

Discontinued

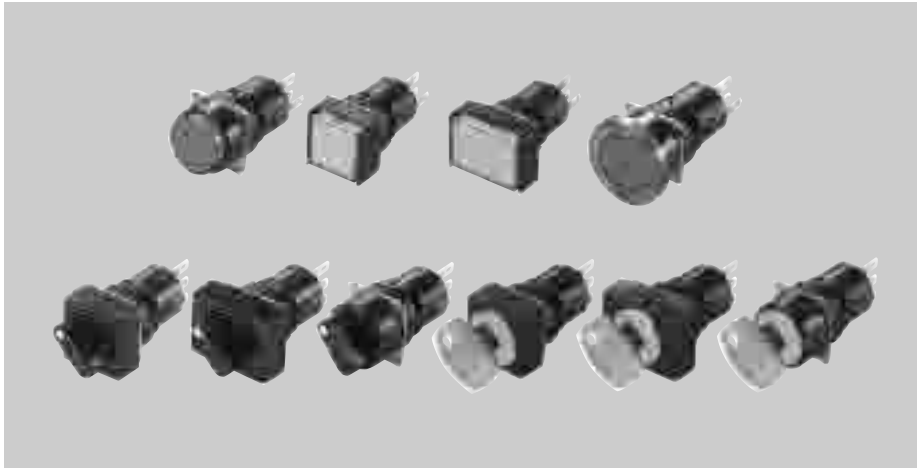


Panasonic
ideas for life

Illuminated pushbutton,
Indicators, Non-illuminated
pushbutton, Selector,
Key selector switches

NS Series

Full lineup to meet varied market needs
Integrated 30 mm short body



FEATURES

1. Unique Fine-mechanism high performance contact construction realizes fine-touch comfortable operation feel.
Covers wide range applications from consumer devices to FA equipment.
2. LED illuminating unit has built-in resistor and diode for controlling current inside the LED bulb.
3. Splashproof type protective construction (IP65).
4. Contacts made of cadmium-free material. (Gold-clad contact)
5. UL and CSA certified.

RoHS Directive compatibility information
<http://www.nais-e.com/>

ORDERING INFORMATION

1. Illuminated pushbutton switches (LED illumination) and indicators (indicator lamps)

ACEA 2

Flange shapes
(With transparent button type)
2: 18 dia. projecting type
3: 18 square flat type
4: 18 × 24 flat type
(With mushroom button type)
0: 24 dia.

Protective construction
2: IP65

No. of poles and operating characteristics
0: Indicator (indicator lamp)
1: Single-pole (1 Form C) momentary
2: Double-pole (2 Form C) momentary
3: Single-pole (1 Form C) alternate
4: Double-pole (2 Form C) alternate

Contact material
0: Indicator (indicator lamp) (No contact)
2: Low-level circuit type (Gold-clad contact)

