MITSUBISHI

D/A Converter Module

User's Manual

(Hardware)

A1S62DA

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	A1S62DA(H/W)-U-E
MODEL CODE	13JE43
IB (NA)-66482-D(0609) 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".

◇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

● Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module. Otherwise, trouble could result from erroneous output or erroneous operation.
  (1) The analog output state will differ according to the setting state of the various functions for controlling the analog output.
     For details, refer to manual Section 3.4.4 on the analog output state.
  (2) If there is a fault in the output element or the internal circuit, correct outputs may not be possible or erroneous outputs may be made.
     Provide a circuit to externally monitor output signals that could lead to major faults.

⚠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 100mm (3.94inch) or more from each other.
  Not doing so could result in noise that would cause erroneous operation.
● At power ON/OFF, voltage or current may instantaneously be output from the output terminal of this module. In such case, wait until the analog output becomes stable to start controlling the external device.

[INSTALLATION PRECAUTIONS]

⚠ **CAUTION**
● Use the PLC in an environment that meets the general specifications given in the User's Manual of the CPU module in use. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration on the product. ● Securely insert the module fixing latch on the module bottom into the fixing holes on the base unit before mounting. Incorrect mounting of the module could lead to erroneous operation, faults or drop.

[WIRING PRECAUTIONS]

⚠ **CAUTION**
● When wiring in the PLC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage. ● Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. ● Be sure there no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.

[STARTUP AND MAINTNANCE PRECAUTIONS]

◇ **DANGER**
● Externally shut off all power phases before touching the terminals. Failure to observe this could lead to erroneous operation. ● Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screws. Not doing so can cause the module to fail or malfunction.

⚠ **CAUTION**
● Do not dissemble or modify the module. Doing so could cause trouble, erroneous operation, injury, or fire. ● Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module. Not doing so may cause damage to the module. ● Do not install/remove the terminal block more than 50 times after the first use of the product. (IEC 61131-2 compliant) ● Before handling the module, always touch grounded metal, etc. to discharge static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

[DISPOSAL PRECAUTIONS]

⚠ **CAUTION**
● When disposing of the product, handle 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)
D/A converter module type A1S62DA User's Manual	IB-66335

Conformance to the EMC Directive/Low Voltage Directive

When incorporating the Mitsubishi PLC into other machinery or equipment and keeping compliance with the EMC and low voltage directives, refer to Chapter 3, "EMC Directives and Low Voltage Directives" of the User's Manual (Hardware) included with the CPU module or base unit used.
The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.
By making this product conform to the EMC directive and low voltage instruction, it is not necessary to make those steps individually.

