MITSUBISHI

PROGRAMMABLE CONTROLLER

MELSEC-A

User's Manual

Intelligent communication module type A1SD51S (Hardware)

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

MITSUBISHI ELECTRIC

IB (NA) 66550-A

The United States	Mitsubishi Electronics America Inc , (Industrial Automation Division) 800 Biermann Court, Mt Prospect, IL 60056 Phone: (708)298 9223
Canada	Mitsubishi Electric Sales Canada, Inc , (Industrial Automation Division) 4299 14th Avenue, Markham Ontario L3R OJ2 Phone: (416)475-7728
United Kingdom	Mitsubishi Electric UK Ltd. (Industrial Sales Division) Travellers Lane, Hatfield Herts AL10 8XB Phone: (0707)276100
Germany	Mitsubishi Electric Europe GmbH, (Industrial Automation Division) Gothaer Strasse 8, Postfach 1548 D 4030 Ratingen 1 Phone (02102)4860
Taiwan	Setsuyo Enterprise Co , Ltd., (106) 11th Fl., Chung Ling Bldg 363 Sec 2 Fu Hsing S Rd Taipei Taiwan R O.C. Phone: (02)732-0161
Hongkong (& China)	Ryoden International Ltd., (Industrial & Electrical Controls Division) 10/F Manulife Tower, 169 Electric Rd North Point Hong Kong Phone: 8878870
Singapore (& Malaysia)	MELCO Sales Shingapore Pte. Ltd , (Industrial Division) 307 Alexandra Rd #05 01/02 Mitsubishi Electric Bldg Singapore 0315 Phone: 4732308
Thailand	F.A Tech Co Ltd , 1138/33 34 Rama 3 Rd Yannawa Bangkok 10120 Phone: (02)295 2861-4
Australia	Mitsubishi Electric Australia Pty Ltd (Industrial Controls Division) 348 Victoria Rd , Rydalmere N S W 2116 Phone: (02)684 7200
Republic of South Africa	M S A Manufacturing (Pty) Ltd (Factory Automation Division) P.O Box 39733, Bramley Johannesburg 2018 Phone: (011)444 8080

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100 TELEX J24532 CABLE MELCO TOKYO
NAGOYA WORKS 1-14 YADA-MINAMI 5 HIGASHI-KU NAGOYA JAPAN

IB (NA) 66550-A (9505) MEE Printed in Japan Specifications subject to change without notice

1. GENERAL DESCRIPTION

1. GENERAL DESCRIPTION

This manual explains the specifications and part names of the A1SD51S intelligent communication module, which is used in combination with MELSEC-A series compact building block type PC CPUs

After unpacking the A1SD51S, check that the following items have been supplied.

Item	Q'ty
A1SD51S intelligent communication module	1

Cautions when data is backed up

If data is backed up by using the common memory, extension registers (ED) and extension relays (EM), the following points must be observed However, if data is cleared when the A1SD51S is started up (i e If SW9 is ON), there is no restriction on the loading position

(1) Module loading position

Load the A1SD51S in the last slot of the main or extension base unit
The slot to the right of the A1SD51S must be vacant or be fitted with a blank cover (A1SG60)

Note

The A1SD51S is backed up by a super capacitor The backup time afforded by this super capacitor is shortened if its temperature becomes too high the above restrictions on the loading position must be observed in order to keep the temperature of the super capacitor sufficiently low

(2) Backup time

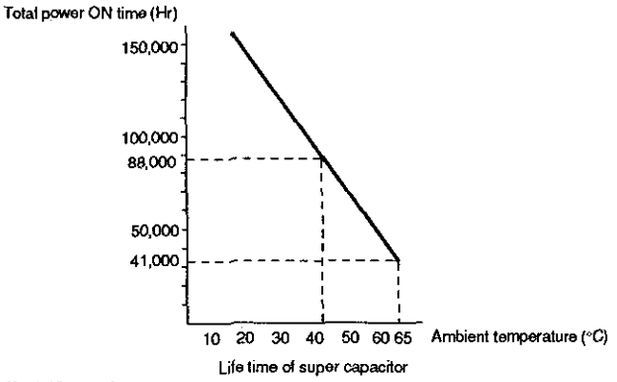
Minimum 48 hours (guaranteed value)
Typically 120 hours (in actual use)

