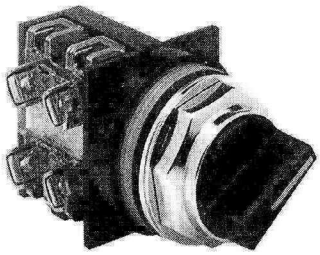
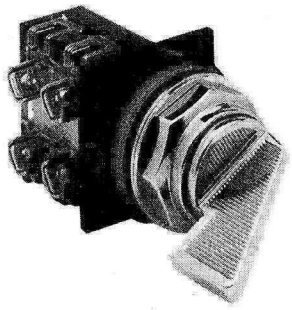
CR104P Heavy-Duty, Nonilluminated Selector Switches

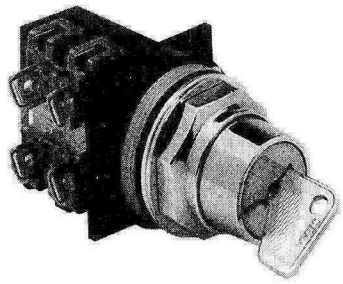
600 Volts Maximum AC/DC
10 Amperes Continuous
Suitable for use in NEMA Type 1, 3, 3R, 4, 4X, 12, and 13 Applications ①



Knob-Operated Selector Switch



Lever-Operated Selector Switch



Cylinder Lock Selector Switch

2-Position, Nonilluminated Knob-, Lever-, and Cylinder Lock-Operated Selector Switches

Units are supplied factory-assembled when ordered with contact blocks.

Viewed From Front of Panel		Contact Block	Catalog Numbers and Prices								
Contacts	Operator Position		Standard Knob, Black② CR104	**List Price, GO-10P1**	Wing Lever, Chrome③ CR104	**List Price, GO-0P1**	Cylinder Lock, Remove Key from:				
Left Right	O = Open X = Closed						Left Only CR104	Right Only CR104	Left and Right CR104	Center Only CR104	**List Price, GO-10P1**
Maintained											
Operator Only	↖ ↗	None	PSG21B	**$22.20**	PSM21	**$22.20**	PSK21A00L	PSK21A00R	PSK21A00M	—	**$ 58.20**
NC / NO	NC X O NO O X	1NO-1NC 1NO-1NC	PSG21B91 —	**40.20** —	PSM21A91 —	**40.20** —	PSK21A91L PSK21A91L51④	PSK21A91R PSK21A91R51④	PSK21A91M PSK21A91M51④	— —	**76.20** **88.20**
NC NC / NO NO	L-NC X O L-NO O X R-NC X O R-NO O X	2NO-2NC	PSG21B92	**58.20**	PSM21A92	**58.20**	PSK21A92L	PSK21A92R	PSK21A92M	—	**94.20**
Spring Return Left To Center											
Operator Only	↖ ↑	None	PSG12B	**34.20**	PSM12	**34.20**	—	—	—	PSK12A00C	**70.20**
NC / NO	NC O X NO X O	1NO-1NC 1NO-1NC	PSG12B91 —	**52.20** —	PSM12A91 —	**52.20** —	— —	— —	— —	PSK12A91C PSK12A91C51④	**88.20** **100.20**
NC NC / NO NO	L-NC O X L-NO X O R-NC O X R-NO X O	2NO-2NC	PSG12B92	**70.20**	PSM12A92	**70.20**	—	—	—	PSK12A92C	**106.20**
Spring Return Right To Center											
Operator Only	↑ ↗	None	PSG63B	**34.20**	PSM63	**34.20**	—	—	—	PSK63A00C	**70.20**
NC / NO	NC X O NO O X	1NO-1NC 1NO-1NC	PSG63B91 —	**52.20** —	PSM63A91 —	**52.20** —	— —	— —	— —	PSK63A91C PSK63A91C51④	**88.20** **100.20**
NC NC / NO NO	L-NC X O L-NO O X R-NC X O R-NO O X	2NO-2NC	PSG63B92	**70.20**	PSM63A92	**70.20**	—	—	—	PSK63A92C	**106.20**

Notes: Catalog Number and price do not include nameplate. All nameplates must be ordered as a separate item from pages 9-33 and 9-34. Two keys included with each cylinder lock.

