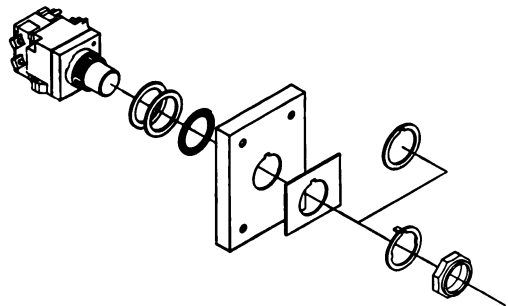
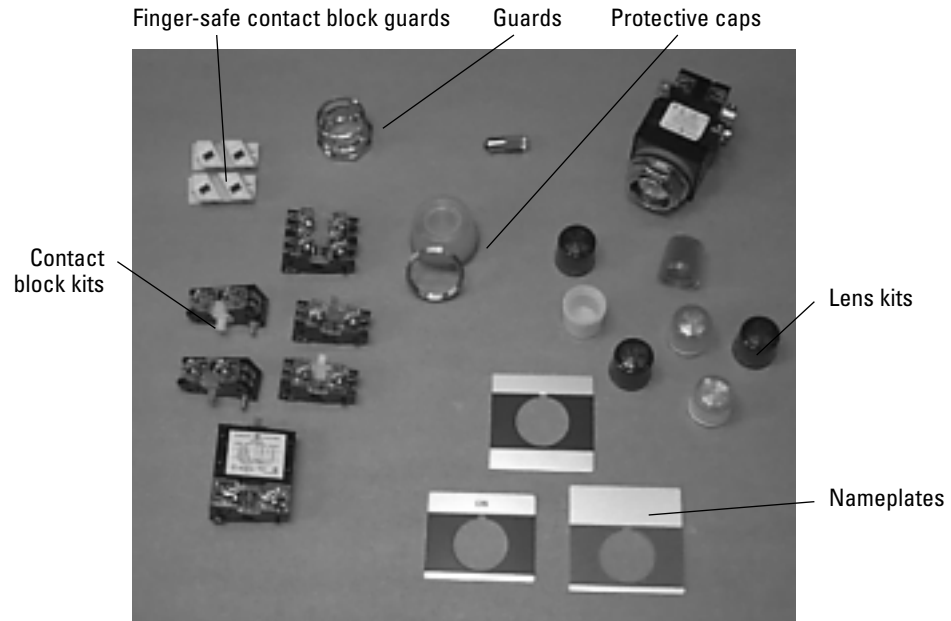


Illuminated Push Buttons

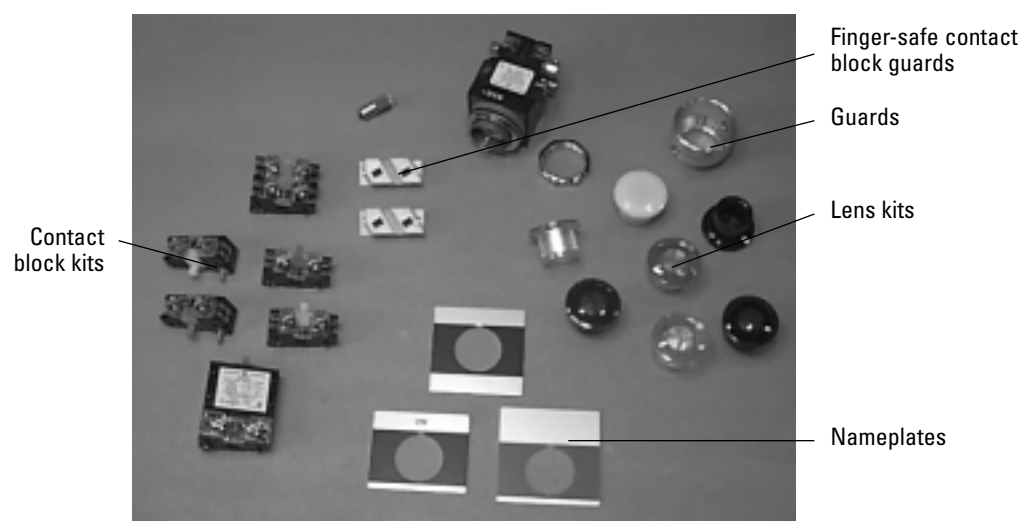


- Lens Cap**
 - Interchangeable, threaded-on design
 - 6 colors: red, green, yellow, amber, blue, white + clear
- Mushroom Head**
 - 1 3/8"
 - 6 colors: red, green, yellow, amber, blue, white + clear
- Mounting Ring**
 - Standard or guarded
- Lamp**
 - Incandescent, LED, neon
- Power Supply**
 - 3 types: Full voltage, transformer, resistor
- Contact Blocks**
 - Color coded for quick installation
 - Maximum of 4 single or 2 double contact blocks
 - Visible contacts for easy, accurate inspections
 - Special applications: early close, late open, gold flashed, reed switch

