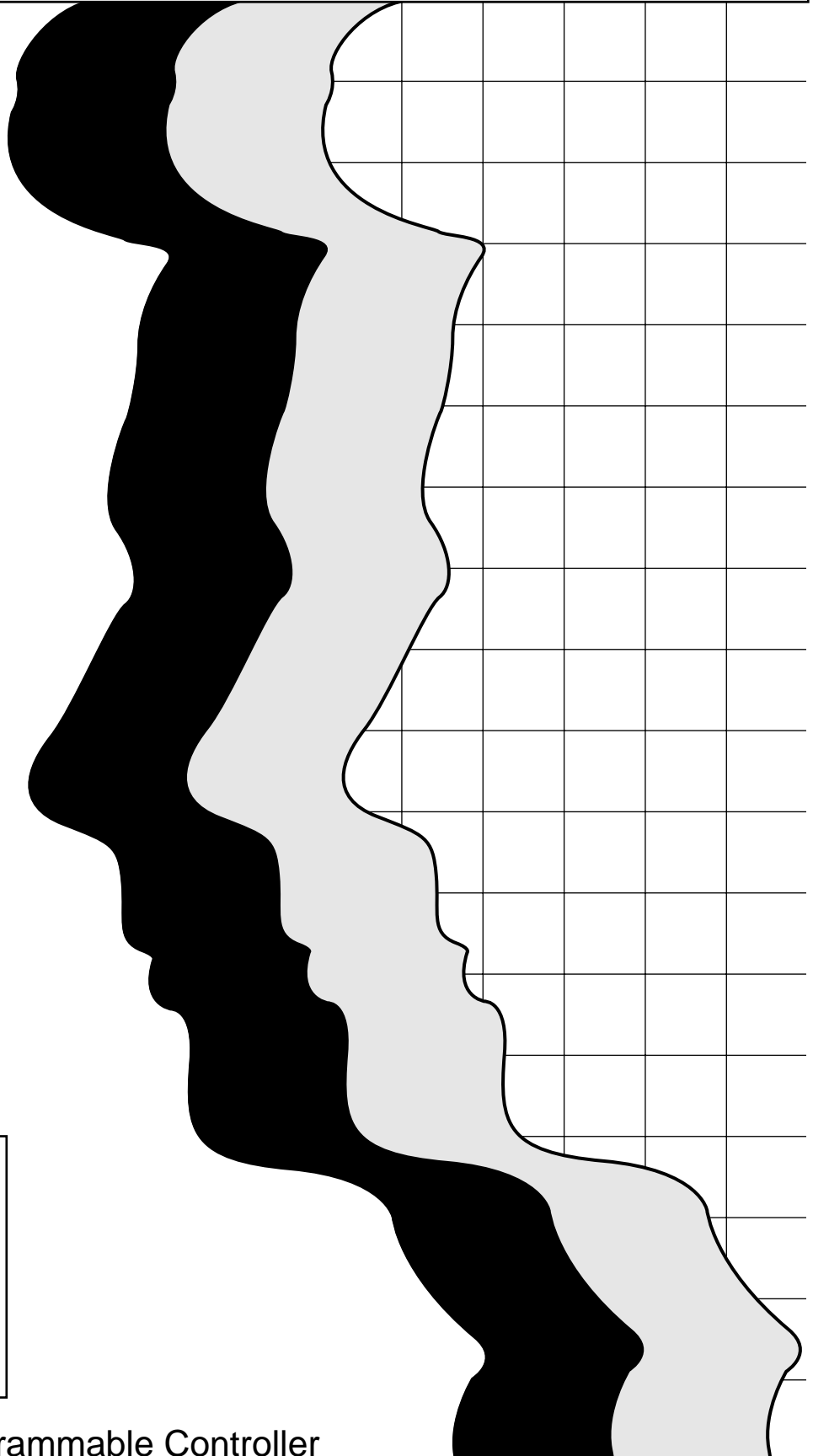


MITSUBISHI

MELSECNET/MINI-S3 Master Module

Type AJ71PT32-S3,AJ71T32-S3,A1SJ71PT32-S3,A1SJ71T32-S3

User's Manual



Mitsubishi Programmable Controller

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the programmable controller system safety precautions.

These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".




DANGER

Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.



CAUTION

Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by  **CAUTION** may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can and read it whenever necessary.
Always forward it to the end user.

[Design Precautions]



DANGER

- When a data link communication error occurs, the status shown below will be established at the faulty station. In order to ensure that the system operates safely at such times, an interlock circuit should be provided in the sequence program (using the communication status information).

Erroneous outputs and operation could result in an accident.

- 1) The data link data which existed prior to the error will be held.
- 2) At the remote I/O stations, all outputs will be switched OFF or output statuses will be held, depending on the E.C. mode setting.



CAUTION

- Do not bundle control lines or communication wires together with main circuit or power lines, or lay them close to these lines.

As a guide, separate the 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 conforms to the general specifications in the manual.
Using the programmable controller in environments outside the ranges stated in the general specifications will cause electric shock, fire, malfunction, or damage to/deterioration of the product.
- Insert the fixing latch on the bottom of the module into the fixing hole in the base unit and install the module using the hole point as a fulcrum. (Modules in AnS series, make sure screws are securely tightened to base unit with specified torques.)
Improper installation may cause erroneous operation, accidents, or the module to fall out.

[Wiring Precautions]



DANGER

- Completely turn off the externally supplied power used in the system when installing or placing wiring. Failure to do so may cause electric shocks or damage the product.



CAUTION

- Be sure to ground the FG terminal, carrying out at least class 3 grounding work with a ground exclusive to the programmable controller.
Otherwise there will be a danger of malfunctions.
- Carry out wiring the module correctly, checking the terminal arrangement of the product.
Carrying out wiring incorrectly will cause fire or failure.
- Tighten the terminal screws to the stipulated torque.
Loose screws will cause malfunctions.
Overtightening of screws can cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.
- Make sure that no foreign matter such as chips or wiring offcuts gets inside the module.
It will cause fire, failure or malfunction.

[Startup and Maintenance Precautions]



DANGER

- Do not touch terminals or connectors while the power is ON.
This will cause malfunctions.
- Switch off all phases of the externally supplied power used in the system when cleaning the module or retightening the terminal. Failure to completely shut off all phases of the external power supply may cause module breakdowns and malfunctions.



CAUTION

- Do not disassemble or modify any module.
This will cause failure, malfunction, injuries, or fire.
- Completely turn off the externally supplied power used in the system before mounting or removing the module. Failure to do so may damage the module or result in malfunctions.
- Always make sure to touch the grounded metal to discharge the electricity charged in the electricity charged in the body, etc., before touching the module.
Failure to do so may cause a failure or malfunctions of the module.

[Precautions When Disposing of This Product]



CAUTION

- Dispose of this product as industrial waste.

REVISIONS

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

Print Date	*Manual Number	Revision
Feb., 1995	IB (NA) 66565-A	First edition
Jul., 1995	IB (NA) 66565-B	<p>Addition Sections 2.2.1, 3.4.1, 3.5.2, 4.5.3, 6.2</p> <p>Correction Sections 3.4.2 (5), 5.1, APPENDIX 4</p>
Dec., 1995	IB (NA) 66565-C	<p>Addition Sections 2.2.1, 3.1, 3.2.1, 3.3.3 (3), 3.3.3 (5)</p>
Aug., 1996	IB (NA) 66565-D	<p>Addition Section 2.2.2</p> <p>Correction Sections 4.5.3, 4.6.1</p>
Oct., 2000	IB (NA) 66565-E	<p>Correction SAFETY PRECAUTIONS, Sections 3.1, 3.4.1, 4.1, 4.3.1, 4.3.2, 4.5.2, 4.5.3, 4.5.5, 4.6.1, APPENDIX 2</p>
Dec., 2003	IB (NA) 66565-F	<p>Addition Conformation to the EMC Directive and Low Voltage Instruction</p> <p>Correction SAFETY PRECAUTIONS, Sections 2.2.1, 3.1, 3.4.2</p>
Aug., 2006	IB (NA) 66565-G	<p>Addition Section 4.5.6</p> <p>Correction SAFETY PRECAUTIONS, Conformation to the EMC Directive and Low Voltage Instruction</p>
Mar., 2007	IB (NA) 66565-H	<p>Change of a term "PLC" was changed to "programmable controller".</p> <p>Correction Conformation to the EMC Directive and Low Voltage Instruction, Section 4.5.6</p>

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A Series of General Purpose Programmable Controllers. Please read this manual carefully so that the equipment is used to its optimum. A copy of this manual should be forwarded to the end User.

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Manuals

The following manuals are also relevant to this product.

Related manuals

- **A2C, MELSECNET/MINI-S3 I/O MODULE User's Manual (SH-3546)**
Describes the specification of the I/O module that can connect to MELSECNET/MINI-S3.
- **SW0GP-MNIPE Operating Manual (IB-66226)**
Describes the procedure for creating the initial data ROM, the character generator ROM, and the message ROM. (For A6GPP/A6PHP)
(Manual packaged with the SW0GP-MNIPE software package)

Conformation to the EMC Directive and Low Voltage Instruction

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

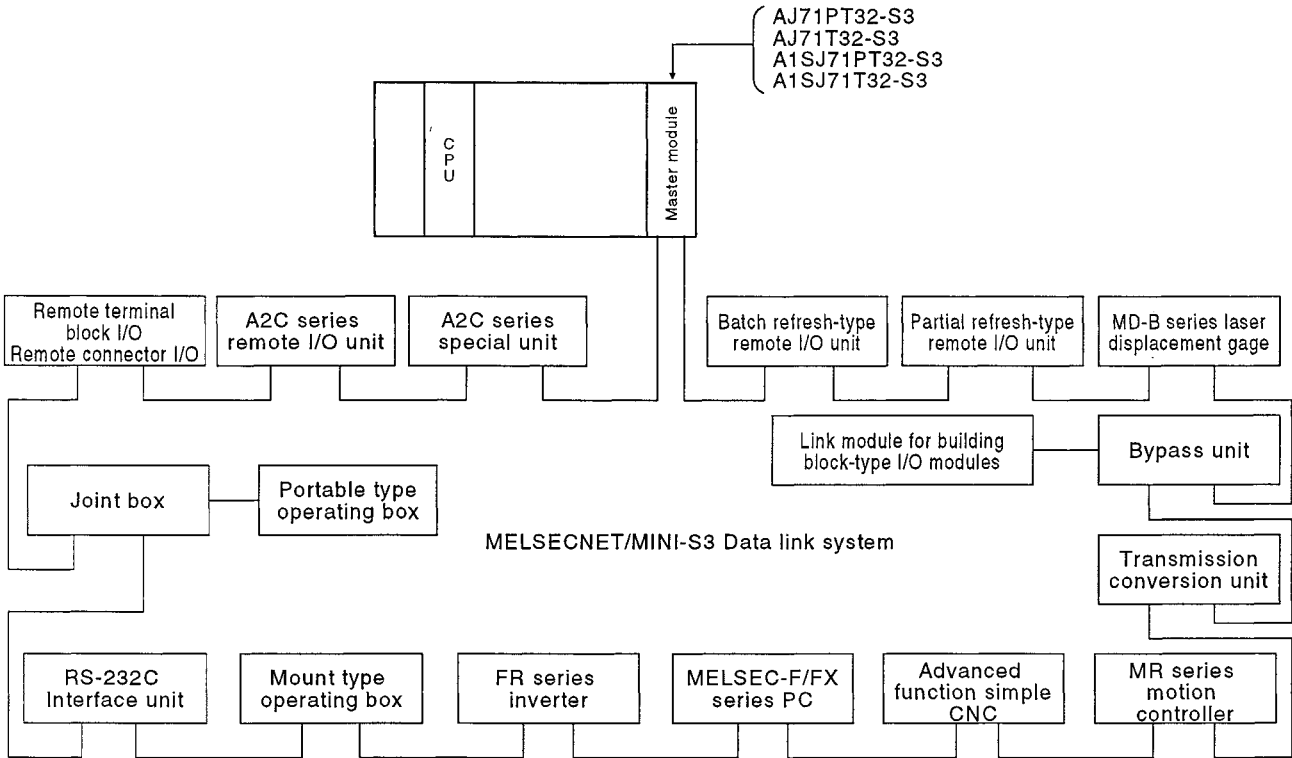
The CE logo is printed on the rating plate of the programmable controller, indicating compliance with the EMC and low voltage directives.

For the compliance of the remote module with the EMC and low voltage directives, refer to "4.5.6 EMC and Low Voltage Directives (Remote module)".

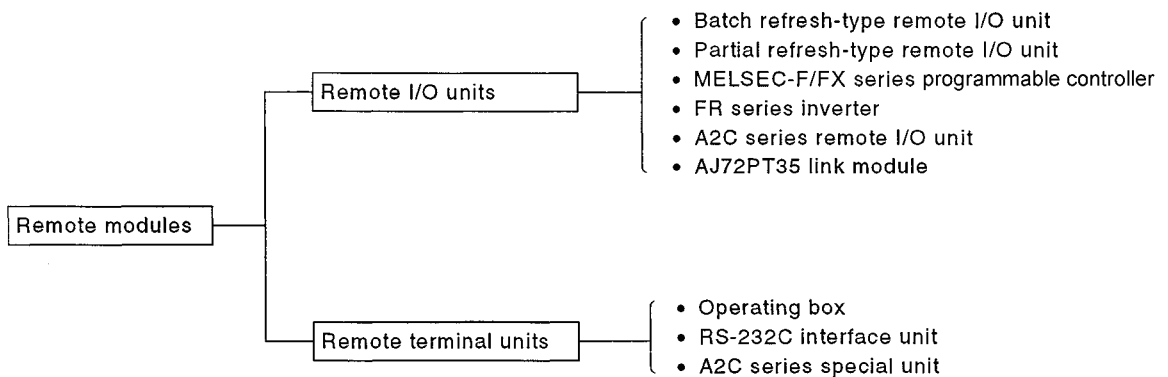
(No additional measures are necessary for the master module to comply with the EMC and low voltage directives.)

1. GENERAL DESCRIPTION

In a typical MINI-S3 link, as shown below, the master module is installed in a main base unit or extension base unit, and connected to remote modules via plastic fiber-optic or twisted-pair wire cables. Since remote units can be located next to installed equipment such as conveyor lines and machinery, this system significantly reduces the wiring required for I/O signal lines.



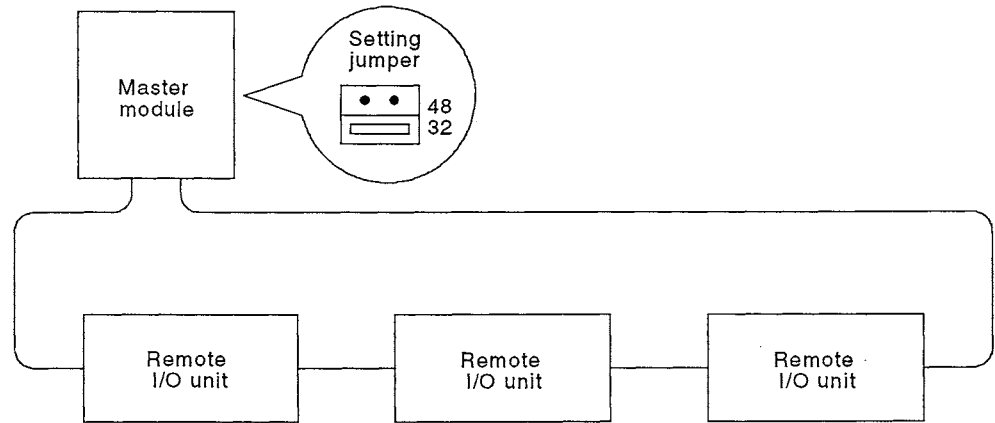
The remote modules that can be connected to the MINI-S3 link consist of remote I/O units and remote terminal units:



Up to 14 remote terminal units can be connected in the MINI-S3 link.

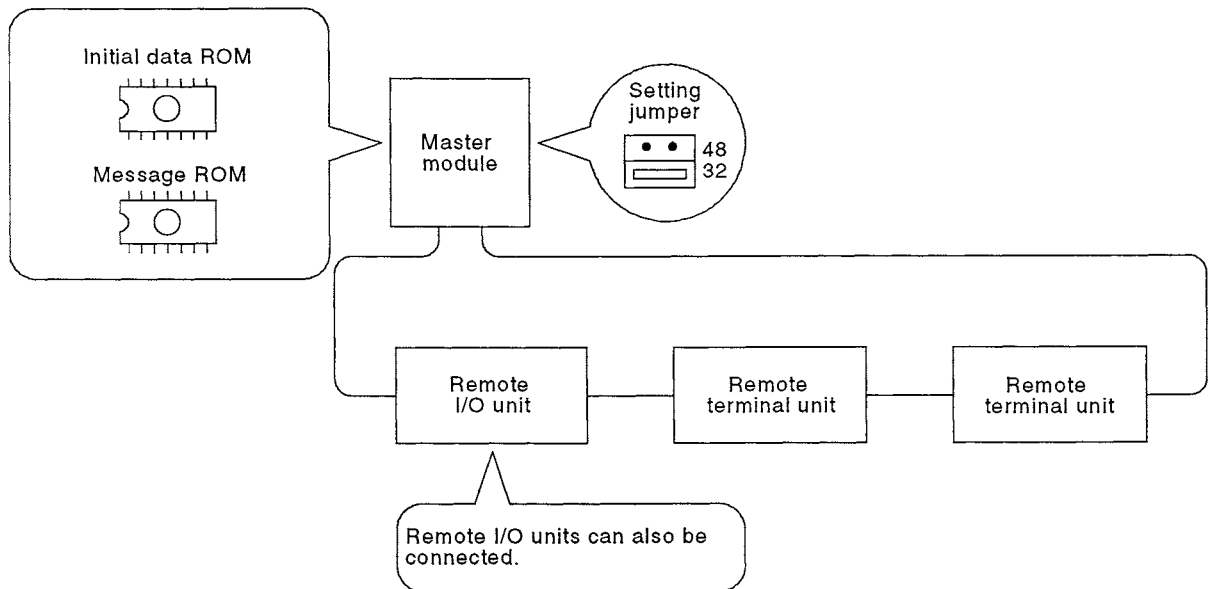
The MINI-S3 link has two modes: the "I/O dedicated mode" and the "extension mode".

I/O dedicated mode This is the mode used if only the "remote I/O units" indicated on the previous page are used. Set the master module's use mode switch setting jumper at the "32" side.



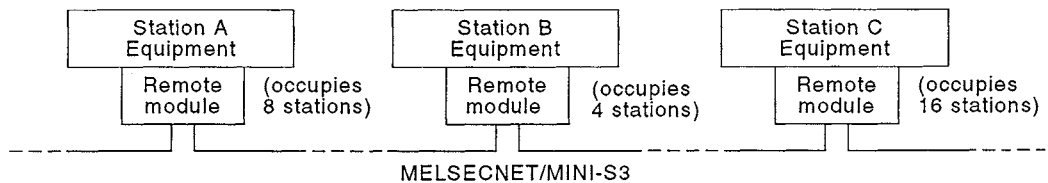
Extension mode. This is the mode used if any of the "remote terminal units" indicated on the previous page are used.

Set the master module's use mode switch setting jumper at the "48" side, and install an initial data ROM and message ROM if using an operating box.



1.1 Features

- (1) Up to 64 remote stations can be connected to the MINI-S3 with remote modules directly installed in separate equipment.

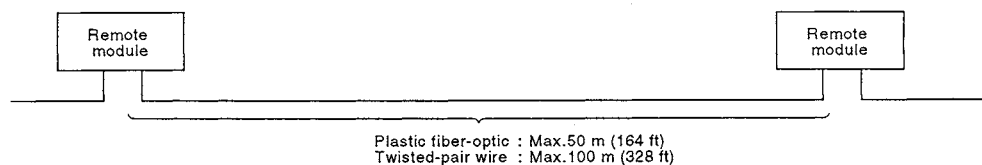


One station corresponds to eight I/O points.

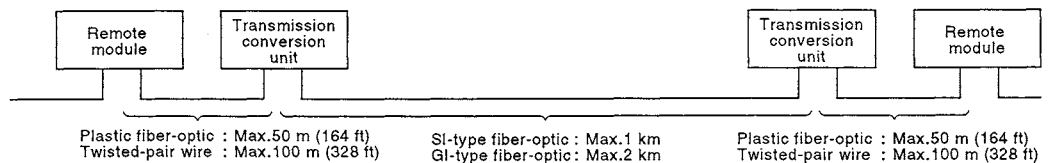
The number of occupied I/O points of a remote module ranges from 1 to 16 (stations).

By using a link module for building block-type I/O modules, remote stations with up to 128 points (occupying 16 stations) can be connected to a single station.

- (2) Since each remote module can be separately located away from the CPU module, this system significantly reduces I/O wiring costs.



- (3) Longer distances can be provided by using AJ35PTC-CNV/AJ35PP-CNV transmission conversion units between remote modules.



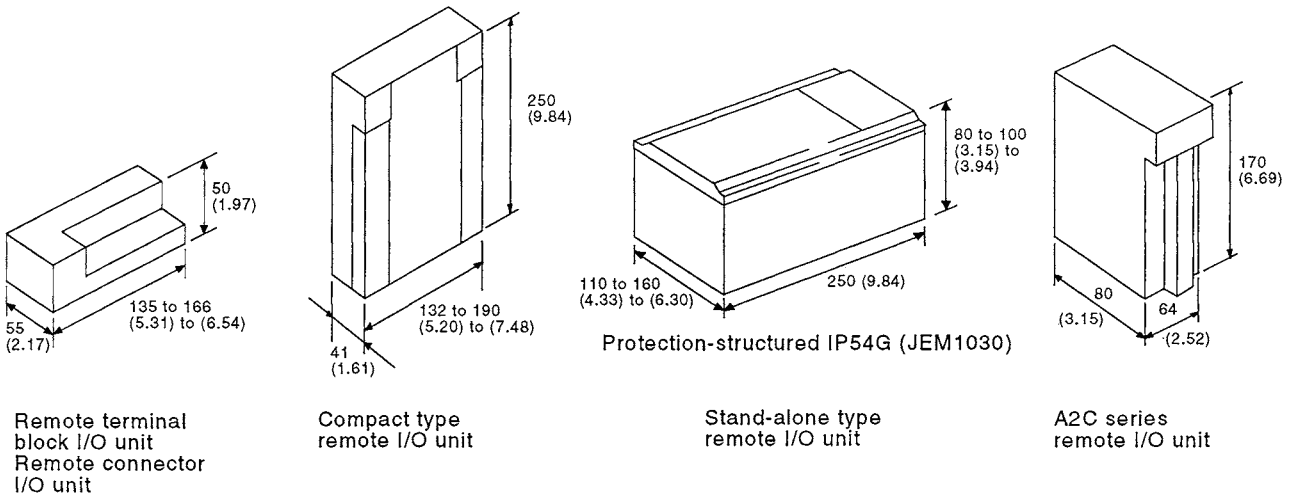
1. GENERAL DESCRIPTION

MELSEC-A

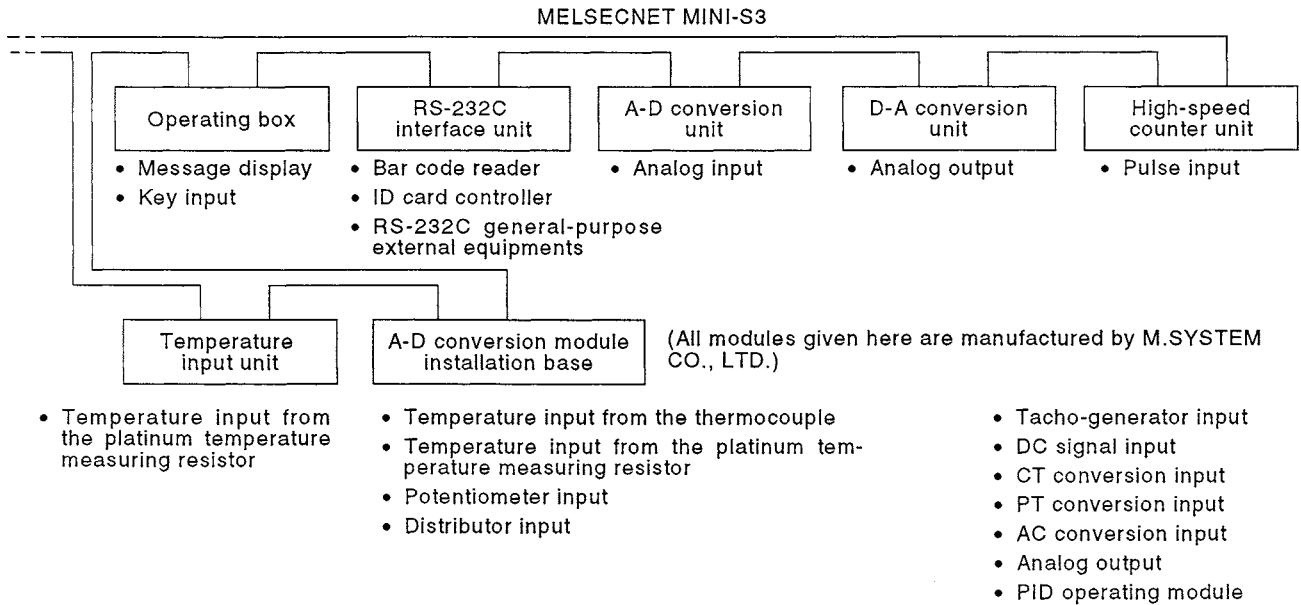
(4) Remote units can be used in many different operating environments.

For example, (a) places that do not have enough space to contain a normal-sized remote unit, or (b) places where protection cannot be provided although the unit is exposed to water, oil, etc.

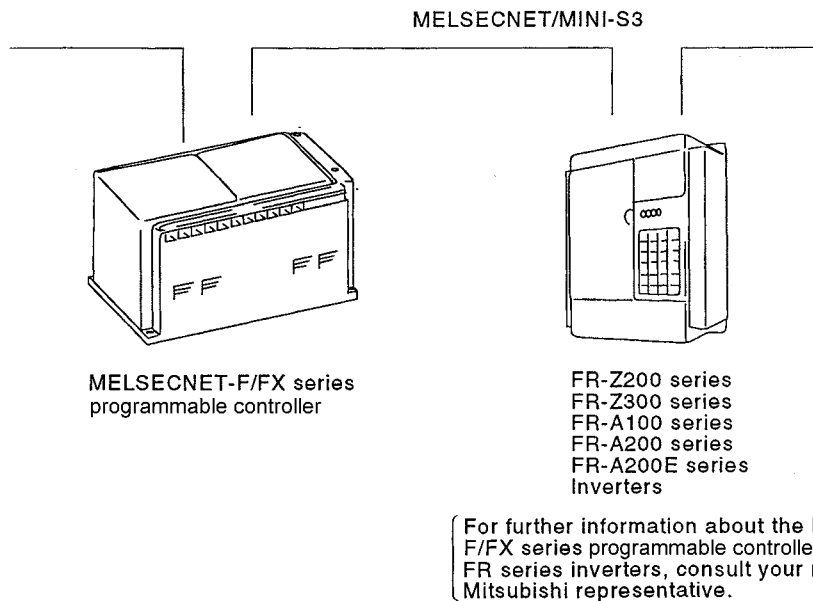
[Unit: mm (inch)]



(5) A special unit for the MINI-S3 link or A2C series enables direct connections with related equipment such as sensors, measuring instruments, and controllers.



- (6) MELSEC-F/FX series programmable controllers and FR series inverters can be directly connected to the MINI-S3 link.



- (7) Connecting an AJ35TT(TP)-BU bypass unit enables the use of the following functions.

(a) Bypass function

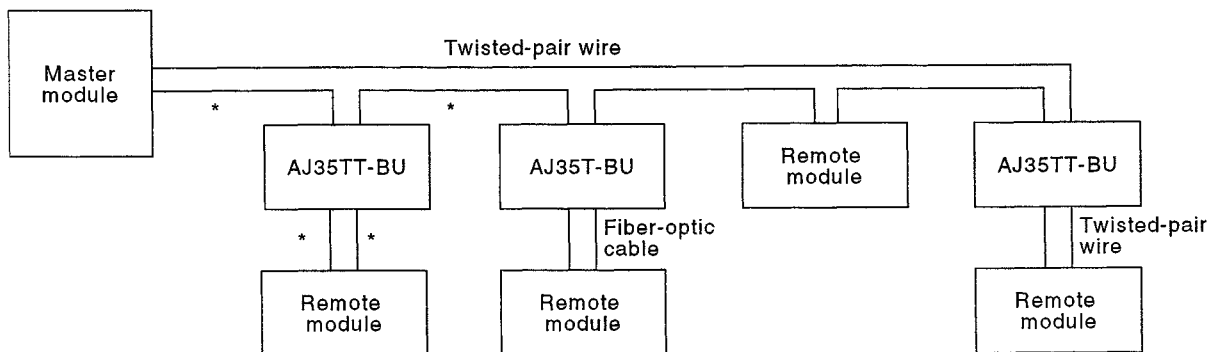
If a transmission fault is detected in a remote station connected via the bypass unit, the faulty station is disconnected from the loop and data link communication continued.

The faulty station is automatically brought back online when it becomes capable of normal communication.

(b) Repeater function

Enables the station-to-station distance to be increased.

The distance between an AJ35TT(TP)-BU and a remote station, or the distance between an AJ35TT(TP)-BU and another AJ35TT(TP)-BU can be made the same as the maximum station-to-station distance in a MINI-S3 link system.



The cable lengths marked "*" can be extended to the maximum station-to-station length.

1. GENERAL DESCRIPTION

MELSEC-A

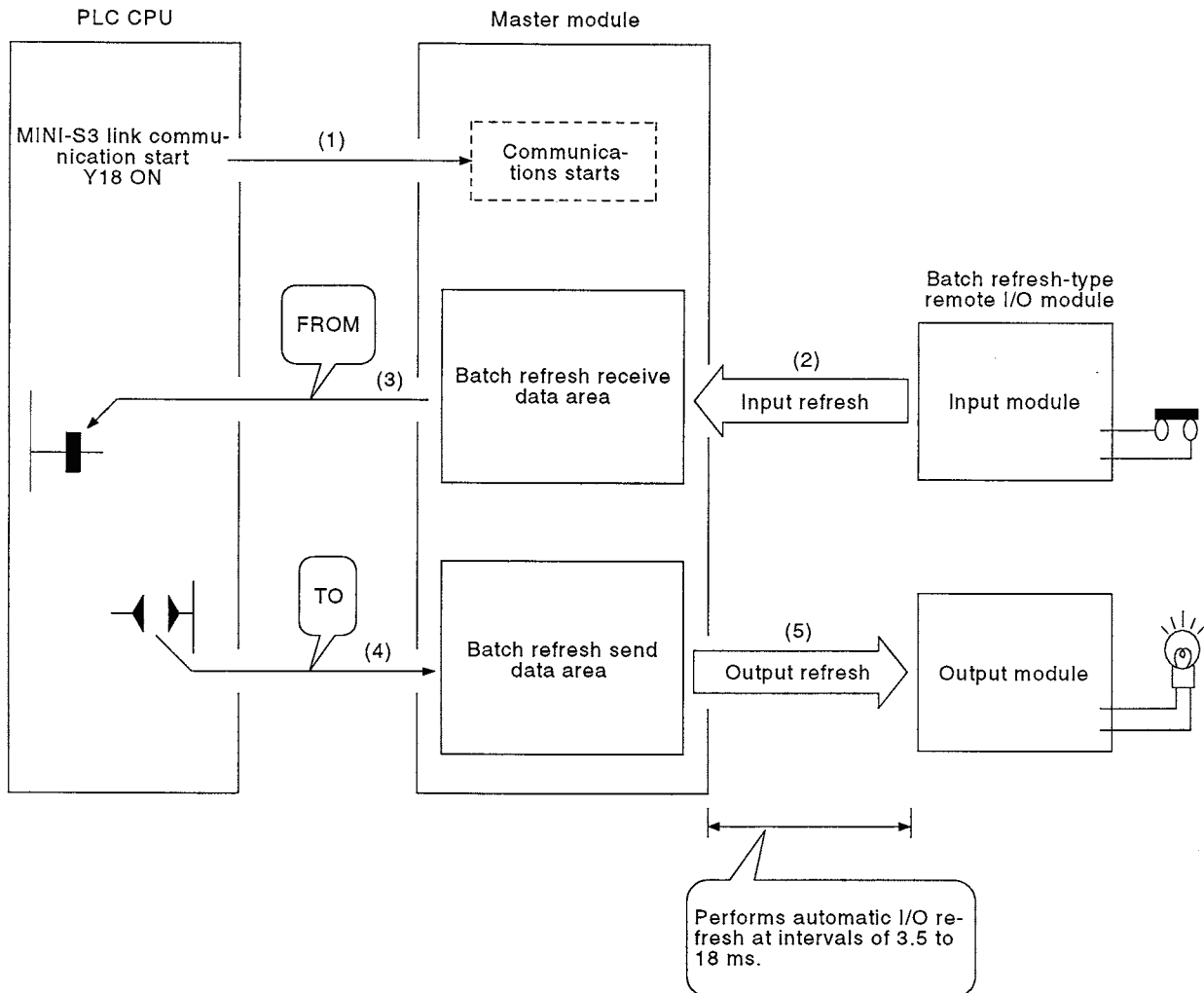
- (8) The available types of master module that can be connected to a MINI-S3 link system are indicated below.

Model	Type	Communication Medium
AJ71PT32-S3	Building block type	Fiber-optic/twisted-pair cable
AJ71T32-S3		Twisted-pair cable
A1SJ71PT32-S3	Compact building-block type	Fiber-optic/twisted-pair cable
A1SJ71T32-S3		Twisted-pair cable

1.2 Outline of Communications

1.2.1 Communication with batch refresh-type remote I/O units

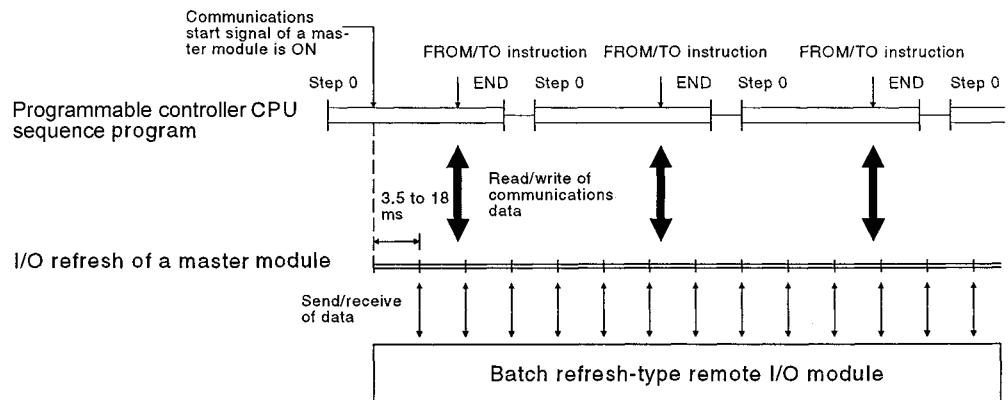
I/O processing for each module is executed every I/O refresh, using the batch refresh receive area of the buffer memory.



- (1) When the MINI-S3 link communication start signal (Y18) comes ON, MINI-S3 link communication starts.
- (2) The input data of the input module is stored in the batch refresh receive data area in I/O refresh processing.
- (3) Input data is read from the batch refresh receive data area in accordance with a FROM instruction.
- (4) Output data is written to the batch refresh transmit data area in accordance with a TO instruction.
- (5) The output data in the batch refresh transmit data area is transferred to the output module when I/O refresh is executed.

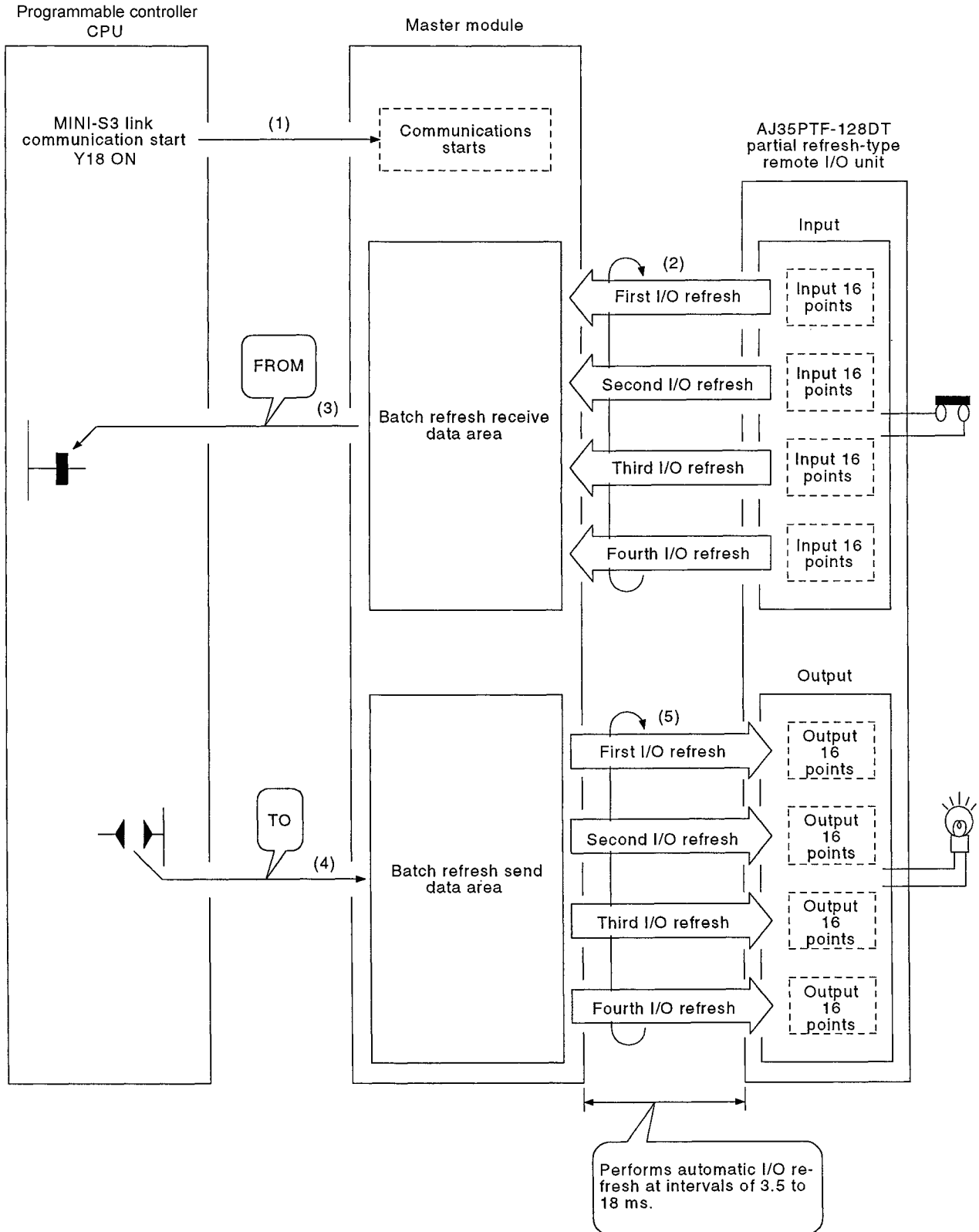
1. GENERAL DESCRIPTION

The timing for data transmission and reception is shown below.



1.2.2 Communications with a partial refresh-type remote I/O unit

Using the partial refresh communications area of the buffer memory, the data of 64 input points and 64 output points is processing in four I/O refresh processings.

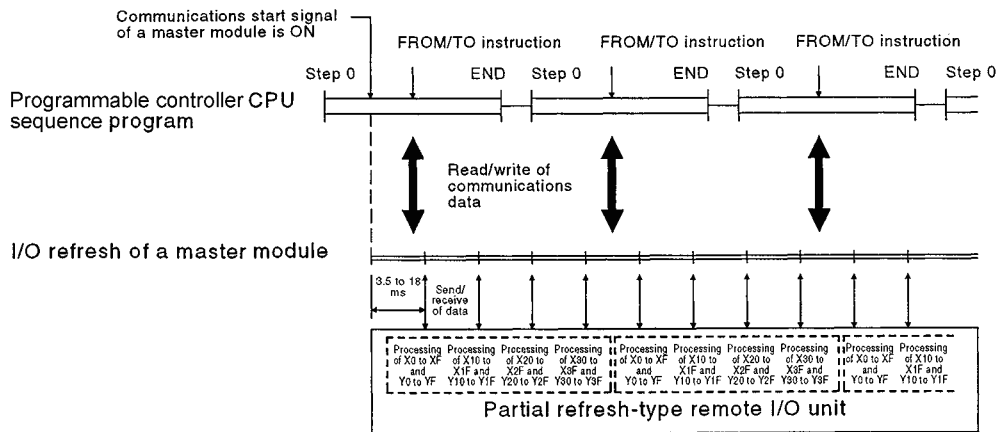


1. GENERAL DESCRIPTION

MELSEC-A

- (1) When the MINI-S3 link communication start signal (Y18) comes ON, MINI-S3 link communication starts.
- (2) The input data is stored in the partial refresh receive data area in four I/O refresh processings (the data of 16 points in each refresh).
- (3) Input data is read from the partial refresh receive data area in accordance with a FROM instruction.
- (4) Output data is written to the partial refresh transmit data area in accordance with a TO instruction.
- (5) The output data in the partial refresh transmit data area is transferred to the output unit in four I/O refresh processings.

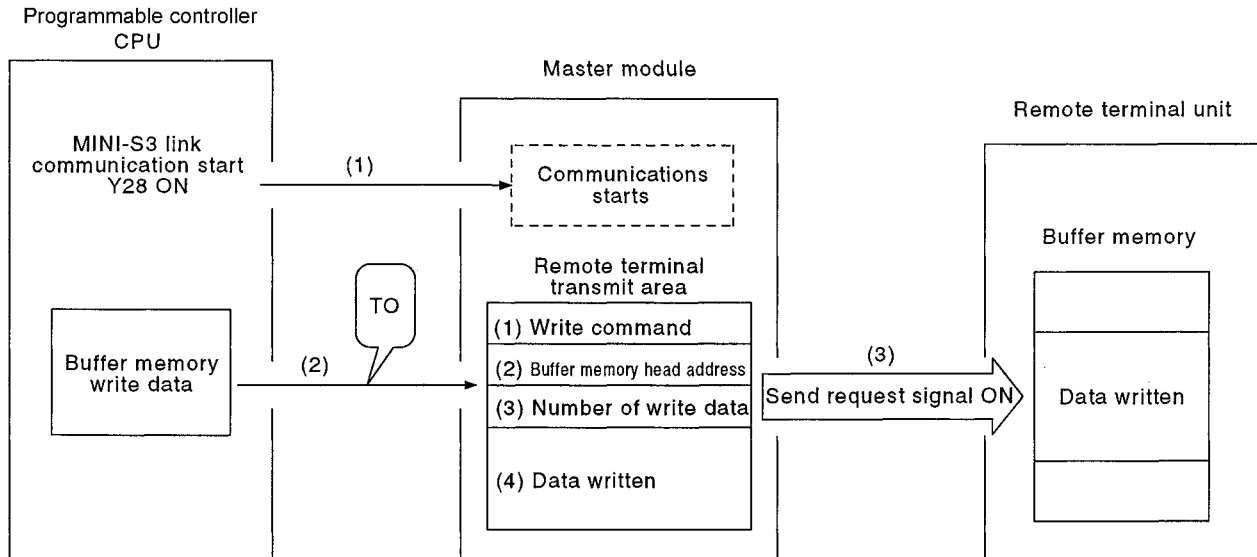
The timing for data transmission and reception is shown below.



1.2.3 Communications with remote terminal units

Data is written to and read from the buffer memory using the remote terminal communications area.

[Writing data to the buffer memory]

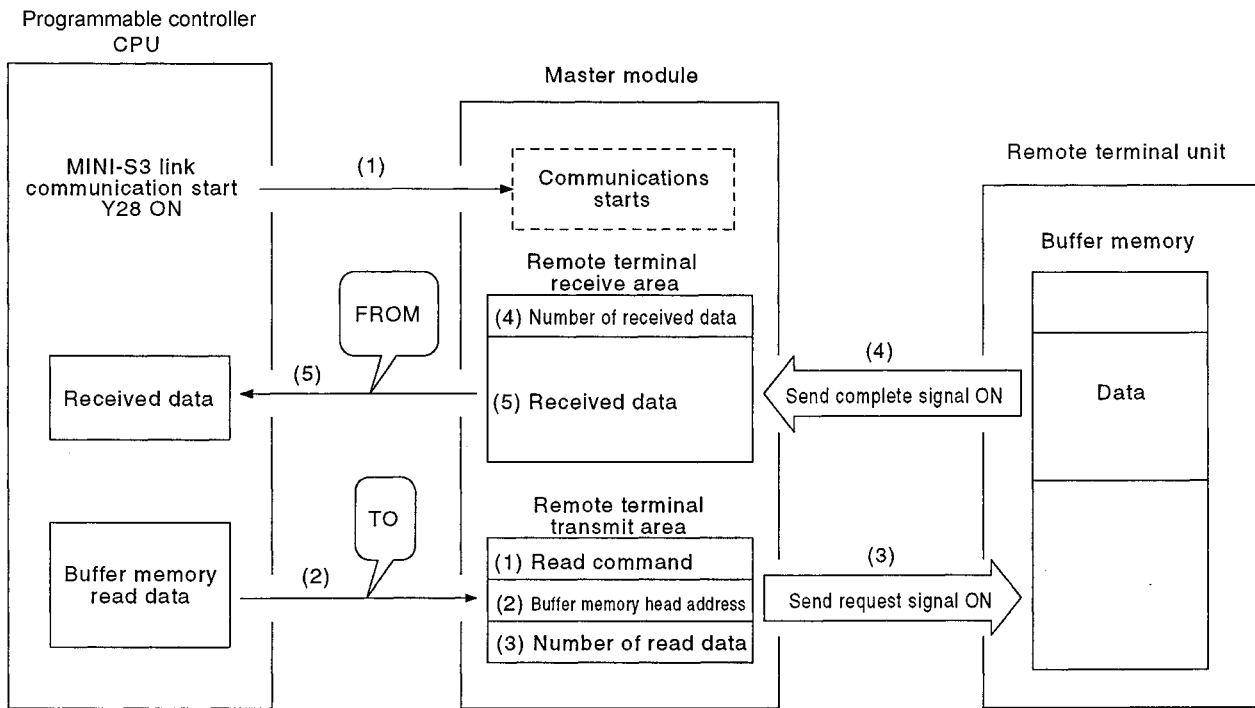


- (1) When the MINI-S3 link communication start signal (Y28) comes ON, MINI-S3 link communication starts.
- (2) The buffer memory write data is written to the remote terminal transmit area.
- (3) When the transmit request signal comes ON, data is written to the buffer memory of the remote terminal unit.

POINT

In communication between a master module and a remote terminal unit, only one word of data is communicated per I/O refresh processing. Several I/O refreshes are required to write data to the buffer memory.

[Reading data from the buffer memory]

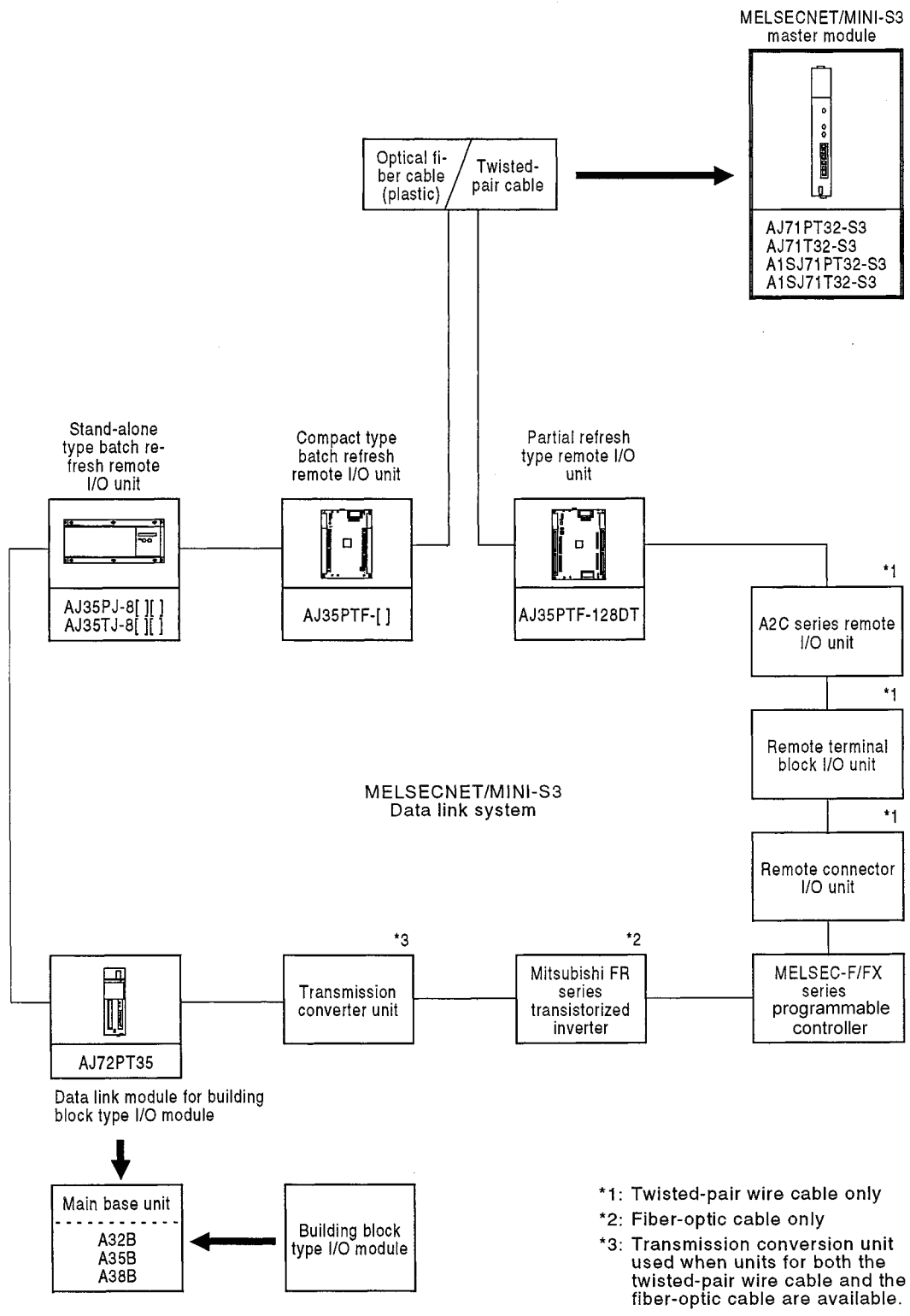


- (1) When the MINI-S3 link communication start signal (Y28) comes ON, MINI-S3 link communication starts.
- (2) The buffer memory read data is written to the remote terminal transmit area.
- (3) When the transmit request signal comes ON, the buffer memory read information is sent to the remote terminal unit.
- (4) On completion of data reading from the buffer memory to the remote terminal receive area, the transmit complete signal comes ON.
- (5) When the transmit complete signal comes ON, receive data is read from the remote terminal receive area.

