This document provides information mainly for selecting suitable models. Please read the document Instruction Sheet carefully for information that the user must understand and accept before purchase, including information on warranty, limitations of liability, and precautions.

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Cat. No. A190-E1-01

**Authorized Distributor:** 

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Printed in Japan

NEW

Pushbutton Switches/Indicators A22R/M22R series



Robust and Graceful design

# **Pushbutton Switches**







A22R/M22R Series Push Button

A22R/M22R Series Push Button

# Responds with high grade

# illumination to Various needs

2 Soft to the touch

• Gentle design for human



# Shining Metal Ring

Provides shining and robust metal ring.







3 Additional unit type

Switch unit can be added.



## Compact size

The body length under a panel decreased by 15% compare with our former products.



A22R/M22R Series Push Button A22R/M22R Series Push Button

## **Assembled Models**

## Non-lighted Type



## Lighted Type



## Selector Non-lighted Type



## Selector Lighted Type



## Key Selector Type



<sup>\*</sup> Refer to the Safety Components Series Catalog (Cat. No. Y106) for detail.

Indicator

Indicator

M22R-E □ - □



## **Emergency Stop Switch**



A22E-□-□-□

# **Operation Units**





Flat type A22R-F□-□ Projection type A22R-T□-□

## Lighted Type



Projection type A22RL-T□-□

## Selector Non-lighted Type



## Selector Lighted Type



## Key Selector







## Lamp Socket



Switch Unit



Switch with Lamp socket



Socket

LED

## Mounting Plate





A22R-3200



LED A22R-□□ A22R/M22R Series Push Button A22R/M22R Series Push Button

# **Assembled Models**

## Pushbutton Switches

#### Non-lighted/Lighted

Appearance	Pushbutton shape	Pushbutton color	Contact form	Part No.	Dimensions
A22R-F□-□□			1a	A22R-FW-10□	28°
			1a	A22R-FB-10□	
			1a	A22R-FG-10□	98
			1a	A22R-FR-10□	
			1a	A22R-FY-10□	29.8
100	Round/Flat		1a	A22R-FA-10□	\$\frac{\phi}{29.8}
			1b	A22R-FB-01□	10.8
			1b	A22R-FR-01□	φ (
		Insert one of th M: Momentary A: Alternate	e following let	ters into the box □.	46.8
A22R-T□-□□			1a	A22R-TW-10□	
	Projection		1a	A22R-TB-10□	<i></i>
			1a	A22R-TG-10□	φ23.7
			1a	A22R-TR-01□	16.7
			1a	A22R-TY-10□	
<b>U</b>			1a	A22R-TA-10□	
4			1b	A22R-TB-01□	8,8
			1b	A22R-TR-01□	1
		Insert one of the following letters into the box $\square$ . M: Momentary A: Alternate			
A22RL-T□-□-□□			1a	A22RL-TW-24A-10□	
			1a	A22RL-TG-24A-10□	
	Projection AC, DC 24V		1a	A22RL-TR-24A-10□	<b>Ø</b> 29.8
	7.0, 20 2.1		1a	A22RL-TY-24A-10□	Ø23.7
			1a	A22RL-TA-24A-10□	16.7
			1a	A22RL-TW-T2-10□	φ ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (
			1a	A22RL-TG-T2-10□	80
	Droingtian		1a	A22RL-TR-T2-10□	9,9
	Projection AC 220V		1a	A22RL-TY-T2-10□	
			1a	A22RL-TA-T2-10□	
		Insert one of the M: Momentary A: Alternate	e following let	ters into the box $\square$ .	

# Assembled Models

## Selector Switches

Appearance	Number of notch	Knob position	Knob color	Contact form	Part No.	Dimensions		
A22RS-2□-□		\ /		1a	A22RS-2M-10	28°		
1				1a1b	A22RS-2M-11			
	2 notches	$\bigcirc$		1a	A22RS-2A-10			
-				1a1b	A22RS-2A-11			
A22RS-3□-□		$\downarrow$		2a	A22RS-3M-20	29.8		
		$\Diamond$		2a	A22RS-3A-20	Ø29.8		
	3 notches			,		46.8 6 10 24.2		
A22RW-2□□-□-□		\/		1a	A22RW-2MG-24A-10	φ29.8		
	2 notches			1a1b	A22RW-2MR-24A-11			
	AC, DC 24V	$\Diamond$		1a	A22RW-2AY-24A-10	010000000000000000000000000000000000000		
ACCRIMATE E		v		1a1b	A22RW-2AA-24A-11	φ		
A22RW-3□□-□-□				2a	A22RW-3MG-24A-20	1 1988		
	3 notches	-		2a	A22RW-3MR-24A-20			
	AO, DO 24V	, io, bo 24V	7.0, DO 24V					
	3 notches AC, DC 24V	$\Diamond$		2a 2a	A22RW-3AY-24A-20 A22RW-3AA-24A-20			

## **Assembled Models**

A22R/M22R Series Key/Signal Indicator/Construction

## Selector Switches

Appearance	Number of notch	Key position	Contact form	Part No.	Dimensions
A22RK-2□-□		٩	1a	A22RK-2ML-10	28°
			1a1b	A22RK-2ML-11	
-		٩٧	1a	A22RK-2M-10	
	2 notches		1a1b	A22RK-2M-11	» (( <b>(()))</b> )
10	2 Holdries	9	1a	A22RK-2AL-10	
			1a1b	A22RK-2AL-11	29.8
		O: key release	position		E AZZIK
A22RK-3□-□		•	2a	A22RK-3ML-20	
		~	2a	A22RK-3M-20	9
		Ů	2a	A22RK-3MC-20	000000000000000000000000000000000000000
	3 notches	♦	2a	A22RK-3AC-20	9
		O: key release	position		9.88

