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E50 Heavy-Duty Factory Sealed 6P+ Switches

Contents

Drawings Online

E50 Heavy-Duty Factory Sealed 6P+ Switches

Product Description

E50 6P+ Limit Switches by Eaton's electrical sector were specifically designed to withstand the penetrating properties of cutting fluids and coolants, such as those used in the automotive industry, as well as extreme shock, vibration and temperature fluctuations. The one-piece, epoxy filled switch body is prewired at the factory to ensure leak-proof, submersible performance. This unique construction positively stops fluid from finding its way to any and all critical connections.

Our 6P+ switches can be ordered in separate components or as complete assembled devices. They are available with prewired 16 AWG cables or mini-connectors. Standard and custom cable lengths are available. As part of the E50 line, the 6P+ switches use the same operating heads as the standard E50 plug-in models to reduce the components you need to inventory.

Features

- Manufactured to take the physical and environmental abuse (including cutting fluids and chemicals) of harsh industrial environments
- Modular, plug-in components (head and switch body) provide application flexibility, reduced inventory and less downtime
- Chemical resistant Viton gaskets, seals and boots are standard, and so are captive, posi-drive screws
- A special tertiary seal on the switch body prevents fluid from entering even when the operating head is not attached

- 600V rating, ridge-topped contacts and wiping action assure continuity even to logic level circuits
- Factory wired cable features a 350 pound pullout capacity
- Keyed, four direction head positioning. Standard 5° pre-travel and 90° total travel
- 24–120 Vac/Vdc LED and 120 Vac neon indicating lights available
- Rotary heads are field convertible CW, CCW, or both, without special tools

Standards and Certifications

- UL Listed
- CSA Certified
- IEC.947.5.1
- TUV—E9271605E02
- CE (where shown)

UL CSA CE

Safety Note

⚠ **Unless otherwise noted, the products contained in this document are not designed or intended for use in human safety applications.**

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

For Customer Service in the U.S. call **1-877-ETN CARE (386-2273)**, in Canada call **1-800-268-3578**. For Application Assistance in the U.S. and Canada call **1-800-426-9184**.

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Product Selection

Assembled Switches—Standard

Connection is by 8 ft cable ①.

Assembled Switch

Lever sold separately

E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard

	Single-Pole			Two-Pole		
Indicating Light:	**None**	**LED (24–120 Vac/Vdc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/Vdc)**	**Neon (120 Vac)**
Switch Body:	**E50SA6P 1NO-1NC**	**E50SAL6P 1NO-1NC**	**E50SAN6P 1NO-1NC**	**E50SB6P 2NO-2NC**	**E50SBL6P 2NO-2NC**	**E50SBN6P 2NO-2NC**
Description	**Assembled Switch Catalog Number**			**Assembled Switch Catalog Number**		

Operating Head Type ②

Side Rotary

Side Rotary (requires an operating lever, see **section 46.8**)						
Standard spring return—E50DR1 ③ CE	E50AR16P	E50ALR16P	E50ANR16P	E50BR16P	E50BLR16P	E50BNR16P
Low force spring return—E50DL1 ③ CE	E50AL16P	E50ALL16P	E50ANL16P	E50BL16P	E50BLL16P	E50BNL16P
Maintained two-position—E50DM1 CE	E50AM16P	E50ALM16P	E50ANM16P	E50BM16P	E50BLM16P	E50BNM16P
Side Pushbutton						

Spring Return

Spring return—E50DS1 CE	E50AS16P	E50ALS16P	E50ANS16P	E50BS16P	E50BLS16P	E50BNS16P

Adjustable Spring Return

Adjustable spring return—E50DS2 CE	E50AS26P	E50ALS26P	E50ANS26P	E50BS26P	E50BLS26P	E50BNS26P

Circuit Diagrams, see **Page 91**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Catalog Number	Code Suffix
Mini-connector ④	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**C**
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**C**
Cable connection	12 ft cable length (standard)	—	**12**
	20 ft cable length (standard)	—	**20**
	Other lengths (special order)	—	**Length in ft**

② For operating head specifications, see **Page 86**.
③ CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.
④ For a full selection of connector cables, see **Tab 54**, **section 54.1**.

