MITSUBISHI

RS-232C interface unit type AJ35PTF-R2

User's Manual



SAFETY PRECAUTIONS

(Read these precautions before using.)

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

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

These • SAFETY PRECAUTIONS • classifive the safety precautions into two categories: "DANGER" and "CAUTION".



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

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

Depending on circumestances, procedures indicated by ACAUTION may also be linked to serious results.

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

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user. [System Design Precautions]

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

Erroneous outputs and operation could result in an accident.

1) The data link data which existed prior to the error will be held.

2) At the MELSECNET/MINI-S3 remote I/O stations, all outputs will be switched OFF or output statuses will be held, depending on the E.C. mode setting.

[System Design Precautions]

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

[Cautions on Mounting]



 Use the PC in an environment that conforms to the general specifications in the manual. Using the PC in environments outside the ranges stated in the general specifications will cause electric shock, fire, malfunction, or damage to/deterioration of the product. When mounting the unit in a panel, fix it securely using screws or other means. If it is not fixed securely, the unit may fall and may cause injuries.

[Cautions on Wiring]

• Switch off the external power supply before staring installation and wiring work. Failure to do so could result in electrical shocks and equipment damage.

 Be sure to ground the FG terminal, carrying out at least class 3 grounding work with a ground exclusive to the PC. Otherwise there will be a danger of electric shock and malfunctions.
 Carry out wiring to the PC correctly, checking the rated voltage and terminal arrangement of the product. Using a power supply that does not conform to the rated voltage, or carrying out wiring incorrectly, will cause fire or failure.
 When wiring to the external device, check the pin arrangement and make sure the wiring is correct.
 Tighten the terminal screws to the stipulated torque. Loose screws will cause short circuits or malfunctions.
 Make sure that no foreign matter such as chips or wiring offcuts gets inside the module. It will cause fire, failure or malfunction.

[Cautions on Startup and Maintenance]

DANGER
 Do not touch terminals while the power is ON. This will cause malfunctions.
 Make sure that the battery is connected properly. Do not attempt to charge or disassemble the battery, do not heat the battery or place it in a flame, and do not short or solder the battery.

Incorrect handling of the battery can cause battery heat generation and ruptures which could result in fire or injury.

 Switch the power off before cleaning or re-tightening terminal screws. Carrying out this work while the power is ON will cause failure or malfunction of the module.

- In order to ensure safe operation, read the manual carefully to acquaint yourself with procedures for program changes, forced outputs, RUN, STOP, and PAUSE operations, etc., while operation is in progress. Incorrect operation could result in machine failure and injury.
- Do not disassemble or modify any module. This will cause failure, malfunction, injuries, or fire.
- Switch the power OFF before mounting or removing the module. Mounting or removing it with the power ON can cause failure or malfunction of the module.
- When replacing fuses, be sure to use the prescribed fuse. A fuse of the wrong capacity could cause a fire.

[Cautions on Disposal]

• Dispose of this product as industrial waste.

REVISIONS

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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. BAR-CODE READING

5. ID CARD READ AND WRITE METHOD

6. DATA COMMUNICATION WITH EXTHERNALLY CONNECTED, GENERAL-PURPOSE DEVICE

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1. INTRODUCTION

This User's Manual explains the features, specifications, linking method, and programming of the AJ35PTF-R2 RS-232C interface unit which is used as a remote terminal of the master module AJ71PT32-S3, A1SJ71PT32-S3, or A2CCPU in the MELSECNET/MINI-S3 data link system (herein after referred to as the MINI-S3).

1.1 Data Communication with the AJ35PTF-R2

Fig. 1.1 indicates the flow of communication data between the AJ35PTF-R2 and the master module in the MINI-S3 link.

- 1) When the communication start signal to a master module is set to ON by the PC CPU, MINI-S3 data link processing starts.
- 2) I/O refresh between the master module and the AJ35PTF-R2 occur at 3.5 to 18msec intervals.
 I/O refresh and execution of the sequence program of a master module occurs asynchronously.
- 3) The I/O data from a bar-code reader or ID card controller is stored in the remote unit reserved areas of the buffer memory (remote terminal unit-dedicated area) in the master module. The data is read to the PC CPU by the FROM instruction when the read request signal from the master module is set to ON.
- 4) Output data to the ID card controller is written from the PC CPU to the remote unit reserved areas of the buffer memory in the master module by the TO instruction. The data is transmitted to the ID card controller when the transmit request signal is set to ON by the PC CPU.



Fig. 1.1 Data Communication Diagram



(1) AJ35PTF-R2 can be used as either a remote terminal for a MINI-S3 link or a remote terminal for an A2CCPU.

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- (2) Data communication with a connectable bar-code reader and an ID plate is conducted without regard to protocol. That is, communication with these equipment is possible by reading or writing the necessary data from or to the buffer memory using the sequence program.
- (3) With other equipments which are designed to be connected to the RS-232C interface unit, data communication is possible in the no-protocol mode when such equipments are equipped with the RS-232C interface.
- (4) The word/byte unit specification for communication, the receive termination code, and the receive termination data count can be set as desired by the user when no-protocol communication is conducted.
- (5) The provision of four general purpose I/O points allows the direct connection between RS-232C interface and bar-code reader or synchronous signals of an ID card controller without use of another remote unit.
- (6) Up to 14 RS-232C interface units can be connected in a single MINI-S3 link.

1.3 Related Manuals

The following manuals are available for reference when using the AJ35PTF-R2.

- (1) AJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's Manual (IB-66217)
 - <u>A1SJ71PT32-S3 MELSECNET/MINI-S3 Master Module User's</u> <u>Manual (IB-66368)</u>

This manual provides information concerning the usage, handling, and programming instructions for the master module, and the general configuration of the MINI-S3 link.

- (2) <u>SWE GP-MINIPE Operating Manual (IB-66226)</u> This manual provides information concerning the use of the initial data ROM for the master module in the extension mode.
- (3) A2CCPU (P21/R21) User's Manual (IB-66267)
 - A2CCPUC24 (PRF) User's Manual (IB-66363) This manual provides information concerning the specifications, handling, and the general configuration.

2. SYSTEM CONFIGURATION



2. SYSTEM CONFIGURATION

2.1 Overall Configuration when AJ71PT32-S3 is Used

Fig. 2.1 shows the configuration of the system when the AJ35PTF-R2 is connected to AJ71PT32-S3.



Fig. 2.1 Overall Configuration for the System Using AJ71PT32-S3

2. SYSTEM CONFIGURATION



2.2 Overall Configuration when the A2CCPU is Used

Fig. 2.2 shows the configuration of the system when the AJ35PTF-R2 is used as a remote terminal unit of the A2CCPU.





2.3 External Equipment that may be Connected

The following table indicates the external device that may be connected to the AJ35PTF-R2.

Connectable Equipment	Remarks				
* Bar-code reader	 Method of data transmission/transfer is no-protocol only. Set specifications within the ranges indicated in Section 7.2. Select one of the following settings for the receive data termination signal ①Termination code ·····The termination code setting Can be designated as desired by the user. Default values 0D0A_H (CR, LF) ②Termination data······Designate then numcount setting 				
* ID card controller	Designate the MINI standard protocol for the ID card controller by the initial data setting using the SWCGP-MINIPE.				
General purpose external device (personal computer, printer etc	 Method of data transmission/transfer is no-protocol only. Set specifications within the ranges indicated in Section 7.2. Select one of the following settings for the receive data termination signal Termination code The terminate code setting can be designated as desired by the user. Default values ODOA_H <cr, lf=""></cr,> Termination data Designate then numcount setting ber of data words/ bytes until data receive terminates. 				

*: When using the AJ35PTF-R2 as a remote terminal for an A2CCPU, only no-protocol transmission is possible by using a connectable bar-code reader and ID card controller as general-purpose external devices.



3. PRE-OPERATION SETTING AND PROCEDURE

3. PRE-OPERATION SETTING AND PROCEDURE

3.1 Pre-Operation Setting and Procedure

3.1.1 When using the AJ35PTF-R2 as a remote terminal for AJ71PT 32-S3



3-1



3.1.2 When using the AJ35PTF-R2 as a remote terminal for the A2CCPU







3.2 Nomenclature



Fig. 3.1 External View of AJ35PTF-R2

No.	Description	Explanation			
1	Station number setting switches	×10 (]) N x1 (])		et the AJ35PTF-R2 station number between 1 – (number of stations occupied) + 1). on 3.3.	
2	Operating status indicator LEDs		LED	Definition	
			PW	ON indicates that AJ35PTF-R2 power is ON.	
		PW RUN SD RD ERR	RUN	ON indicates that data communication is made with the master module without fault.	
			SD	Flickers to indicate that data is being transmitted to master module.	
			RD	Flickers to indicate that data is being received from master module.	
			ERR.	ON indicates a receive data error. OFF indicates normal communication.	
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		For conn	ecting the optical fiber cable.	



No.	Description	Explanation				
		For connecting the AJ35PTF-R2 power and twisted pair data link cables.				
(5)	Terminal block		es are not required Master Station User		To next station From preceding station	
(6)	Unit installation hole	Used to install the I/	O unit to panel. (Fe	or M4 screw)	• 	
(7) (7) (8) (9)	General purpose I/O execute status display LED RS-232C connector Terminal block for	AJ35 X Y 0 0 0 1 0 0 1 0 1 2 0 2 3 0 3 RUNO SDO RDO ERR.O D sub-connector for For connecting the p	Displays the O and the status LED X0 to X3 Y0 to Y3 RUN SD RD ERR. the RS-232C. (25 p	N/OFF status of the of the RS-232C pc Defin Display of the general status. Lit when ON. Display of the general r status. Lit when ON. Lit during normal dat tween RS-232C unit an equipment. Flickers while data is externally connected e Flickers while data is externally connected e Lit if receive data erro during normal commu ins)	ition purpose input ON/OFF purpose output ON/OFF a communication be- d externally connected being transmitted to quipment. being received from quipment. r occurs. Extinguished nication.	
10	input Terminal block for	For connecting the p	ower and output s	ignal cables. Remo	vable.	
	output					
1	Dip switches for the RS-232C interface unit		Item Baud rate	OFF ON OFF ON OFF OFF ON ON OFF OFF OFF OFF	OFF OFF ON ON ON ON ON ON	
_				ON 8 bits	OFF 7 bite	
		SW4 SW5 SW6 SW7 SW8	Data bit Parity Parity Stop bit Xon/Xoff control	8-bits On Even 2 ON	7-bits Off Odd 1 OFF	
Û	E.C. MODE switch	E.C. MODE OFF ON	Used to set whether outputs are retained or switched OFF when I/O refresh is stopped.			