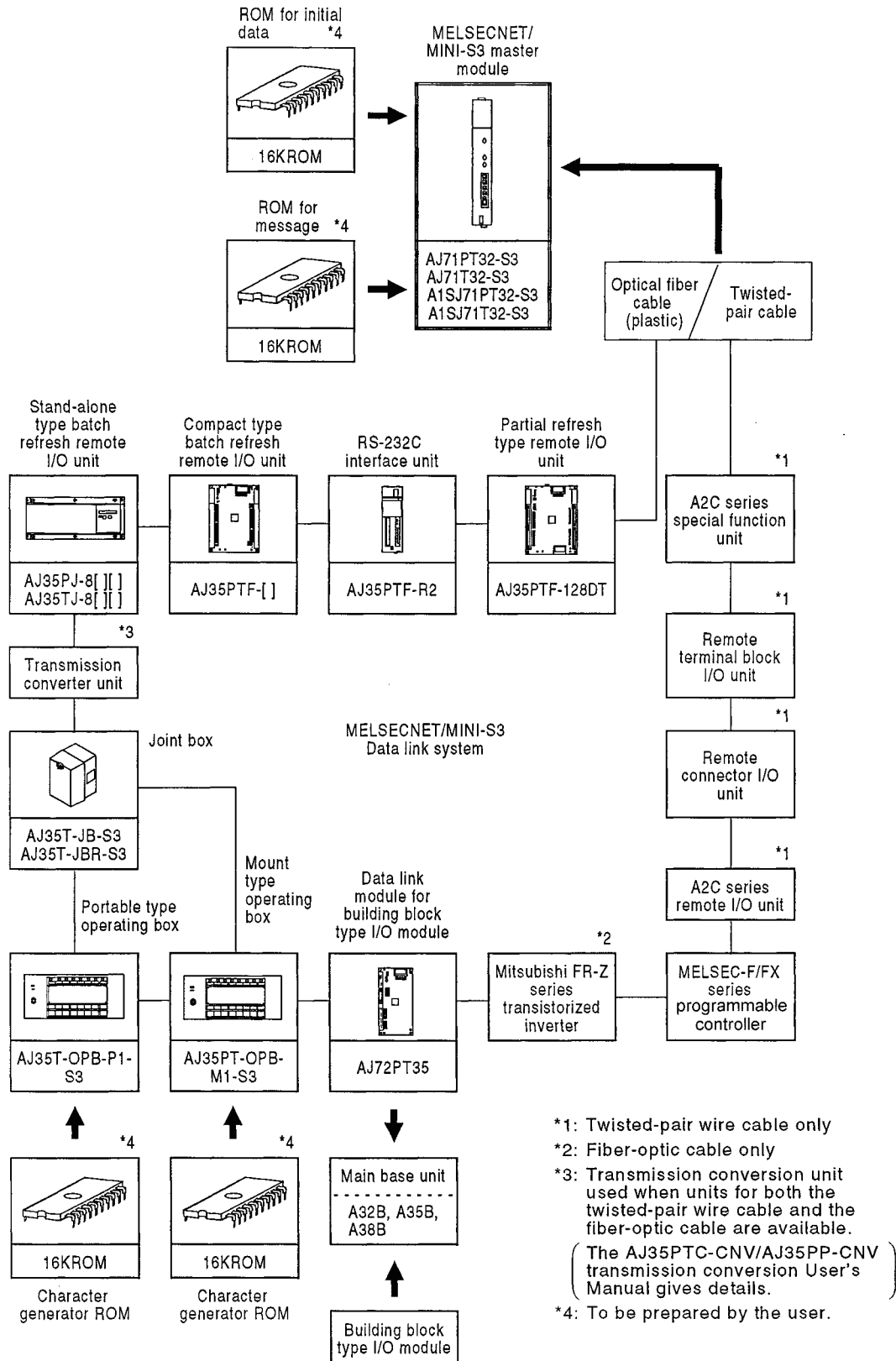
2. SYSTEM CONFIGURATION

2.1 Overall Configuration

2.1.1 System configuration (I/O dedicated mode)



2.1.2 System configuration (extension mode)



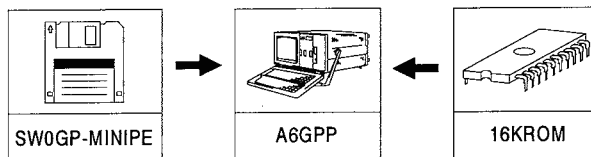
2. SYSTEM CONFIGURATION

MELSEC-A

[Creating the initial data ROM, message ROM, and character generator ROM]

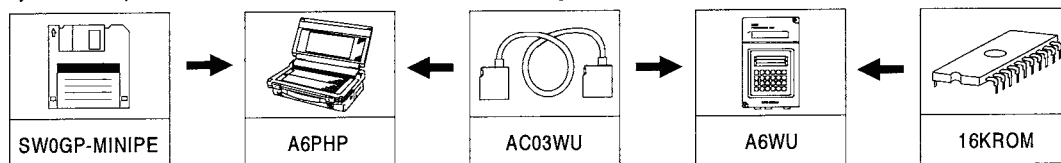
(1) A6GPP

System startup disk

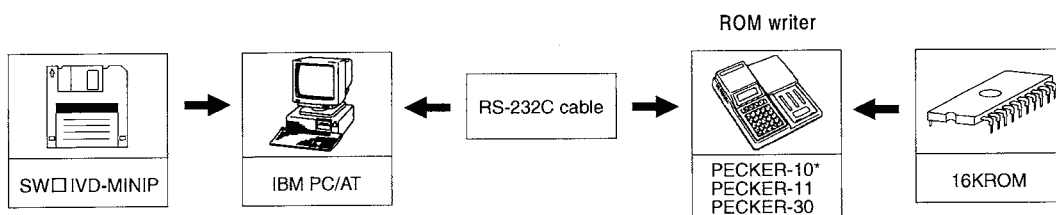


(2) A6PHP

System startup disk



(3) IBM PC/AT



*PECKER-□□□ is the ROM writer of AVAL Co., Ltd. make.

2.2 Applicable A-Series System

2.2.1 Applicable CPU

- (1) AJ71PT32-S3, AJ71T32-S3

The master module can be used with the following CPU models.

A1SCPU A1SCPU-S1 A1SJCPU A1SJCPU-S3 A2SCPU A1SHCPU
A1SJHCPU A1SJHCPU-S8 A2SHCPU A2SHCPU-S1 A2SCPU-S1 A2ASCPU
A2ASCPU-S1 A2USHCPU-S1 A52GCPU A1SCPUC24-R2
A0J2CPU(P23/R23) A0J2HCPU(P21/R21)
A1CPU(P21/R21) A2CPU(P21/R21) A2CPU(P21/R21)-S1 A3CPU(P21/R21)
A1NCPUC(P21/R21) A2NCPUC(P21/R21) A2NCPUC(P21/R21)-S1 A3NCPUC(P21/R21)
A3HCPU(P21/R21) A3MCPUC(P21/R21)
A2ACPU(P21/R21) A2ACPU(P21/R21)-S1 A3ACPU(P21/R21)
A2UCPU A2UCPU-S1 A3UCPU A4UCPU
Q2ASCPU Q2ASCPU-S1 Q2ASHCPU Q2ASHCPU-S1
Q2ACPU Q2ACPU-S1 Q3ACPU Q4ACPU Q4ARCPU

- (a) Master modules can be mounted in any slot of the base unit, and there is no restriction on the number that can be mounted.
- (b) The master module cannot be mounted in the last slot in the 7th extension stage of an A3CPU(P21/R21).

- (2) A1SJ71PT32-S3, A1SJ71T32-S3

The master module can be used with the following CPU models.

A1SCPU A1SCPU-S1 A1SJCPU A1SJCPU-S3 A2SCPU A1SHCPU
A1SJHCPU A1SJHCPU-S8 A2SHCPU A2SHCPU-S1 A2SCPU-S1 A2ASCPU
A2ASCPU-S1 A2USHCPU-S1 A52GCPU A1SCPUC24-R2
Q2ASCPU Q2ASCPU-S1 Q2ASHCPU Q2ASHCPU-S1

Master modules can be mounted in any slot of the base unit.

For use in the I/O dedicated mode, there are no restrictions on the number of modules loaded.

For use in the extended mode, any of the following CPUs accepts up to 10 modules loaded. For other CPUs, there are no restrictions on the number of modules loaded.

A2ACPU(P21/R21) A2ACPU(P21/R21)-S1 A3ACPU(P21/R21)
A2UCPU A2UCPU-S1 A3UCPU A4UCPU
A2ASCPU A2ASCPU-S1 A2USHCPU-S1
Q2ACPU Q2ACPU-S1 Q3ACPU Q4ACPU Q4ARCPU
Q2ASCPU Q2ASCPU-S1 Q2ASHCPU Q2ASHCPU-S1

2.2.2 Notes on configuring the system

- (1) Use the master module in the extension mode when remote terminal units (operating box, RS-232C interface unit, A2C-series special function unit) are used.
- (2) Note that the number of occupied points varies for the master module depending on whether it is being used in the extension mode or the I/O dedicated mode.

Extension mode48 points

I/O dedicated mode32 points

- (3) Create the initial data ROM using SW[]GP-MINIPE type system floppy disk and install it in the master module when it is used in the extension mode.

The ROM does not need be installed when the master module is used in the I/O dedicated mode.

- (4) Create the message ROM and character generation ROM using the SW[]GP-MINIPE type system floppy disk when using the operating box. Install the message ROM in the master module and the character generation ROM in the operating box.
- (5) In the MINI-S3 link system, the loopback function is not available. Therefore, if any of the remote modules causes a communications error (unit power supply goes OFF or hardware becomes faulty), or if any one of the data link cables is disconnected, no communications can be performed in the MINI-S3 link.
- (6) In the MINI-S3 link, to prevent unintended inputs to the remote I/O units, the points indicated in items (a) and (b) below must be taken into consideration when designing the system.
 - (a) Countermeasures against unintended input when turning the power ON and OFF
 - 1) Always turn power to the master module ON after power to the remote I/O units has been turned ON, or turn power to the master module and power to the remote I/O units ON at the same time.
 - 2) Always turn power to the remote I/O units OFF after power to the master module has been turned OFF, or turn power to the master module and power to the remote I/O units OFF at the same time.

REMARK

The power supply of a remote I/O unit refers to the following three things. The following manual gives details.

- A2C, MELSECNET/MINI-S3 I/O module user's manual

- 1) I/O module power supply : This module converts power to the 5 VDC power to be used by the internal circuits of a remote I/O station.
- 2) Input external power supply : The power supply for the input module of a remote I/O unit.
- 3) Output external power supply : The power supply for the output module of a remote I/O unit.

2. SYSTEM CONFIGURATION

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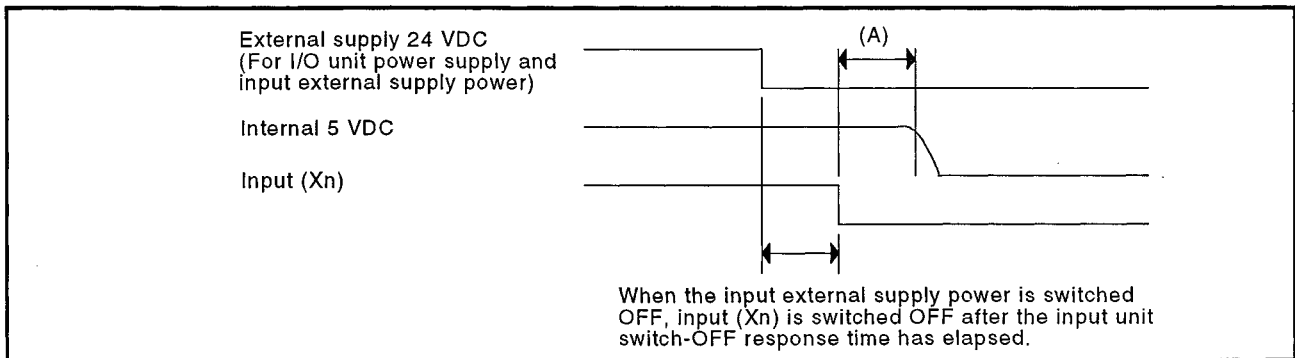
- (b) Prevention of input error due to instantaneous power failure of remote I/O station

Input error may be caused by instantaneous power failure occurring at the remote I/O station power supply.

- 1) Input error caused by instantaneous power failure

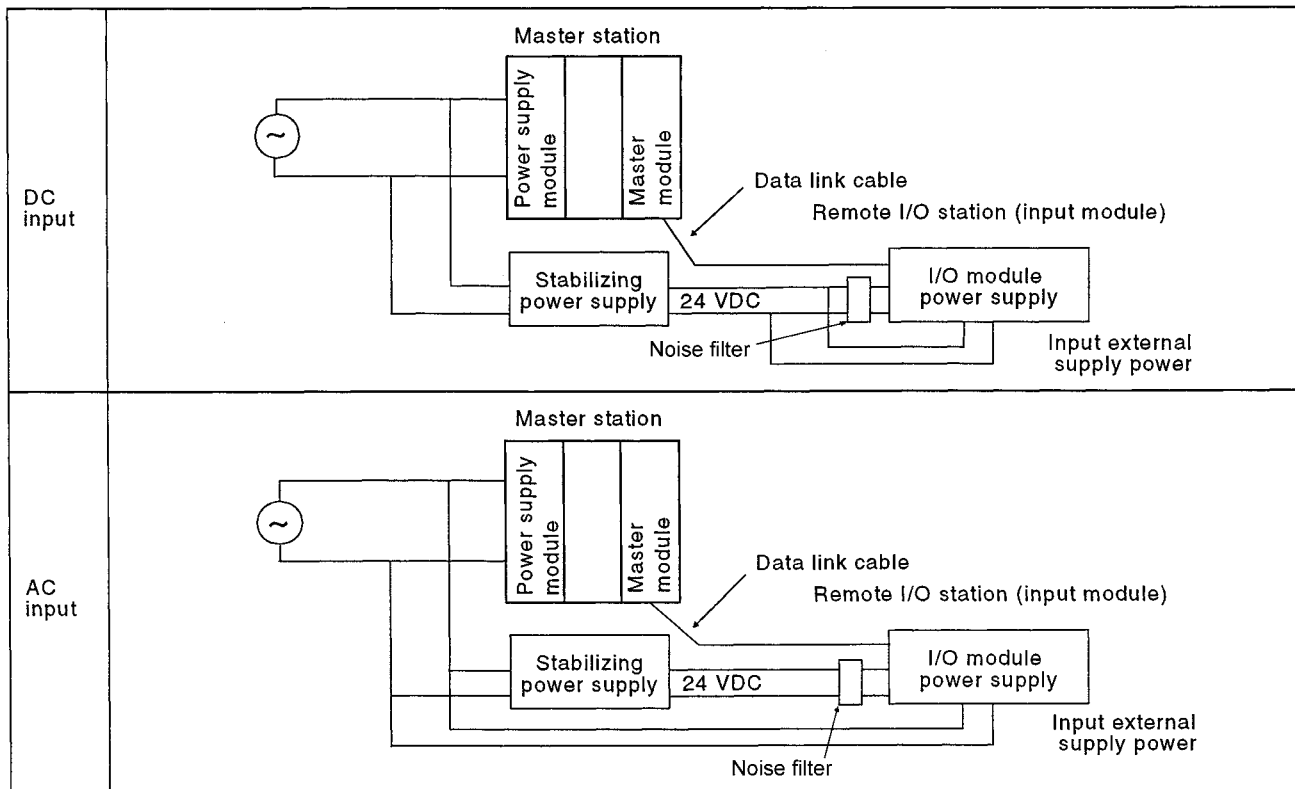
The remote I/O hardware uses the I/O unit power supply of 5 VDC converted by itself from 24 VDC.

If instantaneous power failure occurs at the remote I/O station, the time elapsed until 5 VDC in the remote I/O is switched OFF becomes greater than the input unit switch-OFF response time. Hence, input error occurs if I/O refresh is executed within the period of time indicated by (A) below.



- 2) For prevention of input error

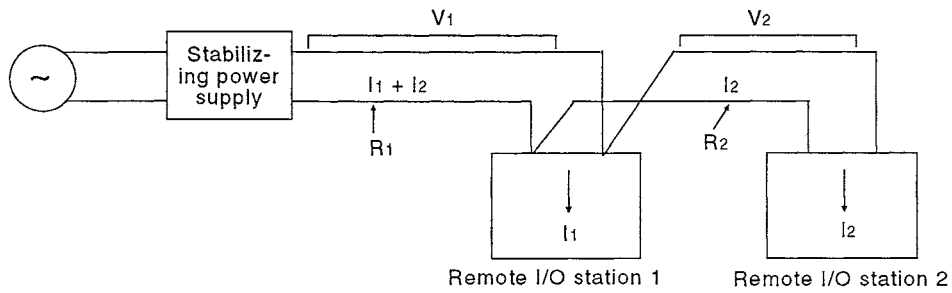
Cables should be wired so that the same power supply provides power to the power supply module, stabilizing power supply, and input external supply power (AC input only).



Power Supply Wiring Example

REMARK

Voltage drop should be taken into consideration when selecting and routing cables for supplying power from one power supply to several remote I/O units.
The concept for voltage drop in the wiring is shown below.



- V_1 : Voltage drop between stabilizing power supply and remote I/O station 1
- V_2 : Voltage drop between remote I/O stations 1 and 2
- R_1 : Electrical resistance between stabilizing power supply and remote I/O station 1
- R_2 : Electrical resistance between remote I/O stations 1 and 2
- I_1 : Current consumed by remote I/O station 1
- I_2 : Current consumed by remote I/O station 2

Calculating the Voltage drop

$$V_1 = R_1 \times (I_1 + I_2)$$

$$V_2 = R_2 \times I_2$$

Calculating the receive terminal voltage of remote I/O station

(Receiving end voltage of remote I/O station 1) = (stabilizing power supply voltage) - V_1

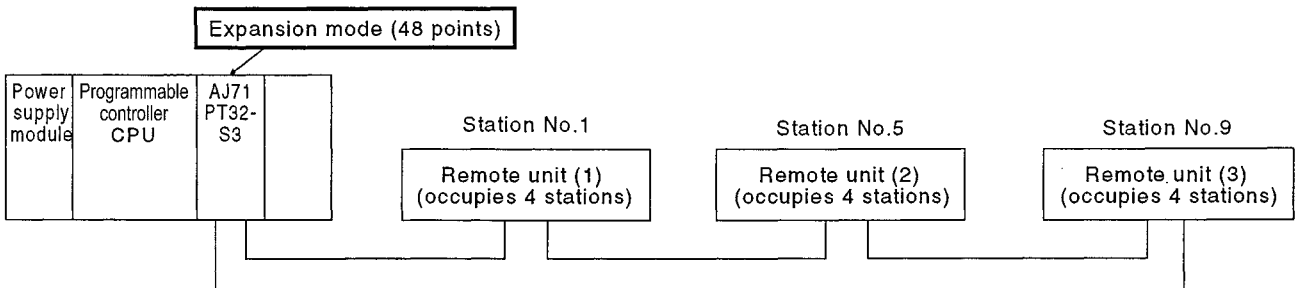
(Receiving end voltage of remote I/O station 2) = (stabilizing power supply voltage) - V_1 - V_2

The remote I/O station may be connected if its receiving end voltage is equal to or greater than its rated voltage.

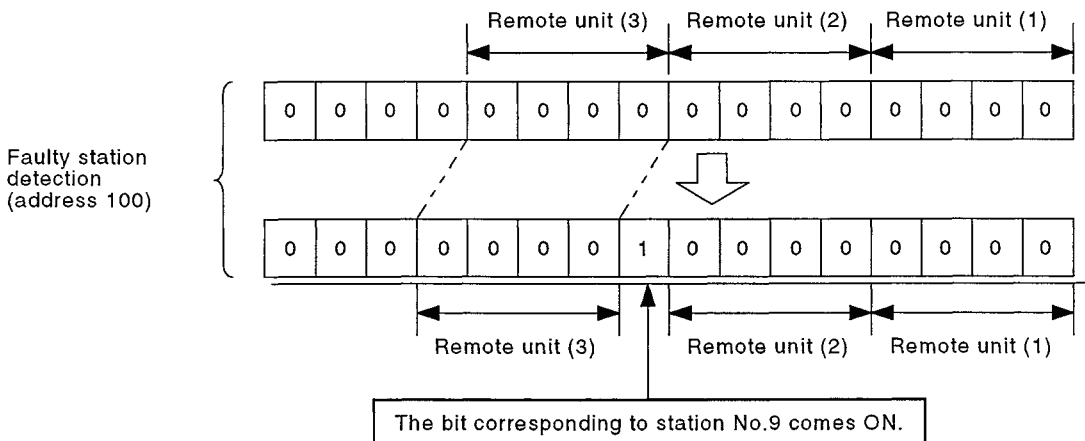
- (7) When a remote I/O unit develops an internal fault, the station numbers may change, and this can lead to incorrect inputs and outputs. Create a sequence program to detect any change in station numbers and to stop the MINI-S3 link system operation if any change is detected. Note however, that since the MINI-S3 link system and sequence scan are not synchronized, it is possible that some incorrect inputs and outputs will occur in the interval between detection of the error and stopping of the MINI-S3 link system.

[Program Example]

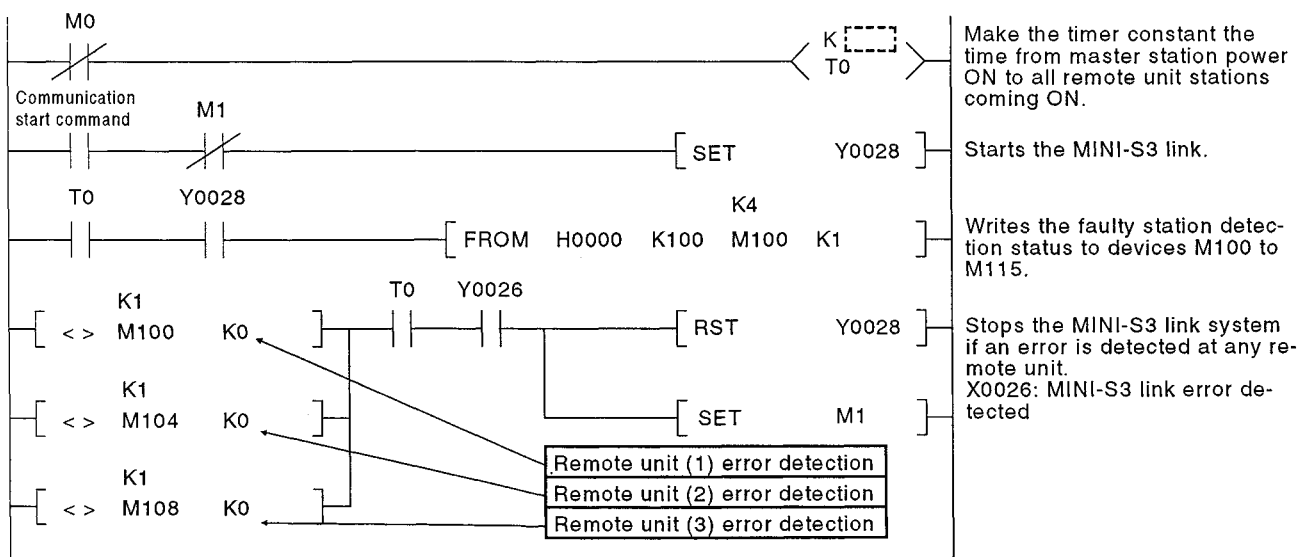
When station numbers change, there is no longer any response from the stations that existed prior to the change, and faulty stations occur. This program stops the MINI-S3 link system on detecting these faulty stations.



Example: Detection of change in station number of remote unit (3) (station No. 9 → 10)



The bit corresponding to station No.9 comes ON.



2. SYSTEM CONFIGURATION

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2.2.3 List of system equipment

Tables 2.1 and list the applicable products equipment that can be used in the MINI-S3 link.

Table 2.1 Applicable Products

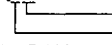
Name	Type	Description	No. of Occupied Points/ No. of Occupied Stations	Usable Master Module Modes	
				Extension Mode	I/O Dedicated Mode
MELSECNET/ MINI-S3 master module	AJ71PT32-S3 AJ71T32-S3 A1SJ71PT32-S3 A1SJ71T32-S3	A[PT32-S3  Twisted-pair wire Fiber-optic cable) can be used for the link. (The ROM used in the extension mode must be prepared separately.)	32 points		○
			48 points	○	
Data storage mem- ory	16KROM	Stores initial data when the master module is used in the extension mode. (Installed in master module.)	—	○	—
		Stores message data when the operating box is used. (Installed in the master module.)	—	○	—
		Stores character generation data when the operating box is used. (Installed in the operating box.)	—	○	—
Stand-alone Re- mote I/O Unit (for optical data link)	AJ35PJ-8A	AC input unit, 100-120 VAC, 8 points	1 station	○	○
	AJ35PJ-8D	DC input unit (sink type) 12/24 VDC, 8 points			
	AJ35PJ-8R	Contact output unit, 24 VDC 2A, 240 VAC 2A, 8 points			
	AJ35PJ-8S1	Triac output unit, 100-240 VAC, 0.6 A/point, 8 points			
	AJ35PJ-8T1	Transistor output unit (sink type), 12/24 VDC, 0.1 A/point, 8 points			
	AJ35PJ-8T2	Transistor output unit (sink type), 12/24 VDC, 0.5 A/point, 8 points			
	AJ35PJ-8T3	Transistor output unit (sink type), 12/24 VDC, 2 A/point, 8 points			
	AJ35PJ-8S2	Triac output unit, 100-240 VAC, 2 A/point, 8 points			
Stand-alone Re- mote I/O Unit (for twisted-pair data link)	AJ35TJ-8A	AC input unit, 100-120 VAC, 8 points	1 station	○	○
	AJ35TJ-8D	DC input unit (sink type) 12/24 VDC, 8 points			
	AJ35TJ-8R	Contact output unit, 24 VDC 2 A, 240 VAC 2 A, 8 points			
	AJ35TJ-8S1	Triac output unit, 100-240 VAC, 0.6 A/point, 8 points			
	AJ35TJ-8T1	Transistor output unit (sink type), 12/24 VDC, 0.1 A/point, 8 points			
	AJ35TJ-8T2	Transistor output unit (sink type), 12/24 VDC, 0.5 A/point, 8 points			
	AJ35TJ-8T3	Transistor output unit (sink type), 12/24 VDC, 2 A/point, 8 points			
	AJ35TJ-8S2	Triac output unit, 100-240 VAC, 2A/point, 8 points			
	AJ35TJ-16T	Transistor output unit (sink type), 12/24 VDC, 0.3 A/point, 16 points	2 stations		
	AJ35TJ-32D	DC input unit (sink type), 12/24 VDC, 32 points	4 stations		
	AJ35TJ-48DT	DC input unit (sink type), 12/24 VDC, 32 points Transistor output unit (sink type), 12/24 VDC, 0.3 A/point, 16 points			

Table 2.1 Applicable Products (Continued)

Name	Type	Description	No. of Occupied Points/ No. of Occupied Stations	Usable Master Module Modes		
				Extension Mode	I/O Dedicated Mode	
Compact Type Remote I/O unit (for optical data link, twisted-pair data link)	AJ35PTF-32A	AC input unit, 100-120 VAC, 32 points	4 stations	○	○	
	AJ35PTF-32D	DC input unit (sink type), 12/24 VDC, 32 points				
	AJ35PTF-24R	Contact output unit, 24 VDC 2A, 240 VAC 2 A, 24 points				
	AJ35PTF-24S	Triac output unit, 100-240 VAC, 0.6 A/point, 24 points				
	AJ35PTF-24T	Transistor output unit, 12/24 VDC, 0.5 A/point, 24 points				
	AJ35PTF-28AR	I/O unit Input side100-120 VAC, 16 points Output sideContact output, 24 VDC 2 A, 240 VAC 2 A, 12 points				
	AJ35PTF-28AS	I/O unit Input side100-120 VAC, 16 points Output sideTriac output, 100-240 VAC, 0.6 A/point, 12 points				
	AJ35PTF-28DR	I/O unit Input sideSink type, 12/24 VDC, 16 points Output sideContact output, 24 VDC 2A, 240 VAC 2 A, 12 points				
	AJ35PTF-28DS	I/O unit Input sideSink type, 12/24 VDC, 16 points Output sideTriac output, 100-240 VAC, 0.6 A/point, 12 points				
	AJ35PTF-28DT	I/O unit Input sideSink type, 12/24 VDC, 16 points Output sideTransistor output, sink type, 12/24 VDC, 0.5 A/point, 12 points				
	AJ35PTF-56AR	I/O unit Input side 100-120 VAC, 32 points Output sideContact output, 24 VDC 2A, 240 VAC 2 A, 24 points				8 stations
	AJ35PTF-56AS	I/O unit Input side100-120 VAC, 32 points Output sideTriac output, 100-240 VAC, 0.6 A/point, 24 points				
	AJ35PTF-56DR	I/O unit Input sideSink type, 12/24 VDC, 32 points Output sideContact output, 24 VDC 2 A, 240 VAC 2A, 24 points				
	AJ35PTF-56DS	I/O unit Input sideSink type, 12/24 VDC, 32 points Output sideTriac output, 100-240 VAC, 0.6 A/point, 24 points				
AJ35PTF-56DT	I/O unit Input side Sink type, 12/24 VDC, 32 points Output sideTransistor output, sink type, 12/24 VDC, 0.5 A/point, 24 points					

Table 2.1 Applicable Products (Continued)

Name	Type	Description	No. of Occupied Points/ No. of Occupied Stations	Usable Master Module Modes	
				Extension Mode	I/O Dedicated Mode
A2C series remote I/O unit	AX11C	AC input unit, 100-120 VAC, 32 points	4 stations	○	○
	AX21C	AC input unit, 200-240 VAC, 32 points	4 stations	○	○
	AX31C	AC/DC input unit, 12/24 VAC/DC, 32 points	4 stations	○	○
	AX41C	DC input unit (sink type), 12/24 VDC, 32 points	4 stations	○	○
	AX41C-S1	DC input unit (sink type), 24 VDC, 32 points	4 stations	○	○
	AX81C	DC input unit (sink/source common type), 12/24 VDC, 32 points	4 stations	○	○
	AY13C	Contact output unit, 24 VDC 0.5 A, 240 VAC 0.5 A 32 points	4 stations	○	○
	AY23C	Triac output unit, 100-240 VAC, 0.3 A 32 points	4 stations	○	○
	AY51C	Transistor output unit, 12/24 VDC, 0.3 A 32 points	4 stations	○	○
	AY61CE	Transistor output unit, 5/12/24 VDC, 1 A 32 points	4 stations	○	○
	AY81C	Transistor output unit (source type), 24 VDC, 0.5 A 32 points	4 stations	○	○
	AX10Y10C	I/O unit Input side100-120 VAC, 16 points Output sideContact output, 24 VDC/240 VAC, 0.5 A, 16 points	4 stations	○	○
	AX40Y10C	I/O unit Input side12/24 VDC (sink type), 16 points Output sideContact output, 24 VDC/240 VAC, 0.5 A, 16 points	4 stations	○	○
	AX10Y22C	I/O unit Input side100-120 VAC, 16 points Output sideTriac output, 100-240 VAC, 0.3 A/point, 16 points	4 stations	○	○
	AX40Y50C	I/O unit Input side12/24 VDC (sink type), 16 points Output sideTransistor output (sink type), 12/24 VDC, 0.3 A, 16 points	4 stations	○	○
	AX40Y50C-S1	I/O unit Input side24 VDC (sink type), 16 points Output sideTransistor output (sink type), 12/24 VDC, 0.3 A, 16 points	4 stations	○	○
AX80Y10C	I/O unit Input side12/24 VDC (sink/source common type), 16 points Output sideContact output, 24 VDC/240 VAC, 16 points	4 stations	○	○	
AX80Y80C	I/O unit Input side12/24 VDC (sink/source common type), 16 points Output sideTransistor output, 24 VDC, 0.5 A, 16 points	4 stations	○	○	

2. SYSTEM CONFIGURATION

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Table 2.1 Applicable Products (Continued)

Name	Type	Description	No. of Occupied Points/ No. of Occupied Stations	Usable Master Module Modes		
				Extension Mode	I/O Dedicated Mode	
A2C series special function unit	A-D converter unit	A68ADC Analog input Voltage -10 to 0 to +10 VDC Current -20 to 0 to +20 m ADC Digital output -2048 to 2047 8 channels/unit	4 stations	○	—	
	High speed counting unit	AD61C	1 phase input 50 kPPS, 2 phase input 50 kPPS, 2 channels/unit	4 stations	○	—
		AD62C	1 phase input 50 kPPS, 2 phase input 50 kPPS, 1 channel/unit			
	D-A converter unit	A64DAVC A64DAIC	Digital input -12000 to +12000 Analog output -10 to +10 VDC 4 channels/unit 0 to +20 mA	4 stations	○	—
Temperature input unit	A64RD3C A64RD4C	Temperature-measuring resistor Pt100, JPt100 3-wire type, 4-wire type Temperature input range: 4 channels/unit -180 °C (-292 °F) to 600 °C (1112 °F)	4 stations	○	—	
DIN rail adapter	A6DIN1C	Adapter for mounting an A2C I/O unit to a DIN rail	—	—	—	
	A6DIN2C	Adapter for mounting an A2C special function unit to a DIN rail	—	—	—	
Flat cable	A2C-C005	50 mm flat cable for connecting A2C units	—	—	—	
	A2C-C007	75 mm flat cable for connecting A2C units	—	—	—	
Common terminal block	A2CCOM-TB	Common terminal block for A2C I/O units	—	—	—	
Remote terminal block I/O unit	AJ35TB1-16A	AC input unit, 100-120 VAC, 16 points	2 stations	○	○	
	AJ35TB1-16D	DC input unit, 24 VDC, 16 points	2 stations	○	○	
	AJ35TB2-16D	DC input unit (sink/source common type) 2-wire type, 24 VDC, 16 points	2 stations	○	○	
	AJ35TB1-16T	Transistor output unit (sink type), 24 VDC, 0.1 A 16 points	2 stations	○	○	
	AJ35TB2-16T	Transistor output unit (sink type) 2-wire type, 24 VDC, 0.1 A 16 points	2 stations	○	○	
	AJ35TB1-16R	Contact output unit, 24 VDC 2 A, 240 VAC 5 A 16 points	2 stations	○	○	
	AJ35TB1-16DT	I/O unit Input side 24 VDC (sink/source common type), 8 points output side Transistor output, 24 VDC, 0.3 A, 8 points	2 stations	○	○	
	AJ35TB1-16DR	I/O unit Input side 24 VDC (sink/source common type), 8 points Output side Contact output, 24 VDC 2 A, 240 VAC 5 A, 8 points	2 stations	○	○	
	AJ35TB1-16AR	I/O unit Input side 100-120 VAC, 8 points Output side Contact output, 24 VDC 2 A, 240 VAC, 5 A, 8 points	2 stations	○	○	
Remote terminal block I/O unit	AJ35TC1-32D	DC input unit (sink/source common type), 24 VDC, 32 points	4 stations	○	○	
	AJ35TC1-32T	Transistor output unit (sink type), 24 VDC, 0.1 A 32 points	4 stations	○	○	
	AJ35TC1-32DT	I/O unit Input side 24 VDC (sink/source common type), 16 points output side Transistor output, 24 VDC, 0.1 A, 16 points	4 stations	○	○	
A-D converter module installation base	AJ35T-M[]B	M04B 4 channels M08B 8 channels M12B 12 channels M16B 16 channels Digital output : 0 to 4000	4 stations	○	—	
Data Link Module (for optical data link, twisted-pair data link)	AJ72PT35	Allows the building block type I/O modules to be used as remote I/O modules. • Max. number of modules: 8 • I/O points: 128 points • Number of occupied stations: 4, 8, 12, 16 (selected by switch)	See left	○	○	

Table 2.1 Applicable Products (Continued)

Name	Type	Description	No. of Occupied Points/ No. of Occupied Stations	Usable Master Module Modes	
				Extension Mode	I/O Dedicated Mode
Partial refresh type remote I/O unit (for optical data link, twisted-pair data link)	AJ35PTF-128DT	I/O unit Input side Sink type, 12/24 VDC, 64 points Output side Transistor output, 12/24 VDC, 100 mA/point, 64 points	4 stations	○	○
RS-232C interface unit (for optical data link, twisted-pair data link)	AJ35PTF-R2	Interface for external equipment conforming to RS-232C interface specifications 1 RS-232C channel General I/O ... each 4 points	4 stations	○	—
Mount type operating box (for optical data link, twisted-pair data link)	AJ35PT-OPB-M1-S3	Character display, key input unit Character display..... 3 lines by 30 columns LCD Sheet keys 8 keys Touch keys..... 24 keys LED display..... 8	4 stations	○	—
Portable type operating box (for twisted-pair data link)	AJ35T-OPB-P1-S3				
Joint box (for twisted-pair data link)	AJ35T-JB-S3 AJ35T-JBR-S3	Connects the portable type operating box to the MINI-S3 link when necessary.	—	○	—
Operating box cable	AC30MINI	Used to connect the joint box and AJ35T-OPB-P1-S3	—	—	—
Bypass module	AJ35TT-BU	Bypass module for MINI-S3 link (twisted-pair wire ↔ twisted-pair wire)	1 station*	○	○
	AJ35TP-BU	Bypass module for MINI-S3 link (twisted-pair wire ↔ fiber-optic cable)	1 station*	○	○
Transmission converter	AJ35PTC-CNV	Twisted pair ↔ Plastic fiber	—	○	○
	AJ35PTC-CNV-SI	Twisted pair ↔ Type S1 fiber-optic	—	○	○
	AJ35PTC-CNV-GI	Twisted pair ↔ Type G1 fiber-optic	—	○	○
	A35PP-CNV	Plastic fiber ↔ Plastic fiber	—	○	○
	AJ35PP-CNV-SI	Plastic fiber ↔ Type S1 fiber-optic	—	○	○
	AJ35PP-CNV-GI	Plastic fiber ↔ Type G1 fiber-optic	—	○	○
Twisted-pair shield cable	—	Twisted-pair cable for MINI-S3 link User prepared in accordance with Section 3.2.3	—	○	○
Optical fiber cable	—	Optical fiber cable for MINI-S3 link User prepared in accordance with Section 3.2.2	—	○	○

*: The number of occupied stations is the same regardless of the number of modules connected.

2. SYSTEM CONFIGURATION

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Table 2.1 Applicable Products (Continued)

Name	Type	Description	No. of Occupied Points/ No. of Occupied Stations	Usable Master Module Modes											
				Extension Mode	I/O Dedicated Mode										
Optical fiber cable connector	CA9104AP	1-core connector for use with the optical fiber cable. Consists of the following:													
		<table border="1"> <thead> <tr> <th>Equipment</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>Housing</td> <td>1</td> </tr> <tr> <td>Ferrule</td> <td>1</td> </tr> <tr> <td>Sleeve</td> <td>1</td> </tr> </tbody> </table>					Equipment	Quantity	Housing	1	Ferrule	1	Sleeve	1	
Equipment	Quantity														
Housing	1														
Ferrule	1														
Sleeve	1														
Assembling tool kit	CT9004P	For assembling optical fiber cable connectors. Consists of the following:	—	—	—										
		<table border="1"> <thead> <tr> <th>Equipment</th> <th>Type</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>Fiber stripper</td> <td>ST1000</td> <td>1</td> </tr> <tr> <td>Fiber cutter</td> <td>CV1000</td> <td>1</td> </tr> <tr> <td>Fiber clasper</td> <td>FC1000</td> <td>1</td> </tr> <tr> <td>Replacement blade for cutter</td> <td>—</td> <td>1</td> </tr> </tbody> </table>					Equipment	Type	Quantity	Fiber stripper	ST1000	1	Fiber cutter	CV1000	1
Equipment	Type	Quantity													
Fiber stripper	ST1000	1													
Fiber cutter	CV1000	1													
Fiber clasper	FC1000	1													
Replacement blade for cutter	—	1													
Optical power tester	HT-102P	For measuring the luminous energy of the MINI-S3 link.	—	—	—										
Cable-through fitting	—	For sealing cables into a stand-alone remote I/O station. User prepared.	—	○	○										
System startup disk	SWI]GP-MINIPE	<ul style="list-style-type: none"> Creates initial data ROM when the master module is used in the extension mode. Creates the message ROM and character generation ROM when the operating box is used. 	—	○	—										

3. SPECIFICATIONS

3.1 General Specifications

Table 3.1 General Specifications

Item	Specifications					
Operating ambient temperature	0 to 55 °C					
Storage ambient temperature	-20 to 75 °C					
Operating ambient humidity	10 to 90 % RH, non-condensing					
Storage ambient humidity	10 to 90 % RH, non-condensing					
Vibration resistance	Conforming to JIS B 3502, IEC 61131-2	For intermittent vibration			10 times each in X, Y and Z directions (80 min)	
		Frequency	Acceleration	Amplitude		Sweep Count
		10 to 57 Hz	—	0.075 mm (0.003 inch)		
		57 to 150 Hz	9.8 m/s ²	—		
		For continuous vibration				
		Frequency	Acceleration	Amplitude		
		10 to 57 Hz	—	0.035 mm (0.0014 in.)		
		57 to 150 Hz	4.9 m/s ²	—		
Shock resistance	Conforming to JIS B 3502, IEC 61131-2 (147 m/s ² , 3 times in each of 3 directions X, Y, Z)					
Operating ambience	Free of corrosive gases.					
Altitude *3	Up to 2,000 m (6561.68 ft.)					
Installation site	Inside a control cabinet					
Overvoltage category *1	II or lower					
Degree of contamination *2	No greater than 2					

REMARK

*1 The value indicates the power distribution unit between the public distribution network and the in-plant machinery to which the device is assumed to be connected. Category II applies to devices powered by fixed equipment. The surge withstand capability of devices whose rated voltage is 300 V or lower is 2500 V.

*2 This is an index which gives a measure of the incidence of conductive materials in the environment in which the device is used. A contamination level of "2" indicates an environment in which there is only contamination by non-conducting materials, but, due to occasional condensation, conductivity may occur.

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

*JIS: Japanese Industrial Standard

3. SPECIFICATIONS

3.2 Performance Specifications

3.2.1 Performance specifications

		AJ71PT32-S3, A1SJ71PT32-S3		Remarks
		AJ71T32-S3, A1SJ71T32-S3		
		Optical Data Link	Twisted-Pair Data Link	
For one master module	Max. number of link	64 stations		No limit to the number of master modules used.
	Input	512 points		Number of input/output points = 8 per remote I/O station. Total number of input + output points = 512.
	Output	512 points		
I/O refresh time *1		3.2 to 18 ms (when 64 stations are connected)		
Communication speed		1.5MBPS		
Optical transmission level		-12.5 to -11.6 dB	—	
Optical receive level		-34.8 to -14.0 dB	—	
Optical wave length		660 nm (Visible radiation)	—	
Max. inter-station transmission distance		50m(35m)/164ft(115ft) *3	100m(50m)/328ft(164ft) *2	No restriction on the overall distance
Number of I/O points occupied		I/O dedicated mode : 32 points Extension mode : 48 points		Will be changed by the setting of mode switching jumper pins.
5 VDC internal current consumption		0.35 A	0.3 A	
Weight		0.6 kg		

Max. number of link stations per master module

- (1) Indicates that the total number of occupied stations assigned to the remote modules is up to 64 stations.

For example, up to 8 compact remote I/O units (AJ35PTF-56DT which occupies 8 stations) can be connected.

The allowable maximum number of remote terminal units (occupying 4 stations) is 14.

For the number of stations occupied by each type of the remote terminal units, see the appropriate remote module user's manual.

- (2) Depends on the type of remote I/O unit connected.

Example 1: If 8 compact remote I/O units (AJ35PTF-56DT which occupies 8 stations) are used, 256 input and 192 output points can be controlled.

Example 2: If 16 partial refresh type remote I/O units (AJ35PTF-128DT which occupies 4 stations) are used, 1024 input and 1024 output points can be controlled.

POINTS																			
<p>*1: The I/O refresh time is determined by the number of remote modules connected in the system, their types, and the setting of the operation mode switch of the master module as indicated below.</p> <div style="border: 1px dashed black; padding: 5px; margin: 5px 0;"> <p>R: Total number of remote stations</p> <p>B: Number of AJ35PTF-128DT units connected</p> <p>T: Number of remote terminal units connected</p> </div>																			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%; text-align: center;">Mode Setting</th> <th style="width: 40%; text-align: center;">Operation Mode Switch</th> <th style="width: 35%; text-align: center;">I/O Refresh Time (msec)</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center; vertical-align: middle;">I/O dedicated mode</td> <td>Online automatic return (0)</td> <td>I/O refresh time = $0.48 + (0.042 \times R) + (0.2 \times B)$</td> </tr> <tr> <td>Online no-automatic return (1)</td> <td>I/O refresh time = $0.46 + (0.053 \times R) + (0.2 \times B)$</td> </tr> <tr> <td>Communication stop when error is detected (2)</td> <td>I/O refresh time = $0.44 + (0.046 \times R) + (0.2 \times B)$</td> </tr> <tr> <td rowspan="3" style="text-align: center; vertical-align: middle;">Extension mode</td> <td>Online automatic return (0)</td> <td>I/O refresh time = $0.66 + (0.044 \times R) + (0.25 \times B) + (0.95 \times T)$</td> </tr> <tr> <td>Online no-automatic return (1)</td> <td>I/O refresh time = $0.54 + (0.058 \times R) + (0.25 \times B) + (0.95 \times T)$</td> </tr> <tr> <td>Communication stop when error is detected (2)</td> <td>I/O refresh time = $0.54 + (0.051 \times R) + (0.25 \times B) + (0.95 \times T)$</td> </tr> </tbody> </table>		Mode Setting	Operation Mode Switch	I/O Refresh Time (msec)	I/O dedicated mode	Online automatic return (0)	I/O refresh time = $0.48 + (0.042 \times R) + (0.2 \times B)$	Online no-automatic return (1)	I/O refresh time = $0.46 + (0.053 \times R) + (0.2 \times B)$	Communication stop when error is detected (2)	I/O refresh time = $0.44 + (0.046 \times R) + (0.2 \times B)$	Extension mode	Online automatic return (0)	I/O refresh time = $0.66 + (0.044 \times R) + (0.25 \times B) + (0.95 \times T)$	Online no-automatic return (1)	I/O refresh time = $0.54 + (0.058 \times R) + (0.25 \times B) + (0.95 \times T)$	Communication stop when error is detected (2)	I/O refresh time = $0.54 + (0.051 \times R) + (0.25 \times B) + (0.95 \times T)$
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<p>*2: The maximum inter-station transmission distance depends on the twisted-pair cable diameter as follows:</p> <p>0.2 mm² (0.00031 in²) to less than 0.5 mm² (0.00077 in²).....50 m (164 ft)</p> <p>0.5 mm² (0.00077 in²) or more 100 m (328 ft)</p>																			
<p>*3: The inter-station transmission distance of the optical fiber cable is between 1 m (3.28 ft) and 50 m (164 ft). Normal communication cannot be guaranteed for distances less than 1 m.</p> <p>Assembling method of optical fiber cable differs depending on cable length; 1 m (3.28 ft) to less than 17 m (55.76 ft), or 17 m (55.76 ft) or more.</p> <p>For details, refer to Appendix 2.</p>																			

3. SPECIFICATIONS

3.2.2 Optical fiber cable specifications

Table 3.2 Optical Fiber Cable Specifications

Item	Specifications
Applicable optical cable	Plastic fiber cable
Cable transmission loss	260 dB/km (853 dB/kft)
Optical fiber OD	1000 μm
Connector	1-core connector
Minimum allowable bend radius *	25 mm (0.98 inch) max. *

*: Since an outboard remote I/O unit is wired in the case, use fiber-optic cable whose allowable bend radius is 25 mm or less.

The following optical fiber cables available from Mitsubishi conform to the specifications in Table 3.2:

Table 3.3 Optical Fiber Cables

Type	Remarks	Max. Interstation Distance
M-2P-[]M-A	PVC coated core cable (standard cable for indoor use, conforming to UL standard) Cable diameter 2.2 mm (0.09 inch)	50 m (164 ft)
M-2P-[]M-B	Reinforced PVC coated core cable (reinforced cable for indoor use) Cable diameter 5.0 mm (0.20 inch)	
M-2P-[]M-C	PE coated core cable (standard cable for indoor use) Cable diameter 2.2 mm (0.09 inch)	

Enter the cable length (m) required in [].

Example: PVC coated core cable of 40 m (131 ft) length

M-2P-40M-A

3.2.3 Twisted-pair cable specifications

Table 3.4 Twisted-Pair Cable Specifications

Item	Specifications
Cable type	Twisted pair shielded cable
Number of pins	2 or more pins
Conductor resistance (20 °C)	88.0 Ω/km max.
Electrostatic capacity (1 kHz)	60 nF/km (197 nF/kft) max. ON average
Characteristic impedance (100 kHz)	110 ± 10 Ω

3. SPECIFICATIONS

3.3 I/O List for the Programmable controller CPU

3.3.1 I/O list for the I/O dedicated mode

A list for I/O signals when the master module is being used in the I/O dedicated mode is indicated in Table 3.5.

The letter "n" in the Device No. column is the head I/O number of the master module and is determined by the mounted location of the master module and the number of points of the I/O units mounted in the slot in front of the master module.

