# SX SERIES

**004968**
*Issue 3*

## MICRO SWITCH Premium Subminiature Basic Switches

## DESCRIPTION

MICRO SWITCH SX Series is a premium subminiature snap-action switch from the family of S series subminiature basic switches. Although small in size, the SX Series is rated for controlling electrical loads ranging from logic-level/computer-based circuits to limited power-duty switching (up to 7 A/250 Vac). The SX premium subminiature switch package offers gold contacts for low energy switching and bifurcated gold contacts for maximum reliability. Bifurcated contacts provide parallel redundancy within the SX switch.

A wide variety of stainless steel levers are available and when combined with the subminiature package size, can adapt the SX Series to a wide range of applications. To enhance the versatility of SX switches, the family is certified to UL, CE, CSA, ENEC, MIL-PRF-8805, FAA-PMA and UKCA for worldwide use. The SX Series is the right choice for a cost-effective premium subminiature switch package.

## FEATURES

- Industry-leading life cycle of up to 10,000,000 operations
- Selection of actuation, electrical termination, and operating characteristics
- Wide temperature range of -54°C to 204°C [-65°F to 400°F]
- Built from military-grade components
- MIL-PRF-8805 qualified listings
- Available with FAA-PMA approvals for commercial aircraft applications
- Silver, gold-plated, or bifurcated gold contacts to handle a variety of electrical load requirements
- Available worldwide through Honeywell's network

## DIFFERENTIATION

- Industry-leading life cycle rating reduces the need to replace switches over life in an OEM platform – reducing total system cost
- 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 0,147 N [15 g] and differential travel as low as 0,025 mm [0.001 in] delivers consistent precise switch characteristics

## APPLICATIONS

- In precision switch assemblies for commercial aircraft to monitor doors for "closed" and "locked" position
- Monitor whether landing gear is "up" or "down and locked"
- In precision switch assemblies for commercial cockpit applications for pushbuttons, toggle, or joystick assemblies
- MIL-PRF-8805 listings suitable for precision switch assemblies in military applications
- FAA-PMA approvals for commercial aircraft
- In precision switch assemblies for pressure switches and temperature switches
- In power generation, fuel level switch for gas and oil

## PORTFOLIO

The MICRO SWITCH SX joins Honeywell's Subminiature Basic Swtich Series ideal for applications where space on the equipment is at a premium. These switches may be adapted to a wide variety of applications. To view the entire product portfolio, click here.

Honeywell

# MICRO SWITCH PREMIUM SUBMINIATURE BASIC SWITCHES
# SX SERIES

**TABLE 1. SPECIFICATIONS**

| CHARACTERISTIC | PARAMETER |
|---|---|
| **Differentiator** | low operating force to 0,147 N [15 g] max; sensitive differential travel as low as 0,025 mm [0.001 in] max.; power load switching capability to 7 A |
| **Ampere rating** | 1 A to 7 A |
| **Circuitry** | SPDT, SPNO |
| **Operating force** | 0.71 oz to 6 oz |
| **Termination** | quick connect, solder, pcb |
| **Actuator** | pin plunger, straight lever, roller lever, simulated roller lever, offset flag lever, crossed roller lever |
| **Voltage** | 125 Vac, 250 Vac, 28 Vdc |
| **Circuitry** | SPNO, SPDT, DPDT |
| **Agency approvals** | UL, CE, UKCA, CSA, ENEC, MIL-PRF-8805, FAA-PMA |
| **Agency file information** | UL: E12252; CSA: LR41372 |
| **Operating temperature** | -54°C to 12°C [-65°F to 250°F]; select catalog listings 204°C [400°F] |
| **Contacts** | silver, gold-plated, bifurcated gold |
| **Housing** | phenolic or thermoplastic polyester |
| **Sealing** | not weather sealed |
| **Mechanical Life** | up to 10,000,000 operations for 11SX Series<br>up to 1,000,000 operations for 1SX Series |
| **Size** | 10,2 mm H x 5,08 mm W x 12,7 mm L [0.4 in H x 0.20 in W x 0.5 in L] |