1. General Description

This manual describes specifications, handling and wiring of an A1S62DA D/A converter module (hereinafter referred to as the A1S62DA).
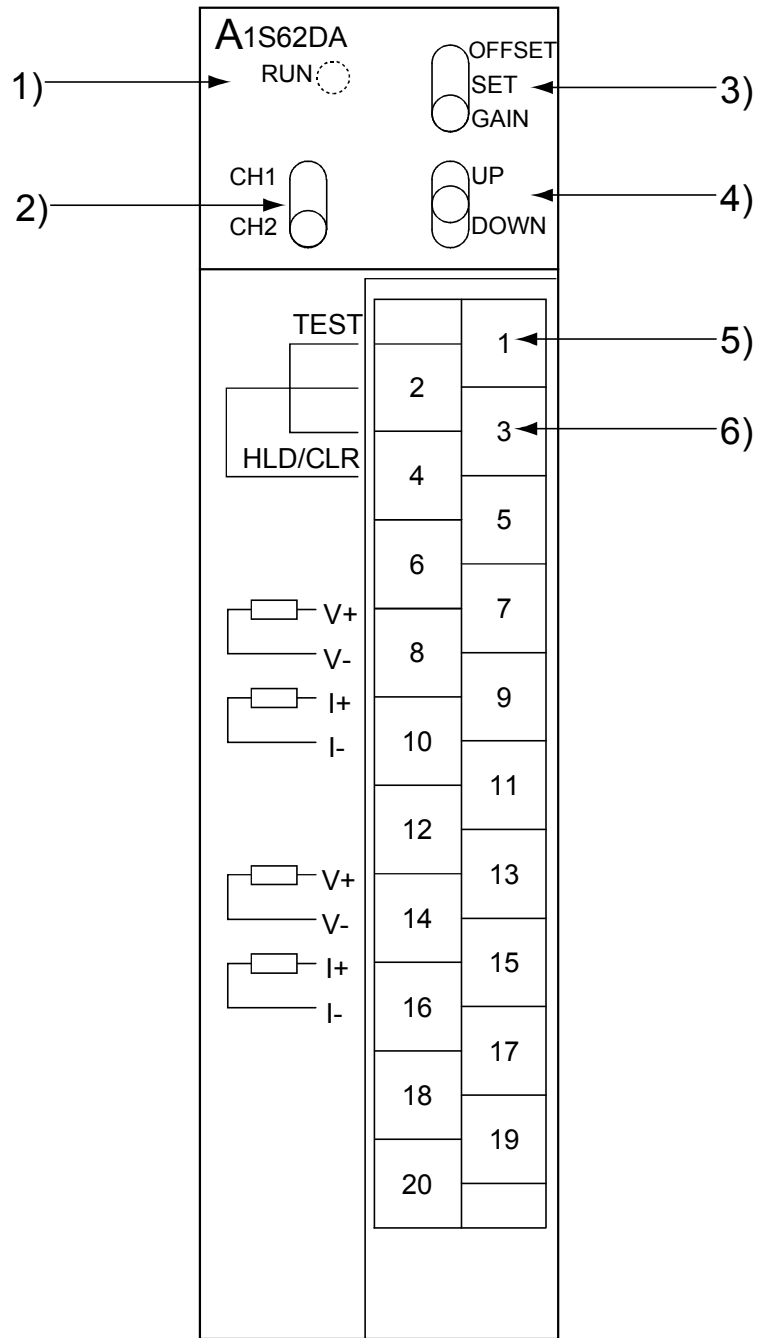
2. Specifications

Item		Specifications						
		Voltage Output			Current Output			
Digital input	1/4000 1/8000 1/12000	-4000 to 4000 -8000 to 8000 -12000 to 12000			0 to 4000 0 to 8000 0 to 12000			
Analog output		-10 to 0 to 10 VDC (External load resistance: $2K\Omega$ to $1M\Omega$)			0 to 20mADC (External load resistance: 0 to 600Ω)			
I/O char-acteristics	Resolution	1/4000 1/8000 1/12000		Analog output value *1	1/4000 1/8000 1/12000			Analog output value *2
	Digital input value	4000 8000 12000 2000 4000 6000 0 0 0 -2000 -4000 -6000 -4000 -8000 -12000		10V 5V 0V -5V -10V	4000 8000 12000 2000 4000 6000 0 0 0			20mA 12mA 4mA
Maximum resolution of analog value	1/4000 1/8000 1/12000	2.5mV 1.25mV 0.83mV		(10V) (10V) (10V)	$5\mu A$ $2.5\mu A$ $1.7\mu A$			(20mA) (20mA) (20mA)
Overall accuracy (accuracy to the maximum value)		$\pm1\%$ ($\pm100mV$)			$\pm1\%$ ($\pm200\mu A$)			
Maximum conversion time		Maximum 25ms/2 channels (same for 1 channel)						
Absolute maximum output		Voltage:$\pm12V$ Current:+28mA						
Output short circuit protection		Provide						
Analog output points		2 channels/module						
Isolation method		Photocoupler insulation between output terminals and PLC power No insulation between channels						
Number of I/O points		32 points						
Connection terminal		20-points terminal block						
Offset/gain adjustment		By the test terminal (without using offset/gain adjusting knobs)						
Applicable wire size		0.75 to 1.5mm^2						
Applicable crimp terminal		1.25-3, 1.25-YS3A, V1.25-3, V1.25-YOS3A						
Internal current consumption (5VDC)		0.8A						
Weight (kg)		0.32kg						

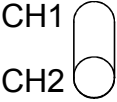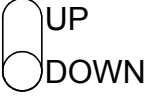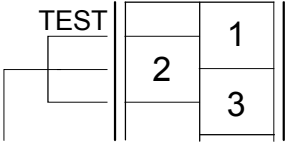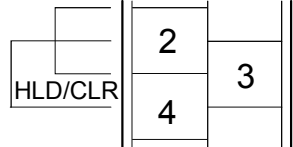The gain is set to 10V and the offset to 0V as the default.
*1 When the offset value is set to 0V and the gain value is set to 10V.
*2 When the offset value is set to 4mA and the gain value is set to 20mA.

