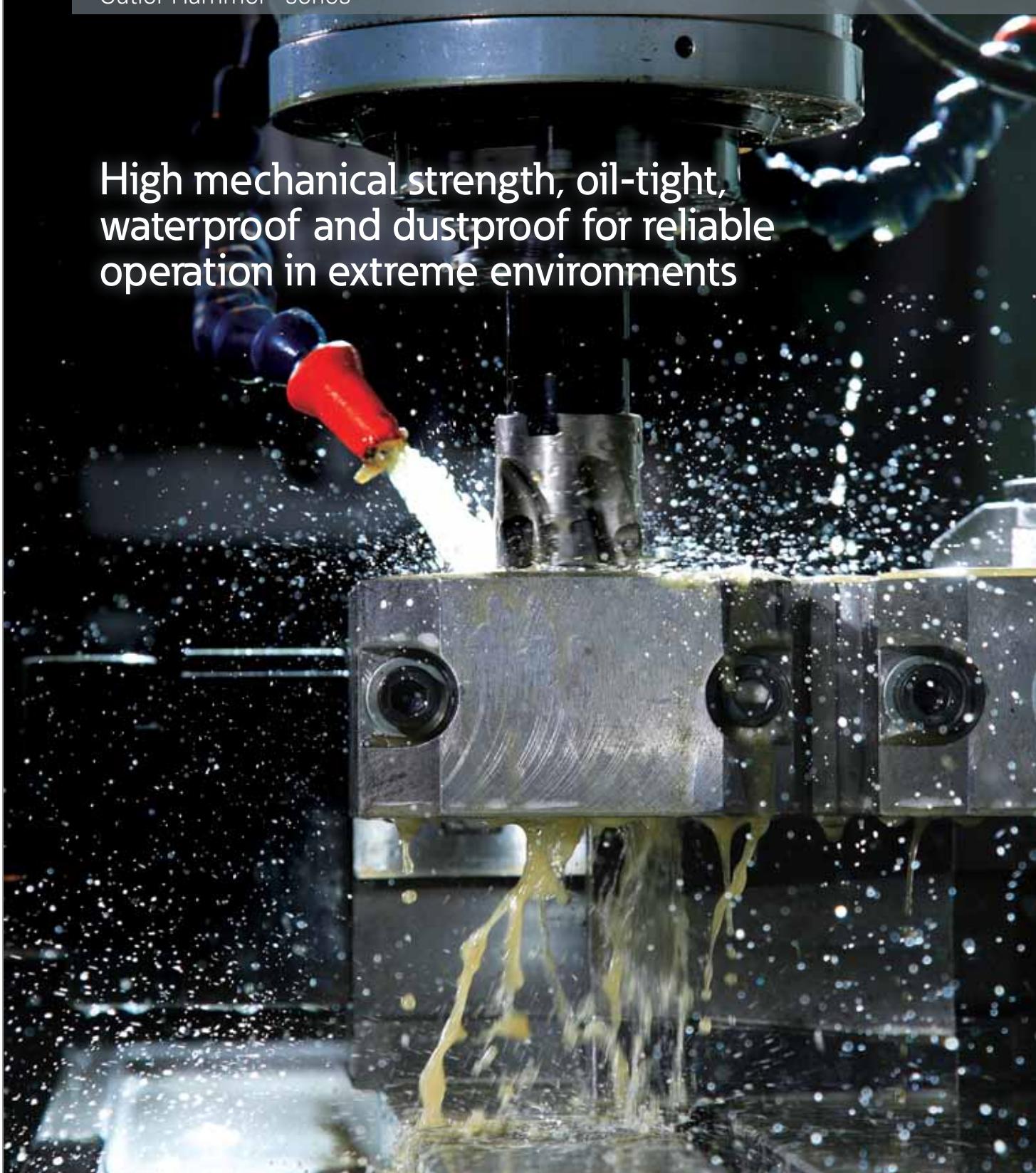


**Limit Switches**  
Cutler-Hammer® series

High mechanical strength, oil-tight,  
waterproof and dustproof for reliable  
operation in extreme environments



**EATON**

*Powering Business Worldwide*



Aerospace



Truck



# Powering business worldwide

## Discover Eaton – a leader in the power management field

Since 1911, when our company began trading as a small truck parts supplier, Eaton® Corporation has come a long way. Today, as a diversified power management company, Eaton has sales of \$11.9 billion USD (FY 2009), employs 70,000 people and has customers in more than 150 countries. Everyday, we help companies across the world to manage power, and do more, while consuming less energy.

Eaton's innovative products, solutions and technologies are designed to help customers to manage power and conserve resources while working more productively, safely and sustainably. Our integrated and diversified business strategy ensures that we remain at the forefront of our industry, decade after decade.

### Aerospace

A leading global supplier to commercial and military aviation and aerospace industries. An extensive technology portfolio includes hydraulic systems, fuel systems, motion control systems, propulsion sub-systems, cockpit controls and displays and fluid health monitoring systems. Our products improve fuel economy, aircraft performance, reliability and safety.

### Truck

A leader in the design, manufacture and marketing of complete line of drivetrain systems and components for medium- and heavy-duty commercial vehicles. Under the "Roadranger" brand, Eaton also markets lubricants, safety products and service tools. Eaton's hybrid power systems have earned the company recognition as a global leader in alternative power for commercial vehicles.

### Electrical

A global leader in electrical control, power distribution, uninterruptible power supply and industrial automation products and services. Our products provide customer-driven PowerChain Management® solutions to serve the power system needs of the industrial, institutional, government, utility, commercial, residential, IT, mission critical and OEM markets worldwide.



Electrical



Automotive



Hydraulics

# Powering business more sustainably

## Sustainability – smaller footprint in the world

The principle of sustainability means meeting the current needs of our own society without compromising the needs or options of future generations. It is a principle, which forms the very core of our design and production philosophy and guides all our activities across the world. Our commitment to reducing our own ecological footprint covers a wide range of green technologies, products and services that help our customers utilise electrical power more efficiently, while improving environmental performance.

Eaton has been recognised throughout the world for its uncompromising business ethics. For example, it was listed as one of the 'World's Most Ethical Companies' on the Ethisphere Institute's annual list for three consecutive years (2007, 2008 and 2009).

### Automotive

A supplier of critical components that reduce emissions and fuel consumption and improve stability and performance of cars, light trucks and commercial vehicles. Principal products include engine valves and valve train components, transmission and engine controls, supercharger, locking and limited slip differentials, cylinder heads, fluid conveyance components, body mouldings and spoilers.

### Hydraulics

A worldwide leader in reliable, high-efficiency hydraulic systems and components for use in mobile and industrial applications. Markets include agriculture, construction, mining, forestry, utility, material handling, earth moving, truck and bus, machine tools, moulding, primary metals, automotive, power generation, port machinery and entertainment.



Learn more about Eaton Green Solutions at [www.eaton.com/greensolutions](http://www.eaton.com/greensolutions)

An Eaton Green Solution

When you see this symbol, you know the solution represents an Eaton benchmark for environmental performance.



# Complete coverage of the market – worldwide in all standards

## **Local market leader with global competence**

Eaton's product series are distinguished by their strong presence in all regions of the world. In markets that adhere to IEC standards, Eaton's Moeller® series is very well established, and in the world of UL/CSA, Eaton is a key player, for example with its Cutler-Hammer® series. Now all customers are benefiting from first-rate engineering and the combined know-how in research and development – no matter which standards they use.

## **South Africa**

Eaton acquired the CHI Control business through the acquisition of Actom Low Voltage, South Africa in July 2011. In terms of organisation, product and production techniques, CHI Control is being fully integrated into Eaton, adopting the Eaton Business System, a single system covering work processes, tools and tooling. The CHI Control logo is now being replaced by the Eaton logo on product rating and carton labels and associated marketing materials with a phased completion date of 1 July 2013. The CHI Control name and logo remain registered trademarks of Eaton Corporation.



**E49 Compact Metal Switches****E49 Compact Metal Switches****Product Description**

E49 Compact Metal Switches by Eaton's electrical sector are designed with high mechanical strength for robust environments. The rugged aluminum die cast construction provides reliable, oil-tight, waterproof and dustproof sealing for a variety of applications. Snap action 1NO-1NC contacts provide flexibility in design.

