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Honeywell

MICRO SWITCH Premium Subminiature Basic Switches

SM Series

004959

Issue 3

Datasheet

DESCRIPTION

The industry-defining name in snap-action switches, Honeywell MICRO SWITCH premium subminiature switches are designed for repeatability and enhanced product life. The MICRO SWITCH SM Series delivers consistent performance within a range of conditions.

The MICRO SWITCH SM Series' small size and light weight are combined with ample electrical capacity, precision operation, and extended life. Featuring high precision and repeatability, the SM Series offers gold contacts for low-energy switching and gold bifurcated contacts for maximum reliability. Bifurcated contacts provide parallel redundancy within the SM switch.

The SM switch is available for power-duty switching up to 11 A (Vac) or 1/4 HP (Vac).

DIFFERENTIATION

- Very wide temperature range allows for years of reliable performance in the harshest of conditions
- MIL-PRF-8805 qualified listings
- Operating forces as low as 0,06 N [6 g] and differential travel as low as 0,025 mm [0.001 in] delivers consistent, precise switch characteristics

FEATURES

- Industry-leading mechanical life of up to 10,000,000 operations
- Selection of actuation, electrical termination, and operating characteristics along with high-temperature construction options
- Wide temperature range of -54°C to 204°C [-65°F to 400°F]
- MIL-PRF-8805 qualified listings in a lightweight, small package
- FAA-PMA approvals for commercial aircraft
- Choice of silver or gold-plated, or gold bifurcated contacts to handle a variety of electrical load requirements
- UL/CSA, cUL, ENEC, and CE approvals

VALUE TO CUSTOMERS

- Industry-leading life cycle rating reduces the need to replace switches over life in an OEM platform – reducing total system cost
- Low operating forces
- Mil-qualified listings
- Life of up to 10,000,000 cycles

POTENTIAL APPLICATIONS

- Precision switch assemblies for commercial aircraft to monitor doors for "closed" and "locked" position
- Landing gear monitor
- Precision switch assemblies for commercial cockpit applications for pushbuttons, toggle, or joystick assemblies
- Precision switch assemblies in military applications
- Assemblies for industrial pressure switches and temperature switches
- Power generation fuel level (gas and oil)

PORTFOLIO

The SM Series of premium subminiature basic switches are a part of a strong offering of submins including SX Series (premium) and ZM, ZM1, ZD, ZX, and ZW Series (standard) switches.

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Table 1. Specifications

Characteristic	Parameter
Differentiator	low operating force to 2 oz. max; power load switching capability to 11 A; motor load handling capacity to 1/4 HP (Vac)
Ampere rating	0.1 A to 11 A
Circuitry	SPDT
Operating force	0.04 oz to 2 oz
Termination	quick connect, solder, pcb
Actuator	pin plunger, straight lever, roller lever, simulated roller lever, paddle lever
Voltage	115 Vac, 125 Vac, 250 Vac, 30 Vdc
Agency approvals	UL, CE, CSA, ENEC, MIL-PRF-8805, FAA-PMA
Agency file information	CE: 61058-1; UL: E12252; CSA: LR41372
Operating temperature	-54°C to 121°C [-65°F to 250°F]; select catalog listings 204°C [400°F]
Contacts	silver, gold plated, bifurcated gold
Housing	phenolic
Sealing	sealed plunger on 411SM Series, other SM Series not weather sealed
Mechanical life	up to 10,000,000 operations for 11SM listings up to 80,000 operations for 1SM/41SM listings up to 1,000,000 operations for gold bifurcated contact
Size	12,7 mm H x 6,35 mm W x 20,3 mm L [0.5 in H x 0.25 in W x 0.8 in L]