3. Nomenclature

A1S62DA

RUN

OFFSET
SET
GAIN

CH1
CH2

UP
DOWN

1)

2)

3)

4)

TEST

HLD/CLR

V+
V-
I+
I-

V+
V-
I+
I-

	1
2	
	3
4	
	5
6	
	7
8	
	9
10	
	11
12	
	13
14	
	15
16	
	17
18	
	19
20	

5)

6)
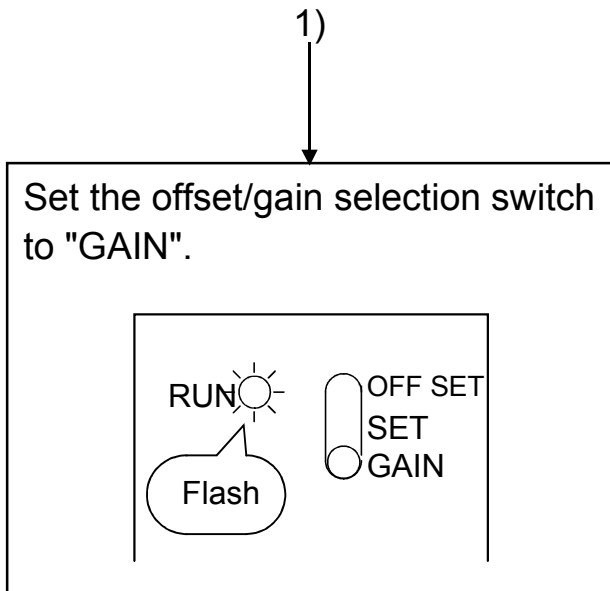
No	Description	Application
1)	"RUN" LED RUN ◯	Indicates the operating status of the A1S62DA. (Normal mode) On :Indicates that the A1S62DA is functional. Off :The 5 VDC power is not supplied or A1S62DA is faulty. Flash :When a digital value is written which is outside the high or low limit, this LED flashes every second. (Test mode) Off :OFFSET/GAIN select switch is in the "SET" position. Flash :When the offset/gain select switch is set to either the OFFSET or GAIN position, this LED flashes every half (0.5) second. 　When the offset or gain has reached the upper or lower limit, this LED flashes every tenth (0.10) of a secind.
2)	Channel select switch CH1 CH2	Used to specify a channel for the offset/gain adjustment.
3)	OFFSET/GAIN select switch OFF SET SET GAIN	OFFSET position: Sets the offset value. GAIN position: Sets the gain value. SET position: The offset/gain value is stored to the A1S62DA internal memory when the switch is moved from "OFFSET"/"GAIN" to "SET".
4)	UP/DOWN switch UP DOWN	Increases or decreases the offset/gain value of the specified channel.
5)	Test mode terminals TEST 1 2 3	Connected between terminals No.1 and No.3 to set the offset/gain values
6)	Output HOLD/CLEAR setting terminals 2 3 HLD/CLR 4	Used to hold or clear the analog output at the time of CPU STOP. 　Disconnected between terminal No.2 and No.4: CLEAR 　　Connected between terminal No.2 and No.4: HOLD The analog output status of the HOLD/CLEAR setting varies with the setting of the D-A conversion value output enable flag and the analog output enable/disable state.

3.1 Setting offset and gain

If the I/O conversion characteristics are to be changed, use the procedure shown below.

Start

Short the test mode terminals (Between 1 and 3).

TEST

A)

Change the "channel selection switch" to the channel desired.

RUN ○ ← OFF

CH1

CH2

Set to the channel to be set.

Set the offset/gain selection switch to "OFFSET".

RUN ☼

Flash

OFF SET
SET
GAIN

Use the "UP/DOWN" switch to set the voltage or amperage to be used as the offset value.

If voltage is used.

V+

V   V-

If amperage is used.

A   I+

I-

Resistance value to actually connect.

Set the offset/gain selection switch to "SET".

RUN ○

OFF

OFF SET
SET
GAIN

1)

1)

Set the offset/gain selection switch to "GAIN".