**Features**

- Rigid die cast switch housing
- High mechanical strength
- Oil-tight, waterproof and dustproof construction

**Contents****Description**

	<b>Page</b>
1 E49 Compact Metal Switches	6
1.1 Product Selection	6
1.2 Technical Data and Specifications	8
1.3 Dimensions	9

 Drawings  
Online

**Standards and Certifications**

- cULus
- NEMA A600 (AC-15)
- NEMA R300 (DC-13)
- IP67
- RoHS

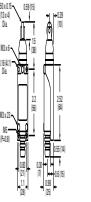


 **DANGER**

**THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE.** This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

## Product Selection

## E49 Compact Metal Switches

Operating Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts (Maximum)	Minimum Return Force	Assembled Unit (Switch Body and Head) 1NO-1NC Contacts Eaton Part Number
<b>Roller Lever</b>	<b>Roller Lever</b>					
	20°	12°	50°	2.99 lbs (1.36 kg)	0.50 lb (0.227 kg)	<b>E49M11AP1</b>
<b>Top Push</b>	<b>Top Push</b>					
	0.067 in (1.7 mm)	0.04 in (1.0 mm)	—	6.02 lbs (2.73 kg)	2.01 lbs (0.913 kg)	<b>E49M11BP1</b>
<b>Top Push Roller</b>	<b>Top Push Roller</b>					
	0.067 in (1.7 mm)	0.04 in (1.0 mm)	0.25 in (6.5 mm)	6.02 lbs (2.73 kg)	2.01 lbs (0.913 kg)	<b>E49M11CP1</b>
<b>Top Push Roller (90° Roller)</b>	<b>Top Push Roller (90° Roller)</b>					
	0.067 in (1.7 mm)	0.04 in (1.0 mm)	0.25 in (6.5 mm)	6.02 lbs (2.73 kg)	2.01 lbs (0.913 kg)	<b>E49M11CP2</b>
<b>Rod Lever</b>	<b>Rod Lever</b>					
	20°	12°	50°	0.31 lb (0.14 kg)	0.06 lb (0.028 kg)	<b>E49M11DP1</b>

**E49 Compact Metal Switches, continued**

<b>Operating Head Type</b>	<b>Travel to Operate Contacts</b>	<b>Travel to Reset Contacts</b>	<b>Total Travel</b>	<b>Force to Operate Contacts (Maximum)</b>	<b>Minimum Return Force</b>	<b>Assembled Unit (Switch Body and Head) 1NO-1NC Contacts</b>	<b>Eaton Part Number</b>
<b>Adjustable Roller Lever</b>							
<b>Adjustable Roller Lever</b>	20°	12°	50°	2.99 lbs (1.35 kg)	0.50 lb (0.227 kg)		<b>E49M11UP1</b>
							
<b>Wobble</b>	<b>Wobble</b>		N/A	N/A	0.33 lb (0.15 kg)	N/A	<b>E49M11VP1</b>
							
<b>Cat Whisker</b>	<b>Cat Whisker</b>		N/A	N/A	0.064 lb (0.03 kg)	N/A	<b>E49M11XM1</b>
							

**Technical Data and Specifications****E49 Compact Metal Switches**

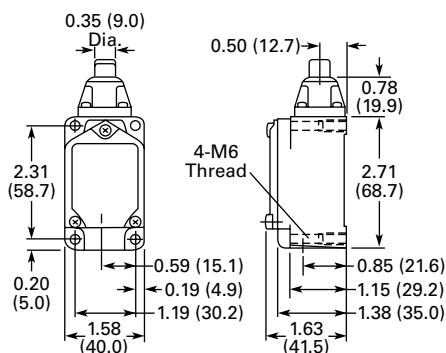
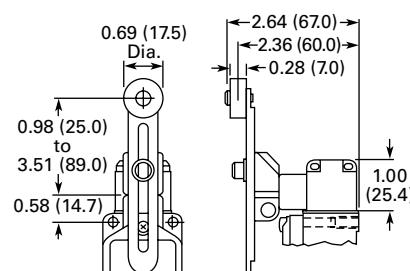
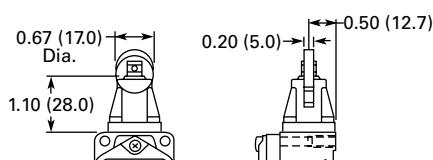
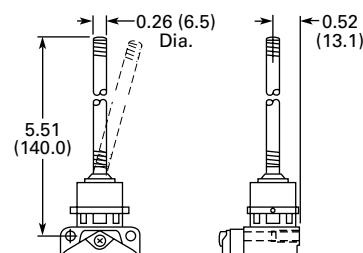
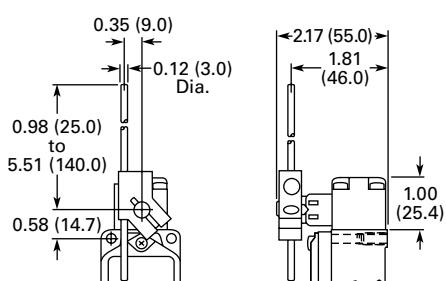
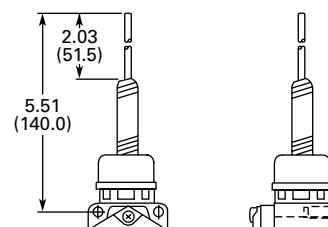
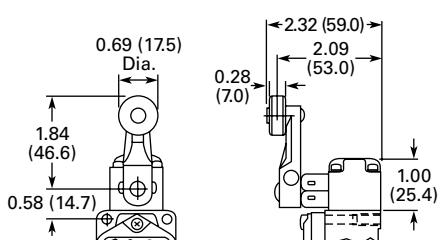
Description	Specification
Operating speed	1 mm to 2 m/sec
Operating frequency	Mechanically: 120 operations/min.; Electronically: 30 operations/min.
Contact resistance	15 mohm max. (initial)
Insulation resistance	100 mohm min. (at 500 Vdc)
Dielectric strength	1,000 Vac, 50/60 Hz for 1 minute between non-continuous terminals; 2,200 Vac, 50/60 Hz for 1 minute between each terminal and non-current carrying metal part and between each terminal and ground
Vibration	Malfunction durability: approx. 1,000 m/sec <sup>2</sup> (approx. 100 Gs); Malfunction durability: approx. 300/sec <sup>2</sup> (30 Gs)
Ambient operating temperature	14° to 176°F (-10 to 80°C)
Humidity	95% RH max.
Service life	Mechanically: 15,000,000 operations/minute; Electronically: 500,000 operations/minute

**Maximum Ampere Ratings—Isolated Contacts, No Polarity Restriction**

NEMA A600 (AC-15) 50 or 60 Hz						NEMA R300 (DC-13)	
Rated Voltage	Current Continuous	Make	Break	Voltamperes Make	Break	Rated Voltage	Current
24 Vac	10A	60A	6.0A	7200 VA	720 VA	24 Vdc	1.5A
120 Vac	10A	60A	6.0A	7200 VA	720 VA	120 Vdc	0.22A
250 Vac	10A	30A	3.0A	7200 VA	720 VA	250 Vdc	0.11A
480 Vac	10A	15A	1.5A	7200 VA	720 VA		
600 Vac	10A	12A	1.2A	7200 VA	720 VA		

**Dimensions**

Approximate Dimensions in Inches (mm)

**Switch Body with E49M11BP1****E49M11UP1****E49M11CP1/E49M11CP2****E49M11VP1****E49M11DP1****E49M11XM1****E49M11AP1**

# Limit Switches

## E50 Heavy-Duty Plug-In Switches

### E50 Heavy-Duty Plug-In Switches

2



### E50 Heavy-Duty Plug-In Switches

#### Product Description

E50 Modular Plug-In Limit Switch Components from Eaton's electrical sector 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 24–120 Vac/Vdc LED indicating light versions simplify setup and troubleshooting operations.

