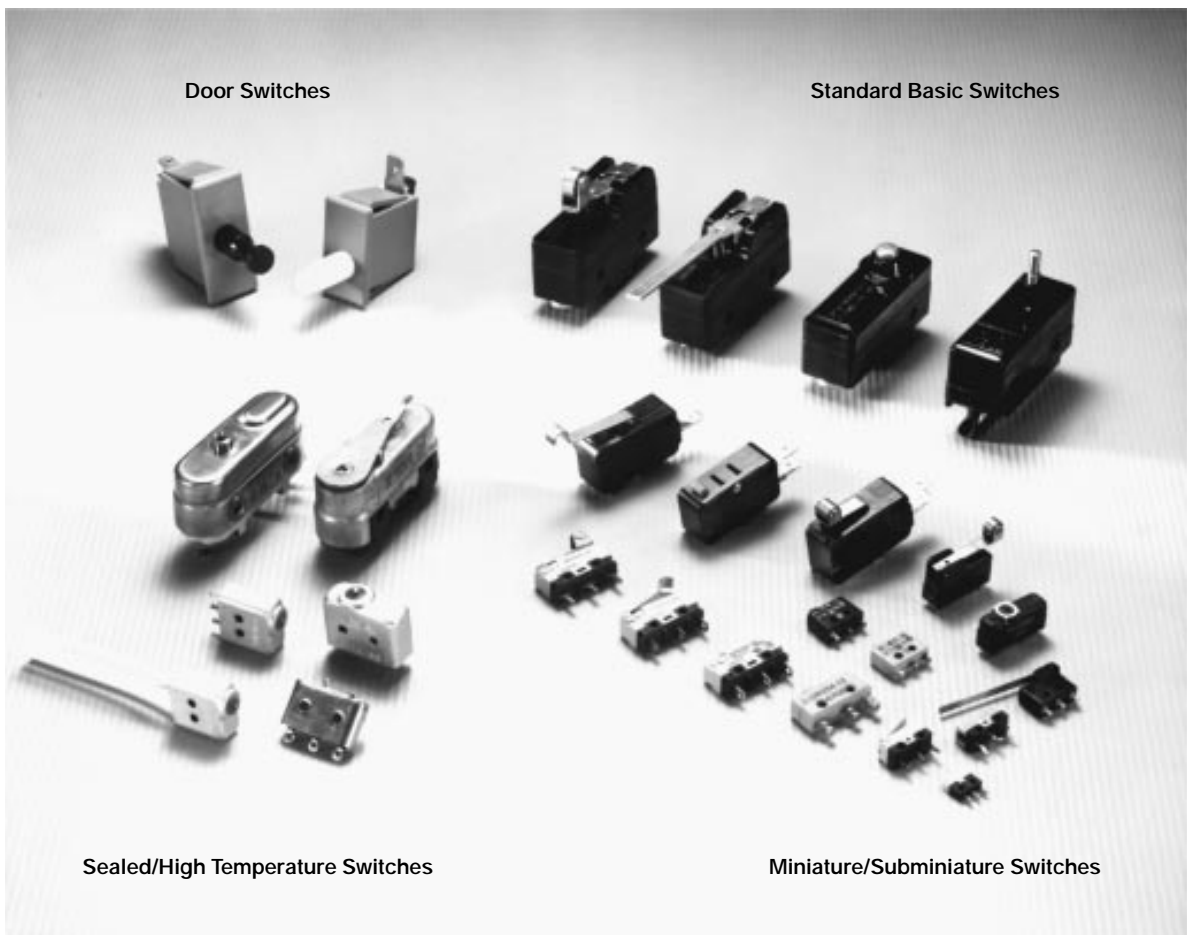


# Basic Switches



Selection

## SUBMINIATURE/MINIATURE BASIC SWITCHES

The U Series of subminiature basic switches are our newest line. The US is the smallest snap-action switch available. The UX and UM are versatile, low cost, full featured products with ample electrical capacity in a compact package. SM subminiature basic switches are a versatile collection of small size and ample electrical capacities, including 11 amp power load handling and 1/4 hp motor load. SX subminiature basic switches are smaller than SM switches, yet are big in performance and selection. They provide up to 7 amp power load capacity. V3 miniature basic switches put a 25 amp power load capacity and a choice of 11 other electrical ratings into a relatively small package with many choices of actuators, contact materials, and terminal designs. V7 miniature basic switches have electrical ratings up to 15 amps. Both commercial and European versions are UL recognized and CSA certified. The latter is also designed to meet all leading European approval agency requirements. TB miniature basic small double-break units can control 2, 3 or 4 isolated circuits.

## STANDARD BASIC SWITCHES

Power load switching and motor handling capacity are among the attractions of thumb-size BZ/BA standard basic switches. Double-pole double-throw switching is added by DT switches. Where there's a need for reliable switching of high capacity systems involving DC motors and solenoids, MT magnetic blow-out switches do the job. The 3MN has double-break switching. 6AS assemblies have two tandem mounted standard basic switches under a common actuator.

## SEALED AND HIGH TEMPERATURE BASIC SWITCHES

Specially adapted basic switches include: SE/XE environment-proof switches which protect subminiature SM/SX basic switches within a sealed housing; HM hermetically sealed switches are interchangeable in operating point with the SM switches; HS hermetically sealed switches which parallel the size and mounting scheme of the standard basic switches; and HT high temperature switches for use up to +1000°F.

## DOOR SWITCHES

AC, WW and DM switches automatically cut power when a service door or drawer is opened.

## Table of Contents

Typical Applications .....	p. 2
Index by Product Type .....	p. 3
Selection Guides .....	p. 4 to 7
Catalog Listings/Order Guides .....	p. 8 to 93
Reference Data .....	p. 94
Catalog Listing/Page Number Index .....	p. 102

# Basic Switches

## Subminiature/Miniature

### ELECTRICAL DATA AND UL CODES

#### MINIATURE/SUBMINIATURE BASIC SWITCHES

Most of the switches in this section are UL recognized and CSA certified. The current and voltage values shown are based on test conditions specified by these agencies. Electrical life of the switch is influenced by each application condition as well as by voltage and current.

Circuitry	Electrical Data
Single-pole double-throw	<b>A</b> 5 amps res., 3 amps ind., (sea level), 4 amps res., 2 amps ind., (50,000 feet), 28 vdc 5 amps res. or ind. 115 vac, 60 Hz. UL/CSA rating: 5 amps, 250 vac.
Single-pole double-throw	<b>B</b> 7 amps res., 4 amps ind., (sea level), 7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. UL/CSA rating: 7 amps, 250 vac.
Single-pole double-throw	<b>C</b> 3.5 amps res., 2 amps ind., (sea level), 3.5 amps res., 1.5 amps ind., (50,000 feet), 28 vdc. UL rating: 7 amps, 250 vac.
Single-pole double-throw	<b>D</b> 1 amp res., 0.5 amp ind., (sea level and 50,000 feet), 28 vdc. UL/CSA rating: 1 amp, 125 vac.
Single-pole double-throw	<b>E</b> 3 amps res., 2 amps ind., (sea level), 28 vdc. UL rating: 3 amps, 250 vac.
Single-pole double-throw	<b>F</b> 7 amps res., 4 amps ind., 2.5 amps lamp load, (sea level), 4 amps res., 2.5 amps ind., 2.5 amps lamp load, (50,000 feet), 28 vdc. 7 amps res., 7 amps ind., 2 amps lamp load, 115 vac, 60 Hz (sea level).
Single-pole double-throw	<b>G</b> 2 amps res., lamp ind., (sea level) 28 vdc.
Single-pole double-throw	<b>H</b> .010 amp res. and ind., (sea level). 28 vdc. UL/CSA rating: 1 amp, 125 vac.
Single-pole double-throw	<b>I</b> 7 amps res., 4 amps ind., (sea level), 28 vdc.
Single-pole double-throw	<b>J</b> 5 amps res., 3 amps ind., (sea level), 5 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. UL rating: 5 amps, 250 vac.
Single-pole double-throw	<b>K</b> UL rating: 5 amps, 125 or 250 vac.
Single-pole double-throw	<b>L</b> 1 amp res., 1/2 amp ind., (sea level) 28 vdc.
Single-pole double-throw	<b>M</b> UL rating: 11 amps and 1/4 hp, 125 or 250 vac.
Single-pole double-throw	<b>N</b> 1 amp res., 0.5 amp ind., 30 vdc. UL rating: 1 amp, 125 vac.
Single-pole double-throw	<b>P</b> 1 amp res., 30 vdc. UL rating: .1 amp, 125 vac.
Single-pole double-throw	<b>R</b> 5 amps res., 3 amps ind., 2.4 amps lamp load (sea level), 5 amps res., 2.5 amps ind., 2.4 amps lamp load, (50,000 feet), 28 vdc. 5 amps res., 5 amps ind., 1.5 amps lamp load, 115 vac. 60 Hz (sea level)

Circuitry	Electrical Data
Single-pole double-throw	<b>S</b> UL rating: 4 amps, 250 vac.
Single-pole double-throw	<b>T</b> UL/CSA rating: 11 amps and 1/3 hp, 125, 250, or 277 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 4 amps, 125 vac "L" (lamp load).
Single-pole double-throw	<b>TT</b> UL/CSA rating: 10 amps and 1/3 hp, 125 or 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 4 amps, 125 vac "L" (lamp load).
Single-pole double-throw unless otherwise noted in order guide	<b>UU</b> 10 amps res., 10 amps ind., (sea level), 6 amps ind. (50,000 feet), 6 amps motor load, 30 vdc.
Single-pole double-throw	<b>U</b> UL/CSA rating: 15.1 amps and 1/2 hp, 125 or 250 vac. 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 5 amps, 120 vac "L" (lamp load).
Single-pole double-throw	<b>VV</b> UL/CSA rating: 3 amps-125, 250, 277 vac; 1/10 hp-250 vac
Single-pole double-throw	<b>V</b> UL/CSA rating: 10 amps and 1/4 hp, 125 or 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc; 3 amps, 125 vac "L" (lamp load).
Single-pole double-throw	<b>W</b> 10 amps, 250 vac or 28 vdc; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc.
Single-pole double-throw	<b>X</b> UL rating: 1 amp, 125 vac.
Single-pole double-throw	<b>Y</b> 10 amps and 1/3 hp, 125 or 250 vac; 4 amps, 125 vac "L" (lamp load).
Single-pole double-throw	<b>YY</b> UL/CSA rating: 5 amps-125, 250, 277 vac 1/10 hp-250 vac
Two-circuit double-break	<b>Z</b> 10 amps, 125 or 250 vac, or 30 vdc. UL/CSA rating: 10 amps, 125 or 250 vac; 1/2 hp, 125 vac.
Four-circuit double-break	<b>ZZ</b> UL rating: 5 amps and 1/10 hp. 125 or 250 vac.
Single-pole double-throw	<b>AA</b> UL rating: 20 amps, 277 vac. 1 hp, 125 vac; 2 hp, 250 vac.
Single-pole double-throw	<b>BB</b> UL rating: 25 amps, 277 vac. 1 hp, 125 vac; 2 hp, 250 vac.

# Basic Switches

## Standard

### ELECTRICAL DATA AND UL CODES STANDARD BASIC SWITCHES

Most of the switches in this section are UL recognized and CSA certified. The current and voltage values shown are based on test conditions specified by these agencies. Electrical life of the switch is influenced by each application condition as well as by voltage and current. For application assistance contact the 800 number.

Circuitry	Electrical Data and UL Codes
Single-pole double-throw unless otherwise noted in order guide	<b>A</b> 15 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L96
Single-pole double-throw unless otherwise noted in order guide	<b>B</b> 5 amps, 125, 250 or 480 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L35
Single-pole double-throw unless otherwise noted in order guide	<b>C</b> 10 amps, 125, 250 or 480 vac; UL Code L8
Single-pole double-throw unless otherwise noted in order guide	<b>D</b> 15 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac. UL Code L103
Single-pole double-throw unless otherwise noted in order guide	<b>E</b> 15 amps, 125, 250 or 480 vac; 1/4 hp, 125 vac, 1/2 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L67
Single-pole double-throw unless otherwise noted in order guide	<b>F</b> 22 amps, 125, 250 or 480 vac; 1/2 hp, 125 vac, 1 hp, 250 vac. UL Code L161
Single-pole double-throw unless otherwise noted in order guide	<b>G</b> 20 amps, 125, 250 or 480 vac; 10 amps, 125 vac "L" (tungsten lamp load); 1 hp, 125 vac; 2 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L23
Single-pole double-throw unless otherwise noted in order guide	<b>H</b> Motor Control 25 amps, 125, 250 or 480 vac; 1 hp, 125 vac; 2 hp, 250 vac; Pilot Duty—750 VA, 125, 250, or 277 vac.
Single-pole double-throw unless otherwise noted in order guide	<b>I</b> 10 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; UL Code L95

Circuitry	Electrical Data and UL Codes
Double-pole double-throw	<b>J</b> 10 amps, 125 or 250 vac; 0.3 amp, 125 vdc; 0.15 amp, 250 vdc. UL Code L59
Single-pole double-throw unless otherwise noted in order guide	<b>K</b> Rating established with switch non-polarized 10 amps, 125 vac or vdc; 1/4 hp, 125 vac or vdc. UL Code L 168  Non-polarized: 10 amps res. or 1/4 hp, 125 vdc; 3 amps max. res. 250 vdc. Polarized*: 10 amps res. or 1/2 hp, 125 vdc; 3 amps max. res., 250 vdc.
Two-circuit double-break	<b>M</b> 25 amps, 125, 250 or 480 vac; 3/4 hp, 125 vac; 1 1/4 hp, 250 vac. 1 amp, 125 vdc; 1/2 amp, 250 vdc. UL Code L58
Single-pole double-throw	<b>P</b> 1 amp, 125 VAC UL Code L22
Single-pole double-throw	<b>R</b> 10 amps, 125 or 250 vac; 1/3 hp, 125 vac; 3/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L115
Single-pole double-throw	<b>S</b> 10 amps, 125 or 250 vac; 1/3 hp, 125 or 250 vac. UL Code L93
Two-circuit double-break	<b>T</b> 15 amps, 125, 250 or 480 vac; 1 amp, 125 vdc; 1/2 amp, 250 vdc; 1/4 hp, 125 vac; 1/2 hp, 250 vac UL Code L73
Single-pole double-throw	<b>U</b> 5 amps, 250 vac. UL Code L4
Two-circuit double-break	<b>V</b> Motor Control 15 amps, 120, 240, 480 or 600 vac; 1/2 hp, 120 vac; 1 hp, 240 vac; 0.8 amp, 115 vdc; 0.4 amp, 230 vdc.
Single-pole single-throw (N.C.)	<b>W</b> 20 amps, 125, 250 or 277 vac; 3/4 hp, 125 vac; 1/2 hp, 250 vac UL Code L178B
Single-pole double-throw	<b>X</b> 15 amps, 125, 250 or 480 vac; 2 amps, 600 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L74
Single-pole double-throw	<b>Y</b> 20 amps, 125, 250 or 480 vac; 3/4 hp, 125 vac; 1 1/2 hp, 250 vac; UL Code L17

\*To polarize, connect negative side of line to common terminal. To achieve the same effect, mount switch with brass screws, using a non-magnetic barrier (at least 1/4" thick) between the switch and mounting surface.

# Basic Switches

## Operating Characteristics

### ELECTROMECHANICAL SWITCHES

Definitions below explain the meaning of operating characteristics. Characteristics shown in tables throughout catalog were chosen as most significant. They are taken at normal room temperature and humidity. These may vary as temperature and humidity conditions differ. Sketches show how characteristics are measured for in-line plunger actuation.

Linear dimensions for in-line actuation are from top of plunger to a reference line, usually the center of the mounting holes.

**Differential Travel (D.T.)**—Plunger or actuator travel from point where contacts “snap-over” to point where they “snap-back.”

**Free Position (F.P.)**—Position of switch plunger or actuator when no external force is applied (other than gravity).

**Full Overtravel Force**—Force required to attain full overtravel of actuator.

**Operating Position (O.P.)**—Position of switch plunger or actuator at which point contacts snap from normal to operated position. Note that in the case of flexible or adjustable actuators, the operating position is measured from the end of the lever or its maximum length. Location of operating position measurement shown on mounting dimension drawings.

**Operating Force (O.F.)**—Amount of force applied to switch plunger or actuator to cause contact “snap-over.” Note in the case of adjustable actuators, the force is measured from the maximum length position of the lever.

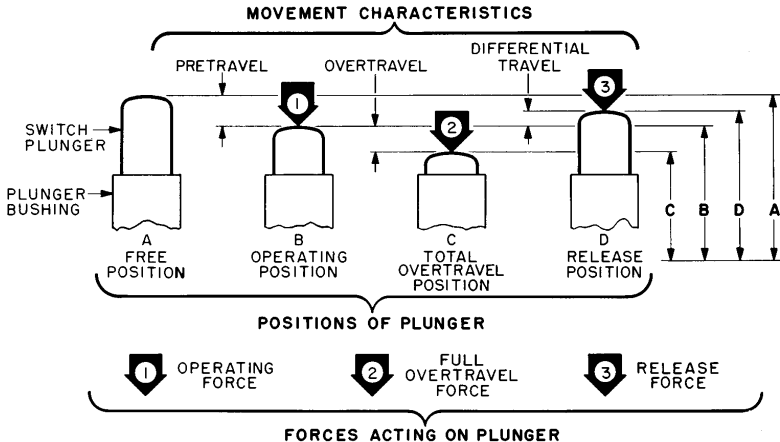
**Overtravel (O.T.)**—Plunger or actuator travel safely available beyond operating position.

**Pretravel (P.T.)**—Distance or angle traveled in moving plunger or actuator from free position to operating position.

**Release Force (R.F.)**—Amount of force still applied to switch plunger or actuator at moment contacts snap from operated position to unoperated position.

**Total Travel (T.T.)**—Distance from actuator free position to overtravel limit position.

### IN-LINE PLUNGER ACTUATION



# Basic Switches

## Operating Characteristics

FULL LOAD AND LOCKED ROTOR CURRENTS FOR SINGLE PHASE AND DC MOTORS

HP	Alternating Current				Direct Current			
	115 Volts		230 Volts		115 Volts		230 Volts	
	Full Load	Locked Rotor	Full Load	Locked Rotor	Full Load	Locked Rotor	Full Load	Locked Rotor
2	24.0	144.0	12.0	72.0	17.0	170.0	8.5	85.0
1½	20.0	120.0	10.0	60.0	13.2	132.0	6.6	66.0
1	16.0	96.0	8.0	48.0	9.6	96.0	4.8	48.0
¾	13.8	82.8	6.9	41.4	7.4	74.0	3.7	37.0
½	9.8	58.8	4.9	29.4	5.4	54.0	2.7	27.0
⅓	7.2	43.2	3.6	21.6	3.8	38.0	1.9	19.0
¼	5.8	34.8	2.9	17.4	3.0	30.0	1.5	15.0
⅙	4.4	26.4	2.2	13.2	2.4	24.0	1.2	12.0
⅛	3.8	22.8	1.9	11.4	2.2	22.0	1.1	11.0
1/10	3.0	18.0	1.5	9.0	2.0	20.0	1.0	10.0
1/20	1.5	9.0	—	—	—	—	—	—

# Basic Switches

## B Type Switches Performance Information

### ELECTRICAL DATA CHART

Catalog Listing (contact gap)	Voltage	Amperes									
		Current Carrying Capacity Max. <sup>1</sup>	Resistive	Inrush		Motor		Lamp		Inductive <sup>2</sup>	
				N.C. Ckt.	N.O. Ckt.	N.C. Ckt.	N.O. Ckt.	N.C. Ckt.	N.O. Ckt.	Sea Level	50,000 Feet
BZ-3YT* .036 in. 0,91 mm	VDC										
	8	5	10	30	15	5	2.5	3	1.5	10	10
	14	5	10	30	15	5	2.5	3	1.5	10	10
	30	5	10	30	15	5	2.5	3	1.5	10	5
	125	5	1	10	10	2	2	1	1	0.6	0.4
250	5	0.6	6	6	1.2	1.2	0.6	0.6	0.4	0.3	
BZ-3YT* .036 in. 0,91 mm	VAC										
	120	5	5	30	15	5	2.5	3	1.5	5	5
	240	5	5	30	15	5	2.5	3	1.5	5	5
277	5	5	30	15	5	2.5	3	1.5	5	5	
BM-2R .020 in. 0,50 mm	VDC										
	8	22	15	30	15	5	2.5	3	1.5	8	7
	14	22	15	30	15	5	2.5	3	1.5	5	5
	30	22	2	30	15	5	2.5	3	1.5	1	1
	125	22	0.4	4	4	0.8	0.4	0.4	0.4	.03	.02
230	22	0.2	2	2	0.4	0.2	0.2	0.2	.02	.01	
BM-2R .020 in. 0,50 mm	VAC										
	125	22	22	35	20	5.8	3.4	3.5	2.0	22	22
	250	22	22	35	20	5.8	3.4	3.5	2.0	22	22
	277	22	22	35	20	5.8	3.4	3.5	2.0	22	22
460	22	22	35	20	5.8	3.4	3.5	2.0	22	22	
BA-2R .020 in. 0,50 mm	VDC										
	8	20	20	30	15	5	2.5	3	1.5	15	15
	14	20	20	30	15	5	2.5	3	1.5	10	8
	30	20	5	30	15	5	2.5	3	1.5	5	2
	125	20	0.5	4	4	0.8	0.4	0.4	0.4	.05	.03
230	20	0.25	2	2	0.4	0.2	0.2	0.2	.03	.02	
BA-2R .020 in. 0,50 mm	VAC										
	120	20	20	75	75	12.5	12.5	7.5	7.5	20	20
	240	20	20	75	75	12.5	12.5	7.5	7.5	20	20
	277	20	20	75	75	12.5	12.5	7.5	7.5	20	20
460	20	20	75	75	12.5	12.5	7.5	7.5	20	20	
BE-2R .020 in. 0,50 mm	VDC										
	8	25	25	30	15	5	2.5	3	1.5	15	15
	14	25	25	30	15	5	2.5	3	1.5	10	8
	30	25	5	30	15	5	2.5	3	1.5	5	2
	125	25	0.5	4	4	0.8	0.8	0.4	0.4	.05	.03
250	25	0.25	2	2	0.4	0.4	0.2	0.2	.03	.02	
BE-2R .020 in. 0,50 mm	VAC										
	120	25	25	96	96	16	16	10	10	25	
	240	25	25	96	96	16	16	10	10	25	
	277	25	25	96	96	16	16	10	10	25	
460	25	25	96	96	16	16	10	10	25		
BZ-R .006 in. 0,15 mm	VAC										
	125	15	15	30	15	5	2.5	3	1.5	15	15
	250	15	15	30	15	5	2.5	3	1.5	15	15
277	15	15	30	15	5	2.5	3	1.5	15	15	
BZ-1R .010 in. 0,25 mm	VDC										
	8	15	15	30	15	5	2.5	3	1.5	8	7
	14	15	15	30	15	5	2.5	3	1.5	5	5
	30	15	2	30	15	5	2.5	3	1.5	1	1
	125	15	0.4	4	4	0.8	0.8	0.4	0.4	0.03	0.01
230	15	0.2	2	2	0.4	0.4	0.2	0.2	0.02	0.01	
BZ-1R .010 in. 0,25 mm	VAC										
	125	15	15	30	15	5	2.5	3	1.5	15	15
	250	15	15	30	15	5	2.5	3	1.5	15	15
	277	15	15	30	15	5	2.5	3	1.5	15	15
460	15	15	30	15	5	2.5	3	1.5	15	15	

\* Ampere levels for BZ-3YT applicable **only** if common terminal is not used and switch is used as a shorting bar switch.

# Basic Switches

## B Type Switches Performance Information

### ELECTRICAL DATA CHART, cont.

Catalog Listing (contact gap)	Voltage	Amperes									
		Current Carrying Capacity Max. <sup>1</sup>	Resistive	Inrush		Motor		Lamp		Inductive <sup>2</sup>	
				N.C. Ckt.	N.O. Ckt.	N.C. Ckt.	N.O. Ckt.	N.C. Ckt.	N.O. Ckt.	Sea Level	50,000 Feet
BZ-2R .020 in. 0.50 mm	VDC										
	8	15	15	30	15	5	2.5	3	1.5	15	15
	14	15	15	30	15	5	2.5	3	1.5	10	8
	30	15	6	30	15	5	2.5	3	1.5	5	2
	125	15	0.4	4	4	0.8	0.8	0.4	0.4	0.05	0.03
230	15	0.2	2	2	0.4	0.4	0.2	0.2	0.03	0.02	
BZ-2R .020 in. 0.50 mm	VAC										
	125	15	15	30	15	5	2.5	3	1.5	15	15
	250	15	15	30	15	5	2.5	3	1.5	15	15
	277	15	15	30	15	5	2.5	3	1.5	15	15
	460	15	15	30	15	5	2.5	3	1.5	15	15
BZ-3R .036 in. 0.91 mm	VDC										
	8	15	15	30	15	5	2.5	3	1.5	15	15
	14	15	15	30	15	5	2.5	3	1.5	15	15
	30	15	10	30	15	5	2.5	3	1.5	10	5
	125	15	0.6	6	6	1.2	1.2	0.6	0.6	0.1	0.05
250	15	0.3	3	3	0.6	0.6	0.3	0.3	0.05	0.03	
BZ-3R .036 in. 0.91 mm	VAC										
	125	15	15	30	15	5	2.5	3	1.5	15	15
	250	15	15	30	15	5	2.5	3	1.5	15	15
	277	15	15	30	15	5	2.5	3	1.5	15	15
	460	15	15	30	15	4	2.5	3	1.5	15	15
BZ-7R .070 in. 1.78 mm	VDC										
	8	30	15	15	5	2.5	3	1.5	15	15	—
	14	15	15	30	15	5	2.5	3	1.5	15	15
	30	15	15	30	15	5	2.5	3	1.5	10	7.5
	125	15	0.75	7.5	7.5	1.5	1.5	0.75	0.75	0.4	0.2
250	15	0.3	3	3	0.6	0.6	0.3	0.3	0.2	0.1	
BZ-7R .070 in. 1.78 mm	VAC										
	120	15	15	30	15	5	2.5	3	1.5	15	15
	240	15	15	30	15	5	2.5	3	1.5	15	15
	277	15	15	30	15	5	2.5	3	1.5	15	15
	460	15	15	30	15	5	2.5	3	1.5	15	15

1 For a 86 – F (30 – C) max. temperature rise at terminals, not opening or closing the load (at sea level).

2 Data established with a 75% power factor on AC loads.

### TEST CONDITIONS

Switch contact life is affected by electrical conditions and other factors, such as: temperature, humidity, airborne contamination, vibration, amount and rate of plunger travel, and cycling

rate. Our Evaluation Laboratory tests are conducted using procedures and practices common to UL and Military Specifications. The following conditions generally apply.

- Temperature: Room Ambient (70 – F, 21 – C).
- Humidity: Room Ambient (50%).
- AC Cycle Rate: 60 operations/minute.
- DC Cycle Rate: 20 operations/minute.
- On-off Time: Equal and compatible with above cycling rates.
- Power Factor (AC): Approximately 75%.
- Inductance (DC): MIL-I-81023 Inductor.
- Circuit Loading: One throw only on a SPDT switch during any test procedure. Both throws are evaluated separately.
- Travel Plunger: Full switch travel is used.
- Actuation: Linear motion.
- Overtravel Force: 1 to 3 lbs. from spring-loaded actuators.

MICRO SWITCH believes that with the following voltage and current values and under the test conditions set forth below switch life of 100,000 closures, 95% survival can be expected. It is a starting point for user evaluation and provides guidelines on the switches identified. Because of the numerous electrical conditions listed, not every current and voltage level has actually been tested on every switch and certain figures have

been extrapolated. For specific switch selection, customers should evaluate switches under actual application conditions or by simulating all application conditions and requirements. The information set forth cannot substitute for the customer's own product evaluation. It should never be published by a customer as a rating on their product.

Reference/Index



# Basic Switches

## Definitions of Terms

**Actuator** – Mechanism of the switch or switch enclosure which operates the contacts.

**Auxiliary Actuator** – A mechanism, sold separately, to provide basic switches with easier means of operation and adjustment and adapt switches to different operating motions by supplying supplemental overtravel.

**Basic Switch** – A self-contained switching unit. It can be used alone, gang-mounted, built into assemblies or enclosed in metal housings.

**Bifurcated Contacts** – A movable contact, generally gold plated, which is forked to provide two contact mating surfaces in a parallel, for more reliable contact.

**Break** – To open an electrical circuit.

**Break Distance** – The minimum open gap distance between stationary and movable objects.

**Characteristics** – This term is used by MICRO SWITCH in a restricted sense and refers only to switch operating characteristics such as pretravel, operating force, etc.

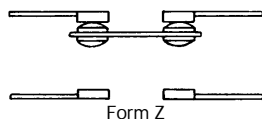
**Circuit** – The contact arrangement with switch actuator and contacts in their normal position.

**Dead break** – Exists in all mechanical switches. Definition: When the switch plunger is being depressed, dead break is non-contact immediately before the plunger reaches the operating point. When the switch plunger is being released, dead break is non-contact immediately before the plunger reaches the release point. Dead break is expressed in distance of plunger travel during which the non-contact occurs. Manufacturing specifications for most BZ/BA basic switches allow a maximum dead break of 0.00005 in. (0,001 mm) measured at the switch plunger. Switches are evaluated while moving the plunger with the switch installed in a 10 VDC, 0.100 ampere circuit. This specification does not apply to switches that have been in service or have not received proper handling or storage. For applications sensitive to dead break, call Freeport for information on applicable electrical and mechanical conditions.

**Dead make** – When the switch plunger is being depressed, dead make is non-contact immediately after the plunger reaches the release point. Dead make is expressed as the distance of plunger travel during which the non-contact occurs.

**Non contact** is a failure of open contacts to close (that is, the switch resistance exceeds the specified value) within the specified range of plunger positions. If a plunger position is specified with respect to time, a non-contact is a contact miss.

**Double Break Contacts** – (Twin break). This breaks the circuit in two places. Referred to as form Z circuitry also.



**Double-Pole Double-Throw (DPDT)** – Switches which make and break two separate circuits. This circuit provides a normally open and normally closed contact for each pole.

**Enclosed Switch** – A basic switch unit (contact block) enclosed in a durable metal housing. The enclosure protects the switching unit, provides mounting means, and fitting for conduit connection.

**Environment-Proof Switch** – A switch which is completely sealed to ensure constant operating characteristics. Sealing normally includes an "O" ring on actuator shaft and fused glass-to-metal terminal seals or complete potting and an elastomer plunger-case seal.

**Explosion-Proof Switch** – A UL listed switch capable of withstanding an internal explosion of a specified gas without igniting surrounding gases.

**Hermetically Sealed Switch** – A switch completely sealed to provide constant operating characteristics. All junctures made with metal-to-metal or glass-to-metal fusion.

**Magnetic Blow-Out Switch** – Contains a small permanent magnet which provides a means of switching high d-c loads. The magnet deflects arc to quench it.

**Maintained Contact Switch** – Designed for applications requiring sustained contact after plunger has been released, but with provision for resetting.

**Make** – To close or establish an electrical circuit.

**Momentary Switch** – A switch with contacts that return from operated condition to normal condition when actuating force is removed. Unless otherwise stated, all switches in this catalog are momentary.

**Mounting Dimensions** – All dimensions on the mounting dimension drawings in this catalog are subject to change without notice. Request current drawings from the nearest MICRO SWITCH Sales Office or write to Freeport.

**Normally Closed Contacts (N.C.)** – Provide a normally closed circuit when actuator is in free position.

**Normally Open Contacts (N.O.)** – Provide a normally open circuit when actuator is in free position.

**Precision Snap-Acting Switch** – An electromechanical switch having predetermined and accurately controlled characteristics, and having a spring loaded quick make and break contact action.

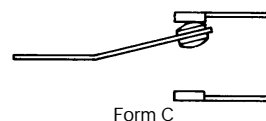
**Projection Contacts** – A design in which one or more truncated projections are arranged on the stationary contacts. When closed on the smooth, spherical surface of the opposing contact this configuration tends to break thru oxides and other film contaminants to avoid the particulate contaminants. Used with silver contacts, this design can be a useful substitute for the more expensive gold or gold alloy contact material.

**Pulse Switch** – Provides a single pulse of current for each cycle of operation.

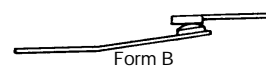
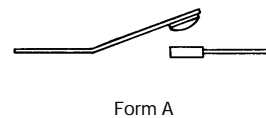
**Quick Connect Terminal** – A plug-in type terminal designed for quick switch wiring.

**Repeatability** – Ability of a switch to repeat its characteristics precisely from one operation to the next operation.

**Single-Pole Double-Throw (SPDT)** – Switch which may either make or break a circuit, depending on how it is wired. Also referred to as form C circuitry.



**Single-Pole Single-Throw (SPST)** – Switch with only one moving and one stationary contact. Available either normally open (N.O.) also referred to as form A circuitry; or normally closed (N.C.) also referred to as form B circuitry.



**Terminal Enclosure** – A housing that fits over switch terminals to protect against electrical shock and accidental shorting, and facilitate wiring.

**Two Circuit Switch** – In one position, moving contacts complete one circuit, in the other position, contacts complete another separate circuit.



