

MITSUBISHI

PROGRAMMABLE CONTROLLER

MELSEC-A

User's Manual

**A/D, D/A Converter Module
type AJ35T-M04, 08, 12, 16B**

REVISIONS

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

Print Date	*Manual Number	Revision
Mar., 1991	IB (NA) 66277-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.

CONTENTS

1	INTRODUCTION	1-1 ~ 1-3
1.1	Features	1-2
2	SPECIFICATIONS	2-1 ~ 2-8
2.1	General Specifications	2-1
2.2	Type Classification	2-1
2.3	Performance Specifications Item	2-2
2.4	Cable Specifications	2-3
2.5	Analog Module Specifications	2-4
2.5.1	List of analog module specifications	2-4
2.5.2	Information on purchasing analog module	2-6
2.5.3	Analog to digital conversion functions	2-8
3	LINKING TO THE A2CCPU	3-1 ~ 3-10
3.1	System Configuration	3-1
3.1.1	Overall configuration	3-1
3.1.2	Precautions during system construction	3-2
3.2	Data Communication Processing	3-3
3.2.1	Communication methods	3-3
3.2.2	Processing time	3-3
3.3	I/O Signals To/From the PC CPU	3-4
3.4	Buffer Memory Allocation	3-6
3.5	Programming	3-7
3.5.1	Basic programs	3-8
3.5.2	Programming examples	3-9
4	AnACPU AND AJ71PT32-S3 LINK	4-1 ~ 4-15
4.1	System Configuration	4-1
4.1.1	Overall configuration	4-1
4.1.2	Applicable systems	4-2
4.1.3	Precautions when constructing the system	4-3
4.2	Data Communication Processing	4-4
4.2.1	Communication method	4-4
4.2.2	Processing time	4-5
4.3	AJ71PT32-S3 I/O Signals	4-6
4.4	Buffer Memory Assignment	4-7
4.4.1	AJ35T buffer memory	4-7
4.4.2	AJ71PT32-S3 buffer memory	4-8
4.5	Programming	4-10
4.5.1	Basic programs	4-10

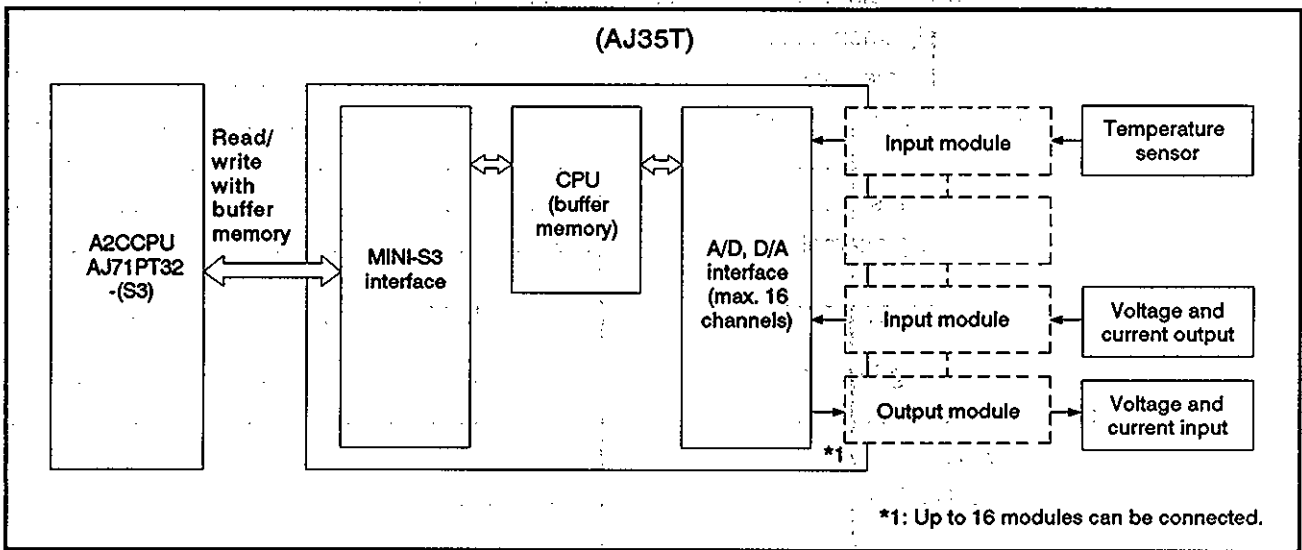
4.5.2	Programming examples	4-13
5	ACPU AND AJ71PT32-S3 LINK	5-1 ~ 5-16
5.1	System Configuration	5-1
5.1.1	Overall configuration	5-1
5.1.2	Applicable systems	5-2
5.1.3	Precautions during system construction	5-3
5.2	Data Communication Processing	5-4
5.2.1	Communication method	5-4
5.2.2	Processing time	5-5
5.3	AJ71PT32-S3 I/O Signals	5-6
5.4	Buffer Memory Assignment	5-7
5.4.1	AJ35T buffer memory	5-7
5.4.2	AJ71PT32-S3 buffer memory	5-8
5.5	Programming	5-10
5.5.1	Basic programs	5-10
5.5.2	Programming examples	5-14
6	INSTALLATION AND PRE-OPERATION SETTING PROCEDURES	6-1 ~ 6-6
6.1	Pre-Operation Setting Procedures	6-1
6.2	Handling Instruction	6-2
6.3	Parts Identification	6-3
6.4	Station Number Settings	6-4
6.5	Installation	6-4
6.6	Wiring of Data Link Cables	6-5
6.6.1	Handling instructions for twisted-pair cables	6-5
6.6.2	Link cable connections	6-5
6.7	Wiring of Analog Input/Output Cables	6-6
6.7.1	Precautions	6-6
7	TROUBLESHOOTING	7-1 ~ 7-4
7.1	Error Code List	7-1
7.2	Error Code List for AJ71PT32-S3	7-2
7.3	POWER LED is OFF	7-2
7.4	LINK RUN LED is OFF	7-3
7.5	ERR. LED is Lit	7-3
7.6	CPU LED Does Not Light	7-3
7.7	Analog-Digital Conversion is Faulty	7-4
	APPENDIX	APP-1
	APPENDIX 1 External Dimensions (Installation Dimensions)	APP-1

1. INTRODUCTION

This manual describes the specifications, handling instructions, and programming information for the AJ35T-M04, 08, 12, and 16B Analog-Digital Converter Module (hereafter referred to as the AJ35T). The AJ35T can be linked to the A2CCPU or the AJ71PT32 MELSECNET/MINI-S3 master module with twisted-pair cables.

The AJ35T comes in four types for 4, 8, 12, and 16 channels. The AJ35T can accept kinds of analog data by connecting analog modules (manufactured by M.SYSTEM CO.,LTD) to the I/O channels.

The following figure shows the overall operations of the AJ35T.



- (1) Data from the analog input module is converted into digital data, which is then stored to buffer memory. Data in the buffer memory can be read and processed using the sequence program.
- (2) Digital data can be stored to buffer memory and then outputted to the analog output module by using the sequence program.

REMARK

For the analog modules supplied by M.SYSTEM.,LTD, see Section 2.5.

1.1 Features

- (1) Up to 14 AJ35T modules can be connected to the MINI-S3 link. The AJ35T stations can be connected at intervals of up to 100 m (328.1 ft) using twisted-pair cables.
- (2) One AJ35T can handle up to 16 channels of analog inputs and outputs. The AJ35T has 4 to 16 channels (selectable by type) and can perform analog-to-digital conversion with a maximum of 16 kinds of analog modules connected to it.
- (3) Many kinds of analog I/O converter modules are available. Analog input modules (such as thermocouples, temperature-measuring resistors, potentiometers, and voltage/current input modules) and analog output modules (such as voltage/current output modules, and PID operation modules) are applicable and can be selected as needed. Analog modules have 1/4000 resolution.
- (4) Thermocouple/temperature-measuring resistor type temperature sensor input modules can be connected directly to thermocouples/temperature-measuring resistors. Temperature sensor input modules linearize the non-linear characteristics of thermocouples/temperature-measuring resistor.

In this manual, the CPU types are referred to as follows:

	Baseless Building-block Type CPU		A2CCPU(P21/R21)
ACPU	Building-block type CPU	A1N, A2N(S1), A3NCPUP(P21/R21), A1, A2-S1, A3CPU(P21/R21) A3HCPUP(P21/R21) A3MCPUP(P21/R21) A2A, A2A-S1, A3ACPU(P21/R21)	
	Compact type CPU	A0J2CPU(P21/R23), A0J2HCPUP(P21/R21)	

POINT

AJ35T I/O addresses in this manual apply when the AJ35T is set as station 1 and remote terminal No. 1, with either the A2CCPU or the AJ71PT32-S3 master module as the master station.

When the AJ35T setting is something other than station 1 or remote terminal No. 1, programming must be done using the station number set to the AJ35T (1 station occupies 8 points, AJ35T occupies 32 points for 4 stations) and the remote terminal number.

Related Manuals

- A2CCPU(P21/R21) User's Manual (IB (NA)-66238)
- AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual (IB (NA)-66217)

2. SPECIFICATIONS

2.1 General Specifications

The general specifications of AJ35T are shown as below.

Item	Specifications				
Operating ambient temperature	0 to 55°C				
Storage ambient temperature	-20 to 75°C				
Operating ambient humidity	10 to 90% RH, non-condensing				
Storage ambient humidity	10 to 90% RH, non-condensing				
Vibration resistance	Conforms to *JIS 0911	Frequency	Acceleration	Amplitude	Sweep Count
		10 to 55 Hz	—	0.075 mm (0.003 in)	10 times * (1 octave/minute)
		55 to 150 Hz	1 G	—	
Shock resistance	Conforms to JIS C 0912 (10 g x 3 times in 3 directions)				
Noise durability	By noise simulator 1500 Vpp noise voltage, 1μs noise width and 25 to 60 Hz noise frequency.				
Dielectric withstand voltage	1500 VAC for 1 minute across AC external terminals and ground 500 VAC for 1 minute across DC external terminals and ground				
Insulation resistance	5 MΩ or larger by 500 VDC insulation resistance tester across AC external terminals and ground				
Grounding	Class 3 grounding; grounding is not required when it is impossible.				
Operating ambient	Free of corrosive gases. Dust should be minimal.				
Cooling method	Self-cooling				

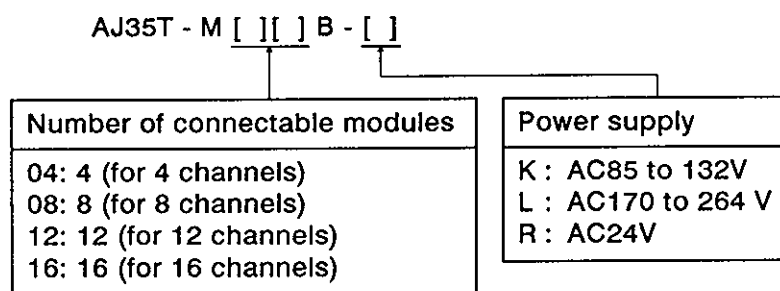
REMARK

One octave marked * indicates a change from the initial frequency to double or half frequency. For example, any of the changes from 10 Hz to 20 Hz, from 20 Hz to 40 Hz, from 40 Hz to 20 Hz, and 20 Hz to 10 Hz are referred to as one octave.

Note: *JIS: Japanese Industrial Standard

2.2 Type Classification

The AJ35T modules are classified as follows:



2. SPECIFICATIONS

MELSEC-A

2.3 Performance Specifications Item

Item		Specifications			
Number of occupied stations (number of occupied points)		4 stations (32 points)			
Number of analog I/O channels		4 channels dedicated	8 channels dedicated	12 channels dedicated	16 channels dedicated
Digital I/O		16-bit signed binary (data part 12 bits: 0 to 4000)			
*1 Maximum conversion speed	Temperature sensor input	Max. 100 msec/channel			
	Analog input	Max. 100 msec/channel (time from analog input to write to buffer memory)			
	Analog output	Max. 100 msec/channel (time from buffer memory to analog output)			
Maximum transmission distance between stations		50 (twisted-pair cable 0.3 mm ²) (164.05 ft) 100 (twisted-pair cable 0.5 mm ²) (328.1 ft)		} Unlimited total distance	
External power supply	AC power	85 to 132 VAC 50/60 Hz			
	DC power	170 to 264 VAC 50/60 Hz			
Power consumption (VA)		6 (without I/O modules) 30 (with 16 I/O modules)			
External dimensions and weights	Type	AJ35T-M04B (4 channels)	AJ35T-M08B (8 channels)	AJ35T-M12B (12 channels)	AJ35T-M16B (16 channels)
	Width (mm)	283	383	483	583
	Height (mm)	130			
	Depth (mm)	146			
	Weight without modules (kg)	1.8	2.0	2.3	2.6

*1: Excluding the communication processing time with the PC CPU.

2.4 Cable Specifications

Twisted-pair cables which can be used with the AJ35T are as follows.

(1) Twisted-pair cable

Item	Specifications
Cable type	Shielded twisted-pair cable
Logarithm	2P or larger
Conductor resistance (20°C)	88.0 Ω /km or less
Electrostatic capacity (1 kHz)	Average 60 nF/km or less
Characteristic impedance (100 kHz)	110 \pm 10 Ω

2. SPECIFICATIONS

MELSEC-A

2.5 Analog Module Specifications

2.5.1 List of analog module specifications

The series 25 analog modules supplied by M.SYSTEM CO., LTD. are used with the AJ35T.

POINT

For details on the analog module specifications, consult the manual for the respective analog module.

Classification	Specifications						
	Applicable modules	Thermo-couples	Temperature sensor input ranges (°C)		Data range	Accuracy	
Temperature sensor input (thermocouple)	25TS-1L -7L -8L	PR R S	0 to 400 0 to 500 0 to 600 0 to 700	0 to 800 400 to 1000 700 to 1400 900 to 1400	0 to 4000	±0.1%	Insulated
	25TS-1 -7 -8	PR R S	0 to 1000 0 to 1200 0 to 1400 0 to 1600	400 to 1400 500 to 1500 600 to 1600 800 to 1600			
	25TS-2L	K	0 to 100 0 to 150	0 to 200 100 to 300			
	25TS-2	K	0 to 300 0 to 400 0 to 500 0 to 600 0 to 800 0 to 1000 0 to 1100 100 to 500 200 to 500 200 to 700 200 to 1000	300 to 600 300 to 800 400 to 800 400 to 1000 500 to 800 500 to 1000 500 to 1200 600 to 1000 600 to 1200 700 to 1200 700 to 1200			
	25TS-3L	E	0 to 100	0 to 150			
	25TS-3	E	0 to 200 0 to 250 0 to 300 0 to 350 0 to 400 0 to 500 0 to 600 0 to 700	0 to 800 100 to 300 100 to 500 200 to 400 200 to 500 300 to 500 300 to 600 300 to 700			
	25TS-4L	J	0 to 100 0 to 250	50 to 200			
	25TS-4	J	0 to 200 0 to 250 0 to 300 0 to 350 0 to 400 0 to 500 0 to 600	100 to 300 100 to 400 100 to 500 200 to 400 200 to 500 300 to 500 300 to 600			
	25TS-5L	T	50 to 150 0 to 1000 0 to 2000	50 to 150 100 to 200			
	25TS-5	T	-100 to 200 -150 to 150 0 to 250	0 to 300 100 to 300			
	25TS-9	Other	Special range				

2. SPECIFICATIONS

MELSEC-A

Classification	Specifications																																													
Temperature sensor input (temperature measuring resistor)	<table border="1"> <thead> <tr> <th>Applicable modules</th> <th>Temperature measuring resistors</th> <th>Temperature sensor input ranges (°C)</th> <th>Data range</th> <th>Accuracy</th> <th></th> </tr> </thead> <tbody> <tr> <td>25RS-1 -3 -4 -5 -0</td> <td>JPt100 Pt100(JIS) Pt100(DIN) Pt50 Other</td> <td> <table border="1"> <tbody> <tr><td>-20 to 50</td><td>0 to 200</td></tr> <tr><td>-40 to 60</td><td>0 to 250</td></tr> <tr><td>-50 to 50</td><td>0 to 300</td></tr> <tr><td>-50 to 100</td><td>0 to 400</td></tr> <tr><td>-50 to 150</td><td>0 to 500</td></tr> <tr><td>-100 to 50</td><td>50 to 100</td></tr> <tr><td>-150 to 150</td><td>50 to 150</td></tr> <tr><td>-200 to 50</td><td>50 to 200</td></tr> <tr><td>0 to 50</td><td>100 to 200</td></tr> <tr><td>0 to 70</td><td>100 to 250</td></tr> <tr><td>0 to 100</td><td>100 to 300</td></tr> <tr><td>0 to 120</td><td>200 to 400</td></tr> <tr><td>0 to 150</td><td>300 to 500</td></tr> </tbody> </table> </td> <td rowspan="2">0 to 4000</td> <td rowspan="2">±0.1%</td> <td rowspan="2">Insulated</td> </tr> <tr> <td>25RS-6 -0</td> <td>Ni508.4Ω Other</td> <td>Please consult Mitsubishi representative.</td> </tr> </tbody> </table>	Applicable modules	Temperature measuring resistors	Temperature sensor input ranges (°C)	Data range	Accuracy		25RS-1 -3 -4 -5 -0	JPt100 Pt100(JIS) Pt100(DIN) Pt50 Other	<table border="1"> <tbody> <tr><td>-20 to 50</td><td>0 to 200</td></tr> <tr><td>-40 to 60</td><td>0 to 250</td></tr> <tr><td>-50 to 50</td><td>0 to 300</td></tr> <tr><td>-50 to 100</td><td>0 to 400</td></tr> <tr><td>-50 to 150</td><td>0 to 500</td></tr> <tr><td>-100 to 50</td><td>50 to 100</td></tr> <tr><td>-150 to 150</td><td>50 to 150</td></tr> <tr><td>-200 to 50</td><td>50 to 200</td></tr> <tr><td>0 to 50</td><td>100 to 200</td></tr> <tr><td>0 to 70</td><td>100 to 250</td></tr> <tr><td>0 to 100</td><td>100 to 300</td></tr> <tr><td>0 to 120</td><td>200 to 400</td></tr> <tr><td>0 to 150</td><td>300 to 500</td></tr> </tbody> </table>	-20 to 50	0 to 200	-40 to 60	0 to 250	-50 to 50	0 to 300	-50 to 100	0 to 400	-50 to 150	0 to 500	-100 to 50	50 to 100	-150 to 150	50 to 150	-200 to 50	50 to 200	0 to 50	100 to 200	0 to 70	100 to 250	0 to 100	100 to 300	0 to 120	200 to 400	0 to 150	300 to 500	0 to 4000	±0.1%	Insulated	25RS-6 -0	Ni508.4Ω Other	Please consult Mitsubishi representative.				
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Tacho-generator input	<table border="1"> <thead> <tr> <th>Applicable module</th> <th>Sensor input range</th> <th>Data range</th> <th>Accuracy</th> <th></th> </tr> </thead> <tbody> <tr> <td>25TG</td> <td>0 to 250 VAC (100 to 1kHz)</td> <td>0 to 4000</td> <td>±0.1%</td> <td>Insulated</td> </tr> </tbody> </table>	Applicable module	Sensor input range	Data range	Accuracy		25TG	0 to 250 VAC (100 to 1kHz)	0 to 4000	±0.1%	Insulated																																			
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25AC	AC converter (0 to 250 VAC, 0 to 1 AAC)																																													
PID operation module	<table border="1"> <thead> <tr> <th>Applicable module</th> <th>Output signal</th> <th>Input signal</th> <th>Accuracy</th> <th></th> </tr> </thead> <tbody> <tr> <td>25PID-A</td> <td>DC4 to 20mA</td> <td> <ul style="list-style-type: none"> Measurement value input: Done by the module connected to the previous channel. Aux. input: 1 to 5 VDC </td> <td>±0.1%</td> <td>Insulated</td> </tr> </tbody> </table>	Applicable module	Output signal	Input signal	Accuracy		25PID-A	DC4 to 20mA	<ul style="list-style-type: none"> Measurement value input: Done by the module connected to the previous channel. Aux. input: 1 to 5 VDC 	±0.1%	Insulated																																			
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<ul style="list-style-type: none"> The PID operation module is used in pairs with input modules. The module performs the PID operation which is necessary for operation control and outputs the control signals of 4 through 20 mA. Connect the PID operation module to the channel next to an input module. 																																														

2. SPECIFICATIONS

MELSEC-A

2.5.2 INFORMATION ON PURCHASING ANALOG MODULE

The analog modules produced by M. SYSTEM CO., LTD can be purchased from the following Mitsubishi representatives.

