

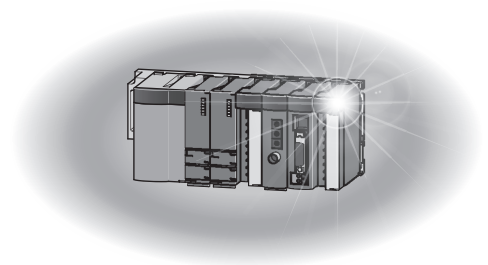
# Mitsubishi Programmable Controller

MELSEC **Q** series

## AS-i Master Module User's Manual

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-QJ71AS92  
-GX Configurator-AS (SW1D5C-QASU-E)





## • SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

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 only. For the safety instructions of the programmable controller system, please read the user's manual for the CPU module to use.

In this manual, the safety precautions 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 store this manual in a safe place and make it accessible when required. Always forward it to the end user.

### [DESIGN PRECAUTIONS]

#### **DANGER**

- If a communication error occurs in the AS-i system, the input will turn OFF from the slave having the communication error.  
Output to the slave having the communication error will be held or cleared depending on the slave specifications.  
The AS-i system communication error can be confirmed with the buffer memory's List of Active Slaves (LAS) (15H to 18H) and with the input signal Configuration error (X4).  
Using the above information, configure an interlock circuit on the sequence program so that the system activates safely.  
There is a risk of accidents caused by incorrect outputs or operations.
- Depending on the module fault, the input/output could enter ON or OFF status.  
Provide an external monitoring circuit for I/O signals that could lead to major accidents.

#### **CAUTION**

- Do not bundle AS-i cable together with main circuit or power lines, or lay them close to these lines.  
As a guide, separate these lines by a distance of at least 100 mm, otherwise malfunctions may occur due to noise.

## [INSTALLATION PRECAUTIONS]

### CAUTION

- Use the programmable controller in an environment that meets the general specifications in CPU module User's Manual.  
Using the programmable controller in an environment outside the range of the general specifications could result in cause electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Do not touch conductive parts or electronic components of the module with your bare hands.  
This could cause malfunction or failure of the module.
- While pressing the lever on the lower part of the module, fully insert the module fixing latch into the hole of the base unit, snap the module into place, and tighten the module fixing screws with the specified torque.  
Failure to observe this could result in damage to the screws or module, module falling, short or misoperation.  
If the screws are tightened excessively, it may damage the screws and cause the module to short-circuit, malfunction or fall off.
- Always shut off all phases of the programmable controller power supply and AS-i power supply externally before mounting or removing the module.  
Failure to shut off all phases could lead to product damage.

## [WIRING PRECAUTIONS]

### DANGER

- Switch off all phases of the programmable controller power supply and AS-i power supply outside the programmable controller before starting installing or wiring work.  
There is a risk of electric shock or malfunction.

## [WIRING PRECAUTIONS]

### CAUTION

- Always confirm the products terminal layout before wiring to the module.  
Incorrect wiring could lead to fires or faults.
- Wiring installation screws to the specified torque.  
If a wiring installation screws is not tightened to the specified torque, the module may fall out, short circuit, or malfunction.  
If a wiring installation screws is tightened excessively, exceeding the specified torque, the module may fall out, short circuit, or malfunction due to breakage of the screw or the module.
- Make sure that no foreign matter such as chips or wire offcuts gets inside the module.  
It will cause fire, failure, or malfunction.
- 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.

## [WIRING PRECAUTIONS]

### CAUTION

- To connect the AS-i cable to the module, the cable must be securely fixed. Please be sure to run it in a duct, or clamp it.  
Failure to observe this could cause the unstable cable connection, resulting in damage to the cable or module by carelessly pulling the cable, or the system malfunction due to poor cable connection.
- When removing the AS-i cable from a module, do not pull it out by hand. Always be sure to unscrew the module mounting screws in advance.  
If the cable is pulled while being connected to the module, it could cause damage to the cable or module, or the system malfunction due to poor cable connection.

## [STARTING AND MAINTENANCE PRECAUTIONS]

### CAUTION

- Do not touch terminals while the power is ON.  
This could cause misoperations.
- Do not disassemble or modify any module.  
This could cause failure, misoperation, injuries, or fire.
- When cleaning a module or retightening terminal screws, always be sure to externally switch off all the phases of the programmable controller power supply and AS-i power supply in advance.  
Failure to observe this could result in module failure or misoperation.  
Loose or excessive tightening could cause damage to the module or screws, module falling, short or misoperation.
- When mounting or removing a module, always be sure to externally switch off all the phases of the programmable controller power supply and AS-i power supply in advance.  
Failure to observe this could result in module failure or misoperation.
- Do not mount/remove the module to/from the base unit more than 50 times after the first use of the product. (IEC 61131-2 compliant)  
Failure to do so may cause malfunction.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.  
Failure to do so may cause a failure or malfunctions of the module.

## [DISPOSAL PRECAUTIONS]

### CAUTION

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

REVISIONS

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

Print Date	* Manual Number	Revision
Apr., 2002	SH (NA)-080291E-A	First edition
Feb., 2003	SH (NA)-080291E-B	Correction SAFETY PRECAUTIONS, Section 5.2.2, 5.4
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## INTRODUCTION

Thank you for purchasing the MELSEC-Q Series programmable controller.  
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the Q Series programmable controller you have purchased, so as to ensure correct use.

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## Compliance with the EMC and Low Voltage Directives

### (1) For programmable controller system

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

### (2) For the product

No additional measures are necessary for the compliance of this product with the EMC and Low Voltage Directives.

## Generic Terms and Abbreviations

Unless otherwise specified, the following generic terms and abbreviations are used to explain the QJ71AS92 type AS-i master module in this manual.

Abbreviation/general terms	Description of the abbreviation/general terms
QJ71AS92	Abbreviation of QJ71AS92.
QCPU (Q mode)	Generic term for, Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q13UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q13UDEHCPU and Q26UDEHCPU.
Extension cable	Generic term for QC05B, QC06B, QC12B, QC30B, QC100B extension cable.
GX Configurator-AS	Generic term for QJ71AS92 type AS-i master module setting and monitor tool GX Configurator-AS (SW1D5C-QASU-E).
GX Developer	Generic product name for SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV, and SWnD5C-GPPW-EVA. ("n" is 4 or greater.) "-A" and "-V" mean volume license product and upgrade product respectively.
LAS	Abbreviation for List of Active Slaves.
LDS	Abbreviation for List of Detected Slaves.
LPF	Abbreviation for List of Peripheral Faults.
LPS	Abbreviation for List of Projected Slaves.
EC flag	Abbreviation for Execution Control flag.
Windows Vista®	Generic term for the following: Microsoft® Windows Vista® Home Basic Operating System, Microsoft® Windows Vista® Home Premium Operating System, Microsoft® Windows Vista® Business Operating System, Microsoft® Windows Vista® Ultimate Operating System, Microsoft® Windows Vista® Enterprise Operating System
Windows® XP	Generic term for the following: Microsoft® Windows® XP Professional Operating System, Microsoft® Windows® XP Home Edition Operating System

Product Structure

The follow table shows the product stricture.

Type	Product	Quantity
QJ71AS92	QJ71AS92 type AS-i master module	1
	Connector	1
SW1D5C-QASU-E	GX Configurator-AS Version1 (1-license product) (CD-ROM)	1
SW1D5C-QASU-EA	GX Configurator-AS Version1 (Multiple-license product) (CD-ROM)	1

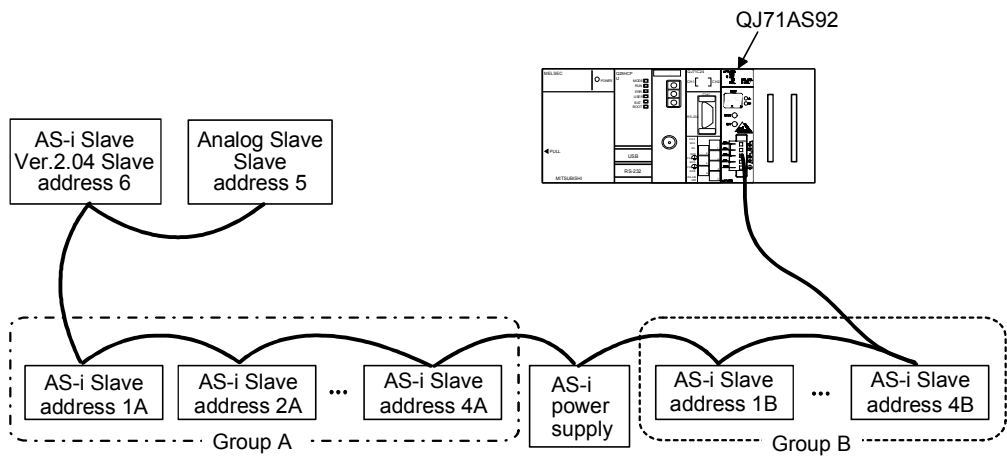
1 OVERVIEW

This manual explains the specifications, procedures for operation and troubleshooting of the QJ71AS92 type AS-i master module (hereinafter, QJ71AS92).

The AS-i (Actuator-Sensor-Interface) is a network system specified by the IEC standard: IEC 62026-2.

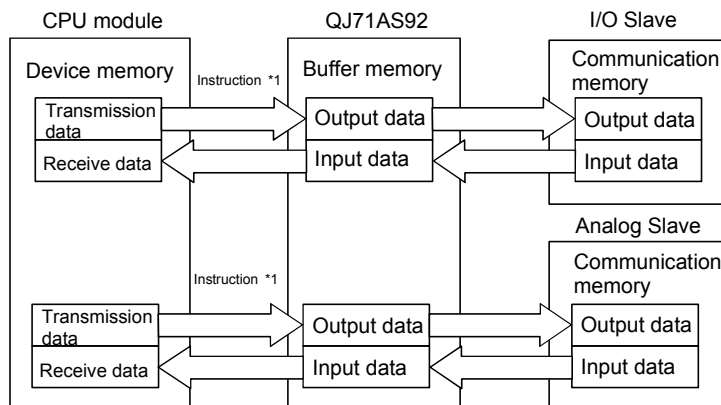
The QJ71AS92 is compatible with the AS-Interface Specification Version 2.11 (hereinafter, AS-i Ver.2.11), and can be used as the master module of the AS-i system.

Refer to IEC 62026-2 for details on the specifications related to the AS-i system described in this manual.



Use the AS-i cables, AS-i power supply and slaves that are compatible with AS-i Ver. 2.11 or AS-i Ver. 2.04.

The CPU module communicates the I/O data of the slaves via the QJ71AS92 buffer memory according to instructions.



\*1: Use of GX Configurator-AS enables automatic refresh without programs. See Chapter 5 for details.

## 1.1 Features

1

The QJ71AS92 has the following features.

**(1) Maximum number of connected slaves**

As the AS-i master, the QJ71AS92 can control a maximum of 62 slaves by splitting the slave addresses into two groups (A and B).

**(2) Communication with analog slaves**

Provided that one channel is equal to 16 bits, the QJ71AS92 can communicate with AS-i analog input or output slaves of one to four channels.

**(3) Overall distance**

The overall distance is 100m.

Note that the overall distance can be extended to up to 300m by using two repeaters.

**(4) Automatic slave address assignment function (Automatic address assignment function)**

The QJ71AS92 can automatically assign the same address to the new slave (same type of product), whose slave address is 0, when changing a slave.

**(5) Easy setting by using utility package (Sold separately)**

GX Configurator-AS is available as an utility package (Sold separately).

Although not necessarily required, GX Configurator-AS enables the automatic refresh to be set from within the software, resulting in easy sequence programming, slave address setting, and monitoring of the setting and operation statuses.

## 2 SYSTEM CONFIGURATION

This chapter explains the system configuration of the QJ71AS92.

### 2.1 Applicable Systems

This section describes the applicable systems.

#### (1) Applicable modules and base units, and No. of modules

##### (a) When mounted with a CPU module

The table below shows the CPU modules and base units applicable to the QJ71AS92 and quantities for each CPU model.

Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient.

Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

Applicable CPU module		No. of modules *1	Base unit *2		
CPU type	CPU model		Main base unit	Extension base unit	
Programmable controller CPU	Basic model QCPU	Q00JCPU	Up to 8		
		Q00CPU	Up to 24	○	○
		Q01CPU			
	High Performance model QCPU	Q02CPU	Up to 64	○	○
		Q02HCPU			
		Q06HCPU			
		Q12HCPU			
	Process CPU	Q02PHCPU	Up to 64	○	○
		Q06PHCPU			
		Q12PHCPU			
		Q25PHCPU			
	Redundant CPU	Q12PRHCPU	Up to 53	×	○
		Q25PRHCPU			
	Universal model QCPU	Q02UCPU	Up to 36	○	○
		Q03UDCPU	Up to 64		
		Q04UDHCPU			
		Q06UDHCPU			
		Q13UDHCPU			
		Q26UDHCPU			
Q03UDECPU					
Q04UDEHCPU					
Q06UDEHCPU					
Q13UDEHCPU					
Q26UDEHCPU					
Safety CPU	QS001CPU	N/A		×	×
C Controller module	Q06CCPU-V	Up to 64	○	○	
	Q06CCPU-V-B				

○: Applicable, ×: N/A

\*1: Limited within the range of I/O points for the CPU module.

\*2: Can be installed to any I/O slot of a base unit.

- (b) Mounting to a MELSECNET/H remote I/O station  
The QJ71AS92 cannot be mounted to any MELSECNET/H remote I/O station.  
Mount it to a CPU module on a master station.

(2) Support of the multiple CPU system

When using the QJ71AS92 in a multiple CPU system, refer to the QPU User's Manual (Multiple CPU System) first.

- (a) Compatible QJ71AS92  
The function version of the first released QJ71AS92 is B, and it supports multiple CPU systems.
- (b) Intelligent function module parameters  
Write intelligent function module parameters to only the control CPU of the QJ71AS92.

(3) Supported software packages

Relation between the system containing the QJ71AS92 and software package is shown in the following table.

GX Developer is necessary when using the QJ71AS92.

		Software version		
		GX Developer	GX Configurator-AS	
Q00J/Q00/Q01CPU	Single CPU system	Version 7 or later	Version 1.13P or later	
	Multiple CPU system	Version 8 or later		
Q02/Q02H/Q06H/ Q12H/Q25HCPU	Single CPU system	Version 4 or later		
	Multiple CPU system	Version 6 or later		
Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later		
	Multiple CPU system			
Q12PH/Q25PHCPU	Single CPU system	Version 7.10L or later		
	Multiple CPU system			
Q12PRH/ Q25PRHCPU	Redundant system	Version 8.45X or later		Version 1.16S or later
Q02U/Q03UD/ Q04UDH/ Q06UDHCPU	Single CPU system	Version 8.48A or later		Version 1.21X or later
	Multiple CPU system			
Q13UDH/ Q26UDHCPU	Single CPU system	Version 8.62Q or later		
	Multiple CPU system			
Q03UDE/Q04UDEH/ Q06UDEH/Q13UDEH /Q26UDEHCPU	Single CPU system	Version 8.68W or later		
	Multiple CPU system			



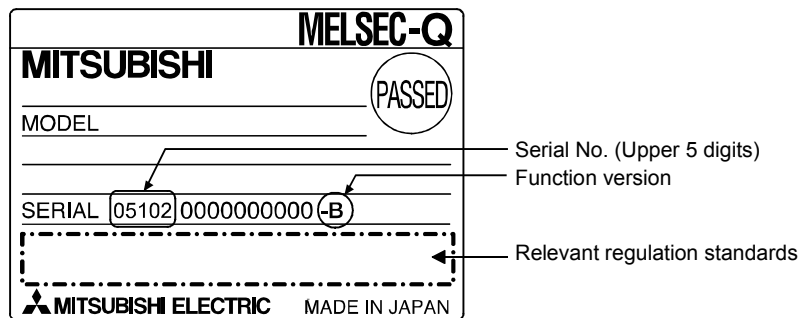
2.2 How to Check the Function Version and Software Version

This section describes how to check the function version of the QJ71AS92 and the GX Configuration-AS software version.

(1) Checking the function version of the QJ71AS92

- (a) Checking at "the SERIAL field of the rating plate" located on the side of the module

The serial No. and function version of the module is shown in the SERIAL field of the rating plate.



- (b) Checking by GX Developer

The serial No. and function version of the module are displayed on the "Production Info. List" and "Module's Detailed Information" screens of GX Developer.

The following explains how to check them on the "Production Info. List" screen. (For the case of "Module's Detailed Information", refer to Section 8.4.)

[Operating procedure]

[Diagnostics] → [System monitor] → Product Inf. List

Slot	Type	Series	Model name	Points	I/O No.	Master PLC	Serial No.	Ver.	Product No.
PLC	PLC	Q	Q06UDHCPU	-	-	-	090920000000000	B	091013092955016-B
0-0	Intelli.	Q	QJ71AS92	32pt	0000	-	051020000000000	B	-
0-1	-	-	None	-	-	-	-	-	-
0-2	-	-	None	-	-	-	-	-	-
0-3	-	-	None	-	-	-	-	-	-
0-4	-	-	None	-	-	-	-	-	-

[Serial No., Ver., Product No.]

- Serial No. of the module is displayed in the Serial No. column.
- Function version of the module is displayed in the Ver. column.
- Serial No. printed on the rating plate is displayed in the Production No. column.\*1

Note that, because the QJ71AS92 does not support the production No. display, "-" is displayed.

\*1: The Production No. column display is active only when the CPU used is a Universal model QCPU.

**POINT**

The serial No. on the rating plate may be different from the serial No. displayed on the product information screen of GX Developer.

- The serial No. on the rating plate indicates the management information of the product.
- The serial No. displayed on the product information screen of GX Developer indicates the function information of the product.

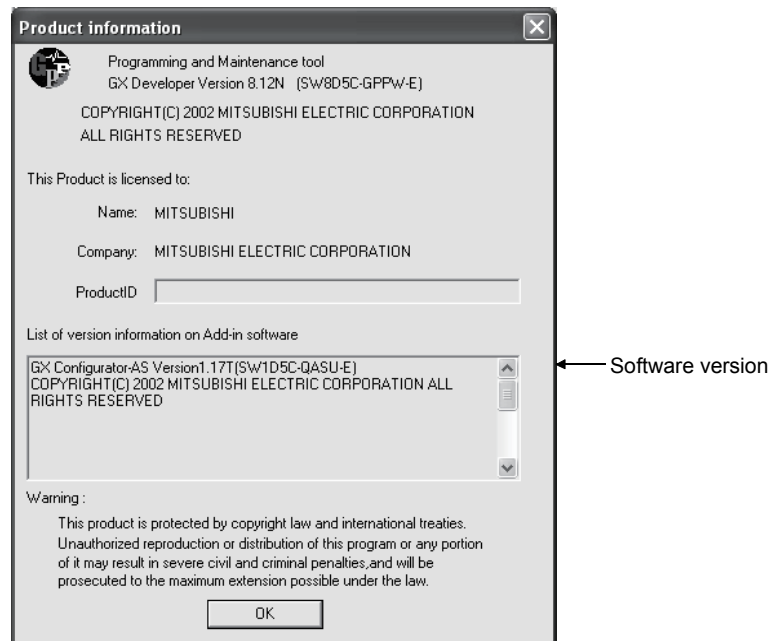
The function information of the product is updated when a new function is added.

(2) Checking the software version of GX Configurator-AS

The software version of GX Configurator-AS can be checked in GX Developer's "Product information" screen.

[Operating procedure]

GX Developer → [Help] → [Product information]



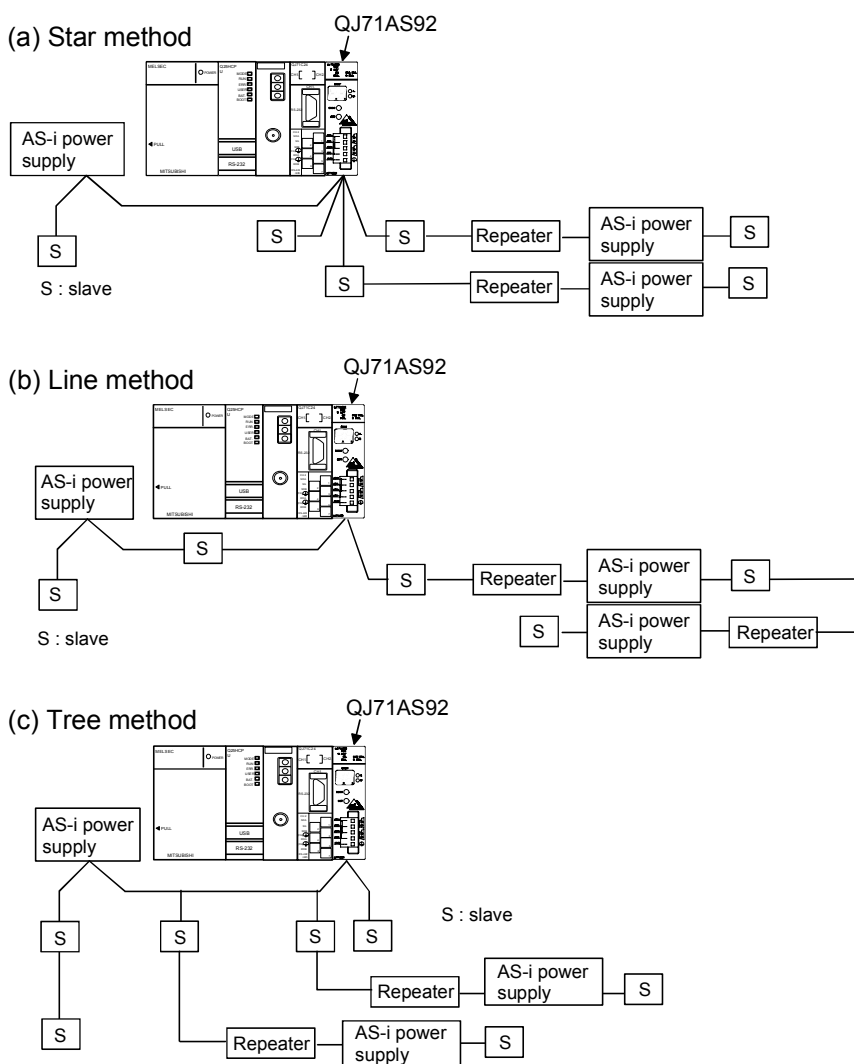
(In the case of GX Developer Version 8)

### 2.3 AS-i System Connection Methods

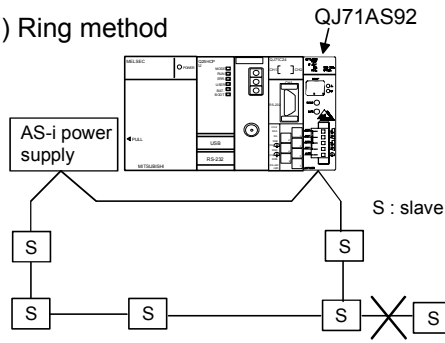
The following methods can be used to connect the AS-i system.

- (1) The star method, line method, tree method or ring method can be used to connect the AS-i system.
- (2) The AS-i system does not require a terminator. The overall distance is 100m when a repeater is not used, and 300m when two repeaters are used.
- (3) One AS-i power supply unit is connected to the AS-i system. The power supply can be connected at any place on the AS-i system. When using a repeater, connect an AS-i power supply unit after the repeater is connected.

Examples of the connection method are shown below.



(d) Ring method



(Note)  
The system cannot be branched to a tree connection, etc., from the ring connection. A partial loop cannot be formed. A repeater cannot be used.

2.4 Precautions for System Configuration

- (1) The QJ71AS92 can be mounted in any slot of the base unit.  
If the QJ71AS92 is mounted on an extension base unit (Q52B, Q55B) to which the power supply module cannot be mounted, the power supply capacity may be insufficient.
- (2) The QJ71AS92 cannot be mounted on a remote I/O station in a MELSECNET/H network system.
- (3) The QJ71AS92 can use the slave addresses assigned to AS-i Ver. 2.11-compatible slaves by grouping them into A and B. \*1  
The other slaves \*2 than the AS-i Ver. 2.11-compatible I/O slaves cannot be grouped into A and B because of the AS-i specifications. Assign them to the slave addresses other than those used for group A and B.

\*1: Check whether the slaves can be grouped or not by reference to the manuals of the slaves used.

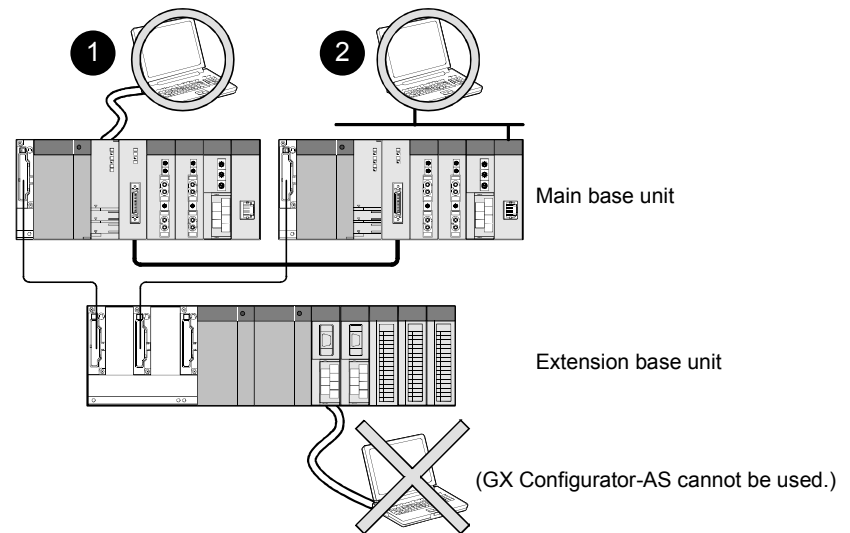
\*2: Analog slave, AS-i Ver. 2.04-compatible I/O slave, etc.

(4) For Use with Q12PRH/Q25PRHCPU

(a) GX Configurator-AS connection

GX Configurator-AS cannot be used when accessing the Q12PRH/Q25PRHCPU via an intelligent function module on an extension base unit from GX Developer.

Connect a personal computer with a communication path indicated below.



1 Direct connection to the CPU

2 Connection through an intelligent function module on the main base unit (Through Ethernet module, MELSECNET/H module, or CC-Link module)

### 3 SPECIFICATIONS

#### 3.1 Performance Specifications

The following are the performance specifications of the QJ71AS92.

##### 3.1.1 Performance specification list

Item		Specifications
Max. number of AS-i slaves *1		62 (Group A: 31, Group B: 31)
Max. number of I/O points *2 (1 point = 1 bit)	Input	248 points
	Output	248 points
Max. address of analog I/O points (1 point = 16 bits)	Input	124 points
	Output	124 points
I/O refresh time		Approx. 5ms (without I/O slave grouping) Approx. 10ms (with I/O slave grouping) Approx. 35ms (per analog slave channel)
Communication speed		167kbps
Transmission distance		Max. 100m (max. 300m with two repeaters)
Connection type		Bus network type (star, line, tree and ring)
Communication method		APM modulation method (Alternating Pulse Modulation)
Error control method		Parity check
Internal memory		EEPROM (for parameter registration), number of writes: 100,000 times
Number of occupied I/O points		32 points (I/O assignment: 32 intelligent points)
Cable type		Use dedicated AS-i cable.
External supply power	Voltage	TYP. 30.5VDC (supplied by AS-i power supply)
	Current consumption	46mA (TYP 30.5VDC)
5VDC internal current consumption		0.40A
Weight		0.12kg

\*1: This is the max. number of Ver. 2.11-compatible I/O slave stations (can be grouped) configured in the same system. If Ver.2.11-compatible I/O slaves that cannot be grouped, analog slaves, and Ver. 2.04-compatible I/O slaves are used together in the same system, calculate the max. number of slaves using the following expression.

$$(N_{IO-A} + N_{IO-B}) + 2 \times (N_A + N_{IO}) \leq 62 \text{ (Group A 31, Group B 31)}$$

Number of Group A Ver. 2.11-compatible I/O slaves:  $N_{IO-A}$

Number of Group B Ver. 2.11-compatible I/O slaves:  $N_{IO-B}$

Number of Ver. 2.11-compatible analog slaves:  $N_A$

Number of Ver. 2.04-compatible I/O slaves:  $N_{IO}$

Slave Type	Grouping
AS-I Ver. 2.11-compatible I/O slave	Please confirm with the manufacturer of the I/O slave unit whether the unit can be grouped.
AS-I Ver. 2.04-compatible I/O slave	Disabled
AS-I Ver. 2.11-compatible analog slave	

\*2: One slave uses four inputs and four outputs.

One analog slave also uses four inputs and four outputs.

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

For the general specifications of the QJ71AS92, Refer to the User's Manual of the used CPU module.

3.2 Functions

The following table lists the QJ71AS92 functions.

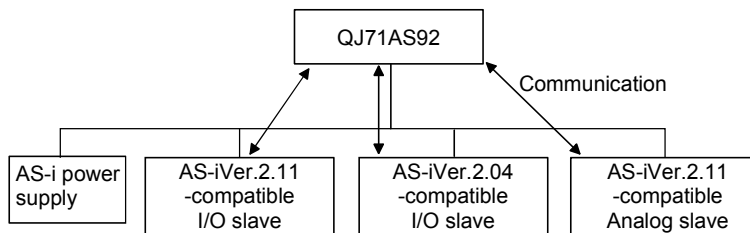
Item	Description
AS-i slave communication function	Communicates with AS-i slaves.
Automatic refresh function by utility package	Automatically refreshes the Q71AS92's I/O data to the CPU module's device memory.
Automatic slave address assignment function	When a slave is replaced with a new one of the same model, this function automatically assigns the previous slave address to the new one that has slave address 0.
Parameter setting function	Sets slave addresses and QJ71AS92's parameters by the following: <ul style="list-style-type: none"> <li>• Utility package</li> <li>• CODE LED and switches on the module's front face.</li> <li>• Sequence program</li> </ul>



3.2.1 Function for communication with AS-i slaves

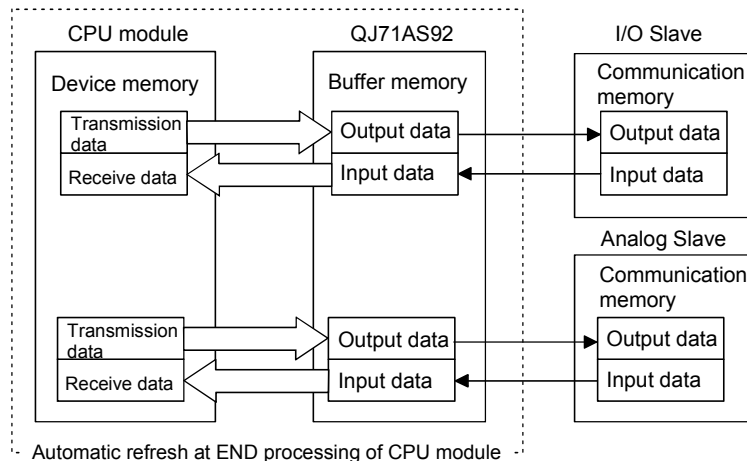
The QJ71AS92 complies with AS-i Ver. 2.11 and can communicate with AS-i slaves. The QJ71AS92 can be connected with the following slaves.

- AS-i Ver. 2.11-compatible I/O slave
- AS-i Ver. 2.04-compatible I/O slave
- AS-i Ver. 2.11-compatible analog slave



3.2.2 Automatic refresh function by utility package

The Q71AS92's I/O data can be automatically refreshed to the CPU module's device memory using utility package (GX Configurator-AS).



### 3.2.3 Automatic slave address assignment function

This function automatically sets the slave address of the old slave to the new slave of the same product having slave No. 0 at the time of slave replacement.  
Refer to Section 4.5.4 for details.

### 3.2.4 Parameter setting function

Slave addresses and QJ71AS92's parameters can be set by any of the following methods.

- (1) Using the utility package (GX Configurator-AS)  
(Refer to "Chapter 5 UTILITY PACKAGE (GX Configurator-AS)".)
- (2) Using the CODE LED and switches  
(Refer to "Section 4.5 Start-Up".)
- (3) Using the sequence program  
(Refer to "Section 3.4.2 (15) Command buffer <request>".)



3.3 I/O Signals for CPU Module

3.3.1 I/O signal list

Table 3.3 lists QJ71AS92 I/O signals.

The following I/O signal assignment is based on the case where the start I/O No. of the QJ71AS92 is "0000" (installed to slot 0 of the main base unit).

Device X represents an input signal from the QJ71AS92 to the programmable controller CPU.

Device Y shows an output signal from the programmable controller CPU to the QJ71AS92.

