IDEC

Think Automation and beyond...

A series Switches & Pilot Lights

IDEC CORPORATION

ø16 ø12 ø10 ø8 A Series Selection Guide

Series	A6 Series Switches and Pilot Lights			
Mounting Hole Size	ø16			
Model	AL6	AB6	AS6	AS6 (key)
Shape				Disc tumbler key  Wave key 
Unit	Illuminated Pushbuttons (Momentary, Maintained) Pilot Light	Pushbuttons (Momentary, Maintained)	Selector Switch (90° 2-position maintained, 90° 2-position spring return, 45° 3-position maintained, 45° 3-position spring return)	Key Selector Switch (90° 2-position maintained, 90° 2-position spring return, 45° 3-position maintained, 45° 3-position spring return)
Bezel Size (mm)	ø18 □18 18 × 24		ø18 □18 18 × 24	
Bezel Color	Black			
Light Source	LED Lamp (IDEC's LATD)	—	—	—
Button/Illumination Color	Illumination: amber, blue, green, pure white, red, white, yellow	Button: black, blue, green, red, white, yellow Lens: amber, blue, green, red, yellow, white	Knob: black	Key cylinder: chrome plating (metal)
Contact: Contact Configuration	SPDT, DPDT (Gold-clad silver contact)			
Contact: Contact Rating (resistive load)	110V AC/1A, 24V DC/1A			
Durability: Electrical	Momentary: 100,000 operations minimum Maintained: 50,000 operations minimum		100,000 operations minimum	
Durability: Mechanical	Momentary: 1,000,000 operations minimum Maintained: 100,000 operations minimum		250,000 operations minimum	
Degree of Protection	IP65, IP40 (IEC 60529)			
Terminal Style	Solder terminal			
Accessories: Switch Guard	Yes	Yes	—	—
Accessories: Socket	Yes	Yes	Yes	Yes
Accessories: Terminal Cover	Yes	Yes	Yes	Yes
Accessories: Dust Cover	Yes	Yes	—	—
Accessories: Mounting Hole Plug	Yes	Yes	Yes	Yes
Remarks	• LED lamps contain a current-limiting resistor and a protection diode. • Available with three-sided barrier.	• Available with three-sided barrier.	• Operator position can be changed by IDEC's original bezel rotating and locking system.	
Approvals	UL CSA CE CCC		UL CSA CE CCC	
Page	**5**	**8**	**10**	**11**

Series		A Series Switches and Pilot Lights					
Mounting Hole Size		ø12		ø10		ø8	
Model		AL2	AB2	AL1	AB1	AL8	AB8
Shape							
Unit		• Illuminated Pushbuttons (Momentary, Maintained) • Pilot Light	• Pushbuttons (Momentary, Maintained)	• Illuminated Pushbuttons (Momentary, Maintained) • Pilot Light	• Pushbuttons (Momentary, Maintained)	• Illuminated Pushbuttons (Momentary, Maintained) • Pilot Light	• Pushbuttons (Momentary, Maintained)
Bezel Size (mm)		ø14 □14 14 × 18		ø12 □12 12 × 16		ø9 □9 9 × 12	
Bezel Color		Black		Black		Black	
Light Source		LED lamp (IDEC's LAD-S)	–	LED lamp (IDEC's LAD-S)	–	LED lamp (IDEC's LAD-S)	–
Button/Illumination Color		Illumination: amber, green, red, white, yellow	Button: black, blue, green, red, white, yellow Lens: amber, blue, green, red, yellow, white	Illumination: amber, green, red, white, yellow	Button: black, blue, green, red, white, yellow Lens: amber, blue, green, red, yellow, white	Illumination: amber, green, red, white, yellow	Button: black, blue, green, red, white, yellow Lens: amber, blue, green, red, yellow, white
Contact	Contact Configuration	SPDT, DPDT (silver contact)		SPDT (silver contact)		SPDT (silver contact)	
	Contact Rating (resistor load)	110V AC/1A, 24V DC/1A		110V AC/1A, 24V DC/1A		110V AC/1A, 24V DC/1A	
Durability	Electrical	Momentary: 100,000 operations minimum Maintained: 50,000 operations minimum		Momentary: 100,000 operations minimum Maintained: 50,000 operations minimum		Momentary: 100,000 operations minimum Maintained: 50,000 operations minimum	
	Mechanical	Momentary: 200,000 operations minimum Maintained: 100,000 operations minimum		Momentary: 200,000 operations minimum Maintained: 100,000 operations minimum		Momentary: 200,000 operations minimum Maintained: 100,000 operations minimum	
Degree of Protection		IP65, IP40 (IEC 60529)		IP40 (IEC 60529)		IP40 (IEC 60529)	
Terminal Style		Solder terminal		Solder terminal		Solder terminal	
Accessories	Switch Guard	Yes		Yes		Yes	
	Socket	Yes		Yes		Yes	
	Terminal Cover	Yes		Yes		Yes	
	Dust Cover	Yes		–		–	
	Mounting Hole Plug	Yes		Yes		Yes	
Remarks		• External current-limiting resistor type (Note)		• External current-limiting resistor type (Note)		• External current-limiting resistor type (Note)	
Approvals		(except for pilot lights)		(except for pilot lights)		(except for pilot lights)	
Page		23	24	30	31	36	37

Note: LED lamps do not contain a current-limiting resistor, and external resistors must be connected.

ø16 A6 Series Switches and Pilot Lights

Light duty in short 22mm body length.

- Features IDEC's original mechanism for snap-action switching. Suitable for a wide variety of office and factory aplications.
- The LED lamp contains a current-limiting resistor and a diode for protection against reverse connection.
- Degree of protection: IP40 and IP65 (IEC 60529)
- UL recognized, CSA certified, EN compliant, and CCC approved.

Applicable Standards	Mark	File No. or Organization
UL508		UL Recognition File No. E55996
CSA C22.2 No.14		CSA File No. LR 21451
EN60947-5-1		EU Low Voltage Directive
GB14048.5		CCC 2003010305027381 (switches) 2008010304288772 (pilot lights)

Contact Ratings (Contact Block)

Rated Insulation Voltage		250V			
Rated Thermal Current		3A			
Operating Voltage (AC/DC)		12V	24V	110V	220V
AC 50/60 Hz	Resistive Load	–	–	1.0A	0.5A
	Inductive Load	–	–	0.7A	0.5A
DC	Resistive Load	1.0A	1.0A	0.2A	–
	Inductive Load	0.7A	0.7A	0.5A	–
Contact Material		Gold-clad silver			

- Minimum applicable load: 5V AC/DC, 1 mA (applicable range may vary with operating conditions and load types)

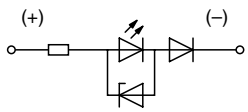
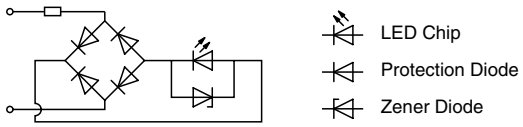
Weight (example)

Weight (approx.)	AL6M-M24: 8g
	AL6M-M221: 46g
	AL6M-P4: 6g
	AL6M-P21: 45g
	AB6M-M2: 7g
	AS6M-2Y2: 9g
	AS6M-2KT2A: 21g

Specifications

Operating Temperature		–25 to +55°C (no freezing)
Storage Temperature		–30 to +80°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Contact Resistance		50 mΩ maximum (initial value)
Insulation Resistance		100 MΩ minimum (500V DC megger)
Dielectric Strength	Switch Unit	Between live and dead metal parts: 2,000V AC, 1 minute Between terminals of different poles: 2,000V AC, 1 minute Between terminals of the same pole: 1,000V AC, 1 minute Between contact and lamp terminals: 1,500V AC, 1 minute
	Illumination Unit	Between live part and ground: 2,000V AC, 1 minute
Vibration Resistance		Operating extremes: 5 to 55 Hz, amplitude 0.75 mm
Shock Resistance		Damage limits: 500 m/s² (50G) Operating extremes: 200 m/s² (20G)
Mechanical Durability (minimum operations)		Momentary: 1,000,000 operations Maintained: 100,000 operations Pushlock Turn Reset: 100,000 operations Selector Switch: 250,000 operations Key Selector Switch: 250,000 operations
Electrical Durability (minimum operations)		Other than Maintained: 100,000 operations Maintained: 50,000 operations (Switching frequency 1200 operations/h)
Degree of Protection		IP40, IP65 (IEC 60529)
Terminal Style		Solder terminal

LED Lamp Ratings (LATD)

Part No.		LATD-5②	LATD-1②	LATD-2②
Lamp Base		Exclusive for A series		
Voltage Range		5V DC ±5%	12V AC/DC ±10%	24V AC/DC ±10%
Rated Voltage		5V DC	12V AC/DC	24V AC/DC
Current Draw	AC	—	9 mA	9 mA
	DC	8 mA	8 mA	8 mA
Color Code ②		A (amber), G (green), JW (pure white), R (red), S (blue), W (white)		
Lamp Base Color		Same as illumination color (except JW - gray base)		
Voltage Marking		Die stamped on the base		
Life (reference value)		Approx. 50,000 hours (The luminance is reduced to 50% of the initial intensity when used on complete DC.)		
Internal Circuit				

- Specify a color code in place of ② in the Part No.
  A (amber), G (green), JW (pure white), R (red), S (blue), W (white)
- Use a pure white (JW) LED lamp for yellow illumination.

Illuminated Pushbuttons

Package Quantity: 1

Shape	Operation	Operating Voltage	Contact	Part No. IP40	Part No. IP65	② Illumination Color Code
Round AL6M 	Momentary	5V DC ±5%	SPDT	**AL6M-M11②**	**AL6M-M11P②**	Specify a color code in place of ② in the Part No. A: amber G: green JW: pure white R: red S: blue W: white Y: yellow
			DPDT	**AL6M-M21②**	**AL6M-M21P②**	
		12V AC/DC ±10%	SPDT	**AL6M-M13②**	**AL6M-M13P②**	
			DPDT	**AL6M-M23②**	**AL6M-M23P②**	
		24V AC/DC ±10%	SPDT	**AL6M-M14②**	**AL6M-M14P②**	
			DPDT	**AL6M-M24②**	**AL6M-M24P②**	
	Maintained	5V DC ±5%	SPDT	**AL6M-A11②**	**AL6M-A11P②**	
			DPDT	**AL6M-A21②**	**AL6M-A21P②**	
		12V AC/DC ±10%	SPDT	**AL6M-A13②**	**AL6M-A13P②**	
			DPDT	**AL6M-A23②**	**AL6M-A23P②**	
		24V AC/DC ±10%	SPDT	**AL6M-A14②**	**AL6M-A14P②**	
			DPDT	**AL6M-A24②**	**AL6M-A24P②**	
Square AL6Q 	Momentary	5V DC ±5%	SPDT	**AL6Q-M11②**	**AL6Q-M11P②**	
			DPDT	**AL6Q-M21②**	**AL6Q-M21P②**	
		12V AC/DC ±10%	SPDT	**AL6Q-M13②**	**AL6Q-M13P②**	
			DPDT	**AL6Q-M23②**	**AL6Q-M23P②**	
		24V AC/DC ±10%	SPDT	**AL6Q-M14②**	**AL6Q-M14P②**	
			DPDT	**AL6Q-M24②**	**AL6Q-M24P②**	
	Maintained	5V DC ±5%	SPDT	**AL6Q-A11②**	**AL6Q-A11P②**	
			DPDT	**AL6Q-A21②**	**AL6Q-A21P②**	
		12V AC/DC ±10%	SPDT	**AL6Q-A13②**	**AL6Q-A13P②**	
			DPDT	**AL6Q-A23②**	**AL6Q-A23P②**	
		24V AC/DC ±10%	SPDT	**AL6Q-A14②**	**AL6Q-A14P②**	
			DPDT	**AL6Q-A24②**	**AL6Q-A24P②**	
Rectangular AL6H 	Momentary	5V DC ±5%	SPDT	**AL6H-M11②**	**AL6H-M11P②**	
			DPDT	**AL6H-M21②**	**AL6H-M21P②**	
		12V AC/DC ±10%	SPDT	**AL6H-M13②**	**AL6H-M13P②**	
			DPDT	**AL6H-M23②**	**AL6H-M23P②**	
		24V AC/DC ±10%	SPDT	**AL6H-M14②**	**AL6H-M14P②**	
			DPDT	**AL6H-M24②**	**AL6H-M24P②**	
	Maintained	5V DC ±5%	SPDT	**AL6H-A11②**	**AL6H-A11P②**	
			DPDT	**AL6H-A21②**	**AL6H-A21P②**	
		12V AC/DC ±10%	SPDT	**AL6H-A13②**	**AL6H-A13P②**	
			DPDT	**AL6H-A23②**	**AL6H-A23P②**	
		24V AC/DC ±10%	SPDT	**AL6H-A14②**	**AL6H-A14P②**	
			DPDT	**AL6H-A24②**	**AL6H-A24P②**	
Rectangular w/three-sided barrier AL6G 	Momentary	5V DC ±5%	SPDT	**AL6G-M11②**	**AL6G-M11P②**	
			DPDT	**AL6G-M21②**	**AL6G-M21P②**	
		12V AC/DC ±10%	SPDT	**AL6G-M13②**	**AL6G-M13P②**	
			DPDT	**AL6G-M23②**	**AL6G-M23P②**	
		24V AC/DC ±10%	SPDT	**AL6G-M14②**	**AL6G-M14P②**	
			DPDT	**AL6G-M24②**	**AL6G-M24P②**	
	Maintained	5V DC ±5%	SPDT	**AL6G-A11②**	**AL6G-A11P②**	
			DPDT	**AL6G-A21②**	**AL6G-A21P②**	
		12V AC/DC ±10%	SPDT	**AL6G-A13②**	**AL6G-A13P②**	
			DPDT	**AL6G-A23②**	**AL6G-A23P②**	
		24V AC/DC ±10%	SPDT	**AL6G-A14②**	**AL6G-A14P②**	
			DPDT	**AL6G-A24②**	**AL6G-A24P②**	

- See page **7** for dimensions.
- See page **20** for marking plate size and engraving area.
- When using white lens unit (clear lens + white marking plate) with color codes A, G, R, or S, specify "W" before ② in the Part No. (without CCC marking) Example: **AL6H-M24W②**
- A pure white (JW) LED lamp is used for yellow illumination.

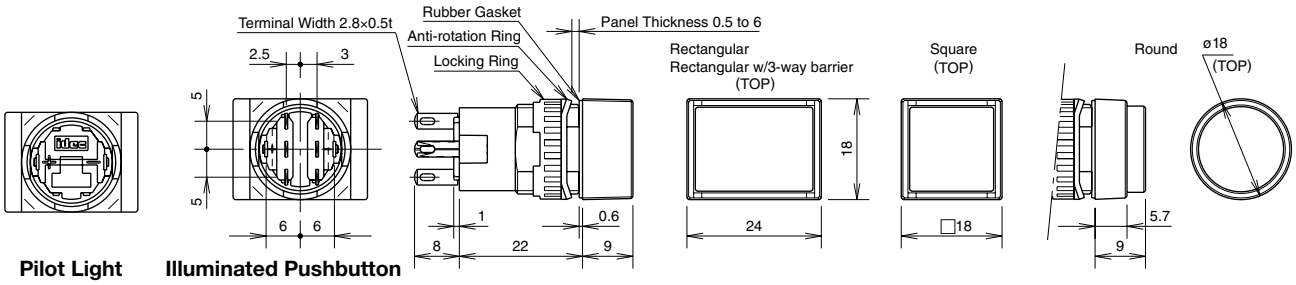
Pilot Lights

Package Quantity: 1

Shape	Operating Voltage	Part No. IP40	Part No. IP65	② Illumination Color Code
Round AL6M-P 	5V DC ±5%	**AL6M-P1②**	**AL6M-P1P②**	Specify a color code in place of ② in the Part No. A: amber G: green JW: pure white R: red S: blue W: white Y: yellow
	12V AC/DC ±10%	**AL6M-P3②**	**AL6M-P3P②**	
	24V AC/DC ±10%	**AL6M-P4②**	**AL6M-P4P②**	
Square AL6Q-P 	5V DC ±5%	**AL6Q-P1②**	**AL6Q-P1P②**	
	12V AC/DC ±10%	**AL6Q-P3②**	**AL6Q-P3P②**	
	24V AC/DC ±10%	**AL6Q-P4②**	**AL6Q-P4P②**	
Rectangular AL6H-P 	5V DC ±5%	**AL6H-P1②**	**AL6H-P1P②**	
	12V AC/DC ±10%	**AL6H-P3②**	**AL6H-P3P②**	
	24V AC/DC ±10%	**AL6H-P4②**	**AL6H-P4P②**	
Rectangular w/three-sided barrier AL6G-P 	5V DC ±5%	**AL6G-P1②**	**AL6G-P1P②**	
	12V AC9DC ±10%	**AL6G-P3②**	**AL6G-P3P②**	
	24V AC/DC ±10%	**AL6G-P4②**	**AL6G-P4P②**	

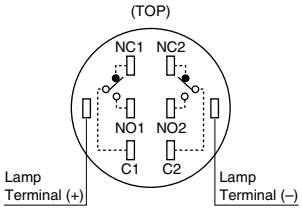
- See page **7** for dimensions.
- See page **20** for marking plate size and engraving area.
- When using white lens unit (clear lens + white marking plate) with color codes A, G, R, or S, specify "W" before ② in the Part No. (without CCC marking) Example: **AL6H-M24W②**
- A pure white (JW) LED lamp is used for yellow illumination.

