Knob-type Selector Switch

Mounting Aperture of 16 mm

- Modular construction
- Oil-resistant IP65 models
- UL and cUL approved.
- Conforms to EN60947-5-1, IEC947-5-1
- Short mounting depth, less than 28.5 mm below panel
- Wide range of switching capacity from standard to microload
- Lighted and non-lighted models
- 2 and 3-notch models
- · Manual and automatic reset models



(€ 91 ₀**91**

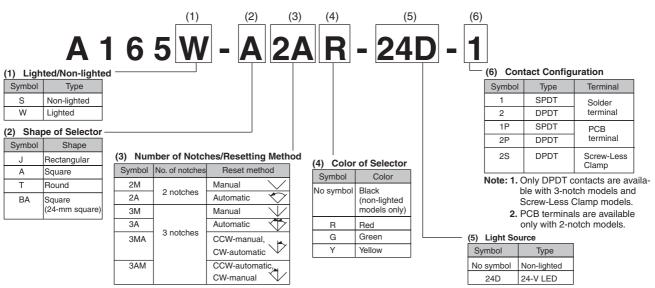
oushbutton Switches

Model Number Structure

Model Number Legend

Completely Assembled

The model numbers used to order sets of Units are illustrated below. One set comprises the Selector, Lamp (lighted models only), and Switch.



Voltage Reduction Unit (24-V Built-in LED)

 Symbol
 Type
 Operating voltage
 Rated voltage

 T1
 LED
 90 to 121 VAC/VDC
 110 VAC/VDC

 T2
 Value
 180 to 242 VAC/VDC
 220 VAC/VDC

Note: 1. Solder terminals are only available with 100-V models.

 The Voltage Reduction Unit is not available for models with PCB terminals.

Subassembled

1. Selector





1. Lighted/Non-lighted

- S: Non-lighted
- W: Lighted

2. Flange Shape

- J: Rectangular
- A: Square
- T: Round
- BA: Square (24-mm square)

3. Number of Notches/Reset Method

- 2M: 2 notches/Manual
- 2A: 2 notches/Automatic
- 3M: 3 notches/Manual
- 3A: 3 notches/Mixed-operation
- 3MA: 3 notches
- 3AM: 3 notches

2. Switch (Same as for Key-type Selector Switches)





- 1. Number of Notches
 - 2N: 2 notches
 - 3N: 3 notches
- 2. Contacts
 - 1: SPDT
 - 2: DPDT

3. Lamp



1. Operating Voltage (Rated Voltage) LED 5DS: 5 VDC (5 VDC) 12DS:12 VDC (12 VDC) 24DS:24 VDC (24 VDC) 3. Lighted/Non-lighted None: Non-lighted

4. Illumination Color

Red

Green

Yellow

R:

G:

Y:

None: Black (Non-lighted models only)

- L: Lighted
- 4. Terminals None: Solder terminals (tab terminals #110)
- 2. Illumination Color
 - R: Red (LED)
 - G: Green (LED) Y: Yellow (LED)

G-60 Knob-type Selector Switch A165S/W

■ List of Models

Ordering as a Set

The model numbers used to order sets of Units are given in the following tables. One set comprises the Selector, Lamp (lighted models only), and Switch.

Solder Terminals

A165 -J (Rectangular) Models



IP65 Oil-resistant

No. of notches	Output	Reset i	nethod	Lighting method	Operating voltage	Model
2 notches	SPDT	Manual	\searrow	LED	24 VDC	A165W-J2M□-24D-1
			~	Non-lighted		A165S-J2M-1
		Automatic	_	LED	24 VDC	A165W-J2A□-24D-1
			\checkmark	Non-lighted		A165S-J2A-1
	DPDT	Manual		LED	24 VDC	A165W-J2M□-24D-2
			\sim	Non-lighted		A165S-J2M-2
		Automatic		LED	24 VDC	A165W-J2A□-24D-2
		X	\sim	Non-lighted		A165S-J2A-2
3 notches	DPDT	Manual		LED	24 VDC	A165W-J3M□-24D-2
		\bigvee	Non-lighted		A165S-J3M-2	

Note: Enter the desired color symbol for the Selector in \Box : R (red); Y (yellow); G (green). The Selector for non-lighted models is black.

