

Miniature Switches and Pilot lights

Ø12 A2 Series

Ø10 A1 Series

Ø8 A8 Series



A2 Series



A1 Series









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 IP40 (IEC60529) |
| |  AB2 | Pushbuttons Momentary Maintained | |
| Ø10 |  AL1 | Illuminated Pushbuttons Momentary Maintained Pilot Light | IP40 (IEC60529) |
| |  AB1 | Pushbuttons Momentary Maintained | |
| Ø8 |  AL8 | Illuminated Pushbuttons Momentary Maintained Pilot Light | IP40 (IEC60529) |
| |  AB8 | Pushbuttons Momentary Maintained | |

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 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 (Example)


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

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/s ² (50G) Operating extremes: 200 m/s ² (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 (*1) | IP40, IP65 (IEC 60529) | |

*1) IP65: A2 series only

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:

$$R = (\text{operating voltage} - V_f) / I_f$$

- 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

Switches & Pilot Lights

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

Miniature

Pilot Lights

HW1Z

AP22




A Series

LD6A



ø10 A1 Series Illuminated Pushbuttons & Pilot Lights

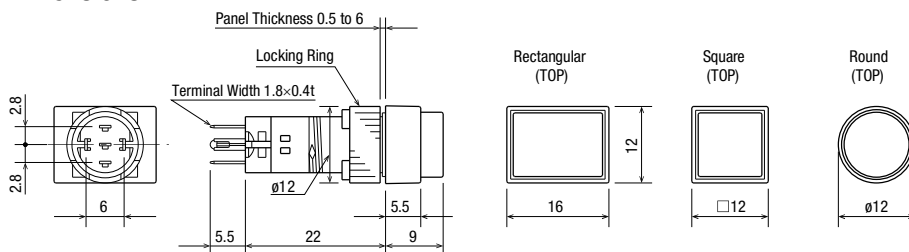
Package Quantity: 1

| Shape | Operation | Contact | Part No. | ② Lens Color Code | LED Lamp |
|---|-------------|---------|-----------|---|--|
| | | | IP40 | | Part No., Rated Current (External Resistor Recommended Value) |
| Round AL1M  | 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  | Momentary | SPDT | AL1Q-M11② | | |
| | Maintained | SPDT | AL1Q-A11② | | |
| | Pilot Light | — | AL1Q-P1② | | |
| Rectangular AL1H  | Momentary | SPDT | AL1H-M11② | | |
| | Maintained | SPDT | AL1H-A11② | | |
| | Pilot Light | — | AL1H-P1② | | |

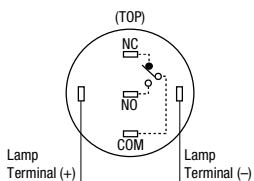
- LED lamps do not have a current-limiting resistor. Connect a current-limiting resistor in series, otherwise LED lamps will be damaged.
- AP1M series pilot lights (round bezel only) with built-in current-limiting resistor are also available.
- Pilot lights are not CCC certified.



Dimensions

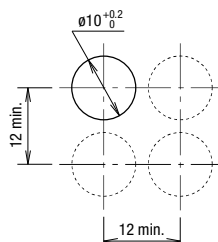


Terminal Arrangement (bottom view)

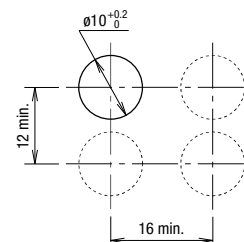


Mounting Hole Layout

Round/Square Units



Rectangular Units



Note: Determine mounting centers to ensure easy operation.

All dimensions in mm.

- APEM
- Switches & Pilot Lights
- 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
- Miniature
- Pilot Lights
- HW1Z
- AP22
- A Series
- LD6A