Dimensions (Illuminated Pushbuttons & Pilot Lights)

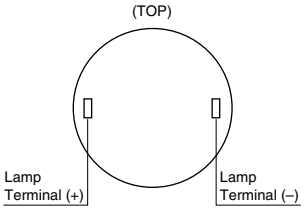


Terminal Arrangement (bottom view)

Illuminated Pushbutton



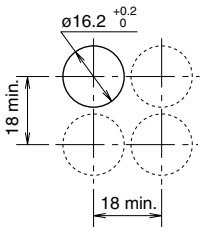
Pilot Light



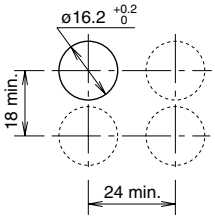
With contact: NC1, NO1, C1 terminal only

Mounting Hole Layout

Round/Square



Rectangular
Rectangular w/3-way barrier



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

Pushbuttons

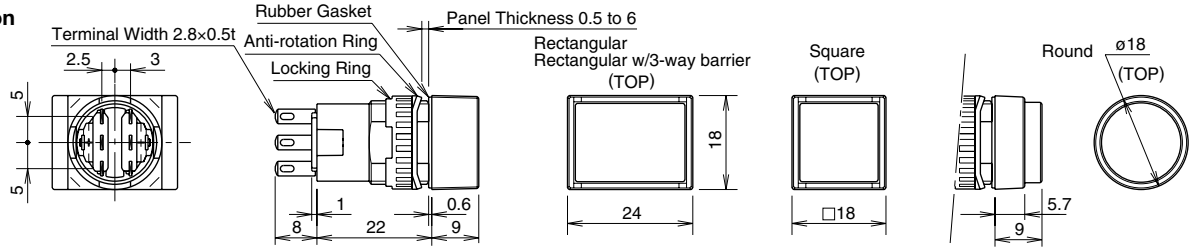
Package Quantity: 1

Shape	Button Style	Operation	Contact	Part No. IP40	Part No. IP65	Color Code ①②
Round AB6M 	Button	Momentary	SPDT	**AB6M-M1①**	**AB6M-M1P①**	B black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6M-M2①**	**AB6M-M2P①**	
		Maintained	SPDT	**AB6M-A1①**	**AB6M-A1P①**	
			DPDT	**AB6M-A2①**	**AB6M-A2P①**	
	Lens	Momentary	SPDT	**AB6M-M1L②**	**AB6M-M1PL②**	A: amber G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6M-M2L②**	**AB6M-M2PL②**	
		Maintained	SPDT	**AB6M-A1L②**	**AB6M-A1PL②**	
			DPDT	**AB6M-A2L②**	**AB6M-A2PL②**	
Square AB6Q 	Button	Momentary	SPDT	**AB6Q-M1①**	**AB6Q-M1P①**	B black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6Q-M2①**	**AB6Q-M2P①**	
		Maintained	SPDT	**AB6Q-A1①**	**AB6Q-A1P①**	
			DPDT	**AB6Q-A2①**	**AB6Q-A2P①**	
	Lens	Momentary	SPDT	**AB6Q-M1L②**	**AB6Q-M1PL②**	A: amber G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6Q-M2L②**	**AB6Q-M2PL②**	
		Maintained	SPDT	**AB6Q-A1L②**	**AB6Q-A1PL②**	
			DPDT	**AB6Q-A2L②**	**AB6Q-A2PL②**	
Rectangular AB6H 	Button	Momentary	SPDT	**AB6H-M1①**	**AB6H-M1P①**	B black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6H-M2①**	**AB6H-M2P①**	
		Maintained	SPDT	**AB6H-A1①**	**AB6H-A1P①**	
			DPDT	**AB6H-A2①**	**AB6H-A2P①**	
	Lens	Momentary	SPDT	**AB6H-M1L②**	**AB6H-M1PL②**	A: amber G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6H-M2L②**	**AB6H-M2PL②**	
		Maintained	SPDT	**AB6H-A1L②**	**AB6H-A1PL②**	
			DPDT	**AB6H-A2L②**	**AB6H-A2PL②**	
Rectangular w/three-sided barrier AB6G 	Button	Momentary	SPDT	**AB6G-M1①**	**AB6G-M1P①**	B black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6G-M2①**	**AB6G-M2P①**	
		Maintained	SPDT	**AB6G-A1①**	**AB6G-A1P①**	
			DPDT	**AB6G-A2①**	**AB6G-A2P①**	
	Lens	Momentary	SPDT	**AB6G-M1L②**	**AB6G-M1PL②**	A: amber G: green R: red S: blue W: white Y: yellow
			DPDT	**AB6G-M2L②**	**AB6G-M2PL②**	
		Maintained	SPDT	**AB6G-A1L②**	**AB6G-A1PL②**	
			DPDT	**AB6G-A2L②**	**AB6G-A2PL②**	

- Specify a color code in place of ① or ② in the Part No.
- See page **9** for dimensions.
- See page **20** for marking plate size and engraving area.
- Black is available for lens style buttons. Black lens consists of a clear lens and a black marking plate. Specify “B” in place of ② in the Part No.
  Example:**AB6H-M2LB**

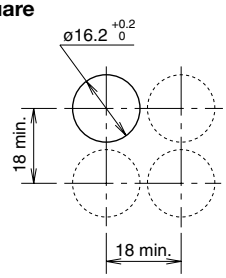
Dimensions

Pushbutton

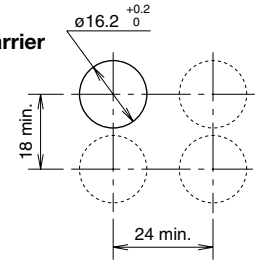


Mounting Hole Layout

Round/Square



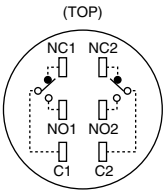
Rectangular
Rectangular w/3-way barrier



Note: Determine mounting centers to ensure easy operation.

Terminal Arrangement
(bottom view)

Pushbutton



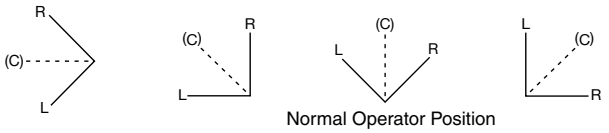
Note: SPDT has only NC1, NO1, and C1 terminals.

All dimensions in mm.

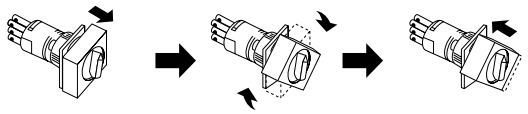
Selector Switches

Operator position can be changed by IDEC's original bezel rotating and locking system. The bezel can be locked at every 45° and bezel rotation is prevented while mounting on a panel.

Example: 3-position



How to change the operator position



Pull out the bezel to release the lock. Rotate the bezel, and push it in at 45° intervals to lock the bezel.

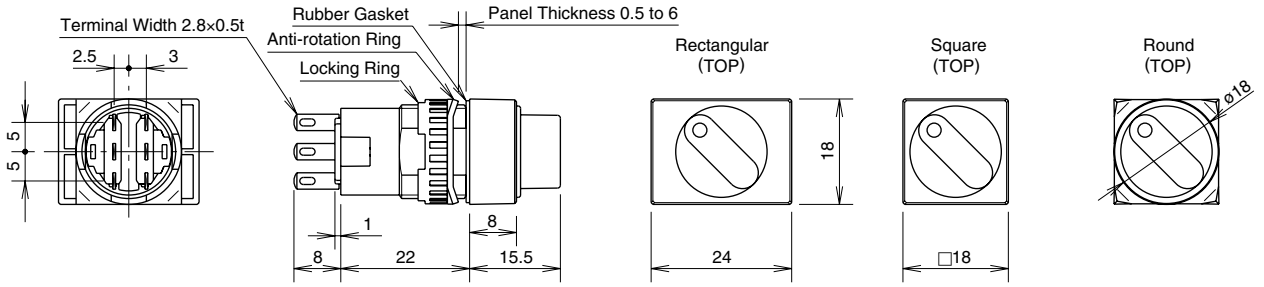
Package Quantity: 1

Shape	Position		Contact	Part No. IP40	Part No. IP65
Round AS6M-□Y	90° 2-position	Maintained	SPDT	**AS6M-2Y1**	**AS6M-2Y1P**
			DPDT	**AS6M-2Y2**	**AS6M-2Y2P**
		Spring return from right to left	SPDT	**AS6M-21Y1**	**AS6M-21Y1P**
			DPDT	**AS6M-21Y2**	**AS6M-21Y2P**
	45° 3-position	Maintained	DPDT	**AS6M-3Y2**	**AS6M-3Y2P**
		Spring return from right to center	DPDT	**AS6M-31Y2**	**AS6M-31Y2P**
		Spring return from left to center	DPDT	**AS6M-32Y2**	**AS6M-32Y2P**
		Spring return two-way	DPDT	**AS6M-33Y2**	**AS6M-33Y2P**
Square AS6Q-□Y	90° 2-position	Maintained	SPDT	**AS6Q-2Y1**	**AS6Q-2Y1P**
			DPDT	**AS6Q-2Y2**	**AS6Q-2Y2P**
		Spring return from right to left	SPDT	**AS6Q-21Y1**	**AS6Q-21Y1P**
			DPDT	**AS6Q-21Y2**	**AS6Q-21Y2P**
	45° 3-position	Maintained	DPDT	**AS6Q-3Y2**	**AS6Q-3Y2P**
		Spring return from right to center	DPDT	**AS6Q-31Y2**	**AS6Q-31Y2P**
		Spring return from left to center	DPDT	**AS6Q-32Y2**	**AS6Q-32Y2P**
		Spring return two-way	DPDT	**AS6Q-33Y2**	**AS6Q-33Y2P**
Rectangular AS6H-□Y	90° 2-position	Maintained	SPDT	**AS6H-2Y1**	**AS6H-2Y1P**
			DPDT	**AS6H-2Y2**	**AS6H-2Y2P**
		Spring return from right to left	SPDT	**AS6H-21Y1**	**AS6H-21Y1P**
			DPDT	**AS6H-21Y2**	**AS6H-21Y2P**
	45° 3-position	Maintained	DPDT	**AS6H-3Y2**	**AS6H-3Y2P**
		Spring return from right to center	DPDT	**AS6H-31Y2**	**AS6H-31Y2P**
		Spring return from left to center	DPDT	**AS6H-32Y2**	**AS6H-32Y2P**
		Spring return two-way	DPDT	**AS6H-33Y2**	**AS6H-33Y2P**

• Bezel: black • Knob: black

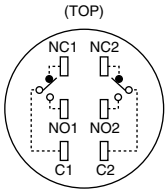
Position	Operation	Contact Operation: Left	Center	Right
90° 2-position	Maintained	SPDT		
		NO NC C	—	NO NC C
	Spring return from right	DPDT		
		Left Contact NO NC C; Right Contact NO NC C	—	Left Contact NO NC C; Right Contact NO NC C
45° 3-position	Maintained	DPDT		
	Spring return from right	Left Contact NO NC C; Right Contact NO NC C	Left Contact NO NC C; Right Contact NO NC C	Left Contact NO NC C; Right Contact NO NC C
	Spring return from left			
	Two-way return			

Dimensions



Terminal Arrangement (bottom view)

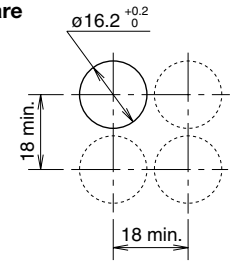
(Selector Switch)



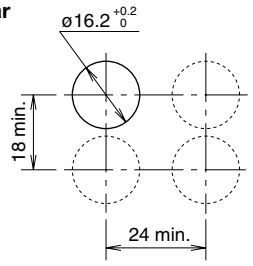
SPDT has NC1, NO1, and C1 only.

Mounting Hole Layout

Round/Square



Rectangular



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

Key Selector Switches

Package Quantity: 1

Shape	Position	Operation	Key Retained at ●		Contact	Part No. IP40	Part No. IP65
Round AS6M	90° 2-position	Maintained	A	Ⓛ Ⓡ	SPDT	**AS6M-2K□1A**	**AS6M-2K□1PA**
					DPDT	**AS6M-2K□2A**	**AS6M-2K□2PA**
			B	Ⓛ ●Ⓡ	SPDT	**AS6M-2K□1B**	**AS6M-2K□1PB**
					DPDT	**AS6M-2K□2B**	**AS6M-2K□2PB**
			C	●Ⓛ Ⓡ	SPDT	**AS6M-2K□1C**	**AS6M-2K□1PC**
					DPDT	**AS6M-2K□2C**	**AS6M-2K□2PC**
		Spring return from right	B	Ⓛ ●Ⓡ	SPDT	**AS6M-21K□1B**	**AS6M-21K□1PB**
					DPDT	**AS6M-21K□2B**	**AS6M-21K□2PB**
	45° 3-position	Maintained	A	Ⓛ Ⓒ Ⓡ	DPDT	**AS6M-3K□2A**	**AS6M-3K□2PA**
			B	Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6M-3K□2B**	**AS6M-3K□2PB**
			C	●Ⓛ Ⓒ Ⓡ	DPDT	**AS6M-3K□2C**	**AS6M-3K□2PC**
			D	●Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6M-3K□2D**	**AS6M-3K□2PD**
			E	Ⓛ ●Ⓒ Ⓡ	DPDT	**AS6M-3K□2E**	**AS6M-3K□2PE**
			G	Ⓛ ●Ⓒ ●Ⓡ	DPDT	**AS6M-3K□2G**	**AS6M-3K□2PG**
			H	●Ⓛ ●Ⓒ Ⓡ	DPDT	**AS6M-3K□2H**	**AS6M-3K□2PH**
		Spring return from right	B	Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6M-31K□2B**	**AS6M-31K□2PB**
			D	●Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6M-31K□2D**	**AS6M-31K□2PD**
			G	Ⓛ ●Ⓒ ●Ⓡ	DPDT	**AS6M-31K□2G**	**AS6M-31K□2PG**
		Spring return from left	C	●Ⓛ Ⓒ Ⓡ	DPDT	**AS6M-32K□2C**	**AS6M-32K□2PC**
			D	●Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6M-32K□2D**	**AS6M-32K□2PD**
			H	●Ⓛ ●Ⓒ Ⓡ	DPDT	**AS6M-32K□2H**	**AS6M-32K□2PH**
		Spring return two-way	D	●Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6M-33K□2D**	**AS6M-33K□2PD**

Disc tumbler key

Wave key

- Specify the key code in place of □ in the Part No.: T (disc tumbler key), S (wave key)
- For contact operation, see page **14**.
- Key is retained at ● positions and removable at ○ positions.
- Two keys are supplied.
- The front of key cylinder is made of metal.
- For disc tumbler key, only one type of key is available.
- For wave key, besides the standard key (key number 0H), six other keys are also available.
  To order other keys, specify the key number as shown below:

Example: **AS6M-2KS1PA-1H**

(blank):	Standard key (0H)	Note:
1H to 2H:	Reversible key	Key number is indicated on the key cylinder.
3H to 6H:	Non-reversible key	Standard keys do not have a key number indication.