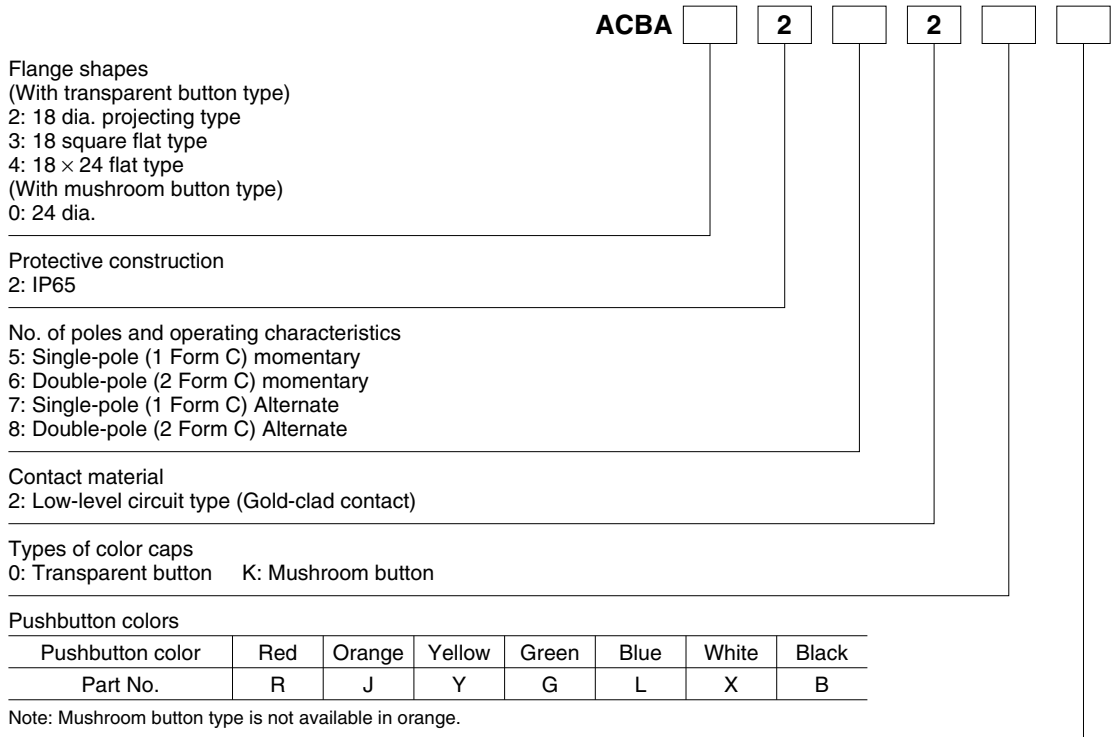
LED voltages and pushbutton colors

Pushbutton color		Color					
		Red	Orange	Yellow	Green	Blue	White (LED: opaque)
LED voltage	5 V DC	1R	4J	4Y	7G	7L	4X
	12 V AC/DC	2R	5J	5Y	8G	8L	5X
	24 V AC/DC	3R	6J	6Y	9G	9L	6X

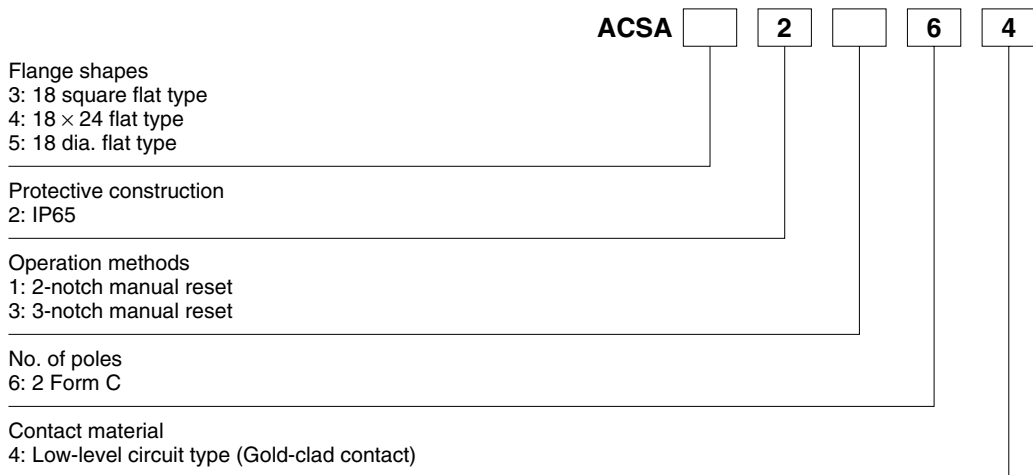
Color cap types
Nil: Regular K: Mushroom button type * There is no mushroom button type in the indicator (indicator lamp).

NS Series (ACEA, ACBA, ACSA, ACKA)

