

**Point-of-Purchase Packaged
Pilot Devices**



Table 47-172. 10250T Point-of-Purchase Packaged Pilot Devices

Product	Description	Catalog Number	Price U.S. \$
Emergency Stop Operators			
Red Non-illuminated Push-Pull	1NO-1NC contact block. Also includes two square engraved legend plates: EMERG. STOP and STOP.	10250T5B62-1-POP	
Red Mushroom Pushbutton	1NO-1NC contact block. Also includes two square engraved legend plates: EMERG. STOP and STOP.	10250T32R-POP	
Red Jumbo Mushroom Pushbutton	Engraved EMERG. STOP with 1NO-1NC contact block.	10250T33-POP	
Momentary Pushbuttons			
Black Flush Pushbutton	1NO-1NC contact block. Also includes two square engraved legend plates: START and JOG.	10250T30B-POP	
Red Extended Pushbutton	1NO-1NC contact block. Also includes one square engraved legend plate: STOP.	10250T31R-POP	
Indicating Lights			
Red Indicating Light	Full voltage 24V AC/DC with two extra lenses: Green and Amber. Also includes two square engraved legend plates: RUN and JOG.	10250T206NC1N-POP	
Red Indicating Light	Resistor 120V AC/DC with two extra lenses: Green and Amber. Also includes one square engraved legend plate: RUN and JOG.	10250T34R-POP	
Illuminated Pushbuttons			
Red Illuminating Pushbutton	Full voltage 24V AC/DC with 1NO-1NC contact block and two extra lenses: Green and Amber. Also includes one square engraved legend plate: POWER ON.	10250T476C21-1-POP	
Red Illuminating Pushbutton	Resistor 120V AC/DC with 1NO-1NC contact block and two extra lenses: Green and Amber. Also includes one square engraved legend plate: POWER ON.	10250T411C21-1-POP	
Selector Switches			
Black Knob Two-Position Selector Switch	1NO-1NC contact block. Also includes three square engraved legend plates: OFF/ON, HAND/AUTO and RUN/JOG.	10250T20KB-POP	
Black Knob Three-Position Selector Switch	1NO-1NC contact block. Also includes 1 square engraved legend plate: HAND/OFF/AUTO.	10250T22KB-POP	

10250T Series, Assembled Devices — Selector Switch Units

Selector Switch Units

- Two-, Three- and Four-Position Maintained
- Non-illuminated and Illuminated



3-Position Maintained Switch
Catalog Number
10250T21KB



3-Position Maintained Switch
Catalog Number
10250T22KB

Table 47-200. 2-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ①		Operator Action ②	Non-illuminated			Illuminated — 120V Transformer			Contact Type	Mounting Location	
			Black Knob ③	Black Lever ③	Price U.S. \$	Red Knob ③	Red Lever ③	Price U.S. \$		A	B
Catalog Number	Catalog Number		Catalog Number	Catalog Number		Catalog Number	Catalog Number				
X O	O X		<u>10250T20KB</u>	<u>10250T20LB</u>		<u>10250ED1117-KR</u>	<u>10250ED1117-LR</u>		1NC 1NO	 	

- ① X = closed circuit, O = open circuit.
- ② M = Maintained. S = Spring return in direction of arrow (→).
- ③ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
Example: 10250T20KG.

Table 47-201. 3-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ④			Operator Action ⑤	Non-illuminated			Illuminated — 120V Transformer			Contact Type	Mounting Location	
				Black Knob ⑥	Black Lever ⑥	Price U.S. \$	Red Knob ⑥	Red Lever ⑥	Price U.S. \$		A	B
Catalog Number	Catalog Number	Catalog Number		Catalog Number	Catalog Number		Catalog Number	Catalog Number				
X O	O O	O X		<u>10250T21KB</u>	<u>10250T21LB</u>		<u>10250ED1117-2KR</u>	<u>10250ED1117-2LR</u>		1NO 1NO	 	
X O	O X	O O		<u>10250T22KB</u>	<u>10250T22LB</u>		<u>10250ED1117-3KR</u>	<u>10250ED1117-3LR</u>		1NO 2NC (Series) 1NO	 	

- ④ X = closed circuit, O = open circuit.
- ⑤ M = Maintained. S = Spring return in direction of arrow (→).
- ⑥ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
Example: 10250T20KG.

Table 47-202. 4-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ⑦				Operator Action ⑧	Non-illuminated			Illuminated — 120V Transformer			Contact Type	Mounting Location	
					Black Knob ⑨	Black Lever ⑨	Price U.S. \$	Red Knob ⑨	Red Lever ⑨	Price U.S. \$		A	B
Catalog Number	Catalog Number	Catalog Number	Catalog Number		Catalog Number	Catalog Number		Catalog Number	Catalog Number				
X O O O	O X O O	O O X O	O O O X		<u>10250T46KB</u>	<u>10250T46LB</u>		<u>10250ED1117-4KR</u>	<u>10250ED1117-4LR</u>		1NC 1NO 1NO 1NC	 	

- ⑦ X = closed circuit, O = open circuit.
- ⑧ M = Maintained. S = Spring return in direction of arrow (→).
- ⑨ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
Example: 10250T20KG.