## ELECTRICAL DATA AND UL CODES

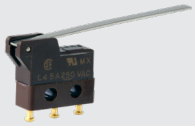
**TABLE 2. UL ELECTRICAL RATINGS**

| CODE | CIRCUITRY | ELECTRICAL DATA AND UL CODES |
|---|---|---|
| **A** | SPDT | 5 A res., 3 A ind., (sea level),<br>4 A res., 2 A ind., (50,000 feet), 28 Vdc<br>5 A res. or ind. 115 Vac, 60 Hz. UL/CSA rating: 5 A, 250 Vac |
| **B** | SPDT | 7 A res., 4 A ind., (sea level),<br>7 A res., 2.5 A ind., (50,000 feet), 28 Vdc. UL/CSA rating: 7 A, 250 Vac |
| **C** | SPDT | 3.5 A res., 2 A ind., (sea level),<br>3.5 A res., 1.5 A ind., (50,000 feet), 28 Vdc. UL rating: 7 A, 250 Vac |
| **D** | SPDT | 1 A res., 0.5 amp ind., (sea level and 50,000 feet), 28 Vdc.<br>UL/CSA rating: 1 amp, 125 Vac |
| **E** | SPDT | 3 A res., 2 A ind., (sea level), 28 Vdc.<br>UL rating: 3 A, 250 Vac |
| **F** | SPDT | 7 A res., 4 A ind., 2.5 A lamp load, (sea level),<br>4 A res., 2.5 A ind., 2.5 A lamp load, (50,000 feet), 28 Vdc.<br>7 A res., 7 A ind., 2 A lamp load, 115 Vac, 60 Hz (sea level) |
| **G** | SPDT | 2 A res., lamp ind., (sea level) 28 Vdc |
| **H** | SPDT | .010 A res. and ind., (sea level). 28 Vdc.<br>UL/CSA rating: 1 A, 125 Vac |
| **I** | SPDT | 7 A res., 4 A ind., (sea level), 28 Vdc |
| **L** | SPDT | 1 A res., 1/2 A ind., (sea level) 28 Vdc |

# MICRO SWITCH PREMIUM SUBMINIATURE BASIC SWITCHES
## SX SERIES

O.T. • Operating Torque
O.F. • Operating Force
P.T. • Pretravel
O.T. • Overtravel
D.T. • Differential Travel
O.P. • Operating Position