(3) Miscellaneous

(a) If backup is required for a longer time than that indicated above, use a PC CPU to back up the data (a PC CPU and a program for data transfer are required)

(b) The charging time for the super capacitor is 1 hour
(If it is charged for less than 1 hour, the backup time will be shorter)

(c) The life of the super capacitor is illustrated below Change the super capacitor when it has been used for its life time (total power ON time) indicated in the figure below Replacement must be carried out at a service center save the data stored in the common memory extension regis ters (ED), and extension relays (EM) before requesting replacement



1 1 Detailed Manual

- A1SD51S Intelligent communication module User's Manual (IB-66551)
- AD51H-BASIC Programming Manual (Command) (IB-66567)
- AD51H-BASIC Programming Manual (Program edit, Compile) (IB-66568)

1 2 Related Manual

- SW1IX AD51HPE Operating Manual (IB-66402)

2. SYSTEM CONFIGURATIONS

2. SYSTEM CONFIGURATIONS

The table below shows the PC CPU modules that are compatible with the A1SD51S and the number of A1SD51S modules that can be connected to the PC CPU modules

Applicable CPU Module	Number of Connectable A1SD51Ss	Note
A1S A1SJ A2S	2	If the A1SD51S is used in conjunction with A1S series or A series special function modules, these modules should be included in the number of A1SD51Ss • A1SJ71C24-R2 Computer Link Module • A1SJ71C24-PRF Computer Link/Printer Function Module • A1SJ71C24-R4 Computer Link/Multidrop Link Module • AD51(S3)/AD51H(S3) Intelligent Communication Module • AD51FD(-S3) External Fault Diagnosis Module
A2US(S1)	6	• AD57G(-S3) Graphic Controller Module • AJ71C21(-S1) Terminal Interface Module (Only when the BASIC program mode is used) • AJ71C22(-S1) Multidrop Link Module • AJ71C23(-S3) Higher Controller High Speed Link Module • AJ71C24(-S3/ S6/-S8) Computer Link Module • AJ71UC24 Computer Link/Multidrop Link Module
A52G	1	• AJ71P41 SUMINET Interface Module • AJ71E71 Ethernet Interface Module

3. PERFORMANCE SPECIFICATIONS

3. PERFORMANCE SPECIFICATIONS

3 1 PERFORMANCE SPECIFICATIONS of A1SD51S

Item		Specifications
Program language		AD51H-BASIC (interpreter, compiler)
Number of tasks		2
Conditions for starting a task		• Started by power ON • Started by an interruption from the PC CPU (impossible at a compile BASIC) • Started by the start command from another task
Internal memory	Program	64 Kbytes (64 Kbytes x 1 task, or 32 Kbytes x 2 tasks)
	Common memory	8 Kbytes
	Buffer	6 Kbytes
	EM	1024 points
	ED	1024 points
General-purpose I/O		• Input: 27 points • Output: 23 points
Memory protection		None (built-in EEP ROM)
Built in interface	RS-232C	2 channels
	RS 422	1 channel
Clock function		None
Memory backup		• Backup capability provided (common memory, extension relay, extension register)
Writing a user program to the ROM		• Disabled (However, a built-in EEP ROM is installed in the body of the A1SD51S)
Console		• PC/AT, VG-620 , VT 382
Programming method		• Online programming • Offline programming (when using PC/AT)
Multi-task debugging		Possible (when debugger used)
Number of I/O points occupided		• 32 points
Current consumption		• 0 4 A
Weight kg (lb)		• 0 3 (0 66)

On the general-purpose specifications, refer to the User's Manual of PC CPU being used

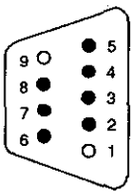
3 2 Connector Specifications

3 2 1 RS-232C Interface (CH 1/CH.2)

