

Enabling Switch

# A4E

## 3-position Enabling Switch for Safer Robot Operation

- Clicking feel.
- Conforms to U.S. standards (ANSI/RIA R15.06-1999) for 3-position switches.
- Can be mounted in two directions.



### Model Number Structure

Model Number Legend

**A4E-**□□□□□□  
 1 2 3 4 5 6

**1. Total output number**

- B: Two outputs
- C: Four outputs

**2. Enable outputs**

- 2: Two contact outputs

**3. Release monitor outputs**

- 0: None
- 1: One contact output

**4. Grip monitor outputs**

- 0: None
- 1: One contact output

**5. Mounting bracket**

- S: No mounting bracket
- H: Horizontal mounting bracket
- V: Vertical mounting bracket

**6. Cover**

- S: No cover
- A: Rubber cover

### Ordering Information

List of Models

Model	Specification
A4E-B200SS	Two outputs, no mounting bracket, no rubber seal
A4E-B200HS	Two outputs, horizontal mounting, no rubber seal
A4E-B200VS	Two outputs, vertical mounting, no rubber seal
A4E-B200VA	Two outputs, vertical mounting, with rubber seal
A4E-C211SS	Four outputs, no mounting bracket, no rubber seal
A4E-C211HS	Four outputs, horizontal mounting, no rubber seal
A4E-C211VS	Four outputs, vertical mounting, no rubber seal
A4E-C211VA	Four outputs, vertical mounting, with rubber seal

Approved Standards

EN 60947-5-1

UL 508

CSA C22.2 No. 14

## Specifications

### Ratings

Rated insulation voltage	250 V
Rated ON current	2.5 A
Rated load	24 VDC, 300 mA (inductive load) 125 VAC, 1 A (resistive load)
Minimum applicable load	24 VDC, 4 mA
Impulse withstand voltage	4.0 kV between terminals of different polarity, 2.5 kV between terminals of same polarity
Ambient temperature	-10°C to 55°C (with no icing)
Ambient humidity	35% to 85% (with no condensation)
Storage temperature	-25°C to 65°C

### Characteristics

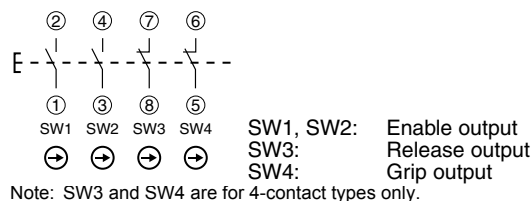
Insulation resistance	100 M min. (at 500 VDC)
Contact resistance	100 m max. (initial value)
Vibration resistance	10 to 55 Hz, 0.75-mm single amplitude min.
Shock resistance	150 m/s <sup>2</sup>
Mechanical durability	OFF-ON: 1,000,000 operations min. OFF-ON-OFF (direct opening): 100,000 operations min.
Electrical durability	100,000 operations min.
Degree of protection	IP65 (rubber seal type only)

### Structure

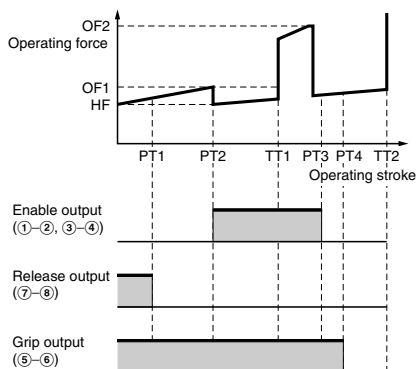
Contact form	4-contact type:2NO (enable output) 1NC (release output) 1NC (grip output) Direct opening for all contacts (See note)
Operating pattern	2-contact type:2NO (enable output) Direct opening for all contacts (See note) During operation: OFF-ON-OFF During reset: OFF-OFF momentary 3-position operation
Terminal shape	Solder terminals

Note: Direct opening only during grip.