NORTH AMERICA

<u>Country</u>	<u>Company Name & Contact</u>	<u>Address</u>	<u>Phone/Fax/Telex</u>
U.S.A. (CANADA, MEXICO)	M-SYSTEM TECHNOLOGY, INC. Mr. Chuck Seifert, President Mr. Kyle Uiam	15028 Beltway Drive, Dallas 75244, U.S.A.	phone: 1-214-385-2277 fax: 1-214-385-2299

EUROPE

U.K.	ACAL AURIEMA LTD. Mr. D.W. Wickens, Divisional Manager Mr. Philip de Freitas	422 Bath Road, Slough, SL1 6BB, U.K.	phone: 46-54-521470 fax: 46-54-521442 telex: 51-847155
SWEDEN	PALMSTIERNAS SVENSKA AB Mr. Rolf Sundvisson Mr. Agne Persson	Box21, S-663 00 Skoghall, SWEDEN	phone: 46-8-15.14.85 fax: 46-8-33.89.83 telex: 54-10040
NORWAY	TORMATIC A/S Mr. Thor Edvardsen Director Mr. Tore Gulbrandsen	Skreppestad, 3250 Larvik, NORWAY	phone: 47-34-25.011 fax: 47-34-24.085 telex: 56-21941
FINLAND	SAHKOTYO OY Mr. Matti Kasurinen, Division Director	P.O. Box 14, SF-33801 Tampere, FINLAND	phone: 358-31-191-111 fax: 358-31-191-244 telex: 57-22243
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2. SPECIFICATIONS

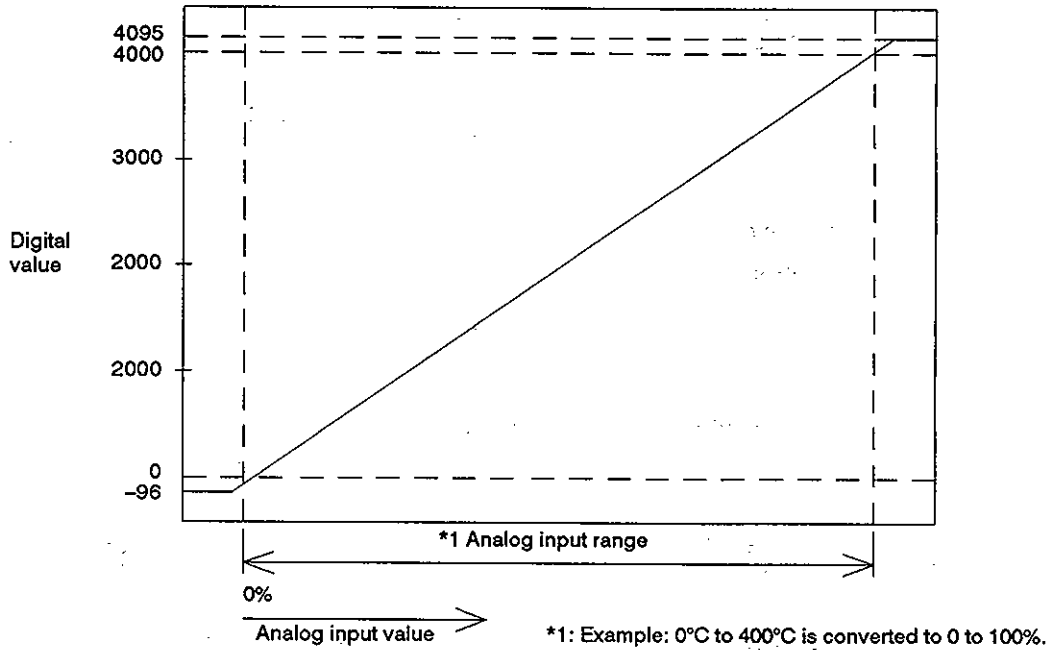
MELSEC-A

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	K & H FORMOSA CORPORA- TION Mr. Y.G. Liao, President	12F1-2, No. 109, Ho Ping East Road, Sec.3 Taipei, TAIWAN, R.O.C.	phone: 886-2-738-9476 fax: 886-2-738-9340 telex: 785-12691
	GOLDPOINT COMPANY LTD. Mr. Charles L. Cha, Manager	8F-2, No. 177 Ho-Ping East Road, Section 1 Taipei, Taiwan, R.O.C	phone: 886-2-341-1686 fax: 886-2-341-1855 telex: 785-12983
	PULSE-LUXE INDUSTRIAL CO., LTD. Mr. Novak S.R. Lai, General Manger	2F1, No. 100, Ho-Ping East Rd., Sec.2 Taipei 10636 TAIWAN, R.O.C.	phone: 886-2-733-0990 fax: 886-2-733-1001
	YOO LIEN INDUSTRIES CO., LTD. Mr. J.Y. Hong, President	P.O. Box 784 Kaoshiung, TAIWAN, R.O.C.	phone: 886-7-521-8282 fax: 886-7-531-7083
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SINGAPORE	HAVEN AUTOMATION (S) PTE. LTD. Mr. Stig Rodsten, Managing Director	29/31 Gul Avenue, Jurong Town SINGAPORE 2262	phone: 65-861-1371 fax: 65-861-7283
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	KIUCHI INSTRUMENTATION PTE. LTD. Mr. Shinji Sugiuchi, General Manager Mr. N.K. Tham	No. 30, Liu Fang Road, SINGAPORE 2262	phone: 65-261-4311 fax: 65-265-7022 telex: 87-56087
	SII SINGAPORE PTE. LTD. Mr. Thomas Lim	32 Jalan Benaan Kapal, SINGAPORE 1439	phone: 65-348-4254 fax: 65-345-1640 telex: 87-26456
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	HAVEN AUTOMATION (M) SDN.	Jalan Sepana 15/3, 40000 Shah Alam Selanger, MALAYSIA	phone: 60-3-5598229 fax: 60-3-5598361 telex: 84-39490

2.5.3 Analog to digital conversion functions

The following figures describe the analog to digital conversion characteristics of the analog module.

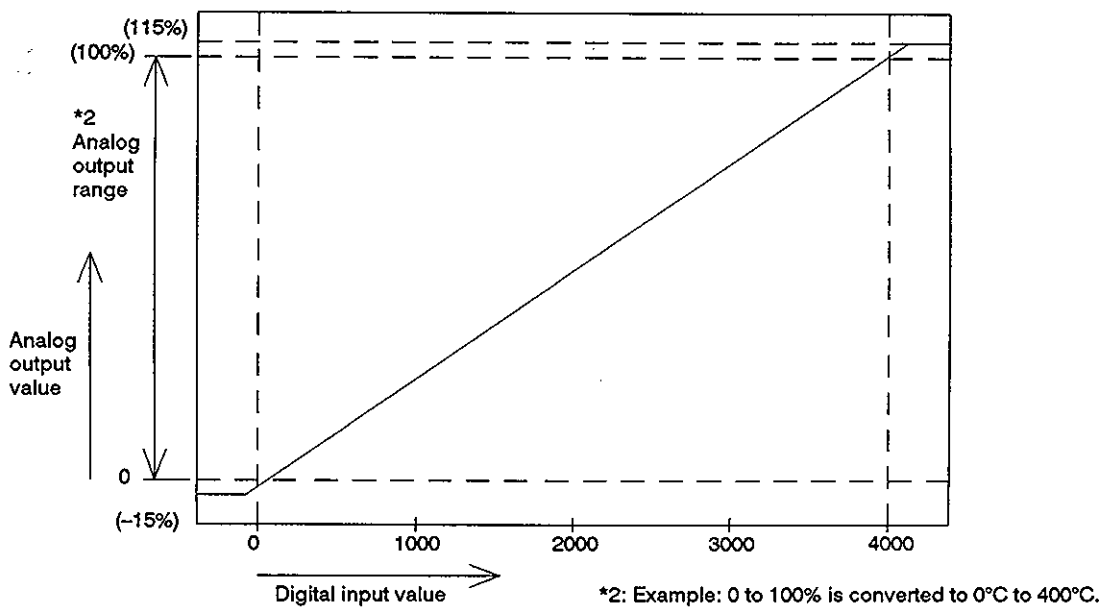
(1) Analog to digital conversion characteristics



REMARK

The temperature sensor input module linearizes (linear output) the non-linear input from the thermocouples and temperature-measuring resistors.

(2) Digital to analog conversion characteristics

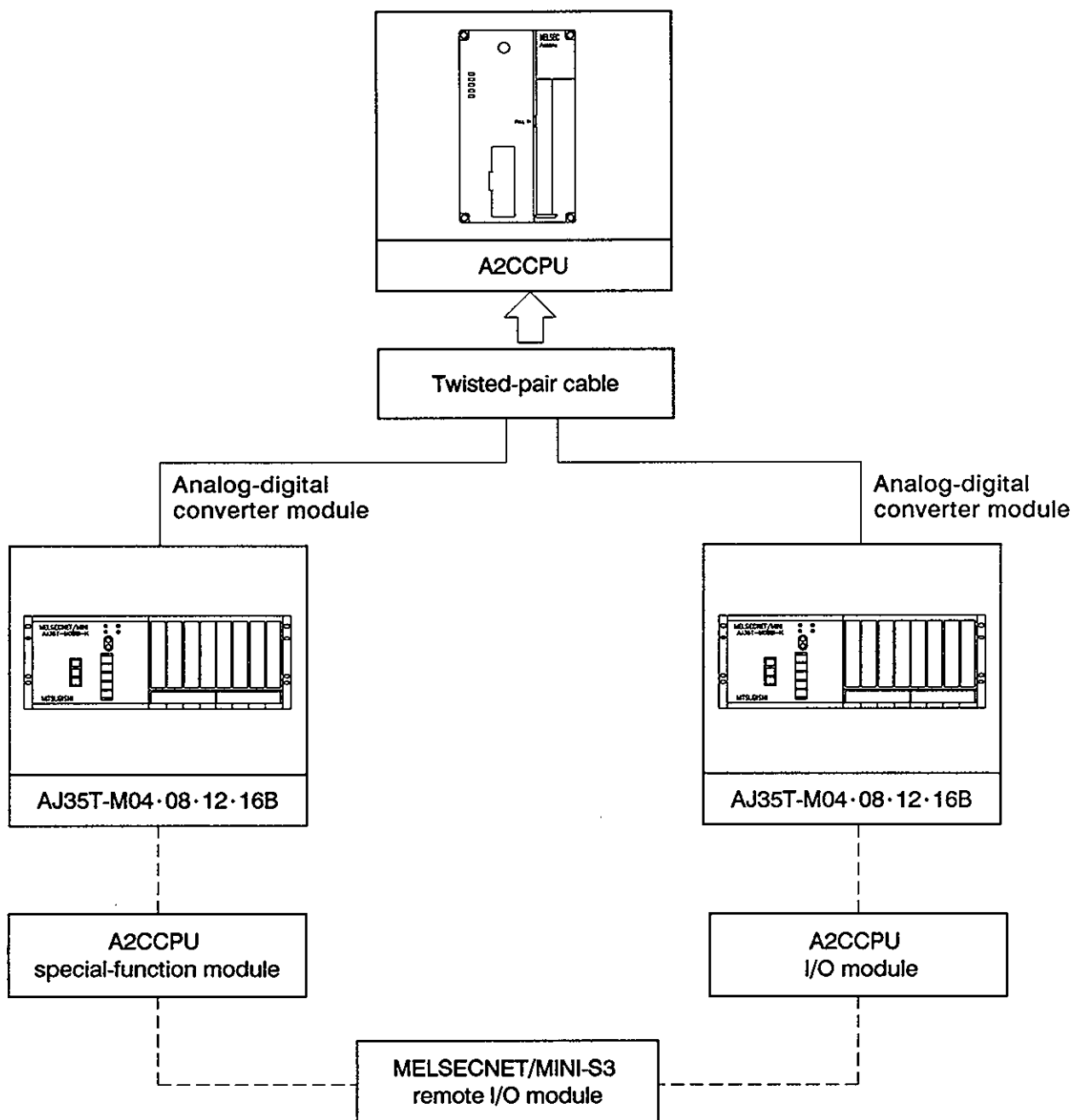


3. LINKING TO THE A2CCPU

3.1 System Configuration

3.1.1 Overall configuration

(1) The overall configuration of the AJ35T using the A2CCPU is shown below.

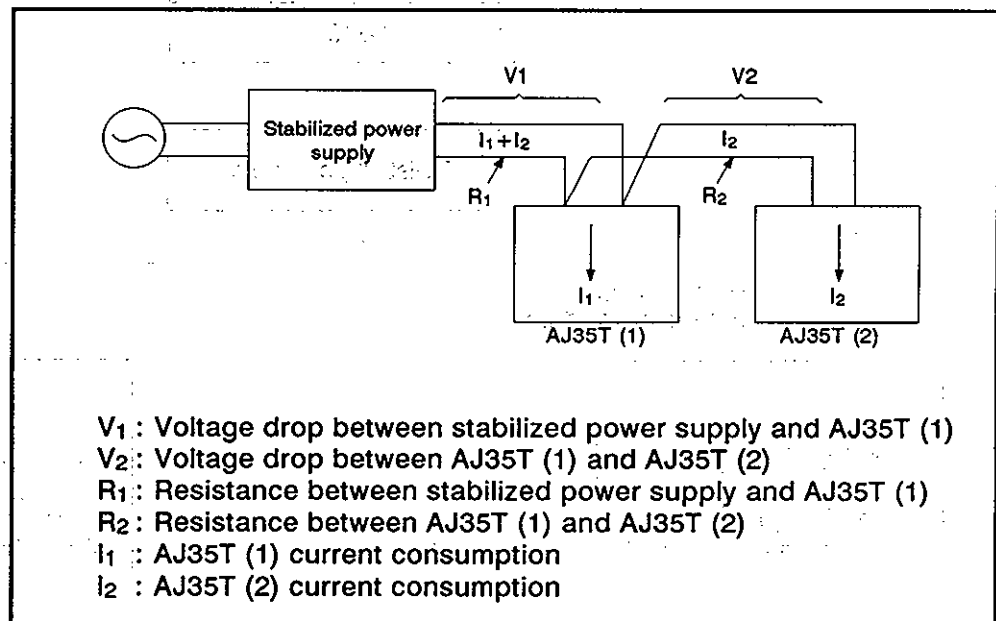


3.1.2 Precautions during system construction

- (1) All AJ35Ts are linked using twisted-pair cables.
- (2) Since each AJ35T occupies 4 stations and a total of 32 I/O points, be careful when setting station numbers and allocating I/O addresses.
- (3) The AJ35T requires an external power supply.
 - (a) A 100 VAC or 200 VAC power can be supplied directly to the AJ35T.
 - (b) When supplying a 24 VDC power from one power supply to multiple AJ35T modules or to the link I/O modules, make sure to select the proper cables and wiring route, taking voltage drops into consideration.

REMARK

Calculating the AJ35T's receiving port voltage¹ Stabilized power supply

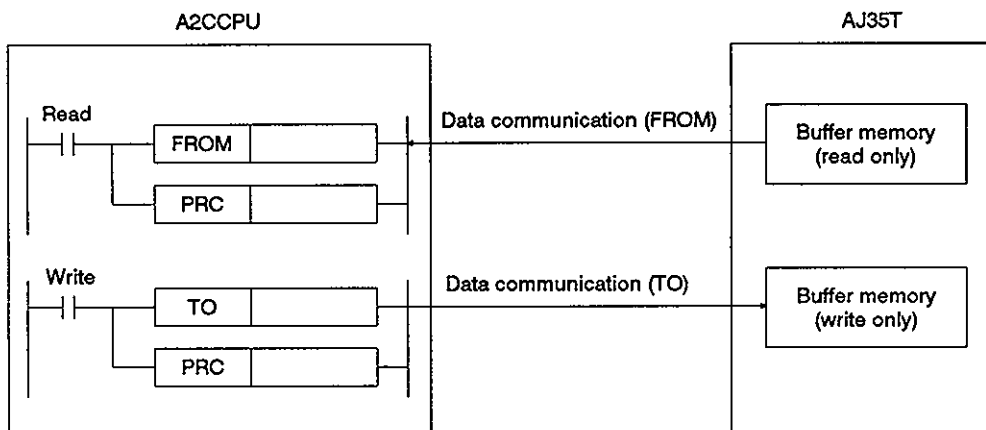


- Calculating voltage drops $V_1 = R_1 \times (I_1 + I_2)$
 $V_2 = R_2 \times I_2$
- AJ35T's receiving port voltage
 (AJ35T(1)receiving port voltage)=(stabilized power supply voltage) - V_1
 (AJ35T(2)receiving port voltage)=(stabilized power supply voltage) - ($V_1 + V_2$)
- Connection is possible if the AJ35T receiving port voltage is within the range of 21.6 V through 26.4 V.

3.2 Data Communication Processing

3.2.1 Communication methods

Communication between the AJ35T and the A2CCPU is shown below.



(1) Buffer memory data processing

- Read The A2CCPU reads data from the AJ35T's buffer memory using the sequence program's FROM instruction.
- Write The A2CCPU writes data to the AJ35T's buffer memory using the sequence program's TO instruction.

3.2.2 Processing time

The processing time required to write data to and read data from the AJ35T buffer memory is shown below.

Item	Max. Processing Time
(1) Data write	$[10 \text{ msec} \times (\text{number of data feeds})] +^{*1} 130 \text{ msec}$
(2) Data read	$[10 \text{ msec} \times (\text{number of data feeds})] +^{*1} 130 \text{ msec}$

* 1 : Total value of the AJ35T internal processing time and the A2CCPU processing time

3. LINKING TO THE A2CCPU

MELSEC-A

3.3 I/O Signals To/From the PC CPU

The A2CCPU uses a part of 32 I/O signals (for 4 stations) which are allocated to the AJ35T.
The I/O device numbers shown here apply when the AJ35T's station number is 01 (X/Y00 to X/Y1F).

(1) I/O signals

Device No.	Signal	Operating Status
X00 to X03	(Unused)	-
X04	Communication error detection	<p>Turned ON when the error code is received from the AJ35T.</p> <p>Turned OFF when Y04 is turned ON.</p> <p>Turned OFF by the sequence program.</p>
X05 to X06	(Unused)	-
X07	Communication completion wait flag	<p>• Normal</p> <p>Turned ON when the data transfer of the A2CCPU is completed.</p> <p>Turned OFF when the communication completion flag from the AJ35T is received.</p>
		<p>• Abnormal</p> <p>Turned ON when the data transfer of the A2CCPU is completed.</p> <p>Turned OFF when Y07 is turned ON.</p> <p>Turned OFF by the sequence program.</p>
X08 to X1F	(Unused)	-
Y00 to Y03	(Unused)	-
Y04	Communication error detection flag reset	<p>• When Y04 is turned ON, X04 is turned OFF and the error code of the AJ35T is reset. Y04 is turned OFF by the sequence program. (See the operating explanation in X04 above.)</p>
X05 to X06	(Unused)	-
Y07	Communication completion wait flag reset	<p>• When Y07 is turned ON, X07 is turned OFF. Y07 is turned OFF by the sequence program. (See the operating explanation in X07 above.)</p>
Y08 to Y1F	(Unused)	-

- (2) Operations of the AJ35T and the A2CCPU with I/O signals
- (a) Communication error detection (X04) and communication error detection reset (Y04)
- When a communication error code signal is sent from the AJ35T to the A2CCPU, the A2CCPU turns ON X04, stores the faulty station data in special registers D9196 through D9199 and the error code in D9180 through D9193, and then, ends communication. Data which is read/written before the communication end is held unchanged.
 - The ERR. LED on the AJ35T is lit.
 - When Y04 is turned ON, the faulty station data and the error code stored in the A2CCPU are cleared. The error code in the AJ35T is also cleared (ERR. LED is turned OFF), and data communication is restarted.
- (b) Communication completion wait flag (X07) and communication completion wait flag reset (Y07)
- In case the A2CCPU cannot receive the communication completion flag from the AJ35T because of noise in data communication, the A2CCPU stays in the communication wait state and does not send data. In this case, X07 is held ON and communication error does not occur.
 - When Y07 is turned ON, the communication wait state is reset and data communication restarts.

3.4 Buffer Memory Allocation

The AJ35T can send data to and receive data from the A2CCPU via a buffer memory (without battery backup).

When power is turned OFF, the buffer memory is cleared.

(1) Read-only buffer memory (for FROM instruction)

Address (decimal)	Contents
0	CH.1 input data
1	CH.2 input data
2	CH.3 input data
3	CH.4 input data
4	CH.5 input data
5	CH.6 input data
6	CH.7 input data
7	CH.8 input data
8	CH.9 input data
9	CH.10 input data
10	CH.11 input data
11	CH.12 input data
12	CH.13 input data
13	CH.14 input data
14	CH.15 input data
15	CH.16 input data
16	Input module loaded
17	Output module loaded
18	Error code

[Contents of buffer memory addresses 16 and 17]

(1) Connection of input/output modules to each channel is indicated by bit.
 { 1: Yes (loaded)
 0: No (unloaded) }

15 through 8 7 through 0

CH.16 through CH.9 CH.8 through CH.1

(2) Each type of loaded module (input/output) can be read using the FROM instruction of the sequence program.

[Contents of memory address 18]

(1) Storage of the error code generated first only (See Section 7.1).

(2) The contents can be read using the FROM instruction of the sequence program.

(2) Write-only buffer memory (for TO instruction)

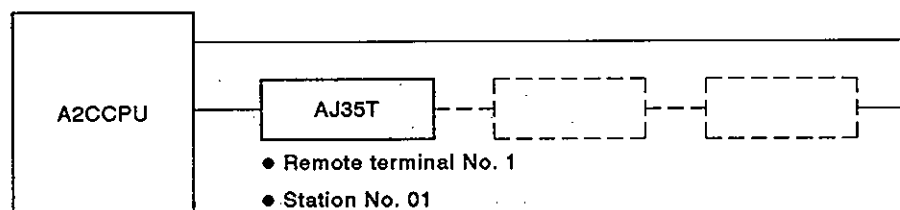
Address (decimal)	Contents
0	CH.1 input data
1	CH.2 input data
2	CH.3 input data
3	CH.4 input data
4	CH.5 input data
5	CH.6 input data
6	CH.7 input data
7	CH.8 input data
8	CH.9 input data
9	CH.10 input data
10	CH.11 input data
11	CH.12 input data
12	CH.13 input data
13	CH.14 input data
14	CH.15 input data
15	CH.16 input data

3.5 Programming

This section explains the procedures for using sequence program instructions, as well as programming methods using sample programs.

- The sample programs in this section are applicable when executing remote terminal parameter settings (MINI standard protocol selection) using the SW4GP-GPPA software package.
- When using the SW3GP-GPPA software package, since remote terminal parameter settings cannot be made, the equivalent contents must be written to special registers using the sequence program. For details, see the A2CCPU User's Manual.

When the A2CCPU and the AJ35T are connected and set as in this example, it shows how the programming in the following subsections is done.



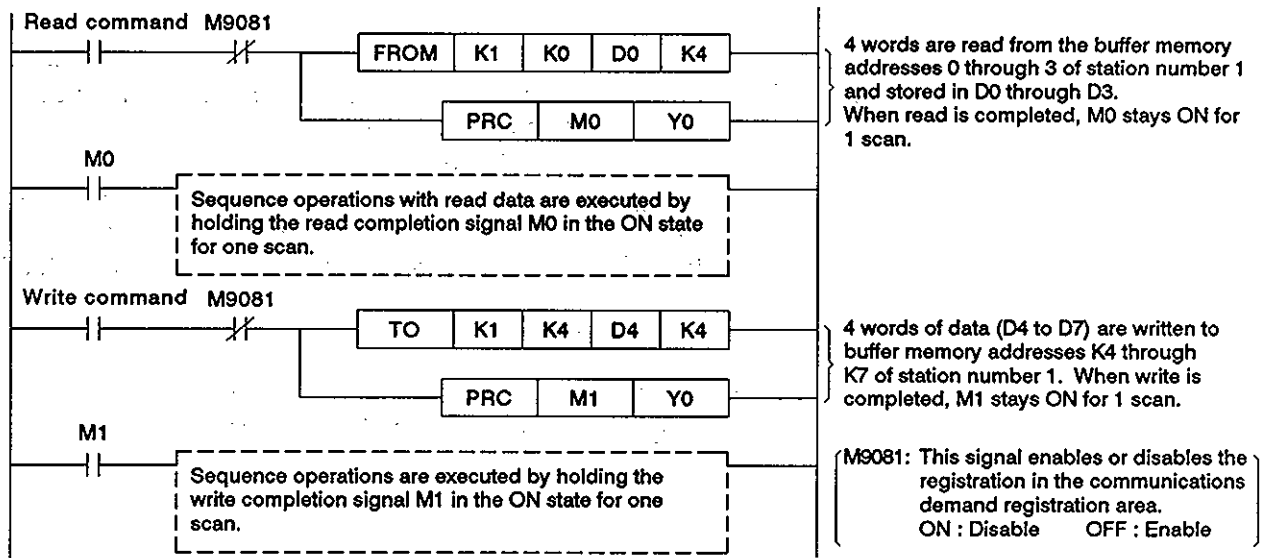
- Parameter (remote terminal setting)

(1) Parameter and remote terminal setting of the A2CCPU are as follows.

