E47BMS02

E47BMS11

E47BMS40

6.2 E47 Precision Switches

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E47 Precision Switches

The Cost-Effective Solution for Highly Accurate Switching Applications

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Product Description

E47 Precision Switches from Eaton's electrical business 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.

Approvals

- UL® Recognized
- CSA® Certified

Features and Benefits

- 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 booted versions shield actuators from debris
- Wide variety of operators available
- Compact size fits where you need it
- Basic or enclosed switch
- Rugged die-cast aluminum enclosure
- Solder or screw terminals
- 1/2" NPT conduit fitting

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

Catalog Number Selection

E47 B M S 01 - V

Description
E47 = Precision switch

Amperes
B = 15A
C = 20A

Type
L = Enclosed
M = Basic

Terminal Type
L = Solder
S = Screw
T = Spade

Product Type

01 = Pin plunger	**21** = Reversed lever
02 = Straight plunger	**22** = Straight lever
03 = Extended plunger	**23** = Integral leaf
04 = Extended straight plunger	**30** = Roller lever
05 = Plunger actuator	**31** = One-way roller
06 = Booted plunger	**32** = Roller lever
07 = Roller plunger	**33** = Booted roller lever
08 = Booted roller plunger	**34** = One-way roller
10 = Roller plunger	**35** = Booted one-way roller
11 = Cross roller plunger	**40** = Adjustable roller
12 = Booted cross roller plunger	**41** = Reversed roller lever
14 = Booted wobble	**42** = Extended roller lever
20 = Standard lever	**43** = Extended adjustable roller

Description
V = Vehicle control

Product Selection

Basic Switches

E47BMS01

Pin Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS01-V**
	Solder	**E47BML01-V**
20A	Screw	**E47CMS01-V**
	Solder	**E47CML01-V** ①

E47BMS02

Straight Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS02-V**
	Solder	**E47BML02-V**
20A	Screw	**E47CMS02-V**
	Solder	**E47CML02-V**

E47BMS03

Extended Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS03-V**
	Solder	**E47BML03-V**

E47BMS04

Extended Straight Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS04-V**
		E47BMT04-V ②
	Solder	**E47BML04-V**
20A	Screw	**E47CMS04-V**
	Solder	**E47CML04-V**

E47BMS10

Roller Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS10-V**
	Solder	**E47BML10-V**
20A	Screw	**E47CMS10-V**

E47BMS11

Cross Roller Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS11-V**
	Solder	**E47BML11-V**
20A	Screw	**E47CMS11-V**

E47BMS20

Standard Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS20-V**
	Solder	**E47BML20-V**

Notes

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

② With space lugs.

Basic Switches, Continued

E47BMS21

Reversed Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS21-V**
	Solder	**E47BML21-V**
	Spade	**E47BMT21-V**

E47BMS22

Straight Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS22-V**
	Solder	**E47BML22-V**
20A	Screw	**E47CMS22-V**

E47BMS23

Integral Leaf

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS23-V**
	Solder	**E47BML23-V**
20A	Screw	**E47CMS23-V**

E47BMS30

Roller Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS30-V**
	Solder	**E47BML30-V**
	Spade	**E47BMT30-V**
20A	Screw	**E47CMS30-V**
	Spade	**E47CMT30-V**

E47BMS31

One-Way Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS31-V**
	Solder	**E47BML31-V**

E47BMS40

Adjustable Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS40-V**
	Solder	**E47BML40-V**

E47BMS41

Reversed Roller Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS41-V**
	Solder	**E47BML41-V**

E47BMS42

Extended Roller Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS42-V**
	Solder	**E47BML42-V**
20A	Screw	**E47CMS42-V**

E47BMS43

Extended Adjustable Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BMS43-V**
	Solder	**E47BML43-V**

Basic Switch Accessories

Terminal Wire Covers for Basic Switches

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

Enclosed Switches

E47BLS05

Plunger Actuator

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS05-V**
20A	Screw	**E47CLS05-V** ①

