Miniature Switches and Pilot lights

Ø12 A2 SeriesØ10 A1 SeriesØ8 A8 Series



Bright illumination face and snap-action switching.







• See website for details on approvals and standards.

Hole Size	Model	Function	Degree of Protection
Ø12	AL2	Illuminated Pushbuttons Momentary Maintained Pilot Light	IP65
	AB2	Pushbuttons Momentary Maintained	— IP40 (IEC60529)
-10	AL1	Illuminated Pushbuttons Momentary Maintained Pilot Light	IP40
ø10	AB1	Pushbuttons Momentary Maintained	(IEC60529)
	AL8	Illuminated Pushbuttons Momentary Maintained Pilot Light	IP40
ø8	AB8	Pushbuttons Momentary Maintained	(IEC60529)

Ø12 A2 / Ø10 A1 / Ø8 A8 Series Miniature Pilot Lights

Bright illumination face and snap-action switching. 22 mm short body.

Contact Ratings (Contact Block)

Rated Insulation	n Voltage	250V	60V		
Rated Thermal	Current	3A			
Operating Volta	age (AC/DC)	24V	/ 110V 220V		
AC 50/60 Hz	Resistive Load	_	1.0A	0.5A	
AC 50/60 HZ	Inductive Load	_	0.7A	0.5A	
DC	Resistive Load	1.0A	0.2A	_	
DC	Inductive Load		0.1A	_	
Contact Materi	Contact Material				

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

Weight (Example)

\A/-:	A2 Series	4g (AL2M-M11, AL2M-P1, AB2M-M1)
Weight (approx.)	A1 Series	3g (AL1M-M11, AL1M-P1, AB1M-M1)
(αρριολ.)	A8 Series	2g (AL8M-M11, AL8M-P1, AB8M-M1)

Specifications

Operating To	emperature	-25 to +55°C (no freezing)					
Storage Ten	nperature	-30 to +80°C (no freezing)					
Operating H	umidity	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 Re	sistance	Damage limits, Operating extremes: 5 to 55 Hz, amplitude 0.75 mm					
Shock Resis	stance	Damage limits: 500 m/s² (50G) Operating extremes: 200 m/s² (20G)					
Mechanical (minimum o		Momentary: 200,000 operations Maintained: 100,000 operations					
Electrical Du (minimum o	•	Momentary: 100,000 operations Maintained: 50,000 operations (Switching frequency 1200 operations/h)					
Degree of P	rotection (*1)	IP40, IP65 (IEC 60529)					

^{*1)} IP65: A2 series only

LED Lamn Batings (LAD-S)

Built-in LED Part No.	LAD-SA	LAD-SG	LAD-SR	LAD-SY
Lamp Base		Exclusive fo	r A series	
Forward Current (If)		20 m	nA	
Forward Voltage (Vf) (nominal)	2.2V	2.1V	1.7V	2.2V
Reverse Voltage (Vr)		4V	1	
Illumination Color	A	G	R	Υ
LED Lamp Color	Amber Clear	Yellow Diffused	Red Clear	Yellow Clear
Applicable Lens Color	Amber	Green	Red	Yellow and White
Base Plastic Color		Rec	d	
LED Lamp Life (reference value)	Approx. 50,000 hours (The ill	uminance reduces to 50% of the	initial intensity when used o	on complete DC.)
Operating Voltage & External Current- limiting Resistor (recommended value)	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W			
(Note)	24V DC. 1.1 K12, 1W			

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.
- The base plastic color for all LEDs are red.

APEM Control Boxes Emergency Stop Switches Enabling Switches Safety Products **Explosion Proof** Terminal Blocks Relays & Sockets Circuit Protectors Power Supplies LED Illumination Controllers Operator Sensors

AUTO-ID

Flush Silhouette ø16 ø22 ø30 Pilot Lights HW1Z AP22

Control Boxes Emergency Enabling Switches Safety Products **Explosion Proof** Terminal Blocks Relays & Sockets Circuit Protectors **Power Supplies** LED Illumination Controllers Operator Interfaces Sensors AUTO-ID

