

# MITSUBISHI

PROGRAMMABLE CONTROLLER

# MELSEC-A

User's Manual

## Position Detection Module type A1S62LS (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-66646-A

### Relevant Manuals

Additional manuals which apply to this product are listed below.

Any of the listed manuals are available upon request.

#### [Detailed Manual]

Manual Name	Manual No
A1S62LS USER'S MANUAL	13J837

Model	A1S62LS-U(HW)-E
Model Number	13J836

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When exported from Japan, the manual does not require application to the Ministry of International Trade and Industry for service transactions permission.

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Specifications subject change without notice

## ● SAFETY PRECAUTIONS ●

(Please read these precautions before operation.)

When using the A1S62LS, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

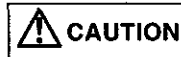
These precautions apply only to the A1S62LS. Refer to the CPU module user's manual for a description of the PC system safety precautions.

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




**DANGER**

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



**CAUTION**

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

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

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.



**DANGER**

#### [Design Precautions]

Provide an external safety circuit so that the entire system functions safely even when the external power supply or the CPU module is faulty.

Failure to do so may lead to incorrect output or malfunction, resulting in an accident.

- (1) Provide an external circuit of PC emergency stop circuit and an interlock circuit to prevent the machine from being damaged (e.g. position detection upper and lower limits).
- (2) When the A1S62LS detects an error, all external output signals may turn OFF depending on the type of the error. Provide an external fail safe circuit.
- (3) Output may remain ON or OFF depending on failure of external output devices, such as a transistor. Provide a circuit that can be monitored externally for output signals that may result in serious accidents.



**CAUTION**

#### [Design Precautions]

- (1) Do not bind or close the control cable and the communication cable with the main circuit cable and the power cable. Connect the former cables at least 100 mm away from the latter cables. Failure to do so may cause noise, resulting in malfunction.



**CAUTION**

#### [Installation Precautions]

- (1) Use the PC under the environment described in general specifications of the manual.

Failure to do so may result in electrical shock, fire, malfunction, product damage, or deterioration of performance.

- (2) Firmly engage the lugs on the bottom of the A1S62LS in the holes on the base unit  
Failure to do so may result in malfunction, failure, or the A1S62LS falling
- (3) Firmly connect the external I/O connector, external setting unit (VS-T62) connector, and sensor connector to the A1S62LS's connector  
Failure to do so may result in poor contact, leading to incorrect input and output

## ⚠ CAUTION

### [Wiring Precautions]

- (1) Check the terminal arrangement and connect the wires correctly
- (2) Do not allow any foreign matter (e.g. cutting chips, wire strips) to enter the A1S62LS  
This may result in fire, failure, or malfunction

## ⚠ DANGER

### [Start-up and Maintenance Precautions]

- (1) Turn the power supply OFF before cleaning  
Failure to do so may result in A1S62LS failure or malfunction

## ⚠ CAUTION

### [Start-up and Maintenance Precautions]

- (1) Do not disassemble, or remodel the unit  
Doing so may result in electrical shock, fire, or A1S62LS malfunction
- (2) Turn the power supply OFF before mounting or dismounting the A1S62LS  
Failure to do so may result in A1S62LS failure or malfunction

## ⚠ CAUTION

### [Disposal Precautions]

- (1) Be sure to handle the A1S62LS as industrial waste when disposing of it

## 1. OVERVIEW

This user's manual contains the specifications and instructions for the A1S62LS position detection module which is to be used in conjunction with MELSEC-A Series of small size CPU module

When unpacking the A1S62LS, be sure to verify that all the parts listed below are present

Part name	Quantity
A1S62LS	1
External I/O connector (FCN-361J024-AU made by Fujitsu)	1
External I/O connector cover (FCN-360C024-B made by Fujitsu)	1

## 2. SPECIFICATIONS

### (1) General Specifications

Item	Specifications				
Operating ambient temperature	0 to +55 C				
Storage ambient temperature	-20 to +75 C				
Operating ambient humidity	10 to 90% RH (non-condensing)				
Storage ambient humidity	10 to 90% RH (non-condensing)				
Vibration resistance	Conforms to JIS C 0911	Frequency	Acceleration	Amplitude	Sweep Count 10 times (1 octave/minute)
		10 to 65Hz	1G	0.075 mm (0.003 in.)	
Shock resistance	Conforms to JIS C 0912 (10G X3 times in 3 directions)				
Noise durability	Tested by noise simulator of 1500 Vpp noise voltage, 1 μs noise width, and 25 to 60 Hz noise frequency				
Withstand voltage	500VAC for 1 minute, across DC external terminals and ground				
Insulation resistance	5M Ω or more, measured by 500VDC insulation resistance tester across AC external terminals and ground				
Operating ambience	Free of corrosive gases. Dust should be minimal				
Cooling method	Self-cooling				