Electrical data and UL codes

Table 2. UL Electrical Ratings

Code	Circuitry	Electrical data and UL codes
J	SPDT	5 A res., 3 A ind., (sea level), 5 A res., 2.5 A ind., (50,000 feet), 28 Vdc. UL rating: 5 A, 250 Vac
K	SPDT	UL rating: 5 A, 125 or 250 Vac
M	SPDT	UL rating: 11 A and 1/4 hp, 125 or 250 Vac
N	SPDT	1 A res., 0.5 A ind., 30 Vdc. UL rating: 1 A, 125 Vac
P	SPDT	1 A res., 30 Vdc. UL rating: .1 A, 125 Vac
R	SPDT	5 A res., 3 A ind., 2.4 A lamp load (sea level), 5 A res., 2.5 A ind., 2.4 A lamp load, (50,000 feet), 28 Vdc. 5 A res., 5 A ind., 1.5 A lamp load, 115 Vac. 60 Hz (sea level)
S	SPDT	UL rating: 4 A, 250 Vac

MICRO SWITCH Premium Subminiature Basic Switches, SM Series

O.F. • Operating force
R.F. • Release force
P.T. • Pretravel
O.T. • Overtravel
D.T. • Differential travel
O.P. • Operating position

Table 3. MICRO SWITCH SM Series Order Guide • Pin Plunger

	Catalog Listing	Recommended For	Electrical Data and UL Codes	O.F. N [oz]	R.F. min. N [oz]	P.T. max. mm [in]	O.T. min. mm [in]	D.T. mm [in]	O.P. * mm [in]
	11SM1077-T	Gold-plated contacts	0.1 A **P**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	12SM604-T	Bifurcated gold contacts, reduced rating	0.1 A **P**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,076 [0.003]	0,1 [0.004]	8,38 [0.330]
	11SM23-T	Gold-plated contacts	1 A **N**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	12SM4-T	Enhanced reliability (bifurcated gold contacts)	1 A **N**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,076 [0.003]	0,1 [0.004]	8,38 [0.330]
	11SM701-T	Lower force	4 A **S**	0,56 [2]	0,14 [0.5]	0,51 [0.020]	0,13 [0.005]	0,051 [0.002]	8,38 [0.330]
	11SM1-T	General purpose	5 A **J**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	11SM3-T	Operating temps to 121°C [250°F]	5 A **J**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	11SM244-T	Operating temps to 204°C [400°F] for 100 hours	5 A	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	11SM401-T	Less differential travel	5 A **K**	0,97 [3.5] max.	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,025 [0.001]	8,38 [0.330]
	21SM284-T2 (MS25085-2)	MIL-PRF-8805 applications	5 A **R**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,76 [0.030]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	21SM284 (MS25085-1)	MIL-PRF-8805 applications, solder terminals	5 A **R**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,76 [0.030]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	22SM1-T	Enhanced stability under varying humidity	5 A **J**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	41SM1-T	Up to 11 A, 1/4 HP (ac)	11 A **M**	0,83 to 1,39 [3 to 5]	0,28 [1]	0,76 [0.030]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	411SM1	Sealed plunger construction	5 A **K**	0,83 to 2,09 [3 to 7.5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]
	411SM23	Sealed plunger construc-tion, gold contacts	1 A **N**	0,83 to 2,09 [3 to 7.5]	0,28 [1]	0,51 [0.020]	0,13 [0.005]	0,1 [0.004]	8,38 [0.330]

* except where stated ±0,38 mm [±0.015 in]

MICRO SWITCH Premium Subminiature Basic Switches, SM Series

O.F. • Operating force
R.F. • Release force
P.T. • Pretravel
O.T. • Overtravel
D.T. • Differential travel
O.P. • Operating position

