User's Manual

BATCH REFRESH TYPE REMOTE I/O UNIT MELSECNET/ MINI-S3

A Series Programmable Controllers

MITSUBISHI

Cat. No. **UMMM(S3)**

REVISIONS

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

Print Date	*Manual Number	Revision
Nov., 1989	IB (NA) 66215-A	First edition

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.

1. INTRODUCTION
2. SYSTEM CONFIGURATION
3. PRE-OPERATION SETTING AND PROCEDURE
4. PROGRAMMING
5. SPECIFICATIONS
6. TROUBLESHOOTING
APPENDICES

CONTENTS

1. INTRODUCTION ..... 1-1～1-4

1.1 Batch Refresh Type Remote I/O Unit 1-2
1.2 Input and Output Methods 1-4

2. SYSTEM CONFIGURATION ..... 2-1～2-6

2.1 Overall Configuration 2-1
2.2 Applicable System 2-2
2.3 Notes on Selecting I/O Units 2-3
2.4 Batch Refresh Type Remote I/O Unit 2-5

3. PRE-OPERATION SETTING AND PROCEDURE ..... 3-1～3-28

3.1 Unit Handling Instructions 3-1
3.2 Stand-Alone Remote I/O Unit 3-2
3.2.1 Pre-operational procedure 3-2
3.2.2 Nomenclature 3-3
3.2.3 Setting the station number 3-6
3.2.4 Setting the E.C. MODE switch 3-6
3.2.5 Machining the panel for wiring 3-7
3.3 Compact Type Remote I/O Unit 3-8
3.3.1 Pre-operational procedure 3-8
3.3.2 Number of stations occupied and I/O assignment 3-9
3.3.3 Nomenclature 3-11
3.3.4 Setting the station number 3-13
3.3.5 Setting the E.C. MODE switch 3-13
3.3.6 Unit installation 3-14
3.3.7 Simulation switch 3-17
3.4 AJ72PT35 Type Data Link Module 3-19
3.4.1 Pre-operational procedure 3-19
3.4.2 Number of stations occupied and I/O assignment 3-20
3.4.3 Notes on installation of I/O modules 3-23
3.4.4 Nomenclature 3-25
3.4.5 Setting the station number 3-27
3.4.6 Setting the E.C. MODE switch 3-27
3.4.7 Setting the number of occupied station 3-28

4. PROGRAMMING ..... 4-1~4-35

4.1 Data I/O Method 4-1
4.1.1 Transmission area of the master module and the remote I/O unit station number 4-1
4.1.2 Data transmission between PC CPU and remote I/O unit 4-3
4.1.3 I/O delay time in remote I/O unit 4-5
4.2 Relation between PC CPU Operating Status and I/O Refresh 4-7
4.3 Characteristics of I/O Refresh when either a Communication or Line Error has Occurred 4-8
4.3.1 Master module error detection 4-8
4.3.2 Operation at an occurrence of errors 4-9
4.4 I/O List for the PC CPU 4-12
4.4.1 Explanation for I/O signals 4-14
4.5 Buffer Memory 4-20
4.5.1 Buffer memory assignment 4-20
4.5.2 Buffer memory and data location 4-22
4.6 Programming Procedure 4-29
4.7 Program Example 4-30
4.7.1 Example of an initial data write program 4-31
4.7.2 Example of an input data read program 4-32
4.7.3 Example of an output data write program 4-33
4.7.4 Example of an application program 4-34

5. SPECIFICATIONS ..... 5-1~5-35

5.1 Stand-alone Remote I/O Units (for optical data link) 5-1
5.1.1 AJ35PJ-8A AC input unit 5-2
5.1.2 AJ35PJ-8D DC input unit 5-3
5.1.3 AJ35PJ-8R contact output unit 5-4
5.1.4 AJ35PJ-8S1 triac output unit 5-5
5.1.5 AJ35PJ-8T1 transistor output unit (sink type) 5-6
5.1.6 AJ35PJ-8T2 transistor output unit (sink type) 5-7
5.1.7 AJ35PJ-8T3 transistor output unit (sink type) 5-8
5.1.8 AJ35PJ-8S2 triac output unit 5-9
5.2 Stand-alone Remote I/O Units (for twisted-pair data link) 5-10
5.2.1 AJ35TJ-8A AC input unit 5-11
5.2.2 AJ35TJ-8D DC input unit (sink type) 5-12
5.2.3 AJ35TJ-8R contact output unit 5-13
5.2.4 AJ35TJ-8S1 triac output unit 5-14
5.2.5 AJ35TJ-8T1 transistor output unit (sink type) 5-15
5.2.6 AJ35TJ-8T2 transistor output unit (sink type) 5-16
5.2.7 AJ35TJ-8T3 transistor output unit (sink type) 5-17
5.2.8 AJ35TJ-8S2 triac output unit 5-18

5.3 Compact Remote I/O Units 5-19
5.3.1 AJ35PTF-32A AC input unit 5-20
5.3.2 AJ35PTF-32D DC input unit (sink type) 5-21
5.3.3 AJ35PTF-24R contact output unit 5-22
5.3.4 AJ35PTF-24S triac output unit 5-23
5.3.5 AJ35PTF-24T transistor output unit (sink type) 5-24
5.3.6 AJ35PTF-28AR AC input and contact output unit 5-25
5.3.7 AJ35PTF-28AS AC input and triac output unit 5-26
5.3.8 AJ35PTF-28DR DC input and contact output unit (sink type input) 5-27
5.3.9 AJ35PTF-28DS DC input and triac output unit (sink type input) 5-28
5.3.10 AJ35PTF-28DT DC input and transistor output unit 5-29
5.3.11 AJ35PTF-56AR AC input and contact output unit 5-30
5.3.12 AJ35PTF-56AS AC input and triac output unit 5-31
5.3.13 AJ35PTF-56DR DC input and contact output unit (sink type input) 5-32
5.3.14 AJ35PTF-56DS DC input and triac output unit 5-33
5.3.15 AJ35PTF-56DT DC input and transistor output unit (sink type input and output) 5-34
5.4 AJ72PT35 Data Link Module 5-35

6. TROUBLESHOOTING ..... 6-1~6-12

6.1 Data Communication Errors 6-1
6.1.1 Data communication continue error 6-1
6.1.2 Data communication stop error 6-3
6.2 Troubleshooting 6-4
6.2.1 General troubleshooting flowchart 6-4
6.2.2 Remote I/O station RD/SD LED OFF 6-5
6.2.3 Input fault 6-6
6.2.4 Output fault 6-7
6.3 I/O Connection Troubleshooting 6-8
6.3.1 Input wiring trobleshooting 6-8
6.3.2 Output wiring trobleshooting 6-11

APPENDICES ..... APP-1~APP-9

APPENDIX 1 Terminal Symbols Sheets for Compact Remote I/O Units APP-1
APPENDIX 2 Dimension Diagrams APP-5

1. INTRODUCTION

This manual includes specifications, handling instructions and programming procedures for batch refresh type remote I/O units connected to and used in the MELSECNET/MINI-S3 data link system (referred to as "MINI-S3").

"Batch refresh type remote I/O units" are remote I/O units; all points are batch processed by one I/O refresh of the MINI-S3 link master station.
Batch refresh type remote I/O units enable high-speed I/O operations by accomplishing batch processing with one I/O refresh.

Information related to the operation of the batch refresh type remote I/O unit not found in this manual is available in the following manual:

AJ71PT32-S3 type MELSECNET/MINI-S3 Master Module User's Manual.

Another type of remote I/O unit that can be connected to and used with the MINI-S3 link is the partial refresh type remote I/O unit. Information related to the partial refresh type remote I/O unit is available in the following manual:

AJ35PTF-128DT Partial Refresh Type Remote I/O Unit User's Manual.

POINT

The batch refresh type remote I/O unit that is used in the MELSECNET/MINI-S3 is the same as that used in the MELSECNET/MINI.

1.1 Batch Refresh Type Remote I/O Unit

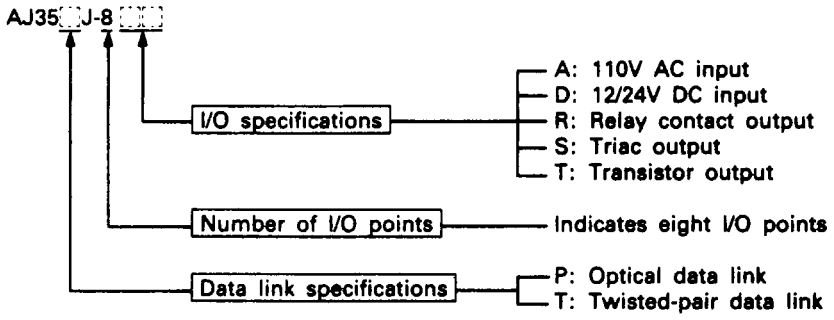
The following types of batch refresh type remote I/O units are used in the MELSECNET/MINI-S3 data link system.

- Stand-alone remote I/O unit
- Compact type remote I/O unit
- AJ72PT35 data link module

(1) Stand-alone remote I/O unit
  (a) Has high-strength, drip-proof casing made of aluminum diecast to allow direct installation to machinery for use as a cable junction box.
  (b) The protection structure conforms to IP54G (JEM1030).
  (c) One unit allows 8-point inputs or outputs.
  (d) Occupies 1 station.
  (e) Optical and twisted-pair data link modules are available.

REMARKS

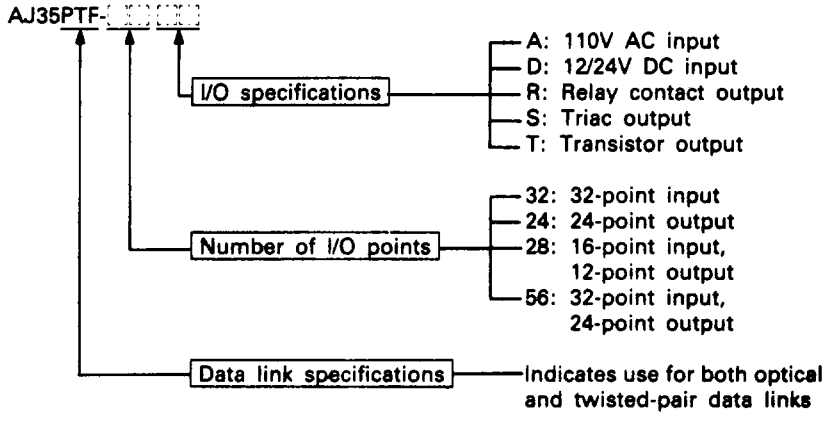
The alphanumeric characters of the stand-alone remote I/O unit indicate the following:



(2) Compact remote I/O unit
  (a) Has the same dimensions as the compact type (A0J2) I/O units.
  (b) Units available are 32-point dedicated input, 24-point dedicated output, and 28-point (16-point input, 12-point output) and 56-point (32-point input, 24-point output) compound I/O units.
  (c) Occupies 4 or 8 stations in accordance with the number of I/O points as indicated. For more information, see the specifications of the corresponding units in Section 3.
    4 stations ····· Unit with 32, 24 or 28 I/O points
    8 stations ····· Unit with 56 I/O points
  (d) Can be used for both optical and twisted-pair data links. For example, data may be received through optical data link (cable connected to RD) and transmitted through twisted-pair data link (cable connected to SDA and SDB)

REMARKS

The alphanumeric characters of the compact remote I/O unit indicate the following:

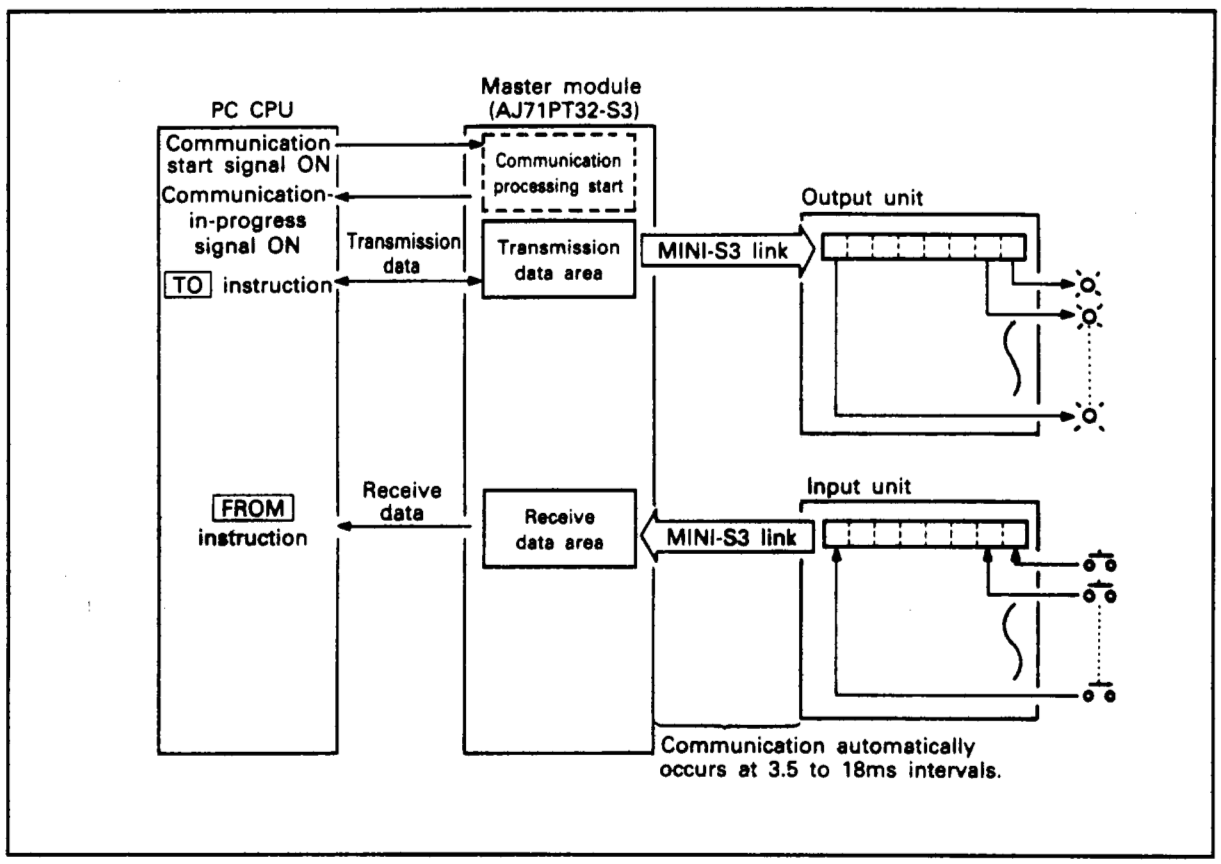


Example: AJ35PTF-56 A R I/O unit
- Output specification: Relay contact output
- Input specification : 100V AC input
- Number of I/O points: 56 (32-point input, 24-point output)

(3) AJ72PT35 link module
  (a) Loaded on the CPU slot of the main base unit to allow the A series building block type I/O modules to be used on a remote I/O station.
  (b) One module allows use of up to 128 I/O points.
  (c) Allows the number of stations occupied to be specified between 4 and 16 in increments of 4.
  (d) Can be used for both optical and twisted-pair data links. For example, data may be received through optical data link (cable connected to RD) and transmitted through twisted-pair data link (cable connected to SDA and SDB).

1.2 Input and Output Methods

Data output and input to each of the remote I/O units is started when the communication start signal of the master module is set on.
Communication with a remote I/O unit normally occurs at 3.5 to 18ms intervals regardless of the sequence program scan time. (For further information concerning methods of input and output, see Section 4.1.)
(For further information concerning the I/O refresh timing, see the AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual.)

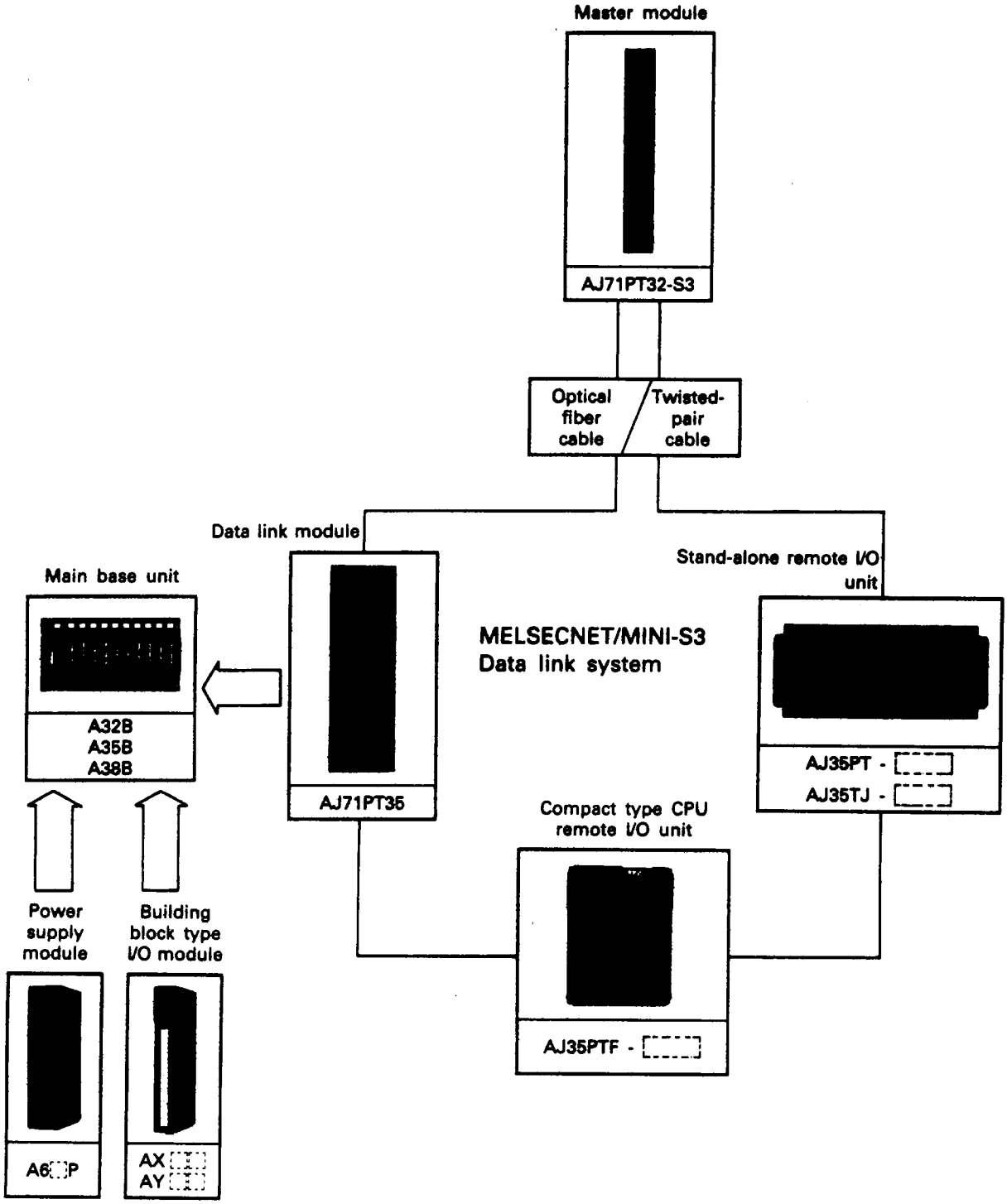


(1) Output to remote I/O units
When data is output to the remote I/O unit, the data is written to the transmission data area in the master module using the sequence program TO instruction.
Writing data to the transmission data area results in its being transmitted automatically to the remote I/O unit and output to external equipment.

(2) Input from remote I/O units
When input data from the remote I/O station is read, the data is read from the receive data area of the master module upon execution of the sequence program FROM instruction.
When data is input from an external equipment to the remote I/O unit, the input data is automatically received in the receive data area of the master module.

2. SYSTEM CONFIGURATION

2.1 Overall Configuration



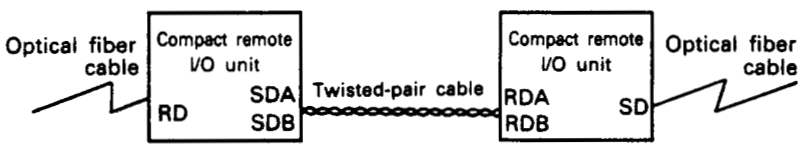
2.2 Applicable System

(1) The following master module can be used in the batch refresh type remote I/O units.

AJ71PT32-S3 (AJ71PT32)

(2) Because the stand-alone remote I/O unit is enclosed in an aluminum diecast providing high-strength and drip-proof properties, it can be mounted directly to machinery.

(3) Both compact type CPU remote I/O units and AJ72PT35 type data link modules are remote I/O units that be used in data link systems that utilize either optical fiber cable or twisted-pair data links.
This makes it possible to use both optical fiber and twisted-pair cable in a single data link. For example, it is possible to receive using an optical data link connected to the RD side, and transmit using an twisted-pair data link connected to the SDA and SDB.



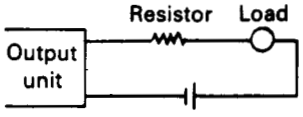
(4) The compact type CPU remote I/O unit and AJ71PT32 occupy multiple station points with one unit.
This requires that care be taken when assigning the total number of stations and the station numbers.
(For further information concerning the assignment of station numbers, see the AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual.)

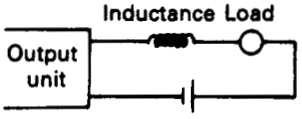
2.3 Notes on Selecting I/O Units

(1) It is recommended that the triac output unit be used with any load that is frequently opened and closed or with any coil load (e.g. electromagnet) that has a large capacity or a low power factor. (The contact output unit would be shortened in service life if used.)

(2) Any inductive L load driven by the output unit must be switched on for more than 1 second and switched off for more than 1 second.

(3) A fault may occur due to rush current when any transistor output unit of max. 0.1A load current is used with a load (e.g. timer, counter) which uses a DC/DC converter. To avoid this, a resistor or inductance must be connected to the load or the output unit with large max. load current must be used.





(4) Any output unit with fuses may be protected by the fuses if it satisfies the following conditions. Otherwise an external fuse must be used.

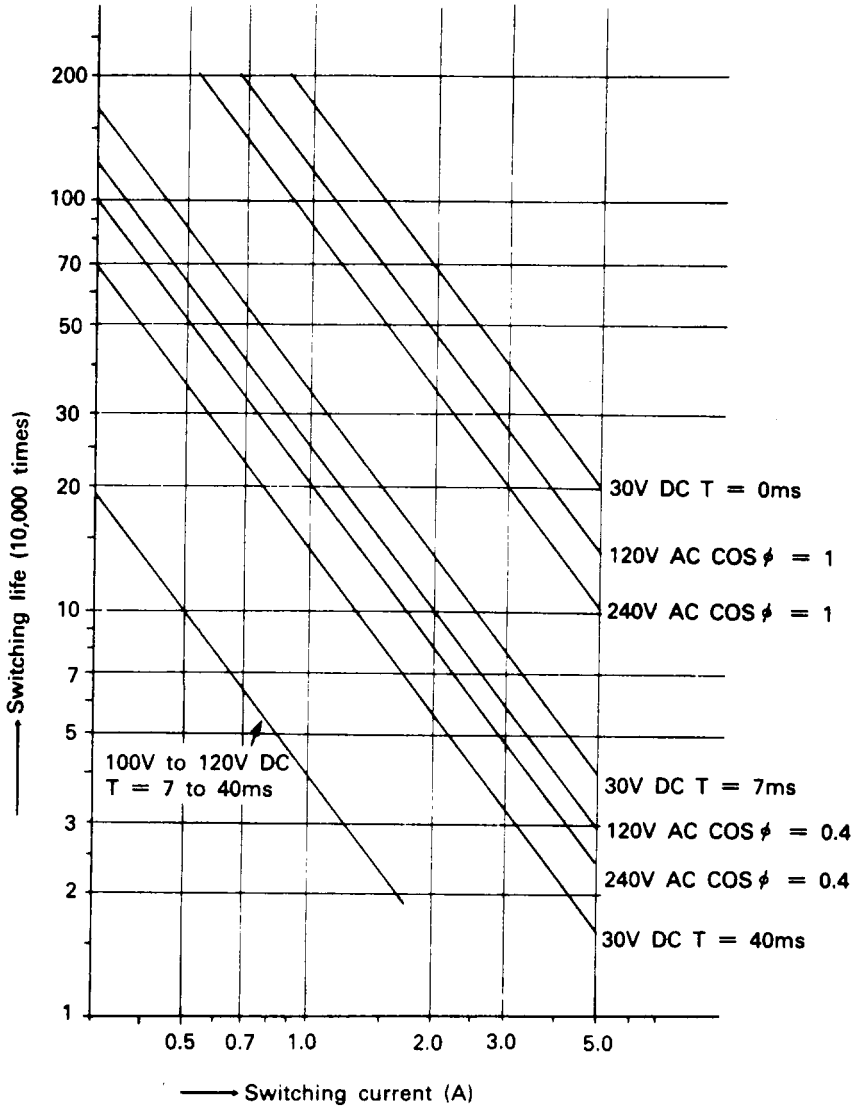
Item \ Load Voltage	12/24V DC Load	110/220V AC Load
Wiring length	3m (118.1inch) minimum	3m (118.1inch) minimum
Cable size	2mm² (14AWG) maximum	2mm² (14AWG) maximum
Short-circuit current	20A maximum	—
Transformer capacity	—	2KVA maximum

In this case, the output unit cannot be protected from overload. It is therefore recommended to use the following external fast-melting fuse.

Define HP or GP fuse for AC.
Define MP fuse for DC.

IB (NA) 66215-A

(5) Relay life of relay output unit
The required output unit should be selected by taking (1) above into consideration.



2.4 Batch Refresh Type Remote I/O Unit

Name	Type	Description	No. of Occupied Stations
Stand-alone Remote I/O Unit (For optical data link)	AJ35PJ-8A	AC input, 100-120V AC, 8 points	1
	AJ35PJ-8D	DC input (sink type), 12/24V DC, 8 points	1
	AJ35PJ-8R	Contact output, 24V DC 2A, 240V AC 2A, 8 points	1
	AJ35PJ-8S1	Triac output, 100-240V AC, 0.6A/point, 8 points	1
	AJ35PJ-8T1	Transistor output (sink type), 12/24V DC, 0.1A/point, 8 points	1
	AJ35PJ-8T2	Transistor output (sink type), 12/24V DC, 0.5A/point, 8 points	1
	AJ35PJ-8T3	Transistor output (sink type), 12/24V DC, 2A/point, 8 points	1
	AJ35PJ-8S2	Triac output, 100-240V AC, 2A/point, 8 points	1
Stand-alone Remote I/O Unit (For twisted-pair data link)	AJ35TJ-8A	AC input, 100-120V AC, 8 points	1
	AJ35TJ-8D	DC input (sink type), 12/24V DC, 8 points	1
	AJ35TJ-8R	Contact output, 24V DC 2A, 240V AC 2A, 8 points	1
	AJ35TJ-8S1	Triac output, 100-240V AC, 0.6A/point, 8 points	1
	AJ35TJ-8T1	Transistor output (sink type), 12/24V DC, 0.1A/point, 8 points	1
	AJ35TJ-8T2	Transistor output (sink type), 12/24V DC, 0.5A/point, 8 points	1
	AJ35TJ-8T3	Transistor output (sink type), 12/24V DC, 2A/point, 8 points	1
	AJ35TJ-8S2	Triac output, 100-240V AC, 2A/point, 8 points	1
Compact Type Remote I/O Unit (for optical data link, twisted-pair data link)	AJ35PTF-32A	AC input, 100-120V AC, 32 points	4
	AJ35PTF-32D	DC input (sink type), 12/24V DC, 32 points	4
	AJ35PTF-24R	Contact output, 24V DC 2A, 240V AC 2A, 24 points	4
	AJ35PTF-24S	Triac output, 100-240V AC, 0.6A/point, 24 points	4
	AJ35PTF-24T	Transistor output (sink type), 12/24V DC, 0.5A/point, 24 points	4
	AJ35PTF-28AR	AC input contact output, input side 100-120V AC, 16 points, output side 24V DC 2A, 240V AC 2A, 12 points	4
	AJ35PTF-28AS	AC input triac output, input side 100-120V AC, 16 points, output side 100-240V AC, 0.6A/point, 12 points	4
	AJ35PTF-28DR	DC input contact output, input side (sink type), 12/24V DC, 16 points, output side 24V DC 2A, 240V AC 2A, 12 points	4
	AJ35PTF-28DS	DC input triac output, input side (sink type), 12/24V DC, 16 points, output side, 100-240V AC, 0.6A/point, 12 points	4

Table 2.1 Remote I/O Unit (Continue)

Name	Type	Description	No. of Occupied Stations
Compact Type Remote I/O Unit (for optical data link, twisted-pair data link)	AJ35PTF-28DT	DC input transistor output, input side (sink type), 12/24V DC, 16 points, output side (sink type), 12/24V DC, 0.5A/point, 12 points	4
	AJ35PTF-56AR	AC input contact output, input side, 100-120V AC, 32 points, output side, 24V DC 2A, 24 points	8
	AJ35PTF-56AS	AC input triac output, input side, 100-120V AC, 32 points, output side, 100-240V AC, 0.6A/point, 24 points	8
	AJ35PTF-56DR	DC input contact output, input side (sink type), 12/24V DC, 32 points, output side, 24V DC 2A, 240V AC 2A, 24 points	8
	AJ35PTF-56DS	DC input triac output, input side (sink type), 12/24V DC, 32 points, output side, 100-240V AC, 0.6A/point, 24 points	8
	AJ35PTF-56DT	DC input transistor output, input side (sink type), 12/24V DC, 32 points, output side (sink type), 12/24V DC, 0.5A/point, 24 points	8
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 Remote I/O Unit

3. PRE-OPERATION SETTING AND PROCEDURE

3.1 Unit Handling Instructions

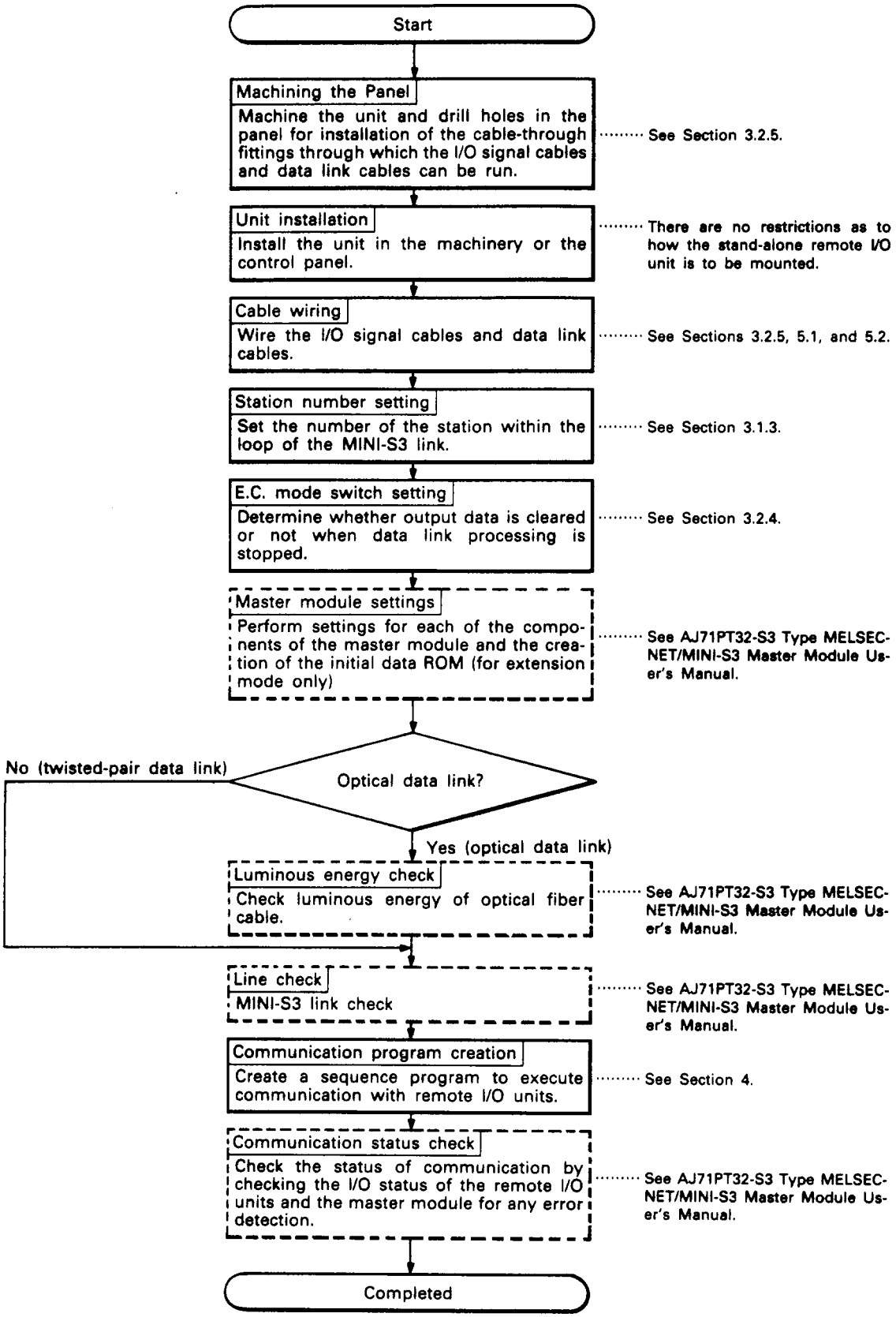
(1) Do not remove printed circuit boards from the housing. Doing so could result in damage to the printed circuit boards. There are no user-serviceable parts on the boards.

(2) When installing cables, ensure that no wire-cutoffs or other unwanted material enters the unit.

(3) Do not subject the batch refresh type remote I/O units to shocks nor drop them.

3.2 Stand-Alone Remote I/O Unit

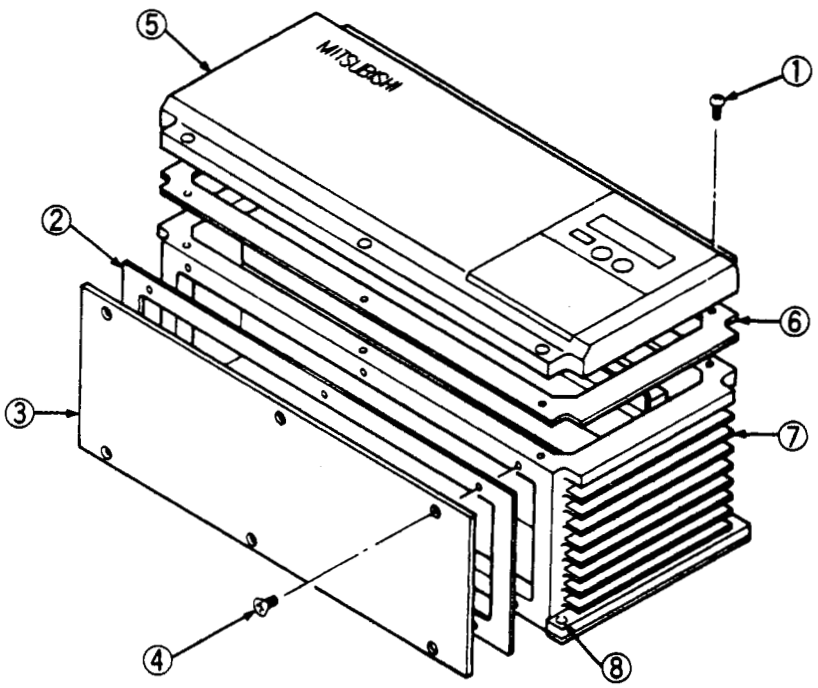
3.2.1 Pre-operational procedure



IB (NA) 66215-A

3.2.2 Nomenclature

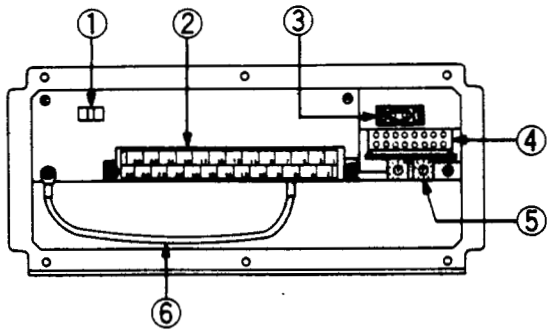
(1) External view



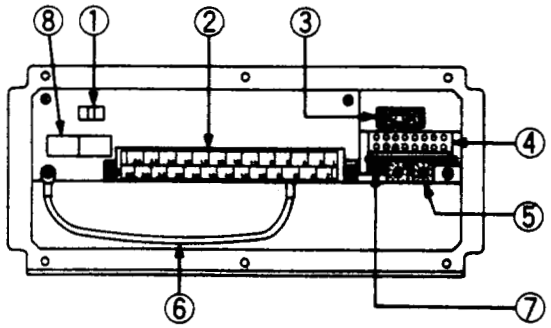
①	Cover fixing screw	M4 pan head screw × 10 Tightening torque: 8 to 11kg·cm (6.93 to 9.53lb·inch)
②	Panel packing	
③	Panel	For machining, see Section 2.2.3.
④	Panel fixing screw	M4 flat head screw × 8 Tightening torque: 8 to 11kg·cm (6.93 to 9.53lb·inch)
⑤	Cover	
⑥	Cover packing	
⑦	Case	
⑧	Unit installation hole	Used to install the I/O unit to panel. For M4 screw Tightening torque: 15 to 19kg·cm (13.0 to 16.5lb·inch)

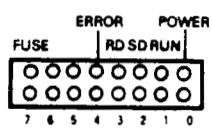
(2) Internal view of model for optical data link

For use as input unit



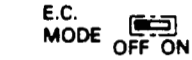
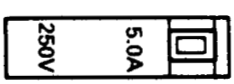
For use as output unit



①	Cable clamp	For fixing the optical fiber cable
②	Terminal block	For connecting the power and I/O signal cables. For information concerning wiring, see Section 5.1. Terminal screws (M3 × 6) Tightening torque: 5 to 8kg·cm (4.33 to 6.93lb·inch)
③	Optical fiber cable connecter SD (OUT) RD (IN) Transmission terminal / Receive terminal	(IN) RD : Connected to (OUT) SD of the preceding station (OUT) SD: Connected to (IN) RD of the succeeding station For connection, see the AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual.
④	Operating status indicator LEDs  	See table below

	LED	Definition	LED	Definition
	POWER	Lit when I/O unit power is on.	0	Indicates the corresponding input/output ON/OFF state.
	RUN	Lit during correct data communication with the master station.	1	
	SD	Flickers while data is being transmitted.	2	
	RD	Flickers while data is being received.	3	
*1	ERROR	Lit if a receive data error is detected. Turn off during correct data communication.	4	
			5	
			6	
*2	FUSE	Lit when a fuse has blown.	7	

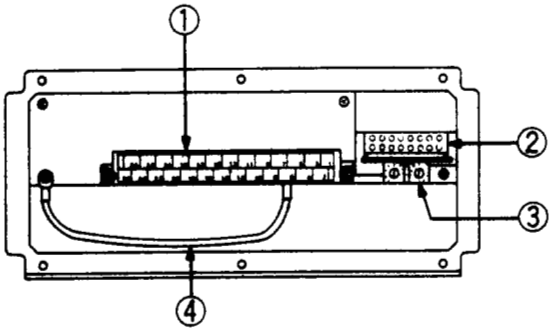
*1: Only remote output unit.
*2: Only remote output unit with fuse.

