

E22 and EM22 Series

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Product Description

Eaton's Cutler-Hammer® 22.5 mm Industrial Heavy-Duty Pushbutton line offers a wide array of functional, smartly styled illuminated and non-illuminated pushbuttons, selector switches, push-pulls, alternate action and twist-to-release operators. The complete line also includes transformer, full voltage, resistor, LED or neon light units.

E22 operators are available with either a traditional chrome or matte black front-of-panel appearance. The space-saving design and modular construction of the E22 line makes on-the-job assembly fast and simplifies the stocking of both components and complete devices.

Eaton's Cutler-Hammer EM22 Metal Series is a rugged line of metal construction 22.5 mm pushbutton devices. They are an extension of the industrially proven E22 Heavy-Duty Double Insulated 22.5 mm pushbutton family.

EM22 operators are heavy-duty zinc die-cast construction plated with a corrosion resistant chromate finish. Operators are complete with a very durable chrome plated metal bezel. Indicating light units in the EM22 Series feature smartly styled round lenses that enhance their appearance and brightness.

All EM22 operators are compatible with existing E22 contact blocks, light units, accessories and enclosures.

EM22 metal operators and indicating lights are grounded when mounted to metal panels through the toothed mounting nut. They are not grounded when mounted to plastic panels.

Features

E22 Operators:

- Heavy-duty oiltight construction
- Chrome metal or black nylon bezels
- Snap-lock contact block mounting

EM22 Operators:

- Heavy-duty zinc die-cast construction
- Metal mounting nut doubles as grounding and anti-rotation device
- Chrome-plated metal bezel (matte black not available)

Common E22 & EM22 Features:

- Reliability nibs on contact blocks
- Plain or notched hole mounting
- Direct opening action \ominus normally closed contacts
- Fingerproof terminals

Benefits

Plastic Devices

- Modular construction makes assembly fast and simplifies stocking of components and complete devices
- Reliability nibs provide positive contact through light, medium or heavy loads
- Chrome finish and plastic construction are corrosion resistant

Metal Devices

- EM22 is backwards compatible with E22 operators
- Metal mounting nut cuts through painted surfaces to provide proper grounding
- Hands-free front of panel mounting reduces installation cost
- Mounting flexibility reduces installation cost, time and inventory
- Stands up well in corrosive environments
- E22 and EM22 compatibility lowers parts count and inventory requirements

Contact Block Operation

Linear make and break. All normally closed (NC) contacts are Direct Opening Action, i.e., NC contacts are physically forced open by direct linkage with the pushbutton operator in the unlikely event of contact weld.

The contact block contacts are provided with "Reliability Nibs." The precisely shaped point of the nib, coined on the silver contact alloy, penetrates dust, film oxide layers and other contaminants. This improves contact reliability even under dry circuit and fine dust conditions.

Logic level contact blocks are available for low power switching — minimum 1 mA @ 5V DC.

Standards and Certifications

- CE EN 60947-5-1
- UL 508 — File No. E131568
- CSA — File No. LR68551

Additional Certifications for Trigger Action E-Stop Devices

- UL Listed E-Stop Device — File No. E217948
- Machinery Safety Directive — EN418
- Semiconductor Manufacturing Equipment — SEMI S2-0200
- DEMKO Third Party Certification — Certificate Nos. 129648-01 and 129648-02

Technical Data and Specifications

Ingress Protection

- UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12 and 13
- IEC IP65

Note: Ratings apply when mounted in enclosures with the same ratings.

Mechanical Endurance Ratings

- Frequency of operation
 - Pushbuttons – 6,000 operations/hr
 - Push-Pulls – 3,000 operations/hr.
 - Push-Push – 1,800 cycles/hr.
 - Selector Switches – 3,000 operations/hr.
 - Trigger-Action E-Stop – 360 cycles/hr.
 - Twist-to-Release – 1,200 cycles/hr
- Mechanical Life
 - Contact Blocks – 3 million operations
 - Pushbuttons – 5 million operations
 - Push-Pulls – 300,000 operations
 - Push-Push – 300,000 operations
 - Selector Switches – 500,000 operations
 - Trigger-Action E-Stop – 100,000 operations
 - Twist-to-Release – 300,000 operations
 - Joysticks — 500,000 operations
- Vibration (IEC 68-2 [BS 2011])
 - Vibration – 5g/0.7 mm peak to peak, 10 sweeps, 10 – 500 Hz
 - Shock – 30g, 18 ms
 - Bump – 25g, 6 ms for 1,000 cycle

Environmental Conditions

- Operating temperature: -4° to +140°F (-20° to +60°C)
- Storage temperature: -40° to +176°F (-40° to +80°C)
- Altitude: Up to 6562 feet (2000m)
- Pollution degree (IEC 947-1): 3
- Humidity: Maximum 95% RH @ 60°C

Terminal Markings

All rear of panel devices are marked with the circuit configuration per CENELEC 50013 standards.

Table 47-29. Contact Blocks

Circuit Configuration	Description	Plunger Color
	1NC	Red
	1NO	Green
	1NO-1NC	White
	2NO	Green
	1NO Early Make	Black
	1NC Late Break	Gray

Table 47-30. Lights Units

Circuit Configuration	Description
	Full Voltage
	Resistor
	Transformer

- E22CB1, E22CB11, E22CB1E, E22B1 and E22B11 contact blocks are marked with Direct Opening Action (DOA) Symbol "⊕" per IEC 60947-5-1, Annex K and NEMA ICS 5, Part 6. For Mechanical Operating Parameters, see **Page 47-69**.

- E22CB1, E22CB11 and E22CB1E contact blocks will be marked as Suitable for Isolation per IEC 60947-5-1.