(1) Transmission specifications

Item		Specifications	
Transmission method		Conforms to RS-232C	
Synchronization method		Asynchronous system	
Transmission rate (bps)		Selectable from 300, 600, 1200 2400, 4800 9600, and 19200 bps	
Transmission specification (USART mode) settings	Start bit	1	Selectable
	Data bits	5, 6, 7, 8 bits	
	Parity bit	Yes or no (odd parity/even parity)	
	Stop bit	1, 1 5, 2 bits	
Communication control		DTR/DSR(ER/DR) control or DC code control	
Line configuration		1:1	
Transmission distance		Max 15 m	

(2) Connector specificaitons



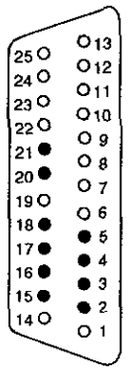
Pin No	Description	Signal Symbol	Transmission Direction A1SD51S ↔ External
2	Receive data	RD(RWD)	←
3	Send data	SD(TXD)	→
4	Data-terminal ready	DTR(ER)	→
5	Signal ground	SG	↔
6	Data set ready	DSR(DR)	←
7	Request to send	RS(RTS)	→
8	Clear to send	CS(CTS)	←

3 2 2 RS-422 Interface (CH 3)

(1) Transmission specifications

Item		Specifications	
Transmission method		Conforms to RS-422/485	
Synchronization method		Asynchronous system	
Transmission rate (bps)		Selectable from 300, 600, 1200, 2400, 4800, 9600, and 19200 bps	
Transmission specification (USART mode) settings	Start bit	1	Selectable
	Data bits	5, 6, 7, 8 bits	
	Parity bit	Yes or no (odd parity/even parity)	
	Stop bit	1, 1 5, 2 bits	
Communication control	CS(CTS) control		
Line configuration		1:1	
Transmission distance		Max 1 5m	

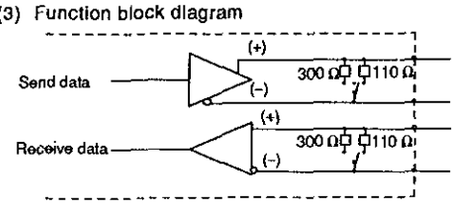
(2) Connector specificaitons



Pin No	Description	Signal Symbol	Transmission Direction A1SD51S ↔ External
2	Receive data	RDA	←
3	Send data	SDA	→
4	Request to send	RSA	←
5	Clear to send	CSA	→
15	Receive data	RDB	←
16	Send data	SDB	→
17	Request to send	RSB	←
18	Clear to send	CSB	→
20	Signanl ground	SG	↔
21	Receive ready	RR *1	←

*1 To enable data reception by the A1SD51S, be sure to connect RR (receive ready) to both the SG (No 20 pin) of the A1SD51S and the SG of the external device as shown above

(3) Function block diagram



4. EXTERNAL WIRING

4 1 RS-232C Connection

The standard method for connecting the RS-232C interface is indicated below
For details on the connection method, refer to the Intelligent communication module User's Manual

(1) Example of external wiring for DTR/DSR(ER/DR) control or DC code control

A1SD51S		Cable Connections and Signal Directions (Connection Example)	External Devices
Signal	Pin No		Signal
RD(RXD)	2		RD(RXD)
SD(TDX)	3		SD(TXD)
DTR(ER)	4		DTR(ER)
SG	5		SG
DSR(DR)	6		DSR(DR)
RS(RTS)	7		RS(RTS)
CS(CTS)	8		CS(CTS)

When wiring is carried about in the way shown above, enable DC code control with Procedure Code 18 of the ZCNTL command, or DTR/DSR (ER/DR) control

(2) Example of external wiring for DC code control

A1SD51S		Cable Connections and Signal Directions (Connection Example)	External Devices
Signal	Pin No		Signal
RD(RXD)	2		RD(RXD)
SD(TDX)	3		SD(TXD)
DTR(ER)	4		DTR(ER)
SG	5		SG
DSR(DR)	6		DSR(DR)
RS(RTS)	7		RS(RTS)
CS(CTS)	8		CS(CTS)

