

Limit Switches

Catalog
March
07

File 9007 / XC



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Merlín Gerin
Square D
Telemecanique





Limit Switches
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Limit Switches

Selection Guide

Osiswitch® Universal

| Design | Miniature | | Compact | | | |
|--|---|---|---|---|---|---|
| |  |  |  |  | | |
| Catalog number | XCMD | | XCKD | XCKP | XCKT | |
| Enclosure | Metal | | | Plastic, double insulated | | |
| Features | Mounting by the body or by the head | | | | | |
| Modularity | Head, body and connection modularity | | | | Head and body modularity | |
| CENELEC conformity | — | | EN 50047 | | EN 50047 compatible | |
| Body dimensions (w x h x d), mm (in.) | 30 x 50 x 16 (1.18 x 1.97 x 0.63) | | 31 x 65 x 30 (1.22 x 2.56 x 1.18) | | 58 x 51 x 30 (2.28 x 2.01 x 1.18) | |
| Head | Linear movement (plunger) Rotary movement (lever) Rotary movement, multi-directional Same heads for ranges XCMD, XCKD, XCKP and XCKT | | | | | |
| Contact blocks | 2 snap action contacts with positive opening operation | | N/C + N/O; N/C + N/C | | N/C + N/O | |
| | 3 snap action contacts with positive opening operation | | N/C + N/C + N/O | N/C + N/C + N/O; N/C + N/O + N/O | | — |
| | 4 snap action contacts with positive opening operation | | N/C + N/C + N/O + N/O | | — | |
| | 2 slow break contacts with positive opening operation | | N/C + N/O break before make | N/C + N/O break before make; N/O + N/C make before break; N/C + N/C simultaneous | | |
| | 2 slow break contacts | | — | N/O + N/O simultaneous | | |
| | 3 slow break contacts with positive opening operation | | N/C + N/C + N/O break before make | N/C + N/C + N/O break before make; N/C + N/O + N/O break before make | | — |
| Insulation voltage (Ui) / thermal current (Ithe) | Pre-cabled 2 contacts: 400 V/6 A 3 contacts: 400 V/4 A 4 contacts: 400 V/3 A | | Screw terminal 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A | | Screw terminal 2 contacts: 500 V/10 A | |
| Connector | Integral M12, 4-pin: 250 V/3 A Integral M12, 5-pin: 60 V/4 A Remote 7/8" 16UN: 250 V/6 A | | Integral M12, 5-pin: 60 V/4 A | Integral M12, 4-pin: 250 V/3 A | — | |
| Degree of protection | NEMA Types 1, 2, 4X, 6, 12 IP 66, IP 67, IP 68, IK 06 | | NEMA Types 1, 2, 4, 6, 12, 13 IP 66, IP 67, IK 06 | NEMA Types 1, 2, 4, 6, 6P, 12, 13 IP 66, IP 67, IK 04 | NEMA Types 1, 2, 4, 6, 12, 13 IP 66, IP 67, IK 04 | |
| Connection | Screw terminals | | — | | 2 entries for ISO M16 or PG 11 conduit thread or 1/2" NPT (using adapter) | |
| | Pre-cabled | | Integral: No Remote: Yes | | — | |
| | Connector | | Integral or remote M12 or remote 7/8" 16UN | | Integral M12 | |
| Page | 44 | | 56 and 60 | | 62 and 66 | |
| Page | 44 | | 56 and 60 | | 68 | |

Limit Switches

Selection Guide

Osiswitch® Optimum and Application

| Design | Miniature Optimum | Compact Application: with manual reset | | |
|--------|-------------------|--|--|--|
|--------|-------------------|--|--|--|



| Catalog number | | XCMN | XCDR | XCPR | XCTR |
|--|--|--|---|---|--------------------------------------|
| Enclosure | | Plastic, double insulated | Metal | Plastic, double insulated | |
| Features | | Mounting by the body or by the head | Mounting by the body | | |
| Modularity | | — | | | |
| CENELEC conformity | | — | | | |
| Body dimensions (w x h x d), mm (in.) | | 30 x 50 x 16 (1.18 x 1.97 x 0.63) | 31 x 65 x 30 (1.22 x 2.56 x 1.18) | | 58 x 51 x 30 (2.28 x 2.01 x 1.18) |
| Head | | Linear movement (plunger) Rotary movement (lever) Rotary movement, multi-directional | Linear movement (plunger) Rotary movement (lever) Same heads for ranges XCDR, XCPR and XCTR | | |
| Contact blocks | 2 snap action contacts with positive opening operation | N/C + N/O | | | |
| | 3 snap action contacts with positive opening operation | — | | | |
| | 4 snap action contacts with positive opening operation | — | | | |
| | 2 slow break contacts with positive opening operation | — | N/C + N/O break before make | | |
| | 2 slow break contacts | — | | | |
| Insulation voltage (Ui) / thermal current (Ithe) | | Screw terminal 2 contacts: 400 V/6 A | Screw terminal 2 contacts: 500 V/10 A | | |
| | Connector | — | | | |
| Degree of protection | | NEMA Types 1, 2, 13 IP 65, IK 04 | IP 66, IP 67, IK 04 | | |
| Connection | Screw terminals | — | 1 entry for ISO M20 or PG 13 conduit thread or 1/2" NPT | 2 entries for ISO M16 or PG 11 conduit thread or 1/2" NPT (using adapter) | |
| | Pre-cabled | Yes | — | | |
| | Connector | — | | | |
| Page | | 52 | 76 | 78 | 80 |

Limit Switches

Selection Guide

Osiswitch® Classic

| | | | |
|--------|---------|--|--|
| Design | Classic | | |
|--------|---------|--|--|



| Catalog number | XCKM | XCKL | XCKJ |
|---|--|--|---|
| Enclosure | Metal | | |
| Features | 3 conduit entries | | Fixed or plug-in body, -40 °C (-40 °F) or +120 °C (+248 °F) versions |
| Modularity | Head + Body + Operator | | |
| CENELEC or DIN conformity | — | | EN 50041 |
| Body dimensions (w x h x d), mm (in.) | 63 x 64 x 30 (2.48 x 2.52 x 1.18) | 52 x 72 x 30 (2.05 x 2.83 x 1.18) | 40 x 77 x 44 (1.57 x 3.03 x 1.73) 42.5 x 84 x 36 (1.67 x 3.31 x 1.42) |
| Head | Linear movement (plunger) Rotary movement (lever) Rotary movement, multi-directional | | |
| Contact blocks | 2 snap action contacts with positive opening operation | N/C + N/O; N/C + N/C | N/C + N/O |
| | 3 snap action contacts with positive opening operation | N/C + N/C + N/O; N/C + N/O + N/O | |
| | C/O snap action contacts | — | |
| | C/O slow break contacts | — | |
| | 2 slow break contacts with positive opening operation | N/C + N/O break before make N/O + N/C make before break N/C + N/C simultaneous | |
| | 2 slow break contacts | N/O + N/O simultaneous | |
| 3 slow break contacts with positive opening operation | N/C + N/C + N/O break before make; N/C + N/O + N/O break before make | | |
| Insulation voltage (Ui) / thermal current (Ithe) | Screw terminal 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A | | — |
| | — | | Connector Integral M12, 5-pin: 60 V/4 A Integral 7/8" 16UN: 250 V/6 A |
| Degree of protection | NEMA Types 1, 2, 4, 6, 6P, 12, 13 IP 66, IK 06 | | NEMA Types 1, 2, 4, 12 IP 66 IK 07 |
| Connection | Screw terminals (cable entry) | 3 entries for ISO M20 or PG 11 conduit thread or 1/2" NPT | 1 entry incorporating cable entry or tapped 1/2" NPT |
| | Connector | — | |
| Page | 82 | 82 | 98 |

Limit Switches

Selection Guide

Osiswitch® Classic, Application, and Miniature Snap Switches

| | | | | |
|--------|---------|--|---|---|
| Design | Classic | Application: for installations requiring electrical redundancy | Application: for lifting and materials handling equipment or very severe applications | Sub-miniature, miniature: applications requiring high precision and a low operating force |
|--------|---------|--|---|---|







| Catalog number | XCKS | XCKML | XCR, XC1AC | XEP, XCO | |
|--|--|--|--|---|-----------------------|
| Enclosure | Plastic, double insulated | Metal | Metal or polyester | Plastic | |
| Features | — | 2 sets of contacts | — | Depending on type | |
| Modularity | Head + Body + Operator | | Fixed composition | Depending on type, fixed composition or contact and operator | |
| CENELEC or DIN conformity | EN 50041 | — | — | — | |
| Body dimensions (w x h x d), mm (in.) | 40 x 72.5 x 36 (1.57 x 2.85 x 1.42) | 72 x 81 x 36 (2.83 x 3.19 x 1.42) | Depending on type | DIN 41635, depending on type | |
| Head | Linear movement (plunger) Rotary movement (lever) Rotary movement, multi-directional | Linear movement (plunger) Rotary movement (lever) | — | Linear movement (plunger) | |
| Contact blocks | 2 snap action contacts with positive opening operation | N/C + N/O; N/C + N/C | 2 x N/C + N/O contact blocks | Depending on type | |
| | 3 snap action contacts with positive opening operation | N/C + N/C + N/O; N/C + N/O + N/O | — | — | |
| | C/O snap action contacts | 2 C/O | — | Depending on type | 1 single-pole contact |
| | C/O slow break contacts | — | — | Depending on type | — |
| | 2 slow break contacts with positive opening operation | N/C + N/O break before make N/O + N/C make before break N/C + N/C simultaneous | 2 x N/C + N/O break before make contact blocks | Depending on type | — |
| | 2 slow break contacts | N/O + N/O simultaneous | — | — | — |
| Insulation voltage (Ui) / thermal current (Ithe) | Screw terminal 2 contacts: 500 V/10 A 3 contacts: 400 V/6 A | — | Screw terminal 2 contacts: 500 V/10 A | Depending on type | |
| | — | — | — | — | |
| Degree of protection | IP 65 IK 03 | NEMA Types: 1, 2, 4, 6, 6P, 12, 13 IP 66 IK 06 | Depending on type: IP 66, IK 05; IP 65, IK 05; or IP 54, IK 05 | Depending on type | |
| Connection | Screw terminals (cable entry) | 1 entry for ISO M20 or PG 13 conduit thread | 3 entries for ISO M20 or PG 13 conduit thread; or PG 13 to 1/2" NPT with adapter | Depending on type: 1 or 3 entries for ISO M20 or PG 13 conduit thread | |
| | Connector | — | — | Depending on type: by tags or pre-wired | |
| Page | 126 | 82 | 136 and 144 | 26 | |

Limit Switches

Selection Guide

Class 9007 Industrial Snap Switches and Miniature Industrial Switches

| Design | Industrial Snap Switch | Miniature Switch | Miniature Enclosed Reed | Heavy Duty Industrial, Precision Oiltight |
|--------|---|---|---|---|
| |  |  |  |  |

| Catalog Number Prefix | 9007A 9007C | 9007MS 9007ML | 9007XA | 9007AW |
|--|--|--|--|--|
| Description | Industrial snap switches with or without operators | Miniature enclosed switches, potted and pre-wired with cable. Unique rotary head. 9007 ML has double break contacts. | Miniature enclosed switches, potted and pre-wired with cable. Reed contacts for superior low-energy switching. | Precision oil tight enclosed switches with unique features, micrometer adjustable and low temperature operation. |
| Enclosure Material | Plastic | Metal bodies, metal head | Metal bodies, metal head | Metal bodies, metal heads |
| Enclosure Rating | None | NEMA: Types 1, 2, 4, 6, 6P, 12, 13 IEC: IP67 | NEMA: Types 1, 2, 4, 6, 6P, 12, 13 | NEMA: Types 1, 2, 4, 6, 6P, 12, 13 |
| Approximate Body Dimensions, mm (in.) | 29.0 x 63.5 x 21.0 (1.14 x 2.5 x 0.83) | 40.1 x 44.4 x 15.8 (1.58 x 1.75 x 0.62) | 40.1 x 44.2 x 16.0 (1.58 x 1.74 x 0.63) | 36.6 x 98.5 x 63.5 (1.44 x 3.88 x 2.5) |
| Heads | Linear | Linear or Rotary | Linear or Rotary | Linear or Rotary |
| Contact Blocks | | | | |
| N.C. + N.O. snap action | X | X | N.O. or N.C. | X |
| N.C. + N.O. break before make, slow break | | | | |
| N.O. + N.C. make before break, slow break | | | | |
| N.C. + N.C. simultaneous, slow break | | | | |
| N.O. + N.O. simultaneous, slow break | | | | |
| C/O snap action | | | | |
| C/O slow break | | | | |
| N.C. + N.C. 2-step, slow break | | | | |
| N.O. + N.O. 2-step, slow break | | | | |
| N.C. + N.C. snap action | | | | |
| N.O. + N.C. slow make, slow break | | | | |
| Cabling | | Pre-wired cable, M12 Connector option available. | Pre-wired cable. | |
| Temperature Range | -65 to +221 °F (-54 to +105 °C) | -40 to +221 °F (-40 to +105 °C) | -20 to +140 °F (-29 to +60 °C) | 0 to +185 °F (-17.8 to 85 °C) Lever operated: -65 to +185 °F (-54 to 85 °C) |
| Additional Features | A variety of operators are available, page 152 | Bottom or side cable entry. Full range of operating heads, page 156. | Bottom cable entry. Three common operating heads, page 160. | Most common operating heads. Micrometer adjustable push rod plunger. Uses 9007C levers, page 190. |

Limit Switches

Selection Guide

Class 9007 Type C Heavy Duty Industrial

| | | | | |
|--------------|---|-----------------------------|-----------------------------|---|
| Applications | Material handling—mechanical conveying, automotive, machine tool, packaging | | | Hazardous application locations: gases (explosion), dust environment. |
| Design | Standard body type 9007C**** | Standard body reed contacts | Compact body type 9007C52** | Hazardous location body type 9007CR**** |



| | | | | |
|--|--|---|---|---|
| Catalog number | 9007C54*** 9007C62*** 9007C68*** 9007C66*** | 9007C84*** 9007C86*** | 9007C52** | 9007CR53** 9007CR61** 9007CR65** 9007CR67** |
| Enclosure | Metal, diecast, zinc alloy | | | |
| Features | Plug-in body | | | Non-plug-in body |
| Factory modifications (Forms) | See pages 176 to 180 | | | |
| Modularity | Head + body + lever | | | |
| Conforming to standards | NEMA 250, EN 60947-1, EN 60947-5-1, IEC 60947, UL 508, C22-2-14-95, CE conformity documentation | | | NEMA 250, EN 60947-1, EN 60947-5-1, IEC 60947, UL 508, C22-2-14-95, CE conformity documentation |
| Product certifications | UL, CSA, CE | | | |
| Body dimensions (w x h x d), mm (in.) with rotary head | 39 x 102 x 45 (1.54 x 4.02 x 1.77) | | 39 x 80 x 45 (1.54 x 3.15 x 1.77) | 69 x 156 x 53 (2.72 x 6.14 x 2.10) |
| Head | Linear movement (plunger) Rotary movement (lever) Multi-directional movement (wobble stick, cat whisker) | | | |
| Contact blocks | Snap action contacts | | 1 N.O. + 1 N.C. | 9007CR53** 1 N.O. + 1 N.C. |
| | Direct opening (positive opening) | | | 9007CR61** 2 N.O. + 2 N.C. |
| | | 9007C62*** 2 N.O. + 2 N.C. | 1 N.O. + 1 N.C. | 9007CR65** 2 N.O. + 2 N.C. neutral position |
| | | 9007C68*** 2 N.O. + 2 N.C. neutral position | | 9007CR67** 2 N.O. + 2 N.C. two stage |
| | | 9007C66*** 2 N.O. + 2 N.C. two stage | 9007C52** Y1561 (→) Single pole only | 9007CR**** Y1561 (→) Single pole only |
| Rated insulation voltage | 600 V | | | — |
| Insulation voltage (Ui)—top half of body | 600 V Except: 9007CO62, 9007CO66, 9007CO68 (Ui = 250 V) and 9007C84, 9007C86 (Ui = 125 V) | | 600 V | 600 V Except: 9007CR63, 9007CR65, 9007CR67 (Ui = 250 V) |
| Thermal current (Ithe)—top half of body | 10 A Excepted: 9007CO84, 9007CO86 (2.5 A) | | 10 A | 10 A |
| Degree of protection | IP 67 conforming to IEC 60529, NEMA Types 2, 4, 6, 6P, 12, 13 | | IP 67 conforming to IEC 60529, NEMA Types 2, 4, 6, 6P, 12, 13, | NEMA Types 2, 4, 6P, 7, 9, 13 |
| Connection (1) | Cable entry or connector Depending on model: 1/2"-14 NPT, M20 x 1.5 ISO cable entry, 5-pin mini connector. | | Cable entry or connector Depending on model: 1/2"-14 NPT, M20 X 1.5 ISO cable entry, 5 pin mini connector. | Cable entry or connector Depending on model: 1/2"-14 NPT, M20 X 1.5 ISO cable entry, 3/4 14 NPT available. |
| Page | 164 | | 172 | 198 |

1. A wide range of connectors are available. Contact your local field office.

Limit Switches

Selection Guide

Severe Duty Mill and Foundry Switches

| Applications | Mill | Mill | Mill | Mill |
|--------------|-------------------------------|------------------------|--|--------------------------------------|
| Design | 9007T Convertible sequence | L100 Fixed sequence | L14 Single Cable Pulls Fixed sequence | L525 Belt Conveyor Fixed sequence |



| Catalog number | 9007T*** | L100*** | L14 | L525 |
|---|--|--|--|--|
| Enclosure | Metal | Metal | Metal | Metal |
| Features | Extra heavy duty contact ratings | Extra heavy duty contact ratings | Extra heavy duty contact ratings | Extra heavy duty contact ratings |
| Factory modifications (Forms) | Page 221 | Page 237 | Page 237 | Page 237 |
| Conforming to standards Product | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 |
| Product certifications | UL Listed, CSA Certified | UL Listed, CSA Certified | UL Listed, CSA Certified | UL Listed, CSA Certified |
| Body dimensions (w x h x d), mm (in.) surface mounting | 58.7 x 114.3 x 64.5 (2.31 x 4.5 x 2.54) | 58.7 x 126 x 53.3 (2.31 x 4.95 x 2.10) | 58.7 x 126 x 53.3 (2.31 x 4.95 x 2.10) | 58.7 x 126 x 53.3 (2.31 x 4.95 x 2.10) |
| Head | Rotary movement (lever) | Rotary movement (lever) | Rotary movement (lever) (3) | Rotary movement (lever) (3) |
| Contact blocks | 1 N.C. + 1 N.O. | 1 N.C. + 1 N.O. | 1 N.C. + 1 N.O. | 1 N.C. + 1 N.O. |
| | Convertible | Fixed | Fixed | Fixed |
| Rated insulation voltage | 600 V | 600 V | 600 V | 600 V |
| Thermal current (Ithe) | 20 A ac/dc | 20 A ac, 5 A dc | 20 A ac, 5 A dc | 20 A ac, 5 A dc |
| Degree of protection | NEMA Types 1, 2, 4, 12, 13 IP65, 66, 67 | NEMA Types 1, 4, 13 IP65, 66 | NEMA Types 1, 4, 13 IP65, 66 | NEMA Types 1, 4, 13 IP65, 66 |
| Connection (2) | Cable entry or connector 1/2" NPT (metric available) | Cable entry or connector 1/2" NPT (metric available) | Cable entry or connector 1/2" NPT (metric available) | Cable entry or connector 1/2" NPT (metric available) |
| Presentation, Applications and Characteristics | Page 216 | Page 228 | Page 232 | Page 233 |
| Interpretation of Catalog Numbers | Page 239 | Page 239 | Page 239 | Page 239 |

1. For other contact options see page 216.
2. A wide range of connectors are available. Contact your local field office.
3. Lever arms are optional and must be ordered separately.

Limit Switches

Selection Guide

Severe Duty Mill and Foundry Switches

| Applications | Foundry | Foundry | Mill and Foundry |
|--------------|--------------------------------|------------------------|--|
| Design | 9007FT Convertible sequence | L300 Fixed sequence | L2153 Dual Pull Stop Fixed sequence |



| Catalog number | 9007FT** | L300** | L2153 |
|---|--|--|--|
| Enclosure | Metal | Metal | Metal |
| Features | Designed specifically for rough foundry applications | Designed specifically for rough foundry applications | Extra heavy duty contact ratings |
| Factory modifications (Forms) | Page 221 | Page 237 | Page 237 |
| Conforming to standards | NEMA A600 UL508 | NEMA A600 UL508 | NEMA A600 UL508 |
| Product certifications | UL Listed, CSA Certified | UL Listed, CSA Certified | UL Listed, CSA Certified |
| Body dimensions (w x h x d), mm (in.) surface mounting | 58.7 x 114.3 x 86.6 (2.31 x 4.5 x 3.41) | 58.7 x 126 x 53.3 (2.31 x 4.95 x 2.10) | 58.7 x 126 x 53.3 (2.31 x 4.95 x 2.10) |
| Head | Rotary movement (lever) | Rotary movement (lever) | Rotary movement (lever) (2) |
| Contact blocks | 1 N.C. + 1 N.O. | 1 N.C. + 1 N.O. | 1 N.C. + 1 N.O. |
| Snap action contacts ♦ Sequences | Convertible | Fixed | Fixed |
| Rated insulation voltage | 600 V | 600 V | 600 V |
| Thermal current (Ithe) | 20 A ac/dc | 20 A ac, 5 A dc | 20 A ac, 5 A dc |
| Degree of protection | NEMA Types 1, 2, 4, 12, 13 IP65, 66, 67 | NEMA Types 1, 4, 13 IP65, 66 | NEMA Types 1, 4, 13 IP65, 66 |
| Connection (1) | Cable entry or connector 1/2" NPT (metric available) | Cable entry or connector 1/2" NPT (metric available) | Cable entry or connector 1/2" NPT (metric available) |
| Presentation, Applications and Characteristics | Page 218 | Page 230 | Page 232 |
| Interpretation of Catalog Numbers | Page 239 | Page 239 | Page 239 |

1. A wide range of connectors are available. Contact your local field office.
 2. Lever arms are optional and must be ordered separately.

Limit Switches Selection Guide Applications by Market Segment

Crane and Hoist

- Overhead Cranes
- Transport Systems

Mill and Foundry

- Iron and Steel
- Cement and Glass

Process Machinery

- Machine Tools
- Plastic, Rubber, Molding
- Printing
- Textile
- Pulp, Paper, Wood

Material Handling

- Conveyance
- Carousels
- Automatic Storage/Retrieval

Packaging Machinery

- Packaging Machines
- Shrink Wrap

Food and Beverage Machinery

- Bottling
- Canning

Simple Machines

- Transportation Wash
- Light Handling
- Assembly Stations
- General Purpose

Electric Lifts

- Lifting Platforms
- Elevators
- Escalators

NOTE: Special electrical options available for:
• Low current switching for programmable controllers
• Hazardous locations



XCKP
XCKT
XCKD

XCKM
XCKL
XCKML

XCMD
9007MS/ML
9007XA

XCKS

Limit Switches
Selection Guide
Applications by Market Segment



9007AW

**XCKJ
9007C**

**L100/L300
9007T/FT**

**XCR
9007CLS**

Limit Switches

Selection Guide

Osiswitch® XC Product Overview

Introduction

Electromechanical detection

Limit switches are used in all automated installations and also in a wide variety of applications, due to the numerous advantages inherent to their technology.

They transmit data to the logic processing system regarding:

- presence/absence
- passing
- positioning
- end of travel

Simplicity of installation, advantages

From an electrical viewpoint

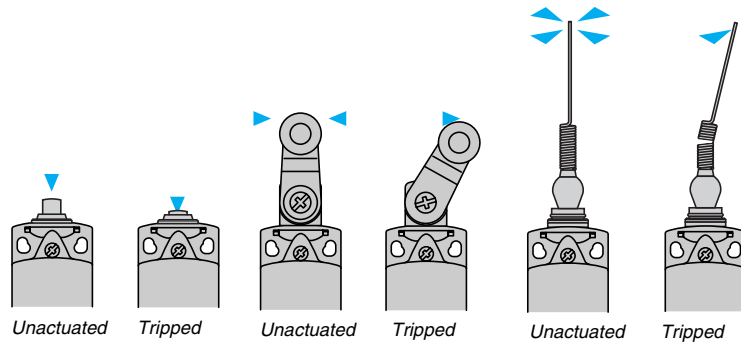
- galvanic separation of circuits,
- models suitable for low power switching, combined with good electrical durability,
- very good short-circuit withstand in coordination with appropriate fuses,
- total immunity to electromagnetic interference,
- high rated operational voltage.

From a mechanical viewpoint

- N/C contacts with positive opening operation,
- high resistance to the different ambient conditions encountered in industry (standard tests and specific tests under laboratory conditions),
- high repeat accuracy, up to 0.01 mm on the tripping points.

Detection movements

- Linear movement (plunger)
- Rotary movement (lever)
- Multi-directional movement



Terminology

Rated value of a quantity

- This replaces the term "nominal value".
- It is the fixed value for a specific function.

Utilization categories

- AC-15 replaces AC-11: control of an electromagnet on a.c., test 10 le/le.
- AC-12: control of a resistive load on a.c. or static load isolated by opto-coupler.
- DC-13 replaces DC-11: control of an electromagnet on d.c., test le/le.
- Ithe is no longer a rated value but a conventional current used for heating tests.

Switching capacity

Example: for category A300 the corresponding operational current, I_e maximum, is 6 A-120 V or 3 A-240 V, the equivalent I_{the} being 10 A.

Positive opening travel

- Minimum travel from the initial movement of contact actuator to the position required to accomplish positive opening operation.

Positive opening force

- The force required on the contact actuator to accomplish positive opening operation.

Positive opening operation

- A limit switch complies with this specification when all the closed contact elements of the switch can be changed, with certainty, to the open position (no flexible link between the moving contacts and the operator of the switch, to which an actuating force is applied).
- All limit switches incorporating either a slow break contact block or a snap action N/C + N/O (form Zb), N/C + N/O + N/O, N/C + N/C + N/O, N/C + N/C + N/O + N/O contact block are positive opening operation, in complete conformity with standard IEC 60947-5-1 Appendix K.

Limit Switches

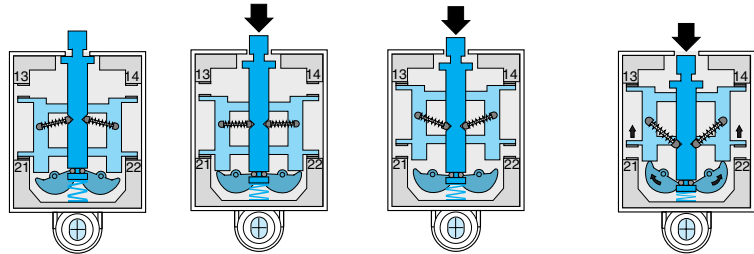
Selection Guide

Osiswitch® XC Product Overview

Contact blocks

Snap action contacts

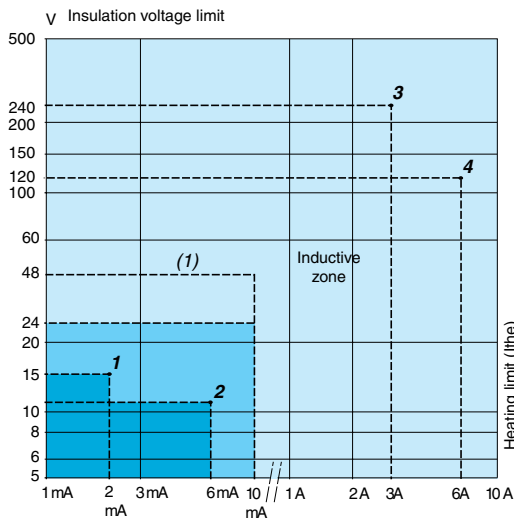
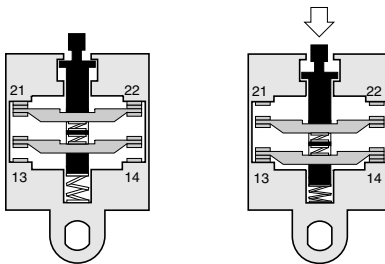
- Snap action contacts are characterized by different tripping and reset points (differential travel).
- The displacement speed of the moving contacts is not related to the speed of the operator.
- This feature ensures satisfactory electrical performance in applications involving low speed actuators.



Unactuated state Approach travel Contact change of state Positive opening

Slow break contacts

- Slow break contacts are characterized by identical tripping and resetting points.
- The displacement speed of the moving contacts is equal, or proportional, to the speed of the operator—which must not be less than 0.1 m/s, or 6 m/minute (0.33 ft/s, or 19.68 ft/minute).
- The opening distance also depends on the distance traveled by the operator.



Electrical durability for normal loads

- Normally, for inductive loads, the current value is less than 0.1 A (sealed), i.e. values of 3 to 40 VA sealed and 30 to 1000 VA inrush, depending on the voltage.

For this type of application the electrical durability exceeds 10 million operating cycles.
Application example: XCKJ161 + LC1D12*** (7 VA sealed, 70 VA inrush).
 Electrical durability = 10 million operating cycles.

Switching capacity

1. Normal industrial PLC input type 1
2. Normal industrial PLC input type 2
3. Switching capacity conforming to IEC 60947-5-5, utilization category AC-15, DC-13

| | | | | | |
|------|-------|--------|------|-------|--------|
| A300 | 240 V | 3 A | B300 | 240 V | 1.5 A |
| Q300 | 250 V | 0.27 A | R300 | 250 V | 0.13 A |
4. Switching capacity conforming to IEC 60947-5-1, utilization category AC-15, DC-13

| | | | | | |
|------|-------|--------|------|-------|--------|
| A300 | 120 V | 6 A | B300 | 120 V | 3 A |
| Q300 | 125 V | 0.55 A | R300 | 125 V | 0.27 A |

Electrical durability for small loads

- The use of limit switches with programmable controllers is becoming more common.
- With small loads, limit switches offer the following levels of reliability:
- failure rate of less than 1 for 100 million operating cycles using snap action contacts (contacts XE2SP).
- failure rate of less than 1 for 20 million operating cycles using slow break contacts (contacts XE•NP and XE3SP).
- failure rate of less than 1 for 5 million operating cycles using contacts XCMD.

| Range of use | |
|--|--|
| Standard contacts Continuous service (frequent switching) | XE2SP2151, P3151 |
| | XE2NP*** |
| | Contacts of XCMD, XE3•P*** |
| Gold flashed contacts on resistive load | Occasional service Infrequent switching, ≤ 1 operating cycle/day and/or corrosive atmosphere |

(1) 1. Usable up to 48 V/10 mA.

Limit Switches

Selection Guide

Osiswitch® XC Product Overview

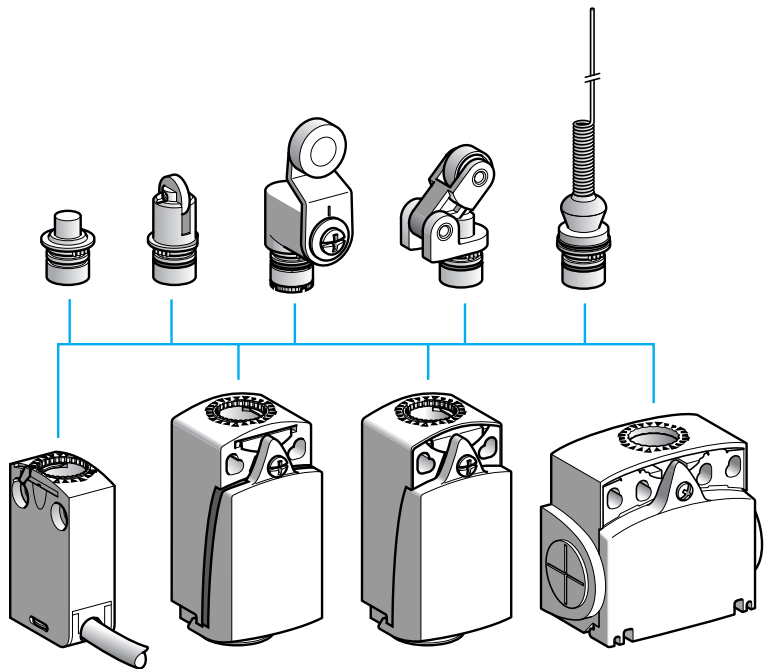
Principle

Innovation through modularity

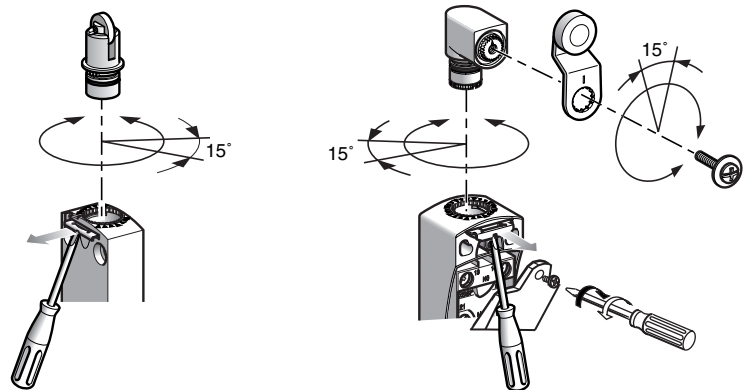
- The Miniature design XCMD and Compact design XCKD, XCKP and XCKT product range family benefits from the **Osiconcept™** principle: **Offering simplicity through innovation.**
- A first in worldwide detection for improving productivity.
A complete offer for resolving the most commonly encountered detection problems:
 - product selection simplified,
 - product availability simplified,
 - installation and setup simplified,
 - maintenance simplified.

Heads

- A single metal operating head type for the Miniature design XCMD and Compact design XCKD, XCKP and XCKT ranges.



- Interchanging of heads achieved by simple operation of forked metal latch.
- Adjustable in 3 planes:



All the heads can be adjusted in 15° steps throughout 360°, in relation to the body.

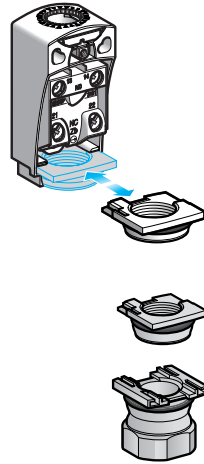
All the levers can be adjusted in 15° steps throughout 360°, in relation to the horizontal axis of the head.

Limit Switches

Selection Guide

Osiswitch® XC Product Overview

Principle (continued)



Cable entries

The cable entries for Compact design XCKD and XCKP switches enable:

- simple cabling due to unrestricted access to contacts
- simple adaptation to the various worldwide markets

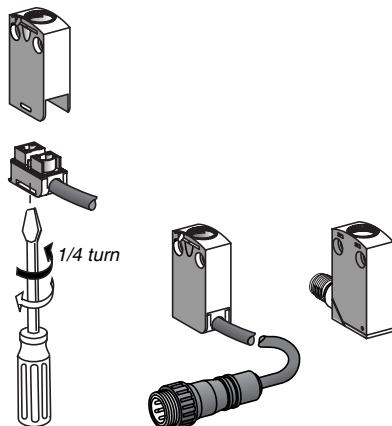
6 models are available:

- ISO M16 x 1.5
- PG 11
- ISO M20 x 1.5
- PG 13
- 1/2" NPT
- PF 1/2 (G 1/2)

Each model is available in metal or plastic, suited for compact design XCKD or XCKP, respectively. A connector version is also available.

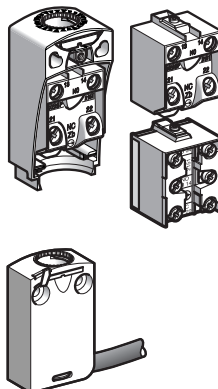
Connection components

- The miniature XCMD range allows interchangeability of these pre-cabled connection components:
 - 1/4 turn is all that is required to remove the connection component on XCMD bodies with 2 and 3 contacts,
 - 6 alternative cable lengths are available.
- The miniature XCMD range also includes an integral or remote connector solution.



Contact block or body with contacts

- 2 and 3 snap action and slow break contact blocks, with positive opening operation, are interchangeable between the Compact design XCKD and XCKP and Classic XCKJ, XCKS, XCKM and XCKL ranges.
- For the Miniature design XCMD range, the contacts are an integral part of the body:
 - 2 and 3 snap action and slow break contacts, with positive opening operation, and interchangeable connection component,
 - 4 snap action contacts, with positive opening operation, with monolithic body and connection components.

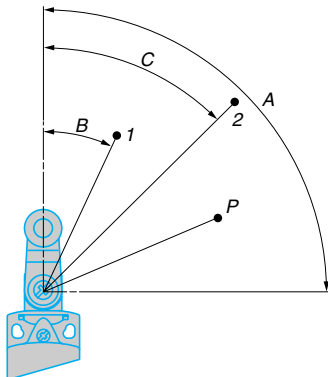
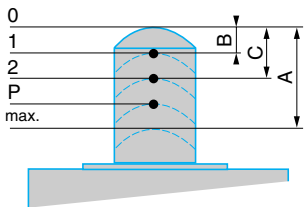
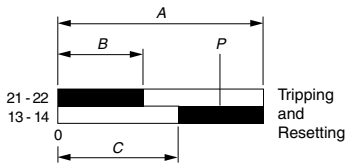
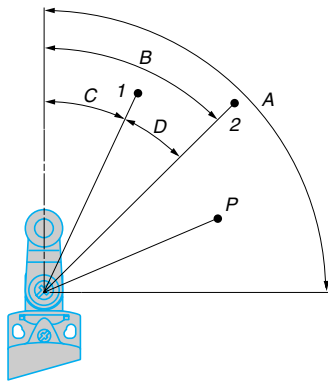
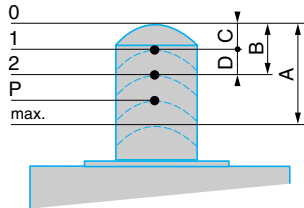
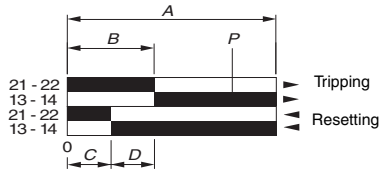


Limit Switches

Selection Guide

Osiswitch® XC Product Overview

Contact blocks (continued)



Functional diagrams of snap action contacts

Example: N/C + N/O

- A—Maximum travel of the operator in mm or degrees.
- B—Tripping travel of contact.
- C—Resetting travel of contact.
- D—Differential travel = B–C.
- P—Point from which positive opening is assured.

Linear movement (plunger)

- 1—Resetting point of contact.
- 2—Tripping point of contact.
- A—Maximum travel of the operator in mm.
- B—Tripping travel of contact.
- C—Resetting travel of contact.
- D—Differential travel = B–C.
- P—Point from which positive opening is assured.

Rotary movement (lever)

- 1—Resetting point of contact.
- 2—Tripping point of contact.
- A—Maximum travel of the operator in degrees.
- B—Tripping travel of contact.
- C—Resetting travel of contact.
- D—Differential travel = B–C.
- P—Point from which positive opening is assured.

Functional diagrams of slow break contacts

Example: N/C + N/O break before make

- A—Maximum travel of the operator in mm or degrees.
- B—Tripping and resetting travel of contact 21-22.
- C—Tripping and resetting travel of contact 13-14.
- P—Point from which positive opening is assured.

Linear movement (plunger)

- 1—Tripping and resetting points of contact 21-22.
- 2—Tripping and resetting points of contact 13-14.
- A—Maximum travel of the operator in mm.
- B—Tripping and resetting travel of contact 21-22.
- C—Tripping and resetting travel of contact 13-14.
- P—Positive opening point.

Rotary movement (lever)

- 1—Tripping and resetting points of contact 21-22.
- 2—Tripping and resetting points of contact 13-14.
- A—Maximum travel of the operator in degrees.
- B—Tripping and resetting travel of contact 21-22.
- C—Tripping and resetting travel of contact 13-14.
- P—Positive opening point.

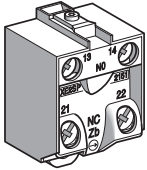
Limit Switches

Selection Guide

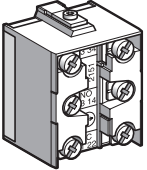
Osiswitch® XC Product Overview

Contact blocks (continued)

XE2•P screw clamp terminal connections



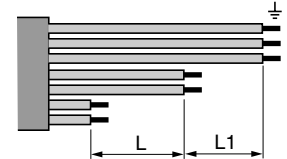
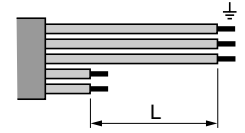
XE3•P screw clamp terminal connections



Mounting

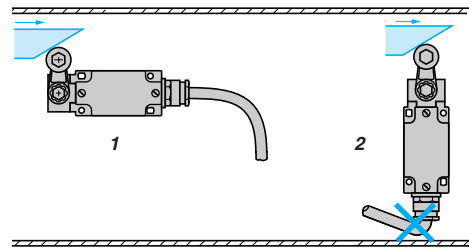
Contact connections

- Tightening torque:
 - minimum tightening torque ensuring the nominal characteristics of the contact: 0.8 N•m (7.08 lb-in)
 - maximum tightening torque without damage to the terminals: 1.2 N•m (10.62 lb-in) for XE2•P, 1 N•m (8.85 lb-in) for XE3•P
- Connecting cable: cable preparation lengths:
 - for XE2•P, L = 22 mm (0.87 in.)
 - for XE2•P3••, L = 45 mm (1.77 in.)
 - for XE3•P:
 - L = 14 mm (0.55 in.)
 - L1 = 11 mm (0.43 in.)



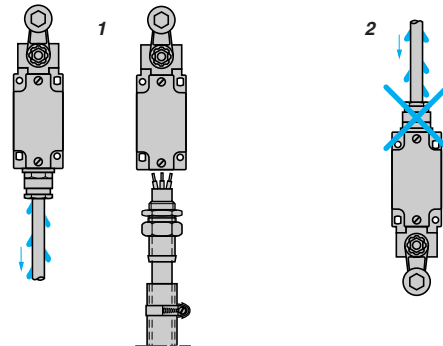
Sweep of connecting cable

- Recommended
- To be avoided



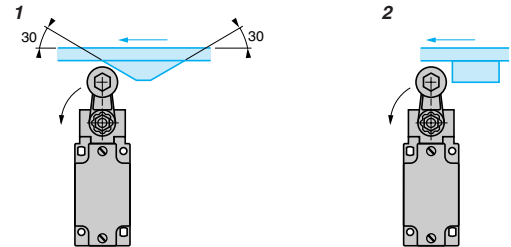
Position of cable entry

- Recommended
- To be avoided



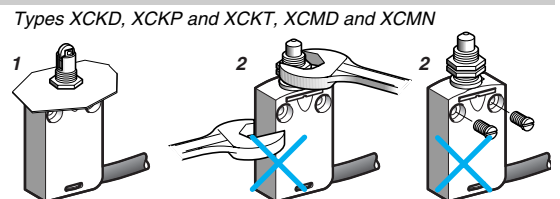
Type of cam

- Recommended
- To be avoided



Mounting limit switches by the head

- Recommended
- Forbidden



Types XCKD, XCKP and XCKT, XCMD and XCMN

Limit Switches

Selection Guide

Osiswitch® XC Product Overview

Setup

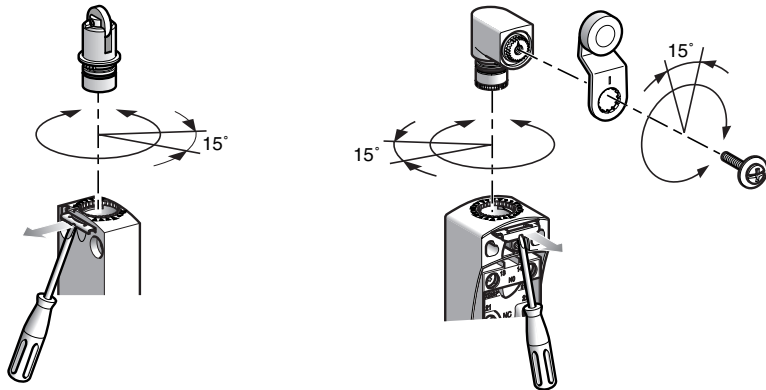
Tightening torque

- The minimum torque is that required to ensure correct operation of the switch.
- The maximum torque is the value which, if exceeded, will damage the switch.

| Range | Item | Torque, N•m (lb-in) | |
|----------------------------------|---|---------------------|-------------|
| | | Min. | Max. |
| Compact design XCKD, XCKP, XCKT | Cover | 0.8 (7.08) | 1.2 (10.62) |
| | Mounting screw for lever on rotary head | 1 (8.85) | 1.5 (13.28) |
| Miniature design XCMD, XCMN | — | — | — |
| | Mounting screw for lever on rotary head | 1 (8.85) | 1.5 (13.28) |
| Classic design XCKJ | Cover | 1 (8.85) | 1.5 (13.28) |
| | Mounting nut for lever on rotary head | 1 (8.85) | 1.5 (13.28) |
| Classic design XCKS | Cover | 0.8 (7.08) | 1.2 (10.62) |
| | Mounting nut for lever on rotary head | 1 (8.85) | 1.5 (13.28) |
| Classic design XCKM, XCKML, XCKL | Cover | 0.8 (7.08) | 1.2 (10.62) |
| | Mounting nut for lever on rotary head | 1 (8.85) | 1.5 (13.28) |

Types XCKD, XCKP, XCKT, XCMD

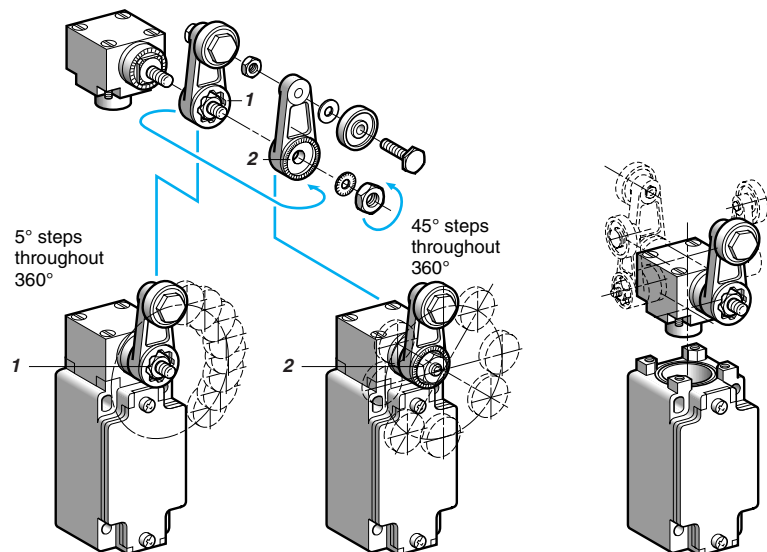
- Adjustable in 3 planes:



All the heads can be adjusted in 15° steps throughout 360°, in relation to the body. All the levers can be adjusted in 15° steps throughout 360°, in relation to the horizontal axis of the head.

Type XCKJ

- Adjustable through 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.
 1. Reversed $\alpha = 5^\circ$
 2. Forward $\alpha = 45^\circ$



Limit Switches

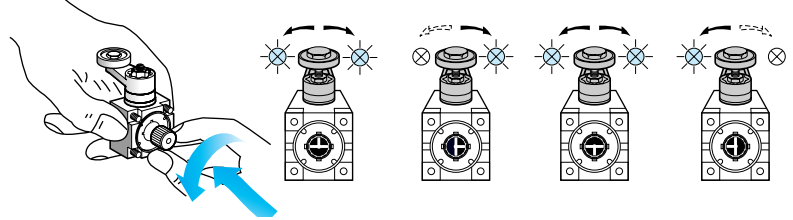
Selection Guide

Osiswitch® XC Product Overview

Setup (continued)

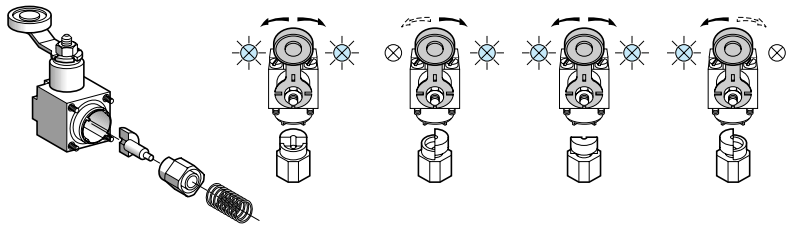
Direction of actuation programming

- XCKJ



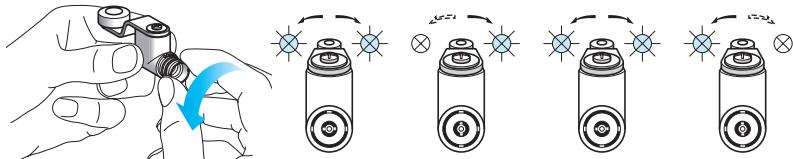
Head ZCKE05

- XCKS



Head ZCKD05

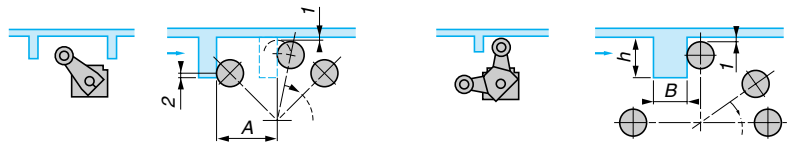
- XCKD, XCKP, XCKT and XCMD



Head ZCE05

Specific cams for heads ZCKE09 and ZC2J09

1. 0.5 mm (0.02 in.) min.
2. 2 mm (0.08 in.) min.



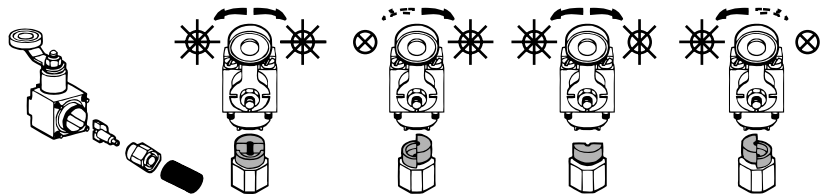
A = length of lever + 11 mm (0.43 in.)

ZCKE09: h = 13–18 mm (0.51–0.71 in.) and B = 12 mm (0.47 in.) max.

ZCKJE09: h = 14–24 mm (0.55–0.94 in.) and B = 6 mm (0.24 in.) max.

ZCKG00 Head Programming

The ZCKG00 head is field convertible to CW, CCW or CW/CCW. The diagram below shows the conversion process.



Limit Switches

Selection Guide





Osiswitch® XC Product Overview

Compliance with standards

The majority of Telemecanique® brand products comply to national standards (such as French NF C standards, German DIN standards), European standards (such as CENELEC), or international standards (such as IEC). These standards rigidly stipulate the characteristic requirements of the designated products (for example IEC 60947 relating to low voltage switchgear and controlgear).

These products, when correctly used, enable the production of control equipment assemblies, machine control equipment or installations conforming to their own specific standards (for example IEC 60204 for the electrical equipment of industrial machines).

IEC 60947-5-1

| | | |
|--|---|---|
| Insulation coordination (and dielectric strength) | <ul style="list-style-type: none"> The standard IEC 60664 defines 4 categories of prospective transient overvoltages. It is important for the user to select control circuit components which are able to withstand these overvoltages. To these ends, the manufacturer states the rated impulse withstand voltage (U_{imp}) applicable to the product. | |
| Terminal connections | <ul style="list-style-type: none"> The cabling capacity, mechanical robustness and durability of the terminals, as well as the ability to resist loosening, are verified by standardized tests. Terminal reference marking conforms to standard EN 50013. | |
| Switching capacity | <ul style="list-style-type: none"> With maximum electrical load. A single designation (A300 for example) enables indication of the contact block characteristics related to its utilization category. | |
| Positive opening operation (IEC 60947-5-1 Appendix K) | <ul style="list-style-type: none"> For contacts used in safety applications (end of travel, emergency stop device, etc.) the assurance of positive opening is required (see IEC 60204, EN 60204) after each test, the opening of the contact being verified by testing with an impulse voltage (2500 V). | |
| Electrical symbols for contacts |  <ul style="list-style-type: none"> Form Za, the 2 contacts are the same polarity. |  <ul style="list-style-type: none"> Form Zb, the 2 contacts are electrically separate. |
| Symbol for positive opening |  <ul style="list-style-type: none"> Simplified version |  <ul style="list-style-type: none"> Complete symbol |

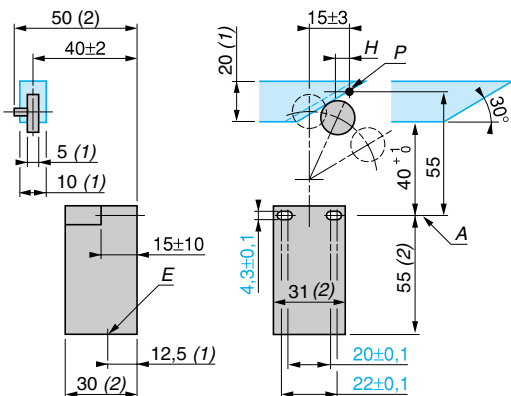
CENELEC EN 50047

The European standards organization CENELEC, which has 14 member countries, has defined in this standard the first type of limit switch.

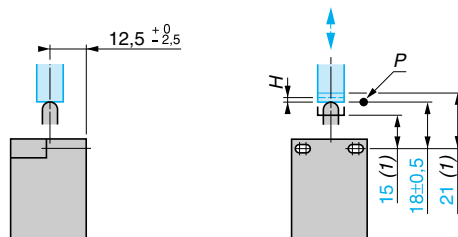
This standard defines 4 variants of devices (forms A, B, C, E).

Limit switches XCKP, XCKD and XCKT conform to standard EN 50047.

Form A, with roller lever



Form B, with end plunger (rounded)

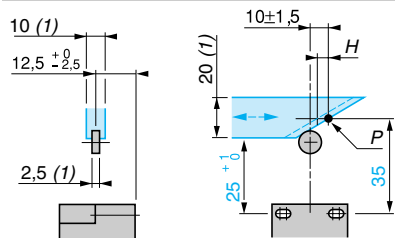


1. Minimum value
2. Maximum value

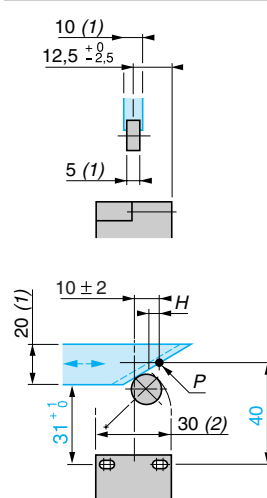
A: reference axis
H: differential travel

P: tripping point
E: cable entry

Form C, with end roller plunger



Form E, with roller lever for 1 direction of actuation



Limit Switches

Selection Guide

Osiswitch® XC Product Overview

Compliance with standards (continued)

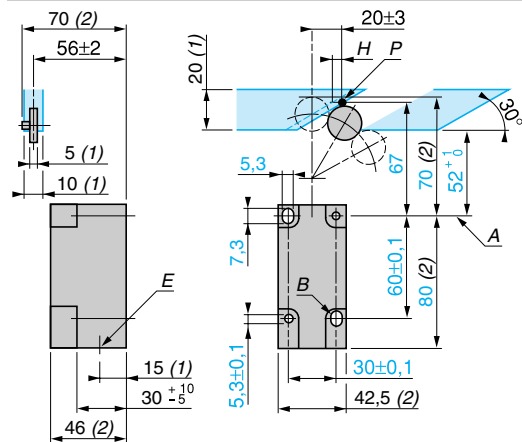
CENELEC EN 50041

The European standards organization CENELEC, which has 14 member countries, has defined in this standard the second type of limit switch.

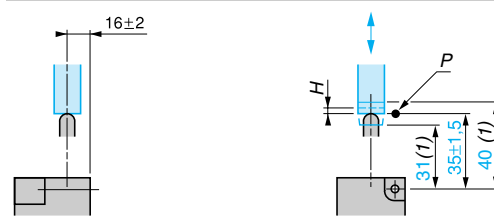
It defines 6 variants of devices (forms A, B, C, D, F, G).

Limit switches XCKJ and XCKS conform to standard EN 50041.

Form A, with roller lever



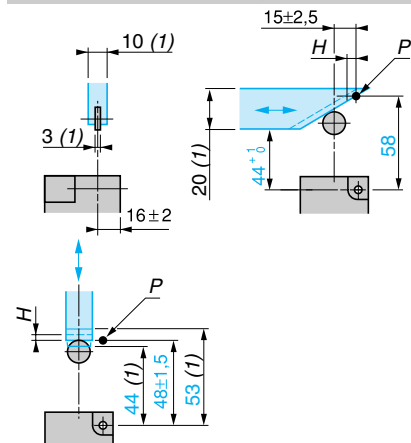
Form B, with end plunger (rounded)



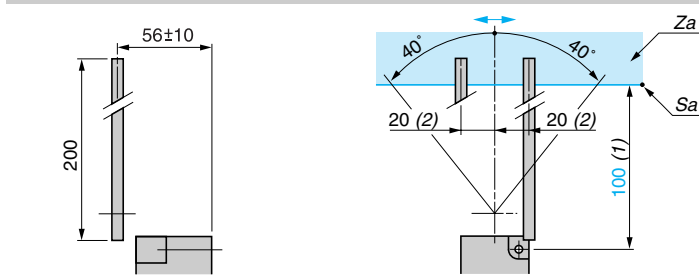
1. Minimum value
2. Maximum value

- A: reference axis
- B: optional elongated holes
- H: differential travel
- P: tripping point
- E: cable entry
- Za: tripping zone
- Sa: tripping threshold

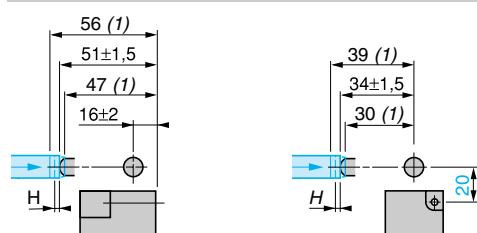
Form C, with end roller plunger



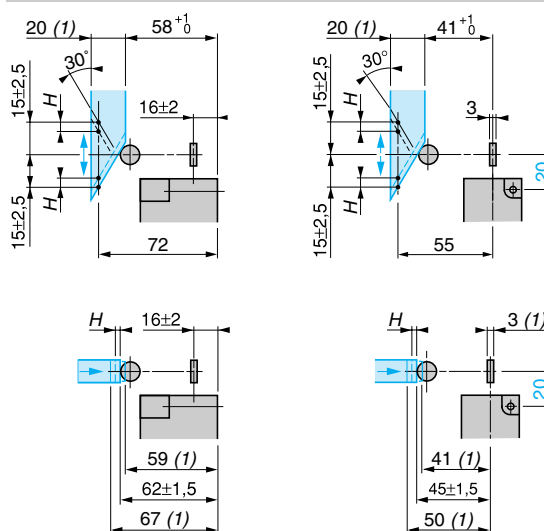
Form D, with rod lever



Form F, with side plunger (rounded)



Form G, with side roller plunger

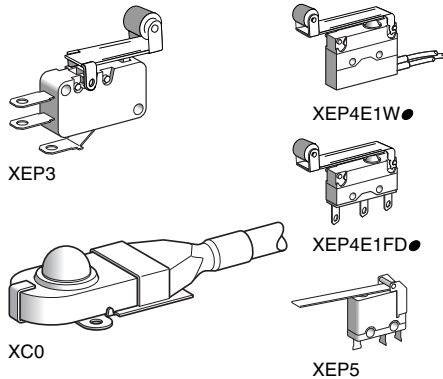


Limit Switches

Osiswitch® Miniature Snap Switches

XEP and XCO

Introduction



Electromechanical detection

Osiswitch miniature snap switches, featuring electromechanical technology, assure the following functions:

- detection of presence or absence
- detection of position.

Actuation of the operator (plunger or lever) on the miniature snap switch causes the electrical contact to change state. This information can then be processed by a PLC controlling the installation.

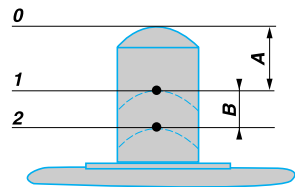
Osiswitch miniature snap switches can be used both for industrial applications and the building sector.

Features

Osiswitch miniature snap switches incorporate a C/O snap-action, single-break contact. They are characterized by:

- high electrical ratings for their very small size
- short tripping travel
- low tripping force
- high repeat accuracy on the tripping points
- long service life

Terminology



Forces

Maximum tripping force: maximum force which must be applied to the operator to move it from the rest (unactuated) position to the trip position (tripping point).

Minimum release force: value to which the force on the operator must be reduced to allow the snap action mechanism to return to its rest (unactuated) position.

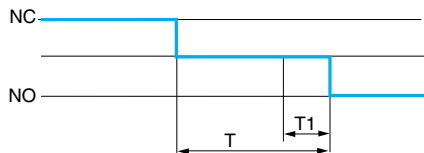
Maximum permissible end of travel force: maximum force that can be applied to the operator at the end of its travel without damaging the switch.

Position / Travel

1. Tripping point: position of the operator in relation to the switch mountings (mounting hole center line) at the instant the switch contact changes state.
 - A. Differential travel: distance between the tripping point and the position at which the snap action mechanism returns to its initial state on release of the operator.
2. Overtravel limit: position of the operator when an extreme force has moved it to the effective end of its available travel.
 - B. Overtravel: distance between the tripping point and the overtravel limit.

The reference point for the figures given for forces and travel is a point F, which is situated on the plunger in the case of a basic switch or at 3 mm (0.12 in.) from the end of the plain lever in the case of a lever operated switch.

Mechanical characteristics



T1: bounce time
T: changeover time

Changeover time

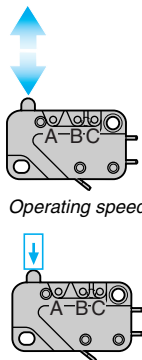
This is the time taken by the moving contact when moving from one fixed contact to another until it becomes fully stable (contact bounce included).

This time is related to the inter-contact distance, the mechanical characteristics of the snap action mechanism, and the mass of the moving element. However, due to the snap action mechanisms used, the time is largely independent of the speed of operation. It is normally less than 20 ms (including bounce times of less than 5 ms).

Operating speed and maximum usable operating rate

Our miniature snap switches are suitable for a wide range of operating speeds: generally, from 1 mm/mn to 1 m/s (0.04 in/mn to 3.28 ft/s). The maximum usable operating rate on a light electrical load may be as high as 10 operations/second.

Mounting



Operating speed and rate

Mounting and operation

To conform to the leakage paths and air gaps in standards EEC 24 - EN/IEC 61058 and EN/IEC 60947:

- an insulation pad must be inserted between the snap switch and the mounting surface if the latter is metal,
- manual operation of a metal actuator must only be carried out with the aid of an intermediate actuator made of an insulating material.
- The installer must ensure adequate protection against direct contact with the output terminals.

Actuation method

Direct operation: The plunger should preferably be actuated along its axis. However, the majority of our miniature snap switches will accept skewed operation provided the angle of actuation is not more than 45°.

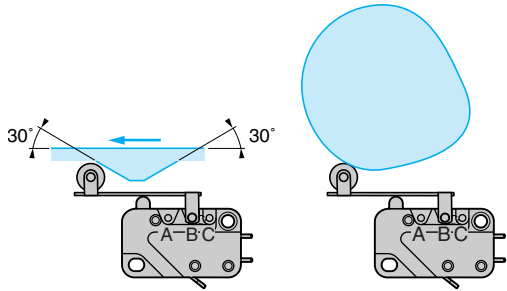
The travel of the actuator must not be limited to only reaching the tripping point. The actuator must always be operated in such a manner that the plunger reaches a point at least 0.5 times the stated overtravel value of the switch. Also, it should not reach its end of travel nor exceed the maximum permissible end-of-travel force.

Limit Switches

Osiswitch® Miniature Snap Switches

XEP and XC0

Mounting (continued)



Actuation method (continued)

Lever operators:

- when actuation is by a roller lever, force should preferably be applied in the direction shown in the diagrams opposite,
- where the movements involved are fast, the ramp should be so designed as to ensure that the operator is not subjected to any violent impact or abrupt release.

Mounting—Tightening torque

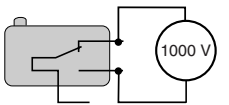
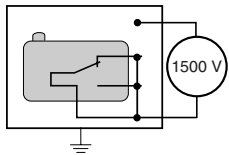
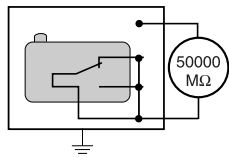
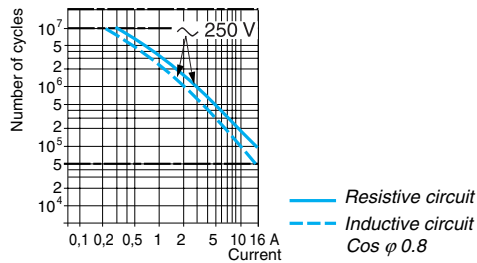
The tightening torque of the fixing screws must conform to the following values:

| Ø of mounting screw | | 2 | 2.5 | 3 | 3.5 | 4 |
|------------------------------------|---------|-----------|-----------|-----------|------------|-------------|
| Tightening torque, N•cm (lb-in) | Maximum | 25 (2.21) | 35 (3.10) | 60 (5.31) | 100 (8.85) | 150 (13.28) |
| | Minimum | 15 (1.33) | 25 (2.21) | 40 (3.54) | 60 (5.31) | 100 (8.85) |

Resistance to mechanical shock and vibration

- Resistance to shock and vibration depends on the mass of the moving parts and on the forces holding the contacts together.
- In general, for a miniature snap switch without accessory:
 - vibration > 10 gn, 10 to 500 Hz
 - shock > 50 gn 11 ms 1/2 sine wave

Electrical characteristics



Operating curves

These indicate the electrical life of the miniature snap switches under standard conditions [20°C (68 °F), 1 cycle/2 seconds], by showing the number of switching operations which can be performed with given types of load. For sealed snap switches, the operating rate is 1 cycle/6 s.

Insulation resistance

The insulation resistance of the miniature snap switches is generally greater than 50,000 MΩ, measured at 500 Vdc

Dielectric strength

The dielectric strength of our miniature snap switches is generally superior to:

- 1500 V between live parts and earth
- 1000 V between contacts
- 600 V between contacts for switches with an inter-contact distance less than 0.3 mm

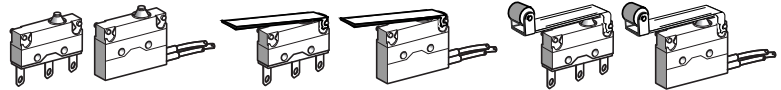
Limit Switches

Osiswitch® Miniature Snap Switches

Subminiature (DIN 41635 B format, sealed) and Sub-subminiature (DIN 41635 D format)

Catalog numbers

Subminiature design, DIN 41635 B format, sealed



| Type of operator | Plunger | Flat lever (1) | Roller lever (1) | |
|--|---|-------------------------|-------------------------|-------------|
| <p>Single-pole C/O snap action Wiring: 1 Black 2 Grey 4 Blue</p> | 2.8 mm (0.11 in.) cable clip tag connections XEP4E1W7 (3) | XEP4E1W7A326 (3) | XEP4E1W7A454 (3) | |
| | Weight, g (oz) | 2.4 (0.08) | 3.1 (0.11) | 3.2 (0.11) |
| | Pre-cabled connections XEP4E1FD (3) | XEP4E1FDA326 (3) | XEP4E1FDA454 (3) | |
| | Weight, g (oz) | 14.1 (0.50) | 14.8 (0.52) | 14.9 (0.53) |
| Separate components | Flat lever (2) ZEP4L326 (3) | — | — | |
| | Weight, g (oz) | 0.7 (0.02) | — | |
| | Roller lever (2) ZEP4L454 (3) | — | — | |
| Weight, g (oz) | 0.8 (0.03) | — | — | |

Sub-subminiature design, DIN 41635D format



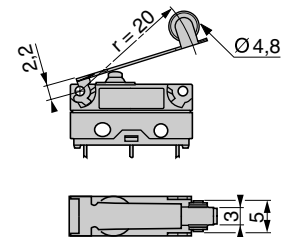
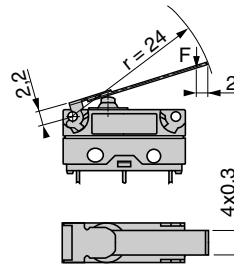
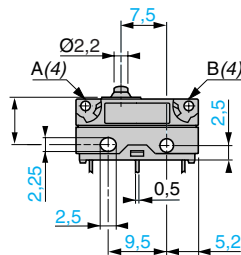
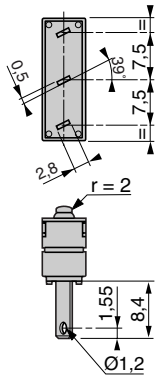
| Type of operator | Plunger | Flat lever (1) |
|------------------------------------|---|-------------------------|
| <p>Single-pole C/O snap action</p> | Solder tag connections XEP5P1W2 (3) | XEP5P1W2Z55B (3) |
| | Weight, g (oz) | 1.4 (0.05) |

Dimensions

XEP4E1W7

XEP4E1W7A326

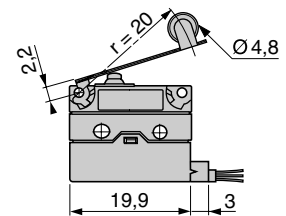
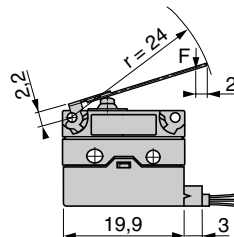
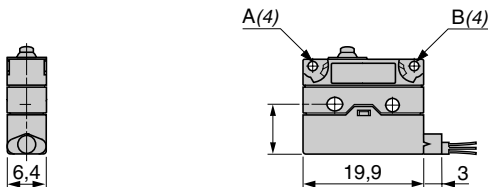
XEP4E1W7A454



XEP4E1FD

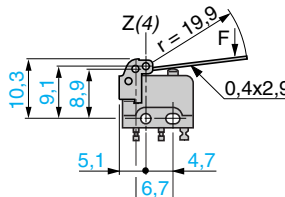
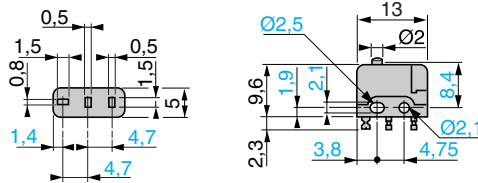
XEP4E1FDA326

XEP4E1FDA454



XEP5P1W2

XEP5P1W2Z55B



1. To avoid damage to the mounting spigots, removal of the lever from complete products is not recommended.
2. Levers only for mounting on basic (plunger) snap switches (XEP4E1W7 and XEP4E1FD).

3. Switches sold in lots of 5.
4. A, B, Z: lever fixing positions.

Limit Switches

Osiswitch® Miniature Snap Switches

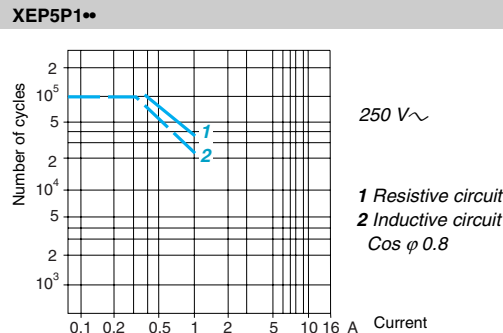
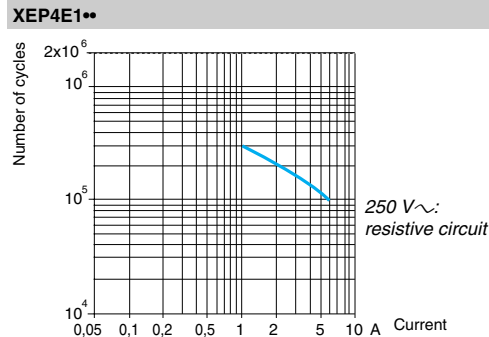
Subminiature (DIN 41635 B format, sealed) and Sub-subminiature (DIN 41635 D format)

| Switch type | XEP4E1**, XEP5P1W2 Plunger | XEP4E1**A326, XEP5P1W2Z55B Flat lever | XEP4E1**A454 Roller lever |
|--------------------------------------|--|--|------------------------------|
| Environmental characteristics | | | |
| Lever fixing position (1) | — | A | A |
| Switch actuation | On end | Horizontal | |
| Product certifications | CE, IEC 60947-5-1, EN 60947-5-1, c UR us, UL 1054, EN 61058 | | |
| Degree of protection | IP 67 XEP4E1FD**, case IP 67 and tags IP 00 XEP4E1W7**, case IP 40 and tags IP 00 XEP5P1W2** | | |
| Operating temperature | - 40...+ 105 °C XEP4E1FD**, -40...+125 °C XEP4E1W**** and XEP5P1** | | |
| Materials | Enclosure | Polyester XEP4, diallyl-phtalate XEP5 | |
| | Lever | — | Stainless steel |
| | Contact | AgCdO XEP4E1**, Ag XEP5 | |
| | Tags | Tinned brass XEP4E1W**, gold plated brass XEP5P1** | |

| | | Lever fixing position (1) | | | |
|--|------|---------------------------|------------------------------|------------------|------------------|
| Maximum tripping force, N (oz) | XEP4 | A | 2.5 N (8.99 oz) | 0.63 N (2.27 oz) | 0.83 N (2.99 oz) |
| | | B | 2.5 N (8.99 oz) | 1.25 N (4.50 oz) | 1.67 N (6.01 oz) |
| | XEP5 | | 2 N (7.19 oz) | 0.80 N (2.88 oz) | — |
| Minimum release force, N (oz) | XEP4 | A | 0.80 N (2.88 oz) | 0.20 N (0.72 oz) | 0.27 N (0.97 oz) |
| | | B | 0.80 N (2.88 oz) | 0.40 N (1.44 oz) | 0.53 N (1.91 oz) |
| | XEP5 | | 0.40 N (1.44 oz) | 0.15 N (0.54 oz) | — |
| Maximum permissible end of travel force, N (lb) | XEP4 | A | 10 N (2.25 lb) | 2.5 N (0.56 lb) | 3.33 N (0.75 lb) |
| | | B | 10 N (2.25 lb) | 5 N (1.12 lb) | 6.67 N (1.50 lb) |
| | XEP5 | | 10 N (2.25 lb) | — | — |
| Tripping point (TP) (2) | XEP4 | A | 8.40 +/- 0.3 mm | 10.7 +/- 1.7 mm | 15.5 +/- 1.4 mm |
| | | B | 8.40 +/- 0.3 mm | 9.6 +/- 1.0 mm | 14.5 +/- 0.9 mm |
| | XEP5 | | 8.40 mm | 9.20 mm | — |
| Maximum differential travel | XEP4 | A | 0.13 mm | 0.52 mm | 0.39 mm |
| | | B | 0.13 mm | 0.26 mm | 0.20 mm |
| | XEP5 | | 0.06 mm | 0.25 mm | — |
| Minimum overtravel | XEP4 | A | 0.60 mm | 2.40 mm | 1.80 mm |
| | | B | 0.60 mm | 1.20 mm | 0.90 mm |
| | XEP5 | | 0.10 mm | — | — |
| Inter-contact distance | XEP4 | | 0.4 mm | | |
| | XEP5 | | 0.3 mm | | |
| Mechanical durability | XEP4 | | 2 million operating cycles | | |
| | XEP5 | | 0.1 million operating cycles | | |

| | | Electrical characteristics |
|------------------------------------|------|--|
| Operational characteristics | XEP4 | AC-15: B300 (Ue: 240 V, Ie: 1.5 A) DC-13: R300 (Ue: 250 V, Ie: 0.1 A) conforming to IEC 60947-5-1, EN 60947-5-1 Appendix A 125-250 Vac 6.0 A conforming to UL 1054 6 (1) A 250 Vac 10,000 cycles conforming to EN 61058 |
| | XEP5 | AC-15: D300 (Ue: 240 V, Ie: 0.3 A) conforming to IEC 60947-5-1, EN 60947-5-1 Appendix A |
| Thermal current | XEP4 | 7.5 A on 250 V (50/60 Hz) |
| | XEP5 | 8.5 A on 250 V (50/60 Hz) |
| Connection | XEP4 | XEP4E1W7*: 2.8 mm (0.11 in.) cable clip tags XEP4E1FD: Pre-cabled (horizontally in-line), 3 x 0.5 mm ² , length 0.5 m (1.6 ft) |
| | XEP5 | Solder tags |

Operating curves



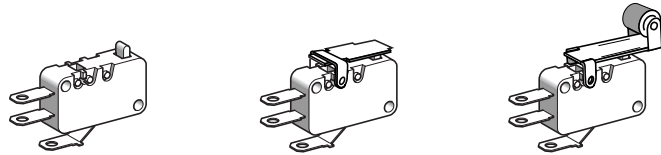
- Miniature snap switches fitted with a lever are supplied with the lever fixed in position A (see page 26).
For basic (plunger) snap switches, it is possible to fix a lever in position A or B, depending on the required tripping conditions (see page 26).
- Position of the operator in relation to the switch mountings (mounting hole center line), at the instant the contact changes state.

Limit Switches

Osiswitch® Miniature Snap Switches

Miniature (DIN 41635 A format)

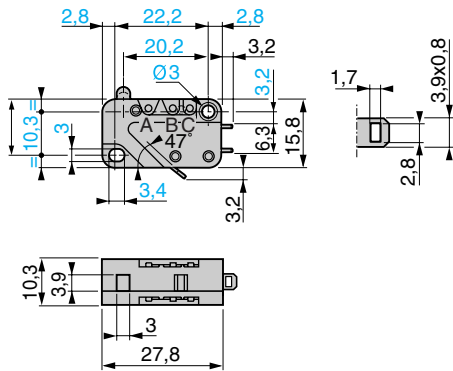
Catalog numbers



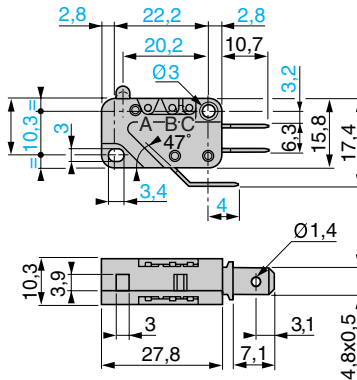
| Type of operator | | Plunger (2) | Flat lever (1) (2) | Roller lever (1) (2) |
|------------------------------------|-----------------------------------|------------------------------------|--------------------|----------------------|
| Single-pole C/O snap action | Standard contacts | Solder tags | XEP3S1W2 | XEP3S1W2B524 |
| | | 4.8 mm (0.19 in.) cable clip tags | XEP3S1W6 | XEP3S1W6B524 |
| | | 6.35 mm (0.25 in.) cable clip tags | XEP3S1W3 | XEP3S1W3B524 |
| | | Weight, g (oz) | 5.6 (0.20) | 6.3 (0.22) |
| | Very low operating force contacts | Solder tags | XEP3S2W2 | XEP3S2W2B524 |
| | | 4.8 mm (0.19 in.) cable clip tags | XEP3S2W6 | XEP3S2W6B524 |
| 6.35 mm (0.25 in.) cable clip tags | | XEP3S2W3 | XEP3S2W3B524 | |
| | Weight, g (oz) | 5.6 (0.20) | 6.3 (0.22) | |
| Flat lever (3) | | ZEP3L524 | | |
| Separate components | | Weight, g (oz) | | |
| Roller lever (3) | | ZEP3L529 | | |
| | | Weight, g (oz) | 1 (0.04) | |

Dimensions

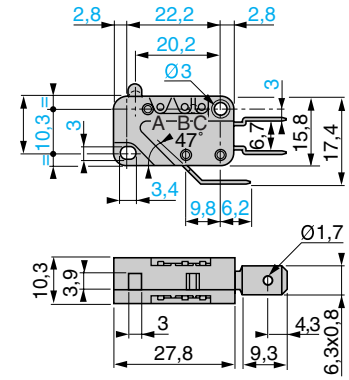
XEP3S•W2



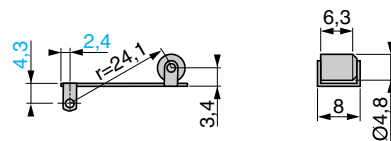
XEP3S•W6



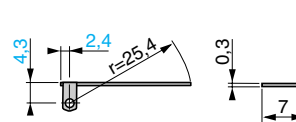
XEP3S•W3



ZEP3L529



ZEP3L524



- To avoid damage to the mounting spigots, removal of the lever from complete products is not recommended.
- Switches sold in lots of 10.
- Levers only for mounting on basic (plunger) snap switches (XEP3S•W2, XEP3S•W3 and XEP3S•W6), in mounting positions A, B or C.

Limit Switches

Osiswitch® Miniature Snap Switches

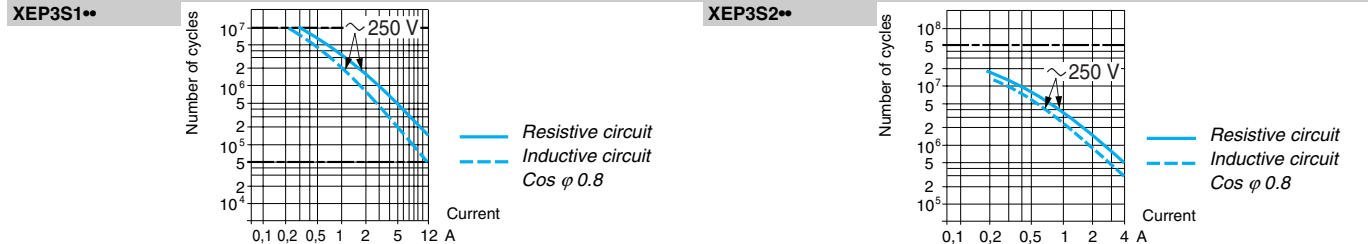
Miniature (DIN 41635 A format)

| | | | |
|--------------------------------------|--|----------------------|--|
| Switch type | XEP3 S•W2 | XEP3 S•W2B254 | XEP3 S•W2B259 |
| Type of operator | Plunger | Flat lever | Roller lever |
| Environmental characteristics | | | |
| Lever fixing position (1) | — | B | B |
| Switch actuation | On end | Horizontal | |
| Product certifications | --- UR us, CE, IEC/EN 60947-5-1, UL 1054, EN 61058-1 | | |
| Degree of protection | Case IP 40 and tags IP 00 | | |
| Operating temperature | - 25...+ 125 °C | | |
| Materials | Enclosure | Polyester | |
| | Lever | — | Stainless steel |
| | Contact | AgNi | Stainless steel, glass reinforced polyamide roller |

| | | | | | |
|---|--------------------------|-----------------------------|----------------------------|----------------------------|---------------------------|
| Mechanical characteristics | | | | | |
| Lever fixing position (1) | | | | | |
| Maximum tripping force, N (oz) | Standard | A | 0.80 N (2.88 oz) | 0.20 N (0.72 oz) | |
| | | B | 0.80 N (2.88 oz) | 0.40 N (1.44 oz) | |
| | | C | 0.80 N (2.88 oz) | 0.53 N (1.91 oz) | |
| | Very low force | A | 0.25 N (0.90 oz) | 0.06 N (0.22 oz) | |
| | | B | 0.25 N (0.90 oz) | 0.13 N (0.47 oz) | |
| | | C | 0.25 N (0.90 oz) | 0.17 N (0.61 oz) | |
| Minimum release force, N (oz) | Standard | A | 0.20 N (0.72 oz) | 0.05 N (0.18 oz) | |
| | | B | 0.20 N (0.72 oz) | 0.10 N (0.36 oz) | |
| | | C | 0.20 N (0.72 oz) | 0.13 N (0.47 oz) | |
| | Very low force | A | 0.05 N (0.18 oz) | 0.01 N (0.04 oz) | |
| | | B | 0.05 N (0.18 oz) | 0.03 N (0.11 oz) | |
| | | C | 0.05 N (0.18 oz) | 0.03 N (0.11 oz) | |
| Maximum permissible end of travel force, N (lb) | Standard, very low force | A | 20 N (4.50 lb) | 5 N (1.12 lb) | |
| | | B | 20 N (4.50 lb) | 10 N (2.25 lb) | |
| | | C | 20 N (4.50 lb) | 13 N (2.92 lb) | |
| Tripping point (TP) (2) | Standard, very low force | A | 14.70 ^{+/-0.4} mm | 15.20 ^{+/-2.5} mm | 20.5 ^{+/-2.9} mm |
| | | B | 14.70 ^{+/-0.4} mm | 15.20 ^{+/-1.0} mm | 20.5 ^{+/-1.5} mm |
| | | C | 14.70 ^{+/-0.4} mm | 15.20 ^{+/-0.8} mm | 20.5 ^{+/-1.2} mm |
| Maximum differential travel | Standard, very low force | A | 0.35 mm | 1.40 mm | |
| | | B | 0.35 mm | 0.70 mm | |
| | | C | 0.35 mm | 0.53 mm | |
| Minimum overtravel | Standard | A | 1.20 mm | 4.80 mm | |
| | | B | 1.20 mm | 2.40 mm | |
| | | C | 1.20 mm | 1.80 mm | |
| | Very low force | A | 1.10 mm | 4.40 mm | |
| | | B | 1.10 mm | 2.20 mm | |
| | | C | 1.10 mm | 1.65 mm | |
| Inter-contact distance | | 0.40 mm | | | |
| Mechanical durability for 2/3 overtravel | Standard | 20 million operating cycles | | | |
| | Very low force | 50 million operating cycles | | | |

| | | | |
|-----------------------------------|----------------|--|--|
| Electrical characteristics | | | |
| Operational characteristics | Standard | AC-15: B300 (Ue: 240 V, Ie: 1.5 A) DC-13: R300 (Ue: 250 V, Ie: 0.1 A) conforming to IEC/EN 60947-5-1 Appendix A 125-250 Vac 10.1 A—1/2 HP conforming to UL 1054 12 (3) A 250 Vac 10,000 cycles conforming to EN 61058-1 | |
| | Very low force | AC-15: D300 (Ue: 240 V, Ie: 0.3 A) conforming to IEC/EN 60947-5-1 Appendix A 125-250 Vac 4 A—1/10 HP conforming to UL 1054 4 (1) A 250 Vac 50,000 cycles conforming to EN 61058-1 | |
| Thermal current | Standard | 15 A on 250 V (50/60 Hz) | |
| | Very low force | 5 A on 250 V (50/60 Hz) | |
| Connection | | XEP3 S•W2 : solder tags. XEP3 S•W6 : 4.8 mm (0.19 in.) cable clip tags XEP3 S•W3 : 6.35 mm (0.25 in.) cable clip tags. | |

Operating curves



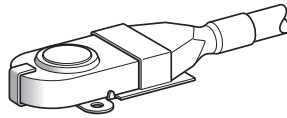
- Miniature snap switches fitted with a lever are supplied with the lever fixed in position B (see page 28). For basic (plunger) snap switches, it is possible to fix a lever in position A, B or C, depending on the required tripping conditions (see page 28).
- Position of the operator in relation to the switch mountings (mounting hole center line), at the instant the contact changes state.

Limit Switches

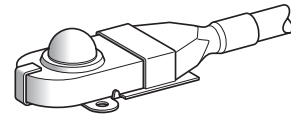
Osiswitch® Miniature Snap Switches

Sealed Design Pre-Cabled

Type of head Plunger (mounting by the body)



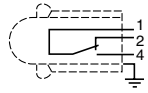
Head with flat plunger



Head with domed encased plunger

Type of operator

Catalog numbers



Single-pole C/O snap action
Wiring:
1 Black
2 Brown
4 Blue

XC010L2

XC011L2

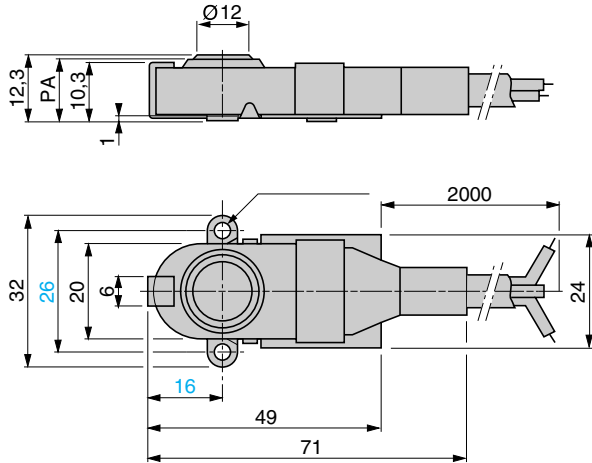
Weight, kg (lb)

0.145 (0.320)

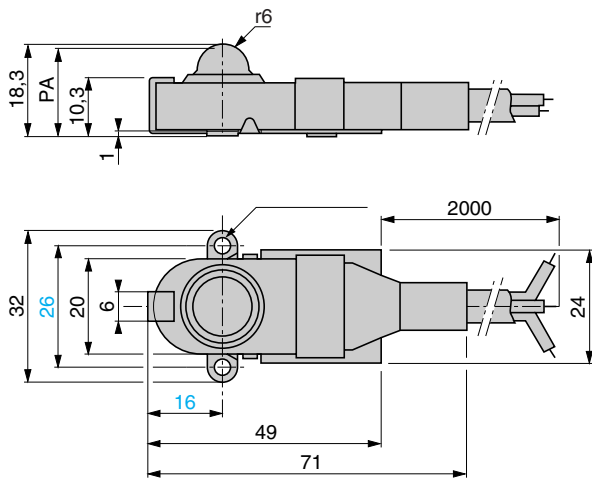
0.150 (0.331)

Dimensions

XC010L2



XC011L2



Limit Switches

Osiswitch® Miniature Snap Switches

Sealed Design Pre-Cabled

| Switch type | XC010• | XC011• |
|---|---|---------------------------|
| Environmental characteristics | | |
| Switch actuation | On end, flat plunger (1) | On end, domed plunger (1) |
| Product certifications | CE, IEC 60947-5-1 | |
| Degree of protection | IP 66 | |
| Operating temperature | 0...85 °C (32...185 °F) | |
| Materials | Internal housing | Metal |
| | Casing | Nitrile |
| | Mounting support | Steel, zinc passivated |
| | Contact | Ag |
| Mechanical characteristics | | |
| Maximum tripping force | 5.3 N (1.19 lb) | |
| Minimum release force | 1.5 N (0.34 lb) | |
| Maximum permissible end of travel force | 30 N (6.74 lb) | |
| Tripping point (TP) (2) | 11.4 ^{±0.4} mm | 17.4 ^{±0.5} mm |
| Maximum differential travel | 0.2 mm | |
| Minimum overtravel | 0.2 mm | |
| Inter-contact distance | 0.5 mm | |
| Mechanical durability | 2 million operating cycles | |
| Electrical characteristics | | |
| Operational current | 1 A on 24 V (50/60 Hz) | |
| Thermal current/insulation voltage | 12 A/60 V | |
| Connection | A05 VVF cable, 3 x 0.75 mm ² , length 2 m (6.6 ft), overall diameter ≤ 7.6 mm (0.30 in.) | |
| Electrical durability | AC-15: 0.5 million operating cycles | |

Operating curve

- Manual actuation must be made by an intermediate insulated part, in order to meet basic safety requirements. One of the two mounting holes must also be used as an earth protection terminal.
- Distance between the base of the switch and the top of the plunger at the instant the contact changes state (see dimensions, page 30).

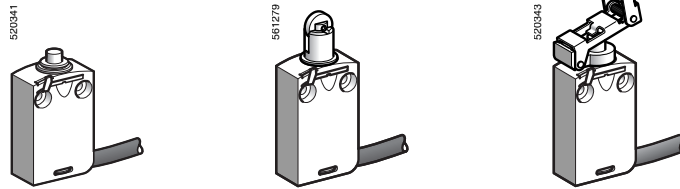
Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD

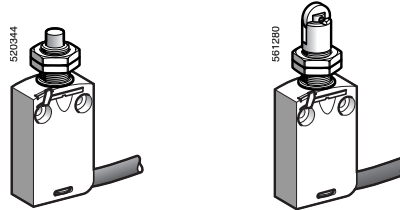
■ XCM D
pre-cabled

□ With head for linear movement (plunger). Mounting by the body.



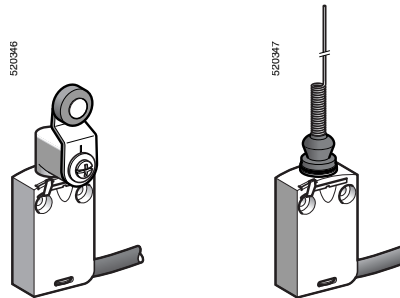
Page 34

□ With head for linear movement (plunger). Mounting by the head.



Page 34

□ With head for rotary movement (lever) or multi-directional. Mounting by the body.



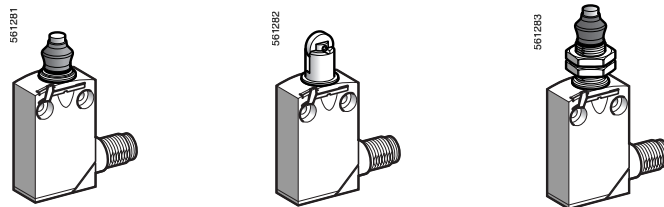
Page 35

■ XCM D
with integral connector

□ With head for linear movement (plunger)

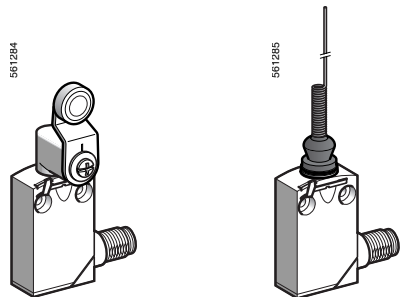
Mounting by the body

Mounting by the head



Page 38

□ With head for rotary movement (lever) or multi-directional. Mounting by the body.



Page 39

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD

| Environmental characteristics | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|----|-----|----|-----|---|---|---|---|---|--|--|---|----|----|-----|---|---|---|---|---|
| Conforming to standards | Products | IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14 | | | | | | | | | | | | | | | | | | | | |
| | Machine assemblies | IEC 60204-1, EN 60204-1 | | | | | | | | | | | | | | | | | | | | |
| Product certifications | UL, CSA (except products with special cables), CCC | | | | | | | | | | | | | | | | | | | | | |
| Protective treatment | Standard version: "TC" | | | | | | | | | | | | | | | | | | | | | |
| Ambient air temperature | Operation: -25...+70 °C (-13...+158 °F). Storage: -40...+70 °C (-40...+158 °F) | | | | | | | | | | | | | | | | | | | | | |
| Vibration resistance | XCMD snap action: 5 gn. XCMD slow break: 25 gn (10...500 Hz) conforming to IEC 60068-2-6 | | | | | | | | | | | | | | | | | | | | | |
| Shock resistance | 25 gn (18 ms) conforming to IEC 60068-2-27 | | | | | | | | | | | | | | | | | | | | | |
| Electric shock protection | Class I conforming to IEC 61-140 and NF C 20-030 | | | | | | | | | | | | | | | | | | | | | |
| Degree of protection | NEMA Types 1, 2, 4, 12, 13 IP 66, IP 67 and IP 68 (1) conforming to IEC 60529 IK 06 conforming to EN 50102 | | | | | | | | | | | | | | | | | | | | | |
| Materials | Bodies and heads: Zamak® zinc alloy | | | | | | | | | | | | | | | | | | | | | |
| Repeat accuracy | 0.05 mm on the tripping points, with 1 million operating cycles for head with end plunger | | | | | | | | | | | | | | | | | | | | | |
| Protection against prolonged immersion: the test conditions are subject to agreement between the manufacturer and the user. | | | | | | | | | | | | | | | | | | | | | | |
| Contact block characteristics | | | | | | | | | | | | | | | | | | | | | | |
| Rated operational characteristics | Switches with 2 contacts | ~ AC-15; B300 (Ue = 240 V, Ie = 1.5 A) = DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 | | | | | | | | | | | | | | | | | | | | |
| | Switches with 3 and 4 contacts | ~ AC-15; C300 (Ue = 240 V, Ie = 0.75 A) = DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 | | | | | | | | | | | | | | | | | | | | |
| | Pre-cabled switches | Ithe = 6 A for 2 contacts, 4 A for 3 contacts, 3 A for 4 contacts | | | | | | | | | | | | | | | | | | | | |
| | Switches with 4-pin M12 connector | Ui = 250 V, Ie = 3 A maximum, Ithe = 3 A | | | | | | | | | | | | | | | | | | | | |
| | Switches with 5-pin M12 connector | Ui = 60 V, Ie = 4 A maximum, Ithe = 4 A | | | | | | | | | | | | | | | | | | | | |
| | Switches with 5-pin 7/8" 16UN connector | Ui = 250 V, Ie = 6 A maximum, Ithe = 6 A | | | | | | | | | | | | | | | | | | | | |
| Rated insulation voltage | Ui = 400 V degree of pollution 3 conforming to IEC 60947-5-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 | | | | | | | | | | | | | | | | | | | | | |
| Rated impulse withstand voltage | U imp = 4 kV conforming to IEC 60947-1, IEC 60664 | | | | | | | | | | | | | | | | | | | | | |
| Positive operation (depending on model) | N/C contacts with positive opening operation conforming to IEC 60947-5-1 Appendix K, EN 60947-5-1 | | | | | | | | | | | | | | | | | | | | | |
| Resistance across terminals | ≤ 25 mΩ conforming to IEC 60255-7 category 3 | | | | | | | | | | | | | | | | | | | | | |
| Electric shock protection | 6 A cartridge fuse type gG (gl) | | | | | | | | | | | | | | | | | | | | | |
| Minimum actuation speed | Snap action contact: 0.01 m/minute (0.03 ft/minute) Slow break contact: 6 m/minute (19.68 ft/minute) | | | | | | | | | | | | | | | | | | | | | |
| Electrical durability | <ul style="list-style-type: none"> Conforming to IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles/hour Load factor: 0.5 | | | | | | | | | | | | | | | | | | | | | |
| | <p>a.c. supply ~ 50/60 Hz m inductive circuit</p> <p>Millions of operating cycles</p> <p>Current in A</p> | <p>XCMD slow break (N/C + N/O, N/C + N/C + N/O contacts)</p> <p>Millions of operating cycles</p> <p>Current in A</p> | | | | | | | | | | | | | | | | | | | | |
| | <p>d.c. supply =</p> <table border="1"> <thead> <tr> <th>Power switched in W for 5 million operating cycles</th> <th>V</th> <th>24</th> <th>48</th> <th>120</th> </tr> </thead> <tbody> <tr> <td>m</td> <td>W</td> <td>3</td> <td>2</td> <td>1</td> </tr> </tbody> </table> | Power switched in W for 5 million operating cycles | V | 24 | 48 | 120 | m | W | 3 | 2 | 1 | <table border="1"> <thead> <tr> <th>Power switched in W for 5 million operating cycles</th> <th>V</th> <th>24</th> <th>48</th> <th>120</th> </tr> </thead> <tbody> <tr> <td>m</td> <td>W</td> <td>4</td> <td>3</td> <td>3</td> </tr> </tbody> </table> | Power switched in W for 5 million operating cycles | V | 24 | 48 | 120 | m | W | 4 | 3 | 3 |
| Power switched in W for 5 million operating cycles | V | 24 | 48 | 120 | | | | | | | | | | | | | | | | | | |
| m | W | 3 | 2 | 1 | | | | | | | | | | | | | | | | | | |
| Power switched in W for 5 million operating cycles | V | 24 | 48 | 120 | | | | | | | | | | | | | | | | | | |
| m | W | 4 | 3 | 3 | | | | | | | | | | | | | | | | | | |

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD, Pre-Cabled

Type of head Plunger (mounting by the body) Plunger (mounting by the head)



| Type of operator | Metal end plunger | Metal end plunger with elastomer boot | Steel roller plunger | Retractable steel roller lever plunger | M12 with metal end plunger | M16 with metal end plunger with elastomer boot | M12 with steel roller plunger |
|------------------|-------------------|---------------------------------------|----------------------|--|----------------------------|--|-------------------------------|
|------------------|-------------------|---------------------------------------|----------------------|--|----------------------------|--|-------------------------------|

Catalog numbers

| | | | | | | | |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 2-pole N/C + N/O snap action | XCMD2110L1 | XCMD2111L1 | XCMD2102L1 | XCMD2124L1 | XCMD21F0L1 | XCMD21G1L1 | XCMD21F2L1 |
| 2-pole N/C + N/O break before make, slow break | XCMD2510L1 | XCMD2511L1 | XCMD2502L1 | XCMD2524L1 | XCMD25F0L1 | XCMD25G1L1 | XCMD25F2L1 |
| 2-pole N/C + N/C snap action | ZCMD29L1 + ZCE10 | ZCMD29L1 + ZCE11 | ZCMD29L1 + ZCE02 | ZCMD29L1 + ZCE24 | ZCMD29L1 + ZCEF0 | ZCMD29L1 + ZCEG1 | ZCMD29L1 + ZCEF2 |
| 3-pole N/C + N/C + N/O snap action | ZCMD39L1 + ZCE10 | ZCMD39L1 + ZCE11 | ZCMD39L1 + ZCE02 | ZCMD39L1 + ZCE24 | ZCMD39L1 + ZCEF0 | ZCMD39L1 + ZCEG1 | ZCMD39L1 + ZCEF2 |
| 3-pole N/C + N/C + N/O break before make, slow break | ZCMD37L1 + ZCE10 | ZCMD37L1 + ZCE11 | ZCMD37L1 + ZCE02 | ZCMD37L1 + ZCE24 | ZCMD37L1 + ZCEF0 | ZCMD37L1 + ZCEG1 | ZCMD37L1 + ZCEF2 |
| Weight, kg (lb) | 0.180 (0.397) | 0.180 (0.397) | 0.185 (0.408) | 0.200 (0.441) | 0.195 (0.430) | 0.220 (0.485) | 0.205 (0.452) |
| 4-pole N/C + N/C + N/O + N/O snap action | ZCMD41L1 + ZCE10 | ZCMD41L1 + ZCE11 | ZCMD41L1 + ZCE02 | ZCMD41L1 + ZCE24 | ZCMD41L1 + ZCEF0 | ZCMD41L1 + ZCEG1 | ZCMD41L1 + ZCEF2 |
| Weight, kg (lb) | 0.160 (0.353) | 0.160 (0.353) | 0.165 (0.364) | 0.180 (0.397) | 0.175 (0.386) | 0.200 (0.441) | 0.185 (0.408) |

Contact operation
(A) = cam displacement
(P) = positive opening point
⊙ N/C contact with positive opening operation, when properly mounted and using a conforming operator

Characteristics

| | | | | |
|--------------------------------|----------------------|------------------|---------------------|------------------|
| Switch actuation | On end | By 30° cam | On end | By 30° cam |
| Type of actuation | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 0.1 m/s (0.33 ft/s) | |
| Minimum force or torque | For tripping | 8.5 N (1.91 lb) | 7 N (1.57 lb) | 2.5 N (0.56 lb) |
| | For positive opening | 42.5 N (9.55 lb) | 35 N (7.87 lb) | 12.5 N (2.81 lb) |

Cabling
 PvR cable, 1 m (3.3 ft) long: 5 x 0.75 mm² for 2-pole contact versions; 7 x 0.5 mm² for 3-pole contact versions; 9 x 0.34 mm² for 4-pole contact versions. For other cable lengths, see page 44.

