### **Heavy-Duty Plug-In Switches**

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E50 Modular Plug-In Limit Switch Components are the industry standard with versatility of design and high reliability for low maintenance, installation and inventory costs. Standard Viton gaskets, seals and boots and a zinc die cast enclosure provide exceptional chemical resistance to the common coolants, cleansing agents, and hydraulic fluids found in machine tool, automotive, waste water treatment and other heavy-duty industrial applications. Mounting dimensions accommodate both U.S. and DIN standards for easy retrofit installations. Super bright 24 - 120V AC/DC LED indicating light versions simplify setup and troubleshooting operations.

## **Approvals**

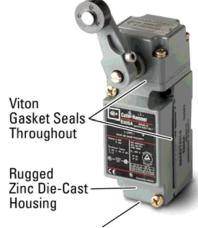
- UL Listed
- CSA Certified
- IEC.947.5.1
- TUV E9271605E02

C € (where shown)

For the most current information on this product, visit our web site at: www.sensingsolutions.com

### Modular Limit Switches Provide Extremely Easy Installation, High Reliability, and Low Maintenance and Inventory Costs

Available as Assembled Switches or Components



Conduit, Cable and Connector Wiring Options



Dozens of Operators to Perfectly Fit Your Application



Rotary, Top and Side Push, Wobble and Specialty Operating Heads



Single or Double Pole Switch Bodies with Optional Indicating Lights



A Variety of Receptacles Meet Your Wiring Needs

### **Product Features**

- Modular, plug-in components (head, body and receptacle) provide application flexibility, reduced inventory and less downtime
- Manufactured to take the physical and environmental abuse (including cutting fluids and chemicals) of harsh industrial environments
- Chemical resistant Viton gaskets, seals and boots are standard, and so are captive, posi-drive screws
- The switches have terminal identification on the nameplate for a visual wiring checkout without guesswork. Heads and switch bodies can be replaced without rewiring
- E50 devices can be ordered in separate components or as complete assembled switches
- 600V rating, ridge-topped contacts and wiping action assure continuity even to logic level circuits
- Keyed, four direction head positioning
- Standard 5° pre-travel and 90° total travel
- 24 120V AC/DC LED and 120V AC neon indicating lights available
- Rotary heads are field convertible CW, CCW, or both, without special tools
- Epoxy filled, pin connector or pigtail pin connector receptacles available

For Customer Service in the U.S. call **1-800-356-1243**, in Canada call **1-800-268-3578**. For Application Assistance in the U.S. and Canada call **1-800-426-9184**.



#### Model Selection — Assembled Switches — Standard

Assembled Switch		Single Pole (5 Terminal Receptacle)			Double Pole (9 Terminal Rec	eptacle)			
	Indicating Light:	None	LED (24 – 120V AC/DC)	Neon (120V AC)	None	LED (24 – 120V AC/DC)	Neon (120V AC)	LED (24 – 120V AC/DC)	Neon (120V AC)
3	Switch Body:	E50SA 1N.O1N.C.	E50SAL 1N.O1N.C.	E50SAN 1N.O1N.C.	E50SB 2N.O2N.C.	E50SBL 2N.O2N.C.	E50SBN 2N.O2N.C.	E50SCL 1N.O2N.C.	E50SCN 1N.O2N.C.
	Receptacle: ①	E50RA	E50RA	E50RA	E50RB	E50RB	E50RB	E50RB	E50RB
Operating Head Type	2	Catalog Numl	ber for Assemb	led Switches					
Side Rotary (requires an operating lever, see <b>PG.05C.04.T.E</b> )	Standard Spring Return — E50DR1 ③	E50AR1	E50ALR1	E50ANR1	E50BR1	E50BLR1	E50BNR1	_	E50CNR1
see Pd.03G.04.1.E)	Low Force Spring Return — E50DL1 ③	E50AL1 <b>C</b> €	E50ALL1	E50ANL1	E50BL1	E50BLL1	E50BNL1	E50CLL1	E50CNL1
	Maintained Two-Position — E50DM1	E50AM1 <b>C</b> €	E50ALM1	E50ANM1	E50BM1	E50BLM1	E50BNM1	E50CLM1	E50CNM1
Side Pushbutton, Spring Return — E50DS1		E50AS1 C €	E50ALS1	E50ANS1	E50BS1	E50BLS1	E50BNS1	E50CLS1	E50CNS1
Side Pushbutton, Adjustable Spring Return — E50DS2		E50AS2 <b>C</b> €	E50ALS2	E50ANS2	E50BS2	E50BLS2	E50BNS2	E50CLS2	E50CNS2
Side Push Roller, Spring Return — E50DS3 @		E50AS3 C €	E50ALS3	E50ANS3	E50BS3	E50BLS3	E50BNS3	E50CLS3	E50CNS3
Side Pushbutton, Maintained — E50DH1		E50AH1 C €	E50ALH1	E50ANH1	E50BH1	E50BLH1	E50BNH1	E50CLH1	E50CNH1
	Wiring:	Single Pole 11 Must be same polarity		0 2	Double Pole 2 Parallel wired Indicator light Same polarity each pole	l 10- t 204	5 6 7 8	Double Pole 1 Series wired Indicator ligh Same polarity each pole	$-\Box$