Table 4. MICRO SWITCH SM Series Order Guide • Integral Lever

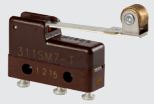
	Catalog Listing	Recommended For	Electrical Data and UL Codes	O.F. N [oz]	R.F. min. N [oz]	P.T. max. mm [in]	O.T. min. mm [in]	D.T. mm [in]	O.P. * mm [in]
	311SM1-T	7,24 mm [0.285 in] straight lever	5 A **J**	0,39 [1.4]	0,07 [0.25]	2,16 [0.085]	0,51 [0.020]	0,48 [0.019]	8,64 mm ±1,5 mm [0.34 in ±0.060 in]
	311SM23-T	7,24 mm [0.285 in] straight lever, gold contacts	1 A **N**	0,39 [1.4]	0,07 [0.25]	2,16 [0.085]	0,51 [0.020]	0,48 [0.019]	8,64 mm ±1,5 mm [0.34 in ±0.060 in]
	311SM701-T	7,24 mm [0.285 in] straight lever, lower force	4 A **S**	0,16 [0.57]	0,03 [0.11]	2,16 [0.085]	0,51 [0.020]	0,36 [0.014]	8,64 mm ±1,5 mm [0.34 in ±0.060 in]
	311SM2-T	14,35 mm [0.565 in] straight lever	5 A **J**	0,31 [1.1]	0,05 [0.18]	3,05 [0.12]	0,66 [0.026]	0,69 [0.027]	8,51 mm ±2 mm [0.335 in ±0.08 in]
	311SM43-T	14,35 mm [0.565 in] straight lever, gold contacts	1 A **N**	0,31 [1.1]	0,05 [0.18]	3,05 [0.12]	0,66 [0.026]	0,69 [0.027]	8,51 mm ±2 mm [0.335 in ±0.08 in]
	311SM702-T	14,35 mm [0.565 in] straight lever, lower force	4 A **S**	0,11 [0.4]	0,02 [0.07]	3,05 [0.12]	0,66 [0.026]	0,38 [0.015]	8,51 mm ±2 mm [0.335 in ±0.08 in]
	311SM3-T	44,8 mm [1.765 in] straight lever	5 A **J**	0,15 [0.53]	0,02 [0.07]	7,87 [0.31]	1,45 [0.057]	2,8 [0.11]	7,11 mm ±4,3 mm [0.28 in ±0.17 in]
	311SM17-H58	44,8 mm [1.765 in] straight lever, gold contacts	1 A **N**	0,15 [0.53]	0,02 [0.07]	7,87 [0.31]	1,45 [0.057]	2,8 [0.11]	7,11 mm ±4,3 mm [0.28 in ±0.17 in]
	311SM703-T	44,8 mm [1.765 in] straight lever, lower force	4 A **S**	0,06 [0.2]	0,01 [0.04]	7,87 [0.31]	1,45 [0.057]	1,78 [0.07]	7,11 mm ±4,3 mm [0.28 in ±0.17 in]
	311SM4-T	6,38 mm [0.251 in] simulat-ed roller lever	5 A **J**	0,39 [1.4]	0,07 [0.25]	2,16 [0.085]	0,46 [0.018]	0,48 [0.019]	11,7 mm ±1,5 mm [0.46 in ±0.06 in]
	311SM25-T	6,38 mm [0.251 in] simu- lated roller lever, gold contacts	1 A **N**	0,39 [1.4]	0,07 [0.25]	2,16 [0.085]	0,46 [0.018]	0,48 [0.019]	11,7 mm ±1,5 mm [0.46 in ±0.06 in]
	311SM704-T	6,38 mm [0.251 in] simulat-ed roller lever, lower force	4 A **S**	0,16 [0.57]	0,03 [0.11]	2,16 [0.085]	0,46 [0.018]	0,33 [0.013]	11,7 mm ±1,5 mm [0.46 in ±0.06 in]
	311SM5-T	13,6 mm [0.535 in] simulat-ed roller lever	5 A **J**	0,31 [1.1]	0,05 [0.18]	3,05 [0.12]	0,66 [0.026]	0,69 [0.027]	11,56 mm ±2 mm [0.455 in ±0.08 in]
	311SM705-T	13,6 mm [0.535 in] simulat-ed roller lever, lower force	4 A **S**	0,11 [0.4]	0,02 [0.07]	3,05 [0.12]	0,66 [0.026]	0,38 [0.015]	11,56 mm ±2 mm [0.455 in ±0.08 in]
	311SM6-T	6,38 mm [0.251 in] roller lever	5 A **J**	0,39 [1.4]	0,07 [0.25]	2,16 [0.085]	0,46 [0.018]	0,48 [0.019]	14,2 mm ±1,5 mm [0.56 in ±0.06 in]
	311SM68-T	6,38 mm [0.251 in] roller lever, gold contacts	1 A **N**	0,39 [1.4]	0,07 [0.25]	2,16 [0.085]	0,46 [0.018]	0,48 [0.019]	14,2 mm ±1,5 mm [0.56 in ±0.06 in]
	311SM706-T	6,38 mm [0.251 in] roller lever, lower force	4 A **S**	0,16 [0.57]	0,03 [0.11]	2,16 [0.085]	0,46 [0.018]	0,33 [0.013]	14,2 mm ±1,5 mm [0.56 in ±0.06 in]
	**311SM7-T**	13,6 mm [0.535 in] roller lever	5 A **J**	0,31 [1.1]	0,05 [0.18]	3,05 [0.12]	0,66 [0.026]	0,69 [0.027]	14,1 mm ±2 mm [0.555 in ±0.08 in]
	111SM1-T	Leaf actuator	5 A **J**	1,95 [7]	0,56 [2]	5,54 [0.218]	0,76 [0.03]	0,76 [0.03]	8,89 mm ±0,76 mm [0.35 in ±0.03 in]
	111SM17-T	Leaf actuator gold contacts	1 A **N**	1,95 [7]	0,56 [2]	5,54 [0.218]	0,76 [0.03]	0,76 [0.03]	8,89 mm ±0,76 mm [0.35 in ±0.03 in]
	111SM2-T	Flexible leaf with roller	5 A **J**	1,95 [7]	0,56 [2]	5,56 [0.219]	0,76 [0.03]	0,64 [0.025]	14,3 mm ±0,76 mm [0.562 in ±0.03 in]
	111SM23-T	Flexible leaf with roller, gold contacts	1 A **N**	1,95 [7]	0,56 [2]	5,56 [0.219]	0,76 [0.03]	0,64 [0.025]	14,3 mm ±0,76 mm [0.562 in ±0.03 in]

