Honeywell

THE POWER OF **CONNECTED**

# MICRO SWITCH Miniature Military-Grade Toggle Switch

TW Series

***005431***

*Issue 3*

**Datasheet**

## DESCRIPTION

Honeywell MICRO SWITCH TW Series toggle switches are military qualified to MIL-83731 specifications for sealed and unsealed toggle switches. Quality construction features include an available bonded seal between the toggle lever and bushing for those applications where a sealing-related failure cannot be tolerated.

The durable design of the TW Series toggle is well-suited for many military, aerospace and other demanding applications where space behind the panel is limited. These applications include environments where the panels are subjected to mechanical shock, vibration, dust, splashing or hose-directed water, and temperature extremes.

MICRO SWITCH TW toggles feature a miniature military-grade design with environmental sealing capabilities and can be configured with a large selection of circuitries, electrical terminations, lever and bushing designs, and contact material options to satisfy a diverse range of applications.

## VALUE TO CUSTOMERS

- MIL-DTL-83731 qualified switches available to meet military specifications
- Environmental sealing availability enables switches to withstand many demanding indoor and outdoor applications
- Miniature size (small footprint) for applications where behind-the-panel space is at a minimum
- 2- and 3-position, maintained and momentary toggle action to meet circuit and actuator requirements

## FEATURES

- MIL-DTL-83731 qualified switches are available to meet military/aerospace specifications
- 1- and 2- pole options along with 2- and 3-position, maintained and momentary toggle action
- Wide temperature range: -65 °C to 71 °C [-85 °F to 160 °F]
- 1/4 in and 15/32 in bushing diameters
- Standard, locking, & colored paddle levers
- Optional lever locks (pull-to-unlock) require two separate actions to actuate
- Three popular termination options: screw, solder, and IWTS (Integrated Wire Termination System)
- Silver alloy or gold-plated contacts
- Electrical endurance of 20,000 cycles at full load

## POTENTIAL INDUSTRIAL APPLICATIONS

- Military and commercial aircraft and helicopters
- Aviation ground support equipment
- Military land vehicles (track and wheeled vehicles)
- Industrial machinery and construction equipment
- Process control

## DIFFERENTIATION

- Miniature size saves space and weight
- Variety of terminations, circuitries, and lever options for a number of applications

## PORTFOLIO

In addition the the TW Series, Honeywell offers six series of MICRO SWITCH toggle switches including the TL Series, NT Series, TS Series, ET Series, and AT Series.

**Table 1. Specifications**

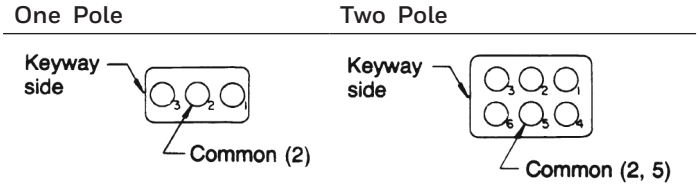
| Characteristic | Parameter |
|---|---|
| Description | miniature military-grade toggle switch |
| Sealing | qualified to MIL-DTL-83731 |
| Operating temperature | -65 °C to 71 °C [-85 °F to 160 °F] |
| Actuators | standard, locking, special design, paddle |
| Action | 2- or 3- position; momentary and maintained |
| Mounting | bushing 15/32 in (0.47 in) Ø; 1/4 in (0.25 in) Ø |
| Circuitry | SPDT, DPDT, SPST, DPST |
| Terminations | IWTS, solder (T and T2), quick connect (H58) |
| Contacts | fine silver or gold-plated |
| Amp rating | 0.1 A to 5.0 A @ 0.5 Vdc to 28 Vdc<br>0.1 A to 5.0 A @ 0.5 Vac to 115 Vac |
| Approvals | UL, qualified to MIL-DTL-83781 |
| Measurement | 49,78 mm H x 14,61 mm W x 14,61 mm D [1.96 in H x 0.575 in W x 0.575 in D] |

**Table 2. Electrical Ratings (in amperes)**

| Volts | Resistive | Inductive | Lamp |
|---|---|---|---|
| 30 Vdc | 5 | 2 | 1 |
| 115 Vac | 5 | 2 | 1 |
| UL Code 117 | 5 A @ 125 Vac | | |

## TERMINAL CIRCUIT IDENTIFICATION

Terminal identifications are referred to in the order guides to indicate which circuits are made in each toggle position (i.e., 1-2 refers to circuit closure through terminals 1 and 2).