3.3 Setting Station Numbers

- (1) Station numbers may be set between 1 and 64.
- (2) The I/O refresh range depends on the number of remote stations (buffer memory address 0). For example, if 10 exists at address 0, I/O refresh is performed with remote stations 1 to 10.
- (3) Remote I/O Station numbers do not have to be sequential, e.g. as shown in Fig. 3.2.



Fig. 3.2 Remote module Numbers Setting

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

POINTS

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





3.4 Wiring

3.4.1 Handling instructions for optical fiber and twisted-pair cables

Handle cables with special care.

- (1) Do not bend the cable to less than specified minimum bending radius.
- (2) Do not crush the cable.
- (3) Do not twist the cable.
- (4) Do not pull the cable by the connector.
- (5) Do not tension the cable.

3.4.2 Connection of optical fiber cables





Fig. 3.3 Connection of Optical Fiber Cables



(2) Optical fiber cable engagement





(3) Optical fiber cable disengagement



Fig. 3.5 Optical Fiber Cable Disengagement

POINTS

 (1) Do not touch the optical fiber cores in the connector or the optical module and keep them clean. Always fit the protective cap to the connector and optical module when not in use.
 If dirt, dust or finger grease adheres to them, the

transmission loss increases and the data link may malfunction.



modul

Master

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

Minimum bending radius

Caution is needed when bending optical fiber cable since bending it at less than specified minimum bending radius may lead to breakage in the optical fiber core and problems in the data link.



3.4.3 Connection of the twisted-pair cables

Connect the twisted pair cables as shown in Fig. 3.6 if using AJ71PT32-S3, or as shown in Fig. 3.7 if using A2CCPU. The terminal arrangement of the remote I/O station is given in Section 3.2, (5).



Fig. 3.6 Connection of Twisted-Pair Cables when the AJ71PT32-S3 is Used



Fig. 3.7 Connection of Twisted-Pair Cables when the A2CCPU is Used



REMARKS

- (1) The twisted-pair shield cable terminal block uses M4 (0.16) screws. Use appropriate solderless terminals.
- (2) Tightening torque is 8 (6.93) to 14kg·cm (12.1lb·inch).

POINT

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

- (1) Do not run or bundle the twisted-pair cables close to or with the main circuit, high-tension cables or load cables. Allow at least 100mm (3.94inch) clearance.
- (2) When connecting the cables to the remote unit terminal block, run the twisted-pair cable as apart from the power supply or I/O cables as possible.
- (3) Do not use a part of the twisted-pair cables (1 pair of 3 pairs of twisted-pair cable) for the power supply cable.



3.5 Precautions Relating to Installation of the Unit

The following precautions must be observed when installing a compact type remote I/O unit in a panel or other base.

- (1) Precautions on installation
 - (a) In order to ensure good ventilation and to make it easy to replace the unit, provide a clearance of at least 80 mm (3.15 inches) between the top of the unit and any structural wall or component. (Fig. 3.3)
 - (b) Do not mount the unit in a horizontal orientation since this prevents good ventilation. (Fig. 3.4)
 - (c) If the surface on which the unit is mounted is uneven or warped, this may strain the printed circuit boards and cause malfunctions. Therefore, mount the unit on a flat surface.
 - (d) Avoid mounting the unit in proximity to vibration sources such as large magnetic contactors and no-fuse circuit breakers; mount it on a separate panel or at a distance.
 In order to avoid the effects of radiated noise and heat, provide a clearance of at least 100 mm (3.94 inches) between the PC and devices mounted in front of it (if there are devices mounted on the back of the panel door).

Also provide a clearance of 50 mm (1.97 inches) between the base unit and devices at left and right of it.



Horizontal mounting (not permitted)



4. BAR-CODE READING

4.1. Bar-Code Reading Function

Use of the AJ35PTF-R2 allows data communication with the connectable bar-code reader to be conducted without regard to protocol. The reading of required data is controlled by the sequence program.

The type of protocol required for the bar-code reader connected to the RS-232C can be automatically executed for data communication processing by recording the type of bar-code reader connected to the RS-232C in the initial data ROM using data selected from the SW[]GP-MINIPE.



- *1: No-protocol communication should be used when communication is conducted with a bar-code reader other than connectable ones.
- *2: No-protocol communication should be used when the AJ35PTF-R2 is used as a remote terminal unit of the A2CCPU.
- *3: For information concerning no-protocol communication, see Section 6.



4.2 Read Procedure

When bar-code data is read using the bar-code reader, the data is read from the FROM area of the remote terminal number corresponding to the remote terminal buffer memory in the master module by executing the FROM instruction in the sequence program.

The correspondence between the set station number for an AJ35PTF-R2 and the remote terminal number is set by the initial data setting of the SW[]]GP-MINIPE and is stored in the initial data ROM.

For information concerning the I/O signals between the master module and RS-232C, see Section 7.5. For information concerning the the communication data area for remote terminal, see Section 7.6.



4-2

 The photoelectric switch detects whether the bar-code label has been placed within the reading area of the bar-code reader and transmits the data as general-purpose input. General-purpose input data is automatically stored in the receive data area for batch refresh remote I/O unit using the I/O refresh of the master module.



2) When it is detected that the object to be read is set in place, the in-zone signal is set to ON for the bar-code reader by the sequence program.

The in-zone signal is transmitted via the general-purpose output.

The general-purpose output is written to the transmission data area for batch refresh by the sequence program. The written data is automatically transmitted to the AJ35PTF-R2 by the I/O refresh of the master module and output to an external device. The bar-code reader begins reading when the in-zone signal is set to ON.

- 3) The data read by the bar-code reader is transmitted automatically to the receive data storage area of the master module.
- 4) When the data read by the bar-code reader is received in the master module, the read complete signal is set to ON in relation to the PC CPU.
- 5) When the ON status of the read request signal is detected, the data contained in the master module is read using the FROM instruction of the sequence program.
- 6) When the data read processing is completed, the sequence program sets the read complete signal to ON. The master module automatically sets the read request signal

to OFF when the read complete signal is set to ON.

Setting the read request signal to OFF enables the next data to be input. (Data cannot be input while the read request signal is ON.)

For information concerning the remote terminal buffer memory area in which the bar-code data is stored, see Section 7.6.2 Communication data area for remote terminal.

For information concerning the general-purpose I/O used for the input and output of the object-in-place signal and the in-zone signal, see Section 7.6.1 Common area (1) Transmission data for batch refresh and (2) Receive data for batch refresh.

The general-purpose I/Os of the RS-232C interface unit use the least significant 4 bits of the last station number of the occupied station.

The AJ35PTF-R2 occupies 4 stations.

<Example> The AJ35PTF-R2 is set to station No. 3.



REMARK

The object-in-place signal can be used directly by the bar-code reader as an in-zone signal and for bar-code data reading.

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4.3 Program Example for Bar-Code Reading

For information concerning bar-code reading, see Section 4.2.

(1) Program example

The following is an example program used to read bar-code data from a bar-code reader connected to an AJ35PTF-R2, which is assigned the station number of 3 and is designated as remote terminal number "1".



5. ID CARD READ AND WRITE METHOD



5. ID CARD READ AND WRITE METHOD

5.1 ID Card Read and Write Functions

When using an RS-232C interface unit with an AJ71PT32-S3 as its master module, data can be written from and to the PC CPU by using the MINI standard protocol mode for data communication with the connectable ID card controller.



- To read the ID card data, transmit the transmit request signal to the ID controller after writing the Control code read command read code, head address, and amount of data units to be read to the transmission data area for remote terminal; the designated data is transmitted to the receive data area for the remote terminal unit.
- To write the ID card data, transmit the transmit request signal to the ID controller after writing the Control code write command write code, head address, amount of data units to be written, and write data to the transmission data area for remote terminal; the write data is written to ID card.
- *1: When data communication is to be conducted with an ID card controller other than connectable one, communication should be conducted in the no-protocol mode.
- *2: No-protocol communication should be used when the AJ35PTF-R2 is used as a remote terminal unit of the A2CCPU.
- *3: For information concerning the use of no-protocol for data communication, see Section 6.

5-1



5.2 Read and Write Procedure

When ID card data is read using the ID card controller, the data is read from the receive data area for the corresponding remote terminal number in the communication data area for remote terminal of the master module by executing the FROM instruction in the sequence program.

When data is to be written, the data is written to the transmission data area in the communication data area for remote terminal of the master module by executing the TO instruction in the sequence program.

The correspondence between the set station number for an AJ35PTF-R2 and the remote terminal number is set by the initial data setting of the SW^[]GP-MINIPE and is stored in the initial data ROM.

For information concerning the I/O signals between the master module and RS-232C, see Section 7.5. For information concerning the communication data area for the remote terminal, see Section 7.6.



(1) Reading data from the ID plate.



- The photoelectric switch detects whether an ID card has been placed within the reading area of the ID card controller and transmits the data as general-purpose input. General-purpose input data is automatically stored in the receive data area for batch refresh remote I/O unit using the I/O refresh of the master module.
- When it is detected by the sequence program that an ID card is positioned to be read, communication start processing is begun.

Communication start processing writes the command data and sets the transmit request signal to ON.

The command data written in the master module by the sequence program is automatically transmitted to the AJ35PTF-R2 when the transmit request signal is set to ON and output to the ID card controller.

The ID card controller reads the data based on the command data input from the RS-232C unit.

- 3) The data read from the ID card is transmitted automatically to the master module over a series of I/O refresh cycles.
- 4) When the data read from the ID card is received in the master module, the transmit complete signal is set to ON in relation to the PC CPU.
 When the ID card data is read, the complete signal is not the receive complete signal but the transmit complete signal.

receive complete signal but the transmit complete signal since the ID card data is received as a response to the transmission of command data.

- 5) When the ON status of the read request signal is detected, the data contained in the master module is read using the FROM instruction by the sequence program.
- 6) When the data read processing is completed, the sequence program sets the transmit request signal to OFF. The master module automatically sets the transmit complete signal to OFF when the transmit request signal is set to OFF.