**TABLE 3. MICRO SWITCH SX 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] |
|---|---|---|---|---|---|---|---|---|---|
|  | **311SX1-T** | 3,43 mm [0.135 in] straight lever | 5 A **A** | 0,49 [1.76] | 0,09 [0.32] | 1,65 [0.065] | 0,36 [0.014] | 0,51 [0.020] | 8,43 mm ±1,14 mm [0.332 in ±0.045 in] |
| | **313SX1-T** | 3,43 mm [0.135 in] straight lever with gold contacts | 1 A **D** | 0,49 [1.76] | 0,09 [0.32] | 1,65 [0.065] | 0,36 [0.014] | 0,51 [0.020] | 8,43 mm ±1,14 mm [0.332 in ±0.045 in] |
|  | **311SX2-T** | 12,8 mm [0.505 in] straight lever | 5 A **A** | 0,31 [1.1] | 0,05 [0.18] | 2,92 [0.115] | 0,64 [0.025] | 0,89 [0.035] | 8,26 mm ±1,91 mm [0.325 in ±0.075 in] |
| | **313SX2-T** | 12,8 mm [0.505 in] straight lever with gold contacts | 1 A **D** | 0,31 [1.1] | 0,05 [0.18] | 2,92 [0.115] | 0,64 [0.025] | 0,89 [0.035] | 8,26 mm ±1,91 mm [0.325 in ±0.075 in] |
|  | **311SX3-T** | 24,5 mm [0.965 in] straight lever | 5 A **A** | 0,20 [0.71] | 0,03 [0.11] | 4,70 [0.185] | 0,61 [0.024] | 1,52 [0.060] | 7,75 mm ±2,92 mm [0.305 in ±0.115 in] |
| | **313SX3-T** | 24,5 mm [0.965 in] straight lever with gold contacts | 1 A **D** | 0,20 [0.71] | 0,03 [0.11] | 4,70 [0.185] | 0,6 [0.024] | 1,52 [0.060] | 7,75 mm ±2,92 mm [0.305 in ±0.115 in] |
|  | **311SX4-T** | 1,1 mm [0.042 in] simulated roller lever | 5 A **A** | 0,58 [2.1] | 0,11 [0.39] | 1,27 [0.050] | 0,25 [0.010] | 0,38 [0.015] | 14,15 mm ±0,91 mm [0.557 in ±0.036 in] |
| | **313SX4-T** | 1,1 mm [0.042 in] simulated roller lever with gold contacts | 1 A **D** | 0,58 [2.1] | 0,11 [0.39] | 1,27 [0.050] | 0,25 [0.010] | 0,38 [0.015] | 14,15 mm ±0,91 mm [0.557 in ±0.036 in] |
|  | **311SX5-T** | 11,7 mm [0.459 in] simulated roller lever | 5 A **A** | 0,31 [1.1] | 0,05 [0.18] | 2,67 [0.105] | 0,56 [0.022] | 0,89 [0.035] | 14,86 mm ±1,65 mm [0.585 in ±0.065 in] |
| | **313SX5-T** | 11,7 mm [0.459 in] simulated roller lever with gold contacts | 1 A **D** | 0,31 [1.1] | 0,05 [0.18] | 2,67 [0.105] | 0,56 [0.022] | 0,89 [0.035] | 14,86 mm ±1,65 mm [0.585 in ±0.065 in] |

# MICRO SWITCH PREMIUM SUBMINIATURE BASIC SWITCHES
## SX SERIES

O.T. • Operating Torque
O.F. • Operating Force
P.T. • Pretravel
O.T. • Overtravel
D.T. • Differential Travel
O.P. • Operating Position

**TABLE 4. MICRO SWITCH SX 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] |
|---|---|---|---|---|---|---|---|---|---|
|  | **12SX2-T** | Bifurcated gold contacts | 0.01 A **H** | 0.7 to 1,39 [2.5 to 5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,051 [0.002] | 8,13 [0.32] |
| | **3SX1-T** | Gold-plated contacts (1SX type) | 1 A **D** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **12SX1-T** | Enhanced reliability (gold bifurcated contacts) | 1 A **D** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,076 [0.003] | 8,13 [0.32] |
| | **12SX3-T** | Lowest differential travel, bifurcated gold contacts | 1 A **H** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,025 [0.001] | 8,13 [0.32] |
| | **13SX21-T** | Gold-plated contacts (11SX type) | 1 A **D** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,051 [0.002] | 8,13 [0.32] |
| | **23SX39-T (MS24547-2)** | MIL-PRF-8805, gold contacts, 82°C [180°F] max. use | 1 A **D** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **23SX39-T2 (MS24547-5)** | MIL-PRF-8805, gold contacts, 82°C [180°F] max. use | 1 A **D** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **93SX39-T (M8805/109-03)** | 0.156 in wide, gold contacts, 82°C [180°F] | 1 A **D** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **411SX21-T (M8805/106-01)** | 204°C [400°F] for 100 hours | 2 A **G** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **413SX21-T (M8805/106-02)** | 204°C [400°F] for 100 hours | 1 A **L** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,051 [0.002] | 8,13 [0.32] |
| | **11SX1-T** | Lowest differential travel | 3 A **E** | 0,97 [3.5] | 0,21 [0.75] | 0,51 [0.02] | 0,1 [0.004] | 0,025 [0.001] | 8,13 [0.32] |
| | **11SX21-T** | General purpose | 5 A **A** | 0.7 to 1,39 [2.5 to 5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,051 [0.002] | 8,13 [0.32] |
| | **11SX22-T** | General purpose | 5 A **A** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,025 [0.001] | 8,13 [0.32] |
| | **17SX21-T** | Enhanced stability under varying humidity, 11SX type | 5 A **A** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,051 [0.002] | 8,13 [0.32] |
| | **1SX1-T** | Power-duty switching | 7 A **B** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **1SX12-T** | Low differential travel | 7 A **C** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,051 [0.002] | 8,13 [0.32] |
| | **1SX48-T** | Added overtravel | 7 A **B** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,25 [0.01] | 0,13 [0.005] | 8,13 [0.32] |
| | **2SX1-T** | Lower operating force | 7 A **B** | 0,83 [3] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **4SX1-T** | 204°C [400°F] for 100 hours | 7 A **I** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **21SX1-T** | Enhanced stability under varying humidity, 1SX type | 7 A **B** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **21SX39-T (MS24547-1)** | MIL-PRF-8805 82°C [180°F] | 7 A **F** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **21SX39-T2 (MS24547-4)** | MIL-PRF-8805 82°C [180°F] | 7 A **F** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |
| | **91SX39-T M8805-109-01** | 0.156 in wide 82°C [180°F] | 7 A **F** | 1,39 [5] | 0,28 [1] | 0,51 [0.02] | 0,1 [0.004] | 0,13 [0.005] | 8,13 [0.32] |