Key Selector Switches

Package Quantity: 1

Shape	Position	Operation	Key Retained at ●		Contact	Part No. IP40	Part No. IP65
Square AS6Q	90° 2-position	Maintained	A	Ⓛ Ⓡ	SPDT	**AS6Q-2K□1A**	**AS6Q-2K□1PA**
					DPDT	**AS6Q-2K□2A**	**AS6Q-2K□2PA**
			B	Ⓛ ●Ⓡ	SPDT	**AS6Q-2K□1B**	**AS6Q-2K□1PB**
					DPDT	**AS6Q-2K□2B**	**AS6Q-2K□2PB**
			C	●Ⓛ Ⓡ	SPDT	**AS6Q-2K□1C**	**AS6Q-2K□1PC**
					DPDT	**AS6Q-2K□2C**	**AS6Q-2K□2PC**
		Spring return from right	B	Ⓛ →●Ⓡ	SPDT	**AS6Q-21K□1B**	**AS6Q-21K□1PB**
					DPDT	**AS6Q-21K□2B**	**AS6Q-21K□2PB**
	45° 3-position	Maintained	A	Ⓛ Ⓒ Ⓡ	DPDT	**AS6Q-3K□2A**	**AS6Q-3K□2PA**
			B	Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6Q-3K□2B**	**AS6Q-3K□2PB**
			C	●Ⓛ Ⓒ Ⓡ	DPDT	**AS6Q-3K□2C**	**AS6Q-3K□2PC**
			D	●Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6Q-3K□2D**	**AS6Q-3K□2PD**
			E	Ⓛ ●Ⓒ Ⓡ	DPDT	**AS6Q-3K□2E**	**AS6Q-3K□2PE**
			G	Ⓛ ●Ⓒ ●Ⓡ	DPDT	**AS6Q-3K□2G**	**AS6Q-3K□2PG**
			H	●Ⓛ ●Ⓒ Ⓡ	DPDT	**AS6Q-3K□2H**	**AS6Q-3K□2PH**
		Spring return from right	B	Ⓛ Ⓒ →●Ⓡ	DPDT	**AS6Q-31K□2B**	**AS6Q-31K□2PB**
			D	●Ⓛ Ⓒ →●Ⓡ	DPDT	**AS6Q-31K□2D**	**AS6Q-31K□2PD**
			G	Ⓛ ●Ⓒ →●Ⓡ	DPDT	**AS6Q-31K□2G**	**AS6Q-31K□2PG**
		Spring return from left	C	●Ⓛ→ Ⓒ Ⓡ	DPDT	**AS6Q-32K□2C**	**AS6Q-32K□2PC**
			D	●Ⓛ→ Ⓒ ●Ⓡ	DPDT	**AS6Q-32K□2D**	**AS6Q-32K□2PD**
			H	●Ⓛ→ ●Ⓒ Ⓡ	DPDT	**AS6Q-32K□2H**	**AS6Q-32K□2PH**
		Spring return two-way	D	●Ⓛ Ⓒ ●Ⓡ	DPDT	**AS6Q-33K□2D**	**AS6Q-33K□2PD**

Disc tumbler key

Wave key

- Specify the key code in place of □ in the Part No.: T (disc tumbler key), S (wave key)
- For contact operation, see page **14**.
- Key is retained at ● positions and removable at ○ positions.
- Two keys are supplied.
- The front of key cylinder is made of metal.
- For disc tumbler key, only one type of key is available.
- For wave key, besides the standard key (key number 0H), six other keys are also available.
  To order other keys, specify the key number as shown below:

Example: **AS6M-2KS1PA-1H**

(blank):	Standard key (0H)	Note:
1H to 2H:	Reversible key	Key number is indicated on the key cylinder.
3H to 6H:	Non-reversible key	Standard keys do not have a key number indication.

Key Selector Switches

Package Quantity: 1

Shape	Position	Operation	Key Retained at ●		Contact	Part No. IP40	Part No. IP65
Rectangular AS6H	90° 2-position	Maintained	A		SPDT	**AS6H-2K□1A**	**AS6H-2K□1PA**
					DPDT	**AS6H-2K□2A**	**AS6H-2K□2PA**
			B		SPDT	**AS6H-2K□1B**	**AS6H-2K□1PB**
					DPDT	**AS6H-2K□2B**	**AS6H-2K□2PB**
			C		SPDT	**AS6H-2K□1C**	**AS6H-2K□1PC**
					DPDT	**AS6H-2K□2C**	**AS6H-2K□2PC**
		Spring return from right	B		SPDT	**AS6H-21K□1B**	**AS6H-21K□1PB**
					DPDT	**AS6H-21K□2B**	**AS6H-21K□2PB**
	45° 3-position	Maintained	A		DPDT	**AS6H-3K□2A**	**AS6H-3K□2PA**
			B		DPDT	**AS6H-3K□2B**	**AS6H-3K□2PB**
			C		DPDT	**AS6H-3K□2C**	**AS6H-3K□2PC**
			D		DPDT	**AS6H-3K□2D**	**AS6H-3K□2PD**
			E		DPDT	**AS6H-3K□2E**	**AS6H-3K□2PE**
			G		DPDT	**AS6H-3K□2G**	**AS6H-3K□2PG**
			H		DPDT	**AS6H-3K□2H**	**AS6H-3K□2PH**
		Spring return from right	B		DPDT	**AS6H-31K□2B**	**AS6H-31K□2PB**
			D		DPDT	**AS6H-31K□2D**	**AS6H-31K□2PD**
			G		DPDT	**AS6H-31K□2G**	**AS6H-31K□2PG**
		Spring return from left	C		DPDT	**AS6H-32K□2C**	**AS6H-32K□2PC**
			D		DPDT	**AS6H-32K□2D**	**AS6H-32K□2PD**
			H		DPDT	**AS6H-32K□2H**	**AS6H-32K□2PH**
		Spring return two-way	D		DPDT	**AS6H-33K□2D**	**AS6H-33K□2PD**

Disc tumbler key

Wave key

- Specify the key code in place of □ in the Part No.: T (disc tumbler key), S (wave key)
- For contact operation, see page **14**.
- Key is retained at ● positions and removable at ○ positions.
- Two keys are supplied.
- The front of key cylinder is made of metal.
- For disc tumbler key, only one type of key is available.
- For wave key, besides the standard key (key number 0H), six other keys are also available.
  To order other keys, specify the key number as shown below:

Example: **AS6M-2KS1PA-1H**

(blank): Standard key (0H)
1H to 2H: Reversible key
3H to 6H: Non-reversible key

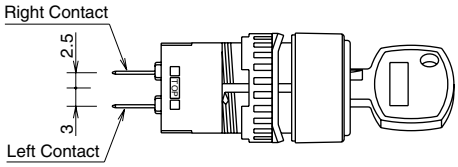
Note:
Key number is indicated on the key cylinder.
Standard keys do not have a key number indication.

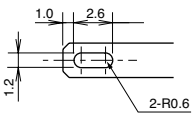
Contact Operation

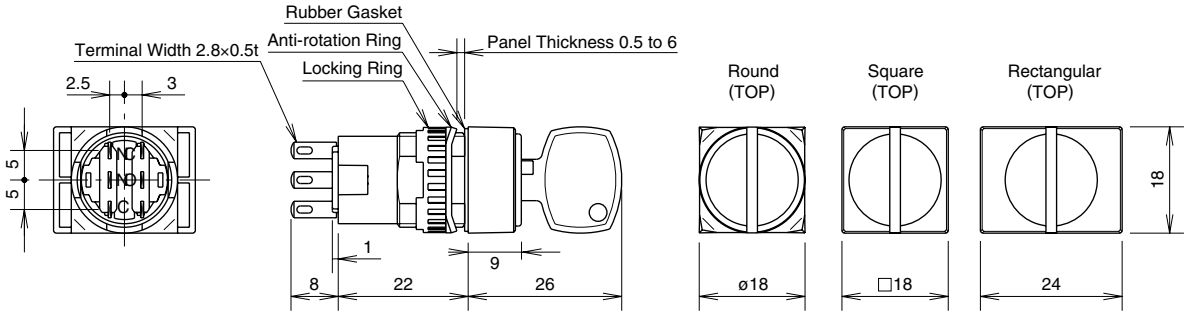
Operator Position & Contact Operation (Top View)					
Positions		Contact	Left	Center	Right
90° 2-position	L R Maintained; L R Spring return from right	SPDT	NO NC C	—	NO NC C
		DPDT	Left Contact NO NC; Right Contact NO NC; C C	—	Left Contact NO NC; Right Contact NO NC; C C
45° 3-position	L C R Maintained; L C R Spring return from right; L C R Spring return from left; L C R Spring return two-way	DPDT	Left Contact NO NC; Right Contact NO NC; C C	Left Contact NO NC; Right Contact NO NC; C C	Left Contact NO NC; Right Contact NO NC; C C

Dimensions

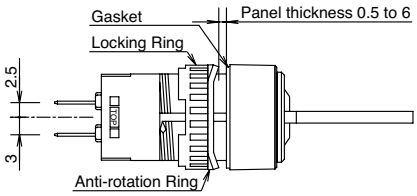
Disc Tumbler Key

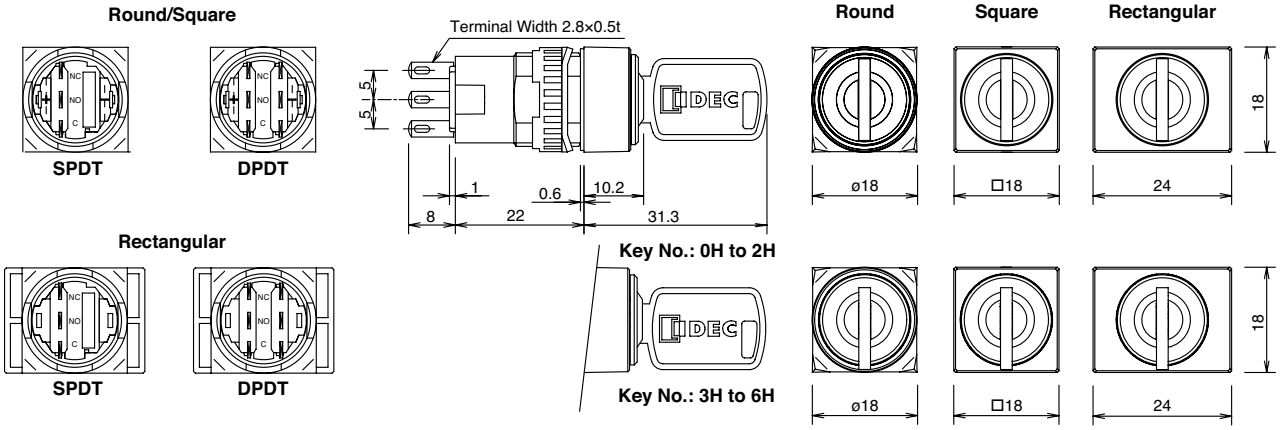






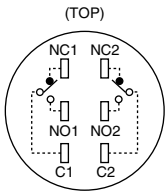
Wave Key





Terminal Arrangement (bottom view)

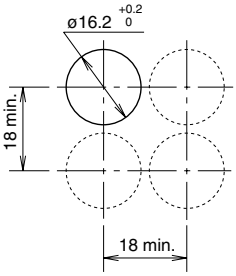
(Key Selector Switch)



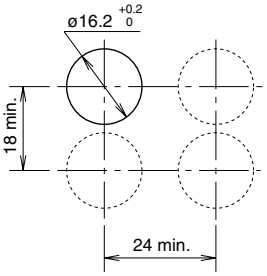
SPDT has NC1, NO1, and C1 only.

Mounting Hole Layout

Round/Square



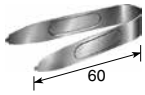
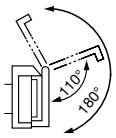
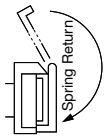
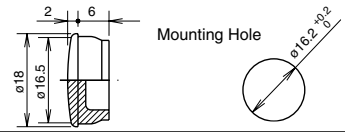
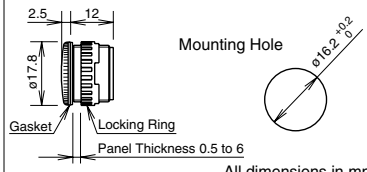
Rectangular



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

Accessories

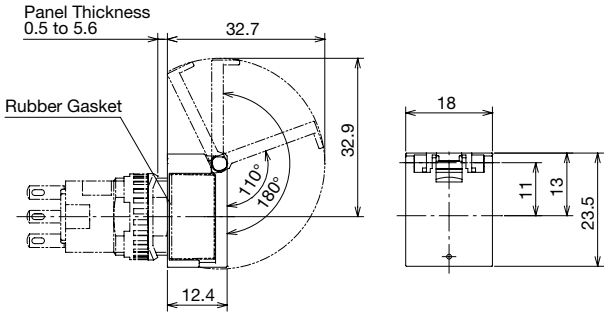
Shape				Material	Part No.	Ordering No.	Package Quantity	Remarks
Locking Ring Wrench 				Metal (nickel-plated brass)	**MT-001**	**MT-001**	1	• Used to tighten the locking ring when installing A6 series into a panel.
Lamp Holder Tool 				Rubber	**OR-77**	**OR-77**	1	• Used to install and remove the LED lamps.
Lens Removal Tool 				Stainless Steel	**MT-101**	**MT-101**	1	• Used to install and remove lenses and buttons.
Switch Guard	[Remains open} For pushbuttons, illuminated pushbuttons 	For round/ square units (110°, 180°)		Guard (polyacetal) Cover (polyarylate) See page **16** for dimensions.	**LB9Z-K2**	**LB9Z-K2**	1	• Degree of protection: IP40 • Used to protect pushbuttons from inadvertent operation.
		For rectangular units (remains 110°, 180°)			**LB9Z-K3P**	**LB9Z-K3P**	1	• Degree of protection: IP65 • Used to protect pushbuttons from inadvertent operation.
	[Spring return] For pushbuttons, illuminated pushbuttons 	For round/ square units (180°)			**AL-K6S**	**AL-K6S**	1	• Degree of protection: IP40 • Used to protect pushbuttons from inadvertent operation.
					AL-K6SP	**AL-K6SP**	1	• Degree of protection: IP65 (when used with IP65 control units) • Used to protect pushbuttons from inadvertent operation.
		For rectangular units (180°)			**AL-KH6S**	**AL-KH6S**	1	• Degree of protection: IP40 • Used to protect pushbuttons from inadvertent operation.
					AL-KH6SP	**AL-KH6SP**	1	• Degree of protection: IP65 (when used with IP65 control units) • Used to protect pushbuttons from inadvertent operation.
Dust Cover 		For round units		Translucent cover: elastomer Black part: polypropylene	**AL-D6**	**AL-D6**	1	• When mounting the units with the dust covers installed, refer to mounting hole layout on page **17**. • Operating temperature: –10 to +55°C
		For square units			**AL-DQ6**	**AL-DQ6**	1	
		For rectangular units			**AL-DH6**	**AL-DH6**	1	
Terminal Cover 				Polyamide (white) See page **17** for dimensions.	**AL-V6**	**AL-V6PN10**	10	• When wiring the terminals, insert the lead wires into the terminal cover holes before soldering. • Terminal cover is not attached and must be ordered separately.
Socket 		Solder Terminal		See page **17** for dimensions.	**AL-C6**	**AL-C6**	1	• Plugs on the rear of the A series.
		PC Board Terminal			**AL-C6V**	**AL-C6V**	1	
Mounting Hole Plug 		Rubber		Nitryl rubber (black)	**AL-B6**	**AL-B6PN05**	5	• Degree of protection: IP65 
Mounting Hole Plug 		Metal		Plug: metal (diecast) Locking ring: polyacetal Gasket: nitrile	**AL-BM6**	**AL-BM6**	1	• Degree of protection: IP65 • Tightening torque: 0.1 to 0.29 N·m.  All dimensions in mm.

