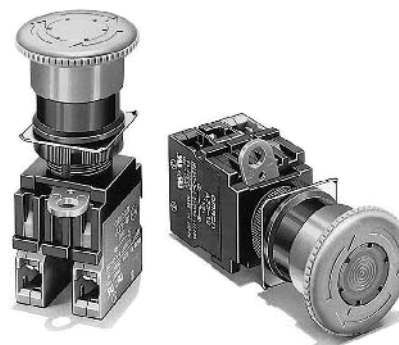


# Emergency Stop Switch A22E

## Install in 22-dia. or 25-dia. Panel Cutout

- Direct opening mechanism to open the circuit when the contact fuses  $\rightarrow$ .
- Safety lock mechanism prevents operating errors.
- Easy mounting and removal of Switch Blocks using a lever.
- Mount three Switch Units in series to improve wiring efficiency.
- Finger protection mechanism on Switch Unit provided as a standard feature.
- Install using either round, or forked crimp terminals.
- Oil-resistant to IP65 (non-lighted models)/IP65 (lighted models)

**Note:** Be sure to read the precautions for all pushbutton switches in the *Pushbutton Switches Group Catalog* (Cat. No. X018), as well as the "Safety Precautions" on page D-29.

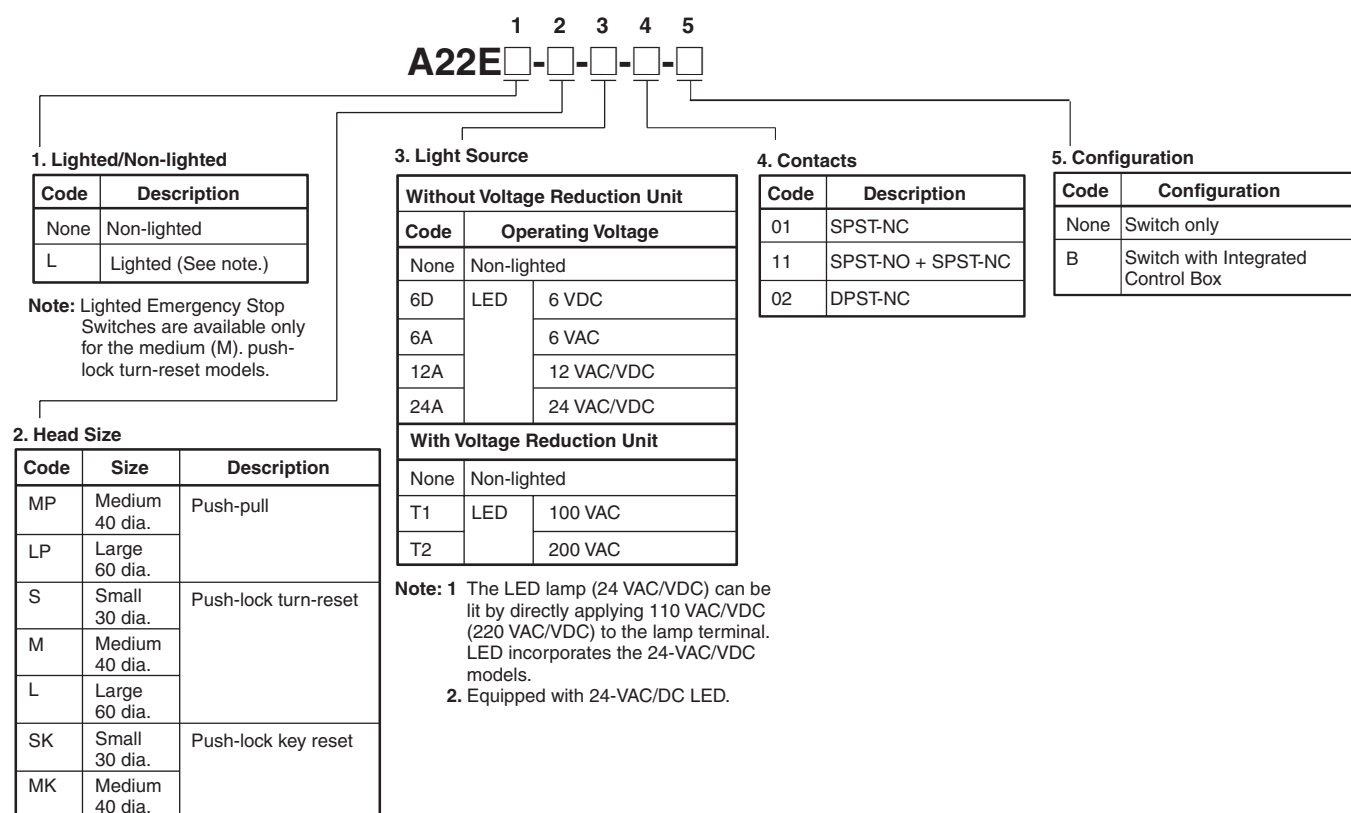


## Model Number Structure

### Model Number Legend

#### Completely Assembled

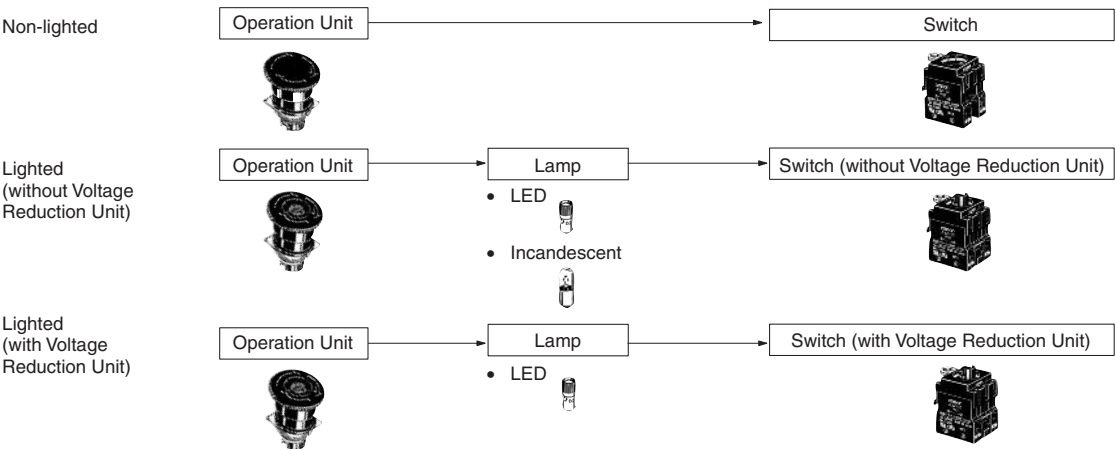
Shipped as a set which includes the Operation Unit, Lamp (lighted models only), and Switch.



Subassembled

The Pushbutton, Lamp, or Switch can be ordered separately. Use them in combination for models that are not available as assembled Units. These can also be used as inventory for maintenance parts.