A165 - A (Square) Models



IP65 Oil-resistant

No. of notches	Output	Reset me	thod	Lighting method	Operating voltage	Model
2 notches	SPDT	Manual	\mathbf{X}	LED	24 VDC	A165W-A2M□-24D-1
			~	Non-lighted		A165S-A2M-1
		Automatic		LED	24 VDC	A165W-A2A□-24D-1
			\checkmark	Non-lighted		A165S-A2A-1
	DPDT Manual	Manual	N (LED	24 VDC	A165W-A2M□-24D-2
			\checkmark	Non-lighted		A165S-A2M-2
		Automatic		LED	24 VDC	A165W-A2A□-24D-2
			\checkmark	Non-lighted		A165S-A2A-2
3 notches	DPDT	Manual		LED	24 VDC	A165W-A3M□-24D-2
			Non-lighted		A165S-A3M-2	

Note: Enter the desired color symbol for the Selector in 🗆: R (red); Y (yellow); G (green). The Selector for non-lighted models is black.

A165 -T (Round) Models



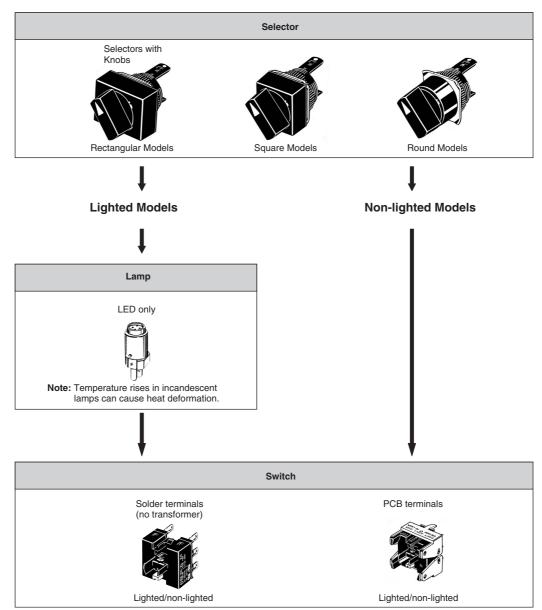
IP65 Oil-resistant

No. of notches	Output	Reset r	nethod	Lighting method	Operating voltage	Model
2 notches	SPDT	Manual	\searrow	LED	24 VDC	A165W-T2M□-24D-1
			× ×	Non-lighted		A165S-T2M-1
		Automatic		LED	24 VDC	A165W-T2A -24D-1
			\checkmark	Non-lighted		A165S-T2A-1
	DPDT Manual	× /	LED	24 VDC	A165W-T2M□-24D-2	
	\sim		Non-lighted		A165S-T2M-2	
		Automatic <		LED	24 VDC	A165W-T2A -24D-2
			\sim	Non-lighted		A165S-T2A-2
3 notches	DPDT	Manual		LED	24 VDC	A165W-T3M□-24D-2
		\checkmark		Non-lighted		A165S-T3M-2

Note: Enter the desired color symbol for the Selector in
R (red); Y (yellow); G (green). The Selector for non-lighted models is black.

Ordering Individually

Selectors, Lamps, and Switches (Sockets) can be ordered separately. Combinations that are not available as sets can be created using individual Units. Also, store the parts as spares for maintenance and repairs.



Selectors (Oil-resistant IP65 Models Only)