Flush Silhouette

ø16

ø22

ø30

Pilot Lights

HW1Z AP22

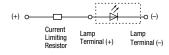
LD6A

ø12 A2 Series Illuminated Pushbuttons & Pilot Lights

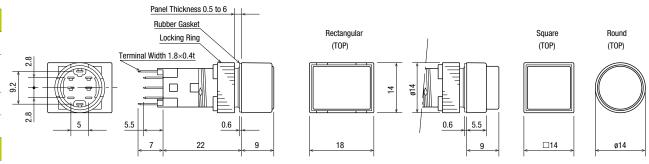
Package Quantity: 1

				Part	No.		LED Lamp	
	Shape	Operation	Contact	IP40	IP65	② Lens Color Code	Part No., Rated Current (External Resistor Recommended Value)	
И	Round AL2M	Momentary	SPDT	AL2M-M112	AL2M-M11P2			
& S		Womentary	DPDT	AL2M-M21②	AL2M-M21P2			
s y		Maintained	SPDT	AL2M-A11@	AL2M-A11P2			
s g		Wallianieu	DPDT	AL2M-A21@	AL2M-A21P2			
S S		Pilot Light	_	AL2M-P1②	AL2M-P1P2		A: LAD-SA	
of	Square AL2Q	Momentary	SPDT	AL2Q-M11@	AL2Q-M11P2	Specify a color code in	A: LAD-SA G: LAD-SG R: LAD-SR	
 s	· ·	Womentary	DPDT	AL2Q-M21@	AL2Q-M21P2	place of ② in the Part No.	W/Y: LAD-SY	
s		Maintained	Maintained	SPDT	AL2Q-A11@	AL2Q-A11P2	A: amber G: green	Rated Current: 20 mA
it s		Walitalieu	DPDT	AL2Q-A21@	AL2Q-A21P2	R: red W: white	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W	
s s		Pilot Light	_	AL2Q-P1②	AL2Q-P1P2	Y: yellow	12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W	
n	Rectangular AL2H	Momentary	SPDT	AL2H-M11@	AL2H-M11P2		247 50. 1.1 102, 177	
s	<u> </u>	Womentary	DPDT	AL2H-M21®	AL2H-M21P2			
or s_		Maintained	SPDT	AL2H-A11@	AL2H-A11P2			
s —		iviaiiilaiiieu	DPDT	AL2H-A21②	AL2H-A21P2			
D —	-	Pilot Light	_	AL2H-P1②	AL2H-P1P2			

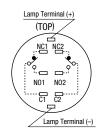
- LED lamps do not have a current-limiting resistor. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged.
- External current-limiting resistor is not necessary when an optional socket with built-in resistor is used (see B-383).
- AP2M series pilot lights (round bezel only) with built-in current-limiting resistors are also available.
- Pilot lights are not CCC certifed.



Dimensions

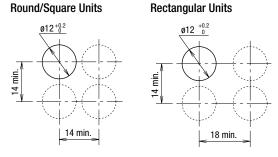


Terminal Arrangement



SPDT has NC1, NO1, and C1 only.

Mounting Hole Layout



Note: Determine mounting centers to ensure easy operation.

Control Boxes Emergency Stop Switches Enabling Switches Safety Products **Explosion Proof** Terminal Blocks Relays & Sockets Circuit Protectors Power Supplies LED Illumination Controllers Operator Interfaces Sensors AUTO-ID

Flush Silhouette

ø16 ø22

ø30

Pilot Lights

HW1Z

AP22

LD6A

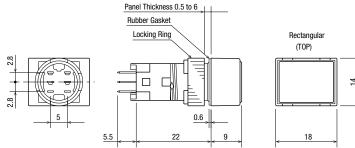
ø12 A2 Series Pushbuttons

Package Quantity: 1

Chana	Dutton Chilo	Operation	Contact	Pa	rt No.	Package Quantity: 1	
Shape	Button Style	Operation	Contact	IP40	IP65	Color Code ①②	
Round AB2M		Momentary	SPDT	AB2M-M1①	AB2M-M1P①	B: black	
	Button	Williary	DPDT	AB2M-M2①	AB2M-M2P①	G: green R: red	
43	DULIOII	Maintained	SPDT	AB2M-A1①	AB2M-A1P①	S: blue W: white	
		Maintaineu	DPDT	AB2M-A2①	AB2M-A2P①	Y: yellow	
		Momentary	SPDT	AB2M-M1L ²	AB2M-M1PL@	A: amber	
	Long	Womentary	DPDT	AB2M-M2L2	AB2M-M2PL2	G: green R: red	
	Lens	Maintained	SPDT	AB2M-A1L2	AB2M-A1PL②	W: white	
		Mamameu	DPDT	AB2M-A2L2	AB2M-A2PL②	Y: yellow	
Square			SPDT	AB2Q-M1①	AB2Q-M1P①	B: black	
AB2Q	Button	Momentary	DPDT	AB2Q-M2①	AB2Q-M2P①	G: green R: red	
		Maintained	SPDT	AB2Q-A1①	AB2Q-A1P①	S: blue W: white	
		iviaiiitaiiieu	DPDT	AB2Q-A2①	AB2Q-A2P①	Y: yellow	
		Momentary	SPDT	AB2Q-M1L2	AB2Q-M1PL2	A: amber G: green R: red W: white	
		Wiomemary	DPDT	AB2Q-M2L2	AB2Q-M2PL2		
	Lens	Maintained	SPDT	AB2Q-A1L ²	AB2Q-A1PL@		
		Maintaineu	DPDT	AB2Q-A2L②	AB2Q-A2PL@	Y: yellow	
Rectangular		Momentary	SPDT	AB2H-M1①	AB2H-M1P①	B: black	
AB2H	Putton	Wildinefficary	DPDT	AB2H-M2①	AB2H-M2P①	G: green R: red	
	Button	Maintained	SPDT	AB2H-A1①	AB2H-A1P①	S: blue W: white	
		iviaiiitaiiieu	DPDT	AB2H-A2①	AB2H-A2P①	Y: yellow	
		Momentary	SPDT	AB2H-M1L2	AB2H-M1PL ²	A: amber	
	Lens	ivionientaly	DPDT	AB2H-M2L2	AB2H-M2PL②	G: green R: red	
	LGIIS	Maintained	SPDT	AB2H-A1L②	AB2H-A1PL②	→ R: red W: white	
		iviaiiitaiiieu	DPDT	AB2H-A2L2	AB2H-A2PL2	Y: yellow	