Table 47-203. Color Selection

Illuminated						Non-illuminated					
Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter
Red	R	White	W	Amber	A	Black	B	Green	G	Blue	L
Green	G	Blue	B	Clear	C	Red	R	White	W	Orange	O

Accessories Pages 47-155 – 47-156
 Additional Circuit
 Arrangements Pages 47-133 – 47-134
 Dimensions Pages 47-160 – 47-162
 Enclosures Pages 47-153 – 47-154
 Legend Plates Pages 47-151 – 47-152
 Discount Symbol 1CD1C



10250T Series

Selector Switch Selection

Cam and Contact Block Selection

Selector switches in their varied forms (2-position, 3-position and 4-position) are a big factor contributing to the great flexibility of control that a well rounded line of "pushbuttons" can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The "X-O" table (Page 47-134) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.
- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block "open." Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks (see Figure 47-94).

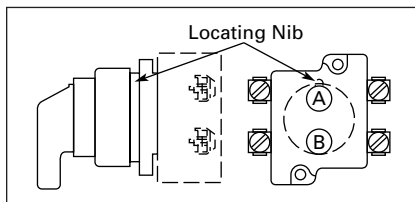


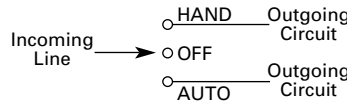
Figure 47-94. Contact Circuit Locations

Systematic Approach

Application: **HAND-OFF-AUTO** Selector Switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

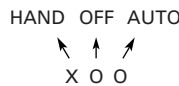
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



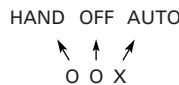
Step 2: "X-O" Pattern.

From the elementary diagram, you can construct an "X-O" diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The "X-O" for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the "X-O" diagram would look like this:



Putting them together, the complete "X-O" diagram is:



Once the "X-O" diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired "X-O" functions. The selection table on the following page lists the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your "X-O" diagram.

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables of the following page show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown in Table 47-204.

Table 47-204. Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X O O	NO	NC	NO	
4	O O X		NO		NO

① Wired in series.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO – (B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:



Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators — knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on Page 47-135. For the above example you may want a 3-position maintained black knob, cam 3 — Catalog Number 10250T1323.

The Complete Switch: 10250T1323 with one 10250T2 or, for one composite catalog number, 10250T21KB found on Page 47-132.

**Selector Switch Selection
(Continued)**

**Table 47-205. 2-Position Selector Switch
Contact Block Selection**

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function	
		Top Plunger A	Bottom Plunger B
1	X O	NC	NC
2	O X	NO	NO

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed Circuit
O = Open Circuit

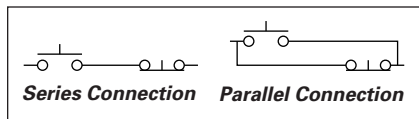


Figure 47-95. Wiring of Jumper Connections

Note: 4-Position Selector Switches limited to 4 contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page 47-148**.

Table 47-206. 3-Position Switch — Cam and Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)			
		Operator with Cam Code #2		Operator with Cam Code #3	
		Mounting Location		Mounting Location	
		Top Plunger A	Bottom Plunger B	Top Plunger A	Bottom Plunger B
1	X O O	NO	NC	NO	
2	X X O		NC		NC
3	X O X	NO		NO	NO
4	O O X		NO		NO
5	O X X	NC	NO	NC	
6	O X O	NC		NC	NC

Table 47-207. 4-Position Switch — Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function		Combination No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function	
		Mounting Location				Mounting Location	
		Top Plunger A	Bottom Plunger B			Top Plunger A	Bottom Plunger B
1	X O O O	NC		10	X O X O	NC	NO
2	O X O O		NO			NO	NO
3	O O X O	NO		11	X X X O	NC	NO
4	O O O X		NC			NO	NO
5	X O O X	NC	NC	12	O X X X	NO	NC
6	O X X O	NO	NO			NO	NO
7	O O X X	NO	NC	13	X O X X	NO	NC
8	X X O O	NC	NO			NO	NC
9	O X O X		NO	14	X X O X	NC	NO

Selector Switch Operators



2-Position Maintained Black Knob Selector Switch — Cam 1
 Cat. No. 10250T1311



3-Position Maintained Black Lever Selector Switch — Cam 3
 Cat. No. 10250T3023



2-Position Maintained Horizontal Mount, Key Removal #1 Keyed Selector Switch — Cam 1
 Cat. No. 10250T16111

Selector Switch Operators with Caps

Table 47-208. Selector Switch Operators with Caps — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Positions	Operator Action ^①	Black Knob Selector Switch — Vertical Mounting ^③			Black Lever Selector Switch — Vertical Mounting ^③		
		Cam Code ^②	Catalog Number	Price U.S. \$	Cam Code ^②	Catalog Number	Price U.S. \$
2-Position — 60° Throw		1	10250T1311		1	10250T3011	
		1	10250T1371		1	10250T3071	
3-Position — 60° Throw		2 3	10250T1322 10250T1323		2 3	10250T3022 10250T3023	
		2 3	10250T1332 10250T1333		2 3	10250T3032 10250T3033	
		2 3	10250T1342 10250T1343		2 3	10250T3042 10250T3043	
		2 3	10250T1352 10250T1353		2 3	10250T3052 10250T3053	
4-Position — 40° Throw		7	10250T1367		7	10250T3067	

① M = Maintained. S = Spring return in direction of arrow (→).