⑤	Station number setting witches 	• Used to set the remote I/O station number in the range 1 to 64. • X10: Left digit of a station number • X1 : Right digit of a station number
⑥	FG wire	Connect ground wire from TB6. This also grounds the case.
⑦	E.C. MODE switch  	Used to set whether outputs are retained or switched OFF when I/O refresh is stopped. For further details, see Section 3.2.4.
⑧	Fuse  	For fuses used with individual modules, see the specifications of the corresponding unit in Section 5.1. When a fuse has blown, a white marking appears in the check opening. MP-20 (2A), MP-32 (3.2A), HP-50 (5A), GP 75 (7.5A)

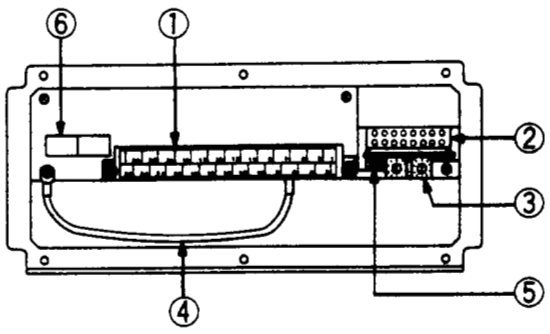
IB (NA) 66215-A

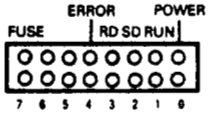
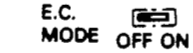
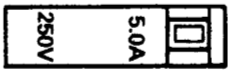
(3) Internal Views of model for twisted-pair data link

For use as input unit



For use as output unit



①	Terminal block	For connecting the power, twisted-pair link and I/O signal cables. • For information concerning the wiring of the power supply and signal cables, see Section 5.2. • For information concerning the wiring of the twisted-pair link cable, see AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual. Terminal screw (M3 × 6); tightening torque 5 to 8kg·cm (4.33 to 6.93lb·inch)
②	Operating status indicator LEDs  	See table below
③	Station number setting witches 	• Used to set the remote I/O station number in the range 1 to 64. • X10: Left digit of a station number • X1 : Right digit of a station number
④	FG wire	Connect ground wire from TB6. This also grounds the case.
⑤	E.C. MODE switch  	Used to set whether outputs are retained or switched OFF when I/O refresh is stopped. For further details, see Section 3.2.4.
⑥	Fuse  	For fuses used with individual modules, see the specifications of the corresponding unit in Section 5.1. When a fuse has blown, a white marking appears in the check opening. MP-20 (2A), MP-32 (3.2A), HP-50 (5A), GP 75 (7.5A)

	LED	Definition	LED	Definition
	POWER	Lit when I/O unit power is on.	0	Indicates the corresponding input/output ON/OFF state.
	RUN	Lit during correct data communication with the master station.	1	
	SD	Flickers while data is being transmitted.	2	
	RD	Flickers while data is being received.	3	
*1	ERROR	Lit if a receive data error is detected. Turn off during correct data communication.	4	
			5	
			6	
*2	FUSE	Lit when a fuse has blown.	7	

*1: Only remote output unit.
*2: Only remote output unit with fuse.

IB (NA) 66215-A

3.2.3 Setting the station number

(1) The station number must be defined after switching OFF the remote I/O station. To avoid erroneous input or output, the station number must not be changed during I/O refresh.

(2) The station number may be set between 1 and 64.
For determining the station number, see the AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual.

3.2.4 Setting the E.C. MODE switch

The E.C. MODE switch ON the remote output I/O station is used to specify whether the station outputs are retained or switched OFF when I/O refresh is stopped (MINI-S3 link communication start (Y18 or Y28 switched OFF)).
The remote I/O station must be turned OFF before setting the E.C. MODE switch.

Link Status \ E.C. MODE Switch		OFF	ON
MINI-S3 link communication start (Y18 or Y28)	ON	Transmission data is output from the remote I/O unit.	
	OFF	Output status just before MINI-S3 link communication start is switched OFF is retained.	All outputs are switched OFF.
If the remote I/O station is disconnected from the system due to communication error	Mode setting switch of master module is at 0 (automatic return) or 2 (communication stop at detection of online error)	Output status just before an occurrence of communication error is retained.	All outputs are switched OFF.
	Mode setting switch of master module is at 1 (automatic return).	All outputs are switched OFF.	

REMARKS

1. The E.C. MODE switch is factory-set to ON.
2. The device number used for the MINI-S3 link communication start device of the master module varies depending on the mode of the master module.
   I/O dedicated mode Y18
   Extension mode Y28

IB (NA) 66215-A

3.2.5 Machining the panel for wiring

The stand-alone remote I/O unit (AJ35PJ/TJ-[ ]) is of drip-proof design. All cables must be sealed by using cable-through fittings. Machine the stand-alone remote I/O panel in accordance with Fig. 3.1 and install the user-prepared cable-through fittings.

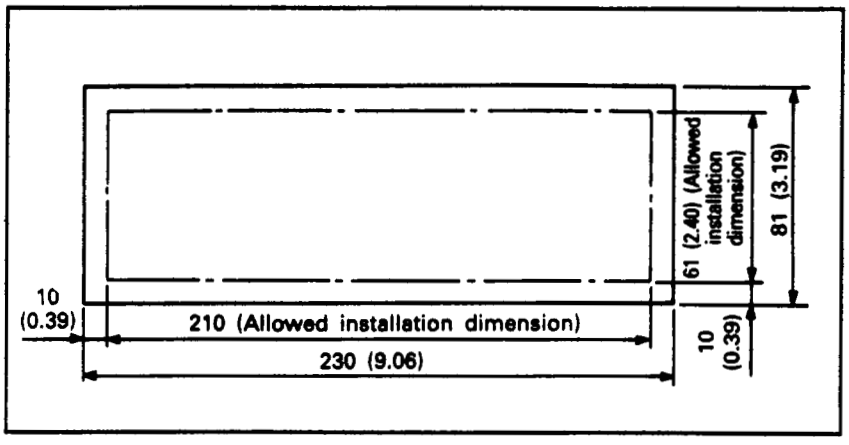


Fig. 3.1 Allowed Installation Dimensions for Cable-Through Fittings

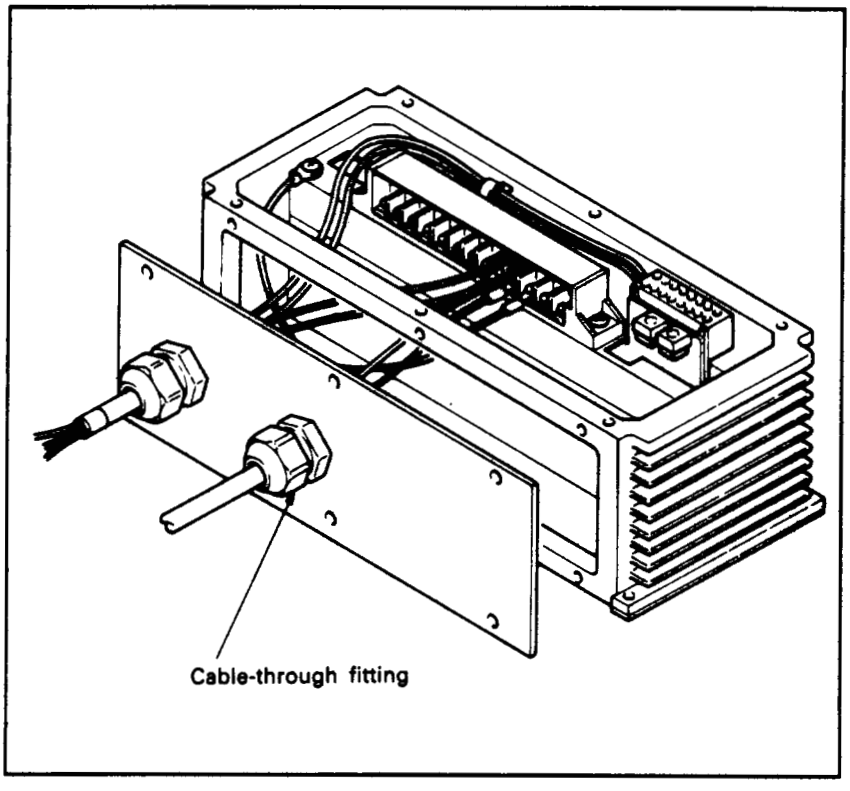


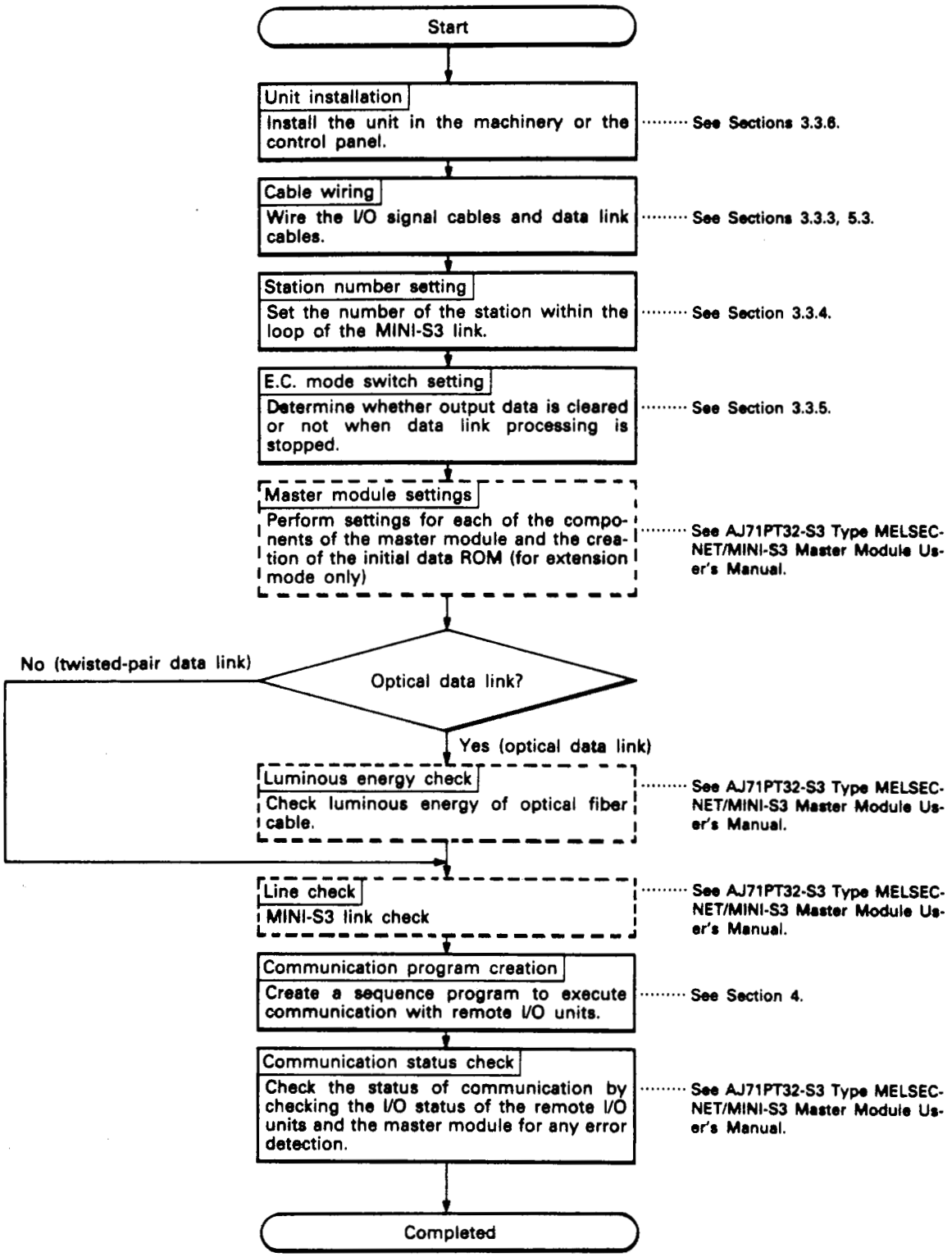
Fig. 3.2 Cable Connection Example

REMARKS

Melamine or urethane paint should be used to repaint the panel on user side. The paint color is Munsell 5.2G 2.5/0.2 (dark gray)

3.3 Compact Remote I/O Unit

3.3.1 Pre-operational procedure



3.3.2 Number of stations occupied and I/O assignment

One compact type remote I/O unit occupies four or eight stations. Its I/O, I/O unit, faulty station detection and other data is processed as follows in accordance with the remote I/O unit station number and the number of stations occupied (n = remote I/O unit station number).

(1) AJ35PTF-32[ ] (4 stations occupied)

I/O Number	I/O Data Storage Location	Remote I/O Station Card Data	Unit of Faulty Station Control
X0 to X7	Receive data of station n	Input	Stations n to (n + 3) are controlled as one control unit.
X8 to XF	Receive data of station (n + 1)	Input	
Y10 to Y17	Receive data of station (n + 2)	Input	
Y18 to Y1F	Receive data of station (n + 3)	Input	

(2) AJ35PTF-24[ ] (4 stations occupied)

I/O Number	I/O Data Storage Location	Remote I/O Station Card Data	Unit of Faulty Station Control
X0 to X7	Transmission data of station n	Output	Stations n to (n + 3) are controlled as one control unit.
X8 to XF	Transmission data of station (n + 1)	Output	
Y10 to Y17	Transmission data of station (n + 2)	Output	
Empty	Transmission data of station (n + 3)	Output	

(3) AJ35PTF-28[ ][ ] (4 stations occupied)

I/O Number	I/O Data Storage Location	Remote I/O Station Card Data	Unit of Faulty Station Control
X0 to X7	Receive data of station n	Input	Stations n to (n + 3) are controlled as one control unit.
X8 to XF	Receive data of station (n + 1)	Input	
Y10 to Y17	Transmission data of station (n + 2)	Output	
Y18 to Y1B	Transmission data of station (n + 3)	Output	

(4) AJ35PTF-56[ ][ ] (8 stations occupied)

I/O Number	I/O Data Storage Location	Remote I/O Station Card Data	Unit of Faulty Station Control
X0 to X7	Receive data of station n	Input	Stations n to (n + 3) are controlled as one control unit.
X8 to XF	Receive data of station (n + 1)	Input	
X10 to X17	Receive data of station (n + 2)	Input	
X18 to X1F	Receive data of station (n + 3)	Input	
Y20 to Y27	Transmission data of station (n + 4)	Output	Stations (n + 4) to (n + 7) are controlled as one control unit.
Y28 to Y2F	Transmission data of station (n + 5)	Output	
Y30 to Y37	Transmission data of station (n + 6)	Output	
Empty	Transmission data of station (n + 7)	Output	

REMARKS

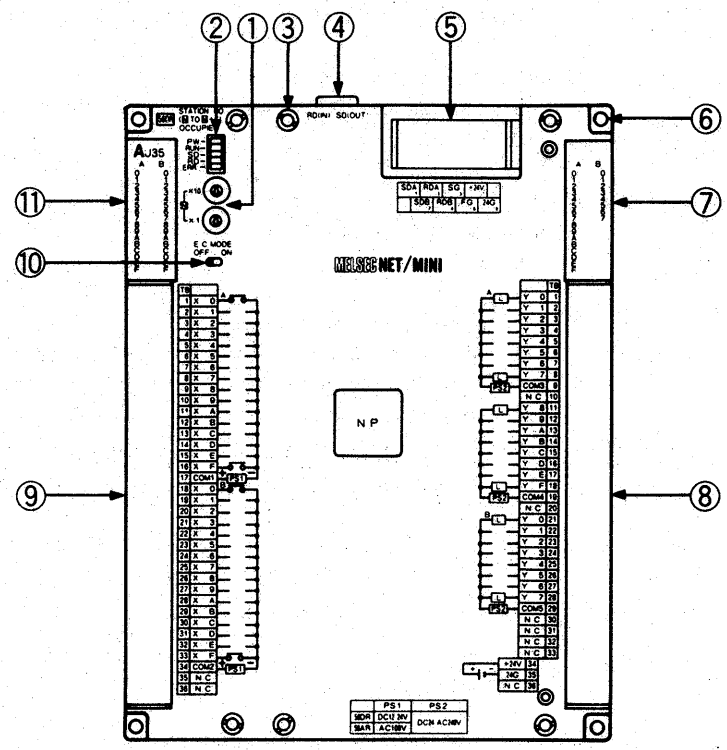
(1) I/O number
Refers to the input/output signal indicated in Section 5.3.

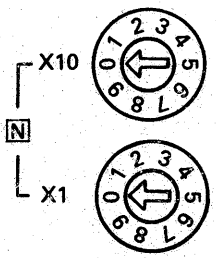
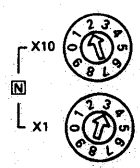
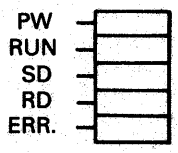
(2) I/O data storage location
Indicates the area of the master module buffer memory where the I/O data is stored.

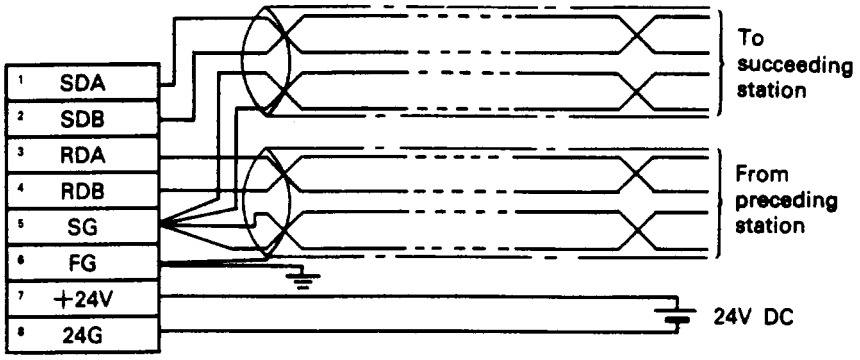
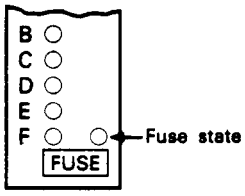
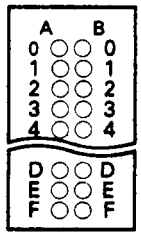
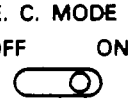
(3) Remote I/O station card data
Indicates the remote I/O unit card data stored to the master module buffer memory.

(4) Unit of faulty station control
Indicates the range of stations treated as faulty when an error has occurred in any remote I/O unit. For example, stations 1 to 4 all treated as faulty stations if the fuse of the AJ35PTF-28AS defined as station 1 has blown.

3.3.3 Nomenclature



①	Station number setting switches 	• Used to set the remote I/O station number may be set between 1 and ((64 − the number of stations occupied) + 1). • X10: Left digit of a station number • X1 : Right digit of a station number Example: Station number: 23 
②	Operating status indicator LEDs 	<table><tr><th>LED</th><th>Definition</th></tr><tr><td>PW</td><td>Lit when I/O unit power is ON.</td></tr><tr><td>RUN</td><td>Lit during correct data communication with the master station.</td></tr><tr><td>SD</td><td>Flickers while data is being transmitted.</td></tr><tr><td>RD</td><td>Flickers while data is being received.</td></tr><tr><td>ERROR</td><td>Lit if a receive data error is detected. Turn off during correct data communication.</td></tr></table>
③	Cover installation screw	Special screw for fixing the front cover. Used as a nut (for M4 screw) when the other unit is fitted.
④	Optical fiber cable connector RD (IN) SD (OUT)	For connecting the optical fiber cables when optical fiber cables are used to connect one station with another. (IN) RD : Connected to (OUT) SD of the preceding station (OUT) SD: Connected to (IN) RD of the succeeding station For connection, see the AJ71PT32-S3 MELSECNET/MIMI-S3 Master Module User's Manual.

No.	Description	Explanation
⑤	Terminal block	For connecting twisted-pair cables when twisted-pair cables are used to connect one station with another, and for connecting I/O unit power cables.  **REMARKS** Twisted-pair cables are not required for optical data link. For details, see the AJ71PT32-S MELSECNET/MINI-S3 Master Module User's Manual.
⑥	Unit installation hole	Used to install the I/O unit to panel. (For M4 screw Tightening torque: 8 to 12 kg·cm (6.93 to 10.4 lb·inch))
⑦	Output indicator LEDs 	Indicate the output ON/OFF state and the output unit fuse (for only the unit with fuse) state. • Lit when the corresponding output is ON. • Lit when the fuse is blown.
⑧	Terminal block	For connecting the power and output signal cables. Removable. (Tightening torque: Terminal screw (M3 screw)·····5 to 8 kg·cm (4.33 to 6.93lb·inch) : Terminal screw (M4 screw)·····8 to 14 kg·cm (6.93 to 12.1lb·inch))
⑨	Terminal block	For connecting the power and input signal cables. Removable. (Tightening torque: Terminal screw (M3 screw)·····5 to 8 kg·cm (4.33 to 6.93lb·inch) : Terminal screw (M4 screw)·····8 to 14 kg·cm (6.93 to 12.1lb·inch))
⑩	Input indicator LEDs 	Indicate the output ON/OFF state. The indicator LED is lit when the corresponding input is ON.
⑪	E.C. MODE switch 	Used to set whether outputs are retained or switched OFF when I/O refresh is stopped. For more information, see Section 3.3.5.

3.3.4 Setting the station number

(1) The station number must be defined after switching OFF the remote I/O station. To avoid erroneous input or output, the station number must not be changed during I/O refresh.
(2) The station number may be set between 1 and ((64 − the number of stations occupied) + 1).
For determining the station number, see the AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual.

3.3.5 Setting the E.C. MODE switch

The E.C. MODE switch ON the remote output I/O station is used to specify whether the station outputs are retained or switched OFF when I/O refresh is stopped (MINI-S3 link communication start (Y18 or Y28 switched OFF)).
The remote I/O station must be turned OFF before setting the E.C. MODE switch.

<table>
<tr><th colspan="2">E.C. MODE Switch / Link Status</th><th>OFF</th><th>ON</th></tr>
<tr><td rowspan="2">MINI-S3 link communication start (Y18 or Y28)</td><td>ON</td><td colspan="2">Transmission data is output from the remote I/O unit.</td></tr>
<tr><td>OFF</td><td>Output status just before MINI-S3 link communication start is switched OFF is retained.</td><td>All outputs are switched OFF.</td></tr>
<tr><td rowspan="2">If the remote I/O station is disconnected from the system due to communication error</td><td>Mode setting switch of master module is at 0 (automatic return) or 2 (communication stop at detection of online error)</td><td>Output status just before an occurrence of communication error is retained.</td><td rowspan="2">All outputs are switched OFF.</td></tr>
<tr><td>Mode setting switch of master module is at 1 (automatic return).</td><td>All outputs are switched OFF.</td></tr>
</table>

REMARKS

1. The E.C. MODE switch is factory-set to ON.
2. The device number used for the MINI-S3 link communication start device of the master module varies depending on the mode of the master module.
   I/O dedicated mode ····· Y18
   Extension mode ····· Y28

IB (NA) 66215-A

3.3.6 Unit installation

(1) Mounting Instructions

(a) Leave a minimum of 80mm (3 inches) clearance above the unit to ensure proper ventilation and ease access. (See Fig. 3.3)

(b) The unit must not be installed on its side or horizontally as in Fig. 3.4.

(c) Ensure that the surface on which the unit is to be mounted is flat to prevent possible flexing of the printed circuit boards.

(d) Do not mount the unit close to sources of vibration like large magnetic contactors or no-fuse breakers.

(e) Up to two compact remote I/O units may be fitted to each other. For full information, see item (2) below.

(f) To protect the unit from heat and noise, all other equipment should be installed at least 100mm (4 inches) away from the PC front (Fig. 3.5) and at least 50mm (2 inches) away from the base unit sides.

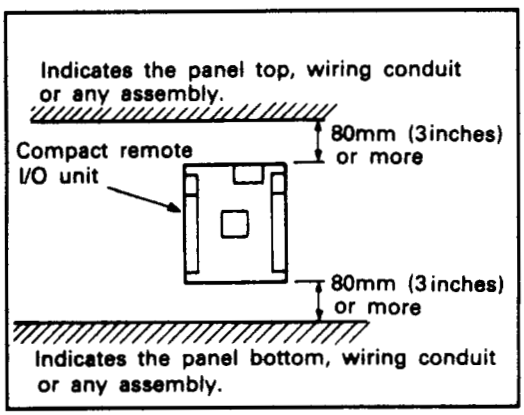


Fig. 3.3 Minimum Clearance

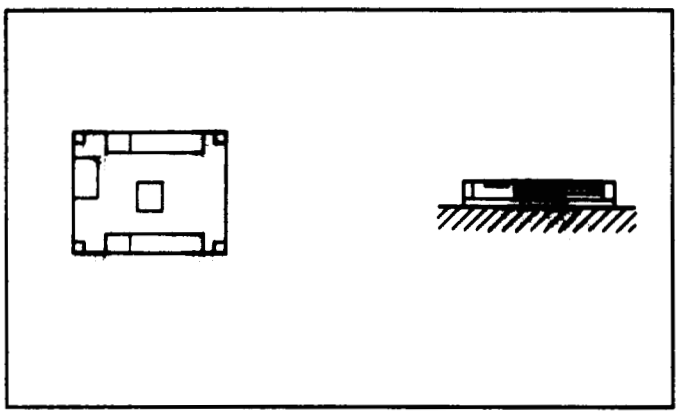


Fig. 3.4 Horizontal Mounting (Not allowed)

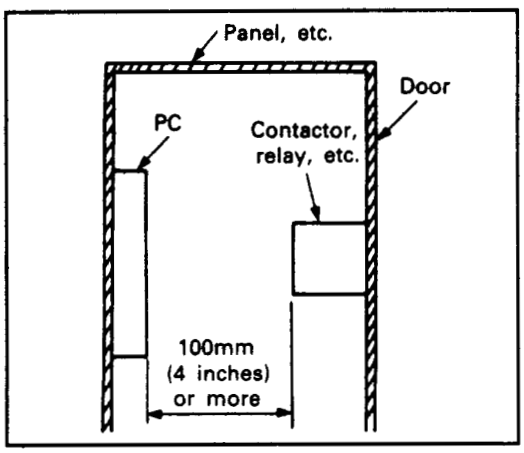
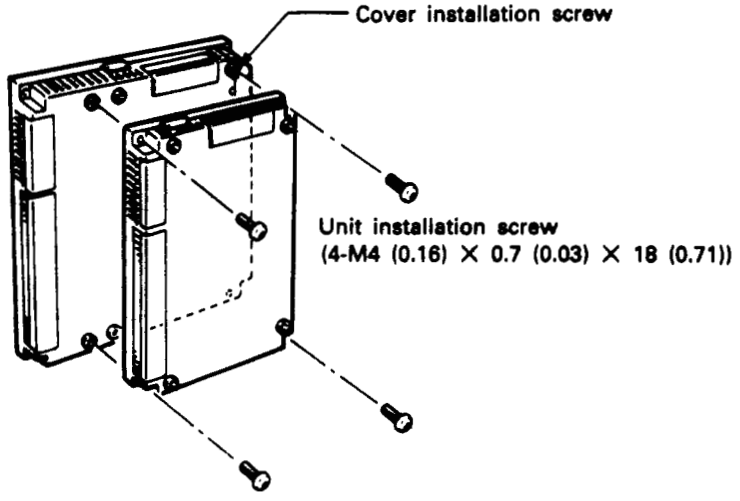


Fig. 3.5 Minimum Front Clearance with Panel Door Closed

(2) Fitting compact remote I/O units
When compact and AJ35PTF-128DT remote I/O units are used, two units may be connected in the following combinations:

Upper Unit / Lower Unit	AJ35PTF-32□	AJ35PTF-24□	AJ35PTF-28□□	AJ35PTF-56□□	AJ35PTF-128DT
AJ35PTF-32□	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
AJ35PTF-24□	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
AJ35PTF-28□□	Disallowed	Disallowed	Disallowed	Disallowed	Disallowed
AJ35PTF-56□□	Allowed	Allowed	Allowed	Allowed using a bracket	Allowed using a bracket
AJ35PTF-128DT	Allowed	Allowed	Allowed	Disallowed	Disallowed

(a) Connecting the AJ35PTF-56□□ and AJ35TF-28□□



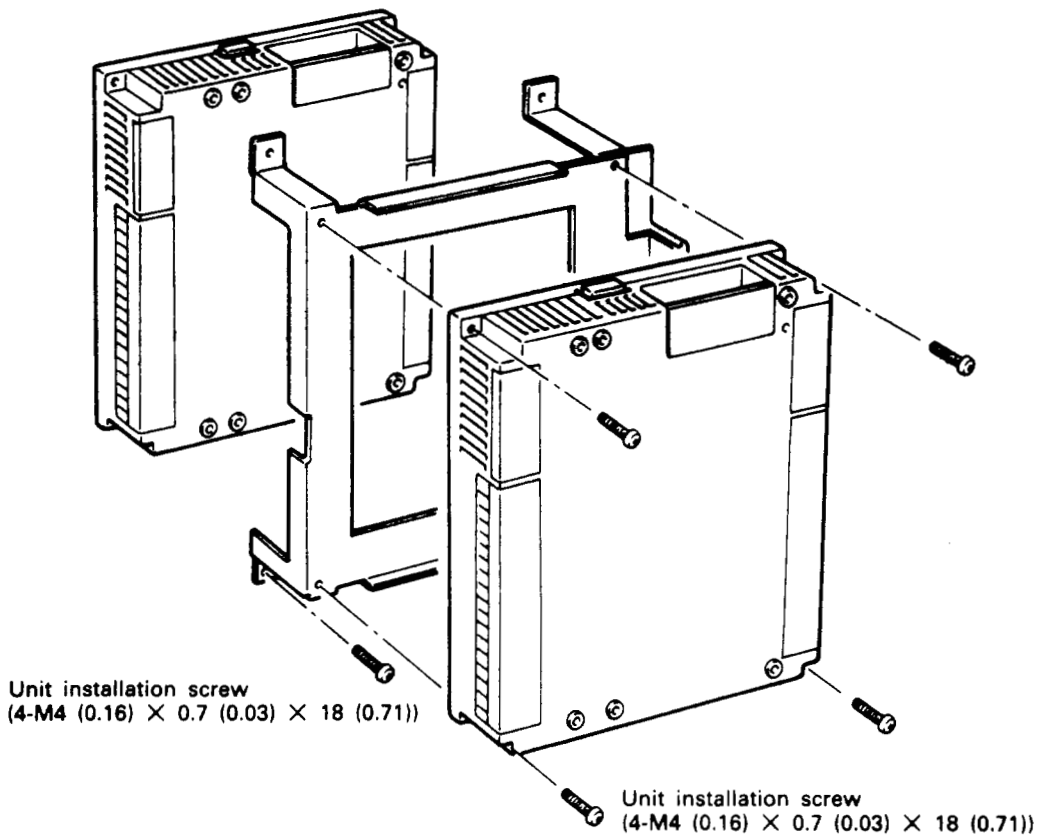
REMARKS

The unit installation screws are supplied with the AJ35PTF-32□, -24□, -28□□, and -56□□.

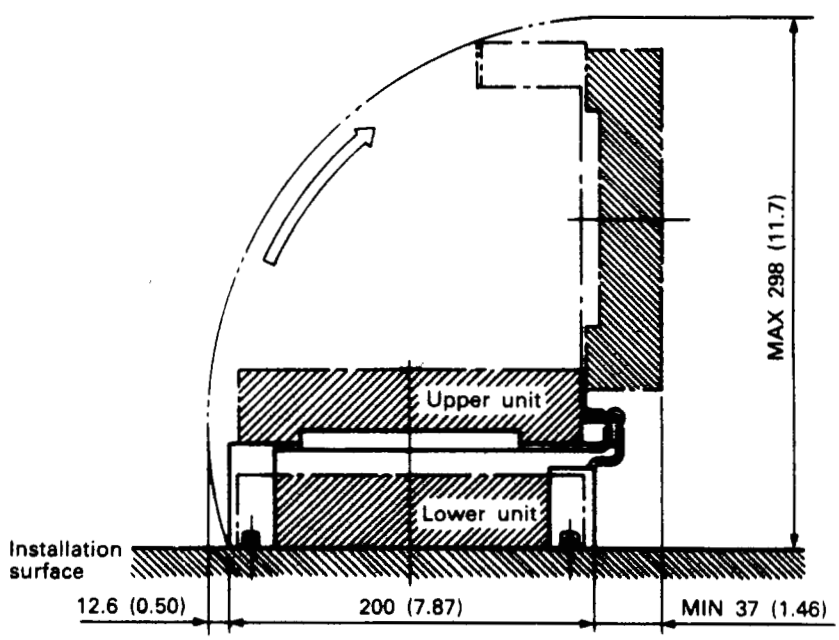
IB (NA) 66216-A

(b) Connection using the A0J2-2F bracket

1) Installation method



2) Diagram showing units connected



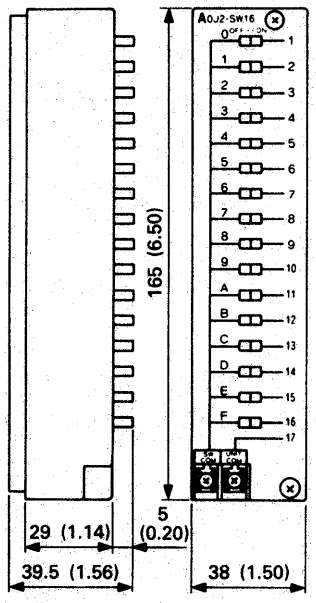
IB (NA) 66215-A

3.3.7 Simulation switch

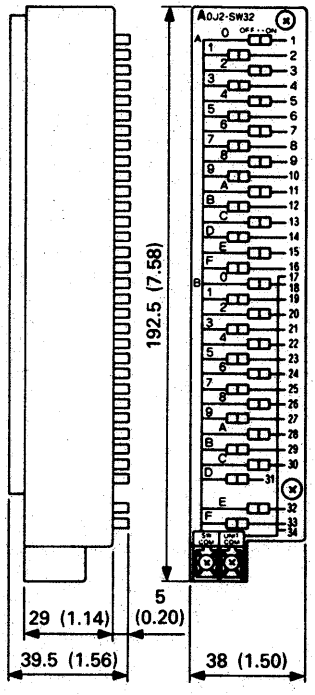
A simulation switch can be mounted in the compact type remote I/O unit to simulate input.
By mounting the simulation switch directly to the input side of the compact type remote I/O unit, inputs can be simulated to be ON and OFF.

The two types of simulation switches are indicated below. The proper one to use depends on the compact type remote I/O unit that is being used.

The A0J2-SW16 type simulation switch is used with the AJ35PTF-28□□.
The A0J2-SW32 type simulation switch is used with the AJ35PTF-32□□ and AJ35PTF-56□□.



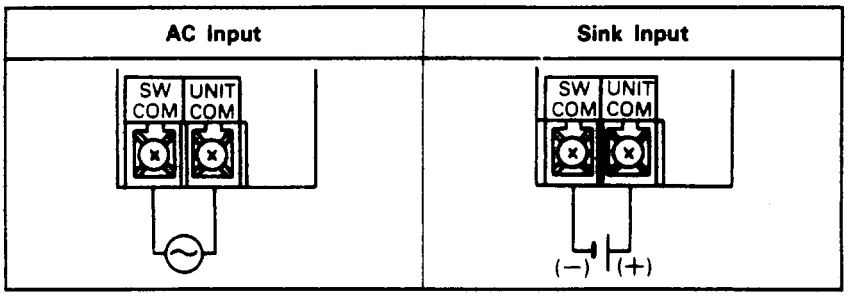
A0J2-SW16 type simulation switch



A02-SW32 type simulation switch

(1) Mounting method of the simulation switch
The simulation switch is mounted by first removing the terminal block from the input side of the compact type remote I/O unit and then mounting the simulation switch directly to the terminal mounting fixture.

(2) Connecting power cable to the simulation switch
Connecting the power cable to the simulation switch in the following manner.
Pay sufficient care when connecting the power cable to the simulation switch because connection differs depending on the type of inputs.



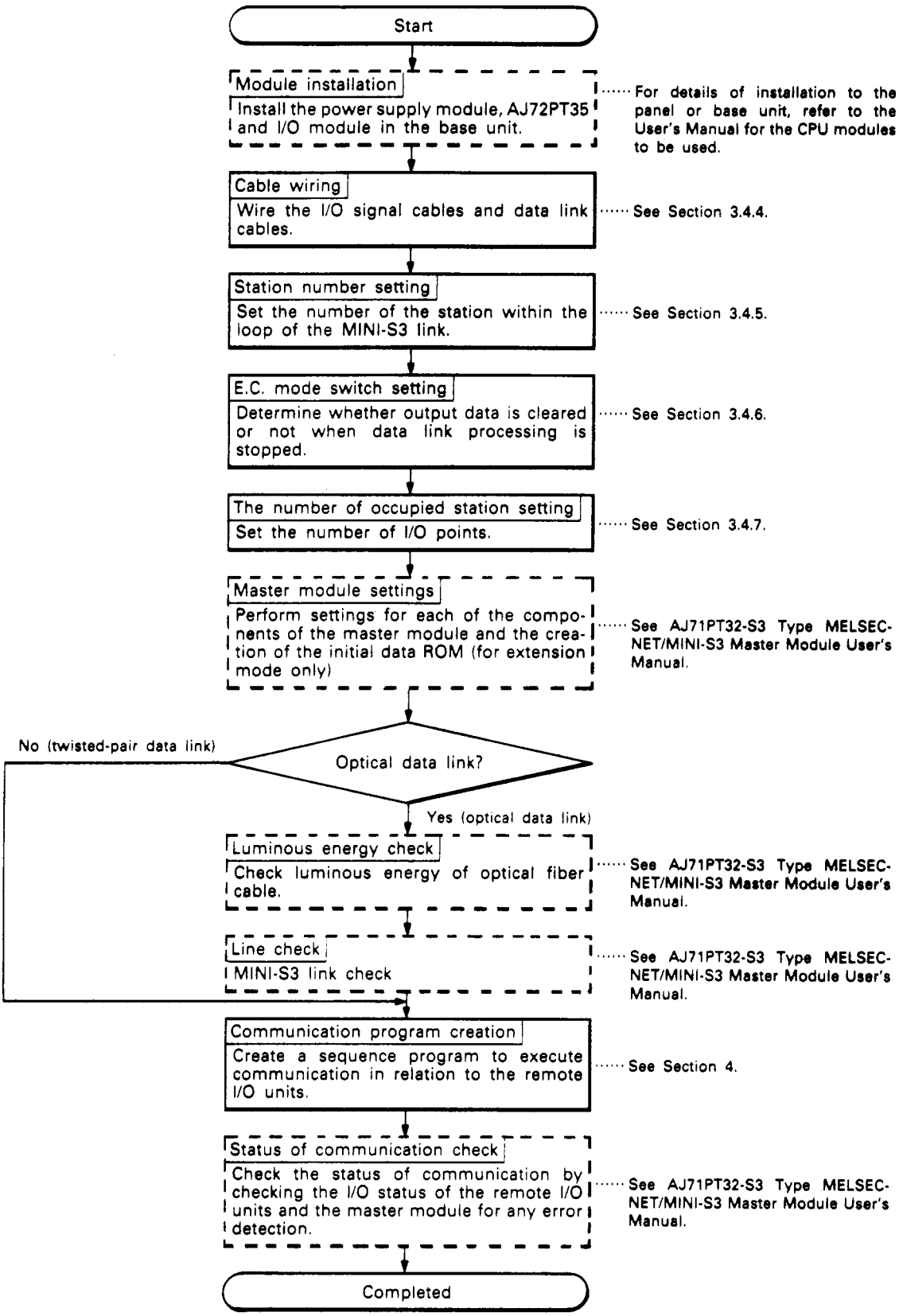
(3) The following table provides specifications for the simulation switch.

Item \ Type	A0J2-SW16	A0J2-SW32
No. of input switches (points)	16	16
Rated voltage, current	250V AC, 10mA	
Minimum voltage, current	5V DC, 1mA	
Switching life (No. of times)	10,000 or more	
Lever operating force (g·f)	400 max.	
Size mm (inch)	165 (6.50) X 38 (1.50) X 39.5 (1.56)	192.5 (7.58) X 38 (1.50) X 39.5 (1.56)
Weight kg (lb)	0.18 (0.40)	0.19 (0.42)

IB (NA) 66215-A

3.4 AJ72PT35 Type Data Link Module

3.4.1 Pre-operational procedure



(B (NA) 66215-A

3.4.2. Number of stations occupied and I/O assignment

Notes on I/O assignment

(1) The AJ72PT35 allows the number of stations occupied to be specified by the occupied station number setting switch between 4 and 16 in increments of 4.

