MITSUBISHI

High Speed Counter Module Type A1SD61

User's Manual

(Hardware)

Thank you for buying the Mitsubishi general-purpose programmable logic controller MELSEC-A Series

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

MODEL	A1SD61 (H/W)-U-E
MODEL CODE	13JE47
IB(NA)-66486-B(0209)MDOC	

●SAFETY PRECAUTIONS●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in the 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 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.
In any 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.

[DESIGN PRECAUTIONS]

⚠ DANGER

- Failure of external output transistors could cause outputs to remain continually ON or continually OFF.
  Provide an external circuit to monitor output signals whose disruption could cause serious accidents.

⚠ CAUTION

- Use the PC in the environment specified in the General Specifications section in this manual.
  Using it in an environment which does not meet the general specifications could cause electric shock, fire or malfunctions, and damage or deterioration of the module.
- Do not bundle the control wire and the communication cable with the main circuit or power line or keep them close to one another.
  Keep the control wire and the communication cable at least 150 mm away from the main circuit or power line: otherwise, noise or malfunctions will occur.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Do not directly touch the conducting part of the module.
  Failure to observe this instruction will cause the module to malfunction or break down.
- Install the module by engaging the module mounting projections on the lower part of the module in the mounting holes of the base unit. Incorrect installation could result in malfunctions, failure of detachment.

[WIRING PRECAUTIONS]

⚠ CAUTION

- The twisted shielded wire must be grounded to at least class 3 specifications at the encoder side (relay box).
- Ground the AG terminal using third class grounding or higher exclusively for the PC. If you do not, the PC will malfunction.
- Before connecting wires to the PC, check the rated voltage and the terminal arrangement. Connecting power of a different voltage or wiring incorrectly will result in fire or failure.
- Do not apply the voltage higher than the value set with a jumper. Failure to observe this instruction will result in failure.
- Tighten the terminal screws to the specified torque.
  Loose terminal screws will cause a short, fire or malfunctions.
  Tightening the terminal screws too far may cause damage to the screws resulting in short circuits or malfunctions.
- Take all possible measures to prevent chips or wire scraps from entering the module. Entry of foreign material will cause fire, failure of malfunctions.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠ DANGER

- Do not touch the terminals while they are live. This will cause malfunctions.
- Switch the power off before cleaning the module or retightening the terminal screws. If the power is left on, the module will break down or malfunction.

⚠ CAUTION

- Do not disassemble or tamper with the module. This will cause failure, malfunctions, injuries or fire.
- Switch the power off before installing or removing the module. If the power is left on, the module will break down or malfunction.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- Dispose of the module as industrial waste.

About This Manual

The following manuals are also related to this product.
In necessary, order them by quoting the details in the tables below.

Detailed Manual

Manual Name	Manual No. (Type code)
High speed counter module type A1SD61 User's Manual	IB-66337 (13J674)

1. GENERAL DESCRIPTION

This manual describes specifications, handling and wiring of an A1SD61 high speed counter module (hereinafter referred to as the A1SD61).

2. PERFORMANCE SPECIFICATIONS

Item		Specifications		
Counting speed selection pin		50K side	10K side	
Number of occupied I/O points		32		
Number of channels		1		
Count input signal	Phase	1-phase and 2-phase inputs		
	Signal levels (ϕA and ϕB)	5 VDC / 12 VDC / 24 VDC 2 to 5 mA		
Counter	Maximum counting speed *1	1-phase input	50k pps	10k pps
		2-phase input	50k pps	7k pps
	Counting range	32-bit binary -2147483648 to 2147483647		
	Type	Equipped with UP/DOWN preset counter and ring counter functions		
	Minimum count pulse width (Set input rise and fall times to 5 μs or less. Duty ratio: 50%)	Unit: μs; 20, 10, 10 (1-phase and 2-phase input)	Unit: μs; 100, 50, 50 (1-phase input)	Unit: μs; 142, 71, 71 (2-phase input)
Limit switch output	Comparison range	32-bit binary		
	Comparison result	A contact operation: Dog ON address ≦ Count value ≦ Dog OFF address B contact operation: Dog OFF address ≦ Count value ≦ Dog ON address		
External input	Preset	12/24 VDC 3/6 mA		
	Function start	5 VDC 5 mA		
External output	Coincidence output	Transistor (open collector) output 12/24 VDC 0.1 A/point 0.8 A/common		

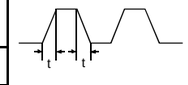
Isolation specifications

Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance
Between pulse input terminal and PLC power supply	Photocoupler isolation	500V AC/1 minute.	5MΩ or more by 500V DC insulation resistance tester.
Between preset input terminal and PLC power supply			
Between function start input terminal and PLC power supply			
Between coincidence output terminal and PLC power supply			