② For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and table on **Pages 47-133 – 47-134**.

③ Field convertible to Horizontal Mounting or order operator only and separate operator cap.

Table 47-209. Key Operators with Cam — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Positions	Operator Action ^④	Cam Code ^⑤	Optional Key Removal Positions ^⑥	Vertical Mounting	Horizontal Mounting	Price U.S. \$
				Catalog Number	Catalog Number	
2-Position — 60° Throw		1	1, 2, 3	10250T1511_	10250T1611_	
		1	2	10250T1571_	10250T1581_	
3-Position — 60° Throw		2 3	1 – 7	10250T1522_ 10250T1523_	10250T1622_ 10250T1623_	
		2 3	1, 4, 5	10250T1532_ 10250T1533_	10250T1632_ 10250T1633_	
		2 3	4	10250T1542_ 10250T1543_	10250T1642_ 10250T1643_	
		2 3	2, 4, 6	10250T1652_ 10250T1653_	10250T1662_ 10250T1663_	
4-Position — 40° Throw		7	7	10250T1677_	10250T1687_	

④ M = Maintained. S = Spring return in direction of arrow (→).

⑤ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and table on **Pages 47-133 – 47-134**.

⑥ Choose key removal position required for application from **Table 47-210** on **Page 47-136**. Add key removal Code No. to listed Catalog Number.
 Example: 10250T15112.

Accessories **Pages 47-155 – 47-156**
 Contact Blocks **Page 47-148**
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 Enclosures **Pages 47-153 – 47-154**
 Legend Plates **Pages 47-151 – 47-152**
 Discount Symbol **1CD1C**

10250T Series, Selector Switch Components

Selector Switch Operators (Continued)

Table 47-210. Key Removal Positions

Code Suffix	Key Removal Positions	Code Suffix	Key Removal Positions
1	Right Only	5	Right & Center
2	Left Only	6	Left & Center
3	Right & Left	7	All Positions
4	Center Only		

Note: Key removal in "spring return from" positions not recommended.

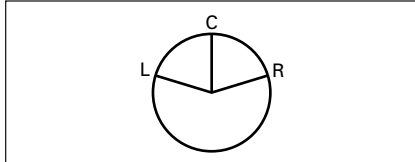


Figure 47-96. Key Removal Positions

Replacement Keys or Dissimilar Locks for Key Operators

Operators listed on **Page 47-135** have identical locks and keys (Key Code H661) Catalog Number 10250ED824. For dissimilar lock and key combinations, see listing at right.

Table 47-211. Replacement Key

Description	Catalog Number	Price U.S. \$
Replacement Keys (Code H661)	10250ED824	

Selector Switch Operators with Dissimilar Locks and Keys — UL (NEMA) 4, 4X and 13

The locks in all key operators listed on **Pages 47-121, 47-135 and 47-180** are identical and use key code number H661. Two keys are supplied with every lock. For additional code number H661 keys, order **Catalog Number 10250ED824**. For others, order 10250ED1130 and designate lock number. When dissimilar locks for each operator or each group of operators are required, select from the lock and key combination listed below. **When Ordering Operator Only** or a Complete Control Unit with a substitute lock, order from table below and add "except Lock and Key Code No. ..."

Table 47-212. "H" Series Locks without Master Key — with Key Slot Cover

Lock and Key Code Numbers			Adder U.S. \$
H501	H635	H663	
H620	H639	H675	
H621	H643	H683	
H634	H654	H688	

Table 47-213. "M" Series Locks with Master Key — with Key Slot Cover

Lock and Key Code Numbers				Adder U.S. \$
MD1	MD14	ME8	MJ6	
MD2	MD15	ME11	MJ10	
MD3	MD16	ME16	MJ11	
MD4	MD19	ME17	MJ13	
MD5	MD20	ME18	MJ15	
MD7	ME2	ME19	MJ16	
MD9	ME3	MJ1	MD17	
MD10	ME5	MJ3		
MD11	ME6	MJ4		
MD13	ME7	MJ5		

Table 47-214. Master Keys for Above Locks

Application	Catalog Number	Price U.S. \$
For Code: MD1 – MD20	10250ED825-3	
ME2 – ME18	10250ED825-4	
MJ1 – MJ16	10250ED825-5	

Selector Switch Operators (Continued)

Selector Switch Operators without Caps

Note: Operators below can be ordered with caps assembled to them by adding the Code Number from **Table 47-216** to the end of Catalog Number below.
Example: 10250T4011KB



**2-Position
Selector Switch
Maintained,
Cam Code 1
Catalog Number
10250T4011**

Table 47-215. Selector Switch Operators without Caps

Positions	Operator Action ①	Cam Code ②	Catalog Number	Price U.S. \$
2-Position — 60° Throw		1	10250T4011	
		1	10250T4081	
3-Position — 60° Throw		2 3	10250T4022 10250T4023	
		2 3	10250T4032 10250T4033	
		2 3	10250T4042 10250T4043	
		2 3	10250T4052 10250T4053	
		2 3	10250T4052 10250T4053	
4-Position — 40° Throw		7	10250T4067	

① M = Maintained. S = Spring return in direction of arrow (→).

