

2.1

Limit Switches

E47 Precision Switches

E47 Precision Switches

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E47 Precision Switches

Product Description

E47 Precision Switches from Eaton's electrical sector provide high accuracy switching at an affordable price. A variety of standard features, such as current capacity, operating force, travel characteristics and actuators, lets you custom fit the switch to your application.

The switches are available in their compact basic form, or enclosed in a rugged, metal housing.

Features

- Compact housings are ideal for use where space is restricted
- Precision, snap-action operators provide accurate repeatability of electrical and mechanical operating characteristics
- High current capacity (up to 20A) allows power load switching and motor handling capability
- Enclosed boot versions shield actuators from debris

Contents

Description

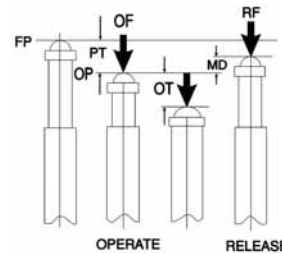
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Operating Characteristics

Operating Characteristics

Definitions



- OF—Operating Force
- RF—Return Force
- PT—Pre-Travel
- OT—Over-Travel
- MD—Movement Differential
- FP—Free Position
- OP—Operating Position

Standards and Certifications

- UL Recognized
- CSA Certified
- CE
- 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.

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.

Product Selection

Basic Switches

E47 Precision Switches—Basic

Type	Specifications ^①	15A Catalog Number	20A Catalog Number
Pin Plunger			
 Pin Plunger			
Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm)	E47BMS01	E47CMS01
Solder terminal	OT max.—0.005 in (0.13 mm) MD max.—0.002 in (0.05 mm) OP—0.626 in (15.9 mm)	E47BML01	E47CML01 ^②
Extended Plunger			
 Extended Plunger			
Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm)	E47BMS03	—
Solder terminal	OT max.—0.063 in (1.6 mm) MD max.—0.002 in (0.05 mm) OP—1.11 in (28.2 mm)	E47BML03	—
Straight Plunger			
 Straight Plunger			
Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm)	E47BMS02	E47CMS02
Solder terminal	OT max.—0.063 in (1.6 mm) MD max.—0.002 in (0.05 mm) OP—0.846 in (21.5 mm)	E47BML02	E47CML02
Reversed Lever			
 Reversed Lever			
Screw terminal	OF max.—5.29 oz (150g) RF max.—0.49 oz (14g) PT max.—0.16 in (4 mm)	E47BMS21	—
Solder terminal	OT max.—0.063 in (1.6 mm) MD max.—0.051 in (1.3 mm) FP max.—0.81 in (20.6 mm)	E47BML21	—
Spade terminal	OP—0.685 in (17.4 mm)	E47BMT21	—
Straight Lever			
 Straight Lever			
Screw terminal	OF max.—2.47 oz (70g) RF min.—0.49 oz (14g) PT max.—0.394 in (10 mm) OT max.—0.220 in (5.6 mm)	E47BMS22	E47CMS22
Solder terminal	MD max.—0.051 in (1.3 mm) FP max.—1.11 in (28.2 mm) OP—0.748 in (19 mm)	E47BML22	—
Standard Lever			
 Standard Lever			
Screw terminal	OF max.—3.53 oz (100g) RF min.—0.99 oz (28g) PT max.—0.197 in (5.0 mm) OT max.—0.079 in (2.0 mm)	E47BMS20	—
Solder terminal	MD max.—0.039 in (1.0 mm) FP max.—0.976 in (24.8 mm) OP—0.748 in (19 mm)	E47BML20	—
Extended Straight Plunger			
 Extended Straight Plunger			
Screw terminal	OF max.—12.3 oz (350g) RF max.—4.02 oz (114g) PT max.—0.016 in (0.4 mm)	E47BMS04	E47CMS04
Screw terminal (with space lugs)	OT max.—0.217 in (5.5 mm) MD max.—0.002 in (0.05 mm) OP—0.858 in (21.8 mm)	E47BMT04	—
Solder terminal		E47BML04	E47CML04

Notes

^① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

^② Contact Eaton's Sensor Applications Department at 1-800-426-9184 for approval status.