* ±0,38 mm [±0.015 in]

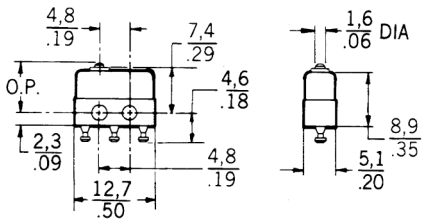
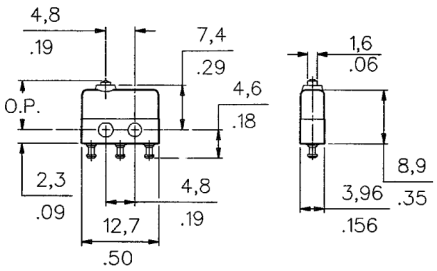
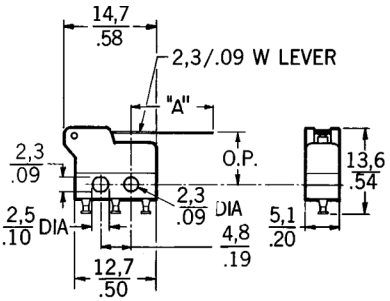
# MICRO SWITCH PREMIUM SUBMINIATURE BASIC SWITCHES
## SX SERIES

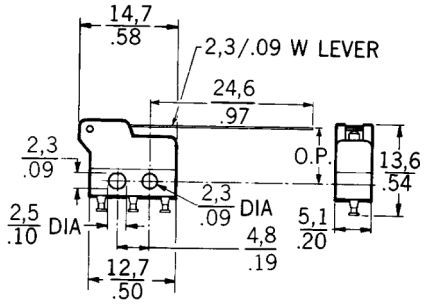
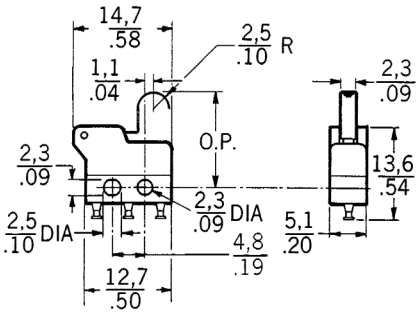
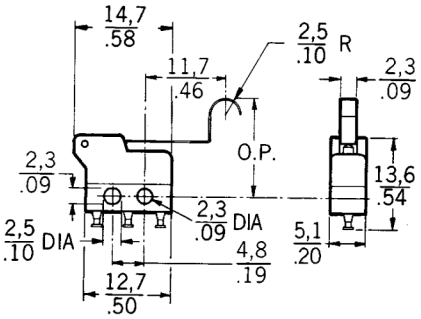
**TABLE 5. NUMERIC DESIGNATIONS FOR MICRO SWITCH 2X SERIES/ORDER GUIDE**