### Contact form



## Operating Characteristics



### Operating stroke

Symbol	Name	A4E-B200□S	A4E-B200VA (See note.)	A4E-C211□S	A4E-C211VA (See note.)
PT1	Release output (ON)	---	---	1 mm max.	1.2 mm max.
PT2	Enable output (ON)	3.2 mm max.	3.4 mm max.	3.2 mm max.	3.4 mm max.
TT1	Max. enable holding position	Approx. 4 mm	Approx. 4.2 mm	Approx. 4 mm	Approx. 4.2 mm
PT3	Enable direct opening position	5.4 mm max.	5.6 mm max.	5.4 mm max.	5.6 mm max.
PT4	Grip output (ON)	---	---	5.4 mm min.	5.4 mm min.
TT2	Max. stroke	Approx. 6.5 mm	Approx. 6.7 mm	Approx. 6.5 mm	Approx. 6.7 mm

Note: Not including the rise of the rubber cover (0.5 mm max.).

### Operating force (reference values)

Symbol	Name	A4E-B200□S	A4E-B200VA	A4E-C211□S	A4E-C211VA
OF1	Enable operating force	7 N max.	14 N max.	7 N max.	14 N max.
HF (See note)	Enable holding force	Approx. 5.5 N	Approx. 8 N	Approx. 5.5 N	Approx. 8 N
OF2	Grip operating force	35 N max.	40 N max.	35 N max.	40 N max.

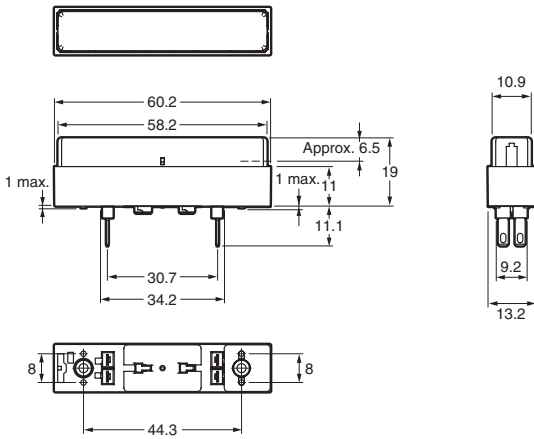
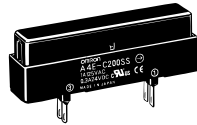
Note: HF indicates "holding force".

## Dimensions

Note: All units are in millimeters unless otherwise indicated.

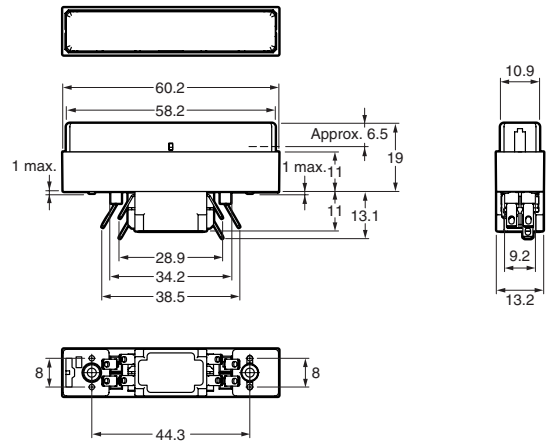
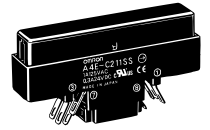
### 2-contact type

#### No mounting bracket A4E-B200SS

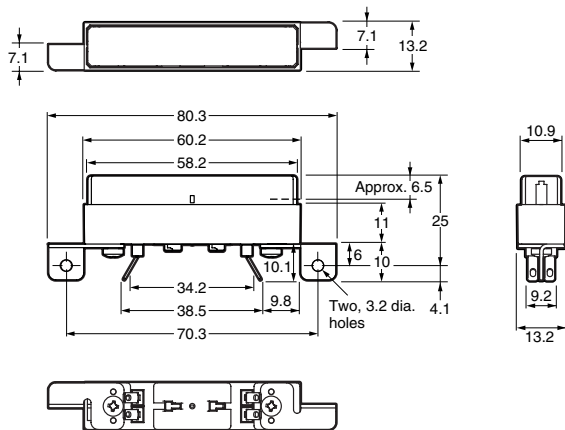
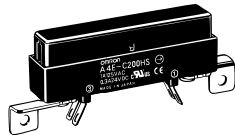