Appearance	Number of notches	Reset m	ethod	Lighting method	Operating voltage	Model	Selector color symbol
Rectangular	2 notches	Manual		LED	24 VDC	A165W-J2M	R (red),
(A165□-J)				Non-lighted		A165S-J2M	Y (yellow),
		Automatic	Ś	LED	24 VDC	A165W-J2A	G (green)
			\bigcirc	Non-lighted		A165S-J2A	
	3 notches	Manual		LED	24 VDC	A165W-J3M	
				Non-lighted		A165S-J3M	
• •		Fully	(LED	24 VDC	A165W-J3A	
		automatic	\bigcirc	Non-lighted		A165S-J3A	
	3 notches	Mixed-	\bigcirc	LED	24 VDC	A165W-J3MA	
		operation	\bigcirc	Non-lighted		A165S-J3MA	
		Mixed-	$(\mathbf{\hat{T}})$	LED	24 VDC	A165W-J3AM	
		operation	\bigcirc	Non-lighted		A165S-J3AM	
Square (A165⊡-A)	2 notches	Manual		LED	24 VDC	A165W-A2M	R (red),
• quai • (••=)				Non-lighted		A165S-A2M	Y (yellow),
		Automatic	Ś	LED	24 VDC	A165W-A2A	G (green)
			\bigcirc	Non-lighted		A165S-A2A	
	3 notches	Manual		LED	24 VDC	A165W-A3M	
				Non-lighted		A165S-A3M	
		Fully	(LED	24 VDC	A165W-A3A	
		automatic		Non-lighted		A165S-A3A	
	3 notches	Mixed-		LED	24 VDC	A165W-A3MA	
		operation	\bigcirc	Non-lighted		A165S-A3MA	_
		Mixed-		LED	24 VDC	A165W-A3AM	
		operation	\bigcirc	Non-lighted		A165S-A3AM	
Round (A165□-T)	2 notches	Manual		LED	24 VDC	A165W-T2M	R (red),
				Non-lighted		A165S-T2M	Y (yellow),
		Automatic	(\mathbf{r})	LED	24 VDC	A165W-T2A	G (green)
•			\bigcirc	Non-lighted		A165S-T2A	
	3 notches	Manual		LED	24 VDC	A165W-T3M	
				Non-lighted		A165S-T3M	
		Fully		LED	24 VDC	A165W-T3A	
		automatic	\bigcirc	Non-lighted		A165S-T3A	
	3 notches	Mixed-	Ì	LED	24 VDC	A165W-T3MA	
		operation	\bigcirc	Non-lighted		A165S-T3MA	
		Mixed-		LED	24 VDC	A165W-T3AM	
		operation	\bigcirc	Non-lighted		A165S-T3AM	

Note: 1. Enter the desired color symbol for the Selector in the $\Box.$

2. The selector for non-lighted models is black.

Switches

Appearance			Classificatio	on		Model
	Lighted	Socket (without	2 notches	SPDT	Solder terminal	A16S-2N-1L
		voltage-reduction		DPDT		A16S-2N-2L
Non-ligh		lighting)	3 notches	DPDT		A16S-3N-2L
	Non-lighted		2 notches	SPDT		A16S-2N-1
				DPDT		A16S-2N-2
			3 notches	DPDT		A16S-3N-2
	Lighted		2 notches	SPDT	PCB terminal	A16S-2N-1LP
				DPDT		A16S-2N-2LP
	Non-lighted			SPDT		A16S-2N-1P
Te				DPDT		A16S-2N-2P

Lamps

LED

Operating voltage	5 VDC	12 VDC	24 VDC
Red	A16-5DSR	A16-12DSR	A16-24DSR
Yellow	A16-5DSY	A16-12DSY	A16-24DSY
Green	A16-5DSG	A16-12DSG	A16-24DSG

Accessories (Order Separately)

Accessories

Name	Appearance	Classification	Model	Remarks
Panel Plugs		Rectangular		Used for covering the panel cutouts for
		Square	A102A-3003	future panel expansion.
	P	Round	A16ZT-3003	Degree of protection: IP40

Tools

Name	Appearance	Model	Applicable types				Remarks	
			Pushbutton Switch	Knob-type Selector Switch	Key-type Selector Switch	Emergency Stop Switch	Indicator	
Screw Fit- ting	G	A16Z-3004	Yes	Yes	Yes	Yes	Yes	Convenient for ganged installation. Tighten to a torque of 0.39 N·m min.
Extractor		A16Z-5080	Yes	Yes	Yes	Yes	Yes	Convenient for extract- ing the Switches and Lamps.

Specifications

Approved Standards

Agency	Standards	File No.
UL, cUL (See note.)	UL508	E41515
	EN60947-5-1	

Note: cUL: CSA, C22.2 No. 14

Approved Standard Ratings

UL, cUL (File No. E41515)

5 A at 125 VAC, 3 A at 250 VAC (general use) 3 A at 30 VDC (resistive)

EN60947-5-1 (Low Voltage Directive)

3 A at 250 VAC (AC12), 3 A at 30 VDC (DC12)

Ratings

Contacts

AC resistive load	DC resistive load
3 A at 250 VAC 5 A at 125 VAC	3 A at 30 VDC

Minimum applicable load: 1 mA at 5 VDC

Rated values are obtained from tests conducted under the following conditions.