# Basic Switches

## Subminiature

US Series



### FEATURES

- MICRO SWITCH'S smallest snap-action switch
- Choice of low energy or power duty electrical ratings
- Variety of integral actuators
- Temperature Range:  $-25^{\circ}$  to  $+80^{\circ}\text{C}$  ( $-13^{\circ}$  to  $+176^{\circ}\text{F}$ )
- Weight: 0.2 grams (.007 oz.) – PC terminal type  
0.3 grams (.011 oz.) – solder terminal type
- Form C single-pole double-throw (SPDT) circuitry

### ELECTRICAL RATINGS

Voltage	Resistive Load Gold Contacts US10 Type	Silver Contacts US20 Type
30 VDC 125 VAC	0.1 A 0.1 A	0.5 A 0.1 A

### ORDER GUIDE SOLDER TERMINALS

Contact Type	Actuator	O.F. max. grams oz.	Solder	R.F. min. g ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
Gold, 0.1 Amp 	A pin plunger	100 3.527	US10D10A00	10 .353	0,3 .012	0,1 .004	0,1 .004	5,4 ± 0,15 .213 ± .006
	C flat lever	25 .88	US10D10C00	2,0 .071	2,4 .094	0,4 .016	0,7 .028	6,4 ± 0,6 .252 ± .024
	E simulated roller lever	30 1.058	US10D10E00	2,0 .071	2,2 .087	0,3 .012	0,7 .028	6,7 ± 0,5 .264 ± .020
Silver, 0.5 Amp 	A pin plunger	100 3.527	US20D10A00	10 .353	0,3 .012	0,1 .004	0,1 .004	5,4 ± 0,15 .213 ± .006
	C flat lever	25 .88	US20D10C00	2,0 .071	2,4 .094	0,4 .016	0,7 .028	6,4 ± 0,6 .252 ± .024
	E simulated roller lever	30 1.058	US20D10E00	2,0 .071	2,2 .087	0,3 .012	0,7 .028	6,7 ± 0,5 .264 ± .020

### ORDER GUIDE PC STRAIGHT TERMINALS

Contact Type	Actuator	O.F. max. grams oz.	PC Straight Cross-Line	R.F. min. g ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
Gold, 0.1 Amp 	A pin plunger	100 3.527	US10D20A00	10 .353	0,3 .012	0,1 .004	0,1 .004	4,8 ± 0,15 .189 ± .006
	C flat lever	25 .88	US10D20C00	1,0 .035	2,4 .094	0,4 .016	0,7 .028	5,8 ± 0,7 .228 ± .028
	E simulated roller lever	30 1.058	US10D20E00	1,0 .035	2,2 .087	0,3 .012	0,7 .028	6,1 ± 0,7 .240 ± .028
Silver, 0.5 Amp 	A pin plunger	100 3.527	US20D20A00	10 .353	0,3 .012	0,1 .004	0,1 .004	4,8 ± 0,15 .189 ± .006
	C flat lever	25 .88	US20D20C00	1,0 .035	2,4 .094	0,4 .016	0,7 .028	5,8 ± 0,7 .228 ± .028
	E simulated roller lever	30 1.058	US20D20E00	1,0 .035	2,2 .087	0,3 .012	0,7 .028	6,1 ± 0,7 .240 ± .028

### OTHER TERMINATION TYPES ARE AVAILABLE

For PC right angle, change 2nd set of numbers to 50 (Example: US10D50A00)

For PC left angle, change 2nd set of numbers to 60 (Example: US10D60A00)



# Basic Switches

## Subminiature



### FEATURES

- Compact size – helps minimize equipment size
- Choice of low energy or power duty electrical ratings
- Variety of integral actuators
- Temperature Range: -25° to +85°C (-13 to 185°F)
- Weight: 0.5 grams (.018 oz.)
- UL/CSA marking designations
- Form C single-pole double-throw (SPDT) circuitry

### ELECTRICAL RATINGS (in amps)

Voltage	Silver Contacts		Gold Contacts
	UX40 Type	UX30 Type	UX10 Type
125 VAC*	3 A	1 A	0.1 A
30 VDC	2 A	1 A	0.1 A
6 VDC	-	-	5 mA
12 VDC	-	-	2 mA
24 VDC	-	-	1 mA

\*UL/CSA rating. UL File No. E12252. UL Standard 1054. CSA file LR23413M167

### ORDER GUIDE

Rating	Actuator	O.F. max. grams oz.	Terminals		R.F. min. g ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
			Solder	PC Straight Self- Supporting					
Gold, 0.1 Amp 125 VAC 	A pin plunger	75 2.65	UX10C10A01	UX10C30A01	10 .353	0,5 .020	0,25 .010	0,12 .005	5,5 ± 0,2 .217 ± .008
		150 5.3	UX10E10A01	UX10E30A01	20 .705	0,5 .020	0,25 .010	0,12 .005	5,5 ± 0,2 .217 ± .008
	C flat lever	25 .88	UX10C10C01	UX10C30C01	2,5 .088	2,1 .083	0,55 .022	0,50 .020	6,8 ± 1,0 .268 ± .039
		50 1.76	UX10E10C01	UX10E30C01	5,0 .176	2,1 .083	0,55 .022	0,50 .020	6,8 ± 1,0 .268 ± .039
	E roller lever simulated	27 .95	UX10C10E01	UX10C30E01	2,0 .071	2,1 .083	0,50 .020	0,50 .020	9,5 ± 1,0 .374 ± .039
		55 1.94	UX10E10E01	UX10E30E01	4,0 .141	2,1 .083	0,50 .020	0,50 .020	9,5 ± 1,0 .374 ± .039
Silver, 1 Amp 125 VAC 	A pin plunger	75 2.65	UX30C10A01	UX30C30A01	10 .353	0,5 .020	0,25 .010	0,12 .005	5,5 ± 0,2 .217 ± .008
	C flat lever	25 .88	UX30C10C01	UX30C30C01	2,5 .088	2,1 .083	0,55 .022	0,50 .020	6,8 ± 1,0 .268 ± .039
	E roller lever simulated	27 .95	UX30C10E01	UX30C30E01	2,0 .071	2,1 .083	0,50 .020	0,50 .020	9,5 ± 1,0 .374 ± .039
Silver, 3 Amp 125 VAC 	A pin plunger	150 5.3	UX40E10A01	UX40E30A01	20 .705	0,5 .020	0,25 .010	0,12 .005	5,5 ± 0,2 .217 ± .008
	C flat lever	50 1.76	UX40E10C01	UX40E30C01	5,0 .176	2,1 .083	0,55 .022	0,50 .020	6,8 ± 1,0 .268 ± .039
	E roller lever simulated	55 1.94	UX40E10E01	UX40E30E01	4,0 .141	2,1 .083	0,50 .020	0,50 .020	9,5 ± 1,0 .374 ± .039

### OTHER TERMINATION TYPES ARE AVAILABLE

For PC right angle, change 2nd set of numbers to 50 (Example: UX10C**50**A01)

For PC left angle, change 2nd set of numbers to 60 (Example: UX10C**60**A01)

# Basic Switches

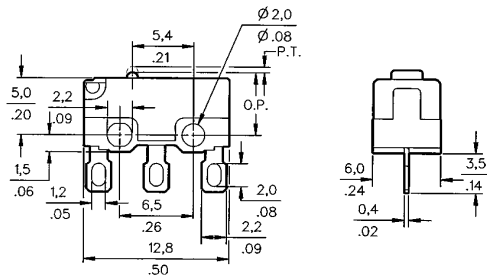
## Subminiature

UX Series

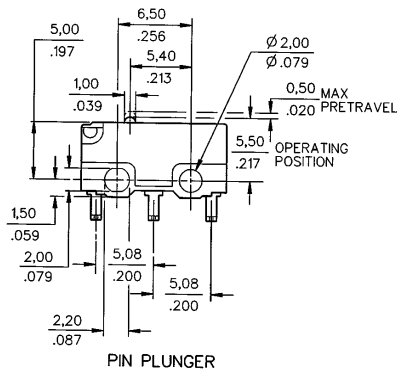
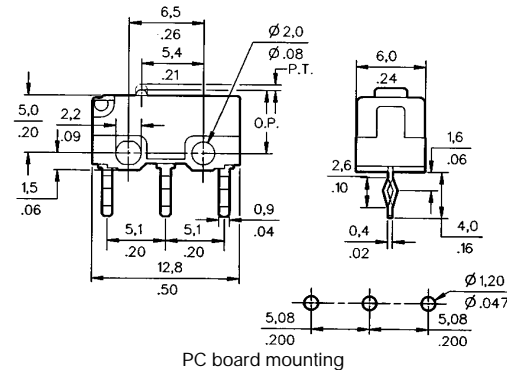
MOUNTING DIMENSIONS (for reference only)  $\frac{\text{mm}}{\text{in.}}$

### Pin plunger (Type A)

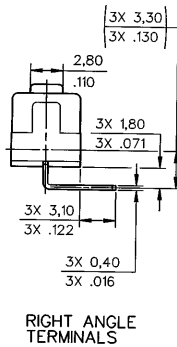
Solder terminals – Type 10



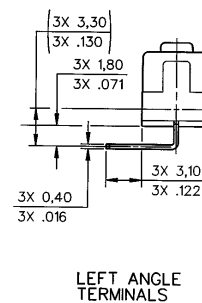
PC board terminals – Type 30



Type 50



Type 60



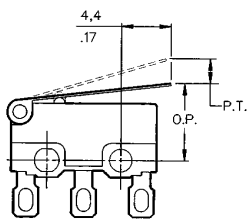
Miniature/  
Subminiature

### LEVER ACTUATORS

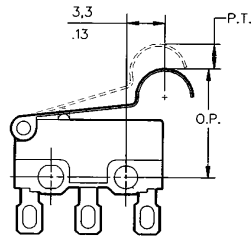
UX Series switches with lever actuators can be operated by cams or slides. They require lower operating forces than pin plunger switches.

Flat levers are .520 in. (13,2 mm) long and simulated roller levers are .480 in. (12,2 mm) long.

Flat lever (Type C)



Simulated Roller Lever (Type E)

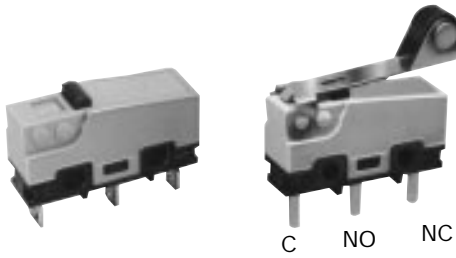


Mounting screw size is 2 mm.  
Maximum tightening torque is 1 kg-cm.

# Basic Switches

## Subminiature

UM Series



### ELECTRICAL RATINGS (in amps)



Voltage	UM50E Silver Contacts		UM40B/D Silver Contacts		UM10A/B/D/E Gold Contacts
	Resistive	Inductive	Resistive	Inductive	Resistive
125 VAC	5	3	3	2	0.1
250 VAC	5	3	3	2	0.1
30 VDC	5	3*	3	2*	0.1

\*Time constant for DC inductive loads: less than 7 msec.  
UL File No. E12252, CSA File LR23413M167




### FEATURES

- Choice of low energy or power duty electrical ratings
- Variety of integral actuators
- Temperature Range: -25° to +85°C (-13° to 185°F)
- Weight: 2 grams (.07 oz.)
- UL/CSA/VDE/SEMKO marking designations
- Form C single-pole double-throw (SPDT) circuitry

### ORDER GUIDE 0.1 AMP TYPE GOLD CONTACTS

Rating	Actuator Length	O.F. max. grams oz.	Terminals		R.F. min. g ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
			Solder	.110 QC					
 0.1 Amp 250 VAC	A pin plunger	25 .88	UM10A10A01	UM10A70A01	2 .071	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
		50 1.76	UM10B10A01	UM10B70A01	7,5 .265	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
		100 3.57	UM10D10A01	UM10D70A01	15 .529	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
		150 5.3	UM10E10A01	UM10E70A01	20 .705	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
	B flat lever 18mm	10 .35	UM10A10B01	UM10A70B01	0,4 .014	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
		20 .7	UM10B10B01	UM10B70B01	1,7 .060	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
		40 1.4	UM10D10B01	UM10D70B01	3,5 .123	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
		60 2.1	UM10E10B01	UM10E70B01	4,0 .141	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
	C flat lever 20mm	8 .28	UM10A10C01	UM10A70C01	0,35 .012	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
		16 .56	UM10B10C01	UM10B70C01	1,5 .053	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
		35 1.23	UM10D10C01	UM10D70C01	3,0 .106	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
		55 2	UM10E10C01	UM10E70C01	3,5 .123	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
	D flat lever 26mm	12 .4	UM10B10D01	UM10B70D01	1,2 .042	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
		25 .88	UM10D10D01	UM10D70D01	2,5 .088	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
		45 1.6	UM10E10D01	UM10E70D01	3,0 .106	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047

### ORDER GUIDE 0.1 AMP TYPE GOLD CONTACTS cont.

Rating	Actuator Length	O.F. max. grams oz.	Terminals		R.F. min. g ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
			Solder	.110 QC					
0.1 Amp 250 VAC 	J flat lever 60mm	6 .2	UM10B10J01	UM10B70J01	0,5 .018	8,5 .335	2,2 .087	2,5 .098	8,8 ± 2,4 .346 ± .094
		15 .52	UM10D10J01	UM10D70J01	1,0 .035	8,5 .335	2,2 .087	2,5 .098	8,8 ± 2,4 .346 ± .094
		20 .7	UM10E10J01	UM10E70J01	1,0 .035	8,5 .335	2,2 .087	2,5 .098	8,8 ± 2,4 .346 ± .094
0.1 Amp 250 VAC 	E simulated roller lever, radius 2,5mm, 19mm	16 .56	UM10B10E01	UM10B70E01	1,5 .053	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
		35 1.23	UM10D10E01	UM10D70E01	3,0 .106	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
		55 2	UM10E10E01	UM10E70E01	3,5 .123	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
	H simulated roller lever, radius 1,3mm, 19mm	16 .56	UM10B10H01	UM10B70H01	1,5 .053	2,8 .110	1,2 .047	0,8 .031	10,7 ± 0,8 .421 ± .031
		35 1.23	UM10D10H01	UM10D70H01	3,0 .106	2,8 .110	1,2 .047	0,8 .031	10,7 ± 0,8 .421 ± .031
		55 2	UM10E10H01	UM10E70H01	3,5 .123	2,8 .110	1,2 .047	0,8 .031	10,7 ± 0,8 .421 ± .031
0.1 Amp 250 VAC 	F roller lever 18,00mm	20 .7	UM10B10F01	UM10B70F01	1,7 .060	2,5 .098	0,8 .031	0,5 .020	14,50 ± 0,8 .571 ± .031
		40 1.4	UM10D10F01	UM10D70F01	3,5 .123	2,5 .098	0,8 .031	0,5 .020	14,50 ± 0,8 .571 ± .031
		60 2.1	UM10E10F01	UM10E70F01	4,0 .141	2,5 .098	0,8 .031	0,5 .020	14,50 ± 0,8 .571 ± .031








Miniature/  
Subminiature

### OTHER TERMINATION TYPES ARE AVAILABLE

- For PC Straight cross-line, change 2nd set of numbers to 20 (Example: UM10A20A01)
- For PC Straight international, change 2nd set of numbers to 40 (Example: UM10A40A01)
- For PC Straight right angle, change 2nd set of numbers to 50 (Example: UM10A50A01)
- For PC Straight left angle, change 2nd set of numbers to 60 (Example: UM10A60A01)



### ORDER GUIDE 3 AND 5 AMP TYPE SILVER CONTACTS

Rating	Actuator Length	O.F. max. grams oz.	Terminals		R.F. min. g ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
			Solder	.110 QC					
3 Amp 250 VAC 	A pin plunger	50 1.76	UM40B10A01	UM40B70A01	7,5 .265	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
		100 3.527	UM40D10A01	UM40D70A01	15,0 .529	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
3 Amp 250 VAC 	B flat lever 18mm	20 .7	UM40B10B01	UM40B70B01	1,7 .060	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
		40 1.4	UM40D10B01	UM40D70B01	3,5 .123	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
	C flat lever 20mm	16 .56	UM40B10C01	UM40B70C01	1,5 .053	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
		35 1.23	UM40D10C01	UM40D70C01	3,0 .106	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
	D flat lever 26mm	12 .4	UM40B10D01	UM40B70D01	1,2 .042	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
		25 .88	UM40D10D01	UM40D70D01	2,5 .088	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
	J flat lever 60mm	6 .2	UM40B10J01	UM40B70J01	0,5 .018	8,5 .335	2,2 .087	2,5 .098	8,8 ± 2,4 .346 ± .094
		15 .52	UM40D10J01	UM40D70J01	1,0 .035	8,5 .335	2,2 .087	2,5 .098	8,8 ± 2,4 .346 ± .094
3 Amp 250 VAC 	E simulated roller lever, radius 2,5mm 19mm	16 .56	UM40B10E01	UM40B70E01	1,5 .053	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
		35 1.23	UM40D10E01	UM40D70E01	3,0 .106	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
	H simulated roller lever, radius 1,3mm 19,15mm	16 .56	UM40B10H01	UM40B70H01	1,5 .053	2,8 .110	1,2 .047	0,8 .021	10,7 ± 0,8 .421 ± .031
		35 1.23	UM40D10H01	UM40D70H01	3,0 .106	2,8 .110	1,2 .047	0,8 .031	10,7 ± 0,8 .421 ± .031
	F roller lever 18mm	20 .7	UM40B10F01	UM40B70F01	1,7 .060	2,5 .098	0,8 .031	0,5 .020	14,50 ± 0,8 .571 ± .031
		40 1.4	UM40D10F01	UM40D70F01	3,5 .123	2,5 .098	0,8 .031	0,5 .020	14,50 ± 0,8 .571 ± .031
5 Amp 250 VAC 	A pin plunger	150 5.3	UM50E10A01	UM50E70A01	20 .705	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
	B flat lever 18mm	60 2.1	UM50E10B01	UM50E70B01	4,0 .141	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
	C flat lever 20mm	55 2	UM50E10C01	UM50E70C01	3,5 .123	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
	D flat lever 26mm	45 1.6	UM50E10D01	UM50E70D01	3,0 .106	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
	J flat lever 60mm		UM50E10J01	UM50E70J01	1,0 .035	8,5 .335	2,2 .087	2,5 .098	8,8 ± 2,4 .346 ± .094
	E simulated roller lever, radius 2,5mm 19mm	55 2	UM50E10E01	UM50E70E01	3,5 .123	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
	H simulated roller lever, radius 1,3mm 19mm	55 2	UM50E10H01	UM50E70H01	3,5 .123	2,8 .110	1,2 .047	0,8 .031	10,7 ± 0,8 .421 ± .031
	F roller lever 18mm	60 2.1	UM50E10F01	UM50E70F01	4,0 .141	2,5 .098	0,8 .031	0,5 .020	14,50 ± 0,8 .571 ± .031

#### OTHER TERMINATION TYPES ARE AVAILABLE

For PC Straight cross-line, change 2nd set of numbers to 20 (Example: UM40B20A01)

For PC Straight international, change 2nd set of numbers to 40 (Example: UM40B40A01)

For PC Straight right angle, change 2nd set of numbers to 50 (Example: UM40B50A01)

For PC Straight left angle, change 2nd set of numbers to 60 (Example: UM40B60A01)

# Basic Switches

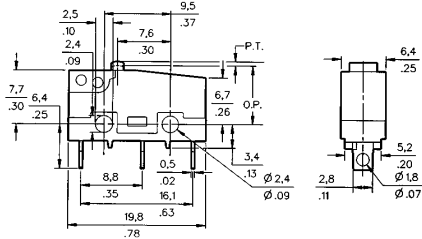
## Subminiature

UM Series

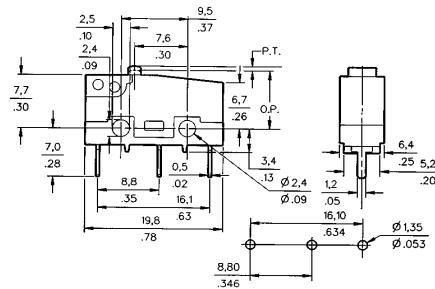
MOUNTING DIMENSIONS (for reference only)  $\frac{\text{mm}}{\text{in.}}$

### Pin Plunger Type A

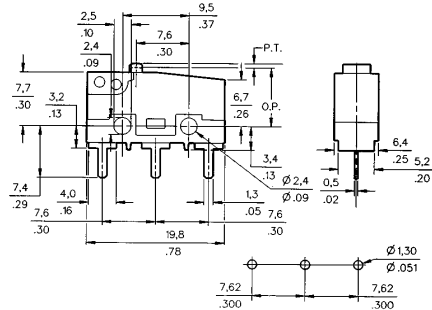
Solder Cross-line Terminals – Type 10



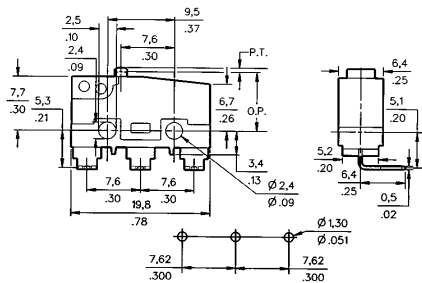
PC Straight Cross-Line – Type 20



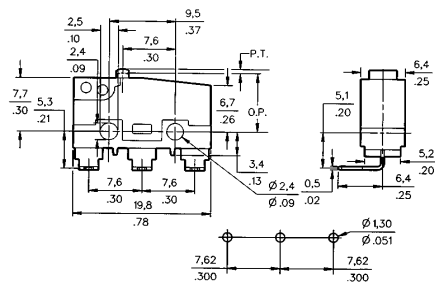
PC Straight In-line – Type 40



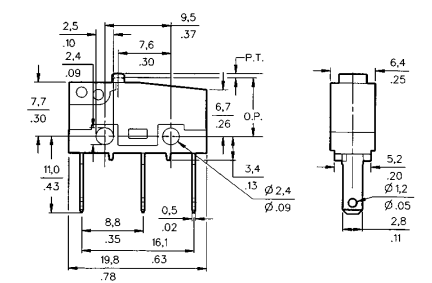
PC Right Angle In-line – Type 50



PC Left Angle In-line – Type 60



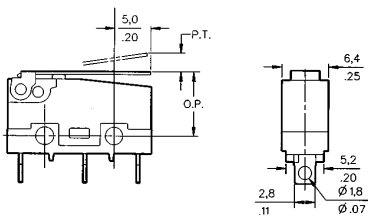
QC Quick Connect – Type 70



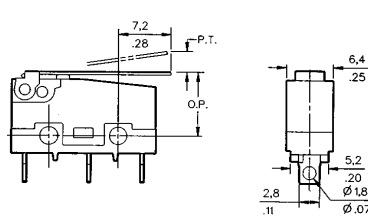
Miniature/  
Subminiature

### Lever Actuators 4mm (.158) wide

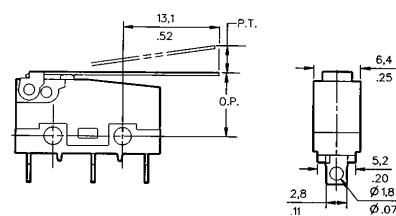
18mm Flat Lever Type B



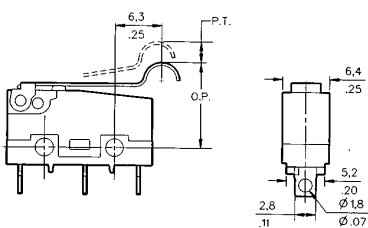
20mm Flat Lever Type C



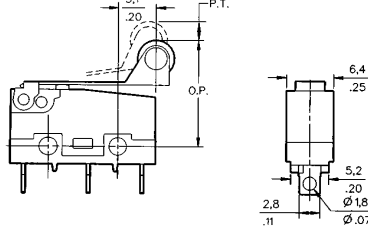
26mm Flat Lever Type D  
60mm Type J



19mm Simulated Roller Type E/H  
Type H has 1,3mm radius  
Type E has 2,5mm radius



18mm Roller Lever Type F  
5mm (.197 in.) dia. x 3,2mm (.126 in.)  
thick roller



Mounting screw size is m 2,3.  
Maximum tightening torque is 3 kg-cm.

# Basic Switches

## Sealed Subminiature

UM Series



IP50-SEALED



IP67-SEALED



### FEATURES

- Silver or gold contacts
- Variety of integral actuator styles including pin plunger, flat lever, roller lever, and simulated roller lever
- IP50 or IP67 type sealing
- Choice of quick-connect, printed circuit board, solder or leadwire termination
- Form C single-pole double-throw
- Temperature range: -40° to 85°C (-40° to 185°F)
- Weight, approx.: .07 oz. (2g.) for IP50-sealed switches; and .14 oz. (4g.) for IP67-sealed switches, not including leadwires
- UL, CSA, VDE, and SEMKO marking designations

### ELECTRICAL RATINGS (in amps)

Voltage	Silver Contacts		Gold Contacts
	Resistive	Inductive	Resistive
125 VAC	2.0	2.0	0.1A
250 VAC	2.0	2.0	0.1A
30 VDC	2.0	2.0	0.1A
125 VDC	0.4	0.05	—

UL File No. E12252, CSA File LR23413M167

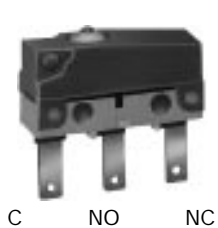
IP50-sealed UM switches are the same size as non-sealed UM switches on pages 12-15. There is an elastomer seal on the switch plunger and a cover-to-case seal. They provide a degree of protection against the entry of dust.

IP67-sealed UM switches have the plunger seal and cover-to-case seal. In addition, their AWG #20 leadwires are molded in epoxy resin. They provide a degree of protection against water entry during temporary immersion.

# Basic Switches

## IP50-Sealed Subminiature

UM Series



Miniature/  
Subminiature

### ORDER GUIDE IP50 SEALED 0.1-AMP GOLD CONTACTS

Actuators	O.F. max. grams oz.	Termination		R.F. min. grams ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
		Solder	.110 QC					
A pin plunger	150 5.3	UM10E11AS1	UM10E71AS1	20 .705	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
B flat lever	60 2.1	UM10E11BS1	UM10E71BS1	4,0 .141	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
C flat lever	55 1.9	UM10E11CS1	UM10E71CS1	3,5 .123	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
D flat lever	45 1.6	UM10E11DS1	UM10E71DS1	3,0 .106	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
E simulated roller lever	55 1.9	UM10E11ES1	UM10E71ES1	3,5 .123	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
F roller lever	60 2.1	UM10E11FS1	UM10E71FS1	4,0 .141	2,5 .098	0,8 .031	0,5 .020	14,5 ± 0,8 .571 ± .031

### ORDER GUIDE IP50 SEALED 2.0-AMP SILVER CONTACTS

Actuators	O.F. max. grams oz.	Termination		R.F. min. grams ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P mm inches
		Solder	.110 QC					
A pin plunger	150 5.3	UM35E11AS1	UM35E71AS1	20 .705	0,6 .024	0,4 .016	0,1 .004	8,4 ± 0,3 .331 ± .012
B flat lever	60 2.1	UM35E11BS1	UM35E71BS1	4,0 .141	2,5 .098	0,8 .031	0,5 .020	8,8 ± 0,8 .346 ± .031
C flat lever	55 1.9	UM35E11CS1	UM35E71CS1	3,5 .123	2,8 .110	1,2 .047	0,8 .031	8,8 ± 0,8 .346 ± .031
D flat lever	45 1.6	UM35E11DS1	UM35E71DS1	3,0 .106	3,5 .138	1,6 .063	1,0 .039	8,8 ± 1,2 .346 ± .047
E simulated roller lever	55 1.9	UM35E11ES1	UM35E71ES1	3,5 .123	2,8 .110	1,2 .047	0,8 .031	11,65 ± 0,8 .459 ± .031
F roller lever	60 2.1	UM35E11FS1	UM35E71FS1	4,0 .141	2,5 .098	0,8 .031	0,5 .020	14,5 ± 0,8 .571 ± .031

#### TO SPECIFY PC TERMINALS:

In the order guides above, change the 2nd set of numbers to 21. **Example:** UM10E11AS1 converts to UM10E21AS1 with PC terminals



# Basic Switches

## IP50-Sealed Subminiature

UM Series

### MOUNTING DIMENSIONS (For reference only)

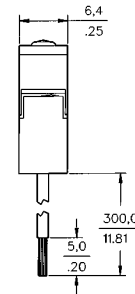
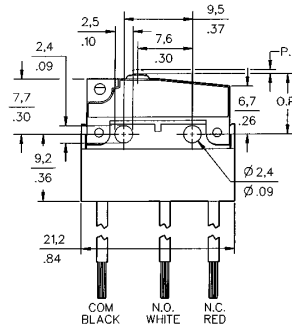
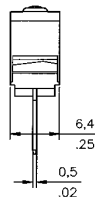
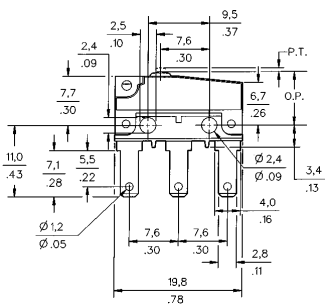
mm  
in.

Mounting screw size is m 2,3  
Maximum torque is 3 kg/cm.

#### Pin Plunger Type A

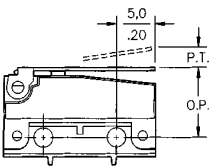
#### QC In-line Terminals

#### Leadwires

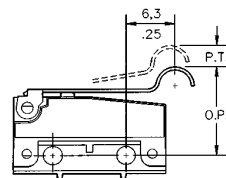


#### Lever Actuators 4 mm/.158 in. wide

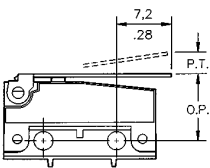
#### 18 mm Flat Lever Type B



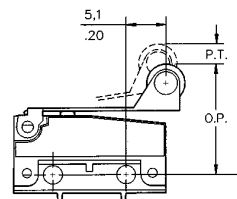
#### 19 mm Simulated Roller Lever Type E 2,5 mm radius



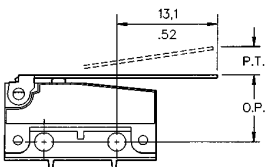
#### 20 mm Flat Lever Type C



#### 18 mm Roller Lever Type F 5 mm/.197 in. dia. x 3,2 mm/.126 in. Thick Roller



#### 26 mm Flat Lever Type D



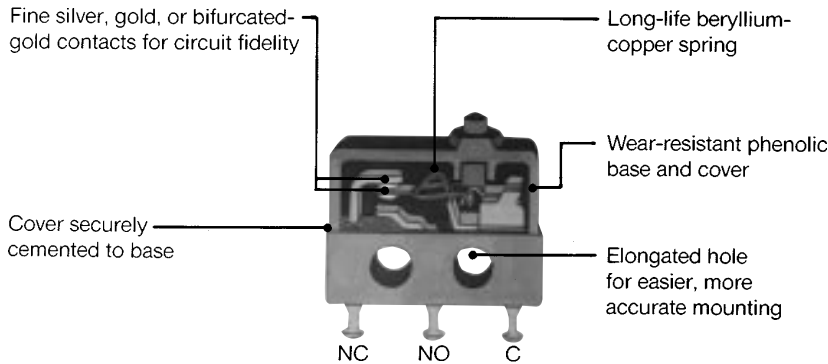
Miniature/  
Subminiature



# Basic Switches

## Subminiature

### CUT-A-WAY 1SX SUBMINIATURE BASIC SWITCH



### FEATURES

- Low operating force to 3 oz. (85 grams) maximum
- Sensitive differential travel as low as .001 inch maximum
- Power load switching capability up to 7 amperes—silver contacts
- Optional gold contacts for low energy applications
- Optional bifurcated gold contacts for maximum reliability
- Long mechanical life up to 10,000,000 cycles—95% survival for 11SX series 1,000,000 cycles—95% survival for 1SX series
- Temperature tolerance  $-65^{\circ}$  to  $+250^{\circ}\text{F}$  ( $-54$  to  $121^{\circ}\text{C}$ ) on standard construction
- High temperature designs for up to  $+400^{\circ}\text{F}$  ( $204^{\circ}\text{C}$ ) for 100 hours
- Variety of integral and auxiliary actuators
- Choice of several terminal styles
- MIL-S-8805 qualified products available
- UL recognized File #E12252, CSA certified file # LR41372

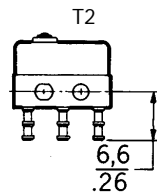
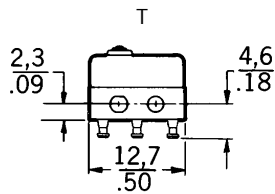
### AVAILABLE TERMINALS

SX switches are available with several types of terminations. The T and T2 terminals provide easy solder lead wire attachment. The H58 terminal offers the simplicity of quick-connect and mate with AMP .058-inch receptacles. Pin terminals allow easy attachment to printed circuit boards.

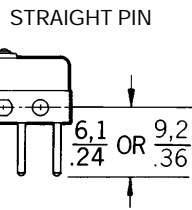
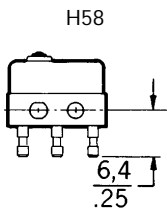
### GENERAL INFORMATION

SX subminiature basic switches are small size precision snap-action switches from MICRO SWITCH. These switches are ideal where savings in space and weight are important. Unless otherwise noted, all listings have silver contacts.

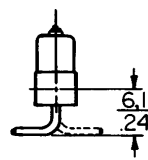
Miniature/  
Subminiature



Mounting torque Round head 2-56 UNC 438 screws—2 inch pounds max.



H391, H392  
90° FORMED PIN



Mate with Amp Inc. Part No. 640024-1 Std.

Dimensions shown are for reference only

Key:  $0,0 = \text{mm}$   
 $0.00 = \text{inches}$

This section covers only **40** of our most popular SX Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **200** other active SX listings will meet your needs. Contact the 800 number.

# Basic Switches

## Subminiature

SX Series

### ORDER GUIDE by ascending electrical capability

PIN PLUNGER

Catalog Listing	Recommended for	Electrical Data and UL Code Page 20	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
11SX91-T	Logic level loads 5VDC, 2mA; SPNO	At Left	1,39 5	0,28 1	0,51 .020	0,1 .004	0,1 .004	8,13 .320
12SX2-T	Best reliability (Bifurcated gold contacts)	.010 Amp H	0,7 to 1,39 2.5 to 5	0,28 1	0,51 .020	0,1 .004	0,051 .002	8,13 .320
3SX1-T	Applications requiring gold contacts (1SX type)	1 Amp D	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
12SX1-T	Best reliability with higher current rating (Bifurcated gold contacts)	1 Amp D	1,39 5	0,28 1	0,51 .020	0,1 .004	0,076 .003	8,13 .320
12SX3-T	Lowest differential travel with bifurcated gold contacts	1 Amp H	1,39 5	0,28 1	0,51 .020	0,1 .004	0,025 .001	8,13 .320
13SX21-T	Applications requiring gold contacts. 11SX type.	1 Amp D	1,39 5	0,28 1	0,51 .020	0,1 .004	0,051 .002	8,13 .320
23SX39-T (MS24547-2)	MIL-S-8805 applications requiring gold contacts +180°F (82°C) max. use	1 Amp D	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
23SX39-T2 (MS24547-5)	As above, with T2 terminals	1 Amp D	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
93SX39-T M8805/109-03	.156" wide, with gold contacts +180°F (82°C)	1 Amp D	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
411SX21-T M8805/106-01	+400°F (204°C) for 100 hours	G	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .220
413SX21-T M8805/106-02	+400°F (204°C) for 100 hours	L	1,39 5	0,28 1	0,51 .020	0,1 .004	0,051 .002	8,13 .220
11SX1-T	Lowest differential travel	3 Amps E	0,97 3.5	0,21 0.75	0,51 .020	0,1 .004	0,025 .001	8,13 .320
11SX21-T	Most applications	5 Amps A	0,7 to 1,39 2.5 to 5	0,28 1	0,51 .020	0,1 .004	0,051 .002	8,13 .320
11SX22-T	For use in sealed enclosures.	5 Amps A	1,39 5	0,28 1	0,51 .020	0,1 .004	0,076 .003	8,13 .320
17SX21-T	Best stability under varying humidity. 11SX type.	5 Amps A	1,39 5	0,28 1	0,51 .020	0,1 .004	0,051 .002	8,13 .320
1SX1-T	Up to 7 amps load handling	7 Amps B	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
1SX12-T	Low differential travel	7 Amps C	1,39 5	0,28 1	0,51 .020	0,1 .004	0,051 .002	8,13 .320
1SX48-T	Added overtravel	7 Amps B	1,39 5	0,28 1	0,51 .020	0,25 .010	0,13 .005	8,13 .320
2SX1-T	Lower force	7 Amps B	0,83 3	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
4SX1-T	Operating in temperature to +400°F (204°C) for 100 hours	7 Amps I	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
21SX1-T	Best stability under varying humidity (1SX type)	7 Amps B	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
21SX39-T (MS24547-1)	MIL-S-8805 application requirements +180°F (82°C)	7 Amps F	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
21SX39-T2 (MS24547-4)	MIL-S-8805 application requirements +180°F (82°C)	7 Amps F	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320
91SX39-T M8805/109-01	.156" wide version of standard SX +180°F (82°C)	7 Amps F	1,39 5	0,28 1	0,51 .020	0,1 .004	0,13 .005	8,13 .320

\*±0,38 mm  
±.015 in.



Dim. Dwg. Fig. 1  
(Except Fig. 2  
for 91SX39-T  
and 93SX34-T)

# Basic Switches

## Subminiature

SX Series

**Characteristics:** O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position

### ORDER GUIDE

#### INTEGRAL LEVERS



Dim. Dwg. Fig. 3

Catalog Listing	Description	Electrical Data And UL Code Page 20	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
311SX1-T	.135 inch (3,43 mm) straight lever	5 Amps <b>A</b>	0,49 1.76	0,09 .32	1,65 .065	0,36 .014	0,51 .020	8,43±1,14 .332±.045
313SX1-T	As above with gold contacts	1 Amp <b>D</b>	0,49 1.76	0,09 .32	1,65 .065	0,36 .014	0,51 .020	8,43±1,14 .332±.045



Dim. Dwg. Fig. 3

311SX2-T	.505 inch (12,8 mm) straight lever	5 Amps <b>A</b>	0,31 1.1	0,05 .18	2,92 .115	0,64 .025	0,89 .035	8,26±1,91 .325±.075
313SX2-T	As above with gold contacts	1 Amp <b>D</b>	0,31 1.1	0,05 .18	2,92 .115	0,64 .025	0,89 .035	8,26±1,91 .325±.075



Dim. Dwg. Fig. 4

311SX3-T	.965 inch (24,5 mm) straight lever	5 Amps <b>A</b>	0,20 .71	0,03 .11	4,70 .185	0,61 .024	1,52 .060	7,75±2,92 .305±.115
313SX3-T	As above with gold contacts	1 Amp <b>D</b>	0,20 .71	0,03 .11	4,70 .185	0,61 .024	1,52 .060	7,75±2,92 .305±.115



Dim. Dwg. Fig. 5

311SX4-T	.042 inch (1,1 mm) simulated roller lever	5 Amps <b>A</b>	0,58 2.1	0,11 .39	1,27 .050	0,25 .010	0,38 .015	14,15±0,91 .557±.036
313SX4-T	As above with gold contacts	1 Amp <b>D</b>	0,58 2.1	0,11 .39	1,27 .050	0,25 .010	0,38 .015	14,15±0,91 .557±.036



Dim. Dwg. Fig. 6

311SX5-T	.459 inch (11,7 mm) simulated roller lever	5 Amps <b>A</b>	0,31 1.1	0,05 .18	2,67 .105	0,56 .022	0,89 .035	14,86±1,65 .585±.065
313SX5-T	As above, with gold contacts	1 Amp <b>D</b>	0,31 1.1	0,05 .18	2,67 .105	0,56 .022	0,89 .035	14,86±1,65 .585±.065

Miniature/  
Subminiature

# Basic Switches

## Subminiature

SX

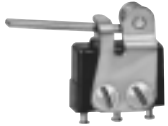
**Characteristics:** O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position; F.P. – Free Position.

\*All characteristics are taken with actuator assembled on Catalog Listing 1SX1-T as shown.

### ORDER GUIDE

#### AUXILIARY ACTUATORS

Switches are not included with actuators.



Dim. Dwg. Fig. 7



Dim. Dwg. Fig. 8



Dim. Dwg. Fig. 9



Dim. Dwg. Fig. 9



Dim. Dwg. Fig. 10

Catalog Listing	Description	Actuator Length "A" mm inches	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. mm inches	O.T. mm inches	D.T. max. mm inches	O.P.†† mm inches	F.P. mm inches
JX-20	Straight lever	18,3 .72	0,28 1 approx.	0,04 .14	—	0,76 .030 approx.	0,76 .030 approx.	10,8 .425 approx.	12,3 .485 approx.
JX-219	Straight lever (For higher temp.)	18,3 .72	0,28 1	0,04 .14	—	0,76 .030 approx.	0,76 .030 approx.	10,8 .425 approx.	12,3 .485 approx.

JX-25	Roller lever	16,5 .65	0,42 1.5	0,04 1.4	—	0,51 .020	0,76 .030	14,9=1,14 .585=.045	168 .660 max.
JX-220	Roller lever (For higher temp.)	16,5 .65	0,42 1.5	0,04 .14	—	0,51 .020	0,76 .030	14,9=1,14 .585=.045	16,8 .660 max.

