

# MITSUBISHI

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# A1SD75P1-S3/P2-S3/P3-S3

# Positioning Module

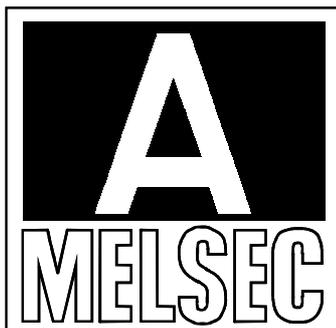
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## User's Manual

(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	A1SD75S3-U-E(H/W)
MODEL CODE	13J882
IB(NA)-66732-E(0412)MEE	

# ● SAFETY PRECAUTIONS ●

(Always read before starting use)

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 the installation of Mitsubishi equipment and the wiring with the external device. Refer to the user's manual of the CPU module to be used for a description of the PLC system safety precautions.

These ● SAFETY PRECAUTIONS ● classify 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 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 read it whenever necessary. Always forward it to the end user.

## [DESIGN PRECAUTIONS]

### DANGER

- Configure a safety circuit so that the safety of the overall system is maintained even when an external power error or PLC error occurs.  
An accident may occur by a false output or a malfunction.
  - 1) Outside of the PLC, construct mechanical damage preventing interlock circuits such as emergency stop, positioning upper and lower limit switches.
  - 2) During machine zero point return operation, the module is controlled by two data: zero point return direction and zero point return speed, and speed begins to decelerate when the near point dog turns on. If the zero point return direction is set incorrectly, the module may continue to operate without decelerating. To prevent damage to the module in such cases, configure an interlock circuit outside the PLC.

### CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.  
They should be installed 100 mm (3.9 inch) or more from each other.  
Not doing so could result in noise that would cause malfunction.

## [INSTALLATION PRECAUTIONS]

### CAUTION

- Use the PLC in an environment that meets the general specifications contained in this manual.  
Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, malfunction, and damage to or deterioration of the product.
- Insert the tabs at the bottom of the module into the mounting holes in the base module, and tighten the screws using the specified torque.  
If the module is not properly installed, it may result in malfunctions, failure, or fallout.
- Verify that the peripheral device connection connector and the external device connection connector is securely attached to the module connector. Confirm that it connects with an audible click.  
If not attached properly, a contact error may occur, resulting in incorrect input or output.
- Always attach a cover to connectors that are not used. If not covered, malfunctions may occur.
- Do not directly touch the module's conductive parts or electronic components.  
Doing so could cause malfunction or failure in the module.

## [WIRING PRECAUTIONS]

### CAUTION

- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.  
Such debris could cause fires, failure, or malfunction.
- Perform soldering of the external device connection connector after verifying the pin layout.
- External device connections shall be correctly soldered.  
Imperfect connection could result in short circuit or erroneous operation.

## [STARTUP AND MAINTENANCE PRECAUTIONS]

### CAUTION

- Switch off all phases of the externally supplied power used in the system before cleaning.  
If you do not switch off the external power supply, it will cause malfunctions of the module.
- Do not disassemble or modify the modules. Doing so could cause failure, malfunction, injury, or fire.
- Switch off all phases of the externally supplied power used in the system before mounting or removing the module. If you do not switch off the external power supply, it will cause failure or malfunction of the module.
- Remove the external device connection connector after the system has been stopped.  
The system will stop if it is removed while the system is running.
- When performing test operation, set the parameter for the speed limit value to a slow setting and prepare for an immediate stop of the module should a dangerous condition occur during operation verification.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.  
Failure to do so can cause the module to fail or malfunction.

## [STARTUP AND MAINTENANCE PRECAUTIONS]

### CAUTION

- Exercise caution when the reference-axis speed for interpolation operation has been specified, since the speed of the opposite axis (second axis) can get greater than the set speed (speed limit value).

## [DISPOSAL PRECAUTIONS]

### CAUTION

- When disposing of this product, treat it as industrial waste.

## About the Manuals

The following product are available for this equipment.  
Refer to the table given below to choose suitable manuals.