2. Pushbutton switches (non-illuminated types and transparent buttons However, the mushroom button type is not clear.)

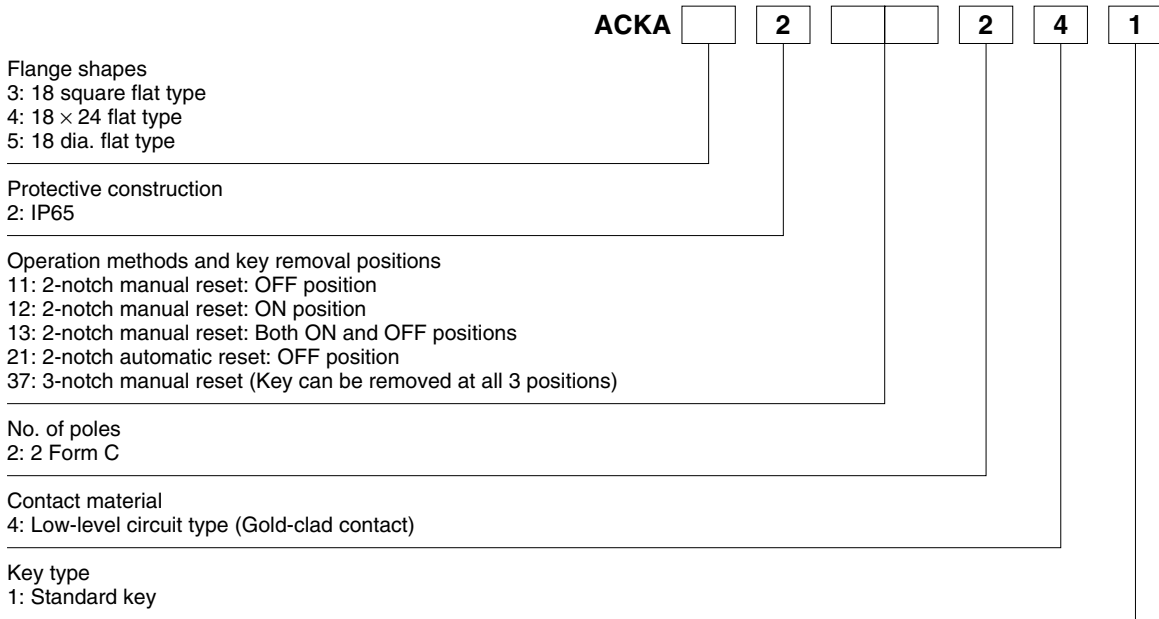


3. Selector switches



NS Series (ACEA, ACBA, ACSA, ACKA)

4. Key selector switches



TYPES

1. Illuminated pushbutton switches (LED illumination)



18 dia. projecting type 18 square flat type 18 × 24 flat type 24 dia. mushroom button type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)	
				Momentary Part No.	Alternate Part No.
16mm dia.	18 dia. projecting type	Single pole	Low-level circuit type (Gold-clad contact)	ACEA2212□*※	ACEA2232□*※
		Double poles		ACEA2222□*※	ACEA2242□*※
	18 square flat type	Single pole		ACEA3212□*※	ACEA3232□*※
		Double poles		ACEA3222□*※	ACEA3242□*※
	18 × 24 flat type	Single pole		ACEA4212□*※	ACEA4232□*※
		Double poles		ACEA4222□*※	ACEA4242□*※
	24 dia. mushroom button type	Single pole		ACEA0212□*※K	ACEA0232□*※K
		Double poles		ACEA0222□*※K	ACEA0242□*※K

Notes) 1. The following combinations of numbers and letters are entered in the square and in the ※ symbol to indicate the LED voltage and pushbutton color.

Pushbutton color		Color					
		Red	Orange	Yellow	Green	Blue	White (Opaque LED)
LED voltage	5 V DC	1R	4J	4Y	7G	7L	4X
	12 V AC/DC	2R	5J	5Y	8G	8L	5X
	24 V AC/DC	3R	6J	6Y	9G	9L	6X

2. The white type has a colorless transparent cap.

NS Series (ACEA, ACBA, ACSA, ACKA)

2. Indicators (indicator lamps)



18 dia. projecting type

18 square flat type

18 x 24 flat type

Mounting hole	Form	Splashproof type (IP65)	
		Part No.	
16mm dia.	18 dia. projecting type	ACEA2200□※	
	18 square flat type	ACEA3200□※	
	18 x 24 flat type	ACEA4200□※	

Notes) 1. The following combinations of numbers and letters are entered in the square and in the ※ symbol to indicate the LED voltage and pushbutton color.

Pushbutton color		Color					
		Red	Orange	Yellow	Green	Blue	White (Opaque LED)
LED voltage	5 V DC	1R	4J	4Y	7G	7L	4X
	12 V AC/DC	2R	5J	5Y	8G	8L	5X
	24 V AC/DC	3R	6J	6Y	9G	9L	6X

2. The white type has a colorless transparent cap.

3. Pushbutton switches (non-illuminated types and transparent buttons However, the mushroom button type is not clear.)



18 dia. projecting type

18 square flat type

18 x 24 flat type

24 dia. mushroom button type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)	
				Momentary	Alternate
				Part No.	Part No.
16mm dia.	18 dia. projecting type	Single pole	Low-level circuit type (Gold-clad contact)	ACBA22520※	ACBA22720※
		Double poles		ACBA22620※	ACBA22820※
	18 square flat type	Single pole		ACBA32520※	ACBA32720※
		Double poles		ACBA32620※	ACBA32820※
	18 x 24 flat type	Single pole		ACBA42520※	ACBA42720※
		Double poles		ACBA42620※	ACBA42820※
	24 dia. Mushroom button	Single pole		ACBA0252K※	ACBA0272K※
		Double poles		ACBA0262K※	ACBA0282K※

Notes) 1. The following letter indicating the pushbutton color is entered in place of the ※ symbol.