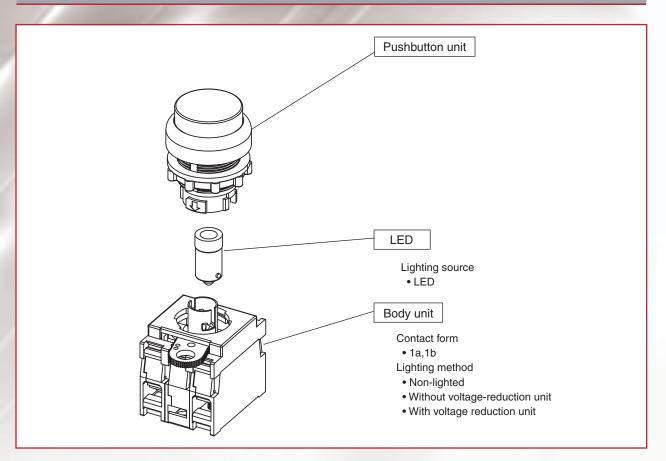
## Indicator

#### All-in-one type

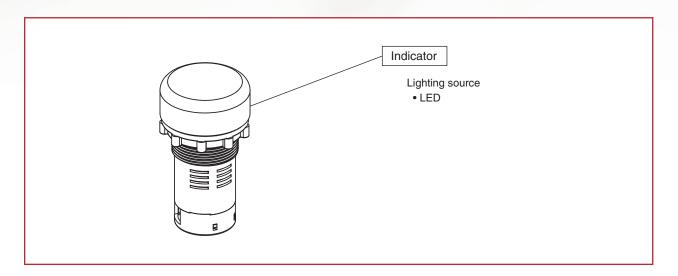
Appearance	LED rating	Indicator color	Part No.	Dimensions
M22R-E□-□			M22R-EW-24A	Ø29.8
			M22R-EG-24A	
	AC, DC 24V		M22R-ER-24A	
			M22R-EY-24A	
			M22R-EA-24A	14.4
and the same of th			M22R-EW-T2	7
			M22R-EG-T2	φ
	AC 220V		M22R-ER-T2	1000
			M22R-EY-T2	
			M22R-EA-T2	<u> </u>

## Structure

## A22R series



## M22R series



A22R/M22R Series Push Button 11 A22R/M22R Series Push Button

# Individual Unit

## Pushbutton unit

Non-lighted/Lighted

Appearance	Pushbutton shape	Pushbutton color	Part No.	Dimensions
A22R-F□-□			A22R-FW-□	<i></i>
			A22R-FB-□	
			A22R-FG-□	
	Round/Flat		A22R-FR-□	
	Hound/Flat		A22R-FY-□	
1.			A22R-FA-□	108
		Insert one of the M: Momentary A: Alternate	e following letters into the box $\square$ .	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
A22R-T□-□			A22R-TW-□	
	Projection		A22R-TB-□	
			A22R-TG-□	16.7
			A22R-TR-□	7 10 19
-			A22R-TY-□	8 0
			A22R-TA-□	
		Insert one of the M: Momentary A: Alternate	e following letters into the box $\square$ .	
A22RL-T□-□			A22RL-TW-□	
			A22RL-TG-□	
	Projection		A22RL-TR-□	0.57
	Lighted type		A22RL-TY-□	3
			A22RL-TA-□	22
			Insert one of the M: Momentary A: Alternate	e following letters into the box $\square$ .

# Individual Unit

## **Selector unit**

Appearance	Number of notch	Knob position	Knob color	Part No.	Dimensions
A22RS-2□		$\vee$		A22RS-2M	<i> </i>
Section 1		$\Diamond$		A22RS-2A	
	2 notches				
A22RS-3□		$\bigvee$		A22RS-3M	
A Company of the Comp		$\Diamond$		A22RS-3A	24.2
3 notches	3 notches	* These N	on-lighted type	s provide black knobs.	22
422RW-2□				A22RW-2MG	
				A22RW-2MR	
And .				A22RW-2MY	
	2 notches			A22RW-2MA	
100	Lighted Type			A22RW-2AG	
		$\bigcirc$		A22RW-2AR	010000000000000000000000000000000000000
		Ť		A22RW-2AY	¥ 0 1
				A22RW-2AA	2 9
				A22RW-3MG	
		$\downarrow$		A22RW-3MR	
	3 notches Lighted			A22RW-3MY	
	Type			A22RW-3AA	
		$\bigcirc$		A22RW-3AG	
				A22RW-3AR	

A22R/M22R Series Key/Switch Section/Mounting Console

A22R/M22R Series Key/Switch Section/Mounting Console

# Individual Unit

## **Selector unit**

#### Key Selector

Appearance	Number of notch	Key position	Part No.	Dimensions
A22RK-2□		°	A22RK-2ML	Ø29.8
17		~~	A22RK-2M	
6	2 notches	<b>\langle</b>	A22RK-2AL	
		O: key release position	on	
A22RK-3□		<u> </u>	A22RK-3ML	AZZIK.
200		~	A22RK-3M	
	3 notches	Ů,	A22RK-3MC	10,00
		$\diamondsuit$	A22RK-3AC	22 0
		O: key release position	n	, , , , , , , , , , , , , , , , , , , ,

## Switch unit

#### For Lighted type

Appearance	Туре	Contact form	Part No.	Dimensions
A22RL-□M-□		1a	A22RL-10M	
		1b	A22RL-01M	29.8
	Standard	2a	A22RL-20M	Ø10.3
		2b	A22RL-02M	φ ε,
		1a1b	A22RL-11M	
AC 220'		1a	A22RL-10M-T2	8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
		1b	A22RL-01M-T2	
	AC 220V	2a	A22RL-20M-T2	
		2b	A22RL-02M-T2	
		1a1b	A22RL-11M-T2	