Unit Combinations



1. Operation Unit

Lighted/Non-lighted

A22E <sup>1</sup> <sup>2</sup> -

**1 Lighted/Non-lighted**

Code	Description
None	Non-lighted
L	Lighted (see note)

**Note:** Lighted Emergency Stop Switches are available only for the 40-dia. push-lock turn-reset models.

**2 Head Size**

Code	Description
MP	40 dia. Push-pull
LP	60 dia. Push-pull
S	30 dia. Push-lock, turn-reset
M	40 dia. Push-lock, turn-reset
L	60 dia. Push-lock, turn-reset
SK	30 dia. Push-lock key reset
MK	40 dia. Push-lock key reset

2. Lamp

A22- <sup>1</sup> <sup>2</sup> -

**1 Operating Voltage (Rated Voltage)**

Incandescent	
Code	LED
6D	6 VDC (6 VDC)
6A	6 VAC (6 VAC)
12A	12 VAC/VDC (12 VAC/VDC)
24A	24 VAC/VDC (24 VAC/VDC)

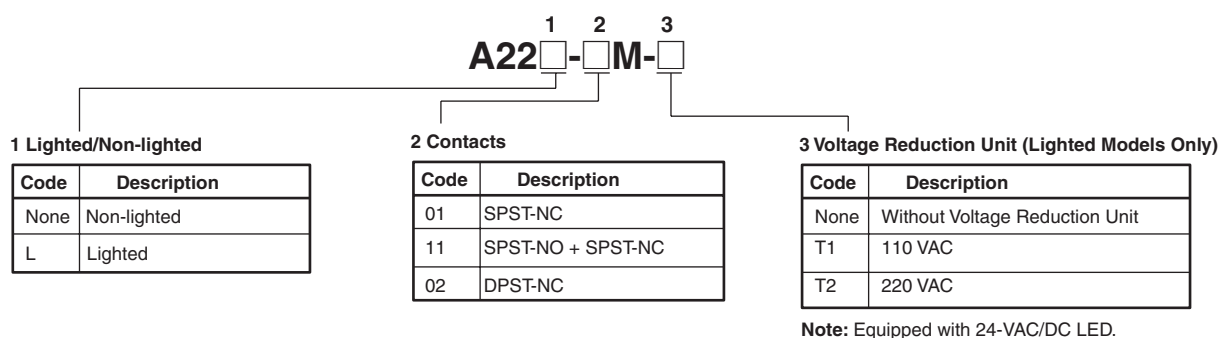
**2 Illumination Color**

Code	Description
R	Red

Emergency Stop  
Switches  
A22E

### 3. Switch

Lighted/Non-lighted



## Ordering Information

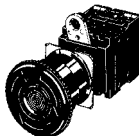

### ■ List of Models

#### Completely Assembled


#### Non-lighted Models

Appearance	Output	Push-lock turn-reset system	Color of cap
40-dia. head Medium Push-pull A22E-MP	SPST-NC	A22E-MP-01	Red
	SPST-NO/SPST-NC	A22E-MP-11	
	DPST-NC	A22E-MP-02	
60-dia. head Large Push-pull A22E-LP	SPST-NC	A22E-LP-01	
	SPST-NO/SPST-NC	A22E-LP-11	
	DPST-NC	A22E-LP-02	
30-dia. head Small Push-lock Turn-reset A22E-S	SPST-NC	A22E-S-01	
	SPST-NO/SPST-NC	A22E-S-11	
	DPST-NC	A22E-S-02	
	DPST-NC + SPST-NO	A22E-S12	
	TPST-NC	A22E-S-03	
40-dia. head Medium Push-lock Turn-reset A22E-M	SPST-NC	A22E-M-01	
	SPST-NO/SPST-NC	A22E-M-11	
	DPST-NC	A22E-M-02	
	DPST-NC + SPST-NO	A22E-M-12	
	TPST-NC	A22E-M-03	
60-dia. head Large Push-lock Turn-reset A22E-L	SPST-NC	A22E-L-01	
	SPST-NO/SPST-NC	A22E-L-11	
	DPST-NC	A22E-L-02	
30-dia. head Small Push-lock Key-reset A22E-SK	SPST-NC	A22E-SK-01	
	SPST-NO/SPST-NC	A22E-SK-11	
	DPST-NC	A22E-SK-02	
40-dia. head Medium Push-lock Key-reset A22E-MK	SPST-NC	A22E-MK-01	
	SPST-NO/SPST-NC	A22E-MK-11	
	DPST-NC	A22E-MK-02	

Lighted Models

Appearance	Output	Lighting	Rated voltage	Push-lock turn-reset system	Color of cap
40-dia. head Push-lock Turn-reset without voltage Reduction Unit 	SPST-NC	LED	6 VDC	A22EL-M-6D-01	Red
			6 VAC	A22EL-M-6A-01	
			12 VAC/VDC	A22EL-M-12A-01	
			24 VAC/VDC	A22EL-M-24A-01	
	SPST-NO/SPST-NC		6 VDC	A22EL-M-6D-11	
			6 VAC	A22EL-M-6A-11	
			12 VAC/VDC	A22EL-M-12A-11	
			24 VAC/VDC	A22EL-M-24A-11	
	DPST-NC		6 VDC	A22EL-M-6D-02	
			6 VAC	A22EL-M-6A-02	
			12 VAC/VDC	A22EL-M-12A-02	
			24 VAC/VDC	A22EL-M-24A-02	
40-dia. head Push-lock Turn-reset with Voltage Reduction Unit 	SPST-NC	110 VAC	A22EL-M-T1-01		
	SPST-NO/SPST-NC	220 VAC	A22EL-M-T2-01		
		110 VAC	A22EL-M-T1-11		
	DPST-NC	220 VAC	A22EL-M-T2-11		
		110 VAC	A22EL-M-T1-02		
		220 VAC	A22EL-M-T2-02		

Switch with Integrated Control Box




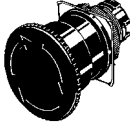

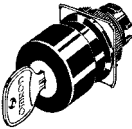
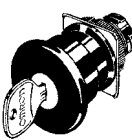
Appearance	Output	Model
	SPST-NC	A22E-M-01B
	SPST-NO/SPST-NC	A22E-M-11B
	DPST-NC	A22E-M-02B

Individual Parts


Order the Operation Unit, Lamp, and Switch Unit separately to assemble models not available as sets or to stock replacement parts.

Operation Units

Non-lighted


Sealing capability and size	IP65 oil-resistant models		
	Small (30 dia.)	Medium (40 dia.)	Large (60 dia.)
Push-pull	---	A22E-MP 	A22E-LP 
Push-lock, Turn-reset	A22E-S 	A22E-M 	A22E-L 
Push-lock, key-reset (push-lock, turn-reset)	A22E-SK 	A22E-MK 	---

## Lighted

Sealing capability and size	IP65
	Medium (40 dia.)
Push-lock, Turn-reset	A22EL-M 


## Lamp

### LED

Rated voltage 	6 VDC	6 VAC	12 VAC/VDC	24 VAC/VDC	Super-bright 24 VAC/VDC
Red	A22-6DR	A22-6AR	A22-12AR	A22-24AR	A22-24ASR

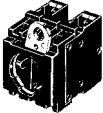
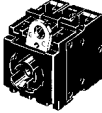
**Note:** For voltage-reduction lighting, use the A22-24AR.

### Incandescent

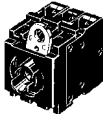
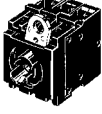
Rated voltage 	6 VAC	14 VAC	28 VAC	130 VAC
	A22-5	A22-12	A22-24	A22-H1

## Switch (Standard Load)

### Without Voltage Reduction Unit







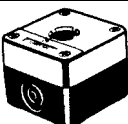








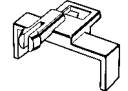
Classification Appearance		Non-lighted 	Lighted 
		Momentary	Momentary
Switch Action			
Contacts			
For standard loads	SPST-NO	A22-10M	A22L-10M
	SPST-NC	A22-01M	A22L-01M
	SPST-NO + SPST-NC	A22-11M	A22L-11M
	DPST-NO	A22-20M	A22L-20M
	DPST-NC	A22-02M	A22L-02M


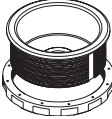
### With Voltage Reduction Unit

Classification Appearance		Lighted (110 VAC) 	Lighted (220 VAC) 
		Momentary	Momentary
Switch Action			
Contacts			
For standard loads	SPST-NO	A22L-10M-T1	A22L-10M-T2
	SPST-NC	A22L-01M-T1	A22L-01M-T2
	SPST-NO + SPST-NC	A22L-11M-T1	A22L-11M-T2
	DPST-NO	A22L-20M-T1	A22L-20M-T2
	DPST-NC	A22L-02M-T1	A22L-02M-T2

**Note:** 1. The above illustrations are for the DPST-NO contact.  
2. When using with a Voltage Reduction Unit, use the A22-24AR.

