Honeywell

# MICRO SWITCH™ Miniature Safety Switches

24CE Series

*004787*

*Issue 1*

**Datasheet**

## DESCRIPTION

Honeywell's 24CE Series of miniature electromechanical safety switches are designed with a rugged metal housing. This Series features positive opening normally closed contacts ⊖ to EN/IEC 60947-5-1-3 specifications. Due to their small size and positive opening normally closed contact, the 24CE Series provides a safety solution for applications where the size of other products could be prohibitive on the machinery. The 24CE Series offers a variety of configurations which include a wide range of actuators, and circuits to solve many application issues. These miniature switches are weather sealed to IP66 for demanding environments on indoor or outdoor machinery. In addition, the 24CE Series has been evaluated for safety functions up to a safety integrity level (SIL) of SIL3 when evaluated to the requirements of IEC 61508-2:2010.

## VALUE TO CUSTOMERS

- Miniature rugged 24CE switches with common 25,4 mm [1.0 in] mounting footprint
- Switches easily gang mounted for multi-pole capability
- Low temperature option of -40 °C [-40 °F]
- Long life of up to 10 million mechanical operations

## DIFFERENTIATION

- Miniature metal body size of 40 mm L x 16 mm W x 49 mm H [1.58 in L x 0.63 in W x 1.93 in H] requires less space on machinery
- Positive opening normally closed contacts ⊖ with an optional normally open contact
- Designed and evaluated for safety functions up to a SIL3 level

## FEATURES

- Compact metal housing epoxy encapsulated with the common 25,4 mm [1.0 in] center-to-center mounting
- Positive opening operation of normally closed contacts ⊖ to EN/IEC 60947-5-1-3 specification
- Designed and agency evaluated for safety functions up to a SIL3 level
- Three different slow-action circuit options: 1NC/1NO BBM (break-before-make), 1NC/1NO MBB (make-before-break), and 1NC
- Wide range of actuator heads and levers
- Can be gang mounted for multiple-pole capability
- CE approvals
- Environmentally sealed to IP66
- Standard temperature operating range of 0 °C to 70 °C [32 °F to 158 °F]
- Optional low temperature operating range of -40 °C to 70 °C [-40 °F to 158 °F]

## POTENTIAL APPLICATIONS

- Industrial
  - Machine tools (small doors and apertures)
  - Material handling
  - Packaging machinery
  - Trailer/truck restraint systems (dok-loks)
- Transportation
  - Small construction machinery

## PORTFOLIO

MICRO SWITCH™ 24CE Series miniature safety switches complement the 924CE Series of miniature safety limit switches. These Series of switches are a small segment of the total family of Honeywell's MICRO SWITCH™ electromechanical safety switches.