E47BLS06

Booted Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS06-V**

E47BLS07

Roller Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS07-V**

E47BLS08

Booted Roller Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS08-V**

E47BLS11

Roller Plunger—Cross Roller Unit

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS11-V**

E47BLS12

Booted Roller Plunger—Cross Roller Unit

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS12-V**

E47BLS14

Booted Wobble

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS14-V**

E47BLS32

Roller Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS32-V**
20A	Screw	**E47CLS32-V** ①

E47BLS33

Booted Roller Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS33-V**

E47BLS34

One-Way Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS34-V**

E47BLS35

Booted One-Way Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	**E47BLS35-V**

Notes

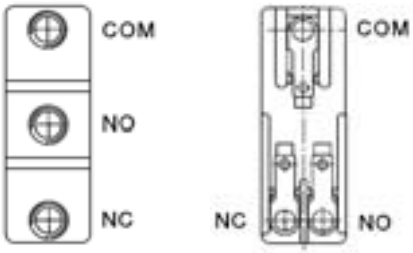
① Contact Eaton's Cutler-Hammer Sensor Applications Department at 1-800-426-9184 for approval status.

Technical Data and Specifications

General Specifications

Item	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 @ 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 (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 inch NPT

Terminal Configuration



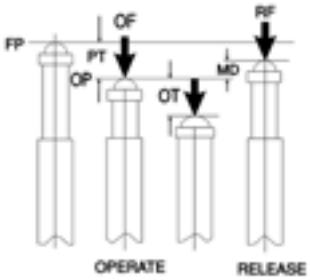
Screw Type **Solder Type**

Note: Spade type not shown, available on some models.

Contact Configuration

Form C Precision Snap Action

Operating Characteristics



Definitions

Code	Description
OF	Operating force
RF	Return force
PT	Pre-travel
OT	Overtravel
MD	Movement differential
FP	Free position
OP	Operating position

Product Specifications

	Catalog Numbers						
	E47…01-V	**E47…02-V**	**E47…03-V**	**E47…04-V**	**E47…05-V**	**E47…06-V**	**E47…07-V**
Operating force (max.)	12.3 oz (350g)	12.3 oz (350g)	12.3 oz (350g)	12.3 oz (350g)	8.82–12.3 oz (250–350g)	28.22 oz (800g)	8.82–12.3 oz (250–350g)
Return force (min.)	—	—	—	—	4.02 oz (114g)	8.46 oz (240g)	4.02 oz (114g)
Return force (max.)	4.02 oz (114g)	4.02 oz (114g)	4.02 oz (114g)	4.02 oz (114g)	—	—	—
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 (2.0 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 (5.0 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 Numbers						
	E47…08-V	**E47…10-V**	**E47…11-V**	**E47…11-V Cross Roller Unit**	**E47…12-V Cross Roller Unit**	**E47…14-V**	**E47…20-V**
Operating force (max.)	17.64 oz (500g)	12.3 oz (350g)	12.3 oz (350g)	8.82–12.3oz (250–350g)	17.64 oz (500g)	2.11 oz (60g)	3.53 oz (100g)
Return force (min.)	3.53 oz (100g)	—	—	4.02 oz (114g)	3.53 oz (100g)	0.88 oz (25g)	0.99 oz (28g)
Return force (max.)	—	4.02 oz (114g)	4.02 oz (114g)	—	—	—	—
Pre-travel (max.)	0.039 in (1.0 mm)	0.016 in (0.4 mm)	0.016 in (0.4 mm)	0.02 in (0.5 mm)	0.039 in (1.0 mm)	0.520 in (13.2 mm)	0.197 in (5.0 mm)
Overtravel (max.)	0.138 in (3.5 mm)	0.14 in (3.58 mm)	0.14 in (3.58 mm)	0.142 in (3.6 mm)	0.138 in (3.5 mm)	0.315 in (8.0 mm)	0.079 in (2.0 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 (1.0 mm)	0.039 in (1.0 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 Numbers						
	E47…21-V	**E47…22-V**	**E47…23-V**	**E47…30-V**	**E47…31-V**	**E47…32-V**	**E47…33-V**
Operating force (max.)	5.29 oz (150g)	2.47 oz (70g)	0.35 oz (10g)	5.64 oz (160g)	5.64 oz (160g)	20.1 oz (570g)	22.57 oz (640g)
Return force (min.)	—	0.49 oz (14g)	0.106 oz (3.0g)	1.48 oz (42g)	1.48 oz (42g)	6.0 oz (1700g)	8.11 oz (230g)
Return force (max.)	0.49 oz (14g)	—	—	—	—	—	—
Pre-travel (max.)	0.16 in (4 mm)	0.394 in (10 mm)	0.787 in (20.0 mm)	0.106 in (2.7 mm)	0.106 in (2.7 mm)	0.157 in (4.0 mm)	0.197 in (5.0 mm)
Overtravel (max.)	0.063 in (1.6 mm)	0.220 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 (6.0 mm)	0.236 in (6.0 mm)
Movement differential (max.)	0.051 in (1.3 mm)	0.051 in (1.3 mm)	0.118 in (3.0 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.)	0.81 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 (19.0 mm)	1.189 in (30.2 mm)	1.697 in (43.1 mm)	—	—