NOTE: For more information, consult pages 40–42.

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD, Pre-Cabled

| Type of head | Rotary (mounting by the body) | | | Multi-directional | |
|---|--|------------------------------|--|--|----------------------|
| | | | | | |
| Type of operator | Thermoplastic roller lever | Steel roller lever | Roller lever with ball bearing mounted roller | Variable length thermoplastic roller lever | Cat's whisker (1) |
| Catalog numbers | | | | | |
| 2-pole N/C + N/O snap action | XCMD2115L1 | XCMD2116L1 | XCMD2117L1 | XCMD2145L1 | XCMD2106L1 |
| 2-pole N/C + N/O break before make, slow break | XCMD2515L1 | XCMD2516L1 | XCMD2517L1 | XCMD2545L1 | XCMD2506L1 |
| 2-pole N/C + N/C snap action | ZCMD29L1 + ZCE01 + ZCY15 | ZCMD29L1 + ZCE01 + ZCY16 | ZCMD29L1 + ZCE01 + ZCY17 | ZCMD29L1 + ZCE01 + ZCY45 | ZCMD29L1 + ZCE06 |
| 3-pole N/C + N/C + N/O snap action | ZCMD39L1 + ZCE01 + ZCY15 | ZCMD39L1 + ZCE01 + ZCY16 | ZCMD39L1 + ZCE01 + ZCY17 | ZCMD39L1 + ZCE01 + ZCY45 | ZCMD39L1 + ZCE06 |
| 3-pole N/C + N/C + N/O break before make, slow break | ZCMD37L1 + ZCE01 + ZCY15 | ZCMD37L1 + ZCE01 + ZCY16 | ZCMD37L1 + ZCE01 + ZCY17 | ZCMD37L1 + ZCE01 + ZCY45 | ZCMD37L1 + ZCE06 |
| Weight, kg (lb) | 0.220 (0.485) | 0.225 (0.496) | 0.220 (0.485) | 0.230 (0.507) | 0.180 (0.397) |
| 4-pole N/C + N/C + N/O + N/O snap action | ZCMD41L1 + ZCE01 + ZCY15 | ZCMD41L1 + ZCE01 + ZCY16 | ZCMD41L1 + ZCE01 + ZCY17 | ZCMD41L1 + ZCE01 + ZCY45 | ZCMD41L1 + ZCE06 |
| Weight, kg (lb) | 0.200 (0.441) | 0.205 (0.452) | 0.200 (0.441) | 0.210 (0.463) | 0.160 (0.353) |
| Contact operation | contact closed contact open | | (A) = cam displacement (P) = positive opening point | N/C contact with positive opening operation, when properly mounted and using a conforming operator | |
| 1. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings. | | | | | |
| Characteristics | | | | | |
| Switch actuation | By 30° cam | | | By any moving part | |
| Type of actuation | | | | | |
| Maximum actuation speed | 1.5 m/s (4.92 ft/s) | | | 1 m/s (3.28 ft/s) | |
| Minimum force or torque | For tripping: 0.1 N*m (0.89 lb-in) For positive opening: 0.5 N*m (4.43 lb-in) | | | — | |
| Cabling | PvR cable, 1 m (3.3 ft) long: 5 x 0.75 mm ² for 2-pole contact versions; 7 x 0.5 mm ² for 3-pole contact versions, 9 x 0.34 mm ² for 4-pole contact versions. For other cable lengths, see page 44. | | | | |

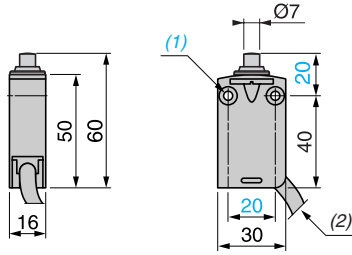
NOTE: For more information, consult pages 40–42.

Limit Switches

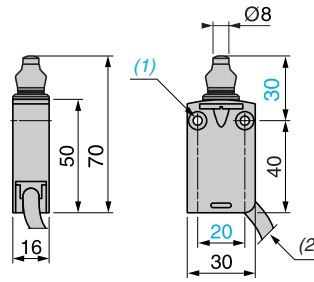
Osiswitch® Miniature, Metal

Universal, XCMD, Pre-Cabled—Dimensions

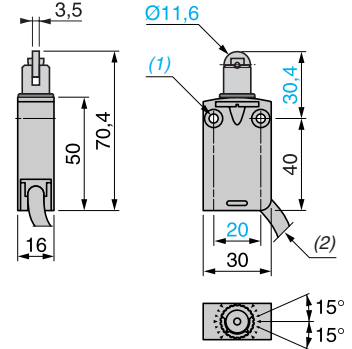
XCMD2•10L1



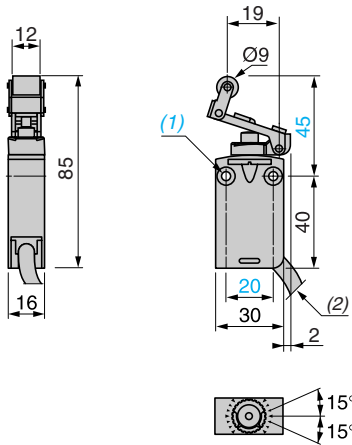
XCMD2•11L1



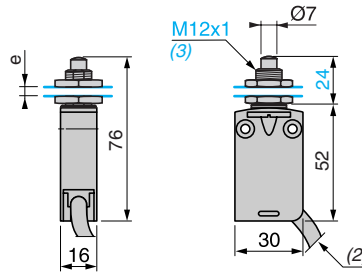
XCMD2•02L1



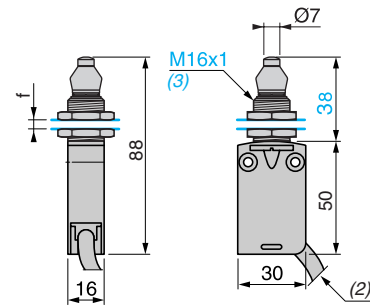
XCMD2•24L1



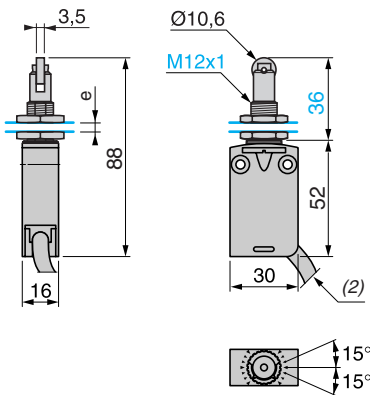
XCMD2•F0L1



XCMD2•G1L1



XCMD2•F2L1



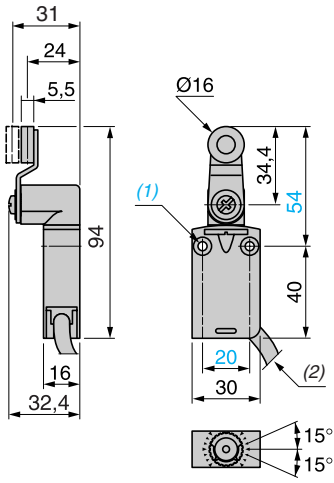
1. 2 mounting holes \varnothing 4.2 mm (0.17 in.), counterbored \varnothing 8 mm (0.31 in.) by 4 mm (0.16 in.) deep.
2. Overall diameter of cable 7.5 mm (0.30 in.).
3. Mounting nut thickness 3.5 mm (0.14 in.).
- e: 8 mm (0.31 in.) max, panel cut-out \varnothing 12.5 mm (0.49 in.).
- f: 8 mm (0.31 in.) max, panel cut-out \varnothing 16.5 mm (0.65 in.).

Limit Switches

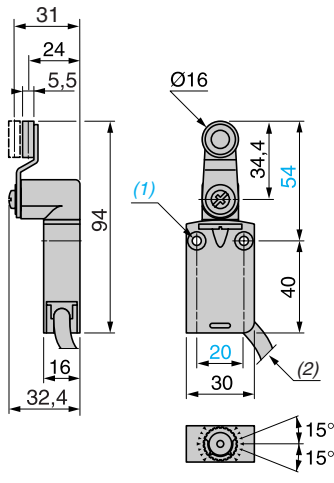
Osiswitch® Miniature, Metal

Universal, XCMD, Pre-Cabled—Dimensions

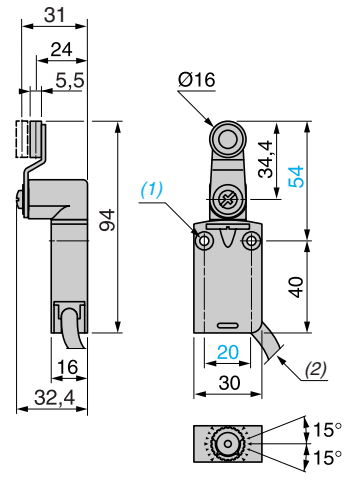
XCMD2•15L1



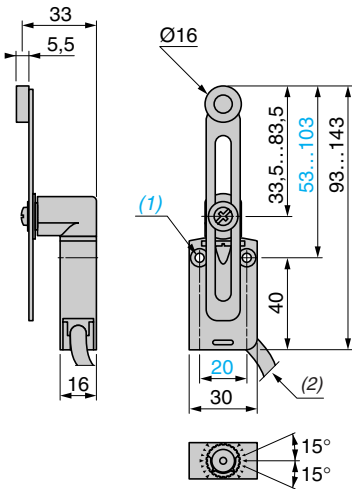
XCMD2•16L1



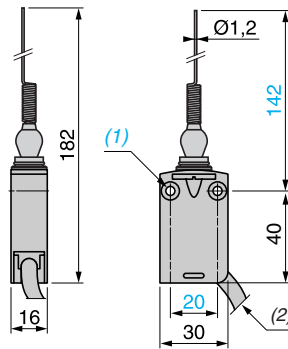
XCMD2•17L1



XCMD2•45L1



XCMD2•06L1



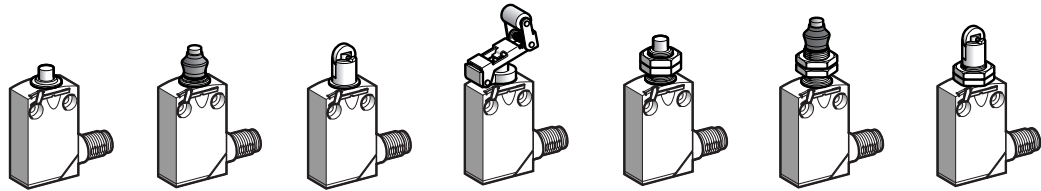
1. 2 mounting holes Ø 4.2 mm (0.17 in.), counterbored Ø 8 mm (0.31 in.) by 4 mm (0.16 in.) deep.
2. Overall diameter of cable 7.5 mm (0.30 in.).
- e: 8 mm (0.31 in.) max, panel cut-out Ø 12.5 mm (0.49 in.).
- f: 8 mm (0.31 in.) max, panel cut-out Ø 16.5 mm (0.65 in.).

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD, Integral or Remote Connector

Type of head Plunger (mounting by the body) Plunger (mounting by the head)



Type of operator Metal end plunger Metal end plunger with elastomer boot Steel roller plunger Retractable steel roller lever plunger M12 with metal end plunger M16 with metal end plunger with elastomer boot M12 with steel roller plunger

Catalog numbers

| | | | | | | | |
|---|--|--|--|--|--|--|--|
| <p>Single-pole C/O snap action + integral M12 4-pin connector</p> | <p>XCMD2110M12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD2111M12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD2102M12 3,1(A) 7(P) 1,4 mm</p> | <p>XCMD2124M12 11,2(A) 25(P) 0 4,9 mm</p> | <p>XCMD21F0M12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD21G1M12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD21F2M12 3,1(A) 7(P) 1,4 mm</p> |
| <p>2-pole N/C + N/O snap action + integral M12 5-pin connector</p> | <p>XCMD2110C12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD2111C12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD2102C12 3,1(A) 7(P) 1,4 mm</p> | <p>XCMD2124C12 11,2(A) 25(P) 0 4,9 mm</p> | <p>XCMD21F0C12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD21G1C12 1,8 4,2(P) 0,8 5mm</p> | <p>XCMD21F2C12 3,1(A) 7(P) 1,4 mm</p> |
| <p>2-pole N/C + N/C snap action + integral M12 5-pin connector</p> | <p>ZCMD29C12 + ZCE10 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD29C12 + ZCE11 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD29C12 + ZCE02 3,1(A) 7(P) 1,4 mm</p> | <p>ZCMD29C12 + ZCE24 11,2(A) 25(P) 0 4,9 mm</p> | <p>ZCMD29C12 + ZCEF0 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD29C12 + ZCEG1 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD29C12 + ZCEF2 3,1(A) 7(P) 1,4 mm</p> |
| <p>Weight, kg (lb)</p> | 0.085 (0.187) | 0.085 (0.187) | 0.090 (0.198) | 0.105 (0.231) | 0.100 (0.220) | 0.125 (0.276) | 0.110 (0.243) |
| <p>2-pole N/C + N/O snap action + M12 5-pin connector on 0.8 m (2.6 ft) flying lead</p> | <p>ZCMD21L08R12 + ZCE10 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08R12 + ZCE11 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08R12 + ZCE02 3,1(A) 7(P) 1,4 mm</p> | <p>ZCMD21L08R12 + ZCE24 11,2(A) 25(P) 0 4,9 mm</p> | <p>ZCMD21L08R12 + ZCEF0 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08R12 + ZCEG1 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08R12 + ZCEF2 3,1(A) 7(P) 1,4 mm</p> |
| <p>2-pole N/C + N/O snap action + 7/8" 16UN 5-pin connector on 0.8 m (2.6 ft) flying lead</p> | <p>ZCMD21L08U78 + ZCE10 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08U78 + ZCE11 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08U78 + ZCE02 3,1(A) 7(P) 1,4 mm</p> | <p>ZCMD21L08U78 + ZCE24 11,2(A) 25(P) 0 4,9 mm</p> | <p>ZCMD21L08U78 + ZCEF0 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08U78 + ZCEG1 1,8 4,2(P) 0,8 5mm</p> | <p>ZCMD21L08U78 + ZCEF2 3,1(A) 7(P) 1,4 mm</p> |
| <p>Weight, kg (lb)</p> | 0.150 (0.331) | 0.150 (0.331) | 0.155 (0.342) | 0.170 (0.375) | 0.165 (0.364) | 0.190 (0.419) | 0.175 (0.386) |
| <p>Contact operation</p> <p>■ contact closed □ contact open</p> | | | (A) = cam displacement (P) = positive opening point | ⊖ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | | |

Characteristics

| Switch actuation | On end | By 30° cam | | On end | By 30° cam |
|-------------------------|---|------------------|----------------|---------------------|------------------|
| Type of actuation | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | | 0.1 m/s (0.33 ft/s) | |
| Minimum force or torque | For tripping | 8.5 N (1.91 lb) | 7 N (1.57 lb) | 2.5 N (0.56 lb) | 8.5 N (1.91 lb) |
| | For positive opening | 42.5 N (9.55 lb) | 35 N (7.87 lb) | 12.5 N (2.81 lb) | 42.5 N (9.55 lb) |
| Positive operation | Although their design is identical to the pre-cabled switches, the switches incorporating an M12 4-pin connector cannot be marked with the ⊖ symbol because they are single-pole C/O. | | | | |

NOTE: For more information, consult pages 40–42.

Limit Switches

Osiswitch® Miniature, Metal

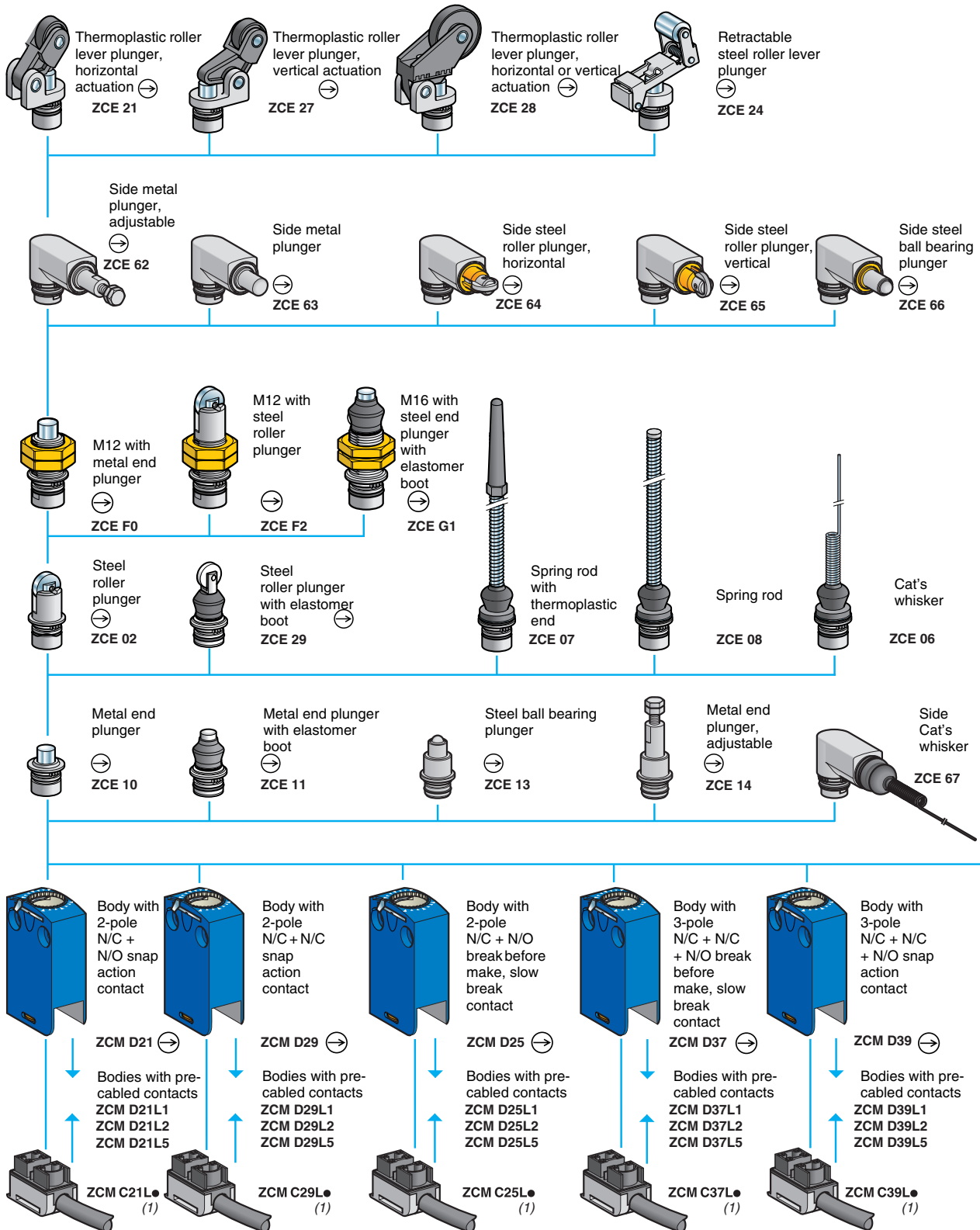
Universal, XCMD, Integral or Remote Connector

| Type of head | Rotary (mounting by the body) | | | | Multi-directional | |
|--|--|--|---|--|--------------------------|--|
| | | | | | | |
| Type of operator | Thermoplastic roller lever | Steel roller lever | Roller lever with ball bearing mounted roller | Variable length thermoplastic roller lever | Cat's whisker (1) | |
| Catalog numbers | | | | | | |
| Single-pole C/O snap action With integral M12 4-pin connector | XCMD2115M12 | XCMD2116M12 | XCMD2117M12 | XCMD2145M12 | XCMD2106M12 | |
| 2-pole N/C + N/O snap action With integral M12 5-pin connector | XCMD2115C12 | XCMD2116C12 | XCM D2117C12 | XCMD2145C12 | XCMD2106C12 | |
| 2-pole N/C + N/C snap action With integral M12 5-pin connector | ZCMD29C12 + ZCE01 + ZCY15 | ZCMD29C12 + ZCE01 + ZCY16 | ZCMD29C12 + ZCE01 + ZCY17 | ZCMD29C12 + ZCE01 + ZCY45 | ZCMD29C12 + ZCE06 | |
| Weight, kg (lb) | 0.125 (0.276) | 0.130 (0.287) | 0.125 (0.276) | 0.135 (0.298) | 0.085 (0.187) | |
| 2-pole N/C + N/O snap action With M12 5-pin connector on 0.8 m (2.6 ft) flying lead | ZCMD21L08R12 + ZCE01 + ZCY15 | ZCMD21L08R12 + ZCE01 + ZCY16 | ZCMD21L08R12 + ZCE01 + ZCY17 | ZCMD21L08R12 + ZCE01 + ZCY45 | ZCMD21L08R12 + ZCE06 | |
| 2-pole N/C + N/O snap action With 7/8" 16UN 5-pin connector on 0.8 m (2.6 ft) flying lead | ZCMD21L08U78 + ZCE01 + ZCY15 | ZCMD21L08U78 + ZCE01 + ZCY16 | ZCMD21L08U78 + ZCE01 + ZCY17 | ZCMD21L08U78 + ZCE01 + ZCY45 | ZCMD21L08U78 + ZCE06 | |
| Weight, kg (lb) | 0.200 (0.441) | 0.205 (0.452) | 0.200 (0.441) | 0.210 (0.463) | 0.160 (0.353) | |
| Contact operation | contact closed contact open | (A) = cam displacement (P) = positive opening point | | N/C contact with positive opening operation, when properly mounted and using a conforming operator | | |
| 1. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting. | | | | | | |
| Characteristics | | | | | | |
| Switch actuation | By 30° cam | | | By any moving part | | |
| Type of actuation | | | | | | |
| Maximum actuation speed | 1.5 m/s (4.92 ft/s) | | | 1 m/s (3.28 ft/s) | | |
| Minimum force or torque | For tripping | 0.1 N•m (0.89 lb-in) | | | — | |
| | For positive opening | 0.5 N•m (4.43 lb-in) | | | — | |
| Positive operation | Although their design is identical to the pre-cabled switches, the switches incorporating an M12 4-pin connector cannot be marked with the symbol because they are single-pole C/O. | | | | | |

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD—Modular

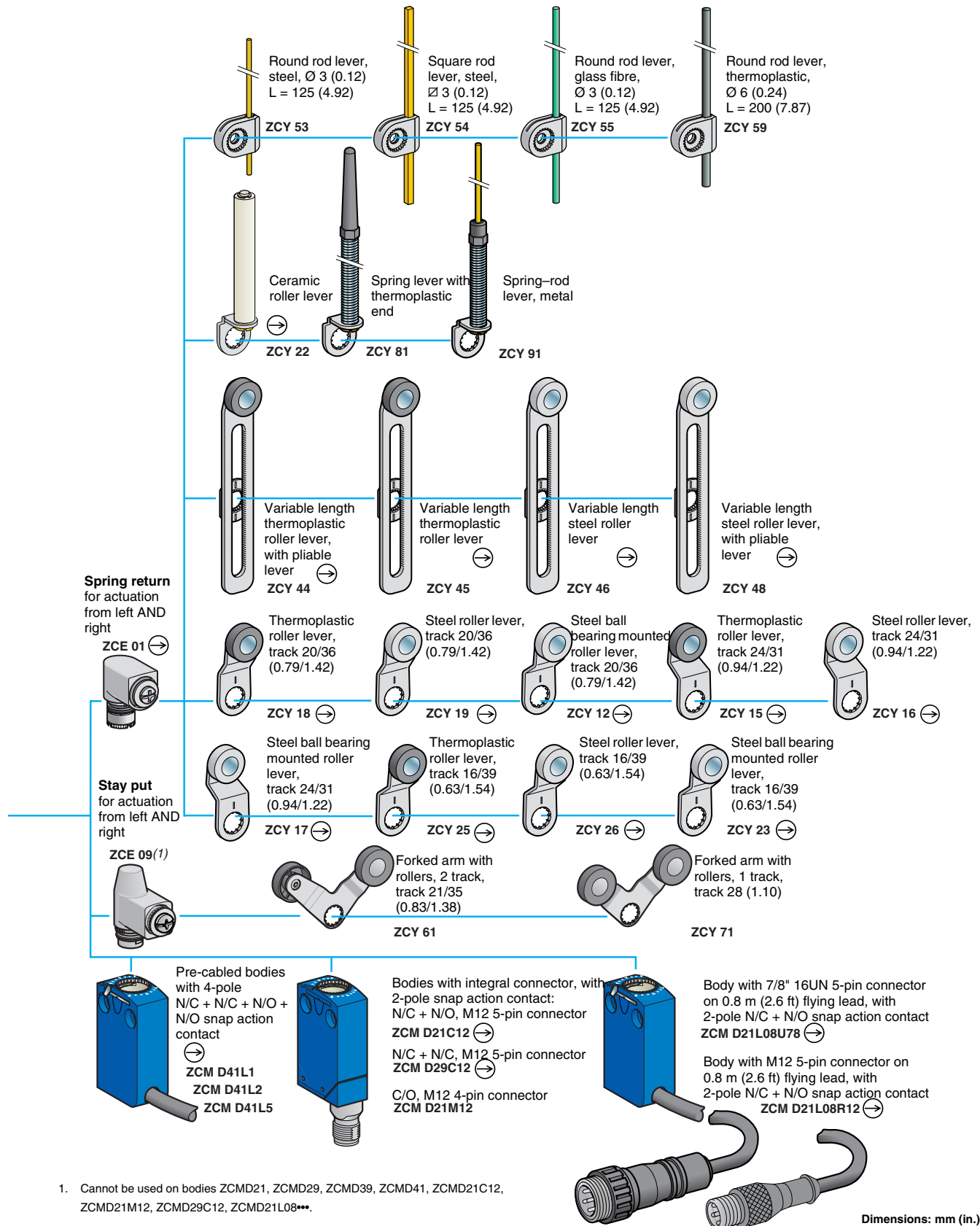


1. Pre-cabled connection components: replace the "*" in the catalog number with the required cable length in meters, either: 1, 2, 3, 5, 7 or 10. Example: ZCM C21L* becomes ZCM C21L7 for a 7 m (23.0 ft) cable. Note: only cable lengths of 1, 2 and 5 m (3.3, 6.6, and 16.4 ft) are available for pre-cabled connection components ZCM C37L* and ZCM C39L*.

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD—Modular



1. Cannot be used on bodies ZCMD21, ZCMD29, ZCMD39, ZCMD41, ZCMD21C12, ZCMD21M12, ZCMD29C12, ZCMD21L08***.

Limit Switches

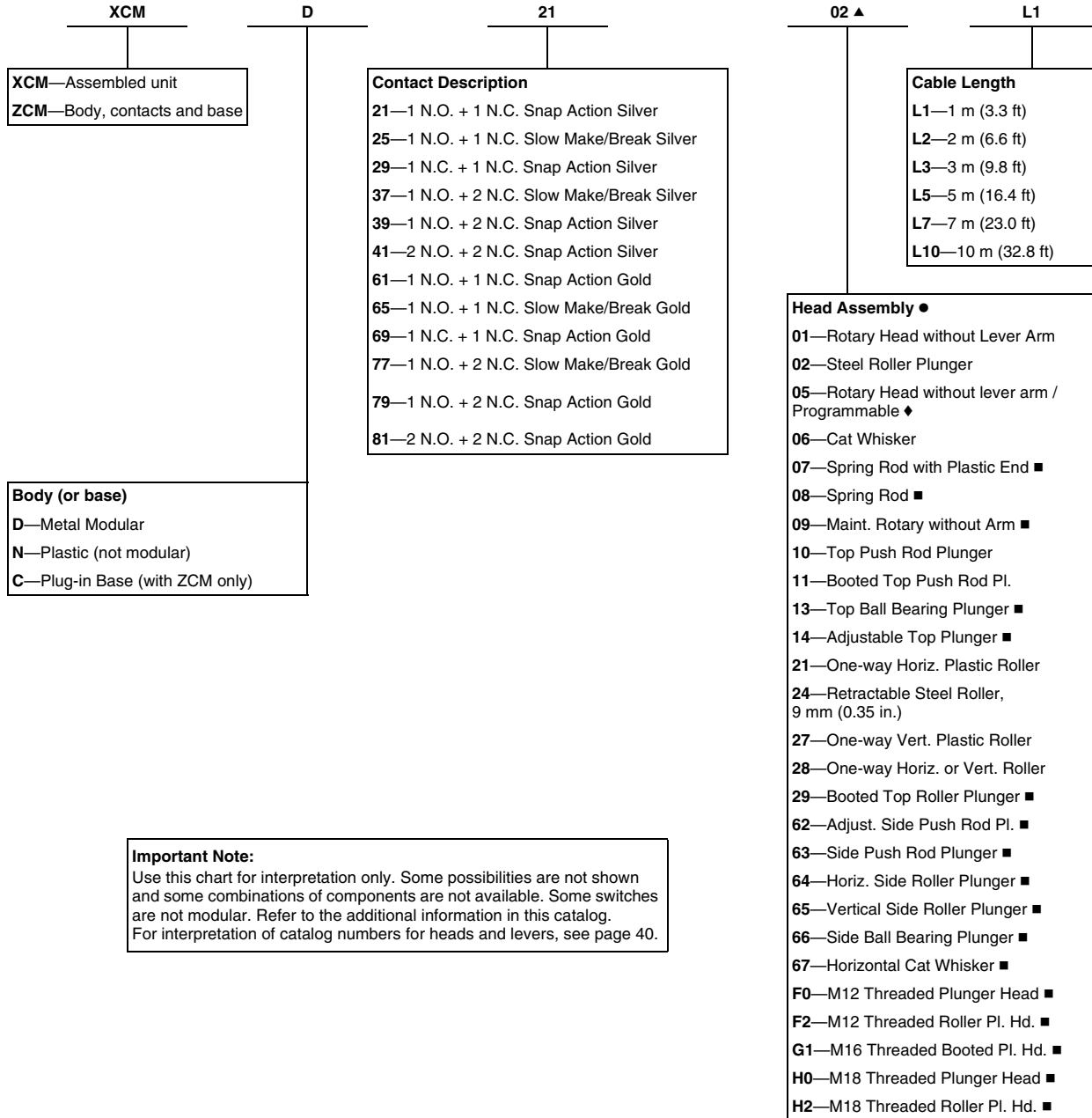
Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD—Modular

Special Features and Catalog Number Explanation

Interpretation of the Catalog Number



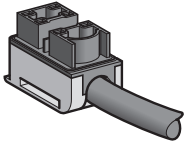
Important Note:
 Use this chart for interpretation only. Some possibilities are not shown and some combinations of components are not available. Some switches are not modular. Refer to the additional information in this catalog. For interpretation of catalog numbers for heads and levers, see page 40.

- Consult your local field sales office for availability.
- ▲ Last two digits of lever catalog number occupy this position when rotary heads with levers are required.
- See page 40 for levers.
- ◆ See page 45 for available levers, specifically allowed for the ZCE05 programmable head.

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD—Modular



ZCMC29L•

Components

| Plug-in base with PVR cable ♦ | | | | |
|--|---------|-------------------------------|------------------|-------------------|
| Contact type | Diagram | Length of PVR cable m (ft) | Catalog number ■ | Weight lb (kg) |
| 2-pole | | | | |
| 2-pole N.C. + N.O. snap action | | 1 (3.3) | ZCMC21L1 | 0.22 (0.100) |
| 2-pole N.C. + N.O. snap action | | 2 (6.6) | ZCMC21L2 | 0.42 (0.190) |
| 2-pole N.C. + N.O. snap action | | 3 (9.8) | ZCMC21L3 | 0.62 (0.280) |
| 2-pole N.C. + N.O. snap action | | 5 (16.4) | ZCMC21L5 | 1.00 (0.440) |
| 2-pole N.C. + N.O. snap action | | 7 (23.0) | ZCMC21L7 | 1.50 (0.700) |
| 2-pole N.C. + N.O. snap action | | 10 (32.8) | ZCMC21L10 | 2.10 (0.970) |
| 2-pole N.C. + N.O. slow break-before-make | | 1 (3.3) | ZCMC25L1 | 0.22 (0.100) |
| 2-pole N.C. + N.O. slow break-before-make | | 2 (6.6) | ZCMC25L2 | 0.42 (0.190) |
| 2-pole N.C. + N.O. slow break-before-make | | 3 (9.8) | ZCMC25L3 | 0.62 (0.280) |
| 2-pole N.C. + N.O. slow break-before-make | | 5 (16.4) | ZCMC25L5 | 1.00 (0.440) |
| 2-pole N.C. + N.O. slow break-before-make | | 7 (23.0) | ZCMC25L7 | 1.50 (0.700) |
| 2-pole N.C. + N.O. slow break-before-make | | 10 (32.8) | ZCMC25L10 | 2.10 (0.970) |

♦ The plug-in base receptacle must match the contact pin outs in the body. Only the length of cord is variable. See page 40 for 3-pole plug-in bases with cord. The 4-pole units and connector versions do not have component modular bases. See pages 34 and 35 for 4 contact bodies, and pages 38 and 39 for M12 connector bodies.

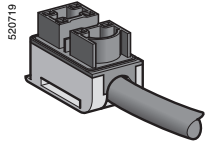
- Available cable lengths:
 ZCMC29L•: 1, 2, 3, 5, 7, and 10 m (3.3, 6.6, 9.8, 16.4, 23.0, and 32.8 ft)
 ZCMC37L•: 1, 2, and 5 m (3.3, 6.6, and 16.4 ft)
 ZCMC39L•: 1, 2, and 5 m (3.3, 6.6, and 16.4 ft)

Limit Switches

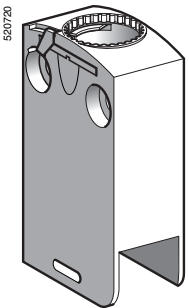
Osiswitch® Miniature, Metal

Universal, XCMD—Modular

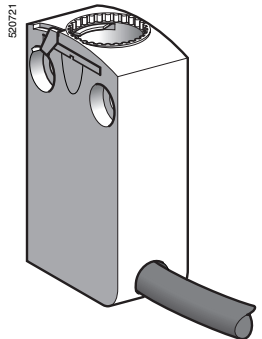
Components



ZCMC21E•



ZCMD6•
ZCMD7•



ZCMD81L•

Pre-cabled connection components (CEI cable) (1)

| Type of contact | Wiring diagram | Length of CEI cable, m (ft) | Catalog Number | Weight kg (lb) |
|------------------------------|----------------|-----------------------------|----------------|----------------|
| 2-pole | | | | |
| N/C + N/O snap action | | 1 (3.28) | ZCMC21E1 | 0.100 (0.220) |
| | | 2 (6.56) | ZCMC21E2 | 0.190 (0.419) |
| | | 3 (9.84) | ZCMC21E3 | 0.280 (0.617) |
| | | 5 (16.40) | ZCMC21E5 | 0.440 (0.970) |
| | | 7 (22.97) | ZCMC21E7 | 0.700 (1.543) |
| | | 10 (32.81) | ZCMC21E10 | 0.970 (2.138) |

Bodies with gold contacts

| Type of contact | Positive operation (2) | Wiring diagram | Length of cable, m (ft) | Catalog Number | Weight kg (lb) |
|--|------------------------|----------------|-------------------------|----------------|----------------|
| 2-pole | | | | | |
| N/C + N/O snap action | ⊕ | | — | ZCMD61 | 0.055 (0.121) |
| N/C + N/C snap action | ⊕ | | — | ZCMD69 | 0.055 (0.121) |
| N/C + N/O break before make, slow break | ⊕ | | — | ZCMD65 | 0.055 (0.121) |
| 3-pole | | | | | |
| N/C + N/C + N/O snap action | ⊕ | | — | ZCMD79 | 0.055 (0.121) |
| N/C + N/C + N/O break before make, slow break | ⊕ | | — | ZCMD77 | 0.055 (0.121) |
| 4-pole | | | | | |
| N/C + N/C + N/O + N/O snap action | ⊕ | | 1 (3.28) | ZCMD81L1 | 0.160 (0.353) |
| | | | 2 (6.56) | ZCMD81L2 | 0.255 (0.562) |
| | | | 5 (16.40) | ZCMD81L5 | 0.525 (1.157) |

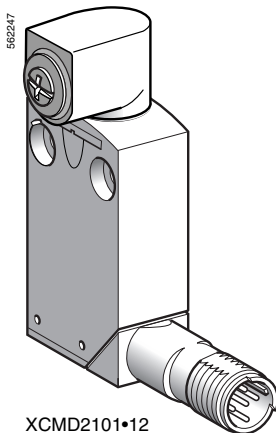
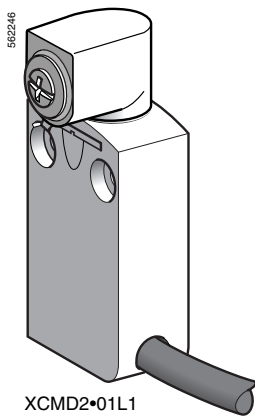
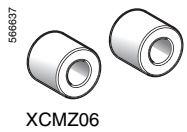
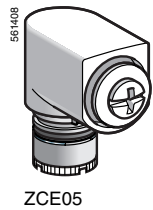
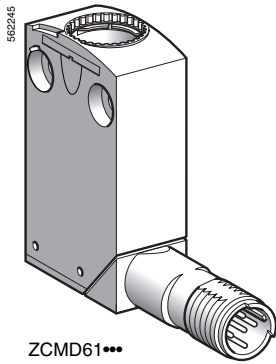
1. Cable not UL, CSA certified.

2. ⊕ bodies with contacts assuring positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD



Bodies with gold contacts, integral connector

| Type of contact | Positive operation (1) | Wiring diagram | Connector | Catalog Number | Weight kg (lb) |
|-----------------------|------------------------|----------------|-----------|----------------|----------------|
| 2-pole | | | | | |
| N/C + N/O snap action | — | | M12 5-pin | ZCMD61C12 | 0.065 (0.143) |
| N/C + N/C snap action | — | | M12 5-pin | ZCMD69C12 | 0.065 (0.143) |
| Single-pole | | | | | |
| C/O snap action | — | | M12 4-pin | ZCMD61M12 | 0.065 (0.143) |

Accessories

| Description | Positive operation (1) | Suitable levers for use with head | Catalog Number | Weight kg (lb) |
|--|------------------------|---|----------------|----------------|
| Rotary head, without lever, spring return, for actuation from left AND right or from left OR right (2) | ⊕ | ZCY12, ZCY15, ZCY16, ZCY17, ZCY18, ZCY19, ZCY22, ZCY23, ZCY25, ZCY26, ZCY39, ZCY53, ZCY54, ZCY55, ZCY81 | ZCE05 | 0.045 (0.099) |
| Spacer for mounting multi-track XCMD | — | — | XCMZ06 | 0.005 (0.011) |
| Spacer for angular positioning of heads with adjustable levers, for values other than -90°, 0° and 90° | — | — | XCMZ07 | 0.005 (0.011) |

Bodies with contacts, with rotary head (without operating lever), pre-cabled

| Type of contact | Positive operation (1) | Wiring diagram | Length of cable, m (ft) | Catalog Number | Weight kg (lb) |
|---|------------------------|----------------|-------------------------|----------------|----------------|
| 2-pole | | | | | |
| N/C + N/O snap action | ⊕ | | 1 (3.28) | XCMD2101L1 | 0.180 (0.397) |
| N/C + N/O break before make, slow break | ⊕ | | 1 (3.28) | XCMD2501L1 | 0.180 (0.397) |

Bodies with contacts, with rotary head (without operating lever), integral connector

| Type of contact | Positive operation (1) | Wiring diagram | Connector | Catalog Number | Weight kg (lb) |
|-----------------------|------------------------|----------------|-----------|----------------|----------------|
| 2-pole | | | | | |
| N/C + N/O snap action | ⊕ | | M12 5-pin | XCMD2101C12 | 0.110 (0.243) |
| Single-pole | | | | | |
| C/O snap action | — | | M12 4-pin | XCMD2101M12 | 0.110 (0.243) |

- ⊕ bodies with contacts or head assuring positive opening operation, when properly mounted and using a conforming operator.
- For programming see page 14.

Limit Switches

Osiswitch® Miniature, Metal

Universal, XCMD—Connector Cabling Accessories

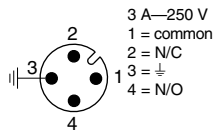
Catalog Numbers of suitable pre-wired female connectors

| Type of connector | M12 straight, 4-pin 4 A, 250 V | M12 straight, 5-pin 4 A, 24 V | M12 elbowed, 5-pin 4 A, 24 V | 7/8" 16 UN straight, 5-pin, 6 A, 250 V |
|-------------------|-----------------------------------|----------------------------------|---------------------------------|---|
| With cable | L = 2 m (6.56 ft) | XZCP1169L2 | XZCP1164L2 | XZCP1264L2 |
| | L = 5 m (16.40 ft) | XZCP1169L5 | XZCP1164L5 | XZCP1264L5 |
| | L = 10 m (32.81 ft) | XZCP1169L10 | XZCP1164L10 | XZCP1264L10 |
| Weight, kg (lb) | 0.105 (0.231) | 0.115 (0.254) | 0.115 (0.254) | 0.190 (0.419) |

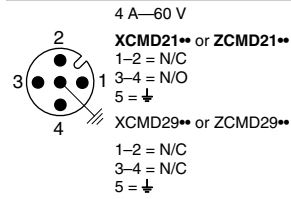
Connections

XCMD with connector

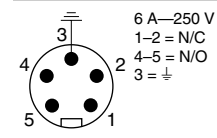
4-pin, M12



5-pin, M12

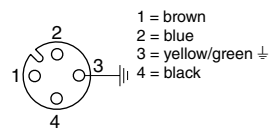


5-pin, 7/8" 16 UN

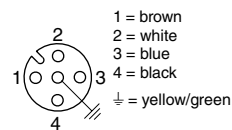


Pre-wired female connectors XZCP

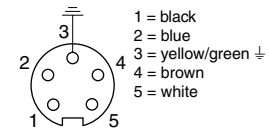
4-pin, M12



5-pin, M12

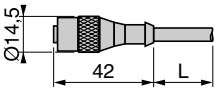


5-pin, 7/8" 16 UN

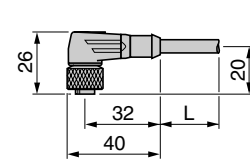


Dimensions

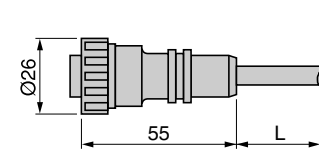
XZCP116•L•



XZCP1264L•



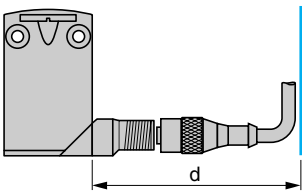
XZCP1771L•



L: cable length 2, 5, or 10 m (6.6, 16.4, or 32.8 ft)

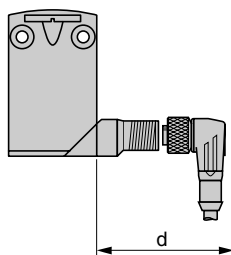
Distances required for plug-in connectors

M12 straight connector



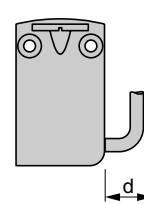
d: min. 65 mm (2.56 in.),
recommended 69 mm (2.72 in.)

M12 elbowed connector



d: min. 42 mm (1.65 in.),
recommended 45 mm (1.77 in.)

Connector on flying lead



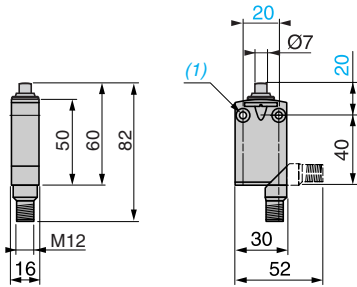
d: min. 20 mm (0.79 in.)

Limit Switches

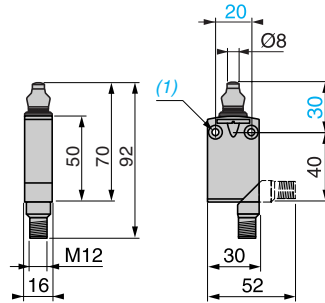
Osiswitch® Miniature, Metal

Universal, XCMD, Integral or Remote Connector

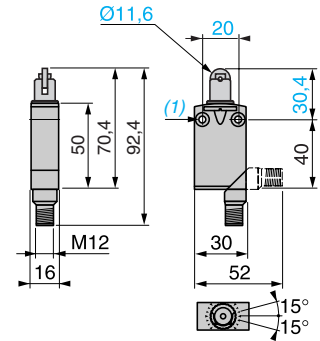
XCMD2•10M12



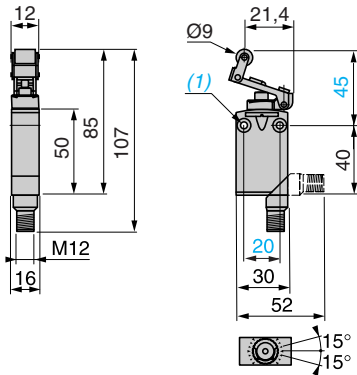
XCMD2•11M12



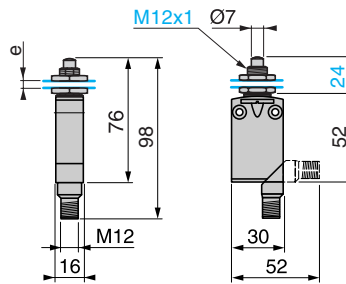
XCMD2•02M12



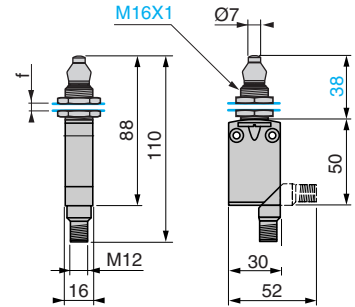
XCMD2•24M12



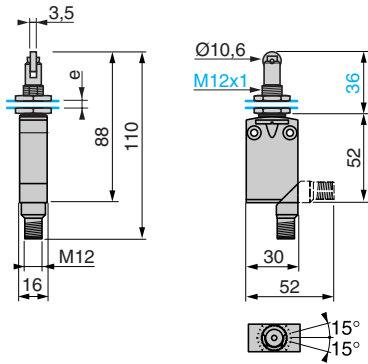
XCMD2•F0M12



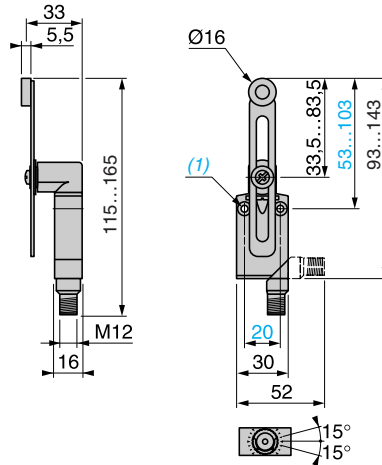
XCMD2•G1M12



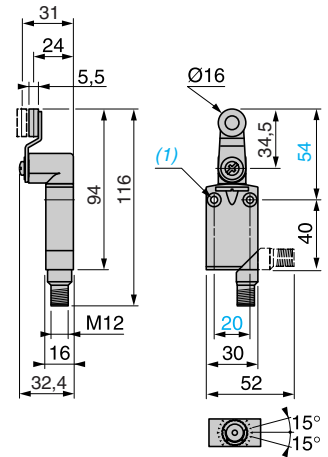
XCMD2•F2M12



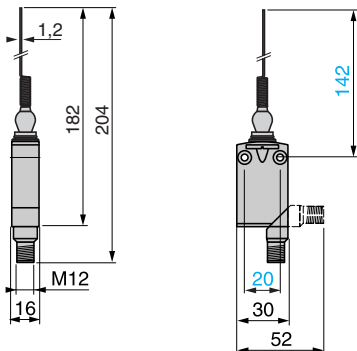
XCMD2•45M12



XCMD2•15M12 / 16M12 / 17M12



XCMD2•06M12



- 1. 2 mounting holes Ø 4.2 mm (0.17 in.), counterbored Ø 8 mm (0.31 in.) by 4 mm (0.16 in.) deep.
- e: 8 mm (0.31 in.) max., panel cut-out Ø 12.5 mm (0.49 in.), mounting nut thickness 3.5 mm (0.14 in.).
- f: 8 mm (0.31 in.) max., panel cut-out Ø 16.5 mm (0.65 in.), mounting nut thickness 3.5 mm (0.14 in.).

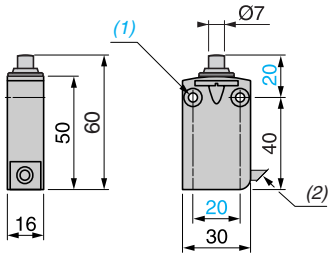
Limit Switches

Limit Switches

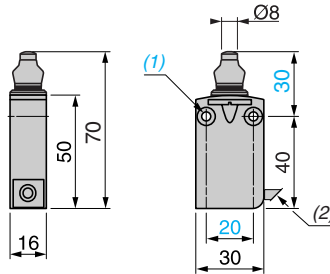
Osiswitch® Miniature, Metal

Universal, XCMD, Integral or Remote Connector

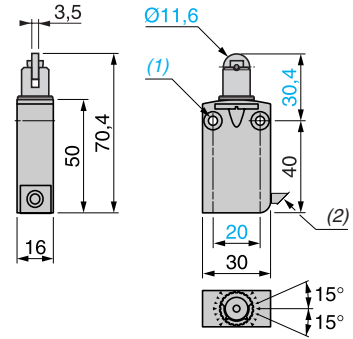
ZCMD21L08*** + ZCE 10



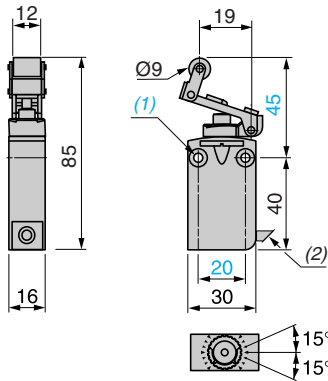
ZCMD21L08*** + ZCE 11



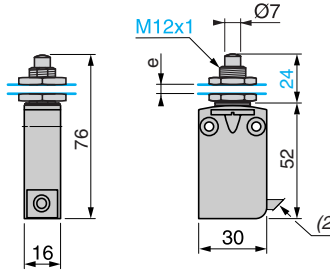
ZCMD21L08*** + ZCE 02



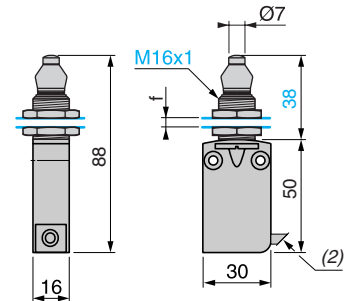
ZCMD21L08*** + ZCE 24



ZCMD21L08*** + ZCE F0



ZCMD21L08*** + ZCE G1



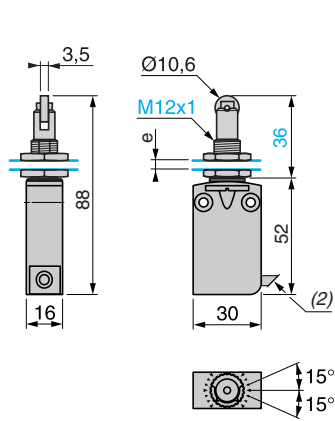
1. 2 mounting holes $\text{Ø} 4.2 \text{ mm}$ (0.17 in.), counterbored $\text{Ø} 8 \text{ mm}$ (0.31 in.) by 4 mm (0.16 in.) deep.
2. Overall diameter 7.5 mm (0.30 in.).
- e: 8 mm (0.31 in.) max., panel cut-out $\text{Ø} 12.5 \text{ mm}$ (0.49 in.), mounting nut thickness 3.5 mm (0.14 in.).
- f: 8 mm (0.31 in.) max., panel cut-out $\text{Ø} 16.5 \text{ mm}$ (0.65 in.), mounting nut thickness 3.5 mm (0.14 in.).

Limit Switches

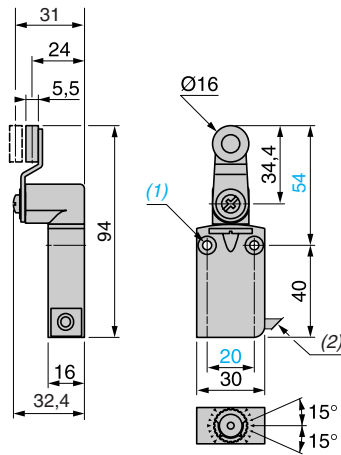
Osiswitch® Miniature, Metal

Universal, XCMD, Integral or Remote Connector

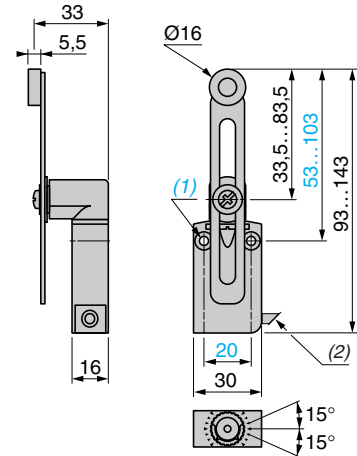
ZCMD21L08*** + ZCEF2



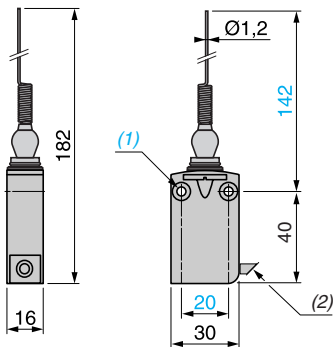
ZCMD21L08*** + ZCE01 + ZCY 15/16/17



ZCMD21L08*** + ZCE01 + ZCY 45



ZCMD21L08*** + ZCE06



1. 2 mounting holes Ø 4.2 mm (0.17 in.), counterbored Ø 8 mm (0.31 in.) by 4 mm (0.16 in.) deep.
2. Overall diameter 7.5 mm (0.30 in.).
- e: 8 mm (0.31 in.) max., panel cut-out Ø 12.5 mm (0.49 in.), mounting nut thickness 3.5 mm (0.14 in.).
- f: 8 mm (0.31 in.) max., panel cut-out Ø 16.5 mm (0.65 in.), mounting nut thickness 3.5 mm (0.14 in.).

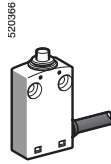
Limit Switches

Osiswitch® Miniature, Plastic

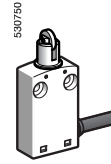
XCMN

■ XCMN
pre-cabled

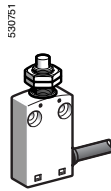
□ With head for linear movement (plunger). Mounting by the body.



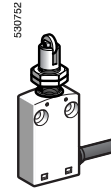
Page 52



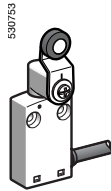
□ With head for linear movement (plunger). Mounting by the head.



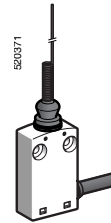
Page 52



□ With head for rotary movement (lever) or multi-directional.



Page 53



Limit Switches

Osiswitch® Miniature, Plastic

XCMN

| Environmental characteristics | | |
|-----------------------------------|------------------------------|--|
| Conforming to standards | Products | IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14 |
| | Machine assemblies | IEC 60204-1, EN 60204-1 |
| Product certifications | | UL, CSA, CCC |
| Protective treatment | Standard version | "TC" |
| Ambient air temperature | Operation | - 25...+70 °C (-13...+158 °F) |
| | Storage | - 40...+70 °C (-40...+158 °F) |
| Vibration resistance | Conforming to IEC 60068-2-6 | 5 gn (10...500 Hz) |
| Shock resistance | Conforming to IEC 60068-2-27 | 25 gn (18 ms) |
| Electric shock protection | | Class II conforming to IEC 61140 and NF C 20030 |
| Degree of protection | | IP 65 conforming to IEC 60529; IK 04 conforming to EN 50102 |
| Materials | Bodies | Plastic |
| | Heads | Zamak® zinc alloy |
| Contact block characteristics | | |
| Rated operational characteristics | | ~ AC-15; B300 (Ue = 240 V, Ie = 1.5 A); Ithe = 6 A |
| | | == DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| Rated insulation voltage | | Ui = 400 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 |
| Rated impulse withstand voltage | | U imp = 4 kV conforming to IEC 60947-1, IEC 60664 |
| Short-circuit protection | | 6 A cartridge fuse type gG (gl) |

Limit Switches

Osiswitch® Miniature, Plastic

XCMN, Pre-Cabled

| Type of head | Plunger (mounting by the body) | | | | Plunger (mounting by the head) | | |
|------------------|--------------------------------|---|--|--|--------------------------------|--|---|
| | | | | | | | |
| Type of operator | Metal end plunger | Steel roller plunger for lateral cam approach | Steel roller plunger for traverse cam approach | Thermoplastic roller lever plunger, 1 direction of actuation | M12 with metal end plunger | M12 with steel roller plunger for lateral cam approach | M12 with steel roller plunger for traverse cam approach |

| Catalog Numbers | | XCMN2110L1 | XCMN2102L1 | XCMN2103L1 | XCMN2121L1 | XCMN21F0L1 | XCMN21F2L1 | XCMN21F3L1 |
|--|--|------------------------------------|--|-----------------------|--|-----------------------|-----------------------|-----------------------|
| 2-pole N/C + N/O snap action | | | | | | | | |
| | | 1,8 4,2(P) 0,8 5mm | 3,1(A) 7(P) 1,4 mm | 3,1(A) 7(P) 1,4 mm | 65(A) 14(P) 2,8 mm | 1,8 4,2(P) 0,8 5mm | 3,1(A) 7(P) 1,4 mm | 3,1(A) 7(P) 1,4 mm |
| Weight, kg (lb) | | 0.080 (0.176) | 0.080 (0.176) | 0.080 (0.176) | 0.090 (0.198) | 0.065 (0.143) | 0.095 (0.209) | 0.095 (0.209) |
| Contact operation | | ■ contact closed □ contact open | (A) = cam displacement (P) = positive opening point | | ⊕ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | | |

| Characteristics | | Plunger (mounting by the body) | | | Plunger (mounting by the head) | | |
|-------------------------|----------------------|--|---------------------|--|--------------------------------|---------------------|----------------|
| Switch actuation | | On end | By 30° cam | | On end | By 30° cam | |
| Type of actuation | | | | | | | |
| Maximum actuation speed | | 0.5 m/s (1.64 ft/s) | 0.1 m/s (0.33 ft/s) | | 0.5 m/s (1.64 ft/s) | 0.1 m/s (0.33 ft/s) | |
| Minimum force or torque | For tripping | 8.5 N (1.91 lb) | 7 N (1.57 lb) | | 2.5 N (0.56 lb) | 8.5 N (1.91 lb) | 7 N (1.57 lb) |
| | For positive opening | 42.5 N (9.55 lb) | 35 N (7.87 lb) | | 12.5 N (2.81 lb) | 42.5 N (9.55 lb) | 35 N (7.87 lb) |
| Cabling | | PvR cable, 4 x 0.75 mm ² , length 1 m (3.28 ft) | | | | | |

Dimensions

XCMN2110L1

XCMN2102L1, XCMN2103L1

XCMN21F2L1, XCMN21F3L1

XCMN2121L1

XCMN21F0L1

1. 2 mounting holes \varnothing 4.2 mm (0.17 in.), counterbored \varnothing 8 mm (0.31 in.) by 4 mm (0.16 in.) deep.
2. Overall diameter 7.5 mm (0.30 in.).
- e: 8 mm (0.31 in.) max, panel cut-out \varnothing 12.5 mm (0.49 in.), mounting nut thickness 3.5 mm (0.14 in.).

Limit Switches

Limit Switches

Osiswitch® Miniature, Plastic

XCMN, Pre-Cabled

| Type of head | Rotary (mounting by the body) | | | Multi-directional | |
|-------------------|--|--|---|--|-----------------------|
| | | | | | |
| Type of operator | Thermoplastic roller lever | Variable length thermoplastic roller lever | Round thermoplastic rod lever Ø 6 mm (0.24 in.) (1) | Spring lever with thermoplastic end (1) | Cat's whisker (1) |
| Catalog Numbers | XCMN2115L1 | XCMN2145L1 | XCMN2159L1 | XCMN2107L1 | XCMN2106L1 |
| Weight, kg (lb) | 0.100 (0.220) | 0.105 (0.231) | 0.080 (0.176) | 0.085 (0.187) | 0.080 (0.176) |
| Contact operation | (A) = cam displacement (P) = positive opening point | | | ⊕ N/C contact with positive opening operation, when properly mounted and using a conforming operator | |

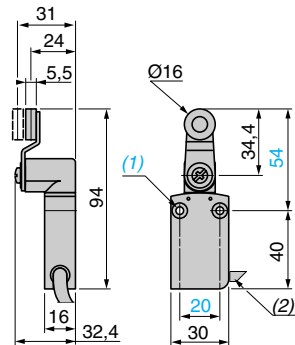
1. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

Characteristics

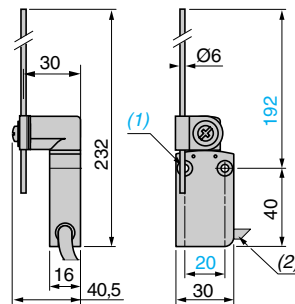
| Switch actuation | By 30° cam | By any moving part |
|-------------------------|--|--------------------|
| Type of actuation | | |
| Maximum actuation speed | 1.5 m/s (4.92 ft/s) | 1 m/s (3.28 ft/s) |
| Minimum force or torque | For tripping: 0.1 N•m (0.89 lb-in) For positive opening: 0.5 N•m (4.43 lb-in) | — |
| Cabling | PvR cable, 4 x 0.75 mm ² , length 1 m (3.28 ft) | |

Dimensions

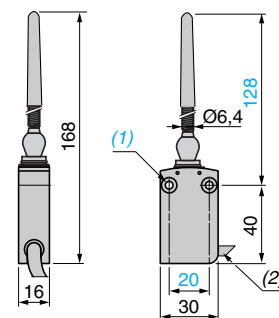
XCMN2115L1



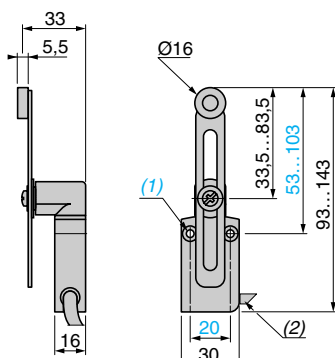
XCMN2159L1



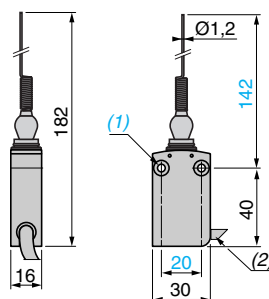
XCMN2107L1



XCMN2145L1



XCMN2106L1



- 2 mounting holes Ø 4.2 mm (0.17 in.), counterbored Ø 8 mm (0.31 in.) by 4 mm (0.16 in.) deep.
- Overall diameter 7.5 mm (0.30 in.).

Limit Switches

Osiswitch® Compact

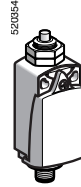
Universal, XCKP and XCKT Plastic / XCKD Metal

■ **XCKP, XCKD**
with 1 cable entry
Conforming to CENELEC EN 50047

□ With head for linear movement (plunger). Mounting by the head or by the body.
XCKD **XCKP**



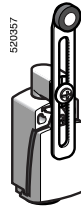
Pages 56 and 60



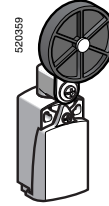
Pages 62 and 66



□ With head for rotary movement (lever) or multi-directional. Mounting by the body.
XCKD **XCKP**



Pages 57 and 61

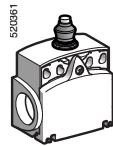


Pages 63 and 67

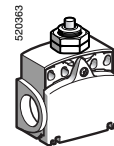
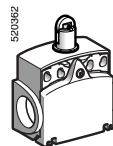


■ **XCKT**
with 2 cable entries
Tripping/resetting points and mounting centers conform to CENELEC EN 50047

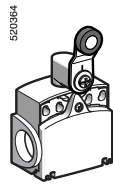
□ With head for linear movement (plunger). Mounting by the head or by the body.
XCKT



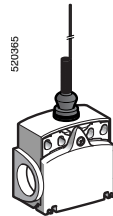
Page 68



□ With head for rotary movement (lever) or multi-directional. Mounting by the body.
XCKT



Page 68



Environmental characteristics

| | | |
|--|------------------------------|--|
| Conforming to standards | Products | IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14 |
| | Machine assemblies | IEC 60204-1, EN 60204-1 |
| Product certifications | | UL, CSA, CCC |
| Protective treatment | Standard version | "TC" |
| Ambient air temperature | Operation | - 25...+70 °C (-13...+158 °F) |
| | Storage | - 40...+70 °C (-40...+158 °F) |
| Vibration resistance | Conforming to IEC 60068-2-6 | 25 gn (10...500 Hz) except switch with head ZCE 24: 20 gn |
| Shock resistance | Conforming to IEC 60068-2-27 | 50 gn (11 ms) except heads ZCE08: 15 gn (11 ms) and ZCE24: 30 gn (18 ms) |
| Electric shock protection | | Class II conforming to IEC 61140 and NF C 20-030 for XCKP and XCKT |
| | | Class I conforming to IEC 61140 and NF C 20-030 for XCKD |
| Degree of protection | | IP 66 and IP 67 conforming to IEC 60529; IK 04 conforming to EN 50102 for XCKP and XCKT, IK 06 conforming to EN 50102 for XCKD |
| Repeat accuracy | | 0.1 mm on the tripping points, with 1 million operating cycles for head with end plunger |
| Cable entry or integral connector | Depending on model | Either: tapped entry for PG 11 or PG 13 conduit thread, tapped ISO M16 x 1.5 or ISO M20 x 1.5, tapped 1/2" NPT, tapped PF 1/2 (G1/2) or integral M12 connector |
| Materials | | XCKD : Zamak® bodies and heads, XCKP and XCKT : plastic bodies, Zamak heads |

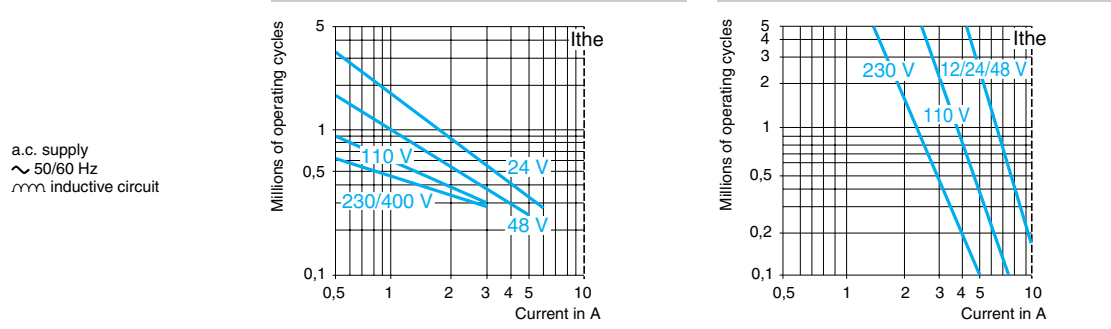
Limit Switches

Osiswitch® Compact

Universal, XCKP and XCKT Plastic / XCKD Metal

| Contact block characteristics | |
|--|--|
| Rated operational characteristics | XE2•P ~ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A ≡ DC-13; Q300 (Ue = 250 V, Ie = 0.27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| | XE3•P ~ AC-15; B300 (Ue = 240 V, Ie = 1.5 A); Ithe = 6 A ≡ DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| Rated insulation voltage | XE2•P Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 |
| | XE3•P Ui = 400 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 |
| Rated impulse withstand voltage | XE2•P U imp = 6 kV conforming to IEC 60947-1, IEC 60664 |
| | XE3•P U imp = 4 kV conforming to IEC 60947-1, IEC 60664 |
| Positive operation (depending on model) | N/C contacts with positive opening operation conforming to IEC 60 947-5-1 Appendix K, EN 60947-5-1 |
| Resistance across terminals | ≤ 25 mΩ conforming to IEC 60255-7 category 3 |
| Short-circuit protection | XE2•P 10 A cartridge fuse type gG (gl) |
| | XE3•P 6 A cartridge fuse type gG (gl) |
| Cabling (screw clamp terminals) | XE2SP•151 and XE2SP2141 Clamping capacity, min: 1 x 0.34 mm ² , max: 2 x 1.5 mm ² |
| | XE2NP21•1 and XE2NP31•1 Clamping capacity, min: 1 x 0.5 mm ² , max: 2 x 2.5 mm ² |
| | XE3NP and XE3SP Clamping capacity, min: 1 x 0.34 mm ² , max: 1 x 1 mm ² or 2 x 0.75 mm ² |
| Minimum actuation speed (for head with end plunger) | XE2SP•151, XE2SP2141 and XE3SP: 0.01 m/minute (0.03 ft/minute) |
| | XE2NP21•1, XE2NP31•1 and XE3NP: 6 m/minute (19.68 ft/minute) |
| Electrical durability | <ul style="list-style-type: none"> Conforming to IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles/hour Load factor: 0.5 |

| XE2SP•151, XE2SP2141 | XE2NP21•1, XE2NP31•1 |
|----------------------|----------------------|
|----------------------|----------------------|

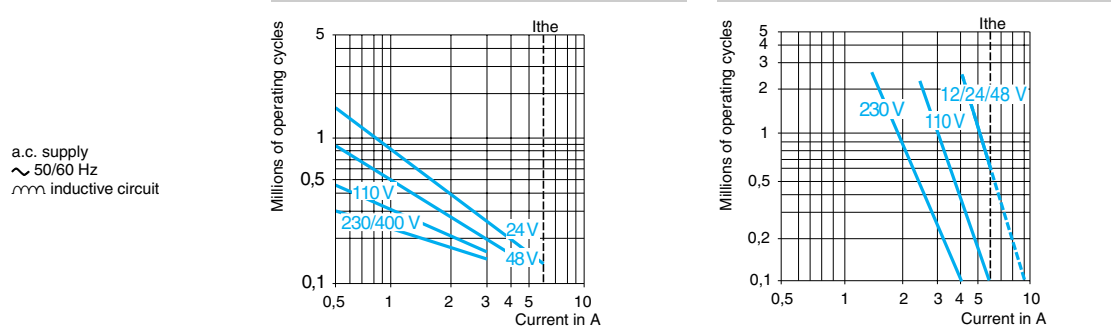


| d.c. supply ≡ | Power switched in W for 5 million operating cycles. | | | | |
|---------------|---|---|----|----|-----|
| | Voltage | V | 24 | 48 | 120 |
| | mm | W | 10 | 7 | 4 |

| d.c. supply ≡ | Power switched in W for 5 million operating cycles. | | | | |
|---------------|---|---|----|----|-----|
| | Voltage | V | 24 | 48 | 120 |
| | mm | W | 13 | 9 | 7 |

For XE2SP•151 on ~ or ≡, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

| XE3NP•••• | XE3SP•••• |
|-----------|-----------|
|-----------|-----------|










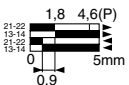
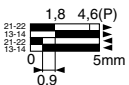
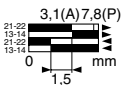
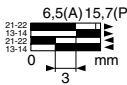
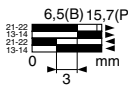
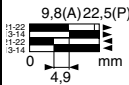

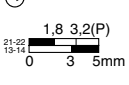
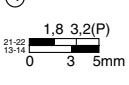
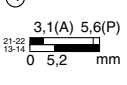
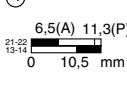
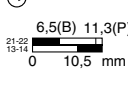
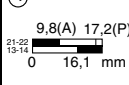




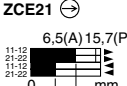
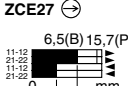


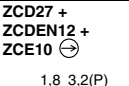
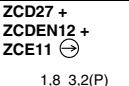
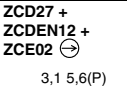
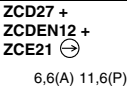
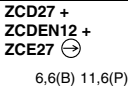
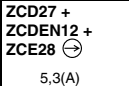

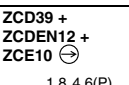
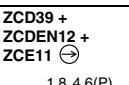
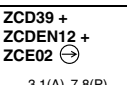
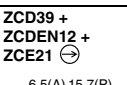
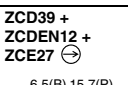
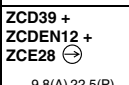






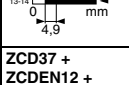



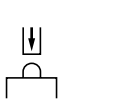
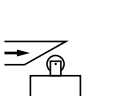
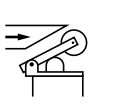

| d.c. supply ≡ | Power switched in W for 5 million operating cycles. | | | | |
|---------------|---|---|----|----|-----|
| | Voltage | V | 24 | 48 | 120 |
| | mm | W | 3 | 2 | 1 |

| d.c. supply ≡ | Power switched in W for 5 million operating cycles. | | | | |
|---------------|---|---|----|----|-----|
| | Voltage | V | 24 | 48 | 120 |
| | mm | W | 4 | 3 | 2 |

Limit Switches

Osiswitch® Compact, Metal

Universal, XCKD—Complete Units with 1/2" NPT Cable Entry










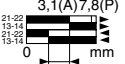
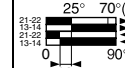
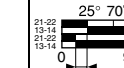

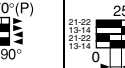
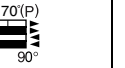

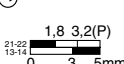
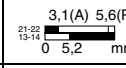
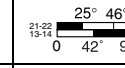
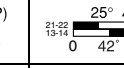
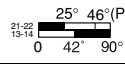
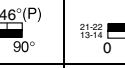
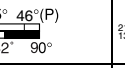

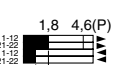

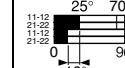
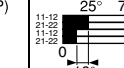

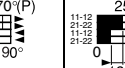
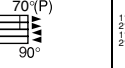

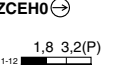
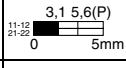

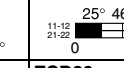
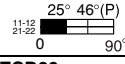
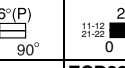
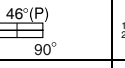

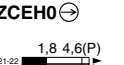
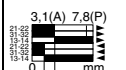
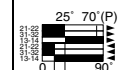
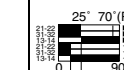
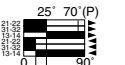

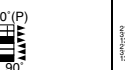

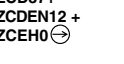
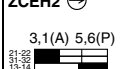

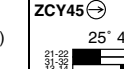
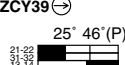
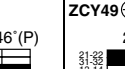






| Type of head | Plunger (mounting by the body) | | | | | |
|---|--|--|--|---|--|--|
| | Form B (1) | | Form C (1) | | Form E (1) | |
| |  |  |  |  |  |  |
| Type of operator | Metal end plunger | Metal end plunger with elastomer boot | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction | Thermoplastic roller lever plunger, horiz. or vert. actuation in 1 direction |
| Catalog Numbers (2) (3) | | | | | | |
|  2-pole N/C + N/O snap action (XE2S P2151) | XCKD2110N12  | XCKD2111N12  | XCKD2102N12  | XCKD2121N12  | XCKD2127N12  | XCKD2128N12  |
|  2-pole N/C + N/O break before make, slow break (XE2N P2151) | XCKD2510N12  | XCKD2511N12  | XCKD2502N12  | XCKD2521N12  | XCKD2527N12  | XCKD2528N12  |
|  2-pole N/C + N/C snap action (XE2S P2141) | ZCD29 + ZCDEN12 + ZCE10  | ZCD29 + ZCDEN12 + ZCE11  | ZCD29 + ZCDEN12 + ZCE02  | ZCD29 + ZCDEN12 + ZCE21  | ZCD29 + ZCDEN12 + ZCE27  | ZCD29 + ZCDEN12 + ZCE28  |
|  2-pole N/C + N/C simultaneous, slow break (XE2N P2141) | ZCD27 + ZCDEN12 + ZCE10  | ZCD27 + ZCDEN12 + ZCE11  | ZCD27 + ZCDEN12 + ZCE02  | ZCD27 + ZCDEN12 + ZCE21  | ZCD27 + ZCDEN12 + ZCE27  | ZCD27 + ZCDEN12 + ZCE28  |
|  3-pole N/C + N/C + N/O snap action (XE3SP2141) | ZCD39 + ZCDEN12 + ZCE10  | ZCD39 + ZCDEN12 + ZCE11  | ZCD39 + ZCDEN12 + ZCE02  | ZCD39 + ZCDEN12 + ZCE21  | ZCD39 + ZCDEN12 + ZCE27  | ZCD39 + ZCDEN12 + ZCE28  |
|  3-pole N/C + N/C + N/O break before make, slow break (XE3N P2141) | ZCD37 + ZCDEN12 + ZCE10  | ZCD37 + ZCDEN12 + ZCE11  | ZCD37 + ZCDEN12 + ZCE02  | ZCD37 + ZCDEN12 + ZCE21  | ZCD37 + ZCDEN12 + ZCE27  | ZCD37 + ZCDEN12 + ZCE28  |
| Weight, kg (lb) | 0.180 (0.397) | 0.180 (0.397) | 0.185 (0.408) | 0.195 (0.430) | 0.190 (0.419) | 0.195 (0.430) |
| Contact operation |  contact closed  contact open | | (A)(B) = cam displacement (P) = positive opening point | |  N/C contact with positive opening operation, when properly mounted and using a conforming operator | |
| Characteristics | | | | | | |
| Switch actuation | On end | | | By 30° cam | | |
| Type of actuation |  | |  | |  |  |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | | 1 m/s (3.28 ft/s) | | |
| Minimum force or torque | For tripping | | 15 N (3.37 lb) | | 12 N (2.70 lb) | |
| | For positive opening | | 45 N (10.12 lb) | | 36 N (8.09 lb) | |
| For positive opening | | | | | 18 N (4.05 lb) | |
| Cable entry (3) | 1 entry tapped M16 x 1.5 mm for ISO cable entry, clamping capacity 4 to 8 mm (0.16 to 0.31 in.) | | | | | |

- Form conforming to EN 50047. See page 22.
- Switches with gold contacts or ring type connections: please consult your local sales office.
- For an entry tapped for a PG 11 conduit thread, replace N12 in the catalog number with **G11**. Examples: XCKD2110N12 becomes **XCKD2110G11**, ZCDEN12 becomes **ZCDEG11**.

Limit Switches

Osiswitch® Compact, Metal

Universal, XCKD—Complete Units with 1/2" NPT Cable Entry

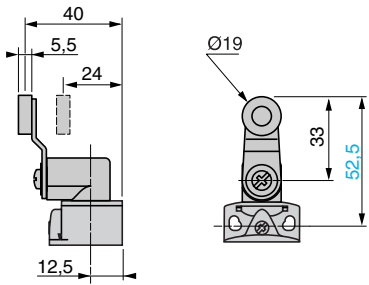
| Type of head | Plunger (mounting by the head) | | Rotary (mounting by the body) Form A (1) | | | | Multi-directional |
|---|--|--|--|--|---|--|--|
| |  |  |  |  |  |  |  |
| Type of operator | M18 with metal end plunger | M18 with steel roller plunger | Thermoplastic roller lever | Variable length thermoplastic roller lever | Thermoplastic roller lever, Ø 50 mm (1.97 in.) | Variable length thermoplastic roller lever, Ø 50 mm (1.97 in.) | Cat's whisker (3) |
| Catalog Numbers (2) (4) | | | | | | | |
|  2-pole N/C + N/O snap action (XE2S P2151) | XCKD21H0N12  | XCKD21H2N12  | XCKD2118N12  | XCKD2145N12  | XCKD2139N12  | XCKD2149N12  | XCKD2106N12  |
|  2-pole N/C + N/O break before make, slow break (XE2N P2151) | XCKD25H0N12  | XCKD25H2N12  | XCKD2518N12  | XCKD2545N12  | XCKD2539N12  | XCKD2549N12  | XCKD2506N12  |
|  2-pole N/C + N/C snap action (XE2S P2141) | ZCD29 + ZCDEN12 + ZCEH0  | ZCD29 + ZCDEN12 + ZCEH2  | ZCD29 + ZCDEN12 + ZCE01 + ZCY18  | ZCD29 + ZCDEN12 + ZCE01 + ZCY45  | ZCD29 + ZCDEN12 + ZCE01 + ZCY39  | ZCD29 + ZCDEN12 + ZCE01 + ZCY49  | ZCD29 + ZCDEN12 + ZCE06  |
|  2-pole N/C + N/C simultaneous, slow break (XE2N P2141) | ZCD27 + ZCDEN12 + ZCEH0  | ZCD27 + ZCDEN12 + ZCEH2  | ZCD27 + ZCDEN12 + ZCE01 + ZCY18  | ZCD27 + ZCDEN12 + ZCE01 + ZCY45  | ZCD27 + ZCDEN12 + ZCE01 + ZCY39  | ZCD27 + ZCDEN12 + ZCE01 + ZCY49  | ZCD27 + ZCDEN12 + ZCE06  |
|  3-pole N/C + N/C + N/O snap action (XE3S P2141) | ZCD39 + ZCDEN12 + ZCEH0  | ZCD39 + ZCDEN12 + ZCEH2  | ZCD39 + ZCDEN12 + ZCE01 + ZCY18  | ZCD39 + ZCDEN12 + ZCE01 + ZCY45  | ZCD39 + ZCDEN12 + ZCE01 + ZCY39  | ZCD39 + ZCDEN12 + ZCE01 + ZCY49  | ZCD39 + ZCDEN12 + ZCE06  |
|  3-pole N/C + N/C + N/O break before make, slow break (XE3N P2141) | ZCD37 + ZCDEN12 + ZCEH0  | ZCD37 + ZCDEN12 + ZCEH2  | ZCD37 + ZCDEN12 + ZCE01 + ZCY18  | ZCD37 + ZCDEN12 + ZCE01 + ZCY45  | ZCD37 + ZCDEN12 + ZCE01 + ZCY39  | ZCD37 + ZCDEN12 + ZCE01 + ZCY49  | ZCD37 + ZCDEN12 + ZCE06  |
| Weight, kg (lb) | 0.220 (0.485) | 0.220 (0.485) | 0.225 (0.496) | 0.235 (0.518) | 0.235 (0.518) | 0.245 (0.540) | 0.175 (0.386) |
| Contact operation | ■ contact closed □ contact open | | (A) = cam displacement (P) = positive opening point | | ⊖ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | |
| Characteristics | | | | | | | |
| Switch actuation | On end | | By 30° cam | | | | By any moving part |
| Type of actuation |  |  |  |  |  | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | | | 1 m/s (3.28 ft/s), any direction |
| Minimum force or torque | For tripping For positive opening | 15 N (3.37 lb) 45 N (10.12 lb) | 10 N (2.25 lb) 36 N (8.09 lb) | 0.1 N•m (0.89 lb-in) 0.25 N•m (2.21 lb-in) | | 0.13 N•m (1.15 lb-in) — | |
| Cable entry (4) | 1 entry tapped M16 x 1.5 mm for ISO cable entry, clamping capacity 4 to 8 mm (0.16 to 0.31 in.) | | | | | | |

- Form conforming to EN 50047. See page 22.
- Switches with gold contacts or ring type connections: please consult your local sales office.
- Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.
- For an entry tapped for a PG 11 conduit thread, replace N12 in the catalog number with **G11**. Examples: XCKD21H0N12 becomes **XCKD21H0G11**, ZCDEN12 becomes **ZCDEG11**.

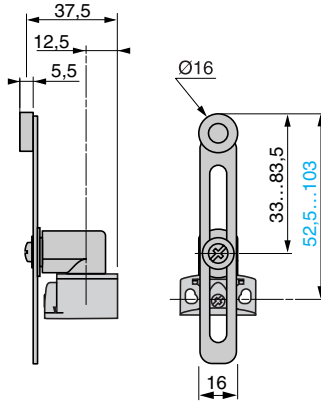
Note: For more information, consult pages 63, 70–71.

Limit Switches
Osiswitch® Compact, Metal
Universal, XCKD—Complete Units with 1/2" NPT Cable Entry

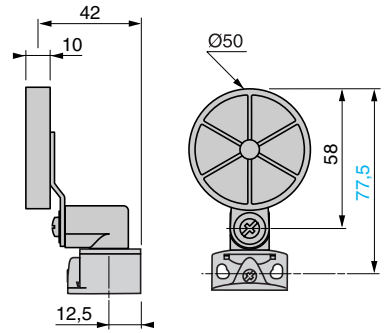
ZCE01 + ZCY18



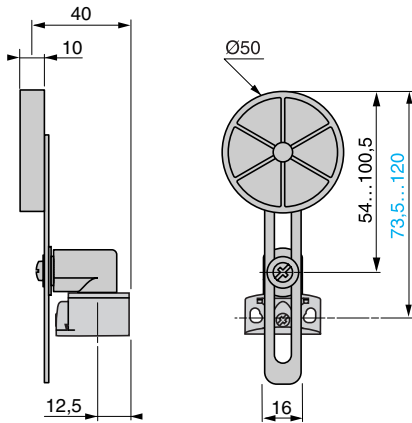
ZCE01 + ZCY45



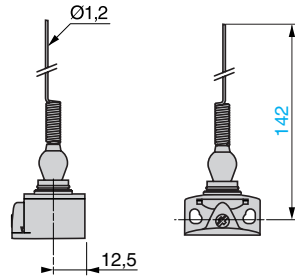
ZCE01 + ZCY39



ZCE01 + ZCY49



ZCE06



Limit Switches

Osiswitch® Compact, Metal

Universal, XCKD—Integral M12 Connector

| Type of head | Plunger (mounting by the body) | | | | | |
|---|--------------------------------|---------------------------------------|--|---|---|--|
| | Form B (1) | | Form C (1) | | Form E (1) | |
| | | | | | | |
| Type of operator | Metal end plunger | Metal end plunger with elastomer boot | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction | Thermoplastic roller lever plunger, horiz. or vert. actuation in 1 direction |
| Catalog Numbers | | | | | | |
| 2-pole N/C + N/O snap action (XE2S P2151) | XCKD2110M12 | XCKD2111M12 | XCKD2102M12 | XCKD2121M12 | XCKD2127M12 | XCKD2128M12 |
| 2-pole N/C + N/C snap action (XE2S P2141) | ZCD29M12 + ZCE10 | ZCD29M12 + ZCE11 | ZCD29M12 + ZCE02 | ZCD29M12 + ZCE21 | ZCD29M12 + ZCE27 | ZCD29M12 + ZCE28 |
| Weight, kg (lb) | 0.190 (0.419) | 0.190 (0.419) | 0.195 (0.430) | 0.205 (0.452) | 0.200 (0.441) | 0.205 (0.452) |
| Contact operation | contact closed contact open | | (A) (B) = cam displacement (P) = positive opening point | | | |

1. Form conforming to EN 50047. See page 22.

Characteristics

| Switch actuation | On end | By 30° cam | | | |
|-------------------------|---|-------------------|---------------|--|--|
| Type of actuation | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | | | |
| Minimum force or torque | For tripping: 15 N (3.37 lb) For positive opening: 45 N (10.12 lb) | 12 N (2.70 lb) | 6 N (1.35 lb) | | |
| Connection | M12 5-pin connector, U _i = 60 V, I _e = 4 A maximum, I _{th} = 4 A | | | | |

Connections

Integral M12 connector

| | | |
|--|--|--|
| | XE2SP2151 1-2: N/C 3-4: N/O 5: ↓ | XE2SP2141 1-2: N/C 3-4: N/C 5: ↓ |
|--|--|--|

Dimensions

| ZCD2-M12 | ZCE10 | ZCE11 | ZCE02 | ZCE21 |
|----------|-------|-------|-------|-------|
| | | | | |
| | | | | |

- 2 elongated holes $\varnothing 4.3 \times 6.3$ mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes $\varnothing 4.3$ mm (0.17 in.) on 20 mm (0.79 in.) centers.
- 2 x $\varnothing 3$ holes for support studs, depth 4 mm (0.16 in.).
- Mounting nut thickness 3.5 mm (0.14 in.).

Limit Switches

Osiswitch® Compact, Metal

Universal, XCKD—Integral M12 Connector

| Type of head | Plunger (mounting by the head) | | Rotary (mounting by the body) Form A (1) | | | | Multi-directional |
|---|--------------------------------|-------------------------------|--|--|--|--|----------------------|
| | | | | | | | |
| Type of operator | M18 with metal end plunger | M18 with steel roller plunger | Thermoplastic roller lever | Variable length thermoplastic roller lever | Thermoplastic roller lever, Ø 50 mm (1.97 in.) | Variable length thermoplastic roller lever, Ø 50 mm (1.97 in.) | Cat's whisker (2) |
| Catalog Numbers | | | | | | | |
| 2-pole N/C + N/O snap action (XE2S P2151) | XCKD21H0M12 | XCKD21H2M12 | XCKD2118M12 | XCKD2145M12 | XCKD2139M12 | XCKD2149M12 | XCKD2106M12 |
| 2-pole N/C + N/C snap action (XE2S P2141) | ZCD29M12 + ZCEH0 | ZCD29M12 + ZCEH2 | ZCD29M12 + ZCE01 + ZCY18 | ZCD29M12 + ZCE01 + ZCY45 | ZCD29M12 + ZCE01 + ZCY39 | ZCD29M12 + ZCE01 + ZCY49 | ZCD29M12 + ZCE06 |
| Weight, kg (lb) | 0.235 (0.518) | 0.235 (0.518) | 0.220 (0.485) | 0.220 (0.485) | 0.220 (0.485) | 0.220 (0.485) | 0.185 (0.408) |
| Contact operation | contact closed contact open | | (A) = cam displacement (P) = positive opening point | | | | |

1. Form conforming to EN 50047. See page 22.
2. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

Characteristics

| Switch actuation | On end | By 30° cam | | | By any moving part |
|-------------------------|---|---------------------|----------------------|--|----------------------------------|
| Type of actuation | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1.5 m/s (4.92 ft/s) | | | 1 m/s (3.28 ft/s), any direction |
| Minimum force or torque | For tripping: 15 N (3.37 lb) For positive opening: 45 N (10.12 lb) | 10 N (2.25 lb) | 0.1 N•m (0.89 lb-in) | | 0.13 N•m (1.15 lb-in) |
| Connection | M12 5-pin connector, U _i = 60 V, I _e = 4 A maximum, I _{th} = 4 A | | | | |

Dimensions

| ZCE01 + ZCY18 | ZCE01 + ZCY45 | ZCE01 + ZCY39 | ZCE01 + ZCY49 | ZCE06 |
|---|---------------|---------------|---------------|-------|
| | | | | |
| ZCEH2 | | | | |
| 3. Mounting nut thickness 3.5 mm (0.14 in.) | | | | |

Limit Switches

Osiswitch® Compact, Plastic

Universal, XCKP—Complete Units with 1/2" NPT Cable Entry

| Type of head | Plunger (mounting by the body) | | | | | |
|---|---|---------------------------------------|---|---|---|--|
| | Form B (1) | Form C (1) | Form E (1) | Form E (1) | Form E (1) | Form E (1) |
| Type of operator | Metal end plunger | Metal end plunger with elastomer boot | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction | Thermoplastic roller lever plunger, horiz. or vert. actuation in 1 direction |
| Catalog Numbers (2) (3) | | | | | | |
| 2-pole N/C + N/O snap action (XE2S P2151) | XCKP2110N12 | XCKP2111N12 | XCKP2102N12 | XCKP2121N12 | XCKP2127N12 | XCKP2128N12 |
| 2-pole N/C + N/O break before make, slow break (XE2N P2151) | XCKP2510N12 | XCKP2511N12 | XCKP2502N12 | XCKP2521N12 | XCKP2527N12 | XCKP2528N12 |
| 2-pole N/C + N/C snap action (XE2S P2141) | ZCP29 + ZCPEN12 + ZCE10 | ZCP29 + ZCPEN12 + ZCE11 | ZCP29 + ZCPEN12 + ZCE02 | ZCP29 + ZCPEN12 + ZCE21 | ZCP29 + ZCPEN12 + ZCE27 | ZCP29 + ZCPEN12 + ZCE28 |
| 2-pole N/C + N/C simultaneous, slow break (XE2N P2141) | ZCP27 + ZCPEN12 + ZCE10 | ZCP27 + ZCPEN12 + ZCE11 | ZCP27 + ZCPEN12 + ZCE02 | ZCP27 + ZCPEN12 + ZCE21 | ZCP27 + ZCPEN12 + ZCE27 | ZCP27 + ZCPEN12 + ZCE28 |
| 3-pole N/C + N/C + N/O snap action (XE3S P2141) | ZCP39 + ZCPEN12 + ZCE10 | ZCP39 + ZCPEN12 + ZCE11 | ZCP39 + ZCPEN12 + ZCE02 | ZCP39 + ZCPEN12 + ZCE21 | ZCP39 + ZCPEN12 + ZCE27 | ZCP39 + ZCPEN12 + ZCE28 |
| 3-pole N/C + N/C + N/O break before make, slow break (XE3N P2141) | ZCP37 + ZCPEN12 + ZCE10 | ZCP37 + ZCPEN12 + ZCE11 | ZCP37 + ZCPEN12 + ZCE02 | ZCP37 + ZCPEN12 + ZCE21 | ZCP37 + ZCPEN12 + ZCE27 | ZCP37 + ZCPEN12 + ZCE28 |
| Weight, kg (lb) | 0.090 (0.198) | 0.090 (0.198) | 0.095 (0.209) | 0.105 (0.231) | 0.100 (0.220) | 0.105 (0.231) |
| Contact operation | | | (A)(B) = cam displacement (P) = positive opening point | | | |
| Characteristics | | | | | | |
| Switch actuation | On end | | By 30° cam | | | |
| Type of actuation | | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | | 1 m/s (3.28 ft/s) | | |
| Minimum force or torque | For tripping 45 N (10.12 lb) | | 12 N (2.70 lb) | | 6 N (1.35 lb) | |
| | For positive opening | | 36 N (8.09 lb) | | 18 N (4.05 lb) | |
| Cable entry (3) | 1 entry tapped M16 x 1.5 mm for ISO cable entry, clamping capacity 4 to 8 mm (0.16 to 0.31 in.) | | | | | |

1. Form conforming to EN 50047. See page 22.
 2. Switches with gold contacts or ring type connections: please consult your local sales office.
 3. For an entry tapped for a PG 11 conduit thread, replace N12 in the catalog number with G11. Examples: XCKP2110N12 becomes XCKP2110G11, ZCPEN12 becomes ZCPEG11.
Note: For more information, consult pages 63, 70–71.

Limit Switches

Osiswitch® Compact, Plastic

Universal, XCKP—Complete Units with 1/2" NPT Cable Entry

| Type of head | Plunger (mounting by the head) | | Rotary (mounting by the body) | | | | Multi-directional |
|-------------------------|---|-------------------------------|--|---|--|--|-----------------------|
| | | | Form A (1) | | | | |
| Type of operator | M18 with metal end plunger | M18 with steel roller plunger | Thermoplastic roller lever | Variable length thermoplastic roller lever | Thermoplastic roller lever, Ø 50 mm (1.97 in.) | Variable length thermoplastic roller lever, Ø 50 mm (1.97 in.) | Cat's whisker (4) |
| Catalog Numbers (2) | XCKP21H0N12 | XCKP21H2N12 | XCKP2118N12 | XCKP2145N12 | XCKP2139N12 | XCKP2149N12 | XCKP2106N12 |
| | 2-pole N/C + N/O snap action (XE2S P2151) | | 2-pole N/C + N/O snap action (XE2SP2141) | 2-pole N/C + N/C simultaneous, slow break (XE2NP2141) | 3-pole N/C + N/C + N/O snap action (XE3SP2141) | 3-pole N/C + N/C + N/O break before make, slow break (XE3NP2141) | |
| Weight, kg (lb) | 0.130 (0.287) | 0.130 (0.287) | 0.135 (0.298) | 0.145 (0.320) | 0.145 (0.320) | 0.155 (0.342) | 0.085 (0.187) |
| Contact operation | | | (A) = cam displacement | (P) = positive opening point | | | |
| Characteristics | | | | | | | |
| Switch actuation | On end | By 30° cam | | | | By any moving part | |
| Type of actuation | | | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | | 1 m/s (3.28 ft/s), any direction | |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 10 N (2.25 lb) | 0.1 N•m (0.89 lb-in) | | | 0.13 N•m (1.15 lb-in) |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 0.25 N•m (2.21 lb-in) | | | — |
| Cable entry (3) | 1 entry tapped M16 x 1.5 mm for ISO cable entry, clamping capacity 4 to 8 mm (0.16 to 0.31 in.) | | | | | | |

- Form conforming to EN 50047. See page 22.
 - Switches with gold contacts or ring type connections: please consult your local sales office.
 - For an entry tapped for a PG 11 conduit thread, replace N12 in the catalog number with G11. Examples: XCKP21H0N12 becomes XCKP21H0G11, ZCPEN12 becomes ZCPEG11.
 - Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.
- Note: For more information, consult pages 63, 70–71.

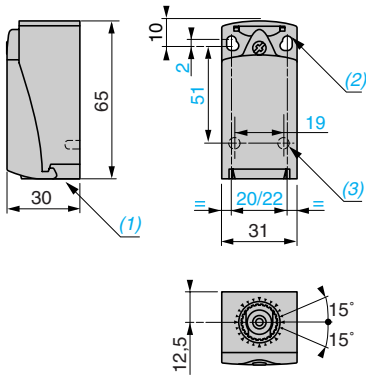
Limit Switches

Limit Switches

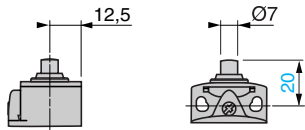
Osiswitch® Compact, Plastic

Universal, XCKP—Complete Units with 1/2" NPT Cable Entry

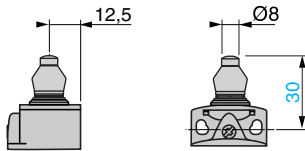
ZCP2• + ZCPEN12 / ZCP3• + ZCPEN12



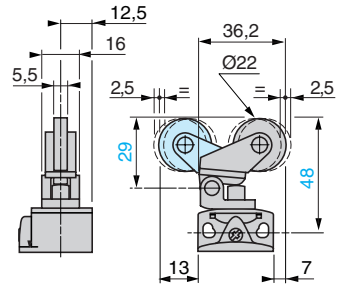
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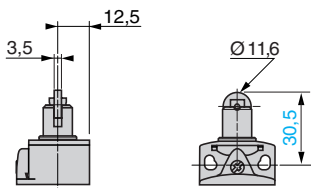
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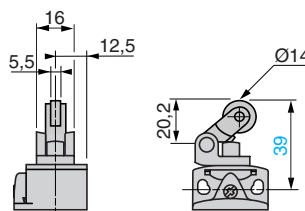
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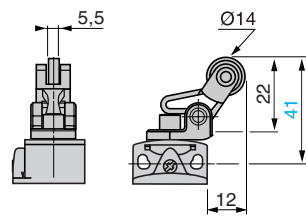
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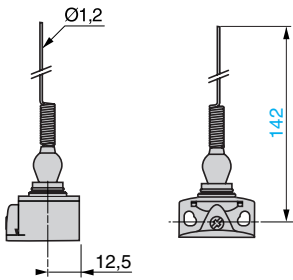
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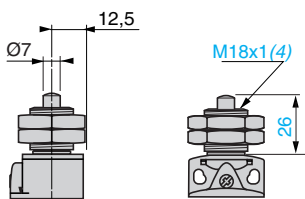
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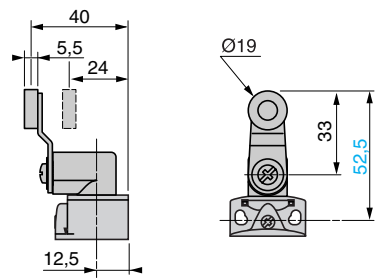
ZCE06



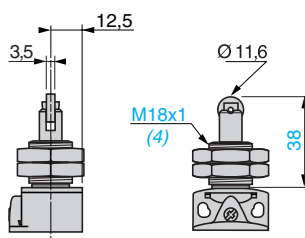
ZCEH0



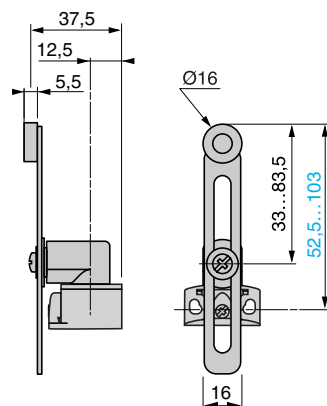
ZCE01 + ZCY18



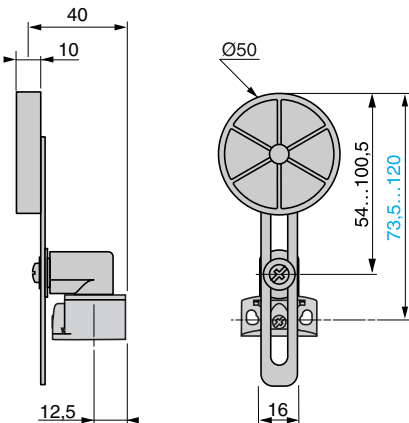
ZCEH2



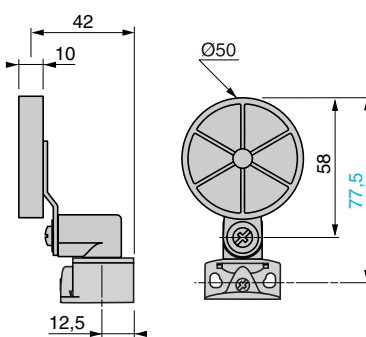
ZCE01 + ZCY45



ZCE01 + ZCY49



ZCE01 + ZCY39



1. Tapped entry for ISO M16 x 1.5 or PG 11 conduit thread.
2. 2 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes Ø 4.3 mm (0.17 in.) on 20 mm (0.79 in.) centers.