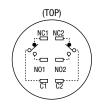
[•] Specify a color code in place of ① or ② in the Part No.

Dimensions



Square Round (TOP) (TOP) 5.5 □14 ø14

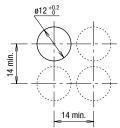
Terminal Arrangement

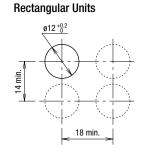


SPDT has NC1, NO1, and C1 only.

Mounting Hole Layout

Round/Square Units





Note: Determine mounting centers to ensure easy operation.



ø12 A2 Series Accessories

Lights	Shape	N	/laterial	Part No.	Part No. Quantity			Remarks				
hts	Locking Ring Wrench	Metal (nickel-plat	ed brass)	MT-002	MT-002	1	1		hten the locking ring when installing the nto a panel.			
APEM	60											
Switches & Pilot Lights	Switch Guard		For round/ square unit	AL-K2	AL-K2	1	• De	egree of p	protection: IP40			
Control Boxes		90° open							otect pushbuttons ertent operation.			
Emergency Stop Switches Enabling			For rectangular unit	AL-KH2	AL-KH2	1	1		for dimensions. (remains 90° open)			
Switches	Cooleat											
Safety Products	Socket	Solder Term	ninal	AL-C2	AL-C2	1	• Sr	naps on t	he rear of the A2 series.			
Explosion Proof Terminal Blocks		PC Board Te	erminal	AL-C2V	AL-C2V	1	(S	ee <mark>B-384</mark>	for dimensions)			
Relays & Sockets	Socket with Built-in Resistor		5V DC	AL-C21	AL-C21	1		Blue	A current limiting resistor is			
Circuit Protectors		Solder	6V DC	AL-C22	AL-C22	1		Green	contained, eliminating the need for external resistors.			
Power Supplies	_	PC Board Terminal	12V DC	AL-C23	AL-C23	1	Color	Yellow	When using the socket with a built-in resistor, make sure that the			
LED Illumination			24V DC	AL-C24	AL-C24	1	tom (Red	continuous current is 1A maximum			
Controllers			5V DC	AL-C21V	AL-C21V	1	Socket Bottom	Blue	and the operating temperature is –25 to +40°C. In collective			
Operator Interfaces						6V DC	AL-C22V	AL-C22V	1	Sock	Green	mounting, keep center-to center- spacing of 20 mm or more between
Sensors						12V DC	AL-C23V	AL-C23V	1		Yellow	adjacent units in consideration of built-in resistor heating.
AUTO-ID			24V DC	AL-C24V	AL-C24V	1		Red	• See B-384 for dimensions.			
Flush Silhouette ø16	Terminal Cover	Nylon		AL-V2	AL-V2PN10	10	int • Te	to the teri	g the terminals, insert the lead wires minal cover holes before soldering. over is not attached and must be parately.			
Ø16 Ø22	Dust Cover	① For roun	d units	AL-D2	AL-D2	1			nting the units with the dust covers			
ø30	① ② ③								efer to mounting hole layout on B-384. emperature: –10 to +55°C			
Miniature		② For square units		AL-DQ2	AL-DQ2	1	Fre		Elastomer (transparent)			
Pilot Lights		③ For recta	angular units	AL-DH2	AL-DH2	1	• Se		Polypropylene (black) for dimensions and mounting hole			
	Mounting Hole Plug											
HW1Z		Nitryl rubbe	er (black)	AL-B2	AL-B2PN05	5	• De	Degree of protection: IP65				

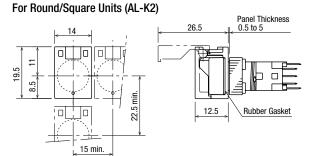
Ordering

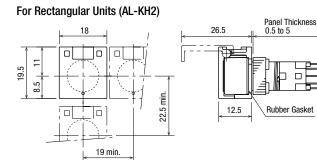
Package

ø12 A2 Series Dimensions

All dimensions in mm.

