

# Installation Instructions

Original Instructions



**Allen-Bradley**

by ROCKWELL AUTOMATION



## 22 mm Compact Metal Safety Limit Switches with 5-pin Micro (M12) Plug Connectors

Catalog Numbers 440P-AA1LB02D5, 440P-AA1LS11D5, 440P-AALS11D5, 440P-ACR1S11D5, 440P-ACRS11D5, 440P-ADP1S11D5, 440P-ADPB02D5, 440P-ADPS11D5, 440P-ARPS11D5, 440P-ARPB02D5

### Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated Standards, Certifications, Intended application, Functional safety data and Enclosure type rating	1
Updated <a href="#">Figure 3</a>	2
Updated Declaration of Conformity	4

**IMPORTANT** Save these instructions for future use. This publication does not include all specifications, dimensions, or special installation considerations.



**ATTENTION:** To avoid electrical shock and unintended operation of equipment, disconnect all power to the safety limit switch and the controlled equipment before you replace or adjust the safety limit switch.

Improper selection or installation of the devices affects the integrity of the safety systems and can result in personnel injury or death, property damage, or economic loss.

Comply with ISO 14119 including selection, accessibility to the installation, arrangement and fastening, possible substitute actuation, access to the escape release, motivation to defeat, and actuation mode.

Use management controls, working procedures, training and additional procedures to minimize the motivation to defeat.

Comply with ISO 13857 and ISO 13855 for guard openings and minimum (safe) distances.

- IMPORTANT**
- Before installation in a safety application, perform a risk assessment to determine whether the specifications of this device are suitable for the foreseeable operational and environmental characteristics of the machine that the device controls.
  - Only the N.C. set of contacts are considered safety contacts.
  - Follow all applicable standards for the application when you deploy these safety limit switches.
  - Follow operation specifications.
  - Place the actuator beyond the point where direct opening action occurs.
  - Do not use these devices to control a motor directly.

### Specifications

Attribute	Value
Standards	IEC 60947-5-1, ISO 14119, EN IEC 60947-1
Certifications	cULus Listed, TÜV Certified, CE Marked for all applicable EU directives, and UKCA Marked for all applicable regulations <a href="http://rok.auto/certifications">rok.auto/certifications</a>
Functional safety data	B10d: $2 \times 10^8$ operations
Intended application	Roller plunger ( <a href="#">Figure 5</a> , and <a href="#">Figure 6 on page 3</a> ): Fulfills IEC 60947-5-1 requirements. Type 1 interlocking devices according to ISO 14119.
<b>Outputs</b>	
Safety contacts	1 N.C. snap action
Auxiliary contacts	1 N.O. snap action
Thermal current ( $I_{th}$ )	3 A
Rated insulation voltage (ui)	300 AC
Short circuit protection	3 A max fast acting fuse IEC 269 type gG or equivalent
<b>Operating Characteristics</b>	
Actuation speed, max [mm/s (in/s)]	250 (9.84)
Actuation speed, min [mm/min. (in/min.)]	100 (3.94)
Actuation frequency, max [ops/hr]	6000
Mechanical life	$1 \times 10^7$ operations at room temperature
Power source, max [AC/DC]	60V 3 A
Torque settings [N·m (lb·in)]	<ul style="list-style-type: none"><li>• Operator head screws (see <a href="#">Figure 12 on page 4</a>): 0.8 (7.1)</li><li>• Short and wide roller lever arm hex nut (see <a href="#">Figure 10</a> and <a href="#">Figure 11 on page 4</a>): 1.0 (8.85)</li><li>• Lever arm screw (see <a href="#">Figure 12 on page 4</a>): 1.8...2.8 (15.93...24.78)</li><li>• Lever arm collar screw (see <a href="#">Figure 12 on page 4</a>): 3.2 (28.32)</li><li>• Panel mount nut: 1.5 (13.28)</li></ul>
<b>Environmental</b>	
Enclosure type rating	NEMA 1, IP66/IP67
Operating temperature [C° (F°)]	2...70 (35.6...158)
Pollution degree	3
<b>General</b>	
Material	<ul style="list-style-type: none"><li>• Housing: Die cast alloy</li><li>• Actuator: Various polymers and metals</li></ul>
Mounting	2 x M4, any position
Vibration	IEC 60068-2-6, 10...55 Hz, 0.35 mm (1.38 in.) amplitude
Shock	IEC 60068-2-7, 30 Gn 3 pulses per axis
Connection	15 cm (6 in.) 5/22 AWG UL AWM 2464 pigtail with 5-pin M12 QD plug
Enclosure color	Red body/black head
Intended use	Cam actuated
Interlocking and coding type <sup>(1)</sup>	Type 1, uncoded

(1) ISO 14119 defines types of interlocking devices and coding.