Setting the read complete signal to OFF enables the next data to be input.

(Data cannot be input while the read complete signal is ON.)

5. ID CARD READ AND WRITE METHOD



(2) Writing data to the ID card

 The photoelectric switch detects whether an ID card has been placed within the reading area of the ID card controller and transmits the data as general-purpose input. General-purpose input data is automatically stored in the receive data area for batch refresh remote I/O unit using the I/O refresh of the master module.

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- 2) When it is detected that the object to be read is set in place, communication start signal processing begins. During communication start signal processing, command data is transmitted to the AJ35PTF-R2 communication buffer, the data to be written to the ID card is written to the same buffer, and the transmit request signal is set to ON. When the transmit request signal is set to ON, the command data written in the master module by the sequence program is automatically output to the controller via the AJ35PTF-R2. The controller writes data based on the command data that is input.
- 3) When the writing of data to the ID card is completed, transmit complete data is returned from the AJ35PTF-R2 to the master module and the transmit complete signal is set to ON and transmitted to the PC CPU.
- 4) When the data write processing is completed, the sequence program sets the transmit request signal to OFF. The master module automatically sets the transmit complete signal to OFF when the transmit request signal is set to OFF. Setting the read complete signal to OFF enables the next data to be input.

(Data cannot be input while the read complete signal is ON.)



5.3 Program Example for ID Card Data Reading

For information concerning ID card data reading, see Section 5.2 (1).

(1) Program example

The following is an example program used to read ID card data from the ID card controller connected to an AJ35PTF-R2, which is assigned the station number of 3 and is designated as remote terminal number "1".





5.4 Program Example for Writing to ID Cards

For information concerning writing to ID cards, see Section 5.2 (2).

(1) Program example

The following is an example program used to read ID card data from the ID card controller connected to an AJ35PTF-R2, which is assigned the station number of 3 and is designated as remote terminal number "1".


6. DATA COMMUNICATION WITH EXTHERNALLY CONNECTED, GENERAL-PURPOSE DEVICE / MELSEC-

6. DATA COMMUNICATION WITH EXTERNALLY CONNECTED, GENERAL-PURPOSE DEVICE

6.1 Data Communication Functions for Externally Connected, General-Purpose Device

The AJ35PTF-R2 can be used for communication purposes with externally connected, general-purpose device such as bar-code readers and ID card controllers other than those the protocols of which are stored in the SWEGP-MINIPE, as well with general-purpose personal computers and printers using no-protocol communication.

When the AJ35PTF-R2 is used as a remote terminal unit of the A2CCPU, data communication should be conducted in the noprotocol mode.

No-protocol data communication can be conducted with an externally connected, general-purpose device, by setting the following items in accordance with the device's interface specifications. Locate the dip switch on the front panel of the AJ35PTF-R2(see Section 3.2). Designate byte/word, receive termination code, and receive termination data count at the remote terminal parameter area(see Section 7.6.1(8)) in AJ71PT32-S3 buffer memory when using the master module or at the remote terminal parameter area(see Section 7.7) in the AJ35PTF-R2 buffer memory when using the A2CCPU.

<Example>

Set the word units, and the termination code "0D0A μ " (CR, LF) as receive parameter settings.



"1234" is transmitted as ASCII code and "CR, LF" $\langle 0D0A_{H}\rangle$ is added to the transmit termination code.

6. DATA COMMUNICATION WITH EXTHERNALLY CONNECTED, GENERAL-PURPOSE DEVICE,

6.2 Data Communication Procedure

6.2.1 When using AJ71PT32-S3

When receive data is to be read from externally connected, general-purpose device, the data is read from the receive data area of the remote terminal number corresponding to the communication data area for remote terminal of the master module upon execution of the FROM instruction by the sequence program.

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When data is to be transmitted, the data is written to the transmission data area of the communication data area for the remote terminal of the master module upon execution of the TO instruction by the sequence program.

The correspondence between the set station number for an AJ35PTF-R2 and the remote terminal number is set by the initial data setting of the SWEEGP-MINIPE, stored in the initial data ROM, and then installed in the master module.

Data communication can be conducted by specifying the following parameters in the no-protocol mode parameter data area of the buffer memory fixed data area: the receive data byte/word setting, receive termination code, and the receive termination data count.



(1) Reading data from externally connected, general-purpose device

- 1) No-protocol mode parameters are set in the master module using the TO instruction of the sequence program.
- 2) Data received from external device is stored in the receive buffer of the AJ35PTF-R2.
- 3) When the data has been stored in the receive buffer of the AJ35PTF-R2, the AJ35PTF-R2 automatically transmits the data to the master module.
- 4) When the data is received in the master module, the read request signal is set to ON in relation to the PC CPU.

6. DATA COMMUNICATION WITH EXTHERNALLY CONNECTED, GENERAL-PURPOSE DEVICE

- 5) When the ON status of the read request signal is detected, the data contained in the master module is read using the FROM instruction by the sequence program.
- 6) When the data read processing is completed, the sequence program sets the read complete signal to ON. When the read complete signal is set to ON, the master module automatically clears the transmission data storage area and sets the read request signal to OFF. Setting the read complete signal to OFF enables the next data to be input.

(Data cannot be input while the read request signal is ON.)

6. DATA COMMUNICATION WITH EXTHERNALLY CONNECTED, GENERAL-PURPOSE DEVICE / MELSEC-



(2) Writing data to externally connected, general-purpose device

- 1) No-protocol mode parameters are set in the master module using the TO instruction of the sequence program.
- 2) Data to be transmitted to external device is written to the transmission data storage area of the master module by the sequence program.
- 3) When data settings in the transmission data storage area have been completed, the sequence program sets the transmit request signal to ON. When the transmit request signal is set to ON, the data contained in the transmission data storage area is transmitted automatically to the AJ35PTF-R2. The AJ35PTF-R2 automatically transmits the data received in the transmission buffer from the master module to the external device.
- 4) The master module sets the transmit complete signal to ON for the PC CPU when transmission of the data to the AJ35PTF-R2 has been completed.

When the ON status of the transmit complete signal is detected, the transmit request signal is set to OFF by the sequence program.

When the transmit request signal is set to OFF, the master module automatically sets the transmit complete signal to OFF.

Setting the transmit complete signal to OFF enables the following data transmissions. (Data cannot be transmitted while the transmit complete signal is ON.)

6.2.2 When using the A2CCPU

When receive data is to be read from an externally connected, general-purpose device, the data is read from the receive data area of the AJ35PTF-R2 using upon execution of the FROM instruction by the sequence program.

When data is to be transmitted, the data is written to the transmission data area of the AJ35PTF-R2, upon execution of the TO instruction by the sequence program.

Data communication can be conducted by specifying the following parameters in the no-protocol mode parameter data area of the buffer memory: the receive data byte/word setting, receive termination code, and the receive termination data count.

(1) Reading data from an externally connected, general-purpose device



- 1) No-protocol mode parameters are set in the AJ35PTF-R2 using the TO instruction of the sequence program.
- 2) Data received from the external device is stored in the receive buffer of the AJ35PTF-R2.
- 3) When the data has been stored in the receive data storage area, the AJ35PTF-R2 sets the read request signal to ON for the A2CCPU.
- 4) Data is read from the receive data storage area received by the FROM instruction after the read request signal is set to ON.

5) When the data read processing is completed, the sequence program sets the read complete signal to ON. When the read complete signal is set to ON, the AJ35PTF-R2 automatically clears the transmission data storage area and sets the read request signal to OFF.
Sotting the read complete signal to OFF.

Setting the read complete signal to OFF enables the next data to be input.

(Data cannot be received while the read request signal is ON.)

POINT

"No-protocol" must be selected for the AJ35PTF-R2 when setting the control functions for the A2CCPU. (See Section 4.2.9 in the A2CCPU User's Manual.)

6. DATA COMMUNICATION WITH EXTHERNALLY CONNECTED, GENERAL-PURPOSE DEVICE / MELSEC-



(2) Writing data to an externally connected, general-purpose device

- 1) No-protocol mode parameters are set in the master module using the TO instruction of the sequence program.
- Data to be transmitted to the external device is written to the transmission data storage area of the AJ35PTF-R2 using the TO instruction of the sequence program.
- 3) When writing data to the transmission data storage area has been completed, the sequence program sets the transmit request signal to ON.
- 4) When the transmit request signal is set to ON, the data contained in the transmission data storage area is transmitted to the external device.
- 5) The AJ35PTF-R2 sets the transmit complete signal to ON for the A2CCPU when transmission of the data to the external device has been completed.

When the ON status of the transmit complete signal is detected, the transmit request signal is set to OFF by the sequence program.

Setting the transmit complete signal to OFF enables the following data transmissions. (Data cannot be transmitted while the transmit complete signal is ON.)

POINT

"No-protocol" must be selected for the AJ35PTF-R2 when setting the control functions for the A2CCPU. (See Section 4.2.9 in the A2CCPU User's Manual.)

6.3 Program Example for Receiving Data

6.3.1 When using the master module

For information concerning read processing of receive data from externally connected, general-purpose device, see Section 6.2.1 (1).

(1) Program example

The following is an example program used to read the data received from a general-purpose device connected externally to an AJ35PTF-R2, which is designated as remote terminal number "1".



6.3.2 When using the A2CCPU

For information concerning read processing of receive data from an externally connected, general-purpose device, see Section 6.2.2 (1).

(1) Program example

The following is an example program used to read the receive data from the general-purpose device connected externally to an AJ35PTF-R2, which is assigned the station number of "5" and is designated as a remote I/O.



6.4 Program Example for Transmitting Data

6.4.1 When using AJ71PT32-S3

For information concerning data transmission to externally connected, general-purpose device, see Section 6.2.1 (2).

(1) Program example

The following is an example program used to transmit data to general-purpose device connected externally to an RS-232C interface unit, which is designated as remote terminal number "1".



6.4.2 When using the A2CCPU

For information concerning data transmission to an externally connected, general-purpose device, see Section 6.2.2 (2).

(1) Program example

The following is an example program used to transmit data to the general-purpose device connected externally to the AJ35PTF-R2, which is assigned the station number of "5" and is designated as a remote I/O.