Applicable wire size	0.75 to 1.5 mm^2
Applicable solderless terminals	R1.25-3, 1.25-YSA, RAV1.25-3, V1.25-YS3A
Internal current consumption (5 VDC)	0.35 A
Weight kg (lb)	0.27 (0.59)

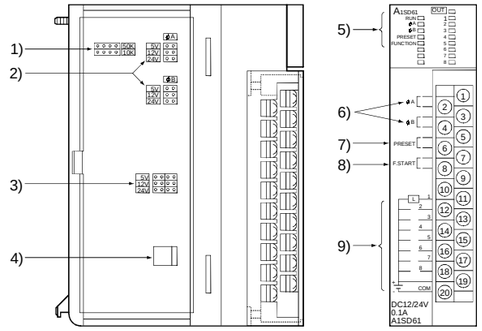
*1: The counting speed is influenced by the pulse leading edge/fall time.
The following counting speeds are possible. If a pulse is counted with a leading edge/fall time that is too long, a counter error may be caused.

Counting Speed Setting Pin	50k		10k	
Leading Edge/Fall Time	1-phase input	2-phase input	1-phase input	2-phase input
t=5 μs or less	50k pps	50k pps	10k pps	7k pps
t=50 μs or less	5k pps	5k pps	1k pps	700 pps
t=500 μs	—	—	500 pps	250 pps



For the general specifications, refer to the User's Manual for the PC CPU used.

3. NOMENCLATURE



NO.	Name	Description
(1)	Counting speed selection pin (50K / 10K)	Counts pulses at a maximum speed of 50k pps in 1-phase or 2-phase input. Counts pulses at 10k pps in 1-phase input, at 7k pps in 2-phase input. (The factory-setting is 50k.) (Set with the jumper)
(2)	Input pulse voltage selection pin (ϕA / ϕB; 5V / 12V / 24V)	Select a pulse voltage that is input to Phase A or B. (The factory-setting is 24 V.) The module operation cannot be guaranteed when the pulse voltage higher than the set value is applied. (Set with the jumper)
(3)	External input voltage selection pin (5V / 12V / 24V)	Select a voltage input to the PRESET/F.START terminals. (The factory-setting is 24 V.) The module operation cannot be guaranteed when the voltage higher than the set value is applied. (Set with the jumper).
(4)	Fuse	Used for protecting outputs 1 to 8 from overcurrent. (Circuit board soldering type)
(5)	LED indicators — RUN	Lit when the module operates normally. Flashes when a data write error has occurred. OFF when a watchdog timer error has occurred.
	LED indicators — ϕA	Lit when voltage is applied to phase A pulse input terminal.
	LED indicators — ϕB	Lit when voltage is applied to phase B pulse input terminal.
	LED indicators — PRESET	Lit and latched when voltage is applied to the PRESET terminal. OFF when external preset detection reset signal (Y16) is turned ON.
	LED indicators — FUNCTION	ON when voltage is applied to the F.START terminal.
	LED indicators — OUTs 1 to 8	ON when a corresponding limit switch is turned ON by he limit switch output function. OFF when the limit switch is turned OFF.
(6)	ϕA/ϕB	Pulse input terminals (ϕB is used as decrement count command.)
(7)	PRESET	The terminal in which voltage is applied when a preset is executed from an external device.
(8)	F. START	The terminal in which voltage is applied when a counter function selection is executed.
(9)	OUTs 1 to 8	An external output terminal used for limit switch output.

4. LOADING AND INSTALLATION

4.1 Cautions on Handling

(1) The case of the A1SD61 is made of resin: do not drop it or subject it to strong impact.
(2) Do not remove the printed circuit board from the case. This could cause failure.
(3) Make sure that no wire offcuts or other debris enters the top of the module during wiring. If anything does enter the module, remove it.
(4) Tighten the module mounting and terminal screws as specified below:

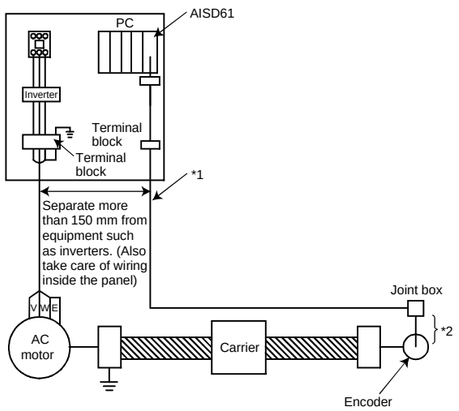
Screw	Tightening Torque Range N·cm [kg·cm] (lb·inches)
Module mounting screw (M4 screw)	78 to 118 [8 to 12] (6.93 to 10.4)
Terminal block terminal screw (M3.5 screw)	59 to 88 [6 to 9] (5.19 to 7.8)
Terminal block mounting screw (M4 screw)	78 to 118 [8 to 12]

5. WIRING

The method for wiring a pulse generator to the A1SD61 is described here.