② For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and table on **Pages 47-133 – 47-134**.

Table 47-216. Operating Caps

Color	Knob		Lever	
	Catalog and Code Number	Price U.S. \$	Catalog and Code Number	Price U.S. \$
Black	10250TKB		10250TLB	
Red	10250TKR		10250TLR	
Green	10250TKG		10250TLG	
Yellow	10250TKY		10250TLY	
White	10250TKW		10250TLW	
Gray	10250TKA		10250TLA	
Blue	10250TKL		10250TLL	
Orange	10250TKO		10250TLO	

Color	Lever ③		Coin Slot	
	Catalog and Code Number	Price U.S. \$	Catalog and Code Number	Price U.S. \$
Black	10250TSB		10250TCB	
Red	10250TSR		10250TCR	
Green	10250TSG		10250TCG	
Yellow	10250TSY		10250TCY	
White	10250TSW		10250TCW	
Gray	10250TSA		10250TCA	
Blue	10250TSL		10250TCL	
Orange	10250TSO		10250TCO	

③ Designed for added ingress protection. For use in maintained operators only.

Accessories **Pages 47-155 – 47-156**
 Contact Blocks **Page 47-148**
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 Legend Plates **Pages 47-151 – 47-152**
 Discount Symbol **1CD1C**

10250T Series, Selector Switch Components

Illuminated Selector Switch Operators

Illuminated Selector Switches without Caps



*2-Position Maintained 120V AC
Transformer Selector Switch,
Cam Code 1
Catalog Number 10250T5971*

Table 47-217. Operator without Knob or Lever

Positions	Operator Action ①	Transformer Type — 50/60 Hz				Full Voltage Type — AC or DC ④			
		6 Volt #755 Lamp				Lamps: 6V — #755, 12V — #756, 24V — #757, 48V — #1835, 120/240V — 120MB			
		Voltage	Catalog and Code Number ②	Cam Code ③	Price U.S. \$	Voltage	Catalog and Code Number ②	Cam Code ③	Price U.S. \$
2-Position – 60° Throw		24	10250T5961	1		6	10250T6201	1	
		120	10250T5971			12	10250T6211		
		208	10250T6511			24	10250T6221		
		240	10250T5981			48	10250T6231		
		380	10250T5991			120	10250T6361		
		480	10250T6001			240 ⑤	10250T6371		
		600	10250T6011						
3-Position – 60° Throw		24	10250T602_	+ 2 or 3		6	10250T624_	+ 2 or 3	
		120	10250T603_			12	10250T625_		
		208	10250T652_			24	10250T626_		
		240	10250T604_			48	10250T627_		
		380	10250T605_			120	10250T638_		
	480	10250T606_			240 ⑤	10250T639_			
	600	10250T607_							
		24	10250T654_	+ 2 or 3		6	10250T612_	+ 2 or 3	
		120	10250T620_			12	10250T632_		
		208	10250T655_			24	10250T642_		
		240	10250T656_			48	10250T672_		
		380	10250T657_			120	10250T622_		
	480	10250T658_			240	10250T682_			
	600	10250T659_							
		24	10250T660_	+ 2 or 3		6	10250T613_	+ 2 or 3	
		120	10250T621_			12	10250T633_		
		208	10250T661_			24	10250T643_		
		240	10250T662_			48	10250T673_		
		380	10250T663_			120	10250T623_		
	480	10250T664_			240	10250T683_			
600	10250T665_								
	24	10250T614_	+ 2 or 3		6	10250T628_	+ 2 or 3		
	120	10250T615_			12	10250T629_			
	208	10250T653_			24	10250T630_			
	240	10250T616_			48	10250T631_			
	380	10250T617_			120	10250T640_			
480	10250T618_			240 ⑤	10250T641_				
600	10250T619_								
4-Position – 40° Throw		24	10250T6087	7		6	10250T6327	7	
		120	10250T6097			12	10250T6337		
		208	10250T6547			24	10250T6347		
		240	10250T6107			48	10250T6357		
		380	10250T6117			120	10250T6427		
		480	10250T6127			240 ⑤	10250T6437		
		600	10250T6137						

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① M = Maintained. S = Spring return in direction of arrow (→).

② Operator includes lens gasket and lens attachment screws.

③ For selection of the proper cam and contact block, to obtain the proper circuit sequence, see selection table on **Pages 47-133 – 47-134**.

④ Full voltage light units can be used at other than listed voltages by changing lamp. Replacement lamps are listed on **Page 47-157**.

⑤ Resistor type. May generate excess heat if used in high density.