(2) Specify the number of stations occupied in accordance with the number of all I/O points of the building-block type I/O modules loaded on the base unit which accommodates the AJ72P35.

(3) See the table below. The number of I/O points per remote I/O station is 8.

Number of Stations Occupied	Number of I/O Points
4	32
8	64
12	96
16	128

(4) I/O modules may be loaded onto the base unit in any order. Note that stations regarded as faulty depend on the number of loaded module points and the loading order as explained in Section 3.4.3.

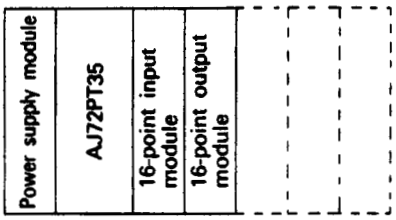
AJ72PT35's I/O, I/O module, faulty station detection and other data is processed as follows in accordance with its station number and the number of stations occupied (n = AJ72PT35 station number).

Number of Stations Occupied	I/O Number	I/O Data Storage Location		Remote I/O Station Card Data *1 (I/O automatically selected in accordance with the loaded unit)		Unit of Faulty Station Control
		Input	Output			
4	X/Y0 to X/Y7	Receive data of station n	Transmission data of station n	Input	Output	Stations n to (n + 3) are controlled as one control unit.
	X/Y8 to X/YF	Receive data of station (n + 1)	Transmission data of station (n + 1)	Input	Output	
	X/Y10 to X/Y17	Receive data of station (n + 2)	Transmission data of station (n + 2)	Input	Output	
	X/Y18 to X/Y1F	Receive data of station (n + 3)	Transmission data of station (n + 3)	Input	Output	
8	X/Y20 to X/Y27	Receive data of station (n + 4)	Transmission data of station (n + 4)	Input	Output	Stations (n + 4) to (n + 7) are controlled as one control unit.
	X/Y28 to X/Y2F	Receive data of station (n + 5)	Transmission data of station (n + 5)	Input	Output	
	X/Y30 to X/Y37	Receive data of station (n + 6)	Transmission data of station (n + 6)	Input	Output	
	X/Y38 to X/Y3F	Receive data of station (n + 7)	Transmission data of station (n + 7)	Input	Output	
12	X/Y40 to X/Y47	Receive data of station (n + 8)	Transmission data of station (n + 8)	Input	Output	Stations (n + 8) to (n + 11) are controlled as one control unit.
	X/Y48 to X/Y4F	Receive data of station (n + 9)	Transmission data of station (n + 9)	Input	Output	
	X/Y50 to X/Y57	Receive data of station (n + 10)	Transmission data of station (n + 10)	Input	Output	
	X/Y58 to X/Y5F	Receive data of station (n + 11)	Transmission data of station (n + 11)	Input	Output	
16	X/Y60 to X/Y67	Receive data of station (n + 12)	Transmission data of station (n + 12)	Input	Output	Station (n + 12) to (n + 15) are controlled as one control unit.
	X/Y68 to X/Y6F	Receive data of station (n + 13)	Transmission data of station (n + 13)	Input	Output	
	X/Y70 to X/Y77	Receive data of station (n + 14)	Transmission data of station (n + 14)	Input	Output	
	X/Y78 to X/Y7F	Receive data of station (n + 15)	Transmission data of station (n + 15)	Input	Output	

REMARKS

*1: The remote I/O station card data in an empty slot is treated as input.

Example: The following example assumes that the AJ72PT35 is station 5, a 16-point input module is on slot 0, a 16-point output module is on slot 1, and four stations occupied.



Station number = 5
Number of stations occupied = 4

I/O Number	I/O Data Storage Location		Remote I/O Station Card Data	
	Input	Output		
X0 to X7	Receive data of station 5		Input	
X8 to XF	Receive data of station 6		Input	
Y10 to Y17		Transmission data of station 7		Output
Y18 to Y1F		Transmission data of station 8		Output

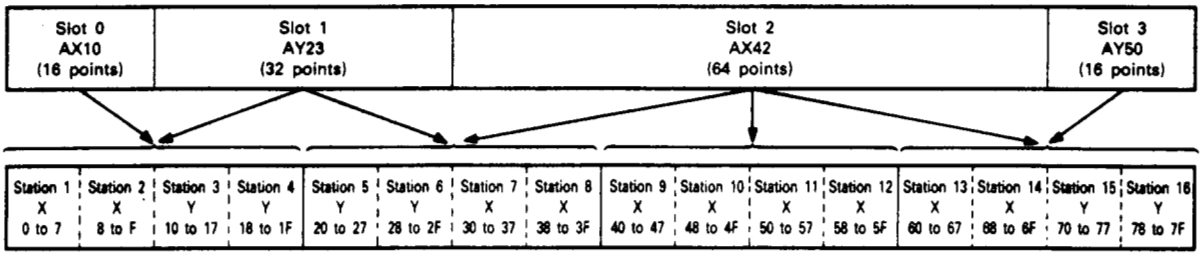
3.4.3 Notes on installation of I/O modules

I/O modules may be loaded in any order. Note that stations regarded as faulty depend on the number of loaded module points and the loading order.

(1) The corresponding I/O ERR. LED is lit to indicate the I/O module which has developed a blown fuse or a module verify error.

(2) The faulty station data in the faulty station area of the master station is controlled in groups of four stations (32 points).

(3) If a communication fault occurs or a fuse is blown, 1 is written to the corresponding bit of the master station faulty station detection area.
When the I/O modules are loaded as shown below, 1 is written to the faulty station detection area as described bellow:



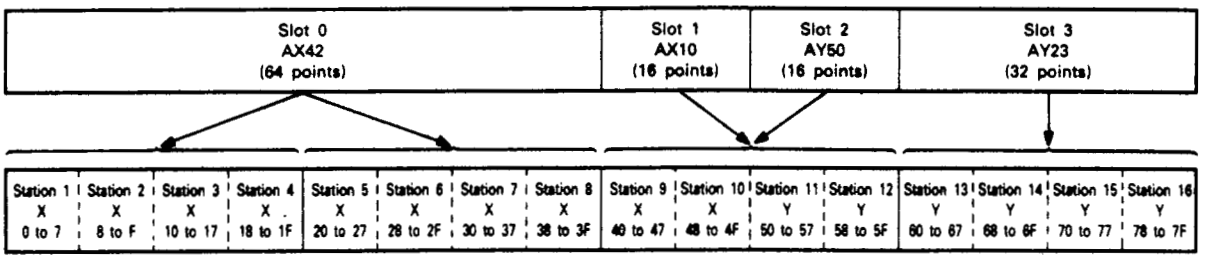
(a) If the fuse of the AY23 on slot 1 has blown, "1" is written to stations 1 to 8 in the faulty station detection area.
In this case, a communication error also occurs at 16 points (stations 1, 2) of the AX10 on slot 0 and 16 points (stations 7, 8) of the AX42 on slot 2. With Y1B (faulty station data clear) set on in the master station, receive data is cleared from the 16 points of the AX10 and the 16 points of the AX42 (X30 to 3F).

(b) If the fuse of the AY50 on slot 3 has blown, "1" is written to stations 13 to 16 in the faulty station detection area.
In this case, a communication error also occurs at 16 points (X60 to 6F) of the AX42 on slot 2.

(4) By assigning the number of I/O module points in groups of four stations (32 points), the faulty module can be matched with the faulty station data in the faulty station detection area. By changing the module assignment in (3) as shown below, for example, the other I/O module(s) is(are) not affected if the AY23 fuse is blown and receive/transmission data can be transferred from/to the master station sequentially.

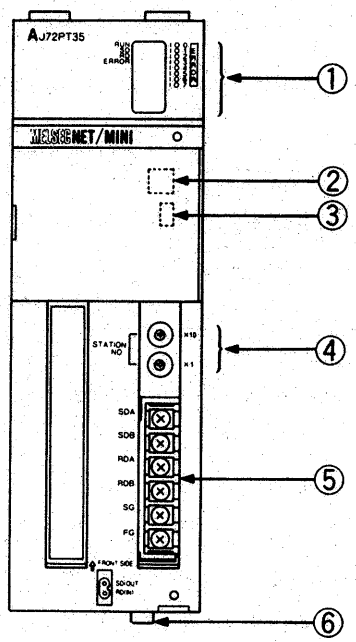
REMARKS

To check whether any output module fuse has blown or not, use the output module fuse LED or the AJ72PT35 LED (I/O 0 to 7).

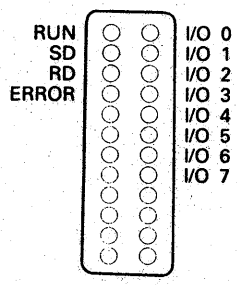


(5) Any I/O module must be installed or removed after switching OFF the power of the remote I/O station.

3.4.4 Nomenclature



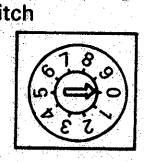
① Operating status indicator LEDs



For indicating operating status, error definition, etc.

LED	Definition
RUN	Lit when data communication is made with the master station without fault.
SD	Flickers when data is being transmitted.
RD	Flickers when data is being received.
ERROR	Lit if a receive data error occurs. It remains OFF during normal communication.
I/O 0	Lit if fuse is blow or verify error is detected with the module loaded in slot 0. It remains OFF under normal conditions.
I/O 1	Lit if fuse is blow or verify error is detected with the module loaded in slot 1. It remains OFF under normal conditions.
I/O 2	Lit if fuse is blow or verify error is detected with the module loaded in slot 2. It remains OFF under normal conditions.
I/O 3	Lit if fuse is blow or verify error is detected with the module loaded in slot 3. It remains OFF under normal conditions.
I/O 4	Lit if fuse is blow or verify error is detected with the module loaded in slot 4. It remains OFF under normal conditions.
I/O 5	Lit if fuse is blow or verify error is detected with the module loaded in slot 5. It remains OFF under normal conditions.
I/O 6	Lit if fuse is blow or verify error is detected with the module loaded in slot 6. It remains OFF under normal conditions.
I/O 7	Lit if fuse is blow or verify error is detected with the module loaded in slot 7. It remains OFF under normal conditions.

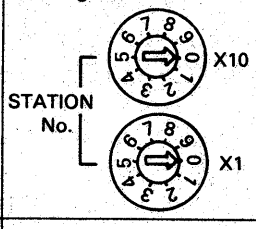
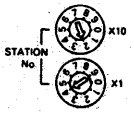
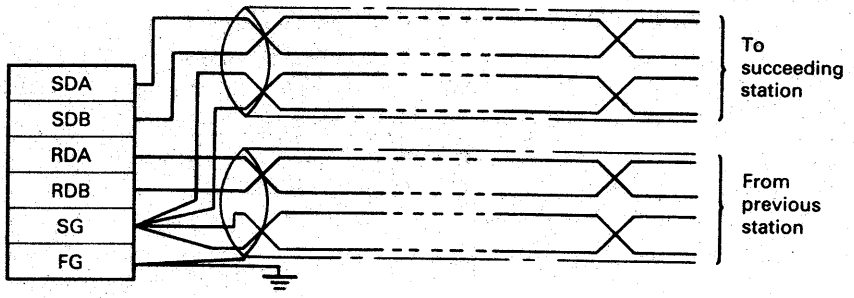
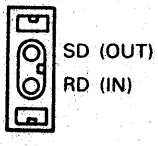
② Occupied station number setting switch



Used to specify the number of stations occupied by the AJ72PT35. For more information, see Section 3.4.7.

③ E.C. MODE switch

Used to define whether outputs are retained or switched off when I/O refresh is stopped. For more information, see Section 3.4.6.

④	Station number setting switches 	• Used to set the remote I/O station number may be set between 1 and (64 − the number of stations occupied) +1). • X10 : Left digit of a station number • X1 : Right digit of a station number Example: station number: 24 
⑤	Twisted-pair cable terminal block	For connecting twisted-pair cables when twisted-pair cables are used to connect one station with another.  **REMARKS** Connection of twisted-pair cable is not necessary for optical data link. For details, see the AJ71PT32-S MELSECNET/MINI-S3 Master Module User's Manual.
⑥	Optical fiber cable connector 	For connecting the optical fiber cables. • RD (IN) : Connected to (OUT) SD of the previous station. • SD (OUT) : Connected to (IN) RD of the succeeding station. For connecting the cable, see the AJ71PT35-S3 Type MELSECNET/MINI-S3 Master Module User's Manual for full information.

3.4.5 Setting the station number

(1) The station number must be defined after switching OFF the remote I/O station. To avoid erroneous input or output, the station number must not be changed during I/O refresh.

(2) The station number may be set between 1 and (64 − the number of stations occupied) + 1).
For determining the station number, see the AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual.

3.4.6 Setting the E.C. MODE switch

The E.C. MODE switch is used to specify whether the station outputs are retained or switched OFF when I/O refresh is stopped (Y18 or Y28 switched OFF).
The remote I/O station must be powered down before setting the E.C. MODE switch.

<table>
<tr><th colspan="2">E.C. MODE Switch / Link Status</th><th>OFF</th><th>ON</th></tr>
<tr><td rowspan="2">MINI-S3 link communication start (Y18 or Y28)</td><td>ON</td><td colspan="2">Transmission data is output from the remote I/O station.</td></tr>
<tr><td>OFF</td><td>Output status at MINI-S3 link communication start switch-OFF is retained.</td><td>All outputs are switched OFF.</td></tr>
<tr><td rowspan="2">If the remote I/O station is disconnected from the system due to communication error</td><td>Mode setting switch of master module is at 0 (automatic return) or 2 (communication stop at detection of online error)</td><td>Output status at occurrence of communication error is retained.</td><td rowspan="2">All outputs are switched OFF.</td></tr>
<tr><td>Mode setting switch of master module is at 1 (automatic return).</td><td>All outputs are switched OFF.</td></tr>
</table>

REMARKS

1. The E.C. MODE switch is factory-set to ON.
2. The device number used for the MINI-S3 link communication start device of the master module varies depending on the mode of the master module.
   I/O dedicated mode ····· Y18
   Extension mode ····· Y28

3.4.7 Setting the number of occupied station

Specify the number of stations occupied in accordance with the number of I/O points of the I/O modules loaded on the base unit.

(1) The number of stations occupied may be defined between 4 and 16 in increments of 4 as indicated below. The number of I/O points per occupied station is 8.

(2) The number of stations occupied is 16 at any of switch positions 0 and 5 to 9.

Switch Position	Number of Stations Occupied
1	4 stations (32 I/O points)
2	8 stations (64 I/O points)
3	12 stations (96 I/O points)
4	16 stations (128 I/O points)

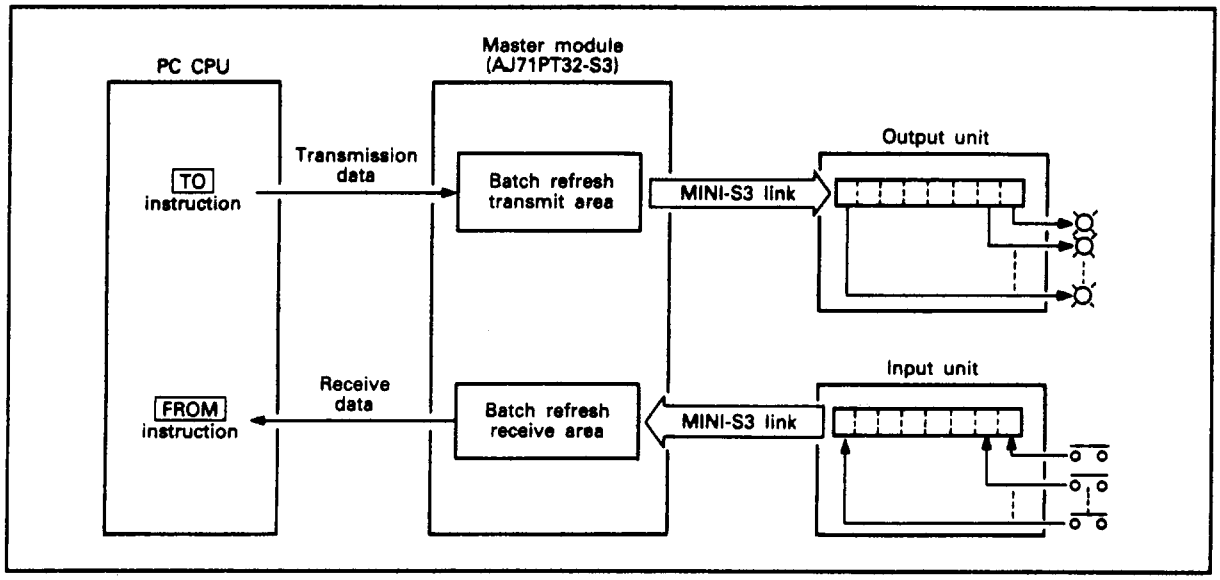
IB (NA) 66215-A

4. PROGRAMMING

4.1 Data I/O Method

4.1.1 Transmission area of the master module and the remote I/O unit station number

Communication between the PC CPU and batch refresh type remote I/O units is conducted via the batch refresh transmit area and receive area of the master module buffer memory.



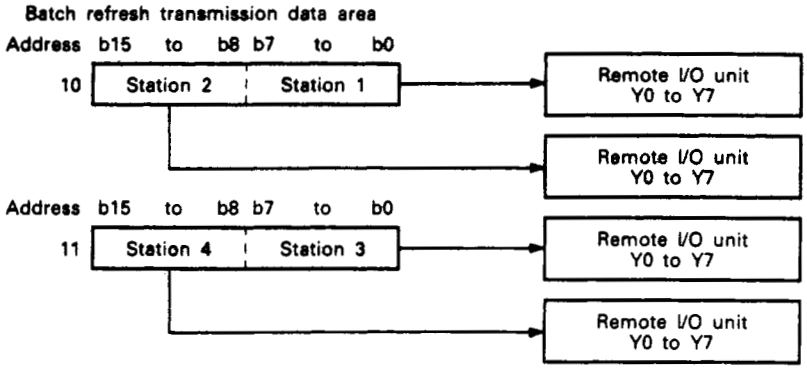
Each batch refresh type remote I/O unit is configured to have 8 points locations for input and for output. The batch refresh transmit and receive data areas are assigned one byte per remote I/O unit number.

Batch refresh transmission data area
(Batch refresh receive data area)

Address	b15 to b8	b7 to b0
10 (110)	Station 2	Station 1
11 (111)	Station 4	Station 3
12 (112)	Station 6	Station 5
13 (113)	Station 8	Station 7
to		
40 (140)	Station 62	Station 61
41 (141)	Station 64	Station 63

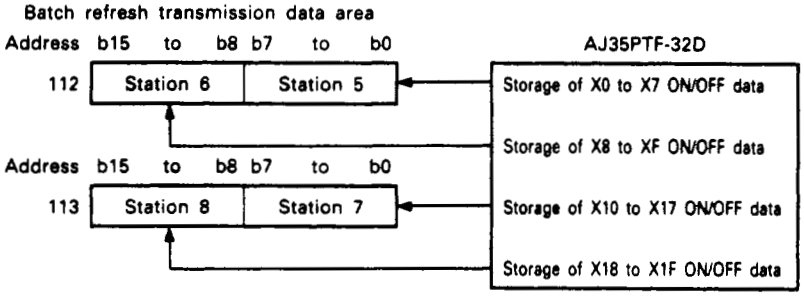
( ) indicates the address for the receive data area.

Output to remote I/O units is sent to the remote I/O unit, the station number of which has been assigned to the area in which the transmission data is written. Input from remote I/O units can be read from the area corresponding to station number of the remote I/O unit using the FROM instruction.



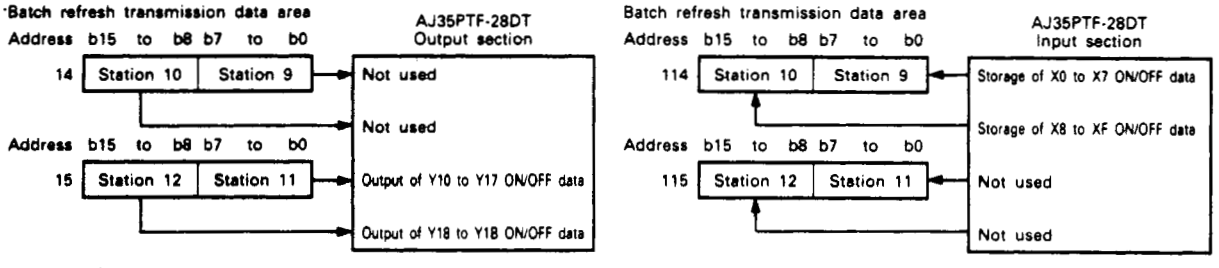
When the number of occupied stations in a remote unit is two or greater, the amount of area used is equal to that number.

Example: The following is an example of an AJ35PTF-32D (input points: 32, number of occupied stations: 4) that has been set to station 5.



In the case of an I/O compound unit, the first half of the area used for the occupied stations is used for receiving. The last half are used for transmission.

Example: The following is an example of an AJ35PTF-28DT (input points: 16, output points: 12, number of occupied stations: 4) that has been set to station 9.



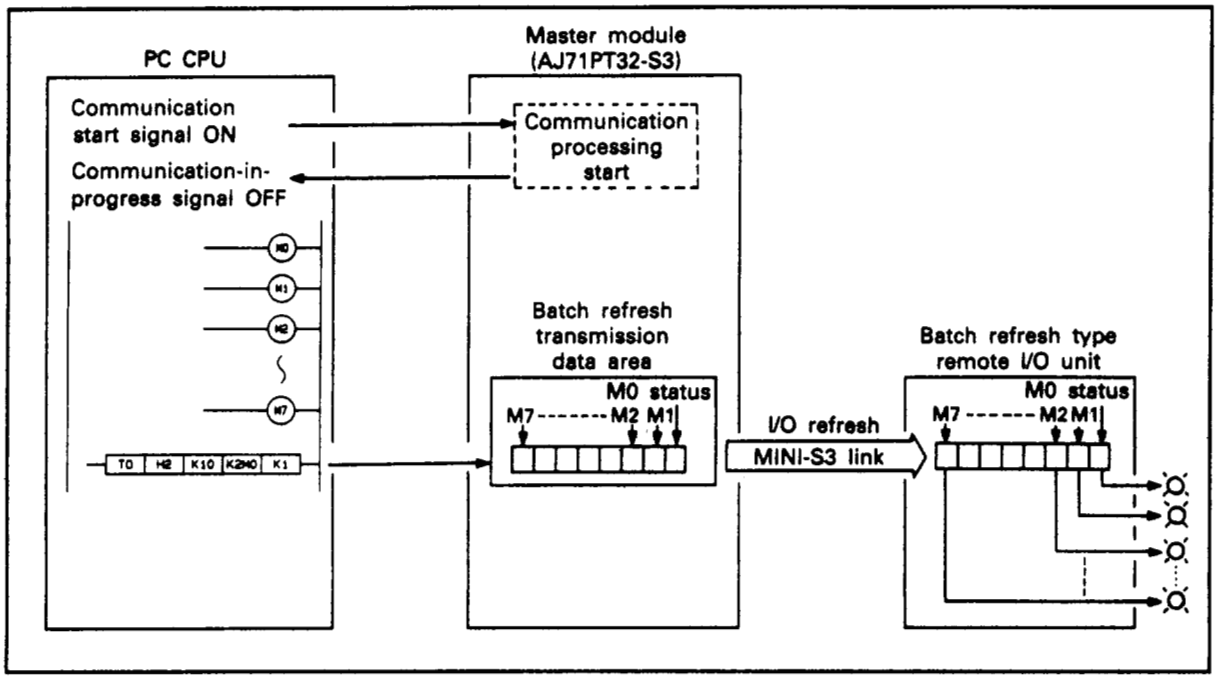
IB (NA) 66215-A

4.1.2 Data transmission between PC CPU and remote I/O unit

Data communication between PC CPU and batch refresh type remote I/O unit is performed by master module I/O refresh. Master module I/O refresh occurs at 3.5 to 18ms intervals regardless of the sequence program scan time when the communication start signal of the master module is set ON. (For further information concerning the I/O refresh time, see the AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual.)

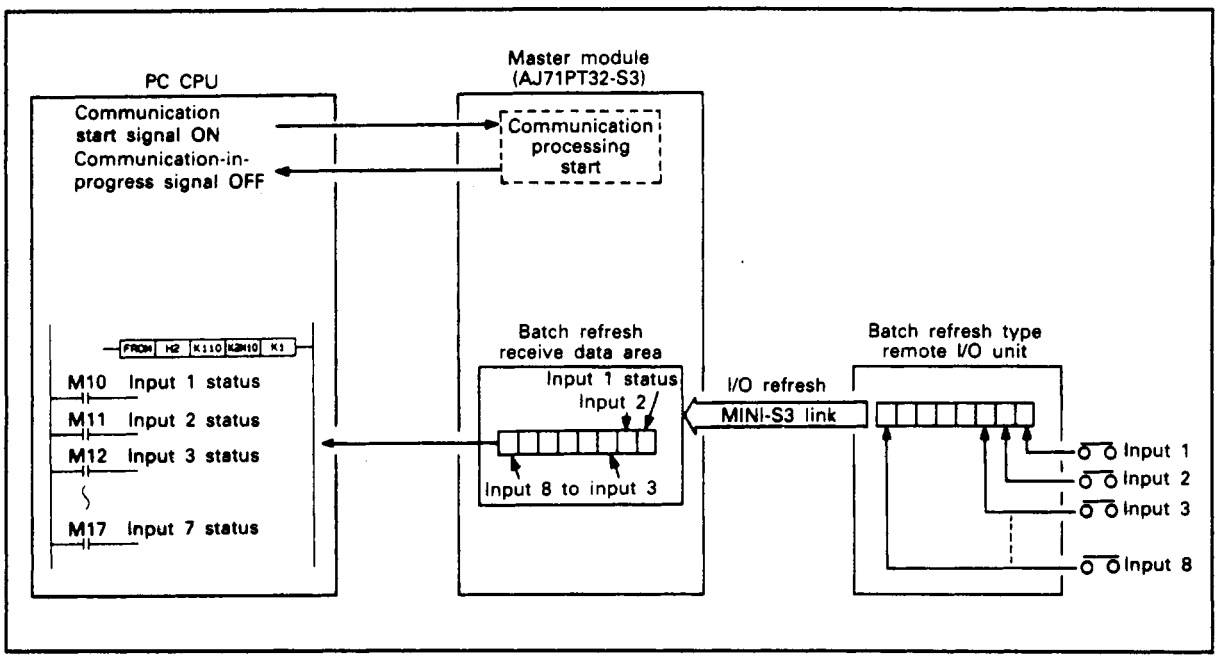
(1) Output to batch refresh type remote I/O unit

When data is output to the remote I/O unit, the data is written to the transmission data area in the master module using the sequence program [TO] instruction.
Writing data to the transmission data area results in its being transmitted automatically to the remote I/O unit and output to external equipment.
Each output of the remote I/O unit corresponds to a particular bit in the master module transmission data area. When an output is set to ON, "1" is written to the transmission data area bit corresponding to that output. When an output is set to OFF, "0" is written to the transmission data area bit corresponding to that output.



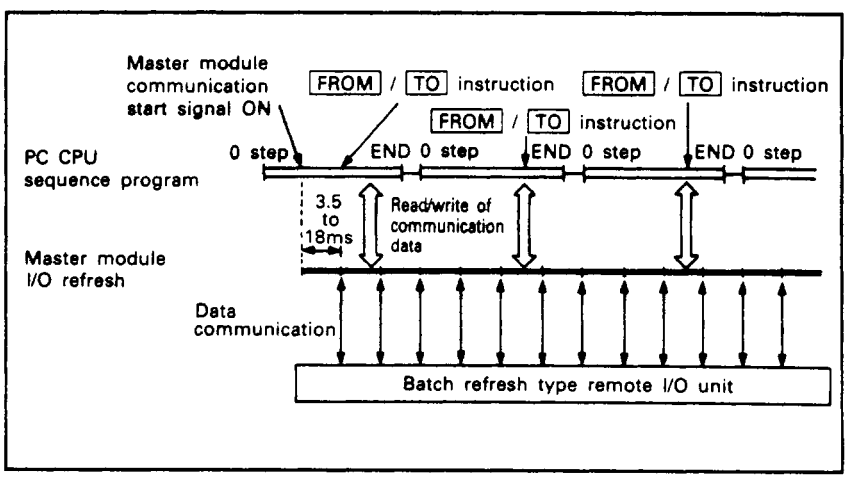
(2) Input from batch refresh type remote I/O unit

When input data from the remote I/O station is read, the data is read from the receive data area of the master module upon execution of the sequence program FROM instruction.
When data is input from an external equipment to the remote I/O unit, the input data is automatically received in the receive data area of the master module.
Each input of the remote I/O unit corresponds to a particular bit in the master module receive data area.
When an input is set to on, "1" is written to the receive data area bit corresponding to that input. When an input is set to off, "0" is written to the receive data area bit corresponding to that input.



(3) Data communication timing

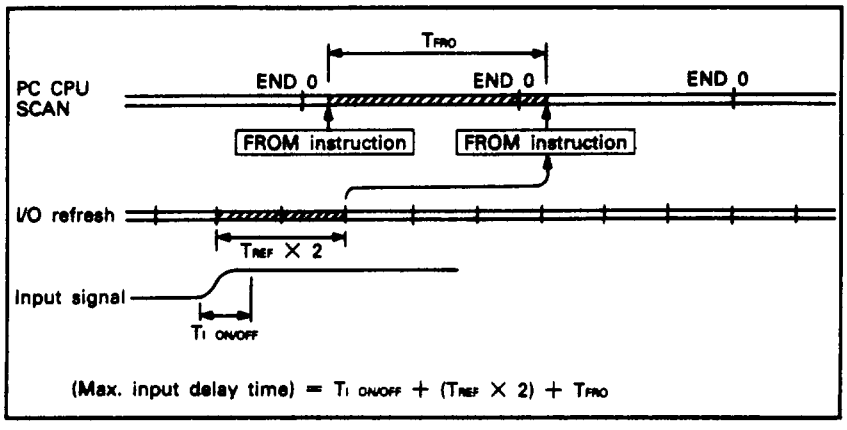
The timing for data communication between the PC CPU master module and remote I/O unit is indicated below.



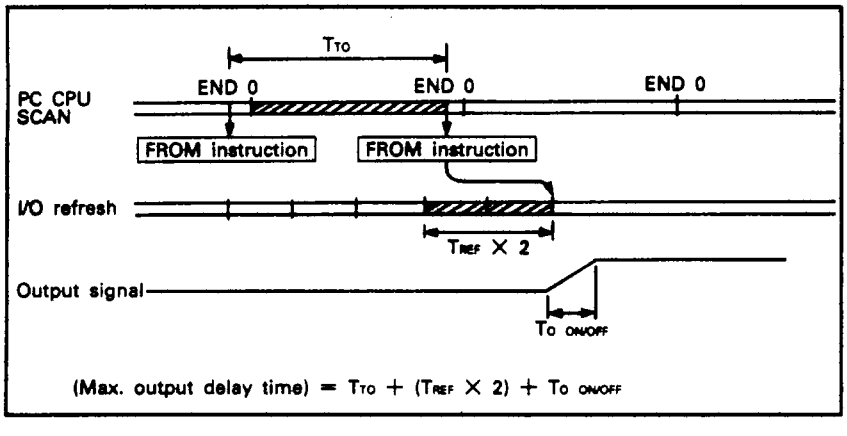
IB-NAI 66215-A

4.1.3 I/O delay time in remote I/O unit

(1) The following delays may occur until the PC CPU reads an input signal from a remote I/O station.
  (a) Input remote I/O station response time ($T_{I\ ON/OFF}$)
  Indicates the period of time required for the input unit to be switched from ON to OFF or from OFF to ON. For further details, see Section 5.
  (b) MINI-S3 link I/O refresh time (T_{REF})
  See MELSECNET/MINI-S3 Master Module User's Manual.
  (c) [FROM] instruction processing time (T_{PRO})
  There is a maximum of 1 scan delay if the [FROM] instruction is executed once during a scan of the sequence program.



(2) The following delays may occur until the PC CPU provides an output signal from an output remote I/O station.
  (a) [TO] instruction processing time (T_{TO})
  There is a maximum of 1 scan delay if the [TO] instruction is executed once during a scan of the sequence program.
  (b) MINI-S3 link I/O refresh time (T_{REF})
  (c) Output remote I/O station response time ($T_{O\ ON/OFF}$)
  Indicates the period of time required for the output unit to be switched from ON to OFF or from OFF to ON. For further information, see Section 5.



IB (NA) 66215-A

Exercise:
Suppose that the FROM and TO instructions are executed during one sequence program scan under the following conditions:

PC CPU scan time (T_{PRO}, T_{TO}) = 50ms
I/O refresh time (T_{REF}) = 3.9ms
Remote I/O unit input response time ($T_{I\ ON/OFF}$) = 25ms
Remote I/O unit output response time ($T_{O\ ON/OFF}$) = 12ms

(Max. input delay time) = $T_{I\ ON/OFF} + (T_{REF} \times 2) + T_{PRO}$
= $25 + (3.9 \times 2) + 50$
= 82.8 (ms)

(Max. output delay time) = $T_{TO} + (T_{REF} \times 2) + T_{O\ ON/OFF}$
= $50 + (3.9 \times 2) + 12$
= 69.8 (ms)

IB (NA) 66215-A

4.2 Relation between PC 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).
   (b) When 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, transmission data (buffer memory addresses 10 to 41) is output to the output remote I/O stations.
   (b) When I/O refresh is stopped, the output unit states depend on their E.C. MODE switch positions.
   For full information on the E.C. MODE switch, see Sections 3.2.4, 3.3.5, and 3.4.6.

I/O Refresh / E.C. MODE Switch	During I/O Refresh ($Y_{(n+18)}/Y_{(n+28)}$ ON)	I/O Refresh Stop ($Y_{(n+18)}/Y_{(n+28)}$ OFF)
ON	Output remote I/O units are switched ON/OFF in accordance with the transmission data.	All outputs are switched OFF.
OFF		Output state at the time of I/O refresh stop is retained.

4.3 Characteristics of I/O Refresh when either a Communication or Line Error has Occurred

4.3.1 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 ($X_{(n+7)}/X_{(n+27)}$)
- Accumulative faulty station detection (addresses 90 to 93)
- Faulty station detection (addresses 100 to 103)
- Communication error code (address 107)
- Error detection code (address 108)

(For further information concerning the I/O signals and buffer memory, see Sections 4.4 and 4.5.)

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.

4.3.2 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 (referred to as CC-type errors)
  The faulty unit is disconnected while other units continue to operate normally.
- Communication stops (referred to as CS-type errors)
  Even if an error occurs in only one unit, communication stops between all units.

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

(1) Operation when CC-type errors occur

When a CC-type error occurs, error processing occurs only in relation to the faulty unit. Other units continue normal communication.

(a) 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 ($Y_{(n+1B)}$/$Y_{(n+2B)}$).

1) 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.

2) 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.

(b) 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.

1) Automatic online return ON (0)
The transmission data set in the buffer memory transmit area is output.

2) Automatic online return OFF (1)
Off data is output.

(2) 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), or
  partial refresh station.

  An I/O refresh was started when an erring 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).

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

(b) Operation when a line error occurs
1) 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.
2) 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.

For further information, concerning the E.C. mode setting, see Section 3.

3) For further information concerning the location of fault when a fault occurs in lines, see AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual.

(c) 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.

1) Input data from the remote I/O unit
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.

2) Output data to the remote I/O units
When a communication error occurs in a remote I/O unit, output data to remote I/O units is processed in one of the two following ways depending on the setting of 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.

For further information concerning the E.C. mode setting, see Section 3.

4.4 I/O List for the PC CPU

The I/O numbers for the master module PC CPU are listed in Tables 4.1 and 4.2.
The device numbers of PC CPU input/output signals vary depending on whether the master module is used in the I/O dedicated mode or extension mode.
(For further information concerning the I/O dedicated mode and extension mode, see AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual.)

(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 4.1.
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)

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

Table 4.1 I/O Signal List

IB (NA) 66215-A

(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 4.2.

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)

Device No.	Signal		Device No.	Signal	
$X_{(n+0)}$	Transmit complete signal	For remote terminal unit No. 1	$Y_{(n+0)}$	Transmit request signal	For remote terminal unit No. 1
$X_{(n+1)}$	Read request signal		$Y_{(n+1)}$	Read complete signal	
$X_{(n+2)}$	Transmit complete signal	For remote terminal unit No. 2	$Y_{(n+2)}$	Transmit request signal	For remote terminal unit No. 2
$X_{(n+3)}$	Read request signal		$Y_{(n+3)}$	Read complete signal	
$X_{(n+4)}$	Transmit complete signal	For remote terminal unit No. 3	$Y_{(n+4)}$	Transmit request signal	For remote terminal unit No. 3
$X_{(n+5)}$	Read request signal		$Y_{(n+5)}$	Read complete signal	
$X_{(n+6)}$	Transmit complete signal	For remote terminal unit No. 4	$Y_{(n+6)}$	Transmit request signal	For remote terminal unit No. 4
$X_{(n+7)}$	Read request signal		$Y_{(n+7)}$	Read complete signal	
$X_{(n+8)}$	Transmit complete signal	For remote terminal unit No. 5	$Y_{(n+8)}$	Transmit request signal	For remote terminal unit No. 5
$X_{(n+9)}$	Read request signal		$Y_{(n+9)}$	Read complete signal	
$X_{(n+A)}$	Transmit complete signal	For remote terminal unit No. 6	$Y_{(n+A)}$	Transmit request signal	For remote terminal unit No. 6
$X_{(n+B)}$	Read request signal		$Y_{(n+B)}$	Read complete signal	
$X_{(n+C)}$	Transmit complete signal	For remote terminal unit No. 7	$Y_{(n+C)}$	Transmit request signal	For remote terminal unit No. 7
$X_{(n+D)}$	Read request signal		$Y_{(n+D)}$	Read complete signal	
$X_{(n+E)}$	Transmit complete signal	For remote terminal unit No. 8	$Y_{(n+E)}$	Transmit request signal	For remote terminal unit No. 8
$X_{(n+F)}$	Read request signal		$Y_{(n+F)}$	Read complete signal	
$X_{(n+10)}$	Transmit complete signal	For remote terminal unit No. 9	$Y_{(n+10)}$	Transmit request signal	For remote terminal unit No. 9
$X_{(n+11)}$	Read request signal		$Y_{(n+11)}$	Read complete signal	
$X_{(n+12)}$	Transmit complete signal	For remote terminal unit No. 10	$Y_{(n+12)}$	Transmit request signal	For remote terminal unit No. 10
$X_{(n+13)}$	Read request signal		$Y_{(n+13)}$	Read complete signal	
$X_{(n+14)}$	Transmit complete signal	For remote terminal unit No. 11	$Y_{(n+14)}$	Transmit request signal	For remote terminal unit No. 11
$X_{(n+15)}$	Read request signal		$Y_{(n+15)}$	Read complete signal	
$X_{(n+16)}$	Transmit complete signal	For remote terminal unit No. 12	$Y_{(n+16)}$	Transmit request signal	For remote terminal unit No. 12
$X_{(n+17)}$	Read request signal		$Y_{(n+17)}$	Read complete signal	
$X_{(n+18)}$	Transmit complete signal	For remote terminal unit No. 13	$Y_{(n+18)}$	Transmit request signal	For remote terminal unit No. 13
$X_{(n+19)}$	Read request signal		$Y_{(n+19)}$	Read complete signal	
$X_{(n+1A)}$	Transmit complete signal	For remote terminal unit No. 14	$Y_{(n+1A)}$	Transmit request signal	For remote terminal unit No. 14
$X_{(n+1B)}$	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		$Y_{(n+20)}$		
$X_{(n+21)}$	MINI-S3 link communicating		$Y_{(n+21)}$		
$X_{(n+22)}$	Reserved		$Y_{(n+22)}$		
$X_{(n+23)}$	Receive data clear completion (for AJ35PTF-R2)		$Y_{(n+23)}$	Receive data clear request (for AJ35PTF-R2)	
$X_{(n+24)}$	Remote terminal unit error detection		$Y_{(n+24)}$	Remote terminal unit error detection clear	
$X_{(n+25)}$	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	
$X_{(n+2F)}$			$Y_{(n+2F)}$		

Only the [ ] signals can be used in the batch refresh type remote I/O unit.