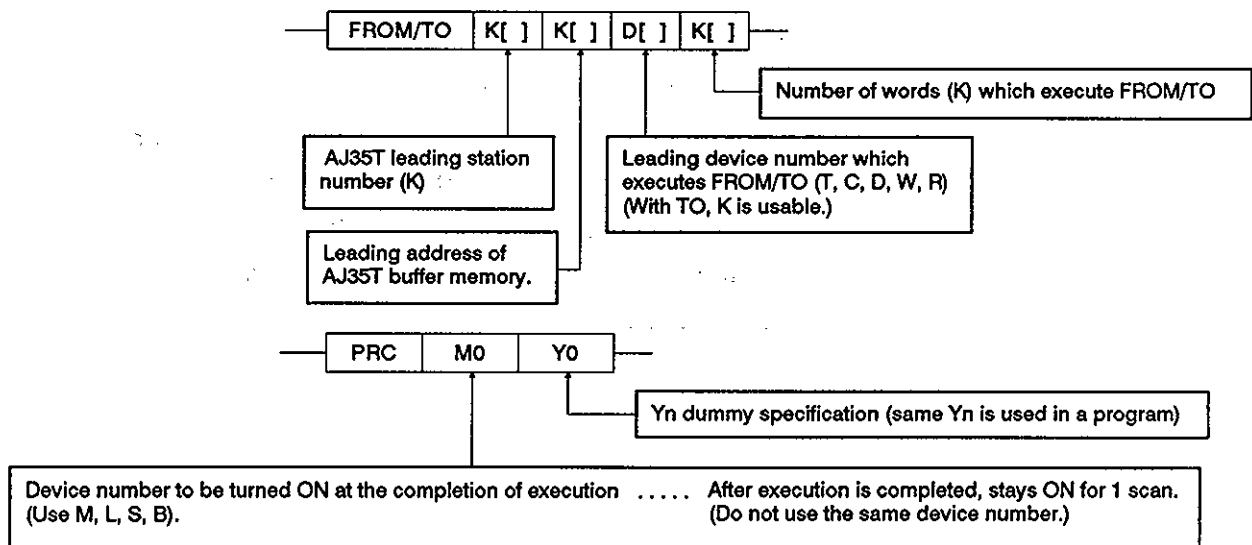
- The remote terminal number of the AJ35T is set to "1".
- The first station number of the AJ35T is set to "1".
- The protocol of the AJ35T is set to "MINI standard protocol".

3.5.1 Basic programs

(1) Read/write processing program from/to the buffer memory



(2) FROM/TO and PRC instructions For details, see the ACPU Programming Manual (Common Instructions).



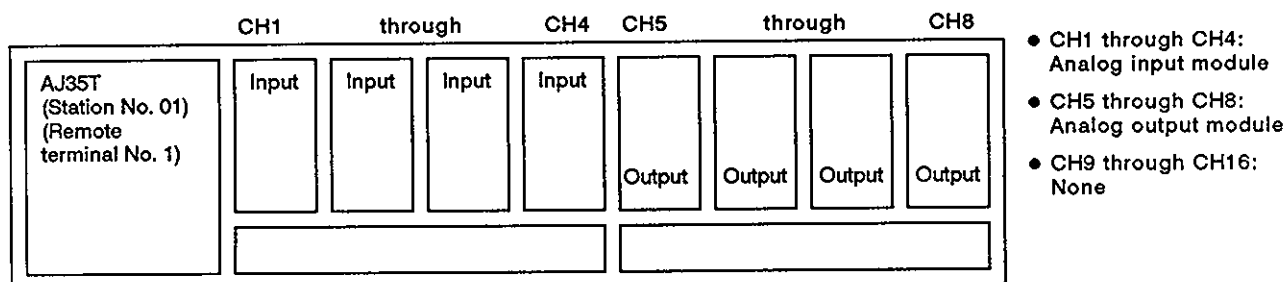
POINT

When the FROM/TO instruction is executed by the A2CCPU sequence program, communication is executed via the link. When the PRC instruction execution completion device is turned ON, data communication ends.

3.5.2 Programming examples

(1) An analog-digital conversion program uses the following conditions.

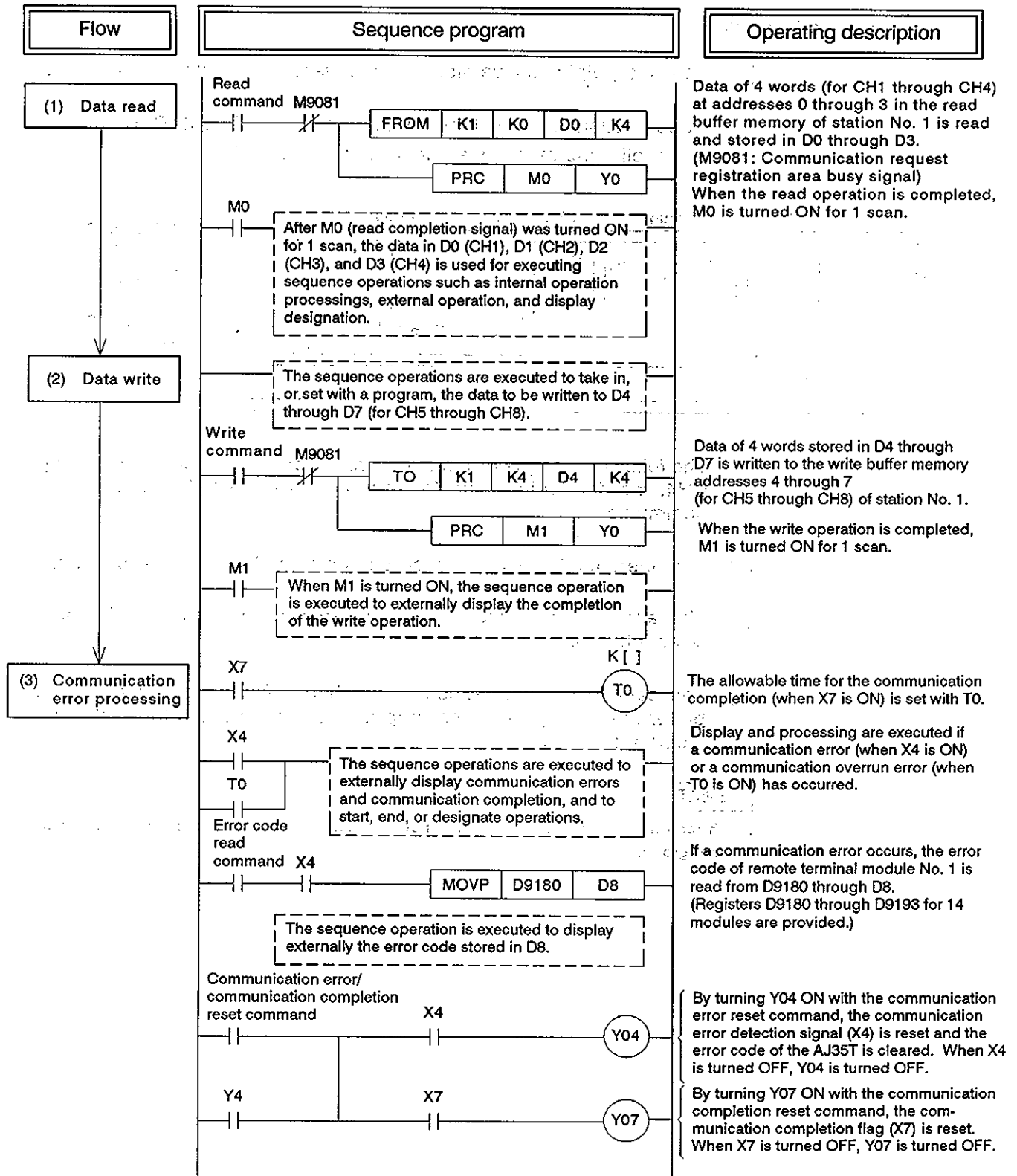
- See Section 3.5 for settings of the AJ35T and the A2CCPU.
- The following modules are loaded to the AJ35T:



- (2) The following sample program covers the data read using CH1 through CH4, the data write using CH5 through CH8, and the processing of communication errors.
- (3) The operation items of the program are given in the "Flow" column.
- (4) The explanation of the sample program is given in the "Operating Description" column.
- (5) The sample program executes batch read/write from/to the AJ35T buffer memory. (Read/write programs can be created for each buffer memory address.)

REMARK

Batch read/write is enabled by loading input modules in one group and output modules in another group.



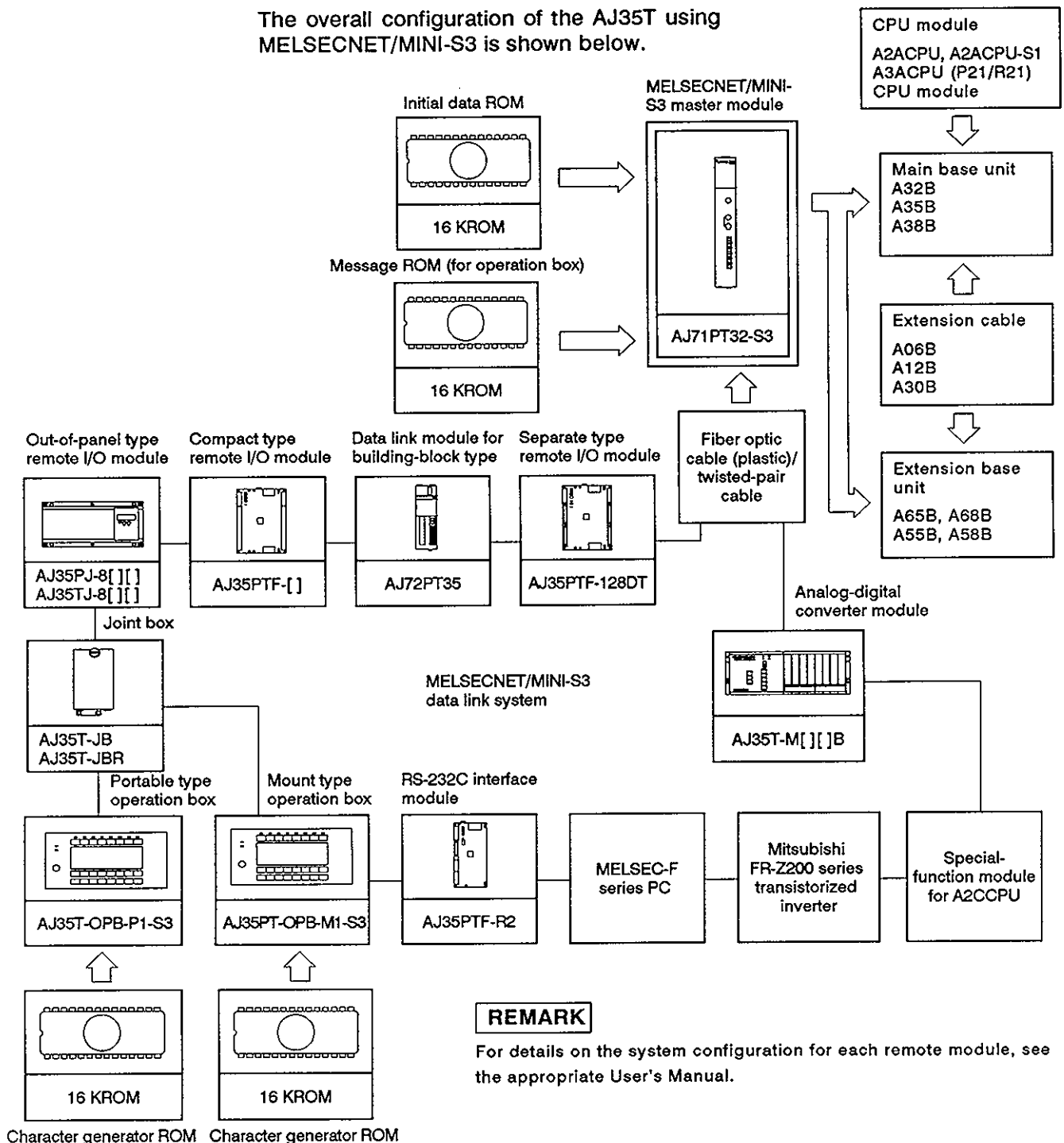
4. AnACPU AND AJ71PT32-S3 LINK

- When this link is executed, the software package "SW4GP-GPPA" is required.
- If "SW3GP-GPPA" is used instead, see the A2A(S1)/A3ACPU User's Manual (Control Functions).

4.1 System Configuration

4.1.1 Overall configuration

The overall configuration of the AJ35T using MELSECNET/mini-S3 is shown below.



REMARK

For details on the system configuration for each remote module, see the appropriate User's Manual.

4.1.2 Applicable systems

The AJ35T can be linked to the following CPUs via the AJ71PT32-S3 master module.

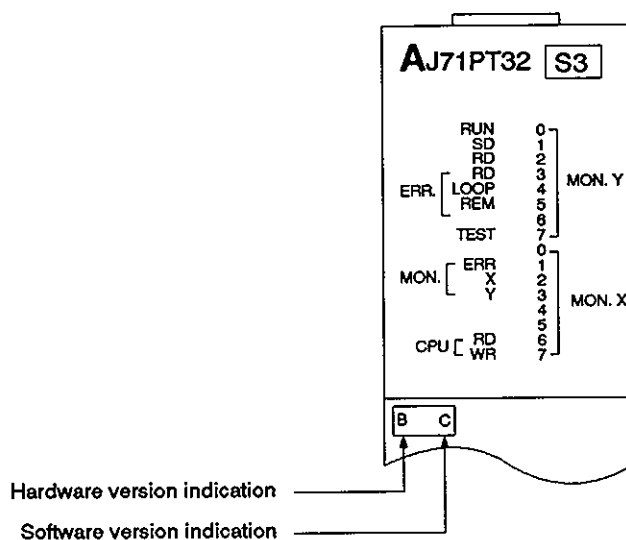
Applicable CPUs	A2ACPU(P21/R21) A2ACPU(P21/R21)-S1 A3ACPU(P21/R21)
-----------------	--

With the exception of (1) and (2) below, the AJ71PT32-S3 master module can be loaded into any slot and linked with the AJ35T. The number of device panels is unlimited.

- (1) If the AJ35T is loaded to an extension base unit (A55B, A58B) without a power supply module, the power capacity may be insufficient. Avoid loading as long as possible. If it is necessary to load, select power supply modules and extension cables with the power capacity of the main base unit power supply module and extension cable voltage drops in mind. For details, see each CPU User's Manual.
- (2) In a MELSECNET (II) data link system, loading is possible to either a master station or a local station. Loading to a remote I/O station is not possible.

4.1.3 Precautions when constructing the system

- (1) The software version indication, shown below, on the front of the AJ71PT32-S3 module must be "C" or later to use the AJ35T. Modules with software version "A", "B" or no software version indication cannot be used.



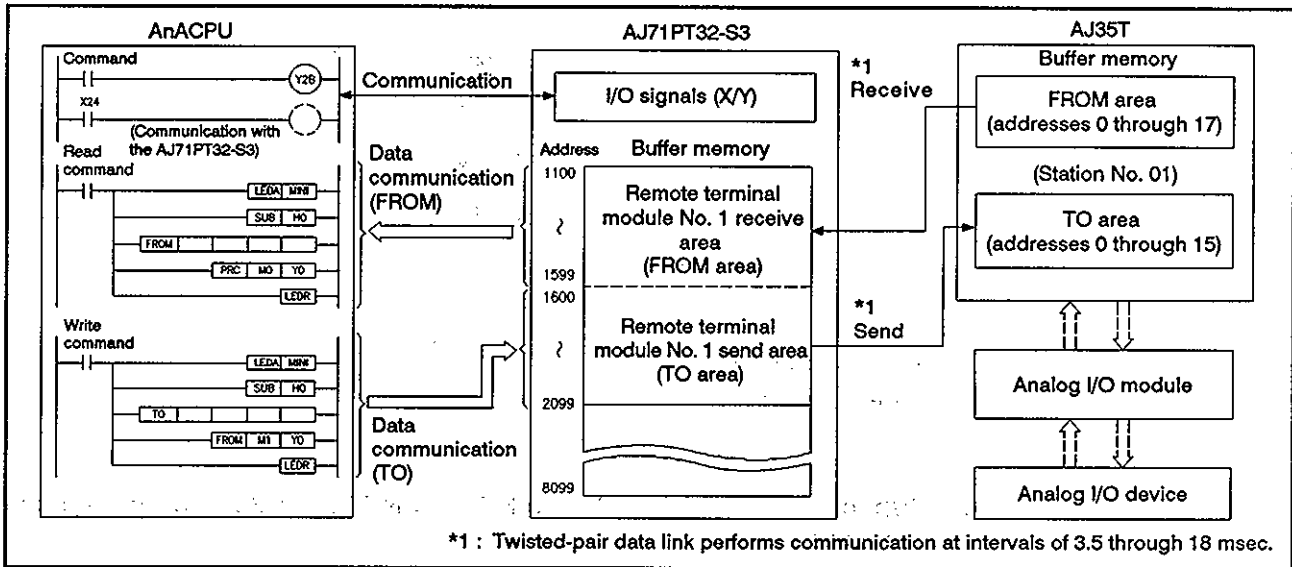
- (2) When using the AJ35T in the MELSECNET/MINI-S3 data link system, use twisted-pair cables.
- (3) Since each AJ35T occupies 4 stations (a total of 32 I/O points), be careful when allocating I/O signals.
- (4) When using the AJ35T, set the AJ71PT32-S3 as follows:
 - (a) Set the "jumper for mode selection" of the AJ71PT32-S3 to the extension mode (occupying 48 I/O points) of "48".
 - (b) Create the initial data ROM for the AJ71PT32-S3 extension mode (occupying 48 I/O points) by the SW0GP-MINIP and install it. For remote terminal data setting at the creation of the initial ROM, set the AJ35T protocol to **4:MINI STANDARD PROTOCOL**.
 - (c) For details, see the following manuals.
 - AJ71PT32-S3 type MELSECNET/MINI-S3 Master Module User's Manual
 - SW0GP-MINIP Operating Manual
- (5) The AJ35T requires a 24 VDC power supply. When supplying power from one power supply to multiple AJ35Ts or to the link I/O modules, be sure to take voltage drops into consideration when selecting cables and doing wiring. To calculate the receiving port voltage, see the **REMARK** in Section 3.1.2.

4.2 Data Communication Processing

4.2.1 Communication method

Communication between the AJ35T and the AnACPU is executed via the AJ71PT32-S3 buffer memory. The communication method is shown below.

- The AJ71PT32-S3 is loaded in slot 0 (Leading I/O number: H0).
- The AJ35T's station number is set at 01, and the remote terminal number at 1 (set with the initial data ROM).



(1) I/O signal communication between the AnACPU and the AJ71PT32-S3. I/O signals such as communication start-up, send request, send completion, and error detection are sent and received.

(2) Communication between the AnACPU, AJ71PT32-S3, and AJ35T. The AJ35T buffer memory data is processed via the AJ71PT32-S3 buffer memory. However, by using the AnACPU dedicated read/write instructions, the AJ35T buffer memory address can be directly specified to execute the TO/FROM instruction without acknowledging the AJ71PT32-S3 buffer memory address designation.

(a) Read from the AJ35T buffer memory.

- By using the sequence program dedicated read instruction, read request is executed to the AJ71PT32-S3.
- The AJ71PT32-S3 reads the data in the AJ35T buffer memory and stores it in the receive area.
- The AnACPU reads the receive data stored in the AJ71PT32-S3.
- When read is completed, the PRC instruction execution complete signal (M1) stays ON for 1 scan.

(b) Write to the AJ35T buffer memory.

- By using the sequence program dedicated write instruction, the AnACPU writes to the AJ71PT32-S3 send area. The AJ71PT32-S3 writes to the AJ35T buffer memory.
- When write is completed, the PRC instruction execution complete signal (M0) stays ON for 1 scan.

4.2.2 Processing time

The processing time required to write data to and read data from the AJ35T buffer memory is shown below.

Item	Max. Processing Time
(1) Data read	$[t \text{ msec} \times (\text{number of data words})] + [t^*1 \text{ msec} \times 5] + 80 \text{ msec}$
(2) Data write	t^*1 : Total value of the AJ35T internal processing time and the PC CPU processing time

“t” is the I/O refresh time. It varies according to the number and type of connected remote module stations.
Calculation of the I/O refresh time is shown below.

Mode	Operation Mode Setting	I/O Refresh Time (msec)
Extension mode (48 points)	Automatic online return enable (0)	$t = 0.66 + (0.044 \times R) + (0.25 \times B) + (0.95 \times T)$
	Automatic online return disable (1)	$t = 0.54 + (0.058 \times R) + (0.25 \times B) + (0.95 \times T)$
	Communication stop at error detection (2)	$t = 0.54 + (0.051 \times R) + (0.25 \times B) + (0.95 \times T)$

R : Total number of remote stations
B : Number of AJ35PTF-128DTs
T : Number of remote terminal modules

4. AnACPU AND AJ71PT32-S3 LINK

MELSEC-A

4.3 AJ71PT32-S3 I/O Signals

I/O signals between the AJ71PT32-S3 and the AnACPU in the extension mode are used when accessing the AJ35T buffer memory.

For details about the I/O signals, see the MELSECNET/MINI-S3 Master Module User's Manual.

A list of I/O signals in the extension mode is shown below.

The "n" in the Device No. column of the table is the master module's leading I/O number. It is determined by the number of I/O points of the I/O modules loaded into the master module's front slot and by the master module position.

