

E47 Precision Limit Switches

Contents

Overview	1
Model Selection, Basic Switches	2
Model Selection, Accessories	5
Model Selection, Enclosed Switches	5
Specifications	7

Cutler-Hammer® 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.

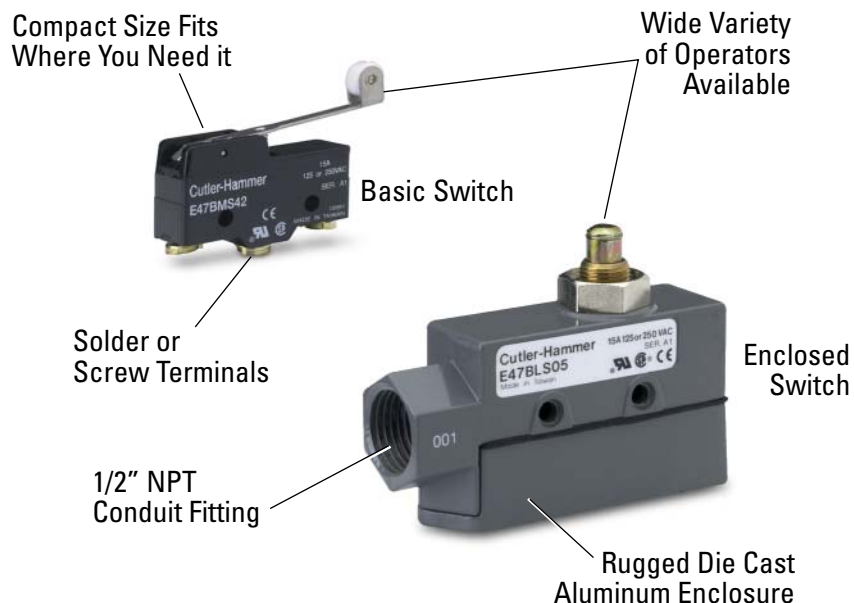
Approvals

- UL Recognized
- CSA Certified



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

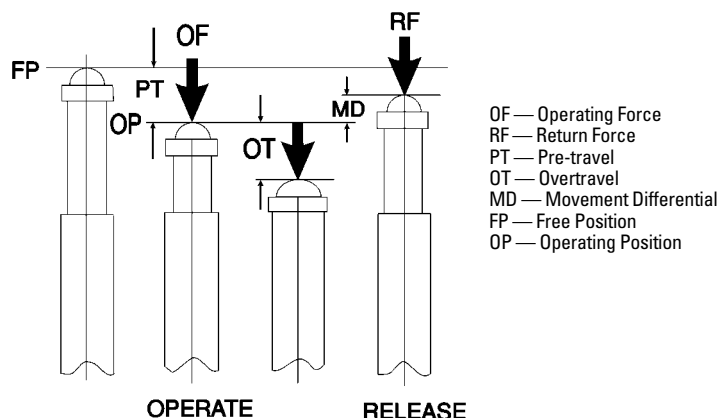
The Cost-Effective Solution for Highly Accurate Switching Applications



Product 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

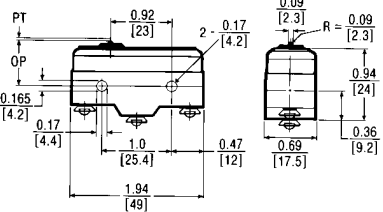
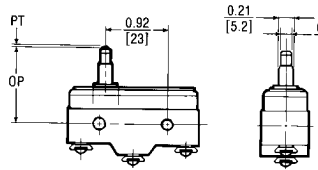
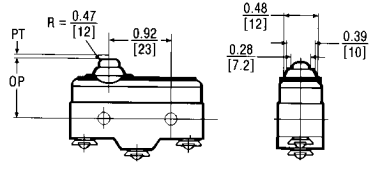
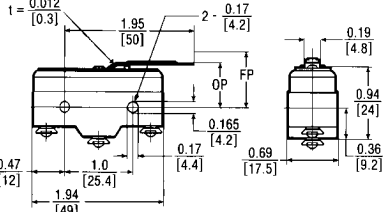
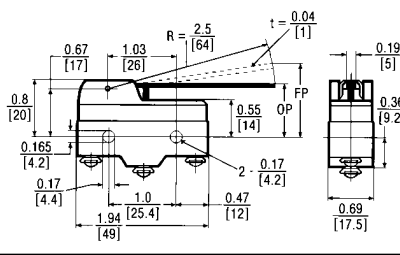
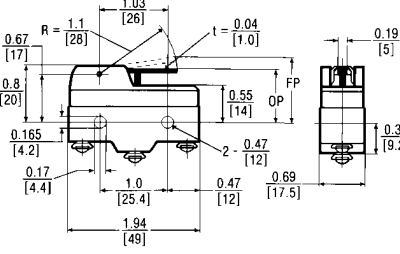
Definitions — Operating Characteristics