## TERMINALS

In addition to the solder terminal listings in the order guides, IWTS (Integrated Wire Termination System) and quick connection versions are also available.

IWTS provides a reliable, serviceable unit and promotes maintainability since wiring bundles need not be disturbed. Leads are quickly and easily assembled or removed with an insert-extract tool. A unique three-rib (grommet style) elastomer seal protects the lead connections without potting. There are no exposed metal terminals. Versions available that will accept No. 20 wire with MS39029/1-101 contact pins. Connections are resistant to shock, vibration, and high pull-out force.

## SPECIAL CIRCUITRIES

Catalog listings with -10, -50, and -70 suffix numbers, as shown in the order guides, have special “on-on-on” circuits, as illustrated below.

### -10 CIRCUITRY

| No of poles | Keyway Side Maint. Position | Center Maint. Position | Opposite Keyway Maint. Position |
|---|---|---|---|
| 2 |  |  |  |

### -50 CIRCUITRY

| No of poles | Keyway Side Maint. Position | Center Maint. Position | Opposite Keyway Maint. Position |
|---|---|---|---|
| 2 |  |  |  |

### -70 CIRCUITRY

| No of poles | Keyway Side Maint. Position | Center Maint. Position | Opposite Keyway Maint. Position |
|---|---|---|---|
| 2 |  |  |  |

## TW SERIES TWO-POSITION ORDER GUIDE

**Table 3. Two-Position TW Series with 15/32 in Bushing**

| | | Circuits Made with Toggle At: | | Sealed Standard Toggle | | Pull-to-Unlock Toggle | | Colored Paddle Lever*** |
|---|---|---|---|---|---|---|---|---|
| No. of poles | Terminals | Keyway Position | Opposite Keyway | Catalog Listing | Military Number | Add Suffix to Standard Toggle Listing [D] | Military Number** | Add Paddle Color Suffix to _ |
| 1  | solder | OFF | 2-3 ON | 11TW1-2 | MS27718-22-1 | D, F, G | MS27720-22-1 | 11TW19-2_ |
| | solder | 2-1 ON | 2-3 ON | 11TW1-3 | MS27718-23-1 | D, F, G | MS27720-23-1 | 11TW19-3_ |
| | solder | 2-1 ON* | 2-3 ON | 11TW1-8 | MS27718-26-1 | F | MS27720-26-1 | 11TW19-8_ |
| | IWTS | 2-1 ON | 2-3 ON | 111TW1-3 | – | D, F, G | – | – |
| | ITWS | 2-1 ON* | 2-3 ON | 111TW1-8 | – | F | – | – |
| 2  | solder | OFF | 2-3, 5-6 ON | 12TW1-2 | MS27719-22-1 | D, F, G | MS27721-22-1 | 12TW19-2_ |
| | solder | 2-1, 5-4 ON | 2-3, 5-6 ON | 12TW1-3 | MS27719-23-1 | D, F, G | MS27721-23-1 | 12TW19-3_ |
| | solder | 2-1, 5-4 ON* | 2-3, 5-6 ON | 12TW1-8 | MS27719-26-1 | F | MS27721-26-1 | 12TW19-8_ |
| | IWTS | 2-1, 5-4 ON | 2-3, 5-6 ON | 112TW1-3 | – | D, F, G | – | – |
| | IWTS | 2-1, 5-4 ON* | 2-3, 5-6 ON | 112TW1-8 | – | F | – | – |

* These positions are momentary. All others are maintained.
** Also add the appropriate suffix to the military number.
*** See page 8 for paddle lever colors
[Δ] See page 8 for locking configurations.