Example: When the master module's leading I/O number is "X/Y20":

X (n+0) through X (n+2F) = X20 through X4F

Y (n+0) through Y (n+2F) = Y20 through Y4F

I/O Signal List in the Extension Mode

Device No.	Signal	Device No.	Signal
X(n+0)	Send request signal	Y(n+0)	Send request signal
X(n+1)	Read complete signal	Y(n+1)	Read complete signal
X(n+2)	Send request signal	Y(n+2)	Send request signal
X(n+3)	Read complete signal	Y(n+3)	Read complete signal
X(n+4)	Send request signal	Y(n+4)	Send request signal
X(n+5)	Read complete signal	Y(n+5)	Read complete signal
X(n+6)	Send request signal	Y(n+6)	Send request signal
X(n+7)	Read complete signal	Y(n+7)	Read complete signal
X(n+8)	Send request signal	Y(n+8)	Send request signal
X(n+9)	Read complete signal	Y(n+9)	Read complete signal
X(n+A)	Send request signal	Y(n+A)	Send request signal
X(n+B)	Read complete signal	Y(n+B)	Read complete signal
X(n+C)	Send request signal	Y(n+C)	Send request signal
X(n+D)	Read complete signal	Y(n+D)	Read complete signal
X(n+E)	Send request signal	Y(n+E)	Send request signal
X(n+F)	Read complete signal	Y(n+F)	Read complete signal
X(n+10)	Send request signal	Y(n+10)	Send request signal
X(n+11)	Read complete signal	Y(n+11)	Read complete signal
X(n+12)	Send request signal	Y(n+12)	Send request signal
X(n+13)	Read complete signal	Y(n+13)	Read complete signal
X(n+14)	Send request signal	Y(n+14)	Send request signal
X(n+15)	Read complete signal	Y(n+15)	Read complete signal
X(n+16)	Send request signal	Y(n+16)	Send request signal
X(n+17)	Read complete signal	Y(n+17)	Read complete signal
X(n+18)	Send request signal	Y(n+18)	Send request signal
X(n+19)	Read complete signal	Y(n+19)	Read complete signal
X(n+1A)	Send request signal	Y(n+1A)	Send request signal
X(n+1B)	Read complete signal	Y(n+1B)	Read complete signal
X(n+1C)	(Unused)	Y(n+1C)	(Unused)
X(n+1D)		Y(n+1D)	
X(n+1E)		Y(n+1E)	
X(n+1F)		Y(n+1F)	
X(n+20)	Hardware error	Y(n+20)	
X(n+21)	MINI-S3 link communication in progress	Y(n+21)	
X(n+22)	(Unused)	Y(n+22)	
X(n+23)	Receive data clear complete	Y(n+23)	Receive data clear request
X(n+24)	Remote terminal module error detection	Y(n+24)	Remote terminal module error detection reset
X(n+25)	Test mode	Y(n+25)	(Unused)
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)	(Unused)	Y(n+29)	(Unused)
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)	Buffer memory channel switching
X(n+2D)		Y(n+2D)	Error reset
X(n+2E)		Y(n+2E)	(Unused)
X(n+2F)		Y(n+2F)	

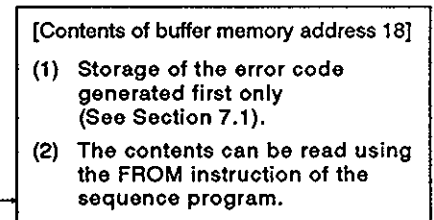
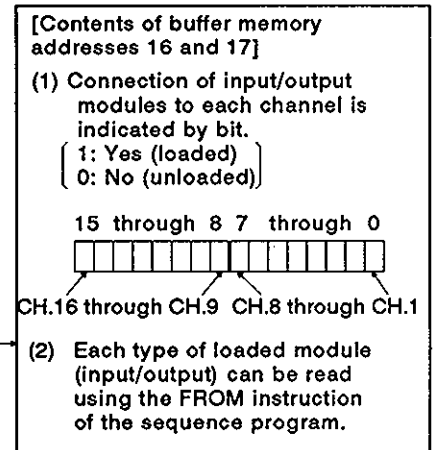
4.4 Buffer Memory Assignment

4.4.1 AJ35T buffer memory

The AJ35T's buffer memory is not backed up by a battery. When power is turned OFF, the buffer memory is cleared.

(1) Read-only buffer memory (for FROM instruction)

Address (decimal)	Contents
0	CH.1 input data
1	CH.2 input data
2	CH.3 input data
3	CH.4 input data
4	CH.5 input data
5	CH.6 input data
6	CH.7 input data
7	CH.8 input data
8	CH.9 input data
9	CH.10 input data
10	CH.11 input data
11	CH.12 input data
12	CH.13 input data
13	CH.14 input data
14	CH.15 input data
15	CH.16 input data
16	Input module loaded
17	Output module loaded
18	Error Code



(2) Write-only buffer memory (for TO instruction)

Address (decimal)	Contents
0	CH.1 input data
1	CH.2 input data
2	CH.3 input data
3	CH.4 input data
4	CH.5 input data
5	CH.6 input data
6	CH.7 input data
7	CH.8 input data
8	CH.9 input data
9	CH.10 input data
10	CH.11 input data
11	CH.12 input data
12	CH.13 input data
13	CH.14 input data
14	CH.15 input data
15	CH.16 input data

4. AnACPU AND AJ71PT32-S3 LINK

MELSEC-A

4.4.2 AJ71PT32-S3 buffer memory

There are communication (send/receive) data addresses for the AJ71PT32-S3 buffer memory according to dedicated read/write instructions between the AJ71PT32-S3 and the AnACPU.

The allocation of buffer memory addresses which are used for automatic communication with the AJ35T are shown below.

For details of the buffer memory, see the MELSECNET/MINI-S3 Master Module User's Manual.

Addresses (decimal)	Contents	PC CPU Read/Write Enable/Disable
0	Total number of remote stations	Read/write enabled
1	Number of retries	
	(Unused)	
4	Line error check	
	(Unused)	—
10 to 41	Batch refresh send data	
	(Unused)	Read only
70 to 77	Remote module's card data	
	(Unused)	—
90 to 93	Accumulated faulty station detection	
	(Unused)	Read/write enabled
100 to 103	Faulty station detection	
	(Unused)	
107	Communication error code	—
108	Error detection code	
	(Unused)	
110 to 141	Batch refresh receive data	Read only
	(Unused)	
160	Line error retry counter	—
161 to 192	Retry counter	
	(Unused)	
195	Remote terminal module faulty stations	—
196 to 209	Remote terminal module error code	
	(Unused)	

* 1 : Area where station number(s) and error code(s) are stored when an AJ35T error occurs. (See Section 7.1 for error codes.)

Addresses (decimal)	Contents		PC CPU Read/Write Enable/Disable
250 to 282	Partial refresh station	Partial refresh type remote I/O module station No. and specification of the number of digits are written.	Read/write enable
	(Unused)	—	
300 to 363	Partial refresh send data	Data output to the partial refresh type remote I/O module is written.	
	(Unused)	—	
598	Partial refresh accumulation input error detection	Partial refresh type remote I/O module's input data received faulty station is stored. (Detection status is retained until reset.)	Read only
599	Partial refresh input error detection	Partial refresh type remote I/O module's input data received faulty station is stored. (Communication status is always undated.)	
600 to 663	Partial refresh receive data	Partial refresh type remote I/O module's input data is stored.	Read/write enabled
858	Receive data clear designation	The AJ35PTF-R2 station number which executes receive data clear by the receive data clear request signal [Y (n + 23)] is specified.	
859	Receive data clear range designation	The receive buffer which is cleared when the receive data clear is executed by the receive data clear request signal [Y (n + 23)] is specified.	
860 to 929	No-protocol mode parameter	Parameters are set when using the AJ35PTF-R2 in a no-protocol mode.	
930 to 1099	(Unused)	—	—
	CH0	CH1	
1100 to 2099	Remote terminal module No. 1 send/receive area	Remote terminal module No. 8 send/receive area	Read/write enabled
2100 to 3099	Remote terminal module No. 2 send/receive area	Remote terminal module No. 9 send/receive area	
3100 to 4099	Remote terminal module No. 3 send/receive area	Remote terminal module No. 10 send/receive area	
4100 to 5099	Remote terminal module No. 4 send/receive area	Remote terminal module No. 11 send/receive area	
5100 to 6099	Remote terminal module No. 5 send/receive area	Remote terminal module No. 12 send/receive area	
6100 to 7099	Remote terminal module No. 6 send/receive area	Remote terminal module No. 13 send/receive area	
7100 to 8099	Remote terminal module No. 7 send/receive area	Remote terminal module No. 14 send/receive area	
	[Y (n + 2C) at OFF]	[Y (n + 2C) at ON]	Send data to the remote terminal module write area, or receive data from the remote terminal store area.

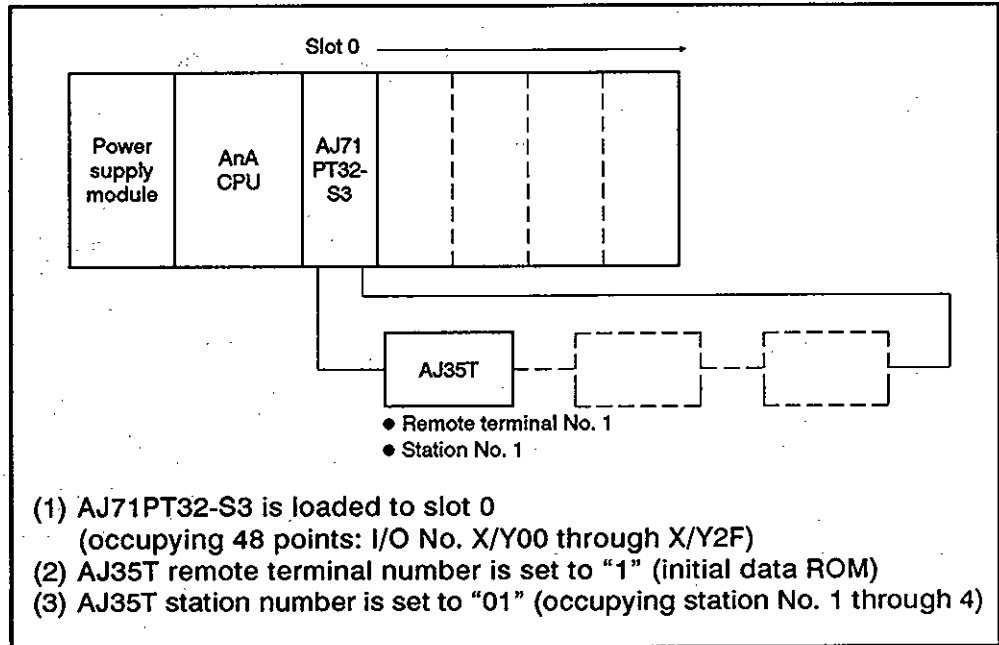
*2

*3

* 2 : Clear processing area for data received during the AJ35T reset operation.
 * 3 : Buffer memory area for AJ35T data transfer (1st module through 14th module)

4.5 Programming

Programming under the setting conditions of AnACPU, AJ71PT32-S3, and AJ35T is explained below.

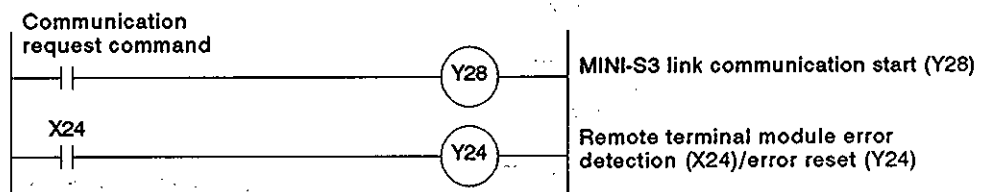


4.5.1 Basic programs

(1) A program for communicating between the AnACPU and the AJ71PT32-S3

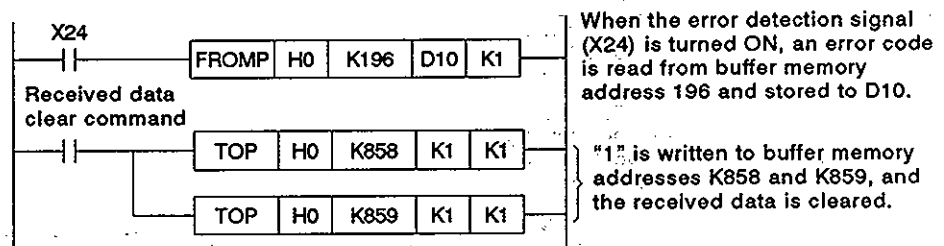
(a) AJ71PT32-S3 I/O signals

Use the I/O signals allocated to the 48 points of X/Y00 through X/Y2F for programming.



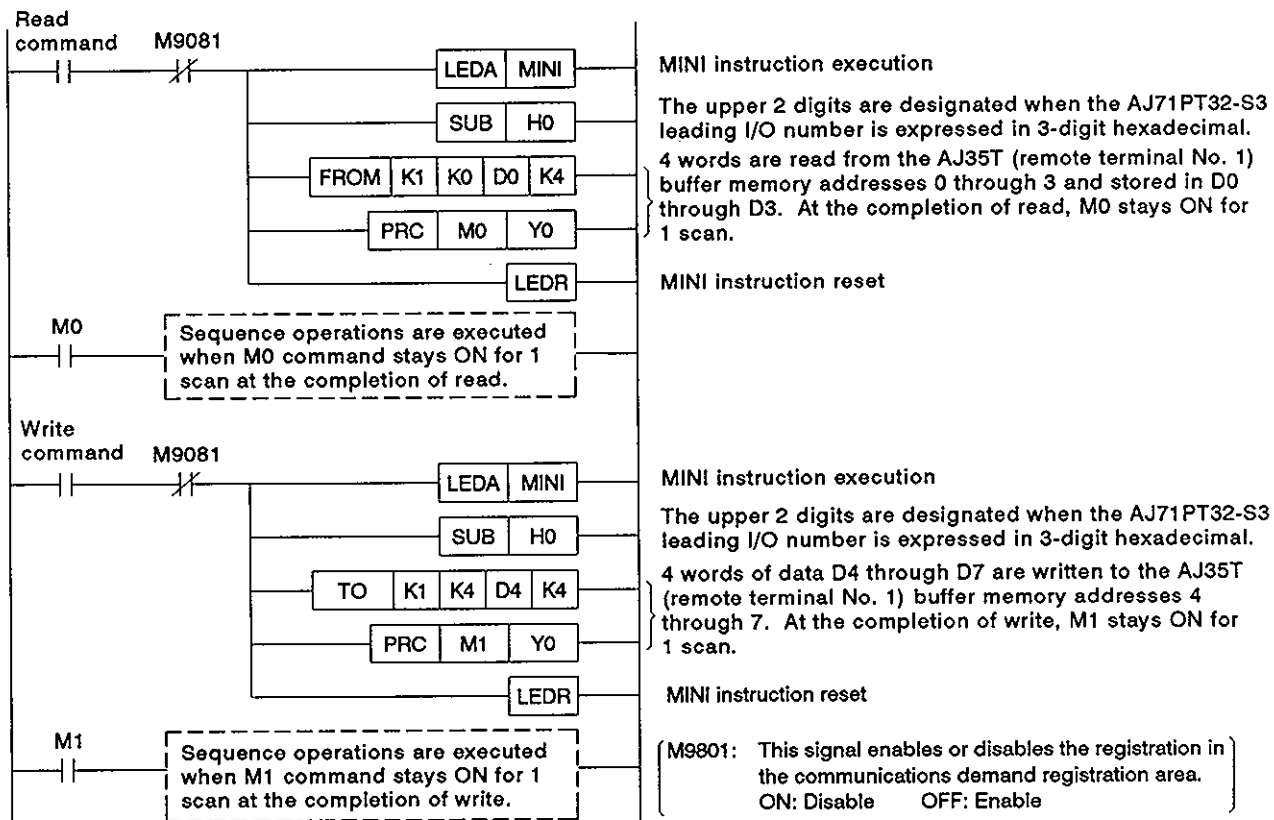
(b) AJ71PT32-S3 buffer memory

Use the FROM/TO instruction to designate buffer memory addresses.



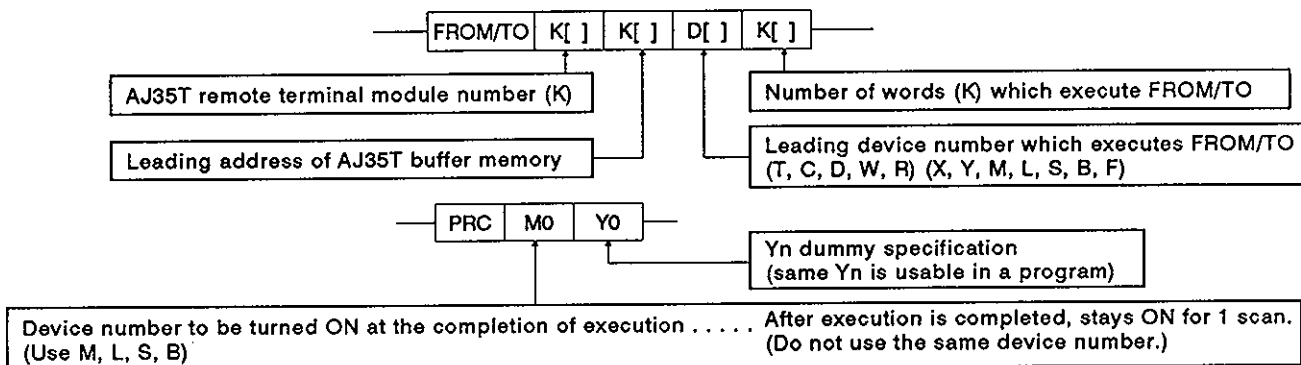
(2) Buffer memory read/write program

- (a) Execute the read/write of buffer memory by directly designating AJ35T buffer memory addresses using AnACPU dedicated instructions via the AJ71PT32-S3. (The AJ35T buffer memory can be used without acknowledging the AJ71PT32-S3 buffer memory.)



(b) FROM/TO and PRC instructions:

For details about FROM/TO and PRC instructions, see the A2A (S1)/A3ACPU Programming Manual (Dedicated Instructions).



POINT

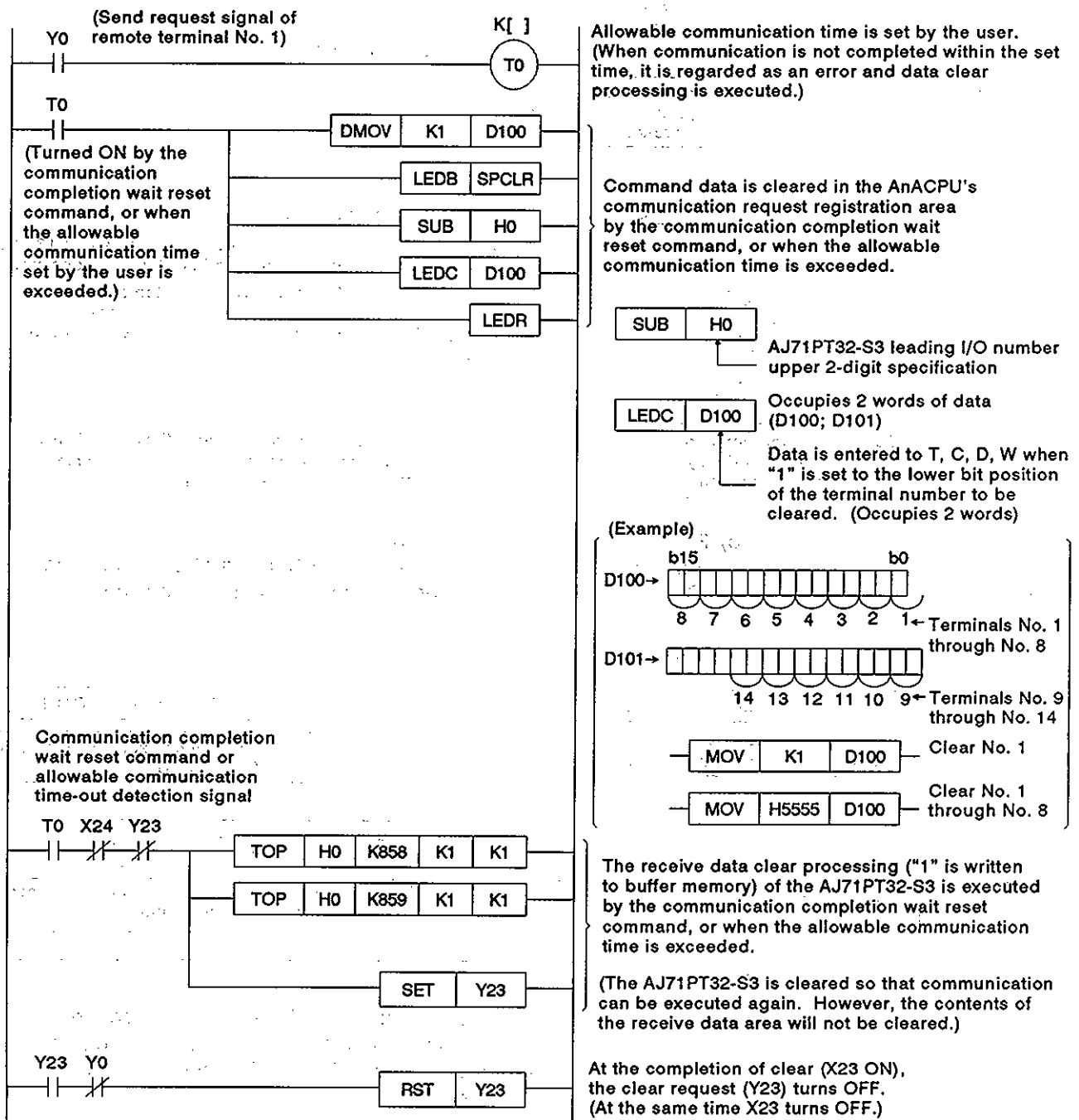
When the FROM/TO instruction is executed by the sequence program, data communication is executed via the AJ71PT32-S3 buffer memory. When the execution completion device of the PRC instruction is turned ON, data communication ends.

- (3) Data clear processing program when allowable communication time is exceeded.

When the FROM/TO instruction is executed, the AnACPU stores data in the communication request registration area. Communication is executed with the buffer memory of the AJ35T via the AJ71PT32-S3.

If the FROM/TO completion signal is not sent to the AnACPU because of communication noise, the AnACPU goes into the wait state and does not send the succeeding data.