Dimensions

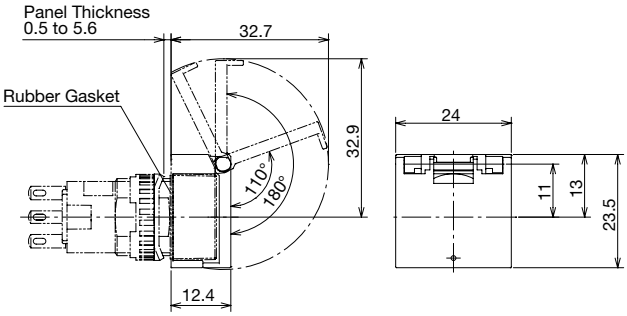
Switch Guard

[Remains open]

For round/square units (Degree of protection: IP40)
LB9Z-K2

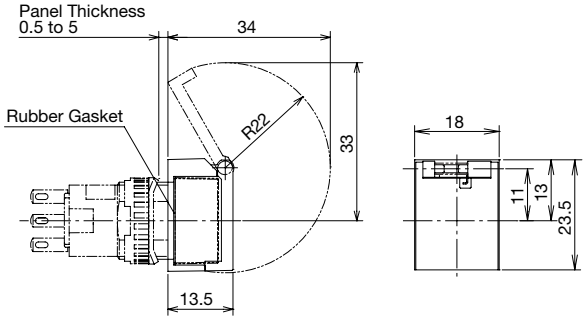


For rectangular units (Degree of protection: IP65)
LB9Z-K3P

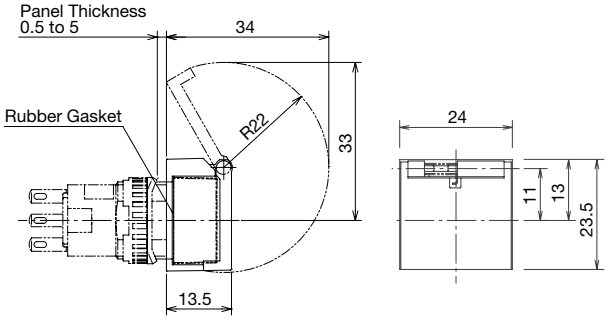


[Spring return]

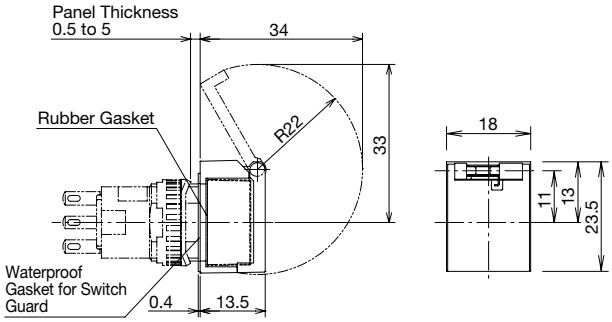
For round/square units (Degree of protection: IP40)
AL-K6S



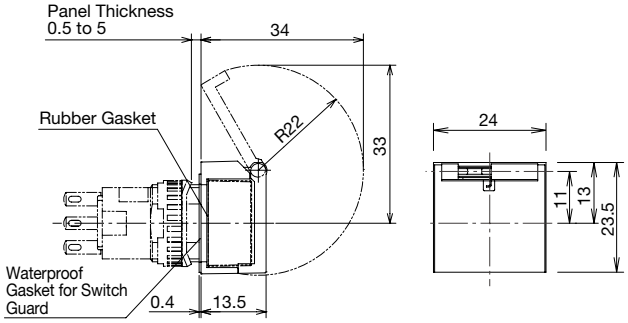
For rectangular units (Degree of protection: IP40)
AL-KH6S



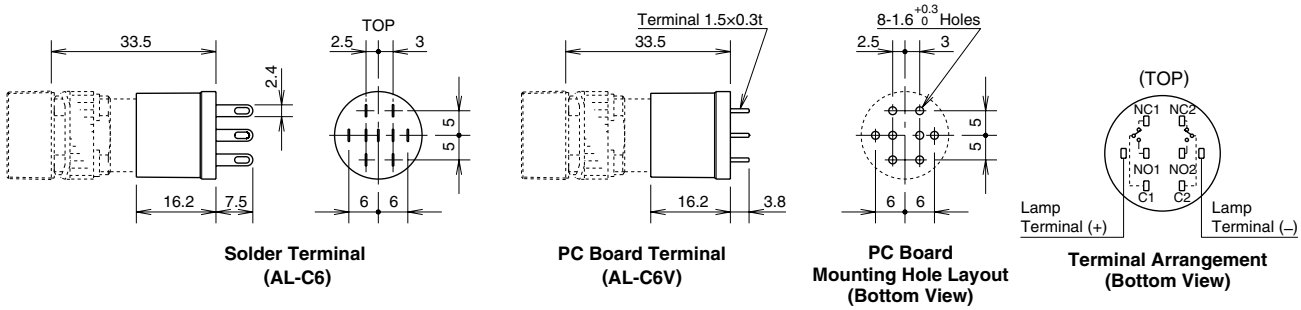
For round/square units (Degree of protection: IP65)
AL-K6SP



For rectangular units (Degree of protection: IP65)
AL-KH6SP



Socket



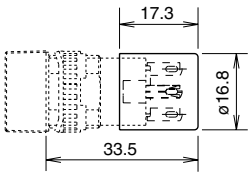
Solder Terminal (AL-C6)

PC Board Terminal (AL-C6V)

PC Board Mounting Hole Layout (Bottom View)

Terminal Arrangement (Bottom View)

Terminal Cover



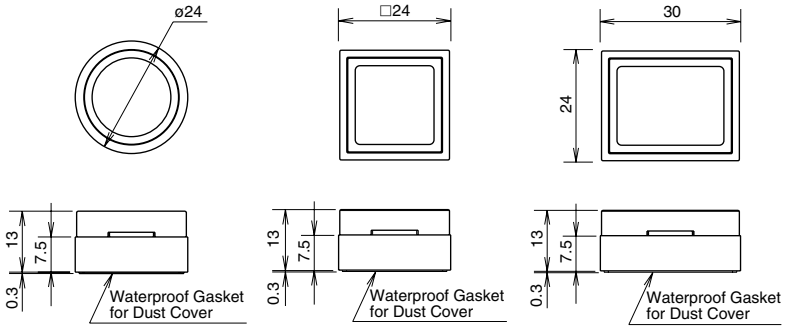
Note: When wiring the terminals, insert the lead wires into the terminal cover holes before soldering.

Dust Cover

For Round Units (AL-D6)

For Square Units (AL-DQ6)

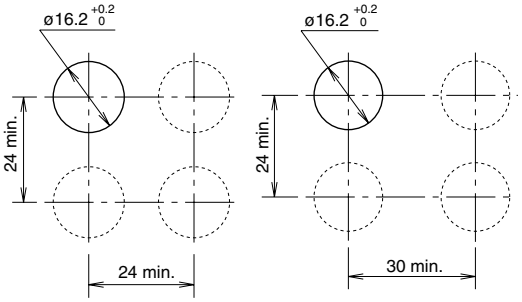
For Rectangular Units (AL-DH6)



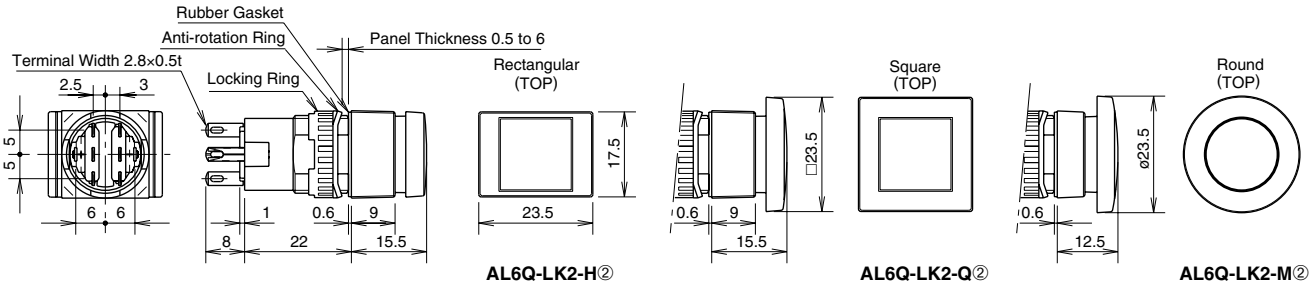
Mounting Hole Centers

Round/Square Units

Rectangular Units



Large Lens and Large Button



AL6Q-LK2-H②
AB6Q-BK2-H②

AL6Q-LK2-Q②
AB6Q-BK2-Q②

AL6Q-LK2-M②
AB6Q-BK2-M②

All dimensions in mm.

Grip Style Enabling Switch Housing

The following A6 series switches can be installed on the HE9Z-GSH51 grip style enabling switch housing to be used as hand-held switches.

- AB6M pushbutton (IP65)
- AS6M selector switch (IP65)
- AS6M key selector switch (IP65)
  (illuminated pushbutton and pilot light cannot be installed)

Part No.	Ordering No.	Package Quantity
HE9Z-GSH51	**HE9Z-GSH51**	1

Specifications

Applicable Cable	Outside diameter ø4.5 to 10 mm
Conduit Port Size	M16 (cable gland is supplied with the grip style enabling switch housing)
Weight (approx.)	65g (grip style enabling switch housing only)

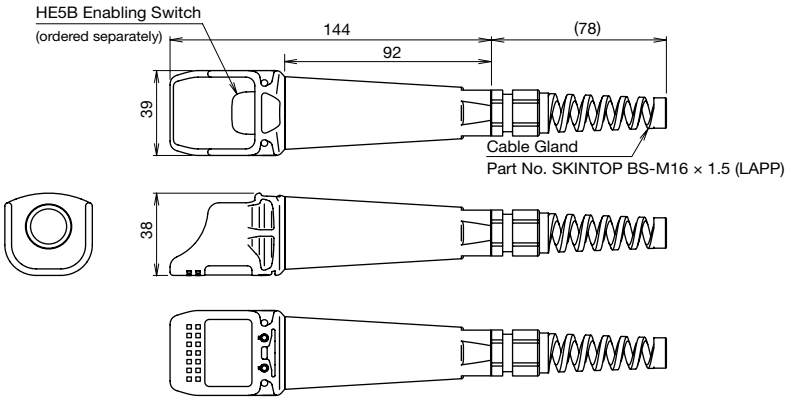
- The above specifications are for the grip style enabling switch housing only. Make sure to check the specifications of switches also.
- For the detailed specifications of grip style enabling switch housing, A6 series switches, and HE5B enabling switch, see their catalogs.

Notes:

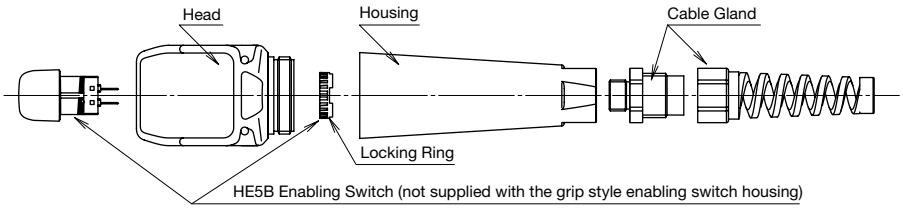
- The HE9Z-GSH51 grip style enabling switch housing does not include the A6 series switche or HE5B enabling switch, and they must be ordered separately.
- The switches must be installed and wired to the HE9Z-GSH51 grip style enabling switch housing by the user. For information on wiring, see the instruction sheet supplied with the HE9Z-GSH51.

Dimensions

HE9Z-GSH51



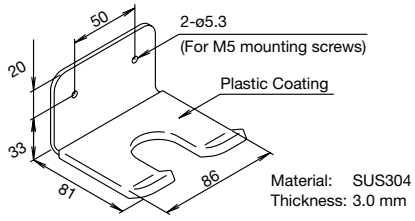
HE9Z-GSH51 + HE5B Construction



- Anti-rotation ring is not required when installing the HE5B enabling switch on the HE9Z-GSH51 grip style enabling switch housing. Use the locking ring only.

Mounting Bracket

Part No: HE9Z-GH1

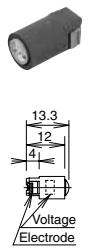


All dimensions in mm.

Maintenance Parts

Shape		Specification		Part No.	Ordering No.	Package Quantity	Remarks
Lens 	Round	Polyarylate		**AL6M-L②**	**AL6M-L②PN05**	5	Specify a color code in place of ② in the Part No. A (amber), C (clear), G (green) R (red), S (blue), Y (yellow) • Use a C (clear) lens for W (white) and JW (pure white) illumination.
	Square			**AL6Q-L②**	**AL6Q-L②PN05**		
	Rectangular			**AL6H-L②**	**AL6H-L②PN05**		
Button 	Round	Polyarylate		**AB6M-B①**	**AB6M-B①PN05**		Specify a color code in place of ① in the Part No. B (black), G (green), R (red) S (blue), W (white), Y (yellow)
	Square			**AB6Q-B①**	**AB6Q-B①PN05**		
	Rectangular			**AB6H-B①**	**AB6H-B①PN05**		
Marking Plate 	Round	Acrylic	White	**AL6M-W**	**AL6M-WPN05**		
			Black	**AL6M-B**	**AL6M-BPN05**		
	Square		White	**AL6Q-W**	**AL6Q-WPN05**		
			Black	**AL6Q-B**	**AL6Q-BPN05**		
	Rectangular		White	**AL6H-W**	**AL6H-WPN05**		
			Black	**AL6H-B**	**AL6H-BPN05**		
Large Lens Unit 	Round (installed on round units)	Translucent color lens		**AL6M-LK2-M②**	**AL6M-LK2-M②**	1	• Specify a color code in place of ② in the Part No. • Degree of protection: IP65 **② Color Code** Translucent Color Lens: A (amber), G (green), R (red), S (blue), W (white), Y (yellow) Opaque Button: B (black), G (green), R (red), S (blue), W (white), Y (yellow) • See page **17** for dimensions.
		Opaque button		**AB6M-BK2-M②**	**AB6M-BK2-M②**		
	Square (installed on square units)	Translucent color lens		**AL6Q-LK2-Q②**	**AL6Q-LK2-Q②**		
		Opaque button		**AB6Q-BK2-Q②**	**AB6Q-BK2-Q②**		
	Rectangular (installed on square units)	Translucent color lens		**AL6Q-LK2-H②**	**AL6Q-LK2-H②**		
		Opaque button		**AB6Q-BK2-H②**	**AB6Q-BK2-H②**		
Locking Ring 		Polyacetal		**HA9Z-LN**	**HA9Z-LNPN10**	10	• Black
Anti-rotation Ring 		Stainless Steel		**LB9Z-LP1**	**LB9Z-LP1PN10**		
Spare key 	Key selector (disc tumbler key)	Brass with nickel plating		**AS6-SK-132**	**AS6-SK-132PN02**	2	• Thickness 1.8 mm
Spare Key  Reversible  Non-reversible	Key selector (wave key)	Diecast zinc alloy (nickel-plated)		**LA9Z-SK-□**	**LA9Z-SK-□PN02**	2	• Specify a key number in place of □ in the Part No. 0H: Standard key (reversible) 1H to 2H: Reversible key 3H to 6H: Non-reversible key
Gasket 		Rubber		**AP6M-WM**	**AP6M-WMPN10**	10	

LED Lamps

Dimensions	Operating Voltage	Current Draw AC	Current Draw DC	Part No.	Ordering No.	② Illumination Color Code	Package Quantity	Base
	5V DC ±5%	—	8 mA	**LATD-5②**	**LATD-5②**	Specify a color code in place of ② in the Ordering No. A: amber G: green JW: pure white R: red S: blue W: white	1	Exclusive for A6 series
					LATD-5②PN10		10	
	6V DC ±5%	7 mA (G, S, JW) 8 mA (A, R, W)	5 mA (G, S, JW) 6 mA (A, R, W)	**LATD-6②**	**LATD-6②**		1	
					LATD-6②PN10		10	
	12V AC/ DC ±10%	9 mA	8 mA	**LATD-1②**	**LATD-1②**		1	
					LATD-1②PN10		10	
	24V AC/ DC ±10%	9 mA	8 mA	**LATD-2②**	**LATD-2②**		1	
					LATD-2②PN10		10	

• Use a pure white (JW) LED lamp for yellow illumination

Safety Precautions

- Turn off the power to A series before starting installation, removal, wiring, maintenance, and inspection of the units. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid a burn on your hand, use the lamp holder tool when replacing lamps.
- For wiring, use wires of a proper size to meet the voltage and current requirements. Failure to tighten terminal screws may cause overheating and create a fire hazard.

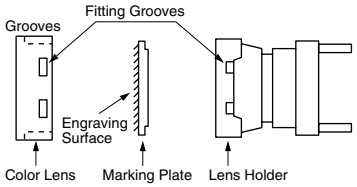
Operating Instructions

Replacement of Lens and Marking Plate

Removal

Remove the lens assembly (color lens, marking plate, lens holder, and spring) by holding the color lens recesses with the Lens Removal Tool (MT-101) and pulling it out. Remove the marking plate by disengaging the latches between the color lens and lens holder.

The marking plate must be engraved on the front side as shown at right.
When using a color film, insert it between the color lens and marking plate.



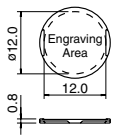
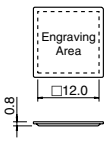
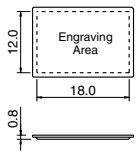
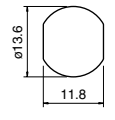
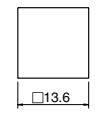
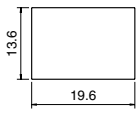
Installation

Place the marking plate on the lens holder in the correct direction, and press the color lens onto the lens holder to engage the latches.
Put the spring on the lens holder and insert the lens holder into the housing in the correct direction.

Marking

For A series illuminated pushbuttons, legends and symbols can be engraved on the built-in marking plates, or printed film can be inserted under the lens for labelling purposes.

Marking Plate & Engraving Area

	Round	Square	Rectangular
Built-in Marking Plate and Engraving Area			
	• Engraving must be made on the engraving area within 0.5mm deep. • The marking plate is made of white acrylic resin.		
Applicable Marking Film (not supplied)			
	• Thickness = 0.1 mm × 1 film • Recommended film material: polyester		

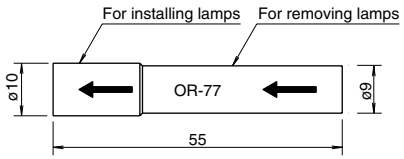
Replacing the LED Lamp

Removal

Use the lamp holder tool (OR-77) to remove lamps. Do not use pliers.

Installation

Use the lamp holder tool (OR-77) to install lamps. Note the correct side of the tool for removal or installation.



All dimensions in mm.

Panel Mounting

When mounting the units into a panel, use the optional locking ring wrench (MT-001) to tighten the locking ring. Do not use pliers. Tightening torque must not exceed 0.88 N·m. Excessive tightening will damage the locking ring.