**Table 4. Two-Position TW Series with 1/4 in Bushing**

| | | Circuits Made with Toggle At: | | Unsealed Standard Toggle | | Sealed Standard Toggle |
|---|---|---|---|---|---|---|
| No. of poles | Terminals | Keyway Position | Opposite Keyway | Catalog Listing | Military Number | Catalog Listing |
| 1  | solder | OFF | 2-3 ON | 1TW1-2 | MS27716-22-1 | 1TW101-2 |
| | solder | 2-1 ON | 2-3 ON | 1TW1-3 | MS27716-23-1 | 1TW101-3 |
| | solder | 2-1 ON* | 2-3 ON | 1TW1-8 | MS27716-26-1 | 1TW101-8 |
| 2  | solder | OFF | 2-3, 5-6 ON | 2TW1-2 | MS27717-22-1 | 2TW101-2 |
| | solder | 2-1, 5-4 ON | 2-3, 5-6 ON | 2TW1-3 | MS27717-23-1 | 2TW101-3 |
| | solder | 2-1, 5-4 ON* | 2-3, 5-6 ON | 2TW1-8 | MS27717-26-1 | 2TW101-8 |

* These positions are momentary. All others are maintained.

## PULL-TO-UNLOCK OPTION

When ordering pull-to-unlock toggle listings (See page 8 for configurations), add the suffix letter shown in the chart on page 11 to the standard toggle listing or the MS part number. For example, to order a 11TW1-2 pull-to-unlock toggle switch with the lever locked out of the center position,

add the letter **D** (i.e., 11TW1-2**D**, MS27718-22-1**D**)

## TW SERIES THREE-POSITION ORDER GUIDE

**Table 5. Three-Position TW Series with 15/32 in Bushing**

| | | Circuits Made with Toggle At: | | | Sealed Standard Toggle | | Pull-to-Unlock Toggle | | Colored Paddle Lever*** |
|---|---|---|---|---|---|---|---|---|---|
| No. of poles | Terminals | Keyway Position | Center Position | Opposite Keyway | Catalog Listing | Military Number | Add Suffix to Standard Toggle Listing [D] | Military Number** | Add Paddle Color Suffix to _ |
| 1  | solder | 2-1 ON | OFF | 2-3 ON | 11TW1-1 | MS27718-21-1 | ALL | MS27720-21-1 | 11TW19-1_ |
| | solder | 2-1 ON* | OFF | 2-3 ON | 11TW1-5 | MS27718-31-1 | E, F, K, L, M, N | MS27720-31-1 | 11TW19-5_ |
| | solder | 2-1 ON* | OFF | 2-3 ON* | 11TW1-7 | MS27718-27-1 | E, L, N | MS27720-27-1 | 11TW19-7_ |
| | IWTS | 2-1 ON | OFF | 2-3 ON | 111TW1-1 | – | ALL | – | – |
| | IWTS | 2-1 ON* | OFF | 2-3 ON | 111TW1-5 | – | E, F, K, L, M, N | – | – |
| | IWTS | 2-1 ON* | OFF | 2-3 ON* | 111TW1-7 | – | E, L, N | – | – |
| 2  | solder | 2-1, 5-4 ON | OFF | 2-3, 5-6 ON | 12TW1-1 | MS27719-21-1 | ALL | MS27721-21-1 | 12TW19-1_ |
| | solder | 2-1, 5-4 ON* | OFF | 2-3, 5-6 ON | 12TW1-5 | MS27719-31-1 | E, F, K, L, M, N | MS27721-31-1 | 12TW19-5_ |
| | solder | 2-1, 5-4 ON* | OFF | 2-3, 5-6 ON* | 12TW1-7 | MS27719-27-1 | E, L, N | MS27721-27-1 | 12TW19-7_ |
| | IWTS | 2-1, 5-4 ON | OFF | 2-3, 5-6 ON | 112TW1-1 | – | ALL | – | – |
| | IWTS | 2-1, 5-4 ON* | OFF | 2-3, 5-6 ON | 112TW1-5 | – | E, F, K, L, M, N | – | – |
| | IWTS | 2-1, 5-4 ON* | OFF | 2-3, 5-6 ON* | 112TW1-7 | – | E, L, N | – | – |

* These positions are momentary. All others are maintained.
** Also add the appropriate suffix to the military number.
*** See page 8 for paddle lever colors
[Δ] See page 8 for locking configurations.