E47 Precision Switches—Basic, continued

Type	Specifications ^①	15A Catalog Number	20A Catalog Number
Roller Plunger			
 Roller Plunger	Screw terminal	E47BMS10	E47CMS10
	Solder terminal	E47BML10	—
Cross Roller Plunger			
 Cross Roller Plunger	Screw terminal	E47BMS11	E47CMS11
	Solder terminal	E47BML11	—
Reversed Roller Lever			
 Reversed Roller Lever	Screw terminal	E47BMS41	—
	Solder terminal	E47BML41	—
Extended Roller Lever			
 Extended Roller Lever	Screw terminal	E47BMS42	E47CMS42
	Solder terminal	E47BML42	—
Roller Lever			
 Roller Lever	Screw terminal	E47BMS30	E47CMS30
	Solder terminal	E47BML30	—
	Spade terminal	E47BMT30	E47CMT30
One-Way Roller			
 One-Way Roller	Screw terminal	E47BMS31	—
	Solder terminal	E47BML31	—
Integral Leaf			
 Integral Leaf	Screw terminal	E47BMS23	E47CMS23
	Solder terminal	E47BML23	—

Note







^① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

E47 Precision Switches—Basic, continued

Type	Specifications ^①	15A Catalog Number	20A Catalog Number
Adjustable Roller	Adjustable Roller		
 Screw terminal	OF max.—17.64 oz (500g) RF min.—6.0 oz (170g) PT max.—0.197 in (5.0 mm) OT max.—0.5 in (12.7 mm)	E47BMS40	—
Solder terminal	MD max.—0.087 in (2.2 mm) FP max.—1.752 in (44.5 mm) OP—1.591 in (40.4 mm)	E47BML40	—
Extended Adjustable Roller	Extended Adjustable Roller		
 Screw terminal	OF max.—21.16 oz (600g) RF min.—10.58 oz (300g) PT max.—0.118 in (3.0 mm) OT max.—0.236 in (6.0 mm)	E47BMS43	—
Solder terminal	MD max.—0.079 in (2.0 mm) FP max.—1.614 in (41 mm) OP—1.591 in (40.4 mm)	E47BML43	—

Enclosed Switches

E47 Precision Switches—Enclosed

Specifications ^①	Catalog Number	Specifications ^①	Catalog Number
Plunger Actuator	Plunger Actuator	Booted Roller Lever	Booted Roller Lever
 OF max.—8.82–12.3 oz (250–350g) RF min.—4.02 oz (114g) PT max.—0.016 in (0.4 mm) OT max.—0.217 in (5.5 mm) MD max.—0.002 in (0.05 mm) OP—1.504 in (38.2 mm)	E47BLS05	 OF max.—22.57 oz (640g) RF min.—8.11 oz (230g) PT max.—0.197 in (5.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	E47BLS33
	E47CLS05 ^{②③}		
Booted Plunger	Booted Plunger	Roller Plunger	Roller Plunger
 OF max.—28.22 oz (800g) RF min.—8.46 oz (240g) PT max.—0.079 in (2.0 mm) OT max.—0.197 in (5.0 mm) MD max.—0.004 in (0.1 mm) OP—1.803 in (45.8 mm)	E47BLS06	 OF max.—8.82–12.3 oz (250–350g) RF min.—4.02 oz (114g) PT max.—0.02 in (0.5 mm) OT max.—0.142 in (3.6 mm) MD max.—0.002 in (0.05 mm) OP—1.957 in (49.7 mm)	E47BLS07
	E47CLS06 ^{②③}		E47BLS11 ^④
Roller Lever	Roller Lever	Booted Roller Plunger	Booted Roller Plunger
 OF max.—20.1 oz (570g) RF min.—6.0 oz (170g) PT max.—0.157 in (4.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	E47BLS32	 OF max.—17.64 oz (500g) RF min.—3.53 oz (100g) PT max.—0.039 in (1.0 mm) OT max.—0.138 in (3.5 mm) MD max.—0.005 in (0.12 mm) OP—1.957 in (49.7 mm)	E47BLS08
	E47CLS32 ^{②③}		E47BLS12 ^④

Notes

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- ^② Contact Eaton's Sensor Applications Department at 1-800-426-9184 for approval status.
- ^③ 20 ampere version.
- ^④ Cross roller unit.

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E47 Precision Switches— Enclosed, continued

	Specifications ①	Catalog Number
One-Way Roller	One-Way Roller OF max.—20.1 oz (570g) RF min.—6.0 oz (170g) PT max.—0.157 in (4.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	E47BLS34
Booted One-Way Roller	Booted One-Way Roller OF max.—22.57 oz (640g) RF min.—8.11 oz (230g) PT max.—0.197 in (5.0 mm) OT max.—0.236 in (6.0 mm) MD max.—0.016 in (0.4 mm)	E47BLS35