### Detailed Manual

Manual name	Manual No. (Model code)
Positioning module type A1SD75P1-S3/P2-S3/P3-S3, AD75P1-S3/P2-S3/P3-S3 User's Manual	IB-66716 (13J871)

### Detailed Manual

Manual name	Manual No. (Model code)
Positioning module software package type SW1IVD-AD75P Operating Manual	IB-66714 (13J915)
GX Configurator-AP Version 1 Operating Manual SW0D5C-AD75P-E	IB-66900 (13J948)

### Correspondence to the EMC Directive and Low Voltage Instruction

To make the PLCs compliant with the EMC directive, refer to Chapter 3 "EMC AND LOW-VOLTAGE DIRECTIVE" in the PLC user's manual (Hardware).

\* When the PLC CPU user's manual (Hardware) does not include Chapter 3" EMC AND LOW-VOLTAGE DIRECTIVE", refer to QnA Series CPU Compatible High-Speed Accessing Basic Base Unit-Additional Explanation for Product Conforming to EMC Standards (IB-68837) (optional).

## 1. Overview

This manual describes how to install A1SD75P1-S3/P2-S3/P3-S3 Positioning Module (hereafter abbreviated as A1SD75) and how to wire them with external devices. After unpacking A1SD75, please confirm that the following products are contained.

Product name		Quantity		
A1SD75P1-S3 Positioning Module		1		
A1SD75P2-S3 Positioning Module			1	
A1SD75P3-S3 Positioning Module				1
Connector for external wiring (Model)	Connector (10136-3000VE)	1	2	3
	Connector cover (10336-56F0-008)	1	2	3

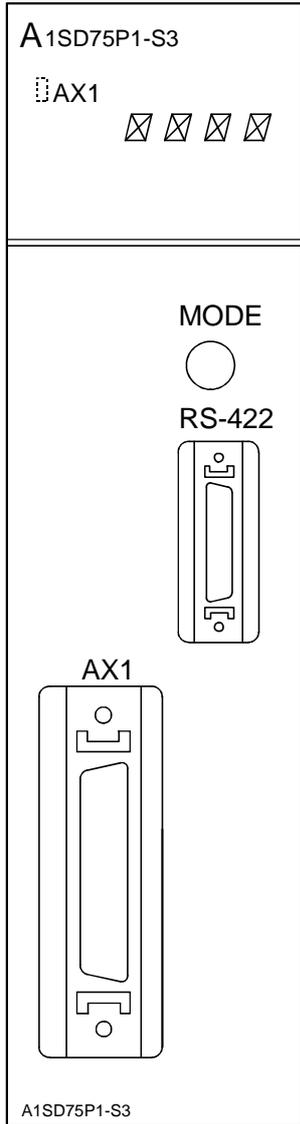
## 2. Performance Specifications

The performance specifications for the A1SD75 are shown below.

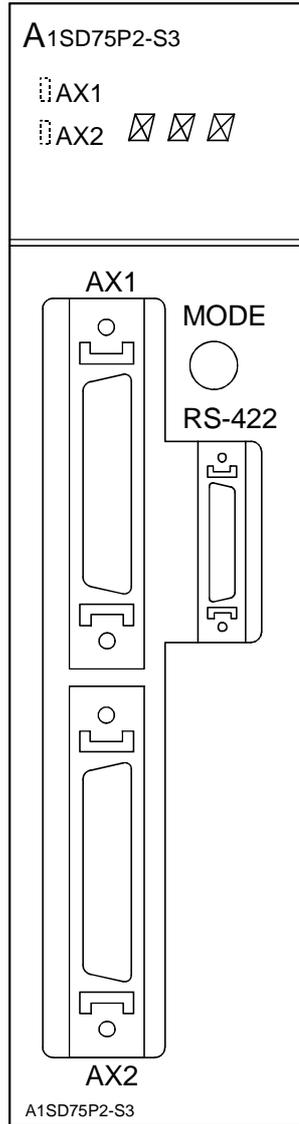
Item	Specifications
Maximum output pulse	When connected to a differential driver : 400 kpps When connected to an open collector : 200 kpps
Maximum connection distance between servos	When connected to a differential driver :10 m When connected to an open collector :2 m
Number of occupied I/O points	32 points
Internal current consumption	5VDC, 0.7A or less (However, when the A1SD75P3-S3 is connected with the differential driver method, the internal current consumption value is 0.78A)
External dimensions	130(H) × 34.5(W) × 93.6(D)mm
Weight	0.35kg