Contact Block Terminal Clamps

- Clamp type: Self-lifting
- Screw type: Plus/minus, captive
- Wire range: 18 to 12 AWG (0.75 to 4.0 mm²)
- Fingerproof protection: IP2X
- Tightening torque: 7 lb-in (0.8 Nm)

Electrical Ratings

Table 47-31. Contact Block ^①

Description	Meet or Exceed NEMA Contact Rating Designations A600 and Q600							
	A600 (AC) Volts				Q600 (DC) Volts			
	120	240	480	600	125	250	440	600
Make and emergency interrupting capacity (Amp)	60	30	15	12	0.55	0.27	0.1	0.1
Normal load break (Amp)	6	3	1.5	1.2	0.55	0.27	0.1	0.1
Thermal current (Amp)	10	10	10	10	2.5	2.5	2.5	2.5

^① Ratings do not apply to rotary cam switches, see Ratings **Page 47-95**.

- A600, Q600 per UL 508
- AC15, DC13 per IEC 60947-5-1

Logic level contact blocks are UL A600, Q600 and IEC AC15, DC13 rated and also have a minimum rating of 1 mA @ 5V DC.

- Impulse withstand voltage (Uimp): 4 kV

Short Circuit Coordination to IEC/EN 60947-5-1

- Rated conditional short circuit current: 1 kA
- Fuse type: GE Power Controls TIA 10, Red Spot Type gG, 10A, 660V AC, 460V DC, BS88-2, IEC 60269-2-1

Electrical Life

- AC15 durability
 - 120V, 6A – 1 x 10⁶ operations
- DC13 durability
 - 24V, 4A – 0.15 x 10⁶ operations
 - 660V, 0.1A – 0.5 x 10⁶ operations

Material

- Housing, bezel, mounting rings: Glass filled nylon
- Metal bezels: Chrome plated brass
- Internal seal: Nitrile rubber
- Panel gasket: Nitrile rubber
- Illuminated lenses: Polycarbonate
- Buttons: Polyester or polycarbonate
- Contacts: Silver
- Terminals: Brass

Product Selection

Pushbutton Units

- Non-illuminated
- Plastic or Metal Operators













- Black or Chrome Bezel
- Flush, Extended or Mushroom Head Operators

Description

Listed below are commonly ordered complete pushbutton devices including

operator and contact block(s). These devices are shipped as unassembled components overpacked in a single bag. For instructions on how to order devices not listed below using a single composite Catalog Number, refer to **Page 47-95**.

Table 47-32. Pushbutton Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

	Button Color	Contact Block Circuit						
		NO	NC	Price U.S. \$	NO-NC	2NO	2NC	Price U.S. \$
		Catalog Number	Catalog Number		Catalog Number	Catalog Number	Catalog Number	
Plastic Operators — Black Bezel								
	Flush — Momentary							
	Black	E22PB1A	E22PB1B		E22PB1C	E22PB1D	E22PB1E	
	Red	E22PB2A	E22PB2B		E22PB2C	E22PB2D	E22PB2E	
	Extended — Momentary							
	Black	E22EB1A	E22EB1B		E22EB1C	E22EB1D	E22EB1E	
	Red	E22EB2A	E22EB2B		E22EB2C	E22EB2D	E22EB2E	
	40 mm Mushroom — Momentary							
	Black	E22LB1A	E22LB1B		E22LB1C	E22LB1D	E22LB1E	
	Red	E22LB2A	E22LB2B		E22LB2C	E22LB2D	E22LB2E	
	40 mm Twist-to-Release Mushroom — Latching							
	Black	E22LLB1A	E22LLB1B		E22LLB1C	E22LLB1D	E22LLB1E	
	Red	E22LLB2A	E22LLB2B		E22LLB2C	E22LLB2D	E22LLB2E	
	50 mm Jumbo Mushroom — Momentary							
	Black	E22JPB1A	E22JPB1B		E22JPB1C	E22JPB1D	E22JPB1E	
	Red	E22JPB2A	E22JPB2B		E22JPB2C	E22JPB2D	E22JPB2E	
	50 mm Jumbo Mushroom — Maintained							
	Red	E22JLB2N8A	E22JLB2N8B		E22JLB2N8C	E22JLB2N8D	E22JLB2N8E	
	EMERGENCY STOP (Metal)							
Plastic Operators — Chrome Bezel								
	Flush — Momentary							
	Black	E22P1A	E22P1B		E22P1C	E22P1D	E22P1E	
	Red	E22P2A	E22P2B		E22P2C	E22P2D	E22P2E	
	Extended — Momentary							
	Black	E22E1A	E22E1B		E22E1C	E22E1D	E22E1E	
	Red	E22E2A	E22E2B		E22E2C	E22E2D	E22E2E	
	40 mm Mushroom — Momentary							
	Black	E22L1A	E22L1B		E22L1C	E22L1D	E22L1E	
	Red	E22L2A	E22L2B		E22L2C	E22L2D	E22L2E	
	40 mm Twist-to-Release Mushroom — Latching							
	Black	E22LL1A	E22LL1B		E22LL1C	E22LL1D	E22LL1E	
	Red	E22LL2A	E22LL2B		E22LL2C	E22LL2D	E22LL2E	
	50 mm Jumbo Mushroom — Momentary							
	Black	E22JP1A	E22JP1B		E22JP1C	E22JP1D	E22JP1E	
	Red	E22JP2A	E22JP2B		E22JP2C	E22JP2D	E22JP2E	
	50 mm Jumbo Mushroom — Maintained							
	Red	E22JL2N8A	E22JL2N8B		E22JL2N8C	E22JL2N8D	E22JL2N8E	
	EMERGENCY STOP (Metal)							

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 Discount Symbol 1CD1

E22 and EM22 Series, Complete Devices — Pushbutton Units


















Table 47-32. Pushbutton Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13 (Continued)

	Button Color	Contact Block Circuit						
		NO	NC	Price U.S. \$	NO-NC	2NO	2NC	Price U.S. \$
		Catalog Number	Catalog Number		Catalog Number	Catalog Number	Catalog Number	
Metal Operators — Chrome Bezel								
	Flush — Momentary							
	Black	EM22P1A	① EM22P2B		EM22P1C	EM22P1D	① EM22P2E	
	Red	EM22P2A	①		EM22P2C	① EM22P3D	①	
Green	EM22P3A	①		EM22P3C				
	Extended — Momentary							
	Red	EM22E2A	EM22E2B		EM22E2C	①	EM22E2E	
	40 mm Mushroom — Momentary							
	Red	EM22L2A	EM22L2B		EM22L2C	①	EM22L2E	
	40 mm Twist-to-Release Mushroom — Latching							
	Red	EM22LL2A	EM22LL2B		EM22LL2C	①	EM22LL2E	
	50 mm Jumbo Mushroom — Momentary							
	Red	EM22JP2A	EM22JP2B		EM22JP2C	EM22JP2D	EM22JP2E	
	50 mm Jumbo Mushroom — Maintained							
Red	EM22JL2N8A	EM22JL2N8B		EM22JL2N8C	EM22JL2N8D	EM22JL2N8E		
EMERGENCY STOP (Metal)								

① See Page 47-95 for ordering other complete devices not shown.