7. SPECIFICATIONS

7.1 General Specifications

Table 7.1 General Specifications

ltem		Specifications					
Operating ambient temperature		0 to 55°C					
Storage ambient	−20 to 75°C						
Operating ambient humidity	10 to 90 %RH, non-condensing						
Storage ambient humidity	10 to 90 %RH, non-condensing						
Vibration resistance	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$						
Shock resistance	Conforms to JIS B 3501, IEC 1131-2 (147 m/s² {15G} x 3 times in 3 directions)						
Operating environment	Free of corrosive gases						
Altitude	Up to 2000 meters (6562 ft)						
Installation site		Inside a control cabinet					
Overvoltage category *1		11 or less					
Degree of contamination *2		No greater than 2					

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

*2 This is an index which gives a measure of the incidence of conductive materials in the environment in which the device is used.

A contamination level of "2" indicates an environment in which there is only contamination by non-conducting materials, but, due to occasional condensation, conductivity may occur.

*JIS: JAPANESE Industrial Standard

7.2 Performance Specifications

ltem		AJ35PTF-R2				
		Optical data link Twisted-pair data link				
Interface		RS-232C standard	RS-232C standard			
Transmissi	on method	Full-duplex (no-proto	col)			
Synchronous system		Start-stop transmiss	ion			
Transmission rate		300, 600, 1200, 4800, 9600, 19200BF	PS (switch selected)			
	Start bit	1				
	Data bit	7 or 8				
Data format	Parity bit	1 or none				
Stop bit		1 or 2				
Error detection		Parity check (even/odd)/none				
		DTR/DSR (ER/DR) control				
Transmission control		Xon/Xoff (DC1/DC3) control ON/OFF, selectable				
Transfer distance		15 m (49.2 ft)				
Receive buffer		2048 bytes				
General purpose I/O		Input: 12/24 VDC (sink type) 4 points Output: transistor output (sink type) 12/24 VDC 4 points				
Number of occupied stations		4 stations				
Power	supply	15.6 to 31.2 VDC	15.6 to 31.2 VDC			
Supply	current	130 mA (24 V)				
Wei	ght	0.71 kg (1.56 lb)				
Transn buf		Max. 1000 bytes set by parameter (default: 500 bytes)	Total 1000 bytes			
Rece	· · · · · · · · · · · · · · · · · · ·	Max. 1000 bytes set by parameter (default: 500 bytes)				

Table 7.2 Performance Specifications

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7.3 RS-232C Connector Specifications



Pin Number	Name	Signal Code	Signal Direction AJ35PTF-R2 ↔ External Equipment		
1	Frame ground	FG	→ →		
2	Transmission data	SD(TXD)	>		
3	Receive data	RD(RXD)	4		
4	Transmit request	RS(RTS)	>		
5	Clear to send	CS(CTS)	▲		
6	Data set ready	SG	4		
7	Signal ground	SG			
8	Receive carrier detected	CD			
20	Data terminal ready	DTR(ER)			

7.1 RS-232C Connector Specifications

Signals and their content

FG The shield of the connecting cable is frame ground and should be connected to Pin 1 on the AJ35PTF-R2. When the external device connected to the AJ35PTF-R2 is provided with an FG pin ensure that the shield is connected to only one of the pins.

Normal data transmission/transfer can sometimes not be conducted when both sides are connected.

- RS Set to ON when the AJ35PTF-R2 hardware is ready.
- CS When CS is OFF the AJ35PTF-R2 cannot transmission data to an external device.

Ensure that the CS is normally set to ON when an external device is ready to receive.

- DSR When DSR is OFF, the AJ35PTF-R2 cannot transmission data to an external device. Send the signal from the external device so that DSR is normally ON.
- DTR ······ Set to ON when the AJ35PTF-R2 is capable of receiving data.
- CDInitializes when OFF. Normally, ensure that CD is continually ON by sending a signal from an external device.

The standard connection example for the RS-232C connector is indicated in the Section APP. 3.



7.4 General Purpose I/O Specifications

	Туре	D	C Input Unit (sink type)		
Specifications		AJ35PTF-R2		Terminal arrangement	
* Number of	input points	<i>L</i>	1		
Isola	tion	Photocoupler			
Rated inp	ut voltage	12 VDC	24 VDC		
Rated inp	ut current	3mA	7mA		
Operating vo	oltage range	10.2 to 31.2 VDC (Rip	ple ratio: within 5 %)		
Number simultaneous		100 % (4 points) switched on simultaneously		2 X1 -0 0-	
ON voltage	ON current	9.5 VDC min./2.6 mA min.		3 X2 0 0	
OFF voltage	OFF current	6 VDC max./1.0 mA max.		4 X3 00	
Input re	sistance	Approx. 3.4 kΩ		5 COM1 + -	
6	OFF to ON	10 ms or less		6 NC	
Response time	ON to OFF	10 ms			
Com	mon	4 points/common (Cor			
Operation	n display	ON indication (LED)		8 NC	
External wire	e connection	8-point terminal blo	· · ·		
Applicable wire size		0.75 to 2 mm ² (tightening torque: 68.25 N			
Applicable solo	lerless terminal	1.25-3 1.25-YS3 V1.25-3 V1.25-YS3			
Number of sta	tions occupied				

Table 7.3 General Purpose Input Specifications

Table 7.4 General Purpose Output Specifications

		Туре	Transistor Output Unit (sink type)		
Specifications			AJ35PTF-R2	Terminal arrangement	
* Number of output points		oints	4		
Isolatio	on		Photocoupler		
Rated load	voltage	9	12/24 VDC		
Operating load v	oltage	range	10.2 to 31.2 VDC		
Max. load	current	t'	0.1 A/point, 0.4 A/common		
Max. inrush	currer	nt	0.4 A, 100 ms max.		
Leakage curre	ent at C	DFF	0.1 mA max.		
Max. voltage d	drop at	ON	2.5 V (0.1 A), 1.75 V (5 mA), 1.7 V (1 mA)		
Deserves times	OFF to ON ON to OFF		2 ms max.		
Response time			2 ms max. (resistance load)	13 12/24V	
Noise supp	ression	1	Clamp diode	14 COM2 +	
Comm	on		4 points/common (Common terminal: TB14)	- 15 NC	
Operation	display		ON indication (LED)	16 NC	
External wire connection		tion	8-point terminal block (M3 screw $ imes$ 6)		
Applicable wire size		2e	0.75 to 2 mm ² (18 to 14 AWG) (tightening torque: 68.25 N · cm 7 kg · cm (8.07 lb · inch))		
Applicable solderless terminal		erminal	1.25-3 1.25-YS3A 2-S3 2-YS3A V1.25-3 V1.25-YS3A V2-S3 V2-YS3A		
Number of statio	ons oc	cupied	4		
Output outputs a	-	Voltage	10.2 to 31.2 VDC		
Output external supply	hower	Current	15 mA (typ. 24 VDC)		

*: General-purpose I/O signals correspond to the location of the first 4 bits in the last station number of occupied station numbers.

	2 sta	ations		-	1 station
4 stations	X/Y 3	X/Y 2	X/Y 1	X/Y 0	3 stations



7.5 List of I/O Signals

7.5.1 When using AJ71PT32-S3

Table 7.5 gives the I/O signals which are transmitted between a PC CPU and a master module.

The I/O signals shown below are used when a building block type I/O module CPU is used and it is installed to slot No. 0 of the base unit.

Device No.	Signal		Device No.	Signal		
X00		Transmit complete	Y00	For remote terminal unit No. 1	Transmit request	
X01	For remote terminal unit No. 1	Read request	Y01	For remote terminal unit No. 1	Read complete	
X02		Transmit complete	Y02	For remote terminal unit No. 2	Transmit request	
X03	For remote terminal unit No. 2	Read request	Y03	For remote terminal unit No. 2	Read complete	
X04		Transmit complete	Y04	For remote terminal unit No. 3	Transmit request	
X05	For remote terminal unit No. 3	Read complete	Y05	Tor remote terminar and No. 5	Read complete	
X06		Transmit complete	Y06	For remote terminal unit No. 4	Transmit request	
X07	For remote terminal unit No. 4	Read request	Y07	Tor remote terminar and No. 4	Read complete	
X08	E interviewe No. E	Transmit complete	Y08	For remote terminal unit No. 5	Transmit request	
X09	For remote terminal unit No. 5	Read request	Y09	Tor temple terminar unit no. s	Read request	
X0A	E	Transmit complete	Y0A	For remote terminal unit No. 6	Transmit request	
X0B	For remote terminal unit No. 6	Read request	Y0B		Read complete	
XOC	E	Transmit complete	YOC	For remote terminal unit No. 7	Transmit request	
XOD	For remote terminal unit No. 7	Read request	Y0D	For remote terminar and the 7	Read complete	
X0E	Francisco terminol unit No. 9	Transmit complete	YOE	For remote terminal unit No. 8	Transmit request	
X0F	For remote terminal unit No. 8	Read request	YOF		Read complete	
X10	For remote terminal unit No. 9	Transmit complete	Y10	For remote terminal unit No. 9	Transmit request	
X11	For remote terminal unit No. 9	Read request	Y11		Read complete	
X12	For remote terminal unit No. 10	Transmit complete	Y12	For remote terminal unit No. 10	Transmit request	
X13	For remote terminal unit No. 10	Read request	Y13		Read complete	
X14	Les remate terminal unit No. 11	Transmit complete	Y14	For remote terminal unit No. 1	Transmit request	
X15	For remote terminal unit No. 11	Read request	Y15		Read complete	
X16	E	Transmit complete	Y16	For remote terminal unit No.	Transmit request	
X17	For remote terminal unit No. 12	Read request	Y17		Read complete	
X18	For remote terminal unit No. 12	Transmit complete	Y18	For remote terminal unit No. 13	Transmit request	
X19	For remote terminal unit No. 13	Read request	Y19		Read complete	
X1A	For remote terminal unit No. 14	Transmit complete	<u> </u>	- For remote terminal unit No. 14	Transmit request	
X1B	For remote terminal unit No. 14	Read request	Y1B		Read complete	
X1C	· · ·		Y1C			
to	Reserved		to	Reserved		
X1F			Y22			
X20	Hardware fa	ult	Y23	Receive data clear		
X21	MINI-S3 link comm	unicating	Y24	Remote terminal unit erro	r detection clear	
X22	Reserved		Y25			
<u> </u>			to	Reserved		
X23	Receive data clear o	completion	Y27			
X24	Remote terminal unit e	rror detection	Y28	MINI-S3 link communication start		
X25	Test mode		Y29	Reserved		
X26	MINI-S3 link error	the second se	Y2A	FROM / TO instruction res		
X27	MINI-S3 link commun		Y2B	Faulty station data of		
X28	User ROM error of	detection	Y2C	Switching buffer men		
X29			Y2D	Error rese	t	
to	Reserved		Y2E	Reserved		
X2F			Y2F			

Table 7.5 List of I/O Signals (for 48 occupied I/O points)



(1) Transmit request signal to the AJ35PTF-R2

(Y00, Y02, Y04, Y06, Y08, Y0A, Y0C, Y0E, Y10, Y12, Y14, Y16, Y18, Y1A) Transmit complete signal to the AJ35PTF-R2

(X00, X02, X04, X06, X08, X0A, X0C, X0E, X10, X12, X14, X16, X18, X1A)

When data such as command data and write data is to be transmitted from the PC CPU to an ID card controller which is connected to the AJ35PTF-R2, the data is first written to the transmission data area of the communication data area for the remote terminal and begins being transmitted when the transmit request signal is set to ON by the sequence program.

