

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 bootable versions shield actuators from debris

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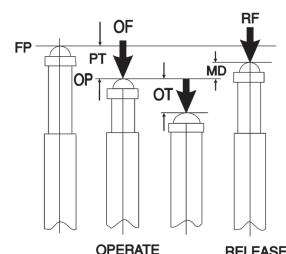
Dimensions **V8-T2-13**



Drawings
Online

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, E117028
- UL tested to Canadian safety standards
- RoHS Compliant



⚠ 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	15A Catalog Number	20A Catalog Number
Pin Plunger	Pin Plunger		
	Screw terminal	E47BMS01	E47CMS01
	Solder terminal	E47BML01	E47CML01 ①
Extended Plunger	Extended Plunger		
	Screw terminal	E47BMS03	—
	Solder terminal	E47BML03	—
Straight Plunger	Straight Plunger		
	Screw terminal	E47BMS02	E47CMS02
	Solder terminal	E47BML02	E47CML02
Reversed Lever	Reversed Lever		
	Screw terminal	E47BMS21	—
	Solder terminal	E47BML21	—
	Spade terminal	E47BMT21	—
Straight Lever	Straight Lever		
	Screw terminal	E47BMS22	E47CMS22
	Solder terminal	E47BML22	—
Standard Lever	Standard Lever		
	Screw terminal	E47BMS20	—
	Solder terminal	E47BML20	—
Extended Straight Plunger	Extended Straight Plunger		
	Screw terminal	E47BMS04	E47CMS04
	Screw terminal (with space lugs)	E47BMT04	—
	Solder terminal	E47BML04	E47CML04

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

E47 Precision Switches—Basic, continued

Adjustable Roller



Type	15A Catalog Number	20A Catalog Number
Adjustable Roller		
Screw terminal	E47BMS40	—
Solder terminal	E47BML40	—
Extended Adjustable Roller		
Screw terminal	E47BMS43	—
Solder terminal	E47BML43	—

Extended Adjustable Roller



Enclosed Switches

E47 Precision Switches—Enclosed

Plunger Actuator



	Catalog Number
Plunger Actuator	
	E47BLS05
	E47CLS05 ①②

Booted Plunger



Booted Plunger	
	E47BLS06
	E47CLS06 ①②

Roller Lever



Roller Lever	
	E47BLS32
	E47CLS32 ①②

E47 Precision Switches—Enclosed, continued

Booted Roller Lever



Catalog Number
Booted Roller Lever
E47BLS33

Roller Plunger



Roller Plunger	
	E47BLS07
	E47BLS11 ③

Booted Roller Plunger



Booted Roller Plunger	
	E47BLS08
	E47BLS12 ③

One-Way Roller



One-Way Roller	
	E47BLS34

Booted One-Way Roller



Booted One-Way Roller	
	E47BLS35

Booted Wobble



Booted Wobble	
	E47BLS14

Notes

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

Accessories

Terminal Wire Covers for Basic Switches

	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

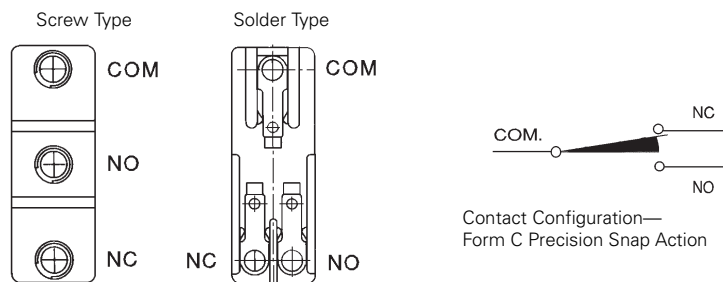
E47 Precision Switches

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
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 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		Inductive Load NC and NO	Motor Load		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.