Switch Guard





APEM

Control Boxes

Emergency Stop Switches Enabling

Switches Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator

Interfaces

Sensors

AUTO-ID

Flush Silhouette

ø16

ø22

ø30

Pilot Lights

HW1Z

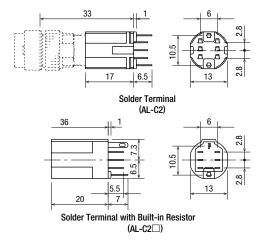
AP22

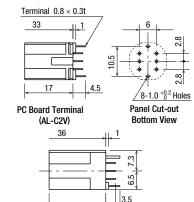
LD6A

Determine mounting centers

Socket

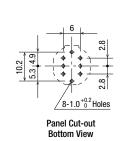
(AL-C2, AL-C2V, AL-C2□)





PC Board Terminal

with Built-in Resistor (AL-C2 □ V)



Terminal Arrangement

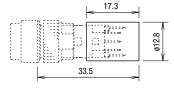
Lamp Terminal (–)

Lamp Terminal (+)

(TOP)

Terminal Cover

(AL-V2)



For Square Units

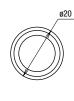
□20

(AL-DQ2)

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

Dust Cover

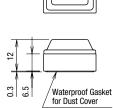
For Round Units (AL-D2)



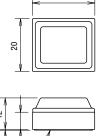
Waterproof Gasket

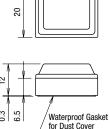
for Dust Cover



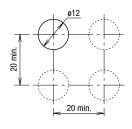


For Rectangular Units (AL-DH2)

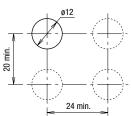




Mounting Hole Centers (Round Units, Square Units)







Note: to ensure easy operation. Specification

ø12 A2 Series Maintenance Parts

Shape

All dimensions in mm.

Color Code ①②

Package Quantity

Ordering Part No.

TS .	Marking Plate	Round		AL2M-W	AL2M-WPN05				
APEM		Square		AL2Q-W	AL2Q-WPN05	5	White		
Switches & Pilot Lights		Rectangular		AL2H-W	AL2H-WPN05				
Control Boxes	Lens Unit		Round	AL2M-LK1-2	AL2M-LK1-@PN02				
Emergency Stop Switches	LONG OTHE		noullu	_					
Enabling		For IP40 units	Square	AL2Q-LK1-②	AL2Q-LK1-@PN02	2	Specify a color code in place of		
Switches Safety Products			Rectangular	AL2H-LK1-2	AL2H-LK1-@PN02				
Explosion Proof		Secretaria 12 de Partir		Round	AL2M-LK2-2	AL2M-LK2-②		② in the Part No.	
Terminal Blocks		For IP65 illuminated pushbuttons	Square	AL2Q-LK2-②	AL2Q-LK2-②		A: amber G: green R: red W: white		
Relays & Sockets		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Rectangular	AL2H-LK2-②	AL2H-LK2-②				
Circuit		4		AL2M-LK3-2	AL2M-LK3-②	1	Y: yellow		
Protectors		For IP65 pilot lights	Square	AL2Q-LK3-②	AL2Q-LK3-②				
Power Supplies			Rectangular	AL2H-LK3-②	AL2H-LK3-②				
LED Illumination	Button Unit		Round	AB2M-BK1-①	AB2M-BK1-①PN02				
Controllers	and the same	For IP40					 Specify a color code in place of in the Part No. 		
Operator Interfaces		pushbuttons	Square	AB2Q-BK1-①	AB2Q-BK1-①PN02	2	U III tile Part No.		
Sensors			Rectangular	AB2H-BK1-①	AB2H-BK1-①PN02		B: black G: green		
AUTO-ID				AB2M-BK2-①	AB2M-BK2-①		R: red		
AUTU-ID		For IP65 pushbuttons	Square	AB2Q-BK2-①	AB2Q-BK2-①	1	S: blue W: white		
			Rectangular	AB2H-BK2-①	AB2H-BK2-①		Y: yellow		

Part No.

Flush Silhouette

ø16

ø22

ø30

Miniature

Pilot Lights

HW1Z

AP22

Control Boxes Emergency Stop Switches Enabling Switches Safety Products **Explosion Proof** Terminal Blocks Relays & Sockets Circuit Protectors Power Supplies LED Illumination Controllers Operator Interfaces Sensors AUTO-ID