Wiring

Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu is recommended when using lead-free solder. When soldering, do not touch the unit with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal. Use a non-corrosive rosin flux.

Installing the Socket

Install the socket on the unit with the TOP markings on the unit and the socket placed in the same direction.

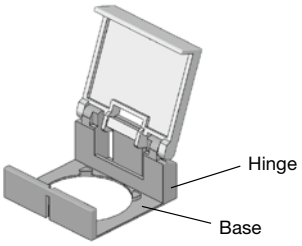
Switch Guard

IP65 (IEC 60529) switch guards must be used with IP65 (IEC 60529) units only. Even if IP65 type switch guards are installed, enclosed type (IP40) units are not made waterproof.

Item		Switch Guard	
		IP65 (IEC 60529)	IP40 (IEC 60529)
Switch	IP65	IP65	IP40
	IP40	IP40	IP40

Opening/closing the Switch Guard (LB9Z-K2, LB9Z-K3P)

When opening/closing the switch guard while the switch guard is not installed on a panel, make sure to hold the hinge. Holding the base might result in damage. Also do not apply force on the guard in other than open/close directions, otherwise the hinge may be damaged.



Operating Voltage of LED Lamps

The operating voltage of 5V DC is measured at complete DC.

Other Notes

Close Proximity Mounting

When mounting pilot lights or illuminated pushbuttons collectively or lighting them continuously, heat may cause the ambient temperature to rise above the rated operating temperature. When the mounting panel is not made of metal or when the units are mounted in an enclosed panel, provide for ventilation or lower the operating voltage.

Replacement of Buttons (Illuminated/Non-illuminated)

Do not replace buttons of maintained action units while the button is in the locked position. Replacing the button in the locked position may damage the internal mechanism. Be sure to release the button before replacing.

Operating and Storage Environment

1. Make sure that the operating/storage temperature and humidity are within the ratings.
2. Do not use enclosed type units in an environment subject to oil, water or dust accumulation. In such an area, use the waterproof/oiltight units (IP65).

Microswitch Contacts

Do not connect NO and NC contacts of a microswitch to different voltages or different power sources to prevent a dead short-circuit.

IP65 Units

IP65 units are evaluated by conventional cutting and cooling oils, and can not be used with some special oils. Contact IDEC for resistance against specific oils.

Selector Switches with Key

Observe the following instructions to prevent malfunction or damage.

- Insert the key to the bottom of the key hole.
- Do not remove the key from any key retained position.
- Besides the standard key (key number 0H), six other key numbers are available. Use a key of the matching number with the key cylinder. The standard key does not have a key number indication.
- Keys are available in two types.
  Key numbers 0H (standard), 1H, and 2H are reversible keys which can be inserted in two ways.
  Key numbers 3H, 4H, 5H, and 6H are non-reversible keys. Make sure of correct insertion direction.

ø12 A2 Series Switches and Pilot Lights

Short 22-mm-long body miniature switches and pilot lights with bright LED illumination face and snap-action switching.

- Degree of protection: IP40 and IP65 (IEC 60529)
- All series have terminals on the same plane.
- UL recognized, CSA certified

Applicable Standards	Mark	File No. or Organization
UL508		UL Recognition File No. E55996
CSA C22.2 No.14		CSA File No. LR 21451
GB14048.5		CCC No.2013010305647324 (except for pilot lights)

Contact Ratings (Contact Block)

Rated Insulation Voltage		250V		
Rated Thermal Current		3A		
Operating Voltage (AC/DC)		24V	110V	220V
AC 50/60 Hz	Resistive Load	–	1.0A	0.5A
	Inductive Load	–	0.7A	0.5A
DC	Resistive Load	1.0A	0.2A	–
	Inductive Load	0.7A	0.1A	–
Contact Material		Silver		

- Minimum applicable load: 5V AC/DC, 3 mA (applicable range may vary with operating conditions and load types)

Weight

Weight (approx.)	AL2M-M11: 4g
	AL2M-P1: 4g
	AB2M-M1: 4g

Specifications

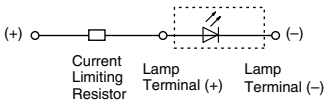
Operating Temperature		–25 to +55°C (no freezing)
Storage Temperature		–30 to +80°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Contact Resistance		50 mΩ maximum (initial value)
Insulation Resistance		100 MΩ minimum (500V DC megger)
Dielectric Strength	Switch Unit	Between live and dead metal parts: 2,000V AC, 1 minute Between terminals of different poles: 2,000V AC, 1 minute Between terminals of the same pole: 1,000V AC, 1 minute Between contact and lamp terminals: 1,500V AC, 1 minute
	Illumination Unit	Between live part and ground: 2,000V AC, 1 minute
Vibration Resistance		Damage limits, Operating extremes: 5 to 55 Hz, amplitude 0.75 mm
Shock Resistance		Damage limits: 500 m/s² (50G) Operating extremes: 200 m/s² (20G)
Mechanical Durability (minimum operations)		Momentary: 200,000 operations Maintained: 100,000 operations
Electrical Durability (minimum operations)		Momentary: 100,000 operations Maintained: 50,000 operations (Switching frequency 1200 operations/h)
Degree of Protection		IP40, IP65 (IEC 60529)

LED Lamp Ratings (LAD-S)

Built-in LED Part No.	LAD-SA	LAD-SG	LAD-SR	LAD-SY
Lamp Base	Exclusive for A series			
Forward Current (If)	20 mA			
Forward Voltage (Vf) (nominal)	2.2V	2.1V	1.7V	2.2V
Reverse Voltage (Vr)	4V			
Illumination Color	A	G	R	Y
LED Lamp Color	Amber Clear	Yellow Diffused	Red Clear	Yellow Clear
Applicable Lens Color	Amber	Green	Red	Yellow and White
Base Plastic Color	Red			
LED Lamp Life (reference value)	Approx. 50,000 hours (The illuminance reduces to 50% of the initial intensity when used on complete DC.)			
Operating Voltage & External Current-limiting Resistor (recommended value) (Note)	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W			
Internal Circuit	(+) (–)			

Note: When LED lamps are used on voltages other than the above, external resistor value R is determined by the following formula:
R = (operating voltage – Vf) / If

- LED lamps do not have a current-limiting resistor, and external resistors of recommended values for each voltage must be provided. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged. Because no protection diode is contained, ensure the correct polarity is observed.

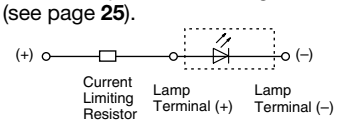


Illuminated Pushbuttons & Pilot Lights

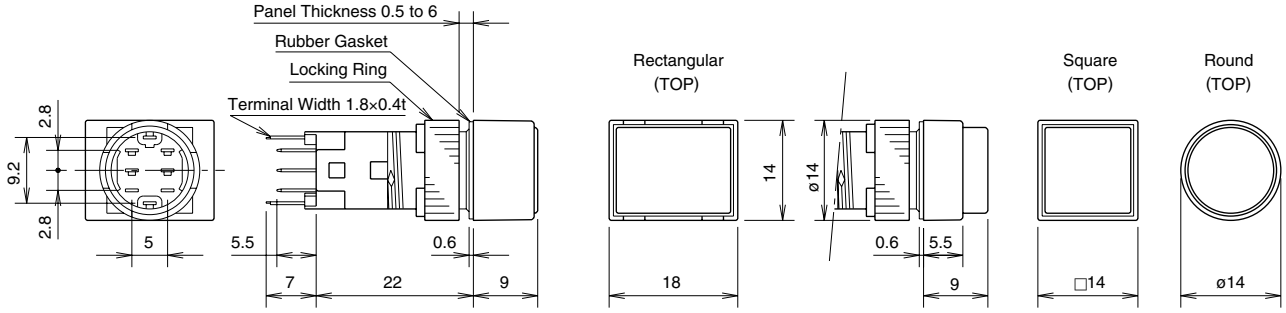
Package Quantity: 1

Shape	Operation	Contact	Part No. IP40	Part No. IP65	② Lens Color Code	LED Lamp Part No., Rated Current (External Resistor Recommended Value)
Round AL2M  (except for pilot lights)	Momentary	SPDT	**AL2M-M11②**	**AL2M-M11P②**	Specify a color code in place of ② in the Part No. A: amber G: green R: red W: white Y: yellow	A: LAD-SA G: LAD-SG R: LAD-SR W/Y: LAD-SY Rated Current: 20 mA 5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W
		DPDT	**AL2M-M21②**	**AL2M-M21P②**		
	Maintained	SPDT	**AL2M-A11②**	**AL2M-A11P②**		
		DPDT	**AL2M-A21②**	**AL2M-A21P②**		
	Pilot Light	—	**AL2M-P1②**	**AL2M-P1P②**		
Square AL2Q  (except for pilot lights)	Momentary	SPDT	**AL2Q-M11②**	**AL2Q-M11P②**		
		DPDT	**AL2Q-M21②**	**AL2Q-M21P②**		
	Maintained	SPDT	**AL2Q-A11②**	**AL2Q-A11P②**		
		DPDT	**AL2Q-A21②**	**AL2Q-A21P②**		
	Pilot Light	—	**AL2Q-P1②**	**AL2Q-P1P②**		
Rectangular AL2H  (except for pilot lights)	Momentary	SPDT	**AL2H-M11②**	**AL2H-M11P②**		
		DPDT	**AL2H-M21②**	**AL2H-M21P②**		
	Maintained	SPDT	**AL2H-A11②**	**AL2H-A11P②**		
		DPDT	**AL2H-A21②**	**AL2H-A21P②**		
	Pilot Light	—	**AL2H-P1②**	**AL2H-P1P②**		

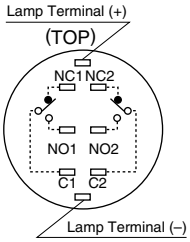
- LED lamps do not have a current-limiting resistor. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged.
- External current-limiting resistor is not necessary when an optional socket with built-in resistor is used (see page **25**).
- AP2M series pilot lights (round bezel only) with built-in current-limiting resistors are also available.
- Pilot lights are not CCC certifed.



Dimensions



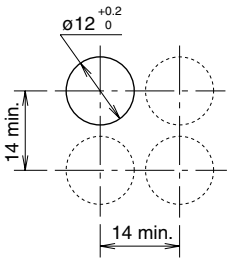
Terminal Arrangement



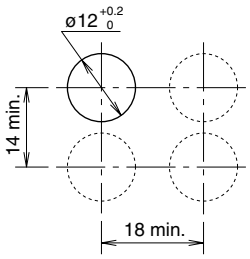
SPDT has NC1, NO1, and C1 only.

Mounting Hole Layout

Round/Square Units



Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

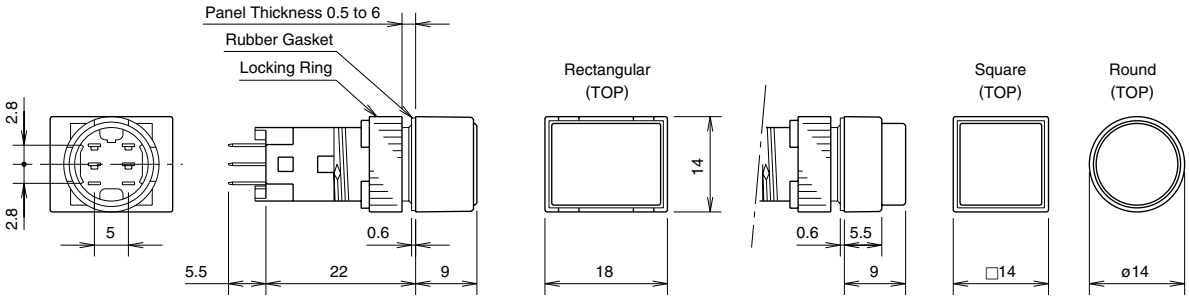
Pushbuttons

Package Quantity: 1

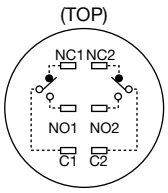
Shape	Button Style	Operation	Contact	Part No. IP40	Part No. IP65	Color Code ①②
Round AB2M 	Button	Momentary	SPDT	**AB2M-M1①**	**AB2M-M1P①**	B: black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB2M-M2①**	**AB2M-M2P①**	
		Maintained	SPDT	**AB2M-A1①**	**AB2M-A1P①**	
			DPDT	**AB2M-A2①**	**AB2M-A2P①**	
	Lens	Momentary	SPDT	**AB2M-M1L②**	**AB2M-M1PL②**	A: amber G: green R: red W: white Y: yellow
			DPDT	**AB2M-M2L②**	**AB2M-M2PL②**	
		Maintained	SPDT	**AB2M-A1L②**	**AB2M-A1PL②**	
			DPDT	**AB2M-A2L②**	**AB2M-A2PL②**	
Square AB2Q 	Button	Momentary	SPDT	**AB2Q-M1①**	**AB2Q-M1P①**	B: black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB2Q-M2①**	**AB2Q-M2P①**	
		Maintained	SPDT	**AB2Q-A1①**	**AB2Q-A1P①**	
			DPDT	**AB2Q-A2①**	**AB2Q-A2P①**	
	Lens	Momentary	SPDT	**AB2Q-M1L②**	**AB2Q-M1PL②**	A: amber G: green R: red W: white Y: yellow
			DPDT	**AB2Q-M2L②**	**AB2Q-M2PL②**	
		Maintained	SPDT	**AB2Q-A1L②**	**AB2Q-A1PL②**	
			DPDT	**AB2Q-A2L②**	**AB2Q-A2PL②**	
Rectangular AB2H 	Button	Momentary	SPDT	**AB2H-M1①**	**AB2H-M1P①**	B: black G: green R: red S: blue W: white Y: yellow
			DPDT	**AB2H-M2①**	**AB2H-M2P①**	
		Maintained	SPDT	**AB2H-A1①**	**AB2H-A1P①**	
			DPDT	**AB2H-A2①**	**AB2H-A2P①**	
	Lens	Momentary	SPDT	**AB2H-M1L②**	**AB2H-M1PL②**	A: amber G: green R: red W: white Y: yellow
			DPDT	**AB2H-M2L②**	**AB2H-M2PL②**	
		Maintained	SPDT	**AB2H-A1L②**	**AB2H-A1PL②**	
			DPDT	**AB2H-A2L②**	**AB2H-A2PL②**	

• Specify a color code in place of ① or ② in the Part No.

Dimensions



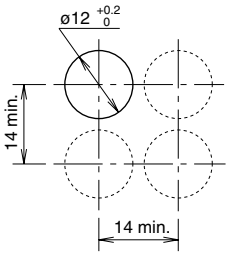
Terminal Arrangement



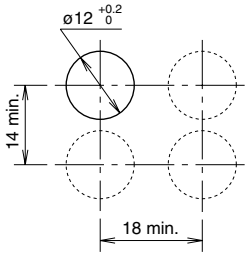
SPDT has NC1, NO1, and C1 only.

