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Sensing and Control  
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### Sensing and Control

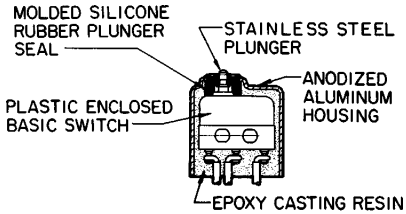
Honeywell Inc.

11 West Spring Street

Freeport, IL 61032

# Position Sensors

## 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.<br>5 amps res., 5 amps ind., 125 or 250 vac, 60 Hz.           | <b>D</b> UL Rating<br>7 amps, 250 vac 60 Hz   |
|                          | <b>B</b> UL and CSA Rating<br>5 amps, 250 vac, 60 Hz  | <b>E</b> 7 amps res., 4 amps ind., (sea level),<br>7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc. |
|                          | <b>C</b> 7 amps res., 4 amps ind., (sea level),<br>7 amps res., 2.5 amps ind., (50,000 feet), 28 vdc.<br>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 |
| <p>Fig. 1</p> | 1SE1            | Most applications                                  | A                      | 1,39-4,73<br>5-17   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
|               | 1SE2            | SPST — Normally-closed                             | A                      | 1,39-4,73<br>5-17   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
|               | 1SE3            | SPST — Normally-open                               | A                      | 1,39-4,73<br>5-17   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
|               | 4SE1            | UL and CSA listing and UL and CSA listed lead wire | B                      | 1,39-4,73<br>5-17   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
|               | 5SE1            | Oil resistant Fluorosilicone seal                  | A                      | 1,39-4,73<br>5-17   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
|               | 7SE1            | Lower force  | A                      | 1,11-2,22<br>4-8    | 0,56<br>2                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
| <p>Fig. 2</p> | 12SE4-T         | High return force                                  | A                      | 1,39-5,28<br>5-19   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.425   |
|               | 1SE1-T          | For customer leading                               | A                      | 1,39-4,73<br>5-17   | 1,11<br>4                | 1,27<br>.050        | 0,08<br>.003        | 0,1<br>.004         | 10,8<br>.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<br>mm<br>inches | Characteristics measured<br>with actuators mounted to a 1SE1 |                                   |                                 |                              |                              |                       |                         |
|--|-----------------|---|-----------------------------------|--|-----------------------------------|---------------------------------|------------------------------|------------------------------|-----------------------|-------------------------|
|  |                 |   |                                   | O.F.<br>max.<br>Newtons<br>ounces                            | R.F.<br>min.<br>Newtons<br>ounces | P.T.<br>approx.<br>mm<br>inches | O.T.<br>min.<br>mm<br>inches | D.T.<br>max.<br>mm<br>inches | O.P.<br>mm<br>inches  | F.P.<br>mm<br>inches    |
| <br>Fig. 3   | JE-1            | Straight leaf<br>(mounting hardware included)                                     | 16,8<br>.66                       | 3,34<br>12   | 0,56<br>2                         | 3,81<br>.150                    | 0,38<br>.015                 | 0,64<br>.025                 | 11,2<br>.440          | 15±0,76<br>.590±.030    |
| <br>Fig. 4   | JE-4            | Roller leaf.<br>Roller turned 90° to switch axis<br>(mounting hardware included). | 16,8<br>.66                       | 3,34<br>12   | 0,56<br>2                         | 3,81<br>.150                    | 0,38<br>.015                 | 0,64<br>.025                 | 16,3<br>.640          | 20,1<br>.790<br>approx. |
| <br>Fig. 5  | JE-5            | Roller leaf<br>(mounting hardware included)                                       | 14,2<br>.560                      | 3,34<br>12   | 0,56<br>2                         | 3,81<br>.150                    | 0,38<br>.015                 | 0,64<br>.025                 | 16,3<br>.640          | 20,1±0,76<br>.790±.030  |
| <br>Fig. 6 | JE-17           | Roller leaf.<br>Reversed position<br>(mounting hardware included)                 | 14,2<br>.560                      | 3,34<br>12   | 0,56<br>2                         | 3,81<br>.150                    | 0,38<br>.015                 | 0,64<br>.025                 | 16,3<br>.640          | 20,1±0,76<br>.790±.030  |
| <br>Fig. 7 | JE-21           | Roller lever  | 13,7<br>.540                      | 1,67<br>6  | 0,28<br>1                         | 2,54<br>.100                    | 0,25<br>.010                 | 0,41<br>.016                 | 16,3<br>.640          | 18,8±0,76<br>.740±.030  |
| <br>Fig. 8 | JE-22           | Tandem<br>Roller<br>Lever   | 17,8<br>.700                      | 4,73<br>17   | 1,11<br>4                         | 2,54<br>.100                    | 0,15<br>.006                 | 0,3<br>.012                  | 16,8±1,3<br>.660±.050 | 19,3±1,3<br>.760±.050   |