**Table 6. Three-Position TW Series with 1/4 in Bushing**

| | Circuits Made with Toggle At: | | | Unealed Standard Toggle | | Sealed Standard Toggle |
|---|---|---|---|---|---|---|
| No. of poles | Keyway Position | Center Position | Opposite Keyway | Catalog Listing | Military Number | Catalog Listing |
| 1  | 2-1 ON | OFF | 2-3 ON | 1TW1-1 | MS27716-21-1 | 1TW101-1 |
| | 2-1 ON* | OFF | 2-3 ON | 1TW1-5 | MS27716-31-1 | 1TW101-5 |
| | 2-1 ON* | OFF | 2-3 ON* | 1TW1-7 | MS27716-27-1 | 1TW101-6 |
| 2  | 2-1, 5-4 ON | OFF | 2-3, 5-6 ON | 2TW1-1 | MS27717-21-1 | 2TW101-2 |
| | 2-1, 5-4 ON* | OFF | 2-3, 5-6 ON | 2TW1-5 | MS27717-31-1 | 2TW101-3 |
| | 2-1, 5-4 ON* | OFF | 2-3, 5-6 ON* | 2TW1-7 | MS27717-26-1 | 2TW101-8 |

* These positions are momentary. All others are maintained.

## PULL-TO-UNLOCK OPTION

When ordering pull-to-unlock toggle listings (See page 8 for configurations), add the suffix letter shown in the chart on page 11 to the standard toggle listing or the MS part number. For example, to order a 11TW1-7 pull-to-unlock toggle switch with the lever locked in the center position, add the letter **E** (i.e., 11TW1-7**E**, MS27720-27-1**E**)

**Table 7. TW Series Switches with Special Circuitries**

All two-pole, three-position TW switches are available with special "on-on-on" **-10**, **-50**, **-70** circuitry options as shown below.

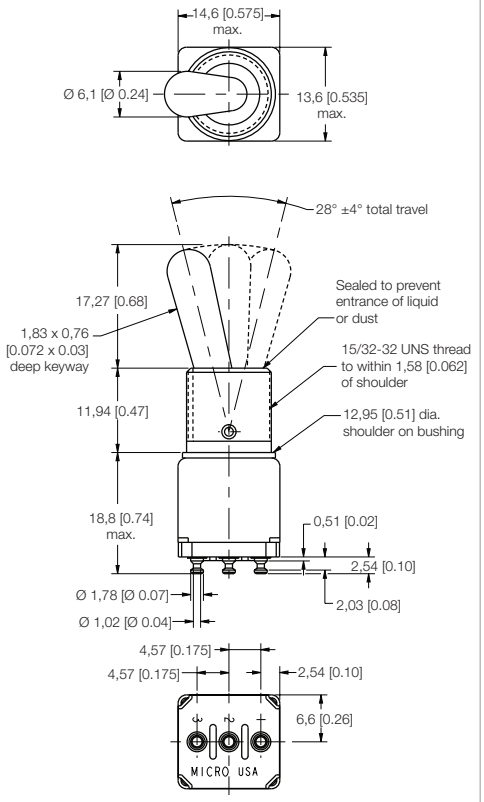
| | | Circuits Made with Toggle At: | | | Sealed Standard Toggle | | Unsealed Standard Toggle | Sealed Paddle Lever |
|---|---|---|---|---|---|---|---|---|
| **No. of poles** | **Terminals** | **Keyway Position** | **Center Position** | **Opposite Keyway** | **15/32 Bushing Catalog Listing** | **1/4 Bushing Catalog Listing** | **1/4 Bushing Catalog Listing** | **15/32 Bushing Catalog Listing*** ** |
| 2  | solder | 2-1, 5-4 ON | 2-1, 5-6 ON | 2-3, 5-6 ON | 12TW1-**10** | 2TW101-**10** | 2TW1-**10** | 12TW19-**10_** |
| | solder | 2-1, 5-4 ON* | 2-1, 5-6 ON | 2-3, 5-6 ON | 12TW1-**50** | 2TW101-**50** | 2TW1-**50** | 12TW19-**50_** |
| | solder | 2-1, 5-4 ON* | 2-1, 5-6 ON | 2-3, 5-6 ON* | 12TW1-**70** | 2TW101-**70** | 2TW1-**70** | 12TW19-**70_** |

* These positions are momentary. All others are maintained.
*** Add color suffix from Table 8 on page 11.