(For example: When the head I/O number of the master module is "X/Y20":
 X (n+0) to X (n+1F) = X20 to X3F
 Y (n+0) to Y (n+1F) = Y20 to Y3F)

Table 3.5 I/O Signal List

Device No.	Signal	Device No.	Signal
X (n+0)	Hardware fault	Y (n+0) to Y (n+17)	Reserved
X (n+1)	MINI-S3 link communicating		
X (n+2)	Reserved		
X (n+3)			
X (n+4)			
X (n+5)	Test mode		
X (n+6)	MINI-S3 link error detection		
X (n+7)	MINI-S3 link communication error		
X (n+8) to X (n+1F)	Reserved	Y (n+18)	MINI-S3 link communication start
		Y (n+19)	Reserved
		Y (n+1A)	FROM/TO instruction response designation
		Y (n+1B)	Faulty station data clear designation
		Y (n+1C)	Reserved
		Y (n+1D)	Error reset
		Y (n+1E) Y (n+1F)	Reserved

3.3.2 I/O list for the extension mode

A list for I/O signals when the master module is being used in the extension mode is indicated in Table 3.6.

The letter "n" in the Device No. column is the head I/O number of the master module and is determined by the mounted location of the master module and the number of points of the I/O units mounted in the slot in front of the master module.

(For example: When the head I/O number of the master module is "X/Y20":
 X (n+0) to X (n+2F) = X20 to X4F
 Y (n+0) to Y (n+2F) = Y20 to Y4F)

Table 3.6 I/O Signal List

Device No.	Signal	Device No.	Signal
X (n+0)	Transmit complete signal	Y (n+0)	Transmit request signal
X (n+1)	Read request signal	Y (n+1)	Read complete signal
X (n+2)	Transmit complete signal	Y (n+2)	Transmit request signal
X (n+3)	Read request signal	Y (n+3)	Read complete signal
X (n+4)	Transmit complete signal	Y (n+4)	Transmit request signal
X (n+5)	Read request signal	Y (n+5)	Read complete signal
X (n+6)	Transmit complete signal	Y (n+6)	Transmit request signal
X (n+7)	Read request signal	Y (n+7)	Read complete signal
X (n+8)	Transmit complete signal	Y (n+8)	Transmit request signal
X (n+9)	Read request signal	Y (n+9)	Read complete signal
X (n+A)	Transmit complete signal	Y (n+A)	Transmit request signal
X (n+B)	Read request signal	Y (n+B)	Read complete signal
X (n+C)	Transmit complete signal	Y (n+C)	Transmit request signal
X (n+D)	Read request signal	Y (n+D)	Read complete signal
X (n+E)	Transmit complete signal	Y (n+E)	Transmit request signal
X (n+F)	Read request signal	Y (n+F)	Read complete signal
X (n+10)	Transmit complete signal	Y (n+10)	Transmit request signal
X (n+11)	Read request signal	Y (n+11)	Read complete signal
X (n+12)	Transmit complete signal	Y (n+12)	Transmit request signal
X (n+13)	Read request signal	Y (n+13)	Read complete signal
X (n+14)	Transmit complete signal	Y (n+14)	Transmit request signal
X (n+15)	Read request signal	Y (n+15)	Read complete signal
X (n+16)	Transmit complete signal	Y (n+16)	Transmit request signal
X (n+17)	Read request signal	Y (n+17)	Read complete signal
X (n+18)	Transmit complete signal	Y (n+18)	Transmit request signal
X (n+19)	Read request signal	Y (n+19)	Read complete signal
X (n+1A)	Transmit complete signal	Y (n+1A)	Transmit request signal
X (n+1B)	Read request signal	Y (n+1B)	Read complete signal
X (n+1C)	Reserved	Y (n+1C)	Reserved
X (n+1D)		Y (n+1D)	
X (n+1E)		Y (n+1E)	
X (n+1F)		Y (n+1F)	
X (n+20)		Hardware fault	
X (n+21)	MINI-S3 link communicating	Y (n+21)	
X (n+22)	Reserved	Y (n+22)	
X (n+23)	Receive data clear completion	Y (n+23)	Receive data clear request
X (n+24)	Remote terminal unit error detection	Y (n+24)	Remote terminal unit error detection clear

3. SPECIFICATIONS

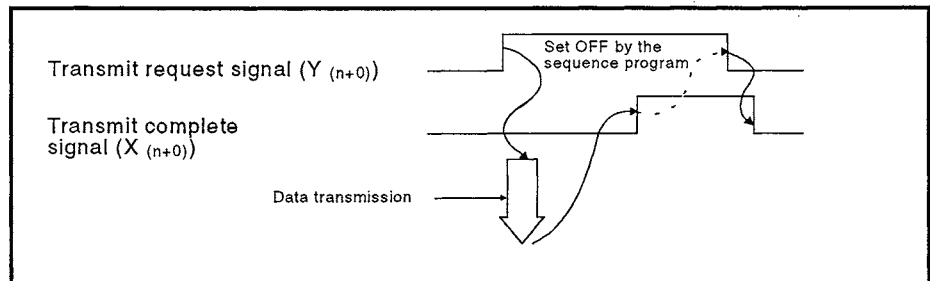
MELSEC-A

Device No.	Signal	Device No.	Signal
X (n+25)	Test mode	Y (n+25)	Reserved
X (n+26)	MINI-S3 link error detection	Y (n+26)	
X (n+27)	MINI-S3 link communication error	Y (n+27)	
X (n+28)	ROM error	Y (n+28)	MINI-S3 link communication start
X (n+29)	Reserved	Y (n+29)	Reserved
X (n+2A)		Y (n+2A)	FROM/TO instruction response designation
X (n+2B)		Y (n+2B)	Faulty station data clear designation
X (n+2C)		Y (n+2C)	Switching buffer memory channel
X (n+2D)		Y (n+2D)	Error reset
X (n+2E)		Y (n+2E)	Reserved
X (n+2F)		Y (n+2F)	

3.3.3 Detailed explanation concerning I/O signals

The values contained in () indicate the device numbers used in Tables 3.5 and 3.6.

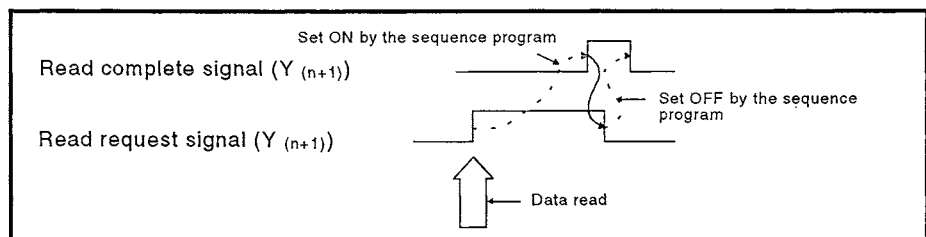
- (1) Transmit complete signal (I/O dedicated mode: Irrelevant/Extension mode: $X_{(n+0)}$ to $X_{(n+1A)}$)
 - (a) The transmit complete signal indicates whether the transmission of data has been completed normally or not after data has been transmitted to a remote terminal unit.
 - (b) The transmission of data to a remote terminal unit starts when the transmit request signal ($Y_{(n+0)}$ to $Y_{(n+1A)}$) is set to ON.
 - (c) Each transmit complete signal is set to on after the relevant transmit request signal is set to ON and the transmission of the data has been completed normally, and are set to OFF when the transmit request signal is set to OFF.



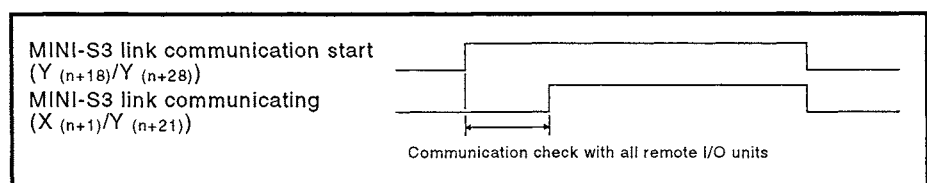
- (d) The device numbers used with the transmit complete signal varies with each remote terminal unit number.

The remote terminal unit number is set by the initial data setting of the master module and is assigned to each remote terminal unit.

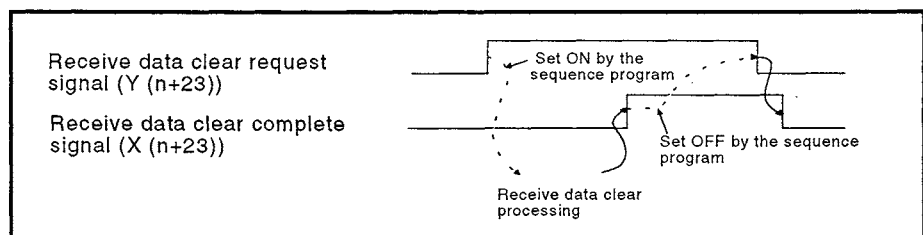
- (2) Read request signal (I/O dedicated mode: Irrelevant/Extension mode: $X_{(n+1)}$ to $X_{(n+1B)}$)
- (a) The master module turns the read request signal ON when data is received from the remote terminal unit.
 - (b) Data is received from the remote terminal units automatically during MINI-S3 link I/O refresh regardless of the sequence program scan. Therefore, the read request signal is used as the condition to execute the FROM instruction when reading the receive data using the FROM instruction.
 - (c) The read request signal is set OFF when the read complete signal ($Y_{(n+0)}$ to $Y_{(n+1B)}$) is set to ON.
 - (d) During the period that the read request signal is ON, the master module cannot receive data.



- (e) The device number used with the read request signal varies with each remote terminal unit number. The remote terminal unit number is set by the initial data setting of the master module and is assigned to each remote terminal unit.
- (3) Hardware fault (I/O dedicated mode: $X_{(n+0)}$ /Extension mode: $X_{(n+20)}$)
- (a) On indicates that the master module mode setting switch has been set to any of 6 to 9 or a hardware fault has occurred.
 - (b) Used as an interlock for the FROM/TO instruction to the master module.
- (4) MINI-S3 link communicating (I/O dedicated mode: $X_{(n+1)}$ /Extension mode: $X_{(n+21)}$)
- (a) The MINI-S3 link communicating signal is a signal that detects the communication status of the MINI-S3 link. After the MINI-S3 link communication start signal has been turned ON, a communication check is performed on all remote units, and this signal is turned ON if they are all normal.
 - (b) When the MINI-S3 communication start signal is turned OFF, or an error that stops data communication occurs, the MINI-S3 link communicating signal is turned OFF.
 - (c) Used as an interlock for data transfer to and from the master module.



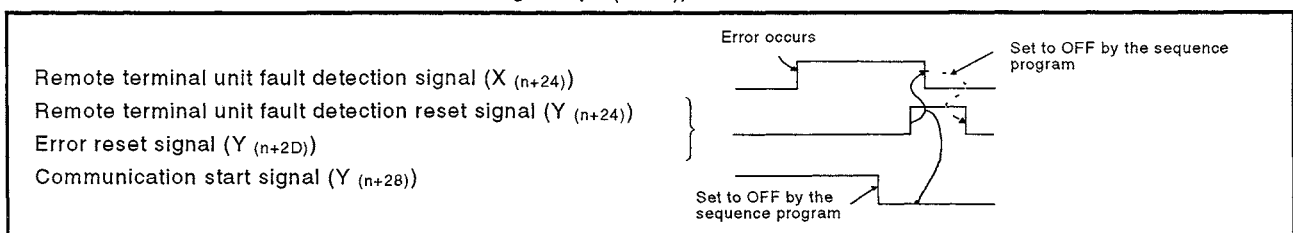
- (5) Receive data clear complete signal (I/O dedicated mode: Irrelevant/Extension mode: $X_{(n+23)}$)
- (a) The receive data clear complete signal indicates whether the receive data area of the buffer memory corresponding to the AJ35PTF-R2 and a remote terminal unit conforming to MINI standard protocol has been cleared normally or not.
 - (b) The receive data area of the buffer memory corresponding to the AJ35PTF-R2 and a remote terminal unit conforming to MINI standard protocol are cleared when the receive data clear request signal ($Y_{(n+23)}$) is set to ON.
 - (c) The receive data clear complete signal is set to ON after the receive data clear request signal is set to ON and the receive data area has been cleared normally, and is set to OFF when the receive data clear request signal is set to OFF.



REMARK

The AJ35PTF-R2 and areas, that are to be cleared in receive data clear processing, are set in the buffer memory (address: 858, 859) of the master module.
See Section 3.4.2 (20), (21).

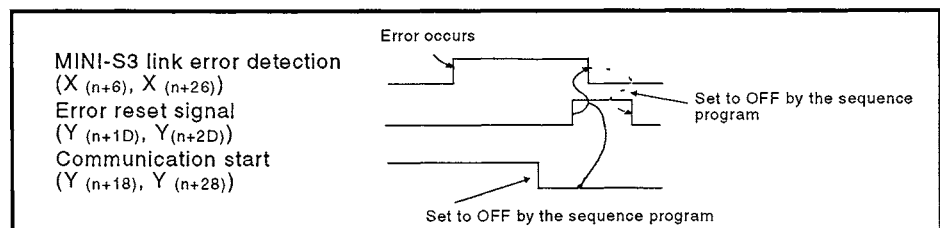
- (6) Remote terminal unit fault detection (I/O dedicated mode: Irrelevant/Extension mode: $X_{(n+24)}$)
- (a) The remote terminal unit fault detection signal is set to ON when an error occurs during communication between a remote terminal unit and the master module.
 - (b) The table in section 6.2 provides a list of faults and errors that can be detected by the remote terminal unit fault detection signal.
 - (c) When an error occurs, the faulty station number is stored in address 195 of the buffer memory and the error code in addresses 196 to 209.
The remote terminal unit fault detection signal is set to ON when one of the bits of address 195 in the buffer memory is set to "1".
 - (d) The remote terminal unit fault detection signal is set to OFF when either the remote terminal unit fault detection reset signal ($Y_{(n+24)}$) or the error reset signal ($Y_{(n+2D)}$) is set to ON. (The ON/OFF status of the error reset signal is set to OFF when the communication start signal (effective only when ($Y_{(n+28)}$) is OFF) or the communication start signal ($Y_{(n+28)}$) is set from OFF to ON.



- (e) MINI-S3 link communication continues even if the remote terminal unit fault detection signal is set to ON.
- (7) Test mode (I/O dedicated mode: $X_{(n+5)}$ /Extension mode: $X_{(n+25)}$)
- (a) On indicates that the power is switched ON with the mode setting switch in any of 3 to 5.
- (8) MINI-S3 link error detection (I/O dedicated mode: $X_{(n+6)}$ /Extension mode: $X_{(n+26)}$)
- (a) This signal detects if the receive data from the remote module is normal or not.
 - (b) The master module checks the receive data from the remote module and, if an error occurs, the signal is set to ON.
 - (c) The MINI-S3 link error detection signal operates in one of three following ways depending on the setting of the operation mode.
 - 1) Operation mode setting specified for automatic online return ON
 Data communication continues even though an error occurs setting the MINI-S3 link error detection signal to ON. The signal is automatically set to OFF with the next communication that is performed without an error.
 - 2) Operation mode setting specified for automatic online return OFF
 When an error has been detected, the MINI-S3 link error detection signal is retained ON.

 The MINI-S3 link error detection signal is set to OFF by setting the start signal ($Y_{(n+18)}$ / $Y_{(n+28)}$) to OFF, and the error reset signal ($Y_{(n+1D)}$ / $Y_{(n+2D)}$) to ON.

 The MINI-S3 link error detection signal is also set to OFF when the start signal ($Y_{(n+18)}$ / $Y_{(n+28)}$) switches from OFF to ON.



- 3) Operation mode setting specified for communication stop at the time of online error detection.
 The MINI-S3 link error detection signal is set to neither ON nor OFF when an error has been detected.
 The MINI-S3 link communication error signal ($X_{(n+7)}$ / $X_{(n+27)}$) is set to ON when an error in the receive data is detected.
- (d) The error detection code is stored in address 108 of the buffer memory when the MINI-S3 link error detection signal is set to ON.

(9) MINI-S3 link communication error (I/O dedicated mode: $X_{(n+7)}$ /Extension mode: $X_{(n+27)}$)

- (a) This signal detects if an error has occurred in the MINI-S3 link line or not.
- (b) If an error has occurred in the MINI-S3 link line, the signal is set to ON.
- (c) The signal is set to ON when:
 - Any remote I/O module power supply is switched OFF.
 - Any data link cable is broken.
 - A communication error has occurred with the mode setting specified for communication stop at the time of online error detection.

(d) The MINI-S3 link communication error signal operates in one of the following three ways depending on the setting of the operation mode.

1) Operation mode setting specified for automatic online return ON

Data communication continues even though an error occurs setting the MINI-S3 link communication error signal to ON. The signal is automatically set to OFF with the next communication that is performed without an error.

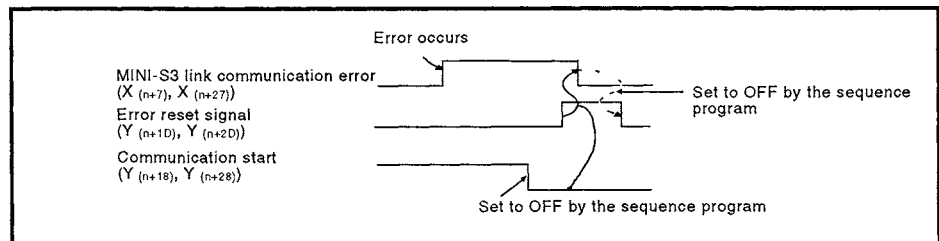
2) Operation mode setting specified for automatic online return OFF, or for communication stop at the time of online detection.

When an error has been detected, the MINI-S3 link communication error signal is retained ON, and the communication does not return online even if the fault is repaired.

For information concerning the output of data during communication error periods, see Section 3.5.1.

The MINI-S3 link communication error signal is set to OFF by setting the communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) to OFF, and the error reset signal ($Y_{(n+1D)}/Y_{(n+2D)}$) to ON.

The MINI-S3 link communication error signal is also set to OFF when the start signal ($Y_{(n+18)}/Y_{(n+28)}$) switches from OFF to ON.



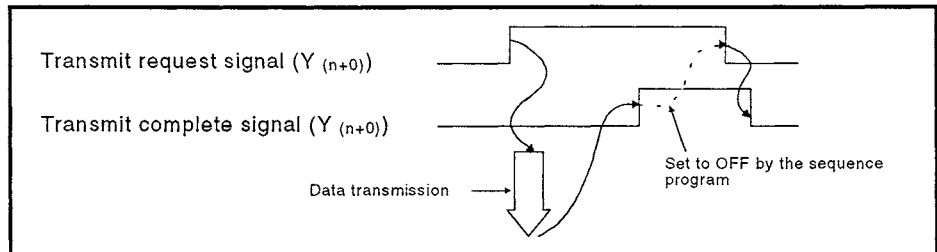
(e) The communication error code is stored in address 107 of the buffer memory, when the MINI-S3 link communication error signal is set to ON.

(10) ROM error signal (I/O dedicated mode; Irrelevant/Extension mode:
($X_{(n+28)}$)

- (a) The ROM error signal checks the status of the initial data ROM and message ROM and determines whether it is normal or not when the master module is used in the extension mode.
- (b) The ROM error signal is set to ON by the following causes.
- Initial data ROM is not installed
 - Initial data is not written
 - Initial data ROM is faulty
 - The number of remote stations set in the initial data ROM is not within the 1 to 64 station range.
 - Message ROM is not installed
 - Message data is not written
 - Message ROM is faulty
- } These are checked only if it has been specified that the operating box is being used.

(11) Transmit request signal (I/O dedicated mode: Irrelevant/Extension mode: ($Y_{(n+0)}$ to $Y_{(n+1A)}$)

- (a) The transmit request signal is set to ON by the sequence program when data is being transmitted with the remote terminal units.
- (b) Data is transmitted to the relevant remote terminal unit when the transmit request signal is set to ON.
- (c) The transmit complete signal ($X_{(n+0)}$ to $X_{(n+1A)}$) is set to on when the transmission of the data completes normally.



- (d) The device numbers used with the transmit request signal varies with each remote terminal unit number.

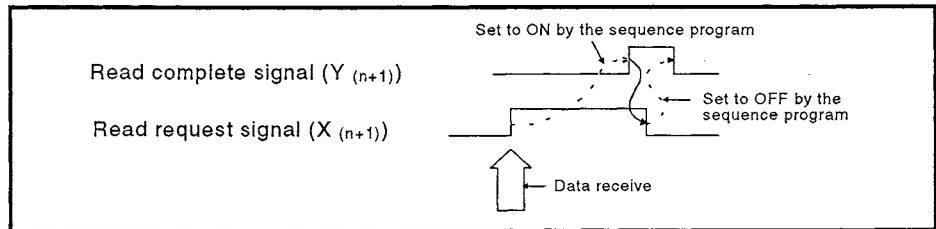
The remote terminal unit number is set by the initial data setting of the master module and is assigned to each remote terminal unit.

(12) Read complete signal (I/O dedicated mode: irrelevant/Extension mode: $(Y_{(n+1)} \text{ to } Y_{(n+1B)})$)

- (a) The read complete signal indicates the master module that the data received from the remote terminal units has been read as instructed by the sequence program. The read complete signal is set to ON by the sequence program.
- (b) The master module sets the read request signal ($X_{(n+1)} \text{ to } X_{(n+1B)}$) to ON when data has been received from the remote terminal units and requests that the data be read by the sequence program.

The read complete signal sets the read request signal to OFF after the received data has been read as instructed by the sequence program FROM instruction.

The master module enables the next data to be received by setting the read request signal to OFF.



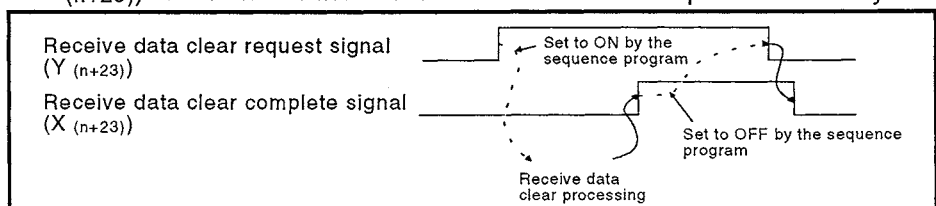
(c) The device numbers used with the read request signal varies with each remote terminal unit number.

The remote terminal unit number is set by the initial data setting of the master module and is assigned to each remote terminal unit.

(13) Receive data clear request signal (I/O dedicated mode: Irrelevant/Extension mode: $(Y_{(n+23)})$)

- (a) The receive data clear signal clears the contents of the receive data area used by AJ35PTF-R2 and a remote terminal unit conforming to MINI standard protocol.
- (b) When receive data clear request signal is set to ON by the sequence program, AJ35PTF-R2 receive data areas listed below are cleared in accordance with the conditions set in addresses 858 and 859 of the buffer memory.
 - Receive data area corresponding to AJ35PTF-R2 and a remote terminal unit conforming to MINI standard protocol of the buffer memory of the master module.
 - Receive data area corresponding to the AJ35PTF-R2 and a remote terminal unit conforming to MINI standard protocol of the buffer memory of the master module and the receive data area of the AJ35PTF-R2 and a remote terminal unit conforming to MINI standard protocol.

(c) The master module sets the receive data clear complete signal ($X_{(n+23)}$) to ON when the receive data clear is completed normally.



(14) Remote terminal unit fault detection reset signal (I/O dedicated mode: Irrelevant/Extension mode: $Y_{(n+24)}$)

- (a) The master module sets the remote terminal unit fault detection signal ($X_{(n+24)}$) to ON, when an error is detected during transmission between the master module and a remote terminal unit.
- (b) The remote terminal unit fault detection reset signal, which is used to reset the status of the device that detected the error, is set to ON by the sequence program.

When an error is detected during data transmission, the error detection signal should be set to ON after the transmit request signal ($Y_{(n+0)}$ to $Y_{(n+1A)}$) is set to OFF.

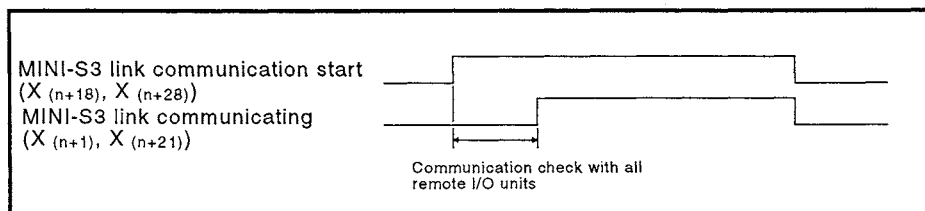
- (c) The following processing occurs when the remote terminal unit fault detection signal is set to ON.
 - The remote terminal unit fault detection signal ($X_{(n+24)}$) is reset.
 - Address 195 of the buffer memory is cleared.

(15) MINI-S3 link communication start (I/O dedicated mode: $Y_{(n+18)}$ /Extension mode: $Y_{(n+28)}$)

- (a) This signal starts the MINI-S3 link communication processing, and is set to ON by the sequence program.
- (b) Setting the MINI-S3 link communication start to ON, initiates I/O refresh by the master module and communication check is performed for all the remote modules.

When the communication check ends normally, the master module sets the MINI-S3 link communication-in-progress signal to ON, and communication is performed by all remote modules.

- (c) When the MINI-S3 link start signal is set to ON, the buffer memory and I/O signals are initialized as indicated below.
 - The contents of addresses 70 to 209 and 598 to 855 of the buffer memory are cleared.
 - The remote terminal unit error detection signal ($X_{(n+24)}$) is set to OFF.
 - The MINI-S3 link error detection signal ($X_{(n+6)}/X_{(n+26)}$) is set to OFF.
 - The MINI-S3 link communication error signal ($X_{(n+7)}/X_{(n+27)}$) is set to OFF.



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(16) FROM/TO instruction response designation (I/O dedicated mode: Y_(n+1A)/Extension mode: Y_(n+2A))

- (a) Defines priority of access to the master module buffer memory.
- (b) Off indicates that the master module processing has priority.
- (c) On indicates that the programmable controller CPU's FROM/TO instruction has priority.
- (d) The following processing varies depending on the ON/OFF status of the FROM/TO instruction response designation.

FROM/TO Instruction Response Designation	OFF	ON
Item		
Access to buffer memory	Priority given to master module.	Priority given to programmable controller CPU's FROM/TO instruction.
Receive (input) data read from several stations by one FROM instruction	The receive data refreshed at the same timing can be read.	The receive data refreshed at different timings may be read.
FROM/TO instruction processing time	There is a delay of (0.3 ms + 0.25 ms X (number of partial refresh stations connected)) max.	No delay

(17) Faulty station data clear designation (I/O dedicated mode: Y_(n+1B)/Extension mode: Y_(n+2B))

- (a) Specify whether the receive data from a faulty remote I/O station is cleared or not.
- (b) The faulty station data clear designation does not clear the transmit data of faulty stations.

Faulty Station Data Clear Designation	OFF	ON
Master Module Buffer Memory		
Transmit data for batch refresh (addresses 10 to 41)	—	—
Transmit data for batch refresh (addresses 110 to 141)	Data at occurrence of communication error is retained.	All points are switched OFF.
Transmit data for partial refresh (addresses 300 to)	—	—
Transmit data for partial refresh (addresses 600 to)	Data at occurrence of communication error is retained.	All points are switched OFF.

POINT

When the faulty station data clear designation is turned ON, you are recommended to set the mode setting switch to the no automatic return mode.

(18) Buffer memory channel switch signal (I/O dedicated mode: Irrelevant/Extension mode: $Y_{(n+2C)}$)

(a) The buffer memory used when transmitting data between the master module and the remote terminal units differs depending on the channel used.

Address	Channel 0	Address	Channel 1
1100	Area for remote terminal unit No. 1	1100	Area for remote terminal unit No. 8
to	to	to	to
8099	Area for remote terminal unit No. 7	8099	Area for remote terminal unit No. 14

(b) When data is read or written from the sequence program using the FROM/TO instructions, it is necessary to specify the channel applicable to the area used by the relevant remote terminal unit.

(c) When channel 0 is specified, the FROM/TO instructions are used relevant to remote terminal units No. 1 to No. 7.
When channel 1 is specified, the FROM/TO instructions are used relevant to remote terminal units No. 8 to No. 14.

(d) Channel switching takes place in accordance with the ON/OFF state of the channel switch signal.

$Y_{(n+2C)}$ OFF ... Channel 0 is specified.

$Y_{(n+2C)}$ ONChannel 1 is specified.

(e) The remote terminal unit number is set by the initial data setting of the master module and is assigned to each remote terminal unit.

(19) Error reset (I/O dedicated mode: $Y_{(n+1D)}$ /Extension mode: $Y_{(n+2D)}$)

(a) When the master module detects an error in communication with a remote module, the MINI-S3 link error detection signal ($X_{(n+6)}/Y_{(n+26)}$) and MINI-S3 link communication error signal ($X_{(n+7)}/Y_{(n+27)}$) are set to ON.

(b) The error reset signal is used to reset the error detected status and is set to ON by the sequence program.

However, the error reset signal is effective only when the start signal ($Y_{(n+18)}/Y_{(n+28)}$) is OFF.

(c) The processing indicated below is performed when the error reset signal is set to ON.

1) The areas of the buffer memory indicated below are cleared.

- Communication error code area (address 107)
- Error detection code area (address 108)
- Remote terminal unit error station detection area (address 195)
- Remote terminal unit error code area (address 196 to 209)

2) The signals indicated below are reset.

- Remote terminal unit error detection signal ($X_{(n+24)}$)
- MINI-S3 link error detection signal ($X_{(n+6)}/Y_{(n+26)}$)
- MINI-S3 link communication error signal ($X_{(n+7)}/Y_{(n+27)}$)

3) The ERR.LEDs indicated below are switched OFF.

- ERR. LOOP LED
- ERR. REM LED

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3.4 Buffer Memory

The master module has a buffer memory (not battery backed) for communication of data with the programmable controller CPU.

The FROM/TO instructions are used to read data from the buffer memory to the programmable controller CPU or write data to the buffer memory from the programmable controller CPU.

3.4.1 Buffer memory assignment

Address (Decimal)	Name	I/O dedicated	Extension	Description	Read/Write of programmable controller CPU
0	Number of remote I/O stations	○	(*1)	Define the remote I/O station range for I/O refresh.	Read/write
1	Number of retries	○	○	Define the number of retries at occurrence of communication error.	
	Reserved	—		—	
4	Line error check	○	○	Used to check error location.	
10 to 41	Transmit data for batch refresh	○	○	Stores data to be output to batch refresh type remote I/O stations.	—
	Reserved	—		—	
70 to 77	Remote I/O units card data	○	○	Stores I/O module types used as remote I/O stations.	Read only
	Reserved	—		—	—
90 to 93	Accumulative faulty station detection *	○	○	Stores the faulty station numbers. (Holds the detection status until reset by the sequence program.)	Read/write
	Reserved	—		—	—
100 to 103	Faulty station detection *	○	○	Stores the most recent faulty station numbers.	Read only
	Reserved	—		—	
107	Communication error code	○	○	Stores the reason why MINI-S3 link error communication error has been switched ON.	
108	Error detection code	○	○	Stores "1" when MINI-S3 link error detected.	
	Reserved	—		—	
110 to 141	Receive data for batch refresh	○	○	Stores the input data to batch refresh type remote I/O unit.	
	Reserved	—		—	
160	Line error retry counter	○	○	Stores the number of retries made when communication cannot be made with all remote I/O stations due to line error.	Read only
161 to 192	Retry counter	○	○	Stores the number of retries made to the faulty station.	
	Reserved	—		—	
195	Remote terminal unit faulty station *	X	○	Stores the station number when the remote terminal unit error occurs.	Read only
196 to 209	Remote terminal unit error code *	X	○	Stores the cause when the remote terminal unit error detection signal (X _(n+24)) is turned ON.	
	Reserved	—		—	—

* When an error such as a line error that stops communication occurs, the contents of the error are not stored. In this case, carry out troubleshooting by referring to Chapter 6.

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Address (Decimal)	Name	I/O dedicated	Extension	Description	Read/Write of programmable controller CPU
250 to 282	Partial refresh station	O	(*1)	Writes the partial refresh type remote I/O unit numbers and the numbers of digits specified (numbers of partial refresh times).	Read/write
	Reserved	—	—	—	
300 to 363	Transmit data for partial refresh	O	O	Stores data output to batch refresh type remote I/O units.	
	Reserved	—	—	—	
598	Accumulative input error detection for partial refresh *	O	O	Stores the faulty station numbers. (Holds the detection status until reset by the sequence program.)	Read only
599	Input faulty station detection for partial refresh *	O	O	Stores the partial refresh input data receive error.	
600 to 663	Receive data for partial refresh *	O	O	Stores input data to partial refresh type remote I/O units.	Read/write
858	Receive data clear specification	X	O	Specifies the station number of the AJ35PTF-R2 that clears receive data using the receive data clear request signal ($Y_{(n+23)}$).	
859	Receive data clear area specification	X	O	Specifies the receive buffer that is to be cleared when the receive data is cleared by the receive data clear request signal ($Y_{(n+23)}$).	
860 to 929	Parameters for no-protocol mode	X	O	Specifies the parameters to be used when in the AJ35PTF-R2 no-protocol mode.	
930 to 1099	Reserved	—	—	—	—
1100 to 2099	Transmission/receive area for remote terminal unit No. 1	X	O	Writes transmit data to a remote terminal unit or stores receive data from a remote terminal unit.	Read/write
	Transmission/receive area for remote terminal unit No. 8				
2100 to 3099	Transmission/receive area for remote terminal unit No. 2				
	Transmission/receive area for remote terminal unit No. 9				
3100 to 4099	Transmission/receive area for remote terminal unit No. 3				
	Transmission/receive area for remote terminal unit No. 10				
4100 to 5099	Transmission/receive area for remote terminal unit No. 4				
	Transmission/receive area for remote terminal unit No. 11				
5100 to 6099	Transmission/receive area for remote terminal unit No. 5				
	Transmission/receive area for remote terminal unit No. 12				
6100 to 7099	Transmission/receive area for remote terminal unit No. 6				
	Transmission/receive area for remote terminal unit No. 13				
7100 to 8099	Transmission/receive area for remote terminal unit No. 7				
	Transmission/receive area for remote terminal unit No. 14				

Channel 0 (Y_(n+2C)..OFF) Channel 1 (Y_(n+2C)..ON)

O Relevant
X Irrelevant

(*1) . . . The data set with the initial data ROM is automatically stored here (a write program including a TO instruction is not necessary).

* When an error such as a line error that stops communication occurs, the contents of the error are not stored. In this case, carry out troubleshooting by referring to Chapter 6.

POINT

Among various processings of the special function module, access from the programmable controller CPU has priority.

Therefore, frequent access from the programmable controller CPU to the special function module buffer memory will not only increase the programmable controller CPU scan time but also cause delays in various processings of the special function module.

Access from the programmable controller CPU to the buffer memory using the FROM/TO instruction or the like should be made only when required.

3.4.2 Buffer memory and data location

- (1) Total number of remote I/O stations (address 0)
 - (a) Define the remote I/O unit range for I/O refresh.
 - (b) I/O refresh is performed for up to the remote I/O unit specified in address 0.

For example, remote I/O units 1 to 20 are refreshed when 20 is set to address 0. Remote units of address 21 and on are not refreshed.
 - (c) Specify the last remote I/O unit number connected to the master module.

The value specified should include the number of occupied stations if the last remote I/O unit occupies two or more stations. That is, set 13 to address 0 to allow data link for up to station 10 that occupies 4 stations.
 - (d) Default value is 0.
 - (e) Any value between 1 and 64 may be specified. Any value set outside this range flags an initial data error when the MINI-S3 link communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is switched ON.
 - (f) The number of remote I/O stations should be written to address 0 with the MINI-S3 link communication start signal OFF because the value active at the leading edge of the MINI-S3 link communication signal is valid.
- (2) Number of retries (address 1)
 - (a) Define the number of retries made to the faulty remote I/O unit.
 - (b) Default value is 5.
 - (c) Any value between 0 and 32 may be specified.
 - (d) The number of retries should be written to address 1 when the MINI-S3 link communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is OFF because the value active at the leading edge of the MINI-S3 link communication start signal is valid.
 - (e) A communication error occurs if the faulty remote I/O unit cannot be restored after retry is made the specified number of times.

(3) Line error check (address 4)

- (a) The line error check setting aids in locating line faults by lighting the remote module RUN LED lamps up to the location where the fault has occurred.

Although faults can be located with the RD/SD LEDs with the line check function provided by the operation mode switch on the front panel of the master module, modules such as the operation box which is not equipped with RD/SD LEDs cannot be checked using this function.

Because the line error check locates the faulty module using the RUN LED, it can be used for all modules.

- (b) The line error check forces the output of OFF data or the value of data that existed directly prior to the fault occurring of each of the remote modules to turn on the RUN LED. (If no line error has occurred, normal data is output.)

POINT

When a line error check is performed, the E.C. mode setting of the output remote I/O units is no longer effective as the data is output forcibly to each of the remote modules.

Note that this means that the output status set by the E.C. mode setting at the point the error occurred is changed by the line error check.

- (c) The line error check is performed by either a "1" or "2" being set in buffer memory address 4.

The value becomes effective when the communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is set from OFF to ON.

0: Test message is sent.

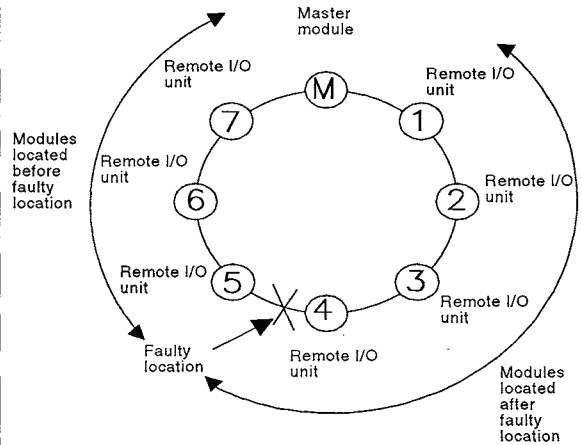
1: Outputs OFF data, and line error check is performed.

2: The value of data that existed directly prior to the fault occurring is output, and line error check is performed.

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(d) The value of line error check settings and the output status to each of the output remote I/O units is indicated below.

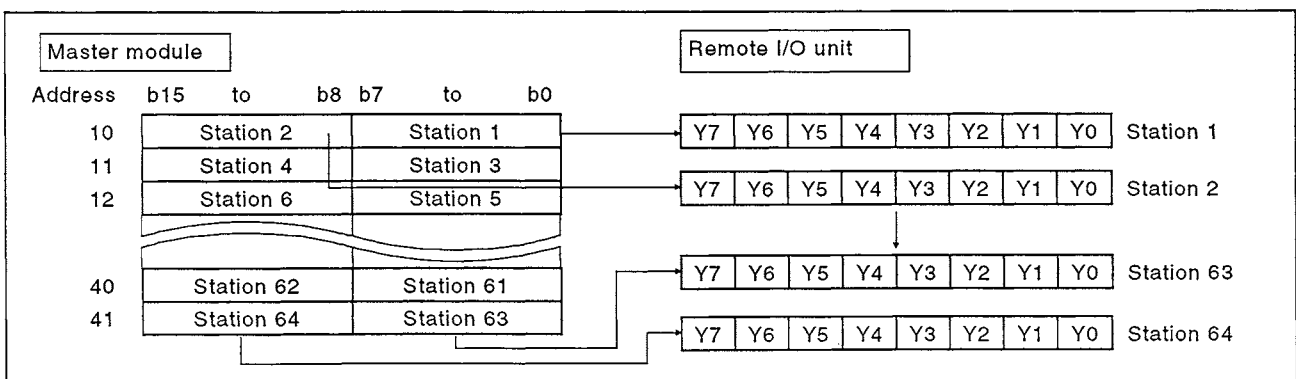
Operation mode switch located on front panel of master module	Line error check setting buffer memory address 4	Output Status of the Remote I/O Units			
		Modules located before faulty location		Modules located after faulty location	
		E.C. mode setting ON	E.C. mode setting OFF	E.C. mode setting ON	E.C. mode setting OFF
0	0	All output points are switched OFF	The data existing directly prior to the fault occurring is retained.	All output points are switched OFF	The data existing directly prior to the fault occurring is retained
	1	All output points are switched OFF.			
	2	The data existing directly prior to the fault occurring is retained.			
1, 2	0	All output points are switched OFF	The data existing directly prior to the fault occurring is retained.	All output points are switched OFF	The data existing directly prior to the fault occurring is retained
	1, 2	All output points are switched OFF			



(e) The output data (the data which uses the transmit data area (addresses 1100 to 8099) for the remote terminal unit) corresponding to the remote terminal unit retains output data regardless of the setting of the line error check.

(4) Transmit data for batch refresh (addresses 10 to 41)

- (a) Set the data to be output to the batch refresh-type remote I/O unit, the remote terminal unit.
- (b) Batch refresh transmit data area assignment is as follows:
Addresses where the transmit data is to be written vary according to the station number assigned to each individual remote I/O units.



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- (c) Batch refresh transmit data area is made up of 8 bits per remote I/O station as shown below.

bn+7	bn+6	bn+5	bn+4	bn+3	bn+2	bn+1	bn+0	
Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0	1: ON 2: OFF

*: Value "n" depends on the remote I/O station number.

b0 to b7 for odd-numbered stations 1, 3 63
b8 to b15 for even-numbered stations 2, 4 64

- (5) Remote I/O unit card data (addresses 70 to 77)

- (a) Stores the card data of the remote I/O units linked to MINI-S3.
 (b) There are three types of card data which is expressed in two bits.
 00: Indicates that there is no remote I/O unit or the module could not make initial communication.
 01: Indicates an input remote I/O unit.
 Indicates a partial refresh type remote I/O unit.
 10: Indicates an output remote I/O unit.
 11: Indicates a remote terminal unit.

- (c) Data is made up as indicated below:

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
70	Station 8	Station 7	Station 6	Station 5	Station 4	Station 3	Station 2	Station 1								
71	Station 16	Station 15	Station 14	Station 13	Station 12	Station 11	Station 10	Station 9								
	Station 24	Station 23	Station 22	Station 21	Station 20	Station 19	Station 18	Station 17								
76	Station 56	Station 55	Station 54	Station 53	Station 52	Station 51	Station 50	Station 49								
77	Station 64	Station 63	Station 62	Station 61	Station 60	Station 59	Station 58	Station 57								

- (d) Remote I/O station card data is processed only once when the MINI-S3 link communication start signal (Y_(n+18)/Y_(n+28)) is turned from OFF to ON.

- (6) Accumulative faulty station detection (addresses 90 to 93)

- (a) The station number of the faulty remote I/O unit is detected.
 (b) Sets "1" to the bit corresponding to the faulty I/O station if correct communication is impossible after the retry of the specified number (address) of retries after an occurrence of communication error.
 (c) If the communication error station can make normal communication in the case of an automatic return, the corresponding bit is not reset. It indicates the cumulative result of the error station detected by Error station detection (address 100 to 103).
 (d) Reset to 0 when the MINI-S3 link communication start signal (Y_(n+18)/Y_(n+28)) is turned from OFF to ON.
 (e) The data configuration is as indicated below:

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
90	Station 16	Station 15	Station 14	Station 13	Station 12	Station 11	Station 10	Station 9	Station 8	Station 7	Station 6	Station 5	Station 4	Station 3	Station 2	Station 1
91	Station 32	Station 31	Station 30	Station 29	Station 28	Station 27	Station 26	Station 25	Station 24	Station 23	Station 22	Station 21	Station 20	Station 19	Station 18	Station 17
92	Station 48	Station 47	Station 46	Station 45	Station 44	Station 43	Station 42	Station 41	Station 40	Station 39	Station 38	Station 37	Station 36	Station 35	Station 34	Station 33
93	Station 64	Station 63	Station 62	Station 61	Station 60	Station 59	Station 58	Station 57	Station 56	Station 55	Station 54	Station 53	Station 52	Station 51	Station 50	Station 49

1: Error
0: Normal

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(7) Faulty station detection (addresses 100 to 103)

- (a) The station number of the faulty remote I/O unit is detected.
- (b) Sets "1" to the bit corresponding to the faulty I/O station if correct communication is impossible after the retry of the specified number (address) of retries after an occurrence of communication error.
- (c) In the automatic return mode, the corresponding bit is reset to "0" when the faulty station is restored.
In the no-automatic return mode, the corresponding bit remains "1".
- (d) Any faulty station is detected when the MINI-S3 link communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is ON. Data is retained when the MINI-S3 link communication start signal is OFF.
- (e) Faulty station detection is only possible when an error that does not stop data communication occurs (see Section 6.1.1). When an error such as a line error that stops data communication occurs, it is not possible to detect faulty stations.
- (f) The data configuration is as indicated below:

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
100	Station 16	Station 15	Station 14	Station 13	Station 12	Station 11	Station 10	Station 9	Station 8	Station 7	Station 6	Station 5	Station 4	Station 3	Station 2	Station 1
101	Station 32	Station 31	Station 30	Station 29	Station 28	Station 27	Station 26	Station 25	Station 24	Station 23	Station 22	Station 21	Station 20	Station 19	Station 18	Station 17
102	Station 48	Station 47	Station 46	Station 45	Station 44	Station 43	Station 42	Station 41	Station 40	Station 39	Station 38	Station 37	Station 36	Station 35	Station 34	Station 33
103	Station 64	Station 63	Station 62	Station 61	Station 60	Station 59	Station 58	Station 57	Station 56	Station 55	Station 54	Station 53	Station 52	Station 51	Station 50	Station 49

1: Error
0: Normal

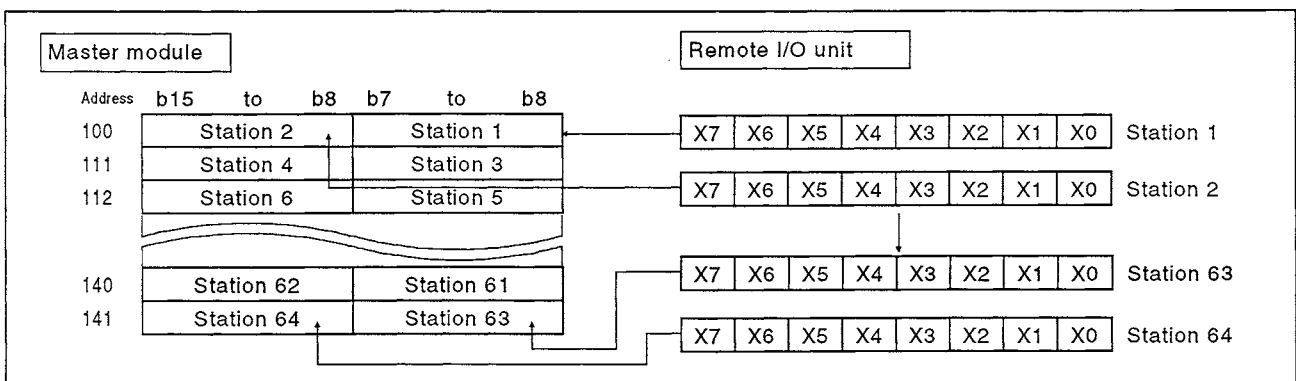
(8) Communication error code (address 107)

- (a) Stores the corresponding error code when the MINI-S3 link communication error signal ($Y_{(n+7)}/Y_{(n+27)}$) is turned ON.
- (b) Communication error codes are as follows:

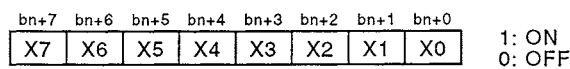
Code	Definition	Cause
0	No error	—
1	Initial data error	Any of the following settings is wrong: <ul style="list-style-type: none"> • Total number of remote stations • Number of retries • Partial refresh stations • Line error check • No-protocol mode parameters
2	Line error	<ul style="list-style-type: none"> • A link cable is broken or a remote I/O unit power is OFF. • Fault in transmission section of remote unit
3	Station fault	Communication has stopped due to a station fault with the communication stop (C-S mode) mode specified for fault detection.
4	Partial refresh type remote I/O unit fault	Communication has stopped due to occurrence of input error of the partial refresh type remote I/O unit with the communication stop (C-S mode) mode specified for fault detection.

- (c) The communication error code is reset to 0 in the following cases:
 - The error reset signal ($Y_{(n+1D)}/Y_{(n+2D)}$) is turned on when the communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is OFF.
 - The communication start signal is turned from OFF to ON.

- (9) Error detection code (address 108)
- (a) "1" indicates that the MINI-S3 link error detection signal ($X_{(n+6)}/X_{(n+26)}$) has been turned ON. "0" indicates normal.
 - (b) In the automatic return mode (mode setting switch = 0), the error detection code remains "1" but the MINI-S3 link error detection signal is switched OFF when communication is restored.
 - (c) The error detection code is reset to 0 in the following cases:
 - The error reset signal ($Y_{(n+1D)}/Y_{(n+2D)}$) is turned ON when the communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is OFF.
 - The communication start signal is turned from OFF to ON.
- (10) Receive data for batch refresh (addresses 110 to 141)
- (a) Stores the input states from the batch refresh-type remote I/O units and the remote terminal unit.
 - (b) Receive data area assignment for batch refresh is as indicated below. The storage address for the receive data varies depending on the station number assigned to each remote module.



- (c) Batch refresh receive data area is made up of 8 bits per remote I/O station as shown below.



*: Value "n" depends on the remote I/O station number.
 b0 to b7 for odd-numbered stations 1, 3 63
 b8 to b15 for even-numbered stations 2, 4 64

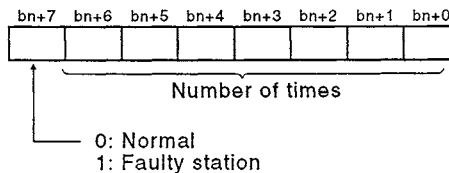
- (11) Line error retry counter (address 160)
- (a) Stores the number of retry times after a line error has occurred.
 - (b) Reset to 0 when communication is restored.
 - (c) Stores the value from address 1 (number of retries) when the MINI-S3 link communication error signal ($X_{(n+7)}/X_{(n+27)}$) is turned ON.

(12) Retry counter (addresses 161 to 192)

- (a) Receives the number of retries made to the faulty remote I/O unit.
- (b) Reset to 0 when communication is restored.
- (c) Buffer memory assignment is as indicated below.

Address	b15 to b8	b7 to b8
161	Station 2	Station 1
162	Station 4	Station 3
163	Station 6	Station 5
.....		
191	Station 62	Station 61
192	Station 64	Station 63

(d) The retry counter area has 8 bit locations per remote I/O station as shown below.



