

Enabling Switch

A4E

CSM_A4E_DS_E_3_1

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.



 Be sure to read the "Safety Precautions" on page 5.

Model Number Structure

Model Number Legend

A4E-
1 2 3 4 5 6

1. Total contact number

B: Two contacts
C: Four contacts

2. Enable outputs

2: Two contacts

3. Release monitor outputs

0: None
1: One contact

4. Grip monitor outputs

0: None
1: One contact

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

Specifications

Certified Standards

Certification body	Standard	File No.
UL *	UL508	E76675
TÜV SÜD	EN60947 5-1 (certified direct opening) EN60947-5-8	Inquire
CQC (CCC)	GB14048.5	2003010305070634

* Certification for CSA C22.2 No. 14 by UL is indicated by the  mark.

Certified Standard Ratings

TÜV (EN60947-5-1)

Item	Utilization category	AC-15	DC-13
Rated operating current (Ie)		0.75 A	0.55 A
Rated operating voltage (Ue)		240 V	125 V

UL/CSA (UL508, CSA C22.2 No.14), CCC (GB 14048.5)

300 mA at 24 VDC (Inductive load)

1 A at 125 VAC (Resistive load)

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 operating temperature	-10 to 55°C (with no icing)
Ambient operating humidity	35% to 85% (with no condensation)
Ambient storage temperature	-25 to 65°C

Characteristics

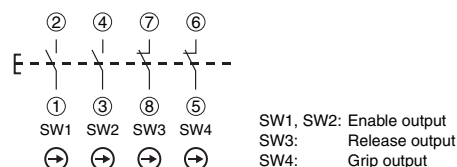
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	100 mΩ max. (initial value)
Vibration resistance	10 to 55 Hz, 0.75-mm single amplitude min.
Shock resistance	150 m/s ²
Mechanical durability	OFF-ON: 1,000,000 operations min. OFF-ON-OFF (direct opening): 100,000 operations min.
Electrical 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 *
	2-Contact Type: 2NO (enable output) Direct opening for all contacts *
Operating pattern	During operation: OFF-ON-OFF During reset: OFF-OFF momentary 3-position operation
Terminal shape	Solder terminals

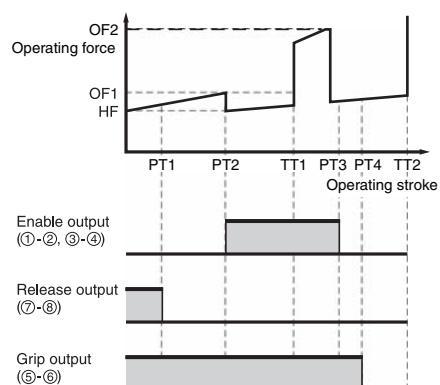
* Direct opening only during grip.

Contact form



Note: SW3 and SW4 are for 4-Contact Types only.

Operating Characteristics



Operating stroke

Symbol	Name	A4E-B200□S	A4E-B200VA	A4E-C211□S	A4E-C211VA
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.	5.6 mm min.
TT2	Max. stroke	Approx. 6.5 mm	Approx. 6.7 mm	Approx. 6.5 mm	Approx. 6.7 mm

Operating force (reference values)

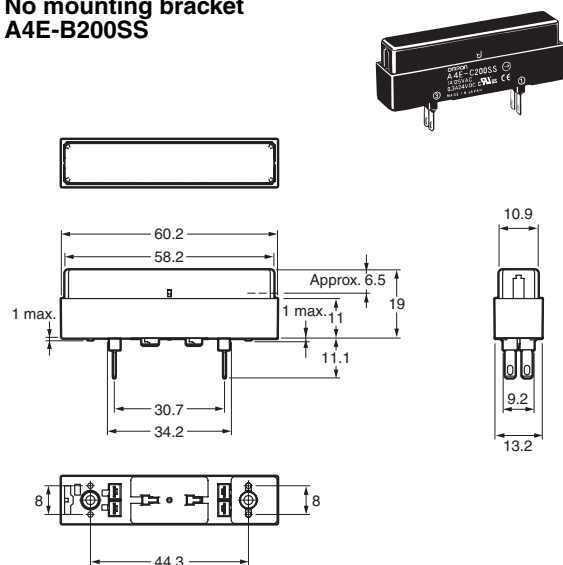
Symbol	Name	A4E-B200□S	A4E-B200VA	A4E-C211□S	A4E-C211VA
OF1	Enable operating force	7 N max.	14 N max.	7 N max.	14 N max.
HF *	Enable holding force	Approx. 5.5 N	Approx. 8 N	Approx. 5.5 N	Approx. 8 N
OF2	Grip operating force	35 N max.	40 N max.	35 N max.	40 N max.

* HF indicates "holding force".