**Table 1. Specifications**

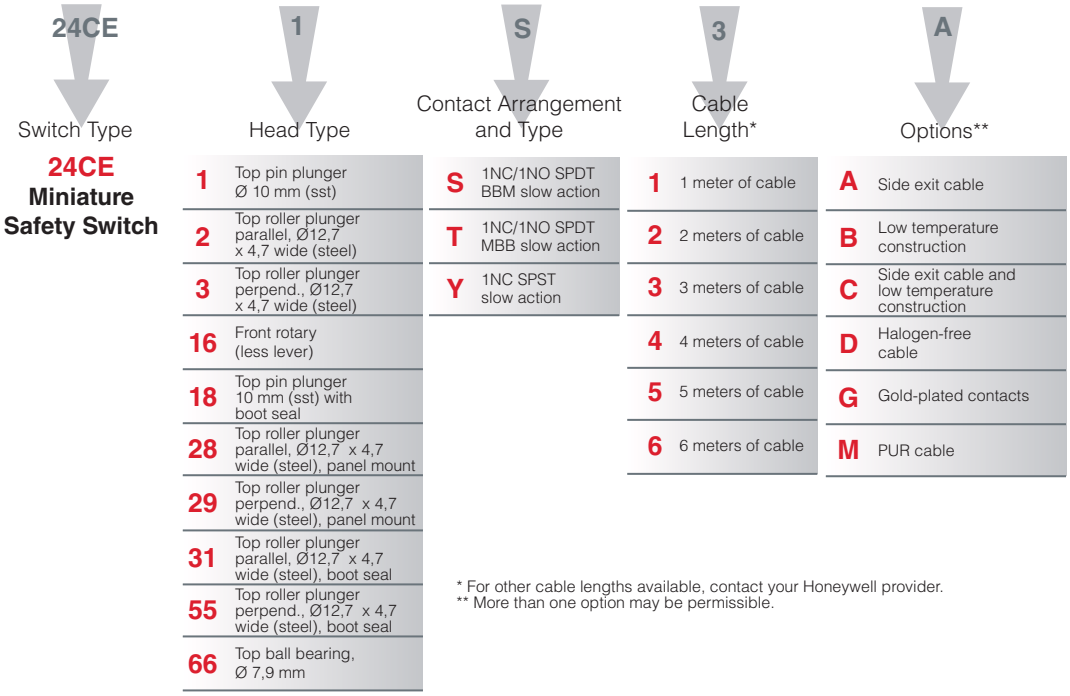
| Characteristic | Parameter |
|---|---|
| Description | Miniature safety electromechanical switch |
| Certifications | CE, SIRA, IEC/EN60947-5-1 |
| Housing material | Epoxy coated die-cast zinc |
| Actuators | Pin plunger (24CE1-)<br>Roller plunger parallel (24CE2-)<br>Roller plunger perpendicular (24CE3-)<br>Rotary (24CE16-)<br>Pin plunger with boot seal (24CE18-)<br>Roller plunger parallel, panel mount (24CE28-)<br>Roller plunger perpendicular, panel mount (24CE29-)<br>Roller plunger parallel with boot seal (24CE31-)<br>Roller plunger perpendicular with boot seal (24CE55-)<br>Ball-bearing plunger (24CE66-) |
| Termination (electrical connection) | 3-core or 5-core harmonised Cenelec cable |
| Contact options | 1NC/1NO BBM (break-before-make), 1NC/1NO MBB (make-before-break), 1NC (all normally closed contacts are positive opening) ⊕ |
| Contact type | Slow action |
| Contact material | Silver alloy, gold-plated contacts optional |
| Utilization category | AC15, B300: DC13, R300 |
| Rated operational voltage (Ue) | 240 V ac or dc |
| Rated operational current | 1.5 A, 0.1 A |
| Rated thermal current (Ith) | 10 A |
| Rated impulse withstand (Uimp) | 2500 V |
| Maximum fuse rating | 10 A |
| Environmental sealing | IP66 |
| Operating temperature | Standard: 0 °C to 70 °C [32 °F to 158 °F]<br>Optional: -40 °C to 70 °C [-40 °F to 158 °F] |
| MCTF (Mechanical life) | >1,000,000 cycles |
| MCTF (Electrical life) | >25,000 cycles |
| SIL Capability | Up to SIL3 (HFT1), IEC61508-2:2010 |
| Proof test interval | 1 year |

**Table 2. Electrical Ratings EN/IEC 60947-5-1**

| ac | | | | dc | | | |
|---|---|---|---|---|---|---|---|
| **B300** | **AC15** | | | **R300** | **DC13** | | |
| **UE** | **IE** | **VA Rating** | | **UE** | **IE** | **VA Rating** | |
| **(Volts)** | **(Amps)** | **Make** | **Break** | **(Volts)** | **(Amps)** | **Make** | **Break** |
| 120 | 3 | 3600 | 360 | 125 | 0.22 | 28 | 28 |
| 240 | 1.5 | 3600 | 360 | 250 | 0.1 | 28 | 28 |

# MICRO SWITCH™ Miniature Safety Switches, 24CE Series

**Figure 1. Product Nomenclature**




* For other cable lengths available, contact your Honeywell provider.
** More than one option may be permissible.

## GANG-MOUNT CAPABILITY

The 24CE Series housing has been designed to enable the user to build their own multiple plunger switch by gang mounting several switches. All pin plunger and roller plunger types are suitable for gang mounting. There is a 16 mm distance between the plungers. The Series is very versatile such that even a lever-type version could be added at the end of the row.

