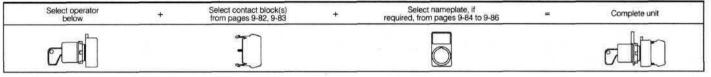


C-2000™ Push Buttons

600 Volts Max. AC/300 Volts Max. DC 10 Amps. Continuous AC/2.5 Amps. Continuous DC

2-Position Key Selector Switches

Selection Process



Operators

* Styles

Cams

*Cam Code

D

1

H

Style *Style Code O Polished Chrome

С

0

0

X

0 X

-

х

0

X

Note position of contact block for cam selection.

0

X

0 X

0

х

0 X 0

х

0

X

x

0

X

-

_

Replace asterisk (*) in catalog number with style code from styles table below. Replace dagger (†) in catalog number with key code from keys table below.

O Satin Chrome

M

Position 1

P9B01VN

P9B11VN

P9B01VN

P9B11VN

P9B01VN

P9B11VN

		Maint	ained		Spring Return	
Cam	Key Removal	0.11	List Price.	Catalo	og No.	List Price.
		Catalog No.	List Price, GO-10GC	From Left	From Right	
	L	P9*SCD0A†	\$43.50	-	P9*SCD5A†	\$56.50
D	R	P9*SCD0E†	43.50	-	-	-
	L-R	P9*SCD0K†	43.50	-		-
	С	P9*SCIOC†	43.50		P9*SCI5C†	56.50
1	R	P9*SCI0E†	43.50		-	-
	C-R	P9*SCION†	43.50	-	-	-
	L	P9*SCH0A†	43.50			
н	С	P9*SCH0C†	43.50	P9*SCH1C†		56.50
	L-C	P9*SCH0H†	43.50	_		-

Round Engineered Plastic

х

Position 2

P9B10VN

_

_

P9B10VN

_

P9B10VN

_

Screw Terminal Contact Block

Square Engineered Plastic

S

Position 2

P9B10FN

_

P9B10FN

_

P9B10FN

_

Inches

Millimeters

Quick-Connect Terminal Contact Block

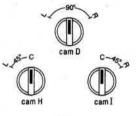
Position 1

P9801FN

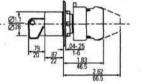
P9B01FN

-

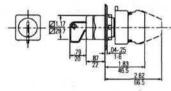
P9B01FN



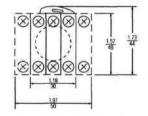




Round Key Selector Switch



Square Key Selector Switch



Typical Back Side View

†Keys (Set of 2)

Key Number	Std.		Special®								Colored ®						
Key Number	3095	9901	9902	9903	9904	9905	9910	9916	9919	3353	R455 (Ronis)	73033 (Yellow)	73034 (Black)	73037 (Red)	73038 (Blue)	73040 (Orange)	
†Key Code	95	01	02	03	04	05	10	16	19	53	55	33	34	37	38	40	

Dimensions shown in

① To order with other than standard key code (95), add \$4.00 to List Price, GO-10GC. Minimum quantity order on Key Codes 95, 55, and 33 is one; for all others, minimum quantity order is ten.

Selection and Drawing Data: pages 9-50, 9-51. Accessories: pages 9-92, 9-93. Technical Data: pages 9-52 to 9-57.