Connection is by 8 ft cable ①.

Assembled Switch

E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard, continued

Lever sold separately

	Single-Pole			Two-Pole		
Indicating Light:	**None**	**LED (24–120 Vac/Vdc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/Vdc)**	**Neon (120 Vac)**
Switch Body:	**E50SA6P** **1NO-1NC**	**E50SAL6P** **1NO-1NC**	**E50SAN6P** **1NO-1NC**	**E50SB6P** **2NO-2NC**	**E50SBL6P** **2NO-2NC**	**E50SBN6P** **2NO-2NC**

Operating Head Type ②

Description	**Assembled Switch Catalog Number**			**Assembled Switch Catalog Number**		
Side Push Roller						
Spring return— E50DS3 ③	**E50AS36P** C E	**E50ALS36P**	**E50ANS36P**	**E50BS36P**	**E50BLS36P**	**E50BNS36P**
Side Pushbutton						
Maintained— E50DH1	**E50AH16P** C E	**E50ALH16P**	**E50ANH16P**	**E50BH16P**	**E50BLH16P**	**E50BNH16P**
Top Pushbutton						
Spring return— E50DT1	**E50AT16P** C E	**E50ALT16P**	**E50ANT16P**	**E50BT16P**	**E50BLT16P**	**E50BNT16P**
Adjustable spring return—E50DT2	**E50AT26P** C E	**E50ALT26P**	**E50ANT26P**	**E50BT26P**	**E50BLT26P**	**E50BNT26P**

Side Push Roller

Side Pushbutton

Spring Return

Adjustable Spring Return

Circuit Diagrams, see **Page 91**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Catalog Number	Code Suffix
Mini-connector ④	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**C**
	Two-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**C**
Cable connection	12 ft cable length (standard)	—	**12**
	20 ft cable length (standard)	—	**20**
	Other lengths (special order)	—	**Length in ft**

② For operating head specifications, see **Page 86**.
③ Roller can be converted in the field between horizontal and vertical.
④ For a full selection of connector cables, see **Tab 54**, **section 54.1**.

Connection is by 8 ft cable ①.

Assembled Switch

Lever sold separately

E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard, continued

	Single-Pole			Two-Pole		
Indicating Light:	**None**	**LED (24–120 Vac/Vdc)**	**Neon (120 Vac)**	**None**	**LED (24–120 Vac/Vdc)**	**Neon (120 Vac)**
Switch Body:	**E50SA6P 1NO-1NC**	**E50SAL6P 1NO-1NC**	**E50SAN6P 1NO-1NC**	**E50SB6P 2NO-2NC**	**E50SBL6P 2NO-2NC**	**E50SBN6P 2NO-2NC**
Description	**Assembled Switch Catalog Number**			**Assembled Switch Catalog Number**		
Top Push Roller						
Spring return— E50DT3	**E50AT36P** CE	**E50ALT36P**	**E50ANT36P**	**E50BT36P**	**E50BLT36P**	**E50BNT36P**
Wobble Head, Spring Return (requires a wobble operator, see **section 46.8**)						
Standard duty— E50DW1	**E50AW16P** CE	**E50ALW16P**	**E50ANW16P**	**E50BW16P**	**E50BLW16P**	**E50BNW16P**
Heavy-duty high strength steel— E50DW2	**E50AW26P** CE	**E50ALW26P**	**E50ANW26P**	**E50BW26P**	**E50BLW26P**	**E50BNW26P**

Operating Head Type ②

Top Push Roller

Wobble Head, Spring Return

Circuit Diagrams, see **Page 91**.

Notes

① Connection options (add the code suffix from the table below to the end of the catalog number):

Option		Catalog Number	Code Suffix
Mini-connector ③	Single-pole (5-pin mini-connector)	**CSMS5D5CY1602**	**C**
	Double-pole (9-pin mini-connector)	**CSMS9D9CY1602**	**C**
Cable connection	12 ft cable length (standard)	—	**12**
	20 ft cable length (standard)	—	**20**
	Other lengths (special order)	—	**Length in ft**

② For operating head specifications, see **Page 86**.
③ For a full selection of connector cables, see **Tab 54**, **section 54.1**.