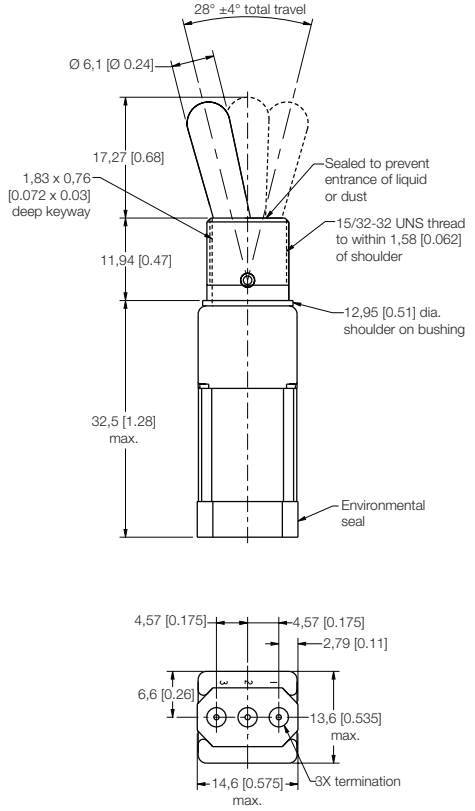
## MICRO SWITCH TW SERIES 1-POLE STANDARD ACTUATOR OPTIONS, TERMINALS, & DIMENSIONS

**Note: Three-position switches shown**

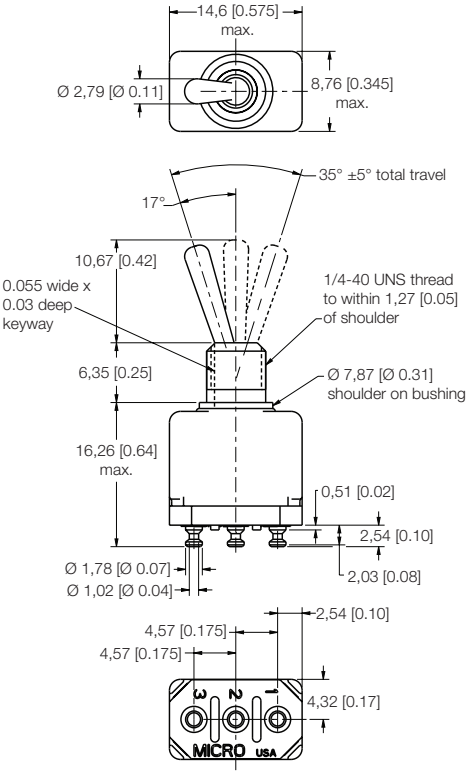
### 11TW1: Single pole, standard lever, 15/32 bushing, solder terminals