Table 3.3 List of I/O signals

Signal Direction: programmable controller CPU ← QJ71AS92		Signal Direction: programmable controller CPU → QJ71AS92		
Input Signal	Signal name	Output Signal	Signal name	
X0	Module Ready	Y0	Not used	
X1	Not used	Y1		
X2	Command Completion	Y2		
X3	Configuration Register Completion	Y3		
X4	Configuration Error	Y4		
X5	AS-i Power Fail	Y5		
X6	Normal Operation Active	Y6		
X7	Configuration Mode Active	Y7		
X8	Not used	Y8		
X9		Y9		
XA		YA		
XB		YB		
XC		YC		
XD		YD		
XE		YE		
XF		YF		
X10	Not used	Y10	Not used	
X11		Y11		
X12		Y12	Command Execution Request	
X13		Y13	Configuration Register Request	
X14		Y14	Off-line Phase	
X15		Y15	Auto Address Assignment Function	
X16		Y16	Configuration Mode	
X17		Y17	Protected Operation Mode	
X18		Not used	Y18	Not used
X19			Y19	
X1A			Y1A	
X1B			Y1B	
X1C			Y1C	EEPROM Write
X1D			Y1D	Refresh Instruction
X1E			Y1E	Not used
X1F			Y1F	

**TIP**

The signals indicated as "Not used" in Table 3.3 are used by the system and cannot be used by the user.

If they are turned ON/OFF by the sequence program, correct operation of the module cannot be guaranteed.

3.3.2 Details of I/O signals

This section describes the details of the QJ71AS92 I/O signals.

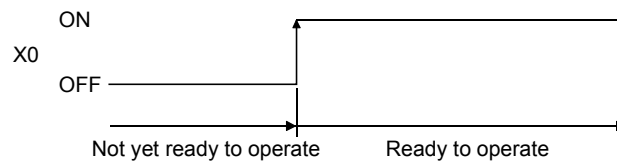
(1) X0: Module Ready

X0 turns ON when the QJ71AS92 enters the operation enabled status after the power is turned ON or the CPU module is reset.

X0 turns OFF when a hardware fault occurs.

OFF : Operation disabled

ON : Operation enabled



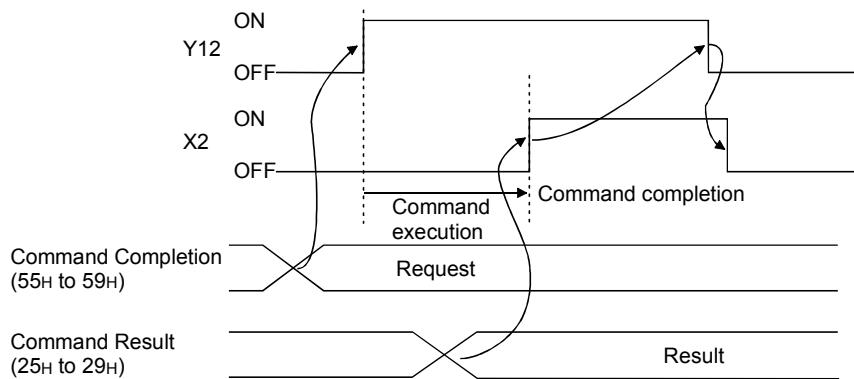
(2) X2: Command Completion, Y12: Command Execution Request

A request to execute the command specified for Command Buffer Request of the buffer memory is made when Y12 turns ON. The command requested when Y12 turned ON is executed, and X2 turns ON at completion of that command. \*1

(Refer to Section 3.4.2)

Y12 ON : Command requested

X2 ON : Command completed



\*1: Do not turn Y12 OFF until X2 turns ON during command execution.

(3) X3: Configuration Registration Completion, Y13: Configuration Registration Request

A request to register the projected slave list (LPS) of the buffer memory is made when Y13 turns ON.

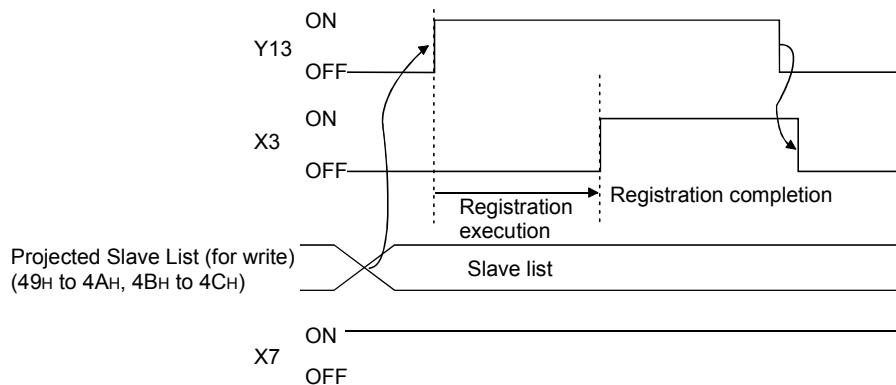
When Y13 turns ON, the QJ71AS92 executes registration of configuration data, and X3 turns ON upon completion of the registration. \*1

Y13 is valid in the configuration mode (X7: ON). \*2

Buffer memory address	Details
49H to 4AH	(A-slaves) List of Projected Slaves (LPS (For Write))
4BH to 4CH	(B-slaves) List of Projected Slaves (LPS (For Write))

Y13 ON : Configuration registration requested

X3 ON : Configuration registration completed



\*1: Do not turn Y13 OFF until X3 turns ON during registration request. Refer to Section 4.5 for details of configuration mode.

\*2: If Y13 is turned ON in a mode other than configuration mode (X7: OFF), configuration data will not be registered although X3 turns ON.

(4) X4: Configuration Error

X4 checks for a configuration error.

A configuration error occurs if the projected slave list (LPS) and detected slave list (LDS) are different in the configuration contents.

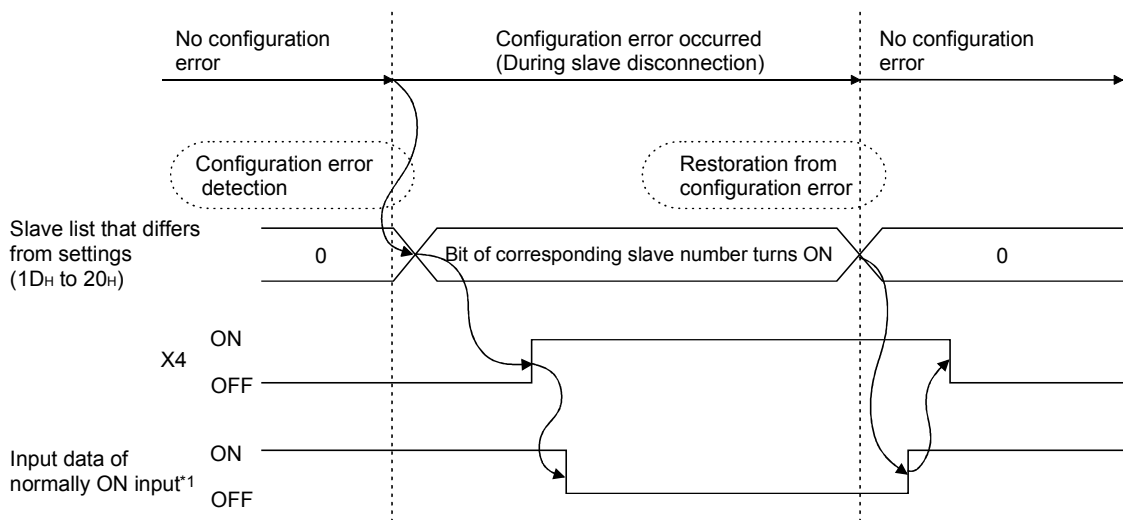
On detection of a configuration error in the AS-i system, the QJ71AS92 turns ON the corresponding bit of the slave list (addresses: 1DH to 20H) that differs from the buffer memory settings and turns X4 ON.

X4 automatically turns OFF when the configuration error is all resolved.

When X4 is ON, check whether the projected slave list (LPS) is the same as the detected slave list (LDS), for example.

OFF : No configuration error

ON : Configuration error detected



\*1: Shows the timing with the input data when the normally-ON input slave is disconnected.

(5) X5: AS-i Power Fail

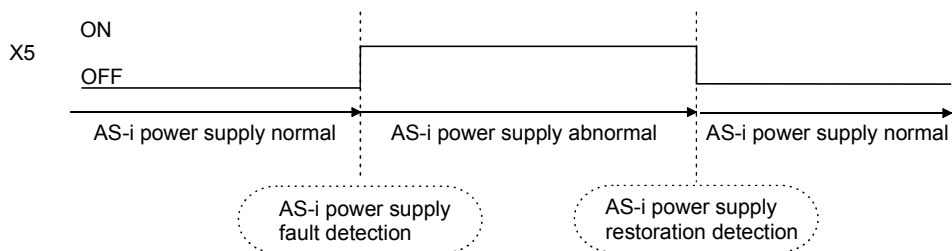
X5 checks the AS-i power supply status.

The QJ71AS92 turns X5 ON when the voltage supplied by the AS-i power supply is insufficient. It turns OFF automatically when the supplied voltage is restored.

When X5 is ON, check the rated current value of the AS-i power supply, the wiring, and the overall distance of the system.

OFF : AS-i power supply normal

ON : AS-i power supply abnormal



For details of the AS-i power supply specifications, contact the manufacture of the AS-i power supply used.

(6) X6: Normal Operation Active

X6 checks the operation status.

X6 turns ON when the QJ71AS92 is not in the normal operation status. (Refer to section 4.5)

OFF : Normal operation

ON : Phase other than normal operation

(7) X7: Configuration Mode Active

X7 checks the configuration mode.

X7 turns ON when the QJ71AS92 is in the configuration mode.

X7 turns OFF when the QJ71AS92 is in the mode other than configuration mode. (Refer to section 4.5)

OFF : Mode other than configuration mode

ON : Configuration mode

Relationships between QJ71AS92 Operating Status and X6/X7

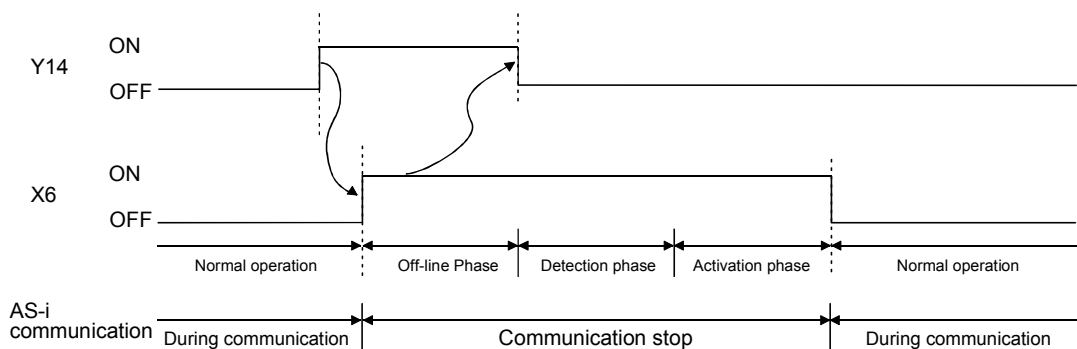
Signal name		X7	
		ON	OFF
X6	ON	Off-line Phase, Detection Phase, Activation Phase	
	OFF	Configuration mode	Protected operation mode

(8) Y14: Off-line Phase

Y14 is initialised AS-i communication.

OFF → ON: The QJ71AS92 is set in the off-line phase.

ON → OFF: The QJ71AS92 changes to normal operation from the off-line phase.



(9) Y15: Auto Address Assignment Function

Sets the automatic slave address assignment function valid or invalid.

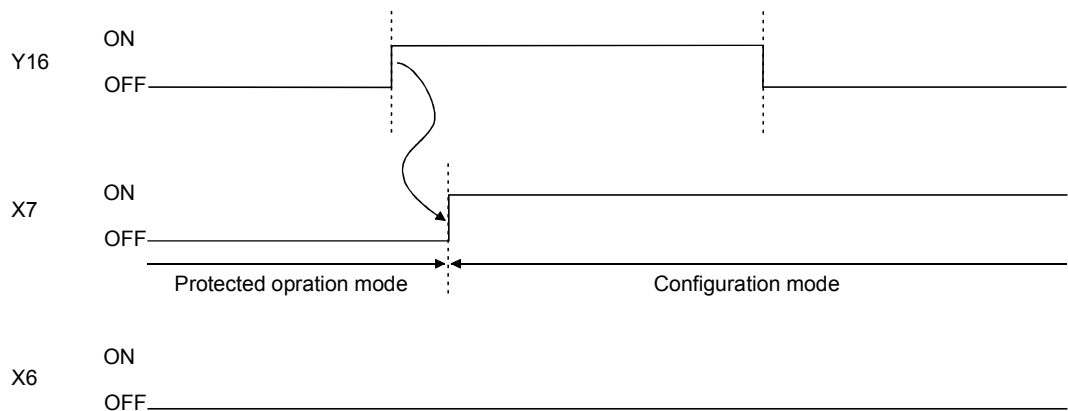
OFF : Automatic slave address assignment function is valid

ON : Automatic slave address assignment function is invalid

(10) Y16: Configuration Mode

OFF → ON: The QJ71AS92 is set in the configuration mode.

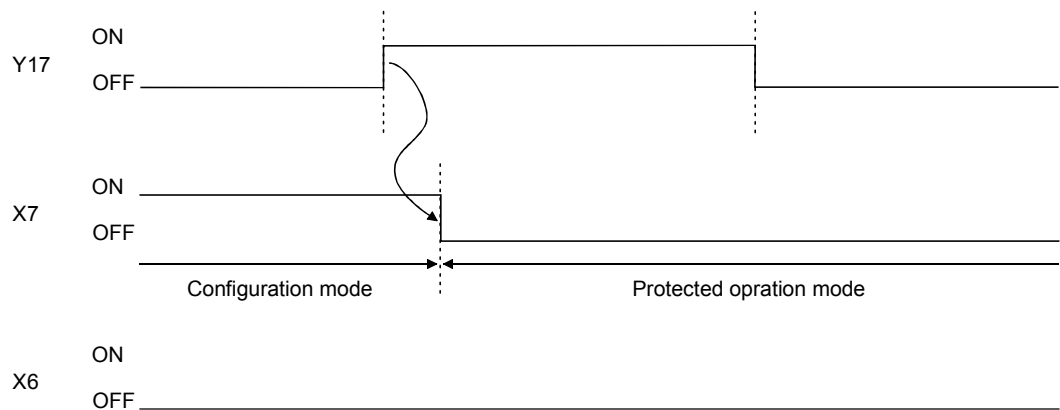
ON → OFF: The QJ71AS92 operation mode does not change.



(11) Y17: Protected Operation Mode

OFF → ON: The QJ71AS92 is set in the protected operation mode. \*1

ON → OFF: The QJ71AS92 operation mode does not change.



\*1: When the QJ71AS92 has recognized the slave address 0, it cannot terminate the configuration mode.

In this case, note that X7 remains ON.

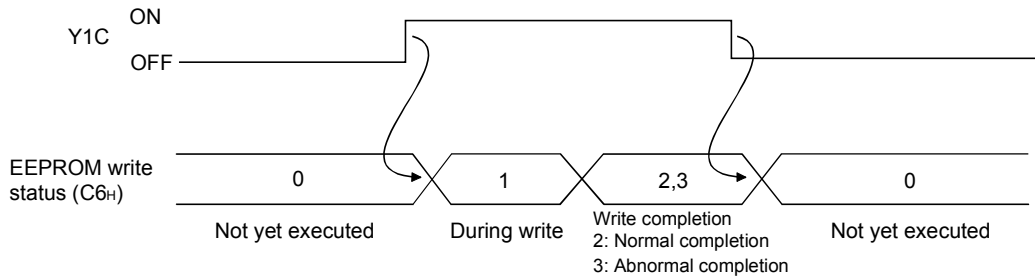
(12) Y1C: EEPROM write

Turning Y1C ON writes the configuration data to the EEPROM.

"Write to EEPROM" can be operated in either the protected operation mode or configuration mode.

From the next time on, the QJ71AS92 will start in the operation mode used when write to EEPROM was performed.

After write is completed, the phase remains in normal operation.



TIP
<p>(1) The address of writes to the EEPROM is 100,000 times. If the address of writes exceeds 100,000 times, the error code "F70H" is written to the QJ71AS92 buffer memory (address: C0H). This means that the hardware is faulty. Please consult your local Mitsubishi serves center or representative, explaining a detailed description of the problem.</p> <p>(2) If write to EEPROM is executed 1000 or more times during continuous operation of the CPU module, the error code "F74H" is written to the QJ71AS92 buffer memory (address: C0H). If "F74H" is written, examine the sequence program again, make sure that write processing has not been performed many times, and restart the CPU module.</p> <p>(3) The configuration data written to the EEPROM are the operation mode, protected slave list (LPS), permanent configuration and permanent parameters.</p>

(13) Y1D: Refresh instruction

Y1D determines whether the contents of the "data output to slaves" in buffer memory are valid.

- OFF : Not output to slaves
- ON : Output to slaves



## 3.4 Buffer Memory

## 3.4.1 Buffer Memory List

Table 3.4 lists the QJ71AS92 buffer memories.

Table 3.4 Buffer memory list

Address		Details	Read/write from CPU module
Hexadecimal	Decimal		
0H	0	(A-slaves) Input Data From Slave Address 1A-3A and part of EC Flag	Reading enabled
1H	1	(A-slaves) Input Data From Slave Address 4A-7A	
2H	2	(A-slaves) Input Data From Slave Address 8A-11A	
3H	3	(A-slaves) Input Data From Slave Address 12A-15A	
4H	4	(A-slaves) Input Data From Slave Address 16A-19A	
5H	5	(A-slaves) Input Data From Slave Address 20A-23A	
6H	6	(A-slaves) Input Data From Slave Address 24A-27A	
7H	7	(A-slaves) Input Data From Slave Address 28A-31A	
8H	8	(B-slaves) Input Data From Slave Address 1B-3B	
9H	9	(B-slaves) Input Data From Slave Address 4B-7B	
AH	10	(B-slaves) Input Data From Slave Address 8B-11B	
BH	11	(B-slaves) Input Data From Slave Address 12B-15B	
CH	12	(B-slaves) Input Data From Slave Address 16B-19B	
DH	13	(B-slaves) Input Data From Slave Address 20B-23B	
EH	14	(B-slaves) Input Data From Slave Address 24B-27B	
FH	15	(B-slaves) Input Data From Slave Address 28B-31B	
10H	16	EC Flags	
11H to 12H	17 to 18	(A-slaves) List of Detected Slaves (LDS)	
13H to 14H	19 to 20	(B-slaves) List of Detected Slaves (LDS)	
15H to 16H	21 to 22	(A-slaves) List of Active Slaves (LAS)	
17H to 18H	23 to 24	(B-slaves) List of Active Slaves (LAS)	
19H to 1AH	25 to 26	(A-slaves) List of Projected Slaves (LPS (For Read))	
1BH to 1CH	27 to 28	(B-slaves) List of Projected Slaves (LPS (For Read))	
1DH to 1EH	29 to 30	(A-slaves) List of slaves that differ from settings	
1FH to 20H	31 to 32	(B-slaves) List of slaves that differ from settings	
21H to 22H	33 to 34	(A-slaves) Error Slave List	
23H to 24H	35 to 36	(B-slaves) Error Slave List	
25H to 29H	37 to 41	Command Buffer <Result>	
2AH to 2FH	42 to 47	Not used	

## TIP

The slaves other than the AS-i Ver. 2.11-compatible I/O slaves assigned to group B use the buffer memory addresses of group A.

Address		Details	Read/write from CPU module
Hexadecimal	Decimal		
30H	48	(A-slaves) Output Data To Slave Address 1A-3A	Writing enabled
31H	49	(A-slaves) Output Data To Slave Address 4A-7A	
32H	50	(A-slaves) Output Data To Slave Address 8A-11A	
33H	51	(A-slaves) Output Data To Slave Address 12A-15A	
34H	52	(A-slaves) Output Data To Slave Address 16A-19A	
35H	53	(A-slaves) Output Data To Slave Address 20A-23A	
36H	54	(A-slaves) Output Data To Slave Address 24A-27A	
37H	55	(A-slaves) Output Data To Slave Address 28A-31A	
38H	56	(B-slaves) Output Data To Slave Address 1B-3B	
39H	57	(B-slaves) Output Data To Slave Address 4B-7B	
3AH	58	(B-slaves) Output Data To Slave Address 8B-11B	
3BH	59	(B-slaves) Output Data To Slave Address 12B-15B	
3CH	60	(B-slaves) Output Data To Slave Address 16B-19B	
3DH	61	(B-slaves) Output Data To Slave Address 20B-23B	
3EH	62	(B-slaves) Output Data To Slave Address 24B-27B	
3FH	63	(B-slaves) Output Data To Slave Address 28B-31B	
40H to 48H	64 to 72	Not used	—
49H to 4AH	73 to 74	(A-slaves) List of Projected Slaves (LPS (For Write))	Writing enabled
4BH to 4CH	75 to 76	(B-slaves) List of Projected Slaves (LPS (For Write))	—
4DH to 54H	77 to 84	Not used	—
55H	85	Command Buffer: <Request (Command)>	Writing enabled
56H to 59H	86 to 89	Command Buffer: <Request (data word 0 to 3(Command))>	
5AH to BFH	90 to 191	Not used	—
C0H to C5H	192 to 197	Current Error Code, Error Code History 1-5	Reading enabled
C6H	198	EEPROM Write Status	
C7H to CFH	199 to 207	Not used	—
D0H to D1H	208 to 209	(A-slaves) List of Peripheral Faults (LPF)	Reading enabled
D2H to D3H	210 to 211	(B-slaves) List of Peripheral Faults (LPF)	
D4H to DFH	212 to 223	Not used	—
E0H to 15FH	224 to 351	Analog Input Data (Slave Address 1-31)	Reading enabled
160H to 1DFH	352 to 479	Analog Output Data (Slave Address 1-31)	
1E0H to 1FFH	480 to 511	(A-slaves) Number of I/O Points	—
200H to 21FH	512 to 543	(B-slaves) Number of I/O Points	
220H to 2FFH	544 to 767	Not used	—
300H to 36DH	768 to 877	Extended Command Buffer <Result>	Reading enabled
36EH to 3FFH	878 to 1023	Not used	—
400H to 46DH	1024 to 1133	Extended Command Buffer <Request(Data)>	Writing enabled
46EH to 7FFH	1134 to 2047	Not used	—

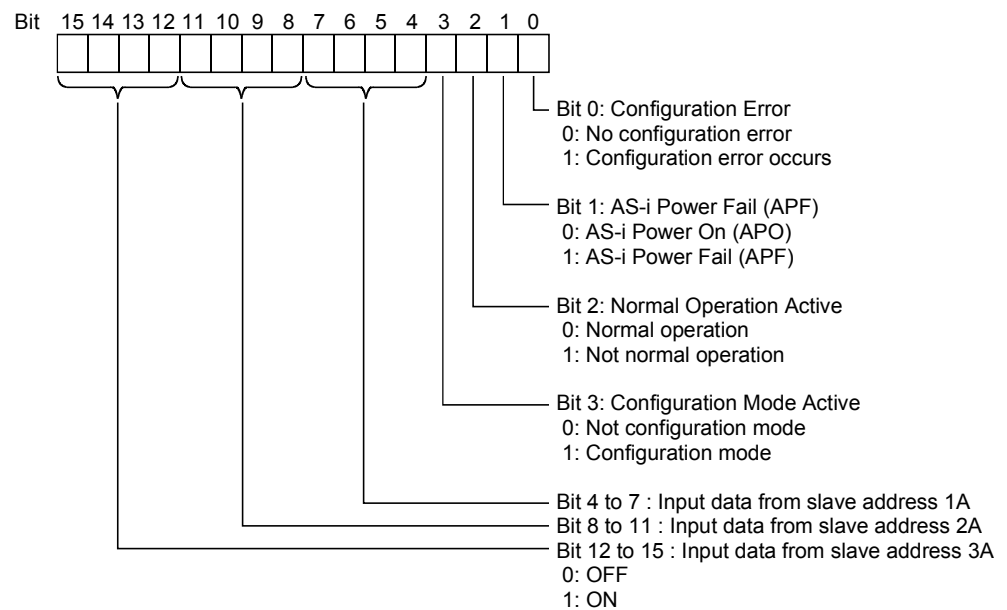
## 3.4.2 Details of Buffer Memory

This section describes the details of each item in the buffer memory, shown in Table 3.4 of section 3.4.1.

(1) Input data from slave address 1A to 3A, and some EC flags (Buffer memory address 0H: Un\G0)

The input data from the AS-i Ver. 2.11-compatible (Group A) and AS-i Ver. 2.04-compatible I/O slaves and part of the EC flag of the QJ71AS92 are stored.

Example: Buffer memory address Un\G0



(a) Bit 0: Configuration Error

Bit 0 checks for a configuration error.

A configuration error occurs if the projected slave list (LPS (for read)) and detected slave list (LDS) are different in the configuration contents.

On detection of a configuration error in the AS-i system, the QJ71AS92 turns ON the corresponding bit of the slave list (addresses: 1DH to 20H) that differs from the buffer memory settings and turns bit 0 ON.

Bit 0 automatically turns OFF when the configuration error is all resolved.

When bit 0 is ON, check whether the wiring is proper and the projected slave list (LPS (for read)) is the same as the detected slave list (LDS), for example. (This bit corresponds to the input signal X4.)

(b) Bit 1: AS-i Power Fail (APF)

Bit 1 checks the AS-i power supply status.

The QJ71AS92 turns bit 1 ON when the voltage supplied by the AS-i power supply is insufficient. It turns OFF automatically when the supplied voltage is restored.

When bit 1 is ON, check the rated current value of the AS-i power supply, the wiring, and the overall distance of the system. (This bit corresponds to the input signal X5.)

(c) Bit 2: Normal Operation Active

Bit 2 checks the operating status.

Bit 2 turns OFF when the QJ71AS92 is in the normal operation status after module ready (X0) has turned ON. (This bit corresponds to the input signal X6.)

(d) Bit 3: Configuration Mode Active

Bit 3 checks the operation mode.

Bit 3 turns ON when the QJ71AS92 is in the configuration mode. Bit 3 turns OFF when the QJ71AS92 is in the mode other than configuration mode. (This bit corresponds to the input signal X7.)

(e) Bit 4 to 7 : Input data from slave address 1A

(f) Bit 8 to 11 : Input data from slave address 2A

(g) Bit 12 to 15 : Input data from slave address 3A

<b>TIP</b>
<ul style="list-style-type: none"> <li>• 0 is stored as the input from a non-connected slave.</li> <li>• As the input from the slave address corresponding to the analog slave, the data used for communication is stored.</li> </ul>

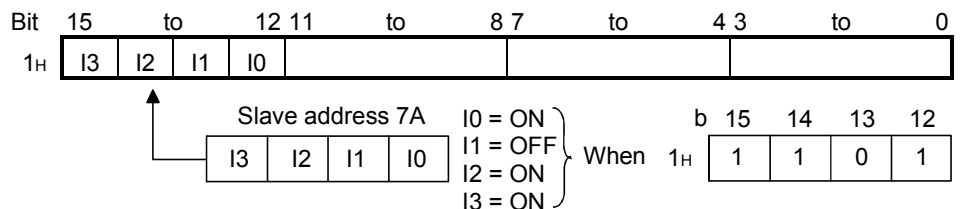
(2) Input data from slave address 4A to 31A (Buffer memory address 1H to 7H: Un\G1 to Un\G7)

The input data from the AS-i Ver. 2.11-compatible (Group A) and AS-i Ver. 2.04-compatible I/O slaves are stored.

Bit	15	to	12 11	To	8 7	to	4 3	to	0
1H	7A			6A		5A		4A	
2H	11A			10A		9A		8A	
3H	15A			14A		13A		12A	
4H	19A			18A		17A		16A	
5H	23A			22A		21A		20A	
6H	27A			26A		25A		24A	
7H	31A			30A		29A		28A	

ON: 1, OFF: 0

Example:



<b>TIP</b>
<ul style="list-style-type: none"> <li>• 0 is stored as the input from a non-connected slave.</li> <li>• As the input from the slave address corresponding to the analog slave, the data used for communication is stored.</li> </ul>

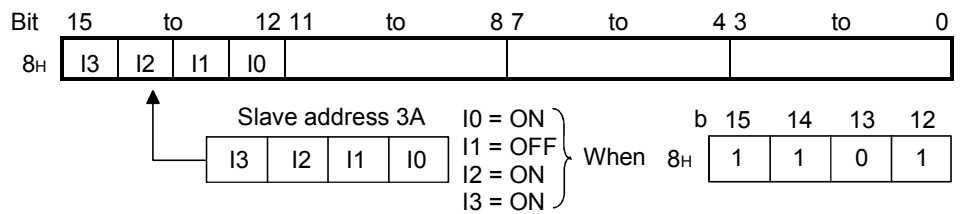
(3) Input data from slave address 1B to 31B (Buffer memory address 8H to FH: Un\G8 to Un\G15)

The input data from the AS-i Ver. 2.11-compatible (Group B) I/O slaves are stored.

Bit	15	to	12 11	to	8 7	to	4 3	to	0
8H	3B			2B			1B		—
9H	7B			6B			5B		4B
AH	11B			10B			9B		8B
BH	15B			14B			13B		12B
CH	19B			18B			17B		16B
DH	23B			22B			21B		20B
EH	27B			26B			25B		24B
FH	31B			30B			29B		28B

— : Not used (0 fixed)  
ON: 1, OFF: 0

Example:

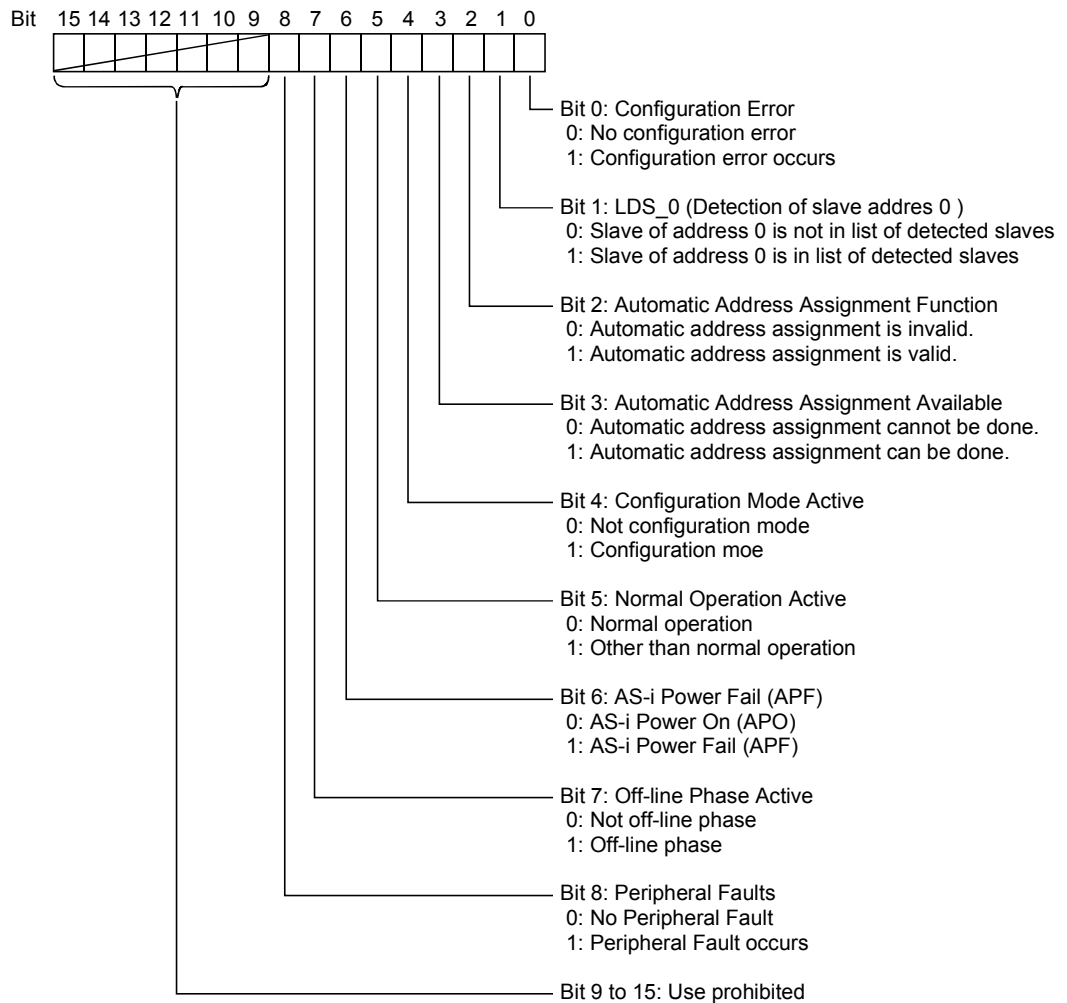


**TIP**

- 0 is stored as the input from a non-connected slave.