Accessories for push buttons



Accessories for mushroom-head push buttons



Illuminated Push Buttons

Type		Contacts		Lens Color		Ring	Lamp	Voltage
C	R	1	0	4	P	B		

L = Full voltage
R = Resistor
T = Transformer

00 = None
10 = 1NO
01 = 1NC
11 = 1NO/1NC
92 = 2NO/2NC

F = Flashing
L = LED
N = Neon
S = Standard

2 = 120V
3 = 240V
4 = 480V
5 = 600V
6 = 6V
7 = 12V
8 = 24V

Availability	
Standard	Mushroom-head
1 = Extended	■
3 = With guard	■
5 = 1 3/8" (35mm)	■

Other forms available:

- Push-on, push-off
- 2-position push-pull mushroom-head
- 3-position push-pull mushroom-head
- Dual input (120v)

Available Combinations

Power Supply	Lamp	Lens Color Code (Digit 4)	Voltage						
			6	12	24	120	240	480	600
Full Voltage	Incandescent	All	■	■	■	■			
	LED	E,G,M,R	■	■	■	■			
	Neon	R,W,C				■			
	Flashing	All	■						
	Resistor	All				■	■		
Transformer	Incandescent	All				■	■	■	■
	LED	E,G,M,R				■	■	■	■
	Flashing	All				■	■	■	■

Availability	
Standard	Mushroom-head
A = No lens/cap	■
C = Clear	■
E = Yellow	■
G = Green	■
L = Blue	■
M = Amber	■
R = Red	■
W = White	■

Tip for Quick Service: For small quantity orders of illuminated operators in colors other than red or green, order operator with red/green lens and order other color lenses separately.

Technical Data

General specifications

Standards & approvals	UL Listed - File Number E2403 CSA Certified - LR15492, Class 321103 NEMA - ICS2 - 1988 IEC 947.5.1 VDE 0660		
Enclosure ratings	All units are suitable for use in NEMA Type 1, 3, 3R, 3S, 4, 4X, 12 and 13 applications when mounted in enclosures rated for those same applications. For some NEMA 4X applications, protective caps will provide improved corrosion resistance.		
Finger protection at terminals	IP2X according to IEC 529 Terminal identification per CENELEC EN 50013		
Temperature range	<u>Operating</u> -25° to +70° C -13° to +158° F	<u>Storage</u> -40° to +70° C -40° to 158° F	
Climate suitability/humidity	<u>Climate Type</u> Temperate Wet Hot Wet Variable Wet	<u>Temperature</u> 74°F (23°C) 74°F (23°C) 104°F (40°C) 74°-104v F (23° to 40° C)	<u>Relative Humidity</u> 50% 83% 92% 83%-92%
Shock and vibration	Resistance to shock - 50g, 11ms Frequency range - 1-100 Hz Vibration amplitude - 1-13.2 Hz - displacement ±1mm 13.2-100 Hz - acceleration ±0.7g		
Operating force		Standard recessed <u>push buttons</u>	Standard flush <u>push buttons</u>
	Without contact blocks	1.625 lbf	2.5 lbf
	With 1NO contact block	2.5 lbf	2.875 lbf
	With 2 NO contact blocks	3.5 lbf	3.5 lbf
	With 3 NO contact blocks	4.0 lbf	4.375 lbf
Wire size	22-12 AWG stranded or solid copper wire		
Torque requirements	Terminal screws: 10-14 in-lbs Contact block mounting screws: 10-14 in-lbs		