**WARNING:**

- For safe operation, the M12 socket of the connecting cable must be rated 60V 3 A or higher per standard EN61984.
- The M12 socket connector of the connecting cable must have a minimum sealing of IP65 to maintain a pollution degree 3 rating.

**Installation**

**IMPORTANT**

Installation of Allen-Bradley® Guardmaster® products must be in accordance with local and/or national codes. Servicing energized industrial control equipment can be hazardous if not in accordance with recommended safety procedures.

EN ISO 14119 replaces EN 1088 as the harmonized standard for interlocking devices associated with guards.

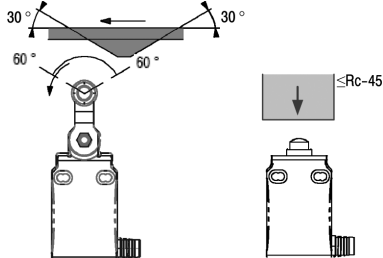
See publication [SAFETY-SR001](#).



Panel mount clearance hole = 13 mm (0.51 in.) maximum.

**Actuation Guidelines**

The method of actuation and over travel affects the service life of the safety limit switch. To maximize the service life, we recommended that you provide an actuator with a 30° pressure angle and a surface hardness of Rc-45 (max).



**Lever Position**

Some rotary switches include levers that mechanically couple to the actuating shaft. You can remove and reinstalled the lever to adjust cam tracking. See [Torque settings on page 1](#).

**Maintenance**

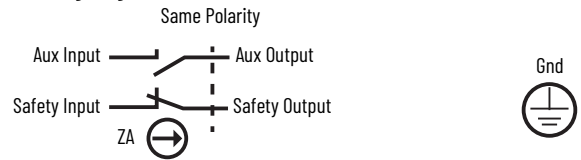
These devices require little maintenance, but we recommend routine visual inspection to help prevent the accumulation of foreign debris on the exterior actuators and rollers. Do not remove the operator head, as it is possible to lose or improperly install internal components.

**Wiring**

**IMPORTANT**

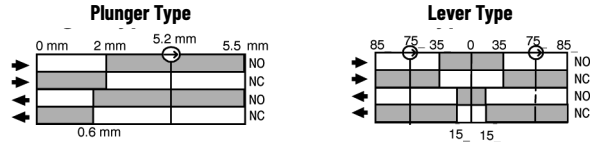
Electrical life depends on load, therefore, operations are not applicable and withdrawn.

**Figure 1 - Wiring Diagram**



**Figure 2 - Contact Opening Characteristics**

- Open
- Closed
- ⊖ Positive Opening Point



**Table 1 - 5-pin Micro (M12) Plug Connector**

Connector Pinout		
Pin	Type	Contact
1	Aux output	N.O.
2	Aux input	N.C.
3	Common	Ground
4	Safety input	N.C.
5	Safety output	N.C.
6	Keyway	-

**Approximate Dimensions**

**Figure 3 - Dome Plunger (Non-panel Mount) [mm (in.)]**

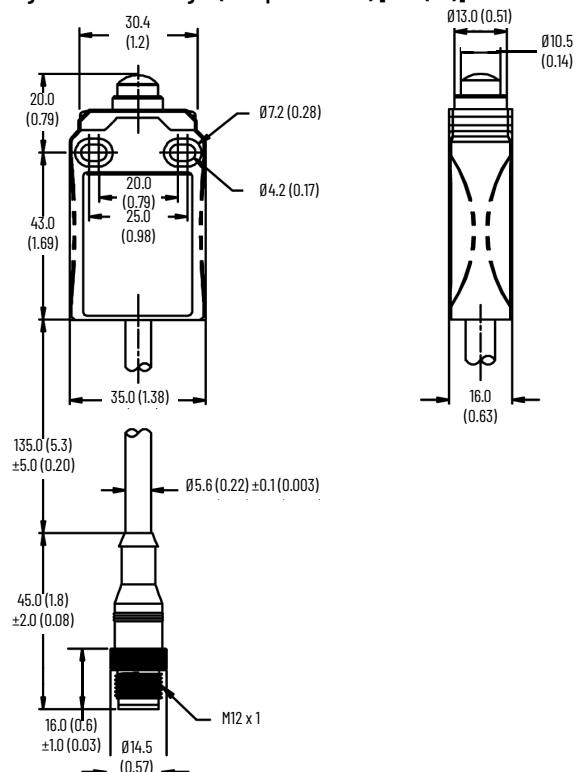


Figure 4 - Dome Plunger (Panel Mount) [mm (in.)]