Table 4.2 I/O List for the Extension Mode

4.4.1 Explanation for I/O signals

The following sections explain the ON/OFF timing and conditions only for I/O signals used for communications with a batch refresh type remote I/O unit among the I/O signals indicated in Tables 4.1 and 4.2.
The contents in ( ) are device numbers which correspond to those indicated in Tables 4.1 and 4.2.
For information concerning I/O signals not explained in this manual, see AJ71PT32-S3 Type MELSECNET/MINI-S3 Master Module User's Manual.

(1) Hardware fault (I/O dedicated mode: $X_{(n+9)}$/extension mode: $X_{(n+29)}$)

(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.

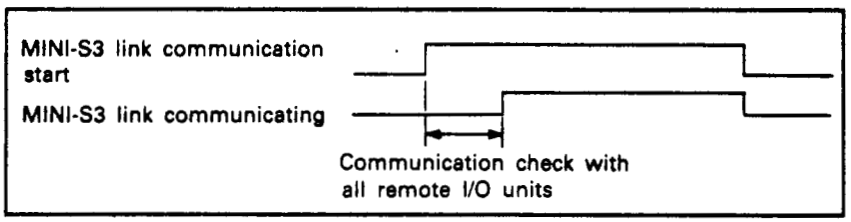
(b) Used as an interlock for the FROM / TO instruction to the master module.

(2) MINI-S3 link communicating (I/O dedicated mode: $X_{(n+1)}$/extension mode: $X_{(n+21)}$)

(a) On indicates that the master module mode has communicated with all remote I/O stations once after Y18 (MINI-S3 link communication start) is switched on.

(b) Switched OFF When Y18 is switched off.
Off indicates that a data communication stop error has occurred.

(c) Used as an interlock for data transfer to and from the master module.



(3) 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.

(4) MINI-S3 link error detection (I/O dedicated mode: $X_{(n+6)}$/extension mode: $X_{(n+26)}$)

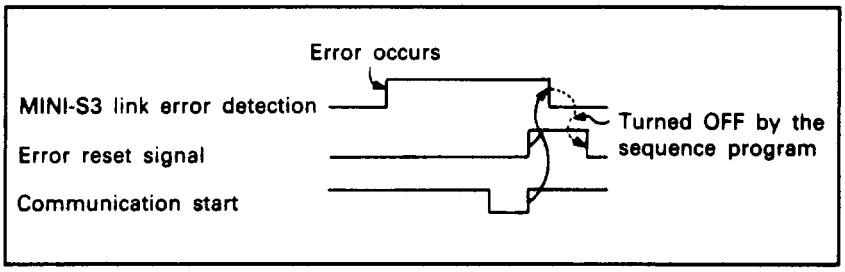
(a) This signal detects if the receive data from the remote unit is normal or not.

(b) The master module checks the receive data from the remote unit 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.

IB (NA) 66215-A

(5) 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.

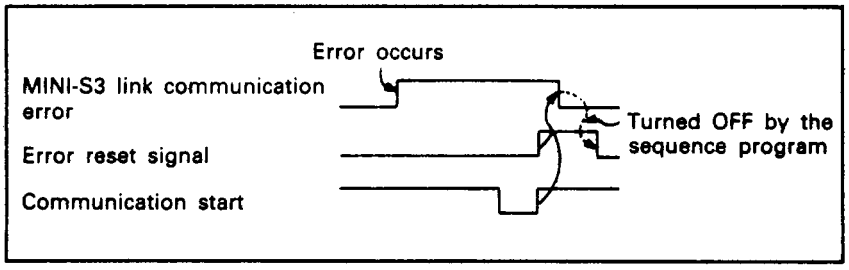
(b) If an error has occurred in the MINI-S3 link line, the signal is set to ON.

(c) The signal is set to ON when:
- Any remote I/O unit 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 4.3.
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.



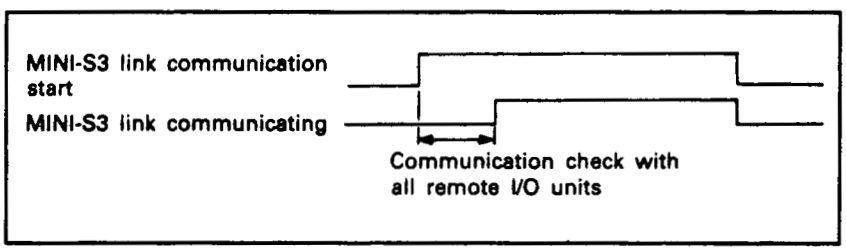
(e) The communication error code is stored in address 107 of the buffer memory, when the MINI-S3 link communication error signal is set to ON.

(6) MINI-S3 link communication start (I/O dedicated mode: $Y_{(n+1B)}$/extension mode: $Y_{(n+2B)}$)

(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 units.
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 units.

(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.



(7) 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 PC 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.

Item \ FROM/TO Instruction Response Designation	OFF	ON
Access to buffer memory	Priority given to master module.	Priority given to PC 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 (0.3ms + 0.2ms × (number of partial refresh stations connected)) max.	No delay

(8) 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) $Y_{(n+1B)}$ or $Y_{(n+2B)}$ is independent of the transmission data to a faulty station.

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

POINT

It is suggested to use no automatic return mode (mode setting switch = 1) when $Y_{(n+1B)}$ or $Y_{(n+2B)}$ is ON.

(9) Error reset (I/O dedicated mode: $Y_{(n+19)}$/extension mode: $Y_{(n+29)}$)

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

3) The ERR.LEDs indicated below are switched OFF.
- ERR. LOOP LED
- ERR. REM LED

4.5 Buffer Memory

The master module has a buffer memory (not battery backed) for communication of data with the PC CPU.
The FROM / TO instructions are used to read data from the buffer memory to the PC CPU or write data to the buffer memory from the PC CPU.

4.5.1 Buffer memory assignment

Address (Decimal)			Description	Read/Write of PC CPU
0	Number of remote I/O stations	(*2)	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	
	Reserved		—	
10 to 41	Transmission 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 unit types used as remote I/O stations.	Read only
	Reserved		—	—
90 to 93	Accumulative faulty station detection		Stores faulty station numbers 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		Latches the ON/OFF state of MINI-S3 link error detection.	
	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.	
161 to 192	Retry counter		Stores the number of retries made to the faulty station.	
	Reserved		—	
195	Remote terminal unit faulty station	(*1)	Stores the station number when the remote terminal unit error occurs.	
196 to 209	Remote terminal unit error code	(*1)	Stores the cause when the remote terminal unit error detection signal ($X_{(n+24)}$) is turned ON.	
	Reserved		—	—
250 to 282	Partial refresh station	(*1)	Write 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 555	Transmission data for partial refresh		Stores data output to batch refresh type remote I/O units.	
	Reserved		—	
598	Accumulative input error detection for partial refresh		Holds the partial refresh input data receive error until reset by the sequence program.	
599	Input faulty station detection for partial refresh		Stores the partial refresh input data receive error.	
600 to 855	Receive data for partial refresh		Stores input data to partial refresh type remote I/O units.	Read only

Only the areas indicated by [ ] can be used in the batch refresh type remote I/O unit.

IB (NA) 66215-A

Address (Decimal)			Description	Read/Write of PC CPU
858	Receive data clear specification	(*1)	Specifies the station number of the AJ71PTF-R2 that clears receive data using the receive data clear request signal ($Y_{(n+23)}$).	Read/write
859	Receive data clear area specification	(*1)	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	(*1)	Specifies the parameters to be used when in the AJ71PTF-R2 no-protocol mode.	
930 to 1099	Reserved		—	—

Address (Decimal)	Channel 0 (*3)	Channel 1 (*3)		Description	Read/Write of PC CPU
1100 to 2099	Transmission/receive area for remote terminal unit No. 1	Transmission/receive area for remote terminal unit No. 8	(*1)	Writes transmission data to a remote terminal unit or stores receive data from a remote terminal unit.	Read/write
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			
	($Y_{(n+2C)}$ ··· OFF)	($Y_{(n+2C)}$ ··· ON)			

POINT

(1) The *1 area is used only when the master module is in the extension mode. (It is not used in the I/O dedicated mode.)

(2) The *2 area does not need to be specified when the master module is in the extension mode. (The contents of the initial data ROM are automatically stored here.)

(3) The *3 channel is used to perform read and write operations for addresses 1100 to 8099 and is switched by the channel switch signal ($Y_{(n+2C)}$).

(4) When power is turned on or the PC CPU is reset, all areas of the buffer memory are cleared (set to 0).
However, for the number of retries (address 1) and the parameters for the no-protocol mode (addresses 860 to 929), the default values are set.

(5) Do not write from the PC CPU to the read-only areas.

(6) The reserved areas are used by the master module system.

(7) Data in the read-only areas including the reserved areas can be read from the PC CPU sequentially, e.g. data can be read from the accumulative faulty station detection (addresses 90 to 93) and faulty station detection (addresses 100 to 103) areas by using a single FROM instruction.

4.5.2 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.
(g) This address does not need to be specified by the sequence program when the master module is used in the extension mode. (Sequence program specified settings are ignored.)
The settings for the total number of remote stations in the extension mode is set by the initial data ROM or the SW□GP-MINIP type system floppy disk.
When power is applied to the PC or when it is reset, the specified contents of the initial data ROM is automatically read to this area.
For further information concerning the methods of specifying the total number of remote stations in the extension mode, see the SW□GP-MINIP Operating Manual.

(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 unit 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, units 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 unit using the RUN LED, it can be used for all units.

(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 units to turn on the RUN LED. (If no line error has occurred, normal data is output.)

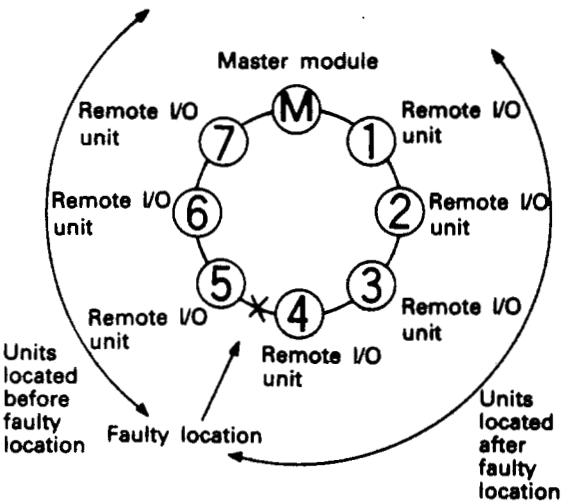
POINT

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 units.
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: Normal data link operations
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 Switch located on front panel of master module	Line Error Check Setting (buffer memory address 4)	Output Status of the Remote I/O Units			
		Units located before faulty location		Units 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.		
	1, 2	All output points are switched OFF			

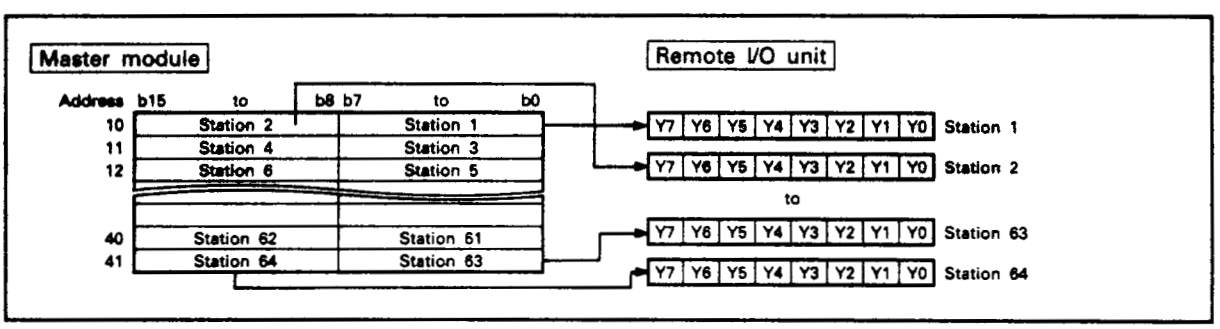


(e) The output data (the data which uses the transmit area (addresses 1100 to 8099) for the remote terminal unit) corresponding to the remote terminal unit retains output data regardless of the setting of the line error check.

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

(a) Set the data to be output to the batch refresh type remote I/O unit.

(b) Batch refresh transmission data area assignment is as follows: Addresses where the transmission data is to be written vary according to the station number assigned to each individual remote I/O units.



(c) Batch refresh transmission 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
0: 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 unit could not make initial communication.
01: Indicates an input remote I/O unit.
Indicates a partial refresh type remote I/O unit
Indicates a remote terminal unit
10: Indicates an output remote I/O 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
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 remote I/O station when a communication error occurs.
(c) The corresponding bit is not reset to 0 if the faulty station is restored. Addresses 90 to 93 indicate accumulative faulty stations indicated in the faulty station detection area (addresses 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

(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) 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: • Total number of remote stations • Number of retries • Partial refresh stations • Line error check • No-protocol mode parameters
2	Line error	A link cable is broken or a remote I/O unit power is OFF.
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.

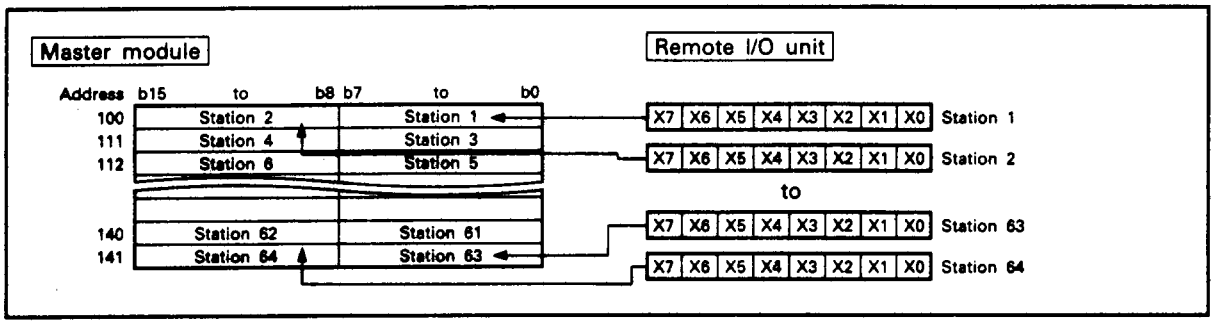
(c) The communication error code is reset to 0 in the following cases:
• The error reset signal ($Y_{(N+1D)}$ / $Y_{(n+2D)}$) is turned on when the communication start signal ($Y_{(n+18)}$ / $Y_{(n+28)}$) is OFF.
• The communication start signal is turned from OFF to ON.

(9) Error detection code (address 108)

(a) "1" indicates that the MINI-S3 link error detection signal ($X_{(n+e}$ / $X_{(n+2e)}$) 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 ($Y_{(n+1B)}$ / $Y_{(n+2B)}$) is OFF.
- The communication start signal is turned from OFF to ON.

(10) Receive data for batch refresh (addresses 110 to 141)

(a) Stores input from the batch refresh type remote I/O units.
(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 unit.



(c) Batch refresh receive 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
X7	X6	X5	X4	X3	X2	X1	X0

1: ON
0: 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

(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)

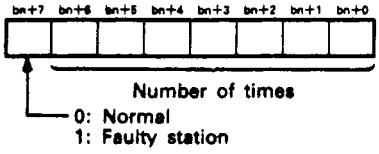
(a) Receives the number of retries made to the faulty remote I/O unit.

(b) Reset to 0 when communication is restored.

(c) Buffer memory assignment is as indicated below:

Address	b15 to b8	b7 to b0
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

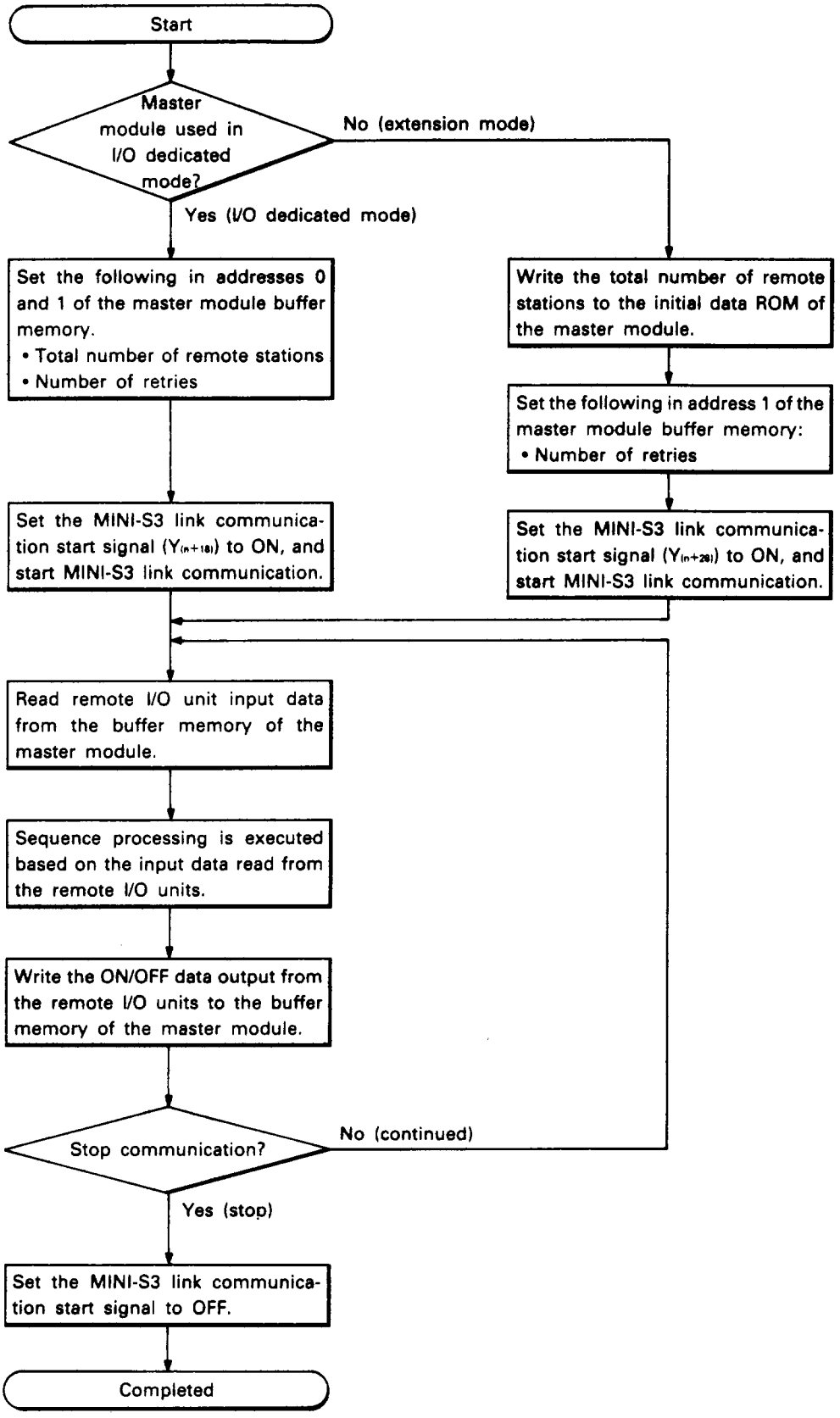
(d) The retry counter area has 8 bit locations per remote I/O station as shown below:



*: 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

IB (NA) 66215-A

4.6 Programming Procedure

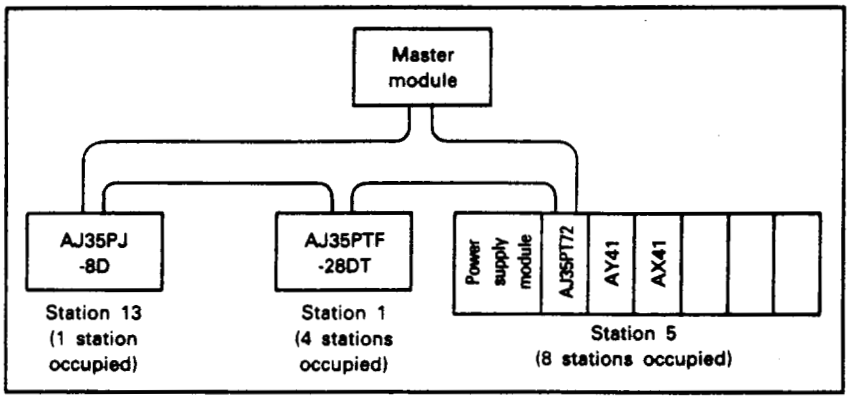


4.7 Program Example

(1) Head I/O number of the AJ71PT32-S3 type master module ..... X · Y20

{In I/O dedicated mode ···X · Y20 to 3F
In extension mode ··· X · Y20 to 4F}

(2) System configuration



REMARKS

Note on setting the station numbers:
The number of FROM and TO instructions used to transfer data of all remote I/O stations can be reduced by setting the remote I/O station numbers. The above system example indicates the station number setting which allows the batch refresh receive data to be read by one FROM instruction.

(3) Assignment of data transmission devices for batch refresh type remote I/O units

{Batch refresh transmission data assignment}

Buffer Memory Address	Remote I/O Station {Upper: 60 to 7 Lower: 68 to 15} Station number	I/O address	Device	Remarks	Buffer Memory Address
10	1	to	to	Empty {Receive station for AJ35PTF-28DT}	
	2	to	to		
1	3	Y10 to 17	Y100 to 107	AJ35PTF-28DT	
	4	Y18 to 1B	Y108 to 10B		
2	5	Y0 to 7	Y110 to 117	AY41 of AJ72PT35	
	6	Y8 to F	Y118 to 11F		
3	7	Y10 to 17	Y120 to 127		
	8	Y18 to 1F	Y128 to 12F		
4	9	to	to	Empty {Receive station for AY41 of AJ72PT35}	
	10	to	to		
5	11	to	to		
	12	to	to		

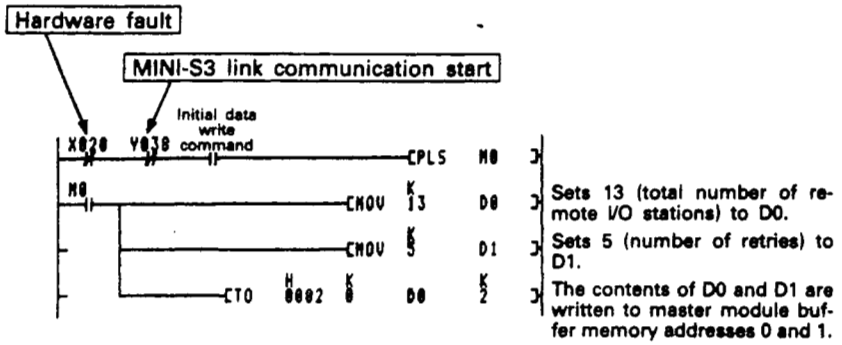
{Batch refresh receive data assignment}

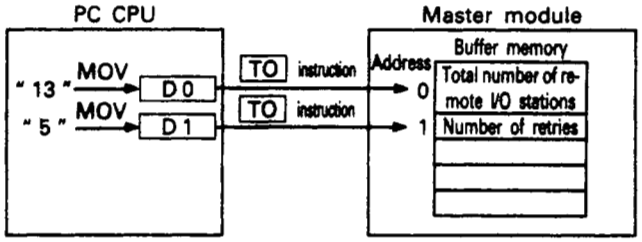
Buffer Memory Address	Remote I/O Station {Upper: 60 to 7 Lower: 68 to 15} Station number	I/O address	Device	Remarks	Buffer Memory Address
110	1	X0 to 7	M200 to 207	AJ35PTF-28DT	1
	2	X8 to F	M208 to 215		
1	3	to	to	Empty Transmission station for AJ35PTF-28DT	
	4	to	to		
2	5	to	to	Empty Transmission station for AX41 of AJ72PT35	
	6	to	to		
3	7	to	to		
	8	to	to		
4	9	X0 to 7	M216 to 223	AX41 of AJ72PT35	
	10	X8 to F	M224 to 231		
5	11	X10 to 17	M232 to 239		
	12	X18 to 1F	M240 to 247		
			M248 to 255		

4.7.1 Example of an initial data write program

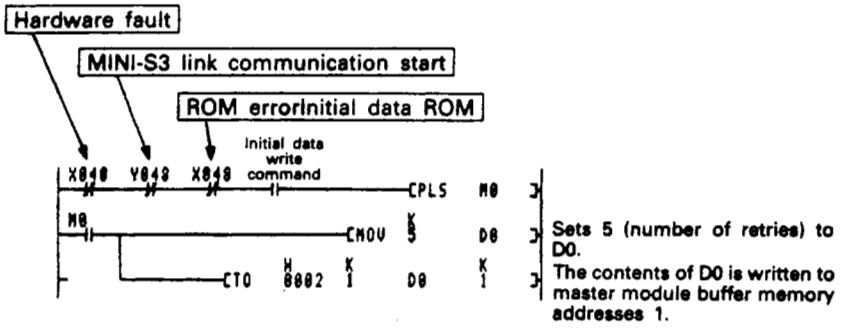
The writing of initial data should occur when the MINI-S3 link communication start signal is OFF.
The set values of the initial data take effect when the MINI-S3 link communication start signal goes from OFF to ON.

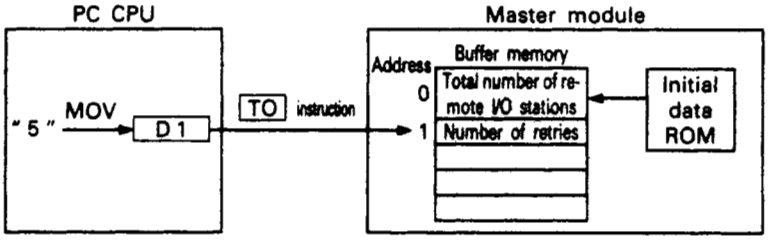
(1) I/O dedicated mode





(2) Extension mode



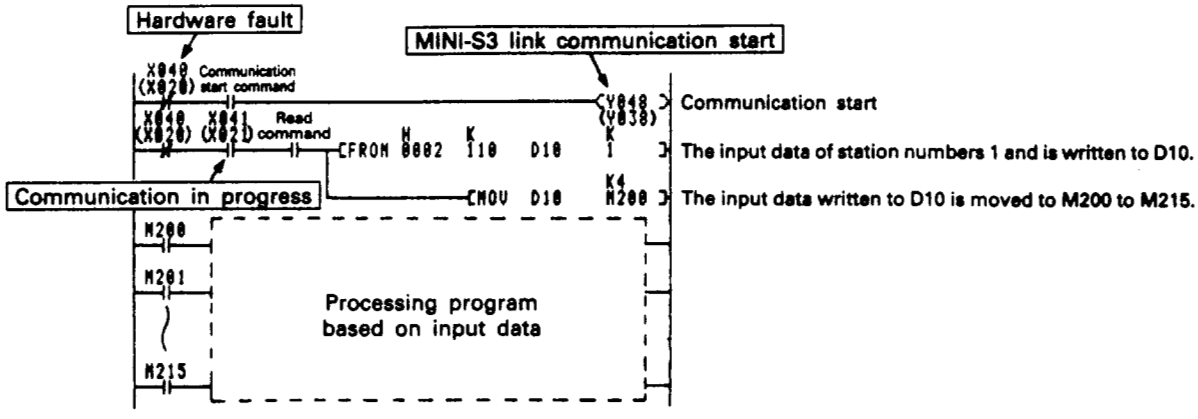


4.7.2 Example of an input data read program

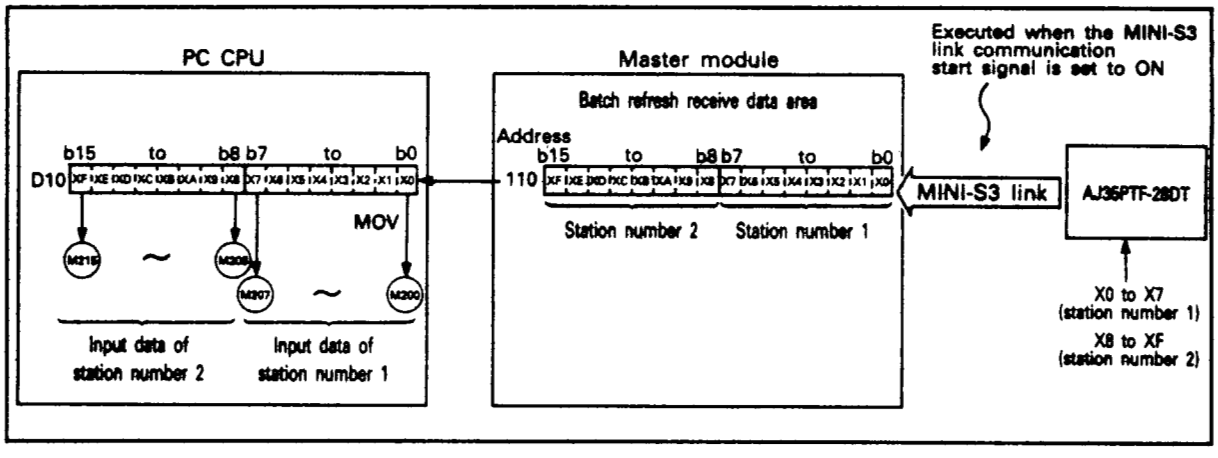
(1) MINI-S3 link communication starts when the master module communication start signal is set to ON.

(2) The input data of the batch refresh type remote I/O units is stored in the batch refresh receive data area (addresses 110 to 141)

(3) An example of program to read the input data of remote I/O station numbers is 1 and 2 to M200 to M215 is given below. The master module is in the extension mode for this example.



The device number in ( ) is the number used in the I/O dedicated mode.

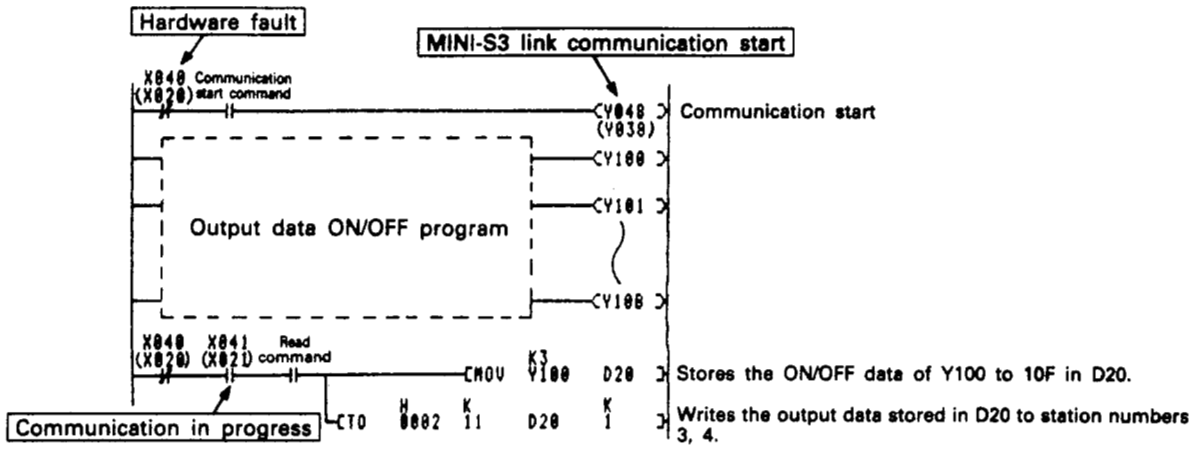


4.7.3 Example of an output data write program

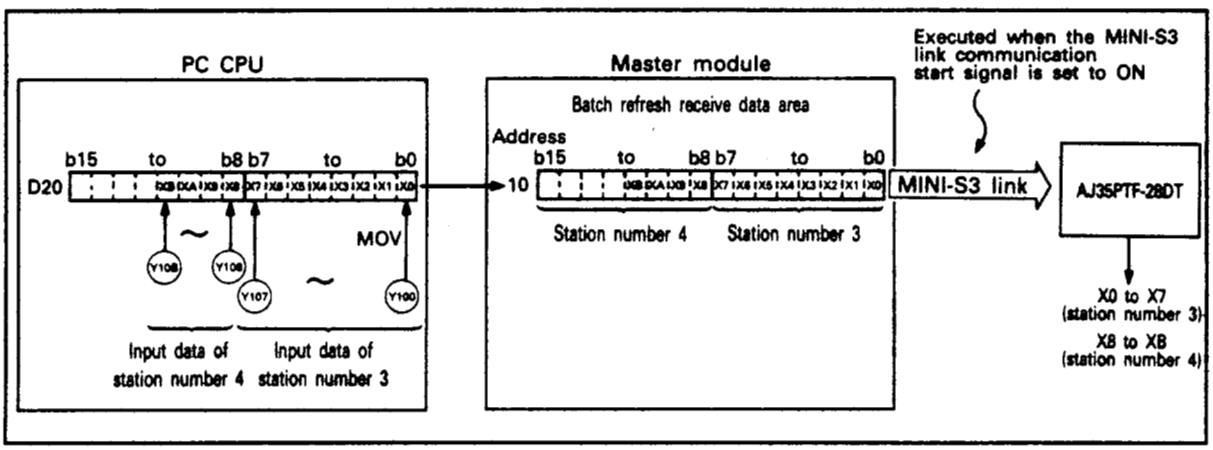
(1) MINI-S3 link communication starts when the master module communication start signal is set to ON.

(2) The output data of the batch refresh type remote I/O units is written in the batch refresh transmission data area (addresses 10 to 41)

(3) An example of program to constantly output the ON/OFF data at Y100 to 10B to remote I/O stations 3 and 4.
The master module is in the extension mode for this example.



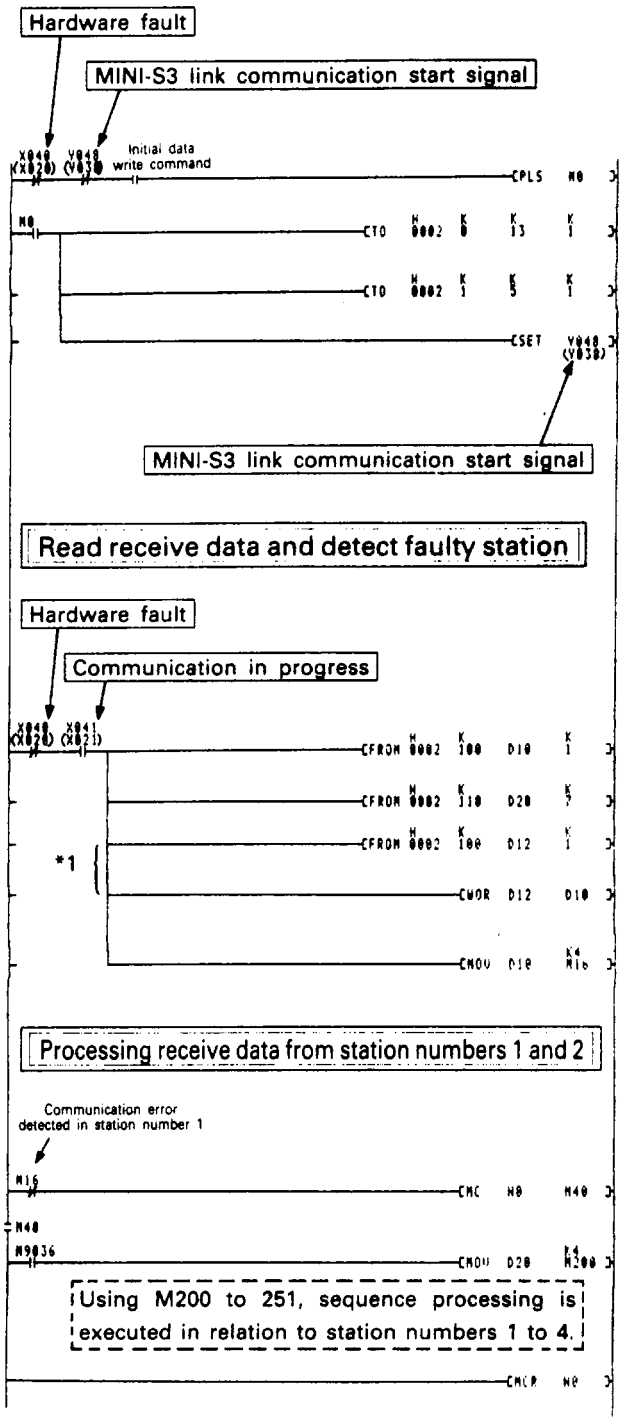
The device number in ( ) is the number used in the I/O dedicated mode.



4.7.4 Example of an application program

For information concerning the configuration of the system and device assignments indicated in the program example, see Section 4.7.
The master module is in the extension mode for this example. (The device number in ( ) is the number used in the I/O dedicated mode.)

Writing initial data



Pulses the initial data write command

Writes the total number of remote stations (13) to master module buffer memory address 0. (I/O dedicated mode operation only)

Writes the number of retries (5) to master module buffer memory address 1.

MINI-S3 link communication start signal is set to ON.

Reads faulty station detection data (station numbers 1 to 13) to D10.

Reads batch refresh receive data area (station numbers 1 to 13) to D20 to D26.

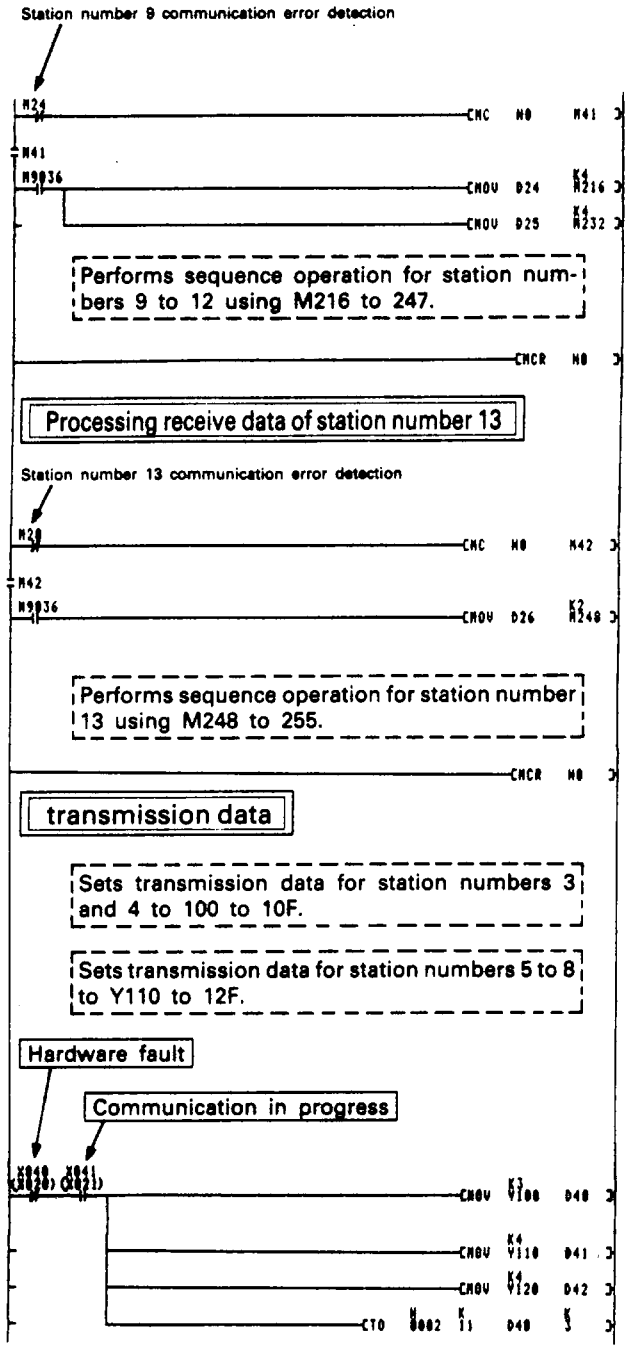
Reads error detection data station numbers (1 to 13) to D12.

ORs faulty station detection data before and after reading receive data to detect communication errors that have occurred during receive data read.

Transfers faulty station detection data (station numbers 1 to 13) to M16 to 31, which are used as interlocks for communication error.

