

## MICRO SWITCH™ Environmentally Sealed Limit Switches

EN Series

003125

Issue 1

Datasheet



### DESCRIPTION

The Honeywell MICRO SWITCH™ Series of EN limit switches are bushing mount designed, manufactured, and qualified to MIL-PRF-8805 standards. These products provide a durable switch for commercial and military aircraft as well as commercial and military ground-based equipment. Other applications include off-road equipment where severe environments are encountered.

The EN Series of switches have proven to deliver consistent and reliable operation in harsh environments on critical applications for more than 65 years.

### VALUE TO CUSTOMERS

- Precise and reliable position indication of critical applications on aircraft and military systems

### DIFFERENTIATION

- MICRO SWITCH™ EN Series' products are highly configurable; offering a variety of integral actuators, electrical circuitries, and electrical terminations

### FEATURES

- Circuitry options from 1PST (one-pole single throw) circuit to 6PDT (six-pole double throw) circuits for position indication of different independent circuits or providing redundant circuit capabilities
- Rugged stainless steel housing and bushing
- All-metal drive train for consistent operating characteristics at high or low temperatures
- Most EN catalog listings are MIL-PRF-8805 compliant for stringent military and non-military applications
- MIL-PRF-8805 symbol 4 (resilient) sealing to keep dust, water, and ice from entering the switch enclosure
- Gold-bifurcated, gold-plated, or silver-alloy switch contacts for reliably controlling electrical loads from less than 0.5 A [low energy/logic level] up to 15 A (power duty)
- Wide temperature range from -54 °C to 125 °C [-65 °F to 257 °F] for sea level or high altitude military or commercial applications
- Assortment of switch actuators and electrical terminations
- Miniature package size [400EN Series and 600EN Series] reduces housing diameter by 30 % for smaller space required on equipment

### POTENTIAL APPLICATIONS

- Landing gear systems for commercial and military aircraft including helicopters
  - WOW switch (Weight-on-Wheels) for landing gear
  - Up-lock and down-lock sensing
  - Landing gear bay doors closed/locked
- External doors and hatches for commercial and military aircraft including helicopters
  - Closed and locked indication for passenger entry/exit doors, cargo bay doors, and/or other doors or hatches (refueling door, APU air inlet door)
- Military ground vehicles
  - Doors or hatches closed/locked or open
- Off-road construction equipment
  - Doors or panels present/closed/open
  - Up-stop or down-stop limits

### PORTFOLIO

Honeywell offers many Series of MICRO SWITCH™ sealed switches including the [HM Series](#), [SE Series](#), [XE Series](#), [HS Series](#), [HE Series](#), and [HR Series](#).

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 1. Specifications

| Characteristic                  | Parameter                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------|
| Description                     | Environmentally sealed military qualified limit switch series (MIL-PRF-8805)             |
| Housing & bushing material      | 300 Series stainless steel                                                               |
| Contact material                | Silver alloy, gold plated, gold bifurcated                                               |
| Mechanical endurance            | 25,000 cycles min.                                                                       |
| Electrical endurance            | 25,000 cycles min. @ rated load                                                          |
| Circuitry                       | 1PST (one-pole single throw) to 6PDT (six-pole double throw); reference Figure 2, page 3 |
| Electrical rating               | Up to 15 A @ 28 Vdc; reference Table 2, page 2                                           |
| Dielectric strength (initial)   | 1000 V RMS; 500 µA max. leakage                                                          |
| Insulation resistance (initial) | 500 Vdc; 1000 Megohms min.                                                               |
| Environmental sealing           | Symbol 4, resilient seal per MIL-PRF-8805                                                |
| Temperature range (std.)        | -54 °C to 85 °C [-65 °F to 185 °F]                                                       |
| Temperature range (opt.)        | -54 °C to 125 °C [-65 °F to 257 °F]                                                      |
| Shock                           | Symbol M (100 g) per MIL-PRF-8805                                                        |
| Vibration                       | Symbol 1, 10 g peak (10 Hz to 500 Hz)                                                    |
| Standards                       | Design conforms to MIL-PRF-8805                                                          |

Table 2. Electrical Ratings

| Rating Code | Sea Level @ 28 Vdc |       |      |      | Altitude 50,000 ft |                    |                |      |
|-------------|--------------------|-------|------|------|--------------------|--------------------|----------------|------|
|             | Inrush             | Motor | Res. | Ind. | Inrush             | Motor <sup>2</sup> | Res.           | Ind. |
| A           | 24                 | 4     | 4    | 2    | 24                 | 4                  | 4 <sup>1</sup> | 2    |
| B           | 36                 | 6     | 10   | 3    | 36                 | 6                  | 10             | 3    |
| C           | 30                 | 5     | 15   | 10   | 30                 | 5                  | 15             | 10   |
| D           | 24                 | 4     | 5    | 3    | -                  |                    |                |      |
| E           | -                  |       | 1    | 0.5  | -                  |                    | 1              | 0.5  |
| F           | N/A                | 4     | 7    | 4    | N/A                | 4                  | 7              | 2.5  |

<sup>1</sup> 5 A for rotary switches.

<sup>2</sup> Application information only.

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

## STANDARD SWITCHES *(see pages 4 and 5)*

While the standard EN Series provides a wide variety of products, Honeywell offers a miniature EN Series and a special EN Series per the following descriptions.