- 1. Load: Resistive load
- 2. Mounting conditions: No vibration and no shock
- 3. Temperature: $20\pm2^{\circ}C$
- 4. Operating frequency: 20 times/min

Characteristics

Super-bright LED

Rated voltage	Rated current	Operating voltage	Internal limiting resistor
5 VDC	30 mA (15 mA)	5 VDC±5%	33 Ω (68 Ω)
12 VDC	15 mA	12 VDC±5%	270 Ω (560 Ω)
24 VDC	10 mA	24 VDC±5%	1600 Ω (2,000 Ω)

Note: The values in parentheses are for blue Selectors.

Item		Knob-type Selector Switch		
Allowable operating	Mechanical	20 operations/minute max.		
frequency	Electrical	10 operations/minute max.		
Insulation resistance		100 MΩ min. (at 500 VDC)		
Dielectric strength		,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each te ninal and ground 1,000 VAC, 50/60 Hz for 1 min between lamp terminals (see note 2)		
Vibration resistance	Malfunction	10 to 55 Hz, 1.5-mm double amplitude (malfunction within 1 ms)		
Shock resistance	Mechanical	500 m/s ²		
	Malfunction	150 m/s ² max. (malfunction within 1 ms)		
Durability	Mechanical	250,000 operations min.		
	Electrical	100,000 operations min.		
Ambient temperature		Operating: -10°C to 55°C (with no icing or condensation) Storage: -25°C to 65°C (with no icing or condensation)		
Ambient humidity		Operating: 35% to 85%		
Electric shock protection class		Class II		
PTI (tracking characteristic)		175		
Degree of contamination		3 (IEC947-5-1)		
Weight		Approx. 13 g (in the case of a lighted DPDT switch)		

Note: 1. Set and reset constitute one operation.

2. With LED and incandescent lamp not mounted.

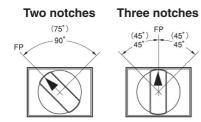
Screw-less Clamp

Item		Screw-less Clamp				
Recommended wire size		0.5 mm ² twisted wire or 0.8 mm-dia. solid wire				
Usable wires and ten- sile strength	Twisted wire	0.3mm ²	0.5 mm ²	0.75 mm ²	1.25 mm ²	
	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.		
	Tensile strength	10 N	20 N	30 N	40 N	
Length of exposed wire		10 ±1 mm				

■ Operating Characteristics

Туре	Knob-type Selector Switch			
Features	2 notches	3 notches		
Operating force (OF) max.	9.8 N⋅m			
Set position (SP)	90±5°	45 ^{+10°}		

■ Operation Angle



Note: 1. The angle used for automatic reset is shown in parentheses. 2. FP: Free Position

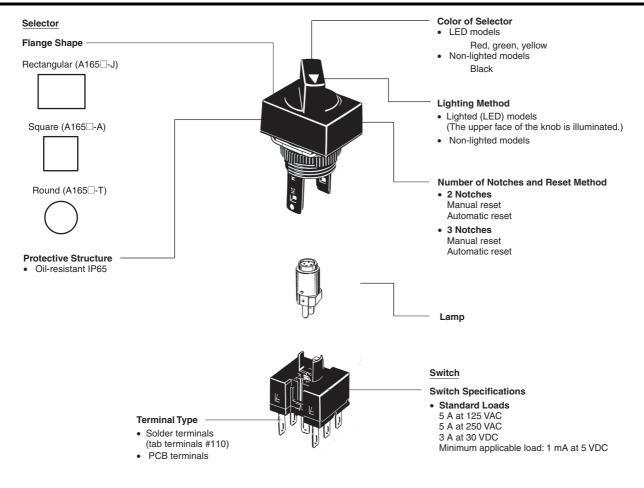
■ Contact Form

Name	Contact		
SPDT	COM		
	NO		



Notch	Contact							
	SPDT		DPDT					
	Position	SW	Position	SW2	SW1			
2 notches	\odot	~~	\odot	~	•••			
	\odot	<i>д</i> .	\otimes	\$.	\$•			
3 notches			\odot	\$•	•••			
			1	~	•••			
			\oslash	~	\$•			