### 3. Name of Each Part

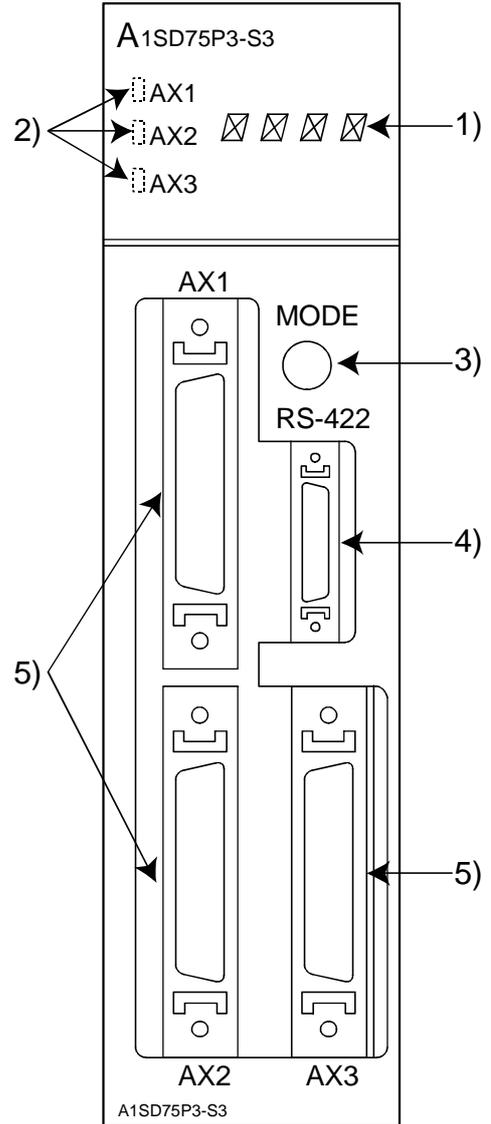
The following shows the name of each part.



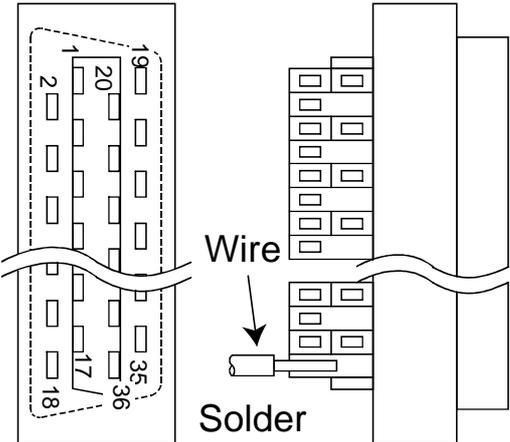
A1SD75P1-S3 front view



A1SD75P2-S3 front view



A1SD75P3-S3 front view

No.	Name	Description
1)	17-segment LED	<ul style="list-style-type: none"> <li>• The operation state (1)) of the axis (2)) is indicated.            RUN : The LED of the axis in operation is flashing            TEST : All LEDs are turned on            IDL : Turned off            ERR : The LED of the axis where an error occurred is flashing</li> </ul>
2)	Axis display LEDs AX1 to 3	
3)	Mode switch	<ul style="list-style-type: none"> <li>• A selector switch that changes the mode.</li> <li>• The mode is changed each time the switch is pressed.</li> </ul>
4)	Peripheral device connection connector	<ul style="list-style-type: none"> <li>• Connector for connection to peripheral device.</li> </ul>
5)	External device connection connector	<ul style="list-style-type: none"> <li>• Connects to the drive unit, machine input, or manual pulser.</li> </ul> <p>The applicable wire size for the connector is AWG #24 to #30 (0.05 to 0.2SQ).</p> <p>The pin layout for the included external device connector is as follows. Perform wiring according to the I/O interface.</p> <div style="text-align: center;">  </div> <p>The pin layout viewed from the top is shown. The connector pins are referred to as 1 to 36.</p>

## 4. Loading and Installation

The following is explanations of the handling precautions and installation environment which is common to modules when handling A1SD75 from unpacking to installation. For the details of loading and installation of the module, refer to User's Manual of PLC CPU module to be used.