# Accessories (Order Separately)

Item	Appearance	Classification		Model	Remarks
Switch Blocks		SPST-NO		A22-10	Provided as standard. Order Switch Blocks only when adding or replacing them.
		SPST-NC		A22-01	
		DPST-NO, one-piece		A22-20	
		DPST-NC, one-piece		A22-02	
Lamp Sockets		Direct lighting		A22-TN	Used when changing the lighting method.
		Voltage-reduction lighting	100 VAC	A22-T1	
			220 VAC	A22-T2	
Mounting Latches		---		A22-3200	Provided as standard. Order Mounting Latches only when mounting Switch Blocks or Lamp Sockets that are purchased individually.
Lock Ring		Rounded shape		A22Z-3360	The body is equipped with a Lock Fitting. This Lock Fitting is used when a more secure lock feature is required. (Refer to page D-26.)
Hole Plug		Round		A22Z-3530	Can be plugged into pre-cut panel holes for future expansion. The color is black.
Control Boxes (Enclosures)		One hole, yellow box (for emergency stop)		A22Z-B101Y	Material: Polycarbonate resin
Operation Keys		---		A22K-K	Two keys are provided.
Connectors		Applicable cable diameter (mm)	7 to 9 dia.	A22Z-3500-1	Plastic connector used to extend a cable from the Switch Box.
			9 to 11 dia.	A22Z-3500-2	
25-dia. Ring		---		A22Z-R25	Can be fit into a 25-dia. hole in the panel. Since this is not attached to the main body, order separately. (Refer to page D-26.)
30-dia. Resin Attachment		---		A22Z-A30	Can be fit into a 30-dia. hole in the panel. (Refer to page D-26.)
Legend Plates for Emergency Stop		60-dia. black letters on yellow back-ground		A22Z-3466-1	"EMERGENCY STOP" is indicated on the plate.
		90-dia. black letters on yellow back-ground		A22Z-3476-1	
		60-dia. black letters on yellow back-ground		A22Z-3466-2	"EMERGENCY OFF" is indicated on the plate.
Lamp Extractor		---		A22Z-3901	Rubber tool used to replace Lamps easily
Tightening Tool		---		A22Z-3905	Tool used to tighten nuts from the back of the panel and to attach caps to lighted models.
Lock Plate		---		A22Z-3380	Use to fix the lever on the Switch.


Item	Appearance	Classification	Model	Remarks
E-stop Shroud (See note.)		---	A22Z-EG1	The SEMI S2-compatible Shroud and legend plate for EMERGENCY OFF come as a set. Use with an A22E Emergency Stop Switch.
E-stop Shroud (See note.)		---	A22Z-EG2	SEMI-S2/SEMATECH Application Guide for SEMI 2S-compatible Shroud. Used together with an A22E Emergency Stop Pushbutton.

**Note:** These E-stop Shrouds are designed for use only in semiconductor manufacturing equipment. Do not use them for any other application.

## Specifications

### Approved Standards

Recognized organization	Standards	File No.
UL (See note 2.)	UL508	E41515
TÜV Product Service	EN60947-5-1 (Approved for direct opening mechanism)	Inquire
CQC (CCC)	GB14048.5	2003010303070635

**Note:** 1. Only models with NC contacts have a direct opening mechanism.  
2. UL-approved for CSA C22.2 No. 14 and bears the  mark.

### Approved Standard Ratings

- UL, cUL (File No.E41515)  
6A at 220 VAC, 10 A at 110 VAC
- TÜV (EN60947-5-1) (Low Voltage Directive)  
3 A at 220VAC
- CCC (GB14048.5)  
3 A at 240 VAC, 1.5 A at 24 VDC

### Ratings

#### Contacts (Standard Load)

Rated carry current	Rated voltage	Rated current (A)			
		AC15 (inductive load)	AC12 (resistive load)	DC13 (inductive load)	DC12 (resistive load)
10	24 VAC	10	10	---	---
	110 VAC	5	10		
	220 VAC	3	6		
	380 VAC	2	3		
	440 VAC	1	2		
	24 VDC	---	---	1.5	10
	110 VDC			0.5	2
	220 VDC			0.2	0.6
	380 VDC			0.1	0.2

**Note:** 1. Rated current values are determined according to the testing conditions. The above ratings were obtained by conducting tests under the following conditions.  
(1) Ambient temperature: 20°±2°C  
(2) Ambient humidity: 65±5%  
(3) Operating frequency: 20 operations/minute  
2. Minimum applicable load: 10 mA at 5 VDC

#### LED Indicators without Voltage Reduction Unit

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA	6 VDC±5%
6 VAC	60 mA	6 VAC/VDC±5%
12 VAC/VDC	30 mA	12 VAC/VDC±5%
24 VAC/VDC	15 mA	24 VAC/VDC±5%

## ■ Characteristics

Item		Emergency Stop Switches	
		Non-lighted model: A22E	Lighted model: A22EL
Allowable operating frequency	Mechanical	30 operations/minute max.	
	Electrical	30 operations/minute max.	
Insulation resistance		100 MΩ min. (at 500 VDC)	
Dielectric strength		2,500 VAC, 50/60 Hz for 1 min between terminals of same polarity 2,500 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground	
Vibration resistance		Malfunction (See note 2.): 10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance	Mechanical	1,000 m/s <sup>2</sup>	
	Malfunction (See note 2.)	250 m/s <sup>2</sup> max.	
Durability	Mechanical	Momentary operation: 300,000 operations min. (See note 3.)	
	Electrical	300,000 operations min. (See note 3.)	
Ambient temperature (See note 1.)		Operating: -20°C to 70°C Storage: -40°C to 70°C	Operating: -20°C to 55°C Storage: -40°C to 70°C
Ambient humidity		Operating: 35% to 85%	
Degree of protection		IP65 (oil-resistant)	IP65
Electric shock protection class		Class II	
PTI (tracking characteristic)		175	
Degree of contamination		3 (IEC60947-5-1)	

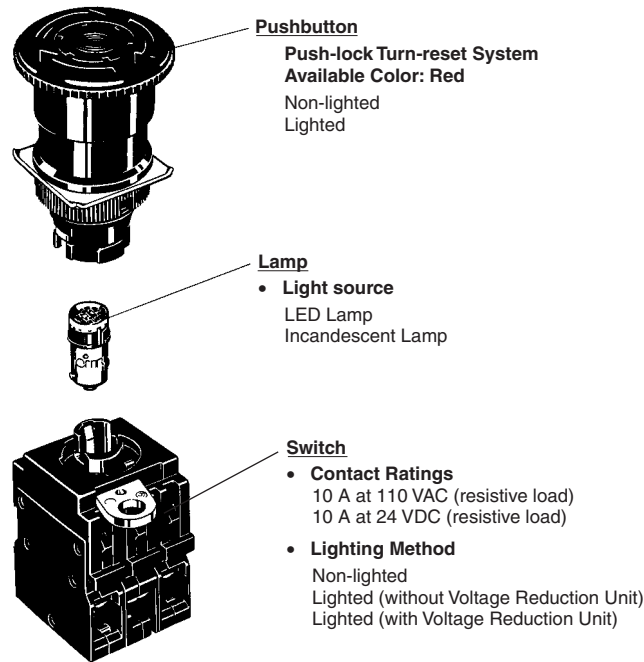
**Note:** 1. With no icing or condensation.

2. Malfunction within 1 ms.

3. Setting and resetting once is counted as one operation.

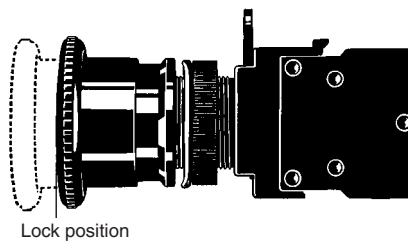


# Nomenclature



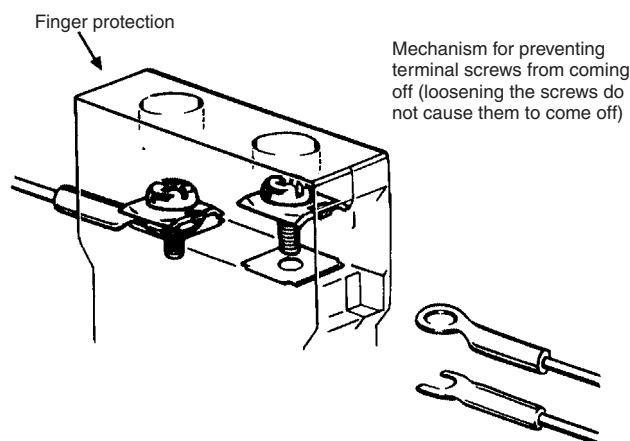
(The above figures are examples of the lighted model.)

