Limit Switches

Catalog
March
07

File 9007 / XC

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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**	—	1 entry for ISO M16 or M20, PG 11, PG 13 conduit thread or 1/2" NPT, PF 1/2		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		42	54 and 58	60 and 64	66

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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			
Contact blocks – 3 snap action contacts with positive opening operation	—			
Contact blocks – 4 snap action contacts with positive opening operation	—			
Contact blocks – 2 slow break contacts with positive opening operation	—	**N/C + N/O** break before make		
Contact blocks – 2 slow break contacts	—			
Contact blocks – 3 slow break contacts with positive opening operation	—			
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)
Connection – **Pre-cabled**	Yes	—		
Connection – **Connector**	—			
Page	50	74	76	78

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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	N/C + N/O; N/C + N/C
	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
	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	1 entry for ISO M20 or PG 13 conduit thread or 1/2" NPT
	Connector	—	—	Integral M12 or 7/8" 16UN
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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	—		
	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	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	Depending on type: by tags or pre-wired
	Connector	—			
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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 148	Bottom or side cable entry. Full range of operating heads, page 152.	Bottom cable entry. Three common operating heads, page 156.	Most common operating heads. Micrometer adjustable push rod plunger. Uses 9007C levers, page 186.

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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 172 to 176				
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**	**9007C54•••**	1 N.O. + 1 N.C.	Reed contacts 1 N.O. or 1 N.C.	1 N.O. + 1 N.C.	**9007CR53••** 1 N.O. + 1 N.C.
		9007C62•••	2 N.O. + 2 N.C.			**9007CR61••** 2 N.O. + 2 N.C.
		9007C68•••	2 N.O. + 2 N.C. neutral position			**9007CR65••** 2 N.O. + 2 N.C. neutral position
		9007C66•••	2 N.O. + 2 N.C. two stage			**9007CR67••** 2 N.O. + 2 N.C. two stage
	Direct opening (positive opening)	9007C•••• Y1561 → Plunger and lever heads only Single pole only			9007C•••• 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.
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1. A wide range lof connectors are available. Contact your local field office.

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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 217	Page 233	Page 233	Page 233
Conforming to standards	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508
Product				
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 — **Snap action contacts** *(1)*	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.
Contact blocks — **Sequences**	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 212	Page 224	Page 228	Page 229
Interpretation of Catalog Numbers	Page 235	Page 235	Page 235	Page 235

1. For other contact options see page 212.
2. A wide range lof connectors are available. Contact your local field office.
3. Lever arms are optional and must be ordered separately.

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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 217	Page 233	Page 233
Conforming to standards	NEMA A600 UL508	NEMA A600 UL508	NEMA A600 UL508
Product			
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 – Snap action contacts ♦	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.	1 N.C. + 1 N.O.
Contact blocks – 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)
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1. A wide range lof connectors are available. Contact your local field office.
2. Lever arms are optional and must be ordered separately.

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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

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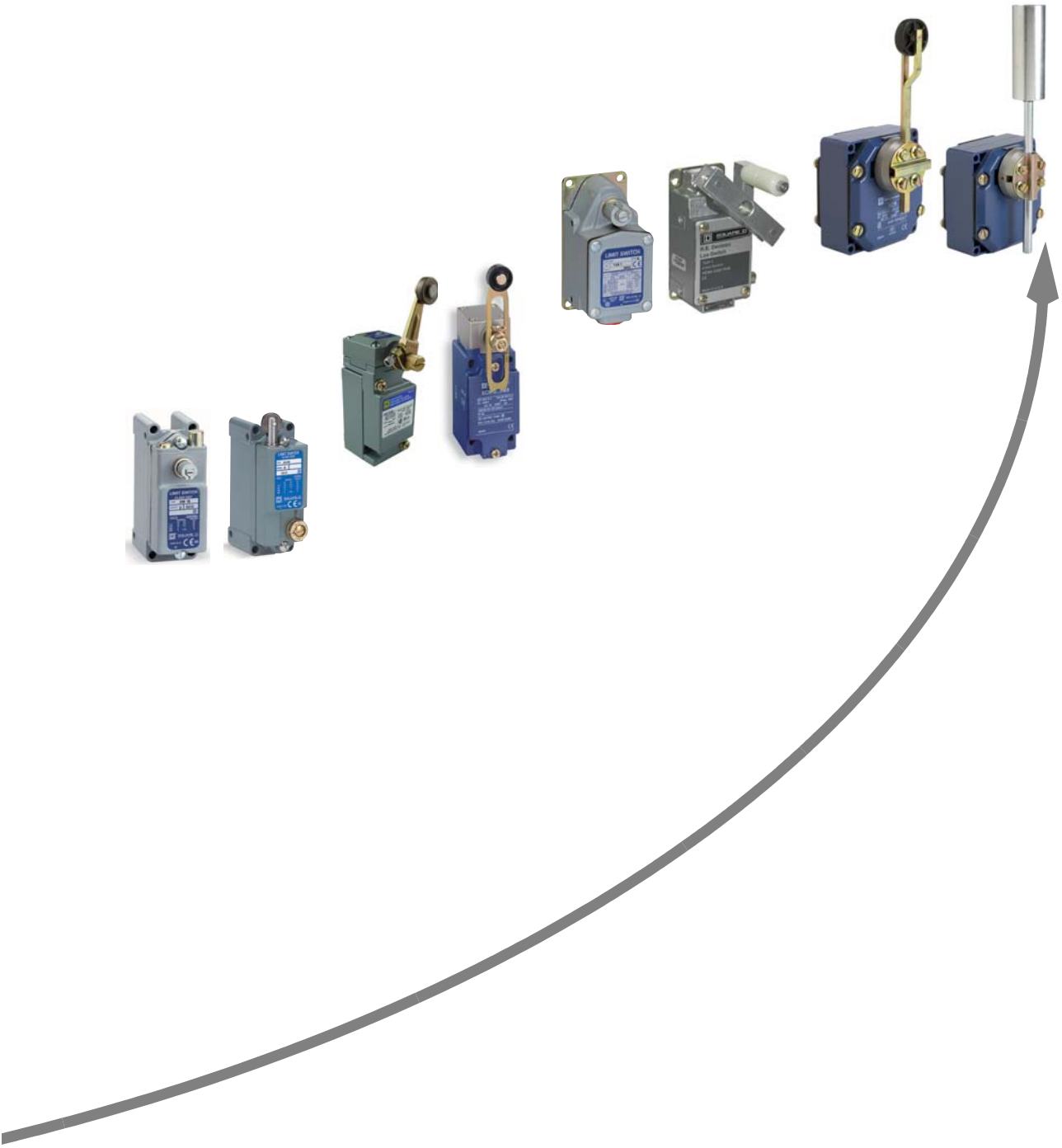

9007AW

XCKJ
9007C

L100/L300
9007T/FT

XCR
9007CLS

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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

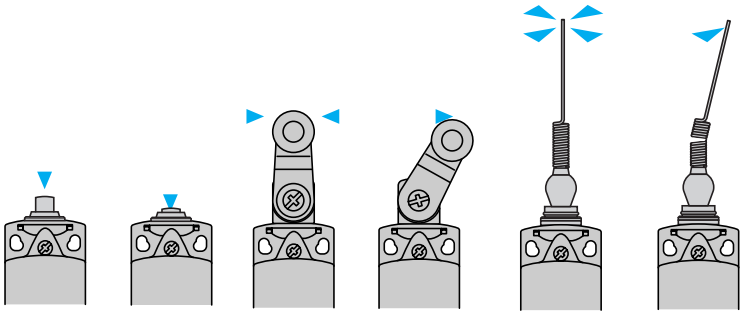
Simplicity of installation, advantages

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 Ie/Ie. • 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 Ie/Ie.
Switching capacity	• Ithe is no longer a rated value but a conventional current used for heating tests. **Example**: for category A300 the corresponding operational current, Ie maximum, is 6 A-120 V or 3 A-240 V, the equivalent Ithe 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.

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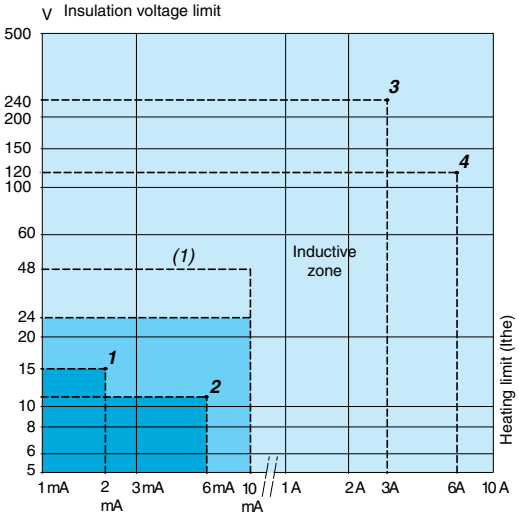
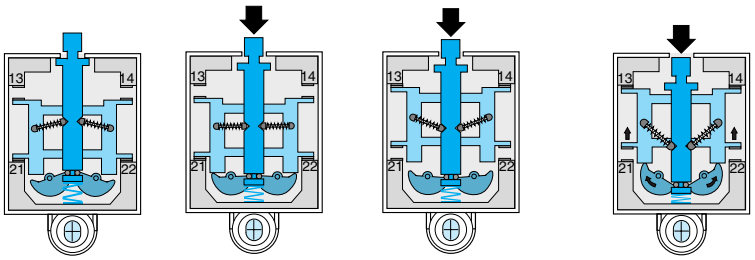
Contact blocks



Snap action contacts

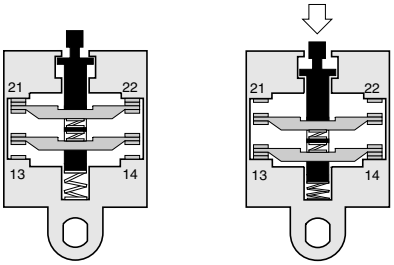
- Snap action contacts are characterized by different tripping and reset points (differential travel).
- The displacement speed of the moving contacts is not related to the speed of the operator.
- This feature ensures satisfactory electrical performance in applications involving low speed actuators.



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

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Principle

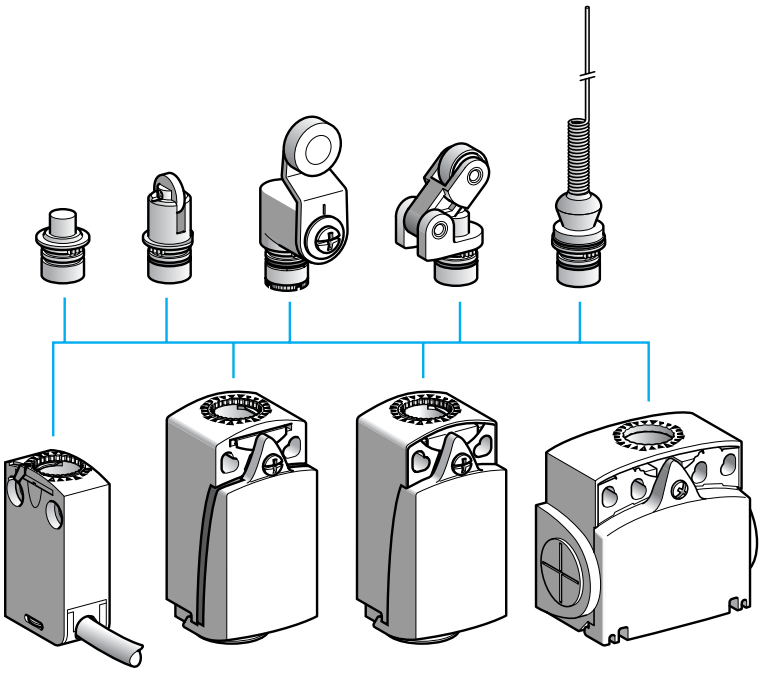
Innovation through modularity

- The Miniature design XCMD and Compact design XCKD, XCKP and XCKT product range family benefits from the **Osi**concept™ principle: **O**ffering **s**implicity through **i**nnovation.
- 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.

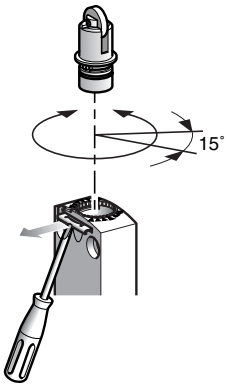
Heads

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

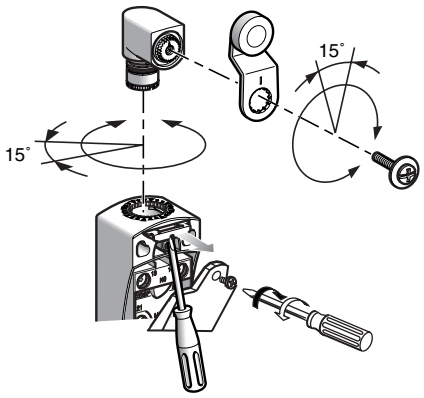
.



- 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.

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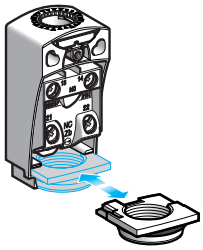
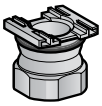
Principle *(continued)*



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

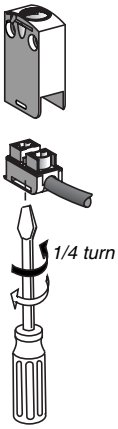


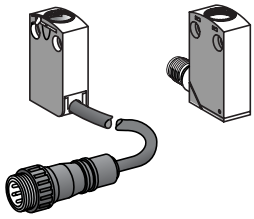
6 models are available:

- 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.

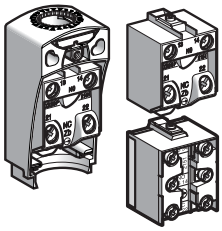
Connection components

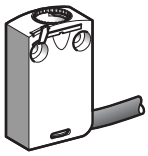




- The miniature XCMD range allows interchangeability of these pre-cabled connection components:
  - — 1/4 turn is all that is required to remove the connection component on XCMD bodies with 2 and 3 contacts,
  - — 6 alternative cable lengths are available.
- The miniature XCMD range also includes an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

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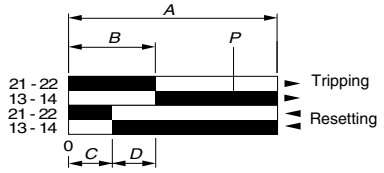
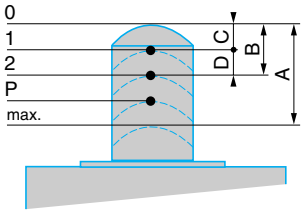
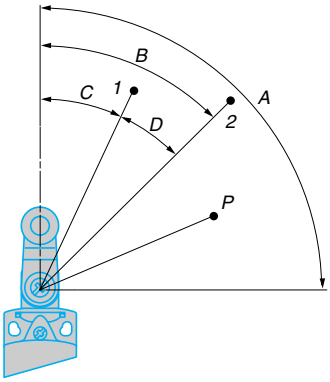
Contact blocks (continued)







Functional diagrams of snap action contacts

- **Example: N/C + N/O**

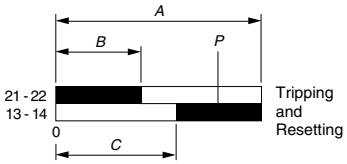
A—Maximum travel of the operator in mm or degrees.
B—Tripping travel of contact.
C—Resetting travel of contact.
D—Differential travel = B–C.
P—Point from which positive opening is assured.

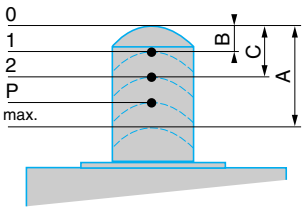
- Linear movement (plunger)

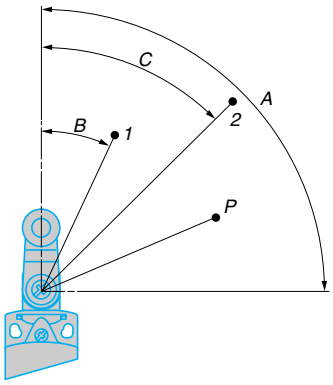
1—Resetting point of contact.
2—Tripping point of contact.
A—Maximum travel of the operator in mm.
B—Tripping travel of contact.
C—Resetting travel of contact.
D—Differential travel = B–C.
P—Point from which positive opening is assured.

- 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.

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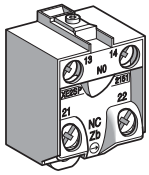
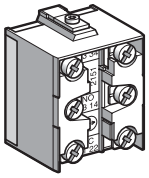
Contact blocks (continued)

XE2• P screw clamp terminal connections



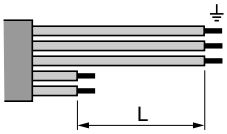
XE3• P screw clamp terminal connections

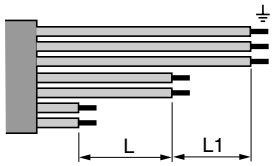


Mounting

Contact connections

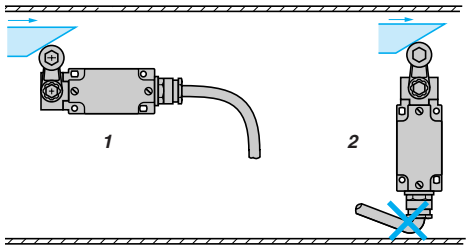
- Tightening torque:
  - — minimum tightening torque ensuring the nominal characteristics of the contact: 0.8 N•m (7.08 lb-in)
  - — maximum tightening torque without damage to the terminals: 1.2 N•m (10.62 lb-in) for **XE2•P**, 1 N•m (8.85 lb-in) for **XE3•P**
- Connecting cable: cable preparation lengths:
  - — 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.)





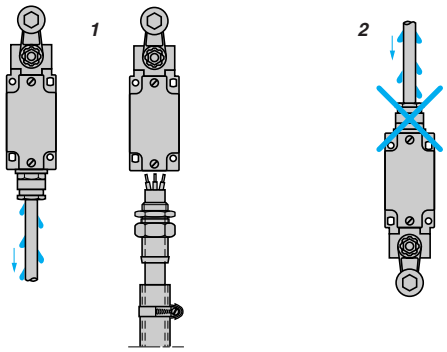
Sweep of connecting cable

1 Recommended
2 To be avoided



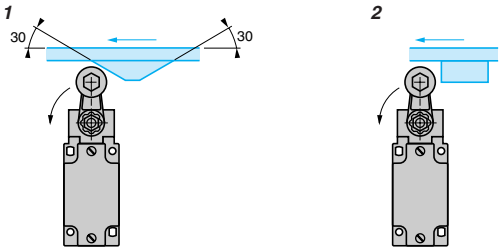
Position of cable entry

1 Recommended
2 To be avoided



Type of cam

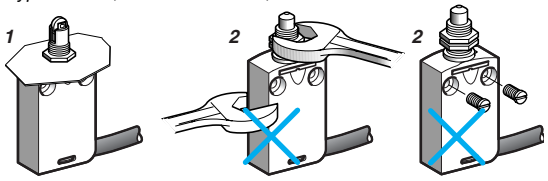
1 Recommended
2 To be avoided



Mounting limit switches by the head

1 Recommended
2 Forbidden

Types XCKD, XCKP and XCKT, XCMD and XCMN



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Setup

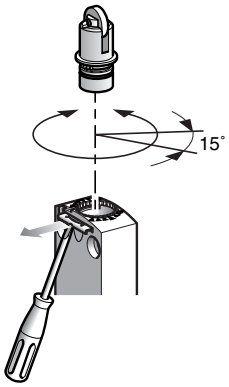
Tightening torque

- 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.

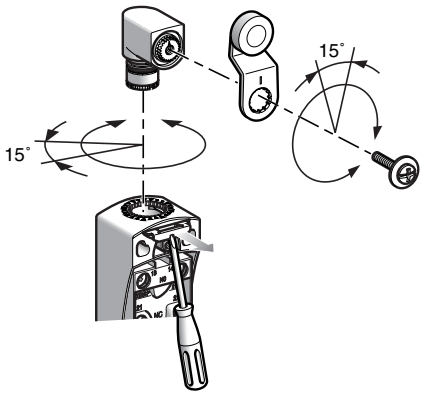
Range	Item	Torque, N•m (lb-in)	
		Min.	Max.
Compact design XCKD, XCKP, XCKT	Cover	0.8 (7.08)	1.2 (10.62)
	Mounting screw for lever on rotary head	1 (8.85)	1.5 (13.28)
Miniature design XCMD, XCMN	—	—	—
	Mounting screw for lever on rotary head	1 (8.85)	1.5 (13.28)
Classic design XCKJ	Cover	1 (8.85)	1.5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

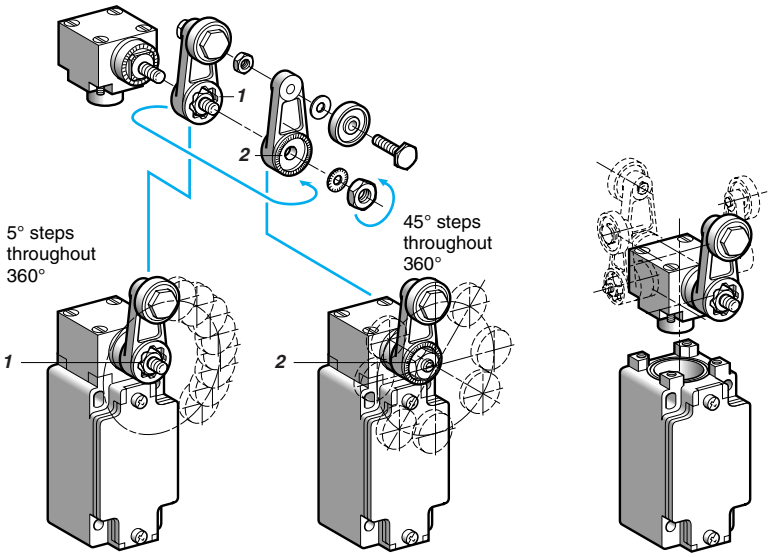


All the levers can be adjusted in 15° steps throughout 360°, in relation to the horizontal axis of the head.

Type XCKJ

- Adjustable through 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.

1. Reversed $\alpha = 5°$
2. *Forward $\alpha = 45°$*



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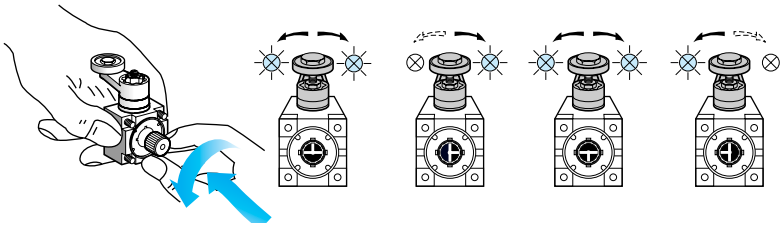
Setup (continued)

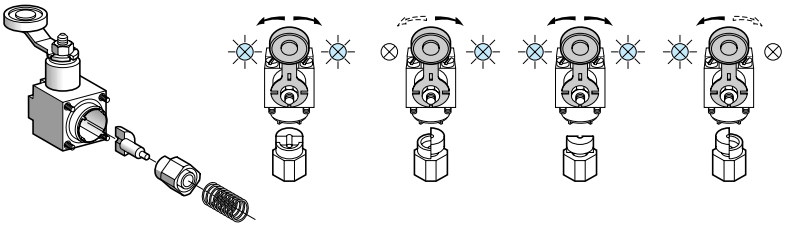
Direction of actuation programming

- XCKJ



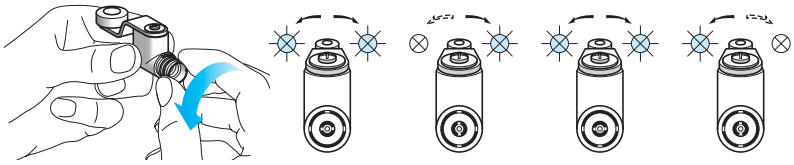
Head ZCKE05

- XCKS



Head ZCKD05

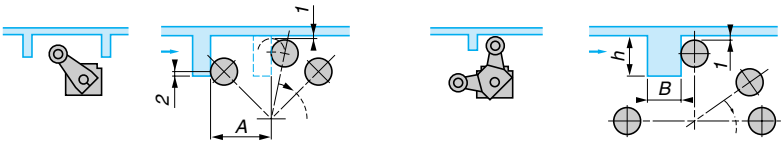
- XCKD, XCKP, XCKT and XCMD



Head ZCE05

Specific cams for heads ZCKE09 and ZC2J09

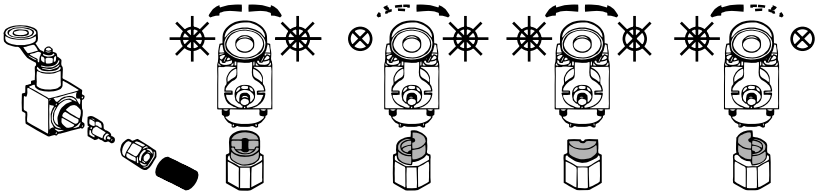
1 0.5 mm (0.02 in.) min.
2 2 mm (0.08 in.) min.



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.



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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).

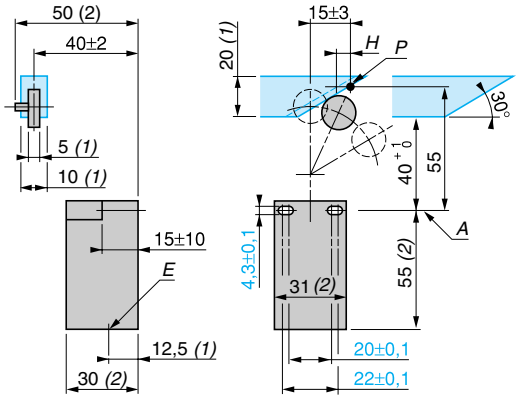
IEC 60947-5-1

Insulation coordination (and dielectric strength)	• 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	• 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	• 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)	• 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	• Form Za, the 2 contacts are the same polarity.	• Form Zb, the 2 contacts are electrically separate.
Symbol for positive opening	• Simplified version	• Complete symbol

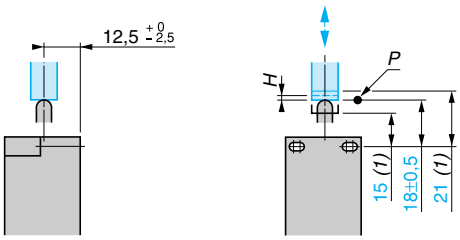
CENELEC EN 50047
The European standards organization CENELEC, which has 14 member countries, has defined in this standard the first type of limit switch.

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)

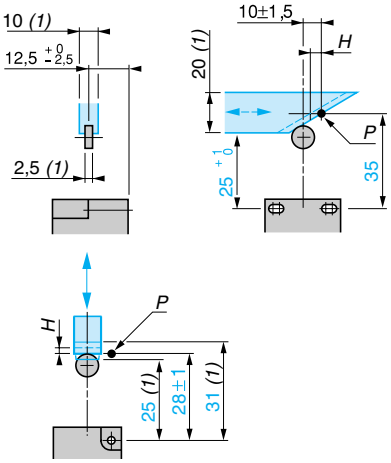


1. Minimum value
2. Maximum value

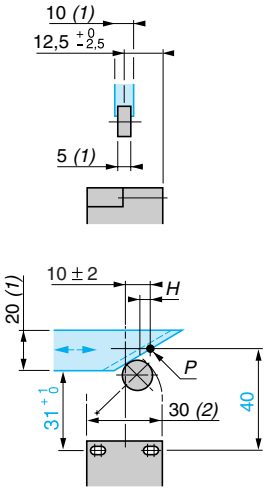
A: reference axis
H: differential travel

P: tripping point
E: cable entry

Form C, with end roller plunger



Form E, with roller lever for 1 direction of actuation



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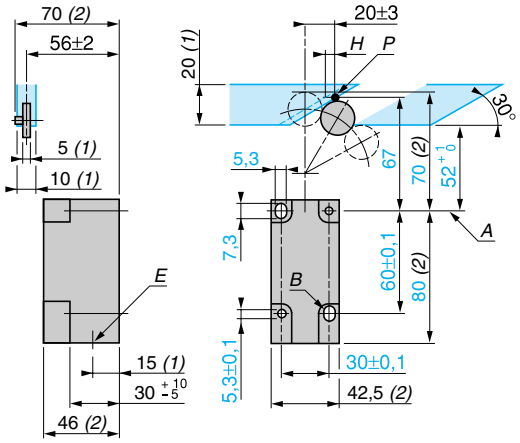
Compliance with standards *(continued)*

CENELEC EN 50041

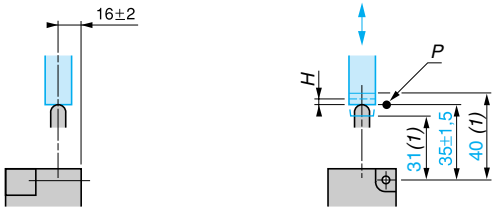
The European standards organization CENELEC, which has 14 member countries, has defined in this standard the second type of limit switch.

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)

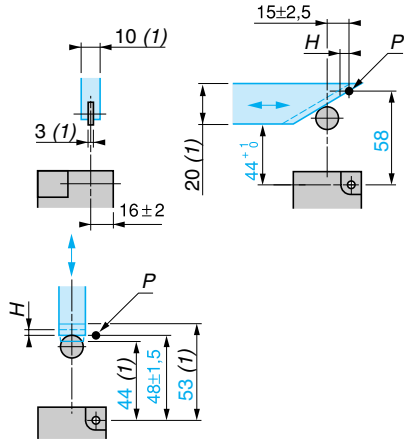


1. Minimum value
2. Maximum value

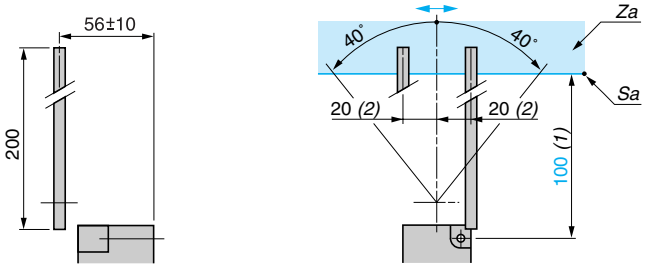
A: reference axis
B: optional elongated holes
H: differential travel
P: tripping point

E: cable entry
Za: tripping zone
Sa: tripping threshold

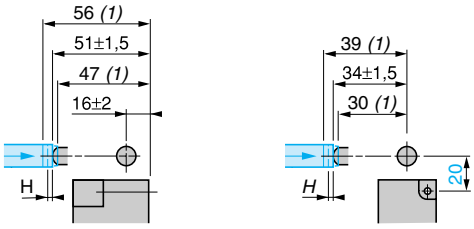
Form C, with end roller plunger



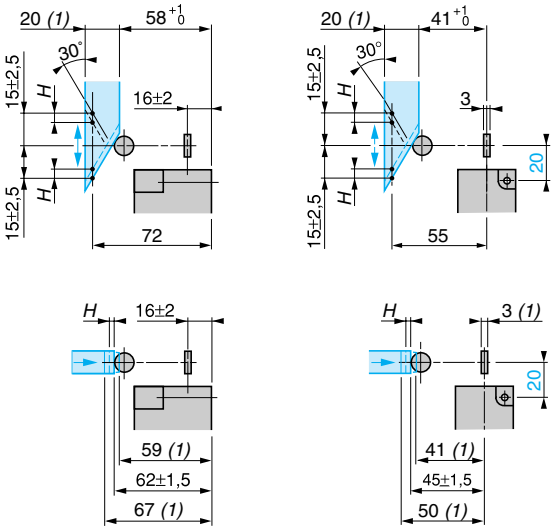
Form D, with rod lever



Form F, with side plunger (rounded)



Form G, with side roller plunger



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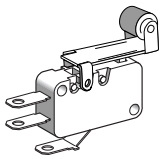
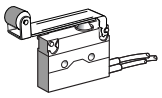
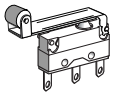
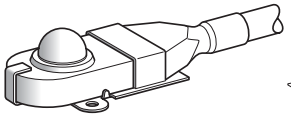
Limit Switches
Osiswitch® Miniature Snap Switches
XEP and XC0

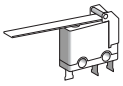
Introduction


XEP3


XEP4E1W●


XEP4E1FD●


XC0


XEP5

Electromechanical detection

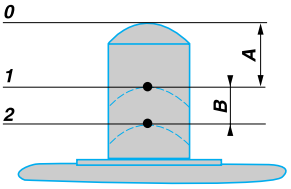
Osiswitch miniature snap switches, featuring electromechanical technology, assure the following functions:
- detection of presence or absence
- detection of position.

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.

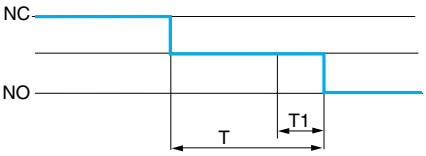
A. Differential travel: distance between the tripping point and the position at which the snap action mechanism returns to its initial state on release of the operator.

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

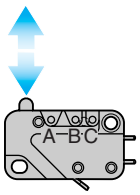
Changeover time

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).

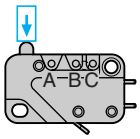
Operating speed and maximum usable operating rate

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.

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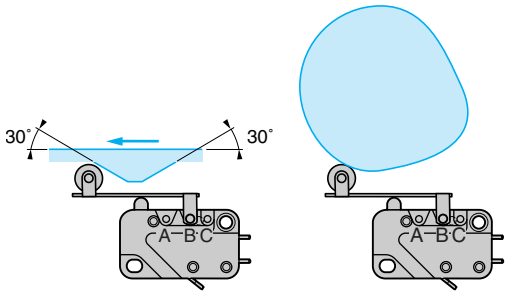
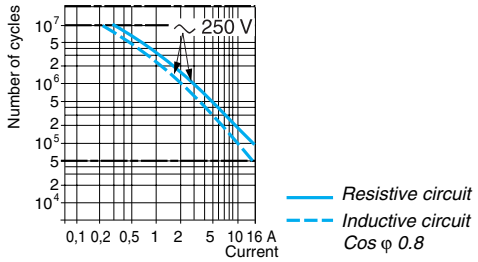
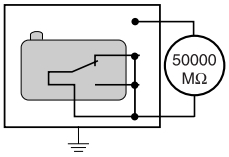
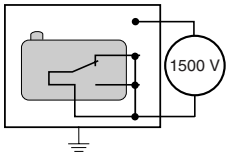
Mounting (continued)

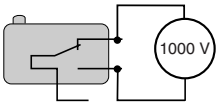


Electrical characteristics









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

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

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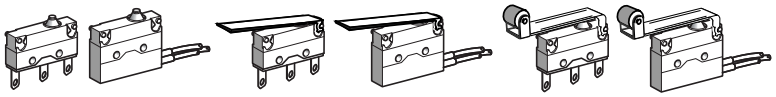
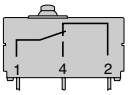
Limit Switches
Osiswitch® Miniature Snap Switches
Subminiature (DIN 41635 B format, sealed) and Sub-subminiature (DIN 41635 D format)

Catalog numbers
Subminiature design, DIN 41635 B format, sealed



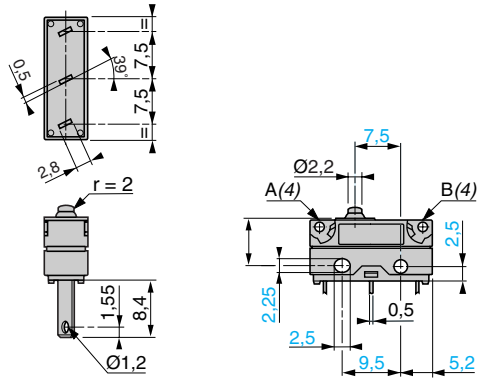
Type of operator		Plunger	Flat lever *(1)*	Roller lever *(1)*
 **Single-pole C/O snap action** Wiring: 1 Black 2 Grey 4 Blue	**2.8 mm (0.11 in.) cable clip tag connections**	**XEP4E1W7** *(3)*	**XEP4E1W7A326** *(3)*	**XEP4E1W7A454** *(3)*
	Weight, g (oz)	2.4 (0.08)	3.1 (0.11)	3.2 (0.11)
	Pre-cabled connections	**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

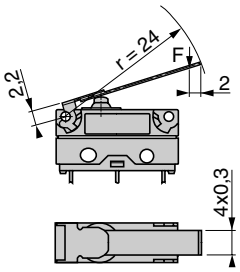
Type of operator		Plunger	Flat lever *(1)*
Single-pole C/O snap action	**Solder tag connections**	**XEP5P1W2** *(3)*	**XEP5P1W2Z55B** *(3)*
	Weight, g (oz)	1.4 (0.05)	1.9 (0.07)

Dimensions

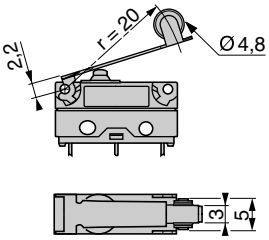
XEP4E1W7



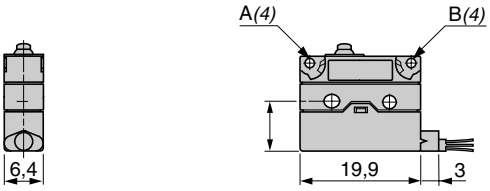
XEP4E1W7A326



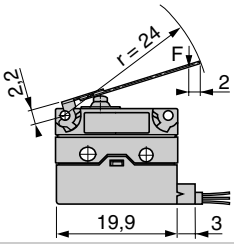
XEP4E1W7A454



XEP4E1FD



XEP4E1FDA326



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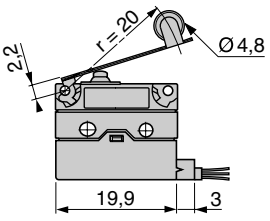
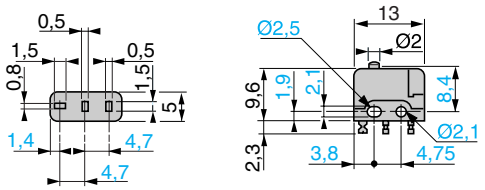
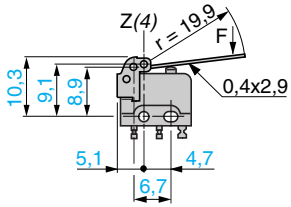


XEP5P1W2



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.

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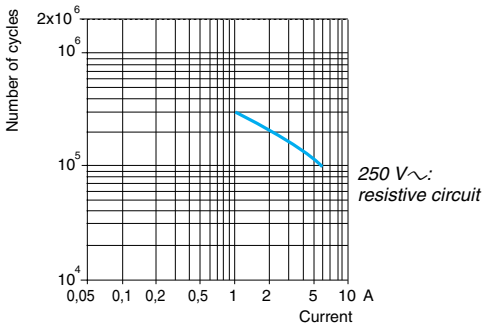
Limit Switches
Osiswitch® Miniature Snap Switches
Subminiature (DIN 41635 B format, sealed) and Sub-subminiature (DIN 41635 D format)

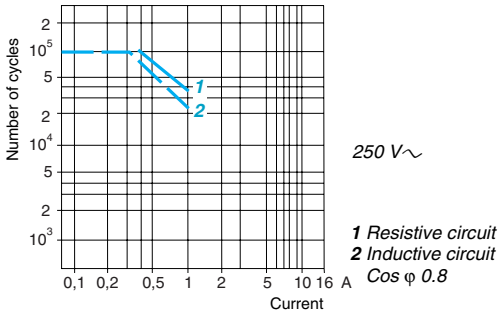
Switch type			XEP4E1••, XEP5P1W2 Plunger	XEP4E1••A326, XEP5P1W2Z55B Flat lever	XEP4E1••A454 Roller lever
Environment characteristics					
Lever fixing position *(1)*			—	A	A
Switch actuation			On end	Horizontal	
Product certifications			CE, IEC 60947-5-1, EN 60947-5-1, c UR us, UL 1054, EN 61058		
Degree 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	Stainless steel, glass reinforced polyamide roller
	Contact		AgCdO **XEP4E1••**, Ag **XEP5**		
	Tags		Tinned brass **XEP4E1W•••**, gold plated brass **XEP5P1••**		
Mechanical characteristics					
		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

XEP4E1••



XEP5P1••



1. Miniature snap switches fitted with a lever are supplied with the lever fixed in position A (see page 24).
   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 24).
2. Position of the operator in relation to the switch mountings (mounting hole center line), at the instant the contact changes state.

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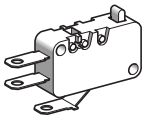
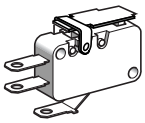
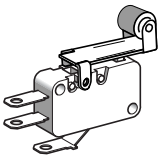
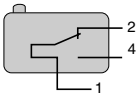
Limit Switches
Osiswitch® Miniature Snap Switches
Miniature (DIN 41635 A format)

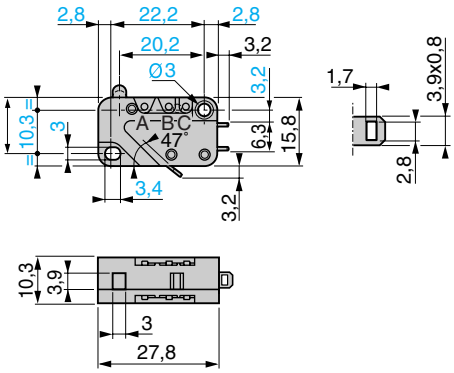
Catalog numbers

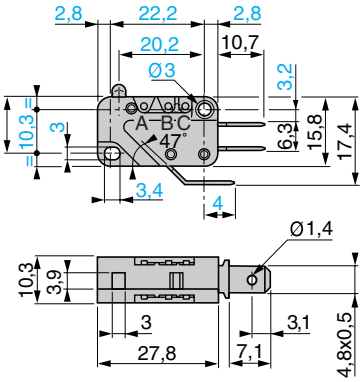
Type of operator			Plunger *(2)*	Flat lever *(1) (2)*	Roller lever *(1) (2)*
Single-pole C/O snap action 	Standard contacts	Solder tags	XEP3S1W2	XEP3S1W2B524	XEP3S1W2B529
		4.8 mm (0.19 in.) cable clip tags	XEP3S1W6	XEP3S1W6B524	XEP3S1W6B529
		6.35 mm (0.25 in.) cable clip tags	XEP3S1W3	XEP3S1W3B524	XEP3S1W3B529
		Weight, g (oz)	5.6 (0.20)	6.3 (0.22)	6.6 (0.23)
	Very low operating force contacts	Solder tags	XEP3S2W2	XEP3S2W2B524	XEP3S2W2B529
		4.8 mm (0.19 in.) cable clip tags	XEP3S2W6	XEP3S2W6B524	XEP3S2W6B529
		6.35 mm (0.25 in.) cable clip tags	XEP3S2W3	XEP3S2W3B524	XEP3S2W3B529
		Weight, g (oz)	5.6 (0.20)	6.3 (0.22)	6.6 (0.23)
Separate components	Flat lever *(3)*		ZEP3L524		
	Weight, g (oz)		0.7 (0.02)		
	Roller lever *(3)*		ZEP3L529		
	Weight, g (oz)		1 (0.04)		

Dimensions

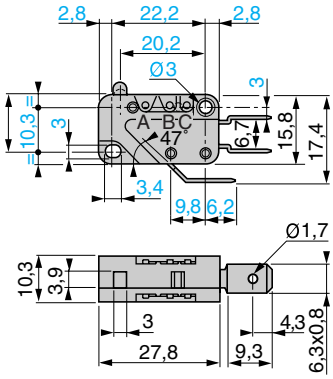
XEP3S•W2



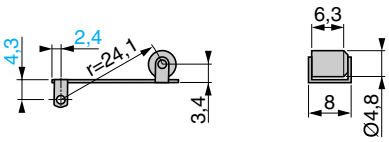
XEP3S•W6



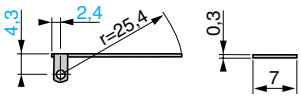
XEP3S•W3



ZEP3L529



ZEP3L524



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

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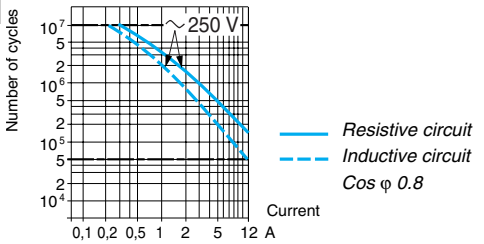
Limit Switches
Osiswitch® Miniature Snap Switches
Miniature (DIN 41635 A format)

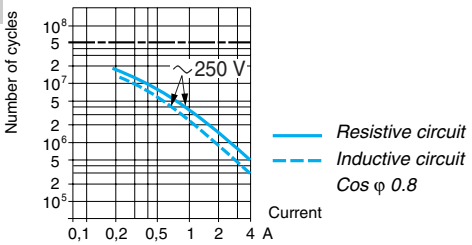
Switch type Type of operator			**XEP3 S•W2** Plunger	**XEP3 S•W2B254** Flat lever	**XEP3 S•W2B259** Roller lever
Environment characteristics					
Lever fixing position *(1)*			—	B	B
Switch actuation			On end	Horizontal	
Product certifications			⎓ UR us, CE, IEC/EN 60947-5-1, UL 1054, EN 61058-1		
Degree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

XEP3S1••



XEP3S2••



1. Miniature snap switches fitted with a lever are supplied with the lever fixed in position B (see page 26). 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 26).
2. Position of the operator in relation to the switch mountings (mounting hole center line), at the instant the contact changes state.

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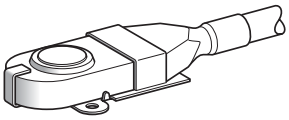
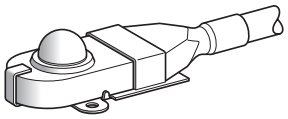
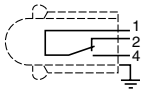
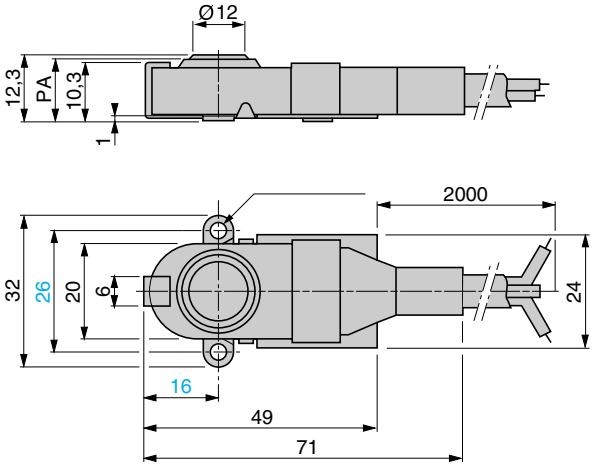
Limit Switches
Osiswitch® Miniature Snap Switches
Sealed Design Pre-Cabled

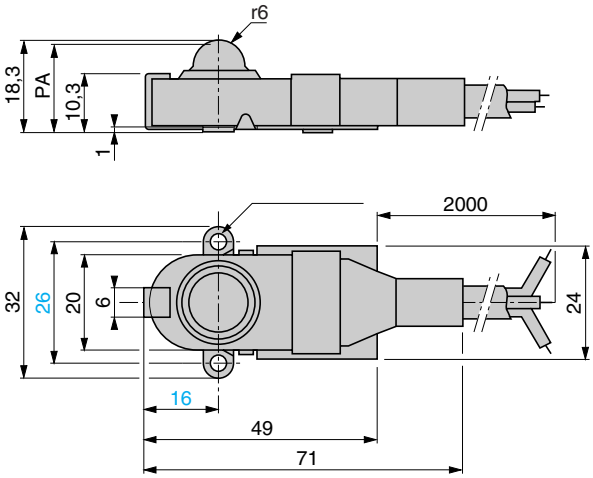
Type of head	Plunger (mounting by the body)	
		
Type of operator	Head with flat plunger	Head with domed encased plunger
Catalog numbers		
 **Single-pole C/O snap action** Wiring: 1 Black 2 Brown 4 Blue	**XC010L2**	**XC011L2**
Weight, kg (lb)	0.145 (0.320)	0.150 (0.331)

Dimensions

XC010L2



XC011L2



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Limit Switches
Osiswitch® Miniature Snap Switches
Sealed Design Pre-Cabled

Switch type		XC010•	XC011•
Environment 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)*		$11.4^{\pm 0.4}$ mm	$17.4^{\pm 0.5}$ 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			

1. 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.
2. Distance between the base of the switch and the top of the plunger at the instant the contact changes state (see dimensions, page 28).

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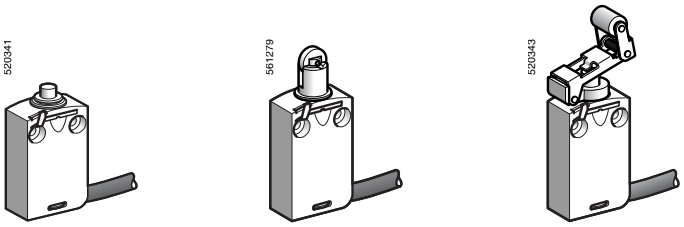
■ XCM D pre-cabled

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



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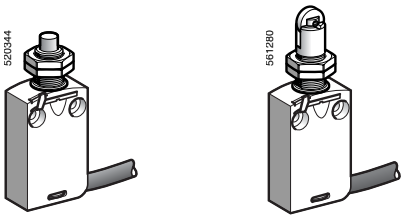
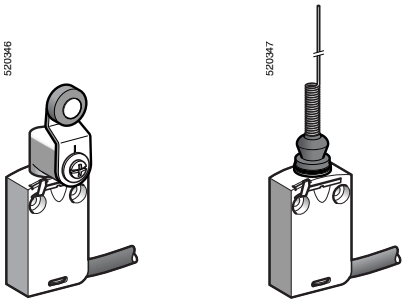
□ With head for linear movement (plunger). Mounting by the head.



Page 32

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



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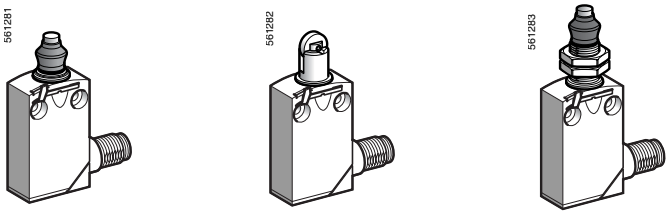
■ XCM D with integral connector

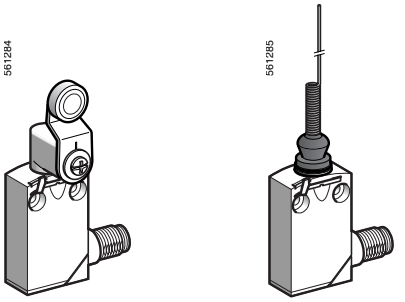
□ With head for linear movement (plunger)

Mounting by the body | Mounting by the head



Page 36

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



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Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD

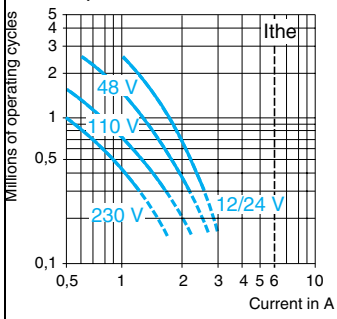
Environment characteristics

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

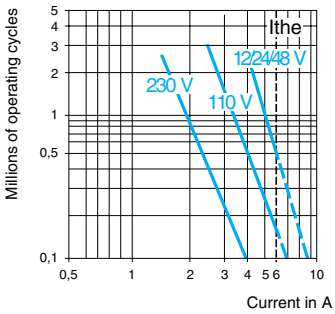
Protection against prolonged immersion: the test conditions are subject to agreement between the manufacturer and the user.

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		• 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
	a.c. supply ∼ 50/60 Hz ⩍ inductive circuit	**XCMD snap action (N/C + N/O, N/C + N/C, N/C + N/C + N/O, N/C + N/C + N/O + N/O contacts)**



XCMD slow break (N/C + N/O, N/C + N/C + N/O contacts)



	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	3

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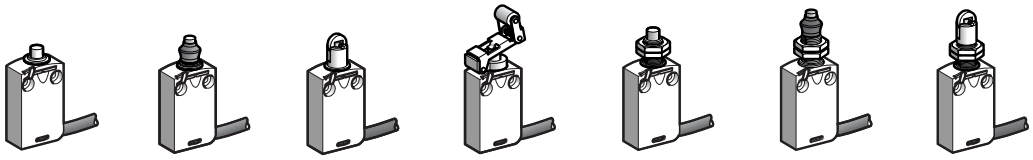
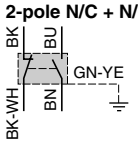
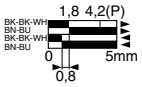
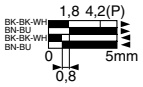
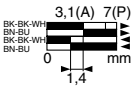
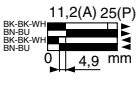
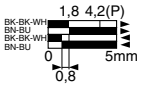
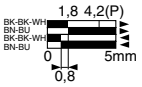
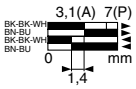
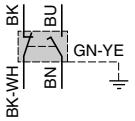
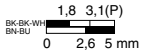
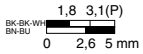
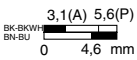
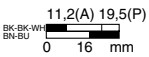
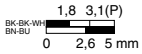
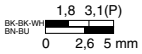
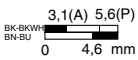
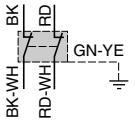
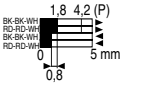
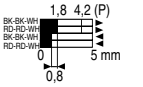
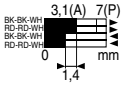
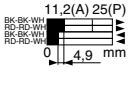
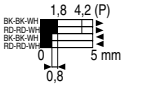
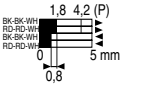
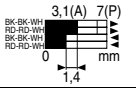
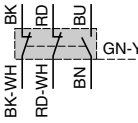
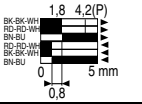
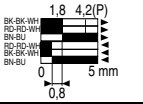
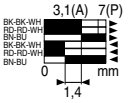
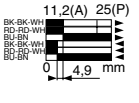
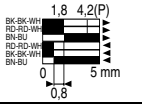
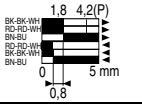
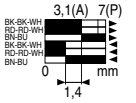
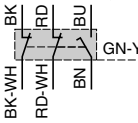
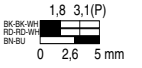
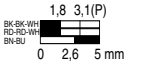
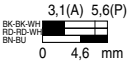
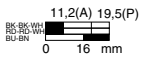
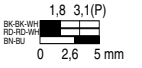
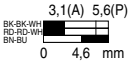
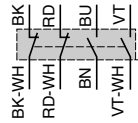
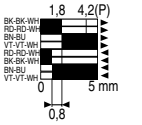
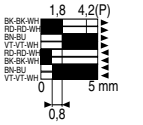
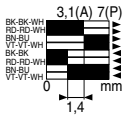
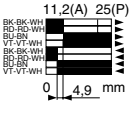
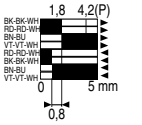
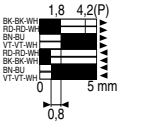
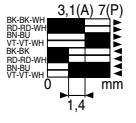
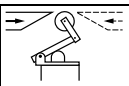
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Pre-Cabled

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	■ 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		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)		7 N (1.57 lb)
Minimum force or torque – 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, 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 42.						