| Prefix | Description |
|---|---|
| **1SX** | Plastic pin plunger, fine silver contacts with 0.188 mounting hole centers |
| **2SX** | 1SX with low force characteristics (3 oz. max. operating force) |
| **3SX** | 1SX with gold/gold alloy contacts |
| **4SX** | 1SX with high temperature construction [400°F] |
| **6SX** | 1SX with high temperature and gold/gold alloy contacts |
| **7SX** | 2SX with gold/gold alloy contacts |
| **11SX** | Low force characteristics (OF and DT) |
| **12SX** | 11SX with bifurcated gold contacts |
| **13SX** | 11SX with gold/gold alloy contacts |
| **14SX** | 11SX with high temperature construction |
| **21SX** | 1SX with MIL-approvals |
| **22SX** | 2SX with MIL-approvals |
| **23SX** | 1SX with gold/gold alloy contacts and MIL-approvals |
| **311SX** | 11SX with integral lever actuator |
| **312SX** | 12SX with integral lever actuator |
| **313SX** | 13SX with integral lever actuator |
| **323SX** | 311SX with gold/gold alloy contacts |
| **91SX** | Thin SX (0.156 in thick) |
| **93SX** | Thin SX (0.156 in thick), gold/gold alloy contacts |
| **411SX** | 11SX with high temperature construction [400°F] |

# MICRO SWITCH PREMIUM SUBMINIATURE BASIC SWITCHES
## SX SERIES

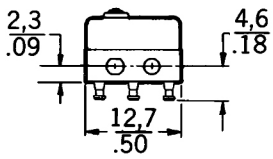
**TABLE 6. STANDARD ACTUATOR OPTIONS, SCREW TERMINALS, & DIMENSIONS (MM/IN)**

| Pin plunger, "T" terminals | Pin plunger, "T1" terminals | Integral lever,<br>3,43 mm [0.135 in] straight lever<br>12,8 mm [0.505 in] straight lever |
|---|---|---|
|  MOUNTING HOLES ACCEPT PINS OR SCREWS OF 2,3/.09 DIA |  |  Dim. "A"<br>311SX1-T 3,6/.14<br>311SX2-T 13,0/.51 |

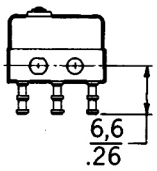
| Integral lever,<br>24,5 mm [0.965 in] straight lever | Integral lever,<br>1,1 mm [0.042 in] simulated roller lever | Integral lever,<br>11,7 mm [0.459 in] simulated roller lever |
|---|---|---|
|  |  |  Interchangeable with 1SX-1T switch with JX-25 actuator. |

## MICRO SWITCH SX SERIES AVAILABLE TERMINALS

T

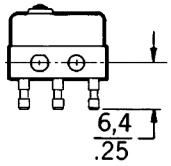



T2



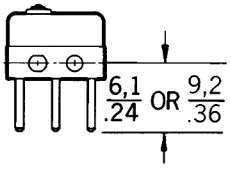

Mounting torque:
0,226 Nm max.
[2 in-lb max.]

H58

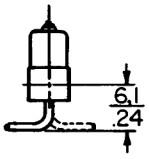



Mate with Amp Inc. Part No. 640024-1 Std.