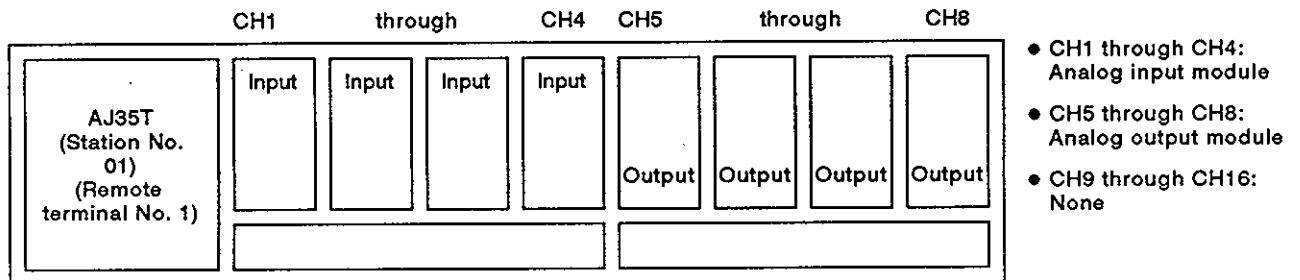
To detect and reset the wait state and clear the data, use a timer and set the allowable communication time. Then, resume communication. The following is the example of a data clear processing program.



4.5.2 Programming examples

(1) An analog-digital conversion program uses the following conditions.

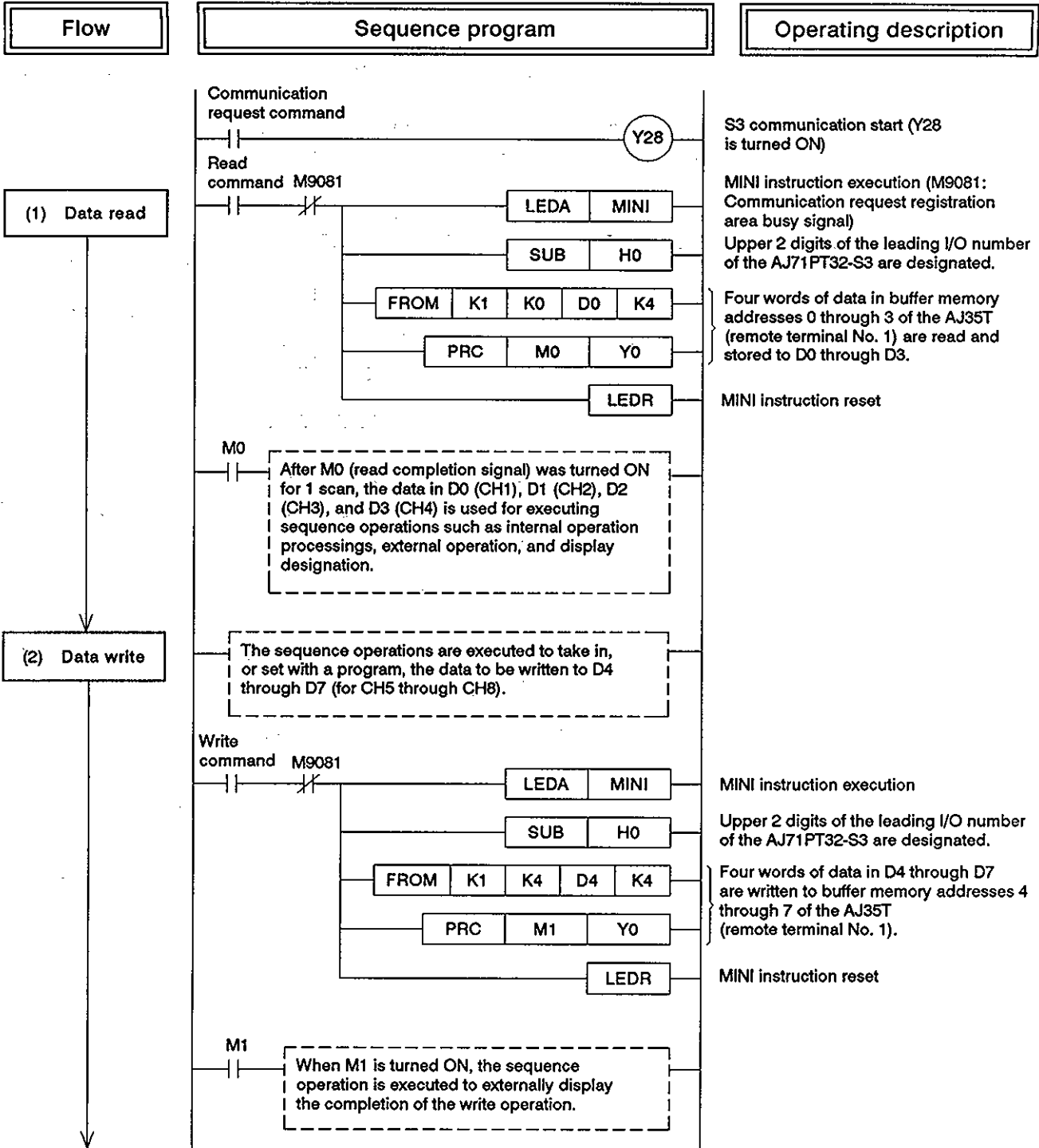
- See Section 4.5 for settings of the AJ35T and the AJ71PT32-S3.
- The following modules are loaded to the AJ35T:



- (2) The following sample program covers the data read using CH1 through CH4, the data write using CH5 through CH8, and the processing of communication errors.
- (3) The operation items of the program are given in the "Flow" column.
- (4) The explanation of the sample program is given in the "Operating Description" column.
- (5) The sample program executes batch read/write from/to the AJ35T buffer memory.
(Read/write programs can be created for each buffer memory address.)

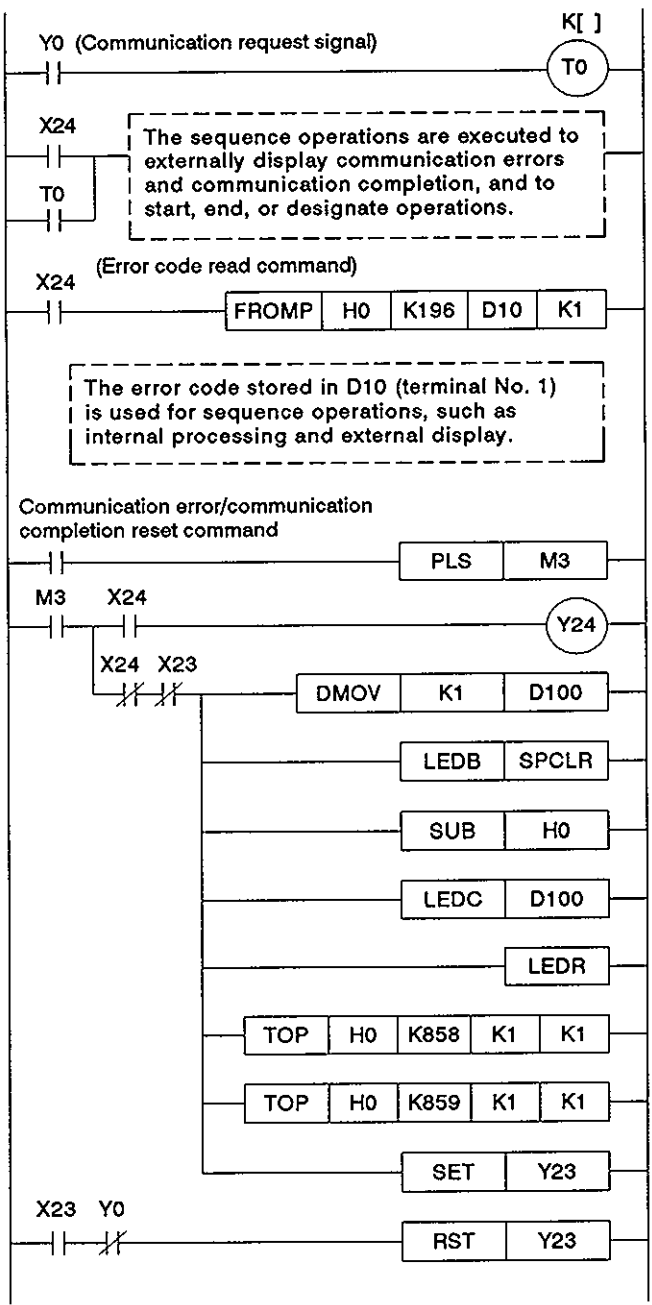
REMARK

Batch read/write is enabled by loading input modules in one group and output modules in another group.



Flow	Sequence program	Operating description
------	------------------	-----------------------

(3) Communication error processing



Allowable communication time is set by the user.

Display and processing are executed if a communication error (when X24 is ON) or a communication overrun error (when T0 is ON) has occurred.

When the S3 error detection (X24) is turned ON, the error code in K196 of the S3's buffer memory (remote terminal No. 1) is read and stored in D10.

Communication error reset (When an error is detected (X24 is ON), turn ON the communication error reset command. This activates the error detection reset signal (Y24) which finally turns X24 OFF.)

AnACPU data clear processing

AJ71PT32-S3 data clear processing

Communication completion wait reset

- Turn ON the communication completion wait reset command to execute data clear processing.
- The communication completion wait reset command can be turned ON using a timer (T0) to set the allowable communication time.

REMARK

- When a communication error or a communication completion wait has occurred, communication between AJ71PT32-S3, AnACPU, and AJ35T becomes abnormal and stops.
- By resetting the communication error or the communication completion wait, the AnACPU and AJ71PT32-S3 clear the data at error occurrence and resume data communication.

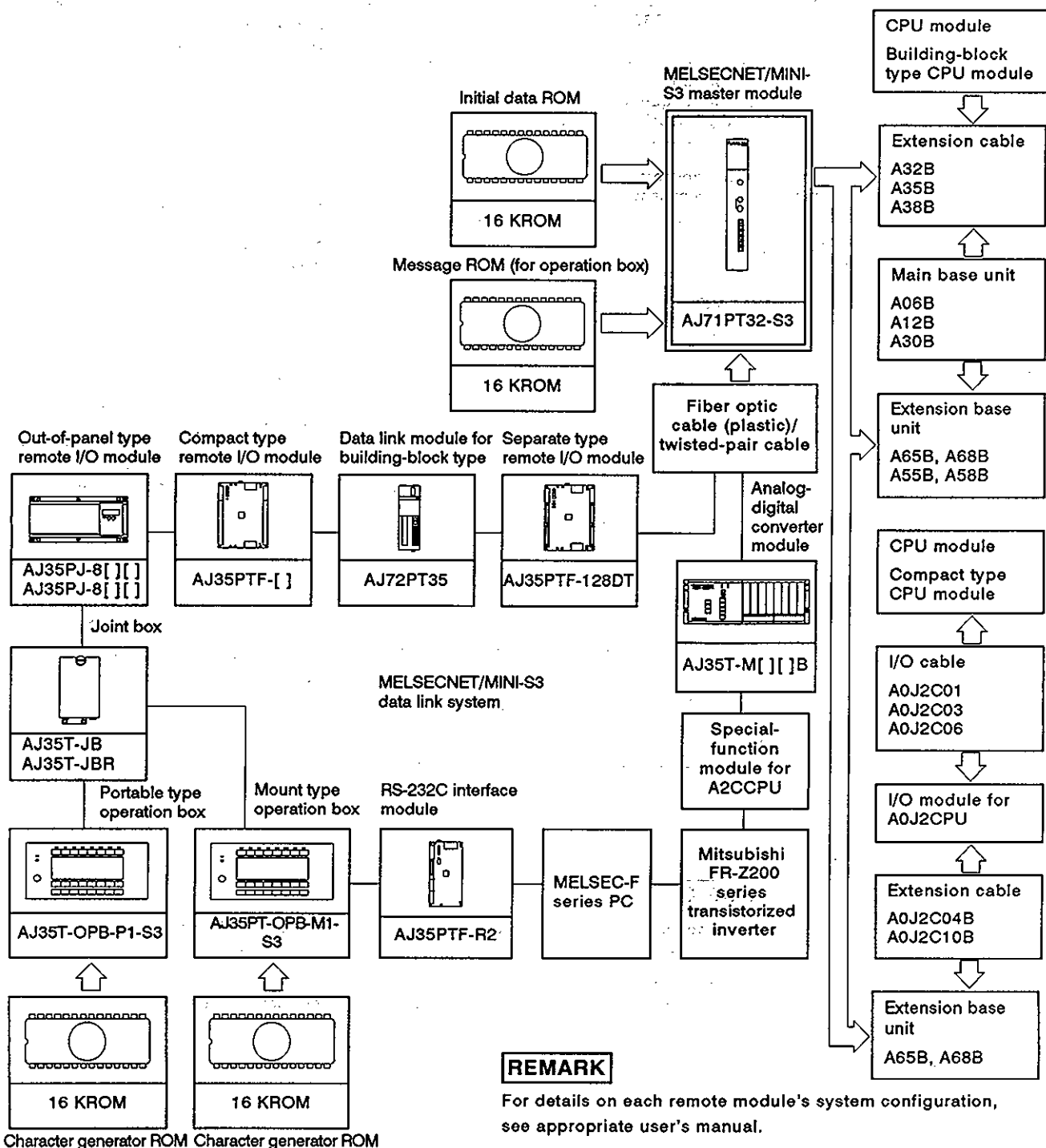
5. ACPU AND AJ71PT32-S3 LINK

- See Section 3 for link with the A2CCPU.
- See Section 4 for link with the A2ACPU(S1) and the A3ACPU.

5.1 System Configuration

5.1.1 Overall configuration

The overall configuration of the AJ35T using MELSECNET/MINI-S3 is shown below.



5.1.2 Applicable systems

The AJ35T can be linked to the following CPUs via the AJ71PT32-S3 master module.

Applicable CPUs	A0J2HCPU	A0J2CPU(P23/R23)
	A1NCPU(P21/R21)	A1CPU(P21/R21)
	A2NCPU(P21/R21)	A2CPU(P21/R21)
	A2NCPU(P21/R21)-S1	A2CPU(P21/R21)-S1
	A3NCPU(P21/R21)	A3CPU(P21/R21)
	A3HCPU(P21/R21)	
	A3MCPU(P21/R21)	

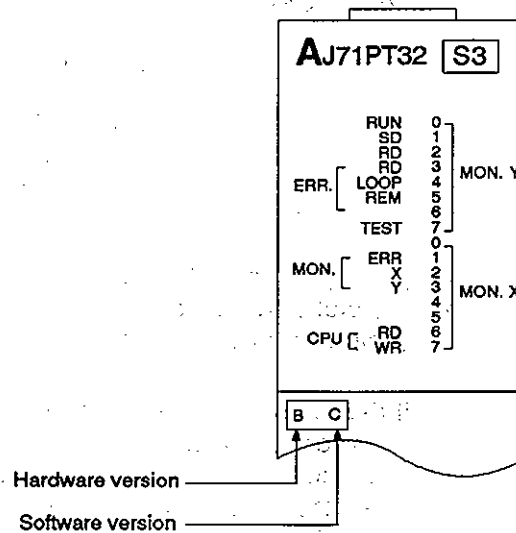
Except for (1) and (3) below, the AJ71PT32-S3 master module can be loaded into any slot and linked with the AJ35T.

The number of device panels is unlimited.

- (1) If the AJ35T is loaded into an extension base unit (A55B, A58B) without a power supply module, the power capacity may be insufficient. Avoid loading as long as possible. If it is necessary to load, be sure to keep the power capacity of the main base unit power supply and extension cable voltage drops in mind when selecting power supply modules and extension cables.
(For details, see each CPU User's Manual.)
- (2) The AJ71PT32-S3 master module cannot be loaded into the last slot of the 7th extension of the A3CPU (P21/R21).
- (3) In a MELSECNET (II) data link system, loading is possible to both a master station and a local station.
The AJ71PT32-S3 master module cannot be used for a remote I/O station.

5.1.3 Precautions during system construction

- (1) The software version indication, shown below, on the front of the AJ71PT32-S3 module must be "C" or later to use the AJ35T. Modules with software version "A", "B" or no software version indication cannot be used.



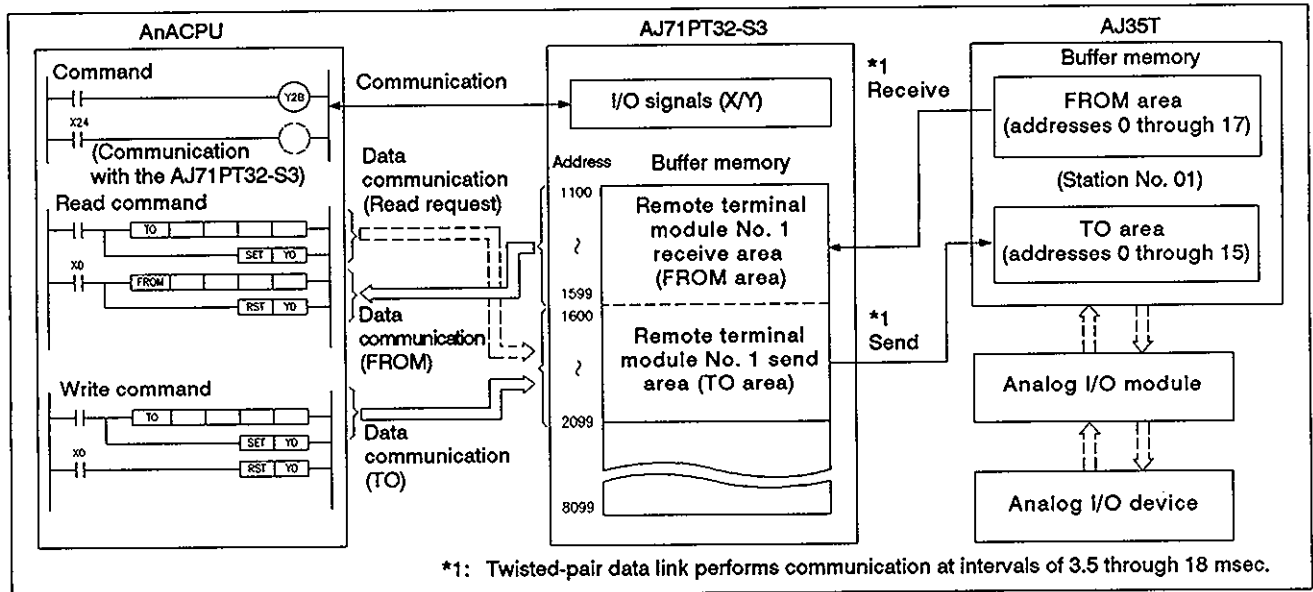
- (2) When using the AJ35T in the MELSECNET/MINI-S3 data link system, use twisted-pair cables.
- (3) Since each AJ35T occupies 4 stations (a total of 32 I/O points), be careful when allocating I/O signals.
- (4) When using the AJ35T, set the AJ71PT32-S3 as follows:
 - (a) Set the "jumper for mode selection" of the AJ71PT32-S3 to the extension mode (occupying 48 I/O points) of "48".
 - (b) Create the initial data ROM for the AJ71PT32-S3 extension mode (occupying 48 I/O points) by the SW0GP-MINIP and install it. For remote terminal data setting at the creation of the initial ROM, set the AJ35T protocol to **4: MINI STANDARD PROTOCOL**.
 - (c) For details, see the following manuals:
 - AJ71PT32-S3 type MELSECNET/MINI-S3 Master Module User's Manual
 - SW0GP-MINIP Operating Manual
- (5) The AJ35T requires a 24 VDC power supply. When supplying power from one power source to multiple AJ35Ts or to the link I/O modules, be sure to take voltage drops into consideration when selecting cables and doing wiring. To calculate the receiving port voltage, see the **REMARK** in Section 3.1.2.

5.2 Data Communication Processing

5.2.1 Communication method

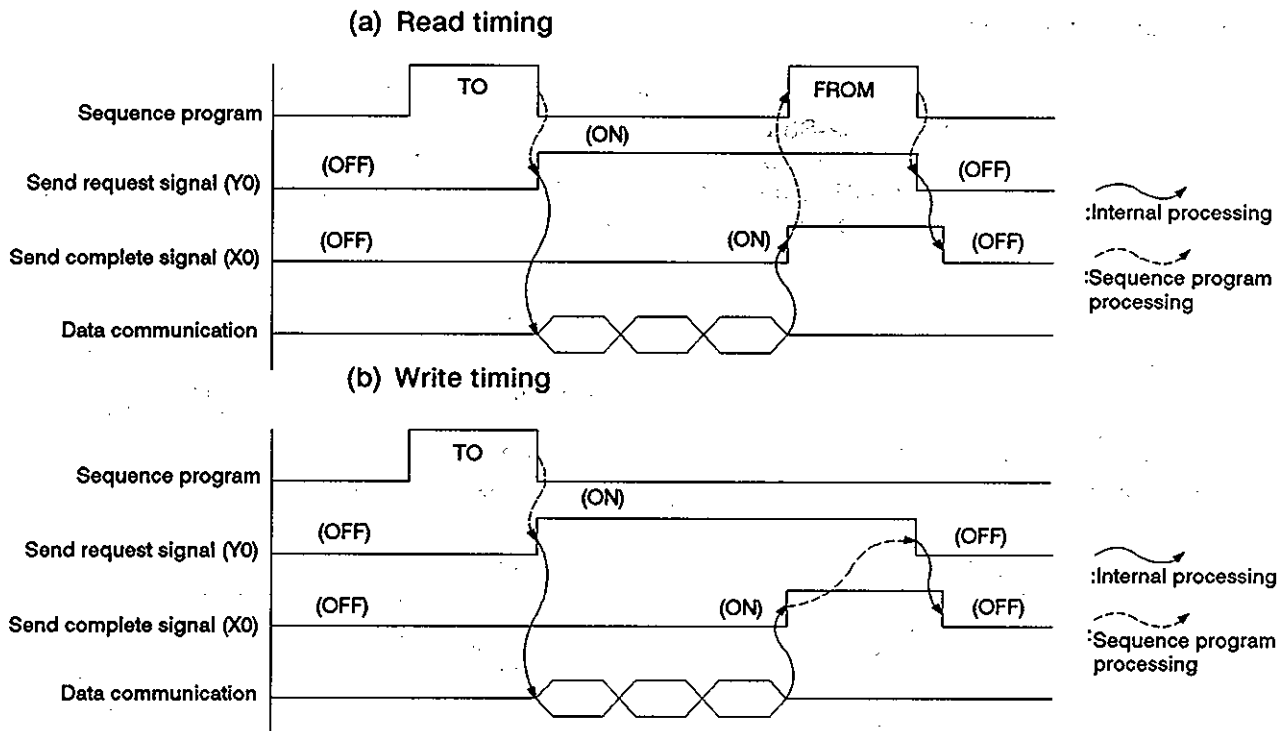
Communication between the AJ35T and the ACPU is executed via the AJ71PT32-S3 buffer memory.

- The AJ71PT32-S3 is loaded in slot 0 (Leading I/O number: H0).
- The AJ35T's station number is set at 01, and the remote terminal number, at 1 (set with the initial data ROM).