## Safety Lock Mechanism to Prevent Misuse



This Switch can be intentionally used to stop equipment in an emergency. Even if an object or person touches the Pushbutton by mistake, the contact will not be released unless the Pushbutton reaches the lock position.

**This Switch uses a finger protection mechanism to prevent electrical shocks. Moreover, it is provided with a mechanism to prevent terminal screws from coming off and also allows connection to either round or forked crimp terminals.**

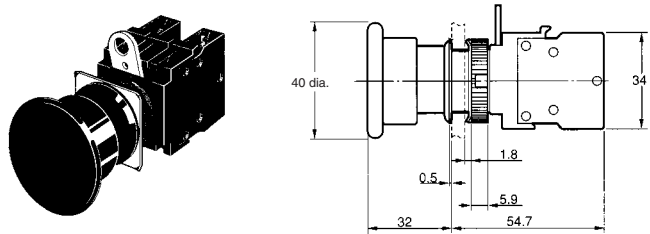


# Dimensions

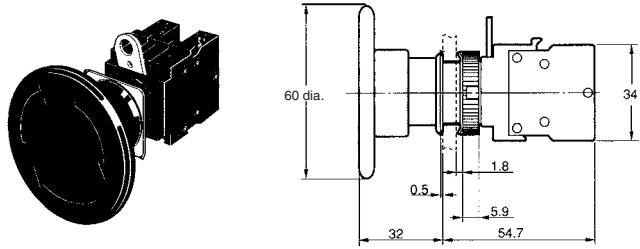
**Note:** All units are in millimeters unless otherwise indicated.

## Non-lighted Models

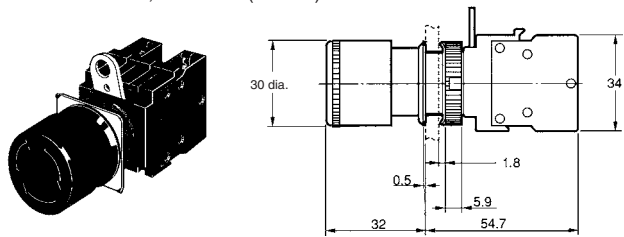
**A22E-MP**  
Medium Push-pull (40-dia.)



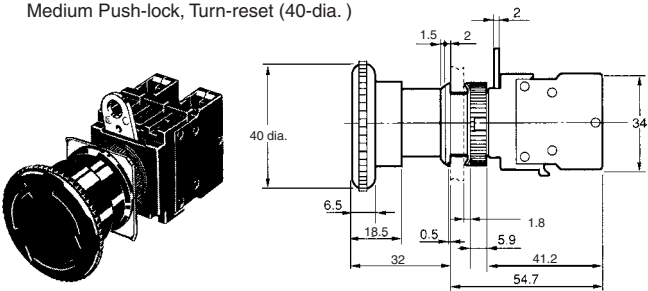
**A22E-LP**  
Large Push-pull (60-dia.)



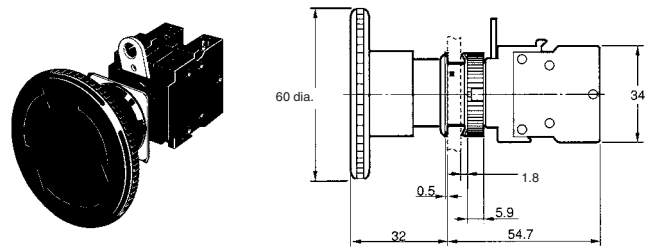
**A22E-S**  
Small Push-lock, Turn-reset (30-dia.)



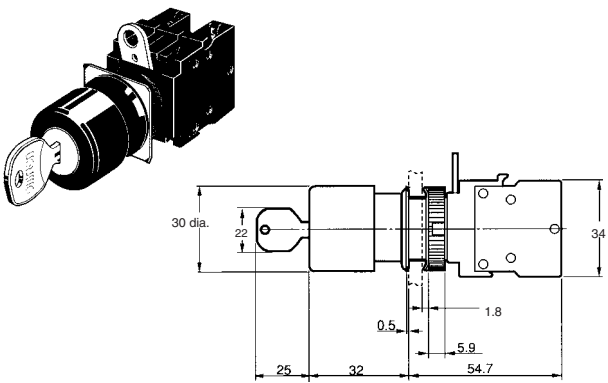
**A22E-M**  
Medium Push-lock, Turn-reset (40-dia.)



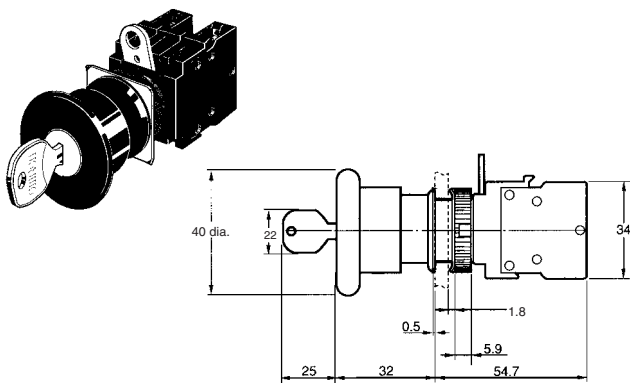
**A22E-L**  
Large Push-lock, Turn-reset (60-dia.)



**A22E-SK**  
Small Push-lock, Key-reset (30-dia.)



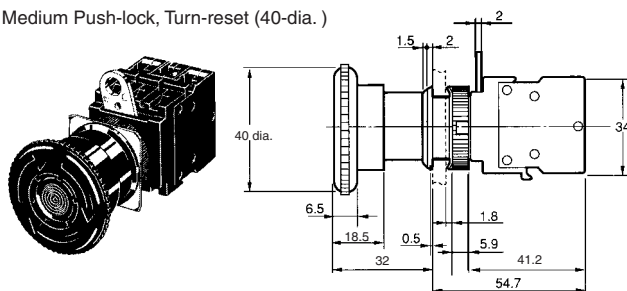
**A22E-MK**  
Medium Push-lock, Key-reset (40-dia.)



## Lighted Models

### A22EL-M

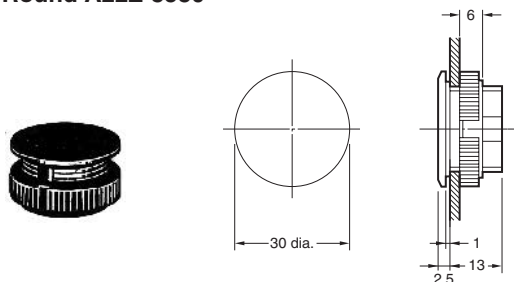
Medium Push-lock, Turn-reset (40-dia.)