#### 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
- 24–120 Vac/Vdc LED and 120 Vac 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

### Contents

#### Description

Page

2 E50 Heavy-Duty Plug-In Switches	11
2.1 Product Selection	11
Assembled Switches—Standard .....	14
Assembled Switches—Special Purpose .....	14
Operating Heads .....	15
Switch Bodies .....	16
Receptacles .....	17
Compatible Connector Cables .....	18
2.2 Accessories .....	18
2.3 Technical Data and Specifications .....	20
2.4 Circuit Diagrams .....	21
2.5 Wiring Diagrams .....	21
2.6 Dimensions .....	22

Drawings Online

#### Standards and Certifications

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



#### DANGER

**THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.**

**Product Selection****Assembled Switches—Standard**

2

**Assembled Switch****E50 Heavy-Duty Plug-In Switches, Assembled—Standard****Single-Pole (5 Terminal Receptacle)**

Indicating Light:	None	LED (24–120 Vac/Vdc)	Neon (120 Vac)
Switch Body:	E50SA	E50SAL	E50SAN
Receptacle: <sup>①</sup>	1NO-1NC	1NO-1NC	1NO-1NC
Description	E50RA	E50RA	E50RA

**Two-Pole (9 Terminal Receptacle)**

Indicating Light:	None	LED (24–120 Vac/Vdc)	Neon (120 Vac)	LED (24–120 Vac/Vdc)	Neon (120 Vac)
Switch Body:	E50SB	E50SBL	E50SBN	E50SCL	—
Receptacle: <sup>①</sup>	2NO-2NC	2NO-2NC	2NO-2NC	1NO-2NC	—
Description	E50RB	E50RB	E50RB	E50RB	E50RB

**BH<sup>②</sup>****Side Rotary****Side Rotary (requires an operating lever, see Page 25)**

Standard spring return—E50DR1 <sup>③</sup>	E50AR1 	E50ALR1	E50ANR1
Low force spring return—E50DL1 <sup>③</sup>	E50AL1 	E50ALL1	E50ANL1
Maintained two-position—E50DM1	E50AM1 	E50ALM1	E50ANM1

**Assembled Switch (Head + Receptacle + Body)**

Eaton Part Number

**Spring Return****Side Pushbutton**

Spring return—E50DS1	E50AS1 	E50ALS1	E50ANS1
----------------------	------------	---------	---------

**Adjustable Spring Return**

Adjustable spring return—E50DS2	E50AS2 	E50ALS2	E50ANS2	E50BS2	E50BLS2	E50BNS2	E50BLS2	E50CNS2
---------------------------------	------------	---------	---------	--------	---------	---------	---------	---------

**Circuit Diagrams, see Page 21.****Notes**

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

Option	Mating Cordset Eaton Part Number	Code Suffix
Mini-connector <sup>④</sup> (with epoxy filled receptacle)	Single-pole (5-pin mini-connector)	<b>CSMS5D5CY1602</b> <b>P5</b> <sup>⑤</sup>
	Two-pole (9-pin mini-connector)	<b>CSMS9D9CY1602</b> <b>P9</b> <sup>⑤</sup>
Micro-connector <sup>⑥</sup> (with epoxy filled receptacle)	Single-pole (5-pin micro-connector)	<b>CSDS5A5CY2202</b> <b>A5</b> <sup>⑤</sup>
Cable connection (with epoxy filled receptacle)	2.3 m cable length	— <b>S</b>
	3.5 m cable length	— <b>S12</b>
	5.8 m cable length	— <b>S20</b>
Manifold mount (rear wiring entrance)	—	— <b>M</b>
20 mm conduit entrance	—	— <b>20</b>

② For operating head specifications, see **Page 15**.

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

④ For a full selection of cable connectors, see **Page 18**.

⑤ Refer to **Page 21** for wiring diagrams.

## Limit Switches

## E50 Heavy-Duty Plug-In Switches

## Assembled Switch



## E50 Heavy-Duty Plug-In Switches, Assembled—Standard, continued

Operating Head Type<sup>②</sup>

## Side Push Roller



## Single-Pole (5 Terminal Receptacle)

Indicating Light:	None	LED (24–120 Vac/Vdc)	Neon (120 Vac)
Switch Body:	E50SA 1NO-1NC	E50SAL 1NO-1NC	E50SAN 1NO-1NC
Receptacle: <sup>①</sup>	E50RA	E50RA	E50RA

Assembled Switch (Head + Receptacle + Body)

Eaton Part Number

## Two-Pole (9 Terminal Receptacle)

	None	LED (24–120 Vac/Vdc)	Neon (120 Vac)	LED (24–120 Vac/Vdc)	Neon (120 Vac)
E50SB 2NO-2NC	E50SBL 2NO-2NC	E50SBN 2NO-2NC	E50SCL 1NO-2NC	—	—
E50RB	E50RB	E50RB	E50RB	E50RB	E50RB

Assembled Switch (Head + Receptacle + Body)

Eaton Part Number

## Side Pushbutton



## Side Pushbutton

Maintained— E50DH1	E50AH1 	E50ALH1 	E50ANH1 
-----------------------	------------	-------------	-------------

E50BH1	E50BLH1	E50BNH1	E50BLH1	—
--------	---------	---------	---------	---

## Spring Return



## Top Pushbutton

Spring return—E50DT1	E50AT1 	E50ALT1 	E50ANT1 
-------------------------	------------	-------------	-------------

E50BT1	E50BLT1	E50BNT1	E50CLT1	E50BNT1
--------	---------	---------	---------	---------

Adjustable Spring  
Return

Adjustable spring return—E50DT2	E50AT2 	E50ALT2 	E50ANT2 
------------------------------------	------------	-------------	-------------

E50BT2	E50BLT2	E50BNT2	—	—
--------	---------	---------	---	---

## Circuit Diagrams, see Page 21.

## Notes

<sup>①</sup> Connection options (add the code suffix from the table below to the end of the Eaton Part number):

Option	Mating Cordset Eaton Part Number	Code Suffix
Mini-connector <sup>④</sup> (with epoxy filled receptacle)	Single-pole (5-pin mini-connector)	CSMS5D5CY1602 P5 <sup>⑤</sup>
	Two-pole (9-pin mini-connector)	CSMS9D9CY1602 P9 <sup>⑤</sup>
Micro-connector <sup>④</sup> (with epoxy filled receptacle)	Single-pole (5-pin micro-connector)	CSDS5A5CY2202 A5 <sup>⑤</sup>
Cable connection (with epoxy filled receptacle)	2.3 m cable length	— S
	3.5 m cable length	— S12
	5.8 m cable length	— S20
Manifold mount (rear wiring entrance)	—	M
20 mm conduit entrance	—	20

<sup>②</sup> For operating head specifications, see Page 15.<sup>③</sup> Roller can be converted in the field between horizontal and vertical.<sup>④</sup> For a full selection of cable connectors, see Page 18.<sup>⑤</sup> Refer to Page 21 for wiring diagrams.

**Assembled Switch****E50 Heavy-Duty Plug-In Switches, Assembled—Standard, continued**

2

Single-Pole (5 Terminal Receptacle)					Two-Pole (9 Terminal Receptacle)				
Indicating Light:	None	LED (24–120 Vac/Vdc)	Neon (120 Vac)		None	LED (24–120 Vac/Vdc)	Neon (120 Vac)	LED (24–120 Vac/Vdc)	Neon (120 Vac)
Switch Body:	E50SA	E50SAL	E50SAN		E50SB	E50SBL	E50SBN	E50SCL	
Receptacle: <sup>①</sup>	1NO-1NC	1NO-1NC	1NO-1NC		2NO-2NC	2NO-2NC	2NO-2NC	1NO-2NC	
Assembled Switch (Head + Receptacle + Body) Eaton Part Number									
Description	Eaton Part Number								

**Operating Head Type<sup>②</sup>****Top Push Roller**

Top Push Roller	E50AT3	E50ALT3	E50ANT3	E50BT3	E50BLT3	E50BNT3	—	—
Spring return E50DT3 <sup>③</sup>	CE							

**Wobble Head,  
Spring Return**

Wobble Head, Spring Return (requires a wobble operator, see section 27)	E50AW1	E50ALW1	E50ANW1	E50BW1	E50BLW1	E50BNW1	EB50BLW1	—
Standard duty—E50DW1	CE							
Heavy-duty high strength steel—E50DW2	E50AW2	E50ALW2	E50ANW2	E50BW2	E50BLW2	E50BNW2	E50CLW2	E50BNW2

**Circuit Diagrams, see Page 21.****Notes**

- <sup>①</sup> Connection options (add the code suffix from the table below to the end of the Eaton Part number):

Option	Mating Cordset Eaton Part Number	Code Suffix
Mini-connector <sup>④</sup> (with epoxy filled receptacle)	Single-pole (5-pin mini-connector)	CSMS5D5CY1602 P5 <sup>⑤</sup>
	Two-pole (9-pin mini-connector)	CSMS9D9CY1602 P9 <sup>⑤</sup>
Micro-connector <sup>⑥</sup> (with epoxy filled receptacle)	Single-pole (5-pin micro-connector)	CSDS5A5CY2202 A5 <sup>⑤</sup>
Cable connection (with epoxy filled receptacle)	2.3 m cable length	— S
	3.5 m cable length	— S12
	5.8 m cable length	— S20
Manifold mount (rear wiring entrance)	—	M
20 mm Conduit Entrance	—	20

- <sup>②</sup> For operating head specifications, see **Page 15**.

- <sup>③</sup> Roller can be converted in the field between horizontal and vertical.

- <sup>④</sup> For a full selection of cable connectors, see **Page 18**.

- <sup>⑤</sup> Refer to **Page 21** for wiring diagrams.