Mounting Hole Layout

Round/Square Units



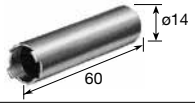
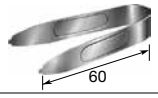
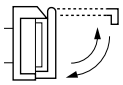
Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

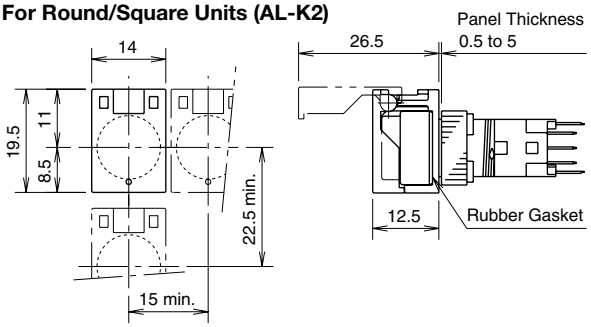
Accessories

Shape	Material		Part No.	Ordering Part No.	Package Quantity	Remarks
Locking Ring Wrench 	Metal (nickel-plated brass)		**MT-002**	**MT-002**	1	• Used to tighten the locking ring when installing the A2 series into a panel.
Lens Removal Tool 	Stainless Steel		**MT-101**	**MT-101**	1	• Used to remove lens and button.
Lamp Holder Tool 	Rubber		**OR-66**	**OR-66**	1	• Used to remove and install LED lamps.
Switch Guard 	90° open	For round/ square unit	**AL-K2**	**AL-K2**	1	• Degree of protection: IP40 • Used to protect pushbuttons from inadvertent operation. • See page **26** for dimensions.  (remains 90° open)
		For rectangular unit	**AL-KH2**	**AL-KH2**	1	
Socket 	Solder Terminal		**AL-C2**	**AL-C2**	1	• Snaps on the rear of the A2 series. (see page **26** for dimensions)
	PC Board Terminal		**AL-C2V**	**AL-C2V**	1	
Socket with Built-in Resistor 	Solder Terminal	5V DC	**AL-C21**	**AL-C21**	1	Socket Bottom Color: Blue • A current limiting resistor is contained, eliminating the need for external resistors. • When using the socket with a built-in resistor, make sure that the continuous current is 1A maximum and the operating temperature is –25 to +40°C. In collective mounting, keep center-to center-spacing of 20 mm or more between adjacent units in consideration of built-in resistor heating. • See page **26** for dimensions.
		6V DC	**AL-C22**	**AL-C22**	1	Green
		12V DC	**AL-C23**	**AL-C23**	1	Yellow
		24V DC	**AL-C24**	**AL-C24**	1	Red
	PC Board Terminal	5V DC	**AL-C21V**	**AL-C21V**	1	Blue
		6V DC	**AL-C22V**	**AL-C22V**	1	Green
		12V DC	**AL-C23V**	**AL-C23V**	1	Yellow
		24V DC	**AL-C24V**	**AL-C24V**	1	Red
Terminal Cover 	Nylon		**AL-V2**	**AL-V2PN10**	10	• When wiring the terminals, insert the lead wires into the terminal cover holes before soldering. • Terminal cover is not attached and must be ordered separately.
Dust Cover 	For round units		**AL-D2**	**AL-D2**	1	• When mounting the units with the dust covers installed, refer to mounting hole layout on page **26**. • Operating temperature: –10 to +55°C • Material Front part: Elastomer (transparent) Rear part: Polypropylene (black) • See page **26** for dimensions and mounting hole layout.
	For square units		**AL-DQ2**	**AL-DQ2**	1	
	For rectangular units		**AL-DH2**	**AL-DH2**	1	
Mounting Hole Plug 	Nitryl rubber (black)		**AL-B2**	**AL-B2PN05**	5	• Degree of protection: IP65

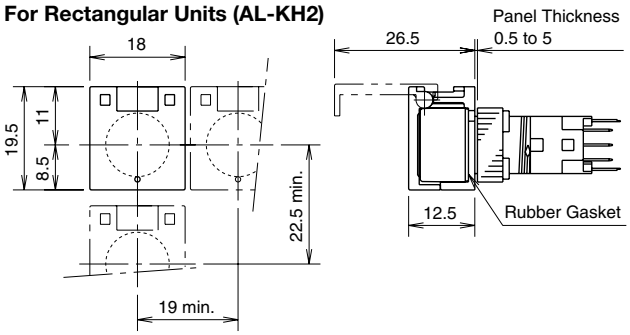
Dimensions

Switch Guard

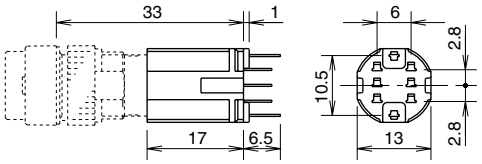
For Round/Square Units (AL-K2)



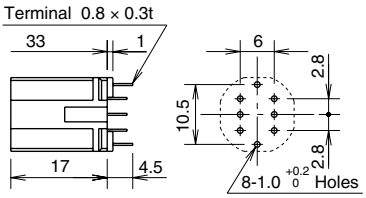
For Rectangular Units (AL-KH2)



Socket (AL-C2, AL-C2V, AL-C2□)



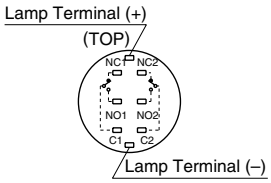
Solder Terminal (AL-C2)

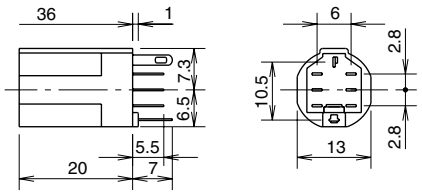


PC Board Terminal (AL-C2V)

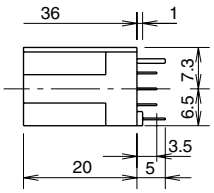
Panel Cut-out Bottom View

Terminal Arrangement

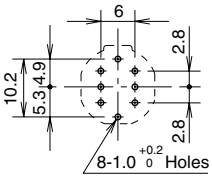




Solder Terminal with Built-in Resistor (AL-C2□)

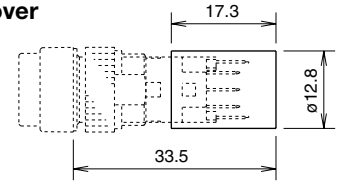


PC Board Terminal with Built-in Resistor (AL-C2□V)



Panel Cut-out Bottom View

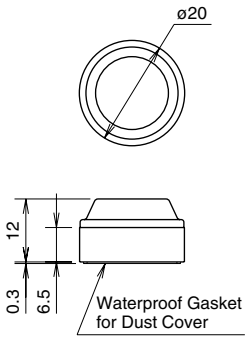
Terminal Cover (AL-V2)



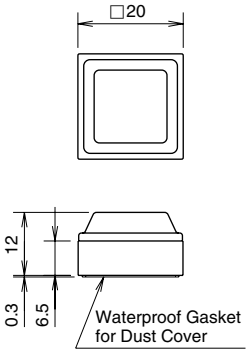
Note: When wiring the terminals, insert the lead wires into the terminal cover holes before soldering.

Dust Cover

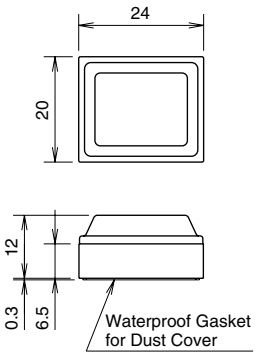
For Round Units (AL-D2)



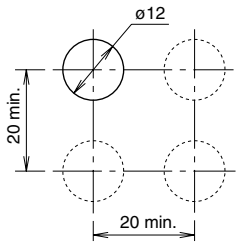
For Square Units (AL-DQ2)



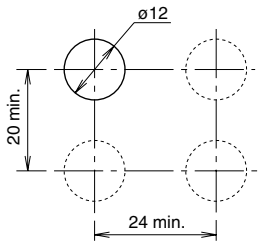
For Rectangular Units (AL-DH2)



Mounting Hole Centers (Round Units, Square Units)



(Rectangular Units)



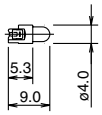
Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

Maintenance Parts

Shape	Specification		Part No.	Ordering Part No.	Package Quantity	Color Code ①②
Marking Plate	Round		**AL2M-W**	**AL2M-WPN05**	5	White
	Square		**AL2Q-W**	**AL2Q-WPN05**		
	Rectangular		**AL2H-W**	**AL2H-WPN05**		
Lens Unit	For IP40 units	Round	**AL2M-LK1-②**	**AL2M-LK1-②PN02**	2	• Specify a color code in place of ② in the Part No. A: amber G: green R: red W: white Y: yellow
		Square	**AL2Q-LK1-②**	**AL2Q-LK1-②PN02**		
		Rectangular	**AL2H-LK1-②**	**AL2H-LK1-②PN02**		
	For IP65 illuminated pushbuttons	Round	**AL2M-LK2-②**	**AL2M-LK2-②**	1	
		Square	**AL2Q-LK2-②**	**AL2Q-LK2-②**		
		Rectangular	**AL2H-LK2-②**	**AL2H-LK2-②**		
	For IP65 pilot lights	Round	**AL2M-LK3-②**	**AL2M-LK3-②**		
		Square	**AL2Q-LK3-②**	**AL2Q-LK3-②**		
		Rectangular	**AL2H-LK3-②**	**AL2H-LK3-②**		
Button Unit	For IP40 pushbuttons	Round	**AB2M-BK1-①**	**AB2M-BK1-①PN02**	2	• Specify a color code in place of ① in the Part No. B: black G: green R: red S: blue W: white Y: yellow
		Square	**AB2Q-BK1-①**	**AB2Q-BK1-①PN02**		
		Rectangular	**AB2H-BK1-①**	**AB2H-BK1-①PN02**		
	For IP65 pushbuttons	Round	**AB2M-BK2-①**	**AB2M-BK2-①**	1	
		Square	**AB2Q-BK2-①**	**AB2Q-BK2-①**		
		Rectangular	**AB2H-BK2-①**	**AB2H-BK2-①**		

LED Lamp						Lens color	
Current-limiting resistor is not contained.	Illumination color: amber	**LAD-SA**	**LAD-SA**	1	Amber	LED color: amber clear
			LAD-SAPN10	10		
	Illumination color: green	**LAD-SG**	**LAD-SG**	1	Green	LED color: yellow diffused
			LAD-SGPN10	10		
	Illumination color: red	**LAD-SR**	**LAD-SR**	1	Red	LED color: clear red
			LAD-SRPN10	10		
	Illumination color: yellow	**LAD-SY**	**LAD-SY**	1	White/ Yellow	LED color: yellow clear
			LAD-SYPN10	10		



All dimensions in mm.

Safety Precautions

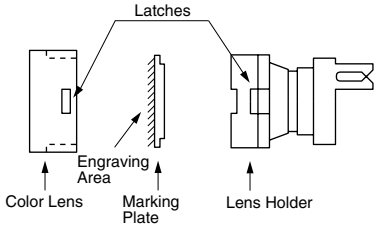
- Turn off the power to A series before starting installation, removal, wiring, maintenance, and inspection of the units. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid burning your hand, use the lamp holder tool when replacing lamps.
- For wiring, use wires of a proper gauge to meet the voltage and current requirements. Failure to tighten terminal screws may cause overheating and create a fire hazard.

Operating Instructions

Replacement of Lens and Marking Plate

Removal

Remove the lens assembly (color lens, marking plate, lens holder, and spring) by holding the color lens recesses with the Lens Removal Tool (MT-101) and pulling it out. Remove the marking plate by disengaging the latches between the color lens and lens holder.
The marking plate must be engraved on the front side as shown below.



Installation

Place the marking plate on the lens holder in the correct direction, and press the color lens onto the lens holder to engage the latches.
Put the spring on the lens holder and insert the lens holder into the housing in the correct direction.

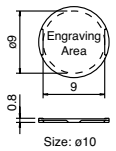
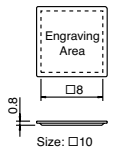
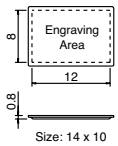
Installing Non-illuminated Button

Non-illuminated pushbuttons contain a marking plate like illuminated units. Be sure to install the marking plate when replacing the button.

Marking

For A series illuminated pushbuttons, legends and symbols can be engraved on the built-in marking plates, or printed film can be inserted under the lens.

Marking Plate & Engraving Area

Lens	Round	Square	Rectangular
Built-in Marking Plate			
	• Engraving must be made on the engraving area less than 0.5mm deep. • The marking plate is made of white acrylic resin.		

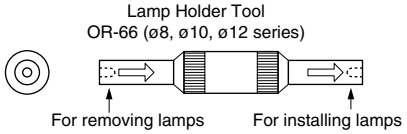
Replacing the LED Lamp

Removal

Use the lamp holder tool (OR-66) to remove lamps. Do not use pliers.

Installation

Use the lamp holder tool (OR-66) to install lamps. Note the correct side of the tool for removal or installation.



Panel Mounting

When mounting the units onto a panel, use the optional locking ring wrench (MT-002) to tighten the locking ring. Do not use pliers. Tightening torque must not exceed 0.78 N·m. Excessive tightening will damage the locking ring.

Wiring

Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu is recommended when using lead-free solder. When soldering, do not touch the unit with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal. Use non-corrosive rosin flux.

Installing the Socket

Install the socket on the unit with the TOP markings on the unit and the socket placed in the same direction.

Operating Voltage of LED Lamps

The operating voltage is measured at complete DC. When using a pulsating voltage such as a full-wave rectification voltage, keep peak currents within the forward current If. Peak currents exceeding the If may shorten the LED lamp life.

Other Notes

Close Proximity Mounting

When mounting pilot lights or illuminated pushbuttons collectively or lighting them continuously, heat may cause the ambient temperature to rise above the rated operating temperature. When the mounting panel is not made of metal or when the units are mounted in an enclosed panel, provide for ventilation or lower the operating voltage.

Replacement of Buttons (Illuminated/Non-illuminated)

Do not replace buttons of maintained action units while the button is in the locked position. Replacing the button in the locked position may damage the internal mechanism. Be sure to release the button before replacing.

Operating and Storage Environment

1. Make sure that the operating/storage temperature and humidity are within the ratings.
2. Do not use enclosed units (IP40) in an environment subject to oil, water or dust accumulation. In such an area, use the waterproof/oiltight units (IP65).

Microswitch Contacts

Do not connect NO and NC contacts of the microswitch to different voltages or different power sources to prevent a dead short-circuit.

IP65 Units

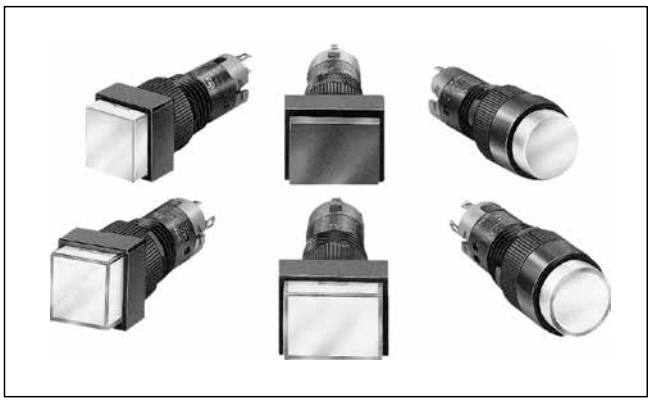
IP65 units are evaluated by conventional cutting and cooling oils, and can not be used with some special oils. Contact IDEC for resistance against special oils.

ø10 A1 Series Switches and Pilot Lights

Short 22-mm-long body miniature switches and pilot lights with LED illumination face and snap-action switching.

- Bright and clear LED illumination.
- All series have terminals on the same plane.
- UL recognized, CSA certified

Applicable Standards	Mark	File No. or Organization
UL508		UL Recognition File No. E55996
CSA C22.2 No.14		CSA File No. LR 21451
GB14048.5		CCC No.2013010305662162 (except for pilot lights)



Contact Ratings (Contact Block)

Rated Insulation Voltage		250V		
Rated Thermal Current		3A		
Operating Voltage (AC/DC)		24V	110V	220V
AC 50/60 Hz	Resistive Load	–	1.0A	0.5A
	Inductive Load	–	0.7A	0.5A
DC	Resistive Load	1.0A	0.2A	–
	Inductive Load	0.7A	0.1A	–
Contact Material		Silver		

- Minimum applicable load: 5V AC/DC, 3 mA (applicable range may vary with operating conditions and load types)

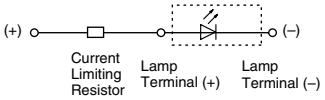
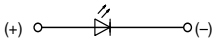
Weight

Weight (approx.)	AL1M-M11: 3g
	AL1M-P1: 3g
	AB1M-M1: 3g

Specifications

Operating Temperature		–25 to +55°C (no freezing)
Storage Temperature		–30 to +80°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Contact Resistance		50 mΩ maximum (initial value)
Insulation Resistance		100 MΩ minimum (500V DC megger)
Dielectric Strength	Switch Unit	Between live and dead metal parts: 2,000V AC, 1 minute Between terminals of different poles: 2,000V AC, 1 minute Between terminals of the same pole: 1,000V AC, 1 minute Between contact and lamp terminals: 1,500V AC, 1 minute
	Illumination Unit	Between live part and ground: 2,000V AC, 1 minute
Vibration Resistance		Damage Limits, Operating extremes: 5 to 55 Hz, amplitude 0.75 mm
Shock Resistance		Damage limits: 500 m/s² (50G) Operating extremes: 200 m/s² (20G)
Mechanical Durability (minimum operations)		Momentary: 200,000 operations Maintained: 100,000 operations
Electrical Durability (minimum operations)		Momentary: 100,000 operations Maintained: 50,000 operations (Switching frequency 1200 operations/h)
Degree of Protection		IP40 (IEC 60529)

LED Lamp Ratings (LAD-S)

Built-in LED Part No.	LAD-SA	LAD-SG	LAD-SR	LAD-SY
Lamp Base	Exclusive for A series			
Forward Current (If)	20 mA			
Forward Voltage (Vf) (nominal)	2.2V	2.1V	1.7V	2.2V
Reverse Voltage (Vr)	4V			
Illumination Color	A	G	R	Y
LED Lamp Color	Amber Clear	Yellow Diffused	Red Clear	Yellow Clear
Applicable Lens Color	Amber	Green	Red	Yellow and White
Base Plastic Color	Red			
LED Lamp Life (reference value)	Approx. 50,000 hours (The illuminance reduces to 50% of the initial intensity when used on complete DC.)			
Operating Voltage & External Current-limiting Resistor (recommended value) (Note)	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W			
Internal Circuit				

Note: When LED lamps are used on voltages other than the above, external resistor value R is determined by the following formula:
R = (operating voltage – Vf) / If

- LED lamps do not have a current-limiting resistor, and external resistors of recommended values for each voltage must be provided. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged. Because no protection diode is contained, ensure the correct polarity is observed.