E47 Precision Switch Specifications—15 A

Catalog Number	E47B...01-V	E47B...02-V	E47B...03-V	E47B...04-V	E47B...05-V	E47B...06-V	E47B...07-V
Operating force (max.)	12.35 oz (350 g)	12.35 oz (350 g)	12.35 oz (350 g)	12.35 oz (350 g)	8.82–12.3 oz (250–350 g)	28.22 oz (800 g)	8.82–12.3 oz (250–350 g)
Return force (min.)	—	—	—	—	4.02 oz (114 g)	8.47 oz (240 g)	4.02 oz (114 g)
Return force (max.)	4.02 oz (114 g)	4.02 oz (114 g)	4.02 oz (114 g)	4.02 oz (114 g)	—	—	—
Pre-travel (max.)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.079 in (2 mm)	0.02 in (0.5 mm)
Overtravel (max.)	0.005 in (0.13 mm)	0.063 in (1.6 mm)	0.063 in (1.6 mm)	0.217 in (5.5 mm)	0.217 in (5.5 mm)	0.197 in (5 mm)	0.142 in (3.6 mm)
Movement differential (max.)	0.002 in (0.05 mm)	0.002 in (0.05 mm)	0.002 in (0.05 mm)	0.002 in (0.05 mm)	0.002 in (0.05 mm)	0.004 in (0.1 mm)	0.002 in (0.05 mm)
Free position (max.)	—	—	—	—	—	—	—
Operating position (max.)	0.626 in (15.9 mm)	0.846 in (21.5 mm)	1.11 in (28.2 mm)	0.858 in (21.8 mm)	1.504 in (38.2 mm)	1.803 in (45.8 mm)	1.957 in (49.7 mm)

Catalog Number	E47B...08-V	E47B...10-V	E47B...11-V	E47B...11-V Cross Roller Unit	E47B...12-V Cross Roller Unit	E47B...14-V	E47B...20-V
Operating force (max.)	17.64 oz (500 g)	12.35 oz (350 g)	12.35 oz (350 g)	8.82–12.3 oz (250–350 g)	17.64 oz (500 g)	2.12 oz (60 g)	3.53 oz (100 g)
Return force (min.)	3.53 oz (100 g)	—	—	4.02 oz (114 g)	3.53 oz (100 g)	0.88 oz (25 g)	0.99 oz (28 g)
Return force (max.)	—	4.02 oz (114 g)	4.02 oz (114 g)	—	—	—	—
Pre-travel (max.)	0.039 in (1 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.02 in (0.5 mm)	0.039 in (1 mm)	0.52 in (13.2 mm)	0.197 in (5 mm)
Overtravel (max.)	0.138 in (3.5 mm)	0.141 in (3.58 mm)	0.141 in (3.58 mm)	0.142 in (3.6 mm)	0.138 in (3.5 mm)	0.315 in (8 mm)	0.079 in (2 mm)
Movement differential (max.)	0.005 in (0.12 mm)	0.002 in (0.05 mm)	0.002 in (0.05 mm)	0.002 in (0.05 mm)	0.005 in (0.12 mm)	0.039 in (1 mm)	0.039 in (1 mm)
Free position (max.)	—	—	—	—	—	—	0.976 in (24.8 mm)
Operating position (max.)	1.957 in (49.7 mm)	1.315 in (33.4 mm)	1.315 in (33.4 mm)	1.957 in (49.7 mm)	1.957 in (49.7 mm)	—	0.748 in (19 mm)

Catalog Number	E47B...21-V	E47B...22-V	E47B...23-V	E47B...30-V	E47B...31-V	E47B...32-V	E47B...33-V
Operating force (max.)	5.29 oz (150 g)	2.47 oz (70 g)	0.35 oz (10 g)	5.64 oz (160 g)	5.64 oz (160 g)	20.11 oz (570 g)	22.58 oz (640 g)
Return force (min.)	—	0.49 oz (14 g)	0.11 oz (3 g)	1.48 oz (42 g)	1.48 oz (42 g)	6 oz (170 g)	8.11 oz (230 g)
Return force (max.)	0.49 oz (14 g)	—	—	—	—	—	—
Pre-travel (max.)	0.157 in (4 mm)	0.394 in (10 mm)	0.787 in (20 mm)	0.106 in (2.7 mm)	0.106 in (2.7 mm)	0.157 in (4 mm)	0.197 in (5 mm)
Overtravel (max.)	0.063 in (1.6 mm)	0.22 in (5.6 mm)	0.22 in (5.6 mm)	0.094 in (2.4 mm)	0.094 in (2.4 mm)	0.236 in (6 mm)	0.236 in (6 mm)
Movement differential (max.)	0.051 in (1.3 mm)	0.051 in (1.3 mm)	0.118 in (3 mm)	0.02 in (0.5 mm)	0.02 in (0.5 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)
Free position (max.)	0.811 in (20.6 mm)	1.11 in (28.2 mm)	—	1.28 in (32.5 mm)	1.717 in (43.6 mm)	—	—
Operating position (max.)	0.685 in (17.4 mm)	0.748 in (19 mm)	0.748 in (19 mm)	1.189 in (30.2 mm)	1.697 in (43.1 mm)	—	—

