

E47BMS02



E47BMS11



E47BMS40



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E47 Precision Switches



The Cost-Effective Solution for Highly Accurate Switching Applications

6

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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

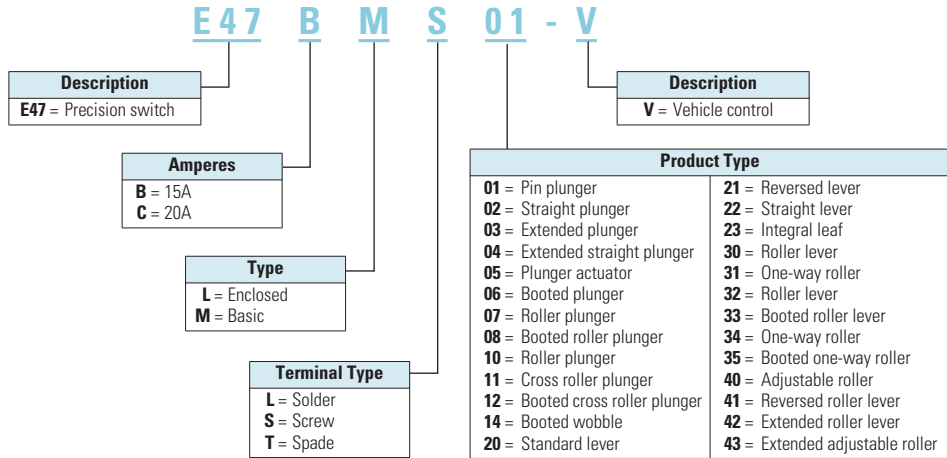


Features and Benefits

- 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



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
	Solder	E47BML04-V
	Solder	E47BMT04-V ^②
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



Plunger Actuator

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



Booted Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS06-V



Roller Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS07-V



Booted Roller Plunger

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS08-V



Roller Plunger—Cross Roller Unit

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS11-V



Booted Roller Plunger—Cross Roller Unit

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS12-V



Booted Wobble

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS14-V



Roller Lever

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



Booted Roller Lever

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS33-V



One-Way Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS34-V



Booted One-Way Roller

Amperes	Terminal Type	Catalog Number
15A	Screw	E47BLS35-V

Notes

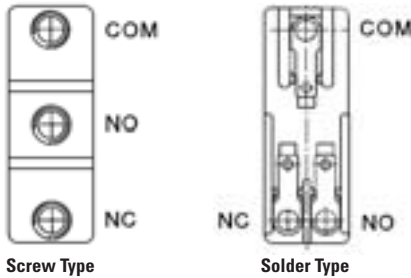
^① Contact Eaton's Cutler-Hammer Sensor Applications Department at 1-800-426-9184 for approval status.

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

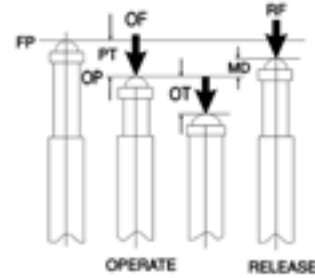
Note: Spade type not shown, available on some models.

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)

6.2

Limit Switches

E47 Precision Switches

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Ratings ①②

Model	Rated Voltage (V)	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		
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			

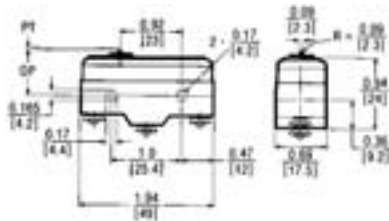
Notes

- 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.

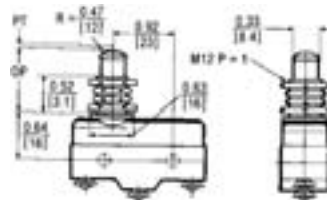
Dimensions

Approximate Dimensions in Inches (mm)