### 4.1 Handling precautions

The following is an explanation of handling precautions of the module.

- (1) Because the case of the module is made of resin, be careful not to drop it or expose it to strong impact.
- (2) Do not remove the printed circuit board of the module from the case. This may cause malfunctions.
- (3) Be careful not to let foreign matters such as filings or wire chips get inside the module during wiring. When such matters do enter, be sure to remove them.
- (4) Execute tightening of the module's installation screws within the range indicated below.

Screw position	Tightening torque range
Module fixing screw (M4 screw)	78 to 118 N•cm

### 4.2 Installation environment

Do not install the A series PLC in the following environments.

- (1) Where the ambient temperature exceeds the 0 to 55°C range.
- (2) Where the ambient humidity exceeds the 10 to 90 % RH range.
- (3) Where condensation is produced by sudden temperature changes.
- (4) Where corrosive or combustible gas is present.
- (5) Where dust, iron powder and other conductive powder, oil mist, salt, or organic solvents are prevalent.
- (6) In direct sunlight.
- (7) Where a strong electric or magnetic field is generated.
- (8) Where vibration and shock may be transmitted directly to the module.

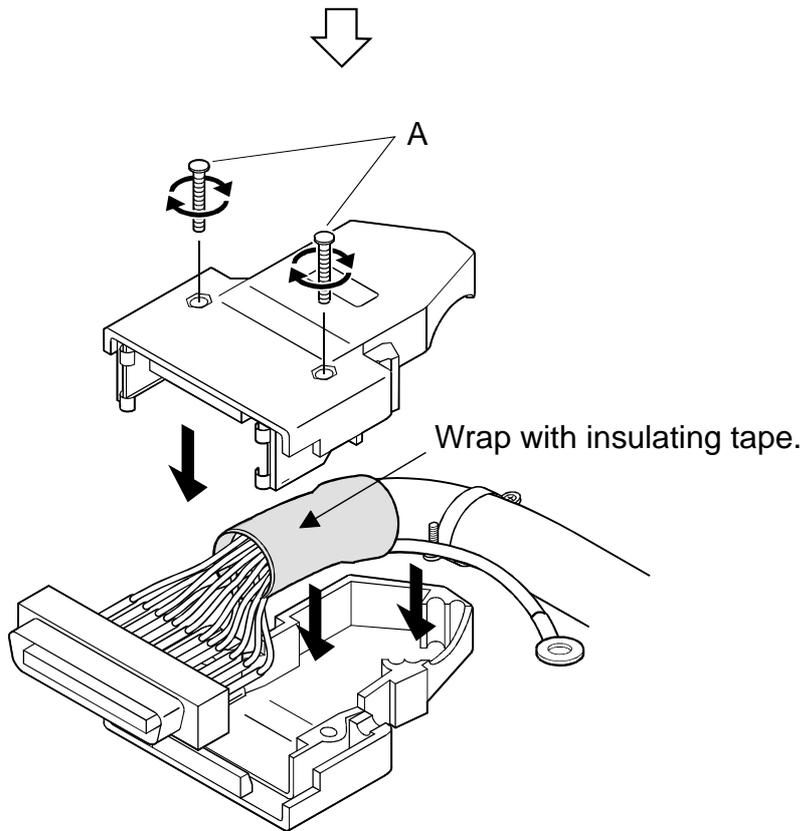
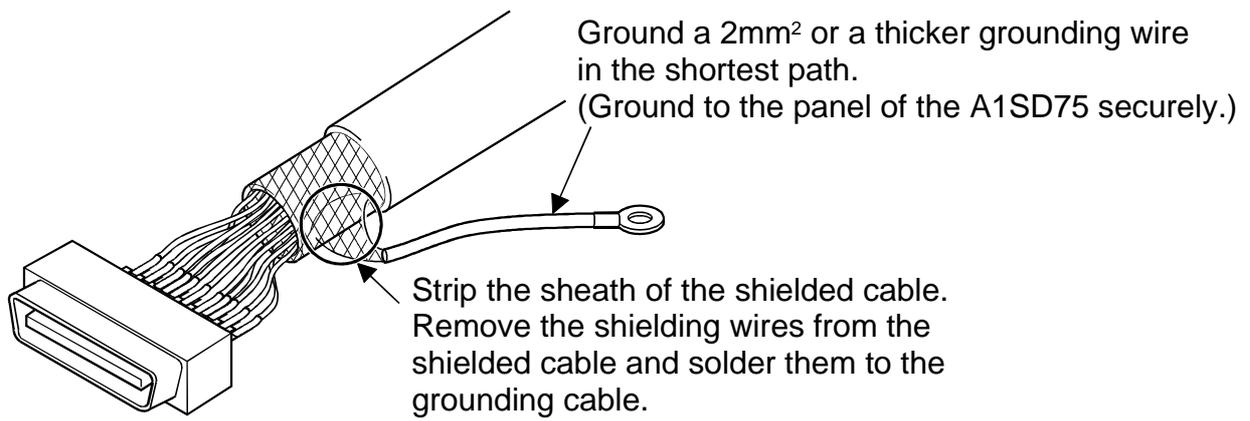
## 5. Wiring