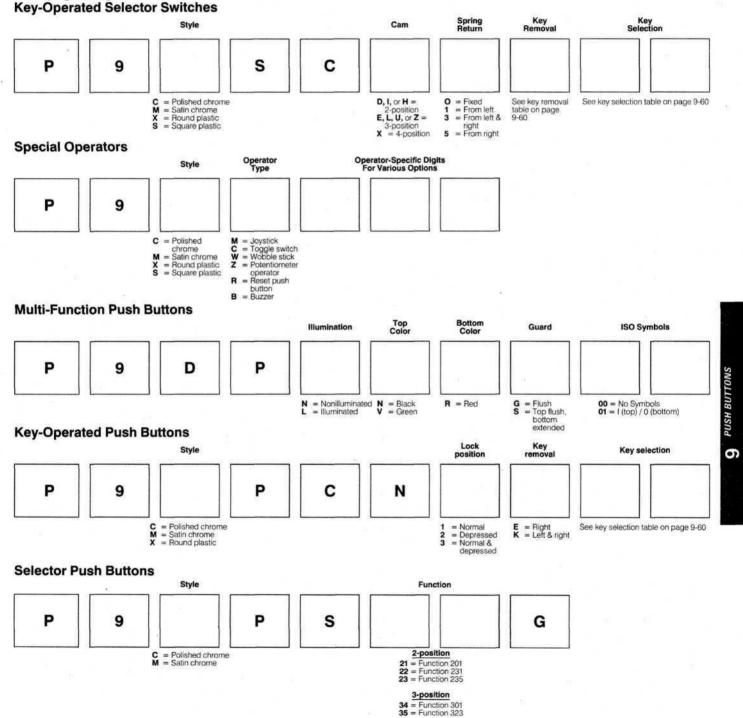
9

C-2000[™] Push Buttons

600 Volts Max. AC/300 Volts Max. DC 10 Amps. Continuous AC/2.5 Amps. Continuous DC

Nomenclature Keys

For use in interpreting catalog numbers only. Do not use for developing catalog numbers.





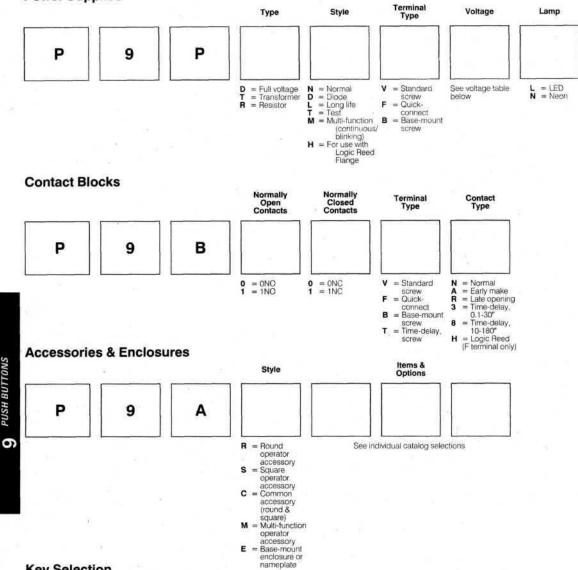
C-2000[™] Push Buttons

600 Volts Max. AC/300 Volts Max. DC 10 Amps. Continuous AC/2.5 Amps. Continuous DC

Nomenclature Keys

For use in interpreting catalog numbers only. Do not use for developing catalog numbers.

Power Supplies



Key Selection

PUSH BUTTONS

Kee March	Std.						Special							Colored		
Key Number	3095	9901	9902	9903	9904	9905	9910	9916	9919	3353	R455 (Ronis)	73033 (Yellow)	73034 (Black)	73037 (Red)	73038 (Blue)	73040 (Orange)
Key Code	95	01	02	03	04	05	10	16	19	53	55	33	34	37	38	40

Key Removal

									ti	Key Re	emoval F	osition							
2- & 3-Position Key Operators	L		C		R		L-C	-	L-R		-	C-R			-	L-C-R	-		-
4-Position Key Operators	2L	L	-	R	2R	2L,-L	-	2L-R	2L-2R	L-R	L-2R	-	2-2R	2L-L-R	2L-L-2R		2L-R-2R	L-R-2R	2L-L-R-2R
Key Removal Code	A	в	С	D	E	F	н	J	к	L	M	N	Р	R	S	Т	U	v	Z

Voltage

Voltage	No lamp	6	12	24	48	60	110	120	110-120	130	220	220-240	220-250	280	380	415-440	480-500	550-600
Voltage code	0	A	в	D	G	н	T	J	J	L	м	N	N	R	U	W	Y	Z

C-2000™ Push Buttons

600 Volts Max. AC/300 Volts Max. DC 10 Amps. Continuous AC/2.5 Amps. Continuous DC

Technical Data (continued)