5.1 Wiring precautions

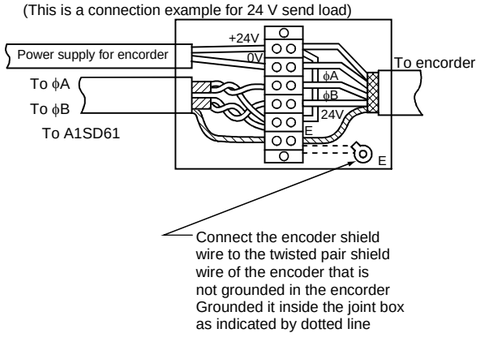
Wire a pulse generator to the A1SD61 while paying attention to the followings;
(1) For a high-speed pulse input, take the following counter measures against noise;
(a) Be sure to use shielded twisted pair cables. Also, make sure they are grounded to the earth.
(b) Do not run a twisted pair cable in parallel with power cables or other I/O lines which may generate noise.
Run cables at least 150 mm (5.91in.) away from the above-mentioned lines and over the shortest distance possible.
(2) For 1-phase input, connect count input signal to phase A only.
(3) If the A1SD61 picks up pulse noise, it will count incorrectly.
(4) The specific measures against noise are shown below;



*1: Metal piping Never run solenoid or inductive wiring through the same conduit.
If sufficient distance cannot be provided between the high current line and input siring, use shielded wire for the high current line.
*2: Distance between the encoder and the joint box should be as short as possible. If the distance from the A1SD61 to the encoder is too long, an excessive voltage drop occurs. Therefore, measure the voltage during operation and make sure that the voltage are within the rated voltage of the encoder. If the voltage drop is large, increase the size of wiring or use an encoder of 24 VDC with les current consumption.

• Ground twisted shielded wire on the encoder side (joint box)

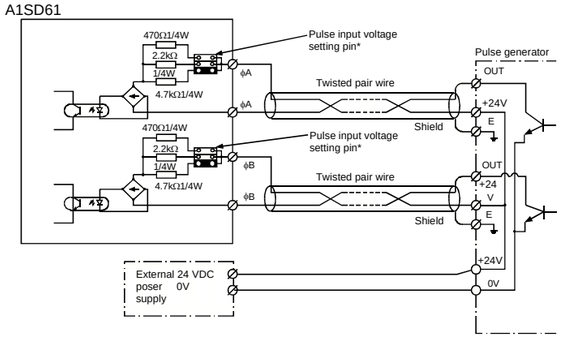
(This is a connection example for 24 V send load)



5.2 Wiring example for the connection with the open collector output pulse generator

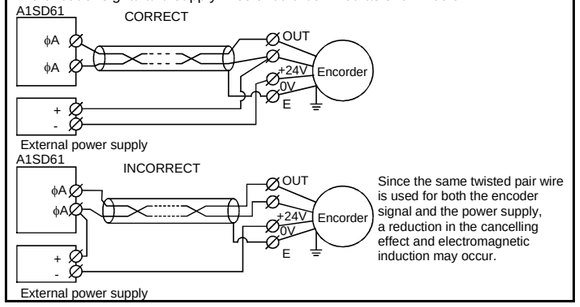
(1) Connection of a 24 VDC pulse generator

A1SD61



POINT

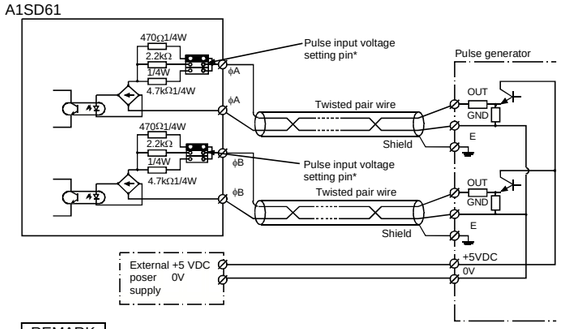
The encoder signal and supply lines should be wired as shown below:



REMARK

* : Set the pulse input voltage setting pin to the ▮▯ position.
(2) Connection of a voltage output pulse generator (5 VDC)

A1SD61



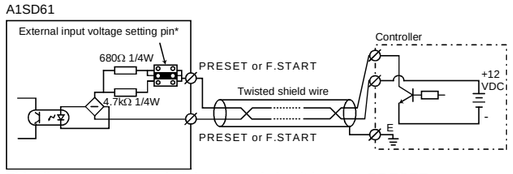
REMARK

* : Set the pluse input voltage setting pin to the ▮▯ position.