## MINIATURE SWITCHES *(see pages 6 through 8)*

Miniature type EN switches meet the demand for smaller size and lighter weight without sacrificing performance or electrical capacity. These types are of the same construction, seal, and materials as the standard size EN switches.

Type 400EN switches are directly interchangeable with their standard size EN counterpart, yet the housings are smaller in diameter and lighter in weight. The miniature-size housing is 7,92 mm [0.312 in] smaller in diameter, and the switch weighs 9,1 g [0.3 oz] less.

## SWITCHES WITH SPECIAL REQUIREMENTS

*(see page 9)*

### High velocity actuation

This switch (1EN231-6) is designed to withstand near “hammer-blow” actuation as is found in over-center locking mechanisms. It is dimensionally interchangeable with standard listing 1EN1-6.

### Low force operation

Special spring construction within this switch (1EN51-6) reduces the normal 6 lb to 12 lb (26,7 N to 53,4 N) EN operating force to 3 lb to 6 lb (13,3 N to 26,7 N). This switch is also dimensionally interchangeable with the standard size 1EN1-6.

### Increased overtravel

A longer plunger and bushing on the switch (1EN61-6) extends the EN overtravel capabilities from the normal 6,35 mm to 21,8 mm [0.25 in to 0.86 in]. The longer bushing also permits additional adjustment of the plunger position or installations where an increased bushing length is required.

### High impact shock

Catalog listing, 1EN75-R3 (M8805/65-001), has been qualified to MIL-PRF-8805, including high impact shock class H. Other switches rated for high impact shock applications incorporate the same plunger mechanism and internal switch design as used in the 1EN75-R3 and are expected to conform to the same requirements.

## TERMINATION

Termination is specified in the order guides. Leadwires are generally six feet long, and of the gage and military specifications noted in the order guides.

## MOUNTING

Plunger actuator switches mount through 5/8 in [Ø 0.625 in] or 15/32 in [Ø 0.469 in] holes. Lock washer, keyed washer, and wire lock hexagon mounting nuts lock the switches in their mounting holes.

Rotary-actuated switches mount through 15/32 in [Ø 0.469 in] holes. A lock washer, wire lock hexagon nut, and locating pins on the top of the housing prevent switch rotation.

Figure 1. Typical EN Switch Construction

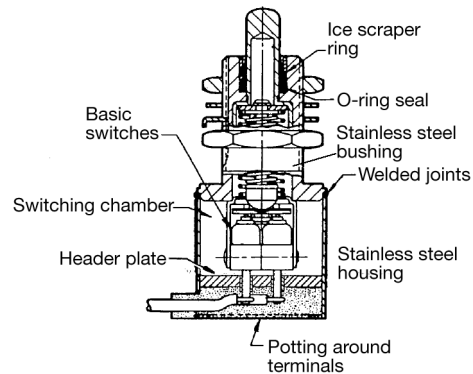
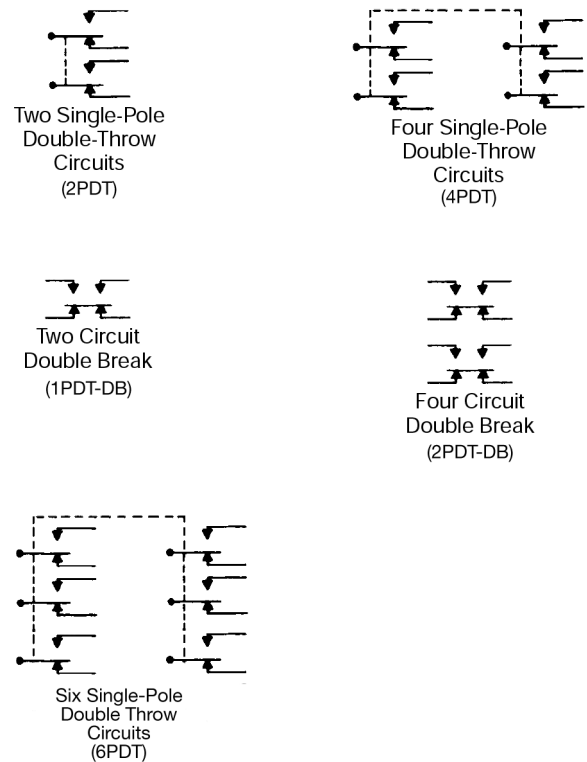


Figure 2. Circuitry Diagrams



# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 3. EN Series Order Guide - Standard Series