When all of the transmission data has been transmitted, the transmit complete signal is set to ON.

Once the transmit complete signal is set to ON, the transmit request signal is set to OFF by the sequence program.

Even if the transmit request signal is set to OFF before the transmit complete signal is set to ON, the transmit complete signal will be set to ON if the transmission should complete.



(2) Read request signal from the AJ35PTF-R2 (X01, X03, X05, X07, X09, X0B, X0D, X0F, X11, X13, X15, X17, X19, X1B) Read complete signal from the AJ35PTF-R2

(Y01, Y03, Y05, Y07, Y09, Y0B, Y0D, Y0F, Y11, Y13, Y15, Y17, Y19, Y1B)

When bar-code data is input from a bar-code reader which is connected to the AJ35PTF-R2, the data is stored in the receive data area of the communication data area for remote terminal and the read request signal is set to ON.

When the read request signal is set to ON, the bar-code data is read using the FROM instruction.

After the data has been read and the read complete signal set to ON by the sequence program, the read request signal is set to OFF.



(3) Hardware fault (X20)

- (a) On indicates that the master module mode setting switch has been set to 6, 7, 8, or 9 or a hardware fault has occurred.



- (4) MINI-S3 link communicating (X21)
 - (a) Switched on when the MINI-S3 link communication start signal (Y28) is set to ON and the communication check between all remote units and the master module has completed without error.
 - (b) Switched OFF when Y28 is switched OFF.
 - (c) OFF indicates that a data communication stop error has occurred.
 - (d) Used as an interlock for data transfer to and from the master module.

MINI-S3 link communication start (Y28)	
MINI-S3 link communicating (X21)	
	Communication with all remote I/O units

- (5) Receive data clear request signal (Y23) Receive data clear complete signal (X23)
 - (a) If an error occurs while data is being received from an external device that is connected to the AJ35PTF-R2, or if a malfunction occurs in the external device, received data is cleared when the receive data clear request signal (Y23) is set to ON.
 - (b) When received data is cleared by the receive data clear request signal being set to ON, the receive data clear complete signal (X23) is set to ON.
 - (c) The remote terminal number for which the receive data is to be cleared if an error occurs is set at the receive data clear designation area (address 858) in the buffer memory.

Receive data clear request signal (Y23) - Receive data clear complete signal	Set to ON by the sequence program	Set to OFF by the sequence program
(X23)		Set to ON by the
		master module



(6) Remote terminal unit error detection (X24) Error detection reset (Y24)

- (a) Remote terminal unit error detection (X24) is set to ON if an error is detected while data is being received from external device which is connected to the AJ35PTF-R2, or when an error is detected in the set data for the buffer memory.
- (b) When the remote terminal unit error detection reset (Y24) is set to ON, the remote terminal unit error detection (X24) is set to OFF.

It is also set to OFF when the error reset signal (Y2D) is set to ON.



(7) Test mode (X25)

The test mode is set to ON when the power is applied with the operation mode setting switch is set to 3, 4, or 5.

(8) MINI-S3 link error detection (X26) Communication continued

The MINI-S3 link error detection (X26) is set to ON when an error is detected in the remote unit receive data by the master module. (a) The MINI-S3 link error detection (X26) operates in the follow-

- ing manner depending on the setting of the operation mode switch. (See the Master module User's Manual.)
 - Automatic online return mode The MINI-S3 link error detection (X26) is set back to OFF after the MINI-S3 link error detection (X26) is set to ON and data link operation returns to normal.
 - Automatic online return OFF Once an error is detected and the MINI-S3 link error detection (X26) is set to ON, it remains ON.
- (b) The corresponding error code is stored to buffer memory address 108 when the MINI-S3 link error detection (X26) is switched ON.

The error code is latched. For further information, see Section 7.5.



(9) MINI-S3 link communication error (X27) Communication stopped

The MINI-S3 link communication error (X27) is set to ON when communication between the master station and the remote units cannot be performed.

(a) X27 is switched ON when:

- Any remote station power supply is turned 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 (mode - 2).
- (b) The corresponding error code is stored to buffer memory address 107 when the MINI-S3 link communication error (X27) is switched ON.
- (c) When the automatic online return mode is set (mode 0), and the unit returns to the data link, the MINI-S3 link communication error is set to OFF.

(10) User ROM error detection (X28)

The user ROM error detection (X28) is set to ON for one of the following causes.

- The initial data ROM installed in the master module is faulty.
- The data stored in the initial data ROM is faulty. The user ROM error detection (X28) is reset to OFF when the erring contents have been corrected and the PC CPU once again restarted.

(11) MINI-S3 link communication start (Y28)

- (a) I/O refresh begins when the MINI-S3 link communication start (Y28) is set to ON.
- (b) MINI-S3 link communication-in-progress (X21) is set to ON when communication with all of the remote units occurs normally.
- (c) The receive data area (Addresses 70 to 210, 598 to 855) of the buffer memory is cleared when the MINI-S3 link communication start (Y28) is set to ON.



(12) FROM / TO instruction response designation (Y2A)

This command determines the priority of access to the master module buffer memory.

- (a) When the FROM / TO instructions response designation (Y2A) is off, I/O refresh processing is given priority.
- (b) When the FROM / TO instructions response designation (Y2A) is on, the PC CPU FROM / TO instructions are given priority.
- (c) Chart 7.6 shows the effects resulting from the ON and OFF states of the FROM / TO instructions response designation (Y2A).

Table 7.6	FROM /	TO	Instruction	Response	Designation
-----------	--------	----	-------------	----------	-------------

FROM / TO Instruction Response Designation (Y2A)	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 diffe- rent timings may be read.
FROM / TO instruction processing time	There is a delay of (0.3 ms \pm 0.2 ms \times (number of partial refresh stations connected)) max.	No delay

(13) Faulty station data clear designation (Y2B)

The faulty station data clear setting (Y2B) specifies whether or not the data in which an error occurred should be cleared from the receive data area of a remote unit.

The faulty station data clear setting (Y2B) does not effect the transmission of data by faulty stations.

Table	7.7	Faulty	Station	Data	Clear	Designation
-------	-----	--------	---------	------	-------	-------------

Faulty Station Data Clear Designation (Y2B) Master Module Buffer Memory	OFF	ON
Transmission data for batch refresh (addresses 10 to 41)		
Transmission data for batch refresh (addresses 110 to 141)	Data at occurrence of communica- tion 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 communica- tion error is retained.	All points are switched OFF.

POINT

It is recommended that the operation mode setting switch be set to the automatic online return OFF mode when the faulty station data clear setting is set to ON.



(14) Buffer memory channel switch (Y2C)

As shown in the diagram below, the communication data area for remote terminal (addresses 1100 to 8099) is shared by remote terminals No. 1 to 7 and No. 8 to 14 from the perspective of the PC CPU. The PC CPU accesses the communication data area for remote terminal by switching channels.



OFF: Channel 0 ON : Channel 1

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(15) Error reset signal (Y2D)

The error reset signal (Y2D) is used to reset the MINI-S3 link error detection (X26) or MINI-S3 link communication error (X27).

- (a) The error can be reset by setting the error reset signal (Y2D) from OFF to ON when the MINI-S3 link communication start signal (Y28) is OFF.
- (b) When the error reset signal (Y2D) is set from OFF to ON, the following addresses are cleared: buffer memory communication error code (address 107), error detection code (address 108), and remote terminal unit number (addresses 196 to 210).
- (c) When the error reset signal (Y2D) is set from OFF to ON, the MINI-S3 link error detection (X26), MINI-S3 link communication error (X27), and the remote terminal unit error detection (X24) are set to OFF.

(d) ERR. LED reset

When the error reset signal (Y2D) is set ON, the corresponding error indicator LEDs (ERR. LOOP LED, ERR. REM LED) are turned OFF.



7.5.2 When using the A2CCPU

Table 7.8 gives the I/O signals which are transmitted between an A2CCPU and an AJ35PTF-R2.

The I/O signals given below are used when an AJ35PTF-R2 is set to station 1.

Device No.	Signal	Device No.	Signal
X(n+0)	Transmit complete	Y(n+0)	Transmit request
X(n+1)	Read request	Y(n+1)	Read complete
X(n+2)	Receive data clear complete	Y(n+2)	Receive data clear request
X(n+3)	Unusable	Y(n+3)	Unusable
X(n+4)	Error detection	Y(n+4)	Error reset/communication reset
X(n+5)		Y(n+5)	
X(n+6)	Unusable	Y(n+6)	Unusable
X(n+7)		Y(n+7)	

Table 7.8 I/O Signals when the A2CCPU is Used

(1) Transmit request signal to the AJ35PTF-R2 (Y0) Transmit complete signal to the AJ35PTF-R2 (X0)

When data such as command data and write data is to be transmitted from the A2CCPU to the general-purpose device which is connected to the AJ35PTF-R2, the data is first written to the transmission data area of the AJ35PTF-R2 buffer memory and begins being transmitted when the transmit request signal is set to ON by the sequence program.

When all of the transmission data has been transmitted, the transmit complete signal is set to ON.

Once the transmit complete signal is set to ON, the transmit request signal is set to OFF by the sequence program.

Even if the transmit request signal is set to OFF before the transmit complete signal is set to ON, the transmit complete signal will be set to ON if the transmission should complete.