#### For Non-lighted type

Appearance	Туре	Contact form	Part No.	Dimensions
A22R-□M		1a	A22R-10M	29.8
	Socket	1b	A22R-01M	5:00
		2a	A22R-20M	
		1a1b	A22R-11M	
		2b	A22R-02M	

# Individual Unit

## **Switch / Lamp units**

#### Switch unit

Appearance	Unit	Contact form	Part No.	Dimensions
A22R-□		1a	A22R-10	9.8
		1b	A22R-01	5.6
	Contact block	* Additional one block can be 1a1b.	mountet to make 2a, 2b, or	36 36

#### Lamp socket

Appearance	Unit	Rating	Part No.	Dimensions
A22R-□	Lamp socket	Without voltage reduction unit AC/DC6V, AC/DC12V, AC/DC24V	reduction unit A22R-TN A22R-TN	
E		With voltage reduction unit AC220V	A22R-T2	9.8

## **Mounting plate**

Appearance	Unit	Part No.	Dimensions
A22R-3200	Mounting plate	A22R-3200	28°

14 A22R/M22R Series LED/Button/Knob/Key/Signal Indicator

## **Individual Unit**

## Lamp unit

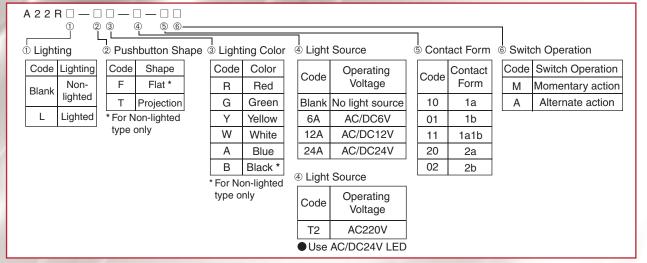
• LED

Appearance	LED operating voltage	Lighting color	Part No.	Dimensions
A22R-□□			A22R-6AW	
			A22R-6AG	
	LED AC/DC6V		A22R-6AR	
			A22R-6AY	
			A22R-6AA	
			A22R-12AW	<del>-</del>
· 100	LED -		A22R-12AG	BA9S/13
			A22R-12AR	88
			A22R-12AY	φ9.3
			A22R-12AA	
			A22R-24AW	
			A22R-24AG	
	LED AC/DC24V		A22R-24AR	
			A22R-24AY	
			A22R-24AA	

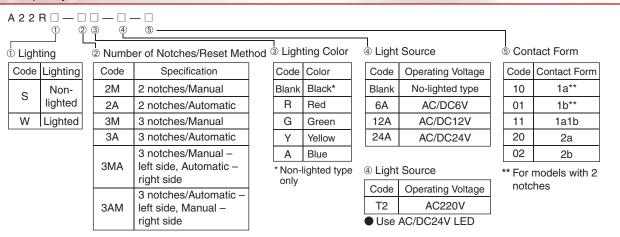
## Nomenclature

#### Nomenclature

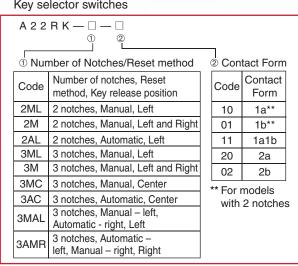
● Completely Assembled A22R□-□□-□-□ Pushbutton switches



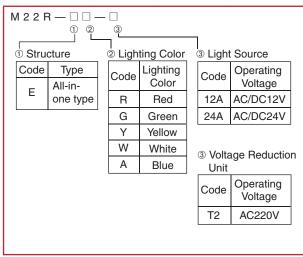
● Completely Assembled A22R□-□□-□ Selector switches



Completely Assembled A22RK-□-□
 Key selector switches



● Completely Assembled M22R-□□-□ Indicator



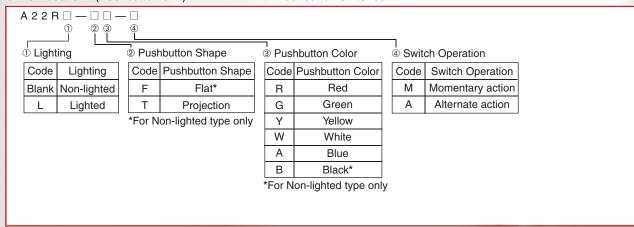
16 A22R/M22R Series Switch Section/ Indicator Section/LED

A22R/M22R Series Switch Section/ Indicator Section/LED 17

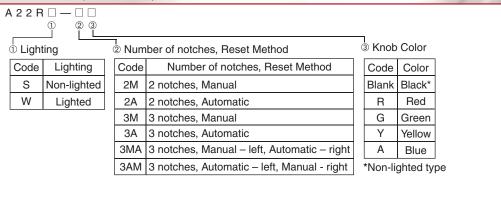
## **Individual Unit**

#### Nomenclature

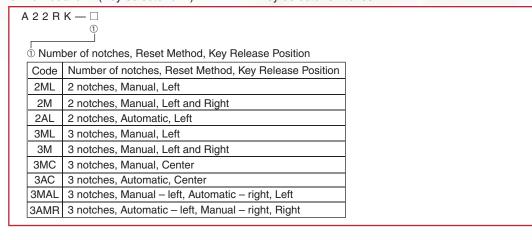
● Individual unit (Pushbutton unit) A22R□-□□-□ Pushbutton switches