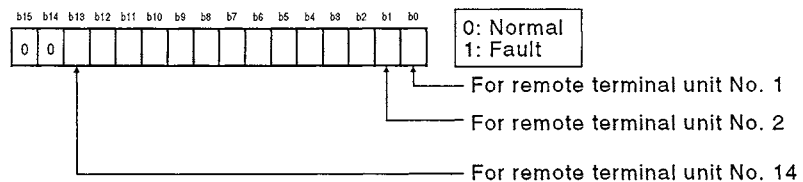
*: Value "n" depends on the remote I/O station number.
 b0 to b7 for odd-numbered stations 1, 3.....63
 b8 to b15 for even-numbered stations 2, 4.....64

(13) Remote terminal unit faulty station (address 195)

- (a) The unit number of the faulty remote terminal unit is detected.
- (b) The table in section 6.2 provides a list of possible causes of faults.
- (c) When a fault is detected the remote terminal unit fault signal ($X_{(n+24)}$) is set to ON and the bit corresponding to the faulty remote terminal unit is set.
- (d) Setting the remote terminal unit faulty station detect from OFF to ON resets the remote terminal unit faulty station bit.

If a fault is detected during data transmission, turn the transmit request signal ($Y_{(n+0)}$ to $Y_{(n+1A)}$) to OFF prior to resetting the remote terminal unit faulty station bit.

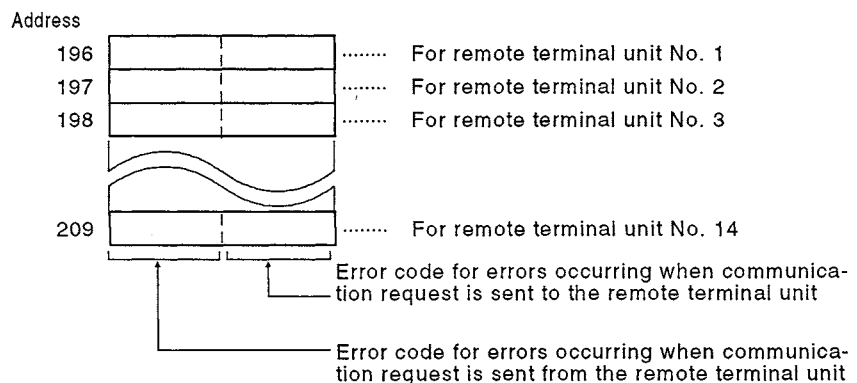
- (e) A fault is detected when the communication request signal is ON.
Data is retained when the communication request signal is OFF.
- (f) The correspondence between the remote terminal unit numbers and bits is indicated below.



- (g) The remote terminal unit number is assigned to each remote terminal unit by the setting of the initial data in the master module.

(14) Remote terminal unit error code (addresses 196 to 209)

- (a) When the remote terminal unit fault detection signal ($X_{(n+24)}$) is set to ON, the error contents is stored as code in the address relevant to the remote terminal unit number.
- (b) For further information concerning error code, see Section 6.2.



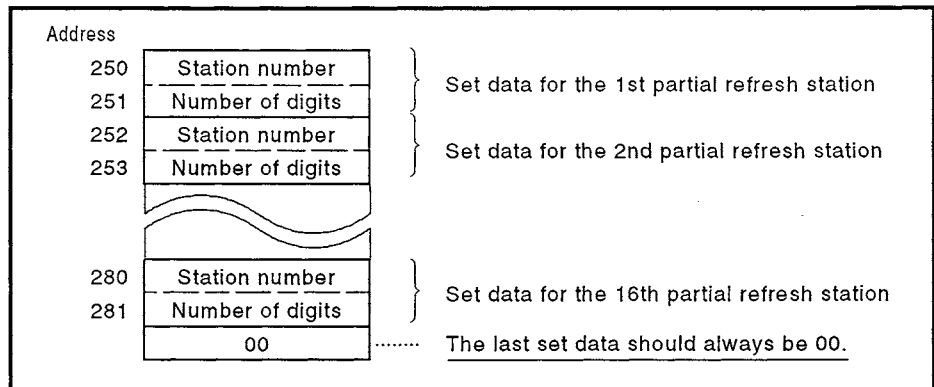
- (c) The remote terminal unit number is assigned to each remote terminal unit by the setting of the initial data in the master module.

(d) The error code is reset when the error reset signal ($Y_{(n+28)}$) is set to ON when the communication start signal ($Y_{(n+2D)}$) is OFF. "0" is also stored in the bit when the communication start signal is set from OFF to ON.

(15) Partial refresh station (addresses 250 to 282)

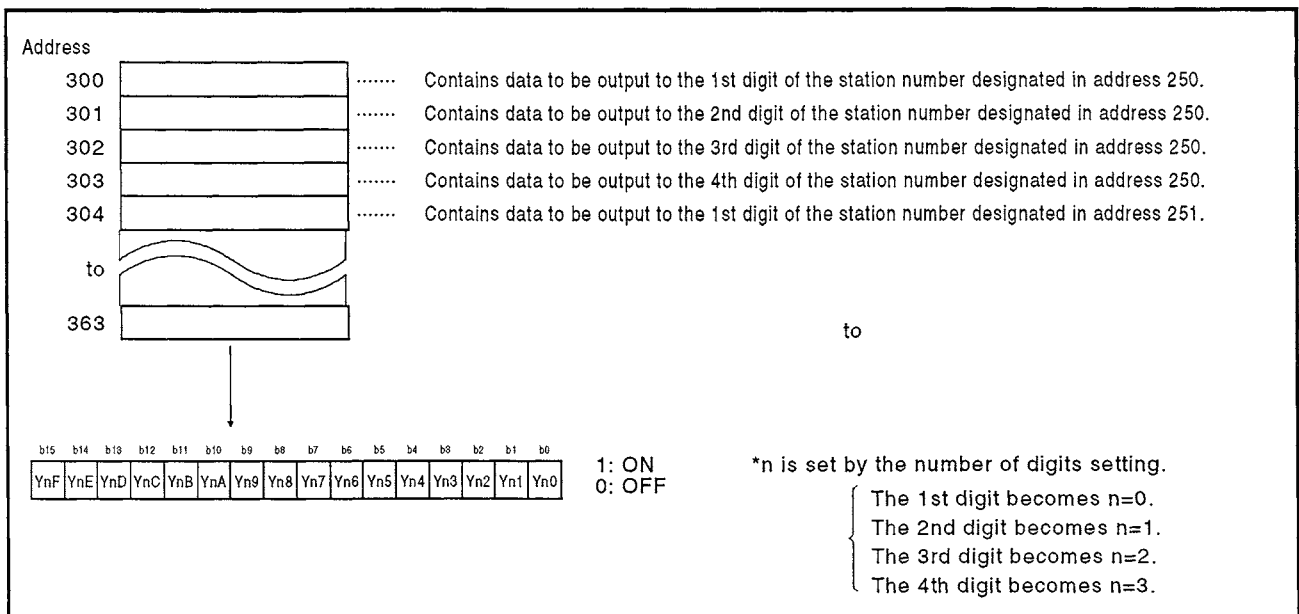
This set data is used to use partial refresh type remote I/O unit, and designates station numbers and the number of digits, which is derived from either the number of inputs or outputs divided by 16 points.

For further information concerning the method to set the data, see AJ35PTF-128DT Partial Refresh Type Remote I/O Unit User's Manual.



(16) Transmit data for partial refresh (address 300 to 363)

Designate data to be output to partial refresh type remote I/O unit. The buffer memory assignment is specified by the setting of the partial refresh station (addresses 250 to 282). For further information, see AJ35PTF-128DT Partial Refresh Type Remote I/O Unit User's Manual.



(17) Accumulative input error station detection for partial refresh (address 598)

(a) Contains I/O refresh status of partial refresh type remote I/O unit.
When the input data cannot be read within a set period, the corresponding bit is set.

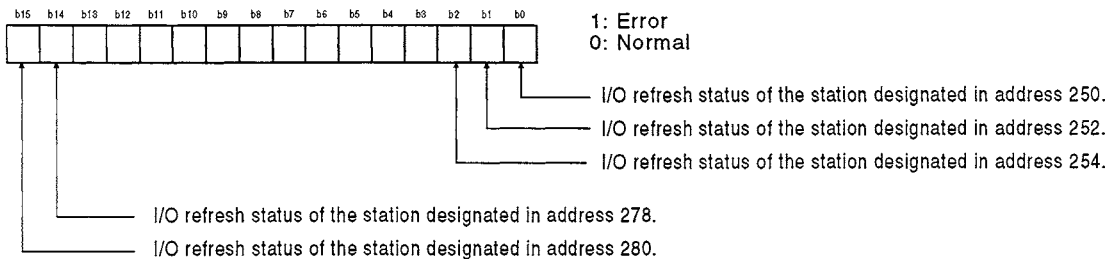
(b) When the faulty input station is restored, the bit corresponding to the station cannot be reset.

The accumulative result of the error stations detected in the input error station detection (address 599), is set for this bit.

(c) Accumulative input error station detection is reset to 0 when the MINI-S3 link communication start ($Y_{(n+18)} Y_{(n+28)}$) is set from OFF to ON.

(d) The buffer memory contains the data indicated below.

The storage area of the error data contents for each station is determined by the settings of the partial refresh station.



(18) Input error station detection for partial refresh (address 599)

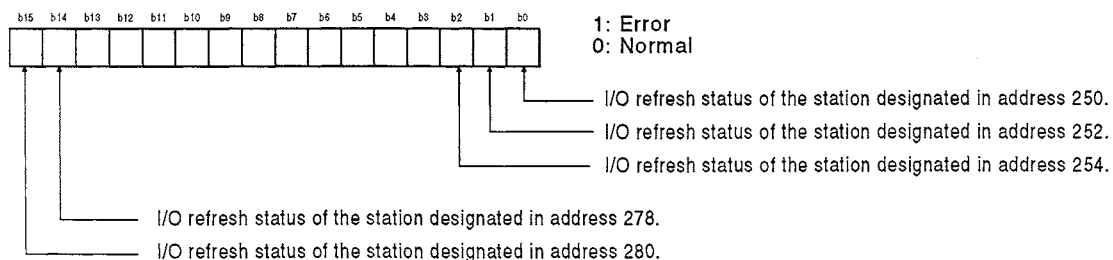
(a) Contains I/O refresh status of partial refresh type remote I/O unit.
When the input data cannot be read within a set period, the corresponding bit is set.

(b) When the faulty input station is restored and the automatic return function is set ON, the bit corresponding to the station with the input error is reset.

If the automatic return function is OFF, the bit is not reset.

(c) The buffer memory contains the data indicated below.

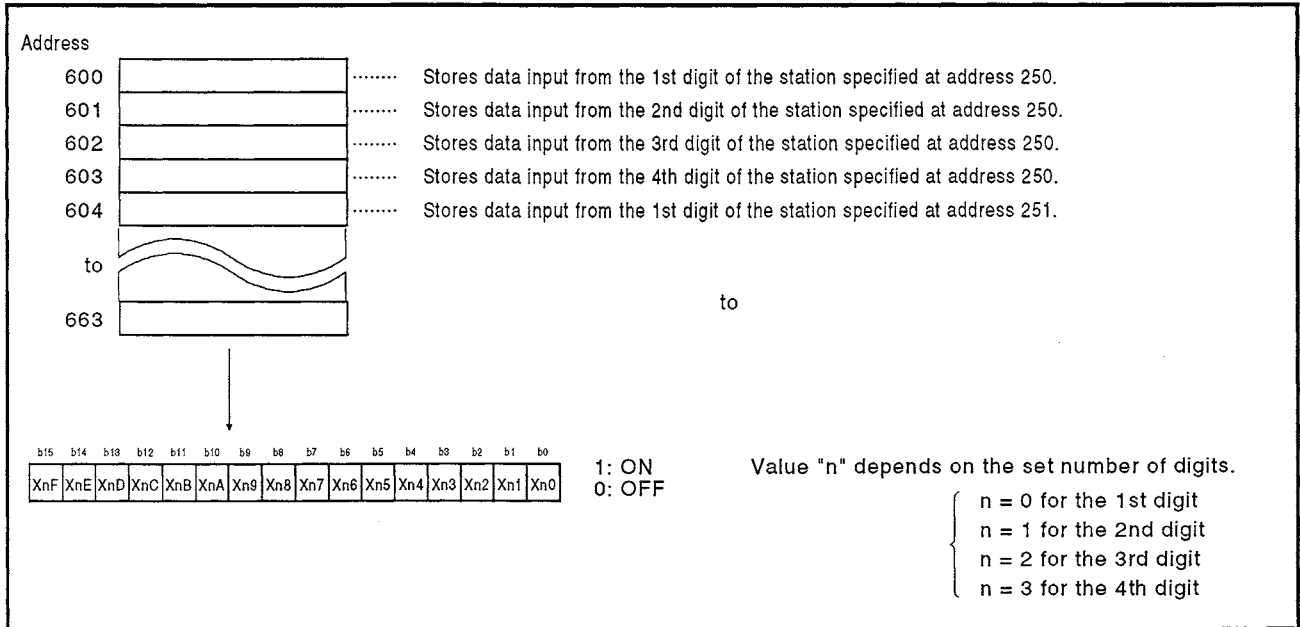
The storage area of the error data contents for each station is determined by the settings of the partial refresh station.



(19) Receive data for partial refresh (addresses 600 to 663)

The data input from the AJ35PTF-128DT is stored in the area corresponding to those addresses.

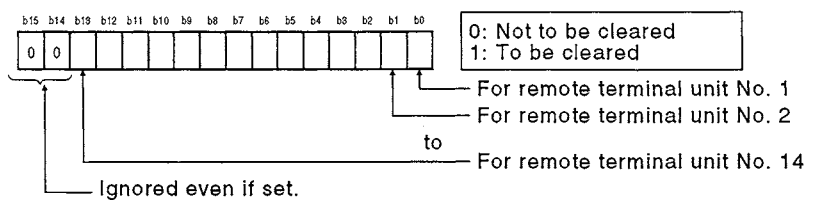
The buffer memory assignment is specified by the setting of the partial refresh station (addresses 250 to 282). For details, refer to the AJ35PTF-128D Partial Refresh Type Remote I/O Unit User's Manual.



(20) Receive data clear designation (address 858)

- (a) The receive data clear designation specifies the AJ35PTF-R2 or a remote terminal unit conforming to MINI standard protocol remote terminal unit remote terminal unit number, the receive buffer of which is to be cleared by the receive data clear request signal ($Y_{(n+23)}$).
- (b) Receive buffer clearance is used in such cases as when an error occurs due to a fault at an external device connected to the AJ35PTF-R2 or a remote terminal unit conforming to MINI standard protocol; it is used to clear the data received up to that point and start from the beginning again.
- (c) In receive buffer clearance, the receive buffer area to be cleared can be specified by receive buffer clear range designation (address 859).
- (d) The buffer memory of remote terminal unit to be cleared is specified by setting "1" in the bit corresponding to the remote terminal unit number that is assigned to the relevant remote terminal unit.

Setting for AJ35PTF-R2 or a remote terminal unit conforming to MINI standard protocol remote terminal unit other than remote terminal unit is ignored.



- (e) The correspondence between the remote terminal unit numbers and bits is indicated below.
- (f) The remote terminal unit number is assigned to each remote terminal unit by the setting of the initial data in the master module.

(21) Receive data clear range designated (address 859)

- (a) The receive data clear range designation specifies the area of receive buffer corresponding to the relevant AJ35PTF-R2 or a remote terminal unit conforming to MINI standard protocol remote terminal unit that is to be cleared by the receive data clear request signal ($Y_{(n+23)}$).
- (b) The receive data clear range designation specifies whether only the receive buffer for the remote terminal unit in the master module corresponding to the remote terminal unit is to be cleared, or if this area and either the receive buffer for communication with AJ35PTF-R2 external devices or the buffer memory of a remote terminal unit conforming to MINI standard protocol is to be cleared at the same time.
- (c) The receive data clear range designation is effective only for remote terminal units that are specified in the receive data clear designation (address 858).

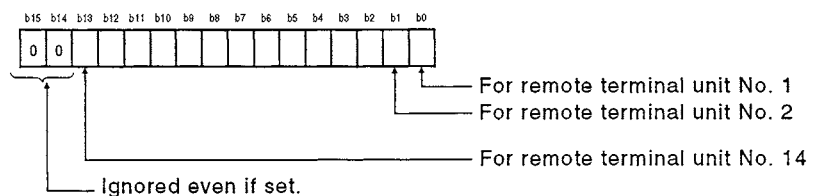
(Receive data clear range designation for remote terminal units that are not specified in the receive data clear designation is ignored.)

- (d) Whether only the receive buffer assigned to the remote terminal unit is to be cleared or whether that and the communication receive buffer of the remote terminal units are to be cleared is specified as indicated below.

0: Clears only the receive buffer for the remote terminal unit in the master module.

1: Clears the receive buffer for the remote terminal unit in the master module and the receive buffer of the remote terminal unit.

- (e) The correspondence between the remote terminal unit numbers and bits is indicated below.



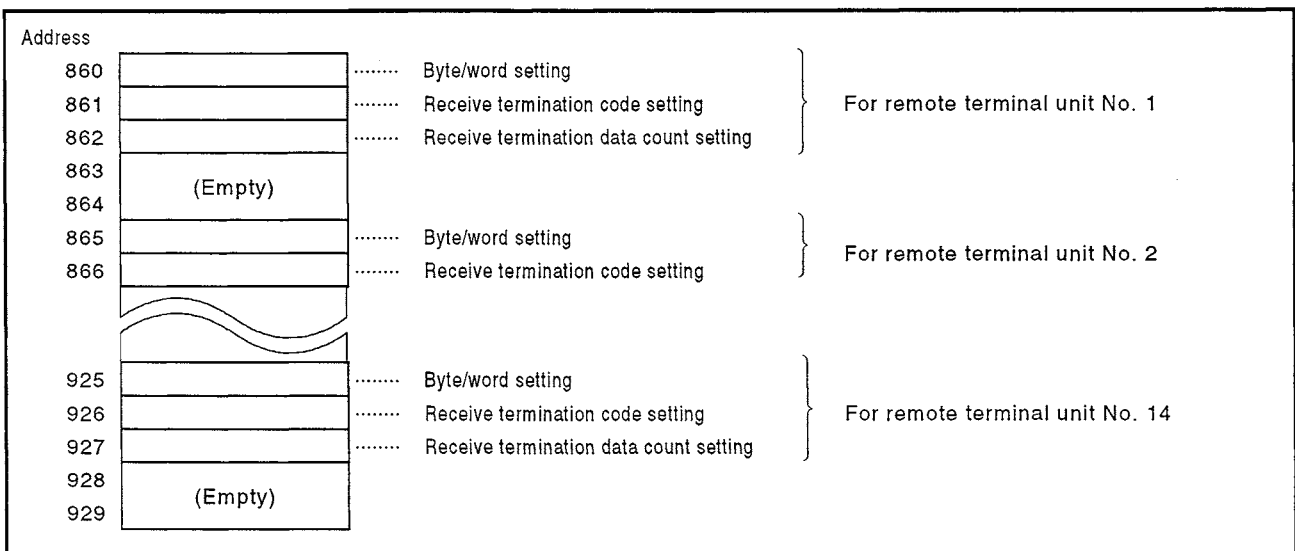
- (f) The remote terminal unit number is assigned to each remote terminal unit by the setting of the initial data in the master module.

(22) No-protocol mode parameters (addresses 860 to 929)

- (a) Set the parameters for AJ35PTF-R2 to use it in the no-protocol mode.
- (b) The three types of settings are indicated below.
 - 1) Byte/word setting:
Sets whether communication is conducted in bytes or word units.
 - 2) Receive termination code setting:
Sets the user-defined code specifying the termination of receive data.
 - 3) Receive termination data count setting:
Designates the termination of data receive using data count.
- (c) For further information concerning the setting of parameter areas for the no-protocol mode, see the AJ35PTF-R2 RS-232C Interface Unit User's Manual.
- (d) Parameters should be written when the MINI-S3 link communication start signal ($Y_{(n+28)}$) is set to OFF.

The parameter values become effective when the MINI-S3 link communication start signal is set from OFF to ON.
- (e) The following values are contained when power is applied to the system.

 Byte/word setting : 0 (word)
 Receive termination code setting : 0D0AH (CR, LF)
 Receive termination data count setting:
 (Receive area word count for a remote terminal unit) - 1
- (f) Assignment of parameter areas for the no-protocol mode is indicated below.

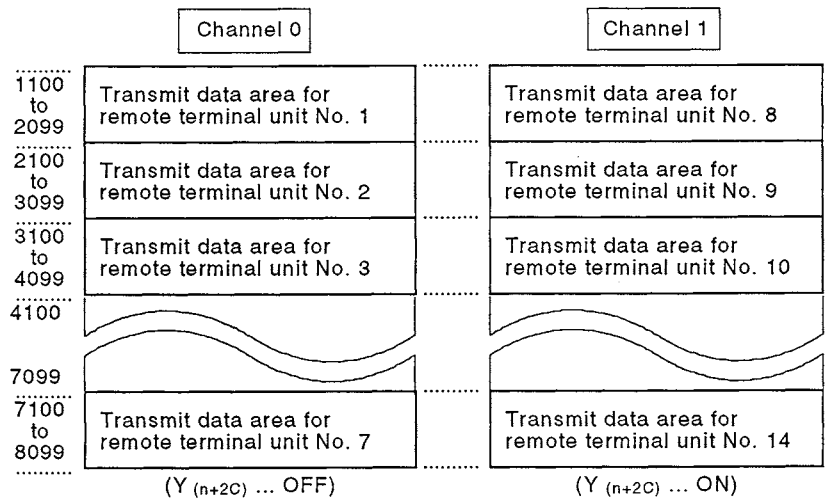


- (g) The remote terminal unit number is assigned to each remote terminal unit by the setting of the initial data in the master module.

Set the parameters to the areas for the unit number assigned to the AJ35PTF-R2 which uses the no-protocol mode.

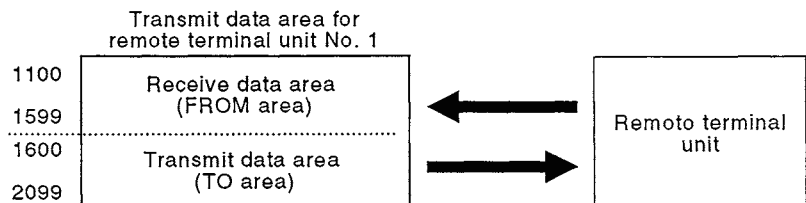
(23) Remote terminal unit communication area (addresses 1100 to 8099)

- (a) The remote terminal unit communication area is used for communication of data between the master module and remote terminal units.
- (b) The channels for the communication data area varies between remote terminal units numbers 1 to 7 and 8 to 14.
 The two channels are switched depending on which remote terminal units the data is being written to or read from using the FROM/TO instructions.
 The channel switch signal ($Y_{(n+2C)}$) is used to specify the channel to be used.
 Channel switching is executed by the channel switching signal ($Y_{(n+2C)}$).



The remote terminal unit number is assigned to each remote terminal unit by the setting of the initial data in the master module. Data read and write is conducted in the areas corresponding to the remote terminal unit numbers assigned to each of the remote terminal units.

- (c) Each communication data area is configured of a transmit data area and a receive area as indicated below. The amount of data that each area can contain when power is applied to the system is 500 words.



Transmit data area is area used to set the data transmitted to the remote terminal unit.
 Receive data area is area used to contain the data received from the remote terminal unit.

- (d) Data storing capacity of each area can be freely specified by the initial data settings of the master module.

(However, the transmit data area plus receive data area must not exceed 1000 words.)

For further information concerning initial data settings, see the SW[] GP-MINIPE Operating Manual.

- (e) For further information concerning the setting of data transmitted to the transmit data area or the data contained in the receive data area, see the user's manuals for the appropriate remote terminal unit.

3.4.3 Relationship between buffer memory allocations and number of occupied points of remote units

The buffer memory addresses at which the data of a remote I/O station is stored are determined in accordance with the station number of the station. If a remote I/O unit occupies two or more stations, its data is stored as indicated below.

- (1) Data corresponding to the number of occupied stations is stored, starting from the station number for which the station number setting was made. For example, assuming that the station number "1" is set for a remote I/O unit that occupies four stations, the output data is stored at addresses 10 and 11 and the input data is stored at addresses 110 and 111.
- (2) Remote I/O station "faulty" status information may be managed for more than one station at a time. If one station becomes faulty, all the stations that are processed together with it are also treated as faulty. For example, in the case of an AJ35PTF-28AS compact remote I/O station, which has 16 input points, 12 output points, and occupies four stations, faulty station processing is executed for all four stations together. If the station number is set to "1", stations 1 through 4 will all be regarded as faulty stations if a fuse blows.

3.5 I/O Refresh

"I/O refresh" is the read/write processing of input and output data that takes place between the master station (buffer memory of the master module) and the remote I/O stations.

Input data: The input statuses of the remote I/O stations are stored in the buffer memory.

Output data: Written from the programmable controller CPU to the buffer memory and output to the remote I/O stations.

I/O refresh processing takes one of the following forms, depending on the type of remote I/O unit.

- (1) Batch refresh type remote I/O units
The input and output data of the remote I/O stations is all read and written in one I/O refresh processing.
- (2) Partial refresh type remote I/O units
The input and output data of the remote I/O stations is divided up for reading/writing in a number of I/O refresh processings.
The number of I/O refresh processings (number of digits) is set in the buffer memory of the master module by the sequence program. For details, see Section 3.4.

The execution of I/O refresh processing varies according to the operating status of the programmable controller CPU and the communication status of the MINI link.

The following sections explain how the operating status of the programmable controller CPU and the operation status in the event of a communication error affect MINI link I/O refresh processing.

3. SPECIFICATIONS

3.5.1 Relation between Programmable controller CPU operating status and I/O refresh

I/O refresh of the MINI-S3 link is performed when the master module is in online mode (mode setting switch = 0 to 2) and $Y_{(n+18)} / Y_{(n+28)}$ (MINI-S3 link communication start) is ON.

I/O refresh stops when the MINI-S3 link communication start signal is turned OFF.

(1) Input remote I/O station

- (a) During I/O refresh, remote I/O station input data is continually stored to the receive data area (buffer memory addresses 110 to 141 or 600 to 855).
- (b) If I/O refresh is stopped, the receive data at the time of I/O refresh stop is retained.

(2) Output remote I/O station

- (a) During I/O refresh, transmit data (buffer memory addresses 10 to 41 or 300 to 555) is output to the output remote I/O stations.
- (b) If I/O refresh is stopped, the output unit states depend on their E.C. MODE switch positions.
For further information on the E.C. MODE switch, see the user's manuals for the appropriate remote I/O module.

E.C. MODE Switch	I/O Refresh	During I/O Refresh (MINI Link Communication Start ($Y_{(n+18)} / Y_{(n+28)}$) ON)	I/O Refresh Stop (MINI Link Communication Start ($Y_{(n+18)} / Y_{(n+28)}$) OFF)
ON		Output remote I/O units are switched ON/OFF in accordance with the transmit data.	All outputs are switched OFF.
OFF			Output state at the time of I/O refresh stop is retained.
No E.C. mode setting switch			All outputs are switched OFF.

(3) Remote terminal units

(a) Output to remote terminal units

- 1) During I/O refresh, data contained in the transmit data area (addresses 1100 to 8099) is transmitted only once when the communication request signal ($Y_{(n+0)}$ to $Y_{(n+1A)}$) is set from OFF to ON.
- 2) The remote terminal unit retains the data received on the previous cycle until the next cycle of data is received. (If I/O refresh is stopped, the last cycle of data is retained.)

(b) Input from remote terminal units

- 1) If data to be sent to the master module appears during I/O refresh processing, the data is received in the receive area of the master module (addresses 1100 to 8099) and the transmit request signal ($X_{(n+1)}$ to $X_{(n+1B)}$) automatically comes ON.
- 2) The last cycle of data received in the master module is retained until the next cycle of data is received. The key input area for the operating box is cleared. (If I/O refresh is stopped, the last cycle of data is retained.)

3.5.2 Characteristics of I/O refresh when either a communication or line error has occurred

(1) Master module error detection

When an error occurs in remote I/O unit, the master module detects the station number of the remote I/O unit and the type of error. The I/O signals of the master module are set to ON as indicated below and the error code is stored in the buffer memory.

- MINI-S3 link error detection signal ($X_{(n+6)}/X_{(n+26)}$)
- MINI-S3 link communication error signal ($X_{(n+7)}/X_{(n+27)}$)
- Remote terminal unit error detection signal ($X_{(n+24)}$)
- Accumulative faulty station detection (addresses 90 to 93)
- Faulty station detection (addresses 100 to 103)
- Communication error code (addresses 107)
- Error detection code (address 108)
- Remote terminal unit error detection (address 195)
- Remote terminal unit error code (addresses 196 to 209)

(For further information concerning the I/O signals and buffer memory, see Sections 3.3 and 3.4.)

When remote I/O units occupy more than two stations, and an error occurs in one station of an occupied station number, the station numbers for all of the occupied stations indicate an error has occurred.

For example, a compact type remote I/O unit AJ35PTF-28AS (input points: 16, output points: 12, number of occupied stations: 4) manages in units of four stations. When set to station 1 and a fuse blows, all of four stations (station 1 to station 4) are treated as faulty station.

(2) Operation at an occurrence of errors

When an error occurs in the MINI-S3 link, one of the following two types of operating conditions develops.

- Communication continues

The faulty unit is disconnected while other modules continue to operate normally.

- Communication stops

Even if an error occurs in only one module, communication stops between all modules.

(For further information concerning the two types of errors, see Section 6.1.)

(a) Operating status when an error that does not stop communication occurs

When an error that does not stop communication occurs, error processing occurs only in relation to the faulty module. Other modules continue normal communication.

1) Input data from remote I/O units

Input data from faulty remote I/O units is processed in one of the two following ways depending on faulty station data clear specification ($Y_{(n+1B)}/Y_{(n+2B)}$) and receive data clear request ($Y_{(n+23)}$).

i) When the faulty station data clear specification and receive data clear request are OFF

The input data from the faulty remote I/O unit is not stored in the buffer memory.

Data received directly prior to the communication error is retained.

For example, in the case when 10 remote I/O units are connected and an error occurs in station 5, the input data of station 5 is that data which existed prior to the error. However, the input data of station 1 to 4 and 6 to 10 is stored.

ii) When the faulty station data clear specification and receive data clear request are ON

All points for the input data of the faulty remote I/O unit are either set to OFF or cleared.

2) Output data to the remote I/O units

Output data to faulty remote I/O units is processed in one of the two following ways depending on the setting of the operation mode switch.

i) Automatic online return ON (0)

The transmit data set in the buffer memory transmit data area is output.

ii) Automatic online return OFF (1)

OFF data is output.

If the fault is in an remote I/O unit, OFF data is output. If the fault is in a remote terminal unit, data is not transmitted even if the transmit request signal is ON.

(b) Operation when CS-type errors occur

The following errors will stop communication.

- Initialize data error

The total number of remote stations (1 to 64)

The number of retries (1 to 32)

Line error check (0 to 2)

Partial refresh stations

No-protocol mode parameters

An I/O refresh was started when an error setting existed in:

- Line error

Open in data link cables or no power is being supplied to the remote I/O unit(s).

- Faulty station

A communication error occurs with either of remote I/O unit when the operation mode switch was set to stop communication when an online error is detected (2).

1) When an initialize data error occurs, the master module does not perform I/O refresh.

2) Operation when a line error occurs

i) Input data from a remote I/O unit

When a fault occurs in a line, none of the input data from any of the remote I/O units is stored in the buffer memory.

Data received directly prior to the fault occurring in the line is retained.

ii) Output data to remote I/O units

When a fault occurs in a line, output data to remote I/O units is processed in one of the two following ways depending on the E.C. mode setting of the output remote I/O unit.

E.C. Mode Setting	Output Data of the Remote I/O Unit
OFF	Retain data that existed directly prior to the error.
ON	All outputs are switched OFF.
No E.C. mode setting switch	

For further information, concerning the E.C. mode setting, see Remote I/O Unit User's Manual.

iii) For further information concerning the location of fault when a fault occurs in lines, see Section 4.6.

3) Operation when a fault occurs in a station

When a communication error occurs in any remote I/O unit with the operation mode switch is set to "2" (stop communication when an online error is detected), MINI-S3 link communication stops.

i) Input data from remote I/O units

When a communication error has occurred in a remote I/O unit and communication has stopped, none of the input data from any of the remote I/O units is stored in the buffer memory.

Data received directly prior to the communication error occurring in the remote I/O unit is retained.

ii) Output data to remote I/O units

If a communication error occurs in a remote unit and communication is stopped, data is not transmitted by a remote terminal unit even if the transmit request signal is ON.

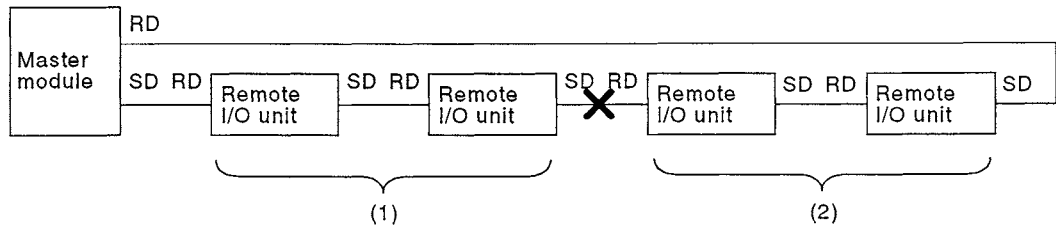
The status of the output of the remote I/O units are dependent on the E.C mode settings of output remote I/O units as indicated below.

E.C. Mode Setting	Output Data of the Remote I/O Unit
OFF	Retain data that existed directly prior to the error.
ON	All outputs are switched OFF.
No E.C. mode setting switch	

For further information concerning the E.C. mode setting, see Remote I/O Unit User's Manual.

(3) Remote I/O unit output OFF time when line error occurs

The time that it takes for the output of a remote I/O unit to go OFF on occurrence of a line error is indicated below.



(a) For remote I/O units up to the error location
 $(\text{I/O refresh time}) \times (\text{retry count})$

(b) Remote I/O units after the error location
 700 ms

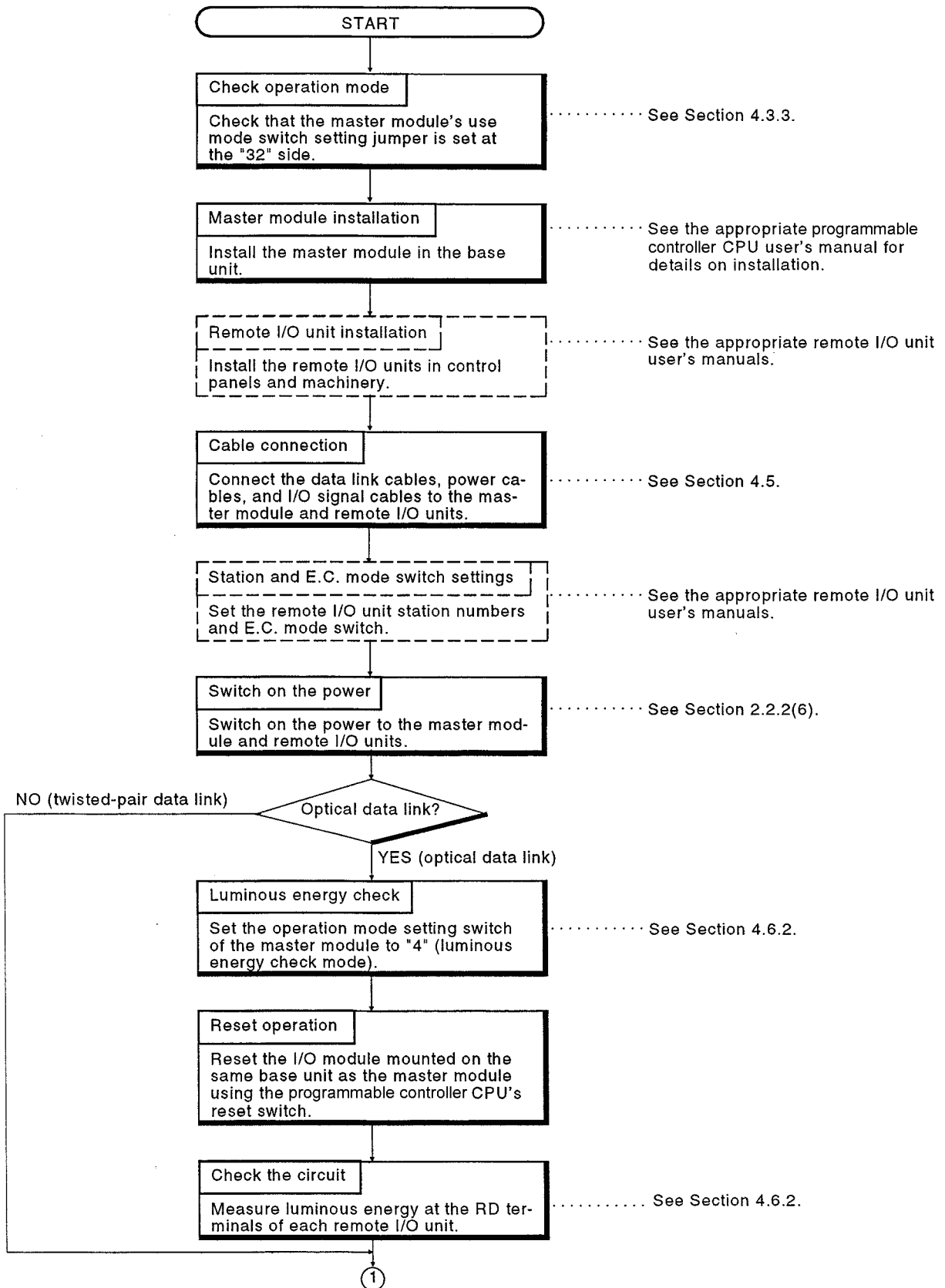
4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

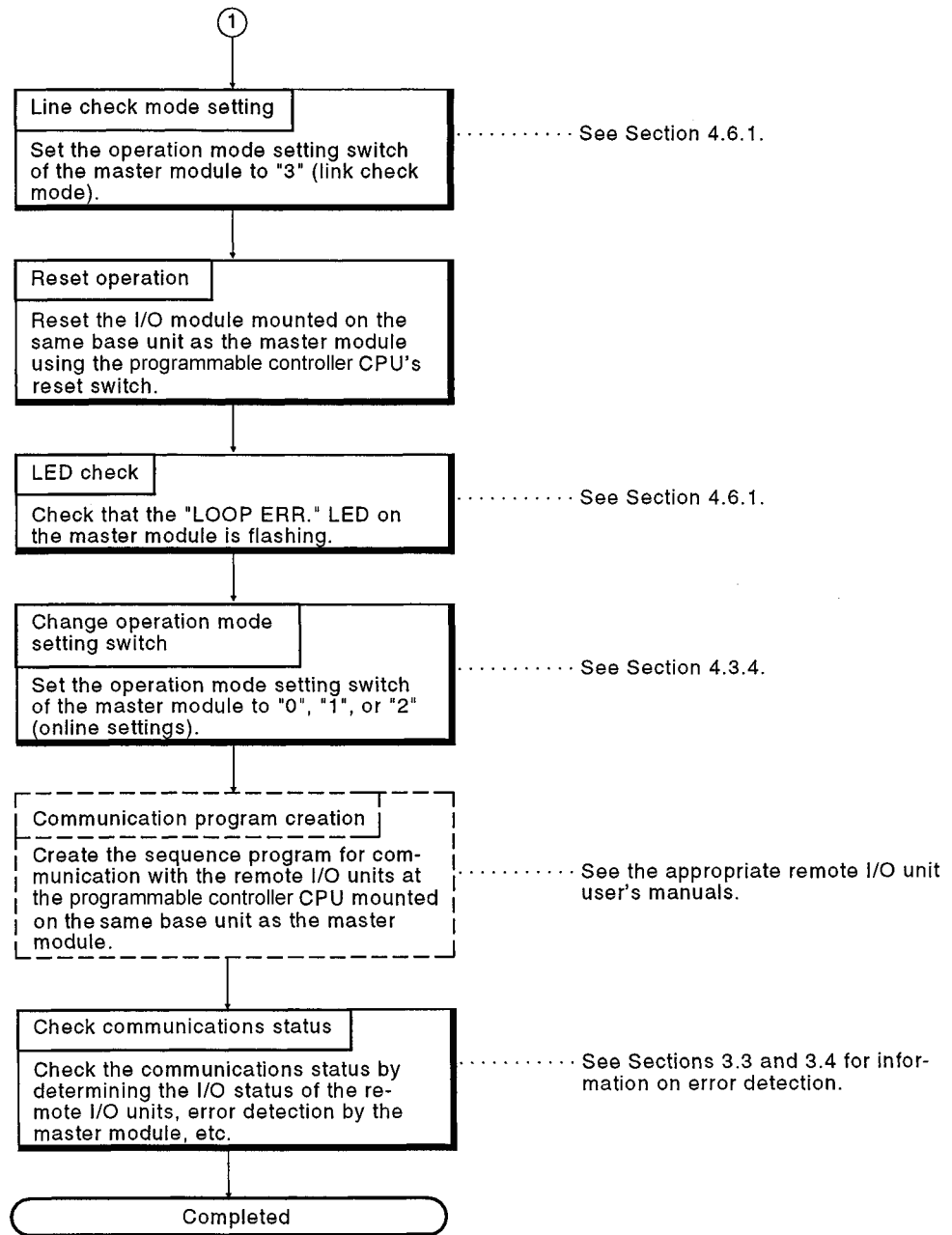
4.1 Master Module Handling Instructions

- (1) The case of master module is made of resin. Do not subject to the master module to impact or shock.
- (2) Do not remove printed circuit boards from the housing. This can cause faults.
- (3) Ensure that no conductive debris can enter the module.
- (4) Tighten module mounting screws (optional) to 78 to 137 N·cm torque.
- (5) To load the module onto the base, hook the two lower lugs into the cut out and gently swing the module into place. Ensure that the top catch engages. To remove the module, press the top catch and swing the module out before unhooking the lower lugs. (For further details, see the A1SCPU User's Manual.)

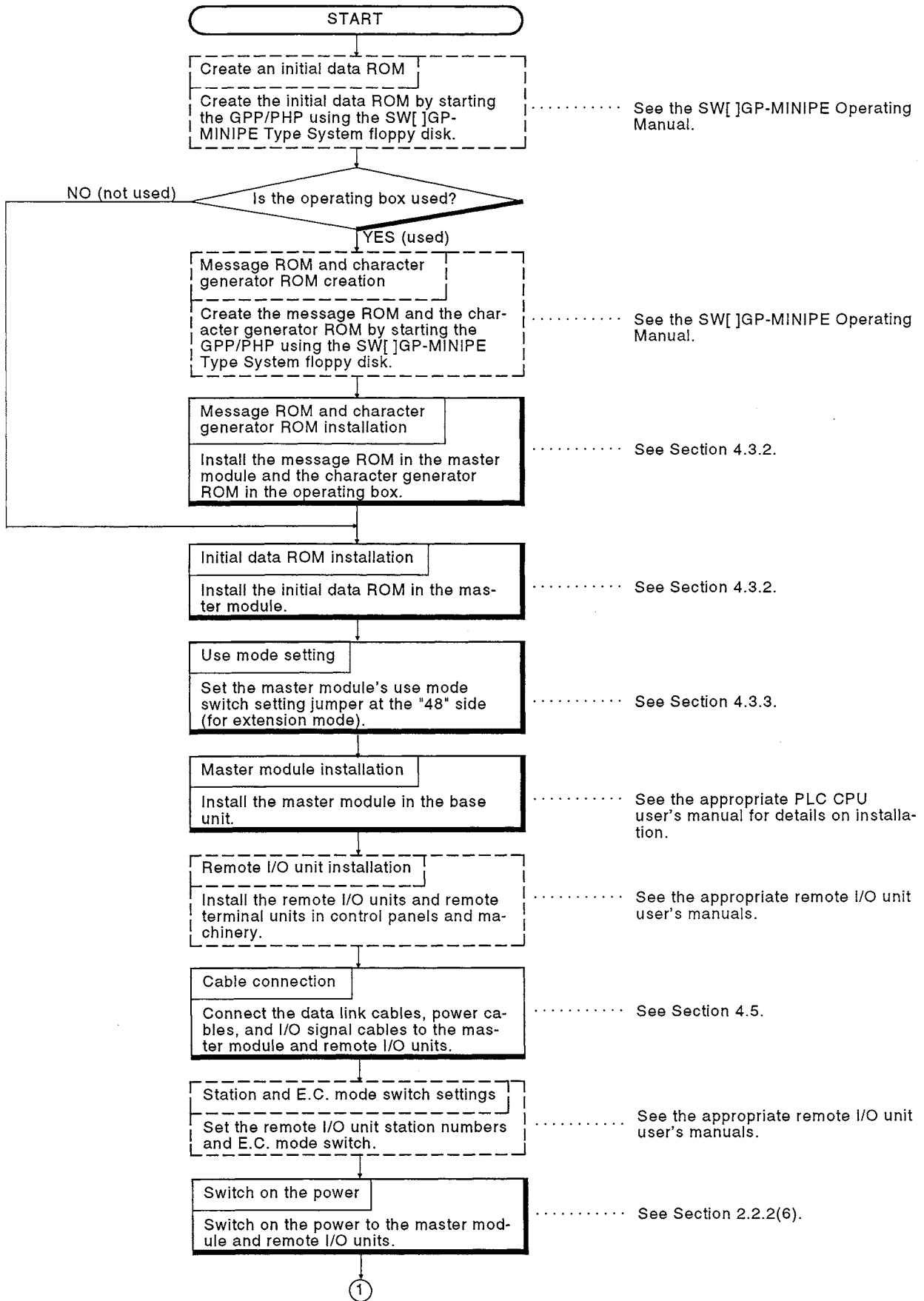
4.2 Procedure Prior to Operation

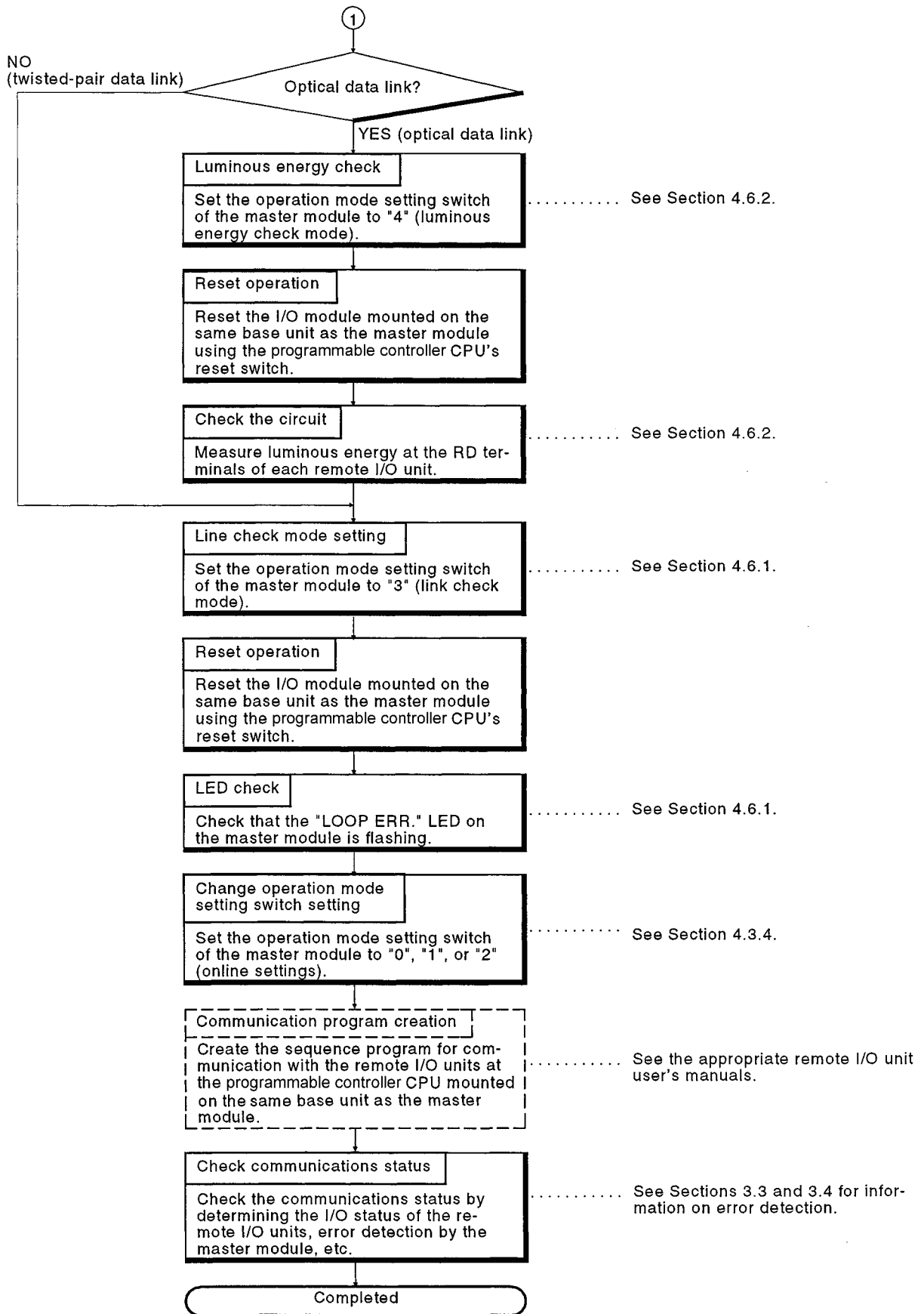
4.2.1 When using the I/O dedicated mode





4.2.2 When using the extension mode



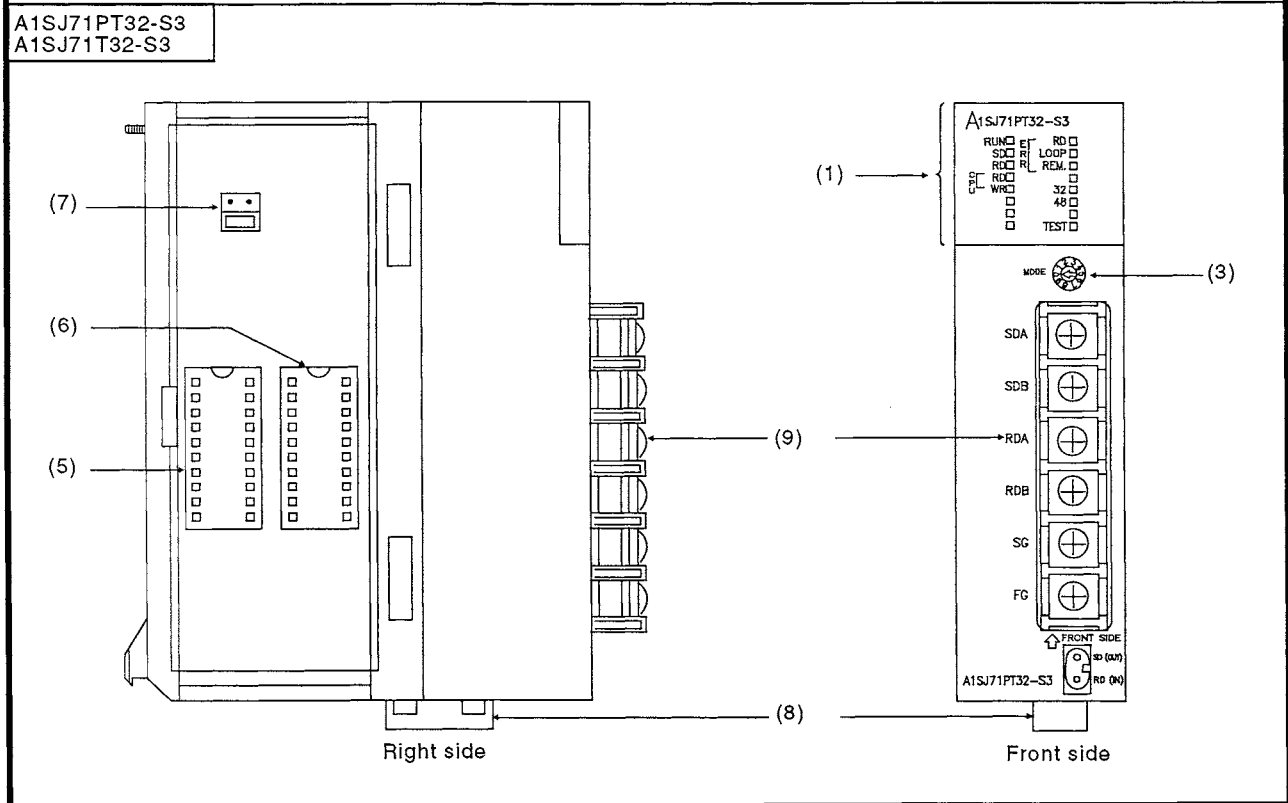
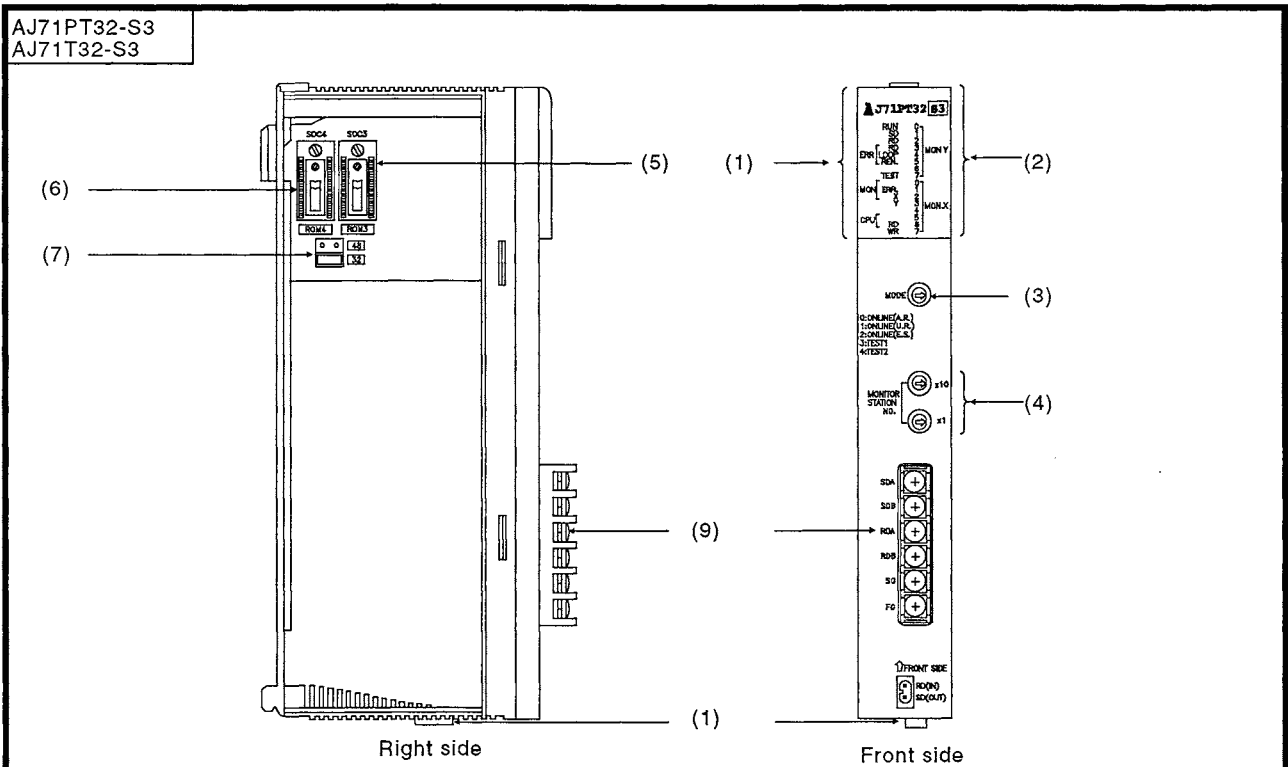