# Limit Switches

## E50 Heavy-Duty Plug-In Switches

### Assembled Switches—Special Purpose

2

#### E50 Heavy-Duty Plug-In Switches, Assembled—Special Purpose

	<b>Operating Data—Nominal Switches</b>	<b>Assembled Switch Eaton Part Number</b>	<b>Switch Body Only Eaton Part Number</b>	<b>Receptacle Only Eaton Part Number</b>	<b>Operating Head Only Eaton Part Number</b>
<b>Neutral Position</b>					
	5° Travel	<b>E50NN1<sup>①</sup></b>	<b>E50SN</b>	<b>E50RB</b>	<b>E50DN1<sup>①</sup></b>
	5° Travel; stainless steel shaft	<b>E50NN1SPL<sup>②</sup></b>	—	—	—
	15° Travel	<b>E50NN2</b>	<b>E50SN</b>	<b>E50RB</b>	<b>E50DN2<sup>③</sup></b>
	Travel to operate contacts:	5° or 15° <sup>④</sup>			
	Travel to reset contacts:	2°	2°	2°	2°
	Total travel:	90°	90°	90°	90°
	Force to operate contacts:	0.2 Nm	0.2 Nm	0.2 Nm	0.2 Nm
	Minimum return force:	0.16Nm	0.16Nm	0.16Nm	0.16Nm
	Operating temperature:	14° to 200°F (−10° to 94°C)			
<b>Two-Step</b>					
	—	<b>E50TD1</b>	<b>E50ST</b>	<b>E50RB</b>	<b>E50DD1</b>
	Travel to operate contacts:	1st step 10°; 2nd step 20°			
	Travel to reset contacts:	4° each	4° each	4° each	4° each
	Total travel:	90°	90°	90°	90°
	Force to operate contacts:	0.19Nm	0.19Nm	0.19Nm	0.19Nm
	Minimum return force:	0.28Nm	0.28Nm	0.28Nm	0.28Nm
	Operating temperature:	CW or CCW: 14° to 250°F (−10° to 121°C) CW and CCW: 14° to 200°F (−10° to 94°C)	CW or CCW: 14° to 250°F (−10° to 121°C) CW and CCW: 14° to 200°F (−10° to 94°C)	CW or CCW: 14° to 250°F (−10° to 121°C) CW and CCW: 14° to 200°F (−10° to 94°C)	CW or CCW: 14° to 250°F (−10° to 121°C) CW and CCW: 14° to 200°F (−10° to 94°C)
<b>Gravity Return</b>					
	<b>Gravity Return (requires E50KL220, E50KL226 or equivalent operating lever, see Page 26)</b>				
	Without indicating light	<b>E50GG1</b>	<b>E50SG</b>	<b>E50RA</b>	<b>E50DG1</b>
	With LED indicating light (24–120 Vac/Vdc)	<b>E50GLG1</b>	<b>E50SGL</b>	<b>E50RA</b>	<b>E50DG1</b>
	With neon indicating light (120 Vac)	<b>E50GNG1</b>	<b>E50SGN</b>	<b>E50RA</b>	<b>E50DG1</b>
	Travel to operate contacts:	10° to 170°	10° to 170°	10° to 170°	10° to 170°
	Travel to reset contacts:	8°	8°	8°	8°
	Total travel:	360°	360°	360°	360°
	Force to operate contacts:	0.19Nm	0.19Nm	0.19Nm	0.19Nm
	Minimum return force:	Gravity	Gravity	Gravity	Gravity
	Operating temperature:	14° to 200°F (−10° to 94°C)			

#### Circuit Diagrams, see Page 21.

##### Notes

<sup>①</sup> Add 9 suffix to the model number for low temperature −40° to 174°F (−40 to 79°C) versions.

<sup>②</sup> Low temperature rating −40° to 174°F (−40° to 79°C)

<sup>③</sup> Depending upon model selected.

**Operating Heads****E50 Heavy-Duty Plug-In Switches, Operating Heads**

Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature <sup>①</sup>			
						Without Cable	With Pre-Wired Cable		
<b>Side Rotary</b>									
									
<b>Side Rotary (requires an operating lever, see Page 25)</b>									
Standard spring return <sup>②</sup>	5°	2°	90°	0.19Nm	0.28Nm	10° to 200°F (-12° to 94°C) <sup>③</sup>	10° to 200°F (-12° to 94°C) <sup>③</sup>	<b>E50DR1</b>	
Low temperature spring return <sup>②</sup>	5°	2°	90°	0.19Nm	0.28Nm	-40° to 175°F (-40° to 79°C)	-31° to 175°F (-34° to 79°C)	<b>E50DR19</b>	
Low force spring return <sup>②</sup>	15°	6°	90°	0.2Nm	0.16Nm	10° to 200°F (-12° to 94°C) <sup>③</sup>	10° to 200°F (-12° to 94°C) <sup>③</sup>	<b>E50DL1</b>	
Maintained two-position	50°	50°	90°	0.19Nm	—	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DM1</b>	
<b>Side Pushbutton</b>									
									
Spring Return	Spring return	0.065 in	0.030 in	0.250 in	0.45Nm	0.06Nm	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DS1</b>
<b>Adjustable Spring Return</b>									
									
Adjustable spring return	0.065 in	0.030 in	0.250 in	0.45Nm	0.06Nm	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DS2</b>	
<b>Side Push Roller</b>									
									
Spring return <sup>④</sup>	0.065 in	0.030 in	0.250 in	0.45Nm	0.06Nm	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DS3</b> <sup>⑤</sup>	
	0.065 in	0.030 in	0.250 in	0.45Nm	0.06Nm	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DS4</b> <sup>⑤</sup>	
<b>Side Pushbutton</b>									
									
Maintained	0.200 in	0.130 in	0.320 in	0.56Nm	0.56Nm	14° to 200°F (-10° to 94°C)	14° to 200°F (-10° to 94°C)	<b>E50DH1</b>	
<b>Top Pushbutton</b>									
									
Spring Return	Spring return	0.040 in	0.020 in	0.280 in	0.45Nm	0.06Nm	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	<b>E50DT1</b>
<b>Adjustable Spring Return</b>									
									
Adjustable spring return	0.040 in	0.020 in	0.280 in	0.45Nm	0.06Nm	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	<b>E50DT2</b>	

**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 22**.

# 2.1

## Limit Switches

### E50 Heavy-Duty Plug-In Switches

#### E50 Heavy-Duty Plug-In Switches, Operating Heads, continued

2

**Top Push Roller**



Description	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Operating Temperature <sup>①</sup>		Eaton Part Number
						Without Cable	With Pre-wired Cable	
<b>Top Push Roller</b>								
<b>Spring return</b>								
	1.02mm	0.5 mm	7.1 mm	0.45Nm	0.06Nm	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	<b>E50DT3</b>
<b>Wobble Head, Spring Return (requires a wobble operator, see Page 27)</b>								
Standard duty	10°	6°	15°	0.23Nm	0.15Nm	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	<b>E50DW1</b>
Heavy-duty high strength steel	10°	6°	15°	0.23Nm	0.15Nm	14° to 250°F (-10° to 121°C)	14° to 221°F (-10° to 105°C)	<b>E50DW2</b>

#### Switch Bodies

#### E50 Heavy-Duty Plug-In Switches, Switch Bodies



Switch Body Construction <sup>①</sup>	Single-Pole 1NO-1NC Eaton Part Number	Two-Pole 2NO-2NC Parallel Wired Indicator Light Eaton Part Number	Two-Pole 2NC-1NO Series Wired Indicator Light Eaton Part Number
Without indicating light	<b>E50SA</b> 	<b>E50SB</b>	—
With LED indicating light 24–120 Vac/Vdc	<b>E50SAL</b>	<b>E50SBL</b>	<b>E50SCL</b>
With neon indicating light 120 Vac	<b>E50SAN</b>	<b>E50SBN</b>	—

#### Circuit Diagrams, see Page 21.

##### Note

- ① Indicating lights are supplied from the factory wired as shown in Circuit Diagrams on **Page 21**. However, they can be easily re-connected to terminals 1 and 2 if necessary (SPDT).