Materials Material Component Cap/levers/knobs (nonilluminated) Polyamide/acetal Cap/levers/knobs (illuminated) Polycarbonate Copper-nickel-chrome plated zinc/aluminum alloy Metal housing Plastic housing Polyamide/acetal Plunger Polyester Stainless steel Springs Body-to-panel gasket Polyester elastomer Cap-to-body gasket Vinyl nitrile rubber Lubricant Lithium grease Polyamide/acetal Cams for nonilluminated selector switches Cams for illuminated selector switches Polyester Cam followers Polyamide/acetal Polyamide/acetal Contact block and power supply housings Contacts Pure silver Conductors Brass alloy Flanges Polyamide/acetal Flange latches Polyamide/acetal Printed circuit board adapter Polyamide/acetal Joystick protective housing Vinyl nitrile rubber Joystick plunger, lever & cam Acetal resin Joystick actuator Polyamide/acetal Push-to-latch, turn-to-release actuator & plunger Polyamide/acetal Wobble stick Polycarbonate Toggle switch lever Polyamide/acetal Protective caps (clear) Silicon rubber Vinyl nitrile rubber Protective caps (colored) Push button protective guards Polycarbonate Polyamide/acetal Mushroom-head guards Padlockable cover Polycarbonate and zinc-plated zinc/aluminum alloy Metal locking rings Zinc-plated zinc/aluminum alloy Keys Plated brass Nameplate holders Polyamide/acetal Nameplate inserts Laminated polyester Polyamide/acetal Hole plug **Power Supply Selection**

Туре	Principle of Operation	Benefit
Full voltage	Supplies input voltage directly to bulb.	Smallest and least expensive. Can be used with LEDs.
Transformer	Utilizes a transformer to step the input voltage down to 6 volts.	Transformer has the effect of damping the inrush current and voltage spikes from the switching device seen when the light is turned on, actually protecting the bulb from these factors that shorten life. Generates less heat than the resistor power supplies. Reduces unsafe supply voltages (up to 600 V) down to a safe level for lamp servicing. Can be used with LEDs. Able to withstand a short circuit of the lamp or lamp socket without damage.
Normal resistor	Utilizes a resistor in series with the incandescent lamp to drop the lamp voltage to 50% of the input voltage.	Least expensive way to reduce unsafe supply voltages (up to 240 V) down to a safe level for lamp servicing.
Diode resistor	Utilizes a resistor and a diode in series with the lamp to rectify and drop a 240 Vac input voltage to operate a 130 V incandescent lamp.	Provides the same function as the normal resistor, but takes up only one position in the flange rather than two. Generates less heat than the normal resistor power supplies.
Long-life resistor	Utilizes a resistor in series with the 130 V incandescent lamp to provide a lamp voltage 80% that of the input voltage.	Extends life of a 130 V incandescent bulb by 1300% (from 2000 to 28,000 hours).
Flashing (full-voltage or transformer)	Utilizes a flashing circuit which can be enabled or disabled by externally switching (shorting) two connections.	Allows the lamp to be switched between OFF, ON, and FLASHING modes.
Panel test (full-voitage or standard resistor)	Utilizes a diode to isolate the lamp test circuit from the supply circuit.	Allows use of indicating lights and "panel test" feature rather than individual push-to-test illuminated push buttons. Eliminates the need for the NO/NC contacts used on conventional push-to-test pilot lights.

C-2000[™] Push Buttor

Technical Data (continued)

600 Volts Max. AC/300 Volts Max. DC 10 Amps. Continuous AC/2.5 Amps. Continuous DC

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 C-2000 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 C-2000 push buttons consume between 10% and 52% less power than the equivalent BA9S incandescent lamp. The table below shows the power consumption of each type:

Volts AC/DC	Incandescent	Watts	LED	Watts	Neon	Watts
6	BA9S606	0.6	080BA9S6L*	0.59		-
6	BA9S615	1.5		-	-	1
12	BA9S12	2.0	080BA9S12L*	0.78	-	—
24	BA9S24	2.0	080BA9S24L*	0.84	-	-
48	BA9S48	2.0	080BA9S48L*	1.12	-	-
60	BA9S6012	1.2	555 I		1 	3
110 -	5.75	-	-	1	BA9SN110	0.077
120		-	080BA9S120L*	1.4	-	-
130	BA9S130	2.0	-	-	-	-
220		_		-	BA9SN220	0.330