### 4-contact type

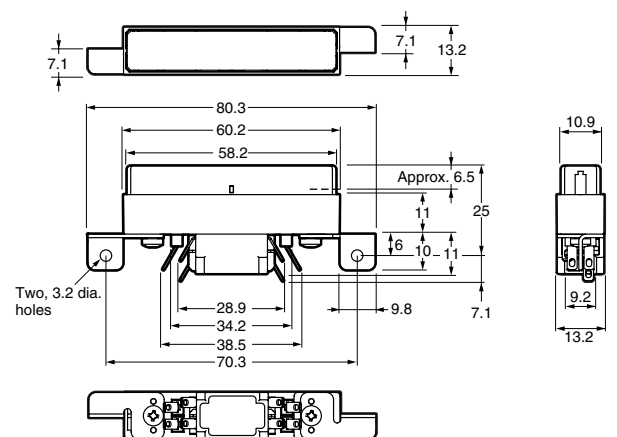
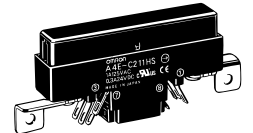
#### No mounting bracket A4E-C211SS



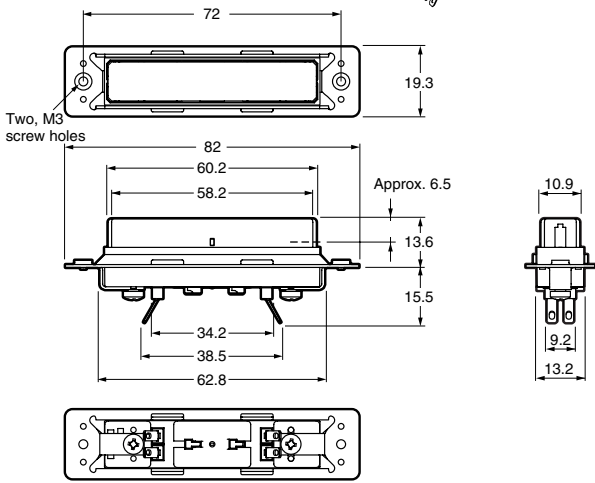
#### Horizontal mounting A4E-B200HS



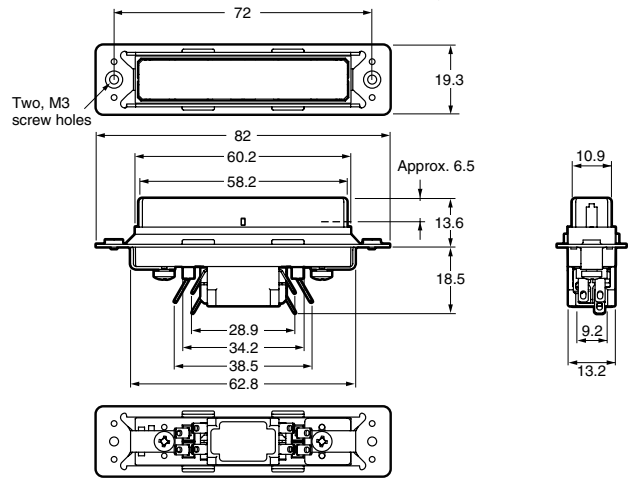
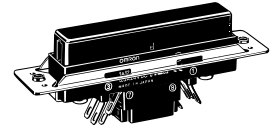
#### Horizontal mounting A4E-C211HS