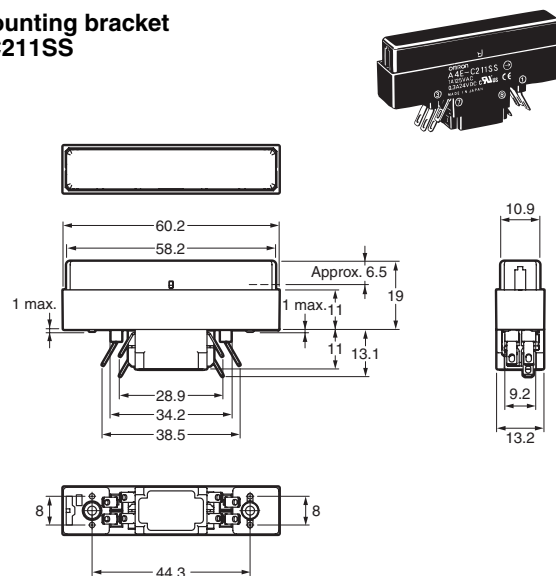
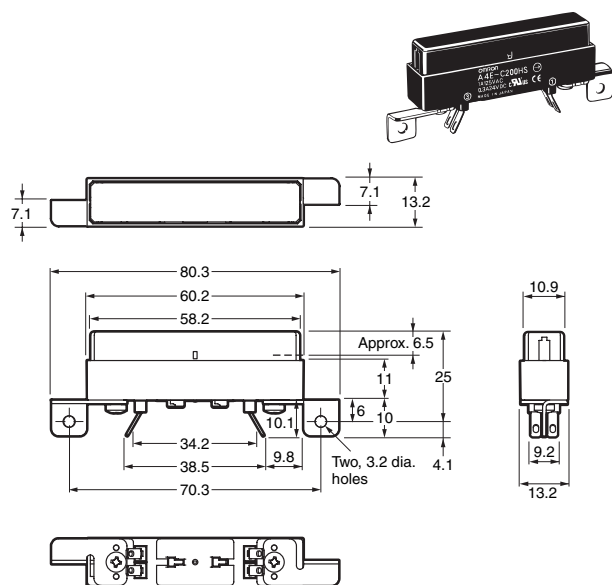
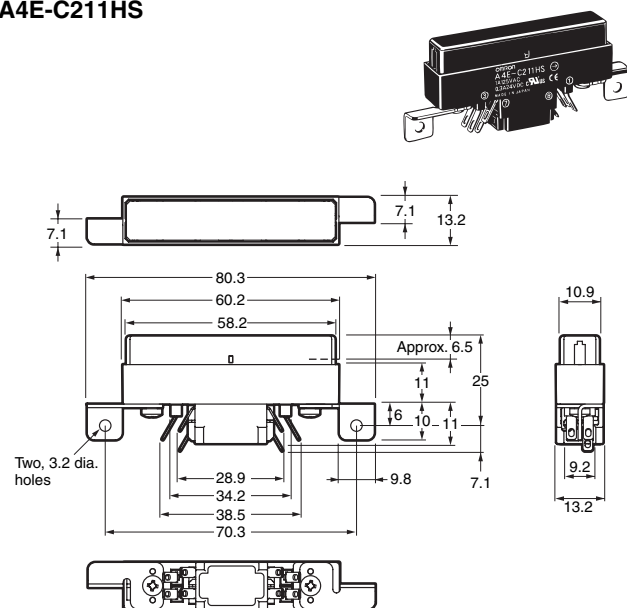
Dimensions

(Unit: mm)