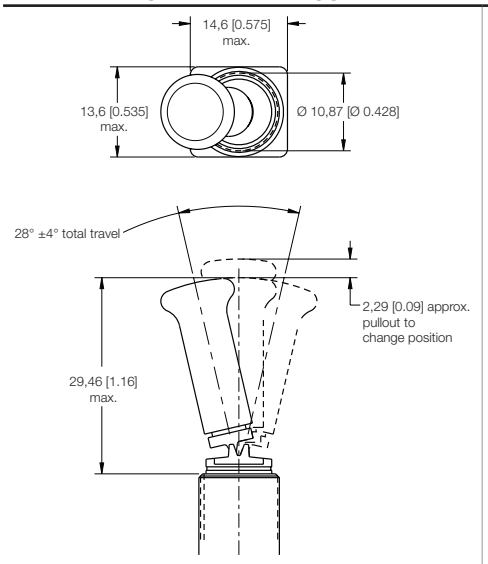

### 111TW1: Single pole, standard lever, 15/32 bushing, IWTS



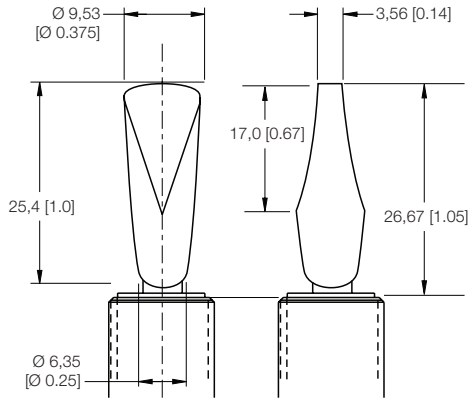

### 1TW1: Single pole, standard lever, 1/4 bushing, solder terminals




### Locking lever dimensions for single pole TW toggles



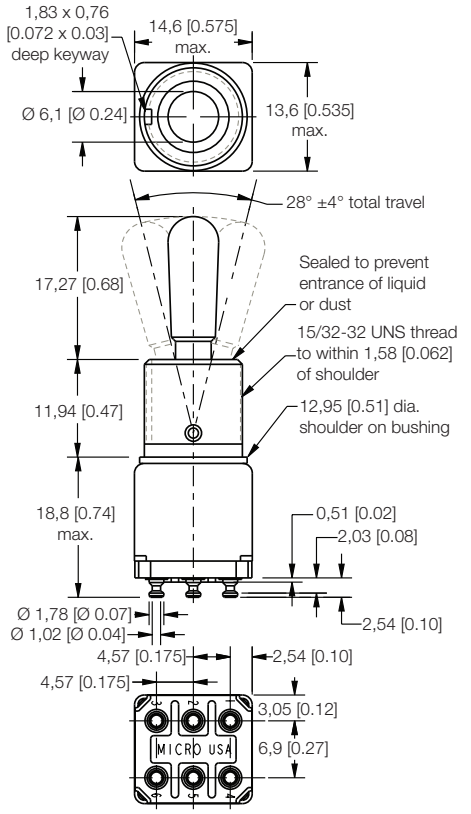

### Colored paddle dimensions for single pole TW toggles



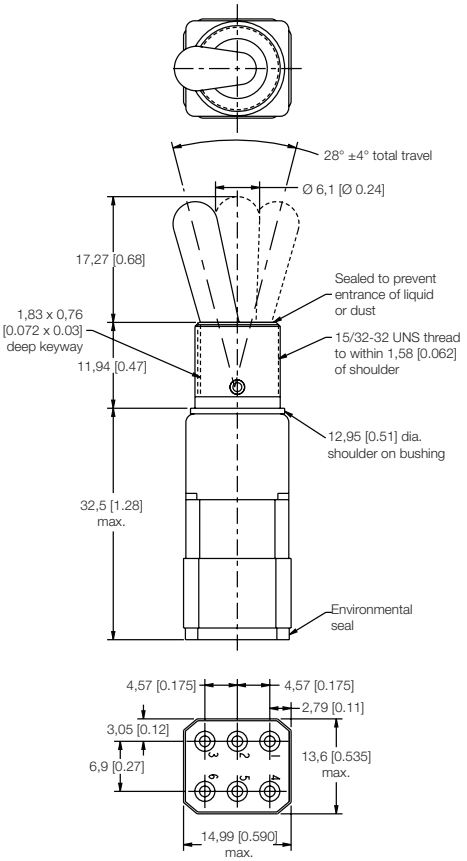
## MICRO SWITCH™ TW SERIES 2-POLE STANDARD ACTUATOR OPTIONS, TERMINALS, & DIMENSIONS