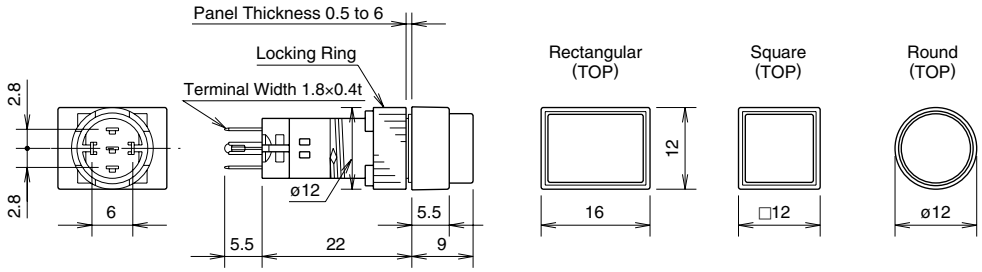
Illuminated Pushbuttons & Pilot Lights

Package Quantity: 1

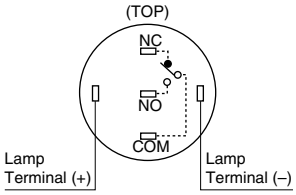
Shape	Operation	Contact	Part No. IP40	② Lens Color Code	LED Lamp Part No., Rated Current (External Resistor Recommended Value)
Round AL1M  (except for pilot lights)	Momentary	**SPDT**	**AL1M-M11②**	Specify a color code in place of ② in the Part No. A: amber G: green R: red W: white Y: yellow	A: LAD-SA G: LAD-SG R: LAD-SR W/Y: LAD-SY Rated Current: 20 mA 5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W
	Maintained	**SPDT**	**AL1M-A11②**		
	Pilot Light	**—**	**AL1M-P1②**		
Square AL1Q  (except for pilot lights)	Momentary	**SPDT**	**AL1Q-M11②**		
	Maintained	**SPDT**	**AL1Q-A11②**		
	Pilot Light	**—**	**AL1Q-P1②**		
Rectangular AL1H  (except for pilot lights)	Momentary	**SPDT**	**AL1H-M11②**		
	Maintained	**SPDT**	**AL1H-A11②**		
	Pilot Light	**—**	**AL1H-P1②**		

- LED lamps do not have a current-limiting resistor. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged.
- AP1M series pilot lights (round bezel only) with built-in current-limiting resistor are also available.
- Pilot lights are not CCC certifed.

Dimensions

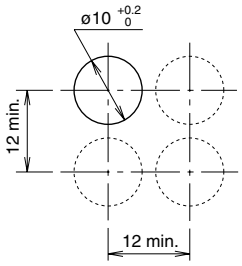


Terminal Arrangement (bottom view)

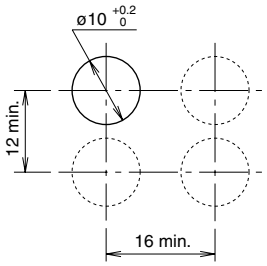


Mounting Hole Layout

Round/Square Units



Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

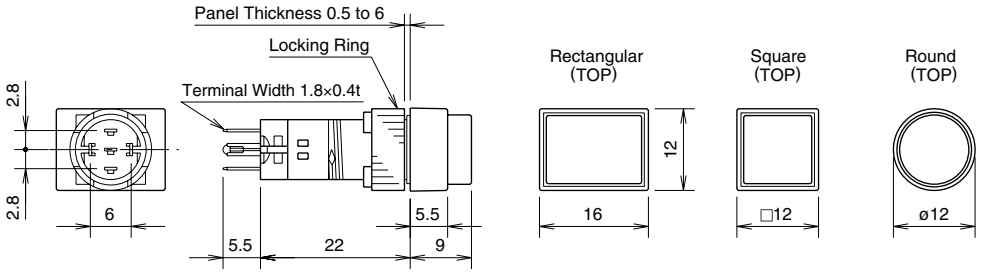
Pushbuttons

Package Quantity: 1

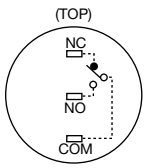
Shape	Button Style	Operation	Contact	Part No. IP40	Color Code ①②
Round AB1M 	Button	Momentary	**SPDT**	**AB1M-M1①**	B black G: green R: red S: blue W: white Y: yellow
		Maintained	**SPDT**	**AB1M-A1①**	
	Lens	Momentary	**SPDT**	**AB1M-M1L②**	A: amber G: green R: red W: white Y: yellow
		Maintained	**SPDT**	**AB1M-A1L②**	
Square AB1Q 	Button	Momentary	**SPDT**	**AB1Q-M1①**	B black G: green R: red S: blue W: white Y: yellow
		Maintained	**SPDT**	**AB1Q-A1①**	
	Lens	Momentary	**SPDT**	**AB1Q-M1L②**	A: amber G: green R: red W: white Y: yellow
		Maintained	**SPDT**	**AB1Q-A1L②**	
Rectangular AB1H 	Button	Momentary	**SPDT**	**AB1H-M1①**	B black G: green R: red S: blue W: white Y: yellow
		Maintained	**SPDT**	**AB1H-A1①**	
	Lens	Momentary	**SPDT**	**AB1H-M1L②**	A: amber G: green R: red W: white Y: yellow
		Maintained	**SPDT**	**AB1H-A1L②**	

• Specify a color code in place of ① or ② in the Part No.

Dimensions

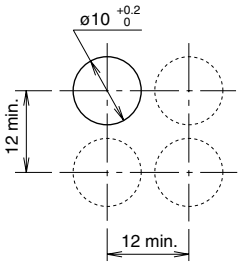


Terminal Arrangement (bottom view)

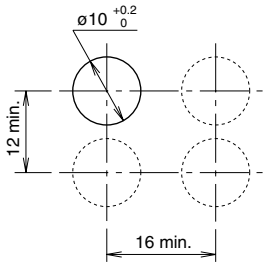


Mounting Hole Layout

Round/Square Units



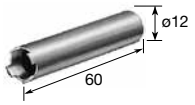
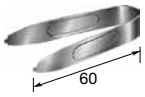
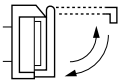
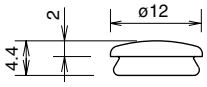
Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

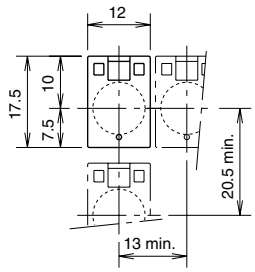
Accessories

Shape	Material		Part No.	Ordering No.	Package Quantity	Remarks
Locking Ring Wrench 	Metal (nickel-plated brass)		**MT-003**	**MT-003**	1	• Used to tighten the locking ring when installing the A1 series into a panel.
Lens Removal Tool 	Stainless Steel		**MT-101**	**MT-101**	1	• Used to remove lens and button.
Lamp Holder Tool 	Rubber		**OR-66**	**OR-66**	1	• Used to remove and install LED lamps.
Switch Guard 	90° open	For round/ square unit	**AL-K1**	**AL-K1**	1	• Used to protect pushbuttons from inadvertent operation. • See page **33** for dimensions.  (remains 90° open)
		For rectangular unit	**AL-KH1**	**AL-KH1**	1	
Socket 	Solder Terminal		**AL-C1**	**AL-C1**	1	• Snaps on the rear of the A1 series. (see page **33** for dimensions)
	PC Board Terminal		**AL-C1V**	**AL-C1V**	1	
Terminal Cover 	Nylon		**AL-V1**	**AL-V1PN10**	10	• When wiring the terminals, insert the lead wires into the terminal cover holes before soldering. • Terminal cover is not attached and must be ordered separately.
Mounting Hole Plug 	Nitryl rubber (black)		**AL-B1**	**AL-B1PN05**	5	• Degree of protection: IP65 

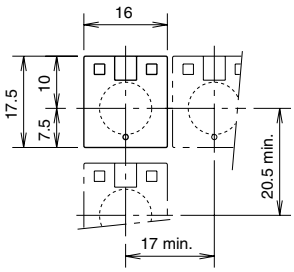
Dimensions

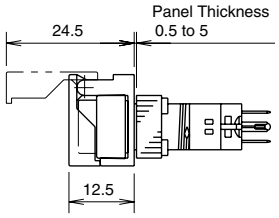
Switch Guard

For Round/Square Units (AL-K1)

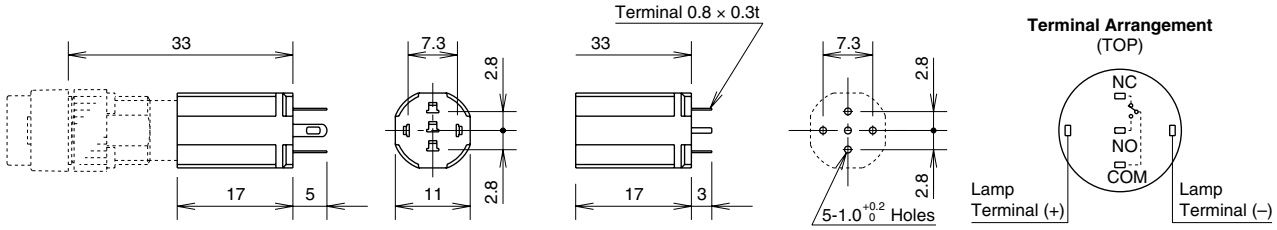


For Rectangular Units (AL-KH1)





Socket (AL-C1, AL-C1V)



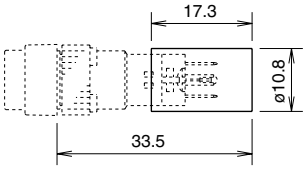
Solder Terminal (AL-C1)

PC Board Terminal (AL-C1V)

(PC Board Terminal Mounting Hole Layout)

(Bottom View)

Terminal Cover



Note: When wiring the terminals, insert the lead wires into the terminal cover holes before soldering.

All dimensions in mm.

Maintenance Parts

Shape		Part No.	Ordering No.	Package Quantity	Color Code ①②
Marking Plate	Round	**AL1M-W**	**AL1M-WPN05**	5	• White
	Square	**AL1Q-W**	**AL1Q-WPN05**		
	Rectangular	**AL1H-W**	**AL1H-WPN05**		
Lens Unit	Round	**AL1M-LK1-②**	**AL1M-LK1-②PN02**	2	Specify a color code in place of ② in the Part No. A (amber), G (green), R (red) W (white), Y (yellow)
	Square	**AL1Q-LK1-②**	**AL1Q-LK1-②PN02**		
	Rectangular	**AL1H-LK1-②**	**AL1H-LK1-②PN02**		
Button Unit	Round	**AB1M-BK1-①**	**AB1M-BK1-①PN02**		Specify a color code in place of ① in the Part No. B (black), G (green), R (red) S (blue), W (white), Y (yellow)
	Square	**AB1Q-BK1-①**	**AB1Q-BK1-①PN02**		
	Rectangular	**AB1H-BK1-①**	**AB1H-BK1-①PN02**		

LED Lamp					Lens color	
Current-limiting resistor is not contained. All dimensions in mm.	Illumination color: amber	**LAD-SA**	**LAD-SA**	1	Amber	LED color: amber clear
			LAD-SAPN10	10		
	Illumination color: green	**LAD-SG**	**LAD-SG**	1	Green	LED color: yellow diffused
			LAD-SGPN10	10		
	Illumination color: red	**LAD-SR**	**LAD-SR**	1	Red	LED color: clear red
			LAD-SRPN10	10		
	Illumination color: yellow	**LAD-SY**	**LAD-SY**	1	White/ Yellow	LED color: yellow clear
			LAD-SYPN10	10		

Safety Precautions

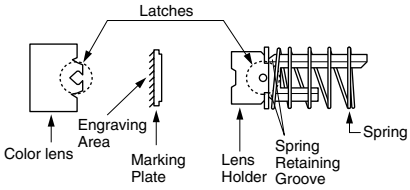
- Turn off the power to A series before starting installation, removal, wiring, maintenance, and inspection of the units. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid burning your hand, use the lamp holder tool when replacing lamps.
- For wiring, use wires of a proper gauge to meet the voltage and current requirements. Failure to tighten terminal screws may cause overheating and create a fire hazard.

Operating Instructions

Replacement of Lens and Marking Plate

Removal

Remove the lens assembly (color lens, marking plate, lens holder, and spring) by holding the color lens recesses with the Lens Removal Tool (MT-101) and pulling it out. Remove the marking plate by disengaging the latches between the color lens and lens holder.
The marking plate must be engraved on the front side as shown below.



Note: Make sure that the spring is inserted in the correct direction. The base of spring must fit the groove in the holder.

Installation

Place the marking plate on the lens holder in the correct direction, and press the color lens onto the lens holder to engage the latches.
Put the spring on the lens holder and insert the lens holder into the housing in the correct direction.

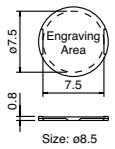
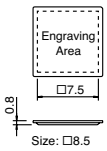
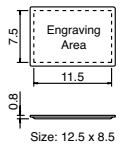
Installing Non-illuminated Button

Non-illuminated pushbuttons contain a marking plate like illuminated units. Be sure to install the marking plate when replacing the button.

Marking

For A series illuminated pushbuttons, legends and symbols can be engraved on the built-in marking plates, or printed film can be inserted under the lens.

Marking Plate & Engraving Area

Lens	Round	Square	Rectangular
Built-in Marking Plate			
	• Engraving must be made on the engraving area less than 0.5mm deep. • The marking plate is made of white acrylic resin.		

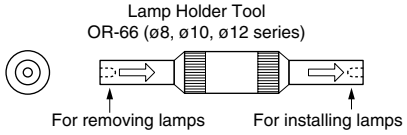
Replacing the LED Lamp

Removal

Use the lamp holder tool (OR-66) to remove lamps. Do not use pliers.

Installation

Use the lamp holder tool (OR-66) to install lamps. Note the correct side of the tool for removal or installation.



Panel Mounting

When mounting the units into a panel, use the optional locking ring wrench (MT-003) to tighten the locking ring. Do not use pliers. Tightening torque must not exceed 0.29 N·m. Excessive tightening will damage the locking ring.

Wiring

Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu is recommended when using lead-free solder. When soldering, do not touch the unit with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal.
Use non-corrosive rosin flux.

Installing the Socket

Install the socket on the unit with the TOP markings on the unit and the socket placed in the same direction.

Operating Voltage of LED Lamps

The operating voltage is measured at complete DC. When using a pulsating voltage such as a full-wave rectification voltage, keep peak currents within the forward current If. Peak currents exceeding the If may shorten the LED lamp life.

Other Notes

Close Proximity Mounting

When mounting pilot lights or illuminated pushbuttons collectively or lighting them continuously, heat may cause the ambient temperature to rise above the rated operating temperature. When the mounting panel is not made of metal or when the units are mounted in an enclosed panel, provide for ventilation or lower the operating voltage.

Replacement of Buttons (Illuminated/Non-illuminated)

Do not replace buttons of maintained action units while the button is in the locked position. Replacing the button in the locked position may damage the internal mechanism. Be sure to release the button before replacing.

Operating and Storage Environment

1. Make sure that the operating/storage temperature and humidity are within the ratings.
2. Do not use enclosed type units in an environment subject to oil, water or dust accumulation.

Microswitch Contacts

Do not connect NO and NC contacts of the microswitch to different voltages or different power sources to prevent a dead short-circuit.

ø8 A8 Series Switches and Pilot Lights

Short 22-mm-long body miniature switches and pilot lights with LED illumination face and snap-action switching.