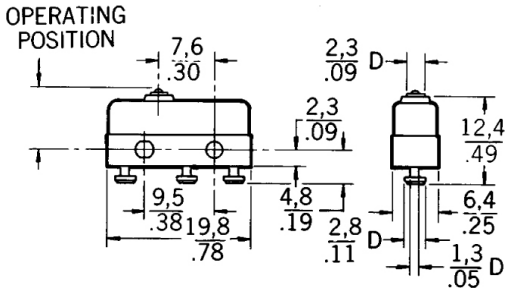
Table 5. Numeric Designations for MICRO SWITCH SM Series/Order Guide

Prefix	Description
1SM	Standard pin plunger construction, up to 80,000 operations
11SM	Long-life pin plunger construction, up to 10,000,000 operations
12SM	Gold bifurcated contacts
21SM	Same as 1SM (formerly had DAP material)
22SM	Same as 11SM (formerly had DAP material)
23SM	Same as 12SM (formerly had DAP material)
41SM	11 A construction (11SM construction)
101SM	1SM with an integral leaf actuator
111SM	11SM with an integral spring leaf
112SM	12SM with an integral spring leaf
122SM	22SM with an integral spring leaf
151SM	51SM with an integral spring leaf
301SM	1SM with an integral rigid lever
302SM	1SM with an integral roller lever
311SM	Integral rigid lever
321SM	21SM with an integral rigid lever
322SM	22SM with an integral rigid lever
401SM	Dust/splash resistant 1SM
411SM	Dust/splash resistant 11SM
412SM	Dust/splash resistant 12SM

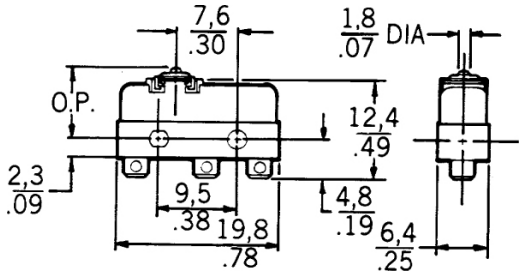
Suffix	Description
23	Gold contacts
400	Low differential travel series
500	Reverse terminal designation
700	Low force series
1000	Gold alloy