Operating Heads

E50 Heavy-Duty Factory Sealed 6P+ Switches, Operating Heads

Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature [1]		Catalog Number
						Without Cable	With Pre-wired Cable	
Side Rotary (requires an operating lever, see **section 46.8**)								
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**
Low temperature spring return [2]	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 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (−10° to 94°C)	14° to 200°F (−10° to 94°C)	**E50DS1**
Adjustable spring return	0.065 in	0.030 in	0.250 in	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 [4]	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (−10° to 94°C)	14° to 200°F (−10° to 94°C)	**E50DS3** [5]
	0.065 in	0.030 in	0.250 in	4 lbs	8 oz	14° to 200°F (−10° to 94°C)	14° to 200°F (−10° to 94°C)	**E50DS4** [5]
Side Pushbutton								
Maintained	0.200 in	0.130 in	0.320 in	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 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (−10° to 121°C)	14° to 221°F (−10° to 105°C)	**E50DT1**
Adjustable spring return	0.040 in	0.020 in	0.280 in	4 lbs	8 oz	14° to 250°F (−10° to 121°C)	14° to 221°F (−10° to 105°C)	**E50DT2**

The image column on the left contains labels:

Side Rotary

Spring Return

Adjustable Spring Return

Side Push Roller

Side Pushbutton

Spring Return

Adjustable Spring Return

Notes

[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.

[3] 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 pre-wired cable.

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

[5] Roller shaft is 0.38 in (9.5 mm) longer on E50DS4, see Dimensions on **Page 92**.

E50 Heavy-Duty Factory Sealed 6P+ Switches, Operating Heads, continued

	Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature [1]		Catalog Number
							Without Cable	With Pre-Wired Cable	
Top Push Roller	**Top Push Roller**								
	Spring return	0.040 in	0.020 in	0.280 in	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	**Wobble Head, Spring Return** (requires a wobble operator, see **section 46.8**)								
	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**

Circuit Diagrams, see **Page 91**.

Switch Bodies

E50 Heavy-Duty Factory Sealed 6P+, Switch Bodies

	Circuit	Switch Body Construction	Cable Length	Catalog Number
Pre-Wired Cable	**Pre-Wired Cable**			
	Single-pole 1NO-1NC	Without indicating light	8 ft	**E50SA6P**
			12 ft	**E50SA6P12**
			20 ft	**E50SA6P20**
		With LED indicating light 24 –120 Vac/Vdc	8 ft	**E50SAL6P**
			12 ft	**E50SAL6P12**
			20 ft	**E50SAL6P20**
		With neon indicating light 120 Vac	8 ft	**E50SAN6P**
			12 ft	**E50SAN6P12**
			20 ft	**E50SAN6P20**
	Two-pole 2NO-2NC	Without indicating light	8 ft	**E50SB6P**
			12 ft	**E50SB6P12**
			20 ft	**E50SB6P20**
		With LED indicating light 24–120 Vac/Vdc	8 ft	**E50SBL6P**
			12 ft	**E50SBL6P12**
		With neon indicating light 120 Vac	8 ft	**E50SBN6P**
			12 ft	**E50SBN6P12**
			20 ft	**E50SBN6P20**
Mini-Connector	**Mini-Connector**			
	Single-pole 1NO-1NC	Without indicating light normal wiring	—	**E50SA6PC** ⊙
		Without indicating light alternate wiring	—	**E50SA6PC-W** ⊙
		With LED indicating light 24–120 Vac/Vdc	—	**E50SAL6PC** ⊙
		With neon indicating light 120 Vac	—	**E50SAN6PC** ⊙
	Two-pole 2NO-2NC	Without indicating light	—	**E50SB6PC** ⊛
		With LED indicating light 24–120 Vac/Vdc	—	**E50SBL6PC** ⊛
		With neon indicating light 120 Vac	—	**E50SBN6PC** ⊛

Notes

⊙⊛ See listing of compatible connector cables on **Page 88**.

[1] Temperature ranges below 32°F (0°C) are based on absence of freezing moisture or water.