## (4) EC flag (Buffer memory address 10H : Un\G16)

Example: Buffer memory address Un\G0



## (a) Bit 0: Configuration Error

Refer to "Section 3.4.2 (1) (a)".

## (b) Bit 1: LDS\_0 (Detection of slave address 0)

Bit 1 checks whether the AS-i system has a slave of slave address 0 or not.  
Bit 1 turns ON when the QJ71AS92 detects slave 0.

## (c) Bit 2: Automatic Address Assignment Function

Bit 2 checks whether the automatic slave address assignment function is valid or invalid. Bit 2 turns ON when the automatic slave address assignment function is enabled in the protected operation mode.

(Related item: Section 3.3.2 (9))

## (d) Bit 3: Automatic Address Assignment Available

Bit 3 checks the operation conditions of the automatic slave address assignment function. Bit 3 turns ON when the automatic slave address assignment function is enabled and only one of the set slaves is not recognised in the protected operation mode. (Refer to Section 4.5.4)

- (e) Bit 4: Configuration Mode Active  
Refer to "Section 3.4.2 (1) (d)".
- (f) Bit 5: Normal Operation Active  
Refer to "Section 3.4.2 (1) (c)".
- (g) Bit 6: AS-i Power Fail (APF)  
Refer to "Section 3.4.2 (1) (b)".
- (h) Bit 7: Off-line Phase Active  
Bit 7 checks whether the QJ71AS92 is in the offline phase or not.  
Bit 7 turns ON when the QJ71AS92 is in the offline phase.
- (i) Bit 8: Peripheral Faults  
Bit 8 detects the peripheral fault of the slave. Bit 8 turns ON when the QJ71AS92 detects the peripheral fault of the slave.  
Check the detection conditions of a peripheral fault in the manual of the slave.  
Bit 8 turns ON when the QJ71AS92 is in the phase other than the normal operation mode.

(5) List of Detected Slaves (LDS) (Buffer memory address 11H to 12H, 13H to 14H: Un\G17 to Un\G18, Un\G19 to Un\G20)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
11H	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	0
12H	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
13H	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
14H	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

The bits corresponding to the slave addresses detected at startup of the QJ71AS92 turn ON.

When the bit is ON, the slave corresponding to that bit is in the AS-i system.

When the bit is OFF, the slave corresponding to that bit is not in the AS-i system.

- (6) List of Active Slaves (LAS) (Buffer memory address 15H to 16H, 17H to 18H: Un\G21 to Un\G22, Un\G23 to Un\G24)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
15H	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	—
16H	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
17H	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
18H	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

The bits corresponding to the slave addresses ready for communication turn ON. When the bit is ON, the slave corresponding to that bit is ready for communication in the AS-i system.

When the bit is OFF, the slave corresponding to that bit is not ready for communication in the AS-i system.

The active slave list (LAS) is made up as described below.

(a) In the configuration mode

The active slave list (LAS) has the same contents as the detected slave list (LDS). Namely, the detected slaves are always ready for communication.

(b) In the protected operating mode

The active slave list (LAS) consists of the slaves that are ON in both the detected slave list (LDS) and projected slave list (LPS (for read)). Namely, only the slaves already registered to the projected slave list (LPS (for read)) from among the detected slaves (slaves that are ON in the detected slave list (LDS)) are ready for communication.

(Related items: Section 3.4.2 (5), Section 3.4.2 (7))



(7) List of Projected Slaves (LPS (For Read)) (Buffer memory address 19H to 1AH, 1BH to 1CH: Un\G25 to Un\G26, Un\G27 to Un\G28)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
19H	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	—
1AH	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
1BH	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
1CH	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

The bits corresponding to the registered slave addresses as the projected slaves in the QJ71AS92 turn on.

When the bit is ON, the slave corresponding to that bit is ready for communication in the AS-i system in the projected operation mode.

When the bit is OFF, the slave corresponding to that bit is not ready for communication in the AS-i system in the projected operation mode.

At power-on of the programmable controller, the data Stored on the EEPROM in the QJ71AS92 are used to make initialization.

TIP
<ul style="list-style-type: none"> <li>• If the LPS has been set, communication cannot be made when the permanent configuration differs from the actual configuration. (Related item: Section 3.5.1)</li> <li>• To read/write the configuration, use the command buffer &lt;request&gt; (buffer memory addresses: 101H to 13FH/141H to 17FH). Refer to Section 3.5.1 for command details. (Related item: Section 4.5 (2))</li> </ul>

(8) List of slaves that differ from the settings (Buffer memory address 1DH to 1EH, 1FH to 20H: Un\G29 to Un\G30, Un\G31 to Un\G32)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1DH	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	0
1EH	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
1FH	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
20H	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

A configuration error occurs if the projected slave list (LPS (for read)) and detected slave list (LDS) are different in the configuration contents.

The logical operation OR on the detected slave list (LDS) and projected slave list (LPS (for read)) are performed. Then, the logical operation exclusive OR on the result of the logical operation OR and the active slave list (LAS) is performed.

Conclusively, the result of the logical operation exclusive OR is stored.

The slave list that differs from the settings can be used to check the slave for a configuration error occurrence.

11H(LDS)				1	1	1	1									
15H(LAS)				0	1	0	1									
19H(LPS)				1	1	0	0									
1DH				1	0	1	0									

On when the operation results are mismatched  
0: OFF  
1: ON

(9) Error Slave List (Buffer memory address 21H to 22H, 23H to 24H: Un\G33 to Un\G34, Un\G35 to Un\G36)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
21H	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	—
22H	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
23H	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
24H	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

The error slave list can be used to check the slave for a communication error occurrence in the projected operation mode.

The result of Logical AND on the reverse active slave list (LAS) and the projected slave list (LPS (for read)) is stored.

Example:

15H(LAS)	0	1	0	1
LAS	1	0	1	0
19H(LPS)	1	1	0	0
21H(Error slave list)	1	0	0	0

(10) Output data to slave addresses 1A to 3A (Buffer memory address 30H: Un\G48)

Output data to I/O slaves compatible with AS-i Ver. 2.11 (System A) or AS-i Ver. 2.04 are stored.

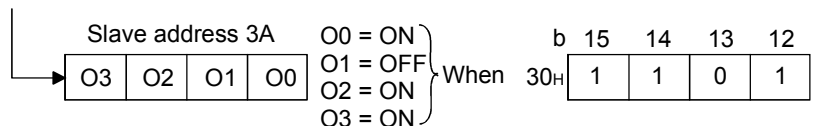
The values stored in the areas corresponding to the analog, non-connected and non-detected slaves are invalid (ignored).

Bit	15	to	12	11	to	8	7	to	4	3	to	0
1H	3A			2A			1A			(0000 fixed)		

ON: 1, OFF: 0

Example:

Bit	15	to	12	11	to	8	7	to	4	3	to	0
30H	O3	O2	O1	O0								



(11) Output data to slave address 4A to 31A (Buffer memory address 31H to 37H: Un\G49 to Un\G55)

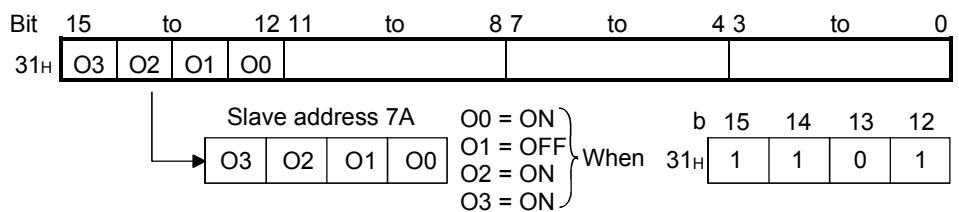
Output data to I/O slaves compatible with AS-i Ver. 2.11 (System A) or AS-i Ver. 2.04 are stored.

The values stored in the areas corresponding to the analog, non-connected and non-detected slaves are invalid (ignored).

Bit	15	to	12	11	to	8	7	to	4	3	to	0				
31H	7A				6A				5A				4A			
32H	11A				10A				9A				8A			
33H	15A				14A				13A				12A			
34H	19A				18A				17A				16A			
35H	23A				22A				21A				20A			
36H	27A				26A				25A				24A			
37H	31A				30A				29A				28A			

ON : 1, OFF : 0

Example:



(12) Output data to slave address 1B to 3B (Buffer memory address 38H: Un\G56)

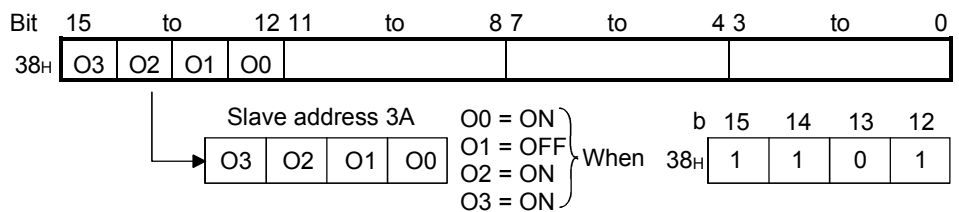
Output data to I/O slaves compatible with AS-i Ver. 2.11 (System B) are stored.

The values stored in the areas corresponding to the non-connected and non-detected slaves are invalid (ignored).

Bit	15	to	12	11	to	8	7	to	4	3	to	0				
38H	3B				2B				1B				(0000 fixed)			

ON : 1, OFF : 0

Example:



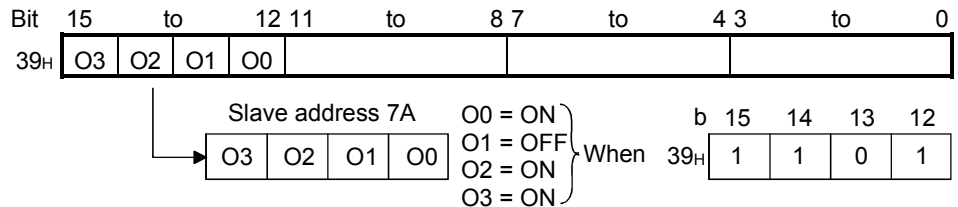
(13) Output data to slave addresses 4B to 31B (Buffer memory address 39H to 3FH: Un\G57 to Un\G63)

Output data to I/O slaves compatible with AS-i Ver. 2.11 (System B) are stored. The values stored into the areas corresponding to the non-connected and non-detected slaves are invalid (ignored).

Bit	15	to	12	11	to	8	7	to	4	3	to	0				
39H	7B				6B				5B				4B			
3AH	11B				10B				9B				8B			
3BH	15B				14B				13B				12B			
3CH	19B				18B				17B				16B			
3DH	23B				22B				21B				20B			
3EH	27B				26B				25B				24B			
3FH	31B				30B				29B				28B			

ON: 1, OFF: 0

Example:



(14) List of Projected Slaves (LPS (For Write)) (Buffer memory address 49H to 4AH, 4BH to 4CH: Un\G73 to Un\G74, Un\G75 to Un\G76)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
49H	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	—
4AH	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
4BH	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
4CH	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

If the bit corresponding to the number of the slave to be communicated with and Y13 are turned ON, data in this area will be registered in the QJ71AS92 and be reflected into the List of projected slaves (LPS (for read)) (buffer memory address: 19H to 1CH).

(Related item: Section 4.5 (2))

<b>TIP</b>	<ul style="list-style-type: none"> <li>• The projected slave list (LPS (for write)) is handled as a 64-bit length in the QJ71AS92. Therefore, if data is written to only the buffer memory address 49H, the contents of the buffer memory address 4AH to 4CH are also made valid as data.</li> <li>• When communicating with the slave that has been judged as ready for communication in the active slave list (LAS) (buffer memory addresses: 15H to 18H), easy registration of the projected slave list (LPS (for read)) and configuration are enabled by using the command buffer &lt;request&gt; 201H.</li> </ul>
------------	--

(15) Command buffer <request>  
(Buffer memory address 55H to 59H: Un\G85 to Un\G89)

Buffer memory address	Item
55H (85)	AS-i command buffer <request>
56H (86)	AS-i command buffer <data word 0>
57H (87)	AS-i command buffer <data word 1>
58H (88)	AS-i command buffer <data word 2>
59H (89)	AS-i command buffer <data word 3>

- (a) After data is written to the command buffer <request> and <data words 0 to 3> and, Y12 is turned ON.
- (b) The QJ71AS92 executes the command buffer <request> when Y12 turns ON. At this time, "08" (request code in execution) is stored into the command buffer <result>. \*1  
\*1 If necessary, the QJ71AS92 reads the command buffer <data words 0 to 3>.
- (c) After the command execution is completed, the QJ71AS92 stores the result into the command buffer <result> and turns ON X2. \*2  
\*2 When the results are added with data, the data is stored into the data word for extended command buffer <result>.  
(Related item: Section 3.4.2 (22))

<b>TIP</b>
Refer to Section 3.5.1 for the command buffer <request> list.

(16) Command buffer <result>  
(Buffer memory address 25H to 29H: Un\G37 to Un\G41)

Buffer memory address	Item
25H (37)	AS-i command buffer <result>
26H (38)	AS-i command buffer <data word 0>
27H (39)	AS-i command buffer <data word 1>
28H (40)	AS-i command buffer <data word 2>
29H (41)	AS-i command buffer <data word 3>

The QJ71AS92 stores the result of executing the command buffer <request>.  
(Related item: Section 3.4.2 (21))

<b>TIP</b>
Refer to Section 3.5.1 for the command buffer <request> list.

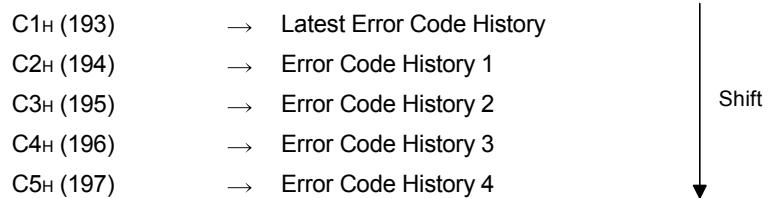
(17) Current Error Code, Error Code History 1-5  
(Buffer memory address C0H to C5H: Un\G192 to Un\G197)

The error code currently detected by the QJ71AS92 and the history of maximum five error codes are stored.

Buffer memory address	Item
C0H (192)	Current Error Code
C1H (193)	Error Code History 1
C2H (194)	Error Code History 2
C3H (195)	Error Code History 3
C4H (196)	Error Code History 4
C5H (197)	Error Code History 5

C0H and C1H store the latest error code. When the error is reset, C0H stores "0".  
In C1H, the error code remains as-is.

Example) When an error occurs, the error codes are stored as indicated below.



**TIP**  
Refer to Section 8.3.1 for error codes.

(18) List of Peripheral Faults (LPF) (Buffer memory address D0H to D1H, D2H to D3H: Un\G208 to Un\G209, Un\G210 to Un\G211)

Each bit corresponds to the peripheral fault occurrence status of the corresponding slave address (1A to 31A, 1B to 31B).

When the bit is ON, it indicates that a peripheral fault has occurred in the slave corresponding to that bit. (When any of the bits is ON, the peripheral fault bit of the EC flag (buffer memory address: 10H) turns ON.)

When the bit is OFF, it indicates that a peripheral fault has not occurred in the slave corresponding to that bit.

The peripheral fault slave list is a function compatible with AS-i Ver. 2.11.

For the peripheral fault detection conditions, refer to the manual of the slave used.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
D0H	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	—
D1H	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A
D2H	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	—
D3H	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

— : Not used (0 fixed)

(19) Analog input data, Analog output data (Buffer memory address E0H to 15FH, 160H to 1DFH: Un\G224 to Un\G351, Un\G352 to Un\G479)

Address		Details	Address		Details
Hexadecimal	Decimal		Hexadecimal	Decimal	
E0H to E3H	224 to 227	Invalid (0 fixed)	160H to 163H	352 to 355	Invalid (0 fixed)
E4H to E7H	228 to 231	Slave address 1	164H to 167H	356 to 359	Slave address 1
E8H to EBH	232 to 235	Slave address 2	168H to 16BH	360 to 363	Slave address 2
ECH to EFH	236 to 239	Slave address 3	16CH to 16FH	364 to 367	Slave address 3
F0H to F3H	240 to 243	Slave address 4	170H to 173H	368 to 371	Slave address 4
F4H to F7H	244 to 247	Slave address 5	174H to 177H	372 to 375	Slave address 5
F8H to FBH	248 to 251	Slave address 6	178H to 17BH	376 to 379	Slave address 6
FBH to FFH	252 to 255	Slave address 7	17CH to 17FH	380 to 383	Slave address 7
100H to 103H	256 to 259	Slave address 8	180H to 183H	384 to 387	Slave address 8
104H to 107H	260 to 263	Slave address 9	184H to 187H	388 to 391	Slave address 9
108H to 10BH	264 to 267	Slave address 10	188H to 18BH	392 to 395	Slave address 10
10CH to 10FH	268 to 271	Slave address 11	18CH to 18FH	376 to 399	Slave address 11
110H to 113H	272 to 275	Slave address 12	190H to 193H	400 to 403	Slave address 12
114H to 117H	276 to 279	Slave address 13	194H to 197H	404 to 407	Slave address 13
118H to 11BH	280 to 283	Slave address 14	198H to 19BH	408 to 411	Slave address 14
11CH to 11FH	284 to 287	Slave address 15	19CH to 19FH	412 to 415	Slave address 15
120H to 123H	288 to 291	Slave address 16	1A0H to 1A3H	416 to 419	Slave address 16
124H to 127H	292 to 295	Slave address 17	1A4H to 1A7H	420 to 423	Slave address 17
128H to 12BH	296 to 299	Slave address 18	1A8H to 1ABH	424 to 427	Slave address 18
12CH to 12FH	300 to 303	Slave address 19	1ACH to 1AFH	428 to 431	Slave address 19
130H to 133H	304 to 307	Slave address 20	1B0H to 1B3H	432 to 435	Slave address 20
134H to 137H	308 to 311	Slave address 21	1B4H to 1B7H	436 to 439	Slave address 21
138H to 13BH	312 to 315	Slave address 22	1B8H to 1BBH	440 to 443	Slave address 22
13CH to 13FH	316 to 319	Slave address 23	1BCH to 1BFH	424 to 447	Slave address 23
140H to 143H	320 to 323	Slave address 24	1C0H to 1C3H	448 to 451	Slave address 24
144H to 147H	324 to 327	Slave address 25	1C4H to 1C7H	452 to 455	Slave address 25
148H to 14BH	328 to 331	Slave address 26	1C8H to 1CBH	456 to 459	Slave address 26
14CH to 14FH	332 to 335	Slave address 27	1CCH to 1CFH	460 to 463	Slave address 27
150H to 153H	336 to 339	Slave address 28	1D0H to 1D3H	464 to 467	Slave address 28
154H to 157H	340 to 343	Slave address 29	1D4H to 1D7H	468 to 471	Slave address 29
158H to 15BH	344 to 347	Slave address 30	1D8H to 1DBH	472 to 475	Slave address 30
15CH to 15FH	348 to 351	Slave address 31	1DCH to 1DFH	476 to 479	Slave address 31

Analog input data \*1

Analog output data

\*1: "7FFFH" is stored when no communication is made.

Example: Buffer memory address: Un\G228 to Un\G231

Buffer memory address	Item
E4H (228)	Analog input data from slave address 1 (Channel 1)
E5H (229)	Analog input data from slave address 1 (Channel 2)
E6H (230)	Analog input data from slave address 1 (Channel 3)
E7H (231)	Analog input data from slave address 1 (Channel 4)

Example: Buffer memory address: Un\G356 to Un\G359

Buffer memory address	Item
164H (356)	Analog output data to slave address 1 (Channel 1)
165H (357)	Analog output data to slave address 1 (Channel 2)
166H (358)	Analog output data to slave address 1 (Channel 3)
167H (359)	Analog output data to slave address 1 (Channel 4)

**REMARK**

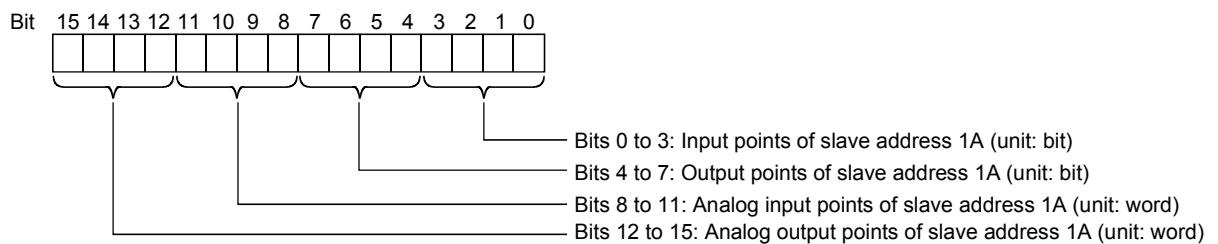
For the range of analog output data, refer to the manual of each analog slave.

(20) Number of I/O Points (Buffer memory address 1E0H to 1FFH, 200H to 21FH: Un\G480 to Un\G511, Un\G512 to Un\G543)

The following table lists the numbers of I/O points and analog I/O points of the slaves in the configuration are displayed.

Address		Details	Address		Details
Hexadecimal	Decimal		Hexadecimal	Decimal	
1E0H	480	Invalid (0 fixed)	200H	512	Invalid (0 fixed)
1E1H	481	Slave address 1A	201H	513	Slave address 1B
1E2H	482	Slave address 2A	202H	514	Slave address 2B
1E3H	483	Slave address 3A	203H	515	Slave address 3B
1E4H	484	Slave address 4A	204H	516	Slave address 4B
1E5H	485	Slave address 5A	205H	517	Slave address 5B
1E6H	486	Slave address 6A	206H	518	Slave address 6B
1E7H	487	Slave address 7A	207H	519	Slave address 7B
1E8H	488	Slave address 8A	208H	520	Slave address 8B
1E9H	489	Slave address 9A	209H	521	Slave address 9B
1EAH	490	Slave address 10A	20AH	522	Slave address 10B
1EBH	491	Slave address 11A	20BH	523	Slave address 11B
1ECH	492	Slave address 12A	20CH	524	Slave address 12B
1EDH	493	Slave address 13A	20DH	525	Slave address 13B
1EEH	494	Slave address 14A	20EH	526	Slave address 14B
1EFH	495	Slave address 15A	20FH	527	Slave address 15B
1F0H	496	Slave address 16A	210H	528	Slave address 16B
1F1H	497	Slave address 17A	211H	529	Slave address 17B
1F2H	498	Slave address 18A	212H	530	Slave address 18B
1F3H	499	Slave address 19A	213H	531	Slave address 19B
1F4H	500	Slave address 20A	214H	532	Slave address 20B
1F5H	501	Slave address 21A	215H	533	Slave address 21B
1F6H	502	Slave address 22A	216H	534	Slave address 22B
1F7H	503	Slave address 23A	217H	535	Slave address 23B
1F8H	504	Slave address 24A	218H	536	Slave address 24B
1F9H	505	Slave address 25A	219H	537	Slave address 25B
1FAH	506	Slave address 26A	21AH	538	Slave address 26B
1FBH	507	Slave address 27A	21BH	539	Slave address 27B
1FCH	508	Slave address 28A	21CH	540	Slave address 28B
1FDH	509	Slave address 29A	21DH	541	Slave address 29B
1FEH	510	Slave address 30A	21EH	542	Slave address 30B
1FFH	511	Slave address 31A	21FH	543	Slave address 31B

Example: Buffer memory address Un\G481





## (21) Extended Command Buffer &lt;Result&gt;

(Buffer memory address 300H to 36DH: Un\G768 to Un\G877)

The result of executing any of the following commands with the command buffer <request> (buffer memory address: 55H) is stored.

- Slave ID read command (command: 301H) \*<sup>1</sup>
- Slave diagnostic information read command (command: 303H) \*<sup>1</sup>
- Slave parameter read command (command: 305H) \*<sup>1</sup>

\*1: Refer to Section 3.5.1 for command details.

Buffer memory address	Item
300H (768)	Extended Command Buffer <Result data word 0>
301H (769)	Extended Command Buffer <Result data word 1>
•	•
•	•
•	•
36CH (876)	Extended Command Buffer <Result data word 108>
36DH (877)	Extended Command Buffer <Result data word 109>

## (22) Extended Command Buffer &lt;Request (Data)&gt;

(Buffer memory address 400H to 46DH: Un\G1024 to Un\G1133)

Used when the following command is executed with the command buffer <request> (buffer memory address: 55H).

- Slave parameter write command (command: 307H) \*<sup>1</sup>

\*1: Refer to Section 3.5.1 for command details.

Buffer memory address	Item
400H (1024)	Extended Command Buffer <Request data word 0>
401H (1025)	Extended Command Buffer <Request data word 1>
•	•
•	•
•	•
46CH (1132)	Extended Command Buffer <Request data word 108>
46DH (1133)	Extended Command Buffer <Request data word 109>

## 3.5 Command List

This section provides the command buffer <request>/<result>.

## 3.5.1 Command Buffer &lt;Request&gt; List

The command buffer <request> lists are indicated below.

A: AS-i Ver. 2.11-compatible Group A I/O slave, Analog slave,  
AS-i Ver. 2.04-compatible I/O slave

B: AS-i Ver. 2.11-compatible Group B I/O slave

1): Off-line phase

2): Configuration mode

3): Protected operation mode

○ : Enabled, – : Disabled

Command code	Details	Target Slave		Operating Status		
		A	B	1)	2)	3)
01H to 1FH	Writes the value of the command buffer <request (data word 0)> to the actual parameter <sup>*1</sup> of the slave address n (n = request code).	○	–	–	○	○
21H to 3FH	Writes the value of the command buffer <request (data word 0)> to the actual parameter <sup>*1</sup> of the slave address n (n = request code - 20H).	–	○	–	○	○
41H to 5FH	Reads the actual parameter <sup>*1</sup> of the slave address n (n = request code - 40H). The result is written to the command buffer <result (data word 0)>.	○	–			
61H to 7FH	Reads the actual parameter <sup>*1</sup> of the slave address n (n = request code - 60H). The result is written to the command buffer <result (data word 0)>.	–	○			
81H to 9FH	Writes the value of the command buffer <request (data word 0)> to the permanent parameter <sup>*1</sup> of the slave address n (n = request code - 80H).	○	–			
A1H to BFH	Writes the value of the command buffer <request (data word 0)> to the permanent parameter <sup>*1</sup> of the slave address n (n = request code - A0H).	–	○	○	○	○
C1H to DFH	Reads the permanent parameter <sup>*1</sup> of the slave address n (n = request code - C0H). The result is written to the command buffer <result (data word 0)>.	○	–			
E1H to FFH	Reads the permanent parameter <sup>*1</sup> of the slave address n (n = request code - E0H). The result is written to the command buffer <result (data word 0)>.	–	○			

○ : Enabled, — : Disabled

Command code	Details	Target Slave		Operating Status		
		A	B	1)	2)	3)
101H to 11FH	Reads the actual configuration <sup>*2</sup> of the slave address n (n = request code - 100H). The result is written to the command buffer <result (data word 0)>.	○	—			
121H to 13FH	Reads the actual configuration <sup>*2</sup> of the slave address n (n = request code - 120H). The result is written to the command buffer <result (data word 0)>.	—	○	○	○	○
141H to 15FH	Writes the value of the command buffer <request (data word 0)> to the permanent configuration <sup>*2</sup> of the slave address n (n = request code - 140H).	○	—			
161H to 17FH	Writes the value of the command buffer <request (data word 0)> to the permanent configuration <sup>*2</sup> of the slave address n (n = request code - 160H).	—	○	—	○	—
181H to 19FH	Reads the permanent configuration <sup>*2</sup> of the slave address n (n = request code - 180H). The result is written to the command buffer <result (data word 0)>.	○	—			
1A1H to 1BFH	Reads the permanent configuration <sup>*2</sup> of the slave address n (n = request code - 1A0H). The result is written to the command buffer <result (data word 0)>.	—	○	○	○	○
1C0H	Reads the number of AS-i power fail times to the data word 0, and resets it.	—	○	—	○	○
1C1H to 1DFH	Reads the number of wrong response times of the slave address n (n = request code - 1C0H) to the data word 0, and clears it.	○	—			
1E1H to 1FFH	Reads the number of wrong response times of the slave address n (n = request code - 1E0H) to the data word 0, and clears it.	—	○	—	○	○
200H	Changes the slave address n (n = data word 0) into m (m = data word 1). n, m = set in 01H to 1FH.	○	—			
	Changes the slave address n (n = data word 0) into m (m = data word 1). n, m = set in 21H to 3FH (slave address + 20H).	—	○	○	○	○
201H	Stores the actual configuration of AS-i. (Copies the active slave list (LAS) to the projected slave list (LPS (for read)) and copies the actual configuration to the permanent configuration.)	○	○	—	○	—
202H	Stores the actual parameters of AS-i to the permanent parameters.	○	○	○	○	○
203H	Sets the SET and MODE switches to Invalid/Valid. Command buffer <request (data word 0)> 0: Valid (default), 1: Invalid					
204H	Reads and clears the illegal slave list. The result is written to the command buffer <result (data words 0, 1)>.	○	○	—	○	○
300H *3	Writes the value of the command buffer <request (data word 0)> to the extension ID code 1 of the slave address 0.					

○ : Enabled, — : Disabled

Command code	Details	Target Slave		Operating Status		
		A	B	1)	2)	3)
301H <sup>*3</sup>	<p>Reads the ID of the slave address n (n = data word 0). The Execution result is stored as follows.</p> <p>Command buffer &lt;request (data word 0)&gt; (Buffer memory address: 56H): Stores the slave address.</p> <p>Command buffer &lt;result&gt; (Buffer memory address: 25H): Stores the Execution result.</p> <p>Command buffer &lt;result (data word 0)&gt; (Buffer memory address: 26H): Stores the size of the read data.</p> <p>Extension command buffer &lt;result&gt; (Buffer memory address: 300H): Stores the read data.</p> <p>*The read data is up to 220 bytes.</p>					
303H <sup>*3</sup>	<p>Reads the diagnostic information of the slave address n (n = data word 0). The Execution result is stored as follows.</p> <p>Command buffer &lt;request (data word 0)&gt; (Buffer memory address: 56H): Stores the slave address.</p> <p>Command buffer &lt;result&gt; (Buffer memory address: 25H): Stores the Execution result.</p> <p>Command buffer &lt;result (data word 0)&gt; (Buffer memory address: 26H): Stores the size of the read data.</p> <p>Extension command buffer &lt;result&gt; (Buffer memory address: 300H): Stores the read data.</p> <p>*The read data is up to 220 bytes.</p>					
305H <sup>*3</sup>	<p>Reads the parameters of the slave address n (n = data word 0). The Execution result is stored as follows.</p> <p>Command buffer &lt;request (data word 0)&gt; (Buffer memory address: 56H): Stores the slave address.</p> <p>Command buffer &lt;result&gt; (Buffer memory address: 25H): Stores the Execution result.</p> <p>Command buffer &lt;result (data word 0)&gt; (Buffer memory address: 26H): Stores the size of the read data.</p> <p>Extension command buffer &lt;result&gt; (Buffer memory address: 300H): Stores the read data.</p> <p>*The read data is up to 220 bytes.</p>	○	○	—	○	○
307H <sup>*3</sup>	<p>Writes the parameters to the slave address n (n = data word 0). The Execution result is stored as follows.</p> <p>Command buffer &lt;request (data word 0)&gt; (Buffer memory address: 56H): Stores the slave address.</p> <p>Command buffer &lt;request (data word 1)&gt; (Buffer memory address: 26H): Stores the size of the written data.</p> <p>Extension command buffer &lt;request (data)&gt; (Buffer memory address: 400H): Sets the written data.</p> <p>Extension command buffer &lt;result&gt; (Buffer memory address: 300H): Stores the written data.</p> <p>*The read data is up to 220 bytes.</p>					

\*1

Name	Description
Actual parameter	Parameter that the target slave has
Permanent parameter	Slave parameter that the QJ71AS92 has

For the actual parameters, refer to the manual of the slave used.

\*2: Consists of the I/O code and ID code of the slave. The data of the inactive slave are default values (FF<sub>H</sub>).