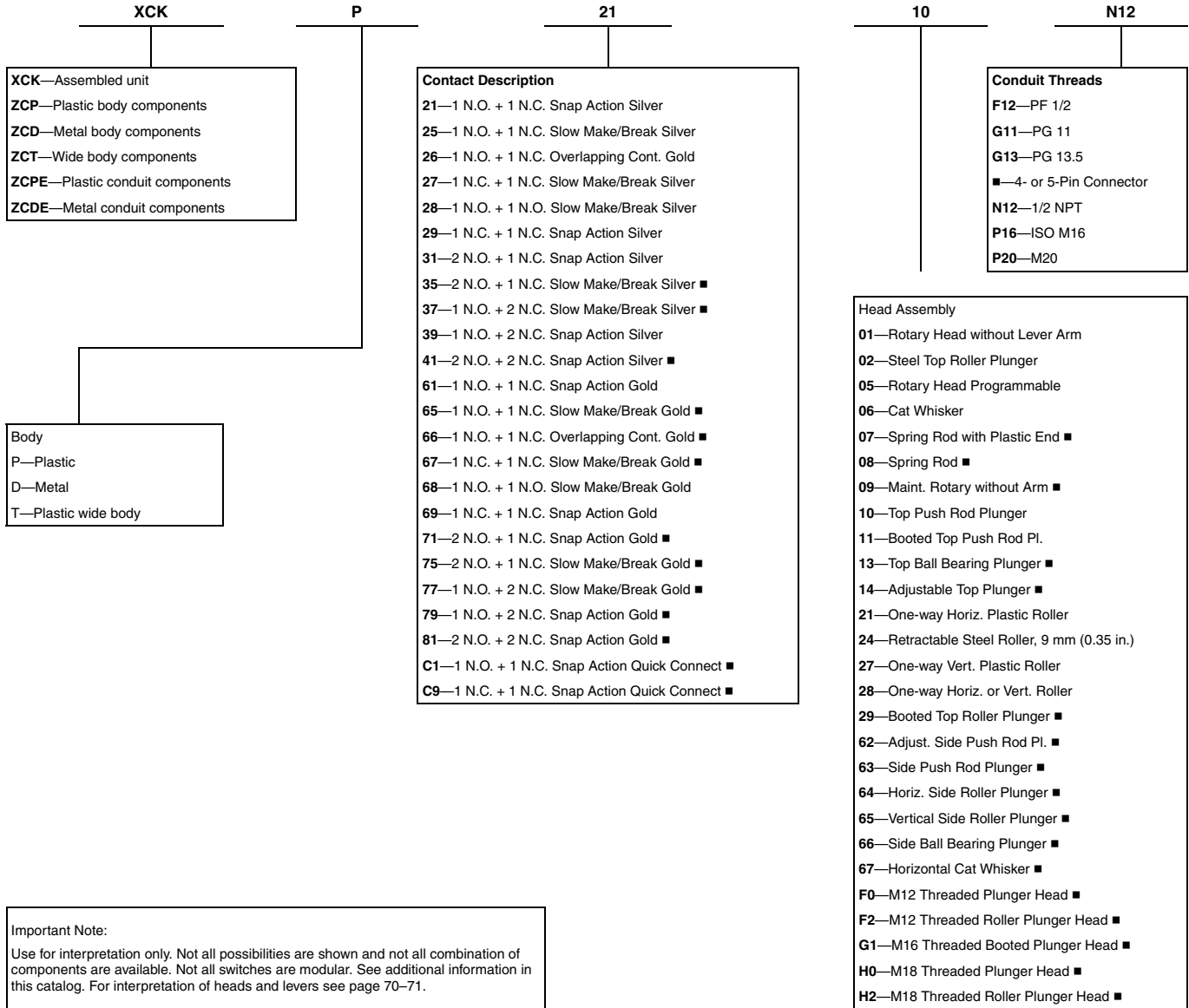
3. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).
4. Mounting nut thickness 3.5 mm (0.14 in.).

Limit Switches

Osiswitch® Compact, Metal and Plastic Universal, XCKD, XCKP, and XCKT

Catalog Number Interpretation

For Interpretation of the Catalog Number Only



■ Call your local field sales office for availability.

Limit Switches

Osiswitch® Compact, Plastic

Universal, XCKP—Integral M12 Connector

| Type of head | Plunger (mounting by the body) | | | | | |
|---|--------------------------------|---------------------------------------|---|---|---|--|
| | Form B (1) | | Form C (1) | Form E (1) | | |
| Type of operator | Metal end plunger | Metal end plunger with elastomer boot | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction | Thermoplastic roller lever plunger, horiz. or vert. actuation in 1 direction |
| Catalog Numbers | | | | | | |
| 2-pole N/C + N/O snap action (XE2S P2151) | XCKP2110M12 | XCKP2111M12 | XCKP2102M12 | XCKP2121M12 | XCKP2127M12 | XCKP2128M12 |
| | | | | | | |
| 2-pole N/C + N/C snap action (XE2S P2141) | ZCP29M12 + ZCE10 | ZCP29M12 + ZCE11 | ZCP29M12 + ZCE02 | ZCP29M12 + ZCE21 | ZCP29M12 + ZCE27 | ZCP29M12 + ZCE28 |
| | | | | | | |
| Weight, kg (lb) | 0.100 (0.220) | 0.100 (0.220) | 0.100 (0.220) | 0.110 (0.243) | 0.110 (0.243) | 0.110 (0.243) |
| Contact operation | | | (A)(B) = cam displacement (P) = positive opening point | | | |

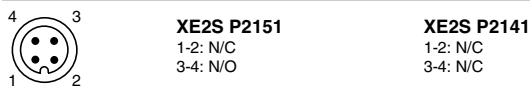
1. Form conforming to EN 50047. See page 22.

Characteristics

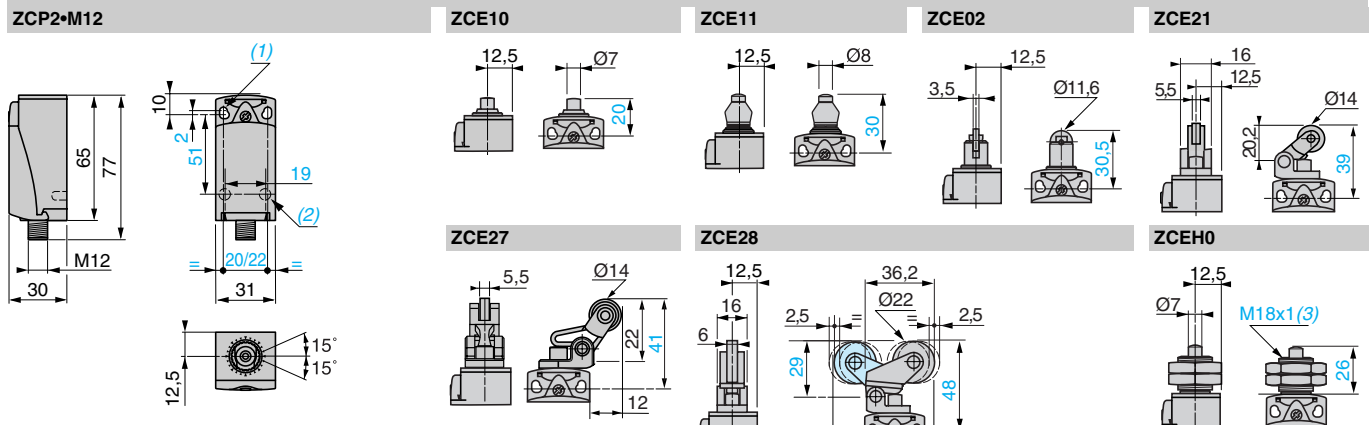
| Switch actuation | On end | By 30° cam | | | | |
|-------------------------|--|-----------------|----------------|-------------------|--|--|
| Type of actuation | | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | | 1 m/s (3.28 ft/s) | | |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 6 N (1.35 lb) | | |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 18 N (4.05 lb) | | |
| Connection | M12 4-pin connector, Ui = 250 V, Ie = 3 A maximum, Ith = 3 A | | | | | |

Connections

Integral M12 connector



Dimensions



- 2 elongated holes $\text{Ø} 4.3 \times 6.3 \text{ mm}$ (0.17 x 0.25 in.) on 22 mm (0.87 in.) (0.87 in.) centers, 2 holes $\text{Ø} 4.3 \text{ mm}$ (0.17 in.) on 20 mm (0.79 in.) ctrs.
- 2 x $\text{Ø} 3 \text{ mm}$ (0.12 in.) holes for support studs, depth 4 mm (0.16 in.).
- Mounting nut thickness 3.5 mm (0.14 in.).

Limit Switches

Osiswitch® Compact, Plastic

Universal, XCKP—Integral M12 Connector

| Type of head | Plunger (mounting by the head) | | Rotary (mounting by the body) | | | | Multi-directional |
|---|--------------------------------|-------------------------------|--|--|--|--|----------------------|
| | | | Form A (1) | | | | |
| | | | | | | | |
| Type of operator | M18 with metal end plunger | M18 with steel roller plunger | Thermoplastic roller lever | Variable length thermoplastic roller lever | Thermoplastic roller lever, Ø 50 mm (1.97 in.) | Variable length thermoplastic roller lever, Ø 50 mm (1.97 in.) | Cat's whisker (2) |
| Catalog Numbers | | | | | | | |
| 2-pole N/C + N/O snap action (XE2SP2151) | XCKP21H0M12 | XCKP21H2M12 | XCKP2118M126 | XCKP2145M12 | XCKP2139M12 | XCKP2149M12 | XCKP2106M126 |
| 2-pole N/C + N/C snap action (XE2S P2141) | ZCP29M12 + ZCEH0 | ZCP29M12 + ZCEH2 | ZCP29M12 + ZCE01 + ZCY18 | ZCP29M12 + ZCE01 + ZCY45 | ZCP29M12 + ZCE01 + ZCY49 | ZCP29M12 + ZCE01 + ZCY49 | ZCP29M12 + ZCE06 |
| Weight, kg (lb) | 0.140 (0.309) | 0.140 (0.309) | 0.140 (0.309) | 0.150 (0.331) | 0.155 (0.342) | 0.160 (0.353) | 0.090 (0.198) |
| Contact operation | contact closed contact open | | (A) = cam displacement (P) = positive opening point | | ☉ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | |

- Form conforming to EN 50047. See page 22.
- Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

Characteristics

| Switch actuation | On end | By 30° cam | By any moving part | |
|-------------------------|--|----------------------------------|---|--|
| Type of actuation | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | |
| Minimum force or torque | For tripping: 15 N (3.37 lb) For positive opening: 45 N (10.12 lb) | 10 N (2.25 lb) 36 N (8.09 lb) | 0.1 N•m (0.89 lb-in) 0.25 N•m (2.21 lb-in) | |
| Connection | M12 4-pin connector, U _i = 250 V, I _e = 3 A maximum, I _{th} = 3 A | | | |

Dimensions

| ZCE01 + ZCY18 | ZCE01 + ZCY45 | ZCE01 + ZCY39 | ZCE01 + ZCY49 | ZCE06 |
|---------------|---------------|---------------|---------------|---|
| | | | | |
| | | | | ZCEH2 |
| | | | | 3. Mounting nut thickness 3.5 mm (0.14 in.) |

Limit Switches

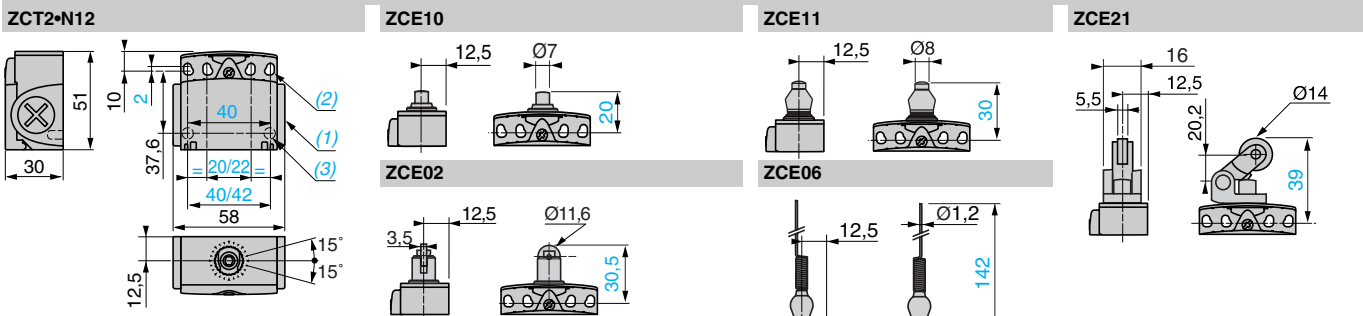
Osiswitch® Compact, Plastic

Universal, XCKT—Complete Units with Two Cable Entries and 1/2" NPT Adapter

| Type of head | Plunger (mounting by the body) | | | Multi-directional | |
|---|---|--|--|---|----------------------------------|
| | Form B (1) | Form C (1) | Form E (1) | | |
| Type of operator | Metal end plunger | Metal end plunger with elastomer boot | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Cat's whisker (4) |
| Catalog Numbers (2) (3) | XCKT2110N12 ⊖ | XCKT2111N12 ⊖ | XCKT2102N12 ⊖ | XCKT2121N12 ⊖ | XCKT2106N12 |
| 2-pole N/C + N/O snap action (XE2SP3151) | | | | | |
| 2-pole N/C + N/O break before make, slow break (XE2NP3151) | | | | | |
| 2-pole N/C + N/O make before break, slow break (XE2N P3161) | | | | | |
| 2-pole N/C + N/C simultaneous, slow break (XE2N P3141) | | | | | |
| 2-pole N/O + N/O simultaneous, slow break (XE2NP3131) | | | | | |
| Weight, kg (lb) | 0.100 (0.220) | 0.100 (0.220) | 0.105 (0.231) | 0.115 (0.254) | 0.095 (0.209) |
| Contact operation | | (A) = cam displacement (P) = positive opening point | ⊖ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | |
| Characteristics | | | | | |
| Switch actuation | On end | By 30° cam | | By any moving part | |
| Type of actuation | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | | 1 m/s (3.28 ft/s) | 1 m/s (3.28 ft/s), any direction |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 6 N (1.35 lb) | 0.3 N*m (2.66 lb-in) |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 18 N (4.05 lb) | — |
| Cable entry (3) | 2 entries tapped M16 x 1.5 for ISO cable entry. Clamping capacity 4 to 8 mm (0.16 to 0.31 in.) (1 entry fitted with blanking plug). | | | | |

- Form conforming to EN 50047. See page 22.
- Switches with gold contacts or ring connections: please consult your local sales office.
- For cable entries tapped for a PG 11 conduit thread, replace N12 in the catalog number with G11. Example: XCKT2110N12 becomes XCKT2110G11.
- Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

Dimensions


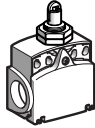

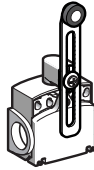
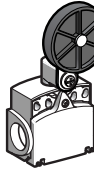
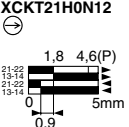
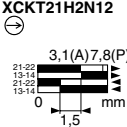
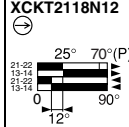
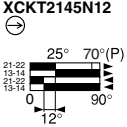
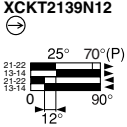


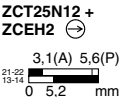

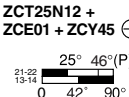
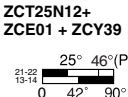

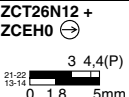
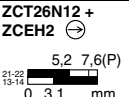
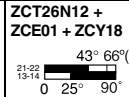
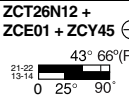
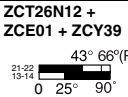


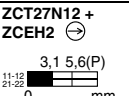
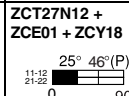
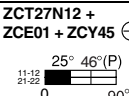
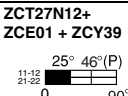


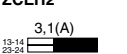
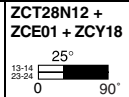
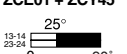
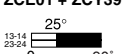

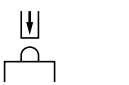
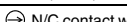
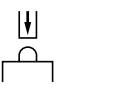


- 2 tapped entries for ISO M16 x 1.5 or PG 11 conduit thread.
- 4 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22/42 mm (0.87/1.65 in.) ctrs., 4 holes Ø 4.3 mm (0.17 in.) on 20/40 mm (0.79/1.57 in.) ctrs.
- 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).

Limit Switches

Osiswitch® Compact, Plastic

Universal, XCKT—Complete Units with Two Cable Entries and 1/2" NPT Adapter

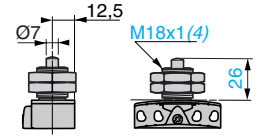
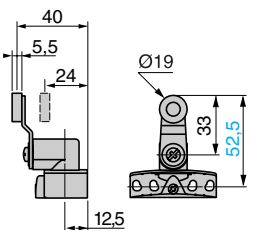
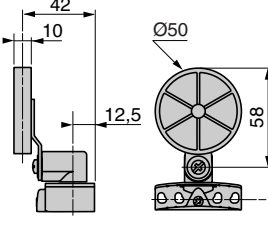
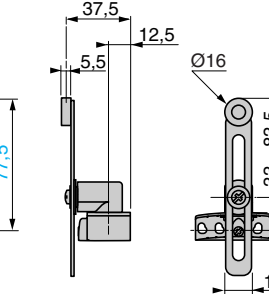
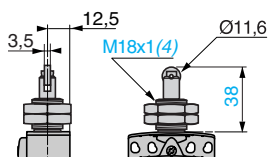
| Type of head | Plunger (mounting by the head) | | Rotary (mounting by the body) Form A (1) | | | |
|---|---|---|---|--|--|---------------|
| |  |  |  |  |  | |
| Type of operator | M18 with metal end plunger | M18 with steel roller plunger | Thermoplastic roller lever | Variable length thermoplastic roller lever | Thermoplastic roller lever, Ø 50 mm (1.97 in.) | |
| Catalog Numbers (2) (3) | XCKT21H0N12  | XCKT21H2N12  | XCKT2118N12  | XCKT2145N12  | XCKT2139N12  | |
|  2-pole N/C + N/O snap action (XE2S P3151) | ZCT25N12 + ZCEH0  | ZCT25N12 + ZCEH2  | ZCT25N12 + ZCE01 + ZCY18  | ZCT25N12 + ZCE01 + ZCY45  | ZCT25N12 + ZCE01 + ZCY39  | |
|  2-pole N/O + N/C break before make, slow break (XE2N P3151) | ZCT26N12 + ZCEH0  | ZCT26N12 + ZCEH2  | ZCT26N12 + ZCE01 + ZCY18  | ZCT26N12 + ZCE01 + ZCY45  | ZCT26N12 + ZCE01 + ZCY39  | |
|  2-pole N/O + N/C make before break, slow break (XE2N P3161) | ZCT27N12 + ZCEH0  | ZCT27N12 + ZCEH2  | ZCT27N12 + ZCE01 + ZCY18  | ZCT27N12 + ZCE01 + ZCY45  | ZCT27N12 + ZCE01 + ZCY39  | |
|  2-pole N/C + N/C simultaneous, slow break (XE2N P3141) | ZCT28N12 + ZCEH0  | ZCT28N12 + ZCEH2  | ZCT28N12 + ZCE01 + ZCY18  | ZCT28N12 + ZCE01 + ZCY45  | ZCT28N12 + ZCE01 + ZCY39  | |
|  2-pole N/O + N/O simultaneous, slow break (XE2NP3131) | Weight, kg (lb) | 0.145 (0.320) | 0.145 (0.320) | 0.145 (0.320) | 0.155 (0.342) | 0.160 (0.353) |
| Contact operation | ■ contact closed (A) = cam displacement □ contact open (P) = positive opening point | | ⊕ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | | |
| Characteristics | | | | | | |
| Switch actuation | On end | By 30° cam | | | | |
| Type of actuation |  |  |  | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | | |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 10 N (2.25 lb) | 0.1 N•m (0.89 lb-in) | | |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 0.25 N•m (2.21 lb-in) | | |
| Cable entry (3) | 2 entries tapped M16 x 1.5 for ISO cable entry. Clamping capacity 4 to 8 mm (0.16 to 0.31 in.) (1 entry fitted with blanking plug). | | | | | |

1. Form conforming to EN 50047. See page 22.

2. Switches with gold contacts or ring type connections; please consult your local sales office.

3. For cable entries tapped for a PG 11 conduit thread, replace N12 in the catalog number with **G11**. Example: XCKT21H0N12 becomes **XCKT21H0G11**.

Dimensions

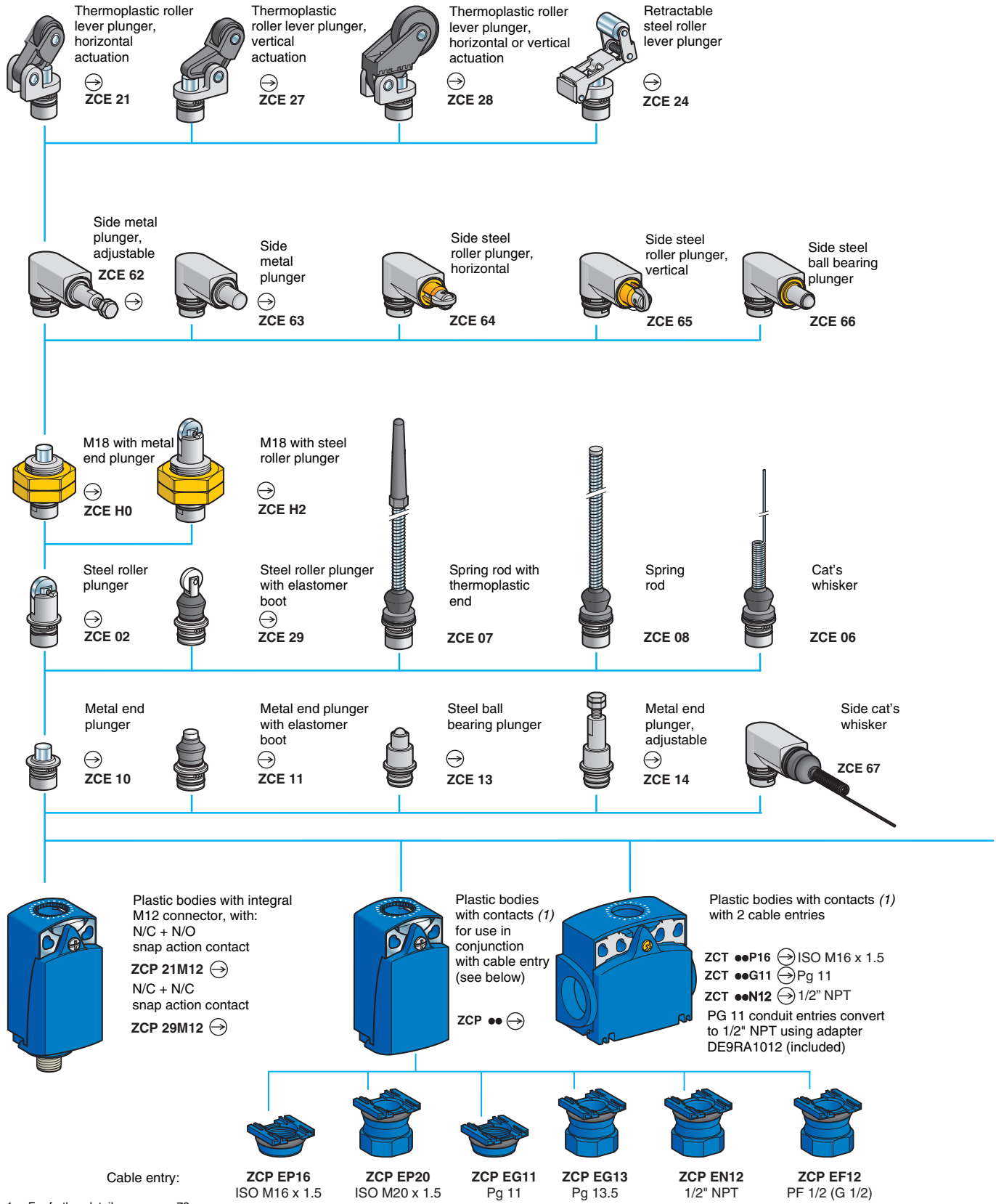
| ZCEH0 | ZCE01 + ZCY18 | ZCE01 + ZCY39 | ZCE01 + ZCY45 |
|---|---|--|---|
|  |  |  |  |
|  | | | |

4. Mounting nut thickness 3.5 mm (0.14 in.)

Limit Switches

Osiswitch® Compact, Metal and Plastic

Universal, XCKD, XCKP, and XCKT—Modular



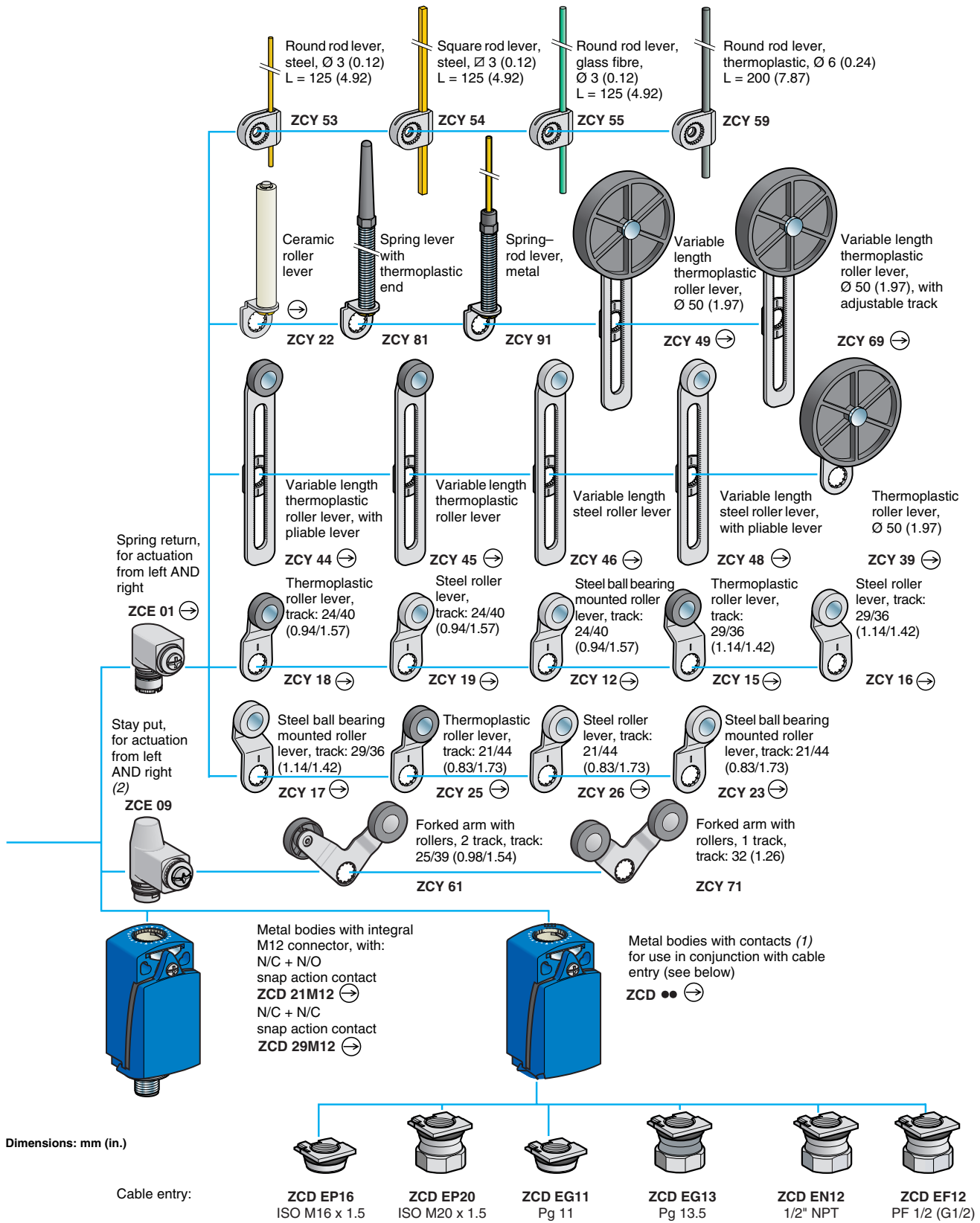
Limit Switches

1. For further details, see page 72.
 2. Cannot be used on bodies: ZCD21, ZCP21, ZCT21, ZCD29, ZCP29, ZCD31, ZCP31, ZCD39, ZCP39, ZCD2•M12, ZCP2•M12.

Limit Switches

Osiswitch® Compact, Metal and Plastic

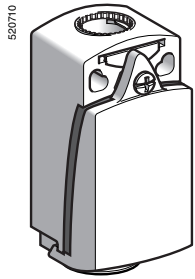
Universal, XCKD, XCKP, and XCKT—Modular



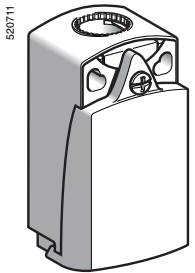
Limit Switches

Osiswitch® Compact, Metal and Plastic

Universal, XCKD, XCKP, and XCKT—Modular



ZCD**



ZCP**

Limit Switches

Bodies with contacts, types XCKD and XCKP⁽¹⁾

| Type of contact | Positive operation (2) | Function diagram | Body material | Catalog Number | Weight kg (lb) |
|---|------------------------|------------------|---------------|----------------|----------------|
| 2-pole | | | | | |
| N/C + N/O snap action (XE2SP2151) | ⊖ | | Metal | ZCD21 | 0.140 (0.309) |
| | | | Plastic | ZCP21 | 0.070 (0.154) |
| N/C + N/C snap action (XE2SP2141) | ⊖ | | Metal | ZCD29 | 0.140 (0.309) |
| | | | Plastic | ZCP29 | 0.070 (0.154) |
| N/C + N/O break before make, slow break (XE2NP2151) | ⊖ | | Metal | ZCD25 | 0.140 (0.309) |
| | | | Plastic | ZCP25 | 0.070 (0.154) |
| N/O + N/C make before break, slow break (XE2NP2161) | ⊖ | | Metal | ZCD26 | 0.140 (0.309) |
| | | | Plastic | ZCP26 | 0.070 (0.154) |
| N/C + N/C simultaneous, slow break (XE2NP2141) | ⊖ | | Metal | ZCD27 | 0.140 (0.309) |
| | | | Plastic | ZCP27 | 0.070 (0.154) |
| N/O + N/O simultaneous, slow break (XE2NP2131) | — | | Metal | ZCD28 | 0.140 (0.309) |
| | | | Plastic | ZCP28 | 0.070 (0.154) |
| 3-pole | | | | | |
| N/C + N/O + N/O snap action (XE3SP2151) | ⊖ | | Metal | ZCD31 | 0.140 (0.309) |
| | | | Plastic | ZCP31 | 0.070 (0.154) |
| N/C + N/C + N/O snap action (XE3SP2141) | ⊖ | | Metal | ZCD39 | 0.140 (0.309) |
| | | | Plastic | ZCP39 | 0.070 (0.154) |
| N/C + N/C + N/O break before make, slow break (XE3NP2141) | ⊖ | | Metal | ZCD37 | 0.140 (0.309) |
| | | | Plastic | ZCP37 | 0.070 (0.154) |
| N/C + N/O + N/O break before make, slow break (XE3NP2151) | ⊖ | | Metal | ZCD35 | 0.140 (0.309) |
| | | | Plastic | ZCP35 | 0.070 (0.154) |

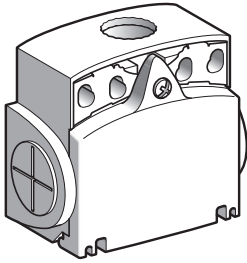
1. Bodies with gold contacts or eyelet type connections: please consult your local sales office.
 2. ⊖ : bodies with contacts assuring positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Compact, Metal and Plastic

Universal, XCKD, XCKP, and XCKT—Modular

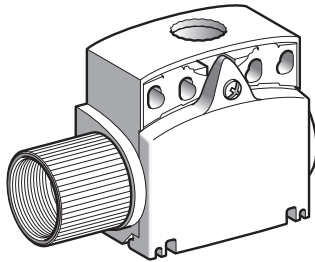
561390



ZCT***

| Bodies with contacts, type XCKT plastic, 2 cable entries | | | | | |
|--|------------------------|------------------|---------------|----------------|----------------|
| Type of contact | Positive operation (1) | Function diagram | Cable entries | Catalog Number | Weight kg (lb) |
| 2-pole | | | | | |
| N/C + N/O snap action (XE2SP3151) | ☞ | | ISO M16 x 1.5 | ZCT21P16 | 0.085 (0.187) |
| | | | PG 11 | ZCT21G11 | 0.085 (0.187) |
| N/C + N/O break before make, slow break (XE2NP3151) | ☞ | | ISO M16 x 1.5 | ZCT25P16 | 0.085 (0.187) |
| | | | PG 11 | ZCT25G11 | 0.085 (0.187) |
| N/C + N/C simultaneous, slow break (XE2NP3141) | ☞ | | ISO M16 x 1.5 | ZCT27P16 | 0.085 (0.187) |
| | | | PG 11 | ZCT27G11 | 0.085 (0.187) |
| N/O + N/O simultaneous, slow break (XE2NP3131) | — | | ISO M16 x 1.5 | ZCT28P16 | 0.085 (0.187) |
| | | | PG 11 | ZCT28G11 | 0.085 (0.187) |
| N/O + N/C make before break, slow break (XE2NP3161) | ☞ | | ISO M16 x 1.5 | ZCT26P16 | 0.085 (0.187) |
| | | | PG 11 | ZCT26G11 | 0.085 (0.187) |

561397



ZCT**N12

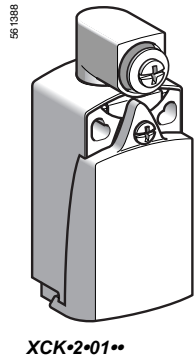
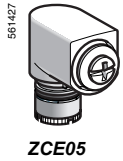
| Bodies with contacts, type XCKT, plastic, 2 cable entries with 1/2" NPT adapter | | | | |
|---|------------------------|------------------|----------------|----------------|
| Type of contact | Positive operation (1) | Function diagram | Catalog Number | Weight kg (lb) |
| 2-pole | | | | |
| N/C + N/O snap action (XE2SP3151) | ☞ | | ZCT21N12 | 0.130 (0.287) |
| N/C + N/O break before make, slow break (XE2NP3151) | ☞ | | ZCT25N12 | 0.130 (0.287) |
| N/C + N/C simultaneous, slow break (XE2N P3141) | ☞ | | ZCT27N12 | 0.130 (0.287) |
| N/O + N/O simultaneous, slow break (XE2NP3131) | — | | ZCT28N12 | 0.130 (0.287) |
| N/O + N/C make before break, slow break (XE2NP3161) | ☞ | | ZCT26N12 | 0.130 (0.287) |

1. ☞ : bodies with contact assuring positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Compact, Metal and Plastic

Universal, XCKD, XCKP, and XCKT—Modular



| Accessories | | | |
|--|---|---------------------|----------------|
| Description | Suitable levers for use with head | Unit catalog number | Weight kg (oz) |
| Rotary head, without lever, spring return, for actuation from left AND right or left OR right (1) | ZCY12, ZCY15, ZCY16, ZCY17, ZCY18, ZCY19, ZCY22, ZCY23, ZCY25, ZCY26, ZCY39, ZCY53, ZCY54, ZCY55, ZCY81 | ZCE05 | 0.045 (1.59) |
| Tap-off terminal (for XCKT) | Sold in lots of 10 | XALZ09 | 0.010 (0.35) |
| Spacer for angular positioning of heads with adjustable levers, for values other than -90°, 0° and 90° | — | XCMZ07 | 0.002 (0.07) |
| Adapter for 1/2" NPT conduit Converts PG 11 conduit entries to 1/2" NPT | Sold in lots of 10 | DE9RA1012 | 0.050 (1.76) |

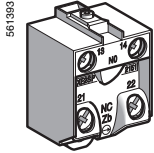
| Bodies with contacts, type XCKP plastic, with rotary head (without operating lever) | | | | | |
|---|------------------|------------------------|---------------|----------------|----------------|
| Type of contact | Function diagram | Positive operation (2) | Cable entry | Catalog Number | Weight kg (lb) |
| 2-pole | | | | | |
| N/C + N/O snap action (XE2SP2151) | | ⊖ | 1/2" NPT | XCKP2101N12 | 0.115 (0.254) |
| | | ⊖ | PG 11 | XCKP2101G11 | 0.115 (0.254) |
| | | ⊖ | M12 connector | XCKP2101M12 | 0.125 (0.276) |
| N/C + N/O break before make, slow break (XE2NP2151) | | ⊖ | 1/2" NPT | XCKP2501N12 | 0.115 (0.254) |
| | | ⊖ | PG 11 | XCKP2501G11 | 0.115 (0.254) |

| Bodies with contacts, type XCKD metal, with rotary head (without operating lever) | | | | | |
|---|------------------|------------------------|---------------|----------------|----------------|
| Type of contact | Function diagram | Positive operation (2) | Cable entry | Catalog Number | Weight kg (lb) |
| 2-pole | | | | | |
| N/C + N/O snap action (XE2SP2151) | | ⊖ | 1/2" NPT | XCKD2101N12 | 0.185 (0.408) |
| | | ⊖ | PG 11 | XCKD2101G11 | 0.185 (0.408) |
| | | ⊖ | M12 connector | XCKD2101M12 | 0.195 (0.430) |
| N/C + N/O break before make, slow break (XE2NP2151) | | ⊖ | 1/2" NPT | XCKD2501N12 | 0.185 (0.408) |
| | | ⊖ | PG 11 | XCKD2501G11 | 0.185 (0.408) |

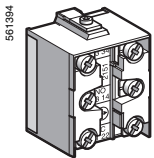
Limit Switches

Osiswitch® Compact, Metal and Plastic

Universal, XCKD, XCKP, and XCKT—Modular



XE2**21**



XE3**21**

Contact blocks with screw clamp terminals for XCKD and XCKP

| Type of contact | Positive operation (1) | Function diagram | Catalog number for standard contacts | Weight kg (lb) |
|---|------------------------|------------------|--------------------------------------|----------------|
| 2-pole | | | | |
| N/C + N/O snap action | ⊕ | | XE2SP2151 | 0.020 (0.044) |
| N/C + N/C simultaneous, snap action | ⊕ | | XE2SP2141 | 0.020 (0.044) |
| N/C + N/O break before make, slow break | ⊕ | | XE2NP2151 | 0.020 (0.044) |
| N/O + N/C make before break, slow break | ⊕ | | XE2NP2161 | 0.020 (0.044) |
| N/C + N/C simultaneous, slow break | ⊕ | | XE2NP2141 | 0.020 (0.044) |
| N/O + N/O simultaneous, slow break | — | | XE2NP2131 | 0.020 (0.044) |

3-pole

| | | | | |
|---|---|--|-----------|---------------|
| N/C + N/O + N/O snap action | ⊕ | | XE3SP2151 | 0.035 (0.077) |
| N/C + N/C + N/O snap action | ⊕ | | XE3SP2141 | 0.035 (0.077) |
| N/C + N/C + N/O break before make, slow break | ⊕ | | XE3NP2141 | 0.035 (0.077) |
| N/C + N/O + N/O break before make, slow break | ⊕ | | XE3NP2151 | 0.035 (0.077) |

Contact blocks with screw clamp terminals for XCKT

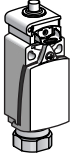
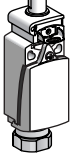
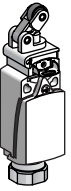

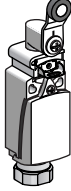

| Type of contact | Positive operation (1) | Function diagram | Catalog number for standard contacts | Weight kg (lb) |
|---|------------------------|------------------|--------------------------------------|----------------|
| 2-pole | | | | |
| N/C + N/O snap action | ⊕ | | XE2SP3151 | 0.015 (0.033) |
| N/C + N/O break before make, slow break | ⊕ | | XE2NP3151 | 0.015 (0.033) |
| N/O + N/C make before break, slow break | ⊕ | | XE2NP3161 | 0.015 (0.033) |
| N/C + N/C simultaneous, slow break | ⊕ | | XE2NP3141 | 0.015 (0.033) |
| N/O + N/O simultaneous, slow break | — | | XE2NP3131 | 0.015 (0.033) |














1. ⊕ : contact blocks assuring positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Compact with Manual Reset

Application, XCDR—Complete Switches, Metal, with One Cable Entry, 1/2" NPT






| Type of head | Plunger (mounting by the body) | | | | Rotary (mounting by the body) | |
|------------------|---|---|---|--|---|---|
| |  |  |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction | Thermoplastic roller lever | Steel roller lever |

| Catalog numbers of complete switches with one 1/2" NPT cable entry | | | | | | |
|---|--|--|--|---|--|--|
|  <p>2-pole N/C + N/O snap action (XE2SP2151)</p> | XCDR2110N12  | XCDR2102N12  | XCDR2121N12  | XCDR2127N12  | XCDR2118N12  | XCDR2119N12  |
| | XCDR2510N12  | XCDR2502N12  | XCDR2521N12  | XCDR2527N12  | XCDR2518N12  | XCDR2519N12  |
| Weight, kg (lb) | 0.215 (0.474) | 0.220 (0.485) | 0.225 (0.496) | 0.225 (0.496) | 0.255 (0.562) | 0.255 (0.562) |

Catalog numbers of complete switches with one PG 13.5 cable entry
 For complete switches with 1 PG 13.5 cable entry, replace N12 with G13.
 Example: XCDR 2110P20 becomes XCDR 2110G13.

Catalog numbers of complete switches with one P20 cable entry
 For complete switches with 1 ISO M20 x 1.5 cable entry, replace N12 with P20.
 Example: XCDR 2110N12 becomes XCDR 2110P20.

| | | | |
|--------------------------|--|--|--|
| Contact operation |  contact closed  contact open | (A) (B) = cam displacement (P) = positive opening point |  N/C contact with positive opening operation, when properly mounted and using a conforming operator |
|--------------------------|--|--|--|

| Characteristics | | | | | |
|-------------------------|--|---|---|--|---|
| Switch actuation | On end | By 30° cam | | | |
| Type of actuation |  |  |  |  |  |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | | | 1.5 m/s (4.92 ft/s) |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 6 N (1.35 lb) | 0.1 N•m (0.89 lb-in) |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 18 N (4.05 lb) | 0.25 N•m (2.21 lb-in) |
| Cable entry | 1 entry tapped M20 x 1.5 mm for ISO cable entry, clamping capacity 7 to 13 mm (0.28 to 0.51 in.), or 1 entry tapped PG 13.5, clamping capacity 9 to 12 mm (0.35 to 0.47 in.), or 1 entry tapped for 1/2" NPT (USAS B2-1) conduit | | | | |

Limit Switches

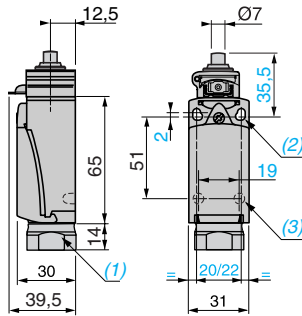
Limit Switches

Osiswitch® Compact with Manual Reset

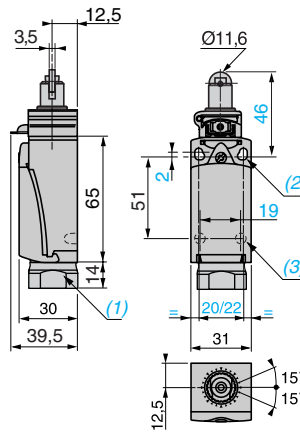
Application, XCDR—Complete Switches, Metal, with One Cable Entry, 1/2" NPT

Dimensions

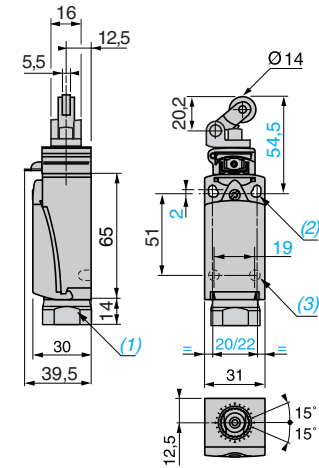
XCDR2•10***



XCDR2•02***



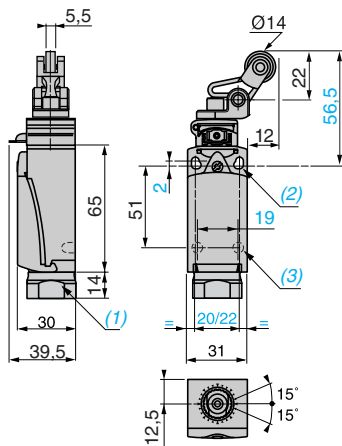
XCDR2•21***



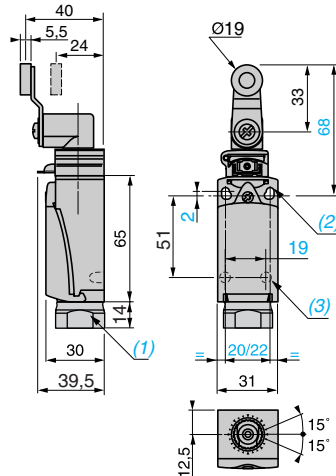
1. Tapped entry for ISO M20 x 1.5 or PG 13.5 conduit thread or 1/2" NPT conduit
2. 2 elongated holes $\varnothing 4.3 \times 6.3$ mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes $\varnothing 4.3$ mm (0.17 in.) on 20 mm (0.79 in.) centers
3. 2 x $\varnothing 3$ holes for support studs, depth 4 mm (0.16 in.)

Dimensions

XCDR2•27***



XCDR2•18***, XCDR2•19***

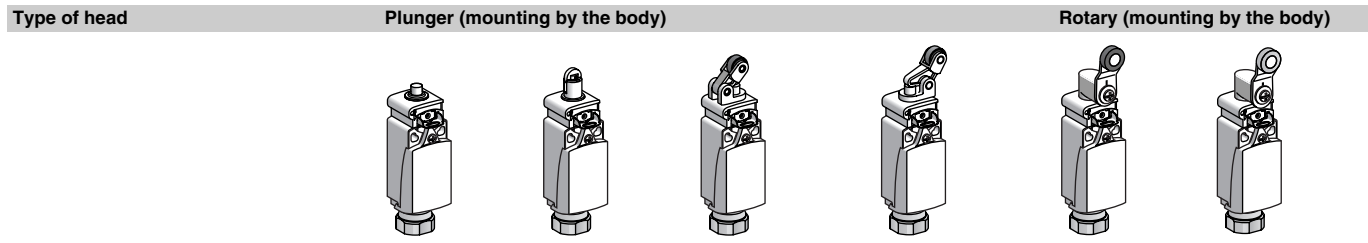


1. Tapped entry for ISO M20 x 1.5 or PG 13.5 conduit thread or 1/2" NPT conduit.
2. 2 elongated holes $\varnothing 4.3 \times 6.3$ mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes $\varnothing 4.3$ mm (0.17 in.) on 20 mm (0.79 in.) centers.
3. 2 x $\varnothing 3$ holes for support studs, depth 4 mm (0.16 in.).

Limit Switches

Osiswitch® Compact with Manual Reset

Application, XCPR—Complete Switches, Plastic, with One Cable Entry, 1/2" NPT



| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever plunger, vertical actuation in 1 direction | Thermoplastic roller lever | Steel roller lever |
|------------------|-------------------|----------------------|---|---|----------------------------|--------------------|
|------------------|-------------------|----------------------|---|---|----------------------------|--------------------|

Catalog numbers of complete switches with one 1/2" NPT cable entry

| | XCPR2110N12 | XCPR2102N12 | XCPR2121N12 | XCPR2127N12 | XCPR2118N12 | XCPR2119N12 |
|--|----------------|-------------------|--------------------|--------------------|----------------|----------------|
| 2-pole N/C + N/O snap action (XE2SP2151) | 1.8 4,6(P) | 3,1(A) 7,8(P) | 6,5(A) 15,7(P) | 6,5(B) 15,7(P) | 25° 70°(P) | 25° 70°(P) |
| 2-pole N/C + N/O break before make, slow break (XE2NP2151) | 1.8 3,2(P) | 3,1(A) 5,6(P) | 6,5(A) 11,3(P) | 6,5(B) 11,3(P) | 25° 46°(P) | 25° 46°(P) |
| 2-pole N/C + N/C snap action (XE2S P2141) | 1.8 4,6(P) | 3,1(A) 7,8(P) | 6,5(A) 15,7(P) | 6,5(B) 15,7(P) | 25° 70°(P) | — |
| Weight, kg (lb) | 0.115 (0.254) | 0.115 (0.254) | 0.125 (0.276) | 0.120 (0.265) | 0.155 (0.342) | — |

Catalog numbers of complete switches with one PG 13.5 cable entry

For complete switches with one PG 13.5 cable entry, replace N12 with G13.
 Example: XCPR 2110P20 becomes XCPR 2110G13.

Catalog numbers of complete switches with one P20 cable entry

For complete switches with one ISO M20 x 1.5 cable entry, replace N12 with P20.
 Example: XCPR 2110N12 becomes XCPR 2110P20.

| | | | |
|--------------------------------|--|--|--|
| Contact operation | contact closed contact open | (A) (B) = cam displacement (P) = positive opening point | N/C contact with positive opening operation, when properly mounted and using a conforming operator |
| Characteristics | | | |
| Switch actuation | On end | By 30° cam | |
| Type of actuation | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | |
| Minimum force or torque | For tripping 45 N (10.12 lb) | 12 N (2.70 lb) | 18 N (4.05 lb) |
| | For positive opening | 36 N (8.09 lb) | 0.1 N•m (0.89 lb-in) |
| Cable entry | 1 entry tapped M20 x 1.5 mm for ISO cable entry, clamping capacity 7 to 13 mm (0.28 to 0.51 in.), or 1 entry tapped PG 13.5, clamping capacity 9 to 12 mm (0.35 to 0.47 in.), or 1 entry tapped for 1/2" NPT (USAS B2-1) conduit | | |

Other versions Complete switches with cable entries other than those listed above. Consult your local sales office.

Limit Switches

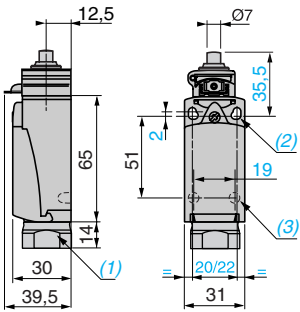
Limit Switches

Osiswitch® Compact with Manual Reset

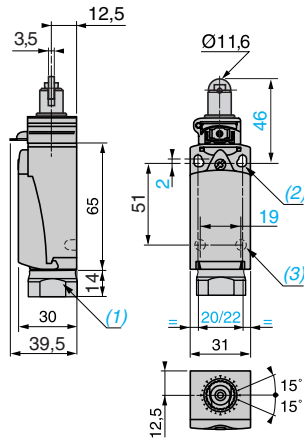
Application, XCPR—Complete Switches, Plastic, with One Cable Entry, 1/2" NPT

Dimensions

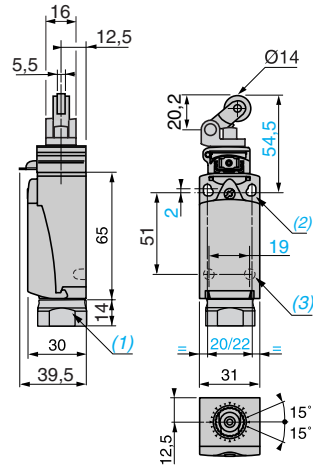
XCPR2•10***



XCPR2•02***



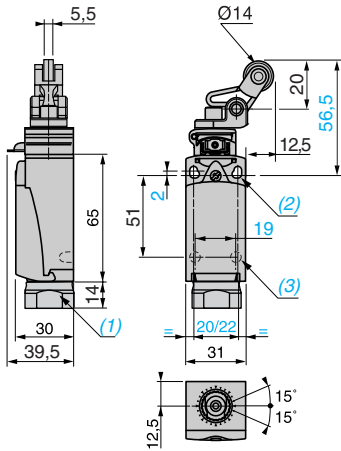
XCPR2•21***



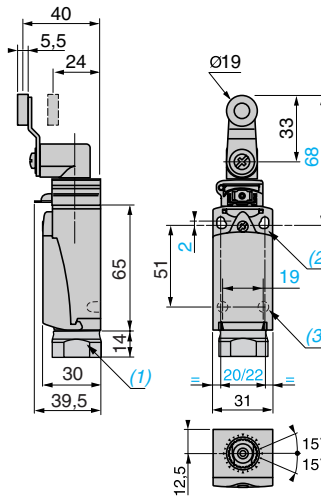
1. Tapped entry for ISO M20 x 1.5 or PG 13.5 conduit thread or 1/2" NPT conduit.
2. 2 elongated holes $\varnothing 4.3 \times 6.3$ mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes $\varnothing 4.3$ mm (0.17 in.) on 20 mm (0.79 in.) centers.
3. 2 x $\varnothing 3$ holes for support studs, depth 4 mm (0.16 in.).

Dimensions

XCPR2•27***



XCPR2•18***, XCPR2•19***


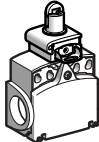

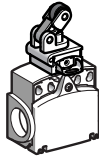

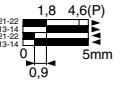
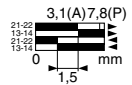
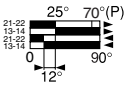
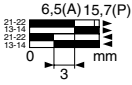

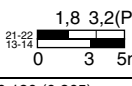
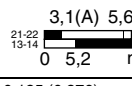
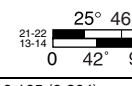
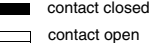


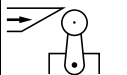



1. Tapped entry for ISO M20 x 1.5 or PG 13.5 conduit thread or 1/2" NPT conduit.
2. 2 elongated holes $\varnothing 4.3 \times 6.3$ mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes $\varnothing 4.3$ mm (0.17 in.) on 20 mm (0.79 in.) centers.
3. 2 x $\varnothing 3$ holes for support studs, depth 4 mm (0.16 in.).

Limit Switches

Osiswitch® Compact with Manual Reset

Application, XCTR—Complete Switches, Plastic, with Two Cable Entries, 1/2" NPT

| Type of head | Plunger (mounting by the body) | | | |
|---|--|---|---|---|
| |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction |
| Catalog numbers of complete switches with two cable entries, 1/2" NPT (1) | | | | |
|  <p>2-pole N/C + N/O snap action (XE2SP3151)</p> | XCTR2110N12 ⊕  | XCTR2102N12 ⊕  | XCTR2118N12 ⊕  | XCTR2121N12 ⊕  |
| |  <p>2-pole N/C + N/O break before make, slow break (XE2NP3151)</p> | XCTR2510N12 ⊕  | XCTR2502N12 ⊕  | XCTR2518N12 ⊕  |
| Weight, kg (lb) | 0.120 (0.265) | 0.125 (0.276) | 0.165 (0.364) | 0.135 (0.298) |
| 1. One PG 11 to 1/2" NPT adapter and one plug included. | | | | |
| Catalog numbers of complete switches with two PG 11 cable entries | | | | |
| For complete switches with two PG 11 cable entries, replace N12 with G11. Example: XCTR 2110N12 becomes XCTR 2110G11 . | | | | |
| Catalog numbers of complete switches with two ISO M16 x 1.5 cable entries | | | | |
| For complete switches with two ISO M16 x 1.5 cable entries, replace N12 with P16. Example: XCTR 2110N12 becomes XCTR 2110P16 . | | | | |
| Weight, kg (lb) | 0.120 (0.265) | 0.125 (0.276) | 0.165 (0.364) | 0.135 (0.298) |
| Contact operation |  | (A) = cam displacement (P) = positive opening point | ⊕ N/C contact with positive opening operation, when properly mounted and using a conforming operator | |
| Characteristics | | | | |
| Switch actuation | On end | By 30° cam | | |
| Type of actuation |  |  |  |  |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | 1 m/s (3.28 ft/s) |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 0.1 N•m (0.89 lb-in) |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 0.25 N•m (2.21 lb-in) |
| Cable entry (1 entry fitted with blanking plug) | 2 entries tapped M16 x 1.5 mm for ISO cable entry, clamping capacity 4 to 8 mm (0.16 to 0.31 in.), or 2 entries tapped PG 11, clamping capacity 7 to 10 mm (0.28 to 0.39 in.), or 2 entries tapped for 1/2" NPT (USAS B2-1) conduit using PG 11 to 1/2" NPT adapter DE9RA1012 (1 entry fitted with adapter) | | | |

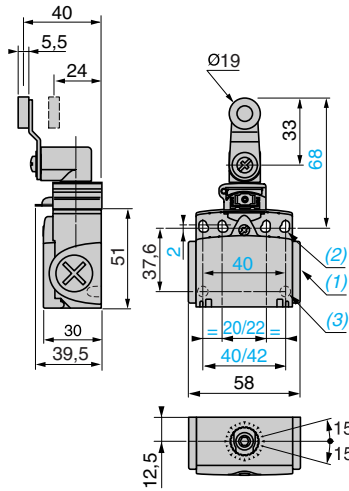
Limit Switches

Osiswitch® Compact, Metal with Manual Reset

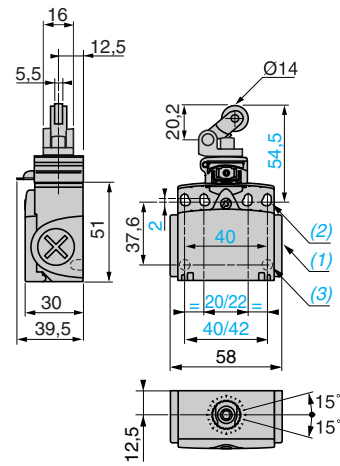
Application, XCDR—Complete Switches with Two Cable Entries, 1/2" NPT

Dimensions

XCTR 2•18***

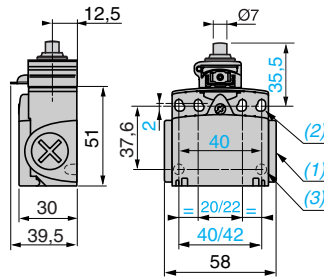


XCTR 2•21***

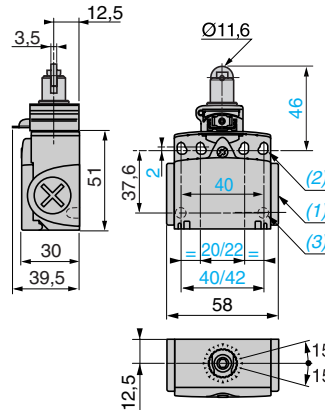


1. Tapped entry for ISO M16 x 1.5 or PG 11 conduit thread. 1/2" NPT adapter included.
2. 4 elongated holes \varnothing 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22/42 mm (0.87/1.65 in.) centers, 4 holes \varnothing 4.3 mm (0.17 in.) on 20/40 mm (0.79/1.57 in.) centers.
3. 2 x \varnothing 3 holes for support studs, depth 4 mm (0.16 in.).

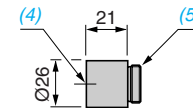
XCTR 2•10***



XCTR 2•02***



DE9RA1012



1. Tapped entry for ISO M16 x 1.5 or PG 11 conduit thread. 1/2" NPT adapter included.
2. 4 elongated holes \varnothing 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22/42 mm (0.87/1.65 in.) centers, 4 holes \varnothing 4.3 mm (0.17 in.) on 20/40 mm (0.79/1.57 in.) centers.
3. 2 x \varnothing 3 holes for support studs, depth 4 mm (0.16 in.).
4. Tapped entry for 1/2" NPT conduit.
5. PG 11 threaded sleeve.

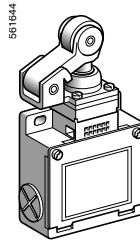
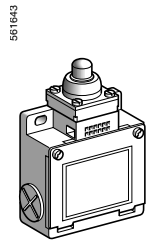
Limit Switches

Osiswitch® Classic, Metal

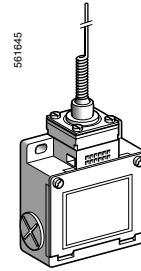
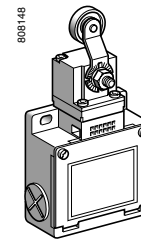
XCKM, XCKL, and XCKML

■ **XCKM**
with 3 cable entries

□ With plunger head



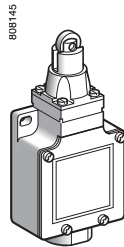
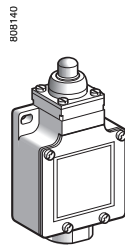
□ With rotary or multi-directional head



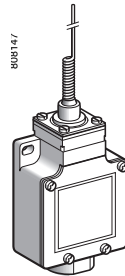
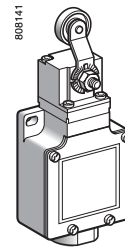
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■ **XCKL**
with 1 cable entry

□ With plunger head



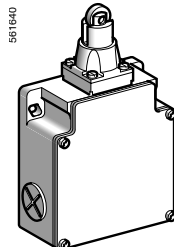
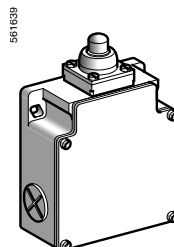
□ With rotary or multi-directional head



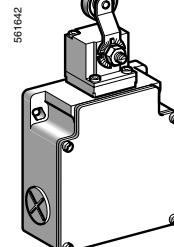
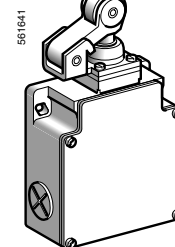
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■ **XCKML**
with 3 cable entries and two 2-pole contacts

□ With plunger head



□ With rotary or multi-directional head



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Environmental characteristics

| | | |
|--|------------------------------|---|
| Conforming to standards | Products | IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14 |
| | Machine assemblies | IEC 60204-1, EN 60204-1 |
| Product certifications | | UL, CSA, CCC (for XCKM) |
| Protective treatment | Version | Standard "TC". Special "TH" |
| Ambient air temperature | For operation | - 25...+70 °C (-13...+158 °F) |
| | For storage | - 40...+70 °C (-40...+158 °F) |
| Vibration resistance | Conforming to IEC 60068-2-6 | 25 gn (10...500 Hz) |
| Shock resistance | Conforming to IEC 60068-2-27 | 50 gn (11 ms) |
| Electric shock protection | | Class I conforming to IEC 61140 and NF C 20-030 |
| Degree of protection | | IP 66 conforming to IEC 60529; IK 05 conforming to EN 50102 |
| Repeat accuracy | | XCKML 0.1 mm; XCKM and XCKL 0.05 mm on the tripping points, with 1 million operating cycles for head with end plunger |
| Cable entry or integral connector | Depending on model | XCKM : 3 tapped entries, PG 11 conduit thread (1/2" NPT adapter available), or tapped M20 XCKL : 1 tapped entry incorporating 1/2" NPT adapter XCKML : 3 tapped entries, PG 13 conduit thread (1/2" NPT adapter included), or tapped M20 |
| Materials | | Bodies: Zamak® zinc alloy Rotary heads: Zamak® zinc alloy or plastic depending on model; other heads: plastic |

Limit Switches

Osiswitch® Classic, Metal

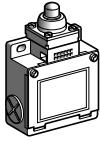
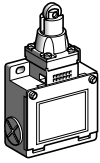
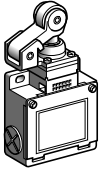
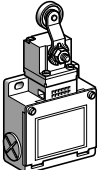
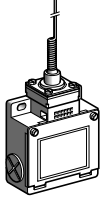
XCKM, XCKL, and XCKML

| Contact block characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---------------------------------|-----|----------------------|--|--|---|----|---|--|---|---|----|---|---------|---|--|----|-----|---|---|---------|---|----|---|--|---|---|----|---|---------|---|----|----|-----|---|---|----|---|---|-----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|---------|---|----|----|-----|---|---|---|---|---|--|--|--|--|--|--|---------|---|----|----|-----|---|---|---|---|---|-----------------|--|--|--|
| Rated operational characteristics | XE2•P | ~ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A --- DC-13; Q300 (Ue = 250 V, Ie = 0,27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE3•P | ~ AC-15; B300 (Ue = 240 V, Ie = 1,5 A); Ithe = 6 A --- DC-13; R300 (Ue = 250 V, Ie = 0,1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated insulation voltage | XE2•P | Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE3•P | Ui = 400 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated impulse withstand voltage | XE2•P | U imp = 6 kV conforming to IEC 60947-1, IEC 60664 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE3•P | U imp = 4 kV conforming to IEC 60947-1, IEC 60664 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Positive operation (depending on model) | N/C contacts with positive opening operation conforming to IEC 947-5-1 Section 3, EN 60 947-5-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance across terminals | ≤ 25 mΩ conforming to IEC 60255-7 category 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Short-circuit protection | XE2•P | 10 A cartridge fuse type gG (gl) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE3•P | 6 A cartridge fuse type gG (gl) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cabling (screw and captive cable clamp terminals) | XE2SP21•1 | Clamping capacity, min: 1 x 0,34 mm ² , max: 2 x 1,5 mm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE2NP21•1 | Clamping capacity, min: 1 x 0,5 mm ² , max: 2 x 2,5 mm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XESP2151L and XENP2151L | Clamping capacity, min: 1 x 0,34 mm ² , max: 2 x 1,5 mm ² or 1 x 2,5 mm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE3NP et XE3SP | Clamping capacity, min: 1 x 0,34 mm ² , max: 1 x 1 mm ² or 2 x 0,75 mm ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum actuation speed | XE2SP21•1, XESP2151L and XE3SP: 0.01 m/minute (0.03 ft/minute) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XE2NP21•1, XENP2151L and XE3NP: 6 m/minute (19.68 ft/minute) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electrical durability | <ul style="list-style-type: none"> Conforming to IEC 60947-5-1 appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles/hour Load factor: 0,5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Voltage | V | 24 | 48 | 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ~ | W | 10 | 7 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ~ | W | 13 | 9 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| ~ | W | 4 | 3 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Limit Switches

Osiswitch® Classic, Metal

XCKM—Complete Switches w/ 3 ISO M20x1.5 Cable Entries, Including One 1/2" NPT Adapter

| Type of head | Plunger (mounting by the body) | | | Rotary (mounting by the body) | Multi-directional (mounting by the body) |
|---|--|---|---|---|---|
| |  |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever (1) | Cat's whisker (4) |
| Catalog numbers (2) (3) | | | | | |
| 2-pole N/C + N/O snap action (XE2SP2151) | | | | | |
| 2-pole N/C + N/O break before make, slow break (XE2NP2151) | | | | | |
| 2-pole N/C + N/C snap action (XE2SP2141) | | | | | |
| 2-pole N/C + N/C simultaneous, slow break (XE2NP2141) | | | | | |
| 3-pole N/C + N/C + N/O snap action (XE3SP2141) | | | | | |
| 3-pole N/C + N/C + N/O break before make, slow break (XE3NP2141) | | | | | |
| Weight, kg (lb) | 0.250 (0.551) | 0.255 (0.562) | 0.300 (0.661) | 0.280 (0.617) | 0.250 (0.551) |
| Contact operation | | (A) = cam displacement (P) = positive opening point | | | |
| Characteristics | | | | | |
| Switch actuation | On end | By 30° cam | | By any moving part | |
| Type of actuation | | | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | 1 m/s (3.28 ft/s), any direction |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 8 N (1.80 lb) | 0.1 N•m (0.89 lb-in) |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 24 N (5.40 lb) | 0.25 N•m (2.21 lb-in) |
| Cable entry (3) | 3 entries tapped M20 x 1.5 mm for ISO cable entry, clamping capacity 7 to 13 mm (0.28 to 0.51 in.) | | | | |

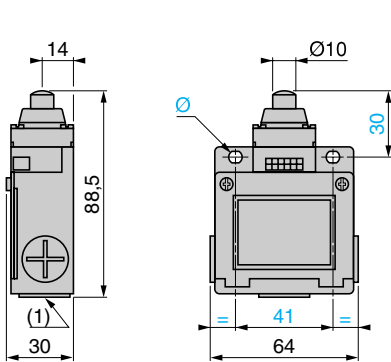
- Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
 - Switches with gold contacts or eyelet type connections: please consult your local sales office.
 - For an entry tapped for a PG 11 conduit thread, delete H29 from the end of the catalog number. Example: XCKM110H29 becomes XCKM110.
 - Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.
- Note:** To convert XCKM110 from PG 11 to 1/2" NPT, use adapter DE9RA1012, included.

Limit Switches

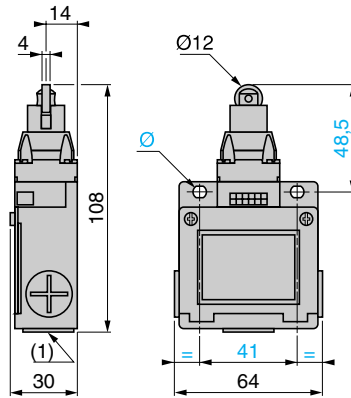
Osiswitch® Classic, Metal

XCKM—Complete Switches w/ 3 ISO M20x1.5 Cable Entries, Including One 1/2" NPT Adapter

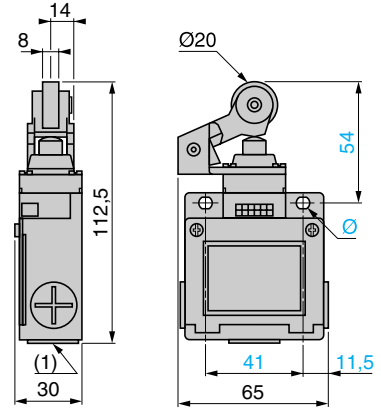
XCKM•10
ZCKMD3• + ZCKD10



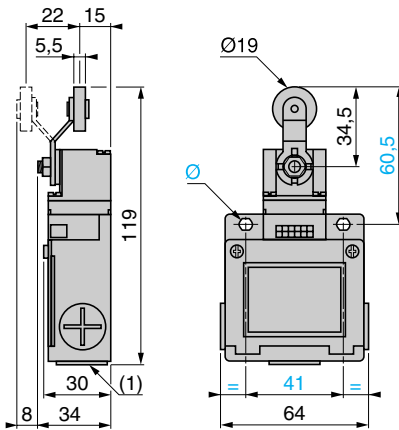
XCKM•02
ZCKMD3• + ZCKD02



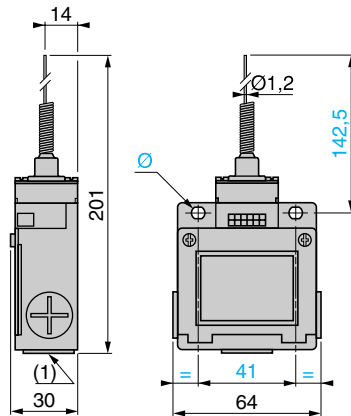
XCKM•21
ZCKMD3• + ZCKD21



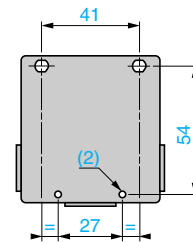
XCKM•15
ZCKMD3• + ZCKD15



XCKM•06
ZCKMD3• + ZCKD06

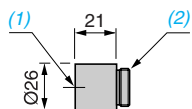


Rear view
XCKM•••, ZCKM•, ZCKMD3•



- 1. 3 tapped entries for ISO M20 x 1.5 or PG 11 conduit thread. Includes 1/2" NPT conduit adapter DE9RA1012.
- 2. 2 x Ø 4 H 11, depth 10.
- Ø: 2 elongated holes Ø 5.2 x 6.2.

Adapter for 1/2" NPT conduit
DE9RA1012



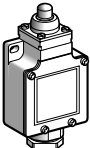
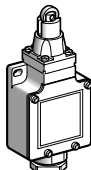
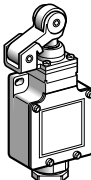
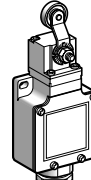
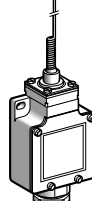










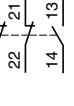
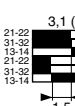
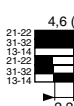

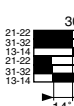





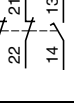
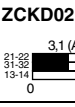
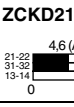
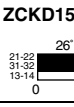
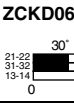







- 1. Tapped entry for 1/2" NPT conduit.
- 2. PG 11 threaded sleeve.

Limit Switches

Limit Switches

Osiswitch® Classic, Metal

XCKL—Complete Switches Incorporating Adapter for 1/2" NPT

| Type of head | Plunger (mounting by the body) | | | Rotary (mounting by the body) | Multi-directional (mounting by the body) |
|--|--|--|--|---|---|
| |  |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever (1) | Cat's whisker (2) |
| Catalog numbers (3) | | | | | |
| 2-pole N/C + N/O snap action (XE2SP2151) |  XCKL110 ⊕ 1.8 4.5(P) 0.9 5.5mm |  XCKL102 ⊕ 3.1(A) 7.8(P) 1.5 mm |  XCKL121 ⊕ 4.6(A) 11.1(P) 2.2 mm |  XCKL115 ⊕ 26° 58°(P) 11° 70° |  XCKL106 ⊕ 30° 14° |
| 2-pole N/C + N/O break before make, slow break (XE2NP2151) |  XCKL510 ⊕ 1.8 3.2(P) 0 3 5.5mm |  XCKL502 ⊕ 3.1(A) 5.6(P) 0 5.2 mm |  XCKL521 ⊕ 4.6(A) 8(P) 0 7.6 mm |  XCKL515 ⊕ 26° 42°(P) 36° 70° |  XCKL506 ⊕ 30° 0 40° |
| 3-pole N/C + N/C + N/O snap action (XE3SP2141) |  ZCKLD39 + ZCKD10 ⊕ 1.8 4.5 (P) mm 0.9 5.5 |  ZCKLD39 + ZCKD02 ⊕ 3.1 (A) 7.8 (P) mm 1.5 |  ZCKLD39 + ZCKD21 ⊕ 4.6 (A) 11.1 (P) mm 2.2 |  ZCKLD39 + ZCKD15 ⊕ 26° 58° (P) 11° 70° |  ZCKLD39 + ZCKD06 ⊕ 30° 14° |
| 2-pole N/C + N/C simultaneous, slow break (XE2NP2141) |  ZCKL7 + ZCKD10 ⊕ 3.2(P) 1.8 5.5mm |  ZCKL7 + ZCKD02 ⊕ 5.6(P) 3.1(A) 9mm |  ZCKL7 + ZCKD21 ⊕ 8(P) 4.6(A) mm |  ZCKL7 + ZCKD15 ⊕ 42°(P) 23° 70° |  ZCKL7 + ZCKD06 ⊕ 30° |
| 3-pole N/C + N/C + N/O break before make, slow break (XE3NP2141) |  ZCKLD37 + ZCKD10 ⊕ 1.8 3.2 (P) mm 0 3 5.5 |  ZCKLD37 + ZCKD02 ⊕ 3.1 (A) 3.2 (P) mm 0 5.2 5.5 |  ZCKLD37 + ZCKD21 ⊕ 4.6 (A) 8 (P) mm 0 7.6 |  ZCKLD37 + ZCKD15 ⊕ 26° 42° (P) 36° 70° |  ZCKLD37 + ZCKD06 ⊕ 30° 0 40° |
| Weight, kg (lb) | 0.255 (0.562) | 0.260 (0.573) | 0.305 (0.672) | 0.285 (0.628) | 0.255 (0.562) |
| Contact operation |  contact closed  contact open | (A) = cam displacement (P) = positive opening point | | ⊕ N/C contact with positive opening operation, when properly mounted and using a conforming operator | |
| Characteristics | | | | | |
| Switch actuation | On end | By 30° cam | | | By any moving part |
| Type of actuation |  |  |  |  |  |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | 1 m/s (3.28 ft/s), any direction |
| Minimum force or torque | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 8 N (1.80 lb) | 0.1 N•m (0.89 lb-in) |
| | For positive opening | 45 N (10.12 lb) | 36 N (8.09 lb) | 24 N (5.40 lb) | 0.25 N•m (2.21 lb-in) |
| Cable entry | 1 entry incorporating metal cable entry. Clamping capacity 6 to 13.5 mm (0.24 to 0.53 in.). | | | | |

1. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
 2. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.
 3. Switches with gold contacts or eyelet type connections: please consult your local sales office.

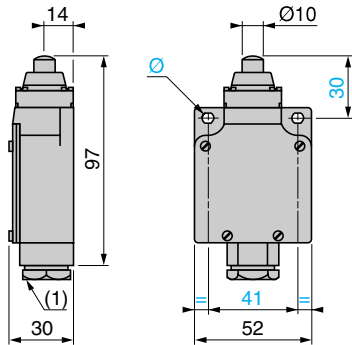
Limit Switches

Limit Switches

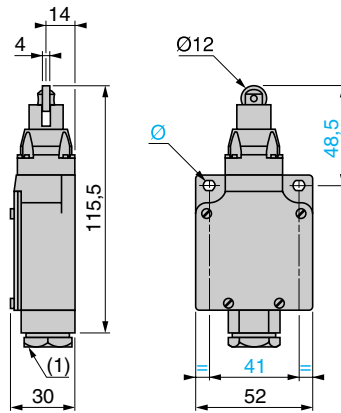
Osiswitch® Classic, Metal

XCKL—Complete Switches Incorporating Adapter for 1/2" NPT

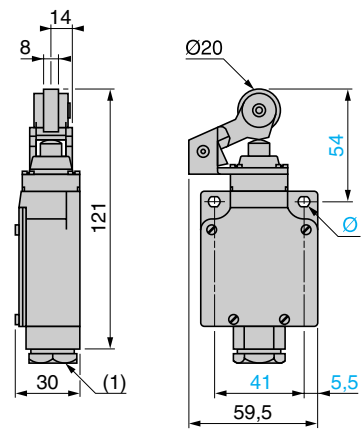
XCKL•10
ZCKL• + ZCKD10
ZCKLD3• + ZCKD10



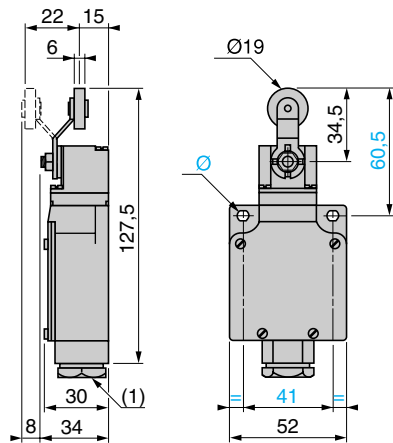
XCKL•02
ZCKL3• + ZCKD02
ZCKLD3• + ZCKD02



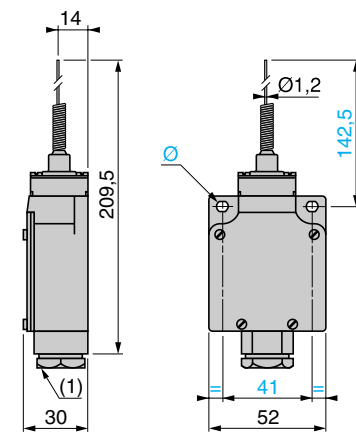
XCKL•21
ZCKL• + ZCKD21
ZCKLD3• + ZCKD21



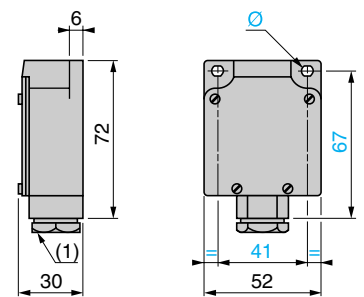
XCKL•15
ZCKL• + ZCKD15
ZCKLD3• + ZCKD15



XCKL•06
ZCKL• + ZCKD06
ZCKLD3• + ZCKD06



Body mountings

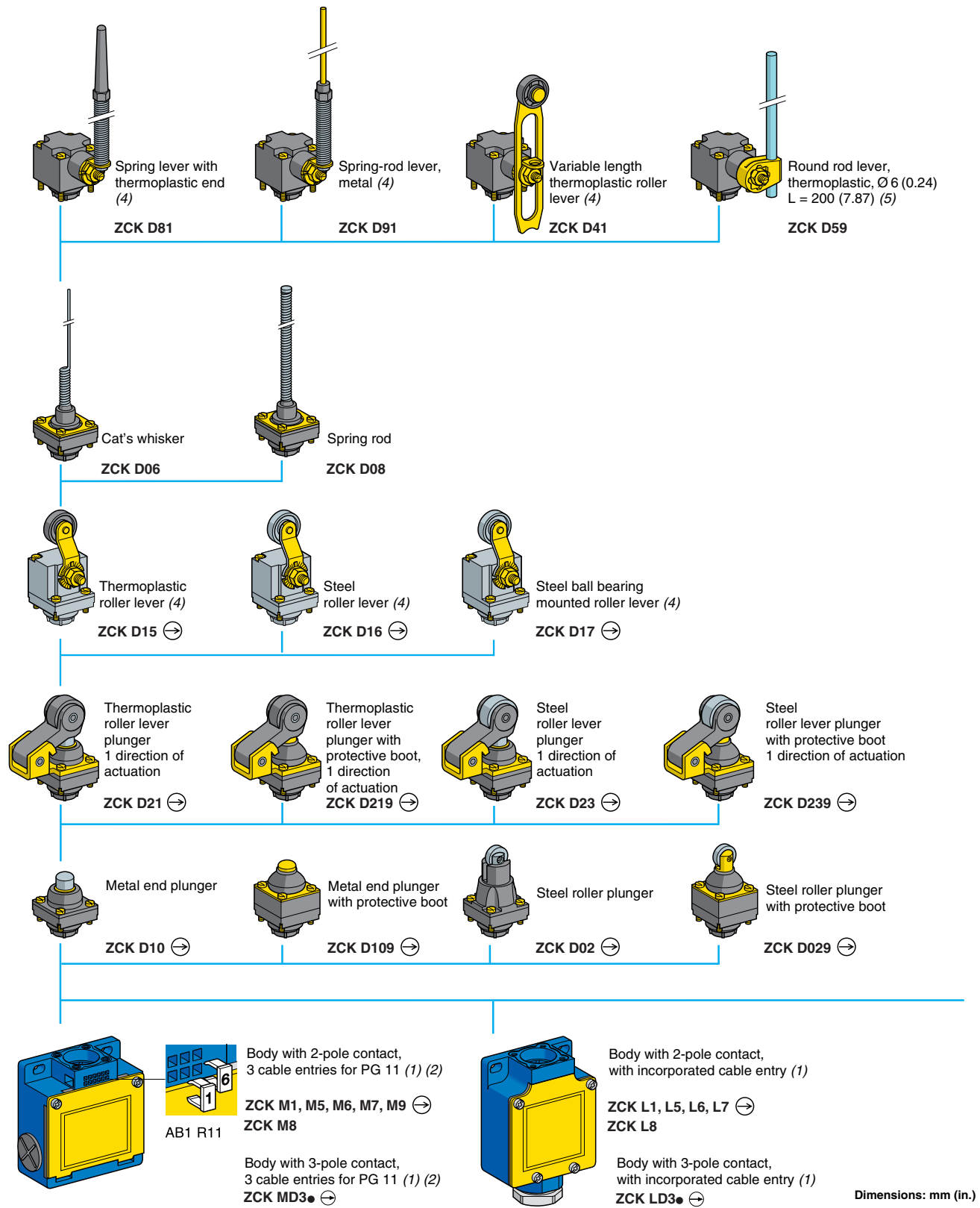


1. Incorporated cable entry.
Ø: 2 elongated holes Ø 5.2 x 6.2.

Limit Switches

Osiswitch® Classic, Metal

XCKM and XCKL—Modular

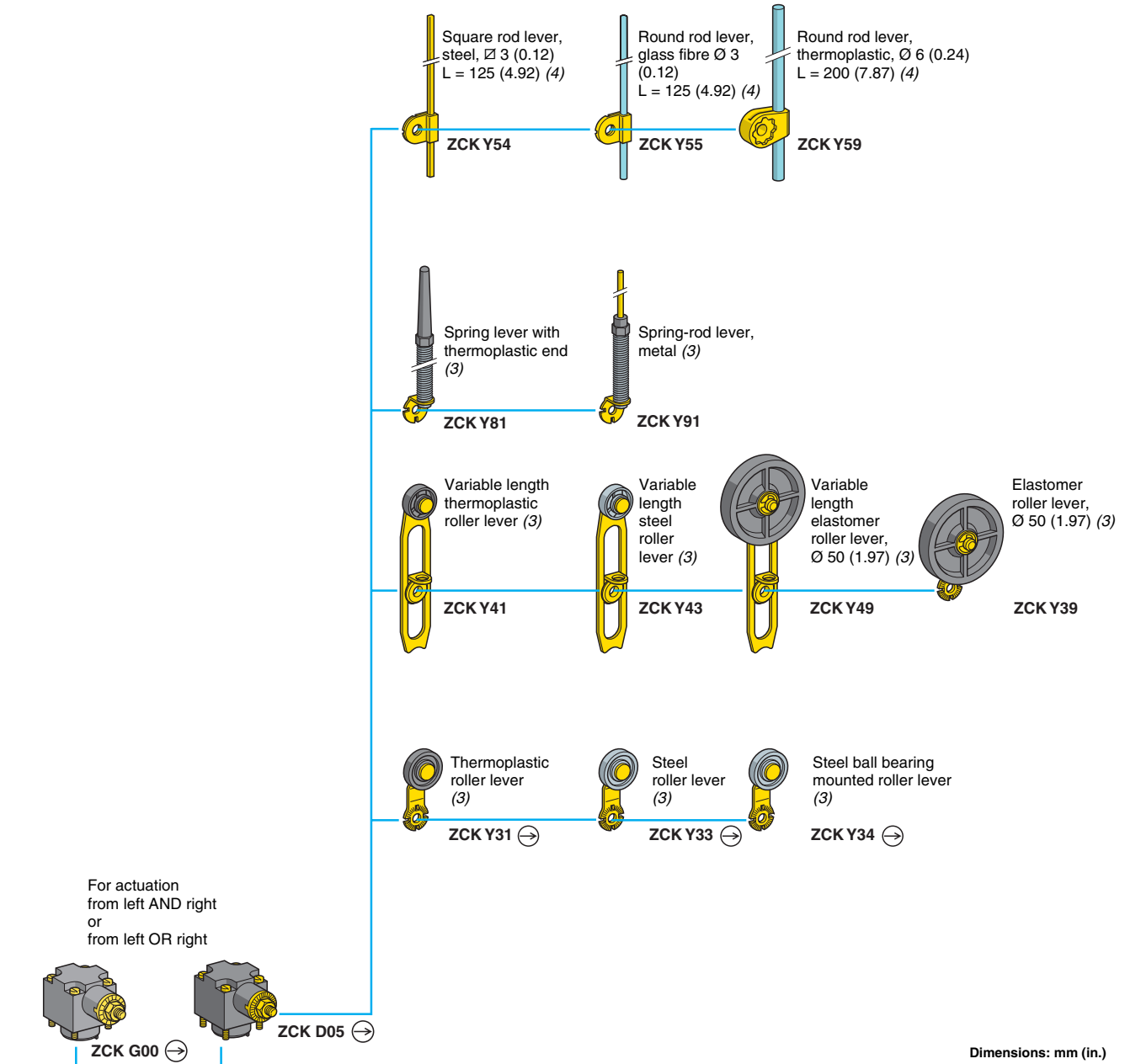


1. For further details. See page 90.
2. For 3 cable entries tapped ISO M20 x 1.5, add **H29** to the catalog number. Example: ZCKM1 becomes **ZCKM1H29**.

Limit Switches

Osiswitch® Classic, Metal

XCKM and XCKL—Modular



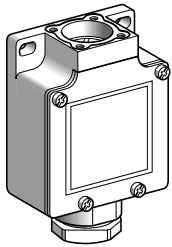
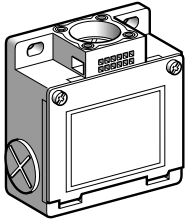
⊙ head assuring positive opening operation, when properly mounted and using a conforming operator.

- 3. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
- 4. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.

Limit Switches

Osiswitch® Classic, Metal

XCKM and XCKL—Modular



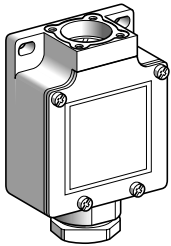
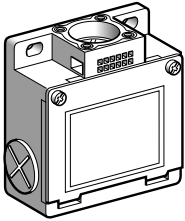
| Bodies with 2-pole contact | | | | | |
|---|------------------|------------------------|---------------|----------------|----------------|
| With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| For limit switches type XCKM | | | | | |
| N/C + N/O snap action (XE2S P2151) | | ⊖ | 1/2" NPT (2) | ZCKM1 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKM1H29 | 0.210 (0.463) |
| N/C + N/O break before make, slow break (XE2N P2151) | | ⊖ | 1/2" NPT (2) | ZCKM5 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKM5H29 | 0.210 (0.463) |
| N/O + N/C make before make, slow break (XE2N P2161) | | ⊖ | 1/2" NPT (2) | ZCKM6 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKM6H29 | 0.210 (0.463) |
| N/C + N/C simultaneous, slow break (XE2N P2141) | | ⊖ | 1/2" NPT (2) | ZCKM7 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKM7H29 | 0.210 (0.463) |
| N/O + N/O simultaneous, slow break (XE2N P2131) | | — | 1/2" NPT (2) | ZCKM8 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKM8H29 | 0.210 (0.463) |
| N/C + N/C snap action (XE2S P2141) | | ⊖ | ISO M20 x 1.5 | ZCKM9H29 | 0.210 (0.463) |
| For limit switches type XCK L | | | | | |
| N/C + N/O snap action (XE2S P2151) | | ⊖ | 1/2" NPT | ZCKL1 | 0.210 (0.463) |
| N/C + N/O break before make, slow break (XE2N P2151) | | ⊖ | 1/2" NPT | ZCKL5 | 0.210 (0.463) |
| N/O + N/C make before make, slow break (XE2N P2161) | | ⊖ | 1/2" NPT | ZCKL6 | 0.210 (0.463) |
| N/C + N/C simultaneous, slow break (XE2N P2141) | | ⊖ | 1/2" NPT | ZCKL7 | 0.210 (0.463) |
| N/O + N/O simultaneous, slow break (XE2N P2131) | | — | 1/2" NPT | ZCKL8 | 0.210 (0.463) |

- ⊖: N/C contact with positive opening operation, when properly mounted and using a conforming operator.
- 3 PG 11 tapped entries, one with metal adapter for 1/2" NPT (USASB2-1) conduit (PG 8).

Limit Switches

Osiswitch® Classic, Metal

XCKM and XCKL—Modular



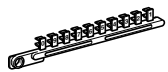
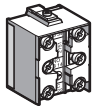
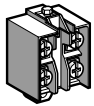
| Bodies with 3-pole contact | | | | | |
|---|------------------|------------------------|---------------|----------------|----------------|
| With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| For limit switches type XCKM | | | | | |
| N/C + N/O + N/O snap action (XE3S P2151) | | | 1/2" NPT (2) | ZCKMD31 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKMD31H29 | 0.210 (0.463) |
| N/C + N/C + N/O snap action (XE3S P2141) | | | 1/2" NPT (2) | ZCKMD39 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKMD39H29 | 0.210 (0.463) |
| N/C + N/C + N/O break before make, slow break (XE3N P2141) | | | 1/2" NPT (2) | ZCKMD37 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKMD37H29 | 0.210 (0.463) |
| N/C + N/O + N/O break before make, slow break (XE3N P2151) | | | 1/2" NPT (2) | ZCKMD35 | 0.210 (0.463) |
| | | | ISO M20 x 1.5 | ZCKMD35H29 | 0.210 (0.463) |
| For limit switches type XCK L | | | | | |
| N/C + N/O + N/O snap action (XE3S P2151) | | | 1/2" NPT | ZCKLD31 | 0.210 (0.463) |
| | | | | | |
| N/C + N/C + N/O snap action (XE3S P2141) | | | 1/2" NPT | ZCKLD39 | 0.210 (0.463) |
| | | | | | |
| N/C + N/C + N/O break before make, slow break (XE3N P2141) | | | 1/2" NPT | ZCKLD37 | 0.210 (0.463) |
| | | | | | |
| N/C + N/O + N/O break before make, slow break (XE3N P2151) | | | 1/2" NPT | ZCKLD35 | 0.210 (0.463) |
| | | | | | |

1. : N/C contact with positive opening operation, when properly mounted and using a conforming operator.
2. 3 PG 11 tapped entries, one with metal adapter for 1/2" NPT (USASB2-1) conduit (PG 8).

Limit Switches

Osiswitch® Classic, Metal

XCKM and XCKL—Modular



| Contact blocks | | | | | |
|---|------------------|--------------------|------------------------|----------------|----------------|
| Type of contact | Function diagram | For bodies | Positive operation (1) | Catalog number | Weight kg (lb) |
| 2-pole contact | | | | | |
| N/C + N/O snap action | | ZCKM1 ZCKL1 | ⊖ | XE2SP2151 | 0.020 (0.044) |
| N/C + N/O break before make, slow break | | ZCKM5 ZCKL5 | ⊖ | XE2NP2151 | 0.020 (0.044) |
| N/O + N/C make before break, slow break | | ZCKM6 ZCKL6 | ⊖ | XE2NP2161 | 0.020 (0.044) |
| N/C + N/C simultaneous, slow break | | ZCKM7 ZCKL7 | ⊖ | XE2NP2141 | 0.020 (0.044) |
| N/O + N/O simultaneous, slow break | | ZCKM8 ZCKL8 | — | XE2NP2131 | 0.020 (0.044) |
| N/C + N/C snap action | | ZCKM9 | ⊖ | XE2SP2141 | 0.020 (0.044) |
| 3-pole contact | | | | | |
| N/C + N/O + N/O snap action | | ZCKMD31 ZCKLD31 | ⊖ | XE3SP2151 | 0.035 (0.077) |
| N/C + N/C + N/O snap action | | ZCKMD39 ZCKLD39 | ⊖ | XE3SP2141 | 0.035 (0.077) |
| N/C + N/C + N/O break before make, slow break | | ZCKMD37 ZCKLD37 | ⊖ | XE3NP2141 | 0.035 (0.077) |
| N/C + N/O + N/O break before make, slow break | | ZCKMD35 ZCKLD35 | ⊖ | XE3NP2151 | 0.035 (0.077) |

1. ⊖: N/C contact with positive opening operation or sub-assembly assuring positive opening operation when properly mounted and using a conforming operator.

Accessories for limit switches type XCKM

| Description | Sold in lots of | Unit catalog number | Weight kg (lb) |
|--|-----------------|---------------------|----------------|
| Tap-off terminal for cabling continuity | 1 | XCKZ09 | 0.010 (0.022) |
| Clip-in markers (strips of 10 numbers: 0 to 9) Other markers, please consult your local sales office. | 25 | AB1R11 | 0.002 (0.004) |

Other versions

Gold flashed contacts.
Please consult your local sales office.

Limit Switches

Osiswitch® Classic, Metal

XCKM and XCKL—Modular

| | | | | | |
|---|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Heads ZCKD10, D109 with body | ZCKM1, L1 | ZCKM5, L5 | ZCKM6, L6 | ZCKM7, L7 | ZCKM8, L8 |
| | ZCKM9 | ZCKMD39, LD39 | ZCKMD37, LD37 | ZCKMD31, LD31 | ZCKMD35, LD35 |
| Heads ZCKD02, D029 with body | ZCKM1, L1 | ZCKM5, L5 | ZCKM6, L6 | ZCKM7, L7 | ZCKM8, L8 |
| | ZCKM9 | ZCKMD39, LD39 | ZCKMD37, LD37 | ZCKMD31, LD31 | ZCKMD35, LD35 |
| Heads ZCKD21, D23, D219, D239 with body | ZCKM1, L1 | ZCKM5, L5 | ZCKM6, L6 | ZCKM7, L7 | ZCKM8, L8 |
| | ZCKM9 | ZCKMD39, LD39 | ZCKMD37, LD37 | ZCKMD31, LD31 | ZCKMD35, LD35 |
| Heads ZCKD15, D16, D17 with body | ZCKM1, L1 | ZCKM5, L5 | ZCKM6, L6 | ZCKM7, L7 | ZCKM8, L8 |
| | ZCKM9 | ZCKMD39, LD39 | ZCKMD37, LD37 | ZCKMD31, LD31 | ZCKMD35, LD35 |
| Heads ZCKD41, D59, D81, D91 with body | ZCKM1, L1 | ZCKM5, L5 | ZCKM6, L6 | ZCKM7, L7 | ZCKM8, L8 |
| | ZCKM9 | ZCKMD39, LD39 | ZCKMD37, LD37 | ZCKMD31, LD31 | ZCKMD35, LD35 |
| Heads ZCKD06, D08 with body | ZCKM1, L1 | ZCKM5, L5 | ZCKM6, L6 | ZCKM7, L7 | ZCKM8, L8 |
| | ZCKM9 | ZCKMD39, LD39 | ZCKMD37, LD37 | ZCKMD31, LD31 | ZCKMD35, LD35 |

Contact operation

■ contact closed
□ contact open

(A) = cam displacement
(P) = positive opening point

Limit Switches

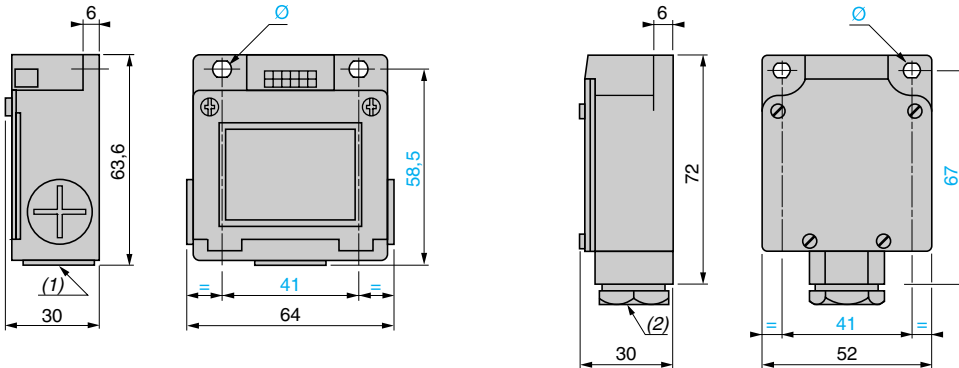
Osiswitch® Classic, Metal

XCKM and XCKL—Modular

Bodies with contacts

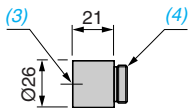
ZCKM1, M5, M6, M7, M8,
ZCKM1H29, M5H29, M6H29, M7H29, M8H29, M9H29

ZCKL1, L5, L6, L7, L8, LD3• (5)



Adapter for 1/2" NPT conduit

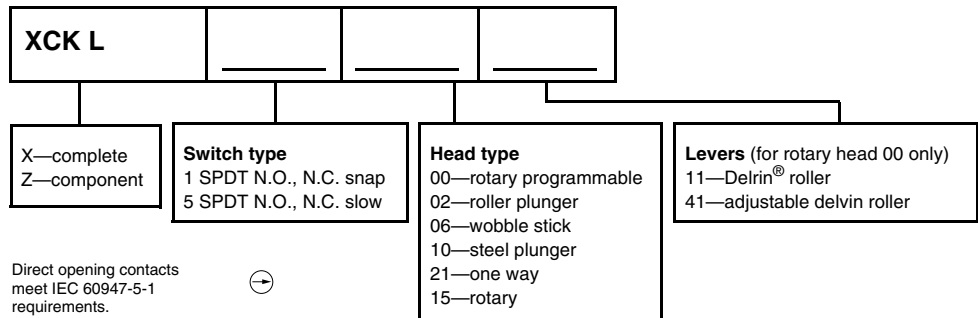
DE9RA1012



1. 3 tapped entries for ISO M20 x 1.5 or PG 11 conduit thread.
2. Incorporated cable entry.
- Ø: 2 elongated holes Ø 5.2 x 6.2.
3. Tapped entry for 1/2" NPT conduit.
4. Threaded sleeve, PG 11.
5. XCKL provided with 1/2" NPT adapter shown above, DE9RA1012.

Complete Switches

For interpreting the complete switch catalog number only



NOTE: Some combinations are not available. Use this information to interpret catalog numbers, not to create them.

