the range again. |
| 1002H | | An attempt was made to change the station number to the one outside the range. | Set the station number to within the range. |
| 1006H | Station number rewrite error | A station number change request was given (Y13 turned on) in the following station number rewrite disabled status.<br>• "TRUE" was set for "No_Add_Chg" in the station number setting from the class 2 master station. | Clear the station number with a station number change request. |
| 2001H | Station number rewrite count excess error | Station number rewrite to the flash ROM was performed more than 60 times consecutively. | • Switch power on again.<br>• Give a station number change request to clear the station number.(refer to Section 3.4.2(6)) |
| 2002H | Flash ROM memory access error | Hardware fault | Change the module. |
| 3002H | Illegal receive parameter error | The setting of the communication WDT is too long. | Check the slave parameters of the master station. |
| 3003H | | The "Min_Tsdr" value is outside the setting range. | |
| 3006H | Communication chip fault | Hardware fault | Change the module. |
| 3007H | Communication time-out error | Time-out occurred in communication with the master station. | • Check the master station status.<br>• Check the cable connection status.<br>• Increase the setting of the communication WDT. |
| 3061H | I/O configuration information error | The data module is not a word type. | Check the slave parameters of the master station. |
| 3062H | | The swap setting is outside the range. | |
| 3063H | | The data assignment mode setting is outside the range. | |
| 3064H | | The data module count setting is outside the range. | |
| 3065H | | The data module setting is outside the range. | |
| 3066H | | The station number set in the parameter is illegal. | |

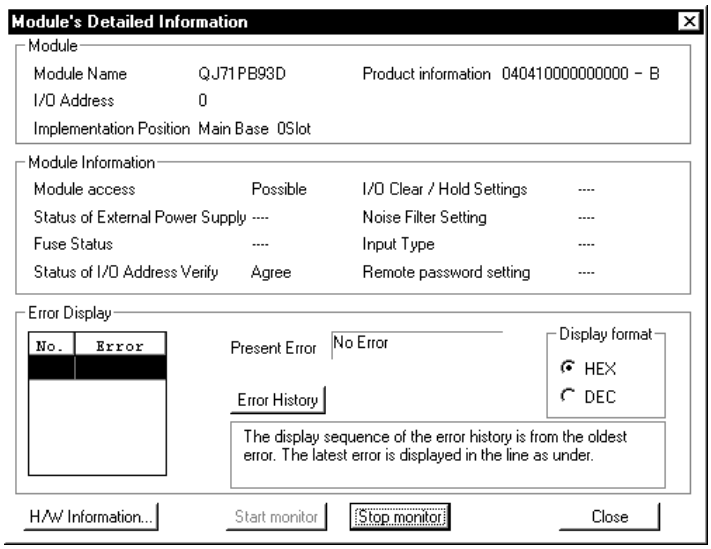
## 9.5 Checking the QJ71PB93D status by system monitor of GX Developer

When you select the module detailed information of the QJ71PB93D in the system monitor of GX Developer, you can check the error code and LED ON/OFF states.

### (1) Operation of GX Developer

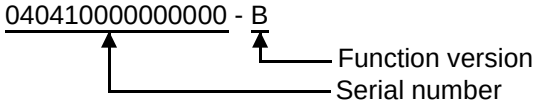
[Diagnostics] →[System monitor] → [Select QJ71PB93D] → [Module Detailed Information]

### (2) Module detailed information




#### (a) Product information

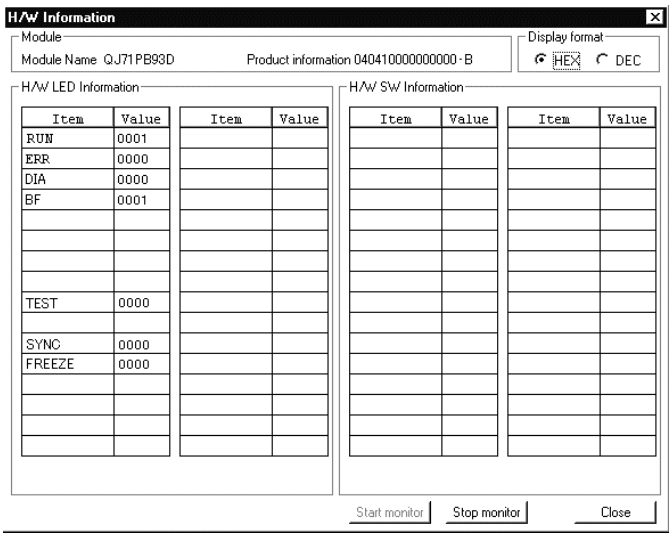
The serial number and function version of the QJ71PB93D are displayed in Product information.