## ■ Dimensions for Accessories

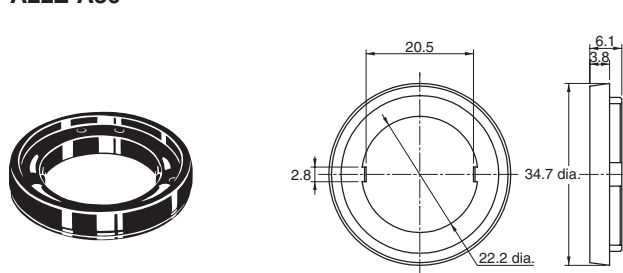
### Hole Plug

Round A22Z-3530



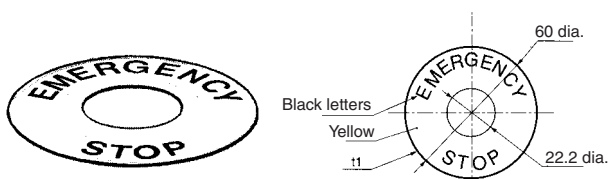
### 30-dia. Resin Attachment

A22Z-A30

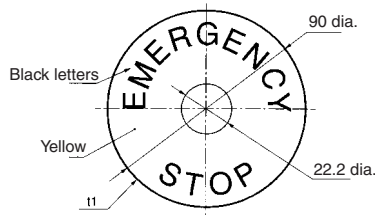


### Legend Plates for Emergency Stop

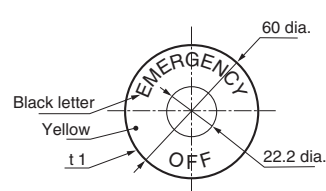
A22Z-3466-1 (φ60)



A22Z-3476-1 (φ90)

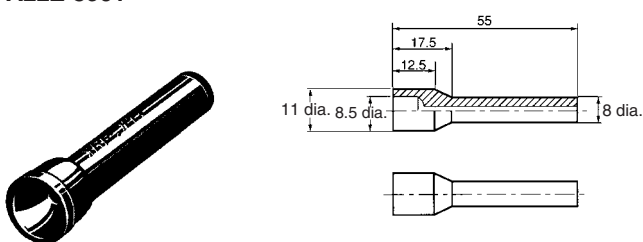


A22Z-3466-2 (φ60)



### Lamp Extractor

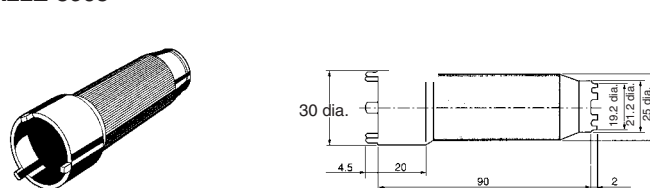
A22Z-3901



Material: Chloroprene rubber

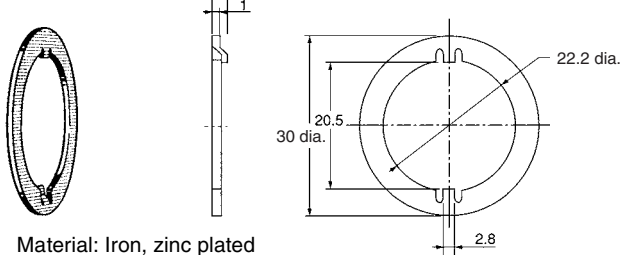
### Tightening Wrench

A22Z-3905



### Lock Ring

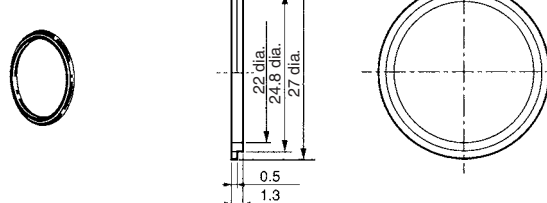
A22Z-3360



Material: Iron, zinc plated

### 25-dia. Ring

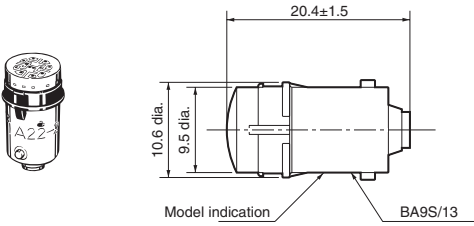
A22Z-R25



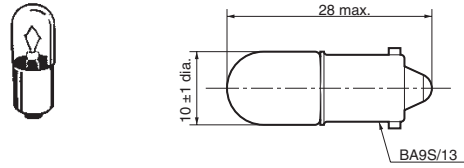
Material: NBR (black)

Lamp

LED A22-6□, 12□, 24□

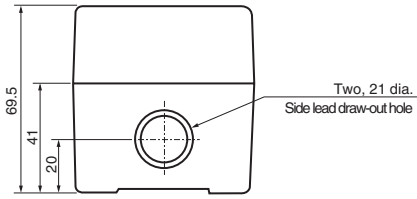
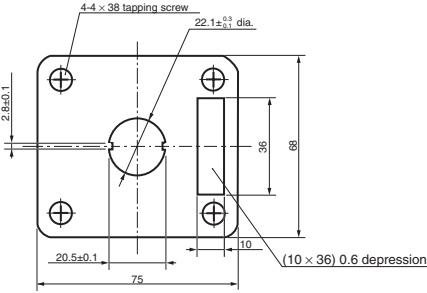


Incandescent Lamp A22-5, 12, 24, H1

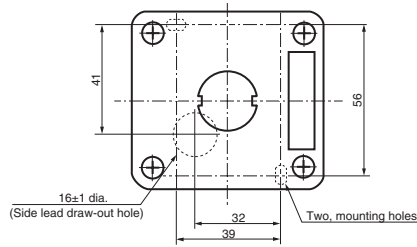


Control Box

A22Z-B101Y (1 hole)

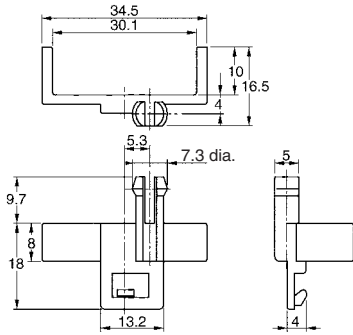
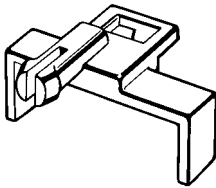


Cable Draw-out Hole (Top View)