NOTE: For more information, consult pages 38–40.

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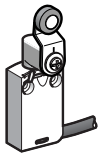
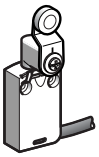
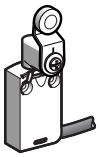
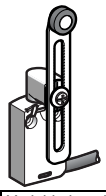
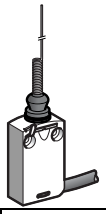
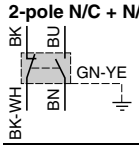
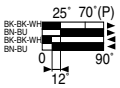
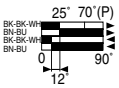
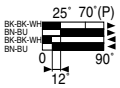
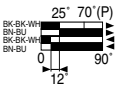
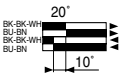
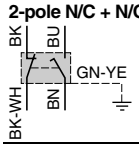
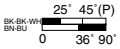
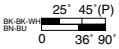
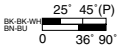
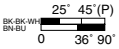
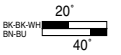
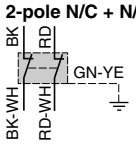
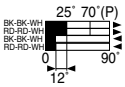
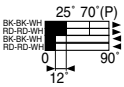
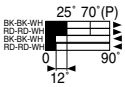
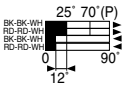
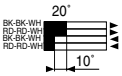
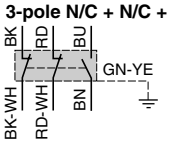
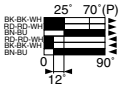
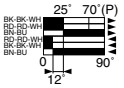
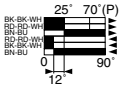
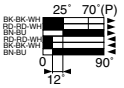
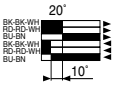
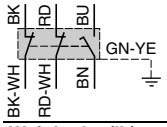
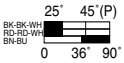
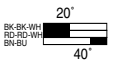
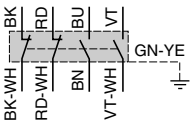
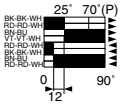
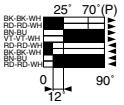
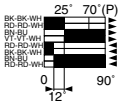
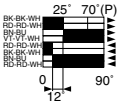
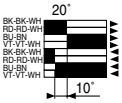
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Pre-Cabled

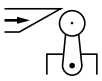
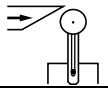
Type of head	Rotary (mounting by the body)				Multi-directional
					
Type of operator	Thermoplastic roller lever	Steel roller lever	Roller lever with ball bearing mounted roller	Variable length thermoplastic roller lever	Cat's whisker *(1)*
Catalog numbers					
2-pole N/C + N/O snap action 	**XCMD2115L1** 	**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 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 42.			

NOTE: For more information, consult pages 38–40.

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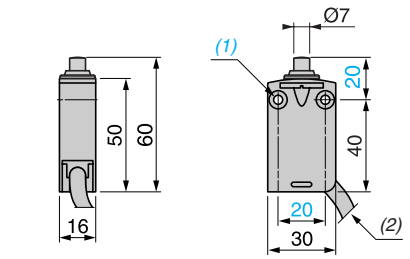
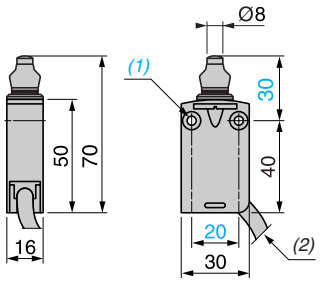
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Pre-Cabled—Dimensions

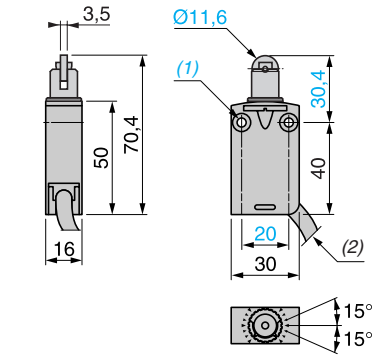
XCMD2•10L1



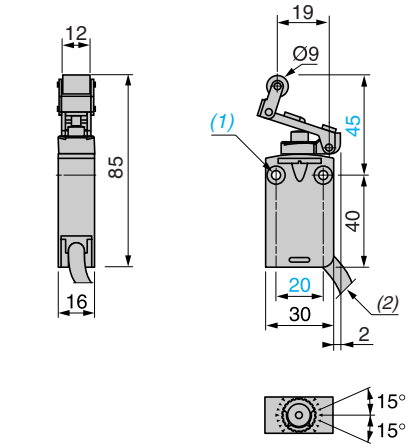
XCMD2•11L1



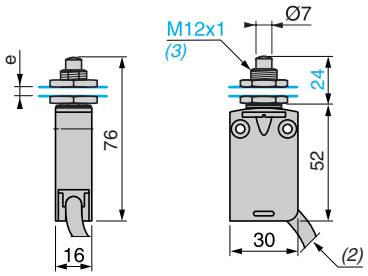
XCMD2•02L1



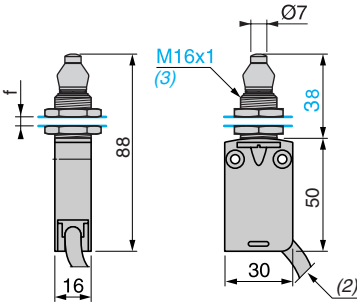
XCMD2•24L1



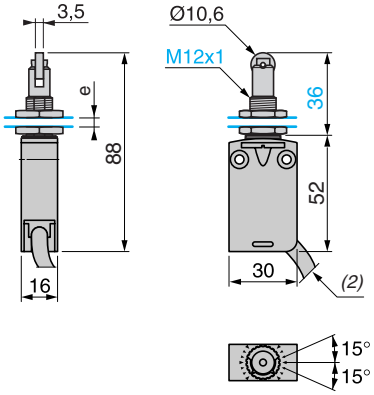
XCMD2•F0L1



XCMD2•G1L1



XCMD2•F2L1



1. 2 mounting holes 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.).
3. Mounting nut thickness 3.5 mm (0.14 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.).

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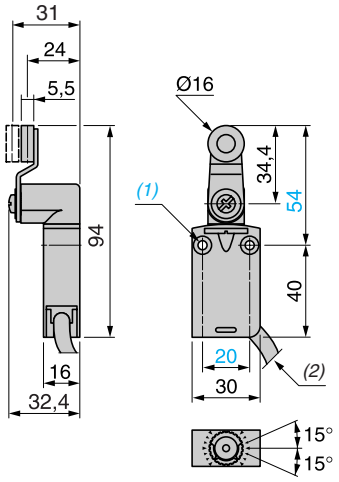
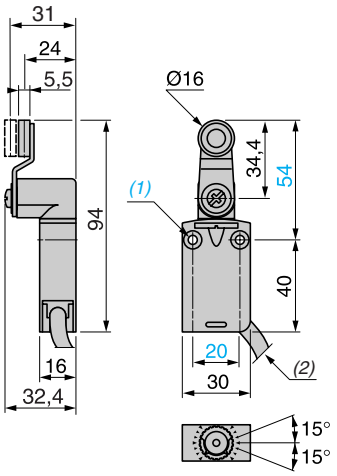
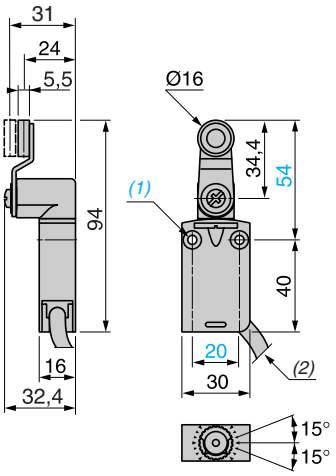
XCMD2•15L1



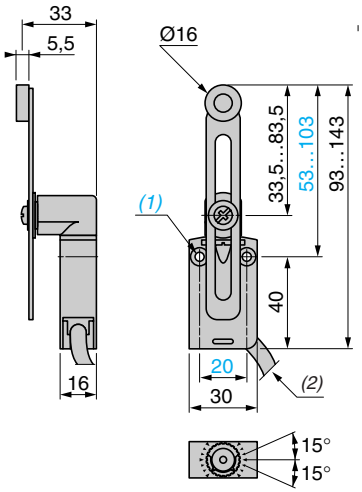
XCMD2•16L1



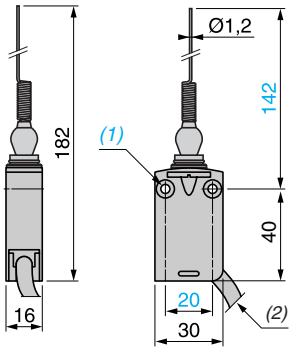
XCMD2•17L1



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.).

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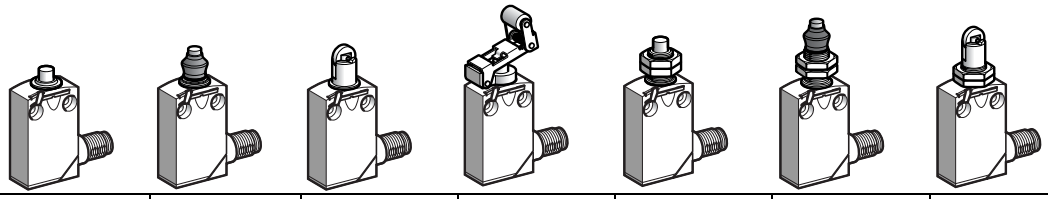
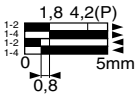
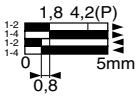
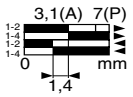
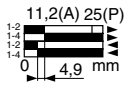
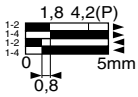
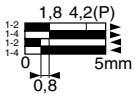
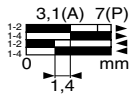
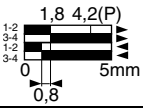
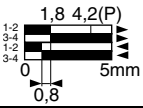
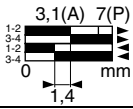
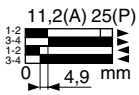
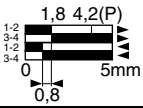
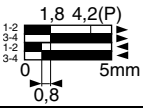
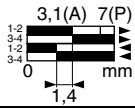
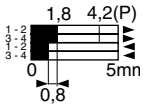
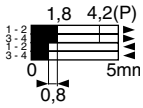
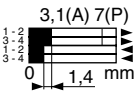
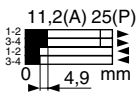
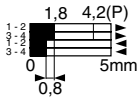
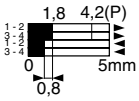
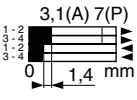
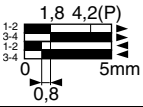
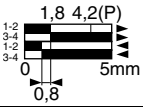
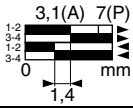
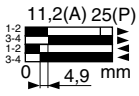
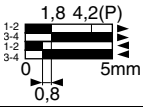
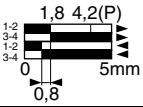
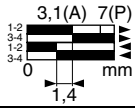
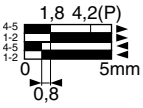
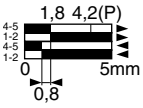
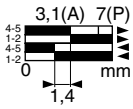
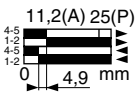
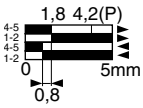
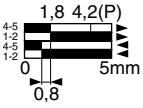
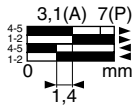
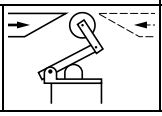
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Integral or Remote Connector

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							
Single-pole C/O snap action + integral M12 4-pin connector	**XCMD2110M12** 	**XCMD2111M12** 	**XCMD2102M12** 	**XCMD2124M12** 	**XCMD21F0M12** 	**XCMD21G1M12** 	**XCMD21F2M12** 
2-pole N/C + N/O snap action + integral M12 5-pin connector	**XCMD2110C12** ⊖ 	**XCMD2111C12** ⊖ 	**XCMD2102C12** ⊖ 	**XCMD2124C12** ⊖ 	**XCMD21F0C12** ⊖ 	**XCMD21G1C12** ⊖ 	**XCMD21F2C12** ⊖ 
2-pole N/C + N/C snap action + integral M12 5-pin connector	**ZCMD29C12 + ZCE10** ⊖ 	**ZCMD29C12 + ZCE11** ⊖ 	**ZCMD29C12 + ZCE02** ⊖ 	**ZCMD29C12 + ZCE24** ⊖ 	**ZCMD29C12 + ZCEF0** ⊖ 	**ZCMD29C12 + ZCEG1** ⊖ 	**ZCMD29C12 + ZCEF2** ⊖ 
Weight, kg (lb)	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)
2-pole N/C + N/O snap action + M12 5-pin connector on 0.8 m (2.6 ft) flying lead	**ZCMD21L08R12 + ZCE10** ⊖ 	**ZCMD21L08R12 + ZCE11** ⊖ 	**ZCMD21L08R12 + ZCE02** ⊖ 	**ZCMD21L08R12 + ZCE24** ⊖ 	**ZCMD21L08R12 + ZCEF0** ⊖ 	**ZCMD21L08R12 + ZCEG1** ⊖ 	**ZCMD21L08R12 + ZCEF2** ⊖ 
2-pole N/C + N/O snap action + 7/8" 16UN 5-pin connector on 0.8 m (2.6 ft) flying lead	**ZCMD21L08U78 + ZCE10** ⊖ 	**ZCMD21L08U78 + ZCE11** ⊖ 	**ZCMD21L08U78 + ZCE02** ⊖ 	**ZCMD21L08U78 + ZCE24** ⊖ 	**ZCMD21L08U78 + ZCEF0** ⊖ 	**ZCMD21L08U78 + ZCEG1** ⊖ 	**ZCMD21L08U78 + ZCEF2** ⊖ 
Weight, kg (lb)	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)
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		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)		7 N (1.57 lb)
Minimum force or torque – 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)
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 38–40.

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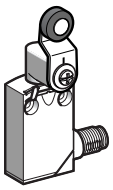
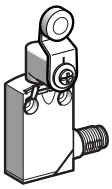
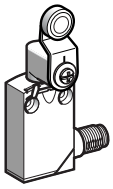
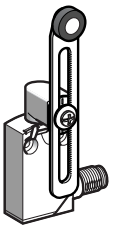
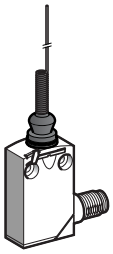
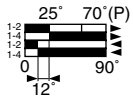
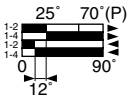
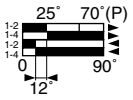
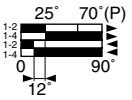
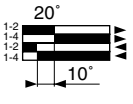
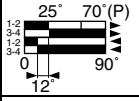
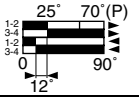
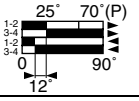
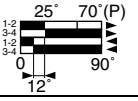
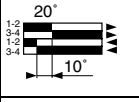
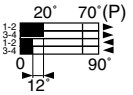
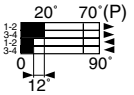
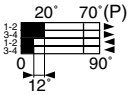
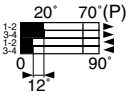
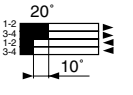
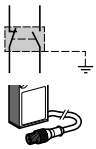
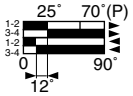
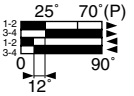
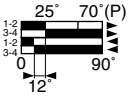
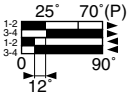
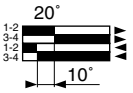
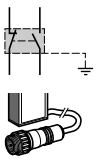
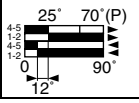
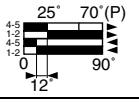
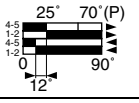
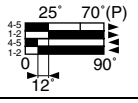
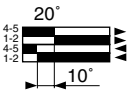
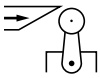
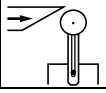
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Integral or Remote Connector

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.			

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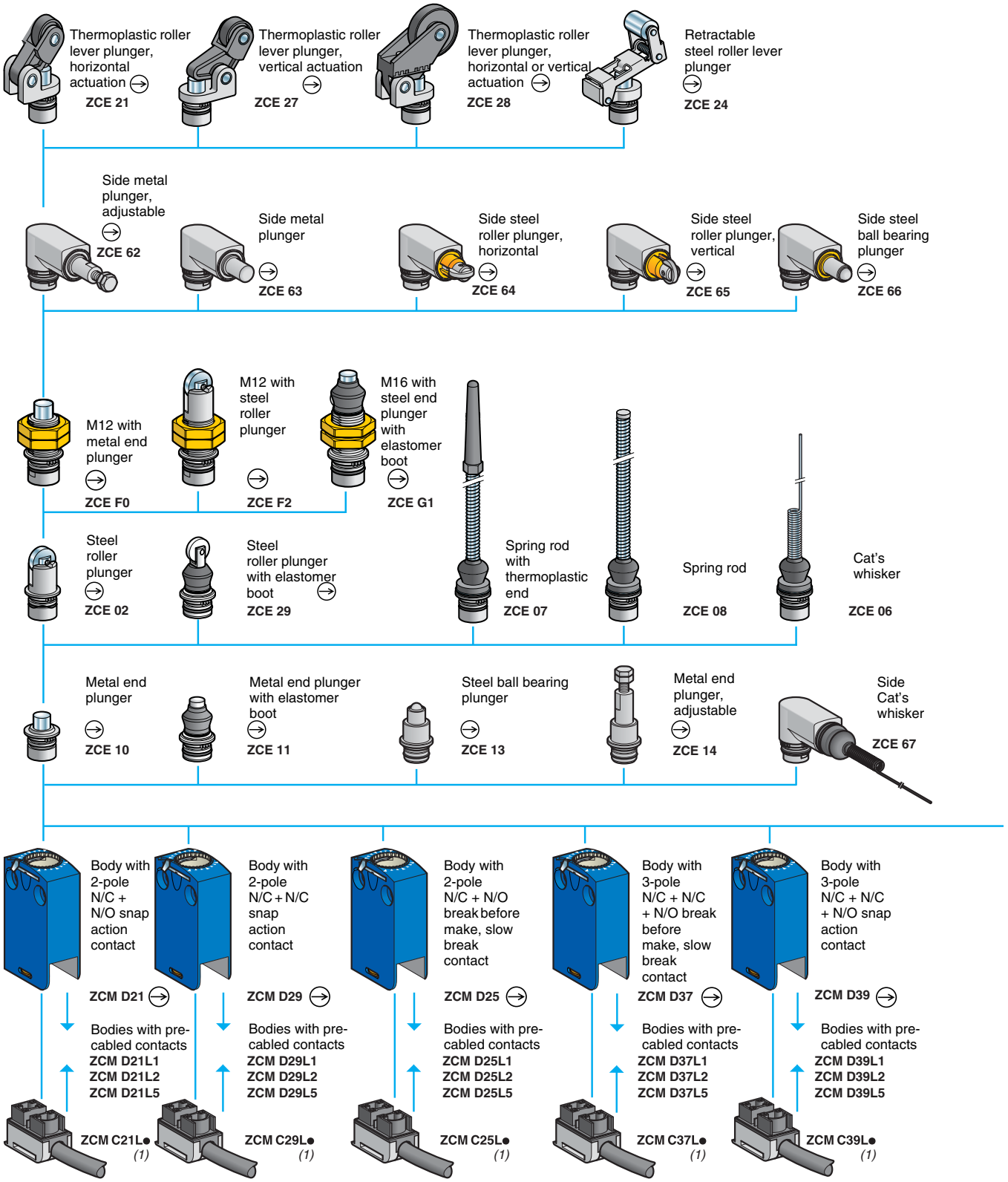
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD—Modular



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•.

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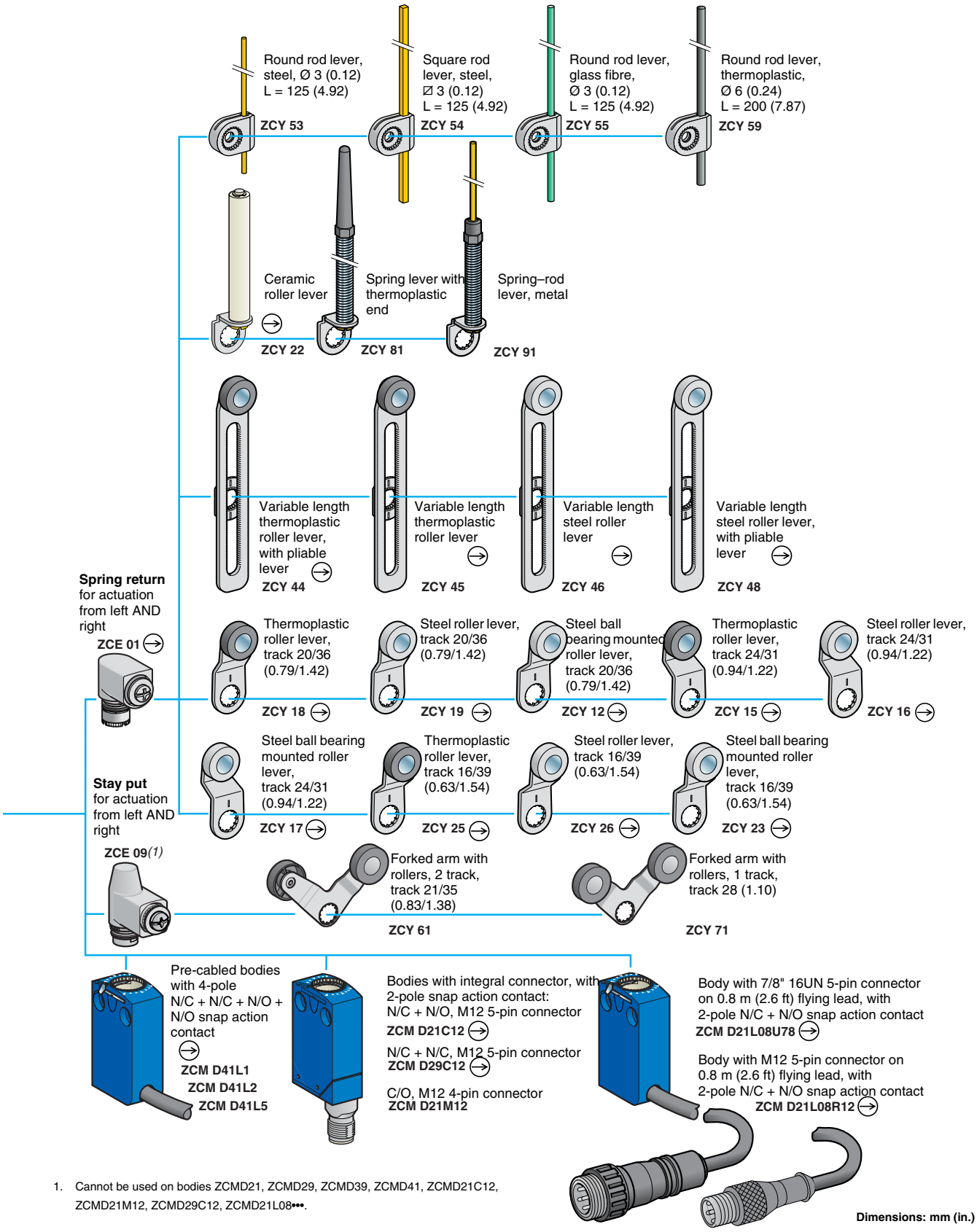

1. Cannot be used on bodies ZCMD21, ZCMD29, ZCMD39, ZCMD41, ZCMD21C12, ZCMD21M12, ZCMD29C12, ZCMD21L08•••.

Dimensions: mm (in.)

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Special Features and Catalog Number Explanation

Interpretation of the Catalog Number

XCM | **D** | **21** | **02 ▲** | **L1**

XCM—Assembled unit
ZCM—Body, contacts and base

Contact Description
21—1 N.O. + 1 N.C. Snap Action Silver
25—1 N.O. + 1 N.C. Slow Make/Break Silver
29—1 N.C. + 1 N.C. Snap Action Silver
37—1 N.O. + 2 N.C. Slow Make/Break Silver
39—1 N.O. + 2 N.C. Snap Action Silver
41—2 N.O. + 2 N.C. Snap Action Silver
61—1 N.O. + 1 N.C. Snap Action Gold
65—1 N.O. + 1 N.C. Slow Make/Break Gold
69—1 N.C. + 1 N.C. Snap Action Gold
77—1 N.O. + 2 N.C. Slow Make/Break Gold
79—1 N.O. + 2 N.C. Snap Action Gold
81—2 N.O. + 2 N.C. Snap Action Gold

Cable Length
L1—1 m (3.3 ft)
L2—2 m (6.6 ft)
L3—3 m (9.8 ft)
L5—5 m (16.4 ft)
L7—7 m (23.0 ft)
L10—10 m (32.8 ft)

Body (or base)
D—Metal Modular
N—Plastic (not modular)
C—Plug-in Base (with ZCM only)

Head Assembly ●
01—Rotary Head without Lever Arm
02—Steel Roller Plunger
05—Rotary Head without lever arm / Programmable ♦
06—Cat Whisker
07—Spring Rod with Plastic End ■
08—Spring Rod ■
09—Maint. Rotary without Arm ■
10—Top Push Rod Plunger
11—Booted Top Push Rod Pl.
13—Top Ball Bearing Plunger ■
14—Adjustable Top Plunger ■
21—One-way Horiz. Plastic Roller
24—Retractable Steel Roller, 9 mm (0.35 in.)
27—One-way Vert. Plastic Roller
28—One-way Horiz. or Vert. Roller
29—Booted Top Roller Plunger ■
62—Adjust. Side Push Rod Pl. ■
63—Side Push Rod Plunger ■
64—Horiz. Side Roller Plunger ■
65—Vertical Side Roller Plunger ■
66—Side Ball Bearing Plunger ■
67—Horizontal Cat Whisker ■
F0—M12 Threaded Plunger Head ■
F2—M12 Threaded Roller Pl. Hd. ■
G1—M16 Threaded Booted Pl. Hd. ■
H0—M18 Threaded Plunger Head ■
H2—M18 Threaded Roller Pl. Hd. ■

Important Note:
Use for interpretation. Not all possibilities are shown and not all combinations of components are available. Some switches are not modular. See additional information in this catalog. For interpretation of heads and levers, see page 38.

■ 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 38 for levers.
♦ See page 43 for available levers, specifically allowed for the ZCE05 programmable head.

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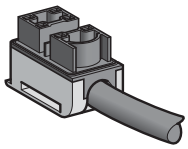
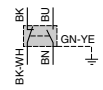
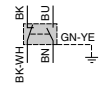
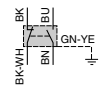
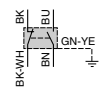
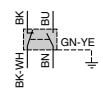
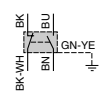
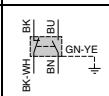
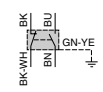
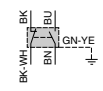
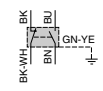
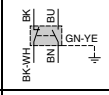
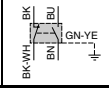


ZCMC2●L●

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 recepticale must match the contact pin outs in the body. Only the length of cord is variable. See page 38 for 3-pole plug-in bases with cord. The 4-pole units and connector versions do not have component modular bases. See pages 32 and 33 for 4 contact bodies, and pages 36 and 37 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)

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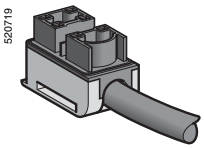
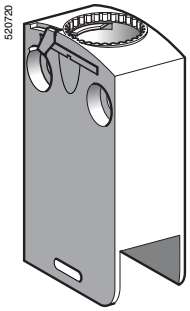
Components


520719

ZCMC21E•

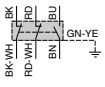
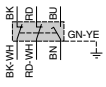
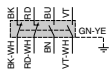
Pre-cabled connection components (CEI cable) *(1)*

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)

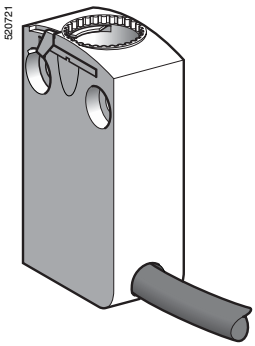

520720

ZCMD6•
ZCMD7•

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.


520721

ZCMD81L•

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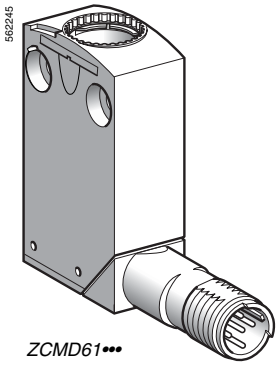
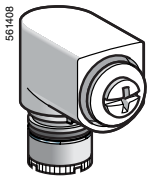
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD


562245

ZCMD61•••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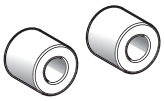
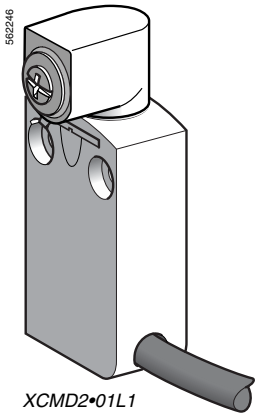
ZCE05


566637

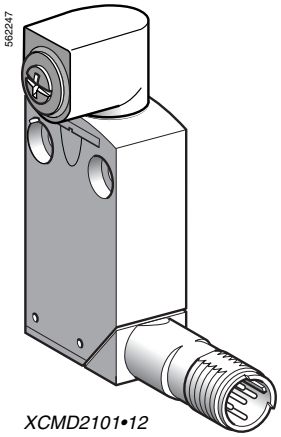
XCMZ06

566638

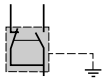
XCMZ07


562246

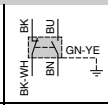
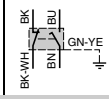
XCMD2•01L1

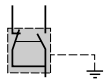

562247

XCMD2101•12

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)

1. ⊖ bodies with contacts or head assuring positive opening operation, when properly mounted and using a conforming operator.
2. For programming see page 12.

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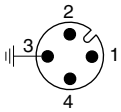
Catalog Numbers of suitable pre-wired female connectors

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	XZCP1771L2
	L = 5 m (16.40 ft)	XZCP1169L5	XZCP1164L5	XZCP1264L5	XZCP1771L5
	L = 10 m (32.81 ft)	XZCP1169L10	XZCP1164L10	XZCP1264L10	XZCP1771L10
Weight, kg (lb)		0.105 (0.231)	0.115 (0.254)	0.115 (0.254)	0.190 (0.419)

Connections

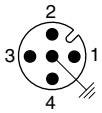
XCMD with connector

4-pin, M12



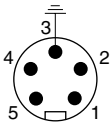
3 A—250 V
1 = common
2 = N/C
3 = ⏚
4 = N/O

5-pin, M12



4 A—60 V
XCMD21•• or **ZCMD21••**
1–2 = N/C
3–4 = N/O
5 = ⏚
XCMD29•• or ZCMD29••
1–2 = N/C
3–4 = N/C
5 = ⏚

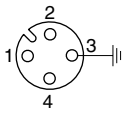
5-pin, 7/8" 16 UN



6 A—250 V
1–2 = N/C
4–5 = N/O
3 = ⏚

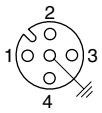
Pre-wired female connectors XZCP

4-pin, M12



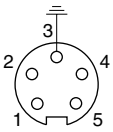
1 = brown
2 = blue
3 = yellow/green ⏚
4 = black

5-pin, M12



1 = brown
2 = white
3 = blue
4 = black
⏚ = yellow/green

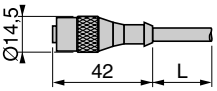
5-pin, 7/8" 16 UN



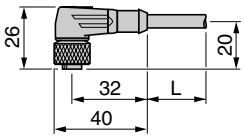
1 = black
2 = blue
3 = yellow/green ⏚
4 = brown
5 = white

Dimensions

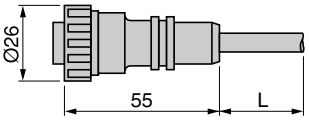
XZCP116•L•



XZCP1264L•



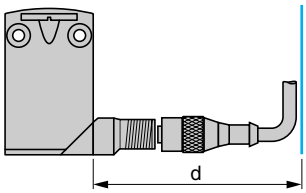
XZCP1771L•



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

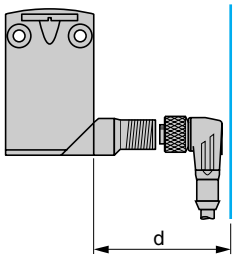
Distances required for plug-in connectors

M12 straight connector



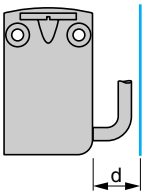
d: min. 65 mm (2.56 in.),
recommended 69 mm (2.72 in.)

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.)

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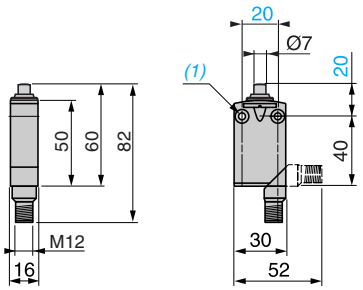
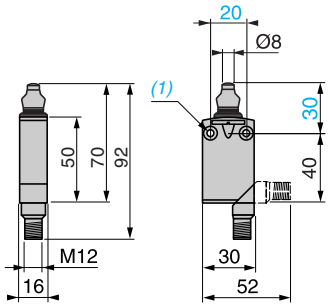
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Integral or Remote Connector

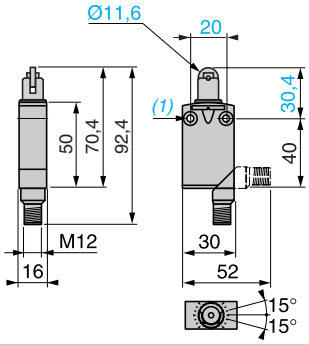
XCMD2•10M12



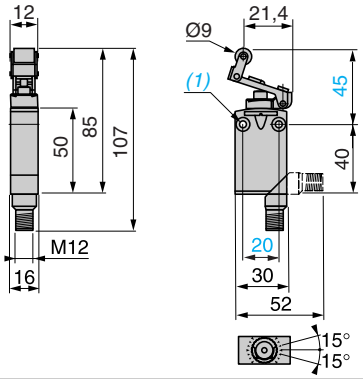
XCMD2•11M12



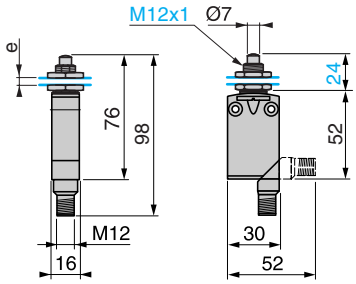
XCMD2•02M12



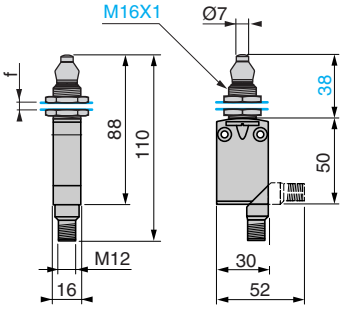
XCMD2•24M12



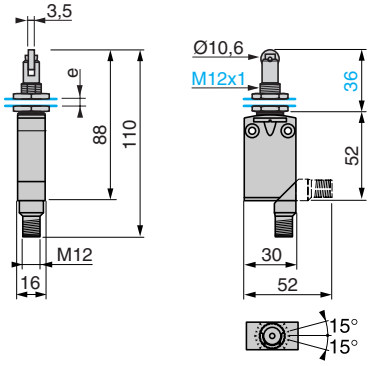
XCMD2•F0M12



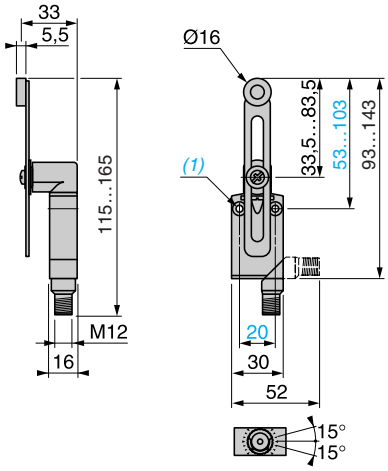
XCMD2•G1M12



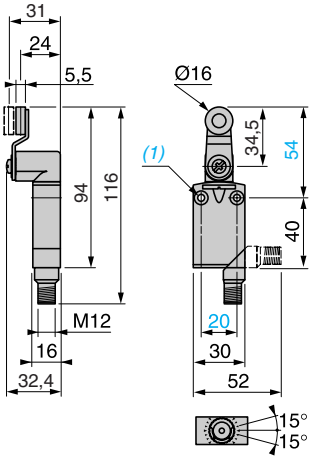
XCMD2•F2M12



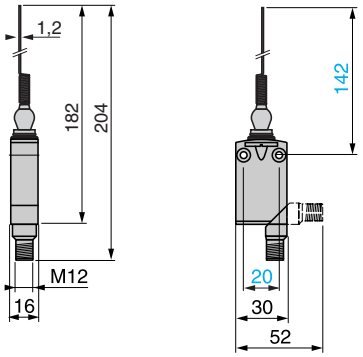
XCMD2•45M12



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.).

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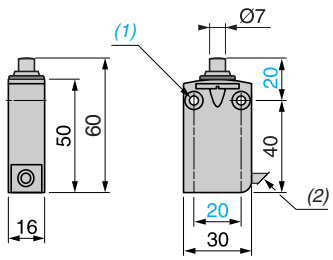
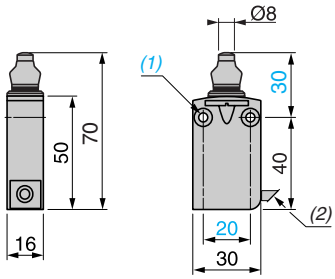
Limit Switches
Osiswitch® Miniature, Metal
Universal, XCMD, Integral or Remote Connector

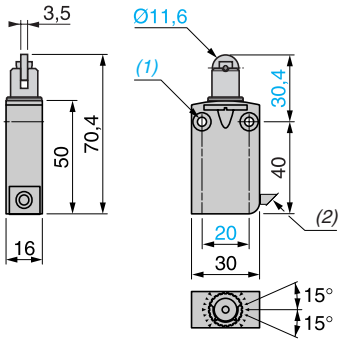
ZCMD21L08••• + ZCE 10



ZCMD21L08••• + ZCE 11



ZCMD21L08••• + ZCE 02



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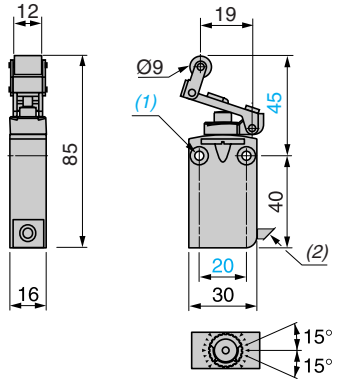
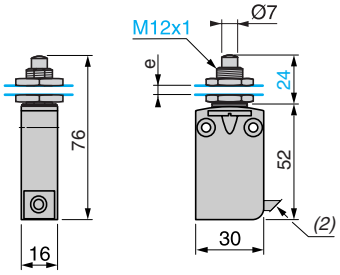
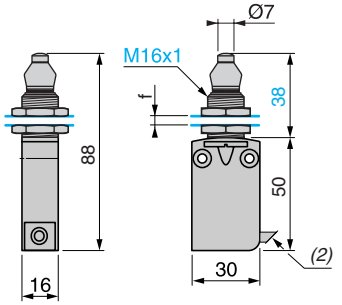


ZCMD21L08••• + ZCE F0



ZCMD21L08••• + ZCE G1



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.).

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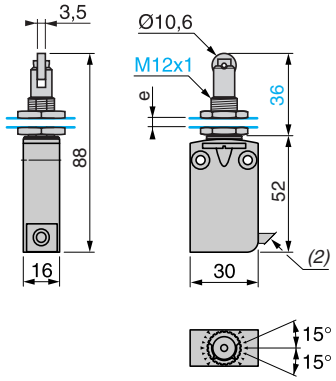
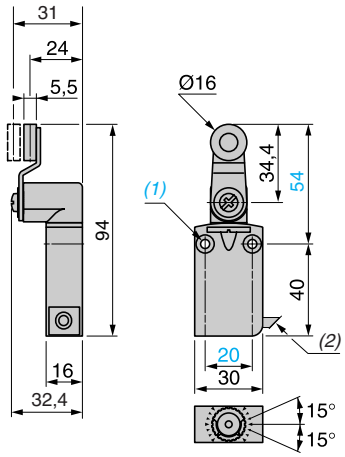
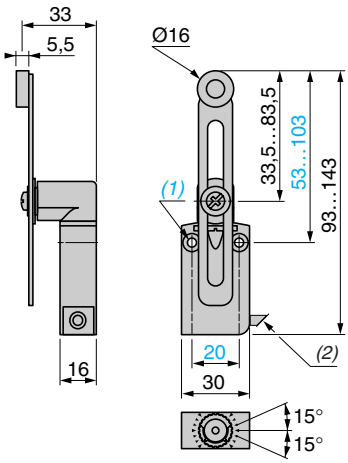
ZCMD21L08••• + ZCEF2



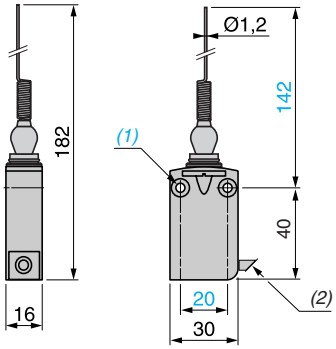
ZCMD21L08••• + ZCE01 + ZCY 15/16/17



ZCMD21L08••• + ZCE01 + ZCY 45



ZCMD21L08••• + ZCE06



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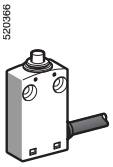
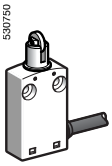
■ XCMN
pre-cabled

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





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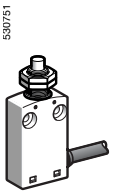
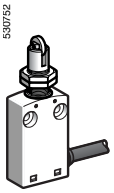
□ With head for linear movement (plunger). Mounting by the head.





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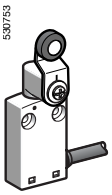
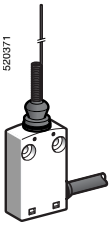
□ With head for rotary movement (lever) or multi-directional.





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Environment 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)

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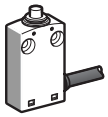
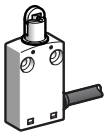
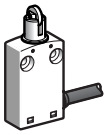
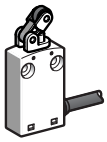
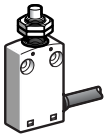
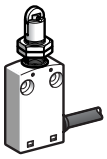
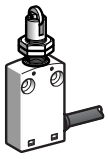
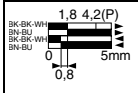
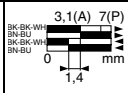
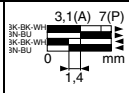
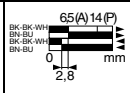
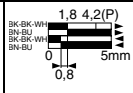
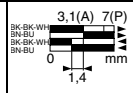
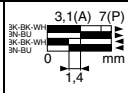
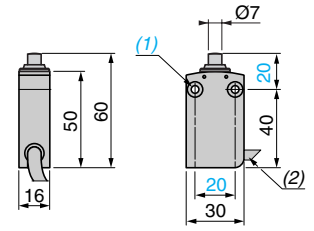
Limit Switches
Osiswitch® Miniature, Plastic
XCMN, Pre-Cabled

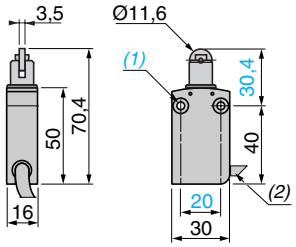
Type of head	Plunger (mounting by the body)				Plunger (mounting by the head)		
							
Type of operator	Metal end plunger	Steel roller plunger for lateral cam approach	Steel roller plunger for traverse cam approach	Thermoplastic roller lever plunger, 1 direction of actuation	M12 with metal end plunger	M12 with steel roller plunger for lateral cam approach	M12 with steel roller plunger for traverse cam approach
Catalog Numbers							
2-pole N/C + N/O snap action (BK, BU, BK-WH, BN)	**XCMN2110L1**	**XCMN2102L1**	**XCMN2103L1**	**XCMN2121L1**	**XCMN21F0L1**	**XCMN21F2L1**	**XCMN21F3L1**
							
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							
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)	
Minimum force or torque – 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

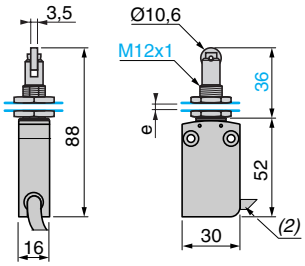
XCMN2110L1



XCMN2102L1, XCMN2103L1



XCMN21F2L1, XCMN21F3L1



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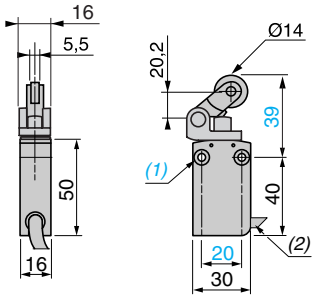

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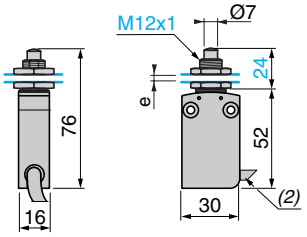

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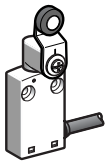
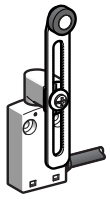
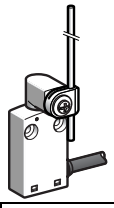
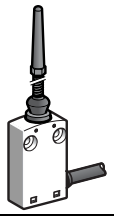
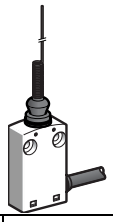
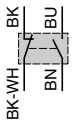
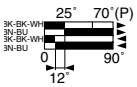
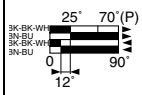
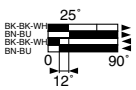
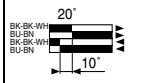
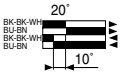
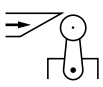
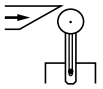
Limit Switches
Osiswitch® Miniature, Plastic
XCMN, Pre-Cabled

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					
 **2-pole N/C + N/O snap action**	**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	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	

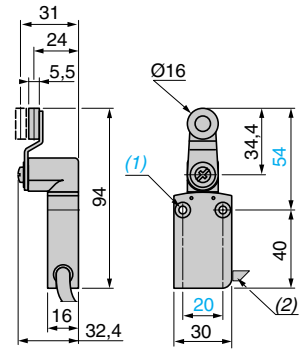
1. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

Characteristics

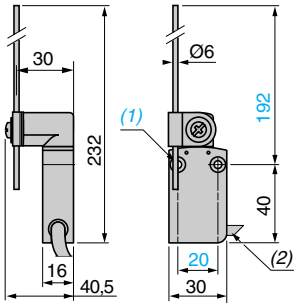
Switch actuation		By 30° cam		By any moving part	
Type of actuation					
Maximum actuation speed		1.5 m/s (4.92 ft/s)		1 m/s (3.28 ft/s)	1 m/s (3.28 ft/s), any direction
Minimum force or torque	For tripping	0.1 N•m (0.89 lb-in)			
	For positive opening	0.5 N•m (4.43 lb-in)			— —
Cabling		PvR cable, 4 x 0.75 mm², length 1 m (3.28 ft)			

Dimensions

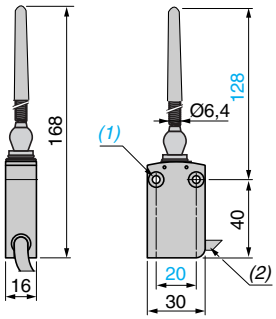
XCMN2115L1



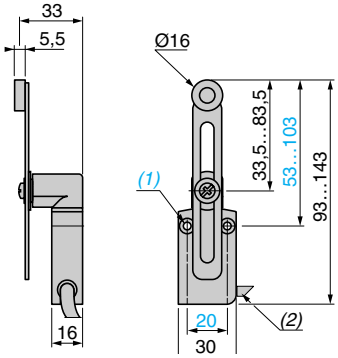
XCMN2159L1



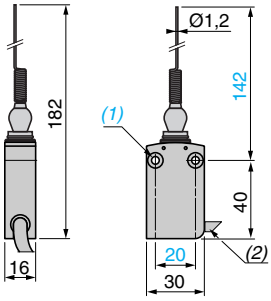
XCMN2107L1



XCMN2145L1



XCMN2106L1



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.).

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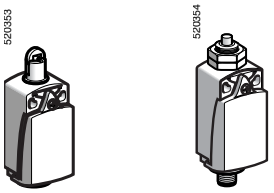
Limit Switches
Osiswitch® Compact
Universal, XCKP and XCKT Plastic / XCKD Metal

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

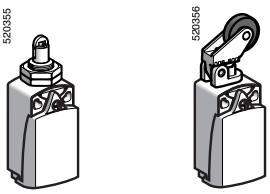
□ With head for linear movement (plunger). Mounting by the head or by the body.

XCK D



Pages 54 and 58

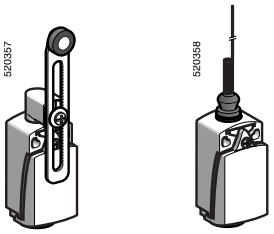
XCK P



Pages 60 and 64

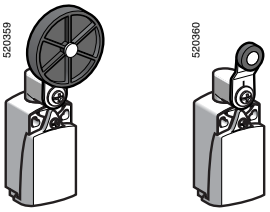
□ With head for rotary movement (lever) or multi-directional. Mounting by the body.

XCK D



Pages 55 and 59

XCK P

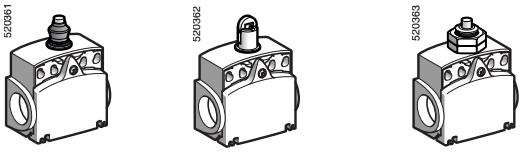


Pages 61 and 65

■ 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.

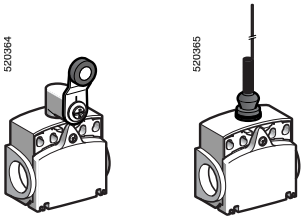
XCK T



Page 66

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

XCK T



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Environment 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

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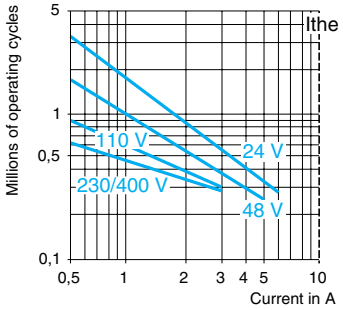
Limit Switches
Osiswitch® Compact
Universal, XCKP and XCKT Plastic / XCKD Metal

Contact block characteristics

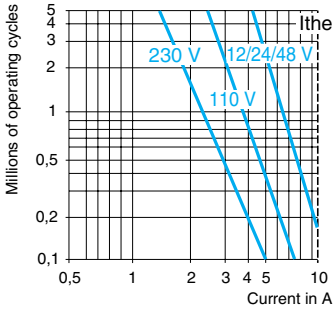
Rated operational characteristics	XE2•P	∿ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A ⎓ DC-13; Q300 (Ue = 250 V, Ie = 0.27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
	XE3•P	∿ AC-15; B300 (Ue = 240 V, Ie = 1.5 A); Ithe = 6 A ⎓ DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 60947-5-1 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 mm², max: 2 x 1.5 mm²
	XE2NP21•1 and XE2NP31•1	Clamping capacity, min: 1 x 0.5 mm², max: 2 x 2.5 mm²
	XE3NP and XE3SP	Clamping capacity, min: 1 x 0.34 mm², max: 1 x 1 mm² or 2 x 0.75 mm²
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		• 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

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

XE2SP•151, XE2SP2141



XE2NP21•1, XE2NP31•1



d.c. supply ⎓

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
	W	10	7	4

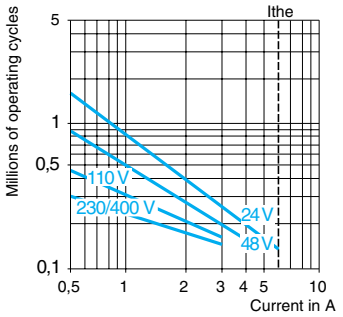
Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
	W	13	9	7

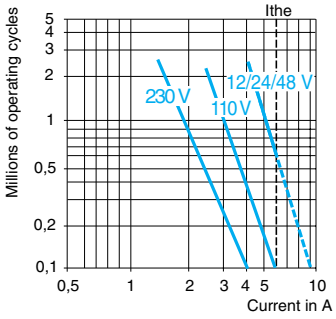
For XE2SP•151 on ∿ or ⎓, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

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

XE3NP••••



XE3SP••••



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

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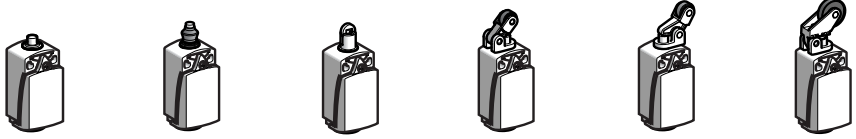
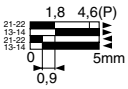
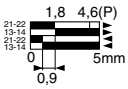
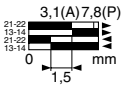
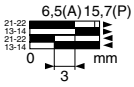
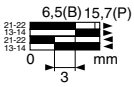
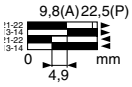
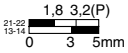
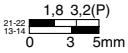
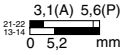
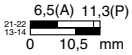
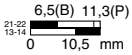
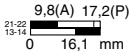
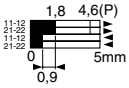
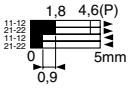
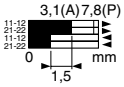
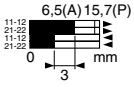
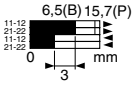
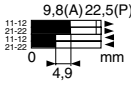
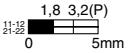
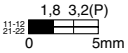
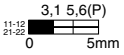
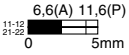
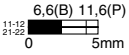
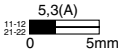
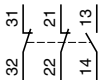
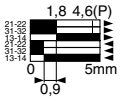
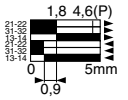
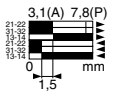
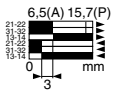
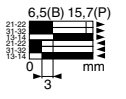
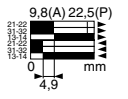
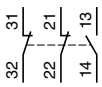
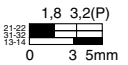
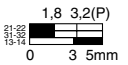
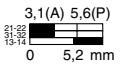
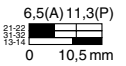
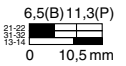
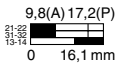
Limit Switches
Osiswitch® Compact, Metal
Universal, XCKD—Complete Units with 1/2" NPT Cable Entry

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)	6 N (1.35 lb)		
Minimum force or torque — For positive opening	45 N (10.12 lb)		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 20.
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: XCKD2110N12 becomes **XCKD2110G11**, ZCDEN12 becomes **ZCDEG11**.