Precautionary notes when wiring as well as the I/O interface are described below.

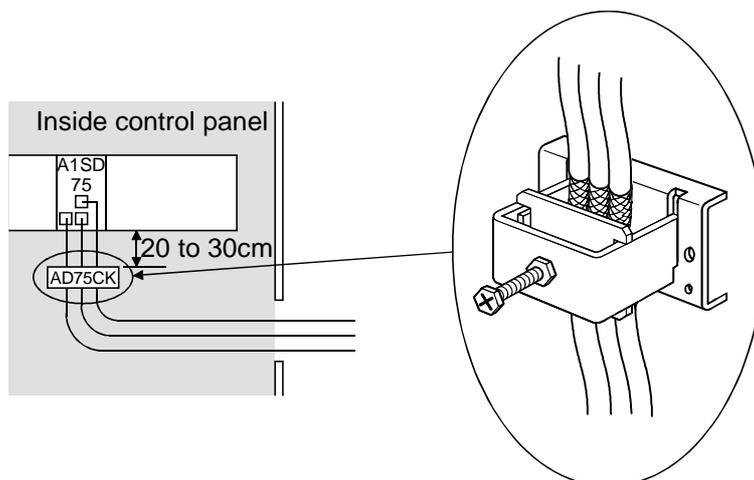
### 5.1 Precautions for wiring

- (1) Perform wiring of the A1SD75 correctly while checking the terminal arrangement.
- (2) Solder or crimp the external device connection connector correctly.  
An improperly soldered or crimped connector may cause malfunctions.
- (3) Be careful to avoid entry of chips, wiring dust and so on inside the A1SD75.  
Otherwise fire, failure or malfunction may be caused.
- (4) Be sure to install a cover for the external device connection connector if no external device is connected. Otherwise malfunction may be caused.
- (5) Connect the external device connection connector and peripheral device connection connector with the connector of the A1SD75. Check that the connector snaps. An improperly connected connector will cause poor continuity, possibly causing erroneous inputs or outputs.
- (6) Do not pull the cable when removing the cable from the A1SD75 or servo amplifier. Hold and pull the connector connected to the A1SD75 or servo amplifier. If the cable connected to the A1SD75 or servo amplifier is pulled, a malfunction may be caused. As well, the A1SD75, servo amplifier or cable may be broken.
- (7) Disconnect the external device connection connector when the system is stopped.  
If the external device connection connector is disconnected during operation of the system, the system will be stopped.
- (8) Route the cables connected to the A1SD75, in a duct, or fix them. If cables are not routed in the duct or no fixing measures are taken to them, drifting or moving cables, breakage of the A1SD75, servo amplifier or cable due to a carelessly pulled cable, or malfunction caused by a poorly connected cable may be caused.
- (9) Do not tie the A1SD75 cable with the main circuit cable, power cable, or a load cable for other than the programmable logic controller or do not route the A1SD75 cable near them. Separate these by 100 mm as a measure. Otherwise noise, surge or induction may cause a malfunction.
- (10) When routing the A1SD75 cable near a power cable at a distance smaller than 100 mm, use a shielded cable for a countermeasure against noise. Connect the shielding wire of the shielded cable securely to the panel of the A1SD75.