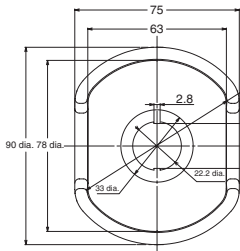
Lock Plate

A22Z-3380



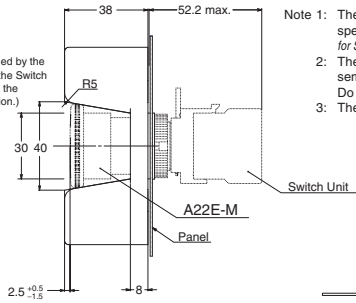
E-stop Shroud

A22Z-EG1

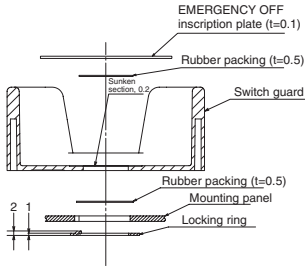


Panel Cutout Dimensions

Allowable panel thickness: 1 to 3 mm

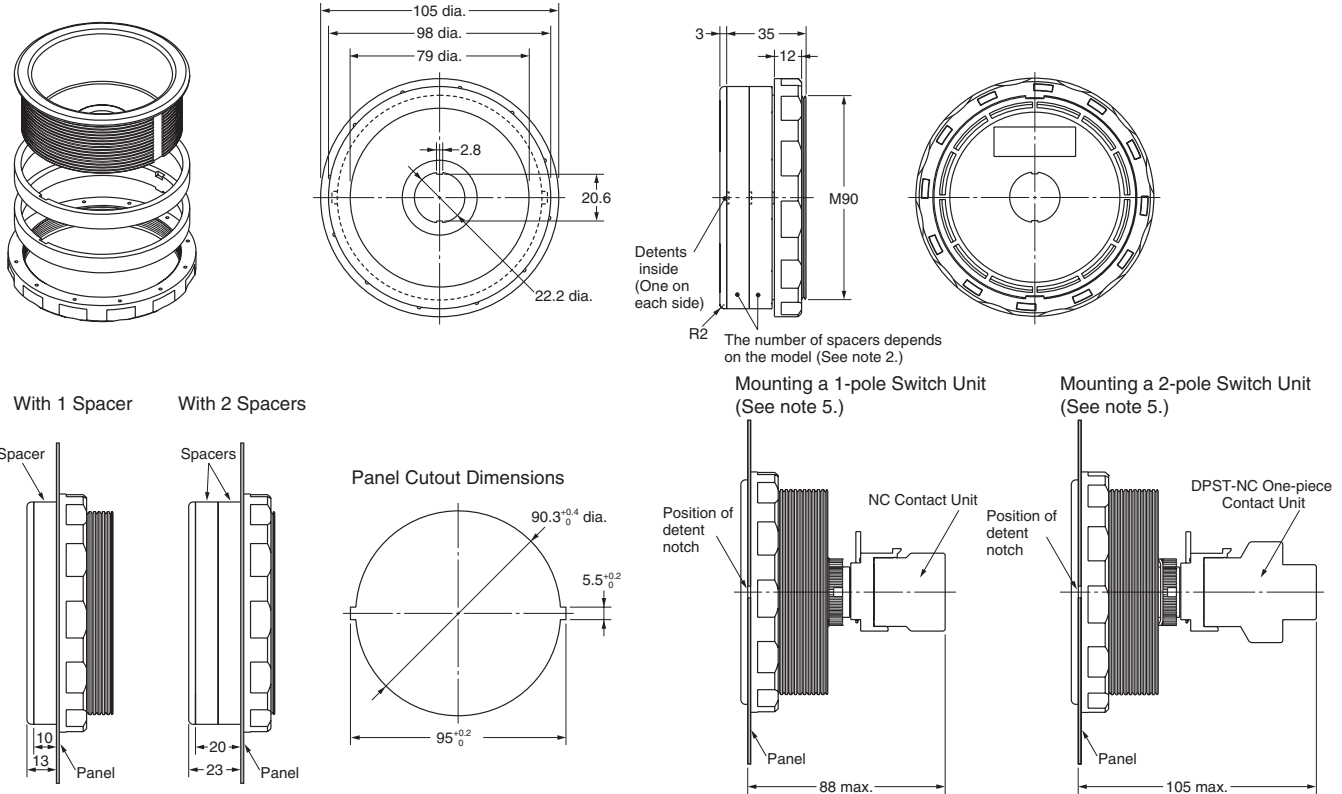


- Note 1: The dimensions of the Shroud conform to the specifications of the SEMATECH Application Guide for SEMI S2-93.  
2: These Shrouds are designed for use only in semiconductor manufacturing equipment. Do not use them for any other application.  
3: The Shroud is not provided with the Switch.



## E-stop Shroud

A22Z-EG2, A22Z-EG21, A22Z-EG22



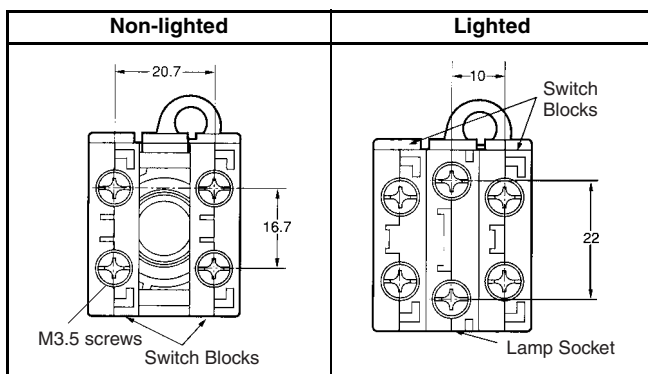
- Note:** 1. These Shrouds are designed for use only in semiconductor manufacturing equipment. Do not use them for any other application.
2. The number of Spacers that are combined depends on the model.

Model	No. of Spacers
A22Z-EG2	0
A22Z-EG21	1
A22Z-EG22	2

3. Tighten to a torque of 1.96 to 2.94 N·m.
4. The allowable panel thicknesses are as follows:  
 Without Spacers:  $t=1.3$  to  $22.5$  mm  
 With 1 Spacer:  $t=1.3$  to  $12.5$  mm  
 With 2 Spacers:  $t=1.3$  to  $2.5$  mm
5. These are the dimension from the front of the panel when the Switch Unit is attached.

## Terminal Arrangement

### Terminal Arrangement (Bottom View)

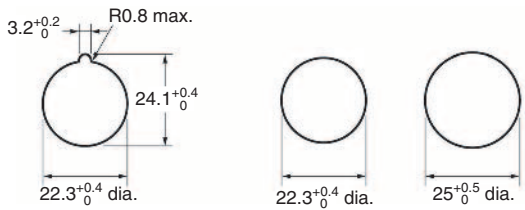


Terminal Connection

Type	Terminal connection (BOTTOM VIEW)	
	SPST-NO + SPST-NC	DPST-NC
Non-lighted		
Lighted without Voltage Reduction Unit		
Lighted with Voltage Reduction Unit		

**Note:** The above terminal connection diagrams are examples for SPST-NO + SPST-NC and DPST-NC.

Panel Cutouts



With Lock Fitting

Without Lock Fitting

A Lock Ring is provided as a standard feature.

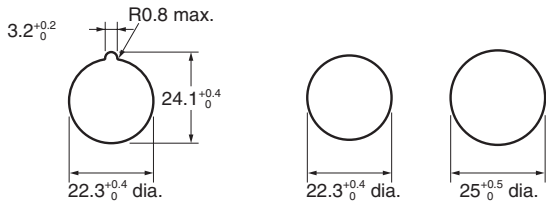
- Note:** 1. When painting or coating the panel, make sure that the specified panel dimensions apply to the panel after painting or coating.
2. Use an A22Z-R25 Ring when mounting to a panel with a 25-mm diameter hole.

Installation

Mounting to the Panel

Preparing the Panel

- The panel dimensions are shown below.
- The panel thickness must be 1 to 5 mm.



With Lock Ring

Without Lock Ring

- Always use a 25-mm-dia. Lock Ring for a 25-mm-dia. hole. IP65 degree of protection will be lost if the 25-mm-dia. Lock Ring is not used because of the larger size of a 25-mm-dia. hole.
- When painting or coating the panel, make sure that the specified panel dimensions apply to the panel after painting or coating.

Mounting the Operation Unit on the Panel

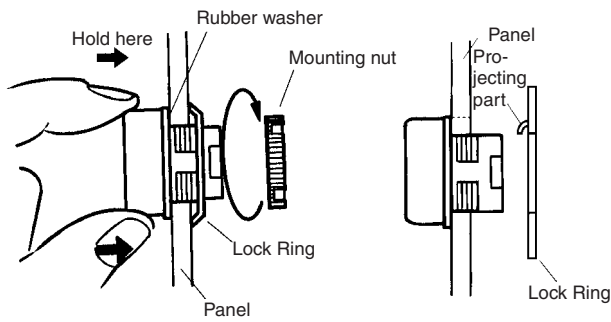
Insert the Operation Unit (Pushbutton) from the front surface of the panel, insert the Lock Ring and the mounting nut from the terminal side, then tighten the nut. Before tightening, check that the rubber washer is present between the Operation Unit and the panel.

When using a Legend Plate Frame, put one rubber washer each between the Legend Plate Frame and the panel and between the Operation Unit and the Legend Plate Frame. (One rubber washer will be provided when one Legend Plate Frame is ordered.)

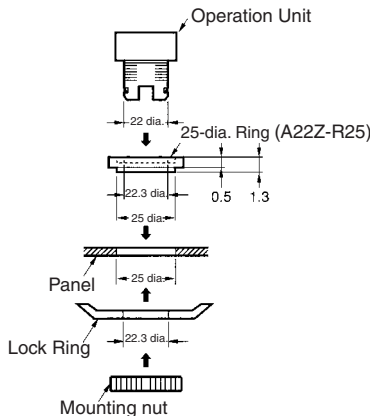
Align the Lock Ring with the groove in the casing, then insert the Lock Ring so that its edge is located on the panel side.

Tighten the mounting nut at a torque of 0.98 to 1.96 N·m.

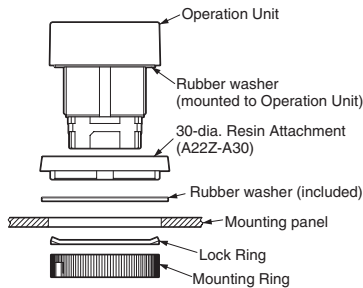
When using a Lock Ring, replace with the supplied Lock Ring, insert the projecting part into the lock slot, and then tighten the mounting nut.