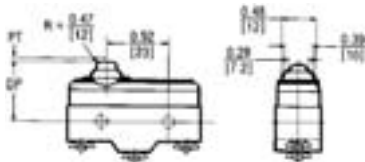
E47...01-V



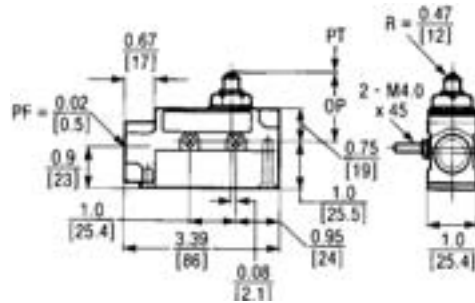
E47...04-V



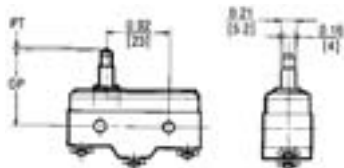
E47...02-V



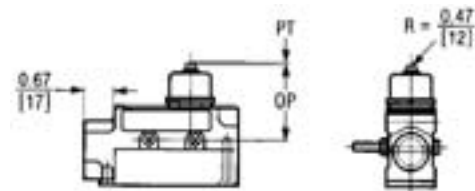
E47...05-V



E47...03-V

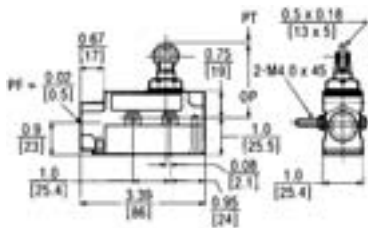


E47...06-V

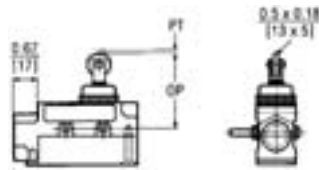


Approximate Dimensions in Inches (mm)

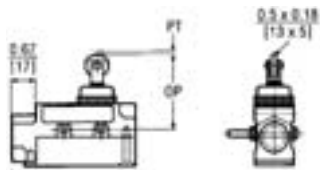
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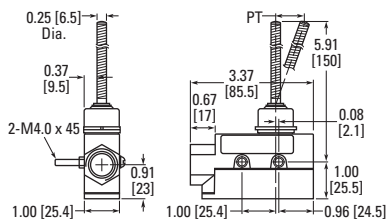
E47...12-V Cross Roller Unit



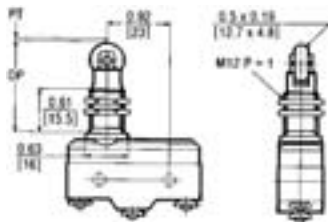
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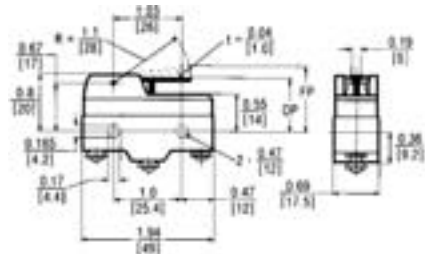
E47...14-V



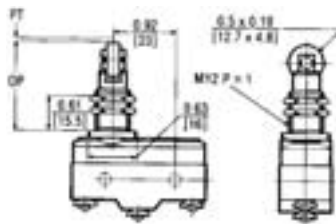
E47...10-V



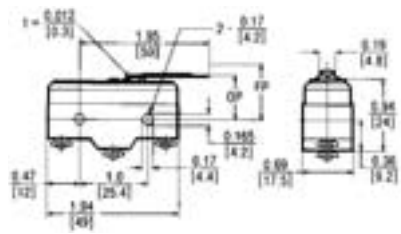
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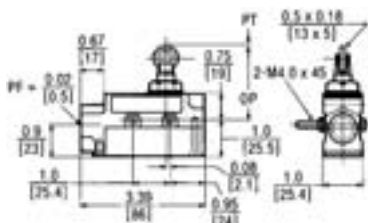
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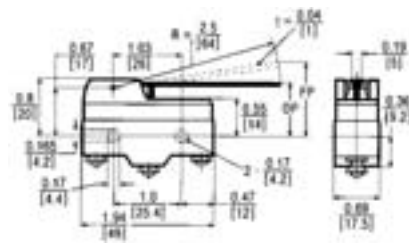
E47...21-V