## BOTTOM-EXIT OR SIDE-EXIT ORIENTATION

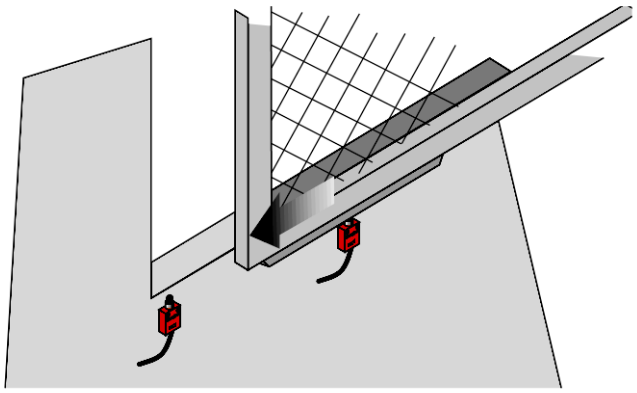
The 24CE Series has been designed with a pre-wired cable fitted in the bottom of the switch housing. Other variations are available with a side-exit cable.

## MOUNTING

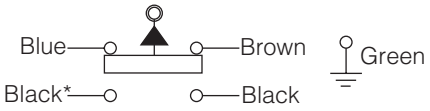
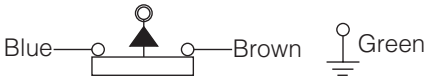
MICRO SWITCH™ 24CE Series safety switches are mounted by using two M5 or #10 screws. The mounting holes are counter bored to keep the screw heads within the overall switch housing dimensions.

## APPLICATION ILLUSTRATION

Two 24CE roller plunger switches to monitor gate position, closed or open.

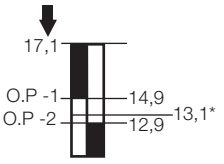
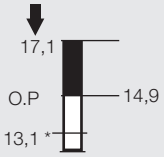
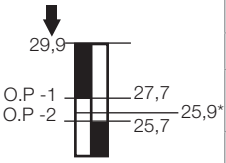
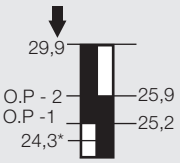
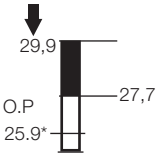


## CONTACT ARRANGEMENT AND DESCRIPTION

| Circuit Type | | Circuit Diagram | Cable/Connector |
|---|---|---|---|
| **S** | **BBM** |  | 5 x 0,75 mm² harmonised Cenelec cable |
| **T** | **MBB** | | 5 x 0,75 mm² harmonised Cenelec cable |
| **Y** | **SPNC** |  | 3 x 0,75 mm² harmonised Cenelec cable |

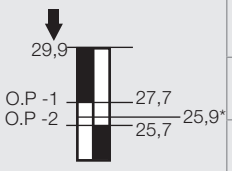
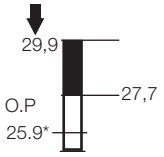
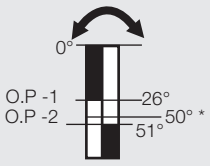
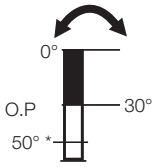
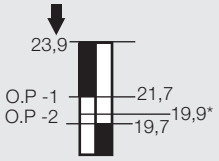
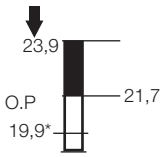
* Grey with PUR cable.