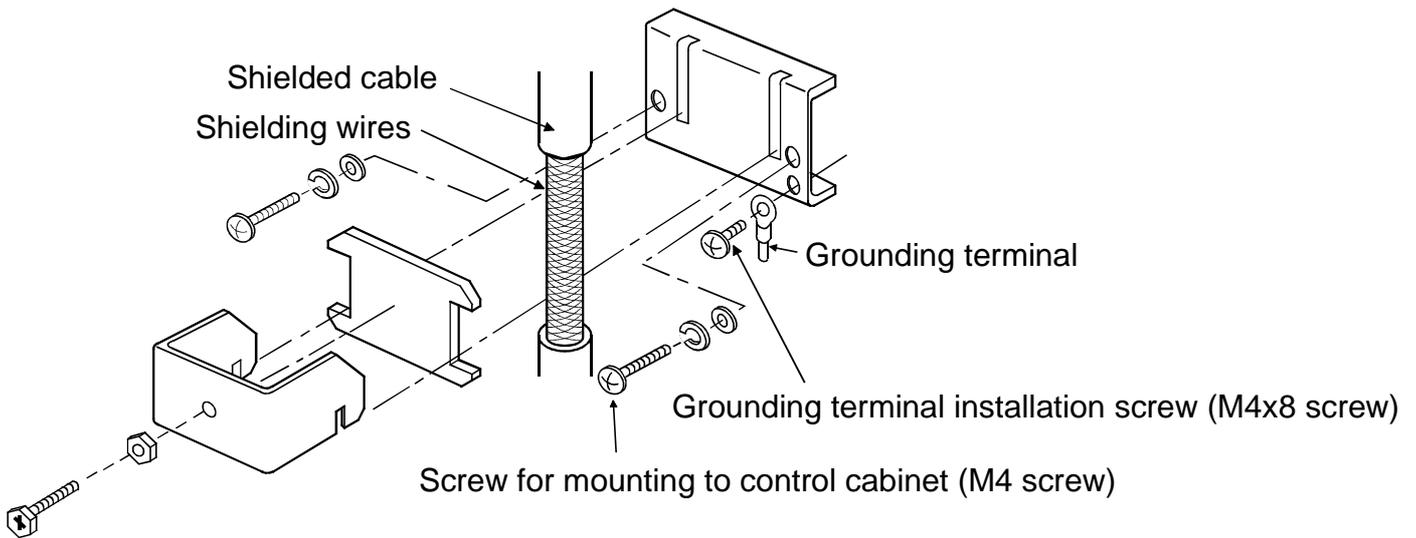
[Shielding wire processing example]



(11) To comply with EMC and low-voltage directives, use shielded cables and AD75CK cable clamp (made by Mitsubishi Electric) to ground to the panel.