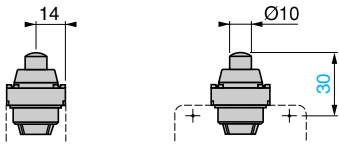
Limit Switches

Osiswitch® Classic, Metal

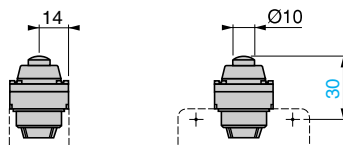
XCKM and XCKL—Modular

Plunger heads

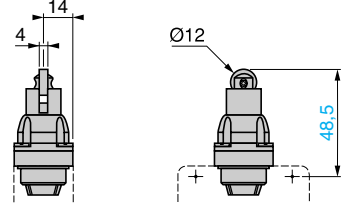
ZCKD10



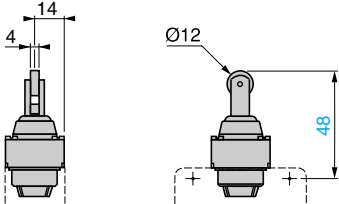
ZCKD109



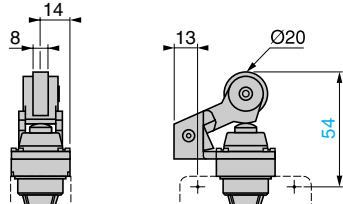
ZCKD02



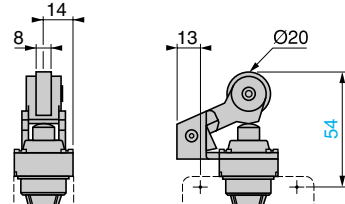
ZCKD029



ZCKD21, D23

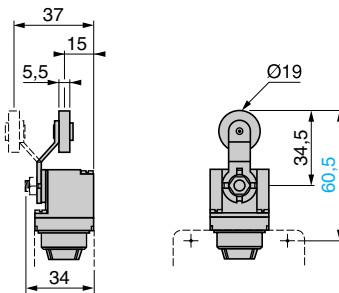


ZCKD219, D239

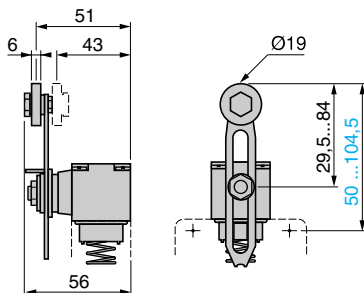


Rotary heads

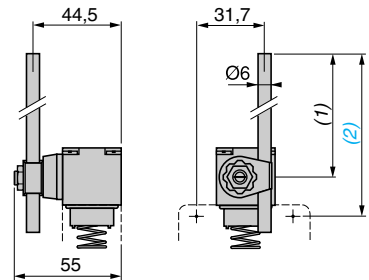
ZCKD15, D16, D17



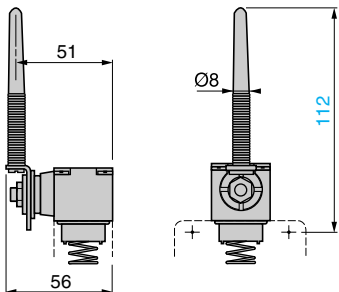
ZCKD41



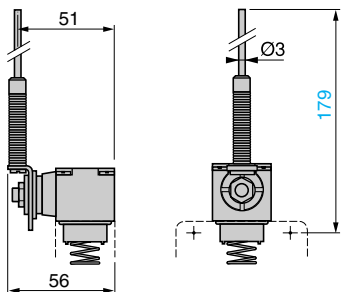
ZCKD59



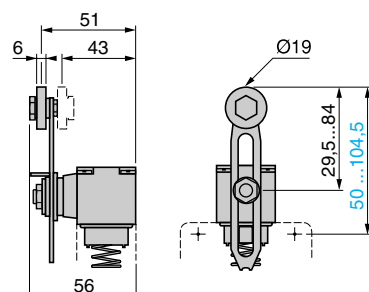
ZCKD81



ZCKD91

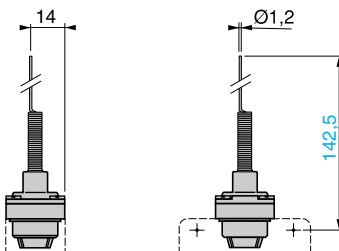


ZCKG00

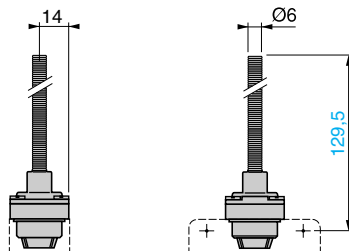


Multi-directional heads

ZCKD06



ZCKD08



1. 190 max.
2. 215.5 max.

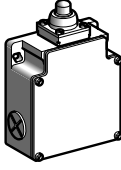
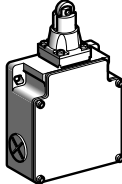
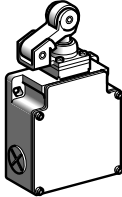
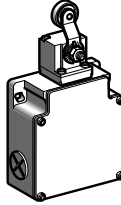
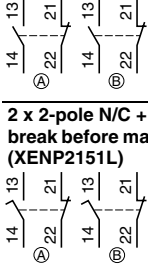

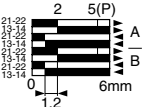

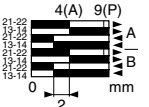

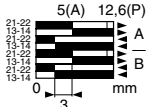

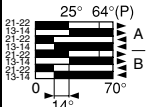
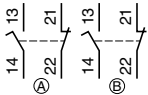



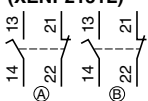



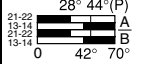
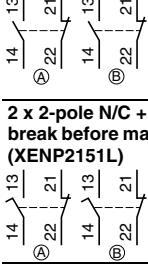



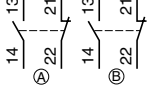

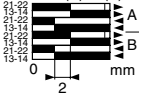

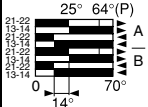
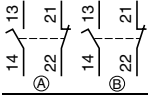



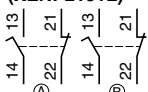



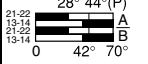







NOTE: operating lever spindle threaded M6.

Limit Switches

Limit Switches

Osiswitch® Classic, Metal

XCKML, 2 x 2-Pole Contacts—Complete Switches

| Type of head | Plunger (mounting by the body) | | | Rotary (mounting by the body) | |
|---|--|---|--|---|----------------------|
| |  |  |  |  | |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever plunger, horizontal actuation in 1 direction | Thermoplastic roller lever (1) | |
| Catalog numbers (2) | | | | | |
| Switches with 3 entries tapped ISO M20 x 1.5 | | | | | |
| 2 x 2-pole N/C + N/O snap action (XESP2151L) | XCKML110H29  | XCKML102H29  | XCKML121H29  | XCKML115H29  | |
|  |  |  |  |  | |
| 2 x 2-pole N/C + N/O break before make, slow break (XENP2151L) | XCKML510H29  | XCKML502H29  | XCKML521H29  | XCKML515H29  | |
|  |  |  |  |  | |
| Switches with 3 entries tapped for PG 13 conduit thread, plus adapter for 1/2" NPT | | | | | |
| 2 x 2-pole N/C + N/O snap action (XESP2151L) | XCKML110  | XCKML102  | XCKML121  | XCKML115  | |
|  |  |  |  |  | |
| 2 x 2-pole N/C + N/O break before make, slow break (XENP2151L) | XCKML510  | XCKML502  | XCKML521  | XCKML515  | |
|  |  |  |  |  | |
| Weight, kg (lb) | 0.400 (0.882) | 0.405 (0.893) | 0.450 (0.992) | 0.430 (0.948) | |
| Contact operation |  contact closed  contact open | (A) = cam displacement (P) = positive opening point |  N/C contact with positive opening operation, when properly mounted and using a conforming operator | | |
| Characteristics | | | | | |
| Switch actuation | On end | By 30° cam | | | |
| Type of actuation |  |  |  |  | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | |
| Minimum force | For tripping | 15 N (3.37 lb) | 12 N (2.70 lb) | 8 N (1.80 lb) | 0.2 N•m (1.77 lb-in) |
| | For positive opening | 60 N (13.49 lb) | 50 N (11.24 lb) | 50 N (11.24 lb) | 0.5 N•m (4.43 lb-in) |
| Cable entry | 3 entries tapped ISO M20 x 1.5, clamping capacity 7 to 13 mm (0.28 to 0.51 in.); or 3 entries tapped for PG 13 conduit thread conforming to NF C 68-300 (DIN PG 13.5), clamping capacity 9 to 12 mm (0.35 to 0.47 in.) (0.35 to 0.47 in.), plus adapter for 1/2" NPT | | | | |

- Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
- Switches available with other 2-pole slow break contact blocks: N/O + N/C make before break, N/C + N/C simultaneous (with positive opening operation, when properly mounted and using a conforming operator), N/C + N/C simultaneous, please consult your local sales office.

Replacement parts

The heads of limit switches type XCKML are the same as those for types XCKM and XCKL (see heads ZCKD10, ZCKD02, ZCKD21 and ZCKD15 on page 88).

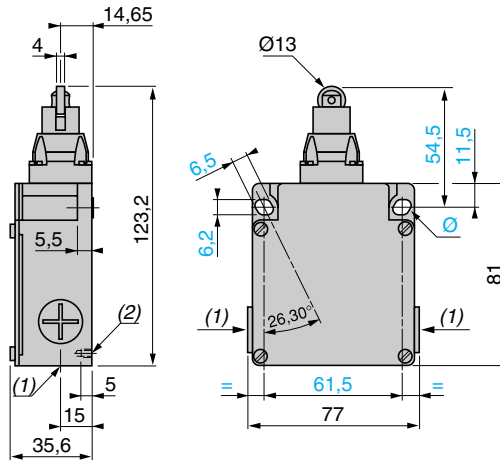
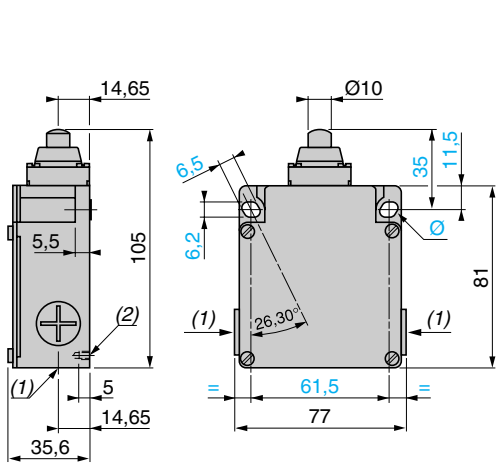
Limit Switches

Osiswitch® Classic, Metal

XCKML, 2 x 2-Pole Contacts—Complete Switches

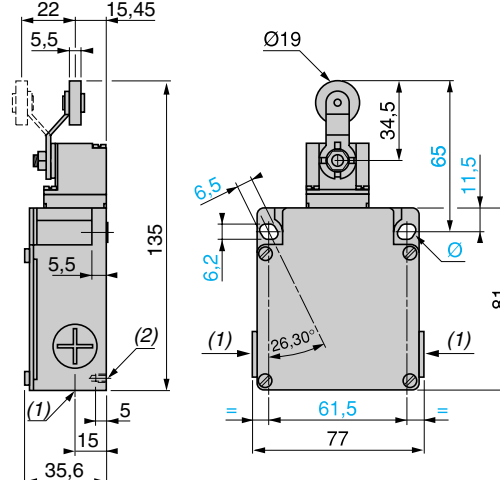
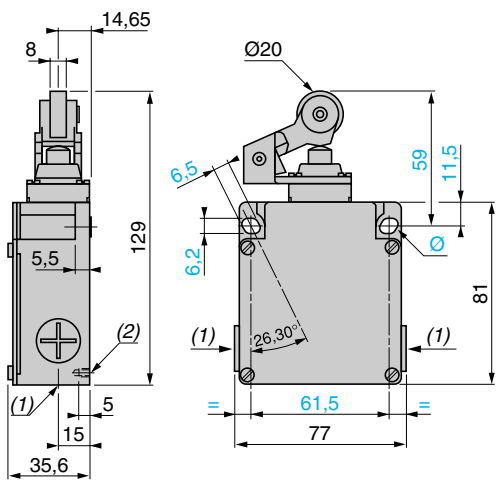
XCKML110H29, XCKML510H29, XCKML110, XCKML510

XCKML102H29, XCKML502H29, XCKML102, XCKML502



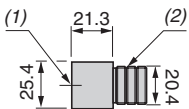
XCKML121H29, XCKML521H29, XCKML121, XCKML521

XCKML115H29, XCKML515H29, XCKML115, XCKML515



1. XCKML***H29: 3 entries tapped M20 x 1.5. XCKML***: 3 entries tapped for PG 13 conduit thread (adapter DE9RA1212 for 1/2" NPT available).
 2. 2 centering holes Ø 3.9 ± 0.2, cover mounting holes axis.
- Ø: 2 elongated holes 6.2 x 6.5, inclined at 26°30' to the vertical axis, for M5 screws.

DE9RA1212 (PG 13 to 1/2" NPT adapter)



1. Tapped entry for 1/2" NPT conduit
2. PG 13 threaded sleeve

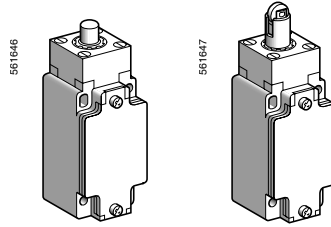
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ

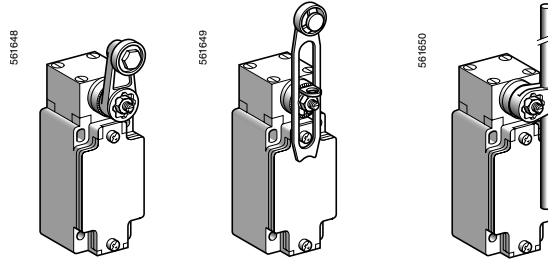
■ XCKJ
fixed, non-plug-in body with 1 cable entry

□ With head for linear movement (plunger)



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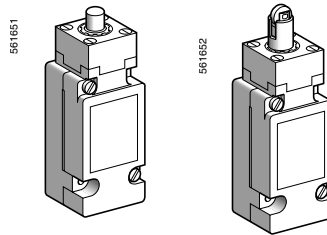
□ With head for rotary movement (lever) or multi-directional



Page 100

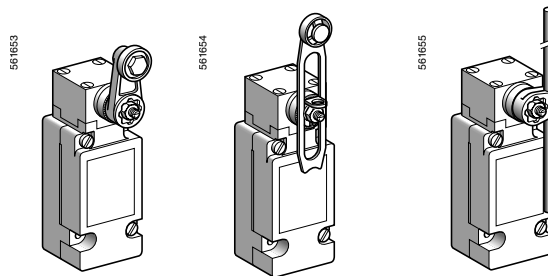
■ XCKJ
plug-in body with 1 cable entry

□ With head for linear movement (plunger)



Page 102

□ With head for rotary movement (lever)



Page 102

Environmental characteristics

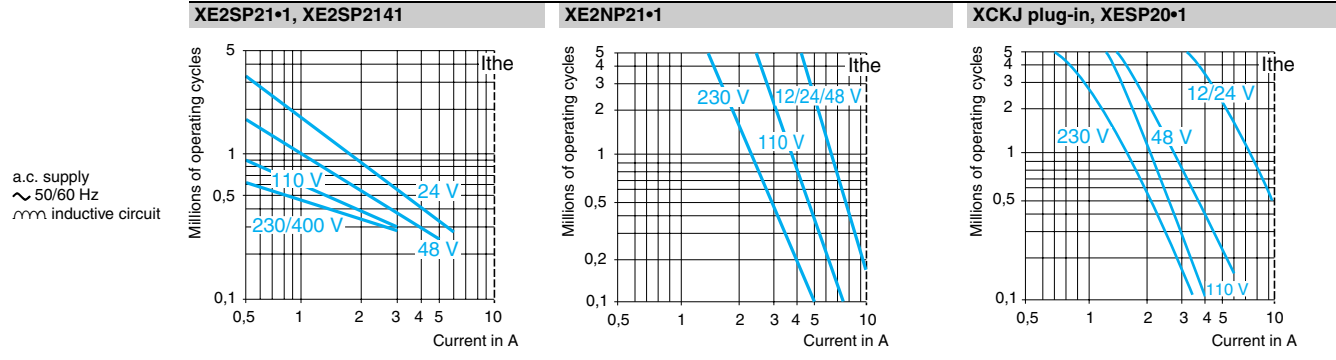
| | | |
|-----------------------------------|------------------------------|--|
| Conforming to standards | Products | IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14 |
| | Machine assemblies | IEC 60204-1, EN 60204-1 |
| Product certifications | | UL, CSA, CCC |
| Protective treatment | Version | Standard "TC", special "TH" |
| Ambient air temperature | Operation | - 25...+70 °C (-13...+158 °F), special sub-assemblies available for extreme temperatures: -40 °C (-40 °F) or +120 °C (248 °F) |
| | Storage | - 40...+70 °C (-40...+158 °F) |
| Vibration resistance | Conforming to IEC 60068-2-6 | 25 gn (10...500 Hz) |
| Shock resistance | Conforming to IEC 60068-2-27 | 50 gn (11 ms) |
| Electric shock protection | | Class I conforming to IEC 61140 and NF C 20-030 |
| Degree of protection | | NEMA Types 1, 2, 4, 12; IP 66 conforming to IEC 60529; IK 07 conforming to EN 50 102 |
| Repeat accuracy | | 0.01 mm on the tripping points, with 1 million operating cycles for head with end plunger |
| Cable entry or integral connector | Depending on model | Tapped entry for PG 13 conduit thread, or tapped ISO M20 x 1.5 or 1/2" NPT, or M12 connector |
| Materials | | Bodies and heads in Zamak® zinc alloy |

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

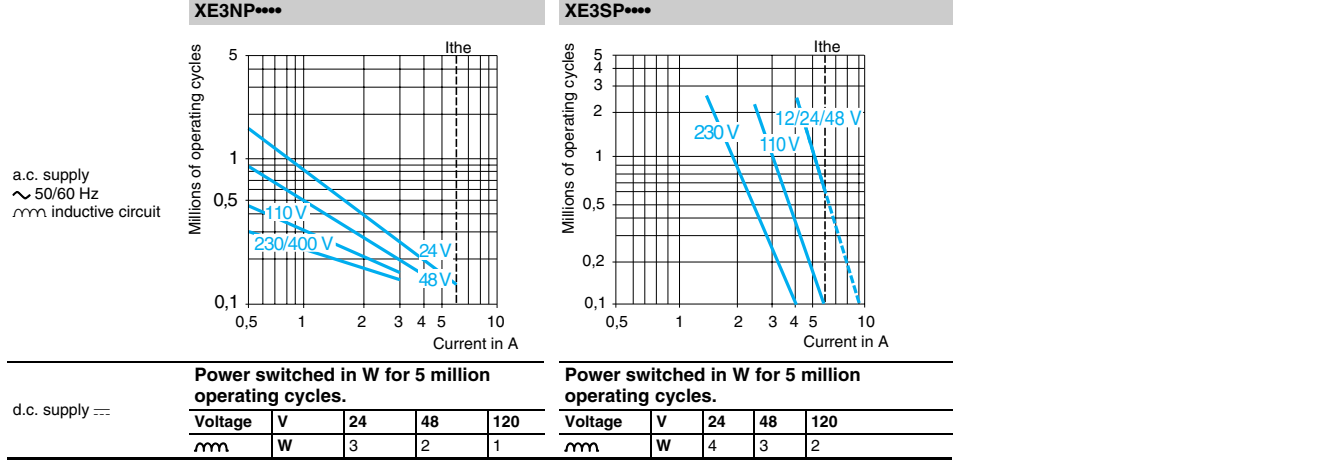
XCKJ

| Contact block characteristics | | |
|---|---------------------------|--|
| Rated operational characteristics | XE2•P | ~ AC-15; A300 ($U_e = 240\text{ V}$, $I_e = 3\text{ A}$); $I_{the} = 10\text{ A}$ ≡ DC-13; Q300 ($U_e = 250\text{ V}$, $I_e = 0.27\text{ A}$), conforming to IEC 60947-5-1 appendix A, EN 60947-5-1 |
| | XE3•P | ~ AC-15; B300 ($U_e = 240\text{ V}$, $I_e = 1.5\text{ A}$); $I_{the} = 6\text{ A}$ ≡ DC-13; R300 ($U_e = 250\text{ V}$, $I_e = 0.1\text{ A}$), conforming to IEC 60947-5-1 appendix A, EN 60947-5-1 |
| Rated insulation voltage | XE2•P | $U_i = 500\text{ V}$ degree of pollution 3 conforming to IEC 60947-1 $U_i = 300\text{ V}$ conforming to UL 508, CSA C22-2 n° 14 |
| | XE3•P | $U_i = 400\text{ V}$ degree of pollution 3 conforming to IEC 60947-1 $U_i = 300\text{ V}$ conforming to UL 508, CSA C22-2 n° 14 |
| Rated impulse withstand voltage | XE2•P | $U_{imp} = 6\text{ kV}$ conforming to IEC 60947-1, IEC 60664 |
| | XE3•P | $U_{imp} = 4\text{ kV}$ conforming to IEC 60947-1, IEC 60664 |
| Positive operation (depending on model) | | N/C contacts with positive opening operation conforming to IEC 60947-5-1 Appendix K, EN 60947-5-1 |
| Resistance across terminals | | $\leq 25\text{ m}\Omega$ conforming to IEC 60255-7 category 3 |
| Short-circuit protection | XE2•P | 10 A cartridge fuse type gG (gl) |
| | XE3•P | 6 A cartridge fuse type gG (gl) |
| Cabling (screw clamp terminals) | XE2SP21•1 | Clamping capacity, min: $1 \times 0.34\text{ mm}^2$, max: $2 \times 1.5\text{ mm}^2$ |
| | XE2NP21•1 | Clamping capacity, min: $1 \times 0.5\text{ mm}^2$, max: $2 \times 2.5\text{ mm}^2$ |
| | XCKJ plug-in and XESP20•1 | Clamping capacity, min: $1 \times 0.75\text{ mm}^2$, max: $2 \times 1.5\text{ mm}^2$ |
| | XE3NP and XE3SP | Clamping capacity, min: $1 \times 0.34\text{ mm}^2$, max: $1 \times 1\text{ mm}^2$ or $2 \times 0.75\text{ mm}^2$ |
| Minimum actuation speed | XE2SP21•1 and XE3SP: | 0.01 m/minute (0.03 ft/minute) |
| | XE2NP21•1 and XE3NP: | 6 m/minute (19.68 ft/minute) |
| Electrical durability | | <ul style="list-style-type: none"> Conforming to IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles/hour Load factor: 0.5 |



| d.c. supply ≡ | Power switched in W for 5 million operating cycles. | | | | Power switched in W for 5 million operating cycles. | | | | Power switched in W for 5 million operating cycles. | | | | | | |
|---------------|---|---|----|----|---|---------|---|----|---|-----|---------|---|----|----|-----|
| | Voltage | V | 24 | 48 | 120 | Voltage | V | 24 | 48 | 120 | Voltage | V | 24 | 48 | 120 |
| | ~ | W | 10 | 7 | 4 | ~ | W | 13 | 9 | 7 | ~ | W | 10 | 7 | 4 |

For XE2SP•151 on ~ or ≡, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

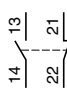
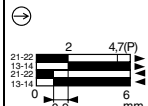
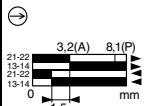
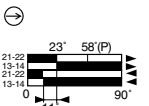
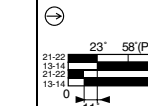
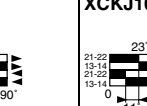
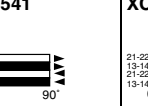
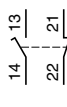
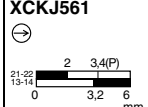
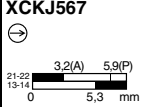
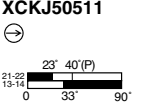
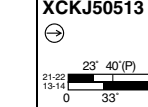

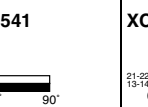
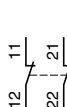
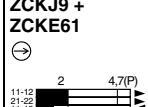
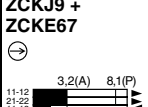
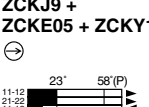
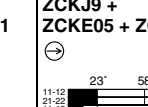
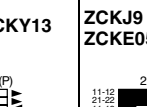
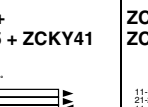
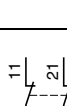
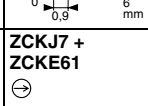
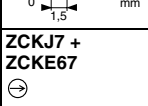
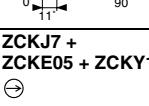
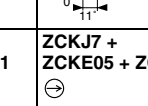
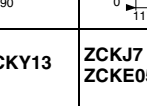
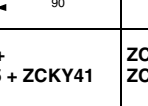
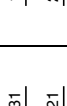
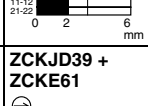

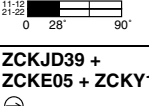
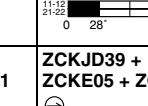
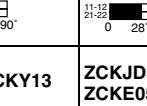
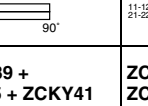
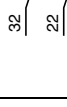
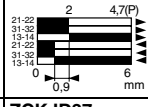
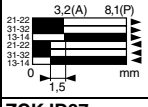
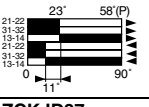
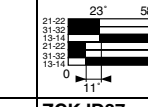
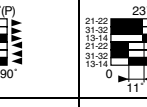
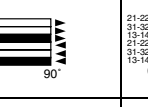










| d.c. supply ≡ | Power switched in W for 5 million operating cycles. | | | | Power switched in W for 5 million operating cycles. | | | | | |
|---------------|---|---|----|----|---|---------|---|----|----|-----|
| | Voltage | V | 24 | 48 | 120 | Voltage | V | 24 | 48 | 120 |
| | ~ | W | 3 | 2 | 1 | ~ | W | 4 | 3 | 2 |

Limit Switches

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041 XCKJ—Complete Switches, Fixed Non-plug-in Body, 1/2" NPT Cable Entry

| Type of head | Plunger (mounting by the body) | | Rotary (mounting by the body) (switches supplied for actuation from left AND right) | | | |
|---|--|---|---|---|---|--|
| | Form B (1) | Form C (1) | Form A (1) | | Form D (1) | |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever (3) | Steel roller lever (3) | Variable length thermoplastic roller lever (3) | Round thermoplastic rod lever, Ø 6 mm (0.24 in.) (3) (4) |
| Catalog numbers (2) | XCKJ161 | XCKJ167 | XCKJ10511 | XCKJ10513 | XCKJ10541 | XCKJ10559 |
|  2-pole N/C + N/O snap action (XE2S P2151) |  21-22 19-14 13-14 0 2 4,7(P) 6 mm 0,9 |  21-22 19-14 13-14 0 3,2(A) 8,1(P) 1,5 |  21-22 19-14 13-14 0 23° 58°(P) 11 90° |  21-22 19-14 13-14 0 23° 58°(P) 11 90° |  21-22 19-14 13-14 0 23° 11 90° |  21-22 19-14 13-14 0 23° 11 90° |
|  2-pole N/C + N/O break before make, slow break (XE2N P2151) |  21-22 19-14 0 2 3,4(P) 6 mm |  21-22 19-14 0 3,2(A) 5,9(P) 5,3 mm |  21-22 19-14 0 23° 40°(P) 33° 90° |  21-22 19-14 0 23° 40°(P) 33° 90° |  21-22 19-14 0 23° 33° 90° |  21-22 19-14 0 23° 33° 90° |
|  2-pole N/C + N/C snap action (XE2S P2141) |  11-12 21-22 19-14 0 2 4,7(P) 6 mm 0,9 |  11-12 21-22 19-14 0 3,2(A) 8,1(P) 1,5 |  11-12 21-22 19-14 0 23° 58°(P) 11 90° |  11-12 21-22 19-14 0 23° 58°(P) 11 90° |  11-12 21-22 19-14 0 23° 11 90° |  11-12 21-22 19-14 0 23° 11 90° |
|  2-pole N/C + N/C simultaneous, slow break (XE2N P2141) |  11-12 21-22 0 2 3,4(P) 6 mm |  11-12 21-22 0 3,5(A) 5,9(P) 3,5 mm |  11-12 21-22 0 62°(P) 28° 90° |  11-12 21-22 0 62°(P) 28° 90° |  11-12 21-22 0 28° 90° |  11-12 21-22 0 28° 90° |
|  3-pole N/C + N/C + N/O snap action (XE3S P2141) |  21-22 31-32 19-14 13-14 0 2 4,7(P) 6 mm 0,9 |  21-22 31-32 19-14 13-14 0 3,2(A) 8,1(P) 1,5 |  21-22 31-32 19-14 13-14 0 23° 58°(P) 11 90° |  21-22 31-32 19-14 13-14 0 23° 58°(P) 11 90° |  21-22 31-32 19-14 13-14 0 23° 11 90° |  21-22 31-32 19-14 13-14 0 23° 11 90° |
|  3-pole N/C + N/C + N/O break before make, slow break (XE3N P2141) |  21-22 31-32 19-14 0 2 3,4(P) 6 mm |  21-22 31-32 19-14 0 3,2(A) 5,9(P) 5,3 mm |  21-22 31-32 19-14 0 23° 40°(P) 33° 90° |  21-22 31-32 19-14 0 23° 40°(P) 33° 90° |  21-22 31-32 19-14 0 23° 33° 90° |  21-22 31-32 19-14 0 23° 33° 90° |
| Weight, kg (lb) | 0.430 (0.948) | 0.455 (1.003) | 0.480 (1.058) | 0.490 (1.080) | 0.485 (1.069) | 0.485 (1.069) |
| Contact operation |  contact closed  contact open | | (A) = cam displacement (P) = positive opening point | |  N/C contact with positive opening operation, when properly mounted and using a conforming operator | |
| Characteristics | | | | | | |
| Switch actuation | On end | By 30° cam | | | By any moving part | |
| Type of actuation |  |  |  |  |  | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | 1.5 m/s (4.92 ft/s) | | | |
| Minimum force or torque | For tripping: 20 N (4.50 lb) For positive opening: 50 N (11.24 lb) | 16 N (3.60 lb) 40 N (8.99 lb) | 0.25 N•m (2.21 lb-in) 0.50 N•m (4.43 lb-in) | | | — |
| Cable entry | 1 entry tapped 1/2" NPT for ISO cable entry, clamping capacity 9 to 12 mm (0.35 to 0.47 in.) | | | | | |

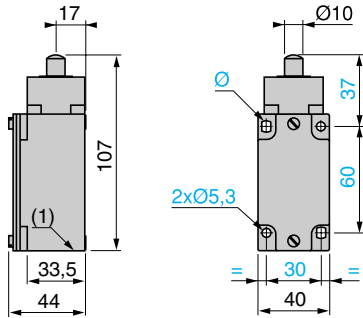
- Form conforming to EN 50041. See page 23.
- Switches with gold contacts or eyelet type connections: please consult your local sales office.
- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.
- Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

Limit Switches

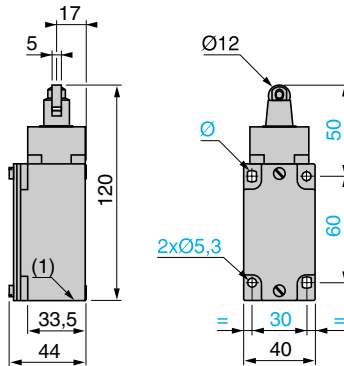
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Complete Switches, Fixed Non-plug-in Body, 1/2" NPT Cable Entry

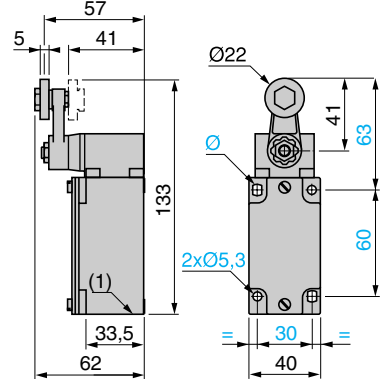
XCKJ•61
ZCKJ•+ ZCKE61



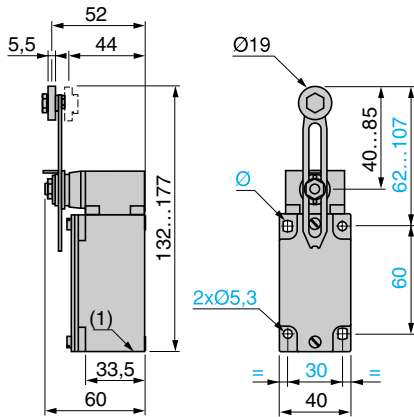
XCKJ•67
ZCKJ•+ ZCKE67



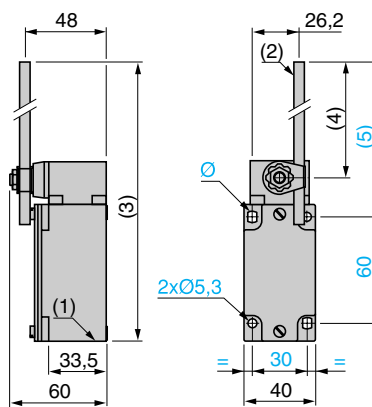
XCKJ•051•
ZCKJ•+ ZCKE05 + ZCKY11 or Y13



XCKJ•0541
ZCKJ•+ ZCKE05 + ZCKY41



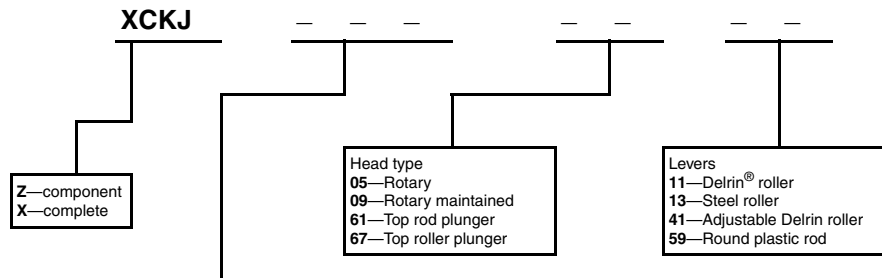
XCKJ•0559
ZCKJ•+ ZCKE05 + ZCKY59



1. 1 tapped entry for 1/2" NPT.
 2. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.).
 3. 282 max.
 4. 190 max.
 5. 212 max.
- Ø: 2 elongated holes Ø 5.3 x 7.3.

For Interpretation of the Complete Switch Catalog Number Only

Note: See following pages for the complete switch offering

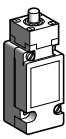
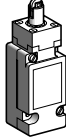

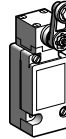
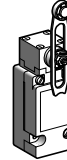
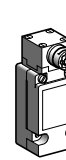

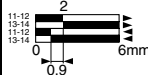
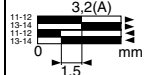
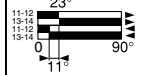
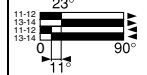
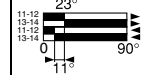
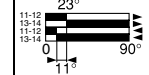
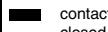
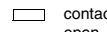



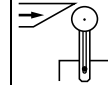



| Switch type | |
|-------------|--|
| 1 | SPDT Non-plug-in |
| 2 | 2SPDT Non-plug-in |
| 4 | 2SPDT Non-plug-in for 2 step or neutral position |
| 5 | SPDT Non-plug-in slow make slow break |
| 8 | SPDT Gold Contacts |
| 11 | SPDT Plug-in |
| 21 | 2SPDT Plug-in |
| 41 | 2SPDT Plug-in for 2 step or neutral position |

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Complete Switches, Plug-in Body, 1/2" NPT Cable Entry

| Type of head | Plunger (mounting by the body) | | Rotary (mounting by the body) (switches supplied for actuation from left AND right) | | | |
|---|---|--|--|--|--|---|
| | Form B (1) | Form C (1) | Form A (1) | | Form D (1) | |
| |  |  |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever (3) | Steel roller lever (3) | Variable length thermoplastic roller lever (3) | Round thermoplastic rod lever, Ø 6 mm (0.24 in.) (3) (4) |
| Catalog numbers (2) | | | | | | |
|  Single-pole C/O snap action | XCKJ1161 | XCKJ1167 | XCKJ110511 | XCKJ110513 | XCKJ110541 | XCKJ110559 |
| |  |  |  |  |  |  |
| Weight, kg (lb) | 0.430 (0.948) | 0.455 (1.003) | 0.480 (1.058) | 0.490 (1.080) | 0.485 (1.069) | 0.485 (1.069) |
| Contact operation |  contact closed  contact open | | (A) = cam displacement | | | |
| Characteristics | | | | | | |
| Switch actuation | On end | By 30° cam | | | By any moving part | |
| Type of actuation |  |  |  |  |  | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | 1.5 m/s (4.92 ft/s) | | | |
| Minimum force or torque for tripping | 20 N (4.50 lb) | 16 N (3.60 lb) | 0.25 N•m (2.21 lb-in) | | | |
| Cable entry | 1 entry tapped for 1/2" NPT cable entry. Clamping capacity 7 to 13 mm (0.28 to 0.51 in.) | | | | | |

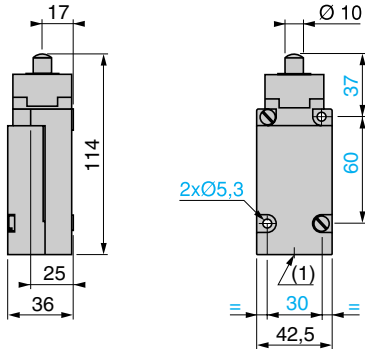
1. Form conforming to EN 50041. See page 23.
2. Switches with gold contacts: please consult your local sales office.
3. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
4. Value taken with actuator operating at 100 mm (3.94 in.) from the mounting.

Limit Switches

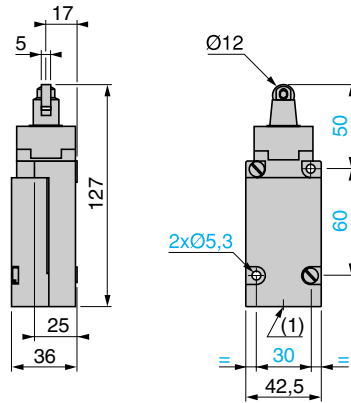
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Complete Switches, Plug-in Body, 1/2" NPT Cable Entry

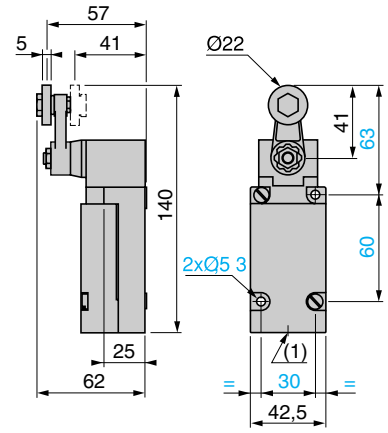
XCKJ1611



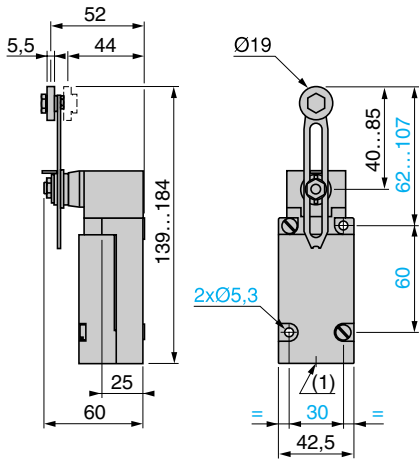
XCKJ1167



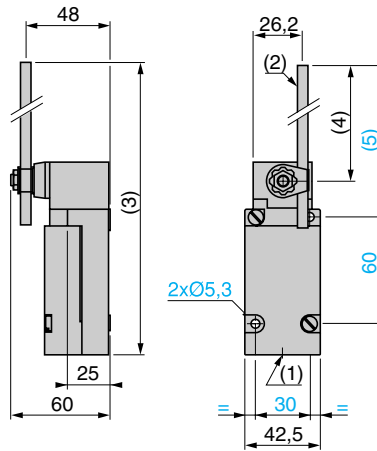
XCKJ110511, XCKJ110513



XCKJ110541



XCKJ110559

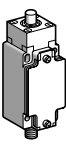
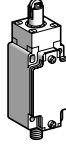
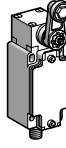
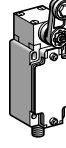

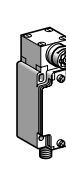
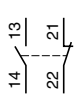
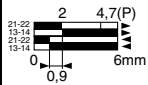
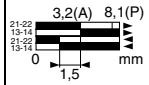
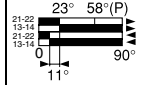
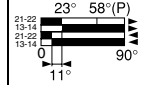
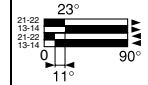
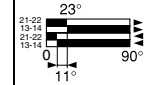
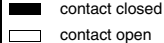








1. Tapped entry for 1/2" NPT conduit.
2. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.).
3. 289 max.
4. 190 max.
5. 212 max.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral M12 Connector

| Type of head | Plunger (mounting by the body) | | Rotary (mounting by the body) (switches supplied for actuation from left AND right) | | | |
|---|--|--|--|---|--|--|
| | Form B (1) | Form C (1) | Form A (1) | | | Form D (1) |
| |  |  |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever (2) | Steel roller lever (2) | Variable length thermoplastic roller lever (2) | Round thermoplastic rod lever, Ø 6 mm (0.24 in.) (2) (3) |
| Catalog numbers (4) | | | | | | |
|  2-pole N/C + N/O snap action (XE2SP2151) | XCKJ161D  | XCKJ167D  | XCKJ10511D  | XCKJ10513D  | XCKJ10541D  | XCKJ10559D  |
| | Weight, kg (lb) | 0.430 (0.948) | 0.455 (1.003) | 0.480 (1.058) | 0.490 (1.080) | 0.485 (1.069) |
| Contact operation |  contact closed  contact open | | (A) = cam displacement (P) = positive opening point | | | |
| Characteristics | | | | | | |
| Switch actuation | On end | By 30° cam | | | By any moving part | |
| Type of actuation |  |  |  |  |  | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | 1.5 m/s (4.92 ft/s) | | | |
| Minimum force or torque | For tripping | 20 N (4.50 lb) | 16 N (3.60 lb) | 0.25 N•m (2.21 lb-in) | | |
| | For positive opening | 50 N (11.24 lb) | 40 N (8.99 lb) | 0.50 N•m (4.43 lb-in) | | |
| Connection | M12 5-pin connector, U _i = 60 V, I _e = 4 A (see suitable pre-wired female connectors below). | | | | | |

- Form conforming to EN 50041. See page 23.
- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.
- Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.
- Switches with gold contacts: please consult your local sales office.

Catalog numbers of suitable pre-wired female connectors

| Type of connector | Length (L) | M12 straight, 5-pin, 4 A/24 V max. | M12 elbowed, 5-pin, 4 A/24 V max. | Weight, kg (lb) |
|--|----------------|------------------------------------|-----------------------------------|-----------------|
| With cable, Ø 5.8 mm (0.23 in.) (4 x 0.34 mm ² + 1 x 0.5 mm ²) | 2 m (6.56 ft) | XZCP1164L2 | XZCP1264L2 | 0.115 (0.254) |
| | 5 m (16.40 ft) | XZCP1164L5 | XZCP1264L5 | 0.270 (0.595) |
| | 10 m (32.8 ft) | XZCP1164L10 | XZCP1264L10 | 0.520 (1.146) |

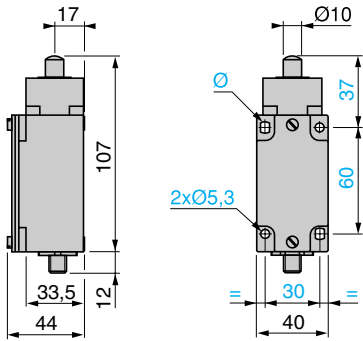
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

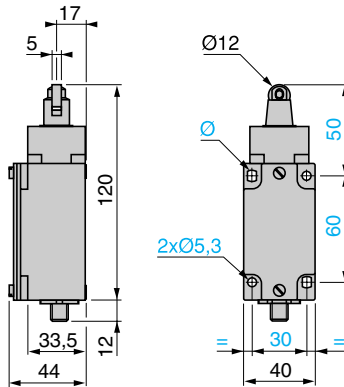
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral M12 Connector

Dimensions

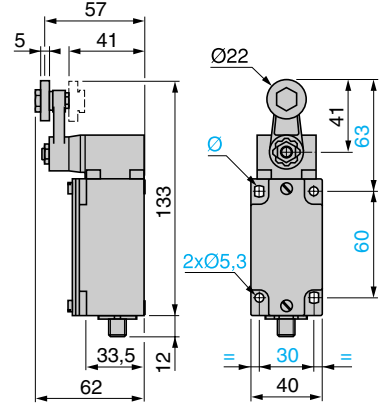
XCKJ161D



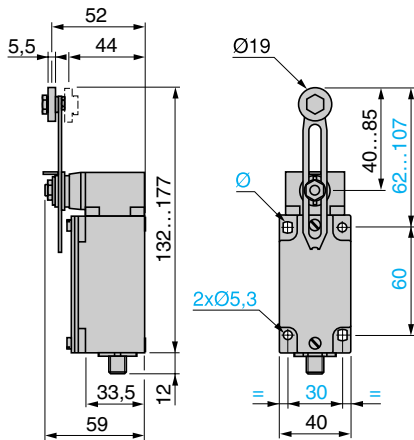
XCKJ167D



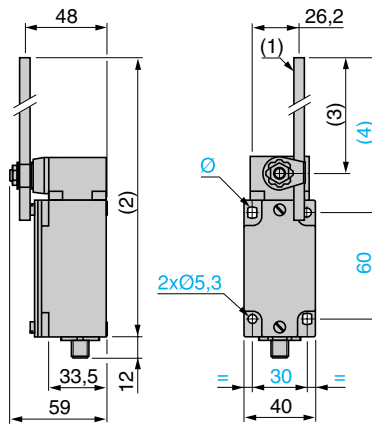
XCKJ1051•D



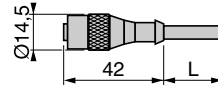
XCKJ10541D



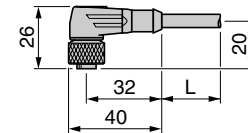
XCKJ10559D



XZCP1164L•



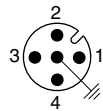
XZCP1264L•



- 1. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.)
- 2. 282 max.
- 3. 190 max.
- 4. 212 max.
- Ø: 2 elongated holes Ø 5.3 x 7.3
- L: Cable length 2, 5, or 10 m (6.6, 16.4, or 32.8 ft)

Connections

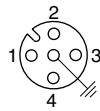
Limit switch XCKJ••••D



- 1-2 = N/C
- 3-4 = N/O
- 5 = ⊥
- 4 A / 24 V max.



Pre-wired female connector XZCP1•64L•

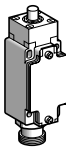
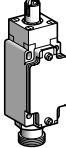
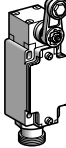
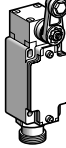
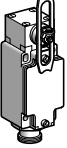
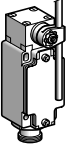

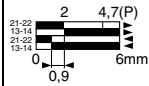
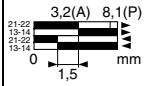
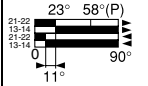
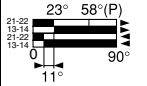
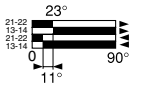
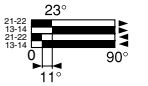
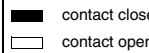
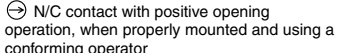








- 1 = brown
- 2 = white
- 3 = blue
- 4 = black
- 5 = ⊥ yellow/green

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral 7/8" 16UN connector

| Type of head | Plunger (mounting by the body) | | Rotary (mounting by the body) (switches supplied for actuation from left AND right) | | | |
|---|--|--|--|---|--|--|
| | Form B (1) | Form C (1) | Form A (1) | | Form D (1) | |
| |  |  |  |  |  |  |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever (2) | Steel roller lever (2) | Variable length thermoplastic roller lever (2) | Round thermoplastic rod lever, Ø 6 mm (0.24 in.) (2) (3) |
| Catalog numbers (4) | | | | | | |
|  2-pole N/C + N/O snap action (XE2SP2151) | XCKJ161A  | XCKJ167A  | XCKJ10511A  | XCKJ10513A  | XCKJ10541A  | XCKJ10559A  |
| | Weight, kg (lb) | 0.430 (0.948) | 0.455 (1.003) | 0.480 (1.058) | 0.490 (1.080) | 0.485 (1.069) |
| Contact operation |  | | (A) = cam displacement (P) = positive opening point |  | | |
| Characteristics | | | | | | |
| Switch actuation | On end | By 30° cam | | | By any moving part | |
| Type of actuation |  |  |  |  |  |  |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | 1 m/s (3.28 ft/s) | 1.5 m/s (4.92 ft/s) | | | |
| Minimum force or torque | For tripping | 20 N (4.50 lb) | 16 N (3.60 lb) | 0.25 N•m (2.21 lb-in) | | |
| | For positive opening | 50 N (11.24 lb) | 40 N (8.99 lb) | 0.50 N•m (4.43 lb-in) | | |
| Connection | 7/8" 16UN 5-pin connector, Ui = 250 V; Ie = 6 A (see suitable pre-wired female connectors below). | | | | | |

- Form conforming to EN 50041. See page 23.
- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
- Value taken with actuator operating at 100 mm (3.94 in.) from the mounting.
- Switches with gold contacts: please consult your local sales office.

Catalog numbers of suitable pre-wired female connectors

| Type of connector | Length (L) | 7/8" 16UN straight, 5-pin, 6 A/250 V max. | Weight, kg (lb) |
|--|----------------|---|-----------------|
| With cable, Ø 6.7 mm (5 x 0.5 mm ²) | 2 m (6.56 ft) | XZCP1771L2 | 0.190 (0.419) |
| | 5 m (16.40 ft) | XZCP1771L5 | 0.475 (1.047) |
| | 10 m (32.8 ft) | XZCP1771L10 | 0.950 (2.094) |

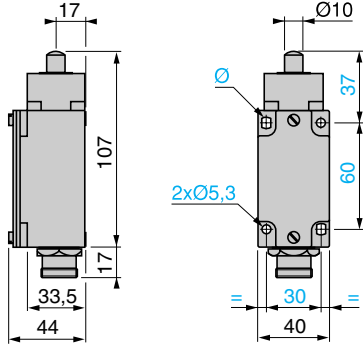
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

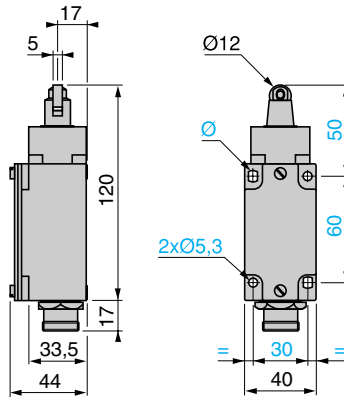
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral 7/8" 16UN connector

Dimensions

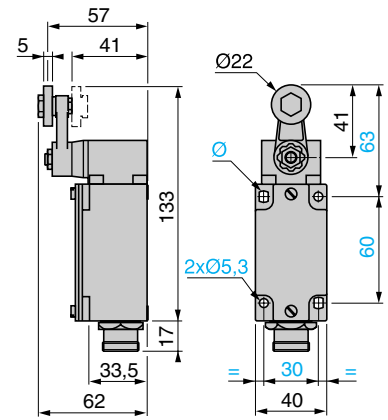
XCKJ161A



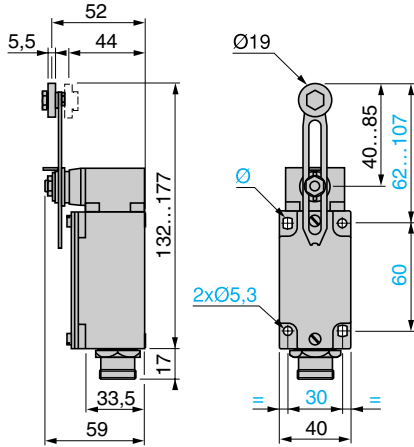
XCKJ167A



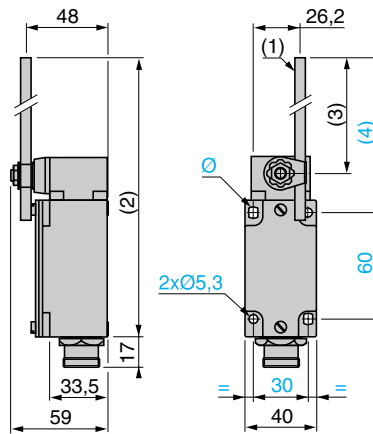
XCKJ1051•A



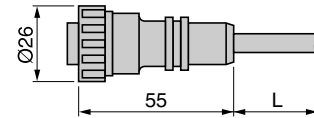
XCKJ10541A



XCKJ10559A



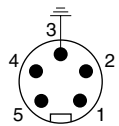
XZCP1771L•



1. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.)
 2. 282 max.
 3. 190 max.
 4. 212 max.
- Ø: 2 elongated holes Ø 5.3 x 7.3
L: cable length: 2, 5, or 10 m (6.6, 16.4, or 32.8 ft)

Connections

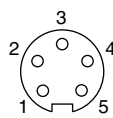
Limit switch XCKJ••••A



- 1 = 21
- 2 = 22
- 3 = \perp
- 4 = 14
- 5 = 13



Pre-wired female connector XZCP1771L•

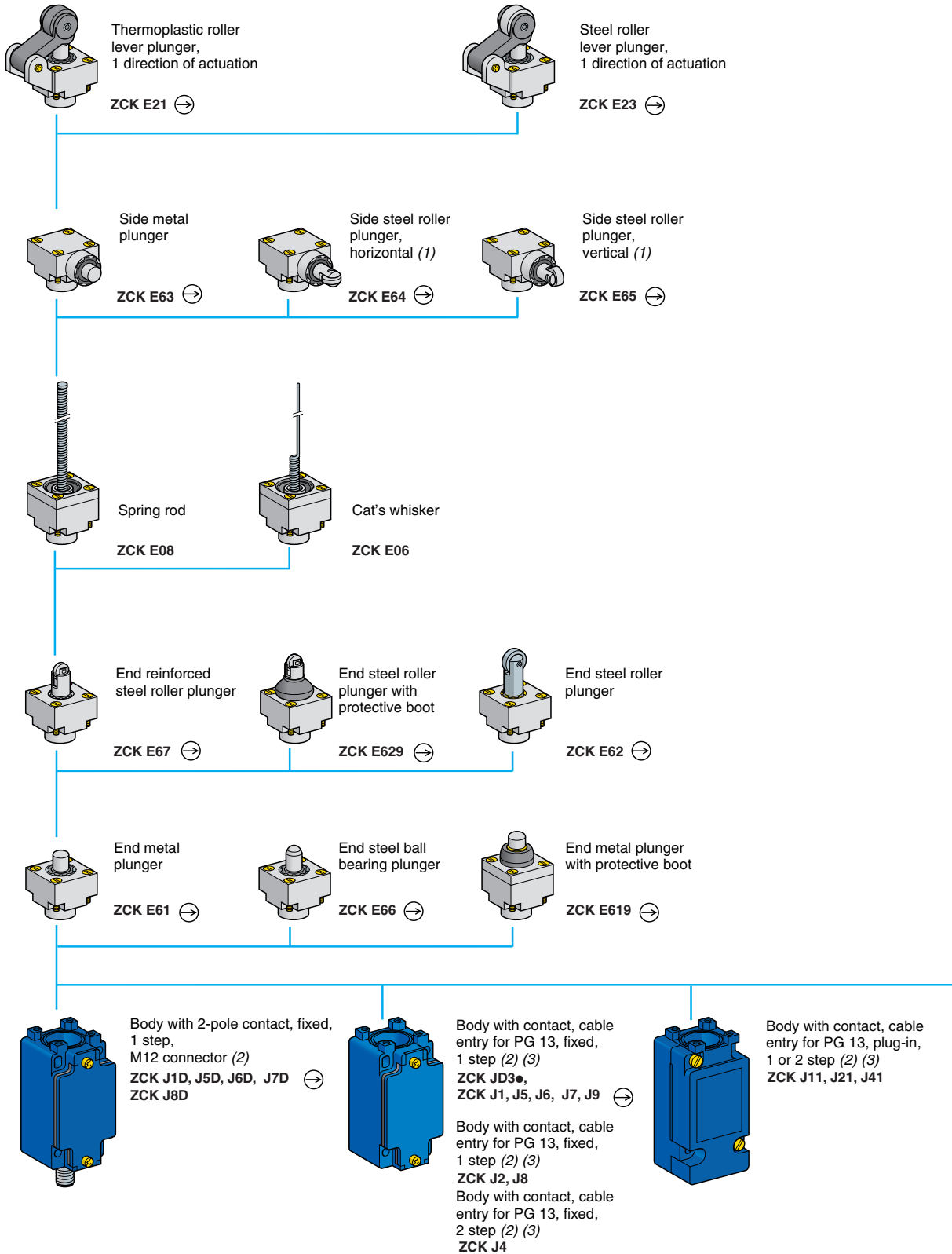


- 1 = black
- 2 = blue
- 3 = yellow/green \perp
- 4 = brown
- 5 = white

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies

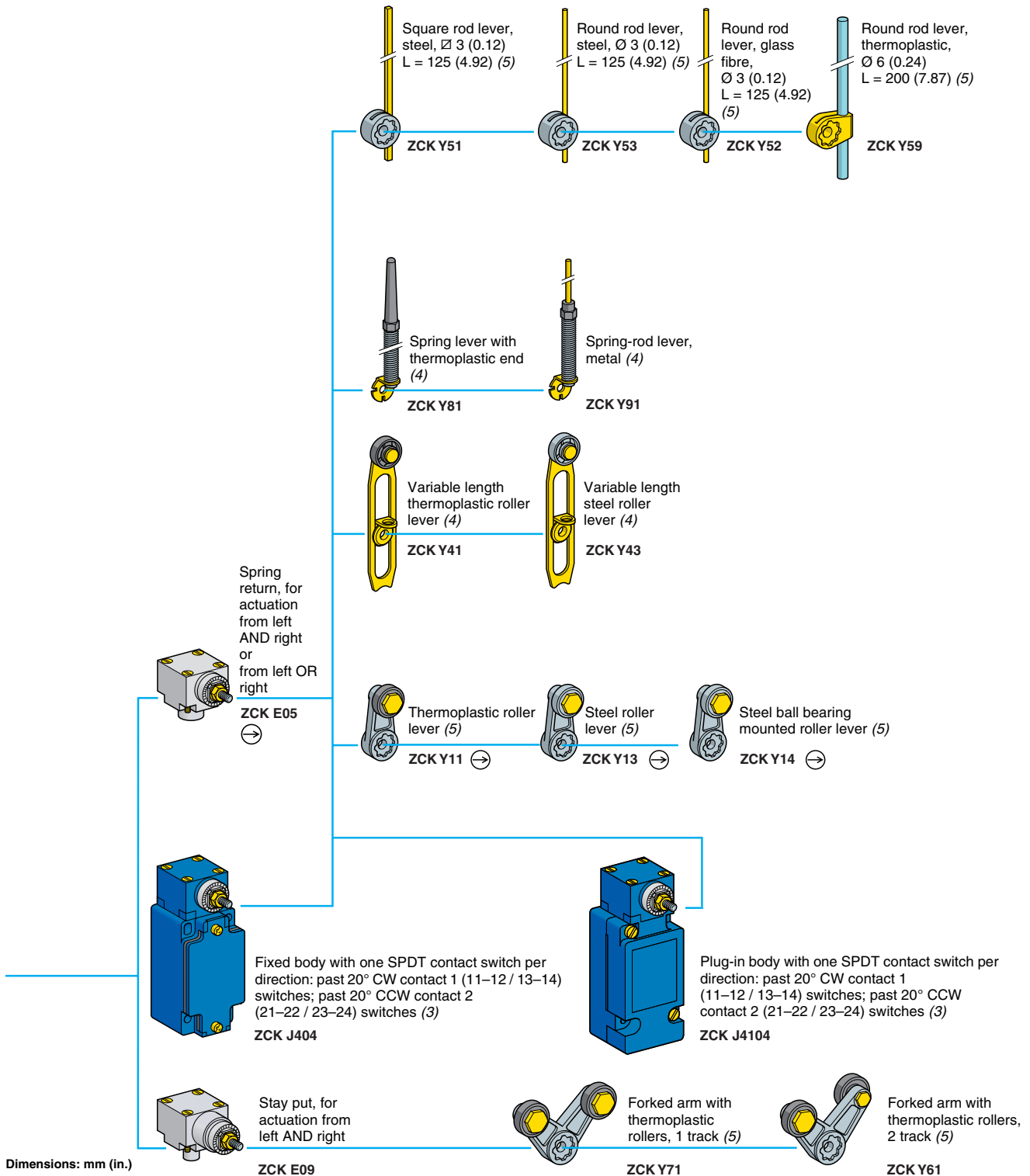


1. Cannot be used with bodies ZCKJ4 and ZCKJ41.
 2. For further details, see page 110.
 3. For a cable entry tapped ISO M20 x 1.5, add **H29** to the catalog number. Example: ZCKJ1 becomes **ZCKJ1H29**.
 For a cable entry tapped 1/2" NPT, do not add an H code to the catalog number. Example: **ZCKJ1**.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies



Dimensions: mm (in.)

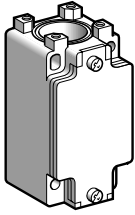
⊙: head assuring positive opening operation, when properly mounted and using a conforming operator.

- 4. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
- 5. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry



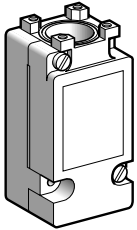
| Fixed bodies with 2-pole contact | | | | | | |
|---|--|------------------|------------------------|---------------|----------------|----------------|
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | 1/2" NPT | ZCKJ1 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ1H29 | 0.310 (0.683) |
| | 2 C/O simultaneous, snap action (XES P2021) | | - | 1/2" NPT | ZCKJ2 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ2H29 | 0.310 (0.683) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊕ | 1/2" NPT | ZCKJ5 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ5H29 | 0.310 (0.683) |
| | N/C + N/O make before make, slow break (XE2N P2161) | | ⊕ | 1/2" NPT | ZCKJ6 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ6H29 | 0.310 (0.683) |
| | N/C + N/C simultaneous, slow break (XE2N P2141) | | ⊕ | 1/2" NPT | ZCKJ7 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ7H29 | 0.310 (0.683) |
| N/O + N/O simultaneous, slow break (XE2N P2131) | | - | 1/2" NPT | ZCKJ8 | 0.310 (0.683) | |
| | | | ISO M20 x 1.5 | ZCKJ8H29 | 0.310 (0.683) | |
| N/C + N/C snap action (XE2S P2141) | | ⊕ | 1/2" NPT | ZCKJ9 | 0.310 (0.683) | |
| | | | ISO M20 x 1.5 | ZCKJ9H29 | 0.310 (0.683) | |
| 2 step | 2 C/O staggered, snap action (XES P2031) | | - | 1/2" NPT | ZCKJ4 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ4H29 | 0.310 (0.683) |
| Fixed bodies with 3-pole contact | | | | | | |
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| - | N/C + N/O + N/O snap action (XE3S P2151) | | ⊕ | 1/2" NPT | ZCKJD31 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJD31H29 | 0.310 (0.683) |
| | N/C + N/C + N/O snap action (XE3S P2141) | | ⊕ | 1/2" NPT | ZCKJD39 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJD39H29 | 0.310 (0.683) |
| | N/C + N/C + N/O break before make, slow break (XE3N P2141) | | ⊕ | 1/2" NPT | ZCKJD37 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJD37H29 | 0.310 (0.683) |
| | N/C + N/O + N/O break before make, slow break (XE3N P2151) | | ⊕ | 1/2" NPT | ZCKJD35 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJD35H29 | 0.310 (0.683) |

1. ⊕: N/C contact with positive opening operation, when properly mounted and using a conforming operator.

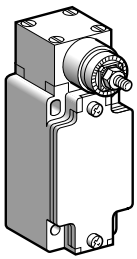
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

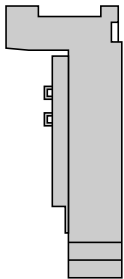
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry



ZCKJ•1



ZCKJ404



ZCKJ0•

| Plug-in bodies with contact | | | | | | |
|-----------------------------|---|------------------|------------------------|---------------|----------------|----------------|
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| 1 step | Single-pole C/O snap action | | — | 1/2" NPT | ZCKJ11 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ11H29 | 0.300 (0.661) |
| | Double-pole 2 C/O simultaneous, snap action | | — | 1/2" NPT | ZCKJ21 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ21H29 | 0.300 (0.661) |
| 2 step | Double-pole 2 C/O staggered, snap action | | — | 1/2" NPT | ZCKJ41 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ41H29 | 0.300 (0.661) |

| Bodies with contact, with rotary head (without operating lever) | | | | | | |
|---|--|------------------|------------------------|---------------|----------------|----------------|
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| Fixed non-plug-in body | | | | | | |
| Neutral position 1 from the left AND 1 from the right | One SPDT contact switch per direction: past 20° CW contact 1 (11–12 / 13–14) switches; past 20° CCW contact 2 (21–22 / 23–24) switches | | — | 1/2" NPT | ZCKJ404 | 0.455 (1.003) |
| | | | | ISO M20 x 1.5 | ZCKJ404H29 | 0.455 (1.003) |
| Plug-in body | | | | | | |
| Neutral position 1 from the left AND 1 from the right | One SPDT contact switch per direction: past 20° CW contact 1 (11–12 / 13–14) switches; past 20° CCW contact 2 (21–22 / 23–24) switches | | — | 1/2" NPT | ZCKJ4104 | 0.465 (1.025) |
| | | | | ISO M20 x 1.5 | ZCKJ4104H29 | 0.465 (1.025) |

| Plug-in housing switch top only | | | | | | |
|--|--------------|----------|----------------|----------------|--|--|
| Description | For use with | Contacts | Catalog number | Weight kg (lb) | | |
| Single-pole 1 C/O with positive opening operation | ZCKJ11 | Silver | ZCKJ01 | 0.150 (0.331) | | |
| Double-pole 2 C/O simultaneous with positive opening operation | ZCKJ21 | Silver | ZCKJ02 | 0.160 (0.353) | | |
| Double-pole 1 C/O + 1 C/O neutral position | ZCKJ41 | Silver | ZCKJ04 | 0.160 (0.353) | | |

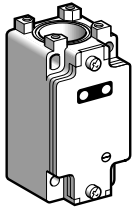
1. Ⓢ: N/C contact with positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

With Indicator Light Module

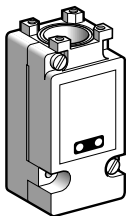


| Fixed non-plug-in bodies with 2-pole contact | | | | | | |
|---|--|------------------|------------------------|---------------|----------------|----------------|
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| With module comprising 1 LED, 24 V$\overline{\text{---}}$ | | | | | | |
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | 1/2" NPT | ZCKJ120 | 0.320 (0.705) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊕ | 1/2" NPT | ZCKJ520 | 0.320 (0.705) |
| With module comprising 2 LEDs, 24 V$\overline{\text{---}}$ | | | | | | |
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | 1/2" NPT | ZCKJ121 | 0.320 (0.705) |
| | | | | ISO M20 x 1.5 | ZCKJ121H29 | 0.320 (0.705) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊕ | 1/2" NPT | ZCKJ521 | 0.320 (0.705) |
| | | | | ISO M20 x 1.5 | ZCKJ521H29 | 0.320 (0.705) |
| With module comprising 2 neon indicator lights, 110/120 V\sim | | | | | | |
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | 1/2" NPT | ZCKJ133 | 0.320 (0.705) |
| | | | | ISO M20 x 1.5 | ZCKJ133H29 | 0.320 (0.705) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊕ | 1/2" NPT | ZCKJ533 | 0.320 (0.705) |
| | | | | ISO M20 x 1.5 | ZCKJ533H29 | 0.320 (0.705) |
| With module comprising 2 neon indicator lights, 220/240 V\sim | | | | | | |
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | 1/2" NPT | ZCKJ134 | 0.320 (0.705) |
| | | | | ISO M20 x 1.5 | ZCKJ134H29 | 0.320 (0.705) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊕ | 1/2" NPT | ZCKJ534 | 0.320 (0.705) |
| | | | | ISO M20 x 1.5 | ZCKJ534H29 | 0.320 (0.705) |
| Plug-in bodies with single-pole contact | | | | | | |
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
| With module comprising 2 LEDs, 24 V$\overline{\text{---}}$ | | | | | | |
| 1 step | C/O snap action | | — | 1/2" NPT | ZCKJ1121 | 0.340 (0.750) |
| | | | | ISO M20 x 1.5 | ZCKJ1121H29 | 0.340 (0.750) |
| With module comprising 2 neon indicator lights, 110/120 V\sim | | | | | | |
| 1 step | C/O snap action | | — | 1/2" NPT | ZCKJ1133 | 0.340 (0.750) |
| | | | | ISO M20 x 1.5 | ZCKJ1133H29 | 0.340 (0.750) |
| With module comprising 2 neon indicator lights, 220/240 V\sim | | | | | | |
| 1 step | C/O snap action | | — | 1/2" NPT | ZCKJ1134 | 0.340 (0.750) |
| | | | | ISO M20 x 1.5 | ZCKJ1134H29 | 0.340 (0.750) |

1. ⊕: N/C contact with positive opening operation, when properly mounted and using a conforming operator.

Indicator light module characteristics

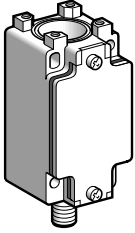
| Type of indicator | 1 LED or 2 LEDs | 2 neon lights | |
|-----------------------------|---|--|--------------------|
| Rated insulation voltage | $\overline{\text{---}}$ 50 V, conforming to IEC 60947-1 | 250 V \sim , conforming to IEC 60947-1 | |
| Current consumption | 7 mA per LED | 2.5 mA per neon | 5 mA per neon |
| Rated operational voltage | 24 V $\overline{\text{---}}$ | 110/120 V \sim | 220/240 V \sim |
| Voltage limits | 20...30 V $\overline{\text{---}}$ (including ripple) | 95...130 V \sim | 190...260 V \sim |
| Service life | 100 000 hours | 20 000 hours | 20 000 hours |
| Reverse polarity protection | Yes | — | |



Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in Bodies with M12 Connector



| Fixed bodies with 2-pole contact | | | | | |
|----------------------------------|---|------------------|------------------------|----------------|------------------|
| Type | With contact block | Function diagram | Positive operation (1) | Catalog number | Weight kg (lb) |
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | ZCKJ1D | 0.320 (0.705) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊖ | ZCKJ5D | 0.320 (0.705) |
| | N/O + N/C make before make, slow break (XE2N P2161) | | ⊕ | ZCKJ6D | 0.320 (0.705) |
| | N/C + N/C simultaneous, slow break (XE2N P2141) | | ⊖ | ZCKJ7D | 0.320 (0.705) |
| | N/O + N/O simultaneous, slow break (XE2N P2131) | | — | ZCKJ8D | 0.320 (0.705) |

1. N/C contact with positive opening operation, when properly mounted and using a conforming operator.

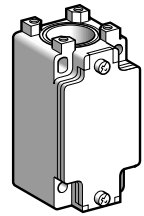
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

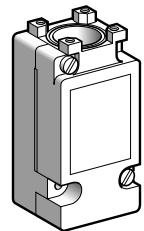
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

Low-Temperature Applications (−40 °F / −40 °C)

Body with contacts—For plunger or rotary head



ZCKJ1



ZCKJ11

| Type | Contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
|--|---|------------------|------------------------|---------------|----------------|----------------|
| Fixed non-plug-in body | | | | | | |
| 1 step | 2-pole 1 N/C + 1 N/O snap action (XE2SP2151) | | ⊕ | 1/2" NPT | ZCKJ1 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ1H29 | 0.310 (0.683) |
| | Double-pole 2 C/O simultaneous snap action (XESP2021) | | — | 1/2" NPT | ZCKJ2 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ2H29 | 0.310 (0.683) |
| | 2-pole 1 N/C + 1 N/O break before make slow break (XE2NP2151) | | ⊕ | 1/2" NPT | ZCKJ5 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ5H29 | 0.310 (0.683) |
| | 2-pole 1 N/O + 1 N/C make before break slow break (XE2NP2161) | | ⊕ | 1/2" NPT | ZCKJ6 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ6H29 | 0.310 (0.683) |
| | 2-pole 1 N/C + 1 N/C simultaneous slow break (XE2NP2141) | | ⊕ | 1/2" NPT | ZCKJ7 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ7H29 | 0.310 (0.683) |
| | 2-pole 1 N/O + 1 N/O simultaneous slow break (XE2NP2131) | | — | 1/2" NPT | ZCKJ8 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ8H29 | 0.310 (0.683) |
| 2-pole 1 N/C + 1 N/C snap action (XE2SP2141) | | ⊕ | 1/2" NPT | ZCKJ9 | 0.310 (0.683) | |
| | | | ISO M20 x 1.5 | ZCKJ9H29 | 0.310 (0.683) | |
| 2 step | Double-pole 2 C/O staggered snap action (XESP2031) | | — | 1/2" NPT | ZCKJ4 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ4H29 | 0.310 (0.683) |
| Plug-in body | | | | | | |
| 1 step | Single-pole 1 C/O snap action | | — | 1/2" NPT | ZCKJ11 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ11H29 | 0.300 (0.661) |
| | Double-pole 2 C/O simultaneous snap action | | — | 1/2" NPT | ZCKJ21 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ21H29 | 0.300 (0.661) |
| 2 step | Double-pole 2 C/O staggered snap action | | — | 1/2" NPT | ZCKJ41 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ41H29 | 0.300 (0.661) |
| Body with contacts—With spring return rotary head (without operating lever) | | | | | | |
| Fixed non-plug-in body | | | | | | |
| Neutral position 1 from the left and 1 from the right | Double-pole 2 C/O staggered snap action | | — | 1/2" NPT | ZCKJ4046 | 0.455 (1.003) |
| | | | | ISO M20 x 1.5 | ZCKJ4046H29 | 0.455 (1.003) |
| Plug-in body | | | | | | |
| Neutral position 1 from the left and 1 from the right | Double-pole 2 C/O staggered snap action | | — | 1/2" NPT | ZCKJ41046 | 0.465 (1.025) |
| | | | | ISO M20 x 1.5 | ZCKJ41046H29 | 0.465 (1.025) |

1. ⊕ : Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.

Setup:
page 122

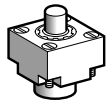
Dimensions:
page 124

Limit Switches

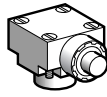
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

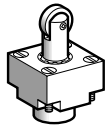
Low-Temperature Applications (−40 °F / −40 °C)



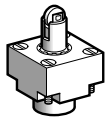
ZCKE616



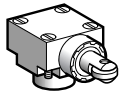
ZCKE636



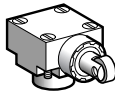
ZCKE626



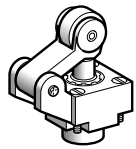
ZCKE676



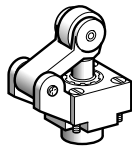
ZCKE646



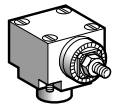
ZCKE656



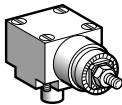
ZCKE216



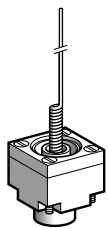
ZCKE236



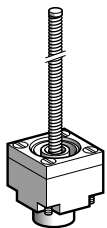
ZCKE056



ZCKE096



ZCKE066



ZCKE086

Plunger heads

| Type of operator | Compatible bodies | Max. actuation speed | Positive operation (1) | Catalog number | Weight kg (lb) |
|--|-------------------------------------|-------------------------------------|------------------------|----------------|----------------|
| For actuation on end | | | | | |
| End plunger metal | ZCKJ•, ZCKJ•• | 0.5 m/s (1.64 ft/s) | ⊖ | ZCKE616 | 0.140 (0.309) |
| Side plunger metal | ZCKJ•, ZCKJ••, except ZCKJ4 and J41 | 0.5 m/s (1.64 ft/s) | ⊖ | ZCKE636 | 0.200 (0.441) |
| For actuation by 30° cam | | | | | |
| End roller plunger steel | ZCKJ•, ZCKJ•• | 1 m/s (3.28 ft/s) | ⊖ | ZCKE626 | 0.155 (0.342) |
| End reinforced roller plunger steel | ZCKJ•, ZCKJ•• | 1 m/s (3.28 ft/s) | ⊖ | ZCKE676 | 0.155 (0.342) |
| Side roller plunger steel | Horizontal | ZCKJ•, ZCKJ••, except ZCKJ4 and J41 | ⊖ | ZCKE646 | 0.205 (0.452) |
| | Vertical | ZCKJ•, ZCKJ••, except ZCKJ4 and J41 | ⊖ | ZCKE656 | 0.205 (0.452) |
| Roller lever plunger (1 direction of actuation) | Thermoplastic | ZCKJ•, ZCKJ•• | ⊖ | ZCKE216 | 0.185 (0.408) |
| | Steel | ZCKJ•, ZCKJ•• | ⊖ | ZCKE236 | 0.195 (0.430) |

Rotary heads (without operating lever)

| Type | Compatible bodies | Max. actuation speed | Positive operation (1) | Catalog number | Weight kg (lb) |
|---|--------------------------|--------------------------------|------------------------|----------------|----------------|
| Spring return, actuation from left AND right or from left OR right (see page 22) | ZCKJ•, ZCKJ•• | 1.5 m/s (4.92 ft/s) by 30° cam | ⊖ | ZCKE056 | 0.165 (0.364) |
| Stay put, actuation from left AND right (see page 22) | ZCKJ1, J11 ZCKJ2, J21 | 1.5 m/s (4.92 ft/s) | — | ZCKE096 | 0.190 (0.419) |

Multi-directional heads

| Type of operator | Compatible bodies | Max. actuation speed | Positive operation (1) | Catalog number | Weight kg (lb) |
|---|--|--------------------------------------|------------------------|----------------|----------------|
| For actuation by any moving part | | | | | |
| "Cat's whisker" | ZCKJ•, ZCKJ••, except ZCKJ4 and ZCKJ41 | 1 m/s (3.28 ft/s) in any direction | — | ZCKE066 | 0.115 (0.254) |
| Spring rod lever | ZCKJ•, ZCKJ••, except ZCKJ4 and ZCKJ41 | 0.5 m/s (1.64 ft/s) in any direction | — | ZCKE086 | 0.125 (0.276) |

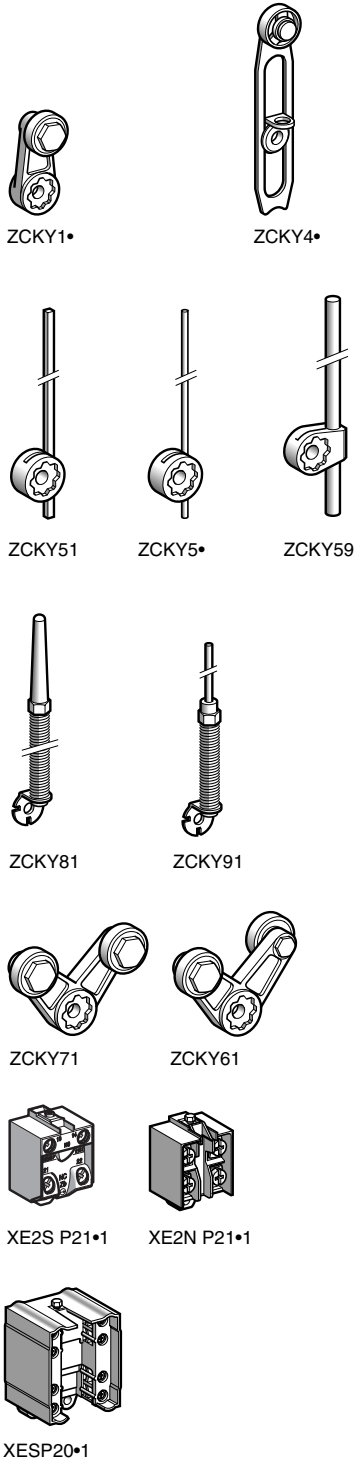
1. ⊖ : Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

Low-Temperature Applications (−40 °F / −40 °C)



| Operating levers for rotary heads | | | | | |
|---|--|------------------------|------------------------|----------------|----------------|
| Description | | Positive operation (1) | Catalog number | Weight kg (lb) | |
| For actuation by 30° cam | | | | | |
| Roller lever (2) | Thermoplastic | ⊖ | ZCKY11 | 0.025 (0.055) | |
| | Steel | ⊕ | ZCKY13 | 0.035 (0.077) | |
| | Steel, ball bearing mounted | ⊕ | ZCKY14 | 0.030 (0.066) | |
| Variable length roller lever (3) | Thermoplastic | — | ZCKY41 | 0.030 (0.066) | |
| | Steel | — | ZCKY43 | 0.040 (0.088) | |
| For actuation by any moving part | | | | | |
| Square rod (2) | ∅ 3 mm (0.12 in.) steel, L = 125 mm (4.92 in.) | — | ZCKY51 | 0.025 (0.055) | |
| Round rod (2) | ∅ 3 mm (0.12 in.) steel, L = 125 mm (4.92 in.) | — | ZCKY53 | 0.025 (0.055) | |
| | ∅ 3 mm (0.12 in.) glass fibre, L = 125 mm (4.92 in.) | — | ZCKY52 | 0.020 (0.044) | |
| | ∅ 6 mm (0.24 in.) thermoplastic, L = 200 mm (7.87 in.) | — | ZCKY59 | 0.030 (0.066) | |
| Spring lever (3) | | — | ZCKY81 | 0.020 (0.044) | |
| Spring metal rod lever (3) | | — | ZCKY91 | 0.025 (0.055) | |
| For actuation by specific cam (for operation with ZCK-E096 head) | | | | | |
| Forked arm and rollers (2) thermoplastic | 1 track | — | ZCKY71 | 0.035 (0.077) | |
| | 2 track | — | ZCKY61 | 0.035 (0.077) | |
| 2- or double-pole contact blocks | | | | | |
| Type | Function diagram | For body type | Positive operation (1) | Catalog number | Weight kg (lb) |
| 1 N/C + 1 N/O snap action | | ZCKJ1 | ⊕ | XE2SP2151 | 0.020 (0.044) |
| 1 N/C + 1 N/O break before make slow break | | ZCKJ5 | ⊕ | XE2NP2151 | 0.020 (0.044) |
| 2 C/O simultaneous snap action | | ZCKJ2 | — | XESP2021 | 0.045 (0.099) |
| 2 C/O staggered snap action | | ZCKJ4 | — | XESP2031 | 0.045 (0.099) |
| 1 N/O + 1 N/C make before break slow break | | ZCKJ6 | ⊕ | XE2NP2161 | 0.020 (0.044) |
| 1 N/C + 1 N/C simultaneous slow break | | ZCKJ7 | ⊕ | XE2NP2141 | 0.020 (0.044) |
| 1 N/O + 1 N/O simultaneous slow break | | ZCKJ8 | — | XE2NP2131 | 0.020 (0.044) |
| 1 N/C + 1 N/C snap action | | ZCKJ9 | ⊕ | XE2SP2141 | 0.020 (0.044) |

- ⊕ : Operating lever able to guarantee positive opening operation, when properly mounted and using a conforming operator, or N/C contact with positive opening operation. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.
- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
- Adjustable throughout 360° in 5° steps.

Setup:
page 122

Dimensions:
page 124

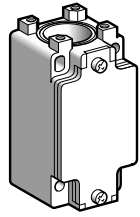
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

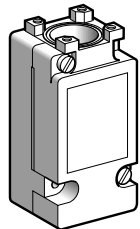
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

High-Temperature Applications (+248 °F /+120 °C)

Body with contacts—For plunger or rotary head



ZCKJ•



ZCKJ•15

| Type | Contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
|--|---|------------------|------------------------|---------------|----------------|----------------|
| Fixed body | | | | | | |
| 1 step | 2-pole 1 N/C + 1 N/O snap action (XE2SP2151) | | ⊕ | 1/2" NPT | ZCKJ1 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ1H29 | 0.310 (0.683) |
| | Double-pole 2 C/O simultaneous snap action (XESP20215) | | — | 1/2" NPT | ZCKJ25 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ25H29 | 0.310 (0.683) |
| | 2-pole 1 N/C + 1 N/O break before make slow break (XE2NP2151) | | ⊕ | 1/2" NPT | ZCKJ5 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ5H29 | 0.310 (0.683) |
| | 2-pole 1 N/O + 1 N/C make before break slow break (XE2NP2161) | | ⊕ | 1/2" NPT | ZCKJ6 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ6H29 | 0.310 (0.683) |
| | 2-pole 1 N/C + 1 N/C simultaneous slow break (XE2NP2141) | | ⊕ | 1/2" NPT | ZCKJ7 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ7H29 | 0.310 (0.683) |
| | 2-pole 1 N/O + 1 N/O simultaneous slow break (XE2NP2131) | | — | 1/2" NPT | ZCKJ8 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ8H29 | 0.310 (0.683) |
| 2-pole 1 N/C + 1 N/C snap action (XE2SP2141) | | ⊕ | 1/2" NPT | ZCKJ9 | 0.310 (0.683) | |
| | | | ISO M20 x 1.5 | ZCKJ9H29 | 0.310 (0.683) | |
| 2 step | Double-pole 2 C/O break before make snap action (XESP20315) | | — | 1/2" NPT | ZCKJ45 | 0.310 (0.683) |
| | | | | ISO M20 x 1.5 | ZCKJ45H29 | 0.310 (0.683) |
| Plug-in body | | | | | | |
| 1 step | Single-pole 1 C/O snap action | | — | 1/2" NPT | ZCKJ115 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ115H29 | 0.300 (0.661) |
| | Double-pole 2 C/O simultaneous snap action | | — | 1/2" NPT | ZCKJ215 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ215H29 | 0.300 (0.661) |
| 2 step | Double-pole 2 C/O break before make snap action | | — | 1/2" NPT | ZCKJ415 | 0.300 (0.661) |
| | | | | ISO M20 x 1.5 | ZCKJ415H29 | 0.300 (0.661) |
| Body with contacts—With spring return rotary head (without operating lever) | | | | | | |
| Fixed body | | | | | | |
| 2 step 1 from the left AND 1 from the right | Double-pole 2 C/O break before make snap action | | — | 1/2" NPT | ZCKJ4045 | 0.455 (1.003) |
| | | | | ISO M20 x 1.5 | ZCKJ4045H29 | 0.455 (1.003) |
| Plug-in body | | | | | | |
| 2 step 1 from the left AND 1 from the right | Double-pole 2 C/O break before make snap action | | — | 1/2" NPT | ZCKJ41045 | 0.465 (1.025) |
| | | | | ISO M20 x 1.5 | ZCKJ41045H29 | 0.465 (1.025) |

1. ⊕: Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.

Setup:
page 122

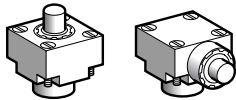
Dimensions:
page 124

Limit Switches

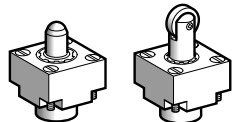
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

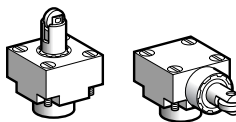
High-Temperature Applications (+248 °F /+120 °C)



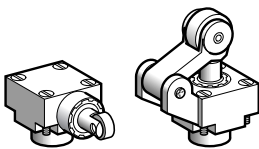
ZCKE615 ZCKE635



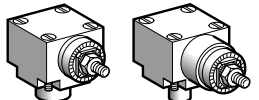
ZCKE665 ZCKE625



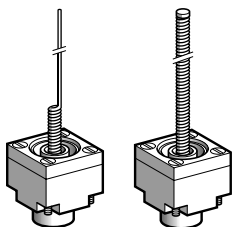
ZCKE675 ZCKE645



ZCKE655 ZCKE235



ZCKE055 ZCKE095



ZCKE065 ZCKE085

| Plunger heads | | | | | | |
|--|--|---|--------------------------------------|------------------------|----------------|----------------|
| Type of operator | Compatible bodies | | Max. actuation speed | Positive operation (1) | Catalog number | Weight kg (lb) |
| For actuation on end | | | | | | |
| End plunger | Metal | ZCKJ1, J2, J4, ZCKJ115, J215, J415, ZCKJ5, J6, J7, J8, J9 | 0.5 m/s (1.64 ft/s) | ⊖ | ZCKE615 | 0.140 (0.309) |
| Side plunger | Metal | ZCKJ1, J2, ZCKJ115, J215, ZCKJ5, J6, J7, J8, J9 | 0.5 m/s (1.64 ft/s) | ⊖ | ZCKE635 | 0.200 (0.441) |
| For actuation by 30° cam | | | | | | |
| End ball bearing plunger | Steel | ZCKJ1, J2, J4, ZCKJ115, J215, J415, ZCKJ5, J6, J7, J8, J9 | 0.1 m/s (0.33 ft/s) | ⊖ | ZCKE665 | 0.150 (0.331) |
| End roller plunger | Steel | ZCKJ1, J2, J4, ZCKJ115, J215, J415, ZCKJ5, J6, J7, J8, J9 | 1 m/s (3.28 ft/s) | ⊖ | ZCKE625 | 0.155 (0.342) |
| End reinforced roller plunger | Steel | ZCKJ1, J2, J4, ZCKJ115, J215, J415, ZCKJ5, J6, J7, J8, J9 | 1 m/s (3.28 ft/s) | ⊖ | ZCKE675 | 0.155 (0.342) |
| Side roller plunger | Steel Horizontal | ZCKJ1, J2, ZCKJ115, J215, ZCKJ5, J6, J7, J8, J9 | 0.6 m/s (1.97 ft/s) | ⊖ | ZCKE645 | 0.205 (0.452) |
| | Steel Vertical | ZCKJ1, J2, ZCKJ115, J215, ZCKJ5, J6, J7, J8, J9 | 0.6 m/s (1.97 ft/s) | ⊖ | ZCKE655 | 0.205 (0.452) |
| Roller lever plunger (1 direction of actuation) | Steel | ZCKJ1, J2, J4, ZCKJ115, J215, J415, ZCKJ5, J6, J7, J8, J9 | 1.5 m/s (4.92 ft/s) | ⊖ | ZCKE235 | 0.195 (0.430) |
| | Thermoplastic | ZCKJ1, J2, J4, ZCKJ115, J215, J415, ZCKJ5, J6, J7, J8, J9 | 1.5 m/s (4.92 ft/s) | ⊖ | ZCKE215 | 0.185 (0.408) |
| Rotary heads (without operating lever) | | | | | | |
| Type | Compatible bodies | | Max. actuation speed | Positive operation (1) | Catalog number | Weight kg (lb) |
| Spring return, actuation from left AND right or from left OR right (see page 22) | ZCKJ1, J2, J4, ZCKJ115, J215, ZCKJ415, ZCKJ5, J6, J7, J8, J9 | | 1.5 m/s (4.92 ft/s) by 30° cam | ⊖ | ZCKE055 | 0.165 (0.364) |
| Stay put, actuation from left AND right (see page 22) | ZCKJ1, J2, ZCKJ115, J215 | | 0.5 m/s (1.64 ft/s) | — | ZCKE095 | 0.190 (0.419) |
| Multi-directional heads | | | | | | |
| Type of operator | Compatible bodies | | Max. actuation speed | Positive operation (1) | Catalog number | Weight kg (lb) |
| For actuation by any moving part | | | | | | |
| "Cat's whisker" | ZCKJ1, J2, ZCKJ115, J215, ZCKJ5, J6, J7, J8, J9 | | 1 m/s (3.28 ft/s) in any direction | — | ZCKE065 | 0.115 (0.254) |
| Spring rod lever | ZCKJ1, J2, ZCKJ115, J215, ZCKJ5, J6, J7, J8, J9 | | 0.5 m/s (1.64 ft/s) in any direction | — | ZCKE085 | 0.125 (0.276) |

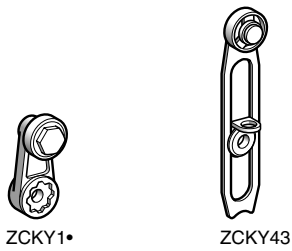
1. ⊖ : Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

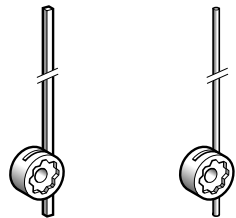
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

High-Temperature Applications (+248 °F /+120 °C)



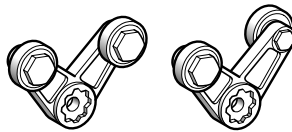
ZCKY115•

ZCKY43



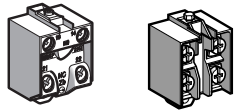
ZCKY51

ZCKY52•



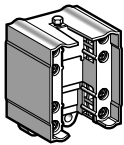
ZCKY715

ZCKY615



XE2S P21•1

XE2N P21•1



XESP20•15

Operating levers for rotary heads

| Description | Positive operation (1) | Catalog number | Weight kg (lb) | |
|----------------------------------|-----------------------------|----------------|----------------|---------------|
| For actuation by 30° cam | | | | |
| Roller lever (2) | Thermoplastic | ⊖ | ZCKY115 | 0.025 (0.055) |
| | Steel | ⊖ | ZCKY13 | 0.035 (0.077) |
| | Steel, ball bearing mounted | ⊖ | ZCKY14 | 0.030 (0.066) |
| Variable length roller lever (3) | Thermoplastic | — | ZCKY415 | 0.030 (0.066) |
| | Steel | — | ZCKY43 | 0.040 (0.088) |

For actuation by any moving part

| | | | | |
|----------------|--|---|--------|---------------|
| Square rod (2) | ∅ 3 mm (0.12 in.) Steel, L = 125 mm (4.92 in.) | — | ZCKY51 | 0.025 (0.055) |
| Round rod (2) | ∅ 3 mm (0.12 in.) steel, L = 125 mm (4.92 in.) | — | ZCKY53 | 0.025 (0.055) |
| | ∅ 3 mm (0.12 in.) glass fibre, L = 125 mm (4.92 in.) | — | ZCKY52 | 0.020 (0.044) |

For actuation by specific cam (for operation with ZCK-E095 head only)

| | | | | |
|--|---------|---|---------|---------------|
| Forked arm and rollers (2) thermoplastic | 1 track | — | ZCKY715 | 0.035 (0.077) |
| | 2 track | — | ZCKY615 | 0.035 (0.077) |

2- or double-pole contact blocks

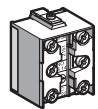
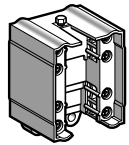
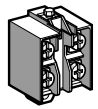
| Type of operator | Function diagram | For body type | Positive operation (1) | Catalog number | Weight kg (lb) |
|--|------------------|---------------|------------------------|----------------|----------------|
| 1 N/C + 1 N/O snap action | | ZCKJ1 | ⊖ | XE2SP2151 | 0.020 (0.044) |
| 1 N/C + 1 N/O break before make slow break | | ZCKJ5 | ⊖ | XE2NP2151 | 0.020 (0.044) |
| 2 C/O simultaneous snap action | | ZCKJ25 | — | XESP20215 | 0.045 (0.099) |
| 2 C/O staggered snap action | | ZCKJ45 | — | XESP20315 | 0.045 (0.099) |
| 1 N/O + 1 N/C make before break slow break | | ZCKJ6 | ⊖ | XE2NP2161 | 0.020 (0.044) |
| 1 N/C + 1 N/C simultaneous slow break | | ZCKJ7 | ⊖ | XE2NP2141 | 0.020 (0.044) |
| 1 N/O + 1 N/O simultaneous slow break | | ZCKJ8 | — | XE2NP2131 | 0.020 (0.044) |
| 1 N/C + 1 N/C snap action | | ZCKJ9 | ⊖ | XE2SP2141 | 0.020 (0.044) |

- ⊖ : Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.
- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
- Adjustable throughout 360° in 5° steps.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

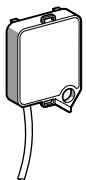
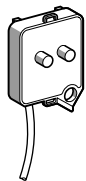
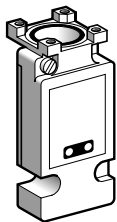
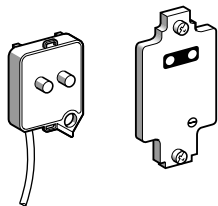


| Contact blocks | | | | | |
|---|------------------|-----------------|------------------------|----------------|----------------|
| Type of contact | Function diagram | For bodies | Positive operation (1) | Catalog number | Weight kg (lb) |
| 2-pole contact | | | | | |
| N/C + N/O snap action | | ZCKJ1 ZCKJ1D | ⊕ | XE2S P2151 | 0.020 (0.044) |
| N/C + N/O break before make, slow break | | ZCKJ5 ZCKJ5D | ⊕ | XE2N P2151 | 0.020 (0.044) |
| 2 C/O simultaneous, snap action | | ZCKJ2 | — | XES P2021 | 0.045 (0.099) |
| 2 C/O staggered, snap action | | ZCKJ4 | — | XES P2031 | 0.045 (0.099) |
| N/O + N/C make before break, slow break | | ZCKJ6 ZCKJ6D | ⊕ | XE2N P2161 | 0.020 (0.044) |
| N/C + N/C simultaneous, slow break | | ZCKJ7 ZCKJ7D | ⊕ | XE2N P2141 | 0.020 (0.044) |
| N/O + N/O simultaneous, slow break | | ZCKJ8 ZCKJ8D | — | XE2N P2131 | 0.020 (0.044) |
| N/C + N/C snap action | | ZCKJ9 | ⊕ | XE2S P2141 | 0.020 (0.044) |
| 3-pole contact | | | | | |
| N/C + N/O + N/O snap action | | ZCKJD31 | ⊕ | XE3S P2151 | 0.035 (0.077) |
| N/C + N/C + N/O snap action | | ZCKJD39 | ⊕ | XE3S P2141 | 0.035 (0.077) |
| N/C + N/C + N/O break before make, slow break | | ZCKJD37 | ⊕ | XE3N P2141 | 0.035 (0.077) |
| N/C + N/O + N/O break before make, slow break | | ZCKJD35 | ⊕ | XE3N P2151 | 0.035 (0.077) |

1. ⊕: N/C contact with positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041 XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components



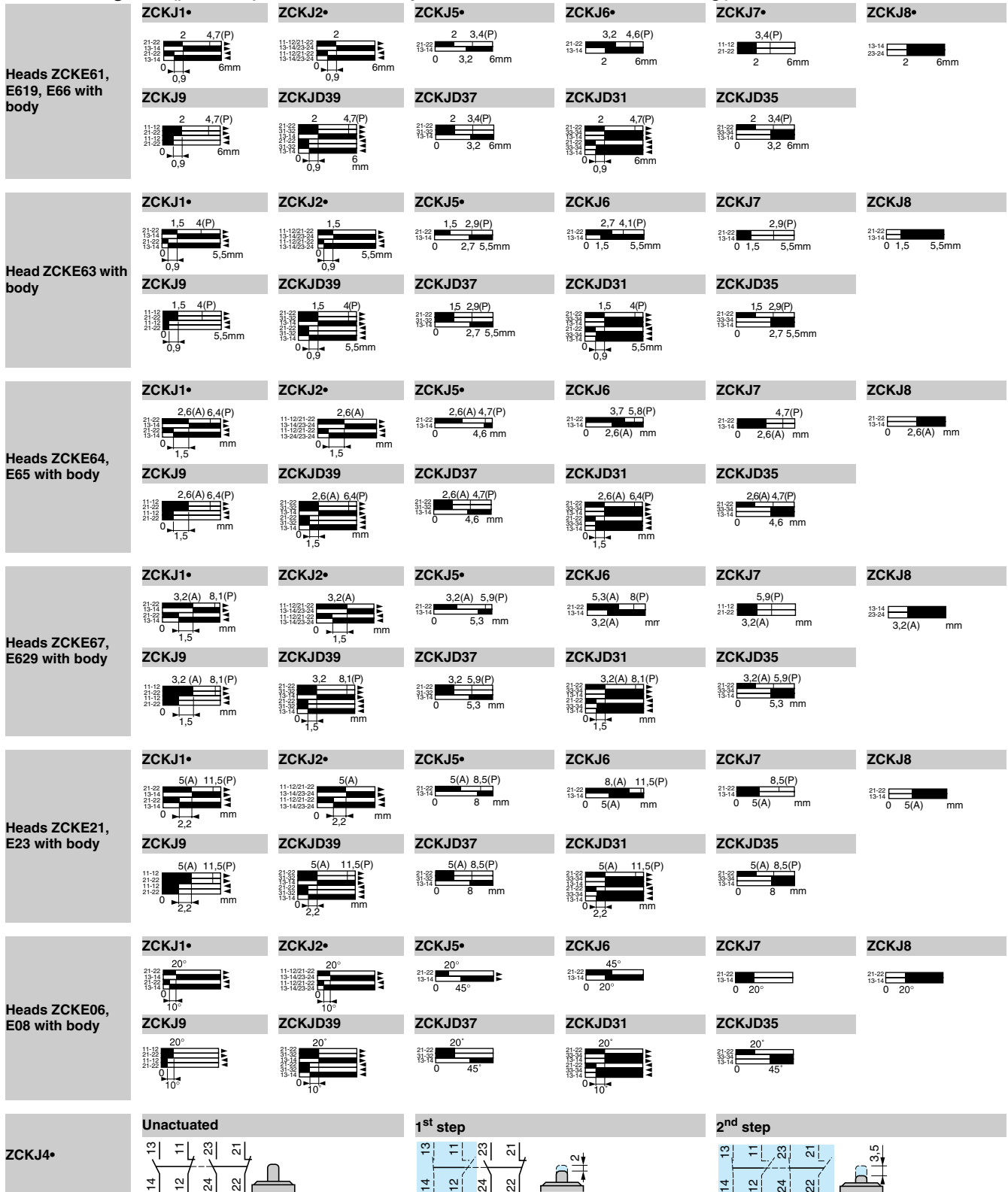
| Covers + indicator light module | | | | |
|---|--|------------------|----------------|----------------|
| For use with | Number and type of indicators | Voltage | Catalog number | Weight kg (lb) |
| Fixed non-plug-in body | 1 LED | 24 V \cdots | ZCK Z020 | 0.060 (0.132) |
| | 2 LEDs | 24 V \cdots | ZCK Z021 | 0.060 (0.132) |
| | 2 neon lights | 110/120 V \sim | ZCK Z033 | 0.060 (0.132) |
| | | 220/240 V \sim | ZCK Z034 | 0.060 (0.132) |
| Plug-in switch-top body with pilot lights | 2 LEDs | 24 V \cdots | ZCKJ0121 | 0.200 (0.441) |
| | 2 neon lights | 110/120 V \sim | ZCKJ0133 | 0.200 (0.441) |
| | | 220/240 V \sim | ZCKJ0134 | 0.200 (0.441) |
| | Indicator light modules | | | |
| For use with | Number and type of indicators | Voltage | Catalog number | Weight kg (lb) |
| Fixed non-plug-in body | 1 LED | 24 V \cdots | ZCKJ902 | 0.030 (0.066) |
| | 2 LEDs | 24 V \cdots | ZCKJ906 | 0.030 (0.066) |
| | 2 neon lights | 110/120 V \sim | ZCKJ903 | 0.030 (0.066) |
| | | 220/240 V \sim | ZCKJ904 | 0.030 (0.066) |
| Module with resistor for machine diagnostics | | | | |
| For use with | Resistor value | | Catalog number | Weight kg (lb) |
| Fixed non-plug-in body (XCKJ1 and ZCKJ1 only) | 15 k Ω , 1/4 W | | ZCKJ82A | 0.030 (0.066) |
| Other versions | Covers + indicator light module for other supply voltages. Please consult your local sales office. | | | |

Limit Switches

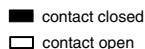
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

Function diagrams (positive operation assured only if the associated sub-assemblies are ⊕)



Contact operation



(A) = cam displacement
(P) = positive opening point

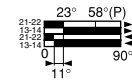
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041 XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

Function diagrams (positive operation assured only if the associated sub-assemblies are ⊕)

Head ZCKE05 with body

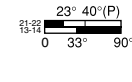
ZCKJ1•



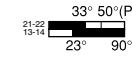
ZCKJ2•



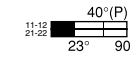
ZCKJ5•



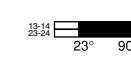
ZCKJ6



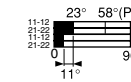
ZCKJ7



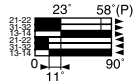
ZCKJ8



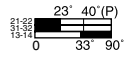
ZCKJ9



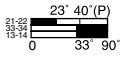
ZCKJD39



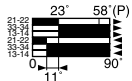
ZCKJD37



ZCKJD39

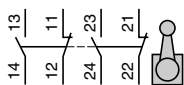


ZCKJD31

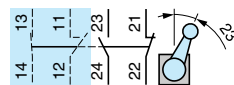


ZCKJ4•

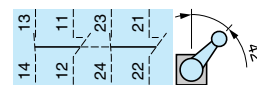
Unactuated



1st step, actuated from left or right

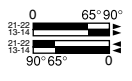


2nd step, actuated from left or right

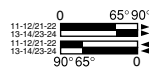


Head ZCKE09 with body

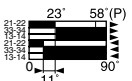
ZCKJ1•



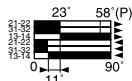
ZCKJ2•



ZCKJD31

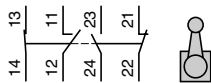


ZCKJD39

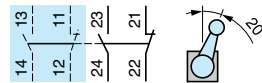


ZCKJ404, J4104 (body with head)

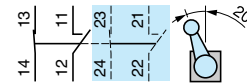
Unactuated



Actuated from left



Actuated from right



Contact operation

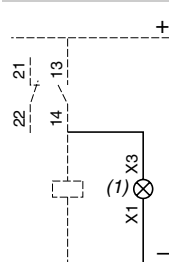
■ contact closed
□ contact open

(P) = positive opening point

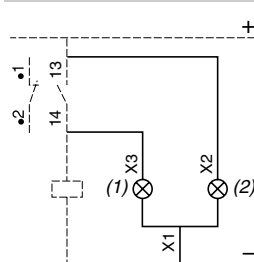
Wiring diagrams

Indicator light modules

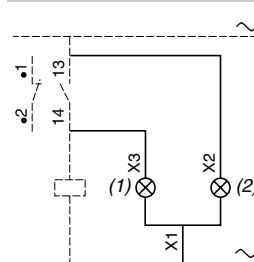
1 LED, 24 V_{DC}



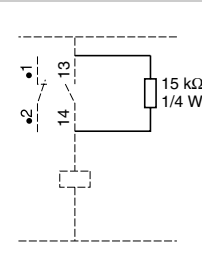
2 LEDs, 24 V_{DC}



2 neon lights, 110/120 or 220/240 V_{AC}

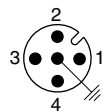


Module with resistor



1. Orange indicator
2. Green indicator

ZCKJ•D



- 1-2= N/C
- 3-4= N/O
- 5= ⚬
- 4 A / 24 V max.