**Receptacles****E50 Heavy-Duty Plug-In Switches, Receptacles**

	Description	Poles	Conduit Entrance	Cable Length	Eaton Part Number
<b>Surface Mount</b>	<b>Surface Mount</b>				
	Conduit entrance, front or rear mounting	Single-pole (5 terminal)	1/2 NPT 20 mm	—	<b>E50RA</b> <b>E50RA20</b>
		Two-pole (9 terminal)	1/2 NPT	—	<b>E50RB</b>
			3/4 NPT	—	<b>E50RB34</b>
			20 mm	—	<b>E50RB20</b>
	<b>Manifold Mount</b>	<b>Manifold Mount</b>			
	Rear wiring entrance instead of conduit hole, gasket on back for oil tightness	Single-pole (5 terminal)	—	—	<b>E50RAM</b>
	Two-pole (9 terminal)	—	—	—	<b>E50RBM</b>
<b>Mini-Connector</b>	<b>Mini-Connector</b>				
	Epoxy filled receptacle with pre-wired mini-connector. (The -W version is a wiring scheme typically used in automotive applications.)	Single-pole (5 terminal)	5-pin mini-connector	—	<b>E50RAP5</b>  <b>E50RAP5-W</b> 
	Two-pole (9 terminal)	9-pin mini-connector	—	—	<b>E50RBP9</b> 
		—	—	—	
<b>Micro Connector Straight Female</b>	<b>Micro-Connector, Straight Female</b>				
	Epoxy filled receptacle with M12 DC micro connector	Single-pole (5 terminal)	—	—	<b>E50RAA5</b>
	—	—	—	—	
<b>Pre-Wired Cable</b>	<b>Pre-Wired Cable</b>				
	Epoxy filled receptacle with pre-wired 16 gauge, yellow jacketed, type SOOW-A cable. Cable enters through hole threaded for conduit.	Single-pole (5 terminal)	1/2 NPT 20 mm	2.3 m 3.5 m 5.8 m 2.3 m 3.5 m 5.8 m 2.3 m 3.5 m 5.8 m 2.3 m 3.5 m 5.8 m	<b>E50RAS</b> <b>E50RAS12</b> <b>E50RAS20</b> <b>E50RA20S</b> <b>E50RA20S12</b> <b>E50RA20S20</b> <b>E50RBS</b> <b>E50RBS12</b> <b>E50RBS20</b> <b>E50RB20S</b> <b>E50RB20S12</b> <b>E50RB20S20</b>

**Wiring Diagrams, see Page 21.****Note**①  See listing of compatible connector cables on **Page 18**.

## Limit Switches

### E50 Heavy-Duty Plug-In Switches

#### **Compatible Connector Cables**

2

#### **Standard Cables** <sup>①</sup>

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/Wire Colors (Face View Female Shown)	Eaton Part Number
<b>Mini-style Straight Female</b>						
8A	—	5-pin	16 AWG	6 ft (2m)		<b>CSMS5D5CY1602</b>
7A	—	9-pin	16 AWG	12 ft (4m)		<b>CSMS9D9CY1602</b>
<b>Micro-Style</b>						
4A	—	5-pin, 5-wire	22 AWG	6.0 ft (2m)		<b>CSDS5A5CY2202</b>

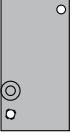
#### **Accessories**

#### **E50 Heavy-Duty Plug-In Switch Accessories**

Description	Eaton Part Number
<b>E50KH1M</b> 	<b>E50KH1M</b> Allows E50 to replace Eaton's 10316 Type LP Surface Mounting Plug-In Limit Switch
<b>E50KH7</b> 	<b>E50KH7</b> Allows E50 to replace Square D Type AW Surface Mounting Non Plug-In Standard Box Limit Switch

Dimensions, see **Page 23**.

**E50 Heavy-Duty Plug-In Switch Accessories, continued**

Description	Eaton Part Number
<b>Adapter Plate, continued</b>	
<b>E50KH4</b> 	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. <b>E50KH4</b> <sup>①</sup>
<b>E50KH5</b> 	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.) <b>E50KH5</b> <sup>①</sup>
<b>E50KH2</b> 	Allows E50 to replace Eaton's 10316 Type LT Non Plug-In Two-Pole Limit Switch <b>E50KH2</b>
<b>E50KH10</b> 	Allows E50 to replace Allen-Bradley 802M Sealed Limit Switch <b>E50KH10</b>
<b>Adjustable Mounting Plate</b>	
<b>E50KH3</b> 	This is a mounting plate only 5/16 in thick and includes the proper mounting bolts and nuts. <b>E50KH3</b> <sup>①</sup> The slots in the plate allow a maximum horizontal adjustment of 1 in and vertical adjustment of 1-1/4 in
<b>Conduit Sealing Nut</b>	
<b>E50KH6</b> 	12.7 mm oiltight <b>E50KH6</b>
Dimensions, see <b>Page 23</b> .	

**Note**

<sup>①</sup> Limit switch not included.

**Technical Data and Specifications**

2

**E50 Heavy-Duty Plug-In Switches**

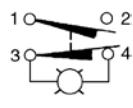
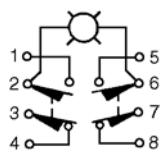
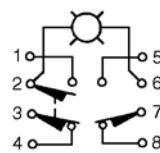
Description	Specification
Environmental ratings	NEMA 1, 3, 3S, 4, 4X, 6, 6P, 13, IP67
Material of construction	Zinc die cast
Switch gasket material	Viton®
Universal U.S./DIN mounting dimensions	1.16 in (30 mm) x 2.34 in (60 mm)
Conduit entrance	1/2 in NPT or 20 mm threading
Contact ratings	See below
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
Two-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 0.030 mm
Top operated	Within 0.007 mm
Side rotary	Within 0.035 mm
Torque requirements:	
Switch body screws	2.8–3.4 Nm
Operating head screws	1.6–2.0 Nm
Wire size	Will accept AWG #22–#12, single or stranded wire

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

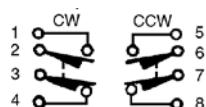
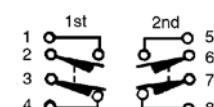
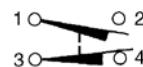
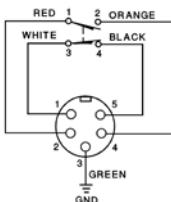
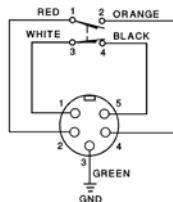
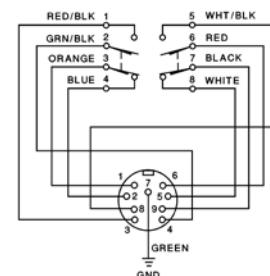
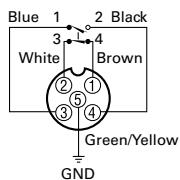
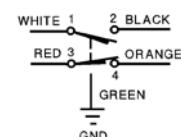
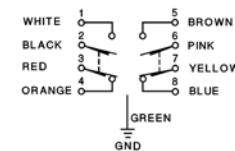
AC Volts	Current, Amperes			Volatamperes			Current, Amperes		
	Make	Break	Cont. ①	Make	Break	DC Volts	Max. Make or Break	Cont. ①	
<b>All Switches Except Gravity Return and Indicating Light Versions</b>									
NEMA A600 Rating						NEMA R300			
120	60	6	10	7200	720	125	0.22	1.0	
240	30	3	10	7200	720	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	
<b>Switches with Indicating Lights (LED or Neon)</b>									
NEMA A150 Rating						NEMA R150			
120	60	6	10	7200	720	125	0.22	1.0	
<b>Gravity Return Switches—Maximum Contact Ratings</b>									
NEMA 6600 Rating—Contacts on same polarity									
120	30	3	5	3600	360	—	—	—	
240	15	1.5	5	3600	360	—	—	—	
480	7.5	0.75	5	3600	360	—	—	—	
600	6	0.60	5	3600	360	—	—	—	

**Note**

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

**Circuit Diagrams****Standard Assembled Switches and Switch Bodies****Single-Pole 1NO-1NC***Must be same polarity.***Two-Pole 2NO-2NC***Parallel wired indicator light.  
Same polarity each pole.***Two-Pole 1NO-2NC***Series wired indicator light.  
Same polarity each pole.*

2

**Special Purpose Assembled Switches****Neutral Position***Same polarity, each pole.***Two-Step (CW, CCW, or Both)***Same polarity, each pole.***Gravity Return***Must be same polarity.***Wiring Diagrams****Receptacles<sup>①</sup>****E50RAP5****E50RAP5-W****E50RBP9****E50RAA5****E50RAS\_****E50RBS\_**<sup>①</sup> The wire colors referenced on these diagrams are those internal to the switch itself.