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Compatible Connector Cables

Standard Cables [1]

Mini-Style, Straight Female

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/Wire Colors (Face View Female Shown)		Catalog Number
Mini-Style, Straight Female							
8A	—	5-pin	16 AWG	6 ft (2m)		1-White 2-Red 3-Green 4-Orange 5-Black	**CSMS5D5CY1602**
7A	—	9-pin	16 AWG	12 ft (4m)		1-Orange 2-Blue 3-Red/Black 4-Green/Black 5-White 6-Red 7-Green 8-White/Black 9-Black	**CSMS9D9CY1602**

Accessories

E50 Heavy-Duty Factory Sealed 6P+ Switch Accessories

	Catalog Number
Adapter Plate	
Allows E50 to replace Eaton's 10316 Type LP Manifold Mounting Plug-In Limit Switch	**E50KH1M**
Allows E50 to replace Square D Type AW Surface Mounting Non Plug-In Standard Box Limit Switch	**E50KH7**

E50KH1M

E50KH7

Dimensions, see **Page 92**.

Note

[1] For a full selection of connector cables, see **Tab 54**, **section 54.1**.

E50 Heavy-Duty Factory Sealed 6P+ Switch Accessories, continued

		Catalog Number

Adapter Plate, continued

E50KH4

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 in thick, with 1/4 in mounting holes.) Namco® long mount.

E50KH4 ①

E50KH5

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 in thick, with 1/4 in mounting holes.)

E50KH5 ①

E50KH2

Allows E50 to replace Eaton's 10316 Type LT Non Plug-In Two-Pole Limit Switch

E50KH2

E50KH10

Allows E50 to replace Allen-Bradley 802M Sealed Limit Switch

E50KH10

Adjustable Mounting Plate

E50KH3

This is a mounting plate only 5/16 in thick and includes the proper mounting bolts and nuts. The slots in the plate allow a maximum horizontal adjustment of 1 in and vertical adjustment of 1-1/4 in

E50KH3 ①

Conduit Sealing Nut

E50KH6

1/2 in oiltight

E50KH6

Dimensions, see **Page 92**)

Note

① Limit switch not included.

Technical Data and Specifications

E50 Heavy-Duty Factory Sealed 6P+ Switches

Description	Specification
Environmental ratings	NEMA 1, 3, 3S, 4, 4X, 6, 6P, 13, IP67, IP69K
Material of 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	13,000,000 operations minimum
Side or top push	10,000,000 operations minimum
Electrical life	
Single-pole	1,000,000 operations typical at full load
Double-pole	100,000 operations typical at full load
Ambient temperature range—standard	
Standard without cable	14° to 250°F (−10° to 121°C)
Standard with cable	14° to 221°F (−10° to 105°C)
Low temperature without cable	−40° to 250°F (−40° to 121°C)
Low temperature with cable	−40° to 221°F (−40° to 105°C)
Repeat accuracy—standard	
Side operated	Within 0.0012 in
Top operated	Within 0.0003 in
Side rotary	Within 0.0014 in
Torque requirements	
Operating head screws	14–18 lb-in

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	60	6	10	7200	720		125	0.22	1.0
240	30	3	10	7200	720		250	0.11	1.0
480	15	1.5	10	7200	720		250	0.11	1.0
600	12	1.2	10	7200	720		250	0.11	1.0
Switches with Indicating Lights (LED or Neon)									
NEMA A150 Rating							NEMA R150		
120	60	6	10	7200	720		125	0.22	1.0

Note

[1] Thermal rating. Valid only if switch does not have to make or break.

Circuit Diagrams ①

Standard Assembled Switches

Single-Pole 1NO-1NC
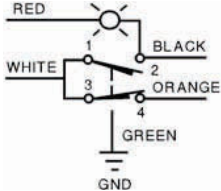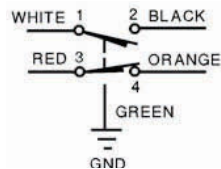
Must be same polarity.

Two-Pole 2NO-2NC

Same polarity, each pole.