## [How to ground shielded cable using AD75CK]



- (12) The influence of noise may be reduced by mounting ferrite cores to the cable connected to the A1SD75 as a noise reduction technique.  
For the noise reduction techniques related to connection with the servo amplifier, also refer to the Instruction Manual of the servo amplifier.
- (13) If compliance with the EMC Directive is not required, the influence of external noise may be reduced by making the configuration compliant with the EMC Directive.  
For the configuration compliant with the EMC Directive, refer to Chapter 3 "EMC Directive, Low Voltage Directive" in the User's Manual (Hardware) of the used CPU module.
- (14) An effect may be produced on external noise by mounting ferrite cores or noise filter (power supply line filter) to the power supply line of the PLC as a noise reduction technique.  
(Example) • Ferrite core  
Type: ZCAT 3035-1330 (TDK ferrite core)  
• Noise filter  
Type: MXB-1210-33 (DENSEI-LAMBDA noise filter)

## 5.2 I/O Interface

○ : Wiring required    △ : Wiring performed as required

I/O classification	External wiring	Pin number	Internal circuit	Signal name	Wiring requirement	
Input	<p>When the upper limit switch is not used</p> <p>When the lower limit switch is not used</p> <p>24VDC*</p> <p>5V</p> <p>A</p> <p>5VDC</p> <p>B</p> <p>OV</p> <p>Manual pulser (MR-HDP01)</p>	11		Near-point dog signal DOG	△	
		12		Upper limit signal FLS	○	
		13		Lower limit signal RLS	○	
		14		Stop signal STOP	△	
		15		Speed/position switch signal CHG	△	
		16		External start signal STRT	△	
		35		Common COM	○	
		36				
		(+) 9		Manual pulser phase A	PULSER A+	△
		(-) 27			PULSER A-	
(+) 10	Manual pulser phase B	PULSER B+				
(-) 28		PULSER B-				

\*: The terminal connected to the common line may be either positive or negative.

I/O classification	External wiring	Pin number	Internal circuit	Signal name		Wiring requirement		
Input	<p>When MR-J2-□A is used</p>	7		Drive unit ready	READY	○		
		8		In-position signal	INPS	△		
		26		Common	COM	○		
		6		Zero-point signal	PGO	△		
		24			PGO COM			
		25		Common	PGO COM			
Output	<p>When MR-J2-□A is used</p>	5		Deviation counter clear	CLEAR	△		
		23		Common	CLEAR COM			
		1		Open collector	CW Phase A PULSE	PULSE F	○*	
		19			COM	PULSE COM		
		2			CCW Phase B SIGN	PULSE R		PULSE COM
		20				COM		
		3(+)		Differential driver	CW Phase A PULSE	PULSE F+	○*	
		21(-)				PULSE F-		
		4(+)			CCW Phase B SIGN	PULSE R+		PULSE R-
		22(-)				PULSE R-		

\* Select open collector output or differential driver output, according to the drive unit used.