# 2.5 Limit Switches

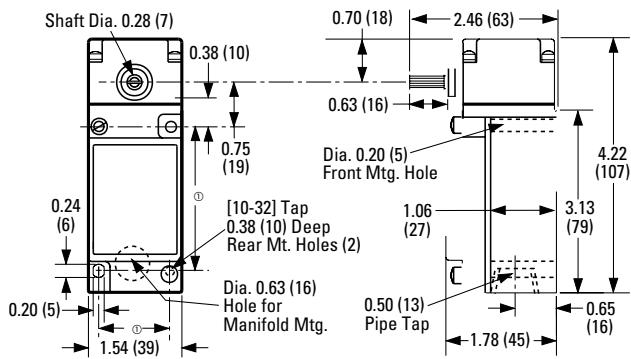
## E50 Heavy-Duty Plug-In Switches

## **Dimensions**

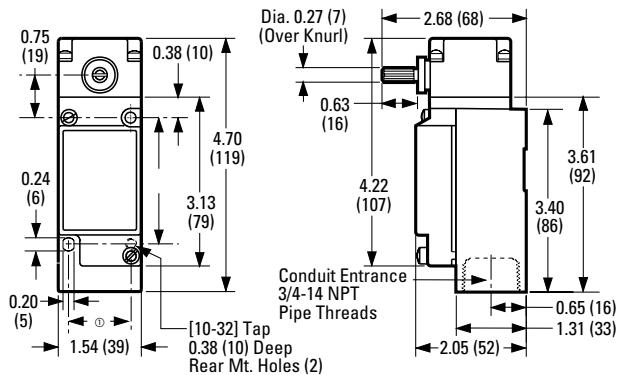
#### Approximate Dimensions in Inches (mm)

2

## Standard



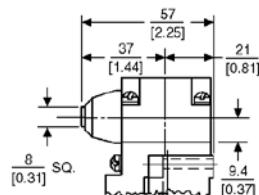
E50SB34



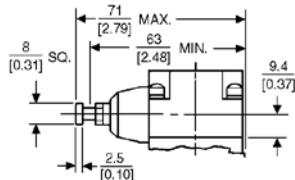
## ***Side Push Operators***

Approximate Dimensions in mm [in]

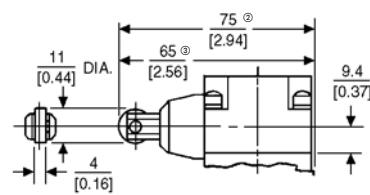
## Pushbutton



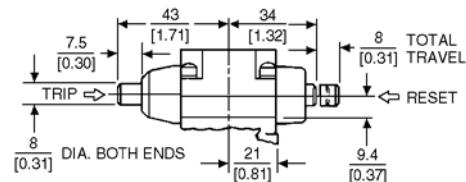
## Adjustable Pushbutton



## Roller

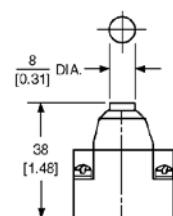


## Maintained Pushbutton

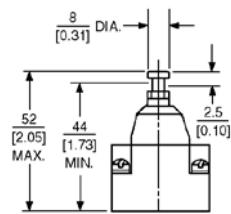


## ***Top Push Operators***

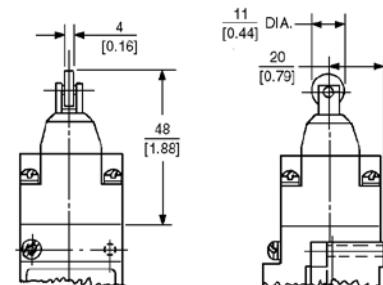
## Pushbutton



## Adjustable Pushbutton



## Roller



## ***Wobble Operators***

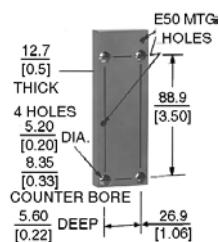
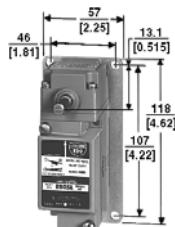
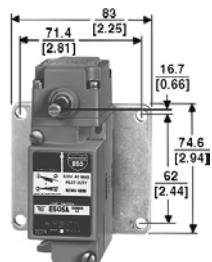
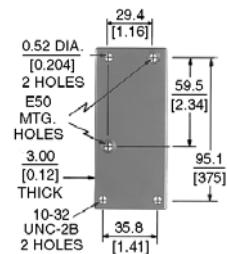
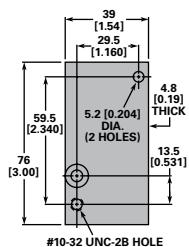
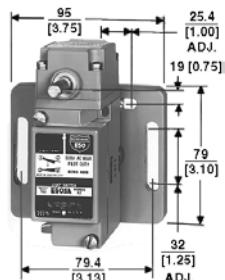
See Operators, Page 27.

## **Notes**

- ① 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.
  - ② For E50DS4.
  - ③ For E50DS3.

**Accessories**

Approximate Dimensions in mm [in]

**Adapter Plates****E50KH1M****E50KH7****E50KH4****E50KH5****E50KH2****E50KH10****Adjustable Mounting Plate****E50KH3**

# Limit Switches

## E50 Heavy-Duty Factory Sealed 6P+ Switches

### E50 Heavy-Duty Factory Sealed 6P+ Switches



3

### Contents

#### Description

Page

3 E50 Heavy-Duty Factory Sealed 6P+ Switches

3.1 Product Selection

Assembled Switches—Standard ..... 25

Dimensions ..... 27

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)



#### DANGER

**THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.**

**Product Selection****Assembled Switches—Standard**Connection is by 2.4 m cable <sup>①</sup>.

3

E50 Heavy-Duty Factory Sealed 6P+ Switches, Assembled—Standard									
Assembled Switch		Single-Pole			Two-Pole				
Lever sold separately	Indicating Light:	None	LED (24–120 Vac/Vdc)	Neon (120 Vac)	None	LED (24–120 Vac/Vdc)			
	Switch Body:	E50SA6P 1NO-1NC	E50SAL6P 1NO-1NC	E50SAN6P 1NO-1NC	E50SB6P 2NO-2NC	E50SBL6P 2NO-2NC			
Operating Head Type <sup>②</sup>		Assembled Switch Eaton Part Number							
Side Rotary		Side Rotary (requires an operating lever, see Page 26)							
	Standard spring return—E50DR1 <sup>③</sup>	E50AR16P CE	E50ALR16P	E50ANR16P	E50BR16P	E50BLR16P	E50BNR16P		
	Low force spring return—E50DL1 <sup>③</sup>	E50AL16P CE	E50ALL16P	E50ANL16P	E50BL16P	E50BLL16P	E50BNL16P		
	Maintained two-position—E50DM1	E50AM16P CE	E50ALM16P	E50ANM16P	E50BM16P	E50BLM16P	E50BNM16P		
Side Pushbutton		Side Pushbutton							
Spring Return		Spring return—E50DS1	E50AS16P CE	E50ALS16P	E50ANS16P	E50BS16P	E50BLS16P	E50BNS16P	
		Adjustable spring return—E50DS2					E50BS26P	E50BLS26P	E50BNS26P
		Circuit Diagrams, see Page 21.							

**Notes**<sup>①</sup> Connection options (add the code suffix from the table below to the end of the Eaton Part number):

Option	Eaton Part Number	Code Suffix
Mini-connector <sup>④</sup>	Single-pole (5-pin mini-connector)	CSMS5D5CY1602 C
	Two-pole (9-pin mini-connector)	CSMS9D9CY1602 C
Cable connection	3.5 m cable length (standard)	— 12
	5.8 m cable length (standard)	— 20
	Other lengths (special order)	Length in metres

<sup>②</sup> For operating head specifications, see **Page 15**.<sup>③</sup> CW (clockwise) and CCW (counterclockwise) operation, easily convertible to CW only or CCW only operation.<sup>④</sup> For a full selection of connector cables, see **Page 18**.

# 3.1

## Limit Switches

### Operators

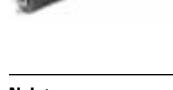
#### Rod Type Operators

For rotary head switches: E50 Plug-In, E50 6P+, and 10316.

**Note:** Only operators with Nylatron rods or rollers should be used with explosion-proof limit switches.

3

#### Operators—Rod Type

	Rod Length (Maximum) Inches (mm) <sup>①</sup>	Rod Type	Eaton Part Number
<b>Nylon/Metal</b> 	5.5(140)	Nylon	<b>E50KL399</b>
		Metal	<b>E50KL202</b>
<b>Metal/Steel</b> 	8.75(222)	Metal	<b>E50KL581</b>
	9.0(229)	Stainless steel	<b>E50KL220</b>
	12.0(305)	Bendable steel	<b>E50KL226</b>
<b>Clamps for Adjustable Rods (Rod not included)</b>			
			
<b>E50KL35</b>			
			
<b>E50KL36</b>			
			
<b>E50KL41</b>			
<b>Nylon/Steel</b> 	<b>Spring Rod</b>	Nylon	<b>E50KL556</b>
		Stainless steel	<b>E50KL421</b>
<b>Nylon Covered Wire</b> 	<b>Adjustable Wire</b>		<b>E50KL533</b>
<b>Nylatron</b> 	<b>Adjustable Wide Roller Lever</b>		<b>E50KL37</b>
			
<b>Nylatron</b> 	<b>Nylatron Loop</b>		<b>E50KL142</b>
			
<b>Zinc-Plated Steel</b> 			<b>E50KL33</b>
<b>Dimensions, see Page 29.</b>			

#### Notes

- ① Length from the operating shaft axis to tip.
- ② Caution: When selecting lever, the minimum required return torque of lever should not exceed minimum return force available in operating head as given in operating head specifications.
- ③ Applies when lever is extended to the maximum dimension.