# Position Sensors

## Environment-Sealed Basic Switches

XE Series



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

### XE SWITCHES ORDER GUIDE

|   | 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<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.425                |
|   | 1XE201 (MS27994-4) | General Use MIL-S-8805 requirements MIL-W-22759/11 wire | C                      | 1,39-4,73<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.425                |
|   | 1XE3               | SPST-Normally Open                                      | C                      | 1,39-4,73<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.425                |
|   | 1XE301 (MS27994-5) | Gold Contacts MIL-W-22759/11 wire                       | R                      | 1,39-4,73<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.425                |
|   | 4XE1               | UL listing and UL and CSA listed leadwire               | D                      | 1,39-4,73<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.425                |
|   | 5XE1               | Oil resistant Fluorosilicone seal                       | C                      | 1,39-4,73<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.425                |
|  <p>Fig. 10</p> | 14XE1              | Less operating force Use to +300°F (149°C)              | E                      | 2,50<br>9 max.           | 0,56<br>2                | 0,76<br>.030        | 0,1<br>.004         | 0,13<br>.005        | 10,9<br>.430                |
|   | 14XE1-T            | For customer leading Use to +300°F (149°C)              | E                      | 2,50<br>9 max.           | 0,56<br>2                | 0,76<br>.030        | 0,1<br>.004         | 0,13<br>.005        | 10,9<br>.430                |
|   | 1XE1-T (MS27994-3) | For customer leading                                    | C                      | 1,39-4,73<br>5-17        | 1,11<br>4                | 1,27<br>.050        | 0,1<br>.004         | 0,13<br>.005        | 10,8<br>.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<br>21   | 0,83<br>3                | 3,18<br>.125           | 0,23<br>.009        | 0,3<br>.012         | 10,8±0,76<br>.425±.030 | 14±0,76<br>.550±.030   |
|  <p>Fig. 12</p> | JM-5            | Roller leaf   | 5,84<br>21   | 0,83<br>3                | 3,18<br>.125           | 0,23<br>.009        | 0,3<br>.012         | 15,9±0,89<br>.625±.035 | 19,1±0,89<br>.750±.035 |