**Table 3. 24CE Order Guide**

| | Head Type | Catalog Listing | Contact Arrangement [slow action] | Operating Force or Torque (max.) | Bar Chart ■ Contact Closed □ Contact Open mm or ° | Options | Harmonised Cenelec cable ** length (meters) |
|---|---|---|---|---|---|---|---|
| | Top pin plunger, Ø 10 mm [sst] | 24CE1-S2 | 1NC/1NO BBM | 22,5 N [5.06 lb] |   | - | 2 |
| | | 24CE1-S2A | 1NC/1NO BBM | 22,5 N [5.06 lb] | | Side-exit cable | 2 |
| | | 24CE1-S2B | 1NC/1NO BBM | 22,5 N [5.06 lb] | | Side-exit cable and -40 °C [-40 °F] low temp. construction | 2 |
| | | 24CE1-S3 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 3 |
| | | 24CE1-S6 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 6 |
| | | 24CE1-S6A | 1NC/1NO BBM | 22,5 N [5.06 lb] | | Side-exit cable | 6 |
| | | 24CE1-Y1 | 1NC | 22,5 N [5.06 lb] |   | - | 1 |
| | | 24CE1-Y1A | 1NC | 22,5 N [5.06 lb] | | Side-exit cable | 1 |
| | | 24CE1-Y2 | 1NC | 22,5 N [5.06 lb] | | - | 2 |
| | | 24CE1-Y2A | 1NC | 22,5 N [5.06 lb] | | Side-exit cable | 2 |
| | | 24CE1-Y3 | 1NC | 22,5 N [5.06 lb] | | - | 3 |
| | | 24CE1-Y8B | 1NC | 22,5 N [5.06 lb] | | -40 °C [-40 °F] low temp. construction | 8 |
| | Top roller plunger, parallel Ø12,7 x 4,7 mm wide [steel] | 24CE2-S1 | 1NC/1NO BBM | 22,5 N [5.06 lb] |   | - | 1 |
| | | 24CE2-S2 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 2 |
| | | 24CE2-S2A | 1NC/1NO BBM | 22,5 N [5.06 lb] | | Side-exit cable | 2 |
| | | 24CE2-S2B | 1NC/1NO BBM | 22,5 N [5.06 lb] | | -40 °C [-40 °F] low temp. construction | 2 |
| | | 24CE2-S3 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 3 |
| | | 24CE2-S6 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 6 |
| | | 24CE2-T1GM | 1NC/1NO MBB | 22,5 N [5.06 lb] |   | Gold plated contacts, PUR cable | 1 |
| | | 24CE2-T2 | 1NC/1NO MBB | 22,5 N [5.06 lb] | | - | 2 |
| | | 24CE2-Y1 | 1NC | 22,5 N [5.06 lb] |   | - | 1 |
| | | 24CE2-Y1B | 1NC | 22,5 N [5.06 lb] | | -40 °C [-40 °F] low temp. construction | 2 |
| | | 24CE2-Y2 | 1NC | 22,5 N [5.06 lb] | | - | 2 |
| | | 24CE2-Y2A | 1NC | 22,5 N [5.06 lb] | | Side-exit cable | 2 |
| | | 24CE2-Y4 | 1NC | 22,5 N [5.06 lb] | | - | 4 |
| | | 24CE2-Y6A | 1NC | 22,5 N [5.06 lb] | | Side-exit cable | 6 |

* Positive opening to IEC/EN 60947-5-1-3.
**For other cable lengths, contact your Honeywell provider.

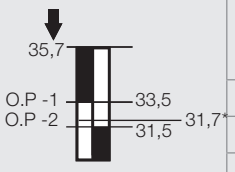
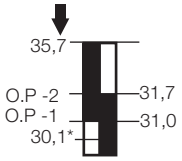
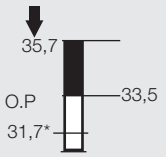
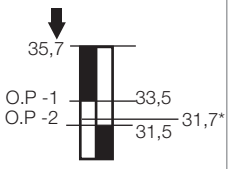
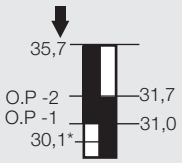
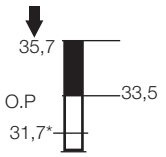
Table 3. 24CE Order Guide, continued