	Signal	Timing
PC CPU ↓ AJ35PTF-R2	Y00 (transmit request) X00 (transmit complete)	Set ON by sequence program Set ON by Set ON by AJ35PTF-R2



(2) Read request signal from the AJ35PTF-R2 (X1) Read complete signal from the AJ35PTF-R2 (Y1)

When receive data is stored in the receive data area of the AJ35PTF-R2 buffer memory which is connected to the generalpurpose device, the read request signal is set to ON.

When the read request signal is set to ON, receive data is read using the FROM instruction.

After the data has been read and the read complete signal is set to ON by the sequence program, the read request signal is set to OFF.



(3) Receive data clear request signal (Y2) Receive data clear complete signal (X2)

If an error occurs while data is being received from an external device that is connected to the AJ35PTF-R2, received data is cleared when the receive data clear request signal is set to ON.

When received data is cleared by the receive data clear request signal being set to ON, the receive data clear complete signal is set to ON.

	Signal	Timing
PC CPU ↓ AJ35PTF-R2	Y02 (clear request) X02 (clear complete)	Set ON by sequence program Set ON by Set ON by AJ35PTF-R2

IMPORTANT

When an A2CCPU is used as the master module, a receive data clear request signal (Y2) should be set to ON only one time after RUN.

Receive processing will not be executed normally if the receive data clear request signal (Y2) is not set to ON.



(4) Error detection signal (X4) Error reset/communication reset signal (Y4)

If a FROM/TO instruction which cannot be used for reading or writing with an AJ35PTF-R2 is sent from the A2CCPU to the AJ35PTF-R2, an error detection signal is set to ON.

When X4 is set to ON, the error code is stored in the error code storage area (A2CCPU special registers D9180 to D9183) of the corresponding remote terminal number.

When an error reset/communication reset signal is set to ON by the sequence program, the AJ35PTF-R2 is reset and the RUN-LED is turned ON.

When an error reset/communication reset signal is set to ON, error code in the A2CCPU error code storage area (D9180 to D9193) and the corresponding FROM/TO instruction contents in the communication request registration area are also cleared.





7.6 Buffer Memory when AJ71PT32-S3 is Used

A buffer memory is provided in the master module (AJ71PT32-S3) for storing data transmitted between the master module and each of the remote units in the MINI-S3 link. (No battery backup is provided.) The following diagram of the buffer memory shows that it is divided into two major areas.



Switching between the two channels of the communication data area for remote terminal is conducted by turning ON/OFF the buffer memory channel designation signal (Y2C).

OFF ····· Channel 0

ON Channel 1



7.6.1 Common area

The following diagram shows how the common area of the buffer memory is allowed to store various kinds of data such as parameter data, error data, and remote unit communication data for batch and partial refresh remote units.

Address (Decimal)		Description	
0	Number of remote	Define the remote I/O station range for I/O refresh.	↑
1	Number of retries	Define the number of retries at occurrence of communication error.	
4	Line error check	Used to check error location	Can be accessed by the PC CPU.
		Reserved	1
10 * to 41	Transmission data for batch refresh	Stores data output to batch refresh type remote I/O stations.	
		Reserved	
70 to 77	Remote I/O station card data	Stores I/O unit types used as remote I/O stations.	Only read from the PC CPU.
		Reserved	
90 to 93	Accumulative faulty station detection	Stores faulty station numbers until reset by the sequence program.	Can be accessed by the PC CPU.
		Reserved	Ť
100 to 103	Faulty station detection	Stores the most recent faulty station numbers.	
		Reserved	
· 107	Communication error code	Stores the reason why X27 (MINI-S3 link communication error) has been switched on.	
108	Error detection code	Latches the ON/OFF state of X6 (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 stations.	Only read from the PC CPU.
		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.	
*195	Remote terminal unit faulty station detection	When the remote terminal unit error detection signal (X24) is set to on, the corresponding bit is set to "1".	
196 * to 210	Remote terminal unit error number	When a remote terminal unit error detection (X24) is set to on, the corresponding error number is stored here.	
		Reserved	
250 to 282	Partial refresh station	Write the partial refresh type remote I/O station numbers and the numbers of digits specified (numbers of partial refresh times).	Ī
		Reserved	
300 to 555	Transmission data for partial refresh	Stores data output to partial refresh type remote I/O stations.	Can be accessed by
		Reserved	the PC CPU.
598	Accumulative input error detection	Holds the partial refresh input data receive error until reset by the sequence program.	
599	Input faulty station detection	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 stations.	Only read from the PC CPU.
		Reserved	
858	Receive data clear specification	Specifies if received data should be cleared when an error occurs in a piece of equipment external to the RS-232C.	l I
859	Receive data clear specification	When a receive data clear station is designated, this specifies whether only the receive buffer memory of the master module is to be cleared or whether the master module and the receive buffer of the RS-232C unit is to be cleared as well.	Can be accessed by the PC CPU.
860 to 929	Parameter area	Sets parameters required for conduct data communication between the RS-232C and external equipment in no-protocol.	
		Reserved] ↓



For further information concerning each range in the common area, see the section on the buffer memory contained in the AJ71PT32-S3 Master Module User's Manual.

This section also contains specific information on the range requirements when creating programs for communication with an RS-232C interface unit.

(1) Line error check (address 4)

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. For further information, see AJ71PT32-S3 Master Module User's Manual

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

(a) Buffer memory assignment is conducted as indicated below.



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



- *: Value "n" depends on the remote I/O station number. b0 to b7 for odd-numbered stations 63...... 1, 3 b8 to b15 for even-numbered stations 64...... 2, 4
- (c) This area is used by the output data transmitted to the general-purpose outputs of the AJ35PTF-R2 and is written to the least significant 4 bits of the last station number location of the occupied station.

<Example>

10	5	statio	station 1				
. 11		1/0	1/0	1/0	1/0	stations 3	
							I.

Location of the least significant 4 bits of station 4 When the AJ35PTF-R2 is set to station 1 (AJ35PTF-R2: 4 stations are occupied)



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

(a) Buffer memory assignment is conducted as indicated below.



(b) Receive data for batch refresh is made up of 8 bits per remote I/O station as shown below.

					bn+2			
X7	X6	X5	X4	Х3	X2	X1	X0	1: ON 0: OFF

- *: Value "n" depends on the remote I/O station number. b0 to b7 for odd-numbered stations 63…………… 1, 3 b8 to b15 for even-numbered stations 64………… 2, 4
- (c) This area is used by the input data transmitted to the generalpurpose inputs from the RS-232C interface and is written to the least significant 4 bits of the last station number location of the occupied stations.

<Example>



When the setting is station No.1 (RS232C unit occupies 4 stations)

Location of the least significant 4 bits of station No.4

(4) Remote terminal unit faulty station detection (address 195)

- (a) When the remote terminal unit error detection (X24) is set to ON the corresponding station bit is set to "1".
- (b) When the remote terminal unit error detection reset (Y24) is set to ON, the corresponding station bit is set to "0".





(5) Remote terminal unit error number (addresses 196 to 210)

- (a) When the remote terminal unit error detection (X24) is set to ON, the error number is stored at these addresses.
- (b) The stored error number is cleared when the MINI-S3 link communication start signal (Y28) or the error reset signal (Y2D) is set to ON.
- (c) For information concerning the content of the error numbers, see Appendix 1, Remote Terminal Unit Error No. List.



(6) Receive data clear designation (address 858)

Designates the remote terminal unit for which receive data is to be cleared when an error occurs in a device external to the AJ35PTF-R2 while data is being received.





(7) Receive data clear range designation (address 859)

When a remote terminal unit has been designated to have its receive data cleared, the receive data clear range designation specifies whether only the receive buffer memory of the master module is to be cleared or whether receive buffer memory of both the master module and the AJ35PTF-R2 is to be cleared as well.





(8) Parameter area (addresses 860 to 929)

The required parameters for no-protocol communication between the AJ35PTF-R2 and external device must be set by terminal numbers.

- (a) The correspondence between the station number of an AJ35PTF-R2 and a remote terminal number is set by the initial data setting of the SWEGP-MINIPE which is stored in the initial data ROM and then installed in the master module.
- (b) Parameters are written to the parameter area using the sequence program when the MINI-S3 link communicating signal (X21) is OFF.
- (c) The parameter area is configured as indicated below.



1) Byte/word setting

Designates whether the communication data is to be conducted in units of bytes or words.



 Receive termination code setting Designates the termination code to be used for receive data.



When the receive termination data count has been designated, receive processing is terminated if data size designated by the receive termination data count is received before a termination code is received.

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3) Receive termination data count setting

Designates the amount of data to be transmitted after which receive will terminate.

When word unit is specified:

Receive termination data count \leq Receive area buffer memory length -1 (default: 499)

When byte unit is specified:

Receive termination data count \leq (Receive area buffer memory length -1) x 2 (default: 998)

Default: Receive data area length minus 1

The termination code "FFFF_H" must be designated in the receive termination code designation area.

When "FFFF_H" is not designated, receive processing is terminated if data equivalent to a termination code is received before data size equal to the termination data count is received.



7.6.2 Communication data area for remote terminal

The configuration indicated below is that for a communication data area for remote terminal used for the input of bar-code data from a bar-code reader, command data and interrupt data output to an ID card, or data read from an ID card.

dress	Channel 0		Channel 1			
ui 635 r	No. 1 reseive data areaNo. 8 reseive data areaNo. 1 transmission data areaNo. 8 					
1100						
	reseive data area		reseive data area			
	No. 1		No. 8			
	transmission data area		transmission data area			
2100	No. 2					
	reseive data area		reseive data area			
	No. 2		No. 9			
	transmission data area		transmission data area			
3100	No. 3		No. 10			
	reseive data area		reseive data area			
	No. 3		No. 10			
	transmission data area		transmission data area			
4100	No. 4					
	reseive data area	emote terminal Channel 1 No. 8 reseive data area No. 8 transmission data area No. 9 reseive data area No. 9 reseive data area No. 10 rea rea No. 10 transmission data area No. 10 transmission data area No. 11 reseive data area No. 11 reseive data area No. 11 reseive data area No. 11 reseive data area No. 11 transmission data area No. 12 reseive data area No. 12 reseive data area No. 12 reseive data area No. 12 reseive data area No. 13 reseive data area No. 14 reseive data area				
	No. 4		No. 11			
	transmission data area		transmission data area			
5100	No. 5					
	reseive data area		reseive data area			
	No. 5		No. 12			
	transmission data area		transmission data area			
6100	No. 6		No. 13			
	reseive data area		reseive data area			
	No. 6		No. 13			
	transmission data area		transmission data area			
7100	No. 7		No. 14			
	reseive data area		reseive data area			
<u> </u>	→ No. 7		No. 14			
	transmission data area		transmission data area			

(1)	The trai	nsmission	data	area	a is	fixed for	or e	ach
	remote	terminal	num	ber	as	shown	in	the
	diagran	n on the	left.					