JX-40	Straight leaf	9,4 .37†	1,95 7	0,56 2	.225 approx.	0,38 .015	0,64 .025	7,5 .295	12,3 .485 ref.
JX-95	Straight leaf (For higher temp.)	9,4 .37†	1,95 7	0,56 2	.225 approx.	0,38 .015	0,64 .025	7,5 .295	12,3 .485 ref.
JX-41**	Reverse leaf	9,4 .37†	1,67 6	0,28 1	.110 approx.	0,38 .015	0,64 .025	7,5 .295	9,4 .370 ref.

JX-45	Roller leaf	6,1 .24†	1,95 7	0,28 1	.225 approx.	0,38 .015	0,64 .025	12,2 .480	16,5 .650 ref.
JX-96	Roller leaf (For higher temp.)	6,1 .24†	1,95 7	0,28 1	.225 approx.	0,38 .015	0,64 .025	12,2 .480	16,5 .650 ref.
JX-51**	Reverse roller leaf	7,6 .30†	1,67 6	0,56 2	.110 approx.	0,38 .015	0,64 .025	12,8 .505	14,7 .580 ref.

JX-4	Tandem leaf	7,9 .31	4,17 15	0,83 3	.065 approx.	0,20 .008	0,76 .030	7,6 .300	9,40 .370 ref.
------	-------------	------------	------------	-----------	-----------------	--------------	--------------	-------------	----------------------

\*\*Switch is mounted with plunger end reversed from JX-40.  
†"A" measurement is from center of mounting hole nearest tip of lever to the point indicated on drawing.

NOTE: Above actuators should be used at temperatures below +300°F (149°C); except listings JX-95, JX-96, JX-219 and JX-220 are for use with the 4SX1-T to 400°F. (204°C).

Except where stated †† ±0,76 mm ±.030 in.

# Basic Switches

## Subminiature

SX Series

### MOUNTING DIMENSIONS (for reference only)

#### PIN PLUNGER

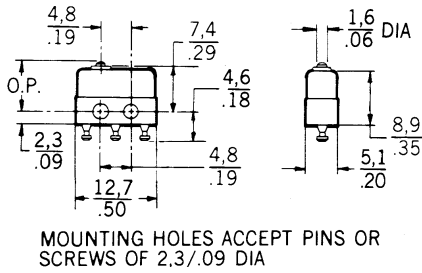


Fig. 1

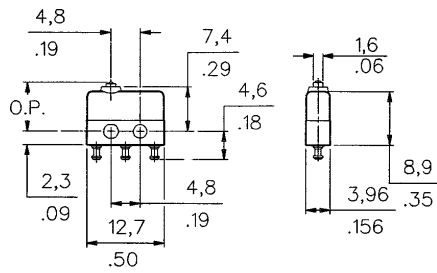


Fig. 2

#### INTEGRAL LEVERS

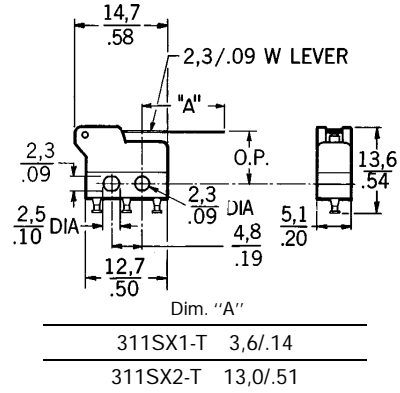


Fig. 3

#### INTEGRAL LEVERS

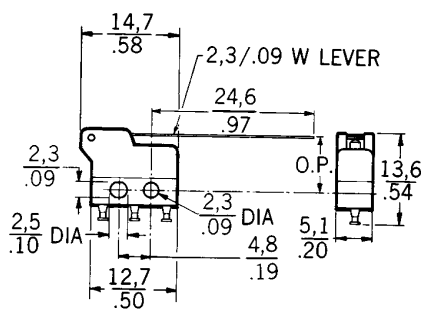


Fig. 4

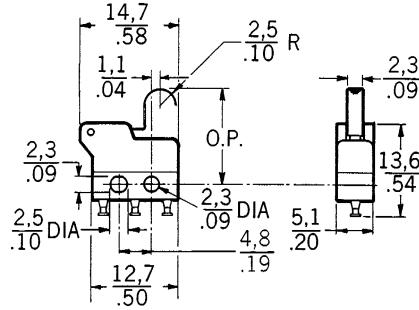


Fig. 5

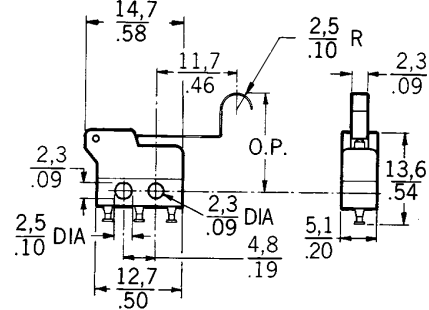


Fig. 6

Interchangeable with 1SX-1T switch with JX-25 actuator.

Miniature/  
Subminiature

#### AUXILIARY ACTUATORS

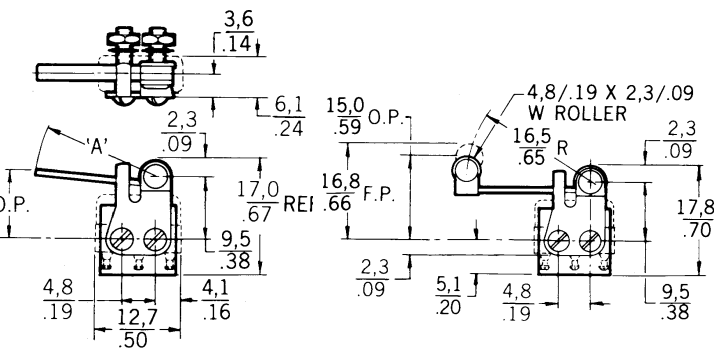


Fig. 7

Switches are not included with actuator.

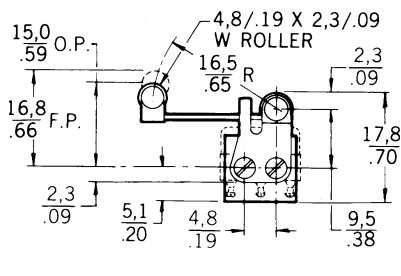


Fig. 8

Mounting holes accept pins or screws of .087 diameter (2,21 mm).

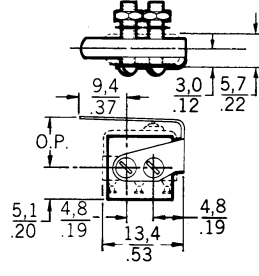


Fig. 9

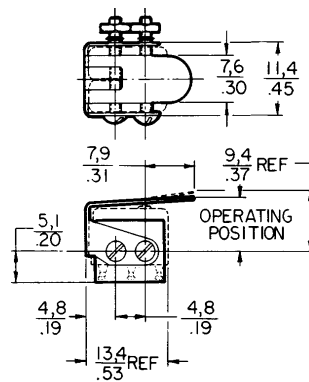


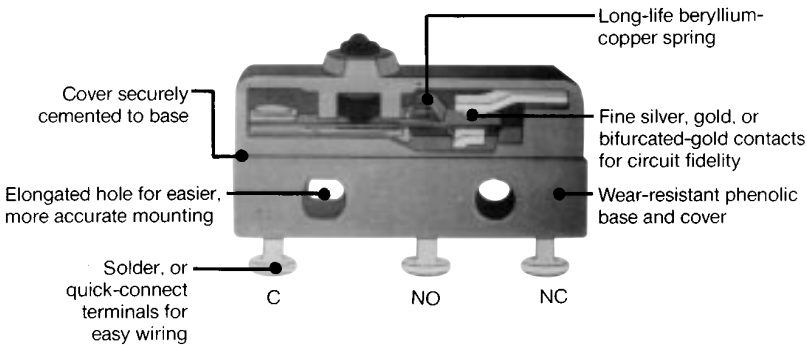
Fig. 10

Key: 0,0 = mm  
0.00 = inches

# Basic Switches

## Subminiature

### CUT-A-WAY SM SUBMINIATURE BASIC SWITCH



### AVAILABLE TERMINALS

Various terminals are available for most listings. These include: the T and T2 for wrap-around soldering of leadwires; solder terminals for solder connections; H58 terminals and H4 series terminals provide easy quick-connect installation; H2 type, round wire wrap or PC terminals; H6 rectangular wire wrap terminals are also available. Other quick-connect terminals of the Series H types are available. Contact the 800 number for ordering information.

### GENERAL INFORMATION

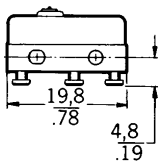
SM subminiature switches are slightly larger than the SX switches. These switches combine small size and light weight with ample electrical capacity, precision operation and long life. Unless otherwise noted, all listings have silver contacts.

### FEATURES

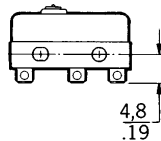
- Low operating force to 2 ounces maximum
- Sensitive differential travel as low as .001 inch (0,025 mm) maximum
- Power load switching capability available to 11 amps (VAC) – silver contacts
- Motor load handling capacity to 1/4 hp (VAC)
- Optional gold contacts for low energy applications
- Optional bifurcated gold contacts for maximum reliability
- Long mechanical life
  - 11SM Series 10,000,000 operations
  - 1SM/41SM Series 80,000 operations
  - Bifurcated contacts 1,000,000 operations
- All at 95% survival
- Standard temperature range –65° to +185°F (–54 to 85°C)
- High temperature construction available for use to +400°F (204°C) for 100 hours
- Variety of integral and auxiliary actuators
- Choice of several terminal styles
- Military Standard construction available with three listings on the MIL-S-8805 qualified products list
- UL recognized File #E12252, CSA certified File #LR41372

Mounting Torque:  
2.3 inch pounds max.

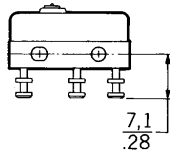
T



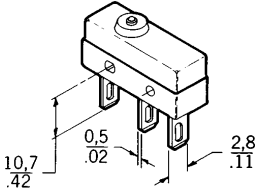
SOLDER



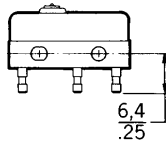
T2



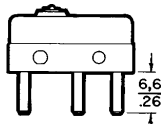
H4



H58



H2



Mates with Amp Inc. Part No. 640024-1 Std.

Dimensions shown are for reference only

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

This section covers only **38** of our most popular SM Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **500** other active SM listings will meet your needs. Contact the 800 number.



# Basic Switches

## Subminiature

# SM Series

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

### ORDER GUIDE by ascending electrical capability

#### PIN PLUNGERS



Dim. Dwg. Fig. 1

Catalog Listing	Recommended For	Electrical Data And UL Code Page 20	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
11SM1077-T	Gold alloy contacts	.1 Amp P	0,83-1,39 3-5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
12SM604-T	Bifurcated gold contacts, reduced rating	.1 Amp P	0,83-1,39 3-5	0,28 1	0,51 .020	0,076 .003	0,1 .004	8,38 .330
11SM23-T	Application requiring gold contacts	1 Amp N	0,83-1,39 3-5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
12SM4-T	Best reliability (Bifurcated gold contacts)	1 Amp N	0,83-1,39 3-5	0,28 1	0,51 .020	0,076 .003	0,1 .004	8,38 .330
11SM701-T	Lower force	4 Amps S	0,56 2	0,14 .5	0,51 .020	0,13 .005	0,051 .002	8,38 .330
11SM1-T	Most applications	5 Amps J	0,83-1,39 3-5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
11SM3-T	Operating in temperatures to +250°F (121°C)	5 Amps J	0,83-1,39 3-5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
11SM244-T	Operating in temperatures to +400°F (204°C) 100 hrs.	5 Amps *	0,83-1,39 3-5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
11SM401-T	Less differential travel	5 Amps K	0,97 3.5 max.	0,28 1	0,51 .020	0,13 .005	0,025 .001	8,38 .330
21SM284-T2 (MS25085-2)	MIL-S-8805 application requirements	5 Amps R	0,83-1,39 3-5	0,28 1	0,76 .030	0,13 .005	0,1 .004	8,38 .330
21SM284 (MS25085-1)	MIL-S-8805 application requirements, solder terminals	5 Amps R	0,83-1,39 3-5	0,28 1	0,76 .030	0,13 .005	0,1 .004	8,38 .330
22SM1-T	Best stability under varying humidity	5 Amps J	0,83-1,39 3-5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
41SM1-T	Up to 11 ampere 1/4 hp (AC) load handling	11 Amps M	0,83-1,39 3-5	0,28 1	0,76 .030	0,13 .005	0,1 .004	8,38 .330

\*For electrical data call 1-800-537-6945

411SM1	Sealed plunger construction	5 Amps K	0,83-2,09 3-7.5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330
411SM23	As above with gold contacts	1 Amp N	0,83-2,09 3-7.5	0,28 1	0,51 .020	0,13 .005	0,1 .004	8,38 .330

Except where stated \* ±0,38mm  
±.015 in.

Miniature/  
Subminiature

# Basic Switches

## Subminiature

## SM Series

**Characteristics:** O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

### ORDER GUIDE

#### INTEGRAL LEVERS



Dim. Dwg. Fig. 4

Catalog Listing	Description	Electrical Data And UL Code Page 20	O.F. max. newtons ounces	R.F. max. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
311SM1-T	.285 inch (7,24mm) straight lever	5 Amps J	0,39 1.4	0,07 .25	2,16 .085	0,51 .020	0,48 .019	8,64±1,5 .340±.060
311SM23-T	As above with gold contacts	1 Amp N	0,39 1.4	0,07 .25	2,16 .085	0,51 .020	0,48 .019	8,64±1,5 .340±.060
311SM701-T	.285 inch (7,24mm) straight lever. Lower force	4 Amps S	0,16 .57	0,03 .11	2,16 .085	0,51 .020	0,36 .014	8,64±1,5 .340±.060

311SM2-T	.565 inch (14,35mm) straight lever	5 Amps J	0,31 1.1	0,05 .18	3,05 .120	0,66 .026	0,69 .027	8,51±2 .335±.080
311SM43-T	As above with gold contacts	1 Amp N	0,31 1.1	0,05 .18	3,05 .120	0,66 .026	0,69 .027	8,51±2 .335±.080
311SM702-T	.565 inch (14,35mm) straight lever. Lower force	4 Amps S	0,11 .4	0,02 .07	3,05 .120	0,66 .026	0,38 .015	8,51±2 .335±.080

311SM3-T	1.765 inch (44,8mm) straight lever	5 Amps J	0,15 .53	0,02 .07	7,87 .310	1,45 .057	2,8 .110	7,11±4,3 .280±.170
311SM17-H58	As above with gold contacts	1 Amp N	0,15 .53	0,02 .07	7,87 .310	1,45 .057	2,8 .110	7,11±4,3 .280±.170
311SM703-T	1.765 inch (44,8mm) straight lever. Lower force	4 Amps S	0,06 .2	0,01 .04	7,87 .310	1,45 .057	1,78 .070	7,11±4,3 .280±.170

311SM4-T	.251 inch (6,38mm) simulated roller lever	5 Amps J	0,39 1.4	0,07 .25	2,16 .085	0,46 .018	0,48 .019	11,7±1,5 .460±.060
311SM25-T	As above with gold contacts	1 Amp N	0,39 1.4	0,07 .25	2,16 .085	0,46 .018	0,48 .019	11,7±1,5 .460±.060
311SM704-T	.251 inch (6,38mm) simulated roller lever. Lower force	4 Amps S	0,16 .57	0,03 .11	2,16 .085	0,46 .018	0,33 .013	11,7±1,5 .460±.060

311SM5-T	.535 inch (13,6mm) simulated roller lever	5 Amps J	0,31 1.1	0,05 .18	3,05 .120	0,66 .026	0,69 .027	11,56±2 .455±.080
311SM705-T	.535 inch (13,6mm) simulated roller lever. Lower force	4 Amps S	0,11 .4	0,02 .07	3,05 .120	0,66 .026	0,38 .015	11,56±2 .455±.080

311SM6-T	.251 inch (6,38mm) roller lever	5 Amps J	0,39 1.4	0,07 .25	2,16 .085	0,46 .018	0,48 .019	14,2±1,5 .560±.060
311SM68-T	As above with gold contacts	1 Amp N	0,39 1.4	0,07 .25	2,16 .085	0,46 .018	0,48 .019	14,2±1,5 .560±.060
311SM706-T	.251 inch (6,38mm) roller lever. Lower force	4 Amps S	0,16 .57	0,03 .11	2,16 .085	0,46 .018	0,33 .013	14,2±1,5 .560±.060

311SM7-T	.535 inch (13,6mm) roller lever	5 Amps J	0,31 1.1	0,05 .18	3,05 .120	0,66 .026	0,69 .027	14,1±2 .555±.080
----------	---------------------------------	----------	-------------	-------------	--------------	--------------	--------------	---------------------

Dim. Dwg. Fig. 10

# Basic Switches

## Subminiature

SM Series

### ORDER GUIDE

#### INTEGRAL LEAF



Dim. Dwg. Fig. 11

Catalog Listing	Recommended For	Electrical Data And UL Code Page 20	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
111SM1-T	Force and stability of flexible leaf actuator	5 Amps J	1,95 7	0,56 2	5,54 .218	0,76 .030	0,76 .030	8,89±0,76 .350±.030
111SM17-T	As above with gold contacts	1 Amp N	1,95 7	0,56 2	5,54 .218	0,76 .030	0,76 .030	8,89±0,76 .350±.030



Dim. Dwg. Fig. 12

111SM2-T	Flexible leaf with roller	5 Amps J	1,95 7	0,56 2	5,56 .219	0,76 .030	0,64 .025	14,3±0,76 .562±.030
111SM23-T	As above with gold contacts	1 Amp N	1,95 7	0,56 2	5,56 .219	0,76 .030	0,64 .025	14,3±0,76 .562±.030

Miniature/  
Subminiature

# Basic Switches

## Subminiature

SM Series

**Characteristics:** O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position; F.P. — Free Position

\* All characteristics are taken with actuator assembled to Catalog Listing 11SM3-T as shown.

### AUXILIARY ACTUATORS

Switches are not included with the actuators.



Dim. Dwg. Fig. 14

### ORDER GUIDE

Catalog Listing	Description	Actuator Length "A" mm inches	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches	F.P. max. mm inches
JS-2	Straight leaf	16,8 .66	2,78 10	0,56 2	1,98 .078	0,38 .015	0,38 .015	8,89±0,38 .350±.015	11,3 .445



Dim. Dwg. Fig. 14

JS-5	Roller leaf (Bronze roller)	15 .59	2,78 10	0,83 3	1,98 .078	0,38 .015	0,38 .015	14,2±0,38 .580±.015	16,9 .665
------	--------------------------------	-----------	------------	-----------	--------------	--------------	--------------	------------------------	--------------



Dim. Dwg. Fig. 14

JS-7	Formed leaf (Simulated roller)	14,7 .58	2,78 10	0,56 2	2,39 .094	0,79 .031	0,38 .015	9,65±0,38 .380±.015	12,1 .475
------	-----------------------------------	-------------	------------	-----------	--------------	--------------	--------------	------------------------	--------------



Dim. Dwg. Fig. 16

JS-220	Straight lever	26,2† 1.03	0,28 1	0,04 .14	3,18 .125 approx.	0,76 .030	0,76 .030	10,3 .406 approx.	—
--------	----------------	---------------	-----------	-------------	----------------------	--------------	--------------	----------------------	---



Dim. Dwg. Fig. 16

JS-246	Roller lever (Steel roller)	25,4† 1.00	0,28 1	0,04 .14	3,18 .125 approx.	0,76 .030	0,76 .030	14,3 .562 approx.	—
--------	--------------------------------	---------------	-----------	-------------	----------------------	--------------	--------------	----------------------	---



Dim. Dwg. Fig. 16

JS-221	Formed lever (Simulated roller)	25,4† 1.00	0,28 1	0,04 .14	3,18 .125 approx.	0,76 .030	0,76 .030	11,6 .455 approx.	—
--------	------------------------------------	---------------	-----------	-------------	----------------------	--------------	--------------	----------------------	---



JS-33**	Tandem leaf	5,3 .21	5,00 18	2,78 10	2,36 .093	0,15 .006	0,38 .015	8,89±0,38 .350±.015	10,5 .415
---------	-------------	------------	------------	------------	--------------	--------------	--------------	------------------------	--------------



JS-31**	Tandem roller leaf (Bronze roller)	4,3 .17	11,1 40	4,45 16	2,36 .093	0,13 .005	0,38 .015	14,5±0,38 .570±.015	16,1 .635
---------	---------------------------------------	------------	------------	------------	--------------	--------------	--------------	------------------------	--------------

\*\*Travel characteristics on tandem actuators vary with actual basic switch characteristics.

NOTE: Above actuators should be used below +300°F.

See page 79 for other actuators that may be used with SM Switches at higher temperatures.

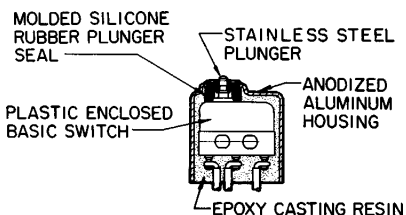
†"A" measurement is from the pivot point of lever to the point indicated on drawing.



# Position Sensors

# SE and XE Series

## Environment-Sealed Basic Switches



### GENERAL INFORMATION

SE and XE switches are the smallest environment-sealed switches offered by MICRO SWITCH. Both types enclose basic switches within a corrosion resistant aluminum housing to seal precision switch contacts from contamination. SE switches include a SM basic switch, and XE switches include the smaller SX basic switch.

Switches held depressed for extended periods of time at temperature extremes may experience retarded plunger return upon deactuation. Where such a condition exists in the application, contact the 800 number for special designs that are available.

### FEATURES

- Watertight seal per enclosure design symbol 3, MIL-S-8805
- Power load switching capability up to 7 amps
- Temperature tolerance up to +221°F (105°C)
- High temperature construction for use to +300°F (149°C)
- Several auxiliary actuators
- Choice of termination
- Military standard construction with listings qualified to MIL-S-8805
- All 4SE switches are UL recognized and CSA certified
- 4XE switches are UL recognized

### ELECTRICAL RATINGS

Circuitry	Electrical Rating Code	
Single-Pole Double-Throw	<b>A</b> 5 amps res., 3 amps ind., (sea level), 5 amps res., 2.5 amps ind., (50,000 feet) 28 vdc. 5 amps res., 5 amps ind., 125 or 250 vac, 60 Hz.	<b>D</b> UL Rating 7 amps, 250 vac 60 Hz
	<b>B</b> UL and CSA Rating 5 amps, 250 vac, 60 Hz	<b>E</b> 7 amps res., 4 amps ind., (sea level), 7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc.
	<b>C</b> 7 amps res., 4 amps ind., (sea level), 7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. 7 amps res., 4 amps ind., (sea level), 115 vac, 400 Hz	<b>R</b> 1 amp res., 0.50 amp ind., 28 vdc.

**Characteristics:** O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position

### SE SWITCHES ORDER GUIDE

	Catalog Listing	Recommended For	Electrical Rating Code	Characteristics					
				O.F. Newtons ounces	R.F. min. Newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
Fig. 1	1SE1	Most applications	A	1,39-4,73 5-17	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425
	1SE2	SPST — Normally-closed	A	1,39-4,73 5-17	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425
	1SE3	SPST — Normally-open	A	1,39-4,73 5-17	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425
	4SE1	UL and CSA listing and UL and CSA listed lead wire	B	1,39-4,73 5-17	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425
	5SE1	Oil resistant Fluorosilicone seal	A	1,39-4,73 5-17	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425
	7SE1	Lower force	A	1,11-2,22 4-8	0,56 2	1,27 .050	0,08 .003	0,1 .004	10,8 .425
Fig. 2	12SE4-T	High return force	A	1,39-5,28 5-19	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425
	1SE1-T	For customer leading	A	1,39-4,73 5-17	1,11 4	1,27 .050	0,08 .003	0,1 .004	10,8 .425

Position Sensors









# Position Sensors

## Environment-Sealed Basic Switches

SE Series

### AUXILIARY ACTUATORS FOR SE SWITCHES ORDER GUIDE (Switches are not included with actuators)

Characteristics: O.F. — Operating Force; R.F. — Release Force;  
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;  
O.P. — Operating Position

	Catalog Listing	Description	Actuator Length A mm inches	Characteristics measured with actuators mounted to a 1SE1						
				O.F. max. Newtons ounces	R.F. min. Newtons ounces	P.T. approx. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches	F.P. mm inches
 Fig. 3	JE-1	Straight leaf (mounting hardware included)	16,8 .66	3,34 12	0,56 2	3,81 .150	0,38 .015	0,64 .025	11,2 .440	15±0,76 .590±.030
 Fig. 4	JE-4	Roller leaf. Roller turned 90° to switch axis (mounting hardware included).	16,8 .66	3,34 12	0,56 2	3,81 .150	0,38 .015	0,64 .025	16,3 .640	20,1 .790 approx.
 Fig. 5	JE-5	Roller leaf (mounting hardware included)	14,2 .560	3,34 12	0,56 2	3,81 .150	0,38 .015	0,64 .025	16,3 .640	20,1±0,76 .790±.030
 Fig. 6	JE-17	Roller leaf. Reversed position (mounting hardware included)	14,2 .560	3,34 12	0,56 2	3,81 .150	0,38 .015	0,64 .025	16,3 .640	20,1±0,76 .790±.030
 Fig. 7	JE-21	Roller lever	13,7 .540	1,67 6	0,28 1	2,54 .100	0,25 .010	0,41 .016	16,3 .640	18,8±0,76 .740±.030
 Fig. 8	JE-22	Tandem Roller Lever	17,8 .700	4,73 17	1,11 4	2,54 .100	0,15 .006	0,3 .012	16,8±1,3 .660±.050	19,3±1,3 .760±.050



# Position Sensors

## Environment-Sealed Basic Switches

XE Series



### XE SWITCHES ORDER GUIDE

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; D.T. — Differential Travel; O.P. — Operating Position.

	Catalog Listing	Recommended For	Electrical Rating Code	Characteristics					
				O.F. max. Newtons ounces	R.F. max. Newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches ±.020 (0,51)
 <p>Fig. 9</p>	1XE1 (MS27994-1)	Most applications MIL-S-8805 requirements	C	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425
	1XE201 (MS27994-4)	General Use MIL-S-8805 requirements MIL-W-22759/11 wire	C	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425
	1XE3	SPST-Normally Open	C	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425
	1XE301 (MS27994-5)	Gold Contacts MIL-W-22759/11 wire	R	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425
	4XE1	UL listing and UL and CSA listed leadwire	D	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425
	5XE1	Oil resistant Fluorosilicone seal	C	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425
 <p>Fig. 10</p>	14XE1	Less operating force Use to +300°F (149°C)	E	2,50 9 max.	0,56 2	0,76 .030	0,1 .004	0,13 .005	10,9 .430
	14XE1-T	For customer leading Use to +300°F (149°C)	E	2,50 9 max.	0,56 2	0,76 .030	0,1 .004	0,13 .005	10,9 .430
	1XE1-T (MS27994-3)	For customer leading	C	1,39-4,73 5-17	1,11 4	1,27 .050	0,1 .004	0,13 .005	10,8 .425

### AUXILIARY ACTUATORS FOR XE SWITCHES ORDER GUIDE (Switches are not included with the actuators)

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position; F.P. — Free Position.

	Catalog Listing	Description	Characteristics measured with actuator mounted on a 1XE1						
			O.F. max. Newtons ounces	R.F. min. Newtons ounces	P.T. approx. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches	F.P. mm inches
 <p>Fig. 11</p>	JM-1	Straight leaf	5,84 21	0,83 3	3,18 .125	0,23 .009	0,3 .012	10,8±0,76 .425±.030	14±0,76 .550±.030
 <p>Fig. 12</p>	JM-5	Roller leaf	5,84 21	0,83 3	3,18 .125	0,23 .009	0,3 .012	15,9±0,89 .625±.035	19,1±0,89 .750±.035

Position Sensors

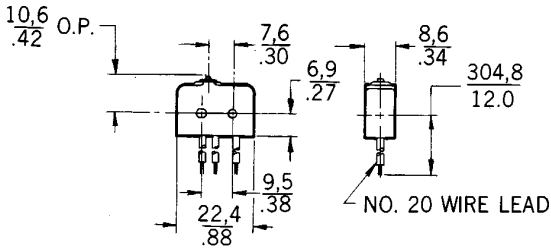
# Position Sensors

## Environment-Sealed Basic Switches

SE Series

### SE MOUNTING DIMENSIONS (For reference only)

SE switches



MOUNTING HOLES WILL ACCEPT PINS OR SCREWS OF 22,1/.087 MAX DIA

Fig. 1

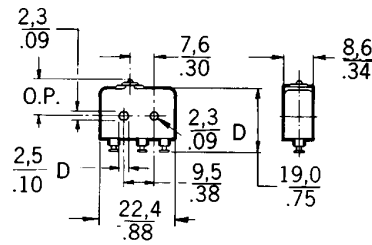


Fig. 2

SE auxiliary actuators

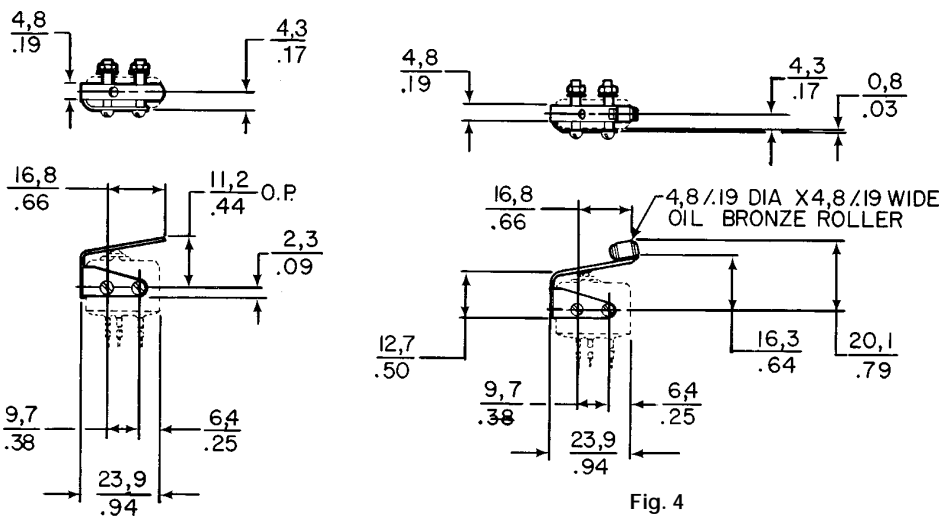


Fig. 3

Fig. 4

4,8 / .19 DIA X 4,8 / .19 WIDE OIL BRONZE ROLLER

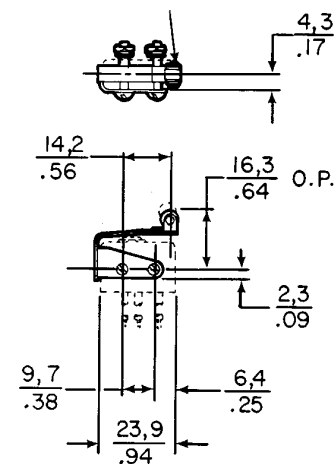


Fig. 5

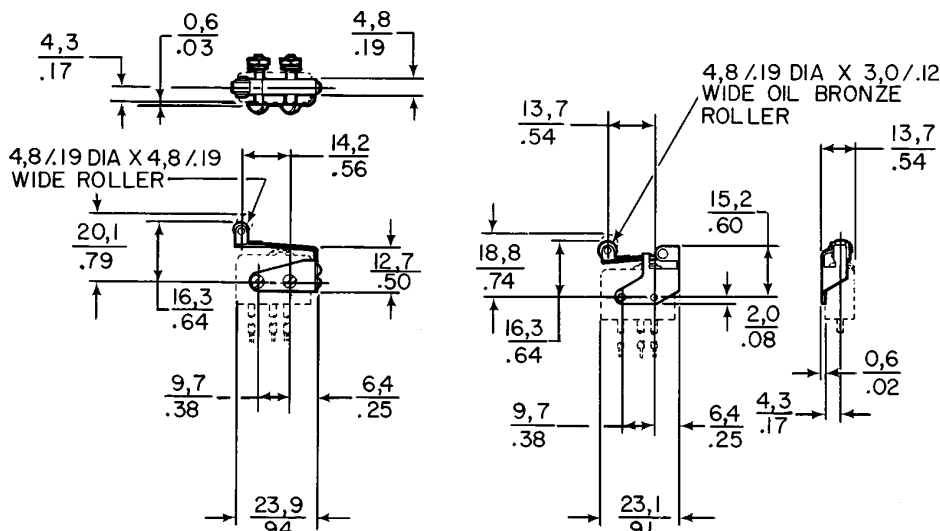


Fig. 6

Fig. 7

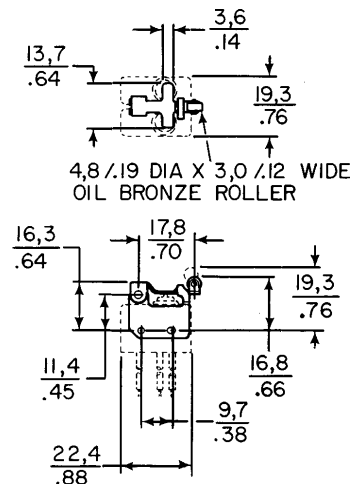


Fig. 8

Key: 0,0 = mm  
0.00 = inches

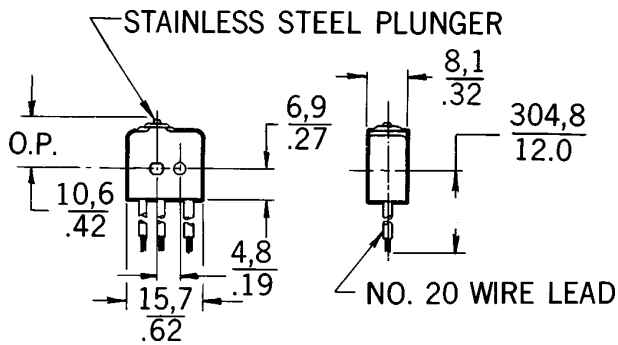
# Position Sensors

XE Series

## Environment-Sealed Basic Switches

XE MOUNTING DIMENSIONS (For reference only)

XE switches



MOUNTING HOLES WILL ACCEPT PINS OR OR SCREWS OF 22,1 / .087 MAX DIA

Fig. 9

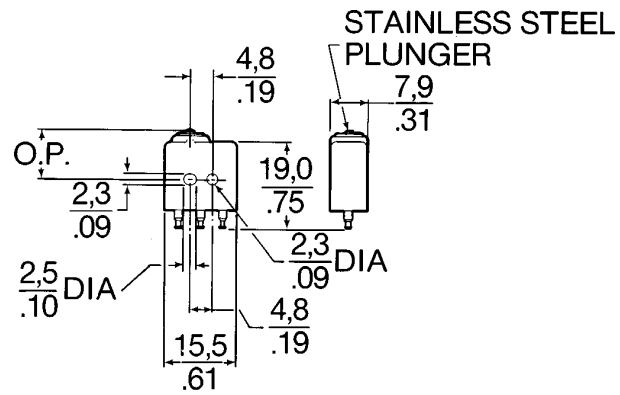


Fig. 10

XE auxiliary actuators

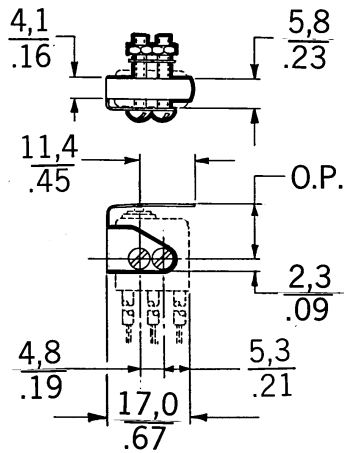


Fig. 11

Key: 0,0 = mm  
0.00 = inches

4,8/.19 D X 2,3/.09 W ROLLER

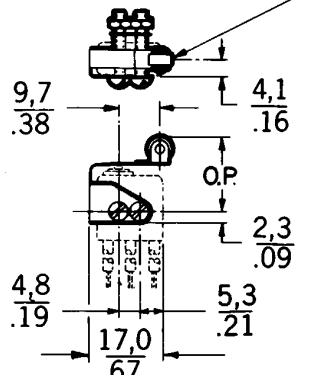


Fig. 12

Position Sensors

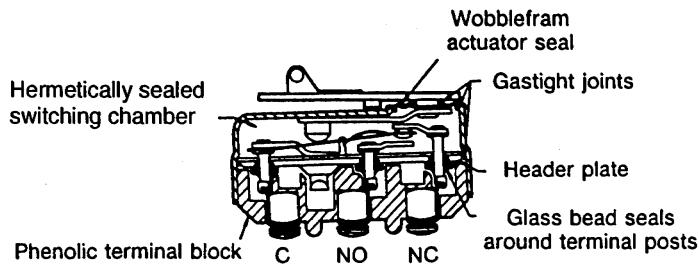
# Position Sensors

## Hermetically Sealed Switches



### GENERAL INFORMATION

HS switches are designed for applications where maximum electrical rating and maximum sealing are essential, and where size and weight requirements are less critical. These switches are side mounted through mounting holes that are outside the sealed switching chamber.