Pushbutton Components

Table 47-33. Momentary Contact Pushbuttons, Non-Illuminated — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Will Accept Maximum of 3 Contact Blocks (6 Circuits) When Used with Supplied 3-Way Adapter and Optional Operator Plug.			Color	E22 Series — Plastic Operators				EM22 Series — Metal Operators	
				Black Bezel		Chrome Bezel		Chrome Bezel	
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
E22 Black	E22 Chrome	EM22 Chrome	25 mm Diameter Flush Button						
			Black	E22PB1		E22P1		EM22P1	
			Red	E22PB2		E22P2		EM22P2	
			Green	E22PB3		E22P3		EM22P3	
			Yellow	E22PB4		E22P4		EM22P4	
			White	E22PB5		E22P5		EM22P5	
			Blue	E22PB6		E22P6		EM22P6	
			Gray	E22PB7		E22P7		EM22P7	
			Orange	E22PB8		E22P8		EM22P8	
			25 mm Diameter Extended Button						
			Black	E22EB1		E22E1		EM22E1	
			Red	E22EB2		E22E2		EM22E2	
			Green	E22EB3		E22E3		EM22E3	
			Yellow	E22EB4		E22E4		EM22E4	
			White	E22EB5		E22E5		EM22E5	
			Blue	E22EB6		E22E6		EM22E6	
			Gray	E22EB7		E22E7		EM22E7	
			Orange	E22EB8		E22E8		EM22E8	
			25 mm Diameter with Full Shroud						
			Black	—		E22PF1		EM22PF1	
			Red	—		E22PF2		EM22PF2	
			Green	—		E22PF3		EM22PF3	
			Yellow	—		E22PF4		EM22PF4	
			White	—		E22PF5		EM22PF5	
			Blue	—		E22PF6		EM22PF6	
			Gray	—		E22PF7		EM22PF7	
			Orange	—		E22PF8		EM22PF8	
			28 mm Dia. Mushroom Head Button						
			Black	E22MB1		E22M1		EM22M1	
			Red	E22MB2		E22M2		EM22M2	
			Green	E22MB3		E22M3		EM22M3	
			Yellow	E22MB4		E22M4		EM22M4	
			Blue	E22MB6		E22M6		EM22M6	
			40 mm Dia. Mushroom Head Button						
			Black	E22LB1		E22L1		EM22L1	
			Red	E22LB2		E22L2		EM22L2	
			Green	E22LB3		E22L3		EM22L3	
			Yellow	E22LB4		E22L4		EM22L4	
			Blue	E22LB6		E22L6		EM22L6	
			50 mm Dia. Mushroom Head Button — Plastic						
			Black	E22JPB1		E22JP1		EM22JP1	
			Red	E22JPB2		E22JP2		EM22JP2	
			Green	E22JPB3		E22JP3		EM22JP3	
			Yellow	E22JPB4		E22JP4		EM22JP4	
			Blue	E22JPB6		E22JP6		EM22JP6	
			Red (Metal)	E22JB2		E22J2		EM22J2	
			Red (Metal) Engraved EMERGENCY STOP						
				E22JB2N8		E22J2N8		EM22J2N8	

Note: For Rear of Panel Extensions, see Table 47-128 on Page 47-94.

Ordering Example — A complete Pushbutton Unit consists of the following:

 Operator See Above	 Operator Plug E22BA2 Required if 3rd Contact Block Is Used. See Page 47-75	 Legend Plate or Print Option See Pages 47-79 – 47-85	 Mounting Adapter E22BA1 (Supplied with Operator). For 5-Way Adapter, See Page 47-77	 Contact Blocks See Page 47-69
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E22 and EM22 Series, Complete Devices — Illuminated Pushbutton Units

Illuminated Momentary Pushbutton Units



- Plastic or Metal Operators
- Black or Chrome Bezel
- Extended Pushbuttons
- Full Voltage, Resistor or Transformer Light Units
- Plastic Lenses
- Metal Operators available with LED