Pushbutton color	Red	Orange	Yellow	Green	Blue	White	Black
Part No.	R	J	Y	G	L	X	B

2. The white type has a colorless transparent cap.

3. The mushroom button type is not available in orange.

NS Series (ACEA, ACBA, ACSA, ACKA)

4. Selector switches



18 square flat type



18 x 24 flat type



18 dia. flat type

1) 2-notch manual reset type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)	
				Part No.	
16mm dia.	18 square flat type	Double poles	Low-level circuit type (Gold-clad contact)	ACSA32164	
	18 x 24 flat type			ACSA42164	
	18 dia. projecting type			ACSA52164	

2) 3-notch manual reset type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)	
				Part No.	
16mm dia.	18 square flat type	Double poles	Low-level circuit type (Gold-clad contact)	ACSA32364	
	18 x 24 flat type			ACSA42364	
	18 dia. projecting type			ACSA52364	

5. Key selector switches



18 square flat type






18 x 24 flat type




18 dia. flat type


1) 2-notch manual reset type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)		
						
				Key removed in OFF position	Key removed in ON position	Key removed in both OFF and ON positions
				Part No.	Part No.	Part No.
16mm dia.	18 square flat type	Double poles	Low-level circuit type (Gold-clad contact)	ACKA3211241	ACKA3212241	ACKA3213241
	18 x 24 flat type			ACKA4211241	ACKA4212241	ACKA4213241
	18 dia. flat type			ACKA5211241	ACKA5212241	ACKA5213241

2) 2-notch automatic reset type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)	
					
				Key removed in OFF position	
				Part No.	
16mm dia.	18 square flat type	Double poles	Low-level circuit type (Gold-clad contact)	ACKA3221241	
	18 x 24 flat type			ACKA4221241	
	18 dia. flat type			ACKA5221241	

3) 3-notch manual reset type

Mounting hole	Form	No. of poles	Contact material	Splashproof type (IP65)	
					
				Key removed in all 3 positions	
				Part No.	
16mm dia.	18 square flat type	Double poles	Low-level circuit type (Gold-clad contact)	ACKA3237241	
	18 x 24 flat type			ACKA4237241	
	18 dia. flat type			ACKA5237241	

NS Series (ACEA, ACBA, ACSA, ACKA)

SPECIFICATIONS


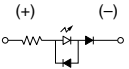
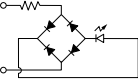
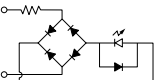
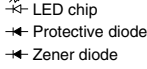
1. Contact rating

1) Gold-clad contact

Load	AC rating	DC rating
Resistive load	0.3 A 250 V AC	1.0 A 30 V DC
Minute load	1 mA 5 V AC/DC*	

Note) The usable range for the minute load indicated by the asterisk may fluctuate depending on the usage conditions and the type of load.

2. LED rating

Rated operating voltage	Operating voltage range	Rated current	LED life (reference value)	Equivalence circuit	Lighted colors
5 V DC	5 V DC \pm 5%	8 mA	Approx. 50,000 hours (with full direct current lighting at 50% of initial intensity)		Red, orange, yellow, opaque
					Green, blue
12 V AC/DC	12 V AC/DC \pm 10%	9 mA/8 mA			Red, orange, yellow, green, blue, opaque
					
24 V AC/DC	24 V AC/DC \pm 10%	9 mA/8 mA			

Note) The current limiting resistor and protective diode are built into the LED bulb.

3. Characteristics

Item	Specifications
Standard usage condition	Ambient temperature: -25 to $+55^{\circ}\text{C}$ (Not freezing) Storage temperature: -30 to $+80^{\circ}\text{C}$ Relative humidity: 45 to 85%
Contact resistance	Max. 50 m Ω (initial)
Insulation resistance	Min. 100 M Ω (500 V DC megger)
Dielectric strength	Switch section Between metal charging part and non-metal charging part: 2,000 V AC for 1 min. Between terminals with unlike poles: 2,000 V AC for 1 min. Between terminals with like poles: 1,000 V AC for 1 min. Between contact terminals and lamp terminals: 1,500 V AC for 1 min.
	Illuminating section Between charging part and ground: 2,000 V AC for 1 min.
Vibration resistance	Malfunctioning 10 to 55 Hz at single amplitude of 0.75 mm
Shock resistance	Durability 500 m/s ²
	Malfunctioning 200 m/s ²
Expected life	Mechanical Momentary: Min. 10 ⁶ times Alternate: Min. 10 ⁵ times Selector switch (incl. those with keys): Min. 2.5 \times 10 ⁵ times
	Electrical Min. 10 ⁵ times, switching frequency 1,200 times/hr. Alternate: Min. 5 \times 10 ⁴ times
Protective construction	Splashproof and oil resistance type IP65 (IEC60529)

DIMENSIONS (unit: mm)