E47 Precision Switches— Enclosed, continued

	Specifications ①	Catalog Number
Booted Wobble	Booted Wobble OF max.—2.11 oz (60g) RF min.—0.88 oz (25g) PT max.—0.520 in (13.2 mm) OT max.—0.315 in (8.0 mm) MD max.—0.039 in (1.0 mm)	E47BLS14



Accessories

Terminal Wire Covers for Basic Switches

	Description	Catalog Number		Description	Catalog Number
45°	Terminal wire cover with 45° conduit interface	E47PA1	90°	Terminal wire cover with 90° conduit interface	E47PA2



Technical Data and Specifications

E47 Precision Switches

Description	Specification
Operating speed	0.01m/second to 1m/second
Operating Frequency	
Mechanical	120 operations/minute
Electrical	20 operations/minute
Mechanical life	3,000,000 operations minimum
Electrical life	500,000 operations minimum
Contact resistance	15M ohms maximum, initial
Insulation resistance	100M ohms minimum at 500 Vdc
Dielectric Strength	
Between non-current carrying parts	1000 Vac, 50/60 Hz for 1 minute
Between current carrying parts and ground	2000 Vac, 50/60 Hz for 1 minute

Notes

- ① OF = Operating Force; RF = Return Force; PT = Pre-Travel; OT = Over-Travel; MD = Movement Differential; FP = Free Position; OP = Operating Position.
- ② Cross roller unit.

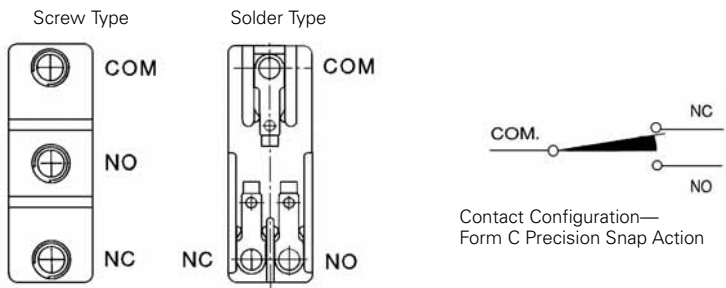
E47 Precision Switches, continued

Description	Specification
Ambient Operating Temperature	
Basic	-13° to 176°F (-25° to 80°C)
Enclosed	5° to 176°F (-15° to 80°C)
Environmental rating enclosed, booted	NEMA 1
Mounting centers	1.0 in (25.4 mm), #8 screw size
Terminal screws	Bottom facing M4 x 0.7 (8-32) Screws with cup washers will accept 22-12 AWG (2.5 sq. mm maximum) Maximum torque: 10 in-lbs.
Threaded bushing	15/32 in
Material of construction	Mineral filled phenolic
Enclosure rating	Aluminum die casting (ADC-3/A380); Seal boot: nitrile, butyl rubber (NBR)
Conduit fitting on enclosed type	1/2 in NPT

Maximum Ampere Ratings ^{①②}

Model	Rated Voltage	Non-Inductive Load (A)			Inductive Load (A)			Inrush Current (A)	
		Resistive Load NC and NO	Lamp Load NC	NO	Inductive Load NC and NO	Motor Load NC	NO	NC	NO
15A	125 Vac	15	3	1.5	15	5	2.5	30 max.	15 max.
	250 Vac	15	2.5	1.25	15	3	1.5		
	500 Vac	3	1.5	0.75	2.5	1.5	0.75		
	8 Vdc	15	3	1.5	15	5	2.5		
	14 Vdc	15	3	1.5	10	5	2.5		
	30 Vdc	6 (2)	3	1.5	5	5	2.5		
	125 Vdc	0.4	0.4	0.4	0.05	0.05	0.05		
	250 Vdc	0.2	0.2	0.2	0.03	0.03	0.03		
20A	125 Vac	20	7.5	7.5	20	12.5	12.5	60 max.	30 max.
	250 Vac	20	7.5	7.5	20	8.3	8.3		
	500 Vac	6	4	4	5	2	2		
	8 Vdc	20	3	1.5	20	12.5	12.5		
	14 Vdc	20	3	1.5	15	12.5	12.5		
	30 Vdc	6	3	1.5	5	5	5		
	125 Vdc	0.5	0.5	0.5	0.05	0.05	0.05		
	250 Vdc	0.25	0.25	0.25	0.03	0.03	0.03		

Terminal Configurations



(Spade type not shown, available on some models)

Notes

- ① Inductive load has a power factor of 0.04 minimum (AC) and a time constant of 7 m/second (DC).
- ② Lamp load has an inrush current of six times steady-state current.