Flush Silhouette

ø16

ø22 ø30

Pilot Lights

HW1Z

AP22

LD6A

ø10 A1 Series Illuminated Pushbuttons & Pilot Lights

Package Quantity: 1

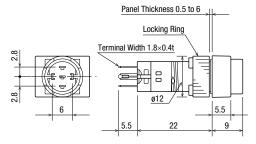
					Package Quantity: 1
			Part No.		LED Lamp
Shape	Operation	Contact	IP40	② Lens Color Code	Part No., Rated Current (External Resistor Recommended Value)
Round AL1M	Momentary	SPDT	AL1M-M11②		
	Maintained	SPDT	AL1M-A112		
	Pilot Light	_	AL1M-P1②		
Square AL1Q	Momentary	SPDT	AL1Q-M11②	Specify a color code in place of ② in the Part No.	A: LAD-SA G: LAD-SG R: LAD-SR W/Y: LAD-SY
	Maintained	SPDT	AL1Q-A11@	A: amber G: green R: red W: white	Rated Current: 20 mA
	Pilot Light	_	AL1Q-P1②	Y: yellow	5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W
Rectangular AL1H	Momentary	SPDT	AL1H-M11②		
	Maintained	SPDT	AL1H-A11②		
	Pilot Light	_	AL1H-P1②		

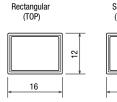
• LED lamps do not have a current-limiting resistor. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged.



- AP1M series pilot lights (round bezel only) with built-in current-limiting resistor are also available.
- Pilot lights are not CCC certifed.

Dimensions

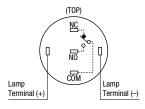




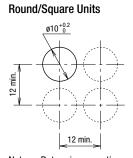


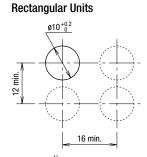


Terminal Arrangement (bottom view)



Mounting Hole Layout





Note: Determine mounting centers to ensure easy operation.

ø22

ø30

Pilot Lights

HW1Z AP22

LD6A

ø10 A1 Series Pushbuttons

Package Quantity: 1

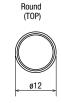
Lights	Shape	Button Style	Operation	Contact	Part No.	Color Code ①②
댨	σπαρο	Dutton Gtyle	Ореганоп	Oontact	IP40	
	Round AB1M	Dutter	Momentary	SPDT	AB1M-M1①	B black G: green R: red
APEM Switches & Pilot Lights		Button	Maintained	SPDT	AB1M-A1①	S: blue W: white Y: yellow
Control Boxes Emergency			Momentary	SPDT	AB1M-M1L2	A: amber G: green
Stop Switches Enabling		Lens	Maintained	SPDT	ADAM AAL 🚳	R: red W: white
Switches			Mannameu	ЭГИ	AB1M-A1L②	Y: yellow
Safety Products Explosion Proof	Square AB1Q	D. Harr	Momentary	SPDT	AB1Q-M1①	B black G: green R: red
Terminal Blocks		Button	Maintained	SPDT	AB1Q-A1①	S: blue W: white
Relays & Sockets						Y: yellow
Circuit Protectors		Momentary	SPDT	AB1Q-M1L2	A: amber G: green	
Power Supplies LED Illumination		Lens	Maintained	SPDT	AB1Q-A1L②	R: red W: white Y: yellow
Controllers	Rectangular AB1H		Momentary	SPDT	AB1H-M1①	B black G: green R: red
Interfaces		Button				S: blue
Sensors			Maintained	SPDT	AB1H-A1①	W: white Y: yellow
AUTO-ID		Long	Momentary	SPDT	AB1H-M1L②	A: amber G: green R: red
Flush Silhouette		Lens	Maintained	SPDT	AB1H-A1L②	W: white Y: yellow
ø16	Specify a color code in place of ① or	r ② in the Part No.				

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

Dimensions

Panel Thickness 0.5 to 6 Locking Ring Terminal Width 1.8×0.4t

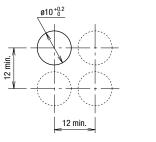
Rectangular (TOP) Square (TOP) 12

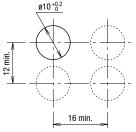


Terminal Arrangement (bottom view)



Mounting Hole Layout Round/Square Units





Rectangular Units

Determine mounting centers to ensure easy operation.

ø10 A1 Series Accessories

Shape		Material	Part No.	Ordering No.	Package Quantity	Remarks	ot Lights
Locking Ring Wrench	Metal (nickel-pla	ted brass)	MT-003	MT-003	1	Used to tighten the locking ring when installing the A1 series into a panel.	
60							APEM Switches &
Switch Guard		For round/	AL-K1	AL-K1	1	Used to protect pushbuttons	Pilot Lights
(m)	90° open	square unit	AL-KI	AL-NI	'	from inadvertent operation. • See B-389 for dimensions.	Control Boxes Emergency
	30 Open	For rectangular	AL-KH1	AL-KH1	1	「上型 a (remains 90° open)	Stop Switches
		unit	AL-MII	AL-KITI	'	(ternains 50 open)	Enabling Switches
Socket	Solder Terminal PC Board Terminal		AL-C1	AL-C1	1	Snaps on the rear of the A1 series. (see B-389 for dimensions)	Safety Products
						(See B 303 for difficultions)	Explosion Proof
			AL-C1V	AL-C1V	1		Terminal Blocks
Terminal Cover						When wiring the terminals, insert the lead wires	Relays & Sockets
		Nylon				into the terminal cover holes before soldering.	Circuit Protectors
	Nylon			AL-V1PN10	10	 Terminal cover is not attached and must be ordered separately. 	Power Supplies
							LED Illumination
Mounting Hole Plug	Mounting Hole Plug					Degree of protection: IP65	Controllers
	Nitryl rubb	Nitryl rubber (black)		AL-B1PN05	5	∾ <u>∅12</u>	Operator Interfaces
	NIU YI TUDD			AL-DIFINUS	J	4.4	Sensors
							AUTO-ID