Table 47-218. Illuminated Knobs and Levers

Color ⑥	Knob		Lever	
	Cat. and Code No.	Price U.S. \$	Cat. and Code No.	Price U.S. \$
Red	10250TER		10250TFR	
Green	10250TEG		10250TFG	
Yellow	10250TEA		10250TFA	
Blue	10250TEL		10250TFL	
Clear	10250TEC		10250TFC	
White	10250TEW		10250TFW	
Amber	10250TEM		10250TFM	

⑥ Amber, Clear and White lenses have a black arrow (pointer), Red, Green and Blue lenses have a white arrow (pointer).

Accessories **Pages 47-155 – 47-156**
 Contact Blocks **Page 47-148**
 Dimensions **Pages 47-160 – 47-162**
 Enclosures **Pages 47-153 – 47-154**
 Legend Plates **Pages 47-151 – 47-152**
 Discount Symbol **1CD1C**

Selector Switch Units

- Two-, Three- and Four-Position — Maintained
- Non-illuminated and Illuminated



*2-Position
Maintained
Switch Knob*



*4-Position
Maintained
Switch Lever*

Table 47-282. 2-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ①		Operator Action ②	Non-illuminated		Price U.S. \$	Illuminated — 120V Transformer		Price U.S. \$	Contact Type	Mounting Location		Cam Code
			Black Knob ③	Black Lever ③		Red Knob ③	Red Lever ③			A	B	
			Catalog Number	Catalog Number		Catalog Number	Catalog Number					
X O	O X		E34VFBK1-1X	E34VFBL1-1X		E34VFB120ER-1X	E34VFB120FR-1X		1NC 1NO			1

① X = closed circuit, O = open circuit.

② M = Maintained.

③ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
 Example: E34VFBK2-X1.

Table 47-283. 3-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ④			Operator Action ⑤	Non-illuminated		Price U.S. \$	Illuminated — 120V Transformer		Price U.S. \$	Contact Type	Mounting Location		Cam Code
				Black Knob ⑥	Black Lever ⑥		Red Knob ⑥	Red Lever ⑥			A	B	
				Catalog Number	Catalog Number		Catalog Number	Catalog Number					
X O	O O	O X		E34VHBK1-2X	E34VHBL1-2X		E34VHB120TER-2X	E34VHB120TFR-2X		1NO 1NO			3
X O O	O X O	O O X		E34VHBK1-23X	E34VHBL1-23X		E34VHB120TER-23X	E34VHB120TFR-23X		1NO 2NC (Series) 1NO			3

④ X = closed circuit, O = open circuit.

⑤ M = Maintained.

⑥ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
 Example: E34VFBK2-X1.

Table 47-284. 4-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ⑦				Operator Action ⑧	Non-illuminated		Price U.S. \$	Illuminated — 120V Transformer		Price U.S. \$	Contact Type	Mounting Location		Cam Code
					Black Knob ⑨	Black Lever ⑨		Red Knob ⑨	Red Lever ⑨			A	B	
					Catalog Number	Catalog Number		Catalog Number	Catalog Number					
X O O O	O X O O	O O X O	O O O X		E34VTBK1-23X	E34VTBL1-23X		E34VRB120TER-23X	E34VRB120TFR-23X		1NC 1NO 1NO 1NC			7

⑦ X = closed circuit, O = open circuit.

⑧ M = Maintained.

⑨ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
 Example: E34VFBK2-X1.

Table 47-285. Color Selection, Non-illuminated

Color	Code Letter
Black	1
Red	2
Green	3
Yellow	4
White	5
Blue	6
Gray	7
Orange	8

Note: For Light Unit Voltage Suffix and Knobs, Levers tables, see **Page 47-181**.

Note: Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages 47-115 – 47-165**.

Accessories **Pages 47-187 – 47-188**
 Additional Circuit Arrangements **Pages 47-178 – 47-179**
 Dimensions **Page 47-191**
 Enclosures **Pages 47-185 – 47-186**
 Legend Plates **Page 47-184**
 Discount Symbol **1CD1C**

E34 Series, Selector Switch Selection



E34 Series

Selector Switch Selection

Cam and Contact Block Selection

Selector switches in their varied forms (2-position, 3-position and 4-position) are a big factor contributing to the great flexibility of control that a well rounded line of "pushbuttons" can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The "X-O" chart (Page 47-179) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.
- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block "open." Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks (see Illustration below).

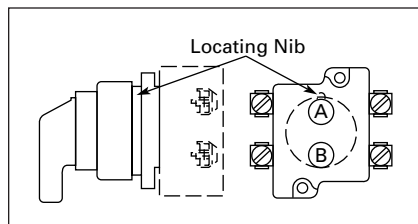


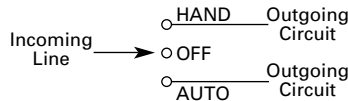
Figure 47-125. Contact Circuit Locations

Systematic Approach

Application: **HAND-OFF-AUTO** Selector Switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

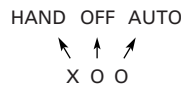
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



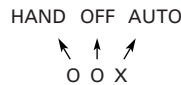
Step 2: "X-O" Pattern.