REMARK

The error display field shows only "No Error".
The error codes stored in the module error information area (buffer memory address: 7F8H) of the QJ71PB93D are not displayed.

### (3) H/W Information




#### (a) H/W LED information

The LED ON/OFF states of the QJ71PB93D are displayed.
For the value of each item, "0001" indicates ON and "0000" OFF.

| Item | Description |
|---|---|
| RUN | ON : Normal<br>OFF: Watchdog timer error occurrence |
| ERR | ON : Parameter setting error or module error occurrence<br>OFF: Normal |
| DIA | ON : Expansion trouble information present<br>OFF: Expansion trouble information absent |
| BF | ON : Before data communication or communication error detection<br>OFF: During data communication |
| TEST | ON : During self-diagnostic execution |
| SYNC | ON : During SYNC mode |
| FREEZE | ON : During FREEZE mode |

# Appendix

## Appendix 1 Differences between QJ71PB93D and A1SJ71PB93D

The following indicates the differences between the MELSEC-Q series QJ71PB93D and MELSEC-A series A1SJ71PB93D.

### (1) Functions, specifications

| Type \ Item | | QJ71PB93D | A1SJ71PB93D |
|---|---|---|---|
| Separation prevention function | Dedicated instructions | Present | Absent |
| | FROM/TO instructions | Absent *1 | Present |
| Watchdog timer error signal | | X00 | X0D |
| Operating station number indication | LED | Absent | LED B0 to B6 lit |
| | Buffer memory | Station number is stored into operating station number (address: 201H). | Station number is stored into operating station number (address: 201H). |
| Self-diagnostic error display method at its occurrence | | Type code is stored into the self-diagnostic status type code display area (buffer memory address: 8D2H). | LED B0 to B6 lit |

*1: One-word data is prevented from separation.

### (2) Precautions for program diversion

The following gives the precautions for diverting the A1SJ71PB93D programs to the QJ71PB93D.

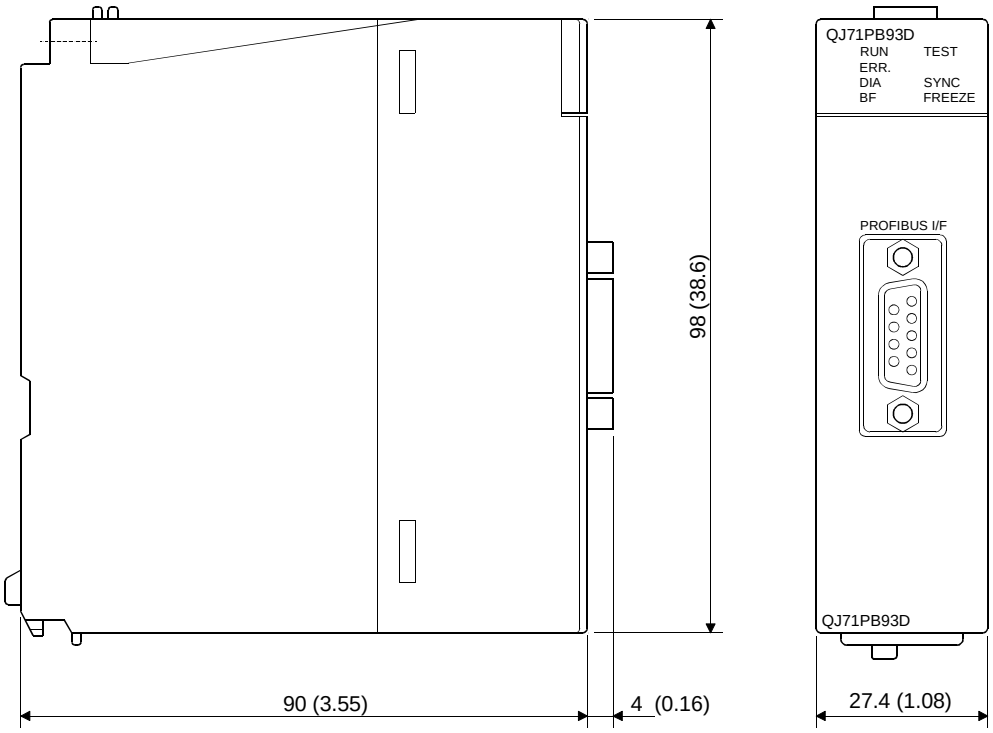
(a) Correct the watchdog timer error signal from X0D to X00.

(b) To read/write I/O data with data separation prevention, use the dedicated instruction (BBLKRD/BBLKWR).

App


App - 1

## Appendix 2 Outline Drawings




Unit : mm (inch)

App

# MEMO


App - 3

# INDEX





Index - 1

# MEMO





Index - 2

# 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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