RUN ☼
Flash

OFF SET
SET
○ GAIN

Set the offset/gain selection switch to "SET".

RUN ○
OFF

OFF SET
SET
GAIN

Use the "UP/DOWN" switch to set the voltage or amperage to be used as the gain value.

If voltage is used.

V+
(V) V-

If amperage is used.

(A) I+
I-

Resistance value to actually connect.

Adjust another channel?
YES
A)

NO

Open the test mode terminals (Between 1 and 3).

TEST

End

Reference

The offset value and gain value are as shown below.

1) Offset value .... This is the current or voltage output from the A1S62DA when the digital value that has been set from the PLC CPU is "0".

2) Gain value .... This is the current or voltage output from the A1S62DA when the digital value that has been set from the PLC CPU is "4000" (when digital resolution value is 1/4000).

4. Handling

4.1 Precautions for handling

(1) The main body case and terminal block are made of resin, so do not drop them or apply strong impacts.

(2) Do not remove the module PCB from the case. Doing so could lead to faults.

(3) Make sure that foreign matter, such as wire scraps, does not enter from the top of the module during wiring. Remove any foreign matter that does enter.

(4) Tighten the module installation screws and terminal screws within the following ranges.

| Screw position	Tightening torque range
Module installation screw (M4 screw)	78 to 118N • cm
Terminal block terminal screw (M3.5 screw)	59 to 88N • cm
Terminal block installation screw (M4 screw)	78 to 118N • cm

5. Wiring

5.1 Wiring instructions

   (1) Separate the main power circuit and/or high voltage wiring from the control and signal wiring.

   (2) Where applicable, ground the shielding of all wires to a common ground point.

5.2 Connection of A1S62DA and external devices

   (1) Shows wiring example with the external device when there is voltage output.
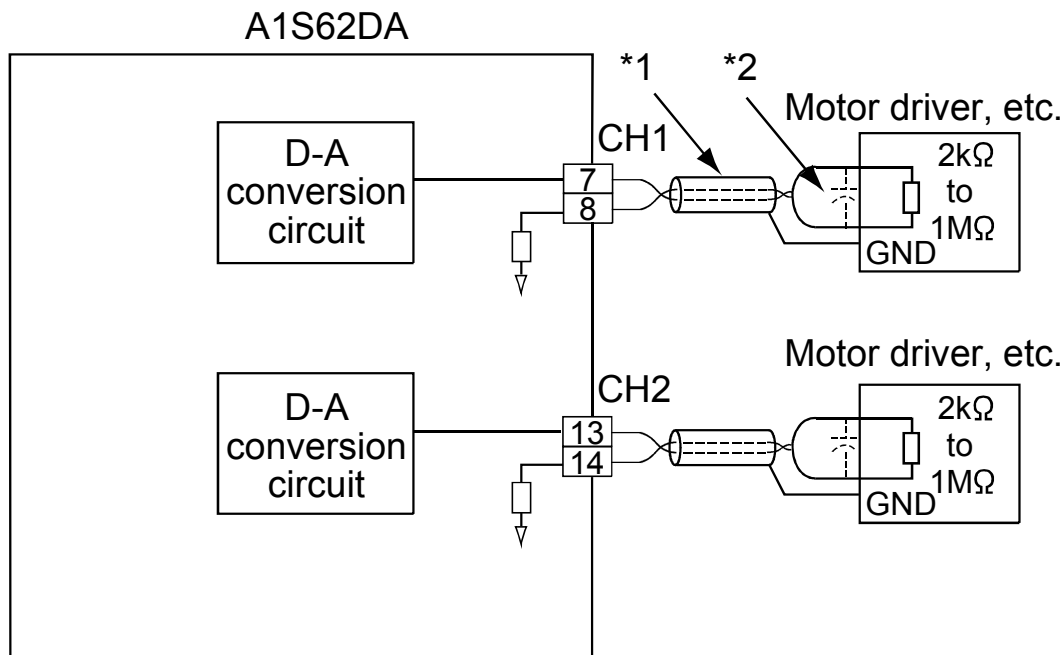
*1: Use two-core shielded wiring (twisted).

*2: If noise or ripple is generated by the external wiring, connect a 0.1 to 0.47μF (25V or more voltage resistance parts) to the input terminal of the external device.