Catalog Number	E47B...34-V	E47B...35-V	E47B...40-V	E47B...41-V	E47B...42-V	E47B...43-V
Operating force (max.)	20.11 oz (570 g)	22.58 oz (640 g)	17.64 oz (500 g)	5.29 oz (150 g)	5.64 oz (160 g)	21.16 oz (600 g)
Return force (min.)	6 oz (170 g)	8.11 oz (230 g)	6 oz (170 g)	—	0.78 oz (22 g)	10.58 oz (300 g)
Return force (max.)	—	—	—	0.49 oz (14 g)	—	—
Pre-travel (max.)	0.157 in (4 mm)	0.197 in (5 mm)	0.197 in (5 mm)	0.157 in (4 mm)	0.28 in (7.1 mm)	0.118 in (3 mm)
Overtravel (max.)	0.236 in (6 mm)	0.236 in (6 mm)	0.5 in (12.7 mm)	0.063 in (1.6 mm)	0.157 in (4 mm)	0.236 in (6 mm)
Movement differential (max.)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.087 in (2.2 mm)	0.051 in (1.3 mm)	0.04 in (1.02 mm)	0.079 in (2 mm)
Free position (max.)	—	—	1.752 in (44.5 mm)	1.252 in (31.8 mm)	1.437 in (36.5 mm)	1.614 in (41 mm)
Operating position (max.)	—	—	1.591 in (40.4 mm)	1.126 in (28.6 mm)	1.189 in (30.2 mm)	1.591 in (40.4 mm)

E47 Precision Switch Specifications—20 A

Catalog Number	E47C...01-V	E47C...02-V	E47C...03-V	E47C...04-V	E47C...05-V	E47C...06-V	E47C...07-V
Operating force (max.)	22.93 oz (650 g)	22.93 oz (650 g)	22.93 oz (650 g)	22.93 oz (650 g)	8.82–12.3 oz (250–350 g)	28.22 oz (800 g)	8.82–12.3 oz (250–350 g)
Return force (min.)	7.05 oz (200 g)	7.05 oz (200 g)	7.05 oz (200 g)	7.05 oz (200 g)	4.02 oz (114 g)	8.47 oz (240 g)	4.02 oz (114 g)
Return force (max.)	—	—	—	—	—	—	—
Pre-travel (max.)	0.028 in (0.7 mm)	0.028 in (0.7 mm)	0.028 in (0.7 mm)	0.028 in (0.7 mm)	0.016 in (0.4 mm)	0.079 in (2 mm)	0.02 in (0.5 mm)
Overtravel (max.)	0.005 in (0.13 mm)	0.063 in (1.6 mm)	0.063 in (1.6 mm)	0.217 in (5.5 mm)	0.217 in (5.5 mm)	0.197 in (5 mm)	0.142 in (3.6 mm)
Movement differential (max.)	0.008 in (0.2 mm)	0.008 in (0.2 mm)	0.002 in (0.05 mm)	0.008 in (0.2 mm)	0.002 in (0.05 mm)	0.004 in (0.1 mm)	0.002 in (0.05 mm)
Free position (max.)	—	—	—	—	—	—	—
Operating position (max.)	0.642 in (16.3 mm)	0.866 in (22 mm)	1.13 in (28.7 mm)	0.89 in (22.6 mm)	1.504 in (38.2 mm)	1.803 in (45.8 mm)	1.957 in (49.7 mm)