STRAIGHT PIN




H391, H392
90° FORMED PIN



# MICRO SWITCH PREMIUM SUBMINIATURE BASIC SWITCHES
## SX SERIES

**TABLE 7. MICRO SWITCH JX SERIES AUXILIARY ACTUATORS FOR THE MICRO SWITCH™ SX SERIES SWITCHES (STAINLESS STEEL ACTUATORS AND HARDWARE)**

| | | Description | Actuator Length | Operating Force Max. | Release Force Min. | Pretravel Max. | Overtravel Min. | Differential Travel Max. | Operating Point Approx. | Free Position Ref. |
|---|---|---|---|---|---|---|---|---|---|---|
| JX-20<br>JX-219 |  | Straight lever<br>(JX-219 for higher temperatures) | 18,3 mm [0.72 in]*** | 0,28 N [1 oz] approx. | 0,04 N [0.14 oz] | – | 0,76 mm [0.030 in approx. | 0,76 mm [0.030 in] approx. | 10,8 mm [0.425 in] | 12,3 mm [0.485 in] |
| JX-25<br>JX-220 |  | Roller lever<br>(JX-220 for higher temperatures) | 16,5 mm [0.65 in]*** | 0,42 N [1.5 oz] | 0,04 N [0.14 oz] | – | 0,51 mm [0.020 in] | 0,76 mm [0.030 in] | 14,9 ,mm [0.585 in] | 168 mm [0.660 in] |
| JX-40<br>JX-95 |  | Straight leaf<br>(JX-95 for higher temperatures) | 9,4 mm [0.37 in][Δ] | 1,95 N [7 oz] | 0,56 N [2 oz] | 5,7 mm [0.225 in] approx. | 0,38 mm [0.015 in] | 0,64mm [0.025 in] | 7,5 mm [0.295 in] | 12,3 mm [0.485 in] |
| JX-41** |  | Reverse leaf | 9,4 mm [0.37 in][Δ] | 1,67 N [6 oz] | 0,28 N [1 oz] | 2,79 mm [0.110 in] approx. | 0,38 mm [0.015 in] | 0,64mm [0.025 in] | 7,5 mm [0.295 in] | 9,4 mm [0.370 in] |
| JX-45<br>JX-96 |  | Roller leaf<br>(JX-96 for higher temperatures) | 6,1 mm [0.24 in][Δ] | 1,95 N [7 oz] | 0,28 N [1 oz] | 5,7 mm [0.225 in] approx. | 0,38 mm [0.015 in] | 0,64mm [0.025 in] | 12,2 mm [0.48 in] | 16,5 mm [0.650 in] |
| JX-51** |  | Reverse roller leaf | 7,6 mm [0.30 in][Δ] | 1,67 N [6 oz] | 0,56 N [2 oz] | 2,79 mm [0.110 in] approx. | 0,38 mm [0.015 in] | 0,64mm [0.025 in] | 12,8 mm [0.505 in] | 14,7 mm [0.58 in] |
| JX-4 |  | Tandem leaf | 7,9 mm [0.31 in][D] | 4,17 N [15 oz] | 0,83 N [3 oz] | 1,65 mm [0.065 in] approx. | 0,20 mm [0.008 in] | 0,76 mm [0.030 in] | 7,6 mm [0.30 in] | 9,40 mm [0.37 in] |

** Switch is mounted with plunger end reversed from JX-40

NOTE: Above actuators should be used below 149°C [300°F], except listings JX-95, JX-96, JX-219, and JX-220 are for use with 4SX1-T to 204°C [400°F]

[D] Measurement for leaf-style levers is from center of mounting hole nearest tip of lever to the point indicated on the drawing

*** Measurement for hinge-style levers is from pivot point of the lever to the end of the lever or center of the lever's roller

## WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items that Honeywell, in its sole discretion, finds defective. The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While Honeywell may provide application assistance personally, through our literature and the Honeywell web site, it is buyer's sole responsibility to determine the suitability of the product in the application.

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### ⚠ WARNING
### IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine-control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

**Failure to comply with these instructions could result in death or serious injury.**

### ⚠ WARNING
### MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

## FOR MORE INFORMATION

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004968-3-EN | 3 | 08/22


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