1. When the panel cutout dimension is 25 dia., remove the supplied rubber washer and mount the 25-dia. Ring as shown below. (Since the A22Z-R25 is not attached to the main body, order separately.)

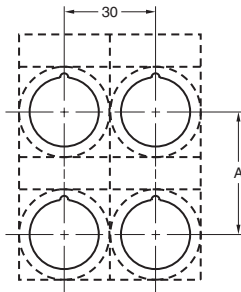


2. When the panel cutout dimension is 30 dia., the A22Z-A30 Attachment is not attached to the main body, order separately.

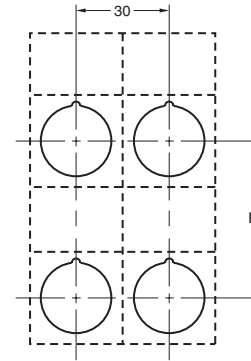


## Matrix Mounting

1. The following diagram provides the dimensions for mounting individual Switches, Legend Plates, and Lock Rings with leads connected directly to Switch terminals.



2. The following diagram provides the dimensions for mounting Large Legend Plates with crimp terminals connected to Switch terminals.



Dimensions A and B between mounting hole centers are given in the following tables.

For 1., Above

Switch model	Dimension A
A22-10, A22-10S, A22-01, A22-01S	45 mm min.
A22-20, A22-20S, A-22-02, A22-02S, A22-11, A22-11S	55 mm min.

For 2., Above

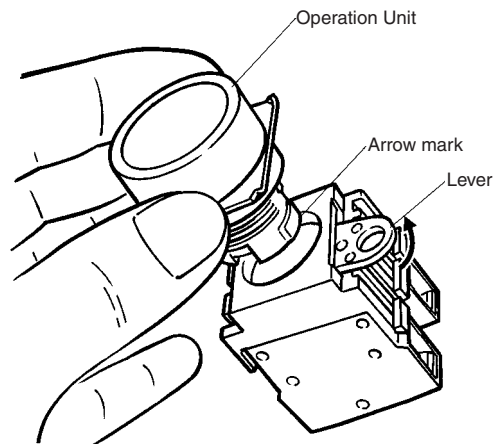
Type of crimp terminal	Switch model	Dimension B
Naked crimp terminals	A22-10, A22-10S, A22-01, A22-01S	51 mm min.
	A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S	61 mm min.
Crimp terminals with insulating sheaths	A22-10, A22-10S, A22-01, A22-01S	60 mm min.
	A22-20, A22-20S, A22-02, A22-02S, A22-11, A22-11S	70 mm min.

**Note:** 1. The above dimensions are the minimum dimensions when using the applicable wiring materials listed on page D-29. If any other materials are used, check the suitability of dimensions in advance.

2. When using pushbuttons exceeding 30 mm, adjust dimension A or B accordingly. (When mounting the A22-M□ in a matrix, "30 mm" would have to be increased to 40 mm.)

## Mounting the Switch on the Operation Unit

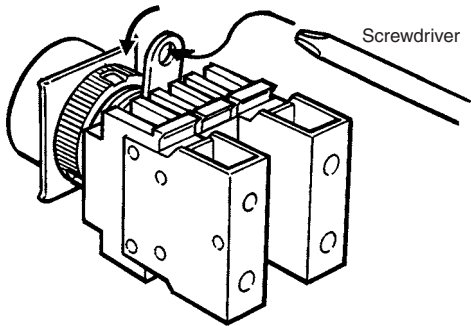
Insert the Operation Unit into the Switch Unit, aligning the arrow mark inscribed on the Case with the lever on the Switch Blocks, then move the lever in the direction indicated by the arrow in the following figure.



### Removing the Switch

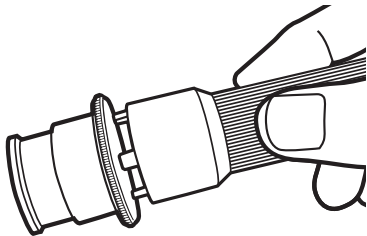
Move the lever in the direction indicated by the arrow in the following figure, then pull the Operation Unit or the Switch Blocks.

Since the lever has a hole with an inside diameter of 6.5 mm, the lever can be moved in the specified direction by inserting a screwdriver into the hole and then moving the screwdriver.



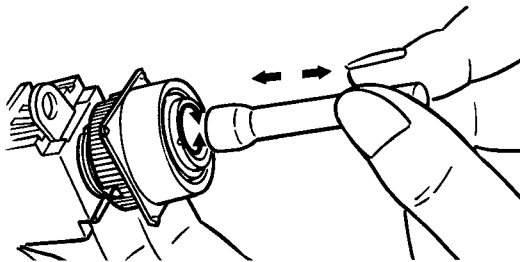
### Assembling the Cap Emergency Stop Switch

Insert the protrusion of the Tightening Wrench (A22Z-3905) into the Cap slot and then turn to remove the Cap.



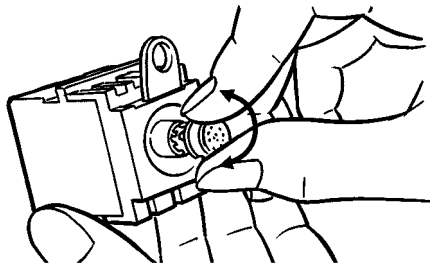
### Installing/Replacing the Lamp Installing/Replacing from the Panel Surface

Insert the Lamp Extractor (A22Z-3901) into the lamp, then rotate the Extractor while pressing it.



### Installing/Replacing on the Switch

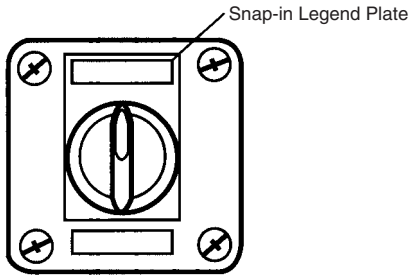
Grip the indicator with your fingers, then rotate the indicator while pressing it against the Switch.



### Control Box (Enclosure)

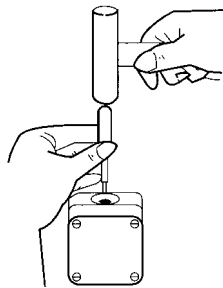
#### Mounting the Switch

The Standard-size Legend Plate Frame can be mounted. Mount the Frame as shown in the following diagram. Mount the Switch in the same way as for an ordinary panel.



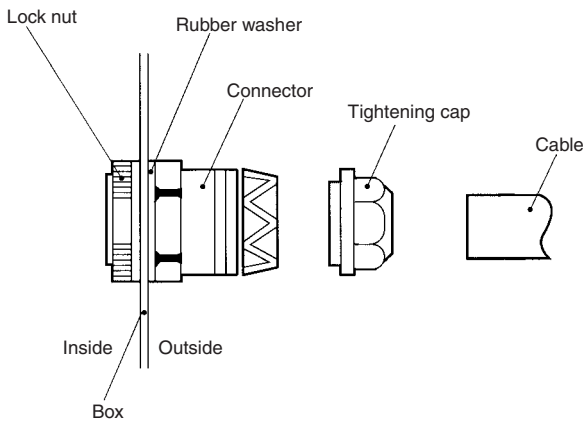
#### Creating a Cable Port Hole

Place the tip of a screwdriver on the surface where the cable port hole is to be created with the cover attached and strike the screwdriver to punch a hole. Attempts to punch a hole on the other side of the case will damage the Box.