(2) Shows wiring example with the external device when there is current output.
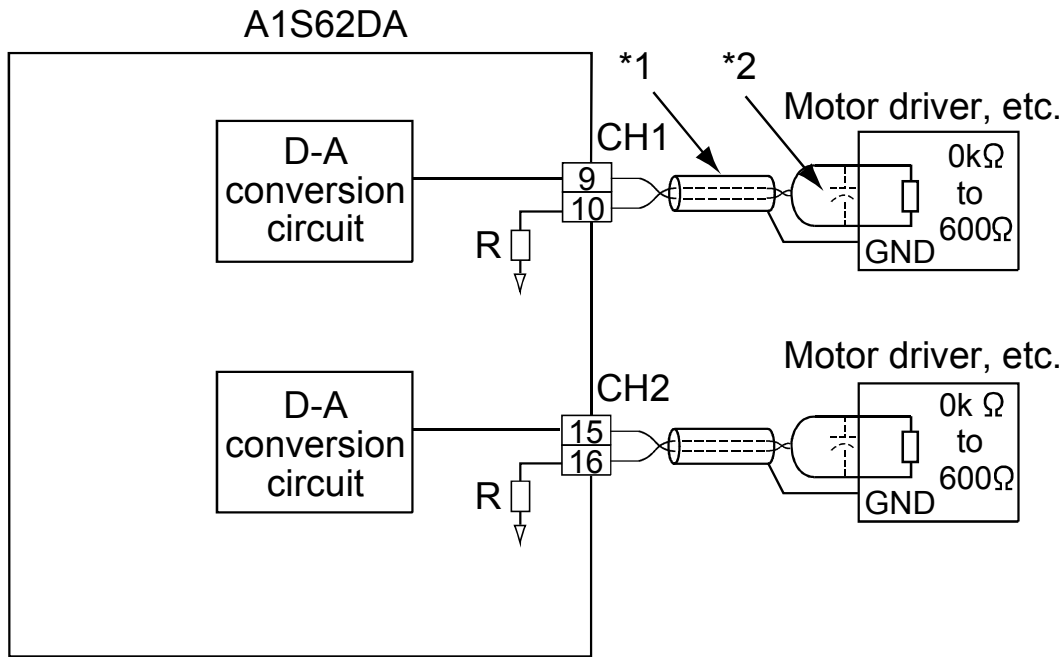
A1S62DA

*1: Use two-core shielded wiring (twisted).
*2: If noise or ripple is generated by the external wiring, connect a 0.1 to 0.47μF (25V or more voltage resistance parts) to the input terminal of the external device.
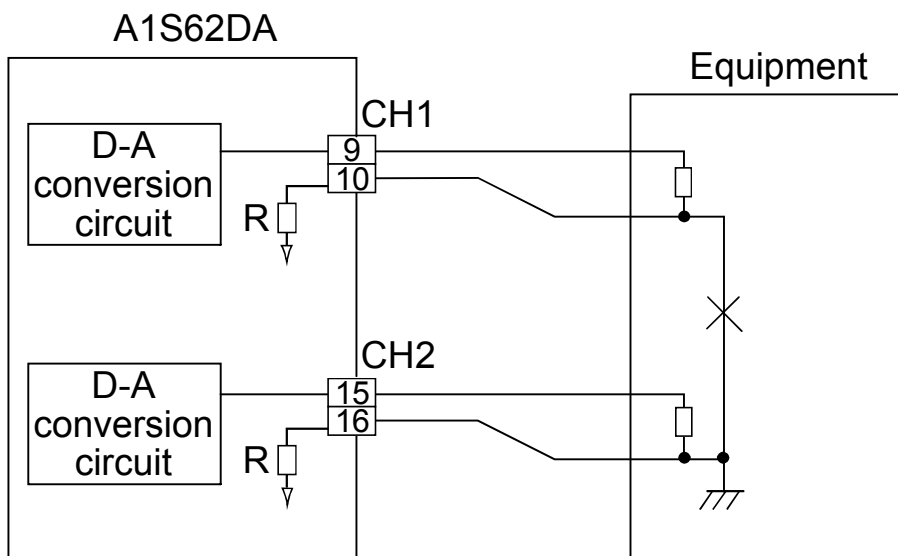