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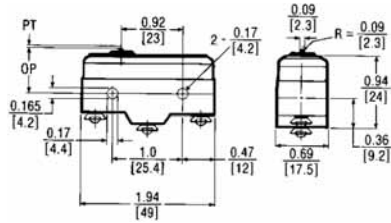
Dimensions

Approximate Dimensions in Inches [mm]

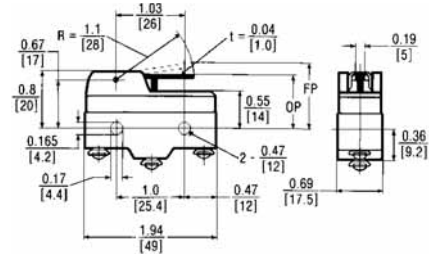
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Basic Switches

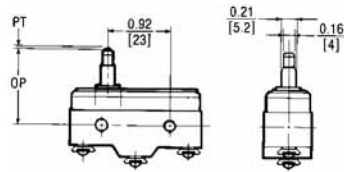
Pin Plunger



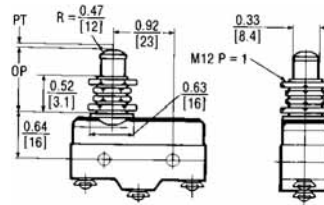
Standard Lever



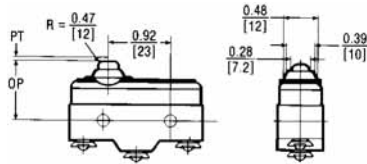
Extended Plunger



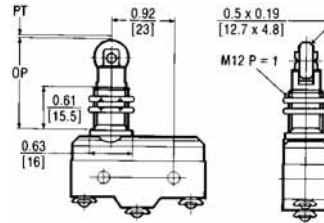
Extended Straight Plunger



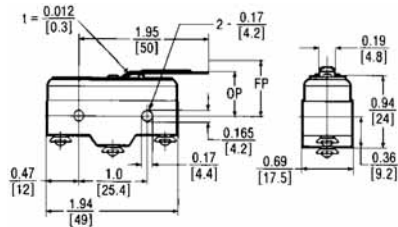
Straight Plunger



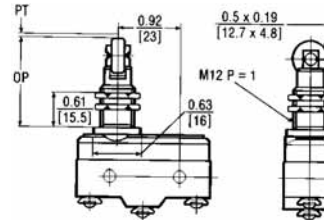
Roller Plunger



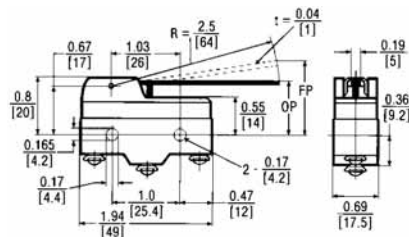
Reversed Lever



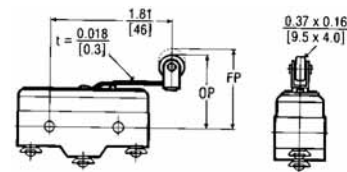
Cross Roller Plunger



Straight Lever

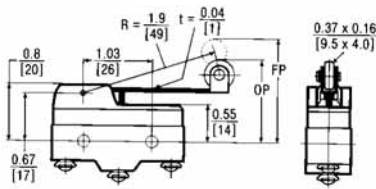


Reversed Roller Lever

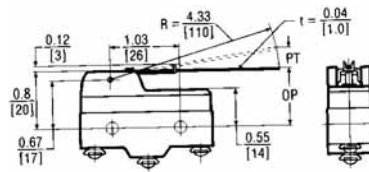


Approximate Dimensions in Inches [mm]