| Actuator             | Circuitry | Termination                                  | Electrical Rating Code** | Catalog Listing  | Military Number or Note    | O.F. N [lb]            | R.F. min. N [lb] | F.P. nom. mm [in] | P.T. max. mm [in] | O.T. min. mm [in] | D.T. max. mm [in] | Bushing Thread Size | Housing Height mm [in] | Housing Diameter or Length mm [in] | Replacement Mounting Hardware Packet |
|----------------------|-----------|----------------------------------------------|--------------------------|------------------|----------------------------|------------------------|------------------|-------------------|-------------------|-------------------|-------------------|---------------------|------------------------|------------------------------------|--------------------------------------|
| PIN PLUNGER          | 2PDT      | Leadwire #20 AWG (side exit) MIL-DTL-22759/7 | A [4 A]                  | <b>1EN1-6</b>    | <b>MS24331-1 (8805/40)</b> | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.980]           | Ø 25,4 [1.0]                       | 19PA8                                |
|                      | 2PDT      | Screw (4-48 thread)                          | A [4 A]                  | <b>1EN1-S</b>    | –                          | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 38,2 [1.51]            | Ø 25,4 [1.0]                       | 19PA78-EN                            |
|                      | 2PDT      | Connector (side exit)                        | A [4 A]                  | <b>1EN42-R</b>   | –                          | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 27,9 [1.10]            | 61,0 [2.4]                         | 19PA78-EN                            |
|                      | 2PDT      | Connector (bottom exit)                      | A [4 A]                  | <b>1EN43-R</b>   | –                          | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 53,3 [2.1]             | Ø 25,4 [1.0]                       | 19PA78-EN                            |
|                      | 2PDT      | Leadwire #18 AWG (side exit) MIL-DTL-22759/7 | B [10 A]                 | <b>2EN1-6</b>    | <b>MS24331-2 (8805/40)</b> | 26,7 to 53,4 [6 to 12] | 22,3 [5]         | 35,0 [1.38]       | 1,27 [0.050]      | 6,35 [0.250]      | 0,89 [0.035]      | 0.625-24 UNEF       | 38,1 [1.50]            | Ø 38,1 [1.50]                      | 19PA8                                |
|                      | 1PDT-DB   | Leadwire #18 AWG (side exit) MIL-DTL-22759/7 | C [15 A]                 | <b>3EN1-6</b>    | <b>MS24331-3 (8805/40)</b> | 26,7 to 53,4 [6 to 12] | 22,3 [5]         | 35,0 [1.38]       | 1,52 [0.060]      | 6,35 [0.250]      | 0,89 [0.035]      | 0.625-24 UNEF       | 33,3 [1.31]            | Ø 38,1 [1.50]                      | 19PA8                                |
|                      | 2PDT-DB   | Leadwire #18 AWG (side exit) MIL-DTL-22759/7 | C [15 A]                 | <b>4EN1-6</b>    | <b>MS24331-4 (8805/40)</b> | 26,7 to 53,4 [6 to 12] | 22,3 [5]         | 35,0 [1.38]       | 1,78 [0.070]      | 6,35 [0.250]      | 1,14 [0.045]      | 0.625-24 UNEF       | 43,2 [1.70]            | Ø 38,1 [1.50]                      | 19PA8                                |
|                      | 4PDT      | Leadwire #20 AWG (side exit) MIL-DTL-22759/7 | A [4 A]                  | <b>5EN1-6</b>    | –                          | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,76 [0.030]      | 0.625-24 UNEF       | 30,5 [1.20]            | Ø 38,1 [1.50]                      | 19PA78-EN                            |
| BALL BEARING PLUNGER | 2PDT      | Leadwire #20 AWG (side exit) MIL-DTL-22759/7 | A [4 A]                  | <b>2001EN1-6</b> | –                          | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 39,1 [1.54]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.980]           | Ø 25,4 [1.0]                       | 19PA8                                |
| ROLLER PLUNGER*      | 2PDT      | Leadwire #20 AWG (side exit) MIL-DTL-22759/7 | A [4 A]                  | <b>21EN9-6*</b>  | FAA-PMA                    | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 45,2 [1.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.980]           | Ø 25,4 [1.0]                       | 19PA115-EN                           |
|                      | 2PDT      | Leadwire #18 AWG (side exit) MIL-W-22759/7   | B [10 A]                 | <b>22EN9-6*</b>  | –                          | 26,7 to 53,4 [6 to 12] | 22,3 [5]         | 45,2 [1.78]       | 1,27 [0.050]      | 6,35 [0.250]      | 0,89 [0.035]      | 0.625-24 UNEF       | 38,1 [1.5]             | Ø 38,1 [1.5]                       | 19PA115-EN                           |
|                      | 2PDT-DB   | Leadwire #18 AWG (side exit) MIL-W-22759/7   | C [15 A]                 | <b>24EN9-6*</b>  | –                          | 26,7 to 53,4 [6 to 12] | 22,3 [5]         | 45,2 [1.78]       | 1,78 [0.070]      | 6,35 [0.250]      | 1,14 [0.045]      | 0.625-24 UNEF       | 43,2 [1.70]            | Ø 38,1 [1.50]                      | 19PA115-EN                           |
|                      | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7   | A [4 A]                  | <b>25EN9-6*</b>  | FAA-PMA                    | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 45,2 [1.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,76 [0.030]      | 0.625-24 UNEF       | 30,5 [1.20]            | Ø 38,1 [1.50]                      | 19PA115-EN                           |

O.F.- Operating Force; R.F.- Release Force; F.P.-Free Position; P.T.-Pretravel; O.T.-Overtravel; D.T.-Differential Travel

\* Roller plunger field adjustable in 45° increments.

\*\* Reference Table 2, page 2, for additional detail.