E47...11-V Cross Roller Unit



E47...22-V



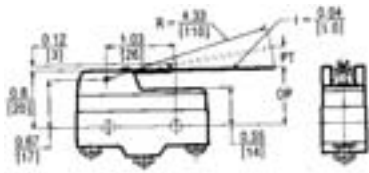
6.2

Limit Switches

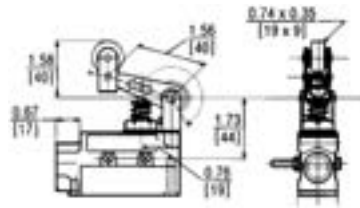
E47 Precision Switches

Approximate Dimensions in Inches (mm)

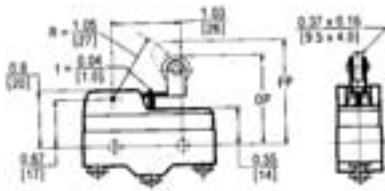
E47...23-V



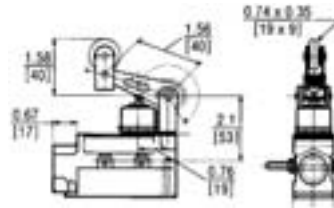
E47...34-V



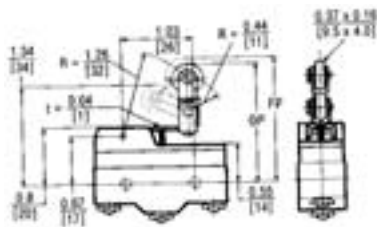
E47...30-V



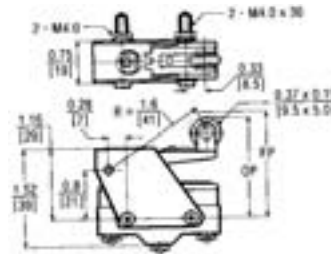
E47...35-V



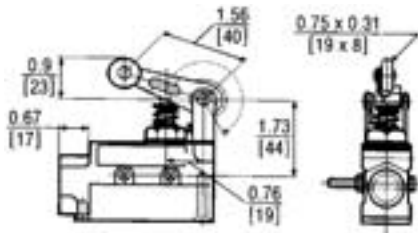
E47...31-V



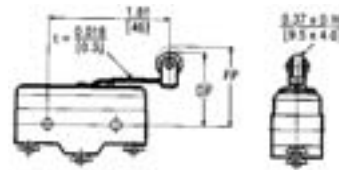
E47...40-V



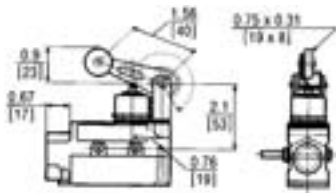
E47...32-V



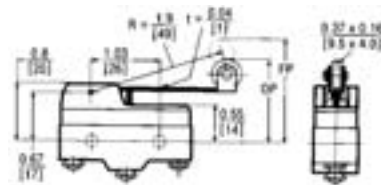
E47...41-V



E47...33-V

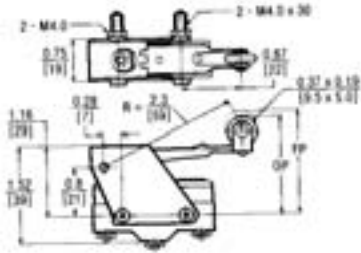


E47...42-V

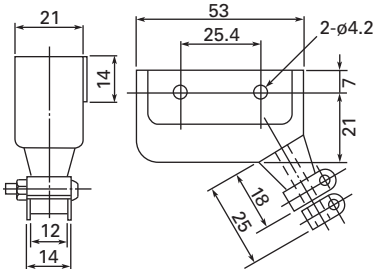


Approximate Dimensions in Inches (mm)

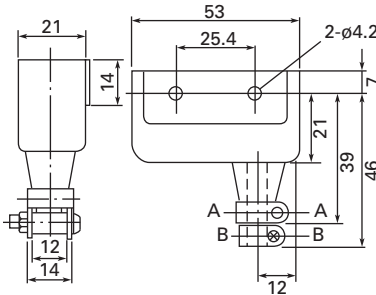
E47...43-V



E47PA1-V



E47PA2-V



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