 $^{\odot}$  Connection options (add the Code Suffix from the table below to the end of the Catalog Number):

Option		Code Suffix	
Mini-Connector	Single Pole (5-Pin Mini-Connector)	P5	
(with epoxy filled receptacle)	Double Pole (9-pin Mini-Connector)	P9	
Cable Connection	8-foot cable length	S	
(with epoxy filled receptacle)	12-foot cable length	S12	
	20-foot cable length	S20	
Manifold Mount (rear wiring entrance)			
20 mm Conduit Entrance		20	

② For Operating Head specifications, see Page 5.



③ CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.

<sup>®</sup> Roller can be converted in the field between horizontal and vertical.

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### Model Selection — Assembled Switches — Standard (Continued)

Single Pole

Assembled Switch		Single Pole (5 Terminal Receptacle)			Jouble Pole (9 Terminal Rec	eptacle)		Jan	
	Indicating Light:	None	LED (24 – 120V AC/DC)	Neon (120V AC)	None	LED (24 – 120V AC/DC)	Neon (120V AC)	LED (24 – 120V AC/DC)	Neon (120V AC)
	Switch Body:	E50SA 1N.O1N.C.	E50SAL 1N.O1N.C.	E50SAN 1N.O1N.C.	E50SB 2N.O2N.C.	E50SBL 2N.O2N.C.	E50SBN 2N.O2N.C.	E50SCL 1N.O2N.C.	E50SCN 1N.O2N.C.
	Receptacle: ①	E50RA	E50RA	E50RA	E50RB	E50RB	E50RB	E50RB	E50RB
Operating Head Type	2	Catalog Numl	ber for Assemb	led Switches					
Top Pushbutton, Spring Return — E50DT1		E50AT1	E50ALT1	E50ANT1	E50BT1	E50BLT1	E50BNT1	E50CLT1	E50CNT1
Top Pushbutton, Adjustable Spring Return — E50DT2		E50AT2	E50ALT2	E50ANT2	E50BT2	E50BLT2	E50BNT2	E50CLT2	E50CNT2
Top Push Roller, Spring Return — E50DT3		E50AT3	E50ALT3	E50ANT3	E50BT3	E50BLT3	E50BNT3	E50CLT3	E50CNT3
Wobble Head, Spring Return (requires a wobble operator, see PG.05C.04.T.E)	Standard Duty — E50DW1	E50AW1	E50ALW1	E50ANW1	E50BW1	E50BLW1	E50BNW1	E50CLW1	E50CNW1
The state of the s	Heavy-Duty High Strength Steel — E50DW2	E50AW2	E50ALW2	E50ANW2	E50BW2	E50BLW2	E50BNW2	E50CLW2	E50CNW2
	Wiring:	Single Pole 11 Must be same polarity	N.O1N.C.	° 2 4	Double Pole 2 Parallel wired Indicator ligh Same polarity each pole	l t 10-	5 6 7 8	Double Pole 1 Series wired Indicator light Same polarity each pole	

Double Pole

Option			
Mini-Connector	Single Pole (5-Pin Mini-Connector)	P5	
(with epoxy filled receptacle)	Double Pole (9-pin Mini-Connector)	P9	
Cable Connection	8-foot cable length	S	
(with epoxy filled receptacle)	12-foot cable length	S12	
	20-foot cable length	S20	
Manifold Mount (rear wiring entrance)			
20 mm Conduit Entrance		20	

② For Operating Head specifications, see Page 5.