	Catalog Numbers					
	E47…34-V	**E47…35-V**	**E47…40-V**	**E47…41-V**	**E47…42-V**	**E47…43-V**
Operating force (max.)	20.1 oz (570g)	22.57 oz (640g)	17.64 oz (500g)	5.29 oz (150g)	5.64 oz (160g)	21.16 oz (600g)
Return force (min.)	6.0 oz (170g)	8.11 oz (230g)	6.0 oz (170g)	—	0.78 oz (22g)	10.58 oz (300g)
Return force (max.)	—	—	—	0.49 oz (14g)	—	—
Pre-travel (max.)	0.157 in (4.0 mm)	0.197 in (5.0 mm)	0.197 in (5.0 mm)	0.16 in (4 mm)	0.28 in (7.1 mm)	0.118 in (3.0 mm)
Overtravel (max.)	0.236 in (6.0 mm)	0.236 in (6.0 mm)	0.5 in (12.7 mm)	0.063 in (1.6 mm)	0.16 in (4 mm)	0.236 in (6.0 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 (2.0 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)

Ratings ①②

Model	Rated Voltage (V)	Non-inductive Load (A) Resistive Load NC and NO	Lamp Load NC	Lamp Load NO	Inductive Load (A) Inductive Load NC and NO	Motor Load NC	Motor Load NO	Inrush Current (A) NC	Inrush Current (A) 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		

Notes

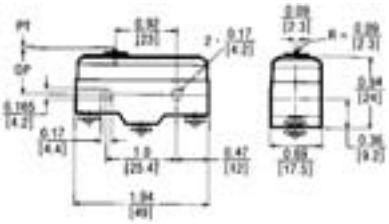
① Inductive load has a power factor of 0.04 minimum (AC) and a time constant of 7 m/second (DC).

② Lamp load has an inrush current of 6 times steady-state current.

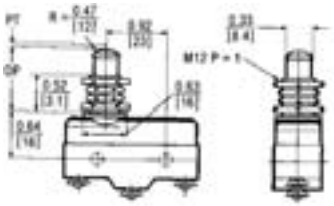
Dimensions

Approximate Dimensions in Inches (mm)

E47…01-V



E47…04-V



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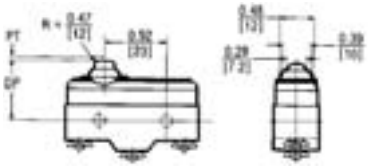
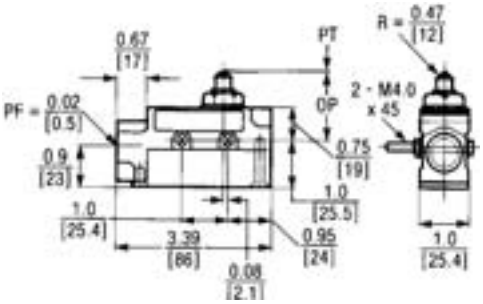
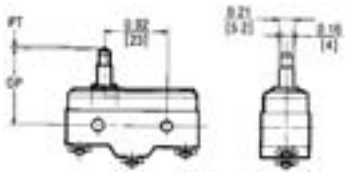