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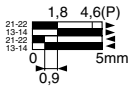
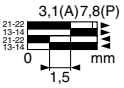
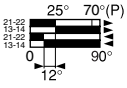
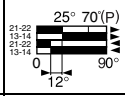
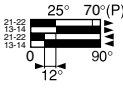
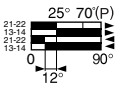
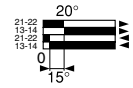
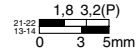
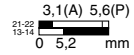
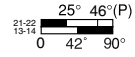
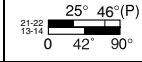
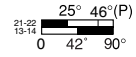
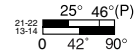
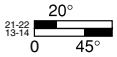
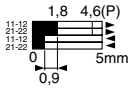
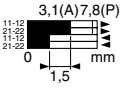
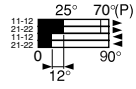
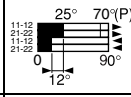
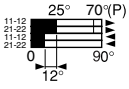
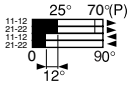
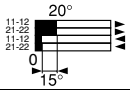
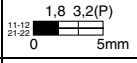
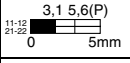
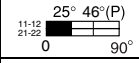
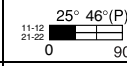
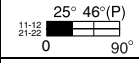
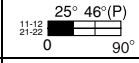
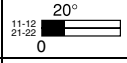
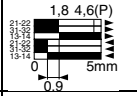
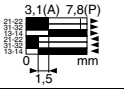
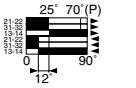
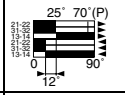
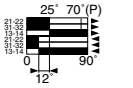
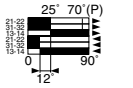
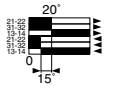
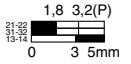
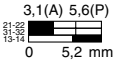
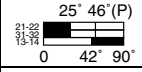
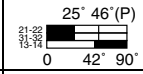
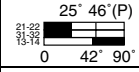
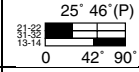
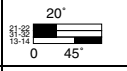
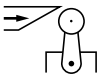
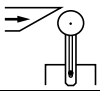
Limit Switches
Osiswitch® Compact, Metal
Universal, XCKD—Complete Units with 1/2" NPT Cable Entry

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)*							
13 21 / 14 22 **2-pole N/C + N/O snap action (XE2S P2151)**	**XCKD21H0N12** 	**XCKD21H2N12** 	**XCKD2118N12** 	**XCKD2145N12** 	**XCKD2139N12** 	**XCKD2149N12** 	**XCKD2106N12** 
13 21 / 14 22 **2-pole N/C + N/O break before make, slow break (XE2N P2151)**	**XCKD25H0N12** 	**XCKD25H2N12** 	**XCKD2518N12** 	**XCKD2545N12** 	**XCKD2539N12** 	**XCKD2549N12** 	**XCKD2506N12** 
11 21 / 12 22 **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 + ZCE 01 + ZCY39** 	**ZCD29 + ZCDEN12 + ZCE01 + ZCY49** 	**ZCD29 + ZCDEN12 + ZCE06** 
11 21 / 12 22 **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** 
31 21 13 / 32 22 14 **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** 
31 21 13 / 32 22 14 **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	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 *(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.)					

1. Form conforming to EN 50047, see page 20.
2. Switches with gold contacts or ring type connections: please consult your local sales office.
3. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.
4. 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, 68–69.

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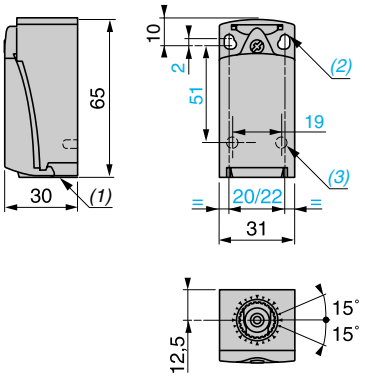
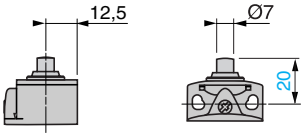
Limit Switches
Osiswitch® Compact, Metal
Universal, XCKD—Complete Units with 1/2" NPT Cable Entry

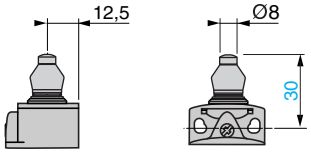
ZCD2• + ZCDEN12 / ZCD3• + ZCDEN12



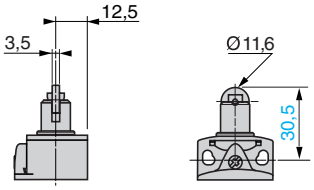
ZCE10



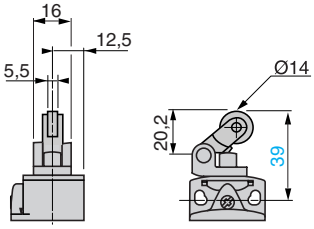
ZCE11



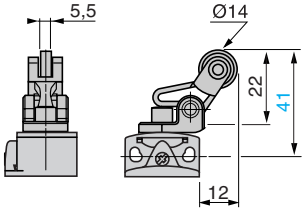
ZCE02



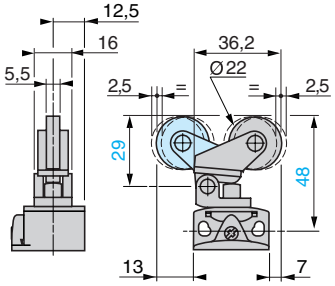
ZCE21



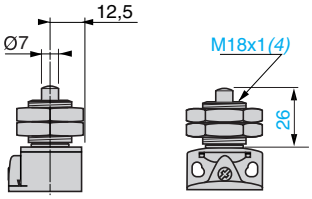
ZCE27



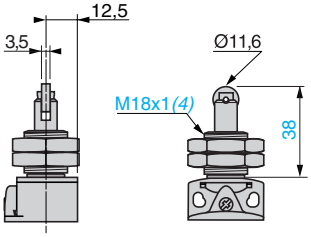
ZCE28



ZCEH0



ZCEH2



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.).

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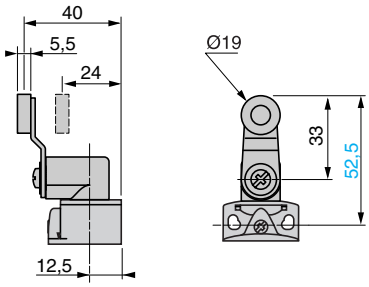
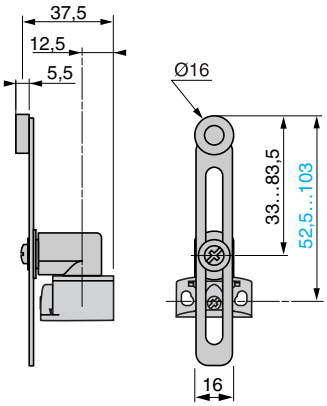
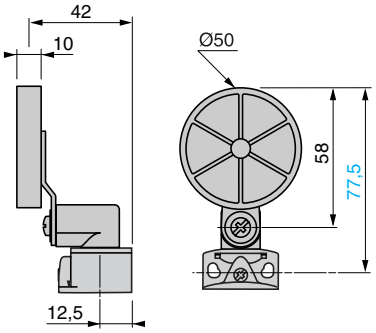
ZCE01 + ZCY18



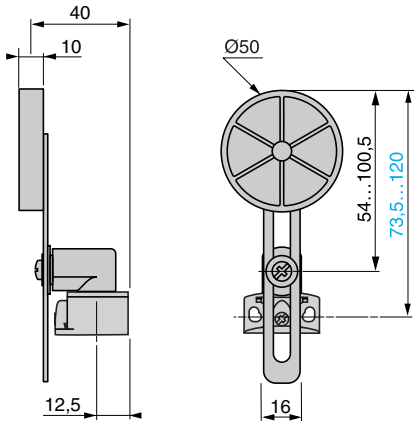
ZCE01 + ZCY45



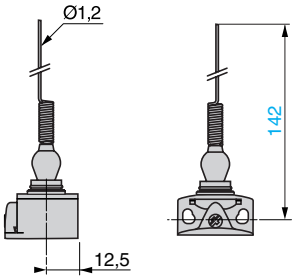
ZCE01 + ZCY39



ZCE01 + ZCY49



ZCE06



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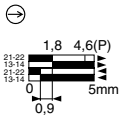
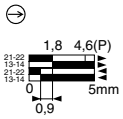
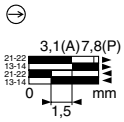
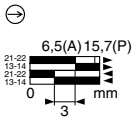
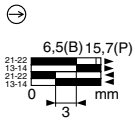
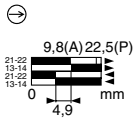
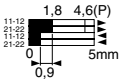
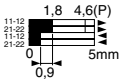
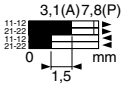
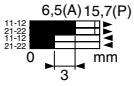
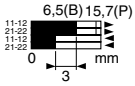
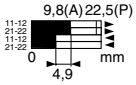
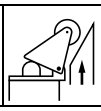
Limit Switches
Osiswitch® Compact, Metal
Universal, XCKD—Integral M12 Connector

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 20.

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 5-pin connector, Ui = 60 V, Ie = 4 A maximum, Ith = 4 A				

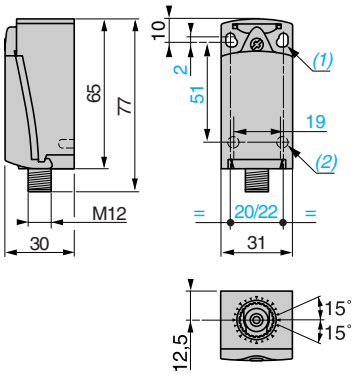
Connections

Integral M12 connector

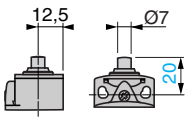
	XE2SP2151	XE2SP2141
	1-2: N/C 3-4: N/O 5: ⏚	1-2: N/C 3-4: N/C 5: ⏚

Dimensions

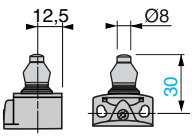
ZCD2•M12



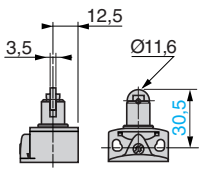
ZCE10



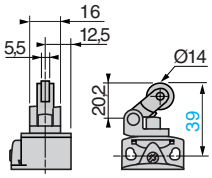
ZCE11



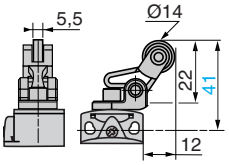
ZCE02



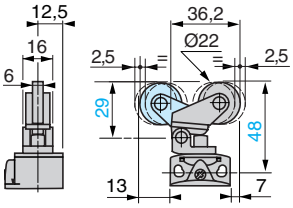
ZCE21



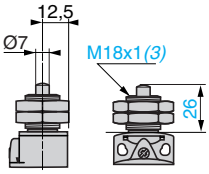
ZCE27



ZCE28



ZCEH0



1. 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.
2. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).
3. Mounting nut thickness 3.5 mm (0.14 in.).

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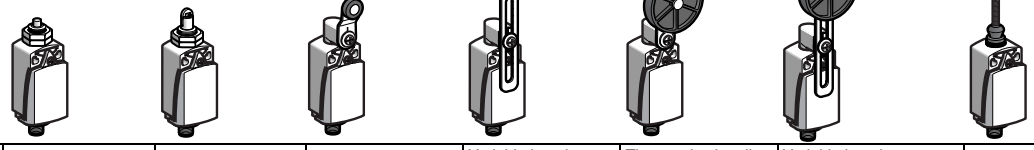
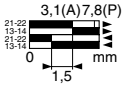
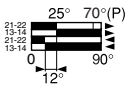
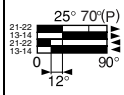
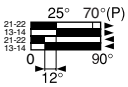
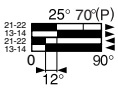
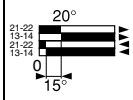
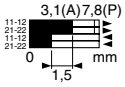
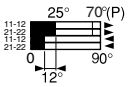
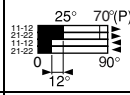
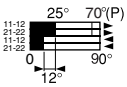
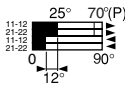
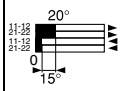
Limit Switches
Osiswitch® Compact, Metal
Universal, XCKD—Integral M12 Connector

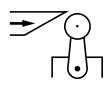
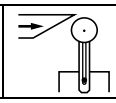
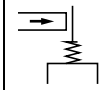
Type of head	Plunger (mounting by the head)		Rotary (mounting by the body) Form A *(1)*				Multi-directional
							
Type of operator	M18 with metal end plunger	M18 with steel roller plunger	Thermoplastic roller lever	Variable length thermoplastic roller lever	Thermoplastic roller lever, Ø 50 mm (1.97 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

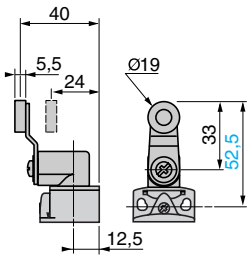
1. Form conforming to EN 50047, see page 20.
2. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

Characteristics

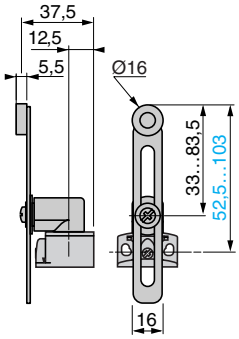
Switch actuation		On end	By 30° cam				By any moving part
Type of actuation							
Maximum actuation speed		0.5 m/s (1.64 ft/s)		1.5 m/s (4.92 ft/s)			1 m/s (3.28 ft/s), any direction
Minimum force or torque	For tripping	15 N (3.37 lb)	10 N (2.25 lb)	0.1 N•m (0.89 lb-in)			0.13 N•m (1.15 lb-in)
	For positive opening	45 N (10.12 lb)	36 N (8.09 lb)	0.25 N•m (2.21 lb-in)			—
Connection		M12 5-pin connector, Ui = 60 V, Ie = 4 A maximum, Ith = 4 A					

Dimensions

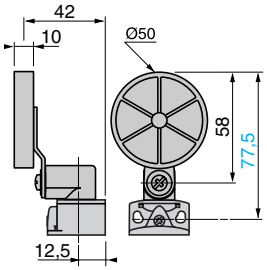
ZCE01 + ZCY18



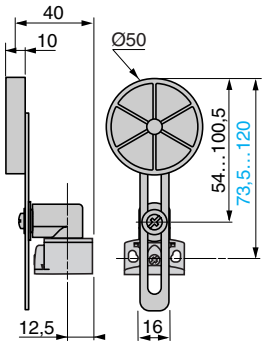
ZCE01 + ZCY45



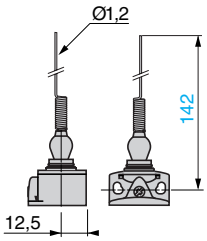
ZCE01 + ZCY39



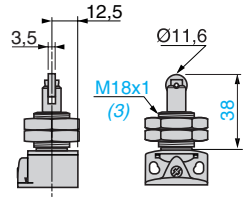
ZCE01 + ZCY49



ZCE06



ZCEH2



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

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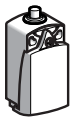
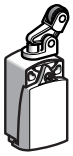
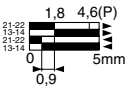
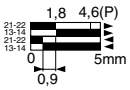
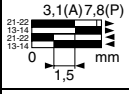
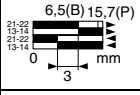
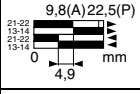
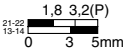
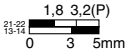
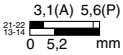
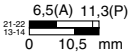
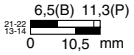
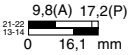
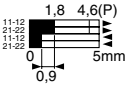
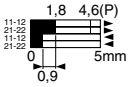
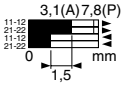
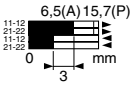
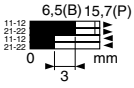
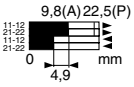
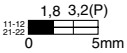
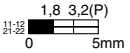
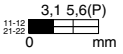
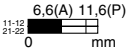
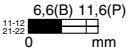
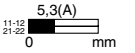
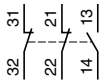
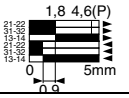
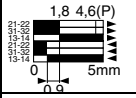
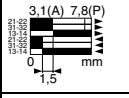
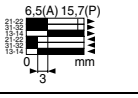
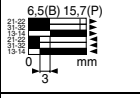
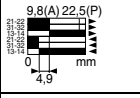
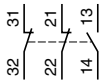
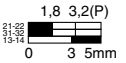
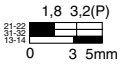
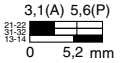
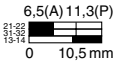
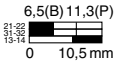
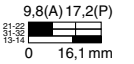
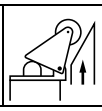
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKP—Complete Units with 1/2" NPT Cable Entry

Type of head	Plunger (mounting by the body)					
	Form B *(1)*		Form C *(1)*	Form E *(1)*		
						
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	■ 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)	6 N (1.35 lb)		
	For positive opening	45 N (10.12 lb)	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 20.
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, 68–69.

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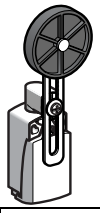
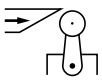
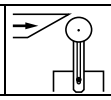
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKP—Complete Units with 1/2" NPT Cable Entry

Type of head	Plunger (mounting by the head)		Rotary (mounting by the body) 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 *(4)*
Catalog Numbers *(2)*							
2-pole N/C + N/O snap action (XE2S P2151)	**XCKP21H0N12** 1,8 4,6(P) 0 5mm 0,9	**XCKP21H2N12** 3,1(A)7,8(P) 0 mm 1,5	**XCKP2118N12** 25° 70°(P) 0 90° 12°	**XCKP2145N12** 25° 70°(P) 0 90° 12°	**XCKP2139N12** 25° 70°(P) 0 90° 12°	**XCKP2149N12** 25° 70°(P) 0 90° 12°	**XCKP2106N12** 20° 0 15°
2-pole N/C + N/O break before make, slow break (XE2NP2151)	**XCKP25H0N12** 1,8 3,2(P) 0 3 5mm	**XCKP25H2N12** 3,1(A) 5,6(P) 0 5,2 mm	**XCKP2518N12** 25° 46°(P) 0 42° 90°	**XCKP2545N12** 25° 46°(P) 0 42° 90°	**XCKP2539N12** 25° 46°(P) 0 42° 90°	**XCKP2549N12** 25° 46°(P) 0 42° 90°	**XCKP2506N12** 20° 0 45°
2-pole N/C + N/C snap action (XE2SP2141)	**ZCP29 + ZCPEN12 + ZCEH0** 1,8 4,6(P) 0 5mm 0,9	**ZCP29 + ZCPEN12 + ZCEH2** 3,1(A)7,8(P) 0 mm 1,5	**ZCP29 + ZCPEN12 + ZCE01 + ZCY18** 25° 70°(P) 0 90° 12°	**ZCP29 + ZCPEN12 + ZCE01 + ZCY45** 25° 70°(P) 0 90° 12°	**ZCP29 + ZCPEN12 + ZCE 01 + ZCY39** 25° 70°(P) 0 90° 12°	**ZCP29 + ZCPEN12 + ZCE01 + ZCY49** 25° 70°(P) 0 90° 12°	**ZCP29 + ZCPEN12 + ZCE06** 20° 0 15°
2-pole N/C + N/C simultaneous, slow break (XE2NP2141)	**ZCP27 + ZCPEN12 + ZCEH0** 1,8 3,2(P) 0 5mm	**ZCP27 + ZCPEN12 + ZCEH2** 3,1 5,6(P) 0 mm	**ZCP27 + ZCPEN12 + ZCE01 + ZCY18** 25° 46°(P) 0 90°	**ZCP27 + ZCPEN12 + ZCE01 + ZCY45** 25° 46°(P) 0 90°	**ZCP27 + ZCPEN12 + ZCE01 + ZCY39** 25° 46°(P) 0 90°	**ZCP27 + ZCPEN12 + ZCE01 + ZCY49** 25° 46°(P) 0 90°	**ZCP27 + ZCPEN12 + ZCE06** 20° 0
3-pole N/C + N/C + N/O snap action (XE3SP2141)	**ZCP39 + ZCPEN12 + ZCEH0** 1,8 4,6(P) 0 5mm	**ZCP39 + ZCPEN12 + ZCEH2** 3,1(A) 7,8(P) 0 mm 1,5	**ZCP39 + ZCPEN12 + ZCE01 + ZCY18** 25° 70°(P) 0 90° 12°	**ZCP39 + ZCPEN12+ ZCE01 + ZCY45** 25° 70°(P) 0 90° 12°	**ZCP39 + ZCPEN12 + ZCE01 + ZCY39** 25° 70°(P) 0 90° 12°	**ZCP39 + ZCPEN12 + ZCE01 + ZCY49** 25° 70°(P) 0 90° 12°	**ZCP39 + ZCPEN12 + ZCE06** 20° 0 15°
3-pole N/C + N/C + N/O break before make, slow break (XE3NP2141)	**ZCP37+ ZCPEN12 + ZCEH0** 1,8 3,2(P) 0 3 5mm	**ZCP37 + ZCPEN12 + ZCEH2** 3,1(A) 5,6(P) 0 5,2 mm	**ZCP37 + ZCPEN12 + ZCE01 + ZCY18** 25° 46°(P) 0 42° 90°	**ZCP37 + ZCPEN12 + ZCE01 + ZCY45** 25° 46°(P) 0 42° 90°	**ZCP37 + ZCPEN12 + ZCE01 + ZCY39** 25° 46°(P) 0 42° 90°	**ZCP37 + ZCPEN12 + ZCE01 + ZCY49** 25° 46°(P) 0 42° 90°	**ZCP37 + ZCPEN12 + ZCE06** 20° 0 45°
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	■ 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)	10 N (2.25 lb)	0.1 N•m (0.89 lb-in)				0.13 N•m (1.15 lb-in)
Minimum force or torque — 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.)						

1. Form conforming to EN 50047, see page 20.
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: XCKP21H0N12 becomes **XCKP21H0G11**, ZCPEN12 becomes **ZCPEG11**.
4. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

NOTE: For more information, consult pages 63, 68–69.

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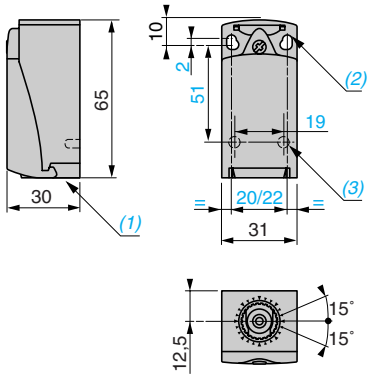
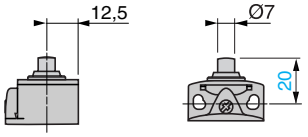
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKP—Complete Units with 1/2" NPT Cable Entry

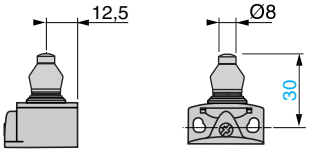
ZCP2• + ZCPEN12 / ZCP3• + ZCPEN12



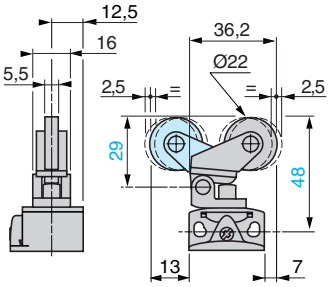
ZCE10



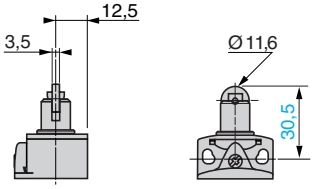
ZCE11



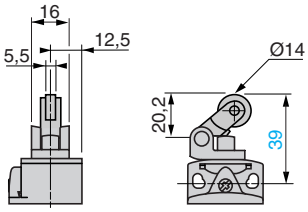
ZCE28



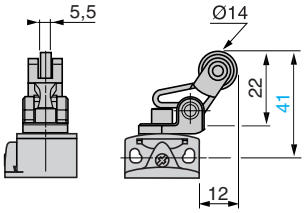
ZCE02



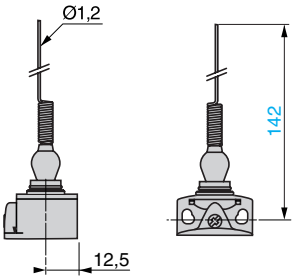
ZCE21



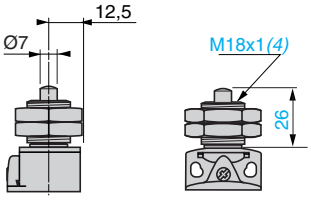
ZCE27



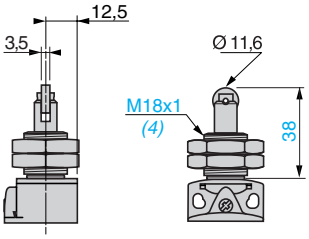
ZCE06



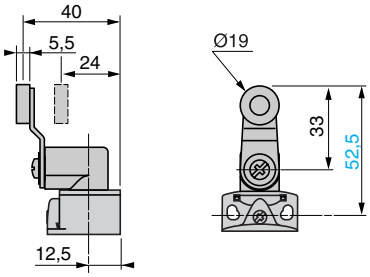
ZCEH0



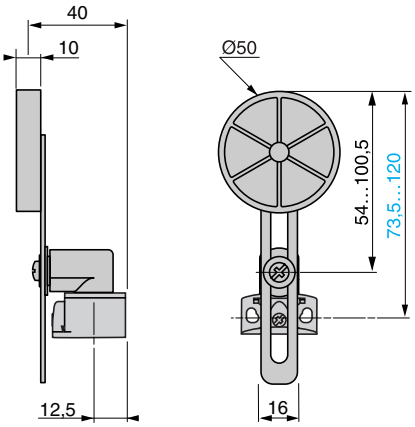
ZCEH2



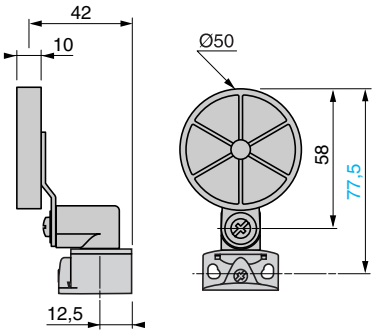
ZCE01 + ZCY18



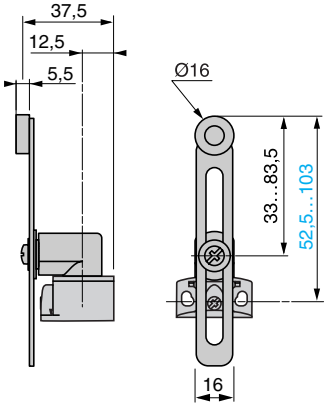
ZCE01 + ZCY49



ZCE01 + ZCY39



ZCE01 + ZCY45



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.).

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Catalog Number Interpretation

For Interpretation of the Catalog Number Only

XCK

XCK—Assembled unit
ZCP—Plastic body components
ZCD—Metal body components
ZCT—Wide body components
ZCPE—Plastic conduit components
ZCDE—Metal conduit components

P

Body
P—Plastic
D—Metal
T—Plastic wide body

21

Contact Description
21—1 N.O. + 1 N.C. Snap Action Silver
25—1 N.O. + 1 N.C. Slow Make/Break Silver
26—1 N.O. + 1 N.C. Overlapping Cont. Gold
27—1 N.C. + 1 N.C. Slow Make/Break Silver
28—1 N.O. + 1 N.O. Slow Make/Break Silver
29—1 N.C. + 1 N.C. Snap Action Silver
31—2 N.O. + 1 N.C. Snap Action Silver
35—2 N.O. + 1 N.C. Slow Make/Break Silver ■
37—1 N.O. + 2 N.C. Slow Make/Break Silver ■
39—1 N.O. + 2 N.C. Snap Action Silver
41—2 N.O. + 2 N.C. Snap Action Silver ■
61—1 N.O. + 1 N.C. Snap Action Gold
65—1 N.O. + 1 N.C. Slow Make/Break Gold ■
66—1 N.O. + 1 N.C. Overlapping Cont. Gold ■
67—1 N.C. + 1 N.C. Slow Make/Break Gold ■
68—1 N.O. + 1 N.O. Slow Make/Break Gold
69—1 N.C. + 1 N.C. Snap Action Gold
71—2 N.O. + 1 N.C. Snap Action Gold ■
75—2 N.O. + 1 N.C. Slow Make/Break Gold ■
77—1 N.O. + 2 N.C. Slow Make/Break Gold ■
79—1 N.O. + 2 N.C. Snap Action Gold ■
81—2 N.O. + 2 N.C. Snap Action Gold ■
C1—1 N.O. + 1 N.C. Snap Action Quick Connect ■
C9—1 N.C. + 1 N.C. Snap Action Quick Connect ■

10

Head Assembly
01—Rotary Head without Lever Arm
02—Steel Top Roller Plunger
05—Rotary Head Programmable
06—Cat Whisker
07—Spring Rod with Plastic End ■
08—Spring Rod ■
09—Maint. Rotary without Arm ■
10—Top Push Rod Plunger
11—Booted Top Push Rod Pl.
13—Top Ball Bearing Plunger ■
14—Adjustable Top Plunger ■
21—One-way Horiz. Plastic Roller
24—Retractable Steel Roller, 9 mm (0.35 in.)
27—One-way Vert. Plastic Roller
28—One-way Horiz. or Vert. Roller
29—Booted Top Roller Plunger ■
62—Adjust. Side Push Rod Pl. ■
63—Side Push Rod Plunger ■
64—Horiz. Side Roller Plunger ■
65—Vertical Side Roller Plunger ■
66—Side Ball Bearing Plunger ■
67—Horizontal Cat Whisker ■
F0—M12 Threaded Plunger Head ■
F2—M12 Threaded Roller Plunger Head ■
G1—M16 Threaded Booted Plunger Head ■
H0—M18 Threaded Plunger Head ■
H2—M18 Threaded Roller Plunger Head ■

N12

Conduit Threads
F12—PF 1/2
G11—PG 11
G13—PG 13.5
■— 4- or 5-Pin Connector
N12—1/2 NPT
P16—ISO M16
P20—M20

Important Note:
Use for interpretation only. Not all possibilities are shown and not all combination of components are available. Not all switches are modular. See additional information in this catalog. For interpretation of heads and levers see page 68–69.

■ Call your local field sales office for availability.

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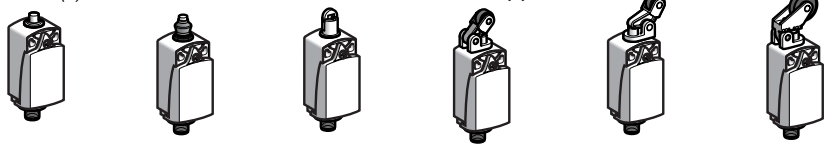
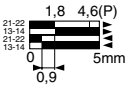
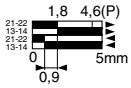
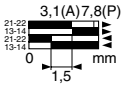
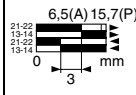
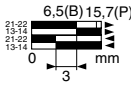
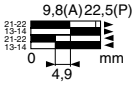
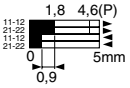
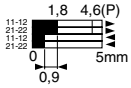
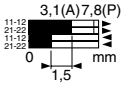
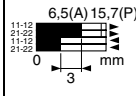
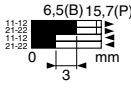
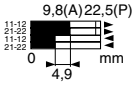
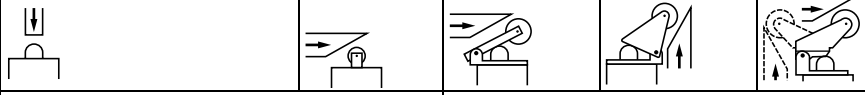
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKP—Integral M12 Connector

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	■ 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	

1. Form conforming to EN 50047, see page 20.

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				

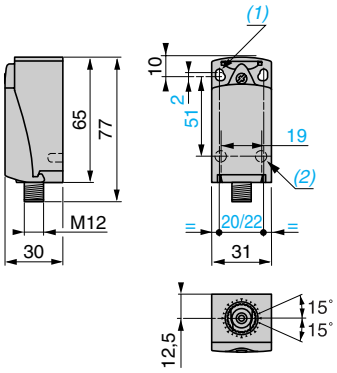
Connections
Integral M12 connector

XE2S P2151
1-2: N/C
3-4: N/O

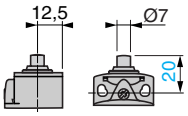
XE2S P2141
1-2: N/C
3-4: N/C

Dimensions

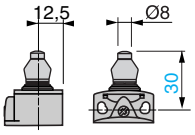
ZCP2•M12



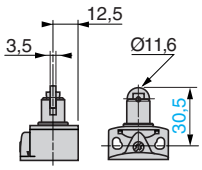
ZCE10



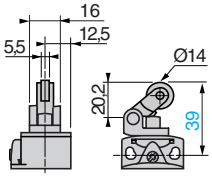
ZCE11



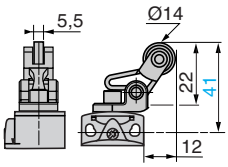
ZCE02



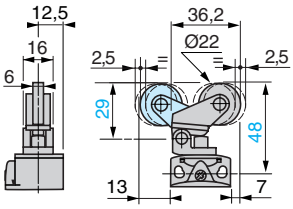
ZCE21



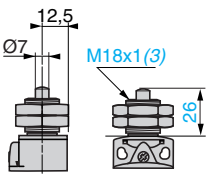
ZCE27



ZCE28



ZCEH0



1. 2 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) (0.87 in.) centers, 2 holes Ø 4.3 mm (0.17 in.) on 20 mm (0.79 in.) ctrs.
2. 2 x Ø 3 mm (0.12 in.) holes for support studs, depth 4 mm (0.16 in.).
3. Mounting nut thickness 3.5 mm (0.14 in.).

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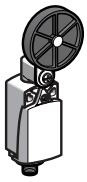
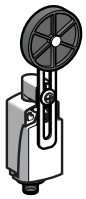
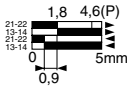
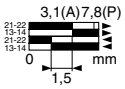
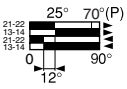
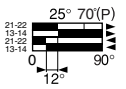
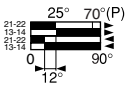
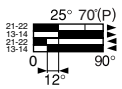
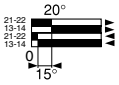
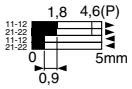
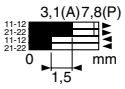
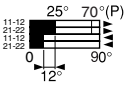
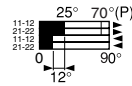
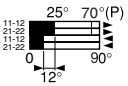
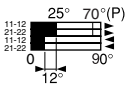
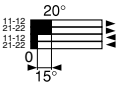
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKP—Integral M12 Connector

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 + ZCY39** ⊖ 	**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)

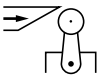
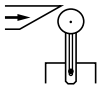
Contact operation
- ■ contact closed
- □ contact open

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

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

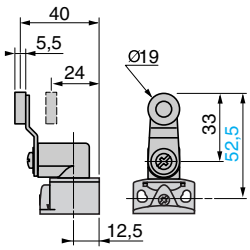
1. Form conforming to EN 50047, see page 20.
2. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

Characteristics

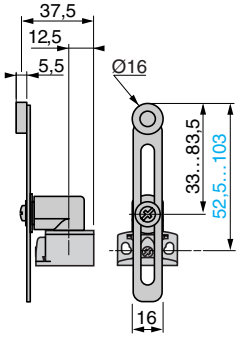
Switch actuation		On end	By 30° cam				By any moving part
Type of actuation							
Maximum actuation speed		0.5 m/s (1.64 ft/s)		1.5 m/s (4.92 ft/s)			1 m/s (3.28 ft/s), any direction
Minimum force or torque	For tripping	15 N (3.37 lb)	10 N (2.25 lb)	0.1 N•m (0.89 lb-in)			0.13 N•m (1.15 lb-in)
	For positive opening	45 N (10.12 lb)	36 N (8.09 lb)	0.25 N•m (2.21 lb-in)			—
Connection		M12 4-pin connector, Ui = 250 V, Ie = 3 A maximum, Ith = 3 A					

Dimensions

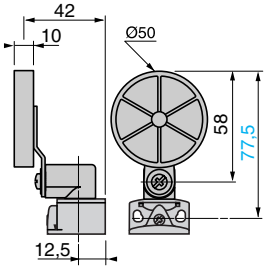
ZCE01 + ZCY18



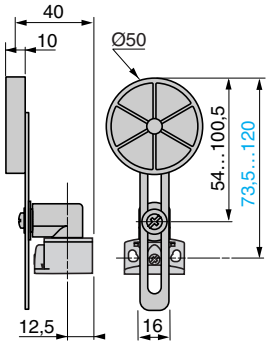
ZCE01 + ZCY45



ZCE01 + ZCY39

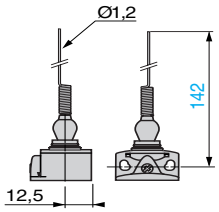


ZCE01 + ZCY49

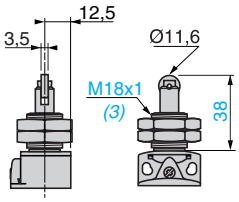


3. Mounting nut thickness 3.5 mm (0.14 in.).

ZCE06



ZCEH2



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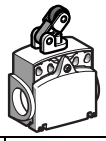
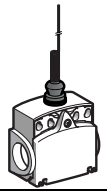
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKT—Complete Units with Two Cable Entries and 1/2" NPT Adapter

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)*					
2-pole N/C + N/O snap action (XE2SP3151)	**XCKT2110N12**	**XCKT2111N12**	**XCKT2102N12**	**XCKT2121N12**	**XCKT2106N12**
	1,8 4,6(P) 0 5mm 0,9	1,8 4,6(P) 0 5mm 0,9	3,1(A) 7,8(P) 0 mm 1,5	6,5(A) 15,7(P) 0 mm 3	20° 0 15°
2-pole N/C + N/O break before make, slow break (XE2NP3151)	**ZCT25N12 + ZCE10**	**ZCT25N12 + ZCE11**	**ZCT25N12 + ZCE02**	**ZCT25N12 + ZCE21**	**ZCT25N12 + ZCE06**
	1,8 3,2(P) 0 3 5mm	1,8 3,2(P) 0 3 5mm	3,1(A) 5,6(P) 0 5,2 mm	6,5(A) 11,3(P) 0 10,5 mm	20° 0 45°
2-pole N/C + N/O make before break, slow break (XE2N P3161)	**ZCT26N12 + ZCE10**	**ZCT26N12 + ZCE11**	**ZCT26N12 + ZCE02**	**ZCT26N12 + ZCE21**	**ZCT26N12 + ZCE06**
	3 4,4(P) 0 1,8 5mm	3 4,4(P) 0 1,8 5mm	5,2 7,6(P) 0 3,1 mm	10,9(A) 16(P) 0 6,6 mm	45° 0 20°
2-pole N/C + N/C simultaneous, slow break (XE2N P3141)	**ZCT27N12 + ZCE10**	**ZCT27N12 + ZCE11**	**ZCT27N12 + ZCE02**	**ZCT27N12 + ZCE21**	**ZCT27N12 + ZCE06**
	1,8 3,2(P) 0 5mm	1,8 3,2(P) 0 5mm	3,1 5,6(P) 0 mm	6,6(A) 11,6(P) 0 mm	20° 0
2-pole N/O + N/O simultaneous, slow break (XE2NP3131)	**ZCT28N12 + ZCE10**	**ZCT28N12 + ZCE11**	**ZCT28N12 + ZCE02**	**ZCT28N12 + ZCE21**	**ZCT28N12 + ZCE06**
	1,8 0 5mm	1,8 0 5mm	3,1(A) 0 mm	6,6(A) 0 mm	20° 0
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	■ 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	

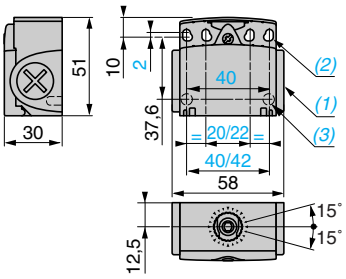
Characteristics

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 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).			

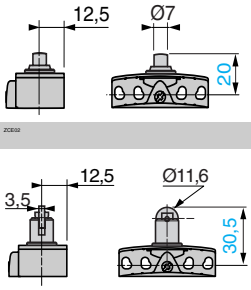
1. Form conforming to EN 50047, see page 20.
2. Switches with gold contacts or ring connections: please consult your local sales office.
3. For cable entries tapped for a PG 11 conduit thread, replace N12 in the catalog number with **G11**. Example: XCKT2110N12 becomes **XCKT2110G11**.
4. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mountings.

Dimensions

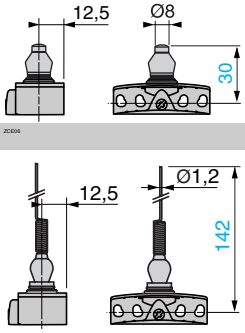
ZCT2•N12



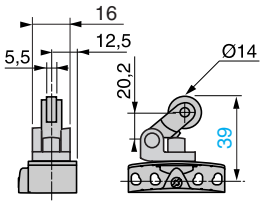
ZCE10



ZCE11



ZCE21



1. 2 tapped entries for ISO M16 x 1.5 or PG 11 conduit thread.
2. 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.
3. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).

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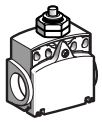
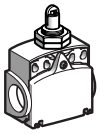
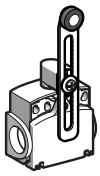
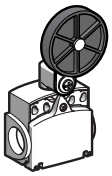
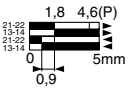
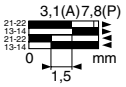
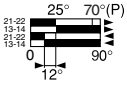
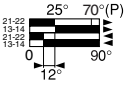
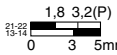
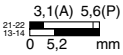
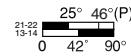
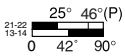
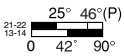
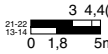
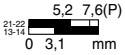
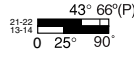
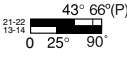
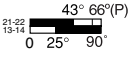
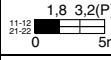
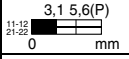
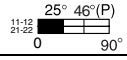
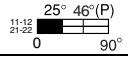
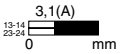
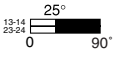
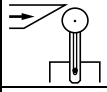
Limit Switches
Osiswitch® Compact, Plastic
Universal, XCKT—Complete Units with Two Cable Entries and 1/2" NPT Adapter

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)*					
2-pole N/C + N/O snap action (XE2S P3151)	**XCKT21H0N12** 	**XCKT21H2N12** 	**XCKT2118N12** 	**XCKT2145N12**	**XCKT2139N12** 
2-pole N/C + N/O break before make, slow break (XE2N P3151)	**ZCT25N12 + ZCEH0** 	**ZCT25N12 + ZCEH2** 	**ZCT25N12 + ZCE01 + ZCY18** 	**ZCT25N12 + ZCE01 + ZCY45** 	**ZCT25N12+ ZCE01 + ZCY39** 
2-pole N/O + N/C make before break, slow break (XE2N P3161)	**ZCT26N12 + ZCEH0** 	**ZCT26N12 + ZCEH2** 	**ZCT26N12 + ZCE01 + ZCY18** 	**ZCT26N12 + ZCE01 + ZCY45** 	**ZCT26N12 + ZCE01 + ZCY39** 
2-pole N/C + N/C simultaneous, slow break (XE2N P3141)	**ZCT27N12 + ZCEH0** 	**ZCT27N12 + ZCEH2** 	**ZCT27N12 + ZCE01 + ZCY18**	**ZCT27N12 + ZCE01 + ZCY45** 	**ZCT27N12+ ZCE01 + ZCY39** 
2-pole N/O + N/O simultaneous, slow break (XE2NP3131)	**ZCT28N12 + ZCEH0**	**ZCT28N12 + ZCEH2** 	**ZCT28N12 + ZCE01 + ZCY18**	**ZCT28N12 + ZCE01 + ZCY45**	**ZCT28N12 + ZCE01 + ZCY39** 
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 □ contact open	(A) = cam displacement (P) = positive opening point		⊖ N/C contact with positive opening operation, when properly mounted and using a conforming operator	

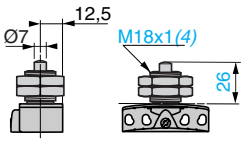
Characteristics

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 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).		

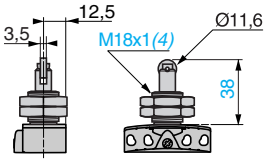
1. Form conforming to EN 50047, see page 20.
2. Switches with gold contacts or ring type connections: please consult your local sales office.
3. For cable entries tapped for a PG 11 conduit thread, replace N12 in the catalog number with **G11**. Example: XCKT21H0N12 becomes **XCKT21H0G11**.

Dimensions

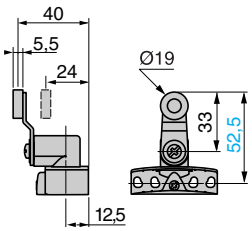
ZCEH0



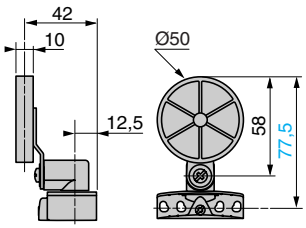
ZCEH2



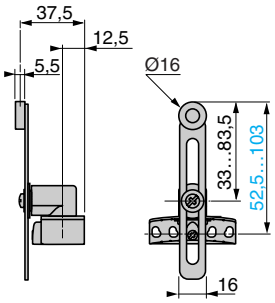
ZCE01 + ZCY18



ZCE01 + ZCY39



ZCE01 + ZCY45



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

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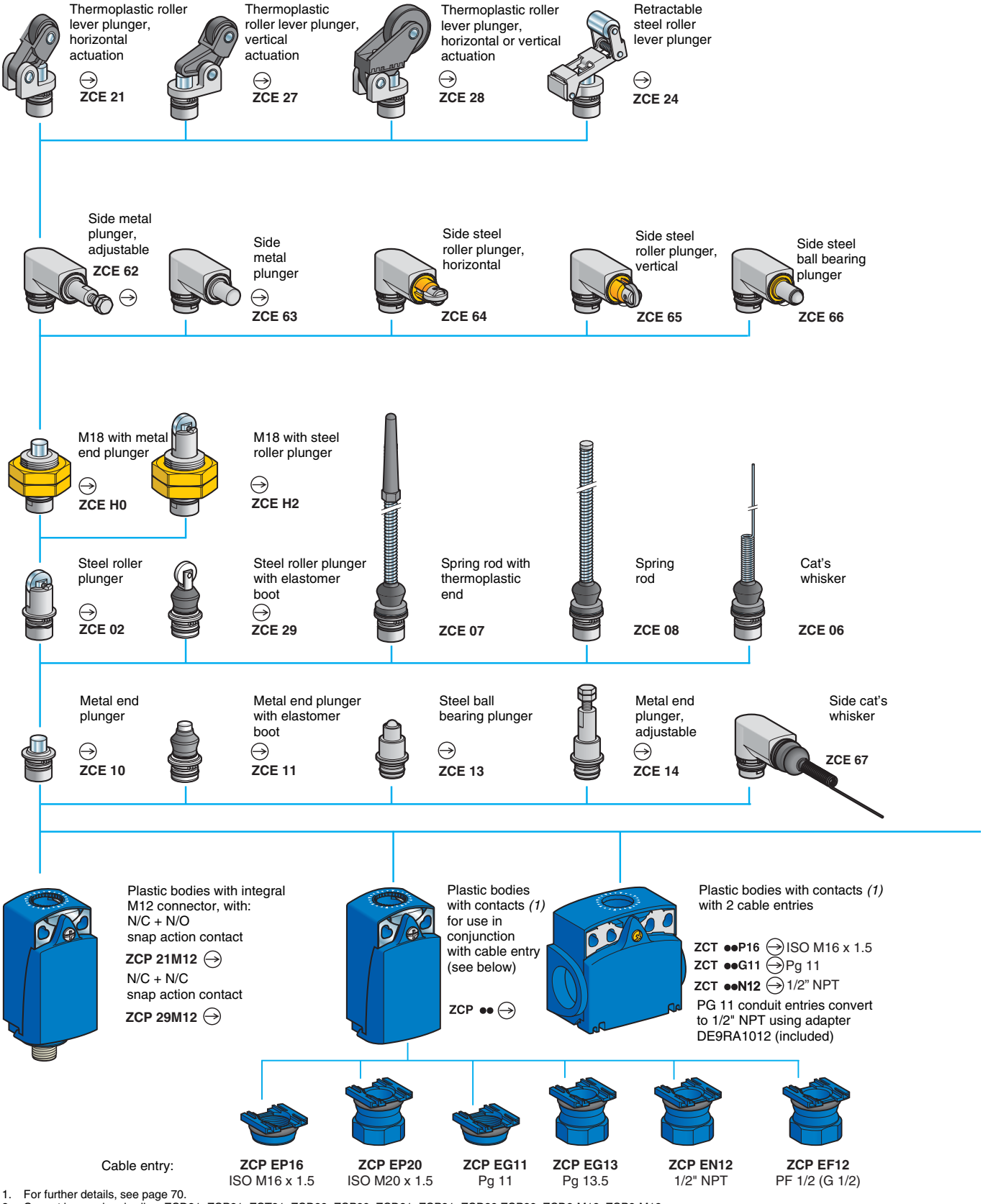
Limit Switches
Osiswitch® Compact, Metal and Plastic
Universal, XCKD, XCKP, and XCKT—Modular



1. For further details, see page 70.
2. Cannot be used on bodies: ZCD21, ZCP21, ZCT21, ZCD29, ZCP29, ZCD31, ZCP31, ZCD39.ZCP39, ZCD2•M12, ZCP2•M12.