4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

MELSEC-A

4.3 Master Station Nomenclature and Settings

4.3.1 Master module nomenclature

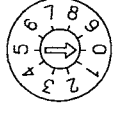
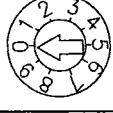
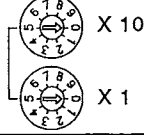
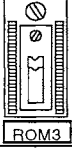
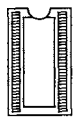
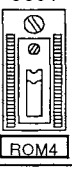
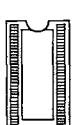
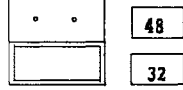
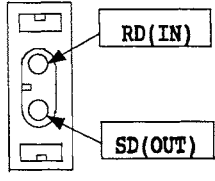


4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

<p>(1)</p> <p>Operating status indicator LEDs (AJ71PT32-S3 AJ71T32-S3)</p> <p>ERR. (LOOP REM.)</p> <p>MON. (ERR.)</p> <p>CPU (RD WR)</p> <p>(A1SJ71PT32-S3 A1SJ71T32-S3)</p> <p>RUN <input type="checkbox"/> E RD <input type="checkbox"/> SD <input type="checkbox"/> R LOOP <input type="checkbox"/> C RD <input type="checkbox"/> R. REM. <input type="checkbox"/> P RD <input type="checkbox"/> U WR <input type="checkbox"/> 32 <input type="checkbox"/> 48 <input type="checkbox"/> TEST <input type="checkbox"/></p>	<p>These LEDs serve to display the operating status, error details, etc.</p> <table border="1"> <thead> <tr> <th>LED</th> <th>Definition</th> </tr> </thead> <tbody> <tr> <td>RUN</td> <td>ON indicates that the master module is normal. OFF indicates a hardware fault.</td> </tr> <tr> <td>SD</td> <td>Flicker indicates that data is being transmitted.</td> </tr> <tr> <td>RD</td> <td>Flicker indicates that data is being received.</td> </tr> <tr> <td rowspan="3">ERR.</td> <td>RD ON indicates that a receive data error has occurred.</td> </tr> <tr> <td>LOOP ON indicates that a line error has occurred</td> </tr> <tr> <td>REM ON indicates that a station is faulty.</td> </tr> <tr> <td>TEST</td> <td>ON indicates test mode.</td> </tr> <tr> <td rowspan="3">MON.</td> <td>ERR. ON indicates that the remote I/O station selected with the monitor station number setting switch is faulty.</td> </tr> <tr> <td>X ON indicates that the remote I/O station selected with the monitor station number setting switch is an input unit.</td> </tr> <tr> <td>Y ON indicates that the remote I/O station selected with the monitor station number setting switch is an output unit.</td> </tr> <tr> <td>32</td> <td>ON indicates I/O dedicated mode. (32 points)</td> </tr> <tr> <td>48</td> <td>ON indicates extension mode. (48 points)</td> </tr> <tr> <td rowspan="2">CPU</td> <td>RD ON indicates that the FROM instruction has been executed from the programmable controller CPU.</td> </tr> <tr> <td>WR ON indicates that the TO instruction has been executed from the programmable controller CPU.</td> </tr> </tbody> </table>	LED	Definition	RUN	ON indicates that the master module is normal. OFF indicates a hardware fault.	SD	Flicker indicates that data is being transmitted.	RD	Flicker indicates that data is being received.	ERR.	RD ON indicates that a receive data error has occurred.	LOOP ON indicates that a line error has occurred	REM ON indicates that a station is faulty.	TEST	ON indicates test mode.	MON.	ERR. ON indicates that the remote I/O station selected with the monitor station number setting switch is faulty.	X ON indicates that the remote I/O station selected with the monitor station number setting switch is an input unit.	Y ON indicates that the remote I/O station selected with the monitor station number setting switch is an output unit.	32	ON indicates I/O dedicated mode. (32 points)	48	ON indicates extension mode. (48 points)	CPU	RD ON indicates that the FROM instruction has been executed from the programmable controller CPU.	WR ON indicates that the TO instruction has been executed from the programmable controller CPU.
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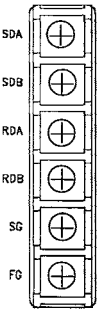
4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

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<p>(3)</p>	<p>Operation mode setting switch (AJ71PT32-S3 AJ71T32-S3)</p> <p>MODE </p> <p>(A1SJ71PT32-S3 A1SJ71T32-S3)</p> <p>MODE </p>	<p>Used to switch the link module mode. (See section 4.3.4)</p> <table border="1" data-bbox="579 253 1412 521"> <thead> <tr> <th>Switch Position</th> <th>Mode</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>ONLINE (A.R.)</td> <td>Online automatic return</td> </tr> <tr> <td>1</td> <td>ONLINE (U.R.)</td> <td>Online no-automatic return</td> </tr> <tr> <td>2</td> <td>ONLINE (E.S.)</td> <td>Communication stop at online error detection</td> </tr> <tr> <td>3</td> <td>TEST 1</td> <td>Line check mode</td> </tr> <tr> <td>4</td> <td>TEST 2</td> <td>Luminous energy check mode</td> </tr> <tr> <td>5 to 9</td> <td>—</td> <td>Not used</td> </tr> </tbody> </table> <p>REMARK</p> <p>The TEST LED is lit when 5 is selected. The RUN and TEST LEDs are switched OFF when any of 6 to 9 is selected.</p>	Switch Position	Mode	Description	0	ONLINE (A.R.)	Online automatic return	1	ONLINE (U.R.)	Online no-automatic return	2	ONLINE (E.S.)	Communication stop at online error detection	3	TEST 1	Line check mode	4	TEST 2	Luminous energy check mode	5 to 9	—	Not used
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<p>(4)</p>	<p>Monitor station number setting switch</p> <p>MONITOR STATION No. </p>	<p>Sets the remote I/O station number to be monitored with the corresponding batch refresh type I/O unit I/O monitoring LED. For details, refer to Section 4.3.5.</p> <ul style="list-style-type: none"> •Set a station number in the range 01 to 64. •X10:..Left digit of a station number •X1 :..Right digit of a station number 																					
<p>(5)</p>	<p>Installation socket for the initial data ROM</p> <p>(AJ71PT32-S3) (A1SJ71PT32-S3) AJ71T32-S3 A1SJ71T32-S3</p> <p>SOC3</p>   <p>ROM3</p>	<p>This socket is used to install the ROM containing the initial data when the master module is used in the extension mode. (The ROM need not be when the master module is used in the dedicated mode.)</p> <p>Initial data is written to the ROM using the SW[JGP-MINIPE Type System floppy disk.</p> <p>For further information concerning the installation and removal of the ROM chip, see Section 4.3.2.</p>																					
<p>(6)</p>	<p>Installation socket for the message ROM</p> <p>(AJ71PT32-S3) (A1SJ71PT32-S3) AJ71T32-S3 A1SJ71T32-S3</p> <p>SOC4</p>   <p>ROM4</p>	<p>This socket is used to install the ROM containing message data used for display on the LCD of the operating box when the operating box is used in the MINI-S3 link. (The ROM need not be installed when the operating box is not used.)</p> <p>Message data is written to the ROM using the SW[JGP-MINIPE Type System floppy disk.</p> <p>For further information concerning the installation and removal of the ROM chip, see Section 4.3.2.</p>																					
<p>(7)</p>	<p>Jumper for the use mode switch</p> 	<p>This jumper determines whether the master module operates in the extension mode or the I/O dedicated mode.</p> <p>Extension modeJumper is placed in the "48" position. I/O dedicated mode.....Jumper is placed in the "32" position.</p> <p>REMARKS</p> <ol style="list-style-type: none"> 1. The jumper is set in the "32" position when shipped from the factory. 2. "32" and "48" are the number of I/O points in the master module when set in the corresponding mode. 																					
<p>(8)</p>	<p>Connector for the optical fiber cable</p> 	<p>This connector is used for an optical fiber cable when communication with remote modules is conducted in an optical data link. (AJ71PT32-S3, A1SJ71PT32-S3 only) (For further information concerning connection between cables and the remote modules, see Sections 4.5.2 and 4.5.4.)</p> <p>RD(IN) : Connected to SD(OUT) of the previous station. SD(OUT) : Connected to RD(IN) of the succeeding station.</p>																					

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<p>(9)</p> 	<p>This connector is used for a twisted-pair cable when communication with remote modules is conducted in a twisted-pair data link. (For further information concerning connection between cables and the remote modules, see Section 4.5.3 and 4.5.4.)</p> <p>SDA :.Connected to RDA of the succeeding station SDB :.Connected to RDB of the succeeding station RDA :.Connected to SDA of the previous station RDB :.Connected to SDB of the previous station SG :.Connected to SG of the succeeding and previous stations FG :.Connection of shield of shield cable and grounding wire</p>
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4.3.2 Installation and removal of ROM (extension mode)

POINTS

- (1) The ROM chips are not supplied with the master module and should be purchased by the user.
- (2) Only 16KROM may be used.
- (3) Initial data ROM and message ROM are created using the SW []GP-MINIPE type system floppy disk.

(1) AJ71PT32-S3, AJ71T32-S3

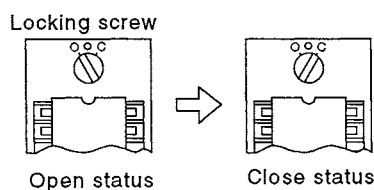
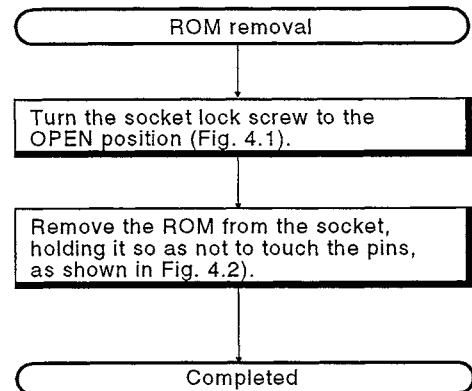
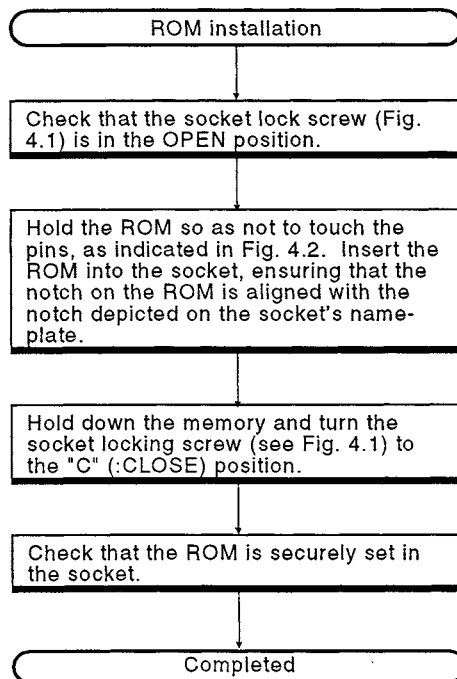


Fig. 4.1

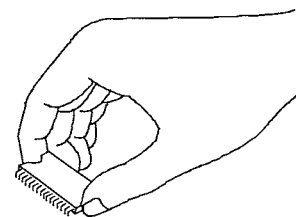
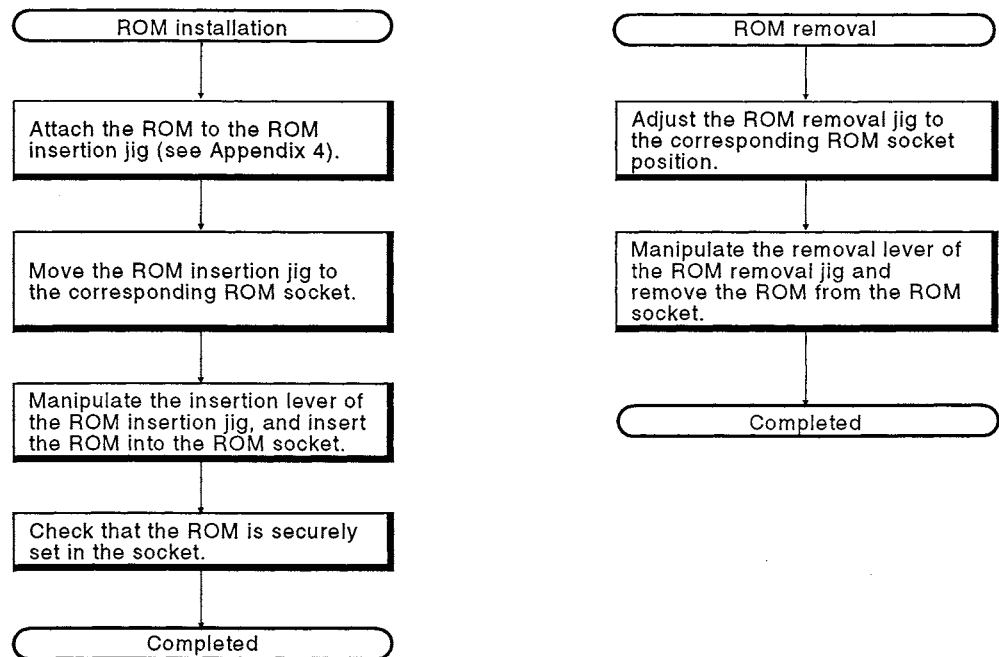


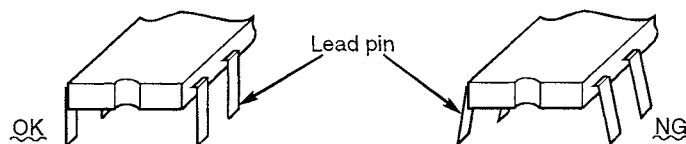
Fig. 4.2

(2) A1SJ71PT32-S3, A1SJ71T32-S3



(3) Memory handling instructions

- (a) Do not touch or bend the memory pins. Doing so can damage the memory.
- (b) Always install the memory in accordance with the indication on the socket. Oppositely installed memory will be damaged.
- (c) If the IC memory pins have spread out on both sides, reform them until they are almost parallel. Fit the IC memory into the memory socket after reforming.



- (d) After fitting the IC memory into the memory socket, fully turn the locking screw to the "C" (:CLOSE) position. (Turning it to any position between "0" and "C" is not acceptable.)



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4.3.3 Jumper settings for the use mode switch

This jumper determines whether the master module operates in the extension mode or the I/O dedicated mode.

POINT

- (1) The jumper is set in the "32" position (I/O dedicated mode) when shipped from the factory.
- (2) "32" and "48" are the number of I/O occupied points in the master module when set in the corresponding mode.

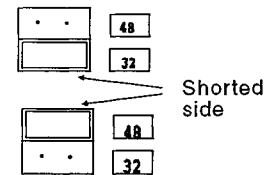
Settings are made as indicated below.

- (1) Operation in the I/O dedicated mode

Jumper is placed in the "32" position.

- (2) Operation in the extension mode

Jumper is placed in the "48" position.



4.3.4 Operation mode switch settings

The operation mode switch selects the mode in which the MINI-S3 link operates.

The operation mode switch provides three types of online modes and two test modes. (see Section 4.6)

Switch Position	Mode	Description	Remarks
0	ONLINE (A.R.)	Online automatic return Disconnects a faulty remote station from the system and continues I/O refresh with the other stations if a communication error occurs and automatically returns the faulty station to the system when the fault is removed.	Online mode
1	ONLINE (U.R.)	Online no-automatic return Disconnects a faulty remote station from the system and continues I/O refresh with the other stations if a communication error occurs. The system should be restarted up to return the faulty station to the system.	Online mode In online no-automatic return mode, all outputs of the faulty remote station are switched off independently of its E.C. MODE switch setting (ON/OFF).
2	ONLINE (E.S.)	Communication stop at online error detection Disconnects all remote stations (stops I/O refresh) from the system if a communication error occurs at any remote station. The system should be restarted up to return all stations to the system.	Online mode
3	TEST 1	Line check mode Checks for MINI-S3 link hardware fault and cable breakage.	Test mode
4	TEST 2	Luminous energy check mode Measures luminous energy at the receive terminal of each remote station in an optical data link system.	Test mode
5 to 9	—	Not used	The TEST LED is lit when 5 is selected. The RUN and TEST LEDs are switched off when any of 6 to 9 is selected.

POINT

When the operation mode has been changed, always reset operation using the reset switch of the programmable controller CPU.

Operating status remains the same if the programmable controller CPU is not reset.

4.3.5 Monitor station number setting switch (AJ71PT32-S3, AJ71T32-S3 only)

By setting this switch as required, the I/O status of the corresponding batch refresh type remote I/O unit can be monitored with the LEDs on the front panel of the master module.

The I/O statuses of partial refresh type remote I/O units and remote terminal units cannot be monitored.

- (1) Set the required remote I/O station number.
- (2) The following statuses of the station whose number has been set can be monitored:
 - (a) Corresponding remote I/O unit communication status ("MON. ERR" LED)
 - ON indicates that a communication error has been detected. OFF indicates a normal communication status.
 - (b) Corresponding remote I/O station unit status ("MON.X,Y" LEDs)
 - The "MON.X" LED is lit to indicate that the remote I/O station is an input unit.
 - The "MON.Y" LED is lit to indicate that the remote I/O station is an output unit.
 - All "MON.X,Y" LEDs are switched OFF when the programmable controller CPU is powered up or reset.
 - (c) Corresponding remote I/O station I/O status ("MON.Y0 to Y7, MON.X0 to X7" LEDs)
 - The "MON.Y0 to Y7" LEDs indicate the contents of the transmission data area (buffer memory addresses 10 to 41).
 - The "MON.X0 to X7" LEDs indicate the contents of the receive data area (buffer memory addresses 110 to 141).
- (3) The remote I/O station status can only be monitored when the operation mode setting switch is set to 0, 1, or 2 (online mode).

The remote I/O station I/O status cannot be monitored when the operation mode setting switch is set to 3 to 9.

POINT

- (1) Remote I/O station I/O status monitoring allows display of the batch refresh transmit and receive data in the buffer memory.
When the MINI-S3 link communication start signal (Y18) is OFF, I/O refresh processing is not executed. Therefore, remote I/O station I/O status monitoring indicates the status immediately before the MINI-S3 link communication start signal (Y18) went OFF.
- (2) The setting of the monitor station number switch can be changed at any time (it is not necessary to reset the programmable controller CPU after changing the station number).

4.4 Setting the Station Numbers of Remote I/O Unit

Specify the remote I/O unit station numbers to determine the buffer memory addresses for remote I/O unit station data, noting the following:

POINT

Any station number must not be changed during I/O refresh to prevent input or output fault.

- (1) Station numbers may be set between 1 and 64.
- (2) The I/O refresh range depends on the number of remote stations (in the I/O dedicated mode: address 0H in the buffer, in the extension mode: initial data ROM). For example, if 10 exists at address 0, I/O refresh is performed with remote stations 1 to 10.
- (3) Station numbers do not have to be sequential, e.g. as shown in Fig. 4.3.

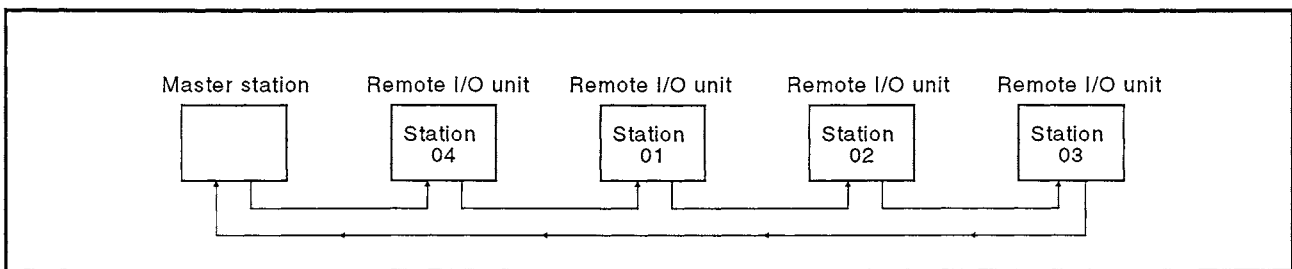


Fig. 4.3 Remote I/O Station Number Setting

REMARK

It is suggested to set sequential numbers to the input and output remote I/O stations individually so that the transmit and receive data is transferred sequentially.

For instance, if there are 10 input and 10 output remote I/O stations, set 1-10 to the input remote I/O stations and 11-20 to the output stations. This defines the receive data addresses as 110-114 and the transmit data addresses as 15-19 to allow sequential data transfer.

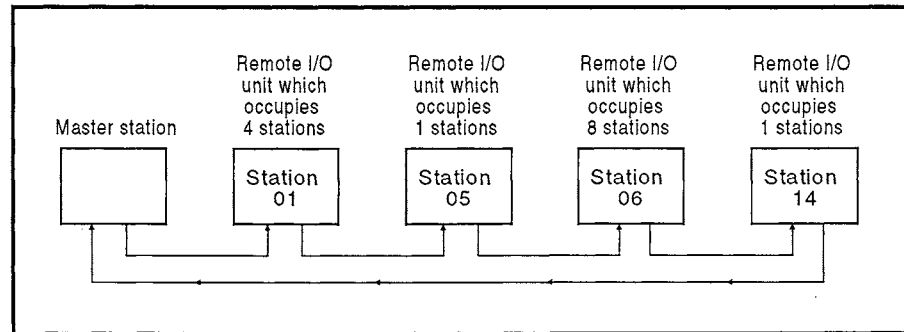
- (4) Set the station numbers for the remote units without skipping any (so that there are no station numbers where no remote unit is connected). If there are any skipped numbers in the total number of remote stations (buffer memory address 0) up to the set station number, the units at those station numbers will be regarded as faulty.

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POINTS

- (1) A remote I/O station number must not be repeated in the same loop. After setting, check that the same number has not been used more than once.
- (2) Station numbers must be specified in accordance with the number of stations occupied by the remote I/O station, e.g. the remote I/O station that occupies four stations (station 01 in the following example) must be accounted for as stations 1 to 4:



4.5 Wiring

4.5.1 Handling instructions for optical fiber and twisted-pair cables

Handle cables with special care.

- (1) Do not press down on the cable with rigid or sharp-edged objects.
- (2) Do not twist the cable excessively.
- (3) Do not stretch the cable too much (beyond the allowable tension).
- (4) Do not step on the cable.
- (5) Do not put anything on the cable.
- (6) Do not damage the cable insulation.

4.5.2 Connection of optical fiber cables

- (1) Connect the optical fiber cables as shown in Fig. 4.4.

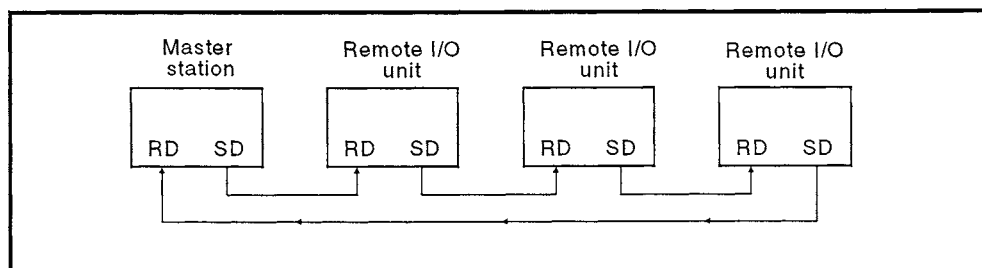


Fig. 4.4 Connection of Optical Fiber Cables

POINTS

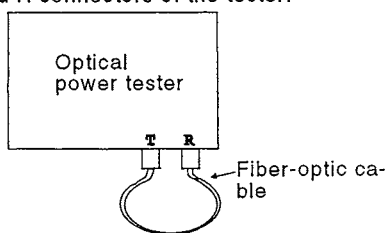
- (1) Remote number setting can be done independently of the order in which the data link cable is connected (see Section 4.4).
- (2) Whenever fiber-optic cable is connected to a module, always check the optical conductivity of the cable. Optical conductivity can be checked by an optical power tester.

For details about optical power testers, consult your nearest Mitsubishi representative.

Optical conductivity is checked as shown below.

[Connection]

Connect both ends of the fiber-optic cable to the T and R connectors of the tester.



[Results]

If the green lights of -27dBm or higher (LEDS on the front of the tester) go ON, the cable works properly.

If these lights do not go ON, check the following:

- Is the end face of the cable properly cut?
- Is the end face clean?
- Is the length of the cable 50 m or less (composite cable 35 m or less)?

(2) Optical fiber cable engagement

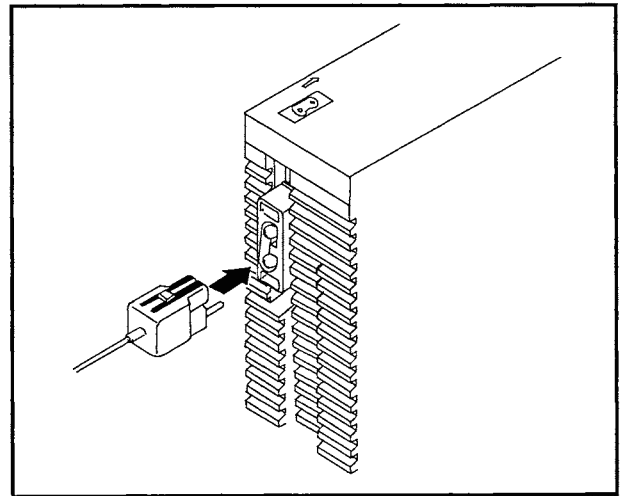
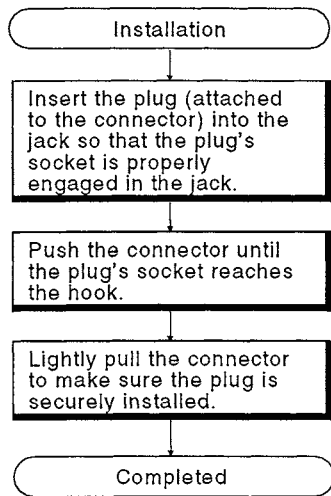


Fig. 4.5 Optical Fiber Cable Engagement

(3) Optical fiber cable disengagement

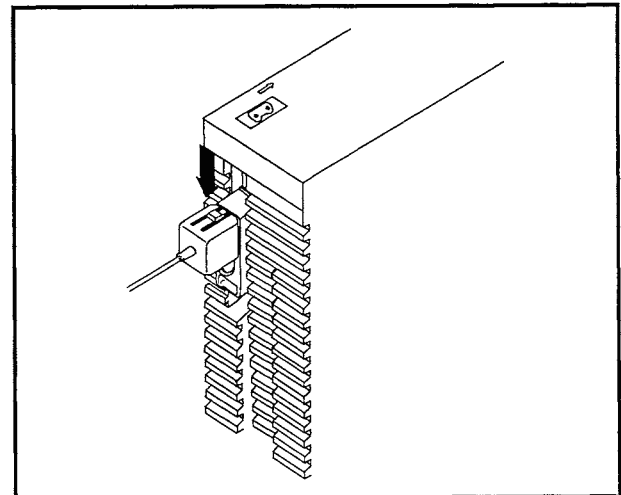
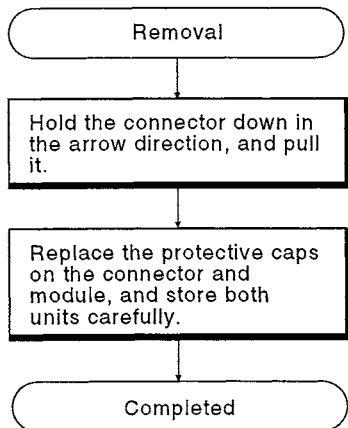
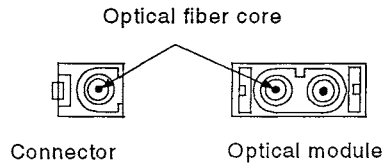


Fig. 4.6 Optical Fiber Cable Disengagement

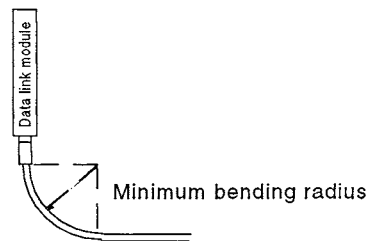
POINTS

- (1) Do not touch the optical fiber cores in the connector or the optical module and keep them clean. Always fit the protective cap to the connector and optical module when not in use.

Transmission loss due to foreign matter (e.g., chips, dust, and finger marks) can result in a data link error.



- (2) Any optical fiber cable must be bent within its minimum bending radius to protect the optical fiber core.



Always be very careful when bending fiber-optic cable.

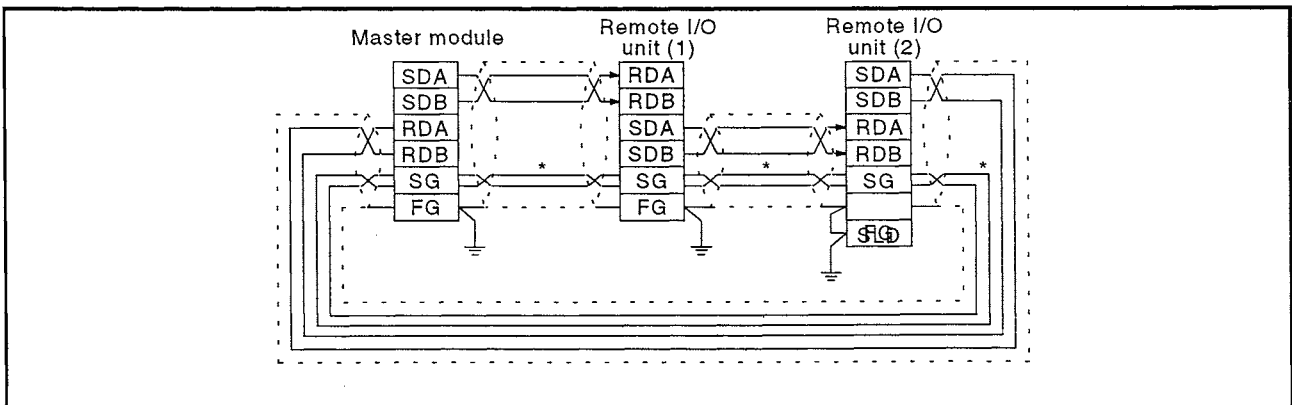
This is because bending fiber-optic cable beyond the minimum bending radius can damage the core, thus disabling the data link.

4.5.3 Connection of twisted-pair cables

Connect the twisted-pair shield cables as shown below. The terminal arrangement of the remote I/O unit is given in the MELSECNET/MINI-S3 Remote I/O User's Manual.

- (1) When the unit itself can be grounded

Ground both ends of the shield wire connecting it to the FG and SLD terminals.



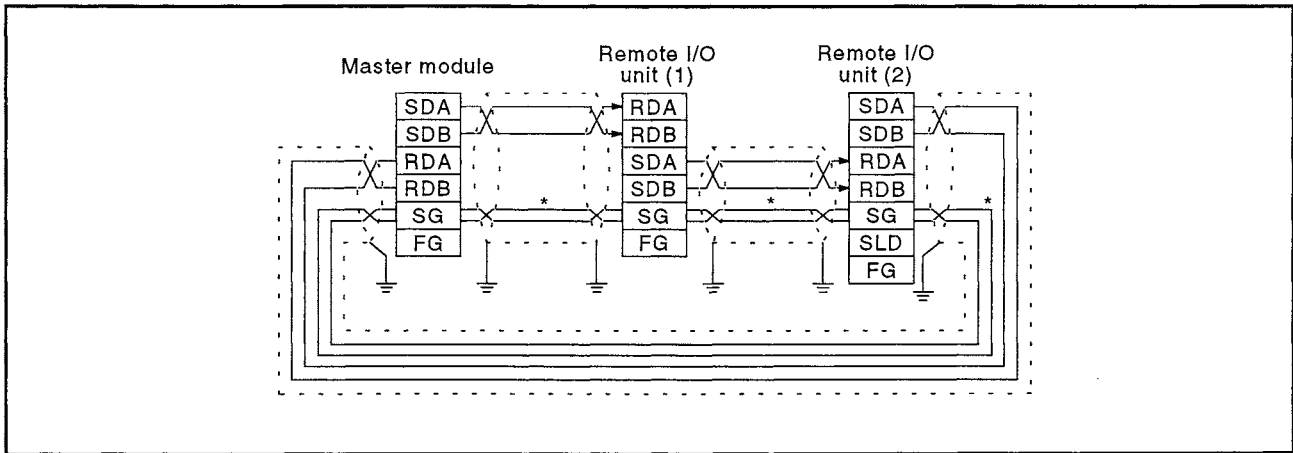
* Providing two SG cables (low resistance value) instead of one is safer and gives better resistance to noise.

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- (2) When the unit itself cannot be grounded

Ground both ends of the shield wire directly rather than via the FG and SLD terminals.



* Providing two SG cables (low resistance value) instead of one is safer and gives better resistance to noise.

REMARKS

- (1) The twisted-pair shield cable terminal block uses M4 (0.16) screws. Use appropriate solderless terminals.
- (2) Tightening torque is 78 to 137 N-cm.

POINTS

When routing twisted-pair cables, pay cautions on the following points:

- (1) Do not run or bundle the twisted-pair cables close to or with the main circuit, high-tension cables or load cables. Allow at least 100 mm (4 inch) clearance.
- (2) When connecting the cables to the remote unit terminal block, run the twisted-pair cable as apart from the power supply or I/O cables as possible.
- (3) Do not use a part of the twisted-pair cables (1 pair of 3 pairs of twisted-pair cable) for the power supply cable.

4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

MELSEC-A

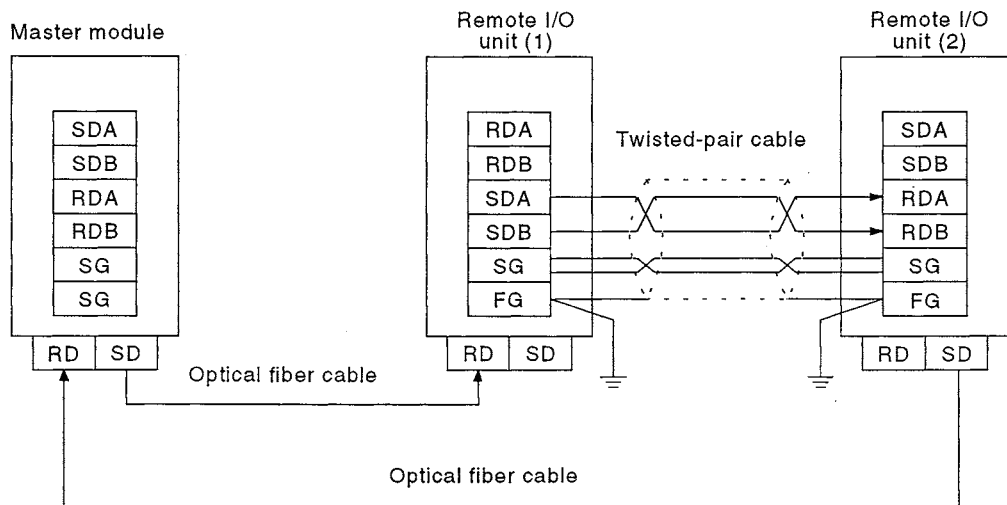
4.5.4 Connection of units for both optical fiber/twisted-pair data links

Both the optical fiber and twisted-pair cables may be used in the same loop to connect any link unit for use as an optical fiber/twisted-pair data link model as shown in below.

The POINT box in Section 4.5.3 gives details about precautions to take when using twisted-pair wire cables.

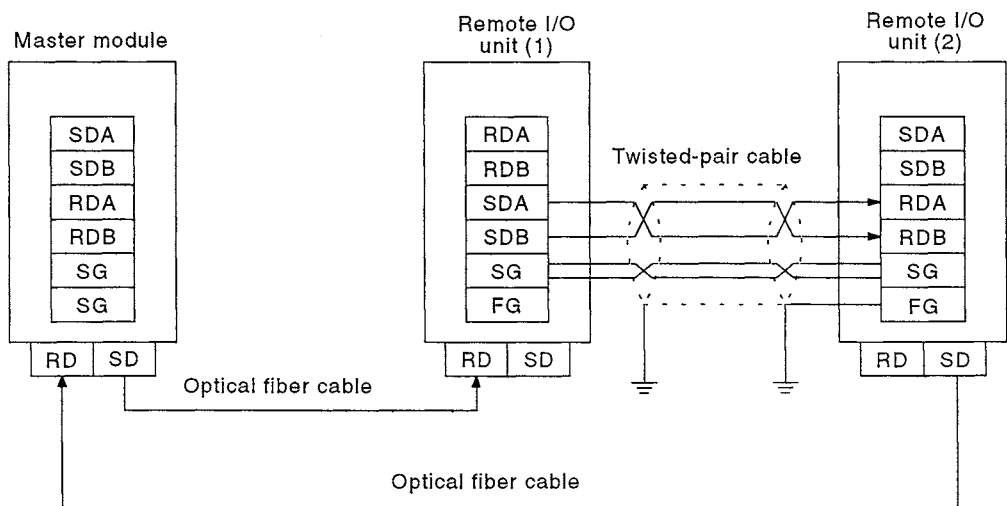
(1) When the unit itself can be grounded

Ground both ends of the shield wire by connecting it to the FG and SLD terminals.



(2) When the unit itself cannot be grounded

Ground both ends of the shield wire directly rather than via the FG and SLD terminals.

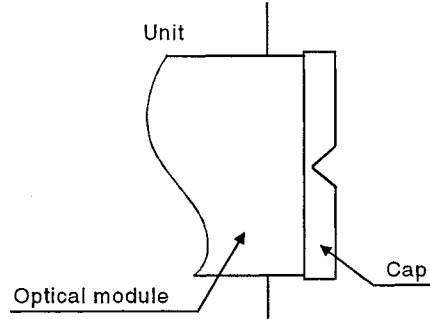


4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

MELSEC-A

4.5.5 Precautions if you have not used an optical data link before

When the dual-purpose optical/twisted pair data link unit is not used to make data link with an optical fiber cable, the cap supplied with the unit must be fitted to the optical module area to prevent entry of a beam into the optical module in an operating environment where a "flash" will be generated near the unit.



4.5.6 EMC and Low Voltage Directives (Remote module)

Meet the following items to comply with the EMC and Low Voltage Directives.

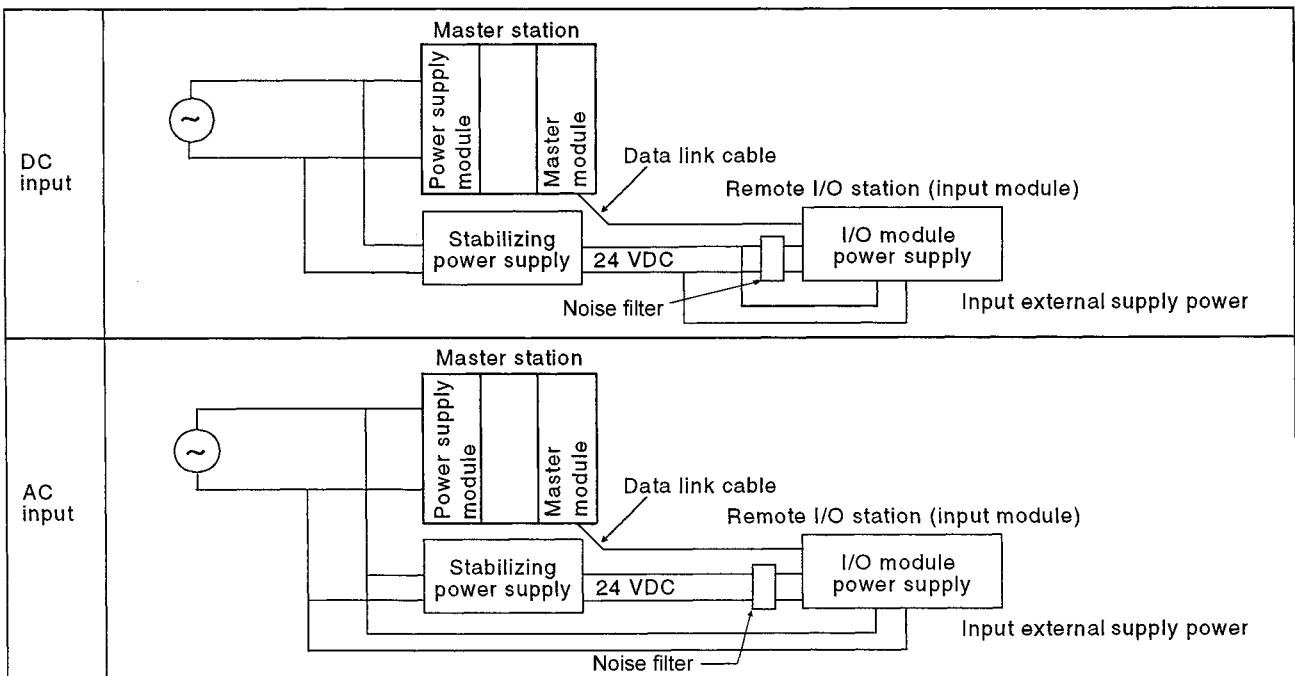
(1) Power line of remote module

The power line connecting to the module power terminal of the remote module should be 10m (32.81ft.) or less.

Also, the power line connecting to the external power supply terminal should be 30m (98.43ft.) or less.

(2) Noise filter (Power line filter)

Attach a noise filter to the power line of the remote module.



Power Supply Wiring Example

Attach the following noise filter to the power line:

Manufacturer: DENSEI-LAMBDA K.K.

Model: MC1206

4.6 Test Modes

The test modes in the MINI-S3 link can be divided into the line check mode and the luminescence check mode.

4.6.1 Line check mode

Use the line check mode to check for disconnection between the hardware of the link module and the fiber-optic/twisted-pair wire cable.

In the optical data link, after measuring the luminescence in the luminescence check mode, perform the line check.

(1) Fig.4.7 shows how to perform the line check.

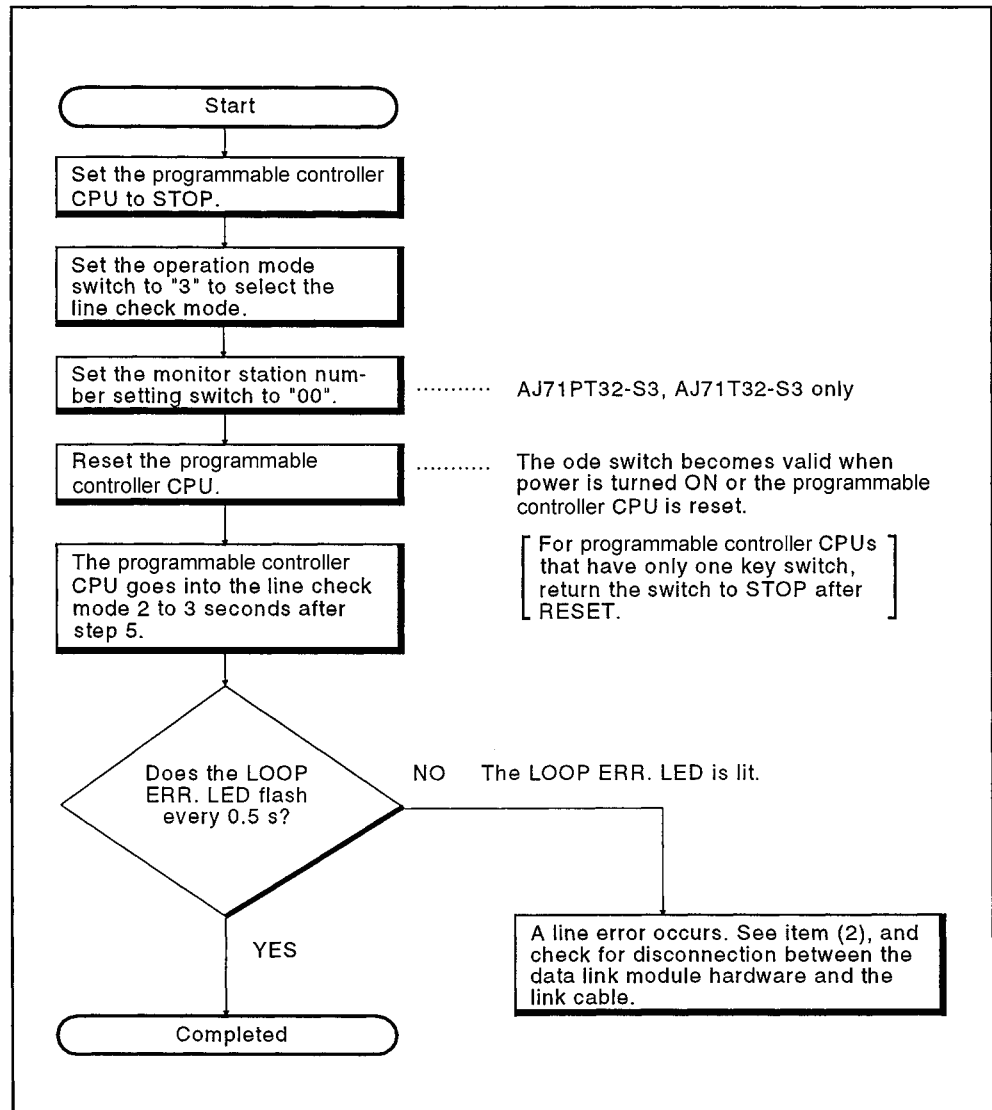


Fig. 4.7 Shows How to Perform the Check

(2) Steps to take when an error occurs in the line check mode

Verify the states of the remote module RD and SD LEDs.