Transfers receive data of station number 1 and 2 to M200 to 215.

Processing receive data of station numbers 9 to 12



Transfers receive data of station numbers 9 to 12 to M216 to 247.

Processing receive data of station number 13

Transfers receive data of station number 13 to M248 to 255.

transmission data

Transfers transmission data Y100 to 10F of station numbers 3 and 4 to D40.

Sets the transmission data corresponding to station numbers 5 to 8 in Y110 to 12F.

Writes batch refresh transmission data to the buffer memory.

REMARKS

*1: Indicates above is the circuit to detect a communication error which has occurred between faulty station detection data read and receive data read. When faulty station data clear designation (Y4B(Y3B)) is off, data existing directly prior to the fault occurring is retained if a communication error occurs. The program marked *1 is not required for a system which may continue operation using the data which was received during correct communication.

5. SPECIFICATIONS

The following sections explain the specifications for the batch refresh type remote I/O units.

- Stand-alone remote I/O unit (for optical data link)
- Stand-alone remote I/O unit (for twisted-pair cable data link)
- Compact type CPU remote I/O unit
- AJ71PT35 type data link module

5.1 Stand-alone Remote I/O Units (for optical data link)

The casing is made of aluminum diecast to ensure high strength and drip-proof structure.

(1) The protection structure conforms to IP54G (JEM1030).

(2) One unit allows 8-point input or output.

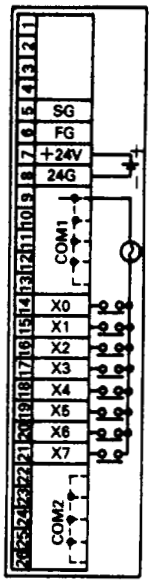
(3) Occupies 1 station.

(4) Uses a batch I/O refresh system.

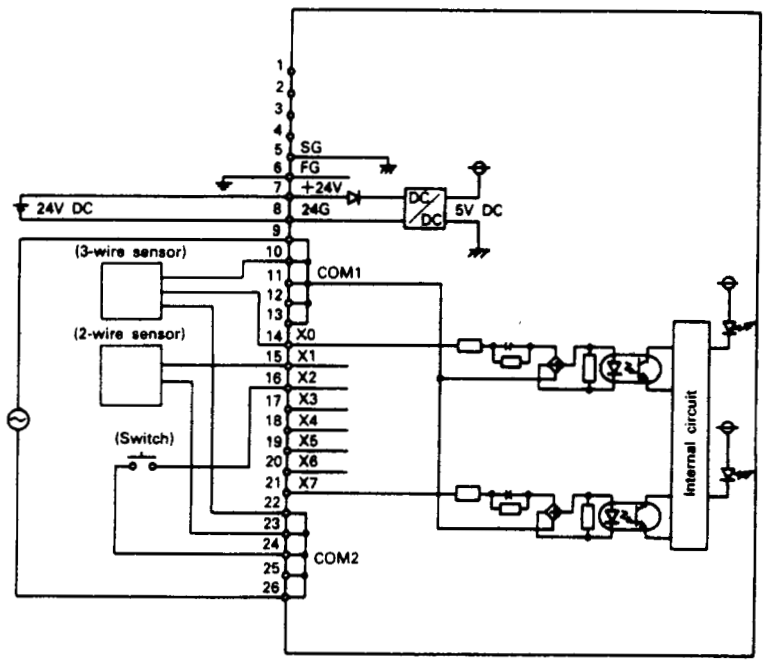
(5) Remote I/O unit for dedicated optical data link operations.

5.1.1 AJ35PJ-8A AC input unit

Specifications \ Type		AC INPUT AJ35PJ-8A	Terminal arrangement
Number of input points		8	
Isolation		Photocoupler	
Rated input voltage		100-120V AC, 50/60Hz	
Rated input current		10mA (100V AC, 60Hz)	
Operating voltage range		85 to 132V AC (50/60Hz ±5%)	
Number of max. simultaneous input points		100% (8 points) switched on simultaneously	
Inrush current		300mA max. within 0.3ms (132V AC)	
ON voltage/ON current		80V AC min./6mA min.	
OFF voltage/OFF current		40V AC max./4mA max.	
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)	
Response time	OFF to ON	15ms max.	
	ON to OFF	25ms max.	
Common		8 points/common (Common terminals: TB9 to TB13)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.04A	
Weight kg (lb)		2.2 (4.84)	



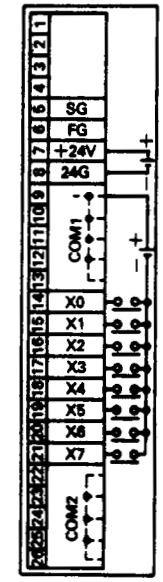
External Connection



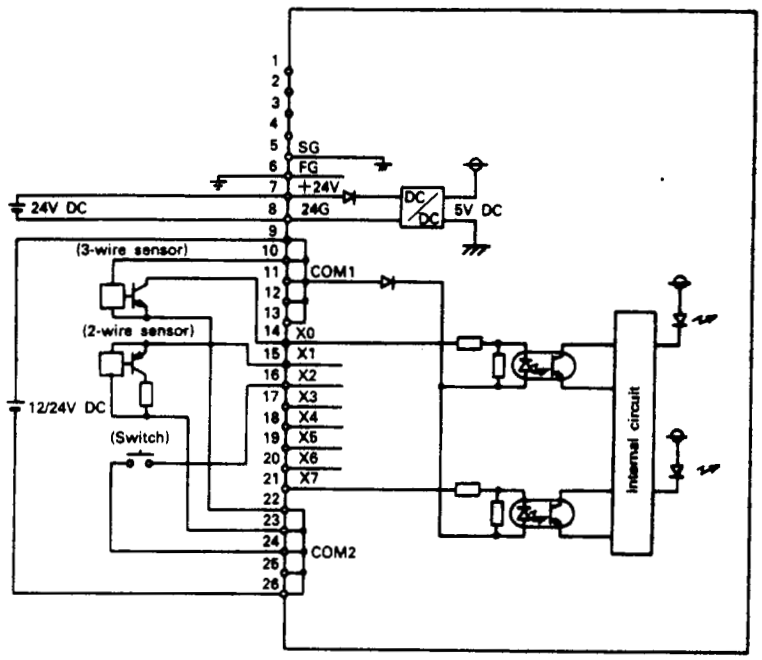
Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	COM1
TB10	COM1
TB11	COM1
TB12	COM1
TB13	COM1
TB14	X0
TB15	X1
TB16	X2
TB17	X3
TB18	X4
TB19	X5
TB20	X6
TB21	X7
TB22	COM2
TB23	COM2
TB24	COM2
TB25	COM2
TB26	COM2

5.1.2 AJ35PJ-8D DC input unit

Specifications \ Type		DC INPUT (sink type)		Terminal arrangement
		AJ35PJ-8D		
Number of input points		8		
Isolation		Photocoupler		
Rated input voltage		12V DC	24V DC	
Rated input current		4mA	10mA	
Operating voltage range		10.2 to 31.2 AC (Ripple ratio: within 5%)		
Number of max. simultaneous input points		100% (8 points) switched on simultaneously		
ON voltage/ON current		9.5V DC min./3mA min.		
OFF voltage/OFF current		6V DC max./1.5mA max.		
Input resistance		Approx. 2.4kΩ		
Response time	OFF to ON	10ms max.		
	ON to OFF	10ms max.		
Common		8 points/common (Common terminals: TB9 to TB13)		
Operation display		ON indication (LED)		
External wire connection		26-point terminal block (M3 screw × 6)		
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))		
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A		
Number of stations occupied		1		
I/O unit power supply	Voltage	15.6 to 31.2V DC		
	Current	0.04A		
Weight kg (lb)		2.2 (4.84)		



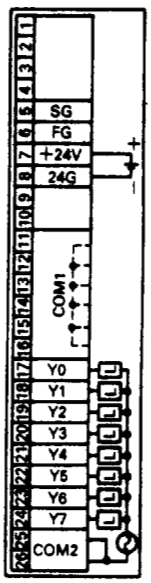
External Connection



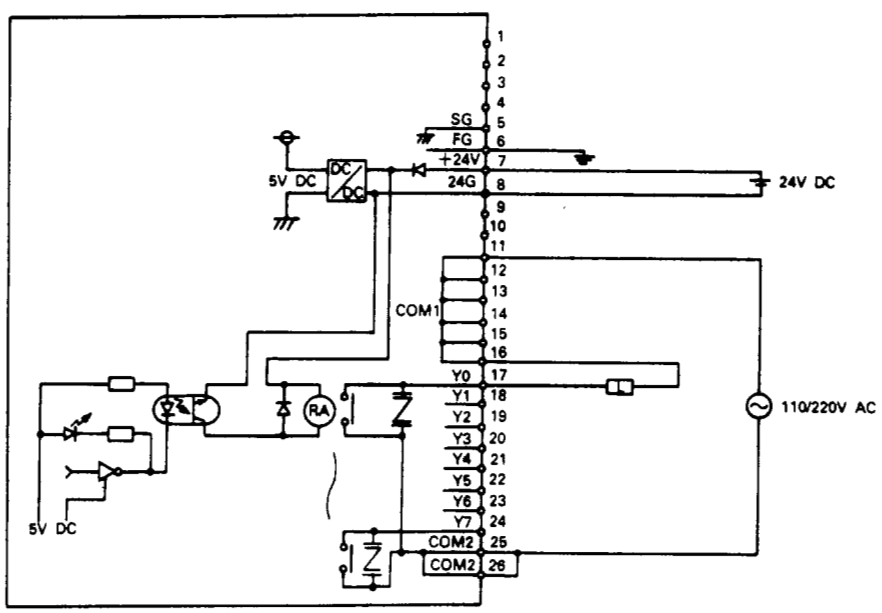
Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	COM1
TB10	COM1
TB11	COM1
TB12	COM1
TB13	COM1
TB14	X0
TB15	X1
TB16	X2
TB17	X3
TB18	X4
TB19	X5
TB20	X6
TB21	X7
TB22	COM2
TB23	COM2
TB24	COM2
TB25	COM2
TB26	COM2

5.1.3 AJ35PJ-8R contact output unit

Specifications \ Type		CONTACT OUTPUT	Terminal arrangement
		AJ35PJ-8R	
Number of output points		8	
Isolation		Photocoupler	
Rated switching voltage, current		24V DC, 2A (resistance load) / 240V AC, 2A (COS ϕ =1) point, 8A/common	
Max. switching load		5V DC, 1mA	
Max. switching voltage		250V AC, 125V DC	
Leakage current at OFF		0.5mA (120V AC, 60Hz), 1.0mA (240V AC, 60Hz)	
Response time	OFF to ON	10ms max.	
	ON to OFF	12ms max.	
Life	Mechanical	20 million times min.	
	Electrical	Rated switching voltage/current load: 200 thousand times min.	
		200V AC/1.5A, 240V AC/1A (COS ϕ =0.7): 200 thousand times min.	
		200V AC/1A, 240V AC/0.5A (COS ϕ =0.35): 200 thousand times min.	
		24V DC/1A, 100V DC/0.1A (L/R = 7ms): 200 thousand times min.	
Max. switching frequency		3600 times/hour	
Noise suppression		Capacitive varistor (430V)	
Common		8 points/common (Common terminals: TB25 to TB26)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	20.4 to 31.2V DC	
	Current	0.13A	
Weight kg (lb)		2.2 (4.84)	



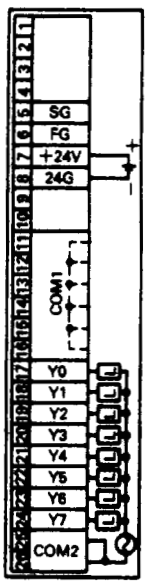
External Connection



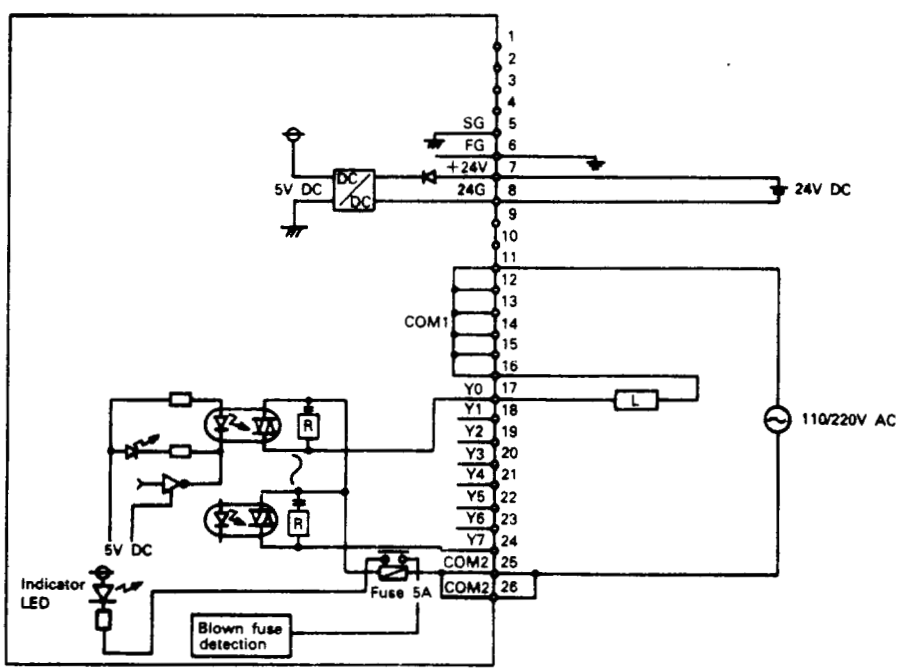
Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	COM1
TB12	COM1
TB13	COM1
TB14	COM1
TB15	COM1
TB16	COM1
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	COM2
TB26	COM2

5.1.4 AJ35PJ-8S1 triac output unit

Specifications \ Type		TRIAC OUTPUT AJ35PJ-8S1	Terminal arrangement
Number of input points		8	
Isolation		Photocoupler	
Rated load voltage		100-240V AC, 40 to 70Hz	
Max. load voltage		264V AC	
Max. load current		0.6A/point, 4A/common	
Min. load voltage/current		24V AC/100mA, 100V AC/10mA, 240V AC/10mA	
Max. inrush current		20A, 10ms max.; 8A, 100ms max.	
Leakage current at OFF		1.5mA (120V AC, 60Hz), 3.0mA (240V AC, 60Hz)	
Max. voltage drop at ON		1.5V max. (100 to 600mA), 1.8V max. (50 to 100mA), 2V max. (10 to 50mA)	
Response time	OFF to ON	1ms max.	
	ON to OFF	0.5 cycles + 1ms max.	
Noise suppression		CR absorber (0.022 μF + 47Ω)	
Fuse rating		Fast-melting fuse 5A (1 fuse per common) HP-50	
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)	
Common		8 points/common (Common terminals: TB25 to TB26)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.08A	
Weight kg (lb)		2.2 (4.84)	



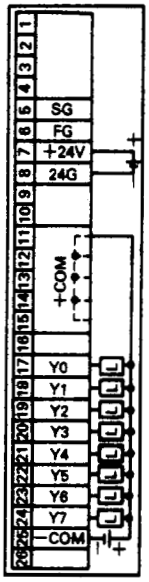
External Connection



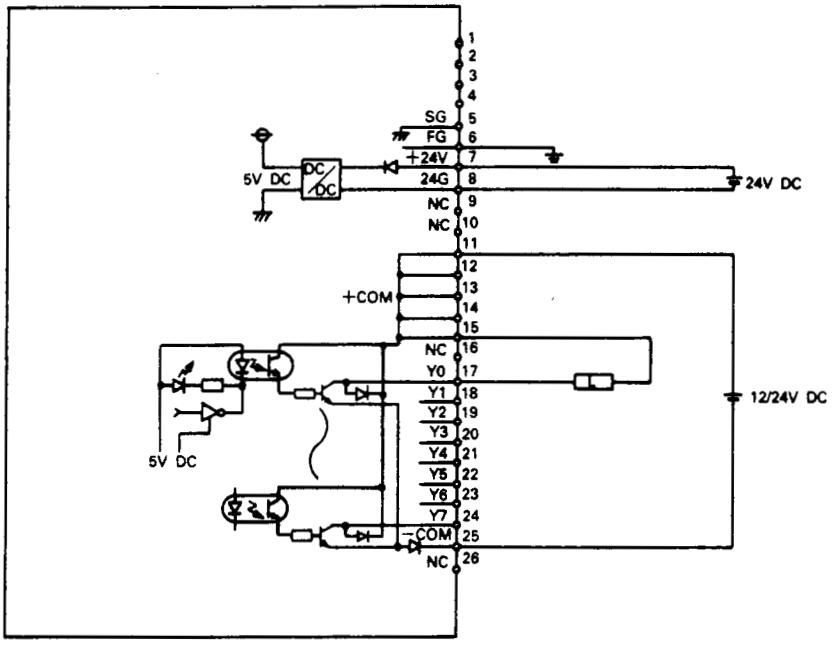
Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	COM1
TB12	COM1
TB13	COM1
TB14	COM1
TB15	COM1
TB16	COM1
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	COM2
TB26	COM2

5.1.5 AJ35PJ-8T1 transistor output unit (sink type)

Specifications \ Type		TRANSISTOR OUTPUT (sink type) AJ35PJ-8T1	Terminal arrangement
Number of output points		8	
Isolation		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 31.2V DC	
Max. load current		0.1A/point, 0.8A/common	
Max. inrush current		0.4A, 100ms max.	
Leakage current at OFF		0.1mA max.	
Max. voltage drop at ON		2.5V (0.1A), 1.75V (5mA), 1.7V (1mA)	
Response time	OFF to ON	2ms max.	
	ON to OFF	2ms max. (resistance load)	
Noise suppression		Clamp diode	
Common		8 points/common (Common terminal: TB25)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.05A	
Output external supply power	Voltage	10.2 to 31.2V DC	
	Current	0.03A (typ. 24V DC)	
Weight kg (lb)		2.2 (4.84)	



External Connection

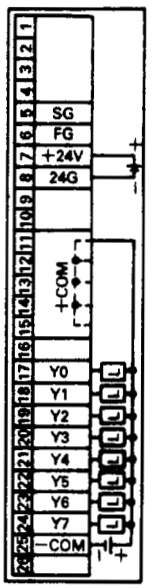


Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	+COM
TB12	+COM
TB13	+COM
TB14	+COM
TB15	+COM
TB16	Vacant
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	−COM
TB26	Vacant

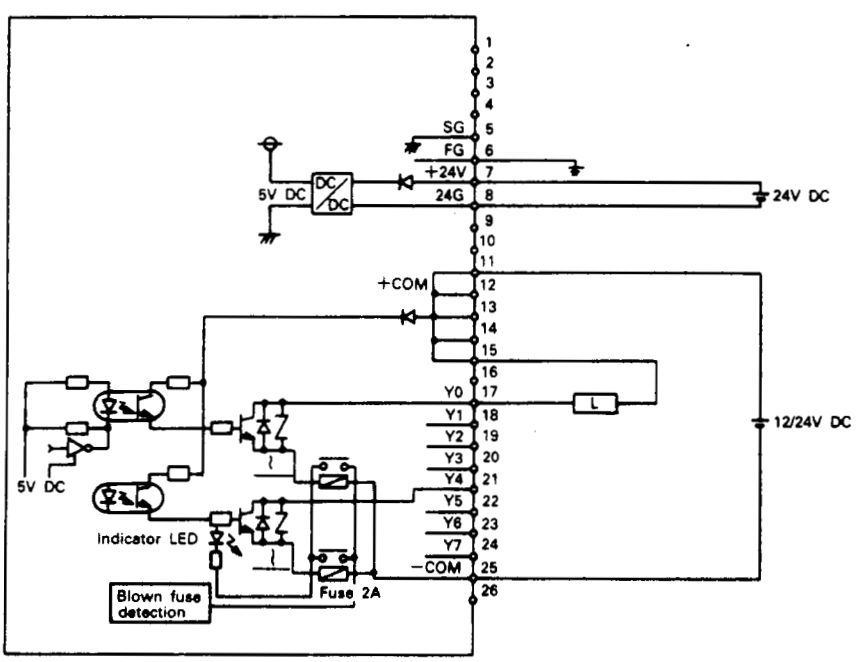
5.1.6 AJ35PJ-8T2 transistor output unit (sink type)

Specifications \ Type		TRANSISTOR OUTPUT (sink type) AJ35PJ-8T2
Number of output points		8
Isolation		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 31.2V DC
Max. load current		0.5A/point, 3.2A/common (1.6A/fuse)
Max. inrush current		7A, 10ms max.; 3.5A, 100ms max.
Leakage current at OFF		0.1mA max.
Max. voltage drop at ON		0.9V (typ.), 0.5A; 1.5V (max.), 0.5A
Response time	OFF to ON	2ms max.
	ON to OFF	2ms max. (resistance load)
Noise suppression		Varistor (52 to 62V)
Fuse rating		Fast-melting fuse 2A (2 fuses per common) MP-20
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)
Common		8 points/common (Common terminal: TB25)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	0.05A
Output external supply power	Voltage	10.2 to 31.2V DC
	Current	0.065A (typ. 24V DC)
Weight kg (lb)		2.2 (4.84)

Terminal arrangement



External Connection

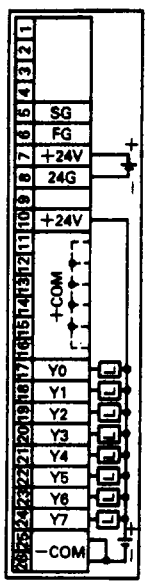


Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	+COM
TB12	+COM
TB13	+COM
TB14	+COM
TB15	+COM
TB16	Vacant
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	−COM
TB26	Vacant

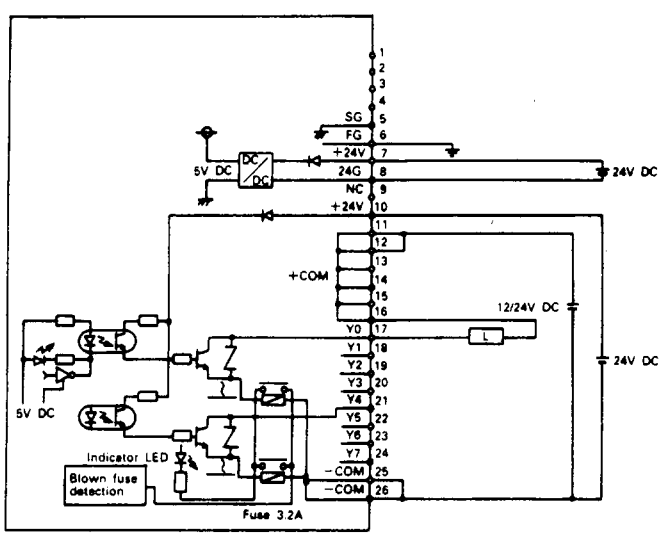
5.1.7 AJ35PJ-8T3 transistor output unit (sink type)

Specifications \ Type		TRANSISTOR OUTPUT (sink type) AJ35PJ-8T3
Number of output points		8
Isolation		Photocoupler
Rated load voltage		12/24V DC *1
Operating load voltage range		21.6 to 31.2V DC (10.2 to 31.2V DC) *1
Max. load current		2A/point, 6A/common (3A/fuse)
Max. inrush current		6A 100ms max.; 10A 10ms max.
Leakage current at OFF		0.1mA max.
Max. voltage drop at ON		1.5V (2A)
Response time	OFF to ON	2ms max.
	ON to OFF	2ms max. (resistance load)
Noise suppression		Varistor (108 to 132V)
Fuse rating		Fast-melting fuse 3.2A (2 fuses per common) MP-32
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)
Common		8 points/common (Common terminals: TB25, TB26)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	0.05A
Output external supply power	Voltage	21.6 to 31.2V DC
	Current	0.065A (typ. 24V DC)
Weight kg (lb)		2.3 (5.06)

Terminal arrangement



External Connection



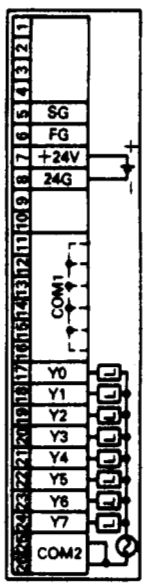
Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	+24V
TB11	+COM
TB12	+COM
TB13	+COM
TB14	+COM
TB15	+COM
TB16	+COM
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	-COM
TB26	-COM

*1: When 12V DC is used as a load power supply, 24V DC is required separately as an output external supply power. In this case, note that the negative terminals are at the same potential as shown above.

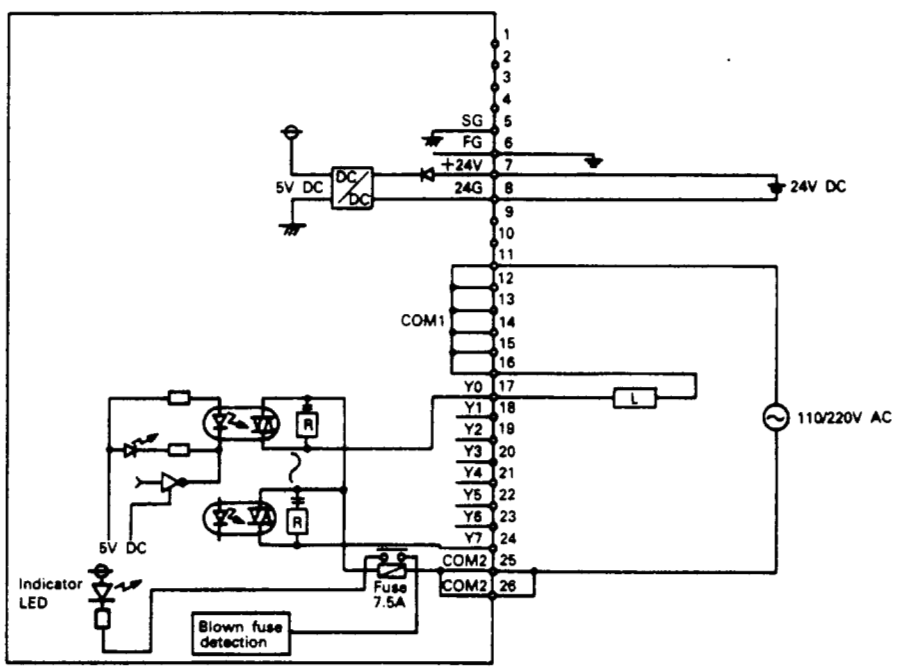
5.1.8 AJ35PJ-8S2 triac output unit

Specifications \ Type		TRIAC OUTPUT AJ35PJ-8S2
Number of output points		8
Isolation		Photocoupler
Rated load voltage		100-240V AC, 50/60Hz ±5%
Max. load current		264V AC
Max. inrush current		2A/point, 5A/common
Min. load voltage/current		24V AC/100mA, 100V AC/10mA, 240V AC/20mA
Max. inrush current		40A 10ms max.; 15A 100ms max.
Leakage current at OFF		1.5mA (120V AC, 60Hz), 3.0mA (240V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (1 to 2A); 1.8V max. (0.2 to 1A); 5V max. (0.2A max.)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Noise suppression		CR absorber (0.022 μF + 47Ω)
Fuse rating		Fast-melting fuse 7.5A (1 fuse per common) GP75R
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)
Common		8 points/common (Common terminals: TB25, TB26)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	0.08A
Weight kg (lb)		2.4 (5.28)

Terminal arrangement



External Connection



Terminal Number	Signal
TB1	Reserved
TB2	Reserved
TB3	Reserved
TB4	Reserved
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	COM1
TB12	COM1
TB13	COM1
TB14	COM1
TB15	COM1
TB16	COM1
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	COM2
TB26	COM2

5.2 Stand-alone Remote I/O Units (for twisted-pair data link)

The casing is made of aluminum diecast to ensure high strength and drip-proof structure.

(1) The protection structure conforms to IP54G (JEM1030).

(2) One unit allows 8-point input or output.

(3) Occupies 1 station.

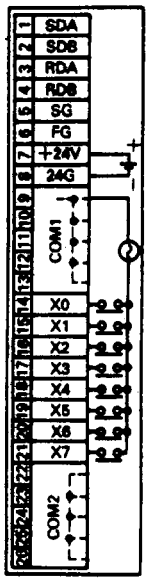
(4) Uses a batch I/O refresh system.

(5) Remote I/O unit for twisted-pair data link operations.

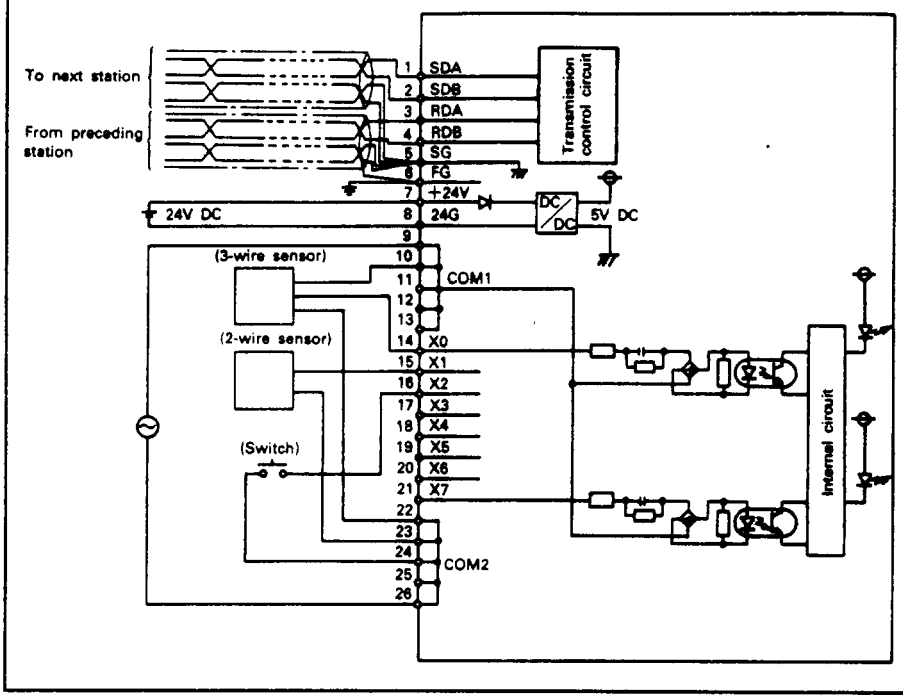
5.2.1 AJ35TJ-8A AC input unit

Specifications \ Type		AC INPUT AJ35TJ-8A
Number of input points		8
Isolation		Photocoupler
Rated input voltage		100-120V AC, 50/60Hz
Rated input current		10mA (100V AC, 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ±5%)
Number of max. simultaneous input points		100% (8 points) switched on simultaneously
Inrush current		300mA max. within 0.3ms (132V AC)
ON voltage/ON current		80V AC min./6mA min.
OFF voltage/OFF current		40V AC max./4mA max.
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF to ON	15ms max.
	ON to OFF	25ms max.
Common		8 points/common (Common terminals: TB9 to TB13)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	0.05A
Weight kg (lb)		2.2 (4.84)

Terminal arrangement



External Connection

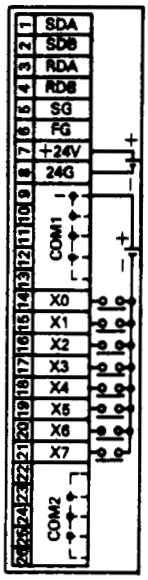


Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	COM1
TB10	COM1
TB11	COM1
TB12	COM1
TB13	COM1
TB14	X0
TB15	X1
TB16	X2
TB17	X3
TB18	X4
TB19	X5
TB20	X6
TB21	X7
TB22	COM2
TB23	COM2
TB24	COM2
TB25	COM2
TB26	COM2

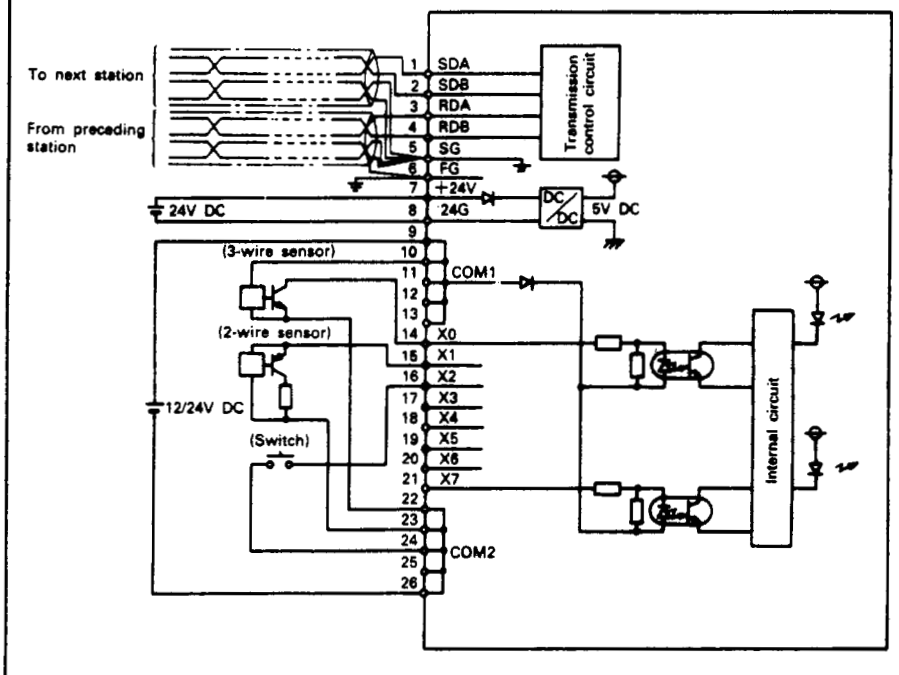
IB (NA) 66215-A

5.2.2 AJ35TJ-8D DC input unit (sink type)

Specifications \ Type		DC INPUT (sink type)	
		AJ35TJ-8D	Terminal arrangement
Number of input points		8	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		4mA	10mA
Operating voltage range		10.2 to 31.2 AC (Ripple ratio: within 5%)	
Number of max. simultaneous input points		100% (8 points) switched on simultaneously	
ON voltage/ON current		9.5V DC min./3mA min.	
OFF voltage/OFF current		6V DC max./1.5mA max.	
Input resistance		Approx. 2.4kΩ	
Response time	OFF to ON	10ms max.	
	ON to OFF	10ms max.	
Common		8 points/common (Common terminals: TB9 to TB13)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.05A	
Weight kg (lb)		2.2 (4.84)	



External Connection

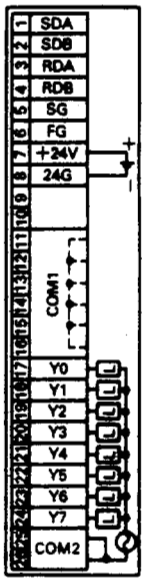


Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	COM1
TB10	COM1
TB11	COM1
TB12	COM1
TB13	COM1
TB14	X0
TB15	X1
TB16	X2
TB17	X3
TB18	X4
TB19	X5
TB20	X6
TB21	X7
TB22	COM2
TB23	COM2
TB24	COM2
TB25	COM2
TB26	COM2

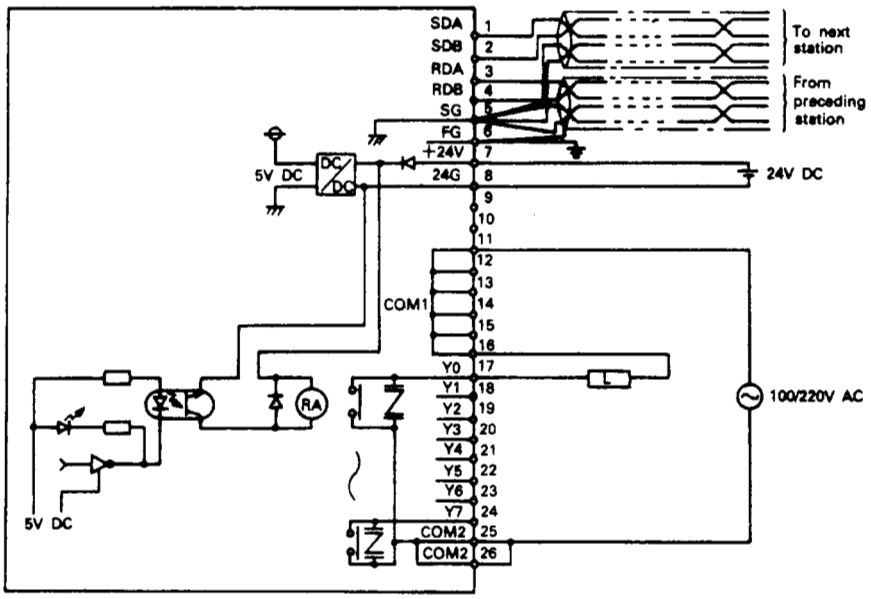
5.2.3 AJ35TJ-8R contact output unit

Specifications \ Type		CONTACT OUTPUT AJ35TJ-8R
Number of output points		8
Isolation		Photocoupler
Rated switching voltage, current		24V DC, 2A (resistance load) / 240V AC, 2A (COSϕ=1) / point, 8A/common
Max. switching load		5V DC, 1mA
Max. switching voltage		250V AC, 125V DC
Leakage current at OFF		0.5mA (120V AC, 60Hz), 1.0mA (240V AC, 60Hz)
Response time	OFF to ON	10ms max.
	ON to OFF	12ms max.
Life	Mechanical	20 million times min.
	Electrical	Rated switching voltage/current load: 200 thousand times min.
		200V AC/1.5A, 240V AC/1A (COSϕ=0.7): 200 thousand times min.
		200V AC/1A, 240V AC/0.5A (COSϕ=0.35): 200 thousand times min.
		24V DC/1A, 100V DC/0.1A (L/R = 7ms): 200 thousand times min.
Max. switching frequency		3600 times/hour
Noise suppression		Capacitive varistor (430V)
Common		8 points/common (Common terminals: TB25 to TB26)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	20.4 to 31.2V DC
	Current	0.13A
Weight kg (lb)		2.2 (4.84)

Terminal arrangement



External Connection

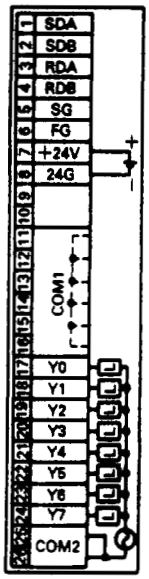


Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	COM1
TB12	COM1
TB13	COM1
TB14	COM1
TB15	COM1
TB16	COM1
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	COM2
TB26	COM2

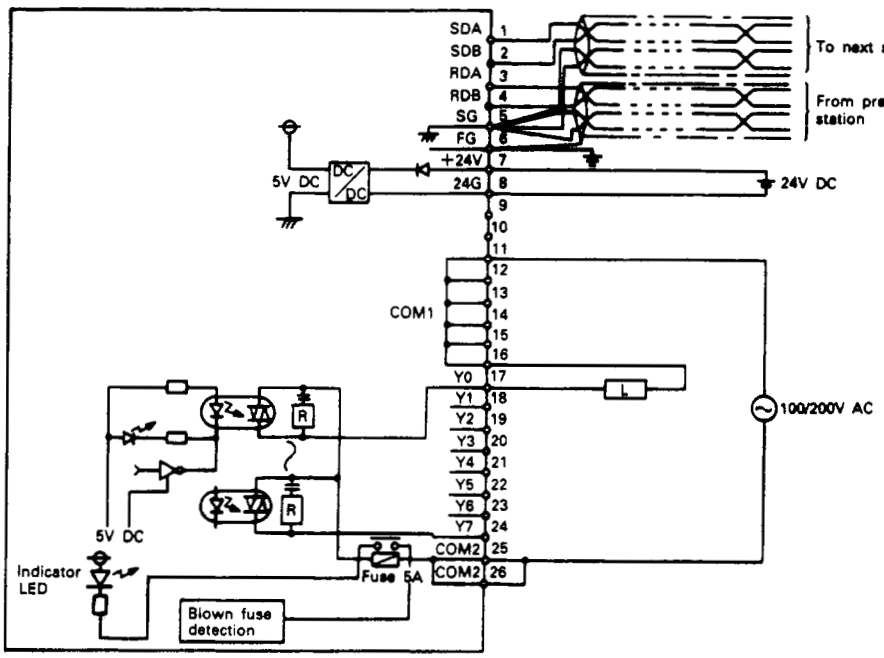
5.2.4 AJ35TJ-8S1 triac output unit

Specifications \ Type		AJ35TJ-8S1
Number of input points		8
Isolation		Photocoupler
Rated load voltage		100-240V AC, 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/point, 4A/common
Min. load voltage/current		24V AC/100mA, 100V AC/10mA, 240V AC/10mA
Max. inrush current		20A, 10ms max.; 8A, 100ms max.
Leakage current at OFF		1.5mA (120V AC, 60Hz), 3.0mA (240V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (100 to 600mA), 1.8V max. (50 to 100mA), 2V max. (10 to 50mA)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Noise suppression		CR absorber (0.022 μF + 47Ω)
Fuse rating		Fast-melting fuse 5A (1 fuse per common) HP-50
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)
Common		8 points/common (Common terminals: TB25 to TB26)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	0.09A
Weight kg (lb)		2.2 (4.84)