1. Illuminated pushbutton switches and indicators



18 dia. projecting type



18 square flat type

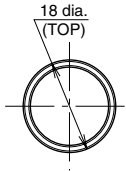


18 x 24 flat type

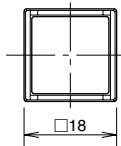


24 dia. mushroom button type

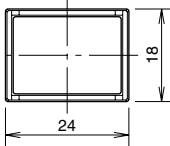
18 dia. projecting type



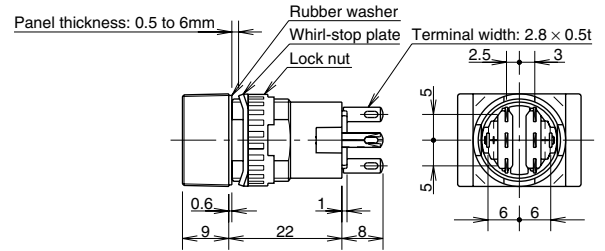
18 square flat type



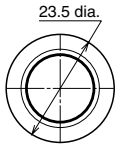
18 x 24 flat type



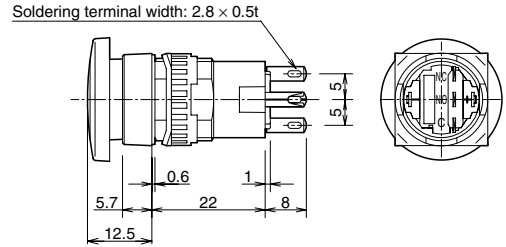
(Illuminated pushbutton switches and indicators)



24 dia. mushroom button type

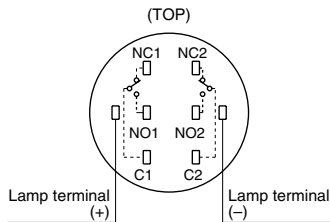


(24 dia. mushroom button type)

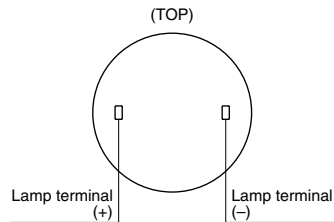


- Notes) 1. Indicators have only lamp terminals, and do not have contact terminals.
2. There is no mushroom button type in the indicator.

WIRING DIAGRAM (BOTTOM VIEW) (Illuminated pushbutton switches)



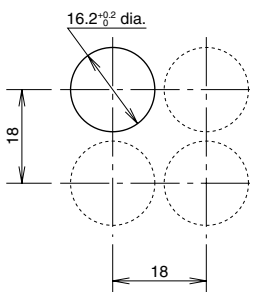
(Indicators)



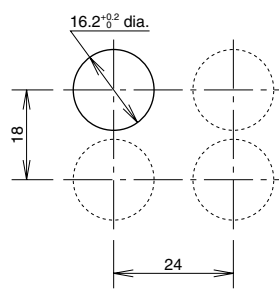
(Single pole "1 Form C" types have only the left terminal.)

Mounting hole diagram, and recommended minimum mounting pitch

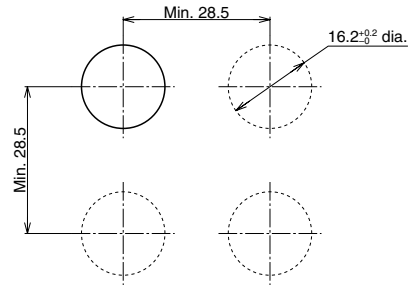
18 dia. projecting and
18 square flat types



18 x 24 flat type



Mushroom button type



Note) Operability should be taken into consideration when deciding the mounting pitch.

NS Series (ACEA, ACBA, ACSA, ACKA)

2. Pushbutton switches



18 dia. projecting type



18 square flat type

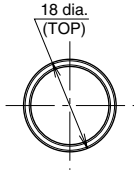


18 x 24 flat type

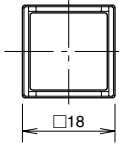


24 dia. mushroom button type

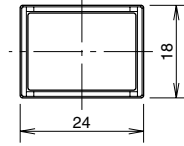
18 dia. projecting type



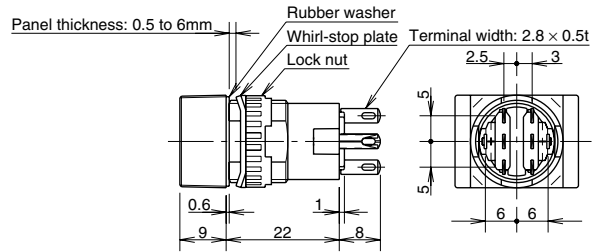
18 square flat type



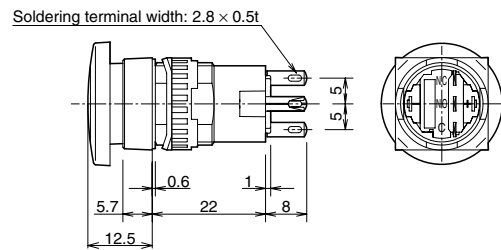
18 x 24 flat type



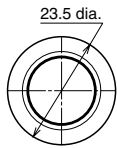
(Illuminated pushbutton switches and indicators)



(24 dia. mushroom button type)

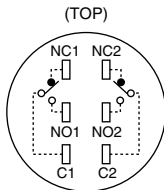


24 dia. mushroom button type



Note) Pushbutton switches have only contact terminals, and do not have lamp terminals.