Table 6. SM Series • Standard Actuator Options, Screw Terminals, and Dimensions (mm/in)

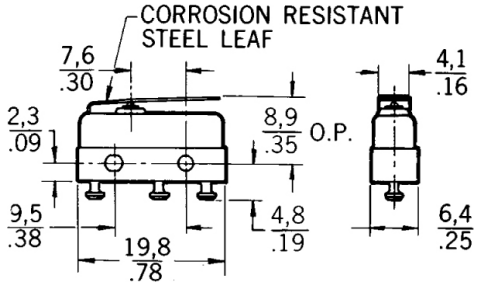
Pin plunger, T terminals



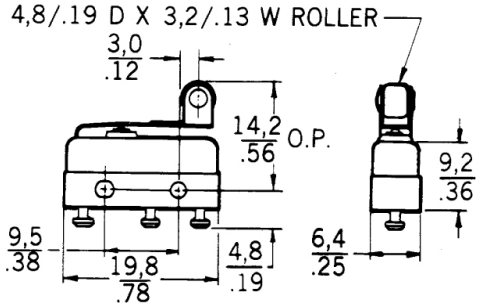
Pin plunger, Solder terminals



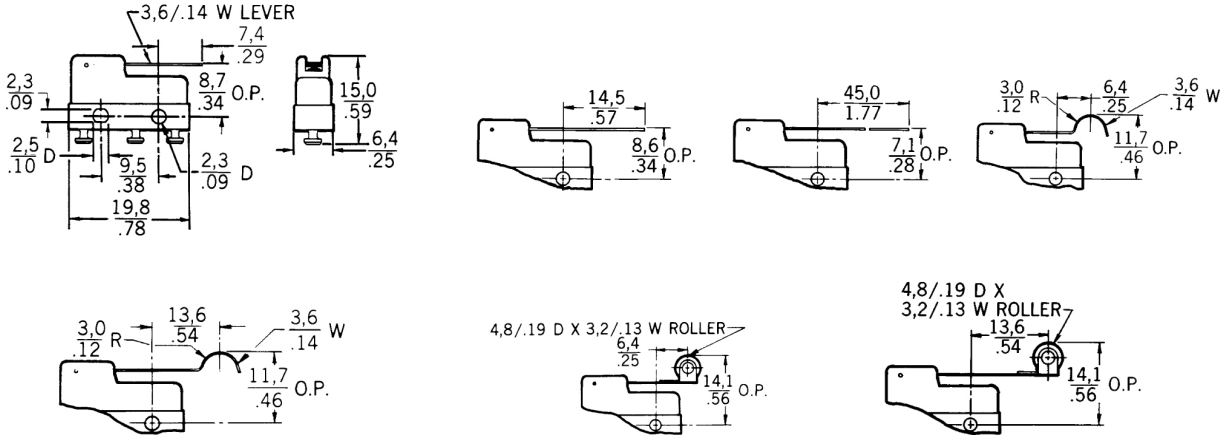
Integral leaf lever



Integral roller lever



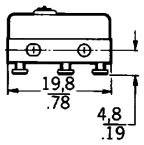
Integral levers



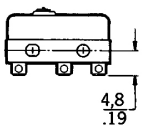
NOTE: The two mounting holes accept pins or screws of 2,21 mm (0.087 in) maximum diameter

MICRO SWITCH SM SERIES AVAILABLE TERMINALS

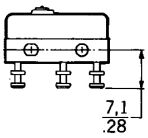
T



SOLDER

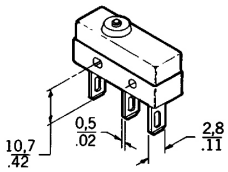


T2

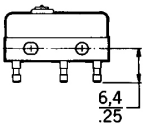


Mounting torque:
0,26 Nm [2.3 in-lb] max.