● Individual unit (Selector unit) A22R□-□□ Selector switches



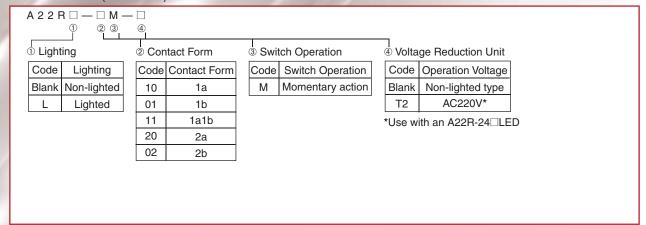
● Individual unit (Key selector unit) A22RK-□ Key selector switches



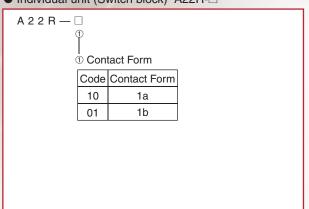
## Nomenclature

#### Nomenclature

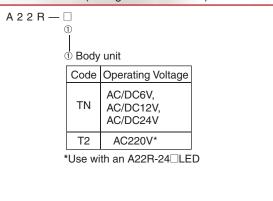
■ Individual unit (Switch unit) A22R□-□M-□



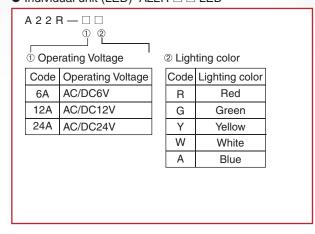
● Individual unit (Switch block) A22R-□



● Individual unit (Voltage-reduction unit) A22R-□



■ Individual unit (LED) A22R-□□ LED



# Accessories / Tools

## **Items**

#### Accessories

Ite	em	Appearance	Clas	ssification		Part No.	Remarks	
					White	A22Z-3321		
	Standard			With Snap-in Legend Plate (without text)		Red	A22Z-3322	Snap-in Legend Plate is acrylic.
	size				Black	A22Z-3323	Shap-in Legend Flate is acrylic.	
Legend Plate		•	Without Snap	p-in Legend	Plate	A22Z-3320		
Frames					White	A22Z-3331		
	Large		With Snap-i Plate (with		Red	A22Z-3332	Coop in Logand plate is comilie	
	size		·		Black	A22Z-3333	Snap-in Legend plate is acrylic.	
			Without Snap	p-in Legend	Plate	A22Z-3330		
Lock	Ring	(N)	Round		A22Z-3360	The Lock Ring is used when more secure lock feature is required.		
Sealing Caps		For flat models		A22Z-3600F	Used to prevent dust or water from entering the Operation Unit (Pushbutton, etc.).			
Sealin	ig Caps		For projection models		ls	A22Z-3600T	Color: opaque Material: silicon	
Hole	e plug		F	Round		A22Z-3530	Can be plugged into pre-cut panel holes for future expansion. The color is black.	
	One hole			A22Z-B101				
Contro	l Boxes		Two holes Three holes			A22Z-B102	Material: Polycarbonate resin.	
						A22Z-B103		
Conn	a ata ra		Applicable diameter			A22Z-3500-1	Plastic connector used to extend	
Conn	nectors		(mm)	ø9~1	1	A22Z-3500-2	a cable from the Switch Box. (See page 30)	

# Accessories / Tools

## **Items**

-	_	=	-	=	=	
۸	_		_	_	_	

Black   A22Z-3443B	
text	
text White A22Z-3443W	
Transparent A22Z-3443C	
White text O A22Z-3443R-2 on red	
background STOP A22Z-3443R-4	
	ached to the Standard
	Plate Frame. Material: Acrylic.
Legend ON A22Z-3443B-5	
Plates With text White text OFF A22Z-3443B-6	
on black background UP A22Z-3443B-7	
DOWN A22Z-3443B-8	
POWER ON A22Z-3443B-9	
OFF-ON A22Z-3443B-10	
Black A22Z-3453B	
Large Without Red A22Z-3453R Atta	Legend Plate Frame.  Material: Acrylic.
White A22Z-3453W Mat	
White A22Z-3453W Mate Transparent A22Z-3453C	
White A22Z-3453W Mai	
White   A22Z-3453W   Material   A22Z-3453C   A22Z-3453C   A22Z-3460   A22Z-3460-1   Afterial   A22Z-3460-1   A44Z-3460-1   A44Z-347-1   A44Z-347-1   A44Z-347-1   A4	er printing on a film,
White         A22Z-3453W         Mate           Transparent         A22Z-3453C           No print (Round)         A22Z-3460                     A22Z-3460-1         After affix           Character Films         O         A22Z-3460-2         the	ix to the indicator Plate of Lighted Pushbotton Switch
White   A22Z-3453W   Mate   A22Z-3453W   Mate   A22Z-3453C     Transparent   A22Z-3453C     No print (Round)   A22Z-3460-1   After affix the care   A22Z-3460-2   The care   A22Z-3460-2   A22Z-3460-2   The care   A22Z-3460-2   The care   A22Z-3460-2   A22Z-3460-2   The care   A22Z-3460-2   The	ix to the indicator Plate of

#### Tools

Item	Appearance	Part No.	Remarks
Lamp Extractor		A22Z-3901	Rubber tool used to easily replace Lamps.
Tightening wrench		A22Z-3905	Tool used to tighten nuts from the back of the panel.