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 3. EN Series Order Guide - Standard Series, continued

| Actuator                          | Circuitry | Termination                                | Electrical Rating Code** | Catalog Listing            | Military Number or Note           | O.T. Nm [in-lb]         | R.T. min. Nm [in-lb] | P.T. degrees [nom.]                 | T.T. degrees [nom.] | D.T. max. degrees | Bushing Thread Size | Housing Height mm [in] | Housing Diameter or Length mm [in] | Replacement Mounting Hardware Packet |
|-----------------------------------|-----------|--------------------------------------------|--------------------------|----------------------------|-----------------------------------|-------------------------|----------------------|-------------------------------------|---------------------|-------------------|---------------------|------------------------|------------------------------------|--------------------------------------|
| ROTARY ROLLER LEVER               | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | D [5 A]                  | <b>31EN11-6 (CW)</b>       | <b>MS21320-1 (8805/48)</b>        | 1,36 to 2,82 [12 to 25] | 1,02 [9]             | 13°                                 | 45°                 | 4°                | 0.469-32 UNS        | 54,8 [2.16]            | Ø 25,4 [1.0]                       | 19PA10                               |
|                                   | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | D [5 A]                  | <b>31EN1-6 (CCW)</b>       | <b>MS21320-2 (8805/48)</b>        | 1,36 to 2,82 [12 to 25] | 1,02 [9]             | 13°                                 | 45°                 | 4°                | 0.469-32 UNS        | 54,8 [2.16]            | Ø 25,4 [1.0]                       | 19PA10                               |
|                                   | 2PDT      | Leadwire #18 AWG (side exit) MIL-W-22759/7 | B [10 A]                 | <b>32EN11-6 (CW)</b>       | <b>MS21320-3 (8805/48)</b>        | 1,36 to 2,82 [12 to 25] | 1,02 [9]             | 20°                                 | 45°                 | 6°                | 0.469-32 UNS        | 68,6 [2.70]            | Ø 38,1 [1.5]                       | 19PA10                               |
|                                   | 2PDT      | Leadwire #18 AWG (side exit) MIL-W-22759/7 | B [10 A]                 | <b>32EN1-6 (CCW)</b>       | <b>MS21320-4 (8805/48)</b>        | 1,36 to 2,82 [12 to 25] | 1,02 [9]             | 20°                                 | 45°                 | 6°                | 0.469-32 UNS        | 68,6 [2.70]            | Ø 38,1 [1.5]                       | 19PA10                               |
|                                   | 2PDT-DB   | Leadwire #18 AWG (side exit) MIL-W-22759/7 | C [15 A]                 | <b>34EN11-6 (CW)</b>       | <b>MS21320-7 (8805/48)</b>        | 1,36 to 2,82 [12 to 25] | 0,9 [8]              | 15°                                 | 45°                 | 10°               | 0.469-32 UNS        | 71,6 [2.82]            | Ø 38,1 [1.5]                       | 19PA10                               |
|                                   | 2PDT-DB   | Leadwire #18 AWG (side exit) MIL-W-22759/7 | C [15 A]                 | <b>34EN1-6 (CCW)</b>       | <b>MS21320-8 (8805/48)</b>        | 1,36 to 2,82 [12 to 25] | 0,9 [8]              | 15°                                 | 45°                 | 10°               | 0.469-32 UNS        | 71,6 [2.82]            | Ø 38,1 [1.5]                       | 19PA10                               |
|                                   | 2PDT      | Leadwire #18 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | <b>35EN27-4 (CW)</b>       | Gold-bifurcated contacts          | 1,36 to 2,82 [12 to 25] | 1,02 [9]             | 20°                                 | 45°                 | 6°                | 0.469-32 UNS        | 60,7 [2.39]            | Ø 38,1 [1.5]                       | 19PA10                               |
|                                   | 2PDT      | Leadwire #18 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | <b>35EN24-4 (CCW)</b>      | FAA-PMA, Gold-bifurcated contacts | 1,36 to 2,82 [12 to 25] | 1,02 [9]             | 20°                                 | 45°                 | 6°                | 0.469-32 UNS        | 60,7 [2.39]            | Ø 38,1 [1.5]                       | 19PA10                               |
| ROTARY LINKAGE LEVER <sup>1</sup> | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | A [4 A]                  | <b>41EN1-6<sup>1</sup></b> | <b>MS24420-1</b>                  | 0,34 [3]                | -                    | Nom. 35° actuation in 360° rotation |                     | 12°               | 0.469-32 UNS        | 26,7 [1.05]            | Ø 25,4 [1.0]                       | 19PA10                               |
|                                   | 2PDT      | Leadwire #18 AWG (side exit) MIL-W-22759/7 | B [10 A]                 | <b>42EN1-6<sup>1</sup></b> | <b>MS24420-2</b>                  | 0,56 [5]                | -                    | Nom. 35° actuation in 360° rotation |                     | 12°               | 0.469-32 UNS        | 42,7 [1.68]            | Ø 38,1 [1.5]                       | 19PA10                               |
|                                   | 2PDT-DB   | Leadwire #18 AWG (side exit) MIL-W-22759/7 | C [15 A]                 | <b>44EN1-6<sup>1</sup></b> | <b>MS24420-4</b>                  | 1,13 [10]               | -                    | Nom. 35° actuation in 360° rotation |                     | 20°               | 0.469-32 UNS        | 46,2 [1.82]            | Ø 38,1 [1.5]                       | 19PA10                               |

O.T.- Operating Torque; R.T.- Release Torque; P.T.-Pretravel; T.T.-Total Travel; D.T.-Differential Travel

<sup>1</sup> These rotary linkage lever switches are continuous rotation CW or CCW.

\*\* Reference Table 2, page 2, for additional detail.