Position Sensors

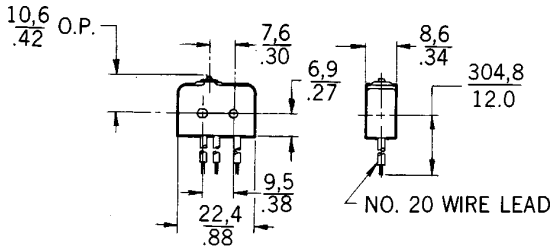
# Position Sensors

SE Series

## Environment-Sealed Basic Switches

### SE MOUNTING DIMENSIONS (For reference only)

SE switches



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

Fig. 1

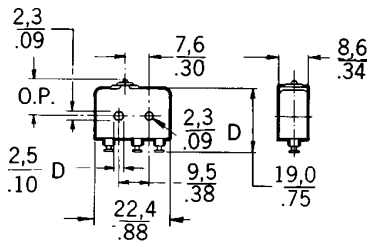


Fig. 2

SE auxiliary actuators

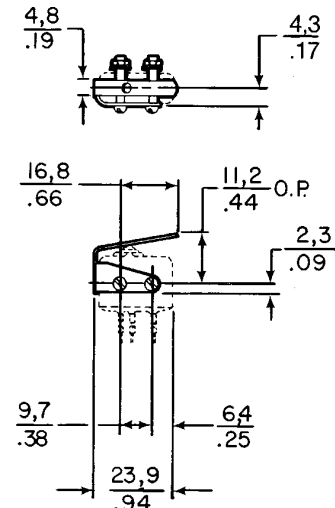


Fig. 3

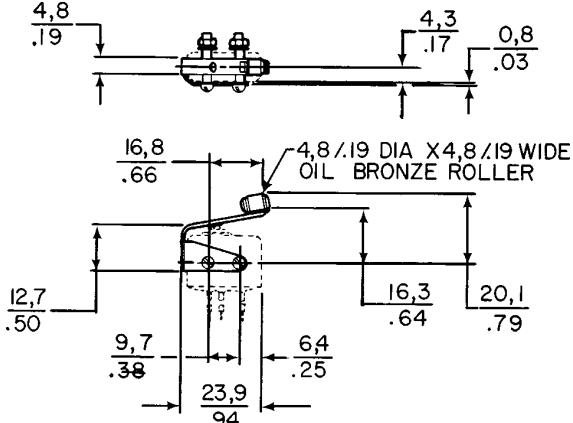


Fig. 4

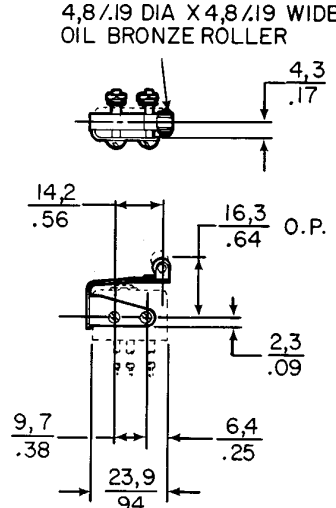


Fig. 5

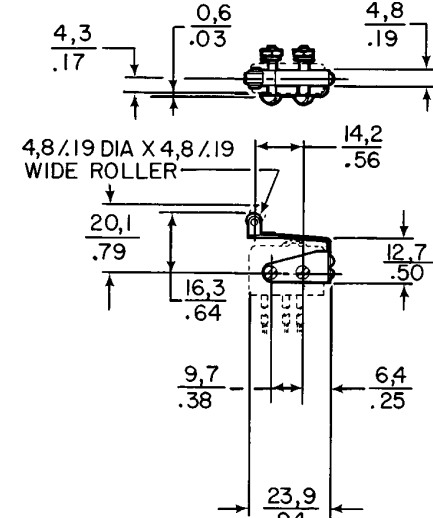


Fig. 6

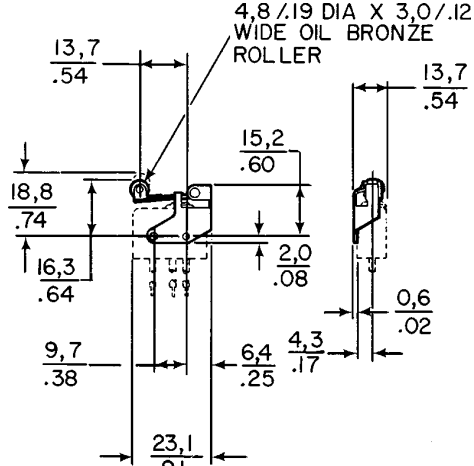


Fig. 7

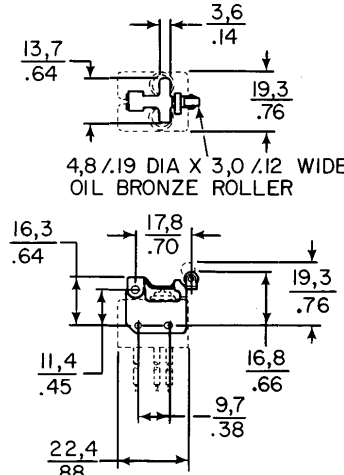


Fig. 8

Key: 0,0 = mm  
0.00 = inches

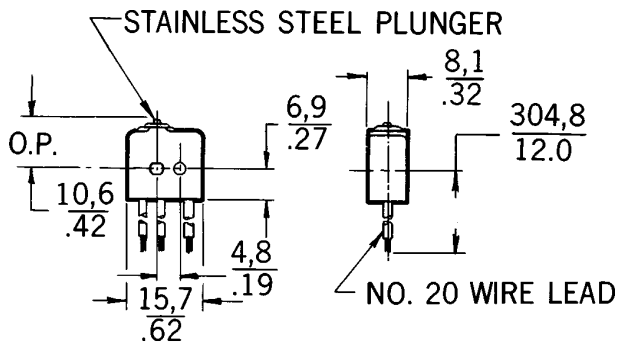
# Position Sensors

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

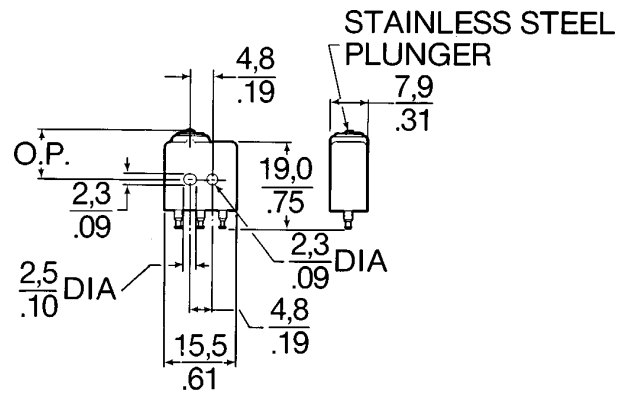


Fig. 10

XE auxiliary actuators

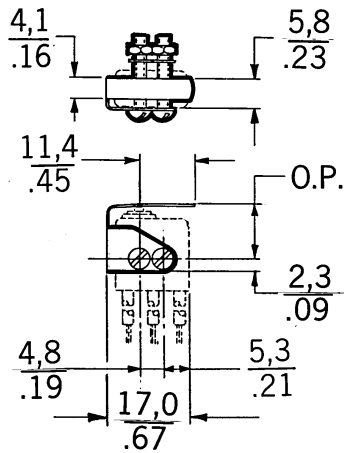


Fig. 11

Key: 0,0 = mm  
0.00 = inches

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

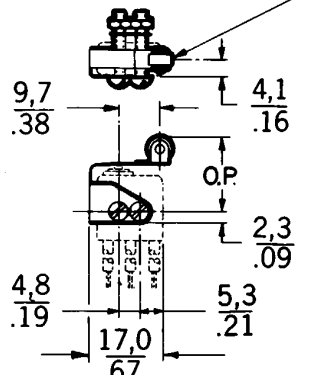


Fig. 12

Position Sensors