Normal : Dimly lit (flashes quickly)

Abnormal : Brightly lit or OFF

The RD and SD LEDs will be dimly lit about two seconds after resetting the programmable controller CPU or after turning ON the power to the master module and remote modules, even if a communications start signal ($Y_{(n+18)}$ or $Y_{(n+28)}$) is turned ON .

Therefore, if the RD and SD LEDs go ON immediately after resetting the programmable controller CPU or after turning ON power to the master module and remote modules independently of the ON/OFF state of a communications start signal, this may indicate a faulty module.

Check the RD and SD LEDs of all stations in data link cable connection order, beginning with the master station transmission (SD) LED. Check the link module hardware and data link cables as explained below:

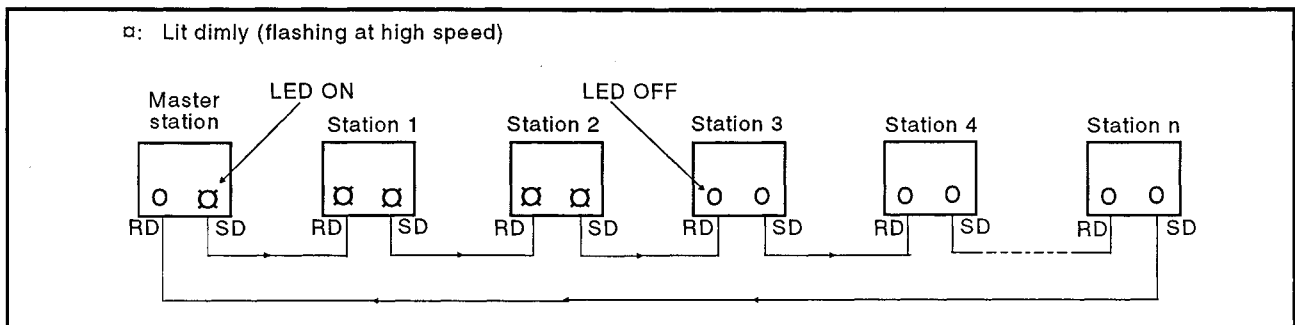


Fig. 4.8 RD/SD LED States at Line Error Occurrence

In Fig. 4.8, the RD and SD LEDs on station 3 are OFF possibly because:

[When the RD and SD LEDs are OFF]

- (a) The data link cable between station 2SD and station 3RD is not connected, is broken or its length is greater than the maximum interstation transmission distance.
 - Check connection of the data link cable.
 - Change the data link cable.
 - Check the cable connection distance.
- (b) Data link module hardware of station 2 is faulty.
 - Connect the cable between station 1 SD and station 3 RD.
- (c) Data link module hardware of station 3 is faulty.
 - Connect the cable between station 2 SD and station 4 RD.

4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

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[When the RD and SD LEDs are brightly lit]

- (a) Hardware fault in the remote module transmission part of Station 2
 - Connect SD of Station 1 to RD of Station 3 to reconfirm the fault.
- (b) Hardware fault occurred in the remote module transmission part of Station 3
 - Connect SD of Station 2 to RD of Station 4 to reconfirm the fault.

POINT

When the value of the transmission status setting (address 4) is either 1 or 2 and a faulty line has occurred, checks can be made using the "RUN" LED in place of the "RD" and "SD" LEDs.

- (3) Checks for modules without RD or SD LED

When checks are being made for remote modules such as the operating box which do not have RD or SD LED, the RUN LED can be used by setting the faulty line check (address 4) of the buffer memory of the master module to either "1" or "2".

- (a) Since in the faulty line check the RUN LEDs light up to the point that the line fault occurred, as indicated below, check the hardware or link cable between the last remote module with a lit RUN LED and the remote module with the extinguished RUN LED.

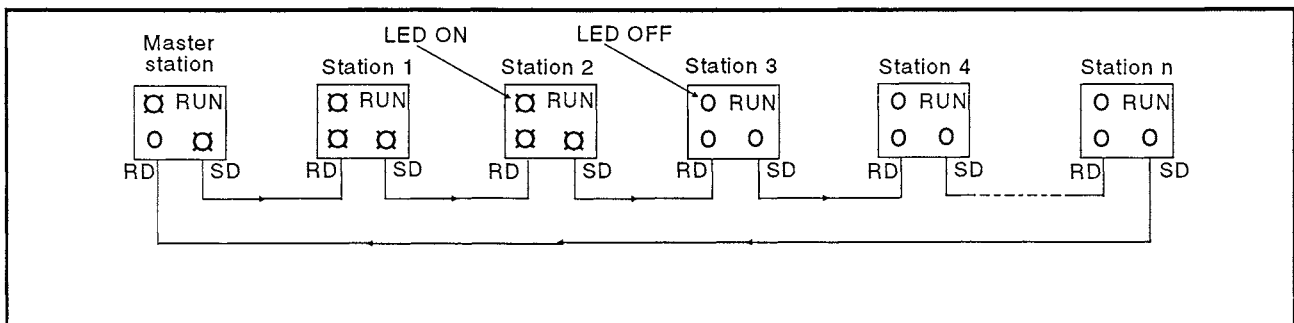


Fig. 4.9 RD/SD LED States at Line Error Occurrence

- (b) The line error check forces the output of OFF data or the value of data that existed directly prior to the fault occurring of each of the remote modules to turn on the RUN LED. (If no line error has occurred, normal data is output.)

POINT

When a line error check is performed, the E.C. mode setting of the output remote I/O units is no longer effective as the data is output forcibly to each of the remote modules.

Note that this means that the output status set by the E.C. mode setting at the point the error occurred is changed by the line error check.

4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

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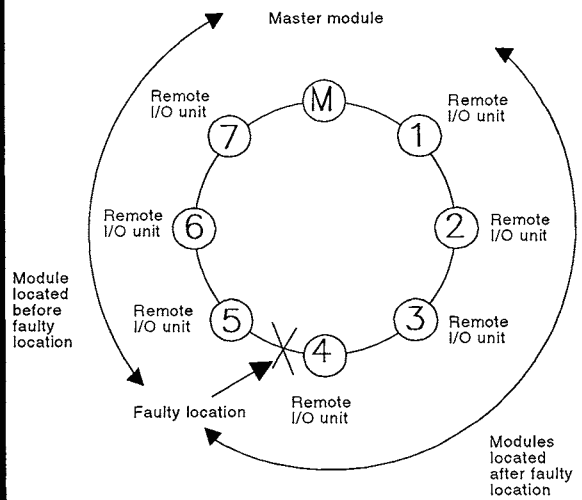
(c) The line error check is performed by either a "1" or "2" being set in buffer memory address 4.

The value becomes effective when the communication start signal ($Y_{(n+18)}/Y_{(n+28)}$) is set from OFF to ON.

- 0 : Test message is sent.
- 1 : Outputs off data, and line error check is performed.
- 2 : The value of data that existed directly prior to the fault occurring is output, and line error check is performed.

(d) The value of line error check settings and the output status to each of the output remote I/O units is indicated below.

Operation Mode Setting switch located on front panel of master module	Line Error Check Setting buffer memory address 4	Output Status of the Remote I/O Units			
		Modules located before faulty location		Modules located after faulty location	
		E.C. mode setting ON	E.C. mode setting OFF	E.C. mode setting ON	E.C. mode setting OFF
0	0	All output points are switched OFF	The data existing directly prior to the fault occurring is retained.	All output points are switched OFF	The data existing directly prior to the fault occurring is retained
	1	All output points are switched OFF.			
	2	The data existing directly prior to the fault occurring is retained.			
1, 2	0	All output points are switched OFF	The data existing directly prior to the fault occurring is retained.	All output points are switched OFF	The data existing directly prior to the fault occurring is retained
	1, 2	All output points are switched OFF			

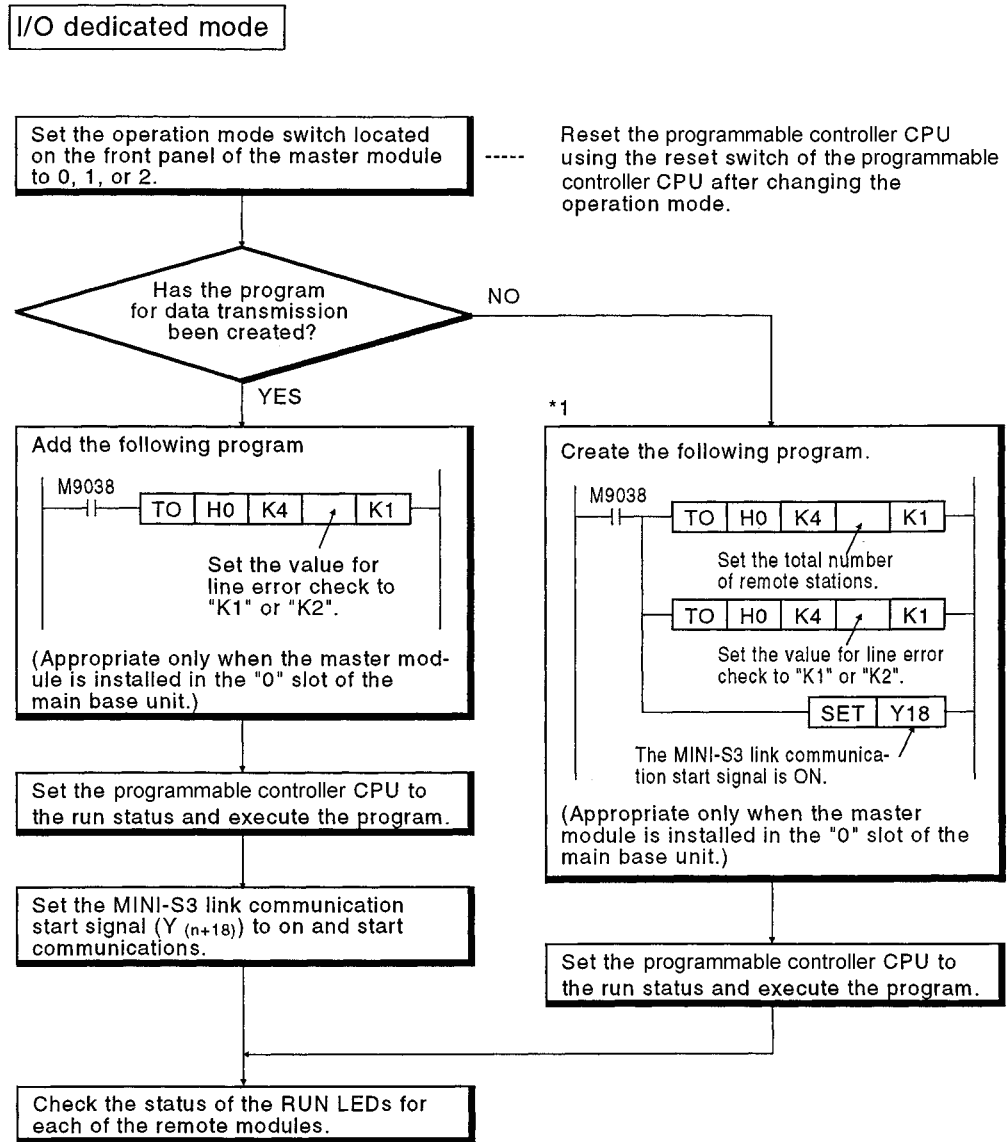


(e) The output data (the data which uses the transmit area (addresses 1100 to 8099) for the remote terminal unit) corresponding to the remote terminal unit retains output data regardless of the setting of the line error check.

4. SETTINGS AND PROCEDURE PRIOR TO OPERATION

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(f) Operation procedure is given below.



*1: The AJ35PTF-128DT RUN LED will not light when the partial refresh type remote I/O unit (AJ35PTF-128DT) is connected, and a check is conducted using the program,.

(This is because initial setting has not been made for the AJ35PTF-128DT.)

Check using the "RD" and "SD" LEDs instead.

Extension mode

Set the operation mode switch located on the front panel of the master module to 0, 1, or 2.

Reset the programmable controller CPU using the reset switch of the programmable controller CPU after changing the operation mode.

Is the initial data ROM installed in the master module?

NO

Create the initial data ROM and install it in the master module.

YES

Has the program for data transmission been created?

NO

Create the following program.

YES

Add the following program

Set the value for line error check to "K1" or "K2".

(Appropriate only when the master module is installed in the "0" slot of the main base unit.)

Set the value for line error check to "K1" or "K2".

SET Y28

The MINI-S3 link communication start signal is ON.

(Appropriate only when the master module is installed in the "0" slot of the main base unit.)

Set the programmable controller CPU to the run status and execute the program.

Set the programmable controller CPU to the run status and execute the program.

Set the MINI-S3 link communication start signal (Y_(n+18)) to on and start communications.

Check the status of the RUN LEDs for each of the remote modules.

4.6.2 Luminescence check mode

When performing a luminescence check in this mode, measure the luminescence at the receiving station (the master module or a remote module).

Measuring luminescence verifies whether or not the fiber-optic cable is working properly.

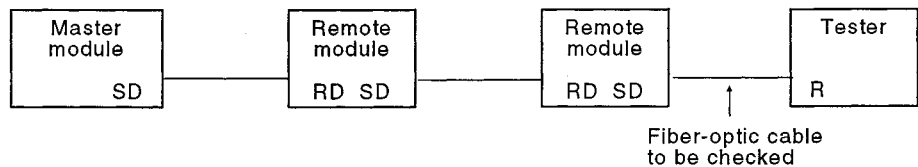
The luminescence check must be performed more than two hours (time taken for the unit's temperature rise to stabilize) after power to all modules in the MINI-S3 link has been turned ON.

REMARK

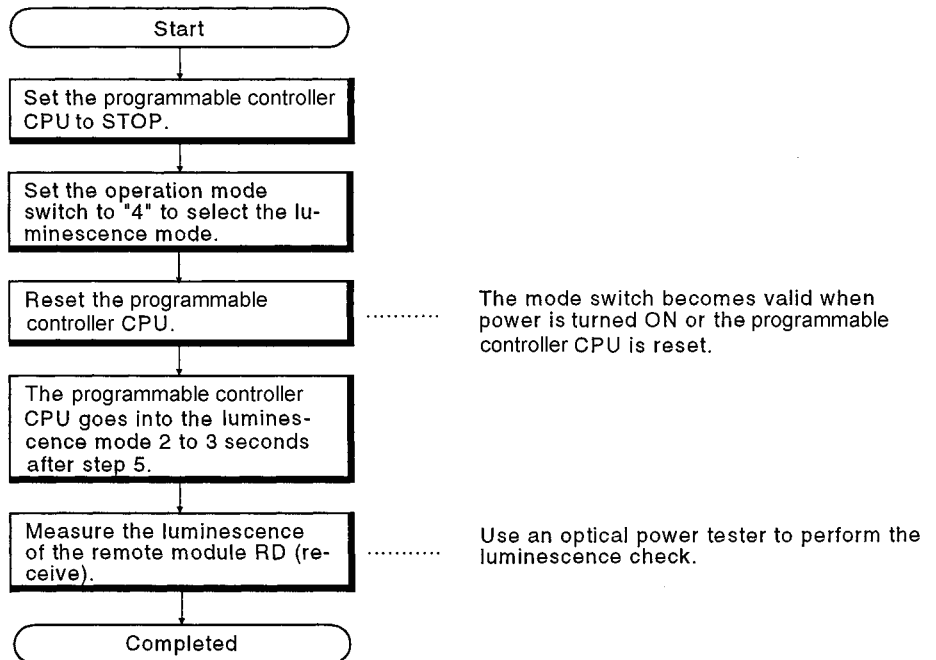
The luminescence check is done with an optical power tester.

For details about optical power testers, consult your nearest Mitsubishi representative.

- (1) To perform the luminescence check, attach the RD end of the fiber-optic cable to be checked to the R connector of the tester.



- (2) The following flowchart shows how to operate the luminescence check.



- (3) The method for judgment is as follows.

The result is normal if the "-30dBm or more" LED (green lamp) on the front panel of the tester lights. If this LED does not light, check the following points:

- Is the end face of the fiber-optic cable cut cleanly?
- Is the end face of the fiber-optic cable soiled?
- Does the length of the fiber-optic cable exceed 50 m (164 ft)(35 m (115 ft) for composite cable)?
- Has the fiber-optic cable been bent with a bending radius of less than 25 mm (0.98 in.)?

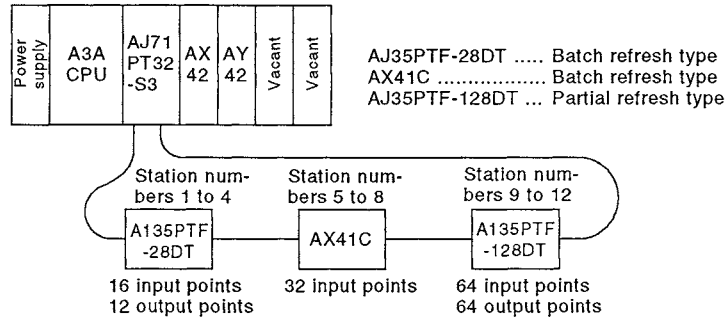
5. PROGRAMMING

This section describes programming in the I/O dedicated mode and in the extension mode.

5.1 I/O Dedicated Mode

Program creation in the I/O dedicated mode is explained here with reference to the following example system configuration.

[Example system configuration]



[Concept]

(1) Program configuration

Programming comprises the following elements: "initial setting", "communication start", and "reading/writing of communication data".

(a) Program for initial setting and MINI-S3 link communication start

This is the program that sets the number of remote I/O stations, number of retries, and partial refresh settings, and switches the MINI-S3 communication start signal ON, in order to execute I/O refresh in the MINI-S3 system.

The items set depend on the type or types of remote I/O unit in the network, as shown below:

O: Set X: Not set

Item	Type(s) of unit used		
	Batch Refresh	Partial Refresh	Batch Refresh + Partial Refresh
Total number of remote stations (address 0)	O	O	O
Number of retries (address 1)	O	O	O
Partial refresh settings (addresses 250 to 282)	X	O	O
MINI-S3 link communication start signal (Y18)	O	O	O

(b) Program for reading/writing communicated data

This is the program that reads the receive data of the remote I/O units connected in the MINI-S3 network and writes their transmit data. Different areas of the buffer memory are used to store data for the batch refresh type and partial refresh type.

	Batch Refresh	Partial Refresh
Receive data	Addresses 110 to 141	Addresses 600 to 663
Transmit data	Addresses 10 to 41	Addresses 300 to 363

(2) I/O numbers

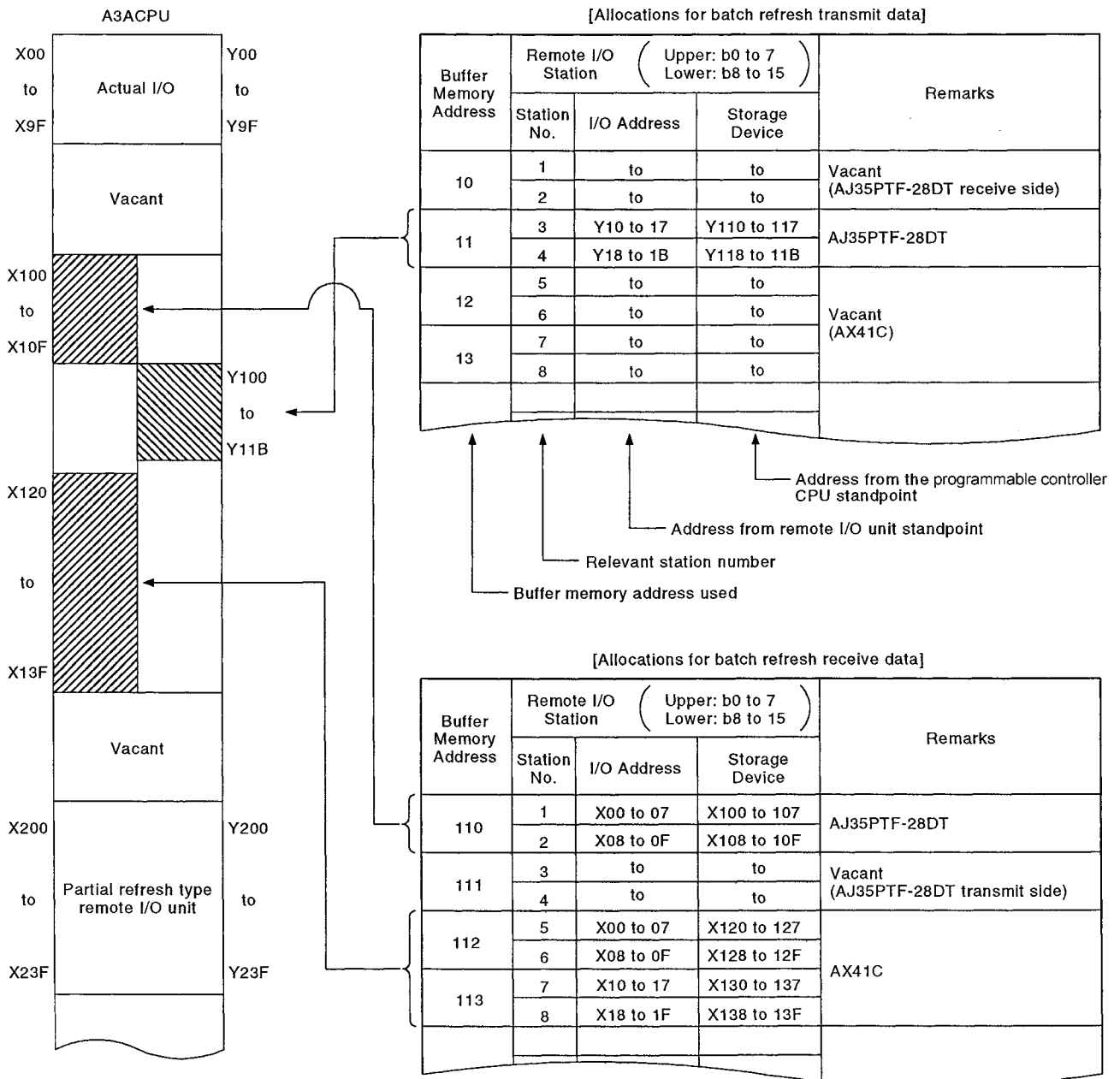
It is necessary to consider which devices of the programmable controller CPU will be used for control of the MINI-S3 communication data.

If X/Y devices are used, allocate devices in the area that follows the actual I/O range (the range used by the modules mounted to the main and extension base units).

(a) Batch refresh type remote I/O units

Filling in the communication data assignment sheet in the appendix, as shown below, will make the situation clear.

In this example, the communication data of the batch refresh type remote I/O units is assumed to be controlled using X/Y 100 to 13F.



(b) Partial refresh type remote I/O units

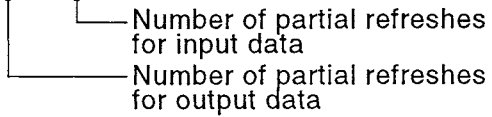
1) The station number and number of digits must be set, and the storage addresses for the communication data must be fixed.

- Station number

Set the head station number for each unit.

- Number of digits

K [] [] [] [] [] []



- End

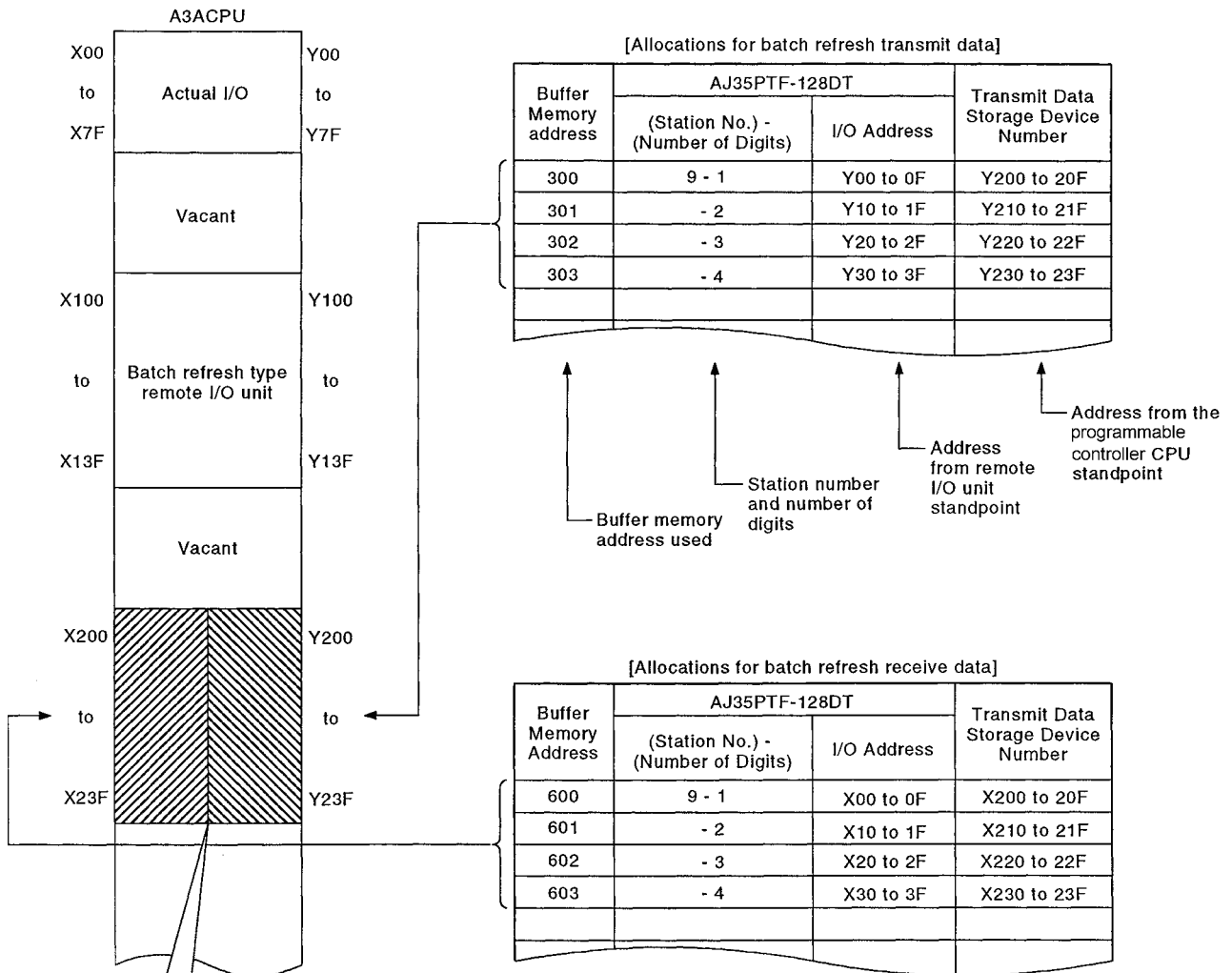
Set "0" as the station number.

[Data set for partial refresh stations]

Buffer Memory Address	Set Data (Upper: station number Lower: number of digits)	I/O Data Storage Address	
		Input Data	Output Data
250	9	600 to 603	300 to 303
251	404		
252	0 (End)	to	to
253			

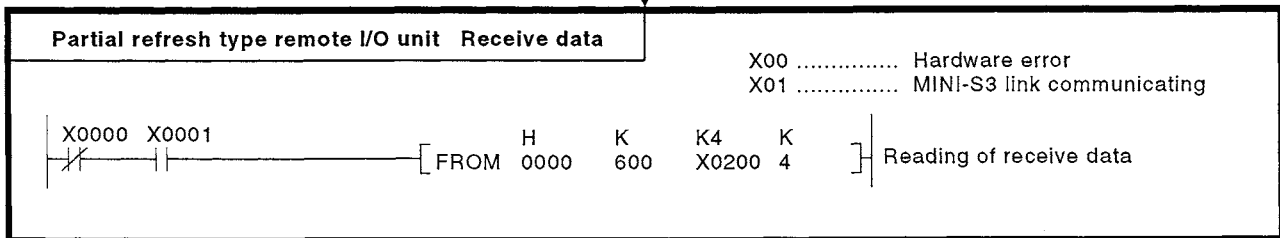
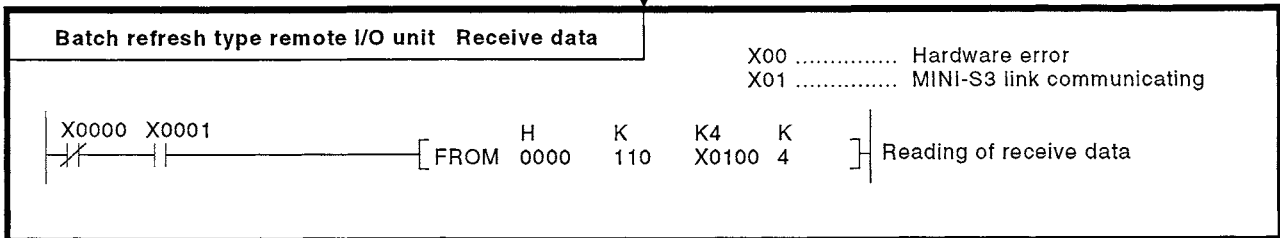
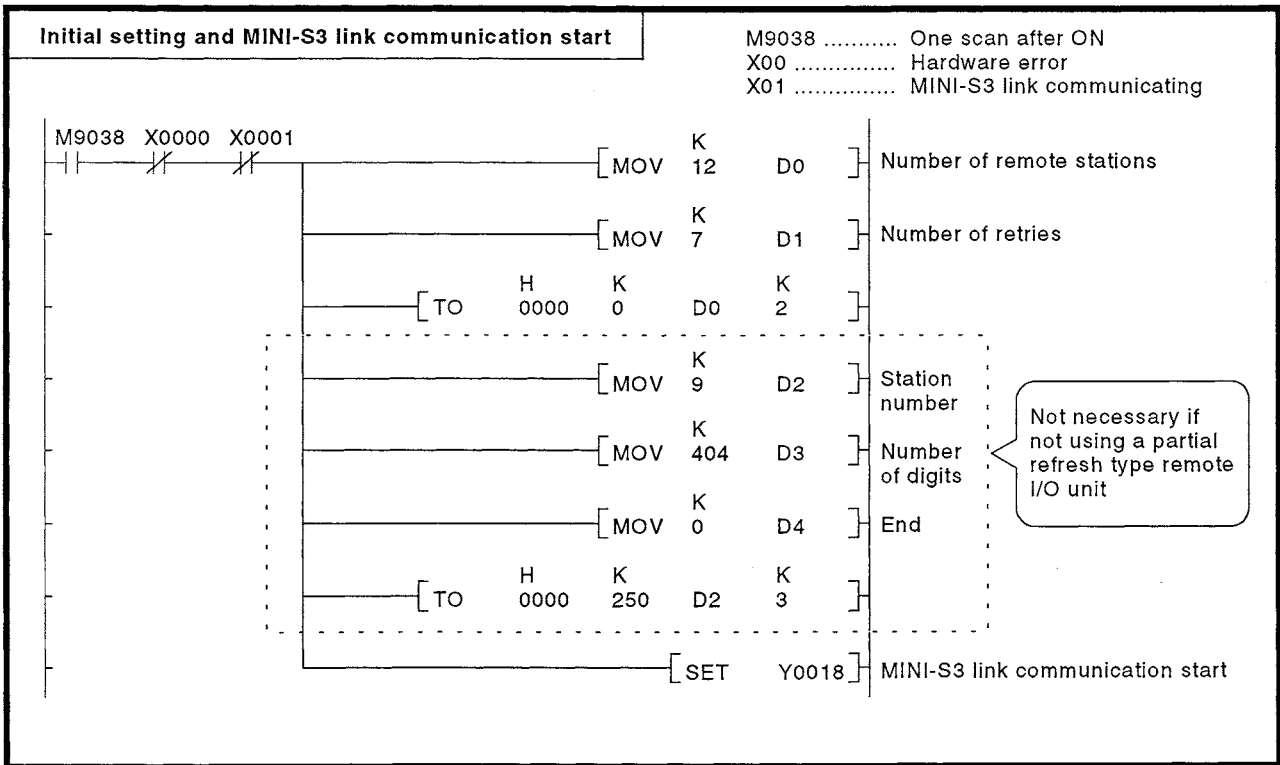
2) Filling in the communication data assignment sheet in the appendix, as shown below, will make the situation clear.

In this example, the communication data of the partial refresh type remote I/O units is assumed to be controlled using X/Y 200 to 23F.



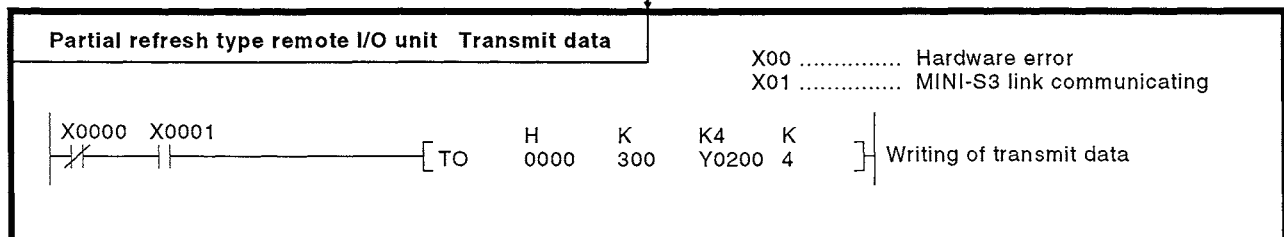
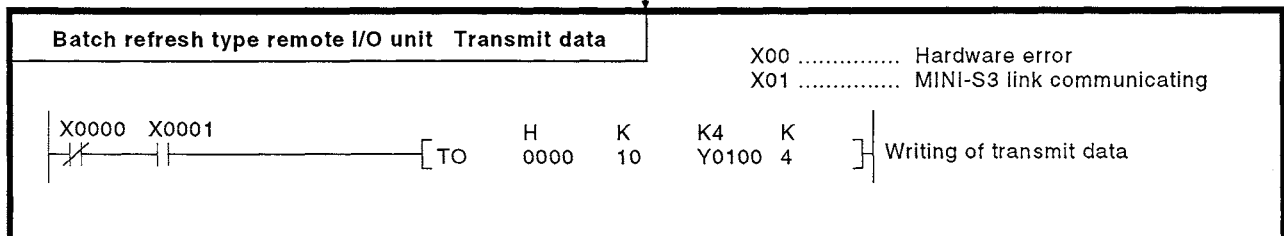
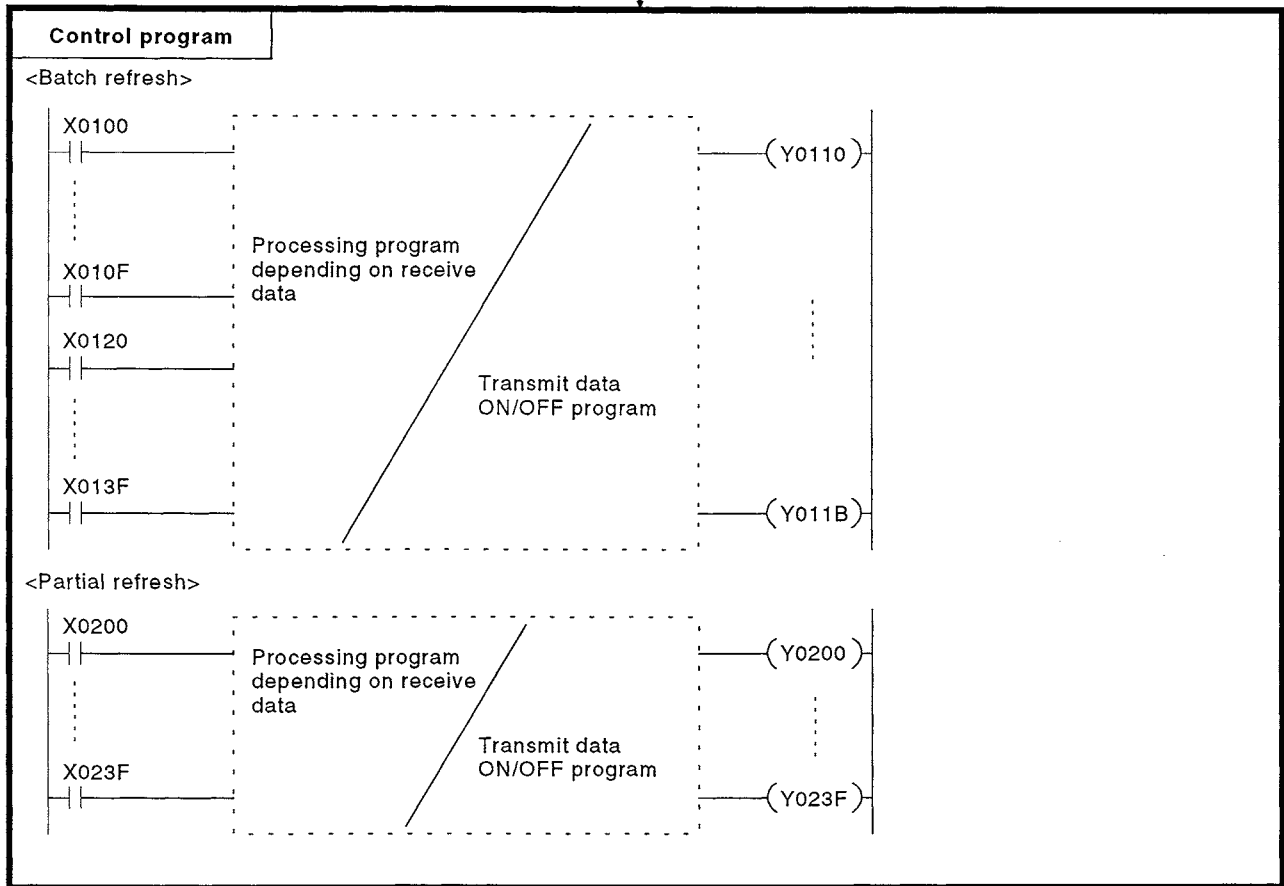
In order to economize on the use of programmable controller CPU devices, the same addresses are used for the receive and transmit storage devices X200 to 23F and Y200 to 23F. (The device range can be shifted, for example to X200 to 23F, Y240 to 27F.)

[Program example]



Continued on next page

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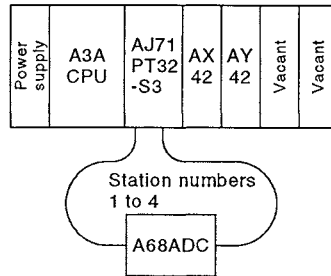


5.2 Extension Mode

Program creation in the extension mode is explained here with reference to the following example system configuration.

Refer to the appropriate unit manuals for the program of dedicated protocol/no-protocol (AJ35PTF-R2), and operating box protocol (AJ35PT-OPB-M1-S3, AJ35T-OPB-P1-S3).

[Example system configuration]



[Creation of the initial data ROM]

In the extension mode, the use mode switch setting jumper must be set at the "48" side and the initial data ROM must be installed.

(1) Number of remote stations setting

Set the total number of stations for the remote unit.

This setting makes it unnecessary to write a program including a TO instruction specifying address 0 of the buffer memory.

(2) Remote terminal setting

Set the following items, (1) through (4), for the remote terminal units.

(a) Station number The station number set for each remote terminal unit.

(b) Protocol The correspondence between protocols and units is indicated below.

Dedicated protocol	AJ35PTF-R2
No-protocol	
Operating box protocol	AJ35PT-OPB-M1-S3, AJ35T-OPB-P1-S3
MINI standard protocol	A68ADC, A64DAVC, A64DAIC, AD61C, AD62C, A64RD3C, A64RD4C

(c) FROM address Head address of the receive area

(d) TO address Head address of the transmit area

(3) Partial refresh remote I/O setting

Set the following items, (1) through (3), for partial refresh type remote I/O units.

(a) Station number The station number set at the unit.

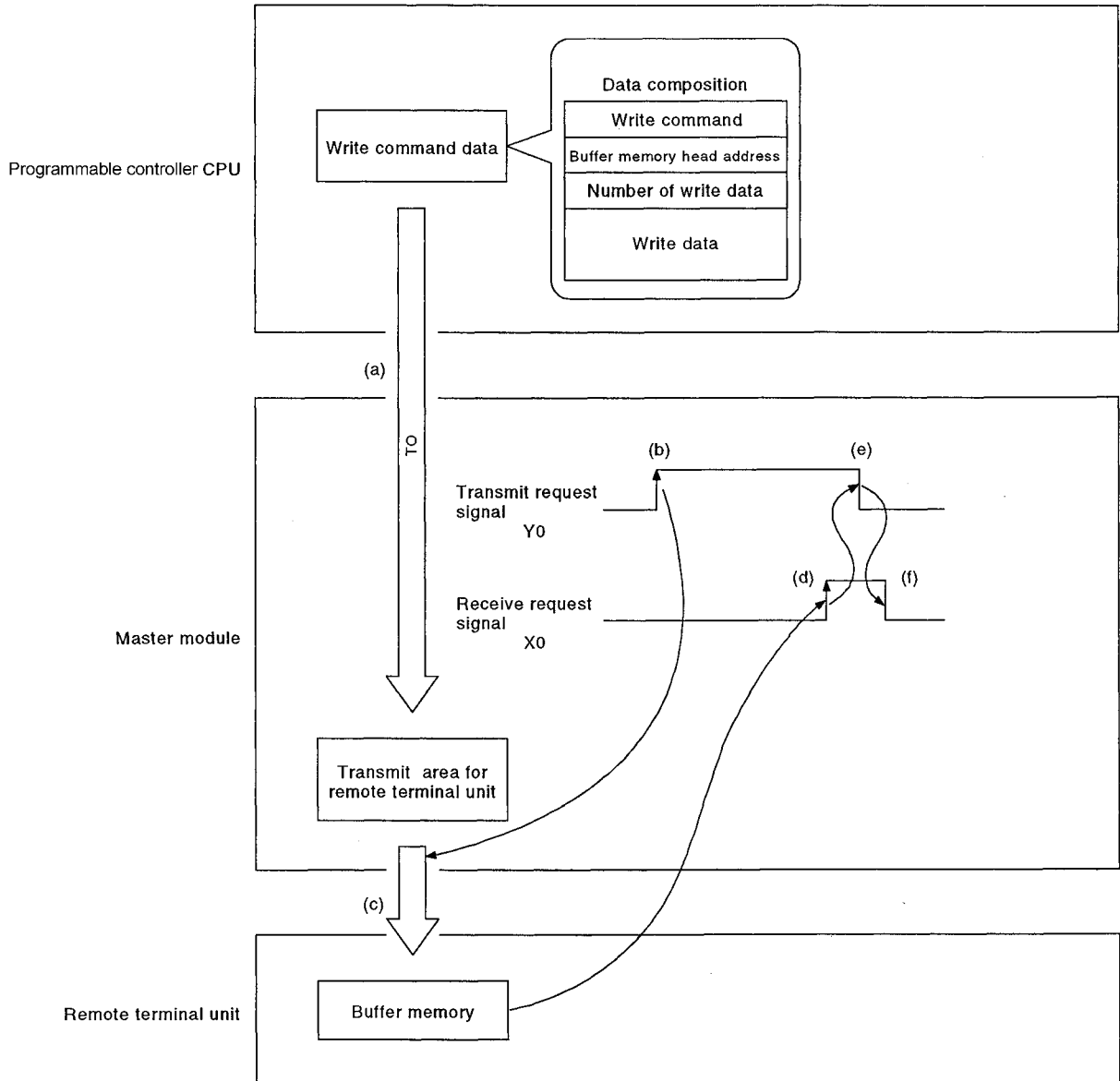
(b) Number of input digits Number of input points refreshed = number of digits x 16 points.

(c) Number of output digits .. Number of output points refreshed = number of digits x 16 points.

These settings make it unnecessary to write a program including a TO instruction specifying addresses 250 to 282 of the buffer memory.

[Concept]

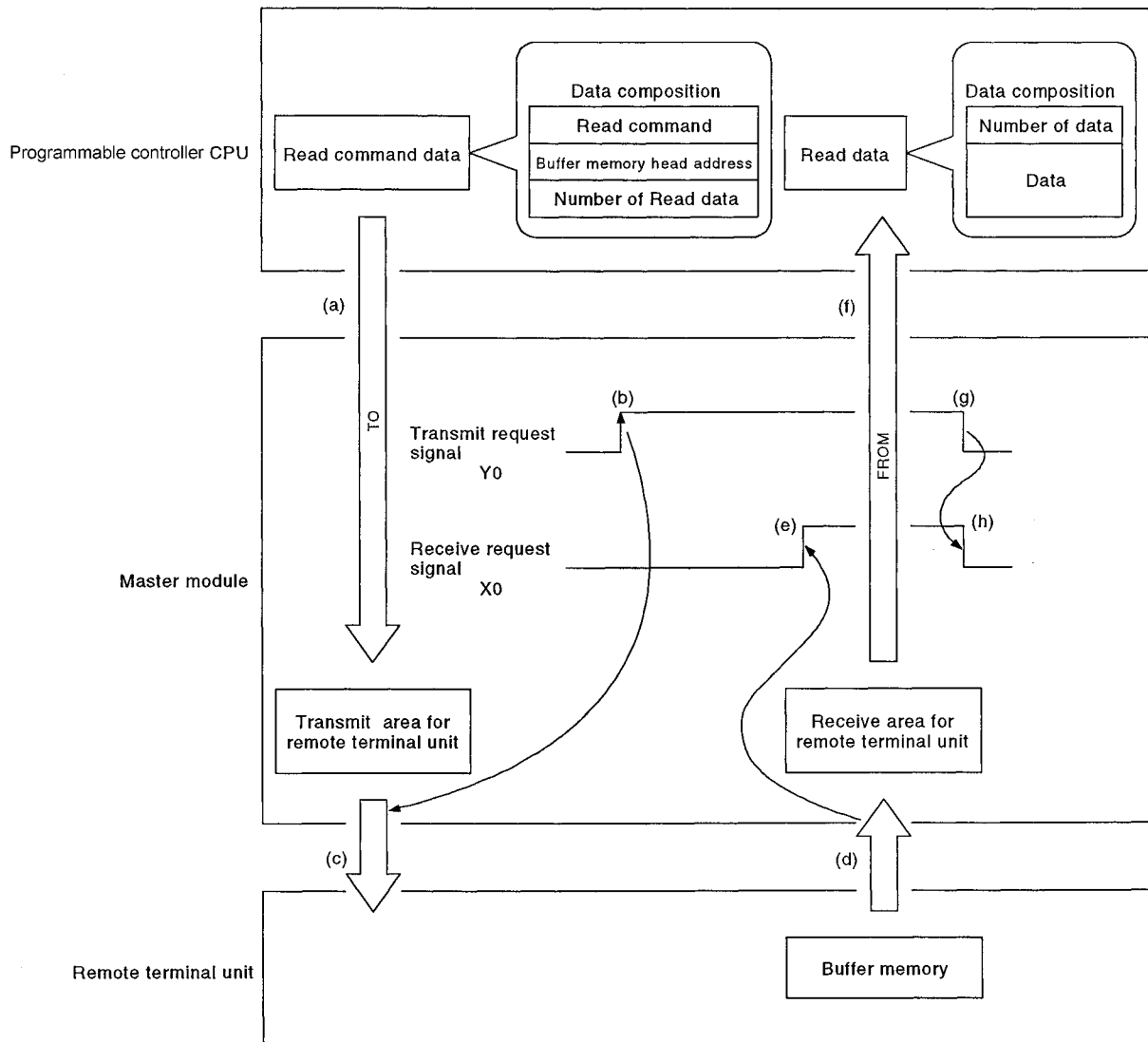
(1) Writing to the buffer memory



- (a) The write command data is written to the transmit area for the remote terminal unit.
- (b) The transmit request signal (Y0) is switched ON.
- (c) When the transmit request signal (Y0) comes ON, the write command data is sent to the remote terminal unit.
- (d) When data writing to the buffer memory is completed, the transmit complete signal (X0) comes ON.
- (e) When the transmit complete signal (X0) comes ON, the transmit request signal (Y0) is switched OFF.
- (f) When the transmit request signal (Y0) goes OFF, the transmit complete signal (X0) goes OFF.

This completes one writing cycle.

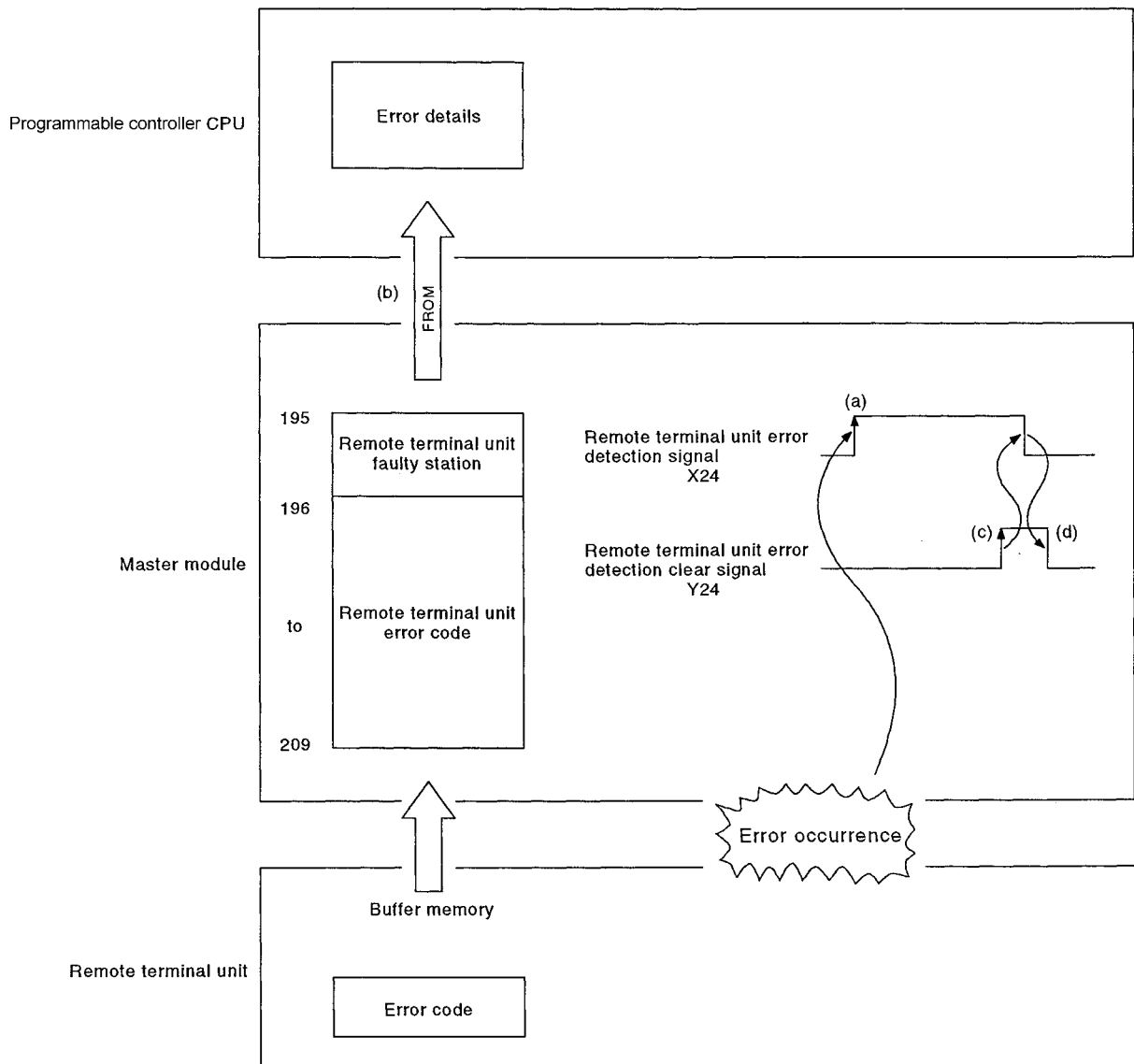
(2) Reading from the buffer memory



- (a) The read command data is written to the transmit area for the remote terminal unit.
- (b) The transmit request signal (Y0) is switched ON.
- (c) When the transmit request signal (Y0) comes ON, the read command data is sent to the remote terminal unit.
- (d) On the basis of the read command data, data in the buffer memory is stored in the receive area for the remote terminal unit.
- (e) When the data is stored in the receive area for the remote terminal unit, the transmit complete signal (X0) comes ON.
- (f) When the transmit complete signal (X0) comes ON, the data is read from the receive area for the remote terminal unit.
- (g) After the data has been read, the transmit request signal (Y0) is switched OFF.
- (h) When the transmit request signal (Y0) is switched OFF, the transmit complete signal (X0) goes OFF.