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 4. EN Series Order Guide - Miniature Series

| Actuator    | Circuitry | Termination                                | Electrical Rating Code** | Catalog Listing | Military Number or note                 | O.F. N [lb]            | R.F. min. N [lb] | F.P. nom. mm [in] | P.T. max. mm [in] | O.T. min. mm [in] | D.T. max. mm [in] | Bushing Thread Size | Housing Height mm [in] | Housing Diameter or Length mm [in] | Replacement Mounting Hardware Packet |
|-------------|-----------|--------------------------------------------|--------------------------|-----------------|-----------------------------------------|------------------------|------------------|-------------------|-------------------|-------------------|-------------------|---------------------|------------------------|------------------------------------|--------------------------------------|
| PIN PLUNGER | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | 402EN1-6        | MS21321-1 8805/39                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.98]            | Ø 17,5 [0.69]                      | -                                    |
|             | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | 404EN1-6        | MS21321-2 8805/39                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 30,5 [1.2]             | Ø 25,4 [1.0]                       | -                                    |
|             | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | 602EN1-6        | MS27240-1 8805/43                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 22,3 [0.88]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | 19PA9                                |
|             | 2PDT      | Solder pins                                | F [7 A]                  | 602EN142        | -                                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 22,3 [0.88]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | 19PA9                                |
|             | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | 602EN222-6*     | MS27240-5 8805/43, Gold-plated contacts | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 22,3 [0.88]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | 19PA9                                |
|             | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | 602EN602-6      | FAA-PMA                                 | 8,9 to 17,8 [2 to 4]   | 4,7 [1]          | 37,1 [1.46]       | nom. 0,38 [0.015] | 6,35 [0.250]      | 0,51 [0.020]      | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | 19PA9                                |
|             | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | 604EN1-6        | MS27240-2 8805/43                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 22,3 [0.88]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 30,5 [1.2]             | Ø 25,4 [1.0]                       | 19PA9                                |
|             | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | 604EN222-6*     | MS27240-6 8805/43, Gold-plated contacts | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 22,3 [0.88]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 30,5 [1.2]             | Ø 25,4 [1.0]                       | 19PA9                                |

O.F.- Operating Force; R.F.- Release Force; F.P.-Free Position; P.T.-Pretravel; O.T.-Overtravel; D.T.-Differential Travel

\* Each pole (basic switch) has gold-plated silver contacts for controlling low energy loads. If the switch is applied to a power-duty application, the switch is not recommended to control a low energy load.

\*\* Reference Table 2, page 2, for additional detail.

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 4. EN Series Order Guide - Miniature Series, continued

| Actuator        | Circuitry | Termination                                | Electrical Rating Code** | Catalog Listing                | Military Number or note                        | O.F. N [lb]            | R.F. min. N [lb] | F.P. nom. mm [in] | P.T. max. mm [in] | O.T. min. mm [in] | D.T. max. mm [in] | Bushing Thread Size | Housing Height mm [in] | Housing Diameter or Length mm [in] | Replacement Mounting Hardware Packet |
|-----------------|-----------|--------------------------------------------|--------------------------|--------------------------------|------------------------------------------------|------------------------|------------------|-------------------|-------------------|-------------------|-------------------|---------------------|------------------------|------------------------------------|--------------------------------------|
| ROLLER PLUNGER* | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>422EN1-6*</b>               | -                                              | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 45,2 [1.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.98]            | Ø 17,5 [0.69]                      | 19PA115-EN                           |
|                 | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>424EN1-6*</b>               | -                                              | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 45,2 [1.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 30,5 [1.2]             | Ø 25,4 [1.0]                       | 19PA8                                |
|                 | 6 PDT     | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>426EN9-8*</b>               | -                                              | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 45,2 [1.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,76 [0.030]      | 0.625-24 UNEF       | 32,7 [1.29]            | Ø 38,1 [1.5]                       | 19PA8                                |
|                 | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>622EN1-6*</b>               | <b>MS27240-3 8805/43</b>                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 32,9 [1.30]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | 19PA9                                |
|                 | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | <b>622EN222-6*<sup>1</sup></b> | <b>MS27240-7 8805/43, Gold-plated contacts</b> | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 32,9 [1.30]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | 19PA9                                |
|                 | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>624EN1-6*</b>               | <b>MS27240-4 8805/43</b>                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 32,9 [1.30]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 30,5 [1.2]             | Ø 25,4 [1.0]                       | 19PA9                                |
|                 | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | <b>624EN222-6*<sup>1</sup></b> | <b>MS27240-8 8805/43 Gold-plated contacts</b>  | 26,7 to 53,4 [6 to 12] | 17,8 [4]         | 32,9 [1.30]       | 1,02 [0.040]      | 3,18 [0.125]      | 0,51 [0.020]      | 0.469-32 UNS        | 30,5 [1.2]             | Ø 25,4 [1.0]                       | 19PA9                                |

O.F.- Operating Force; R.F.- Release Force; F.P.-Free Position; P.T.-Pretravel; O.T.-Overtravel; D.T.-Differential Travel

<sup>1</sup> Each pole (basic switch) has gold-plated silver contacts for controlling low energy loads. If the switch is applied to a power-duty application, the switch is not recommended to control a low energy load.

\* Roller plunger field adjustable in 45° increments.

\*\* Reference Table 2, page 2, for additional detail.



# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 4. EN Series Order Guide - Miniature Series, continued

| Actuator                          | Circuitry | Termination                                | Electrical Rating Code** | Catalog Listing                 | Military Number or note | O.T. Nm [in-lb] | R.T. min. Nm [in-lb] | P.T. degrees [nom.]                 | T.T. degrees [nom.] | D.T. max. degrees | Bushing Thread Size | Housing Height mm [in] | Housing Diameter or Length mm [in] | Replacement Mounting Hardware Packet |
|-----------------------------------|-----------|--------------------------------------------|--------------------------|---------------------------------|-------------------------|-----------------|----------------------|-------------------------------------|---------------------|-------------------|---------------------|------------------------|------------------------------------|--------------------------------------|
| ROTARY LINKAGE LEVER <sup>1</sup> | 2PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>442EN1-6<sup>1</sup></b>     | –                       | 0,34 [3]        | –                    | Nom. 50° actuation in 360° rotation | –                   | 12°               | 0.469-32 UNS        | 25,4 [1.0]             | Ø 17,5 [0.69]                      | –                                    |
|                                   | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>444EN1-6<sup>1</sup></b>     | –                       | 0,34 [3]        | –                    | Nom. 50° actuation in 360° rotation | –                   | 12°               | 0.469-32 UNS        | 30,23 [1.19]           | Ø 17,5 [0.69]                      | –                                    |
|                                   | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | F [7 A]                  | <b>444EN49-6<sup>1</sup></b>    | –                       | 0,34 [3]        | –                    | Nom. 50° actuation in 360° rotation | –                   | 12°               | 0.469-32 UNS        | 30,23 [1.19]           | Ø 17,5 [0.69]                      | –                                    |
|                                   | 4PDT      | Leadwire #20 AWG (side exit) MIL-W-22759/7 | E [1 A]                  | <b>444EN222-6<sup>1,2</sup></b> | Gold-plated contacts    | 0,34 [3]        | –                    | Nom. 50° actuation in 360° rotation | –                   | 12°               | 0.469-32 UNS        | 30,23 [1.19]           | Ø 17,5 [0.69]                      | –                                    |

O.T.- Operating Torque; R.T.- Release Torque; P.T.-Pretravel; T.T.-Total Travel; D.T.-Differential Travel

<sup>1</sup> These rotary linkage lever switches are continuous rotation CW or CCW.

<sup>2</sup> Each pole (basic switch) has gold-plated silver contacts for controlling low energy loads. If the switch is applied to a power-duty application, the switch is not recommended to control a low energy load.

\*\* Reference Table 2, page 2, for additional detail.



# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 5. EN Series Order Guide - Special Purpose Series

| Utilization                | Actuator    | Circuitry                                  | Termination                                       | Electrical Rating Code ** | Catalog Listing   | Military Number or note | O.F. N [lb]            | R.F. min. N [lb]       | F.P. nom. mm [in] | P.T. max. mm [in] | O.T. min. mm [in] | D.T. max. mm [in] | Bushing Thread Size | Housing Height mm [in] | Housing Diameter or Length mm [in] | Replacement Mounting Hardware Packet |            |
|----------------------------|-------------|--------------------------------------------|---------------------------------------------------|---------------------------|-------------------|-------------------------|------------------------|------------------------|-------------------|-------------------|-------------------|-------------------|---------------------|------------------------|------------------------------------|--------------------------------------|------------|
| HIGH VELOCITY ACTUATION    | PIN PLUNGER | 2PDT                                       | Leadwire #20 AWG (side exit) MIL-W-22759/7        | A [4 A]                   | <b>1EN231-6</b>   | -                       | 26,7 to 53,4 [6 to 12] | 17,8 [4]               | 35,0 [1.38]       | 1,02 [0.040]      | 5,84 [0.230]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.98]            | 25,4 [1.0]                         | 19PA78-EN                            |            |
| LOW FORCE OPERATION        |             | 2PDT                                       | Leadwire #20 AWG (side exit) MIL-W-22759/7        | A [4 A]                   | <b>1EN51-6</b>    | -                       | 13,3 to 26,7 [3 to 6]  | 8,89 [2]               | 35,0 [1.38]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 0.625-24 UNEF       | 24,9 [0.98]            | 25,4 [1.0]                         | 19PA78-EN                            |            |
| INCREASED OVERTRAVEL       |             | 2PDT                                       | Leadwire #20 AWG (side exit) MIL-W-81044/9 Type E | A [4 A]                   | <b>1EN61-6</b>    | FAA-PMA                 |                        | 26,7 to 53,4 [6 to 12] | 17,8 [4]          | 35,0 [1.38]       | 1,02 [0.040]      | 12,70 [0.500]     | 0,51 [0.020]        | 0.625-24 UNEF          | 24,9 [0.98]                        | 25,4 [1.0]                           | 19PA78-EN  |
| INCREASED SHOCK RESISTANCE |             | 2PDT                                       | 7 Pin bottom exit, MIL. type connector            | A [4 A]                   | <b>1EN75-R</b>    | -                       |                        | 26,7 to 53,4 [6 to 12] | 17,8 [4]          | 9,53 [0.375]      | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]        | 1.0-20 UNEF            | 57,9 [2.28]                        | Ø 25,4 [1.0]                         | 19PA121-EN |
|                            |             | 2PDT                                       | 7 Pin side exit, MIL. type connector              | A [4 A]                   | <b>1EN76-R</b>    | -                       |                        | 26,7 to 53,4 [6 to 12] | 17,8 [4]          | 9,53 [0.375]      | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]        | 1.0-20 UNEF            | 36,6 [1.44]                        | 26,7 [1.05]                          | 19PA121-EN |
|                            |             | 2PDT                                       | 7 Pin bottom exit, MIL. type connector            | D [5 A]                   | <b>1EN75-R3</b>   | M8805/65-001            |                        | 26,7 to 53,4 [6 to 12] | 17,8 [4]          | 9,53 [0.375]      | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]        | 1.0-20 UNEF            | 73,4 [2.89]                        | Ø 25,4 [1.0]                         | 19PA121-EN |
|                            |             | 2PDT                                       | 7 Pin bottom exit, MIL. type connector            | A [4 A]                   | <b>21EN75-R1*</b> | -                       |                        | 26,7 to 53,4 [6 to 12] | 17,8 [4]          | 19,8 [0.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]        | 1.0-20 UNEF            | 57,9 [2.28]                        | Ø 25,4 [1.0]                         | 19PA121-EN |
|                            | 2PDT        | Leadwire #20 AWG (side exit) MIL-W-22759/7 | A [4 A]                                           | <b>21EN75-2*</b>          | -                 |                         | 26,7 to 53,4 [6 to 12] | 17,8 [4]               | 19,8 [0.78]       | 1,02 [0.040]      | 6,35 [0.250]      | 0,51 [0.020]      | 1.0-20 UNEF         | 34,5 [1.36]            | Ø 25,4 [1.0]                       | 19PA121-EN                           |            |