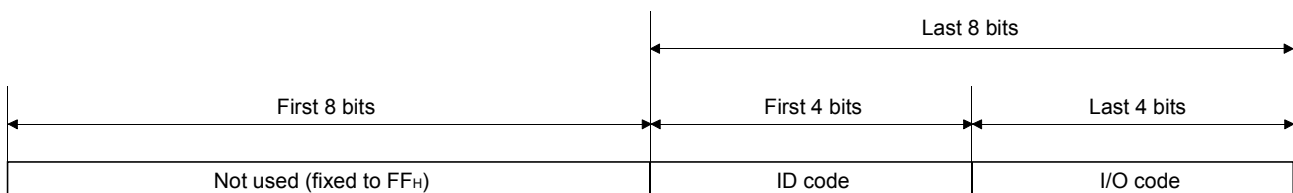
When communicating in the projected operation mode, the permanent configuration of the slave whose bit in the LPS (for read) (buffer memory addresses: 19<sub>H</sub> to 1C<sub>H</sub>) is ON must match the actual configuration of the corresponding slave connected.

Name	Description
Actual configuration	I/O code and ID code that the slave holds. (Extension ID code 1, 2 . . . Added to AS-i Ver. 2.11.)
Permanent configuration	I/O code and ID code that the QJ71AS92 holds. (Extension ID code 1, 2 . . . Added to AS-i Ver. 2.11.)

Configuration data structure of AS-i Ver. 2.11-compatible slave



Configuration data structure of AS-i Ver. 2.04-compatible slave



For the I/O and ID codes, refer to the manual of the slave used.

This data can be stored on the EEPROM of the QJ71AS92. For how to store the data to the EEPROM, See Section 3.3.2 (12) or Section 4.5.1.

\*3 This command can be used with the slave compatible with the slave profile S-7.4.

For the profile of the slave used, refer to the manual of the slave.

## 3.5.2 Command Buffer &lt;Result&gt; List

The following table lists the command buffer <result>.

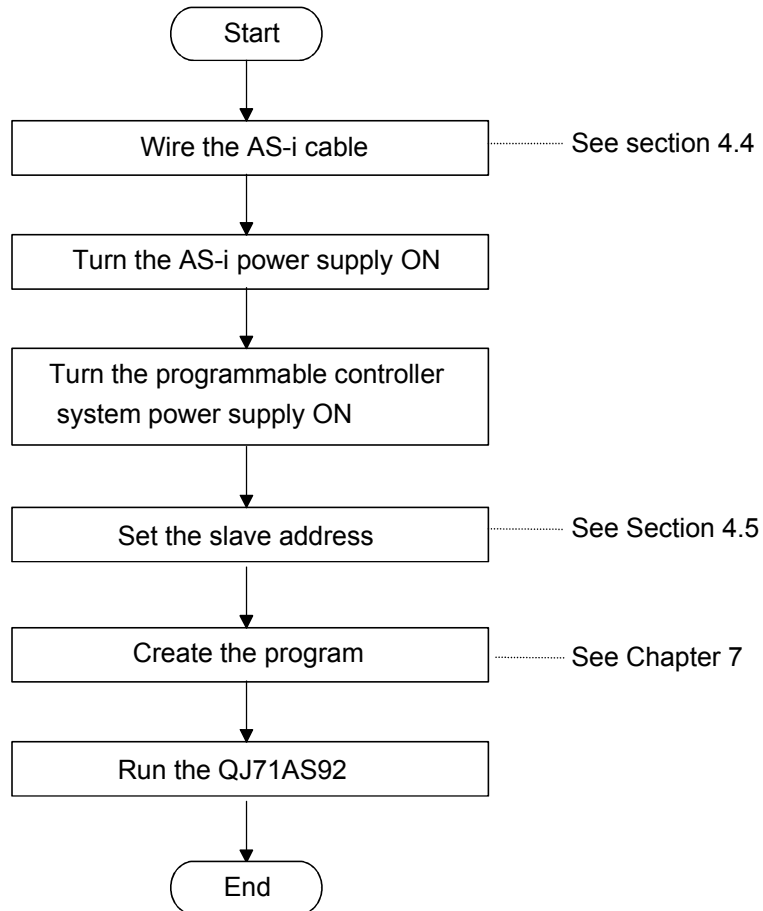
Result Value	Description
00H	The command was not executed.
01H	The request code was executed.
02H	The target slave address does not exist.
03H	The slave of slave address 0 exists.
04H	The target slave address is used by another slave.
05H	The target slave address cannot be erased.
06H	The target slave address cannot be set.
07H	The slave address cannot be written to the nonvolatile memory of the slave.
08H	The request code is in execution.
09H	The request code is wrong.
0AH	The data word value is outside the setting range.
0BH	The extension ID code 1 was not stored correctly.
0CH	The extension ID code 1 could not be read correctly.

## 4 SETTINGS AND PROCEDURES FOR OPERATION

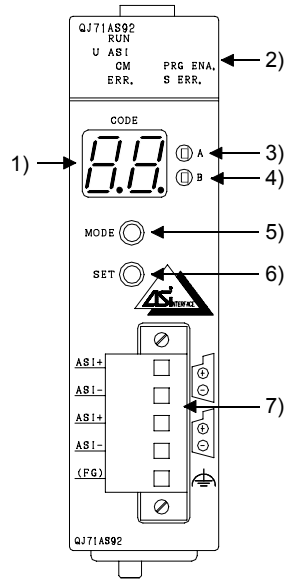
This section explains the procedures, name of each part, installation, connection to the AS-i system and settings for using the QJ71AS92 in the AS-i system.

### 4.1 Outline Procedures for Operation

The following chart shows the procedures for using the QJ71AS92 in the AS-i system.



4.2 Part Names



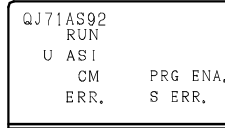
4

No.	Name	Details																																							
1)	"CODE" LED	Shows the slave address or error code of the QJ71AS92. <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="10">Number</th> <th colspan="3">Alphabet</th> </tr> <tr> <th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th> <th>p</th><th>g</th><th>d</th> </tr> </thead> <tbody> <tr> <td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> <td>P</td><td>g</td><td>d</td> </tr> </tbody> </table>	Number										Alphabet			0	1	2	3	4	5	6	7	8	9	p	g	d	0	1	2	3	4	5	6	7	8	9	P	g	d
Number										Alphabet																															
0	1	2	3	4	5	6	7	8	9	p	g	d																													
0	1	2	3	4	5	6	7	8	9	P	g	d																													
2)	LED Display	Turned on/off to indicate the operating statuses of the QJ71AS92. (Refer to Section 4.2.1)																																							
3)	"A" LED	When the slave address 0 to 31 are displayed on "Code", the slave types are also displayed. <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>A LED</th> <th>B LED</th> <th>Details</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>OFF</td> <td>AS-i Ver. 2.04-compatible I/O slave, Analog slave, Ver. 2.11 non-grouped I/O slave</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>AS-i Ver. 2.11-compatible Group A I/O slave</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>AS-i Ver. 2.11-compatible Group B I/O slave</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>- (for future use)</td> </tr> </tbody> </table>	A LED	B LED	Details	OFF	OFF	AS-i Ver. 2.04-compatible I/O slave, Analog slave, Ver. 2.11 non-grouped I/O slave	ON	OFF	AS-i Ver. 2.11-compatible Group A I/O slave	OFF	ON	AS-i Ver. 2.11-compatible Group B I/O slave	ON	ON	- (for future use)																								
A LED	B LED	Details																																							
OFF	OFF	AS-i Ver. 2.04-compatible I/O slave, Analog slave, Ver. 2.11 non-grouped I/O slave																																							
ON	OFF	AS-i Ver. 2.11-compatible Group A I/O slave																																							
OFF	ON	AS-i Ver. 2.11-compatible Group B I/O slave																																							
ON	ON	- (for future use)																																							
4)	"B" LED																																								
5)	MODE Switch	Used to change between the protected operation mode and configuration mode. (Refer to Section 4.5)																																							
6)	SET Switch	Used to set the address to the slave or set parameters to the QJ71AS92. (Refer to Section 4.5)																																							
7)	Connector	Connected to the AS-i system using the AS-i cable. (Refer to Section 4.4.2)																																							



4.2.1 LED Display

The QJ71AS92 LEDs display the following details.




LED name	Color	Details
RUN	green	Lit when the module is normally operating. On = Normal operation Off = Hardware error detected or power not supplied.
U ASI	green	Lit when AS-i power is supplied. On = Power is supplied from AS-i bus. Off = Power is not supplied from AS-i bus.
CM	yellow	Lit when the module is operating in configuration mode. On = Configuration mode or parameters being stored. Off = Protected operation mode
ERR.	red	Lit when an error occurs. On = Alarm detected. Example) Slave address alarm, parameter error and so forth. Off = Alarm not detected.
PRG ENA.	yellow	Lit when automatic slave address assignment function is ready. (See Section 4.5.4) On = Ready. Off = Not ready
S ERR.	red	- (for future use)

### 4.3 Mounting and Installation

This section describes the precautions to be observed when handling the QJ71AS92 from unpacking to installation, and the installation environment. are explained in this section.

#### 4.3.1 Precautions for Handling

 CAUTION
<ul style="list-style-type: none"> <li>• Use the programmable controller in an environment that meets the general specifications in CPU module User's Manual. Using the programmable controller in the environments outside the ranges stated in the general specifications will cause electric shock, fire, misoperation, or damage to/deterioration of the product.</li> <li>• While pressing the lever on the lower part of the module, fully insert the module fixing latch into the hole of the base unit, snap the module into place, and tighten the module fixing screws with the specified torque. Failure to observe this could result in damage to the screws or module, module falling, short or misoperation.</li> <li>• Always shut off all phases of the programmable controller power supply and AS-i power supply externally before mounting or removing the module. Failure to shut off all phases could lead to product damage.</li> <li>• Do not touch conductive parts or electronic components of the module with your bare hands. This could cause Misoperation or failure of the module.</li> </ul>

(1) The module case and communication connector are made of resin, so take care not to drop or apply strong impacts.

(2) Tighten the screws such as module fixing screws within the following ranges.

Screw location	Tightening torque range
Module fixing screw (normally not required) (M3 screw) *1	0.36 to 0.48 N·m
Communication connector mounting screw	0.40 to 0.50 N·m
Communication connector wiring mounting screw	0.50 to 0.60 N·m

\*1 The module can be easily fixed onto the base unit using the hook at top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

#### 4.3.2 Installation Environment

Refer to the User's Manual of the CPU module being used for details on the installation environment.

## 4.4 Connection to AS-i System

This section describes the precautions to observe when connecting the QJ71AS92 to the AS-i system, and the wiring methods.

### 4.4.1 Precautions for wiring

 **DANGER**

- Switch off all phases of the programmable controller power supply and AS-i power supply outside the programmable controller before starting installing or wiring work.  
If all phases are not switched off, electric shock will occur or the product will be damaged.
- Be sure to install the terminal covers included with the product, when turning on the power or operating the product after installation and wiring is completed.  
Failure to install the terminal cover could lead to electric shocks.

 **CAUTION**

- Always confirm the products terminal layout before wiring to the module.  
Miswiring could lead to fires or faults.
- Tighten terminal screws within the specified torque.  
Failure to observe this could result in damage to the screws or module, short or misoperation.
- Make sure that no foreign matter such as chips or wire offcuts gets inside the module.  
It will cause fire, failure, or misoperation.
- 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.
- To connect the AS-i cable to the module, the cable must be securely fixed. Please be sure to run it in a duct, or clamp it.  
Failure to observe this could cause the unstable cable connection, resulting in damage to the cable or module by carelessly pulling the cable, or the system malfunction due to poor cable connection.
- Do not bundle AS-i cable together with main circuit or power lines, or lay them close to these lines.  
As a guide, separate these lines by a distance of at least 100 mm, otherwise misoperations may occur due to noise.
- When removing the AS-i cable from a module, do not pull it out by hand. Always be sure to unscrew the module mounting screws in advance.  
If the cable is pulled while being connected to the module, it could cause damage to the cable or module, or the system malfunction due to poor cable connection.

- (1) The overall distance is up to 100m.  
The distance can be increased 100m by use of one repeater.  
Since up to two repeaters can be used in series, the overall distance can be increased up to 300m.

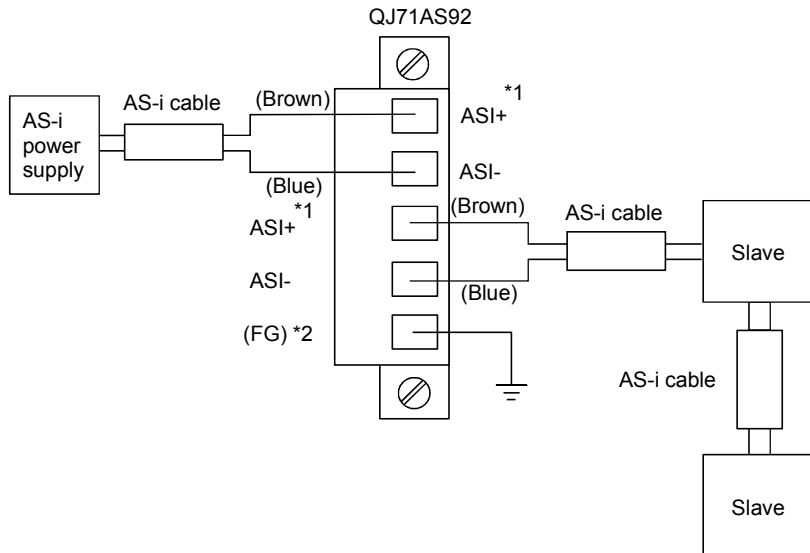
4.4.2 Wiring

Be sure connect the QJ71AS92 to the AS-i system with the AS-i cable.

An example of wiring to the QJ71AS92 is shown below.

(Confirm each module being used for the AS-i power supply and slave terminal layout.)

Strip the AS-i cable by about 7mm and plug it to the connector.

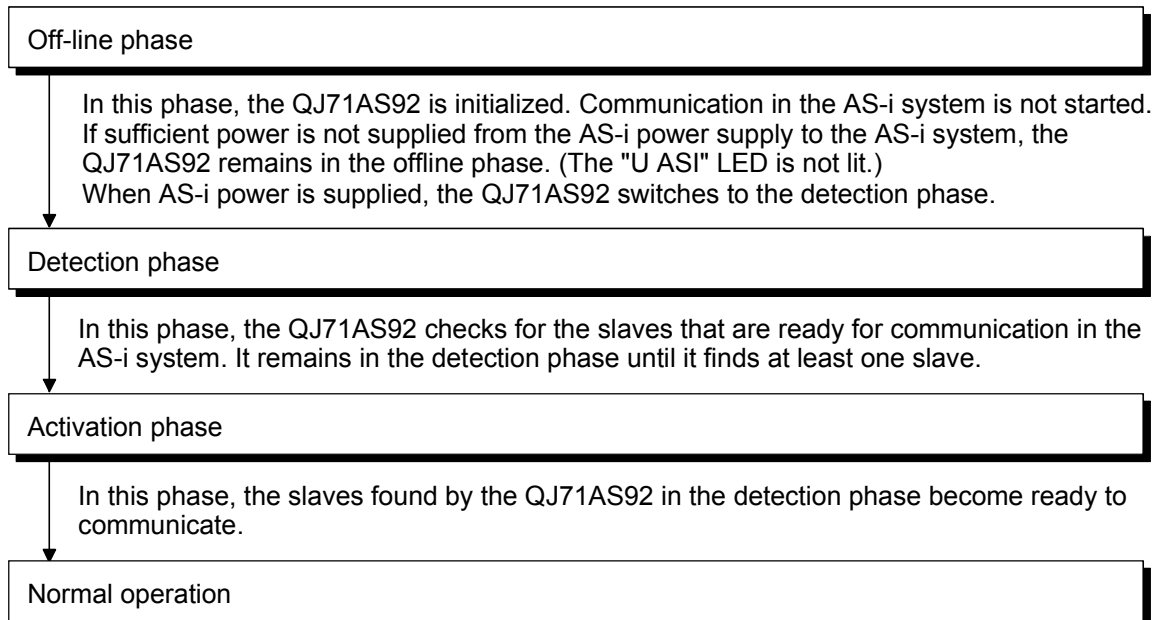


\*1: The ASI+ and ASI- terminals are connected within the module, respectively.

\*2: Always ground the FG terminal to the protective ground conductor.

## 4.5 Start-Up

After powering on the programmable controller, the QJ71AS92 is placed in the normal operation status (ready to communicate data with the slaves) via the following communication phases.



In the normal operation status, the QJ71AS92 can communicate data with all the slaves that are ready for communication. The QJ71AS92 sends a management message to check for a newly connected slave, and if it exists, makes it ready for communication.

The normal operation phase has the configuration mode and protected operation mode. The QJ71AS92 is put in either mode that has been registered to the EEPROM after powering on.

The configuration mode and protected operation mode can be switched between each other by writing an instruction (command) from the CPU module.

### (a) Configuration mode

In this mode, the QJ71AS92 communicates with all detected slaves. (However, output data is not output to the slave of slave address 0.) This mode is used to set the slave address.

### (b) Protected operation mode

In this mode, the QJ71AS92 communicates with all registered slaves. Normally, this mode is used to make communication. To use this mode, the configuration data of the slave must be registered. If a slave not registered as configuration data is detected at start of communication, a configuration error will occur.

(1) Method of setting the slave address

There are two methods of setting the slave address.

Select either of the followings as necessary.

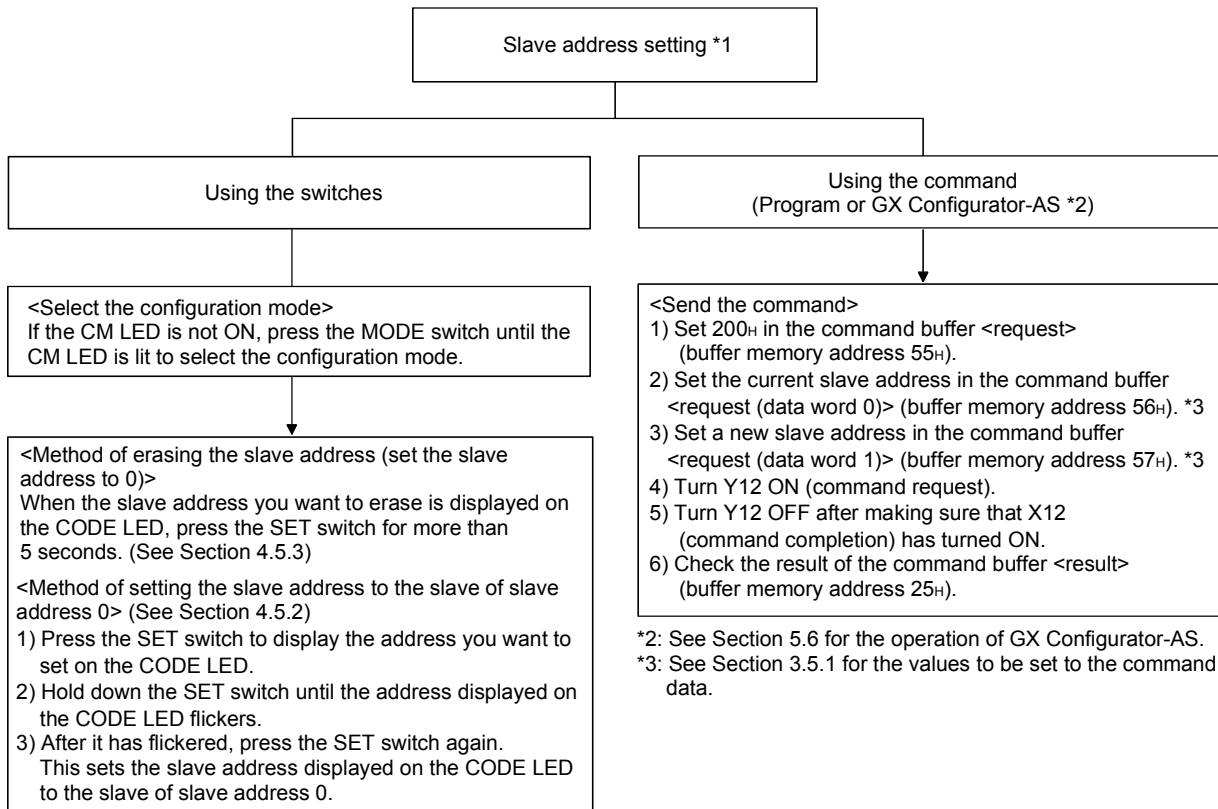
(a) Using the switches (on the QJ71AS92 front panel):

Setting can be made without a peripheral device.

(b) Using the command (for the QJ71AS92):

Setting can be made in the environment where the module cannot be operated (the module is installed in the inaccessible place far end of an operator panel).

The following chart shows the operation sequence of each method.



\*1: The slave address can be set to only the slave that has been set to address 0.

For details of the method of using the switches, See Section 4.5.1 and later.

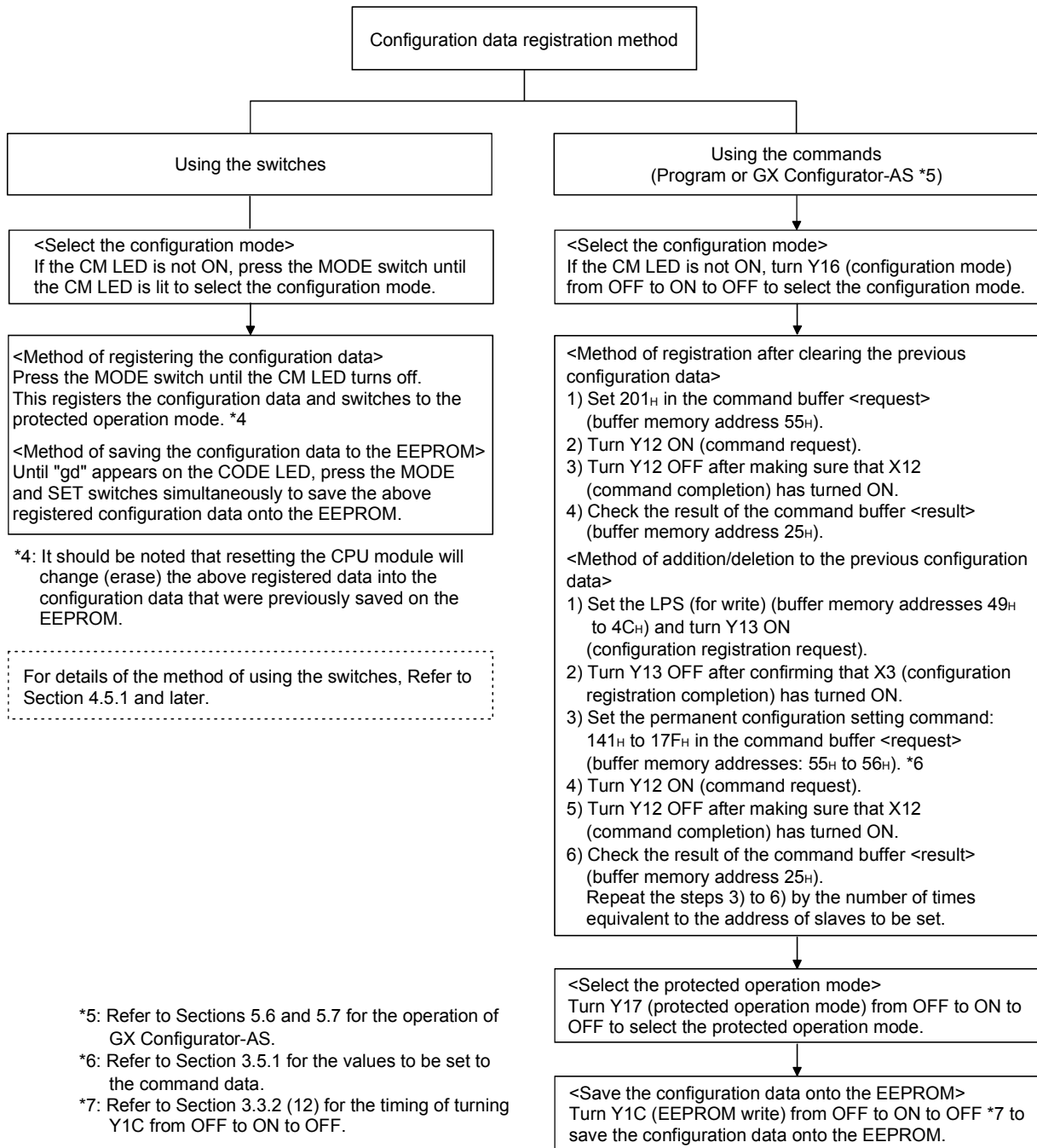
\*2: See Section 5.6 for the operation of GX Configurator-AS.  
\*3: See Section 3.5.1 for the values to be set to the command data.

(2) Method of registering the configuration data to the QJ71AS92

Before starting operation in the protected operation mode, the configuration data of the slave that is ready for communication must be registered to the QJ71AS92.

There are two methods of registering the configuration data just as 4.5.(1) "Method of setting the slave address". Register the configuration data by using the switches or by using the command.

The following chart shows the operation sequence of each method.



4.5.1 Slave registration

The configuration data of the slaves must be registered to the QJ71AS92 before it is operated in the protected operation mode.

Slave registration to the QJ71AS92 can be performed by the switch operation in the following (1) and (2).

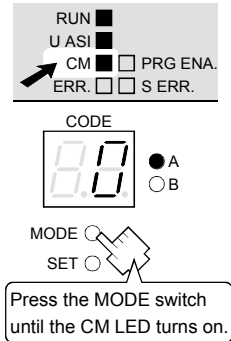
However, the data registered to the QJ71AS92 are lost when the programmable controller is powered on or the CPU module is reset. To store the registered data, perform operation up to (3). The data are written to the EEPROM of the QJ71AS92.

- (1) Put the QJ71AS92 in the configuration mode and assign addresses to the slaves.

If the CM LED is off, press the MODE switch until the CM LED is lit.

Alternatively, turn Y16 ON.

In this mode, assign any slave address to the slave of slave address 0. (Refer to "Section 4.5.2 Slave address assignment".)



**TIP**

When assigning the slave address with the QJ71AS92 connected to the slave of slave address 0, please make sure that only one slave of slave address 0 is connected to it.

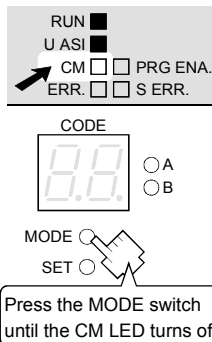
The QJ71AS92 will not perform slave address assignment when being connected with more than two slaves of slave address 0

- (2) Put the QJ71AS92 in the protected operation mode and register the configuration data of the slaves.

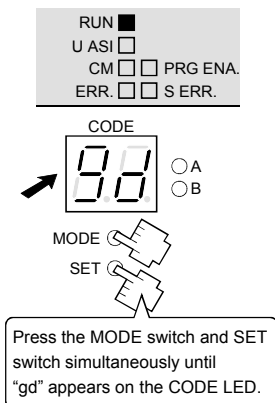
Press the MODE switch until the CM LED is off. Alternatively, turn Y17 ON.

Normally, set this mode when operating the AS-i system.

If the MODE switch is not pressed until CM LED turns off, the configuration data of the slaves is not registered properly even though CM LED is on. If the ERR.LED is lit, restart operation from (1).



- (3) Press the MODE and SET switches simultaneously until "gd" appears on the CODE LED. Alternatively, turn Y1C ON. (The configuration data are written to the EEPROM.)





When the programmable controller is powered on or the CPU module is reset next time, communication is performed using the data stored on the EEPROM.

Since the data were stored onto the EEPROM in the protected operation mode in the above procedure, the QJ71AS92 will start in the protected operation mode at the next startup. When data were stored onto the EEPROM in the configuration mode, the QJ71AS92 will start in the configuration mode at the next startup.

Normally, store the data onto the EEPROM in the protected operation mode. (Related item: Section 4.5 (2))

TIP
-----

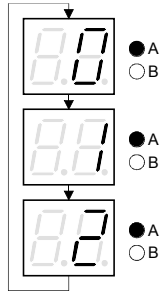
The number of writes to the EEPROM is 100,000 times.

If the number of writes exceeds 100,000 times, "F70H" is written to the "error code" of the QJ71AS92 buffer memory.

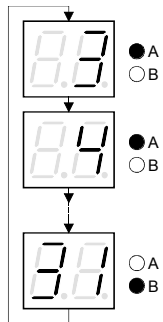
"F70H" indicates a hardware fault. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

4.5.2 Slave address assignment

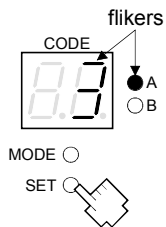
This section describes how to assign any slave address to the slave of slave address 0 by using the switches on the front of the QJ71AS92 panel. Following is the example when the slaves of slave No.1 and 2 have been registered.



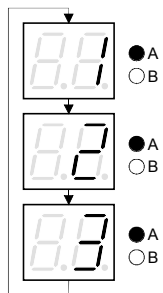
- (1) Put the QJ71AS92 in the configuration mode by reference to Section 4.5.1 (1).
- (2) The QJ71AS92 displays all the slave addresses of the recognised slaves in order on the CODE LED. "0" is displayed if the slave of slave address 0 is connected. If the recognised slave is the Ver. 2.11-compatible grouped slave, the QJ71AS92 lights up the "A"/"B" LED on the right of the CODE LED to indicate that the slave is in group A or B.



- (3) Press the SET switch to display the usable slave addresses. The usable slave address is displayed in order every time the SET switch is pressed. For the Ver. 2.11-compatible grouped slaves, the QJ71AS92 lights up the "A" LED on the right of the CODE LED and displays the slaves in group A. After that, the slave addresses of group B appear consecutively. If the SET or MODE switch is not operated for longer than 10 seconds, the QJ71AS92 returns to the display status in (1).



- (4) When the slave address to be set has appeared, press the SET switch until the indicated slave address flickers. This selects the target slave address.
- (5) When the SET switch is pressed again, the flickering slave address is set to the slave of slave address 0. (It is stored into the nonvolatile memory of the slave.)



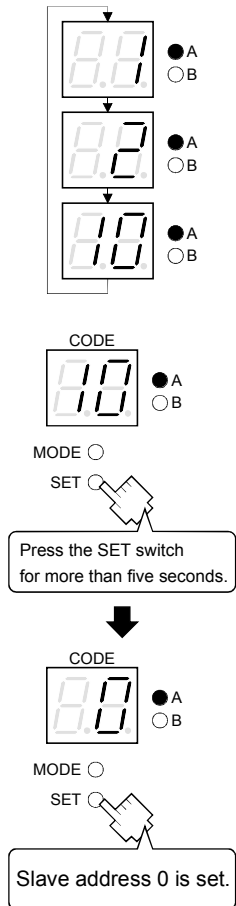
- (6) The slave address of the slave recognized again appears on the CODE LED. (Related item: Section 4.5 (1))

**TIP**  
 When changing the slave address of the slave by using the switches on the front of the panel, the QJ71AS92 assigns the target slave address after assigning the slave address 0 to the slave once.  
 See Section 4.5.3 for the method to set the slave address to 0.

4.5.3 Slave address erasure

This section describes the procedure of assigning the slave address 0 to the slave with No.10.

Following is the example when the slaves of slave No.1 and 2 have been registered.



- (1) Put the QJ71AS92 in the configuration mode, by reference Section 4.5.1 (1). All the slave addresses recognized in the AS-i system are displayed on the CODE LED in order.

- (2) When the slave No.10 is displayed, press the SET switch for more than five seconds. This sets slave address 0 to the slave. ("0" is stored into the nonvolatile memory of the slave.) At the same time, "0" appears on the CODE LED of the QJ71AS92.

- (3) When you release the SET switch, the CODE LED displays the slave address of the slave that has been recognized again.

#### 4.5.4 Automatic slave address assignment function

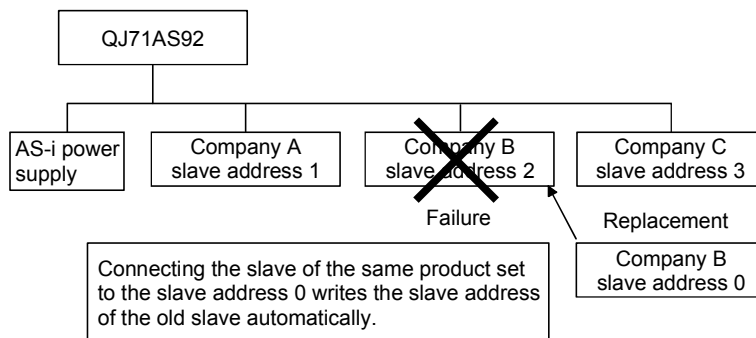
The automatic slave address automatically assigns the same address to the new slave (same type of product) whose slave address is 0, when changing a slave.

The following conditions must be satisfied to function the automatic slave address assignment.

- (1) The QJ71AS92 is in the protected operation mode.
- (2) The automatic slave address assignment function is valid.  
(See Section 3.3.2 (9))
- (3) Only one of the slaves in the configuration is not recognized.