### FEATURES

- Hermetically sealed per MIL-S-8805, design symbol 5 (-67° to +180°F or -55° to 82°C)
- Power load switching capability up to 25 amperes, 28 VDC
- Temperature tolerance from -67°F to +250°F (-55°C to +125°C)
- High temperature construction for use to +300°F (149°C)
- Several styles of integral lever actuators
- Two styles of terminals
- Military standard construction with listings on the MIL-S-8805 qualified products list
- UL recognized File #E12252; CSA certified LR 4442

### ELECTRICAL RATINGS

Circuitry	Electrical Rating Codes
Single-Pole Double-Throw	<b>M</b> 25 amps res., 8 amps ind., 5 amps motor, 3 amps lamp load, 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz UL-CSA Rating: 1 amp., 115 vac, 60 Hz.
	<b>N</b> 15 amps res., 8 amps ind., 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz
	<b>O</b> 20 amps res., 8 amps ind., 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz UL-CSA Rating: 1 amp, 115 vac, 60 Hz
	<b>P</b> 10 amps res., 5 amps ind., 28 vdc; 1 amp res., 1 amp ind., 115 vac, 60 Hz UL-CSA Rating: 1 amp., 115 vac, 60 Hz.






# Position Sensors

## Hermetically Sealed Switches

HS Series

Characteristics: O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

### HS ORDER GUIDE

	Catalog Listing	Recommended For	Electrical Rating Code	Operating Characteristics					
				O.F. max. Newtons ounces	R.F. min. Newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
 Fig. 1	1HS1 (MS25011-1)	Most applications MIL-S-8805 (M8805/47)	M	2,78-6,12 10-22	1,11 4	1,65 .065	0,25 .010	0,51 .020	13,5 ± 0,38 .530 ± .015
	101HS1	Operating in temperatures to +250°F (121°C)	O	2,78-6,12 10-22	1,11 4	1,65 .065	0,25 .010	0,51 .020	13,5 ± 0,38 .530 ± .015
	102HS1	Operating in temperatures to +300°F (149°C)	P	2,78-8,34 10-30	1,11 4	1,65 .065	0,25 .010	0,51 .020	13,5 ± 0,38 .530 ± .015
 Fig. 2	4HS4-118	Lead wire termination	N	2,78-6,12 10-22	1,11 4	1,65 .065	0,25 .010	0,51 .020	15,6 .615 ± .020
 Fig. 3	1HS41	Applications requiring added overtravel	M	1,11-5,56 4-20	0,56 2	—	1,57 .062 max.	2,54 .100	13,54 .533 approx.
 Fig. 4	1HS6 (MS25011-4)	MIL-S-8805 requirements. More operating force	M	6,12-7,78 22-28	1,11 4	2,16 .085	0,25 .010	0,51 .020	13,5 ± 0,38 .530 ± .015
 Fig. 5	1HS3	Roller lever	M	2,78-6,12 10-22	1,11 4	1,65 .065	0,25 .010	0,51 .020	18,3 ± 0,38 .720 ± .015

HS MOUNTING DIMENSIONS (For reference only)  
 Mounting holes will accept pins or screws of .139" (3,53mm) diameter.

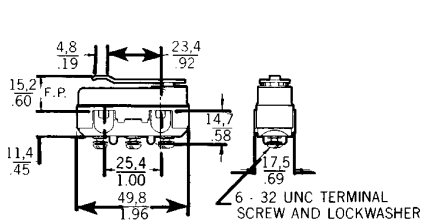


Fig. 1

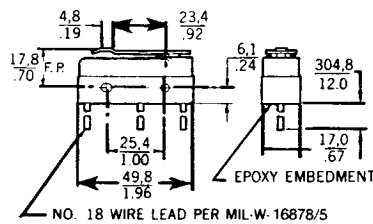


Fig. 2

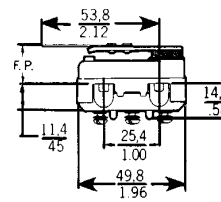


Fig. 3

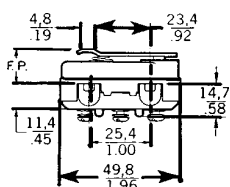


Fig. 4

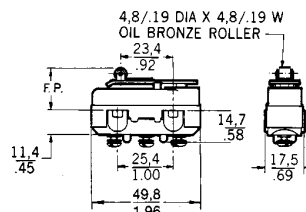


Fig. 5

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

Position Sensors

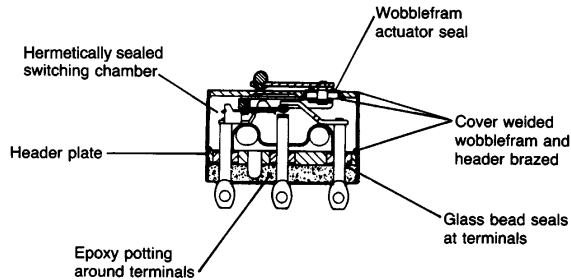
Position Sensors

Miniature Hermetically Sealed Switches



GENERAL INFORMATION

HM switches are not generally recommended for 115 VAC, 60 Hz. If you have a 60 Hz application in the milliamp range, contact our 800 number for special design variations that are available.



FEATURES

- Hermetically sealed per enclosure design symbol 5, MIL-S-8805
- Power load switching capability up to 4 amperes, 28 VDC and 2 Amps 115 VAC, 400 Hz
- Temperature tolerance from -85°F to +250°F (-65°C to +121°C)
- High temperature construction for use from -85°F to +500°F (-65°C to +260°C)
- Variety of auxiliary actuators
- Choice of terminal styles
- Gold contacts for special applications
- Military standard construction with listings on the MIL-S-8805 qualified products list.

ELECTRICAL RATINGS

Circuitry	Electrical Rating Code
Single-Pole Double-Throw	H 1 amp res., 0.25 amp ind., 28 VDC.
Single-Pole Double-Throw	I 2 amps res., 2 amps ind., 0.5 amps lamp load, 115 VAC, 400 Hz. 4 amps res., 2 amps ind., 1 amp lamp load, 28 VDC
Single-Pole Double-Throw	J 1/2 amp res., 1/4 amp ind. (sea level or 70,000 ft.), 28 VDC
Single-Pole Double-Throw	K 3 amps res., 1 amp ind. (sea level or 70,000 ft.), 28 VDC 1 amp res. or ind. (sea level), 115 VAC., 400 Hz.
Single-Pole Double-Throw	L 3 amp res., 1 amp ind., 28 VDC 1 amp res., 1 amp ind., 115 VAC, 400 Hz.

APPLICATION NOTES

1. Honeywell does *not* recommend the use of silver cadmium oxide switch contacts in non-arcing loads. Non-arcing loads are generally loads less than 12 volts and/or 0.5 amp. Catalog listings in the 5, 6, 15, and 16HM Series use silver cadmium oxide contacts. If you have specific questions, contact the MICRO SWITCH Application Center at 1-800-537-6945.
2. For applications involving non-arcing loads, catalog listings in the 9, 10, 19 and 20HM Series are recommended.
3. The 1, 2, 5, and 6HM Series are recommended for use only in 3 to 4 amp range applications.





# Position Sensors

## Miniature Hermetically Sealed Switches

HM Series

Characteristics: O.F. — Operating Force; R.F. — Release Force;  
 P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;  
 O.P. — Operating Position.

### HM ORDER GUIDE

	Catalog Listing	Recommended For	Electrical Rating Code	Operating Characteristics					
				O.F. max. Newtons ounces	R.F. min. Newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches ±.015 (0,38 mm)
 Fig. 1	11HM1 (MS27216-5)	Most applications. Exceeds MIL-S-8805 requirements for shock and vibration.	K	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330
	13HM1	Applications requiring gold contacts	H	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330
	9HM1 (MS27216-6)	Bifurcated gold contacts	J	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330
 Fig. 2	2HM19-1 (MS27216-2)	MIL-S-8805 application requirements 1 ft. (305mm) leads	I	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330
	2HM19-5 (MS27216-4)	5 foot (1524mm) long leads	I	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330
 Fig. 3	16HM1-1	High temperature to 500°F (260°C) flat spring	L	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330
 Fig. 4	15HM2	Operating in temperatures to +500°F (260°C) with weld tab termination.	L	1,95 7	0,28 1	0,76 .030	0,08 .003	0,15 .006	8,38 .330

### HM MOUNTING

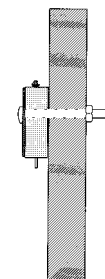
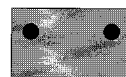
A force spreading plate is recommended to reduce the chance of product damage due to excessive mounting force.

### MOUNTING PLATE

19PA137-HM

### NOTICE

Torque on #2 mounting screws must be restricted to 1.5 inch pounds max. to prevent switch damage. The force spreading mounting plate used as shown will allow up to 2.5 inch pounds of mounting torque.






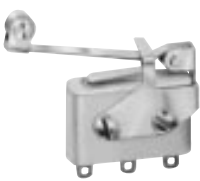
Position Sensors



Miniature Hermetically Sealed Switches

AUXILIARY ACTUATORS FOR HM SWITCHES ORDER GUIDE  
(Switches are not included)

Characteristics: O.F. — Operating Force; R.F. — Release Force;  
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;  
O.P. — Operating Position; F.P. — Free Position.

	Catalog Listing	Description	Temp. (Max.)	Operating Characteristics with Actuator Mounted on a 6HM1-1						
				O.F. max. Newtons ounces	R.F. min. Newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches	F.P. mm inches
 Fig. 5	JS-254	Leaf	500°F (260°C)	2,50 9	0,56 2	—	0,76 .030	0,76 .030	8,64 .340 approx.	12,2 .480 approx.
 Fig. 6	JS-151	Roller leaf	500°F (260°C)	2,50 9	0,56 2	—	0,76 .030	0,76 .030	14 .550 approx.	17,5 .690 approx.
 Fig. 7	JS-307	Straight lever	500°F (260°C)	0,42 1.5	0,03 .11	3,18 .125 approx.	0,64 .025	1,42 .056	10,3 .406 approx.	
 Fig. 8	JS-308	Roller lever	500°F (260°C)	0,42 1.5	0,03 .11	3,18 .125 approx.	0,64 .025	1,42 .056	14,3 .562 approx.	

**MOUNTING TORQUE:**  
JS-254 2.5 inch pounds  
all others 1.5 inch pounds  
See optional mounting plate – previous page.

All standard JS actuators in the SM Section of Catalog 10 can be used with the HM line. However, hardware, insulator, and oil impregnated roller supplied with these actuators may not provide the required service at temperatures above 250°F (121°C).

# Position Sensors

## Miniature Hermetically Sealed Switches

HM Series

HM MOUNTING DIMENSIONS (For reference only)  
Pin plunger switches

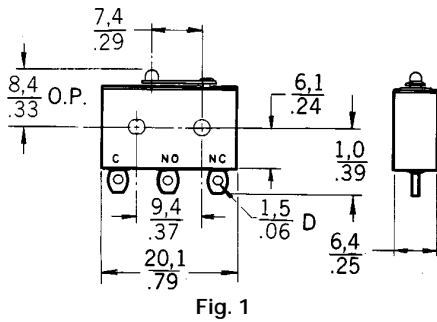


Fig. 1

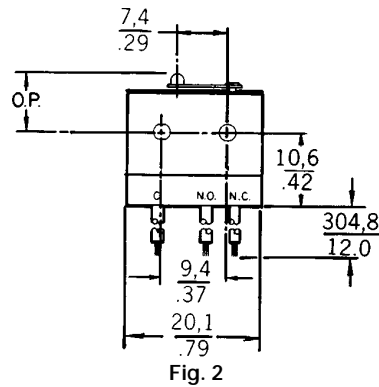


Fig. 2

MOUNTING HOLES WILL ACCEPT PINS OR  
SCREWS OF 1,9/.08 DIA

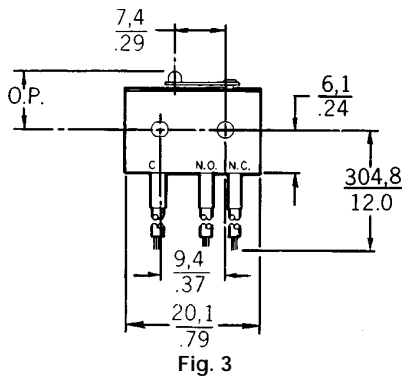


Fig. 3

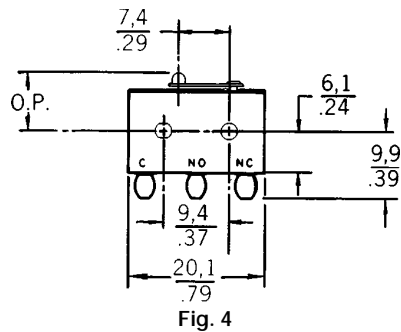


Fig. 4

### Auxiliary actuators

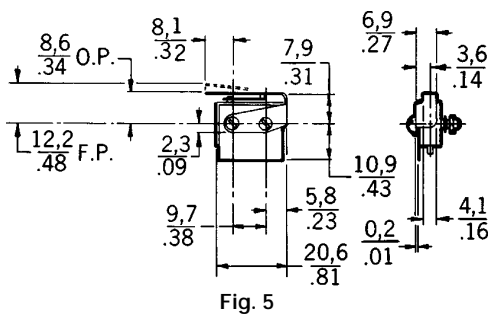


Fig. 5

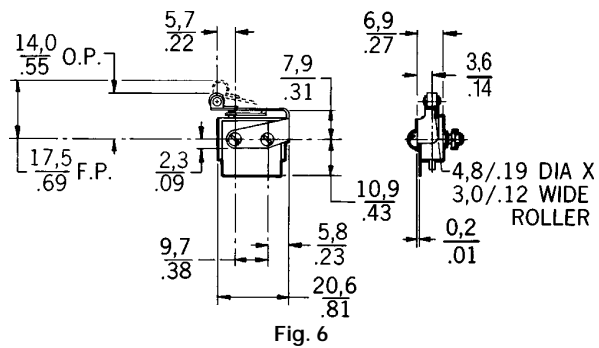


Fig. 6

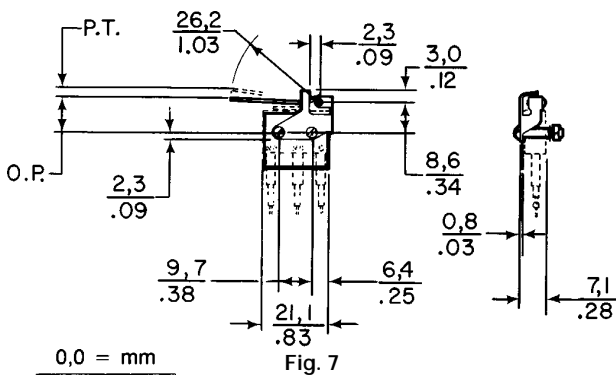


Fig. 7

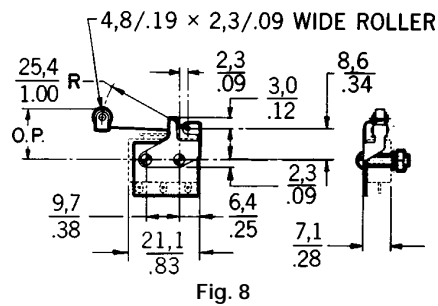


Fig. 8

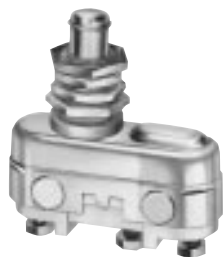
Key: 0,0 = mm  
0.00 = inches

Position Sensors

# Position Sensors

## High Temperature Basic Switches

HT Series




### GENERAL INFORMATION

HT switches will withstand temperatures up to +1000F. The switching element is mounted on a ceramic base within a stainless steel enclosure. HT switches are not classified as sealed switches.

### FEATURES




- Temperature tolerance up to +1000°F (538°C)
- Designed to meet military applications
- Side and panel mount
- UL recognized

### ELECTRICAL RATINGS

Circuitry	Electrical Rating
Single-Pole	UL Ratings: 3 amps, 1/10 HP, 125 vac. 3 amps, 1/6 HP, 250 vac.
Double-Throw 	

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; O.P. – Operating Position

### HT ORDER GUIDE

	Catalog Listing	Description	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	O.P. mm inches
 Fig. 1	1HT1	Straight plunger panel mount	2,78-5,56 10-20	1,67 6	1,65 .065	4,78 .188	23,7 .935 approx.
 Fig. 2	3HT1	Roller plunger panel mount	8,34 30 max.	1,67 6	1,65 .065	4,78 .188	35,9 1.413 approx.
 Fig. 3	2HT1	Pin plunger side mount	2,78-5,56 10-20	1,67 6	1,27 .050	0,25 .010	16,8 .66 approx.

### HT MOUNTING DIMENSIONS (For reference only)

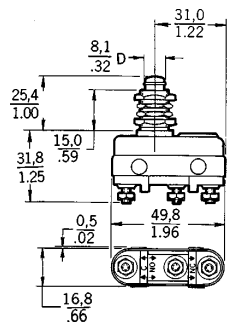


Fig. 1

Mounting holes will accept pins or screws of .139" (3,53 mm) dia.

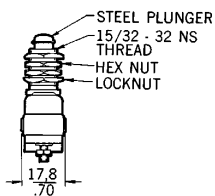


Fig. 2

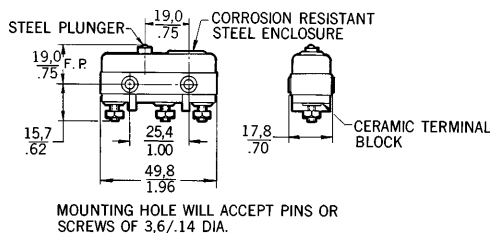
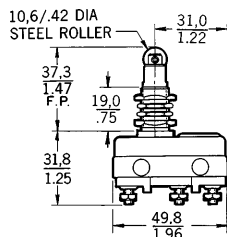


Fig. 3

MOUNTING HOLE WILL ACCEPT PINS OR SCREWS OF 3,6/.14 DIA.

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

# Basic Switches

## Magnetic Blow-out



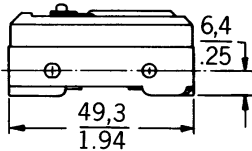
**FEATURES**

- Arc resistant case
- Mechanical life of 100,000 operations — 95% survival
- Temperature tolerance to +180°F (82°C)
- Mounting interchangeability with Z switches
- UL recognized

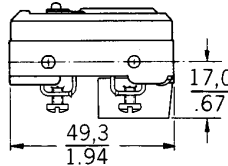
**GENERAL INFORMATION**

MT (single-pole double-throw) magnetic blow-out switches are designed to switch high capacity (125 and 250 VDC) systems. An integral magnet around the contact gap protects the contacts by deflecting the arc. Vents between the cover and housing allow the hot gas to escape. These switches are designed for the control of DC motors, solenoids, etc.

**AVAILABLE TERMINALS**



Solder (No listing designation)



**A28**  
6-32NC x .218" Screws  
will accept up to #12 wire.

**ELECTRICAL RATING**

Circuitry	Electrical Data and UL Codes
Single-pole double-throw unless otherwise noted in order guide 	<p><b>K</b> Rating established with switch non-polarized 10 amps, 125 vac or vdc; 1/4 hp, 125 vac or vdc. UL Code L 168</p> <p>Non-polarized: 10 amps res. or 1/4 hp, 125 vdc; 3 amps max. res. 250 vdc.</p> <p>Polarized*: 10 amps res. or 1/2 hp, 125 vdc; 3 amps max. res., 250 vdc.</p>

\*To polarize, connect negative side of line to common terminal. To achieve the same effect, mount switch with brass screws, using a non-magnetic barrier (at least 1/4" thick) between the switch and mounting surface.

**Characteristics:** O.F. – Operating Force;  
R.F. – Release Force; P.T. – Pretravel;  
O.T. – Overtravel; D.T. – Differential Travel;  
O.P. – Operating Position.

**ORDER GUIDE**

Catalog Listing	Recommended For	Electrical Data and UL Codes	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
<b>MT-4R-A28</b>	Pin plunger SPDT	10 Amps <b>K</b>	3,34-5,0 <b>12-18</b>	1,39 <b>5</b>	1,02 <b>.04</b>	0,13 <b>.005</b>	0,1-0,18 <b>.004-.007</b>	15,9±0,38 <b>.625±.015</b>



Dim. Dwg. Fig. 1

# Basic Switches

## Magnetic Blow-out

MT Series

### ORDER GUIDE



Dim. Dwg. Fig. 2

Catalog Listing	Description	Electrical Data and UL Codes	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
MT-4RV-A28	Straight lever	10 Amps K	0,56 2	0,14 0.5	12,7 0.5	1,19 .047	2,16 .085	19,1 .750



Dim. Dwg. Fig. 3

MT-4RV2-A28	1.90 inch (48,3mm) lever with hardened steel roller	10 Amps K	0,76 2.75	0,07 0.25	8,89 0.35	0,79 .031	1,65 .065	30,2 1.188
MT-4RV22-A28	1.03 inch (26,2mm) lever with hardened steel roller	10 Amps K	1,25 4.5	0,28 1	5,08 .200	0,38 .015	0,89 .035	31,3 1.234



Dim. Dwg. Fig. 4

MT-4RL-A28	1.95 inch (49,5mm) flexible leaf	10 Amps K	3,34 12	0,28 1	—	1,52 .060 max.	—	19,1 .750
------------	----------------------------------	--------------	------------	-----------	---	----------------------	---	--------------



Dim. Dwg. Fig. 5

MT-4RL2-A28	1.82 inch (46,2mm) flexible leaf with hardened steel roller	10 Amps K	3,34 12	0,28 1	—	1,52 .060 max.	—	30,2 1.188
-------------	-------------------------------------------------------------	--------------	------------	-----------	---	----------------------	---	---------------

Standard  
Basic Switches

Except where stated \* ±0,76 mm  
±.030 in.

# Basic Switches

## Magnetic Blow-out

MT Series

MOUNTING DIMENSIONS (For reference only)

**PIN PLUNGER**

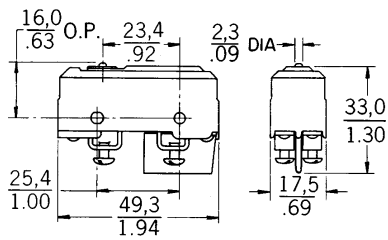


Fig. 1

**STRAIGHT LEVER**

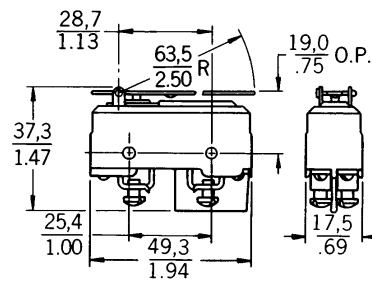


Fig. 2

**ROLLER LEVER**

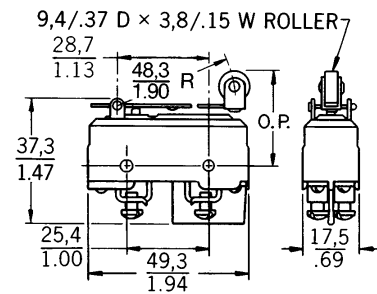


Fig. 3

**FLEXIBLE LEAF**

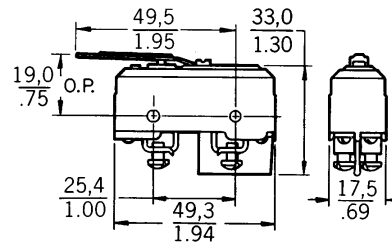


Fig. 4

**FLEXIBLE ROLLER LEAF**

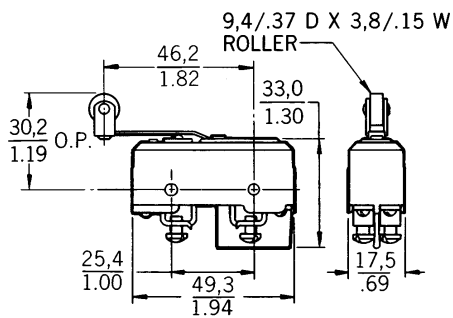


Fig. 5

Mounting holes accept pins or screws of .139" (3.53 mm) diameter.

Key:  $\frac{0,0}{0.00} = \text{mm}$   
 $\frac{0.00}{0.00} = \text{inches}$

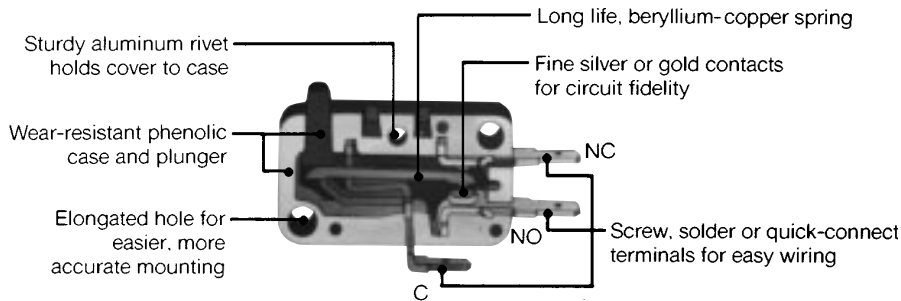
Courtesy of Steven Engineering, Inc. • 230 Ryan Way, South San Francisco, CA 94080-6370 • Main Office: (650) 588-9200 • Outside Local Area: (800) 258-9200 • www.stevenengineering.com

# Basic Switches

## Miniature

# V3 Series

### CUT-A-WAY V3 MINIATURE BASIC SWITCH



### GENERAL INFORMATION

V3 miniature basic switches feature high electrical capacity and long life. Their size and shape meet design requirements in all types of applications.

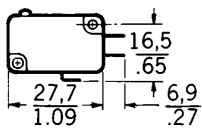
There is a choice of SPDT, SPNC, and SPNO circuitry. Many lever styles, contact materials, and terminal variations can be furnished. Contact the 800 number for ordering information.

### FEATURES

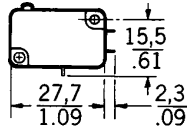
- Low operating force to .53 ounce maximum
- Sensitive differential travel as low as .006 inch maximum
- Power load switching capability up to 25 amperes—silver contacts
- Gold alloy crosspoint, silver cadmium, and other contact material for special applications
- Long mechanical life of 10,000,000 cycles—95% survival for V3-100, V3-1100, V3-2100, V3-3000 Series
- Temperature tolerance up to +180°F (82°C) on standard construction
- High temperature construction for use up to +600°F (316°C)
- 3,1 mm mounting holes available
- UL recognized File #E12252, CSA certified File #LR41370

### AVAILABLE TERMINALS

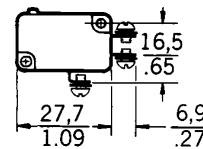
SOLDER



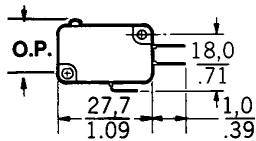
SHORT SOLDER



SCREW



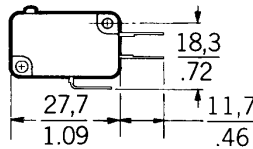
D8



.188 wide x .020 thick terminals

QUICK CONNECT

D9



.250 wide x .032 thick terminals

Dimensions shown are for reference only

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

Mounting torque:  
2 inch pounds min.  
5 inch pounds max.

This section covers only 60 of our most popular V3 Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately 850 other active V3 listings will meet your needs. Contact the 800 number.

# Basic Switches

## Miniature

# V3 Series

**Characteristics:** O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

### PIN PLUNGERS

#### ORDER GUIDE by ascending electrical capability



Dim. Dwg. Fig. 1

Catalog Listing	Recommended For	Electrical Data And UL Code Page 20	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.** mm inches
V3-343-D8	General use. Gold alloy crosspoint contacts.	1 Amp X	2,22 8 max.	0,56 2	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-2451-D8	Lowest force.	3 Amps VV	0,15 .53	—	1,2 .047	1,27 .050	0,051-0,25 .002-.010	14,7 .578
V3-2401-D8	Lower force.	5 Amps YY	0,24 .9	—	1,2 .047	1,27 .050	0,051-0,25 .002-.010	14,7 .578
V3-70101-D8	Most 5 amp applications.	5 Amps ZZ	2,22 8	0,56 2	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-1101-D8	General use.	10 Amps TT	0,72 max. 2.6	0,10 .35	1,2 .047	1,27 .050	0,051-0,25 .002-.010	14,7 .578
V3-2101-D8	Low force.	10 Amps V	0,50 max. 1.8	0,05 .18	1,2 .047	1,27 .050	0,051-0,25 .002-.010	14,7 .578
V3-101-D8	Higher force. Most applications.	11 Amps T	2,22 8 max.	0,56 2	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-1-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	1,67-3,89 6-14	1,11 4	1,21 .047	1,0 .040	0,15-0,4 .006-.016	14,7 .578
V3-3001-D8	High force. Up to 15.1 amps load handling.	15,1 Amps U	1,47 max. 5.3	0,15 .53	1,2 .047	1,27 .050	0,051-0,25 .002-.010	14,7 .578
V3-2800-D9	Up to 20 amps load handling	20 Amps AA	0,63 - 1,22 2.3 - 4.4	0,20 0.7	1,2 .047	1,27 .050	0,25 .010 max.	14,7 .578
V3-2900-D9	Up to 25 amps load handling	25 Amps BB	1,22 - 2,20 4.4 - 7.9	0,31 1.1	1,2 .047	1,27 .050	0,25 .010 max	14,7 .578

Miniature/  
Subminiature



Dim. Dwg. Fig. 2

V3-1001 (MS25253-1)	MIL-S-8805 application requirements (SPDT)	10 Amps UU	1,67-3,89 6-14	1,11 4	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-1002 (MS25253-3)	MIL-S-8805 application requirements (SPNC)	10 Amps UU	1,67-3,89 6-14	1,11 4	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-1003 (MS25253-2)	MIL-S-8805 application requirements (SPNO)	10 Amps UU	1,67-3,89 6-14	1,11 4	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-129*	Operating in temperature to +302°F (150°C)	11 Amps T	2,22 8 max.	0,56 2	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578
V3-245*	Operating in temperature to +400°F (204°C)	10 Amps W	2,78-6,95 10-25	1,67 6	1,2 .047	1,02 .040	0,15-0,41 .006-.016	14,7 .578

\*For actuators, contact MICRO SWITCH Sales Office.

\*\*Tolerances ±0.38  
±0.15

#### ORDER GUIDE

### SIMULATED ROLLER



Dim. Dwg. Fig. 3

Catalog Listing	Recommended For	Electrical Data And UL Code Page 20	Length of Lever "A" mm inches	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
V3L-1123-D8	General use.	10 Amps TT	32,6 1.285	0,39 1.4	0,05 .18	2,54 .100	2,03 .080	0,76 .030	18,5 .730
V3L-2105-D8	Low force.	10 Amps V	32,6 1.285	0,33 1.2	0,02 .07	2,54 .100	2,03 .080	0,76 .030	18,5 .730
V3L-121-D8	High force. Most applications.	11 Amps T	32,6 1.285	1,11 4	0,14 .5	3,18 .125	1,57 .062	0,81 .032	18,5 .730
V3L-5-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	32,6 1.285	2,22 8	0,28 1	3,18 .125	1,57 .062	0,81 .032	18,5 .730
V3L-3014-D8	High force. Up to 15.1 amps load handling.	15.1 Amps U	32,6 1.285	0,94 3.4	0,07 .25	2,54 .100	1,90 .075	0,76 .030	18,5 .730

\*±1.5 mm  
±.060 in.



**Characteristics:** O.F. – Operating Force; R.F. – Release Force; P.T. – Pre-travel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

### ORDER GUIDE

#### STRAIGHT LEVERS



Dim. Dwg. Fig. 4

Catalog Listing	Recommended For	Electrical Data And UL Code Page 20	Length of Lever "A" mm inches	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
V3L-1105-D8	General use.	10 Amps TT	21,3 .860	0,72 2.6	0,10 .35	1,5 .060	1,14 .045	0,33 .013	15,2±0,51 .600±.020
V3L-2101-D8	Low force. Added overtravel.	10 Amps V	21,3 .860	0,50 1.8	0,50 .18	1,5 .060	1,14 .045	0,33 .013	15,2±0,51 .600±.020
V3L-101-D8	Higher force. Most applications.	11 Amps T	21,3 .860	2,50 9	0,56 2	1,5 .060	1,02 .040	0,41 .016	15,2±0,51 .600±.020
V3L-1-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	21,3 .860	3,89 14	0,83 3	1,5 .060	1,02 .040	0,41 .016	15,2±0,51 .600±.020
V3L-3001-D8	High force. Up to 15.1 amps load handling.	15.1 Amps U	21,3 .860	1,47 5.3	0,15 .53	1,5 .060	1,02 .040	0,28 .011	15,2±0,51 .600±.020



Dim. Dwg. Fig. 4

V3L-1108-D8	General use.	10 Amps TT	35,6 1.40	0,39 1.4	0,04 .14	2,79 .110	2,29 .090	0,76 .030	15,2±1,5 .600±.060
V3L-2102-D8	Low force.	10 Amps V	35,6 1.40	0,31 1.1	0,02 .07	2,79 .110	2,29 .090	0,76 .030	15,2±1,5 .600±.060
V3L-104-D8	Higher force. Most applications.	11 Amps T	35,6 1.40	1,11 4	0,14 .5	3,18 .125	2,29 .090	1,27 .050	15,2±1,5 .600±.060
V3L-2-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	35,6 1.40	2,22 8	0,28 1	3,18 .125	2,29 .090	1,27 .050	15,2±1,5 .600±.060
V3L-3005-D8	High force. Up to 15.1 amps load handling.	15.1 Amps U	35,6 1.40	.86 3.1	0,06 .21	3,05 .120	2,29 .090	0,81 .032	15,2±1,5 .600±.060



Dim. Dwg. Fig. 4

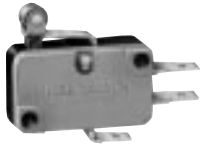
V3L-2425-D8	Lower force.	5 Amps YY	59,4 2.34	0,07 .25	—	5,08 .200	4,06 .160	1,4 .055	15,2±2 .600±.080
V3L-1122-D8	General use.	10 Amps TT	59,4 2.34	0,22 .81	0,02 .07	5,08 .200	4,06 .160	1,4 .055	15,2±1,8 .600±.070
V3L-2106-D8	Low force.	10 Amps V	59,4 2.34	0,16 .56	0,01 .04	5,08 .200	4,06 .160	1,4 .055	15,2±1,8 .600±.070
V3L-131-D8	Higher force. Most applications.	11 Amps T	59,4 2.34	0,58 2.1	0,12 .42	6,6 .260	3,81 .150	2,29 .090	14,7±2 .580±.080
V3L-6-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	59,4 2.34	1,11 4	0,14 .50	6,95 2.60	3,81 .150	2,29 .090	14,35±1,5 .565±.060
V3L-3013-D8	High force. Up to 15.1 amps load handling.	15.1 Amps U	59,4 2.34	0,39 1.4	0,03 .11	5,33 .210	4,06 .160	1,52 .060	15,2±1,9 .600±.075



Dim. Dwg. Fig. 4

V3L-2472-D8	Lowest force.	3 Amps VV	69,45 2.75	0,03 .11	—	5,97 .235	5,08 .200	1,60 .063	15,2±2,54 .600±.100
V3L-1124-D8	General use.	10 Amps TT	69,45 2.75	0,19 .70	0,01 .04	7,74 .305	3,68 .145	1,65 .065	15,31±2,54 .603±.100
V3L-145-D8	Most applications.	11 Amps T	69,45 2.75	0,54 1.93	0,10 .36	0,76 .300	4,57 .180	2,54 .100	14,48±2,03 .570±.080
V3L-14-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	69,45 2.75	0,83 3	0,14 .50	8,38 .330	4,32 .170	2,54 .100	13,72±2,03 .540±.080

### ROLLER LEVERS



Dim. Dwg. Fig. 7

### ORDER GUIDE

Catalog Listing	Recommended For	Electrical Data And UL Codes Page 20	Length of Lever "A" mm inches	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
V3L-1117-D8	General use.	10 Amps TT	20,6 .81	0,89 3.2	0,10 .35	1,2 .047	1,14 .045	0,33 .013	20,6±0,76 .810±.030
V3L-2103-D8	Low force.	10 Amps V	20,6 .81	0,58 2.1	0,03 .11	1,42 .056	0,86 .034	0,33 .013	20,6±0,76 .810±.030
V3L-139-D8	Higher force. Most applications.	11 Amps T	20,6 .81	2,22 8	0,56 2	1,5 .060	1,02 .040	0,41 .016	20,6±0,76 .810±.030
V3L-3-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	20,6 .81	3,89 14	0,83 3	1,52 .060	1,02 .040	0,41 .016	20,6±0,76 .810±.030
V3L-3003-D8	High force. Up to 15.1 amps load handling.	15.1 Amps U	20,6 .81	1,89 6.8	0,15 .53	1,2 .047	1,02 .040	0,05 - 0,25 .002 - .010	20,6±0,76 .810±.030

V3L-1101-D8	General use.	10 Amps TT	34 1.34	0,44 1.6	0,04 .14	3,18 .125	2,16 .085	0,76 .030	20,6±1,5 .810±.060
V3L-2104-D8	Low force.	10 Amps V	34 1.34	0,31 1.1	0,02 .07	3,18 .125	2,16 .085	0,76 .030	20,6±1,5 .810±.060
V3L-111-D8	Higher force. Most applications.	11 Amps T	34 1.34	1,11 4	0,14 .5	3,18 .125	2,16 .085	1,27 .050	20,6±1,5 .810±.060
V3L-4-D8	Highest force. Up to 15.1 amps load handling with reduced life.	15.1 Amps U	34 1.34	2,22 8	0,28 1	3,18 .125	2,16 .085	1,27 .050	20,6±1,5 .810±.060
V3L-3004-D8	Higher force. Up to 15.1 amps load handling.	15.1 Amps U	34 1.34	0,89 3.2	0,14 .5	3,18 .125	2,16 .085	0,76 .030	20,6±1,5 .810±.060

Miniature/  
Subminiature

**Characteristics:** O.F. — Operating Force; O.T. — Overtravel; D.T. — Differential Travel; R.F. — Release Force; P.T. — Pretravel; O.P. — Operating Position; F.P. — Free Position.