- Bright and clear LED illumination.
- All series have terminals on the same plane.
- UL recognized, CSA certified

Applicable Standards	Mark	File No. / Organization
UL508		UL Recognition File No. E55996
CSA C22.2 No.14		CSA File No. LR 21451
GB14048.5		CCC No.2013010305650376 (except for pilot lights)

Contact Ratings (Contact Block)

Rated Insulation Voltage		250V		
Rated Thermal Current		3A		
Operating Voltage (AC/DC)		24V	110V	220V
AC 50/60 Hz	Resistive Load	–	1.0A	0.5A
	Inductive Load	–	0.7A	0.5A
DC	Resistive Load	1.0A	0.2A	–
	Inductive Load	0.7A	0.1A	–
Contact Material		Silver		

- Minimum applicable load: 5V AC/DC, 3 mA (applicable range may vary with operating conditions and load types)

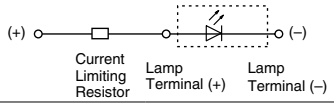
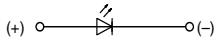
Weight

Weight (approx.)	AL8M-M11: 2g
	AL8M-P1: 2g
	AB8M-M1: 2g

Specifications

Operating Temperature		–25 to +55°C (no freezing)
Storage Temperature		–30 to +80°C (no freezing)
Operating Humidity		45 to 85% RH (no condensation)
Contact Resistance		50 mΩ maximum (initial value)
Insulation Resistance		100 MΩ minimum (500V DC megger)
Dielectric Strength	Switch Unit	Between live and dead metal parts 2,000V AC, 1 minute Between terminals of different poles: 2,000V AC, 1 minute Between terminals of the same pole: 1,000V AC, 1 minute Between contact and lamp terminals: 1,500V AC, 1 minute
	Illumination Unit	Between live part and ground: 2,000V AC, 1 minute
Vibration Resistance		Damage Limits, Operating extremes: 5 to 55 Hz, amplitude 0.75 mm
Shock Resistance		Damage limits: 500 m/s² (50G) Operating extremes: 200 m/s² (20G)
Mechanical Durability (minimum operations)		Momentary: 200,000 operations Maintained: 100,000 operations
Electrical Durability (minimum operations)		Momentary: 100,000 operations Maintained: 50,000 operations (Switching frequency 1200 operations/h)
Degree of Protection		IP40 (IEC 60529)

LED Lamp Ratings (LAD-S)

Part No.	LAD-SA	LAD-SG	LAD-SR	LAD-SY
Lamp Base	Exclusive for A series			
Forward Current (If)	20 mA			
Forward Voltage (Vf) (nominal)	2.2V	2.1V	1.7V	2.2V
Reverse Voltage (Vr)	4V			
Illumination Color	A	G	R	Y
LED Lamp Color	Amber Clear	Yellow Diffused	Red Clear	Yellow Clear
Applicable Lens Color	Amber	Green	Red	Yellow and White
Base Plastic Color	Red			
LED Lamp Life (reference value)	Approx. 50,000 hours (The illuminance reduces to 50% of the initial intensity when used on complete DC.)			
Operating Voltage & External Current-limiting Resistor (recommended value) (Note)	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W			
Internal Circuit				

Note: When LED lamps are used on voltages other than the above, external resistor value R is determined by the following formula:
R = (operating voltage – Vf) / If

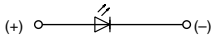
- LED lamps do not have a current-limiting resistor, and external resistors of recommended values or each voltage must be provided. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged. Because no protection diode is contained, ensure the correct polarity is observed.

Illuminated Pushbuttons & Pilot Lights

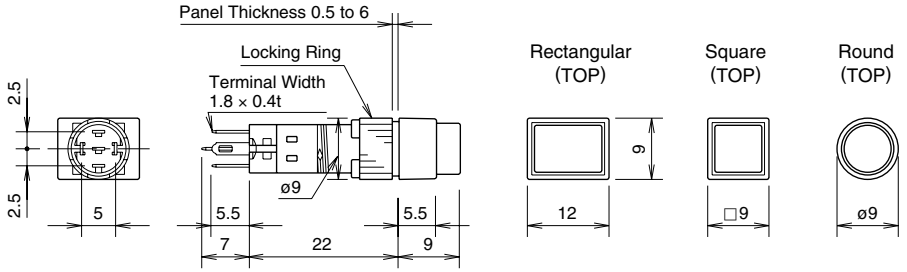
Package Quantity: 1

Shape	Operation	Contact	Part No. IP40	② Lens Color Code	LED Lamp Part No., Rated Current (External Resistor Recommended Value)
Round AL8M  (except for pilot lights)	Momentary	**SPDT**	**AL8M-M11②**	Specify a color code in place of ② in the Part No. A: amber G: green R: red W: white Y: yellow	A: LAD-SA G: LAD-SG R: LAD-SR W/Y: LAD-SY Rated Current: 20 mA 5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W
	Maintained	**SPDT**	**AL8M-A11②**		
	Pilot Light	**—**	**AL8M-P1②**		
Square AL8Q  (except for pilot lights)	Momentary	**SPDT**	**AL8Q-M11②**		
	Maintained	**SPDT**	**AL8Q-A11②**		
	Pilot Light	**—**	**AL8Q-P1②**		
Rectangular AL8H  (except for pilot lights)	Momentary	**SPDT**	**AL8H-M11②**		
	Maintained	**SPDT**	**AL8H-A11②**		
	Pilot Light	**—**	**AL8H-P1②**		

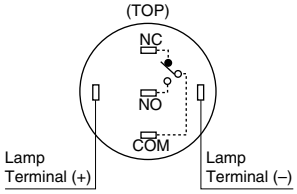
- LED lamps do not have a current-limiting resistor. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged.
- AP8M series pilot lights (round bezel only) with built-in current-limiting resistor are also available.
- Pilot lights are not CCC certified.



Dimensions

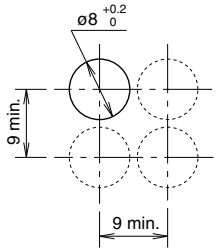


Terminal Arrangement

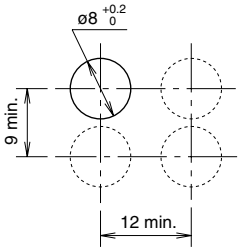


Mounting Hole Layout

Round/Square Units



Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

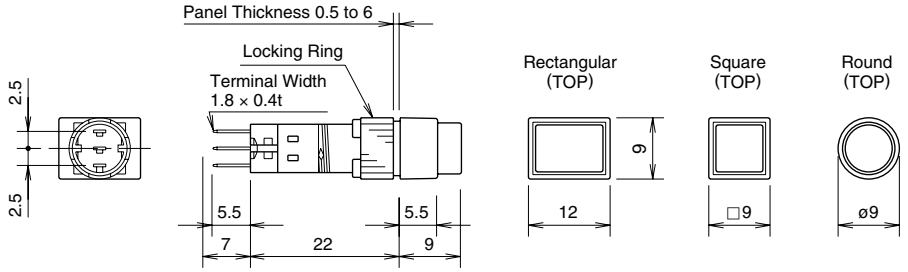
Pushbuttons

Package Quantity: 1

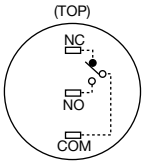
Shape	Button Style	Operation	Contact	Part No. IP40	Color Code ①②
Round AB8M 	Button	Momentary	**SPDT**	**AB8M-M1①**	B black G: green R: red S: blue W: white Y: yellow
		Maintained	**SPDT**	**AB8M-A1①**	
	Lens	Momentary	**SPDT**	**AB8M-M1L②**	A: amber G: green R: red W: white Y: yellow
		Maintained	**SPDT**	**AB8M-A1L②**	
Square AB8Q 	Button	Momentary	**SPDT**	**AB8Q-M1①**	B black G: green R: red S: blue W: white Y: yellow
		Maintained	**SPDT**	**AB8Q-A1①**	
	Lens	Momentary	**SPDT**	**AB8Q-M1L②**	A: amber G: green R: red W: white Y: yellow
		Maintained	**SPDT**	**AB8Q-A1L②**	
Rectangular AB8H 	Button	Momentary	**SPDT**	**AB8H-M1①**	B black G: green R: red S: blue W: white Y: yellow
		Maintained	**SPDT**	**AB8H-A1①**	
	Lens	Momentary	**SPDT**	**AB8H-M1L②**	A: amber G: green R: red W: white Y: yellow
		Maintained	**SPDT**	**AB8H-A1L②**	

- Specify a color code in place of ① or ② in the Part No.
- Lens style buttons can be used with marking plate and film.

Dimensions

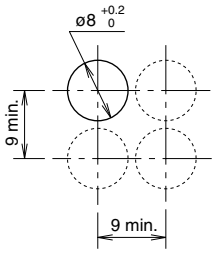


Terminal Arrangement (bottom view)

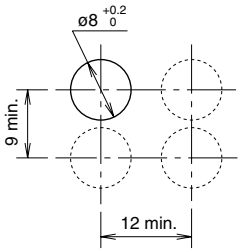


Mounting Hole Layout

Round/Square Units



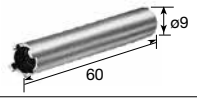
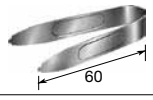
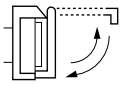
Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

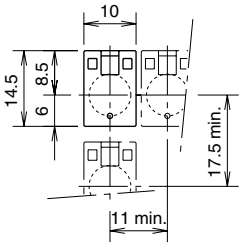
Accessories

Shape	Material		Part No.	Ordering Part No.	Package Quantity	Remarks
Locking Ring Wrench 	Metal (nickel-plated brass)		**MT-004**	**MT-004**	1	• Used to tighten the locking ring when installing the A8 series into a panel.
Lens Removal Tool 	Stainless Steel		**MT-101**	**MT-101**	1	• Used to remove the lens and button.
Lamp Holder Tool 	Rubber		**OR-66**	**OR-66**	1	• Used to remove and install the LED lamps.
Switch Guard 	90° open	For round/ square Unit	**AL-K8**	**AL-K8**	1	• Used to protect pushbuttons from inadvertent operation. • See page **38** for dimensions.  (remains 90° open)
		For rectangular unit	**AL-KH8**	**AL-KH8**	1	
Socket 	Solder Terminal		**AL-C8**	**AL-C8**	1	• Snaps on the rear of the A8 series. (see page **38** for dimensions)
	PC Board Terminal		**AL-C8V**	**AL-C8V**	1	
Terminal Cover 	Nylon		**AL-V8**	**AL-V8PN10**	10	• When wiring the terminals, insert the lead wires into the terminal cover holes before soldering. • Terminal cover is not attached and must be ordered separately.
Mounting Hole Plug 	Nitryl rubber (black)		**AL-B8**	**AL-B8PN05**	5	• Degree of protection: IP65

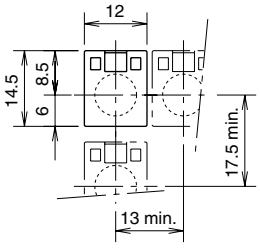
Dimensions

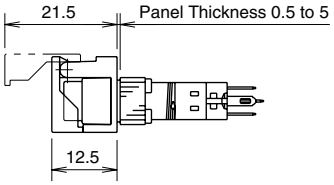
Switch Guard

For Round/Square Units (AL-K8)

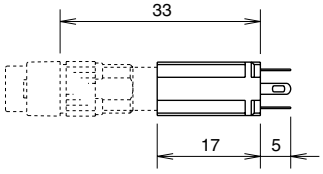


For Rectangular Units (AL-KH8)

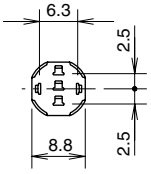


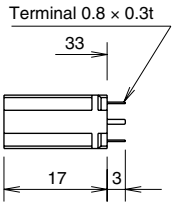


Socket (AL-C8, AL-C8V)

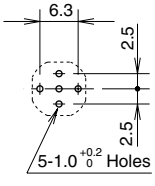


Solder Terminal (AL-C8)



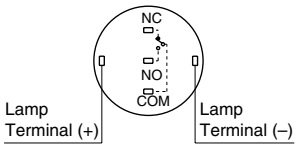


PC Board Terminal (AL-C8V)



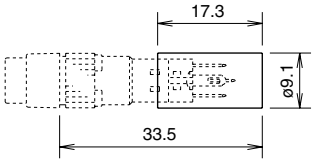
(PC Board Terminal Mounting Hole Layout)

Terminal Arrangement
(TOP)



(Bottom View)

Terminal Cover (AL-V8)



Note: When wiring the terminals, insert the lead wires into the terminal cover holes before soldering.

All dimensions in mm.

Maintenance Parts

Shape		Part No.	Ordering Part No.	Package Quantity	Color Code ①②		
Marking Plate	Round	**AL8M-W**	**AL8M-WPN05**	5	• White		
	Square	**AL8Q-W**	**AL8Q-WPN05**				
	Rectangular	**AL8H-W**	**AL8H-WPN05**				
Lens Unit	Round	**AL8M-LK1-②**	**AL8M-LK1-②PN02**	2	Specify a color code in place of ② in the Part No. A (amber), G (green), R (red) W (white), Y (yellow)		
	Square	**AL8Q-LK1-②**	**AL8Q-LK1-②PN02**				
	Rectangular	**AL8H-LK1-②**	**AL8H-LK1-②PN02**				
Button Unit	Round	**AB8M-BK1-①**	**AB8M-BK1-①PN02**		Specify a color code in place of ① in the Part No. B (black), G (green), R (red) S (blue), W (white), Y (yellow)		
	Square	**AB8Q-BK1-①**	**AB8Q-BK1-①PN02**				
	Rectangular	**AB8H-BK1-①**	**AB8H-BK1-①PN02**				
LED Lamp Current-limiting resistor is not contained. All dimensions in mm.	Illumination color: amber	**LAD-SA**	**LAD-SA**	1	Lens color	Amber	LED color: amber clear
			LAD-SAPN10	10			
	Illumination color: green	**LAD-SG**	**LAD-SG**	1		Green	LED color: yellow diffused
			LAD-SGPN10	10			
	Illumination color: red	**LAD-SR**	**LAD-SR**	1		Red	LED color: clear red
			LAD-SRPN10	10			
	Illumination color: yellow	**LAD-SY**	**LAD-SY**	1		White/ Yellow	LED color: yellow clear
			LAD-SYPN10	10			

Safety Precautions

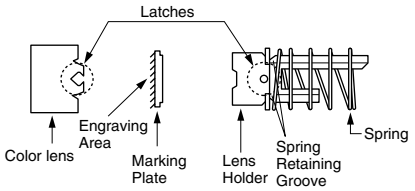
- Turn off the power to A series before starting installation, removal, wiring, maintenance, and inspection of the units. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid burning your hand, use the lamp holder tool when replacing lamps.
- For wiring, use wires of a proper size to meet the voltage and current requirements. Failure to tighten terminal screws may cause overheating and create a fire hazard.

Operating Instructions

Replacement of Lens and Marking Plate

Removal

Remove the operator (color lens, marking plate, lens holder, and spring) by holding the color lens recesses with the Lens Removal Tool (MT-101) and pulling it out. Remove the marking plate by disengaging the latches between the color lens and lens holder. The marking plate must be engraved on the front side as shown below.



Note: Make sure that the spring is inserted in the correct direction. The base of spring must fit the groove in the holder.

Installation

Place the marking plate on the lens holder in the correct direction, and press the color lens onto the lens holder to engage the latches.
Put the spring on the lens holder and insert the lens holder into the housing in the correct direction.

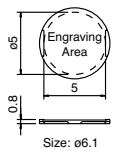
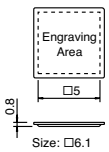
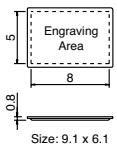
Installing Non-illuminated Button

Non-illuminated pushbuttons contain a marking plate like illuminated units. Be sure to install the marking plate when replacing the button.

Marking

For A series illuminated pushbuttons, legends and symbols can be engraved on the built-in marking plates, or printed film can be inserted under the lens.

Marking Plate & Engraving Area

Lens	Round	Square	Rectangular
Built-in Marking Plate			
	• Engraving must be made on the engraving area less than 0.5mm deep. • The marking plate is made of white acrylic resin.		

Operating Instructions

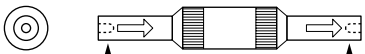
Replacing the LED Lamp

Removal

Use the lamp holder tool (OR-66) to remove lamps. Do not use pliers.

Installation

Use the lamp holder tool (OR-66) to install lamps. Note the correct side of the tool for removal or installation.



Panel Mounting

When mounting the units onto a panel, use the optional locking ring wrench (MT-004) to tighten the locking ring. Do not use pliers. Tightening torque must not exceed 0.29 N·m. Excessive tightening will damage the locking ring.

Wiring

Solder the terminal at 350°C within 3 seconds using a 60W soldering iron. Sn-Ag-Cu is recommended when using lead-free solder. When soldering, do not touch the enabling switch with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal.
Use a non-corrosive rosin flux.

Installing the Socket

Install the socket on the unit with the TOP markings on the unit and the socket placed in the same direction.

Operating Voltage of LED Lamps

The operating voltage of 5V DC is measured at complete DC. When using a pulsating voltage such as a full-wave rectification voltage, keep peak currents within the forward current If. Peak currents exceeding the If may shorten the LED lamp life.

Other Notes

Close Proximity Mounting

When mounting pilot lights or illuminated pushbuttons collectively or lighting them continuously, heat may cause the ambient temperature to rise above the rated operating temperature. When the mounting panel is not made of metal or when the units are mounted in an enclosed panel, provide for ventilation or lower the operating voltage.

Replacement of Buttons (Illuminated/Non-illuminated)

Do not replace buttons of maintained action units while the button is in the locked position. Replacing the button in the locked position may damage the internal mechanism. Be sure to release the button before replacing.

Operating and Storage Environment

1. Make sure that the operating/storage temperature and humidity are within the ratings.
2. Do not use enclosed type units in an environment subject to oil, water or dust accumulation.

Microswitch Contacts

Do not connect NO and NC contacts of the microswitch to different voltages or different power sources to prevent a dead short-circuit.

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