| | Head Type | Catalog Listing | Contact Arrangement [slow action] | Operating Force or Torque (max.) | Bar Chart ■ Contact Closed □ Contact Open mm or ° | Options | Harmonised Cenelec cable ** length (meters) |
|---|---|---|---|---|---|---|---|
| | Top roller plunger, perpindicular Ø12,7 x 4,7 mm wide [steel] | 24CE3-S2 | 1NC/1NO BBM | 22,5 N [5.06 lb] |  | - | 2 |
| | | 24CE3-S2A | 1NC/1NO BBM | 22,5 N [5.06 lb] | | Side-exit cable | 2 |
| | | 24CE3-S3 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 3 |
| | | 24CE3-Y1 | 1NC | 22,5 N [5.06 lb] |  | - | 1 |
| | | 24CE3-Y2 | 1NC | 22,5 N [5.06 lb] | | - | 2 |
| | | 24CE3-Y2A | 1NC | 22,5 N [5.06 lb] | | Side-exit cable | 2 |
| | Front rotary [less lever] | 24CE16-S1 | 1NC/1NO BBM | 0,30 Nm [2.66 in-lb] |  | - | 1 |
| | | 24CE16-Y1 | 1NC | 0,30 Nm [2.66 in-lb] |  | - | 1 |
| | | 24CE16-Y6 | 1NC | 0,30 Nm [2.66 in-lb] | | - | 6 |
| | Top pin plunger, Ø7,1 mm [sst] w boot seal | 24CE18-S1 | 1NC/1NO BBM | 22,5 N [5.06 lb] |  | - | 1 |
| | | 24CE18-S2 | 1NC/1NO BBM | 22,5 N [5.06 lb] | | - | 2 |
| | | 24CE18-Y7AM | 1NC | 22,5 N [5.06 lb] |  | PUR cable, side exit | 7 |

* Positive opening to IEC/EN 60947-5-1-3.
**For other cable lengths, contact your Honeywell provider.

# MICRO SWITCH™ Miniature Safety Switches, 24CE Series

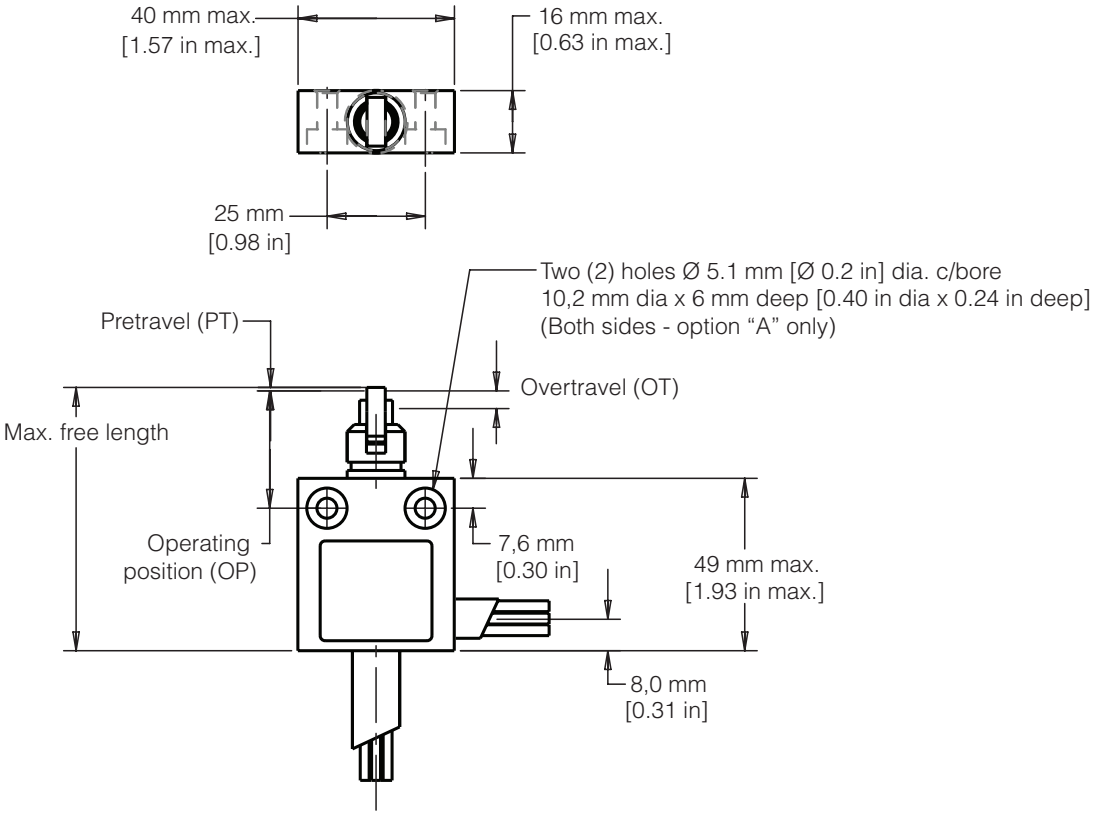
**Table 3. 24CE Order Guide, continued**