When wiring is carried about in the way shown above, enable DC code control with Procedure Code 18 of the ZCNTL command

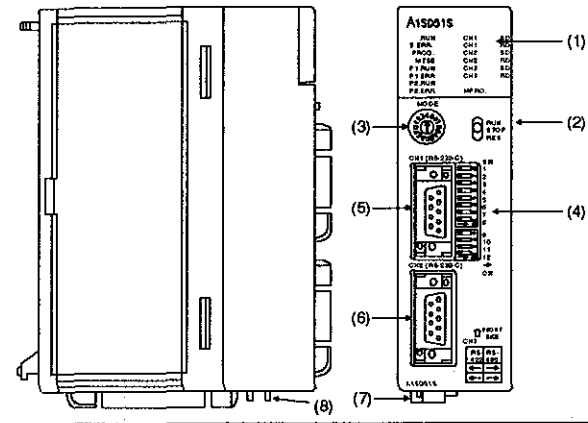
4 2 RS-422/485 Connection

The standard method for connecting the RS-422C interface in a 1 1 configuration is indicated below

A1SD51S		Cable Connections and Signal Directions (Connection Example)	External Devices
Signal	Pin No		Signal
SDA	3		RDA
SDB	16		RDB
RDA	2		SDA
RDB	15		SDB
CSA	5		RSA
CSB	18		RSB
RSA	4		CSA
RSB	17		CSB
RR	21		
SG	20		SG

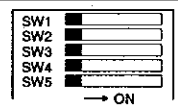
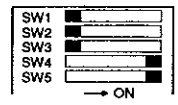
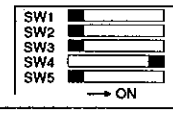
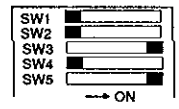
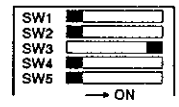
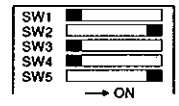
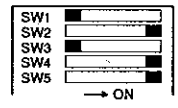
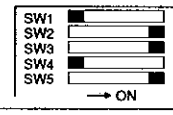
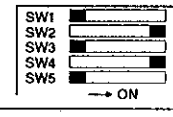
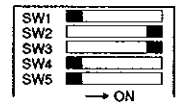
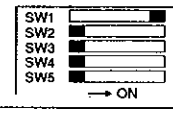
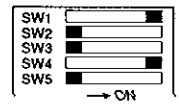
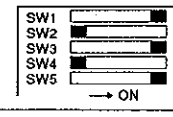
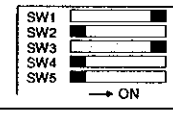
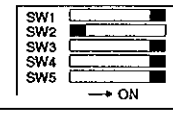
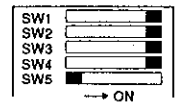
For details on the terminal resistor settings and the external wiring example for a 1:n configuration, refer to the A1SD51S Intelligent communication module User's Manual