① When mounted in enclosures rated for those same applications. For some NEMA Type 4X applications, protective caps will improve corrosion resistance.

② To order knob in a color other than black, replace the "B" in listed Catalog Numbers with E (Yellow), G (Green), L (Blue), or R (Red).

③ To order black wing lever, replace "A" in Catalog Number with "B" before 91 or 92 contact digits. Example: the Catalog Number for a maintained, 1NO-1NC, operator with black wing lever is CR104PSM21**B**91.

④ CH501 keyed cylinder lock. Other listed cylinder locks are alike and use identical keys. Dissimilar locks are also available; contact nearest GE Industrial Systems—Electrical Distribution and Control Representative.

Nameplates and Legend Inserts ..... **pages 9-33, 9-34**
Technical Data ..... **pages 9-3 to 9-5**
Drilling Plan and Dimensions ..... **page 9-4**
Extra Keys for Cylinder Lock Selector Switches ..... **page 9-32**

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.

References:
See Publication Index, Section 18.

CR104P Heavy-Duty Push Buttons

600 Volts Maximum AC/DC
10 Amperes Continuous

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, 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	Operating: -25° to +70°C / -13° to +158°F Storage: -40° to +70°C / -40° to +158°F
Climate suitability/ humidity	Temperate: 74°F (23°C), 50% Wet: 74°F (23°C), 83% Hot Wet: 104°F (40°C), 92% Variable Wet: 74° to 104°F (23° to 40°C), 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	Without contact blocks: 1.625 lb./f. / 2.5 lb./f. With 1NO contact block: 2.5 lb./f. / 2.875 lb./f. With 2 NO contact blocks: 3.5 lb./f. / 3.5 lb./f. With 3 NO contact blocks: 4.0 lb./f. / 4.375 lb./f.
Wire size	22-12 AWG stranded or solid copper wire
Torque requirements	Terminal screws: 10-14 in./lb. Contact block mounting screws: 10-14 in./lb.

Contacts

Electrical reliability data	With indicating light loads, tested for 5,000,000 operations at 40mA and 115 V resistive loads with no failures observed.
Electrical characteristics	Thermal current: 10A per IEC 947-5-1 Insulation voltage: Ui = 660 Vac/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: 2500 V Short-circuit protection: 10A time-delay fuse gG per IEC 269.1 & 269.3
Finger-safe terminals	Available for silver and gold single- and double-circuit 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		
125 V	250 V	600 V
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-.15A	.001-.15A
Resistive, watts (VA)	8 VA maximum	4.5 VA maximum

Power supply resistor values

Input	Resistor value
120 Vac/dc	750 ohms ±5%, 5 watts, 2 resistors in series
240 Vac/dc	2700 ohms ±5%, 5 watts, 2 resistors in series

CR104P Heavy-Duty Push Buttons

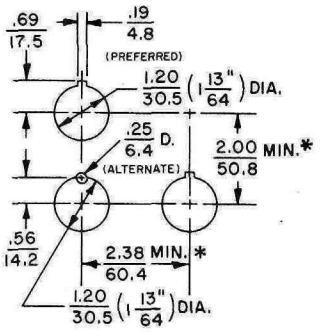
600 Volts Maximum AC/DC
10 Amperes Continuous

Technical Data, Dimensions

Mounting

CR104P push buttons are designed for front mounting, with or without nameplates, in 1 13/64" diameter holes. Operators are provided with an octagonal ring, spacers, and gaskets to ensure an oiltight, uniform front protrusion.