When these conditions are satisfied, the slave address of the slave that is not recognized any more is automatically assigned to the new slave of the slave address 0.

Whether the conditions are satisfied or not can be checked using the PRG ENA. LED or EC flag (buffer memory address: 10H).



#### TIP

If the slave address is not assigned automatically, performs the slave address assignment according to the method given in Section 4.5.2.

If two slaves are different products, the automatic slave address assignment function is not available.

## 5 UTILITY PACKAGE (GX Configurator-AS)

## 5.1 Functions of the Utility Package

Table 5.1 lists the functions of the utility package.

Table 5.1 Utility Package (GX Configurator-AS) Function List

Function	Description	Reference section
Automatic refresh* <sup>1</sup>	Set the I/O data of the AS-i module to be automatically refreshed.	Section 5.4
Monitor/test	• X/Y monitor/test	Section 5.5
	• Command request	Section 5.6
	• Configuration data registration/EEPROM Storage	Section 5.7

**TIP**

\*1 When auto refresh setting is made, a maximum of 24 bytes of intelligent function module parameters are required per module.

## 5.2 Installing and Uninstalling the Utility Package

For how to install or uninstall the utility package, refer to "Method of installing the MELSOFT Series" included in the utility package.

### 5.2.1 Handling precautions

The following explains the precautions on using the GX Configurator-AS.

(1) For safety

Since GX Configurator-AS is add-in software for GX Developer, read "Safety Precautions" and the basic operating procedures in the GX Developer Operating Manual.

(2) About installation

The GX Configurator-AS is an add-in software for GX Developer Version 4 or later. Therefore, GX Configurator-AS must be installed on the personal computer that has already GX Developer Version 4 or later installed.

(3) Screen error of Intelligent function module utility

Insufficient system resource may cause the screen to be displayed inappropriately while using the Intelligent function module utility.

If this occurs, close the Intelligent function module utility, GX Developer (program, comments, etc.), and other applications, and then start GX Developer and Intelligent function module utility again.

(4) To start the Intelligent function module utility

(a) In GX Developer, select "QCPU (Q mode)" for PLC series and specify a project.

If any PLC series other than "QCPU (Q mode)" is selected, or if no project is specified, the Intelligent function module utility will not start.

(b) Multiple Intelligent function module utilities can be started.

However, [Open parameters] and [Save parameters] operations under [Intelligent function module parameter] are allowed for one Intelligent function module utility only. Only the [Monitor/test] operation is allowed for the other utilities.

(5) Switching between two or more Intelligent function module utilities

When two or more Intelligent function module utility screens cannot be displayed side by side, select a screen to be displayed on the top of others using the task bar.



(6) Number of parameters that can be set in GX Configurator-AS

When multiple intelligent function modules are mounted, the number of parameter settings must not exceed the following limit.

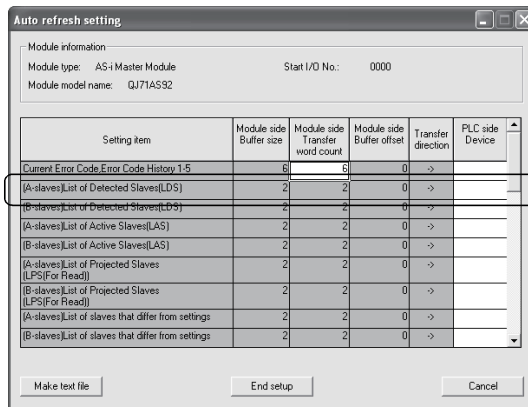
When intelligent function modules are installed to:	Maximum number of parameter settings	
	Initial setting	Auto refresh setting
Q00J/Q00/Q01CPU	512	256
Q02/Q02H/Q06H/Q12H/Q25HCPU	512	256
Q02PH/Q06PH/Q12PH/Q25PHCPU	512	256
Q12PRH/Q25PRHCPU	512	256
Q02UCPU	2048	1024
Q03UD/Q04UDH/Q06UDH/Q13UDH/ Q26UDH/Q03UDE/Q04UDEH/ Q06UDEH/Q13UDEH/Q26UDEHCPU	4096	2048

For example, if multiple intelligent function modules are installed to the Q25HCPU, configure the settings in GX Configurator so that the number of parameter settings for all the intelligent function modules does not exceed the limit of the Q25HCPU. Calculate the total number of parameter settings separately for the initial setting and for the auto refresh setting.

The number of parameters that can be set for one module in GX Configurator-AS is shown below.

Target module	Initial setting	Auto refresh setting
QJ71AS92	0 (Not used)	30 (Max.)

Example) Counting the number of parameter settings in Auto refresh setting



This one row is counted as one setting. Blank rows are not counted. Count up all the setting items on this screen, and add the total to the number of settings for other intelligent function modules to get a grand total.

## 5.2.2 Operating environment

This section explains the operating environment of the personal computer that runs GX Configurator-AS.

Item	Description	
Installation (Add-in) target *1	Add-in to GX Developer Version 4 (English version) or later*2	
Computer	Windows® -based personal computer	
CPU	Refer to the following table "Operating system and performance required for personal computer".	
Required memory		
Hard disk space*3	For installation	65 MB or more
	For operation	10 MB or more
Display	800 × 600 dots or more resolution*4	
Operating system	Microsoft® Windows® 95 Operating System (English version) Microsoft® Windows® 98 Operating System (English version) Microsoft® Windows® Millennium Edition Operating System (English version) Microsoft® Windows NT® Workstation Operating System Version 4.0 (English version) Microsoft® Windows® 2000 Professional Operating System (English version) Microsoft® Windows® XP Professional Operating System (English version) Microsoft® Windows® XP Home Edition Operating System (English version) Microsoft® Windows Vista® Home Basic Operating System (English version) Microsoft® Windows Vista® Home Premium Operating System (English version) Microsoft® Windows Vista® Business Operating System (English version) Microsoft® Windows Vista® Ultimate Operating System (English version) Microsoft® Windows Vista® Enterprise Operating System (English version)	

\*1: Install GX Configurator-AS in GX Developer Version 4 or higher in the same language.

GX Developer (English version) and GX Configurator-AS (Japanese version) cannot be used in combination, and GX Developer (Japanese version) and GX Configurator-AS (English version) cannot be used in combination.

\*2: GX Configurator-AS is not applicable to GX Developer Version 3 or earlier.

\*3: At least 15GB is required for Windows Vista® .

\*4: Resolution of 1024 × 768 dots or more is recommended for Windows Vista® .

## Operating system and performance required for personal computer

Operating system	Performance required for personal computer	
	CPU	Memory
Windows® 95	Pentium® 133MHz or more	32MB or more
Windows® 98	Pentium® 133MHz or more	32MB or more
Windows® Me	Pentium® 150MHz or more	32MB or more
Windows NT® Workstation 4.0	Pentium® 133MHz or more	32MB or more
Windows® 2000 Professional	Pentium® 133MHz or more	64MB or more
Windows® XP Professional	Pentium® 300MHz or more	128MB or more
Windows® XP Home Edition	Pentium® 300MHz or more	128MB or more
Windows Vista® Home Basic	Pentium® 1GHz or more	1GB or more
Windows Vista® Home Premium	Pentium® 1GHz or more	1GB or more
Windows Vista® Business	Pentium® 1GHz or more	1GB or more
Windows Vista® Ultimate	Pentium® 1GHz or more	1GB or more
Windows Vista® Enterprise	Pentium® 1GHz or more	1GB or more



POINT
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- |   |
|---|
| <ul style="list-style-type: none"><li>• The functions shown below are not available for Windows® XP and Windows Vista® .<br/>If any of the following functions is attempted, this product may not operate normally.<br/>Start of application in Windows® compatible mode<br/>Fast user switching<br/>Remote desktop<br/>Large fonts (Details setting of Display Properties)<br/>Also, 64-bit version Windows® XP and Windows Vista® are not supported.</li><li>• Use a USER authorization or higher in Windows Vista® .</li></ul> |
|---|

## 5.3 Utility Package Operation

### 5.3.1 Common utility package operations

#### (1) Control keys

Special keys that can be used for operation of the utility package and their applications are shown in the table below.

Key	Application
<input type="button" value="Esc"/>	Cancels the current entry in a cell. Closes the window.
<input type="button" value="Tab"/>	Moves between controls in the window.
<input type="button" value="Ctrl"/>	Used in combination with the mouse operation to select multiple cells for test execution.
<input type="button" value="Delete"/>	Deletes the character where the cursor is positioned. When a cell is selected, clears all of the setting contents in the cell.
<input type="button" value="Back Space"/>	Deletes the character where the cursor is positioned.
<input type="button" value="↑"/> <input type="button" value="↓"/> <input type="button" value="←"/> <input type="button" value="→"/>	Moves the cursor.
<input type="button" value="Page Up"/>	Moves the cursor one page up.
<input type="button" value="Page Down"/>	Moves the cursor one page down.
<input type="button" value="Enter"/>	Completes the entry in the cell.

#### (2) Operation Command Buttons

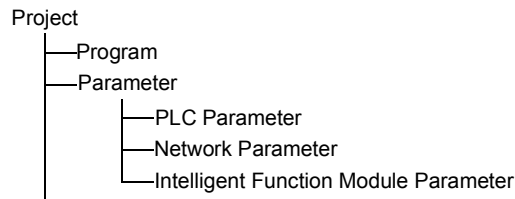
- : Displays the current value of the item selected.
- : Creates a file containing the screen data in text file format.
- : Starts monitoring of the current value field.
- : Stops monitoring of the current value field.
- : Registers the setting data of the selected item in the QJ71AS92.  
To apply  to multiple items simultaneously, set the data for the corresponding items, select the multiple items while pressing down , then click .
- : Closes the screen that is currently open and returns to the previous screen.

### (3) Data created with the utility package

The following data or files that are created with the utility package can be also handled in GX Developer. Figure 5.1 shows respective data or files are handled in which operation.

#### <Intelligent function module parameters>

- (a) This represents the data created in Auto refresh setting, and they are stored in an intelligent function module parameter file in a project created by GX Developer.



- (b) Steps 1) to 3) shown in Figure 5.1 are performed as follows:

- 1) From GX Developer, select:  
[Project] → [Open project] / [Save] / [Save as]
- 2) On the intelligent function module selection screen of the utility, select:  
[Intelligent function module parameter] → [Open parameters] / [Save parameters]
- 3) From GX Developer, select:  
[Online] → [Read from PLC] / [Write to PLC] → "Intelligent function module parameters"  
Alternatively, from the intelligent function module selection screen of the utility, select:  
[Online] → [Read from PLC] / [Write to PLC]

<Text file>

- (a) A text file can be created by clicking the **Make text file** button on the Auto refresh setting, or Monitor/Test screen. The text files can be utilized to create user documents.
- (b) Text files can be saved in any directory.

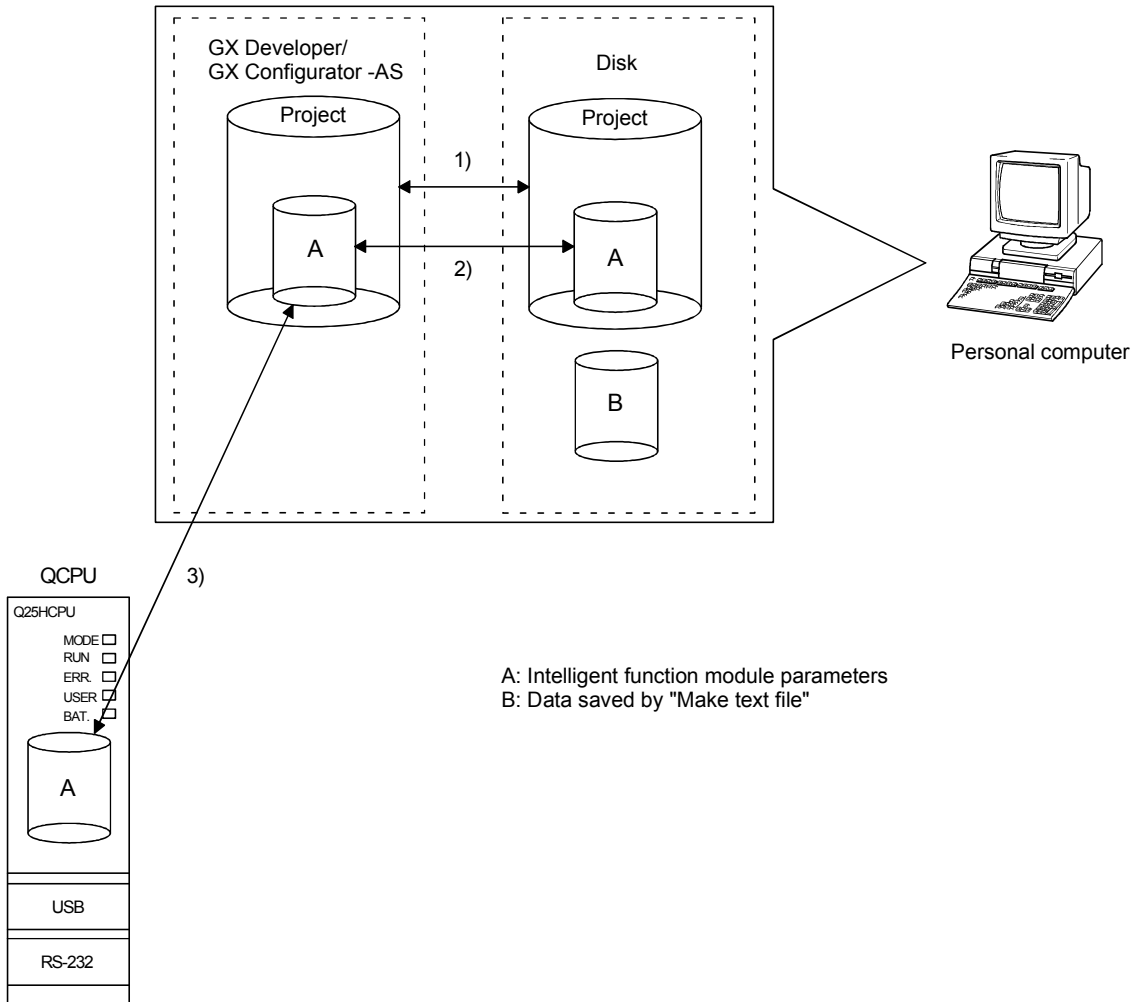
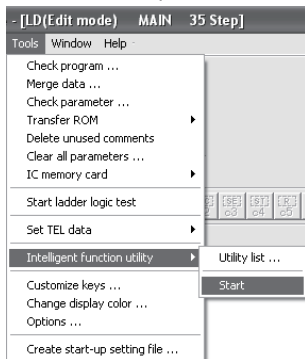


Figure 5.1 Correlation chart for data created with the utility package

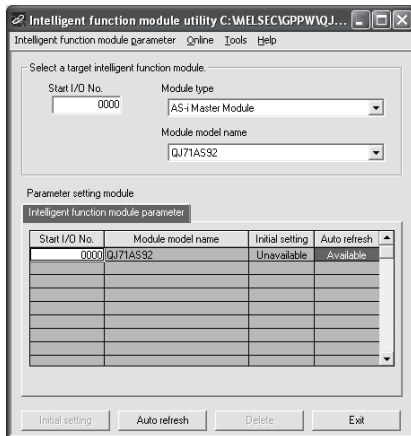
5.3.2 Operation overview

GX Developer screen

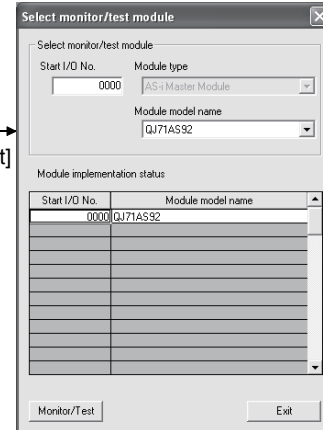


[Tools] – [Intelligent function utility] – [Start]

Select a target intelligent function module screen



Select monitor/test module screen



When used via online operation

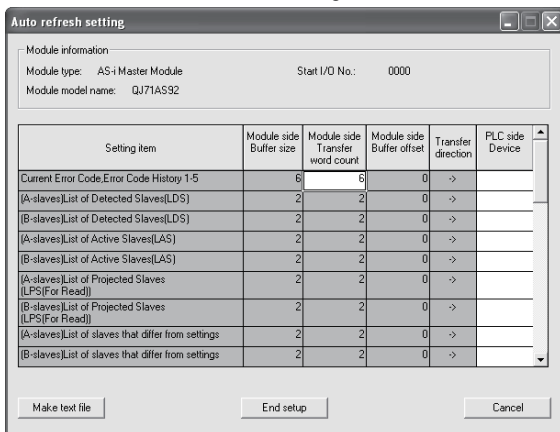
Select [Online] – [Monitor/Test] from the menu bar.

Refer to Section 5.3.3

Auto refresh

Enter "Start I/O No.", and select "Module type" and "Module model name".

Auto refresh setting screen

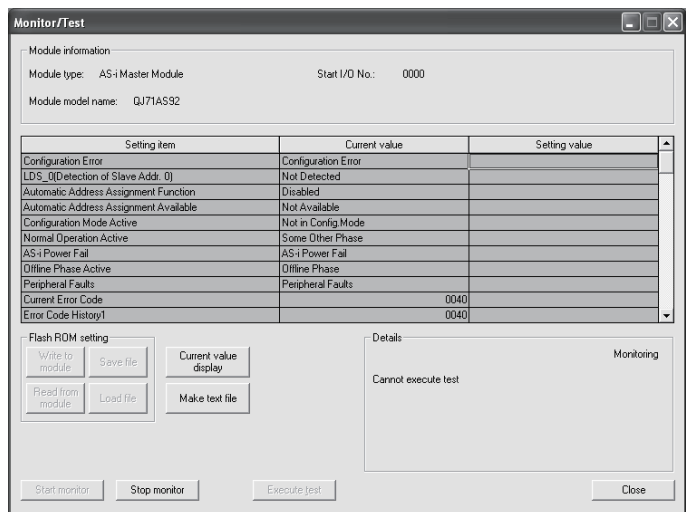


Refer to Section 5.4

Monitor/Test

Select a module to be monitored/tested.

Monitor/Test screen



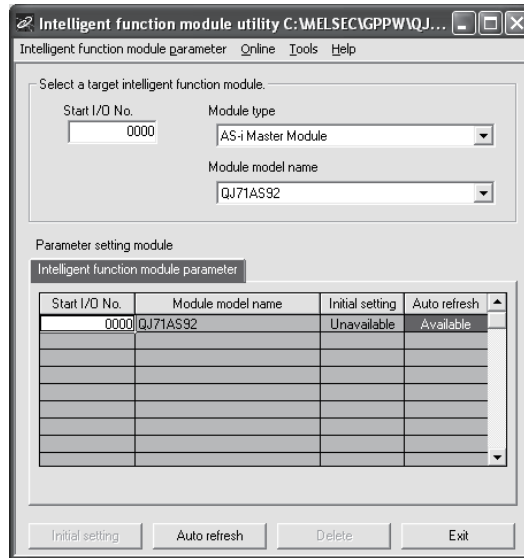
Refer to Section 5.5

## 5.3.3 Starting the Intelligent function module utility

## [Operating procedure]

Intelligent function module utility is started from GX Developer.

## [Setting screen]



## [Explanation of items]

## (1) Activation of other screens

Following screens can be displayed from the intelligent function module utility screen.

## (a) Auto refresh setting screen

"Start I/O No.\*1" → "Module type" → "Module model name" →

**Auto refresh**

## (b) Select monitor/test module screen

[Online] → [Monitor/Test]

\*1 Enter the start I/O No. in hexadecimal.

## (2) Command buttons

Cannot be selected.

**Auto refresh**

Starts the auto refresh setting screen.

**Delete**

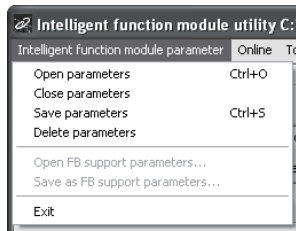
Deletes the initial setting and auto refresh setting of the selected module.

**Exit**

Close this screen.

## (3) Menu bar

## (a) File menu



Intelligent function module parameters of the project opened by GX Developer are handled.

[Open parameters] : Reads a parameter file.

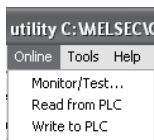
[Close parameters] : Closes the parameter file. If any data are modified, a dialog asking for file saving will appear.

[Save parameters] : Saves the parameter file.

[Delete parameters] : Deletes the parameter file.

[Exit] : Closes this screen.

## (b) Online menu



[Monitor/Test] : Activates the Select monitor/test module screen.

[Read from PLC] : Reads intelligent function module parameters from the CPU module.

[Write to PLC] : Writes intelligent function module parameters to the CPU module.

## TIP

## (1) Saving intelligent function module parameters in a file

Since files cannot be saved using the GX Developer project saving operation, save the files using the "Select a target intelligent function module" screen shown above.

## (2) Reading/writing intelligent function module parameters from/to a programmable controller using GX Developer

(a) Intelligent function module parameters can be read from and written into a programmable controller after having been saved in a file.

(b) Set a target CPU module in GX Developer:

[Online] → [Transfer setup].

## (3) Checking the required utility

While the start I/O is displayed on the Intelligent function module utility setting screen, "\*" may be displayed for the model name.

This means that the required utility has not been installed or the utility cannot be started from GX Developer.

Check the required utility, selecting [Tools] - [Intelligent function utility] - [Utility list...] in GX Developer.

## 5.4 Auto refresh setting

## [Purpose]

Configure the QJ71AS92's buffer memory for automatic refresh.

## [Operating procedure]

"Start I/O No.\*" → "Module type" → "Module model name" → Auto refresh

\* Enter the start I/O No. in hexadecimal.

## [Setting screen]

Setting item	Module side Buffer size	Module side Transfer word count	Module side Buffer offset	Transfer direction	PLC side Device
Current Error Code:Error Code History 1-5	8	6	0	<-	
(A-slaves)List of Detected Slaves(LDS)	2	2	0	<-	
(B-slaves)List of Detected Slaves(LDS)	2	2	0	<-	
(A-slaves)List of Active Slaves(LAS)	2	2	0	<-	
(B-slaves)List of Active Slaves(LAS)	2	2	0	<-	
(A-slaves)List of Projected Slaves (LPS)(For Read)	2	2	0	<-	
(B-slaves)List of Projected Slaves (LPS)(For Read)	2	2	0	<-	
(A-slaves)List of slaves that differ from settings	2	2	0	<-	
(B-slaves)List of slaves that differ from settings	2	2	0	<-	

## [Explanation of items]

## (1) Items

- Module side Buffer size : Displays the buffer memory size of the setting item.
- Module side Transfer word count : Displays the number of words to be transferred.
- Module side Buffer offset : The buffer memory addresses are offset on a one word basis.
- Transfer direction : "<->" indicates that data are written from the CPU module to the buffer memory.  
"->" indicates that data are loaded from the buffer memory to the CPU module.
- PLC side Device : Enter a CPU module side device that is to be automatically refreshed.  
Applicable devices are X, Y, M, L, B, T, C, ST, D, W, R, and ZR.  
When using bit devices X, Y, M, L or B, set a number that can be divided by 16 points (examples: X10, Y120, M16, etc.)  
Also, buffer memory data are stored in a 16-point area, starting from the specified device number. For example, if X10 is entered, data are stored in X10 to X1F.



## (2) Command buttons

<b>Make text file</b>	Creates a file containing the screen data in text file format.
<b>End setup</b>	Saves the set data and ends the operation.
<b>Cancel</b>	Cancels the setting and ends the operation.

## [Explanation of items]

Item	Reference section
Current Error Code, Error Code History 1-5	Section 3.4.2 (17)
(A-slaves) List of Detected Slaves (LDS)	Section 3.4.2 (5)
(B-slaves) List of Detected Slaves (LDS)	
(A-slaves) List of Active Slaves (LAS)	Section 3.4.2 (6)
(B-slaves) List of Active Slaves (LAS)	
(A-slaves) List of Projected Slaves (LPS (For Read))	Section 3.4.2 (7)
(B-slaves) List of Projected Slaves (LPS (For Read))	
(A-slaves) List of slaves that differ from settings	Section 3.4.2 (8)
(B-slaves) List of slaves that differ from settings	
(A-slaves) Error Slave List	Section 3.4.2 (9)
(B-slaves) Error Slave List	
(A-slaves) List of Peripheral Faults (LPF)	Section 3.4.2 (18)
(B-slaves) List of Peripheral Faults (LPF)	
(A-slaves) Number of I/O Points (Slave Addr. 1A-31A)	Section 3.4.2 (20)
(B-slaves) Number of I/O Points (Slave Addr. 1B-31B)	
EC Flag	Section 3.4.2 (4)
(A-slaves) Input Data of Slave Addr. From 1A-3A and part of EC Flag	Section 3.4.2 (1)
(A-slaves) Input Data of Slave Addr. From 4A-31A	Section 3.4.2 (2)
(B-slaves) Input Data of Slave Addr. From 1B-31B	Section 3.4.2 (3)
(A-slaves) Output Data of Slave Addr. From 1A-31A	Section 3.4.2 (10), (11)
(B-slaves) Output Data of Slave Addr. From 1B-31B	Section 3.4.2 (12), (13)
Analog Input Data(Slave addr. 1-31)	Section 3.4.2 (19)
Analog Output Data(Slave addr. 1-31)	
Command Buffer <Command>	Section 3.4.2 (15)
Command Buffer <Request (Data Word 0-3 (Command Argument))>	
Extended Command Buffer <Command (Data)>	Section 3.4.2 (22)
Command Buffer <Result>	Section 3.4.2 (16)
Extended Command Buffer <Result>	Section 3.4.2 (21)
(A-slaves) List of Projected Slaves (LPS (For Write))	Section 3.4.2 (14)
(B-slaves) List of Projected Slaves (LPS (For Write))	

**TIP**

The auto refresh settings are stored in an intelligent function module parameter file. After the auto refresh settings are written to the CPU module, they are validated by performing STOP → RUN → STOP → RUN operations for the CPU module, turning the power OFF and then ON, or resetting the CPU module.

The auto refresh settings cannot be changed from sequencer programs. However, processing equivalent to auto refresh can be added using the FROM/TO/MOV instruction in the sequence program.

5.5 Monitor/Test

[Purpose]

Used to monitor the EC flag, error code and error history and to perform configuration registration/EEPROM Storage operation.

[Operating procedure]

Select monitor/test module screen → "Start I/O No.\*" → "Module type" → "Module model name" → **Monitor/Test**

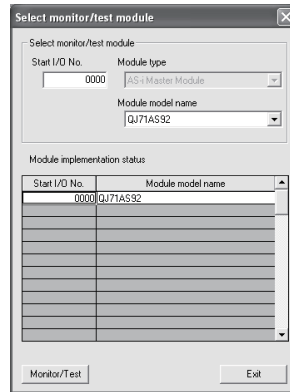
\* Enter the start I/O No. in hexadecimal.

The screen can also be started from System monitor of GX Developer Version 6 or later.

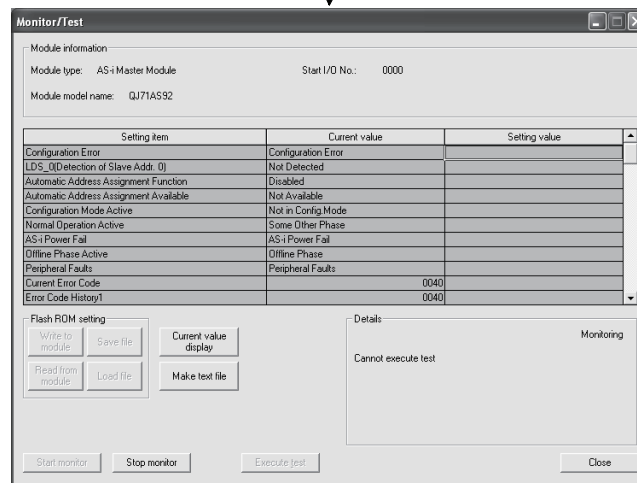
Refer to the GX Developer Operating Manual for details.

[Setting screen]

Select monitor/test module screen



Monitor/Test screen



[Explanation of items]

(1) Items

Setting item : Displays buffer memory names.

Current value : Monitors the present buffer memory values.

Setting value : Enter or select values to be written into the buffer memory for test operation.

## (2) Command buttons

Current value display	Displays the current value of the item selected. (This is used to check the text that cannot be displayed in the current value field. However, in this utility package, all items can be displayed in the display fields).
Make text file	Creates a file containing the screen data in text file format.
Start monitor /	Selects whether or not to monitor current values.
Stop monitor	
Execute test	Performs a test on the selected item. To select more than one item, select them while holding down the <span style="border: 1px solid black; padding: 0 2px;">Ctrl</span> key.
Close	Closes the screen that is currently open and returns to the previous screen.

The following monitor/test selection menu is displayed.

Item	Reference section
Configuration Error	Section 3.4.2 (4)
LDS_0 (Detection of Slave Addr. 0)	
Automatic Address Assignment Function	
Automatic Address Assignment Available	
Configuration Mode Active	
Normal Operation Active	
AS-i Power Fail	
Offline Phase Active	
Peripheral Faults	
Current Error Code	
Error Code History 1	
Error Code History 2	
Error Code History 3	
Error Code History 4	
X/Y monitor/test	Section 5.5.1
(A-slaves) List of Detected Slaves (LDS)	Section 5.5.2
(B-slaves) List of Detected Slaves (LDS)	Section 5.5.3
(A-slaves) List of Active Slaves (LAS)	Section 5.5.4
(B-slaves) List of Active Slaves (LAS)	Section 5.5.5
(A-slaves) List of Projected Slaves (LPS (For Read))	Section 5.5.6
(B-slaves) List of Projected Slaves (LPS (For Read))	Section 5.5.7
(A-slaves) List of slaves that differ from settings	Section 5.5.8
(B-slaves) List of slaves that differ from settings	Section 5.5.9
(A-slaves) Error Slave List	Section 5.5.10
(B-slaves) Error Slave List	Section 5.5.11
(A-slaves) List of Peripheral Faults (LPF)	Section 5.5.12
(B-slaves) List of Peripheral Faults (LPF)	Section 5.5.13

Item	Reference section
(A-slaves) Number of I/O Points	Section 5.5.14
(B-slaves) Number of I/O Points	Section 5.5.15
(A-slaves) Input Data of Slave Addr. From 1A-31A	Section 5.5.16
(B-slaves) Input Data of Slave Addr. From 1B-31B	Section 5.5.17
(A-slaves) Output Data of Slave Addr. From 1A-31A	Section 5.5.18
(B-slaves) Output Data of Slave Addr. From 1B-31B	Section 5.5.19
Analog Input Data (Slave Addr. 1-31)	Section 5.5.20
Analog Output Data (Slave Addr. 1-31)	Section 5.5.21
*Comment Request*	Section 5.6
1. Set request code in the Command buffer	
AS-i Command Buffer <Command>	
AS-i Command Buffer <Data Word 0>	
AS-i Command Buffer <Data Word 1>	
AS-i Command Buffer <Data Word 2>	
AS-i Command Buffer <Data Word 3>	
Extended Command Buffer <Command (Data)>	
2. Execute the Command	
Command Execution Request	
3. Check the Command execution result.	
AS-i Command Buffer <Result>	
AS-i Command Buffer <Data Word 0>	
AS-i Command Buffer <Data Word 1>	
AS-i Command Buffer <Data Word 2>	
AS-i Command Buffer <Data Word 3>	
Extended Command Buffer <Result>	

Item	Reference section
*Configuration Data Registration/EEPROM Save*	Section 5.7
1. Change to Configuration Mode Change to Configuration Mode when [Mode Status] is not in "Configuration Mode".	
Mode Status	
Configuration Mode Change Request	
2. Set LPS	
(A-slaves) List of Projected Slaves (LPS (For Write))	
(B-slaves) List of Projected Slaves (LPS (For Write))	
Configuration Register Request	
3. Register Permanent Configuration by Command	
AS-i Command Buffer <Command>	
AS-i Command Buffer <Data Word 0>	
Command Execution Request	
AS-i Command Buffer <Result>	
AS-i Command Buffer <Data Word 0>	
4. Change to Protected Operation Mode	
Protected Operation Mode Change Request	
Mode Change Request Result (Current Error Code)	
5. Save the Configuration Data in EEPROM Execute only in case of saving in EEPROM	
EEPROM Write Request	
EEPROM Write Status	
Turn OFF the EEPROM Write Request	
* If any errors occurred in the request result of procedures 3, 4&5, please check the error code and perform the corrective actions.	