H4

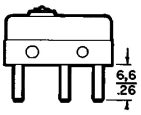


H58



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

H2

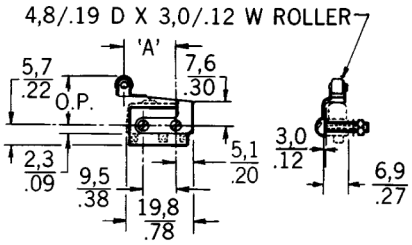
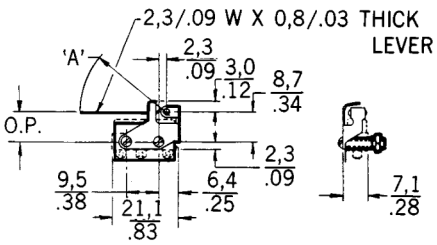


MICRO SWITCH JS SERIES AUXILIARY ACTUATORS FOR THE MICRO SWITCH SM SERIES SWITCHES (stainless steel actuator and hardware)

		Description	Actuator Length	Operting Force max.	Release Force min.	Pretravel max.	Overtravel min.	Differential Travel max.	Operating Point	Free Position max.
JS-2		Straight leaf	16,8 mm [0.66 in]	2,78 N [10 oz]	0,56 N [2 oz]	1,98 mm [0.078 in]	0,38 mm [0.015 in]	0,38 mm [0.015 in]	8,89 mm ±0,38 mm [0.350 in ±0.015 in]	11,3 mm [0.445 in]
JS-5		Roller leaf (bronze roller)	15 mm [0.59 in]	2,78 N [10 oz]	0,83 N [3 oz]	1,98 mm [0.078 in]	0,38 mm [0.015 in]	0,38 mm [0.015 in]	14,2 mm ±0,38 mm [0.580 in ±0.015 in	16,9 mm [0.665 in]
JS-7		Formed leaf (simulated roller)	14,7 mm [0.58 in]	2,78 N [10 oz]	0,56 N [2 oz]	2,39 mm [0.094 in]	0,79 mm [0.031 in]	0,38 mm [0.015 in]	9,65 mm ±0,38 mm [0.380 in ±0.015 in]	12,7 mm [0.475 in]
JS-220		Straight lever	26,2 mm [1.03 in]*	0,28 N [1 oz]	0,04 N [0.14 oz]	3,18 mm [0.125 in] approx.	0,76 mm [0.030 in]	0,76 mm [0.030 in]	10,3 mm [0.406 in] approx.	–
JS-246		Roller lever (steel roller)	25,4 mm [1.00 in]*	0,28 N [1 oz]	0,04 N [0.14 oz]	3,18 mm [0.125 in] approx.	0,76 mm [0.030 in]	0,76 mm [0.030 in]	14,3 mm [0.562 in] approx.	–
JS-221		Formed lever (simulated roller)	25,4 mm [1.00 in]*	0,28 N [1 oz]	0,04 N [0.14 oz]	3,18 mm [0.125 in] approx.	0,76 mm [0.030 in]	0,76 mm [0.030 in]	11,6 mm [0.455 in] approx.	–
JS-33** Δ		Tandem leaf	5,3 mm [0.21 in]	5,00 N [18 oz]	2,78 N [10 oz]	2,36 mm [0.093 in]	0,15 mm [0.006 in]	0,38 mm [0.015 in]	8,89 mm ±0,38 mm [0.350 in ±0.015 in]	10,5 mm [0.415 in]
JS-31** Δ		Tandem leaf (bronze roller)	4,3 mm [0.17 in]	11,1 N [40 oz]	4,45 N [16 oz]	2,36 mm [0.093 in]	0,13 mm [0.005 in]	0,38 mm [0.015 in]	14,5 mm ±0,38 mm [0.570 in ±0.015 in]	16,1 mm [0.635 in]

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

NOTE: Above actuators should be used below 300ºF

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

Δ Plated steel machine screws