### REMARKS

1 octave marked with an asterisk (\*) indicates a change from the initial frequency to double or half frequency

For example, any of the following changes are referred to as 1 octave 10 Hz→20Hz, 20Hz→40Hz, 40Hz→20Hz, 20Hz→10Hz

### (2) Performance Specifications

Item	Specifications	
Number of position detection axis	1	
Position detection format	Absolute position detection by ABSOCODER sensor	
Number of divisions	[4096 divisions x 32 turn] to [409.6 divisions x 320 turns]	
Limit switch output function	Number of programs	9 Program No 0 Program No 1-8
	Number of multi-dogs (dog/CH)	10
	Number of output channels (CH)	For limit SW output function only: 16/1 program For limit SW output and Positioning functions: 8/1 pro
	Data setting method	Sequence program
Positioning function	Control format	Unidirectional positioning
	Target position setting method	1-point setting prior to positioning operation
	Max. number of positioning points	1
	Number of registered positioning pattern data	2
	Number of output channels for positioning signal output (CH)	8
Data setting method	Sequence program	
Minimum position setting units	0.00001	
Current position value setting function	Current position value setting, Current position value present setting	
JOG operation function	JOG operation executed by JOG FWD/RVS signal inputs	
Sampling time (msec)	1	
Response time (msec)	Limit SW output signal & positioning output signal	2
	Current position value output	
Gate time (msec)	Speed output	Conforms to settings of parameters 4, 8, 16, 32, and 64
	Rotation speed output	
Number of I/O signals	32	
Internal power consumption (5VDC) (A)	0.55 (VS T62 not connected)	
	1.0 (VS T62 connected)	
Outer dimensions	mm (in.) 130 (H) x 34 (W) x 93 (D) (5.12 x 1.34 x 3.66)	
Mass	kg (lb) 0.5 (1.1)	

### (3) ABSOCODER Sensor Specifications

Model Name	MRE 32SP062SAC	MRE G ① SP062FAC				
		①=64	①=128	①=160	①=256	①=320
Number of divisions per revolution	4,096	2,048	1,024	819.2	512	409.6
Number of revolutions	32	64	128	160	256	320
Max. number of divisions	131,072					
Scale length	Travel amount per turn X Number of revolutions Drive unit's resolution					

### 3. INTERFACE SPECIFICATIONS

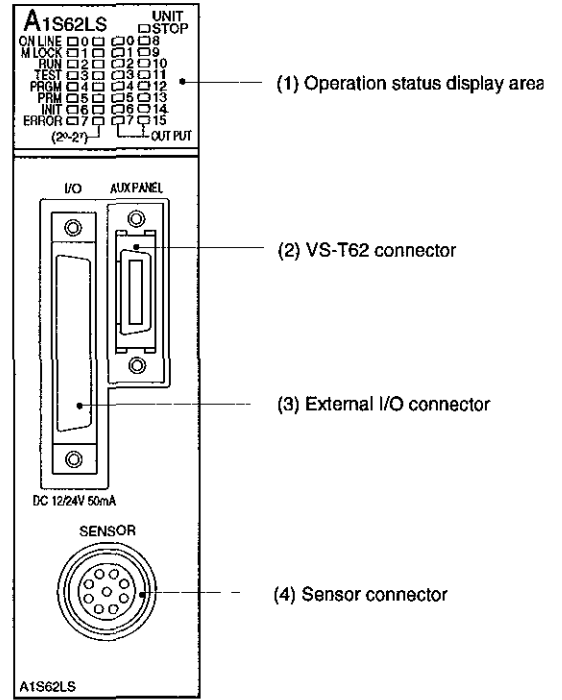
Item		Specifications		
Input Signals	Number of input points	Current position value preset input: 2		
	Isolation method	Photo-coupler		
	Rated input voltage	12 VDC	24 VDC	
	Rated input current	4 mA	10 mA	
	Operating input voltage range	10.2 - 30 VDC		
	ON voltage	10VDC or more		
	OFF voltage	4VDC or less		
	Response time	OFF→ON	0.04 msec (with input voltage of 24V)	
		ON→OFF	0.2 msec (with input voltage of 24V)	
Common connections	1 common for 2 points (common terminal: B1, B2)			
Output Signals	Number of output points	For current position detection function	No output	
		For limit SW output function	Limit SW output: 16	
		For limit SW output and Positioning functions	Limit SW output: 8 Positioning signal output: 8	
	Isolation method	Photo-coupler		
	Rated load voltage	12/24VDC		
	Operating load voltage range	10.2 - 30VDC		
	Max load current	50 mA		
	Max rush current	0.4 A (10 msec or less)		
	Current leakage when OFF	0.1 mA or less		
	Max voltage drop when ON	1.0 V (at 50 mA)		
	Response time	OFF→ON	1 msec (when load current is 50 mA)	
		ON→OFF	1 msec (when load current is 50 mA)	
	Common connections	1 common for 16 points (common terminal: A1, A2)		
External cable connection format	24 pins connector			
Compatible wire size	0.3 mm <sup>2</sup>			
Internal circuit				