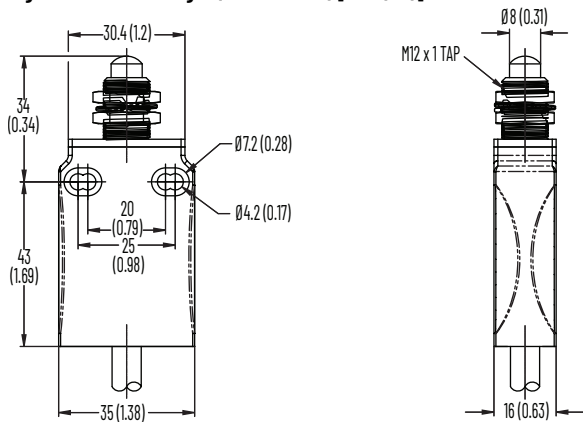


Figure 7 - Cross Roller Plunger (Non-panel Mount) [mm (in.)]

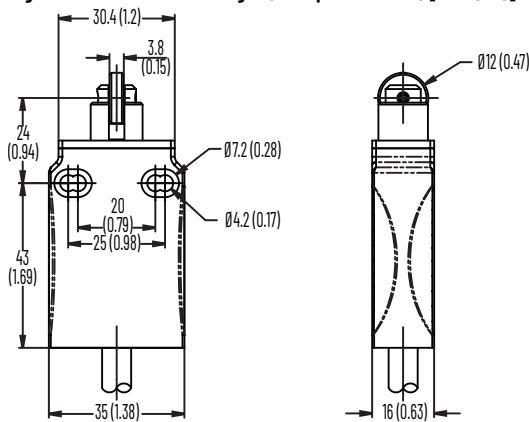


Figure 5 - Roller Plunger (Non-panel Mount) [mm (in.)]

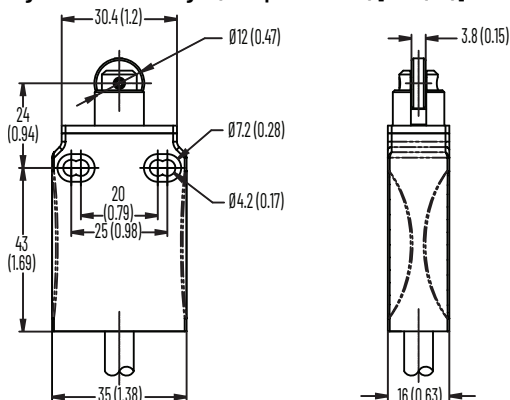


Figure 8 - Cross Roller Plunger (Panel Mount) [mm (in.)]

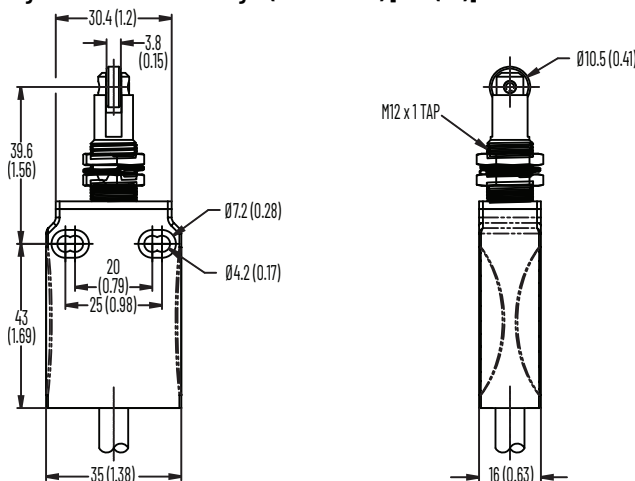


Figure 6 - Roller Plunger (Panel Mount) [mm (in.)]

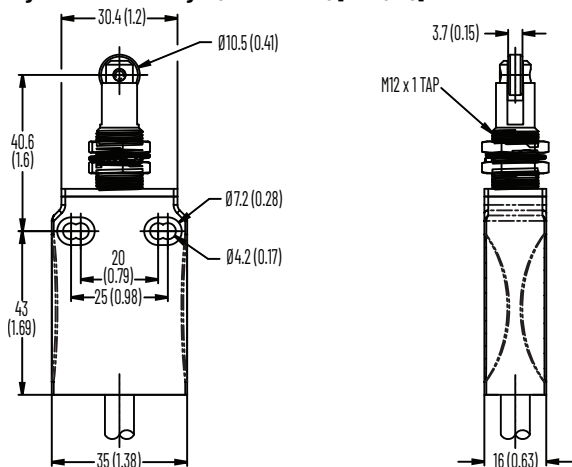
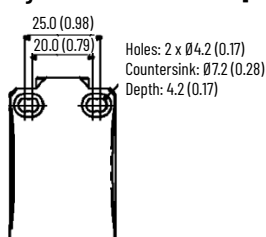


Figure 9 - Countersink Hole [mm (in.)]