Limit Switches

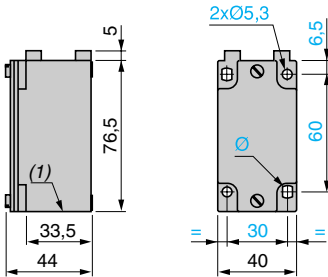
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

Bodies

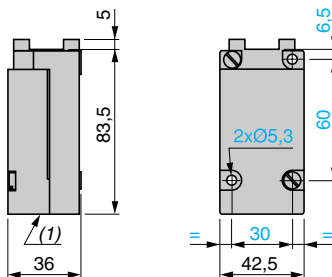
Non-plug-in

ZCKJ1, J2, J5, J4, J2•, J3•, J6, J7, J8, J9
ZCKJ1H29, J2H29, J5H29, J4H29, J2•H29, J3•H29,
J6H29, J7H29, J8H29, J9H29



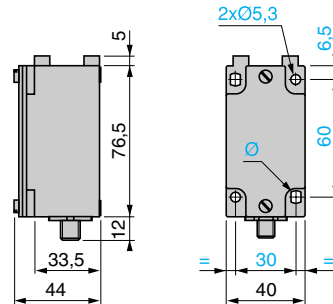
Plug-in

ZCKJ11, J21, J41, J11••
ZCKJ11H29, J21H29, J41H29, J11••H29



Non-plug-in

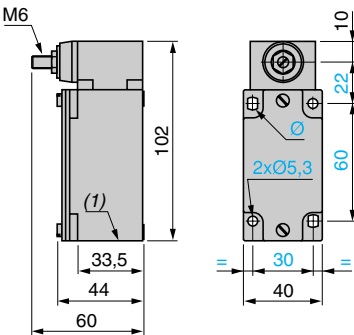
ZCKJ1D, J5D, J6D, J7D, J8D



Bodies with rotary head mounted

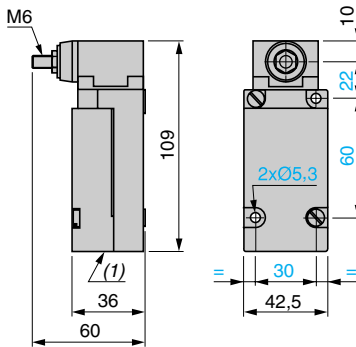
Non-plug-in

ZCKJ404, ZCKJ404H29



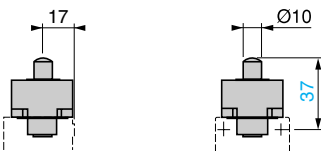
Plug-in

ZCKJ4104, ZCKJ4104H29

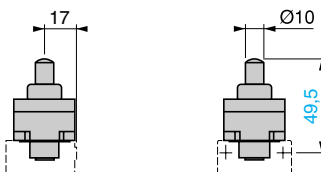


Plunger heads

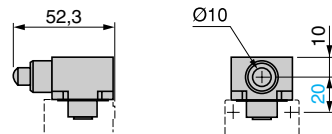
ZCKE61



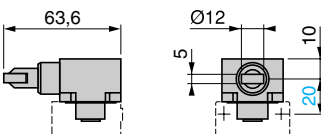
ZCKE619



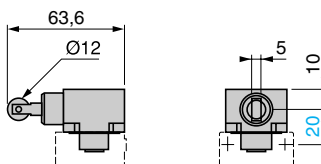
ZCKE63



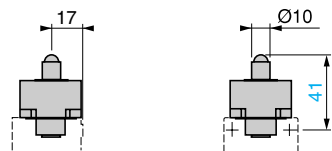
ZCKE64



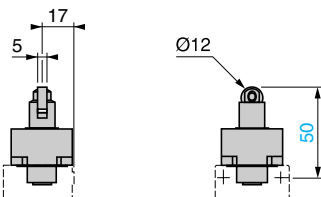
ZCKE65



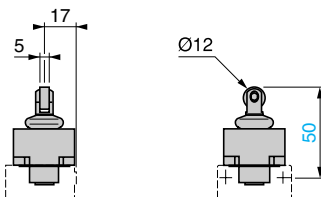
ZCKE66



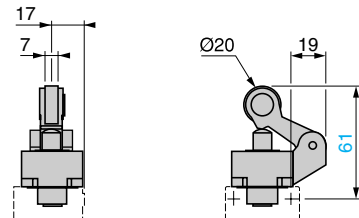
ZCKE62, ZCKE67



ZCKE629



ZCKE21, E23

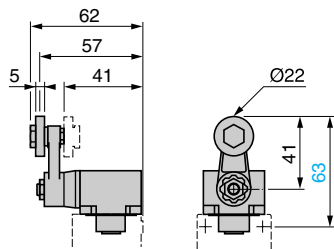


1: 1 tapped entry for 1/2" NPT.
Ø: 2 elongated holes Ø 5.3 x 7.3.

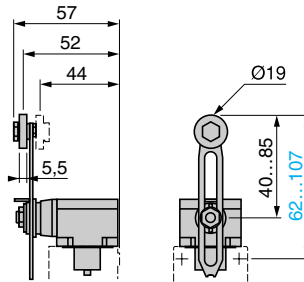
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041 XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

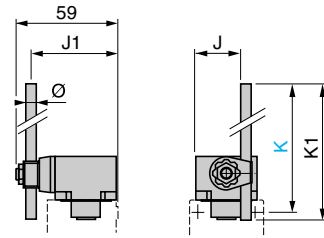
Rotary head ZCKE05 with operating lever ZCKY11, Y13, Y14



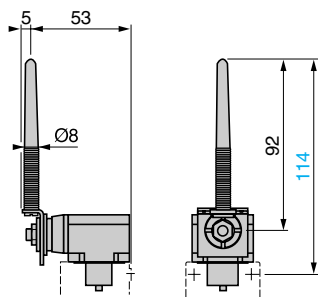
ZCKY41, Y43



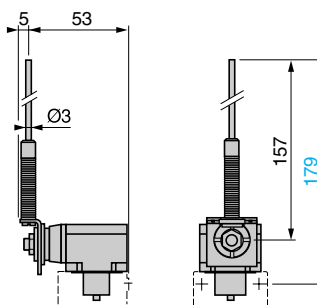
ZCKY51, Y52, Y53, Y59



ZCKY81

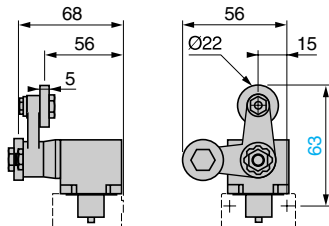


ZCKY91

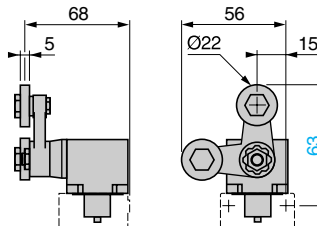


| | J | J1 | K max | K1 | Ø |
|--------|------|----|-------|-----|-----|
| ZCKY51 | 20 | 49 | 137 | 123 | Ø 3 |
| ZCKY52 | 20 | 49 | 137 | 125 | Ø 3 |
| ZCKY53 | 20 | 49 | 137 | 125 | Ø 3 |
| ZCKY59 | 26.2 | 48 | 212 | 200 | Ø 6 |

Rotary head ZCKE09 with operating lever ZCKY61

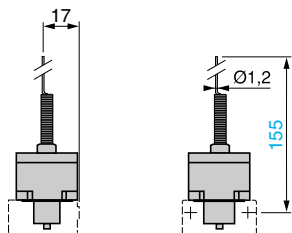


ZCKY71

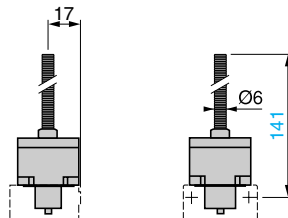


Multi-directional heads

ZCKE06



ZCKE08



NOTE: Operating lever spindle threaded M6.

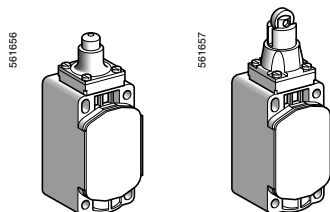
Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated

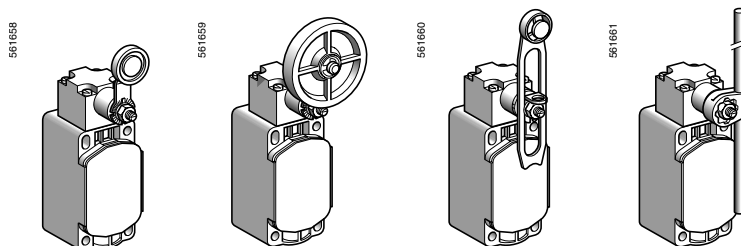
■ XCKS
fixed, non-plug-in body with 1 cable entry

□ With head for linear movement (plunger) operators



Page 128

□ With head for rotary movement (lever) operators



Page 128

Environmental characteristics

| | | |
|----------------------------------|------------------------------|---|
| Conforming to standards | Products | IEC 60947-5-1, EN 60947-5-1, UL 508, CSA C22-2 n° 14 |
| | Machine assemblies | IEC 60204-1, EN 60204-1 |
| Approvals | | UL, CSA, CCC |
| Protective treatment | Version | Standard "TC" and "TH" |
| Ambient air temperature | For operation | - 25...+70 °C (-13...+158 °F) |
| | For storage | - 40...+70 °C (-40...+158 °F) |
| Vibration resistance | Conforming to IEC 60068-2-6 | 25 gn (10...500 Hz) |
| Shock resistance | Conforming to IEC 60068-2-27 | 50 gn (11 ms) |
| Electric shock protection | | Class II conforming to IEC 61140 and NF C 20-030 |
| Degree of protection | | IP 65 conforming to IEC 60529; IK 03 conforming to EN 50102 |
| Repeat accuracy | | 0.05 mm on the tripping points, with 1 million operating cycles for head with end plunger |
| Cable entry | Depending on model | Tapped entry for PG 13 conduit thread, or tapped ISO M20 x 1.5, 1/2" NPT with adapter |
| Materials | | Body and heads: plastic |

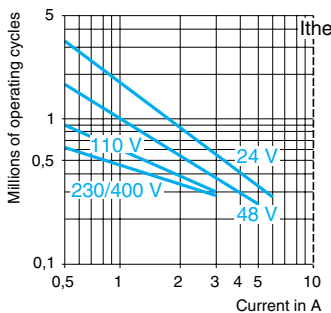
Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated

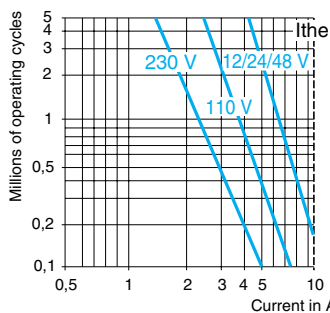
| Contact block characteristics | | |
|---|-----------------|--|
| Rated operational characteristics | XE2•P | ~ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A --- DC-13; Q300 (Ue = 250 V, Ie = 0,27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| | XE3•P | ~ AC-15; B300 (Ue = 240 V, Ie = 1,5 A); Ithe = 6 A --- DC-13; R300 (Ue = 250 V, Ie = 0,1 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| Rated insulation voltage | XE2•P | Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 |
| | XE3•P | Ui = 400 V degree of pollution 3 conforming to IEC 60947-1 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 |
| Rated impulse withstand voltage | XE2•P | U imp = 6 kV conforming to IEC 60947-1, IEC 60664 |
| | XE3•P | U imp = 4 kV conforming to IEC 60947-1, IEC 60664 |
| Positive operation (depending on model) | | N/C contacts with positive opening operation conforming to IEC 60947-5-1 Appendix K, EN 60947-5-1 |
| Resistance across terminals | | ≤ 25 mΩ conforming to IEC 60255-7 category 3 |
| Short-circuit protection | XE2•P | 10 A cartridge fuse type gG (gl) |
| | XE3•P | 6 A cartridge fuse type gG (gl) |
| Cabling (screw and captive cable clamp terminals) | XE2SP21•1 | Clamping capacity, min.: 1 x 0.34 mm ² , max.: 2 x 1.5 mm ² |
| | XE2NP21•1 | Clamping capacity, min.: 1 x 0.5 mm ² , max.: 2 x 2.5 mm ² |
| | XESP3021 | Clamping capacity, min.: 1 x 0.75 mm ² , max.: 2 x 1.5 mm ² |
| | XE3NP and XE3SP | Clamping capacity, min.: 1 x 0.34 mm ² , max.: 1 x 1 mm ² or 2 x 0.75 mm ² |
| Minimum actuation speed | | XE2SP21•1, XESP3021 and XE3SP: 0.01 m/minute (0.03 ft/minute) XE2NP21•1 and XE3NP: 6 m/minute (19.68 ft/minute) |
| Electrical durability | | <ul style="list-style-type: none"> • Conforming to IEC 60947-5-1 Appendix C • Utilization categories AC-15 and DC-13 • Maximum operating rate: 3600 operating cycles per hour • Load factor: 0.5 |

XE2SP21•1, XE2SP2141

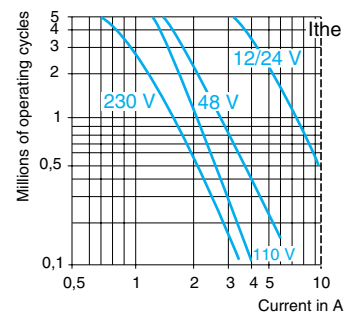


a.c. supply
~ 50/60 Hz
~ inductive circuit

XE2NP21•1



XESP3021



d.c. supply ---

Power switched in W for 5 million operating cycles.

| Voltage | V | 24 | 48 | 120 |
|---------|---|----|----|-----|
| ~ | W | 10 | 7 | 4 |

Power switched in W for 5 million operating cycles.

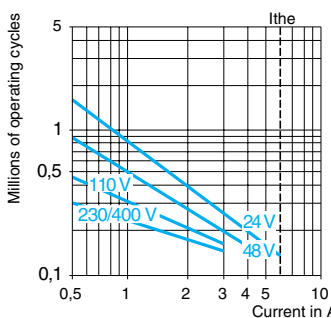
| Voltage | V | 24 | 48 | 120 |
|---------|---|----|----|-----|
| ~ | W | 13 | 9 | 7 |

Power switched in W for 5 million operating cycles.

| Voltage | V | 24 | 48 | 120 |
|---------|---|----|----|-----|
| ~ | W | 10 | 7 | 4 |

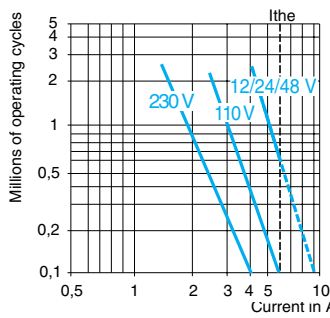
For XE2SP•151 on ~ or ---, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

XE3SP••••



a.c. supply
~ 50/60 Hz
~ inductive circuit

XE3NP••••



d.c. supply ---

Power switched in W for 5 million operating cycles.

| Voltage | V | 24 | 48 | 120 |
|---------|---|----|----|-----|
| ~ | W | 3 | 2 | 1 |


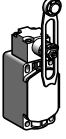














Power switched in W for 5 million operating cycles.

| Voltage | V | 24 | 48 | 120 |
|---------|---|----|----|-----|
| ~ | W | 4 | 3 | 2 |

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Complete Switches with 1/2" NPT Adapter Included

| Type of head | Plunger (mounting by the body) | | | Rotary (mounting by the body) | | | |
|---|--|---|---|---|--|---|--|
| | Form B (1) | Form C (1) | Form A (1) |  |  |  | |
| Type of operator | Metal end plunger | Steel roller plunger | Thermoplastic roller lever (4) | Elastomer roller lever, Ø 50 mm (1.97 in.) (4) | Variable length thermoplastic roller lever (4) | Variable length elastomer roller lever, Ø 50 mm (1.97 in.) (4) | Round thermoplastic rod lever, Ø 6 mm (0.24 in.) (5) (6) |
| Catalog numbers (2) (3) | XCKS101 | XCKS102 | XCKS131 | XCKS139 | XCKS141 | XCKS149 | XCKS159 |
|  | 2-pole N/C + N/O snap action (XE2S P2151) |  |  |  |  |  | |
| Weight, kg (lb) | 0.095 (0.209) | 0.105 (0.231) | 0.145 (0.320) | 0.150 (0.331) | 0.155 (0.342) | 0.155 (0.342) | 0.150 (0.331) |
| Contact operation |  | | | (A) = cam displacement (P) = positive opening point | ☉ N/C contact with positive opening operation, when properly mounted and using a conforming operator | | |
| Characteristics | | | | | | | |
| Switch actuation | On end | By 30° cam | | | | By any moving part | |
| Type of actuation |  |  |  |  |  |  | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | | 1.5 m/s (4.92 ft/s) | | | 1 m/s (3.28 ft/s) | |
| Minimum force or torque | For tripping For positive opening | 15 N (3.37 lb) 45 N (10.12 lb) | 12 N (2.70 lb) 36 N (8.09 lb) | 0.15 N•m (1.33 lb-in) 0.3 N•m (2.66 lb-in) | — | | |
| Cable entry (3) | 1 entry tapped M20 x 1.5 mm for ISO cable entry, clamping capacity 7 to 13 mm (0.28 to 0.51 in.) | | | | | | |

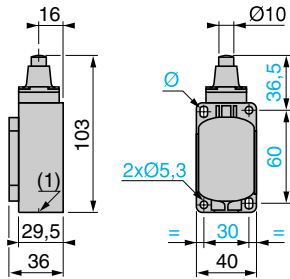
- Form conforming to EN 50041. See page 23.
- Switches with gold contacts or eyelet type connections: please consult your local sales office.
- To convert PG 13 to 1/2" NPT, use adapter DE9RA1212. For ISO M20 x 1.5, add H29 to the end of the catalog number. Example: XCKS101 becomes XCKS101H29.
- Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
- Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.
- Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

Limit Switches

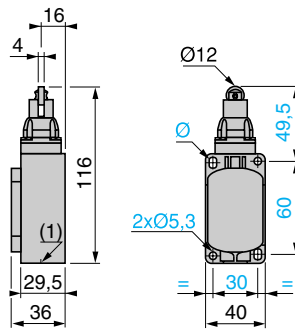
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Complete Switches with 1/2" NPT Adapter Included

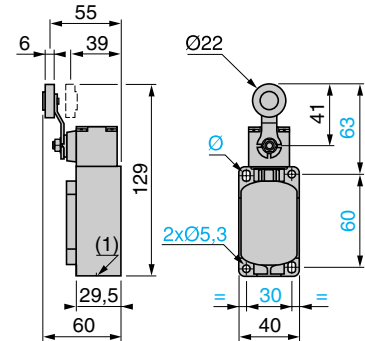
XCKS-01
ZCKS• + ZCKD01



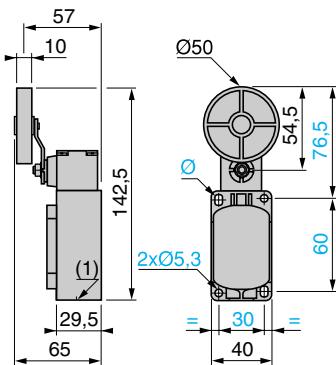
XCKS-02
ZCKS• + ZCKD02



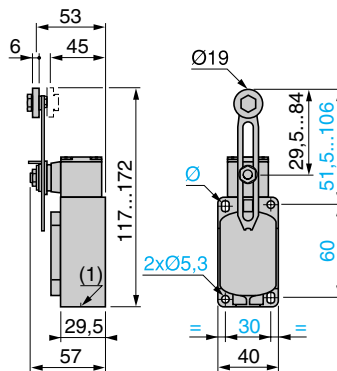
XCKS-31
ZCKS• + ZCKD31



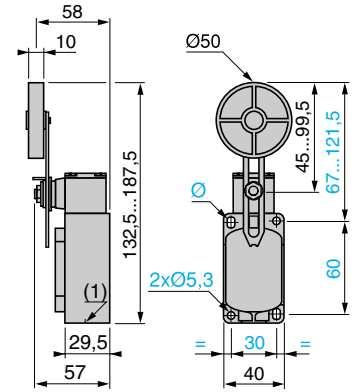
XCKS-39
ZCKS• + ZCKD39



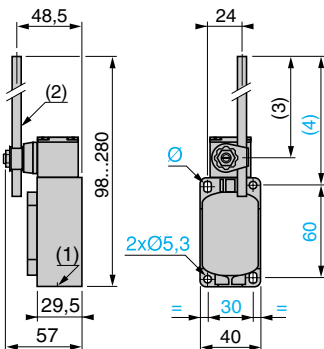
XCKS-41
ZCKS• + ZCKD41



XCKS-49
ZCKS• + ZCKD49



XCKS-59
ZCKS• + ZCKD59

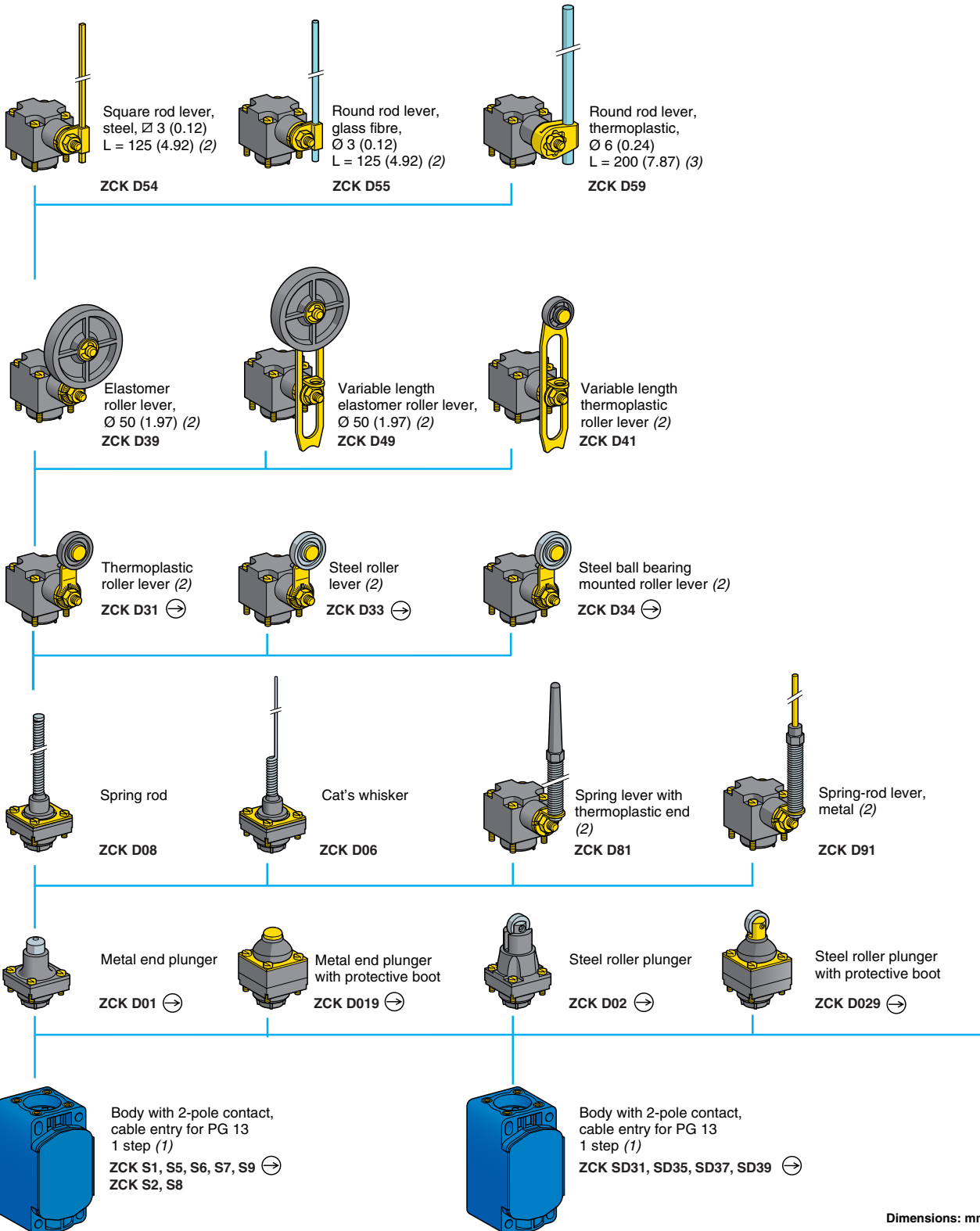


1. 1 tapped entry for PG 13 conduit thread (convertible to 1/2" NPT using adapter DE9RA1212, included); or
1 tapped entry for ISO M20 x 1.5 conduit thread (with suffix H29 added to the catalog number).
 2. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.)
 3. 190 max.
 4. 212 max.
- Ø: 2 elongated holes Ø 5.3 x 7.3.

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



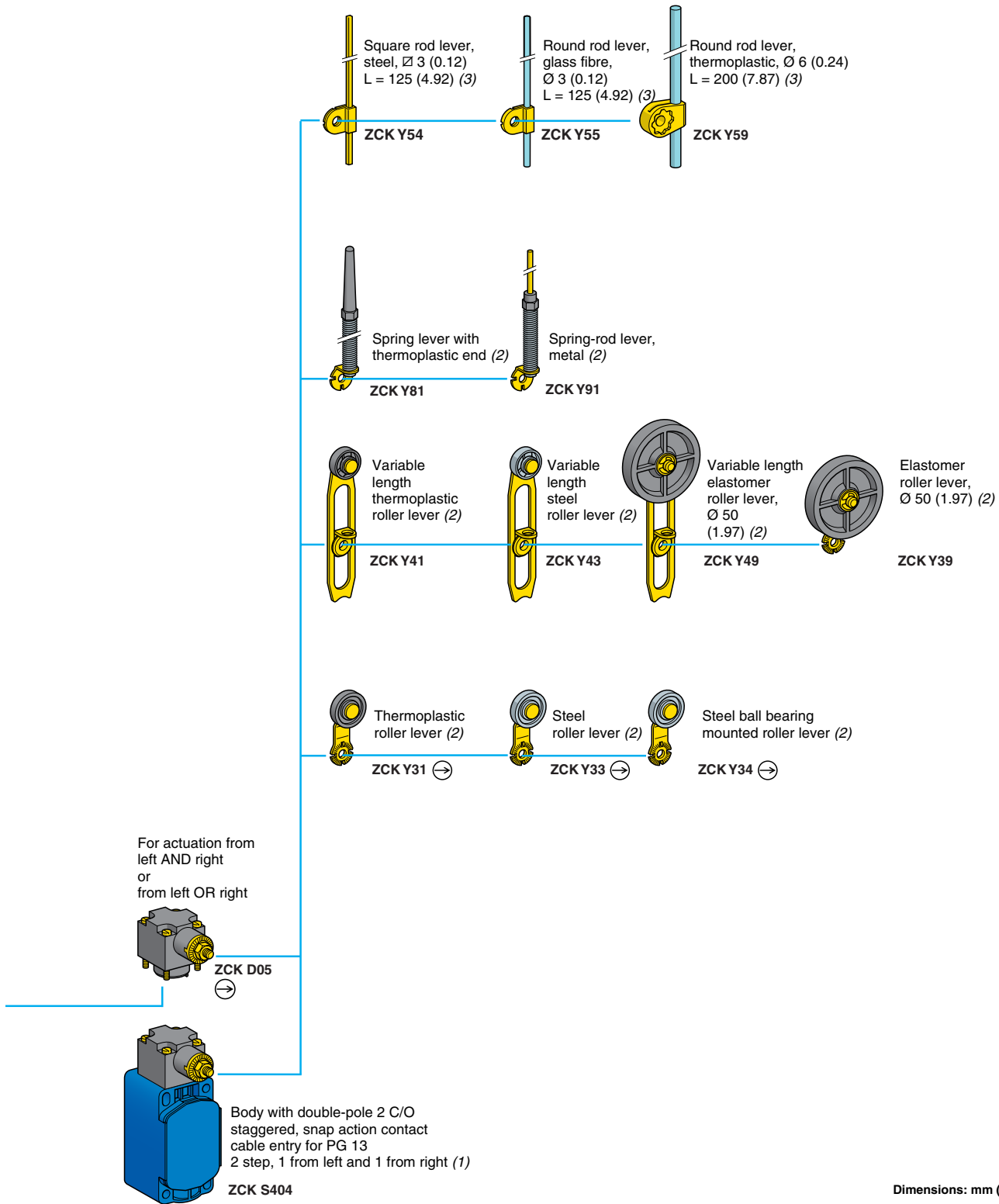
Dimensions: mm (in.)

1. For further details, see page 132. For a cable entry tapped ISO M20 x 1.5, add **H29** to the catalog number. Example: ZCKS1 becomes **ZCKS1H29**. To convert PG 13 to 1/2" NPT, use adapter DE9RA1212. See page 135 for dimensional drawing.
2. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
3. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.

Limit Switches

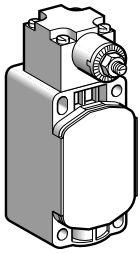
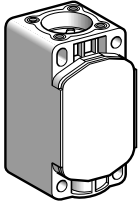
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



1. For further details, see page 132. For a cable entry tapped ISO M20 x 1.5, add **H29** to the catalog number. Example: ZCKS1 becomes **ZCKS1H29**. To convert PG 13 to 1/2" NPT, use adapter DE9RA1212.
- ⊖: N/C contact with positive opening operation or head assuring positive opening operation, when properly mounted and using a conforming operator.
2. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
3. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting.

Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Modular



Limit Switches

Bodies with 2-pole contact

| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
|------------------------------------|--|------------------|------------------------|---------------|----------------|----------------|
| 1 step | N/C + N/O snap action (XE2S P2151) | | ⊕ | 1/2" NPT | ZCKS1 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKS1H29 | 0.080 (0.176) |
| | 2 C/O simultaneous, snap action (XES P3021) | | - | 1/2" NPT | ZCKS2 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKS2H29 | 0.080 (0.176) |
| | N/C + N/O break before make, slow break (XE2N P2151) | | ⊕ | 1/2" NPT | ZCKS5 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKS5H29 | 0.080 (0.176) |
| | N/O + N/C make before make, slow break (XE2N P2161) | | ⊕ | 1/2" NPT | ZCKS6 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKS6H29 | 0.080 (0.176) |
| | N/C + N/C simultaneous, slow break (XE2N P2141) | | ⊕ | 1/2" NPT | ZCKS7 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKS7H29 | 0.080 (0.176) |
| | N/O + N/O simultaneous, slow break (XE2N P2131) | | - | 1/2" NPT | ZCKS8 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKS8H29 | 0.080 (0.176) |
| N/C + N/C snap action (XE2S P2141) | | ⊕ | 1/2" NPT | ZCKS9 | 0.080 (0.176) | |
| | | | ISO M20 x 1.5 | ZCKS9H29 | 0.080 (0.176) | |

Bodies with double-pole contact and spring return rotary head

Without operating lever

| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
|--|------------------------------|------------------|------------------------|---------------|----------------|----------------|
| 2 step 1 from left and 1 from right | 2 C/O staggered, snap action | | - | 1/2" NPT | ZCKS404 | 0.150 (0.331) |
| | | | | ISO M20 x 1.5 | ZCKS404H29 | 0.150 (0.331) |

Bodies with 3-pole contact and 1 cable entry

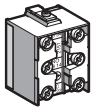
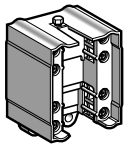
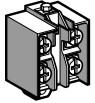
| Type | With contact block | Function diagram | Positive operation (1) | Cable entry | Catalog number | Weight kg (lb) |
|--------|--|------------------|------------------------|---------------|----------------|----------------|
| 1 step | N/C + N/O + N/O snap action (XE3S P2151) | | ⊕ | 1/2" NPT | ZCKSD31 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKSD31H29 | 0.080 (0.176) |
| | N/C + N/C + N/O snap action (XE3S P2141) | | ⊕ | 1/2" NPT | ZCKSD39 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKSD39H29 | 0.080 (0.176) |
| | N/C + N/C + N/O break before make, slow break (XE3N P2141) | | ⊕ | 1/2" NPT | ZCKSD37 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKSD37H29 | 0.080 (0.176) |
| | N/C + N/O + N/O break before make, slow break (XE3N P2151) | | ⊕ | 1/2" NPT | ZCKSD35 | 0.080 (0.176) |
| | | | | ISO M20 x 1.5 | ZCKSD35H29 | 0.080 (0.176) |

1. ⊕: N/C contact with positive opening operation or head assuring positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



| Contact blocks | | | | | |
|---|------------------|----------|------------------------|----------------|----------------|
| Type of contact | Function diagram | For body | Positive operation (1) | Catalog number | Weight kg (lb) |
| 2-pole contact | | | | | |
| N/C + N/O snap action | | ZCKS1 | ⊕ | XE2S P2151 | 0.020 (0.044) |
| N/C + N/O break before make, slow break | | ZCKS5 | ⊕ | XE2N P2151 | 0.020 (0.044) |
| 2 C/O simultaneous, snap action | | ZCKS2 | — | XES P3021 | 0.045 (0.099) |
| N/O + N/C make before break, slow break | | ZCKS6 | ⊕ | XE2N P2161 | 0.020 (0.044) |
| N/C + N/C simultaneous, slow break | | ZCKS7 | ⊕ | XE2N P2141 | 0.020 (0.044) |
| N/O + N/O simultaneous, slow break | | ZCKS8 | — | XE2N P2131 | 0.020 (0.044) |
| N/C + N/C snap action | | ZCKS9 | ⊕ | XE2S P2141 | 0.020 (0.044) |
| 3-pole contact | | | | | |
| N/C + N/O + N/O snap action | | ZCKSD31 | ⊕ | XE3S P2151 | 0.035 (0.077) |
| N/C + N/C + N/O snap action | | ZCKSD39 | ⊕ | XE3S P2141 | 0.035 (0.077) |
| N/C + N/C + N/O break before make, slow break | | ZCKSD37 | ⊕ | XE3N P2141 | 0.035 (0.077) |
| N/C + N/O + N/O break before make, slow break | | ZCKSD35 | ⊕ | XE3N P2151 | 0.035 (0.077) |

1. ⊕: N/C contact with positive opening operation or sub-assembly assuring positive opening operation, when properly mounted and using a conforming operator.

Other versions Gold flashed contacts.
Please consult your local sales office.

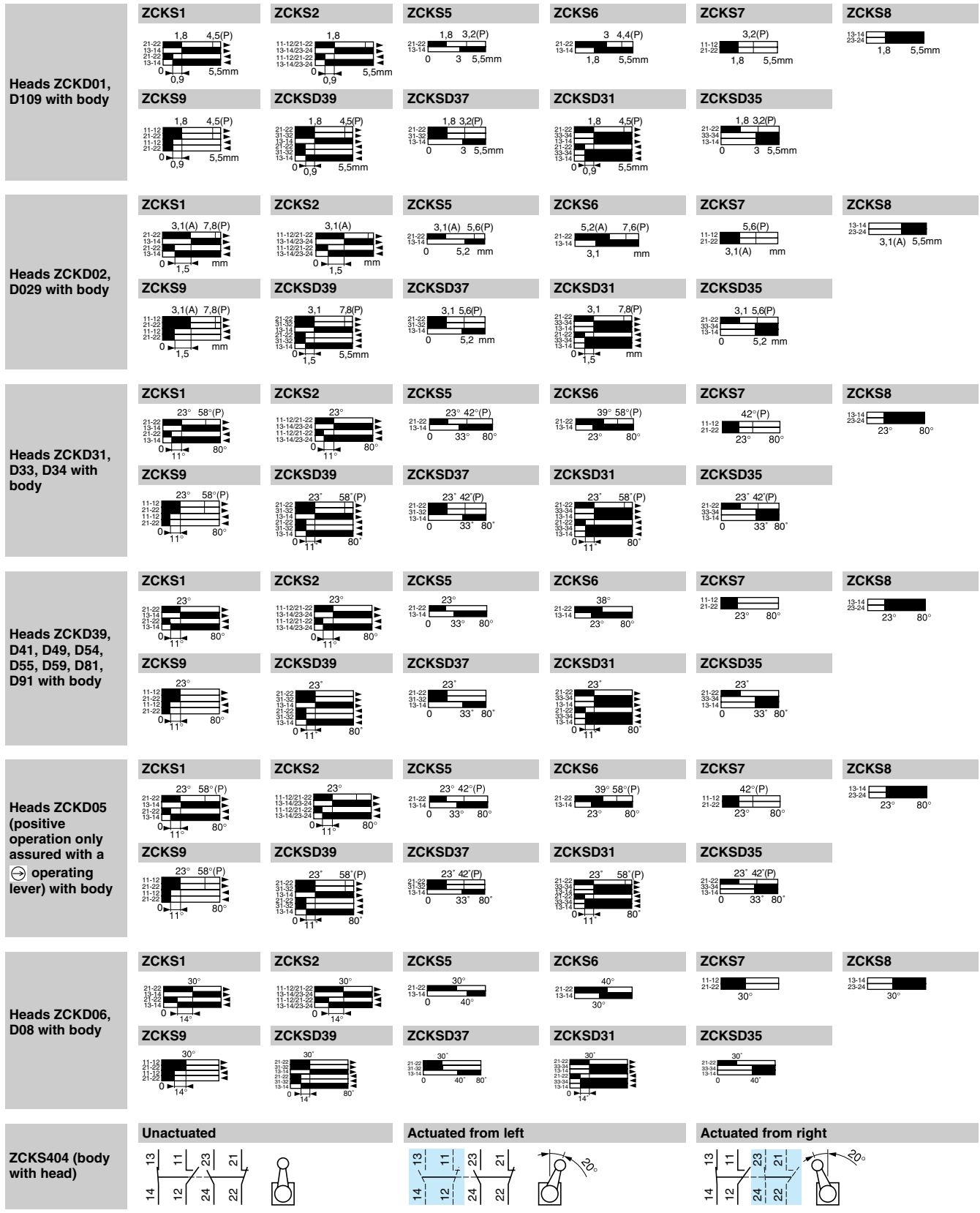
1/2" NPT Adapter

| Description | Catalog number | Weight kg (lb) |
|---------------------------|----------------|----------------|
| PG 13 to 1/2" NPT adapter | DE9RA1212 | |

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



Contact operation contact closed contact open (A) = cam displacement (P) = positive opening point

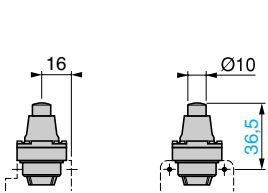
Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

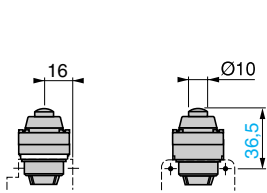
XCKS—Double Insulated, Modular

Plunger heads

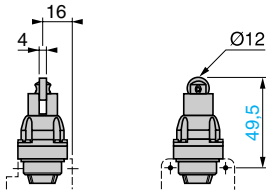
ZCKD01



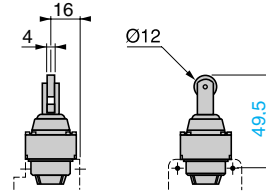
ZCKD019



ZCKD02

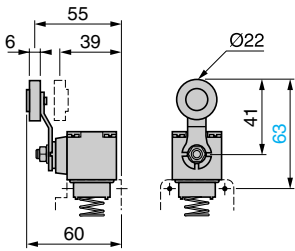


ZCKD029

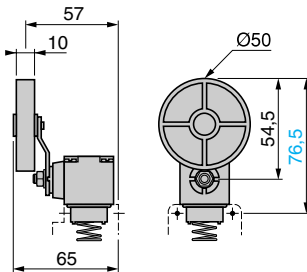


Rotary heads

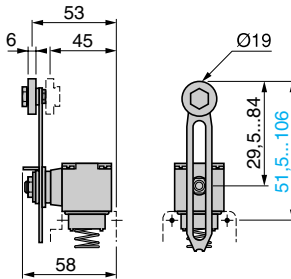
ZCKD31, D33, D34



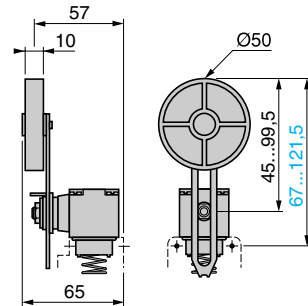
ZCKD39



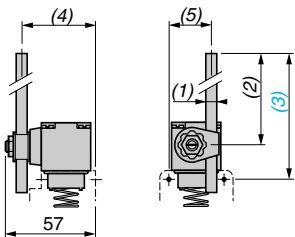
ZCKD41



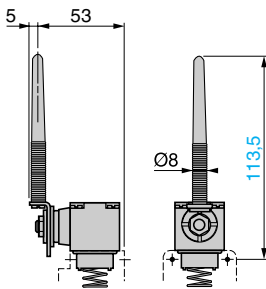
ZCKD49



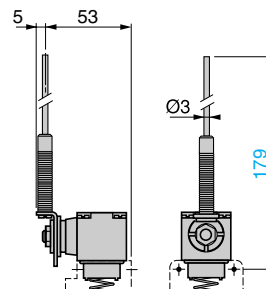
ZCKD54, D55, D59



ZCKD81



ZCKD91

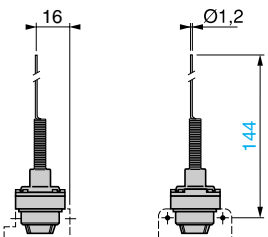


| ZCK | (1) rod | (2) | (3) | (4) | (5) |
|-----|--------------|----------|----------|------|------|
| D54 | Ø 3, L = 125 | 115 max. | 137 max. | 49 | 24 |
| D55 | Ø 3, L = 125 | 115 max. | 137 max. | 49 | 24 |
| D59 | Ø 6, L = 200 | 190 max. | 212 max. | 46.5 | 26.2 |

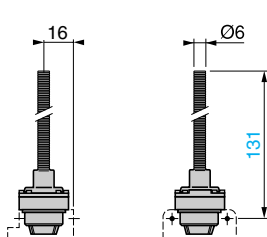
NOTE: operating lever spindle threaded M6.

Multi-directional heads

ZCKD06



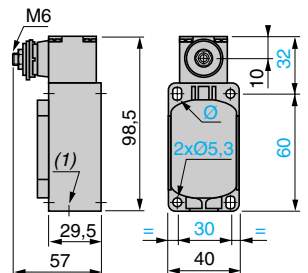
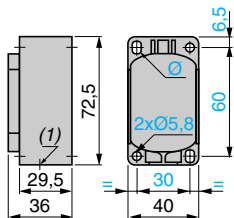
ZCKD08



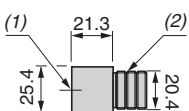
Bodies with contacts

ZCKS1, S2, S5, S6, S7, S8, S9
ZCKS1H29, S2H29, S5H29,
S6H29, S7H29, S8H29, S9H29
ZCKSD3*, SD3*H29

ZCKS404, S404H29



DE9RA1212 (PG 13 to 1/2" NPT adapter)



1. Tapped entry for 1/2" NPT conduit
2. PG 13 threaded sleeve

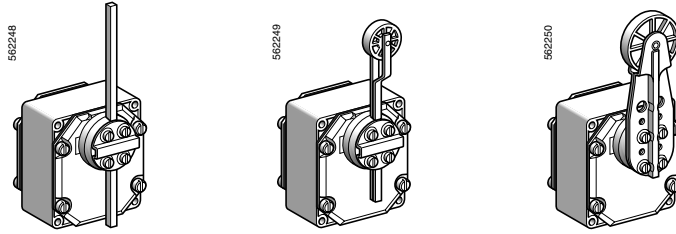
1. 1 tapped entry for PG 13 conduit thread (convertible to 1/2" NPT using adapter DE9RA1212); or 1 tapped entry for ISO M20 x 1.5 conduit thread (with suffix H29 added to the catalog number).
- Ø: 2 elongated holes Ø 5.3 x 7.3.

Limit Switches

Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyer Belt Shift Monitoring XCR and XCRT

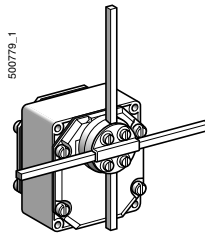
■ XCR

□ With head for rotary movement operators, spring return to off position
1 contact actuation position per direction



Page 138

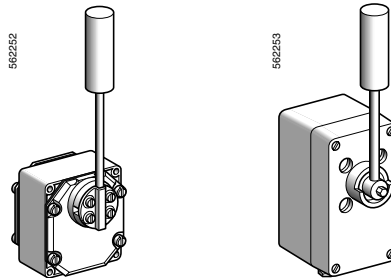
□ With head for rotary movement operators, stay put
1 contact actuation position per direction



Page 138

■ XCRT

□ With head for rotary movement operators, spring return to off position
2 contact actuation positions per direction
1 actuated at 10°, other contact actuated at 18°



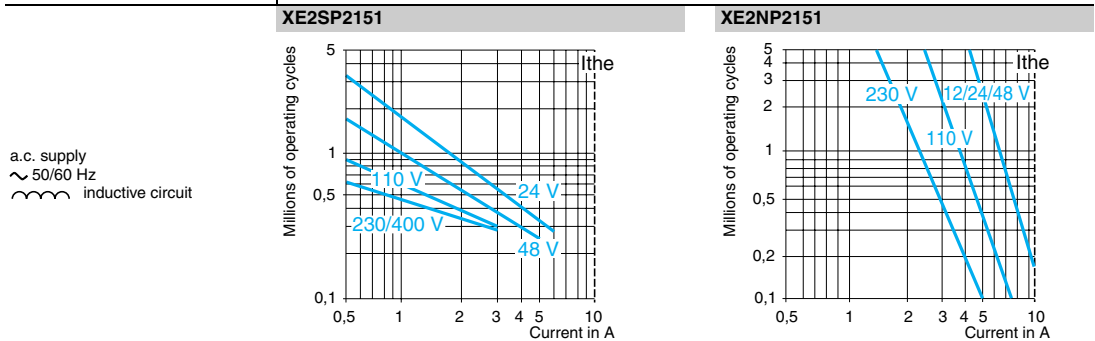
Page 140

Limit Switches

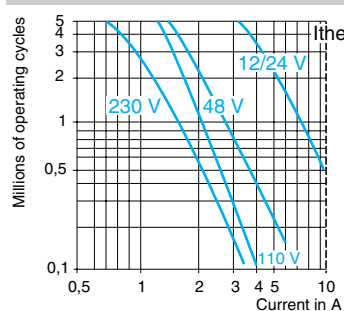
Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyor Belt Shift Monitoring XCR and XCRT

| Environmental characteristics | | |
|-------------------------------|--------------------|---|
| Conforming to standards | Products | IEC/EN 60947-5-1, VDE 0660-200 (CSA C22-2 n° 14 for XCR), CCC (for XCR) |
| | Machine assemblies | IEC/EN 60204-1, NF C 79-130 |
| Product certifications | Standard version | XCRA, B, E, F , CSA A300 |
| | Special version | XCRA, B, E, F , CSA A300, 1/2" NPT |
| Protective treatment | Standard version | "TC" |
| Ambient air temperature | | Operation: -25...+70 °C (-13...+158 °F); Storage: -40...+70 °C (-40...+158 °F) |
| Vibration resistance | | 9 gn (10...500 Hz) |
| Shock resistance | | XCRA, B, E, F: 68 gn; XCRT: 30 gn (18 ms) |
| Electric shock protection | | Class I conforming to IEC 60536 and NF C 20-030 |
| Degree of protection | | XCRA, B, E, F: IP 54 conforming to IEC 60529; IP 54S conforming to NF C 20-010 XCRT: IP 65 conforming to IEC 60529; IP 65S conforming to NF C 20-010 |
| Enclosure | | Metal, except XCRT315: polyester |
| Cable entry | | Tapped entry for PG 13 (PG 13.5) conduit thread |

| Contact block characteristics | | |
|---|-----------------------|---|
| Rated operational characteristics | | ~ AC-15; A300 (Ue = 240 V, Ie = 3 A) = DC-13; Q300 (Ue = 250 V, Ie = 0.27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1 |
| Rated insulation voltage | | Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 and VDE 0110, group C conforming to NF C 20-040 Ui = 300 V conforming to UL 508, CSA C22-2 n° 14 |
| Rated impulse withstand voltage | | U imp = 6 kV conforming to IEC 60947-1, IEC 60664 |
| Positive operation (depending on model) | | N/C contacts with positive opening operation to IEC 60947-5-1 Section 3, EN 60947-5-1 |
| Resistance across terminals | | ≤ 25 mΩ conforming to NF C 93-050 method A or IEC 60255-7 category 3 |
| Short-circuit protection | | 10 A cartridge fuse type gG (gl) |
| Cabling | Screw clamp terminals | XE2SP2151: Clamping capacity, min: 1 x 0.34 mm ² , max: 2 x 1.5 mm ² XE2NP2151: Clamping capacity, min: 1 x 0.5 mm ² , max: 2 x 2.5 mm ² XCRT contacts: Clamping capacity, min: 1 x 0.5 mm ² , max: 2 x 2.5 mm ² |
| Minimum actuation speed | | XE2SP2151 and XCRT contacts: 0.01 m/minute (0.03 ft/minute), XE2NP2151: 6 m/minute (19.68 ft/minute) |
| Electrical durability | | Conforming to IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles per hour Load factor: 0.5 |



XCRT contacts



| d.c. supply = | Voltage | 24 V | 48 V | 120 V |
|---|----------------------|------|------|-------|
| Power switched in W for 5 million operating cycles W | XE2SP2151 | 10 | 7 | 4 |
| | XE2NP2151 | 13 | 9 | 7 |
| | XCRT contacts | 10 | 7 | 4 |

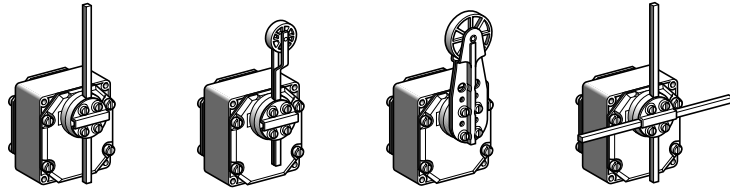
For XE2SP2151 on ~ or = N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

Limit Switches

Osiswitch® Classic, For Hoisting and Material Handling

XCR—Complete Switches with One Cable Entry

Type of head Rotary with spring return to off position Stay put



| | | | | |
|----------------------|--|----------------------------|----------------------------------|--|
| Type of operator | Metal rod, \varnothing 6 mm (0.24 in.) | Thermoplastic roller lever | Large thermoplastic roller lever | Metal rods, \varnothing 6 mm (0.24 in.) crossed or "T" (1) |
| Maximum displacement | 55° in each direction | | | 90° in each direction |

1. Crossed rods for XCRE*8, "T" rods for XCRF*7.

Catalog numbers of complete switches (↻ N/C contact with positive opening operation)

| | | | | | |
|--|---|----------------------|----------------------|----------------------|----------------------|
| <p>Two 2-pole 1 N/C + 1 N/O snap action XE2SP2151</p> | Both contacts operate in each direction | X CRA11 ↻ | X CRA12 ↻ | X CRA15 ↻ | X CRE18 ↻ |
| | 1 contact operates in each direction | X CRB11 ↻ | X CRB12 ↻ | X CRB15 ↻ | X CRF17 ↻ |
| <p>Two 2-pole 1 N/C + 1 N/O break before make, slow break XE2NP2151</p> | Both contacts operate in each direction | X CRA51 ↻ | X CRA52 ↻ | X CRA55 ↻ | X CRE58 ↻ |
| | 1 contact operates in each direction | X CRB51 ↻ | X CRB52 ↻ | X CRB55 ↻ | X CRF57 ↻ |

| | | | | |
|-------------------|------------------------------|-------|-------|--|
| Weight, kg (lb) | 1.110 | 1.145 | 1.155 | 1.135 |
| Contact operation | (P) = positive opening point | | | 1. 1 st contact 2. 2 nd contact |

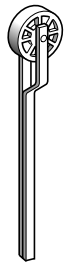
Complementary characteristics not shown under general characteristics (page 127)

| | | |
|-------------------------|--|-----------------------|
| Maximum actuation speed | 1.5 m/s (4.92 ft/s) | |
| Minimum torque | For tripping | 0.45 N•m (3.98 lb-in) |
| | For positive opening | 0.75 N•m (6.64 lb-in) |
| Cable entry | 1 entry tapped for PG 13 conduit thread conforming to NF C 68-300 (DIN PG 13.5). Clamping capacity 9 to 12 mm (0.35 to 0.47 in.). 1/2" NPT with adapter DE9RA1212. | |

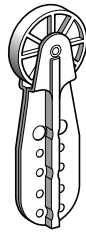
Limit Switches

Osiswitch® Classic, For Hoisting and Material Handling

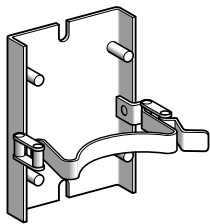
XCR—Complete Switches with One Cable Entry



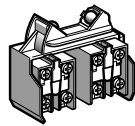
XCRZ02



XCRZ05



XCRZ09



XCRZ1•

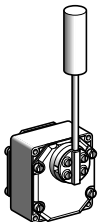
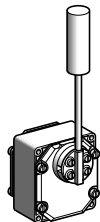
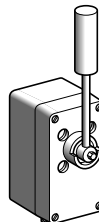
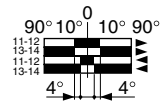
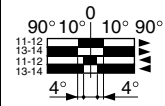
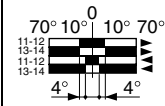
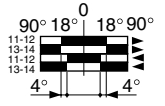
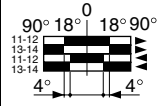
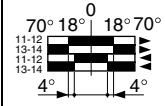
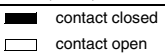
Separate components

| Description | For switches | Type | Catalog number | Weight kg (lb) |
|--|-----------------------------|--|---------------------|----------------|
| Rod, \varnothing 6 mm (0.24 in.) | XCRA XCRB | L = 200 mm (7.87 in.) | XCRZ03 | 0.020 (0.044) |
| | | L = 300 mm (11.81 in.) | XCRZ04 | 0.030 (0.066) |
| Roller lever thermoplastic roller | XCRA XCRB | — | XCRZ02 | 0.050 (0.110) |
| Large roller lever thermoplastic roller | XCRA XCRB | — | XCRZ05 | 0.090 (0.198) |
| Quick mounting/ release bracket | XCRA, XCRB XCRE, XCRF | — | XCRZ09 | 0.520 (1.146) |
| Contact block (2 contacts) with mounting plate | XCRA, XCRB XCRE, XCRF | 2-pole 1 N/C + 1 N/O snap action | XCRZ12 | 0.135 (0.298) |
| | | 2-pole 1 N/C + 1 N/O break before make, slow break | XCRZ15 | 0.135 (0.298) |
| Description | Application | Sold in lots of | Unit catalog number | Weight kg (lb) |
| Adapter | PG 13.5 to ISO M20 x 1.5 | 5 | DE9RA13520 | 0.050 (0.110) |
| Adapter | PG 13.5 to 1/2" NPT | 5 | DE9RA1212 | 0.050 (0.110) |

Limit Switches

Osiswitch® Classic, For Conveyor Belt Shift Monitoring





XCRT—Complete Switches with One Cable Entry and 1/2" NPT Adapter Included

| Type of switch | Standard | For corrosive atmospheres | |
|---|--|---|---|
| |  |  |  |
| Features | Zinc alloy enclosure Colour: industrial blue Zinc plated steel lever, spring return to off position Cam angles: 10° and 18° Maximum displacement: 90° | Zinc alloy enclosure Colour: blue Stainless steel lever, spring return to off position Cam angles: 10° and 18° Maximum displacement: 90° | Glass reinforced polyester enclosure Colour: grey Stainless steel lever, spring return to off position Cam angles: 10° and 18° Maximum displacement: 70° |
| Catalog numbers of complete switches | | | |
| 2 single-pole C/O snap action | XCRT115 | XCRT215 | XCRT315 |
| 1 st contact |  |  |  |
| 2 nd contact |  |  |  |
| Weight, kg (lb) | 1.170 (2.579) | 1.170 (2.579) | 1.520 (3.351) |
| Contact operation |  | | |

Complementary characteristics not shown under general characteristics (page 127)

| | |
|--------------------------------|--|
| Minimum tripping torque | 1.0 N•m (8.85 lb-in) |
| Cable entry | 1 entry tapped for PG 13 conduit thread conforming to NF C 68-300 (DIN PG 13.5) Clamping capacity 9 to 12 mm (0.35 to 0.47 in.) 1/2" NPT with adapter DE9RA1212 included |

Switch operation

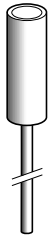
| Normal position | Fault signalling | Stopping of the conveyor belt | Maximum rotation |
|---|---|--|---|
|  |  |  |  |

Dimensions:
page 143

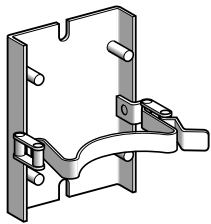
Limit Switches

Osiswitch® Classic, For Conveyor Belt Shift Monitoring

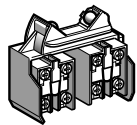
XCRT—Complete Switches with One Cable Entry and 1/2" NPT Adapter Included



XCRZ901



XCRZ09



XCRZ42

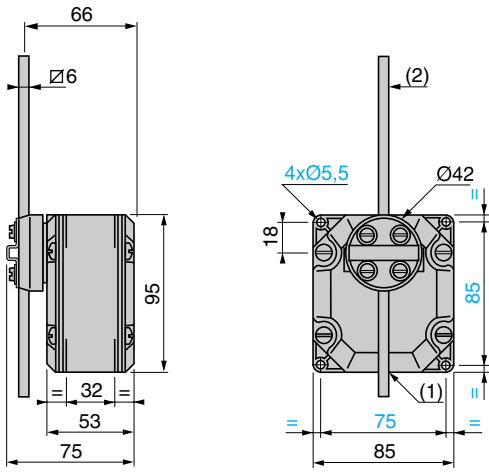
Separate components

| Description | Type | For switches | Catalog number | Weight kg (lb) |
|--|-----------------------------|--------------------|---------------------|----------------|
| Roller with lever | Zinc plated steel | XCRT115 XCRT215 | XCRZ901 | 0.230 (0.507) |
| | Stainless steel | XCRT115 XCRT215 | XCRZ902 | 0.230 (0.507) |
| | | XCRT315 | XCRZ903 | 0.230 (0.507) |
| Quick mounting/release bracket | — | XCRT115 XCRT215 | XCRZ09 | 0.520 (1.146) |
| Contact block (2 contacts) with mounting plate | Single-pole C/O snap action | XCRT•15 | XCRZ42 | 0.135 (0.298) |
| Description | Application | Sold in lots of | Unit catalog number | Weight kg (lb) |
| Adapter | PG 13.5 to ISO M20 x 1.5 | 5 | DE9RA13520 | 0.050 (0.110) |
| Adapter | PG 13.5 to 1/2" NPT | 5 | DE9RA1212 | 0.050 (0.110) |

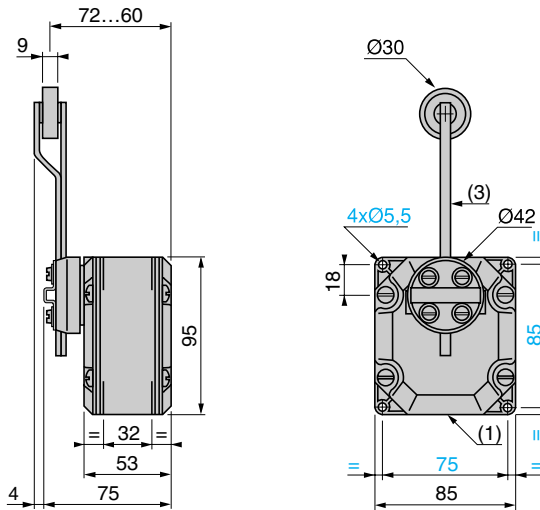
Limit Switches

Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyor Belt Shift Monitoring XCR and XCRT

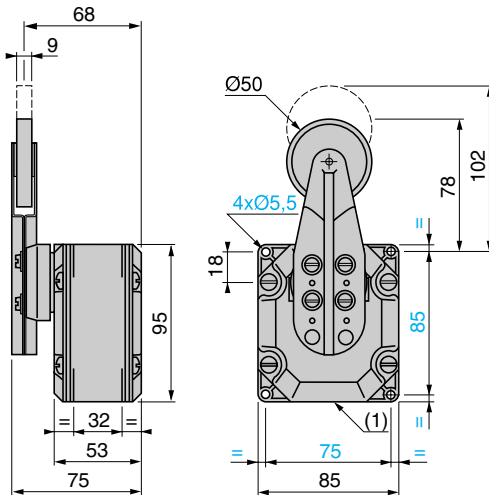
XCRA11, B11, A51, B51



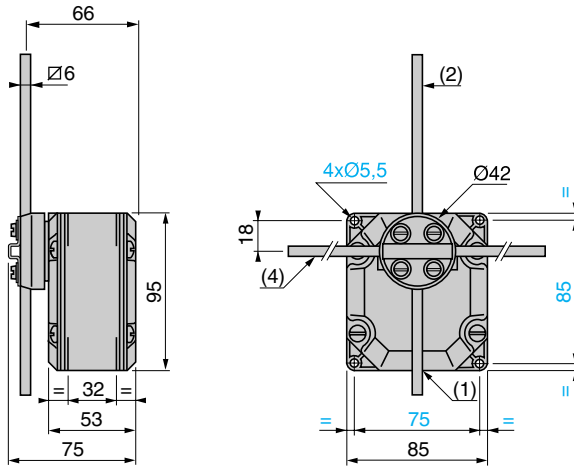
XCRA12, B12, A52, B52



XCRA15, B15, A55, B55



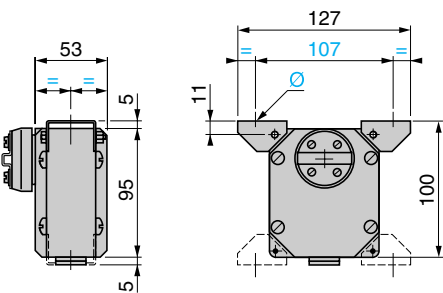
XCREF18, E58, F17, F57



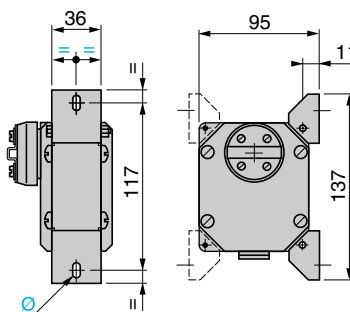
- 1. 1 tapped entry for PG 13 conduit thread.
- 2. Rod length: 200 mm (7.87 in.).
- 3. Rod + roller length: 160 mm (6.30 in.).
- 4. Rod length: 300 mm (11.81 in.) for XCRF17 and F57, 200 mm (7.87 in.) for XCR E18 and E58.

Supplementary mounting using 2 adjustable lugs (included with switch)

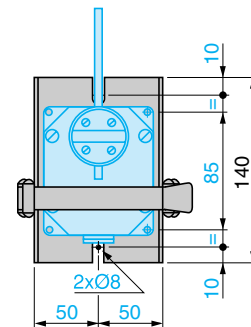
Horizontally positioned



Vertically positioned



Quick mounting/release bracket XCRZ09



Ø: 1 elongated hole Ø 6 x 8.

Characteristics:
pages 137 and 138

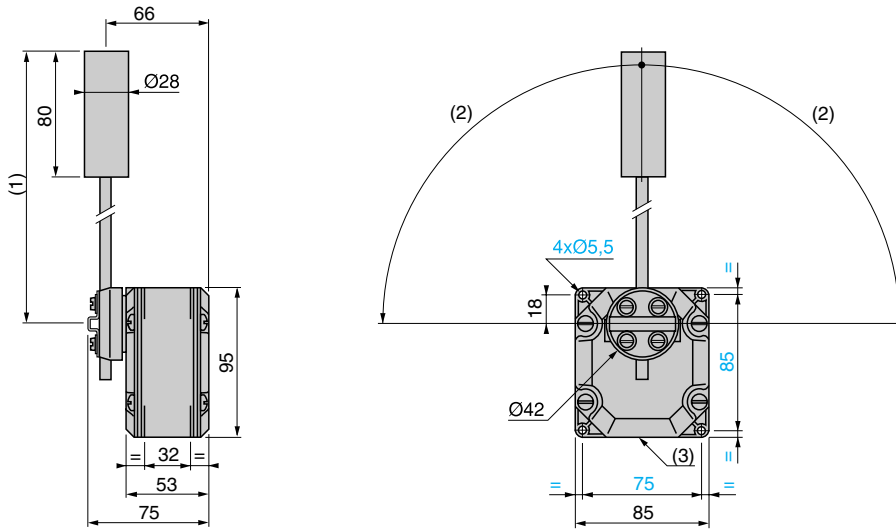
Catalog numbers:
page 138

Operation:
page 138

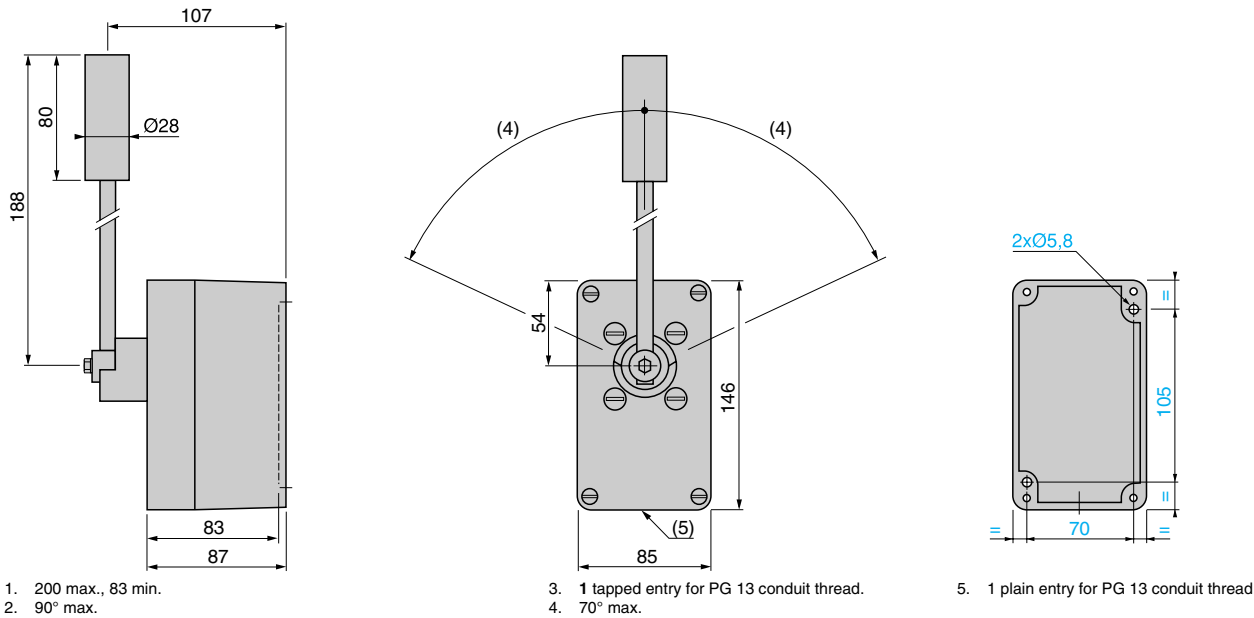
Limit Switches

Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyor Belt Shift Monitoring XCR and XCRT

XCRT115, T215



XCRT315



1. 200 max., 83 min.

2. 90° max.

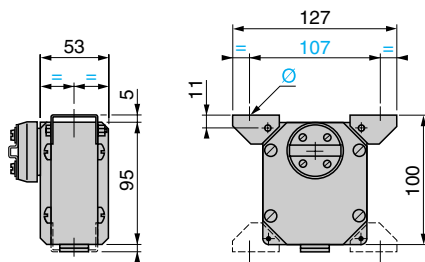
3. 1 tapped entry for PG 13 conduit thread.

4. 70° max.

5. 1 plain entry for PG 13 conduit thread.

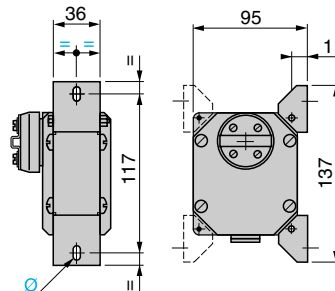
Supplementary mounting using 2 adjustable lugs (included with XCRT115 and T215)

Horizontally positioned

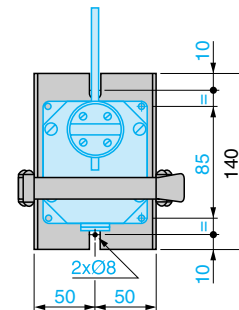


Ø: 1 elongated hole Ø 6 x 8.

Vertically positioned



Quick mounting/release bracket XCRZ09



Characteristics:
pages 137 and 140

Catalog numbers:
page 140

Operation:
page 141

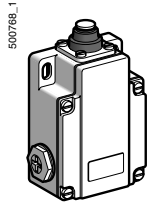
Limit Switches

Osiswitch® Classic, For Material Handling

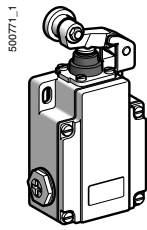
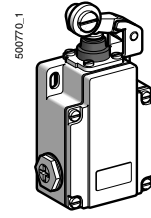
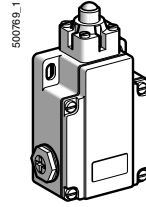
XC1AC

■ XC1AC
with slow break contacts

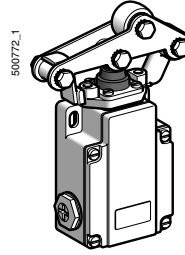
□ With head for linear movement (plunger)



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Limit Switches

Osiswitch® Classic, For Material Handling

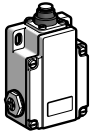
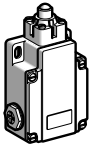


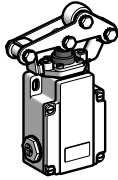
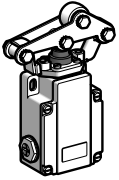

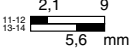
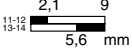
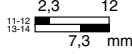
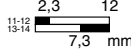
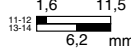
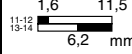

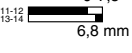
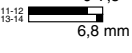
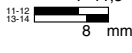
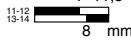
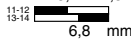
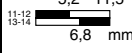

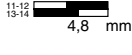
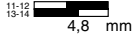
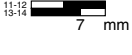
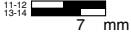
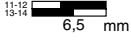
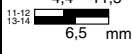















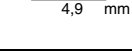
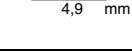
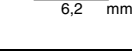
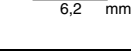
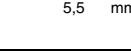


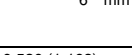
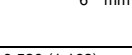
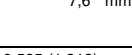
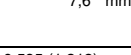
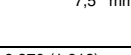
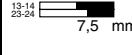
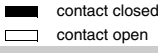
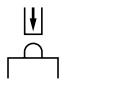
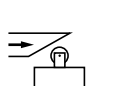
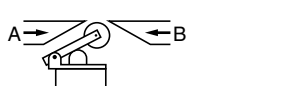
XC1AC

| Environmental characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---------------------------|-----|------|--|----------------------|--|--|--|-----------|----|-----|-----|--|---------------------------------------|-----|-----|------|--|---------------------------------------|-----|-----|-----|---------------------|--|--|--|-----------|----|-----|-----|--------------------------------------|---------------------------------------|-----|-----|----|--|---------------------------------------|----|----|
| Conformity to standards | IEC/EN 60947-5-1, IEC 60337-1, VDE 0660-200, CSA C22-2 n° 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Product certifications | Special version CSA 600 V (ac) HD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Protective treatment | Version Standard "TC", special "TH" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ambient air temperature | For operation - 25...+70 °C (-13...+158 °F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | For storage - 40...+70 °C (-40...+158 °F) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating position | All positions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vibration resistance | 9 gn (10...500 Hz) conforming to IEC 60068-2-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shock resistance | 95 gn (11 ms) conforming to IEC 60068-2-27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electric shock protection | Class I conforming to IEC 60536 and NF C 20-030 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Degree of protection | IP 65 conforming to IEC 60529 and NF C 20-010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mechanical durability | 10 million operating cycles | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cable entry | 3 tapped entries for PG 13 conduit thread | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contact block characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conventional thermal current | 10 A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated insulation voltage | Slow break contact blocks ~ 500 V and = 600 V conforming to IEC 60947-5-1, NF C 20-040 ~ and = 600 V conforming to CSA C22-2 n° 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance across terminals | ≤ 8 mΩ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum tripping force | XC1AC1•1 : 33 N (7.42 lb); XC1AC1•6 : 23 N (5.17 lb); XC1AC1•7 : 29 N (6.52 lb) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Terminal referencing | Conforming to CENELEC EN 50013 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Short-circuit protection | 10 A cartridge fuse type gG (gl) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electrical durability | Conforming to IEC 60947-5-1 Appendix C Utilization categories AC-15 and DC-13 Maximum operating rate: 3600 operating cycles/hour Load factor: 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th colspan="4">Slow break contact blocks</th> </tr> <tr> <th colspan="4">Power switched in VA</th> </tr> <tr> <th>Voltage V</th> <th>48</th> <th>110</th> <th>230</th> </tr> </thead> <tbody> <tr> <td>a.c. supply ~ 50/60 Hz ~ inductive circuit</td> <td>For 1 million operating cycles</td> <td>450</td> <td>900</td> <td>1900</td> </tr> <tr> <td></td> <td>For 3 million operating cycles</td> <td>170</td> <td>350</td> <td>430</td> </tr> <tr> <th colspan="4">Power switched in W</th> </tr> <tr> <th>Voltage V</th> <th>48</th> <th>110</th> <th>230</th> </tr> <tr> <td>d.c. supply = ~ inductive circuit</td> <td>For 1 million operating cycles</td> <td>100</td> <td>100</td> <td>95</td> </tr> <tr> <td></td> <td>For 3 million operating cycles</td> <td>35</td> <td>40</td> <td>33</td> </tr> </tbody> </table> | Slow break contact blocks | | | | Power switched in VA | | | | Voltage V | 48 | 110 | 230 | a.c. supply ~ 50/60 Hz ~ inductive circuit | For 1 million operating cycles | 450 | 900 | 1900 | | For 3 million operating cycles | 170 | 350 | 430 | Power switched in W | | | | Voltage V | 48 | 110 | 230 | d.c. supply = ~ inductive circuit | For 1 million operating cycles | 100 | 100 | 95 | | For 3 million operating cycles | 35 | 40 |
| Slow break contact blocks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power switched in VA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Voltage V | 48 | 110 | 230 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.c. supply ~ 50/60 Hz ~ inductive circuit | For 1 million operating cycles | 450 | 900 | 1900 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | For 3 million operating cycles | 170 | 350 | 430 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power switched in W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Voltage V | 48 | 110 | 230 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d.c. supply = ~ inductive circuit | For 1 million operating cycles | 100 | 100 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | For 3 million operating cycles | 35 | 40 | 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Limit Switches

Osiswitch® Classic, For Material Handling

XC1AC—Complete Switches with Slow-Break Contacts and 1/2" NPT Adapter Included

| Type of head | Plunger | | | | | |
|---|---|---|--|--|---|---|
| |  |  |  |  |  |  |
| Type of operator | End plunger | End ball bearing plunger | Roller lever | Offset roller lever | Reinforced roller lever | Roller lever on needle roller bearing |
| Catalog numbers of complete switches | | | | | | |
| Single pole C/O slow break ZC1AZ11 | XC1AC111 | XC1AC115 | XC1AC116 | XC1AC118 | XC1AC117 | XC1AC119 |
|  |  |  |  |  |  |  |
| 2-pole N/C + N/O break before make, slow break ZC1AZ12 | XC1AC121 | XC1AC125 | XC1AC126 | XC1AC128 | XC1AC127 | XC1AC129 |
|  |  |  |  |  |  |  |
| 2-pole N/O + N/C make before break, slow break ZC1AZ13 | XC1AC131 | XC1AC135 | XC1AC136 | XC1AC138 | XC1AC137 | XC1AC139 |
|  |  |  |  |  |  |  |
| 2-pole N/C + N/C simultaneous, slow break ZC1AZ14 | XC1AC141 | XC1AC145 | XC1AC146 | XC1AC148 | XC1AC147 | XC1AC149 |
|  |  |  |  |  |  |  |
| 2-pole N/O + N/O simultaneous, slow break ZC1AZ15 | XC1AC151 | XC1AC155 | XC1AC156 | XC1AC158 | XC1AC157 | XC1AC159 |
|  |  |  |  |  |  |  |
| 2-pole N/C + N/C staggered, slow break ZC1AZ16 | XC1AC161 | XC1AC165 | XC1AC166 | XC1AC168 | XC1AC167 | XC1AC169 |
|  |  |  |  |  |  |  |
| 2-pole N/O + N/O staggered, slow break ZC1AZ17 | XC1AC171 | XC1AC175 | XC1AC176 | XC1AC178 | XC1AC177 | XC1AC179 |
|  |  |  |  |  |  |  |
| Weight, kg (lb) | 0.530 (1.168) | 0.530 (1.168) | 0.595 (1.312) | 0.595 (1.312) | 0.870 (1.918) | 0.870 (1.918) |
| Contact operation |  | | | | | |
| Complementary characteristics not shown under general characteristics (page 137) | | | | | | |
| Switch actuation | On end | By 30° cam | | | | |
| Type of actuation |  |  |  | | | |
| Maximum actuation speed | 0.5 m/s (1.64 ft/s) | Direction A: 1 m/s (3.28 ft/s); Direction B: 0.5 m/s (1.64 ft/s) (1) | | | | |
| Cable entry | 3 tapped entries for PG 13 (DIN PG 13.5) conduit thread, clamping capacity 9 to 12 mm (0.35 to 0.47 in.) (2 entries fitted with blanking plug) 1/2" NPT with adapter DE9RA1212 | | | | | |
| Connection | Screw terminals. Clamping capacity: min 1 x 0.5 mm ² , max 1 x 2.5 mm ² | | | | | |

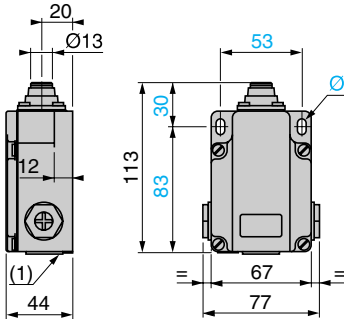
1. For a 45° cam the maximum actuation speed becomes 0.5 m/s (1.64 ft/s) and for a 15° cam, 1 m/s (3.28 ft/s).

Limit Switches

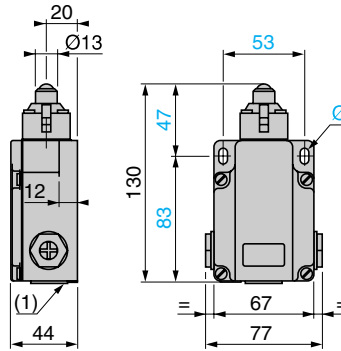
Osiswitch® Classic, For Material Handling

XC1AC—Complete Switches with Slow-Break Contacts and 1/2" NPT Adapter Included

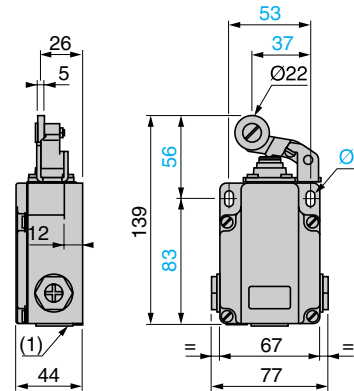
XC1AC1•1



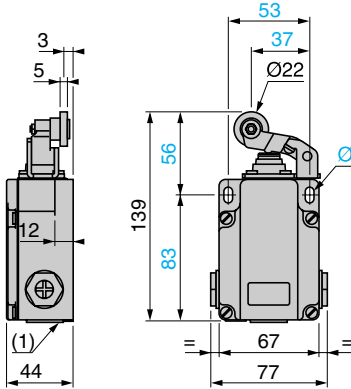
XC1AC1•5



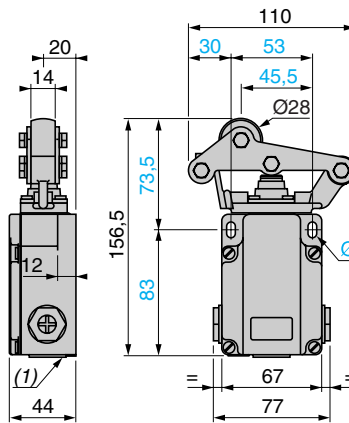
XC1AC1•6



XC1AC1•8

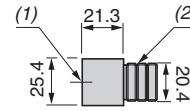


XC1AC1•7, XC1AC1•9



DE9RA1212

(PG 13 to 1/2" NPT adapter)



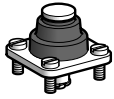
1. Tapped entry for 1/2" NPT conduit
2. PG 13 threaded sleeve

1. 3 tapped entries for PG 13 conduit thread or ISO 20 with adapter DE9RA1620.
- Ø: 2 elongated holes Ø 6.5 x 10.

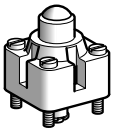
Limit Switches

Osiswitch® Classic, For Material Handling

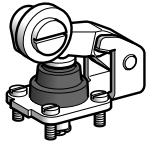
XC1AC—Renewal Parts



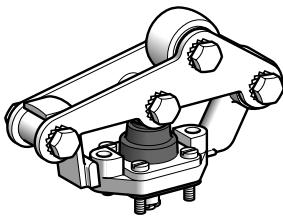
ZC1AC001



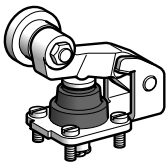
ZC1AC005



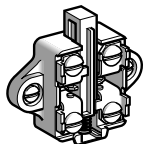
ZC1AC006



ZC1AC007
ZC1AC009



ZC1AC008



ZC1AZ1•

| Plunger heads | | | | |
|--|--|-------------------|----------------|----------------|
| Type of operator | Maximum actuation speed | Type of actuation | Catalog number | Weight kg (lb) |
| For actuation on end | | | | |
| End plunger | 0.5 m/s (1.64 ft/s) | | ZC1AC001 | 0.035 (0.077) |
| For actuation by 30° cam | | | | |
| End ball bearing plunger | 0.5 m/s (1.64 ft/s) | | ZC1AC005 | 0.050 (0.110) |
| Roller lever | Direction A 1 m/s (3.28 ft/s) Direction B 0.5 m/s (1.64 ft/s) | | ZC1AC006 | 0.100 (0.220) |
| Reinforced roller lever | Direction A 1 m/s (3.28 ft/s) Direction B 0.5 m/s (1.64 ft/s) | | ZC1AC007 | 0.375 (0.827) |
| Offset roller lever | Direction A 1 m/s (3.28 ft/s) Direction B 0.5 m/s (1.64 ft/s) | | ZC1AC008 | 0.100 (0.220) |
| Roller lever on needle roller bearing | Direction A 1 m/s (3.28 ft/s) Direction B 0.5 m/s (1.64 ft/s) | | ZC1AC009 | 3.380 (7.452) |
| Contact blocks | | | | |
| Type of contact | Function diagram | Catalog number | Weight kg (lb) | |
| C/O, single pole | | ZC1AZ11 | 0.040 (0.088) | |
| N/C + N/O break before make | | ZC1AZ12 | 0.045 (0.099) | |
| N/O + N/C make before break | | ZC1AZ13 | 0.040 (0.088) | |
| N/C + N/C simultaneous | | ZC1AZ14 | 0.045 (0.099) | |
| N/O + N/O simultaneous | | ZC1AZ15 | 0.045 (0.099) | |
| N/C + N/C staggered | | ZC1AZ16 | 0.040 (0.088) | |
| N/O + N/O staggered | | ZC1AZ17 | 0.040 (0.088) | |
| Adapter plate | | | | |
| Description | Catalog number | Weight kg (lb) | | |
| Mounting plate (For replacing an old version type RN-67522 limit switch with an XC1AC limit switch) | ZC1AZ8 | 3.380 (7.452) | | |

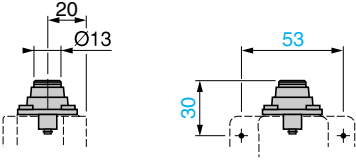
Limit Switches

Osiswitch® Classic, For Material Handling

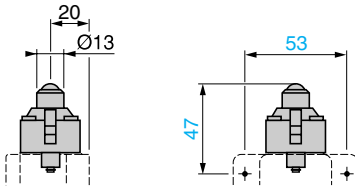
XC1AC—Renewal Parts

Dimensions

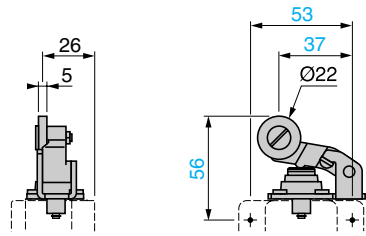
ZC1AC001



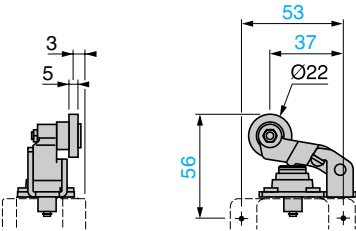
ZC1AC005



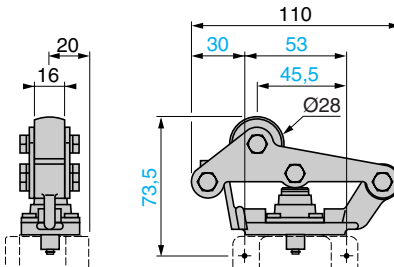
ZC1-AC006



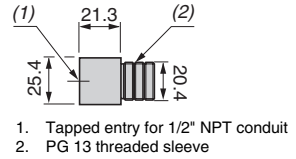
ZC1AC008



ZC1AC007, AC009



DE9RA1212
(PG 13 to 1/2" NPT adapter)



1. Tapped entry for 1/2" NPT conduit
2. PG 13 threaded sleeve

Limit Switches
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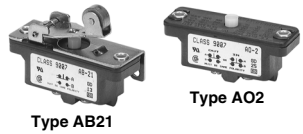
Limit Switches

Snap Action Industrial Switches

Class 9007

Industrial Snap Switches and Limit Switches without Enclosures

Industrial Snap Switches have been incorporated in many Square D® products such as timers, specialty push buttons, foot switches, operating mechanisms, door interlocks, motor control centers, position switches, and many other control products.



- **Recommended Actuator**—An adjustable actuator is recommended. If a non-adjustable actuator is used, a resilient type or a mechanical stop should be used to prevent bottoming of button mechanism.
- **Adjustable Actuator Overtravel**—Minimum recommended overtravel in both trip and reset directions is 0.015 in. (0.38 mm).
- **Non-Adjustable Actuator Total Travel**—Maximum differential limit plus 0.030 in. (0.76 mm). Example: 0.076 in. (1.9 mm) for Type AO2.
- **Non-Adjustable Actuator Total Travel**—Fully retracted—from mounting surface, at least 0.139 in. (3.5 mm) for Type AO1 and 0.160 in. (4.0 mm) for Types AO2 and CO3. Fully engaged—from mounting surface, at least 0.061 in. (1.5 mm) but not closer than 0.045 in. (1.1 mm).

Quick Make and Break

| Type of Operator | Contact Arrangement • | Type | Type of Operator | Contact Arrangement • | Type | Type of Operator | Contact Arrangement • | Type | |
|-------------------------|-------------------------------|--|--|-----------------------|--|---|-----------------------|------------------|------------|
| Basic Snap Switch | 1 N.O. 1 N.C. | AO 1 | Rigid Roller Lever Type | 2 N.O. 2 N.C. | CB 31 (RH) ▲ | Roller Plunger Type Panel Mounting Non-Oiltight | 1 N.O. 1 N.C. | AP 321 | |
| | 1 N.C. | AO 1A | | | CB 32 (LH) ▲ | | 1 N.O. 1 N.C. | AP 324 † | |
| | 1 N.O. | AO 1B | | | CB 41 ▲ (without Side Mtg. Bracket) | | 2 N.O. 2 N.C. | CP 321 | |
| | 1 N.O. 1 N.C. | AO 2 | | | CB 33 (RH) ◆ | | 2 N.O. 2 N.C. | CP 324 † | |
| | 1 N.C. | AO 6 (Plug-in) | | | CB 34 (LH) ◆ | | Operator Only | AP 301 * | |
| | 1 N.C. | AO 2A | Rigid Roller Lever Type One Way Roller | 1 N.O. 1 N.C. | AB 25 (RH) | Roller Plunger Type Panel Mounting Oiltight | 1 N.O. 1 N.C. | AP 304 † * | |
| | 1 N.O. | AO 2B | | 1 N.C. | AB 26 (LH) | | 1 N.O. 1 N.C. | AP 323 | |
| | 2 N.O. 2 N.C. | CO 3 | | 2 N.O. 2 N.C. | CB 35 (RH) | | 2 N.O. 2 N.C. | AP 325 † | |
| | 2 N.O. | CO 6 (Plug-in) | Cabinet Door Type | 2 N.O. 2 N.C. | CB 36 (LH) | Roller Plunger Type Panel Mounting Oiltight | 2 N.O. 2 N.C. | CP 323 | |
| | Two Stage 2 N.O. 2 N.C. | CO 7 | | 1 N.O. 1 N.C. | AC 1 | | 2 N.O. 2 N.C. | CP 325 † | |
| Rigid Roller Lever Type | 1 N.O. 1 N.C. | AB 21 (RH) ▲ | Plunger Type Panel Mounting | 1 N.O. 1 N.C. | 2 N.O. 2 N.C. | Mushroom Button Type Panel Mounting | 1 N.O. 1 N.C. | AP 303 * | |
| | | AB 22 (LH) ▲ | | | 1 N.O. 1 N.C. | | CC 1 | 2 N.O. 2 N.C. | AP 305 † * |
| | | AB 41 ▲ (without Side Mtg. Bracket) | | | 2 N.O. 2 N.C. | | AP 221 | 1 N.O. 1 N.C. | AP 222 |
| | | AB 23 (RH) ◆ | | | Operator Only | | CP 221 | 2 N.O. 2 N.C. | CP 222 |
| | | AB 24 (LH) ◆ | | | Operator Only | | AP 201 * | Operator Only | AP 202 * |

- Single-pole snap switches that contain two double-break contact elements (1 N.O. and 1 N.C.) must be used on circuits of the same polarity. Two-pole snap switches contain two electrically separated sets of contact elements allowing use on circuits of opposite polarity. Each set contains two double-break contact elements (1 N.O. and 1 N.C.) that must be used on circuits of the same polarity.
- † Roller turned 90° from standard (perpendicular to mounting holes).
- ▲ With 0.22 in. (5.6 mm) width roller.
- ◆ With 0.47 in. (12.0 mm) width roller.
- * For use with Type AO and CO basic switches.

Maximum Current Ratings For Control Contacts—All Types

| Switch Type | Contacts | Direct Opening Contacts Meet IEC 60947-5-1 Requirements | Voltage | AC—50 or 60 Hz | | | | | Resistive 75% Power Factor | Voltage | DC | | AC or DC Continuous Carrying Amperes |
|-----------------------------|---------------------------------------|---|---------|----------------------------|-------|-------------|-------------|------------------------|----------------------------|---------|--|----|--------------------------------------|
| | | | | Inductive 35% Power Factor | | | | Make and Break Amperes | | | Inductive and Resistive Make and Break Amperes | | |
| | | | | Make | Break | Single Pole | Double Pole | | | | | | |
| AO1, AC | SPDT Form Z SPST • Form X or Y | No | 120 | 40 | 4800 | 15 | 1800 | 15 | 125 | 0.5 | 0.25 | 15 | |
| | | | 240 | 20 | 4800 | 10 | 2400 | 10 | 250 | 0.25 | 0.1 | 15 | |
| | | | 480 | 10 | 4800 | 6 | 2880 | 6 | 600 | 0.05 | — | 15 | |
| | | | 600 | 8 | 4800 | 5 | 3000 | 5 | — | — | — | 15 | |
| AW, AO2 and AO6, AB, AP | SPDT Form Z SPST • Form X or Y | No | 120 | 40 | 4800 | 15 | 1800 | 15 | 125 | 2.0 | 0.5 | 15 | |
| | | | 240 | 20 | 4800 | 10 | 2400 | 10 | 250 | 0.5 | 0.2 | 15 | |
| | | | 480 | 10 | 4800 | 6 | 2880 | 6 | 600 | 0.1 | 0.02 | 15 | |
| | | | 600 | 8 | 4800 | 5 | 3000 | 5 | — | — | — | 15 | |
| AW, CO3 and CO6, CB, CC, CP | DPDT Form ZZ DPST Form AA or BB | No | 120 | 30 | 3600 | 3 | 360 | 3 | 125 | 1.0 | 0.2 | 10 | |
| | | | 240 | 15 | 3600 | 1.5 | 360 | 1.5 | 250 | 0.3 | 0.1 | 10 | |
| | | | 480 | 7.5 | 3600 | 0.75 | 360 | 0.75 | 600 | 0.1 | — | 10 | |
| | | | 600 | 6 | 3600 | 0.6 | 360 | 0.6 | — | — | — | 10 | |

Acceptable Wire Size 14–22 AWG
Recommended Terminal Clamp Torque 6–9 lb-in. (0.7–1 N•m)



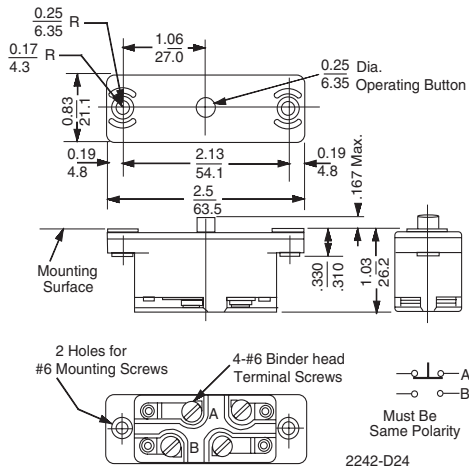
Limit Switches

Snap Action Industrial Switches

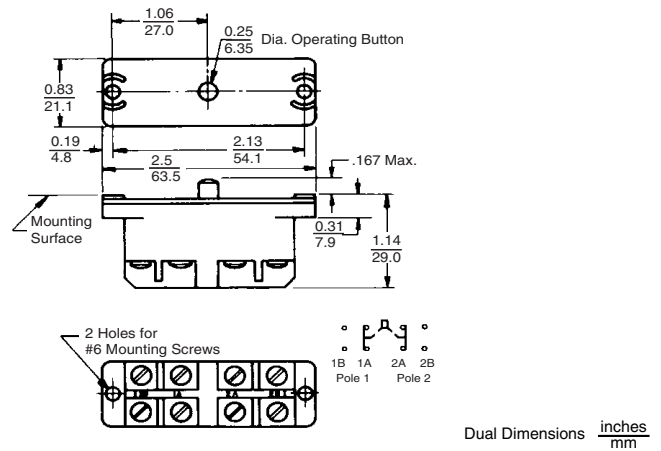
Class 9007

Approximate Dimensions and Operating Data, Types AO, CO, AP, and CP

Class 9007 Type AO, Single-Pole Snap Switch



Class 9007 Type CO, Two-Pole Snap Switch

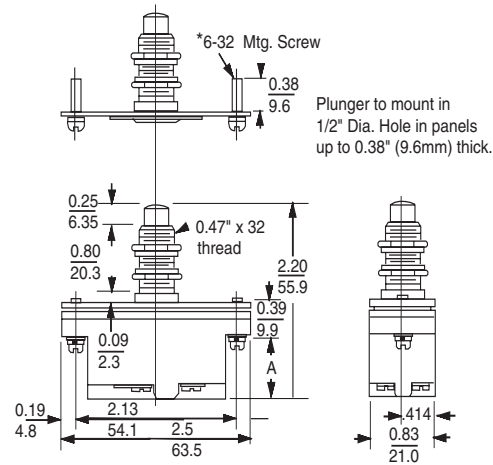


| | Operating Data, in. (mm) | |
|-----------------|--------------------------|------------------------|
| | AO1, 1A, 1B | AO2, 2A, 2B |
| Pre-travel | 0.057–0.074 (1.4–1.8) | 0.057–0.074 (1.4–1.8) |
| Differential | 0.015–0.025 (0.6–0.6) | 0.035–0.046 (0.9–1.16) |
| Total travel | 0.103–0.125 (2.6–3.2) | 0.103–0.125 (2.6–3.2) |
| Operating force | 7–11 oz (0.05–0.08 N) | 10–14 oz (0.07–0.1 N) |

| | Operating Data, in. (mm) | |
|----------------------|--------------------------|-------------------------|
| | CO3 | CO7 |
| Pre-travel 1st stage | 0.057–0.074 (1.4–1.8) | 0.035–0.060 (0.9–1.5) |
| Pre-travel 2nd stage | — | 0.060–0.085* (1.5–2.1) |
| Differential | 0.025–0.046 (0.6–1.16) | 0.010–0.020 (0.25–0.50) |
| Total travel | 0.103–0.125 (2.6–3.2) | — |
| Operating force | 7–12 oz (0.05–0.084 N) | 7–12 oz (0.05–0.084 N) |

* Separation between first and second stage trip points is 0.020–0.025 (0.5–0.6).
 Note: Shipping weight of Type AO and CO is 0.25 lb (0.11 kg).