#### Signal Name and Pin Arrangement

Pin No	Signal Name				Pin arrangement
	For current position detection function	For Limit SW Output	For Positioning		
			Using 'speed switching' format	Using 'speed stepping' format	
B12	Not used	CH.0	CH.0	CH.0	Code: FCN 361J024 AU
B11	Not used	CH.1	CH.1	CH.1	
B10	Not used	CH.2	CH.2	CH.2	
B9	Not used	CH.3	CH.3	CH.3	
B8	Not used	CH.4	CH.4	CH.4	
B7	Not used	CH.5	CH.5	CH.5	
B6	Not used	CH.6	CH.6	CH.6	
B5	Not used	CH.7	CH.7	CH.7	
A12	Not used	CH.8	FWD	FWD/low speed	
A11	Not used	CH.9	RVS	RVS/low speed	
A10	Not used	CH.10	High-speed	High speed	
A9	Not used	CH.11	Low speed	Medium speed	
A8	Not used	CH.12	Brake release	Brake release	
A7	Not used	CH.13	In-position	In-position	
A6	Not used	CH.14	Positioning in progress	Positioning in progress	
A5	Not used	CH.15	Operation error	Operation error	
B4	Current position preset input 1	Current position preset input 1	Current position preset input 1	Current position preset input 1	Note Do not connect any cord to pin Nos. A3 and A4 and spare pins
B3	Current position preset input 2	Current position preset input 2	Current position preset input 2	Current position preset input 2	
B1, B2	12/24VDC	12/24VDC	12/24VDC	12/24VDC	
A1, A2	0V	0V	0V	0V	

### 4. NAME OF PARTS

The illustration below shows the configuration of the A1S62LS



Name	Description
(1) Operation status display area (LED display)	
ONLINE <input type="checkbox"/>	Lights when the A1S62LS operation status signal (X1) turns ON (online)
M LOCK <input type="checkbox"/>	Lights when the mode lock signal (Y19) turns ON
<input type="checkbox"/> RUN <input type="checkbox"/> TEST <input type="checkbox"/> PRGM <input type="checkbox"/> PRM <input type="checkbox"/> INIT	The LED corresponding to the selected mode lights or flashes Lit: when the manual mode is selected Flashing when the sequence mode is selected
ERROR <input type="checkbox"/>	Lights when the error detection signal (X7) turns ON
UNIT <input type="checkbox"/> STOP	Lit when watchdog timer error signal (X0) is ON (H/W error) or during the period after the PC CPU had been reset until normal operation is started
OUTPUT	Displays 0 to 15 channel output state on the monitor Lit: output is ON Unlit: output is OFF
(2 <sup>0</sup> ~2 <sup>7</sup> )	Displays the lower 8 bits (binary code) of the sensor binary current position Displays the error code (binary code) when an error is detected
(2) VS-T62 connector	Connect in order to designate settings from the VS-T62
(3) External I/O connector	Connects the following preset input, limit switch output, positioning signal output
(4) Sensor connector	For connecting the ABSOCODER sensor (MRE) cable

## 5. HANDLING PRECAUTIONS

The following precautions should be observed when handling the A1S62LS

- (1) As the A1S62LS is constructed from a resin-based material, it should not be dropped or subjected to severe shocks
- (2) Never remove the PCBs from their cases
- (3) Turn OFF power supply to the PC before mounting and dismantling the A1S62LS to and from the base
- (4) During the wiring procedure, be sure to prevent foreign matter such as wire clippings, etc., from getting inside the A1S62LS (the top part of the A1S62LS is particularly vulnerable)
- (5) Tighten the A1S62LS securing screw (M4) within the torque range of 8-12 kg cm (6.7-10.0 lb·in)
- (6) Place the cover on the connector when not connecting any peripheral equipment