5.3 Wiring Example for the Connection of a Controller to External Input Terminals (PRESET and F.START)

(1) When a controller (sink load type) is supplied with 12 V:

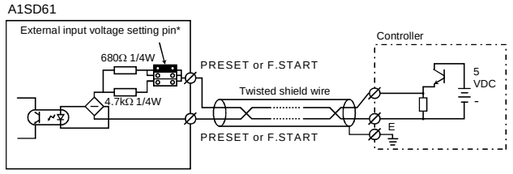
A1SD61



This diagram assumes that the internal circuit is set to PRESET.

(2) When a controller (source load type) is supplied with 5 V:

A1SD61



This diagram assumes that the internal circuit is set to PRESET.

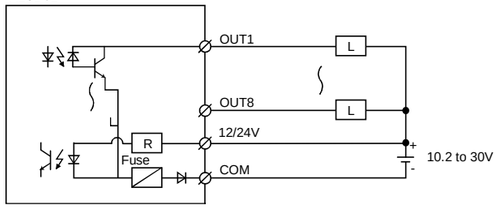
REMARK

* : Set the external input voltage setting pin to the ▮▯ position.

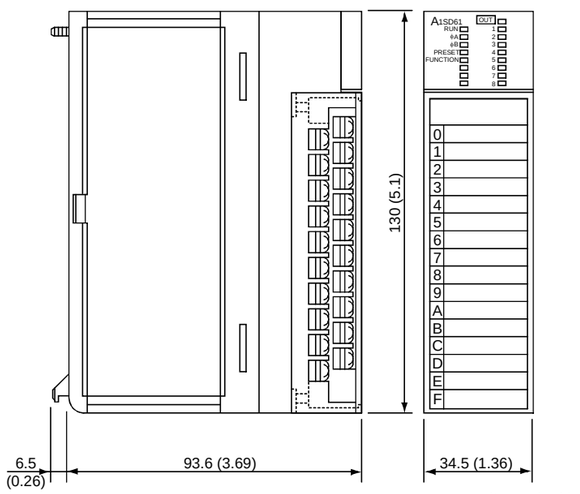
5.4 Wiring examples at external output terminals (OUT1 to OUT8)

To use an OUT terminal, the internal photocoupler should be activated.
For this example, 10.2 to 30 VDC external power is necessary. Connection methods are as follows:

A1SD61



6. OUTSIDE DIMENSIONS



Unit: mm (Inch)

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061 Tel : +1-847-478-2100
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Av. Rio Branco, 123-15 ,and S/1507, Rio de Janeiro, RJ CEP 20040-005, Brazil Tel : +55-21-221-8343
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Herts., AL10 8XB,UK Tel : +44-1707-276100
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo - Ingr.2 Via Paracelso 12, 20041 Agrate B., Milano, Italy Tel:+39-039-60531
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80 08190 - Sant Cugat del Valles, Barcelona, Spain Tel:+34-935-653135
South Africa	Circuit Breaker Industries LTD. Private Bag 2016, Isando 1600, Johannesburg, South Africa Tel : +27-11-928-2000
Hong Kong	Ryoden Automation Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, HongKong Tel : +852-2887-8870
China	Ryoden International Shanghai Ltd. 3F Block5 Building Automation Instrumentation Plaza 103 Cao Bao Rd. Shanghai 200233 China Tel : +86-21-6475-3228
Taiwan	Setsuyo Enterprise Co., Ltd. 6F., No.105 Wu-Kung 3rd.RD, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
Korea	HAN NEUNG TECHNO CO.,LTD. 1F Dong Seo Game Channel Bldg., 660-11, Deungchon-dong Kangsec-ku, Seoul, Korea Tel : +82-2-3660-9552
Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 ALEXANDRA ROAD #05-01/02, MITSUBISHI ELECTRIC BUILDING SINGAPORE 159943 Tel : +65-473-2480
Thailand	F. A. Tech Co.,Ltd. 898/28,29,30 S.V.City Building,Office Tower 2,Floor 17-18 Rama 3 Road, Bangkpongpang, Yannawa, Bangkok 10120 Tel : +66-2-682-6522
Indonesia	P.T. Autoteknindo SUMBER MAKMUR Jl. Muara Karang Selatan Block A Utara No.1 Kav. No.11 Kawasan Industri/ Pergudangan Jakarta - Utara 14440 Tel : +62-21-663-0833
India	Messung Systems Put,Ltd. Electronic Sadan NO:111 Unit No15, M.I.D.C BHOSARI PUNE-411026 Tel : +91-20-7128927
Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, PostalBag, No 2, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : 1-8-12, OFFICE TOWER Z 14F HARUMI CHUO-KU 104-6212, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI5, HIGASHI-KU, NAGOYA, JAPAN