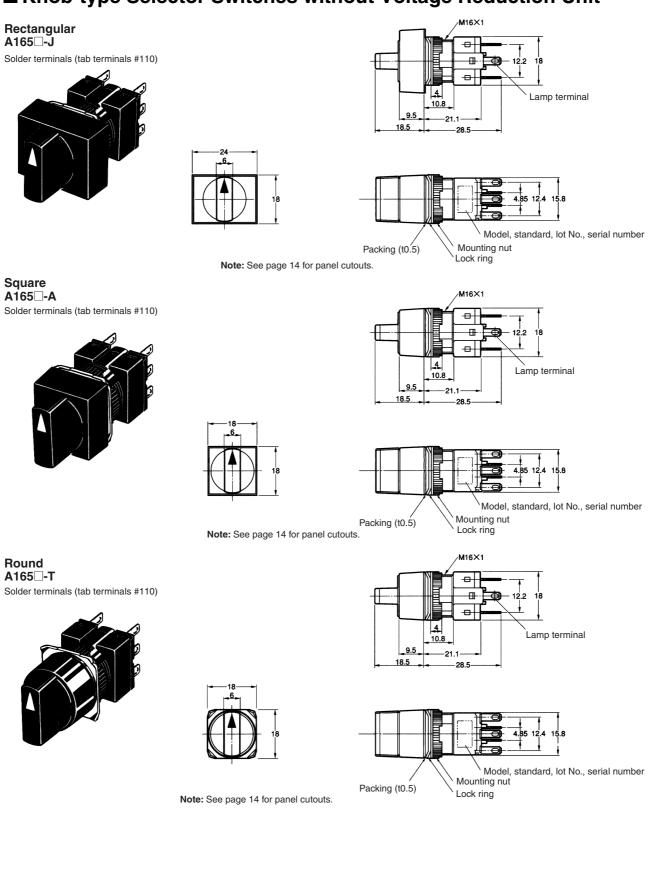
Nomenclature



Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Knob-type Selector Switches without Voltage Reduction Unit

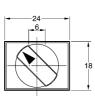


OMROD

The following diagrams show the rectangular model as a representative example. The lamp terminal is also provided with non-lighted models.





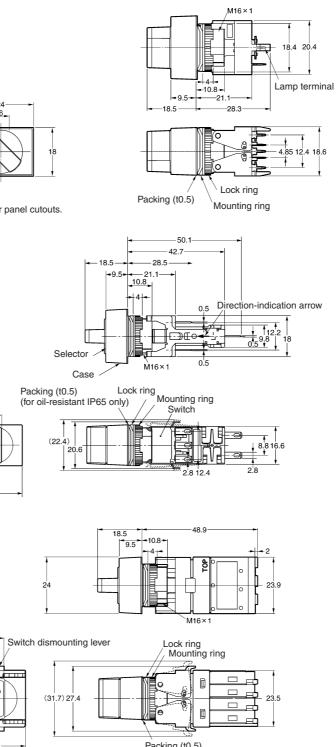


Note: See page 14 for panel cutouts

18

18

24



Reduced-voltage light-ing, solder terminals (tab terminals #110)

Rectangular

A165WŬ-T



Rectangular A165 -2S

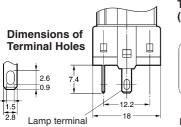
> Packing (t0.5) (for oil-resistant IP65 only)

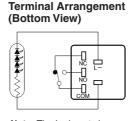
■ Terminal Arrangement

Models with Solder Terminals without Reduced-voltage Lighting

Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.

Lighted SPDT Switches





Note: The L+ is not shown on the Switch.