## 6. WIRING PRECAUTIONS

The following wiring precautions should be observed when connecting the A1S62LS to external devices

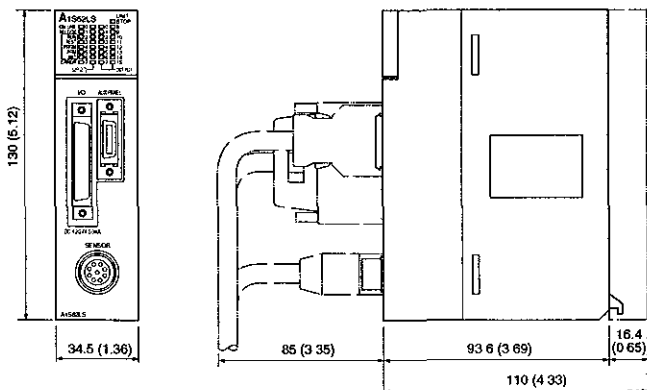
For the sensor cable, use NSD's dedicated ABSOCODER sensor cable

No other type of sensor cable should be used

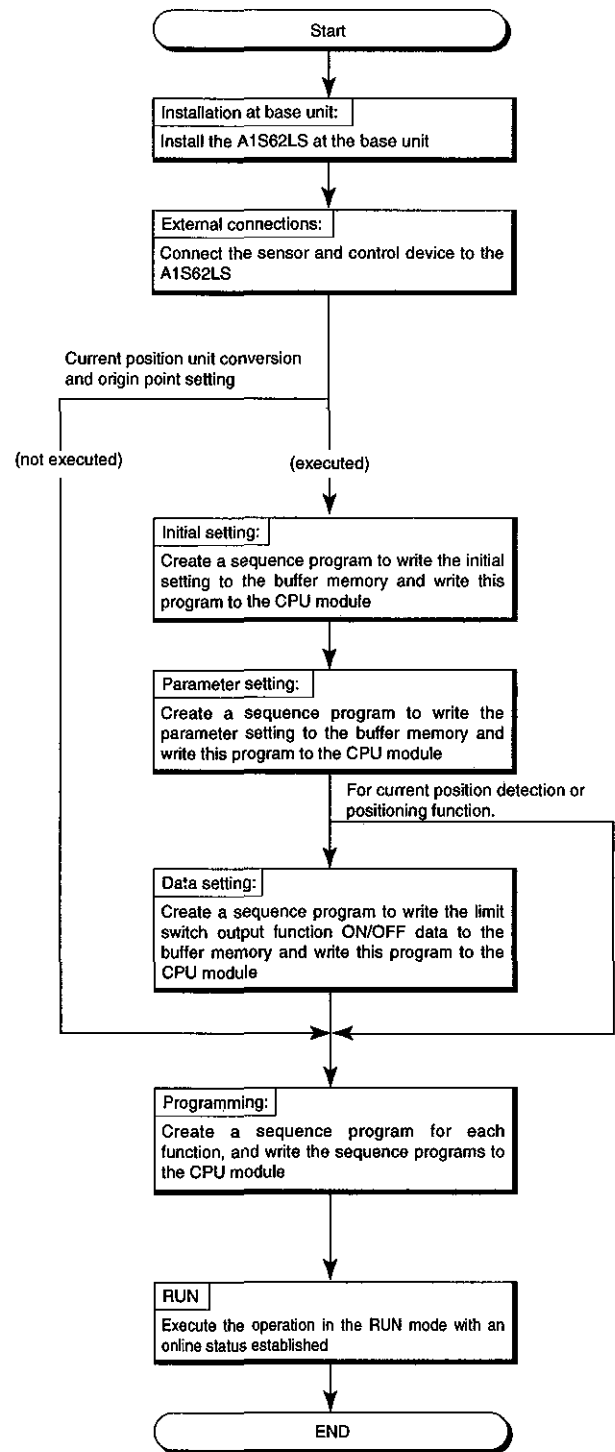
- (1) The A1S62LS signal lines and ABSOCODER sensor cable should be located as far as possible from power lines and other lines which generate a high level of electrical noise
- (2) If location near the above power lines is unavoidable, the cable duct should be separated, with individual wiring conduits being provided
- (3) When wiring conduits are used, they should be securely grounded
- (4) The input/output signal line size should be 0.3mm<sup>2</sup>

## 7. DIMENSIONS

Unit: mm (in.)



## 8. OPERATION SEQUENCE



### REMARKS

Settings other than current position setting can be done even when the ABSOCODER sensor is not connected