| | Head Type | Catalog Listing | Contact Arrangement [slow action] | Operating Force or Torque (max.) | Bar Chart ■ Contact Closed □ Contact Open mm or ° | Options | Harmonised Cenelec cable ** length (meters) |
|---|---|---|---|---|---|---|---|
| | Top roller plunger, parallel Ø12,7 x 4,7 mm wide (steel) with boot seal | 24CE31-S1 | 1NC/1NO BBM | 25,5 N [5.73 lb] |   | - | 1 |
| | | 24CE31-S1A | 1NC/1NO BBM | 25,5 N [5.73 lb] | | Side-exit cable | 1 |
| | | 24CE31-S1C | 1NC/1NO BBM | 25,5 N [5.73 lb] | | Side-exit cable, -40 °C [-40 °F] low temp. construction | 1 |
| | | 24CE31-S2 | 1NC/1NO BBM | 25,5 N [5.73 lb] | | - | 2 |
| | | 24CE31-S2A | 1NC/1NO BBM | 25,5 N [5.73 lb] | | Side-exit cable | 2 |
| | | 24CE31-S2B | 1NC/1NO BBM | 25,5 N [5.73 lb] | | -40 °C [-40 °F] low temp. construction | 2 |
| | | 24CE31-S5 | 1NC/1NO BBM | 25,5 N [5.73 lb] | | - | 5 |
| | | 24CE31-T2 | 1NC/1NO MBB | 25,5 N [5.73 lb] |   | - | 2 |
| | | 24CE31-Y1 | 1NC | 25,5 N [5.73 lb] |   | - | 1 |
| | | 24CE31-Y2 | 1NC | 25,5 N [5.73 lb] | | - | 2 |
| | | 24CE31-Y3 | 1NC | 25,5 N [5.73 lb] | | - | 3 |
| | | 24CE31-Y5 | 1NC | 25,5 N [5.73 lb] | | - | 5 |
| | Top roller plunger, perpindicular Ø12,7 x 4,7 mm wide [steel] with boot seal | 24CE55-S1 | 1NC/1NO BBM | 25,5 N [5.73 lb] |   | - | 1 |
| | | 24CE55-T2A | 1NC/1NO MBB | 25,5 N [5.73 lb] |   | Side-exit cable | 2 |
| | | 24CE55-Y1 | 1NC | 25,5 N [5.73 lb] |   | - | 1 |
| | | 24CE55-Y2 | 1NC | 25,5 N [5.73 lb] | | - | 2 |

* Positive opening to IEC/EN 60947-5-1-3.
**For other cable lengths, contact your Honeywell provider.

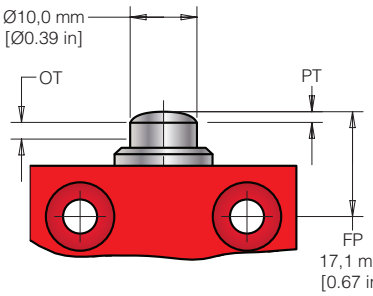
## DIMENSIONAL DRAWINGS

**Figure 2. 24CE General Dimensions**



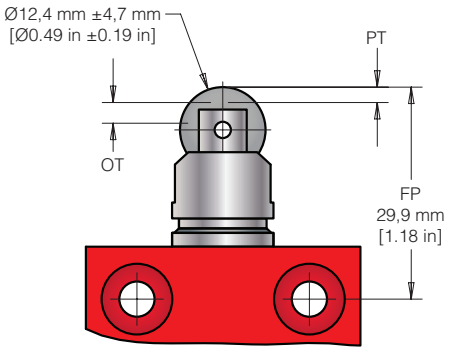
## DIMENSIONAL DRAWINGS mm [in]