Important

(1) The voltage and current output for the same channel cannot be used simultaneously.
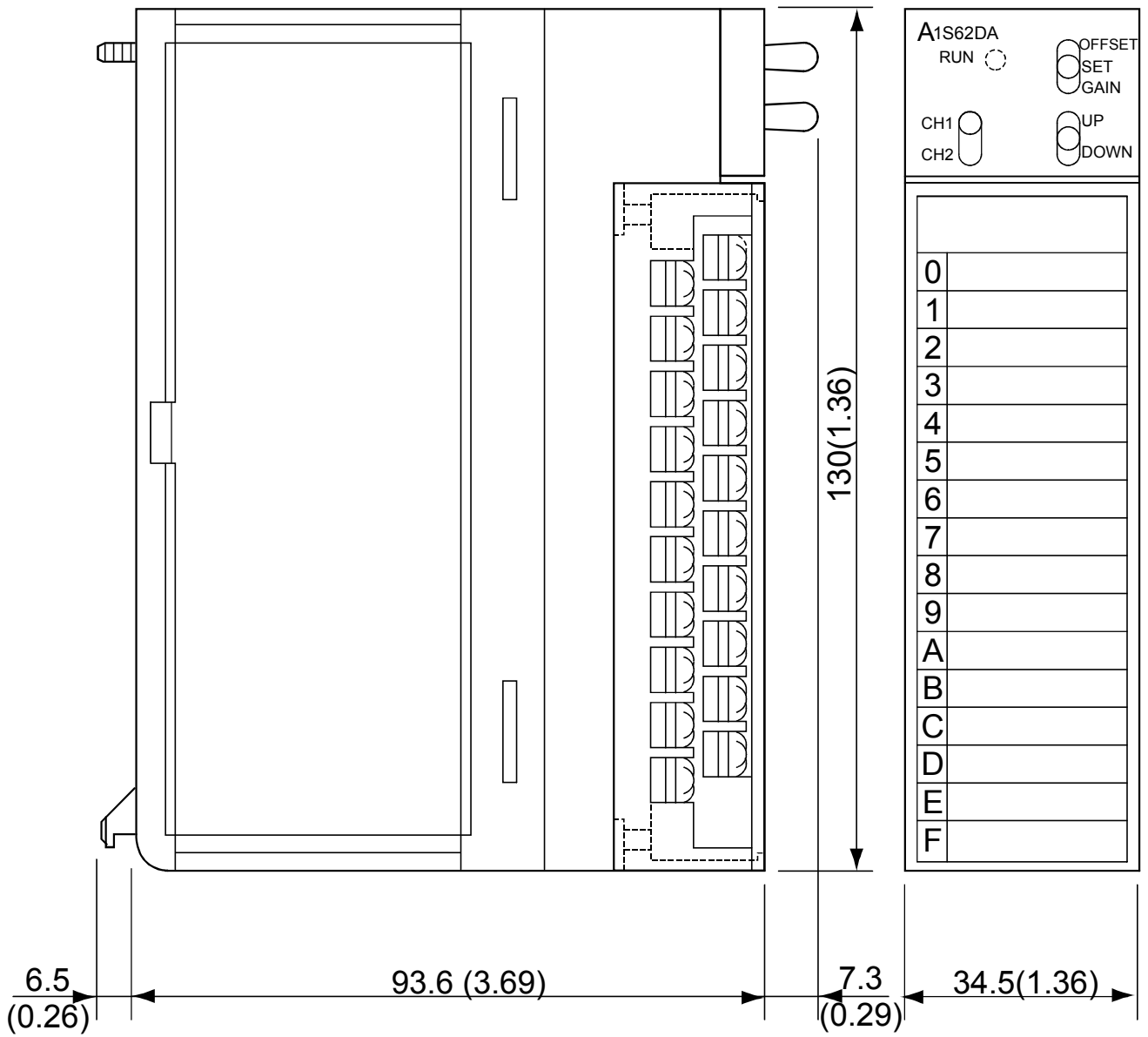   Always open any terminals that are not being used as it is possible that if they are used they could cause damage to the internal elements.
(2) If current output is used, I-(COM) will become common and cannot be connected with equipment.
   The output will normally cease.

A1S62DA

6. External Dimensions

6.5
(0.26)   93.6 (3.69)   7.3
(0.29)   34.5(1.36)

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.

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