5.5.1 X/Y monitor/test

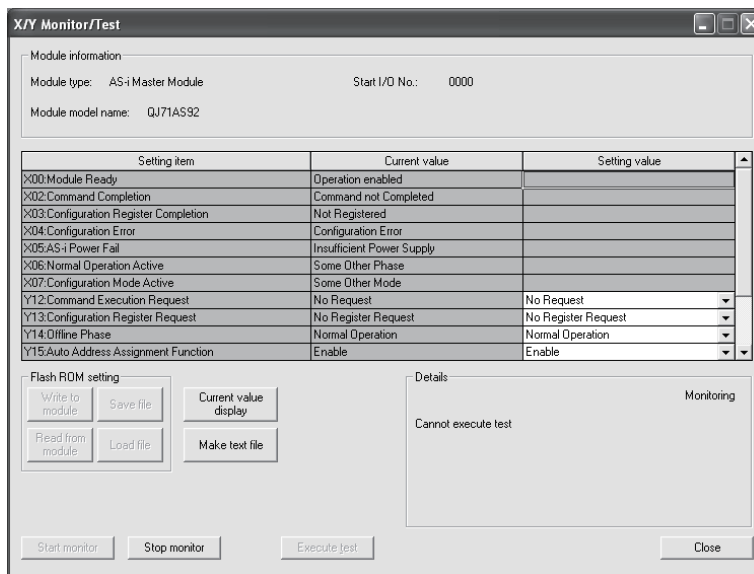
[Purpose]

Used to monitor the I/O signals or test the output signals.

[Operating procedure]

Monitor/Test screen → X/Y Monitor/Test

[Setting screen]



[Monitor/Test items]

Item	Reference section
X00: Module Ready	Section 3.3.2 (1)
X02: Command Completion	Section 3.3.2 (2)
X03: Configuration Register Completion	Section 3.3.2 (3)
X04: Configuration Error	Section 3.3.2 (4)
X05: AS-i Power Fail	Section 3.3.2 (5)
X06: Normal Operation Active	Section 3.3.2 (6)
X07: Configuration Mode Active	Section 3.3.2 (7)
Y12: Command Execution Request	Section 3.3.2 (2)
Y13: Configuration Register Request	Section 3.3.2 (3)
Y14: Offline Phase	Section 3.3.2 (8)
Y15: Auto Address Assignment Function	Section 3.3.2 (9)
Y16: Configuration Mode	Section 3.3.2 (10)
Y17: Protected operation mode	Section 3.3.2 (11)
Y1C: EEPROM write	Section 3.3.2 (12)
Y1D: Refresh Instruction	Section 3.3.2 (13)

5.5.2 (A-slaves) List of Detected Slaves (LDS)

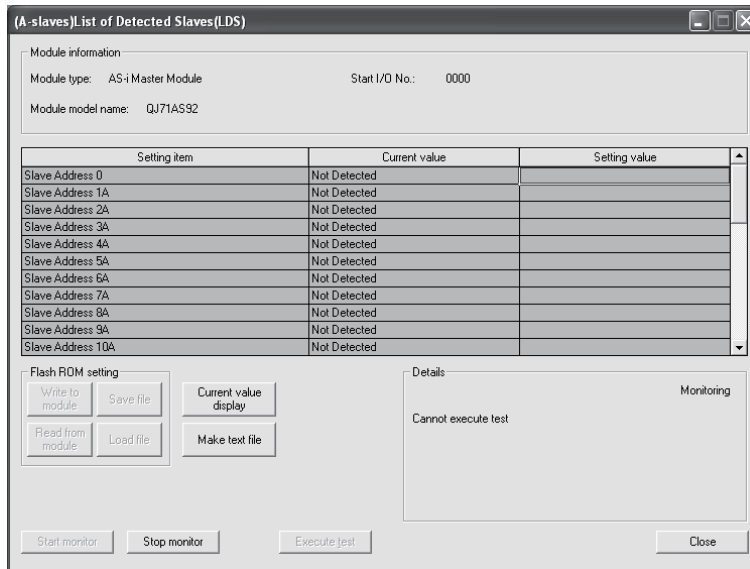
[Purpose]

Used to monitor the detection status of each (A-slaves) slave number.

[Operating procedure]

Monitor/Test screen → (A-slaves) LDS

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (5) for details of the setting items.

5.5.3 (B-slaves) List of Detected Slaves (LDS)

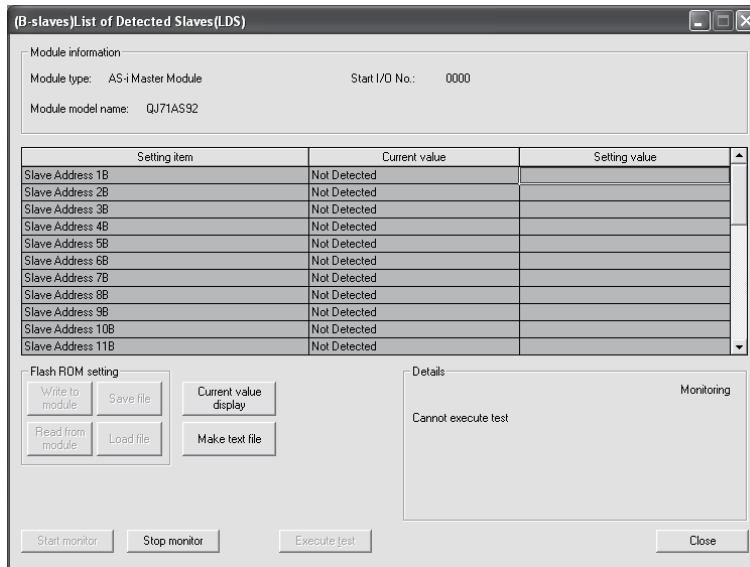
[Purpose]

Used to monitor the detection status of each (B-slaves) slave number.

[Operating procedure]

Monitor/Test screen → (B-slaves) LDS

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (5) for details of the setting items.



## 5.5.4 (A-slaves) List of Active Slaves (LAS)

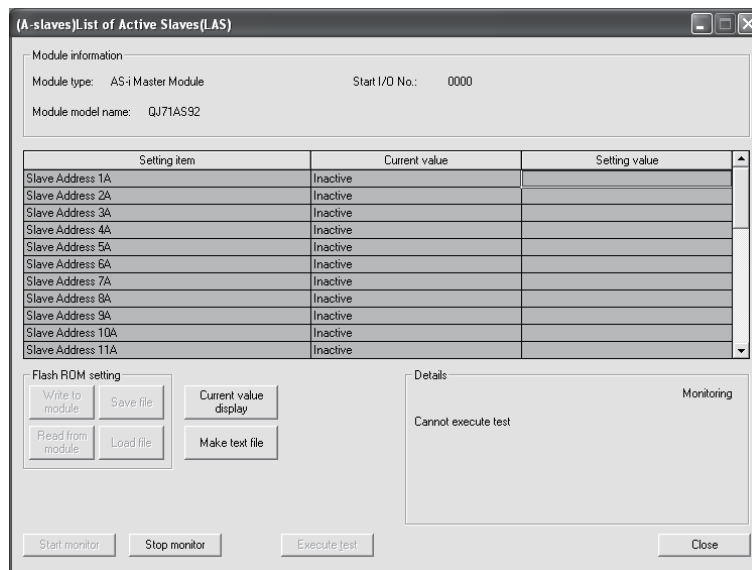
## [Purpose]

Used to monitor the communication status of each (A-slaves) slave number.

## [Operating procedure]

Monitor/Test screen → (A-slaves) LAS

## [Setting screen]

**REMARK**

Refer to Section 3.4.2 (6) for details of the setting items.

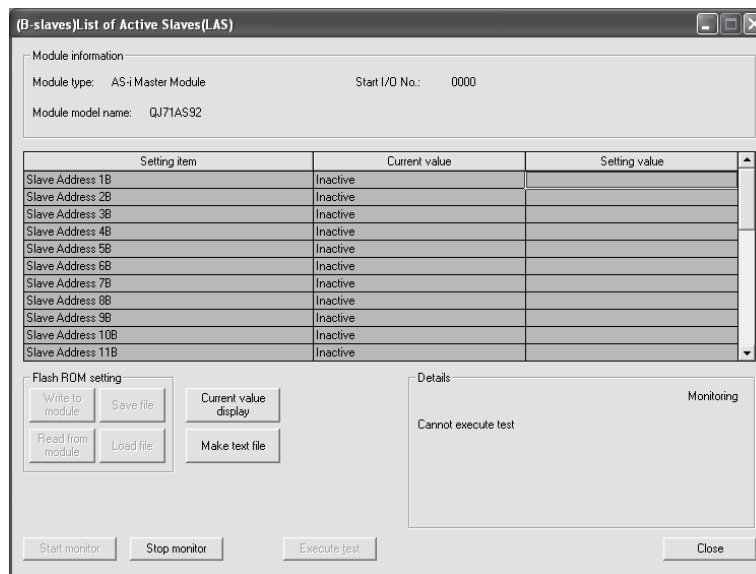
## 5.5.5 (B-slaves) List of Active Slaves (LAS)

**[Purpose]**

Used to monitor the communication status of each (B-slaves) slave number.

**[Operating procedure]**

Monitor/Test screen → **(B-slaves) LAS**

**[Setting screen]**


(B-slaves)List of Active Slaves(LAS)

Module information  
 Module type: AS-i Master Module      Start I/O No.: 0000  
 Module model name: QJ71AS32

Setting item	Current value	Setting value
Slave Address 1B	Inactive	
Slave Address 2B	Inactive	
Slave Address 3B	Inactive	
Slave Address 4B	Inactive	
Slave Address 5B	Inactive	
Slave Address 6B	Inactive	
Slave Address 7B	Inactive	
Slave Address 8B	Inactive	
Slave Address 9B	Inactive	
Slave Address 10B	Inactive	
Slave Address 11B	Inactive	

Flash ROM setting  
 Write to module    Save file    Current value display  
 Read from module    Load file    Make text file

Monitoring  
 Cannot execute test

Start monitor    Stop monitor    Execute test    Close

**REMARK**

Refer to Section 3.4.2 (6) for details of the setting items.

5.5.6 (A-slaves) List of Projected Slaves (LPS (For Read))

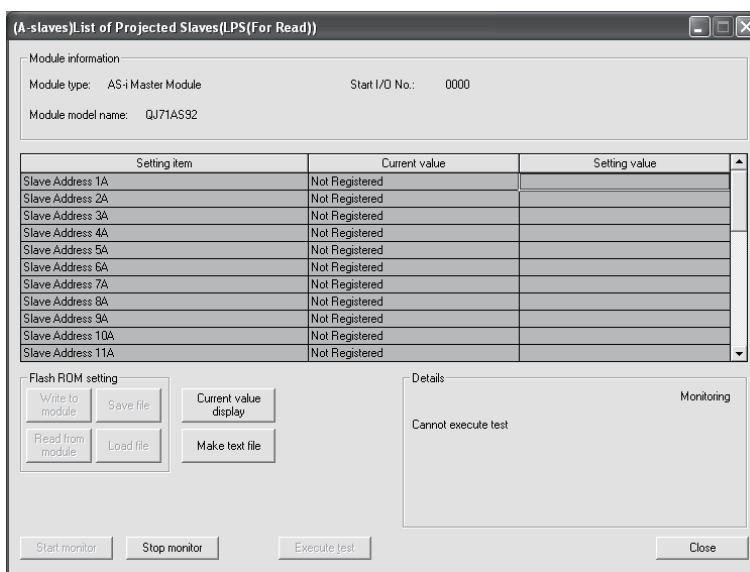
[Purpose]

Used to monitor the parameter registration status of each (A-slaves) slave number.

[Operating procedure]

Monitor/Test screen → (A-slaves) LPS (For Read)

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (7) for details of the setting items.

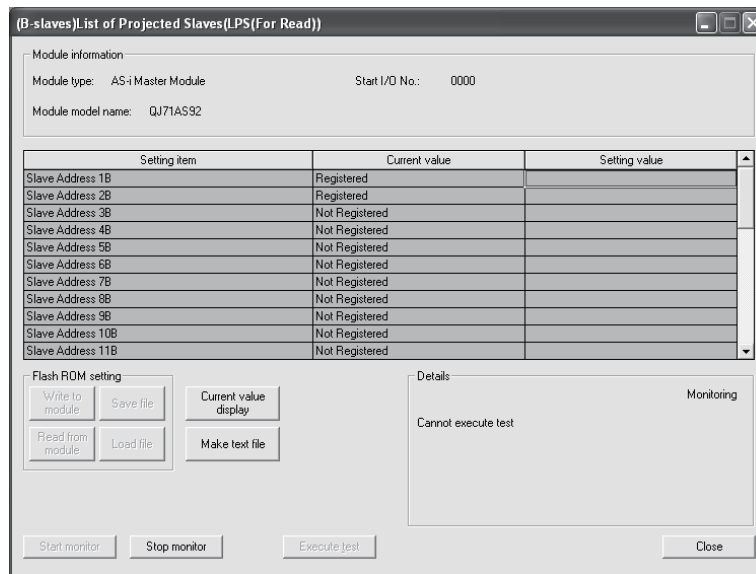
## 5.5.7 (B-slaves) List of Projected Slaves (LPS (For Read))

**[Purpose]**

Used to monitor the parameter registration status of each (B-slaves) slave number.

**[Operating procedure]**

Monitor/Test screen → **(B-slaves) LPS (For Read)**

**[Setting screen]****REMARK**

Refer to Section 3.4.2 (7) for details of the setting items.

5.5.8 (A-slaves) List of slaves that differ from settings

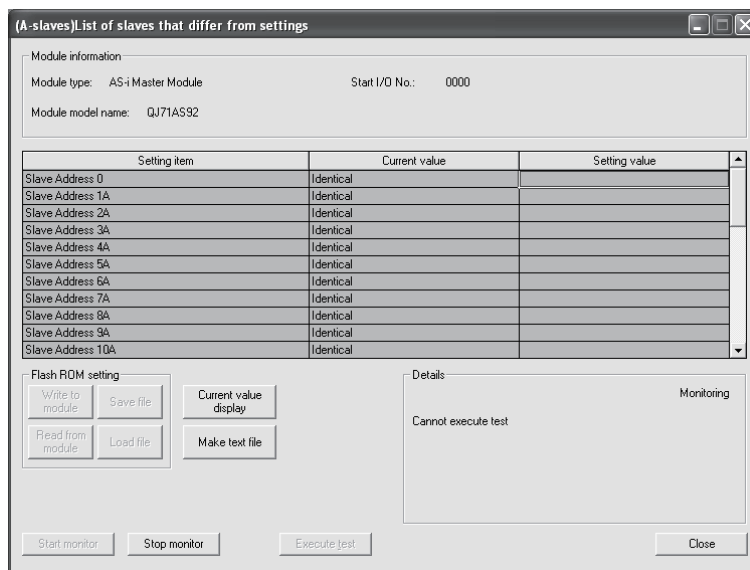
[Purpose]

The result of EXCLUSIVE ORing the result of ORing the (A-slaves) detected slave list (LDS) and projected slave list (LPS) and the active slave list (LAS) is stored. The result of (detected slave list (LDS) | projected slave list (LPS)) ^ active slave list (LAS) is displayed.

[Operating procedure]

Monitor/Test screen → (A-slaves) Slave List

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (8) for details of the setting items.

## 5.5.9 (B-slaves) List of slaves that differ from settings

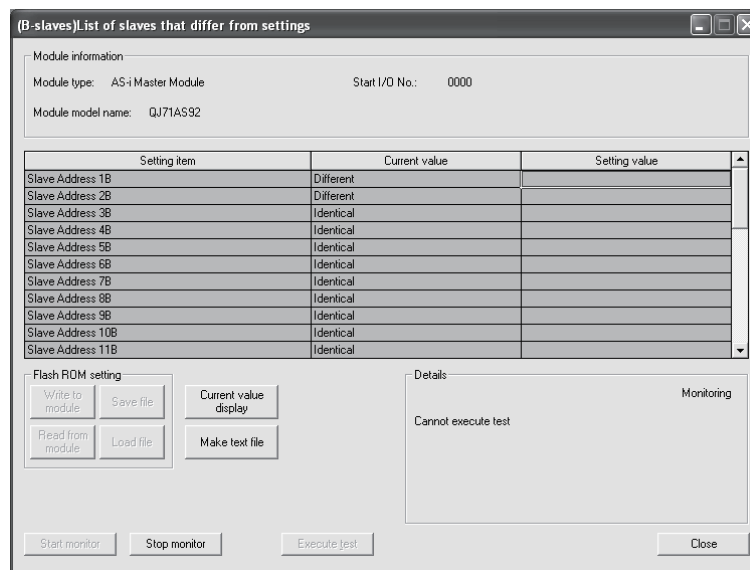
**[Purpose]**

The result of EXCLUSIVE ORing the result of ORing the (B-slaves) detected slave list (LDS) and projected slave list (LPS) and the active slave list (LAS) is stored.

The result of (detected slave list (LDS) | projected slave list (LPS)) ^ active slave list (LAS) is displayed.

**[Operating procedure]**

Monitor/Test screen → (B-slaves) Slave List

**[Setting screen]****REMARK**

Refer to Section 3.4.2 (8) for details of the setting items.

5.5.10 (A-slaves) Error Slave List

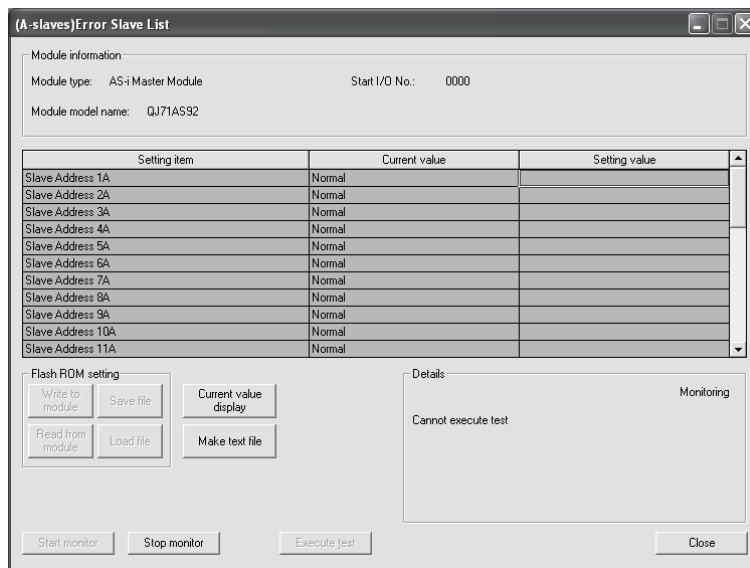
[Purpose]

Used to monitor whether each (A-slaves) slave number is active or inactive.

[Operating procedure]

Monitor/Test screen → (A-slaves) Error Slave List

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (9) for details of the setting items.

5.5.11 (B-slaves) Error Slave List

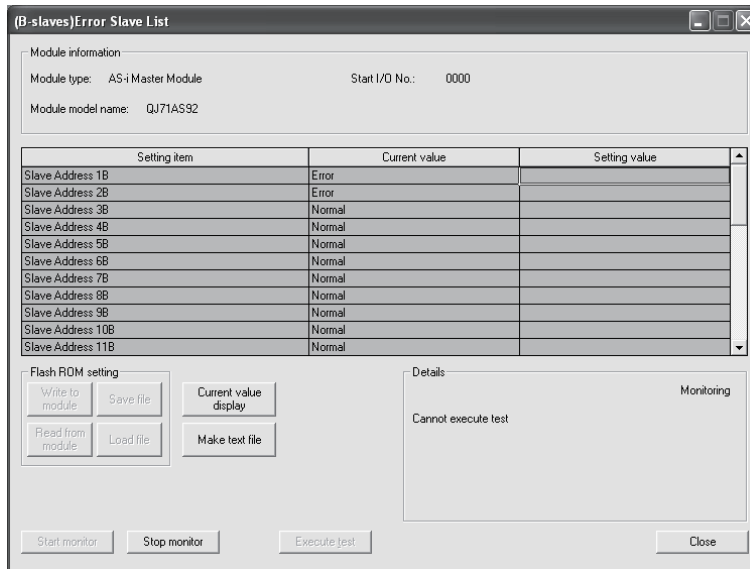
[Purpose]

Used to monitor whether each (B-slaves) slave number is active or inactive.

[Operating procedure]

Monitor/Test screen → (B-slaves) Error Slave List

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (9) for details of the setting items.



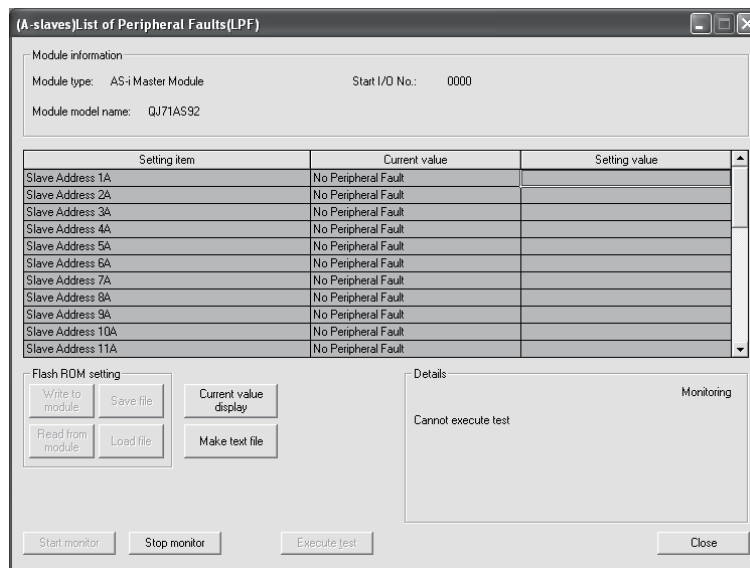
## 5.5.12 (A-slaves) List of Peripheral Faults (LPF)

**[Purpose]**

Used to monitor the peripheral fault occurrence status of each (A-slaves) slave.

**[Operating procedure]**

Monitor/Test screen → (A-slaves) LPF

**[Setting screen]****REMARK**

Refer to Section 3.4.2 (18) for details of the setting items.

## 5.5.13 (B-slaves) List of Peripheral Faults (LPF)

**[Purpose]**

Used to monitor the peripheral fault occurrence status of each (B-slaves) slave.

**[Operating procedure]**

Monitor/Test screen → (B-slaves) LPF

**[Setting screen]**

Module information:

Module type: AS-i Master Module      Start I/O No.: 0000

Module model name: QJ71AS92

Setting item	Current value	Setting value
Slave Address 1B	No Peripheral Fault	
Slave Address 2B	No Peripheral Fault	
Slave Address 3B	No Peripheral Fault	
Slave Address 4B	No Peripheral Fault	
Slave Address 5B	No Peripheral Fault	
Slave Address 6B	No Peripheral Fault	
Slave Address 7B	No Peripheral Fault	
Slave Address 8B	No Peripheral Fault	
Slave Address 9B	No Peripheral Fault	
Slave Address 10B	No Peripheral Fault	
Slave Address 11B	No Peripheral Fault	

Flash ROM setting

Write to module    Save file    Current value display

Read from module    Load file    Make text file

Details

Monitoring

Cannot execute test

Start monitor    Stop monitor    Execute test    Close

**REMARK**

Refer to Section 3.4.2 (18) for details of the setting items.

5.5.14 (A-slaves) Number of I/O Points

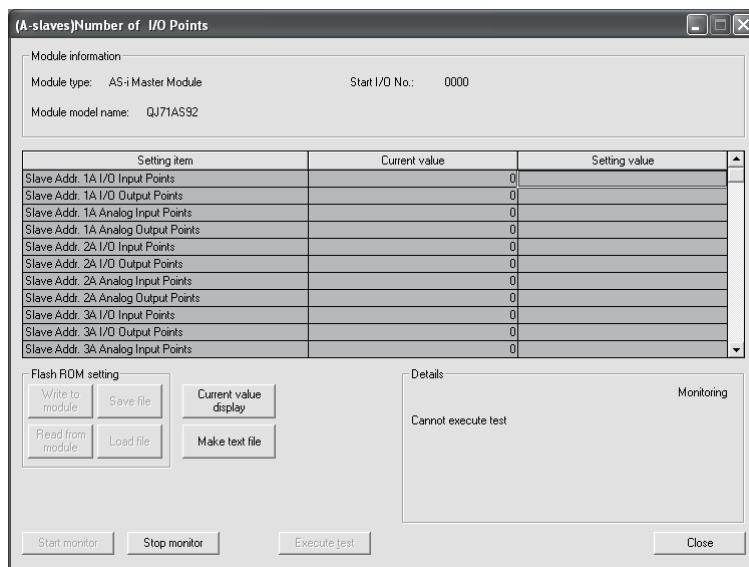
[Purpose]

Used to monitor the I/O input and output points and analog input and output points of each (A-slaves) slave number.

[Operating procedure]

Monitor/Test screen → (A-slaves) Number of I/O Points

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (20) for details of the setting items.

5.5.15 (B-slaves) Number of I/O Points

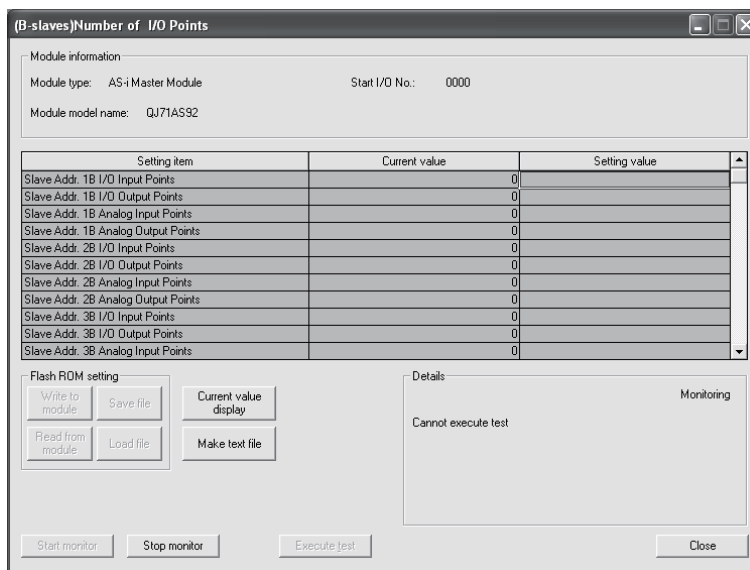
[Purpose]

Used to monitor the I/O input and output points and analog input and output points of each (B-slaves) slave number.

[Operating procedure]

Monitor/Test screen → (B-slaves) Number of I/O Points

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (20) for details of the setting items.

## 5.5.16 (A-slaves) Input Data of Slave Addr. From 1A-31A

**[Purpose]**

Used to monitor the input data from each (A-slaves) slave.

**[Operating procedure]**

Monitor/Test screen → (A-slaves) Slave Addr. 1-31

**[Setting screen]**

(A-slaves) Input Data of Slave Addr. From 1A-31A

Module information

Module type: AS-i Master Module      Start I/O No.: 0000

Module model name: QJ71AS92

Setting item	Current value	Setting value
Input Data from Slave Address 1A	0000	
Input Data from Slave Address 2A	0000	
Input Data from Slave Address 3A	0000	
Input Data from Slave Address 4A	0000	
Input Data from Slave Address 5A	0000	
Input Data from Slave Address 6A	0000	
Input Data from Slave Address 7A	0000	
Input Data from Slave Address 8A	0000	
Input Data from Slave Address 9A	0000	
Input Data from Slave Address 10A	0000	
Input Data from Slave Address 11A	0000	

Flash ROM setting

Write to module    Save file    Current value display

Read from module    Load file    Make text file

Details

Monitoring

Cannot execute test

Start monitor    Stop monitor    Execute test    Close

**REMARK**

Refer to Section 3.4.2 (1), (2) for details of the setting items.

## 5.5.17 (B-slaves) Input Data of Slave Addr. From 1B-31B

**[Purpose]**

Used to monitor the input data from each (B-slaves) slave.

**[Operating procedure]**

Monitor/Test screen → (B-slaves) Slave Addr. 1-31

**[Setting screen]**

Module information:

Module type: AS-i Master Module      Start I/O No.: 0000

Module model name: QJ71AS32

Setting item	Current value	Setting value
Input Data from Slave Address 1B	0000	
Input Data from Slave Address 2B	0000	
Input Data from Slave Address 3B	0000	
Input Data from Slave Address 4B	0000	
Input Data from Slave Address 5B	0000	
Input Data from Slave Address 6B	0000	
Input Data from Slave Address 7B	0000	
Input Data from Slave Address 8B	0000	
Input Data from Slave Address 9B	0000	
Input Data from Slave Address 10B	0000	
Input Data from Slave Address 11B	0000	

Flash ROM setting

Write to module    Save file    Current value display

Read from module    Load file    Make text file

Details

Monitoring

Cannot execute test

Start monitor    Stop monitor    Execute test    Close

**REMARK**

Refer to Section 3.4.2 (3) for details of the setting items.

## 5.5.18 (A-slaves) Output Data of Slave Addr. From 1A-31A

**[Purpose]**

Used to monitor the output data to each (A-slaves) slave.

**[Operating procedure]**

Monitor/Test screen → (A-slaves) Slave Addr. 1-31

**[Setting screen]**

(A-slaves) Output Data of Slave Addr. From 1A-31A

Module information

Module type: AS-i Master Module      Start I/O No.: 0000

Module model name: QJ71A592

Setting item	Current value	Setting value
Output Data to Slave Address 1A	0000	0000
Output Data to Slave Address 2A	0000	0000
Output Data to Slave Address 3A	0000	0000
Output Data to Slave Address 4A	0000	0000
Output Data to Slave Address 5A	0000	0000
Output Data to Slave Address 6A	0000	0000
Output Data to Slave Address 7A	0000	0000
Output Data to Slave Address 8A	0000	0000
Output Data to Slave Address 9A	0000	0000
Output Data to Slave Address 10A	0000	0000
Output Data to Slave Address 11A	0000	0000

Flash ROM setting

Write to module    Save file    Current value display

Read from module    Load file    Make text file

Details

Monitoring

Binary input

Setting range

0000 - 1111

Start monitor    Stop monitor    Execute test    Close

**REMARK**

Refer to Section 3.4.2 (10), (11) for details of the setting items.

5.5.19 (B-slaves) Output Data of Slave Addr. From 1B-31B

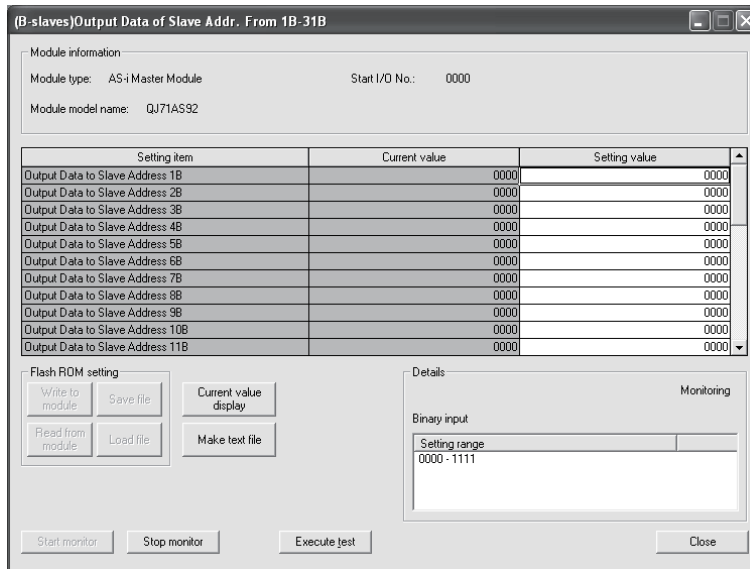
[Purpose]

Used to monitor the output data to each (B-slaves) slave.

[Operating procedure]

Monitor/Test screen → (B-slaves) Slave Addr. 1-31

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (12), (13) for details of the setting items.



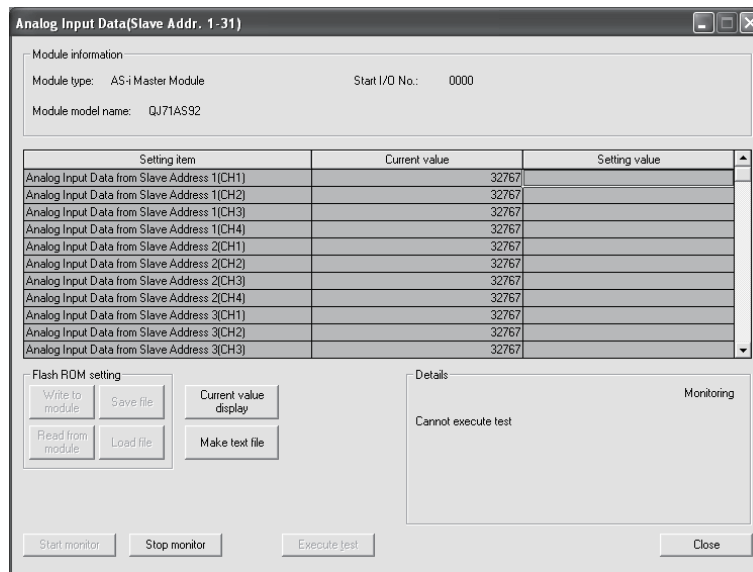
## 5.5.20 Analog Input Data (Slave Addr. 1-31)

**[Purpose]**

Used to monitor the analog input data from channels 1 to 4 of each slave number.