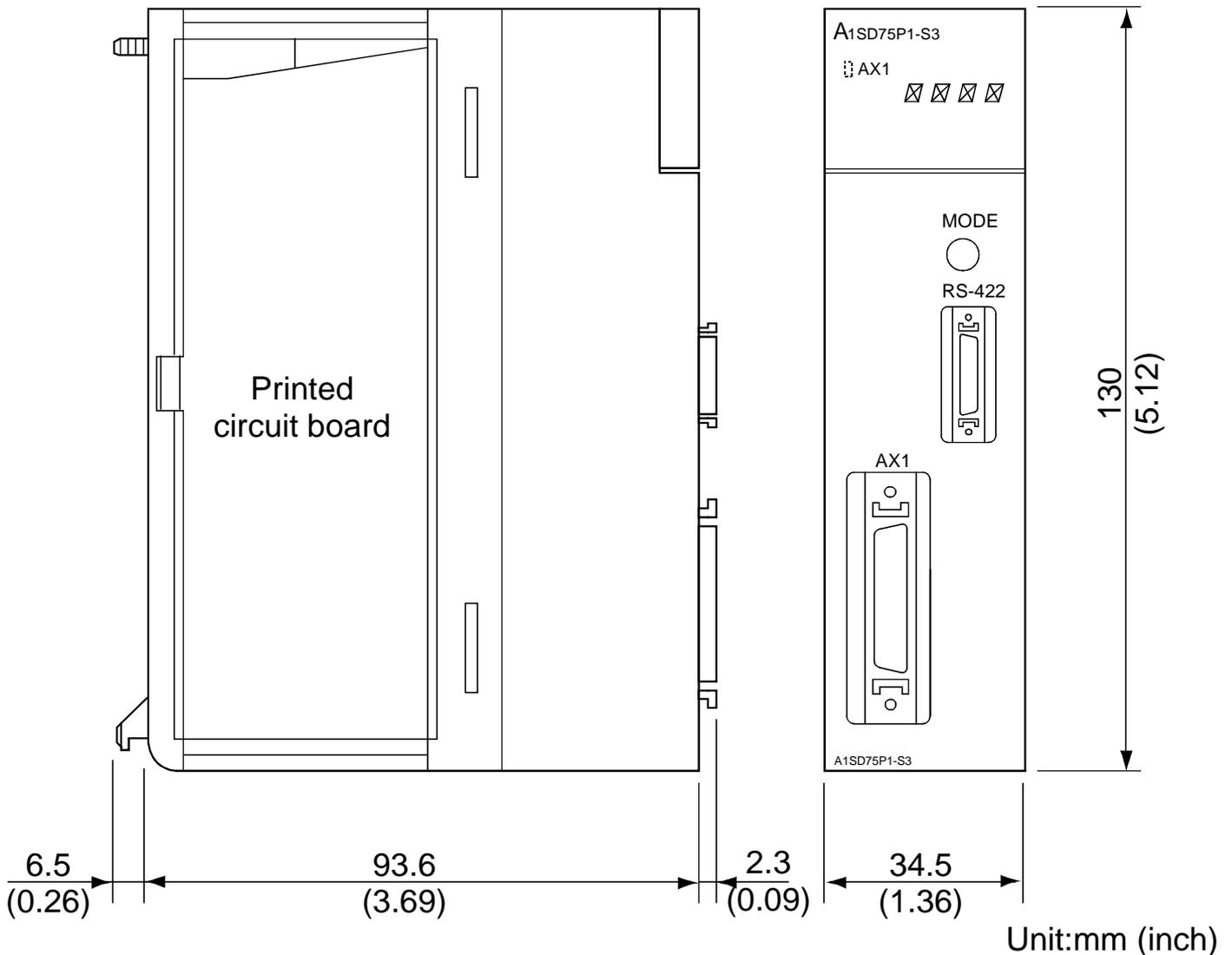
**Remark**

The following shows the relationship between "pulse output mode" selected via the parameter and the pulse output according to "pulse output logic selection".

Mode selection	Positive logic		Negative logic	
	Forward rotation	Reverse rotation	Forward rotation	Reverse rotation
CW CCW				
PULSE SIGN				
Aφ Bφ				

## 6. External Dimensions

A1SD75P1-S3 is shown.



\* External dimensions are the same for A1SD75P1-S3, P2-S3 and P3-S3.

## 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	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	Hong Kong	Ryoden Automation Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, HongKong Tel : +852-2887-8870
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias, 184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil Tel : +55-11-5908-8331	China	Ryoden Automation Shanghai Ltd. 3F Block5 Building Automation Instrumentation Plaza 103 Cao Bao Rd. Shanghai 200233 China Tel : +86-21-6120-0808
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0	Taiwan	Setsuyo Enterprise Co., Ltd. 6F., No.105 Wu-Kung 3rd.RD, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Herts., AL10 8XB,UK Tel : +44-1707-276100	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
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, 20041 Agrate B., Milano, Italy Tel : +39-039-6053344	Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 Alexandra Road #05-01/02, Mitsubishi Electric Building Singapore 159943 Tel : +65-6473-2308
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80 08190 Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131	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
France	Mitsubishi Electric Europe B.V. French Branch 25 Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568	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
South Africa	Circuit Breaker Industries LTD. Tripswitch Drive, Elandsfontein Gauteng, South Africa Tel : +27-11-928-2000	India	Messung Systems Put,Ltd. Electronic Sadan NO:111 Unit No15, M.I.D.C BHOSARI,PUNE-411026, India Tel : +91-20-712-2807
		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-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

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