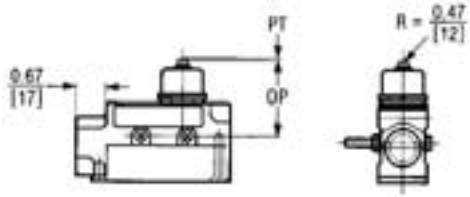
E47…05-V



E47…03-V

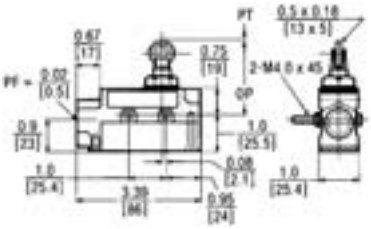


E47…06-V

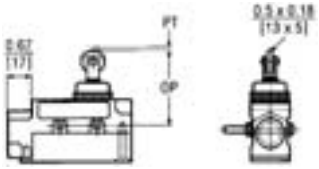


Approximate Dimensions in Inches (mm)

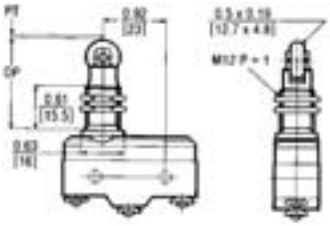
E47…07-V



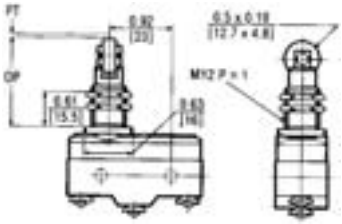
E47…08-V



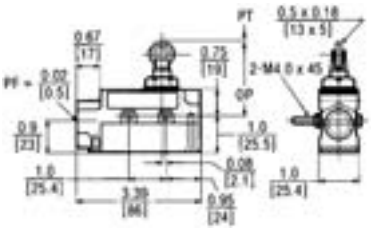
E47…10-V



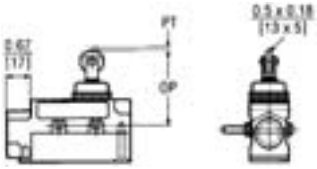
E47…11-V



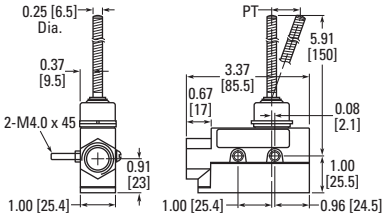
E47…11-V Cross Roller Unit



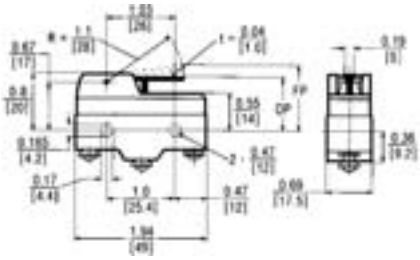
E47…12-V Cross Roller Unit



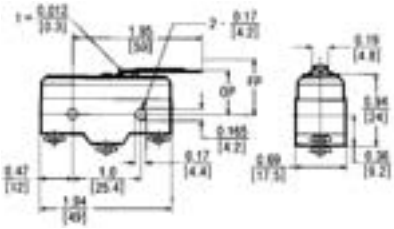
E47…14-V



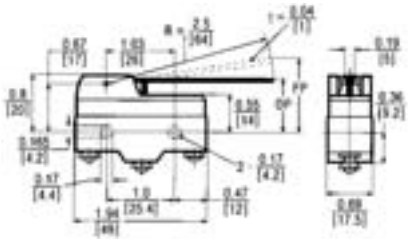
E47…20-V



E47…21-V

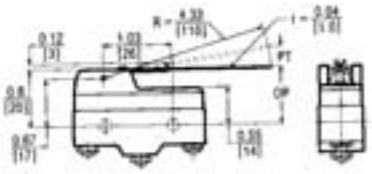


E47…22-V

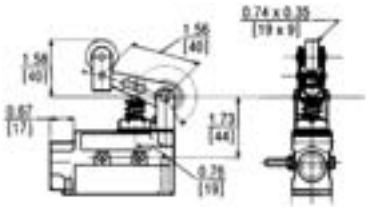


Approximate Dimensions in Inches (mm)