\* Characteristics taken with actuator assembled on Catalog Listing V3-1 switch as shown.

### AUXILIARY ACTUATORS



Dim. Dwg. Fig. 11

### ORDER GUIDE - SWITCHES ARE NOT INCLUDED WITH ACTUATORS

Catalog Listing	Description	Actuator Length "A" mm inches	O.F. max newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches	F.P. max. mm inches
JV-1	Leaf type	21,3 .84	3,34 12	1,11 4	1,19 .047	0,79 .031	0,41 .016	15±0,38 .590±.015	16,4 .645



Dim. Dwg. Fig. 11

JV-7	Long leaf	32,3 1.27	2,50 9	1,11 4	1,57 .062	1,27 .050	0,64 .025	14,5±0,76 .570±.030	17,4 .685
------	-----------	--------------	-----------	-----------	--------------	--------------	--------------	------------------------	--------------



Dim. Dwg. Fig. 11

JV-5	Roller leaf	20,6 .81	3,34 12	1,11 4	1,52 .060	0,79 .031	0,41 .016	20,3±0,64 .800±.025	22,1 .870
------	-------------	-------------	------------	-----------	--------------	--------------	--------------	------------------------	--------------

NOTE: Contact a MICRO SWITCH Sales Office for application assistance when actuators will be used at temperatures above 300°F (149°C).

# Basic Switches Miniature

## V3 Series

**Characteristics:** O.F. — Operating Force;  
R.F. — Release Force; P.T. — Pretravel;  
O.T. — Overtravel; D.T. — Differential Travel;  
O.P. — Operating Positon; F.P. — Free Position  
\* Characteristics taken with actuator assembled on Catalog Listing V3-100 switch as shown.

### AUXILIARY ACTUATORS

Switches are not included with actuators

#### ORDER GUIDE - SWITCHES ARE NOT INCLUDED WITH ACTUATORS

Catalog Listing	Description	Actuator Length "A" mm inches	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches	F.P. max. mm inches
<b>JV-26</b>	Long lever	44,5† 1.75	0,39 1.4	0,06 .21	8,33 .328	3,58 .141	4,75 .187	12,7±3,18 .500±.125	—



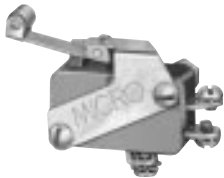
Dim. Dwg. Fig. 14

<b>JV-20</b>	Roller lever	19,1† .750	0,83 3	0,14 .5	4,78 .188	1,57 .062	1,98 .078	19,5±1,4 .766±.055	23,8 .936
--------------	--------------	---------------	-----------	------------	--------------	--------------	--------------	-----------------------	--------------



Dim. Dwg. Fig. 14

<b>JV-220</b>	Roller lever	17,7† .695	0,83 3	0,14 .5	4,78 .188	1,57 .062	1,98 .078	19,5±1,1 .766±.045	23,8 .936
---------------	--------------	---------------	-----------	------------	--------------	--------------	--------------	-----------------------	--------------



Dim. Dwg. Fig. 14

<b>JV-30</b>	One-way roller lever	20,6 .81	3,34 12	1,11 4	2,03 .080	0,51 .020	0,38 .015	25,7±0,76 1.010±.030	27,7 1.09
--------------	----------------------	-------------	------------	-----------	--------------	--------------	--------------	-------------------------	--------------



Dim. Dwg. Fig. 11

<b>JV-91**</b>	Tandem leaf	20,6 .81	5,00 18	1,67 6	1,57 .062	0,89 .035	—	14,9±0,76 .588±.030	16,5 .650
----------------	-------------	-------------	------------	-----------	--------------	--------------	---	------------------------	--------------



Dim. Dwg. Fig. 17

<b>JV-82**</b>	Tandem roller leaf	20,6 .81	5,00 18	1,67 6	1,57 .062	0,89 .035	—	20,5±0,76 .806±.030	21,8 .860
----------------	--------------------	-------------	------------	-----------	--------------	--------------	---	------------------------	--------------



Dim. Dwg. Fig. 17

NOTE: Contact the 800 number for application assistance when actuators will be used at temperatures above 300°F (149°C).  
\*\* Travel characteristics on tandem actuators vary with actual basic switch characteristics. These shown are typical for the assembly.  
† "A" measurement is from the pivot point of lever to the point indicated on drawing.

# Basic Switches

## Miniature

MOUNTING DIMENSIONS (for reference only)

### PIN PLUNGERS

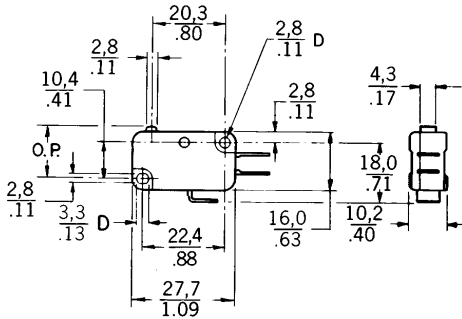


Fig. 1

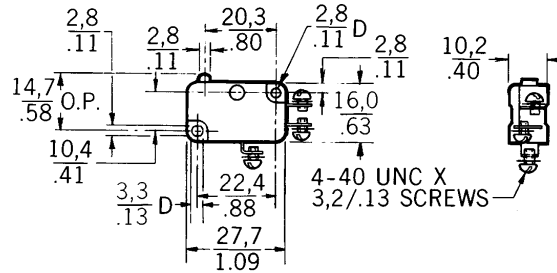


Fig. 2

### SIMULATED ROLLER

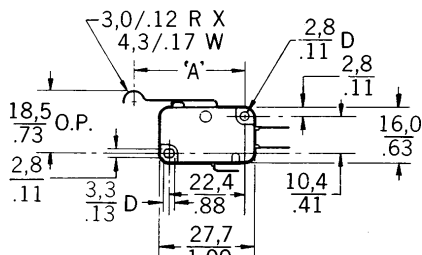


Fig. 3

### STRAIGHT LEVER

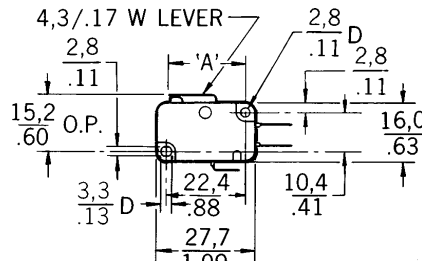


Fig. 4

### ROLLER LEVER

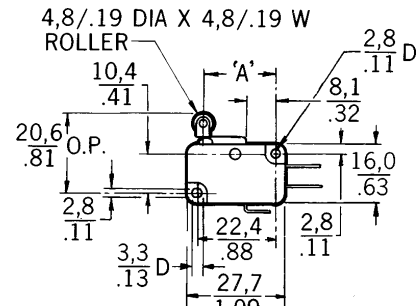


Fig. 7

Miniature/  
Subminiature

### AUXILIARY ACTUATORS

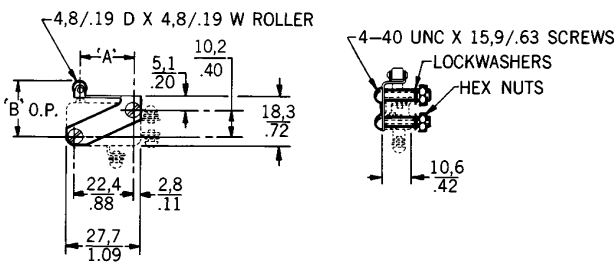


Fig. 11

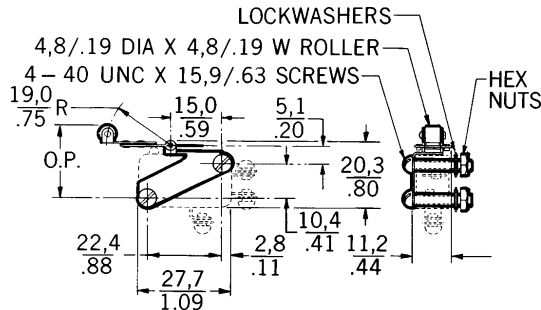


Fig. 14

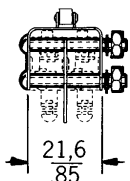


Fig. 17

NOTE: Operate point dimensions taken at top of lever/roller.

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

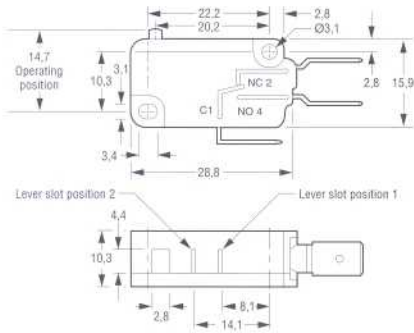
## V5 Series Miniature Basic Switches

V5 Series Basic Switches are used for simple or precision on/off, end of limit, presence/absence, pressure, temperature and manual operator interface application needs.

<b>Voltage:</b>	250 Vac
<b>Operating temperature:</b>	
Standard	-55 °C to 85 °C -67 °F to 185 °F
High temperature	-55 °C to 150 °C -67 °F to 302 °F
<b>Termination:</b>	6,3 mm x 0,8 mm Quick connect (QC)
<b>Contact type:</b>	Silver/silver cadmium oxide
<b>Electrical rating:</b>	V5A 20 A V5B/P/R 16 A V5C/D 10 A V5S 22 A
<b>Switching options:</b>	SPDT Single Pole Double Throw

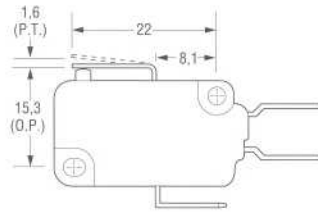
### OPTIONS

#### Top pin plunger



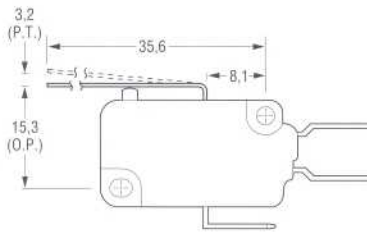
<b>APPROVALS</b>		<b>REFERENCE</b>
CE, ENEC		V5A010CB
CE, CSA, ENEC, UL		V5B010CB3
CE, CSA, UL	4,8 mm x 0,5 mm QC	V5B010FB3
CE, ENEC	Solder terminals	V5B010TB
CE, ENEC	High temperature	V5B210CB
CE, ENEC		V5C010BB
CE, CSA, ENEC, UL	4,8 mm x 0,5 mm QC	V5C010EB3
CE, CSA, ENEC, UL	Solder terminals	V5C010TB3
CE, ENEC		V5P010CB
<b>APPROVALS</b>	<b>SWITCHING OPTIONS</b>	<b>REFERENCE</b>
CE, ENEC	SPNO	V5D030BB
CE, ENEC	SPNO	V5R030CB
CE, BEAB	SPNC	V5S020CB
CE, BEAB	SPNO	V5S030CB

### Straight lever Type B



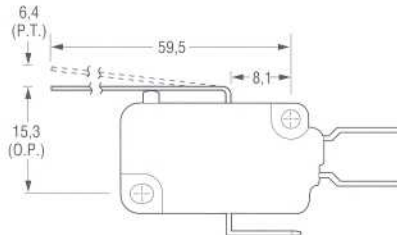
<b>APPROVALS</b>	<b>REFERENCE</b>
CE, CSA, ENEC, UL	V5C010BB3B

### Type C



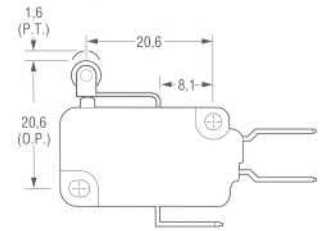
<b>APPROVALS</b>	<b>REFERENCE</b>
CE, ENEC	High temperature V5B210CB1C

### Type G



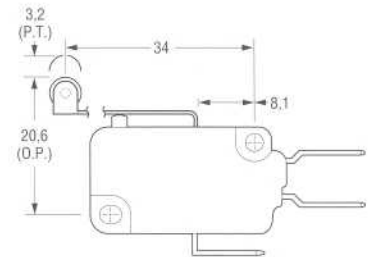
<b>APPROVALS</b>	<b>REFERENCE</b>
CE, ENEC	V5C010BB1G

### Roller lever Type D



<b>APPROVALS</b>	<b>REFERENCE</b>
CE, CSA, ENEC, UL	High temperature V5B210CB3D
CE, CSA, ENEC, UL	V5C010BB3D

### Type E



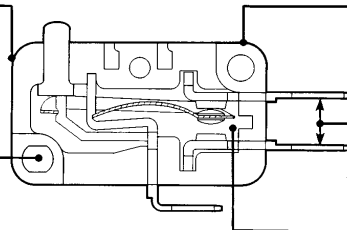
<b>APPROVALS</b>	<b>REFERENCE</b>
CE, CSA, ENEC, UL	Lever position 2 High temperature V5A010CB4E
CE, ENEC	V5B210CB1E



### CUTAWAY V7 MINIATURE BASIC SWITCH

Thermoplastic material meets KC 250 arc tracking test per VDC 0630, DIN 53 480, and UL94V-0.

Mounting hole size options for #4 or 3mm screw.



4mm (min) spacing between current carrying parts and mounting hardware.

"E" terminals designed to provide 3mm (min.) spacing with uninsulated receptacles installed. Terminals meet DIN 46 244 dimensions.

Internal construction meet 3mm (min.) creepage and clearance requirement.

### FEATURES

- Quick-connect and printed wiring board termination
- Proven V3 switching mechanism
- Physically interchangeable with existing V3 switches
- All existing V3 lever options available
- UL recognized File # E12252; CSA certified File # LR41370
- International listings carry VDE approval
- Power load switching capability up to 21 amps
- Temperature tolerance -40° to 185°F (-40° to 85°C)
- High temperature construction available—350°F

### APPLICABLE EUROPEAN SYMBOLS

- $\mu$  = microgap construction. (The measurement between open contacts is less than 3mm).\*\*
- $\sim$  = alternating current (used with value of voltage source: 250V  $\sim$ ).
- T = maximum rated use temperature; followed by the temperature value in °C (example T 85).
- +++ = switch is rated for at least 50,000 cycles at its rated current. (Sometimes referred to as "frequent" operation.)
- 10(3) = first number represents resistive rating. Second number represents inductive (motor) rating.

### GENERAL INFORMATION

The V7 Series is available in two versions, the Timesaver series and the International series. The Timesaver series is UL recognized and CSA certified. Timesaver series switches use readily available high-volume components to provide especially responsive delivery performance. The International V7 provides VDE approval in addition to UL recognition and CSA certification.

The V7 offers a choice of four quick-connect and two printed wiring board terminal types. Three quick-connect types are offset to meet international 3mm spacing requirements and one is designed for use with molded connectors. Contact material choice includes gold alloy, silver alloy or silver for handling various electrical loads. There are two mounting hole sizes available. Standard .114" or 3mm to meet European design requirements.

Terminal variations and switch dimensions of the European designed version conform to applicable DIN standards. These V7s mate with both standard domestic and international industry stan-

dard receptacles and connectors. The plastic enclosure meets VDE KC250 arc tracking requirement and is approvable under the Refrigeration Industry Taste and Odor test.

### OPERATING FORCES

- 175 grams (V rating only)
- 150 grams (Not applicable to Electrical Rating V)
- 75 grams (Not applicable to Electrical Rating C or V)
- 50 grams (Not applicable to Electrical Rating B, C, V)
- 25 grams (Not applicable to Electrical Rating B, C, E, V)
- 15 grams (Not applicable to Electrical Rating A, B, C, E, S, V)

Mounting Torque:  
2 inch pounds min.  
5 inch pounds max.

### ELECTRICAL RATINGS

A	B	C*	D	E	F	S	V
5 amps, 125, 250 or 277 VAC; 1/10 hp, 250 VAC	11 amps and 1/8 hp, 125, 250 or 277 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 4 amps, 125 VAC "L"	15.1 amps and 1/8 hp, 125, 250 or 277 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 5 amps, 120 VAC "L"	1 amp, 125 VAC	10 amps and 1/8 hp, 125 or 250 VAC; 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 4 amps, 125 VAC "L"	3 amps, 125, 250 or 277 VAC; 1/10 hp, 250 VAC	.1 amp, 125 VAC	21 amps 125, 250 or 277 VAC, 1 HP 125, 250, 277 VAC; 2 HP, 250, 277 VAC
W	X						
15.1 amps, 125, 250 or 277 VAC	6 amps; 1/8 HP, 125, 250 or 277 VAC						
International Series Only							
10 (3) +++ 250V $\sim$ T 85 $\mu$			5 (2) +++ 250V $\sim$ T 85 $\mu$			+++	16 (4) 250V $\sim$ T 85 $\mu$ 50E3 SPNO only

\* Available only when specifying 150 gram operating force.  
NOTE: "L" denotes lamp load.

\*\* The microgap construction (M) means contact gap is less than 3mm. Therefore, these products are suitable for secondary circuit use but not primary circuit use which requires a 3mm gap.



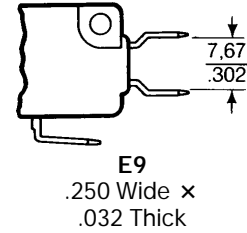
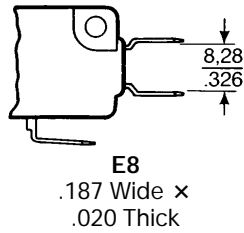
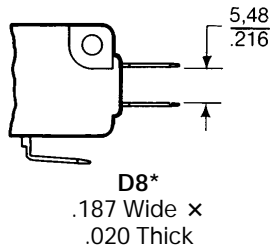
# Basic Switches

## Miniature

V7 Series

### AVAILABLE TERMINALS

#### Quick-connect



NOTE: D8 and E8 terminals are European approved when used with electrical ratings B, D, or E. E9 terminals are European approved when used with electrical ratings B, C, D, or E.

\* International approving agencies will require that switches with these terminals have insulated receptacles or connector.

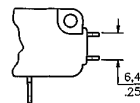
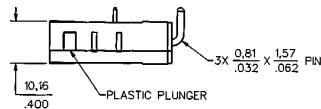
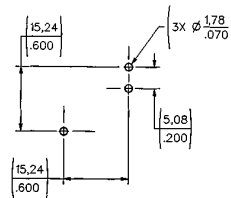
### Printed Wiring Board

Printed wiring board terminals interface with snap-on receptacles and other components from AMPMODU interconnection system.

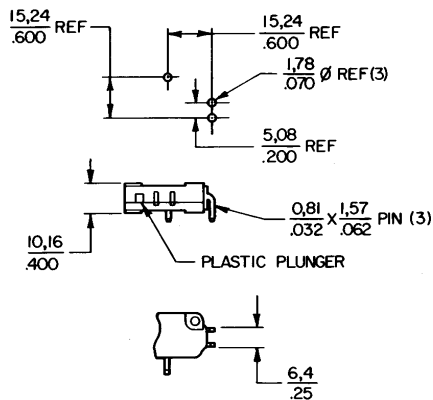
Dimensions shown are for reference only.

Key:  $\frac{0,0}{0,00} = \frac{\text{mm}}{\text{inches}}$

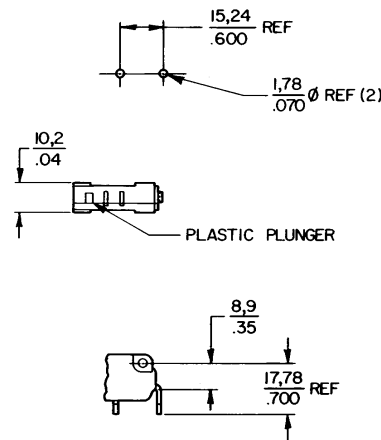
#### PO1



#### PO2



#### PO7



Miniature/  
Subminiature

This section covers only 48 of our most popular V7 Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately 300 other active V7 listings will meet your needs. Contact the 800 number.

# Basic Switches

## Miniature

# V7 Series

### TIMERSAVER SERIES

#### PIN PLUNGERS



Dim. Dwg. Fig. 1

#### ORDER GUIDE - SPDT\*

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel.

Catalog Listing	Elect. Rating P. 38	O.F. max. grams ounces	R.F. min. grams ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches
V7-1S17D8	1 Amp S	150 5.3	25 .88	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-3S17E9	1 Amp S	50 1.75	5 .175	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-3A17E9	5 Amps A	50 1.75	5 .175	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-2B17D8	11 Amps B	75 2.63	10 .35	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-2B17E9	11 Amps B	75 2.63	10 .35	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-1C17D8	15.1 Amps C	150 5.3	25 .88	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-9W1AE9	15.1 Amps W (350°F)	300 10.6	25 .88	1,19 .047	1,27 .050	0,25 .010 max.
V7-1V19E9	21 Amps V	175 6.1	20 .70	1,19 .047	1,27 .050	0,05-0,25 .002-.010

#### STRAIGHT LEVERS



Dim. Dwg. Fig. 2

#### ORDER GUIDE - SPDT\* .87" LEVER TIMESAVER SERIES

V7-3S17D8-002	1 Amp S	54 1.9	3 .11	1,52 .060	0,89 .035	0,33 .013
V7-1A17D8-002	5 Amps A	160 5.6	7 .25	1,52 .060	0,89 .035	0,38 .015
V7-2B17D8-002	11 Amps B	80 2.8	5 1.76	1,52 .060	0,89 .035	0,38 .015
V7-1C17E9-002	15.1 Amps C	160 5.6	17 .60	1,52 .060	0,89 .35	0,36 .014
V7-1V19E9-002	21 Amps V	185 6.5	13 .5	1,65 .065	0,89 .035	0,38 .015

#### 1.40" LEVER TIMESAVER SERIES

V7-3S17D8-022	1 Amp S	30 1.05	1 0.035	3,04 .120	2,16 .085	0,76 .030
V7-1A17E9-022	5 Amps A	85 3	8 .28	3,04 .120	1,52 .060	0,76 .030
V7-1X2AD8-022	6 Amps X (350°F)	185 6.5	15 .53	1,40 .055	0,76 .030	0,38 .015
V7-1B17D8-022	11 Amps B	82 2.9	8 .28	3,04 .120	1,7 .067	0,68 .027
V7-1C17E9-022	15.1 Amps C	82 2.9	8 .28	3,04 .120	1,7 .067	0,76 .030
V7-1V19E9-022	21 Amps V	95 3.3	5 .18	3,3 .130	1,78 .070	0,76 .030

#### 2.34" LEVER TIMESAVER SERIES

V7-3S17D8-048	1 Amp S	16 .56	.5 .018	5,97 .235	3,0 .118	1,27 .050
V7-2B17D8-048	11 Amps B	20 .7	1 .035	5,97 .235	2,92 .115	1,27 .050
V7-1C17E9-048	15.1 Amps C	85 3	4 .14	5,97 .235	1,65 .065	1,29 .051
V7-9W1AE9-048	15.1 Amps W (350°F)	90 3.2	4 .14	6,35 .250	3,15 .124	1,37 .054

\* For SPST (N.O. & N.C.) circuitry, contact the 800 number.

NOTE: Catalog listings in V7 Order Guides have standard .114" mounting holes. For 3mm size holes, contact the 800 number.



# Basic Switches

## Miniature

# V7 Series

### SIMULATED ROLLER LEVERS

### ORDER GUIDE - SPDT\* 1.29" LEVER TIMESAVER SERIES

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel.

Catalog Listing	Elect. Rating P. 38	O.F. max. grams ounces	R.F. min. grams ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches
-----------------	------------------------	------------------------------	------------------------------	---------------------------	---------------------------	---------------------------

### 1.29" LEVER TIMESAVER SERIES

V7-1S17D8-263	1 Amp S	90 3.15	9 .32	2,79 .110	1,9 .075	0,76 .030
V7-1B17D8-263	11 Amps B	90 3.15	9 .32	2,79 .110	1,52 .060	0,76 .030
V7-1C17D8-263	15.1 Amps C	91 3.19	9 .32	2,79 .110	1,54 .061	0,61 .024

### .81" ROLLER LEVER TIMESAVER SERIES

V7-2S17D8-201	1 Amp S	90 3.15	7 .25	1,19 .047	1,02 .040	0,38 .015
V7-2B17D8-201	11 Amps B	88 3.1	7 .25	1,3 .052	1,04 .041	0,3 .012
V7-1C17E9-201	15.1 Amps C	176 6.16	19 .67	1,3 .052	0,81 .032	0,3 .012
V7-1V19E9-201	21 Amps V	205 7.2	15 .5	1,42 .056	0,81 .032	0,33 .013

### 1.34" ROLLER LEVER TIMESAVER SERIES

V7-3S17D8-207	1 Amp S	35 1.23	2 .07	2,79 .110	2,03 .080	0,76 .030
V7-2A17D8-207	5 Amps A	43 1.51	3 .105	2,92 .115	1,52 .060	0,64 .025
V7-1C17E9-207	15.1 Amps C	86 3	9 .32	2,84 .112	1,63 .064	0,64 .025
V7-1V19E9-207	21 Amps V	100 3.5	7 .25	3,07 .121	1,65 .065	0,76 .030

\* For SPST (N.O. & N.C.) circuitry, contact the 800 number.

NOTE: Catalog listing in V7 Order Guides have standard .114" mounting holes. For 3mm size holes, contact the 800 number.



Dim. Dwg. Fig. 3



Dim. Dwg. Fig. 4

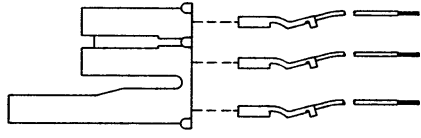
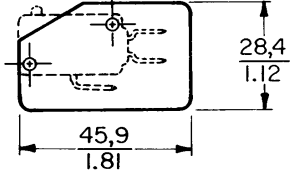



Dim. Dwg. Fig. 7

Miniature/  
Subminiature

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

### ORDER GUIDE – ACCESSORIES

Catalog Listing	Description	Catalog Listing	Description
15PA176-V7	Connector/Receptacle packet - Includes 25 connectors and 75 receptacles with 18", blue 16 gauge PVC insulated, stranded wire. (To be used with D8 terminals only). 	15PA177-V7	Insulator packet (500 pcs.) .018" thick varnished fiberglass. 
15PA260	Plunger boot seal. Elastomer dust and splash resistant plunger seal. 		

Dimensions shown are for reference only.

# Basic Switches

## Miniature

# V7 Series

### INTERNATIONAL SERIES

#### PIN PLUNGER



Dim. Dwg. Fig. 1

#### ORDER GUIDE - SPDT\* INTERNATIONAL SERIES

**Characteristics:** O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel.

Catalog Listing	Elect. Rating P. 38	O.F. max. grams ounces	R.F. min. grams ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches
V7-1B11E9	11 Amps B	150 5.3	25 .88	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-2B11D8	11 Amps B	75 2.63	10 .35	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-2B11PO2	11 Amps B	75 2.63	10 .35	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-3E11D8	10 Amps E	50 1.75	5 .175	1,19 .047	1,27 .050	0,05-0,25 .002-.010
V7-3E11E9	10 Amps E	50 1.75	5 .175	1,19 .047	1,27 .050	0,05-0,25 .002-.010

#### STRAIGHT LEVERS



Dim. Dwg. Fig. 5

#### 1.40" LEVER INTERNATIONAL SERIES

V7-1B11E9-022	11 Amps B	80 2.8	8 .28	2,79 .110	2,28 .090	0,76 .030
V7-2B11E9-022	11 Amps B	45 1.58	4 .14	2,79 .110	2,28 .090	0,76 .030
V7-3E11D8-022	10 Amps E	30 1.05	2 .070	2,79 .110	2,28 .090	0,76 .030

#### SIMULATED ROLLER LEVERS



Dim. Dwg. Fig. 3

#### 1.29" LEVER INTERNATIONAL SERIES

V7-2B11D8-263	11 Amps B	50 1.75	5 .175	2,54 .100	1,9 .075	0,76 .030
V7-3E11E9-263	10 Amps E	33 1.16	2 .070	2,54 .100	1,9 .075	0,76 .030

#### ROLLER LEVERS



Dim. Dwg. Fig. 4

#### ORDER GUIDE - SPDT\* .81" LEVER INTERNATIONAL SERIES

V7-2B11D8-201	11 Amps B	90 3.15	10 .35	1,19 .047	1,02 .040	0,38 .015
V7-3E11D8-201	10 Amps E	62 2.17	5 .175	1,19 .047	1,02 .040	0,38 .015

#### 1.34" LEVER INTERNATIONAL SERIES

V7-2B11E9-207	11 Amps B	45 1.58	5 .175	2,54 .100	2,16 .085	0,76 .030
---------------	--------------	------------	-----------	--------------	--------------	--------------

NOTE: Catalog listings in V7 Order Guides have standard .114" mounting holes. For 3mm size holes, contact the 800 number.

Dim. Dwg. Fig. 7

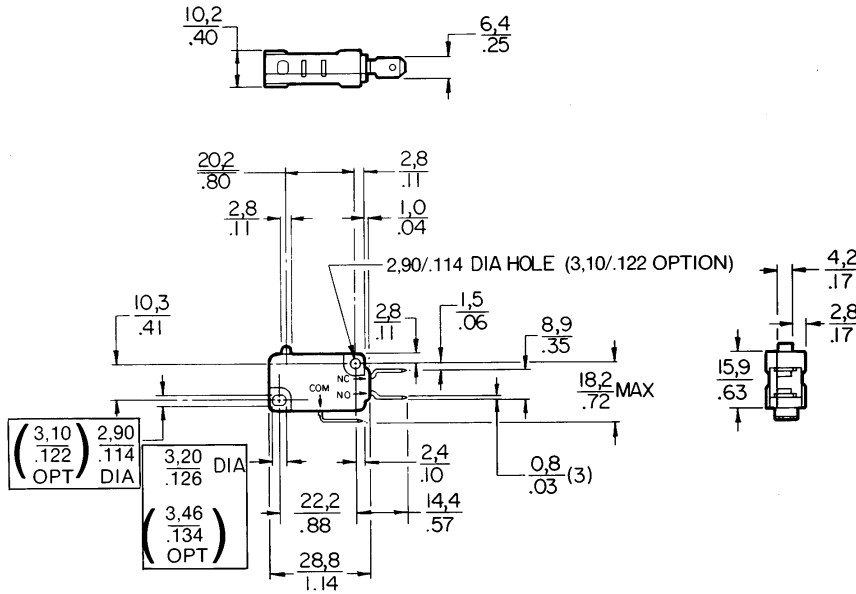
# Basic Switches

## Miniature

MOUNTING DIMENSIONS (for reference only)

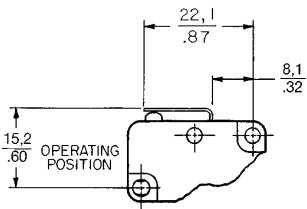
Key:  $\frac{0,0}{0.00} = \text{mm}$   
 $\frac{0,00}{0.00} = \text{inches}$

**PIN PLUNGER**  
 Fig. 1

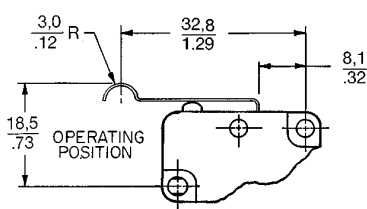


Miniature/  
 Subminiature

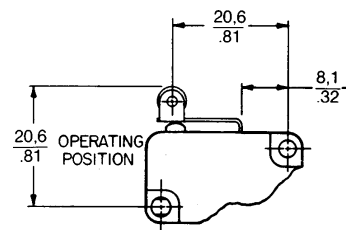
**Fig. 5** Straight Lever (Style-002)



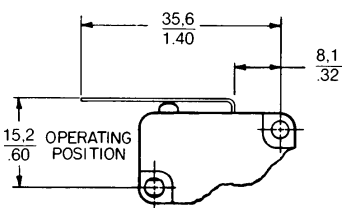
**Fig. 3** Simulated Roller (Style-263)



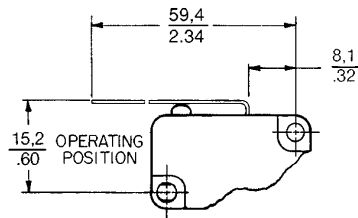
**Fig. 4** Roller Lever (Style-201)



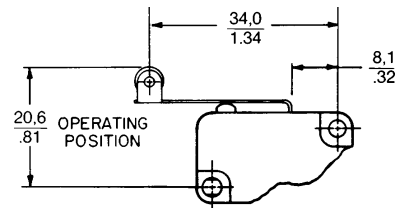
**Fig. 5** Straight Lever (Style-022)



**Fig. 6** Straight Lever (Style-048)



**Fig. 7** Roller Lever (Style-207)



NOTE: All levers are 0.17" (4,31 mm) wide. Rollers are 0.19" (4,82 mm) wide.

NOTE: Operate point dimensions taken at top of lever/roller.

# ZM, ZX, ZV and ZW Series Subminiature Basic Switches

ZM, ZX, ZV and ZW Series Subminiature Basic Switches are cost-effective devices used for simple on/off applications. These switches combine small size and light weight with ample electrical capability and long life. Plastic lever capability is available on the ZV Series.