Terminal arrangement



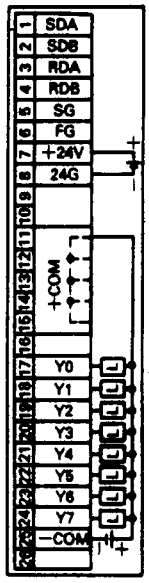
External Connection



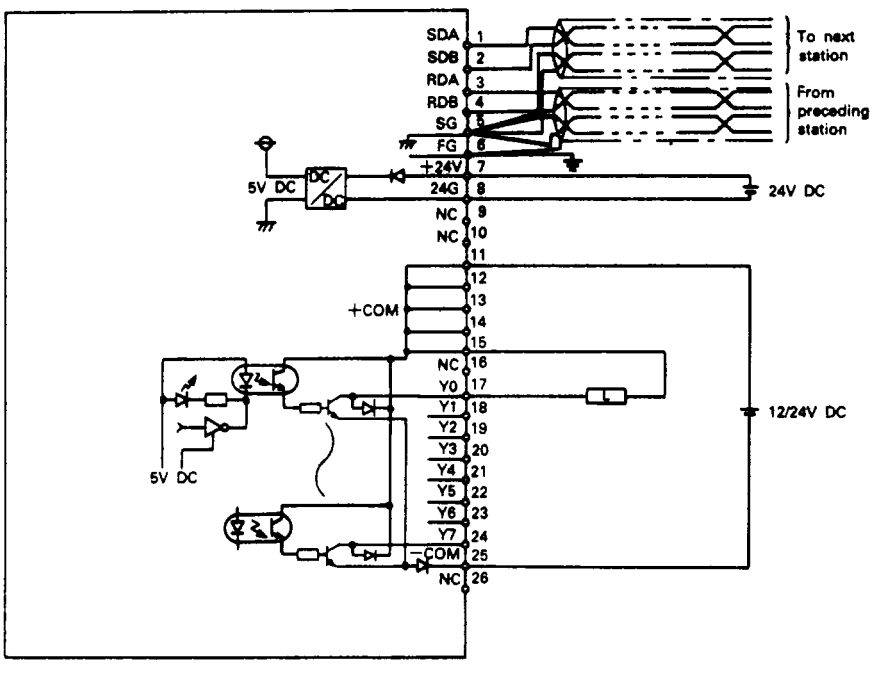
Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	COM1
TB12	COM1
TB13	COM1
TB14	COM1
TB15	COM1
TB16	COM1
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	COM2
TB26	COM2

5.2.5 AJ35TJ-8T1 transistor output unit (sink type)

Specifications \ Type		TRANSISTOR OUTPUT (sink type) AJ35TJ-8T1	Terminal arrangement
Number of output points		8	
Isolation		Photocoupler	
Rated load voltage		12/24V DC	
Operating load voltage range		10.2 to 31.2V DC	
Max. load current		0.1A/point, 0.8A/common	
Max. inrush current		0.4A, 100ms max.	
Leakage current at OFF		0.1mA max.	
Max. voltage drop at ON		2.5V (0.1A), 1.75V (5mA), 1.7V (1mA)	
Response time	OFF to ON	2ms max.	
	ON to OFF	2ms max. (resistance load)	
Noise suppression		Clamp diode	
Common		8 points/common (Common terminal: TB25)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.06A	
Output external supply power	Voltage	10.2 to 31.2V DC	
	Current	0.03A (typ. 24V DC)	
Weight kg (lb)		2.2 (4.84)	



External Connection

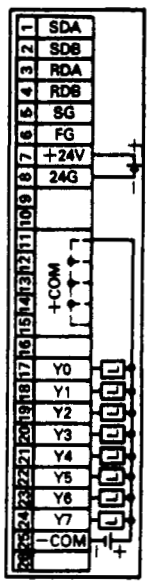


Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	+COM
TB12	+COM
TB13	+COM
TB14	+COM
TB15	+COM
TB16	Vacant
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	−COM
TB26	Vacant

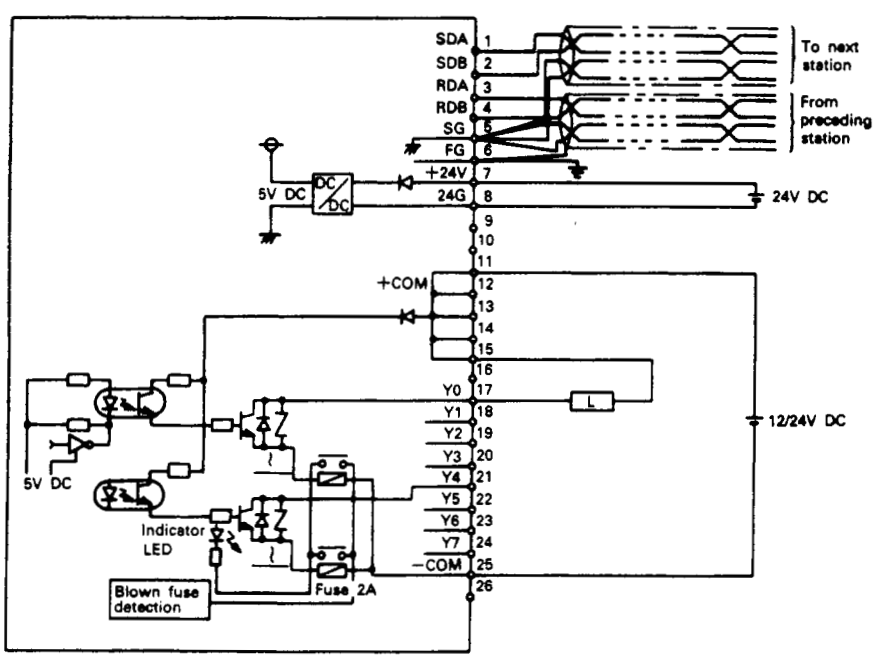
5.2.6 AJ35TJ-8T2 transistor output unit (sink type)

Specifications \ Type		TRANSISTOR OUTPUT (sink type) AJ35TJ-8T2
Number of output points		8
Isolation		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 31.2V DC
Max. load current		0.5A/point, 3.2A/common (1.6A/fuse)
Max. inrush current		7A, 10ms max.; 3.5A, 100ms max.
Leakage current at OFF		0.1mA max.
Max. voltage drop at ON		0.9V (typ.), 0.5A; 1.5V (max.), 0.5A
Response time	OFF to ON	2ms max.
	ON to OFF	2ms max. (resistance load)
Noise suppression		Varistor (52 to 62V)
Fuse rating		Fast-melting fuse 2A (2 fuses per common) MP-20
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)
Common		8 points/common (Common terminal: TB25)
Operation display		ON indication (LED)
External wire connection		26-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		1
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	0.06A
Output external supply power	Voltage	10.2 to 31.2V DC
	Current	0.065A (typ. 24V DC)
Weight kg (lb)		2.2 (4.84)

Terminal arrangement



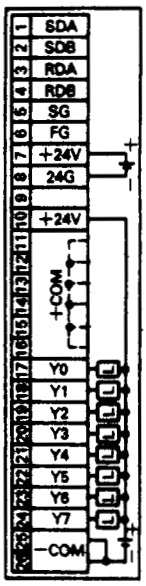
External Connection



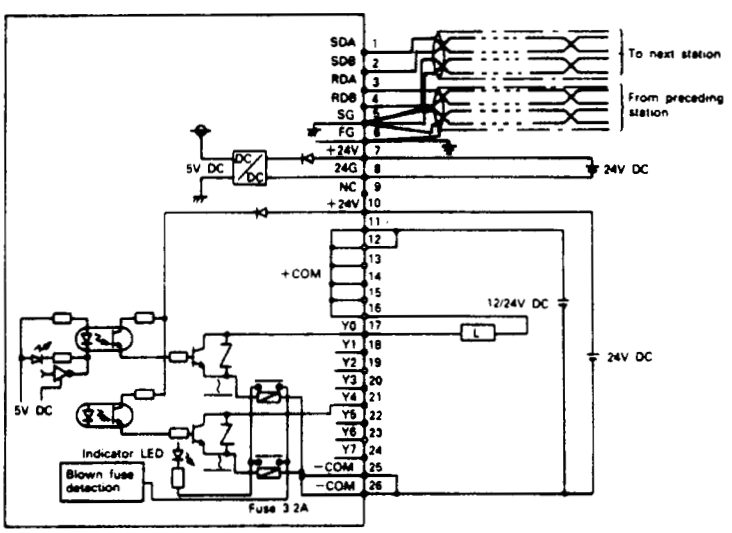
Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	+COM
TB12	+COM
TB13	+COM
TB14	+COM
TB15	+COM
TB16	Vacant
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	−COM
TB26	Vacant

5.2.7 AJ35TJ-8T3 transistor output unit (sink type)

Specifications \ Type		TRANSISTOR OUTPUT (sink type) AJ35TJ-8T3	Terminal arrangement
Number of output points		8	
Isolation		Photocoupler	
Rated load voltage		12/24V DC *1	
Operating load voltage range		21.6 to 31.2V DC (10.2 to 31.2V DC) *1	
Max. load current		2A/point, 6A/common (3A/fuse)	
Max. inrush current		6A, 100ms max.; 10A, 10ms max.	
Leakage current at OFF		0.1mA max.	
Max. voltage drop at ON		1.5V (2A)	
Response time	OFF to ON	2ms max.	
	ON to OFF	2ms max. (resistance load)	
Noise suppression		Varistor (108 to 132V)	
Fuse rating		Fast-melting fuse 3.2A (2 fuses per common) MP-32	
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)	
Common		8 points/common (Common terminals: TB25, TB26)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.06A	
Output external supply power	Voltage	21.6 to 31.2V DC	
	Current	0.065A (typ. 24V DC)	
Weight kg (lb)		2.3 (5.06)	



External Connection

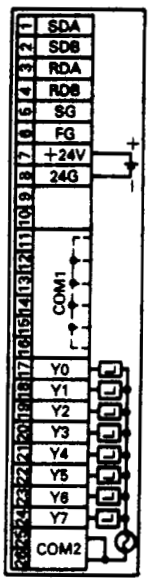


Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	+24V
TB11	+COM
TB12	+COM
TB13	+COM
TB14	+COM
TB15	+COM
TB16	+COM
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	-COM
TB26	-COM

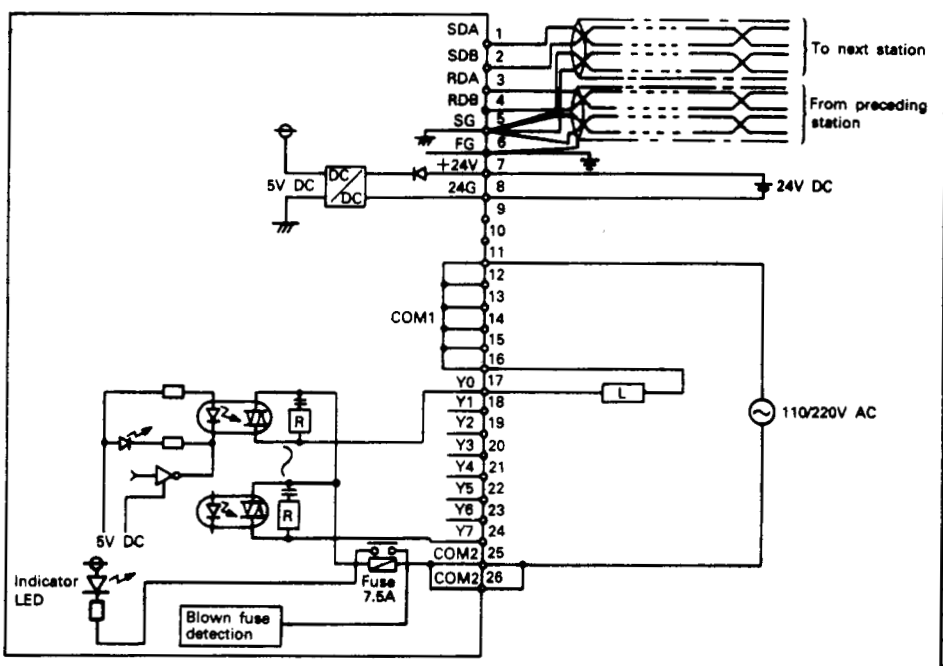
*1: When 12V DC is used as a load power supply, 24V DC is required separately as an output external supply power. In this case, note that the negative terminals are at the same potential as shown above.

5.2.8 AJ35TJ-8S2 triac output unit

Specifications \ Type		TRIAC OUTPUT AJ35TJ-8S2	Terminal arrangement
Number of output points		8	
Isolation		Photocoupler	
Rated load voltage		100-240V AC, 50/60Hz ±5%	
Max. load current		264V AC	
Max. inrush current		2A/point, 5A/common	
Min. load voltage/current		24V AC/100mA, 100V AC/10mA, 240V AC/20mA	
Max. inrush current		40A, 10ms max.; 15A, 100ms max.	
Leakage current at OFF		1.5mA (120V AC, 60Hz), 3.0mA (240V AC, 60Hz)	
Max. voltage drop at ON		1.5V max. (1 to 2A); 1.8V max. (0.2 to 1A); 5V max. (0.2A max.)	
Response time	OFF to ON	1ms max.	
	ON to OFF	0.5 cycles + 1ms max.	
Noise suppression		CR absorber (0.022 μF + 47Ω)	
Fuse rating		Fast-melting fuse 7.5A (1 fuse per common) GP75R	
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)	
Common		8 points/common (Common terminals: TB25, TB26)	
Operation display		ON indication (LED)	
External wire connection		26-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		1	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	0.09A	
Weight kg (lb)		2.4 (5.28)	



External Connection



Terminal Number	Signal
TB1	SDA
TB2	SDB
TB3	RDA
TB4	RDB
TB5	SG
TB6	FG
TB7	+24V
TB8	24G
TB9	Vacant
TB10	Vacant
TB11	COM1
TB12	COM1
TB13	COM1
TB14	COM1
TB15	COM1
TB16	COM1
TB17	Y0
TB18	Y1
TB19	Y2
TB20	Y3
TB21	Y4
TB22	Y5
TB23	Y6
TB24	Y7
TB25	COM2
TB26	COM2

5.3 Compact Remote I/O Units

Same in size as the compact type (A0J2) I/O units.

(1) Units available are 32-point dedicated input, 24-point dedicated output, and 28-point (16-point input, 12-point output) and 56-point (32-point input, 24-point output) compound I/O units.

(2) Occupies 4 or 8 stations.

(3) Uses a batch I/O refresh system.

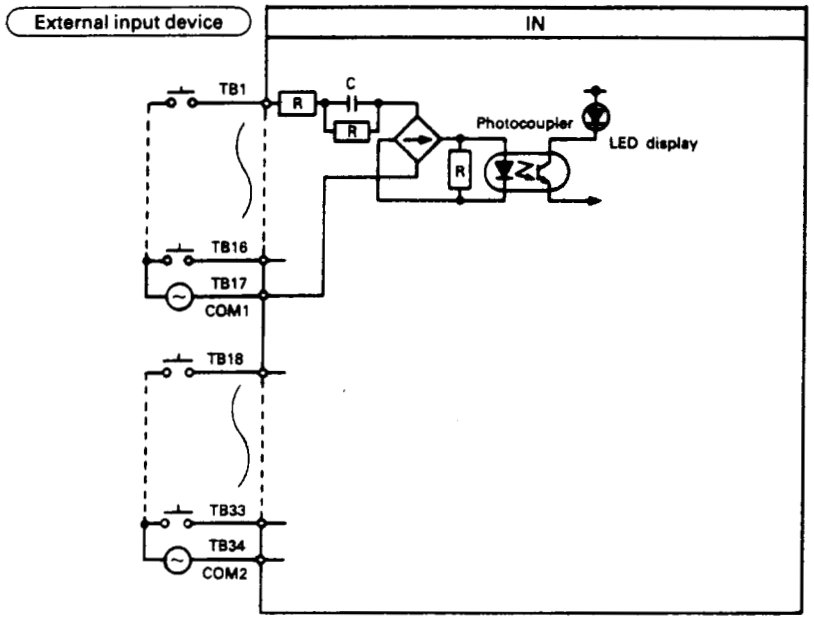
(4) Can be used for both optical and twisted-pair data links.

5.3.1 AJ35PTF-32A AC input unit

INPUT SPECIFICATIONS		
Number of input points		32
Isolation		Photocoupler
Rated input voltage		100-120V AC, 50/60Hz
Rated input current		10mA (100V AC, 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ±5%)
ON voltage/ON current		80V AC min./6mA min.
OFF voltage/OFF current		40V AC max./4mA max.
Inrush current		300mA max. within 0.3ms (132V AC)
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF to ON	15ms max. (6ms typ.)
	ON to OFF	35ms max. (16ms typ.)
Common		16 points/common (Common terminals: TB17, TB34)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on
External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	110mA
Weight kg (lb)		0.75 (1.65)

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection

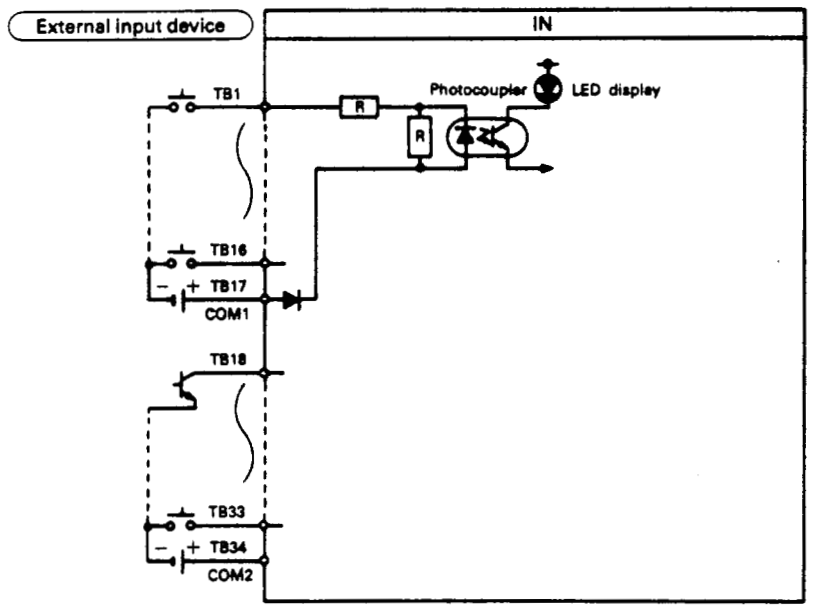


5.3.2 AJ35PTF-32D DC input unit (sink type)

INPUT SPECIFICATIONS			
Number of input points		32	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2 AC (Ripple ratio: within 5%)	
ON voltage/ON current		9.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminals: TB17, TB34)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on	
External wire connection		36-point terminal block (M3 screw × 6)	
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb-inch))	
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied		4	
I/O unit power supply	Voltage	15.6 to 31.2V DC	
	Current	110mA	
Weight kg (lb)		0.70 (1.54)	

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection

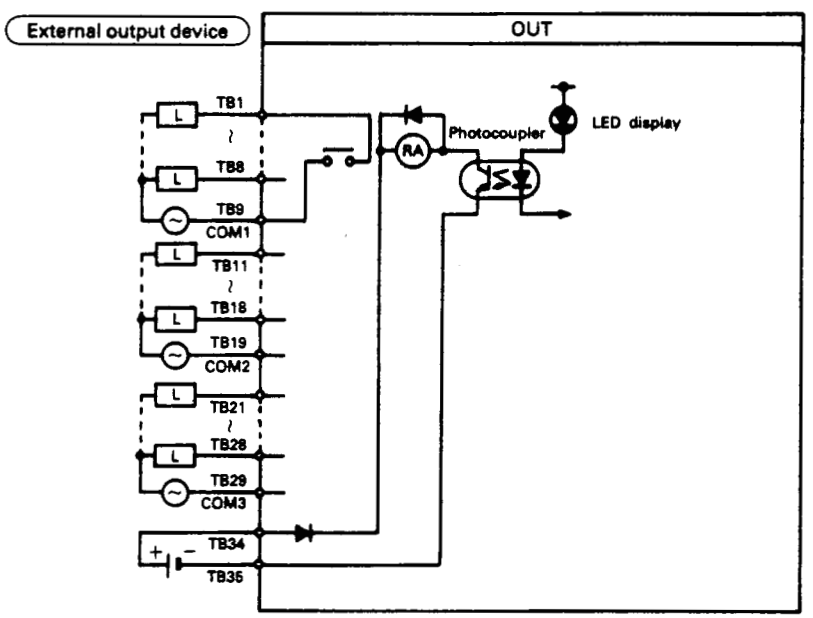


5.3.3 AJ35PTF-24R contact output unit

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated switching voltage, current		24V DC, 2A (resistance load) 240V AC, 2A (COS ϕ = 1) / point, 5A/common
Min. switching load		5V DC/1mA
Max. switching voltage		264V AC, 125V DC
Max. switching frequency		3600 times/hour
Life	Mechanical	20 million times min.
	Electrical	Rated switching voltage/current load: 200 thousand times min.
		200V AC/1.5A, 240V AC/1A (COS ϕ = 0.7): 200 thousand times min.
		200V AC/1A, 240V AC/0.5A (COS ϕ = 0.35): 200 thousand times min.
		24V DC/1A, 100V DC/0.1A (L/R = 7ms): 200 thousand times min.
Response time	OFF to ON	10ms max.
	ON to OFF	12ms max.
Output external supply power (Power for driving relay coil)	Voltage	24V DC 10%, ripple voltage 4Vp-p max.
	Current	220mA (24V DC, all points switched on)
Noise suppression		Not provided
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	120mA
Weight kg (lb)		0.80 (1.76)

OUT	
Terminal Number	Input Signal
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	COM1
TB10	NC
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	X0B
TB15	X0C
TB16	X0D
TB17	Y0E
TB18	Y0F
TB19	COM2
TB20	NC
TB21	Y10
TB22	Y11
TB23	Y12
TB24	Y13
TB25	Y14
TB26	Y15
TB27	Y16
TB28	Y17
TB29	COM3
TB30	NC
TB31	NC
TB32	NC
TB33	NC
TB34	24V DC
TB35	24G DC
TB36	NC

External Connection

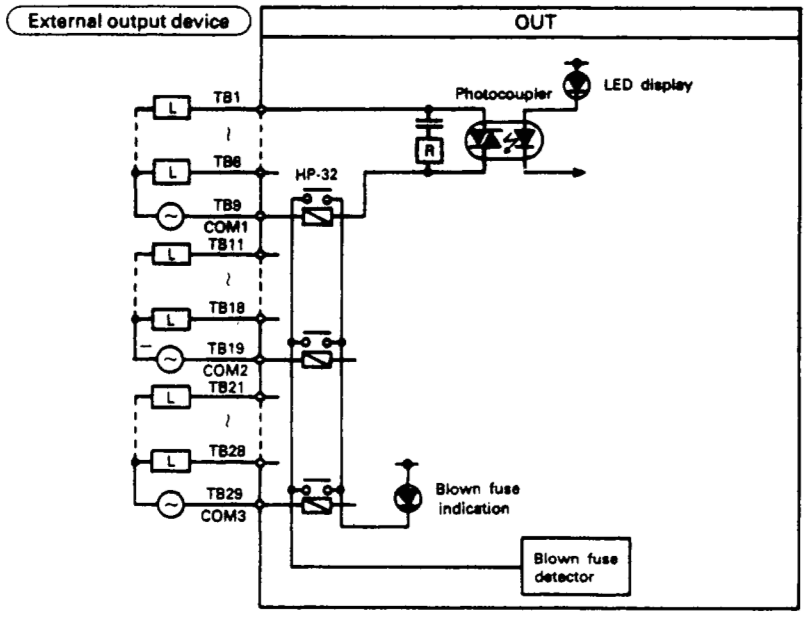


5.3.4 AJ35PTF-24S triac output unit

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated load voltage		100-240V AC, 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/point, 2.4A/common
Min. load voltage/current		24V AC/100mA, 100V/240V AC/10mA
Max. inrush current		20A, 10ms max.; 8A, 100ms max.
Leakage current at OFF		1.5mA (120V AC, 60Hz) 3.0mA (240V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (100 to 600mA), 1.8V max. (50 to 100mA), 2V max. (10 to 50mA)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Fuse rating		Fast-melting fuse 3.2A (1 fuse per common) HP-32
Blown fuse indication		Provided (When fuse is blown, LED is lit to indicate that the station is faulty.)
Noise suppression		CR absorber (0.022 μF + 47Ω)
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	200mA
Weight kg (lb)		0.83 (1.83)

OUT	
Terminal Number	Input Signal
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	COM1
TB10	NC
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	X0B
TB15	X0C
TB16	X0D
TB17	Y0E
TB18	Y0F
TB19	COM2
TB20	NC
TB21	Y10
TB22	Y11
TB23	Y12
TB24	Y13
TB25	Y14
TB26	Y15
TB27	Y16
TB28	Y17
TB29	COM3
TB30	NC
TB31	NC
TB32	NC
TB33	NC
TB34	NC
TB35	NC
TB36	NC

External Connection

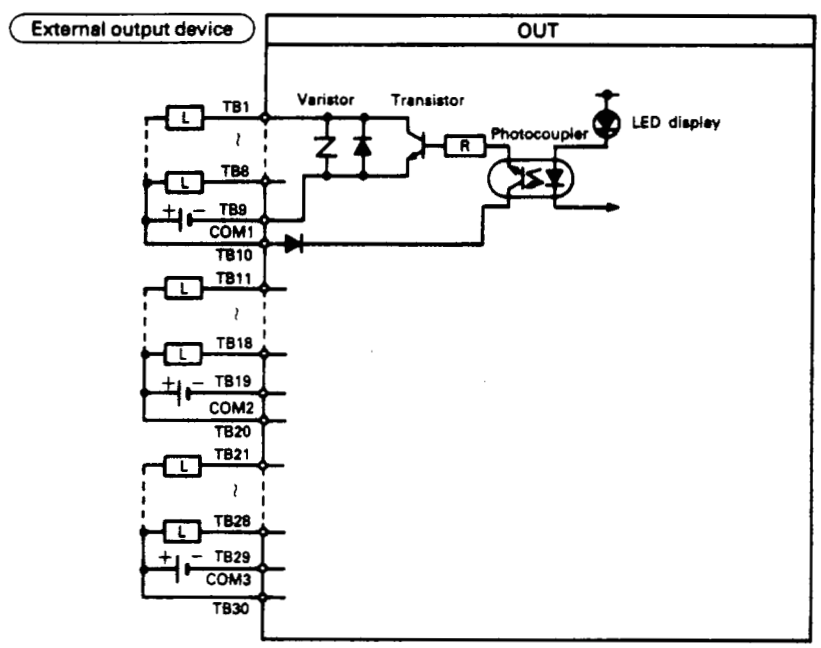


5.3.5 AJ35PTF-24T transistor output unit (sink type)

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 31.2V DC
Max. load current		0.5A/point, 3.2A/common
Max. inrush current		4A, 10ms max.
Leakage current at OFF		0.1mA max.
Max. voltage drop at ON		0.9V (typ.) 0.5A 1.5V (max.) 0.5A
Output type		Sink type
Response time	OFF to ON	2ms max.
	ON to OFF	2ms max. (resistance load)
External supply power	Voltage	12/24V DC (10.2 to 31.2V DC)
	Current	23mA (typ. 24V DC, 8 points/common switched on)
Noise suppression		Varistor (52 to 62V)
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	130mA
Weight kg (lb)		0.73 (1.61)

OUT	
Terminal Number	Input Signal
TB1	Y00
TB2	Y01
TB3	Y02
TB4	Y03
TB5	Y04
TB6	Y05
TB7	Y06
TB8	Y07
TB9	COM1
TB10	12/24V DC
TB11	Y08
TB12	Y09
TB13	Y0A
TB14	X0B
TB15	X0C
TB16	X0D
TB17	Y0E
TB18	Y0F
TB19	COM2
TB20	12/24V DC
TB21	Y10
TB22	Y11
TB23	Y12
TB24	Y13
TB25	Y14
TB26	Y15
TB27	Y16
TB28	Y17
TB29	COM3
TB30	12/24V DC
TB31	NC
TB32	NC
TB33	NC
TB34	NC
TB35	NC
TB36	NC

External Connection



5.3.6 AJ35PTF-28AR AC input and contact output unit

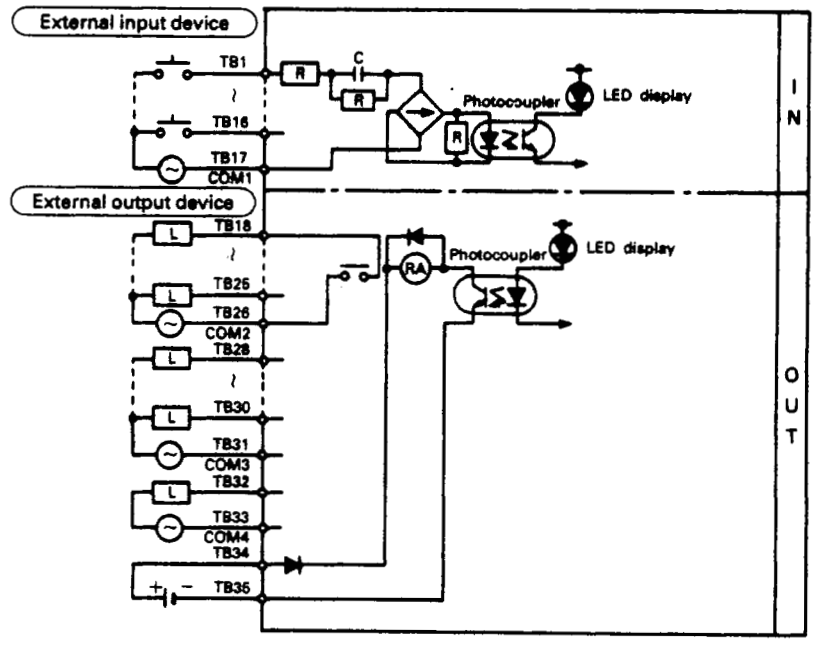
INPUT SPECIFICATIONS		
Number of input points		16
Isolation		Photocoupler
Rated input voltage		100-120V AC, 50/60Hz
Rated input current		10mA (100V AC, 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ±5%)
ON voltage/ON current		80V AC min./6mA min.
OFF voltage/OFF current		40V AC max./4mA max.
Inrush current		300mA max. within 0.3ms (132V AC)
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF to ON	15ms max. (6ms typ.)
	ON to OFF	25ms max. (16ms typ.)
Common		16 points/common (Common terminal: TB17)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on

OUTPUT SPECIFICATIONS		
Number of output points		12
Isolation		Photocoupler
Rated switching voltage/current		24V DC/2A (resistance load) / 240V AC/2A (COS ϕ = 1) / point, 5A/common
Min. switching load		5V DC/1mA
Max. switching voltage		264V AC, 125V DC
Max. switching frequency		3600 times/hour
Life	Mechanical	20 million times min.
	Electrical	Rated switching voltage/current load 200 thousand times min.
		200V AC/1.5A, 240V AC/1A (COS ϕ = 0.7), 200 thousand times min.
		200V AC/1A, 240V AC/0.5A (COS ϕ = 0.35), 200 thousand times min.
		24V DC/1A, 100V DC/0.1A (L/R=7ms), 200 thousand times min.
Response time	OFF to ON	10ms max.
	ON to OFF	12ms max.
Output external supply power (Power for driving relay coil)	Voltage	24V DC ±10%, ripple voltage 4Vp-p max.
	Current	110mA (24V DC, all points switched on)
Noise suppression		Not provided
Common		8 points/common (Common terminal: TB26) 3 points/common (Common terminal: TB31) Independent contact (Common terminal: TB33)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	120mA
Weight kg (lb)		0.78 (1.72)

	Terminal Number	Signal
IN	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM1
OUT	TB18	Y10
	TB19	Y11
	TB20	Y12
	TB21	Y13
	TB22	Y14
	TB23	Y15
	TB24	Y16
	TB25	Y17
	TB26	COM2
	TB27	NC
	TB28	Y18
	TB29	Y19
	TB30	Y1A
	TB31	COM3
	TB32	Y1B
	TB33	COM4
	TB34	24V DC
	TB35	24G DC
	TB36	NC

External Connection



5.3.7 AJ35PTF-28AS AC input and triac output unit

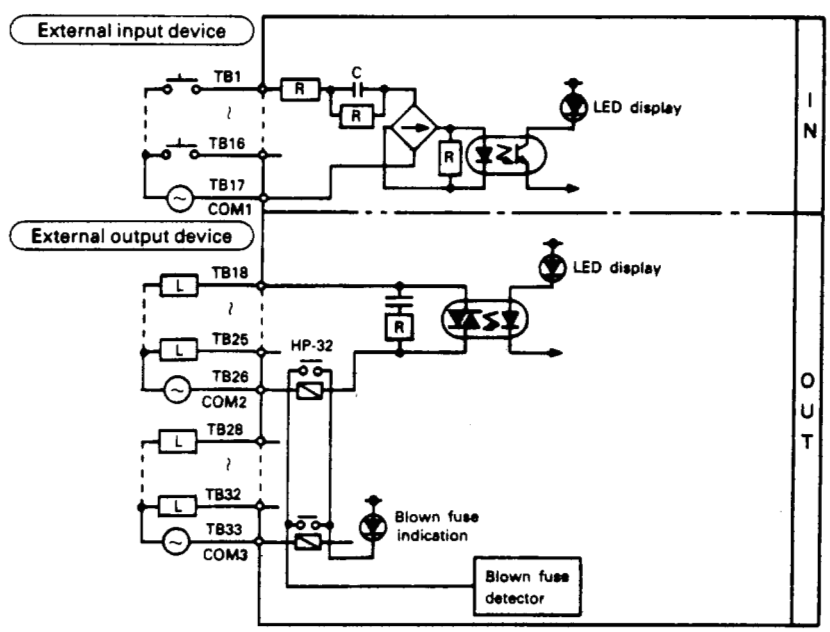
INPUT SPECIFICATIONS		
Number of input points		16
Isolation		Photocoupler
Rated input voltage		100-120V AC, 50/60Hz
Rated input current		10mA (100V AC, 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ±5%)
ON voltage/ON current		80V AC min./6mA min.
OFF voltage/OFF current		40V AC max./4mA max.
Inrush current		300mA max. within 0.3ms (132V AC)
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF to ON	15ms max. (8ms typ.)
	ON to OFF	25ms max. (16ms typ.)
Common		16 points/common (Common terminal: TB17)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on

OUTPUT SPECIFICATIONS		
Number of output points		12
Isolation		Photocoupler
Rated load voltage		100-240V AC, 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/point, 2.4A/common
Min. load voltage/current		24V AC/100mA, 100V/240V AC/10mA
Max. inrush current		20A, 10ms max.; 8A, 100ms max.
Leakage current at OFF		1.5mA (132V AC, 60Hz) 3.0mA (264V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (0.1 to 0.6A), 1.8V max. (50 to 100mA), 2.0V max. (10 to 50mA)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Fuse rating		Fast-melting fuse 3.2A (one fuse per common) HP-32
Blown fuse indication		Provided (When fuse is blown, the LED is lit to indicate that the station is faulty.)
Noise suppression		CR absorber (0.022μF+47Ω)
Common		8 points/common (Common terminal: TB26) 4 points/common (Common terminal: TB33)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	140mA
Weight kg (lb)		0.65 (1.43)

	Terminal Number	Signal
IN	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM1
OUT	TB18	Y10
	TB19	Y11
	TB20	Y12
	TB21	Y13
	TB22	Y14
	TB23	Y15
	TB24	Y16
	TB25	Y17
	TB26	COM2
	TB27	NC
	TB28	Y18
	TB29	Y19
	TB30	Y1A
	TB31	NC
	TB32	Y1B
	TB33	COM3
	TB34	NC
	TB35	NC
	TB36	NC

External Connection



5.3.8 AJ35PTF-28DR DC input and contact output unit (sink type input)

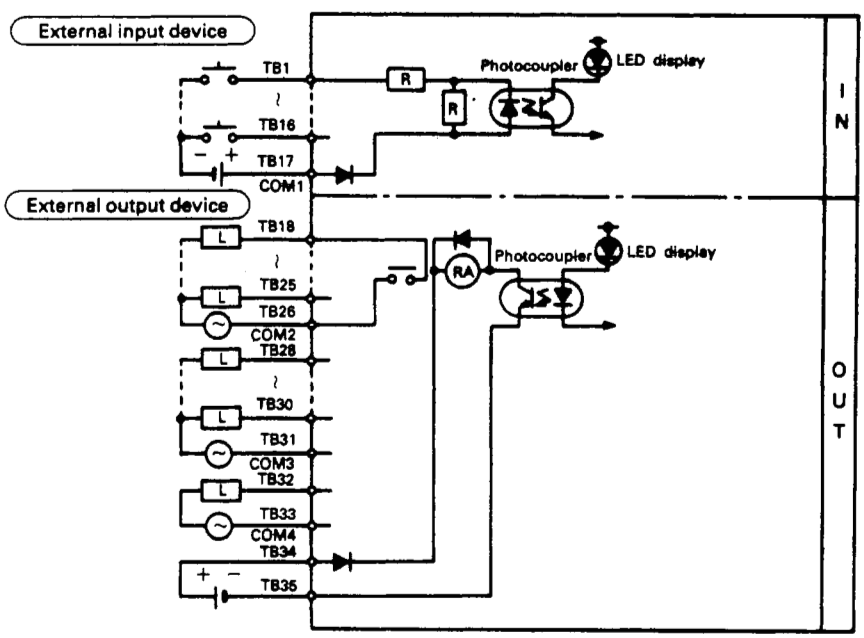
INPUT SPECIFICATIONS			
Number of input points		16	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2V DC (ripple ratio within 5%)	
ON voltage/ON current		9.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminal: TB17)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on	

OUTPUT SPECIFICATIONS		
Number of output points		12
Isolation		Photocoupler
Rated switching voltage/current		24V DC/2A (resistance load)/ point, 5A/common 240V AC/2A (COS ϕ = 1)
Min. switching load		5V DC/1mA
Max. switching voltage		264V AC, 125V DC
Max. switching frequency		3600 times/hour
Life	Mechanical	20 million times min.
	Electrical	Rated switching voltage/current load 200 thousand times min.
		200V AC/1.5A, 240V AC/1A (COS ϕ = 0.7), 200 thousand times min.
		200V AC/1A, 240V AC/0.5A (COS ϕ = 0.35), 200 thousand times min.
		24V DC/1A, 100V DC/0.1A (L/R=7ms), 200 thousand times min.
Response time	OFF to ON	10ms max.
	ON to OFF	12ms max.
Output external supply power (Power for driving relay coil)	Voltage	24V DC ±10%, ripple voltage 4Vp-p max.
	Current	110mA (24V DC, all points switched on)
Noise suppression		Not provided
Common		8 points/common (Common terminal: TB26) 3 points/common (Common terminal: TB31) Independent contact (Common terminal: TB33)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		36-point terminal block (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		4
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	120mA
Weight kg (lb)		0.76 (1.67)