- (1) I/O signal communication between the ACPU and the AJ71PT32-S3
I/O signals such as communication start, send request, send completion, and error detection are sent and received.
- (2) Communication between the ACPU, AJ71PT32-S3, and AJ35T
 - (a) Read from the AJ35T buffer memory
 - By using the TO instruction of the sequence program, the ACPU writes the data for read request, leading address, and the number of words to be read to the AJ71PT32-S3's send area.
 - When the send request signal (Y0) is set, the AJ71PT32-S3 reads the data of the designated number of words from the AJ35T buffer memory, beginning with the designated leading address according to the data sent by the TO instruction, stores it in the receive area, and turns ON the send completion signal (X0).
 - The ACPU reads the receive data stored in the AJ71PT32-S3 receive area. It uses the FROM instruction when the send completion signal (X0) is turned ON.
 - (b) Write to the AJ35T buffer memory
 - Using the TO instruction of the sequence program, the ACPU writes data to the AJ71PT32-S3 send area.
 - When the send request signal (Y0) is turned ON, the AJ71PT32-S3 writes data to the AJ35T buffer memory.

(3) Processing timing



5.2.2 Processing time

The processing time required to write data to and read data from the AJ35T buffer memory is shown below.

Item	Max. Processing Time
(1) Data read	$[t \text{ msec} \times (\text{number of data words})] + [(t \text{ msec} \times 5) + 80 \text{ msec}]$
(2) Data write	*1: Total value of the AJ35T internal processing time and the PC CPU processing time

"t" is the I/O refresh time. It varies according to the number and type of connected remote module stations. Calculation of the I/O refresh time is shown below.

Mode	Operation Mode Setting	I/O Refresh Time (msec)
Extension mode (48 points)	Automatic online return enable (0)	$t = 0.66 + (0.044 \times R) + (0.25 \times B) + (0.95 \times T)$
	Automatic online return disable (1)	$t = 0.54 + (0.058 \times R) + (0.25 \times B) + (0.95 \times T)$
	Communication stop at error detection (2)	$t = 0.54 + (0.051 \times R) + (0.25 \times B) + (0.95 \times T)$

R : Total number of remote stations
 B : Number of AJ35PTF-128DTs
 T : Number of remote terminal modules

5.3 AJ71PT32-S3 I/O Signals

I/O signals between the AJ71PT32-S3 and the ACPU in the extension mode are used when accessing the AJ35T buffer memory.

For details about the I/O signals, see the MELSECNET/MINI-S3 Master Module User's Manual.

The list of I/O signals in the extension mode is shown below.

"n" in the Device No. column of the table is the master module leading I/O number. It is determined by the number of I/O points of the I/O modules loaded into the master module's front slot and by the master module's position.

Example: When the master module leading I/O number is "X/Y20"

X (n+0) through X (n+2F) = X20 through X4F

Y (n+0) through Y (n+2F) = Y20 through Y4F

I/O Signal List in the Extension Mode

Device No.	Signal	Device No.	Signal
X(n+0)	Send request signal	Y(n+0)	Send request signal
X(n+1)	Read complete signal	Y(n+1)	Read complete signal
X(n+2)	Send request signal	Y(n+2)	Send request signal
X(n+3)	Read complete signal	Y(n+3)	Read complete signal
X(n+4)	Send request signal	Y(n+4)	Send request signal
X(n+5)	Read complete signal	Y(n+5)	Read complete signal
X(n+6)	Send request signal	Y(n+6)	Send request signal
X(n+7)	Read complete signal	Y(n+7)	Read complete signal
X(n+8)	Send request signal	Y(n+8)	Send request signal
X(n+9)	Read complete signal	Y(n+9)	Read complete signal
X(n+A)	Send request signal	Y(n+A)	Send request signal
X(n+B)	Read complete signal	Y(n+B)	Read complete signal
X(n+C)	Send request signal	Y(n+C)	Send request signal
X(n+D)	Read complete signal	Y(n+D)	Read complete signal
X(n+E)	Send request signal	Y(n+E)	Send request signal
X(n+F)	Read complete signal	Y(n+F)	Read complete signal
X(n+10)	Send request signal	Y(n+10)	Send request signal
X(n+11)	Read complete signal	Y(n+11)	Read complete signal
X(n+12)	Send request signal	Y(n+12)	Send request signal
X(n+13)	Read complete signal	Y(n+13)	Read complete signal
X(n+14)	Send request signal	Y(n+14)	Send request signal
X(n+15)	Read complete signal	Y(n+15)	Read complete signal
X(n+16)	Send request signal	Y(n+16)	Send request signal
X(n+17)	Read complete signal	Y(n+17)	Read complete signal
X(n+18)	Send request signal	Y(n+18)	Send request signal
X(n+19)	Read complete signal	Y(n+19)	Read complete signal
X(n+1A)	Send request signal	Y(n+1A)	Send request signal
X(n+1B)	Read complete signal	Y(n+1B)	Read complete signal
X(n+1C)	(Unused)	Y(n+1C)	(Unused)
X(n+1D)		Y(n+1D)	
X(n+1E)		Y(n+1E)	
X(n+1F)		Y(n+1F)	
X(n+20)	Hardware error	Y(n+20)	
X(n+21)	MINI-S3 link communication in progress	Y(n+21)	
X(n+22)	(Unused)	Y(n+22)	
X(n+23)	Receive data clear complete	Y(n+23)	Receive data clear request
X(n+24)	Remote terminal module error detection	Y(n+24)	Remote terminal module error detection reset
X(n+25)	Test mode	Y(n+25)	(Unused)
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)	(Unused)	Y(n+29)	(Unused)
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)	Buffer memory channel switching
X(n+2D)		Y(n+2D)	Error reset
X(n+2E)		Y(n+2E)	(Unused)
X(n+2F)	Y(n+2F)		

5.4 Buffer Memory Assignment

5.4.1 AJ35T buffer memory

The AJ35T's buffer memory is not backed up by a battery. When power is turned OFF, the buffer memory is cleared.

(1) Read-only buffer memory (for FROM instruction)

Address (decimal)	Contents
0	CH.1 input data
1	CH.2 input data
2	CH.3 input data
3	CH.4 input data
4	CH.5 input data
5	CH.6 input data
6	CH.7 input data
7	CH.8 input data
8	CH.9 input data
9	CH.10 input data
10	CH.11 input data
11	CH.12 input data
12	CH.13 input data
13	CH.14 input data
14	CH.15 input data
15	CH.16 input data
16	Input module loaded
17	Output module loaded
18	Error Code

[Contents of buffer memory addresses 16 and 17]

(1) Connection of input/output modules to each channel is indicated by bit.
 { 1: Yes (loaded)
 0: No (unloaded) }

(2) Each type of loaded module (input/output) can be read using the FROM instruction of the sequence program.

[Contents of buffer memory address 18]

(1) Storage of the error code generated first only (See Section 7.1).

(2) The contents can be read using the FROM instruction of the sequence program.

(2) Write-only buffer memory (for TO instruction)

Address (decimal)	Contents
0	CH.1 input data
1	CH.2 input data
2	CH.3 input data
3	CH.4 input data
4	CH.5 input data
5	CH.6 input data
6	CH.7 input data
7	CH.8 input data
8	CH.9 input data
9	CH.10 input data
10	CH.11 input data
11	CH.12 input data
12	CH.13 input data
13	CH.14 input data
14	CH.15 input data
15	CH.16 input data

5.4.2 AJ71PT32-S3 buffer memory

There are communication (send/receive) data addresses for the AJ71PT32-S3 buffer memory according to dedicated read/write instructions between the AJ71PT32-S3 and the ACPU.

The allocation of buffer memory addresses which are used for automatic communication with the AJ35T are shown below.

For details of the buffer memory, see the MELSECNET/MINI-S3 Master Module User's Manual.

Addresses (decimal)		Contents	PC CPU Read/Write Enable/Disable
0	Total number of remote stations	The range of the station numbers of all connected remote modules is set.	Read/write enabled
1	Number of retries	The number of retries at communication error occurrence is set.	
	(Unused)	—	
4	Line error check	Used to confirm line fault areas.	
	(Unused)	—	—
10 to 41	Batch refresh send data	Data output to the batch refresh type remote I/O module is written.	
	(Unused)	—	
70 to 77	Remote module's card data	Each connected remote module type is stored.	Read only
	(Unused)	—	—
90 to 93	Accumulated faulty station detection	Station numbers of remote modules which are in communication error are stored. (Detection status is retained until reset.)	Read/write enabled
	(Unused)	—	—
100 to 103	Faulty station detection	The station number of the remote module which is in communication error is stored. (Communication status is constantly updated.)	Read only
	(Unused)	—	
107	Communication error code	When the MINI-S3 link communication signal is ON, this means the cause of the communication error has been stored.	
108	Error detection code	The accumulated number of times the MINI-S3 link error detection turns ON is stored.	
	(Unused)	—	Read only
110 to 141	Batch refresh receive data	Input data from batch refresh type remote I/O module is stored.	
	(Unused)	—	
160	Line error retry counter	The number of executions of retry processing when communication with all remote modules is disabled by line error is stored.	—
161 to 192	Retry counter	The number of times retry processing is executed to faulty stations is stored.	
	(Unused)	—	
195	Remote terminal module faulty stations	The station number of the remote terminal module where an error has occurred is stored.	—
196 to 209	Remote terminal module error code	The reason why the remote terminal module error detection signal [X (n + 24)] is ON is stored.	
	(Unused)	—	

* 1 : Area where station number(s) and error code(s) are stored when an AJ35T error occurs. (See Section 7.1 for error codes.)

5. ACPU AND AJ71PT32-S3 LINK

MELSEC-A

Addresses
(decimal)

250 to 282	Partial refresh station (Unused)
300 to 363	Partial refresh send data (Unused)
598	Partial refresh accumulation input error detection
599	Partial refresh input error detection
600 to 663	Partial refresh receive data
858	Receive data clear designation
859	Receive data clear range designation
860 to 929	No-protocol mode parameter
930 to 1099	(Unused)

*2

Contents	PC CPU Read/Write Enable/Disable
Partial refresh type remote I/O module station No. and specification of the number of digits are written.	
—	
Data output to the partial refresh type remote I/O module is written.	Read/write enable
—	
Partial refresh type remote I/O module's input data received faulty station is stored. (Detection status is retained until reset.)	
Partial refresh type remote I/O module's input data received faulty station is stored. (Communication status is always undated.)	
Partial refresh type remote I/O module's input data is stored.	Read only
The AJ35PTF-R2 station number which executes receive data clear by the receive data clear request signal [Y (n + 23)] is specified.	
The receive buffer which is cleared when the receive data clear is executed by the receive data clear request signal [Y (n + 23)] is specified.	Read/write enabled
Parameters are set when using the AJ35PTF-R2 in a no-protocol mode.	
—	

CH0

CH1

1100 to 2099	Remote terminal module No. 1 send/receive area	Remote terminal module No. 8 send/receive area
2100 to 3099	Remote terminal module No. 2 send/receive area	Remote terminal module No. 9 send/receive area
3100 to 4099	Remote terminal module No. 3 send/receive area	Remote terminal module No. 10 send/receive area
4100 to 5099	Remote terminal module No. 4 send/receive area	Remote terminal module No. 11 send/receive area
5100 to 6099	Remote terminal module No. 5 send/receive area	Remote terminal module No. 12 send/receive area
6100 to 7099	Remote terminal module No. 6 send/receive area	Remote terminal module No. 13 send/receive area
7100 to 8099	Remote terminal module No. 7 send/receive area	Remote terminal module No. 14 send/receive area

*3

[Y (n + 2C) at OFF]

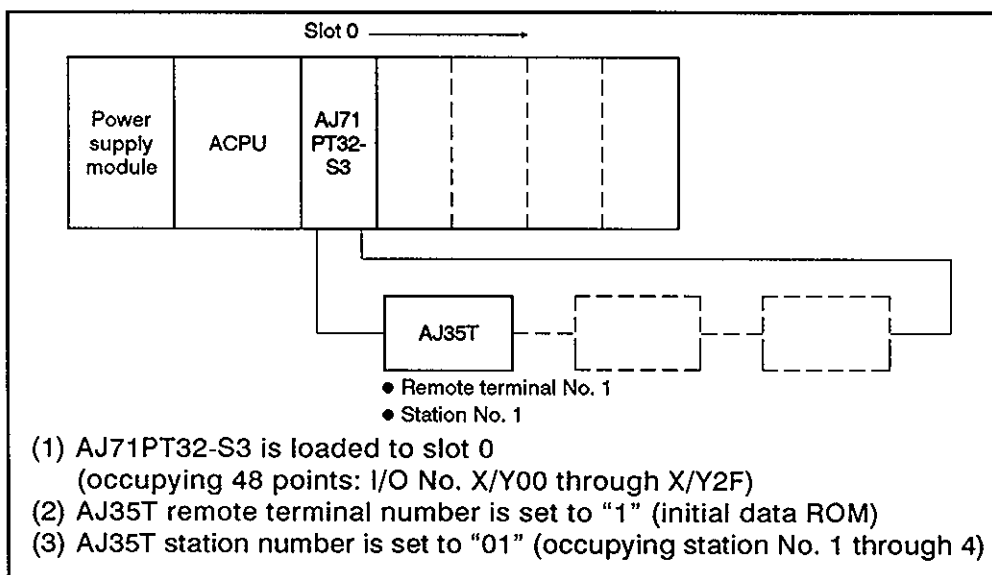
[Y (n + 2C) at ON]

* 2 : Clear processing area for data received during the AJ35T reset operation.

* 3 : Buffer memory area for AJ35T data transfer (1st module through 14th module)

5.5 Programming

Programming under the setting conditions of ACPU, AJ71PT32-S3, and AJ35T is explained below.

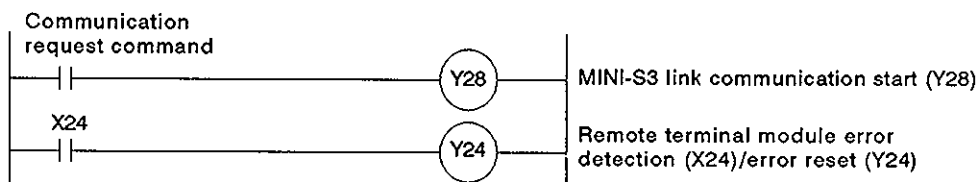


REMARK

When the AJ71PT32-S3 is loaded into slot 0 of the extension base of A0J2H/A0J2CPU, the upper 2 digits of the FROM/TO instruction leading I/O number will be H10 because 64 points of I/O numbers (100 through 13F) are occupied.

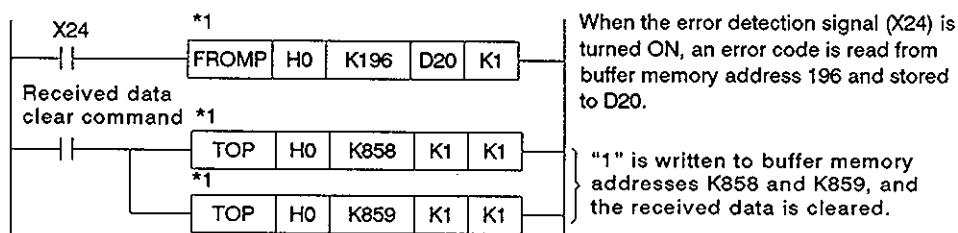
5.5.1 Basic programs

- (1) A program for communicating between the ACPU and the AJ71PT32-S3
 - (a) AJ71PT32-S3 I/O signals
Use the I/O signals allocated to the 48 points of X/Y00 through X/Y2F for programming.



(b) AJ71PT32-S3 buffer memory

Use the FROM/TO instruction to designate buffer memory addresses.



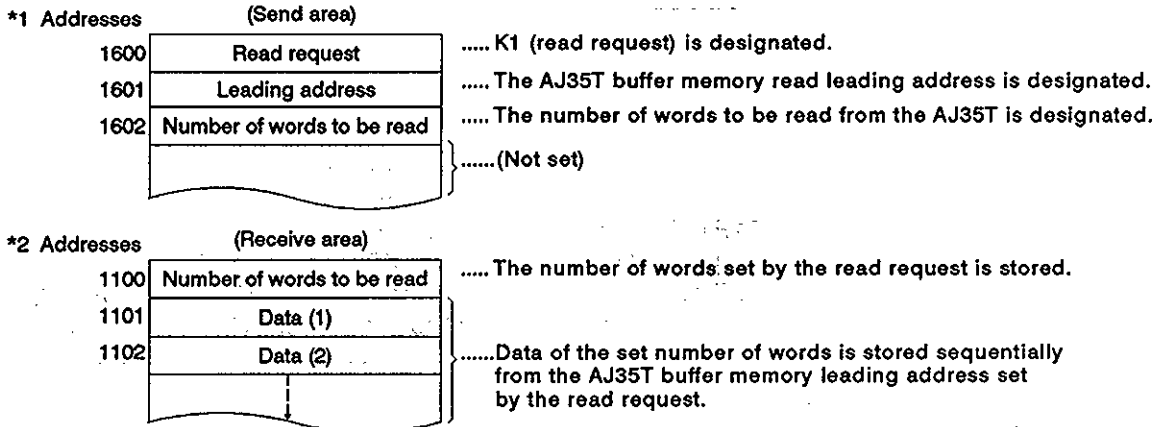
*1: The A0J2CPU(P23/R23) is not provided with the FROMP/TOP pulse instruction. Use internal relays to change data into pulses.

(2) AJ35T buffer memory read program

To read data from the AJ35T's buffer memory, data is set to the buffer memory of the send area of the AJ71PT32-S3, and a send request signal is turned ON.

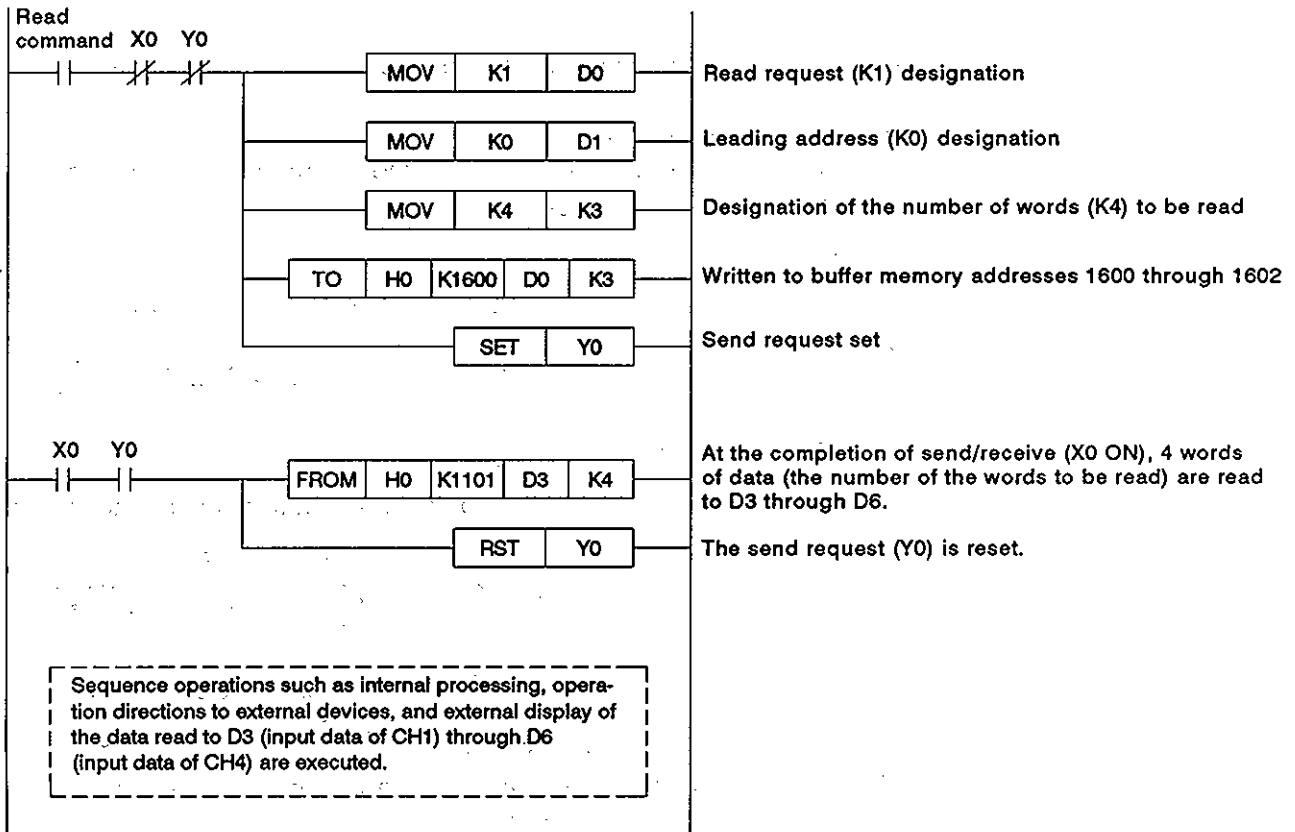
When the read operation is completed, the buffer memory of the receive area of the AJ71PT32-S3 is read.

(a) Details of the data set to the send and receive areas of the AJ71PT32-S3 (addresses of the 1st module)



* 1, 2 : Data set at the leading address of modules 2 through 14 is the same.