2) The size of receive data area and transmission data area can be changed as needed within the range of addresses assigned to each remote terminal.

The desired range can be specified by setting the head addresses of the receive data area and the transmission data area. (Default values:

Receive data area = 500 words Transmission data area = 500 words

 Set the station number of operating box corresponding to each remote terminal number.

[Example]

For remote terminal unit No. 1 =Station 2 For remote terminal unit No. 2 = Station 9 For remote terminal unit No. 3 = Station 15

(4) The settings in (2) and (3) are set using the SW[]]GP-MINIPE link data settings which are written to the link data ROM and installed in the master module.

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

-Remote terminal number

1 address = 1 word (2 bytes)

* For information concerning the assignment of transmission data area for each remote terminal number, see the following page.



(2) When an ID plate controller is connected:



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(3) When, general-purpose external device (no-protocol) is connected:



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7.6.3 Buffer data when ID card controller is connected

When the ID card data is read and after the read command write code, head address, and the amount of data units have been written to the transmission data area for the remote terminal by execution of the TO instruction, the ID card data corresponding to the command data is read and stored in the receive data area when the transmit request signal is output.

Data is written to an ID card data based on the command data when the transmit request signal is output after the write command write code, head address, and the amount of data units to be written have been written to the transmission data area for remote terminal by execution of the TO instruction.

To read and write data from and to an ID card, word or byte setting must be made. The setting is made in the most significant two places of the command code (hexadecimal, 4 places).

<example></example>	Read code	
	0001н	0 1 0 1 _H
	1	1
	Word setting	Byte setting

(1) Word designation

(a) Status of buffer contents

1) Read is designated



ID card

1 byte

1 word (2 bytes)





1 word (2 bytes)

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	(b) Conter	nts of	buffer data			
	Table 7.8 Buffer Data	When N	Word Unit is Designated	j		
Command Code	Function	(Address)	Transmission Data Area Designation Data	(Address)	Receive [Data Area
	Reads the designated amount of data from the designated address by directly designating the	+0	Read code: 0001н	+0	Read wo	rd length
Read	address in the ID card within the address range of 0 to FH. Stores 00_{H} in the most significant byte of the	+1	Head address for reading: 0 to Fн	+1	00	Read data
	receive data area and read data in the least significant byte.	+2	Amount of read data units: 1 to 10 _H	+n	· (
	Reads the designated amount of data from the designated address by designating the	+0	Designated page read code: 0002⊦	+0	Read wo	rd length
Page	ID card page. Stores 00H in the most significant byte of the receive data area and read data in the least	+1	Page No.: 0 to FF _H	+1	00	Read data
designation data read	significant byte.	+2	Head address for reading: 0 to Fн		(
		+3	Amount of read data units: 1 to 10н	+n		•
	Read the designated amount of bytes of data from the designated address by desig-	+0	Extension read code: 0003н	+0	Read wo	rd length
Extension read	nating the memory address in the ID card within the range of 0 to FFFH. Stores 00H in the most significant byte of the	+1	Head address to be read: 0 to FFF _H	+1	00	Read data
	receive data area and read data in the least significant byte.	+2	Amount of read data units: 1 to 3E8 _H	+n		\$
Page No.	Reads the ID card page register	+0	Page No. read code: 0004н	+0	Read word	l length (1)
Read			:	+1	00	Page No.
Write	Writes the least significant byte of the write data in the transmission data area by the designated amount of data from the desig- nated address by directly designating the address in the ID card within the address range of 0 to F _H .	+0	Write code: 0005н			
		1 +1	Head address for writing: 0 to F _H			
		+2	Amount of write data units: 1 to 10 _H			
		+3	Write data (hexadecimal, 2 places)			
		+n	:			
	Writes the least significant byte of the write in the transmission data area by the desig-	ļ ⊤v	Page designation write code: 0006н	_		
Page	nated amount of data from the designated address by designating the ID card page.		Page No.: 0 to FFH			
		+2	Head address for writing: 0 to F _H			
designation data write		+3	Amount of write data units: 1 to 10 _H			
		+4	Write data (hexadecimal, 2 places)			
		+n	:			
	Writes the least significant byte of the write data in the transmission data area by the designated amount of data from the design	e ⊤v	Extension write code: 0007н			

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+1

+2

+3

+n

+0

+1

Head address for writing:

0 to FFFH

Amount of write data units: 1 to 3E8H

Write data

(hexadecimal, 2 places)

:

Page No. write code: 0008_H

Page No.: 0 to FFH

data in the transmission data area by the designated amount of data from the desig-

nated address by designating the memory address of the ID card within the address

Writes the page No. to the ID card page

range of 0 to FFFH.

register.

Extension

write

Page No. write



- (2) Byte setting
 - (a) Status of buffer data contents
 - 1) Read designation



2) Write designation



.



(b) Contents of buffer data

Table 7.9 Buffer Data When Byte Unit is Designated

Command code	Function	(Address)	Transmission data area designation data	(Address)	Receive data area
	Reads the designated amount of data from the designated address by directly designating the	+0	Read code: 0101н	+0	Read word length
Read	address in the ID card within the address range of 0 to F_{H} . Stores the read data to the receive data area in		Head address for reading: 0 to Fн	+1	Read data Read data
	the order of the least significant and most significant byte areas.	+2	Amount of read data units: 1 to 10 _H	- +n	5
	Reads the designated amount set data from the designated address by designating the	+0	Designated page read code: 0102+	+0	Read word length
Page designation	ID card page. Stores the read data to the receive data area in the order of the least significant and most	+1	Page No.: 0 to FFH	+1	Read data Read data
data read	significant byte areas.	+2	Head address for reading: 0 to Fн		(
		+3	Amount of read data units: 1 to 10⊦	+n	}
	Read the designated amount of bytes of data from the designated address by desig-	+0	Extension read code: 0103н	+0	Read word length
Extension read	nsion nating the memory address in the ID card		Head address to be read: 0 to FFF _H	+1	Read data Read data
	in the order of the least significant and most significant byte areas.	+2	Amount of read data units	+n	Ş
	Writes the write data in the transmission data area in the order of the least and most	+0	Write code: 0105 _H		
Write	significant bytes by the designated amount of data from the designated address by directly designating the address in the ID card within the address range of 0 to $F_{\rm H}$.	+1	Head address for writing: 0 to F _H	-	
		+2	Amount of write data units: 1 to 10н		
		+3	Write data		
		+n	:		
Page designation data write	Writes the write data area in the transmis- sion data area in the order of the least and most significant bytes by the designated amount of data from the designated address by designating the ID card page.	TU	Page designation write code: 0106н	_	
		+1	Page No.: 0 to FFH		
		+2	Head address for writing: 0 to F _H	-	
		+3	Amount of write data units: 1 to 10 _H		
		+4	Write data	_	
		+n	:		
	Writes the write data in the transmission data area in the order of the least and most	: ''	Extension write code: 0107н		
	significant bytes by the designated amount of data from the designated address by designating the memory address of ID card	· +1	Head address for writing 0 to FFFн	-	
Extension write	with in the address range of 0 to FFFH.	+2	Amount of write data units		
		+3	Write data		
		+n	:		

~



7.7 Buffer memory when the A2CCPU is Used

When an A2CCPU is used, data is directly read/written from/to the AJ35TPF-R2 buffer memory.

The memory map is as shown below. (Backup battery is not provided.)



1 address = 1 word (2 bytes)

(1) Receive data area (addresses 0 to 999)

Maximum 1000-word area (default: 500 words from 0 to 499) can be used as the receive data area.

Area can be changed by designating word length at the receive data area word length setting area (address 1003).

Receive data area = addresses 0 to address (designated word length -1)





(2) Transmission data area (addresses 0 to 999)

Up to 1000-word area (default: 500 words from 500 to 999) can be allocated for the transmission data area.

Area size can be changed by designating a word length at the receive data area word length setting area (address 1003).

Transmission data area = address (designated word length) - address 999



(3) Byte/word setting (address 1000)

Designates whether the communication data is to be conducted in units of bytes or words.



(4) Receive termination code setting (address 1001)

Designates a termination code which is used to designate the termination of receive data.



nated in the range 00H to FFH.

When the receive termination data count has been designated, receive processing is terminated if data size designated by the receive termination data count is received before a termination code is received.

(5) Receive termination data count setting (address 1002)

Designates the receive termination data count when receiving data by the fixed length.

When word unit is specified:

Receive termination data count \leq Receive area buffer memory length -1 (default: 499)

When byte unit is specified:

Receive termination data count \leq (Receive area buffer memory length -1) X 2 (default: 998)

Designate the termination code "FFFF_{μ}" at the receive termination code setting area (address 1001).

(6) Receive data area word length setting (address 1003)

Designates the receive data area. Setting range: 0 to 1000 (default: 500)



7.8 Reasons for Slow Response Time of Read and Write Data

The following section provides an explanation for the slow response times that occur when reading data from or writing data to a bar-code reader or an ID card controller when they are connected to an AJ35PTF-R2 in the MINI-S3 link.