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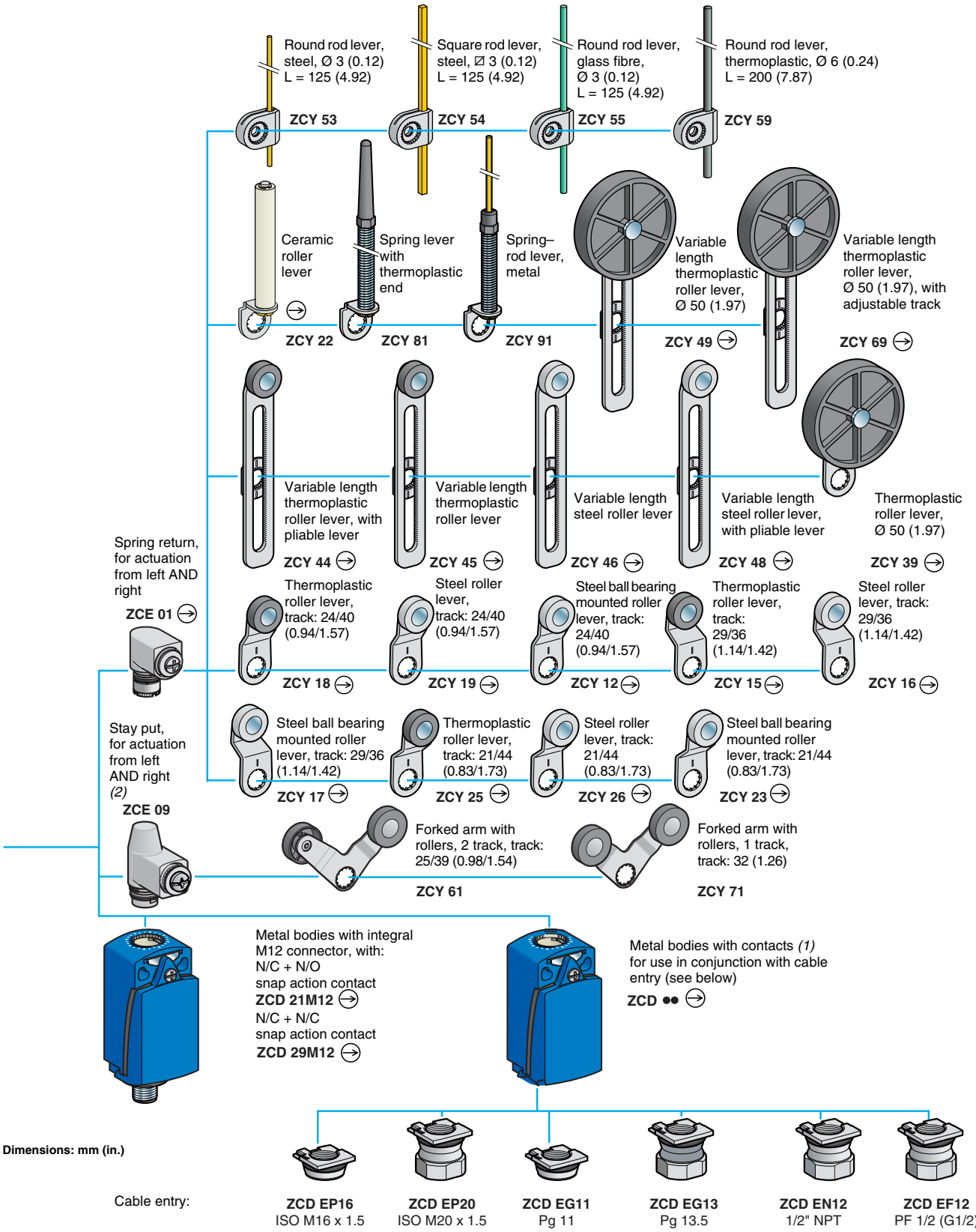

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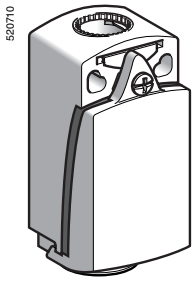
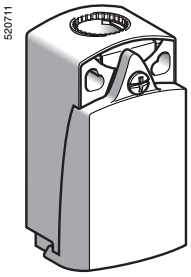
Limit Switches
Osiswitch® Compact, Metal and Plastic
Universal, XCKD, XCKP, and XCKT—Modular



ZCD ••



ZCP••

Bodies with contacts, types XCK D and XCK P*(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)	⊖	13 21 / 14 22	Metal	**ZCD 21**	0.140 (0.309)
			Plastic	**ZCP 21**	0.070 (0.154)
N/C + N/C snap action (XE2SP2141)	⊖	11 21 / 12 22	Metal	**ZCD 29**	0.140 (0.309)
			Plastic	**ZCP 29**	0.070 (0.154)
N/C + N/O break before make, slow break (XE2NP2151)	⊖	13 21 / 14 22	Metal	**ZCD 25**	0.140 (0.309)
			Plastic	**ZCP 25**	0.070 (0.154)
N/O + N/C make before break, slow break (XE2NP2161)	⊖	13 21 / 14 22	Metal	**ZCD 26**	0.140 (0.309)
			Plastic	**ZCP 26**	0.070 (0.154)
N/C + N/C simultaneous, slow break (XE2NP2141)	⊖	11 21 / 12 22	Metal	**ZCD 27**	0.140 (0.309)
			Plastic	**ZCP 27**	0.070 (0.154)
N/O + N/O simultaneous, slow break (XE2NP2131)	—	13 23 / 14 24	Metal	**ZCD 28**	0.140 (0.309)
			Plastic	**ZCP 28**	0.070 (0.154)
3-pole					
N/C + N/O + N/O snap action (XE3SP2151)	⊖	21 33 13 / 22 34 14	Metal	**ZCD 31**	0.140 (0.309)
			Plastic	**ZCP 31**	0.070 (0.154)
N/C + N/C + N/O snap action (XE3SP2141)	⊖	31 21 13 / 32 22 14	Metal	**ZCD 39**	0.140 (0.309)
			Plastic	**ZCP 39**	0.070 (0.154)
N/C + N/C + N/O break before make, slow break (XE3NP2141)	⊖	31 21 13 / 32 22 14	Metal	**ZCD 37**	0.140 (0.309)
			Plastic	**ZCP 37**	0.070 (0.154)
N/C + N/O + N/O break before make, slow break (XE3NP2151)	⊖	21 33 13 / 22 34 14	Metal	**ZCD 35**	0.140 (0.309)
			Plastic	**ZCP 35**	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.

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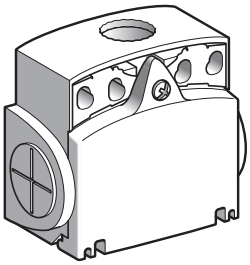
561390

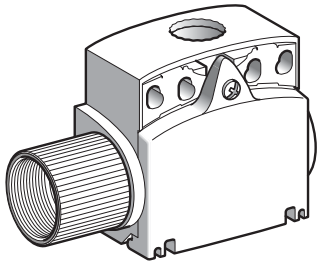


ZCT•••

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)	⊖	13 21 / 14 22	ISO M16 x 1.5	**ZCT 21P16**	0.085 (0.187)
			PG 11	**ZCT 21G11**	0.085 (0.187)
N/C + N/O break before make, slow break (XE2NP3151)	⊖	13 21 / 14 22	ISO M16 x 1.5	**ZCT 25P16**	0.085 (0.187)
			PG 11	**ZCT 25G11**	0.085 (0.187)
N/C + N/C simultaneous, slow break (XE2NP3141)	⊖	11 21 / 12 22	ISO M16 x 1.5	**ZCT 27P16**	0.085 (0.187)
			PG 11	**ZCT 27G11**	0.085 (0.187)
N/O + N/O simultaneous, slow break (XE2NP3131)	—	13 23 / 14 24	ISO M16 x 1.5	**ZCT 28P16**	0.085 (0.187)
			PG 11	**ZCT 28G11**	0.085 (0.187)
N/O + N/C make before break, slow break (XE2NP3161)	⊖	13 21 / 14 22	ISO M16 x 1.5	**ZCT 26P16**	0.085 (0.187)
			PG 11	**ZCT 26G11**	0.085 (0.187)

561387



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)	⊖	13 21 / 14 22	**ZCT 21N12**	0.130 (0.287)
N/C + N/O break before make, slow break (XE2NP3151)	⊖	13 21 / 14 22	**ZCT 25N12**	0.130 (0.287)
N/C + N/C simultaneous, slow break (XE2N P3141)	⊖	11 21 / 12 22	**ZCT 27N12**	0.130 (0.287)
N/O + N/O simultaneous, slow break (XE2NP3131)	—	13 23 / 14 24	**ZCT 28N12**	0.130 (0.287)
N/O + N/C make before break, slow break (XE2NP3161)	⊖	13 21 / 14 22	**ZCT 26N12**	0.130 (0.287)

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

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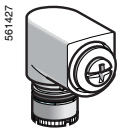
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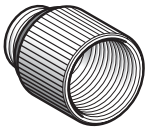
ZCE05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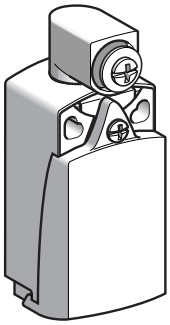
DE9RA1012


561388

XCK•2•01••

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)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	1/2" NPT	**XCKD2501N12**	0.185 (0.408)
		⊖	PG 11	**XCKD2501G11**	0.185 (0.408)

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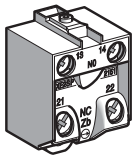
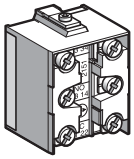


XE2••21••

561394



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	⊖	13 21 / 14 22	**XE2SP2151**	0.020 (0.044)
N/C + N/C simultaneous, snap action	⊖	11 21 / 12 22	**XE2SP2141**	0.020 (0.044)
N/C + N/O break before make, slow break	⊖	13 21 / 14 22	**XE2NP2151**	0.020 (0.044)
N/O + N/C make before break, slow break	⊖	13 21 / 14 22	**XE2NP2161**	0.020 (0.044)
N/C + N/C simultaneous, slow break	⊖	11 21 / 12 22	**XE2NP2141**	0.020 (0.044)
N/O + N/O simultaneous, slow break	—	13 23 / 14 24	**XE2NP2131**	0.020 (0.044)
3-pole				
N/C + N/O + N/O snap action	⊖	21 33 13 / 22 34 14	**XE3SP2151**	0.035 (0.077)
N/C + N/C + N/O snap action	⊖	31 21 13 / 32 22 14	**XE3SP2141**	0.035 (0.077)
N/C + N/C + N/O break before make, slow break	⊖	31 21 13 / 32 22 14	**XE3NP2141**	0.035 (0.077)
N/C + N/O + N/O break before make, slow break	⊖	21 33 13 / 22 34 14	**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	⊖	13 21 / 14 22	**XE2SP3151**	0.015 (0.033)
N/C + N/O break before make, slow break	⊖	13 21 / 14 22	**XE2NP3151**	0.015 (0.033)
N/O + N/C make before break, slow break	⊖	13 21 / 14 22	**XE2NP3161**	0.015 (0.033)
N/C + N/C simultaneous, slow break	⊖	11 21 / 12 22	**XE2NP3141**	0.015 (0.033)
N/O + N/O simultaneous, slow break	—	13 23 / 14 24	**XE2NP3131**	0.015 (0.033)

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

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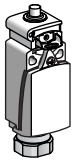
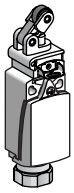
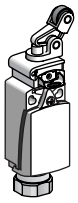
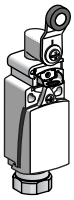
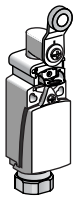
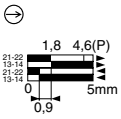
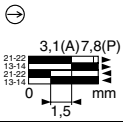
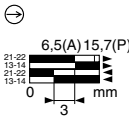
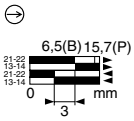
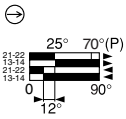
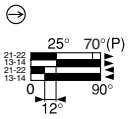
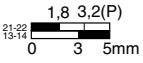
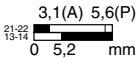
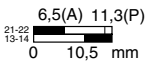
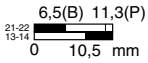
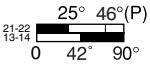
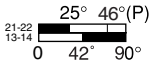
Limit Switches
Osiswitch® Compact with Manual Reset
Application, XCDR—Complete Switches, Metal, with One Cable Entry, 1/2" NPT

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						
2-pole N/C + N/O snap action (XE2SP2151)	**XCDR2110N12** 	**XCDR2102N12** 	**XCDR2121N12** 	**XCDR2127N12** 	**XCDR2118N12** 	**XCDR2119N12** 
2-pole N/C + N/O break before make, slow break (XE2NP2151)	**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**.

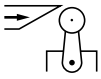
Contact operation

- ■ 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				

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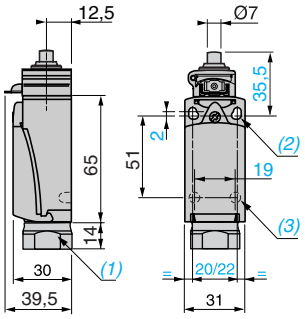
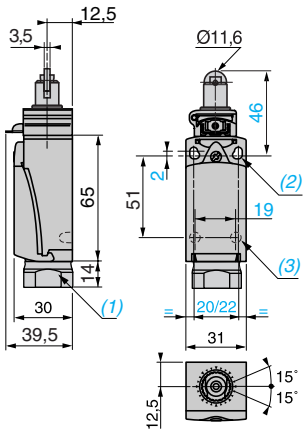
Dimensions

XCDR2•10•••

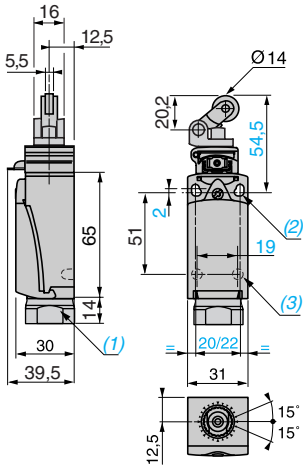


1. Tapped entry for ISO M20 x 1.5 or PG 13.5 conduit thread or 1/2" NPT conduit
2. 2 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes Ø 4.3 mm (0.17 in.) on 20 mm (0.79 in.) centers
3. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.)

XCDR2•02•••

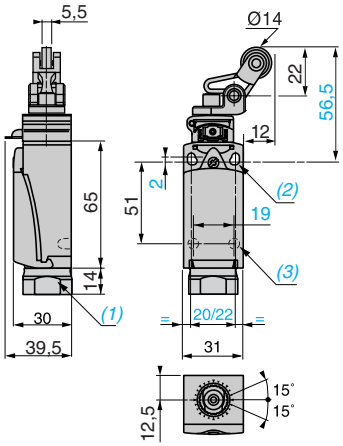


XCDR2•21•••

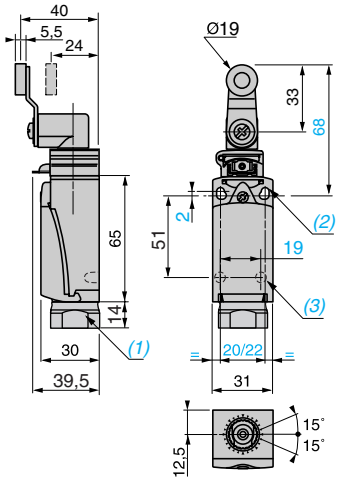


Dimensions

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 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.).

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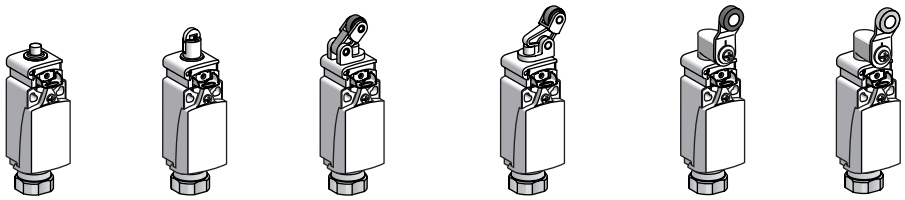
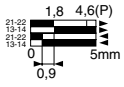
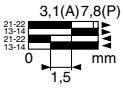
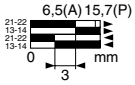
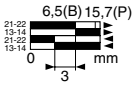
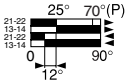
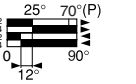
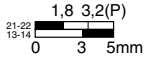
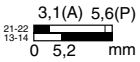
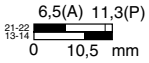
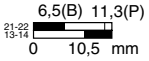
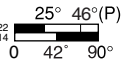
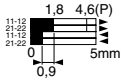
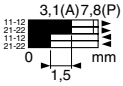
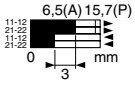
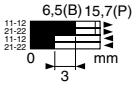
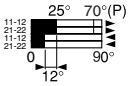
Limit Switches
Osiswitch® Compact with Manual Reset
Application, XCPR—Complete Switches, Plastic, with One Cable Entry, 1/2" NPT

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						
2-pole N/C + N/O snap action (XE2SP2151)	**XCPR2110N12** 	**XCPR2102N12** 	**XCPR2121N12** 	**XCPR2127N12** 	**XCPR2118N12** 	**XCPR2119N12** 
2-pole N/C + N/O break before make, slow break (XE2NP2151)	**XCPR2510N12** 	**XCPR2502N12** 	**XCPR2521N12** 	**XCPR2527N12** 	**XCPR2518N12**	**XCPR2519N12** 
2-pole N/C + N/C snap action (XE2S P2141)	**XCPR2910N12** 	**XCPR2902N12** 	**XCPR2921N12** 	**XCPR2927N12** 	**XCPR2918N12** 	—
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

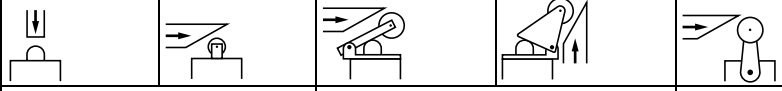
For complete switches with one PG 13.5 cable entry, replace N12 with **G13**.
Example: XCPR 2110P20 becomes **XCPR 2110G13**.

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)		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				

Other versions

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

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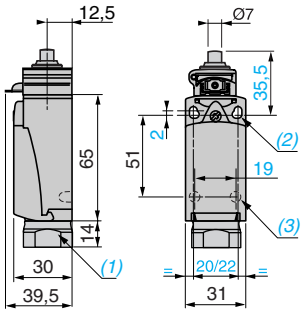
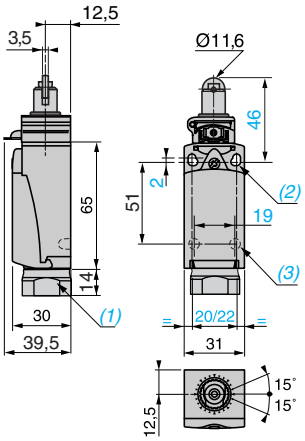
Dimensions

XCPR2•10•••

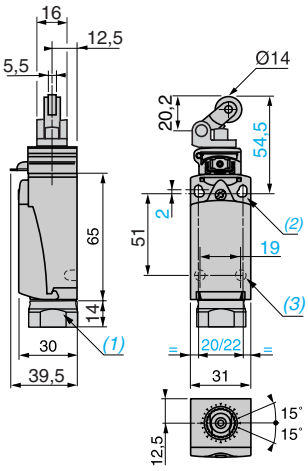


1. Tapped entry for ISO M20 x 1.5 or PG 13.5 conduit thread or 1/2" NPT conduit.
2. 2 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22 mm (0.87 in.) centers, 2 holes Ø 4.3 mm (0.17 in.) on 20 mm (0.79 in.) centers.
3. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).

XCPR2•02•••

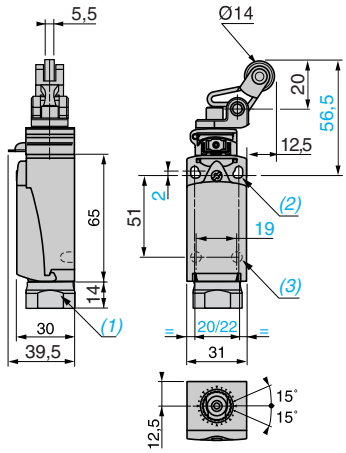


XCPR2•21•••

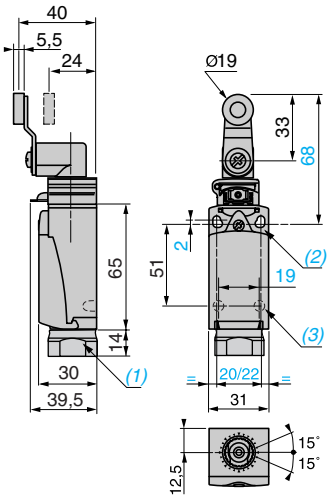


Dimensions

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 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.).

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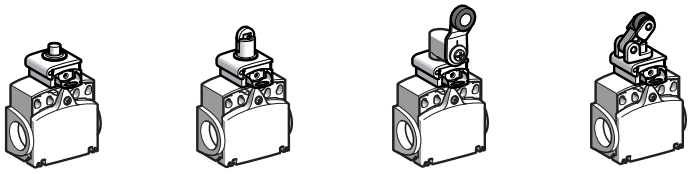
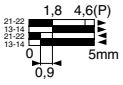
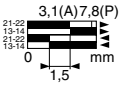
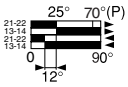
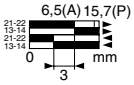
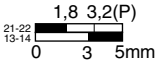
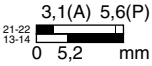
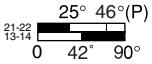
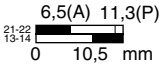
Limit Switches
Osiswitch® Compact with Manual Reset
Application, XCTR—Complete Switches, Plastic, with Two Cable Entries, 1/2" NPT

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)*				
2-pole N/C + N/O snap action (XE2SP3151)	**XCTR2110N12** ⊖ 	**XCTR2102N12** ⊖ 	**XCTR2118N12** ⊖ 	**XCTR2121N12** ⊖ 
2-pole N/C + N/O break before make, slow break (XE2NP3151)	**XCTR2510N12** ⊖ 	**XCTR2502N12** ⊖ 	**XCTR2518N12** ⊖ 	**XCTR2521N12** ⊖ 
Weight, kg (lb)	0.120 (0.265)	0.125 (0.276)	0.165 (0.364)	0.135 (0.298)

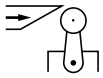
1. One PG 11 to 1/2" NPT adapter and one plug included.

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	■ 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)	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)	6 N (1.35 lb)
Minimum force or torque — For positive opening	45 N (10.12 lb)	36 N (8.09 lb)	0.25 N•m (2.21 lb-in)	18 N (4.05 lb)
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)			

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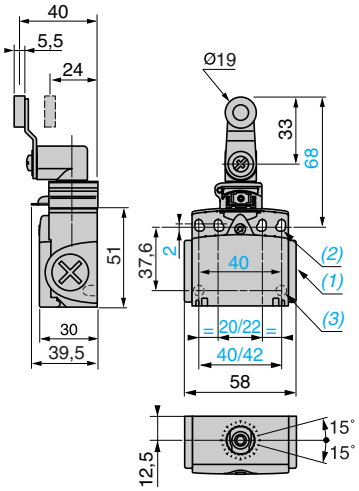
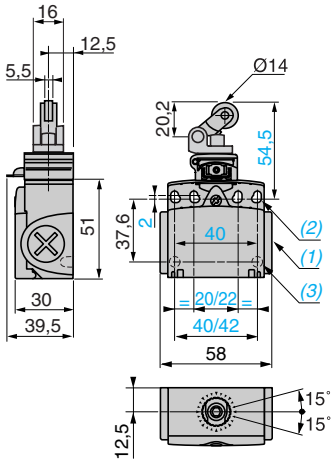
Limit Switches
Osiswitch® Compact, Metal with Manual Reset
Application, XCDR—Complete Switches with Two Cable Entries, 1/2" NPT

Dimensions

XCTR 2•18•••

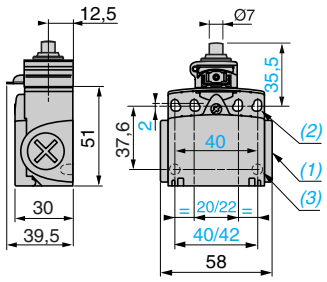


XCTR 2•21•••

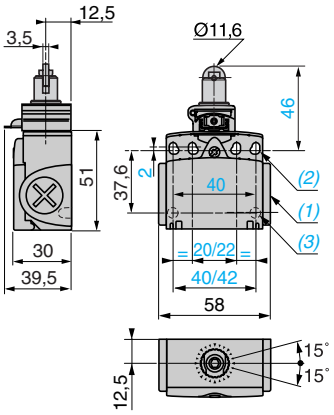


1. Tapped entry for ISO M16 x 1.5 or PG 11 conduit thread. 1/2" NPT adapter included.
2. 4 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22/42 mm (0.87/1.65 in.) centers, 4 holes Ø 4.3 mm (0.17 in.) on 20/40 mm (0.79/1.57 in.) centers.
3. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).

XCTR 2•10•••



XCTR 2•02•••



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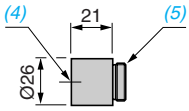

1. Tapped entry for ISO M16 x 1.5 or PG 11 conduit thread. 1/2" NPT adapter included.
2. 4 elongated holes Ø 4.3 x 6.3 mm (0.17 x 0.25 in.) on 22/42 mm (0.87/1.65 in.) centers, 4 holes Ø 4.3 mm (0.17 in.) on 20/40 mm (0.79/1.57 in.) centers.
3. 2 x Ø 3 holes for support studs, depth 4 mm (0.16 in.).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

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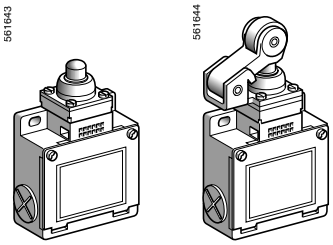
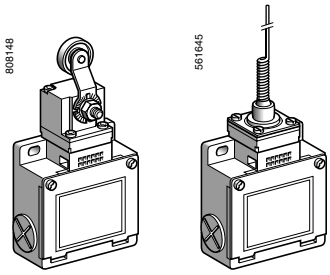
Limit Switches
Osiswitch® Classic, Metal
XCKM, XCKL, and XCKML

■ XCKM
with 3 cable entries

□ With plunger head



□ With rotary or multi-directional head



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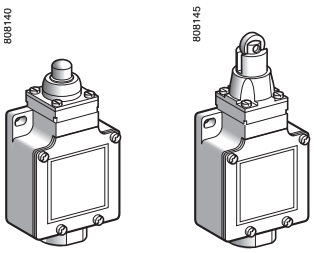
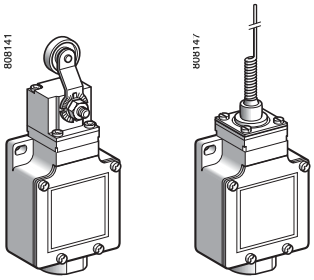
■ XCKL
with 1 cable entry

□ With plunger head



□ With rotary or multi-directional head



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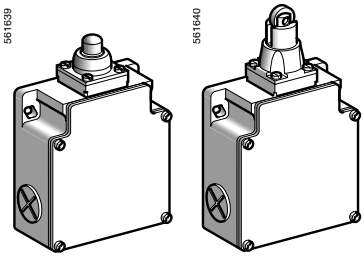
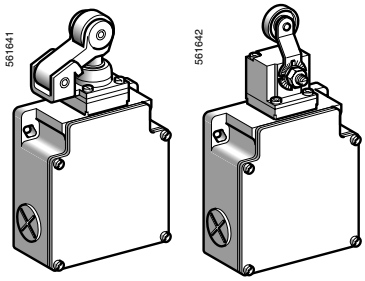
■ XCKML
with 3 cable entries and two 2-pole contacts

□ With plunger head



□ With rotary or multi-directional head



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Environment 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

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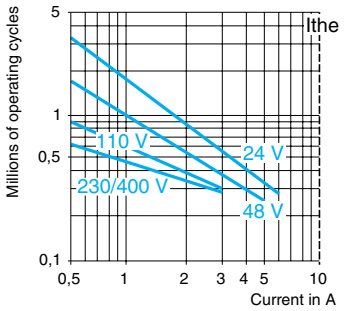
Contact block characteristics

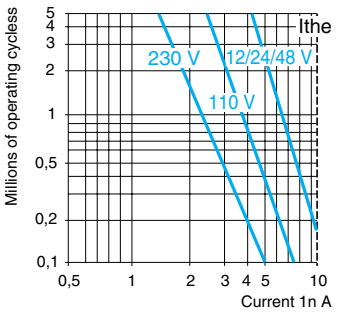
Rated operational characteristics	XE2•P	∿ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A ⎓ DC-13; Q300 (Ue = 250 V, Ie = 0,27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
	XE3•P	∿ AC-15; B300 (Ue = 240 V, Ie = 1,5 A); Ithe = 6 A ⎓ DC-13; R300 (Ue = 250 V, Ie = 0,1 A), conforming to IEC 60947-5-1 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 mm², max: 2 x 1,5 mm²
	XE2NP21•1	Clamping capacity, min: 1 x 0,5 mm², max: 2 x 2,5 mm²
	XESP2151L and XENP2151L	Clamping capacity, min: 1 x 0,34 mm², max: 2 x 1,5 mm² or 1 x 2,5 mm²
	XE3NP et XE3SP	Clamping capacity, min: 1 x 0,34 mm², max: 1 x 1 mm² or 2 x 0,75 mm²
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		• 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

a.c. supply
∿ 50/60 Hz
⩘ inductive circuit

XE2SP21•1, XE2SP2141, XESP2151L



XE2NP21•1, XENP2151L



d.c. supply ⎓

Power switched in W for 5 million operating cycles

Voltage	V	24	48	120
⩘	W	10	7	4

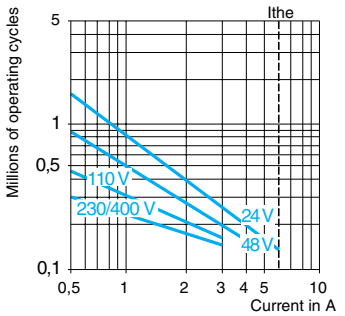
Power switched in W for 5 million operating cycles

Voltage	V	24	48	120
⩘	W	13	9	7

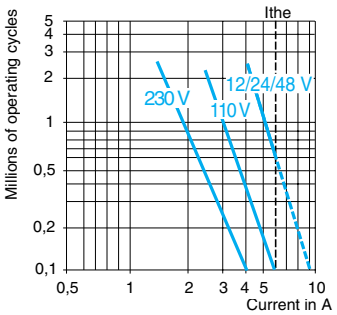
For XE2SP•151 on ∿ or ⎓, the "N/C" and "N/O" contacts are simultaneously loaded to the values shown with reverse polarity.

a.c. supply
∿ 50/60 Hz
⩘ inductive circuit

XE3SP••••



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

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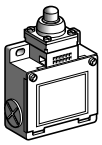
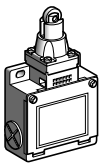
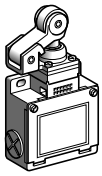
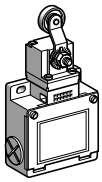
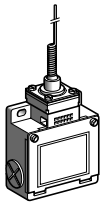
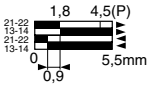
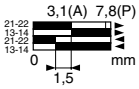
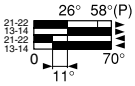
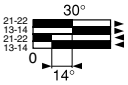
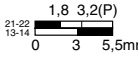
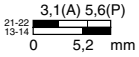
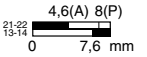
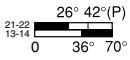
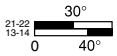
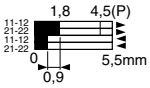
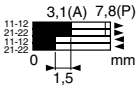
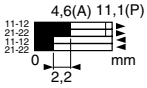
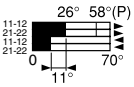
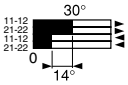
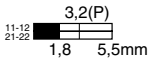
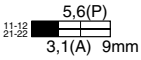
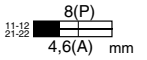
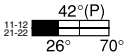
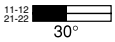
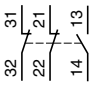
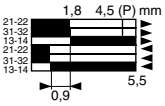
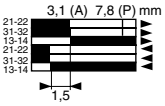
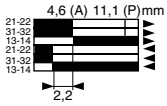
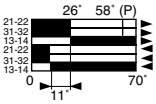
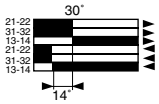
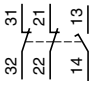
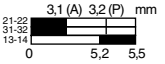
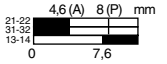
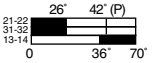
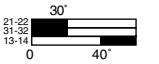
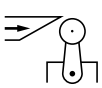
Limit Switches
Osiswitch® Classic, Metal
XCKM—Complete Switches w/ 3 ISO M20x1.5 Cable Entries, Including One 1/2" NPT Adapter

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)	**XCKM110H29** ⊖ 	**XCKM102H29** ⊖ 	**XCKM121H29** ⊖	**XCKM115H29** ⊖ 	**XCKM106H29** 
2-pole N/C + N/O break before make, slow break (XE2NP2151)	**XCKM510H29** ⊖ 	**XCKM502H29** ⊖ 	**XCKM521H29** ⊖ 	**XCKM515H29** ⊖ 	**XCKM506H29** 
2-pole N/C + N/C snap action (XE2SP2141)	**ZCKM9H29 + ZCKD10** ⊖ 	**ZCKM9H29 + ZCKD02** ⊖ 	**ZCKM9H29 + ZCKD21** ⊖ 	**ZCKM9H29 + ZCKD15** ⊖ 	**ZCKM9H29 + ZCKD06** 
2-pole N/C + N/C simultaneous, slow break (XE2NP2141)	**ZCKM7H29 + ZCKD10** ⊖ 	**ZCKM7H29 + ZCKD02** ⊖ 	**ZCKM7H29 + ZCKD21** ⊖ 	**ZCKM7H29 + ZCKD15** ⊖ 	**ZCKM7H29 + ZCKD06** 
3-pole N/C + N/C + N/O snap action (XE3SP2141) 	**ZCKMD39H29 + ZCKD10** ⊖ 	**ZCKMD39H29 + ZCKD02** ⊖ 	**ZCKMD39H29 + ZCKD21** ⊖ 	**ZCKMD39H29 + ZCKD15** ⊖ 	**ZCKMD39H29 + ZCKD06** 
3-pole N/C + N/C + N/O break before make, slow break (XE3NP2141) 	**ZCKMD37H29 + ZCKD10** ⊖	**ZCKMD37H29 + ZCKD02** ⊖ 	**ZCKMD37H29 + ZCKD21** ⊖ 	**ZCKMD37H29 + ZCKD15** ⊖ 	**ZCKMD37H29 + ZCKD06** 
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	■ 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)	0.13 N•m (1.15 lb-in)
Minimum force or torque — 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.)				

1. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
2. Switches with gold contacts or eyelet type connections: please consult your local sales office.
3. For an entry tapped for a PG 11 conduit thread, delete **H29** from the end of the catalog number. Example: **XCKM110H29** becomes **XCKM110**.
4. 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.

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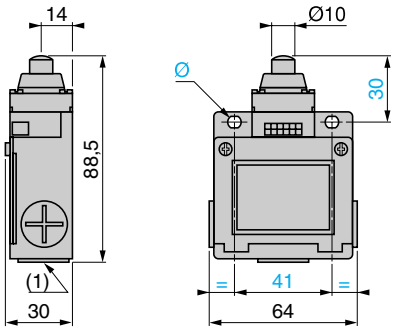
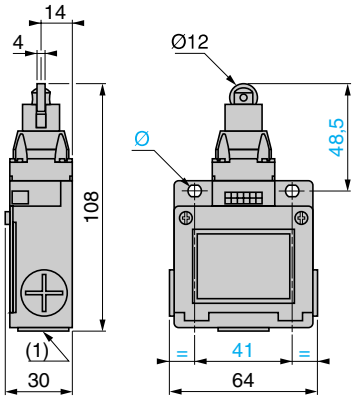
Limit Switches
Osiswitch® Classic, Metal
XCKM—Complete Switches w/ 3 ISO M20x1.5 Cable Entries, Including One 1/2" NPT Adapter

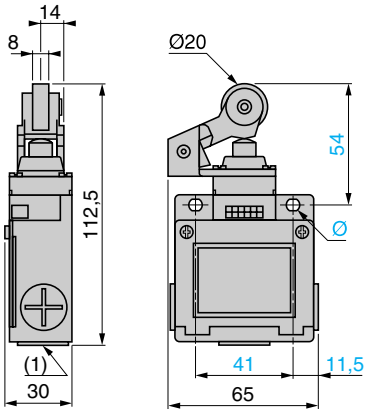
XCKM•10
ZCKMD3• + ZCKD10



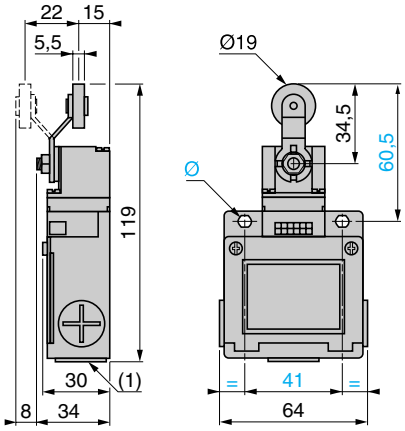
XCKM•02
ZCKMD3• + ZCKD02



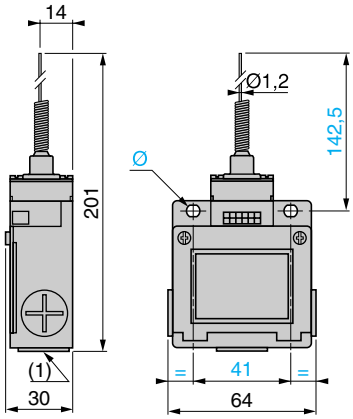
XCKM•21
ZCKMD3• + ZCKD21



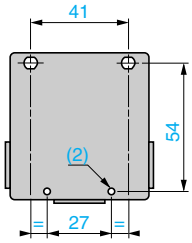
XCKM•15
ZCKMD3• + ZCKD15



XCKM•06
ZCKMD3• + ZCKD06



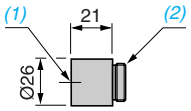
Rear view
XCKM•••, ZCKM•, ZCKMD3•



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.

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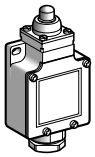
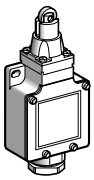
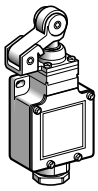
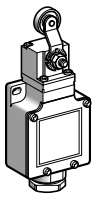
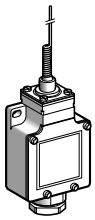
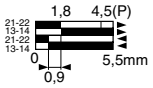
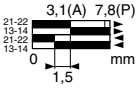
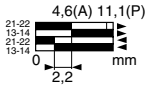
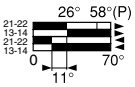
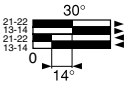
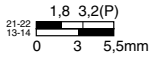
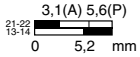
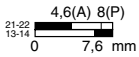
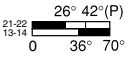
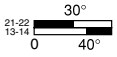
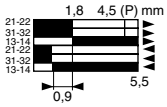
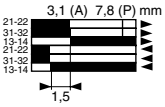
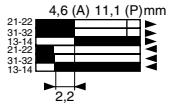
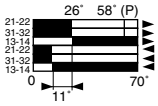
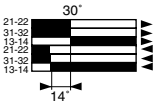
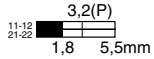
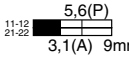
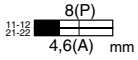
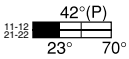
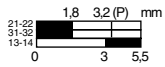
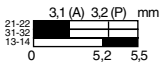
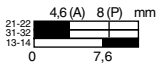
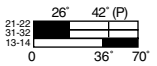
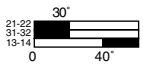
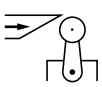
Limit Switches
Osiswitch® Classic, Metal
XCKL—Complete Switches Incorporating Adapter for 1/2" NPT

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** ⊖ 	**XCKL102** ⊖ 	**XCKL121** ⊖ 	**XCKL115** ⊖ 	**XCKL106** 
2-pole N/C + N/O break before make, slow break (XE2NP2151)	**XCKL510** ⊖ 	**XCKL502** ⊖ 	**XCKL521** ⊖ 	**XCKL515** ⊖ 	**XCKL506** 
3-pole N/C + N/C + N/O snap action (XE3SP2141)	**ZCKLD39 + ZCKD10** ⊖ 	**ZCKLD39 + ZCKD02** ⊖ 	**ZCKLD39 + ZCKD21** ⊖ 	**ZCKLD39 + ZCKD15** ⊖ 	**ZCKLD39 + ZCKD06** 
2-pole N/C + N/C simultaneous, slow break (XE2NP2141)	**ZCKL7 + ZCKD10** ⊖ 	**ZCKL7 + ZCKD02** ⊖ 	**ZCKL7 + ZCKD21** ⊖ 	**ZCKL7+ ZCKD15** ⊖ 	**ZCKL7 + ZCKD06**
3-pole N/C + N/C + N/O break before make, slow break (XE3NP2141)	**ZCKLD37 + ZCKD10** ⊖ 	**ZCKLD37 + ZCKD02** ⊖ 	**ZCKLD37 + ZCKD21** ⊖ 	**ZCKLD37 + ZCKD15** ⊖ 	**ZCKLD37 + ZCKD06** 
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)	0.13 N•m (1.15 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.

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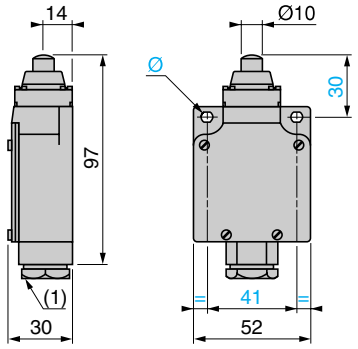
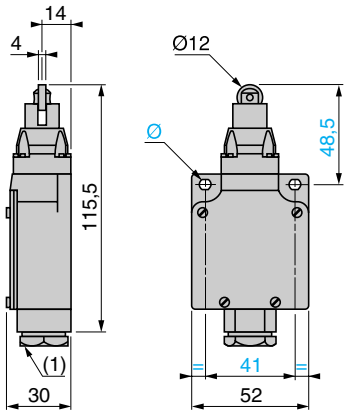
Limit Switches
Osiswitch® Classic, Metal
XCKL—Complete Switches Incorporating Adapter for 1/2" NPT

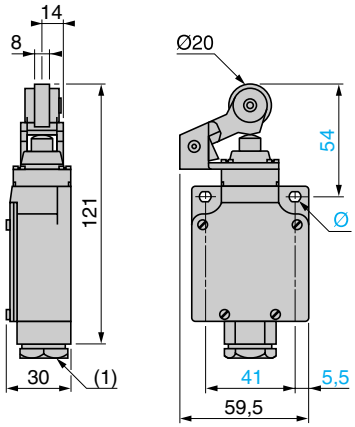
XCKL•10
ZCKL• + ZCKD10
ZCKLD3• + ZCKD10



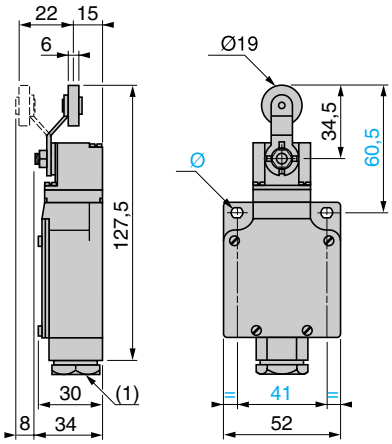
XCKL•02
ZCKL3• + ZCKD02
ZCKLD3• + ZCKD02



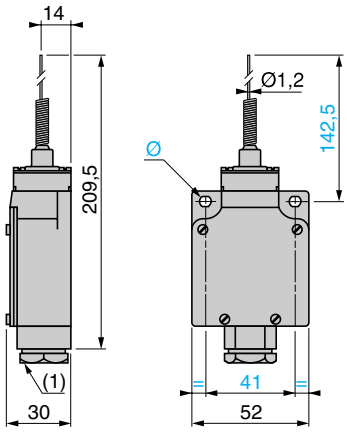
XCKL•21
ZCKL• + ZCKD21
ZCKLD3• + ZCKD21



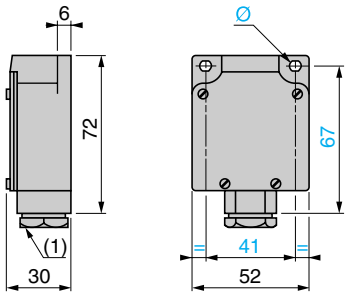
XCKL•15
ZCKL• + ZCKD15
ZCKLD3• + ZCKD15



XCKL•06
ZCKL• + ZCKD06
ZCKLD3• + ZCKD06



Body mountings



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

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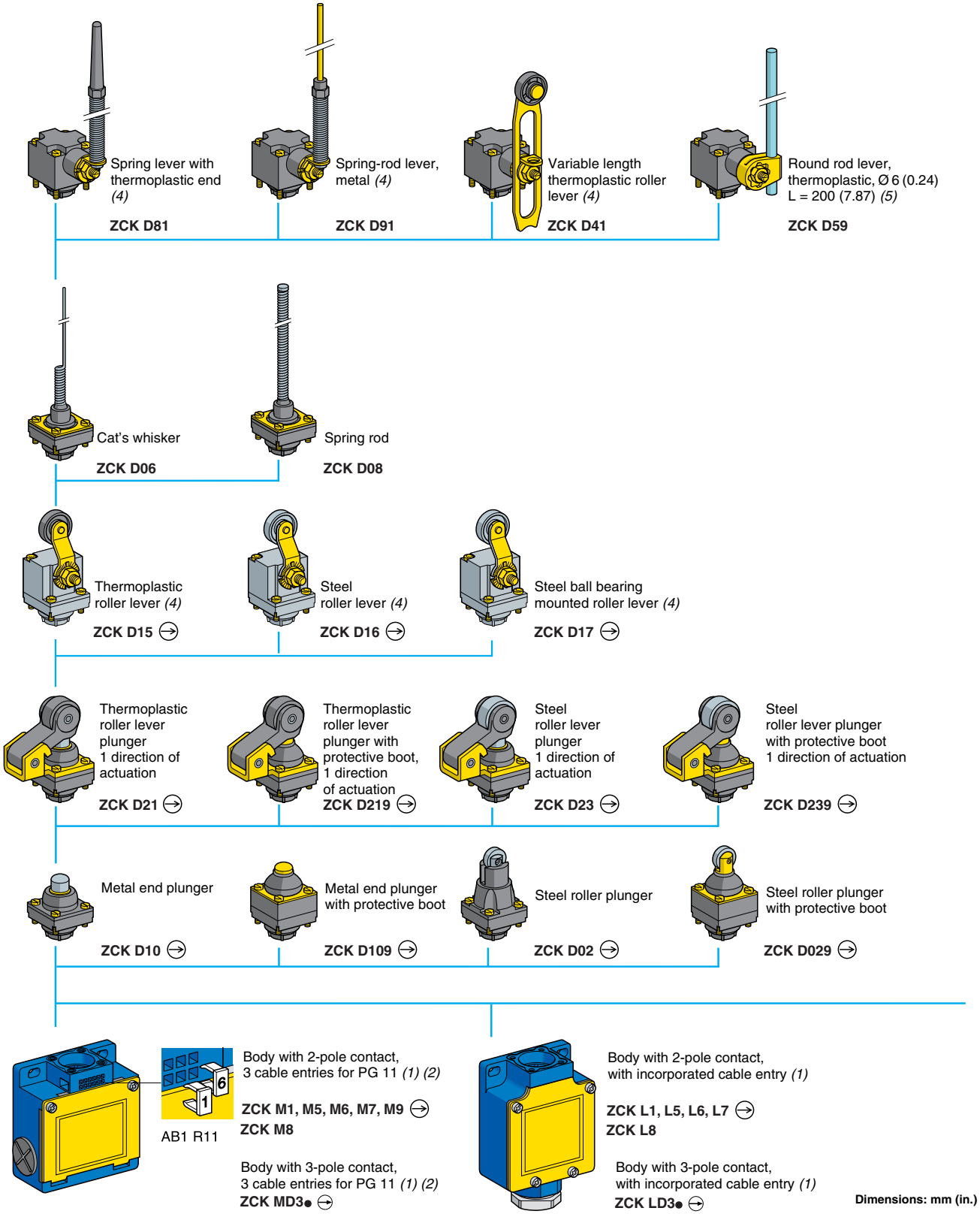
Limit Switches
Osiswitch® Classic, Metal
XCKM and XCKL—Modular



Dimensions: mm (in.)

1. For further details, see page 88.
2. For 3 cable entries tapped ISO M20 x 1.5, add **H29** to the catalog number. Example: ZCKM1 becomes **ZCKM1H29**.

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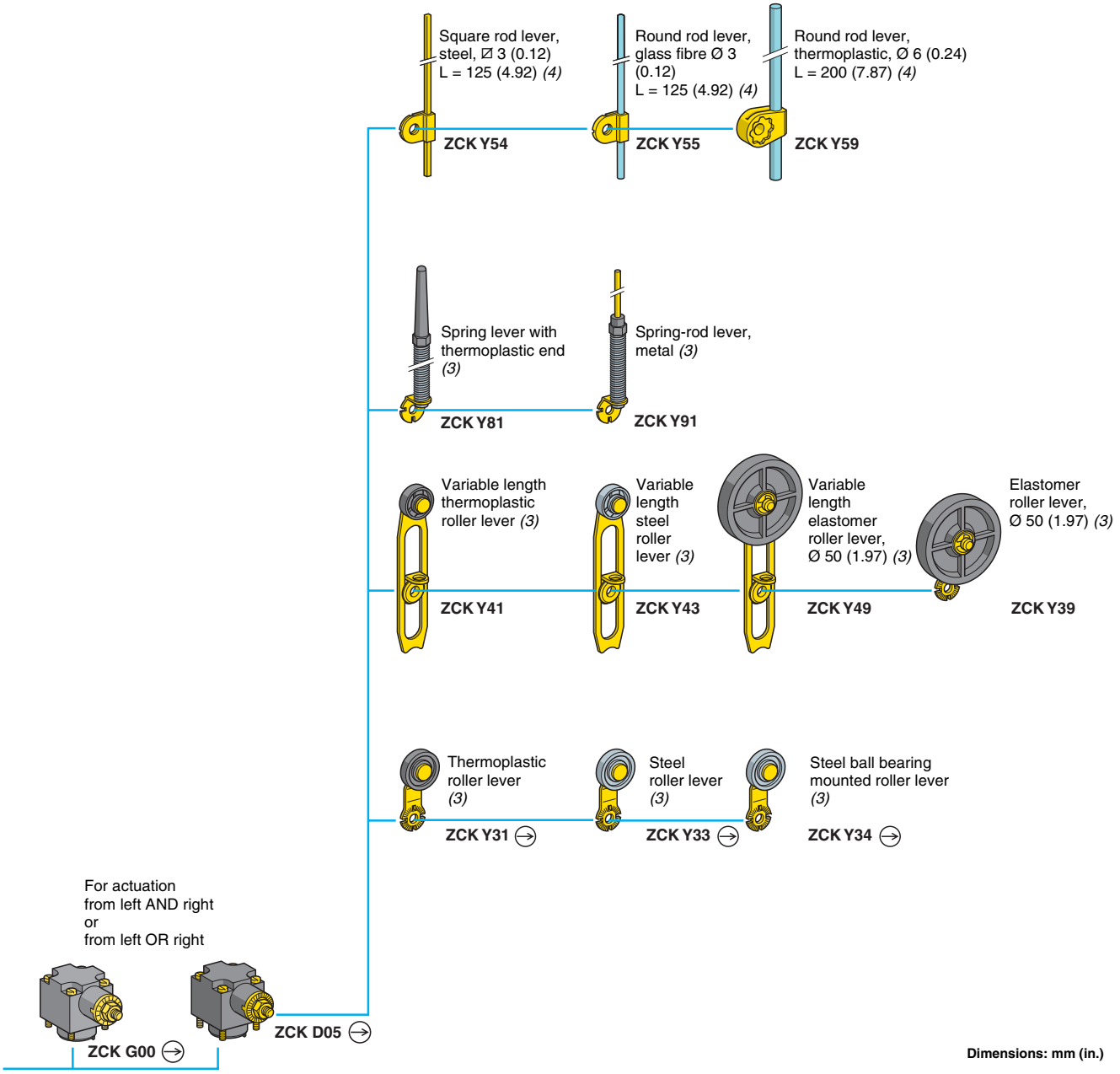

Dimensions: mm (in.)

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.

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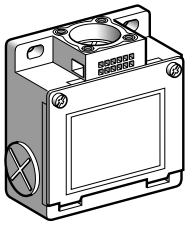
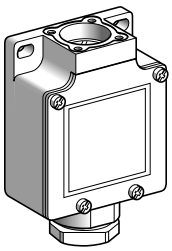
Limit Switches
Osiswitch® Classic, Metal
XCKM and XCKL—Modular





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)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	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)	21 13 / 22 14	⊖	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)	11 21 / 12 22	⊖	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)	13 23 / 14 24	—	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)	11 21 / 12 22	⊖	ISO M20 x 1.5	**ZCKM9H29**	0.210 (0.463)
For limit switches type XCK L					
N/C + N/O snap action (XE2S P2151)	13 21 / 14 22	⊖	1/2" NPT	**ZCKL1**	0.210 (0.463)
N/C + N/O break before make, slow break (XE2N P2151)	13 21 / 14 22	⊖	1/2" NPT	**ZCKL5**	0.210 (0.463)
N/O + N/C make before make, slow break (XE2N P2161)	21 13 / 22 14	⊖	1/2" NPT	**ZCKL6**	0.210 (0.463)
N/C + N/C simultaneous, slow break (XE2N P2141)	11 21 / 12 22	⊖	1/2" NPT	**ZCKL7**	0.210 (0.463)
N/O + N/O simultaneous, slow break (XE2N P2131)	13 23 / 14 24	—	1/2" NPT	**ZCKL8**	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).

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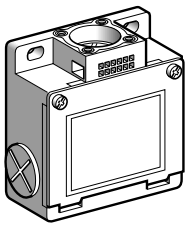

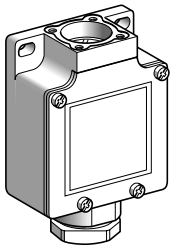

Bodies with 3-pole contact

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)	31 33 13 / 32 34 14	⊖	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)	31 21 13 / 32 22 14	⊖	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)	31 21 13 / 32 22 14	⊖	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)	21 33 13 / 22 34 14	⊖	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)	31 33 13 / 32 34 14	⊖	1/2" NPT	**ZCKLD31**	0.210 (0.463)
N/C + N/C + N/O snap action (XE3S P2141)	31 21 13 / 32 22 14	⊖	1/2" NPT	**ZCKLD39**	0.210 (0.463)
N/C + N/C + N/O break before make, slow break (XE3N P2141)	31 21 13 / 32 22 14	⊖	1/2" NPT	**ZCKLD37**	0.210 (0.463)
N/C + N/O + N/O break before make, slow break (XE3N P2151)	21 33 13 / 22 34 14	⊖	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).

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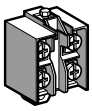
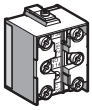
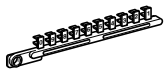
Limit Switches
Osiswitch® Classic, Metal
XCKM and XCKL—Modular







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	13 21 / 14 22	ZCKM1 ZCKL1	⊖	**XE2S P2151**	0.020 (0.044)
N/C + N/O break before make, slow break	13 21 / 14 22	ZCKM5 ZCKL5	⊖	**XE2N P2151**	0.020 (0.044)
N/O + N/C make before break, slow break	21 13 / 22 14	ZCKM6 ZCKL6	⊖	**XE2N P2161**	0.020 (0.044)
N/C + N/C simultaneous, slow break	11 21 / 12 22	ZCKM7 ZCKL7	⊖	**XE2N P2141**	0.020 (0.044)
N/O + N/O simultaneous, slow break	13 23 / 14 24	ZCKM8 ZCKL8	—	**XE2N P2131**	0.020 (0.044)
N/C + N/C snap action	11 21 / 12 22	ZCKM9	⊖	**XE2S P2141**	0.020 (0.044)
3-pole contact					
N/C + N/O + N/O snap action	31 33 13 / 32 34 14	ZCKMD31 ZCKLD31	⊖	**XE3S P2151**	0.035 (0.077)
N/C + N/C + N/O snap action	31 21 13 / 32 22 14	ZCKMD39 ZCKLD39	⊖	**XE3S P2141**	0.035 (0.077)
N/C + N/C + N/O break before make, slow break	31 21 13 / 32 22 14	ZCKMD37 ZCKLD37	⊖	**XE3N P2141**	0.035 (0.077)
N/C + N/O + N/O break before make, slow break	21 33 13 / 22 34 14	ZCKMD35 ZCKLD35	⊖	**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.