Roller can be converted in the field between horizontal and vertical.



<sup>®</sup> CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.

# Limit Switches Heavy-Duty Plug-In Switches

June 2000

### Model Selection — Assembled Switches — Special Purpose

	Operating Data — Nominal	Catalog Numb	Catalog Number			Circuit Diagram
		Assembled Switch	Switch Body Only	Receptacle Only	Operating Head Only	
Neutral Position	5° Travel	E50NN1	E50SN	E50RB	E50DN1	Same Polarity
(requires an operating lever, see <b>PG.05C.04.T.E</b> )	15° Travel	E50NN2	E50SN	E50RB	E50DN2	Each Pole
	Travel to Operate Contacts: Travel to Reset Contacts: Total Travel: Force to Operate Contacts: Minimum Return Force: Operating Temperature:	5° or 15° (depending upon model selected) 2° 90° 1.8 in-lbs 2.5 in-oz 14° to 200°F (-10° to 94°C)				1 CW 5 6 6 3 7 4 8 8
Two Step CW, CCW or		E50TD1	E50ST	E50RB	E50DD1	Same Polarity
both, Convertible (requires an operating lever, see <b>PG.05C.04.T.E</b> )	Travel to Operate Contacts: Travel to Reset Contacts: Total Travel: Force to Operate Contacts: Minimum Return Force: Operating Temperature:	1st Step 10°; 2nd Step 10° 4° Each 90° 3 in-lbs 4.5 in-oz CW or CCW: 14° to 250°F (-10° to 121°C) CW and CCW: 14° to 200°F (-10° to 94°C)			Each Pole  1	
Gravity Return (requires E50KL220,	without Indicating Light	E50GG1	E50SG	E50RA	E50DG1	Must Be Same
E50KL226 or equivalent	with LED Indicating Light (24-120V AC/DC)	E50GLG1	E50SGL			Polarity
operating lever, see PG.05C.04.T.E)	with Neon Indicating Light (120V AC)	E50GNG1	E50SGN			
	Travel to Operate Contacts: Travel to Reset Contacts: Total Travel: Force to Operate Contacts: Minimum Return Force: Operating Temperature:	10° to 170° 8° 90° 1.8 in-lbs 2.5 in-oz 14° to 200°	F (-10° to 94°C	;)		10 02

#### Model Selection — Operating Heads

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Description		Travel to	Travel to	Total	Force to	Minimum	Operating Temperature ①		Catalog
		Operate Contacts	Reset Contacts	Travel	Operate Contacts	Return Force	Without Cable	With Pre-Wired Cable	Number
Side Rotary (requires an operating lever, see	Standard Spring Return ②	5°	2°	90°	3 in-lbs	4.5 in-oz	10° to 200°F (-12° to 94°C) ③	10° to 200°F (-12° to 94°C) ③	E50DR1
PG.05C.04.T.E)	Low ② Temperature Spring Return	5°	2°	90°	3 in-lbs	4.5 in-oz	-40° to 175°F (-40° to 79°C)	-31° to 175°F (-34° to 79°C)	E50DR19
	Low Force Spring Return ②	15°	6°	90°	1.5 in-lbs	2.5 in-oz	10° to 200°F (-12° to 94°C) ③	10° to 200°F (-12° to 94°C) 3	E50DL1
	Maintained Two-Position	50°	50°	90°	3 in-lbs	_	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	E50DM1
Side Pushbutton, Spring Return		0.065 inch	0.030 inch	0.250 inch	4 lbs	8 oz	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	E50DS1
Side Pushbutton, Adjustable Spring Return		0.065 inch	0.030 inch	0.250 inch	4 lbs	8 oz	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	E50DS2
Side Push Roller, Spring Return ®		0.065 inch	0.030 inch	0.250 inch	4 lbs	8 oz	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DS3</b> ⑤
									<b>E50DS4</b> ⑤
Side Pushbutton, Maintained	8	0.200 inch	0.130 inch	0.320 inch	5 lbs	5 lbs	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	E50DH1
Top Pushbutton, Spring Return		0.040 inch	0.020 inch	0.280 inch	4 lbs	8 oz	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	E50DT1
Top Pushbutton, Adjustable Spring Return		0.040 inch	0.020 inch	0.280 inch	4 lbs	8 oz	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	E50DT2
Top Push Roller, Spring Return		0.040 inch	0.020 inch	0.280 inch	4 lbs	8 oz	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	E50DT3
Wobble Head, Spring Return (requires a wobble operator, see PG.05C.04.T.E)	Standard Duty	10°	6°	15°	2 in-lbs	2.4 in-oz	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	E50DW1
	Heavy-Duty High Strength Steel	10°	6°	15°	2 in-lbs	2.4 in-oz	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	E50DW2