Table 47-34. Plastic Illuminated Extended Pushbutton Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Description	Button Color	NO	NC	Price U.S. \$	NO-NC	2NO	2NC	Price U.S. \$
		Catalog Number	Catalog Number		Catalog Number	Catalog Number		
Plastic Operators — Black Bezel								
	24V AC/DC Full Voltage							
	Red	E22TB2X4A	E22TB2X4B		E22TB2X4C	E22TB2X4D	E22TB2X4E	
	Green	E22TB3X4A	E22TB3X4B		E22TB3X4C	E22TB3X4D	E22TB3X4E	
	White	E22TB5X4A	E22TB5X4B		E22TB5X4C	E22TB5X4D	E22TB5X4E	
	Blue	E22TB6X4A	E22TB6X4B		E22TB6X4C	E22TB6X4D	E22TB6X4E	
	Amber	E22TB9X4A	E22TB9X4B		E22TB9X4C	E22TB9X4D	E22TB9X4E	
Clear	E22TB0X4A	E22TB0X4B		E22TB0X4C	E22TB0X4D	E22TB0X4E		
	120V AC/DC Resistor Unit							
	Red	E22TB2X10A	E22TB2X10B		E22TB2X10C	E22TB2X10D	E22TB2X10E	
	Green	E22TB3X10A	E22TB3X10B		E22TB3X10C	E22TB3X10D	E22TB3X10E	
	White	E22TB5X10A	E22TB5X10B		E22TB5X10C	E22TB5X10D	E22TB5X10E	
	Blue	E22TB6X10A	E22TB6X10B		E22TB6X10C	E22TB6X10D	E22TB6X10E	
	Amber	E22TB9X10A	E22TB9X10B		E22TB9X10C	E22TB9X10D	E22TB9X10E	
Clear	E22TB0X10A	E22TB0X10B		E22TB0X10C	E22TB0X10D	E22TB0X10E		
	120V Transformer AC — 50/60 Hz							
	Red	E22TB2X11A	E22TB2X11B		E22TB2X11C	E22TB2X11D	E22TB2X11E	
	Green	E22TB3X11A	E22TB3X11B		E22TB3X11C	E22TB3X11D	E22TB3X11E	
	White	E22TB5X11A	E22TB5X11B		E22TB5X11C	E22TB5X11D	E22TB5X11E	
	Blue	E22TB6X11A	E22TB6X11B		E22TB6X11C	E22TB6X11D	E22TB6X11E	
	Amber	E22TB9X11A	E22TB9X11B		E22TB9X11C	E22TB9X11D	E22TB9X11E	
Clear	E22TB0X11A	E22TB0X11B		E22TB0X11C	E22TB0X11D	E22TB0X11E		
Plastic Operators — Chrome Bezel								
	24V AC/DC Full Voltage							
	Red	E22T2X4A	E22T2X4B		E22T2X4C	E22T2X4D	E22T2X4E	
	Green	E22T3X4A	E22T3X4B		E22T3X4C	E22T3X4D	E22T3X4E	
	White	E22T5X4A	E22T5X4B		E22T5X4C	E22T5X4D	E22T5X4E	
	Blue	E22T6X4A	E22T6X4B		E22T6X4C	E22T6X4D	E22T6X4E	
	Amber	E22T9X4A	E22T9X4B		E22T9X4C	E22T9X4D	E22T9X4E	
Clear	E22T0X4A	E22T0X4B		E22T0X4C	E22T0X4D	E22T0X4E		
	120V AC/DC Resistor Unit							
	Red	E22T2X10A	E22T2X10B		E22T2X10C	E22T2X10D	E22T2X10E	
	Green	E22T3X10A	E22T3X10B		E22T3X10C	E22T3X10D	E22T3X10E	
	White	E22T5X10A	E22T5X10B		E22T5X10C	E22T5X10D	E22T5X10E	
	Blue	E22T6X10A	E22T6X10B		E22T6X10C	E22T6X10D	E22T6X10E	
	Amber	E22T9X10A	E22T9X10B		E22T9X10C	E22T9X10D	E22T9X10E	
Clear	E22T0X10A	E22T0X10B		E22T0X10C	E22T0X10D	E22T0X10E		
	120V Transformer AC — 50/60 Hz							
	Red	E22T2X11A	E22T2X11B		E22T2X11C	E22T2X11D	E22T2X11E	
	Green	E22T3X11A	E22T3X11B		E22T3X11C	E22T3X11D	E22T3X11E	
	White	E22T5X11A	E22T5X11B		E22T5X11C	E22T5X11D	E22T5X11E	
	Blue	E22T6X11A	E22T6X11B		E22T6X11C	E22T6X11D	E22T6X11E	
	Amber	E22T9X11A	E22T9X11B		E22T9X11C	E22T9X11D	E22T9X11E	
Clear	E22T0X11A	E22T0X11B		E22T0X11C	E22T0X11D	E22T0X11E		

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 Discount Symbol 1CD1

Table 47-35. Metal Illuminated Pushbutton Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13









	Button Color	NO Contact Block				NC Contact Block			
		Incandescent		LED		Incandescent		LED	
		Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Metal Operators — Chrome Bezel									
	24V AC/DC Full Voltage								
	Red	EM22T2X4A		EM22T2X40A		EM22T2X4B		EM22T2X40B	
	Green	EM22T3X4A		EM22T3X41A		EM22T3X4B		EM22T3X41B	
	White	EM22T5X4A		EM22T5X90A		EM22T5X4B		EM22T5X90B	
	Blue	EM22T6X4A		EM22T6X52A		EM22T6X4B		EM22T6X52B	
	Amber	EM22T9X4A		EM22T9X95A		EM22T9X4B		EM22T9X95B	
	Clear	EM22T0X4A		EM22T0X90A		EM22T0X4B		EM22T0X90B	
	120V AC Full Voltage								
	Red	—		EM22T2X43A		—		EM22T2X43B	
	Green	—		EM22T3X44A		—		EM22T3X44B	
	White	—		EM22T5X92A		—		EM22T5X92B	
	Blue	—		EM22T6X61A		—		EM22T6X61B	
	Amber	—		EM22T9X96A		—		EM22T9X96B	
	Clear	—		EM22T0X92A		—		EM22T0X92B	
	120V AC/DC Resistor Unit								
Red	EM22T2X10A		—		EM22T2X10B		—		
Green	EM22T3X10A		—		EM22T3X10B		—		
White	EM22T5X10A		—		EM22T5X10B		—		
Blue	EM22T6X10A		—		EM22T6X10B		—		
Amber	EM22T9X10A		—		EM22T9X10B		—		
Clear	EM22T0X10A		—		EM22T0X10B		—		
	120V AC Transformer — 50/60 Hz								
	Red	EM22T2X11A		EM22T2X433A		EM22T2X11B		EM22T2X433B	
	Green	EM22T3X11A		EM22T3X444A		EM22T3X11B		EM22T3X444B	
	White	EM22T5X11A		EM22T5X922A		EM22T5X11B		EM22T5X922B	
	Blue	EM22T6X11A		EM22T6X611A		EM22T6X11B		EM22T6X611B	
	Amber	EM22T9X11A		EM22T9X966A		EM22T9X11B		EM22T9X966B	
	Clear	EM22T0X11A		EM22T0X922A		EM22T0X11B		EM22T0X922B	

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E22 and EM22 Series, Illuminated Pushbutton Components