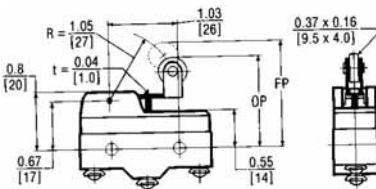
Extended Roller Lever



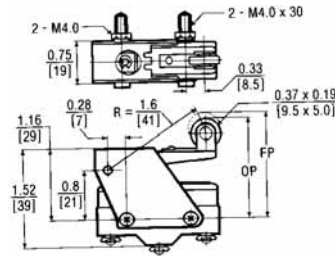
Integral Leaf



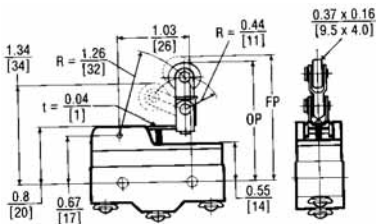
Roller Lever



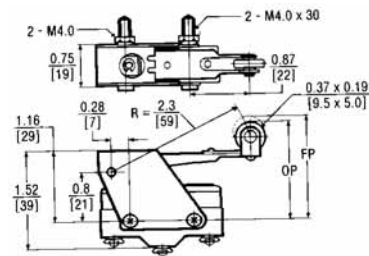
Adjustable Roller



One-Way Roller

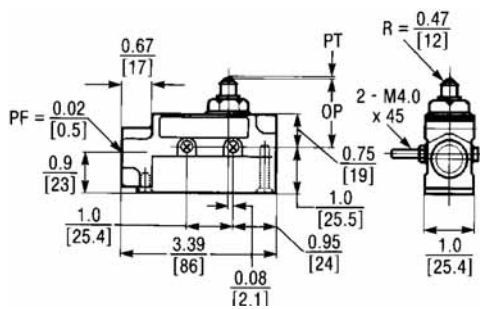


Extended Adjustable Roller

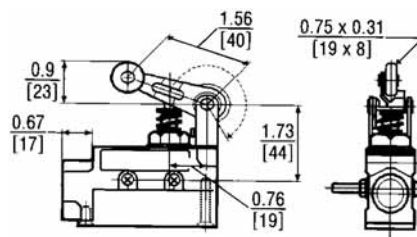


Enclosed Switches

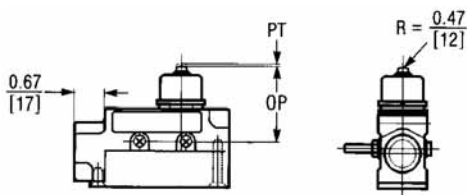
Plunger Actuator



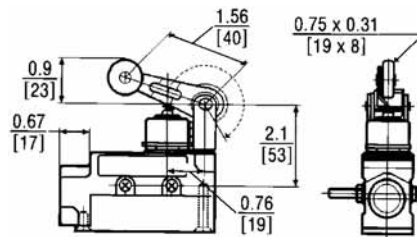
Roller Lever



Booted Plunger



Booted Roller Lever



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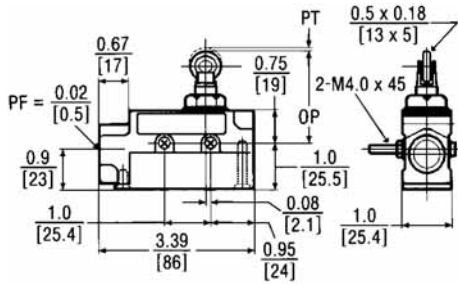
Limit Switches

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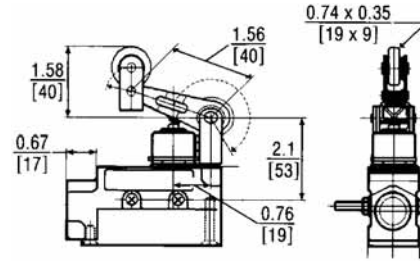
Approximate Dimensions in Inches [mm]

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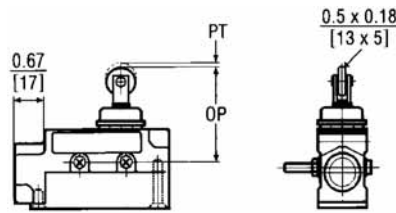
Roller Plunger



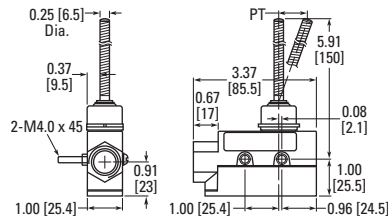
Booted One-Way Roller



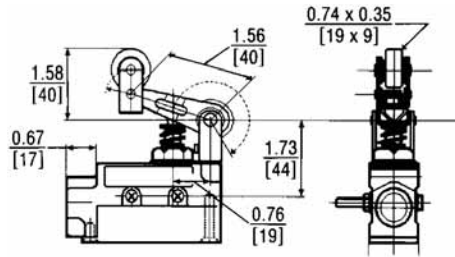
Booted Roller Plunger



Booted Wobble



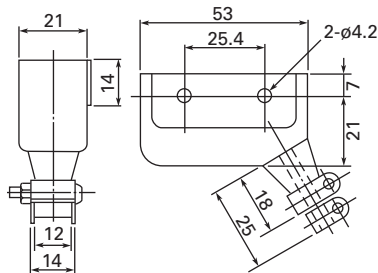
One-Way Roller



Accessories

Approximate Dimensions in mm

Terminal Wire Cover with 45° Conduit Interface



Terminal Wire Cover with 90° Conduit Interface