- ① Temperature ranges below +32°F (0°C) are based on absence of freezing moisture or water.
- ② CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.
- ⑤ For CW and CCW operation. For CW only or CCW only operation, high temperature limit increases to 250°F (121°C) without cable, and 221°F (105°C) with prewired cable.
- Roller can be converted in the field between horizontal and vertical.
- ⑤ Roller shaft is 0.38 inches (9.5 mm) longer on E50DS4, see dimensions on Page 11.



#### Model Selection — Switch Bodies

	Circuit	Switch Body Construction	Catalog Number
Switch Bodies	Single Pole 1N.O1N.C. Must Be Same Polarity ①	Without Indicating Light	E50SA C E
	10 02	With LED Indicating Light 24 – 120V AC/DC	E50SAL
100 mm		With Neon Indicating Light 120V AC	E50SAN
	Double Pole 2N.O2N.C. Parallel Wired Ind. Light Same Polarity Each Pole	Without Indicating Light	E50SB
3 4 4		With LED Indicating Light 24 – 120V AC/DC	E50SBL
	30 0 07	With Neon Indicating Light 120V AC	E50SBN
00-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	Double Pole 2N.C1N.O. Series Wired Ind. Light Same Polarity Each Pole	With LED Indicating Light 24 – 120V AC/DC	E50SCL
	10 5 5 6	With Neon Indicating Light 120V AC	E50SCN
	3 7 8 8		

① Indicating lights are supplied from the factory wired as shown. However, they can easily be reconnected to terminals 1 and 2 if necessary (SPDT).



	Description	Poles	Conduit Entrance	Cable Length	Catalog Number	Wiring
Surface Mount	Conduit entrance, front or rear	Single Pole	1/2 NPT	_	E50RA	1)
	mounting	(5 Terminal)	20 mm	_	E50RA20	
2 3		Double Pole	1/2 NPT	_	E50RB	0
		(9 Terminal)	3/4 NPT	_	E50RB34	
			20 mm	_	E50RB20	
Manifold Mount	Rear wiring entrance instead of conduit hole, gasket on back for oil tightness	Single Pole (5 Terminal)	_	_	E50RAM	0
		Double Pole	_	_	E50RBM	•
		(9 Terminal)				
Mini-Connector	Epoxy filled receptacle with prewired Mini-Connector. (The -W version is a wiring scheme typically used in automotive applications.)	Single Pole (5 Terminal)	5-pin Mini- Connector	_	E50RAP5	RED 1 2 ORANGE WHITE 3 BLACK  1 0 5  2 0 A  3 GREEN ENDONE
					E50RAP5-W	WHITE 1 2 BLACK  RED 0 ORANGE  1 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
		Double Pole (9 Terminal)	9-pin Mini- Connector	_	E50RBP9	RED/BLK 1 S WHT/BLK GRN/BLK 2 O 6 RED ORANGE 3 7 BLACK BLUE 4 8 WHITE  1 0 7 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Prewired Cable	Epoxy filled receptacle with prewired	Single Pole	1/2 NPT	8-foot	E50RAS	②
	16 gauge, yellow jacketed, type SOOW-A cable. Cable enters through	(5 Terminal)		12-foot	E50RAS12	WHITE 1 2 BLACK
	hole threaded for conduit			20-foot	E50RAS20	RED 3 ORANGE
A			20 mm	8-foot	E50RA20S	GREEN
				12-foot	E50RA20S12	— GND
150				20-foot	E50RA20S20	
		Double Pole	1/2 NPT	8-foot	E50RBS	© WHITE 0 5 BROWN
		(9 Terminal)		12-foot	E50RBS12	BLACK 2 6 PINK
				20-foot	E50RBS20	RED 3 YELLOW
			20 mm	8-foot	E50RB20S	ORANGE OBLUE
				12-foot	E50RB20S12	GREEN
				20-foot	E50RB20S20	GND