**Wobble Type Operators**

For E50DW1 and E50DWZ Operator Heads on E50 Plug-In and E50 6P+ Switches.

**Note:** Only operators with Nylatron rods or rollers should be used with explosion-proof limit switches.

**Operators—Wobble Type**

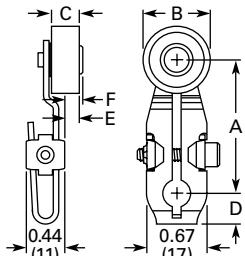
3

	Wobble Type	Eaton Part Number
E50KW2	Nylon Rod	E50KW2
E50KW3	Stainless Steel Rod	E50KW3
E50KW4	Coil Spring	E50KW4

Dimensions, see Page 29.

**Dimensions**

Approximate Dimensions in Inches (mm)

**Roller Type Operators****Standard Roller**

Eaton Part Number	A Lever Length <sup>①</sup>	B Roller Diameter	C Roller Width	D	E	F
E50KL39	0.88 (22.2)	0.75 (19.0)	0.32 (8.1)	0.31 (7.9)	0.20 (5.1)	0.24 (6.1)
E50KL40	1.38 (34.9)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL531	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL200	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL355	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL377	1.50 (38.1)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL32	1.50 (38.1)	—	—	0.34 (8.6)	—	—
E50KL552	2.00 (50.8)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL546	2.00 (50.8)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL549	2.00 (50.8)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL572	2.00 (50.8)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL553	2.50 (63.5)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL547	2.50 (63.5)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL550	2.50 (63.5)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL573	2.50 (63.5)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL575	2.50 (63.5)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.11 (2.8)	0.17 (4.3)
E50KL554	3.00 (76.2)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.05 (1.3)	0.11 (2.8)
E50KL548	3.00 (76.2)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL551	3.00 (76.2)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.13 (3.3)	0.17 (4.3)
E50KL574	3.00 (76.2)	0.75 (19.0)	1.00 (25.4)	0.34 (8.6)	0.83 (21.1)	0.83 (21.1)
E50KL576	3.00 (76.2)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.11 (2.8)	0.17 (4.3)

**Note**

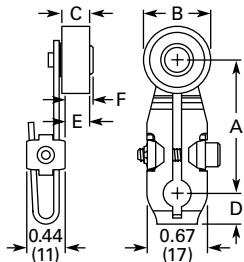
<sup>①</sup> Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).

# 3.1

## Limit Switches

### Operators

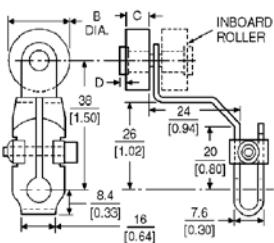
Approximate Dimensions in Inches (mm)



#### Roller on Reverse Side

Eaton Part Number	A Lever Length <sup>①</sup>	B Roller Diameter	C Roller Width	D	E	F
<b>E50KL580</b>	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.34 (8.6)	0.18 (4.6)	0.24 (6.1)
<b>E50KL310</b>	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.27 (6.9)	0.31 (7.9)
<b>E50KL579</b>	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.34 (8.6)	0.27 (6.9)	0.31 (7.9)
<b>E50KL536</b>	1.50 (38.1)	1.50 (38.1)	0.28 (7.1)	0.34 (8.6)	0.23 (5.8)	0.31 (7.9)

Approximate Dimensions in mm [in]

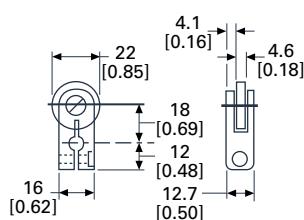


#### Offset Roller

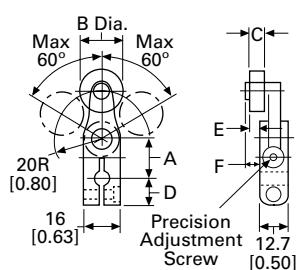
Eaton Part Number	A Lever Length <sup>①</sup>	B Roller Diameter	C Roller Width	D
<b>Inboard</b>				
<b>E50KL24</b>	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)
<b>E50KL25</b>	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)
<b>E50KL26</b>	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.04 (1.0)
<b>Outboard</b>				
<b>E50KL27</b>	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)
<b>E50KL28</b>	1.50 (38.1)	0.75 (19.0)	0.32 (8.1)	0.03 (0.8)
<b>E50KL29</b>	1.50 (38.1)	0.69 (17.5)	0.25 (6.4)	0.04 (1.0)
<b>E50KL30</b>	1.50 (38.1)	0.75 (19.0)	1.00 (25.4)	—

Approximate Dimensions in mm [in]

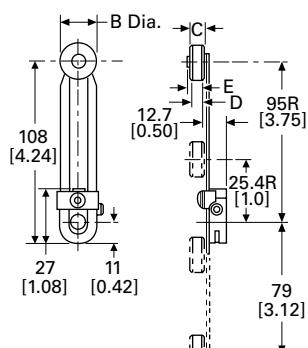
#### Bantam Lever



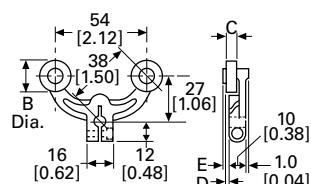
#### Precision Adjustment <sup>②</sup>



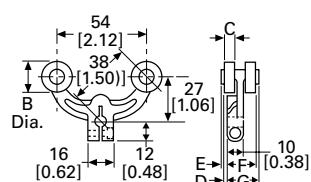
#### Adjustable Roller <sup>③</sup>



#### Fork Lever—Both Rollers on One Side



#### Fork Lever—One Roller Outside, One Inside



#### Notes

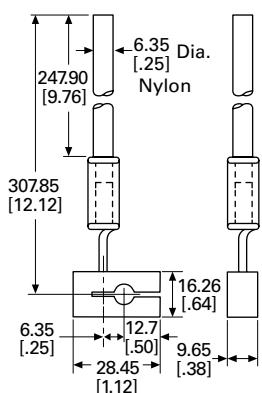
- ① Length from the operating shaft axis to the roller axis (or to the tip for non-roller operators).
- ② Maximum length dimension between operating shaft axis to the roller axis for comparison. Precision adjustable to lesser dimensions.
- ③ By reassembling lever, minimum length can be reduced another 12.7 mm (0.5 in).

## Operators

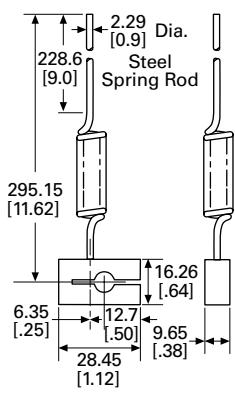
Approximate Dimensions in Inches [mm]