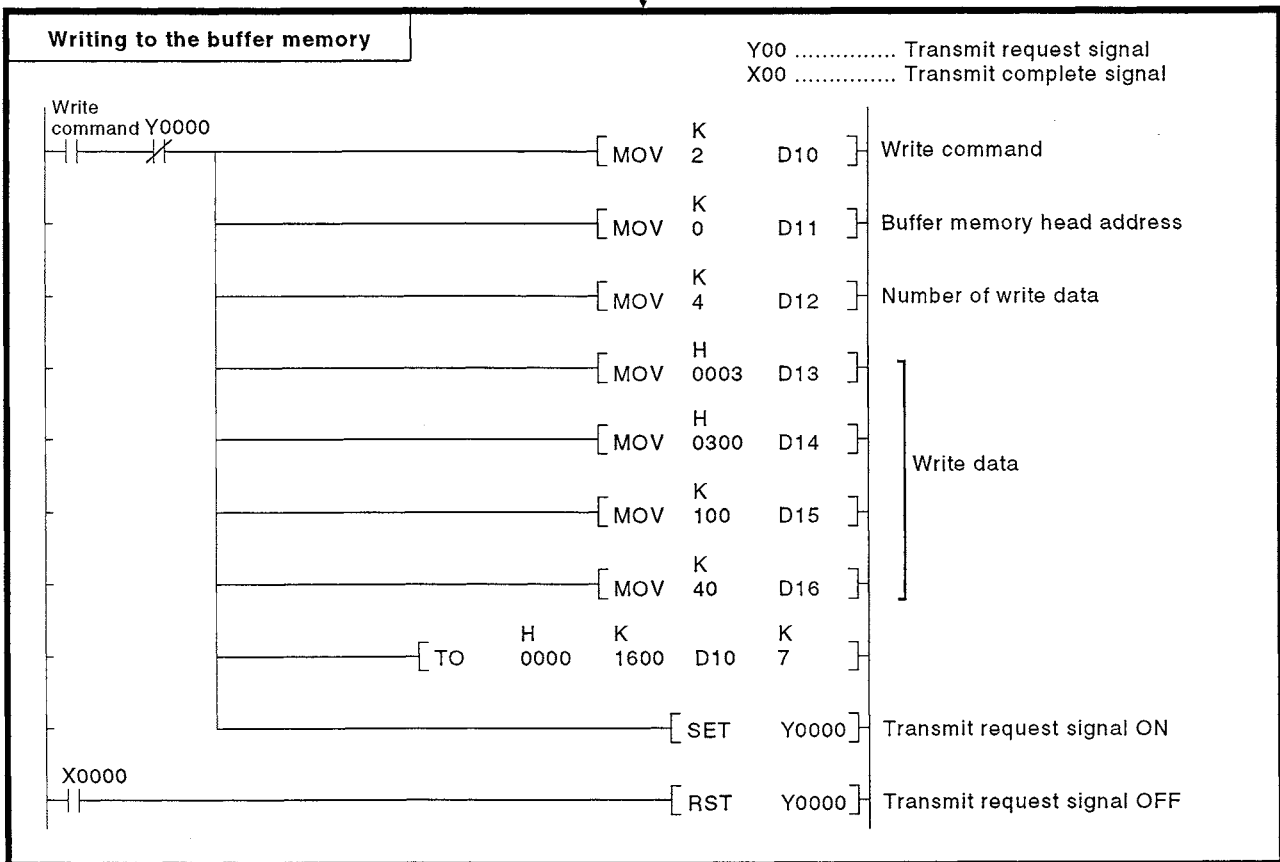
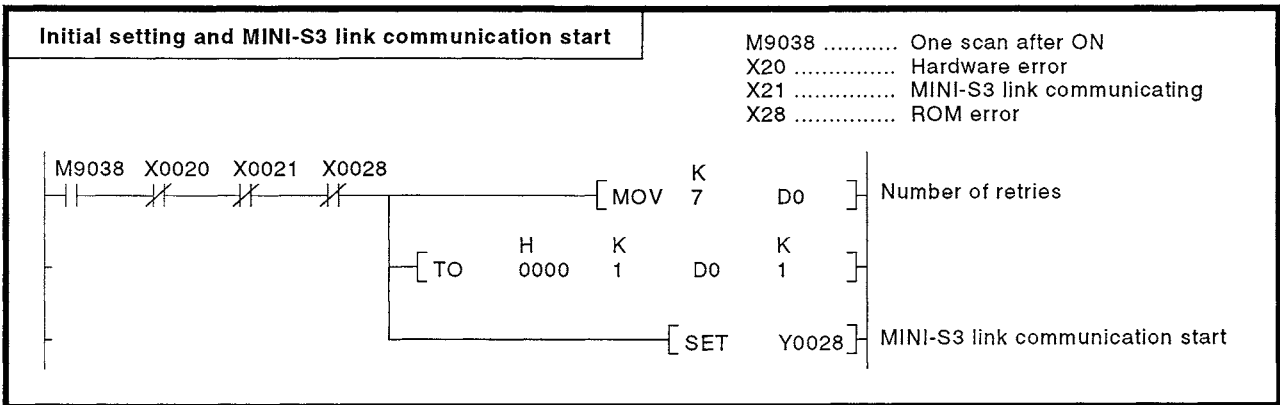
This completes one reading cycle.

(3) Reading and resetting error codes



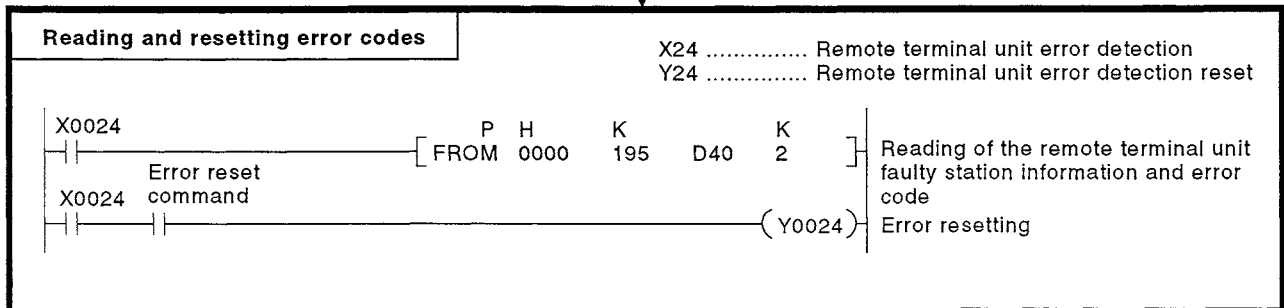
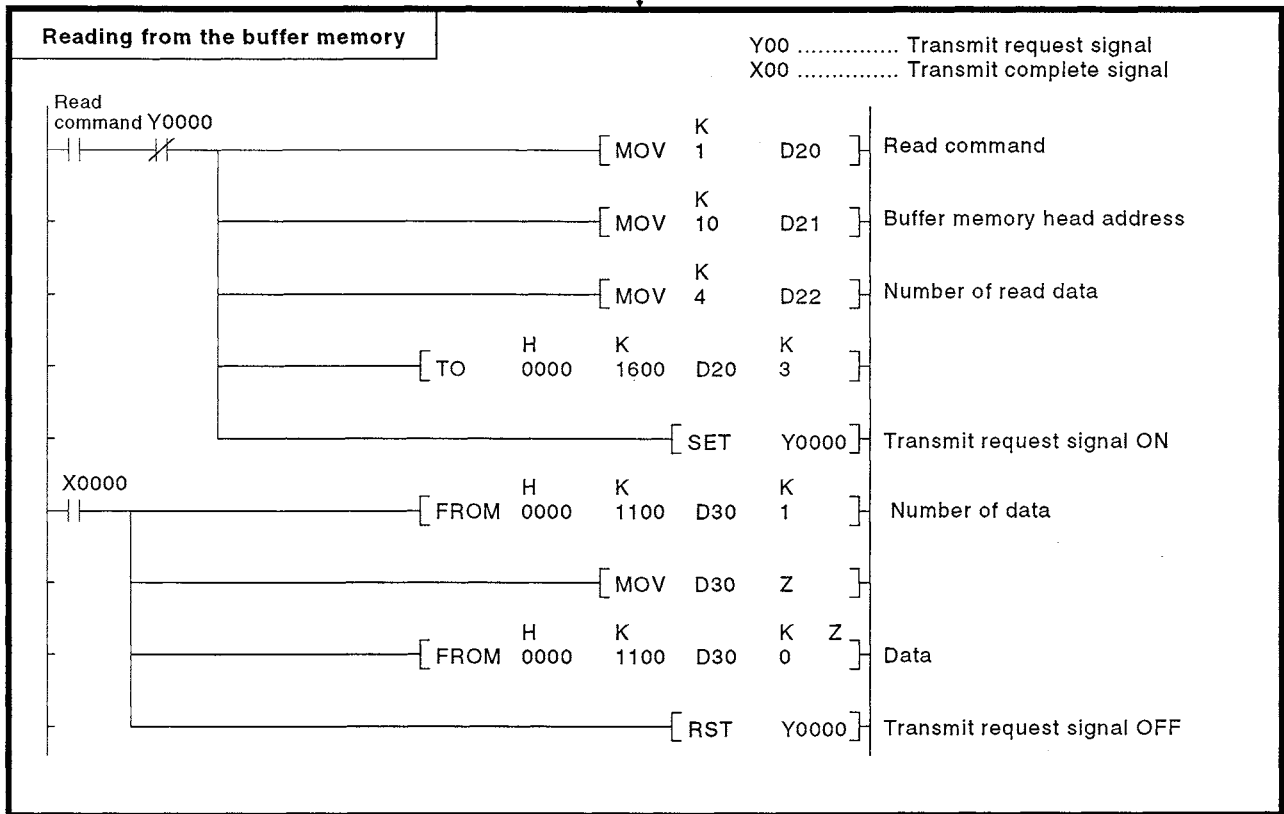
- (a) When an error occurs, the remote terminal unit error detection signal (X24) comes ON, the faulty station information is stored in buffer memory address 195, and the error code is stored in buffer memory addresses 196 to 209.
- (b) The faulty station information and error code are read to check the error details.
- (c) After the error has been remedied, the remote terminal unit error detection clear signal (Y24) comes ON and the error details are cleared.
- (d) When the error details have been cleared (i.e. when the remote terminal unit error detection signal (X24) goes OFF), the remote terminal unit error detection clear signal (Y24) is switched OFF.

[Program example]



Continued on next page

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5.3 Programming for MELSECNET/MINI-S3 Automatic Refresh Parameter Setting

Setting the MINI-S3 link information, I/O storage devices, etc., in the parameters, enables automatic communication of transmit/receive data for batch refresh to/from the relevant areas of the master module's buffer memory.

A sequence program can be created by using, the I/O devices allocated for communication by parameter settings. This makes FROM/TO instructions unnecessary.

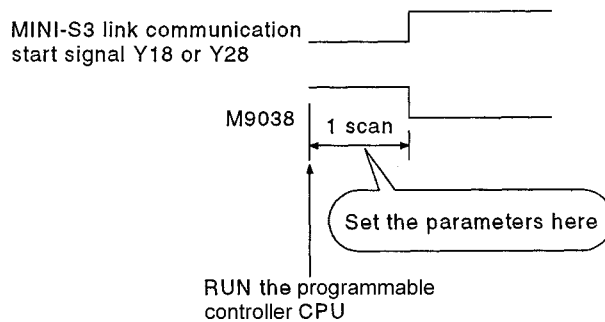
Programmable controller CPUs
for which parameter settings are possible

A2ACPU(P21/R21)	Q2ACPU
A2ACPU-S1(P21/R21)	Q2ACPU-S1
A3ACPU(P21/R21)	Q3ACPU
A2UCPU	Q4ACPU
A2UCPU-S1	Q4ARCPU
A3UCPU	Q2ASCPU
A4UCPU	Q2ASCPU-S1
A2ASCPU	Q2ASHCPU
A2ASCPU-S1	Q2ASHCPU-S1
A2USHCPU-S1	

- (1) The programmable controller CPU automatically switches on the MINI-S3 link communication start signal (Y18 or Y28) with respect to master modules for which parameters are set.

There is no need to switch this signal on using the sequence program.

- (2) If parameter data (initial settings) is required, for example for an AJ35PTF-R2, write it in the first scan after the MINI-S3 link communication start signal has gone OFF.

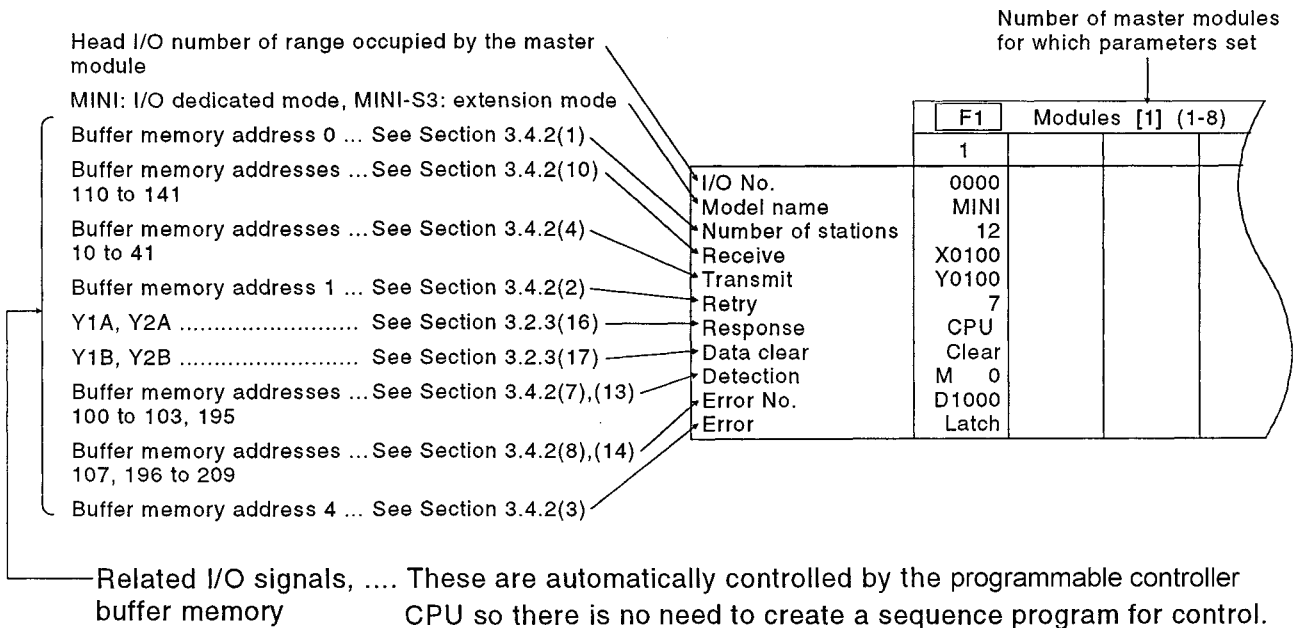


- (3) The I/O data is batch refreshed after execution of the programmable controller CPU END instruction (when the programmable controller CPU is in the RUN, PAUSE, STEP RUN status).
- (4) It is not possible to set communication data for partial refresh type I/O units or remote terminal units.
- (5) Parameters can be set for up to 8 master modules.

For the ninth and later modules, communication processing must be controlled from the sequence program.

[MELSECNET/MINI-S3 Automatic Refresh Parameters]

The programming required to set the MELSECNET/MINI-S3 automatic refresh parameters for the system example in Section 5.1 is described here.

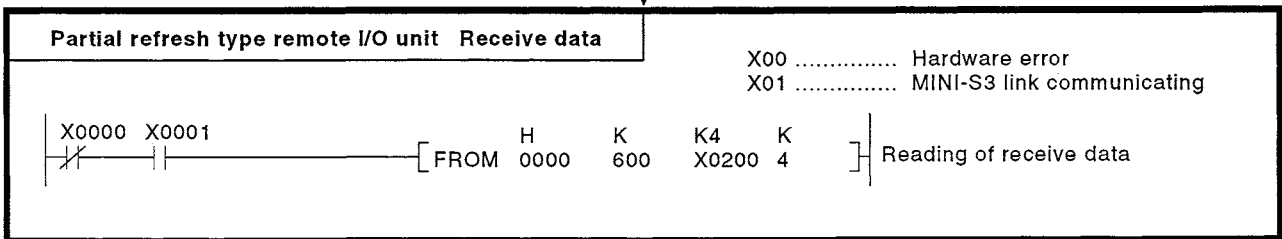
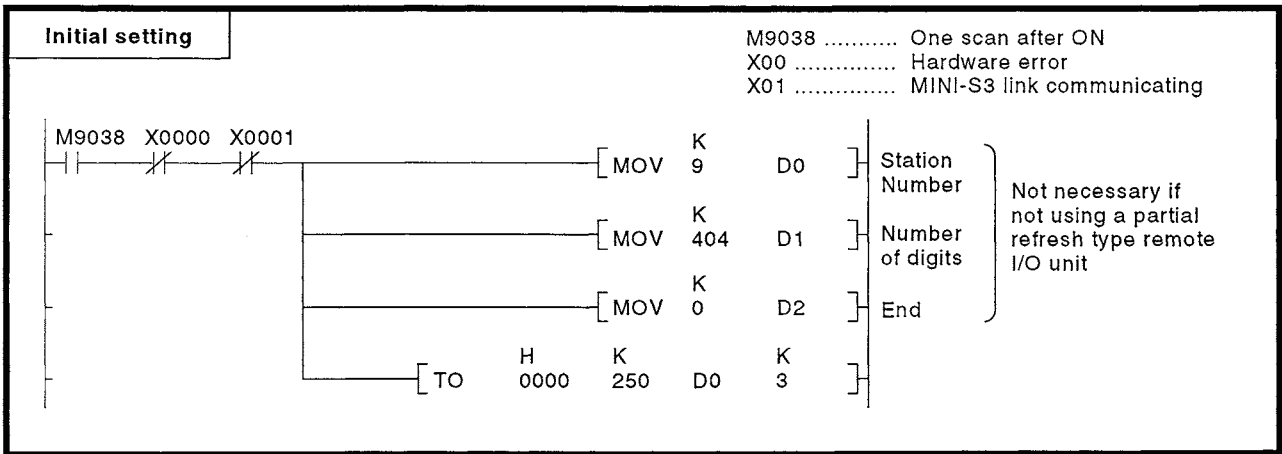


The table below shows which items require programming and which do not.

O: Required X: Not required

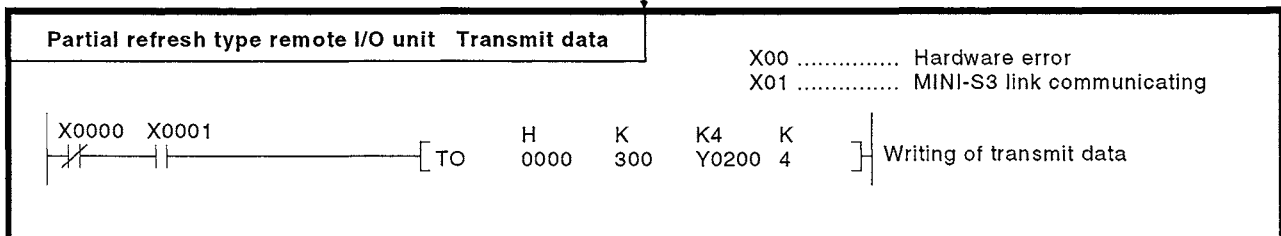
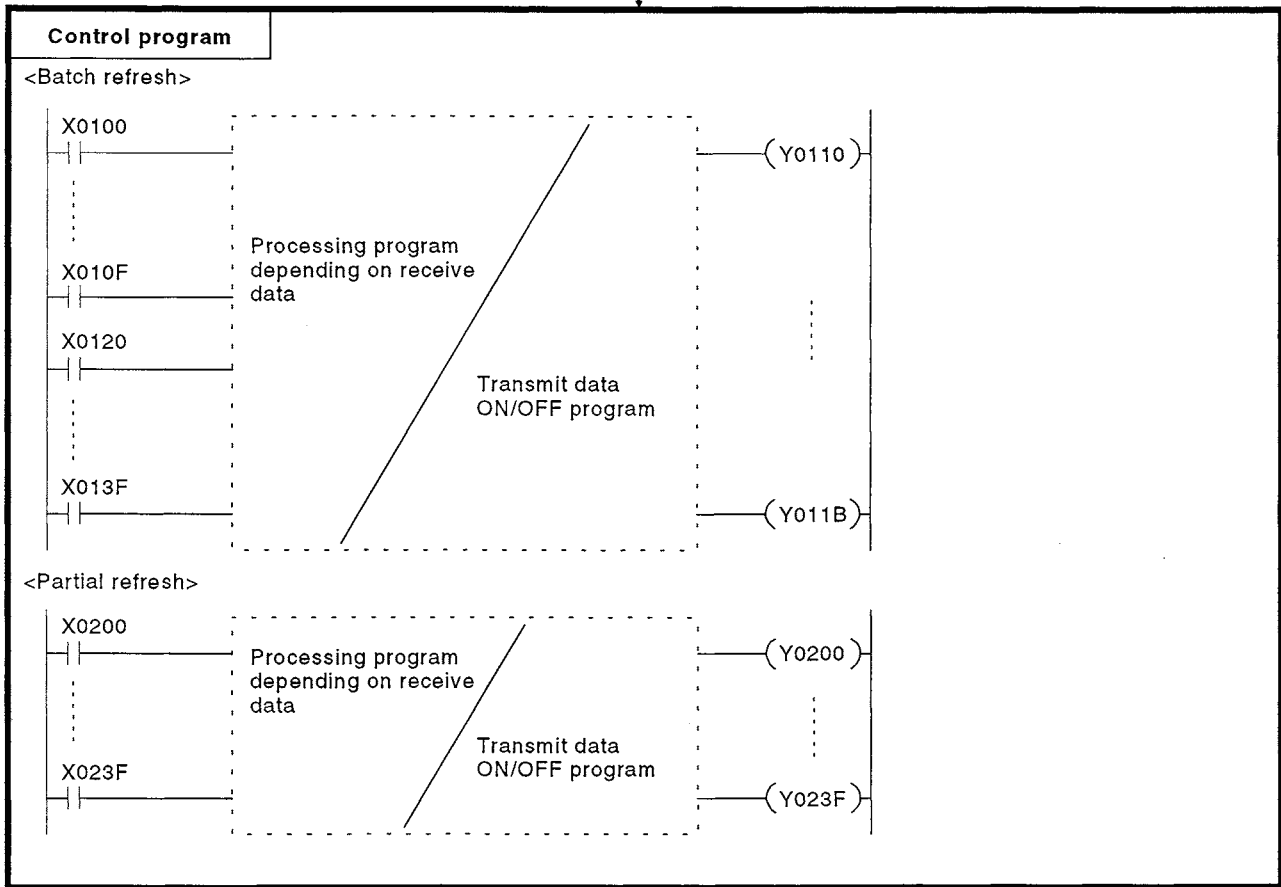
Item	Type of Unit Used		
	Batch Refresh	Partial Refresh	Batch Refresh + Partial Refresh
Number of remote stations	X	X	X
Number of retries	X	X	X
Partial refresh setting	X	O	O
MINI-S3 link communication start signal	X	X	X
Receive data read (batch refresh)	X	X	X
Receive data read (partial refresh)	X	O	O
Transmit data write (batch refresh)	X	X	X
Transmit data write (partial refresh)	X	O	O

[Program example]



Continued on next page

Continued from previous page



5.4 Delay Time

5.4.1 I/O delay time for batch refresh type remote I/O units

This section describes the delays that occur when processing I/O signals in a MINI-S3 network.

(1) The following factors are responsible for the delay before the programmable controller CPU reads an input signal from the remote I/O unit.

(a) Remote I/O station input unit response time ($T_{I\ ON/OFF}$)

This is the time required for the input unit to be switched from ON to OFF or from OFF to ON.

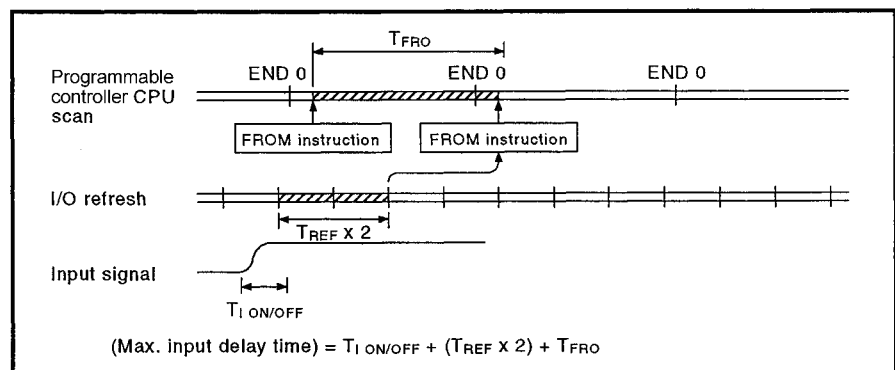
For details, refer to the A2C, MELSECNET/MINI-S3 I/O Module User's Manual.

(b) I/O refresh time for the MINI-S3 link (T_{REF})

For details, see Section 3.2.1.

(c) Time taken to complete FROM instruction processing for reading the input signal (T_{FRO})

A maximum delay of one scan will occur if the FROM instruction is executed once per scan of the sequence program.



(2) The following factors are responsible for delay before the programmable controller CPU provides outputs from the output remote I/O station.

(a) Time taken to complete TO instruction processing for outputting from the remote I/O station (T_{TO}).

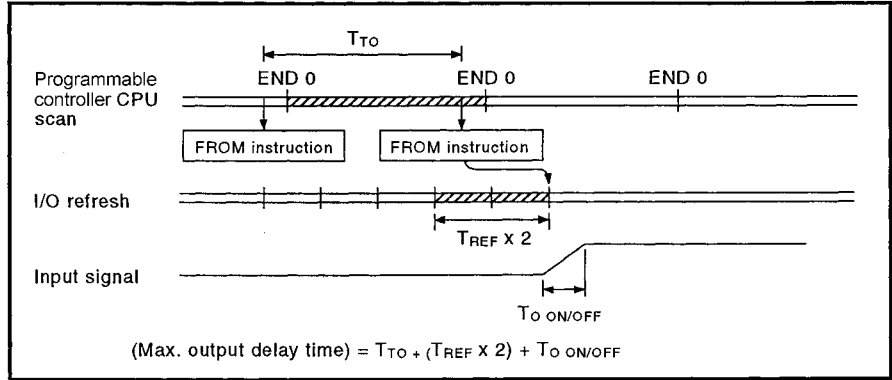
A maximum delay of one scan will occur if the TO instruction is executed once per scan of the sequence program.

(b) I/O refresh time for the MINI-S3 link (T_{REF})

(c) Remote I/O station output unit response time ($T_{O\ ON/OFF}$)

This is the time required for the output unit to be switched from ON to OFF or from OFF to ON.

For details, refer to the Batch Refresh Type Remote I/O User's Manual.



[Example]

Assume that the FROM/TO instruction to read and write output data under the conditions listed below is executed once per sequence program scan:

- Programmable controller CPU scan time (T_{FRO}, T_{TO}) : 50 ms
- I/O refresh time (T_{REF}) : 3.9 ms
- Input response time of remote I/O station ($T_{I\ ON/OFF}$) : 25 ms
- Output response time of remote I/O station ($T_{O\ ON/OFF}$): 12 ms

Under these conditions, the following delays will occur:

$$\begin{aligned} \text{Maximum input delay time} &= T_{I\ ON/OFF} + (T_{REF} \times 2) + T_{FRO} \\ &= 25 + (3.9 \times 2) + 50 \\ &= \underline{\underline{82.8 \text{ (ms)}}} \end{aligned}$$

$$\begin{aligned} \text{Maximum output delay time} &= T_{TO} + (T_{REF} \times 2) + T_{O\ ON/OFF} \\ &= 50 + (3.9 \times 2) + 12 \\ &= \underline{\underline{69.8 \text{ (ms)}}} \end{aligned}$$

5.4.2 I/O delay time for a partial refresh type remote I/O unit (AJ35PTF-128DT)

I/O refresh processing for an AJ35PTF-128DT is performed in groups of partial refreshes whose number corresponds to the number of digits set for the master module.

The I/O delay time when using an AJ35PTF-128DT is explained below.

- (1) The following factors are responsible for the delay before the programmable controller CPU reads an input signal from the AJ35PTF-128DT.

- (a) Time required to receive 1 digit data (T_{DRI})

This is the time that elapses between digit (input data read range) designation by the master module and storage of the input data in the buffer memory.

T_{DRI} is calculated from the I/O refresh time (T_{REF}) and the time that elapses before the input module input data is established (T_{DIO} : this is 8 ms for the AJ35PTF-128DT).

$$T_{DRI} = \left(\frac{T_{DIO}}{T_{REF}} + 1 \right) \times T_{REF}$$

Round up decimal fractions.

For example, if the I/O refresh time is 7.1 ms, the time taken to receive one digit data from the AJ35PTF-128DT will be:

$$T_{DRI} = \left(\frac{8}{7.1} + 1 \right) \times 7.1 = (2 + 1) \times 7.1 = 21.3 \text{ (ms)}$$

- (b) Digit-based delay time (T_{DS})

This is the time taken to read all input data of the AJ35PTF-128DT and save it in the buffer memory, calculated as follows:

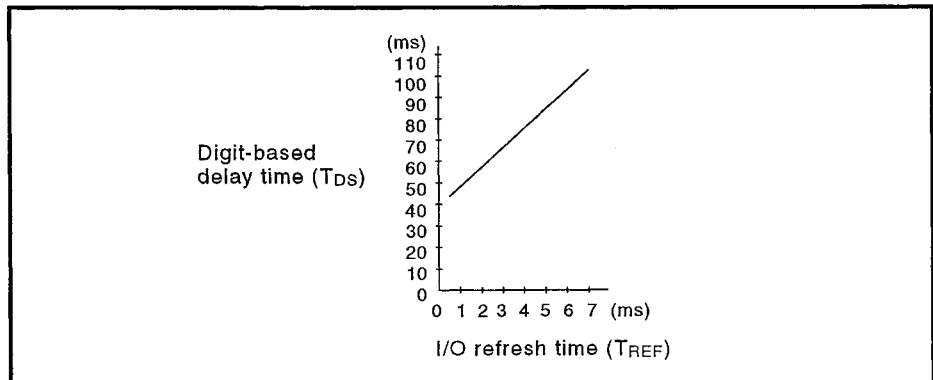
$$T_{DS} = T_{DRI} \times (K + 1) \quad K: \text{Number of digits} = 4$$

For example, if the I/O refresh time is 7.1 ms, the time taken to receive four digit data from the AJ35PTF-128DT will be:

$$T_{DS} = T_{DRI} \times (K + 1) = 21.3 \times 5 = 106.5 \text{ (ms)}$$

REMARK

The relationship between the AJ35PTF-128DT I/O refresh time (T_{REF}) and the digit-based delay time (T_{DS}) is shown below.



- (c) Time taken to complete FROM instruction processing for reading an input signal (T_{FRO})

A maximum delay of one scan will occur if the FROM instruction is executed once per scan of the sequence program.

Least common multiple of I/O refresh time which satisfies T_{DIO} (T_{REF} x n)

(Max. input delay time) = {T_{DRI} x (K + 1)} + T_{FRO}

For example, the maximum input delay time if the programmable controller CPU scan time were 50 ms and sixteen AJ35PTF-128DT units were connected would be:

$$T_{REF} = 3.9 \text{ (ms)} + 0.25 \text{ (ms)} \times 16 \text{ (units)} = 7.9 \text{ (ms)}$$

↓

When the I/O refresh time is 3.9 ms

Delay of 0.25 ms per partial refresh type remote I/O station.

$$T_{DRI} = \left(\frac{8}{7.9} + 1 \right) \times 7.9 = (2 + 1) \times 7.9 = 23.7 \text{ (ms)}$$

(Max. input delay time) = {23.7 x (4 + 1)} + 50 = 168.5 (ms)

(2) The following factors are responsible for the delay before the programmable controller CPU provides outputs from an AJ35PTF-128DT.

(a) Time required to complete TO instruction processing for outputting from the AJ35PTF-128DT station (T_{TO}).

A maximum delay of one scan will occur if the TO instruction is executed once per scan of the sequence program.

(b) Time required to provide all outputs to the AJ35PTF-128DT (T_{DSO})

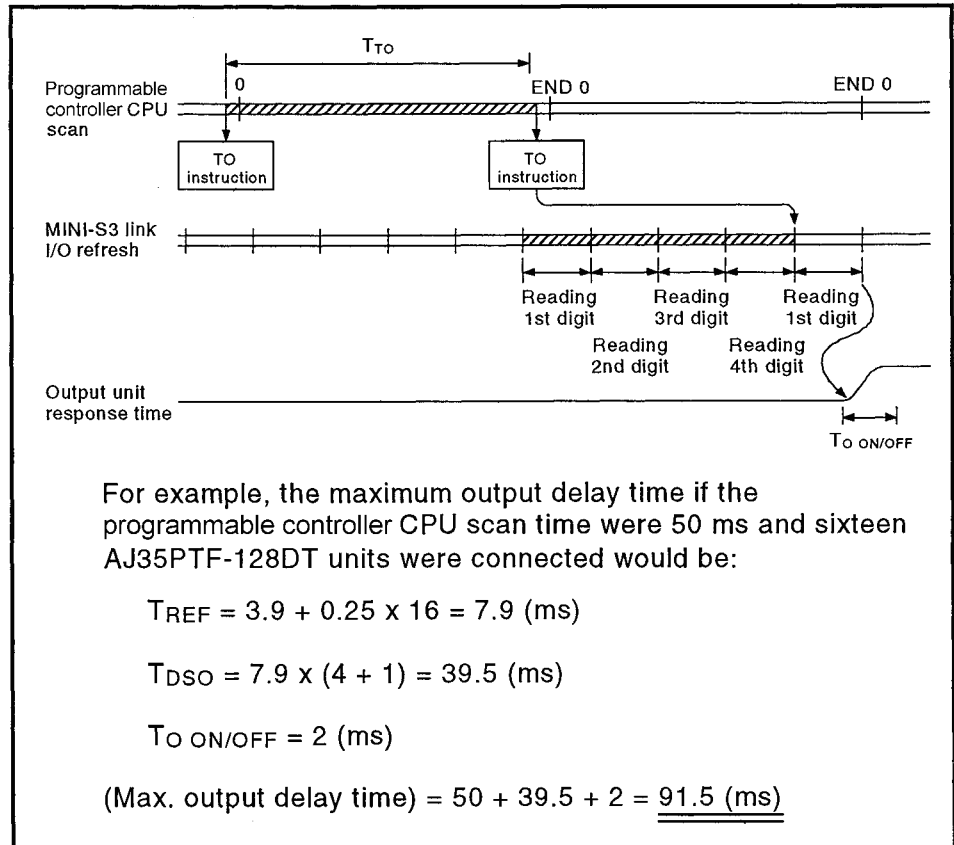
This is the time that elapses between digit (output data write range) designation by the master module and output of the output data stored in the buffer memory to the AJ35PTF-128DT.

T_{DSO} is calculated using the following expression:

$$T_{DSO} = T_{REF} \times (K + 1) \quad \begin{array}{l} T_{REF} : \text{I/O refresh time} \\ K : \text{Number of digits} \end{array}$$

(c) AJ35PTF-128DT output unit response time ($T_{O ON/OFF}$)

This is the time required for the output unit to be switched from ON to OFF or from OFF to ON.



6. TROUBLESHOOTING

6.1 Data Communication Errors

There are two types of errors which may occur during data communication between the master module and remote stations.

- (1) Error which only stops data communication with the faulty remote module.
- (2) Error which stops data communication with all remote modules.

REMARK

A communication error indicates that normal communication could not be made after retries had been made the number of retries set to buffer memory address 1.

6.1.1 Data communication continue error

The following operations are performed when the error occurring only stops communication with the faulty station and continues communication with the other stations:

- (1) When an error occurs with a remote I/O unit
 - (a) The MINI-S3 link error detection ($X_{(n+6)}/X_{(n+26)}$) is turned ON. This signal is turned OFF when communication is restored. For further details, see Section 3.3.3.
 - (b) Stores the faulty station number to buffer memory addresses 100 to 103,
 - 1) Sets 1 to the corresponding bit.
 - 2) In the automatic return mode, the corresponding bit is reset to 0 when the faulty station is restored.
 - 3) In the no-automatic return mode, the corresponding bit remains 1.
 - (c) Stores the accumulative faulty station numbers to buffer memory addresses 90 to 93. This area stores the accumulative result of faulty stations explained in (2).
 - (d) Stores the error detection code in buffer memory address 108. 1 is written to this address when any station causes a communication error. 1 remains if communication is restored.
 - (e) Clears the faulty station, accumulative faulty station and error detection code when the MINI-S3 link communication start ($Y_{(n+18)}/Y_{(n+28)}$) is turned from OFF to ON.
 - (f) Switches ON the "ERR. REM" LED of the master module.
 - (g) Switches OFF all outputs of the faulty station in the no-automatic return mode.

- (2) When an error as indicated in Section 6.2 occurs with the remote terminal unit
 - (a) The remote terminal unit error detection ($X_{(n+24)}$) is turned ON. This signal is turned OFF when the remote terminal unit error detection reset ($Y_{(n+24)}$) is turned from OFF to ON. For further details, see Section 3.3.3.
 - (b) Stores the faulty remote terminal unit number to buffer memory address 195.
 - 1) Sets 1 to the corresponding bit.
 - 2) The corresponding bit is reset to 0 when the faulty station is restored to allow correct communications or the remote terminal error detection reset signal is turned ON.
 - (c) Stores the code indicating the error contents in buffer memory addresses 196 to 209. The code is cleared when the error reset ($Y_{(n+2D)}$) is turned ON while the MINI-S3 link communication start signal ($Y_{(n+28)}$) is OFF or when the MINI-S3 link communication start signal ($Y_{(n+28)}$) is turned from OFF to ON.

POINT

The data communication continue error may occur when:

- (1) The total number of remote stations connected does not coincide with the number of remote stations (address 0) specified. For example, an error occurs at station 3 when the number of stations set is 5 and there are stations 1, 2, 4 and 5 connected.
- (2) The fuse in an output remote I/O unit has blown.
- (3) An error as indicated in Section 6.2 occurs with a remote terminal unit.
- (4) I/O communications cannot be performed due to a fault outside the transmission part of a remote I/O unit.
- (5) A communication data error has occurred due to noise. In this case examine the data link cable wiring and grounding methods.

6.1.2 Data communication stop error

The following operations are performed when the error occurring has stopped data communication with all remote I/O stations.

- (1) Switches the MINI-S3 link communication in-progress signal ($X_{(n+1)}/X_{(n+21)}$) OFF and the MINI-S3 link error detection signal ($X_{(n+7)}/X_{(n+27)}$) ON.
- (2) Stores the corresponding error code to buffer memory address 107.

Table 6.1 Communication Error Code List

Error Code	Definition	Cause	How to Identify the Cause
0	No error	—	—
1	Initial data error	I/O refresh has been initiated after while there are errors in the setting of: <ul style="list-style-type: none"> • total number of remote I/O stations • number of retries • partial refresh stations • line error check • parameter for the no-protocol mode 	Check the initial data ROM or the sequence program in which the initial data write is performed.
2	Line error	Any data link cable has been broken or remote I/O station power switched OFF.	Check the line in the line check mode (see Section 4.6.1).
3	Station fault	Data communication has been stopped due to station fault with the mode setting switch set to 2 (communication stop specified at online error detection).	Check addresses 100 to 103 in the buffer and verify the station where the communications error occurred.
4	Faulty partial refresh type remote I/O station	Data communication has been stopped due to an error occurring in input from the partial refresh type remote I/O station with the mode setting switch set to 2 (communication stop specified at online error detection).	Verify the station that caused the input error by detecting the partial refresh input error stored in buffer address 599.

- (3) When code 3 is stored to address 107, 1 is set to the corresponding bit of the faulty station area (addresses 90 to 93) and accumulative faulty station area (addresses 100 to 103).
- (4) The communication error code can be cleared by:
 - (a) Turning the MINI-S3 link communication start signal from OFF to ON.
 - (b) Turning the error reset signal ($Y_{(n+1D)}/Y_{(n+2D)}$) from OFF to ON with the MINI-S3 link communication start ($Y_{(n+18)}/Y_{(n+28)}$) OFF.
- (5) The faulty station and accumulative faulty station bits are reset to 0 when the MINI-S3 link communication start signal ($X_{(n+18)}/X_{(n+28)}$) is turned from OFF to ON.

6.2 Table of Error Codes for Errors Occurring During Remote Terminal Unit Communication

When an error occurs during communication between the master module and remote terminal units, the remote terminal unit fault detection signal ($X_{(n+24)}$) is set to ON and the number of the faulty station is set in buffer memory address 195 and the error code is stored in address 196 to 209.

The following table lists the contents of the error codes stored in the buffer memory address 196 to 209 and the relevant processing.

Error Code (decimal)	Error Name	Error Content	Processing
1	Data setting error	An error exists in the data set in a remote terminal transmit data area.	See the relevant remote terminal unit user's manual and set the correct data.
2	Bar-code read error	An error occurred due to the bar-code reader connected to the AJ35PTF-R2 being unable to read bar-code.	See the manual for the bar-code reader being used and take appropriate action.
3	ID card access error	An error occurred while an ID card controller is connected to the AJ35PTF-R2 due to one of the following causes.	<ul style="list-style-type: none"> See the manual for the ID card controller being used and install or replace the battery.
		<ul style="list-style-type: none"> A battery is not installed in the ID card, or the battery is low. 	<ul style="list-style-type: none"> Set the timing, location, and position of the ID card so that the ID card data can be read correctly when a read request is made.
		<ul style="list-style-type: none"> An ID card was not present when a data read request was made, or the data could not be read. 	
		<ul style="list-style-type: none"> Commands from the master module to the ID card controller are not transmitted in the proper format. 	<ul style="list-style-type: none"> Noise may be a possible cause of the error. Attempt communication one more time. If the error occurs again, use the troubleshooting procedures outlined in the AJ35PTF-R2 RS-232C Interface User's Manual.
4	ID card battery error	An error occurred while an ID card controller is connected to the AJ35PTF-R2 due to the lack of a battery in the ID card, or to its being low. (Read data is stored correctly in the buffer memory.)	See the manual for the ID card controller being used and install or replace the battery.
5	ID card data receive error	An error occurred while an ID card controller was connected to the AJ35PTF-R2 due to response data not being transmitted to the master module in the proper format in response to a read request command from the master module.	<ul style="list-style-type: none"> Noise may be a possible cause of the error. Attempt communication one more time. If the error occurs again, use the troubleshooting procedures outlined in the AJ35PTF-R2 RS-232C Interface User's Manual.
6	WDT error	A remote terminal unit meant to can handle MINI standard protocol is out of control.	Reset the remote terminal unit; or Turn ON/OFF the power, and reset the unit. If the unit does not return to normal after resetting, a hardware fault has occurred. Consult the vendor of the unit.
8	Transmit data area setting error	An error occurred because the number of bytes set for the transmit data portion of the communication data area used for the remote terminal units is less than the specified number of bytes.	See the relevant remote terminal unit user's manual and set the required number of bytes for transmit data in the transmit data area.
9	Communication error	An error occurred in communication between the master module and remote terminal units.	Noise or a faulty remote terminal unit may be possible causes of the error. See Section 6.3.1 and take appropriate action.
11			
10	Transmit data area setting error	An error occurred because the number of bytes set for the receive data portion of the communication data area used for the remote terminal units is less than the specified number of bytes.	See the relevant remote terminal unit user's manual and set the required number of bytes for receive data in the receive data area.

6. TROUBLESHOOTING

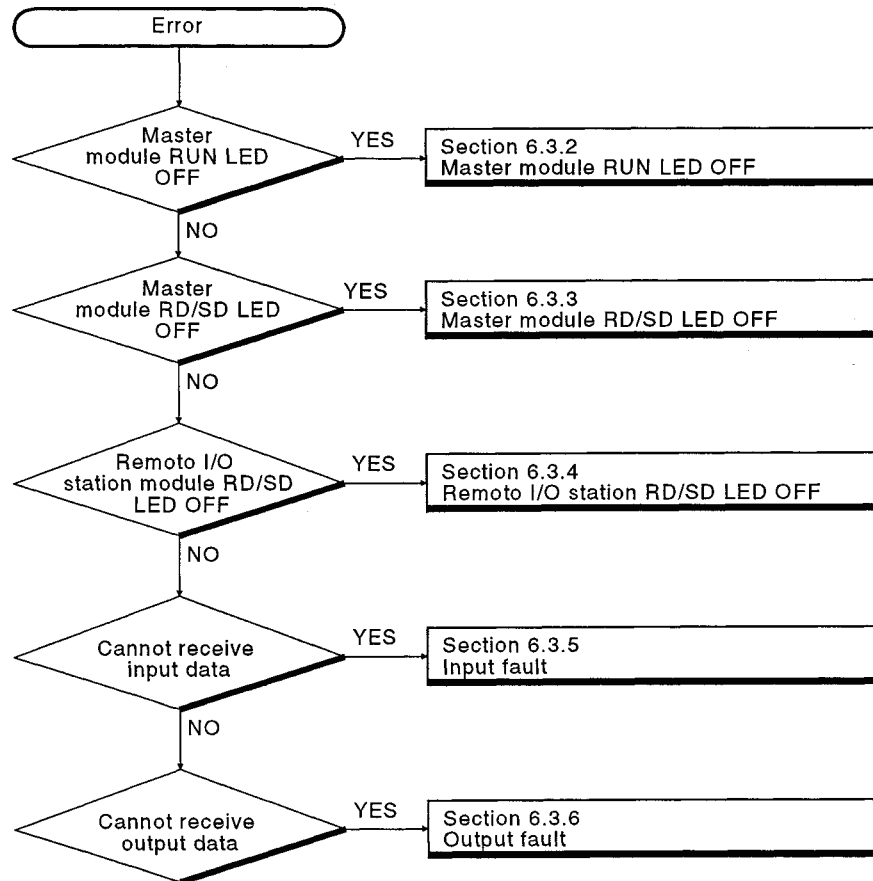
MELSEC-A

Error Code (decimal)	Error Name	Error Content	Processing
100	Read error	<ul style="list-style-type: none"> An address outside the read area was designated. The first address and number of words designation goes outside the read area. 	Make a designation within the read area
101	Write error	<ul style="list-style-type: none"> An address outside the write area was designated. The first address and number of words designation goes outside the write area. 	Make a designation within the write area.
102	Command error	A command code other than read (01H) or write (02H) was received.	<ul style="list-style-type: none"> Ensure that codes other than 01H and 02H are not received. Since the problem may be caused by noise, take measures against noise.
103	Designated number of words error	A designation of "0" for the number of words to read/write was received.	<ul style="list-style-type: none"> Do not designate "0" as the number of words. Since the problem may be caused by noise, take measures against noise.
104	——	Data was received when a read request was made.	Since the problem may be caused by noise, take measures against noise.
105	——	The number of words designated in the write command data and the number of words in the received data differ.	
106 to	Refer to the manual for the relevant remote terminal unit.		