Switch Bodies

**Pre-Wired Cable—
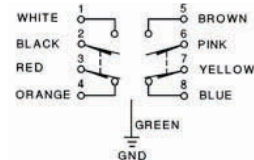Single-Pole 1NO-1NC**

E50SA6P_

E50SAL6P_
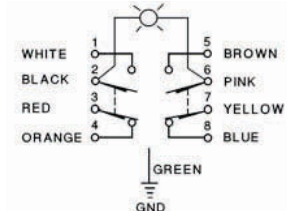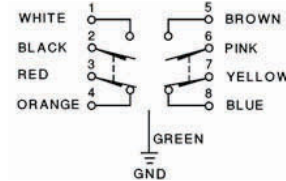
**Pre-Wired Cable—
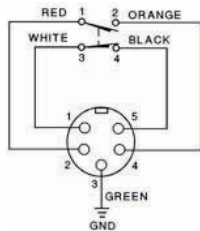Two-Pole 2NO-2NC**

E50SB6P_

E50SBL6P_
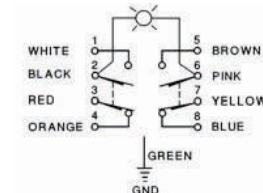
Wiring Diagrams ①

Mini-Connector—Single-Pole 1NO-1NC

E50SA6PC

E50SA6PC-W
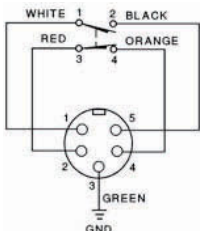
E50SAL6PC/E50SAN6PC
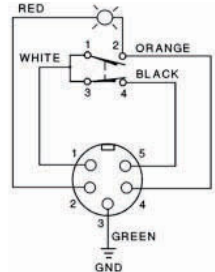
Mini-Connector—Two-Pole 2NO-2NC

E50SB6PC
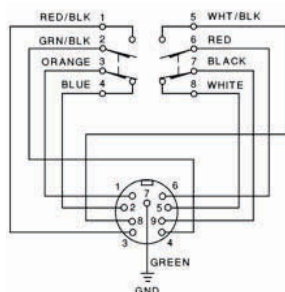
E50SBL6PC/E50SBN6PC
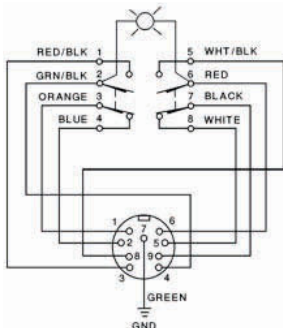
Note
① The wire colors referenced on these diagrams are those internal to the switch itself.

Dimensions

Approximate Dimensions in Inches (mm)

Standard

6P+ Limit Switch with Rotary Operating Head

2.25 (57.0)
1.44 (37.0)
0.81 (21.0)
0.31 (8.0)
0.37 (9.4)
Dia. 0.20 (5.0) Front Mtg. Hole
4.22 (107.0)
3.13 (79.0)
1.58 (40.1)
1.13 (28.7)
Conduit Entrance 0.50 Pipe Tap

0.75 (19.0)
0.75 (19.0)
2.74 (69.5)
0.45 (11.4)
0.24 (6.2)
0.20 (5.2)
0.99 (25.0)
1.54 (39.0)
[10-32] Tap 0.38 (10.0) Deep Rear Mtg. Holes (2)
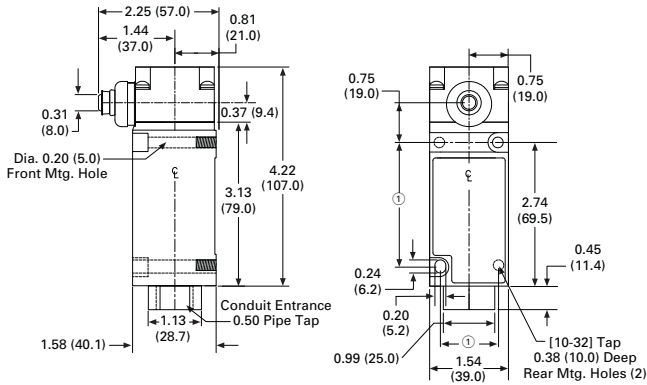
Side Push Operators

Approximate Dimensions in mm [in]