- ① See Model Selection Switch Bodies for wiring information.
- ② The wire colors referenced on these diagrams are those internal to the switch itself.



#### Model Selection — Accessories

Dimensions	Description	Catalog Number
Adapter Plate E50 ATTACHING HOLES (2)  THICK  E50 ATTACHING HOLES (2)  THICK  E50 ATTACHING HOLES (2)  THICK  E50 ATTACHING HOLES (2)  F10 ATTACHING HOLES (2)	Allows E50 to replace Cutler-Hammer 10316 Type LP Surface Mounting Plug-In Limit Switch	E50KH1
2 HOLES 5.10 [0.20] 29.4 [1.156]	Allows E50 to replace Cutler-Hammer 10316 Type LP Manifold Mounting Plug-In Limit Switch	E50KH1M
Adapter Plate	Allows E50 to replace Square D Type AW Surface Mounting Non Plug-In Standard Box Limit Switch	E50KH7
Adapter Plate 46 [1.81] 13.1 [0.515] 13.1 [0.515] 14.62] 17.81	Allows E50 to replace National Acme, Type D-1200M, Style 2 Mounting. Denison LoxSwitch, Model L-100W, Style 2 Mounting. Square D 9007 Type T, Style B Mounting. (Adapter plate is 1/8 inch thick, with 1/4 inch mounting holes.)	<b>E50KH4</b> ①
Adapter Plate 71.4 [2.25] 16.7 [0.66] 74.6 [2.94]	Allows E50 to replace National Acme, Type D-1200M, Style 1 Mounting. Denison LoxSwitch, Model L-100W, Style 1 Mounting. Square D 9007 Type T, Style C Mounting. (Adapter plate is 1/8 inch thick, with 1/4 inch mounting holes.)	<b>E50KH5</b> ①
Adapter Plate  0.52 DIA.  [0.204] 2 HOLES E50 MTG. HOLES 3.00 [0.12] THICK 10-32 UNC-2B 2 HOLES [1.41]	Allows E50 to replace Cutler-Hammer 10316 Type LT Non Plug-In 2-Pole Limit Switch	E50KH2
Adapter Plate (1.54) (1.54) (2.5) (1.59) (1.	Allows E50 to replace Allen-Bradley 802M Sealed Limit Switch	E50KH10



### **Model Selection** — **Accessories (Continued)**

Dimensions	Description	Catalog Number
Adjustable Mounting Plate 95 25.4 [1.00] ADJ. 19 [0.75] 79 [3.10] 79.4 [3.13] ADJ.	This is a mounting plate only 5/16 inch thick and includes the proper mounting bolts and nuts. The slots in the plate allow a maximum horizontal adjustment of 1 inch and vertical adjustment of 1-1/4 inches	<b>E50KH3 ①</b>
Jumpers for Two-Pole Receptacles  Single CONNECTOR  DOUBLE CONNECTOR	Jumpers for series, parallel or series-parallel connection of 2-pole limit switches. Kit consists of one double and four single connectors. Photo shows installation of double connector, two screws removed for clarity	E50KH8
Conduit Sealing Nut	1/2 inch oiltight	E50KH6

① Limit Switch not included.