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. on Comparison

Bulb Type	Approx. Lifespan (hours)	Shock & Vibration Immunity	Operating Temperature	Power Consumption	Brightness
LED	100,000	High	Medium	Medium	Medium
Incandescent	2,000	Low	High	High	High
Neon	20,000	Medium	Low	Low	Low

Guideform Specifications

IEC 22 mm push buttons shall be type GE C-2000™ series. They shall be listed by Underwriters Laboratories (UL), certified by Canadian Standards Association (CSA) and conform to International Electrotechnical Commission (IEC) and Japanese

Standard features shall include:

- Fully automated manufacturing with 100% on-line inspection.
- Manufactured in ISO 9001 certified facility.
- · 4 different operator styles: round metal body with polished chrome finish, round metal body with satin chrome finish, black round engineered plastic body, and black square engineered plastic body.
- Contact blocks and power supplies completely interchangeable among all 4 styles of operators.
- Locking rings that tighten from the rear with a special wrench or flat-blade screwdriver.
- Contact block flanges that mount on operators with 4-point positive locking.
- Universal mounting design that permits push buttons to be mounted with or without locating notch punched in panel. Orientation tab on operator notch that is removable with screwdriver.
- Modular assembly incorporating snap-on contact blocks and power supplies, removable with flat-blade screw driver.
- Devices mount on 30 mm x 50 mm (1.18 x 1.97 in.) center.
- Devices mount on panel thickness of 1 to 6 mm (.039 to .236 in.).
- Captive front-of-panel gasket for superior sealing.
- Lamps removable from the front of the panel.

Industrial Standard (JIS) standards. All push buttons, selector switches and pilot lights shall conform to the applicable requirements of NEMA standard ICS-2 for AC and DC control circuits. Enclosures shall be listed by UL and certified by CSA.

- Metal operators constructed of die cast body.
- · Polished and satin chrome operators feature triple chrome plating.
- Permanent marking of contact blocks by laser etching.
- Double bridge wiping action contact block design for applications from 12-600 volts ac and 12-300 volts dc.
- PLC interfacing with standard contact blocks.
- Contact blocks rated for 10 million electrical operations at 12 volts, 5 milliamps.
- · Contact block cases shall be ultrasonically welded to provide superior protection in dust conditions. Contact blocks rated for 250,000 operations at 12 volts, 5 milliamps in severely dusty conditions.
- Power supplies shall be available in full-voltage, resistor, and transformer forms.
- Resistor power supplies shall be available in standard, diode, and long-life forms.
- Screw, quick-connect, and base-mount contact blocks.
- Printed circuit board connector for use with quick-connect contact blocks.
- Global nomenclature.
- Multi-lingual nameplates.
- Global availability.