For Customer Service in the U.S. call **1-800-356-1243**,
 in Canada call **1-800-268-3578**.
 For Application Assistance in the U.S. and Canada
 call **1-800-426-9184**.

July 2005

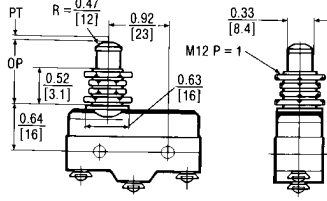
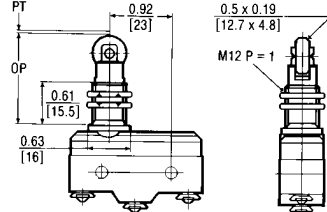
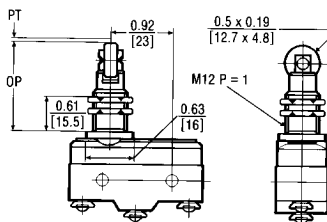
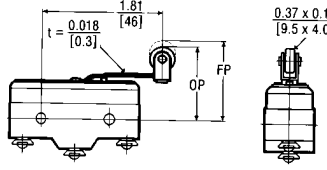
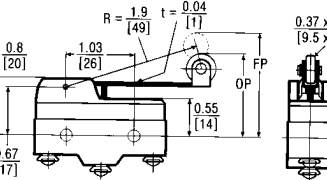
Model Selection — Basic Switches

	Type	Catalog Number		Specifications ①	Approximate Dimensions in Inches (mm)
		15A	20A		
 Pin Plunger	Screw Terminal	E47BMS01	E47CMS01	OF Max. — 12.3 oz (350g) RF Max. — 4.02 oz (114g) PT Max. — 0.016 in (0.4 mm) OT Max. — 0.005 in (0.13 mm) MD Max. — 0.002 in (0.05 mm) OP — 0.626 in (15.9 mm)	
	Solder Terminal	E47BML01	E47CML01 ②		
 Extended Plunger	Screw Terminal	E47BMS03	—	OF Max. — 12.3 oz (350g) RF Max. — 4.02 oz (114g) PT Max. — 0.016 in (0.4 mm) OT Max. — 0.063 in (1.6 mm) MD Max. — 0.002 in (0.05 mm) OP — 1.11 in (28.2 mm)	
	Solder Terminal	E47BML03	—		
 Straight Plunger	Screw Terminal	E47BMS02	E47CMS02	OF Max. — 12.3 oz (350g) RF Max. — 4.02 oz (114g) PT Max. — 0.016 in (0.4 mm) OT Max. — 0.063 in (1.6 mm) MD Max. — 0.002 in (0.05 mm) OP — 0.846 in (21.5 mm)	
	Solder Terminal	E47BML02	E47CML02		
 Reversed Lever	Screw Terminal	E47BMS21	—	OF Max. — 5.29 oz (150g) RF Max. — 0.49 oz (14g) PT Max. — 0.16 in (4 mm) OT Max. — 0.063 in (1.6 mm) MD Max. — 0.051 in (1.3 mm) FP Max. — 0.81 in (20.6 mm) OP — 0.685 in (17.4 mm)	
	Solder Terminal	E47BML21	—		
	Spade Terminal	E47BMT21	—		
 Straight Lever	Screw Terminal	E47BMS22	E47CMS22	OF Max. — 2.47 oz (70g) RF Min. — 0.99 oz (28g) PT Max. — 0.394 in (10 mm) OT Max. — 0.220 in (5.6 mm) MD Max. — 0.051 in (1.3 mm) FP Max. — 1.11 in (28.2 mm) OP — 0.748 in (19 mm)	
	Solder Terminal	E47BML22	—		
 Standard Lever	Screw Terminal	E47BMS20	—	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) MD Max. — 0.039 in (1.0 mm) FP Max. — 0.976 in (24.8 mm) OP — 0.748 in (19 mm)	
	Solder Terminal	E47BML20	—		