Accessories for limit switches type XCKM

Description	Sold in lots of	Unit catalog number	Weight kg (lb)
Tap-off terminal for cabling continuity	1	**XCK Z09**	0.010 (0.022)
Clip-in markers (strips of 10 numbers: 0 to 9) Other markers, please consult your local sales office.	25	**AB1 R11**	0.002 (0.004)
Other versions	Gold flashed contacts. Please consult your local sales office.		

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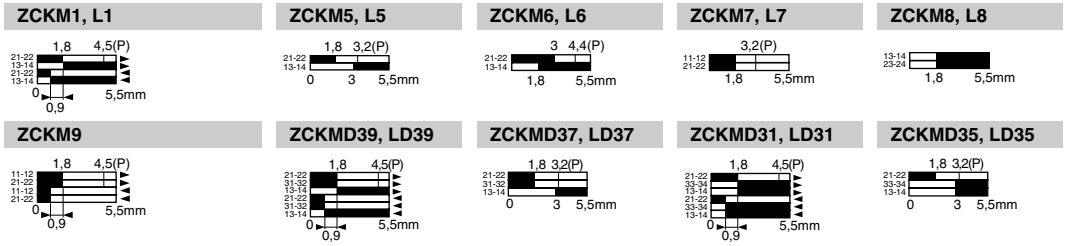
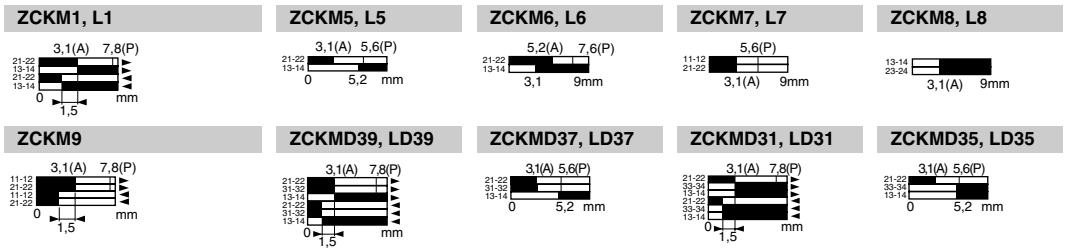
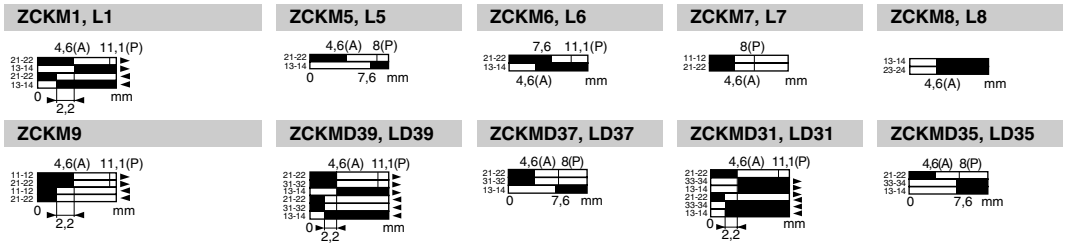
Heads ZCKD10, D109 with body



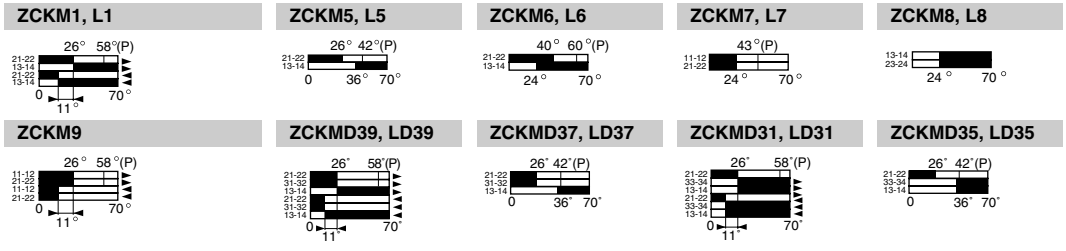
Heads ZCKD02, D029 with body



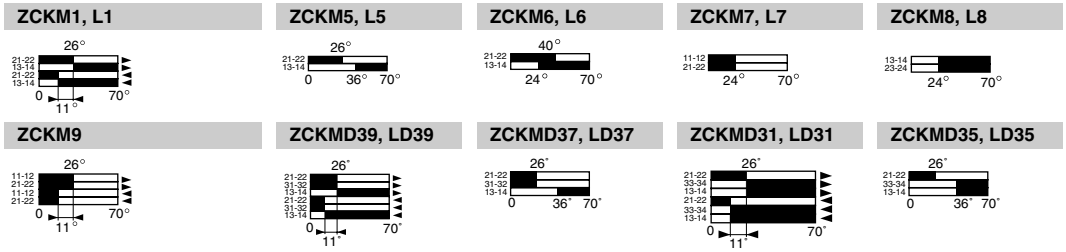
Heads ZCKD21, D23, D219, D239 with body



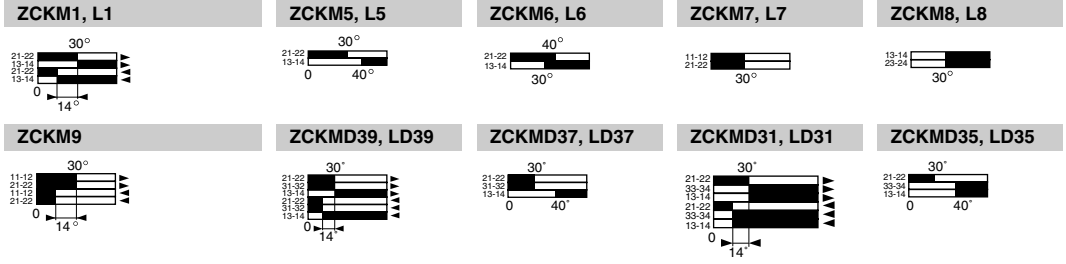
Heads ZCKD15, D16, D17 with body



Heads ZCKD41, D59, D81, D91 with body



Heads ZCKD06, D08 with body



Contact operation

- ■ contact closed
- □ contact open

(A) = cam displacement

(P) = positive opening point

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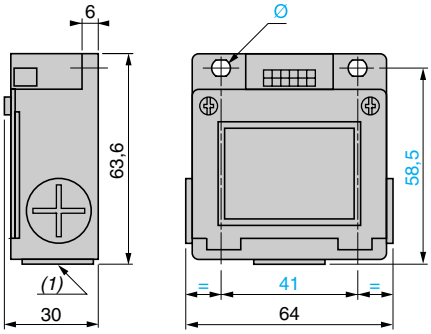
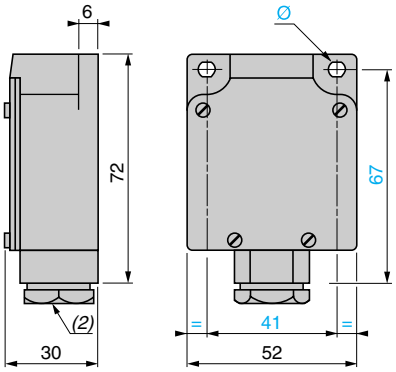
Limit Switches
Osiswitch® Classic, Metal
XCKM and XCKL—Modular

Bodies with contacts

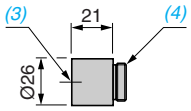
ZCKM1, M5, M6, M7, M8,
ZCKM1H29, M5H29, M6H29, M7H29, M8H29, M9H29



ZCKL1, L5, L6, L7, L8, LD3• *(5)*



Adapter for 1/2" NPT conduit
DE9RA1012



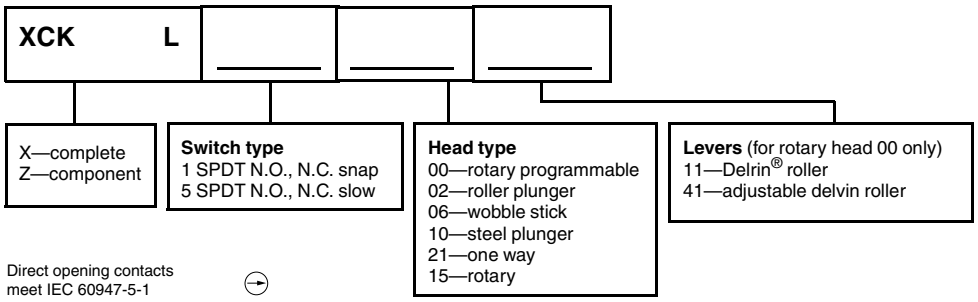
1. 3 tapped entries for ISO M20 x 1.5 or PG 11 conduit thread.
2. Incorporated cable entry.

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 interpretating the complete switch catalog number only



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

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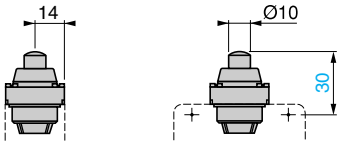
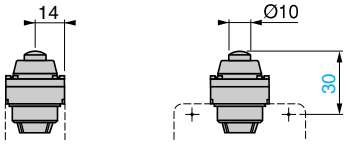
Limit Switches
Osiswitch® Classic, Metal
XCKM and XCKL—Modular

Plunger heads

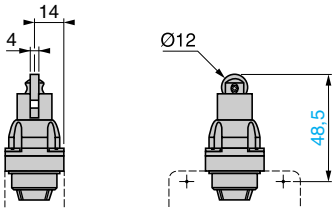
ZCKD10



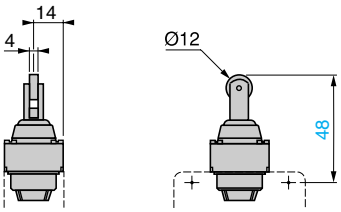
ZCKD109



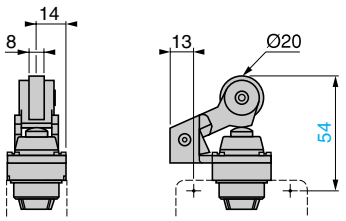
ZCKD02



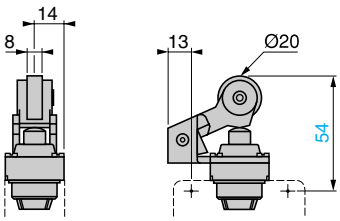
ZCKD029



ZCKD21, D23

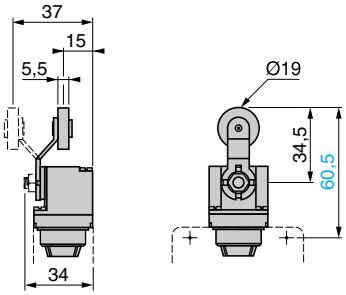


ZCKD219, D239

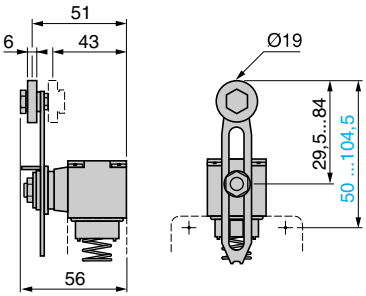


Rotary heads

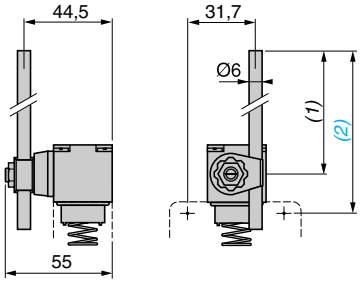
ZCKD15, D16, D17



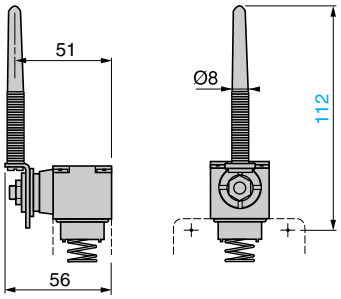
ZCKD41



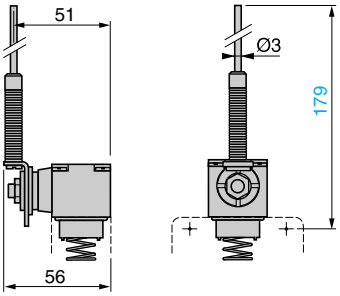
ZCKD59



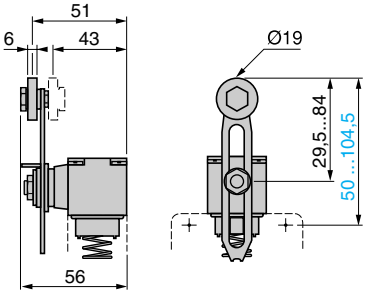
ZCKD81



ZCKD91

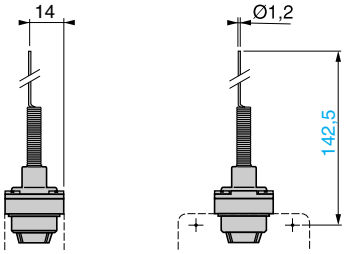


ZCKG00

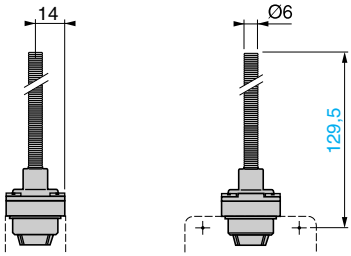


Multi-directional heads

ZCKD06



ZCKD08



1. 190 max.
2. 215.5 max.

NOTE: operating lever spindle threaded M6.

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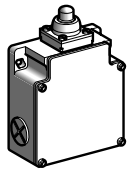
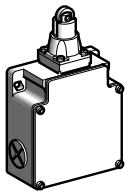
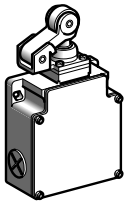
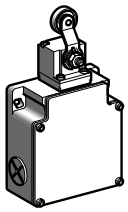
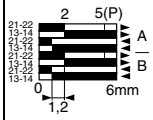
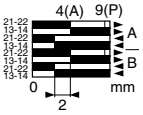
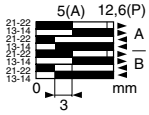
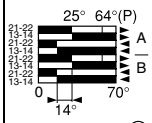
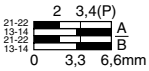
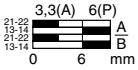
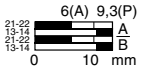
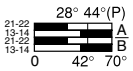
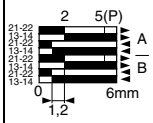
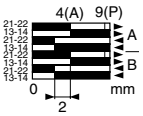
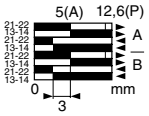
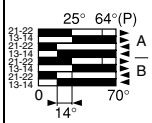
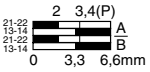
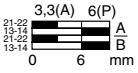
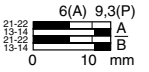
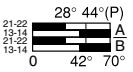
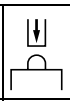
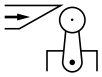
Limit Switches
Osiswitch® Classic, Metal
XCKML, 2 x 2-Pole Contacts—Complete Switches

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)
Minimum force — 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			

1. Adjustable throughout 360° in 5° steps, or in 90° steps by reversing the notched washer.
2. 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.

Note: 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 86).

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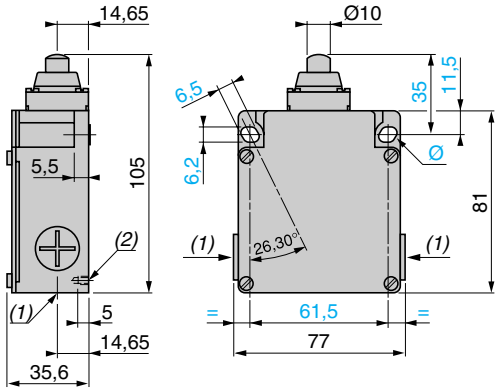
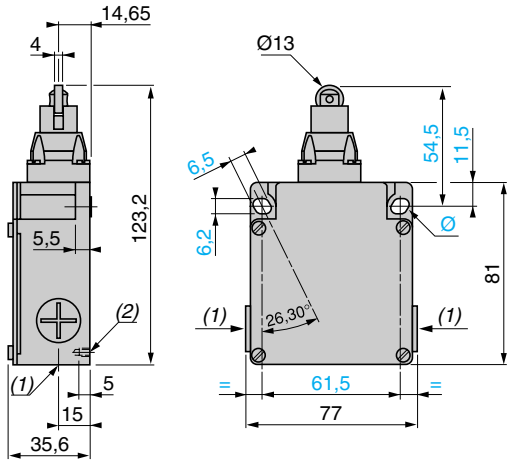
Limit Switches
Osiswitch® Classic, Metal
XCKML, 2 x 2-Pole Contacts—Complete Switches

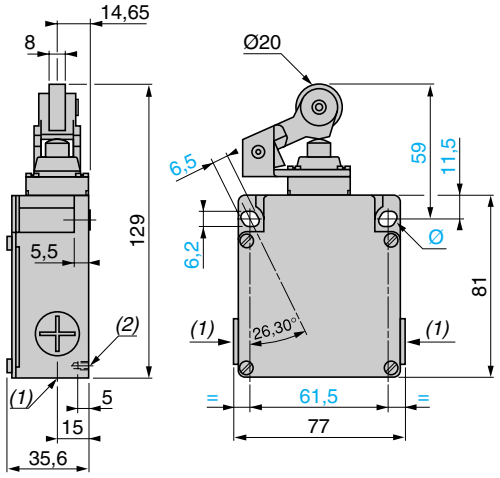
XCKML110H29, XCKML510H29, XCKML110, XCKML510



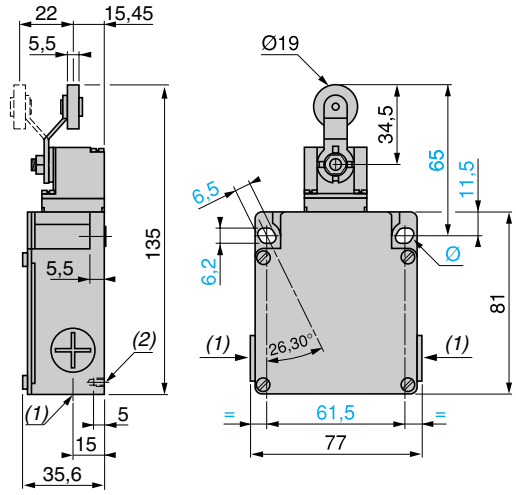
XCKML102H29, XCKML502H29, XCKML102, XCKML502



XCKML121H29, XCKML521H29, XCKML121, XCKML521



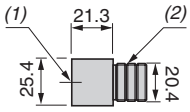
XCKML115H29, XCKML515H29, XCKML115, XCKML515



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

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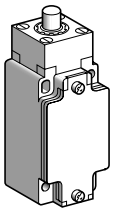
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ

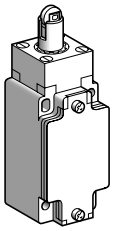
■ XCKJ
fixed, non-plug-in body with 1 cable entry

□ With head for linear movement (plunger)

561646



561647



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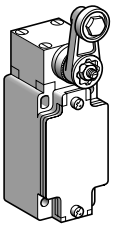
□ With head for rotary movement (lever) or multi-directional

561648



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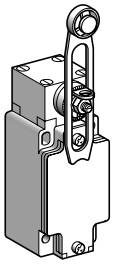

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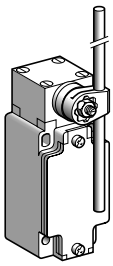

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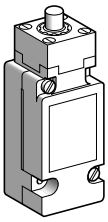
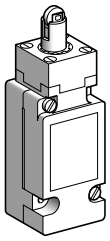
■ XCKJ
plug-in body with 1 cable entry

□ With head for linear movement (plunger)

561651



561652



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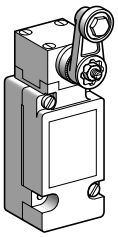
□ With head for rotary movement (lever)

561653



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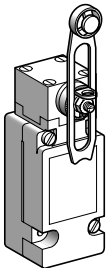

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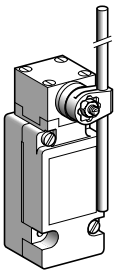

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Environment characteristics

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

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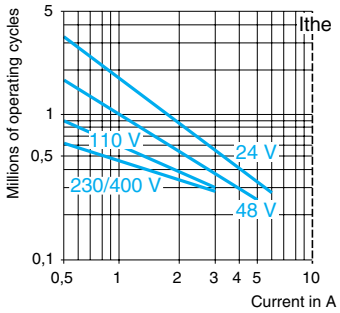
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ

Contact block characteristics

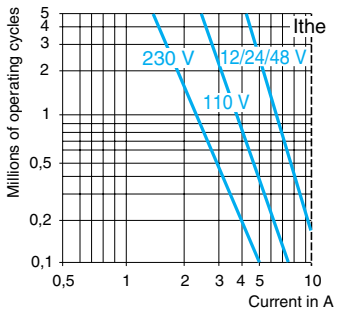
Rated operational characteristics	**XE2•P**	∼ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A ⎓ DC-13; Q300 (Ue = 250 V, Ie = 0.27 A), conforming to IEC 60947-5-1 appendix A, EN 60947-5-1
	XE3•P	∼ AC-15; B300 (Ue = 240 V, Ie = 1.5 A); Ithe = 6 A ⎓ DC-13; R300 (Ue = 250 V, Ie = 0.1 A), conforming to IEC 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 clamp terminals)	**XE2SP21•1**	Clamping capacity, min: 1 x 0.34 mm², max: 2 x 1.5 mm²
	XE2NP21•1	Clamping capacity, min: 1 x 0.5 mm², max: 2 x 2.5 mm²
	XCKJ plug-in and XESP20•1	Clamping capacity, min: 1 x 0.75 mm², max: 2 x 1.5 mm²
	XE3NP and XE3SP	Clamping capacity, min: 1 x 0.34 mm², max: 1 x 1 mm² or 2 x 0.75 mm²
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		• 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

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

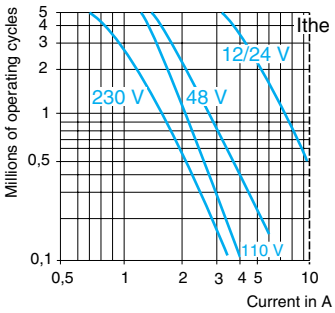
XE2SP21•1, XE2SP2141



XE2NP21•1



XCKJ plug-in, XESP20•1



d.c. supply ⎓

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
inductive circuit	W	10	7	4

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
inductive circuit	W	13	9	7

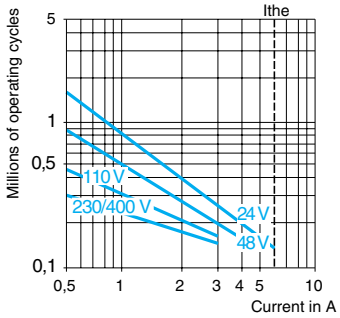
Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
inductive circuit	W	10	7	4

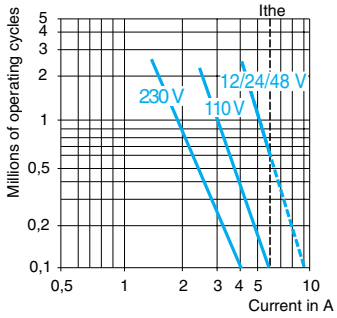
For XE2SP•151 on ∼ or ⎓, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

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

XE3NP••••



XE3SP••••



d.c. supply ⎓

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
inductive circuit	W	3	2	1

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
inductive circuit	W	4	3	2

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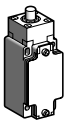
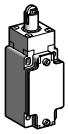
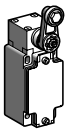
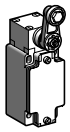
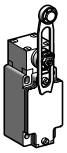
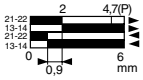
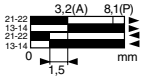
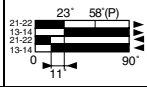
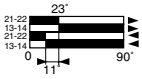
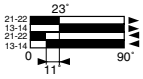
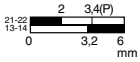
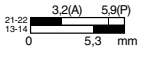
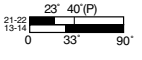
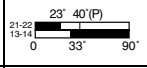
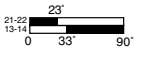
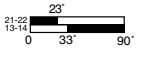
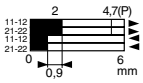
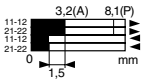
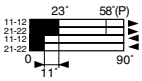
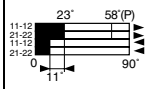
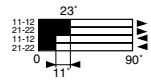
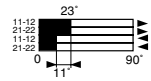
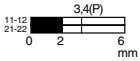
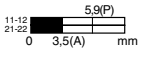
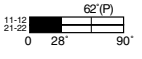
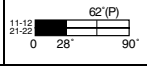
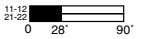
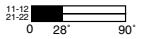
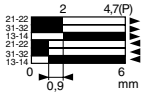
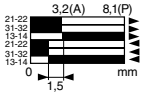
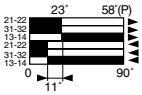
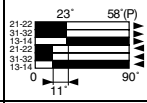
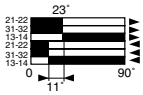
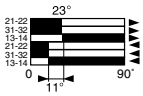
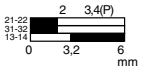
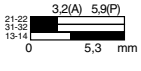
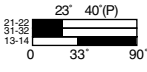
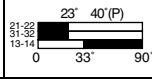
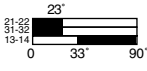
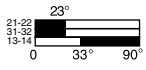
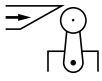
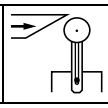
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Fixed Non-plug-in Body, 1/2" NPT Cable Entry

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)*						
13 21 / 14 22 **2-pole N/C + N/O snap action (XE2S P2151)**	**XCKJ161** 	**XCKJ167** 	**XCKJ10511**	**XCKJ10513** 	**XCKJ10541** 	**XCKJ10559** 
13 21 / 14 22 **2-pole N/C + N/O break before make, slow break (XE2N P2151)**	**XCKJ561** 	**XCKJ567** 	**XCKJ50511** 	**XCKJ50513** 	**XCKJ50541** 	**XCKJ50559** 
11 21 / 12 22 **2-pole N/C + N/C snap action (XE2S P2141)**	**ZCKJ9 + ZCKE61** 	**ZCKJ9 + ZCKE67** 	**ZCKJ9 + ZCKE05 + ZCKY11** 	**ZCKJ9 + ZCKE05 + ZCKY13** 	**ZCKJ9 + ZCKE05 + ZCKY41** 	**ZCKJ9 + ZCKE05 + ZCKY59** 
11 21 / 12 22 **2-pole N/C + N/C simultaneous, slow break (XE2N P2141)**	**ZCKJ7 + ZCKE61** 	**ZCKJ7 + ZCKE67** 	**ZCKJ7 + ZCKE05 + ZCKY11** 	**ZCKJ7 + ZCKE05 + ZCKY13** 	**ZCKJ7 + ZCKE05 + ZCKY41** 	**ZCKJ7 + ZCKE05 + ZCKY59** 
31 21 13 / 32 22 14 **3-pole N/C + N/C + N/O snap action (XE3S P2141)**	**ZCKJD39 + ZCKE61** 	**ZCKJD39 + ZCKE67** 	**ZCKJD39 + ZCKE05 + ZCKY11** 	**ZCKJD39 + ZCKE05 + ZCKY13** 	**ZCKJD39 + ZCKE05 + ZCKY41** 	**ZCKJD39 + ZCKE05 + ZCKY59** 
31 21 13 / 32 22 14 **3-pole N/C + N/C + N/O break before make, slow break (XE3N P2141)**	**ZCKJD37 + ZCKE61** 	**ZCKJD37 + ZCKE67** 	**ZCKJD37 + ZCKE05 + ZCKY11** 	**ZCKJD37 + ZCKE05 + ZCKY13** 	**ZCKJD37 + ZCKE05 + ZCKY41** 	**ZCKJD37 + ZCKE05 + ZCKY59** 
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)	16 N (3.60 lb)	0.25 N•m (2.21 lb-in)			
Minimum force or torque — For positive opening	50 N (11.24 lb)	40 N (8.99 lb)	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.)					

1. Form conforming to EN 50041, see page 21.
2. Switches with gold contacts or eyelet type connections: please consult your local sales office.
3. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.
4. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

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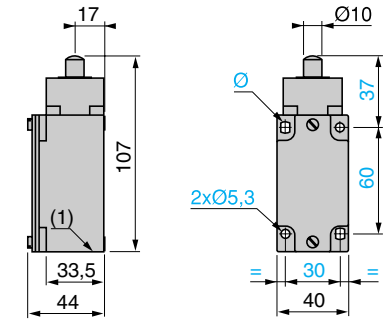
Limit Switches

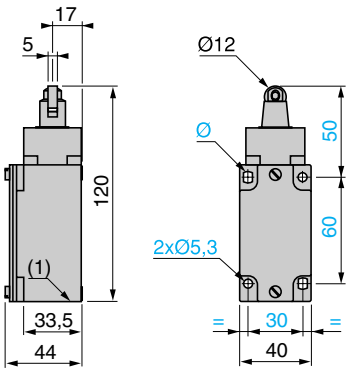
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

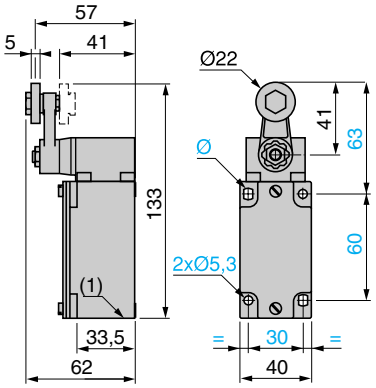
XCKJ•61
ZCKJ•+ ZCKE61



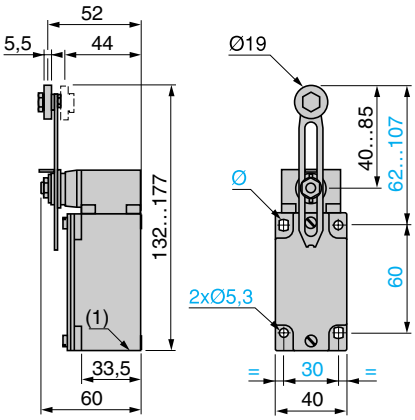
XCKJ•67
ZCKJ• + ZCKE67



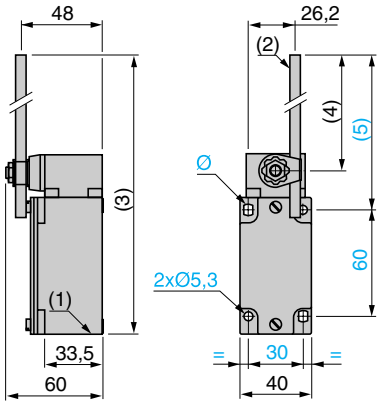
XCKJ•051•
ZCKJ• + ZCKE05 + ZCKY11 or Y13



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

XCKJ — — — — — — —

Z—component
X—complete

Head type
05—Rotary
09—Rotary maintained
61—Top rod plunger
67—Top roller plunger

Levers
11—Delrin® roller
13—Steel roller
41—Adjustable Delrin roller
59—Round plastic rod

Switch type

1	SPDT	Nonplug-in
2	2SPDT	Nonplug-in
4	2SPDT	Nonplug-in for 2 step or neutral position
5	SPDT	Nonplug-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

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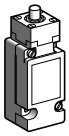
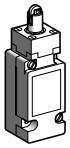
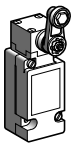
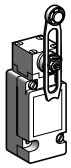
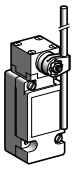
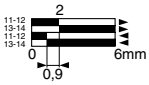
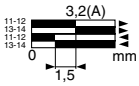
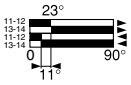
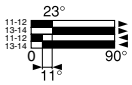
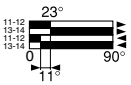
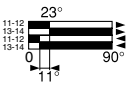
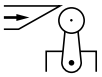
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Plug-in Body, 1/2" NPT Cable Entry

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 21.
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.

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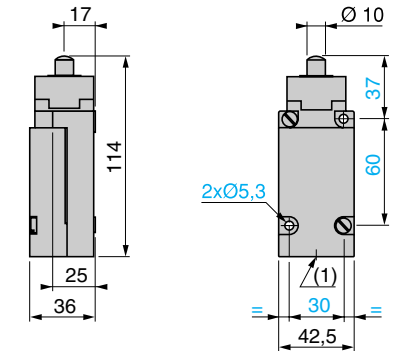
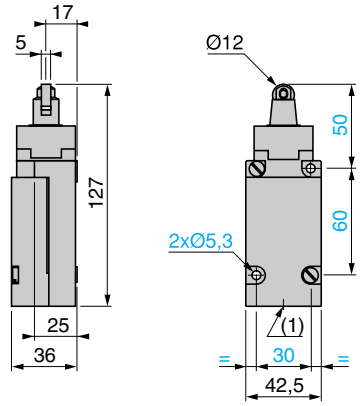
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Plug-in Body, 1/2" NPT Cable Entry

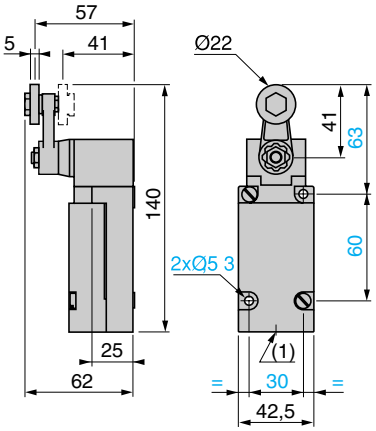
XCKJ1611



XCKJ1167



XCKJ110511, XCKJ110513



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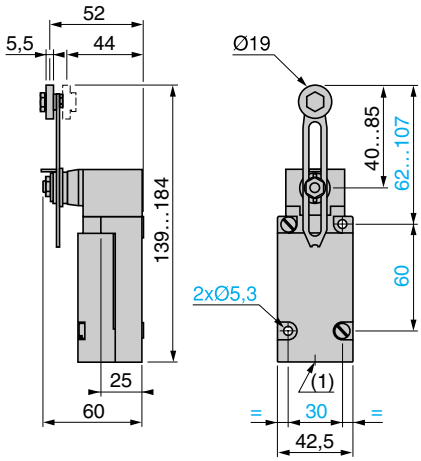

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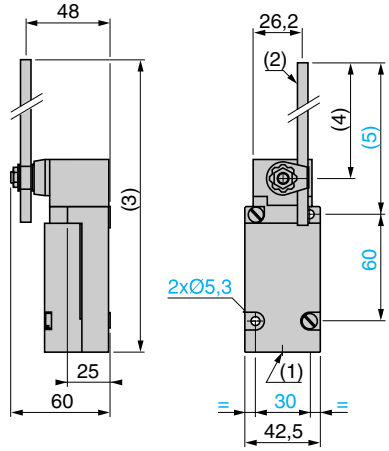

1. Tapped entry for 1/2" NPT conduit.
2. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.).
3. 289 max.
4. 190 max.
5. 212 max.

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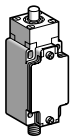
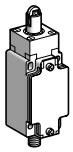
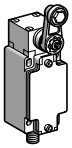
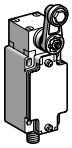
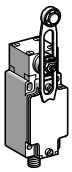
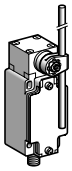
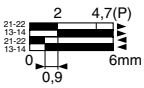
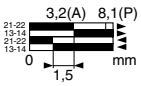
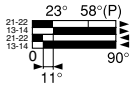
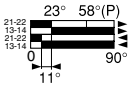
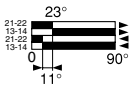
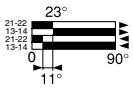
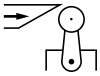
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral M12 Connector

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)	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)			
Minimum force or torque — 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, Ui = 60 V, Ie = 4 A (see suitable pre-wired female connectors below).					

1. Form conforming to EN 50041, see page 21.
2. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever or its mounting.
3. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.
4. 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.
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**
	5 m (16.40 ft)	**XZCP1164L5**	**XZCP1264L5**
	10 m (32.8 ft)	**XZCP1164L10**	**XZCP1264L10**
Weight, kg (lb)	2 m (6.56 ft)	0.115 (0.254)	
	5 m (16.40 ft)	0.270 (0.595)	
	10 m (32.8 ft)	0.520 (1.146)	

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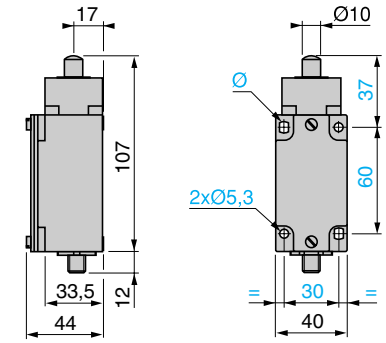
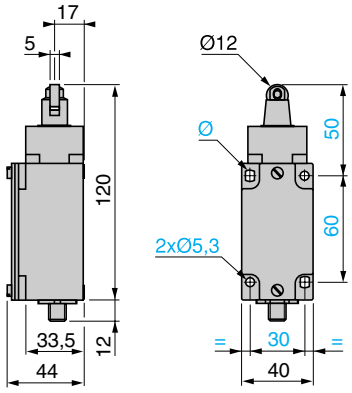
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral M12 Connector

Dimensions

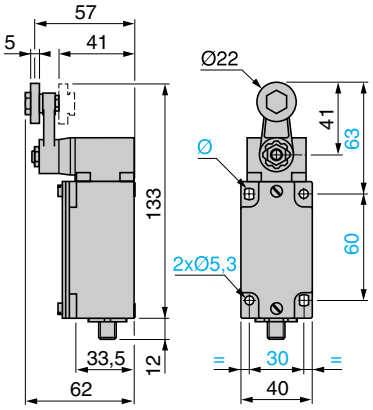
XCKJ161D



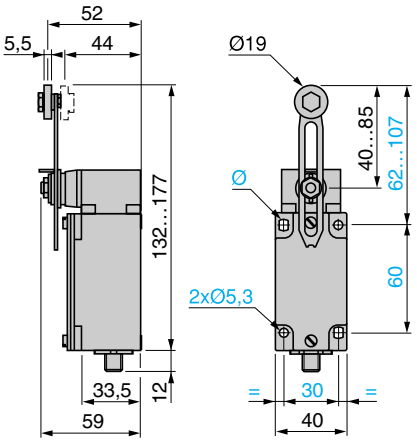
XCKJ167D



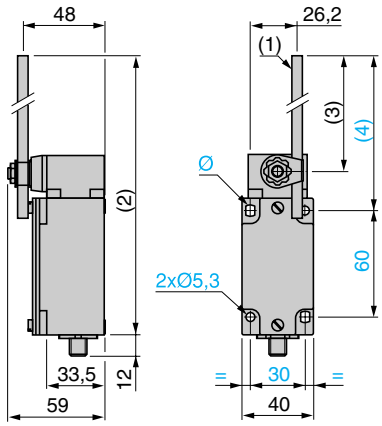
XCKJ1051•D



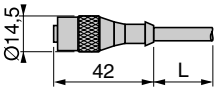
XCKJ10541D



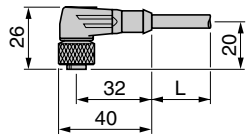
XCKJ10559D



XZCP1164L•



XZCP1264L•

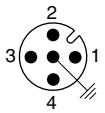


1. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.)
2. 282 max.
3. 190 max.
4. 212 max.

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)

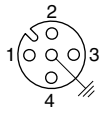
Connections

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

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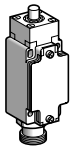
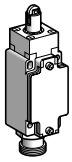
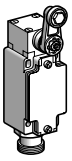
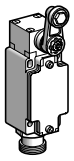
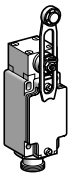
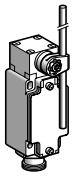
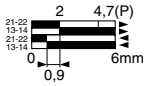
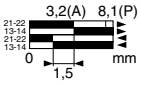
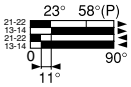
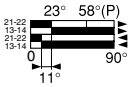
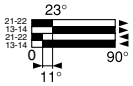
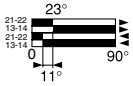
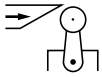
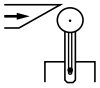
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral 7/8" 16UN connector

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)	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)	16 N (3.60 lb)	0.25 N•m (2.21 lb-in)			
Minimum force or torque — 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).					

1. Form conforming to EN 50041, see page 21.
2. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
3. Value taken with actuator operating at 100 mm (3.94 in.) from the mounting.
4. 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.
With cable, Ø 6.7 mm (5 x 0.5 mm²)	2 m (6.56 ft)	**XZCP1771L2**
	5 m (16.40 ft)	**XZCP1771L5**
	10 m (32.8 ft)	**XZCP1771L10**
Weight, kg (lb)	2 m (6.56 ft)	0.190 (0.419)
	5 m (16.40 ft)	0.475 (1.047)
	10 m (32.8 ft)	0.950 (2.094)

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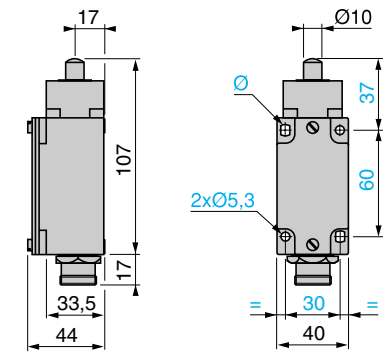
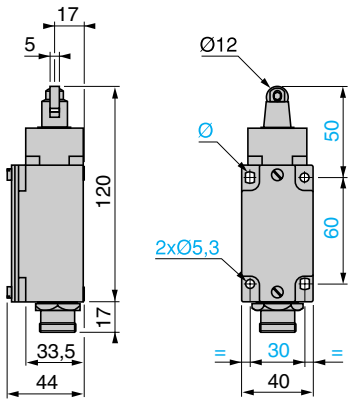
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral 7/8" 16UN connector

Dimensions

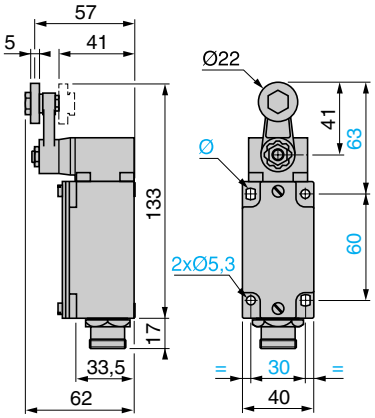
XCKJ161A



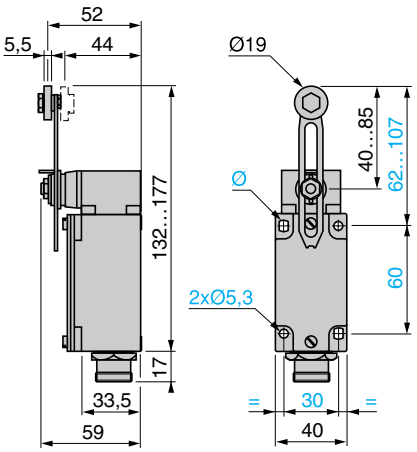
XCKJ167A



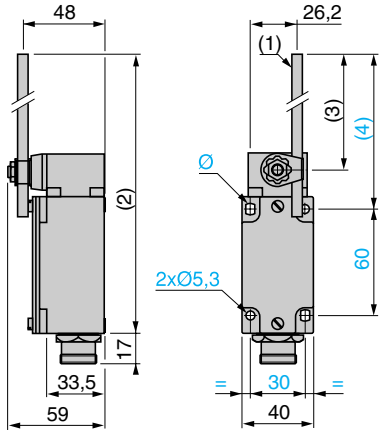
XCKJ1051•A



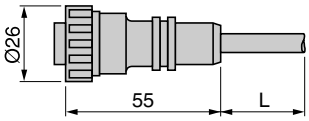
XCKJ10541A



XCKJ10559A



XZCP1771L•



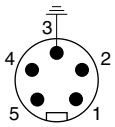
1. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.)
2. 282 max.
3. 190 max.
4. 212 max.

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)

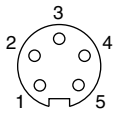
Connections

Limit switch XCKJ••••A



1 = 21
2 = 22
3 = ⏚
4 = 14
5 = 13

Pre-wired female connector XZCP1771L•



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

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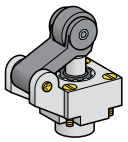
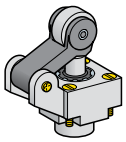
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies



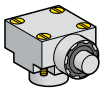
Thermoplastic roller lever plunger, 1 direction of actuation

ZCK E21



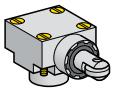
Steel roller lever plunger, 1 direction of actuation

ZCK E23



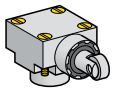
Side metal plunger

ZCK E63



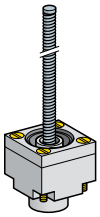
Side steel roller plunger, horizontal *(1)*

ZCK E64



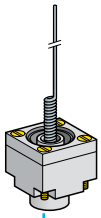
Side steel roller plunger, vertical *(1)*

ZCK E65



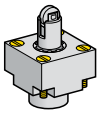
Spring rod

ZCK E08



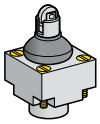
Cat's whisker

ZCK E06



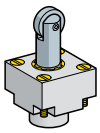
End reinforced steel roller plunger

ZCK E67



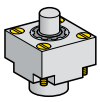
End steel roller plunger with protective boot

ZCK E629



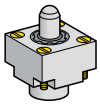
End steel roller plunger

ZCK E62



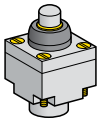
End metal plunger

ZCK E61



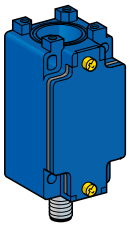
End steel ball bearing plunger

ZCK E66



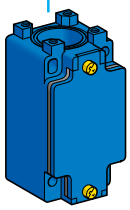
End metal plunger with protective boot

ZCK E619



Body with 2-pole contact, fixed, 1 step, M12 connector *(2)*

ZCK J1D, J5D, J6D, J7D
ZCK J8D



Body with contact, cable entry for PG 13, fixed, 1 step *(2) (3)*

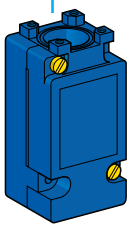
ZCK JD3●,
ZCK J1, J5, J6, J7, J9

Body with contact, cable entry for PG 13, fixed, 1 step *(2) (3)*

ZCK J2, J8

Body with contact, cable entry for PG 13, fixed, 2 step *(2) (3)*

ZCK J4



Body with contact, cable entry for PG 13, plug-in, 1 or 2 step *(2) (3)*

ZCK J11, J21, J41

1. Cannot be used with bodies ZCKJ4 and ZCKJ41.
2. For further details, see page 108.
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**.

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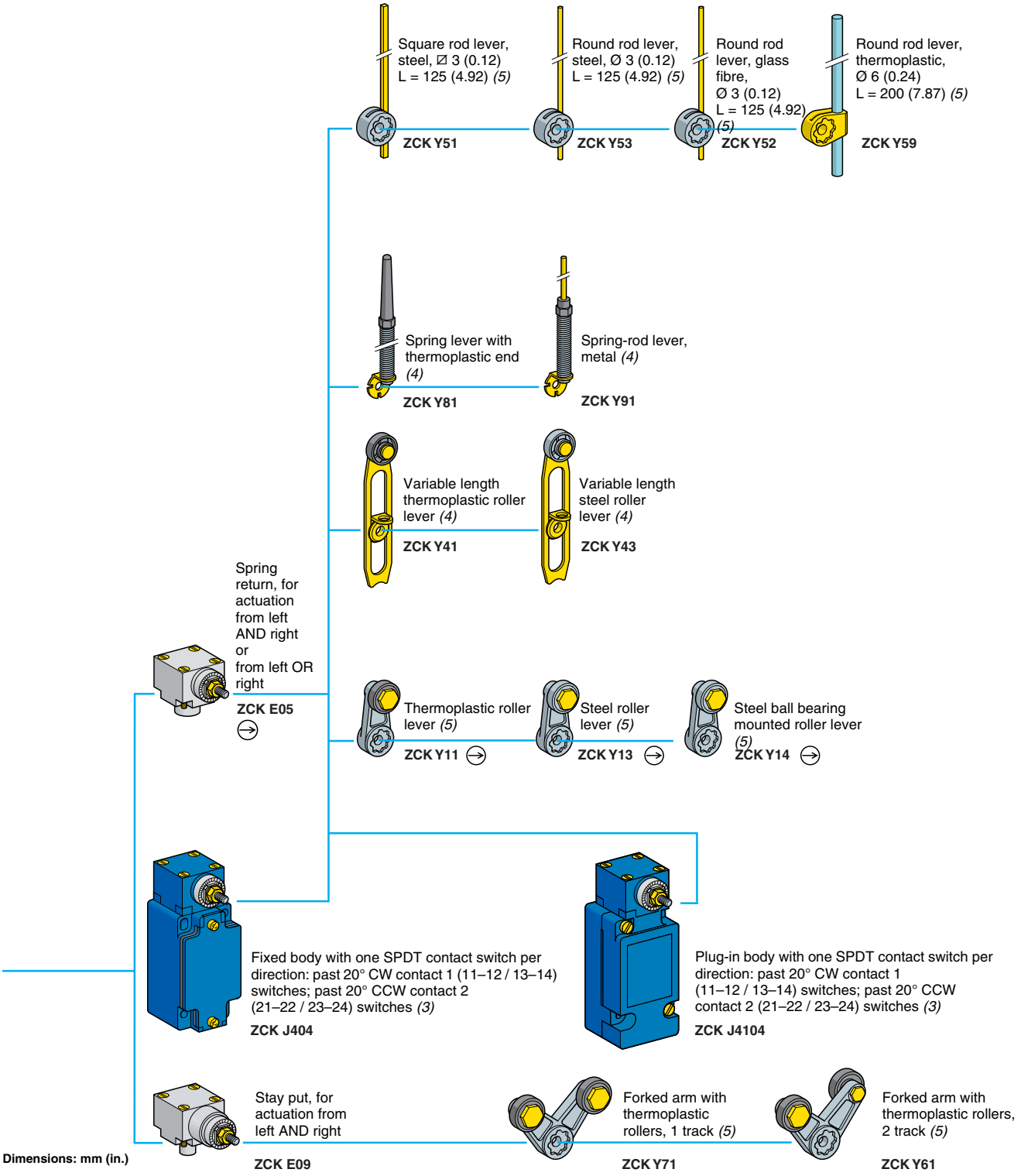
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies



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.

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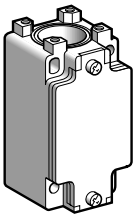
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry



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)	13 21 / 14 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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)	13 21 / 14 22	⊖	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)	21 13 / 22 14	⊖	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)	11 21 / 12 22	⊖	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)	13 23 / 14 24	—	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)	11 21 / 12 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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)	31 33 13 / 32 34 14	⊖	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)	31 21 13 / 32 22 14	⊖	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)	31 21 13 / 32 22 14	⊖	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)	21 33 13 / 22 34 14	⊖	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.

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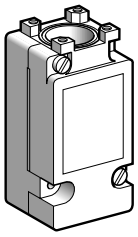
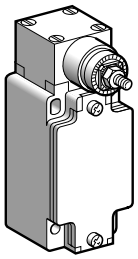
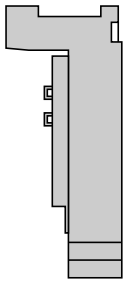
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry



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	13 11 14 12	—	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	13 11 23 21 14 12 24 22	—	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	13 11 23 21 14 12 24 22	—	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	13 11 23 21 14 12 24 22	—	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	13 11 23 21 14 12 24 22	—	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.

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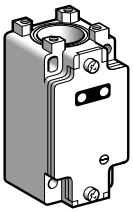
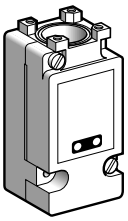
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

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⎓						
1 step	N/C + N/O snap action (XE2S P2151)	13 21 / 14 22	⊖	1/2" NPT	**ZCKJ120**	0.320 (0.705)
	N/C + N/O break before make, slow break (XE2N P2151)	13 21 / 14 22	⊖	1/2" NPT	**ZCKJ520**	0.320 (0.705)
With module comprising 2 LEDs, 24 V⎓						
1 step	N/C + N/O snap action (XE2S P2151)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	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∼						
1 step	N/C + N/O snap action (XE2S P2151)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	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∼						
1 step	N/C + N/O snap action (XE2S P2151)	13 21 / 14 22	⊖	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)	13 21 / 14 22	⊖	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⎓						
1 step	**C/O snap action**	13 11 / 14 12	—	**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∼						
1 step	**C/O snap action**	13 11 / 14 12	—	**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∼						
1 step	**C/O snap action**	13 11 / 14 12	—	**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	⎓ 50 V, conforming to IEC 60947-1	250 V∼, 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⎓	110/120 V∼	220/240 V∼
Voltage limits	20…30 V⎓ (including ripple)	95…130 V∼	190…260 V∼
Service life	100 000 hours	20 000 hours	20 000 hours
Reverse polarity protection	Yes	—	

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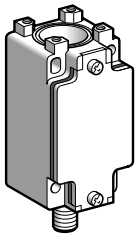

Fixed bodies with 2-pole contact

Type	With contact block	Function diagram	Positive operation *(1)*	Catalog number	Weight kg (lb)
1 step	N/C + N/O snap action (XE2S P2151)	13 21 / 14 22	⊖	**ZCKJ1D**	0.320 (0.705)
	N/C + N/O break before make, slow break (XE2N P2151)	13 21 / 14 22	⊖	**ZCKJ5D**	0.320 (0.705)
	N/O + N/C make before make, slow break (XE2N P2161)	21 13 / 22 14	⊖	**ZCKJ6D**	0.320 (0.705)
	N/C + N/C simultaneous, slow break (XE2N P2141)	11 21 / 12 22	⊖	**ZCKJ7D**	0.320 (0.705)
	N/O + N/O simultaneous, slow break (XE2N P2131)	13 23 / 14 24	—	**ZCKJ8D**	0.320 (0.705)

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

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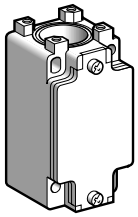
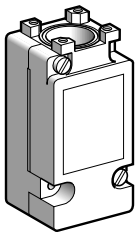
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

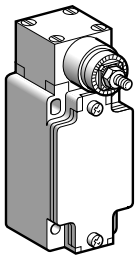
Low-Temperature Applications (–40 °F / –40 °C)



ZCKJ1



ZCKJ11



ZCKJ4046

Body with contacts—For plunger or rotary head

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)	13 21 / 14 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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)	13 21 / 14 22	⊖	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)	21 13 / 22 14	⊖	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)	11 21 / 12 22	⊖	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)	13 23 / 14 24	—	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)	11 21 / 12 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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	13 11 / 14 12	—	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	13 11 23 21 / 14 12 24 22	—	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	13 11 23 21 / 14 12 24 22	—	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)

Type	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	Double-pole 2 C/O staggered snap action	13 11 23 21 / 14 12 24 22	—	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	13 11 23 21 / 14 12 24 22	—	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 120

Dimensions:
page 122

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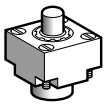
Low-Temperature Applications (–40 °F / –40 °C)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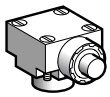
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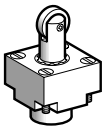
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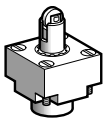
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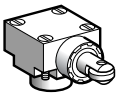
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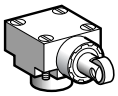
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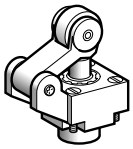
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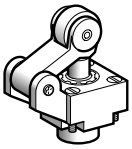
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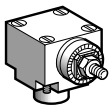
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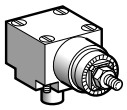
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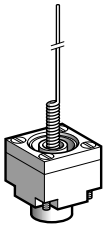
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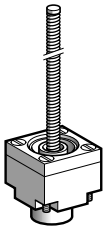
ZCKE086

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	0.6 m/s (1.97 ft/s)	⊖	**ZCKE646**	0.205 (0.452)
	Vertical	ZCKJ•, ZCKJ••, except ZCKJ4 and J41	0.6 m/s (1.97 ft/s)	⊖	**ZCKE656**	0.205 (0.452)
Roller lever plunger (1 direction of actuation)	Thermoplastic	ZCKJ•, ZCKJ••	1.5 m/s (4.92 ft/s)	⊖	**ZCKE216**	0.185 (0.408)
	Steel	ZCKJ•, ZCKJ••	1.5 m/s (4.92 ft/s)	⊖	**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 20)	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 20)	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.