	Terminal Number	Signal
IN	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM1
OUT	TB18	Y10
	TB19	Y11
	TB20	Y12
	TB21	Y13
	TB22	Y14
	TB23	Y15
	TB24	Y16
	TB25	Y17
	TB26	COM2
	TB27	NC
	TB28	Y18
	TB29	Y19
	TB30	Y1A
	TB31	COM3
	TB32	Y1B
	TB33	COM4
	TB34	24V DC
	TB35	24G DC
	TB36	NC

External Connection



5.3.9 AJ35PTF-28DS DC input and triac output unit (sink type input)

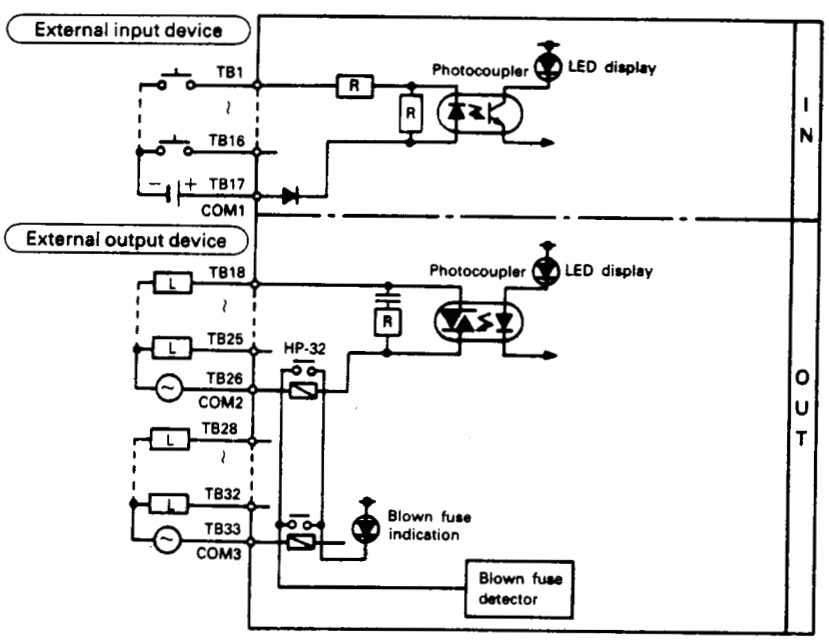
INPUT SPECIFICATIONS			
Number of input points		16	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2V DC (ripple ratio within 5%)	
ON voltage/ON current		9.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminal: TB17)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on	

OUTPUT SPECIFICATIONS		
Number of output points		12
Isolation		Photocoupler
Rated load voltage		100-240V AC, 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/point, 2.4A/common
Min. load voltage/current		24V AC/100mA, 100V/240V AC/10mA
Max. inrush current		20A, 10ms max.; 8A, 100ms max.
Leakage current at OFF		1.5mA (132V AC, 60Hz) 3.0mA (264V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (0.1 to 0.6A), 1.8V max. (50 to 100mA), 2.0V max. (10 to 50mA)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Fuse rating		Fast-melting fuse 3.2A (one fuse per common) HP-32
Blown fuse indication		Provided (When fuse is blown, the LED is lit to indicate that the station is faulty.)
Noise suppression		CR absorber (0.022μF+47Ω)
Common		8 points/common (Common terminal: TB26) 4 points/common (Common terminal: TB33)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection	36-point terminal block (M3 screw × 6)	
Applicable wire size	0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb-inch))	
Applicable solderless terminal	1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied	4	
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	150mA
Weight kg (lb)	0.76 (1.67)	

	Terminal Number	Signal
IN	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM1
OUT	TB18	Y10
	TB19	Y11
	TB20	Y12
	TB21	Y13
	TB22	Y14
	TB23	Y15
	TB24	Y16
	TB25	Y17
	TB26	COM2
	TB27	NC
	TB28	Y18
	TB29	Y19
	TB30	Y1A
	TB31	NC
	TB32	Y1B
	TB33	COM3
	TB34	NC
	TB35	NC
	TB36	NC

External Connection



5.3.10 AJ35PTF-28DT DC input and transistor output unit

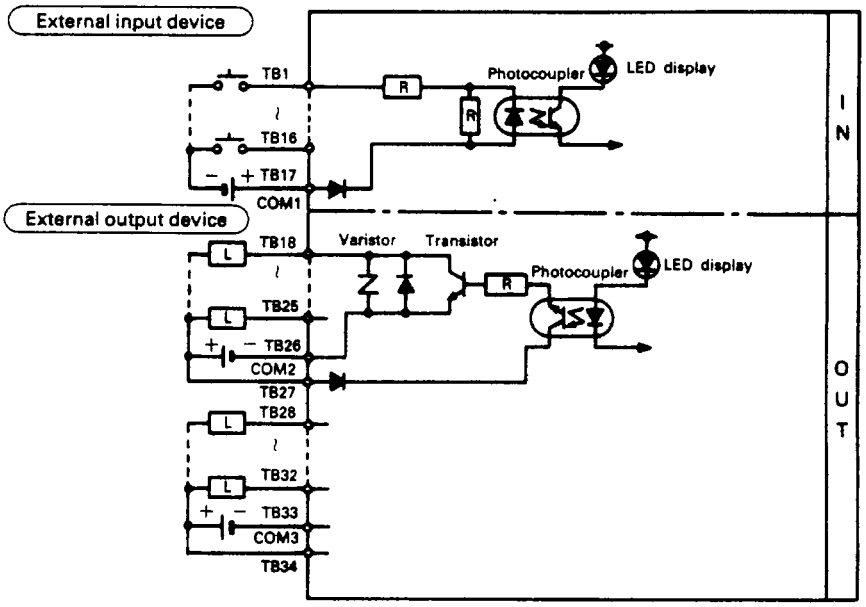
INPUT SPECIFICATIONS			
Number of input points		16	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2V DC (ripple ratio within 5%)	
ON voltage/ON current		9.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminal: TB17)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on	

OUTPUT SPECIFICATIONS		
Number of output points		12
Isolation		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 31.2V DC
Max. load current		0.5A/point, 3.2A/common
Max. inrush current		4A, 10ms max.
Leakage current at OFF		0.1mA max.
Max. voltage drop at ON		0.9V (typ.) 0.5A 1.5V (max.) 0.5A
Output type		Sink type
Response time	OFF to ON	2ms max.
	ON to OFF	2ms max. (resistance load)
Output external supply power	Voltage	12/24V DC (10.2 to 31.2V DC)
	Current	23mA (typ. 24V DC, 8 points/common switched on)
Noise suppression		Varistor (52 to 62V)
Common		8 points/common (Common terminal: TB26) 4 points/common (Common terminal: TB33)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection	36-point terminal block (M3 screw × 6)	
Applicable wire size	0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))	
Applicable solderless terminal	1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A	
Number of stations occupied	4	
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	110mA
Weight kg (lb)	0.65 (1.43)	

	Terminal Number	Signal
IN	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM1
OUT	TB18	Y10
	TB19	Y11
	TB20	Y12
	TB21	Y13
	TB22	Y14
	TB23	Y15
	TB24	Y16
	TB25	Y17
	TB26	COM2
	TB27	12/24V DC
	TB28	Y18
	TB29	Y19
	TB30	Y1A
	TB31	NC
	TB32	Y1B
	TB33	COM3
	TB34	12/24V DC
	TB35	NC
	TB36	NC

External Connection



5.3.11 AJ35PTF-56AR AC input and contact output unit

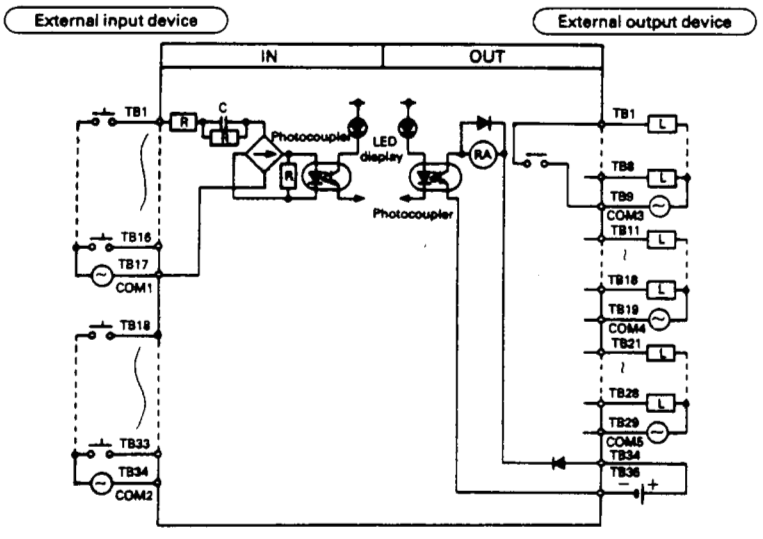
INPUT SPECIFICATIONS		
Number of input points		32
Isolation		Photocoupler
Rated input voltage		100-120V AC, 50/60Hz
Rated input current		10mA (100V AC, 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ±5%)
ON voltage/ON current		80V AC min./6mA min.
OFF voltage/OFF current		40V AC max./4mA max.
Inrush current		300mA max. within 0.3ms (132V AC)
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF to ON	15ms max. (6ms typ.)
	ON to OFF	25ms max. (16ms typ.)
Common		16 points/common (Common terminals: TB17, TB34)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
Number of max. simultaneous input points		100% (16 points/common) simultaneously switched on

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated switching voltage/current		24V DC/2A (resistance load)/ point, 5A/common 240V AC/2A (COS ϕ = 1) / point, 5A/common
Min. switching load		5V DC/1mA
Max. switching voltage		264V AC, 125V DC
Max. switching frequency		3600 times/hour
Life	Mechanical	20 million times min.
	Electrical	Rated switching voltage/current load 200 thousand times min.
		200V AC/1.5A, 240V AC/1A (COS ϕ = 0.7), 200 thousand times min.
		200V AC/1A, 240V AC/0.5A (COS ϕ = 0.35), 200 thousand times min.
		24V DC/1A, 100V DC/0.1A (L/R=7ms), 200 thousand times min.
Response time	OFF to ON	10ms max.
	ON to OFF	12ms max.
Output external supply power (Power for driving relay coil)	Voltage	24V DC ±10%, ripple voltage 4Vp-p max.
	Current	220mA (24V DC, all points switched on)
Noise suppression		Not provided
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		Two 36-point terminal blocks (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		8
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	150mA
Weight kg (lb)		1.20 (2.64)

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection



OUT	
Output Signal	Terminal Number
Y20	TB1
Y21	TB2
Y22	TB3
Y23	TB4
Y24	TB5
Y25	TB6
Y26	TB7
Y27	TB8
COM3	TB9
NC	TB10
Y28	TB11
Y29	TB12
Y2A	TB13
Y2B	TB14
Y2C	TB15
Y2D	TB16
Y2E	TB17
Y2F	TB18
COM4	TB19
NC	TB20
Y30	TB21
Y31	TB22
Y32	TB23
Y33	TB24
Y34	TB25
Y35	TB26
Y36	TB27
Y37	TB28
COM5	TB29
NC	TB30
NC	TB31
NC	TB32
NC	TB33
24V DC	TB34
24G DC	TB35
Vacant	TB36

5.3.12 AJ35PTF-56AS AC input and triac output unit

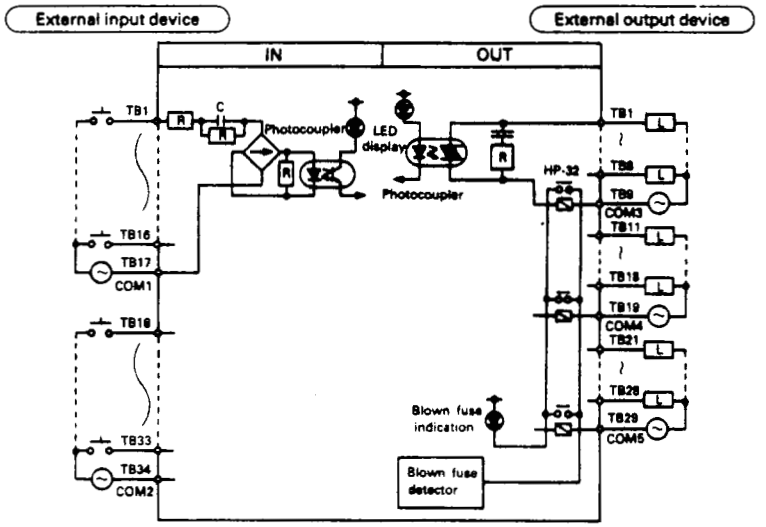
INPUT SPECIFICATIONS		
Number of input points		32
Isolation		Photocoupler
Rated input voltage		100-120V AC, 50/60Hz
Rated input current		10mA (100V AC, 60Hz)
Operating voltage range		85 to 132V AC (50/60Hz ±5%)
ON voltage/ON current		80V AC min./6mA min.
OFF voltage/OFF current		40V AC max./4mA max.
Inrush current		300mA max. within 0.3ms (132V AC)
Input impedance		Approx. 10kΩ (60Hz), approx. 12kΩ (50Hz)
Response time	OFF to ON	15ms max. (6ms typ.)
	ON to OFF	35ms max. (16ms typ.)
Common		16 points/common (Common terminals: TB17, TB34)
Operation display		Provided (LED is lit to indicate that corresponding input is on)
Number of max. simultaneous input points		60% (10 points/common) simultaneously switched on

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated load voltage		100-240V AC, 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/point, 2.4A/common
Min. load voltage/current		24V AC/100mA, 100V/240V AC/10mA
Max. inrush current		20A, 10ms max.; 8A, 100ms max.
Leakage current at OFF		1.5mA (132V AC, 60Hz) 3.0mA (264V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (0.1 to 0.8A), 1.8V max. (0.1A), 2.0V max. (10 to 50mA)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Fuse rating		Fast-melting fuse 3.2A (one fuse per common) HP-32
Blown fuse indication		Provided (When fuse is blown, the LED is lit to indicate that the station is faulty.)
Noise suppression		CR absorber (0.022μF+47Ω)
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		Two 36-point terminal blocks (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		8
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	230mA
Weight kg (lb)		1.10 (2.42)

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection



OUT	
Output Signal	Terminal Number
Y20	TB1
Y21	TB2
Y22	TB3
Y23	TB4
Y24	TB5
Y25	TB6
Y26	TB7
Y27	TB8
COM3	TB9
NC	TB10
Y28	TB11
Y29	TB12
Y2A	TB13
Y2B	TB14
Y2C	TB15
Y2D	TB16
Y2E	TB17
Y2F	TB18
COM4	TB19
NC	TB20
Y30	TB21
Y31	TB22
Y32	TB23
Y33	TB24
Y34	TB25
Y35	TB26
Y36	TB27
Y37	TB28
COM5	TB29
NC	TB30
NC	TB31
NC	TB32
NC	TB33
NC	TB34
NC	TB35
NC	TB36

5.3.13 AJ35PTF-56DR DC input and contact output unit (sink type input)

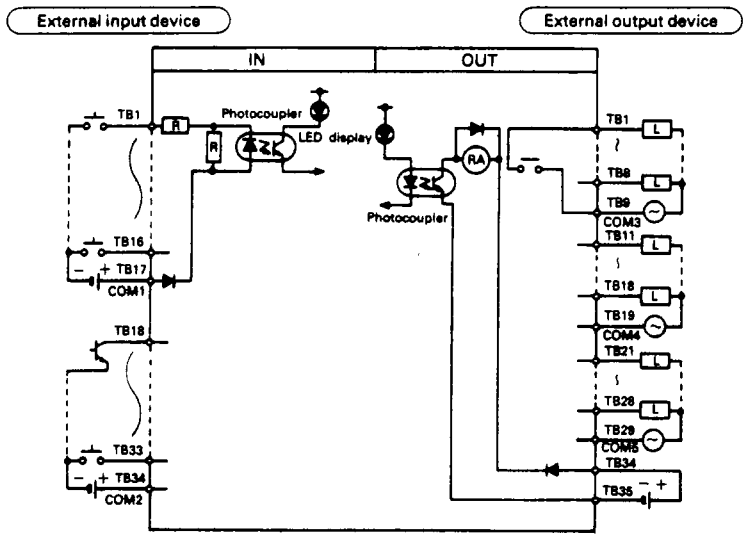
INPUT SPECIFICATIONS			
Number of input points		32	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2V DC (ripple ratio within 5%)	
ON voltage/ON current		9.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminals: TB17, TB34)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		60% (10 points/common) simultaneously switched on	

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated switching voltage, current		24V DC, 2A (resistance load)/ 240V AC, 2A (COSφ=1) / point, 5A/common
Min. switching load		5V DC/1mA
Max. switching voltage		264V AC, 125V DC
Max. switching frequency		3600 times/hour
Life	Mechanical	20 million times min.
	Electrical	Rated switching voltage/current load 200 thousand times min.
		200V AC/1.5A, 240V AC/1A (COSφ=0.7), 200 thousand times min.
		200V AC/1A, 240V AC/0.5A (COSφ=0.35), 200 thousand times min.
		24V DC/1A, 100V DC/0.1A (L/R=7ms), 200 thousand times min.
Response time	OFF to ON	10ms max.
	ON to OFF	12ms max.
Output external supply power (Power for driving relay coil)	Voltage	24V DC ±10%, ripple voltage 4Vp-p max.
	Current	220mA (24V DC, all points switched on)
Noise suppression		Not provided
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		Two 36-point terminal blocks (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		8
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	150mA
Weight kg (lb)		0.98 (2.16)

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection



OUT	
Output Signal	Terminal Number
Y20	TB1
Y21	TB2
Y22	TB3
Y23	TB4
Y24	TB5
Y25	TB6
Y26	TB7
Y27	TB8
COM3	TB9
NC	TB10
Y28	TB11
Y29	TB12
Y2A	TB13
Y2B	TB14
Y2C	TB15
Y2D	TB16
Y2E	TB17
Y2F	TB18
COM4	TB19
NC	TB20
Y30	TB21
Y31	TB22
Y32	TB23
Y33	TB24
Y34	TB25
Y35	TB26
Y36	TB27
Y37	TB28
COM5	TB29
NC	TB30
NC	TB31
NC	TB32
NC	TB33
24V DC	TB34
24G DC	TB35
Vacant	TB36

5.3.14 AJ35PTF-56DS DC input and triac output unit

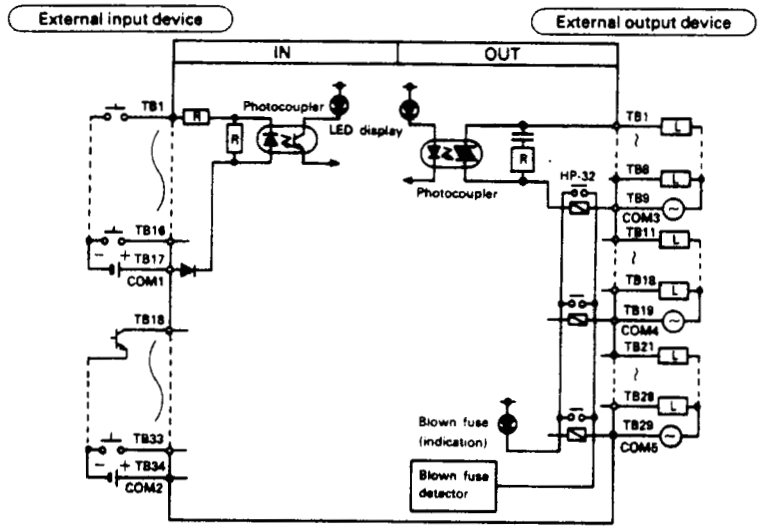
INPUT SPECIFICATIONS			
Number of input points		32	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2V DC (ripple ratio within 5%)	
ON voltage/ON current		9.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminals: TB17, TB34)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		60% (10 points/common) simultaneously switched on	

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated load voltage		100-240V AC, 40 to 70Hz
Max. load voltage		264V AC
Max. load current		0.6A/point, 2.4A/common
Min. load voltage/current		24V AC/100mA, 100V/240V AC/10mA
Max. inrush current		20A, 10ms max.; 8A, 100ms max.
Leakage current at OFF		1.5mA (132V AC, 60Hz) 3.0mA (264V AC, 60Hz)
Max. voltage drop at ON		1.5V max. (0.1 to 0.6A), 1.8V max. (50 to 100mA), 2.0V max. (10 to 50mA)
Response time	OFF to ON	1ms max.
	ON to OFF	0.5 cycles + 1ms max.
Fuse rating		Fast-melting fuse 3.2A (one fuse per common) HP-32
Blown fuse indication		Provided (When fuse is blown, the LED is lit to indicate that the station is faulty.)
Noise suppression		CR absorber (0.022μF+47Ω)
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding output is on.)

External wire connection		Two 36-point terminal blocks (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		8
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	230mA
Weight kg (lb)		1.16 (2.55)

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection



OUT	
Output Signal	Terminal Number
Y20	TB1
Y21	TB2
Y22	TB3
Y23	TB4
Y24	TB5
Y25	TB6
Y26	TB7
Y27	TB8
COM3	TB9
NC	TB10
Y28	TB11
Y29	TB12
Y2A	TB13
Y2B	TB14
Y2C	TB15
Y2D	TB16
Y2E	TB17
Y2F	TB18
COM4	TB19
NC	TB20
Y30	TB21
Y31	TB22
Y32	TB23
Y33	TB24
Y34	TB25
Y35	TB26
Y36	TB27
Y37	TB28
COM5	TB29
NC	TB30
NC	TB31
NC	TB32
NC	TB33
NC	TB34
NC	TB35
NC	TB36

5.3.15 AJ35PTF-56DT DC input and transistor output unit (sink type input and output)

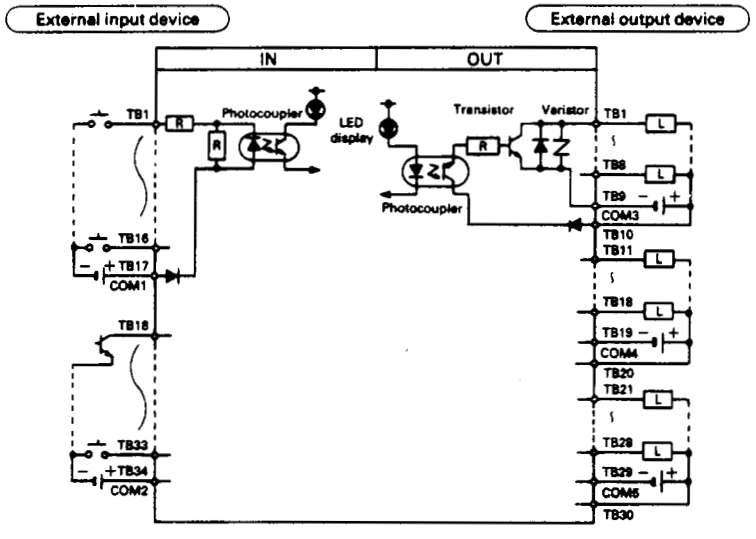
INPUT SPECIFICATIONS			
Number of input points		32	
Isolation		Photocoupler	
Rated input voltage		12V DC	24V DC
Rated input current		3mA	7mA
Operating voltage range		10.2 to 31.2V DC (ripple ratio within 5%)	
ON voltage/ON current		8.5V DC min./2.6mA min.	
OFF voltage/OFF current		6V DC max./1.0mA max.	
Input resistance		Approx. 3.4kΩ	
Input type		Sink type	
Response time	OFF to ON	10ms max. (6ms typ.)	
	ON to OFF	10ms max. (7.5ms typ.)	
Common		16 points/common (Common terminals: TB17, TB34)	
Operation display		Provided (LED is lit to indicate that corresponding input is on)	
Number of max. simultaneous input points		60% (10 points/common) simultaneously switched on	

OUTPUT SPECIFICATIONS		
Number of output points		24
Isolation		Photocoupler
Rated load voltage		12/24V DC
Operating load voltage range		10.2 to 31.2V DC
Max. load current		0.5A/point, 3.2A/common
Max. inrush current		4A, 10ms max.
Leakage current at OFF		0.1mA max.
Max. voltage drop at ON		0.9V (typ.) 0.5A, 1.5V (max.) 0.5A
Output type		Sink type
Response time	OFF to ON	2ms max.
	ON to OFF	2ms max. (resistance load)
Output external supply power	Voltage	12/24V DC (10.2 to 31.2V DC)
	Current	23mA (typ. 24V DC, 8 points/common switched on)
Noise suppression		Varistor (52 to 62V)
Common		8 points/common (Common terminals: TB9, TB19, TB29)
Operation display		Provided (LED is lit to indicate that corresponding output is on)

External wire connection		Two 36-point terminal blocks (M3 screw × 6)
Applicable wire size		0.75 to 2mm² (18 to 14 AWG) (tightening torque: 7kg·cm (6.06lb·inch))
Applicable solderless terminal		1.25-3, 1.25-YS3A, 2-S3, 2-YS3A, V1.25-3, V1.25-YS3A, V2-S3, V2-YS3A
Number of stations occupied		8
I/O unit power supply	Voltage	15.6 to 31.2V DC
	Current	160mA
Weight kg (lb)		1.09 (2.40)

IN	
Terminal Number	Input Signal
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM1
TB18	X10
TB19	X11
TB20	X12
TB21	X13
TB22	X14
TB23	X15
TB24	X16
TB25	X17
TB26	X18
TB27	X19
TB28	X1A
TB29	X1B
TB30	X1C
TB31	X1D
TB32	X1E
TB33	X1F
TB34	COM2
TB35	NC
TB36	NC

External Connection



OUT	
Output Signal	Terminal Number
Y20	TB1
Y21	TB2
Y22	TB3
Y23	TB4
Y24	TB5
Y25	TB6
Y26	TB7
Y27	TB8
COM3	TB9
12/24V DC	TB10
Y28	TB11
Y29	TB12
Y2A	TB13
Y2B	TB14
Y2C	TB15
Y2D	TB16
Y2E	TB17
Y2F	TB18
COM4	TB19
12/24V DC	TB20
Y30	TB21
Y31	TB22
Y32	TB23
Y33	TB24
Y34	TB25
Y35	TB26
Y36	TB27
Y37	TB28
COM5	TB29
12/24V DC	TB30
NC	TB31
NC	TB32
NC	TB33
NC	TB34
NC	TB35
NC	TB36

5.4 AJ72PT35 Data Link Module

The AJ72PT35 allows the A series building block type I/O modules to be used on a remote I/O station.

(1) Loaded on the CPU slot of the main base unit.

(2) One module allows up to 128 I/O points to be used.

(3) Allows the number of stations occupied to be specified by the switch between 4 and 16 in increments of 4.

(4) Uses a batch I/O refresh system.

(5) Can be used for both optical and twisted-pair data links.

Specifications \ Type		AJ72PT35	Remarks
AJ72PT35 each	Max. number of I/O modules	8	
	Max. number of I/O points	128	
	Number of stations occupied	4, 8, 12, 16 (Selected by the occupied station number setting switch)	The number of I/O points is set to 32, 64, 96 or 128 in accordance with the setting of the occupied stations.
Base unit used		A32B, A35B, A38B	Extension base must not be used.
Modules used		Building block type input, output, I/O compound (treated as output), and blank modules	Special modules must not be used.
5V DC internal current consumption		0.5A	
Weight		0.75kg	

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 I/O stations.

(1) Error which only stops data communication with the faulty remote I/O station.

(2) Error which stops data communication with all remote I/O stations.

REMARKS

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) 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 4.4.

(2) Stores the faulty station number to buffer memory addresses 100-103,

(a) Sets 1 to the corresponding bit.
(b) In the automatic return mode, the corresponding bit is reset to 0 when the faulty station is restored.
(c) In the no-automatic return mode, the corresponding bit remains 1.

(3) Stores the accumulative faulty station numbers to buffer memory addresses 90-93. This area stores the accumulative result of faulty stations explained in (2).

(4) 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.

(5) 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.

(6) Switches on the "ERR. REM" LED of the master module.

(7) Switches off all outputs of the faulty station in the no-automatic return mode.

POINT

The data communication continue error may occur when:

(1) The total number of remote I/O stations connected does not coincide with the number of remote I/O 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) 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.

Error Code	Definition	Cause
0	No error	———
1	Initial data error	I/O refresh has been initiated after while there are errors in the setting of: • total number of remote I/O stations • number of retries • partial refresh stations • line error check • parameter for the no-protocol mode
2	Line error	Any data link cable has been broken or remote I/O station power switched OFF.
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).
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).

Table 6.1 Communication Error Code List

(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:

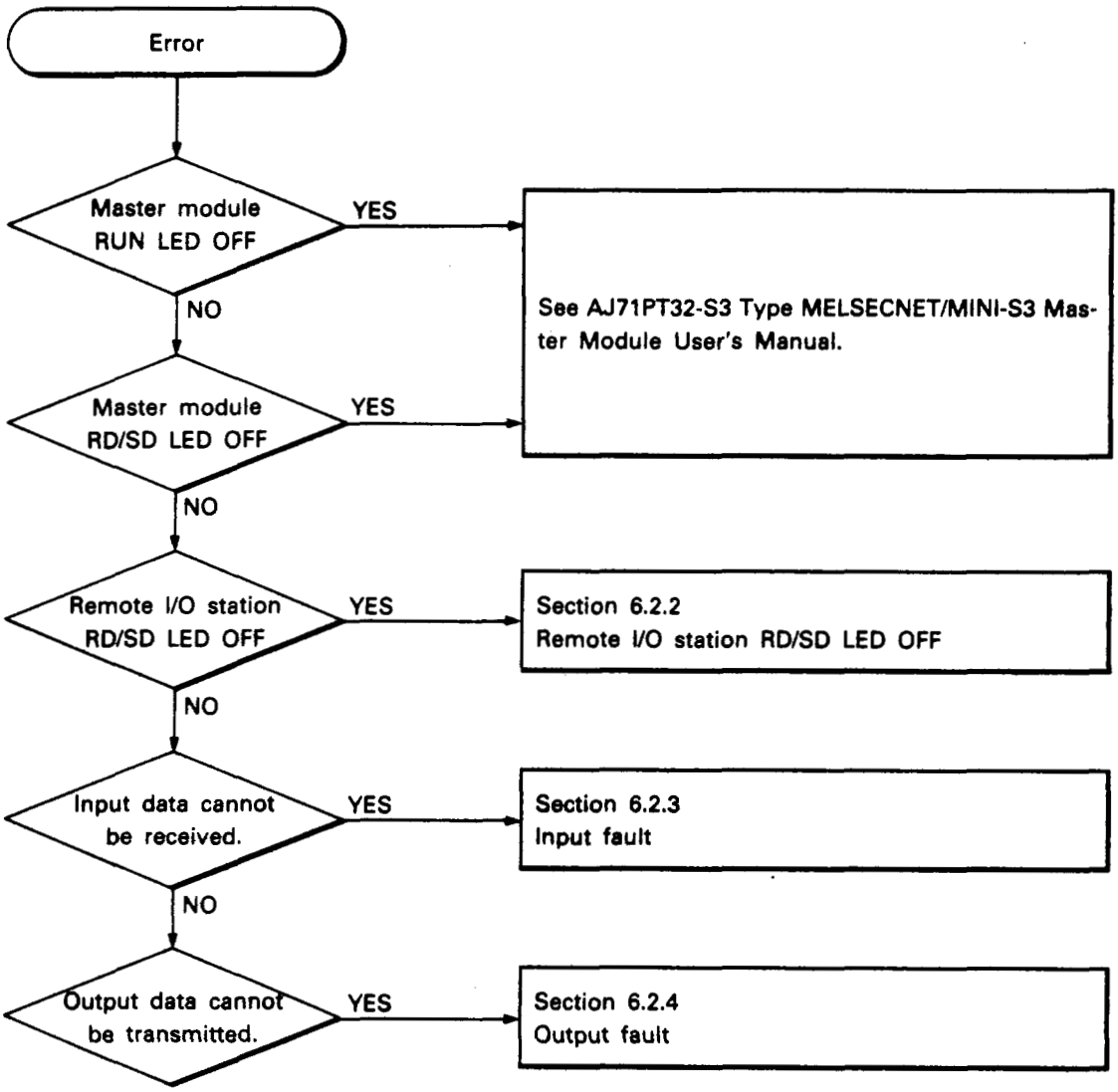
(a) Turning the MINI-S3 link communication start signal from OFF to ON.
(b) Turning the error reset signal ($Y_{(n+10)}/Y_{(n+20)}$) from OFF to ON with the MINI-S3 link communication start ($Y_{(n+18)}/Y_{(n+28)}$) OFF.

(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 Troubleshooting

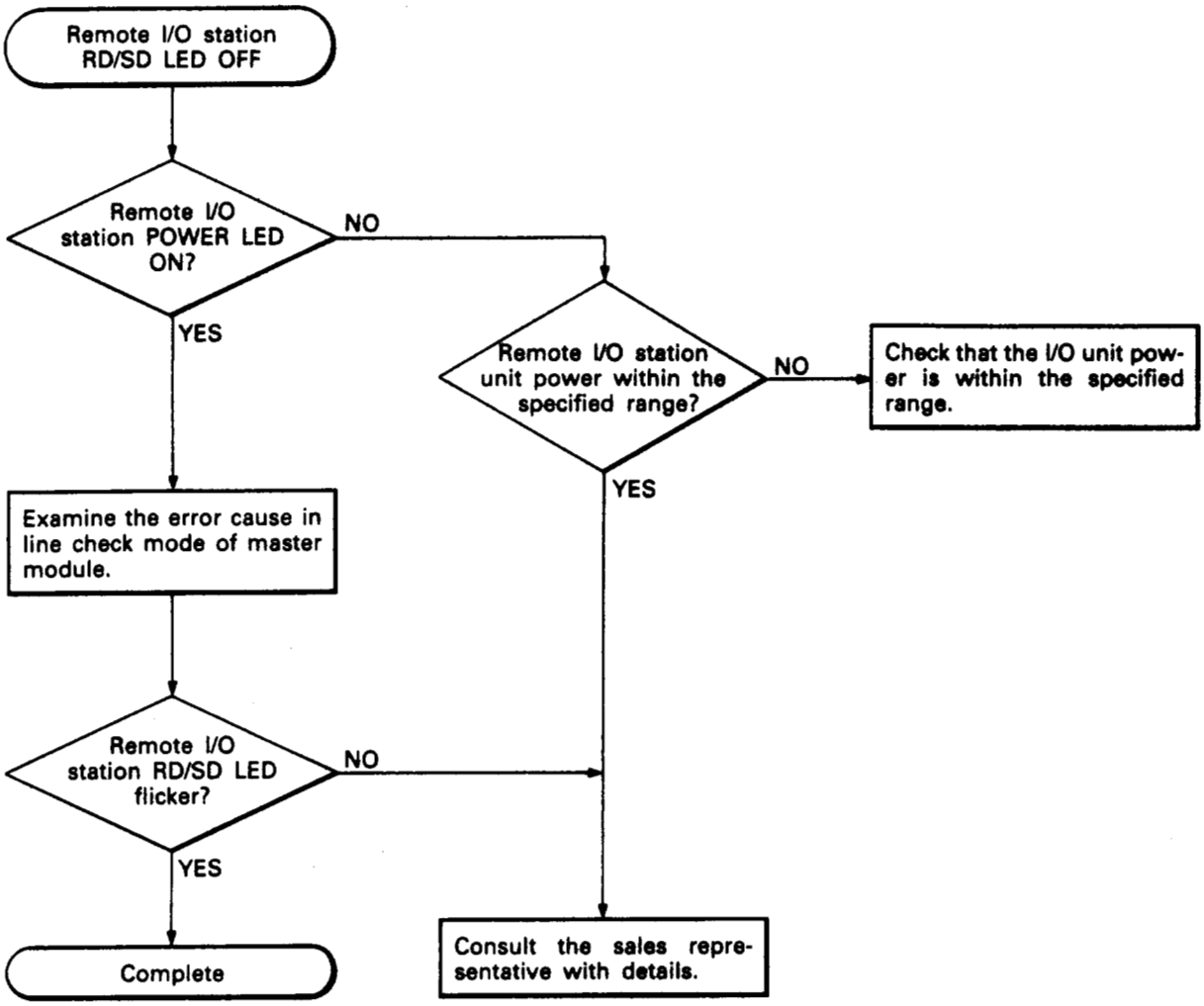
For information on PC CPU unit troubleshooting, see the corresponding CPU User's Manual.