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

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

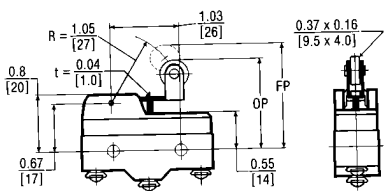
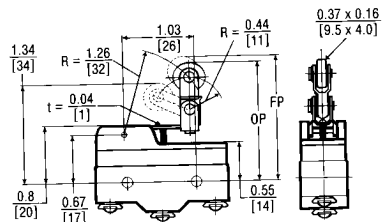
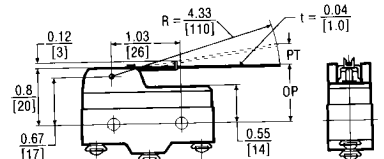
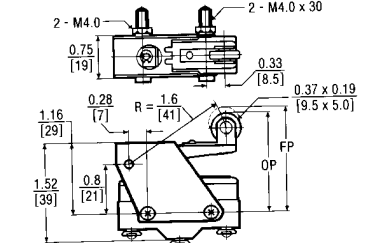
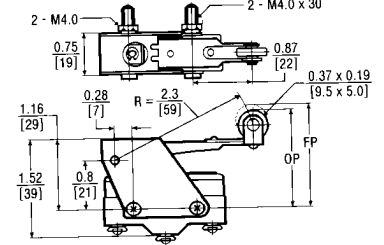
Model Selection — Basic Switches (Continued)

	Type	Catalog Number		Specifications ^①	Approximate Dimensions in Inches (mm)
		15A	20A		
Extended Straight Plunger 	Screw Terminal	E47BMS04	E47CMS04	OF Max. — 12.3 oz (350g) RF Max. — 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 — 0.858 in (21.8 mm)	
	Solder Terminal	E47BML04	E47CML04		
Roller Plunger 	Screw Terminal	E47BMS10	E47CMS10	OF Max. — 12.3 oz (350g) RF Max. — 4.02 oz (114g) PT Max. — 0.016 in (0.4 mm) OT Max. — 0.14 in (3.58 mm) MD Max. — 0.002 in (0.05 mm) OP — 1.315 in (33.4 mm)	
	Solder Terminal	E47BML10	—		
Cross Roller Plunger 	Screw Terminal	E47BMS11	E47CMS11	OF Max. — 12.3 oz (350g) RF Max. — 4.02 oz (114g) PT Max. — 0.016 in (0.4 mm) OT Max. — 0.14 in (3.58 mm) MD Max. — 0.002 in (0.05 mm) OP — 1.315 in (33.4 mm)	
	Solder Terminal	E47BML11	—		
Reversed Roller Lever 	Screw Terminal	E47BMS41	—	OF Max. — 5.29 oz (150g) RF Max. — 0.49 oz (14g) PT Max. — 0.16 in (4 mm) OT Max. — 0.063 in (1.6 mm) MD Max. — 0.051 in (1.3 mm) FP Max. — 1.252 in (31.8 mm) OP — 1.126 in (28.6 mm)	
	Solder Terminal	E47BML41	—		
Extended Roller Lever 	Screw Terminal	E47BMS42	E47CMS42	OF Max. — 5.64 oz (160g) RF Min. — 0.78 oz (22g) PT Max. — 0.28 in (7.1 mm) OT Max. — 0.16 in (4 mm) MD Max. — 0.04 in (1.02 mm) FP Max. — 1.437 in (36.5 mm) OP — 1.189 in (30.2 mm)	
	Solder Terminal	E47BML42	—		

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

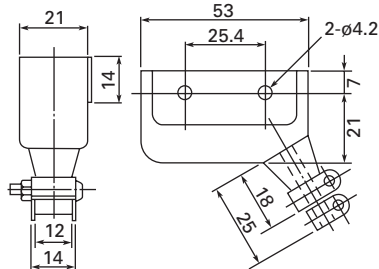
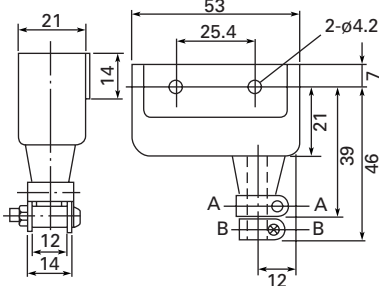
July 2005