- (1) The following are reasons for the delay that occurs in the output of bar-code data from a bar-code reader to the PC CPU.
 (a) Set complete signal input response time. (T1_N)
 - The time required from the point that the set complete signal is input to the point that the input signal for the AJ35PTF-R2 changes from OFF to ON.
 - (b) MINI-S3 link I/O refresh time (T1_{REF})
 The time required for the set complete signal to be transmitted to the master module.
 - (c) The time (T1_{FROM}) required for the set complete signal, which is input to the batch refresh receive data area of the master module, to be completely read by the PC CPU when the FROM instruction is executed.
 - (d) The time $(T1_{\tau_0})$ required for the in-zone signal, which is transmitted from the PC CPU, to be completely written to the batch refresh transmission data area of the master module when the TO instruction is executed.
 - (e) MINI-S3 link I/O refresh time $(T2_{REF})$ The time required for the in-zone signal to be transmitted to the AJ35PTF-R2.
 - (f) In-zone signal output response time (T_{out}) The time required for the output signal of the AJ35PTF-R2 to change from OFF to ON.
 - * When the set complete signal from the sensor is used as a direct in-zone signal for the bar-code reader, the times of (a) to (f) can be disregarded.
 - (g) The input response time (T2_N) required for the AJ35PTF-R2 to read bar-code data from the bar-code reader.
 - (h) MINI-S3 link I/O refresh time (T3_{REF}) The time required for bar-code data to be transmitted to the master module.
 - (i) The time (T2_{FROM}) required for bar-code data, that has been stored in the remote terminal receive data area of the master module from the AJ35PTF-R2 data, to be read to the PC CPU when the FROM instruction is executed.

7. SPECIFICATIONS



<Example>

(Example)	
PC CPU scan time (T1 _{FROM} , T2 _{FROM})	: 50ms
I/O refresh time (T1 _{REF} , T2 _{REF} , T3 _{REF})	: 4ms
Set complete signal response time (T1 _{IN})	: 25ms
TO instruction execution time (T_{TO})	: 5ms
In-zone signal response time (Tour)	: 12ms
Bar-code data (10 characters) read response time (T2	⊪): 35ms
Maximum delay of	
bar-code data read time =T1IN+T1REFX2+T1FROM+TTO+	T2ref×2+
T₀∪⊤+T2ıℕ+T3REF×(10/2+1)+	
$=25+4\times2+50+5+4\times2+1$	2+35+4
×(10/2+1)+50	
=217ms	

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- (2) The following are reasons for the delay that occurs in the output of ID card data from a ID card controller to the PC CPU.
 - (a) Set complete signal input response time. (T1_N) The time required from the point that the set complete signal is input to the point that the input signal for the AJ35PTF-R2 changes from OFF to ON.
 - (b) MINI-S3 link I/O refresh time (T1_{ner})
 The time required for the set complete signal to be transmitted to the master module.
 - (c) The time (T1_{FROM}) required for the set complete signal, which is input to the batch refresh receive data area of the master module, to be completely read by the PC CPU when the FROM instruction is executed.
 - (d) The time $(T_{\tau o})$ required for designated data to be written from the PC CPU to the master module when the TO instruction is executed.
 - (e) MINI-S3 link I/O refresh time (T2_{ReF}) The time required for command data to be transmitted to the AJ35PTF-R2.
 - (f) The output response time (T_{our}) required for designated data to be output from the AJ35PTF-R2 to the ID card controller.
 - (g) The input response time (T2_{IN}) required for the AJ35PTF-R2 to read ID card data from the ID card controller.
 - (h) MINI-S3 link I/O refresh time (T3_{REF})
 The time required for ID card data to be transmitted to the master module.
 - (i) The time (T2_{FROM}) required for ID card data, that has been stored in the remote terminal receive data area of the master module from the AJ35PTF-R2 data, to be read to the PC CPU when the FROM instruction is executed.

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7. SPECIFICATIONS



<example></example>

PC CPU scan time (T1 _{FROM} , T2 _{FROM}) :					
I/O refresh time (T1REF, T2REF, T3REF)					
Set complete signal response time (T1 _{IN})					
TO instruction execution time (T_{To})					
Command data output response time (Tour) : 2					
	ers) read response time (T2 _{IN})	: 35ms			
Maximum delay of					
ID card data read time	=T1 _{IN} +T1 _{REF} ×2+T1 _{FROM} +T _{T0} +T				
	Tout+T2IN+T3REF×(10/2+1)+⁻				
	$=10+4\times2+50+5+4\times3+2+3$	35+4×			
(10/2+1)+50					
	= <u>196ms</u>				

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- (3) The following are reasons for the delay that occurs in the output of ID card data from the PC CPU to the ID card controller.
 - (a) Set complete signal input response time. (T1_N)
 The time required from the point that the set complete signal is input to the point that the input signal for the AJ35PTF-R2 changes from OFF to ON.
 - (b) MINI-S3 link I/O refresh time (T1_{REF})
 The time required for the set complete signal to be transmitted to the master module.
 - (c) The time (T_{FROM}) required for the set complete signal, which is input to the batch refresh receive data area of the master module, to be completely read by the PC CPU when the FROM instruction is executed.
 - (d) The time (T_{τ_0}) required for command data and write data to be written from the PC CPU to the master module when the TO instruction is executed.
 - (e) MINI-S3 link I/O refresh time (T2_{REF})
 The time required for command data and write data to be transmitted to the AJ35PTF-R2.
 - (f) The time (T_{out}) required for command data and write data to be output from the AJ35PTF-R2 data to the ID card controller.



<Example>

(Example/		
PC CPU scan time (TFROM)		: 50ms
I/O refresh time (T1REF, T2REF)		: 4ms
Set complete signal respons	e time (T1™)	: 10ms
TO instruction execution tim	ne (T _{TO}	: 5ms
Command data and write dat	a output response time (Tou	ո): 40ms
Maximum delay of ID card data read time	$=T_{IN}+T1_{REF}\times2+T1_{FROM}+T_{TC}$ $(20/2+1)+T_{OUT}$ $=10+4\times2+50+5+4\times(20)$ $=157ms$	
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8. TROUBLESHOOTING



8. TROUBLESHOOTING

8.1 Remote Terminal Unit Error Detection Program

The program shown below can be used to read various kinds of error data including remote terminal unit fault signal, communication error, and data error.



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

When an error occurs during communication with a remote terminal unit, the following error detection signals are turned ON and error codes are stored in the buffer memory.

When using AJ71PT32-S3: remote terminal unit error detection signal (X_{n+24}) Buffer memory address 195: error station Buffer memory addresses 196 to 209: error codes When using the A2CCPU: error detection signal (X4) A2CCPU D9196 to D9199: error stations A2CCPU D9180 to D9193: error codes

Error Code (decimal)	Error Name	Error Content	Processing
1	Data designation error	An error exists in the data set in communica- tion data area for remote terminal.	See Section 7.6.2 and 7.7, and set the correct data.
2	Bar-code read error	An error occurred due to the ID card control- ler connected to the AJ35PTF-R2 being un- able to read bar-code.	See the manual for the ID card controller being used and take appropriate action.
		 An error occurred while an ID card controller is connected to the AJ35PTF-R2 due to one of the following causes. A battery is not installed in the ID card, or the battery is low. 	 See the manual for the ID card controller being used and install or replace the battery.
3	ID card access error	 An ID card was not present when a data read request was made, or the data could not be read. 	 Set the timing, location, and position of the ID card so that the ID card data can be read correctly when a read request is made.
		 Commands from the master module to the ID card controller are not transmitted in the proper format. 	 Noise may be a possible cause of the error. Attempt communication one more time. If the error occurs again, use the troubleshooting procedures outlined in the AJ35PTF-R2 RS-232C Interface User's Manual.
4	ID card battery error	An error occurred while an ID card controller is connected to the AJ35PTF-R2 due to the lack of a battery in the ID card, or to its being low. (Read data is stored correctly in the buffer) memory.	See the manual for the ID card controller being used and install or replace the battery.
5	ID card data receive error	An error occurred while an ID card controller was connected to the AJ35PTF-R2 due to response data not being transmitted to the master module in the proper format in re- sponse to a read request command from the master module.	 Noise may be a possible cause of the error. Attempt communication one more time. If the error occurs again, use the troubleshooting procedures outlined in the AJ35PTF-R2 RS-232C Interface User's Manual.
8	Transmission data area setting error	An error occurred because the number of bytes set for the transmission data portion of the communication data area used for the remote terminal units is less than the speci- fied number of bytes.	See the relevant remote terminal unit user's manual and set the required number of bytes for trans- mission data in the transmission data area.
9	Communication error	An error occurred in communication between the master module and remote terminal units.	Noise or a faulty remote terminal unit may be possible causes of the error.
10	Receive data area setting error	An error occurred because the number of bytes set for the receive data portion of the communication data area used for the remote terminal units is less than the specified num- ber of bytes.	See the relevant remote terminal unit user's manual and set the required number of bytes for re- ceive data in the receive data area.

8. TROUBLESHOOTING



8.3 Troubleshooting

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

8.3.1 General troubleshooting flowchart





8.3.2 Bar-code data cannot be read





8.3.3 ID card data cannot be read



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8.3.4 ID card data cannot be written



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.

APPENDIX

APPENDIX

APPENDIX 1 AJ35PTF-R2 DIMENSIONS



APP



APPENDIX 2 CONNECTING THE RS-232C CONNECTOR

The examples of standard connections using the RS-232C connector are shown below.

(1) When connecting to a device whose CD terminal can be turned ON

AJ35PTF-R2		Cable Connection and Signal	Computer		
Signal	Pin No.	Direction	Pin No.	Signal	
FG	1		1	FG	
SD(TXD)	2		2	SD(TXD)	
RD(RXD)	3		3	RD(RXD)	
RS	4		4	RS	
CS(CTS)	5		5	CS(CTS)	
DSR(DR)	6		6	DSR(DR)	
SG	7	$\leftarrow > < > < \rightarrow$	7	SG	
CD	8		8	CD	
DTR(ER)	20		20	DTR(ER)	

(2) When connecting to a device whose CD terminal cannot be turned ON

AJ35PTF-R2		Cable Connection and Signal	Computer		
Signal	Pin No.	Direction	Pin No.	Signal	
FG	1		1	FG	
SD(TXD)	2		2	SD(TXD)	
RD(RXD)	3		3	RD(RXD)	
RS	4		4	RS	
CS(CTS)	5		5	CS(CTS)	
DSR(DR)	6		6	DSR(DR)	
SG	7		7	SG	
CD	8		8	CD	
DTR(ER)	20		20	DTR(ER)	

IMPORTANT

- (1) Design the configuration of a system to provide an external protective or safety inter locking circuit for the PCs.
- (2) 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.
 - (a) Ground human body and work bench.
 - (b) Do not touch the conductive areas of the printed circuit board and its electrical parts with and 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.

RS-232C interface unit type AJ35PTF-R2

User's Manual

MODEL AJ35PTF-R2-USERS-E MODEL 13J771

IB(NA)66219-G(9709)MEE

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