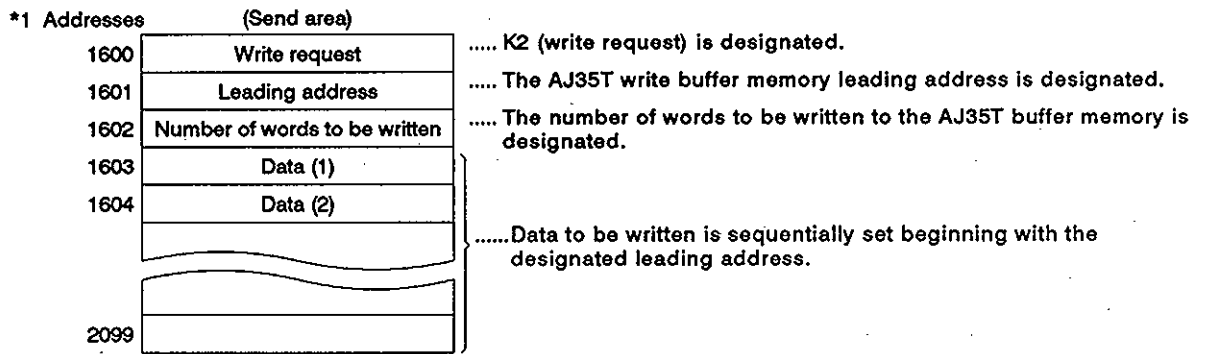
(b) Program example



(3) AJ35T buffer memory write program

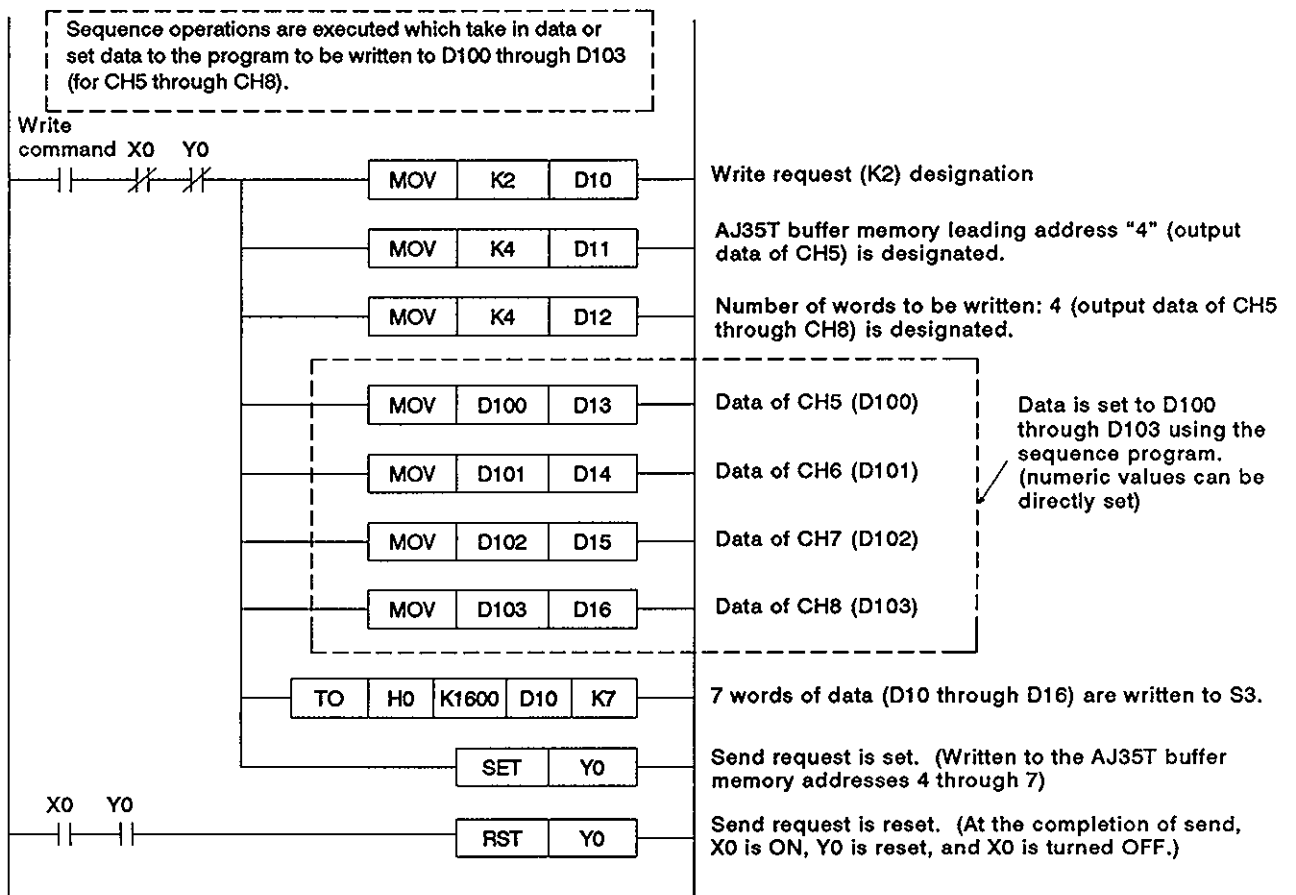
To write data to the AJ35T's buffer memory, data is set to the buffer memory of the send area of the AJ71PT32-S3, and a send request signal is turned ON.

(a) Details of the data set to the send and receive areas of the AJ71PT32-S3 (addresses of the 1st module)



* 1 : Data set at the leading address of modules 2 through 14 is the same.

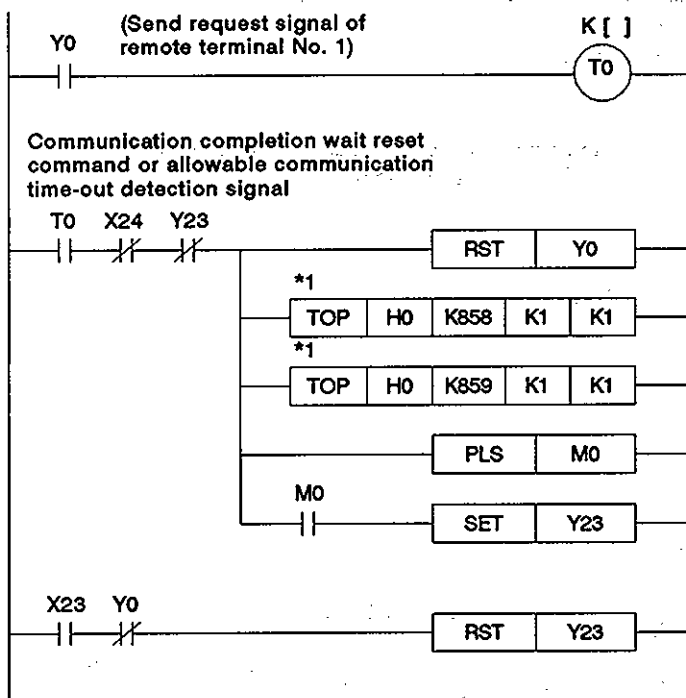
(b) Sample program



- (4) Data clear processing program when allowable communication time is exceeded

The ACPU turns ON the communication request signal (Y0) at the execution of the FROM/TO instruction, and executes read/write with the buffer memory of the AJ35T via the AJ71PT32-S3.

If the send completion signal (X0) is not sent to the ACPU when the AJ35T and the AJ71PT32-S3 are put into the wait state due to communication noise, the ACPU is put into the wait state.



Allowable communication time is set by the user. (When communication is not completed within the set time, it is regarded as an error and the received data clear processing is executed.)

The receive data clear processing ("1" is written to buffer memory) of the AJ71PT32-S3 is executed by the communication completion wait reset command, or when the allowable communication time is exceeded. (The AJ71PT32-S3 is cleared so that communication can be executed again. However, the contents of the receive data area will not be cleared.)

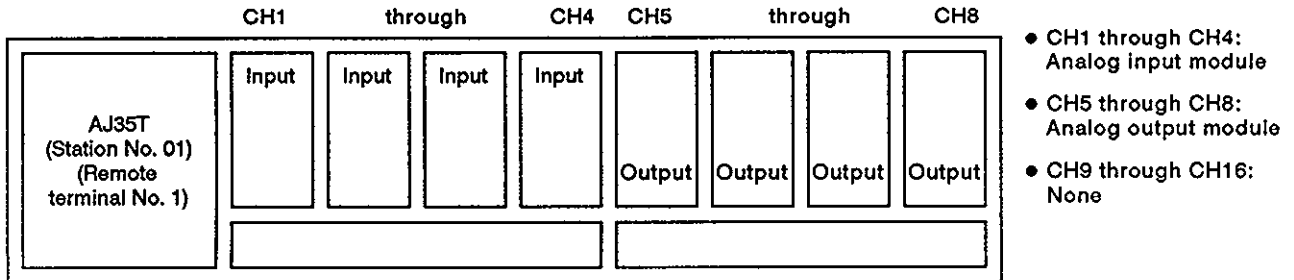
At the completion of clear (X23 ON), the clear request (Y23) turns OFF. At the same time X23 turns OFF.

*1 : The A0J2CPU(P23/R23) is not provided with the TOP pulse instruction. Use internal relays to change data into pulses.

5.5.2 Programming examples

(1) An analog-digital conversion program uses the following conditions.

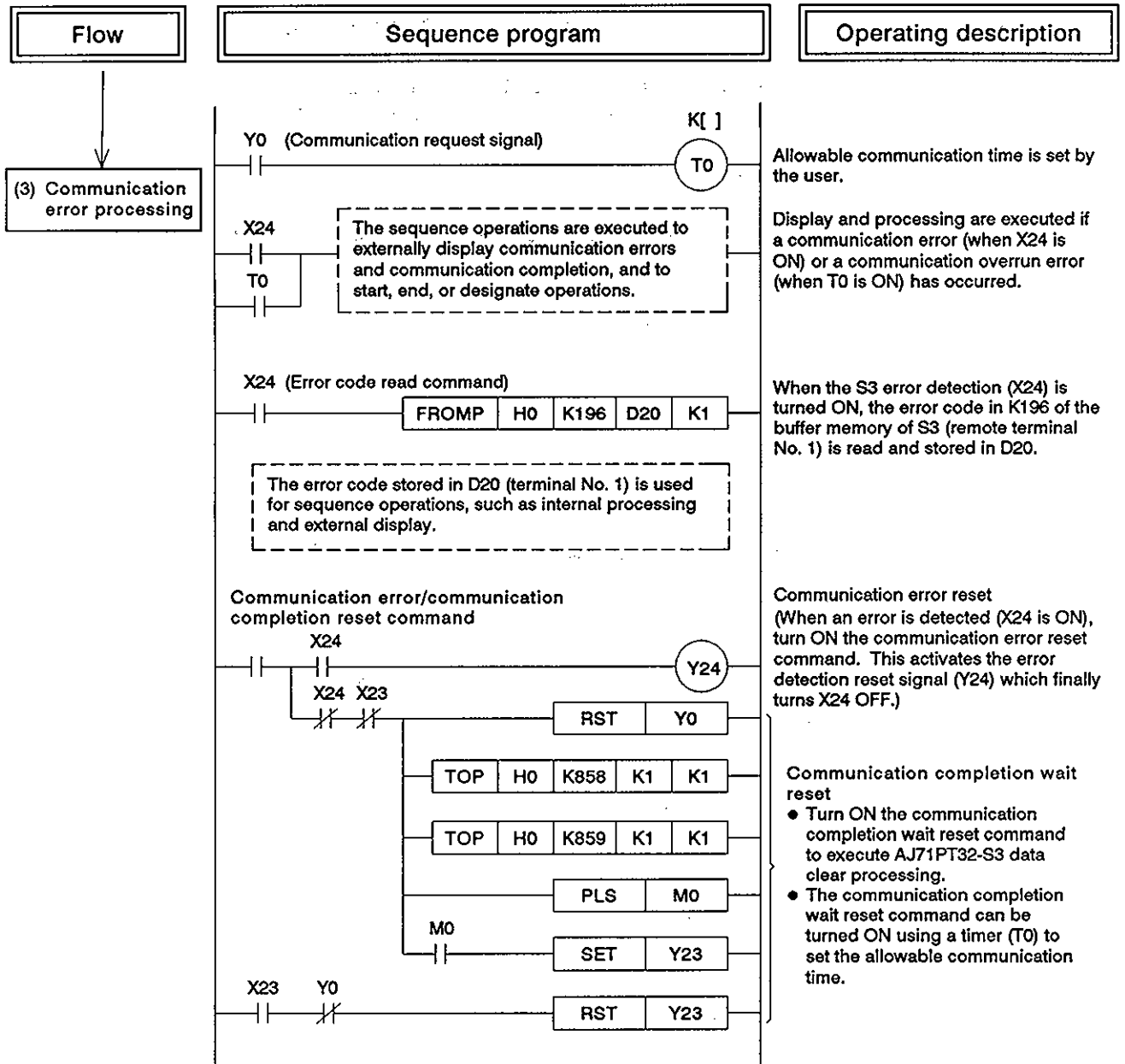
- See Section 5.5 for settings of the AJ35T and the AJ71PT32-S3.
- The following modules are loaded to the AJ35T:



- (2) The following sample program covers the data read using CH1 through CH4, the data write using CH5 through CH8, and the processing of communication errors.
- (3) The operation items of the program are given in the “Flow” column.
- (4) The explanation of the sample program is given in the “Operating Description” column.
- (5) The sample program executes batch read/write from/to the AJ35T buffer memory. (Read/write programs can be created for each buffer memory address.)

REMARK

Batch read/write is enabled by loading input modules in one group and output modules in another group.



REMARK

- When a communication error or a communication completion wait has occurred, communication between AJ71PT32-S3 and AJ35T becomes abnormal and stops.
- By resetting the communication error or the communication completion wait, the AJ71PT32-S3 clear the data at error occurrence and resume data communication.

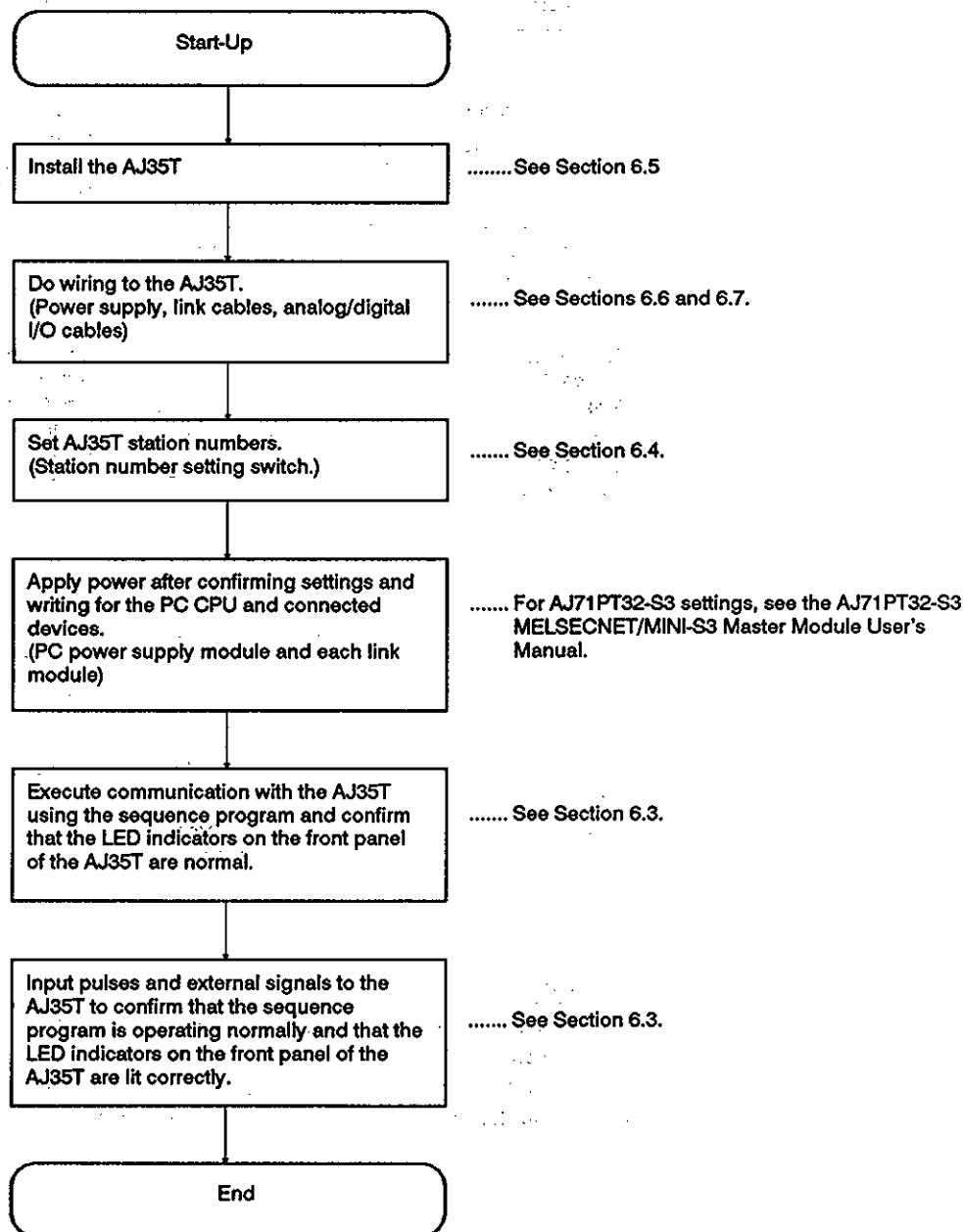
6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES MELSEC-A

6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES

Pre-operation procedures for the AJ35T, names and settings for each part of the AJ35T, and the wiring methods are explained in this section.

6.1 Pre-Operation Setting Procedures

Pre-operation setting procedures for the AJ35T are explained below.



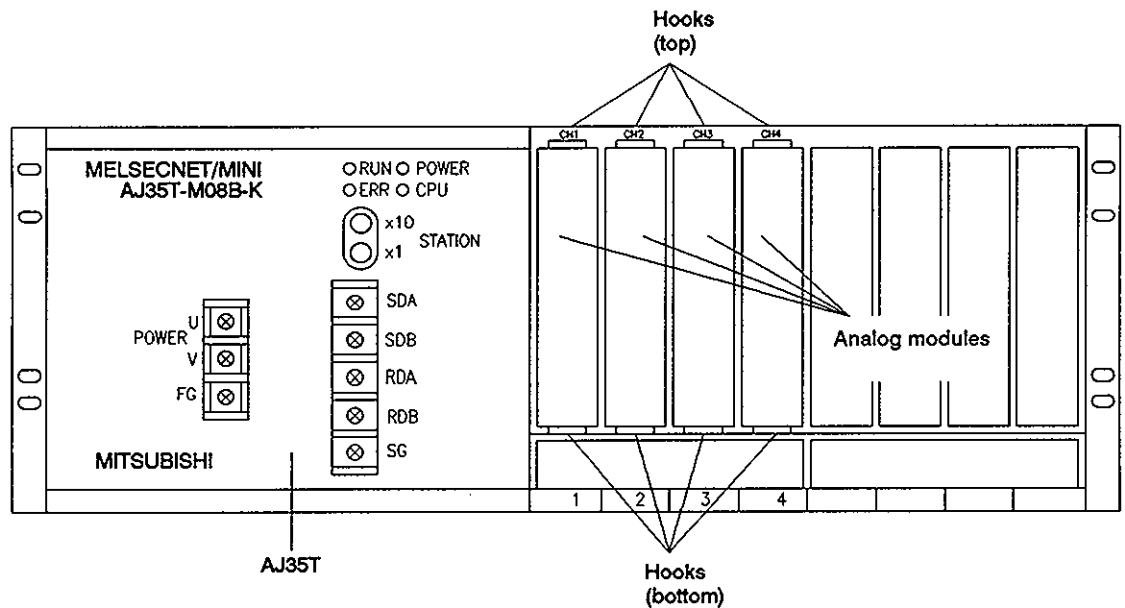
6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES MELSEC-A

6.2 Handling Instruction

- (1) Protect the A616DA and its terminal block from impact loads.
- (2) Do not remove the printed circuit boards from the housing. There are no user-serviceable parts on the boards.
- (3) Ensure that no conductive debris can enter the module. If it does, make sure that it is removed. Guard particularly against wire offcuts.
- (4) Tighten the screws as specified below:

Screw		Tightening Torque Range kg·cm (lb·inch)
Terminal screw of the communication terminal block	(M3 screw)	5(4.33) to 8(6.93)
Terminal screw of the module terminal block	(M3.5 screw)	8.5(7.36) to 11.5(9.96)
Terminal screw of the power supply terminal block	(M4 screw)	8(6.93) to 14(12.1)

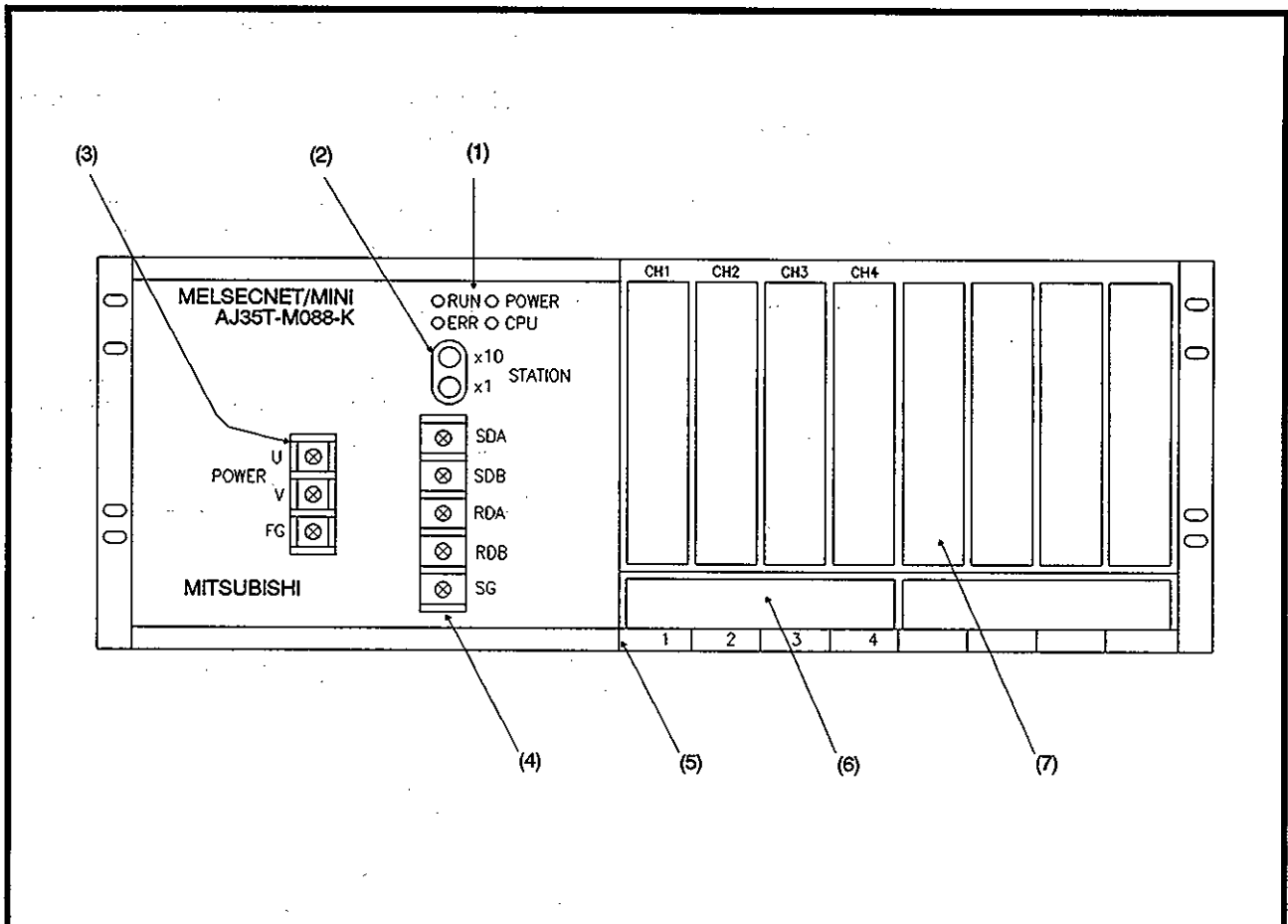
- (5) To load the module onto the base, press the module against the base so that the catch on the top of the unit is securely locked. To unload the module, push the catch, and after the catch is disengaged from the base, pull the module toward you.