Illuminated Pushbutton Components

Table 47-36. Illuminated Pushbutton and PresTest Indicating Light Operators — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Will Accept Maximum of 2 Contact Blocks (4 Circuits) When Used with Supplied 3-Way Adapter			Color	E22 Series — Plastic Operators				EM22 Series — Metal Operators		
				Black Bezel		Chrome Bezel		Chrome Bezel		
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	
			25 mm Diameter Flush Lens							
			Red	E22NB2		E22N2		EM22N2		
			Green	E22NB3		E22N3		EM22N3		
			Yellow	E22NB4		E22N4		EM22N4		
			White	E22NB5		E22N5		EM22N5		
			Blue	E22NB6		E22N6		EM22N6		
			Amber	E22NB9		E22N9		EM22N9		
			Clear	E22NB0		E22N0		EM22N0		
			25 mm Diameter Extended Lens							
			Red	E22TB2		E22T2		EM22T2		
			Green	E22TB3		E22T3		EM22T3		
			Yellow	E22TB4		E22T4		EM22T4		
			White	E22TB5		E22T5		EM22T5		
			Blue	E22TB6		E22T6		EM22T6		
			Amber	E22TB9		E22T9		EM22T9		
			Clear	E22TB0		E22T0		EM22T0		
			25 mm Dia. Extended ^① Lens with Shroud							
			Red	—		E22TX2		EM22TX2		
			Green	—		E22TX3		EM22TX3		
			Yellow	—		E22TX4		EM22TX4		
			White	—		E22TX5		EM22TX5		
			Blue	—		E22TX6		EM22TX6		
			Amber	—		E22TX9		EM22TX9		
			Clear	—		E22TX0		EM22TX0		

^① If a Flush Lens type is required instead of Extended, substitute **N** for **T** in listed Catalog Number.
 Example: E22NX2 — Red flush illuminated pushbutton with full shroud. Chrome version only.

Note: For Rear of Panel Extensions, see **Table 47-128** on **Page 47-94**.

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Alternate-Action (Push-Push) Pushbutton Units

- Non-illuminated or Illuminated
- Plastic or Metal Operators
- Black or Chrome Bezel
- Flush or Extended Operators

Description
Listed below are commonly ordered complete pushbutton devices including operator and contact block(s). These devices are shipped as unassembled

components overpacked in a single bag. For instructions on how to order devices not listed below using a single composite Catalog Number, refer to **Page 47-95**.

Table 47-37. E22 and EM22 Series Non-illuminated Flush and Extended Alternate-Action Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

	Button Color	Contact Block Circuit						
		NO	NC	Price U.S. \$	NO-NC	2NO	2NC	Price U.S. \$
		Catalog Number	Catalog Number		Catalog Number	Catalog Number	Catalog Number	
E22 Series — Plastic Operators — Black Bezel								
	Flush							
	Black	E22PPB1A	E22PPB1B		E22PPB1C	E22PPB1D	E22PPB1E	
	White	E22PPB5A	E22PPB5B		E22PPB5C	E22PPB5D	E22PPB5E	
Gray	E22PPB7A	E22PPB7B		E22PPB7C	E22PPB7D	E22PPB7E		
	Extended							
	Black	E22EPB1A	E22EPB1B		E22EPB1C	E22EPB1D	E22EPB1E	
	White	E22EPB5A	E22EPB5B		E22EPB5C	E22EPB5D	E22EPB5E	
Gray	E22EPB7A	E22EPB7B		E22EPB7C	E22EPB7D	E22EPB7E		
E22 Series — Plastic Operators — Chrome Bezel								
	Flush							
	Black	E22PP1A	E22PP1B		E22PP1C	E22PP1D	E22PP1E	
	White	E22PP5A	E22PP5B		E22PP5C	E22PP5D	E22PP5E	
Gray	E22PP7A	E22PP7B		E22PP7C	E22PP7D	E22PP7E		
	Extended							
	Black	E22EP1A	E22EP1B		E22EP1C	E22EP1D	E22EP1E	
	White	E22EP5A	E22EP5B		E22EP5C	E22EP5D	E22EP5E	
Gray	E22EP7A	E22EP7B		E22EP7C	E22EP7D	E22EP7E		
EM22 Series — Metal Operators — Chrome Bezel								
	Flush							
	Black	EM22PP1A	EM22PP1B		EM22PP1C	EM22PP1D	EM22PP1E	
	White	EM22PP5A	EM22PP5B		EM22PP5C	EM22PP5D	EM22PP5E	
Gray	EM22PP7A	EM22PP7B		EM22PP7C	EM22PP7D	EM22PP7E		
	Extended							
	Black	EM22EP1A	EM22EP1B		EM22EP1C	EM22EP1D	EM22EP1E	
	White	EM22EP5A	EM22EP5B		EM22EP5C	EM22EP5D	EM22EP5E	
Gray	EM22EP7A	EM22EP7B		EM22EP7C	EM22EP7D	EM22EP7E		

Note: In order to comply with NFPA 79 and IEC 60204-1 requirements:

The colors black, white or gray shall be used for Push-Push operators which act alternately as START/ON and STOP/OFF pushbuttons.

Push-Push operators shall only be used for functions which can not result in a hazardous condition.

IEC 60204-1 recommends that Push-Push operators acting alternately as START/ON and STOP/OFF pushbuttons be marked with the printed legend N124.