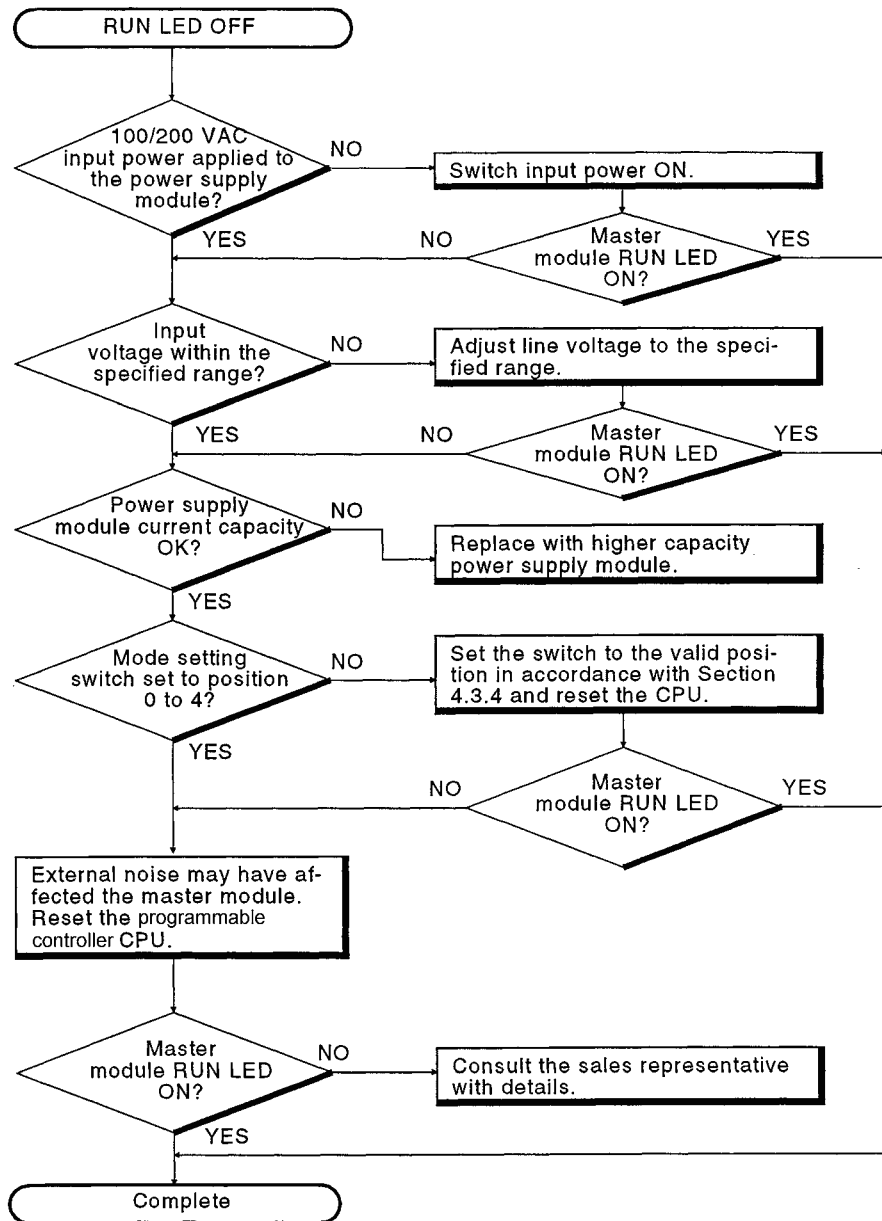
6.3 Troubleshooting

For information on programmable controller CPU module troubleshooting, see the corresponding CPU User's Manual.

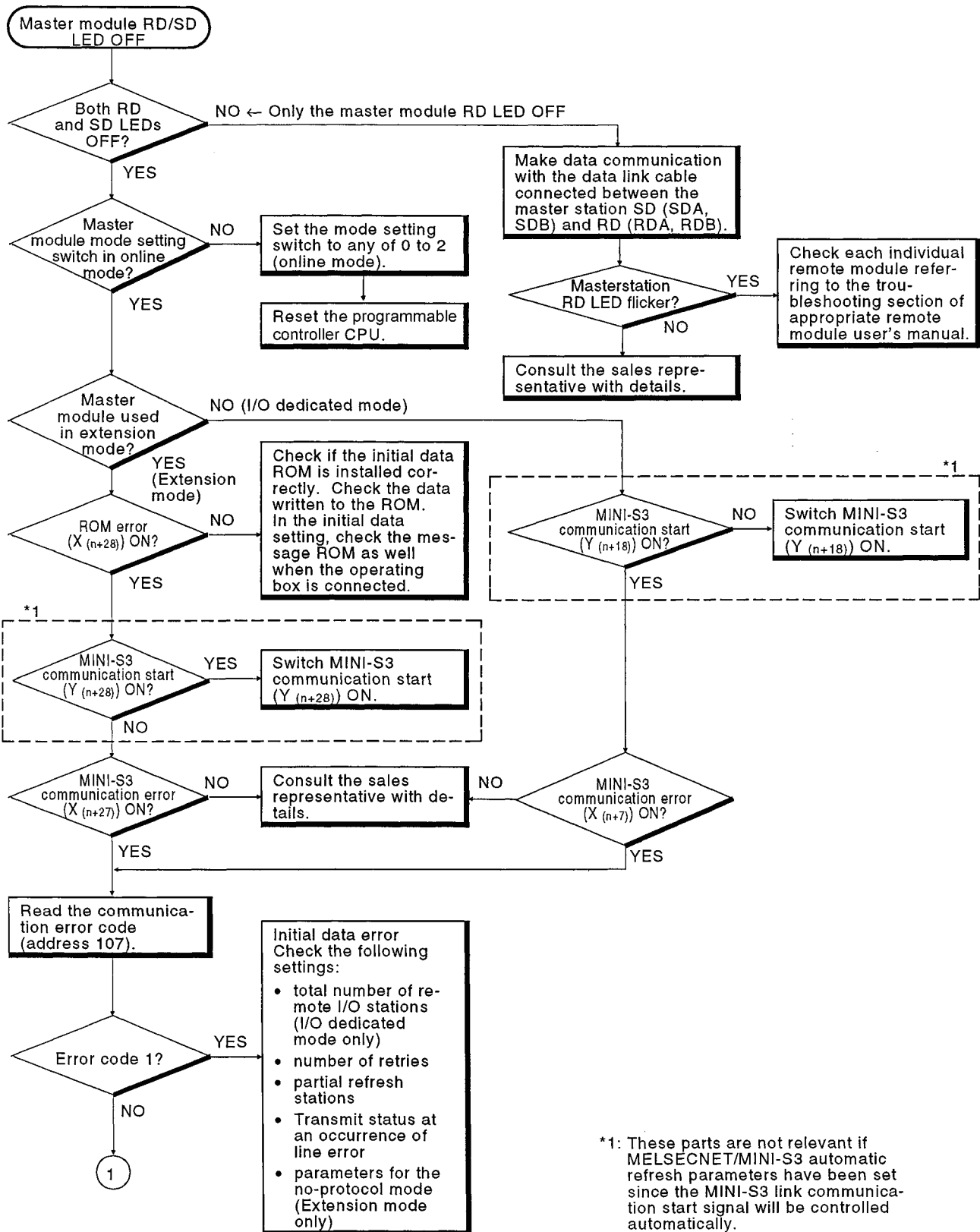
6.3.1 General troubleshooting flowchart

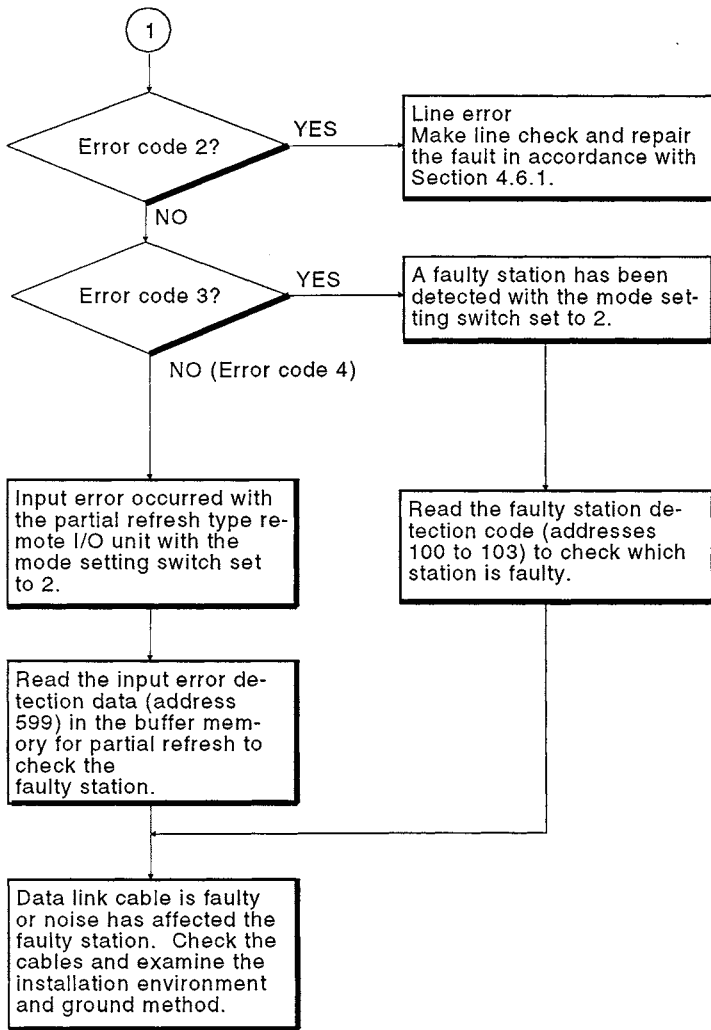


6.3.2 Master module RUN LED OFF

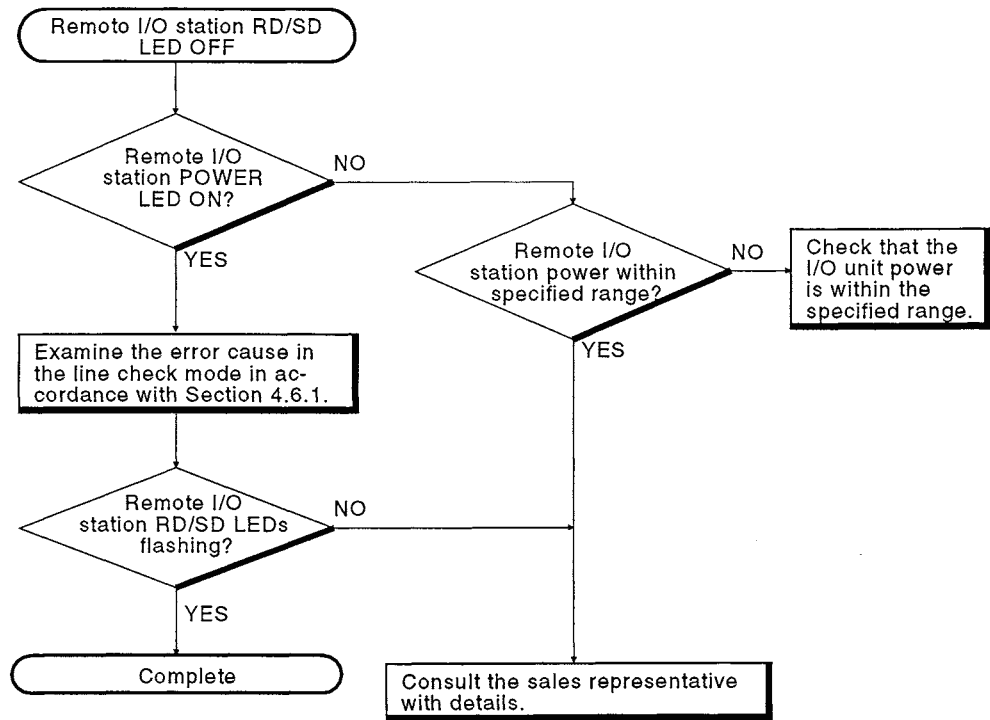


6.3.3 Master module RD/SD LED OFF

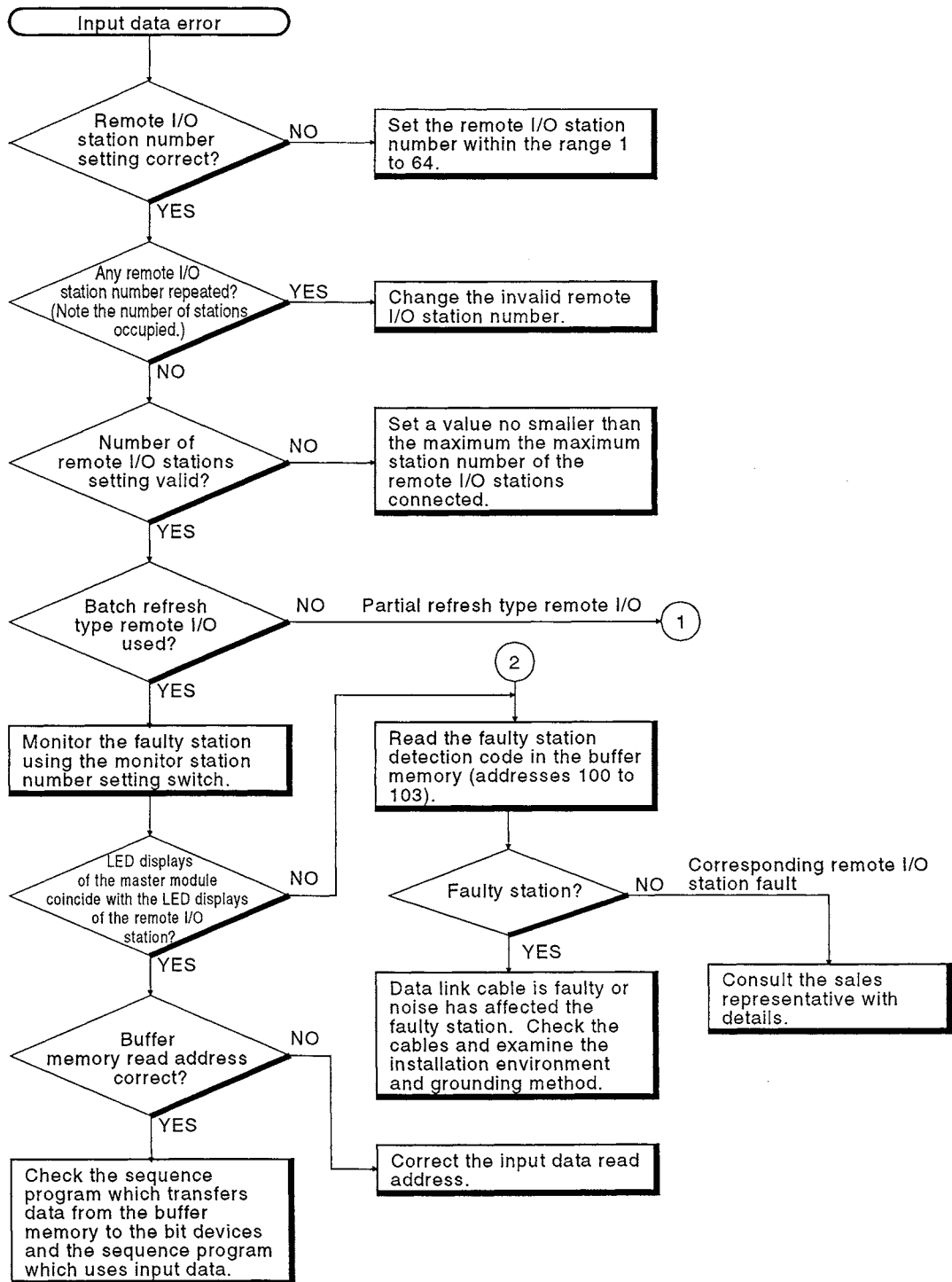


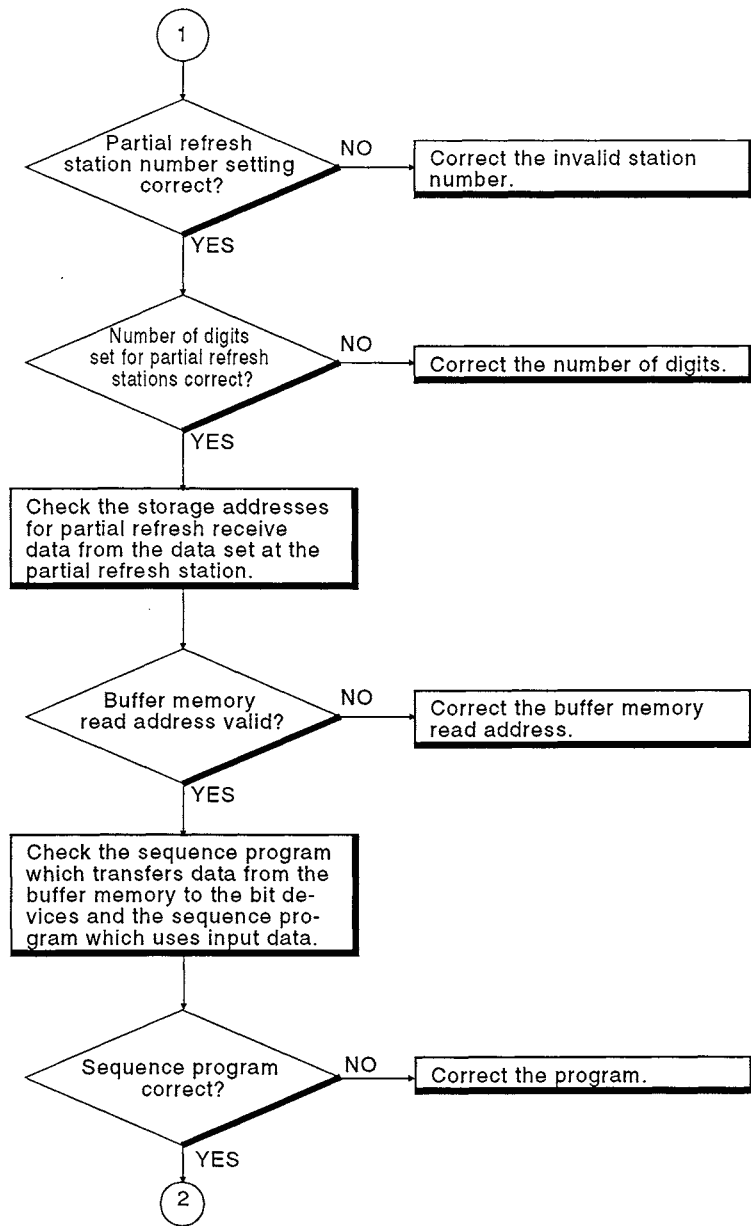


6.3.4 Remote I/O station RD/SD LED OFF

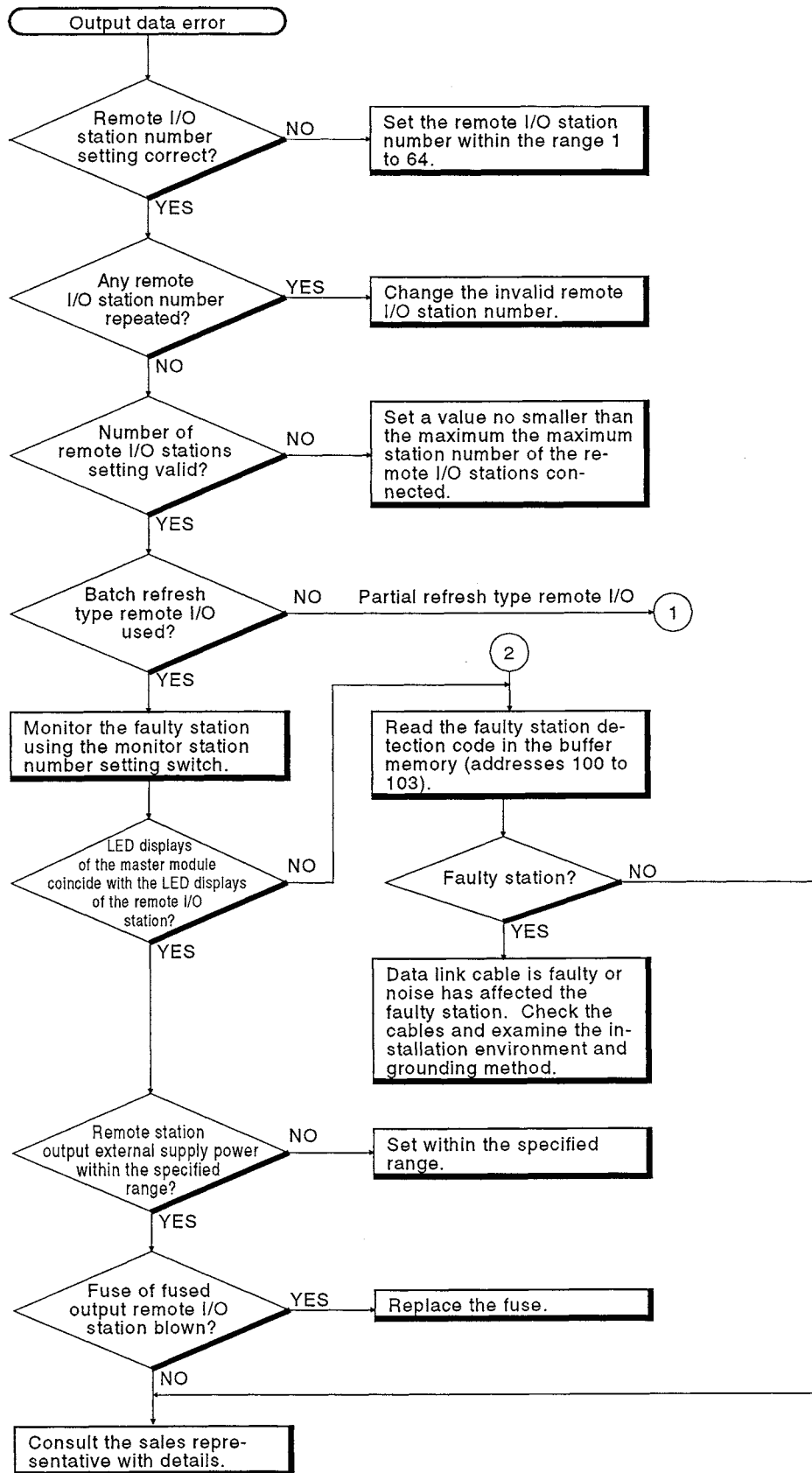


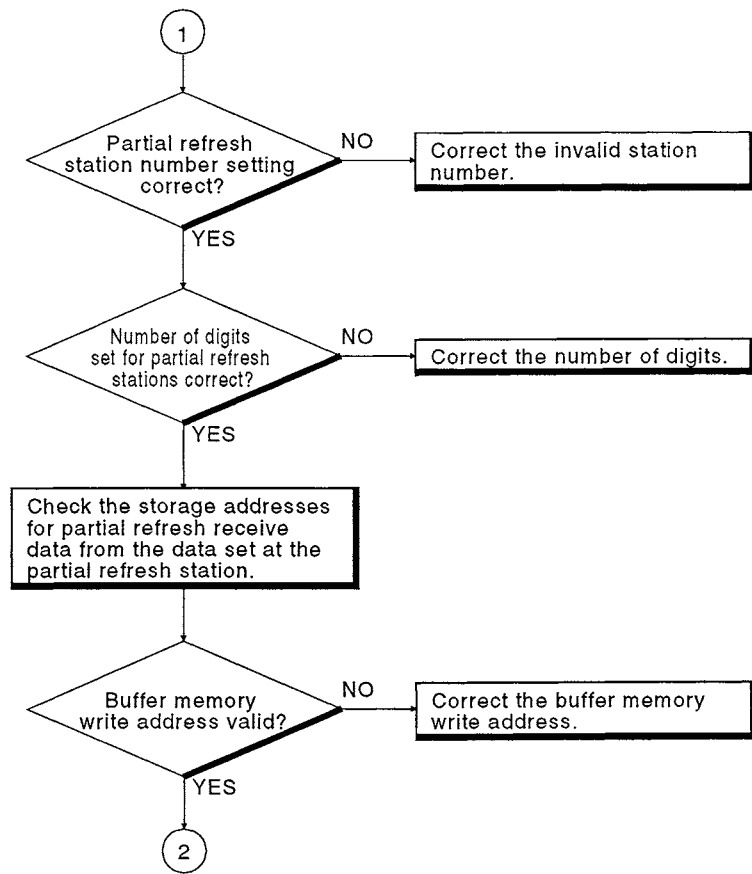
6.3.5 Input fault





6.3.6 Output fault





APPENDICES

APPENDIX 1 COMPATIBILITY WITH AJ71PT32

The table below lists the differences between the AJ71PT32 and the models covered by this manual.

All items related to data transfer processing methods, data communication programs, etc., that are not listed in the following table are the same for both.

Item	AJ71PT32	AJ71PT32-S3, AJ71T32-S3, A1SJ71PT32-S3, A1SJ71T32-S3	
		I/O Dedicated Mode	Extension Mode
Equipment that can be connected	<ul style="list-style-type: none"> • Stand-alone remote I/O unit • Compact type remote I/O unit • AJ71PT35 type data link module • Partial refresh type remote I/O unit • MELSEC-F, FX series PLC • Mitsubishi FR series inverter • Manifold solenoid valve 	All items listed to the left plus the following: <ul style="list-style-type: none"> • AJ35PT-OPB-M1(S3) operating box • AJ35PT-OPB-P1(S3) operating box • AJ35PTF-R2 RS-232C interface unit 	
Number of I/O points occupied by the master module	32	48	
Initial data setting method	Set by the sequence program	Set by the sequence program and initial data ROM (The ROM is created using the SW[JGP-MINIPE or the SW[JSPX-MINIPE type system floppy disk.)	
Line error check setting (buffer memory address 4)	Not available	Available	
I/O refresh timing	3.2 to 3.9	3.2 to 3.9	3.5 to 18

- (1) When the AJ71PT32-S3/AJ71T32-S3/A1SJ71PT32-S3/A1SJ71T32-S3 is used in the I/O dedicated mode, sequence programs created for the AJ71PT32 can be used without any modification.
- (2) The following modifications must be made to sequence programs created for the AJ71PT32 if they are to be used with an AJ71PT32-S3/AJ71T32-S3/A1SJ71PT32-S3/A1SJ71T32-S3 in the extension mode.
 - (a) All initial data except for the number of retries is set in the ROM which is then installed in the master module. (For information concerning initial data settings in the ROM, see the SW[JGP-MINIPE Operating Manual.)
 - (b) Since the number of I/O points occupied by the master module increases from 32 to 48, the device numbers (X,Y) of the I/O units after the master module must be changed.

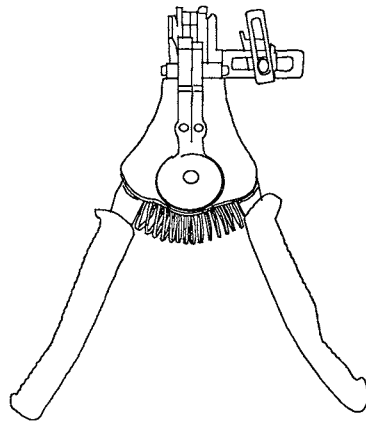
APPENDIX 2 OPTICAL CONNECTOR MANUFACTURING METHOD

(1) Assembling tools

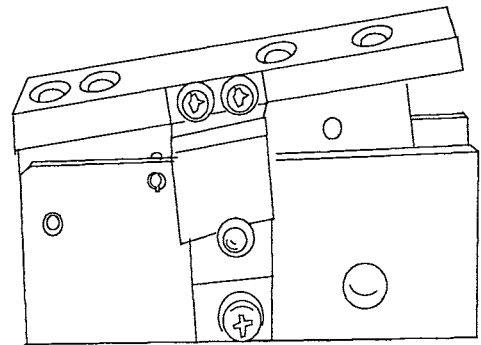
Description	Type	Quantity
Fiber stripper	ST 1000	1
Fiber cutter	CV 1000	1
Fiber clumper	FC 1000	1
Optical power tester	HT 102P	1
Cutter replacement blade	—	1

*: For information on placing orders, etc., contact your nearest Mitsubishi representative.

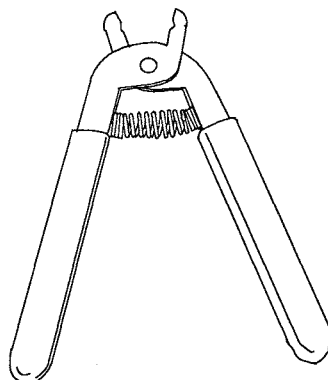
Fiber stripper



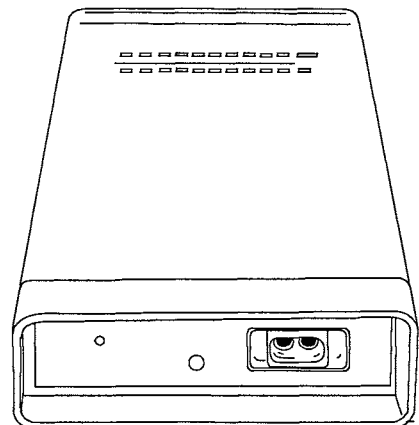
Fiber cutter



Fiber clumper



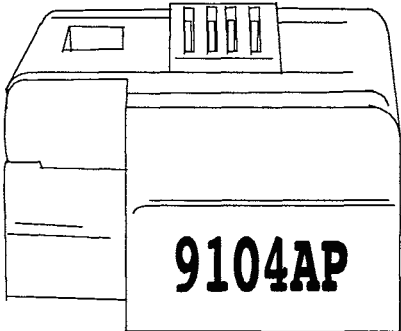
Optical power tester



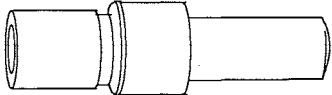
(2) Connector parts

Description	Quantity
Housing	1
Ferrule	1
Sleeve	1

Housing



Ferrule

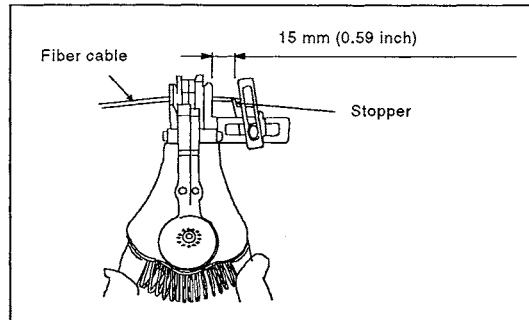


Sleeve

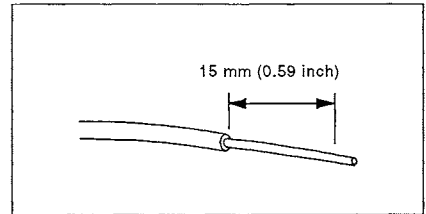


(3) Assembling procedure and notes on using tools

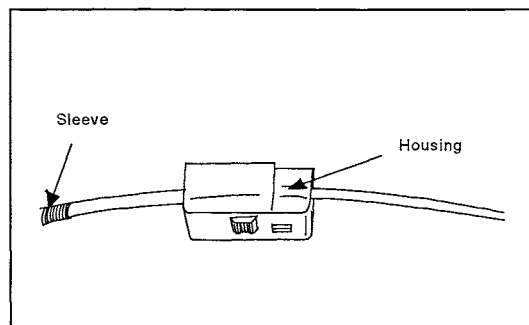
(a) Removing the outer sheath



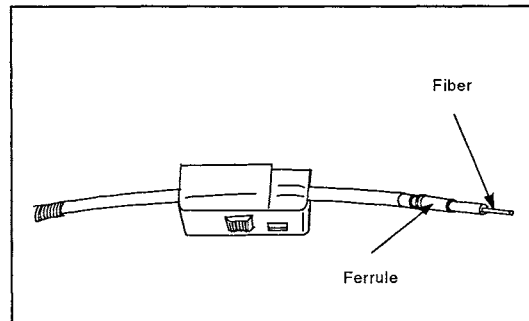
Set the end face of the optical fiber cable to the stripper stopper and strip the outer sheath approx. 15 mm (0.59 inch).



(b) Inserting the sleeve and housing

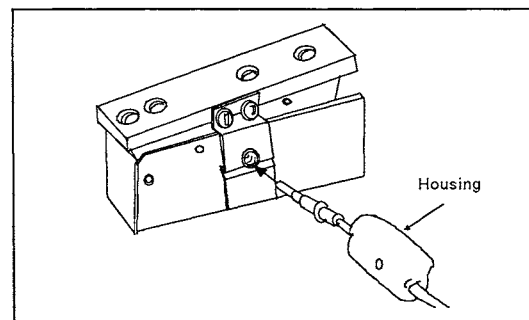


(c) Inserting the ferrule

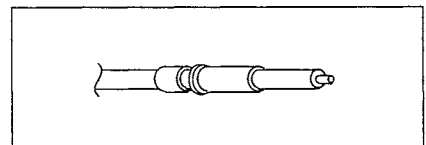


Insert the ferrule until the fiber comes out of the ferrule end and stops against the outer sheath.

(d) Cutting the fiber



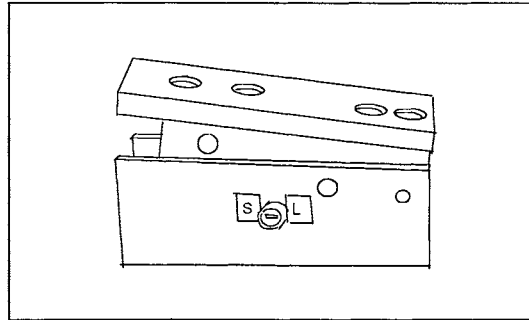
Insert the ferrule into the fiber cutter cut-off the fiber.



The fiber is cut off approx. 1 mm (0.4 inch) from the ferrule end.

(e) Switching the cable length select knob

(Cable length 1 m (3.28 ft) to less than 17 m (55.76 ft))

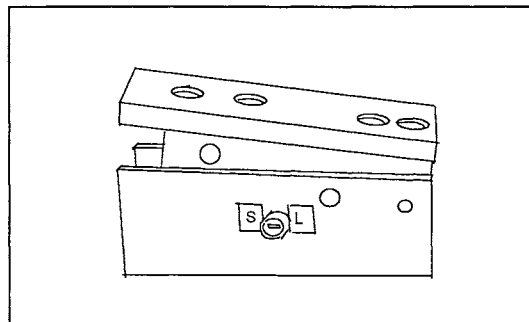


Push and turn the cable length select knob and set the arrow to "SHORT".

POINT

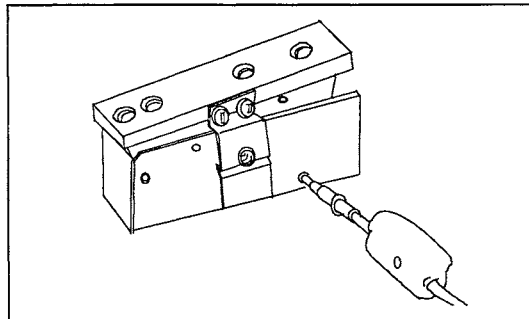
Only cables longer than 1 m (3.28 ft) can be used in MINI-S3 link systems.

(Cable length 17 m (55.76 ft) and up)

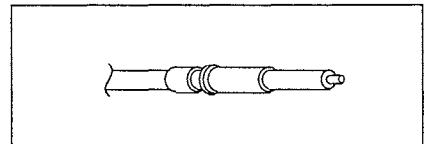


Turn the cable length select knob and set the arrow to "LONG".

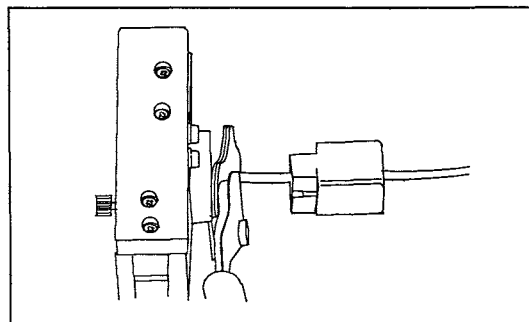
(f) Positioning the fiber end face



Insert the ferrule into the fiber cutter positioning hole until it stops. (Check that the fiber is not in the outside of the ferrule end.)

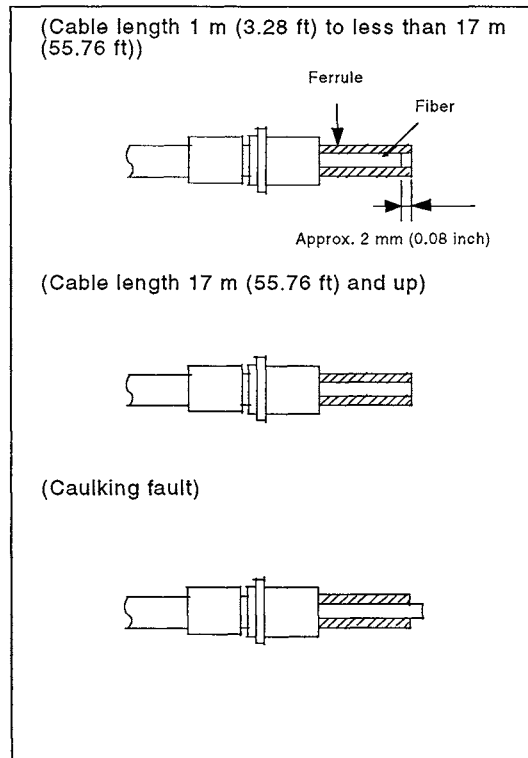


(g) Caulking the ferrule



With the ferrule in the state in step (f), caulk the ferrule with the fiber clamping tool.

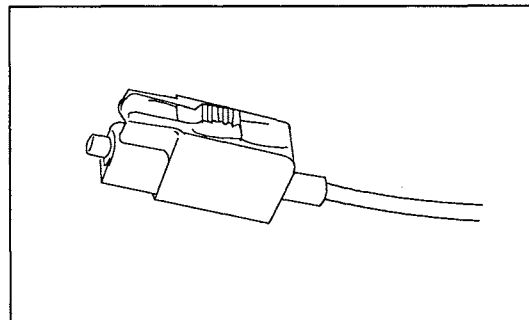
(h) Checking the ferrule end



Ensure that the fiber is not in the outside of the ferrule end. If the fiber is exposed, start the procedure all over again, or cut off or polish the protruding fiber with a knife, etc.

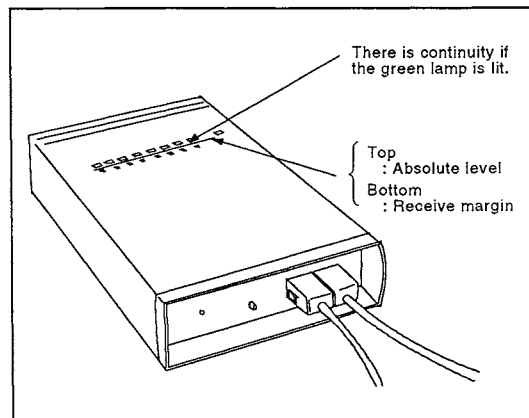
- If the knob was set to "SHORT" (for cable length 1 m (3.28 ft) to less than 17 mm (55.76 ft)), the fiber is fastened about 2 mm (0.08 inch) backward from the ferrule end.
- If the knob was set to "LONG" (for cable length 17 m (55.76 ft) and up), the fiber is fastened at the ferrule end.

(i) Overall assembly



Return the housing to the ferrule side and fasten it with the sleeve.

(j) Making optical continuity check



Insert the finished optical connector into the optical power tester and make optical continuity check.

The green lamp is lit if there is continuity.

However, the green lamp may be lit if the cable between 1 m (3.28 ft) and less than 17 m (55.76 ft) length has been assembled with the cable length select knob accidentally set to "LONG". In this case, communication error occurs because the receiving light level is too high. The end face checking in step (h) must be made.

APPENDIX 3 COMMUNICATION DATA ASSIGNMENT SHEETS

(1) Batch refresh communication data sheet

Buffer Memory Address	Remote I/O Station (Upper: b0 to 7 Lower: b8 to 15)			Remarks	Buffer Memory Address	Remote I/O Station (Upper: b0 to 7 Lower: b8 to 15)			Remarks
	Station Number	I/O Address	Device			Station Number	I/O Address	Device	
[]10	1	to	to		[]26	33	to	to	
	2	to	to			34	to	to	
[]11	3	to	to		[]27	35	to	to	
	4	to	to			36	to	to	
[]12	5	to	to		[]28	37	to	to	
	6	to	to			38	to	to	
[]13	7	to	to		[]29	39	to	to	
	8	to	to			40	to	to	
[]14	9	to	to		[]30	41	to	to	
	10	to	to			42	to	to	
[]15	11	to	to		[]31	43	to	to	
	12	to	to			44	to	to	
[]16	13	to	to		[]32	45	to	to	
	14	to	to			46	to	to	
[]17	15	to	to		[]33	47	to	to	
	16	to	to			48	to	to	
[]18	17	to	to		[]34	49	to	to	
	18	to	to			50	to	to	
[]19	19	to	to		[]35	51	to	to	
	20	to	to			52	to	to	
[]20	21	to	to		[]36	53	to	to	
	22	to	to			54	to	to	
[]21	23	to	to		[]37	55	to	to	
	24	to	to			56	to	to	
[]22	25	to	to		[]38	57	to	to	
	26	to	to			58	to	to	
[]23	27	to	to		[]39	59	to	to	
	28	to	to			60	to	to	
[]24	29	to	to		[]40	61	to	to	
	30	to	to			62	to	to	
[]25	31	to	to		[]41	63	to	to	
	32	to	to			64	to	to	

When using this sheet as the receive data sheet, set [1] in the square brackets.

(2) Partial refresh station set data sheet

Buffer Memory Address	Set Data (Upper: Station number Lower: Number of digits)	Addresses of I/O Data Location		Remarks
		Input data	Output data	
250 251	-----	to	to	
252 253	-----	to	to	
254 255	-----	to	to	
256 257	-----	to	to	
258 259	-----	to	to	
260 261	-----	to	to	
262 263	-----	to	to	
264 265	-----	to	to	
266 267	-----	to	to	
268 269	-----	to	to	
270 271	-----	to	to	
272 273	-----	to	to	
274 275	-----	to	to	
276 277	-----	to	to	
278 279	-----	to	to	
280 281	-----	to	to	

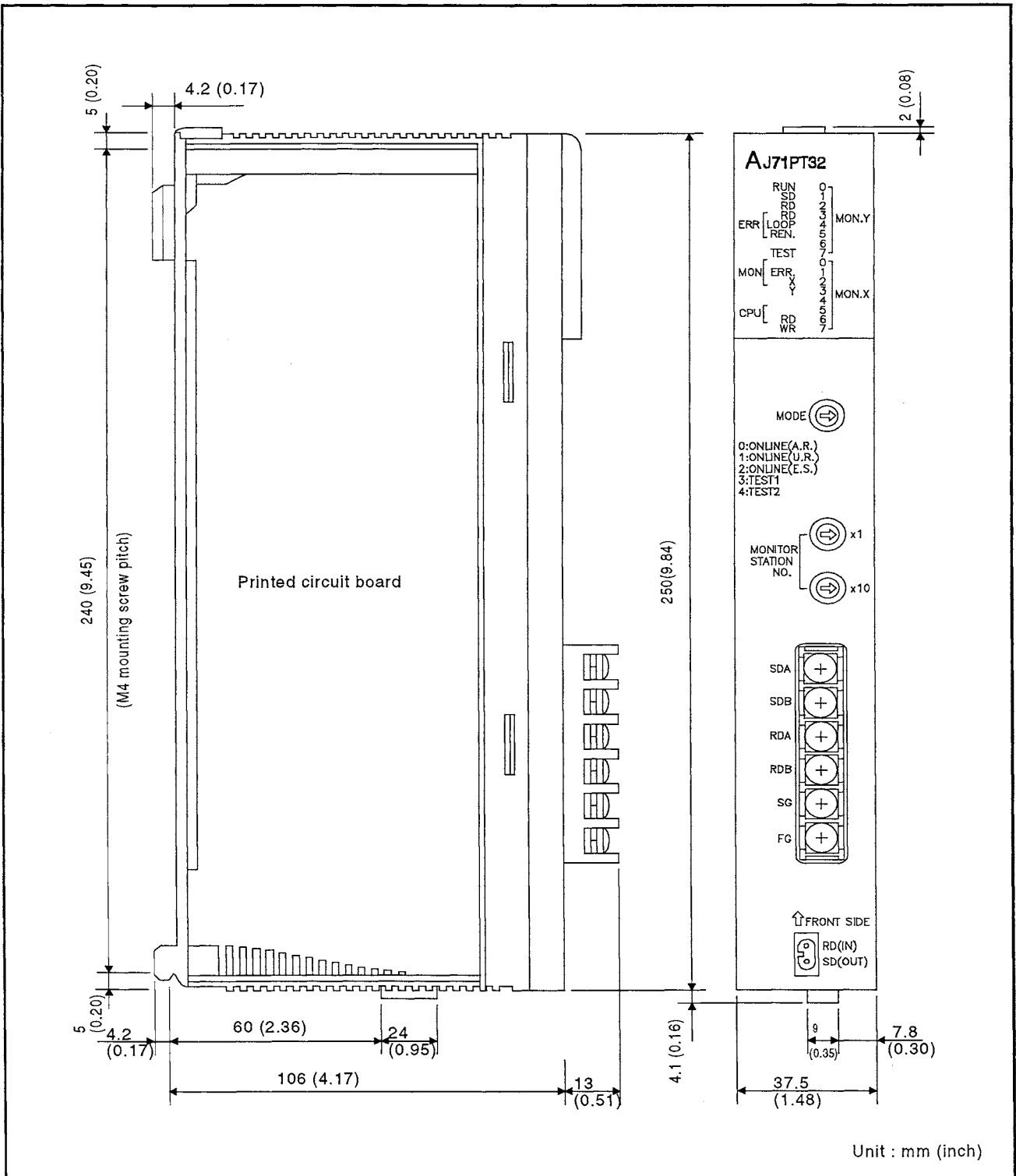
(3) Partial refresh communication data sheet

Buffer Memory Address	Remote I/O Station		Devices for Storing Receive Data	Remarks
	(Station number) – (Number of digits)	I/O address		
[][]0	—	0 to F	to	
[][]1	—	0 to F	to	
[][]2	—	0 to F	to	
[][]3	—	0 to F	to	
[][]4	—	0 to F	to	
[][]5	—	0 to F	to	
[][]6	—	0 to F	to	
[][]7	—	0 to F	to	
[][]8	—	0 to F	to	
[][]9	—	0 to F	to	
[][]0	—	0 to F	to	
[][]1	—	0 to F	to	
[][]2	—	0 to F	to	
[][]3	—	0 to F	to	
[][]4	—	0 to F	to	
[][]5	—	0 to F	to	
[][]6	—	0 to F	to	
[][]7	—	0 to F	to	
[][]8	—	0 to F	to	
[][]9	—	0 to F	to	
[][]0	—	0 to F	to	
[][]1	—	0 to F	to	
[][]2	—	0 to F	to	
[][]3	—	0 to F	to	
[][]4	—	0 to F	to	
[][]5	—	0 to F	to	
[][]6	—	0 to F	to	
[][]7	—	0 to F	to	
[][]8	—	0 to F	to	
[][]9	—	0 to F	to	

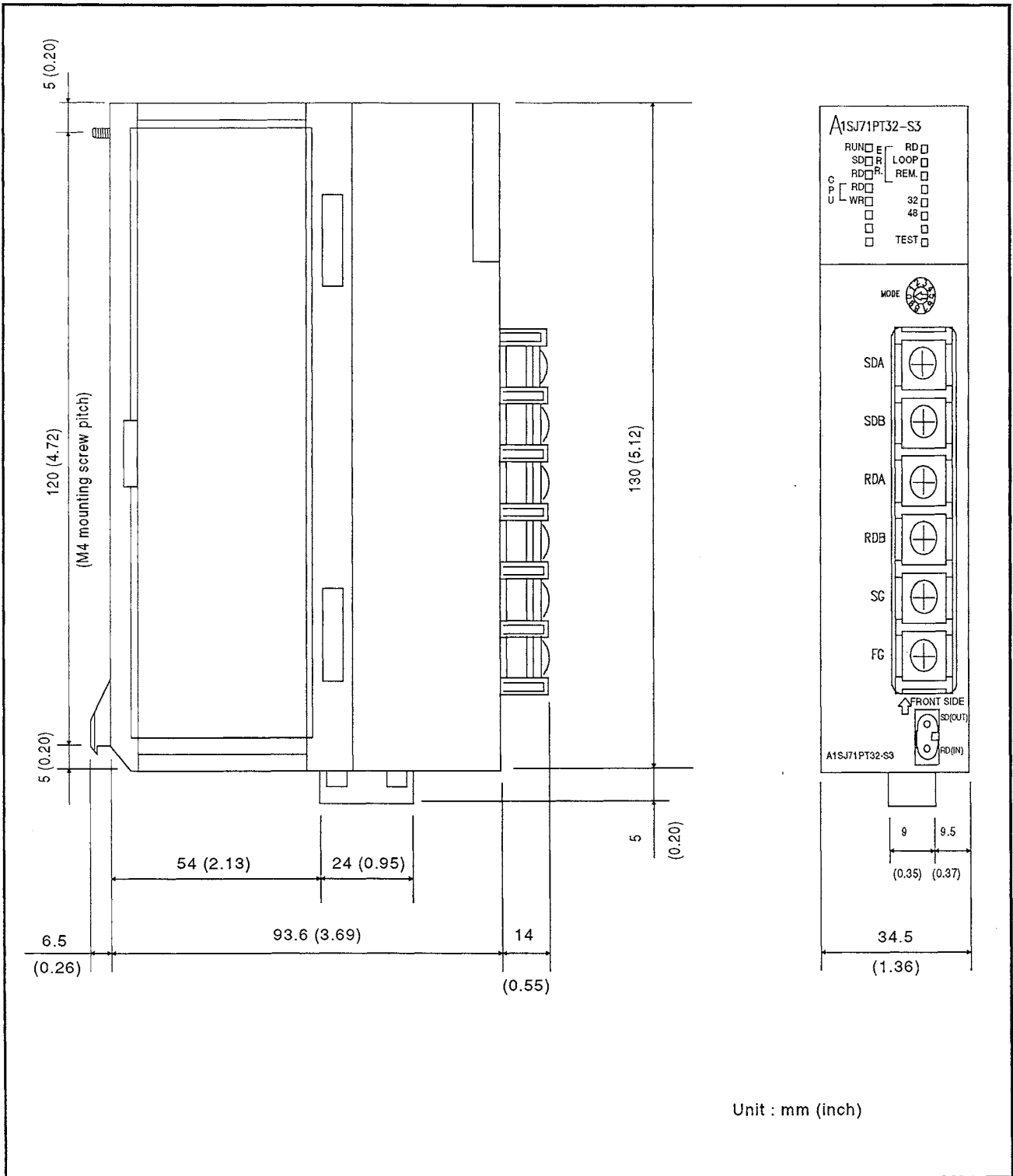
When using this sheet as the transmit data sheet, set [3][] in the square brackets. When using it as a receive data sheet, set [6][].

APPENDIX 4 DIMENSIONS

4.1 AJ71PT32-S3, AJ71T32S-3



4.2 A1SJ71PT32-S3, A1SJ71T32-S3



Unit : mm (inch)

WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

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

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

[Gratis Warranty Term]

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

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

[Gratis Warranty Range]

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

2. Onerous repair term after discontinuation of production

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

3. Overseas service

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

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

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

5. Changes in product specifications

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

6. Product application

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

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

MELSECNET/MINI-S3 Master Module

Type AJ71PT32-S3,AJ71T32-S3,A1SJ71PT32-S3,A1SJ71T32-S3

User's Manual

MODEL	MNET/MINI-MTR-U-E
MODEL CODE	13JE64
IB(NA)-66565-H(0703)MEE	

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Specifications subject to change without notice.