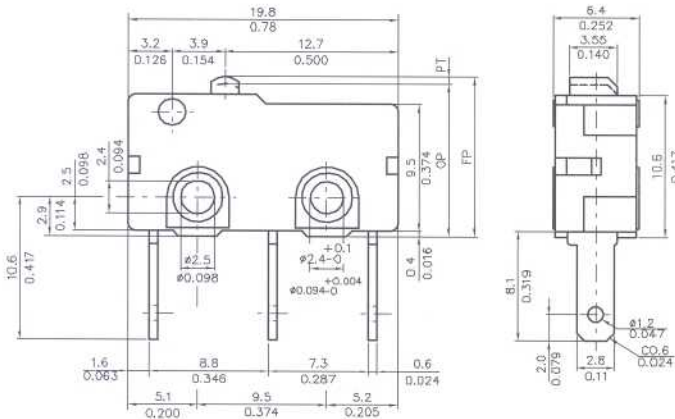
**Electrical rating:** 0.1 A, 3 A, 5 A or 10.1 A  
**Voltage:** 125/250 Vac  
**Operating temperature:** 25 °C to 85 °C [-13 °F to 185 °F]  
**Termination:** Quick connect, solder, PCB  
**Contact type:** Gold or silver  
**Switching options:** SPDT

## ZM Series

**Approvals:** UL/CSA  
**Electrical rating:** 0.1 A, 5 A or 10.1 A

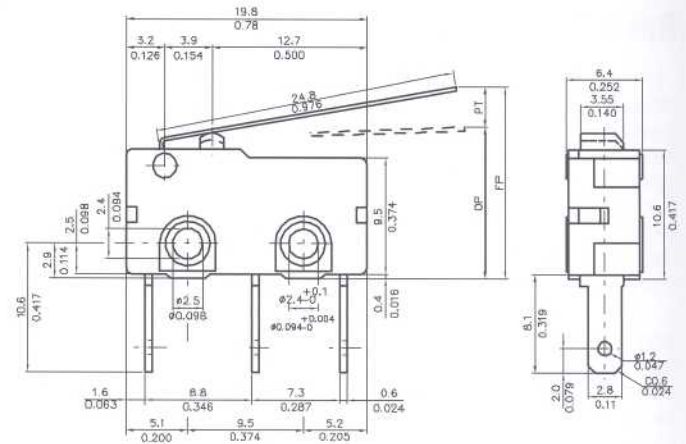
### OPTIONS

#### Top pin plunger



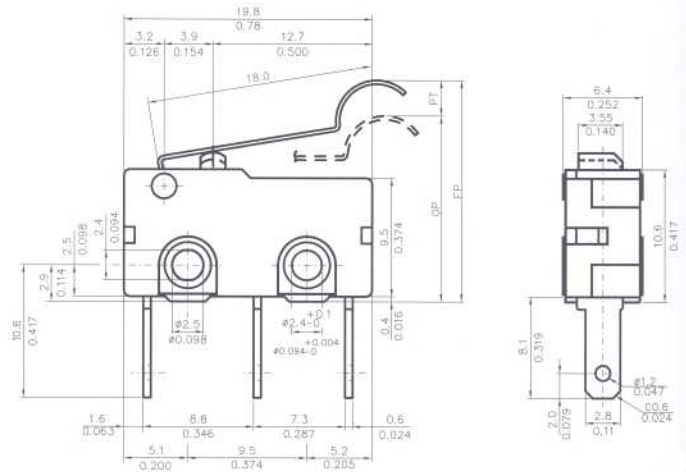
TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Quick connect	5 A	silver	ZM50E70A01
Solder	5 A	silver	ZM50E10A01
PCB	10.1 A	silver	ZM90G20A01
Solder	0.1 A	gold	ZM10B10A01

#### Straight lever



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Quick connect	5 A	silver	ZM50E70D01
Solder	5 A	silver	ZM50E10D01

#### Simulated roller lever



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Quick connect	5 A	silver	ZM50E70E01
Solder	5 A	silver	ZM50E10E01

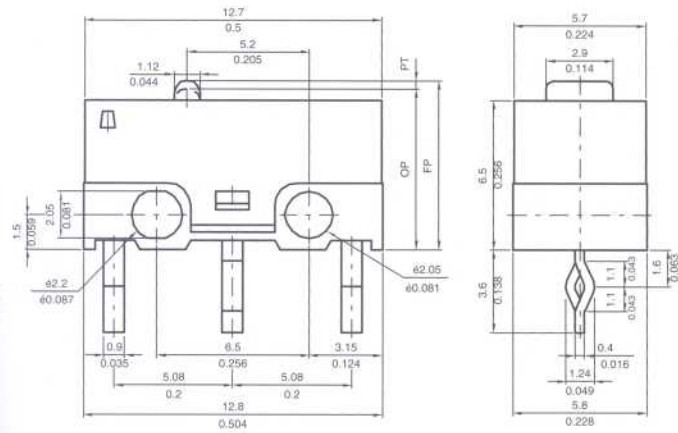
**ZX Series**

Approvals:  
Electrical rating:

UL/CSA  
0.1 A or 3 A

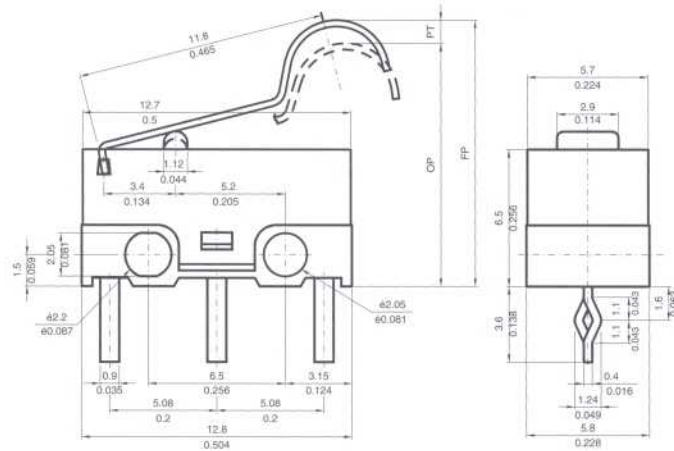
**OPTIONS**

*Top pin plunger*



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
PCB	3 A	silver	ZX40E30A01
Solder	0.1 A	gold	ZX10C10A01

*Simulated roller lever*



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
PCB	3 A	silver	ZX40E30E01
Solder	3 A	silver	ZX40E10E01

**ZV Series**

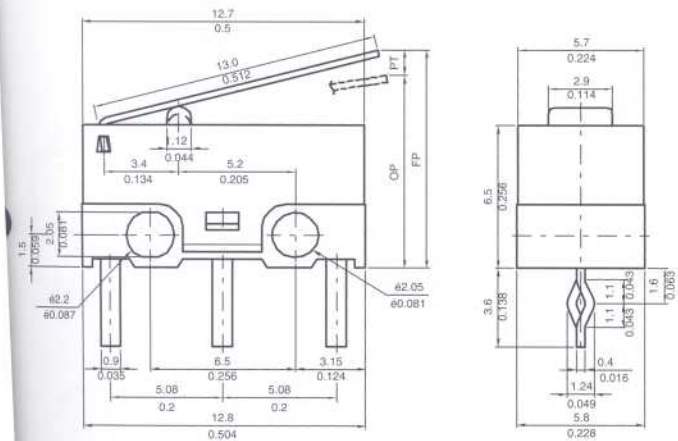
Approvals:  
Electrical rating:

UL/ENEC  
0.1 A, 5 A or 10.1 A

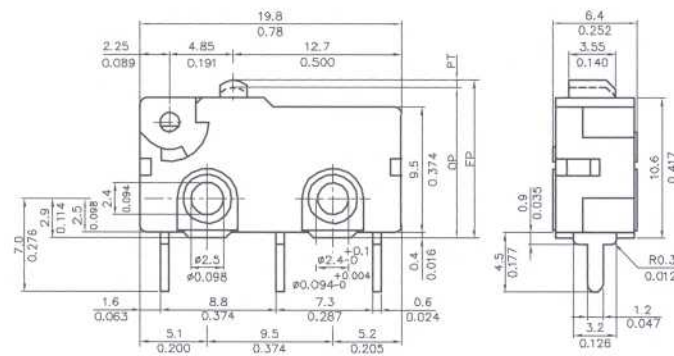
**OPTIONS**

*Top pin plunger*

*Straight lever*



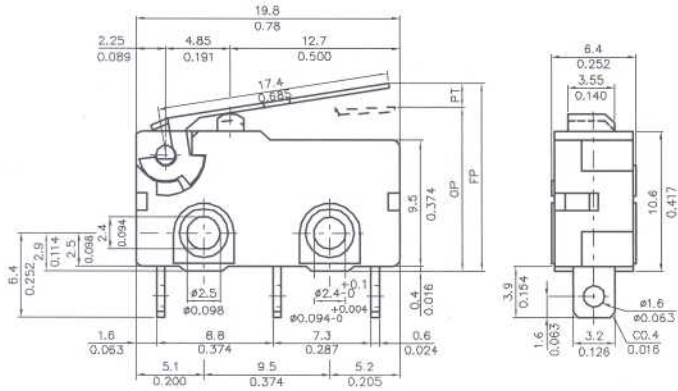
TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
PCB	3 A	silver	ZX40E30C01
Solder	3 A	silver	ZX40E10C01



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
PCB	5 A	silver	ZV50E20A01
Solder	5 A	silver	ZV50E10A01
Quick connect	0.1 A	gold	ZV10B70A01

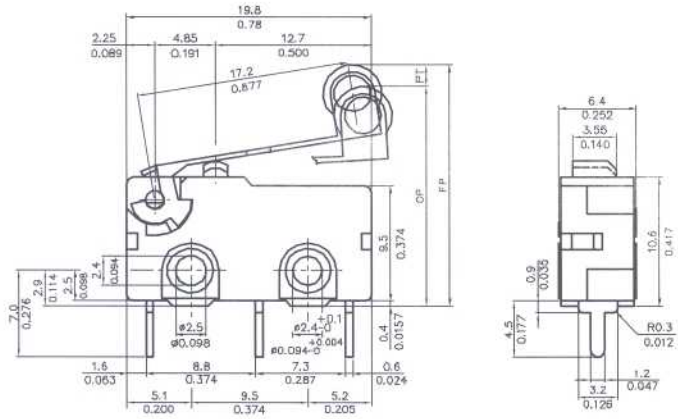


**Straight lever**



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Solder	5 A	silver	ZV50E10B01
Quick connect	5 A	silver	ZV50E70C01

**Roller lever**



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
PCB	5 A	silver	ZV50E20F01
Quick connect	5 A	silver	ZV50E70F01

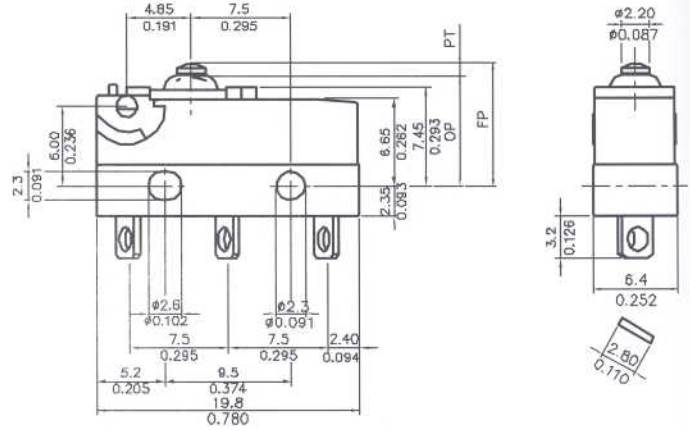
**ZW Sealed Series**

Approvals:  
Electrical rating:

UL/ENEC  
0.1 A or 5 A

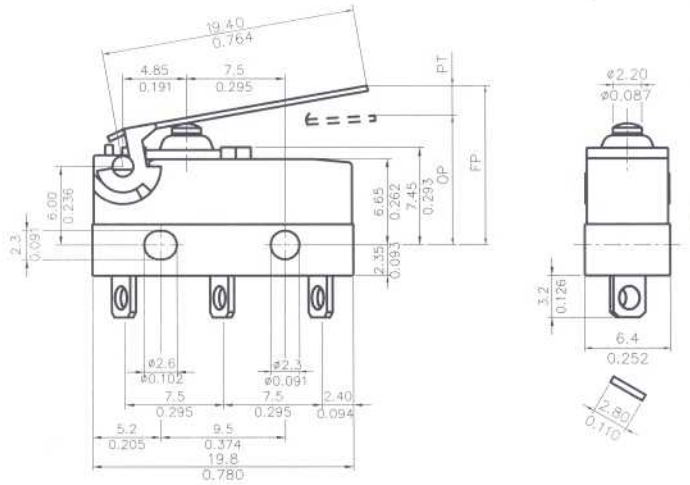
**OPTIONS**

**Top pin plunger**



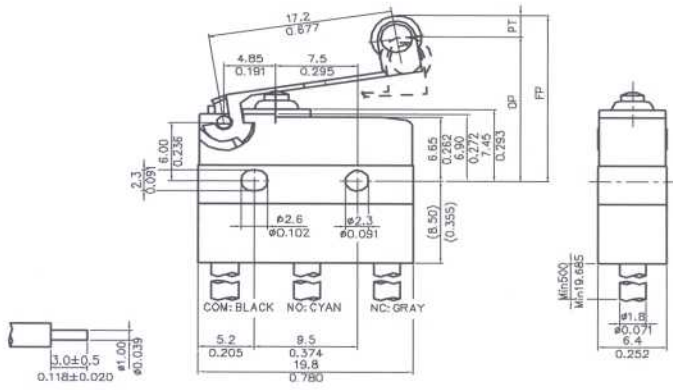
TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Solder	5 A	silver	ZW50F15AD1

**Straight lever**



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Solder	0.1 A	gold	ZW10E15CD1

Roller lever



TERMINATION	ELECTRICAL RATING	CONTACT TYPE	REFERENCE
Wire leads	0.1 A	gold	ZW10E90FW1

# Basic Switches

## Miniature Double-break

TB Series



### FEATURES

- Power load switching capability up to 10 amperes
- Motor handling capacity of 1/2 horsepower, 125 VAC
- Two- and four-circuit double-break
- Several auxiliary actuators
- Choice of terminal styles
- UL recognized, CSA certified
- Momentary action

### GENERAL INFORMATION

TB miniature switches are basic double-break units which offer a means of controlling isolated circuits. Each circuit can be driven by independent voltage sources. These switches find many uses in modern control systems because of their circuitry.

The terminals of two- and four-circuit double break switches must be wired to identical voltage sources and the same polarity so that a voltage potential is not set up between adjacent terminals. A voltage potential between adjacent terminals could promote dielectric breakdown at high energy levels. The loads should be on the same sides of the line.

**Characteristics:** O.F. – Operating Force; R.F. – Release Force; P.T. – Pretravel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

### ORDER GUIDE

Catalog Listing	Description	Electrical Data And UL Code Page 20	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.** mm inches
1TB1-1	Two-circuit, double-break end screw terminals	10 Amps <b>Z</b>	1,95-3,61 <b>7-13</b>	1,11 <b>4</b>	1,52 <b>.060</b>	0,25 <b>.010</b>	0,25-0,64 <b>.010-.025</b>	11,7 <b>.460</b>



Dim. Dwg. Fig. 1

1TB1-2	Two-circuit, double-break end solder terminals	10 Amps <b>Z</b>	1,95-3,61 <b>7-13</b>	1,11 <b>4</b>	1,52 <b>.060</b>	0,25 <b>.010</b>	0,25-0,64 <b>.010-.025</b>	11,7 <b>.460</b>
--------	------------------------------------------------	---------------------	--------------------------	------------------	---------------------	---------------------	-------------------------------	---------------------



Dim. Dwg. Fig. 2

1TB1-3	Two-circuit, double-break front solder terminals	10 Amps <b>Z</b>	1,95-3,61 <b>7-13</b>	1,11 <b>4</b>	1,52 <b>.060</b>	0,25 <b>.010</b>	0,25-0,64 <b>.010-.025</b>	11,7 <b>.460</b>
--------	--------------------------------------------------	---------------------	--------------------------	------------------	---------------------	---------------------	-------------------------------	---------------------



Dim. Dwg. Fig. 3

41TB5-3	Four-circuit, double-break front solder terminals	10 Amps <b>Z</b>	5,56-10,0 <b>20-36</b>	2,22 <b>8</b>	1,78 <b>.070</b>	0,25 <b>.010</b>	0,64-1,14 <b>.025-.045</b>	4,70 <b>.185</b>
---------	---------------------------------------------------	---------------------	---------------------------	------------------	---------------------	---------------------	-------------------------------	---------------------



Dim. Dwg. Fig. 4

\* ±0,38 mm  
±.015 in

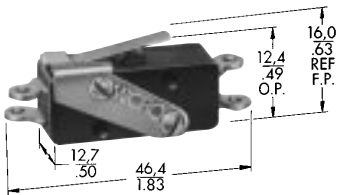


# Basic Switches

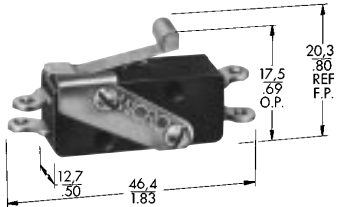
## Miniature Double-break

### AUXILIARY ACTUATORS

For use with 1TB1-1 and 1TB1-2 switches



JT-1



JT-5

### ORDER GUIDE

Catalog Listing	Description
JT-1	Leaf actuator
JT-5	Roller leaf actuator

Switches are not included with the actuators.

### MOUNTING DIMENSIONS (For reference only)

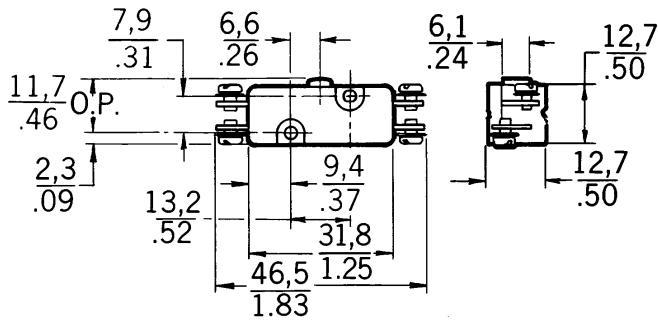


Fig. 1

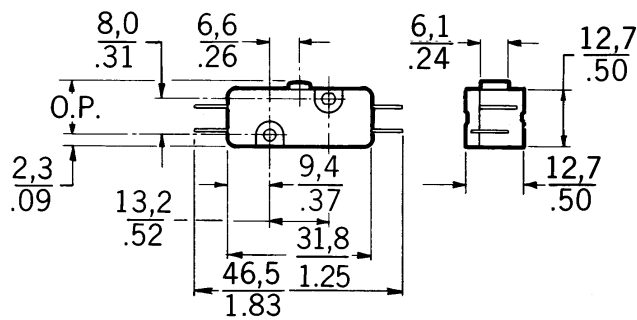


Fig. 2

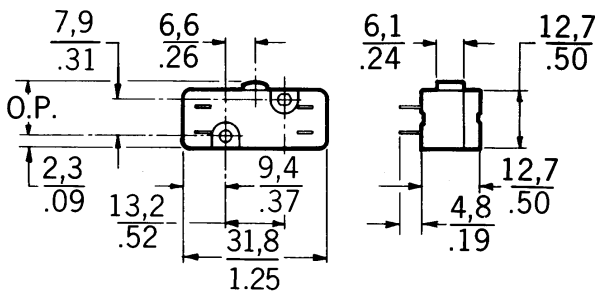


Fig. 3

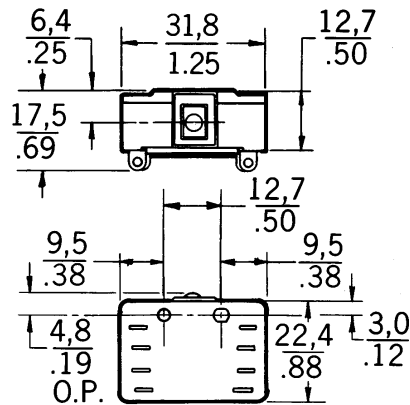


Fig. 4

Fig. 4

Miniature/  
Subminiature

Key: 0,0 = mm  
0.00 = inches

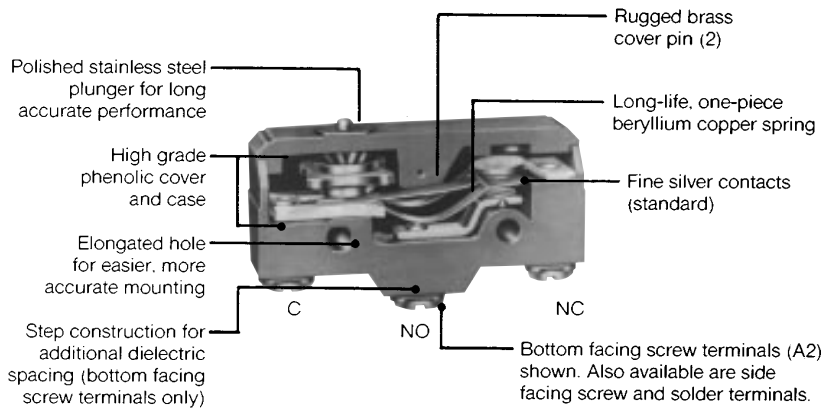
# Basic Switches

## Standard

## BZ/BA Series

### STANDARD BASIC SWITCH CUT-A-WAY

The cut-a-way shown is representative of the standard basic switches described in this catalog.



### FEATURES

- Operating force as low as 4 oz. (113 grams) maximum
- Sensitive differential travel as low as .0002 to .0003 inches (0,005 to 0,008 mm)
- Power load switching capability to 25 amperes
- Motor handling capacity to 2 horse-power at 250 VAC
- Long mechanical life
- High temperature constructions for up to +400°F (204°C)
- Momentary or maintained contact action
- Alloy contacts available for special application needs
- Variety of integral actuators
- Variety of auxiliary actuators
- Variety of terminal designs
- Optional sealed plunger and cover
- Stainless steel snap spring available
- Military standard construction available with over 50 listings on the MIL-S-8805 Qualified products list
- UL recognized, CSA certified

Characteristics as stated are taken at normal room temperature and humidity. These may vary as temperature and humidity conditions differ.

### GENERAL INFORMATION

MICRO SWITCH standard basic switches are precision snap-action mechanisms enclosed in accurately molded plastic cases. These switches are carefully manufactured and thoroughly inspected. They are industry known for their compactness, light weight, accurate repeatability and long life.

The type BZ switch design meets most applications needs. Modifications of the standard silver contact design and material, spring configuration, and plunger locations give the type BM, BA and BE switches greater electrical load handling capacity. Other changes in materials and switch design provide operating characteristics, temperature tolerances, and sealing to cover a wide range of special requirements.

### MOUNTING DIMENSIONS

Mounting dimensions are included at the end of each product section. They are shown in English and metric equivalents. These dimensions are for reference only. For exacting layout work, request an engineering layout work, request an engineering drawing from the 800 number.

### GENERAL SWITCH IDENTIFICATION

First letter in catalog listing designates:

- B = Single-pole double-throw
- W = Single-pole single-throw (normally closed)
- Y = Single-pole single-throw (normally open)

Second letter in catalog listing designates:

- Z = Standard 15-amp version
- M = 22-amp version
- A = Standard 20-amp version
- E = 25-amp version

Mounting holes for Types BZ, BM, BA, BE, DT, MT, and 6AS switches accept pins or screws of .139 inch (3,53 mm) diameter.

### RECOMMENDED TORQUE (max.)

Mounting screws . . . . . 3 in./lbs.\*  
Terminal screws . . . . . 4 in./lbs.  
Panel mount bushing . . . . . 4-6 in./lbs.

\* Note: Tightening mounting screws above 3 in./lbs. changes operating characteristics and increases the possibility of cracking the case.

This section covers only **over 100** of our most popular BZ/BA type Series catalog listings. If you don't find what you're looking for, it's likely one of the approximately **1800** other active listings will meet your needs. Contact the 800 number.

Standard Basic Switches

### UL/CSA

Our basic switches are Component Recognized by Underwriters' Laboratories, Inc. and certified by Canadian Standards Association. The BA, BZ, and BM line is covered as Special Use Switches to UL Standard 1054; the BE line is covered as an Industrial Motor Controller to UL Standard 508.

Agency File References are:

BA	UL File E12252, issued 12-09-88
BM	UL File E12252, issued 12-08-88
BZ	UL File E12252, issued 6-29-89
BE-1,2,5	UL File E22779, Vol. 4, Sec. 1
BE-R	UL File E22779, Vol. 4, Sec. 2

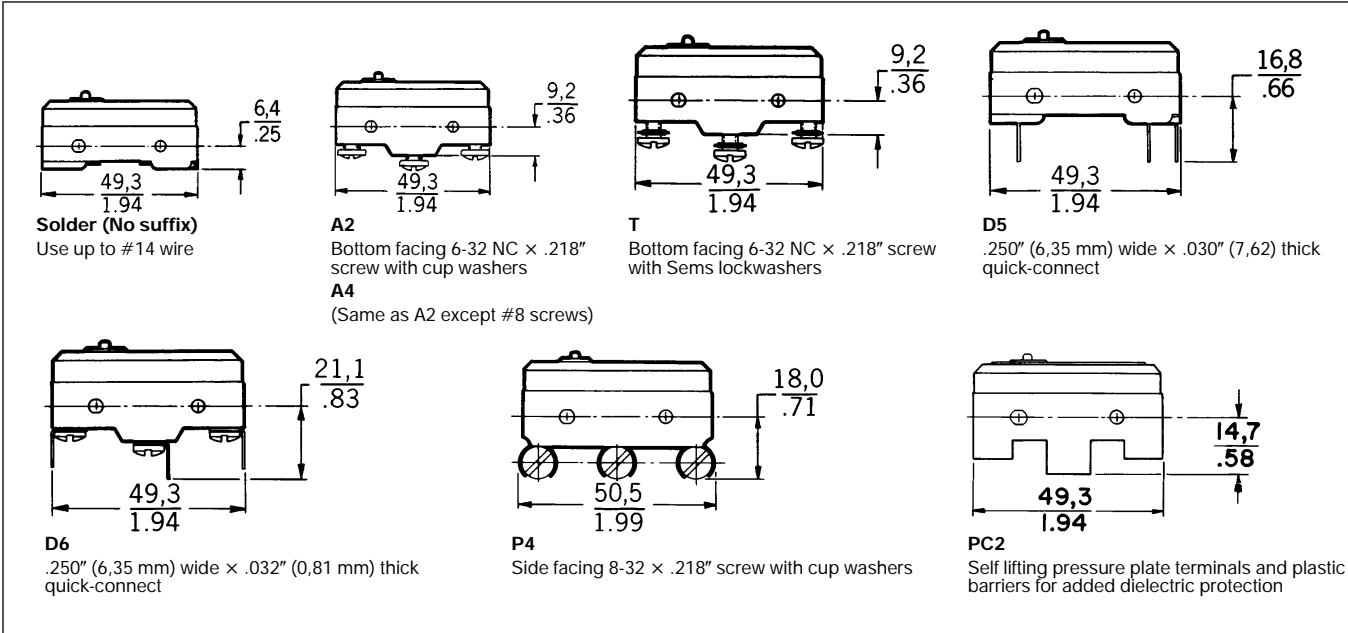
# Basic Switches

## Standard

BZ/BA Series

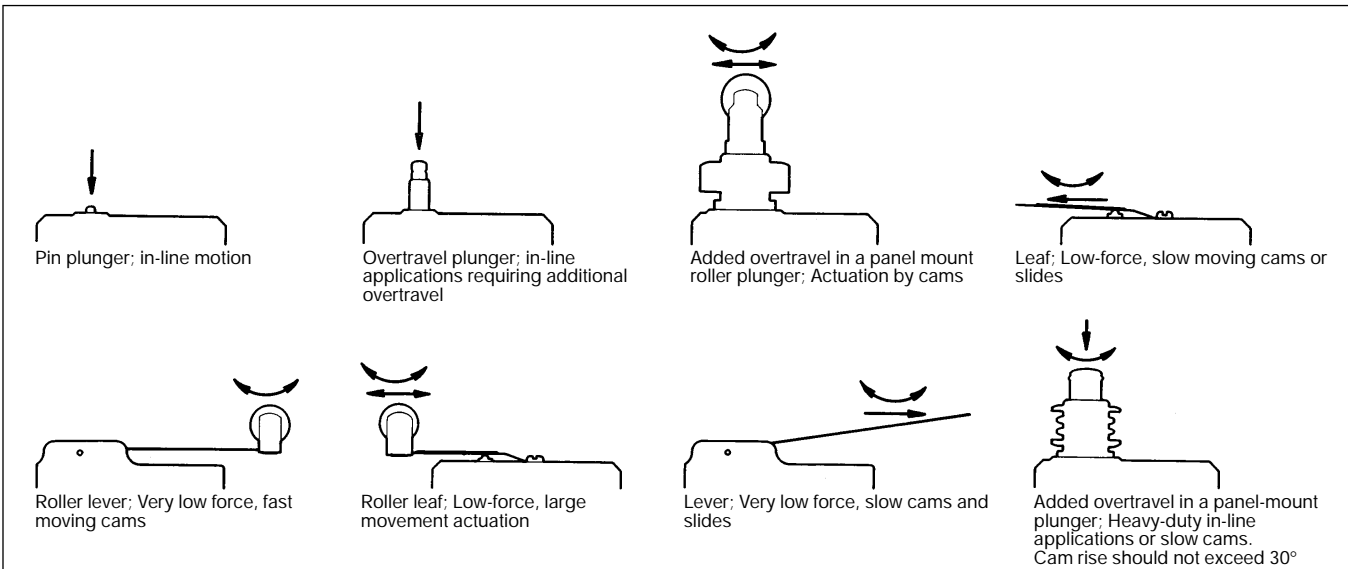
### AVAILABLE TERMINALS

Most of the BZ/BA catalog listings have A2 type terminals. Several other terminal styles are shown and others are available. Specific information should be requested from the 800 number or local Authorized Distributor.



### ACTUATORS

BA, BE, BM and BZ standard basic switches use the actuators described.



# Basic Switches

## Standard

## BZ/BA Series

**Characteristics:** O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

### ORDER GUIDE by ascending electrical capability

#### PIN PLUNGER

#### BZ/BA TYPE



Dim. Dwg. Fig. 1

#### SEALED TYPE



Dim. Dwg. Fig. 2

#### BA/BE TYPE



Dim. Dwg. Fig. 3



Dim. Dwg. Fig. 4

Catalog Listing	Recommended For	Electrical Data And UL Codes Page 46	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.** mm inches
BZ-2R72-A2	Applications requiring gold alloy contacts	1 Amp <b>P</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
BZ-2R725551-A2	Gold alloy contacts Dustproof and splash resistant seal	1 Amp <b>P</b>	2,22-4,17 <b>8-15</b>	1,11 <b>4</b>	— <b>—</b>	0,13 <b>.005</b>	0,01-0,06 <b>.0004-.0025</b>	15,88 <b>.625</b>
BZ-2R244-A2	Operating in temp. to +400°F (204°C) for 100 hours	5 Amps <b>B</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
BZ-R21-A2	Lower force	10 Amps <b>C</b>	1,11 <b>4</b>	0,7 <b>2.5</b>	0,30 <b>.012</b>	0,13 <b>.005</b>	0,005-0,013 <b>.0002-.0005</b>	15,88 <b>.625</b>
BZ-2R-A2	Most applications SPDT	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
WZ-2R-A2	SPST (normally closed)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
YZ-2R-A2	SPST (normally open)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
BZ-R-A2	Less differential travel	15 Amps <b>D</b>	1,95-2,5 <b>7-9</b>	1,11 <b>4</b>	0,30 <b>.012</b>	0,13 <b>.005</b>	0,005-0,008 <b>.0002-.0003</b>	15,88 <b>.625</b>
BZ-R19-A2	Best repeatability	15 Amps <b>D</b>	1,95-3,34 <b>7-12</b>	1,11 <b>4</b>	0,30 <b>.012</b>	0,13-0,2 <b>.005-.008</b>	0,005-0,02 <b>.0002-.0008</b>	16,26 <b>.640</b>
BZ-2R24-A2	Operating in temp. to +250°F (121°C)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
BZ-2RT04 (8805/1-004)	MIL-S-8805 application requirements	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,67 <b>6</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
BZ-2R05-A2	Best stability under varying humidity	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,01-0,05 <b>.0004-.0020</b>	15,88 <b>.625</b>
BZ-2R5551-A2	Dustproof and splash resistant seal	15 Amp <b>A</b>	2,5-4,17 <b>9-15</b>	1,11 <b>4</b>	— <b>—</b>	0,13 <b>.005</b>	0,01-0,06 <b>.0004-.0025</b>	15,88 <b>.625</b>
BZ-2R55-A2-S	Best service for sealed construction. Stainless steel internal snap spring.	15 Amps <b>A</b>	2,5-4,17 <b>9-15</b>	1,11 <b>4</b>	— <b>—</b>	0,13 <b>.005</b>	0,01-0,06 <b>.0004-.0025</b>	15,88 <b>.625</b>
BA-2R-A2	Up to 20 ampere load handling	20 Amps <b>G</b>	3,89-6,12 <b>14-22</b>	2,78 <b>10</b>	1,27 <b>.050</b>	0,25 <b>.010</b>	0,05-0,19 <b>.0020-.0075</b>	16,26 <b>.640</b>
BA-2R24-A2	Operating in temperature to +250°F (121°C)	20 Amps <b>G</b>	3,89-6,12 <b>14-22</b>	2,78 <b>10</b>	1,27 <b>.050</b>	0,25 <b>.010</b>	0,05-0,19 <b>.0020-.0075</b>	16,26 <b>.640</b>
BM-1R-A2	Up to 22 ampere load handling	22 Amps <b>F</b>	1,95-2,78 <b>7-10</b>	1,11 <b>4</b>	0,38 <b>.015</b>	0,13 <b>.005</b>	0,013-0,025 <b>.0005-.0010</b>	15,88 <b>.625</b>
BE-2R-A4	Up to 25 ampere load handling	25 Amps <b>H</b>	3,89-6,12 <b>14-22</b>	2,78 <b>10</b>	1,27 <b>.050</b>	0,25 <b>.010</b>	0,05-0,19 <b>.0020-.0075</b>	16,26 <b>.640</b>

BZ-RX	Manual reset (maintained contact) applications, solder terminals	15 Amps <b>E</b>	1,95-2,5 <b>7-9</b> 0,56-2,78* <b>2-10</b>	— <b>—</b> — <b>—</b>	0,30 <b>.012</b> — <b>—</b>	0,13 <b>.005</b> 0,38* <b>.015</b>	— <b>—</b> — <b>—</b>	15,88 <b>.625</b>
WA-1RX-A4	Manual reset SPST-NC, A4 terminals	20 Amps <b>W</b>	5,56 <b>20</b> 6,95* <b>25</b>	— <b>—</b> — <b>—</b>	— <b>—</b> — <b>—</b>	0,25 <b>.010</b> — <b>—</b>	0,20 <b>.008</b> — <b>—</b>	16,26 <b>.64</b> 27,9* <b>1.10</b>

\* Reset characteristics.

Except where stated \*\* ±0,38mm ±.015 in.

All catalog listings shown are not necessarily stock items. Stocking depends on sales experience.

Auxiliary actuators see p. 62-63.

Standard Basic Switches

# Basic Switches

## Standard

## BZ/BA Series

Characteristics: O.F. — Operating Force;  
R.F. — Release Force; P.T. — Pretravel;  
O.T. — Overtravel; D.T. — Differential Travel;  
O.P. — Operating Position.

### OVERTRAVEL PLUNGER

### ORDER GUIDE

Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.* mm inches
<b>BZ-2RD72-A2</b>	Applications requiring gold alloy contacts	1 Amp <b>P</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,05 <b>.0004-.0020</b>	21,21 <b>.835</b>
<b>BZ-2RD-A2</b>	Added overtravel. For manual operation and slow 20° (max) cam rise	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,05 <b>.0004-.0020</b>	21,21 <b>.835</b>
<b>BZ-2RD24-A2</b>	Operating in temperature to +250°F (121°C)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,05 <b>.0004-.0020</b>	21,21 <b>.835</b>
<b>BM-1RD-A2</b>	Up to 22 ampere load handling	22 Amps <b>F</b>	1,95-2,78 <b>7-10</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,013-0,025 <b>.0005-.0010</b>	21,21 <b>.835</b>

<b>BZ-2RDS725551-A2</b>	Applications requiring gold alloy contacts plus dustproof and splash resistant seal	1 Amp <b>P</b>	3,61-5,28 <b>13-19</b>	1,11 <b>4</b>	—	1,52 <b>.060</b>	0,01-0,063 <b>.0004-.0025</b>	28,20 <b>1.110</b>
<b>BZ-2RDS5551-A2</b>	Dustproof and splash resistant seal	15 Amps <b>A</b>	3,61-5,28 <b>13-19</b>	1,11 <b>4</b>	—	1,52 <b>.060</b>	0,01-0,063 <b>.0004-.0025</b>	28,20 <b>1.110</b>

<b>BA-2RB-A2</b>	Up to 20 ampere load handling	20 Amps <b>G</b>	3,89-6,12 <b>14-22</b>	2,78 <b>10</b>	1,27 <b>.050</b>	2,39 <b>.094</b>	0,05-0,19 <b>.0020-.0075</b>	26,20 <b>1.03</b>
<b>BE-2RB-A4</b>	Up to 25 ampere load handling	25 Amps <b>H</b>	3,89-6,12 <b>14-22</b>	2,78 <b>10</b>	1,27 <b>.050</b>	2,39 <b>.094</b>	0,05-0,19 <b>.0020-.0075</b>	26,20 <b>1.03</b>

<b>BZ-2RS72-A2</b>	Applications requiring gold alloy contacts	1 Amp <b>P</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,05 <b>.0004-.0020</b>	28,20 <b>1.110</b>
<b>BZ-2RS-A2</b>	Added overtravel. For in-line operation and with JR auxiliary actuators	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,063 <b>.0004-.0025</b>	28,20 <b>1.110</b>
<b>BZ-2RS24-A2</b>	Operating in temperature to +250°F (121°C)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,05 <b>.0004-.0020</b>	28,20 <b>1.110</b>
<b>BZ-2RST04 M8805(1-012)</b>	MIL-S-8805 application requirements	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,67 <b>6</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,01-0,05 <b>.0004-.0020</b>	28,20 <b>1.110</b>
<b>BZ-RSX</b>	Manual reset solder terminals	15 Amps <b>E</b>	1,95-2,64 <b>7-9</b>	— —	0,30 <b>.012</b>	0,64 <b>.025</b>	— —	2,79 <b>1.11</b>
<b>BM-1RS-A2</b>	Up to 22 ampere load handling	22 Amps <b>F</b>	1,95-2,78 <b>7-10</b>	1,11 <b>4</b>	0,38 <b>.015</b>	1,52 <b>.060</b>	0,013-0,025 <b>.0005-.0010</b>	28,20 <b>1.110</b>

<b>BZ-2RS7225551-A2</b>	Applications requiring gold alloy contacts plus dustproof and splash resistant seal	1 Amp <b>P</b>	2,5-4,17 <b>9-15</b>	1,11 <b>4</b>	—	1,52 <b>.060</b>	0,01-0,063 <b>.0004-.0025</b>	28,20 <b>1.110</b>
<b>BZ-2RS5551-A2</b>	Dustproof and splash resistant seal	15 Amps <b>A</b>	2,5-4,17 <b>9-15</b>	1,11 <b>4</b>	—	1,52 <b>.060</b>	0,01-0,063 <b>.0004-.0025</b>	28,20 <b>1.110</b>

\*±0,51 mm  
±.020 in.