### Figure 3. 24CE1 Dimensions



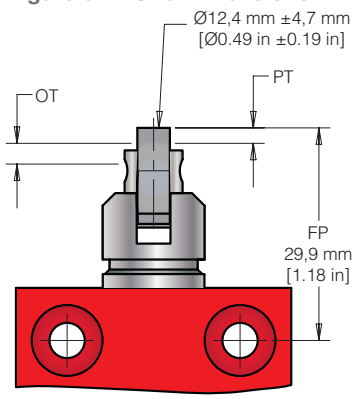

| Pin Plunger Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 17,1 [0.67] | 17,1 [0.67] | 17,1 [0.67] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

### Figure 4. 24CE2 Dimensions



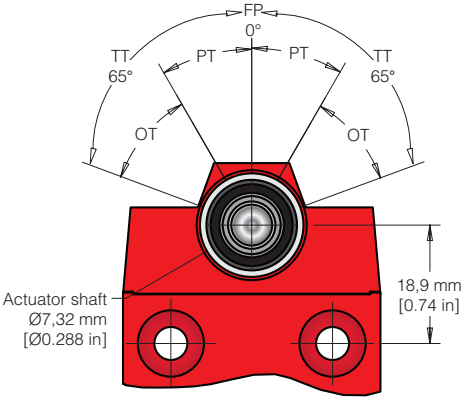

| Roller Plunger Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 29,9 [1.18] | 29,9 [1.18] | 29,9 [1.18] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

### Figure 5. 24CE3 Dimensions



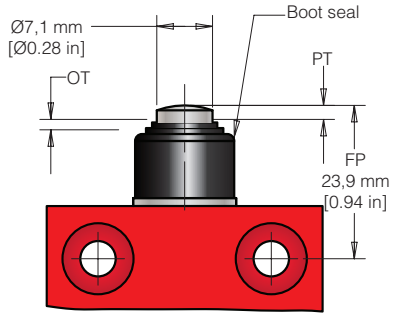

| Roller Plunger Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 29,9 [1.18] | 29,9 [1.18] | 29,9 [1.18] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

### Figure 6. 24CE16 Dimensions



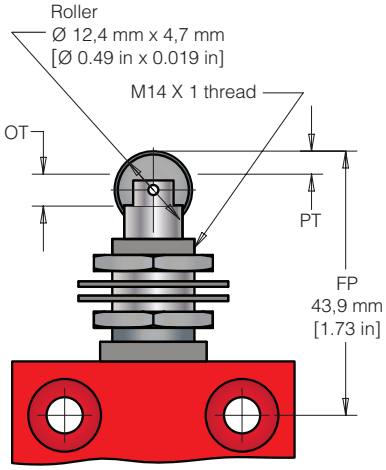

| Side Rotary Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (degrees) | 0 | 0 | 0 |
| Pretravel (max. degrees) | 26 | 48 | 26 |
| Total travel (min. degrees) | 65 | 65 | 65 |

### Figure 7. 24CE18 Dimensions



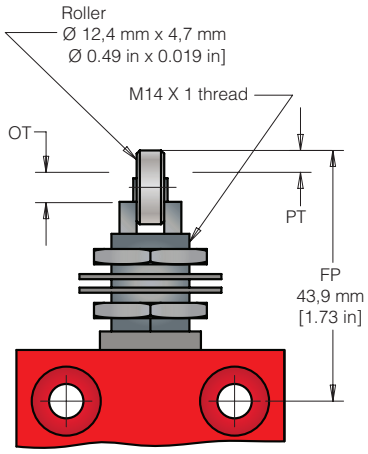

| Pin Plunger with Boot Seal Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 23,9 [0.94] | 23,9 [0.94] | 23,9 [0.94] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