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E22 and EM22 Series, Complete Devices — Push-Push Units

Table 47-38. Illuminated Bezel Flush Assembled Push-Push Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

	Button Color	Contact Block Circuit						Price U.S. \$
		NO	NC	NO-NC	2NO	2NC		
		Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number		
Plastic Operators — Chrome Bezel								
	24V AC/DC Full Voltage, Flush, Illuminated Bezel							
	Red	E22TP2X4A	E22TP2X4B	E22TP2X4C	E22TP2X4D	E22TP2X4E		
	Green	E22TP3X4A	E22TP3X4B	E22TP3X4C	E22TP3X4D	E22TP3X4E		
	White	E22TP5X4A	E22TP5X4B	E22TP5X4C	E22TP5X4D	E22TP5X4E		
	Blue	E22TP6X4A	E22TP6X4B	E22TP6X4C	E22TP6X4D	E22TP6X4E		
	Amber Clear	E22TP9X4A E22TP0X4A	E22TP9X4B E22TP0X4B	E22TP9X4C E22TP0X4C	E22TP9X4D E22TP0X4D	E22TP9X4E E22TP0X4E		
	120V AC/DC Resistor, Flush, Illuminated Bezel							
	Red	E22TP2X10A	E22TP2X10B	E22TP2X10C	E22TP2X10D	E22TP2X10E		
	Green	E22TP3X10A	E22TP3X10B	E22TP3X10C	E22TP3X10D	E22TP3X10E		
	White	E22TP5X10A	E22TP5X10B	E22TP5X10C	E22TP5X10D	E22TP5X10E		
	Blue	E22TP6X10A	E22TP6X10B	E22TP6X10C	E22TP6X10D	E22TP6X10E		
	Amber Clear	E22TP9X10A E22TP0X10A	E22TP9X10B E22TP0X10B	E22TP9X10C E22TP0X10C	E22TP9X10D E22TP0X10D	E22TP9X10E E22TP0X10E		
	120V AC Transformer — 50/60 Hz, Flush, Illuminated Bezel							
	Red	E22TP2X11A	E22TP2X11B	E22TP2X11C	E22TP2X11D	E22TP2X11E		
	Green	E22TP3X11A	E22TP3X11B	E22TP3X11C	E22TP3X11D	E22TP3X11E		
	White	E22TP5X11A	E22TP5X11B	E22TP5X11C	E22TP5X11D	E22TP5X11E		
	Blue	E22TP6X11A	E22TP6X11B	E22TP6X11C	E22TP6X11D	E22TP6X11E		
	Amber Clear	E22TP9X11A E22TP0X11A	E22TP9X11B E22TP0X11B	E22TP9X11C E22TP0X11C	E22TP9X11D E22TP0X11D	E22TP9X11E E22TP0X11E		
Metal Operators — Chrome Bezel								
	24V AC/DC Full Voltage Unit, Flush, Illuminated Bezel							
	Red	EM22TP2X4A	EM22TP2X4B	EM22TP2X4C	EM22TP2X4D	EM22TP2X4E		
	Green	EM22TP3X4A	EM22TP3X4B	EM22TP3X4C	EM22TP3X4D	EM22TP3X4E		
	White	EM22TP5X4A	EM22TP5X4B	EM22TP5X4C	EM22TP5X4D	EM22TP5X4E		
	Blue	EM22TP6X4A	EM22TP6X4B	EM22TP6X4C	EM22TP6X4D	EM22TP6X4E		
	Amber Clear	EM22TP9X4A EM22TP0X4A	EM22TP9X4B EM22TP0X4B	EM22TP9X4C EM22TP0X4C	EM22TP9X4D EM22TP0X4D	EM22TP9X4E EM22TP0X4E		
	120V AC/DC Resistor Unit, Flush, Illuminated Bezel							
	Red	EM22TP2X10A	EM22TP2X10B	EM22TP2X10C	EM22TP2X10D	EM22TP2X10E		
	Green	EM22TP3X10A	EM22TP3X10B	EM22TP3X10C	EM22TP3X10D	EM22TP3X10E		
	White	EM22TP5X10A	EM22TP5X10B	EM22TP5X10C	EM22TP5X10D	EM22TP5X10E		
	Blue	EM22TP6X10A	EM22TP6X10B	EM22TP6X10C	EM22TP6X10D	EM22TP6X10E		
	Amber Clear	EM22TP9X10A EM22TP0X10A	EM22TP9X10B EM22TP0X10B	EM22TP9X10C EM22TP0X10C	EM22TP9X10D EM22TP0X10D	EM22TP9X10E EM22TP0X10E		
	120V AC Transformer Unit, Flush, Illuminated Bezel							
	Red	EM22TP2X11A	EM22TP2X11B	EM22TP2X11C	EM22TP2X11D	EM22TP2X11E		
	Green	EM22TP3X11A	EM22TP3X11B	EM22TP3X11C	EM22TP3X11D	EM22TP3X11E		
	White	EM22TP5X11A	EM22TP5X11B	EM22TP5X11C	EM22TP5X11D	EM22TP5X11E		
	Blue	EM22TP6X11A	EM22TP6X11B	EM22TP6X11C	EM22TP6X11D	EM22TP6X11E		
	Amber Clear	EM22TP9X11A EM22TP0X11A	EM22TP9X11B EM22TP0X11B	EM22TP9X11C EM22TP0X11C	EM22TP9X11D EM22TP0X11D	EM22TP9X11E EM22TP0X11E		

Note: In order to comply with NFPA 79 and IEC 60204-1 requirements:

The colors black, white or gray shall be used for Push-Push operators which act alternately as START/ON and STOP/OFF pushbuttons. White shall be used for illuminated Push-Push operators.

Push-Push operators shall only be used for functions which can not result in a hazardous condition.

IEC 60204-1 recommends that Push-Push operators acting alternately as START/ON and STOP/OFF pushbuttons be marked with the printed legend N124.












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Alternate Action (Push-Push) Components

Non-illuminated and Illuminated Push-Push Operators

Note: Will accept a maximum of 2 contact blocks when used with supplied 3-way adapter, 5-way mounting adapters are not to be used.

Table 47-39. Push-Push Operators — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

	E22 Series — Plastic Operators				EM22 Series — Metal Operators	
	Black Bezel		Chrome Bezel		Chrome Bezel	
Flush, Non-illuminated						
						
Color	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Black White Gray	E22PPB1 E22PPB5 E22PPB7		E22PP1 E22PP5 E22PP7		EM22PP1 EM22PP5 EM22PP7	
Extended, Non-illuminated						
						
Color	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Black White Gray	E22EPB1 E22EPB5 E22EPB7		E22EP1 E22EP5 E22EP7		EM22EP1 EM22EP5 EM22EP7	
Flush, Illuminated						
						
Color	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
White Clear Red Green Blue Amber	E22NPB5 E22NPB0 E22NPB2 E22NPB3 E22NPB6 E22NPB9		E22NP5 E22NP0 E22NP2 E22NP3 E22NP6 E22NP9		EM22NP5 EM22NP0 EM22NP2 EM22NP3 EM22NP6 EM22NP9	
Flush, Illuminated with Lens Guard						
						
Color	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
White Clear Red Green Blue Amber	— — — — — —		E22TP5 E22TP0 E22TP2 E22TP3 E22TP6 E22TP9		EM22TP5 EM22TP0 EM22TP2 EM22TP3 EM22TP6 EM22TP9	

Note: In order to comply with NFPA 79 and IEC 60204-1 requirements:

The colors black, white or gray shall be used for Push-Push operators which act alternately as START/ON and STOP/OFF pushbuttons. White shall be used for illuminated Push-Push operators.