Dim. Dwg. Fig. 11



Dim. Dwg. Fig. 12



Dim. Dwg. Fig. 13



Dim. Dwg. Fig. 14



Dim. Dwg. Fig. 15

# Basic Switches

## Standard

## BZ/BA Series

### OVERTRAVEL PLUNGER



Dim. Dwg. Fig. 16

### ORDER GUIDE

Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.** mm inches
<b>BZ-2RQ-A2</b>	Added overtravel. For manual in-line operation and for slow 30° (max) rise cams	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,01-0,05 <b>.0004-.0020</b>	38,10±0,51 <b>1.500±.020</b>
<b>BZ-2RQ24-A2</b>	Operating in temperature to ±250°F (121°C)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,01-0,05 <b>.0004-.0020</b>	38,10±0,51 <b>1.500±.020</b>

### BZ/BM TYPE



Dim. Dwg. Fig. 17

<b>BZ-2RQ172-A2</b>	Applications requiring gold alloy contacts	1 Amp <b>P</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,01-0,05 <b>.0004-.0020</b>	21,82 <b>.859</b>
<b>BZ-2RQ1-A2</b>	BZ-2RQ-A2 type applications with panel mount	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,01-0,05 <b>.0004-.0020</b>	21,82 <b>.859</b>
<b>BZ-2RQ1T04 (M8805/1-020)</b>	MIL-S-8805 application requirements	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,67 <b>6</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,01-0,05 <b>.0004-.0020</b>	21,82 <b>.859</b>
<b>BZ-2RQ124-A2</b>	Operating in temperature to ±250°F (121°C)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,01-0,05 <b>.0004-.0020</b>	21,82 <b>.859</b>
<b>BZ-2RN702</b>	Furnished with unassembled seal boot.	15 Amps <b>X</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>0.15</b>	3,18 <b>.125</b>	0,01-0,05 <b>.0004-.0020</b>	48,4±0,50 <b>1.906±.020</b>
<b>BZ-RQ1X</b>	Manual reset. Solder terminals	15 Amps <b>E</b>	1,67-2,64 <b>6-9.5</b>	- <b>-</b>	0,30 <b>0.12</b>	5,56 <b>.219</b>	- <b>-</b>	23,42±1,14 <b>.922±.045</b> 7,14* .281*
<b>BA-2RQ1-A2</b>	Up to 20 ampere load handling	20 Amps <b>G</b>	3,89-6,12 <b>14-22</b>	2,78 <b>10</b>	1,27 <b>.050</b>	5,56 <b>.219</b>	0,05-0,19 <b>.0020-.0075</b>	21,82 <b>.859</b>
<b>BM-1RQ1-A2</b>	Up to 22 ampere load handling	22 Amps <b>F</b>	1,95-2,78 <b>7-10</b>	1,11 <b>4</b>	0,38 <b>.015</b>	5,56 <b>.219</b>	0,013-0,025 <b>.0005-.0010</b>	21,82 <b>.859</b>

### BA TYPE



Dim. Dwg. Fig. 18

<b>BZ-2RQ1872-A2</b>	Applications requiring gold alloy contacts	1 Amp <b>P</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	3,56 <b>.140</b>	0,01-0,05 <b>.0004-.0020</b>	33,32±1,14 <b>1.312±.045</b>
<b>BZ-2RQ18-A2</b>	Added overtravel. Roller plunger for rapid cam (30° max) rise and slide operation. Panel mount	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	3,56 <b>.140</b>	0,01-0,05 <b>.0004-.0020</b>	33,32±1,14 <b>1.312±.045</b>
<b>BZ-2RQ1824-A2</b>	Operating in temperature to ±250°F (121°C)	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	3,56 <b>.140</b>	0,01-0,05 <b>.0004-.0020</b>	33,32±1,14 <b>1.312±.045</b>
<b>BZ-2AQ18T1</b>	Double-break circuitry	15 Amps <b>T</b>	3,89-6,68 <b>14-24</b>	1,11 <b>4</b>	0,51 <b>.020</b>	3,58 <b>.141</b>	0,03-0,10 <b>.001-.004</b>	33,35±1,19 <b>1.313±.047</b>
<b>BM-1RQ18-A2</b>	Up to 22 ampere load handling	22 Amps <b>F</b>	1,95-2,78 <b>7-10</b>	1,11 <b>4</b>	0,38 <b>.015</b>	3,56 <b>.140</b>	0,013-0,025 <b>.0005-.0010</b>	33,32±1,14 <b>1.312±.045</b>



Dim. Dwg. Fig. 19



Dim. Dwg. Fig. 20

<b>BZ-2RQ181-A2</b>	Applications requiring roller plunger 90° to major axis of switch	15 Amps <b>A</b>	2,5-3,61 <b>9-13</b>	1,11 <b>4</b>	0,38 <b>.015</b>	3,56 <b>.140</b>	0,01-0,05 <b>.0004-.0020</b>	33,32±1,14 <b>1.312±.045</b>
---------------------	-------------------------------------------------------------------	---------------------	-------------------------	------------------	---------------------	---------------------	---------------------------------	---------------------------------

\* Reset characteristics.

Except where stated \*\* ±0,76 mm ±.030 in.

Standard Basic Switches

# Basic Switches Standard

## BZ/BA Series

**Characteristics:** O.F. — Operating Force; R.F. — Release Force;  
P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel;  
O.P. — Operating Position.

### STRAIGHT LEVER

### ORDER GUIDE

#### BZ/BM TYPE



Dim. Dwg. Fig. 21

#### BA TYPE



Dim. Dwg. Fig. 23

#### ADJUSTABLE



Dim. Dwg. Fig. 22



Dim. Dwg. Fig. 24

Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.** mm inches
BZ-2RW8072-A2	Applications requiring gold alloy contacts	1 Amp P	0,7 2.5	0,14 0.5	—	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-2RW80722555105-A2	Best stability under varying humidity. Gold alloy contacts with seal	1 Amp P	0,7 2.5	0,14 0.5	—	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-2RW8244-A2	Operating in temp. to +400°F (204°C) for 100 hours	5 Amps B	0,7 2.5	0,14 0.5	—	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-RW8435-A2	Lowest operating force (without external return spring)	10 Amps I	0,07 .25	—	6,76 .266	5,56 .219	0,08-0,38 .003-.015	19,1 .750
BZ-2RW876T	1.25 inch lever requirements	15 Amps A	1,67 6	0,42 1.5	—	0,42 .141	0,10-0,63 .004-.025	19,1 .750
BZ-2RW80-A2	2.5 inch lever requirements	15 Amps A	0,7 2.5	0,14 0.5	—	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-2RW84-A2	Lower force (without external return spring)	15 Amps A	0,28 1	0,03 0.125	8,33 .328	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-2RW805551-A2	Dustproof and splash resistant seal	15 Amps A	0,7 2.5	0,14 0.5	—	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-2RWT04 (M8805/1-044)	ML-S-8805 application requirements	15 Amps A	0,28-0,90 1-3.25	0,21 0.75	7,52 .296	4,37 .172	2,36 .093	19,1 .750
BZ-2RW824-A2	Operating in temperature to +250°F (121°C)	15 Amps A	0,7 2.5	0,14 0.5	—	5,56 .219	0,18-1,27 .007-.050	19,1 .750
BZ-RW80X	Manual reset solder terminals	15 Amps E	0,63 2.25	—	—	5,56 .219	— —	19,05 .750
						0,38* .015	- -	7,14* .281
BZ-2RW863-A2	6 inch lever requirements	15 Amps A	0,28 1	—	—	12,7 .500	0,46-3,68 .018-.145	19,1±1,52 .750±.060
BA-2RV-A2	Up to 20 ampere load handling	20 Amps G	0,7 2.5	0,14 0.5	15,88 .625	1,98 .078	2,77 .109	19,1 .750
BM-1RW84-A2	Up to 22 ampere load handling	22 Amps F	0,28 1	0,03 0.125	7,54 .297	5,56 .219	0,13-0,84 .005-.033	19,1 .750
BE-2RV-A4	Up to 25 ampere load handling	25 Amps H	0,7 2.5	0,14 0.5	15,88 .625	1,98 .078	2,77 .109 max.	19,1 .750

\* Reset characteristics.

BZ-2RW899-A2	Adjustable operating point (17 mm to 22 mm) .670" to .880"	15 Amps A	0,7 2.5	0,14 0.5	—	3,54† .125	0,18-1,27 .007-.050	17,02-22,35 .670-.880
--------------	------------------------------------------------------------	-----------	------------	-------------	---	---------------	------------------------	--------------------------

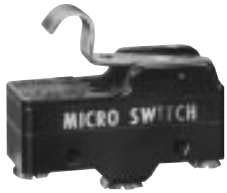
BZ-2RM-A2	Reverse acting actuator (switch plunger depressed in free position)	15 Amps A	1,67 6	0,28 1	5,56 .219	5,56 .219	0,10-0,89 .004-.035	19,1 .750
-----------	---------------------------------------------------------------------	-----------	-----------	-----------	--------------	--------------	------------------------	--------------

† From  $\frac{17}{670}$  mm O.P.

Except where stated \*\* ±0.76 mm ±.030 in.



## SIMULATED ROLLER



Dim. Dwg. Fig. 27

## ORDER GUIDE

Catalog Listing	Recommended For	Electrical Data And UL Code Page 46	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.** mm inches
<b>BZ-2RW80147-A2</b>	1.05 inch (26,7 mm) (simulated roller) lever applications	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BZ-2RW80196-A2</b>	1.90 inch (48,3 mm) (simulated roller) lever applications	15 Amps <b>A</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	3,96 <b>.156</b>	0,10-1,0 <b>.004-.040</b>	30,17±0,76 <b>1.188±.030</b>

## ROLLER LEVER

### BZ/BM TYPE



Dim. Dwg. Fig. 25



Dim. Dwg. Fig. 28

### BA/BE TYPE



Dim. Dwg. Fig. 26

<b>BZ-2RW82272-A2</b>	Applications requiring gold alloy contacts	1 Amp <b>P</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BZ-2RW82272551-A2</b>	Applications requiring gold alloy contacts plus dustproof and splash resistant seal	1 Amp <b>P</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BZ-2RW822-A2</b>	1.05 inch (26,7 mm) (steel roller) lever applications	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BZ-2RW8222-A2</b>	Roller turned 90°	15 Amps <b>A</b>	0,7-1,81 <b>2.5-6.5</b>	0,35 <b>1.25</b>	—	3,58 <b>.141 max.</b>	0,08-0,51 <b>.003-.020</b>	30,75 <b>1.25</b>
<b>BZ-2RW82224-A2</b>	Operating in temperature to +250°F (121°C)	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BZ-2RW822551-A2</b>	Dustproof and splash resistant seal	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BZ-2RW82255-A2-S</b>	Best service for sealed construction. Stainless steel internal snap spring.	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	30,17 <b>1.188</b>
<b>BA-2RV22-A2</b>	Up to 20 ampere load handling	20 Amps <b>G</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	6,35 <b>.250</b>	0,76 <b>.030</b>	1,14 <b>.045 max.</b>	29,77 <b>1.172</b>
<b>BM-1RW822-A2</b>	Up to 22 ampere load handling	22 Amps <b>F</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,025-0,33 <b>.001-.013</b>	30,17 <b>1.188</b>
<b>BE-2RV22-A4</b>	Up to 25 ampere load handling	25 Amps <b>H</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	6,35 <b>.250</b>	0,76 <b>.030</b>	1,14 <b>.045 max.</b>	29,77 <b>1.172</b>

<b>BZ-2RW82299-A2</b>	Adjustable operating point. Roller lever 1.05 inch (26,7 mm)	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	1,02 <b>.040</b>	0,08-0,51 <b>.003-.020</b>	29,77-30,56 <b>1.172-1.203</b>
<b>BZ-2RW8299-A2</b>	Adjustable operating point. Roller lever 1.90 inch (48,3 mm)	15 Amps <b>A</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	2,16 <b>.085</b>	0,10-1,0 <b>.004-.040</b>	29,2-31,5 <b>1.150-1.24</b>

Standard  
Basic Switches

Except where stated \* ±0,38 mm  
±.015 in.



### Characteristics:

O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel;

O.T. — Overtravel; D.T. — Differential Travel;

O.P. — Operating Position.

### ROLLER LEVER

### ORDER GUIDE

#### BZ/BM TYPE



Dim. Dwg. Fig. 29

#### BA/BE TYPE



Dim. Dwg. Fig. 30



Dim. Dwg. Fig. 31



Dim. Dwg. Fig. 32

Catalog Listing	Recommended For	Electrical Data And UL Code Page 46	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.* mm inches
<b>BZ-2RW82725551-A2</b>	Applications requiring gold alloy contacts, plus dustproof, and splash resistant seal	1 Amp <b>P</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	3,96 <b>.156</b>	0,10-1,0 <b>.004-.040</b>	30,17±0,76 <b>1.188±.030</b>
<b>BZ-2RW82-A2</b>	1.90 inch (48,3 mm) (steel roller) lever applications	15 Amps <b>A</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	3,96 <b>.156</b>	0,10-1,0 <b>.004-.040</b>	30,17±0,76 <b>1.188±.030</b>
<b>BZ-2RW825551-A2</b>	Dustproof and splash resistant seal	15 Amps <b>A</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	3,96 <b>.156</b>	0,10-1,0 <b>.004-.040</b>	30,17±0,76 <b>1.188±.030</b>
<b>BZ-2RW8224-A2</b>	Operating in temperature to +250°F (121°C)	15 Amps <b>A</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	3,96 <b>.156</b>	0,10-1,0 <b>.004-.040</b>	30,17±0,76 <b>1.188±.030</b>
<b>BA-2RV2-A2</b>	Up to 20 ampere load handling	20 Amps <b>G</b>	0,97 <b>3.5</b>	0,14 <b>0.5</b>	11,89 <b>.468</b>	1,52 <b>.060</b>	2,16 <b>.085</b>	30,17±0,76 <b>1.188±.030</b>
<b>BM-1RW82-A2</b>	Up to 22 ampere load handling	22 Amps <b>F</b>	0,97 <b>3.5</b>	0,21 <b>0.75</b>	—	3,96 <b>.156</b>	0,08-0,56 <b>.003-.022</b>	30,17±0,76 <b>1.188±.030</b>
<b>BE-2RV2-A4</b>	Up to 25 ampere load handling	25 Amps <b>H</b>	0,97 <b>3.5</b>	0,14 <b>0.5</b>	11,89 <b>.468</b>	1,52 <b>.060</b>	2,16 <b>.085 max.</b>	30,17±0,76 <b>1.188±.030</b>

NOTE: For adjustable operate point and simulated roller lever switches, refer to previous page.

<b>BZ-RW922-A2</b>	Best repeatability and O.P. stability	10 Amps <b>I</b>	3,34 <b>12</b>	1,11 <b>4</b>	0,38 <b>.015</b>	2,54 <b>.100</b>	0,013-0,025 <b>.0005-.0010</b>	31,37 <b>1.235</b>
--------------------	---------------------------------------	---------------------	-------------------	------------------	---------------------	---------------------	-----------------------------------	-----------------------

<b>BZ-2RW826-A2</b>	One-way roller (9,4 mm × 3,8 mm) .37" dia. × .15" wide roller	15 Amps <b>A</b>	1,67 <b>6</b>	0,42 <b>1.5</b>	—	2,39 <b>.094</b>	0,08-0,51 <b>.003-.020</b>	41,34 <b>1.625</b>
<b>BZ-2RW825-A2</b>	One-way roller (4,83 mm × 4,83 mm) .19" dia. × .19" wide roller	15 Amps <b>A</b>	2,22 <b>8</b>	0,42 <b>1.5</b>	—	1,52 <b>.060</b>	0,38 <b>.015</b>	28,96 <b>1.14</b>

Except where stated \* ±0,38 mm  
±.015 in.

# Basic Switches

## Standard

BZ/BA Series

### FLEXIBLE LEAF

### ORDER GUIDE

Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.** mm inches
<b>BZ-2RL-A2</b>	Force and stability of the flexible leaf actuator	15 Amps <b>A</b>	1,39 5	0,14 0.5	-	1,52 .060	1,27 .050	17,48 .688
<b>BZ-2RL5551-A2</b>	Dustproof and splash resistant seal	15 Amps <b>A</b>	1,95 7	0,14 0.5	-	1,52 .060	1,27 .050	17,48 .688
<b>BZ-2RLT04 (M8805/1-001)</b>	MIL-S-8805 application requirements	15 Amps <b>A</b>	1,39 5	0,14 0.5	-	1,52 .060	1,27 .050	17,48 .688
<b>BZ-2RL24-A2</b>	Operating in temperature to +250°F (121°C)	15 Amps <b>A</b>	1,39 5	0,14 0.5	-	1,52 .060	1,27 .050	17,48 .688
<b>BZ-RLX</b>	Manual reset. Solder terminals	15 Amps <b>E</b>	0,83 3	- -	- -	1,57 .062 0,38* .015	- -	17,48 .688 7,14* .281
<b>BA-2RL-A2</b>	Up to 20 ampere load handling	20 Amps <b>G</b>	2,5 9	0,28 1	-	1,57 .062	1,57 .062	17,48 .688
<b>BE-2RL-A4</b>	Up to 25 ampere load handling	25 Amps <b>H</b>	2,5 9	0,28 1	-	1,57 .062	1,57 .062	17,48 .688

BZ TYPE



Dim. Dwg. Fig. 33

BA/BE TYPE



Dim. Dwg. Fig. 34

### FLEXIBLE ROLLER LEAF

### ORDER GUIDE

Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
<b>BZ-RL24-A2</b>	Operating in temp. to +250°F (121°C) for 100 hours	5 Amps <b>B</b>	1,39 5	0,14 0.5	-	1,52 .060	1,27 .050	28,6 1.125
<b>BZ-2RL2-A2</b>	Force and stability of the flexible leaf with roller	15 Amps <b>A</b>	1,39 5	0,14 0.5	-	1,52 .060	1,27 .050	28,6 1.125
<b>BZ-2RL25551-A2</b>	Dustproof and splash resistant seal	15 Amps <b>A</b>	1,95 7	0,14 0.5	-	1,52 .060	1,27 .050	28,6 1.125
<b>BZ-2RL2T04 (M8805/1-036)</b>	MIL-S-8805 application requirements	15 Amps <b>A</b>	1,04-1,39 3.75-5	0,14 0.5	-	1,52 .060	1,27 .050	28,6 1.125
<b>BA-2RL2-A2</b>	Up to 20 ampere load handling	20 Amps <b>G</b>	2,5 9	0,28 1	-	1,52 .060	1,65 .065	28,6 1.125
<b>BE-2RL2-A4</b>	Up to 25 ampere load handling	25 Amps <b>H</b>	2,5 9	0,28 1	-	1,52 .060	1,65 .065	28,6 1.125

BZ TYPE



Dim. Dwg. Fig. 35

BA/BE TYPE



Dim. Dwg. Fig. 36

\* Reset characteristics

\*\* ±0.76 mm  
±.030 in.

Standard Basic Switches

# Basic Switches

## Standard

# BZ/BA Series

### GENERAL INFORMATION SPECIAL CIRCUITRY SWITCHES

"Special sequence" switches provide unusual circuit control. A make-before-break switch provides circuit continuity while switching from N.C. to N.O. In another make-before-make switch, upon actuation, one circuit is made an interval before the second circuit. Another switch

provides a single pulse or momentary closure of the contacts with each cycle of operation.

Double break versions can interrupt greater inductive loads and feature shorting bar construction. A split contact version allows control of the two isolated circuits.



**Characteristics:** O.F. – Operating Force;  
R.F. – Release Force; P.T. – Pretravel;  
O.T. – Overtravel; D.T. – Differential Travel;  
O.P. – Operating Position.

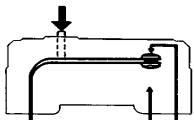
### PIN PLUNGER

#### ORDER GUIDE

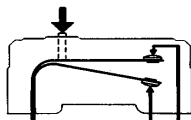


Dim. Dwg. Fig 5

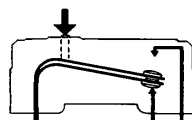
Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.* mm inches
BZ-2G-A2	Make-before-break contact action	10 Amps C	5,56 20 max.	2,22 8	0,76 .030	0,13 .005	0,38 .015	15,9 .625



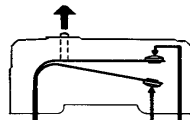
Unoperated



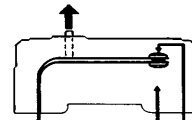
Intermediate



Fully Operated



Intermediate Release



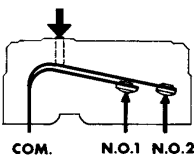
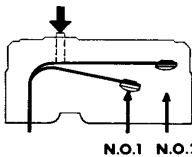
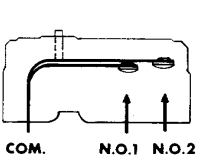
Fully Released



Dim. Dwg. Fig. 6

6BS1-B	Make-before-make contact action	10 Amps R	9,73 35 max.	2,78 10	-	-	-	-
--------	---------------------------------	--------------	-----------------	------------	---	---	---	---

\*±0,38 mm  
± .015 in.



Dim. Dwg. Fig. 4-A

10BS210	Adjustable differential travel	20 Amps Y	3,10-5,56 11-20	2,78 10	-	0,25 .010 at max. setting	0,04-0,06 .0015-.0025 0,18 .007 at max. setting	16,3 .64
---------	--------------------------------	--------------	--------------------	------------	---	------------------------------	----------------------------------------------------------	-------------

# Basic Switches

## Standard

BZ/BA Series

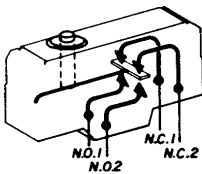
PIN PLUNGER —  
SPECIAL CIRCUITRY

### ORDER GUIDE

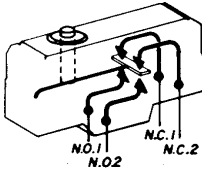
Catalog Listing	Recommended For	Electrical Data and UL Codes Page 46	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.* mm inches
<b>BZ-3AT</b>	Double-break, low voltage DC applications	15 Amps <b>T</b>	4,45-7,23 <b>16-26</b>	1,11 <b>4</b>	0,76 <b>.030</b>	0,13 <b>.005</b>	0,051-0,13 <b>.002-.005</b>	15,9 <b>.625</b>
<b>BZ-2AW80T</b>	As above, with 2.5 inch lever	15 Amps <b>T</b>	0,90 <b>3.25</b>	0,14 <b>.25</b>	- <b>-</b>	5,56 <b>.219</b>	0,51 <b>2.54</b>	19,05±0,76 <b>.750±.030</b>
<b>BZ-2AW82T</b>	As above, with 1.9 inch roller lever	15 Amps <b>T</b>	1,25 <b>4.5</b>	0,21 <b>.75</b>	- <b>-</b>	3,96 <b>.156</b>	0,38-1,91 <b>.015-.075</b>	30,18±0,76 <b>1.188±.030</b>
<b>BZ-2AW822T</b>	As above, with 1.05 inch roller lever	15 Amps <b>T</b>	2,36 <b>8.5</b>	0,42 <b>1.5</b>	- <b>-</b>	2,39 <b>.094</b>	0,20-2,39 <b>.008-.030</b>	30,18±0,76 <b>1.188±.030</b>



Dim. Dwg. Fig. 8



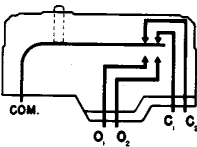
Dim. Dwg. Fig. 9



<b>BA-3ST</b>	Double-break, low voltage DC applications	25 Amps <b>M</b>	7,23-10,6 <b>26-38</b>	2,78 <b>10</b>	1,65 <b>.065</b>	0,25 <b>.010</b>	0,18-0,38 <b>.007-.015</b>	16,3 <b>.640</b>
---------------	-------------------------------------------	---------------------	---------------------------	-------------------	---------------------	---------------------	-------------------------------	---------------------



Dim. Dwg. Fig. 10



<b>BZ-3YT (MS25383-1)</b>	MIL-S-8805 application requirements. (split contact)	5 Amps <b>U</b>	4,45-7,23 <b>16-26</b>	1,11 <b>4</b>	0,76 <b>.030</b>	0,13 <b>.005</b>	0,025-0,1 <b>.001-.004</b>	15,9 <b>.625</b>
<b>BZ-3YWT80</b>	As above, with 2.50 inch lever	5 Amps <b>U</b>	0,97 <b>3.5</b>	0,14 <b>.5</b>	- <b>-</b>	5,56 <b>.219</b>	0,51-2,54 <b>.020-.100</b>	19,05±0,76 <b>.750±.030</b>
<b>BZ-3YWT82</b>	As above, with 1.9 inch roller lever	5 Amps <b>U</b>	1,25 <b>4.5</b>	0,21 <b>.75</b>	- <b>-</b>	3,96 <b>.156</b>	0,38-1,91 <b>.015-.075</b>	30,18±0,76 <b>1.188±.030</b>
<b>BZ-3YWT822</b>	As above, with 1.05 inch roller lever	5 Amps <b>U</b>	1,95 <b>7</b>	0,42 <b>1.5</b>	- <b>-</b>	2,39 <b>.094</b>	0,20-1,02 <b>.008-.040</b>	30,19 <b>.188</b>

Except where stated \* ±0,38 mm  
±.015 in.

Standard  
Basic Switches

# Basic Switches

## Standard

# BZ/BA Series

### MOUNTING DIMENSIONS (For reference only)

#### PIN PLUNGERS

BZ/BM

BA/BE

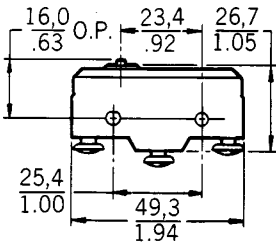


Fig. 1

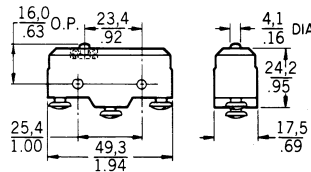


Fig. 2

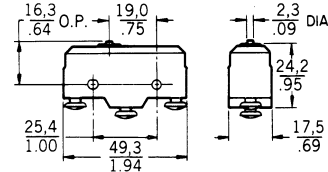


Fig. 3

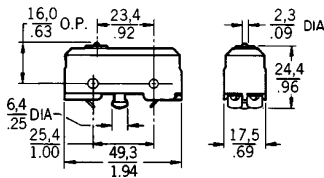


Fig. 4

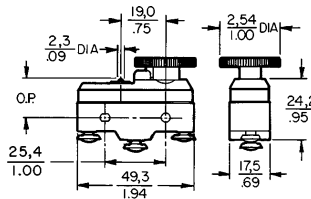


Fig. 4-A

#### PIN PLUNGERS — SPECIAL CIRCUITRY

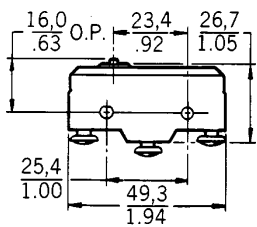


Fig. 5

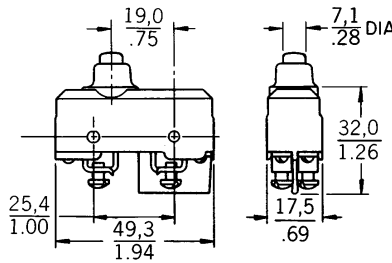


Fig. 6

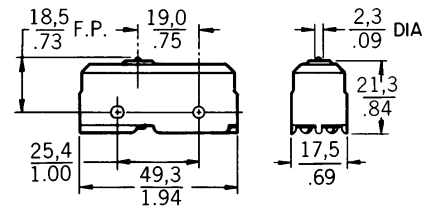


Fig. 7

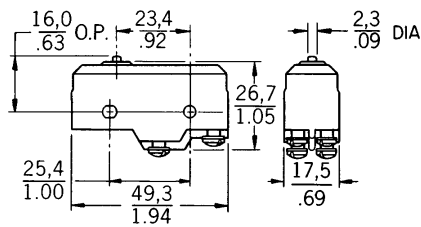


Fig. 8

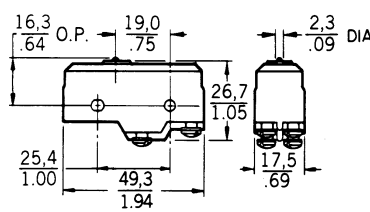


Fig. 9

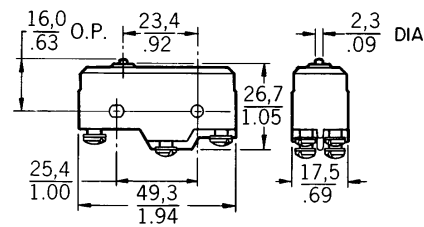


Fig. 10

Mounting holes accept pins or screws of .139" (3.53 mm) diameter.

Key: 0.0 = mm  
0.00 = inches

# Basic Switches

## Standard

BZ/BA Series

MOUNTING DIMENSIONS (For reference only)

### OVERTRAVEL PLUNGERS

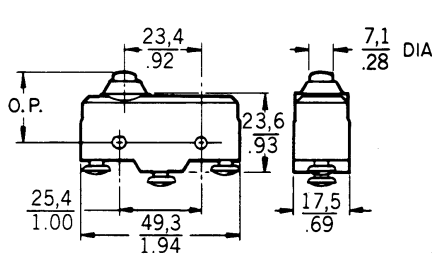


Fig. 11

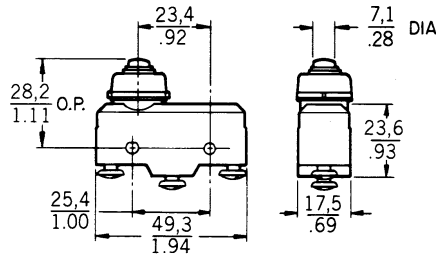


Fig. 12

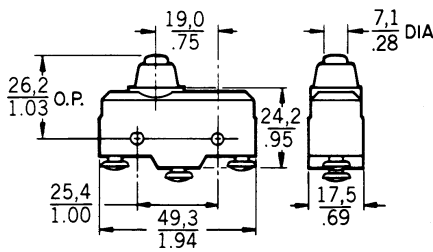


Fig. 13

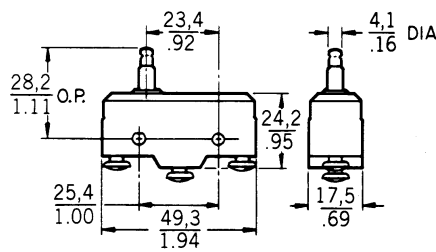


Fig. 14

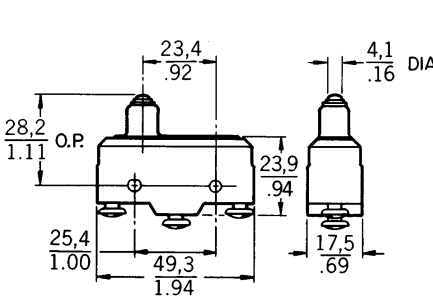


Fig. 15

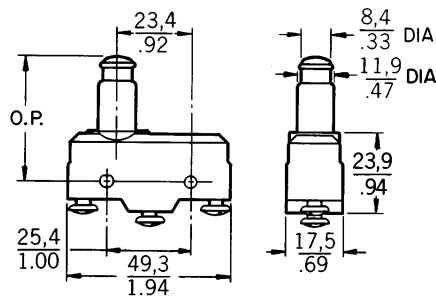
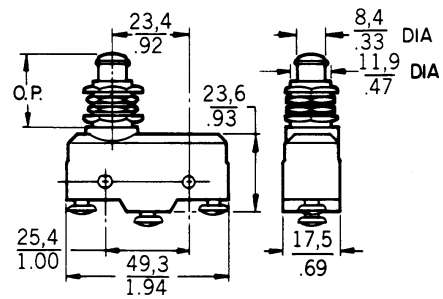
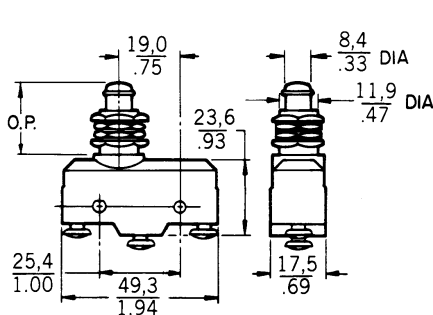


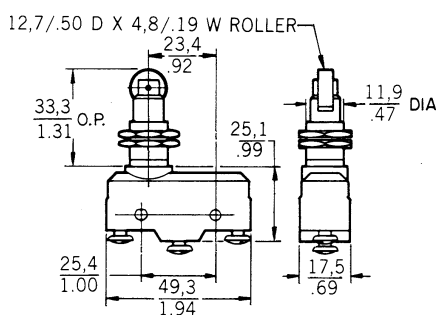
Fig. 16



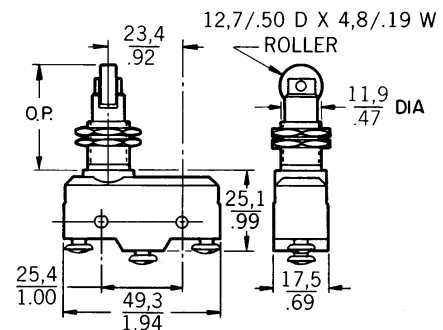
\*Fig. 17



\*Fig. 18



\*Fig. 19



\*Fig. 20

Standard  
Basic Switches

\* Threaded bushings are 15/32-32ns.

# Basic Switches

## Standard

BZ/BA Series

MOUNTING DIMENSIONS (For reference only)

### STRAIGHT LEVERS

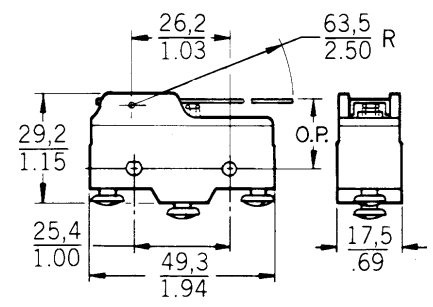


Fig. 21

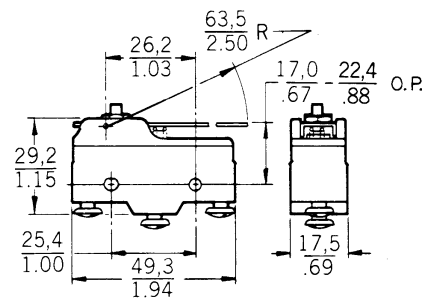


Fig. 22

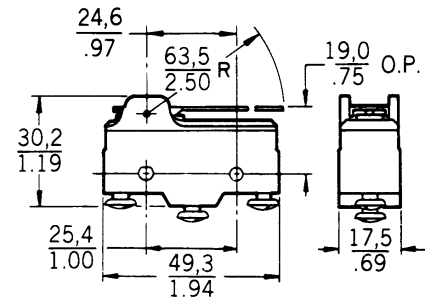


Fig. 23

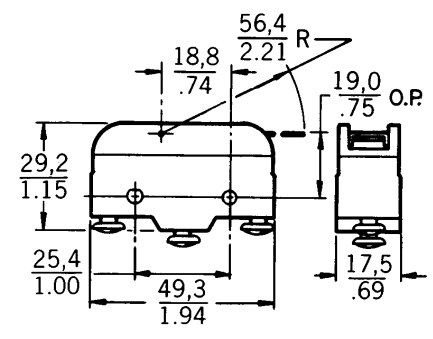


Fig. 24

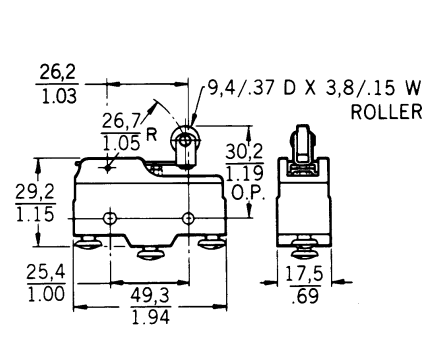


Fig. 25

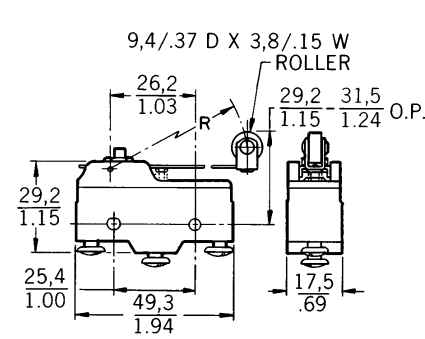


Fig. 26

R = 26,7/1,05 FOR BZ-2RW82299-A2  
48,3/1,90 FOR BZ-2RW8299-A2

### FLEXIBLE LEAF ACTUATOR

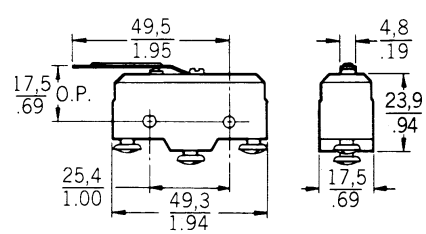


Fig. 33

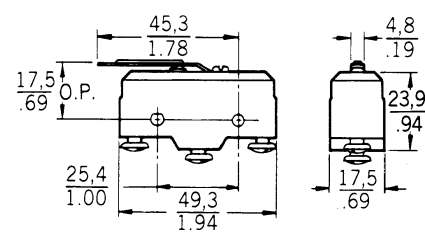


Fig. 34

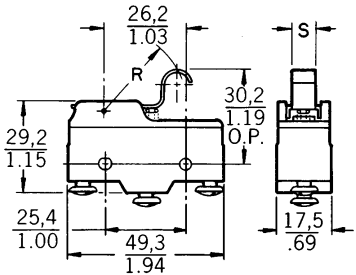
# Basic Switches

## Standard

BZ/BA Series

### MOUNTING DIMENSIONS

### ROLLER LEVERS



R = 26,7/1.05 FOR BZ-2RW80147-A2  
48,3/1.90 FOR BZ-2RW80196-A2

S = 7,9/.31 FOR BZ-2RW80147-A2  
4,8/.19 FOR BZ-2RW80196-A2

Fig. 27

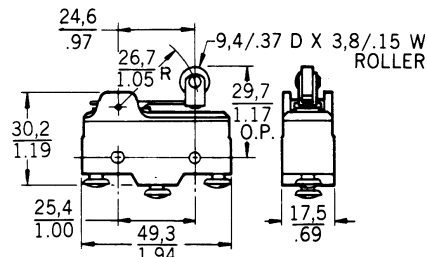


Fig. 28

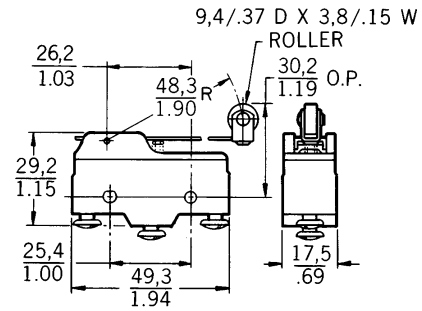


Fig. 29

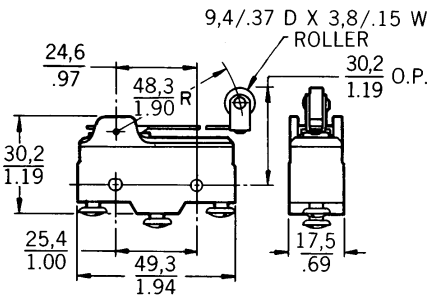


Fig. 30

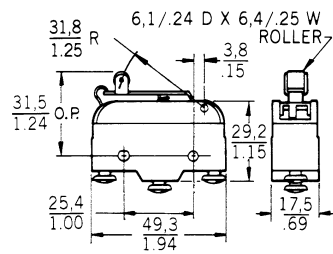
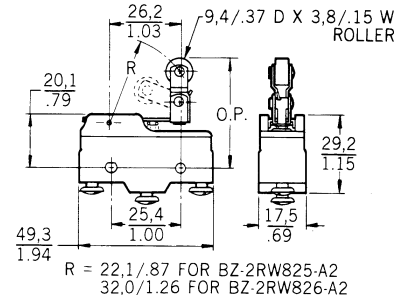


Fig. 31



R = 22,1/.87 FOR BZ-2RW825-A2  
32,0/1.26 FOR BZ-2RW826-A2

Fig. 32

Standard  
Basic Switches

### FLEXIBLE ROLLER LEAF

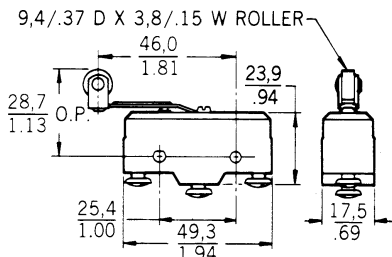


Fig. 35

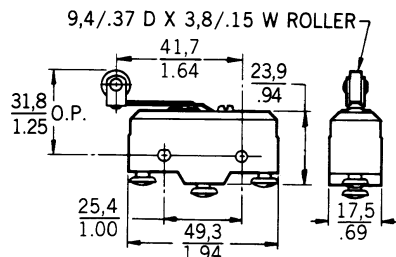


Fig. 36

Mounting holes accept pins or screws of .139" (3.53 mm) diameter.