Flush Silhouette

ø16

ø22 ø30

Pilot Lights

HW1Z AP22

Control Boxes Emergency Stop Switches

Safety Products

Explosion Proof

Terminal Blocks Relays & Sockets

Circuit

Protectors

Controllers

Operator Interfaces Sensors AUTO-ID

Power Supplies

LED Illumination

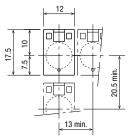
Enabling Switches

ø10 A1 Series Dimensions

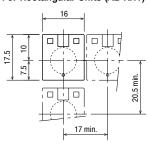
All dimensions in mm.

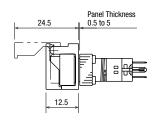
Switch Guard

For Round/Square Units (AL-K1)

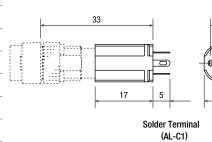


For Rectangular Units (AL-KH1)



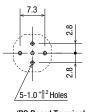


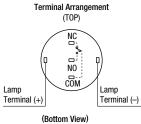
Socket (AL-C1, AL-C1V)



33 17 **PC Board Terminal** (AL-C1V)

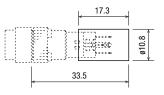
 $\underline{\text{Terminal 0.8} \times \text{0.3t}}$





(PC Board Terminal **Mounting Hole Layout)**

Terminal Cover



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

Flush Silhouette

ø16

ø22 ø30

Pilot Lights

HW1Z AP22

LD6A

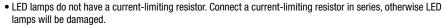
ø10 A1 Series Maintenance Parts

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

ø8 A8 Series Illuminated Pushbuttons & Pilot Lights

Package Quantity: 1

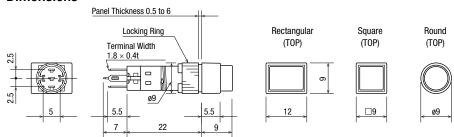
					Package Quantit	<i>J</i> : I
			Part No.		LED Lamp	
Shape	Operation	Contact	IP40	② Lens Color Code	Part No., Rated Current (External Resistor Recommended Value)	
Round AL8M	Momentary	SPDT	AL8M-M112			
	Maintained	SPDT	AL8M-A112			
	Pilot Light	_	AL8M-P1②		A. LAD CA	
Square AL8Q	Momentary	SPDT	AL8Q-M11②	Specify a color code in place of ② in the Part No.	A: LAD-SA G: LAD-SG R: LAD-SR W/Y: LAD-SY	
	Maintained	SPDT	AL8Q-A112	A: amber G: green	Rated Current: 20 mA 5V DC: 150Ω, 1/2W 6V DC: 200Ω, 1/2W 12V DC: 510Ω, 1W 24V DC: 1.1 kΩ, 1W	
	Pilot Light	_	AL8Q-P1②	R: red W: white Y: yellow		
Rectangular AL8H	Momentary	SPDT	AL8H-M11②		55 mi,	
	Maintained	SPDT	AL8H-A112			
	Pilot Light	_	AL8H-P1②			



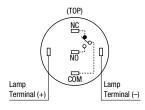


- AP8M series pilot lights (round bezel only) with built-in current-limiting resistor are also available.
- Pilot lights are not CCC certified.

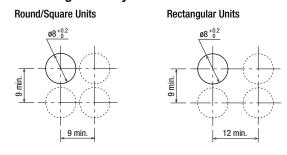
Dimensions



Terminal Arrangement



Mounting Hole Layout



Determine mounting centers to ensure easy operation.

All dimensions in mm.