Push-Push operators shall only be used for functions which cannot result in a hazardous condition.

IEC 60204-1 recommends that Push-Push operators acting alternately as START/ON and STOP/OFF pushbuttons be marked with the IEC symbol for Push-Push pushbuttons. To order with legend, add Suffix **N124** to operator Catalog Number. Example: E22PPB1**N124**

Note: For Rear of Panel Extensions, see **Table 47-128** on **Page 47-94**.

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Alternate Action (Push-Push) Components (Continued)

Contact Block Selection/Application

Non-illuminated Push-Push operators will accept a maximum of 2 contact blocks (singles or duals). 5-way mounting adapters are not suitable with Push-Push operators. Illuminated Push-Push operators will accept a maximum of 2 contact blocks (singles or duals) and one light unit.

Table 47-40. Push-Push Operators

Contact Block Required			Circuit	Circuit Operation ①	
Suffix Code	Catalog Number	Price U.S. \$		Push-ON	Push-OFF
B	E22B1		1NC	O	X
A	E22B2		1NO	X	O
W	E22B11		1NO-1NC	X	O
				O	X
V	E22B20		2NO	X	O
				X	O

① X = Closed Circuit
O = Open Circuit

Note: Add Contact Block Suffix Code from tables above to operator Catalog Number to order as a complete device. Example: E22EP1B = chrome bezel, Black button Push-Push with 1NC contact block.

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Trigger Action Emergency Stop Pushbutton Units — EN 418 Compliant

The European Machinery Safety Directive EN 418 requires all emergency OFF devices to be self-latching types and to have positive (direct) opening operation. Devices have to be manually reset. Actuators shall be mushroom head type and colored RED. The background immediately around the device actuator should be colored YELLOW. See Page 47-42 for yellow guard.

The new E22 trigger action operators in conjunction with yellow nameplates and DOA (Direct Opening Action) con-

tact blocks are fully compliant with this safety directive.





Features

- Safety interlock against inadvertent operation
- Stop command and latching occur simultaneously
- Contacts cannot be “teased” open
- Direct Opening Action (DOA) contact blocks
- Resettable by rotation of actuator

Periodic Inspection

Industrial control equipment should be periodically inspected. Eaton recommends inspection of Emergency Stop devices for proper mechanical operation after every 500 hours of elapsed time. See National Electrical Manufacturers Association (NEMA) Standard No. ICS 1.3, *Preventive Maintenance of Industrial Control and Systems Equipment*, for guidelines in setting up a maintenance program.

Table 47-41. Trigger Action Emergency OFF Switch Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13



Action	Color	Legend/ Engraving	Contact Block Circuit						
			1NC		2NC	1NC-1NO		2NC-1NO	
			Catalog Number	Price U.S. \$	Catalog Number	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
40 mm Trigger Action Twist-to-Release ①									
	Red	 (Red)	E22LTA2QB		E22LTA2QE	E22LTA2QW		E22LTA2QWB	
40 mm Trigger Action Twist-to-Release EMO (Emergency Machine OFF) ②									
	Red	 (White) ③	E22LTA2N123QB		E22LTA2N123QE	E22LTA2N123QW		E22LTA2N123QWB	

① Third party certified by DEMKO. For specification drawing, request A70-8530 from the Cutler-Hammer TRC — call 1-800-809-2772.

② Third party certified by DEMKO and GS3 to SEMI S2-0200 specifications. For specification drawing, request A70-8508 from the Cutler-Hammer TRC — call 1-800-809-2772.

③ EMO (Emergency Machine OFF) marking per SEMI S2 requirement.

Table 47-42. Two-Position Push-Pull Emergency Stop Pushbutton Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Action	Color	Legend/ Engraving	Contact Block Circuit				
			1NC		2NC	1NC-1NO	
			Catalog Number	Price U.S. \$	Catalog Number	Catalog Number	Price U.S. \$
40 mm Mushroom							
	Red	None	E22LPB2B		E22LPB2E	E22LPB2C	
	Red	 ④	E22LPB2N125B		E22LPB2N125E	E22LPB2N125C	

④ IEC Symbol for Emergency Stop.

Direct Opening Action (DOA) for IEC 60947-5-1 (Annex K) and NEMA ICS 5 (Part 6) Compliance

Table 47-43. Mechanical Operating Parameters of Operators with E22CB1 and E22CB11 (NC Contacts Only)

DOA Operating Parameters	Latching Trigger Action E-Stop		2-Position Push-Pull	
	E-Stop + E22CB1	E-Stop + E22CB11	2-Pos. Push-Pull + E22CB1	2-Pos. Push-Pull + E22CB11
Min. Travel to Open Contact — Inches (mm)	0.24 (6.1)	0.24 (6.1)	0.08 (2.1)	0.08 (2.1)
Min. Force to Open Contact — lb (N)	5.00 (22.24)	5.00 (22.24)	0	0
Total Travel — Inches (mm)	0.29 (7.4)	0.29 (7.4)	0.23 (5.8)	0.23 (5.8)

Discount Symbol **1CD1**

E22 and EM22 Series, Emergency Stop Components

Emergency Stop Components

Table 47-44. Standard Emergency Stop and Emergency OFF Operators — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