Drilling Plan Dual Dimensions Inches / Millimeters



Acceptable panel thickness	0.04 - 0.25 inches (1.02 - 6.35mm)

Mechanical Life Ratings

Operator	Number of Operations
Standard push buttons	3,000,000
Illuminated push buttons (including push-on/push-off)	1,000,000
Momentary mushroom-head push buttons	3,000,000
Maintained & push-to-latch, turn-to-release mushroom-head push buttons	500,000
Selector switches (all)	1,000,000
Joysticks	500,000
Toggle switches	500,000
Wobble sticks	1,000,000
Key-operated push buttons	500,000
Selector push buttons	1,000,000
Time-delay push buttons	1,000,000

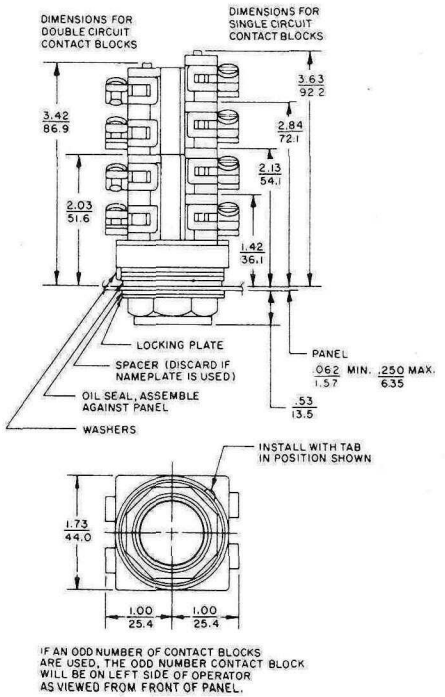
Electrical Life Ratings

Push buttons—5,000,000 operations
Selector switches—500,000 operations

Maximum Contacts

Operator	Single Circuit		Double Circuit	
	Blocks	Contacts	Blocks	Contacts
Nonilluminated selector switches (excluding 4-position)	6	6	6	12
Combination (push-turn)	6	6	6	12
Nonilluminated momentary push buttons (incl. mushroom-head)	8	8	4	8
Illuminated momentary push buttons	4	4	2	4
Push-to-latch/turn-to-release mushroom-head push buttons	4	4	4	8
Cylinder lock push buttons	4	4	4	8
Illuminated selector switches	4	4	2	4
3-position & 5-position joysticks	4	4	4	8
Push-pull illuminated mushroom-head push buttons	2	2	2	4
Push-pull nonilluminated mushroom-head push buttons	2	2	2	4
Nonilluminated 4-position selector switches	—	—	2	4
Push-push illuminated push buttons	2	2	—	—

Dual Dimensions Inches / Millimeters (For Estimating Only)



For dimensional information on other operators, contact nearest GE Industrial Systems—Electrical Distribution and Control Representative. Manufacturing tolerances apply to all untoleranced dimensions.

Panel thickness (inches)	No. of washers required
.062	3
.093	2
.125	2
.188	1
.25	0

Materials

Component	Material
Cap (nonilluminated)	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