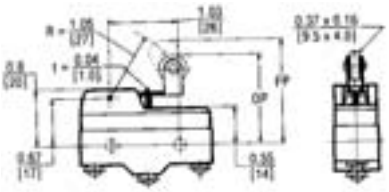
E47…23-V



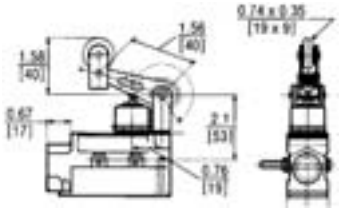
E47…34-V



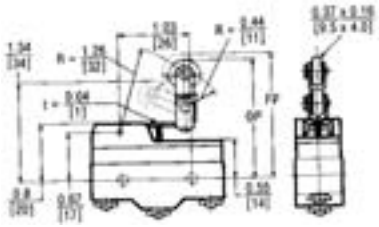
E47…30-V



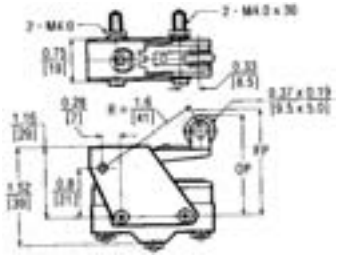
E47…35-V



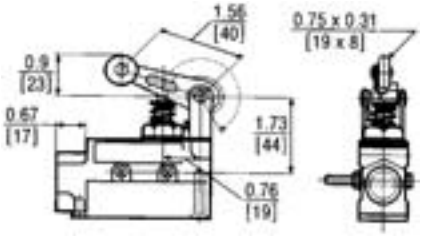
E47…31-V



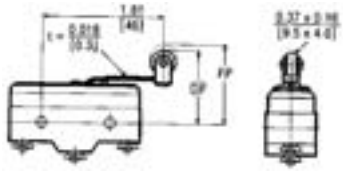
E47…40-V



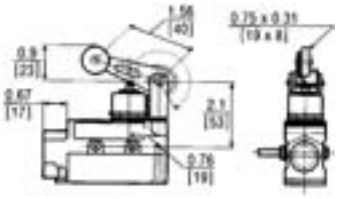
E47…32-V



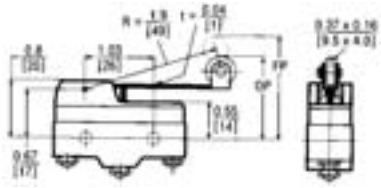
E47…41-V



E47…33-V

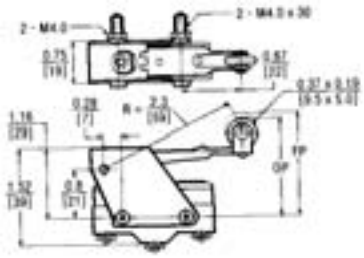


E47…42-V

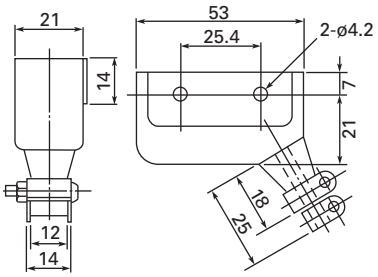


Approximate Dimensions in Inches (mm)

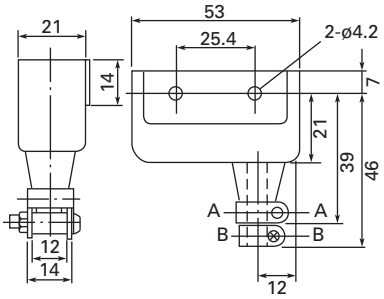
E47…43-V



E47PA1-V



E47PA2-V



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