All Shown with Chrome Bezel	Action	Color	Button Diameter/ Material	Legend/ Engraving	Plastic — Black Bezel		Plastic — Chrome Bezel	
					Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Maximum of 2 Contact Blocks (4 Circuits) When Used with Supplied 3-Way Adapter (Unless Otherwise Noted)								
	Maintained Trigger Action Twist-to-Release	Red	40 mm/Plastic		E22LTA2 ①		—	
	Maintained Trigger Action Twist-to-Release	Red	40 mm/Plastic	EMO	E22LTA2N123 ①		—	
	Momentary ③	Red	40 mm/Plastic		E22LB2		E22L2	
			50 mm/Plastic		E22JPB2		E22JP2	
			50 mm/Alum.		E22JB2		E22J2	
				EMERG. STOP	E22JB2N8		E22J2N8	
	Maintained — 2-Position Push-Pull ③	Red	40 mm/Plastic		E22LPB2 ①		E22LP2 ①	
	Maintained — 2-Position Push-Pull ③	Red	50 mm/Plastic		E22JPLB2 ①		E22JPL2 ①	
			50 mm/Alum.		E22JLB2 ①		E22JL2 ①	
				EMERG. STOP	E22JLB2N8 ①		E22JL2N8 ①	
	Maintained — 2-Position Push-Pull ③	Red	40 mm/Plastic		E22EDB2 ①		E22ED2 ①	
				EMERG. STOP	E22EDB2N8 ①		E22ED2N8 ①	
				EMERG. STOP	E22EDB2N796 ①②		E22ED2N796 ①②	
	Maintained — 2-Position Push-Pull ③	Red	40 mm/Plastic Illuminated		E22GDB2 ①		E22GD2 ①	
				EMERG. STOP	E22GDB2N8 ①		E22GD2N8 ①	
				EMERG. STOP	E22GDB2N796 ①②		E22GD2N796 ①②	
	Maintained — Twist-to-Release	Red	40 mm/Plastic		E22LLB2		E22LL2	
					E22LLB2N886		E22LL2N886	
	Maintained — Key Release	Red	40 mm/Plastic		E22GB2		E22G2	

① Compliant with EN418 Machinery Safety Directive.
 ② Yellow field — red letters.
 ③ Maximum of 3 contact blocks allowable (6 circuits) when optional operator plug is used.

Table 47-45. EN418 Compliant Safety Yellow Guard

	Description	Color	Catalog Number	Price U.S. \$
	Mushroom Guard for 40 mm Trigger Action Switch — To be used with E22LTA2 and E22LTA2N123 operators.	Safety Yellow	E22MGTA	

Periodic Inspection
















Industrial control equipment should be periodically inspected. Eaton recommends inspection of Emergency Stop devices for proper mechanical operation after every 500 hours of elapsed time. See National Electrical

Manufacturers Association (NEMA) Standard No. ICS 1.3, *Preventive Maintenance of Industrial Control and Systems Equipment*, for guidelines in setting up a maintenance program.

Contact Blocks **Page 47-69**
 Enclosures **Pages 47-87 – 47-88**
 5-Way Adapter **Page 47-77**
 Legend Plates **Pages 47-79 – 47-85**
 Suffix Codes **Page 47-98**
 Discount Symbol **1CD1**

Twist-to-Release, Push-Pull and Key Release Components

Table 47-46. Maintained Contact Mushroom Head Operators, Non-illuminated — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Will Accept Maximum of 2 Contact Blocks (4 Circuits) When Used with Supplied 3-Way Adapter.			E22 Series — Plastic Operators				EM22 Series — Metal Operators			
			Color	Black Bezel		Chrome Bezel		Color	Chrome Bezel	
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$		Catalog Number	Price U.S. \$
			Twist-to-Release — 28 mm Diameter Button (Push to Latch — Twist to Release)							
Black	E22MLB1		E22ML1		Black	EM22ML1				
Red	E22MLB2		E22ML2		Red	EM22ML2				
Green	E22MLB3		E22ML3		Green	EM22ML3				
Yellow	E22MLB4		E22ML4		Yellow	EM22ML4				
Blue	E22MLB6		E22ML6		Blue	EM22ML6				
			Twist-to-Release — 40 mm Diameter Button (Push to Latch — Twist to Release)							
Black	E22LLB1		E22LL1		Black	EM22LL1				
Red	E22LLB2		E22LL2		Red	EM22LL2				
Green	E22LLB3		E22LL3		Green	EM22LL3				
Yellow	E22LLB4		E22LL4		Yellow	EM22LL4				
Blue	E22LLB6		E22LL6		Blue	EM22LL6				
			Push-Pull — 40 mm Diameter Button (Push to Latch — Pull to Release)							
Black	E22LPB1		E22LP1		Black	EM22LP1				
Red	E22LPB2		E22LP2		Red	EM22LP2				
Green	E22LPB3		E22LP3		Green	EM22LP3				
Yellow	E22LPB4		E22LP4		Yellow	EM22LP4				
Blue	E22LPB6		E22LP6		Blue	EM22LP6				
			Push-Pull — 50 mm Diameter Button (Push to Latch — Pull to Release)							
Black	E22JPLB1		E22JPL1		Black	EM22JPL1				
Red	E22JPLB2		E22JPL2		Red	EM22JPL2				
Green	E22JPLB3		E22JPL3		Green	EM22JPL3				
Yellow	E22JPLB4		E22JPL4		Yellow	EM22JPL4				
Blue	E22JPLB6		E22JPL6		Blue	EM22JPL6				
Red (Metal)	E22JLB2		E22JL2		Red (Metal)	EM22JL2				
Red (Metal)	EMERGENCY STOP									
	E22JLB2N8		E22JL2N8			EM22JL2N8				
			Key Release — 40 mm Diameter Button (Push to Latch — Turn Key to Release) ①②							
Black	E22GB1		E22G1		Black	EM22G1				
Red	E22GB2		E22G2		Red	EM22G2				
Green	E22GB3		E22G3		Green	EM22G3				

① For legend plates, use oversize plates, Catalog Numbers E22VA1, VA2 or VA8 listed on Page 47-74.

② To order a different key and lock assembly, add suffix B1, C1, D1, E1 or F1 to the end of the Catalog Number.

Note: For Rear of Panel Extensions, see Table 47-128 on Page 47-94.