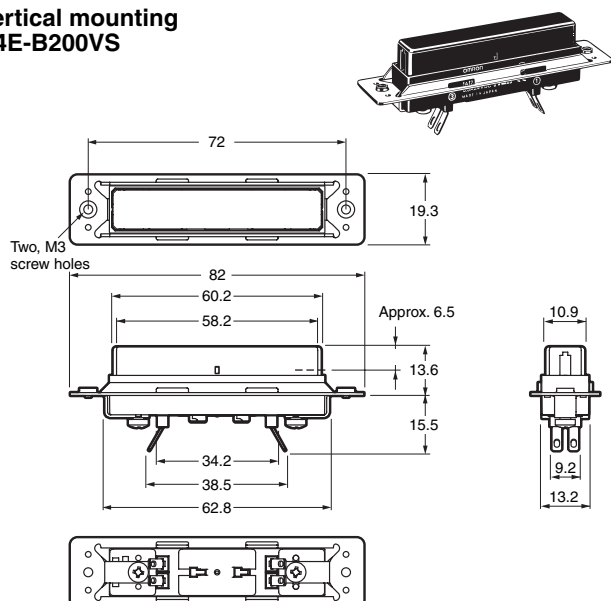
2-Contact Type

No mounting bracket
A4E-B200SS

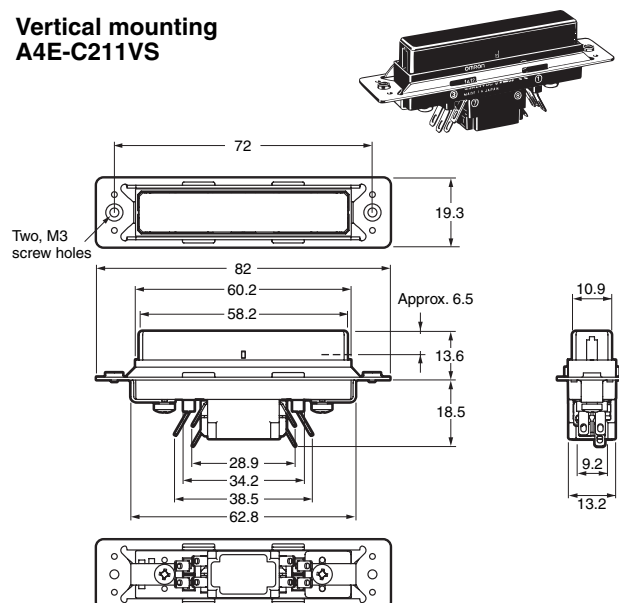
4-Contact Type

No mounting bracket
A4E-C211SSHorizontal mounting
A4E-B200HSHorizontal mounting
A4E-C211HS

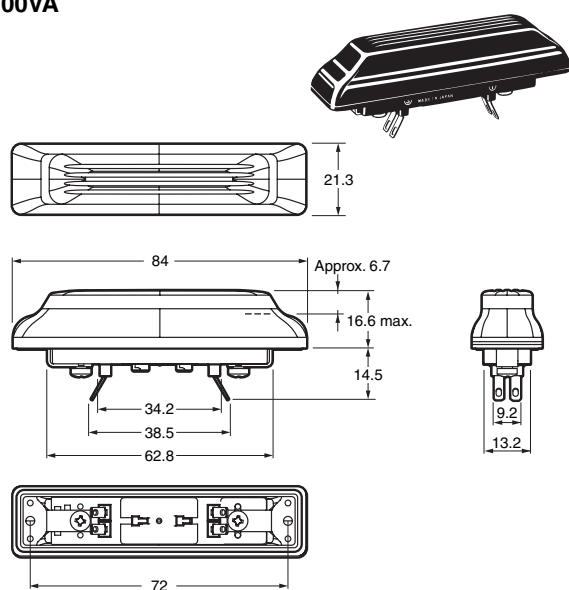
Vertical mounting A4E-B200VS



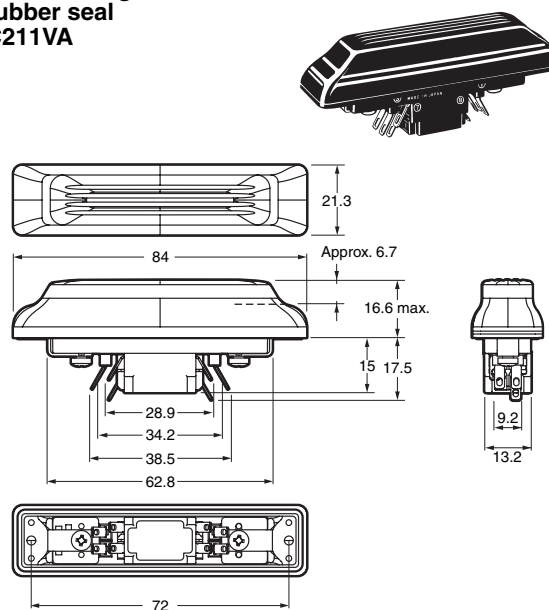
Vertical mounting A4E-C211VS



Vertical mounting with rubber seal A4E-B200VA



Vertical mounting with rubber seal A4E-C211VA



Safety 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.



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.



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



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.



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



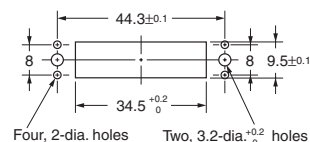
Precautions for Correct Use

Mounting

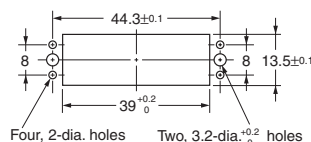
Use M3 screws and flat washers or spring washers to mount the Switch securely. Use a tightening torque of 0.39 to 0.59 N·m.

No-mounting-bracket type

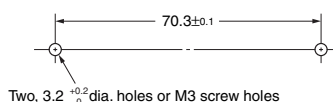
2-Contact type



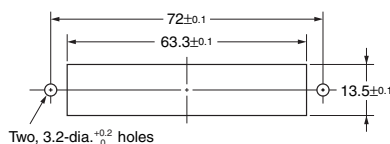
4-Contact type



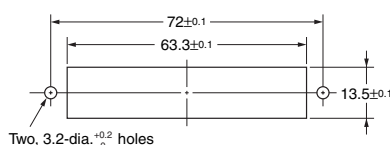
Horizontal mounting type (2-Contact type/4-Contact type)



Vertical mounting type (2-Contact type/4-Contact type)



Vertical mounting type with rubber seal (2-Contact type/4-Contact type)



Wiring

- Use an appropriate wire size (0.5 to 0.75 mm²) 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 with oil, water, or chemicals, check the effect of those substances on the Switch.

Some types of oil, water, and chemicals will degrade the sealing capability, which may result in contact failure, 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.

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2010.1

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