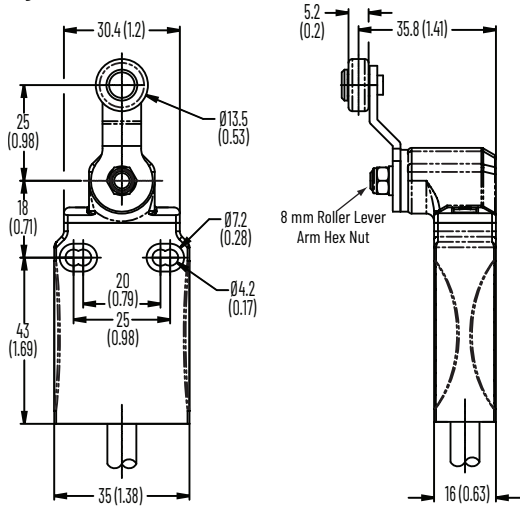
Lever Arm Switches



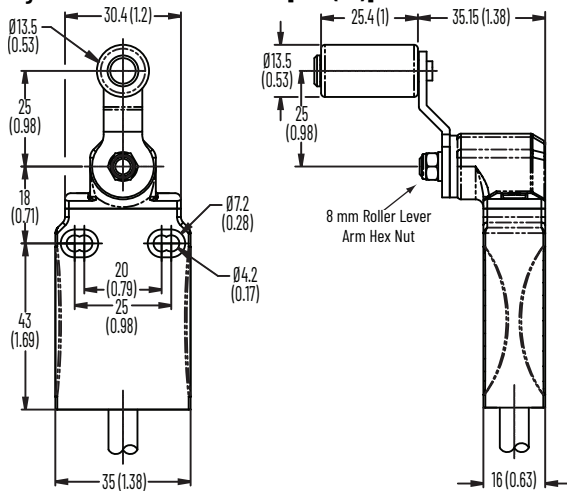
Lever arm versions are non-panel mount only.

**IMPORTANT** Do not use operator heads with adjustable actuators for safety applications.

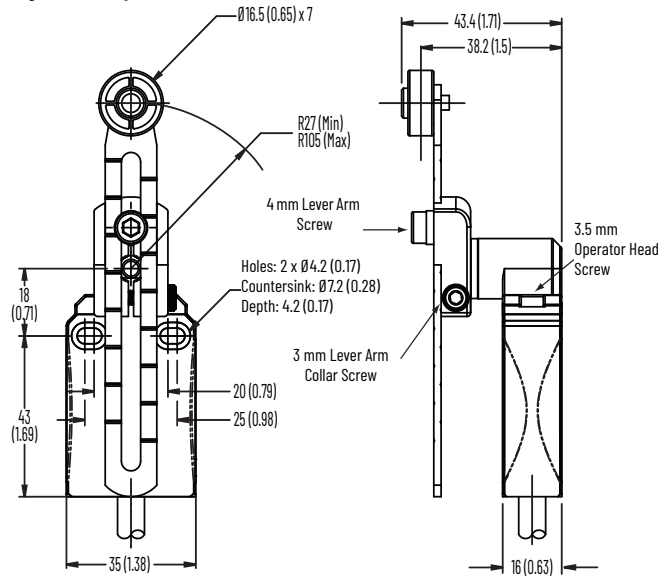
**Figure 10 - Short Roller Lever Arm [mm (in.)]**



**Figure 11 - Wide Roller Lever Arm [mm (in.)]**



**Figure 12 - Adjustable Roller Lever Arm [mm (in.)]**



## Declaration of Conformity

### CE Conformity

Rockwell Automation declares that the products that are shown in this document conform with the 2014/30/EU Electromagnetic Compatibility Directive (EMC) and 2006/42/EC Machinery Directive (MD) and that the respective standards and/or technical specifications have been applied.

For a comprehensive CE certificate visit: [rok.auto/certifications](http://rok.auto/certifications)

### UKCA Conformity

Rockwell Automation declares that the products that are shown in this document are in compliance with 2016 No. 1091 Electromagnetic Compatibility Regulations and 2008 No. 1597 Supply of Machinery (Safety) Regulations and that the respective standards and/or technical specifications have been applied.

For a comprehensive UKCA certificate visit: [rok.auto/certifications](http://rok.auto/certifications)

## Waste Electrical and Electronic Equipment (WEEE)







At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at [rok.auto/pec](http://rok.auto/pec).

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