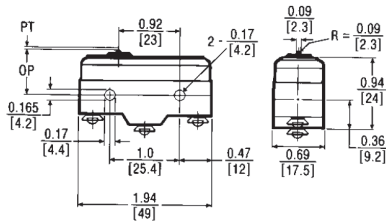
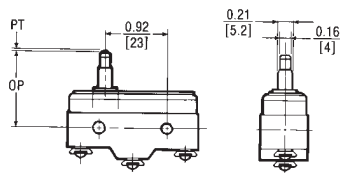
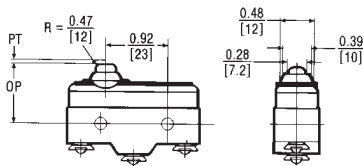
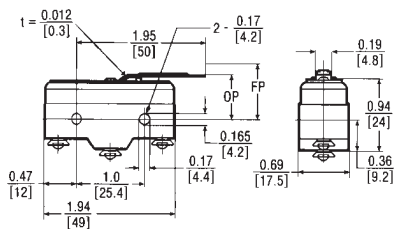
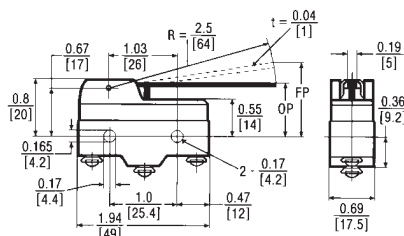
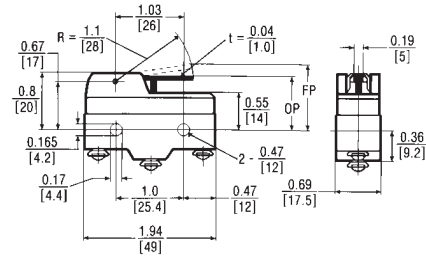
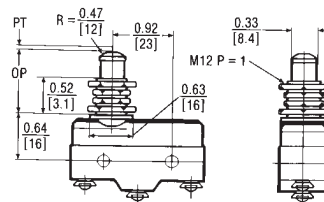
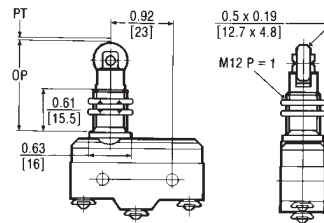
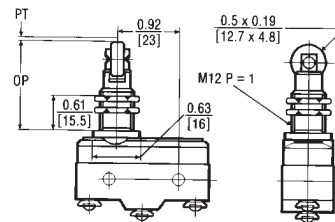
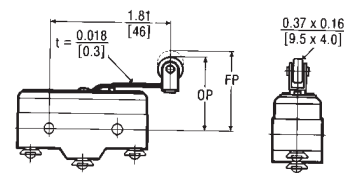
Catalog Number	E47C...08-V	E47C...10-V	E47C...11-V	E47C...11-V Cross Roller Unit	E47C...12-V Cross Roller Unit	E47C...14-V	E47C...20-V
Operating force (max.)	17.64 oz (500 g)	22.93 oz (650 g)	22.93 oz (650 g)	8.82–12.3 oz (250–350 g)	17.64 oz (500 g)	2.12 oz (60 g)	5.64 oz (160 g)
Return force (min.)	3.53 oz (100 g)	7.05 oz (200 g)	7.05 oz (200 g)	4.02 oz (114 g)	3.53 oz (100 g)	0.88 oz (25 g)	1.48 oz (42 g)
Return force (max.)	—	—	—	—	—	—	—
Pre-travel (max.)	0.039 in (1 mm)	0.028 in (0.7 mm)	0.028 in (0.7 mm)	0.02 in (0.5 mm)	0.039 in (1 mm)	0.52 in (13.2 mm)	0.256 in (6.5 mm)
Overtravel (max.)	0.138 in (3.5 mm)	0.141 in (3.58 mm)	0.141 in (3.58 mm)	0.142 in (3.6 mm)	0.138 in (3.5 mm)	0.315 in (8 mm)	0.047 in (1.2 mm)
Movement differential (max.)	0.005 in (0.12 mm)	0.008 in (0.2 mm)	0.008 in (0.2 mm)	0.002 in (0.05 mm)	0.005 in (0.12 mm)	0.039 in (1 mm)	0.047 in (1.2 mm)
Free position (max.)	—	—	—	—	—	—	—
Operating position (max.)	1.957 in (49.7 mm)	1.362 in (34.6 mm)	1.362 in (34.6 mm)	1.957 in (49.7 mm)	1.957 in (49.7 mm)	—	0.78 in (19.8 mm)