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$



# Basic Switches

## Auxiliary Actuators Standard Basic



### FEATURES

- Additional overtravel
- Quick, easy installation
- Corrosion resistance
- MIL-S-8805 listed units

**NOTE:** Switches shown are not included with the actuator. All actuators are for use with pin plunger types only except catalog listing JR.

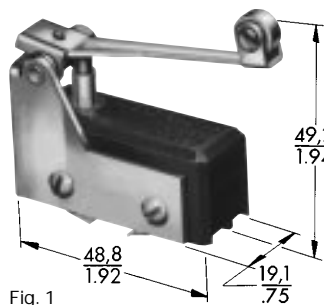
### GENERAL INFORMATION

Auxiliary actuators adapt the plunger-type standard basic switches to many application needs. Auxiliary actuators minimize the need for a large inventory of switch types. Actuators and switches are sold as separate items and must be ordered separately. Mounting hardware is furnished with the actuator.

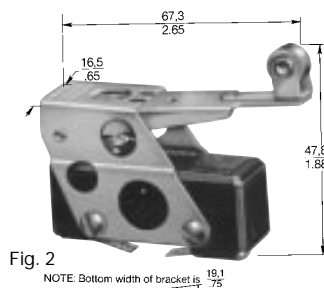
### Characteristics:

O.T. — Overtravel;  
O.P. — Operating Position;  
F.P. — Free Position.

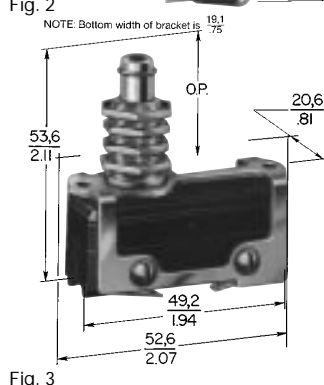
### ORDER GUIDE



Description	Catalog Listing	Use Only With	O.T. min. mm inches	O.P.* mm inches	F.P. max. mm inches
Roller lever for "S" plunger type BZ and DT switches only. Permits cam operation.	JR	BZ DT	11.1 .437	44,45±3,18 1.75±.125	



Adjustable roller lever. Tang on top of actuator can be bent to adjust O.P. and F.P.	AD5721R (8805/59) AN3169-1	BZ BM	11,1 .437 approx.	31,75-41,15 1.25-1.62	39,6-43,7 1.56-1.72
	ADA3721R	BA BE	9,53 .375 approx.	40,48 1.594 approx.	43,03 1.812
	ADD3721R	DT MT	9,53 .375 approx.	39,6 1.562 approx.	46,03 1.812



Straight plunger. Panel mount.	MC2711 (8805/59) AN3168-2	BZ BM	4,78 .188	27,79 .188	29,4 1.156
	MCA2711	BA BE	3,96 .156	28,17 1.109	30,18 1.188
	MCD2711	DT MT	3,58 .141	27,79 1.094	30,18 1.188

Dimensions shown are for reference only.

Except where stated \* ±1,14 mm ±.045 in.

# Basic Switches

## Auxiliary Actuators Standard Basics

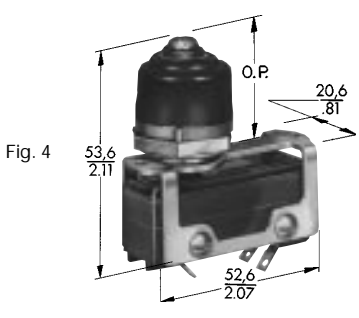


Fig. 4

### ORDER GUIDE

Description	Catalog Listing	Use Only With	O.T. min. mm Inches	O.P.* mm Inches	F.P. max. mm Inches
Sealed straight plunger. Panel mount. Elastomer seal boot keeps out liquid splash and dirt. Furnished unassembled.	MC2711H	BZ BM	4,78 .188	28,98 1.141	29,4 1.156
	MCA2711H	BA BE	4,37 .172	27,38±0,76 1.078±.030	29,56 1.156
	MCD2711H	DT MT	3,58 .141	27,79 1.094	30,18 1.188

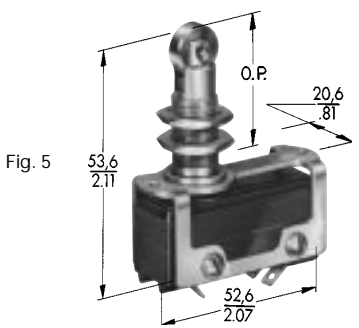


Fig. 5

Roller plunger. Panel mount. Roller parallel to long axis of the switch.	MD3211Q	BZ BM	3,18 .125 approx.	35,7 1.406	37,69 1.484
	MDA3711Q	BA BE	3,18 .125	36,12 1.422	37,69 1.484
	MD3211Q	DT MT	3,18 .125	35,7 1.406	37,69 1.484

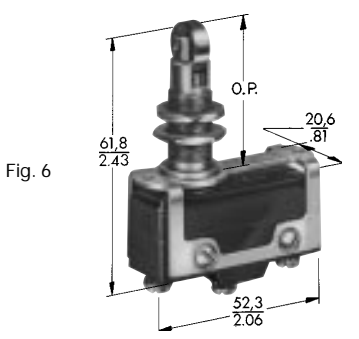


Fig. 6

Cross roller plunger. Panel mount. Roller perpendicular to long axis of the switch.	MD3211Q1	BZ BM	3,18 .125 approx.	35,7 1.406	37,69 1.484
	MDA3711Q1	BA BE	3,18 .125	36,12 1.422	37,69 1.484
	MD3211Q1	DT MT	3,18 .125	35,7 1.406	37,69 1.484

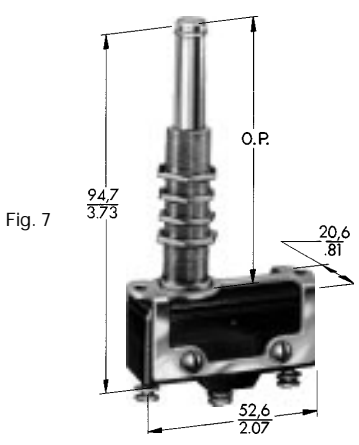


Fig. 7

High overtravel plunger. Panel mount.	MC7711 (8805/58) AN3167-1	BZ BM	20,62 .812	69,1 2.719	70,64 2.781
	MCA7711	BA BE	19,84 .781	69,44 2.734	71,42 2.812
	MCD7711	DT MT	18,26 .719	69,1 2.719	71,42 2.812

Except where stated\* ±1,14 mm ±.045 in.

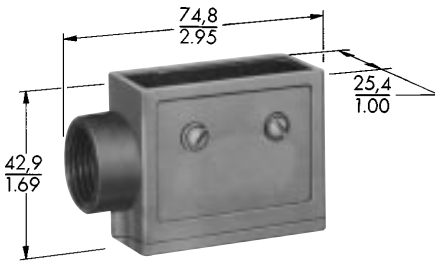
Standard Basic Switches

# Basic Switches

## Accessories Standard Basics

### DIE CAST ZINC ENCLOSURES

Width of opening .74" (18,8 mm)



3PA1



3PA2\*

\*Width of base is 2.125 inches (54 mm) and mounting hole centers are 1.625 inches (41,3 mm) apart.

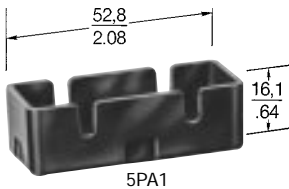
### FEATURES

- Protect switch from physical abuse
- Protect personnel from contact with exposed terminals
- Provide rugged mounting means
- 1/2-14NPT internal thread conduit hub

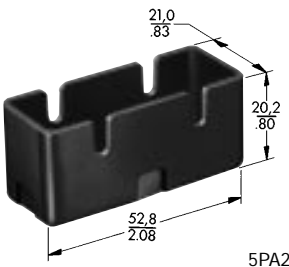
### ORDER GUIDE

Catalog Listing	Description
3PA1	Side mount enclosure—Can be mounted from either side through .140" (3,55mm) dia. holes on 1" (25,4mm) centers.
3PA28	Side mount enclosure—Can be mounted from either side through .140" (3,55mm) dia. holes on 1" (25,4mm) centers. 1/2-14 NPSM internal thread conduit hub.
3PA2	Flange mount enclosure—Switch is first secured in enclosure; two 0.172" (4,37mm) dia. holes in the flange accept #8 machine screws for mounting on 1.625 (41,3mm) centers.
3PA6	Side mount enclosure—For use with actuator Fig. 2 page 58.

### PLASTIC TERMINAL ENCLOSURES



5PA1



5PA2



5PA1 WITH SWITCH ASSEMBLY

### FEATURES

- Easy to use
- Screw and solder terminal versions
- Protect personnel from contact with exposed terminals

### ORDER GUIDE

Catalog Listing	Description
5PA1	For solder terminal switches
5PA2	For screw terminal switches
5PA3	For solder or screw terminal switches with auxiliary actuators assembled.

Dimensions shown are for reference only.

Switches are not included with enclosures.

# Basic Switches

## Accessories Standard Basics

### ADJUSTABLE MOUNTING BRACKETS



8MA1 WITH SWITCH ASSEMBLED

#### FEATURES

- Sturdy plated steel construction
- Fast, easy screwdriver adjustment
- Can be used with all standard basic switches

#### GENERAL INFORMATION

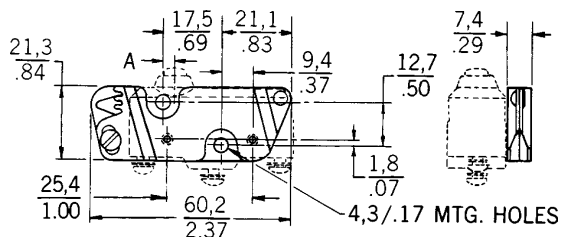
The operation point of a basic switch can be regulated up to .080" (2 mm) by loosening the locking screw, inserting a screwdriver in the adjusting slot, and twisting.

#### ORDER GUIDE

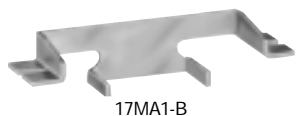
Catalog Listing	Description
8MA1	Adjustable mounting bracket, adjustment slot on the left.
8MA2	Adjustable mounting bracket, adjustment slot on the right.

### MOUNTING DIMENSIONS

'A' Dimension for  
BZ Type 3,6/.14  
BA Type 7,8/.31



### CONVERSION MOUNTING BRACKET



17MA1-B



17MA1-B WITH SWITCH ASSEMBLED

#### FEATURES

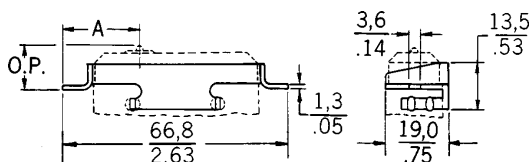
- Converts standard basic switches from side to top mount
- Corrosion resistant
- Snaps into switch mounting holes—without tools

#### ORDER GUIDE

Catalog Listing	Description
17MA1-B	Conversion mounting bracket.

Standard Basic Switches

### MOUNTING DIMENSIONS



'A' Dimension for  
Z Type 22,9/.90  
A Type 27,0/1.06

O.P.  
11,6/.46  
11,9/.47

Switches are not included with bracket.

# Basic Switches

## Double-pole Double-throw

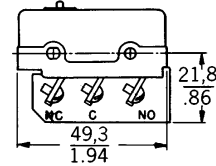


### FEATURES

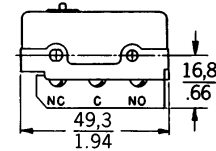
- Two independent single-pole double-throw circuits on one housing
- Design permitting several wiring combinations
- Savings in space and weight
- Mounting interchangeability with type Z switches
- Temperature tolerance to +180°F (82°C)
- UL recognized, CSA certified

### AVAILABLE TERMINALS

**B6**  
6-32 UNC x .188"  
(No. 5 pan head screws)



**A7**  
4-40 UNC x .125"  
Screws with lockwashers.  
Fiberglass insulator isolates terminals and prevents accidental shorting.



### ELECTRICAL RATING

Circuitry	Electrical Data and UL Codes
Double-pole double-throw 	<b>J</b> 10 amps, 125 or 250 vac; 0.3 amp, 125 vdc; 0.15 amp, 250 vdc. UL Code L59

**Characteristics:** O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

### DOUBLE-POLE DOUBLE-THROW



Dim. Dwg. Fig. 1

### ORDER GUIDE

Catalog Listing	Description	Electrical Data and UL Code	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. mm inches	D.T. max. min. mm inches	O.P.* mm inches
<b>DT-2R-A7</b> <b>MS25008-1</b>	Pin plunger	10 Amps <b>J</b>	3,34-5,56 <b>12-20</b>	0,56 <b>2</b>	1,91 <b>.075</b>	0,13 <b>.005</b>	1,02-1,52 <b>.040-.060</b>	15,6 <b>.615±.015</b>



Dim. Dwg. Fig. 9

<b>DT-2RS1-A7</b>	Straight plunger	10 Amps <b>J</b>	3,34-5,56 <b>12-20</b>	0,28 <b>1</b>	1,91 <b>.075</b>	0,51 <b>.020</b>	1,02-1,52 <b>.040-.060</b>	28,2±0,38 <b>1.11±.015</b>
-------------------	------------------	---------------------	---------------------------	------------------	---------------------	---------------------	-------------------------------	-------------------------------



Dim. Dwg. Fig. 3

<b>DT-2RV3-A7</b>	Straight lever Reversed lever position	10 Amps <b>J</b>	1,11-1,95 <b>4-7</b>	0,14 <b>0.5</b>	6,86 <b>.270</b>	0,25 <b>.010</b>	2,92-4,83 <b>.115-.190</b>	18,3 <b>.719</b>
-------------------	----------------------------------------	---------------------	-------------------------	--------------------	---------------------	---------------------	-------------------------------	---------------------



Dim. Dwg. Fig. 2

<b>DT-2RV-A7</b>	Straight lever	10 Amps <b>J</b>	0,97-1,67 <b>3.5-6</b>	0,28 <b>1</b>	25,4 <b>1</b>	1,57 <b>.062</b>	12,4-19,2 <b>.490-.755</b>	21,8 <b>.859</b>
------------------	----------------	---------------------	---------------------------	------------------	------------------	---------------------	-------------------------------	---------------------

Except where stated \* ±0.76 mm ±.030 in.

# Basic Switches

## Double-pole Double-throw

### ORDER GUIDE



Dim. Dwg. Fig. 8

Catalog Listing	Recommended For	Electrical Data and UL Codes	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
DT-2RV216-A7	Roller lever (centered steel roller)	10 Amps <b>J</b>	11,1 <b>2.5 lbs.</b>	1,11 <b>4</b>	1,02 <b>.040</b>	0,13 <b>.005</b>	0,51-0,76 <b>.020-.030</b>	31 <b>1.219</b>



Dim. Dwg. Fig. 5

DT-2RV22-A7	1.03 inch (26,2mm) roller lever (steel roller)	10 Amps <b>J</b>	2,5-4,17 <b>9-14</b>	0,83 <b>3</b>	-	0,79 <b>.031</b>	4,95-7,75 <b>.195-.305</b>	30,2±0,38 <b>1.188±.015</b>
-------------	------------------------------------------------	---------------------	-------------------------	------------------	---	---------------------	-------------------------------	--------------------------------



Dim. Dwg. Fig. 7

DT-2RV212-A7	Roller lever Reversed lever position	10 Amps <b>J</b>	2,5-4,17 <b>9-15</b>	0,42 <b>1.5</b>	3,3 <b>.130</b>	0,13 <b>.005</b>	1,27-2,16 <b>.050-.085</b>	29,4 <b>1.156</b>
--------------	--------------------------------------	---------------------	-------------------------	--------------------	--------------------	---------------------	-------------------------------	----------------------



Dim. Dwg. Fig. 6

DT-2RV23-A7	Roller lever Reversed lever position	10 Amps <b>J</b>	1,53-2,64 <b>5.5-9.5</b>	0,21 <b>.75</b>	4,45 <b>.175</b>	0,25 <b>.010</b>	2,16-3,43 <b>.085-.135</b>	29,4 <b>1.156</b>
-------------	--------------------------------------	---------------------	-----------------------------	--------------------	---------------------	---------------------	-------------------------------	----------------------



Dim. Dwg. Fig. 4

DT-2RV2-A7	1.90 inch (48,3 mm) roller lever (steel roller)	10 Amps <b>J</b>	1,25-2,09 <b>4.5-7.5</b>	0,42 <b>1.5</b>	—	1,19 <b>.047</b>	9,27-14,4 <b>.365-.565</b>	31,8 <b>1.250</b>
------------	-------------------------------------------------	---------------------	-----------------------------	--------------------	---	---------------------	-------------------------------	----------------------

Except where stated \* ±0,76 mm ±.030 in.

Auxiliary actuators see page 68-69.

Standard Basic Switches

# Basic Switches

DT Series

## Double-pole Double-throw

MOUNTING DIMENSIONS (For reference only)

### PIN PLUNGER

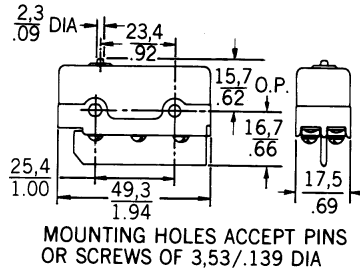


Fig. 1

### STRAIGHT LEVER

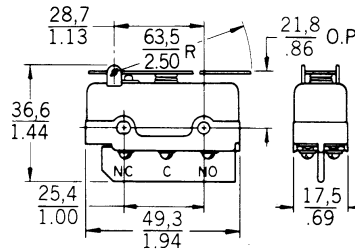


Fig. 2

### STRAIGHT LEVER

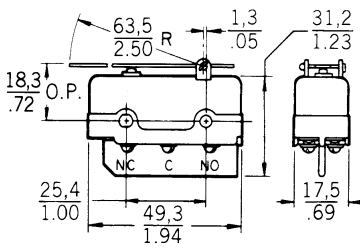


Fig. 3

### ROLLER LEVER

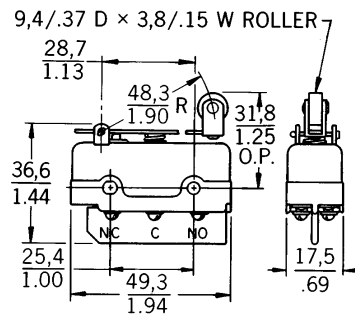


Fig. 4

Key:  $\frac{0,0}{0.00} = \frac{\text{mm}}{\text{inches}}$

# Basic Switches

DT Series

## Double-pole Double-throw

MOUNTING DIMENSIONS (For reference only)

ROLLER LEVER

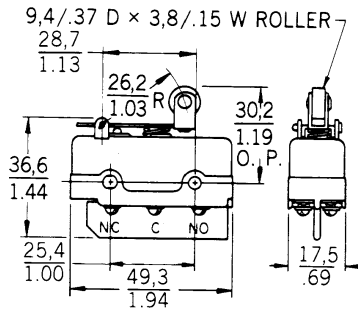


Fig. 5

ROLLER LEVER

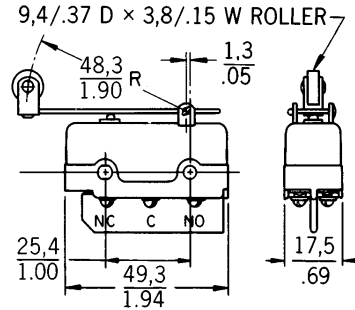


Fig. 6

ROLLER LEVER

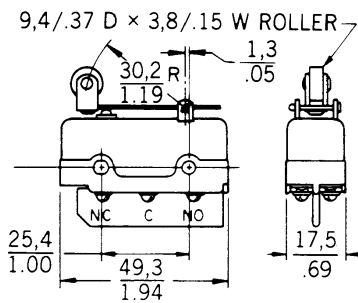


Fig. 7

ROLLER LEVER

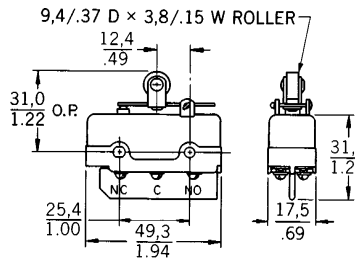


Fig. 8

STRAIGHT PLUNGER

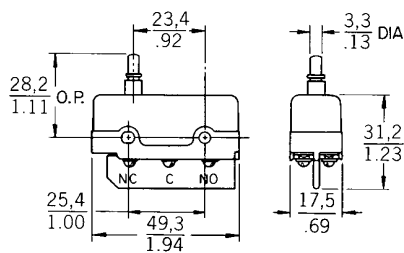


Fig. 9

Standard Basic Switches



# Basic Switches

## Magnetic Blow-out



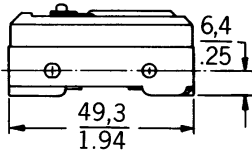
**FEATURES**

- Arc resistant case
- Mechanical life of 100,000 operations — 95% survival
- Temperature tolerance to +180°F (82°C)
- Mounting interchangeability with Z switches
- UL recognized

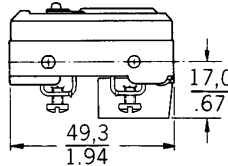
**GENERAL INFORMATION**

MT (single-pole double-throw) magnetic blow-out switches are designed to switch high capacity (125 and 250 VDC) systems. An integral magnet around the contact gap protects the contacts by deflecting the arc. Vents between the cover and housing allow the hot gas to escape. These switches are designed for the control of DC motors, solenoids, etc.

**AVAILABLE TERMINALS**



Solder (No listing designation)



**A28**  
6-32NC x .218" Screws  
will accept up to #12 wire.

**ELECTRICAL RATING**

Circuitry	Electrical Data and UL Codes
Single-pole double-throw unless otherwise noted in order guide 	<p><b>K</b> Rating established with switch non-polarized 10 amps, 125 vac or vdc; 1/4 hp, 125 vac or vdc. UL Code L 168</p> <p>Non-polarized: 10 amps res. or 1/4 hp, 125 vdc; 3 amps max. res. 250 vdc.</p> <p>Polarized*: 10 amps res. or 1/2 hp, 125 vdc; 3 amps max. res., 250 vdc.</p>

\*To polarize, connect negative side of line to common terminal. To achieve the same effect, mount switch with brass screws, using a non-magnetic barrier (at least 1/4" thick) between the switch and mounting surface.

**Characteristics:** O.F. – Operating Force;  
R.F. – Release Force; P.T. – Pretravel;  
O.T. – Overtravel; D.T. – Differential Travel;  
O.P. – Operating Position.

**ORDER GUIDE**

Catalog Listing	Recommended For	Electrical Data and UL Codes	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P. mm inches
<b>MT-4R-A28</b>	Pin plunger SPDT	10 Amps <b>K</b>	3,34-5,0 <b>12-18</b>	1,39 <b>5</b>	1,02 <b>.04</b>	0,13 <b>.005</b>	0,1-0,18 <b>.004-.007</b>	15,9±0,38 <b>.625±.015</b>



Dim. Dwg. Fig. 1

# Basic Switches

## Magnetic Blow-out

MT Series

### ORDER GUIDE



Dim. Dwg. Fig. 2

Catalog Listing	Description	Electrical Data and UL Codes	O.F. max. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
MT-4RV-A28	Straight lever	10 Amps K	0,56 2	0,14 0.5	12,7 0.5	1,19 .047	2,16 .085	19,1 .750



Dim. Dwg. Fig. 3

MT-4RV2-A28	1.90 inch (48,3mm) lever with hardened steel roller	10 Amps K	0,76 2.75	0,07 0.25	8,89 0.35	0,79 .031	1,65 .065	30,2 1.188
MT-4RV22-A28	1.03 inch (26,2mm) lever with hardened steel roller	10 Amps K	1,25 4.5	0,28 1	5,08 .200	0,38 .015	0,89 .035	31,3 1.234



Dim. Dwg. Fig. 4

MT-4RL-A28	1.95 inch (49,5mm) flexible leaf	10 Amps K	3,34 12	0,28 1	—	1,52 .060 max.	—	19,1 .750
------------	----------------------------------	--------------	------------	-----------	---	----------------------	---	--------------



Dim. Dwg. Fig. 5

MT-4RL2-A28	1.82 inch (46,2mm) flexible leaf with hardened steel roller	10 Amps K	3,34 12	0,28 1	—	1,52 .060 max.	—	30,2 1.188
-------------	-------------------------------------------------------------	--------------	------------	-----------	---	----------------------	---	---------------

Standard Basic Switches

Except where stated \* ±0,76 mm  
±.030 in.

# Basic Switches

## Magnetic Blow-out

MT Series

MOUNTING DIMENSIONS (For reference only)

### PIN PLUNGER

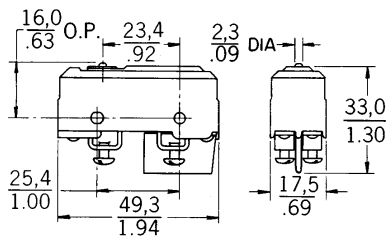


Fig. 1

### STRAIGHT LEVER

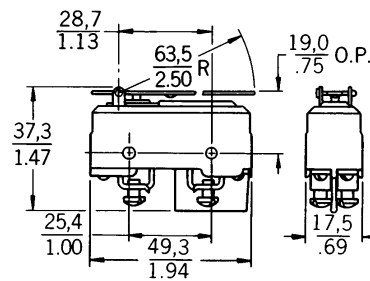


Fig. 2

### ROLLER LEVER

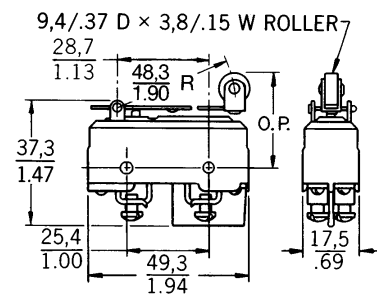


Fig. 3

### FLEXIBLE LEAF

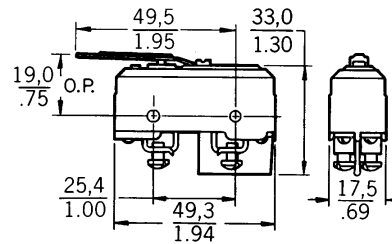


Fig. 4

### FLEXIBLE ROLLER LEAF

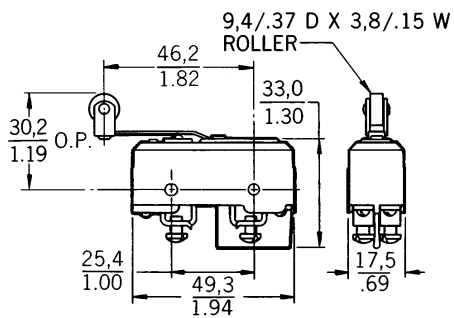


Fig. 5

Mounting holes accept pins or screws of .139" (3.53 mm) diameter.

Key:  $\frac{0,0}{0.00} = \text{mm}$   
 $\frac{0,00}{0.00} = \text{inches}$

# Basic Switches

## Double-break



### FEATURES

- .080 inch minimum overtravel
- Power load switching capability up to 15 amperes
- Motor handling capacity of 1 horsepower at 240 vac.
- Long mechanical life of 10,000,000 cycles—95% survival
- Arc resistant plastic
- More space between terminals to reduce possibility of shorting
- #8 Terminal screws
- UL recognized, CSA certified

### GENERAL INFORMATION

3MN switches are for use with limit or control mechanisms on machine tools, presses or other industrial equipment.

These switches provide easy gang mounting.

The terminals of double-break switches must be wired to identical voltage sources and the same polarity. The loads should be on the same sides of the lines.

### ELECTRICAL RATING

Circuitry	Electrical Data and UL Codes
<p>Two-circuit double-break</p>	<p><b>V</b> Motor Control                      15 amps, 120, 240, 480 or 600 vac;                      1/2 hp, 120 vac; 1 hp, 240 vac;                      0.8 amp, 115 vdc; 0.4 amp, 230 vdc.</p>

### ORDER GUIDE

**Characteristics:** O.F. — Operating Force; R.F. — Release Force; P.T. — Pretravel; O.T. — Overtravel; D.T. — Differential Travel; O.P. — Operating Position.

Catalog Listing	Description	Electrical Data and UL Codes	O.F. newtons ounces	R.F. min. newtons ounces	P.T. max. mm inches	O.T. min. mm inches	D.T. mm inches	O.P.* max. mm inches
3MN1	For most applications	15 Amps <b>V</b>	3,34-5,56 <b>12-20</b>	1,67 <b>6</b>	1,52 <b>.060</b>	2,03 <b>.080</b>	0,38-0,63 <b>.015-.025</b>	2,16 <b>.085</b>
3MN6	Lower force	15 Amps <b>V</b>	1,95-3,1 <b>7-11</b>	1,11 <b>4</b>	1,52 <b>.060</b>	2,03 <b>.080</b>	0,38-0,63 <b>.015-.025</b>	2,16 <b>.085</b>

\* ±0,38 mm  
±.015 in.

Standard Basic Switches



Dim. Dwg. Fig. 1

### MOUNTING DIMENSIONS (For reference only)

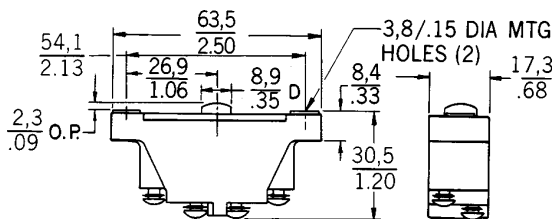


Fig. 1

Key:  $\frac{0,0}{0,00} = \frac{\text{mm}}{\text{inches}}$

# Basic Switches

## Tandem Switch Assemblies





**FEATURES**

- Variety of actuators
- Choice of circuitries and electrical ratings
- Choice of terminations
- Field adjustable operating point on one or both basic switches

**GENERAL INFORMATION**

6AS switches are two standard basic switches ganged together and actuated by a single actuator. Operating characteristics will depend on the type of individual switches and actuators.

**ELECTRICAL RATING**

Circuitry	Electrical Data and UL Codes
Single-pole double-throw unless otherwise noted in order guide 	<b>A</b> 15 amps, 125, 250 or 480 vac; 1/8 hp, 125 vac; 1/4 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L96
Single-pole double-throw unless otherwise noted in order guide 	<b>G</b> 20 amps, 125, 250 or 480 vac; 10 amps, 125 vac "L" (tungsten lamp load); 1 hp, 125 vac; 2 hp, 250 vac; 1/2 amp, 125 vdc; 1/4 amp, 250 vdc. UL Code L23

**ORDER GUIDE**

Characteristics: O.F. – Operating Force; R.F. – Release Force; P.T. – Pre-travel; O.T. – Overtravel; D.T. – Differential Travel; O.P. – Operating Position.

Catalog Listing	Description	Lever Length mm inches	Type Terminals	Electrical Data and UL Codes	O.F. max. newtons ounces	R.F. min. newtons ounces	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
<b>6AS32</b>	Centered lever. Adjustment over both switches.	58,72 <b>2.312</b>	<b>Solder</b>	15 Amps <b>A</b>	2,22 <b>8</b>	0,14 <b>0.5</b>	0,51 <b>.020</b>	2,77 <b>.109</b>	18,29 <b>.720 adj.</b>
<b>6AS54</b>	Short lever. Adjustment over switch D.	20,47 <b>.806</b>	<b>Solder</b>	15 Amps <b>A</b>	3,34 <b>12</b>	0,83 <b>3</b>	0,25 <b>.010</b>	3,96 <b>.156</b>	18,24 <b>.718 max.</b>
<b>6AS25</b>	Centered lever. Adjustment over switch D.	32,26 <b>1.270</b>	<b>A2</b>	20 Amps <b>G</b>	3,89 <b>14</b>	1,11 <b>4</b>	1,02 <b>.040</b>	—	18,67 <b>.735</b>



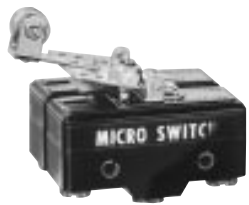
Dim. Dwg. Fig. 1

Unless otherwise noted \* ±0,76 mm ±.030 in.

### ORDER GUIDE

Catalog Listing	Description	Lever Length mm inches	Type Terminals	Electrical Data and UL Codes	O.F. max. newtons ounces	R.F. min. newtons ounces	O.T. min. mm inches	D.T. max. mm inches	O.P.* mm inches
6AS13	Centered lever. Adjustment over switch D.	30,56 1.203	Solder	15 Amps A	2,22 8	0,14 0.5	0,51 .020	2,77 .109	29,77 1.172
6AS18	Centered lever. Adjustment over both switches.	30,56 1.203	Solder	15 Amps A	2,22 8	0,14 0.5	0,51 .020	2,77 .109	29,77 1.172 adj.
6AS36	Lever over switch C. Adjustment over switch D.	30,56 1.203	A2	15 Amps A	2,22 8	0,14 0.5	0,51 .020	2,77 .109	29,77 1.172
6AS35	Lever and adjustment over switch D.	30,56 1.203	A2	15 Amps A	2,22 8	0,14 0.5	0,51 .020	2,77 .109	29,77 1.172
6AS16	Centered lever. Adjustment over switch D.	30,56 1.203	A2	20 Amps G	3,89 14	1,11 4	1,02 .040	3,96 .156	30,96±1,14 1.219±.045
6AS69	Centered lever. Adjustment over switch D.	27,25 1.073	T	25 Amps M	—	—	—	—	30,96±1,14 1.219±.045
6AS112	Centered lever. Adjustment over switch D.	30,56 1.203	A2	25 Amps H	3,89 14	1,11 4	1,02 .040	3,96 .156	30,96±1,14 1.219±.045
6AS5	Centered leaf. No adjustment. Switches operate within .030" of each other.	38,35 1.51	A2	15 Amps A	—	—	0,76-1,52 .030-.060	—	

Unless otherwise noted \* ±0,76 mm  
±.030 in.



Dim. Dwg. Fig. 2



Dim. Dwg. Fig. 3

### MOUNTING DIMENSIONS (For reference only)

Standard  
Basic Switches

#### STRAIGHT LEVER

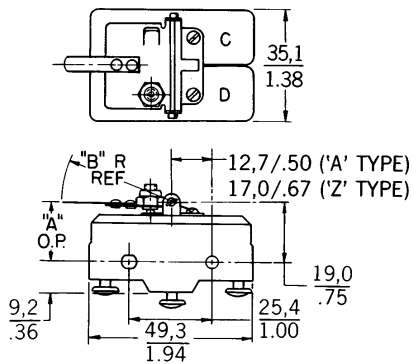


Fig. 1

#### ROLLER LEVER

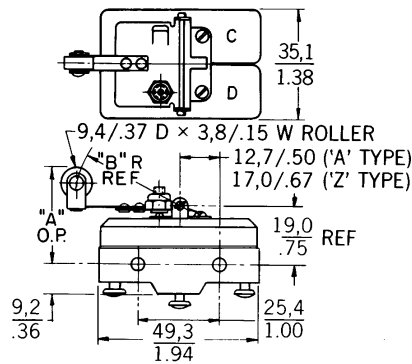


Fig. 2

#### LEAF

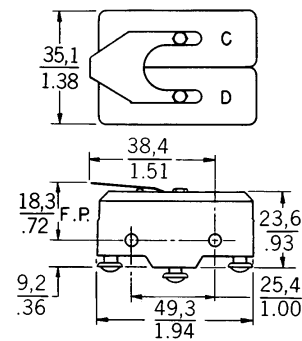


Fig. 3

Mounting holes accept pins or screws of .139" (3,53 mm) diameter.

Key: 0,0 = mm  
0.00 = inches