

# MITSUBISHI

## AD75P1-S3/P2-S3/P3-S3

### Positioning Module

## 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	AD75P-U-E(H/W)
MODEL CODE	13J883
IB(NA)-66733-C(0007)MEE	

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### ● 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 take it out and 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 zero return operation, the module is controlled by two data zero return direction and zero return speed, and speed begins to decelerate when the near point dog turns on. If the zero 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 RS-422 connector for the drive unit 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 connector after verifying the pin layout.
- External connections shall be correctly soldered. Imperfect connection could result in short circuit or erroneous operation.

### [STARTUP AND MAINTENANCE PRECAUTIONS]

#### ⚠CAUTION

- Make sure to switch all phases of the external power supply off 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.
- Make sure to switch all phases of the external power supply off 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 drive unit 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.

### [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 products 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 AD75P1-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)
Positioning module software package type SW0D5C-AD75P-E Operating Manual	IB-66900 (13J948)

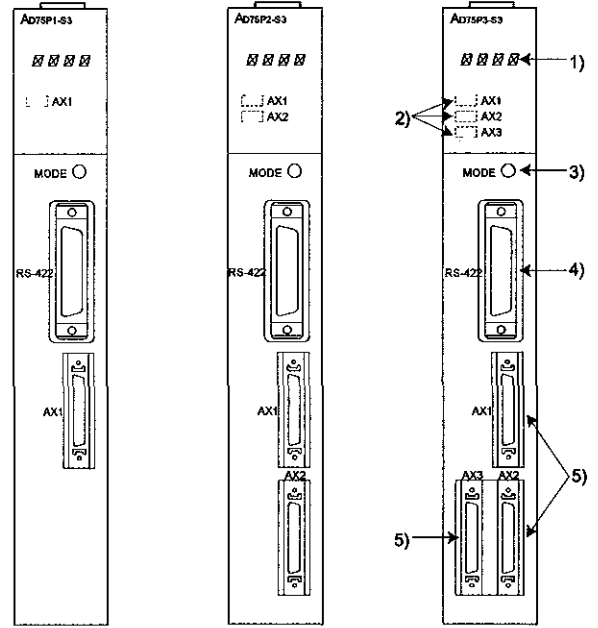
#### Correspondence to EMC DIRECTIVE

To make the PLCs compliant with the EMC directive, refer to Chapter 2 "EMC AND LOW-VOLTAGE DIRECTIVE" in the PLC user's manual (Hardware)

\* When the PLC CPU user's manual (Hardware) does not include Chapter 2 "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)

### 3. Name of Each Part

The following shows the name of each part



AD75P1-S3 front view    AD75P2-S3 front view    AD75P3-S3 front view

### 1. Overview

This manual describes how to install AD75P1-S3/P2-S3/P3-S3 Positioning Module (hereafter abbreviated as AD75) and how to wire them with external devices. After unpacking AD75, please confirm that the following products are contained

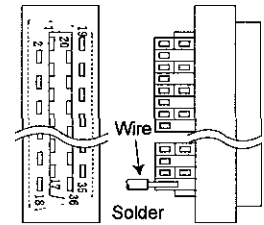
Product name	Quantity		
AD75P1-S3 Positioning Module	1		
AD75P2-S3 Positioning Module		1	
AD75P3-S3 Positioning Module			1
Connector for external wiring (Model)	Connector (10136-3000VE)	1	2
	Connector cover (10336-56F0-008)	1	2

### 2 Performance Specifications

The performance specifications for the AD75 are shown below.

Item	Specifications
Maximum output pulse	When connected to a differential driver 400 kbps When connected to an open collector 200 kbps
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 AD75P3-S3 is connected with the differential driver method, the internal current consumption value is 0.78A)
External dimensions (mm)	250(H) × 37.5(W) × 106(D)
Weight (kg)	0.45

No.	Name	Description
1)	17-segment LED	<ul style="list-style-type: none"> <li>Indicates the operation status</li> <li>When the mode switch is pressed, it displays a message for the selected mode.</li> </ul>
2)	Axis display LEDs AX1 to 3	<ul style="list-style-type: none"> <li>Indicate the status of respective axes based on the message displayed on the 17-segment LED.</li> </ul>
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)	RS-422 connector	<ul style="list-style-type: none"> <li>Connector for connection to peripheral device.</li> </ul>
5)	External wiring connector	<ul style="list-style-type: none"> <li>Connects to the drive unit, machine input, or manual pulser</li> <li>The applicable wire size for the connector is AWG #24 to #30 (0.05 to 0.25SQ)</li> <li>The pin layout for the included external wiring connector is as follows. Perform wiring according to the I/O interface</li> </ul>



The pin layout viewed from the top is shown  
The connector pins are referred to as 1 to 36.