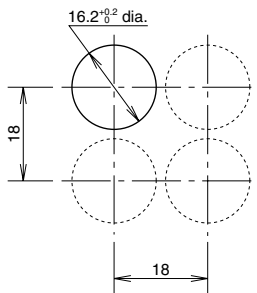
WIRING DIAGRAM (BOTTOM VIEW) (Pushbutton switches)



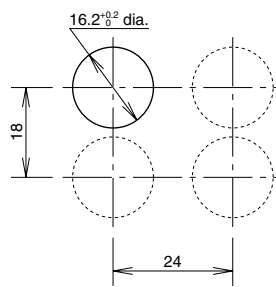
(Single pole "1 Form C" types have only the left terminal.)

Mounting hole diagram, and recommended minimum mounting pitch

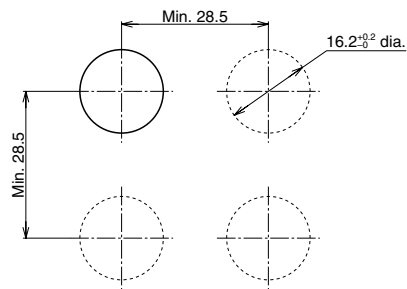
18 dia. projecting and
18 square flat types



18 x 24 flat type



Mushroom button type

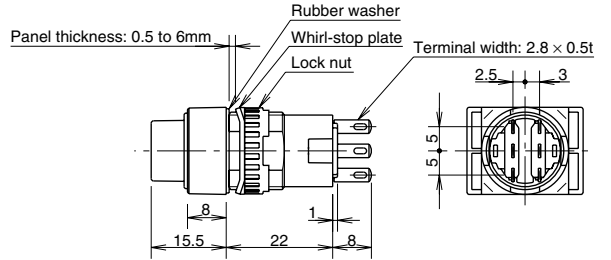
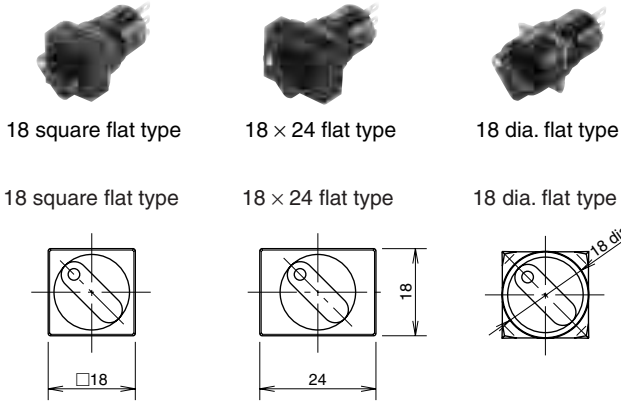


Note) Operability should be taken into consideration when deciding the mounting pitch.

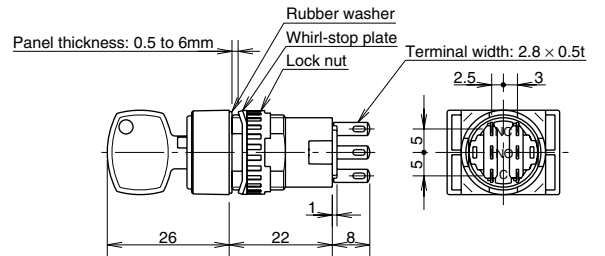
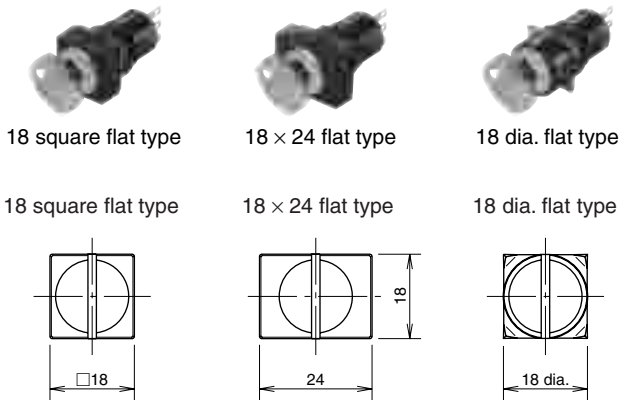
NS Series (ACEA, ACBA, ACSA, ACKA)

3. Selector switches/Key selector switches

1) Selector switches

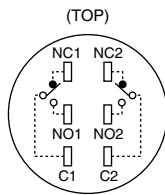


2) Key selector switches

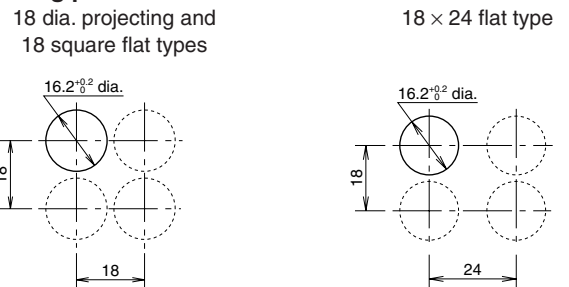


WIRING DIAGRAM (BOTTOM VIEW)

(Selector switches/Key selector switches)



Mounting hole diagram, and recommended minimum mounting pitch



Note) Operability should be taken into consideration when deciding the mounting pitch.