Catalog Number	E47C...21-V	E47C...22-V	E47C...23-V	E47C...30-V	E47C...31-V	E47C...32-V	E47C...33-V
Operating force (max.)	12.35 oz (350 g)	2.82 oz (80 g)	0.35 oz (10 g)	6.35 oz (180 g)	5.64 oz (160 g)	20.11 oz (570 g)	22.58 oz (640 g)
Return force (min.)	1.76 oz (50 g)	0.49 oz (14 g)	0.11 oz (3 g)	1.48 oz (42 g)	1.48 oz (42 g)	6 oz (170 g)	8.11 oz (230 g)
Return force (max.)	—	—	—	—	—	—	—
Pre-travel (max.)	0.157 in (4 mm)	0.394 in (10 mm)	0.787 in (20 mm)	0.106 in (2.7 mm)	0.106 in (2.7 mm)	0.157 in (4 mm)	0.197 in (5 mm)
Overtravel (max.)	0.063 in (1.6 mm)	0.22 in (5.6 mm)	0.22 in (5.6 mm)	0.094 in (2.4 mm)	0.094 in (2.4 mm)	0.236 in (6 mm)	0.236 in (6 mm)
Movement differential (max.)	0.051 in (1.3 mm)	0.05 in (1.27 mm)	0.118 in (3 mm)	0.02 in (0.5 mm)	0.02 in (0.5 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)
Free position (max.)	0.811 in (20.6 mm)	1.11 in (28.2 mm)	—	1.28 in (32.5 mm)	1.717 in (43.6 mm)	—	—
Operating position (max.)	0.717 in (18.2 mm)	0.78 in (19.8 mm)	0.748 in (19 mm)	1.205 in (30.6 mm)	1.697 in (43.1 mm)	—	—

Catalog Number	E47C...34-V	E47C...35-V	E47C...40-V	E47C...41-V	E47C...42-V	E47C...43-V
Operating force (max.)	20.11 oz (570 g)	22.58 oz (640 g)	17.64 oz (500 g)	12.35 oz (350 g)	4.23 oz (120 g)	21.16 oz (600 g)
Return force (min.)	6 oz (170 g)	8.11 oz (230 g)	6 oz (170 g)	1.76 oz (50 g)	0.78 oz (22 g)	10.58 oz (300 g)
Return force (max.)	—	—	—	—	—	—
Pre-travel (max.)	0.157 in (4 mm)	0.197 in (5 mm)	0.197 in (5 mm)	0.157 in (4 mm)	0.28 in (7.1 mm)	0.118 in (3 mm)
Overtravel (max.)	0.236 in (6 mm)	0.236 in (6 mm)	0.5 in (12.7 mm)	0.063 in (1.6 mm)	0.157 in (4 mm)	0.236 in (6 mm)
Movement differential (max.)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.087 in (2.2 mm)	0.051 in (1.3 mm)	0.04 in (1.02 mm)	0.079 in (2 mm)
Free position (max.)	—	—	1.752 in (44.5 mm)	1.252 in (31.8 mm)	1.437 in (36.5 mm)	1.614 in (41 mm)
Operating position (max.)	—	—	1.591 in (40.4 mm)	1.157 in (29.4 mm)	1.575 in (40 mm)	1.591 in (40.4 mm)

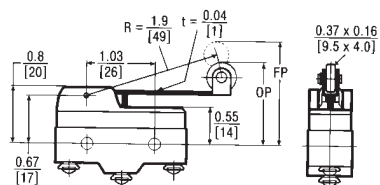
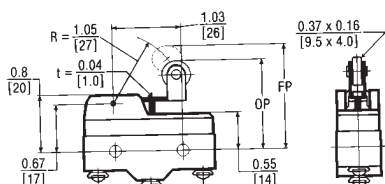
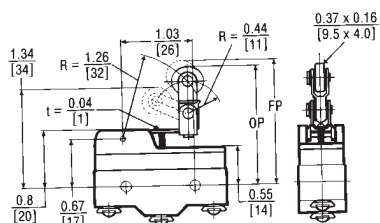
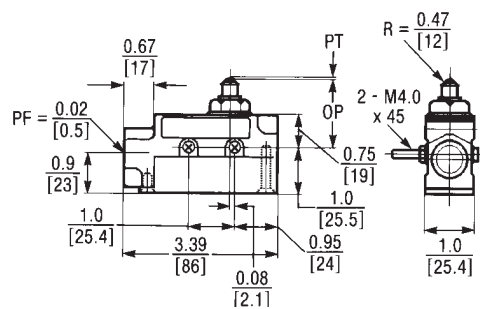
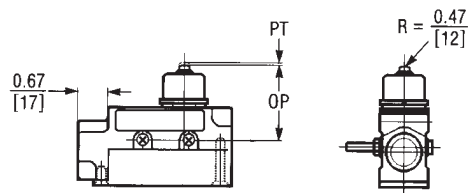
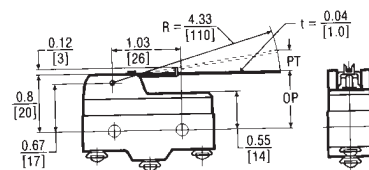
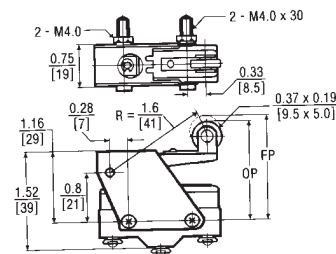
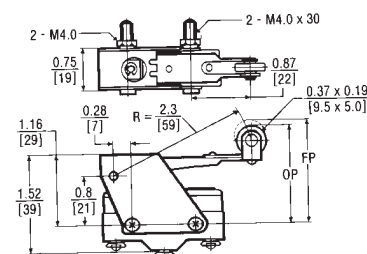
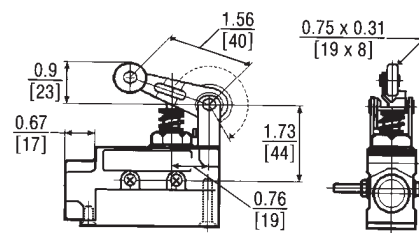
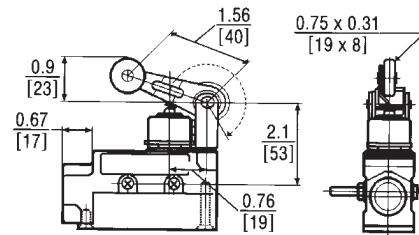
Dimensions