Pushbutton

57 [2.25]
37 [1.44]
21 [0.81]
8 [0.31] SQ.
9.4 [0.37]

Adjustable Pushbutton

71 [2.79] MAX.
63 [2.48] MIN.
8 [0.31] SQ.
9.4 [0.37]
2.5 [0.10]

Roller

75 ② [2.94]
65 ③ [2.56]
11 [0.44] DIA.
9.4 [0.37]
4 [0.16]

Maintained Pushbutton

43 [1.71]
34 [1.32]
7.5 [0.30]
8 [0.31] TOTAL TRAVEL
TRIP
RESET
8 [0.31] DIA. BOTH ENDS
21 [0.81]
9.4 [0.37]
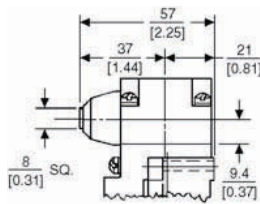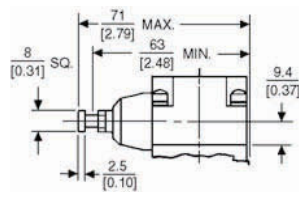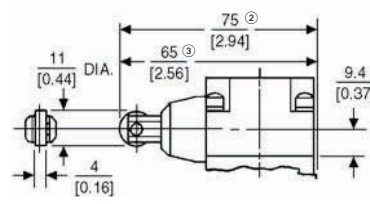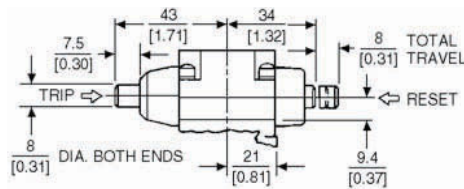
Top Push Operators

Pushbutton

8 [0.31] DIA.
38 [1.48]

Adjustable Pushbutton

8 [0.31] DIA.
52 [2.05] MAX.
44 [1.73] MIN.
2.5 [0.10]

Roller

4 [0.16]
48 [1.88]
11 [0.44] DIA.
20 [0.79]
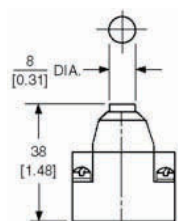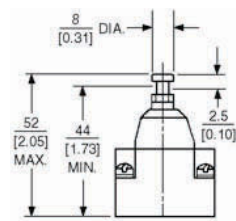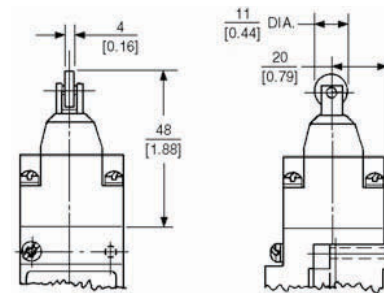
Wobble Operators

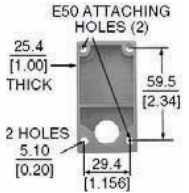See Operators, **section 46.8**.

Notes

① Can accommodate both U.S., 1.16 (29.4) x 2.34 (59.5) and DIN, 1.18 (30.0) x 3.26 (60.0), mounting dimensions.

② For E50DS4.
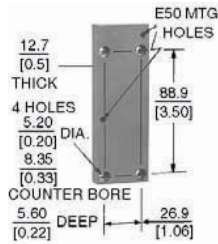
③ For E50DS3.

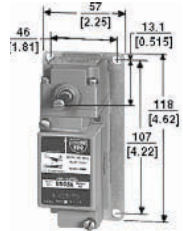## Accessories

Approximate Dimensions in mm [in]
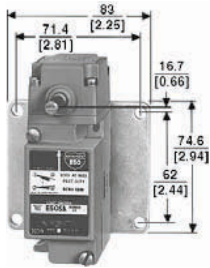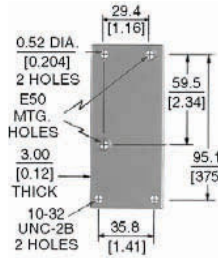
Adapter Plates

E50KH1M

E50KH7

E50KH4

E50KH5

E50KH2

E50KH10

Adjustable Mounting Plate

E50KH3