Model Selection — Basic Switches (Continued)

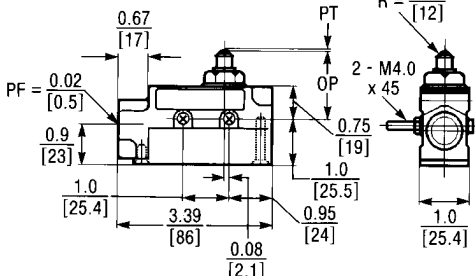
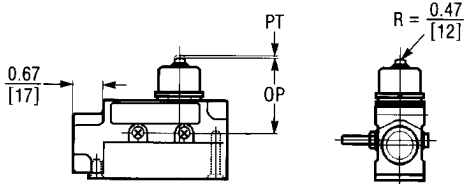
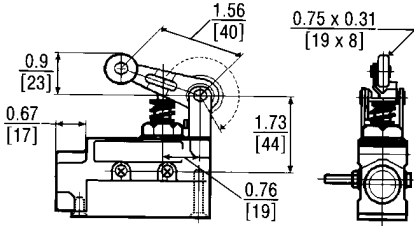
	Type	Catalog Number		Specifications ①	Approximate Dimensions in Inches (mm)
		15A	20A		
Roller Lever 	Screw Terminal	E47BMS30	E47CMS30	OF Max. — 5.64 oz (160g) RF Min. — 1.48 oz (42g) PT Max. — 0.106 in (2.7 mm) OT Max. — 0.094 in (2.4 mm) MD Max. — 0.02 in (0.5 mm) FP Max. — 1.28 in (32.5 mm) OP — 1.189 in (30.2 mm)	
	Solder Terminal	E47BML30	—		
	Spade Terminal	E47BMT30	E47CMT30		
One-Way Roller 	Screw Terminal	E47BMS31	—	OF Max. — 5.64 oz (160g) RF Min. — 1.48 oz (42g) PT Max. — 0.106 in (2.7 mm) OT Max. — 0.094 in (2.4 mm) MD Max. — 0.02 in (0.5 mm) FP — 1.717 in (43.6 mm) OP — 1.697 in (43.1 mm)	
	Solder Terminal	E47BML31	—		
Integral Leaf 	Screw Terminal	E47BMS23	E47CMS23	OF Max. — 0.35 oz (10g) RF Min. — 0.106 oz (3.0g) PT Max. — 0.787 in (20.0 mm) OT Max. — 0.22 in (5.6 mm) MD Max. — 0.118 in (3.0 mm) OP — 0.748 in (19.0 mm)	
	Solder Terminal	E47BML23	—		
Adjustable Roller 	Screw Terminal	E47BMS40	—	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) MD Max. — 0.087 in (2.2 mm) FP Max. — 1.752 in (44.5 mm) OP — 1.591 in (40.4 mm)	
	Solder Terminal	E47BML40	—		
Extended Adjustable Roller 	Screw Terminal	E47BMS43	—	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) MD Max. — 0.079 in (2.0 mm) FP Max. — 1.614 in (41 mm) OP — 1.591 in (40.4 mm)	
	Solder Terminal	E47BML43	—		

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

Model Selection — Accessories — Terminal Wire Covers for Basic Switches

	Description	Catalog Number	Approximate Dimensions in mm
	Terminal wire cover with 45° conduit interface	E47PA1	
	Terminal wire cover with 90° conduit interface	E47PA2	

Model Selection — Enclosed Switches

	Catalog Number	Specifications ①	Approximate Dimensions in Inches (mm)
Plunger Actuator 	E47BLS05 E47CLS05 ② (20 Amp version)	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)	
Booted Plunger 	E47BLS06	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)	
Roller Lever 	E47BLS32 E47CLS32 ② (20 Amp version)	OF Max. — 20.1 oz (570g) RF Min. — 6.0 oz (1700g) PT Max. — 0.157 in (4.0 mm) OT Max. — 0.236 in (6.0 mm) MD Max. — 0.016 in (0.4 mm)	