From the elementary diagram, you can construct an "X-O" diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The "X-O" for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the "X-O" diagram would look like this:



Putting them together, the complete "X-O" diagram is:



Once the "X-O" diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired "X-O" functions. The selection table on the following page lists the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your "X-O" diagram.

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables of the following page show all the "X-O" combinations. For the purpose of this example, the applicable portion of those charts is shown in **Table 47-286**.

Table 47-286. Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X O O	NO	NC	NO	
4	O O X		NO		NO

① Wired in series.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO - (B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:



Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators — knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page 47-180**. For the above example you may want a 3-position maintained black knob, cam 3 — Catalog Number E34VHBK1.

The Complete Switch: E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page 47-177**.

Selector Switch Selection
(Continued)

Table 47-287. 2-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position		Contact Blocks Required to Accomplish Circuit Function	
			Top Plunger A	Bottom Plunger B
1	X	O		
2	O	X		

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed Circuit
 O = Open Circuit

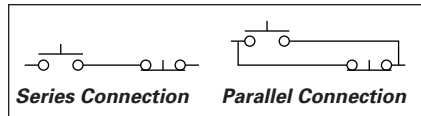


Figure 47-126. Wiring of Jumper Connections

Note: 4-Position Selector Switches limited to 4 contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page 47-182**.

Table 47-288. 3-Position Switch — Cam and Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)			
		Operator with Cam Code #2		Operator with Cam Code #3	
		Mounting Location		Mounting Location	
		Top Plunger A	Bottom Plunger B	Top Plunger A	Bottom Plunger B
1	X O O	NO		NO	
2	X X O		NC		NC
3	X O X	NO		NO	
4	O O X		NO		NO
5	O X X	NC		NC	
6	O X O	NC		NC	

Table 47-289. 4-Position Switch — Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function		Combination No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function	
		Mounting Location				Mounting Location	
		Top Plunger A	Bottom Plunger B			Top Plunger A	Bottom Plunger B
1	X O O O			10	X O X O		
2	O X O O					NC NO	
3	O O X O			11	X X X O		
4	O O O X					NC NO NO	
5	X O O X			12	O X X X		
6	O X X O					NO NC NO	
7	O O X X			13	X O X X		
8	X X O O					NO NC NC	
9	O X O X			14	X X O X		

E34 Series, Selector Switch Components



2-Position Maintained Black Knob Selector Switch — Cam 1
Catalog Number E34VFBK1



3-Position Maintained Keyed Selector Switch
Catalog Number E34KGHB1

Selector Switch Operators

Table 47-290. Operators with Knob Assembled — UL (NEMA)
Type 3, 3R, 4, 4X, 12, 13

Positions	Operator Action ①	Black Knob Selector Switch — Vertical Mounting ③		
		Cam Code ②	Catalog Number ④	Price U.S. \$
2-Position — 60° Throw		1	<u>E34VFBK1</u>	
		1	<u>E34VEBK1</u>	
3-Position — 60° Throw		2 3	<u>E34VGBK1</u> <u>E34VHBK1</u>	
		2 3	<u>E34VJBK1</u> <u>E34VKBK1</u>	
		2 3	<u>E34VLBK1</u> <u>E34VMBK1</u>	
		2 3	<u>E34VNBK1</u> <u>E34VPBK1</u>	
4-Position — 40° Throw		7	<u>E34VTBK1</u>	

- ① M = Maintained. S = Spring return in direction of arrow (→).
- ② For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and table on Pages 47-178 – 47-179.
- ③ Field convertible to Horizontal Mounting.
- ④ For other colors of either the knob or lever, replace the underlined characters of the Catalog Number with the appropriate Suffix Code from Alternate Knob and Lever Table below. Example: E34VFB2.

Note: Use NEMA 4X 10250T operators where exposed to ultraviolet light, see Pages 47-115 – 47-165.

Table 47-291. Key Operators with Cam and Cap — UL (NEMA)
Type 3, 3R, 4, 4X, 12, 13

Positions	Operator Action ⑤	Cam Code ⑥	Key Removal Positions ⑦	Vertical Mounting	Horiz. Mounting	Price U.S. \$
				Catalog Number	Catalog Number	
2-Position — 60° Throw		1	1, 2, 3	E34KFB_	E34KFHB_	
		1	2	E34KEB_	E34KEHB_	
3-Position — 60° Throw		2 3	1 – 7	E34KGB_	E34KGHB_	
		2 3	1, 4, 5	E34KJB_	E34KJHB_	
		2 3	4	E34KLB_	E34KLHB_	
		2 3	2, 4, 6	E34KNB_	E34KNHB_	
4-Position — 40° Throw		7	7	E34KTB_	E34KTHB_	

- ⑤ M = Maintained. S = Spring return in direction of arrow (→).
- ⑥ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and table on Pages 47-178 – 47-179.
- ⑦ Choose key removal position required for application from Table 47-292. Add key removal Code No. to listed Catalog Number. Example: E34KFB2.

Table 47-292. Key Removal Positions

Code Suffix	Key Removal Positions	Code Suffix	Key Removal Positions
1	Right Only	5	Right & Center
2	Left Only	6	Left & Center
3	Right & Left	7	All Positions
4	Center Only		

Note: Key removal in “spring return from” positions not recommended.