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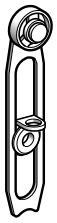
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

ZCKY1•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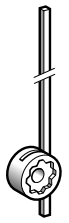
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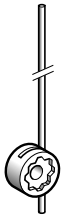
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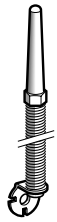
ZCKY59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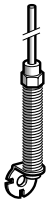
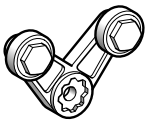
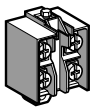

ZCKY91


ZCKY71

ZCKY61

XE2S P21•1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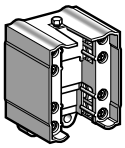
XESP20•1

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)*	Ø 3 mm (0.12 in.) steel, L = 125 mm (4.92 in.)	—	**ZCKY53**	0.025 (0.055)
	Ø 3 mm (0.12 in.) glass fibre, L = 125 mm (4.92 in.)	—	**ZCKY52**	0.020 (0.044)
	Ø 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	13 21 / 14 22	ZCKJ1	⊖	**XE2SP2151**	0.020 (0.044)
1 N/C + 1 N/O break before make slow break	13 21 / 14 22	ZCKJ5	⊖	**XE2NP2151**	0.020 (0.044)
2 C/O simultaneous snap action	13 11 23 21 / 14 12 24 22	ZCKJ2	—	**XESP2021**	0.045 (0.099)
2 C/O staggered snap action	13 11 23 21 / 14 12 24 22	ZCKJ4	—	**XESP2031**	0.045 (0.099)
1 N/O + 1 N/C make before break slow break	21 13 / 22 14	ZCKJ6	⊖	**XE2NP2161**	0.020 (0.044)
1 N/C + 1 N/C simultaneous slow break	11 21 / 12 22	ZCKJ7	⊖	**XE2NP2141**	0.020 (0.044)
1 N/O + 1 N/O simultaneous slow break	13 23 / 14 24	ZCKJ8	—	**XE2NP2131**	0.020 (0.044)
1 N/C + 1 N/C snap action	11 21 / 12 22	ZCKJ9	⊖	**XE2SP2141**	0.020 (0.044)

1. ⊖ : 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.
2. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
3. Adjustable throughout 360° in 5° steps.

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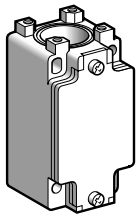
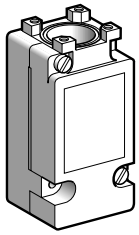
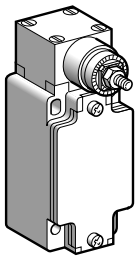
High-Temperature Applications (+248 °F /+120 °C)



ZCKJ•



ZCKJ•15



ZCKJ4045

Body with contacts—For plunger or rotary head

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)	13 21 / 14 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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)	13 21 / 14 22	⊖	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)	21 13 / 22 14	⊖	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)	11 21 / 12 22	⊖	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)	13 23 / 14 24	—	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)	11 21 / 12 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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	13 11 / 14 12	—	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	13 11 23 21 / 14 12 24 22	—	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	13 11 23 21 / 14 12 24 22	—	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)

Type	Contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
Fixed body						
2 step 1 from the left **AND** 1 from the right	Double-pole 2 C/O break before make snap action	13 11 23 21 / 14 12 24 22	—	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	13 11 23 21 / 14 12 24 22	—	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.

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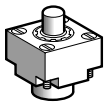
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

High-Temperature Applications (+248 °F /+120 °C)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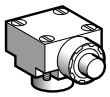
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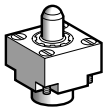
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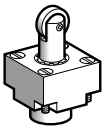
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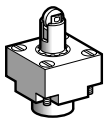
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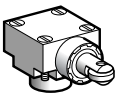
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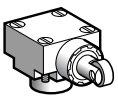
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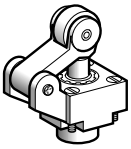
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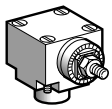
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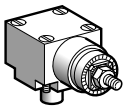
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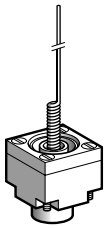
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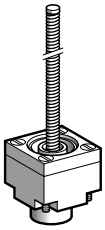
ZCKE085

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 20)	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 20	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.

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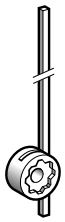
High-Temperature Applications (+248 °F /+120 °C)

ZCKY1•

ZCKY43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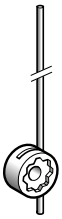
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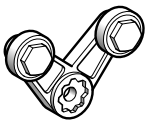
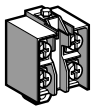
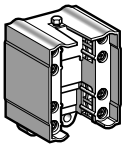

ZCKY715

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)*	Ø 3 mm (0.12 in.) steel, L = 125 mm (4.92 in.)	—	**ZCKY53**	0.025 (0.055)
	Ø 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) thermoplastiic	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	13 21 / 14 22	ZCKJ1	⊖	**XE2SP2151**	0.020 (0.044)
1 N/C + 1 N/O break before make slow break	13 21 / 14 22	ZCKJ5	⊖	**XE2NP2151**	0.020 (0.044)
2 C/O simultaneous snap action	13 11 23 21 / 14 12 24 22	ZCKJ25	—	**XESP20215**	0.045 (0.099)
2 C/O staggered snap action	13 11 23 21 / 14 12 24 22	ZCKJ45	—	**XESP20315**	0.045 (0.099)
1 N/O + 1 N/C make before break slow break	21 13 / 22 14	ZCKJ6	⊖	**XE2NP2161**	0.020 (0.044)
1 N/C + 1 N/C simultaneous slow break	11 21 / 12 22	ZCKJ7	⊖	**XE2NP2141**	0.020 (0.044)
1 N/O + 1 N/O simultaneous slow break	13 23 / 14 24	ZCKJ8	—	**XE2NP2131**	0.020 (0.044)
1 N/C + 1 N/C snap action	11 21 / 12 22	ZCKJ9	⊖	**XE2SP2141**	0.020 (0.044)

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.
2. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
3. Adjustable throughout 360° in 5° steps.

Setup:
page 120

Dimensions:
page 122

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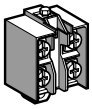
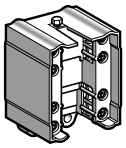
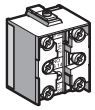
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components







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	13 21 / 14 22	ZCKJ1 ZCKJ1D	⊖	**XE2S P2151**	0.020 (0.044)
N/C + N/O break before make, slow break	13 21 / 14 22	ZCKJ5 ZCKJ5D	⊖	**XE2N P2151**	0.020 (0.044)
2 C/O simultaneous, snap action	13 11 23 21 / 14 12 24 22	ZCKJ2	—	**XES P2021**	0.045 (0.099)
2 C/O staggered, snap action	13 11 23 21 / 14 12 24 22	ZCKJ4	—	**XES P2031**	0.045 (0.099)
N/O + N/C make before break, slow break	21 13 / 22 14	ZCKJ6 ZCKJ6D	⊖	**XE2N P2161**	0.020 (0.044)
N/C + N/C simultaneous, slow break	11 21 / 12 22	ZCKJ7 ZCKJ7D	⊖	**XE2N P2141**	0.020 (0.044)
N/O + N/O simultaneous, slow break	13 23 / 14 24	ZCKJ8 ZCKJ8D	—	**XE2N P2131**	0.020 (0.044)
N/C + N/C snap action	11 21 / 12 22	ZCKJ9	⊖	**XE2S P2141**	0.020 (0.044)
3-pole contact					
N/C + N/O + N/O snap action	31 33 13 / 32 34 14	ZCKJD31	⊖	**XE3S P2151**	0.035 (0.077)
N/C + N/C + N/O snap action	31 21 13 / 32 22 14	ZCKJD39	⊖	**XE3S P2141**	0.035 (0.077)
N/C + N/C + N/O break before make, slow break	31 21 13 / 32 22 14	ZCKJD37	⊖	**XE3N P2141**	0.035 (0.077)
N/C + N/O + N/O break before make, slow break	21 33 13 / 22 34 14	ZCKJD35	⊖	**XE3N P2151**	0.035 (0.077)

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

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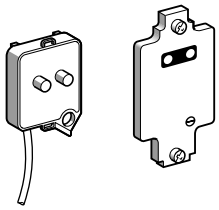

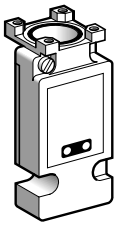

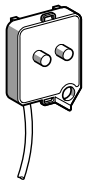

Covers + indicator light module

For use with	Number and type of indicators	Voltage	Catalog number	Weight kg (lb)
Fixed non-plug-in body	1 LED	24 V⎓	**ZCK Z020**	0.060 (0.132)
	2 LEDs	24 V⎓	**ZCK Z021**	0.060 (0.132)
	2 neon lights	110/120 V∿	**ZCK Z033**	0.060 (0.132)
		220/240 V∿	**ZCK Z034**	0.060 (0.132)
Plug-in switch-top body with pilot lights	2 LEDs	24 V⎓	**ZCKJ0121**	0.200 (0.441)
	2 neon lights	110/120 V∿	**ZCKJ0133**	0.200 (0.441)
		220/240 V∿	**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⎓	**ZCKJ902**	0.030 (0.066)
	2 LEDs	24 V⎓	**ZCKJ906**	0.030 (0.066)
	2 neon lights	110/120 V∿	**ZCKJ903**	0.030 (0.066)
		220/240 V∿	**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 kΩ, 1/4 W	**ZCKJ82A**	0.030 (0.066)
Other versions	Covers + indicator light module for other supply voltages. Please consult your local sales office.		

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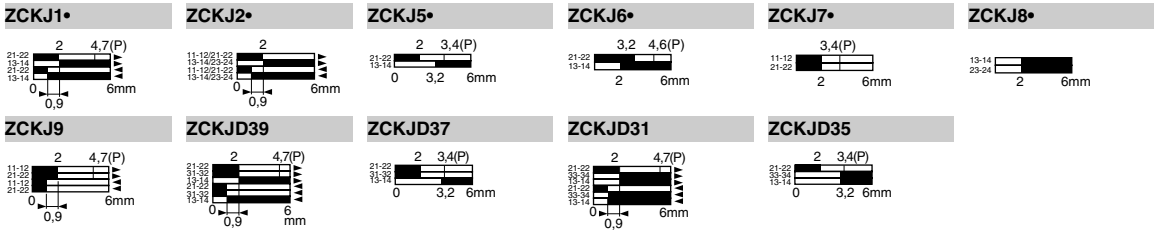
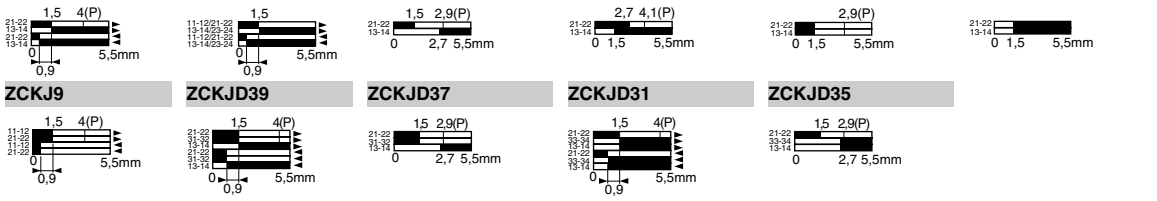
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

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

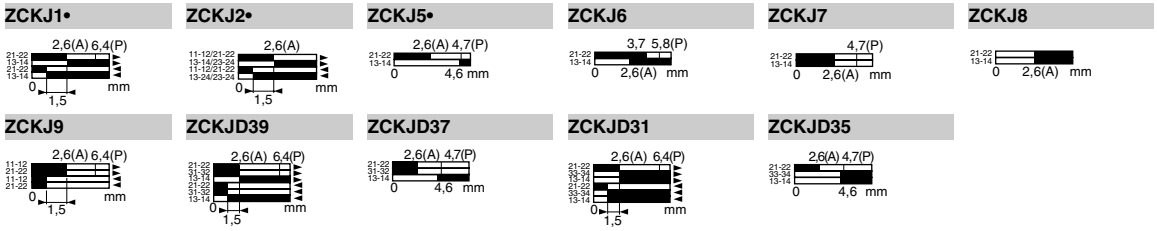
Heads ZCKE61, E619, E66 with body



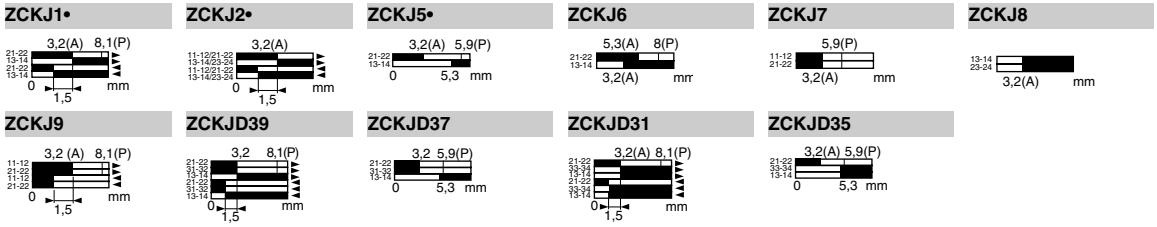
Head ZCKE63 with body



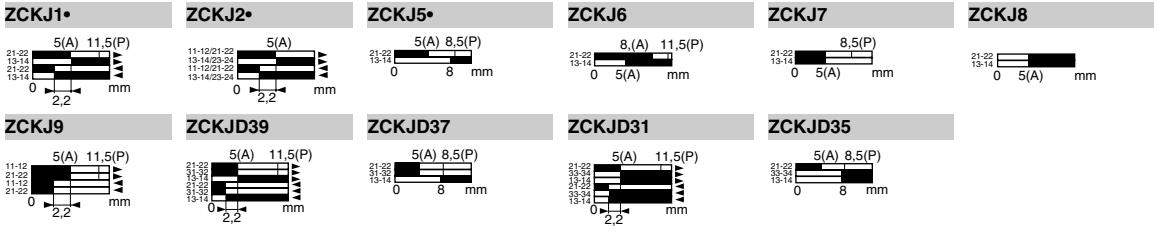
Heads ZCKE64, E65 with body



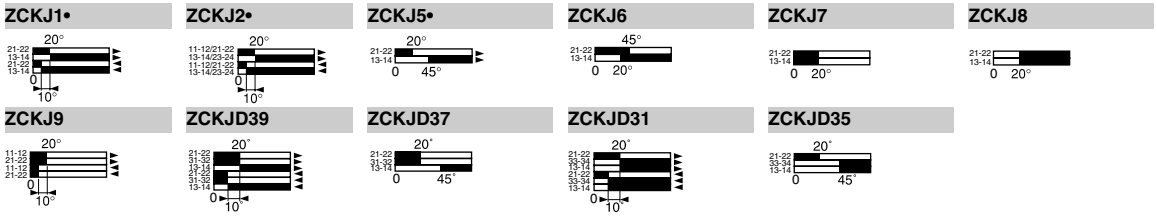
Heads ZCKE67, E629 with body



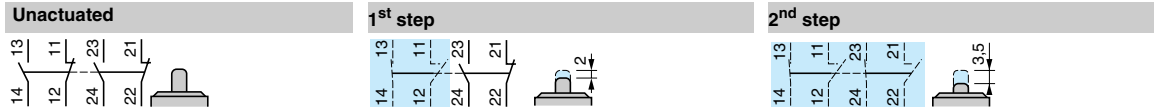
Heads ZCKE21, E23 with body



Heads ZCKE06, E08 with body



ZCKJ4•



Contact operation

- ■ contact closed
- □ contact open

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

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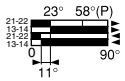
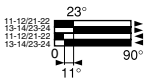
Function diagrams (positive operation assured only if the associated sub-assemblies are ⊖)

Head ZCKE05 with body

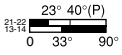
ZCKJ1•



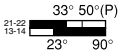
ZCKJ2•



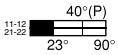
ZCKJ5•



ZCKJ6

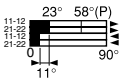


ZCKJ7

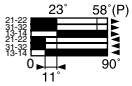


ZCKJ8

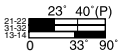
ZCKJ9



ZCKJD39



ZCKJD37



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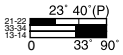
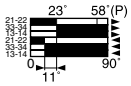
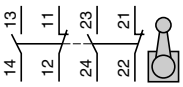


ZCKJD31

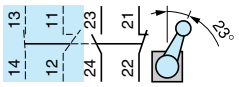


ZCKJ4•

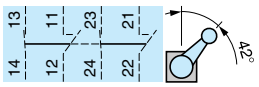
Unactuated



1st step, actuated from left or right

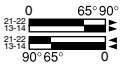


2nd step, actuated from left or right

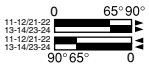


Head ZCKE09 with body

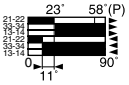
ZCKJ1•



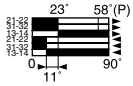
ZCKJ2•



ZCKJD31

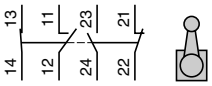


ZCKJD39

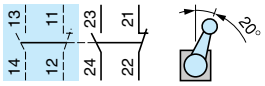


ZCKJ404, J4104 (body with head)

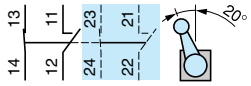
Unactuated



Actuated from left



Actuated from right



Contact operation

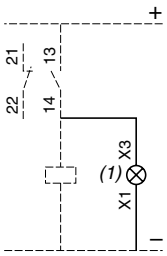
■ contact closed
□ contact open

(P) = positive opening point

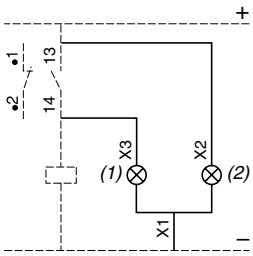
Wiring diagrams

Indicator light modules

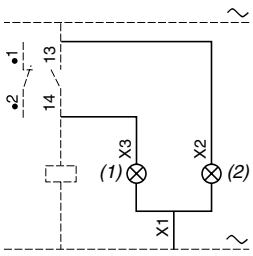
1 LED, 24 V⎓



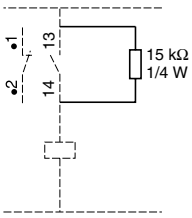
2 LEDs, 24 V⎓



2 neon lights, 110/120 or 220/240 V∼

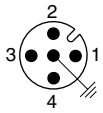


Module with resistor



1. Orange indicator
2. Green indicator

ZCKJ•D



1–2= N/C
3–4= N/O
5= ⏚
4 A / 24 V max.

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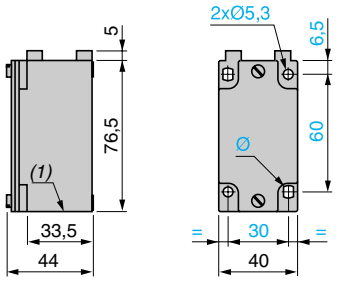
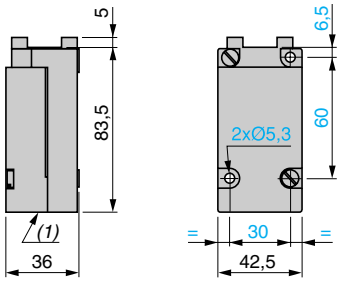
Limit Switches
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies—Components

Bodies

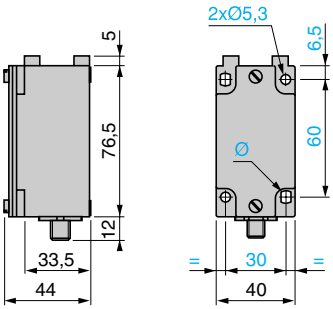
Non-plug-in
ZCKJ1, J2, J5, J4, J•2•, J•3•, J6, J7, J8, J9
ZCKJ1H29, J2H29, J5H29, J4H29, J•2•H29, J•3•H29, J6H29, J7H29, J8H29, J9H29



Plug-in
ZCKJ11, J21, J41, J11••
ZCKJ11H29, J21H29, J41H29, J11••H29

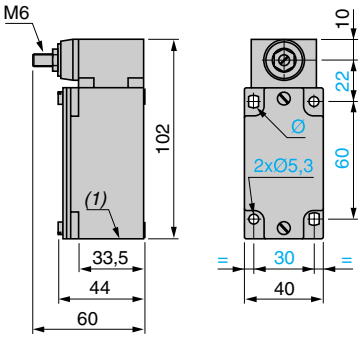


Non-plug-in
ZCKJ1D, J5D, J6D, J7D, J8D

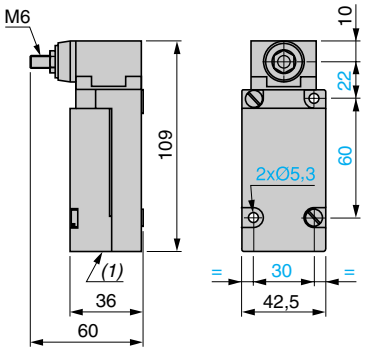


Bodies with rotary head mounted

Non-plug-in
ZCKJ404, ZCKJ404H29

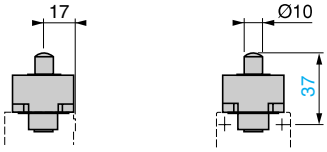


Plug-in
ZCKJ4104, ZCKJ4104H29

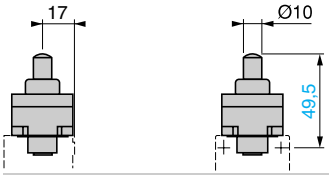


Plunger heads

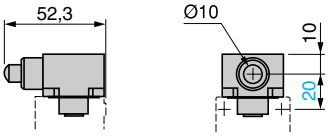
ZCKE61



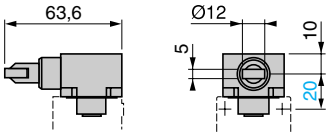
ZCKE619



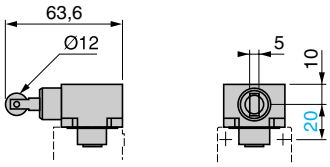
ZCKE63



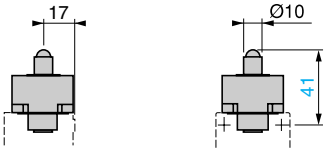
ZCKE64



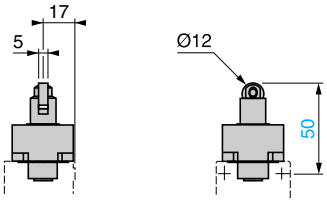
ZCKE65



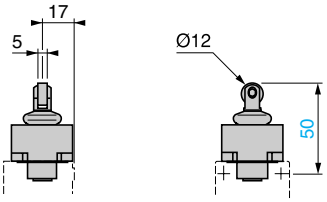
ZCKE66



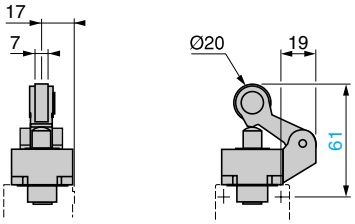
ZCKE62, ZCKE67



ZCKE629



ZCKE21, E23



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

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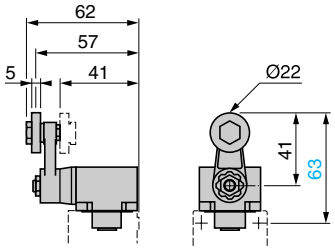
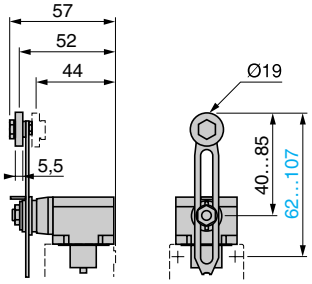
Rotary head ZCKE05 with operating lever

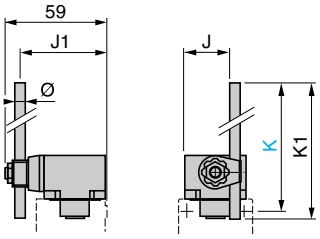
ZCKY11, Y13, Y14



ZCKY41, Y43

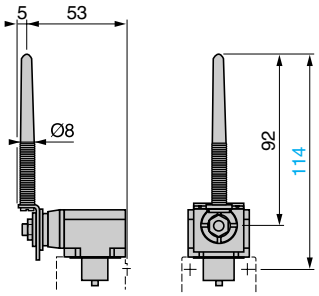


ZCKY51, Y52, Y53, Y59

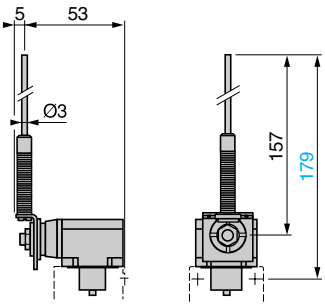


	J	J1	K max	K1	Ø
ZCKY51	20	49	137	123	Ø 3
ZCKY52	20	49	137	125	Ø 3
ZCKY53	20	49	137	125	Ø 3
ZCKY59	26.2	48	212	200	Ø 6

ZCKY81

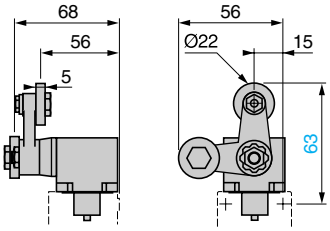


ZCKY91

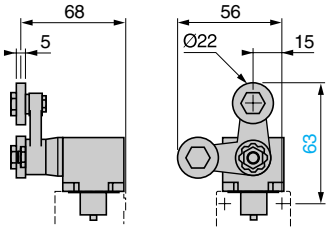


Rotary head ZCKE09 with operating lever

ZCKY61

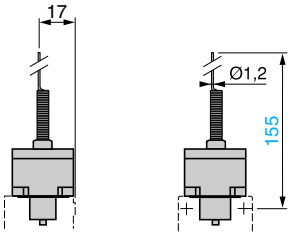


ZCKY71

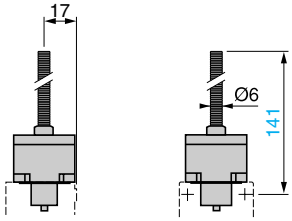


Multi-directional heads

ZCKE06



ZCKE08



Note: operating lever spindle threaded M6.

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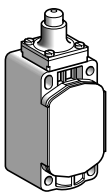
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated

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

□ With head for linear movement (plunger) operators

561656



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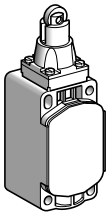

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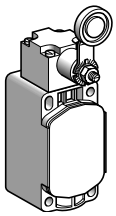
□ With head for rotary movement (lever) operators

561658



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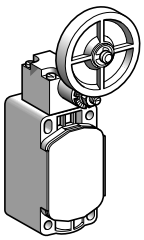

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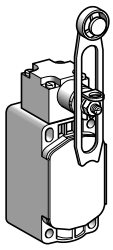

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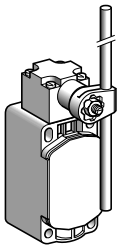

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Environment characteristics

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

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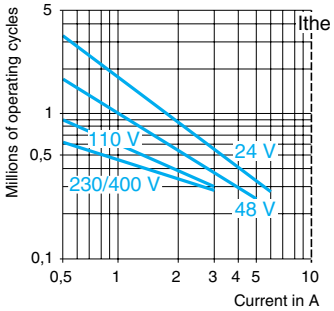
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated

Contact block characteristics

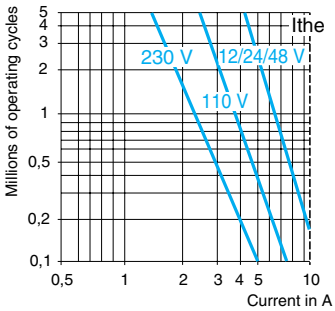
Rated operational characteristics	XE2•P	∼ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A ⎓ DC-13; Q300 (Ue = 250 V, Ie = 0,27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
	XE3•P	∼ AC-15; B300 (Ue = 240 V, Ie = 1,5 A); Ithe = 6 A ⎓ DC-13; R300 (Ue = 250 V, Ie = 0,1 A), conforming to IEC 60947-5-1 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 (Dpg. 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 mm², max.: 2 x 1.5 mm²
	XE2NP21•1	Clamping capacity, min.: 1 x 0.5 mm², max.: 2 x 2.5 mm²
	XESP3021	Clamping capacity, min.: 1 x 0.75 mm², max.: 2 x 1.5 mm²
	XE3NP and XE3SP	Clamping capacity, min.: 1 x 0.34 mm², max.: 1 x 1 mm² or 2 x 0.75 mm²
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		• 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

a.c. supply
∼ 50/60 Hz
⁓ inductive circuit

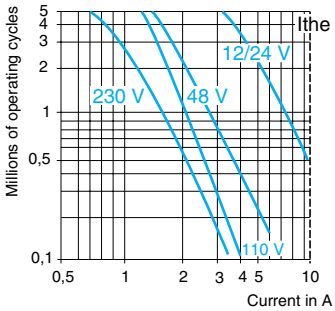
XE2SP21•1, XE2SP2141



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

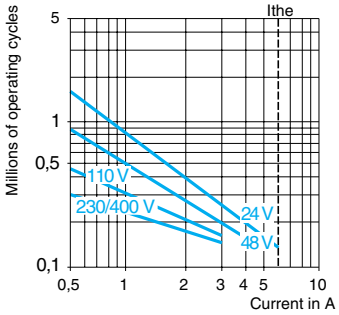
Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
⁓	W	10	7	4

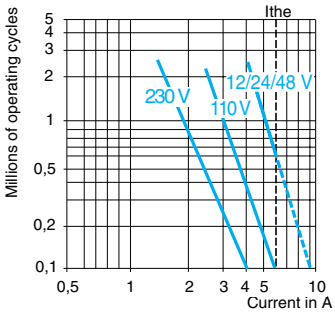
For XE2SP•151 on ∼ or ⎓, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

a.c. supply
∼ 50/60 Hz
⁓ inductive circuit

XE3SP••••



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

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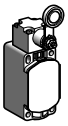
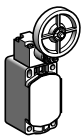
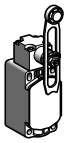
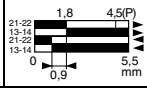
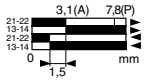
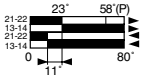
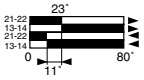
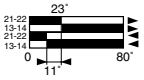
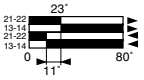
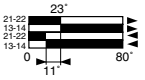
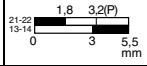
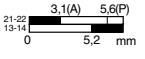
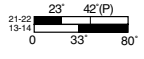
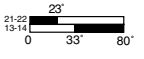
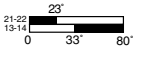
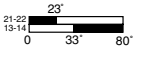
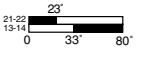
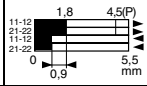
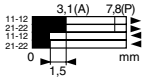
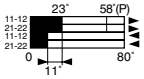
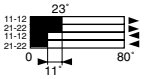
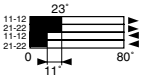
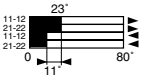
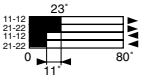
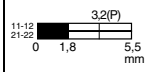
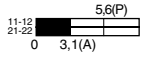
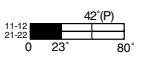
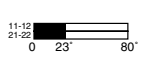
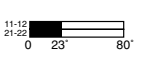
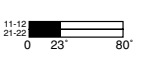
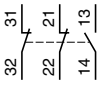
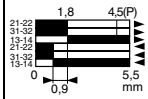
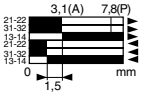
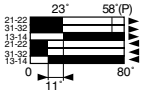
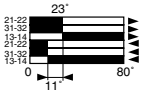
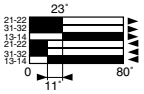
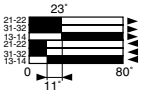
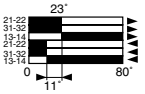
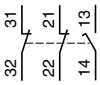
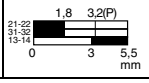
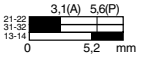
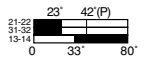
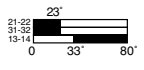
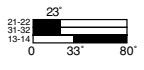
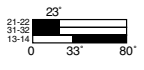
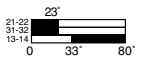
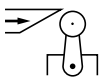
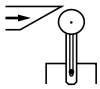
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Complete Switches with 1/2" NPT Adapter Included

Type of head	Plunger (mounting by the body)		Rotary (mounting by the body)				
	Form B *(1)*	Form C *(1)*	Form A *(1)*				Form D *(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)*							
2-pole N/C + N/O snap action (XE2S P2151)	**XCKS101** 	**XCKS102** 	**XCKS131** 	**XCKS139** 	**XCKS141** 	**XCKS149** 	**XCKS159** 
2-pole N/C + N/O break before make, slow break (XE2N P2151)	**XCKS501** 	**XCKS502** 	**XCKS531** 	**XCKS539** 	**XCKS541** 	**XCKS549** 	**XCKS559** 
2-pole N/C + N/C snap action (XE2S P2141)	**ZCKS9 + ZCKD01** 	**ZCKS9 + ZCKD02** 	**ZCKS9 + ZCKD31** 	**ZCKS9 + ZCKD39** 	**ZCKS9 + ZCKD41** 	**ZCKS9 + ZCKD49** 	**ZCKS9 + ZCKD59** 
2-pole N/C + N/C simultaneous, slow break (XE2N P2141)	**ZCKS7 + ZCKD01** 	**ZCKS7 + ZCKD02** 	**ZCKS7 + ZCKD31** 	**ZCKS7 + ZCKD39** 	**ZCKS7 + ZCKD41** 	**ZCKS7 + ZCKD49** 	**ZCKS7 + ZCKD59**
 **3-pole N/C + N/C + N/O snap action (XE3S P2141)**	**ZCKSD39 + ZCKD01** 	**ZCKSD39 + ZCKD02** 	**ZCKSD39 + ZCKD31** 	**ZCKSD39 + ZCKD39** 	**ZCKSD39 + ZCKD41** 	**ZCKSD39 + ZCKD49** 	**ZCKSD39 + ZCKD59** 
 **3-pole N/C + N/C + N/O break before make, slow break (XE3N P2141)**	**ZCKSD37 + ZCKD01** 	**ZCKSD37 + ZCKD02** 	**ZCKSD37 + ZCKD31** 	**ZCKSD37 + ZCKD39** 	**ZCKSD37 + ZCKD41** 	**ZCKSD37 + ZCKD49** 	**ZCKSD37 + ZCKD59** 
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
- 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)
Minimum force or torque	For tripping	15 N (3.37 lb)	12 N (2.70 lb)	0.15 N•m (1.33 lb-in)			
	For positive opening	45 N (10.12 lb)	36 N (8.09 lb)	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.)					

1. Form conforming to EN 50041, see page 21.
2. Switches with gold contacts or eyelet type connections: please consult your local sales office.
3. 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**.
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.
6. Value taken with actuation by moving part at 100 mm (3.94 in.) from the mounting.

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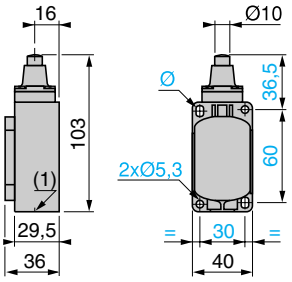
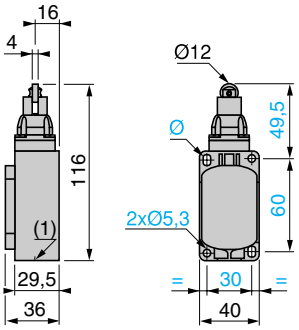
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Complete Switches with 1/2" NPT Adapter Included

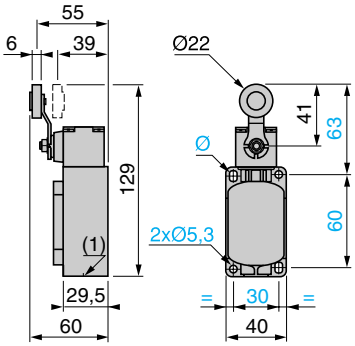
XCKS•01
ZCKS• + ZCKD01



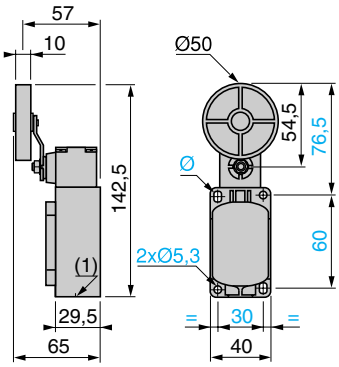
XCKS•02
ZCKS• + ZCKD02



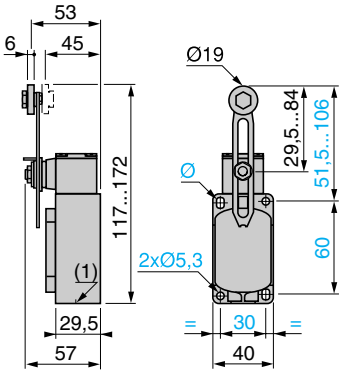
XCKS•31
ZCKS• + ZCKD31



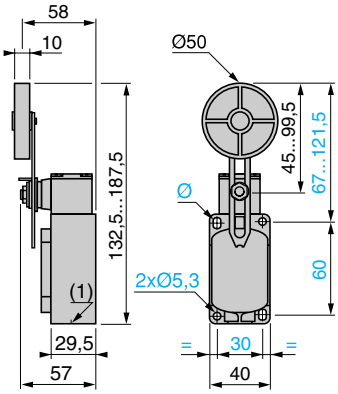
XCKS•39
ZCKS• + ZCKD39



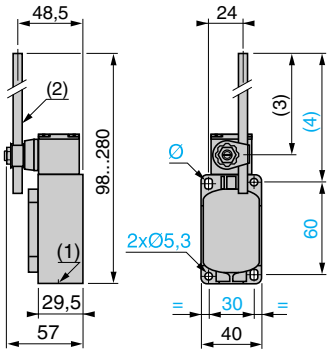
XCKS•41
ZCKS• + ZCKD41



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.

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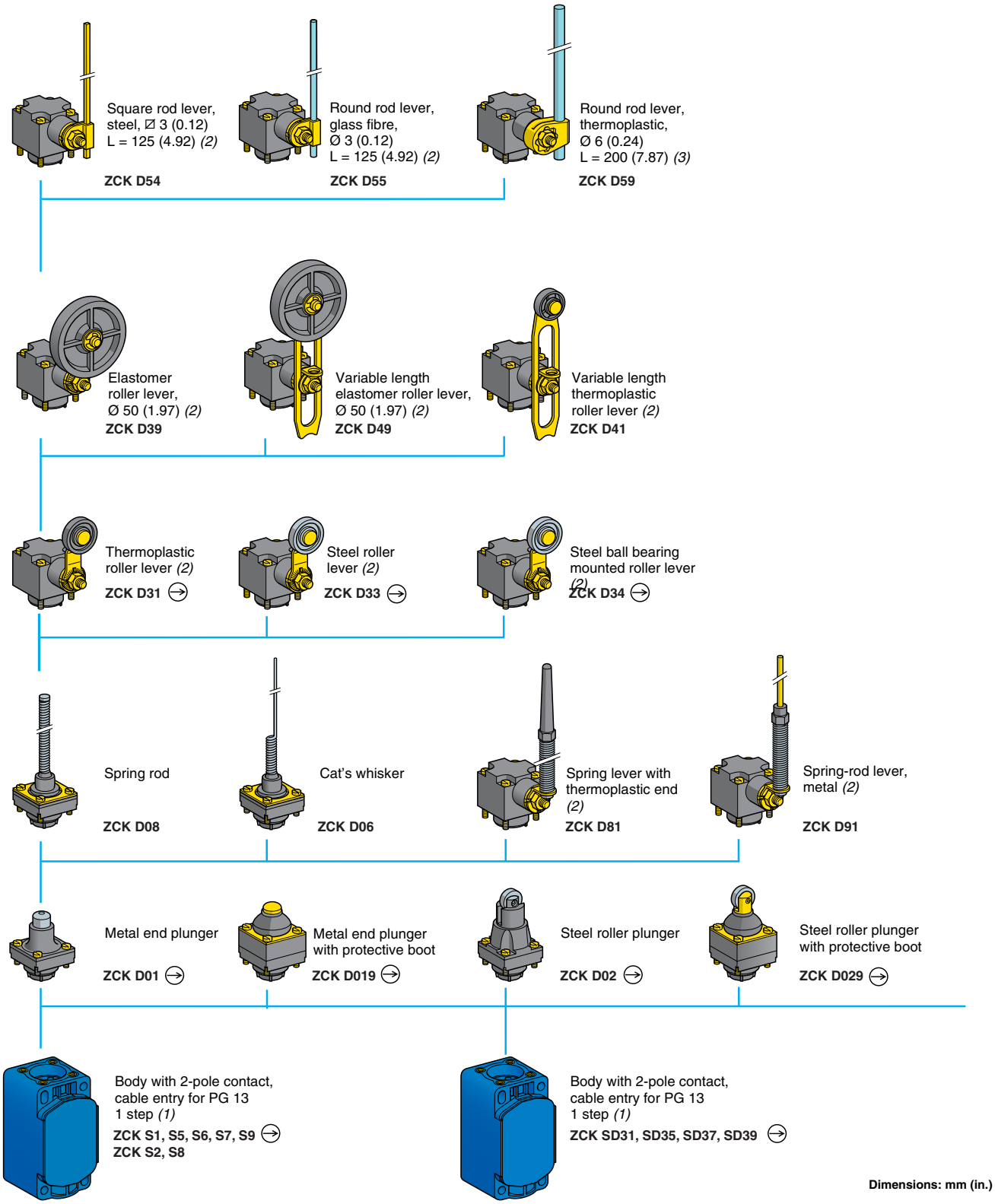
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Modular



Dimensions: mm (in.)

1. For further details, see page 130. 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 133 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.

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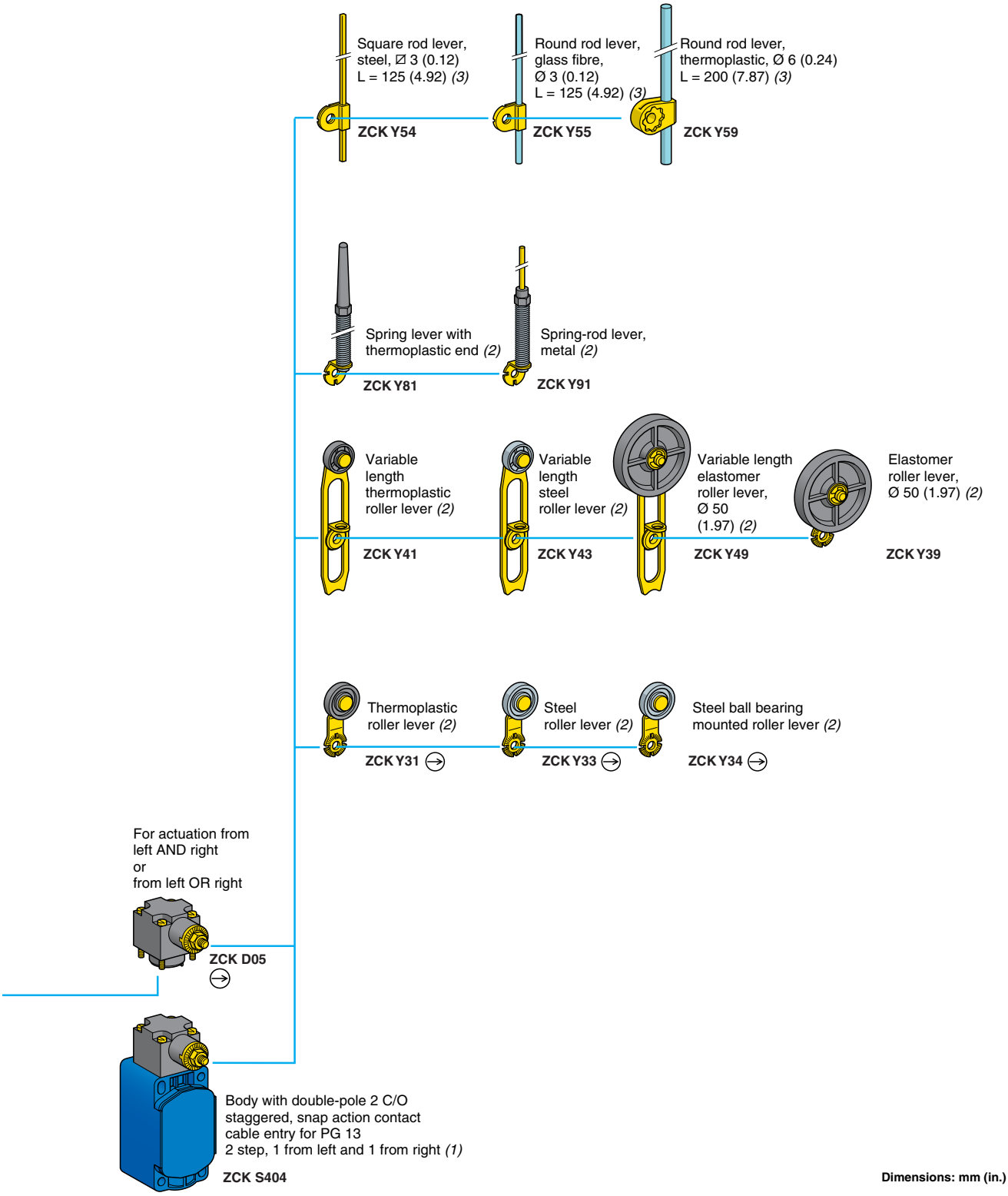
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Modular



Dimensions: mm (in.)

1. For further details, see page 130. 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.

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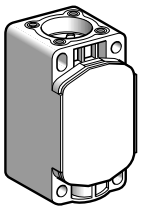
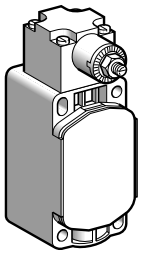
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Modular





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)	13 21 / 14 22	⊖	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)	13 11 23 21 / 14 12 24 22	—	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)	13 21 / 14 22	⊖	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)	21 13 / 22 14	⊖	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)	11 21 / 12 22	⊖	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)	13 23 / 14 24	—	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)	11 21 / 12 22	⊖	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	13 11 23 21 / 14 12 24 22	—	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)	31 33 13 / 32 34 14	⊖	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)	31 21 13 / 32 22 14	⊖	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)	31 21 13 / 32 22 14	⊖	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)	21 33 13 / 22 34 14	⊖	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.

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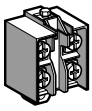

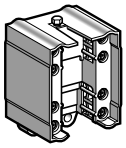

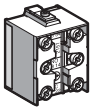

Contact blocks

Type of contact	Function diagram	For body	Positive operation *(1)*	Catalog number	Weight kg (lb)
2-pole contact					
N/C + N/O snap action	13 21 / 14 22	ZCKS1	⊖	**XE2S P2151**	0.020 (0.044)
N/C + N/O break before make, slow break	13 21 / 14 22	ZCKS5	⊖	**XE2N P2151**	0.020 (0.044)
2 C/O simultaneous, snap action	13 11 23 21 / 14 12 24 22	ZCKS2	—	**XES P3021**	0.045 (0.099)
N/O + N/C make before break, slow break	21 13 / 22 14	ZCKS6	⊖	**XE2N P2161**	0.020 (0.044)
N/C + N/C simultaneous, slow break	11 21 / 12 22	ZCKS7	⊖	**XE2N P2141**	0.020 (0.044)
N/O + N/O simultaneous, slow break	13 23 / 14 24	ZCKS8	—	**XE2N P2131**	0.020 (0.044)
N/C + N/C snap action	11 21 / 12 22	ZCKS9	⊖	**XE2S P2141**	0.020 (0.044)
3-pole contact					
N/C + N/O + N/O snap action	31 33 13 / 32 34 14	ZCKSD31	⊖	**XE3S P2151**	0.035 (0.077)
N/C + N/C + N/O snap action	31 21 13 / 32 22 14	ZCKSD39	⊖	**XE3S P2141**	0.035 (0.077)
N/C + N/C + N/O break before make, slow break	31 21 13 / 32 22 14	ZCKSD37	⊖	**XE3N P2141**	0.035 (0.077)
N/C + N/O + N/O break before make, slow break	21 33 13 / 22 34 14	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**	

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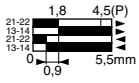
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Modular

Heads ZCKD01, D109 with body

ZCKS1


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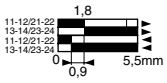

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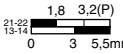

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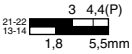

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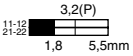

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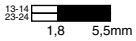

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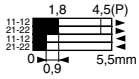

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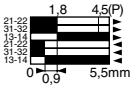

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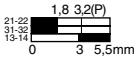

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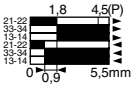

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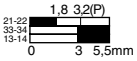

Heads ZCKD02, D029 with body

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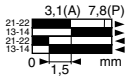

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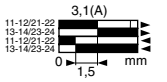

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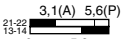

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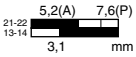

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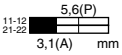

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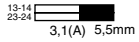

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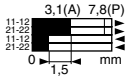

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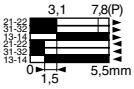

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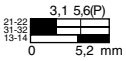

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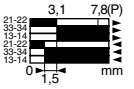

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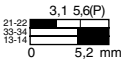

Heads ZCKD31, D33, D34 with body

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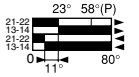

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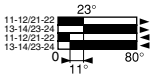

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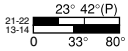

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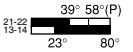

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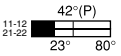

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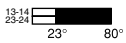
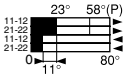


ZCKS9


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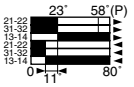

ZCKSD37

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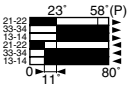

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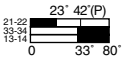
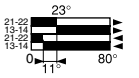


Heads ZCKD39, D41, D49, D54, D55, D59, D81, D91 with body

ZCKS1


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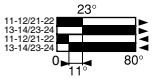

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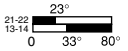

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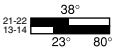
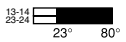


ZCKS7

ZCKS8


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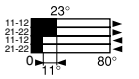

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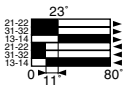
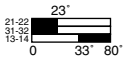


ZCKSD37


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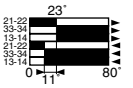

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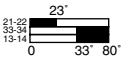
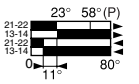
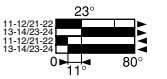
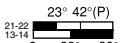


Heads ZCKD05 (positive operation only assured with a ⊖ operating lever) with body

ZCKS1


ZCKS2


ZCKS5


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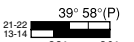
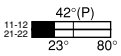
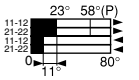


ZCKS7


ZCKS8

ZCKS9


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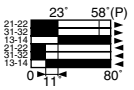
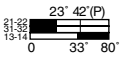
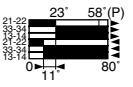


ZCKSD37


ZCKSD31


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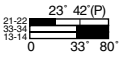
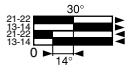


Heads ZCKD06, D08 with body

ZCKS1


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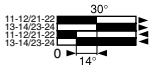
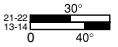


ZCKS5


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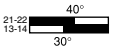

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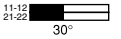

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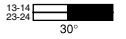

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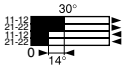

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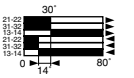

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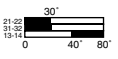

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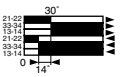

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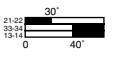
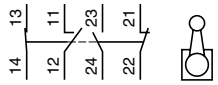
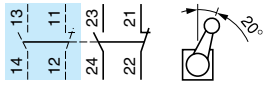


ZCKS404 (body with head)

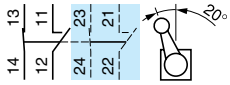
Unactuated



Actuated from left



Actuated from right



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

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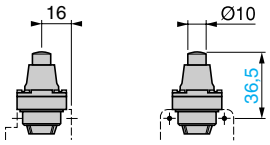
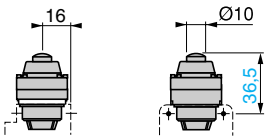
Limit Switches
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041
XCKS—Double Insulated, Modular

Plunger heads

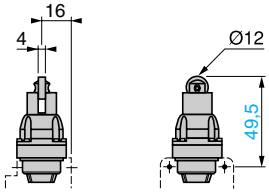
ZCKD01



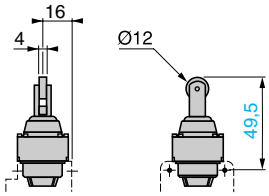
ZCKD019



ZCKD02

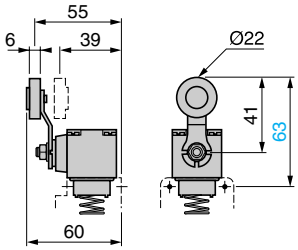


ZCKD029

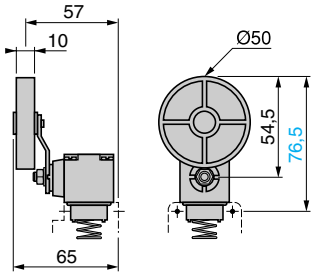


Rotary heads

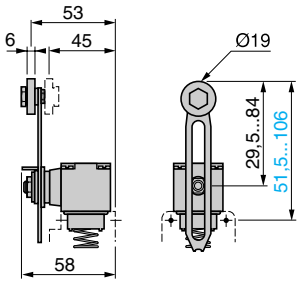
ZCKD31, D33, D34



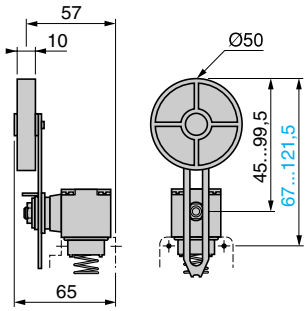
ZCKD39



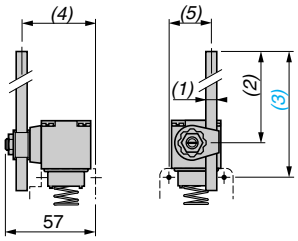
ZCKD41



ZCKD49

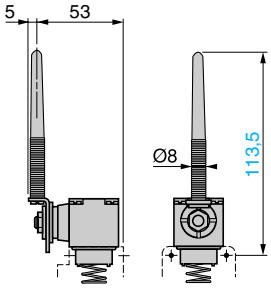


ZCKD54, D55, D59

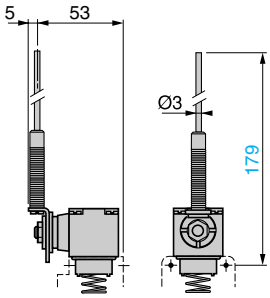


ZCK	(1) rod	(2)	(3)	(4)	(5)
D54	Ø 3, L = 125	115 max.	137 max.	49	24
D55	Ø 3, L = 125	115 max.	137 max.	49	24
D59	Ø 6, L = 200	190 max.	212 max.	46.5	26.2

ZCKD81



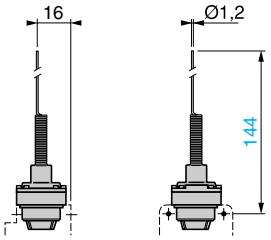
ZCKD91



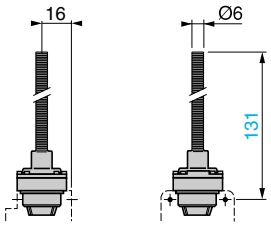
NOTE: operating lever spindle threaded M6.