O.F.- Operating Force; R.F.- Release Force; F.P.-Free Position; P.T.-Pretravel; O.T.-Overtravel; D.T.-Differential Travel

\*Roller plunger field adjustable in 45° increments.

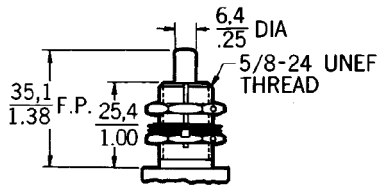
\*\* Reference Table 2, page 2, for additional detail.

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

## OPERATION

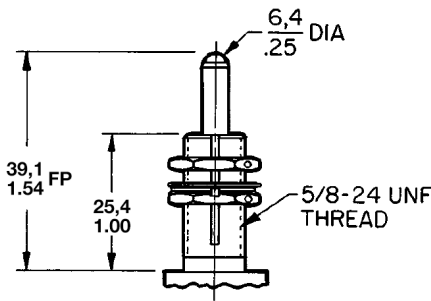
### Plunger Actuators

For in-line actuation. An ice scraper ring cleans the actuator with each operation.



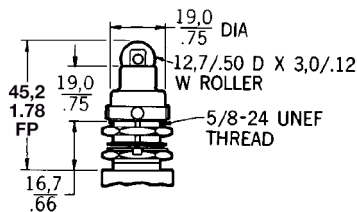
### Ball Bearing Plunger Actuators

For random direction operation. An ice scraper ring cleans the actuator with each operation.



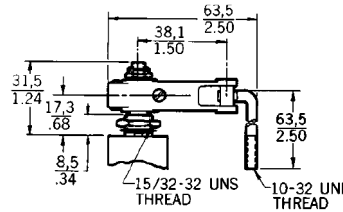
### Roller Plunger Actuators

For cam and slide actuation not to exceed 20° rise. Roller adjusts laterally in 45° increments. An ice scraper ring cleans the actuator with each operation.



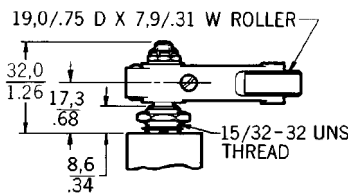
### Roller Linkage Lever Actuators

A threaded rod attaches to the rotary lever for positive actuation. The rotary lever operates in either direction and adjusts laterally to any position through 360°. The threaded rod pivots in two planes. The actuator has no spring return, but is controlled directly by the movement of the actuating device.



### Roller Lever Actuators

For cam and slide actuation with more than a 30° rise. The actuator is available in clockwise or counterclockwise operation with a spring-return mechanism. The actuator adjusts laterally to any position through 360°. The roller is laminated phenolic.



# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

## DIMENSIONAL DRAWINGS

Figure 3. Standard-size EN Switches

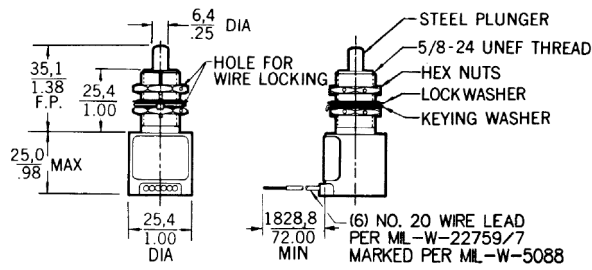
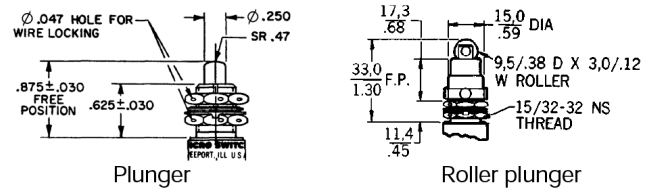