# **Specifications**

## Approved standards

#### Switch unit

UL, cUL	UL 508/CSA C22.2 No.14 File No. E76675 6A 240VAC/10A 120VAC
EN EN60947-5-1 (low voltage directive) 3A 240VAC (AC-15)	
ccc	GB/14048.5-2001 3A 240VAC/1.5A 24VDC

#### Lamp unit

UL 508/CSA C22.2 No.14
File No. E76675
24\/ΔC/DC ΜΔΧ

#### Voltage-reduction unit

UL, cUL	UL 508/CSA C22.2 No.14 File No. E76675 220VAC
ccc	GB/14048.5-2001 220VAC

#### Indicator

UL, cUL	UL 508/CSA C22.2 No.14 File No. E76675 12A: 12VAC/DC 24A: 24VAC/DC T2: 220VAC
ccc	GB/14048.5-2001 T2: 220VAC

## Ratings

#### Contacts

Rated current	Rated voltage	Inductiv	ve load
(A)	(V)	Rated current (A)	Power factor
10	240	3	0.4

Rated current values are determined according to the testing conditions. The above ratings were obtained by conducting tests under the following conditions:

Ambient temperature: 20+/- 2°C Ambient humidity: 65+/-5%RH

Operating frequency: 30 operations/minute

#### ● LED (For pushbutton unit)

Operating voltage	Current consumption
AC/DC 6V±5%	20mA
AC/DC 12V±5%	20mA
AC/DC 24V±5%	20mA

#### ● LED (For indicator unit)

Operating voltage	Current consumption
AC/DC 12V±5%	20mA
AC/DC 24V±5%	20mA

#### Voltage reduction unit (For pushbutton and indicator units)

Operating voltage	Current consumption
AC 200V(190 to 230V)	20mA

## Characteristics

## Characteristics

#### Environmer

	Environment	
	Ambient temperature*1	Non-lighted type: -20 to +60°C Lighted type: -20 to +50°C
	Ambient humidity	-35 to 85%RH
7	Storage temperature*1	-40 to +70°C
	Protective code*2	IP65
	Vibration resistance	10 to 55Hz, Double amplitude 1.5mm
	Shock resistance	Non-lighted type: 1,000m/s <sup>2</sup> Lighted type: 600m/s <sup>2</sup>

<sup>\*1:</sup> With no icing or condensation

#### Operation

Operation		Slow action
Operating Mechanical		Momentary operation: 60 operations/minute max.
frequency Electrical	Knob-type and Key-type selector: 30 operations/minute max.	
Mechanical durability		Momentary switch :3,000,000 operations Alternate, Key/Knob Selector switches: 300,000 operations

#### Electrical Characteristics (Switch block)

· · · · · · · · · · · · · · · · · · ·	·
Insulation resistance	100MΩ Minimum (At 500VDC)
Dielectric strength	Between terminals of same polarity: AC2,500V 50/60Hz for 1 minute Between terminals of different polarity: AC2,500V 50/60Hz for 1 minute
Rating	AC-15, A600, Ue=240V, Ie=3A
Rated insulation voltage	Ui=600V, Pollution degree: 3
Conditional short-circuit current	10A, IEC60209-1
Electrical durability	500,000 operations Minimum (at AC 240V, 3A, cosø=0.4)

<sup>\*2:</sup> Protection against dust or water from the front of a mounting panel side

# Characteristics

## Operating characteristics

#### Pushbutton switch (1a1b)

Total Travel Force (TTF)	29.4N Maximum
Total Travel (TT)	5.5mm Maximum

#### Knob-type selector switch (1a1b)

Total Travel Force (TTF)	Manual reset: 0.34N·m Maximum * Auto-reset 2-notch: 0.25N·m * 3-notch: 0.34N·m *	
Total Travel (TT)	2-notch: approx. 90 degree (3-notch: approx.45 degree)	
Releasing Force (RF)	Manual reset: 0.34N⋅m Maximum *	

<sup>\*</sup> Rotation torque for knob type/key type selector switches.

#### Key-type selector switch (1a1b)

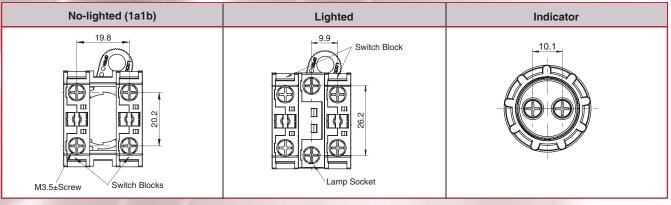
Total Travel Force (TTF)	Manual reset: 0.34N·m Maximum * Auto-reset 2-notch: 0.25N·m * 3-notch: 0.34N·m *	
Total Travel (TT)	2-notch: approx. 90 degree (3-notch: approx.45 degree)	
Releasing Force (RF)	Manual reset: 0.34N·m Maximum *	

<sup>\*</sup> Rotation torque for knob type/key type selector switches.

# Terminal

## Terminal Arrangement

#### Bottom view (unit: mm)



## Terminal connection

Туре	Terminal connection
Non-lighted (1a1b)	BOTTOM VIEW  1 3 4
Lighted without voltage reduction unit (1a1b)	BOTTOM VIEW  1
Lighted with voltage reduction unit (1a1b)	BOTTOM VIEW  (1) (3) (4) (4)

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## **Precautions**

#### Precautions

#### <u>∕.\</u>Warning

Do not wire and/or touch the switch terminal while power is supplied to the switch to avoid electric shock.



#### Correct Use

#### Mounting

- Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance.
- Do not tighten the mounting ring more than necessary using tools such as pointed-nose pliers. Doing so will damage the mounting ring. The tightening torque is 0.98 to 1.96N·m.
- Recommended panel thickness: 1 to 5 mm.

#### Wirin

- Terminal screws must be Phillips with a square washer.
- The tightening torque is 1.08 to 1.27N·m.
- Single wires, stranded wires and crimp terminals except round type can be connected to the Switch.
- Applicable Wire Size

Strand wire: 2mm<sup>2</sup> Maximum

Solid wire: 1.6mm diameter Maximum

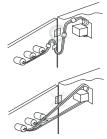
Bare Crimp Terminals



Crimp Terminal with Insulating Sheath



- Secure appropriate insulation distance after wiring of the Switch.
- Perform wiring so that the lead wires will not be caught on other objects as this will cause stress on the Switch terminals.
   Wire the Switch so that there is slack in the lead wires and fix lead wires at intermediate points. If the panel to which the Switch is mounted needs to be opened and closed for maintenance purpose, perform wiring so that the opening and closing of the panel will not interfere with the wiring.