Technical Data

Contacts

Electrical reliability data	With indicating light loads, tested for 5,000,000 operations at 40mA and 115V resistive loads with no failures observed.		
Electrical characteristics	<u>Characteristic</u>	<u>Value</u>	
	Thermal current	10A per IEC 947-5-1	
	Insulation voltage	Ui = 660V AC/DC	
	Protection from electrical shock	Class I per IEC 536 for metal operators; Class II (double insulation) per IEC 536 for plastic operators	
	Insulation category	Group C per VDE 0110	
	Dielectric strength	2500V	
	Short circuit protection	10A time delay fuse gG per IEC 269.1 & 269.3	
Finger safe terminals	Available for silver and gold single contact blocks, as components and as assembled versions.		
Contact characteristics	NC: slow make, double break (positive opening) NO: slow make, double break Opposite polarity Self-cleaning below 300 volts NO and NC snap action (for use on joysticks)		
AC ratings, NEMA A600 Heavy Pilot Duty	Maximum AC voltage	Continuous current amperes	AC voltamperes @ 60/50 Hz ¹
			Make Break
	600	10	7200 720
	¹ Maximum make and break currents are 60 and 6 amperes respectively for voltages of 120 and below.		
DC ratings, NEMA P600	Maximum make or break amperes		
	125V	250V	600V
	1.1	0.55	0.2
Reed switch block ratings		AC ratings	DC ratings
	Operating voltage	2-120 VAC	2-30 VDC
	Continuous current (maximum)	.001-.15 A	.001-.15 A
	Resistive, watts (VA)	8 VA maximum	4.5 VA maximum
Power supply resistor values	<u>Input</u>	<u>Resistor value</u>	
	120V AC/DC	750 ohms ±5%, 5 watts, 2 resistors in series	
	240V AC/DC	2700 ohms ±5%, 5 watts, 2 resistors in series	

Technical Data

Materials

Component	Material
Cap (non-illuminated)	Unfilled polyacetal
Cap (illuminated)	Polycarbonate
Metal housings	Chromium or zinc plated zinc ingot
Plastic housing	Nylon
White plunger	Unfilled polyacetal
Flange	Nylon
Grease	Good for temperatures of -42° to +204°C
Plate spacer	Polycarbonate
Locking plate	Chromium plated zinc ingot
Locking ring	Chromium plated zinc ingot
Hexagonal ring	Chromium plated zinc ingot
Contact block housing	Nylon
Cam	Unfilled Polyacetal
Cam follower	Unfilled Polyacetal
Joystick protective housings	Vinyl nitrile
Terminal screw	#6-32
Gasket	Vinyl nitrile
Contacts	Silver alloy
Push button guards	Chromium plated zinc ingot
Wobble stick	Aluminum
Key	Brass
Protective caps	Silicon rubber
Locking attachment	Polycarbonate

Lamp selection

Incandescent, neon and light emitting diode (LED) lamps are available for use in indicating lights, illuminated push buttons and illuminated selector switches. Although incandescent lamps have traditionally been the most frequently used, it is wise to review the characteristics of the different types of lamps and select the one that is most appropriate for the application. Although the incandescent lamp offers the lowest initial cost, the LED is usually the most economical over the long term, due to its long life, resistance to shock and vibration, and lower power consumption. Benefits of LEDs include:

- **Resistance to shock and vibration** — Since LEDs are solid state, they are completely impervious to the problems associated with shock and vibration that can significantly reduce the life of incandescent lamps by mechanically breaking the filament. The high inrush currents at startup associated with incandescents also act to significantly reduce the life of lamps used in frequent on-off applications.
- **Longer Life** — The LEDs used with CR104P push buttons have a service life of 100,000 hours (11 years) compared to 20,000 hours (28 months) for the neon lamps, and 2,000 hours (3 months) for the standard incandescent lamps.
- **Reduced Power Consumption** — The LEDs used for the CR104P push buttons consume between 10% and 52% less power than the equivalent incandescent lamp. The table below shows the power consumption of each type:

Type	Volts AC/DC	Incandescent CR104P	Watts	LED CR104P	Watts	Neon CR104P	Watts
Full voltage/ transformer	6 (20,000 hours)	PXA16	.95	PXA36*	0.54	—	—
	12 (15,000 hours)	PXA12	1.12	PXA32*	0.72	—	—
	24 (2,500 hours)	PXA14	1.12	PXA34*	0.72	—	—
	120 (slide base)	PXA52	3	—	—	—	—
	130 (bayonet socket)	PXA54	2.6	PXA38*	1.2	PXA19	—
Resistor	240	PXA52	3	—	—	—	—
	120	PXA15	—	—	—	—	—
Cluster Lights	12	PXA22	.96	—	—	—	—
	24	PXA24	1.12	—	—	—	—
	6	PXA26	1.2	—	—	—	—

- **Lower Operating Temperature** - Because of the lower power consumption and greater efficiency of LEDs, they operate much cooler than incandescent lamps. Thus, in applications where heat in the enclosure could be a problem, LED lamps are a better choice.

Incandescent bulbs are recommended for light duty applications and panels not subject to shock and vibration. Neon lamps offer a middle ground, at a cost and performance between the LED and the incandescent, but can have problems associated with flicker induced by noise and frequency. LED lamps offer the best overall performance for the long term.