6.2.1 General troubleshooting flowchart

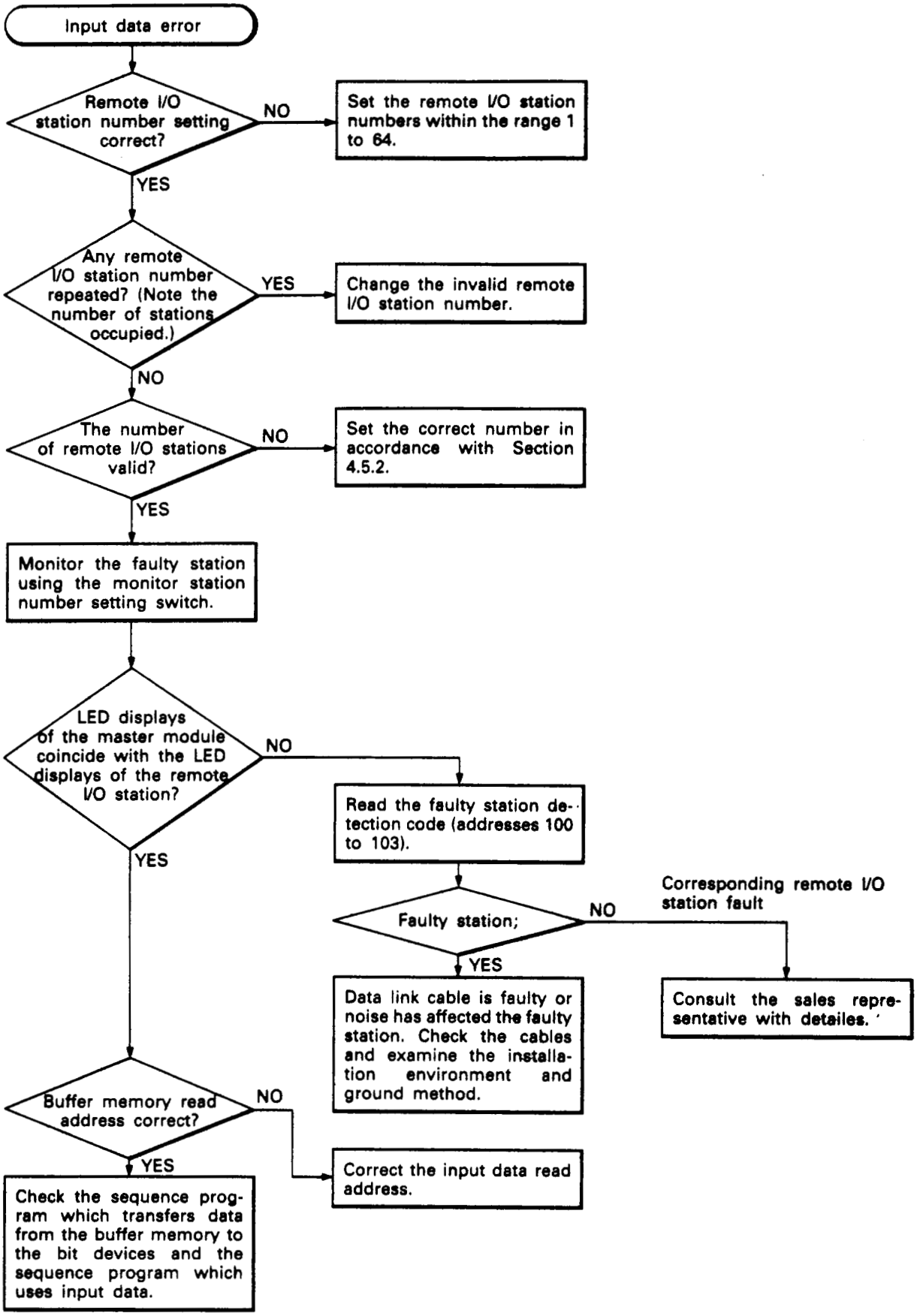


IB (NA) 66215-A

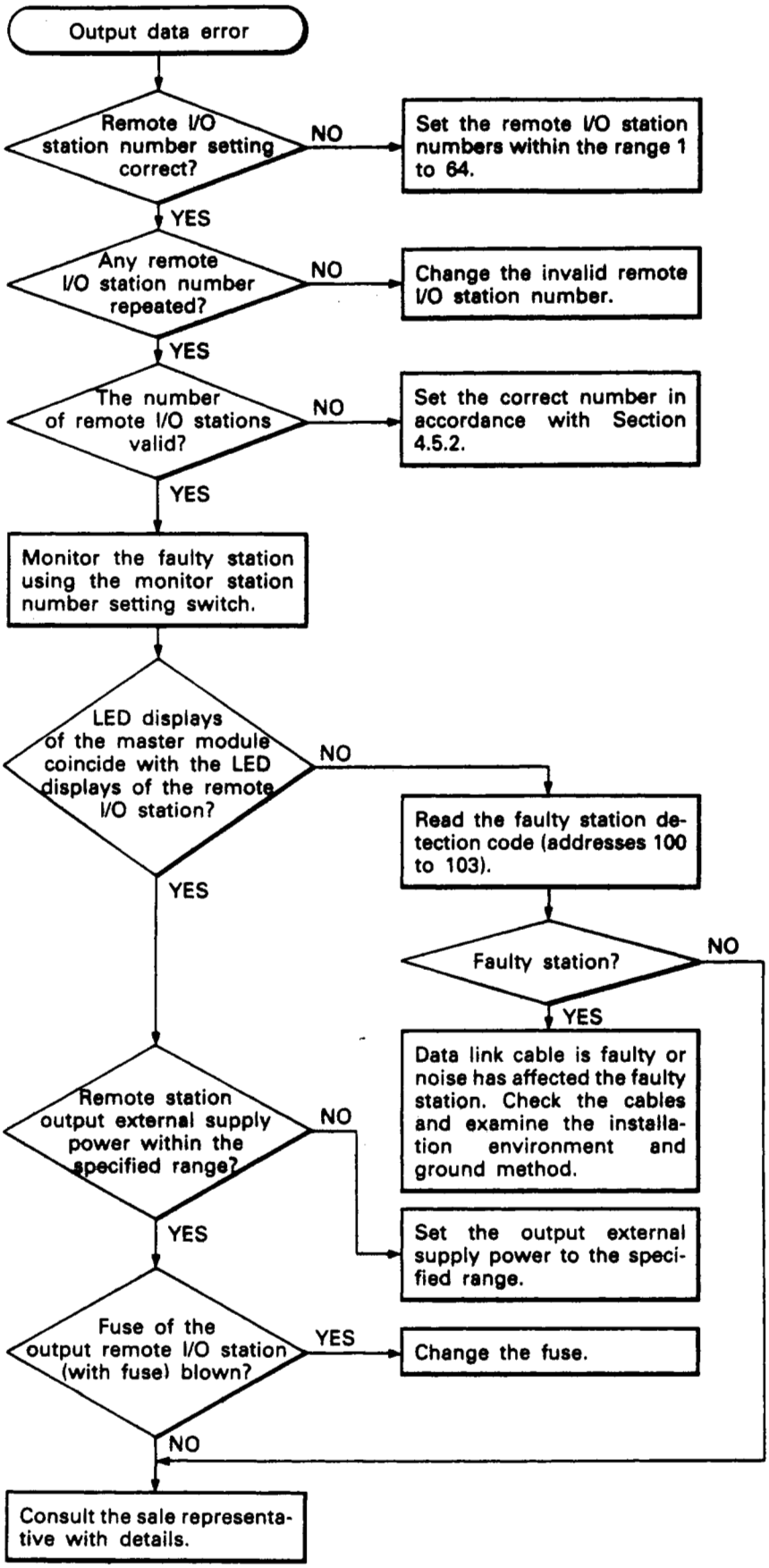
6.2.2 Remote I/O station RD/SD LED OFF



6.2.3 Input fault



6.2.4 Output fault



6.3 I/O Connection Troubleshooting

6.3.1 Input wiring troubleshooting

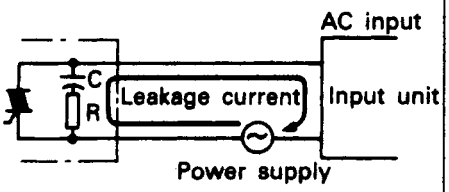
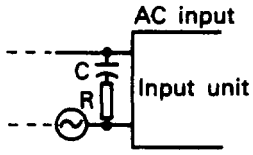
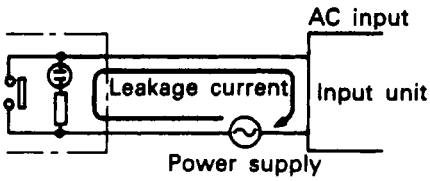
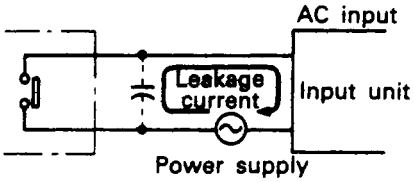
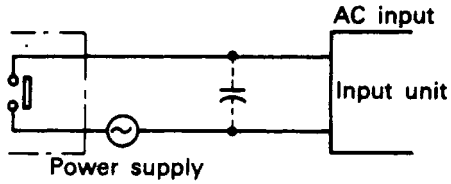
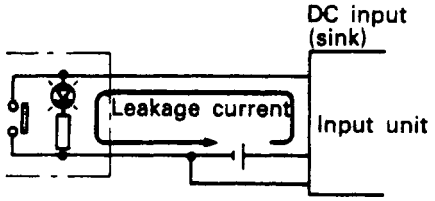
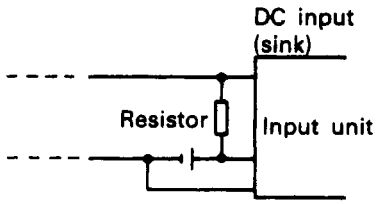
	Condition	Cause	Corrective Action
Example 1	AC input signal does not switch off. (Input LED may remain on or flicker)	● Input device leakage current. 	● Connect a CR network across input to drop the voltage below the input unit's OFF threshold.  Use C = 0.1 to 0.47 μF and R = 47 to 120Ω (1/2W)
Example 2	AC input signal does not switch off. (Input LED may remain on or flicker)	● Leakage current due to contact switch with neon indicator. 	● As example 1, or. ● Construct independent indicator circuit.
Example 3	AC input signal does not switch off. (Input LED may remain on or flicker)	● Leakage current due to line capacity of wiring cable. (Line capacity of twisted pair wire is approx. 100 PF/m.) 	● As Example 1. ● Note that moving the power supply to the input device end of the cable will prevent leakage current from being generated. 
Example 4	DC input signal does not switch off. (Input LED may remain on or flicker)	● Leakage current due to contact switch with LED indicator. 	● Connect a resistor across the input and COM to drop the voltage below the input unit's OFF threshold.  Sample resistor value calculation given on next page.

Table 6.2 Input Wiring Troubleshooting (Continue)

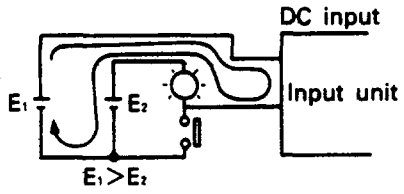
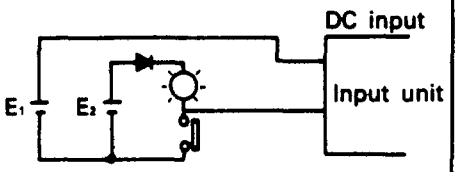
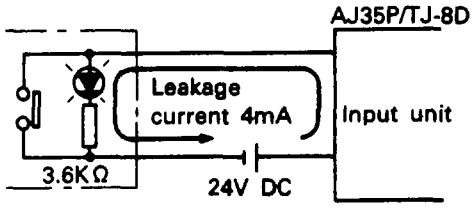
	Condition	Cause	Corrective Action
Example 5	DC input signal does not switch off. (Input LED may remain on or flicker)	● Current flow due to the use of two power supplies. 	● Use single power supply. ● Use diode as shown below: 

Table 6.2 Input Wiring Troubleshooting

Example:
Calculation for Example 4

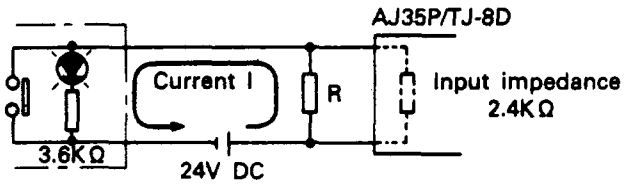


Consider a contact switch with LED indicator connected to the AJ35P/TJ-8D, giving a 4mA leakage current.

- The voltage V_{TB} across terminal and common is obtained by the following expression:

$$V_{TB} = 4\ [mA] \times 2.4\ [K\Omega] = 9.6\ [V]$$ (The voltage drop across the LED may be ignored.)

The OFF threshold voltage is 6V so that the input will remain energized when the contact switch is open. Use resistor R as shown below:



- Calculated the resistor value, R, as shown below:
  For an input voltage 6V, current I must be:

$$(24 - 6\ [V]) \div 3.6\ [K\Omega] \times 5mA$$

Resistor R must be selected to give a current I greater than 5mA.

- Hence, for resistor, R

  $6\ [V] \div R > 5 - 2.5\ [mA]$
  $6\ [V] \div 2.5\ [mA] > R$
  $2.4\ [K\Omega] > R$

  For R = 2KΩ, the power capacity must be:

  W = (applied voltage)^2 / R (or W = (maximum current) 2 × R)

  Resistor R terminal voltage is:

  $$\frac{2.4 \times 2}{2.4 + 2}\ [K\Omega] : \frac{2.4 \times 2}{2.4 + 2} + 3.6\ [K\Omega] = X : 24\ [V]$$

  $X = 5.58\ [V]$

  Therefore, the power capacity W of resistor R is:

  $W = (5.58\ [V])^2 / 2\ [K\Omega] = 0.015\ [W]$

- Use a safety factor of 3 to 5. Resistor should therefore be rated at 0.5 to 1W.

  A 2KΩ, 0.5 to 1W resistor should therefore be connected across the relevant input terminal and its COM.

6.3.2 Output wiring troubleshooting

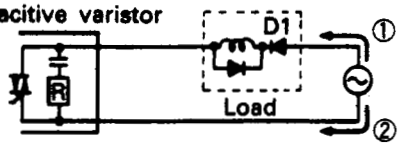
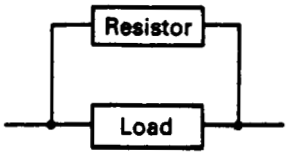
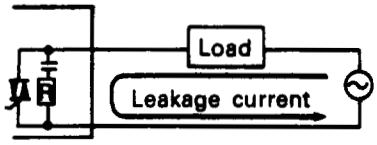
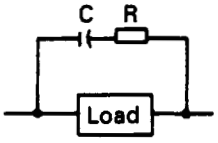
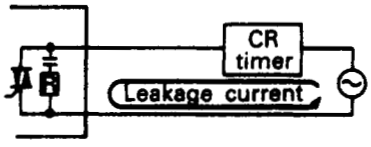
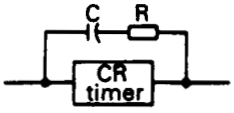
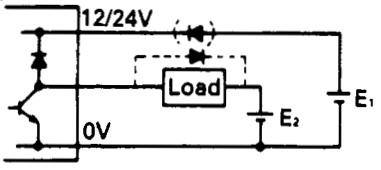
	Condition	Cause	Corrective Action
Example 1	AC voltage applied to output load when output is off.	• Half wave rectification by load (typical of some solenoids). Output unit with CR absorber or capacitive varistor  • Current flow in direction ① causes C or capacitive varistor to change. Current flow in direction ② applies C or capacitive varistor voltage plus E across D1 (voltage=2.2E (approx)).	• Connect a resistor of several ten KΩ to several hundred KΩ across the load. Note: This solution may lead to damage to the diode. Suitable output loads should be substituted for the existing solenoids. 
Example 2	AC load does not switch off.	• Leakage current due to built-in noise suppression. Output unit with CR absorber or capacitive varistor 	• Connect a CR network across the load. Where long cable runs between output unit and load are used, there may be a leakage current due to the line capacity.  Use C=0.1 to 0.47 μF and R=47 to 120Ω(1/2W).
Example 3	AC load is C-R type timer, time constant fluctuates.	Output unit with CR absorber or capacitive varistor 	• Drive the CR type timer from the same contact as the relay. Some timers have half-wave rectified internal circuits. Take precautions as indicated below:  CR values will depend on the load.
Example 4	DC load does not switch off.	• Current flow due to the use of two power supplies. Output unit with clamp diode  When E1<E2, current flows.	• Use single power supply. • Use diode (a) as on the left. When a relay (or similar load) is used, a free wheel diode should be connected across the load (see diode (b) on the left).

Table 6.3 Output Wiring Troubleshooting

IB (NA) 66215-A

POINT

Specifications for the RC network described in Examples 2 and 3 are as follows:

1) Combination of C and R

C	0.1 μF	0.47 μF	0.5 μF
R	120Ω	47Ω	50Ω

2) Capacitor voltage rating is 630V DC or 200V AC.

3) Resistor rating is 1/2W or more.

4) As a guide for output load power consumption of 30VA, use C=0.47 μF and R=47Ω (approx.).

MEMO

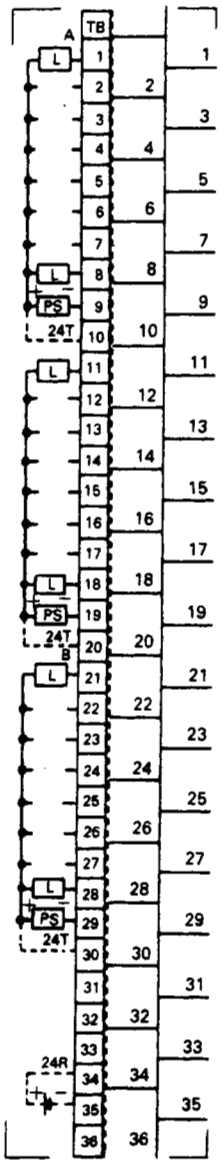
APPENDICES

APPENDIX 1 Terminal Symbol Sheets for Compact Remote I/O Units

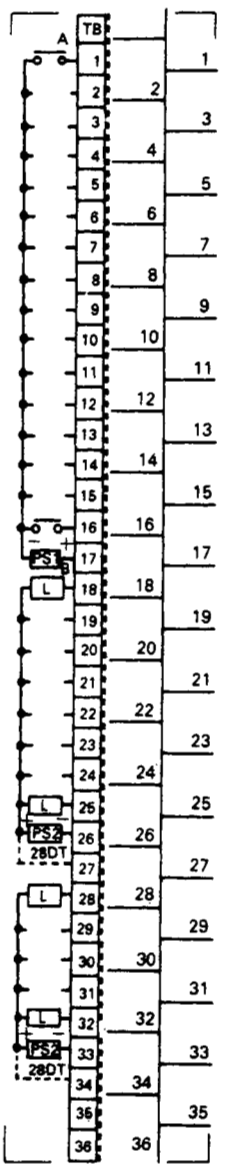
Cut and apply any of the following sheets to the corresponding terminal block cover if the silkscreen terminal diagram of the first I/O unit is hidden under the second unit.

AJ35PTF-□□□

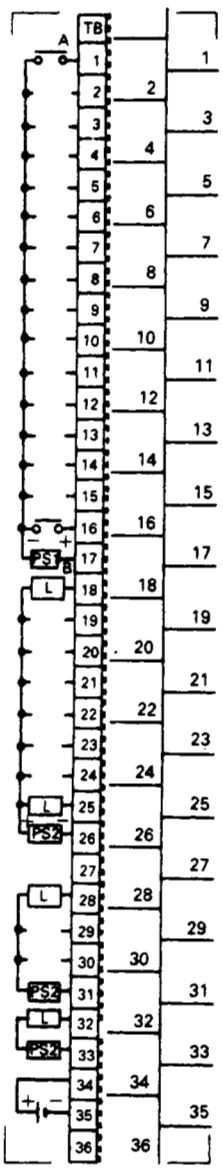
24□



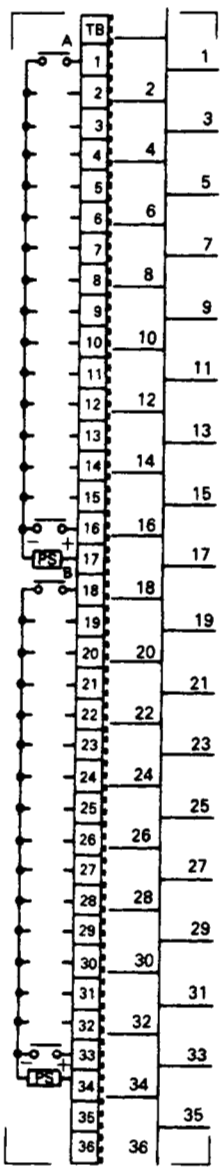
28DS,DT,AS



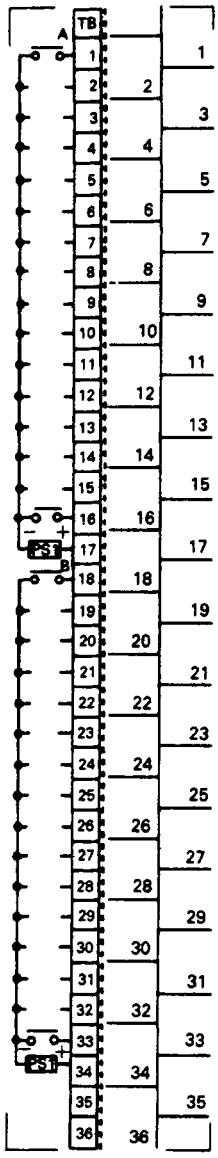
28DR,AR



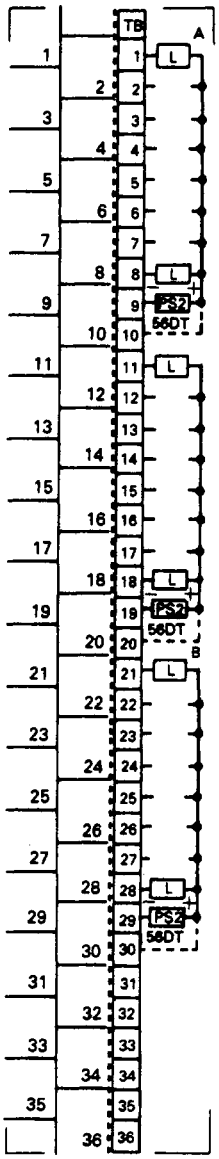
32□



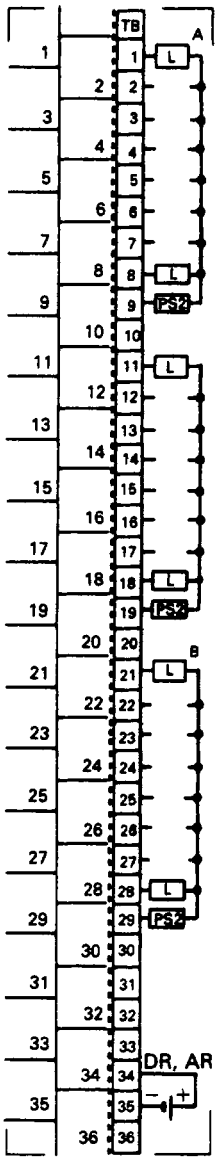
Left-hand terminal block of 56[ ][ ]



Right-hand terminal block of 56DS, DT, AS

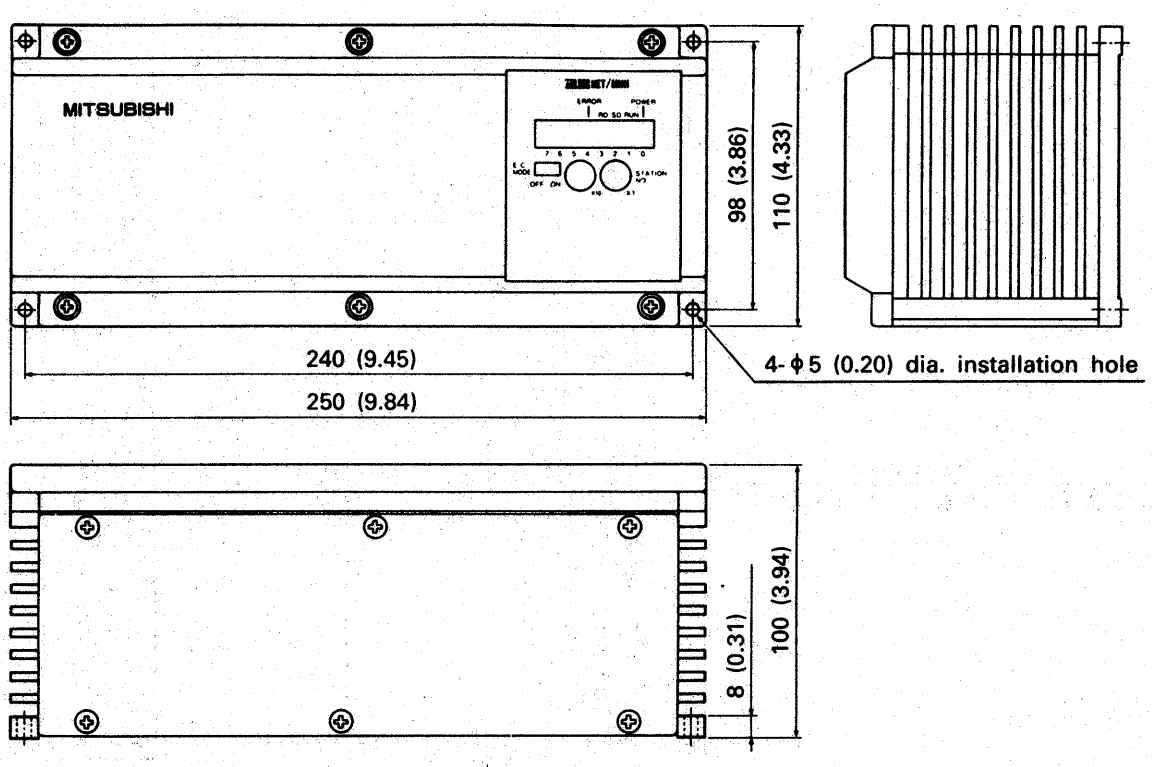


Right-hand terminal block of E56DR, AR



APPENDIX 2 Dimension Diagrams

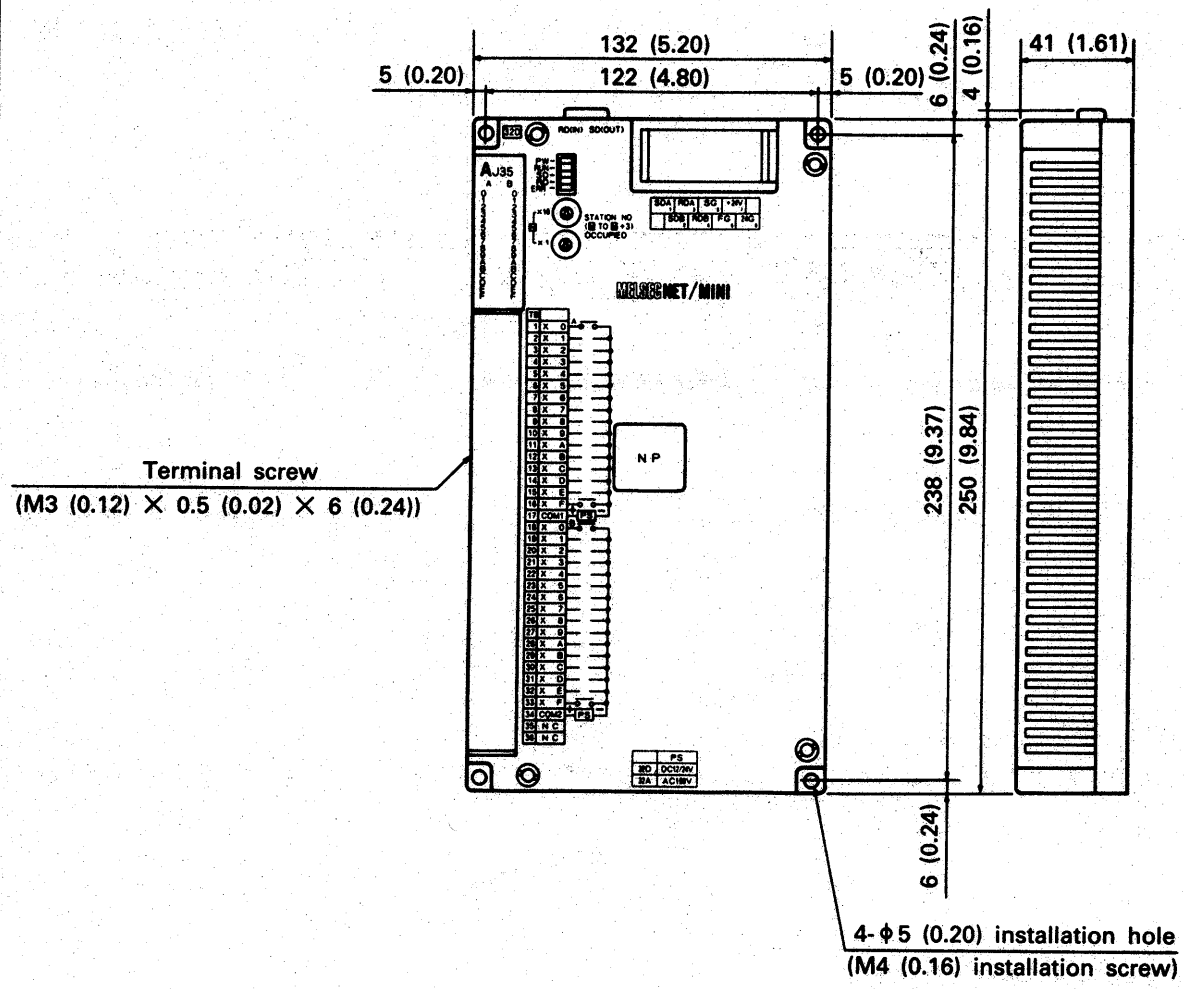
(1) Stand-alone remote I/O unit



Unit: mm (inch)

(2) Compact remote I/O unit

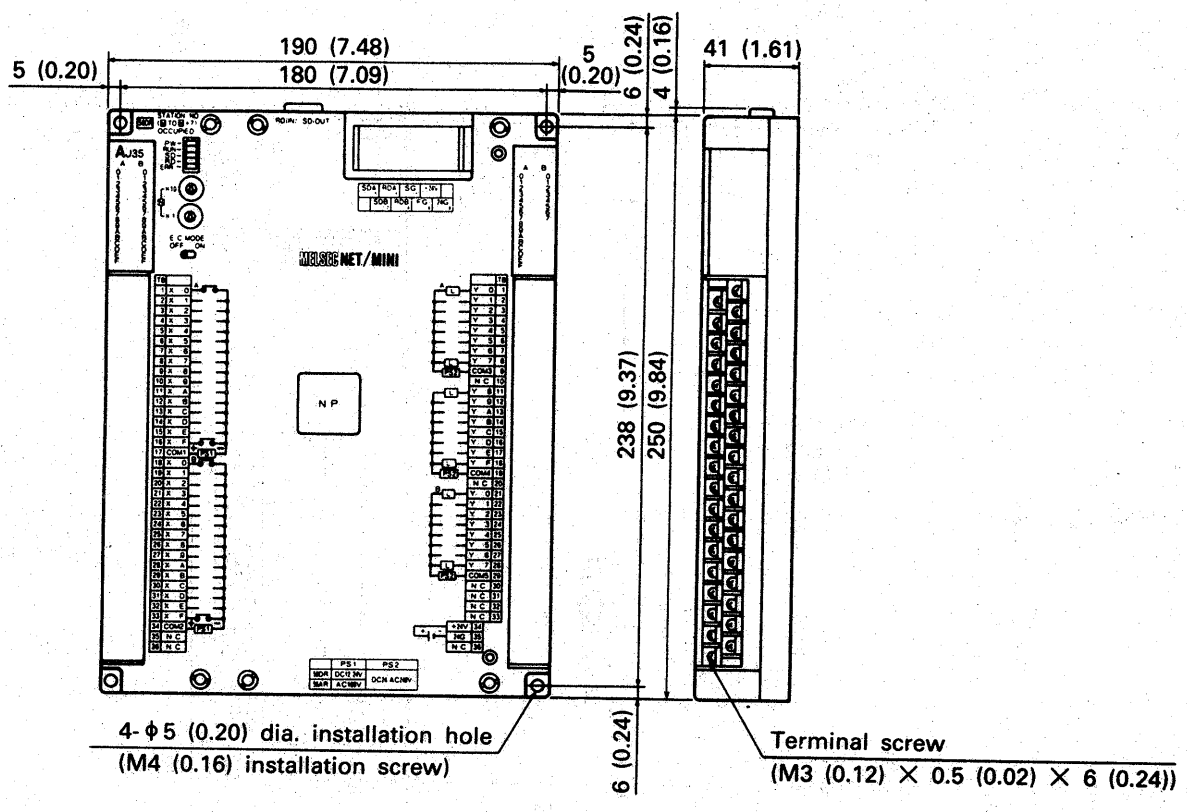
(a) AJ35PTF-32, 28, 24[ ][ ]
The following diagram is for the AJ35PTF-32[ ] which is equal in external dimensions to the AJ35PTF-28[ ][ ] and AJ35PTF-24[ ].



The length of the M4 (0.16) installation screw should be between 18 (0.71) and 20mm (0.79 inch).

Unit: mm (inch)

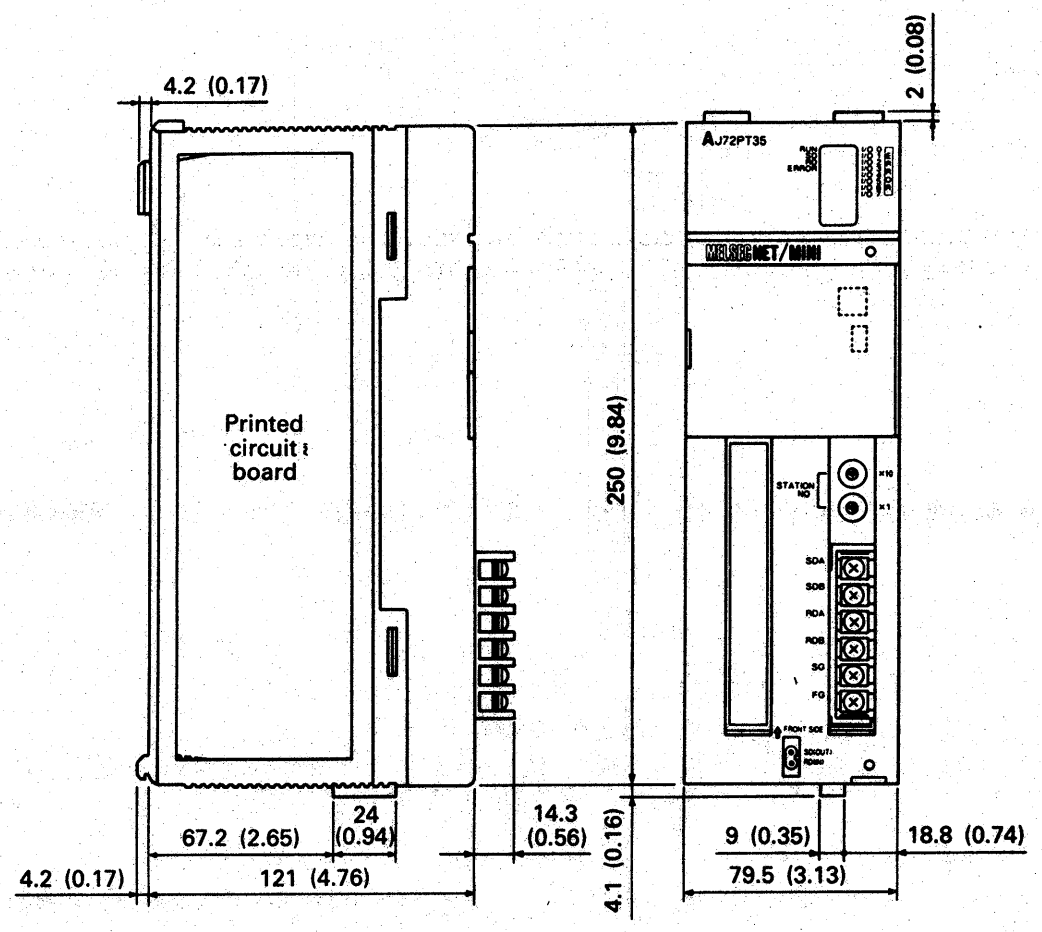
(b) AJ35PTF-56[ ][ ]



The length of the M4 (0.16) installation screw should be between 18 (0.71) and 20 mm (0.79 inch).

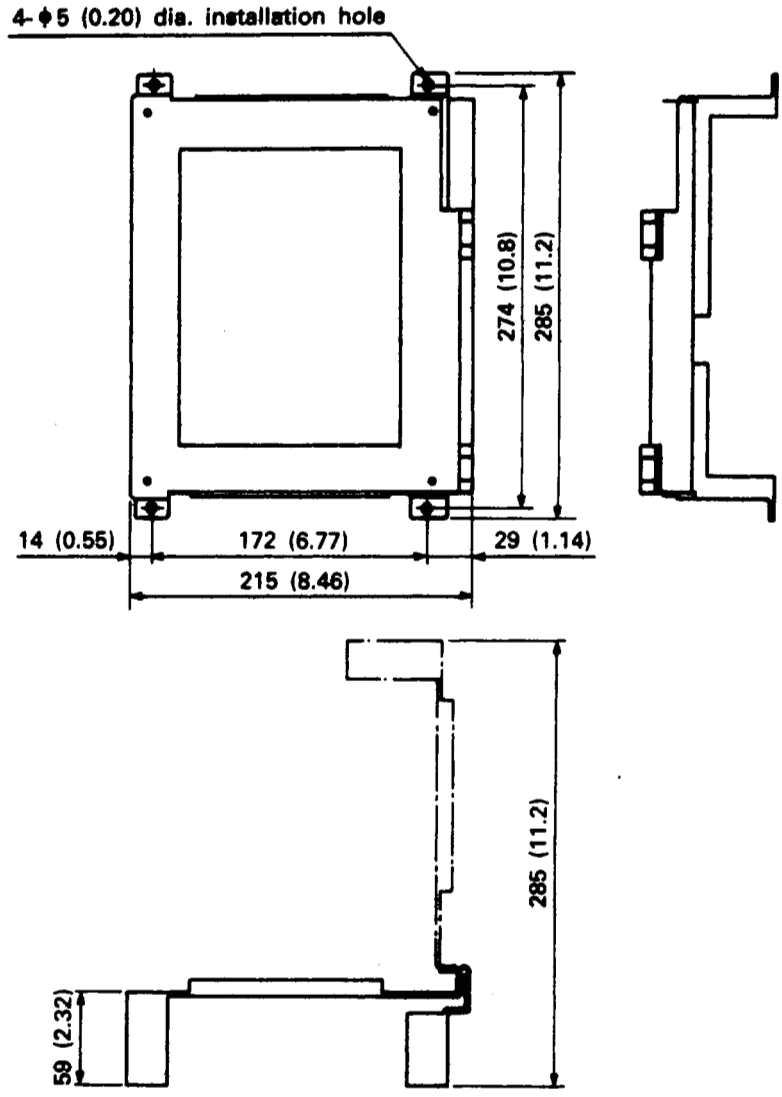
Unit: mm (inch)

(3) AJ72PT35



Unit: mm (inch)

(4) A0J2-2F bracket dimensions



Unit: mm (inch)

IB (NA) 66215-A

IMPORTANT

The components on the printed circuit boards will be damaged by static electricity, so avoid handling them directly. If it is necessary to handle them take the following precautions.

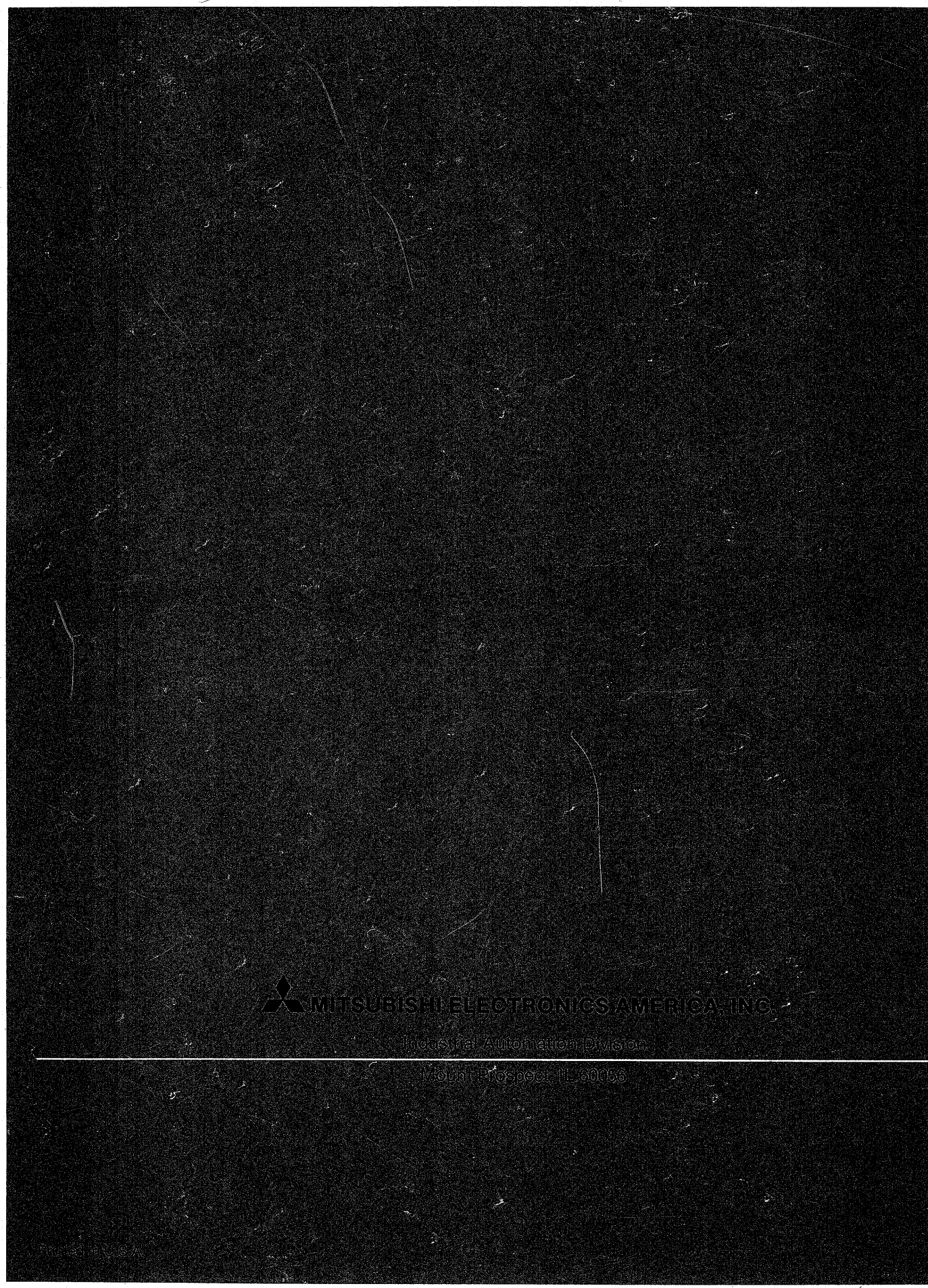
(1) Ground human body and work bench.

(2) Do not touch the conductive areas of the printed circuit board and its electrical parts with any non-grounded tools etc.

Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.

All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.

Owing to the very great variety in possible applications of this equipment, you must satisfy yourself as to its suitability for your specific application.



MITSUBISHI ELECTRONICS AMERICA, INC.
Industrial Automation Division
Mount Prospect, IL 60056