## 4. Loading and Installation

The following is explanations of the handling precautions and installation environment which is common to modules when handling AD75 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 Ncm

### 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

## 5.2 I/O Interface

○ . Wiring required Δ . Wiring performed as required

I/O classification	External wiring	Pin number	Internal circuit	Signal name	Wiring requirement			
Input		11		Near point dog signal	DOG	Δ		
		12		High limit LS signal	FLS	○		
		13		Low limit LS signal	RLS	○		
		14		Stop signal	STOP	Δ		
		15		Speed/position switch signal	CHG	Δ		
		16		External start signal	STRT	Δ		
		35		24VDC	36	Common	COM	○
		( ) 9					Manual pulser phase A	PULSER A+
		( ) 27		Manual pulser phase A	PULSER A			
		( ) 10		Manual pulser phase B	PULSER B+			
		( ) 28			PULSER B-			

## 5. Wiring

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

### 5.1 Precautionary notes when wiring

This section describes the precautionary notes for the wiring process between the AD75 and outside (drive unit)

- (1) Length of connection cable between the AD75 and drive unit
  - (a) When an open collector is used, the maximum cable length is 2 m (6.56 ft). However, this value might change according to the drive unit specifications. Perform wiring after verifying the specifications for the drive unit to be used
  - (b) When a differential driver is used, the maximum cable length is 10 m (32.81 ft). To extend the distance between the AD75 and drive unit, use a differential driver
- (2) Wiring for I/O signals
  - (a) Avoid bundling with or installing near the proximity of power wires or main circuit wires
  - (b) When installing near the proximity of power wires or main circuit wires, use separate ducts or piping
  - (c) If bundling cannot be avoided, use a batch shielded cable and ground it on the PLC side
  - (d) When wiring is done via piping, be sure to ground the pipe
  - (e) If the connection cable is long or the main circuit wiring is in the proximity, operation error may occur due to noise

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

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

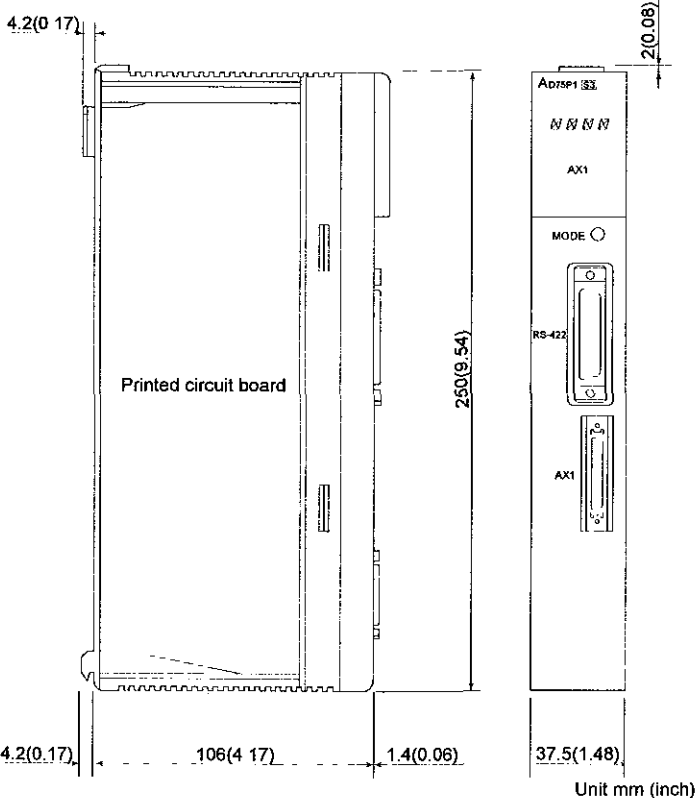
**Remark**

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

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

**6 External Dimensions**

AD75P1-S3 is shown



\* External dimensions are the same for AD75P1-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

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