**[Operating procedure]**

Monitor/Test screen → **Analog Input Data**

**[Setting screen]****REMARK**

Refer to Section 3.4.2 (19) for details of the setting items.

5.5.21 Analog Output Data (Slave Addr. 1-31)

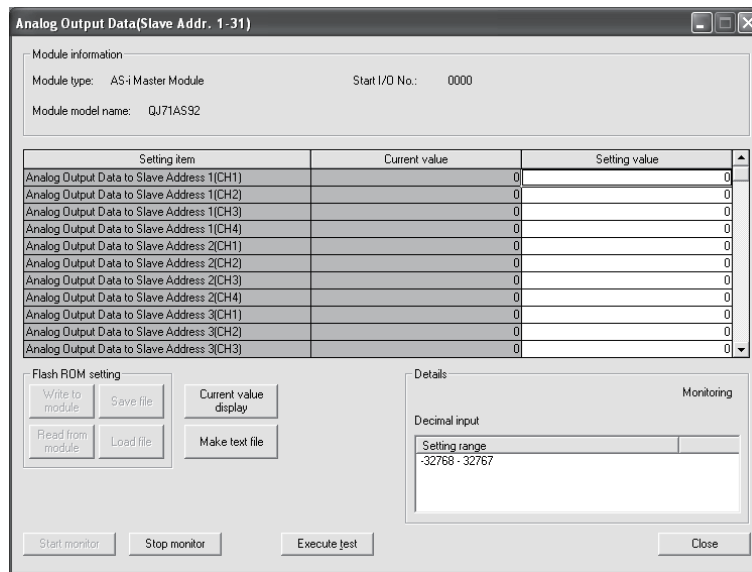
[Purpose]

Used to monitor the analog output data from channels 1 to 4 of each slave number.

[Operating procedure]

Monitor/Test screen → **Analog Output Data**

[Setting screen]



**REMARK**

Refer to Section 3.4.2 (19) for details of the setting items.

## 5.6 Command Request / Command Result

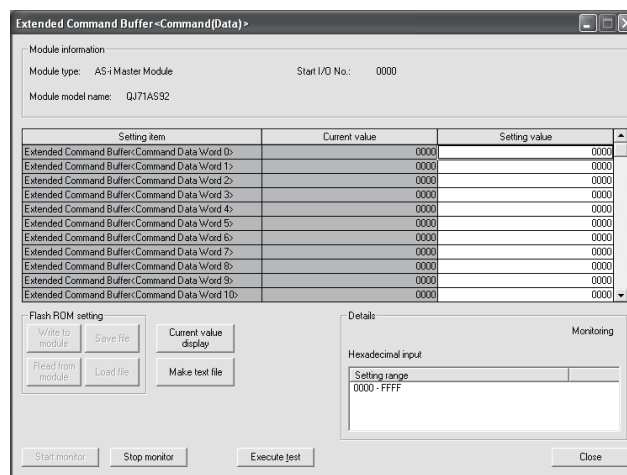
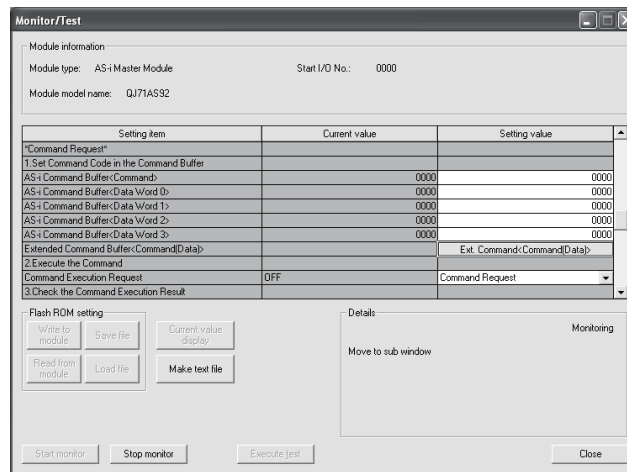
## [Purpose]

Used to request a command from the QJ71AS92.

## [Operating procedure]

Monitor/Test screen → Ext. Command <Command (Data)>

## [Setting screen]



## [Operation procedure]

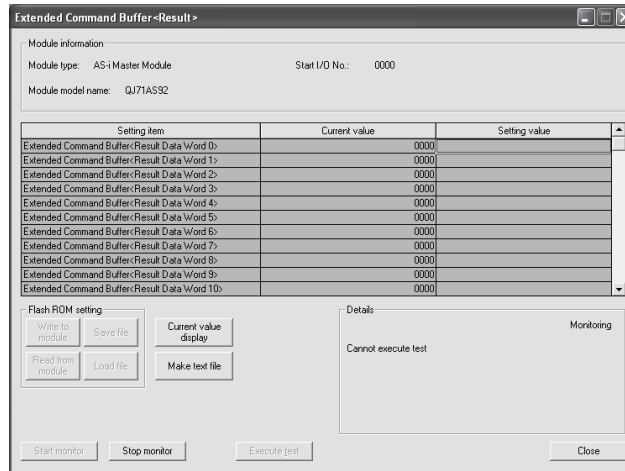
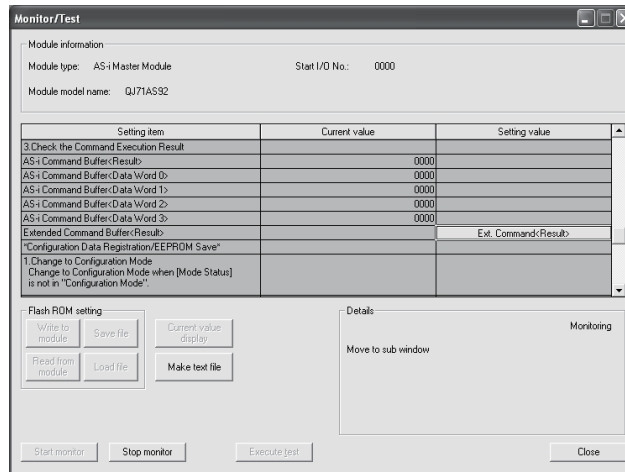
- (1) **Set the request code to the command buffer**  
 Set the request code in the setting value field of "AS-i Command Buffer <Command>".\*1 Also make settings in the data words 0 to 3 according to the request code.  
 Perform a selection test to write the set values to the buffer.  
 \*1 For the slave parameter write command, open the "Extended Command Buffer <Command (Data)>" sub screen and set the data to be written.
- (2) **Execute the command**  
 Choose "Command Request" in the setting value field of "Command Request" and perform a selection test to execute the command.  
 Command execution is completed on completion of the selection test.

**[Purpose]**

Used to display the result in response to the command request.

**[Operating procedure]**

Monitor/Test screen → Ext. Command <Result>

**[Setting screen]****[Operation procedure]****(1) Check the command execution result.**

Check the execution result in the setting value fields of AS-i Command Buffer <Result> and <Data Word 0 to 3>.\*<sup>1</sup>

\*1 For the slave parameter read command, open the "Extended Command Buffer <Command (Data)>" sub screen and check the read data.

## 5.7 Configuration Data Registration/EEPROM Storage

## [Purpose]

Used to register the configuration and Storage the data onto the EEPROM.

## [Operating procedure]

Monitor/Test screen → Configuration Data Registration/EEPROM Storage

## [Setting screen]

Setting item	Current value	Setting value
"Configuration Data Registration/EEPROM Save"		
1. Change to Configuration Mode Change to Configuration Mode when [Mode Status] is not in "Configuration Mode".		
Mode Status	Some Other Mode	
Configuration Mode Change Request	OFF	Mode Change Request
2. Set LPS		
(A-slaves) List of Projected Slaves (LPS (For Write))		(A-slaves) LPS (For Write)
(B-slaves) List of Projected Slaves (LPS (For Write))		(B-slaves) LPS (For Write)
Configuration Register Request	OFF	Register Request
3. Register Permanent Configuration by Command		

## [Operation procedure]

- (1) Switch to the configuration mode.  
Choose "Mode Change Request" in the setting value field of "Configuration Mode Change Request" and execute a selection test to switch to the configuration mode.
- (2) Set the LPS.  
Open the "(A-slaves) List of Projected Slaves (LPS (For Write))" or "(B-slaves) List of Projected Slaves (LPS (For Write))" sub screen and make settings. (Refer to Section 3.4.2 (14).)  
Choose "Register Request" in the setting value field of "Configuration Register Request" and execute a selection test.
- (3) Register the permanent configuration using the commands  
The minimum configuration to execute the commands for registering the permanent configuration is provided.  
(Since the data word to be used is only 0, there are no data word 1 to 3 items.)  
<Used request codes>  
201H: For batch-registration of whole configuration, 141H to 17FH: For partial registration.  
Check the command execution result in "AS-i Command Buffer <Result>". If any error is found, take corrective action in accordance with the error code.  
Refer to "Section 3.5.1 Command Buffer <Request> List" for command details.

- (4) Switch to the protected operation mode.  
Perform operation to return from the configuration mode selected in (1) to the protected operation mode. Choose "Mode Change Request" in the setting value field of "Protected Operation Mode Change Request" and execute a selection test to return to the protected operation mode.  
Check the mode change request result in "Mode Change Request Result (Current Error Code)". If any error is found, take corrective action in accordance with the error code.
- (5) Storage the configuration data onto the EEPROM.
  - 1) Choose "Write Request" in the setting value field of "Turn OFF the EEPROM Write Request" and execute a selection test to make a EEPROM write request.
  - 2) Confirm that EEPROM write is complete.  
Making a write request changes the indication in the setting value field of "EEPROM Write Request " as indicated below.  
At normal completion: "Not yet written" → "Writing" → "Write completed" \*1  
At abnormal completion: "Not yet written" → "Writing" → "Write Failed" \*1  
\*1 If the write time is short, "Writing" does not appear.  
If "Write Failed" has occurred, scroll the screen, check the error codes in "Current Error Code" and "Error Code History 1-5", and take corrective action according to the error codes.
  - 3) Choose "OFF" in the setting value field of "Turn OFF the EEPROM Write Request" and execute a selection test to turn OFF the EEPROM write request.

## 5.7.1 Setting the Configuration Data (LPS)

## [Purpose]

Used to make the following setting when performing configuration registration and Storage onto EEPROM.

- (A-slaves) List of Projected Slaves (LPS (For Write))
- (B-slaves) List of Projected Slaves (LPS (For Write))

## [Operating procedure]

Monitor/Test screen → (A-slaves) LPS (For Write) /

(B-slaves) LPS (For Write)

## [Setting screen]

Module information  
Module type: AS+ Master Module Start I/O No.: 0000  
Module model name: QJ71AS92

Setting item	Current value	Setting value
Slave Address 1A	Not registered in LPS	Not registered in LPS
Slave Address 2A	Not registered in LPS	Not registered in LPS
Slave Address 3A	Not registered in LPS	Not registered in LPS
Slave Address 4A	Not registered in LPS	Not registered in LPS
Slave Address 5A	Not registered in LPS	Not registered in LPS
Slave Address 6A	Not registered in LPS	Not registered in LPS
Slave Address 7A	Not registered in LPS	Not registered in LPS
Slave Address 8A	Not registered in LPS	Not registered in LPS
Slave Address 9A	Not registered in LPS	Not registered in LPS
Slave Address 10A	Not registered in LPS	Not registered in LPS
Slave Address 11A	Not registered in LPS	Not registered in LPS

Flash ROM setting  
Write to module Save file Current value display  
Read from module Load file Make text file

Details  
Monitoring  
Select input  
Setting range  
Not registered in LPS  
Registered in LPS

Start monitor Stop monitor Execute test Close

Module information  
Module type: AS+ Master Module Start I/O No.: 0000  
Module model name: QJ71AS92

Setting item	Current value	Setting value
Slave Address 1B	Not registered in LPS	Not registered in LPS
Slave Address 2B	Not registered in LPS	Not registered in LPS
Slave Address 3B	Not registered in LPS	Not registered in LPS
Slave Address 4B	Not registered in LPS	Not registered in LPS
Slave Address 5B	Not registered in LPS	Not registered in LPS
Slave Address 6B	Not registered in LPS	Not registered in LPS
Slave Address 7B	Not registered in LPS	Not registered in LPS
Slave Address 8B	Not registered in LPS	Not registered in LPS
Slave Address 9B	Not registered in LPS	Not registered in LPS
Slave Address 10B	Not registered in LPS	Not registered in LPS
Slave Address 11B	Not registered in LPS	Not registered in LPS

Flash ROM setting  
Write to module Save file Current value display  
Read from module Load file Make text file

Details  
Monitoring  
Select input  
Setting range  
Not registered in LPS  
Registered in LPS

Start monitor Stop monitor Execute test Close

## [Operation procedure]

- (1) Set the (A-slaves) List of Protected Slaves (LPS (for write)).  
Set/monitor the slave numbers you want to register in the (A-slaves) LPS.
- (2) Set the (B-slaves) List of Protected Slaves (LPS (for write)).  
Set/monitor the slave numbers you want to register in the (B-slaves) LPS.

**REMARK**

Refer to Section 3.4.2 (14) for details of the setting items.

## 6 TRANSMISSION DELAY TIME

This chapter describes the transmission delay times of the QJ71AS92.

### 6.1 AS-i cycle time

(1) AS-i Ver. 2.04-compatible I/O slaves

$$\text{AS-i cycle time} = 171\mu\text{s} \times (\text{number of communicating slaves} + 2)$$

(2) AS-i Ver. 2.11-compatible I/O slaves

(a) Cycle time for the slaves that use the same address in group A and B

$$\text{AS-i cycle time} = \{171\mu\text{s} \times (\text{number of communicating slaves} + 2)\} \times 2$$

(b) Cycle time for the slaves that use different addresses in group A and B is the same as described in (1).

(3) Analog slaves

$$\text{AS-i cycle time} = \{171\mu\text{s} \times (\text{number of communicating slaves} + 2)\} \times 7 \times (\text{number of channels})$$

**TIP**

Count the number of communicating slaves as described below.

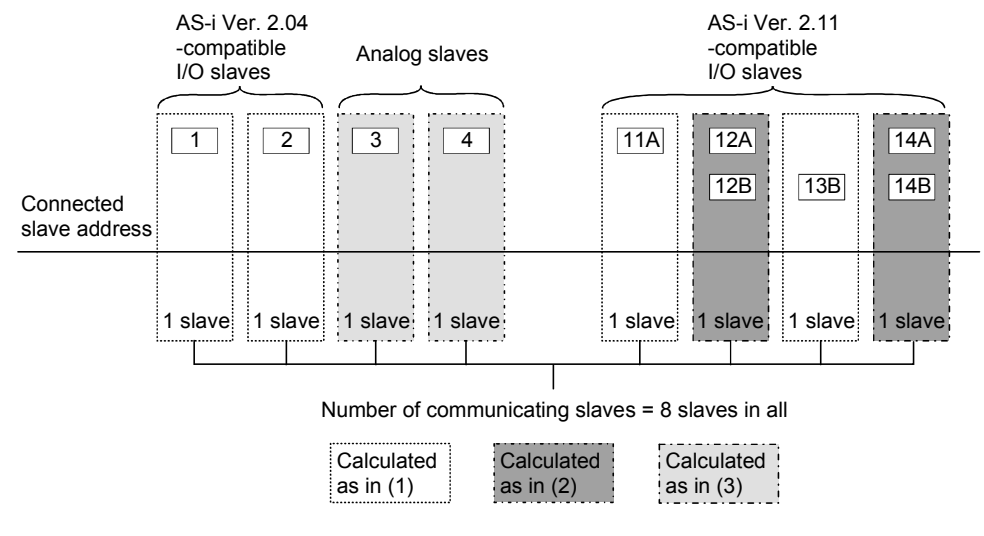
AS-i Ver. 2.04-compatible I/O slaves and analog slaves:

- Count the number of connected slaves.

AS-i Ver. 2.11-compatible I/O slaves:

- When the slaves in group A and B use the same slave address, count the slaves of the same slave address as 1.
- When the slaves in group A and B use different slave addresses, count the number of connected slaves.

Example) When slaves are connected as shown below





## 6.2 Input Transmission Delay

- (1) When importing the input signal by using the FROM/MOV instruction or the auto refresh setting of the utility package

Normal value =

$(AS-i \text{ cycle time} \times 1) + (\text{sequence scan} \times 0.5) + \text{slave input delay}$

Maximum value =

$(AS-i \text{ cycle time} \times 2) + (\text{sequence scan} \times 1) + \text{slave input delay}$

## 6.3 Output Transmission Delay

- (1) When sending the output signal by using the TO/MOV instruction

Normal value =  $(AS-i \text{ cycle time} \times 1) + \text{slave output delay}$

Maximum value =  $(AS-i \text{ cycle time} \times 2) + \text{slave output delay}$

- (2) When using the auto refresh setting of the utility package

Normal value =

$(AS-i \text{ cycle time} \times 1) + (\text{sequence scan} \times 0.5) + \text{slave output delay}$

Maximum value =

$(AS-i \text{ cycle time} \times 2) + (\text{sequence scan} \times 1) + \text{slave output delay}$

## 7 PROGRAMMING

When applying the following program examples to the actual system, make sure to examine the applicability and confirm that it will not cause system control problems.

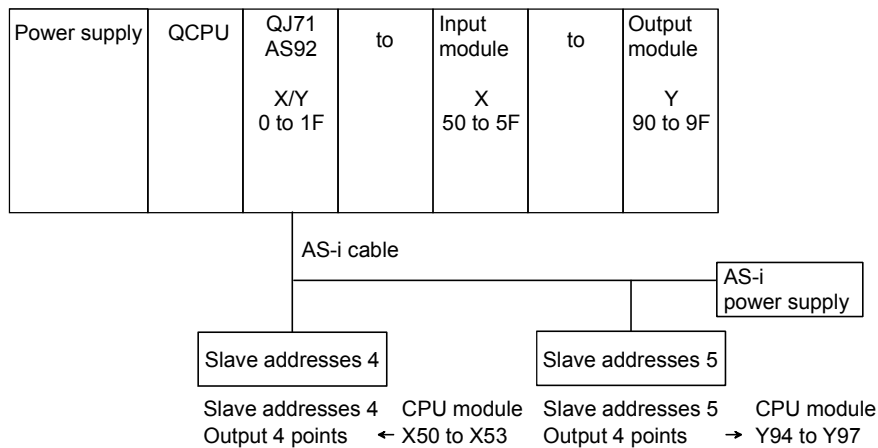
### 7.1 I/O Slave

This section explains the programs for I/O data communication between the QJ71AS92 and I/O slaves.

The system configuration example in (1) shows how the programs perform when the utility package is used and when it is not used.

#### (1) System Configuration

The QJ71AS92 is mounted on slot 0 of the main base unit.



#### (2) Operations

The following operations are performed in the above system.

- (a) The inputs X50 to X53 of the CPU module are output to the output data to the slave address 4.
- (b) The input data from the slave address 5 is output to the outputs Y94 to Y97 of the CPU module.

#### REMARK

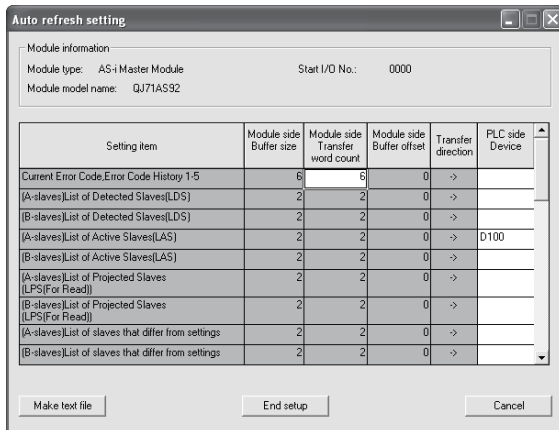
If a configuration error occurs, I/O control is executed for the slaves are ready for communication.

7.1.1 Program example when utility package is used

(1) Operation of utility package

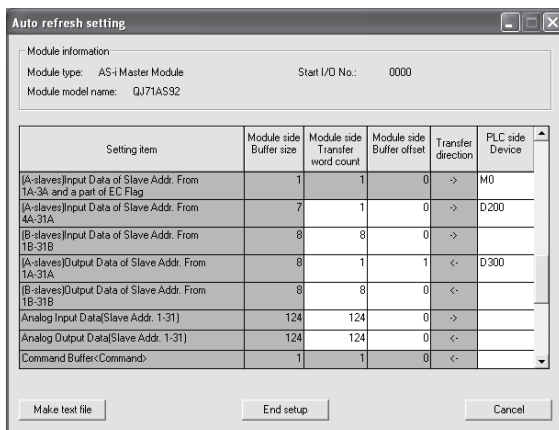
(a) Auto refresh setting (Refer to Section 5.4)

Set the (A-slaves) active slave list, the input data from (A-slaves) slave address 4A to 31A, and the output data to (A-slaves) slave address 4A to 31A.



(a)-1

- The (A-slaves) List of Active Slave (LAS) is transferred to D100 and D101 of the CPU module.

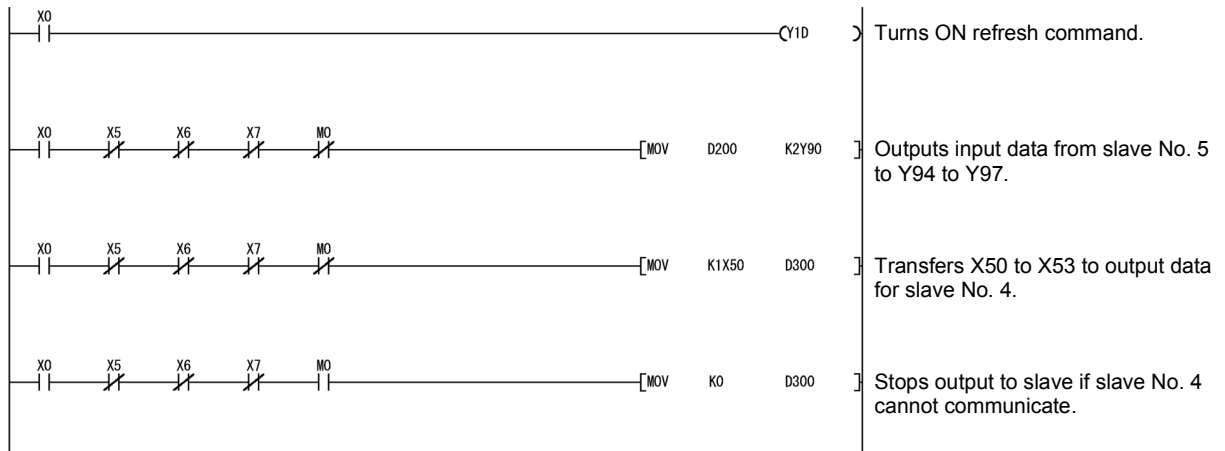


(a)-2

- The input data from (A-slaves) slave address 4A - 7A are transferred to D200 of the CPU module.
- D300 of the CPU module is transferred to the output data to (A-slaves) slave address 4A - 7A.  
(To transfer the output data to the slave address 5, one word of the module side buffer memory addresses are offset by module side buffer offset.)

- (b) Write of intelligent function module parameters (Refer to section 5.3.3)  
Write the intelligent function module parameters to the CPU module.  
Perform this operation on the "Select a target intelligent function module" screen.

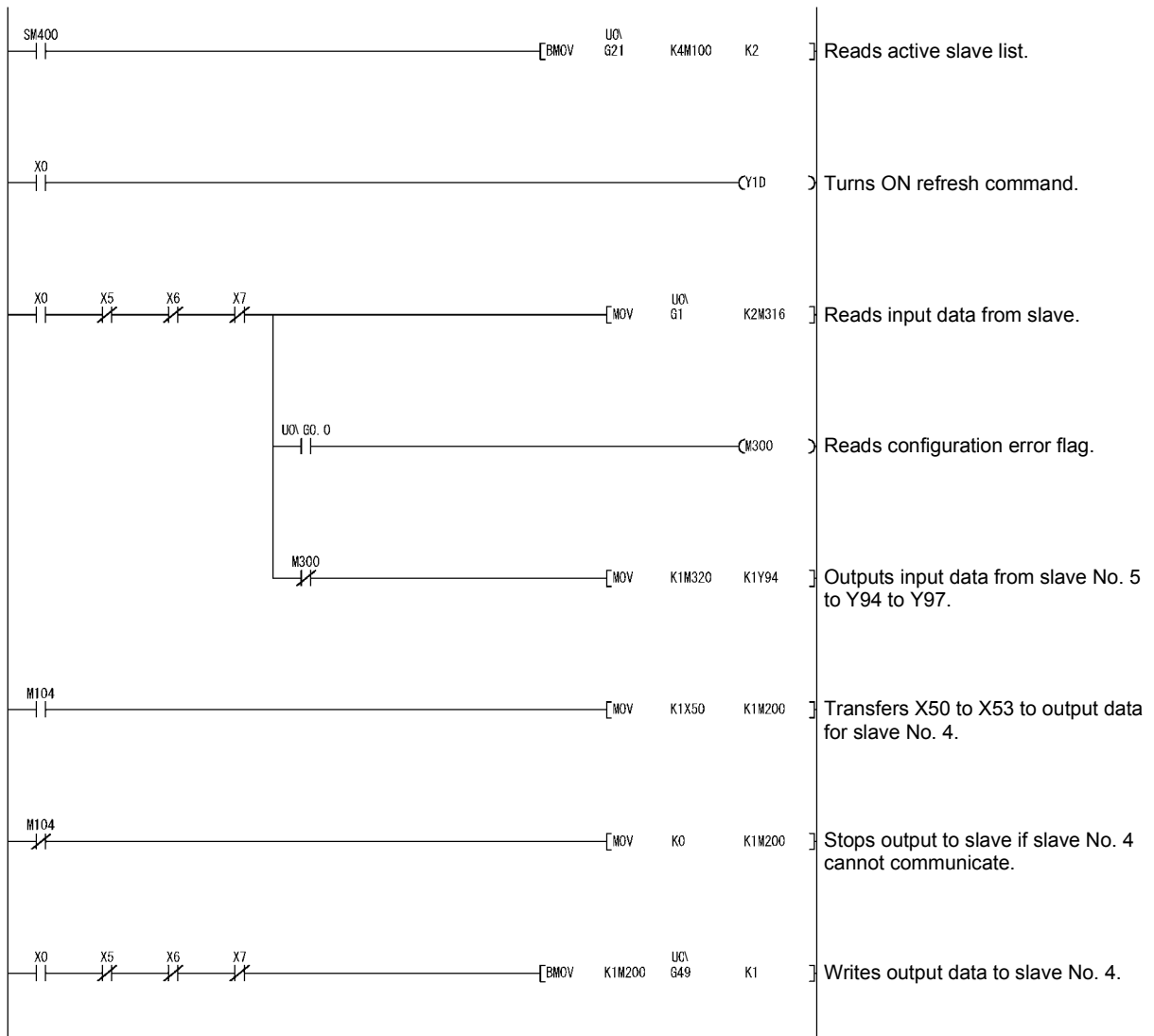
## (2) Program Examples

Explanation of devices

- X0 : Module ready (ON when normal)  
 X5 : AS-i power failure (OFF when normal)  
 X6 : Normal operation active (OFF when in normal operation)  
 X7 : Configuration mode active (OFF except when in configuration mode)  
 D200 : Input data from slave address 4 to 7 (Input data from slave address 4 is in bits 0 to 3)  
 D300 : Output data to slave address 4 to 7 (Output data to slave address 5 is in bits 4 to 7)  
 M0 : Configuration error flag

## 7.1.2 Program example when utility package is not used

## (1) Program Examples

Explanation of devices

- X0 : Module ready (ON when normal)  
 X5 : AS-i power failure (OFF when normal)  
 X6 : Normal operation active (OFF when in normal operation)  
 X7 : Configuration mode active (OFF except when in configuration mode)  
 M104 : ON when slave address 4 is ready for communication  
 M200 to M203 : Output data to slave address 4  
 M300 : Configuration error flag  
 M320 to M323 : Input data from slave address 5

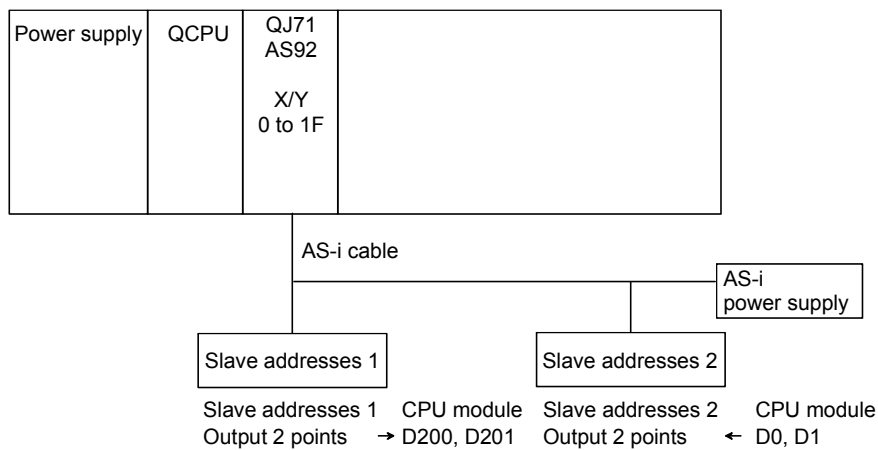
## 7.2 Analog Slave

This section explains the programs for I/O data communication between the QJ71AS92 and I/O slaves.

The system configuration example in (1) shows how the programs perform when the utility package is used and when it is not used.

### (1) System Configuration

The QJ71AS92 is mounted on slot 0 of the main base unit.



### (2) Operations

The following operations are performed in the above system.

- (a) D400 and D401 of the CPU module are output to the analog output data to the slave address 2.
- (b) The analog input data from the slave address 1 is stored into D200 and D201 of the CPU module.

#### REMARK

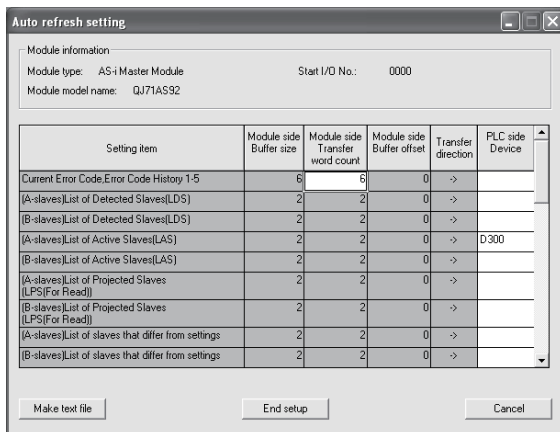
If a configuration error occurs, I/O control is executed for the slaves that are ready for communication.

7.2.1 Program example when utility package is used

(1) Operation of utility package

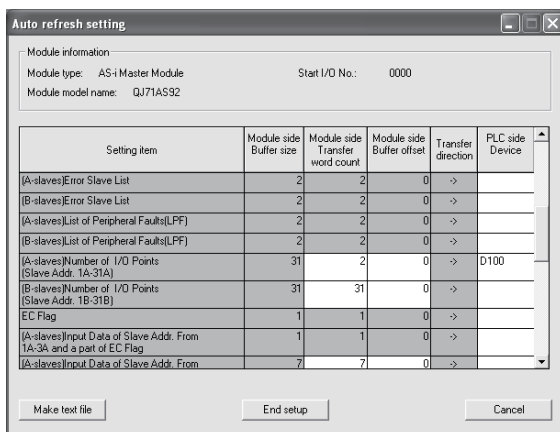
(a) Auto refresh setting (Refer to Section 5.4)

Set the (A-slaves) active slave list, the number of (A-slaves) I/O channels, the analog input data, and the analog output data.



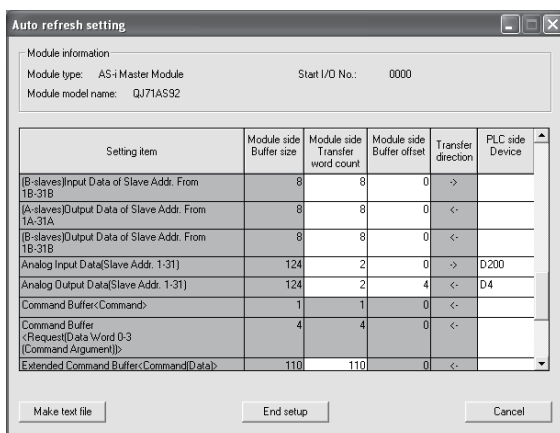
(a)-1

- The (A-slaves) List of Active Slaves (LAS) is transferred to D300 and D301 of the CPU module.