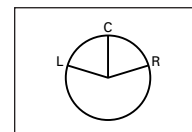


Figure 47-127. Key Removal Positions

Dissimilar Locks and Keys

Listed operators have identical locks and keys (Key Code H661), Catalog Number 10250ED824. For dissimilar lock and key combinations, see Page 47-136.

Table 47-293. Alternate Knobs and Levers for Operators Above

Color	Knob			Lever			Lever Designed for Added Ingress Protection ⑧		
	Suffix Code	Catalog Number	Price U.S. \$	Suffix Code	Catalog Number	Price U.S. \$	Suffix Code	Catalog Number	Price U.S. \$
Black	K1	E34K1		L1	E34L1		A1	E34A1	
Red	K2	E34K2		L2	E34L2		A2	E34A2	
Green	K3	E34K3		L3	E34L3		A3	E34A3	
Yellow	K4	E34K4		L4	E34L4		A4	E34A4	
White	K5	E34K5		L5	E34L5		A5	E34A5	
Blue	K6	E34K6		L6	E34L6		A6	E34A6	
Gray	K7	E34K7		L7	E34L7		A7	E34A7	
Orange	K8	E34K8		L8	E34L8		A8	E34A8	

⑧ For use on maintained operators only.

Accessories Page 47-187 – 47-188
 Dimensions Page 47-191
 Legend Plates Page 47-184
 Discount Symbol 1CD1C



**2-Position Maintained
 120V AC Transformer
 Selector Switch, Cam 1
 Catalog Number E34VFB120**

Illuminated Selector Switch Operators

Table 47-294. Operator without Knob or Lever

Positions	Operator Action	Transformer Type — 50/60 Hz		Full Voltage Type — AC or DC ^③	
		6 Volt #755 Lamp		Lamps — #755, #757, #1835, 120MB ^④	
		Catalog Number ^{① ⑤}	Price U.S. \$	Catalog Number ^⑤	Price U.S. \$
2-Position — 60° Throw		Cam Code 1 ^②		Cam Code 1 ^②	
		E34VFB_		E34SFB_	
3-Position — 60° Throw		Cam Code 2 ^②	Cam Code 3 ^②	Cam Code 2 ^②	Cam Code 3 ^②
		E34VGB_	E34VHB_	E34SGB_	E34SHB_
		E34VNB_ ^⑥	E34VPB_ ^⑥	E34SNB_ ^⑦	E34SPB_ ^⑦
		E34VJB_ ^⑥	E34VKB_ ^⑥	E34SJB_ ^⑦	E34SKB_ ^⑦
4-Position — 40° Throw		E34VLB_	E34VMB_	E34SLB_	E34SMB_
		E34VRB_	—	E34SRB_	—

- ① Operator includes lens gasket and lens attachment screws.
- ② For selection of the proper cam and contact block required to obtain a specific circuit sequence, see selection table on **Pages 47-178 – 47-179**.
- ③ Full voltage light units can be used at other than listed voltages by changing lamp. Replacement lamps are listed in **Page 47-157**.
- ④ 120MB lamps are used on both 120V and 240V operators.
- ⑤ Add Code Suffix for Light Unit Voltage to listed Catalog Number from Light Unit Voltage Suffix Table at bottom of page.
 Example: For 24V transformer type light unit, order E34VFB024.
- ⑥ 120 and 240V transformer only.
- ⑦ 120 full voltage only.

Table 47-295. Light Unit Voltage Suffix — Add to operator Catalog Number listed in table above.

Type of Light Unit			Full Voltage Type AC or DC ^②		
Transformer Type 50/60 Hz			Full Voltage Type AC or DC ^②		
Voltage	Suffix Code	Adder U.S. \$	Voltage	Suffix Code	Adder U.S. \$
24	024		6	06	
120	120		12	12	
208	208		24	24	
240	240		48	48	
380	380		120	120	
480	480		240 ^③	240	
600	600				

- ② Full voltage light units can be used at other than listed voltages by changing lamp. Replacement lamps are listed in **Page 47-157**.
- ③ Resistor type. May generate excess heat if used in high density.

Table 47-296. Knobs, Levers

	Color ^①	Knob	Lever	Price U.S. \$
		Catalog Number and Code Number		
	Red	10250TER	10250TFR	
	Green	10250TEG	10250TFG	
	Yellow	10250TEA	10250TFA	
	Blue	10250TEL	10250TFL	
	Clear	10250TEW	10250TFW	
	White	10250TEV	10250TFV	
	Amber	10250TEM	10250TFM	

① Amber, clear and white lenses have a black arrow (pointer). Red, green and blue lenses have a white arrow (pointer).

Note: Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages 47-115 – 47-165**.