APEM

Control Boxes

Emergency Stop Switches Enabling Switches

Safety Products

Explosion Proof Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers Operator

Interfaces Sensors

AUTO-ID

Flush Silhouette

ø16

ø22 ø30

Pilot Lights

HW1Z

AP22

Control Boxes

Emergency
Stop Switches

Enabling
Switches

Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit
Protectors

Power Supplies

LED Illumination

Controllers

Operator

ø8 A8 Series Pushbuttons

Package Quantity: 1

Chono	Dutton Ctulo	Operation	Contact	Part No.	1 ackage Quantity. 1
Shape	Button Style	Operation	Contact	IP40	Color Code ①②
Round AB8M	Button	Momentary	SPDT	AB8M-M1①	B black G: green R: red
	Button	Maintained	SPDT	AB8M-A1①	S: blue W: white Y: yellow
	Lens	Momentary	SPDT	AB8M-M1L②	A: amber G: green R: red
	20110	Maintained	SPDT	AB8M-A1L②	W: white Y: yellow
Square AB8Q	Button	Momentary	SPDT	AB8Q-M1①	B black G: green R: red
	Dutton	Maintained	SPDT	AB8Q-A1①	S: blue W: white Y: yellow
	Lens	Momentary	SPDT	AB8Q-M1L②	A: amber G: green R: red
		Maintained	SPDT	AB8Q-A1L②	W: white Y: yellow
Rectangular AB8H	Button	Momentary	SPDT	AB8H-M1①	B black G: green R: red
		Maintained	SPDT	AB8H-A1①	S: blue W: white Y: yellow
	Lens	Momentary	SPDT	AB8H-M1L②	A: amber G: green R: red
		Maintained	SPDT	AB8H-A1L②	W: white Y: yellow

Flush Silhouette

Sensors AUTO-ID

ø16 ø22

ø30

Pilot Lights

HW1Z

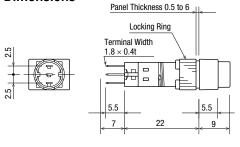
AP22 A Series

LD6A

 \bullet Specify a color code in place of $\ensuremath{\mathfrak{I}}$ or $\ensuremath{\mathfrak{D}}$ in the Part No.

 \bullet Lens style buttons can be used with marking plate and film.

Dimensions



Rectangular (TOP)

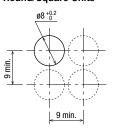


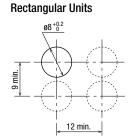


Terminal Arrangement (bottom view)



Mounting Hole Layout Round/Square Units





Note: Determine mounting centers to ensure easy operation.

ø8 A8 Series Accessories

Shape		Material	Part No.	Ordering Part No.	Package Quantity	Remarks	ot Lights
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.	APEM
Switch Guard	90° open	For round/square Unit	AL-K8	AL-K8	1	Used to protect pushbuttons from inadvertent operation. See B-393 for dimensions.	Switches & Pilot Lights Control Boxe
	эо орси	For rectangular unit	AL-KH8	AL-KH8	1	(remains 90° open)	Emergency Stop Switch Enabling Switches
Socket	Solder Terr	minal	AL-C8	AL-C8	1	Snaps on the rear of the A8 series. (see B-393 for dimensions)	Safety Produ
	PC Board Terminal		AL-C8V	AL-C8V	1		Terminal Blo
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.	Circuit Protectors Power Supp LED Illumina Controllers
Mounting Hole Plug	Plug Nitryl rubber (black)		AL-B8	AL-B8PN05	5	Degree of protection: IP65	Operator Interfaces Sensors AUTO-ID

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Flush Silhouette

ø16

ø22

ø30

Pilot Lights

HW1Z

Control Boxes

Emergency Stop Switches Enabling

Switches

Safety Products

Explosion Proof

Terminal Blocks

Circuit

Protectors

Controllers

Power Supplies

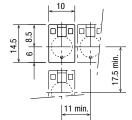
LED Illumination

ø8 A8 Series Dimensions

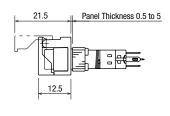
All dimensions in mm.

Switch Guard

For Round/Square Units (AL-K8)

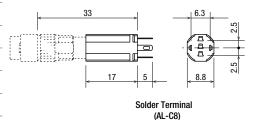


For Rectangular Units (AL-KH8)



Socket

(AL-C8, AL-C8V)



Terminal 0.8 × 0.3t

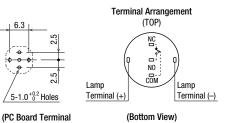
33

6.3

5.1.0 + 0.2 Holes

PC Board Terminal (AL-C8V)

(PC Board Terminal Mounting Hole Layout)