**Note: Three-position switches shown**

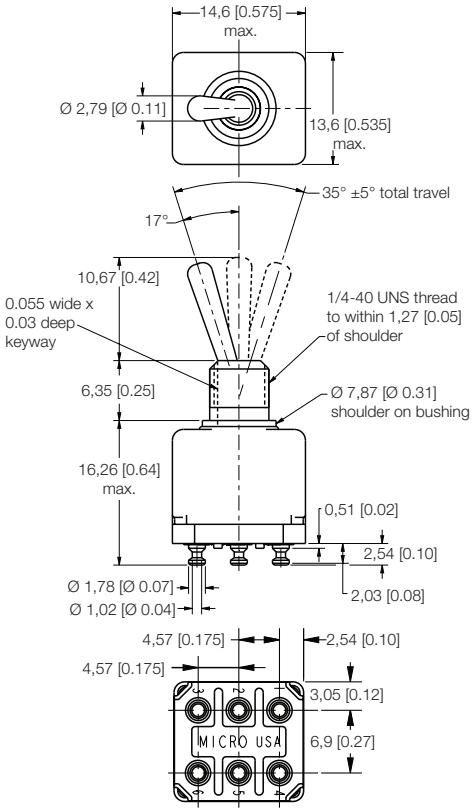
### 12TW1: Single pole, standard lever, 15/32 bushing, solder terminals



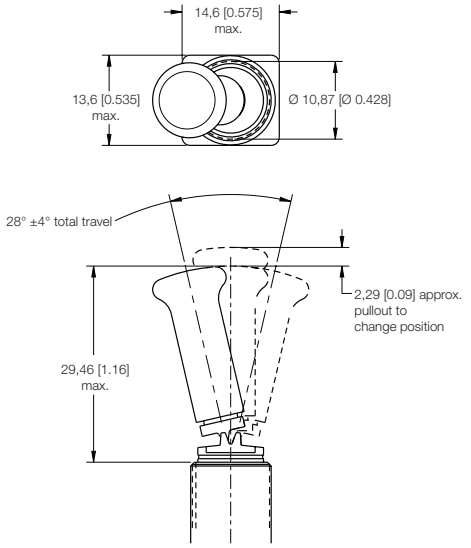

### 112TW1: Single pole, standard lever, 15/32 bushing, IWTS



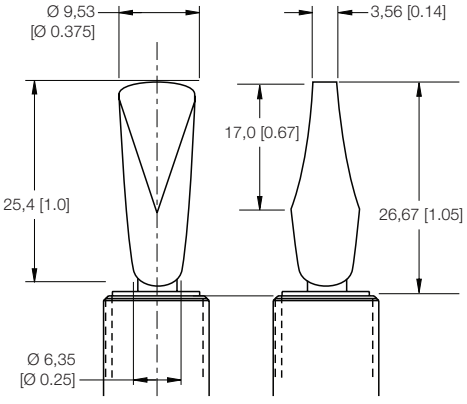

### 2TW1: Single pole, standard lever, 1/4 bushing, solder terminals




### Locking lever dimensions for double pole TW toggles




### Colored paddle dimensions for double pole TW toggles



## MICRO SWITCH TW SERIES LOCKING CONFIGURATIONS

| A | B | D | E | F | G | H |
|---|---|---|---|---|---|---|
|  Locked In Three Positions |  Locked In Center and Extreme Position (Keyway Side) |  Locked Out Of Center Position |  Locked In Center Position |  Locked In Extreme Position (Opposite Keyway) |  Locked In Extreme Position (Keyway Side) |  Locked Out Of Center And Extreme Position (Keyway Side) |

| J | K | L | M | N | P |
|---|---|---|---|---|---|
|  Locked Out Of Center And Extreme Position (Opposite Keyway) |  Locked In Center And Extreme Position (Opposite Keyway) |  Locked Out Of Extreme Position (Keyway Side) |  Locked Out Of And Into Extreme Position (Opposite Keyway) |  Locked Out Of Extreme Position (Opposite Keyway) |  Locked Out Of And Into Extreme Position (Keyway Side) |

**Table 8. Paddle Lever Colors**

| Color Suffix | Paddle Lever Color |
|---|---|
| A001 | White |
| A002 | Black |
| A003 | Blue |
| A004 | Red |
| A005 | Green |
| A006 | Orange |
| A007 | Light Grey |

## ADDITIONAL MATERIALS

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

- Product installation instructions
- Product range guide
- Product application-specific information
  - Flight deck toggle switches
  - Sensors and switches in front loaders
  - Sensors and switches in mobile cranes
  - Sensors and switches in oil rig applications

### ⚠ WARNING
### PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**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.**

**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.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, Honeywell assumes no responsibility for its use.

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