Multi-directional heads

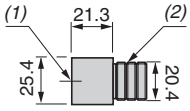
ZCKD06



ZCKD08



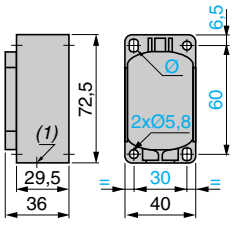
DE9RA1212 (PG 13 to 1/2" NPT adapter)



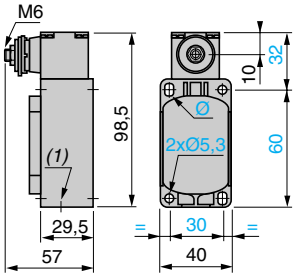
1. Tapped entry for 1/2" NPT conduit
2. PG 13 threaded sleeve

Bodies with contacts

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



ZCKS404, S404H29



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.

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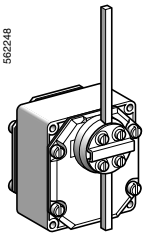
Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyer Belt Shift Monitoring

XCR and XCRT

■ XCR

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

562248



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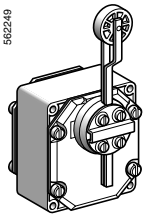
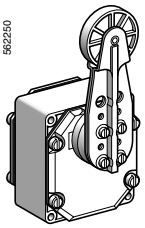


562250



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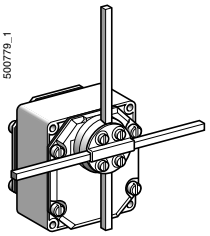
□ With head for rotary movement operators, stay put
1 contact actuation position per direction

500779_1



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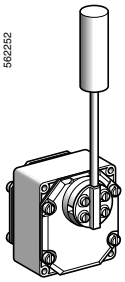
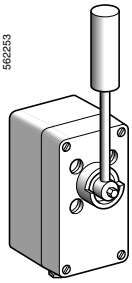
■ XCRT

□ 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°

562252



562253



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

Environment characteristics

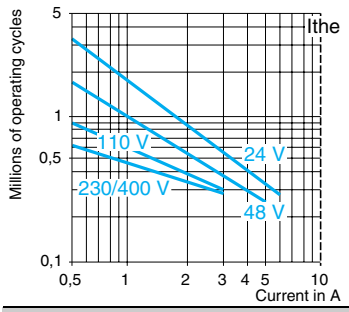
Conforming to standards	Products	IEC/EN 60947-5-1, VDE 0660-200 (CSA C22-2 n° 14 for **XCR**), CCC (for **XCR**)
	Machine assemblies	IEC/EN 60204-1, NF C 79-130
Product certifications	Standard version	**XCRA, B, E, F**: CSA A300
	Special version	**XCRA, B, E, F**: CSA A300, 1/2" NPT
Protective treatment	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 545 conforming to NF C 20-010 **XCRT**: IP 65 conforming to IEC 60529; IP 655 conforming to NF C 20-010
Enclosure		**M**etal, except **XCRT315:** polyester
Cable entry		**T**apped entry for PG 13 (PG 13.5) conduit thread

Contact block characteristics

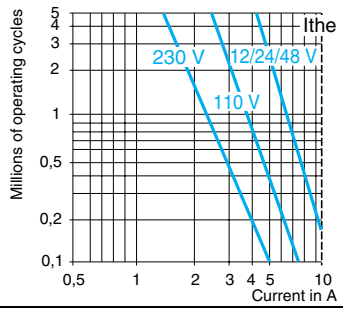
Rated operational characteristics		∼ AC-15; A300 (Ue = 240 V, Ie = 3 A) ⎓ DC-13; Q300 (Ue = 250 V, Ie = 0.27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
Rated insulation voltage		Ui = 500 V degree of pollution 3 conforming to IEC 60947-1 and VDE 0110, group C conforming to NF C 20-040 Ui = 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 mm², max: 2 x 1.5 mm² **XE2NP2151**: Clamping capacity, min: 1 x 0.5 mm², max: 2 x 2.5 mm² **XCRT** contacts: Clamping capacity, min: 1 x 0.5 mm², max: 2 x 2.5 mm²
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

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

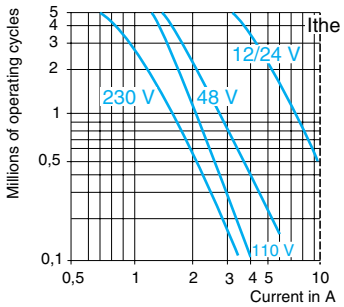
XE2SP2151



XE2NP2151



XCRT contacts



d.c. supply ⎓

Power switched in W for 5 million operating cycles **W**

Voltage	24 V	48 V	120 V
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.

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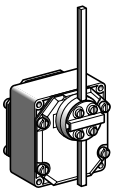
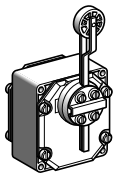
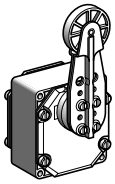
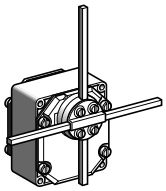
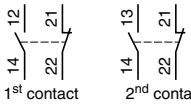
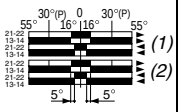
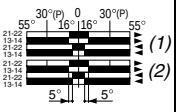
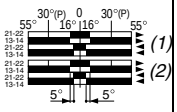
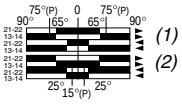
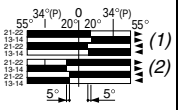
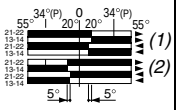
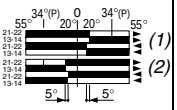
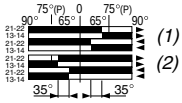
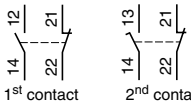
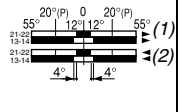
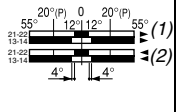
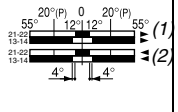
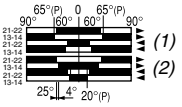
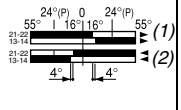
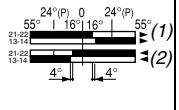
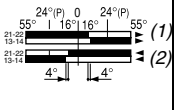
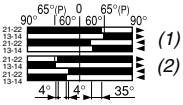
Limit Switches
Osiswitch® Classic, For Hoisting and Material Handling
XCR—Complete Switches with One Cable Entry

Type of head	Rotary with spring return to off position			Stay put
Maximum displacement	55° in each direction			90° in each direction
				
Type of operator	Metal rod, Ø 6 mm (0.24 in.)	Thermoplastic roller lever	Large thermoplastic roller lever	Metal rods, Ø 6 mm (0.24 in.) crossed or "T" *(1)*

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

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

Two 2-pole 1 N/C + 1 N/O snap action XE2SP2151  1st contact 2nd contact	Both contacts operate in each direction	**XCRA11** ⊖ 	**XCRA12** ⊖ 	**XCRA15** ⊖ 	**XCRE18** ⊖ 
	1 contact operates in each direction	**XCRB11** ⊖ 	**XCRB12** ⊖ 	**XCRB15** ⊖ 	**XCRF17** ⊖ 
Two 2-pole 1 N/C + 1 N/O break before make, slow break XE2NP2151  1st contact 2nd contact	Both contacts operate in each direction	**XCRA51** ⊖ 	**XCRA52** ⊖ 	**XCRA55** ⊖ 	**XCRE58** ⊖ 
	1 contact operates in each direction	**XCRB51** ⊖ 	**XCRB52** ⊖ 	**XCRB55** ⊖ 	**XCRF57** ⊖ 
Weight, kg (lb)		1.110	1.145	1.155	1.135
Contact operation		■ *contact closed* □ *contact open*	*(P) = positive opening point* 1. 1st contact 2. 2nd contact		

Complementary characteristics not shown under general characteristics (page 125)

Maximum actuation speed		1.5 m/s (4.92 ft/s)	
Minimum torque	For tripping	0.45 N•m (3.98 lb-in)	0.60 N•m (5.31 lb-in)
	For positive opening	0.75 N•m (6.64 lb-in)	0.70 N•m (6.20 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.	

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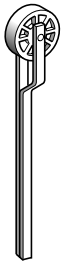
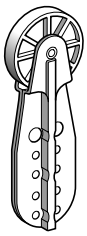
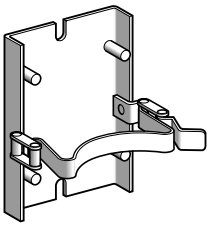


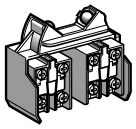
XCRZ02



XCRZ05



XCRZ09



XCRZ1•

Separate components

Description	For switches	Type	Catalog number	Weight kg (lb)
Rod, Ø 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)

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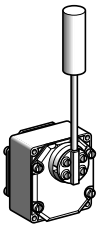
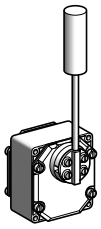
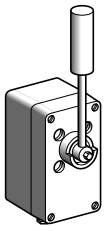
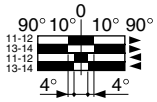
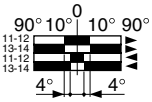
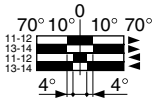
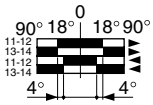
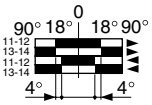
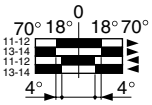
Limit Switches
Osiswitch® Classic, For Conveyer Belt Shift Monitoring
XCRT—Complete Switches with One Cable Entry and 1/2" NPT Adapter Included

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°

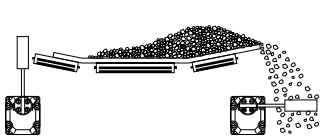
Catalog numbers of complete switches

2 single-pole C/O snap action	XCRT115	XCRT215	XCRT315
1st contact			
2nd contact			
Weight, kg (lb)	1.170 (2.579)	1.170 (2.579)	1.520 (3.351)
Contact operation	*contact closed* *contact open*		

Complementary characteristics not shown under general characteristics (page 125)

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 141

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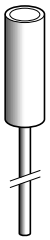
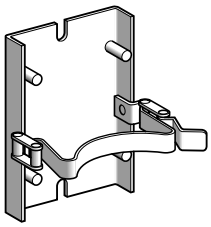
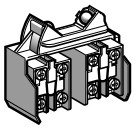


XCRZ9••



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)

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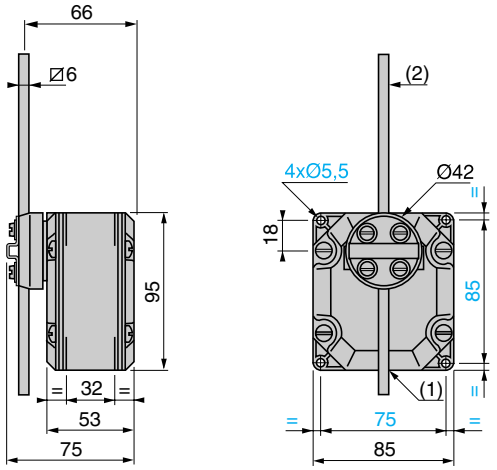
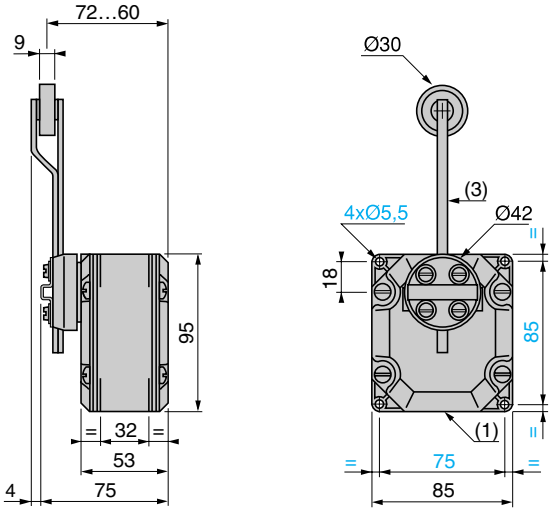
Limit Switches
Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyer Belt Shift Monitoring
XCR and XCRT

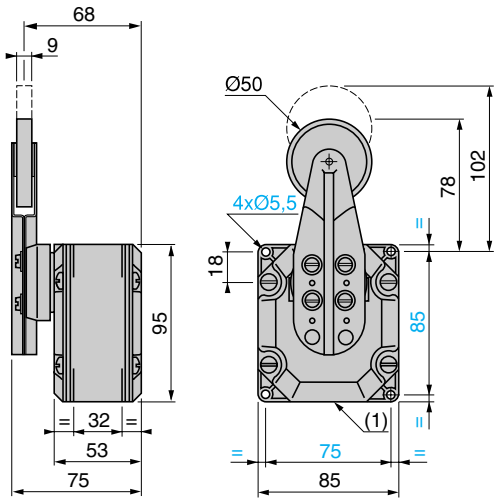
XCRA11, B11, A51, B51



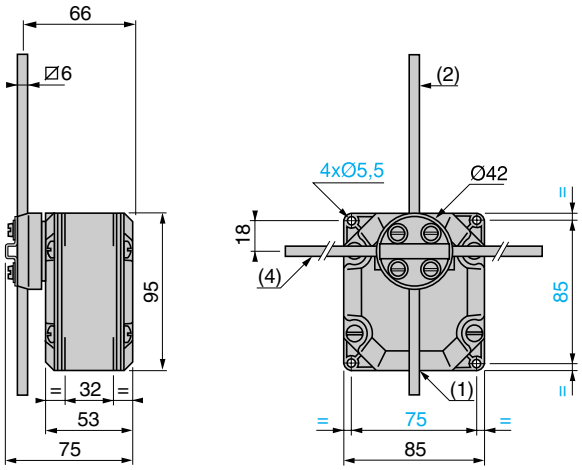
XCRA12, B12, A52, B52



XCRA15, B15, A55, B55



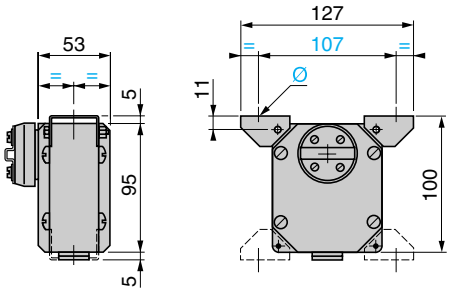
XCRE18, E58, F17, F57



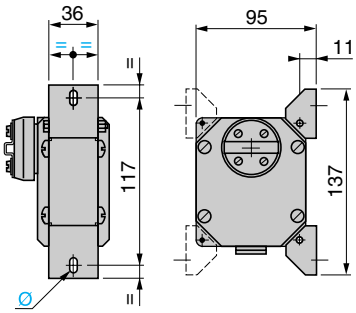
1. 1 tapped entry for PG 13 conduit thread.
2. Rod length: 200 mm (7.87 in.).
3. Rod + roller length: 160 mm (6.30 in.).
4. Rod length: 300 mm (11.81 in.) for XCRF17 and F57, 200 mm (7.87 in.) for XCR E18 and E58.

Supplementary mounting using 2 adjustable lugs (included with switch)

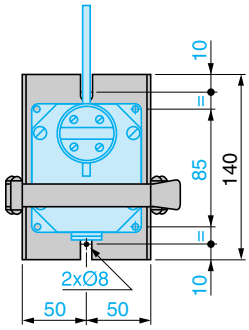
Horizontally positioned



Vertically positioned



Quick mounting/release bracket XCRZ09



Ø: 1 elongated hole Ø 6 x 8.

Characteristics:
pages 135 and 136

Catalog numbers:
page 136

Operation:
page 136

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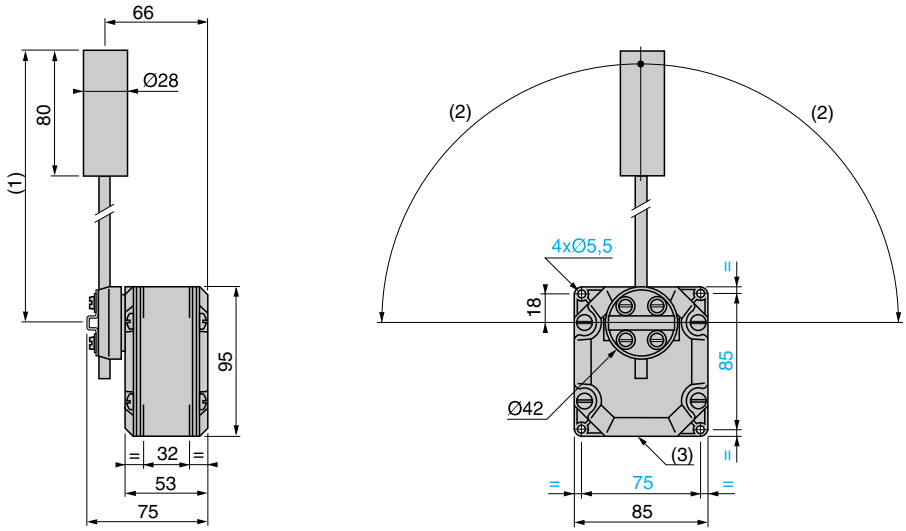
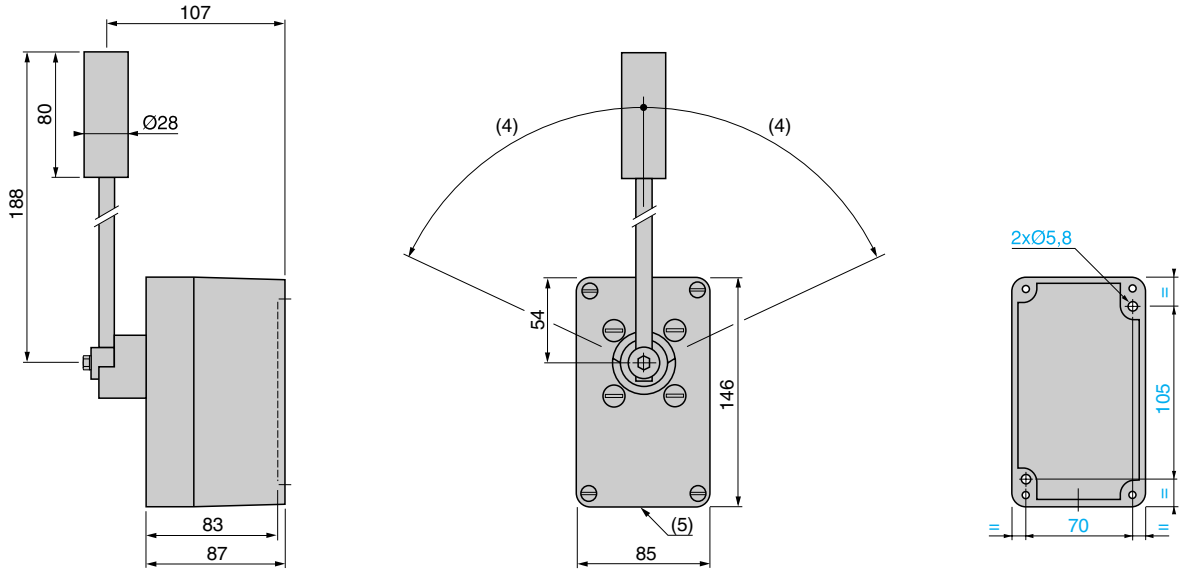
XCRT115, T215



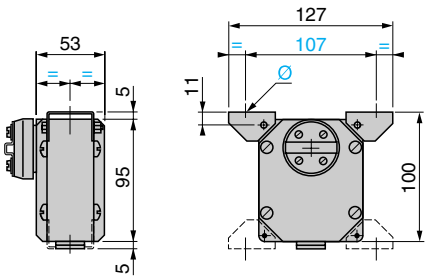
XCRT315



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.

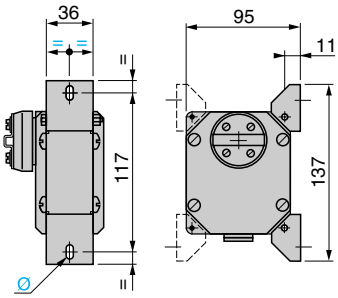
Supplementary mounting using 2 adjustable lugs (included with XCRT115 and T215)

Horizontally positioned

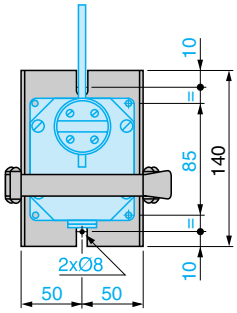


Ø: 1 elongated hole Ø 6 x 8.

Vertically positioned



Quick mounting/release bracket XCRZ09



Characteristics: pages 135 and 138

Catalog numbers: page 138

Operation: page 139

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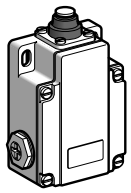
■ XC1AC
with slow break contacts

□ With head for linear movement (plunger)

500768_1



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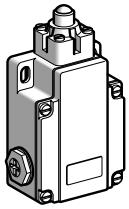

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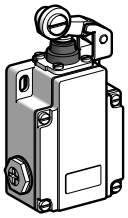

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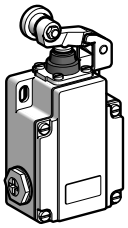
500771_1



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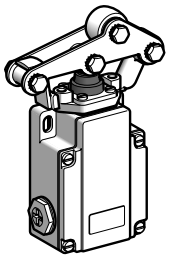

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Environment characteristics		
Conformity to standards		IEC/EN 60947-5-1, IEC 60337-1, VDE 0660-200, CSA C22-2 n° 14
Product certifications	Special version	CSA 600 V (ac) HD
Protective treatment	Version	Standard “TC”, special “TH”
Ambient air temperature	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			
	a.c. supply ∿ 50/60 Hz ⌒⌒⌒ inductive circuit	**Slow break contact blocks** Power switched in **VA**			
		Voltage **V**	**48**	**110**	**230**
		For 1 million operating cycles	450	900	1900
		For 3 million operating cycles	170	350	430
	d.c. supply ⎓ ⌒⌒⌒ inductive circuit	Power switched in **W**			
		Voltage **V**	**48**	**110**	**230**
		For 1 million operating cycles	100	100	95
		For 3 million operating cycles	35	40	33

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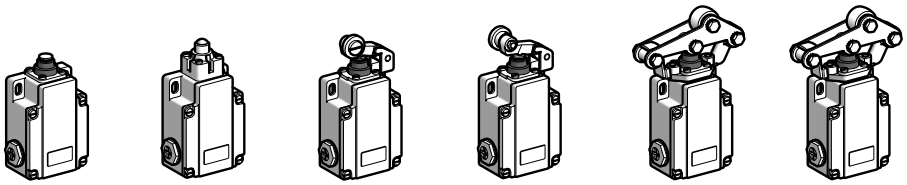
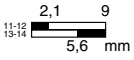
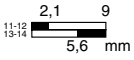
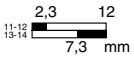
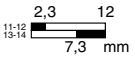
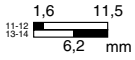
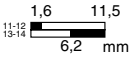
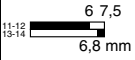
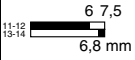
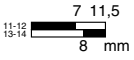
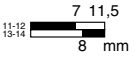
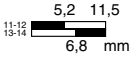
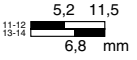
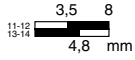
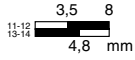
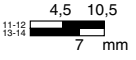
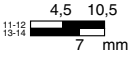
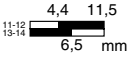
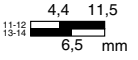
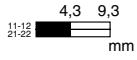
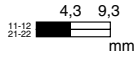
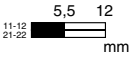
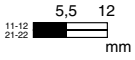
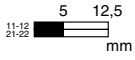
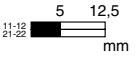
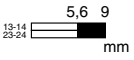
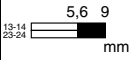
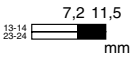
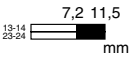
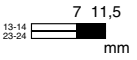
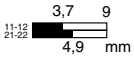
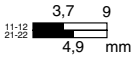
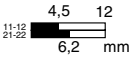
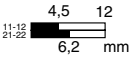
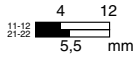
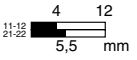
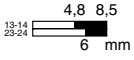
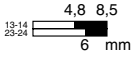
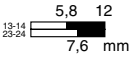
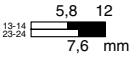
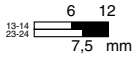
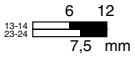
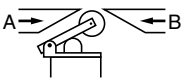
Limit Switches
Osiswitch® Classic, For Material Handling
XC1AC—Complete Switches with Slow-Break Contacts and 1/2" NPT Adapter Included

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**  11-12 13-14: 2,1 9; 5,6 mm	**XC1AC115**  11-12 13-14: 2,1 9; 5,6 mm	**XC1AC116**  11-12 13-14: 2,3 12; 7,3 mm	**XC1AC118**  11-12 13-14: 2,3 12; 7,3 mm	**XC1AC117**  11-12 13-14: 1,6 11,5; 6,2 mm	**XC1AC119**  11-12 13-14: 1,6 11,5; 6,2 mm
2-pole N/C + N/O break before make, slow break ZC1AZ12	**XC1AC121**  11-12 13-14: 6 7,5; 6,8 mm	**XC1AC125**  11-12 13-14: 6 7,5; 6,8 mm	**XC1AC126**  11-12 13-14: 7 11,5; 8 mm	**XC1AC128**  11-12 13-14: 7 11,5; 8 mm	**XC1AC127**  11-12 13-14: 5,2 11,5; 6,8 mm	**XC1AC129**  11-12 13-14: 5,2 11,5; 6,8 mm
2-pole N/O + N/C make before break, slow break ZC1AZ13	**XC1AC131**  11-12 13-14: 3,5 8; 4,8 mm	**XC1AC135**  11-12 13-14: 3,5 8; 4,8 mm	**XC1AC136**  11-12 13-14: 4,5 10,5; 7 mm	**XC1AC138**  11-12 13-14: 4,5 10,5; 7 mm	**XC1AC137**  11-12 13-14: 4,4 11,5; 6,5 mm	**XC1AC139**  11-12 13-14: 4,4 11,5; 6,5 mm
2-pole N/C + N/C simultaneous, slow break ZC1AZ14	**XC1AC141**  11-12 21-22: 4,3 9,3; mm	**XC1AC145**  11-12 21-22: 4,3 9,3; mm	**XC1AC146**  11-12 21-22: 5,5 12; mm	**XC1AC148**  11-12 21-22: 5,5 12; mm	**XC1AC147**  11-12 21-22: 5 12,5; mm	**XC1AC149**  11-12 21-22: 5 12,5; mm
2-pole N/O + N/O simultaneous, slow break ZC1AZ15	**XC1AC151**  13-14 23-24: 5,6 9; mm	**XC1AC155**  13-14 23-24: 5,6 9; mm	**XC1AC156**  13-14 23-24: 7,2 11,5; mm	**XC1AC158**  13-14 23-24: 7,2 11,5; mm	**XC1AC157** 13-14 23-24: 7 11,5; mm	**XC1AC159**  13-14 23-24: 7 11,5; mm
2-pole N/C + N/C staggered, slow break ZC1AZ16	**XC1AC161**  11-12 21-22: 3,7 9; 4,9 mm	**XC1AC165**  11-12 21-22: 3,7 9; 4,9 mm	**XC1AC166**  11-12 21-22: 4,5 12; 6,2 mm	**XC1AC168**  11-12 21-22: 4,5 12; 6,2 mm	**XC1AC167**  11-12 21-22: 4 12; 5,5 mm	**XC1AC169**  11-12 21-22: 4 12; 5,5 mm
2-pole N/O + N/O staggered, slow break ZC1AZ17	**XC1AC171**  13-14 23-24: 4,8 8,5; 6 mm	**XC1AC175**  13-14 23-24: 4,8 8,5; 6 mm	**XC1AC176**  13-14 23-24: 5,8 12; 7,6 mm	**XC1AC178**  13-14 23-24: 5,8 12; 7,6 mm	**XC1AC177**  13-14 23-24: 6 12; 7,5 mm	**XC1AC179**  13-14 23-24: 6 12; 7,5 mm
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	■ *contact closed* □ *contact open*					

Complementary characteristics not shown under general characteristics (page 135)

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).

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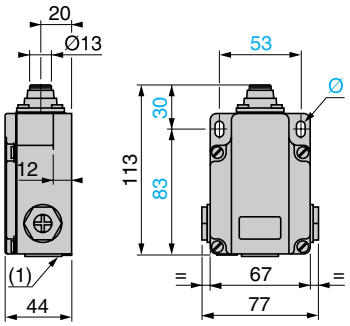
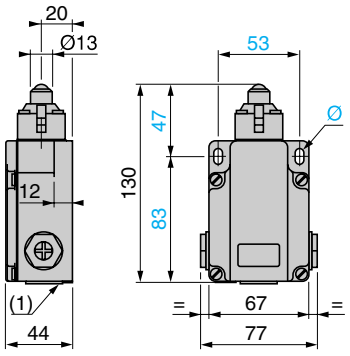
Limit Switches
Osiswitch® Classic, For Material Handling
XC1AC—Complete Switches with Slow-Break Contacts and 1/2" NPT Adapter Included

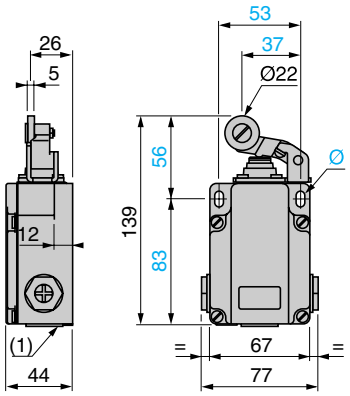
XC1AC1•1



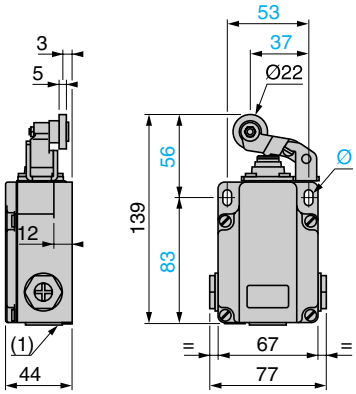
XC1AC1•5



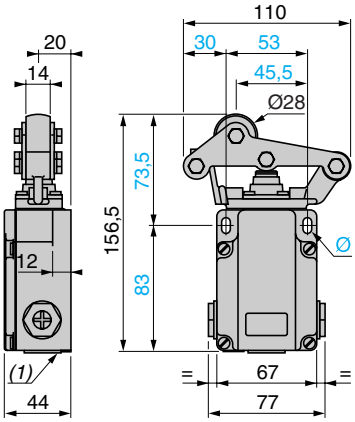
XC1AC1•6



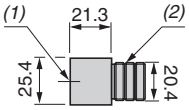
XC1AC1•8



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.

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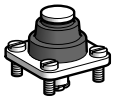
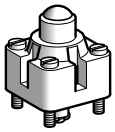
Limit Switches
Osiswitch® Classic, For Material Handling
XC1AC—Renewal Parts



ZC1AC001



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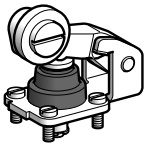
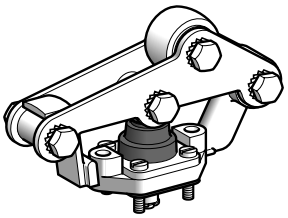
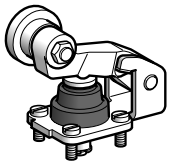


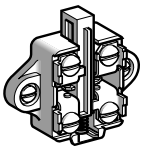
ZC1AC006



ZC1AC007
ZC1AC009

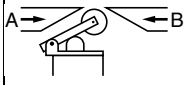
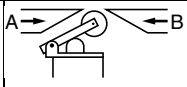
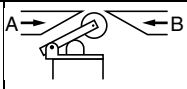
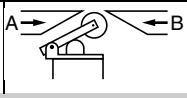


ZC1AC008

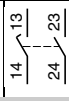


ZC1AZ1•

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** **Direction B**	 1 m/s (3.28 ft/s) 0.5 m/s (1.64 ft/s)		**ZC1AC006**	0.100 (0.220)
Reinforced roller lever **Direction A** **Direction B**	 1 m/s (3.28 ft/s) 0.5 m/s (1.64 ft/s)		**ZC1AC007**	0.375 (0.827)
Offset roller lever **Direction A** **Direction B**	 1 m/s (3.28 ft/s) 0.5 m/s (1.64 ft/s)		**ZC1AC008**	0.100 (0.220)
Roller lever on needle roller bearing **Direction A** **Direction B**	 1 m/s (3.28 ft/s) 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)

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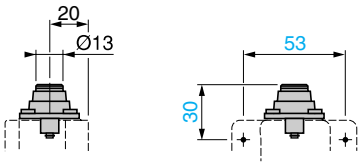
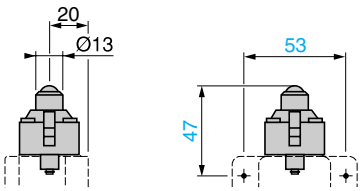
Dimensions

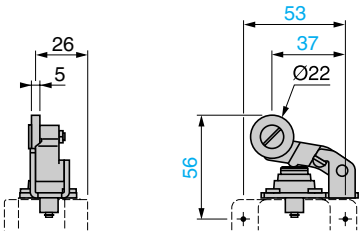
ZC1AC001



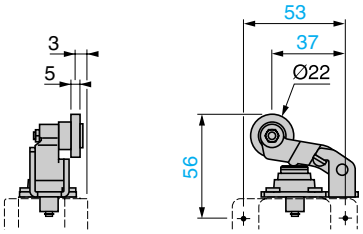
ZC1AC005



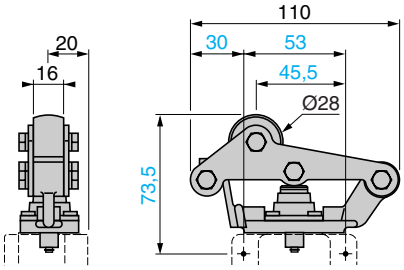
ZC1-AC006



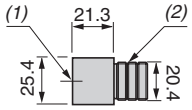
ZC1AC008



ZC1AC007, AC009



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



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

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Limit Switches
Snap Action Industrial Switches
Class 9007

Industrial Snap Switches and Limit Switches without Enclosures

Type AB21

Type AO2

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
Basic Snap Switch	1 N.O. 1 N.C.	AO 1
	1 N.C.	AO 1A
	1 N.O.	AO 1B
	1 N.O. 1 N.C.	AO 2
		AO 6 (Plug-in)
	1 N.C.	AO 2A
	1 N.O.	AO 2B
	2 N.O. 2 N.C.	CO 3
	2 N.O.	CO 6 (Plug-in)
	Two Stage 2 N.O. 2 N.C.	CO 7
Rigid Roller Lever Type	1 N.O. 1 N.C.	AB 21 (RH) ▲
		AB 22 (LH) ▲
		AB 41 ▲ (without Side Mtg. Bracket)
		AB 23 (RH) ♦
		AB 24 (LH) ♦

Type of Operator	Contact Arrangement ●	Type
Rigid Roller Lever Type	2 N.O. 2 N.C.	CB 31 (RH) ▲
		CB 32 (LH) ▲
		CB 41 ▲ (without Side Mtg. Bracket)
		CB 33 (RH) ♦
		CB 34 (LH) ♦
Rigid Roller Lever Type One Way Roller	1 N.O. 1 N.C.	AB 25 (RH)
		AB 26 (LH)
	2 N.O. 2 N.C.	CB 35 (RH)
		CB 36 (LH)
Cabinet Door Type	1 N.O. 1 N.C.	AC 1
	2 N.O. 2 N.C.	CC 1
Plunger Type Panel Mounting	1 N.O. 1 N.C.	AP 221
	2 N.O. 2 N.C.	CP 221
	Operator Only	AP 201 ∗

Type of Operator	Contact Arrangement •	Type
Roller Plunger Type Panel Mounting Non-Oiltight	1 N.O. 1 N.C.	AP 321
		AP 324 †
	2 N.O. 2 N.C.	CP 321
		CP 324 †
	Operator Only	AP 301 ∗
		AP 304 † ∗
Roller Plunger Type Panel Mounting Oiltight	1 N.O. 1 N.C.	AP 323
		AP 325 †
	2 N.O. 2 N.C.	CP 323
		CP 325 †
	Operator Only	AP 303 ∗
		AP 305 † ∗
Mushroom Button Type Panel Mounting	1 N.O. 1 N.C.	AP 222
	2 N.O. 2 N.C.	CP 222
	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	AC—50 or 60 Hz Voltage	AC Inductive 35% Power Factor Make A	AC Inductive 35% Power Factor Make VA	AC Inductive 35% Power Factor Break A	AC Inductive 35% Power Factor Break VA	AC Resistive 75% Power Factor Make and Break Amperes	DC Voltage	DC Inductive and Resistive Make and Break Amperes Single Pole	DC Inductive and Resistive Make and Break Amperes Double Pole	AC or DC Continuous Carrying Amperes
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)

File E42259
CCN NKCR2

File LR25490
Class 3211-03

Marking

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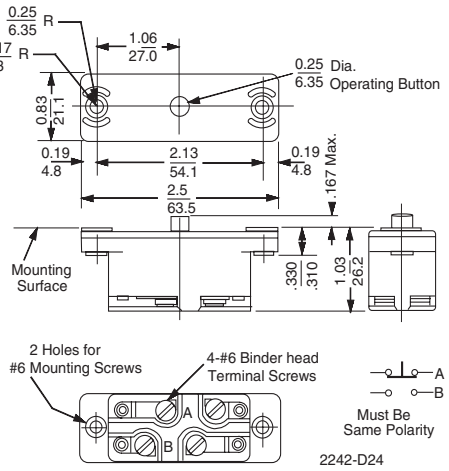
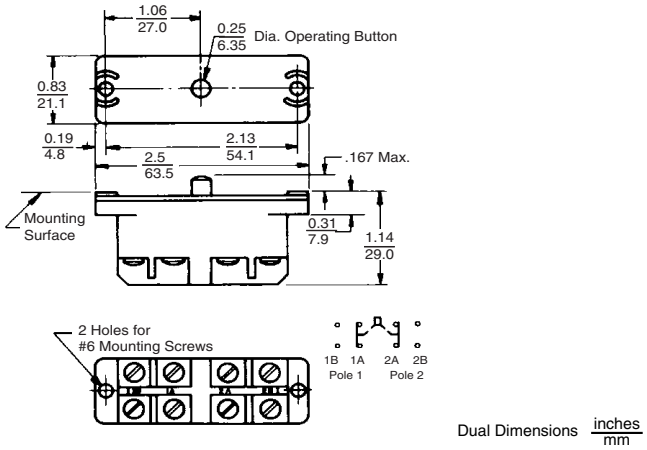
Approximate Dimensions and Operating Data, Types AO, CO, AP, and CP

Class 9007 Type AO, Single-Pole Snap Switch



Class 9007 Type CO, Two-Pole Snap Switch

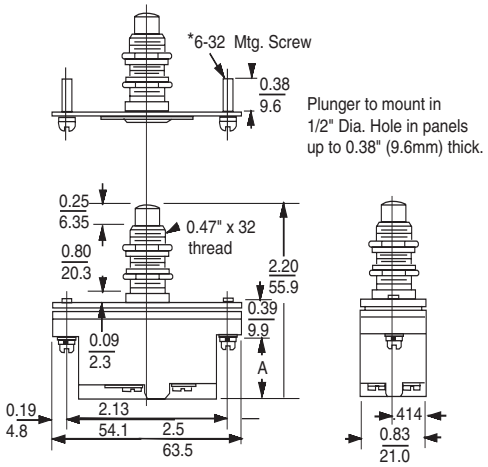


	Operating Data, in. (mm)	
	AO1, 1A, 1B	**AO2, 2A, 2B**
Pre-travel	0.057–0.074 (1.4–1.8)	0.057–0.074 (1.4–1.8)
Differential	0.015–0.025 (0.6–0.6)	0.035–0.046 (0.9–1.16)
Total travel	0 .103–0.125 2.6–3.2)	0.103–0.125 (2.6–3.2)
Operating force	7–11 oz (0.05–0.08 N)	10–14 oz (0.07–0.1 N)

	Operating Data, in. (mm)	
	CO3	**C07**
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)

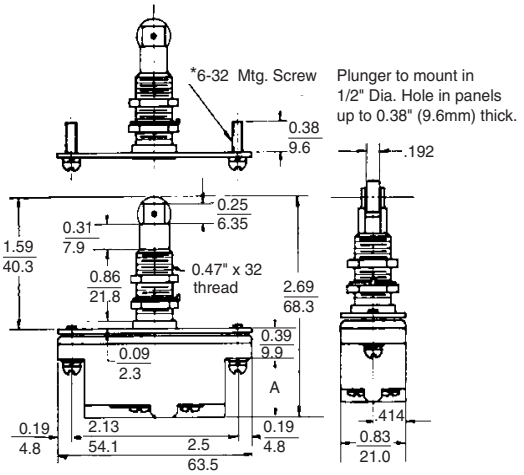
∗ Separation between first and second stage trip points is 0.020–.025 (0.5–0.6).
Note: Shipping weight of Type AO and CO is 0.25 lb (0.11 kg).

Type AP201, 221, and CP221



NOTE: Type AP221 shown.

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



NOTE: Type AP321 shown.

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

Type	Dimension A
AP321, 323, 324, 325	0.70 (17.8)
CP321, 323, 324, 325	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)

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 max.	20 oz (0.14 N)	28 oz (0.2 N)	26 oz (0.18 N)	28 oz (0.2 N)

Note: Shipping weight 0.25 lb (0.11 kg).

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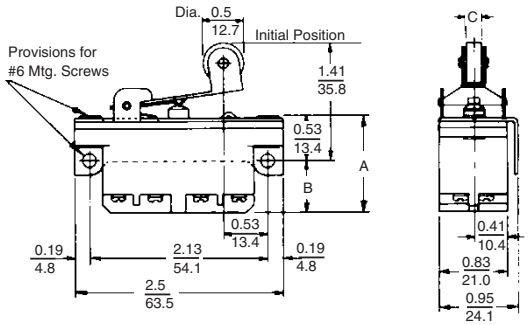
Approximate Dimensions and Operating Data, Types AB, CB, AC, and CC

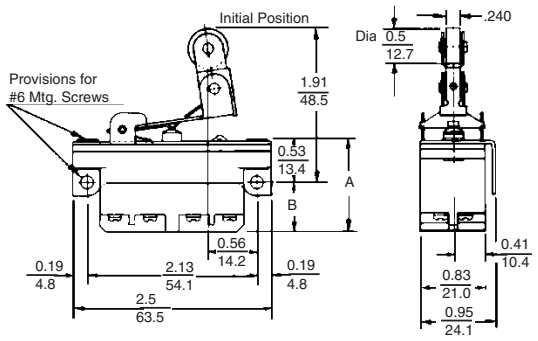
Type AB21 through 24 and CB31 through 34



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)

Type 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)

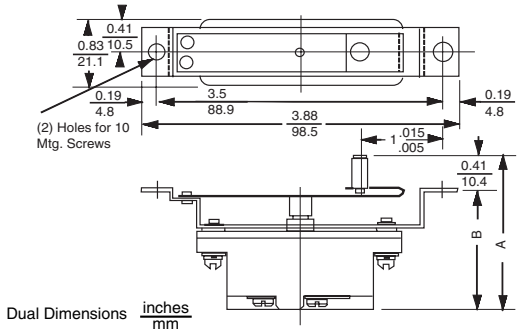
Operating Data

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)

Note: Shipping weight 0.25 lb.

Type AC1 and CC1

Dimensions



Note: Type AC1 shown. Shipping weight 0.25 lb.

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.

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)

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Shown with Standard Bottom Entrance Cable

Shown with 4-Pin Micro-Connector

File E42259
CCN NKCR

File LR 25490
Class 3211 03

Marking

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.

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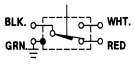
Limit Switches
Miniature
Class 9007 Types MS and ML

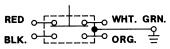
Shown with Side-Entrance Cable

- 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 154.

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

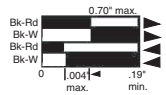
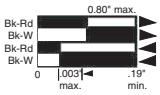
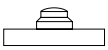
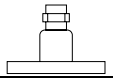
Contact Characteristics	
Rated thermal current	10 A (standard)
Rated insulation voltage	300 Vac and Vdc (standard)
Gold contact switching ratings	0.1 A, 24 Vdc; 0.24 VA

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	100 mA @ 125 Vac
	240 AC	30 A	3 A	
	10.0 Amperes Continuous			30 mA 28 Vdc
	DC Contact Rating: 5 A (Resistance), 28 Vdc			

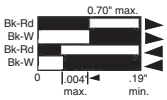
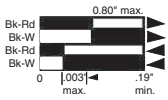
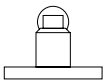
Type ML Circuit—Form Z	Electrical Rating/SPDT-DB		
	Silver Contacts		
1 N.O.—1 N.C.	Voltage	Make	Break
	120 AC	60 A	6 A
	240 AC	30 A	3 A
	10.0 Amperes, Continuous		
	DC Contact Rating: 5 A (Res), 28 Vdc		

Description / Functional Diagrams

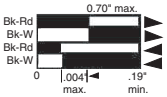
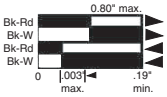
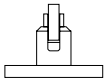
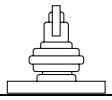
Top Plunger

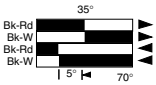
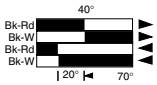
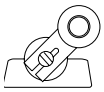
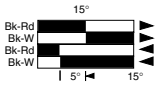
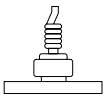
	MS	ML	MS	ML	MS	ML	MS	ML
			Top plunger 		Bushing mounted—top plunger		Adjustable top plunger 	
Operating Force/Torque			80 oz (0.6 N)					
Contact			SPDT					
Form			Form C	Form Z	Form C	Form Z	Form C	Form Z
Contact Type	Silver		**MS01S0100**	**ML01S0100**	**MS06S0100**	**ML06S0100**	**MS09S0100**	**ML09S0100**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

Parallel roller plunger

	MS	ML	MS	ML	MS	ML
			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
			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**	
			*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**	

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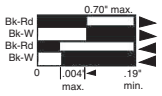
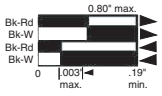
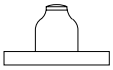
Description / Functional Diagram

Booted Devices							
MS	**ML**	**MS**	**ML**	**MS**	**ML**	**MS**	**ML**
		Booted top plunger 		Booted parallel roller plunger		Booted cross roller 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	**MS10S0100**	**ML10S0100**	**MS12S0100**	**ML12S0100**	**MS13S0100**	**ML13S0100**
	Gold	**MS10G0100**	—	**MS12G0100**	—	**MS13G0100**	—

Note: See the available options on page 154 and add the designator (up to three) to the end of the catalog number, if applicable. See the example on page 154 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).

Lever

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**	—

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**	—	**7JX4N**	—

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)				**S ∗**

∗ Add "S" to end of catalog number.

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

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Catalog Number Interpretation and Options

9007MS02 Shown with M12 Connector

For Interpretation of the Catalog Number Only

9007 M S 0 1 S 0 1 0 0

Mini Line M

Contact Form

S	
L	

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

Contact Type

S	10 A Silver Contacts (standard)
G	Gold Contacts

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)

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)

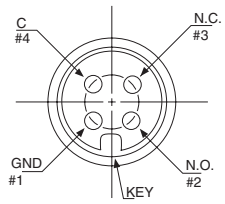
	Designator ■
#16 AWG SJTO cable	02
Side entrance, #18 AWG SJTO cable, or Connector 12, 54, 55, 82, 84 ∗	06
Gray #18 AWG SJTO cable	10
#18 AWG individual conductors	11
Male 4-pin mini-connector with 3 ft (0.9 m) cable (MS only)	12
Low force (NEMA Type 1 only)18 oz.	21
High Pre-Travel—adds 0.030	30
Male 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.

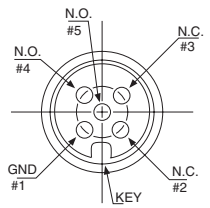
∗ For side entry connectors, include 06, then 12, 54, 55, 82, or 84; otherwise the connector will come from bottom of housing. Example of catalog no. with side entrance connector: 9007MS01S000654. No cable available with 54 and 55. Option 12 is supplied with 3 ft (0.9 m) of cable.