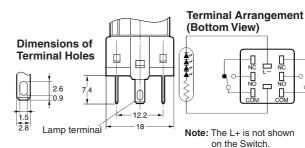
Non-lighted SPDT Switches

Dimensions of Terminal Holes

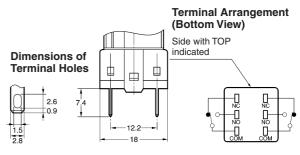
Models with PCB Terminals

Lighted SPDT Switches

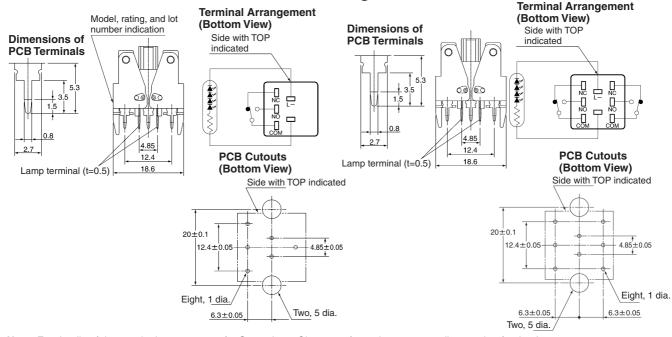
Lighted DPDT Switches



Non-lighted DPDT Switches



Lighted DPDT Switches



Note: For details of the terminal arrangement for Screw-Less Clamps, refer to the corresponding section for the A16.

Non-lighted Models with PCB Terminals

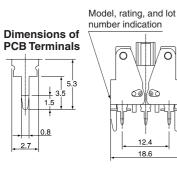
Lamp terminals are not provided with the Non-lighted Knob-type Selector Switches and Key-type Selector Switches.

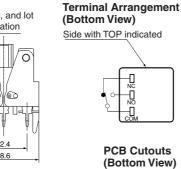
0

Side with TOP indicated

Two, 5 dia.

Non-lighted SPDT Switches





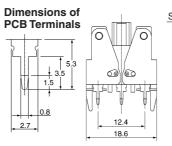
20±0.1

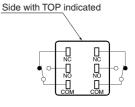
Three, 1 dia

 12.4 ± 0.05

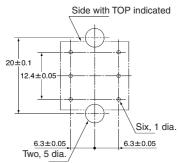
 6.3 ± 0.05







PCB Cutouts (Bottom View)

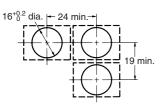


Panel Cutouts

Models with Solder Terminals

Rectangular A165 -J

(Top View)



Square A165 -A Round A165
-T (Top View) 16^{+0.2} dia. 19 miı

min.

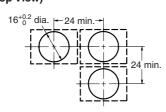
Note: 1. Make sure the thickness of the mounting panel is 0.5 to 3.2 mm.

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

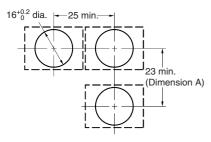
Models with PCB Terminals

Rectangular A165 -J

(Top View)



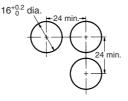
Rectangular A165W□-T



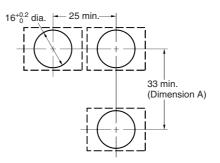
Recommended panel thickness: 0.5 to 3.2 mm

Square A165□-A Round A165□-T

(Top View)



Rectangular A165⊡-2S



Recommended panel thickness: 0.5 to 3.2 mm

Note: 1. Ensure that the variation in the distance between the centers of neighboring mounting holes is less than ±0.1 mm.
2. Make sure the thickness of the mounting panel is 0.5 to 3.2 mm. If, however, a Switch Guard or Dust Cover is used, the thickness of the mounting panel must be 0.5 to 2 mm.

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

Installation

For details on mounting the Switch to a panel, and mounting and dismounting the Switch, refer to installation details for the A16 Pushbutton Switch.

Panel Mounting

Refer to the Installation section for the A16.

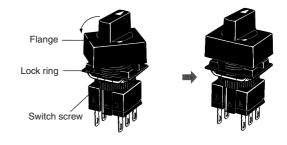
Mounting and Replacing the Pushbutton

Refer to the Installation section for the A16.

■ Flange Rotation

A165 Knob-type Selector Switch

Fix the Switch screw and rotate the flange in 45° turns.



Precautions

Refer to the Technical Information for Pushbutton Switches (Cat. No. A143) and the Precautions section for the A16.

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. A125-E1-02

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

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