Internal circuit diagram

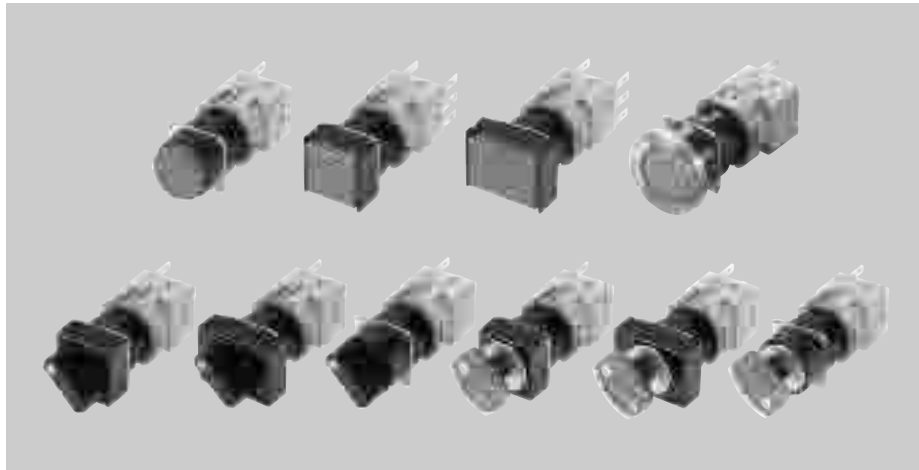
Notch positions (TOP VIEW)				
Notch specifications	Contact arrangement	1 (left)	0 (center)	2 (right)
90°— 2-notch Stopping at each position Right return	2 contacts (2 Form C)	Left contact: NO NC Right contact: NO NC 		Left contact: NO NC Right contact: NO NC
45°— 3-notch Stopping at each position	2 contacts (2 Form C)	Left contact: NO NC Right contact: NO NC 	Left contact: NO NC Right contact: NO NC 	Left contact: NO NC Right contact: NO NC

**Illuminated pushbutton,
non-illuminated pushbutton,
selector,
key selector switches**

ND Series
(mounting hole 16 dia. type)

**Bright, clear illumination (ultra-high intensity LED used)
Separate mounting model features removable lock lever**

Tight, space-saving mounting



2. Emergency pushbutton switches equipped with safety lock mechanism. Contacts have forced contact separation mechanism. Two button diameters available, 25 and 40.

1) Safety lock mechanism
A safety lock mechanism is used in which the contact does not move until the pushbutton has completely locked. Because the contact does not operate unless the button has been pressed all the way down, there is no danger of the machine suddenly stopping because of a malfunction caused by something coming in contact with the button, and no loss from such situations.

FEATURES

1. Bright, clear LED illumination

1) Uses brilliantly illuminating LEDs that are much brighter than incandescent bulbs.

2) Brightness greatly increased for vastly improved recognition and safety. Yellow and green are particularly easy to distinguish.

Makers who are especially concerned about product liability laws and worker safety and sanitation are calling for machines that are designed and manufactured based on the ISO12100 series of international safety standards (general regulations governing basic conceptual design for machine safety). With the ISO12100 series, the man-machine interface must be designed so that the status of the machine can be recognized clearly and correctly by anyone running the machine, without special training or expertise. For that reason, display lamp colors are standardized under IEC60073, IEC60204-1 and other standards cited in the ISO12100 series, and are covered by JIS standards as well. The LED illumination of the ND type meets safety needs such as these, and beyond.

Note) IEC60073:
JIS C 0448 Colors for Display Units and Operation Devices
IEC60204-1:
JIS B 9960-1 Safety of Machines and Electrical Units of Machines

Display lamp colors and meanings indicating machine status (taken from International Electrical Standards Conference IEC-60073 and 60204-1)

Color	Meaning	Explanation	Operator action
Red	Emergency	Hazardous situation	Action appropriate to hazardous situation
Yellow	Caution	Problem status/urgent or critical situation	Visual monitoring and (or) intervention
Green	Normal	Normal status	As appropriate
Blue	Obligatory	Displays status of action required by operator	Obligatory action
White	Neutral	Any other status; Can be used when using red, yellow, green, or blue might be interpreted erroneously.	Visual monitoring

3) Power consumption greatly reduced (12 V type).