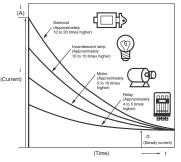


#### Operational Environment

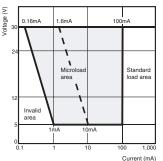
- The IP65 model is designed with a degree of protection so that it will not sustain damage if it is subject to water from any direction to front of the panel
- This Switch is indoor use only. Outdoor use of the Switch will cause operation failure of the Switch.
- Do not use the Switch in the water, oil, or in locations where water, oils, detergent, chemicals, or solvent is applied to the Switch always.
   Otherwise, switching failure will be happened.
- Do not use the Switch under the environmental condition where corrosive gas (ammonia, chlorine, dioxide sulfur...etc.) is generated. Otherwise, the Switch will corrode.
- Do not use the Switch in locations where dust, metal or plastic dust exists.
   Dust will accumulate o the Switch, and then the Switch wouldn't operate normally.
- Do not use the Switch under the environmental condition where excessive vibration or shock exists. Otherwise, incorrect switching would occur.

#### Electrical Conditions

- The switching load capacity of the Switch greatly varies between AC and DC. Always be sure to apply the rated load. The control capacity will drastically drop if it is a DC load. This is because a DC load has no current zero-cross point, unlike an AC load. Therefore, if an arc is generated, it may continue for a comparatively long time. Furthermore, the current direction is always the same, which results in a contact relocation phenomena whereby the contacts easily stick to each other and do not separate when the surfaces of the contacts are uneven.
- Some types of load have a great difference between normal current and
  inrush current. Make sure that the inrush current is within the permissible
  value. The greater the inrush current in the closed circuit is, the greater
  the contact abrasion or shift will be. Consequently, contact weld, contact
  separation failures, or insulation failures may result. Furthermore, the
  Switch may be broken or damaged.
- If the load is inductive, counter-electromotive voltage will be generated.
  The higher the voltage is, the higher the generated energy will be, which
  increase the abrasion of the contacts and contact relocation phenomena.
  Be sure to use the Switch within the rated conditions.



Before using the Switch, be sure to test the Switch under actual conditions.
 This product is a standard load type Switch. Using the Switch for opening and closing a microload circuit may cause contact failure. Use the Switch within the operating range as shown in below chart.



 When use the Switch for opening and closing a microload or large-load, use the Switch with an appropriate relay.

## **Precautions**

#### **Precautions**

#### Switching

- Do not use the Switch for loads that exceed the rated switching capacity or other contact ratings. Doing so may result in contact weld, separation failure, or insulation failures. Furthermore, the Switch may be broken or damaged.
- Do not touch the charged switch terminals while power is supplied, otherwise an electric shock may be received.
- The life of the Switch varies greatly with switching conditions.
   Before using the Switch, be sure to test the Switch under actual conditions. Make sure that the number of switching operations is within the permissible range.
- If a deteriorated Switch is used continuously, insulation failures, contact weld, contact failures, switch damage, or switch burnout may result.
- Do not apply excessive or incorrect voltages to the Switch or incorrectly wire the terminals. Otherwise, the Switch may not function properly and have an adverse effect on external circuitry.
- Furthermore, the Switch itself may become damaged or burnt.
- Do not use the Switch in locations where flammable or explosive gasses are present. Otherwise switching arcs or heat radiation may cause a fire or explosion.
- Do not drop or disassemble the Switch, otherwise it may not be capable of full performance. Furthermore, it may be broken or burnt.

#### • LED

- The LED current-limiting resistor is built-in, so internal resistance is not required.
- If commercially available LEDs are used, select the ones that meet the following conditions:
   Base: BA9S/13□

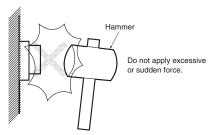
Overall length: 26mm Maximum
Power consumption: 2.6 W Maximum

#### Storage

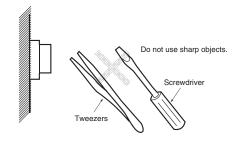
- When the Switch is left unused or stored for long periods, the ambient conditions can have a great effect on the condition of the Switch. In certain environments, leaving the Switch exposed may result I deterioration (i.e., oxidation, or the creation of an oxide film) of the contacts and terminals, causing the contact resistance to increase, and making it difficult to solder the lead wires. Therefore, store in a well-ventilated room, inside, for example, a non-hygroscopic case, in a location where no corrosive gasses are present.
- If the Switch is stored in a location where it will be exposed to direct light, colored resin in the colored plate may fade. Therefore, do not store the Switch I locations where it will be exposed to direct light.

#### Mechanical Conditions

 Operating the Switch using a hard object (e.g., metal), or with a large or sudden force, may deform or damage the Switch, resulting in faulty or rough operation, or shortening of the Switch life.



 The pushbutton surface is composed of resin. Therefore, do not attempt to operate the pushbutton using a sharp object, such as a screwdriver or a pair of tweezers. Also, do not drop, throw, or knock the Switch. Doing so may damage or deform the pushbutton surface and result in faulty operation.

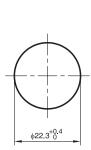


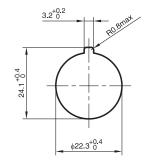
Periodic maintenance is required to use the Switch stably.

## Installation

## Mounting to the Panel

- ① Panel Hole Dimensions
- The cutout dimensions are as shown in below:

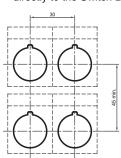


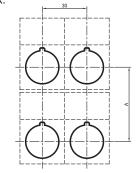


When Lock Ring is not used.