5 NOMENCLATURE AND SETTING



No	Name	Function	
(1)	LED RUN CH1 SD S ERR CH1 RD PROG CH2 SD MTSE CH2 RD P1 RUN CH3 SD P1 ERR CH3 RD P2 RUN P2 ERR M PRO	RUN	Normal operation During normal operation: ON When a fault occurs: OFF
		S ERR	System error During normal operation: OFF When a fault occurs: ON
		PROG	Programming mode In programming mode: ON
		MTSE	Multitask setting error When a setting error occurs: ON
		P1 RUN	Task 1 execution When task 1 is executed: ON
		P1 ERR	Task 1 error When a task 1 error occurs: ON
		P2 RUN	Task 2 execution When task 2 is executed: ON
		P2 ERR	Task 2 error When a task 2 error occurs: ON
		CH1 SD	CH 1 send status During data transmission: Flashes
		CH1 RD	CH 1 receive status During data reception: Flashes
		CH2 SD	CH 2 send status During data transmission: Flashes
		CH2 RD	CH 2 receive status During data reception: Flashes
		CH3 SD	CH 3 send status During data transmission: Flashes
		CH3 RD	CH 3 receive status During data reception: Flashes
		M PRO	Memory protect status When SW10 is ON: ON
(2)	RUN keyswitch RUN STOP RES	Used to execute/stop tasks and to reset hardware • RUN: To execute tasks (valid only in the execution and debugging modes) • STOP: To stop tasks (valid only the execution and debugging modes) • RESET: To reset hardware	
(3)	Mode setting switch 1 Mode	Mode settings (factory setting: 0)	
		Mode	Notes
		0	Execution mode
		1	
		2	Multitask debugging mode
		3	
		4	Programming mode
		5 to F	Unusable
(4)	Mode setting switch 2 SW 1 2 3 4 5 6 7 8 9 10 11 12	Console and other settings	
		SW	Setting / Position: ON / OFF
		1 to 5	Console port/debugger port setting: See *1
		6	Stopping BASIC program by pressing the [Break] or [Ctrl] + [C] keys valid/invalid: Valid / Invalid
		7	PC CPU reset signal valid/invalid: Valid / Invalid
		8	Time access enabled after PC CPU is reset: 200 msec / 200 msec
		9	Backup area clear: Cleared at startup / Not cleared
		10	User program protection: Protected / Not protected
		11	Not used
		12	

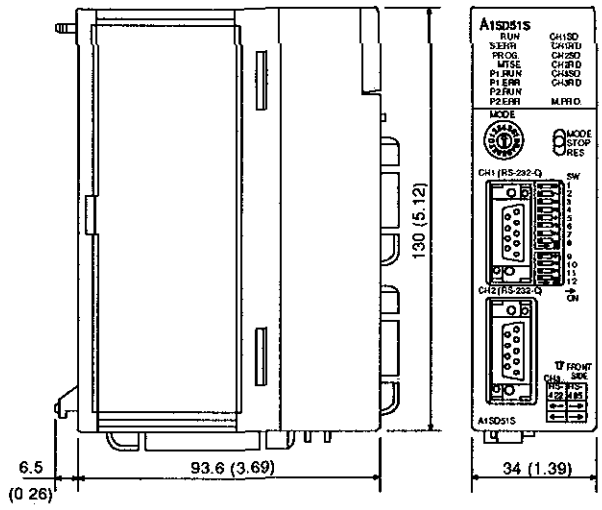
*1 Console/debugger port setting

Console	Debugger	Setting
PC/AT connected to CH 3	No connection	
	VT 382 connected to CH 1	
	VG-620 connected to CH 1	
	VT-382 connected to CH 2	
	VG 620 connected to CH 2	
VT 382 connected to CH 1	No connection	
	PC/AT connected to CH 1	
	VT-382 connected to CH 2	
VG 620 connected to CH 1	No connection	
	PC/AT connected to CH 3	
	VG 620 connected to CH 2	
No connection	No connection	
	PC/AT connected to CH 3	
	VT-382 connected to CH 1	
	VG 620 connected to CH 1	
	VT-382 connected to CH 2	
	VG-620 connected to CH 2	

No	Name	Function
(5)	RS-232 interface (CH 1)	Used to connect a console, debugger, general-purpose terminal, or printer etc
(6)	RS-232C interface (CH 2)	Used to connect a console, debugger, general purpose terminal, or printer etc
(7)	RS-422/485 interface (CH 3)	Used to connect a console or debugger etc
(8)	Terminal resistor selector switch	Used to select the RS 422/485 terminal resistor • RS-422 330 Ω • RS-485 110 Ω

6. EXTERNAL DIMENSIONS

6. EXTERNAL DIMENSIONS



Unit: mm (inch)

REVISIONS

A	
May., 1995	

IMPORTANT

(1) Design the configuration of a system to provide an external protective or safety interlocking circuit for the CPs

(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 suitabil-