Type AP201, 221, and CP221



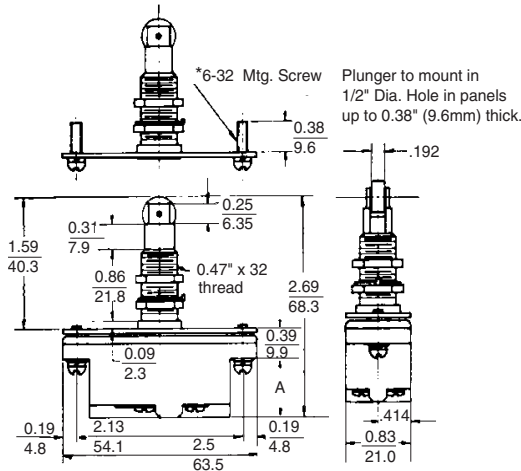
NOTE: Type AP221 shown.

| Type | Dimension A |
|-------|-------------|
| AP221 | 0.70 (17.8) |
| CP221 | 0.80 (20.3) |

| Operating Data | | |
|-----------------|-----------------------|-----------------------|
| | AP221 | CP221 |
| Pretravel | 0.070–0.089 (1.8–2.2) | 0.070–0.089 (1.8–2.2) |
| Differential | 0.035–0.046 (0.9–1.2) | 0.025–0.046 (0.9–1.2) |
| Overtravel | 0.161–0.180 (4.1–4.6) | 0.161–0.180 (4.1–4.6) |
| Total travel | 0.231–0.269 (5.8–6.8) | 0.231–0.269 (5.8–6.8) |
| Operating force | 10–14 oz (0.07–0.1 N) | 7–12 oz (0.05–0.08 N) |

Note: Shipping weight 0.25 lb (0.11 kg).

Type AP301, 303, 304, 305, 321, 323, 324, 325, and CP321, 323, 324, 325



NOTE: Type AP321 shown.

| Type | Dimension A |
|----------------------|-------------|
| AP321, 323, 324, 325 | 0.70 (17.8) |
| CP321, 323, 324, 325 | 0.80 (20.3) |

| Operating Data | | | | |
|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | AP321, 324 | AP323, 325 | CP321, 324 | CP323, 325 |
| Pretravel | 0.060–0.150 (1.5–3.8) | 0.060–0.150 (1.5–3.8) | 0.060–0.150 (1.5–3.8) | 0.060–0.150 (1.5–3.8) |
| Differential | 0.035–0.046 (0.9–1.2) | 0.035–0.046 (0.9–1.2) | 0.025–0.046 (0.9–1.2) | 0.035–0.046 (0.9–1.2) |
| Total travel | 0.200–0.340 (5.1–8.6) | 0.200–0.340 (5.1–8.6) | 0.200–0.340 (5.1–8.6) | 0.200–0.340 (5.1–8.6) |
| Operating force | 20 oz (0.14 N) | 28 oz (0.2 N) | 26 oz (0.18 N) | 28 oz (0.2 N) |

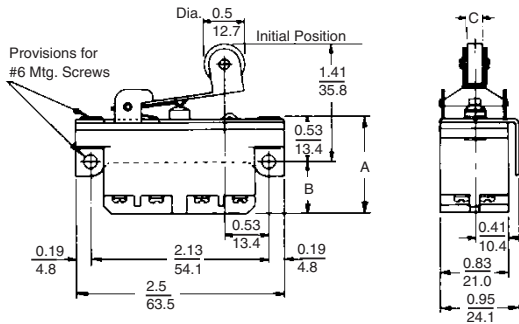
Limit Switches

Snap Action Industrial Switches

Class 9007

Approximate Dimensions and Operating Data, Types AB, CB, AC, and CC

Types AB21 through 24 and CB31 through 34



Note: Type CB31 RH mounting shown.
Type AB41 and CB41 same as above except without side mounting plates.

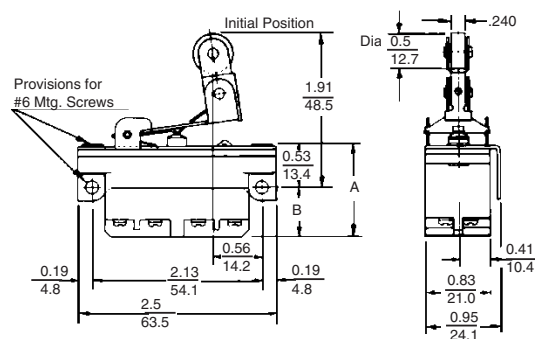
| Type | Dimension | | |
|----------|-------------|-------------|-------------|
| | A | B | C |
| AB21, 22 | 1.03 (26.2) | 0.5 (12.7) | 0.22 (5.6) |
| AB23, 24 | 1.03 (26.2) | 0.5 (12.7) | 0.47 (12.0) |
| AB41 | 1.03 (26.2) | — | 0.22 (5.6) |
| CB31, 32 | 1.13 (28.7) | 0.59 (15.0) | 0.22 (5.6) |
| CB33, 34 | 1.13 (28.7) | 0.59 (15.0) | 0.47 (12.0) |
| CB41 | 1.13 (28.7) | — | 0.22 (5.6) |

Operating Data

| | |
|-----------------|----------------|
| Pre-travel | 0.16 (4.5) |
| Differential | 0.08 (2.0) |
| Overtravel | 0.06 (1.5) |
| Total travel | 0.22 (5.6) |
| Operating force | 8 oz (0.23 kg) |

Note: Shipping weight 0.25 lb (0.11 kg).

Types AB25, 26 and CB35, 36



Note: Type CB35 mounting shown.

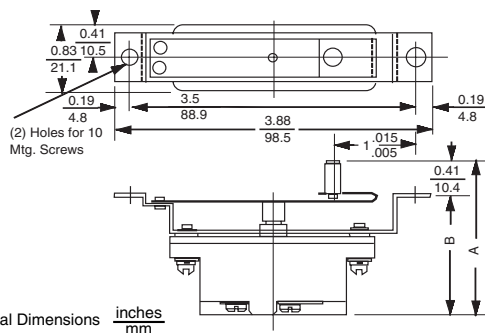
| Type | Dimension | | |
|----------|-------------|-------------|------------|
| | A | B | C |
| AB25, 26 | 1.03 (26.2) | 0.5 (12.7) | 0.22 (5.6) |
| CB35, 36 | 1.13 (28.7) | 0.59 (15.0) | 0.22 (5.6) |

Operating Data

| | |
|-----------------|----------------|
| Pre-travel | 0.16 (4.5) |
| Differential | 0.08 (2.0) |
| Overtravel | 0.06 (1.5) |
| Total travel | 0.22 (5.6) |
| Operating force | 8 oz (0.23 kg) |

Types AC1 and CC1

Dimensions



Note: Type AC1 shown.

| Type | Dimension | |
|------|-------------|-------------|
| | A | B |
| AC1 | 1.91 (48.5) | 1.5 (38.1) |
| CC1 | 2 (50.8) | 1.59 (40.4) |

Note: Shipping weight 0.25 lb (0.11 kg).

Operating Data

| | AC1 | CC1 |
|-----------------|----------------|----------------|
| Pre-travel | 0.16 (4.5) | 0.16 (4.5) |
| Differential | 0.05 (1.3) | 0.07 (1.8) |
| Overtravel | 0.09 (2.3) | 0.09 (2.3) |
| Total travel | 0.25 (6.4) | 0.25 (6.4) |
| Operating force | 8 oz (0.23 kg) | 8 oz (0.23 kg) |

Limit Switches

Miniature

Class 9007 Type MS and ML



Shown with Standard Bottom Entrance Cable



Shown with 4-Pin Micro-Connector

Description

Mini-Switch (MS) miniature switches meet the need for very small, enclosed switches with environmental sealing. A full range of styles are available, including top push plunger, parallel roller plunger, cross roller plunger, rotary lever, and omnidirectional whisker. Factory pre-wiring with industrial grade cable (type SJTO) eliminates the need to remove the cover to wire the switch. Bottom- or side-entrance cable connection is available.

Housings are rugged diecast zinc construction. Excellent sealing is achieved with an epoxy compound encapsulation of the electrical cable connections and switch housing. A Viton® O-ring seal on the plunger keeps liquids from entering the switch cavity.

Features

The heavy-duty, completely encapsulated miniature MS limit switch is intended for difficult applications such as machine tools, earth moving equipment, and general transportation. Key features include:

- Symmetrical design and top mounting holes for easy gang mounting of several switches for multiple switching
- Epoxy encapsulation sealing the pre-wired heavy duty #18 AWG SJTO cable and protecting against temporary submersion
- Single-pole double-throw (SPDT) Form C or Form Z, 1 N.O. + 1 N.C. contact
- Fine rotary lever adjustment
- Compact diecast zinc housing
- NEMA Type 6P and IP67 rated
- 10 ampere continuous current rating
- Gold contacts for low level logic switching
- Stainless steel rollers
- UL Listed and CSA Certified
- CE Marking
- Standard temperature range: -40 to +220 °F (-40 to +104 °C)

Options

- Gold crosspoint contacts
- Double-break contacts (Type ML only)
- Side-entrance cable or connectors
- Low force (top plunger models only)
- Yellow or gray SJTO cable
- 4- or 5-pin micro-connectors, AC and DC
- #16 AWG SJTO cable
- Tapped 8-32 holes on top of housing

Rotary Head

Conventional rotary limit switches have mounting holes in the base or body of the switch. In our rotary design, mounting holes are located in the head also. Cycling and stress forces are transmitted from the shaft in the head directly to the mounting bolts. The strain on the joint between the body and the head is eliminated. The result is a stronger and more rigid mounting, less subject to vibration or a weakness in the joint.

Bulkhead Mounted Mini-Switches

The MS housing is designed for multiple switching by gang mounting several switches.

Two mounting holes can be tapped in the top of each switch (except rotary lever) for #8-32 thread bolts. Switches can be readily mounted to any frame or plate by drilling holes through same to accommodate #8-32 bolts and switch plungers. Both sides of the housing are counter-bored for surface mounting.



File E42259
CCN NKCR



File LR 25490
Class 3211 03

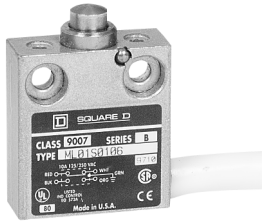


Marking

Limit Switches

Miniature

Class 9007 Types MS and ML



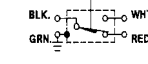
Shown with Side-Entrance Cable

- 0.98 in. (25 mm) Mounting Hole Centers
- 3 ft (0.9 m) Cable, Standard
- For other available lengths, and for a list of options, see page 158.

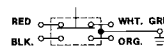
| General Specifications | |
|------------------------|--|
| Temperature range | -40 to +220 °F (-40 to +104 °C) The minimum temperatures listed are based on the absence of freezing moisture or water. |
| Enclosure rating | NEMA Types 1, 2, 4, 6, 6P, 12, 13, IP67 |
| Vibration resistance | 10G (75–1200 Hz) |
| Shock resistance | 35G |
| Cable | #18 AWG SJTO |

| Contact Characteristics | |
|--------------------------------|----------------------------|
| Rated thermal current | 10 A (standard) |
| Rated insulation voltage | 300 Vac and Vdc (standard) |
| Gold contact switching ratings | 0.1 A, 24 Vdc; 0.24 VA |

| Type MS Circuit—Form C | Electrical Ratings/SPDT | | |
|---|-------------------------|------|----------------------------------|
| | Silver Contacts | | Gold Contacts |
| 1 N.O.—1 N.C. | Voltage | Make | Break |
| | 120 AC | 60 A | 6 A |
| | 240 AC | 30 A | 3 A |
| 10.0 Amperes Continuous | | | 100 mA @ 125 Vac 30 mA 28 Vdc |
| DC Contact Rating: 5 A (Resistance), 28 Vdc | | | |



| Type ML Circuit—Form Z | Electrical Rating/SPDT-DB | | |
|--------------------------------------|---------------------------|------|--------------------------------------|
| | Silver Contacts | | |
| 1 N.O.—1 N.C. | Voltage | Make | Break |
| | 120 AC | 60 A | 6 A |
| | 240 AC | 30 A | 3 A |
| 10.0 Amperes, Continuous | | | DC Contact Rating: 5 A (Res), 28 Vdc |
| DC Contact Rating: 5 A (Res), 28 Vdc | | | |



Description / Functional Diagrams

| Top Plunger | | | | | | | |
|------------------------|----|---------------------|-----------|-----------------------------|-----------|------------------------|-----------|
| MS | ML | MS | ML | MS | ML | MS | ML |
| | | Top plunger | | Bushing mounted—top plunger | | Adjustable top plunger | |
| Operating Force/Torque | | 80 oz (0.6 N) | | | | | |
| Contact | | SPDT | | | | | |
| Form | | Form C | Form Z | Form C | Form Z | Form C | Form Z |
| Contact Type | | Silver MS01S0100 | ML01S0100 | MS06S0100 | ML06S0100 | MS09S0100 | ML09S0100 |
| | | Gold MS01G0100 | — | MS06G0100 | — | MS09G0100 | — |

| Parallel roller plunger | | | | | | | |
|-------------------------|----|-------------------------|-----------|---|-----------|----|----|
| MS | ML | MS | ML | MS | ML | MS | ML |
| | | Parallel roller plunger | | Bushing mounted—parallel roller plunger | | | |
| Operating Force/Torque | | 80 oz (0.6 N) | | | | | |
| Contact | | SPDT | | | | | |
| Form | | Form C | Form Z | Form C | Form Z | | |
| Contact Type | | Silver MS02S0100 | ML02S0100 | MS07S0100 | ML07S0100 | | |
| | | Gold MS02G0100 | — | MS07G0100 | — | | |

| Cross roller plunger | | | | | | | |
|------------------------|----|----------------------|-----------|--------------------------------------|-----------|----|----|
| MS | ML | MS | ML | MS | ML | MS | ML |
| | | Cross roller plunger | | Bushing mounted—cross roller plunger | | | |
| Operating Force/Torque | | 80 oz (0.6 N) | | | | | |
| Contact | | SPDT | | | | | |
| Form | | Form C | Form Z | Form C | Form Z | | |
| Contact Type | | Silver MS03S0100 | ML03S0100 | MS08S0100 | ML08S0100 | | |
| | | Gold MS03G0100 | — | MS08G0100 | — | | |

| Rotary lever, CW and CCW | | | | Omnidirectional—wire whisker (NEMA Types 1, 2, 12, 13 only) | | | |
|--------------------------|----|---------------------------|-----------|---|----|----|----|
| MS | ML | MS | ML | MS | ML | MS | ML |
| | | | | | | | |
| | | Note: Lever not included. | | | | | |
| Operating Force/Torque | | 48 oz-in (0.3 N•m) | | 15 oz-in (0.1 N•m) | | | |
| Contact | | SPDT | | | | | |
| Form | | Form C | Form Z | Form C | | | |
| Contact Type | | Silver MS04S0100 | ML04S0100 | MS05S0100 | | | |
| | | Gold MS04G0100 | — | MS05G0100 | | | |

Limit Switches

Limit Switches

Miniature

Class 9007 Type MS and ML

Description / Functional Diagram

| Booted Devices | | | | | | | | | |
|------------------------|----|---------------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| MS | ML | MS | ML | MS | ML | MS | ML | | |
| | | | | | | | | | |
| Operating Force/Torque | | 80 oz (0.6 N) | | | | | | | |
| Contact | | SPDT | | | | | | | |
| Form | | Form C | Form Z | Form C | Form Z | Form C | Form Z | | |
| Contact Type | | Silver | MS10S0100 | ML10S0100 | MS12S0100 | ML12S0100 | MS13S0100 | ML13S0100 | |
| | | Gold | MS10G0100 | — | MS12G0100 | — | MS13G0100 | — | |

Note: See the available options on page 158 and add the designator (up to three) to the end of the catalog number, if applicable. See the example on page 158 for conductor length selection.

Lever Arm Selection

There are many styles of levers to accommodate most industrial applications. The levers are diecast metal. The standard roller levers are available with nylon rollers and are also available with steel rollers. See the tables below. Dimensions are given as in. (mm).

Style 7 Levers—0.75 in. (19 mm) diameter, nylon or steel roller

| Length | | Catalog Number 0.25 (6) Wide | | Catalog Number 0.5 (13) Wide | | Catalog Number 0.75 (19) Wide | | Catalog Number 1 (25) Wide | |
|--------|-------|------------------------------|-------|------------------------------|-------|-------------------------------|-------|----------------------------|-------|
| in. | mm | Nylon | Steel | Nylon | Steel | Nylon | Steel | Nylon | Steel |
| 0.875 | 22.23 | 7A2N | 7A2 | 7B2N | 7B2 | 7F2N | — | 7J2N | — |
| 1.375 | 34.93 | 7A3N | — | 7B3N | — | 7F3N | — | 7J3N | — |
| 1.5 | 38.10 | 7A1N | 7A1 | 7B1N | — | 7F1N | — | 7J1N | — |
| 1.75 | 44.45 | 7A7N | — | 7B7N | — | 7F7N | — | 7J7N | — |
| 2.00 | 50.8 | 7A4N | — | 7B4N | — | 7F4N | — | 7J4N | — |



Lever

Style 7X Levers—0.75 in. (19 mm) diameter, nylon or steel roller

| Length | | Catalog Number 0.25 (6) Wide | | Catalog Number 0.5 (13) Wide | | Catalog Number 0.75 (19) Wide | | Catalog Number 1 (25) Wide | |
|--------|-------|------------------------------|-------|------------------------------|-------|-------------------------------|-------|----------------------------|-------|
| in. | (mm) | Nylon | Steel | Nylon | Steel | Nylon | Steel | Nylon | Steel |
| .875 | 22.23 | 7XA2N | 7XA2 | 7XB2N | 7XB2 | 7XF2N | — | 7XJ2N | — |
| 1.375 | 34.93 | 7XA3N | — | 7XB3N | — | 7XF3N | — | 7XJ3N | — |
| 1.5 | 38.10 | 7XA1N | 7XA1 | 7XB1N | — | 7XF1N | — | 7XJ1N | — |
| 1.75 | 44.45 | 7XA7N | — | 7XB7N | — | 7XF7N | — | 7XJ7N | — |
| 2.00 | 50.8 | 7XA4N | — | 7XB4N | — | 7XF4N | — | 7XJ4N | — |

Specialty Arms and Options

| Description | Length | Diameter | Width | Catalog Number |
|---|---------------------------|-----------|-------------|----------------|
| Style 7D adjustable length, metal roller | 1.38 to 3.38 (35 to 85.8) | 0.75 (19) | 0.25 (6.35) | 7D |
| Style 7D adjustable length, nylon roller | 1.38 to 3.38 (35 to 85.8) | 0.75 (19) | 0.25 (6.35) | 7DN |
| Style 7S spring nylon rod | 6 (152.4) | 0.3 (7.6) | — | 7S |
| Style 7N nylon rod | 5 (127) | 0.3 (7.6) | — | 7N |
| Corrosion proof (option available with nylon rollers only)—Suffix to add to the end of catalog number | | | | S |

Lever tightening torque for mounting the lever on the shaft: minimum 17 lb-in (1.9 N•m).

Limit Switches

Miniature

Class 9007 Type MS and ML

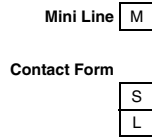
Catalog Number Interpretation and Options

For Interpretation of the Catalog Number Only

9007 M S 0 1 S 0 1 0 0



9007MS02 Shown with M12 Connector



Actuator Type

| | |
|---|-----|
| Top Push Plunger | 0 1 |
| Parallel Roller Plunger | 0 2 |
| Cross Roller Plunger | 0 3 |
| Rotary Lever CW & CCW | 0 4 |
| Omnidirectional Wire Whisker | 0 5 |
| Bushing Mounted Top Push Plunger | 0 6 |
| Bushing Mounted Parallel Roller Plunger | 0 7 |
| Bushing Mounted Cross Roller Plunger | 0 8 |
| Adjustable Top Push Plunger | 0 9 |
| Booted Top Push Plunger | 1 0 |
| Booted Parallel Roller Plunger | 1 2 |
| Booted Cross Roller Plunger | 1 3 |

Conductor Length Options

| | |
|-----|-------------------------|
| 0 0 | No Cable |
| 0 1 | 3 ft (0.9 m) (stranded) |
| 0 2 | 6 ft (1.8 m) |
| 0 3 | 9 ft (2.7 m) |
| 0 4 | 12 ft (3.7 m) |
| 0 5 | 18 ft (5.5 m) |
| 1 3 | 33 ft (10 m) |

Contact Type

| | |
|----------|---------------------------------|
| S | 10 A Silver Contacts (standard) |
| G | Gold Contacts |

Examples

| Option | Description |
|--------|-------------------------------------|
| 0 2 | # 16 AWG SJTO Cable |
| 0 6 | Side Entrance 18-4 SJTO Cable |
| 1 0 | Gray 18-4 SJTO Cable |
| 1 1 | # 18 AWG Individual Conductors |
| 2 1 | Low Force (top plunger only) 18 oz. |

◆ List options in numerically ascending order. Example: 9007MS01S030621. See other options below.

| Conductor Length | Designator |
|-----------------------|------------|
| No cable | 00 |
| 3 ft (0.9 m)—standard | 01 |
| 6 ft (1.8 m) | 02 |
| 9 ft (2.7 m) | 03 |
| 12 ft (3.7 m) | 04 |
| 18 ft (5.5 m) | 05 |
| 33 ft (10 m) | 13 |

| MS Options (Does not apply to ML except where noted) | Designator |
|--|------------|
| #16 AWG SJTO cable | 02 |
| Side entrance, #18 AWG SJTO cable, or Connector 12, 54, 55, 82, 84 * | 06 |
| Gray #18 AWG SJTO cable | 10 |
| #18 AWG individual conductors | 11 |
| Male 4-pin mini-connector with 3 ft (0.9 m) cable (MS only) | 12 |
| Low force (NEMA Type 1 only) 18 oz. | 21 |
| High Pre-Travel—adds 0.030 | 30 |
| Male 4-pin micro-connector in housing (DC type) † (no cable) (MS only) | 54 |
| Male 5-pin micro-connector in housing (DC type) † (no cable) (ML only) | 55 |
| Tapped holes in top of plunger style housing (MS and ML) | 81 |
| Male 4-pin micro-connector in housing (AC type) (no cable) (MS only) | 82 |
| Black 18/5 SJTO Cable (ML only) | 83 |
| Male 4-pin micro-connector in housing (AC type) (no cable) (MS only) | 84 |

■ Ex: 9007MS01S0100 with a 9 ft (2.7 m) cable becomes 9007MS01S0300. 9007MS01S0100 with side entrance becomes 9007MS01S0106.

* For side entry connectors, include 06, then 12, 54, 55, 82, or 84; otherwise the connector will come from bottom of housing. Example of catalog no. with side entrance connector: 9007MS01S000654. No cable available with 54 and 55. Option 12 is supplied with 3 ft (0.9 m) of cable.

† DC connectors are rated 3 A, 250 Vac/Vdc.

Male Plug (face) Pin-outs

| | | | | |
|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | | | |
| Option 54 (MS only) | Option 55 (ML only) | Option 12 (MS only) | Option 82 (MS only) | Option 84 (MS only) |

Limit Switches

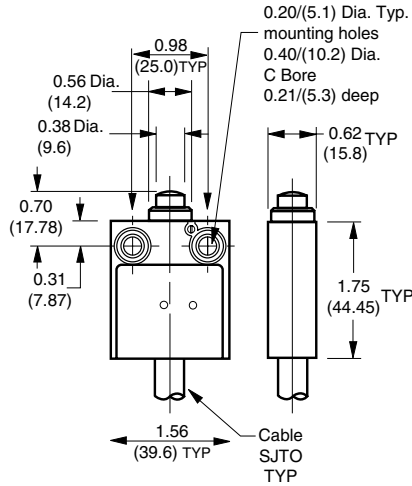
Miniature

Class 9007 Type MS and ML

Dimensions

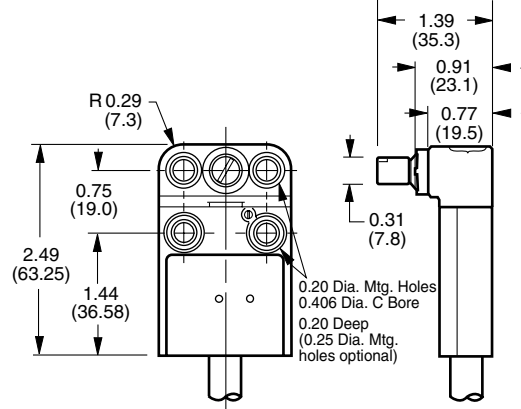
Top Push Plunger

MS01, MLO1



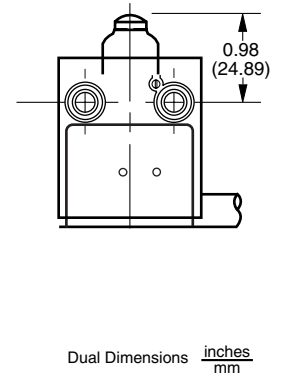
Rotary Lever

MSO4, MLO4



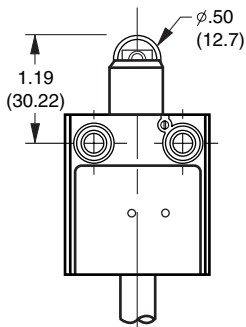
Booted Top Push Plunger with Mid-Side Entry Cable

MS10, ML10



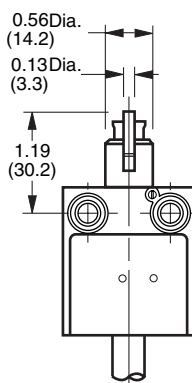
Parallel Roller Plunger

MS02, ML02



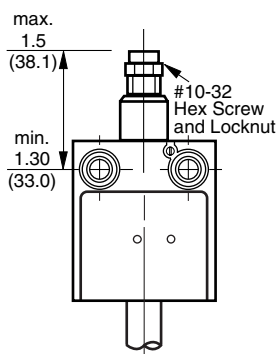
Cross Roller Plunger

MS03, ML03



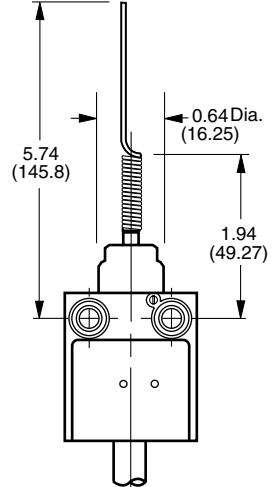
Adjustable Top Push Plunger

MS09, ML09



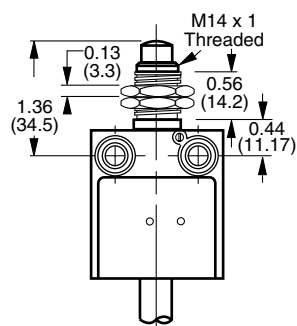
Omini-directional

MS05, ML05



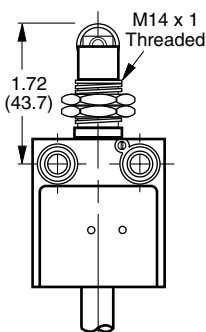
Bushing Mounted Top Push Plunger

MS06, ML06



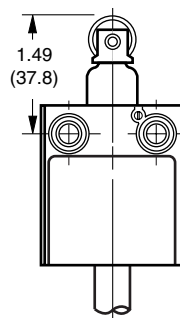
Bushing Mounted Parallel Roller Plunger

MS07, ML07



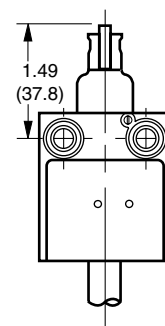
Parallel Booted Roller Plunger

MS12, ML12



Cross-Booted Roller Plunger

MS13, ML13



Limit Switches

Limit Switches

Miniature Enclosed Reed

Class 9007 Type XA



Straight Plunger



Roller Plunger



Cross Roller Plunger

Description and Specifications

Sealed construction keeps contaminants out of the contact area, making it the ideal choice for low voltage, low current circuits used by programmable controllers.

Type XA is designed for use in applications where contact reliability, environmental immunity, small size, or low cost are required.

NOTE:

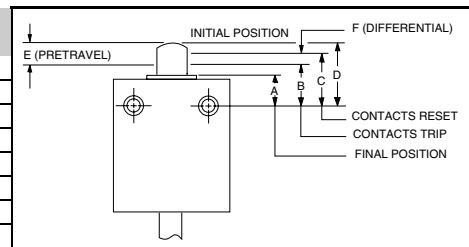
- Because reed switches are operated by a magnet, they should not be installed in areas where strong magnetic fields may be present. The devices should always be checked for proper operation after installation.
- Type XA **cannot be used in Division 2 locations** since the National Electrical Code (NEC) requires provisions for conduit connection. The Type C reed switches have this provision for conduit but the Type XA do not.

| Cable Length* ft (m) | Straight Plunger | | Roller Plunger | | Cross Roller Plunger | |
|-------------------------|------------------|--------------|----------------|--------------|----------------------|--------------|
| | N.O. Type | N.C. Type | N.O. Type | N.C. Type | N.O. Type | N.C. Type |
| 3 (0.9) | XA7303E | XA7503E | XA7303D | XA7503D | XA7303DC | XA7503DC |
| 6 (1.8) | XA7306E | XA7506E | XA7306D | XA7506D | XA7306DC | XA7506DC |
| 9 (2.7) | XA7309E | XA7509E | XA7309D | XA7509D | XA7309DC | XA7509DC |

* Other cable lengths are available. Order by changing the last two numerical digits of the Type number to the length desired.
Example: An XA7303E with 15 ft (4.5 m) of cable would become an XA7315E.

Operating Data

| Dimensions in. (mm) | Top Push Rod (Type E) | Roller Plunger (Types D, DC) |
|-------------------------------|--------------------------|---------------------------------|
| Initial position (D) | 0.690 (17.5) | 1.190 (30.2) |
| Trip position (B) | 0.620 (15.7) | 1.120 (28.4) |
| Pre-travel (E) | 0.07 (1.8) | 0.07 (17.8) |
| Reset position (C) maximum | 0.655 (16.6) | 1.155 (29.3) |
| Differential (F) | 0.015 (0.38) | 0.015 (0.38) |
| Final position (A) | 0.492 (12.5) | 0.992 (25.2) |
| Total stroke | 0.198 (5.0) | 0.198 (5.0) |
| Operating force (max.) | 2.75 lb (0.31 N) | 2.75 lb (0.31 N) |



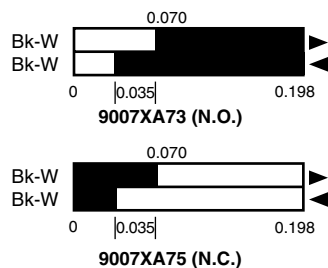
| Contacts | The contact is a fully encapsulated, hermetically sealed reed, suitable for controlling solid-state loads as well as industrial relays. Switches can also be used as inputs to intrinsically safe systems. Use of a transient suppressor extends the life of the switch when used on heavy electrical loads. |
|------------------------|--|
| Enclosure Construction | Diecast zinc—baked, gray enamel finish. Meets NEMA Types 2, 4, 4X, 6P, 12 and 13 requirements. Oil-tight, dust-tight, water-tight, and submersible. |
| Cable | SJTOWA jacketed cable with 18 gauge wire. |
| Ambient Temperature | -20 to +140 °F (-28.9 to +60 °C). |
| Agency Listings | UL: File E42259 CCN NKCR CSA: File LR 25490, Class 3211 03 |

NOTE: The XA switch is available with a 3 ft (0.9 m) cable and 3-pin Brad Harrison male connector No. 40904 (or equivalent), Form Y190.

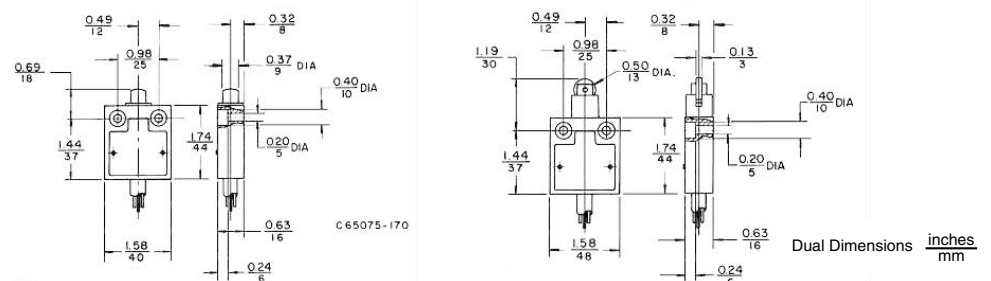
Maximum Current Ratings for Control Circuit Contacts—Type XA

| AC—50/60 Hz | | | | | | DC | | |
|-------------|------------------------------|-----|-------|------------------------------|--|-------|-------------------------------------|-----------------------------|
| Volts | Inductive (35% Power Factor) | | | Resistive (75% Power Factor) | | Volts | Resistive | |
| | Make | | Break | Continuous Carrying Amperes | Make, Break, and Continuous Carrying Amperes | | Make and Break Amperes Single Throw | Continuous Carrying Amperes |
| | A | VA | A | | | VA | | |
| 120 | 2.0 | 240 | 0.2 | 24 | 0.5 | 120 | 0.2 | 0.5 |
| 240 | 1.0 | 240 | 0.1 | 24 | 0.5 | — | — | — |

Contact Diagrams



Dimensions



Limit Switches

9007AW Heavy Duty Industrial Precision, Oiltight



Lever Arm Type



Plunger Type

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$

Lever Arm And Plunger Types

| Select Switch | | Lever Arm Type Without Lever Arm. Select from CCW Operation ■ | Select Operator | |
|--|---------------|---|--|--|
| Mounting | Contacts | Type | Roller Plunger Type With Micrometer Adjustment | Push Rod Plunger Type With Micrometer Adjustment |
| Surface Mounting Plug-in | 1 N.O.—1 N.C. | AW16 | AW36 | AW46 |
| | 2 N.O. | ‡ | — | — |
| | 2 N.C. | AW19‡ | — | — |
| Surface Mounting Nonplug-in Standard Box | 1 N.O.—1 N.C. | AW12 | AW32 | AW42 |
| Surface Mounting Nonplug-in Deep Box | 1 N.O.—1 N.C. | AW14 | — | — |
| | 2 N.O.—2 N.C. | AW18 | AW38 | — |
| Open Type (Without Box) Plug-in | 1 N.O.—1 N.C. | AO16 | AO36 | — |
| | 2 N.O. | ‡ | — | — |
| | 2 N.C. | ‡ | — | — |
| Open Type (Without Box) Nonplug-in | 1 N.O.—1 N.C. | AO12 | — | — |
| | 2 N.O.—2 N.C. | AO18 | — | — |
| Flush Mounting | 1 N.O.—1 N.C. | AF12 | — | — |

| Nominal Operating Data in. (mm) | Pre-travel | 5° | 0.09 (2.3) | 0.09 (2.3) |
|------------------------------------|---------------------------|--|-----------------------------------|-----------------------------------|
| | Total-travel | 30° | 0.25 (6.3) ±0.06 (1.5) Adjustable | 0.25 (6.3) ±0.06 (1.5) Adjustable |
| | Differential | 2.5° | 0.05 (1.3) | 0.05 (1.3) |
| | Reverse Over-travel | 25° | — | — |
| | Operating Torque or Force | 2.75 lb-in (0.31 N•m) | 3 lb-in (0.34 N•m) | 3 lb-in (0.34 N•m) |
| | Repeat Accuracy | ±0.002 (0.05) Linear travel of cam on 1.38 (35) lever arm | ±0.001 (0.02) | ±0.001 (0.02) |

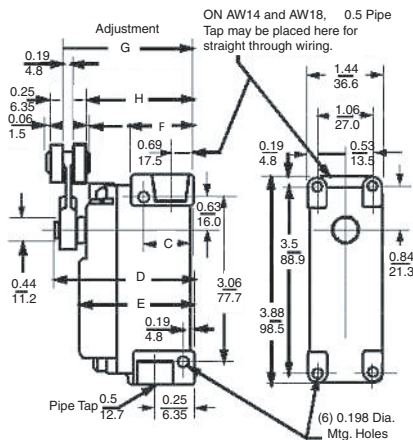
■ Field convertible to CW operation.

‡ 2 N.O. contact only when Type AW19 is operated in clockwise direction. 2 N.C. contacts only when Type AW19 is operated in counterclockwise direction.

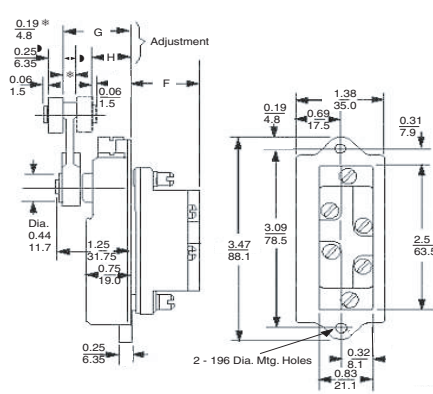
Lever arms, see page 190.

Approximate Dimensions

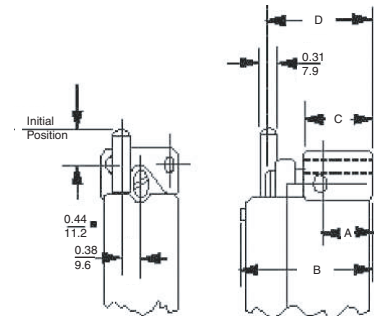
Type AW



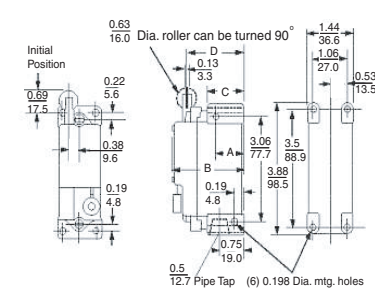
Type AO



Type AW42, 46, 48, and 49



Type AW32, 36, and 38



| Type | C | D | E | F | G | H |
|------|------------|-------------|------------|-------------|--------------------|---------------------|
| AW12 | 0.31 (7.9) | 2.69 (68.3) | 2.19 (56) | 1.16 (29.4) | 2.5–2.56 (63.5–65) | 2.06–2.13 (52.3–54) |
| AW14 | | | | | | |
| AW16 | 1.25 (32) | 3 (76) | 2.5 (63.5) | 1.47 (37) | 2.81–2.88 (71–73) | 2.38–2.44 (60–62) |
| AW18 | | | | | | |
| AW19 | | | | | | |
| AO12 | — | — | — | 1.03 (26) | 1.06–1.13 (27–29) | 0.63–0.69 (16–17.5) |
| AO18 | — | — | — | 1.13 (29) | 1.06–1.13 (27–29) | 0.63–0.69 (16–17.5) |

| Type | A | B | C | D |
|--------------------------|------------|-----------|-------------|------------|
| AW32 and AW42 | 0.31 (7.9) | 2.22 (56) | 1.16 (29.4) | 1.81 (46) |
| AW36, 38, 46, 48, and 49 | 1.25 (32) | 2.53 (64) | 1.47 (37.3) | 2.13 (5.4) |

Limit Switches

Limit Switches

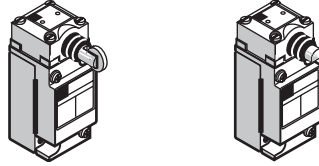
9007C Heavy Duty Industrial—Plug-in Body, Metal Standard and Compact

Standard plug-in body type with 1 cable entry (1)

The standard plug-in body types with one cable entry are also available with reed contacts

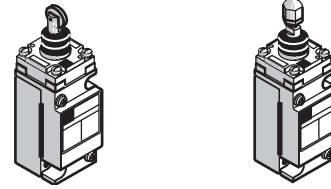
With reed contacts

With head for linear movement side plunger



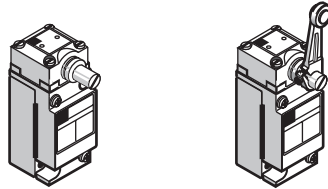
Page 164
Page 168

top plunger



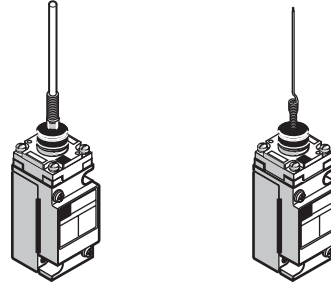
Page 165
Page 173

With head for rotary movement (lever)



Page 166
Page 170

With head for multi-directional movement

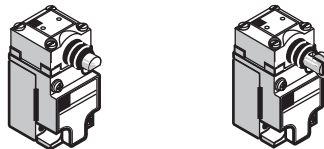


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Page 171

With reed contacts

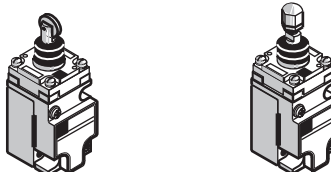
Compact plug-in body type with one cable entry (1)

With head for linear movement Side plunger



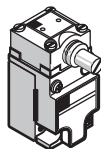
Page 172

Top plunger



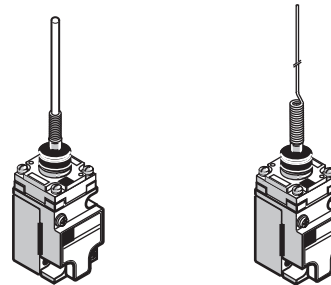
Page 173

With head for rotary movement (lever)



Page 174

With head for multi-directional movement



Page 175

1. Factory modifications: see pages 176 to 180

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard and Compact

| Environmental characteristics | | |
|-------------------------------|------------------------------|--|
| Conforming to standards | Products | NEMA 250, EN 60947-1, EN 60947-5-1, IEC 60947, UL 508, C22-2-14-95, CE conformity documentation |
| Product certifications | | UL, CSA, CE |
| Protective treatment | | Epoxy powder coat (additional protection available) |
| Ambient air temperature | Operation | -20...+185 °F (-28.9...+85 °C), wider range available |
| | Storage | -20...+185 °F (-28.9...+85 °C), wider range available |
| Vibration resistance | Conforming to IEC 60068-2-6 | 25 gn (10...150 Hz, 11 ms) (Reed switch good for 18.5g only) |
| Shock resistance | Conforming to IEC 60068-2-27 | 60 gn (9 ms) 40 gn (9 ms) for reed switch |
| Electric shock protection | Conforming to IEC 61140 | Class 0 |
| Degree of protection | Conforming to IEC 60529 | IP 67 |
| Cable entry or connector (1) | Depending on model | 1/2-14 NPT, M20 x 1.5, ISO cable entry, 5-pin mini connector, 4-pin micro connector |
| Materials | Bodies, heads, levers | Bodies and heads in Zamak® zinc alloy, levers and rods in zinc, steel, stainless steel, Delrin® resin. |

1. A wide range of connectors are available. Contact your local field office.

| Contact block characteristics | | |
|--|-------------------------------|---|
| Rated operational characteristics hard contacts -AC Voltage (top half of body) | 9007CO52 (compact single) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CO54 (single pole) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CO62 (two pole) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CO66 (two pole two stage) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CO68 (two pole neutral) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| Reed switches, complete body | 9007C84 (1 N.O.) | NEMA C600 (Ue = 600 V, Ie = 0.3 A); Ithe = 2.5 A |
| | 9007C86 (1 N.C.) | NEMA C600 (Ue = 600 V, Ie = 0.3 A); Ithe = 2.5 A |
| Rated operational characteristics hard contacts -DC Voltage (top half of body) | 9007CO52 (compact single) | NEMA Q600 (Ue = 600 V, Ie = 0.1 A); Ithe = 2.5 A |
| | 9007CO54 (single pole) | NEMA Q600 (Ue = 600 V, Ie = 0.1 A); Ithe = 2.5 A |
| | 9007CO62 (two pole) | NEMA R300 (Ue = 250 V, Ie = 0.11 A); Ithe = 1.0 A |
| | 9007CO66 (two pole two stage) | NEMA R300 (Ue = 250 V, Ie = 0.11 A); Ithe = 1.0 A |
| | 9007CO68 (two pole neutral) | NEMA R300 (Ue = 250 V, Ie = 0.11 A); Ithe = 1.0 A |
| Reed switches, complete body | 9007C84 (1 N.O.) | NEMA Q150 (Ue = 125 V, Ie = 0.55 A); Ithe = 2.5 A |
| | 9007C86 (1 N.C.) | NEMA Q150 (Ue = 125 V, Ie = 0.55 A); Ithe = 2.5 A |
| Rated insulation voltage | | 600 V |
| Rated impulse withstand voltage | | 2,500 Vac for 1 minute for CE; 2,200 Vac for 1 minute for UL; and 2,640 Vac for 1 s for CSA |
| Positive opening | Special Y1561 | Special Y1561 (one pole slow break only) → |
| Short circuit protection | | 10 A, Bussman Class CC KTK-R-10 fuse non-time-delay |
| Terminal wire sizes (cabling/screw clamp) | | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum |
| Maximum actuation speed | | 15.2 mpm / 27.4 mpm (50 fpm / 90 fpm) with 45 degree cam angle, levers only |
| Electrical durability | | 1 million operating cycles |

Types of contact elements

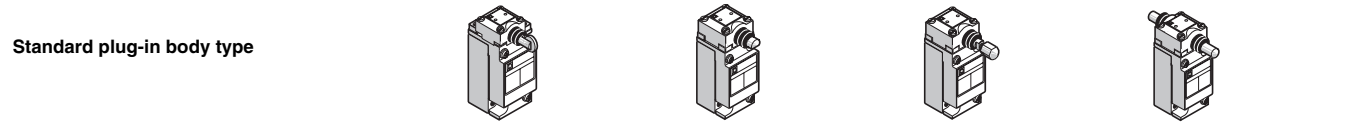
Example: 9007C54 single-pole limit switch, Form Z, same polarity

| IEC 60947-5-1 | | | NEMA | | | JIS | | |
|---------------|--------|-----------------------|------|--------|----------------------|------|--------|--------------|
| Form | Symbol | Description | Form | Symbol | Description | Form | Symbol | Description |
| A | | Single break | A | | — | 3 | | — |
| X | | — | | | | | | Double break |
| B | | Single break | B | | — | 2 | | — |
| Y | | — | | | | | | Double break |
| C | | — | C | | — | 1 | | Single break |
| Za | | Same polarity | Z | | "Same polarity" only | | | Double break |
| Zb | | Electrically separate | | | | | | — |

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body

Type of head **Side Plunger (mounting by the body)**



| | | | | |
|------------------|---|--------------------------------------|---|---|
| Type of operator | Side roller plunger, spring return, vertical roller (1) | Side push rod plunger, spring return | Side push rod plunger, adjustable (2) spring return | Side push rod plunger, maintained contact |
|------------------|---|--------------------------------------|---|---|

Catalog numbers

| | | | | |
|--|---------------------|---------------------|----------------------|---------------------|
| 1 N.O. 1 N.C. snap action | 9007C54F | 9007C54G | 9007C54GD | 9007C54H |
| 2 N.O. 2 N.C. snap action | 9007C62F | 9007C62G | 9007C62GD | 9007C62H |
| 2 N.O. 2 N.C. Two stage snap action | 9007C66F | 9007C66G | 9007C66GD | |
| Weight, kg (lb) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |

| | |
|--------------------------|--|
| Contact operation | |
|--------------------------|--|

Characteristics (nominal operating data)


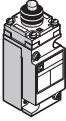


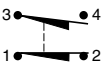
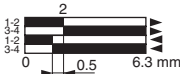
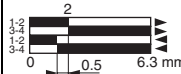
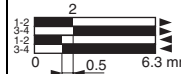
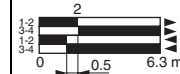
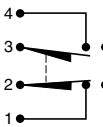
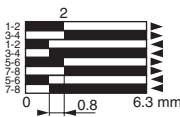
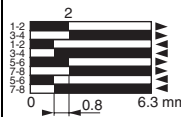
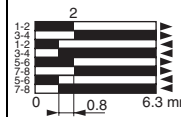
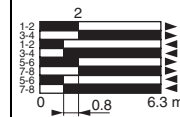
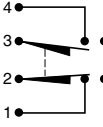
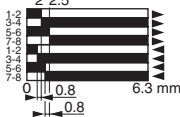
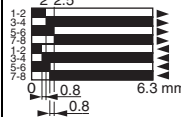
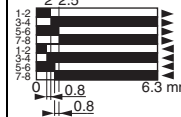
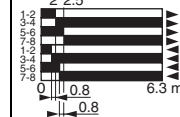
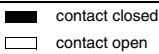


| | | | |
|---|--|-------------------|-------------------|
| Switch actuation | On end | | |
| Type of actuation | | | |
| Pre-travel | 2 mm (0.08 in.) | | 3.6 mm (0.14 in.) |
| Pre-travel two Stage | First stage | 2 mm (0.08 in.) | |
| | First stage to second stage | 0.5 mm (0.02 in.) | |
| Total travel | 6.3 mm (0.25 in.) | | |
| Differential | 0.8 mm (0.03 in.) | | |
| Reverse overtravel | — | | |
| Minimum force or torque | 1 pole & 2 pole | 4 lb (17.8 N) | 7 lb (31.1 N) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22AWG (2.05–0.644 mm ²) wires maximum | | |
| Repeatability (linear travel of cam) | 0.03 mm (0.001 in.) | | — |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | |

1. Can be converted to horizontal roller type in the field. To order horizontal roller version add the letter **H** at the end of the equivalent vertical roller version type.
 2. To lock the nut in the desired position, crimp the slot near the bottom of the nut.

Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body

| Type of head | | Top Plunger (mounting by the body) | | | |
|---|--|--|--|---|--|
| Standard plug-in body type | |  |  |  |  |
| Type of operator | | Top roller plunger spring return | Top push rod plunger spring return | Top push rod plunger adjustable (1) spring return | Palm operated (2) |
| Catalog numbers | | | | | |
| 1 N.O. 1 N.C. snap action  | | 9007C54D  | 9007C54E  | 9007C54ED  | 9007C54R (2)  |
| 2 N.O. 2 N.C. snap action  | | 9007C62D  | 9007C62E  | 9007C62ED  | 9007C62R (2)  |
| 2 N.O. 2 N.C. Two stage snap action  | | 9007C66D  | 9007C66E  | 9007C66ED  | 9007C66R (2)  |
| Weight, kg (lb) | | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation | |  contact closed  contact open | | | |
| Characteristics (nominal operating data) | | | | | |
| Switch actuation | | On end | | | |
| Type of actuation | |  | | | |
| Pre-travel | | 2 mm (0.08 in.) | | | |
| Pre-travel two Stage | | First stage 2 mm (0.08 in.) First stage to second stage 0.3 mm (0.01 in.) | | | |
| Total travel | | 6.3 mm (0.25 in.) | | | |
| Differential | | 0.5 mm (0.02 in.) | | | |
| Reverse overtravel | | — | | | |
| Minimum force or torque | | 1 pole & 2 pole 3 lb (13.3 N) | | | 7 lb (31.1 N) |
| Terminal wire sizes (Cabling/Screw Clamp) | | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | | 0.03 mm (0.001 in.) | | | |
| Cable entry | | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | |

- To lock the nut in the desired position, crimp the slot near the bottom of the nut.
- Does not include mushroom button. Must be ordered separately see page 189.

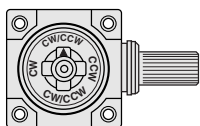
Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body

| Type of head | Rotary (lever arm type) (1) | | | | | |
|--|--|---------------------------------|-----------------------|-----------------------|--------------------------------------|-----------------------|
| Standard plug-in body type | | | | | | |
| Type of operator | Standard pre-travel, spring return | Low differential, spring return | Neutral position | | Light operating torque spring return | Maintained contact |
| Type of direction | CW & CCW (2) | CW & CCW (2) | CW & CCW | CW & CCW | CW & CCW (2) | CW (trip) CCW (reset) |
| Catalog numbers | | | | | | |
| 1 N.O., 1 N.C. snap action | 9007C54B2 | 9007C54A2 | | | 9007C54N2 | 9007C54C |
| 2 N.O., 2 N.C. snap action | 9007C62B2 | 9007C62A2 | | | 9007C62N2 | 9007C62C |
| 2 N.O., 2 N.C. snap action Neutral position | | | 9007C68T10 | 9007C68T5 | | |
| 2 N.O., 2 N.C. Two stage snap action | 9007C66B2 | 9007C66A2 | | | 9007C66N2 | |
| Weight, kg (lb) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation | contact closed | | contact open | | | |
| Characteristics (nominal operating data) | | | | | | |
| Switch actuation | By 30° cam | | | | | |
| Type of actuation | | | | | | |
| Pre-travel | 10° | 5° | 10° | 5° | 10° | 45° |
| Pre-travel two stage | | | | | | |
| First stage | 10° | 5° | — | — | 10° | — |
| First stage to second stage | 2.5° | 1.5° | — | — | 2.5° | — |
| Total travel | 90° | — | — | — | — | 90° |
| Differential | 4° | 2° | 4° | 2° | 4° | — |
| Reverse overtravel | 90° | — | — | — | — | — |
| Operating torque/force 1 pole & 2 pole | 4 lb-in (0.45 N•m) | | | | 25 oz-in (0•18 N•m) | 3 lb-in (0.34 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | | | |
| Repeatability (linear travel of cam) | 0.05 mm (± 0.002 in.) | 0.03 mm (± 0.001 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | | | |

1. Lever arm type must be ordered separately from pages 190 to 195.
 2. These devices are factory set to operate the contacts in both the CW and CCW directions. Mode of operation is field convertible to CW only or CCW only. To order factory converted devices: For CCW only operation, change the 2 at the end of the Type number to 1 (for example, C54B2 becomes C54B1). For CW only operation, delete the 2 at the end of the Type number (for example C54B2 becomes C54B).






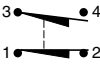
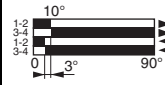
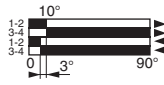
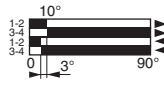
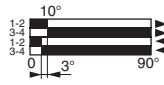
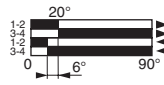
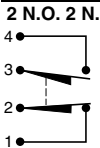
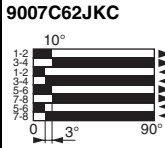
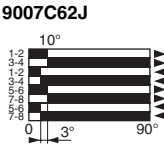
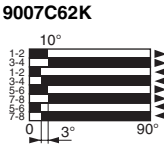
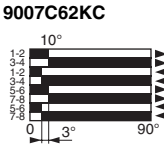
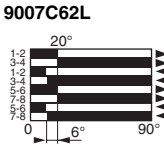
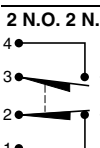
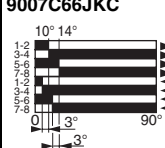
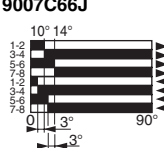
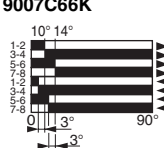
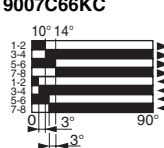
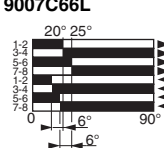





Mode of operation of the lever arm is easily convertible to clockwise or both. Simply pull out and rotate the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW.

Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body

| Type of head | Flexible operator (wobble stick) | | | | |
|---|--|--|---|---|--|
| Standard plug-in body type |  |  |  |  |  |
| Type of operator | Universal (1) | Wobble stick Delrin® extension (1) | Wobble stick wire extension (1) | Wobble stick coil spring extension (1) | Cat whisker |
| Catalog numbers | | | | | |
| 1 N.O. 1 N.C. snap action  | 9007C54JKC  | 9007C54J  | 9007C54K  | 9007C54KC  | 9007C54L  |
| 2 N.O. 2 N.C. snap action  | 9007C62JKC  | 9007C62J  | 9007C62K  | 9007C62KC  | 9007C62L  |
| 2 N.O. 2 N.C. Two stage snap action  | 9007C66JKC  | 9007C66J  | 9007C66K  | 9007C66KC  | 9007C66L  |
| Weight, kg (lb) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation |  contact closed  contact open | | | | |
| Characteristics (nominal operating data) | | | | | |
| Switch actuation | Object from any direction | | | | |
| Type of actuation |  | | | | |
| Pre-travel | 10° (any direction) | | | | 20° |
| Pre-travel two stage | 10° (any direction) | | | | 20° |
| First stage | 10° (any direction) | | | | 20° |
| First stage to second stage | 4° | | | | 5° |
| Total travel | 90° | | | | |
| Differential | 3 | | | | 6° |
| Reverse overtravel | — | | | | |
| Operating torque/force 1 pole & 2 pole | 3 lb-in (0.34 N•m) | | | | 7 oz-in (0.05 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | | |
| Repeatability (linear travel of cam) | — | | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | | |

1. Wobble stick extensions are available separately for the universal head. See page 189.

Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body—Reed Contacts


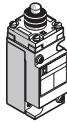
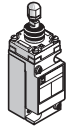
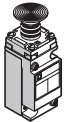







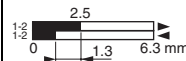
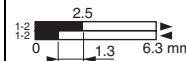
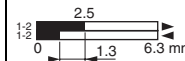



| Type of head | | Side Plunger (mounting by the body) | | | |
|--|--|--|-------------------------------------|--|--|
| Standard plug-in body type | | | | | |
| Type of operator | | Side roller plunger spring return vertical roller (1) | Side push rod plunger spring return | Side push rod plunger adjustable (2) spring return | Side push rod plunger maintained contact |
| Catalog numbers | | | | | |
| 1 N.O. Reed contacts snap action | | 9007C84F | 9007C84G | 9007C84GD | 9007C84H |
| 1 N.C. Reed contacts snap action | | 9007C86F | 9007C86G | 9007C86GD | 9007C86H |
| Weight, kg (lb) | | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation | | | | | |
| Characteristics (nominal operating data) | | | | | |
| Switch actuation | | On end | | | |
| Type of actuation | | | | | |
| Pre-travel | | 2.8 mm (0.110 in.) | | | 3.6 mm (0.14 in.) |
| Total travel | | 6.3 mm (0.25 in.) | | | |
| Differential | | 1.8 mm (0.07 in.) | | | — |
| Reverse overtravel | | — | | | — |
| Minimum force or torque 1 pole & 2 pole | | 4 lb (17.8 N) | | | 7 lb (31.1 N) |
| Terminal wire sizes (Cabling/Screw Clamp) | | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | | 0.076 mm (± 0.003 in.) | | | — |
| Cable entry | | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | |

- Can be converted to horizontal roller type in the field. To order horizontal roller version add the letter **H** at the end of the equivalent vertical roller version type.
- To lock the nut in the desired position, crimp the slot near the bottom of the nut.

Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body—Reed Contacts

| Type of head | Top Plunger (mounting by the body) | | | |
|---|--|---|---|--|
| Standard plug-in body type |  |  |  |  |
| Type of operator | Top roller plunger spring return | Top push rod plunger spring return | Top push rod plunger adjustable (1) spring return | Palm operated (2) |
| Catalog numbers | | | | |
| 1 N.O. Reed contacts snap action  | 9007C84D  | 9007C84E  | 9007C84ED  | 9007C84R (2)  |
| 1 N.C. Reed contacts snap action  | 9007C86D  | 9007C86E  | 9007C86ED  | 9007C86R (2)  |
| Weight, kg (lb) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation |  contact closed  contact open | | | |
| Characteristics (nominal operating data) | | | | |
| Switch actuation | On end | | | |
| Type of actuation |  | | | |
| Pre-travel | 2.5 mm (0.100 in.) | | | |
| Total travel | 6.3 mm (0.25 in.) | | | |
| Differential | 1.3 mm (0.05 in.) | | | |
| Reverse overtravel | — | | | |
| Minimum force or torque 1 pole & 2 pole | 4 lb (17.8 N) | | | |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | 0.076 mm (± 0.003 in.) | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | |

- To lock the nut in the desired position, crimp the slot near the bottom of the nut.
- Does not include mushroom button. Must be ordered separately from page 189.

Dimensions:
pages 182 to 185


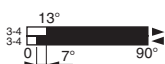


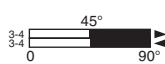

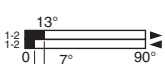
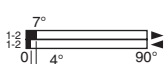
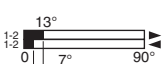
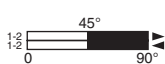
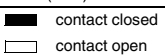
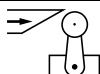
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body—Reed Contacts

Type of head **Rotary (lever arm type) (1)**

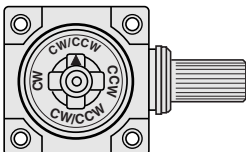
Standard plug-in body type



| | | | | |
|---|---|--|---|--|
| Type of operator | Standard pre-travel spring return | Low differential spring return | Light operating torque spring return | Maintained contact |
| Type of direction | CW & CCW (2) | CW & CCW (2) | CW & CCW (2) | CW (trip) CCW (reset) |
| Catalog numbers | | | | |
| 1 N.O. Reed contacts snap action  | 9007C84B2  | 9007C84A2  | 9007C84N2  | 9007C84C  |
| 1 N.C. Reed contacts snap action  | 9007C86B2  | 9007C86A2  | 9007C86N2  | 9007C86C  |
| Weight, kg (lb) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation |  | | | |
| Characteristics (nominal operating data) | | | | |
| Switch actuation | By 30° cam | | | |
| Type of actuation |  | | | |
| Pre-travel | 13° | 7° | 13° | 45° |
| Total travel | 90° | | | |
| Differential | 7° | 4° | 7° | — |
| Reverse overtravel | 90° | 90° | 90° | — |
| Operating torque force 1 pole & 2 pole | 4 lb-in (17.8 N•m) | | 25 oz-in (0.18 N•m) | 3 lb-in (0.34 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | 0.15 mm (± 0.006 in.) | 0.076 mm (± 0.003 in.) | 0.15 mm (± 0.006 in.) | 0.15 mm (± 0.006 in.) |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | |

- Lever arm type must be ordered separately from pages 190 to 195.
- These devices are factory set to operate the contacts in **both** the CW and CCW directions. **Mode of operation** is field convertible to CW only or CCW only. **To order factory converted devices:** For CCW only operation, change the **2** at the end of the Type number to **1** (for example, C54B2 becomes C54B1). For CW only operation, delete the **2** at the end of the Type number (for example, C54B2 becomes C54B).







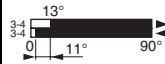
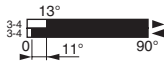
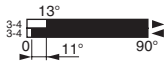
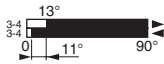
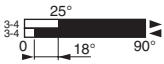

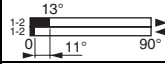
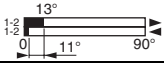
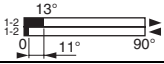
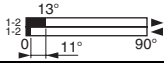
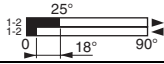



Mode of operation of the lever arm is easily convertible to clockwise or both.
Simply pull out and rotate the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW.



Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Standard Body—Reed Contacts

| Type of head | Flexible operator (wobble stick) | | | | |
|---|--|--|---|---|--|
| Standard plug-in body type |  |  |  |  |  |
| Type of operator | Universal (1) | Wobble stick Delrin® extension (1) | Wobble stick wire extension (1) | Wobble stick coil spring extension (1) | Cat whisker |
| Catalog numbers | | | | | |
| 1 N.O. Reed contacts snap action  | 9007C84JKC  | 9007C84J  | 9007C84K  | 9007C84KC  | 9007C84L  |
| 1 N.C. Reed contacts snap action  | 9007C86JKC  | 9007C86J  | 9007C86K  | 9007C86KC  | 9007C86L  |
| Weight, kg (lb) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) | 0.568 (1.25) |
| Contact operation |  contact closed  contact open | | | | |
| Characteristics (nominal operating data) | | | | | |
| Switch actuation | By any moving object in any direction | | | | |
| Type of actuation |  | | | | |
| Pre-travel | 13° (any direction) | | | | 25° |
| Total travel | 90° | | | | |
| Differential | 11° | | | | 18° |
| Reverse overtravel | — | | | | |
| Operating torque/force 1 pole & 2 pole | 3 lb-in (0.34 N•m) | | | | 7 oz-in (0.05 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | | |
| Repeatability (linear travel of cam) | — | | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | | |

1. Wobble stick extensions are available separately for the universal head. See page 189.
 Acceptable wire sizes: 12-22 AWG Recommended,
 Terminal clamp torque: 7 lb-in (0.80 N•m).

Dimensions:
 pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Compact Body

Type of head **Side Plunger (mounting by the body)**

Compact plug-in body type



| | | | | |
|------------------|---|-------------------------------------|--|--|
| Type of operator | Side roller plunger spring return vertical roller (1) | Side push rod plunger spring return | Side push rod plunger adjustable (2) spring return | Side push rod plunger maintained contact |
|------------------|---|-------------------------------------|--|--|

Catalog numbers

| | | | | |
|---------------------------|-----------------|-----------------|------------------|-----------------|
| 1 N.O. 1 N.C. snap action | 9007C52F | 9007C52G | 9007C52GD | 9007C52H |
| | | | | |

| | | | | |
|-----------------|--------------|--------------|--------------|--------------|
| Weight, kg (lb) | 0.456 (1.01) | 0.445 (0.98) | 0.422 (0.93) | 0.568 (1.25) |
|-----------------|--------------|--------------|--------------|--------------|

| | |
|-------------------|--|
| Contact operation | |
|-------------------|--|

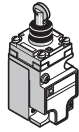
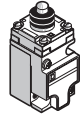
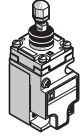
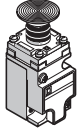
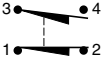
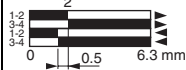
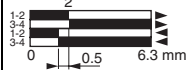
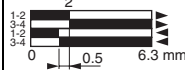
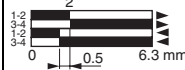
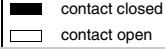



Characteristics (nominal operating data)

| | | | |
|---|---|-------------------|---|
| Switch actuation | On end | | |
| Type of actuation | | | |
| Pre-travel | 2 mm (0.08 in.) | 3.6 mm (0.14 in.) | |
| Pre-travel two Stage | First stage | 2 mm (0.08 in.) | — |
| | First stage to second stage | 0.5 mm (0.02 in.) | — |
| Total travel | 6.3 mm (0.25 in.) | 6.3 mm (0.25 in.) | |
| Differential | 0.8 mm (0.03 in.) | — | |
| Reverse overtravel | — | — | |
| Minimum force or torque 1 pole & 2 pole | 4 lb (17.8 N) | 7 lb (31.1 N) | |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | |
| Repeatability (linear travel of cam) | 0.03 mm (0.001 in.) | — | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry. Prewired options available. | | |

- Can be converted to horizontal roller type in the field. To order horizontal roller version add the letter H at the end of the equivalent vertical roller version type.
- To lock the nut in the desired position, crimp the slot near the bottom of the nut.

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Compact Body

| Type of head | Top Plunger (mounting by the body) | | | |
|--|--|---|---|--|
| Compact plug-in body type |  |  |  |  |
| Type of operator | Top roller plunger spring return | Top push rod plunger spring return | Top push rod plunger adjustable (1) spring return | Palm operated (2) |
| Catalog numbers | | | | |
| 1 N.O. 1 N.C. snap action  | 9007C52D  | 9007C52E  | 9007C52ED  | 9007C52R (2)  |
| Weight, kg (lb) | 0.169 (0.43) | 0.169 (0.43) | 0.422 (0.93) | 0.568 (1.25) |
| Contact operation |  contact closed  contact open | | | |
| Characteristics (nominal operating data) | | | | |
| Switch actuation | On end  | | | |
| Type of actuation |  | | | |
| Pre-travel | 2 mm (0.08 in.) | | | |
| Pre-travel two Stage | First stage | 2 mm (0.08 in.) | | |
| | First stage to second stage | 0.03 mm (0.01 in.) | | |
| Total travel | 6.3 mm (0.25 in.) | | | |
| Differential | 0.5 mm (0.02 in.) | | | |
| Reverse overtravel | | | | |
| Minimum force or torque 1 pole & 2 pole | 3 lb (13.3 N) | | | |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | 0.03 mm (0.001 in.) | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry. Prewired options available. | | | |

- To lock the nut in the desired position, crimp the slot near the bottom of the nut.
- Does not include mushroom button. Must be ordered separately see page 189.

Dimensions:
pages 182 to 185

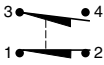
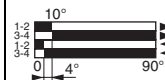
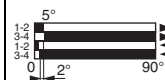
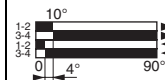
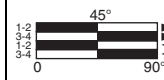
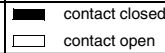
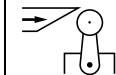
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Compact Body

Type of head **Rotary (lever arm type) (1)**

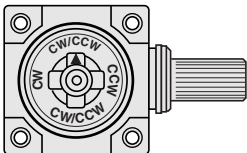
Compact plug-in body type



| | | | | |
|---|---|--|---|---|
| Type of operator | Standard pre-travel spring return | Low differential spring return | Light operating torque spring return | Maintained contact |
| Type of direction | CW & CCW (2) | CW & CCW (2) | CW & CCW (2) | CW (trip) CCW (reset) |
| Catalog numbers | | | | |
| 1 N.O. 1 N.C. snap action | 9007C52B2 | 9007C52A2 | 9007C52N2 | 9007C52C |
|  |  |  |  |  |
| Weight, kg (lb) | 0.481 (1.06) | 0.481 (1.06) | 0.481 (1.06) | 0.481 (1.06) |
| Contact operation |  | | | |
| Characteristics (nominal operating data) | | | | |
| Switch actuation | By 30° cam | | | |
| Type of actuation |  | | | |
| Pre-travel | 10° | 5° | 10° | 45° |
| Pre-travel two Stage | | | | |
| First stage | 10° | 5° | 10° | — |
| First stage to second stage | 2.5° | 1.5° | 2.5° | — |
| Total travel | 90° | 90° | 90° | 90° |
| Differential | 4° | 2° | 4° | — |
| Reverse overtravel | 90° | 90° | 90° | — |
| Operating torque/force | 4 lb-in (0.45 N•m) | | 25 oz-in (0.18 N•m) | 3 lb-in (0.34 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | 0.05 mm (± 0.002 in.) | 0.03 mm (± 0.001 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | |

- Lever arm type must be ordered separately from pages 190 to 195.
- These devices are factory set to operate the contacts in **both** the **CW** and **CCW** directions. **Mode of operation** is field convertible to CW only or CCW only.
To order factory converted devices: For CCW only operation, change the 2 at the end of the Type number to 1 (for example, C52B2 becomes C52B1). For CW only operation, delete the 2 at the end of the Type number (for example, C52B2 becomes C52B).

Mode of operation of the lever arm is easily convertible to clockwise or both.
Simply pull out and rotate the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW.



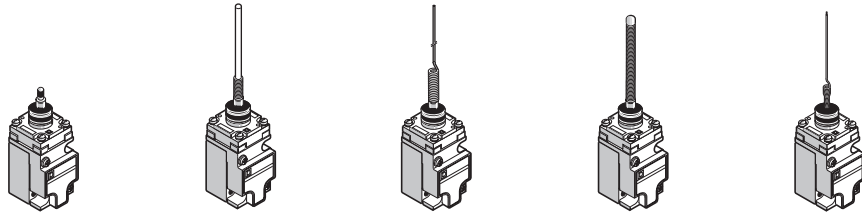
Dimensions:
pages 182 to 185

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Compact Body

Type of head **Flexible operator (wobble stick)**

Compact plug-in body type



| Type of operator | Universal (1) | Wobble stick Delrin® extension (1) | Wobble stick wire extension (1) | Wobble stick coil spring extension (1) | Cat whisker |
|---|--|------------------------------------|---------------------------------|--|---------------------|
| Catalog numbers | | | | | |
| 1 N.O. 1 N.C. | | | | | |
| | 9007C52JKC | 9007C52J | 9007C52K | 9007C52KC | 9007C52L |
| Weight, kg (lb) | 0.468 (1.03) | 0.568 (1.25) | 0.540 (1.19) | 0.568 (1.25) | 0.468 (1.03) |
| Contact operation | | | | | |
| Characteristics (nominal operating data) | | | | | |
| Switch actuation | By any moving | | | | |
| Type of actuation | | | | | |
| Pre-travel | 10° (any direction) | | | | 20° |
| Pre-travel two stage | | | | | |
| First stage | 10° (any direction) | | | | 20° |
| First stage to second stage | 4° | | | | 5° |
| Total travel | 90° | | | | |
| Differential | 3° | | | | 6° |
| Reverse overtravel | — | | | | |
| Operating torque/force | 3 lb-in (0.34 N•m) | | | | 7 oz-in (0.05 N•m) |
| 1 pole & 2 pole | | | | | |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | | |
| Repeatability (linear travel of cam) | — | | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | | |

1. Wobble stick extensions are available separately for the universal head. See page 189.

Dimensions:
pages 182 to 185

Limit Switches

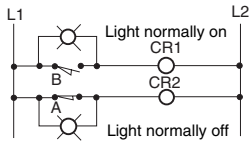
9007C Heavy Duty Industrial—Plug-in Body, Metal

Factory Modifications (Forms)

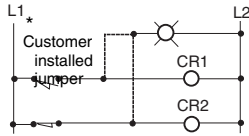


S9

Rotary head shown with S9 option



Form P5 Thru P9



Form P10

* Only one of the jumpers may be used.
Pilot light is ON when load is energized

Special features and modifications

Special features do not apply to 9007CR unless noted. Not field installable, except where noted.

Shaft equipped with hub for mounting larger diameter lever used with 9007T/FT limit switches

Any rotary lever arm 9007C, CF or CR switch can be furnished with an optional shaft and hub combination which will accept the lever arms normally used with 9007T and FT limit switches. To order, add S9 as suffix to the device number. For example, to order a 9007C54B2 with this modification, order as a 9007C54B2S9. For details about switches and lever arms that can be furnished with this modification, see the appropriate catalog or the Digest.

| Description | Suffix to add to the device catalog number | Weight kg (lb) |
|----------------------------------|--|----------------|
| Optional hub for 9007T/FT levers | S9 | 0.018 (0.04) |

Hub only: can be field installed on rotary shaft; see accessories, page 181

Addition of LED pilot light (1)

| Description | Suffix to add to the device catalog number | Weight kg (lb) |
|---|--|----------------|
| Addition of LED pilot light in parallel with N.O. contact (light normally on) | P5 (2) | 0.57 (1.25) |
| Addition of LED pilot light in parallel with N.C. contact (light normally off) | P6 (2) | 0.57 (1.25) |
| Addition of two LED pilot lights, one in parallel with N.O. contact (light normally on), one in parallel with N.C. contact (light normally off) | P7 | 0.57 (1.25) |
| Addition of two LED pilot lights in parallel with N.O. contacts (lights normally on) | P8 (3) | 0.57 (1.25) |
| Addition of two LED pilot lights in parallel with N.C. contacts (lights normally off) | P9 (3) | 0.57 (1.25) |
| Addition of one isolated LED pilot light (light on when load is energized) | P10 (4) | 0.57 (1.25) |

LED Pilot light, 24 to 120 V AC or DC on plug-in type switch (9007C52, C54, C62, C66, C68 or (2))

1. Bleeder circuit must be added to ensure PLC compatibility.
2. 9007C84 and C86 are available with P5 or P6 pilot lights only.
3. 9007C62, C66 or C68 only.
4. 9007C54 only. Not available with prewired receptacles.

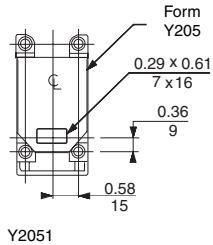
Examples of complete units with pilot lights in standard plug-in body type

| Single pole | Catalog number | Weight kg (lb) |
|------------------|----------------|----------------|
| Side plunger | 9007C54FP6 | 0.57 (1.25) |
| | 9007C54DP6 | 0.57 (1.25) |
| Top plunger | 9007C54EP6 | 0.57 (1.25) |
| | 9007C54BP6 | 0.57 (1.25) |
| Rotary | 9007C54LP6 | 0.57 (1.25) |
| Wobble stick | 9007C54JP6 | 0.57 (1.25) |
| | 9007C54BP6 | 0.57 (1.25) |
| Two poles | | |
| Side plunger | 9007C62FP6 | 0.57 (1.25) |
| | 9007C62DP6 | 0.57 (1.25) |
| Top plunger | 9007C62EP6 | 0.57 (1.25) |
| | 9007C62BP6 | 0.57 (1.25) |
| Rotary | 9007C62LP6 | 0.57 (1.25) |
| Wobble stick | 9007C62JP6 | 0.57 (1.25) |
| | 9007C62BP6 | 0.57 (1.25) |

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Factory Modifications (Forms)



Special features and modifications (continued)

Special features do not apply to 9007CR unless noted. Not field installable, except where noted.

Manifold mounting

| Description | Suffix to add to the device catalog number | Weight kg (lb) |
|--|--|----------------|
| Manifold mounting available on standard and compact types. Replaces existing type B installations if new hole is drilled to match knockout. Supersedes type C with form Y205. Receptacle is furnished with a wiring hole and a gasket in the base. | Y2051 | 0.57 (1.25) |
| Special chemical resistant coating (includes Viton® fluorocarbon seals—Y140, and stainless steel head and body screws) (1) | L3 | 0.57 (1.25) |
| Low temperature – lever types only: limit switch will operate in an ambient temperature range of -40 to 185 °F (standard limit switch ambient temperature range is -20 to 185 °F). Minimum temperature is based on the absence of freezing moisture or water. | Y128 | 0.57 (1.25) |

Viton fluorocarbon gaskets and seals (1)

Substitution of Viton fluorocarbon gaskets and seals on:

| | | |
|--|-------|-------------|
| Lever arm type, standard box (Viton fluorocarbon shaft seals on lever arm types as standard) | Y140 | 0.57 (1.25) |
| Lever arm type, compact box (Viton fluorocarbon shaft seals on lever arm types as standard) | Y140 | 0.57 (1.25) |
| Plunger type, standard box | Y140 | 0.57 (1.25) |
| Plunger type, compact box | Y140 | 0.57 (1.25) |
| Substitution of Viton fluorocarbon boot only on plunger type switches | Y1401 | 0.57 (1.25) |

1. Fluorocarbon (as found in Viton seals) has been shown to resist sunlight aging problems.

Mini and micro connectors, ISO M20 (Form M11)

To order 9007C with ISO M 20 thread add the suffix M11 to the device number.

Examples of complete unit catalog numbers with ISO M20 thread in standard plug-in body type

| Type of head | Catalog number | Weight kg (lb) |
|---------------------|----------------|----------------|
| Single pole | | |
| Side plunger | 9007C54FM11 | 0.57 (1.25) |
| Top plunger | 9007C54DM11 | 0.57 (1.25) |
| | 9007C54EM11 | 0.57 (1.25) |
| Rotary | 9007C54B2M11 | 0.57 (1.25) |
| Wobble stick | 9007C54LM11 | 0.57 (1.25) |
| | 9007C54JM11 | 0.57 (1.25) |
| Two poles | | |
| Side plunger | 9007C62FM11 | 0.57 (1.25) |
| Top plunger | 9007C62DM11 | 0.57 (1.25) |
| | 9007C62EM11 | 0.57 (1.25) |
| Rotary | 9007C62B2M11 | 0.57 (1.25) |
| Wobble stick | 9007C62LM11 | 0.57 (1.25) |
| | 9007C62JM11 | 0.57 (1.25) |

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Factory Modifications (Forms)



Y190•

Standard body shown with Y190• option

Special features and modifications (continued)

Special features do not apply to 9007CR unless noted. Not field installable, except where noted.

Pre-wired receptacle (1) (2)

| Description | For use | Suffix to add to the device catalog number | Weight kg (lb) |
|--|--|--|----------------|
| Plug-in limit switch furnished with pre-wired mini 5-pin Brad Harrison male connector | | | |
| Single pole | For use with Brad Harrison female portable plug No.41306, 41307 or 41308 (or equal). | Y1901 | 0.60 (1.33) |
| | Same as Y1901 but with different wire color coding | Y1905 | 0.60 (1.33) |
| Tamper proof screws in complete switch only | | | |
| Single pole | Same as Y1901 but with tamper proof screws on head and body | Y1903 | 0.60 (1.33) |
| | Similar to Y1905 except for double pole device | Y19013 | 0.60 (1.33) |

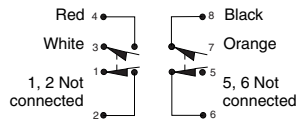
1. Plug and cable assemblies: see accessories page 181
2. Not available with P10 or for Hazardous location switches

Examples of complete unit catalog numbers with mini or micro connectors in standard plug-in body type

| Type of head | Catalog number | Weight kg (lb) |
|--|-----------------|----------------|
| Single pole, 5-pin mini connector (7/8"-16 UN-2A thread) | | |
| Side plunger | 9007C54FY1901 | 0.57 (1.25) |
| Top plunger | 9007C54DY1901 | 0.57 (1.25) |
| | 9007C54EY1901 | 0.57 (1.25) |
| Rotary | 9007C54B2Y1901 | 0.57 (1.25) |
| Wobble stick | 9007C54LY1901 | 0.57 (1.25) |
| | 9007C54JY1901 | 0.57 (1.25) |
| Two poles, 9-pin mini connector (1-2/8"-16 UN-2A thread) | | |
| Side plunger | 9007C62FY19016 | 0.57 (1.25) |
| Top plunger | 9007C62DY19016 | 0.57 (1.25) |
| | 9007C62EY19016 | 0.57 (1.25) |
| Rotary | 9007C62B2Y19016 | 0.57 (1.25) |
| Wobble stick | 9007C62LY19016 | 0.57 (1.25) |
| | 9007C62JY19016 | 0.57 (1.25) |
| Single pole, 5-pin micro single key (M12 x 1 thread) | | |
| Side plunger | 9007C62FY1912 | 0.57 (1.25) |
| Top plunger | 9007C54DY1912 | 0.57 (1.25) |
| | 9007C54EY1912 | 0.57 (1.25) |
| Rotary | 9007C54B2Y1912 | 0.57 (1.25) |
| Wobble stick | 9007C54LY1912 | 0.57 (1.25) |
| | 9007C54JY1912 | 0.57 (1.25) |
| Single pole, 5-pin micro connector two keys (1/2"-20 UNF-2A thread) | | |
| Side plunger | 9007C54FY19019 | 0.57 (1.25) |
| Top plunger | 9007C54DY19019 | 0.57 (1.25) |
| | 9007C54EY19019 | 0.57 (1.25) |
| Rotary | 9007C54B2Y19019 | 0.57 (1.25) |
| Wobble stick | 9007C54LY19019 | 0.57 (1.25) |
| | 9007C54JY19019 | 0.57 (1.25) |



Form Y1901, Y1903



Form Y19013



Form Y1905

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Factory Modifications (Forms)



Y18**
Terminal base shown
with Y18** option

Special features and modifications (continued)

Special features do not apply to 9007CR unless noted. Not field installable, except where noted.

Potted limit (position) switch or plug-in receptacle only (1)

| Description (2) | | | Suffix to add to the device catalog number | Weight kg (lb) |
|---|---|--|--|----------------|
| With individual wires | Single pole | With five #16 wires five feet long | Y1841 | 0.59 (1.30) |
| | Two pole | With nine #16 wires five feet long | Y1842 | 0.60 (1.32) |
| With STOWA cord | Single pole | With five conductor #16 STOWA cord eight feet long | Y1851 | 1.30 (2.88) |
| | Single pole | Same as Y1851 but with different wire color coding | Y1855 | 1.30 (2.88) |
| | Two pole | With nine conductor #16 STOWA cord eight feet long | Y1852 | 1.31 (2.90) |
| | Two pole | Same as Y1852 but with different wire color coding | Y1856 | 1.31 (2.90) |
| Tamper proof screws—complete switch only | | | | |
| With individual wires | Same as Y1841 but with tamper proof screws on head and body | | Y1843 | 0.59 (1.30) |
| | Same as Y1842 but with tamper proof screws on head and body | | Y1844 | 0.60 (1.32) |
| With STOWA cord | Same as Y1851 but with tamper proof screws on head and body | | Y1853 | 1.30 (2.88) |
| | Same as Y1852 but with tamper proof screws on head and body | | Y1854 | 1.30 (2.88) |
| | Same as Y1855 but with tamper proof screws on head and body | | Y1857 | 1.31 (2.90) |
| | Same as Y1856 but with tamper proof screws on head and body | | Y1858 | 1.31 (2.90) |

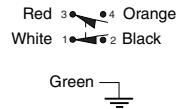
- Not for 9007CR Hazardous location devices
- Wire entry completely sealed with epoxy resin.

Dust boot (protects against abrasive dusts, dirt, grit and sand)

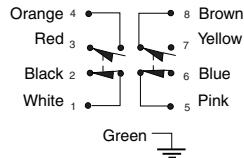
| Description | Suffix to add to the device catalog number | Weight kg (lb) | |
|---|---|----------------|-------------|
| Lever type limit switch furnished with a boot around the shaft | On all 9007C and 9007CR lever type switches | Y33 | 0.01 (0.01) |
| Dust boot only | See accessories, page 181 | | |

Wiring Diagrams

Forms Y1851 and Y1853



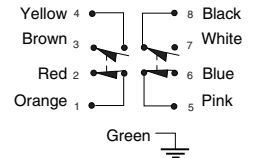
Forms Y1852 and Y1854



Forms Y1855 and Y1857



Forms Y1856 and Y1858



Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Factory Modifications (Forms)

Special features and modifications (continued)

Special features do not apply to 9007CR unless noted. Not field installable, except where noted.

Optional shafts

| Description | Suffix to add to the device catalog number | Weight kg (lb) |
|---|--|----------------|
| Optional shaft, 7.8 mm (0.306 in.) diameter: To accommodate lever arms from the obsolete Denison C limit switches. Available on all 9007C, CF, or CR limit switches | Y247 | 0.57 (1.25) |
| Optional shaft, 7.1 mm (0.28 in.) diameter: Available on all 9007C, CF, or CR limit switches | Y249 | 0.57 (1.25) |

Switch with adapter plate

| Description | Suffix to add to the device catalog number | Weight kg (lb) |
|---|--|----------------|
| Switch with adapter plate permitting substitution of any 9007C switch with standard body for any type T switch with style B base plate | Y147 | — |

Direct acting contacts / Positive opening contacts ☞ Y1561

One pole, normally closed, slow make-slow break, direct acting contact mechanism substituted for standard snap switch on 9007C52, C54 and CR53 devices.

This mechanism was designed for use in emergency overtravel applications. The movable contact of this basic switch unit is acted upon directly by the actuating mechanism of the limit switch and is not dependent upon the force exerted by a snap switch blade or spring to open the circuit. Because these contacts are slow make-slow break, they are best suited for applications where they are not actuated during normal operation, but only if abnormal overtravel is encountered.

Electrical contact ratings

| AC—NEMA A600 maximum current—35 % power factor | | | | | | DC maximum current | | | |
|---|------|------|-------|-----|--------------------------|--------------------|---------------|------------|--------------------------|
| Volts | Make | | Break | | Continuous carrying A | Volts | Make or break | | Continuous carrying A |
| | A | VA | A | VA | | | A | VA | |
| 120 | 60 | 7200 | 6 | 720 | 10 | 125 | 1.1/0.55 (1) | 138/69 (1) | 5/2.5 (1) |
| 240 | 30 | 7200 | 3 | 720 | 10 | — | — | — | — |
| 480 | 15 | 7200 | 1.5 | 720 | 10 | 250 | 0.27 | 67.5 | 2.5 |
| 600 | 12 | 7200 | 1.2 | 720 | 10 | 600 | 0.10 | 60 | 2.5 |

1. 9007C52 compact unit ratings at 125 Vdc—same ratings as 9007C54 and 9007CR53 at other voltages.

| Description | Suffix to add to the device catalog number | Weight kg (lb) |
|---|--|----------------|
| Direct acting contact/positive opening contact block (slow break single pole only) | Y1561 | 0.566 (1.25) |

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Accessories

| Accessories | | |
|---|----------------|-------------------|
| Hub only | | |
| Description | Catalog number | Weight kg (lb) |
| Hub can be field installed on any 9007C lever type switch, increasing the shaft diameter from 0.375–0.749 in. (9.53–19 mm), to accept levers normally used with 9007T/FT switches. | 9007S9 | 0.02 (0.04) |
| Dust boot only | | |
| Description | Catalog number | Weight kg (lb) |
| Dust boot can be field installed on any 9007C and CR lever type switch | 9007BT3 | 0.01 (0.01) |
| Conduit seal insert (field instable) | | |
| Description | Catalog number | Weight kg (lb) |
| Conduit seal fits in conduit entrance and excludes liquids | | |
| 5 hole seal | 31032-488-01 | 0.01 (0.02) |
| 9 hole seal | 31032-815-01 | 0.01 (0.02) |
| Plug and cable assemblies | | |
| Description | Catalog number | Weight kg (lb) |
| 5-pin mini connecting cables (to fit certain switches with Form Y190**) | | |
| Plug and 3 ft (0.91 m) cable | BH20-5-3 | — |
| Plug and 6 ft (1.83 m) cable | BH20-5-6 | — |
| Plug and 12 ft (3.66 m) cable | BH20-5-12 | — |
| Note: Other cables available. See the Machine Cabling section of the Sensors catalog, 9006CT0101. | | |
| Adapter—Field installable | | |
| Description | Catalog number | Weight kg (lb) |
| Adapter plate kit only | | |
| Plate plus mounting screws for substitution of any 9007C switch with standard box for any 9007T switch with style B base plate | 9007BT1 | 0.23 (0.50) |
| Adapter plate | | |
| for direct substitution of any 9007C plunger switches for 9007B plug-in plunger switches—use only if there is a problem in lining up cam tracks | | |
| Standard body type | 9007CT10 (1) | 0.13 (0.28) |
| Compact body type | 9007CT13 (2) | 0.01 (0.20) |
| Adapter plate kit | | |
| permitting direct substitution of any 9007C lever arm switch with standard box for any 9007AW lever arm switch | 9007CT11 | 0.23 (0.50) |
| 20 mm conduit connection adapter | | |
| male 0.5 in. (12.7 mm) NPT on one end, female 0.787 in. (20 mm) on other end | 9007CT12 | 0.01 (0.20) |

1. Dimensions: 0.22 x 2.94 x 1.54 in. (5.6 x 75 x 39 mm)

2. Dimensions: 0.22 x 2.07 x 1.54 in. (5.6 x 53 x 39 mm)

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Dimensions—Standard Body

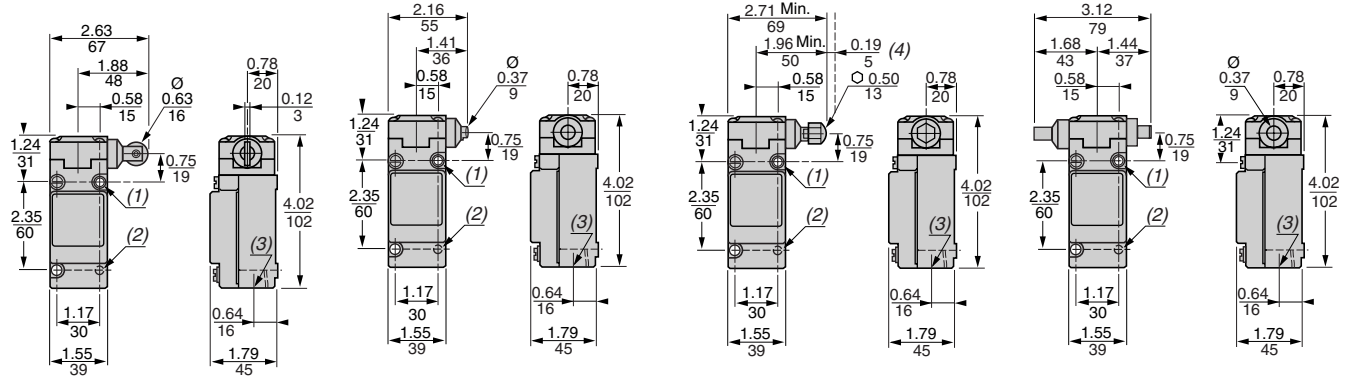
Side Plunger

9007C**F

9007C**G

9007C**GD

9007C**H



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

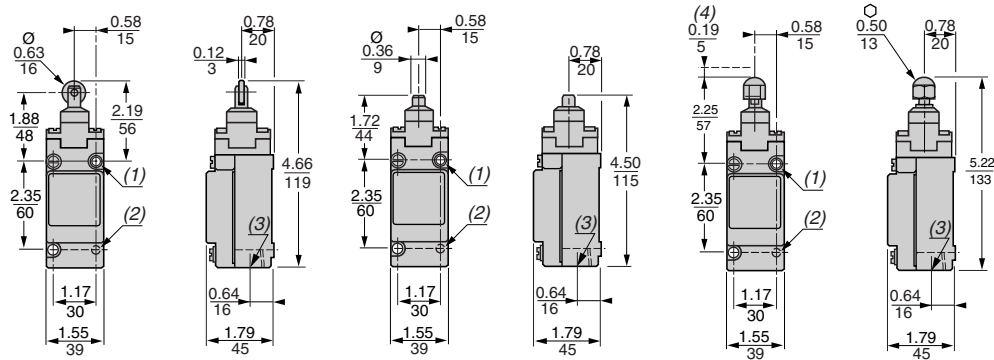
1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.
4. Adjustable.

Top Plunger

9007C**D

9007C**E

9007C**ED



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.
4. Adjustable.

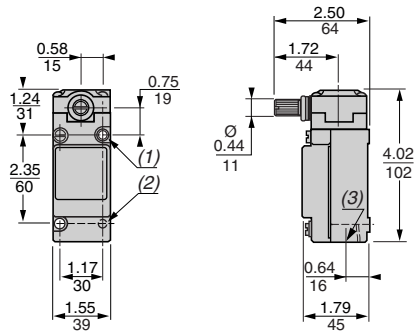
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Dimensions—Standard Body

Rotary

9007C*** A, B, C, N, T5, T10



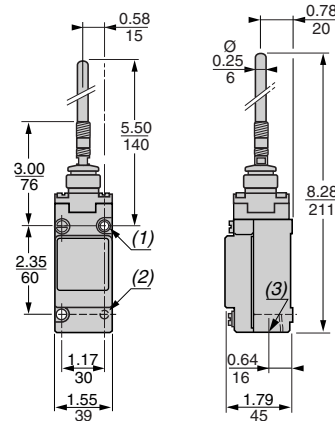
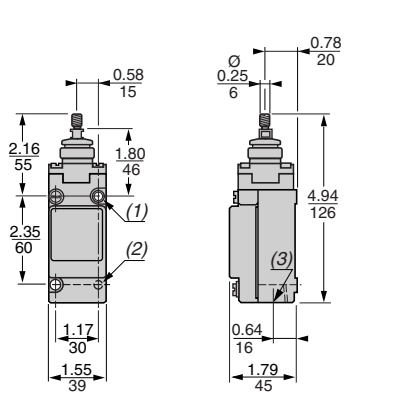
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.

Wobble stick

9007C**JKC

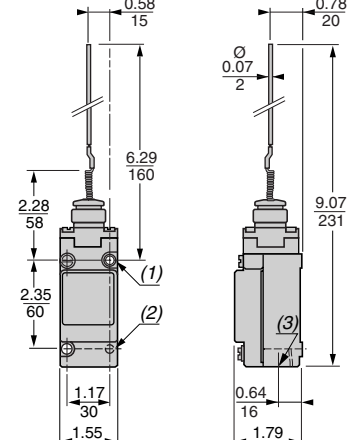
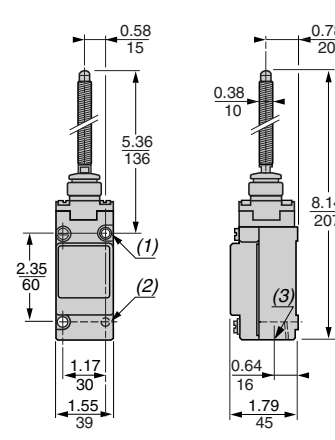
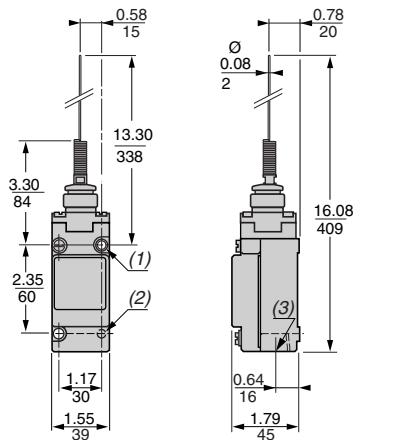
9007C**J



9007C**K

9007C**KC

9007C**L



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.

Limit Switches

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Dimensions—Compact Body

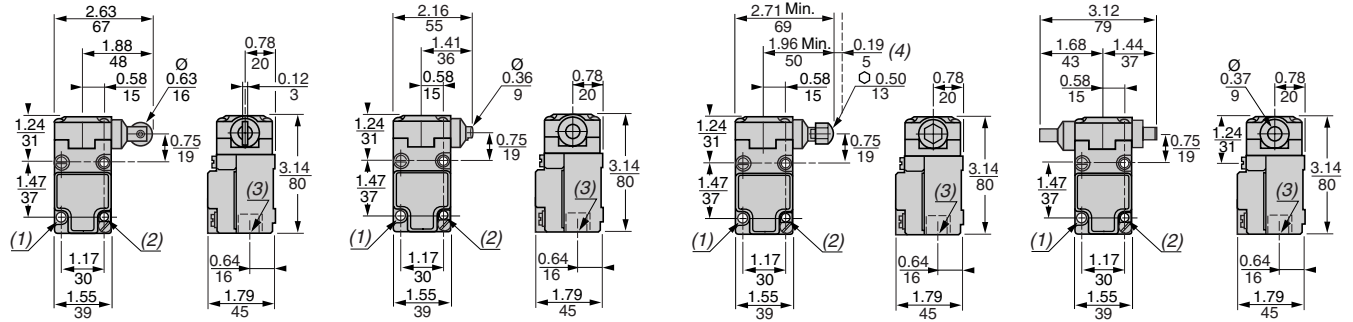
Side Plunger

9007C52F

9007C52G

9007C52GD

9007C52H



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

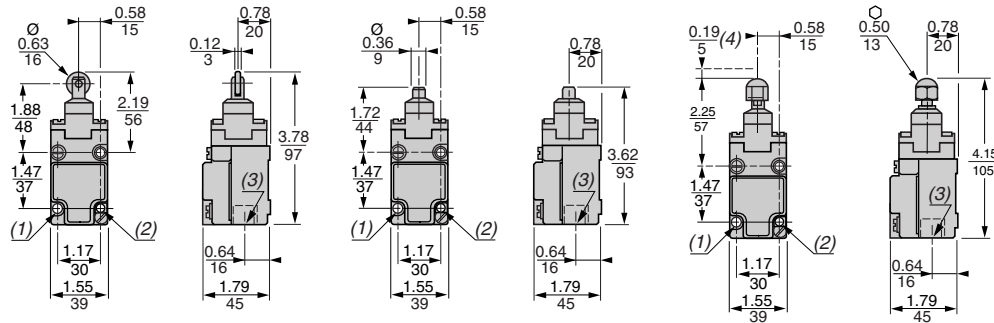
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.
4. Adjustable.

Top Plunger

9007C52D

9007C52E

9007C52ED



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

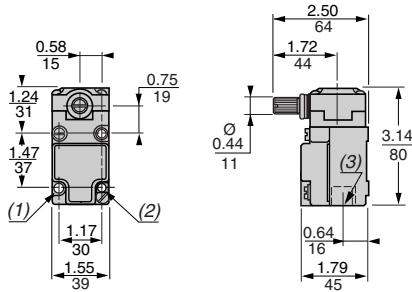
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.
4. Adjustable.

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Dimensions—Compact Body

Rotary

9007C52•• A, B, C, N, T5, T10



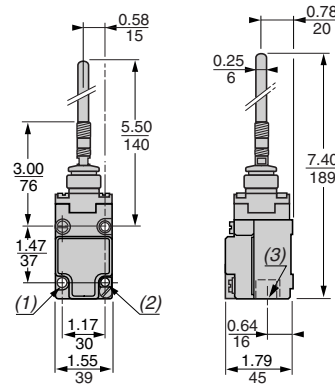
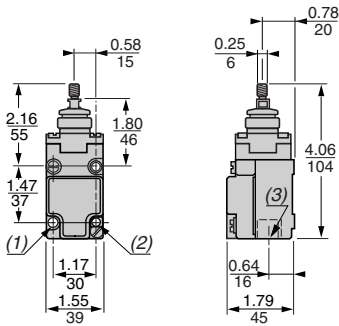
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.