Approximate Dimensions in Inches [mm]

Basic Switches**Pin Plunger****Extended Plunger****Straight Plunger****Reversed Lever****Straight Lever****Standard Lever****Extended Straight Plunger****Roller Plunger****Cross Roller Plunger****Reversed Roller Lever**

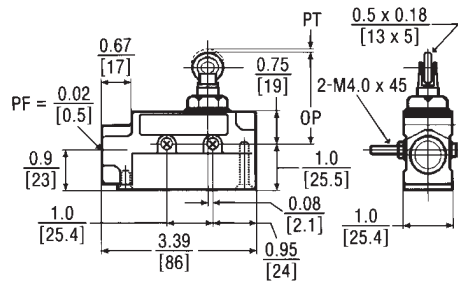
Approximate Dimensions in Inches [mm]

2

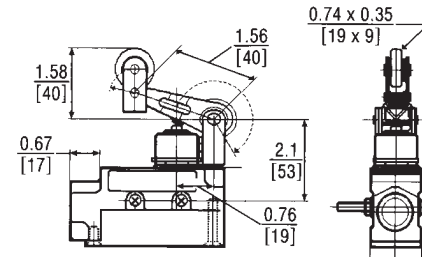
Extended Roller Lever**Roller Lever****One-Way Roller****Enclosed Switches****Plunger Actuator****Booted Plunger****Integral Leaf****Adjustable Roller****Extended Adjustable Roller****Roller Lever****Booted Roller Lever**

Approximate Dimensions in Inches [mm]

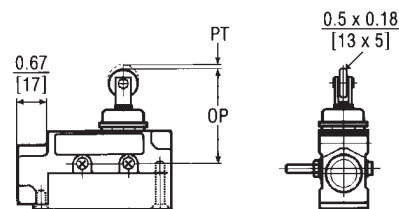
Roller Plunger



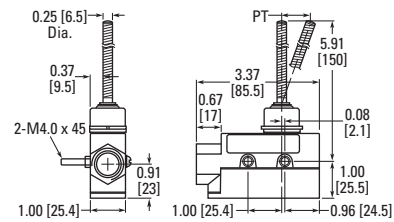
Booted One-Way Roller



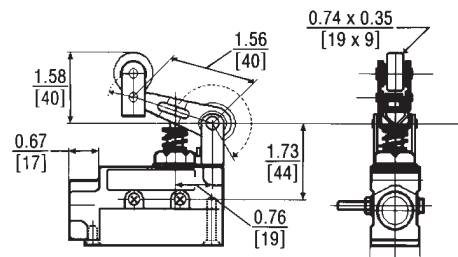
Booted Roller Plunger



Booted Wobble



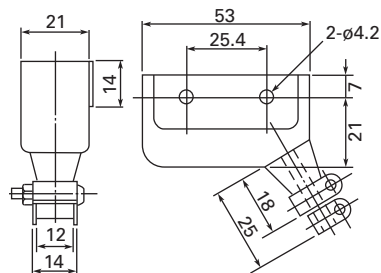
One-Way Roller



Accessories

Approximate Dimensions in mm

Terminal Wire Cover with 45° Conduit Interface



Terminal Wire Cover with 90° Conduit Interface