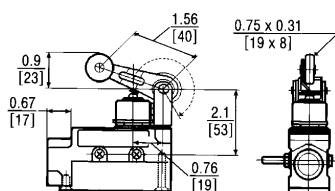
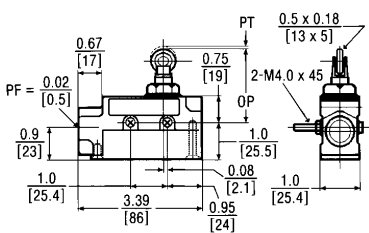
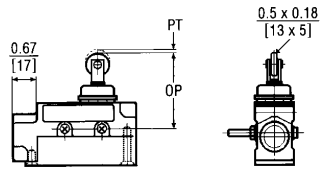
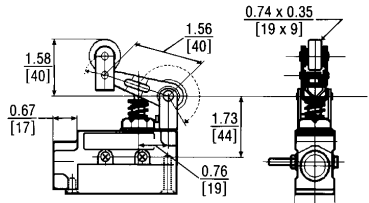
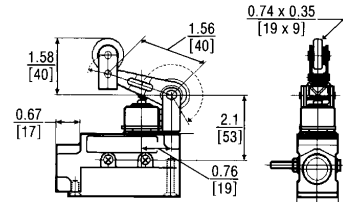
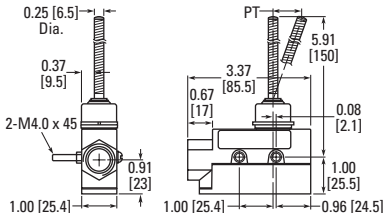
① OF = Operating Force; RF = Return Force; PT = Pre-travel; OT = Overtravel; MD = Movement Differential; FP = Free Position; OP = Operating Position.

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

■ Fast turn product with typical one day lead-time to shipment.

July 2005

Model Selection — Enclosed Switches (Continued)

	Catalog Number	Specifications ①	Approximate Dimensions in Inches (mm)
	E47BLS33	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)	
	E47BLS07 E47BLS11 (Cross Roller Unit)	OF Max. — 8.82 – 12.3oz (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)	
	E47BLS08 E47BLS12 (Cross Roller Unit)	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)	
	E47BLS34	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)	
	E47BLS35	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)	
	E47BLS14	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)	

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

Specifications

Operating Speed	0.01m/second to 1m/second
Operating Frequency Mechanical Electrical	120 Operations/minute 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 @ 500V DC
Dielectric Strength Between Non-current Carrying Parts Between Current Carrying Parts and Ground	1000V AC, 50/60 Hz for 1 minute 2000V AC, 50/60 Hz for 1 minute
Ambient Operating Temperature Basic Enclosed	-13° to 176°F (-25° to 80°C) 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)
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

Ratings ^{①②}

Model	Rated Voltage (V)	Non-inductive Load (A)			Inductive Load (A)			Inrush Current (A)	
		Resistive Load	Lamp Load		Inductive Load	Motor Load		N.C.	N.O.
			N.C.	N.O.		N.C.	N.O.		
15A	125V AC	15	3	1.5	15	5	2.5	30 Max.	15 Max.
	250V AC	15	2.5	1.25	15	3	1.5		
	500V AC	3	1.5	0.75	2.5	1.5	0.75		
	8V DC	15	3	1.5	15	5	2.5		
	14V DC	15	3	1.5	10	5	2.5		
	30V DC	6 (2)	3	1.5	5	5	2.5		
20A	125V DC	0.4	0.4	0.4	0.05	0.05	0.05	60 Max.	30 Max.
	250V DC	0.2	0.2	0.2	0.03	0.03	0.03		
	125V AC	20	7.5	7.5	20	12.5	12.5		
	250V AC	20	7.5	7.5	20	8.3	8.3		
	500V AC	6	4	4	5	2	2		
	8V DC	20	3	1.5	20	12.5	12.5		
	14V DC	20	3	1.5	15	12.5	12.5		
	30V DC	6	3	1.5	5	5	5		
	125V DC	0.5	0.5	0.5	0.05	0.05	0.05		
	250V DC	0.25	0.25	0.25	0.03	0.03	0.03		

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.

Terminal Configurations