Wobble stick

9007C52JKC

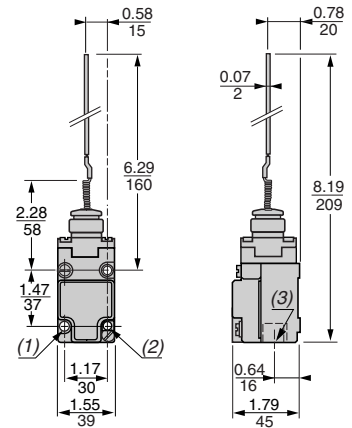
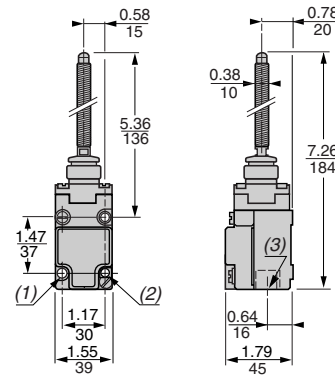
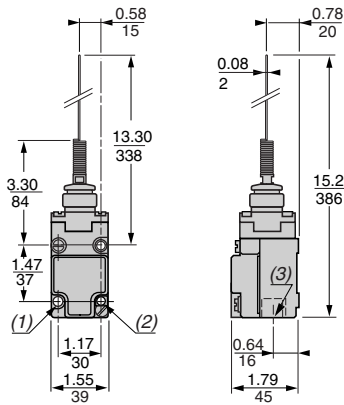
9007C52J



9007C52K

9007C52KC

9007C52L



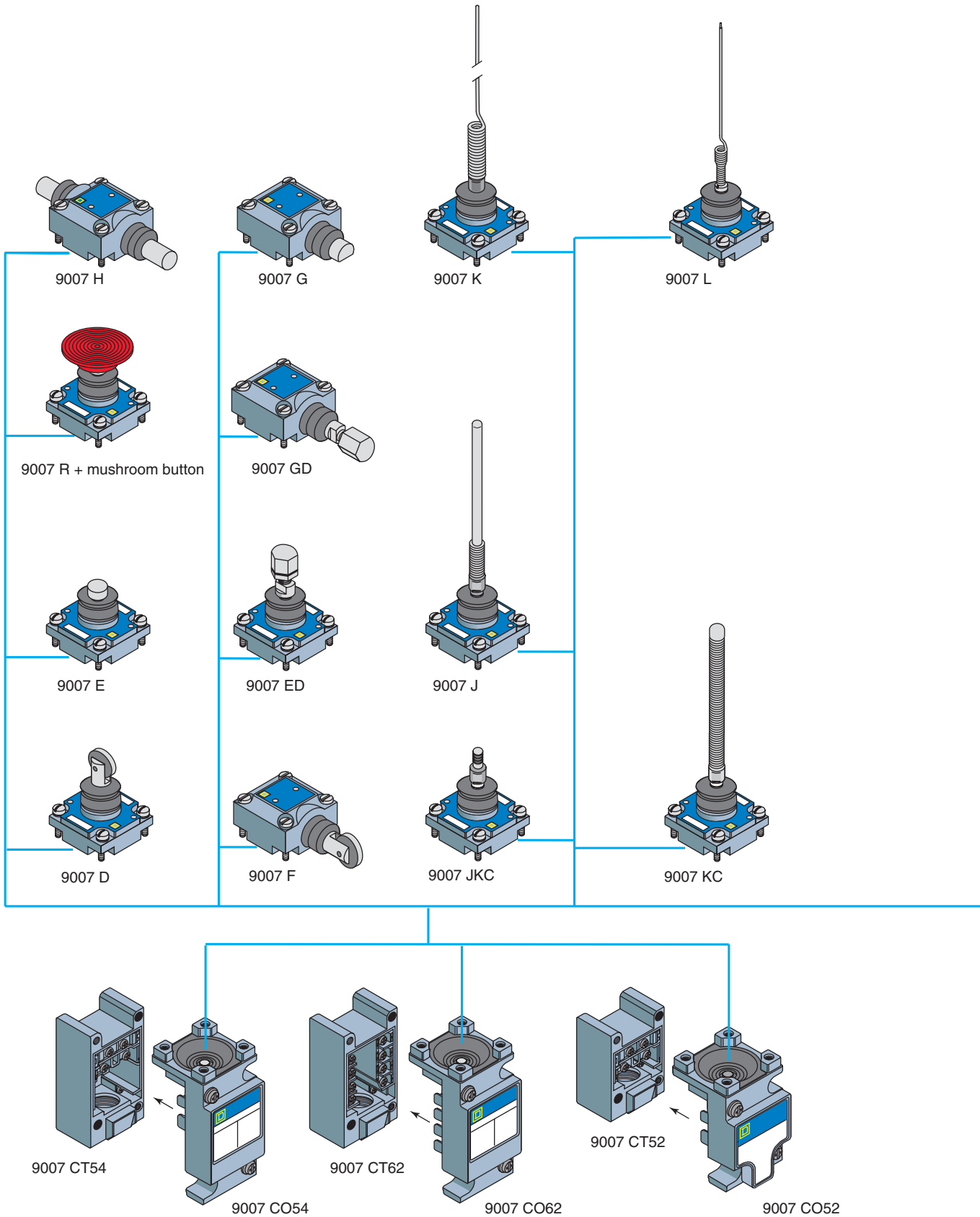
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.

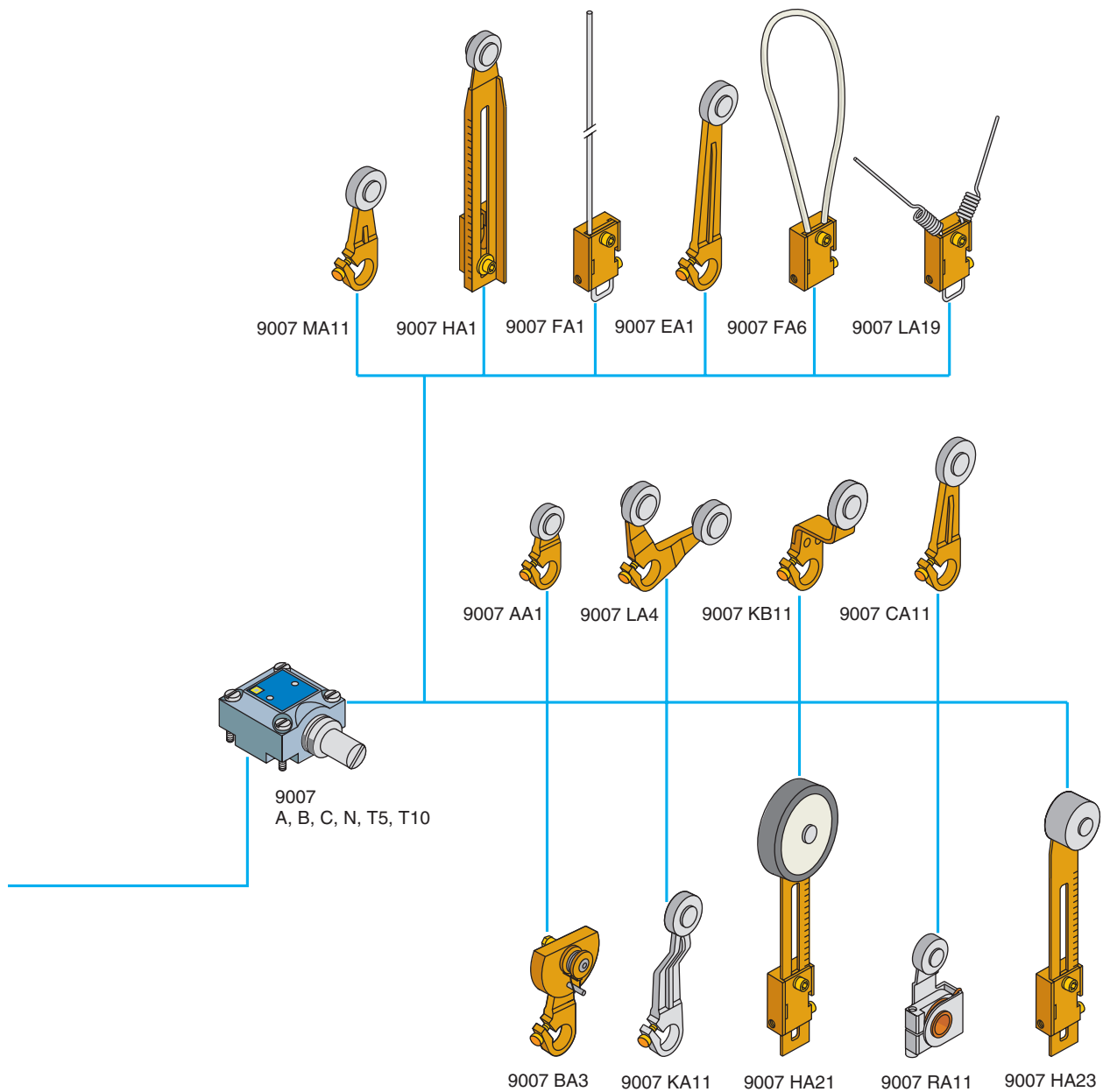
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Adaptable Sub-Assemblies

Limit Switches



Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Adaptable Sub-Assemblies

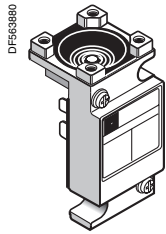


Limit Switches

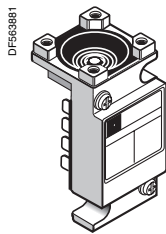
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

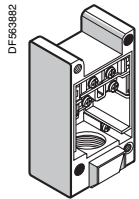
Adaptable Sub-Assemblies



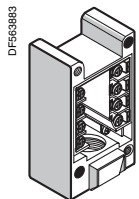
9007CO54



9007CO62



9007CT54



9007CT62

Limit Switches

Body with contacts for plunger or rotary heads Plug-in Unit (Top) with contacts

| Type | Type of contact | Function diagram | Catalog number | Weight kg (lb) |
|--------------------------------|------------------|------------------|----------------|----------------|
| For standard plug-in body type | Single pole | | 9007CO54 | 0.19 (0.42) |
| | Two pole | | 9007CO62 | 0.20 (0.44) |
| | Two stage | | 9007CO66 | 0.23 (0.50) |
| | Neutral position | | 9007CO68 | 0.20 (0.45) |
| For compact plug-in body type | Single pole | | 9007CO52 | 0.18 (0.40) |

Plug-in Receptacle (Base) with screw terminals (1)

| Type | Type of contact | Function diagram | Catalog number | Weight kg (lb) |
|--------------------------------|--------------------------------------|------------------|----------------|----------------|
| For standard plug-in body type | Single pole | | 9007CT54 | 0.22 (0.48) |
| | Two pole | | 9007CT62 | 0.22 (0.48) |
| | Neutral position | | 9007CT62 | 0.22 (0.48) |
| | Two stage | | 9007CT62 | 0.22 (0.48) |
| | Reed switches, either N/O or N/C (2) | | 9007CT54 | 0.22 (0.48) |
| For compact plug-in body type | Single pole | | 9007CT52 | 0.15 (0.34) |

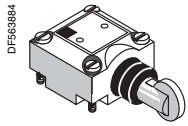
1. Acceptable wire sizes: 12-22 AWG (2.05 mm²-0.644mm²). Recommended terminal clamp torque: 7 lb-in (0.80 N•m).
2. Reed switches: plug-in switches less heads are not available as separate units. Order complete plug-in unit with a head. Example: 9007C084B2.

Dimensions:
page 196

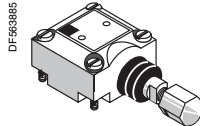
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

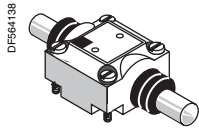
Adaptable Sub-Assemblies



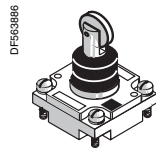
9007F



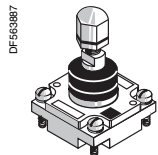
9007GD



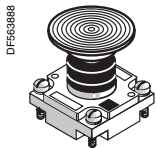
9007H



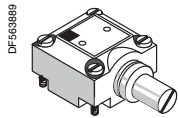
9007D



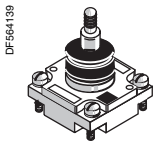
9007ED



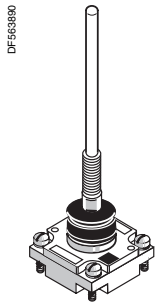
9007R + mushroom button



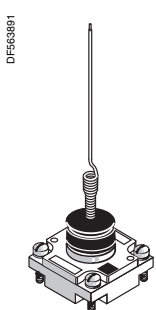
9007C



9007JKC



9007J



9007L

Heads for linear, rotary and multi-directional movements

Side plunger heads

| Type of operator | Catalog number | Weight kg (lb) |
|---|----------------|----------------|
| Side roller plunger, spring return, vertical roller (1) | 9007F | 0.16 (0.36) |
| Side push rod plunger, spring return | 9007G | 0.15 (0.34) |
| Side push rod plunger, adjustable spring return | 9007GD | 0.16 (0.36) |
| Side push rod plunger, maintained contact | 9007H | 0.16 (0.36) |

Top plunger heads

| Type of operator | Catalog number | Weight kg (lb) |
|---|----------------|----------------|
| Top roller plunger, spring return | 9007D | 0.12 (0.26) |
| Top push rod plunger, spring return | 9007E | 0.11 (0.24) |
| Top push rod plunger, adjustable spring return | 9007ED | 0.12 (0.27) |
| Palm operated turret head without mushroom button | 9007R | 0.13 (0.28) |
| Mushroom button see Accessories (below) | | |

Rotary heads (without lever arm type)

| Type of operator | Type of direction | Catalog number | Weight kg (lb) |
|--|--------------------------|----------------|----------------|
| Standard pre-travel spring return | CW & CCW | 9007B | 0.19 (0.41) |
| Low differential spring return | CW & CCW | 9007A | 0.19 (0.41) |
| Neutral position | CW & CCW | 9007T10 | 0.16 (0.36) |
| Standard pre-travel spring return | | | |
| Neutral position | CW & CCW | 9007T5 | 0.16 (0.36) |
| Low differential spring return | | | |
| Extra light operating torque spring return | CW & CCW | 9007N | 0.18 (0.40) |
| Maintained contact | CW (trip) CCW (reset) | 9007C | 0.19 (0.41) |

Multi-directional head

| Type of operator | Catalog number | Weight kg (lb) |
|---|----------------|----------------|
| Universal (2) | 9007JKC | 0.19 (0.41) |
| Wobble stick, Delrin® extension (2) | 9007J | 0.20 (0.43) |
| Wobble stick, wire extension (2) | 9007K | 0.26 (0.57) |
| Wobble stick, coil spring extension (2) | 9007KC | 0.22 (0.48) |
| Cat whisker | 9007L | 0.17 (0.37) |

Accessories

| Description | Diameter in. (mm) | Color | Catalog number | Weight kg (lb) |
|--|-----------------------|----------------|----------------|----------------|
| Mushroom button for palm operated turret head | 1.38 (35) | Black | 2358C6G3 | 0.03 (0.06) |
| | | Red | 2358C6G2 | 0.03 (0.06) |
| | | Green | 2358C6G6 | 0.03 (0.06) |
| | | Yellow | 2358C6G8 | 0.03 (0.06) |
| | 2.25 (57.2) | Black | — | — |
| | | Red | 2358C22G3 | 0.05 (0.10) |
| | | Green | 2358C22G6 | 0.05 (0.10) |
| | | Yellow | 2358C22G8 | 0.05 (0.10) |
| Description (2) | Type of extension | Catalog number | Weight kg (lb) | |
| Wobble stick extensions for the universal head | Delrin® extension | 9007WJ | 0.01 (0.03) | |
| | Wire extension | 9007WK | 0.01 (0.02) | |
| | Coil spring extension | 9007WKC | 0.02 (0.04) | |

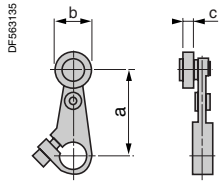
- Field convertible to horizontal.
- Acceptable wire sizes: 12-22 AWG (2.05 mm²-0.644mm²).
Recommended terminal clamp torque: 7 lb-in (0.80 N•m).

Dimensions:
page 196

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Lever Arms for Rotary Heads



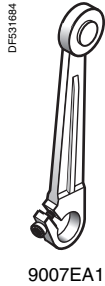
a: Length of lever Arm
b: Roller diameter
c: Roller width



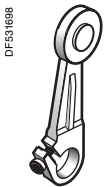
9007AA1



9007MA11



9007EA1



9007CA11

Cast zinc lever arms with standard roller

Lever arms with steel roller (1)

| Arm | Steel roller | | Catalog number | Weight kg (lb) |
|------------------------|--------------------------|-----------------------|----------------|-------------------|
| Length (a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| 0.88 (22) | 0.63 (16) | 0.25 (6.3) | 9007AA1 | 0.02 (0.05) |
| | | 0.63 (16) | 9007AA2 | 0.03 (0.07) |
| 1.38 (35) | 0.75 (19) | 0.25 (6.3) | 9007BA11 | 0.03 (0.07) |
| | | 0.63 (16) | 9007BA12 | 0.05 (0.10) |
| | 0.63 (16) | 0.25 (6.3) | 9007BA1 | 0.03 (0.07) |
| | | 0.63 (16) | 9007BA2 | 0.04 (0.08) |
| 1.5 (38) | 0.75 (19) | 0.25 (6.3) | 9007MA11 | 0.03 (0.07) |
| | | 0.63 (16) | 9007MA12 | 0.05 (0.11) |
| | 0.63 (16) | 0.25 (6.3) | 9007MA1 | 0.03 (0.06) |
| | | 0.63 (16) | 9007MA2 | 0.05 (0.10) |
| 2 (51) | 0.75 (19) | 0.25 (6.3) | 9007CA11 | 0.04 (0.08) |
| | | 0.63 (16) | 9007CA12 | 0.05 (0.12) |
| | 0.63 (16) | 0.25 (6.3) | 9007CA1 | 0.04 (0.08) |
| | | 0.63 (16) | 9007CA2 | 0.05 (0.10) |
| 2.5 (63.5) | 0.75 (19) | 0.25 (6.3) | 9007DA11 | 0.05 (0.10) |
| | | 0.63 (16) | 9007DA12 | 0.06 (0.13) |
| | 0.63 (16) | 0.25 (6.3) | 9007DA1 | 0.04 (0.08) |
| | | 0.63 (16) | 9007DA2 | 0.05 (0.11) |
| 3 (76) | 0.75 (19) | 0.25 (6.3) | 9007EA11 | 0.05 (0.10) |
| | | 0.63 (16) | 9007EA12 | 0.06 (0.14) |
| | 0.63 (16) | 0.25 (6.3) | 9007EA1 | 0.04 (0.09) |
| | | 0.63 (16) | 9007EA2 | 0.06 (0.14) |

Lever arms with nylon roller

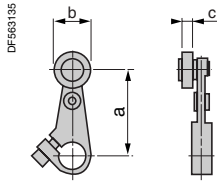
| Arm | Nylon roller | | Catalog number | Weight kg (lb) |
|------------------------|--------------------------|-----------------------|----------------|-------------------|
| Length (a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| 0.88 (22) | 0.63 (16) | 0.25 (6.3) | 9007AA8 | 0.02 (0.05) |
| | | 0.63 (16) | 9007AA17 | 0.03 (0.07) |
| 1.38 (35) | 0.75 (19) | 0.25 (6.3) | 9007BA18 | 0.03 (0.07) |
| | | 0.63 (16) | 9007BA8 | 0.05 (0.10) |
| | 1 (25.4) | 0.25 (6.3) | 9007BA17 | 0.05 (0.11) |
| | | 0.63 (16) | 9007BA4 | 0.03 (0.06) |
| 1.5 (38) | 0.75 (19) | 0.25 (6.3) | 9007BA13 | 0.05 (0.10) |
| | | 0.63 (16) | 9007MA18 | 0.03 (0.06) |
| | 0.63 (16) | 0.25 (6.3) | 9007MA18 | 0.05 (0.10) |
| | | 0.63 (16) | 9007MA17 | 0.05 (0.10) |
| 2 (51) | 1 (25.4) | 0.25 (6.3) | 9007MA4 | 0.05 (0.10) |
| | | 0.63 (16) | 9007MA13 | 0.05 (0.12) |
| | 0.75 (19) | 0.25 (6.3) | 9007MA18 | 0.05 (0.10) |
| | | 0.63 (16) | 9007CA8 | 0.03 (0.06) |
| 2.5 (63.5) | 0.63 (16) | 0.25 (6.3) | 9007CA17 | 0.03 (0.07) |
| | | 0.63 (16) | 9007CA4 | 0.05 (0.12) |
| | 1 (25.4) | 0.25 (6.3) | 9007CA13 | 0.06 (0.14) |
| | | 0.63 (16) | 9007DA18 | 0.03 (0.07) |
| 3 (76) | 0.75 (19) | 0.25 (6.3) | 9007DA8 | 0.06 (0.13) |
| | | 0.63 (16) | 9007DA17 | 0.06 (0.13) |
| | 1 (25.4) | 0.25 (6.3) | 9007DA4 | 0.06 (0.14) |
| | | 0.63 (16) | 9007DA13 | 0.07 (0.15) |
| 3 (76) | 0.75 (19) | 0.25 (6.3) | 9007EA18 | 0.04 (0.08) |
| | | 0.63 (16) | 9007EA8 | 0.06 (0.14) |
| | 0.63 (16) | 0.25 (6.3) | 9007EA17 | 0.07 (0.16) |
| | | 0.63 (16) | 9007EA4 | 0.07 (0.15) |
| 1 (25.4) | 0.25 (6.3) | 9007EA13 | 0.08 (0.17) | |
| | 0.63 (16) | 9007EA13 | 0.08 (0.17) | |

1. Material is hardened, oil-impregnated, sintered iron.

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Lever Arms for Rotary Heads



a: Length of lever Arm
b: Roller diameter
c: Roller width

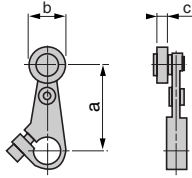
| Cast zinc lever arms (continued) | | | | |
|--|---------------------------------|-----------------------|----------------|-------------------|
| Lever arms with ball bearing roller | | | | |
| Arm | Ball bearing roller | | Catalog number | Weight kg (lb) |
| Length (a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| 0.88 (22) | 0.69 (17.5) | 0.25 (6.3) | 9007AA9 | 0.04 (0.09) |
| 1.38 (35) | 0.69 (17.5) | 0.25 (6.3) | 9007BA9 | 0.04 (0.09) |
| 1.5 (38) | 0.69 (17.5) | 0.25 (6.3) | 9007MA9 | 0.04 (0.09) |
| 2 (51) | 0.69 (17.5) | 0.25 (6.3) | 9007CA9 | 0.04 (0.09) |
| 2.5 (63.5) | 0.69 (17.5) | 0.25 (6.3) | 9007DA9 | 0.04 (0.09) |
| 3 (76) | 0.69 (17.5) | 0.25 (6.3) | 9007EA9 | 0.04 (0.09) |
| Lever arms with roller on opposite side to standard | | | | |
| Lever arm | Roller on opposite side | | Catalog number | Weight kg (lb) |
| Length (a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| 0.88 (22) | 0.63 (16) | 0.25 (6.3) | 9007AA5 | 0.04 (0.09) |
| | 0.63 (16) | 0.63 (16) | 9007AA6 | 0.04 (0.09) |
| 1.38 (35) | 0.75 (19) | 0.25 (6.3) | 9007BA15 | 0.04 (0.09) |
| | 0.63 (16) | 0.25 (6.3) | 9007BA5 | 0.04 (0.09) |
| 1.5 (38) | 0.63 (16) | 0.63 (16) | 9007BA6 | 0.04 (0.09) |
| | 0.75 (19) | 0.25 (6.3) | 9007MA15 | 0.04 (0.09) |
| 2 (51) | 0.63 (16) | 0.25 (6.3) | 9007MA5 | 0.04 (0.09) |
| | 0.63 (16) | 0.63 (16) | 9007MA6 | 0.04 (0.09) |
| 2.5 (63.5) | 0.75 (19) | 0.25 (6.3) | 9007CA15 | 0.04 (0.09) |
| | 0.63 (16) | 0.25 (6.3) | 9007CA5 | 0.04 (0.09) |
| 3 (76) | 0.63 (16) | 0.63 (16) | 9007CA6 | 0.04 (0.09) |
| | 0.75 (19) | 0.25 (6.3) | 9007DA15 | 0.04 (0.09) |
| 2.5 (63.5) | 0.63 (16) | 0.25 (6.3) | 9007DA5 | 0.04 (0.09) |
| | 0.63 (16) | 0.63 (16) | 9007DA6 | 0.04 (0.09) |
| 3 (76) | 0.75 (19) | 0.25 (6.3) | 9007EA15 | 0.04 (0.09) |
| | 0.63 (16) | 0.25 (6.3) | 9007EA5 | 0.04 (0.09) |
| 3 (76) | 0.63 (16) | 0.63 (16) | 9007EA6 | 0.04 (0.09) |
| | 0.63 (16) | 0.63 (16) | 9007EA6 | 0.04 (0.09) |
| Lever arms with roller countersunk roller pin | | | | |
| Arm | Roller (countersunk roller pin) | | Catalog number | Weight kg (lb) |
| Length (a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| 1.5 (38) | 0.75 (19) | 0.25 (6.3) | 9007MA31 | 0.03 (0.07) |
| 2 (51) | 0.75 (19) | 0.25 (6.3) | 9007CA31 | 0.04 (0.08) |
| 2.5 (63.5) | 0.75 (19) | 0.25 (6.3) | 9007DA31 | 0.04 (0.09) |
| Lever arms with cable operated with eyebolt (I.D.) instead of roller | | | | |
| Arm | Cable | | Catalog number | Weight kg (lb) |
| Length in. (mm) | Length in. (mm) | | | |
| 1.5 (38) | 0.38 (9.6) | | 9007MA22 | 0.05 (0.10) |

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Lever Arms for Rotary Heads

DF563135



a: Length of lever Arm
b: Roller diameter
c: Roller width

| Flat steel lever arms with standard roller (1) | | | | |
|--|--------------------------|-----------------------|------------------|-------------------|
| Arm | Roller | | Catalog number | Weight kg (lb) |
| Length(a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| Lever arms with steel roller | | | | |
| 0.88 (22) | 0.63 (16) | 0.25 (6.3) | 9007AA1S | 0.01 (0.03) |
| | 0.63 (16) | 0.63 (16) | 9007AA2S | 0.01 (0.03) |
| 1.38 (35) | 0.63 (16) | 0.25 (6.3) | 9007BA1S | 0.01 (0.03) |
| | 0.63 (16) | 0.63 (16) | 9007BA2S | 0.01 (0.03) |
| 2 (51) | 0.63 (16) | 0.25 (6.3) | 9007CA1S | 0.03 (0.07) |
| | 0.63 (16) | 0.63 (16) | 9007CA2S | 0.04 (0.08) |
| 2.5 (63.5) | 0.63 (16) | 0.25 (6.3) | 9007DA1S | 0.04 (0.08) |
| | 0.63 (16) | 0.63 (16) | 9007DA2S | 0.04 (0.08) |
| 3 (76) | 0.63 (16) | 0.25 (6.3) | 9007EA1S | 0.04 (0.08) |
| | 0.63 (16) | 0.63 (16) | 9007EA2S | 0.04 (0.08) |
| Lever arms with nylon roller | | | | |
| 1.38 (35) | 1 (25.4) | 0.25 (6.3) | 9007BA4S | 0.01 (0.03) |
| 1.5 (38) | 0.75 (19) | 0.25 (6.3) | 9007MA18S | 0.01 (0.03) |
| 2 (51) | 1 (25.4) | 0.25 (6.3) | 9007CA4S | 0.03 (0.07) |
| 2.5 (63.5) | 1 (25.4) | 0.25 (6.3) | 9007DA4S | 0.04 (0.08) |
| 3 (76) | 1 (25.4) | 0.25 (6.3) | 9007EA4S | 0.04 (0.08) |
| Lever arms without roller | | | | |
| 0.88 (22) | — | — | 9007AA0S | |
| 1.38 (35) | — | — | 9007BA0S | 0.01 (0.02) |
| 2 (51) | — | — | 9007CA0S | 0.03 (0.06) |
| 2.5 (63.5) | — | — | 9007DA0S | 0.03 (0.07) |
| 3 (76) | — | — | 9007EA0S | 0.03 (0.07) |

1. Material is hardened, oil-impregnated, sintered iron.

| 90° Forked cast zinc lever arms | | | | | |
|---|------------------------------|-------------------------|----------------------|-----------------|-------------------|
| Arm | Roller position | Roller | | Catalog number | Weight kg (lb) |
| Length(a) in. (mm) | | Diameter(b) in. (mm) | Width(c) in. (mm) | | |
| Lever arms with steel roller | | | | | |
| 1.5 (38) | Rollers on same side | 0.75 (19) | 0.25 (6.3) | 9007LA4 | 0.05 (0.12) |
| | | 0.63 (16) | 0.25 (6.3) | 9007LA1 | 0.07 (0.15) |
| | R.H. Roller on opposite side | 0.75 (19) | 0.25 (6.3) | 9007LA5 | 0.05 (0.12) |
| | | 0.63 (16) | 0.25 (6.3) | 9007LA2 | 0.07 (0.15) |
| | L.H. Roller on opposite side | 0.75 (19) | 0.25 (6.3) | 9007LA6 | 0.05 (0.12) |
| | | 0.63 (16) | 0.25 (6.3) | 9007LA3 | 0.07 (0.15) |
| Lever arms with nylon rollers | | | | | |
| 1.5 (38) | Rollers on same side | 0.75 (19) | 0.25 (6.3) | 9007LA16 | 0.04 (0.09) |
| | | 1 (25.4) | | 9007LA10 | 0.06 (0.14) |
| | R.H. Roller on opposite side | 0.75 (19) | 0.25 (6.3) | 9007LA17 | 0.04 (0.09) |
| | | 1 (25.4) | | 9007LA11 | 0.06 (0.14) |
| | L.H. Roller on opposite side | 0.75 (19) | 0.25 (6.3) | 9007LA18 | 0.04 (0.09) |
| | | 1 (25.4) | | 9007LA12 | 0.06 (0.14) |
| Lever arms with ball bearing rollers | | | | | |
| 1.5 (38) | Rollers on same side | 0.69 (17.5) | 0.25 (6.3) | 9007LA7 | 0.11 (0.25) |
| | R.H. Roller on opposite side | 0.69 (17.5) | 0.25 (6.3) | 9007LA8 | 0.11 (0.25) |
| | L.H. Roller on opposite side | 0.69 (17.5) | 0.25 (6.3) | 9007LA9 | 0.11 (0.25) |

DF531682



9007LA4

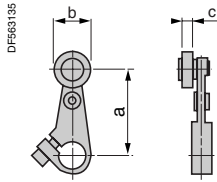
Limit Switches

Dimensions:
page 197

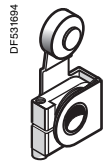
Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

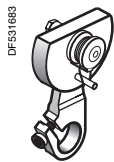
Lever Arms for Rotary Heads



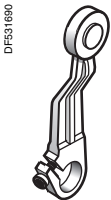
a: Length of lever Arm
b: Roller diameter
c: Roller width



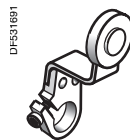
9007RA11



9007BA3



9007KA11



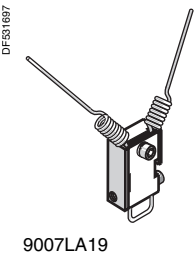
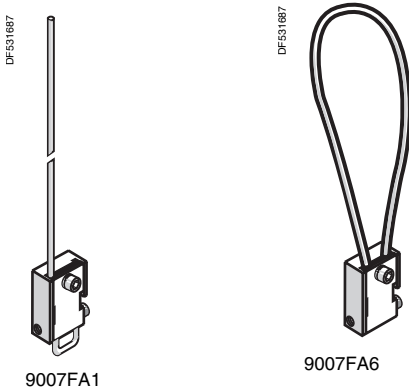
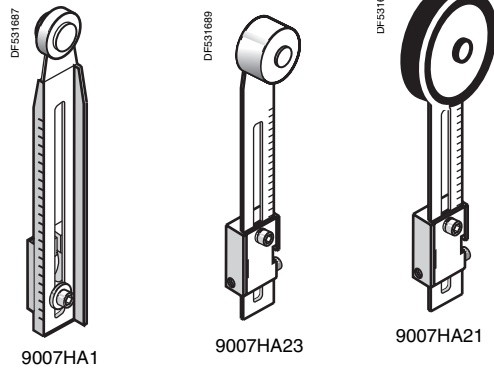
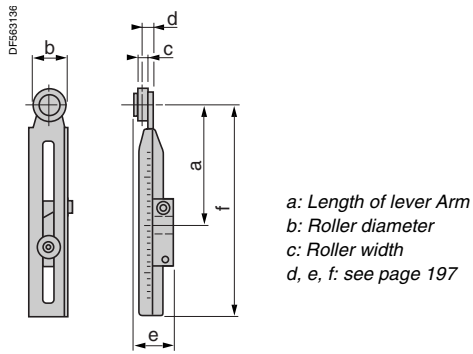
9007KB11

| One-way lever arm | | | | | |
|--|-----------|--------------------------|-----------------------|----------------|-------------------|
| Arm | | Steel roller | | Catalog number | Weight kg (lb) |
| Length (a) in. (mm) | | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| Lever arm with standard roller | | | | | |
| 1.5 (38) | | 0.75 (19) | 0.25 (6.3) | 9007RA11 | 0.05 (0.12) |
| Lever arm with nylon roller | | | | | |
| 1.5 (38) | | 0.75 (19) | 0.25 (6.3) | 9007RA18 | 0.05 (0.12) |
| Lever arm with ball bearing roller | | | | | |
| 1.5 (38) | | 0.69 (17.5) | 0.25 (6.3) | 9007RA9 | 0.05 (0.12) |
| Lever arm with rod type | | | | | |
| 5 (127) | | — | — | 9007FA2 | 0.05 (0.12) |
| One-way cast zinc roller lever arm | | | | | |
| Arm | | Roller | | Catalog number | Weight kg (lb) |
| Length (a) in. (mm) | | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| Cast arm with steel roller | | | | | |
| 1.38 (35) | | 1.25 (32) | 0.25 (6.3) | 9007BA3 | 0.07 (0.15) |
| 1.5 (38) | | 1.25 (32) | 0.25 (6.3) | 9007MA3 | 0.10 (0.23) |
| 2 (51) | | 1.25 (32) | 0.25 (6.3) | 9007CA3 | 0.12 (0.27) |
| 2.5 (63.5) | | 1.25 (32) | 0.25 (6.3) | 9007DA3 | 0.12 (0.27) |
| 3 (76) | | 1.25 (32) | 0.25 (6.3) | 9007EA3 | 0.13 (0.29) |
| Flat steel arm with steel roller | | | | | |
| 1.38 (35) | | 1.25 (32) | 0.25 (6.3) | 9007BA3S | 0.07 (0.15) |
| 2 (51) | | 1.25 (32) | 0.25 (6.3) | 9007CA3S | 0.10 (0.23) |
| 2.5 (63.5) | | 1.25 (32) | 0.25 (6.3) | 9007DA3S | 0.12 (0.27) |
| 3 (76) | | 1.25 (32) | 0.25 (6.3) | 9007EA3S | 0.13 (0.29) |
| Offset type cast zinc lever arm | | | | | |
| Offset lever arm | | Roller | | Catalog number | Weight kg (lb) |
| Length in. (mm) | Offset | Diameter in. (mm) | Width in. (mm) | | |
| Offset cast zinc arm with steel roller | | | | | |
| 2 (51) | 0.44 (11) | 0.63 (16) | 0.25 (6.3) | 9007KA1 | 0.04 (0.08) |
| | | 0.63 (16) | 0.63 (16) | 9007KA2 | 0.04 (0.08) |
| | | 0.75 (19) | 0.25 (6.3) | 9007KA11 | 0.04 (0.09) |
| | | 0.75 (19) | 0.63 (16) | 9007KA12 | 0.05 (0.12) |
| 1.5 (38) | 0.88 (22) | 0.75 (19) | 0.25 (6.3) | 9007KB11 | 0.04 (0.10) |
| | | 0.75 (19) | 0.25 (6.3) | 9007KB15 | 0.04 (0.10) |
| Offset cast zinc arm with ball bearing roller | | | | | |
| 2 (51) | 0.44 (11) | 0.69 (17.5) | 0.25 (6.3) | 9007KA9 | 0.04 (0.10) |
| Offset cast zinc arm with nylon roller | | | | | |
| 2 (51) | 0.44 (11) | 0.75 (19) | 0.25 (6.3) | 9007KA18 | 0.04 (0.10) |
| | | 0.75 (19) | 1 (25.4) | 9007KA21 | 0.04 (0.10) |

Dimensions:
page 197

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Lever Arms for Rotary Heads



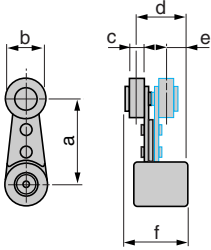
| Adjustable length lever arm | | | | |
|---|-----------------------|--------------------|----------------|----------------|
| Lever arm | Roller | | Catalog number | Weight kg (lb) |
| Dimensions length (a) in. (mm) | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| Adjustable length arm with steel roller | | | | |
| Non-bendable, adjustable from 0.88 (22) to 4 (101) | 0.63 (16) | 0.25 (6.3) | 9007HA1 | 0.05 (0.12) |
| | 0.63 (16) | 0.63 (16) | 9007HA2 | 0.07 (0.14) |
| Bendable, adjustable from 0.88 (22) to 4 (101) | 0.63 (16) | 0.25 (6.3) | 9007HA5 | 0.06 (0.14) |
| | 0.63 (16) | 0.63 (16) | 9007HA6 | 0.04 (0.18) |
| Adjustable length arm with nylon roller | | | | |
| Non-bendable, adjustable from 0.88 (22) to 4 (101) | 0.63 (16) | 0.25 (6.3) | 9007HA4 | 0.05 (0.12) |
| | 1 (25.4) | 0.63 (16) | 9007HA22 | 0.06 (0.13) |
| Bendable, adjustable from 0.88 (22) to 4 (101) | 0.63 (16) | 0.25 (6.3) | 9007HA8 | 0.06 (0.14) |
| | 1.0 (16) | 0.63 (16) | 9007HA23 | 0.07 (0.16) |
| | 2 (51) | 0.25 (6.3) | 9007HA26 | 0.08 (0.17) |
| Adjustable length arm with ball bearing roller | | | | |
| Non-bendable, adjustable from 0.88 (22) to 4 (101) | 0.69 (17.5) | 0.25 (6.3) | 9007HA24 | 0.06 (0.13) |
| Bendable, adjustable from 0.88 (22) to 4 (101) | 0.69 (17.5) | 0.25 (6.3) | 9007HA25 | 0.07 (0.16) |
| Adjustable length arm with ball Delrin® roller | | | | |
| Bendable, adjustable from 0.88 (22) to 4 (101) | 1.63 (41) | 0.25 (6.3) | 9007HA20 | 0.07 (0.16) |
| Adjustable length arm with rubber tire roller | | | | |
| Bendable, adjustable from 0.88 (22) to 4 (101) | 2.13 (54) | 0.5 (12.7) | 9007HA21 | 0.10 (0.22) |
| Adjustable length arm without roller | | | | |
| Non-bendable, adjustable from 0.88 (22) to 4 (101) | — | — | 9007HA0 | 0.15 (0.33) |
| Bendable, adjustable from 0.88 (22) to 4 (101) | — | — | 9007HA9 | 0.11 (0.25) |
| Rod type lever arm | | | | |
| Description | Length in. (mm) | | Catalog number | Weight kg (lb) |
| Rod | | | | |
| Stainless steel rod | 10 (254) | | 9007FA1 | 0.07 (0.15) |
| Spring rod, steel | 12 (304) | | 9007FA3 | 0.07 (0.15) |
| Spring rod, Delrin® | 12 (304) | | 9007FA5 | 0.07 (0.15) |
| Looped Delrin rod arm | — | | 9007FA6 | 0.05 (0.11) |
| 90° forked rod | | | | |
| Spring rods, steel | 2.5 (63.5) | | 9007LA19 | 0.06 (0.13) |

Dimensions:
page 197

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal

Lever Arms for Rotary Heads



a: Length of lever Arm
 b: Roller diameter
 c: Roller width
 d, e: see page 197

| 360° angular adjustable lever arm | | | | | |
|--|------------------------|--------------------------|-----------------------|----------------|----------------|
| 360° angular adjustable lever arm | | Roller | | Catalog number | Weight kg (lb) |
| Length (a) in. (mm) | Roller (1) position | Diameter (b) in. (mm) | Width (c) in. (mm) | | |
| Lever arms with steel roller | | | | | |
| 0.88 (22) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007AA1M | 0.09 (0.20) |
| | Roller inside | 0.63 (16) | 0.25 (6.3) | 9007AA5M | 0.09 (0.20) |
| 1.38 (35) | Roller outside | 0.75 (19) | 0.25 (6.3) | 9007AA11M | 0.09 (0.20) |
| | Roller inside | 0.63 (16) | 0.25 (6.3) | 9007BA1M | 0.09 (0.22) |
| 1.5 (38) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007BA5M | 0.10 (0.22) |
| | Roller inside | 0.75 (19) | 0.25 (6.3) | 9007BA11M | 0.10 (0.22) |
| 2 (51) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007MA1M | 0.11 (0.24) |
| | Roller inside | 0.63 (16) | 0.25 (6.3) | 9007MA5M | 0.11 (0.24) |
| 2.5 (63.5) | Roller outside | 0.75 (19) | 0.25 (6.3) | 9007MA11M | 0.11 (0.24) |
| | Roller inside | 0.63 (16) | 0.25 (6.3) | 9007CA1M | 0.11 (0.24) |
| 3 (76) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007CA5M | 0.11 (0.24) |
| | Roller inside | 0.75 (19) | 0.25 (6.3) | 9007CA11M | 0.11 (0.25) |
| 2.5 (63.5) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007DA1M | 0.11 (0.25) |
| | Roller inside | 0.63 (16) | 0.25 (6.3) | 9007DA5M | 0.12 (0.27) |
| 3 (76) | Roller outside | 0.75 (19) | 0.25 (6.3) | 9007DA11M | 0.12 (0.27) |
| | Roller inside | 0.63 (16) | 0.25 (6.3) | 9007EA1M | 0.12 (0.27) |
| 3 (76) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007EA5M | 0.12 (0.27) |
| | Roller inside | 0.75 (19) | 0.25 (6.3) | 9007EA11M | 0.13 (0.29) |
| Lever arms with nylon roller | | | | | |
| 0.88 (22) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007AA8M | 0.09 (0.20) |
| | | 0.75 (19) | 0.25 (6.3) | 9007AA18M | 0.09 (0.20) |
| 1.38 (35) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007BA8M | 0.11 (0.25) |
| | | 0.75 (19) | 0.25 (6.3) | 9007BA18M | 0.11 (0.25) |
| 1.5 (38) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007MA8M | 0.10 (0.23) |
| | | 0.75 (19) | 0.25 (6.3) | 9007MA18M | 0.11 (0.25) |
| 2 (51) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007CA8M | 0.12 (0.27) |
| | | 0.75 (19) | 0.25 (6.3) | 9007CA18M | 0.12 (0.27) |
| 2.5 (63.5) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007DA8M | 0.12 (0.27) |
| | | 0.75 (19) | 0.25 (6.3) | 9007DA18M | 0.12 (0.27) |
| 3 (76) | Roller outside | 0.63 (16) | 0.25 (6.3) | 9007EA8M | 0.12 (0.26) |
| | | 0.75 (19) | 0.25 (6.3) | 9007EA18M | 0.12 (0.27) |
| Lever arms with ball bearing roller | | | | | |
| 0.88 (22) | Roller outside | 0.69 (17.5) | 0.25 (6.3) | 9007AA9M | 0.10 (0.23) |
| 1.38 (35) | Roller outside | 0.69 (17.5) | 0.25 (6.3) | 9007BA9M | 0.11 (0.24) |
| 1.5 (38) | Roller outside | 0.69 (17.5) | 0.25 (6.3) | 9007MA9M | 0.19 (0.26) |
| 2 (51) | Roller outside | 0.69 (17.5) | 0.25 (6.3) | 9007CA9M | 0.19 (0.26) |
| 2.5 (63.5) | Roller outside | 0.69 (17.5) | 0.25 (6.3) | 9007DA9M | 0.12 (0.27) |
| 3 (76) | Roller outside | 0.69 (17.5) | 0.25 (6.3) | 9007EA9M | 0.13 (0.28) |

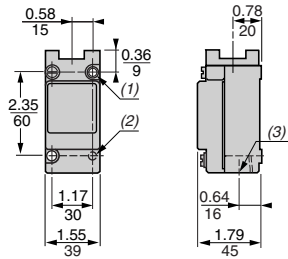
1. Roller can be changed in the field from roller outside to roller inside position or vice versa.

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Bodies and Heads, Dimensions

Body

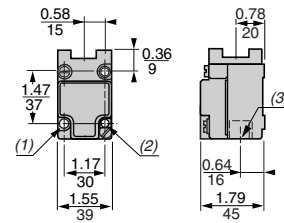
Standard



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

- 2 x 0.20/5 x 0.22/6 HLS.
- 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
- 1/2 14 NPT.

Compact

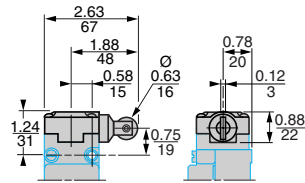


Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

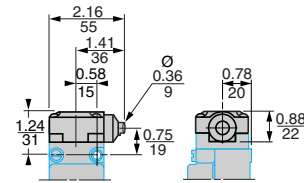
- 2 x 0.20/5 HLS.
- 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
- 1/2 14 NPT.

Side plunger heads

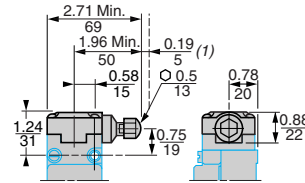
9007F



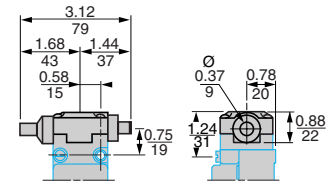
9007G



9007GD

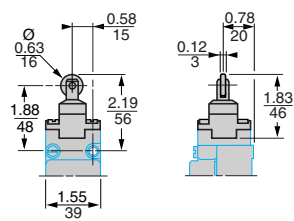


9007H

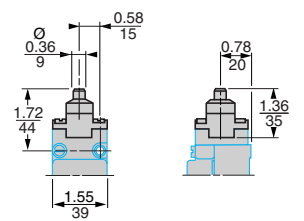


Top plunger heads

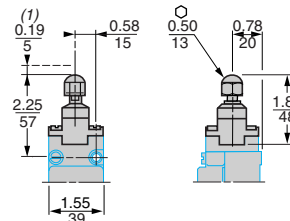
9007D



9007E



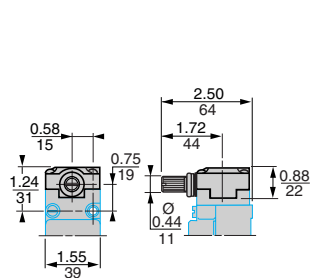
9007ED



1. Adjustable

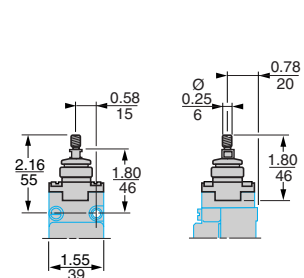
Rotary heads

9007C

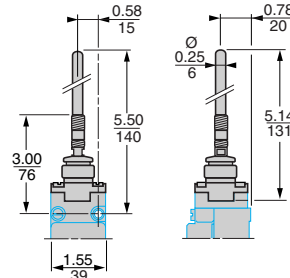


Multi-directional heads

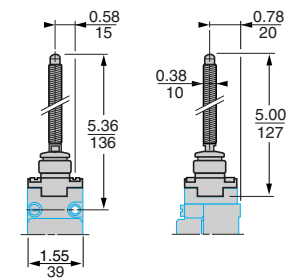
9007JKC



9007J

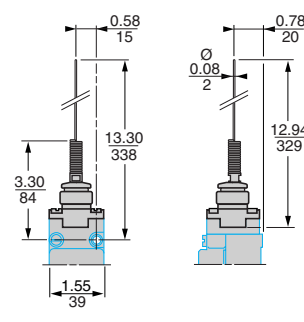


9007KC

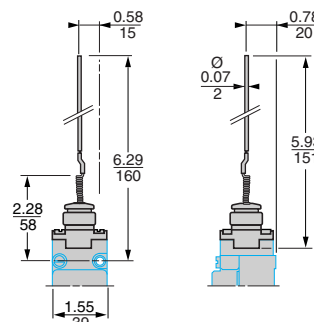


Multi-directional heads (continued)

9007K



9007L



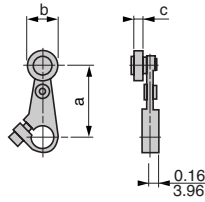
Catalog numbers:
pages 188 and 189

Limit Switches

9007C Heavy Duty Industrial—Plug-in Body, Metal Lever Arms for Rotary Heads, Dimensions

Lever arms

9007AA**, BA**, CA**, DA**, EA**, FA**, KA**, LA**, MA**, RA**

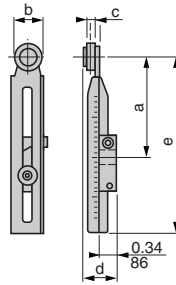


a: Length of lever Arm
b: Roller diameter
c: Roller width

a, b, c: pages 190 to 193

Adjustable length lever arms

9007HA* and 9007HA***

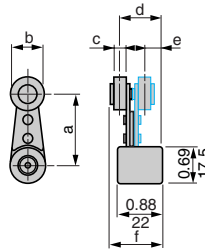


a: Length of lever arm
b: Roller diameter
c: Roller width
d = 0.38/10
e = 4.38/111

a, b, c: page 194

360° angular adjustable lever arms

9007AA**M, 9007BA**M, 9007CA**M, 9007DA**M, 9007EA**M, 9007MA**M



a: Length of lever Arm
b: Roller diameter
c: Roller width
d = 0.84/21
e = 0.38/10
f = 1.05/27

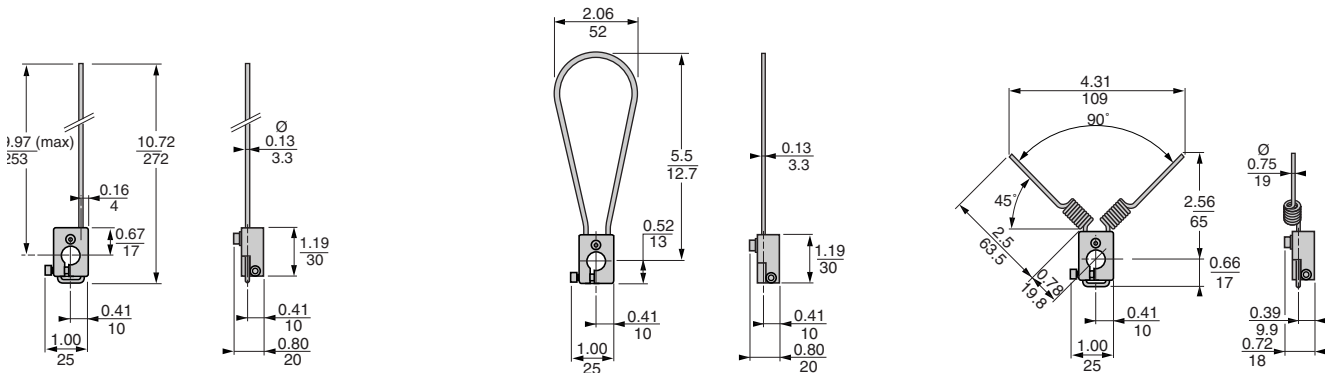
a, b, c: page 195

Rod type lever arms

9007FA1

9007FA6

9007LA19



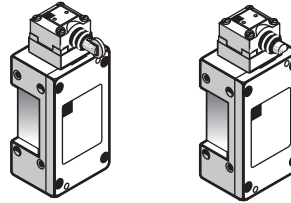
Catalog numbers:
pages 190 to 195

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location

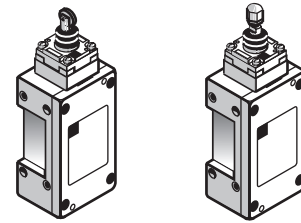
Hazardous Non-Plug-in Body Type (1)

With head for linear movement
side plunger



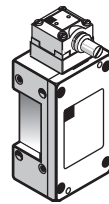
Page 200

top plunger



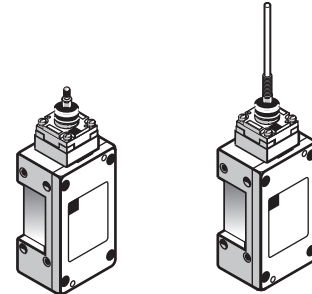
Page 201

With head for rotary movement (lever)



Page 202

With head for multi-directional movement



Page 203

1. Factory modifications: see pages 176 to 180.

Application Information—Hazardous Locations

Classification of hazardous locations

Hazardous locations are those areas that **may** have flammable gases or combustible dusts present in quantities sufficient to produce an explosive or ignitable mixture. These gases, dusts, may always be present or may only be present in abnormal situations. The National Electrical Code (NEC) describes these areas in Articles 500 through 503 and divides them into three types of categories: Class, Group, Division.

- **Classes**

The *Classes* (I, II, III) differentiate between the type of hazardous materials: I is for gases, II is for dusts, and III is for fibers.

- **Groups**

The *Groups* (A, B, C, D, E, F, and G) further subdivide each class according to the relative explosive force of the materials. Group A atmosphere is acetylene which has a higher explosive force than Group B (which may contain hydrogen, for example); and Group B has a higher explosive force than Group D, etc.

- **Divisions**

The *Divisions* (1 and 2) refer to the presence of these hazardous gases and dusts. Division 1 areas can have these gases or dusts present **at all times** under **normal operating conditions** in an ignitable concentration. Division 2 areas **only** have **ignitable concentrations** of dusts or gases present during **abnormal conditions**, such as machine failures or container breakage.

The table below summarizes the classifications described above.

Summary of Classification Chart

| Class | Division | Group |
|-------------|--|--|
| I. Gas | 1. Hazard May Exist May Exist In Atmosphere Under Normal Operating Conditions | A. Acetylene B. Manufactured Gases Containing Hydrogen C. Petrochemicals (e.g. ethylene) D. Petrochemicals (e.g. alcohol) |
| | 2. Potential Hazard A. May be present in atmosphere only under abnormal circumstances. | A. Acetylene B. Manufactured Gases Containing Hydrogen C. Petrochemicals (e.g. ethylene) D. Petrochemicals (e.g. alcohol) |
| II. Dust | 1. Hazard May Exist May Exist In Atmosphere Under Normal Operating Conditions | E. Conductive and Combustible Dust (Resistivity $\leq 10^5$ ohms/cm) F. Carbonaceous Dusts (Resistivity $> 10^2$ ohm/cm but < 108 ohm/cm) G. Non-Conductive Combustible Dust (Resistivity $> = 105$ ohms/cm) |
| | 2. Potential Hazard A. May be present in atmosphere only under abnormal circumstances. | G. Non-Conductive Combustible Dust (Resistivity $> = 105$ ohms/cm) |
| III. Fibers | 1. Production Areas | Easily Ignitable Fibers |
| | 2. Handling and Storage Areas | Easily Ignitable Fibers |

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location

| Environmental characteristics | | |
|---|-------------------------------|---|
| Conforming to standards | Products | NEMA 250, EN 60947-1, EN 60947-5-1, IEC 60947, UL 508, C22-2-14-95, CE conformity documentation |
| | Machine assemblies | IEC 60204-1 |
| Product certifications | | UL, CSA, CE |
| Protective treatment | | Epoxy powder coat |
| Ambient air temperature (Lever/rotary head) | Operation | -20...+185 °F (-29...+85 °C), wider range available |
| | Storage | -20...+185 °F (-29...+85 °C), wider range available |
| Vibration resistance | Conforming to IEC 60068-2-6 | 25 gn (10...150 Hz, 11 ms) (C86F switch good for 18.5g only) |
| Shock resistance | Conforming to IEC 60068-2-27 | 60 gn (9 ms) 40 gn (9 ms) for reed switch |
| | | |
| Electric shock protection | Conforming to IEC 61140 | Class 0 |
| Degree of protection | Conforming to IEC 60529 | IP 67 |
| Cable entry or connector | Depending on model | 1/2-14 NPT, M20 X 1.5, ISO cable entry, 5-pin mini connector, 4-pin micro connector |
| Materials | Bodies, heads, levers | Bodies in aluminum, heads in Zamak® zinc alloy, levers and rods in zinc, steel, stainless steel, Delrin® resin. |
| Contact block characteristics | | |
| Rated operational characteristics hard contacts -AC Voltage | 9007CR53 (single pole) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CR61 (two pole) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CR65 (two pole two stage) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| | 9007CR67 (two pole neutral) | NEMA A600 (Ue = 600 V, Ie = 1.2 A); Ithe = 10 A |
| Rated operational characteristics hard contacts -DC Voltage | 9007CR53 (single pole) | NEMA Q600 (Ue = 600 V, Ie = 0.1 A); Ithe = 2.5 A |
| | 9007CR61 (two pole) | NEMA R300 (Ue = 250 V, Ie = 0.11 A); Ithe = 1.0 A |
| | 9007CR65 (two pole two stage) | NEMA R300 (Ue = 250 V, Ie = 0.11 A); Ithe = 1.0 A |
| | 9007CR67 (two pole neutral) | NEMA R300 (Ue = 250 V, Ie = 0.11 A); Ithe = 1.0 A |
| Rated insulation voltage | | 600 V |
| Rated Impulse Withstand Voltage | | 2,500 Vac for 1 minute for CE; 2,200 Vac for 1 minute for UL; and 2,640 Vac for 1 s for CSA |
| Positive Opening | Special Y1561 | Special Y1561 (one pole slow break only) ⊖ |
| Short Circuit Protection | | 10 A. Bussman Class CC KTK-R-10 fuse non-time-delay |
| Terminal wire sizes (Cabling/Screw Clamp) | | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum |
| Maximum Actuation Speed | | 50fpm / 90fpm (15.2 m/min / 27.4 m/min) with 45 degree cam angle, levers only |
| Electrical Durability | | 1 million operating cycles |

Types of contact elements

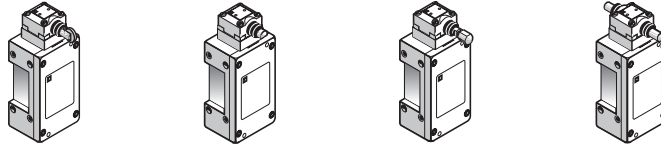
| IEC 60947-5-1 | | | NEMA | | | JIS | | |
|---------------|--------|-----------------------|------|--------|----------------------|------|--------|--------------|
| Form | Symbol | Description | Form | Symbol | Description | Form | Symbol | Description |
| A | | Single break | A | | — | 3 | | — |
| X | | — | | | | | | Double break |
| B | | Single break | B | | — | 2 | | — |
| Y | | — | | | | | | Double break |
| C | | — | C | | — | 1 | | Single break |
| Za | | Same polarity | Z | | "Same polarity" only | | | Double break |
| Zb | | Electrically separate | | | | | | Double break |

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location

Type of head **Side Plunger (mounting by the body)**

Hazardous location non-plug-in body type



| | | | | |
|-------------------------|---|-------------------------------------|--|--|
| Type of operator | Side roller plunger spring return vertical roller (1) | Side push rod plunger spring return | Side push rod plunger adjustable (2) spring return | Side push rod plunger maintained contact |
|-------------------------|---|-------------------------------------|--|--|

Catalog numbers

| | | | | |
|--|----------------------|----------------------|-----------------------|----------------------|
| 1 N.O. 1 N.C. snap action | 9007CR53F | 9007CR53G | 9007CR53GD | 9007CR53H |
| 2 N.O. 2 N.C. snap action | 9007CR61F | 9007CR61G | 9007CR61GD | 9007CR61H |
| 2 N.O. 2 N.C. Two stage snap action | 9007CR65F | 9007CR65G | 9007CR65GD | |
| Weight, kg (lb) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) |

| | |
|--------------------------|--|
| Contact operation | |
|--------------------------|--|

Characteristics (nominal operating data)

| | |
|--|--|
| Switch actuation | On end |
| Type of actuation | |
| Pre-travel | 2 mm (0.08 in.) 3.6 mm (0.14 in.) |
| Pre-travel two Stage | First stage: 2 mm (0.08 in.) First stage to second stage: 0.5 mm (0.02 in.) |
| Total travel | 6.3 mm (0.25 in.) |
| Differential | 0.8 mm (0.03 in.) |
| Reverse overtravel | — |
| Minimum force or torque 1 pole & 2 pole | 4 lb (17.8 N) 7 lb (31.1 N) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum |
| Repeatability (linear travel of cam) | 0.03 mm (0.001 in.) — |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry |

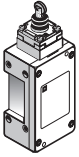
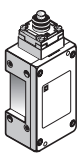
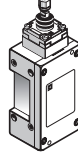
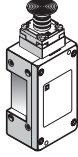
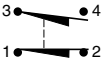
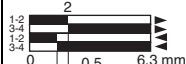
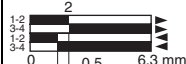


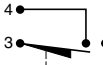



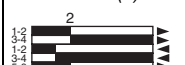
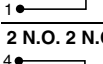
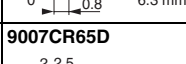
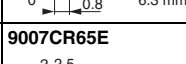
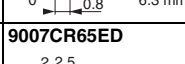
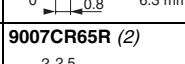



1. Can be converted to horizontal roller type in the field. To order horizontal roller version add the letter H at the end of the equivalent vertical roller version type.
2. To lock the nut in the desired position, crimp the slot near the bottom of the nut.

Limit Switches

Dimensions:
pages 204 and 205

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location

| Type of head | Top Plunger (mounting by the body) | | | |
|--|---|--|--|---|
| Hazardous location non-plug-in body type |  |  |  |  |
| Type of operator | Top roller plunger spring return | Top push rod plunger spring return | Top push rod plunger adjustable (1) spring return | Palm operated (2) |
| Catalog numbers | | | | |
| 1 N.O. 1 N.C. snap action  | 9007CR53D  | 9007CR53E  | 9007CR53ED  | 9007CR53R (2)  |
| 2 N.O. 2 N.C. snap action  | 9007CR61D  | 9007CR61E  | 9007CR61ED  | 9007CR61R (2)  |
| 2 N.O. 2 N.C. Two stage snap action  | 9007CR65D  | 9007CR65E  | 9007CR65ED  | 9007CR65R (2)  |
| Weight, kg (lb) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) |
| Contact operation |  contact closed  contact open | | | |
| Characteristics (nominal operating data) | | | | |
| Switch actuation | On end | | | |
| Type of actuation |  | | | |
| Pre-travel | 2 mm (0.08 in.) | | | |
| Pre-travel two Stage | First stage | 2 mm (0.08 in.) | | |
| | First stage to second stage | 0.3 mm (0.01 in.) | | |
| Total travel | 6.3 mm (0.25 in.) | | | |
| Differential | 0.5 mm (0.02 in.) | | | |
| Reverse overtravel | — | | | |
| Minimum force or torque | 1 pole & 2 pole | 3 lb (13.3 N) | | 7 lb (31.1 N) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | |
| Repeatability (linear travel of cam) | 0.03 mm (0.001 in.) | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | |

- To lock the nut in the desired position, crimp the slot near the bottom of the nut.
- Does not include mushroom button. Must be ordered separately see page 189.

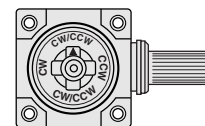
Dimensions:
pages 204 and 205

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location

| Type of head | Rotary (lever arm type) (1) | | | | | |
|---|--|--------------------------------|------------------------|-----------------------|--------------------------------------|-----------------------|
| Hazardous location non-plug-in body type | | | | | | |
| Type of operator | Standard pre-travel spring return | Low differential spring return | Neutral position | | Light operating torque spring return | Maintained contact |
| Type of direction | CW & CCW (2) | CW & CCW (2) | CW & CCW | CW & CCW | CW & CCW (2) | CW (trip) CCW (reset) |
| Catalog numbers | | | | | | |
| 1 N.O. 1 N.C. snap action | 9007CR53B2 | 9007CR53A2 | | | 9007CR53N2 | 9007CR53C |
| 2 N.O. 2 N.C. snap action | 9007CR61B2 | 9007CR61A2 | | | 9007CR61N2 | 9007CR61C |
| 2 N.O. 2 N.C. snap action Neutral position | | | 9007CR67T10 | 9007CR67T5 | | |
| 2 N.O. 2 N.C. two stage snap action | 9007CR65B2 | 9007CR65A2 | | | 9007CR65N2 | |
| Weight, kg (lb) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) |
| Contact operation | ■ contact closed | | □ contact open | | | |
| Characteristics (nominal operating data) | | | | | | |
| Switch actuation | By 30° cam | | | | | |
| Type of actuation | | | | | | |
| Pre-travel | 10° | 5° | 10° | 5° | 10° | 45° |
| Pre-travel two stage | | | | | | |
| First stage | 10° | 5° | — | — | 10° | — |
| First stage to second stage | 2.5° | 1.5° | — | — | 2.5° | — |
| Total travel | 90° | | | | | 90° |
| Differential | 4° | 2° | 4° | 2° | 4° | — |
| Reverse overtravel | 90° | | | | | — |
| Operating torque/force 1 pole & 2 pole | 4 lb-in (0.45 N•m) | | | | 25 oz-in (0.18 N•m) | 3 lb-in (0.34 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | | | |
| Repeatability (linear travel of cam) | 0.05 mm (± 0.002 in.) | 0.03 mm (± 0.001 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) | 0.05 mm (± 0.002 in.) |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | | | |

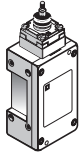
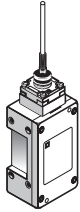
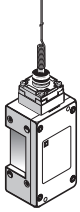
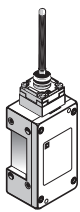
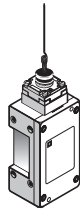
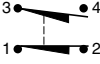
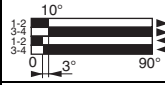
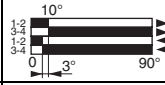
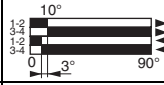
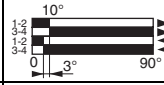
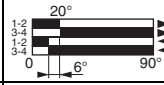
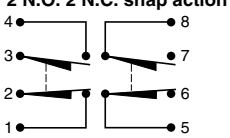
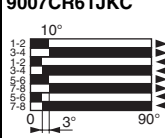
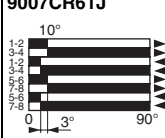
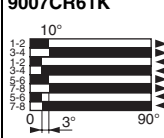
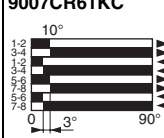
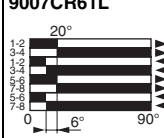
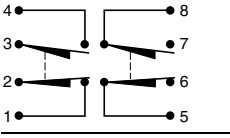
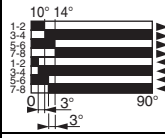
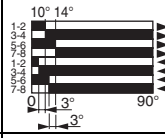
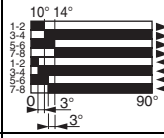
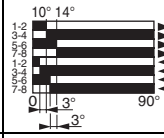
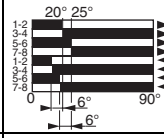



- Lever arm type must be ordered separately from page 190 to 193.
- These devices are factory set to operate the contacts in **both** the CW and CCW directions. **Mode of operation** is field convertible to CW only or CCW only.
To order factory converted devices: For CCW only operation, change the 2 at the end of the Type number to 1 (for example: C54B2 becomes C54B1). For CW only operation, delete the 2 at the end of the Type number (for example, C54B2 becomes C54B).
 Mode of operation of the lever arm is easily convertible to clockwise or both.
 Simply pull out and rotate the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW.



Dimensions:
pages 204 and 205

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location

| Type of head | Flexible operator (wobble stick) | | | | |
|--|--|--|---|---|--|
| Hazardous location non-plug-in body type |  |  |  |  |  |
| Type of operator | Universal (1) | Wobble stick Delrin® extension (1) | Wobble stick wire extension (1) | Wobble stick coil spring extension (1) | Cat whisker |
| Catalog numbers | | | | | |
| 1 N.O. 1 N.C. snap action  | 9007CR53JKC  | 9007CR53J  | 9007CR53K  | 9007CR53KC  | 9007CR53L  |
| 2 N.O. 2 N.C. snap action  | 9007CR61JKC  | 9007CR61J  | 9007CR61K  | 9007CR61KC  | 9007CR61L  |
| 2 N.O. 2 N.C. Two stage snap action  | 9007CR65JKC  | 9007CR65J  | 9007CR65K  | 9007CR65KC  | 9007CR65L  |
| Weight, kg (lb) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) | 1.020 (2.25) |
| Contact operation |  contact closed  contact open | | | | |
| Characteristics (nominal operating data) | | | | | |
| Switch actuation | By any moving object from any direction | | | | |
| Type of actuation |  | | | | |
| Pre-travel | 10° (any direction) | | | | 20° |
| Pre-travel two-stage | 10° (any direction) | | | | 20° |
| First stage | 10° (any direction) | | | | 20° |
| First stage to second stage | 4° | | | | 5° |
| Total travel | 90° | | | | |
| Differential | 3 | | | | 6° |
| Reverse overtravel | — | | | | |
| Operating torque/force 1 pole & 2 pole | 3 lb-in (0.34 N•m) | | | | 7 oz-in (0.05 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | 1 or 2, 12–22 AWG (2.05–0.644 mm ²) wires maximum | | | | |
| Repeatability (linear travel of cam) | — | | | | |
| Cable entry | 1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry | | | | |

1. Wobble stick extensions are available separately for the universal head or as replacements for complete devices (see page 189)

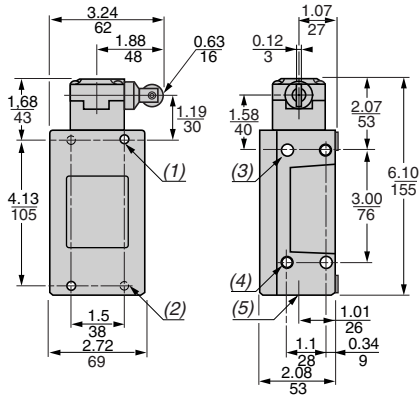
Dimensions:
pages 204 and 205

Limit Switches

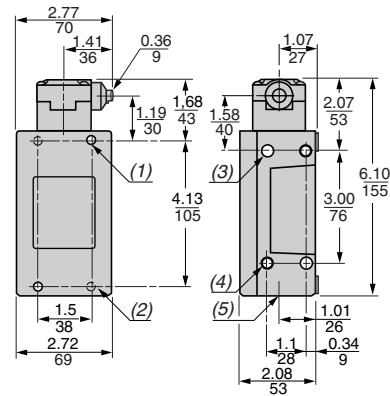
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location—Dimensions

Side Plunger

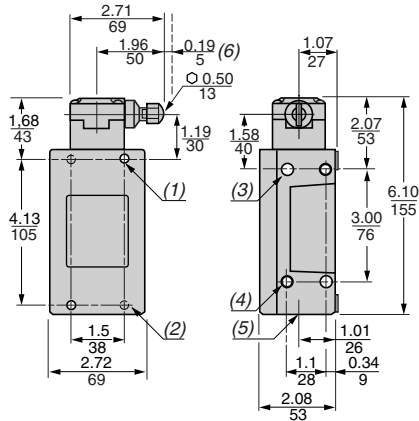
9007C••F



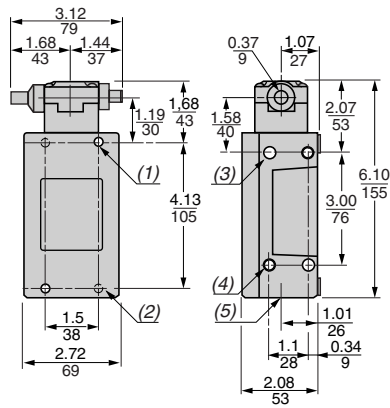
9007C••G



9007C••GD



9007C••H

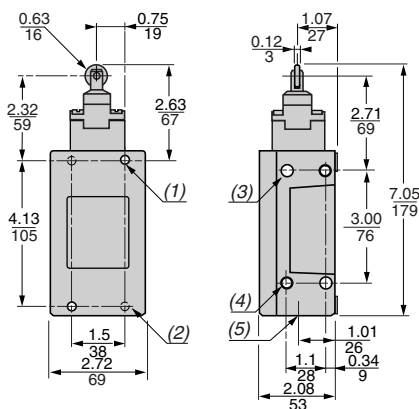


1. 2 x 0.277, front Mtg. holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 3/4 NPT.
6. Adjustable.

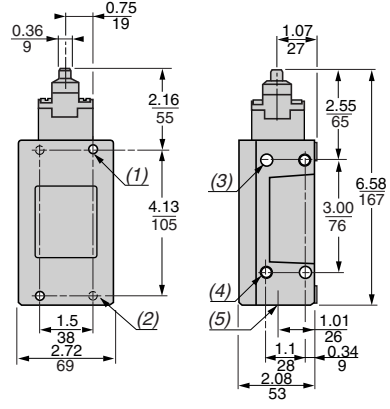
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Top Plunger

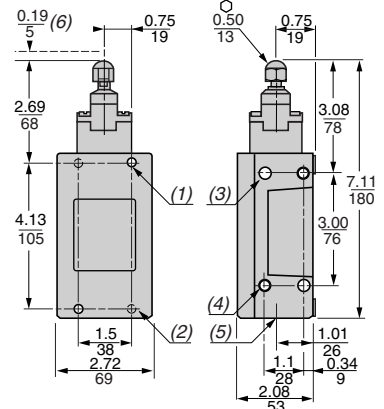
9007C••D



9007C••E



9007C••ED



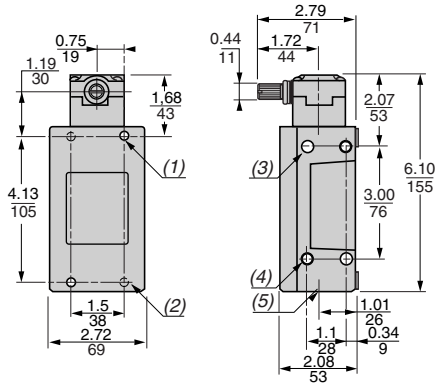
1. 2 x 0.277, front Mtg. holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 3/4 NPT.
6. Adjustable.

Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Limit Switches

9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location—Dimensions

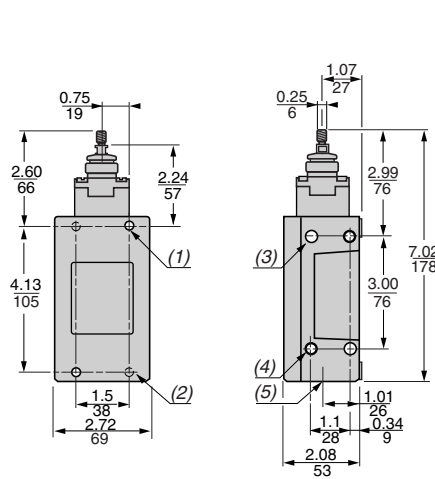
Rotary
9007C***



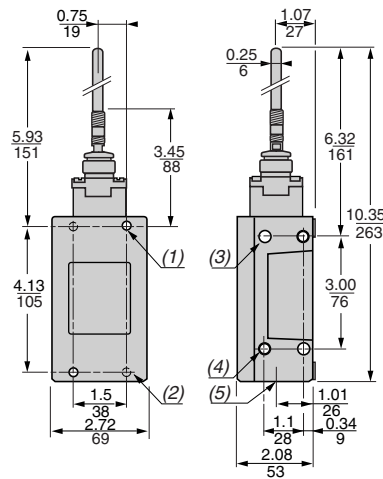
1. 2 x 0.2777, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.2677 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 1/4 NPT.

Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

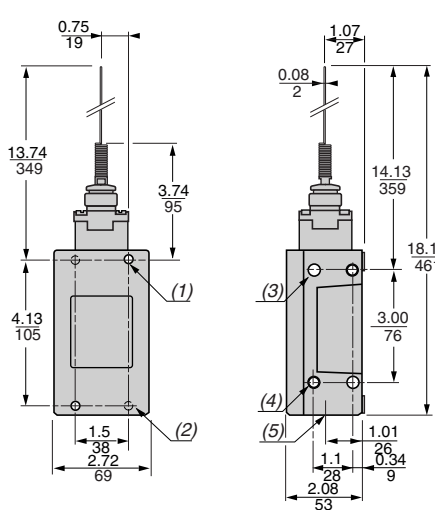
Wobble stick
9007C**JKC



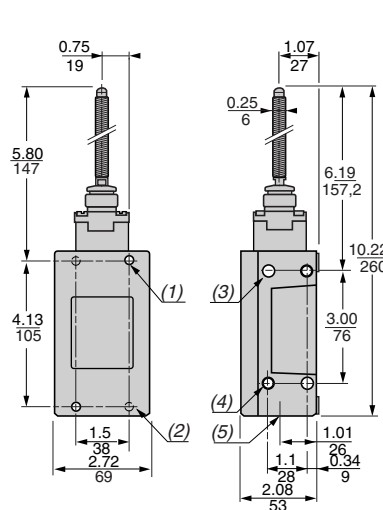
9007C**J



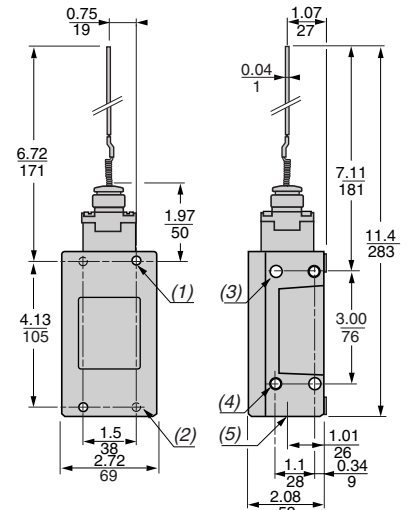
9007C**K



9007C**KC



9007C**L



1. 2 x 0.2777, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.2677 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 1/4 NPT.

Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Limit Switches

Limit Switches

9007C Heavy Duty Industrial

Technical Information

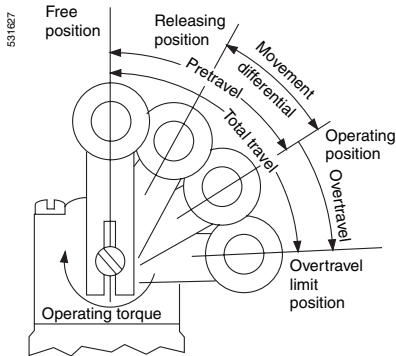


Figure 1: Rotary lever type

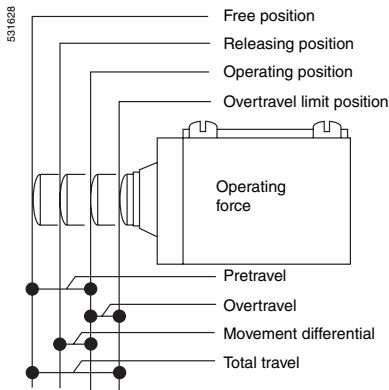


Figure 2: Linear (or Plunger) type

Glossary

CCW—Counterclockwise only (for lever types).

CW—Clockwise only (for lever types).

Differential—The movement differential or differential is the distance or angle from the operating position to the releasing position.

Free or normal position—Free or normal position is the initial position of the actuator when there is no external force (other than gravity) applied on the actuator.

Neutral position—Lever operated switch with a minimum of two contacts. One contact changes state only when lever moves CW. The second contact changes state only when the lever moves CCW. (The center position is the free position.)

Operating position—Operating position is the position of the actuator at which the contacts change state.

Overtravel—Overtravel is the distance or angle through which the actuator moves when traveling from the operating position to the overtravel limit position.

Pre-travel—Pre-travel is the distance or angle through which the actuator moves from the free position to the position at which the contacts change state, the operating position.

Release position—Release position is that position of the actuator at which the contacts change state from the operated contact position to the normal contact position.

Release torque—Release torque is the value to which the torque on the actuator must be reduced to allow the contacts to change state from the operated position to the normal contact position.

Actuator-lever—An actuator is the mechanism of the switch or enclosure which, when moved as intended, will operate the contacts.

Maintained contact limit switch—A maintained contact limit switch is a switch which remains in a given condition until actuated to another condition, which is also maintained until further actuation.

Momentary contact limit switch—A momentary contact limit switch is a switch which returns from the operated condition to its free or normal circuit condition when the actuating force is removed.

N.C.—Normally closed contact, when the switch mechanism is at its free or normal position.

N.O.—Normally open contact, when the switch mechanism is at its free or normal position.

Operating torque—Operating torque (force) is the minimum torque (force) value which must be applied to the actuator to cause the contacts to change state.

Overtravel limit position—Overtravel limit position is that position of the actuator beyond which further overtravel would cause damage to the switch or actuator.

Repeatability—Repeatability is the ability to consistently maintain the original operating characteristics. Measured by the difference between the operating position of a new switch and of the same after 1 million operations.

Total travel—Total travel is the sum of the pre-travel and overtravel.

Travel—Movement of the actuator from its free or normal position when force is applied. (See pre-travel and over travel.)

Limit Switches

9007C Heavy Duty Industrial

Technical Information

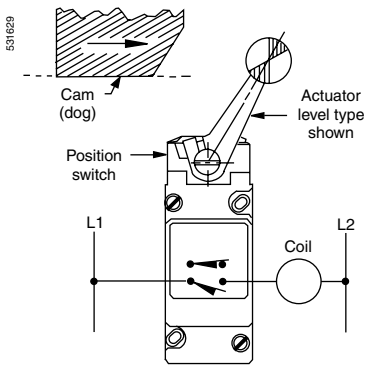


Figure 3—Limit switch

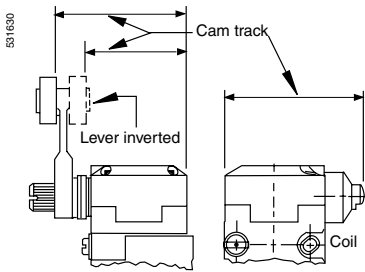


Figure 4—Cam track dimension

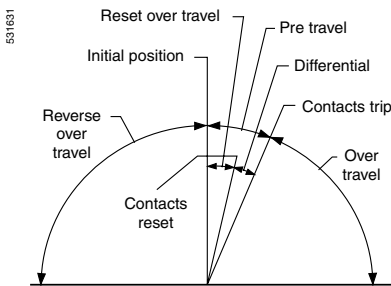


Figure 5—Contact travel

Glossary (continued)

Definition of limit switch terms

There are many terms common to position switches that are not used with other control devices. Before proceeding further, definitions of the commonly used terms should be understood as these terms will be used throughout this document.

Limit switch—A device that converts a mechanical motion into an electrical control signal.

Actuator—The mechanism of a limit switch that operates the contacts, i.e., lever arm, plunger, wobble stick.

Cam—A machine part or component that applies force to the switch actuator causing it to move as intended. Also known as “dog”.

Cam track dimension—The distance from the switch mounting surface to some point on the roller or actuator.

Differential—The distance that the limit switch actuator moves, from the trip point to the reset point of the contacts.

Direct-acting/positive opening contacts—Normally closed contacts that are moved directly by the operating shaft. They are slow make-slow break contacts and have a shorter life than snap action contacts due to longer arcing times. In general, these should only be used where movement of actuator must break welded contacts, as in a crane safety limit switch. (Snap action positive opening contacts are available in the Telemecanique® XCKJ limit switch.)

Maintained contacts—Contacts that remain in the tripped position until the return travel of the cam moves the switch actuator back and resets the contacts.

Neutral (free or normal) position limit switch—A lever arm type switch with two sets of contacts. One set operates when the shaft is rotated clockwise; the other operates when the shaft is rotated counterclockwise.

Operating force—The force required to move limit switch actuator to cause the contacts to change state.

Overtravel—The distance that the position switch actuator may move beyond the trip point, (see figure 5) without damage to the switch.

Pole—The number of moveable contacts in a switching mechanism. A single pole device may be 1 N.O., 1 N.C. or 1 N.O. and 1 N.C. with a single set of moveable contacts is used to bridge those stationary contacts. A double or two pole switch has two moveable contacts.

Positive break contacts—Normally closed contacts with a special mechanism to ensure opening. Can be snap acting positive break or direct acting slow make, slow break type. The slow break direct acting type is not recommended for high cycle applications due to shorter life.

Pre-travel—The distance that the limit switch actuator must move to trip the contacts.

Reed contacts—A mechanism consists of a set of contacts hermetically sealed in a glass envelope and actuated by a magnet attached to the operator. This sealed construction keeps contaminants out of the contact area, making the reed switch ideal for low voltage, low current circuits such as programmable controllers.

Reset point—The position of the actuator at which the contacts return to the normal position.

Snap action contacts—Contacts that move rapidly to open or closed position and are relatively independent of cam speed. Because of shorter arcing times, snap acting contacts have longer contact life than slow make and break contacts and should be used where fast moving cams are encountered or where good repeat accuracy is required.

Spring return—Contacts that return to their original position when the actuating force is removed.

Definition

Slow break contacts—The speed of transfer of the moveable contacts is dependent on the speed of the operator. The amount of travel of the moveable contacts is also dependent on the amount of travel by the operator. Slow make and break contacts have the same trip and reset points, and do not have the differential travel common to snap switches.

Snap action contacts—The speed of transfer of the moveable contacts is not dependent on the speed of the operator. The amount of travel of the moveable contacts is also not dependent on the amount of travel by the operator. The movement of the moveable contacts are determined by a preset travel, after this point is reached, the contacts will trip. Snap action contacts have different trip and reset points, the difference is identified as “differential.”

Flexible operators—Flexible resilient or elastic operators, i.e., wobble sticks, do not ensure direct opening/positive opening action.

Isolated contacts—Single-pole double-throw (SPDT) contacts with four terminals which have two isolated contact bars mechanically linked. No polarity restrictions apply. Different (isolated) power supplies can also be applied.

Same polarity—Single-pole double throw (SPDT) contacts with four terminals that require the supply to be applied with the same polarity (i.e., L1 or +) on the same side of the contact bar. Two different supplies are not allowed in this configuration. (The loads should always be on the same side of the contact bar.)

Direct opening contact (also known as positive opening contacts)—A normally closed contact element coupled with the switch actuator via a non-resilient (non-elastic) member so that full contact opening is obtained when the actuator is moved through the direct opening travel by applying a direct opening force. The contact element will shear open in the event of sticking contacts or broken springs. Proper fusing of the control circuit is required. Direct opening contacts meet IEC 60947-5-1 requirements.

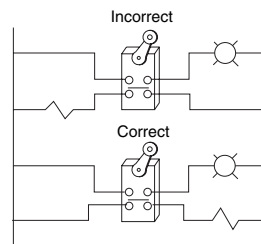
Direct opening travel (also known as positive opening travel)—Minimum travel from the actuator free position to the position where the direct opening operation is completed. Usually longer than the normal pre-travel.

Reed contacts—Contact mechanism consists of a set of contacts hermetically sealed in a glass envelope and actuated by a magnet attached to the operator. This sealed construction keeps contaminants out of the contact area, making the reed switch the ideal switch for low voltage, low current circuits such as programmable controllers.

NOTE: Because reed switches are operated by a magnet, they should not be installed in areas where strong magnetic fields may be present. The devices should always be checked for proper operation after installation.

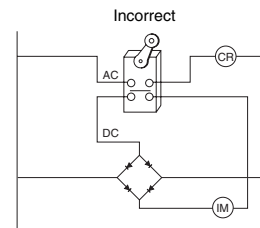
Polarity

Opposite polarities should not be connected to the contacts of one limit switch unless the limit switch is specifically designed for such service (isolated contacts—no polarity). See page 209.



Power sources

Power from different sources should not be connected to the contacts of one limit switch unless the switch is specifically designed for such service (isolated contacts—no polarity).



Limit Switches

9007C Heavy Duty Industrial

Technical Information

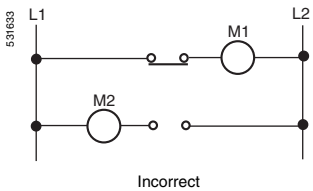
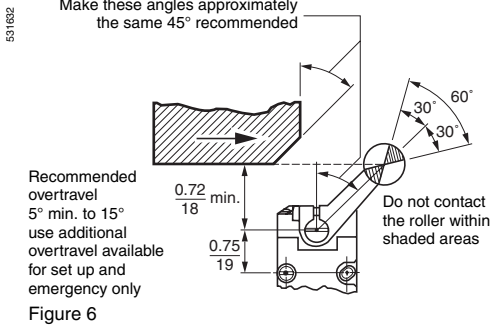


Figure 7—Contacts connected to opposite polarities. Line to line short (bold line) can occur through arc drawn when contacts operate

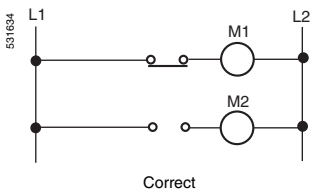


Figure 8—Contacts connected to same polarity. Line to line short cannot occur when contacts operate

Overriding Cams

The cam trailing edge on overriding cams must also be considered for maximum switch life (see figure 6). Lever arm snap back causes shock loads which reduce switch life. Also, with reversing cams the trailing edge becomes a leading edge on the return stroke. The overtravel of the limit switch should not be exceeded, but 5° minimum to 15° travel past the trip point is recommended. Additional travel should only be used for set up and emergencies. Cam design procedures for limit switches with other than lever arm actuators vary from switch type to switch type and are discussed along with other limit switch application design suggestions in additional literature "Proper Application of Limit Switches" (SM444).

Contacts

- Make sure the electrical load is within limit switch contact ratings.
- The single pole, double throw contacts of a snap switch used in a limit switch should not be used on opposite polarities. When load M1 is connected between the contact and line L2, and load M2 is connected between the other contact and line L1 (figure 7), a line-to-line short (bold line) can occur through the arc, which may be drawn as the contacts operate. When contacts are connected to the same polarity (figure 8), this line-to-line short cannot occur.
- The same result can occur if different power sources are connected to the single-pole, double-throw contacts of a snap switch.
- With limit switches having reed contacts, some form of transient protection should be used. This protects the small contacts from damaging surges and increases contact life.

Coolant

- When possible, avoid mounting limit switches where they will be constantly exposed to coolant, chips, etc. Although designed for such applications, switches last longer when not exposed to these contaminants.
- Make sure cover screws are tightened to ensure a good oiltight seal.
- When possible, avoid using fire-resistant coolants of the phosphate ester type. Equipment exposed to these coolants requires special seals and gaskets. Viton® fluoroelastomer, resistant to these types of coolants, is the standard shaft seal material on Type C lever arm types. If required, all gaskets, as well as boots on plunger types, can be furnished in Viton material.

Recommendations for Conduit Installation

Limit switch leakage is often traced to the conduit system. Coolant or condensation in the conduit line can enter the switch through the conduit entry. Oil tightness depends on the condition of the conduit connection and seal. Recommendations for installing conduit to position switches are as follows:

- To ensure an oiltight seal, use thread sealant and a conduit seal or a sealing bushing around the conduit fitting. Otherwise, the fitting probably will leak.
- Limit switches should be installed with the conduit end down whenever possible.
- If condensation or moisture is present inside the conduit, a Square D® conduit seal can be inserted into the conduit entry. The conduit fitting can then be connected in the normal manner. Thread sealant and a sealing bushing must still be used.
- Often a junction box fills with coolant and/or condensation, which backs up into the position limit through the conduit. A simple solution is to drill a hole in the bottom of the junction box to allow the liquid to drain out.
- If conduit leakage is severe, pre-wired and potted position limit (Forms Y184• and Y185•) should be used. The switches are pre-wired with either individual wires or multiconductor STOWA cord, and the receptacle is sealed with a potting material.
- The Square D limit switch is available with a pre-wired male plug receptacle. The connector provides an effective oiltight seal when used with the appropriate female connector cord.

Limit Switches

9007C Heavy Duty Industrial

Technical Information

Terminal Identification

European (IEC) contact terminals marking

| Single pole | Double pole | |
|-------------|----------------------|----------------------|
| | 1 st pole | 2 nd pole |
| 11-12 | 11-12 | 21-22 |
| 13-14 | 13-14 | 23-24 |
| 11-12 | 11-12 | 21-22 |
| 13-14 | 13-14 | 23-24 |

Each terminal is marked with 2 digits: First digit indicates the pole (circuit). The second digit indicates the type of contact:

_1-2 is N.C., _3-4 is N.O.

i.e.: 11-12, 21-22 are N.C. 13-14, 23-24 are N.O.

Example of European Terminal Markings:

For switch elements without isolated contacts:

11-12 Is the N.C. contact of pole No. 1, 13-14 Is the N.O. contact of pole No. 2

For switch elements with isolated contacts:

13-14 Is the N.O. contact of pole No. 1, 21-22 Is the N.C. contact of pole No. 2

Example of US Terminal Markings

| Single pole | Double pole | |
|-------------|----------------------|----------------------|
| | 1 st pole | 2 nd pole |
| 1-2 | 1-2 | 5-6 |
| 3-4 | 3-4 | 7-8 |
| 1-2 | 1-2 | 5-6 |
| 3-4 | 3-4 | 7-8 |

Each contact terminal is marked with one digit, i.e., 1-2, 3-4, 5-6,7-8.

Example of US Terminal Markings:

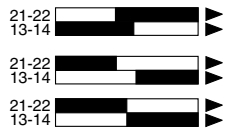
For most snap switch elements (isolated contacts not usually on US manufactured switches):

1-2 is the N.C. contact of pole No. 1,

3-4 is the N.O. contact of pole No. 1

5-6 is the N.C. contact of pole No. 2,

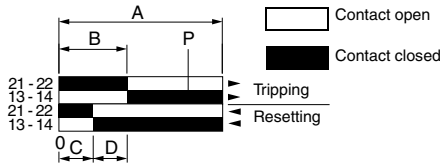
7-8 is the N.O. contact of pole No. 2



Make-before-break (overlapping) SPDT: the normally open contact closes before the normally closed contact opens.

Break-before-make (offset) SPDT: the normally closed contact opens before the normally open contact closes.

Simultaneous make and break SPDT: the normally closed contact opens at the same time as the normally open contact closes.



A = Maximum travel of the operator in mm or degrees.

B = Tripping travel of the contact.

C = Resetting travel of contact.

D = B-C = Differential travel.

P = Point from which positive opening is assured.

NOTE: The arrows indicate direction of actuation clockwise (CW) and return for simplicity reasons. For counterclockwise (CCW) only direction of actuation is reversed.

Wiring diagrams

Form A SPST-NO



Form B SPST-NC



Form C SPDT



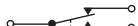
Form AA DPST-NO



Form BB DPST-NC



Form CC DPDT



Form X SPST-NO-DB



Form Y SPST-NC-DB



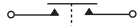
Form Zb SPDT isolated contacts



Form Z DPDT-DB



Form XX DPST-NO-DB



Form YY DPST-NC-DB



Form ZZ DPDT-DB



Limit Switches

9007C Heavy Duty Industrial Cam Design

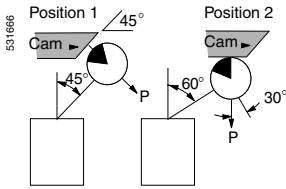


Figure 1A cam design for speeds up to 50 fpm

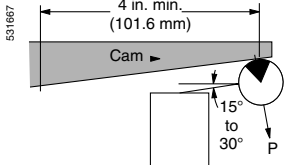


Figure 1B cam design for speeds from 50 to 200 fpm (15.2 to 60.9 mpm).

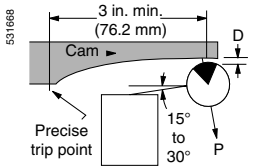


Figure 1C cam design for speeds from 200 to 400 fpm (60.9 to 121.9 mpm).

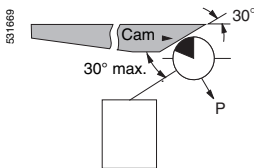


Figure 2

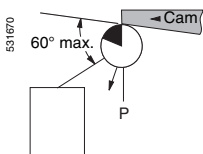


Figure 3

Application information

Excessive impact from improperly designed actuating systems is without question the leading cause of premature failure of the electromechanical limit switch. At slow speed, impact is rarely troublesome, but as speed increases, impact applied to the switch becomes a critical problem. In today's higher speed machines, therefore, it is important to give proper consideration to correctly designed actuating systems. These recommendations are designed to assist you in obtaining greater life from your limit switches. The black sector in the roller indicates the recommended design limits of the angle of pressure shown in the illustrations as "P". Three main design and installation considerations are:

- The pressure applied by the actuating mechanism to switch operating lever should approximate direction of lever rotation with a variation not to exceed 30°.
- Since the angle of pressure changes drastically with rotation of the lever, the cam must be designed for proper pressure angles at all positions of the lever travel.
- The switch operating levers should be positioned as nearly parallel with the leading edges of the cams as possible.

Considering these three factors:

- The cam in Figure 1A is satisfactory for speeds up to 50 fpm (15.2 mpm)
- The cam in Figure 1B is suitable for speeds up to 200 fpm (60.9 mpm) (nonuniform acceleration of switch lever)
- The cam in Figure 1C is satisfactory for speeds up to 400 fpm (121.9 mpm) (uniform or other controlled acceleration)

Designing proper pressure angles for overriding cams for electromechanical limit switches

Don't underestimate the importance of adjusting the cams and operating levers in electromechanical limit switches to provide the proper pressure angles in every travel position. Without the means to control the angle of pressure or the limit of override, the operating lever may spring back with damaging results. *Lever flyback usually causes double pulsing of the contacts, and places additional stresses on the mechanical system of the limit switch.* The excessive impacts absorbed from inadequately designed actuating devices eventually leads to abnormal wear and premature failure of the limit switch.

By looking closely at the actuating angles of the cam surface, designers and engineers can obtain the maximum operating life from electromechanical limit switches. The following recommendations help provide a workable knowledge of proper lever and cam angles—and how they are applied to secure optimum conditions:

- Actuating cam on machinery or slide should provide a trailing edge so that upon overriding the operating lever will not snap back.
- During the approach phase, **the pressure angle of the cam should not vary from the lever angle more than 30°.**
- On the override phase, **the angle of the trailing edge of the cam to the lever should be no more than 60°.**

If these guidelines are followed, the switch operating levers will always be approximately parallel with the leading edges of the actuating surfaces or cams.

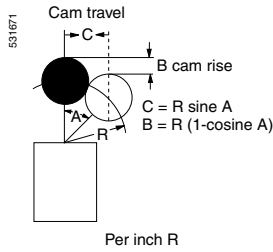
Figure 2 shows leading edge of cam about to depress and actuate the electromechanical limit switch. The black sector of the roller indicates the recommended design limits of the angle of pressure shown in drawings as "P".

Figure 3 shows operating lever roller following the trailing edge of the cam on the override cycle. Unless a one-way lever is used, the cam will operate the switch on the return cycle.

Limit Switches

9007C Heavy Duty Industrial

Linear/Angular Lever Travel



Application information (continued)

The table below can assist the designer of machine tools and conveyors, the plant engineer, or the maintenance personnel responsible for keeping this equipment in a satisfactory operating condition.

The design engineer will find the table useful in making trouble-free cam layouts. For example, if the recommended operating travel for a switch is between 15° and 30°, use the table to figure cam rise and travel. This aids in determining what type of cam to design, its dimensions, etc.

The plant engineer can use the table to determine where to position levers on replacement switches or revamped circuitry to operate existing cams. The engineer can also use the table to position the lever in proper relationship to the cam, and to find out whether switches and cams are installed properly to obtain maximum switch life.

All dimensions in the table are for 1 in. (25.4 mm) levers. If you use longer levers, multiply the figures by the increased lever length. For example, for a 2 in. (50.8 mm) lever, use the multiplier 2.