The power consumption has been reduced by 60% in the 12 V type (mounting hole 16 dia. type).

4) Continuous illumination with no need for replacement for 5 years (50,000 hours).

5) Products available in 6 illuminated colors: red, orange, yellow, green, blue, and white.

	Rated current	
	Mounting hole 16 dia. type	Mounting hole 22 dia. type
12 V AC/DC type	8 mA (20 mA in previous model)	10 mA (20 mA in previous model)

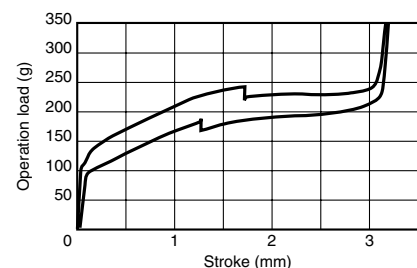


2) Forced contact separation mechanism
The mechanism is designed so that the button operation force is used, as is, as the contact separation force. Therefore, the circuit will shut off perfectly even if a problem happens to occur such as the contact welding shut. (Conforms to EN60947-5-1 Annex K.)

3) Two button diameters available, 25 and 40.

3. Nice, light switching feel. Light operation load due to snap action mechanism. Short stroke type.

Relationship between operation load and stroke (Mounting hole 16 dia. type: 1 Form C contact momentary action)



1) Stroke: 3 mm

2) Mechanical life (mounting hole 16 dia. type)
Momentary type: Min. 2×10^6
(4 times better than previous)
Alternate type: Min. 2.5×10^5
(2.5 times better than previous)

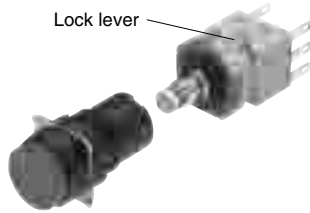
ND Series: 16 dia. types (ACEL, ACBL, ACSL, ACKL)

4. Removal/installation type with lock lever system.

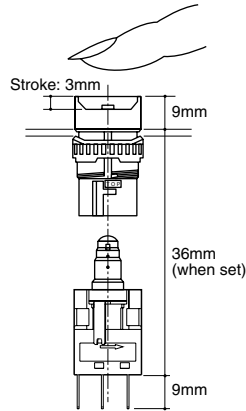
Smooth installation now possible.

- 1) New tight mounting type added. Space saving realized with small installation area.
- 2) It is easy to install in tight spaces and maintenance is easy.
- 3) Operation efficiency is greatly increased since surface installation and wiring operations can be carried out separately.

Mounting hole 16 dia. type



Mounting hole 16 dia. type exterior configuration diagram



5. Mushroom button type for easier operation.

6. Splashproof type protective construction (IP65).

Conforms to IEC 60529.

7. Safety standard

- 1) UL and CSA certified (excluding buzzer).
- 2) Conforms to EN standard (excluding buzzer), has received CE marking.

8. Durability

Thermoplastic materials are used for durability in the outer casing and installation points.

9. Contacts made of cadmium-free material.

RoHS Directive compatibility information
<http://www.nais-e.com/>

ORDERING INFORMATION

1. Illuminated pushbutton switches (LED illumination) and indicators (display lamps)

Illumination type
 EL: LED type

Mounting holes and flange shapes
 (With transparent button type)

Mounting hole	Flange shape
2: 16 dia.	18 dia. projecting type
3: 16 dia.	18 square flat type
4: 16 dia.	18 × 24 flat type

(With mushroom button type)

Mounting hole	Flange shape
0: 16 dia.	24 dia.
5: 16 dia.	30 dia.

Protective construction

2: Splashproof type (IP65)

No. of poles and operating characteristics

0: Indicator (indicator lamp)	3: Single-pole (1 Form C) alternate
1: Single-pole (1 Form C) momentary	4: Double-pole (2 Form C) alternate
2: Double-pole (2 Form C) momentary	

Contact material

0: Indicator (indicator lamp) (No contact)	2: Low-level circuit type (Gold-clad contact)
1: Standard type (Silver contact)	

LED voltages and pushbutton colors

Pushbutton color		Color					
		Red	Orange	Yellow	Green	Blue	White (LED: opaque)
LED voltage	5 V DC	1R	4J	4Y	7G	7L	4X
	12 V AC/DC	2R	5J	5Y	8G	8L	5X
	24 V AC/DC	3R	6J	6Y	9G	9L	6X

Terminal shape and mounting dimensions

Nil: solderable tab terminal, tight mounting
 3: Terminal for PC board and tight mounting (only gold contact)

Color cap types

Nil: Regular K: Mushroom button type * There is no mushroom button type in the indicator (indicator lamp).

ACEL 2