Contact Blocks **Page 47-182**
 Dimensions **Page 47-191**
 Enclosures **Pages 47-185 – 47-186**
 Legend Plates **Page 47-184**
 Discount Symbol **1CD1C**

E34 Series, Components — Contact Blocks

Contact Blocks

Standard Contact Blocks

- UL A600/P600 rated
- Color-coded plungers – red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s Cutler-Hammer contact blocks. A pointed silver nib on the contact tip

ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack	Operator	Max. Stack
Pushbuttons	6	2- or 3-Position Selector Switches	6
Push-Pull Operators	2	4-Position Selector Switches	4
Roto-Push Operators	4	Joysticks	4

Table 47-297. Contact Blocks

Symbol	Circuit	Description/ Notes ①	Standard				Logic Level			
			Pressure Terminals		Spade Terminals ②		Pressure Terminals		Spade Terminals ②	
			Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
	Blank No Plunger 1NC	Stack up to 6 blocks (6 circuits) unless otherwise noted.	10250T51		10250T59		10250T51E		10250T59E	
	Blank No Plunger 1NO	Stack up to 6 blocks (6 circuits) unless otherwise noted.	10250T53		10250T60		10250T53E		10250T60E	
	NO-NC	Stack up to 6 blocks (12 circuits) unless otherwise noted.	10250T1		10250T40		10250T1E		10250T40E	
	2NC	Stack up to 6 blocks (12 circuits) unless otherwise noted.	10250T3		10250T42		10250T3E		10250T42E	
	2NO	Stack up to 6 blocks (12 circuits) unless otherwise noted.	10250T2		10250T41		10250T2E		10250T41E	

Special Function Blocks ③

	Blank No Plunger LONC	Late opening NC. Stack up to 6 blocks (6 circuits) unless otherwise noted.	10250T71 ③		—		10250T71E ③		—	
	ECNO-NC	Early closing NO and standard NC. Stack up to 6 blocks unless otherwise noted.	10250T47 ③ ④		—		10250T47E ③		—	
	ECNO-NO	Early closing NO and standard NO. Stack up to 4 blocks unless otherwise noted.	10250T57 ③ ④		—		10250T57E ③		—	
	2LONC	Two late opening NC contacts. Stack up to 6 blocks unless otherwise noted.	10250T45 ③		—		10250T45E ③		—	
	LONC-ECNO	Overlapping contacts. Stack up to 4 blocks unless otherwise noted.	10250T55 ③ ④		—		10250T55E ③		—	

Special Purpose Blocks ⑤

	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to 4 blocks unless otherwise noted.	10250T44 ⑤		—					
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① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.

② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5” (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.

③ Special function contact blocks are not suitable for use with roto-push operators, 3-position push-pull operators, or 4-position selector switches.


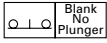
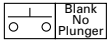
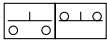
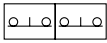
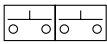
④ ECNO contact blocks are not suitable for use with 2-position joysticks or when operators are used with padlock attachments.

⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with 3-position push-pull operators only on low voltage (30V or less) circuits.

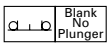
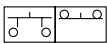
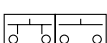
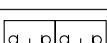
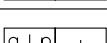
Ratings **Page 47-116**
 Dimensions **Pages 47-160 – 47-162**
 Discount Symbol **1CD1C**

Contact Blocks (Continued)

Table 47-298. Contact Blocks with Fingerproof Shrouds

Symbol	Circuit	Description/ Notes ①	 10250T1CP	Standard		Logic Level	
				Pressure Terminals ②		Pressure Terminals ②	
				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
 Blank No Plunger	1NC	Stack up to 6 blocks (6 circuits) unless otherwise noted.	10250T51P		10250T51EP		
 Blank No Plunger	1NO	Stack up to 6 blocks (6 circuits) unless otherwise noted.	10250T53P		10250T53EP		
	NO-NC	Stack up to 6 blocks (12 circuits) unless otherwise noted.	10250T1P		10250T1EP		
	2NC	Stack up to 6 blocks (12 circuits) unless otherwise noted.	10250T3P		10250T3EP		
	2NO	Stack up to 6 blocks (12 circuits) unless otherwise noted.	10250T2P		10250T2EP		

Special Function Blocks ③

 Blank No Plunger	LONC	Late opening NC. Stack up to 6 blocks (6 circuits) unless otherwise noted.	10250T71P ③		10250T71EP ③	
	ECNO-NC	Early closing NO and standard NC. Stack up to 6 blocks unless otherwise noted.	10250T47P ③ ④		10250T47EP ③	
	ECNO-NO	Early closing NO and standard NO. Stack up to 4 blocks unless otherwise noted.	10250T57P ③ ④		10250T57EP ③	
	2LONC	Two late opening NC contacts. Stack up to 6 blocks unless otherwise noted.	10250T45P ③		10250T45EP ③	
	LONC-ECNO	Overlapping contacts. Stack up to 4 blocks unless otherwise noted.	10250T55P ③ ④		10250T55EP ③	

① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.

② To order contact blocks with translucent amber housing, change Suffix P to **CP** in Catalog Number e.g. **10250T51CP**.

③ Special function contact blocks are not suitable for use with roto-push operators, 3-position push-pull operators, or 4-position selector switches.

④ ECNO contact blocks are not suitable for use with 2-position joysticks or when operators are used with padlock attachments.