Figure 4. Miniature-size EN Switches

### 600EN actuators



### 400EN actuators

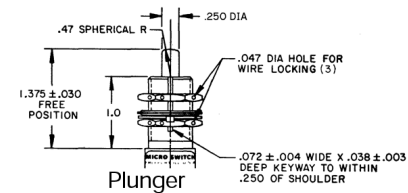
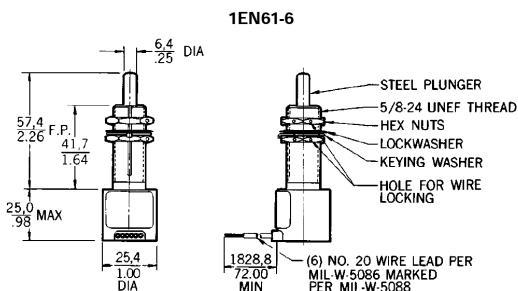
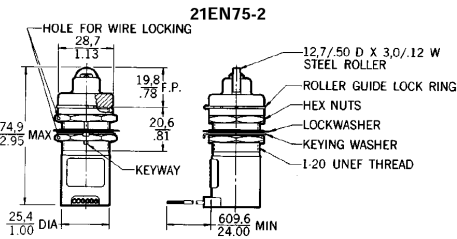
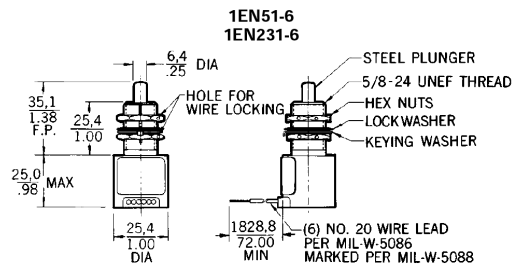
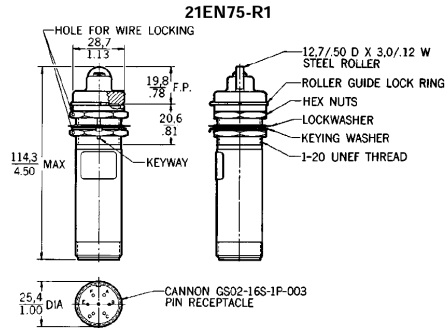
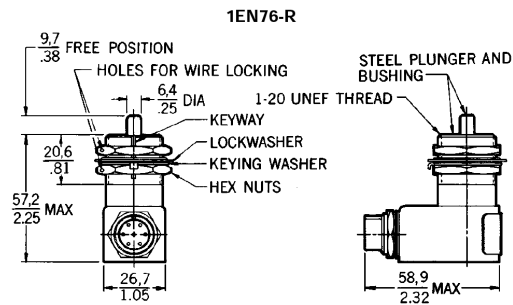
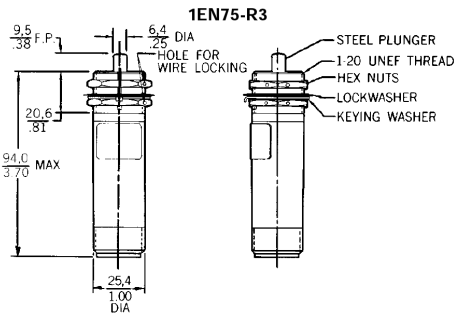
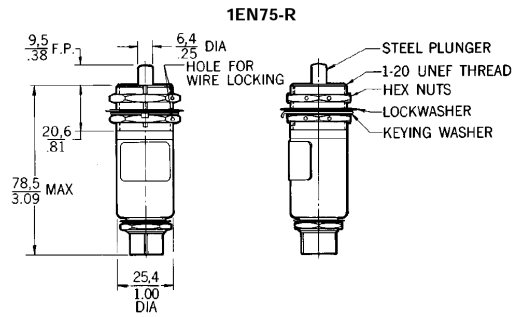


Figure 5. Special-purpose EN Switches

### Standard size EN switches













NOTE: Steel plunger and actuators are made from stainless steel.

Key: 0.0 = mm  
0.00 = inches

# MICRO SWITCH™ Environmentally Sealed Limit Switches, EN Series

Table 6. Replacement Parts

|                                                                                     | Catalog Listing | Description                     | Used On                                   |
|-------------------------------------------------------------------------------------|-----------------|---------------------------------|-------------------------------------------|
|    | 6PA30           | Roller lever arm                | 30EN Series                               |
|    | 6PA31           | Linkage lever arm               | 40EN Series                               |
|    | 6PA32           | Roller lever arm                | 1EN and 1HE Series                        |
|    | 6PA202-EN       | Roller lever arm                | 600EN and 600HE Series                    |
|    | 15PA104         | Roller guide and locking ring   | 21EN, 422/424EN Series (5/8 in bushing)   |
|    | 15PA105         | Roller guide and locking ring   | 622/624EN Series (15/32 in bushing)       |
|   | 15PA137         | Locking ring only               | 21EN 422/424EN Series (5/8 in bushing)    |
|  | 15PA107         | Locking ring only               | 622EN and 624EN Series (15/32 in bushing) |
|  | 19PA8           | Military-type mounting hardware | 1EN Series (5/8 in bushing)               |
|  | 19PA9           | Military-type mounting hardware | 600EN Series (15/32 in bushing)           |

## ADDITIONAL MATERIALS

The following associated literature is available on the Honeywell web site at [sensing.honeywell.com](http://sensing.honeywell.com):

- Product line guide
- Product range guide
- Aerospace and defense product range guide

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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.**

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- 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.**

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