All limit switches have a recommended operating travel and for best performance should be installed within these limits. (1)

Dual dimensions: in. (mm)

| A | B | C | A | B | C |
|-----|-------------------|-----------------|-----|-----------------|-----------------|
| 1° | 0.0002 (0.005 mm) | 0.017 (0.43 mm) | 46° | 0.305 (7.7 mm) | 0.719 (18.2 mm) |
| 2° | 0.0006 (0.015 mm) | 0.035 (0.89 mm) | 47° | 0.318 (8.1 mm) | 0.731 (18.6 mm) |
| 3° | 0.0014 (0.035 mm) | 0.052 (1.3 mm) | 48° | 0.331 (8.4 mm) | 0.743 (18.9 mm) |
| 4° | 0.002 (0.05 mm) | 0.070 (1.8 mm) | 49° | 0.344 (8.7 mm) | 0.755 (19.2 mm) |
| 5° | 0.004 (0.101 mm) | 0.087 (2.2 mm) | 50° | 0.357 (9.0 mm) | 0.766 (19.4 mm) |
| 6° | 0.005 (0.127 mm) | 0.105 (2.6 mm) | 51° | 0.371 (9.4 mm) | 0.777 (19.7 mm) |
| 7° | 0.007 (0.178 mm) | 0.122 (3.1 mm) | 52° | 0.384 (9.7 mm) | 0.788 (20.0 mm) |
| 8° | 0.010 (0.254 mm) | 0.139 (3.5 mm) | 53° | 0.398 (10.1 mm) | 0.799 (20.3 mm) |
| 9° | 0.012 (0.304 mm) | 0.156 (4.0 mm) | 54° | 0.412 (10.4 mm) | 0.809 (20.5 mm) |
| 10° | 0.015 (0.381 mm) | 0.174 (4.4 mm) | 55° | 0.426 (11.0 mm) | 0.819 (20.8 mm) |
| 11° | 0.018 (0.457 mm) | 0.191 (4.8 mm) | 56° | 0.441 (11.2 mm) | 0.829 (21.0 mm) |
| 12° | 0.022 (0.559 mm) | 0.208 (5.3 mm) | 57° | 0.455 (11.5 mm) | 0.839 (21.3 mm) |
| 13° | 0.026 (0.660 mm) | 0.225 (5.7 mm) | 58° | 0.468 (12.3 mm) | 0.857 (21.7 mm) |
| 14° | 0.030 (0.762 mm) | 0.242 (6.1 mm) | 59° | 0.485 (12.3 mm) | 0.866 (22 mm) |
| 15° | 0.034 (0.863 mm) | 0.259 (6.6 mm) | 60° | 0.500 (12.7 mm) | 0.875 (22.2 mm) |
| 16° | 0.039 (0.990 mm) | 0.276 (7.2 mm) | 61° | 0.515 (13.1 mm) | 0.883 (22.4 mm) |
| 17° | 0.044 (1.12 mm) | 0.292 (7.4 mm) | 62° | 0.531 (13.5 mm) | 0.891 (22.6 mm) |
| 18° | 0.049 (1.24 mm) | 0.309 (7.8 mm) | 63° | 0.546 (14.0 mm) | 0.899 (22.8 mm) |
| 19° | 0.054 (1.37 mm) | 0.326 (8.3 mm) | 64° | 0.562 (14.3 mm) | 0.906 (23.0 mm) |
| 20° | 0.060 (1.52 mm) | 0.342 (8.7 mm) | 65° | 0.577 (14.6 mm) | 0.914 (23.2 mm) |
| 21° | 0.066 (1.67 mm) | 0.358 (9.1 mm) | 66° | 0.593 15.0 (mm) | 0.921 (23.4 mm) |
| 22° | 0.073 (1.85 mm) | 0.375 (9.5 mm) | 67° | 0.609 15.5 (mm) | 0.927 (23.5 mm) |
| 23° | 0.079 (2.00 mm) | 0.391 (9.9 mm) | 68° | 0.625 (16.0 mm) | 0.934 (23.7 mm) |
| 24° | 0.086 (2.2 mm) | 0.407 (10.3 mm) | 69° | 0.642 (16.3 mm) | 0.940 (23.9 mm) |
| 25° | 0.094 (2.38 mm) | 0.423 (10.7 mm) | 70° | 0.658 (16.7 mm) | 0.946 (24.0 mm) |
| 26° | 0.101 (2.56 mm) | 0.438 (11.1 mm) | 71° | 0.674 (17.1 mm) | 0.951 (24.1 mm) |
| 27° | 0.109 (2.77 mm) | 0.454 (11.5 mm) | 72° | 0.691 (17.5 mm) | 0.956 (24.3 mm) |
| 28° | 0.117 (2.9 mm) | 0.469 (12 mm) | 73° | 0.708 (18.0 mm) | 0.961 (24.4 mm) |
| 29° | 0.125 (3.17 mm) | 0.485 (12.3 mm) | 74° | 0.724 (18.4 mm) | 0.966 (24.5 mm) |
| 30° | 0.134 (3.40 mm) | 0.500 (12.7 mm) | 75° | 0.741 (19.0 mm) | 0.970 (24.6 mm) |
| 31° | 0.143 (3.6 mm) | 0.515 (13.1 mm) | 76° | 0.758 (19.2 mm) | 0.974 (24.7 mm) |
| 32° | 0.152 (3.9 mm) | 0.530 (13.4 mm) | 77° | 0.775 (20.0 mm) | 0.978 (24.8 mm) |
| 33° | 0.161 (4.1 mm) | 0.545 (14.0 mm) | 78° | 0.792 (20.1 mm) | 0.982 (24.9 mm) |
| 34° | 0.171 (4.3 mm) | 0.559 (14.2 mm) | 79° | 0.809 (20.5 mm) | 0.985 (25.0 mm) |
| 35° | 0.181 (4.6 mm) | 0.574 (14.6 mm) | 80° | 0.826 (21.0 mm) | 0.988 (25.1 mm) |
| 36° | 0.191 (4.8 mm) | 0.588 (15 mm) | 81° | 0.844 (21.4 mm) | 0.990 (25.1 mm) |
| 37° | 0.201 (5.1 mm) | 0.602 (15.3 mm) | 82° | 0.861 (21.8 mm) | 0.993 (25.2 mm) |
| 38° | 0.212 (5.4 mm) | 0.616 (15.6 mm) | 83° | 0.878 (22.3 mm) | 0.995 (25.3 mm) |
| 39° | 0.223 (5.7 mm) | 0.629 (16.0 mm) | 84° | 0.895 (22.7 mm) | 0.996 (25.3 mm) |
| 40° | 0.234 (6.0 mm) | 0.643 (16.3 mm) | 85° | 0.913 (23.2 mm) | 0.997 (25.3 mm) |
| 41° | 0.245 (6.2 mm) | 0.656 (16.6 mm) | 86° | 0.930 (23.6 mm) | 0.998 (25.4 mm) |
| 42° | 0.257 (6.5 mm) | 0.669 (17.0 mm) | 87° | 0.948 (24.0 mm) | 0.999 (25.4 mm) |
| 43° | 0.269 (6.8 mm) | 0.682 (17.3 mm) | 88° | 0.965 (24.5 mm) | 1.000 (25.4 mm) |
| 44° | 0.281 (7.1 mm) | 0.695 (17.6 mm) | 89° | 0.983 (25.0 mm) | 1.000 (25.4 mm) |
| 45° | 0.293 (7.4 mm) | 0.707 (18 mm) | 90° | 1.000 (25.4 mm) | 1.000 (25.4 mm) |

1. Refer to document SM444R1 for additional information regarding Cam speed and angles.

Limit Switches

9007C Heavy Duty Industrial

Installation Considerations

Lever Actuators

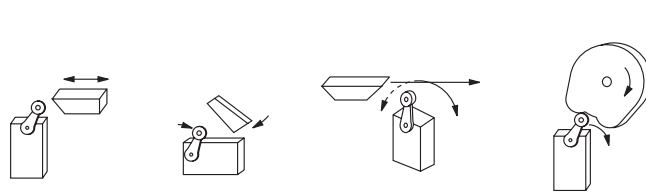
For limit switches with lever actuators, the actuating force should be applied as nearly perpendicular to the lever as practical and perpendicular to the shaft axis about which the lever rotates.

Lever Actuators

Correct



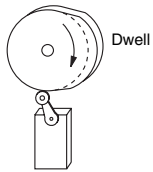
Incorrect



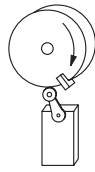
Dwelling Requirements

Where relatively fast motions are involved, the cams should be so designed that the limit switch will be held operated long enough to operate relays, valves, etc.

Correct

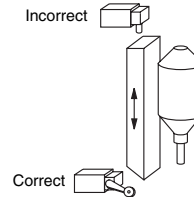
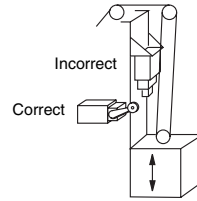


Incorrect

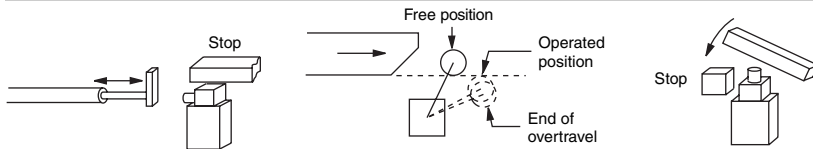


Overtravel limitations

Operating mechanisms for limit switches should be so designed that, under any operating or emergency conditions, the limit switch is not operated beyond its overtravel limit position. A limit switch should not be used as a mechanical stop.



Correct



Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

Conforming to NEMA A600 and UL508

Description

9007T Mill Switches

Use the 9007T Mill switches instead of other limit switches in the following applications:

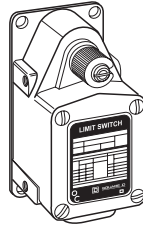
- Where the current load exceeds the typical heavy duty limit switch contact rating of 10 A and falls within the range of up to 20 A continuous.
- Where an operating sequence is required that is not possible on other limit switches. Fifteen sequences are available. Universal type has twelve different operating sequences with CW only, CCW only and neutral position. Standard type has three operating sequences with CW and CCW operation.
- Where higher reset forces are required due to foreign material interfering with lever arm operation, or where long heavy arms must reset against gravity.

9007FT Foundry Switches

The 9007FT Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around the shaft. The devices can withstand hot falling sand up to 300° F (149° C.).

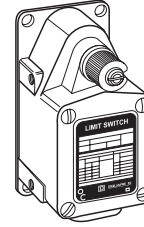
9007 (convertible sequence)

9007T Mill Switches



Page 216

9007FT Foundry Switches



Page 218

Application Information

Type T — Ideal for applications requiring extra heavy duty contact ratings, or higher operating and reset forces. Rugged mechanical construction with several different operating sequences in one basic switch.

Type FT — Designed specifically for rough foundry application. The shaft is entirely beyond the switch case to prevent jamming of the lever arm due to build up of sand. A dust boot is furnished as standard to further prevent sand packing and allow free movement of the lever arm. An extra long shaft bearing makes the switch extremely rugged and able to handle the rough applications encountered in foundries, mills, machine tool and similar industries. The switch will withstand hot falling sand up to 300° F (149° C).

Type T and FT

Enclosure — Oil-tight, dust-tight, water-tight, drip-tight meets NEMA Types 2, 4, and 13 requirements. Die cast zinc construction.

Operating Sequences — Fifteen sequences available. Universal type has 12 different operating sequences with CW only, CCW only, and neutral position operation. Standard type has three operating sequences with CW and CCW operation. Various sequences will give quick make and break, spring return with maintained contact, or slow make and break. Most sequences are convertible by removing the base plate and adjusting the positioning plate and/or latches

Ambient Temperature Range — 10° F (-12.2° C) to 185° F (85° C) ambient at full rated load, up to 220° F (104° C) ambient with single coil load.

Lever Arm — Die cast zinc construction with hardened, oil-impregnated, sintered iron rollers.

Conduit — 0.5 in. standard / 20 mm optional—Form M11

Mounting — Four baseplates provide end or side mounting holes and/or manifold mounting. All mounting holes are 0.25 in. (6.35 mm) diameter. Two tapped holes on each side of switch allows side mounting.

Contacts — SPDT¹ double break and three point double throw single break. Silver contact tips. Phenolic contact block. Nylon liner. Polarity must be the same on double throw contacts.

1. Single pole, double throw.

Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

Conforming to NEMA A600 and UL508

| Environmental characteristics | |
|-------------------------------|---|
| Conforming to standards | UL508 |
| Product certifications | UL Listed, CSA Certified, CE Marked |
| Protective treatment | Corrosion resistant gray paint |
| Ambient air temperature | -10 to +185 °F (-23 to +85 °C) Housing can withstand falling sand at +300 °F (+149 °C) |
| Vibration resistance | 10G (10–55 Hz) |
| Shock resistance | 30G |
| Electric shock protection | Class O |
| Degree of protection | NEMA Types 1, 2, 4, 12, 13, IP65, 66, 67 |
| Cable entry or connector | 1/2" NPT (metric available) |
| Materials | Cast zinc |

| Contact block characteristics | |
|--|---|
| Rated operational characteristics hard contacts AC Voltage | NEMA A600 Ithe = 20 A 20 A Resistive and continuous |
| Rated operational characteristics hard contacts DC Voltage | NEMA P 600 Ithe = 20 A 20 A Resistive and continuous |
| Rated insulation voltage | 600 V |
| Rated impulse withstand voltage | 2,500 Vac for 1 minute for CE, 2,200 Vac for 1 minute for UL, and 2,640 Vac for 1 minute for CSA |
| Positive opening | No |
| Short circuit protection | 20 A Bussmann Class CC KTK-R-20 fuse, non-time-delay |
| Terminal wire sizes (Cabling/Screw Clamp) | 12 – 22 AWG (3.31 mm ² – 0.326 mm ²) wire max. |
| Maximum actuation speed | 15.2 mpm / 27.4 mpm (50 fpm / 90 fpm) with 45 ° Cam angle, levers only |

| Maximum current ratings for control circuit contacts | | | | | | | | | | | | |
|--|-------|-------------------------------|--------|-------------|------|-----------------------------------|---|-----|-----------------|----------------------------|-----------------------------------|-----------------------------------|
| Contacts | AC | | | | | | | DC | | | | |
| | Volts | Inductive 35% Power Factor | | | | Continuous Carrying Amperes | Resistive 75% Power Factor | | Volts | Inductive and Resistive | | Continuous Carrying Amperes |
| | | Make Amperes | | Break VA | | | Make, Break and Continuous Carrying Amperes | | | Make and Break Amperes | Continuous Carrying Amperes | |
| | | | VA | Amperes | VA | | | | Single Throw | Double Throw | | |
| SPDT Quick Make and Break | 120 | 150 | 18,000 | 20 | 2400 | 20 | 20 | 120 | 5.0 | 9 | 20 | |
| | 240 | 75 | 18,000 | 12.5 | 3000 | 20 | 20 | 250 | 1.0 | 9 | 20 | |
| | 480 | 37.5 | 18,000 | 6.25 | 3000 | 20 | 20 | 600 | 0.2 | 9 | 20 | |
| | 600 | 30 | 18,000 | 5 | 3000 | 20 | 20 | | | | | |
| All Slow Make and Break | 120 | 60 | 7200 | 6 | 720 | 20 | 10 20 | 9 | 9 | 9 | 9 | |
| | 240 | 30 | 7200 | 3 | 720 | 20 | 10 20 | 9 | 9 | 9 | 9 | |
| | 480 | 15 | 7200 | 1.5 | 720 | 20 | 10 20 | 9 | 9 | 9 | 9 | |
| | 600 | 12 | 7200 | 1.2 | 720 | 20 | 10 20 | 9 | 9 | 9 | 9 | |

| Characteristics for material and ratings comparisons — standard switches | | |
|--|-------------------------------|-----------------------------------|
| | 9007 Type T/FT | Type L (R. B. Denison Lox Switch) |
| Body material | Cast zinc | Cast aluminum |
| Cover material | Cast zinc | Aluminum |
| Base plate material | Steel with zinc plating | Steel with chromate plating |
| Shaft seal material | Nitrile | PVC |
| Contact block material | Phenolic | Glass filled nylon |
| Moveable contact material | Fine silver on copper backing | Coin Silver on steel backing |
| Stationary contact material | Fine silver on copper backing | 90/10 AgCdO on copper backing |
| Low ambient temperature rating | -10° F | 0° F |
| High ambient temperature at full rating | 180° F | 200° F |
| Enclosure rating | NEMA Types 1, 2, 4, 12 and 13 | NEMA Types 1, 4 and 13 |
| Vibration resistance | 10G (10–150 Hz) | 40G max (10-150 Hz) |

♦ Many switches are available with higher or lower temperature limits by selecting special versions or special options. See page 237.


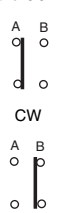
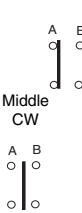
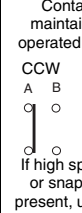
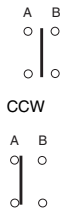
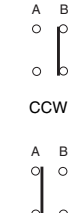
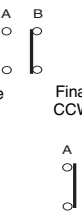
Limit Switches

9007T Severe Duty Mill Switches

Universal Operating Sequences

Universal Catalog Numbers

Base Plate







| Surface Mounted | A | 9007TUA1 | 9007TUA2 | 9007TUA3 | 9007TUA4 | 9007TUA5 | 9007TUA6 |
|---|---|---|---|---|--|--|--|
| | B | 9007TUB1 | 9007TUB2 | 9007TUB3 | 9007TUB4 | 9007TUB5 | 9007TUB6 |
| | C | 9007TUC1 | 9007TUC2 | 9007TUC3 | 9007TUC4 | 9007TUC5 | 9007TUC6 |
| | D | 9007TUD1 | 9007TUD2 | 9007TUD3 | 9007TUD4 | 9007TUD5 | 9007TUD6 |
| | | No. 1 | No. 2 | No. 3 ④ | No. 4 | No. 5 | No. 6 |
| | | SPDT Spring Return CW Only | SPDT Spring Return CW Only | SPDT Maintained Contact | SPDT Spring Return Neutral Position | SPDT Spring Return CCW Only | SPDT Spring Return CCW Only |
|  | | Initial position and CCW  | Initial position and CCW  | Spring return of arm to initial pos. Contact pos. maintained until operated in reverse CCW CW  | Initial position  | Initial position and CW  | Initial position and CW  |

Characteristics

Nominal Operating Data


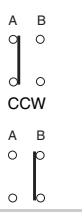
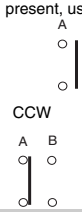
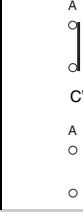
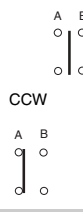
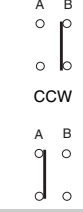
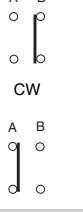
| | | | | | | |
|-------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|-------------------------|
| Pre-travel ① | 14° | Int. Pos. 9°, Final 16° | 7° | 6° | 14° | Int. Pos. 9°, Final 16° |
| Total travel | 88° | 88° | 81° | 81° | 88° | 88° |
| Differential | 12° | 5° | 7° | 5° | 12° | 5° |
| Operating torque | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) |
| Repeat accuracy ② | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) |

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

| | | | | | | |
|----------------|--|--|--|---|--|--|
| |  |  |  |  |  |  |
| Weight lb (kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) |

Universal Catalog Numbers (continued)

Base Plate






| Surface Mounted | A | 9007TUA7 | 9007TUA8 | 9007TUA9 | 9007TUA10 | 9007TUA11 | 9007TUA12 |
|---|---|---|--|---|--|--|--|
| | B | 9007TUB7 | 9007TUB8 | 9007TUB9 | 9007TUB10 | 9007TUB11 | 9007TUB12 |
| | C | 9007TUC7 | 9007TUC8 | 9007TUC9 | 9007TUC10 | 9007TUC11 | 9007TUC12 |
| | D | 9007TUD7 | 9007TUD8 | 9007TUD9 | 9007TUD10 | 9007TUD11 | 9007TUD12 |
| | | No. 7 | No. 8 ④ | No. 9 | No. 10 | No. 11 | No. 12 |
| | | SPDT Maintained | SPDT Maintained Neutral Position | SPDT Spring Return Slow Make, Slow Break | SPDT Spring Return Slow Make, Slow Break | SPDT Spring Return Slow Mak, Slow Break | SPDT Maintained |
|  | | If high speed cam or snap-back present, use No. 12  | Initial position If high speed cam or snap-back is present, use No. 12  | Initial position and CCW  | Initial position  | Initial position and CW  | CCW  |

Characteristics

Nominal Operating Data

| | | | | | | |
|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Pre-travel ① | 10° | 6° | 12° | 3° | 12° | 45° |
| Total travel | 85° | 81° | 87° | 81° | 87° | 90° |
| Differential | 12° | 10° | 0° | 0° | 0° | 0° |
| Operating torque | 2.5 lb-in (0.28 N•m) | 2.5 lb-in (0.28 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 8 lb-in (0.9 N•m) |
| Repeat accuracy ② | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) |

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

| | | | | | | |
|----------------|---|---|---|--|---|--------------------|
| |  |  |  |  |  | Not adjustable |
| Weight lb (kg) | 2.35 lb (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) |

Footnotes: see page 217

Dimensions:
pages 222 to 225

Interpretation of Catalog Numbers:
page 239

Base Plates:
pages 221 and 222

Limit Switches

9007T Severe Duty Mill Switches

Standard Operating Sequences

Standard Catalog Numbers

Base Plate

Surface
Mounted



| A | 9007TSA1 | 9007TSA2 | 9007TSA3 | | |
|-----------------------------------|----------|-----------------------------------|----------|--|--|
| B | 9007TSB1 | 9007TSB2 | 9007TSB3 | | |
| C | 9007TSC1 | 9007TSC2 | 9007TSC3 | | |
| D | 9007TSD1 | 9007TSD2 | 9007TSD3 | | |
| No. 1 | | No. 2 | | No. 3 | |
| SPDT Spring Return CW & CCW | | SPDT Spring Return CW & CCW | | SPDT Spring Return CW & CCW Slow Make, Slow Break | |
| Initial position | | Initial position | | Initial position | |
| | | | | | |

Characteristics (nominal operating data)

| | | | |
|--|---|---|---|
| Switch actuation | By 30° cam | | |
| Type of actuation | | | |
| Pre-travel ① | 14° | Int. Pos. 9°, Final 16° | 9° |
| Total travel | 89° | 89° | 89° |
| Differential | 12° | Int. Pos. 5.5°, Final 7.5° | 5° |
| Reverse overtravel | N/A (future availability) | N/A (future availability) | N/A (future availability) |
| Operating torque/force 1 pole & 2 pole | 10 lb-in (1.13 N•m) | 10 lb-in (1.13 N•m) | 10 lb-in (1.13 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | #12–22 AWG (3.31–0.326 mm ²) | #12–22 AWG (3.31–0.326 mm ²) | #12–22 AWG (3.31–0.326 mm ²) |
| Repeatability ② (linear travel of cam) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) |
| Cable entry (metric available) | 1/2" NPT | 1/2" NPT | 1/2" NPT |
| Weight lb (kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) | 2.35 lb. (1.07 kg) |

① The pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to free travel of lever arm at initial position.

② Linear travel of cam on 1.5 in. (38.1mm) lever arm.

③ Remove spring from the positioning plate.

④ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present. The application should be checked and No. 12 sequences substituted where possible.

Note: For Type FT foundry switches, change the "T" at the beginning of the equivalent Type number above to "FT" (Example: FTUB1). See page 218.


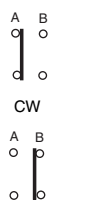
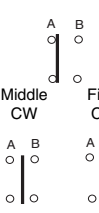
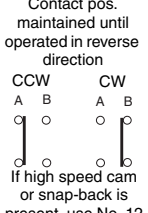
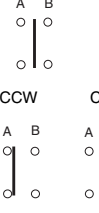
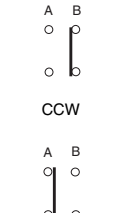
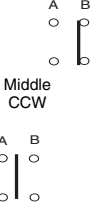
Limit Switches

9007FT Severe Duty Foundry Switches

Universal Operating Sequences

Universal Catalog Numbers

Base Plate







| | | | | | | | |
|---|---|---|---|--|--|--|--|
| Surface Mounted | A | 9007FTUA1 | 9007FTUA2 | 9007FTUA3 | 9007FTUA4 | 9007FTUA5 | 9007FTUA6 |
| | B | 9007FTUB1 | 9007FTUB2 | 9007FTUB3 | 9007FTUB4 | 9007FTUB5 | 9007FTUB6 |
| | C | 9007FTUC1 | 9007FTUC2 | 9007FTUC3 | 9007FTUC4 | 9007FTUC5 | 9007FTUC6 |
| | D | 9007FTUD1 | 9007FTUD2 | 9007FTUD3 | 9007FTUD4 | 9007FTUD5 | 9007FTUD6 |
| | | No. 1 | No. 2 | No. 3 ④ | No. 4 | No. 5 | No. 6 |
| | | SPDT Spring Return CW Only | SPDT Spring Return CW Only | SPDT Maintained Contact | SPDT Spring Return Neutral Position | SPDT Spring Return CCW Only | SPDT Spring Return CCW Only |
|  | | Initial position and CCW  | Initial position and CCW  | Spring return of arm to initial pos. Contact pos. maintained until operated in reverse direction CCW CW  If high speed cam or snap-back is present, use No. 12 | Initial position  | Initial position and CW  | Initial position and CW  |

Characteristics

Nominal Operating Data


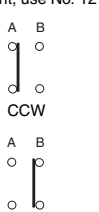
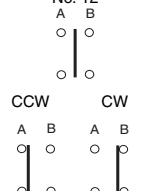
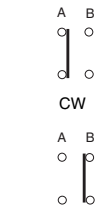
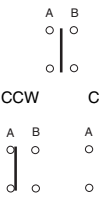
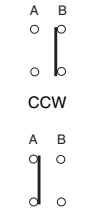
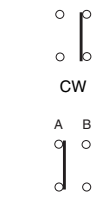
| | | | | | | |
|--------------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|-------------------------|
| Pre-travel ① | 14° | Int. Pos. 9°, Final 16° | 7° | 6° | 14° | Int. Pos. 9°, Final 16° |
| Total travel | 88° | 88° | 81° | 81° | 88° | 88° |
| Differential | 12° | 5° | 7° | 5° | 12° | 5° |
| Operating torque | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) |
| Repeat accuracy ② | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) |

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

| | | | | | | |
|-----------------------|--|--|--|---|--|--|
| |  |  |  |  |  |  |
| Weight lb (kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) |

Universal Catalog Numbers (continued)

Base Plate






| | | | | | | | |
|---|---|---|---|---|--|--|--|
| Surface Mounted | A | 9007FTUA7 | 9007FTUA8 | 9007FTUA9 | 9007FTUA10 | 9007FTUA11 | 9007FTUA12 |
| | B | 9007FTUB7 | 9007FTUB8 | 9007FTUB9 | 9007FTUB10 | 9007FTUB11 | 9007FTUB12 |
| | C | 9007FTUC7 | 9007FTUC8 | 9007FTUC9 | 9007FTUC10 | 9007FTUC11 | 9007FTUC12 |
| | D | 9007FTUD7 | 9007FTUD8 | 9007FTUD9 | 9007FTUD10 | 9007FTUD11 | 9007FTUD12 |
| | | No. 7 | No. 8 ④ | No. 9 | No. 10 | No. 11 | No. 12 |
| | | SPDT Maintained | SPDT Maintained Neutral Position | SPDT Spring Return Slow Make, Slow Break | SPDT Spring Return Slow Make, Slow Break | SPDT Spring Return Slow Make, Slow Break | SPDT Maintained |
|  | | If high speed cam or snap-back present, use No. 12  | Initial position If high speed cam or snap-back present, use No. 12  | Initial position and CCW  | Initial position  | Initial position and CW  | CCW  |

Characteristics

Nominal Operating Data

| | | | | | | |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Pre-travel ① | 10° | 6° | 12° | 3° | 12° | 45° |
| Total travel | 85° | 81° | 87° | 81° | 87° | 90° |
| Differential | 12° | 10° | 0° | 0° | 0° | 0° |
| Operating torque | 2.5 lb-in (0.28 N•m) | 2.5 lb-in (0.28 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 12 lb-in (1.35 N•m) | 8 lb-in (0.9 N•m) |
| Repeat accuracy ② | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) |

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

| | | | | | | |
|-----------------------|---|---|---|--|---|-------------------|
| |  |  |  |  |  | Not adjustable |
| Weight lb (kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) | 2.57 lb (1.17 kg) |

Footnotes: see page 219

Dimensions:
pages 222 to 225

Interpretation of Catalog Numbers:
page 239

Limit Switches

9007FT Severe Duty Foundry Switches

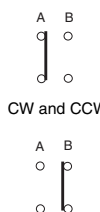
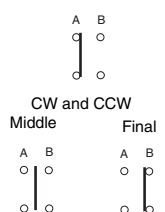
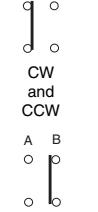
Standard Operating Sequences

Standard Catalog Numbers

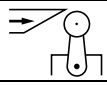
Base Plate

Surface
Mounted



| A | 9007FTSA1 | 9007FTSA2 | 9007FTSA3 |
|---|---|--|---|
| B | 9007FTSB1 | 9007FTSB2 | 9007FTSB3 |
| C | 9007FTSC1 | 9007FTSC2 | 9007FTSC3 |
| D | 9007FTSD1 | 9007FTSD2 | 9007FTSD3 |
| | No. 1 | No. 2 | No. 3 |
| | Single Pole Double Throw Spring Return CW & CCW | Single Pole Double Throw Spring Return CW & CCW | Single Pole Double Throw Spring Return CW & CCW Slow Make Slow Break |
| | Initial position  | Initial position  | Initial position  |

Characteristics (nominal operating data)

| | | | |
|--|---|---|---|
| Switch actuation | By 30° cam | | |
| Type of actuation |  | | |
| Pre-travel ① | 14° | Int. Pos. 9°, Final 16° | 9° |
| Total travel | 89° | 89° | 89° |
| Differential | 12° | Int. Pos. 5.5°, Final 7.5° | 5° |
| Reverse overtravel | N/A (future availability) | N/A (future availability) | N/A (future availability) |
| Operating torque/force 1 pole & 2 pole | 10 lb-in (1.13 N•m) | 10 lb-in (1.13 N•m) | 10 lb-in (1.13 N•m) |
| Terminal wire sizes (Cabling/Screw Clamp) | #12–22 AWG (3.31–0.326 mm ²) | #12–22 AWG (3.31–0.326 mm ²) | #12–22 AWG (3.31–0.326 mm ²) |
| Repeatability ② (linear travel of cam) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) | ± 0.004 in. (0.10 mm) |
| Cable entry (metric available) | 1/2" NPT | 1/2" NPT | 1/2" NPT |
| Weight lb (kg) | 2.57 lb. (1.17 kg) | 2.57 lb. (1.17 kg) | 2.57 lb. (1.17 kg) |

① The pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to free travel of lever arm at initial position.

② Linear travel of cam on 1.5 in. (38.1mm) lever arm.

③ Remove spring from the positioning plate.

④ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present. The application should be checked and No. 12 sequences substituted where possible.

Note: Type FT Foundry Switches are obtained by changing the "T" at the beginning of the equivalent type number to "FT" (Example: FTUB1).

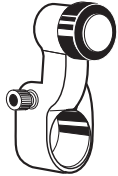
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

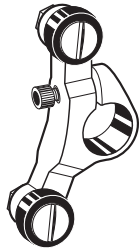
Lever Arms and Renewal Parts



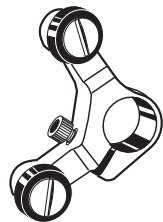
Standard Roller



Offset Type



120° Forked



90° Forked

Standard Roller

| Arm | | Steel Roller | | Catalog Number | Weight lb (kg) |
|---------------------------|-------------------|-----------------|----------------|----------------|----------------|
| Length in. (mm) | Diameter in. (mm) | Roller Position | Width in. (mm) | | |
| 1.5 (38.1) | 0.75 (19) | Optional | 0.25 (6.3) | 9007B1 | 0.17 (0.077) |
| 1.5 (38.1) | 1.0 (25.4) | Optional | 0.25 (6.3) | 9007B2 | 0.19 (0.086) |
| 1.5 (38.1) | 1.38 (35) | Optional | 0.25 (6.3) | 9007B3 | 0.23 (0.104) |
| 2.5 (63.5) | 0.75 (19) | Optional | 0.25 (6.3) | 9007B7 | 0.25 (0.113) |
| 2.5 (63.5) | 1.0 (25.4) | Optional | 0.25 (6.3) | 9007B8 | 0.25 (0.113) |
| 2.5 (63.5) | 1.38 (35) | Optional | 0.25 (6.3) | 9007B9 | 0.27 (0.122) |
| 1.5 (38.1) | 0.75 (19) | Optional | 0.5 (12.7) | 9007B12 | 0.34 (0.154) |
| 1.5 (38.1) | 1.0 (25.4) | Optional | 0.5 (12.7) | 9007B13 | 0.34 (0.154) |
| 1.5 (38.1) | 1.38 (35) | Optional | 0.5 (12.7) | 9007B14 | 0.42 (0.191) |
| 5 (127) | 0.75 (19) | Optional | 0.25 (6.3) | 9007B19 | 1.00 (0.454) |
| 2.88 (73.1) | 0.75 (19) | No roller | — | 9007B21 | 0.20 (0.091) |
| 2.5 (63.5) | 0.75 (19) | Optional | 0.5 (12.7) | 9007B22 | 0.22 (0.100) |
| 2.5 (63.5) | 1.0 (25.4) | Optional | 0.5 (12.7) | 9007B23 | 0.28 (0.127) |
| 2.5 (63.5) | 1.38 (35) | Optional | 0.5 (12.7) | 9007B24 | 0.36 (0.163) |
| Adjustable ⁽¹⁾ | 0.75 (19) | Optional | 0.25 (6.3) | 9007R18 | 0.50 (0.227) |
| Adjustable ⁽¹⁾ | 1.0 (25.4) | Optional | 0.25 (6.3) | 9007R19 | 0.50 (0.227) |
| Adjustable ⁽¹⁾ | 1.38 (35) | Optional | 0.25 (6.3) | 9007R20 | 0.50 (0.227) |

1. Does not include lever arm clamp or rod. If lever arm clamp is required, use 9007R16 or R17.

Offset Type (for obtaining different cam track dimensions)

| Arm | | Steel Roller | | Catalog Number | Weight lb (kg) |
|-----------------|-------------------|-----------------|----------------|----------------|----------------|
| Length in. (mm) | Diameter in. (mm) | Roller Position | Width in. (mm) | | |
| 1.5 (38.1) | 0.75 (19) | Inside offset | 0.25 (6.3) | 9007C1 | 0.50 (0.227) |
| 1.5 (38.1) | 1.0 (25.4) | Inside offset | 0.25 (6.3) | 9007C2 | 0.50 (0.227) |
| 1.5 (38.1) | 1.38 (35) | Inside offset | 0.25 (6.3) | 9007C3 | 0.50 (0.227) |
| 1.5 (38.1) | 0.75 (19) | Outside offset | 0.25 (6.3) | 9007D1 | 0.18 (0.082) |
| 1.5 (38.1) | 1.0 (25.4) | Outside offset | 0.25 (6.3) | 9007D2 | 0.18 (0.082) |
| 1.5 (38.1) | 1.38 (35) | Outside offset | 0.25 (6.3) | 9007D3 | 0.18 (0.082) |
| 1.88 (48) | 0.75 (19) | Outside offset | 0.25 (6.3) | 9007E4 | 0.20 (0.091) |
| 1.88 (48) | 1.0 (25.4) | Outside offset | 0.25 (6.3) | 9007E5 | 0.27 (0.122) |
| 1.88 (48) | 1.38 (35) | Outside offset | 0.25 (6.3) | 9007E6 | 0.27 (0.122) |
| 1.88 (48) | 0.75 (19) | Inside offset | 0.25 (6.3) | 9007F4 | 0.30 (0.136) |
| 1.88 (48) | 1.0 (25.4) | Inside offset | 0.25 (6.3) | 9007F5 | 0.30 (0.136) |
| 1.88 (48) | 1.38 (35) | Inside offset | 0.25 (6.3) | 9007F6 | 0.30 (0.136) |

120° Forked (for maintained contact lever arm type switches)

| Arm | | Steel Roller | | Catalog Number | Weight lb (kg) |
|-----------------|-------------------|-----------------|----------------|----------------|----------------|
| Length in. (mm) | Diameter in. (mm) | Roller Position | Width in. (mm) | | |
| 1.5 (38.1) | 0.75 (19) | Same side | 0.25 (6.3) | 9007J1 | 0.31 (0.141) |
| 1.5 (38.1) | 1.0 (25.4) | Same side | 0.25 (6.3) | 9007J2 | 0.40 (0.181) |
| 1.5 (38.1) | 0.75 (19) | LH on opp. side | 0.25 (6.3) | 9007K1 | 0.50 (0.227) |
| 1.5 (38.1) | 1.0 (25.4) | LH on opp. side | 0.25 (6.3) | 9007K2 | 0.50 (0.227) |
| 1.5 (38.1) | 0.75 (19) | RH on opp. side | 0.25 (6.3) | 9007N1 | 0.66 (0.299) |
| 1.5 (38.1) | 1.0 (25.4) | RH on opp. side | 0.25 (6.3) | 9007N2 | 0.70 (0.316) |

90° Forked (for maintained contact lever arm type switches)

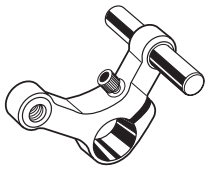
| Arm | | Steel Roller | | Catalog Number | Weight lb (kg) |
|-----------------|-------------------|-----------------|----------------|----------------|----------------|
| Length in. (mm) | Diameter in. (mm) | Roller Position | Width in. (mm) | | |
| 1.5 (38.1) | 0.75 (19) | Same side | 0.25 (6.3) | 9007X1 | 0.30 (0.136) |
| 1.5 (38.1) | 1.0 (25.4) | Same side | 0.25 (6.3) | 9007X2 | 0.40 (0.181) |
| 1.5 (38.1) | 0.75 (19) | RH on opp. side | 0.25 (6.3) | 9007Y1 | 0.50 (0.227) |
| 1.5 (38.1) | 1.0 (25.4) | RH on opp. side | 0.25 (6.3) | 9007Y2 | 0.50 (0.227) |
| 1.5 (38.1) | 0.75 (19) | LH on opp. side | 0.25 (6.3) | 9007Z1 | 0.66 (0.299) |
| 1.5 (38.1) | 1.0 (25.4) | LH on opp. side | 0.25 (6.3) | 9007Z2 | 0.70 (0.316) |

Dimensions:
pages 222 to 225

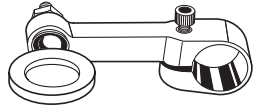
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

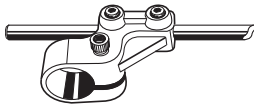
Lever Arms and Renewal Parts



With Reset



Cable Operated



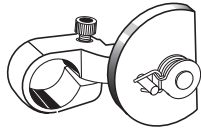
Rod Type
(rod not included)



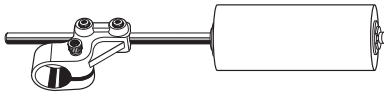
Ball Bearing Type



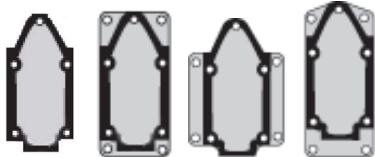
Weld-On Type



1-Way Roller Type



Conveyor Side Guide
(use with 9007R16 or R17)



Style A Style B Style C Style D

Base Plates

Cable operated

| Arm | Steel roller | Roller | | Catalog Number | Weight lb (kg) |
|---|-------------------|-----------------|----------------|----------------|----------------|
| Length in. (mm) | Diameter in. (mm) | Roller Position | Width in. (mm) | | |
| 1.5 (38.1) | 0.75 (19) | None | None | 9007Y3 | — |
| 2.5 in. (63.5mm) long with eyebolt 0.25 (6.3mm) I.D. instead of roller. | | | | 9007B27 | — |

Rod Type (used on conveyor systems or where unusual shapes are required)

| | | | | | |
|------------|-----------|------------|------|---------|--------------|
| Adjustable | 0.75 (19) | 0.19 (4.8) | None | 9007R16 | 0.18 (0.081) |
| Adjustable | 0.75 (19) | 0.25 (6.3) | None | 9007R17 | 0.18 (0.081) |

1. Rod not included
2. Key stock not included

Ball Bearing Type (for abrasive dust areas or with high speed cams)

| | | | | | |
|------------|-----------|--------|------------|---------|--------------|
| 1.5 (38.1) | 0.75 (19) | Center | 0.28 (7.1) | 9007B16 | 0.15 (0.068) |
|------------|-----------|--------|------------|---------|--------------|

Weld-On Type (used where a special operator is required to weld to lever)

| | | | | | |
|----------|-----------|------|------|---------|--------------|
| 3.5 (89) | 0.75 (19) | None | None | 9007G10 | 0.50 (0.227) |
|----------|-----------|------|------|---------|--------------|

One Way Roller Type (used with reversible cams for one way operations)

| | | | | | |
|------------|-----------|----------------|------------|--------|--------------|
| 1.5 (38.1) | 0.75 (19) | Outside offset | 0.25 (6.3) | 9007D4 | 0.64 (0.290) |
|------------|-----------|----------------|------------|--------|--------------|

Conveyor Side Guide

| | | |
|---|---------|--------------|
| 8.44 in. (214.3) long with 1.5 in. (38.1) dia. 3.75 in. (95.2) Delrin® roller | 9007R21 | 1.63 (0.739) |
| 8.44 in. (214.3) long with 0.88 in. (22.3) dia. 3.75 in. (95.2) Delrin roller | 9007R22 | 1.42 (0.644) |

Separate Base Plates (2)

| Style | Mounting Holes | Catalog Number | Weight lb (kg) |
|-------|----------------|----------------|----------------|
| A | None (1) | 2934D32G1 | |
| B | End | 2934D14G1 | 0.34 (0.154) |
| C | Side | 2934D33G1 | 0.42 (0.191) |
| D | End | 2934D34G1 | 0.36 (0.163) |

1. No mounting holes in base plate. Side mounting holes in switch case must be used.
2. Acceptable wire sizes 14 – 18 AWG (2.08 – 0.823 mm²); recommended terminal clamp torque 13 – 16 lb-in. (1.46 – 1.80 N•m).

Optional Conduit Threads

| Description | Catalog Number | Weight lb (kg) |
|----------------------------|----------------|----------------|
| Metric | | |
| M20 - 20mm (per B.S. 4568) | M11 | — |
| Example: 9007TUB4M11 | | |

Three Point Contacts — Ordering Information

Select Type number of desired contact operating sequence for standard contact switch.

Change the letter following "T" or "FT" as shown below.

| Change: | U to Y | Contact Configuration Changes |
|----------------------|--------|-------------------------------|
| For example: | S to K | From: |
| TUB1 changes to TYB1 | | |
| TSB1 changes to TKB1 | | |

Limit Switches

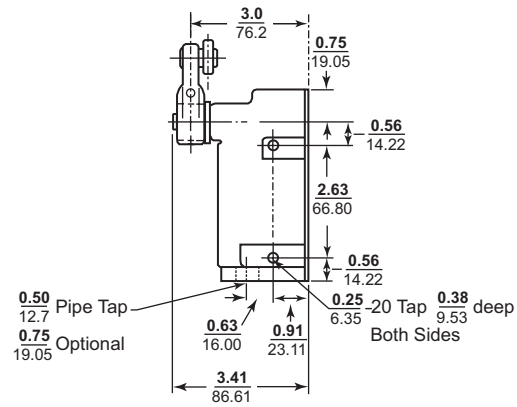
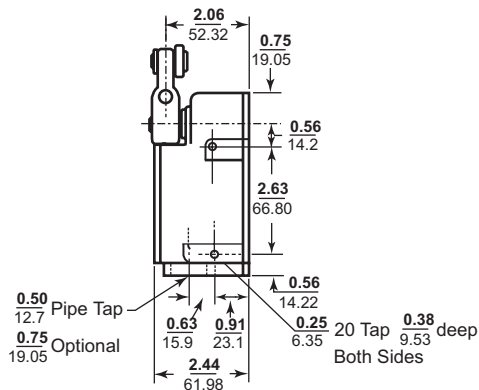
9007T and FT Severe Duty Mill and Foundry Switches

Dimensions

Surface Mounting

Type T

Type FT



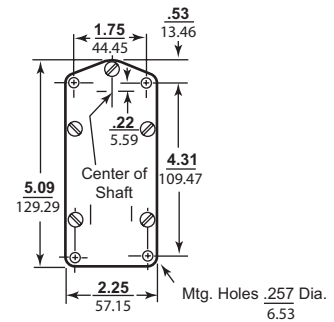
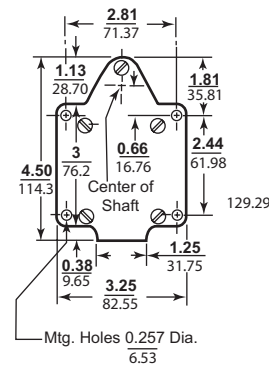
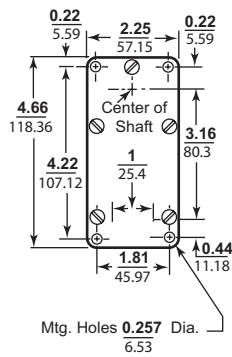
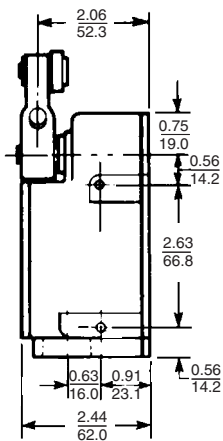
Base Plates

Style A

Style B

Style C

Style D



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Limit Switches

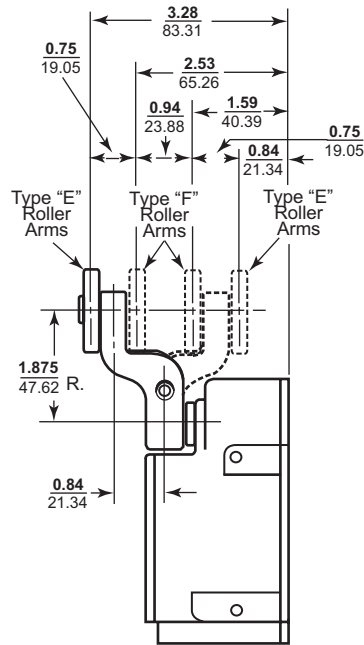
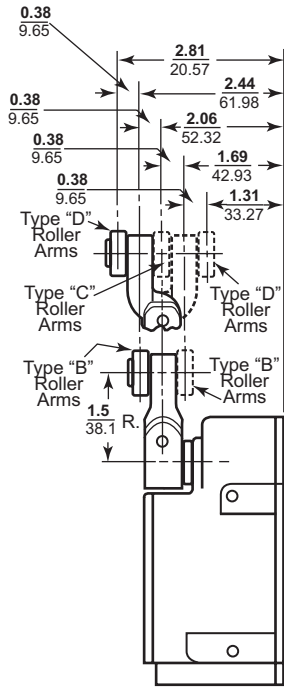
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

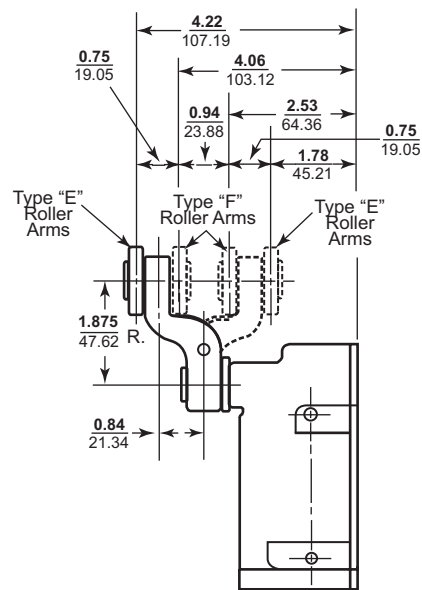
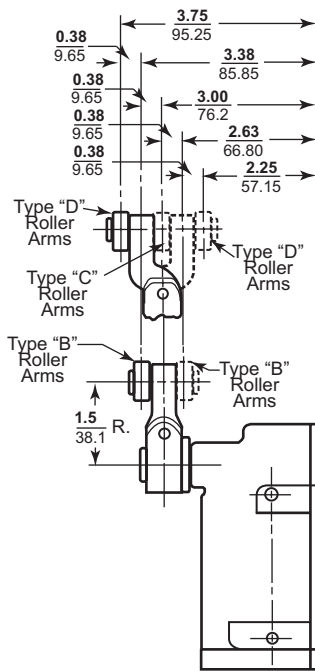
Dimensions

CAM Track Dimensions

Type T



Type FT



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Limit Switches

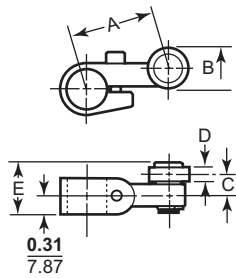
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

Dimensions

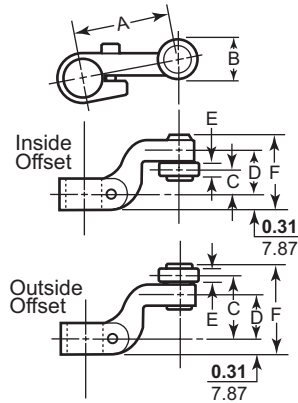
Type T and FT Lever Arms

Standard Roller

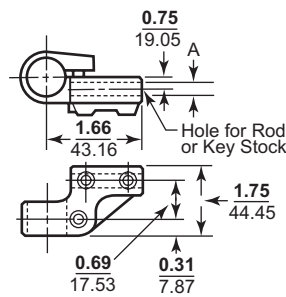


For dimension A refer to page 12.

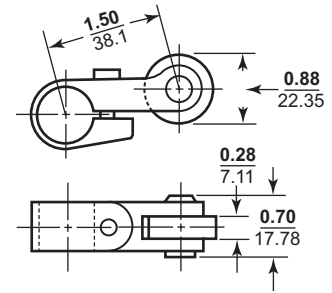
Offset Type



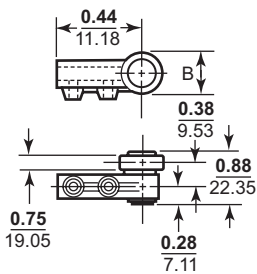
Adjustable Length Rod Type



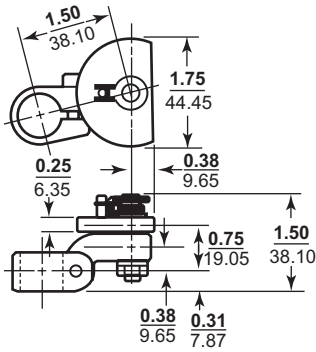
Ball Bearing Roller Type B16



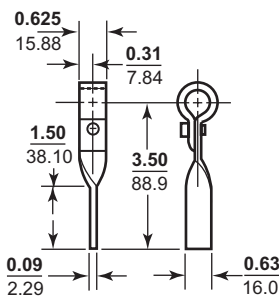
Roller Arm for use with Type R17



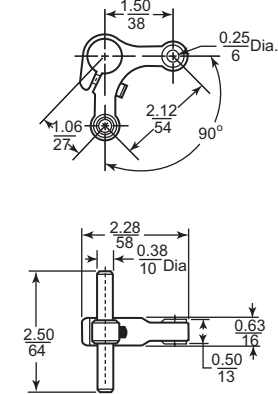
1-Way Roller Type D4



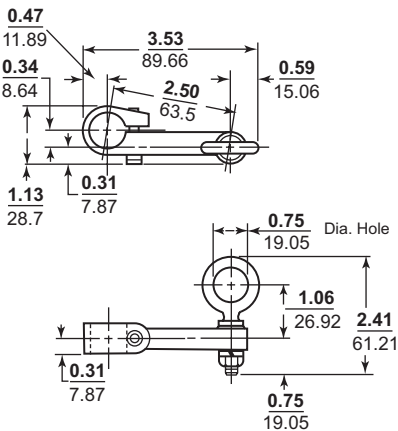
Weld-On Arm Type G10



Cable Operated with Reset Type Y3



Cable Operated Type B27



Limit Switches

NOTE: All levers on this page can be used on Type C limit switches by installing the 9007S9 hub.

Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Limit Switches

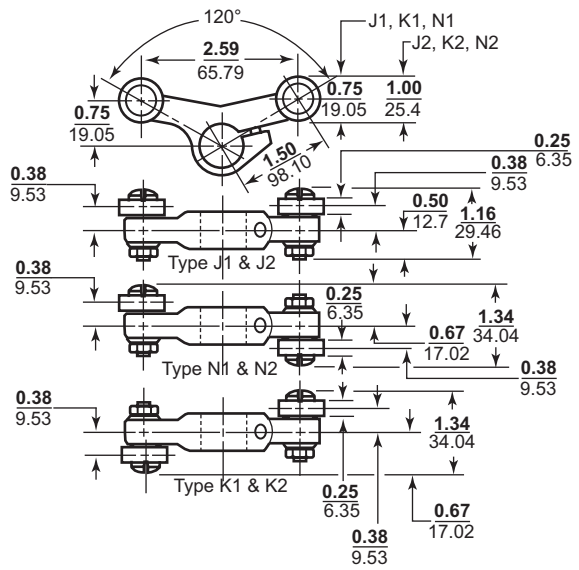
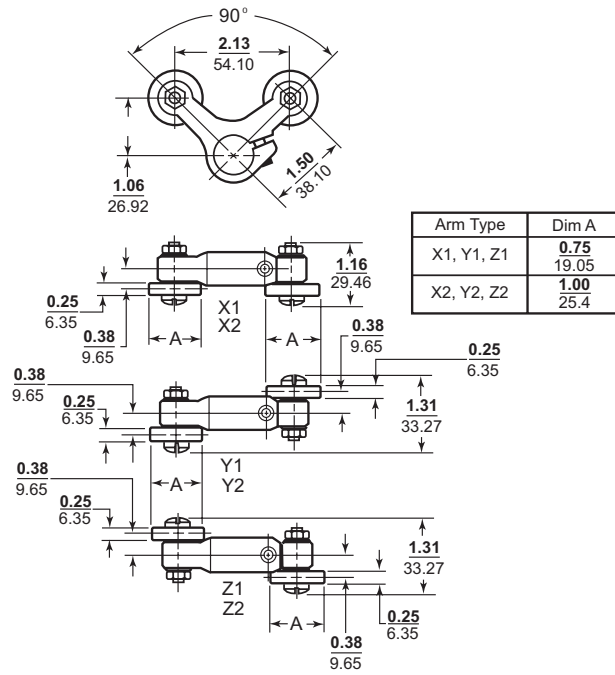
9007T and FT Severe Duty Mill and Foundry Switches

Dimensions

Type T and FT Lever Arms (continued)

90° Forked

120° Forked



Limit Switches

R.B. Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100, L300 Mill and Foundry Switches, L140, L2153 Cable Pulls, L529 Belt Conveyor

Conforming to NEMA A600 and UL508

Description

L100W Switches ♦

Use the L100W Mill switches instead of other limit switches in the following applications:

- Where the current load exceeds the typical heavy duty limit switch contact rating of 10 A and falls within the range of up to 20 A continuous.
- Where an operating sequence is required that is not possible on other limit switches (35 choices with the L switches).
- Where higher reset forces are required due to foreign material interfering with lever arm operation, or where long heavy arms must reset against gravity.

♦ L switches are not preceded by 9007. They are known as the R.B. Denison® Lox Switch™ L, and include conveyor belt and slack cable pull switches in the product offering.

L300W Switches

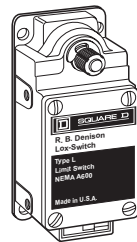
The L300W Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around the shaft. The devices can withstand hot falling sand up to 300° F (149° C).

Features L100, L300, L140, L2153, L525

- Captive cover screws
- Heavy duty snap action mechanism prevents teasing or false contact opening.
- Positive trip action prevents the lever from slipping around the 0.5 in. (12.7 mm) shaft even if not properly tightened.
- High current capability. 20 A maximum continuous
- Isolated (no polarity) double and triple circuits with double break (throw) action
- Wide 0.25 in. (6.3 mm) contact gap ensures very high shock and vibration resistance.
- Easy to access contacts allow for easy inspection and replacement.
- Stamped contact configuration number for easy identification even if the switch is painted
- Many contact arrangements to solve difficult applications
- Model L300 is an extra heavy duty version for very aggressive environments.
 - The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing.
 - Heavy duty stainless steel springs and hardened spring operators permit longer life under extreme lever fly-back and high impact.
 - Same parameters as L100 models, except that the distance between the back of the switch and the lever is increased by 0.34 in. (8.6 mm).
- Two and three circuits in CW, CCW, neutral position, spring return and maintained, snap action or slow-make slow-break, two steps (L525) are available.
- 2 circuit models can be CW or CCW field converted.
- Wide range of options: high shock and vibration, with gold contact, low or very high temperature
- 0.5 in. (12.7 mm) NPT conduit entrance standard on 2-pole models (5 wires max.)
- 0.75 in. (19 mm) NPT conduit entrance standard on 3-pole models (7 wires max.)

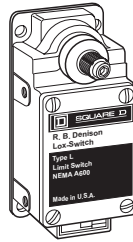
L100, L300 Switches (fixed sequence)

L100 Mill



Page 228

L300 Foundry

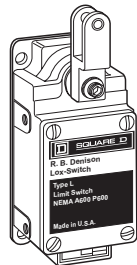


Page 230

- Model L300 is an extra heavy duty version for very aggressive environments
 - The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing.
 - Heavy duty stainless steel springs and hardened spring operators permit longer life under extreme lever fly-back and high impact.
 - Same parameters as L100 models, except that the distance between the back of the switch and the lever is increased by 0.34 in. (8.6 mm).

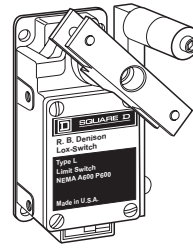
Cable Pulls (fixed sequence)

L140 Mill and Foundry



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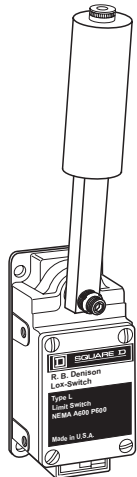
L2153 Mill and Foundry



Page 232

Belt Conveyors

L525 Mill and Foundry



Page 233

Conveyor belt limit switches are ideal for policing the lateral movement of belt conveyors. When the conveyor belt shifts, it contacts the switch roller and a 12° movement of the lever transfers the first set of contacts. This set is usually wired to initiate a warning alarm system to alert the worker that the belt is moving off the rollers. Further lateral movement of the belt, causing the lever to move another 8°, trips the second set of contacts. These contacts are normally wired to the conveyor drive system and when actuated stop the system, minimizing damage to the conveyor or loss of material on the belt.

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100, L300 Mill and Foundry Switches, L140, L2153 Cable Pulls, L529 Belt Conveyor

| Environmental characteristics | |
|-------------------------------|---|
| Conforming to standards | UL508 |
| Product certifications | UL Listed, CSA Certified, CE Marked |
| Protective treatment | Corrosion resistant gray paint |
| Ambient air temperature | -10 to +185 °F (-23 to +85 °C) With H prefix: -10 to +350 °F (-23 to +177 °C). (1) |
| Vibration resistance | 10G (10–55 Hz) |
| Shock resistance | 30G |
| Electric shock protection | Class O |
| Degree of protection | NEMA Types 1, 2, 4, 12, 13, IP65, 66, 67 |
| Cable entry or connector | 1/2" NPT (metric available) |
| Materials | Cast zinc ◊ |

1. For a switch with an ambient temperature rating up to 350 °F (177 °C), add an H to the beginning of the catalog number.
For example, change catalog number L100WS2M2 to HL100WS2M2.

| Contact block characteristics | | |
|---|------------|--|
| Rated operational characteristics hard contacts | AC Voltage | NEMA A600 Ithe = 20 A 20 A Resistive and continuous |
| Rated operational characteristics hard contacts | DC Voltage | NEMA P600 Ithe = 20 A 20 A Resistive and continuous |
| Rated insulation voltage | | 600 V |
| Rated impulse withstand voltage | | 2,500 Vac for 1 minute for CE, 2,200 Vac for 1 minute for UL, and 2,640 Vac for 1 minute for CSA |
| Positive opening | | No |
| Short circuit protection | | 20 A Bussmann Class CC KTK-R-20 fuse, non-time-delay |
| Terminal wire sizes (Cabling/Screw Clamp) | | 12 – 22 AWG (3.31 mm ² – 0.326 mm ²) wire max. |
| Maximum actuation speed | | 15.2 mpm / 27.4 mpm (50 fpm / 90 fpm) with 45 ° Cam angle, levers only |

| Contacts | AC | | | | | | | DC | | | | |
|---------------------------------|-------|----------------------------|--------|------------------|------|--|---|---------------------------|-------|-------------------------|-----------------|--|
| | Volts | Inductive 35% Power Factor | | | | Con- tinuous Carrying Amperes | Resistive 75% Power Factor | | Volts | Inductive and Resistive | | Con- tinuous Carrying Amperes |
| | | Make Amperes | VA | Break Amperes | VA | | Make, Break and Continuous Carrying Amperes | Make and Break Amperes | | Single Throw | Double Throw | |
| SPDT Quick Make and Break | 120 | 150 | 18,000 | 20 | 2400 | 20 | 20 | 120 | 5.0 | 9 | 20 | |
| | 240 | 75 | 18,000 | 12.5 | 3000 | 20 | 20 | 250 | 1.0 | 9 | 20 | |
| | 480 | 37.5 | 18,000 | 6.25 | 3000 | 20 | 20 | 600 | 0.2 | 9 | 20 | |
| | 600 | 30 | 18,000 | 5 | 3000 | 20 | 20 | | | | | |
| All Slow Make and Break | 120 | 60 | 7200 | 6 | 720 | 20 | 10 | 20 | 9 | 9 | 9 | |
| | 240 | 30 | 7200 | 3 | 720 | 20 | 10 | 20 | 9 | 9 | 9 | |
| | 480 | 15 | 7200 | 1.5 | 720 | 20 | 10 | 20 | 9 | 9 | 9 | |
| | 600 | 12 | 7200 | 1.2 | 720 | 20 | 10 | 20 | 9 | 9 | 9 | |

| Characteristics for material and ratings comparisons — standard switches ◊ | | |
|--|-------------------------------|-----------------------------------|
| | 9007 Type T/FT | Type L (R. B. Denison Lox Switch) |
| Body material | Cast zinc | Cast aluminum |
| Cover material | Cast zinc | Aluminum |
| Base plate material | Steel with zinc plating | Steel with chromate plating |
| Shaft seal material | Nitrile | PVC |
| Contact block material | Phenolic | Glass filled nylon |
| Moveable contact material | Fine silver on copper backing | Coin Silver on steel backing |
| Stationary contact material | Fine silver on copper backing | 90/10 AgCdO on copper backing |
| Low ambient temperature rating | -10° F | 0° F |
| High ambient temperature at full rating ♦ | 180° F | 200° F |
| Enclosure rating | NEMA Types 1, 2, 4, 12 and 13 | NEMA Types 1, 4 and 13 |
| Vibration resistance | 10G (10–150 Hz) | 40G max (10-150 Hz) |

♦ Many switches are available with higher or lower temperature limits by selecting special versions or special options. See page 237.

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100 Mill Switches

| L100 Mill Switches | | | | | |
|--|----------------------|-----------------|----------------|---------------------|-----------------|
| Description | Operating Torque | Contact Diagram | Catalog Number | Operating Data | Weight, lb (kg) |
| Snap-action CW spring return | 190 oz-in (1.34 N•m) | | L100WS2M1 | A (see page 229) | 1.51 (0.68) |
| Snap-action CCW spring return | 190 oz-in (1.34 N•m) | | L100WS2M2 | A (see page 229) | 1.51 (0.68) |
| Maintained contact ■ CW and CCW snap action | 45 oz-in (0.32 N•m) | | L100WS2M3 | A (see page 229) | 1.51 (0.68) |
| Snap action CW spring return | 190 oz-in (1.34 N•m) | | L100WDR2M4 | A (see page 229) | 1.51 (0.68) |
| Snap action CCW spring return | 190 oz-in (1.34 N•m) | | L100WDR2M5 | A (see page 229) | 1.51 (0.68) |
| Maintained contact ■ CW and CCW snap action | 45 oz-in (0.32 N•m) | | L100WDR2M6 | A (see page 229) | 1.51 (0.68) |
| Snap action CCW spring return | 190 oz-in (1.34 N•m) | | L100WDL2M7 | A (see page 229) | 1.51 (0.68) |
| Snap action CW spring return | 190 oz-in (1.34 N•m) | | L100WDL2M8 | A (see page 229) | 1.51 (0.68) |
| Snap action CW 1 N.C./ 2 N.O. spring return | 190 oz-in (1.34 N•m) | | L100WTR2M10 | A (see page 229) | 1.51 (0.68) |
| Snap action CCW 1 N.O./ 2 N.C. spring return | 190 oz-in (1.34 N•m) | | L100WTR2M11 | A (see page 229) | 1.51 (0.68) |
| Maintained contact ■ CW and CCW snap action 3 poles | 45 oz-in (0.32 N•m) | | L100WTR2M12 | A (see page 229) | 1.51 (0.68) |
| Snap action CCW 2 N.O./ 1 N.C. spring return | 190 oz-in (1.34 N•m) | | L100WTL2M13 | A (see page 229) | 1.51 (0.68) |
| Snap action CW 1 N.O./ 2 N.C. spring return | 190 oz-in (1.34 N•m) | | L100WTL2M14 | A (see page 229) | 1.51 (0.68) |
| Maintained contact ■ CW and CCW snap action 3 poles | 45 oz-in (0.32 N•m) | | L100WTL2M15 | A (see page 229) | 1.51 (0.68) |
| Neutral position ■ spring return slow make and break 1 N.O. contact per direction | 95 oz-in (0.67 N•m) | | L100WN2M16 | B (see page 229) | 1.51 (0.68) |
| Neutral position ■ spring return slow make and break 1 N.O. contact for both directions | 95 oz-in (0.67 N•m) | | L100WN2M17 | B (see page 229) | 1.51 (0.68) |

Dimensions:
page 238

Operating Data:
page 229

Interpretation of Catalog Numbers:
page 239

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100 Mill Switches

| L100 Mill Switches (continued) | | | | | |
|--|---------------------|-----------------|-----------------|------------------------|-----------------|
| Description | Operating Torque | Contact Diagram | Catalog Number | Operating Data | Weight, lb (kg) |
| Neutral position ■ spring return slow make and break 1 N.C.-CW, 1 N.C.-CCW | 95 oz-in (0.67 N•m) | | L100WNC2M18 | B (see table below) | 1.51 (0.68) |
| Neutral position ■ spring return slow make and break 2 N.O.-CW, 1 N.O.-CCW | 95 oz-in (0.67 N•m) | | L100WTRN2M20 | B (see table below) | 1.51 (0.68) |
| Neutral position ■ spring return slow make and break N.O.-CW, 2 N.O.-CCW | 95 oz-in (0.67 N•m) | | L100WTLN2M21 | B (see table below) | 1.51 (0.68) |
| Slow make-before-break CW spring return | 170 oz-in (1.2 N•m) | | L100WS02M22 | C (see table below) | 1.51 (0.68) |
| Slow make-before-break CCW spring return | 170 oz-in (1.2 N•m) | | L100WS02M23 | C (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O.-CW, N.O.-CCW spring return snap action | 170 oz-in (1.2 N•m) | | L100WNS2M26 | D (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O.-CW, N.O.-CCW maintained in CCW only | 170 oz-in (1.2 N•m) | | L100WNSR2M28 | D (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O.-CW, N.O.-CCW maintained in CW only | 170 oz-in (1.2 N•m) | | L100WNSL2M29 | D (see table below) | 1.51 (0.68) |
| Neutral position ■ N.C.-CW, N.C.-CCW spring return snap action | 170 oz-in (1.2 N•m) | | L100WNC2M34 | D (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O.-CW, N.O./N.C.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L100WTRN1C2M38 | B (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O./N.C.-CW, N.O.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L100WTLN1C2M39 | B (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L100WTRN2C2M40 | B (see table below) | 1.51 (0.68) |
| Neutral position ■ N.C.-CW, N.O./N.C.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L100WTLN2M41 | B (see table below) | 1.51 (0.68) |
| Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return snap action | 95 oz-in (0.67 N•m) | | L100WTRN2CS2M48 | D (see table below) | 1.51 (0.68) |

| Operating Data for Contact Arrangements | | | | |
|--|----------------------|---------------------|---------------------|----------------------|
| | A | B | C | D |
| Pretravel | 17° nominal | 7° maximum | 7° nominal | 9° nominal |
| Differential travel | 11° nominal | 4° maximum | — | 6° nominal |
| Overlapping travel | — | — | 4° nominal | — |
| Total travel | 80° | 70° | 80° | 70° |
| Recommended installation travel | 20°–35° | 10° – 25° | 20° – 35° | 13° – 30° |
| Repetitive accuracy of switch | ± 0.03x | — | — | ± 0.03x |
| Operating torque, max with return spring | 190 oz-in (1.34 N•m) | 95 oz-in (0.67 N•m) | 170 oz-in (1.2 N•m) | 170 oz-in (1.2 N•m) |
| Maintained contact | 45 oz-in (0.317 N•m) | — | — | 45 oz-in (0.317 N•m) |

Dimensions:
page 238

Operating Sequences for Conveyor Belts:
page 233

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L300 Foundry Switches

| L300 Foundry Switches | | | | | |
|--|----------------------|-----------------|----------------|---------------------|-----------------|
| Description | Operating Torque | Contact Diagram | Catalog Number | Operating Data | Weight, lb (kg) |
| Snap-action CW spring return | 190 oz-in (1.34 N•m) | | L300WS2M1 | A (see page 231) | 1.54 (0.70) |
| Snap-action CCW spring return | 190 oz-in (1.34 N•m) | | L300WS2M2 | A (see page 231) | 1.54 (0.70) |
| Maintained contact ■ CW and CCW snap action | 45 oz-in (0.32 N•m) | | L300WS2M3 | A (see page 231) | 1.54 (0.70) |
| Snap action CW spring return | 190 oz-in (1.34 N•m) | | L300WDR2M4 | A (see page 231) | 1.54 (0.70) |
| Snap action CCW spring action | 190 oz-in (1.34 N•m) | | L300WDR2M5 | A (see page 231) | 1.54 (0.70) |
| Maintained contact ■ CW and CCW snap action | 45 oz-in (0.32 N•m) | | L300WDR2M6 | A (see page 231) | 1.54 (0.70) |
| Snap action CCW spring return | 190 oz-in (1.34 N•m) | | L300WDL2M7 | A (see page 231) | 1.54 (0.70) |
| Snap action CW spring return | 190 oz-in (1.34 N•m) | | L300WDL2M8 | A (see page 231) | 1.54 (0.70) |
| Snap action CW 1 N.C./2 N.O. spring return | 190 oz-in (1.34 N•m) | | L300WTR2M10 | A (see page 231) | 1.54 (0.70) |
| Snap action CCW 1 N.O./2 N.C. spring return | 190 oz-in (1.34 N•m) | | L300WTR2M11 | A (see page 231) | 1.54 (0.70) |
| Maintained contact ■ CW and CCW snap action 3 poles | 45 oz-in (0.32 N•m) | | L300WTR2M12 | A (see page 231) | 1.54 (0.70) |
| Snap action CCW 2 N.O./1 N.C. spring return | 190 oz-in (1.34 N•m) | | L300WTL2M13 | A (see page 231) | 1.54 (0.70) |
| Snap action CW 1 N.O./2 N.C. spring return | 190 oz-in (1.34 N•m) | | L300WTL2M14 | A (see page 231) | 1.54 (0.70) |
| Maintained contact ■ CW and CCW snap action 3 poles | 45 oz-in (0.32 N•m) | | L300WTL2M15 | A (see page 231) | 1.54 (0.70) |
| Neutral position ■ spring return slow make and break 1 N.O. contact per direction | 95 oz-in (0.67 N•m) | | L300WN2M16 | B (see page 231) | 1.54 (0.70) |
| Neutral position ■ spring return slow make and break 1 N.O. contact for both directions | 95 oz-in (0.67 N•m) | | L300WN2M17 | B (see page 231) | 1.54 (0.70) |

Dimensions:
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Operating Data:
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Interpretation of Catalog Numbers:
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Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L300 Foundry Switches

| L300 Foundry Switches (continued) | | | | | |
|--|---------------------|-----------------|-----------------|------------------------|-----------------|
| Description | Operating Torque | Contact Diagram | Catalog Number | Operating Data | Weight, lb (kg) |
| Neutral position ■ spring return slow make and break 1 N.C.-CW, 1 N.C.-CCW | 95 oz-in (0.67 N•m) | | L300WNC2M18 | B (see table below) | 1.54 (0.70) |
| Neutral position ■ spring return slow make and break 2 N.O.-CW, 1 N.O.-CCW | 95 oz-in (0.67 N•m) | | L300WTRN2M20 | B (see table below) | 1.54 (0.70) |
| Neutral position ■ spring return slow make and break N.O.-CW, 2 N.O.-CCW | 95 oz-in (0.67 N•m) | | L300WTLN2M21 | B (see table below) | 1.54 (0.70) |
| Slow make-before-break CW spring return | 170 oz-in (1.2 N•m) | | L300WS02M22 | C (see table below) | 1.54 (0.70) |
| Slow make-before-break CCW spring return | 170 oz-in (1.2 N•m) | | L300WS02M23 | C (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O.-CW, N.O.-CCW spring return snap action | 170 oz-in (1.2 N•m) | | L300WNS2M26 | D (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O.-CW, N.O.-CCW maintained in CCW only | 170 oz-in (1.2 N•m) | | L300WNSR2M28 | D (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O.-CW, N.O.-CCW maintained in CW only | 170 oz-in (1.2 N•m) | | L300WNSL2M29 | D (see table below) | 1.54 (0.70) |
| Neutral position ■ N.C.-CW, N.C.-CCW spring return snap action | 170 oz-in (1.2 N•m) | | L300WNCS2M34 | D (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O.-CW, N.O./N.C.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L300WTRN1C2M38 | B (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O./N.C.-CW, N.O.-CCW Spring return slow make and break | 95 oz-in (0.67 N•m) | | L300WTLN1C2M39 | B (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L300WTRN2C2M40 | B (see table below) | 1.54 (0.70) |
| Neutral position ■ N.C.-CW, N.O./N.C.-CCW spring return slow make and break | 95 oz-in (0.67 N•m) | | L300WTLN2M41 | B (see table below) | 1.54 (0.70) |
| Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return snap action | 95 oz-in (0.67 N•m) | | L300WTRN2CS2M48 | D (see table below) | 1.54 (0.70) |

| Operating Data for Contact Arrangements | A | B | C | D |
|--|----------------------|---------------------|---------------------|----------------------|
| Pretravel | 17° nominal | 7° maximum | 7° nominal | 9° nominal |
| Differential travel | 11° nominal | 4° maximum | — | 6° nominal |
| Overlapping travel | — | — | 4° nominal | — |
| Total travel | 80° | 70° | 80° | 70° |
| Recommended installation travel | 20°-35° | 10° - 25° | 20° - 35° | 13° - 30° |
| Repetitive accuracy of switch | ± 0.03x | — | — | ± 0.03x |
| Operating torque, max with return spring | 190 oz-in (1.34 N•m) | 95 oz-in (0.67 N•m) | 170 oz-in (1.2 N•m) | 170 oz-in (1.2 N•m) |
| Maintained contact | 45 oz-in (0.317 N•m) | — | — | 45 oz-in (0.317 N•m) |

Dimensions:
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Operating Sequences for Conveyor Belts:
page 233

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches L140 and L2153 Cable Pulls



L140 Cable Pull



L2153 Dual Pull Stop

L140 Series Cable Pulls (1)

| Circuit | Direction | Catalog Number (2) | Weight lb (kg) |
|-------------------|-----------|--------------------|----------------|
| 1 N.C. | CW right | L142 | 1.54 (0.70) |
| 1 N.O. and 1 N.C. | CW right | L143 | 1.54 (0.70) |
| 1 N.O. and 1 N.C. | CCW left | L144 | 1.54 (0.70) |
| 1 N.C. | CCW left | L145 | 1.54 (0.70) |
| 2 N.O. and 1 N.C. | CW right | L146 | 1.54 (0.70) |
| 2 N.C. and 1 N.O. | CW right | L147 | 1.54 (0.70) |
| 2 N.O. and 1 N.C. | CCW left | L148 | 1.54 (0.70) |
| 2 N.C. and 1 N.O. | CCW left | L149 | 1.54 (0.70) |

1. Style K levers were designed specifically for this application; see page 235 (order separately).
2. To complete the catalog number, refer to page 239 and add the suffix for the mounting plate style and the front cover material.

L2153 Dual Pull Stop

| Description | Catalog Number | Weight lb (kg) |
|---|----------------|----------------|
| Dual pull cord switch—maintained contacts (stop and lever included) | L2153 | 2.04 (0.93) |

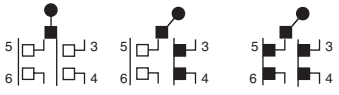
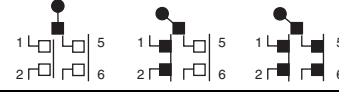
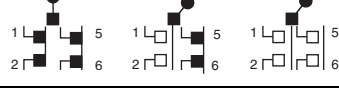
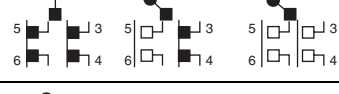
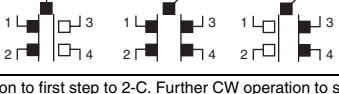
Characteristics

| | |
|--|---------------------------------|
| Pretravel | 17° ± 2° |
| Differential travel | 11° ± 2° |
| Overlapping travel | — |
| Total travel | 80° |
| Recommended installation travel | — |
| Repetitive accuracy of switch | ± 0.03x |
| Operating torque, max with return spring | 13–27 lb-in (1.47–3.05 N•m) |
| Reset torque | 7–19 lb-in (0.79–2.14 N•m) |
| Temperature range | -20 to 120 °F (-6.6 to 48.8 °C) |
| Maintained contact | — |

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L525 Belt Conveyor Switches

| L525 Belt Conveyor Switches | | | | |
|---|----------------------|--|----------------|----------------|
| Description | Operating Torque | Contact Diagram | Catalog Number | Weight lb (kg) |
| 2 step sequence CW spring return, snap action, 2 N.O. | 150 oz-in (1.06 N•m) |  | L525WDR2M56 | 1.5 (0.68) |
| 2 step sequence CCW spring return, snap action, 2 N.O. | 150 oz-in (1.06 N•m) |  | L525WDL2M57 | 1.5 (0.68) |
| 2 step sequence CW spring return, snap action, 2 N.C. | 150 oz-in (1.06 N•m) |  | L525WDL2M58 | 1.5 (0.68) |
| 2 Step sequence CCW spring return, snap action, 2 N.C | 150 oz-in (1.06 N•m) |  | L525WDR2M59 | 1.5 (0.68) |
| 2 Step sequence CW spring return, snap action, N.O./N.C | 150 oz-in (1.06 N•m) |  | L100WS0S2M60 | 1.5 (0.68) |

■ Two step snap action. One normally closed, one normally open; CW operation to first step to 2-C. Further CW operation to second step, 1-O, 1-C. Spring return. Pretravel 9° nominal. Additional travel 8° nominal. Differential second step 7° nominal. Differential first step 7° nominal.

Characteristics

| | |
|--|------------------------------|
| Pretravel | 12° nominal |
| Additional travel | 8° nominal |
| Differential travel | 7× nominal |
| Total travel | 75° nominal |
| Operating torque, max with return spring | 150 oz-in nominal (1.06 N•m) |

Dimensions:
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Limit Switches

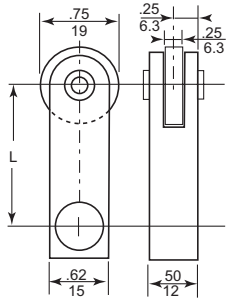
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100/L300 Lever Arms

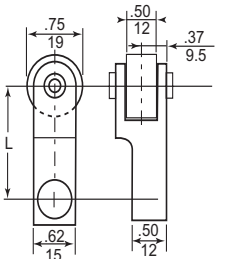
Lever Arms

Lever arms are constructed of machined aluminum.

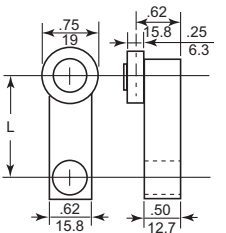
Dual dimensions: in. (mm)



Style A



Style B



Style C

| Style A Steel Roller | | | | |
|----------------------|--------------|------------|------------------|----------------|
| Arm | Steel roller | | Catalog Number ♦ | Weight lb (kg) |
| Length | Diameter | Width | | |
| 1.25 (31.7) | 0.75 (19) | 0.25 (6.3) | AC | 0.06 (0.027) |
| 1.50 (38.1) | 0.75 (19) | 0.25 (6.3) | AA | 0.06 (0.027) |
| 1.75 (44.4) | 0.75 (19) | 0.25 (6.3) | AD | 0.07 (0.031) |
| 2.00 (50.8) | 0.75 (19) | 0.25 (6.3) | AH | 0.08 (0.036) |
| 2.25 (57.1) | 0.75 (19) | 0.25 (6.3) | AJ | 0.09 (0.041) |
| 2.50 (63.5) | 0.75 (19) | 0.25 (6.3) | AO | 0.10 (0.045) |
| 2.75 (69.8) | 0.75 (19) | 0.25 (6.3) | AK | 0.10 (0.045) |
| 3.00 (76.2) | 0.75 (19) | 0.25 (6.3) | AB | 0.11 (0.050) |
| 3.50 (88.9) | 0.75 (19) | 0.25 (6.3) | AL | 0.12 (0.054) |
| 4.00 (101.6) | 0.75 (19) | 0.25 (6.3) | AM | 0.13 (0.059) |
| 4.50 (114.3) | 0.75 (19) | 0.25 (6.3) | AN | 0.14 (0.064) |
| 5.00 (127.0) | 0.75 (19) | 0.25 (6.3) | AP | 0.16 (0.073) |
| 5.50 (139.7) | 0.75 (19) | 0.25 (6.3) | AQ | 0.18 (0.082) |
| 6.00 (152.4) | 0.75 (19) | 0.25 (6.3) | AR | 0.20 (0.091) |

♦ Example: AC — This is the complete catalog number to order.

| Style A Options | | |
|-----------------|------------------------|---------------------------|
| Diameter | Description | Catalog Number—Add Suffix |
| 1.00 (25.4) | Roller | 1 |
| 1.25 (32) | Roller | 4 |
| 1.50 (38.1) | Roller | 2 |
| — | Nylon roller | N |
| 0.75 (19) | Ball bearing roller | R |
| — | Stainless steel roller | NS |

| Style B Steel Roller | | | | |
|----------------------|--------------|-------------|----------------|----------------|
| Arm | Steel roller | | Catalog Number | Weight lb (kg) |
| Length | Diameter | Width | | |
| 1.50 (38.1) | 0.75 (19) | 0.50 (12.7) | BA | 0.06 (0.027) |
| 2.00 (50.8) | 0.75 (19) | 0.50 (12.7) | BH | 0.08 (0.036) |
| 2.50 (63.5) | 0.75 (19) | 0.50 (12.7) | BO | 0.10 (0.045) |
| 3.00 (76.2) | 0.75 (19) | 0.50 (12.7) | BB | 0.12 (0.054) |
| 4.00 (101.6) | 0.75 (19) | 0.50 (12.7) | BM | 0.13 (0.059) |
| 4.50 (114.3) | 0.75 (19) | 0.50 (12.7) | BN | 0.14 (0.064) |
| 5.50 (139.7) | 0.75 (19) | 0.50 (12.7) | BQ | 0.18 (0.082) |
| 6.00 (152.4) | 0.75 (19) | 0.50 (12.7) | BR | 0.20 (0.091) |

| Style B Options | | |
|-----------------|--------------|---------------------------|
| Diameter | Description | Catalog Number—Add Suffix |
| — | Nylon roller | N |
| 1.50 (38.1) | Roller | 2 |

| Style C Steel Roller On Side | | | | |
|------------------------------|--------------|------------|----------------|----------------|
| Arm | Steel roller | | Catalog Number | Weight lb (kg) |
| Length | Diameter | Width | | |
| 1.25 (31.7) | 0.75 (19) | 0.25 (6.3) | CC | 0.06 (0.027) |
| 1.50 (38.1) | 0.75 (19) | 0.25 (6.3) | CA | 0.06 (0.027) |
| 1.75 (44.4) | 0.75 (19) | 0.25 (6.3) | CD | 0.07 (0.031) |
| 2.00 (50.8) | 0.75 (19) | 0.25 (6.3) | CH | 0.08 (0.036) |
| 2.50 (63.5) | 0.75 (19) | 0.25 (6.3) | CO | 0.10 (0.045) |
| 3.00 (76.2) | 0.75 (19) | 0.25 (6.3) | CB | 0.11 (0.050) |
| 3.50 (88.9) | 0.75 (19) | 0.25 (6.3) | CL | 0.12 (0.054) |
| 4.00 (101.6) | 0.75 (19) | 0.25 (6.3) | CM | 0.13 (0.059) |
| 6.00 (152.4) | 0.75 (19) | 0.25 (6.3) | CR | 0.20 (0.091) |

| Style C Options | | |
|-----------------|--------------|---------------------------|
| Diameter | Description | Catalog Number—Add Suffix |
| 1.0 (24.5) | Roller | 1 |
| 1.25 (32) | Roller | 4 |
| 1.50 (38.1) | Roller | 2 |
| — | Nylon roller | N |

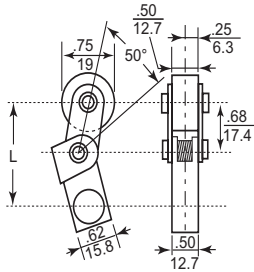
Dimensions:
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Limit Switches

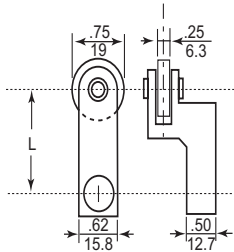
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100/L300 Lever Arms

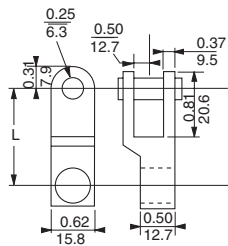
Dual dimensions: in. (mm)



Style E



Style F



Style K

Style E One Way Steel Roller

| Arm | Steel roller | | Catalog Number | Weight lb (kg) |
|-------------|--------------|-------------|----------------|----------------|
| Length | Diameter | Width | | |
| 1.50 (38.1) | 0.75 (19) | 0.50 (12.7) | EA | 0.30 (0.136) |
| 1.75 (44.4) | 0.75 (19) | 0.50 (12.7) | ED | 0.40 (0.181) |
| 3.00 (76.2) | 0.75 (19) | 0.50 (12.7) | EB | 0.50 (0.227) |

Style E Options

| Diameter in. (mm) | Description | Catalog Number Add Suffix |
|-------------------|--------------|---------------------------|
| — | Nylon roller | N |

Style F Offset Steel Roller

| Arm | Steel roller | Roller Position | | Catalog Number | Weight lb (kg) |
|-------------|--------------|-----------------|------------|----------------|----------------|
| Length | Diameter | Offset | Width | | |
| 1.50 (38.1) | 0.75 (19) | 0.62 (15.8) | 0.15 (3.8) | FB | 0.06 (0.027) |
| 1.50 (38.1) | 0.75 (19) | 0.87 (22.2) | 0.15 (3.8) | FA | 0.06 (0.027) |
| 1.50 (38.1) | 0.75 (19) | 1.00 (25.4) | 0.15 (3.8) | FC | 0.06 (0.027) |
| 2.00 (50.8) | 0.75 (19) | 1.00 (25.4) | 0.15 (3.8) | FE | 0.08 (0.036) |
| 2.50 (63.5) | 0.75 (19) | 1.00 (25.4) | 0.15 (3.8) | FG | 0.10 (0.045) |
| 3.00 (76.2) | 0.75 (19) | 0.62 (15.8) | 0.15 (3.8) | FI | 0.11 (0.050) |
| 3.00 (76.2) | 0.75 (19) | 1.00 (25.4) | 0.15 (3.8) | FJ | 0.11 (0.050) |

Style F Options

| Diameter | Description | Catalog Number—Add Suffix |
|-------------|--------------|---------------------------|
| 1.00 (24.5) | Roller | 1 |
| — | Nylon roller | N |

Style K (for use with L140 cable pulls)

| Arm | Steel roller | Description | Catalog Number ♦ | Weight lb (kg) |
|-------------|--------------|-------------|------------------|----------------|
| 1.50 (38.1) | — | — | KA | 0.05 (0.023) |
| 2.50 (63.5) | — | — | KO | 0.08 (0.036) |
| 3.00 (76.2) | — | — | KB | 0.09 (0.041) |

♦ Example: KA — This is the complete catalog number to order.

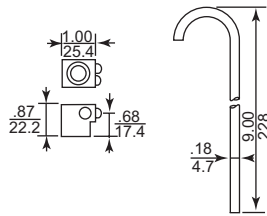
Style L (renewal parts for L2153 dual pull stop)

| Description | Catalog Number | Weight lb (kg) |
|-----------------|----------------|----------------|
| Lever | AL1746 | 0.25 (0.113) |
| Mechanical stop | AL1649 | 0.10 (0.045) |

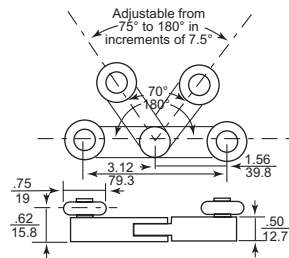
Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches Lever Arms

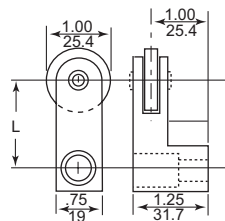
Dual dimensions: in. (mm)



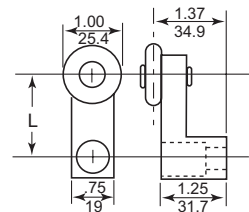
Style R



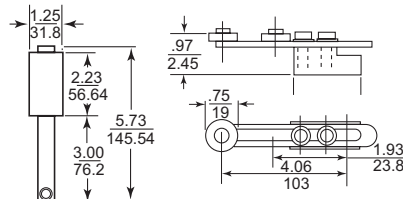
Style V



Style LA



Style LC



Rolling Pin

Adjustable Rolling Pin

Style R Steel Rod

| Description | Catalog Number | Weight lb (kg) |
|-------------|----------------|----------------|
| Hub only | R | 0.10 (0.045) |
| Rod only | R9 | 0.09 (0.041) |

Style V Yoke (for maintained position switches)

| Description | Catalog Number | Weight lb (kg) |
|-------------|----------------|----------------|
| Yoke | VA | 0.50 (0.227) |

Style V Options

| Diameter | Description | Catalog Number—Add Suffix |
|------------|---------------------|---------------------------|
| 1.0 (24.5) | Roller | 1 |
| — | Nylon roller | N |
| 0.75 (19) | Ball bearing roller | R |

Style LA (to pass over switch cover)

| Arm | Catalog Number | Weight lb (kg) |
|-----------|----------------|----------------|
| Length | | |
| 1.50 (30) | LAA1 | 0.12 (0.054) |
| 2.00 (50) | LAH1 | 0.12 (0.054) |
| 2.50 (63) | LA01 | 0.12 (0.054) |

Style LA Options

| Diameter | Description | Catalog Number—Add Suffix |
|----------|--------------|---------------------------|
| 1.5 (38) | Roller | 2 |
| — | Nylon roller | N |

Style LC (to pass over switch cover)

| Arm | Catalog Number | Weight lb (kg) |
|-----------|----------------|----------------|
| Length | | |
| 1.50 (30) | LCA1 | 0.12 (0.054) |
| 2.00 (50) | LCH1 | 0.12 (0.054) |
| 2.50 (63) | LCO1 | 0.13 (0.059) |

Style LC Options

| Diameter | Description | Catalog Number—Add Suffix |
|-----------|--------------|---------------------------|
| 1.25 (32) | Roller | 4 |
| 1.5 (38) | Roller | 2 |
| — | Nylon roller | N |

Rolling Pin (for use with 2 step switches for conveyor or belt applications)

| Arm | Catalog Number | Weight lb (kg) | |
|-------------|-----------------------------|----------------|--------------|
| Length | | | |
| 2.25 (75.1) | AL1650 | 0.30 (0.136) | |
| 2.25 (75.1) | High temp. Teflon® material | AL16501 | 0.33 (0.150) |
| 3.0 (50.8) | AL1802 | 0.33 (0.150) | |

Rolling Pin (adjustable)

| Arm | Steel roller | Width | Catalog Number | Weight lb (kg) |
|-------------------------|--------------|------------|----------------|----------------|
| Length | Diameter | | | |
| 2.00 (51) to 4.00 (102) | 0.75 (19) | 0.25 (6.3) | AL1650 | 0.30 (0.136) |

◆ Example: KA — This is the complete catalog number to order.

Note: No hub component is needed for Type AL rolling pins. The arm mounts directly onto the shaft of the switch.

Dimensions:
page 238

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100/L300 Options and Accessories



Mini Change Connector



Straight Male Connector



90° Angle Male Connector

Housing Options •

| Description | Example | Catalog Number | Weight lb (kg) |
|--|------------------------------------|----------------|-------------------|
| | Full Catalog Number | Add Prefix | |
| 0.75 in. conduit opening Available on 2 circuit switches. Standard on 3 circuit switches | L100WS2M1 changes to GL100WS2M1 | G | 1.54 (0.70) |
| High temperature 0 to +350 °F (-17.7 to +176.6 °C) ■ Metal front cover only | L100WS2M1 changes to HL100WS2M1 | H | 1.54 (0.70) |
| Low temperature -20 to 200 °F (-28.8 to +93.3 °C) ■ | L100WS2M1 changes to TL100WS2M1 | T | 1.54 (0.70) |
| High shock Available only on operating sequences 1, 2, 4, 5, 7-11, 13, 14 | L100WS2M1 changes to L526WS2M1 | 526 | 1.54 (0.70) |
| | L300WS2M1 changes to L326WS2M1 | 326 | |
| Gold contacts | L100WS2M1 changes to L522WS2M1 | 522 | 1.54 (0.70) |
| | L300WS2M1 changes to L322WS2M1 | 322 | |
| Metric conduit threads M20 (20 mm) | L100WS2M1 changes to ML100WS2M1 | M | 1.54 (0.70) |

Wiring

| Description | Example | Catalog Number | Weight lb (kg) |
|--|--------------------------------------|----------------|-------------------|
| | Full Catalog Number | Add Prefix | |
| Straight male receptacle 4-pin ▲ Factory prewired | L100WS2M1 changes to PL100WS2M1 | P | 1.54 (0.70) |
| 90° Angle male receptacle 4-pin ▲ Factory prewired—facing right | L100WS2M1 changes to APL100WS2M1 | AP | 1.54 (0.70) |
| Ministyle male receptacle † 8 A max. 5-pin (double circuit) or 7 A max. 7-pin (triple circuit) | L100WS2M1 changes to BL100WS2M1 | B | 1.54 (0.70) |
| Potted and prewired | Example | Add Suffix | Weight lb (kg) |
| 5 wires 6 feet (1.8 mm) long | L100WS2M1 changes to L100WS2M1P | P | 1.54 (0.70) |
| 5 wires 12 feet (3.6 mm) long | L100WS2M1 changes to L100WS2M1P12 | P12 | |
| 5 wires 18 feet (5.5 mm) long | L100WS2M1 changes to L100WS2M1P18 | P18 | |

Front Covers

| Description | Example | Catalog Number | Weight lb (kg) |
|---|-------------------------------------|----------------|-------------------|
| | Full Catalog Number | Add Suffix | |
| Standard metal | | M | — |
| Transparent plastic cover with metal frame | | PF | — |
| Transparent plastic cover with metal frame and Neon indicator light (not connected) | | GF | — |
| | L100WS2M1 changes to L100WS2PF 1 | | 1.54 (0.70) |

Accessories

| Description | Catalog Number | Weight lb (kg) |
|---|-----------------|----------------------|
| Sealed female plug and cable for P and AP connector | | |
| 4 pin, #16 AWG STO cable 140 °F (60 °C) | 4 ft. (1.21 m) | 1010004 1.20 (0.54) |
| | 6 ft. (1.82 m) | 1010006 1.25 (0.57) |
| | 10 ft. (3.04 m) | 10100010 1.50 (0.68) |
| Sealed female plug and cable for ministyle connector (B) | | |
| 5 pin, #16 AWG STO cable 221 °F (105 °C) | 3 ft. (0.91 m) | BH2053 1.50 (0.68) |
| | 6 ft. (1.82 m) | BH2056 1.70 (0.77) |
| | 12 ft. (3.65 m) | BH20512 2.10 (0.95) |

- Other options available — contact your local field office for details.
- ▲ Receptacle is a 4-pin male APL/PL-SWTS, Cannon part # MS3102E20-4P-F79 or equal.
- † Ministyle male connectors are:
 - 5-pin: Brad Harrison #41310 (or equal)
 - 7-pin: Brad Harrison #42805 (or equal)
- The minimum temperatures listed are based on the absence of freezing moisture or water.

Limit Switches

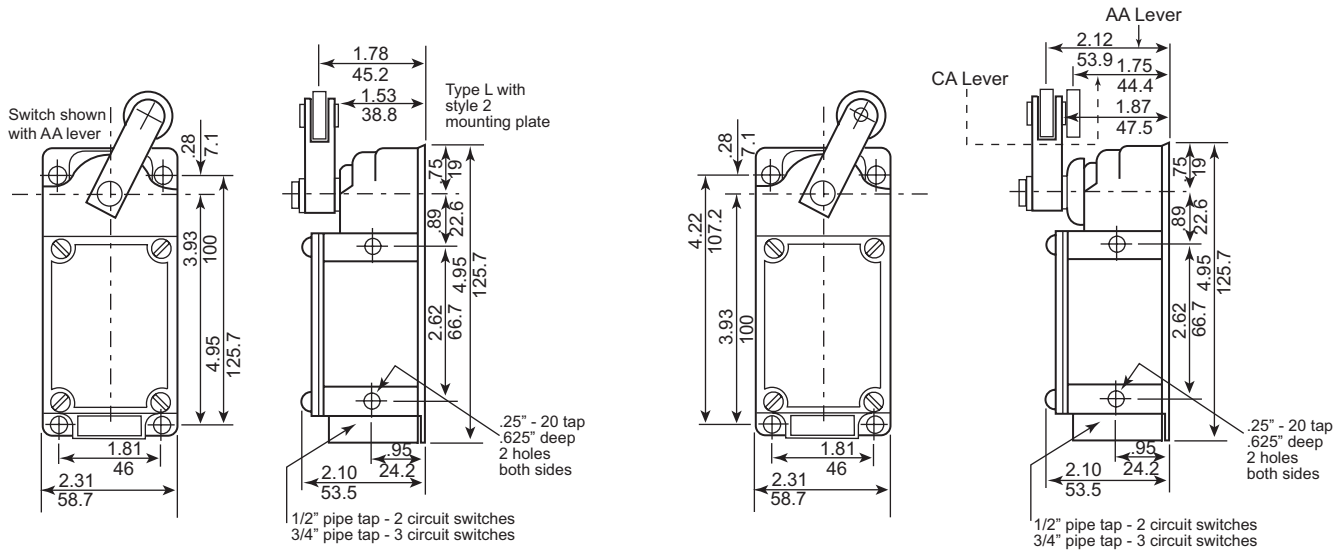
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

Dimensions

Switches

Type L100

Type L300



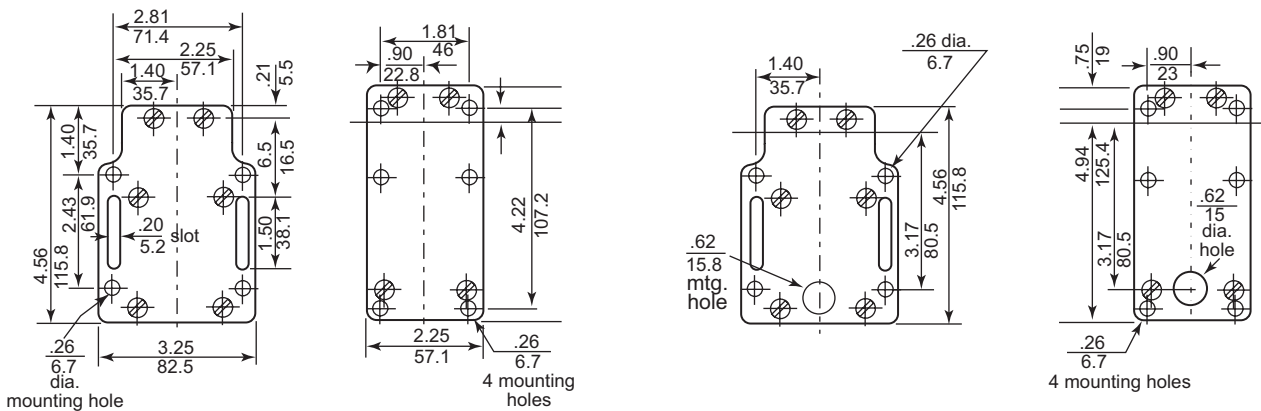
Base Plates

Style 1

Style 2

Style 3

Style 4

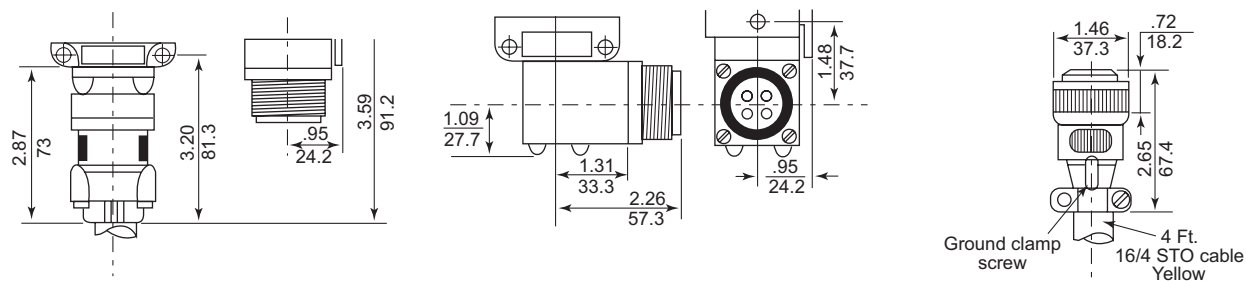


Receptacles

PL

APL

101000



Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Limit Switches

Interpretation of Catalog Numbers

Severe Duty Mill and Foundry Switches

Interpretation of Catalog Numbers

The interpretation of catalog numbers is intended to help you understand how the catalog number is laid out. It is to be used with existing numbers only. The table below should not be used to generate new catalog numbers. If the contact sequence required is not listed, contact your local field office.

L100 and L300



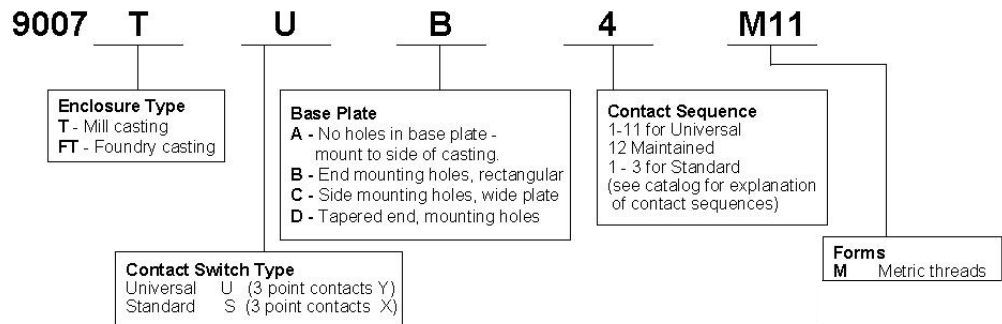
| Style | Housing | | | Function | Mounting Plate | Front Cover | | Contact Arrangement | |
|------------------------------|----------|-----------------------------------|----------|----------|----------------|-------------|----------|-------------------------------------|----------------|
| L | 1 | 0 | 0 | W | S | 2 | P | F | |
| | | | | | | | | | 1 to 60 |
| Mill | 100 | L14" and L2153 pull cord switches | | | Style 1 | 1 | M | Standard metal | |
| Foundry | 300 | | | | Style 2 | 2 | PF | Transparent plastic | |
| Belt Conveyor | 525 | | | | Style 3 | 3 | GF | Transparent plastic with neon light | |
| Two circuit single operation | | | | WS | Style 4 | 4 | | | |
| Two circuit dual operation | | | | WD | | | | | |
| Triple circuit | | | | WT | | | | | |
| Neutral | | | | WN | | | | | |

The only modifications to the existing catalog numbers are:

- Base Plates: Select style 1, 2, 3 or 4
- Front Covers: Select metal, transparent plastic, or transparent plastic with neon light.

For special features see page 237.

9007T and FT



Sensors, Limit Switches, and Connector Cables

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