C-2000™ Push Buttons

600 Volts Max. AC/300 Volts Max. DC 10 Amps. Continuous AC/2.5 Amps. Continuous DC

Technical Data

General Specifications						
Conformity to standards	UL508 (USA) NEMA ICS-2 (USA) VDE 0660 (Germany) BSI (Great Britain) CEI EN60947.5.1 (Italy) CENELEC EN 5000 7 (Europe)		IEC 947. UTE (Fra	40 (France)	nada)	
Approvals	UL listed — File Number E66677 CSA Certified — File Number 16661-63 Manufacturing facility is registered to ISC	0 9000	<€			6 - P -
Finger protection at terminals	IP2X according to IEC 529 Terminal identification per CENELEC EN	N 50013				
Enclosure ratings	Suitable for use in NEMA Types 1, 3, 3F only unless used with protective rubber of	R, 3S, 4, 4X, 12, and 13 encl cap accessory.) IP66 per IEC	osures. (Multi-fun 529, when moun	ction push buttons a led in enclosures wi	are suitable for NEM th equal or superior	A Type 1 enclosures seal.
Ambient temperature	Operating - 13° to +158°F - 25° to +70°C	<u>Storage</u> -40° to 158°F -40° to +70°C				
Climate suitability/humidity	Climate Type Temperature Wet Hot Wet Variable Wet	Temperature 74°F (23°C) 74°F (23°C) 74°F (23°C) 104°F (40°C) 74° to 104°F (23° to 40°C)	B	elative Humidity 50% 83% 92% 83% to 92%	588	20
Resistance to vibration	Per IEC 68-2-6. 16g with a frequency fro	m 40-500 Hz and maximum (peak-to-peak amp	blitude of 0.75mm.		
Resistance to shock	According to MIL 202B, method 202A. other operators.	Test was performed for 1/2 s	inusoid for 11ms,	38g max for all ope	rators with transform	ners and 100g for all
Operating force	Standard push button operator: 2.5 lbs. Each contact block: 1.3 lbs. (6 N) Selector switch operator: 2.4 in./lb. (0.27					
Wire Terminals						
Wire capacity and terminal torque requirements (for all power supplies and contact blocks)	Parallel Conductor Size	e Combinations (Stranded #12 with #14 #14 with #16 #16 with #18 #16 with #20 #16 with #22 #18 with #22 #18 with #22 #20 with #22	or Solid Wire)		12 12 12 12 12 10-11 10-11	al Torque in./lb. in./lb. in./lb. in./lb. 2 in./lb. 2 in./lb. 2 in./lb.
Quick connect terminals	Suitable for one female tab connector mi 0.8 mm).	easuring 0.25 x 0.03 inches (6	5.35 x 0:8 mm) or	two female tab conr	nectors measuring 0).11 x 0.03 inches (2.8)
Contact Data						
Electrical reliability data	Electrical life and reliability in low level cu operations.)	rrent: 80 million operations a	t 12V, 5mA, resist	ive load. (32 contact	s tested successful	ly for 2.5 million
Dust resistance	In extremely dusty environments, electric life at low level current is 10 million opera			at 12 V, 5mA, resis	tive load. In a clean	environment, electrical
Thermal current	Ith = 10A per IEC 947-5-1					
Insulation voltage	Ui = 660 Volts ac/dc (opposite polarity) e	except 2NO and 2NC blocks	300 Vac/dc			
Protection from electrical shock	Class I per IEC 536 for metal operators Class II (double insulation) per IEC 536 fe	or plastic operators		· · · · · ·		
nsulation category	Group "C" per VDE 0110					
	Group "C" per VDE 0110 2500 Volts					
Dielectric strength						
Insulation category Dielectric strength Short circuit protection Pilot duty ratings	2500 Volts 10A type gG fuse, per IEC 269.1 & 269.3 A600 (maximum make volt-amperes = 7 Volts (V) 12 Continuous (A) 10	second an an an an addition of the second se	nperes = 720; PF 120 10 60 6	= .25) 240 480 10 10 30 15 3 1.5	600 10 12 1.2	

6

GE Push Buttons

Section 9



The GE push button offering includes a complete line of control units and stations in both full size push buttons (30 mm) and in miniature size devices (22 mm) which are designed to be used in numerous types of industrial applications.

The CR104P full-size, heavy-duty oiltight and watertight line is complete with a variety of accessories and enclosures.

Light Tower Status Indicating Lights provide information at a glance in industrial or commercial environments where you need to transmit and receive information across a distance. Modularity and versatility make them valuable in a broad range of applications.

GE's C-2000[™] 22mm Global Push Buttons are designed to be applied in just about any application worldwide. C-2000 push buttons conform to all major world standards and are UL listed and CSA Certified. All devices except the double push button are rated for NEMA 1, 3, 3R, 3S, 4, 4X, 12, 13, and IP66 when mounted in a suitable enclosure. C-2000 push buttons are manufactured in an ISO 9000 facility, assuring you that these products comply with quality standards that are recognized worldwide. Pre-engraved nameplates are available in French, Spanish, Italian, German, and English. The C-2000 push button line is globally available under the same catalog numbers, packaging, and markings anywhere in the world.

An entire listing of CR2943 and CR2941 standard-duty push

 button control stations is available, suitable for NEMA Type 1, 4, 4X, and 7 and 9 applications.



Heavy-Duty 30mm Push Buttons, Selector Switches, Indicating Lights, Accessories (CR104P Series)	36
Light Tower Status Indicating Lights (SL Series)	47
C-2000™ 22mm Global Push Buttons (P9 Series)	00
Standard-Duty Push Button Control Stations (CR2943 and CR2941 Series)	03
Palm Switches	54

References:

See Publication Index, Section 18.