- (6) Be sure to turn the power to the analog modules OFF before loading/unloading them.

6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES MELSEC-A

6.3 Parts Identification

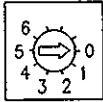
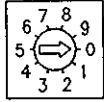


No.	Name	Description										
(1)	Operation state indicator LED	<ul style="list-style-type: none"> LEDs for operating status, and error definition indication, etc. <table border="1"> <thead> <tr> <th>LED</th> <th>Confirmation</th> </tr> </thead> <tbody> <tr> <td>RUN</td> <td> <ul style="list-style-type: none"> Lit : Normal communication Off : Communication stop </td> </tr> <tr> <td>POWER</td> <td> <ul style="list-style-type: none"> Lit : Power ON Off : Power OFF </td> </tr> <tr> <td>CPU</td> <td> <ul style="list-style-type: none"> Lit : Communicating with master station Off : Communication with master station completed </td> </tr> <tr> <td>ERR</td> <td> <ul style="list-style-type: none"> Lit : Receive data error Off : Normal communication </td> </tr> </tbody> </table>	LED	Confirmation	RUN	<ul style="list-style-type: none"> Lit : Normal communication Off : Communication stop 	POWER	<ul style="list-style-type: none"> Lit : Power ON Off : Power OFF 	CPU	<ul style="list-style-type: none"> Lit : Communicating with master station Off : Communication with master station completed 	ERR	<ul style="list-style-type: none"> Lit : Receive data error Off : Normal communication
LED	Confirmation											
RUN	<ul style="list-style-type: none"> Lit : Normal communication Off : Communication stop 											
POWER	<ul style="list-style-type: none"> Lit : Power ON Off : Power OFF 											
CPU	<ul style="list-style-type: none"> Lit : Communicating with master station Off : Communication with master station completed 											
ERR	<ul style="list-style-type: none"> Lit : Receive data error Off : Normal communication 											
(2)	Station Number setting switch	<ul style="list-style-type: none"> Sets the station number from 01 through 61 by error rotary switch. Station 00 is a bypass function. (For details, see Section 6.4) 										
(3)	Power supply terminal block	<ul style="list-style-type: none"> 100/200 VAC terminals, 24 VDC terminals, and FG terminal. (M4 screws) 										
(4)	Communication terminal block	<ul style="list-style-type: none"> Terminals for send, receive, and shield connection. (M3 screws) 										
(5)	Base	<ul style="list-style-type: none"> Used for loading units and modules. 										
(6)	Module terminal block	<ul style="list-style-type: none"> I/O terminals for analog modules. (See Section 6.7 for details.) (M3.5 screws) 										
(7)	Module loading connector	<ul style="list-style-type: none"> Used for power supply and I/O signal processing of analog modules. 										

6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES MELSEC-A

6.4 Station Number Settings

(1) Settings for the AJ35T station number setting switches are explained below.

		Setting
 × 10	 × 1	(1) Switch of x 10 : Set the 2nd digit of station number (2) Switch of x 1 : Set the 1st digit of station number (3) Set station numbers in the range of 01 to 61. (4 stations/module) (4) Set station number 00 as a bypass function (relay).

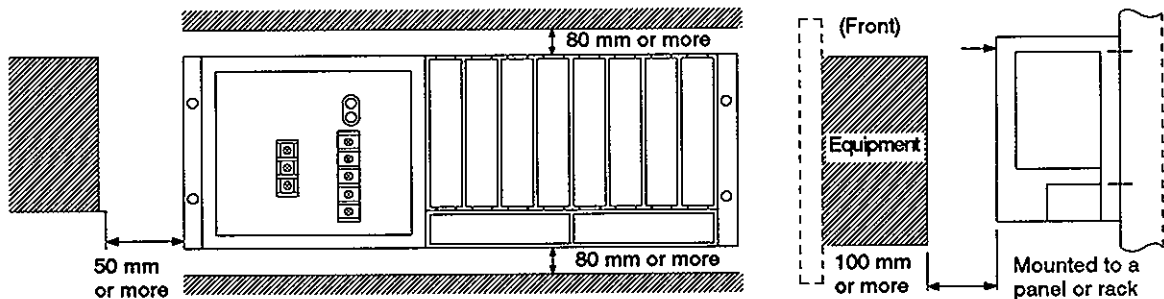
(2) This switch number is set to "00" at shipment.

(3) For precautions about station number settings when connected to MELSECNET/MINI-S3, see the following manuals:

- A2CCPU User's Manual
- AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual

6.5 Installation

(1) Installing directions and precautions

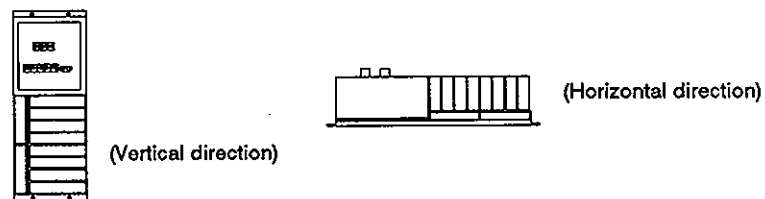


(a) Allow a clearance of at least 80 mm (3.15 in) between the module surfaces and surrounding structures and components to ensure good ventilation, easy wiring, and easy module replacement.

(b) If equipment which emits radiative heat or noise is positioned in front of the AJ35T (or if similar equipment is mounted on the inside of the panel door), allow a clearance of at least 100 mm (3.94 in.) between that equipment and the AJ35T. Also, allow a clearance of at least 50 mm (1.97 in.) between such equipment and the side faces of AJ35T.

(2) Restrictions

Do not install the AJ35T module in the following positions.



(3) Installation dimensions

Installation dimensions vary according to type of module. For details, see the Appendix of this manual.

6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES MELSEC-A

6.6 Wiring of Data Link Cables

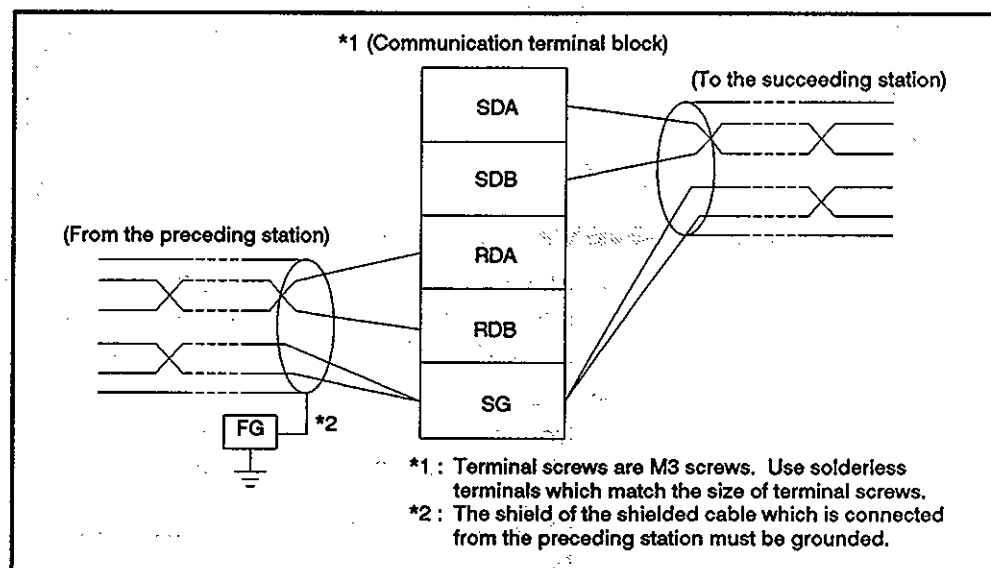
6.6.1 Handling instructions for twisted-pair cables

Handle cables with special care.

- (1) Do not compress the cable with rigid and/or sharp-edged material.
- (2) Do not twist the cable very much.
- (3) Do not pull strong the cable.
- (4) Do not step on the cable.
- (5) Do not put things on the cable.
- (6) Do not damage the insulation of the cable.

6.6.2 Link cable connections

Twisted-pair cables are connected as shown below.



POINT

Twisted-pair cables must be connected so they are not influenced by noise or surge induction.

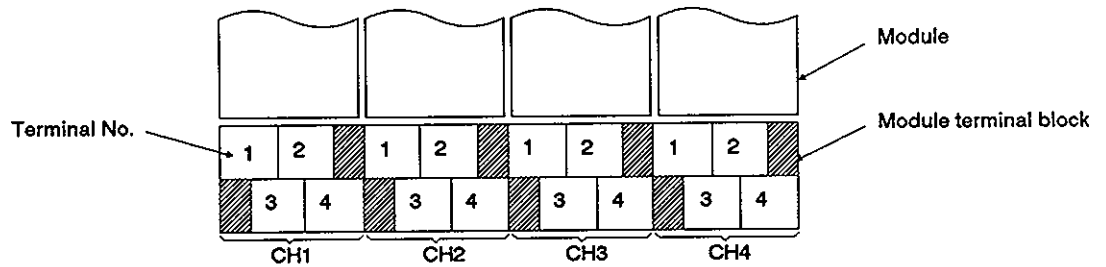
- (1) Do not lay the cables close to (nor bind them together with) main circuit wires, high-tension wires, or load carrying wires. Allow 100 mm (3.94 in.) or more clearance between them.
- (2) When connecting to the remote module terminal block, allow maximum clearance between twisted-pair cables and module power supply lines and I/O signal wires.
- (3) Do not use any portion of the twisted-pair cables (such as 1 pair among 3 pairs) for power supply.

6. INSTALLATION AND PRE-OPERATION SETTING PROCEDURES MELSEC-A

6.7 Wiring of Analog Input/Output Cables

6.7.1 Precautions

- (1) Each channel is provided with four terminals for connecting analog I/O cables.
The method for connecting cables varies according to the type of module.



- (2) Do not lay the analog I/O cables close to (nor bind them together with) main circuit wires, high-tension wires, or load carrying wires.
They will be easily influenced by noise, surge, and induction.

POINT

For the proper method of connecting cables to the module terminal block, consult the manual for the module to be used.

7. TROUBLESHOOTING

This section describes the condition of the LED indicators on the AJ35T module when an error is detected, as well as troubleshooting procedures when the analog-digital conversion does not function normally.

7.1 Error Code List

- (1) If the AJ35T detects an error (ERR. LED is lit) when the FROM/TO instruction is executed, it stores the following error codes to buffer memory 18 and sends an error code to the A2CCPU or AJ71PT32-S3.

Read the error code from the A2CCPU or AJ71PT32-S3, and perform the corrective action as indicated below.

Error Code	Error and Cause	Corrective Action
100	(Read error) 1. When the FROM instruction is executed, the leading address number of the buffer memory address is address 19 or larger. 2. An attempt is made to read words from the area exceeding address 19.	Confirm the sequence program and correct.
101	(Write error) 1. When the TO instruction is executed, the leading address number of the buffer memory address is address 16 or larger. 2. An attempt is made to write words to the area above address 16.	Confirm the sequence program and correct.
102	Commands other than read/write have been received. Because of noise, data has been rewritten.	Execute communications again. Take proper anti-noise measures.
103	A number of read/write designated words 0 have been received.	
104	Data has been received when the FROM instruction is executed.	
105	The number of words written and the number of words received are different when the TO instruction is executed.	

- (a) When multiple errors occur, the AJ35T stores the data error code of the first error detected by the AJ35T. It does not store the codes of subsequent errors.
- (b) The communication error reset uses the sequence program to reset the error code. The error code is reset by the communication error reset using the sequence program.
- (c) When an error code is reset, the ERR. LED turns OFF.

POINT

- (1) When the AJ35T causes an error, the A2CCPU stores the faulty station data and the error code of AJ35T to a special register.
- (2) When the AJ35T causes an error, the AJ71PT32-S3 stores the faulty station data and the error code of AJ35T to the buffer memory.

7.2 Error Code List for AJ71PT32-S3

Error Code (decimal)	Error Name	Error Description	Corrective Action
1	Setting data error	There is an error in the data to be set to the send area for the AJ35T.	Set the correct data.
6	WDT error	AJ35T is faulty.	Check the indicator LEDs on the AJ35T and take corrective actions following Sections 7.3 to 7.5 below.
8	Send area setting error	The send area for AJ35T is set smaller than the number of bytes of data to be handled.	Set the correct size of the send area for the AJ35T.
9	Communication error	Communication between AJ35T and AJ71PT32-S3 cannot be done correctly.	<ul style="list-style-type: none"> ● Noise: Retry communication. ● Check AJ35T for hardware fault.
11			
10	Receive area setting error	The receive area of the AJ35T is set smaller than the number of bytes of data to be handled.	Set the correct size of the receive area for AJ35T.

- (1) Error codes are stored in the buffer memory at addresses K196 through K209 of the AJ71PT32-S3.
Faulty station data is stored in the buffer memory at address K195.
- (2) The error codes and faulty station data sent from the AJ35T are also stored to the buffer memory at addresses K196 through K209 (error code) and K195 (faulty station data).
- (3) Reset error codes using the communication error reset of the sequence program.

7.3 POWER LED is OFF

Check Item	Corrective Action
Is the power supply charged?	● Turn ON the power supply of 100/200 VAC and 24 VDC.
Is the 24 VDC within the rated voltage?	● Set the voltage between 21.6 and 26.4 VDC.
Is the wiring correct?	● Check for broken wires and bad wiring and correct any problems.
Is there a hardware error detected?	<ul style="list-style-type: none"> ● After confirming that there are no problems in the power supply, turn it ON/OFF repeatedly. (Confirm whether or not the link hardware is faulty because of noise, etc.) ● If the LED is OFF, the AJ35T hardware is faulty. Consult a Mitsubishi representative.

7. TROUBLESHOOTING

MELSEC-A

7.4 LINK RUN LED is OFF

Check Item	Corrective Action
Is the POWER LED lit?	●When the POWER LED is flashing or OFF, correct it according to Section 7.3.
Are station numbers and remote terminal numbers set correctly? (With the AJ71PT32-S3, is the communication start signal ON?)	●Check and correct parameters, ROM, and the sequence program by comparing with AJ35T settings.
Are communication cables correctly connected?	●Check for cable disconnection, incomplete terminal contact, and faulty wiring.
Is a hardware error detected?	● After confirming that the power supply is correct, turn it ON/OFF repeatedly. (Confirm whether or not the link hardware is faulty because of noise, etc.) ● If the LED is OFF, the AJ35T link hardware is faulty. Consult a Mitsubishi representative.

7.5 ERR. LED is Lit

Check Item	Corrective Action
Is read/write executed within the buffer memory range?	● If not, check the sequence program and correct the setting of the read/write execution within the buffer memory range.
Abnormal data was received during read/write. (Data was misread due to noise.)	● Reset the operation with the sequence program and retry communication. Take a noise-prevention measure.
Is a hardware error detected?	● After confirming that the power supply is correct, turn it ON/OFF repeatedly. (Confirm whether or not the link hardware is faulty because of noise, etc.) ● If the LED is OFF, the AJ35T link hardware is faulty. Consult a Mitsubishi representative.

7.6 CPU LED Does Not Light

Check Item	Corrective Action
Is the RUN LED lit?	● If the RUN LED is OFF, follow Section 7.4.
Is the ERR. LED OFF?	● If the ERR. LED is lit, follow Section 7.5.
Is the CPU in the communication wait state? (Communication disabled due to noise.)	● Reset the operation with the sequence program and retry communication. ● If the LED does not light, the AJ35T link hardware is faulty. Consult a Mitsubishi representative.

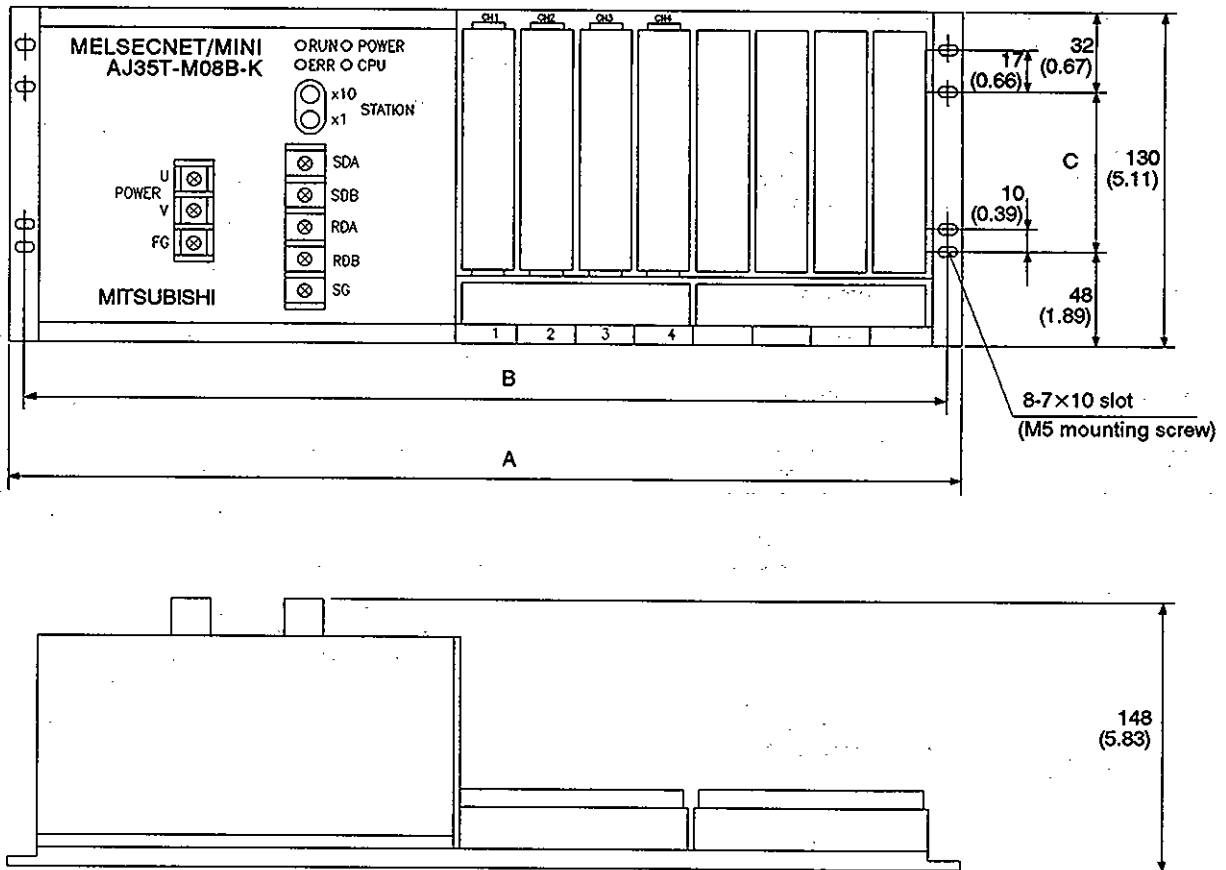
7.7 Analog-Digital Conversion Is Faulty

Check Item	Corrective Action
Is the PC CPU or AJ71PT32-S3 indicating an error?	<ul style="list-style-type: none"> ● If the PC CPU is faulty, follow the troubleshooting procedures in the PC CPU manual. ● If the AJ71PT32-S3 is faulty, follow the troubleshooting procedures in the S3 manual.
Is the PC CPU or AJ71PT32-S3 detecting an AJ35T error?	<ul style="list-style-type: none"> ● Connect a peripheral device to the CPU and monitor the input/output signals of special M's and D's and S3. Detected errors should be corrected by following the troubleshooting procedures in the S3 manual.
Is the RUN LED lit, and is the ERR. LED OFF?	<ul style="list-style-type: none"> ● If the RUN LED is OFF, follow Section 7.4. ● If the ERR. LED is lit, follow Section 7.5.
Is the station number of the AJ35T the same as the station number set with the sequence program? (Is the buffer memory address which is to be accessed correct?)	<ul style="list-style-type: none"> ● Using the A2CCPU, make the settings of the station number and parameter the same as those set with the program. ● Using the AJ71PT32-S3, make the AJ71PT32-S3 buffer memory settings of the AJ35T station number and remote terminal number the same as those set with the program.
Is the sequence program data represented in 12-bit binary values of 0 through 4000?	<ul style="list-style-type: none"> ● Correct the sequence program so that all data is represented in 12-bit binary values of 0 through 4000.
Are modules correct and loaded properly?	<ul style="list-style-type: none"> ● If the module is the wrong type, replace it with the correct one. ● If it is not properly loaded, load it correctly and lock it with hooks.
Is wiring to the module terminal block correct?	<ul style="list-style-type: none"> ● Check and correct any faulty wiring.
Is the monitored value correct when a device is operated while monitoring the analog-digital conversion values of another device?	<ul style="list-style-type: none"> ● Move the connection cables of the devices away from each other. ● Move the analog I/O cables away from the main circuit wires and high-tension cables. Take noise-prevention measures.
Is operation with correct data possible after changing the loading channel of the module and correcting the buffer memory addresses to be accessed by the sequence program?	<ul style="list-style-type: none"> ● If the operation is executed with correct data, then the AJ35T hardware is faulty. Consult a Mitsubishi representative. ● If the operation is executed with incorrect data or operation is not executed at all, check the module and the devices connected to the module. Correct or replace faulty ones. (Check the analog I/O values.)

- (1) If no faults are found using the checks mentioned above, and if the analog-digital conversion is not performed at all or incorrectly performed, then the system hardware is faulty. Consult a Mitsubishi representative.

APPENDIX

APPENDIX 1 External Dimensions (Installation Dimensions)



Type	Variable dimensions	Installation Dimensions		
		Width	A	B
AJ35T-M04B		283 (11.1)	265 (10.4)	50 (1.96)
AJ35T-M08B		383 (15.1)	365 (14.4)	50 (1.96)
AJ35T-M12B		483 (19.0)	465 (18.3)	50 (1.96)
AJ35T-M16B		583 (22.9)	565 (22.2)	50 (1.96)

Unit : mm (inch)

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 test, 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 ELECTRIC CORPORATION

HEAD OFFICE: MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100 TELEX: J24532 CABLE MELCO TOKYO
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