When Lock Ring

- · Recommended panel thickness is 1 to 5mm.
- In outer surface treatment such as coating is performed for the panel, the panel dimensions after outer surface treatment must meet the specified panel dimensions.
- ② Matrix Installation
- (1) The following panel hole dimensions apply when Switch Unit and the Standard-size Legend Plate Frame and Lock Ring are mounted, and lead wires are connected directly to the Switch Block.
- (2) The following panel hole dimensions apply when the Large-size Legend Plate Frame is mounted, and when crimp terminals are connected to the Switch Block terminals.



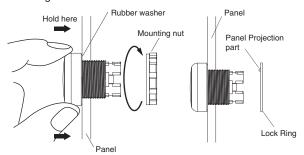


Type of crimp terminal	Dimension A
Bare crimp terminals	51 mm Minimum
Crimp terminals with insulating sheath	60 mm Minimum

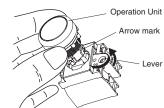
Note: The above dimensions are the minimum dimensions for when the wires described under "Applicable Wire Size".

If a different wires are used, the wiring dimensions may be different so determine an appropriate pitch before setup.

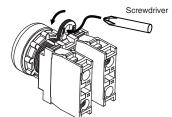
- 3 Mounting the Operation Unit on the Panel
- Insert the Operation Unit (Pushbutton, etc.) from the front surface of the panel, insert the Lock Ring and the mounting nut from the terminal side, then tighten the nut. Before tightening, check that the rubber washer is present between the Pushbutton Unit and the panel.
- When using a Legend Plate Frame, put one rubber washer each between the Legend Plate Frame and the panel and between the Operation Unit and the Legend Plate Frame.
   (One rubber washer will be provided when one Legend Plate Frame is ordered.)
- Align the Lock Ring with the groove in the casing, then insert the Lock Ring so that its edge is located on the panel side.
- Tighten the mounting nut at a torque of 0.98 to 1.96N·m.
- When using a Lock Ring, replace with the supplied Lock Ring, insert the projecting part into the lock slot, and then tighten the mounting nut.



- Mounting the Switch on the Pushbutton Unit
- Insert the Pushbutton Unit into the Switch Unit, aligning the arrow mark inscribed on the Case with the lever on the Switch Blocks, then move the lever in the direction indicated by the arrow in the following figure.



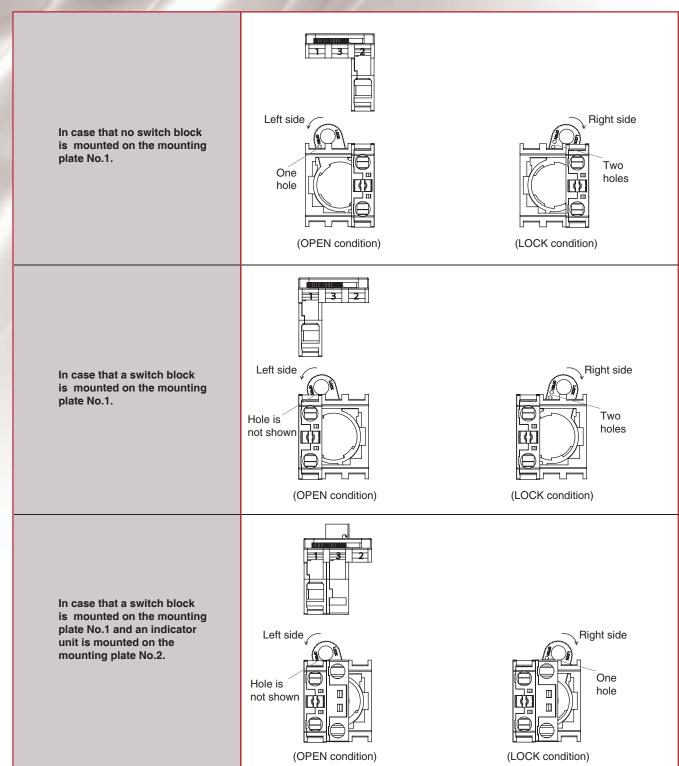
- ⑤ Removing the Switch
- Move the lever in the direction indicated by the arrow in the following figure, then pull the Pushbutton Unit or the Switch Blocks.
- Since the lever has a hole with an inside diameter of 6.5mm, the lever can be moved in the specified direction by inserting a screwdriver into the hole and then moving the screwdriver.



## Installation

## How to confirm the Lever Position, OPEN or LOCK

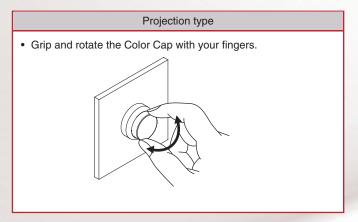
● The Lever Position, OPEN (Operation unit is not fixed)/LOCK (Operation unit is fixed), can be confirmed from the Switch terminal side.



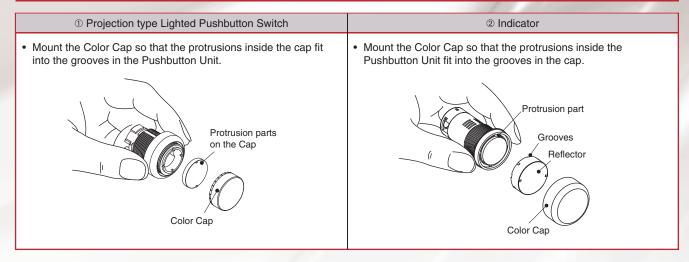
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## Installation