(a)-2

- The number of (A-slaves) I/O points is transferred to D100 and D101 of the CPU module.



(a)-3

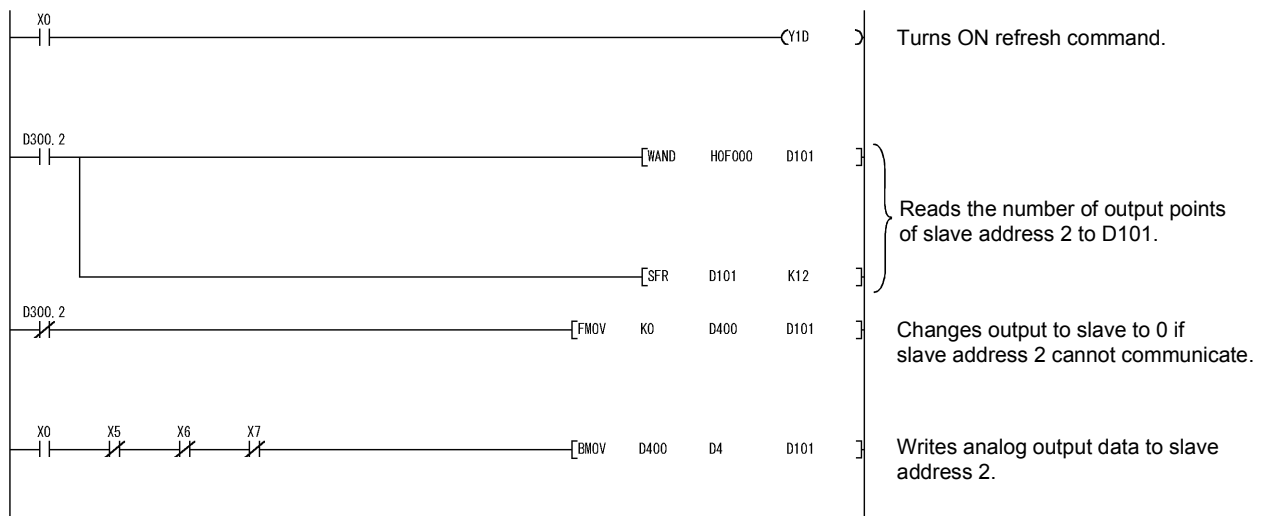
- The analog input data is transferred to D200 and D201 of the CPU module.
- D4 and D5 of the CPU module are transferred to the analog output data. (To transfer the analog output data to the slave address 2, four words of the module side buffer memory addresses are offset by module side buffer offset.)

(b) Write of intelligent function module parameters (Refer to Section 5.3.3)

Write the intelligent function module parameters to the CPU module.

Perform this operation on the "Select a target intelligent function module" screen.

## (2) Program Examples

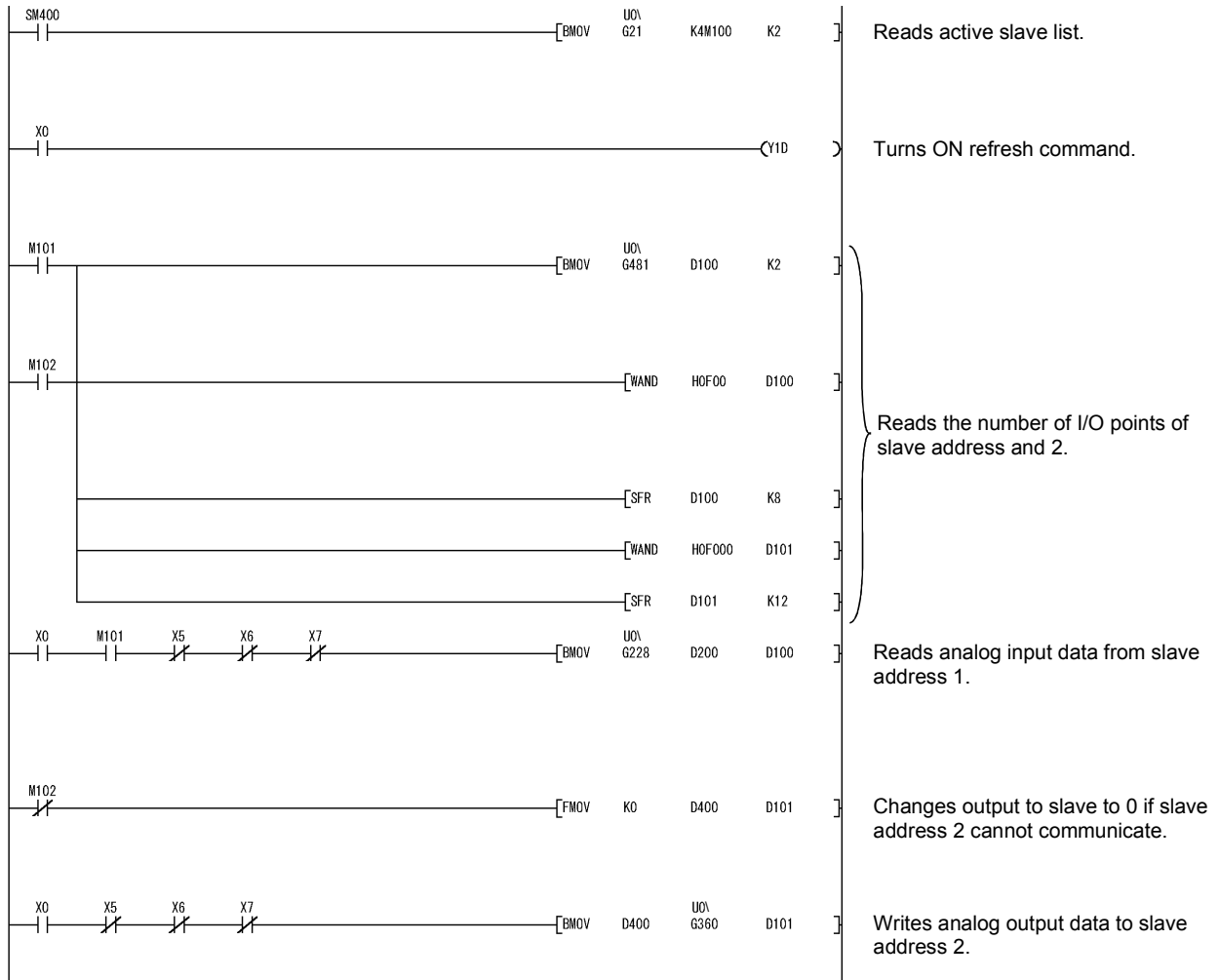
Explanation of devices

- X0 : Module ready (ON when normal)  
 X5 : AS-i power failure (OFF when normal)  
 X6 : Normal operation active (OFF when in normal operation)  
 X7 : Configuration mode active (OFF except when in configuration mode)  
 D101 : Number of analog output points of slave address 2  
 D302.2 : ON when slave address 2 is ready for communication  
 D400, D401 : Analog output data to slave address 2  
 D4, D5 : Output of slave address 2 and automatically refreshed data



7.2.2 Program example when utility package is not used

(1) Program Examples



Explanation of devices

- X0 : Module ready (ON when normal)
- X5 : AS-i power failure (OFF when normal)
- X6 : Normal operation active (OFF when in normal operation)
- X7 : Configuration mode active (OFF except when in configuration mode)
- M101 : ON when slave address 1 is ready for communication
- M102 : ON when slave address 2 is ready for communication
- D100 : Number of analog input points of slave address 1
- D101 : Number of analog output points of slave address 2
- D200, D201 : Analog input data from slave address 1
- D400, D401 : Analog output data to slave address 2

## 8 TROUBLESHOOTING

The chapter describes the troubleshooting methods to be taken when a fault occurs in the QJ71AS92.

### 8.1 Checking Items at Error Occurrence

First check the QJ71AS92 as follows.

- (1) Check "RUN" and "U ASI" LED.
  - If "RUN" LED of QJ71AS92 is off, check whether the power supply is supplied to programmable controller.
  - If "U ASI" LED is off, check the current rating of AS-i power supply, wiring.
- (2) Check "ERR." LED.
  - If the "ERR." LED of the QJ71AS92 is on, check the slave status and wiring.
  - Check the error code at the buffer memory address C0H and take corrective action.  
See Section 8.3 for the error codes.
- (3) Check the external power supply for slave.

If this power supply capacity is not enough or miss-wiring is, the slave will not normally operate.
- (4) Check the total number of slaves.
  - The total number of slaves should be calculated according to the expression in Section 3.1.
  - Check for overlapping slave addresses.
- (5) Check whether slaves are configured as intended.
  - Check whether the slave are correctly connected.
  - Check the slave list that differs from the settings (buffer memory addresses: 1DH to 20H) and reexamine the corresponding slave.
- (6) Check total extension distance
  - The total extension distance must not exceed 100m. However, when the repeater is used, it is possible to extend the distance by 100m per repeater. A maximum of two repeaters can be used in series.

## 8.2 Error Checking

Check the following items, if QJ71AS92 does not seem to operate normally.

### 8.2.1 LED check

Check LED statuses of the QJ71AS92 as follows.

#### (1) Check the status of the "RUN" LED status

Status	Details
Lit.	The power supply of programmable controller is on.
Off	Check whether the power supply of programmable controller is on. Check that the RESET switch of the CPU module is not in the RESET position.

#### (2) Check the status of the "U ASI" LED.

Status	Details
Lit.	AS-i power supply is normal.
Off	Check the wiring and capacity about AS-i power supply.

#### (3) Check the status of the "ERR." LED.

Status	Details
Lit.	Existing slave was lost or response was lost from slave, so that the mismatch occurred in LPS and LDS. Check the following points.
Off	Slave configuration is normal.

- Check the error code (buffer memory address: C0H or "CODE" LED situated at the front panel of the QJ71AS92) and the slave list that differs from the settings(buffer memory addresses: 1DH to 20H), and reexamine the corresponding slave.
- Check the slave status. See the slave manual for the method to check the status. If the slave is damaged, change that slave.
- Check the slave wiring. If the wiring is broken, replace the cable.
- Check whether the new slave is the same product that as the slave that has failed. If the slave is a different product, replace it with the same product. To use the different product, register the slave again.
- Check the slave address of the slave. If the same slave address is already used, all the slaves of that slave address cannot be recognized. Change the slave address into an unused slave address.
- Check that the AS-i power supply located behind the repeater has not failed. Refer to the AS-i power supply manual for the checking method. Replace the AS-i power supply if it has failed.
- Check that the repeater has not failed. See the repeater manual for the checking method. Change the repeater if it has failed.

#### TIP

If there are two slaves that have the same I/O and ID codes and the same slave address, both slaves will operate with the same slave address or both will become faulty.

## 8.3 Error Code List

When an error is detected, the QJ71AS92 turns the ERR. LED on and displays the status on the CODE LED with any of the following numbers.

At error occurrence, the error code is also stored into "Error Code, Error History" (buffer memory addresses C0H to C5H: Un\G192 to Un\G197) of the buffer memory.

Number		Detail
Error Code	"CODE" LED	
39H	39	A configuration error has not occurred.
40H	40	The QJ71AS92 is in the offline phase.
41H	41	The QJ71AS92 is in the detection phase.
42H	42	The QJ71AS92 is in the activation phase.
43H	(0 to 31) * <sup>1</sup>	A configuration data mismatch occurs in the configuration mode.
A00H to A1FH	0 to 31 * <sup>2</sup>	A LED ON Communication with the slave of the corresponding slave address in group A cannot be performed in the protected operation mode.
B00H to B1FH		B LED ON Communication with the slave of the corresponding slave address in group B cannot be made in the protected operation mode.
C00H to C1FH		A/B LED ON or OFF Communication with the non-grouped slave of the corresponding slave address cannot be performed in the protected operation mode. (AS-i Ver. 2.04-compatible I/O slave, analog slave)
E51H	51	Internal error: Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
E52H	52	
E53H	53	
E80H	80	The slave address 0 was recognized. The QJ71AS92 cannot end the configuration mode.
E81H	81	A general error occurred during a slave address change.
E82H	82	The QJ71AS92 has been set in the switch operation disabled status from the CPU module.
E90H	90	An error occurred during slave address change. The slave of the slave address 0 does not exist.
E91H	91	An error occurred during slave address change. The assigned slave address has already been used.
E92H	92	An error occurred during slave address change. A new slave address cannot be set.
E93H	93	An error occurred during slave address change. The new slave address can be stored into only the nonvolatile memory of the slave.
E94H	94	An error occurred during slave address change in the protected operation mode. The configuration information of the slave is in error.
E95H	95	An error occurred during slave address change in the protected operation mode. The slave address that caused the setting error is the slave used instead of the old slave.
F50H	50	Hardware error: Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
F70H	70	Hardware error: EEPROM write error. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
F72H	72	Hardware error: Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
F73H	73	
F74H	74	EEPROM write error: The processing of write to the EEPROM is performed more than 1000 times during continuous CPU module operation.
-	pg	EEPROM write in execution. (This is rarely displayed since write is completed in a short time.)
-	gd	EEPROM write completed.

\*1: Any of No. 0 to 31 is displayed.

\*2: Slave address detected in the configuration mode. The error code is not stored.

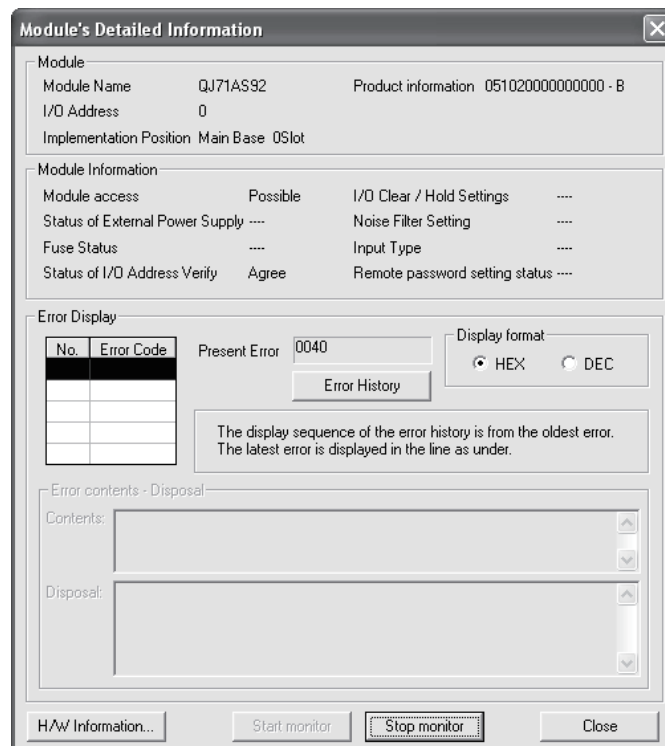
## 8.4 Checking the QJ71AS92 status using GX Developer system monitor

By selecting the detailed information of the QJ71AS92 in the system monitor of GX Developer, the error code and LED ON/OFF statuses can be checked.

## (1) When using GX Developer Version 8

## (a) Setting procedure

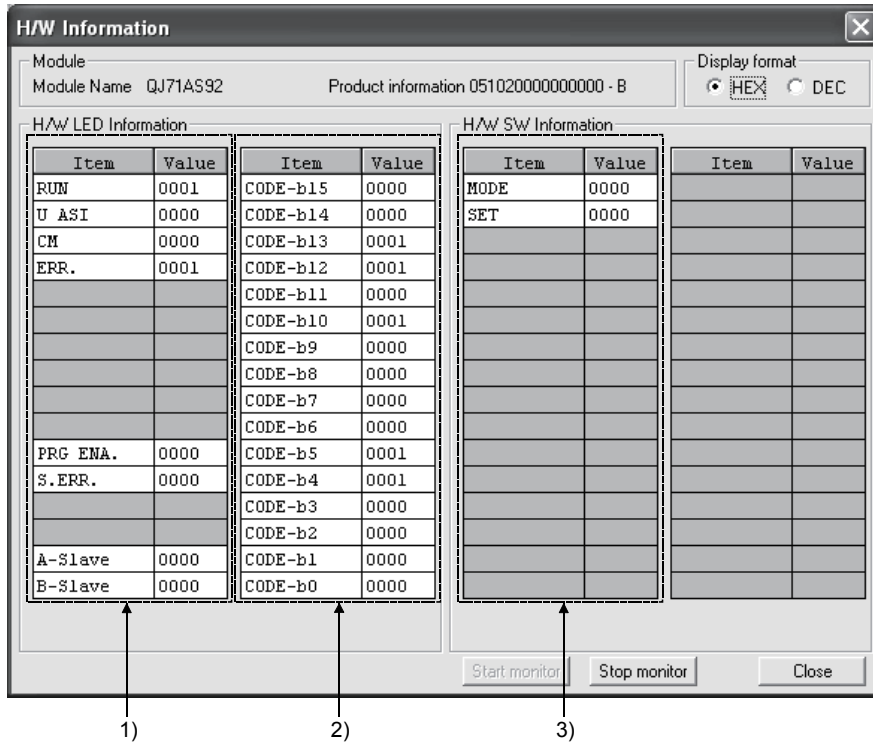
[Diagnostics] → [System monitor] "Select module"  
"Module Detailed Information" → "H/W information"



(b) Product information

Function version is displayed as follows:

051020000000000-B  
 ↑  
 Function version B



1) H/W LED Information (Left side)

The followings are displayed as H/W LED information.

Item	Details	Status
RUN	ON/OFF status of "RUN" LED	0: OFF 1: ON
U ASI	ON/OFF status of "U ASI" LED	
CM	ON/OFF status of "CM" LED	
ERR.	ON/OFF status of "ERR." LED	
PRG ENA.	ON/OFF status of "PRG ENA." LED	
S ERR.	ON/OFF status of "S ERR." LED	
A-Slave	ON/OFF status of "A" LED	
B-Slave	ON/OFF status of "B" LED	

2) H/W LED Information (Right side)

Item	Details		Status
CODE-b15	ON/OFF status of second digit of "CODE" LED	Shows the first 4 bits of the value converted into ASCII character code.	—
CODE-b14			
CODE-b13			
CODE-b12			
CODE-b11		Shows the last 4 bits of the value converted into ASCII character code.	
CODE-b10			
CODE-b9			
CODE-b8			
CODE-b7	ON/OFF status of first digit of "CODE" LED	Shows the first 4 bits of the value converted into ASCII character code.	
CODE-b6			
CODE-b5			
CODE-b4			
CODE-b3		Shows the last 4 bits of the value converted into ASCII character code.	
CODE-b2			
CODE-b1			
CODE-b0			

Display Example:

When [40] appears on the "CODE" LED:

Second digit = [4] = 34H (ASCII character code) = 0011 0100 (bit indication)

First digit = [0] = 30H (ASCII character code) = 0011 0000 (bit indication)

They are displayed as follows.

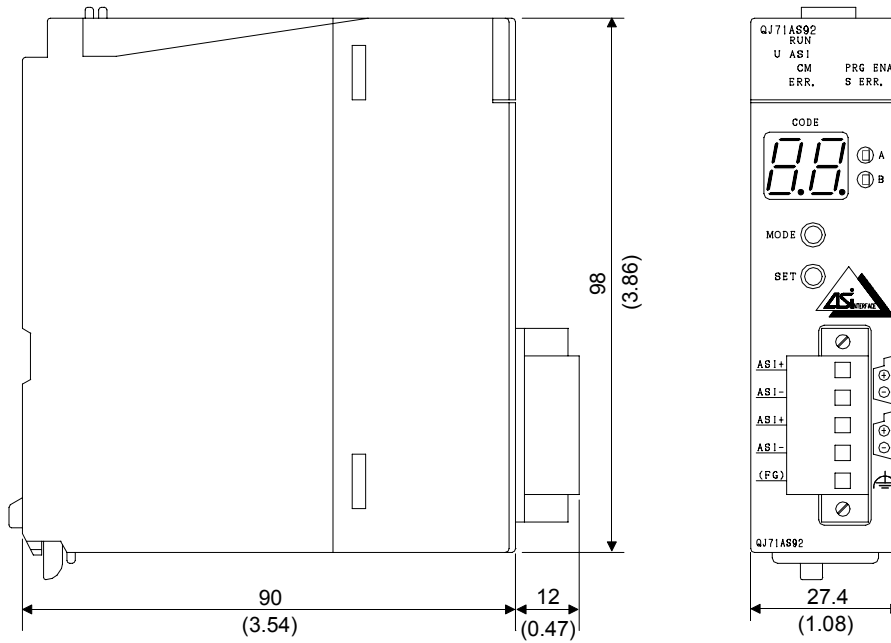
CODE-b15 to b0 = [40] = (34H) (30H) = 0011 0100 0011 0000

3) H/W SW Information (Left side)

Item	Details	Status
MODE	Position of "MODE" switch	—
SET	Position of "SET" switch	

APPENDIX

Appendix 1 External Dimensions



Unit: mm (in.)



## Appendix 2. AS-i Protocol Implementation Conformance Statement (PICS)

List of implemented functions:

No.	List of implemented functions	Mark /Profile	Remark /implemented by
A	Functions or calls at host interface		
1	Image, Status = Read_IDI()	x	BFM
2	Status = Write_OD(Image)	x	BFM
3	Status = Set_Permanent_Parameter(S_Addr, S_Param)	x	CMD
4	S_Param, Status = Get_Permanent_Parameter(S_Addr)	x	CMD
5	Status, RS_Param = Write_Parameter(S_Addr, S_Param)	x	CMD
6	Status, S_Param = Read_Parameter(S_Addr)	x	CMD
7	Status = Store_Actual_Parameters()	x	CMD
8	Status = Set_Permanent_Configuration(S_Addr, S_Config)	x	CMD
9	Status, S_Config = Get_Permanent_Configuration(S_Addr)	x	CMD
10	Status = Store_Actual_Configuration()	x	CMD
11	Status, S_Config = Read_Actual_Configuration(S_Addr)	x	CMD
12	Status = Set_LPS(S_List)	x	BFM
13	Status, S_List= Get_LPS()	x	BFM
14	Status, S_List= Get_LAS()	x	BFM
15	Status, S_List= Get_LDS()	x	BFM
16.0	Status, Flags = Get_Flags()	x	BFM
16.1	Status, Flag = Get_Flag_Config_OK()	x	I/O and BFM
16.2	Status, Flag = Get_Flag_LDS.0()	x	BFM
16.3	Status, Flag = Get_Flag_Auto_Address_Assign()	x	BFM
16.4	Status, Flag = Get_Flag_Auto_Prog_Available()	x	BFM
16.5	Status, Flag = Get_Flag_Configuration_Active()	x	I/O and BFM
16.6	Status, Flag = Get_Flag_Normal_Operation_Active()	x	I/O and BFM
16.7	Status, Flag = Get_Flag_APF()	x	I/O and BFM
16.8	Status, Flag = Get_Flag_Offline_Ready()	x	BFM
16.9	Status, Flag = Get_Flag_Periphery_OK()	x	BFM
17	Status = Set_Operation_Mode(Mode)	x	I/O
18	Status = Set_Offline_Mode(Mode)	x	I/O
19	Status = Activate_Data_Exchange(Mode)	-	-
20	Status = Change_Slave_Address(S_Addr1,S_Addr2)	x	CMD
21.1	Status = Set_Auto_Address_Enable(Mode)	x	I/O
21.2	Mode = Get_Auto_Address_Enable()	x	I/O
22.1	Status, Resp = Cmd_Reset_AS-i_Slave(S_Addr, RESET)	-	-
22.2	Status, Resp = Cmd_Read_IO_Configuration(S_Addr, CONF)	-	-
22.3	Status, Resp = Cmd_Read_Identification_Code(S_Addr, IDCOD)	-	-
22.4	Status, Resp = Cmd_Read_Status(S_Addr, STAT)	-	-
22.5	Status, Resp = Cmd_Read_Reset_Status(S_Addr, STATRES)	-	-
22.6	Status, Resp = Cmd_Read_Ext_ID-Code_1(S_Addr, IDCOD1)	-	-
22.7	Status, Resp = Cmd_Read_Ext_ID-Code_2(S_Addr, IDCOD2)	-	-
23	Status, S_List = Get_List_of_Periphery_Faults()	x	BFM
24	Status = Write_Extended_ID-Code_1(S_Ext_ID-Code_1)	x	CMD

No.	List of implemented functions	Mark /Profile	Remark /implemented by
B	Integrated support of slave profiles		
1	Analog slave profile S7.3 support integrated	x	BFM
2	Analog slave profile S7.4 support integrated	x	CMD

Key to the symbols for column 3:

sign	meaning
x	implemented
-	not available

Key to the symbols for column 4:

sign	meaning
BFM	implemented by Buffer Memory
CMD	implemented by Command request
I/O	implemented by I/O signal
-	not available

Appendix 3 Differences between QJ71AS92 and A1SJ71AS92

(1) The following table indicates the differences in specifications between the QJ71AS92 and A1SJ71AS92.

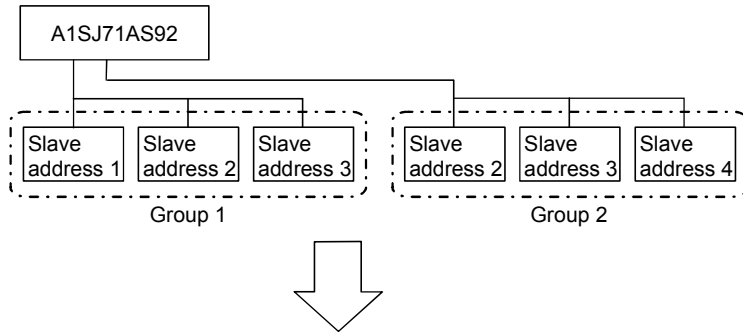
Item		Specifications	
		QJ71AS92	A1SJ71AS92
AS-i Standard		Ver. 2.11	Ver. 2.04
Max. number of AS-i system slaves		62 (Group A: 31 + Group B: 31)	31 (non- grouped) x 2 systems
Connectable slave type	Ver. 2.04-compatible I/O slave	Connectable	Connectable
	Ver. 2.11-compatible I/O slave	Connectable	N/A
	Analog slave	Connectable	N/A
I/O refresh time	When slaves are not grouped into A and B • Ver. 2.04-compatible I/O slave • Analog slave • Ver. 2.11-compatible I/O slave (When not grouped)	Approx. 5ms	Approx. 5ms
	When slaves are grouped into A and B • Ver. 2.11-compatible I/O slave (When grouped)	Approx. 10ms	N/A
	Analog slave	Approx. 35ms (channel 1) Approx. 70ms (channel 2) Approx. 105ms (channel 3) Approx. 140ms (channel 4)	N/A
Internal memory		EEPROM (for registration of slave configuration) Number of writes: 100,000 times max.	Flash ROM (for registration of slave configuration) Number of writes: 10,000 times max.
Number of occupied I/O points		32 points (I/O assignment: 32 intelligent points)	32 points (I/O assignment: 32 special points)

(2) Precautions for diverting the system

The following table indicates the precautions for diverting the A1SJ71AS92 system.

No.	Item	QJ71AS92	A1SJ71AS92
1	System	1 system	2 systems
2	Grouping	Allowed (compatible with AS-i Ver. 2.11)	Not allowed
3	Connectable slave	AS-i Ver. 2.04-compatible I/O slave AS-i Ver. 2.11-compatible I/O slave Analog slave AS-i Ver. 2.04-compatible I/O slave	AS-i Ver. 2.04-compatible I/O slave

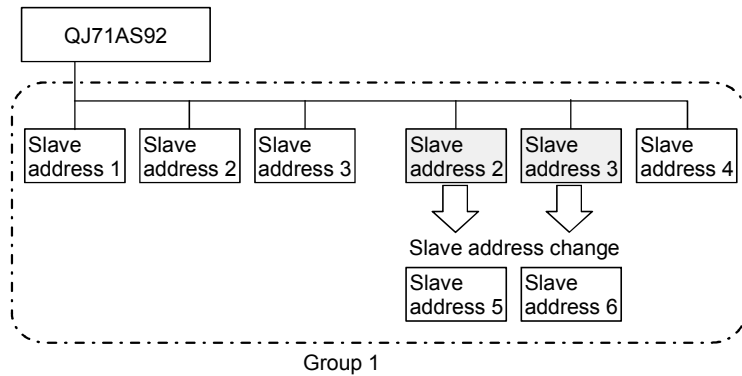
Example: When two systems are controlled by the A1SJ71AS92



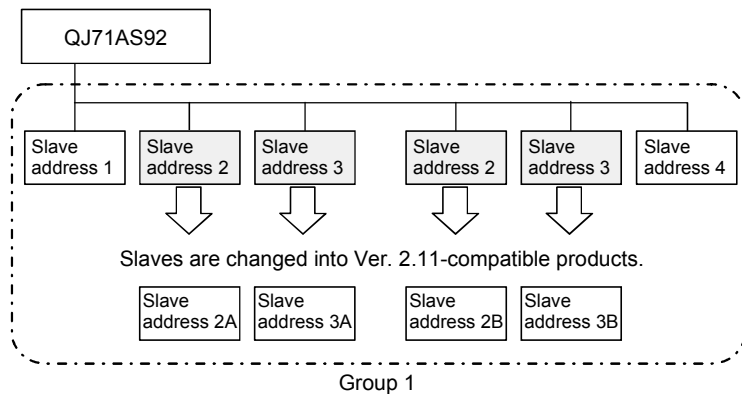
The A1SJ71AS92 system can be diverted to the QJ71AS92 system in any of the following three methods.

**TIP**  
 In any of the three methods, the program for the second system slaves must be modified.

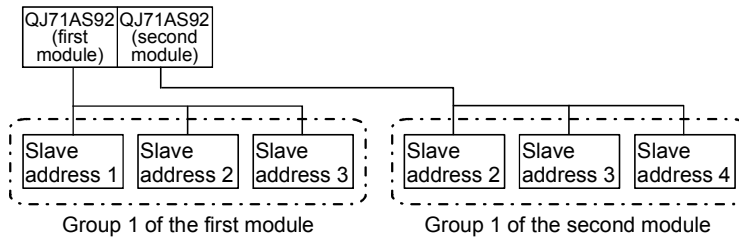
- 1) Change the slave addresses of the second system into the slave addresses not used in the first system, and connect the second system to the first system.



- 2) Change the slaves whose slave addresses overlap in the first and second systems into the AS-i Ver. 2.11-compatible slaves. Then split the slaves into two groups (A and B) and assign different slave addresses to group A and B, and connect the second system to the first system



3) Prepare two QJ71AS92 modules. Then connect the slaves of the first and second systems to the respective modules.



(3) Precautions for program utilization

No.	Item	QJ71AS92	A1SJ71AS92
1	Module ready signal	X0	X1
2	Watchdog timer error signal	X0 (Also used as module ready signal) • ON: Normal • OFF: Watchdog timer error occurred	X0 • ON: Normal • OFF: Watchdog timer error occurred
3	Configuration Registration Request/ completed	1) When values are set in the projected slave list (LPS (for write)) (buffer memory addresses: 49H to 4CH) and Configuration Registration Request (Y13) is turned ON, they are registered. 2) The registration result is reflected on the projected slave list (LPS (for read)) (buffer memory addresses: 19H to 1CH), and configuration register completion (X3) is turned ON.	1) When values are set in the projected slave list (LPS (for write)) (buffer memory addresses: 49H to 4AH, A9H to AAH), they are registered automatically. 2) The registration result is reflected on the projected slave list (LPS (for read)) (buffer memory addresses: 19H to 1AH, 79H to 7AH).
4	Command Request/ completed	1) When a command is written to the command buffer <request> (buffer memory addresses: 55H to 59H) and command execution request (Y12) is turned ON, the command is executed. 2) The execution result is stored into the command buffer <request> (buffer memory addresses: 25H to 29H) and command completion (X2) is turned ON.	1) When a command is written to the command buffer <request> (buffer memory addresses: 55H to 59H, B5H to B9H), the command is executed automatically. 2) The execution result is stored into the command buffer <result> (buffer memory addresses: 25H to 29H, 85H to 89H).



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# WARRANTY

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

## 1. Gratis Warranty Term and Gratis Warranty Range

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

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

### [Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

### [Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
  1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
  2. Failure caused by unapproved modifications, etc., to the product by the user.
  3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
  4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
  5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
  6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
  7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

## 2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

## 3. Overseas service

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

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

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

## 5. Changes in product specifications

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

## 6. Product application

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

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

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SPREAD

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SH(NA)-080291E-G(0805)MEE

MODEL: QJ71AS92-U-S-E

MODEL CODE: 13JR53

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