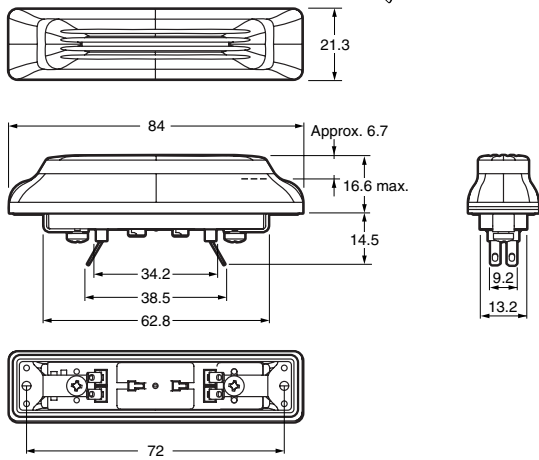
**Vertical mounting  
A4E-B200VS**



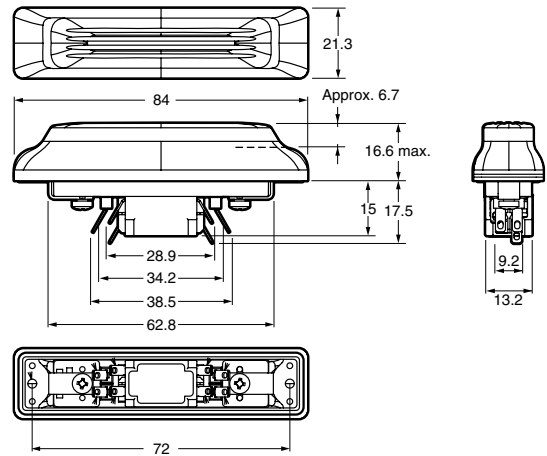
**Vertical mounting  
A4E-C211VS**



**Vertical mounting with  
rubber seal  
A4E-B200VA**



**Vertical mounting with  
rubber seal  
A4E-C211VA**



Precautions

**WARNING**

Do not wire the Switch or touch any terminal of the Switch while power is being supplied. Doing so may result in electric shock.

**WARNING**

Always use the Switch in a system that is operated directly by hand. Do not operate the Switch with a mechanical actuator. Insufficient Switch strength may result in damage to the Switch, electric shock, or fire.

**CAUTION**

Design a safe system for using the Switch, based on a risk assessment that takes into account all reasonably foreseeable malfunctions.

**CAUTION**

Determine the Switch mounting direction and structural design only after thorough risk assessment. For example, in a structure where the Switch protrudes from the pendant perimeter, the weight of the pendant itself could place the Switch into the enable condition and operate the machine. Likewise, in a buried structure where the Switch lies below the surface of the pendant, the Switch may not enter the grip condition when pressed and thus fail to stop the machine.

**CAUTION**

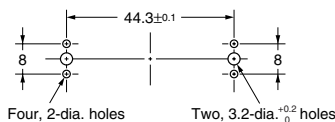
Configure the system so that the machine operates only when the Switch is in the enable position.

Correct Use

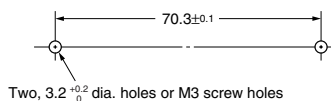
Mounting

Use M3 screws and flat washers or spring washers to mount the Switch securely. Use a tightening torque of 0.39 to 0.59 Nm.

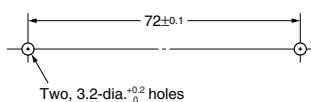
No-mounting-bracket type



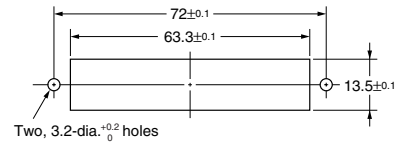
Horizontal mounting type



Vertical mounting type



Vertical mounting type with rubber seal



Wiring

- Use an appropriate wire size (0.5 to 0.75 mm<sup>2</sup>) for the applied voltage and carry current.
- Do not use a #110 tab receptacle.
- Wire according to the terminal numbers. Mistaken wiring may damage the Switch and result in fire.
- Wire according to the terminal arrangement.
- Use good-quality 6:4 (tin:lead) solder.
- Use a resin flux cored solder.
- Do not use a liquid or chlorine type flux.
- Perform soldering within 3 s using a 30-W max. soldering iron (temperature at the tip of the soldering iron: 350°C max.). Insulate with an insulation tube.
- Do not move the terminal for at least one minute after soldering.
- Do not apply a force that would deform the terminal when wiring.

Operating Environment

Prior to using the Switch in places that are subject to contact by oil spray or chemicals, check the effect of those substances on the Switch.

Some types of oil spray and chemicals will degrade the sealing capability, which may result in faulty contact, defective insulation, ground fault, or burning damage.

Improper Operating Environment

- Do not use the Switch in places that are subject to sudden temperature change.
- Do not use the Switch in places that are subject to high temperatures and condensation.
- Do not use the Switch in places that are subject to strong vibration.
- Do not use the Switch in places that are subject to direct contact with machine filings or dust.

Storage

- Do not store the Switch in places with hydrogen sulfide or other corrosive gas or sea breeze.
- Do not store the Switch in places where the level of dust is high enough to be visible.
- Do not store the Switch in direct sunlight.
- Do not impose excessive force on the Switch during storage. Otherwise, the Switch may deform.

Handling

- Do not drop the Switch. Otherwise, the Switch may malfunction.
  - Do not apply strong vibration or shock to the Switch. Otherwise, the Switch may malfunction or be damaged.
- Do not contact the Switch with sharp objects. Otherwise, the Switch may be scratched. Scratches on the operating portion of the Switch may result in problems both in appearance and operation.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.