## **Rod Type Operators**

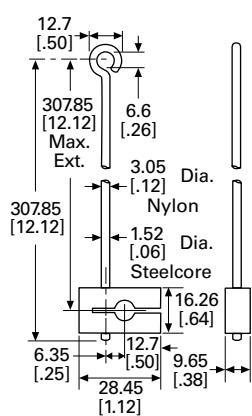
## **Spring Rod—E50KL556**



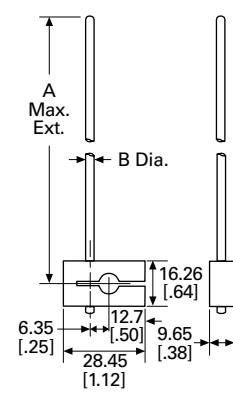
## Spring Rod—E50KL421



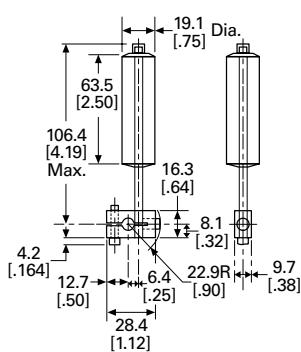
## Adjustable Wire



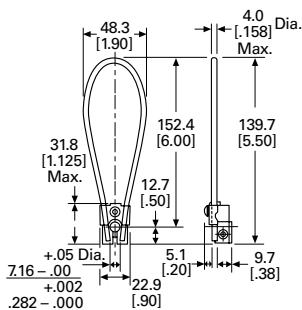
## Adjustable Rod



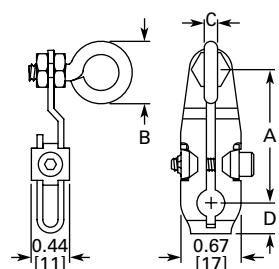
## Adjustable Wide Roller Lever



## **Nylatron Loop—E50KL142**

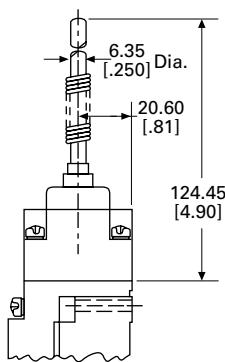


E50KL33

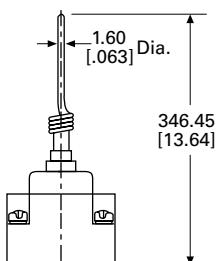


## ***Wobble Type Operators***

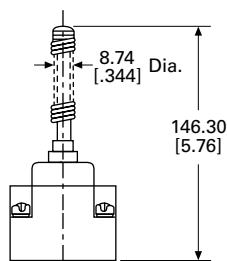
## Nylon Rod



## **Stainless Steel Rod**



## Coil Spring



# Limit Switches

## Hazardous Location Limit Switches

### Hazardous Location Limit Switches



### Hazardous Location Limit Switches

#### Product Description

Type LX, CX and CBX limit switches by Eaton's electrical sector are designed for extreme environmental service in NEMA 7–9 locations where the danger of an internal or external explosion of flammable gases, vapors, metal alloy or grain dust exists. Type CB provides excellent corrosion resistant properties in NEMA 4X applications. Markets served include mining, grain storage, forest products, petrochemical, pharmaceutical and waste and sewage management.

#### Features

- Sealed and unsealed versions available
- One-way gasket on sealed version keeps liquids out, yet allows a harmless release of gases in the event of an internal explosion
- Silicon bronze housing provides excellent corrosion resistant properties in extreme NEMA 4X applications
- Temperature buildup on limit switch surface is dissipated by housing design and materials used
- Utilizes the operating heads and internal switch mechanisms of the 10316 L Non Plug-in line

### Contents

#### Description

	Page
4 Hazardous Location Limit Switches	31
4.1 Product Selection	31



#### DANGER

**THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.**

#### Standards and Certifications

- cUL



#### NEMA Ratings Comparison

Switch Type	LX	CX	CBX	CB <sup>①</sup>
<b>NEMA 1, 4, 13</b>	—	✓	✓	✓
<b>NEMA 4X</b>	—	—	✓	✓
<b>NEMA 7 Division I, Class I, BCD</b>	✓	✓	✓	—
<b>NEMA 9 Division I, Class II, EFG</b>	✓	✓	✓	—

#### Note

① Not rated for explosive locations.

## **Product Selection**

Complete Assembled Switches with Spring Return Heads 

### **Operating Data—Nominal**

Head Type	Travel to Operate Contacts	Travel to Reset Contacts	Total Travel	Force to Operate Contacts	Minimum Return Force	Body Type	Contacts	Eaton Part Number
<b>Side Rotary Operated</b> 	<b>Standard, 10° Pre-Travel</b> <sup>③</sup>					Type LX	1NO-1NC <sup>④</sup>	<b>10316H1002</b>
	10°	4°	50°	0.19Nm	0.28Nm		2NO	<b>10316H1039</b>
							1NO and 1NC <sup>④</sup>	<b>10316H1049</b>
							2NC	<b>10316H1059</b>
						Type CX	1NO-1NC <sup>④</sup>	<b>10316H2200</b>
							1NO and 1NC <sup>④</sup>	<b>10316H2176</b>
							2NC	<b>10316H2178</b>
						Type CB	1NO-1NC <sup>④</sup>	<b>10316H2149</b>
							2NC	<b>10316H2140</b>
						Type CBX	1NO-1NC <sup>④</sup>	<b>10316H2168</b>
							2NC	<b>10316H2159</b>
<b>Narrow Differential 5° Pre-Travel</b> <sup>③</sup>								
	5°	2°	50°	0.68Nm	0.28Nm	Type LX	1NO-1NC <sup>④</sup>	<b>10316H1146</b>
						Type CX	1NO-1NC <sup>④</sup>	<b>10316H2197</b>
<b>Neutral Position, 18° Pre-Travel</b> <sup>③</sup>								
	18°	6°	50°	0.2Nm	0.16Nm	Type LX	2NO	<b>10316H1071</b>
							2NC	<b>10316H1072</b>
						Type CX	2NO	<b>10316H2179</b>
						Type CBX	2NC	<b>10316H2160</b>
<b>Side Push Operated</b> 	<b>Pushbutton</b>							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	0.45Nm	0.06Nm	Type LX	1NO and 1NC <sup>④</sup>	<b>10316H1213</b>
	<b>Adjustable Pushbutton</b>							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	0.45Nm	0.06Nm	Type LX	1NO-1NC <sup>④</sup>	<b>10316H1192</b>
	<b>Vertical Roller, 0.44 in (11.2 mm) Diameter</b>							
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	0.45Nm	0.06Nm	Type LX	1NO-1NC <sup>④</sup>	<b>10316H1007</b>
<b>Vertical Roller, 0.75 in (19.1 mm) Diameter</b>								
	0.07 in (1.8 mm)	0.03 in (0.76 mm)	0.29 in (7.4 mm)	0.45Nm	0.06Nm	Type LX	1NO-1NC <sup>④</sup>	<b>10316H1194</b>

## *Notes*

- ① Contact Eaton's Sensor Applications Engineering at 1-800-426-9184 for replacement contact blocks.
  - ② For operating levers, see **Page 26**. Only levers with Nylatron rods or rollers should be used with explosion-proof limit switches.
  - ③ Field convertible to clockwise only or counterclockwise only operation.
  - ④ 1NO-1NC contacts must be same polarity when both circuits are used—1NO and 1NC contacts have isolated poles and may be used on opposite polarity.
  - ⑤ Neutral position switches operate one circuit in each direction.



# EATON

## The power of fusion.



# EATON

Powering Business Worldwide

There's a certain energy at Eaton. It's the power of uniting some of the world's most respected names to build a brand you can trust to meet every power management need. The energy created supports our commitment to powering business worldwide.

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges. [Eaton.com/Electrical](http://Eaton.com/Electrical).

All of the above are trademarks of Eaton Corporation or its affiliates. Eaton has a license to use the Westinghouse brand name in Asia Pacific. ©2012 Eaton Corporation.

Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customised, integrated solutions to solve our customers' most critical challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority.

For more information, visit [www.eaton.eu/electrical](http://www.eaton.eu/electrical)

Follow us on social media to get the latest product and support information.



To contact an Eaton salesperson or local distributor/agent, please visit  
[www.eaton.eu/electrical/customersupport](http://www.eaton.eu/electrical/customersupport)

Local Distributor/agent

**Vanderbijlpark Sales Office**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P.O. Box 5861  
Vanderbijlpark 1900  
Tel: (016) 889 2476/7  
Fax: (016) 889 2266

**Witbank Branch**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P.O. Box 3798  
Witbank 1035  
Tel: (013) 692 3066  
Fax: (013) 697 3246

**Africa Electrical Sector HQ**  
**Eaton Electric (South Africa) (Pty) Ltd**  
Private Bag X019  
Wadeville 1422  
Tel: (011) 824-7400  
Fax: (086) 681 9302

**Richards Bay Sales Office**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P O Box 1700,  
Richards Bay, 3900  
Tel: (035) 797 5181/2/3  
Fax: (035) 797 5184  
Cell : 082 460 3995

**Port Elizabeth Sales Office**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P.O. Box 7327  
Newton Park 6055  
Tel: (041) 364 1049  
Fax: (041) 364 2180

**Cape Town Branch**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P.O. Box 3308  
Cape Town 8000  
Tel: (021) 531 5852  
Fax: (021) 531 9953

**Rustenburg Sales Office**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P.O. Box 20493, Protea Park, Rustenburg 0305  
Tel: (014) 596 7600  
Fax: (014) 596 6197

**Durban Branch**  
**Eaton Electric (South Africa) (Pty) Ltd**  
P.O. Box 132,  
Umgeni Business Park,  
Durban 4098  
Tel: (031) 263 0502  
Fax: (031) 263 0756

**Eaton Industries Manufacturing GmbH**  
**EMEA Headquarters**  
7 Route de la Longeraie  
1110 Morges  
Switzerland

Changes to the products, to the information contained in this document, and to prices are reserved; so are errors and omissions. Only order confirmations and technical documentation by Eaton is binding. Photos and pictures also do not warrant a specific layout or functionality. Their use in whatever form is subject to prior approval by Eaton. The terms and conditions of Eaton apply, as referenced on Eaton internet pages and Eaton order confirmations.