#### Securing the Connector Cable

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



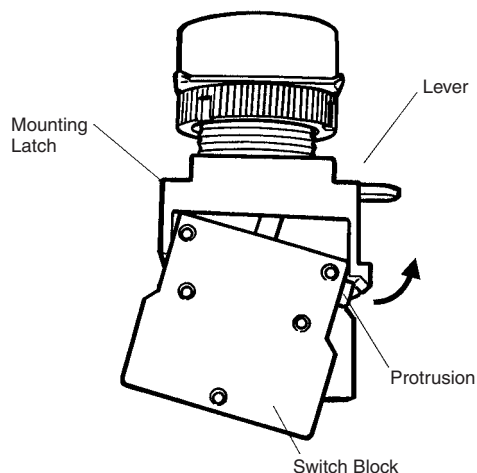
Cable diameter	Connector
7 to 9 dia.	A22Z-3500-1
9 to 11 dia.	A22Z-3500-2



## ■ Installing/Removing the Switch Blocks

### Installing the Switch Blocks

Hook the small protrusion on the Mounting Latch into the groove on the other side of the lever, then push up the Switch Block in the direction indicated by the arrow in the figure below.

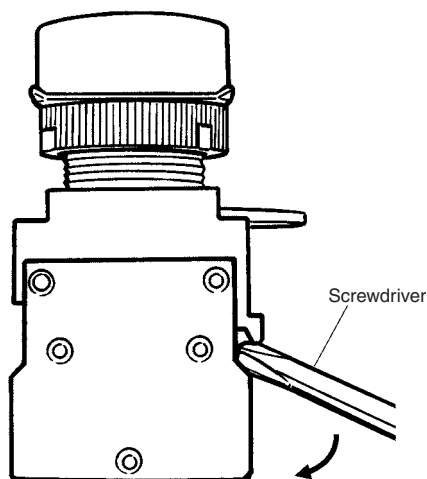


### Removing the Switch Blocks

Insert a screwdriver between the Mounting Latch and the Switch Block, then push down the screwdriver in the direction indicated by the arrow in the following figure.

Use either of the following screwdrivers.

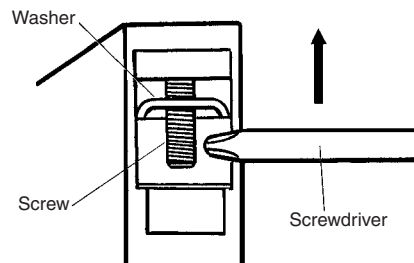
Flat-head screwdriver	3 to 6 mm	
Phillips screwdriver	3 to 6 mm dia.	



## ■ Wiring

### Wiring Round Crimp Terminals

Loosen the terminal screw from the Switch Unit until it completely comes off the groove, insert a screwdriver as shown in the following figure, then push up the washer in the direction indicated by the arrow to temporarily secure it. Now, a round crimp terminal can be connected. After inserting the terminal, tighten the screws to complete wiring.



# Safety Precautions

Be sure to read the precautions for all pushbutton switches in the *Pushbutton Switches Group Catalog* (Cat. No. X018).

## CAUTION

Do not apply a voltage exceeding the rated voltage across the incandescent lamp terminals.  
The lamp may be destroyed and the operation unit may fly out.



## Precautions for Correct Use

### Mounting

Always make sure that the power is turned OFF before mounting, removing, or wiring the Switch, or performing maintenance. Electric shock may occur.

Do not tighten the mounting ring more than necessary using tools such as pointed-nose pliers. Doing so will damage the mounting ring. The tightening torque is 0.98 to 1.96 N·m.

Recommended panel thickness: 1 to 5 mm.

### Wiring

When DC-specific LEDs are used, wire the Switch so that the X1 terminal is positive.

Terminal screws must be Phillips or slotted M3.5 screws with a square washer.

The tightening torque is 1.08 to 1.27 N·m.

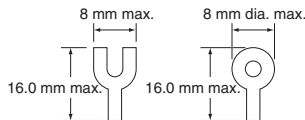
Single wires, stranded wires, and crimp terminals can be connected to the Switch.

Applicable Wiring Materials:

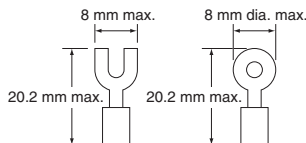
Twisted strands: 2 mm<sup>2</sup> max.

Solid wire: 1.6 mm dia.

Naked Crimp Terminals



Crimp Terminals with Insulating Sheaths



After wiring the Switch, maintain an appropriate clearance and creepage distance.

### Operating Environment

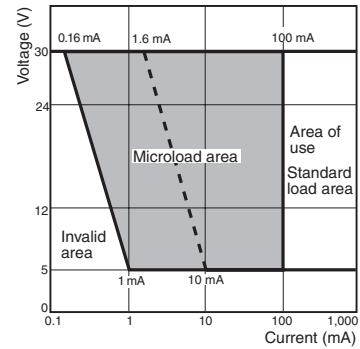
The IP65 model is designed with a protective structure so that it will not sustain damage if it is subjected to water from any direction to the front of the panel.

### Using the Microload

Contact failure may occur if a Switch designed for a standard load is used to switch a microload. Use Switches within the application ranges shown in the following graph. Even within the application range, insert a contact protection circuit, if necessary, to prevent the reduction of life expectancy due to extreme wear on the contacts caused by loads where inrush current occurs when the contact is opened and closed.

The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% ( $\lambda_{60}$ ) (conforming to JIS C5003).

The equation,  $\lambda_{60} = 0.5 \times 10^{-6}/\text{time}$  indicates that the estimated malfunction rate is less than 1/2,000,000 with a reliability level of 60%.



### LEDs

The LED current-limiting resistor is built-in, so internal resistance is not required.

If commercially available LEDs are used, select the ones that meet the following conditions:

Base: BA9S/13□

Overall length: 26 mm max.

Power consumption: 2.6 W max.

### Others

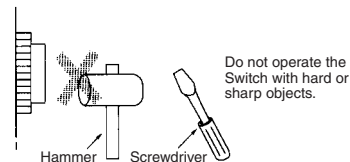
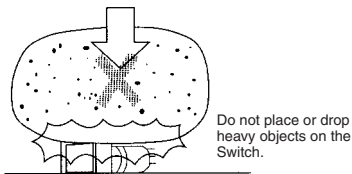
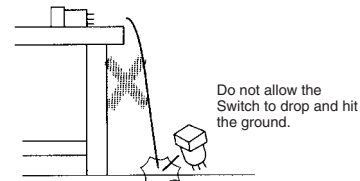
The oil-resistant IP65 uses NBR rubber and is resistant to general cutting oil and cooling oil. Some particular oils cannot be used with the oil-resistant IP65, however, so contact your OMRON representative for details.

If the panel is to be finished with coating, etc., make sure that the panel meets the specified dimensions after the coating.

Do not subject the Switch to extreme shock or vibration. Doing so will cause malfunctions and damage to the Switch.

Do not let sharp objects come into contact with the Switches that are made of resin. Doing so will damage the Switches, causing scratches on the outside of the Pushbuttons, and malfunction.

When handling the Switches, do not throw or drop them.



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A119-E1-04

In the interest of product improvement, specifications are subject to change without notice.

# Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. **Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. **Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **Force Majeure.** Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
  - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
  - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
  - c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
  - d. Delivery and shipping dates are estimates only; and
  - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. **Warranties.** (a) **Exclusive Warranty.** Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) **Limitations.** OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) **Buyer Remedy.** Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See <http://oeweb.omron.com> or contact your Omron representative for published information.
14. **Limitation on Liability; Etc.** OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. **Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. **Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

## Certain Precautions on Specifications and Use

1. **Suitability of Use.** Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
  - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
  - (ii) Use in consumer products or any use in significant quantities.
  - (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
  - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
 NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **Performance Data.** Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. **Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Complete "Terms and Conditions of Sale" for product purchase and use are on Omron's website at [www.omron.com/oei](http://www.omron.com/oei) – under the "About Us" tab, in the Legal Matters section.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.



**OMRON ELECTRONICS LLC**

One Commerce Drive  
Schaumburg, IL 60173

**847-843-7900**

For US technical support or other inquiries:

**800-556-6766**

**OMRON CANADA, INC.**

885 Milner Avenue  
Toronto, Ontario M1B 5V8

**416-286-6465**

**OMRON ON-LINE**

Global - <http://www.omron.com>  
USA - <http://www.omron.com/oei>  
Canada - <http://www.omron.ca>