### Figure 8. 24CE28 Dimensions



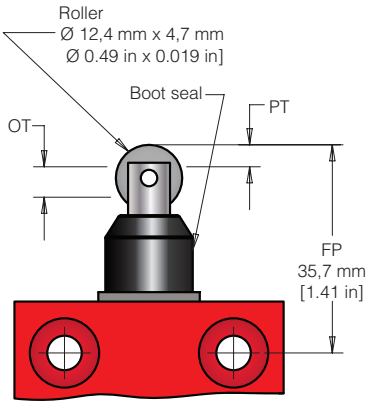

| Top Roller Plunger with Panel Mount Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 43,9 [1.73] | 43,9 [1.73] | 43,9 [1.73] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

**Figure 9. 24CE29 Dimensions**



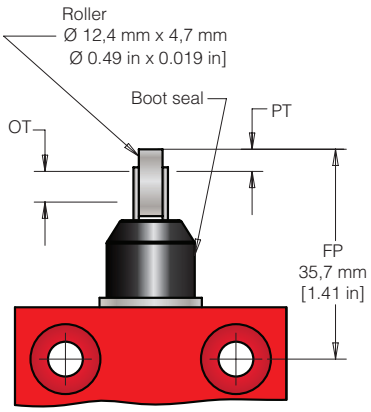

| Top Roller Plunger with Panel Mount Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 43,9 [1.73] | 43,9 [1.73] | 43,9 [1.73] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

**Figure 10. 24CE31 Dimensions**



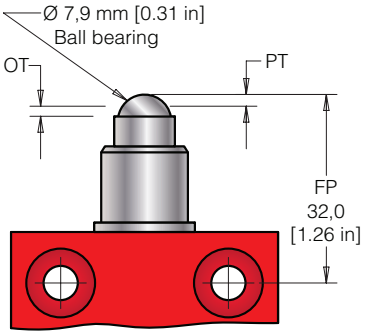

| Roller Plunger with Boot Seal Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 35,7 [1.41] | 35,7 [1.41] | 35,7 [1.41] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

**Figure 11. 24CE55 Dimensions**




| Roller Plunger with Boot Seal Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 35,7 [1.41] | 35,7 [1.41] | 35,7 [1.41] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

**Figure 12. 24CE66 Dimensions**




| Ball Bearing Plunger Operating Characteristics | S 1NC/1NO (BBM) | T 1NC/1NO (MBB) | Y 1NC |
|---|---|---|---|
| Free position (±0,4 [0.02]) | 32,0 [1.26] | 32,0 [1.26] | 32,0 [1.26] |
| Pretravel (max.) | 2,2 [0.09] | 4,0 [0.16] | 2,2 [0.09] |
| Overtravel (min.) | 1,0 [0.04] | 0,5 [0.02] | - |

**Table 4. Levers for Use with 24CE Front Rotary Switches**

| | Catalog Listing | Rod/ Roller Material | Rod/ Roller Dia. mm [in] | Roller Width mm [in] |
|---|---|---|---|---|
| **Fixed length lever; 38,1 mm [1.5 in] radius** | | | | |
| | GLZ51A | Nylon | 19,0 [0.75] | 6,35 [0.25] |
| | GLZ51B | Steel | 19,0 [0.75] | 6,35 [0.25] |
| | GLZ51C | Nylon | 25,4 [1.00] | 12,7 [0.50] |
| | GLZ51E | Bronze | 19,0 [0.75] | 6,35 [0.25] |
| | GLZ51T | SST | 19,0 [0.75] | 9,5 [0.38] |
| **Fixed length offset lever; 38,1 mm [1.5 in] radius** | | | | |
| | GLZ55A | Nylon | 19,0 [0.75] | 6,35 [0.25] |
| | GLZ55B | Steel | 19,0 [0.75] | 6,35 [0.25] |
| | GLZ55E | Bronze | 19,0 [0.75] | 6,35 [0.25] |

## ADDITIONAL MATERIALS

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Product line guide
- Product range guide
- Installation instructions
- Certificates: SIL
- Certificates: Electrical endurance
- Certificates: Mechanical endurance
- Safety switch quick reference guide

**Find out more**

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

## ⚠ WARNING
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- 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.**

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