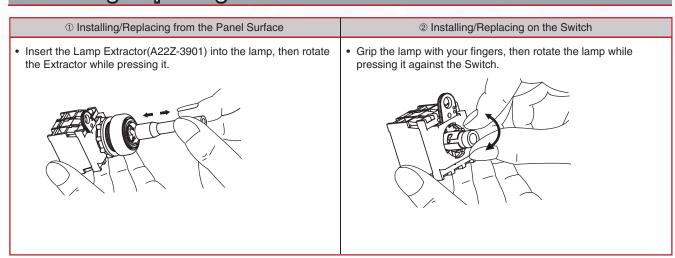
## Mounting/Replacing the Color Cap



## Assembling the Cap

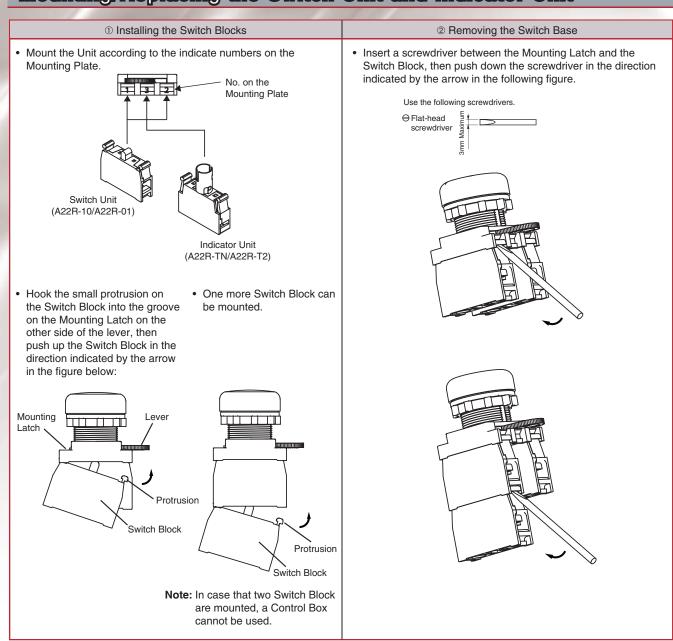


## Installing/Replacing the LED



## Installation

## Mounting/Replacing the Switch Unit and Indicator Unit



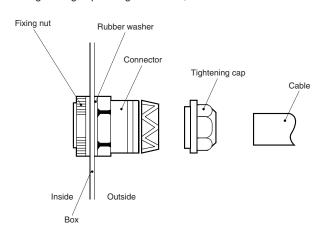
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## Installation

#### **Control Box**

# The Standard-size Legend Plate Frame can be mounted. Mount the Switch in the same way as for an ordinary panel. Place the tip of a screwdriver on the surface where the cable port hole is to be created with the cover attached and strike the screwdriver to punch a hole. Attempts to punch a hole on the other side of the case will damage the Box. Screwdriver to punch a hole of the case will damage the Box. Screwdriver to punch a hole of the case will damage the Box. Screwdriver to punch a hole of the case will damage the Box.

- ③ Securing the Connector Cable
- ① Insert the connector into the cable port in the Box and secure with the fixing nut inside the box.
- ② Open a hole in the thin rubber section of the rubber ring.
- 3 Pass the tightening cap through the cable, insert the cable into the connector, and tighten the hexagonal nut to secure the cable.



Cable diameter (mm)	Connector	
7 to 9 mm dia.	A22Z-3500-1	
9 to 11 mm dia.	A22Z-3500-2	

## Installation

## Engraving

- Engrave the characters on the surface on the Cap. Make sure that the characters are aligned parallel to the imaginary lie connecting the two protruding portions to the left and right of the Cap.
- The characters must not be engraved deeper than 0.5mm. Apply an alcohol-based paint coating, such as melamine, alkyd, or acrylic resin paint coating, to the engraved characters.

Protruding portions of the Cap



#### Material: Acrylic

- Engrave the characters directly on the matted side of the Snap-in Legend Plate.
- The characters must be engraved no deeper than 0.5mm.
- Apply alcohol-based paint coating to the engraved characters.
- If the Snap-in Legend Plate is transparent, engrave the mirror-written characters on the back of the Snap-in Legend Plate and apply paint coating of a different color to the remaining part of the Snap-in Legend Plate.

### Affixing Character Film

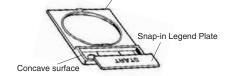
 Hold the Cap, remove the cardboard o the Film, and attach the Film to the Cap. Make sure that the protruding portions of the Cap engage the cutout portions of the Film and that the characters are aligned parallel to the imaginary line connecting the two protruding portions to the left and right of the Cap.



## Mounting and Dismounting Snap-in Legend

- Press and secure the Snap-in Legend Plate onto the Legend Plate Frame
- The direction of the characters will vary with the mounting direction of the control panel if the Switch is a knob or key selector model.

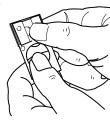
Legend Plate Frame



 To easily remove the Snap-in Legend Plate from the Legend Plate Frame mounted to the panel. Insert a Tool with a thin tip into the space between the Snap-in Legend Plate and the Legend Plate Frame

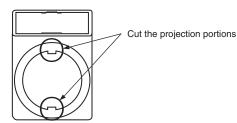


- The Snap-in Legend Plate is easily removed by pressing the Snap-I Legend Plate from the back of the Legend Plate Frame.
- The Legend Plate Frame is made of acrylic resin, which is easily damaged by shock. Be sure to handle the Legend Plate Frame with care

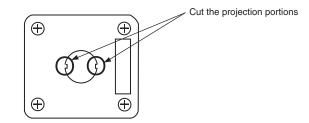


## Precautions when use the Indicators

- Lock Ring (A22Z-3360) cannot be used.When use the Legend Plate Frames
- When use the Legend Plate Frames (A22Z-332□, A22Z-333□) cut the projection portions shown in the below fig.



- When use the Control Box (A22Z-B10  $\square$  ), cut the projection portions shown in the below fig.



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