Terminal Cover

Operator Interfaces

Sensors

AUTO-ID

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

Flush Silhouette

ø16 ø22

ø30

Miniature

Pilot Lights

HW1Z AP22

A Series

LD6A

ø8 A8 Series Maintenance Parts

Shape		Part No.	Ordering Part No.	Package Quantity	Color Code ①②	
Marking Plate	Round	AL8M-W	AL8M-WPN05			
	Square	AL8Q-W	AL8Q-WPN05	5	White	
	Rectangular	AL8H-W	AL8H-WPN05			
Lens Unit	Round	AL8M-LK1-2	AL8M-LK1-@PN02		Charify a color code in place of @ in the Part No.	
	Square	AL8Q-LK1-②	AL8Q-LK1-@PN02		Specify a color code in place of ② in the Part No. A (amber), G (green), R (red) W (white), Y (yellow)	
	Rectangular	AL8H-LK1-2	AL8H-LK1-@PN02	2	w (wille), r (yellow)	
Button Unit	Round	AB8M-BK1-①	AB8M-BK1-①PN02	2	Specify a color code in place of ① in the Part No.	
	Square	AB8Q-BK1-①	AB8Q-BK1-①PN02		B (black), G (green), R (red) S (blue), W (white), Y (vellow)	
	Rectangular	AB8H-BK1-①	AB8H-BK1-①PN02		S (blue), w (willie), i (yeilow)	

A2/A1/A8 Series Accessories

All dimensions in mm.

When ordering, specify the Ordering No.

Shape	Material	Part No.	Ordering Part No.	Package Quantity	Remarks
Lens Removal Tool					
60.0	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.

A2/A1/A8 Series Maintenance Parts

When ordering, specify the Ordering No.

Shape		Part No.	Ordering Part No.	Package Quantity			Remarks	
LED Lamp	Illumination color: red	LAD-SR	LAD-SR	1		Dod	LED color: clear red	
	mummation color: red	LAD-SK	LAD-SRPN10	10		Red	LED color: clear red	
	Illumination color, groon	LAD CC	LAD-SG	1		Croon	LCD color, vallous diffused	
	Illumination color: green	LAD-SG	LAD-SGPN10	10	color	Green	LED color: yellow diffused	
5.3	Illumination cales ambas	LAD CA	LAD-SA	1	Lens	Amahau	LED color ambay along	
9.0	Illumination color: amber	LAD-SA	LAD-SAPN10	10		Amber	LED color: amber clear	
Current-limiting	III. and a selection of the selection of	LAD OV	LAD-SY	1		White/	LED calculations do an	
resistor is not contained.	Illumination color: yellow	LAD-SY	LAD-SYPN10	10		Yellow	LED color: yellow clear	

APEM

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products **Explosion Proof**

Terminal Blocks

Relays & Sockets

Circuit

Protectors

Power Supplies

LED Illumination

Controllers Operator

Sensors

AUTO-ID

Flush Silhouette

ø16 ø22

ø30

Pilot Lights

HW1Z

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.

APEM

Pilot Lights

Control Boxes

Emergency Stop Switches

Safety Products

Enabling

Switches

Explosion Proof

Terminal Blocks

Relavs & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Interfaces

Sensors AUTO-ID

Flush Silhouette

ø16

ø22

ø30

Miniature

Pilot Lights

HW1Z

AP22

LD6A

Operating Instructions

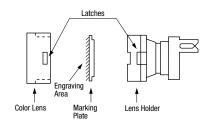
Replacement of Lens and Marking Plate

Removal

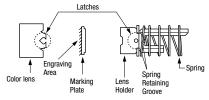
Remove the lens assembly (color lens, marking plate, lens holder, and spring) by holding the color lens recesses with the Lens Removal Tool (MT-101) and pulling it out. Remove the marking plate by disengaging the latches between the color lens and lens holder.

The marking plate must be engraved on the front side as shown below.

A2 Series



A8, A1 Series



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 the same marking plate as illuminated units. Be sure to install the marking plate when replacing the button.

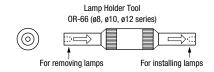
Replacing the LED Lamp

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-002/-003/-004) to tighten the locking ring. Do not use pliers. Tightening torque must not exceed 0.78 N·m (A8, A1 series : 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.

Operating Instructions

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

A2 Series

Lens	Round	Square	Rectangular
Built-in Marking Plate	Engraving Area Size: ø10	Engraving; Area □ □ B Size: □10	Engraving Area Size: 14 x 10
Bu		ide on the engraving area nade of white acrylic resin	· ·

A1 Series

Lens	Round	Square	Rectangular			
Built-in Marking Plate	Engraving Area 7.5 Size: ø8.5	Engraving: Area Size: □8.5	Engraving Area 11.5 Size: 12.5 x 8.5			
Bu	Engraving must be made on the engraving area less than 0.5mm deep. The marking plate is made of white acrylic resin.					

A8 Series

Lens	Round	Square	Rectangular			
Built-in Marking Plate	Engraving Area Size: ø6.1	Engraving: Area 5 Size: □6.1	Engraving Area 8 Size: 9.1 x 6.1			
Bu	Engraving must be made on the engraving area less than 0.5mm deep. The marking plate is made of white acrylic resin.					

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

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.

IP65 Units (A2 series only)

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.

APEM

Control Boxes

Emergency Stop Switches Enabling

Switches Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

Flush Silhouette

ø16

ø22

ø30

Pilot Lights

HW1Z