CR104P Heavy-Duty Selector Switches

600 Volts Maximum AC/DC
10 Amperes Continuous

Cam Logic

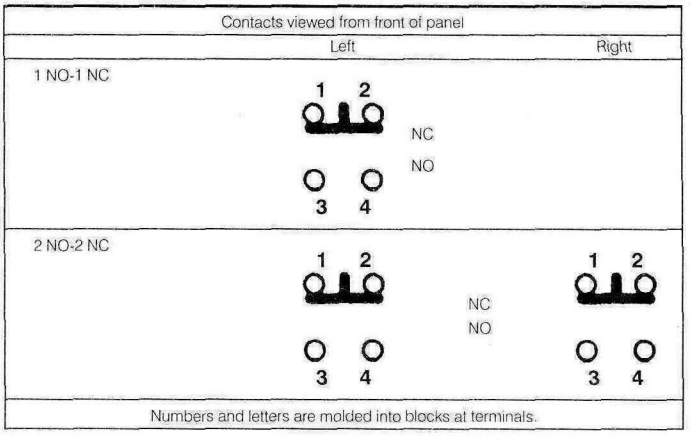
2-Position Selector Switches

			Illuminated or Nonilluminated		Nonilluminated Only		Nonilluminated Only	
			Cam #1		Cam #2		Cam #3	
Operator Position	↖	↑	↗	Type of Contact Block	Mounting Location Left-Right	Type of Contact Block	Mounting Location Left-Right	Type of Contact Block	Mounting Location Left-Right
Contact State	O	—	X	NO	L or R	—		—	
	X	—	O	NC	L or R	—		—	
	X	O	—	—		NO	L or R	—	
	O	X	—	—		NC	L or R	—	
	—	X	O	—		—		NO	L or R
	—	O	X	—		—		NC	L or R

In the catalog number of a 2-position selector switch, the cam is identified by the fifth figure after the "104". Example: CR104PSG21B, the cam number is 1.

Schematic Diagrams

CR104PS Selector Switches



3-Position Selector Switch

				Illuminated or Nonilluminated		Nonilluminated Only		Illuminated or Nonilluminated		Nonilluminated Only		Illuminated or Nonilluminated	
				Cam #2		Cam #3		Cam #4		Cam #5		Cam #6	
Operator Position	↖	↑	↗	Type of Contact Block	Mounting Location Left-Right	Type of Contact Block	Mounting Location Left-Right	Type of Contact Block	Mounting Location Left-Right	Type of Contact Block	Mounting Location Left-Right	Type of Contact Block	Mounting Location Left-Right
Contact State	O	O	X	—	—	NO	L or R	NO	L or R	NO	L or R	NO	Left
	O	X	O	NC	L or R	NC	L or R	—	—	NC	Right	2-NC	L+R (IN SERIES) ①
	X	O	O	NO	L or R	—	—	NC	L or R	NC	Left	NO	Right
	X	X	O	1-NO+1-NC	in parallel ①	—	—	—	—	—	—	NC	Left
	O	X	X	—	—	1-NO+1-NC	in parallel ①	—	—	—	—	NC	Right
	X	O	X	—	—	—	—	1-NO+1-NC	in parallel ①	NO +NC	Right Left in Parallel ①	2 NO	in parallel ①

4-Position Selector Switch

Operator Position	↖	↑	↗	→	Nonilluminated Only Cam #7 Type of Contact Block	Nonilluminated Only Cam #7 Mounting Location Left-Right	Field Wired
Contact State	X	O	O	O	NC	Left	—
	O	O	X	O	NO	Left	—
	O	O	O	X	NC	Right	—
	O	X	O	O	NO	Right	—
	O	O	X	X	NO NC	Left Right	2-in parallel
	O	X	O	X	NO NC	Right Right	2-in parallel
	O	X	X	O	NO NO	Left Right	2-in parallel
	X	O	O	X	NC NC	Left Right	2-in parallel
	X	O	X	O	NO NC	Left Left	2-in parallel
	O	X	X	X	NO NO NC	Left Right Right	3-in parallel
	X	X	X	O	NO NC NO	Left Left Right	3-in parallel
	X	X	O	X	NC NO NC	Left Right Right	3-in parallel
	X	O	X	X	NO NC NC	Left Left Right	3-in parallel

X = Contact is closed. NO = Normally open contact.
O = Contact is open. NC = Normally closed contact.
— = This position is nonexistent or is a "pass-through" position with no detent to stop or hold the knob there.

① Field wired.

In the catalog number of a 3-position nonilluminated selector switch the fifth figure after the "104" is the cam code number. Example: In CR104PSG32B91, the cam number is 2.

Note that an "open" position for an NO contact may **not** be a closed position for an NC contact at the same locaton and knob position. The cam may depress the contact plunger only half way in that position.

Changing cams on operators is not recommended: but, changing contact blocks on operators per above chart may meet a special need.

Example: To provide both X O O and O X O operation, simply add a single-circuit NO contact block (L or R) to a CR104PSG32B01.