### **Specifications**

ороонношноно	
Environmental Ratings	NEMA 1, 3, 3S, 4, 4X, 6, 6P, 13, IP67
Enclosure Construction	Zinc die cast
Switch Gasket Material	Viton ®
Universal U.S./DIN Mounting Dimensions	1.16 in (30 mm) x 2.34 in (60 mm)
Conduit Entrance	1/2 in NPT or 20 mm threading
Contact Ratings	See below
Contact Operation	Snap action over center mechanism
Contact Material	Fine silver
Maximum Frequency of Operation	8000 operations per hour
Mechanical Life: Side Rotary Side or Top Push	13,000,000 operations minimum 10,000,000 operations minimum
Electrical Life: Single Pole Double Pole	1,000,000 operations typical at full load 100,000 operations typical at full load
Ambient Temperature Range — Standard Standard without Cable Standard with Cable Low Temperature without Cable Low Temperature with Cable	14° to 250°F (-10° to 121°C) 14° to 221°F (-10° to 105°C) -40° to 250°F (-40° to 121°C) -40° to 221°F (-40° to 105°C)
Repeat Accuracy — Standard Side Operated Top Operated Side Rotary	Within 0.0012 in Within 0.0003 in Within 0.0014 in
Torque Requirements: Switch Body Screws Operating Head Screws	25 – 30 lb-in 14 – 18 lb-in
Wire Size	Will accept AWG #22 – #12, single or stranded wire

### Electrical Data — Maximum Contact Ratings (Same polarity each pole)

AC Volts	Current, Amperes			Voltamperes		DC Volts	Current, Amperes	
	Make	Break	Cont. ①	Make	Break		Max. Make or Break	Cont. ①

#### **All Switches Except Gravity Return and Indicating Light Versions**

NEMA A600 Rating						NEMA R300			
120 240 480 600	60 30 15 12	6 3 1.5 1.2	10	7200	720	125 250	0.22 0.11	1.0 1.0	

#### Switches with Indicating Lights (LED or Neon)

		NEMA A1	50 Rating				NEMA R150				
120	60	6	10	7200	720	125	0.22	1.0			

### Gravity Return Switches — Maximum Contact Ratings

NEMA 6600 Rating — Contacts on Same Polarity						_			
120 240 480 600	30 15 7.5 6	3 1.5 0.75 0.60	5	3600	360	_	_	_	

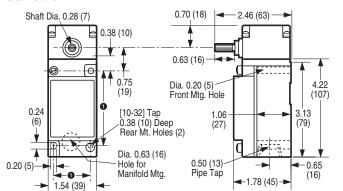
 $<sup>\</sup>ensuremath{\mathbb{O}}$  Thermal rating. Valid only if switch does not have to make or break.



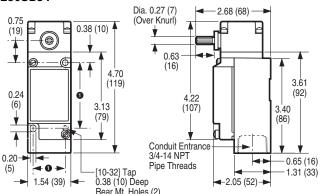
#### **Approximate Dimensions in Inches (mm)**

#### Standard

11



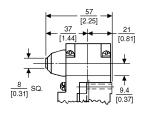
### E50SB34



• Can accommodate both U.S., 1.16 (29.4) x 2.34 (59.5) and DIN, 1.18 (30) x 3.26 (60), mounting dimensions.

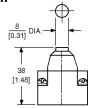
### Side Push Operators in mm [Inches]

#### **Pushbutton**



### Top Push Operators in mm [Inches]

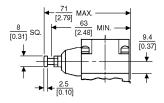
# Pushbutton



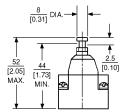
### **Wobble Operators**

See Operators in PG.05C.04.T.E

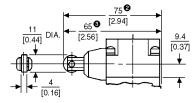
### **Adjustable Pushbutton**



#### **Adjustable Pushbutton**

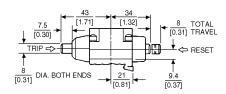


### Roller



- For E50DS4.
- For E50DS3.

### **Maintained Pushbutton**



### Roller