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

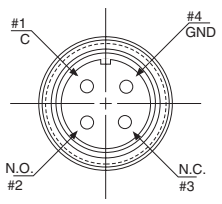
Male Plug (face) Pin-outs



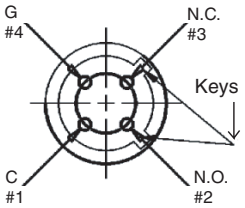
Option 54 (MS only)



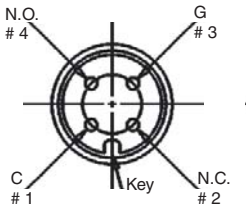
Option 55 (ML only)



Option 12 (MS only)



Option 82 (MS only)



Option 84 (MS only)

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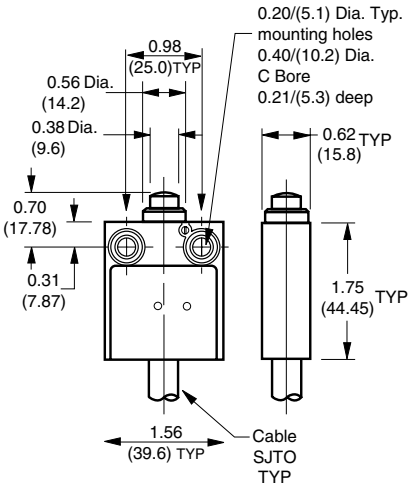
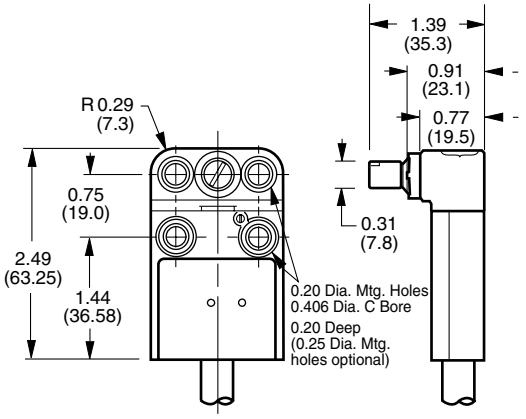
Dimensions

Top Push Plunger



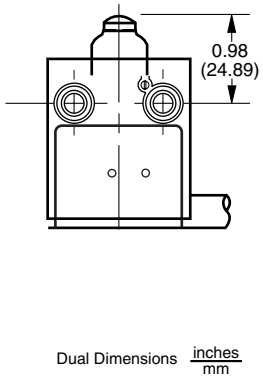
MS01, MLO1

Rotary Lever



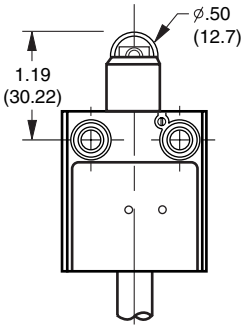
MSO4, ML04

Booted Top Push Plunger with Mid-Side Entry Cable



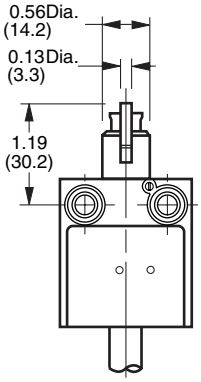
MS10, ML10

Parallel Roller Plunger



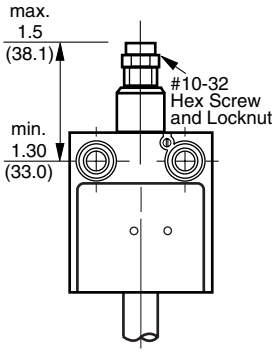
MS02, ML02

Cross Roller Plunger



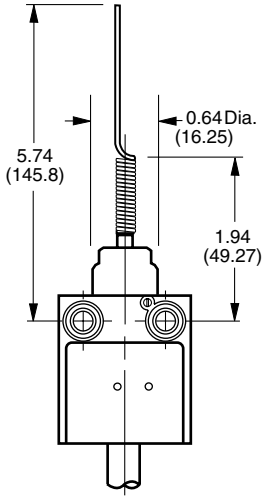
MS03, ML03

Adjustable Top Push Plunger



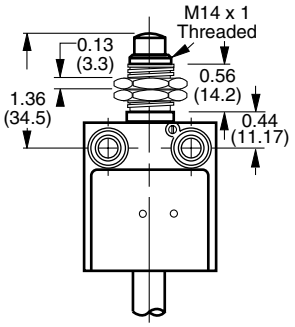
MS09, ML09

Omini-directional



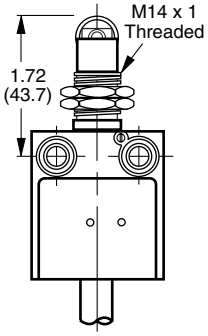
MS05, ML05

Bushing Mounted Top Push Plunger



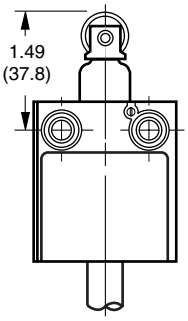
MS06, ML06

Bushing Mounted Parallel Roller Plunger



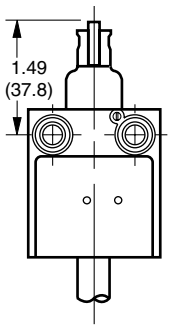
MS07, ML07

Parallel Booted Roller Plunger



MS12, ML12

Cross-Booted Roller Plunger



MS13, ML13

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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:

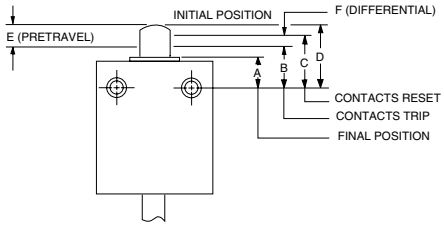
- Because reed switches are operated by a magnet, they should not be installed in areas where strong magnetic fields may be present. The devices should always be checked for proper operation after installation.
- Type XA **cannot be used in Division 2 locations** since the National Electrical Code (NEC) 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 N.O. Type	Straight Plunger N.C. Type	Roller Plunger N.O. Type	Roller Plunger N.C. Type	Cross Roller Plunger N.O. Type	Cross Roller Plunger 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 XA73**03**E with 15 ft (4.5 m) of cable would become an XA73**15**E.

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)



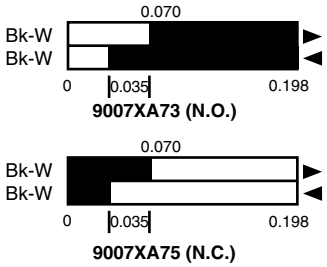
Contacts	The contact is a fully encapsulated, hermetically sealed reed, suitable for controlling solid-state loads as well as industrial relays. Switches can also be used as inputs to intrinsically safe systems. Use of a transient suppressor extends the life of the switch when used on heavy electrical 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.

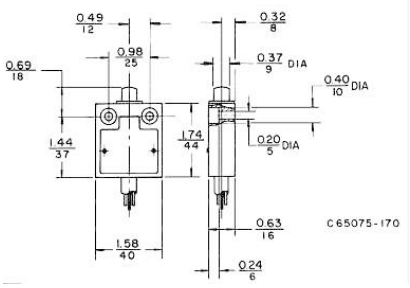
Maximum Current Ratings for Control Circuit Contacts—Type XA

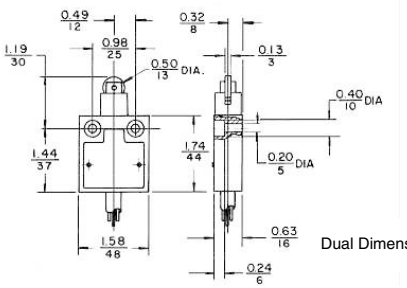
AC—50/60 Hz							DC		
Volts	Inductive (35% Power Factor) Make A	Make VA	Break A	Break VA	Continuous Carrying Amperes	Resistive (75% Power Factor) Make, Break, and Continuous Carrying Amperes	Volts	Resistive Make and Break Amperes Single Throw	Continuous Carrying Amperes
120	2.0	240	0.2	24	0.5	0.2	**120**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

Contact Diagrams



Dimensions





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

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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

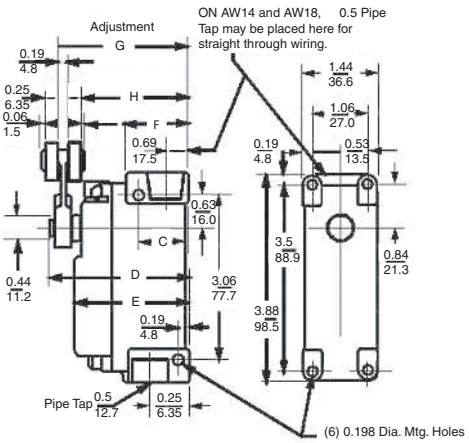
Select Switch		Select Operator: Lever Arm Type Without Lever Arm. Select from CCW Operation ■	Roller Plunger Type With Micrometer Adjustment	Push Rod Plunger Type With Micrometer Adjustment
Mounting	**Contacts**	**Type**	**Type**	**Type**
Surface Mounting Plug-in	1 N.O.—1 N.C.	AW16	AW36	AW46
	2 N.O.	‡	—	—
	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)

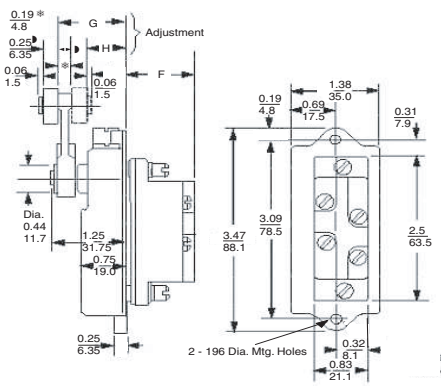
■ Field convertible to CW operation.
‡ 2 N.O. contact only when Type AW19 is operated in clockwise direction. 2 N.C. contacts only when Type AW19 is operated in counterclockwise direction.
Lever arms, see page 186.

Approximate Dimensions

Type AW

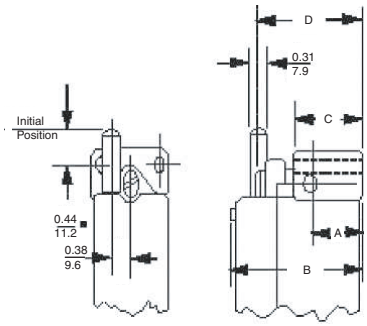


Type AO

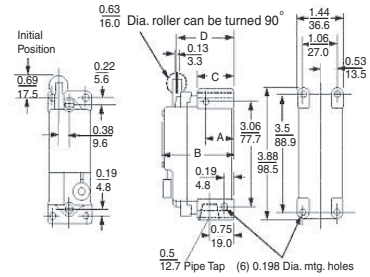


Type	C	D	E	F	G	H
AW12	0.31 (7.9)	2.69 (68.3)	2.19 (56)	1.16 (29.4)	2.5–2.56 (63.5–65)	2.06–2.13 (52.3–54)
AW14 AW16 AW18 AW19	1.25 (32)	3 (76)	2.5 (63.5)	1.47 (37)	2.81–2.88 (71–73)	2.38–2.44 (60–62)
AO12	—	—	—	1.03 (26	1.06–1.13 (27–29)	0.63–0.69 (16–17.5)
AO18	—	—	—	1.13 (29)	1.06–1.13 (27–29)	0.63–0.69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

Type AW42, 46, 48, and 49



Type AW32, 36, and 38



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)

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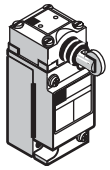
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard and Compact

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 head for linear movement

side plunger



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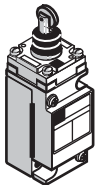
top plunger



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With reed contacts

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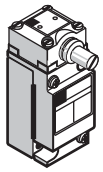
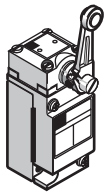
With head for rotary movement (lever)





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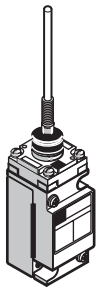
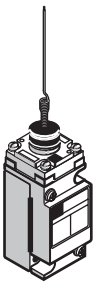
With head for multi-directional movement





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With reed contacts

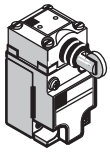
Page 166

Page 167

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

With head for linear movement

Side plunger



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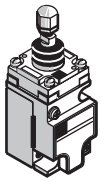
Top plunger



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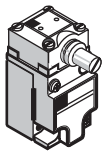
With head for rotary movement (lever)



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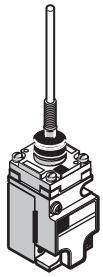
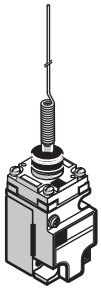
With head for multi-directional movement





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1. Factory modifications: see pages 172 to 176

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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 zink, steel, stainless steel, Delrin® resin.

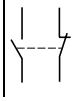
1. A wide range lof connectors are available. Contact your local field office.

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 **X**		Single break	**A**		–	**3**		– Double break
B **Y**		Single break	**B**		–	**2**		– Double break
C		–	**C**		–	**1**		Single break
Za		Same polarity	**Z**		"Same polarity" only			Double break
Zb		Electrically separate						

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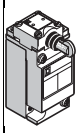
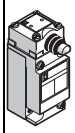
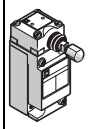
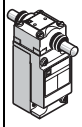
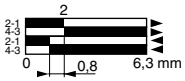
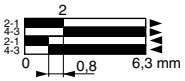
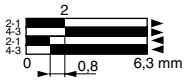
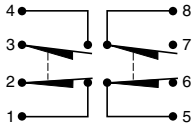
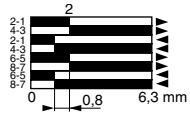
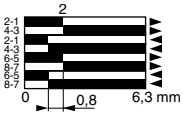
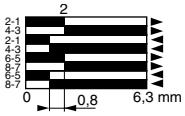
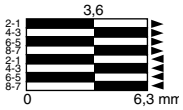
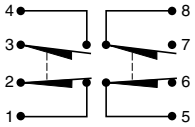
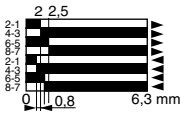
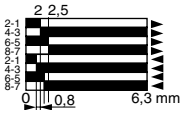
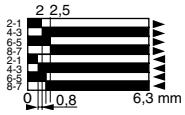
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body

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. 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	■ contact closed □ contact open			

Characteristics (nominal operating data)

Switch actuation		On end	
Type of actuation			
Pre-travel		2 mm (0.08")	3.6 mm (0.14")
Pre-travel two Stage	First stage	2 mm (0.08")	
	First stage to second stage	0.5 mm (0.02")	
Total travel		6.3 mm (0.25")	
Differential		0.8 mm (0.03")	
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")	–
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 178 to 181

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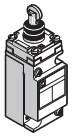
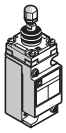
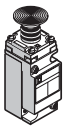
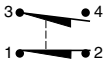
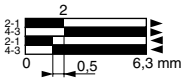
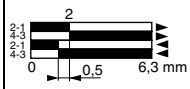
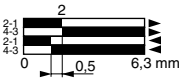
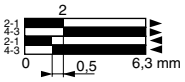
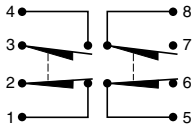
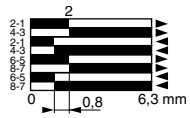
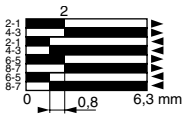
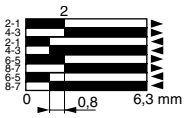
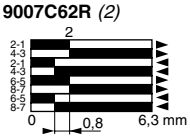
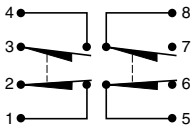
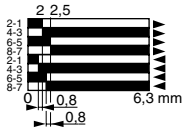
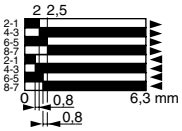
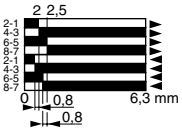
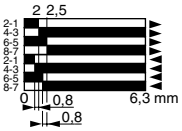
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body

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")	
Pre-travel two Stage	First stage	2 mm (0.08")	
	First stage to second stage	0.3 mm (0.01")	
Total travel		6.3 mm (0.25")	
Differential		0.5 mm (0.02")	
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")	
Cable entry		1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry	

1. To lock the nut in the desired position, crimp the slot near the bottom of the nut.
2. Does not include mushroom button. Must be ordered separately see page 185.

Dimensions:
pages 178 to 181

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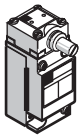
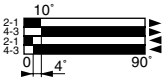
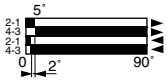
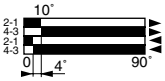
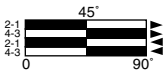
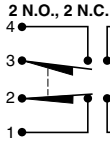
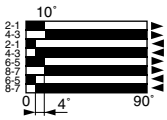
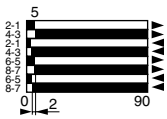
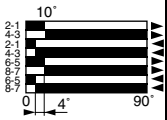
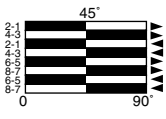
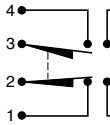
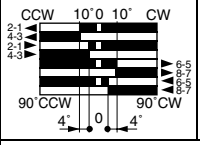
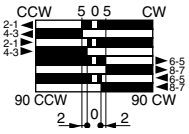
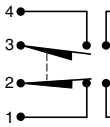
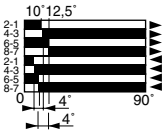
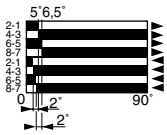
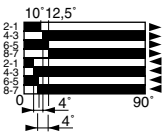
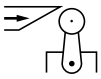
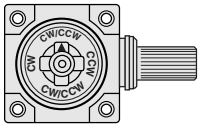
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body

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: Standard pre-travel, spring return	Neutral position: Low differential, spring return	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")	0.03 mm (± 0.001")	0.05 mm (± 0.002")	0.05 mm (± 0.002")	0.05 mm (± 0.002")	0.05 mm (± 0.002")
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 186 to 191.
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 178 to 181

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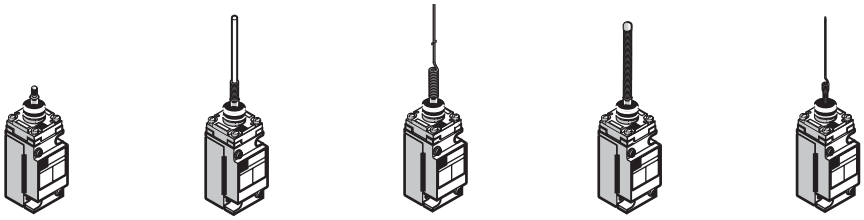
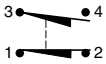
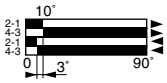
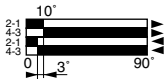
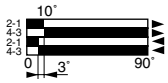
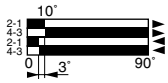
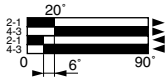
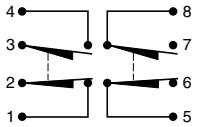
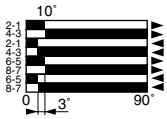
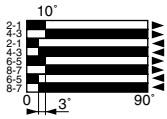
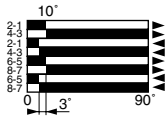
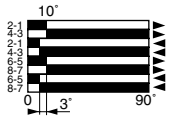
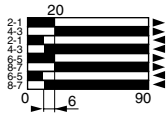
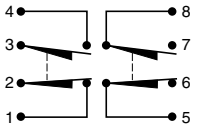
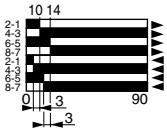
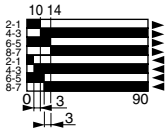
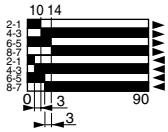
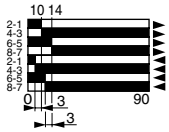
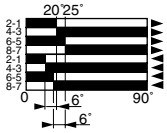
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body

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 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 185.

Dimensions:
pages 178 to 181

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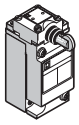
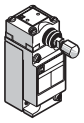
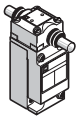
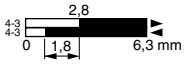
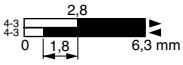
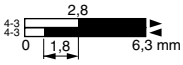
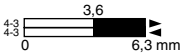
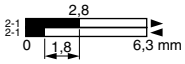
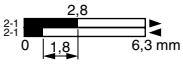
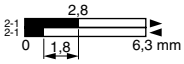
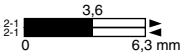
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body—Reed Contacts

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	contact closed contact open			
Characteristics (nominal operating data)				
Switch actuation	On end			
Type of actuation				
Pre-travel	2.8 mm (0.110")			3.6 mm (0.14")
Total travel	6.3 mm (0.25")			
Differential	1.8 mm (0.07")			–
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")		–	
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 178 to 181

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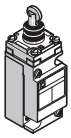
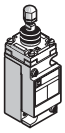
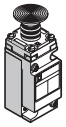
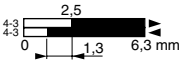
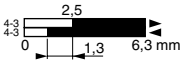
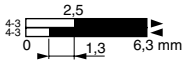
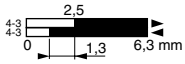
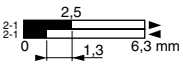
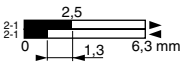
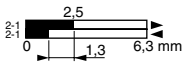
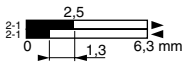
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body—Reed Contacts

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")			
Total travel	6.3 mm (0.25")			
Differential	1.3 mm (0.05")			
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")			
Cable entry	1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry			

1. To lock the nut in the desired position, crimp the slot near the bottom of the nut.
2. Does not include mushroom button. Must be ordered separately from page 185.

Dimensions:
pages 178 to 181

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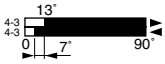
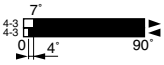
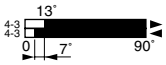
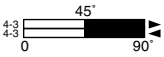
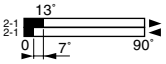
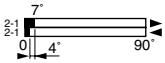
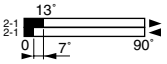
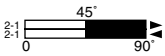
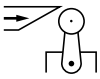
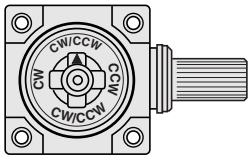
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body—Reed Contacts

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 3 4	**9007C84B2** 	**9007C84A2** 	**9007C84N2** 	**9007C84C** 
1 N.C. Reed contacts snap action 1 2	**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	contact closed contact open			
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")	0.076 mm (± 0.003")	0.15 mm (± 0.006")	0.15 mm (± 0.006")
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 186 to 191.
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 178 to 181

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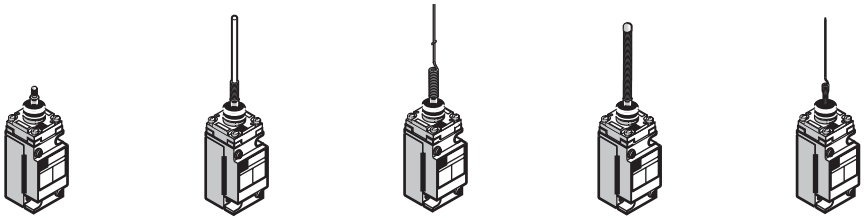
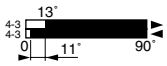
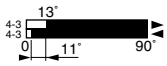
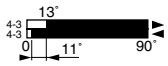
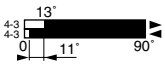
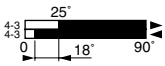
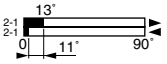
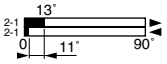
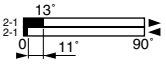
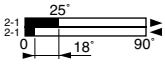
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Standard Body—Reed Contacts

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 3 ● ● 4	**9007C84JKC** 	**9007C84J** 	**9007C84K** 	**9007C84KC** 	**9007C84L** 
1 N.C. Reed contacts snap action 1 ● ● 2	**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 185.
Acceptable wire sizes: 12-22 AWG Recommended,
Terminal clamp torque: 7 lb-in (0.80 N•m).

Dimensions:
pages 178 to 181

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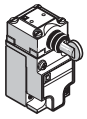
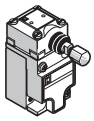
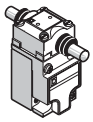
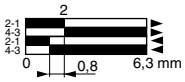
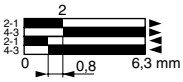
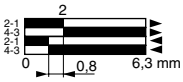
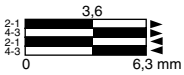
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Compact Body

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	contact closed contact open			
Characteristics (nominal operating data)				
Switch actuation	On end			
Type of actuation				
Pre-travel	2 mm (0.08")			3.6 mm (0.14")
Pre-travel two Stage – First stage	2 mm (0.08")			–
Pre-travel two Stage – First stage to second stage	0.5 mm (0.02")			–
Total travel	6.3 mm (0.25")			6.3 mm (0.25")
Differential	0.8 mm (0.03")			–
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")			–
Cable entry	1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry. Prewired options available.			

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 178 to 181

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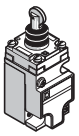
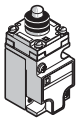
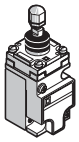
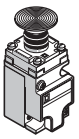
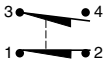
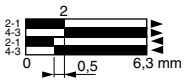
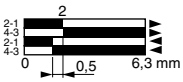
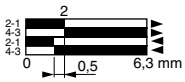
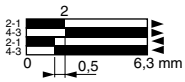
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Compact Body

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")			
Pre-travel two Stage First stage	2 mm (0.08")			
Pre-travel two Stage First stage to second stage	0.03 mm (0.01")			
Total travel	6.3 mm (0.25")			
Differential	0.5 mm (0.02")			
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")			
Cable entry	1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry. Prewired options available.			

1. To lock the nut in the desired position, crimp the slot near the bottom of the nut.
2. Does not include mushroom button. Must be ordered separately see page 185.

Dimensions:
pages 178 to 181

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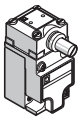
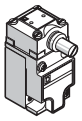
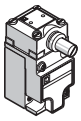
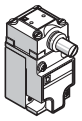
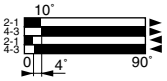
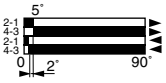
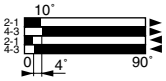
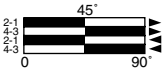
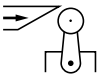
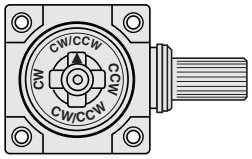
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Compact Body

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	■ contact closed □ contact open			
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 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")	0.03 mm (± 0.001")	0.05 mm (± 0.002")	0.05 mm (± 0.002")
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 186 to 191.
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, 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 178 to 181

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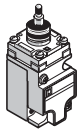
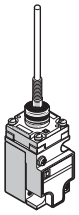
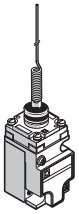
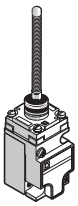
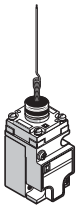
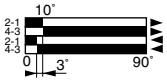
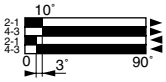
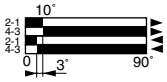
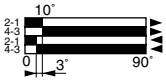
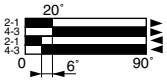
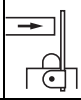
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Compact Body

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	contact closed contact open				

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 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 185.

Dimensions:
pages 178 to 181

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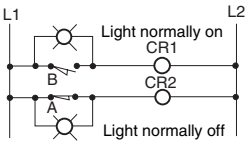
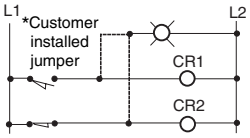
S9

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 (not shown in this catalog)	**S9**	0.018 (0.04)
Hub only: can be field installed on rotary shaft, see accessories page 177		

Addition of LED pilot light *(1)*

Description		Suffix to add to the device catalog number	Weight kg (lb)
LED Pilot light, 24 to 120 V AC or DC on plug-in type switch (9007C52, C54, C62, C66, C68 or *(2)*)	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)

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		
Side plunger	**9007C54FP6**	0.57 (1.25)
Top plunger	**9007C54DP6**	0.57 (1.25)
	9007C54EP6	0.57 (1.25)
Rotary	**9007C54B2P6**	0.57 (1.25)
Wobble stick	**9007C54LP6**	0.57 (1.25)
	9007C54JP6	0.57 (1.25)
Two poles		
Side plunger	**9007C62FP6**	0.57 (1.25)
Top plunger	**9007C62DP6**	0.57 (1.25)
	9007C62EP6	0.57 (1.25)
Rotary	**9007C62B2P6**	0.57 (1.25)
Wobble stick	**9007C62LP6**	0.57 (1.25)
	9007C62JP6	0.57 (1.25)

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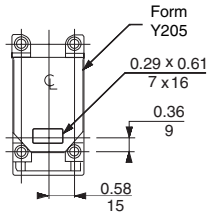

Y2051

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)

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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)*

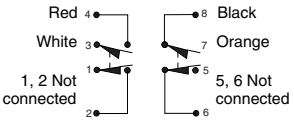
Description	For use	Suffix to add to the device catalog number	Weight kg (lb)
Plug-in limit switch furnished with pre-wired mini 5-pin Brad Harrison male connector			
Single pole	For use with Brad Harrison female portable plug No.41306, 41307 or 41308 (or equal).	**Y1901**	0.60 (1.33)
	Same as Y1901 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 177
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

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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 Y1841but 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)

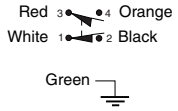
1. Not for 9007CR Hazardous location devices
2. Wire entry completely sealed with epoxy resin.

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

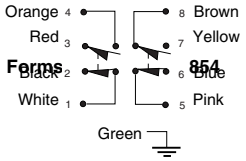
Description		Suffix to add to the device catalog number	Weight kg (lb)
Lever type limit switch furnished with a boot around the shaft	On all 9007C and 9007CR lever type switches	**Y33**	0.01 (0.01)
Dust boot only	see accessories, page 177		

Wiring Diagrams

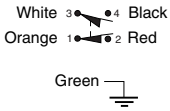
Forms Y1851 and Y1853



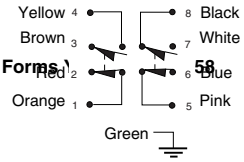
Forms 854



Forms Y1855 and Y1857



Forms 58



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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") 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") 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			
	Make		Break		Continuous carrying		Make or break		Continuous carrying
Volts	A	VA	A	VA	A	Volts	A	VA	A
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)

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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" (9.53 mm) to 0.749" (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 to allow 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" (12.7 mm) NPT on one end, female 0.787" (20 mm) on other end	**9007CT12**	0.01 (0.20)

(1) Dimensions: 0.22" (5.6 mm) x 2.94" (75 mm) x 1.54" (39 mm)
(2) Dimensions: 0.22" (5.6 mm) x 2.07" (53 mm) x 1.54" (39 mm)

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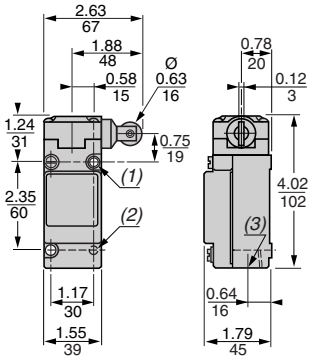
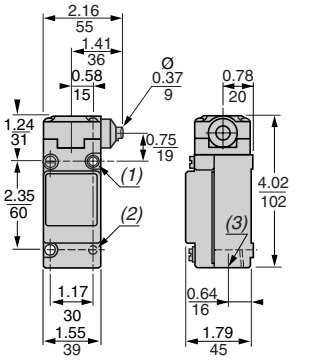
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Dimensions—Standard Body

Side Plunger

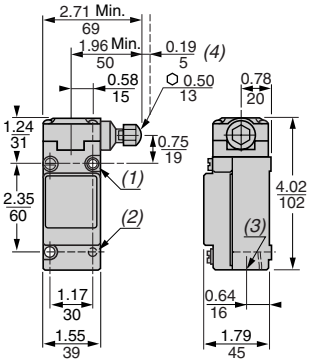
9007C••F



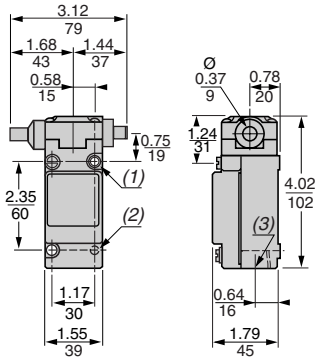
9007C••G



9007C••GD



9007C••H

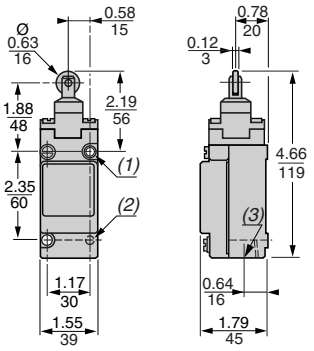


Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

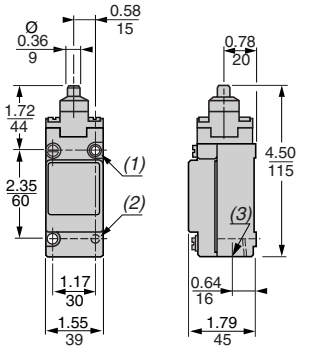
1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.
4. Adjustable.

Top Plunger

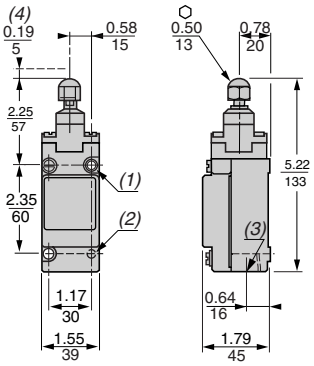
9007C••D



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.

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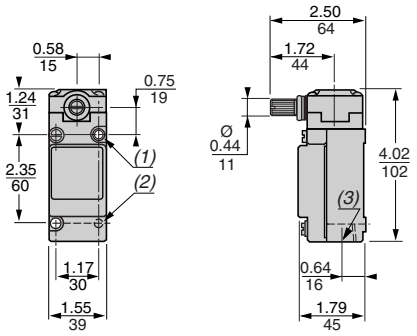
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Dimensions—Standard Body

Rotary

9007C•••• A, B, C, N, T5, T10



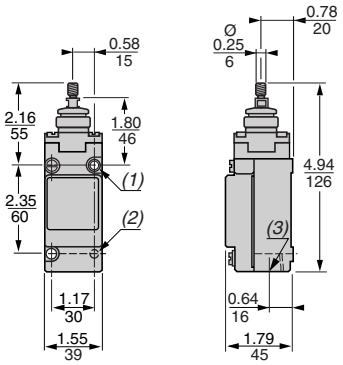
Dual dimensions: in. / mm

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

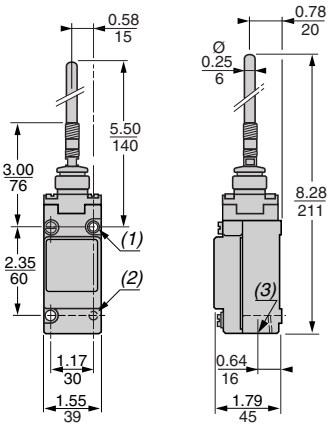
(3) 1/2 14 NPT.

Wobble stick

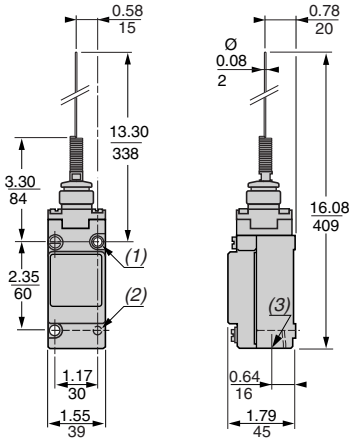
9007C••JKC



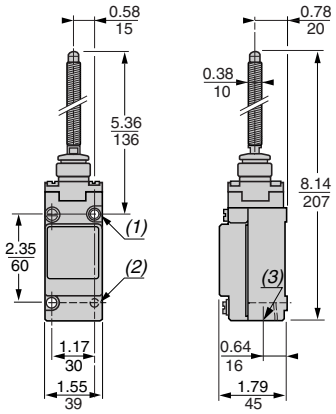
9007C••J



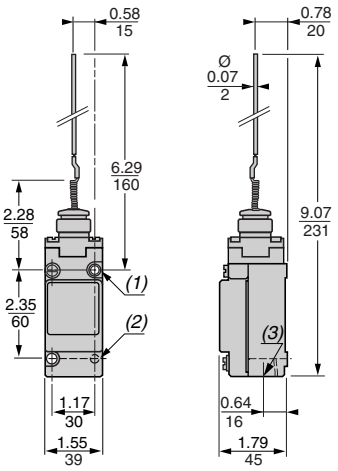
9007C••K



9007C••KC



9007C••L



Dual dimensions: in. / 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.

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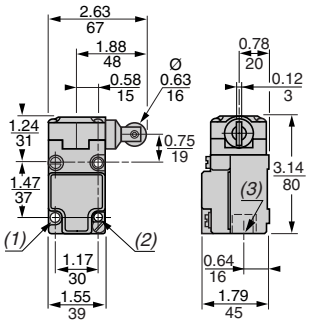
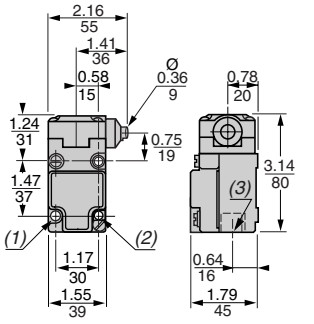
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Dimensions—Compact Body

Side Plunger

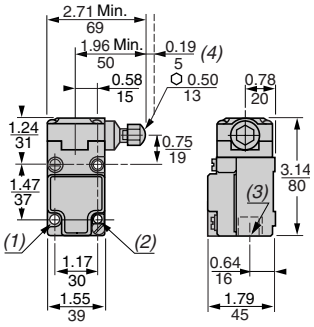
9007C52F



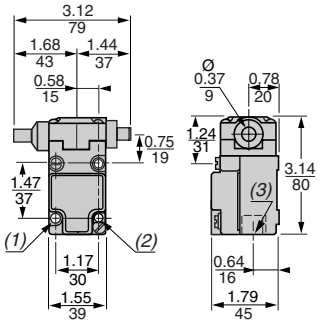
9007C52G



9007C52GD



9007C52H

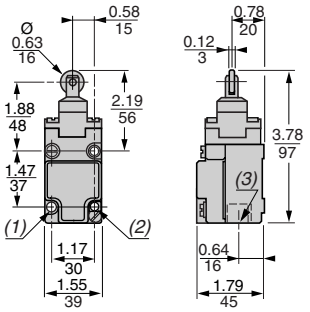


Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

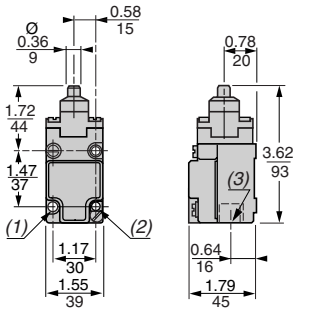
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.
4. Adjustable.

Top Plunger

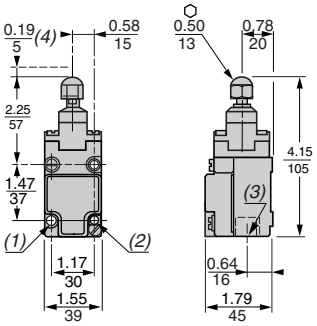
9007C52D



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.

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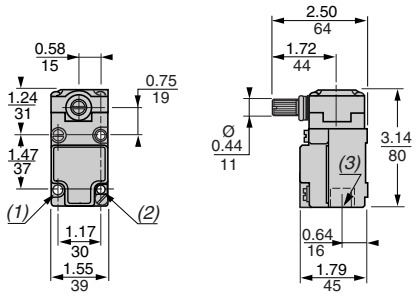
Rotary

9007C52•• A, B, C, N, T5, T10



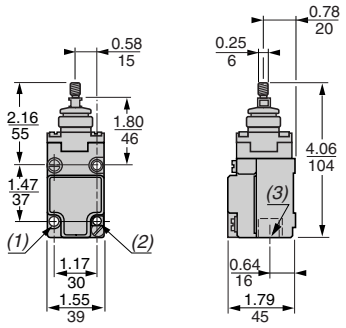
Dual dimensions: in. / mm

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

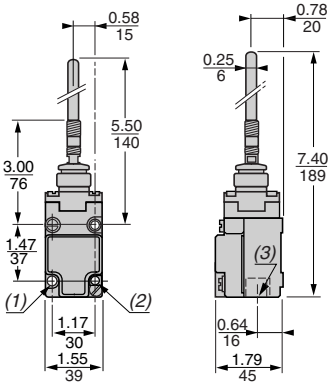
(4) 1/2 14 NPT.

Wobble stick

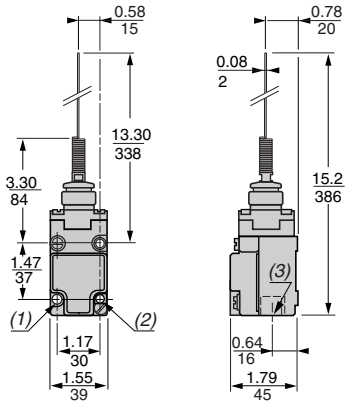
9007C52JKC



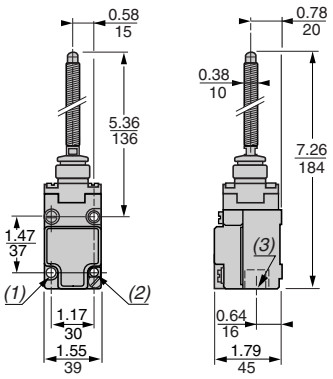
9007C52J



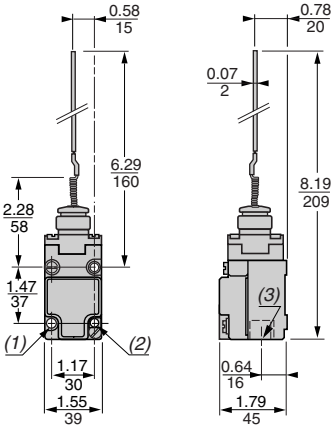
9007C52K



9007C52KC



9007C52L



Dual dimensions: in. / 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.

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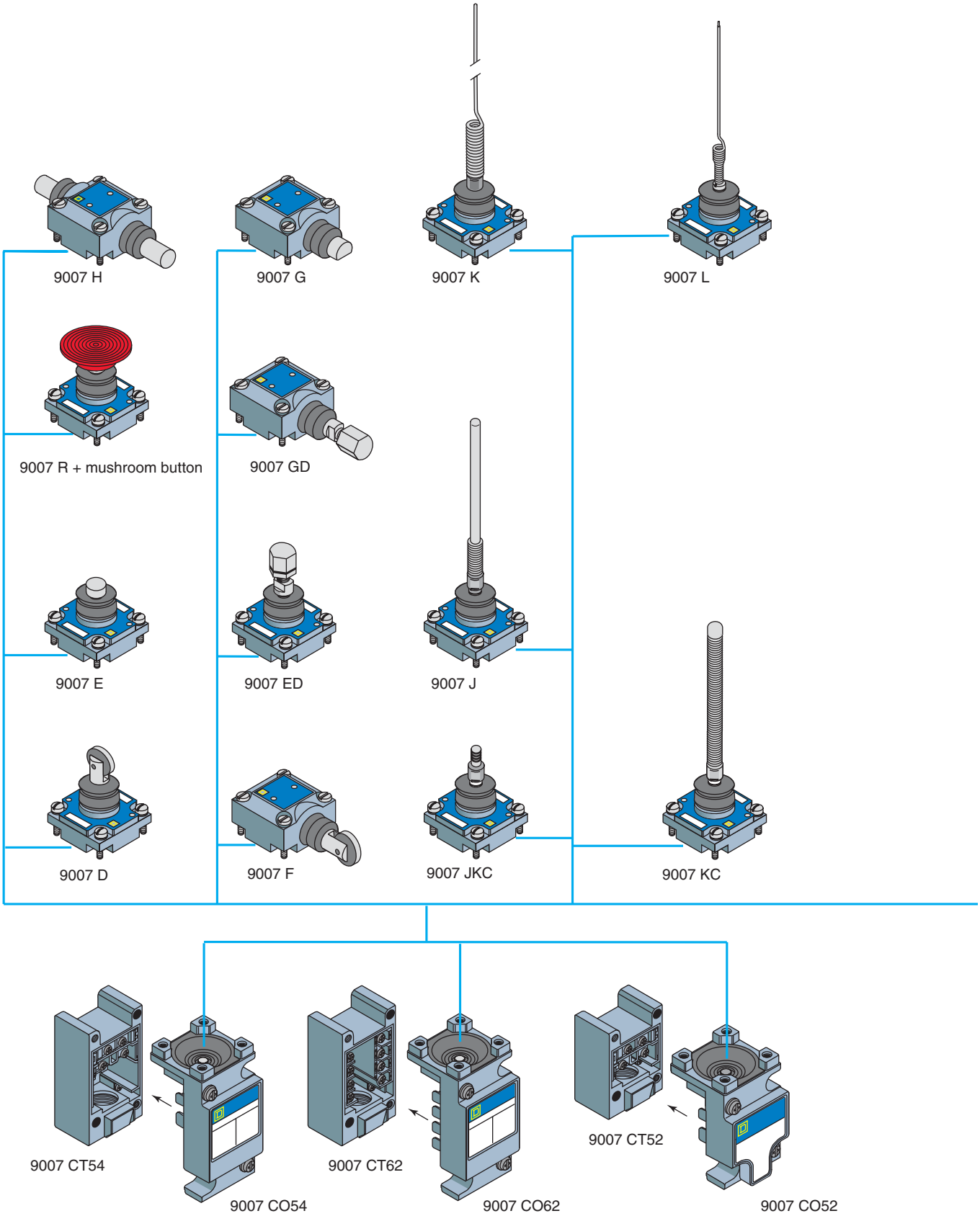
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Adaptable Sub-Assemblies



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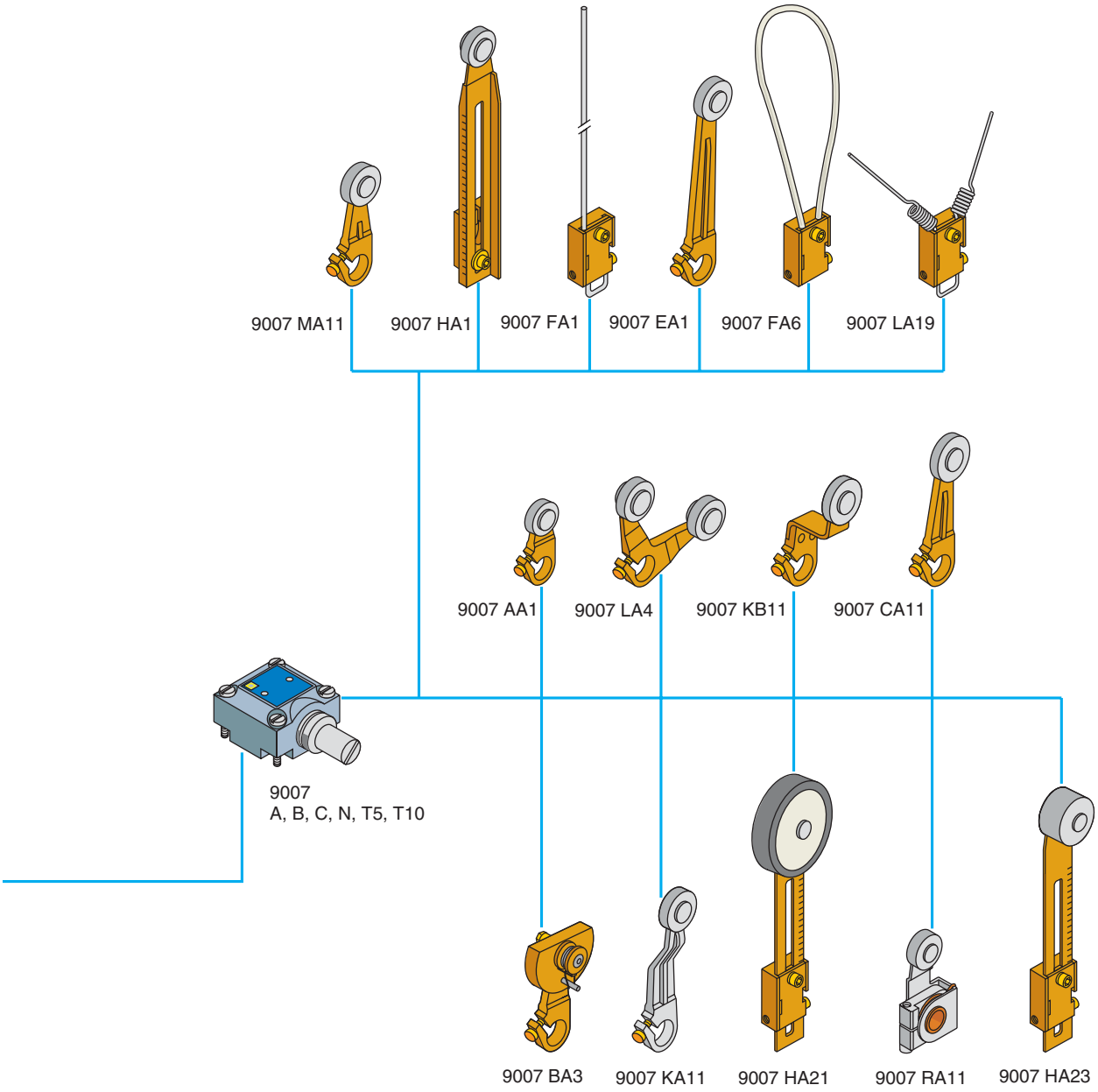
9007C Heavy Duty Industrial—Plug-in Body, Metal

Adaptable Sub-Assemblies



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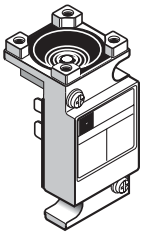
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Adaptable Sub-Assemblies

DF563880



9007CO54

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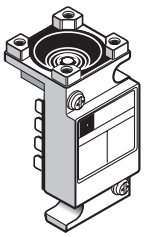
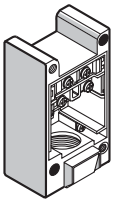


9007CO62

DF563882



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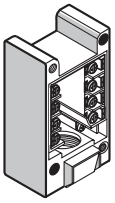

9007CT62

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	3 4 / 1 2	**9007CO54**	0.19 (0.42)
	Two pole	4 3 2 1 / 8 7 6 5	**9007CO62**	0.20 (0.44)
	Two stage	4 3 2 1 / 8 7 6 5	**9007CO66**	0.23 (0.50)
	Neutral position	4 3 2 1 / 8 7 6 5	**9007CO68**	0.20 (0.45)
For compact plug-in body type	Single pole	3 4 / 1 2	**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	3 4 / 1 2	**9007CT54**	0.22 (0.48)
	Two pole	4 3 2 1 / 8 7 6 5	**9007CT62**	0.22 (0.48)
	Neutral position	4 3 2 1 / 8 7 6 5	**9007CT62**	0.22 (0.48)
	Two stage	4 3 2 1 / 8 7 6 5	**9007CT62**	0.22 (0.48)
	Reed switches, either N/O or N/C *(2)*	3 4 / 1 2	**9007CT54**	0.22 (0.48)
For compact plug-in body type	Single pole	3 4 / 1 2	**9007CT52**	0.15 (0.34)

1. Acceptable wire sizes: 12-22 AWG (2.05 mm^2-0.644mm^2). 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 192

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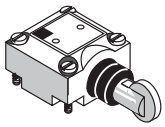
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Adaptable Sub-Assemblies

DF563884

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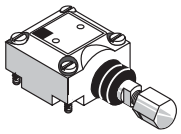
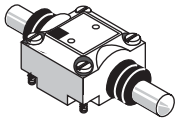

9007GD

DF564138

9007H

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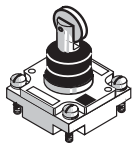
9007D

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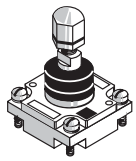
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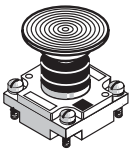
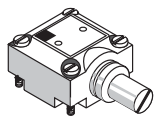
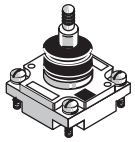

9007R + mushroom button

DF563889

9007C

DF564139

9007JKC

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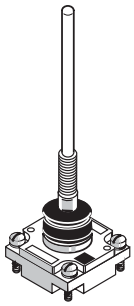
9007J

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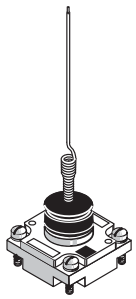
9007L

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 Mushroom button see Accessories (below)	**9007R**	0.13 (0.28)

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 Standard pre-travel spring return	CW & CCW	**9007T10**	0.16 (0.36)
Neutral position Low differential spring return	CW & CCW	**9007T5**	0.16 (0.36)
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)

1. Field convertible to horizontal.
2. Acceptable wire sizes: 12-22 AWG (2.05 mm^2-0.644mm^2).
   Recommended terminal clamp torque: 7 lb-in (0.80 N•m).

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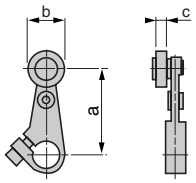
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Lever Arms for Rotary Heads

DF563135



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

DF563899

9007AA1

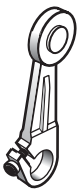
DF563900

9007MA11

DF531684

9007EA1

DF531698



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)	0.25 (6.3)	**9007BA8**	0.05 (0.10)
		0.63 (16)	**9007BA17**	0.05 (0.11)
	1 (25.4)	0.25 (6.3)	**9007BA4**	0.03 (0.06)
		0.63 (16)	**9007BA13**	0.05 (0.10)
1.5 (38)	0.75 (19)	0.25 (6.3)	**9007MA18**	0.03 (0.06)
	0.63 (16)	0.25 (6.3)	**9007MA8**	0.05 (0.10)
		0.63 (16)	**9007MA17**	0.05 (0.10)
	1 (25.4)	0.25 (6.3)	**9007MA4**	0.05 (0.10)
		0.63 (16)	**9007MA13**	0.05 (0.12)
2 (51)	0.75 (19)	0.25 (6.3)	**9007CA18**	0.05 (0.10)
	0.63 (16)	0.25 (6.3)	**9007CA8**	0.03 (0.06)
		0.63 (16)	**9007CA17**	0.03 (0.07)
	1 (25.4)	0.25 (6.3)	**9007CA4**	0.05 (0.12)
		0.63 (16)	**9007CA13**	0.06 (0.14)
2.5 (63.5)	0.75 (19)	0.25 (6.3)	**9007DA18**	0.03 (0.07)
	0.63 (16)	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)	0.25 (6.3)	**9007EA8**	0.06 (0.14)
		0.63 (16)	**9007EA17**	0.07 (0.16)
	1 (25.4)	0.25 (6.3)	**9007EA4**	0.07 (0.15)
		0.63 (16)	**9007EA13**	0.08 (0.17)

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

Dimensions:
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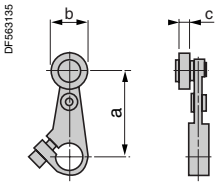

a: Length of lever Arm
b: Roller diameter
c: Roller width

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)
	0.63 (16)	0.63 (16)	**9007BA6**	0.04 (0.09)
1.5 (38)	0.75 (19)	0.25 (6.3)	**9007MA15**	0.04 (0.09)
	0.63 (16)	0.25 (6.3)	**9007MA5**	0.04 (0.09)
	0.63 (16)	0.63 (16)	**9007MA6**	0.04 (0.09)
2 (51)	0.75 (19)	0.25 (6.3)	**9007CA15**	0.04 (0.09)
	0.63 (16)	0.25 (6.3)	**9007CA5**	0.04 (0.09)
	0.63 (16)	0.63 (16)	**9007CA6**	0.04 (0.09)
2.5 (63.5)	0.75 (19)	0.25 (6.3)	**9007DA15**	0.04 (0.09)
	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)
	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)

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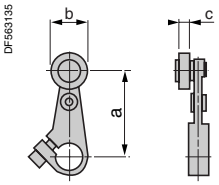
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Lever Arms for Rotary Heads



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

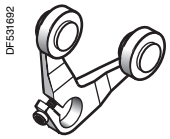
Flat steel lever arms with standard roller *(1)*

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)



9007LA4

Dimensions:
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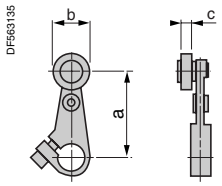
Lever Arms for Rotary Heads

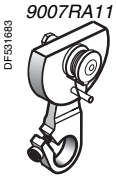


a: Length of lever Arm
b: Roller diameter
c: Roller width

One-way lever arm

Arm	Steel roller		Catalog number	Weight
Length *(a)* in. (mm)	Diameter *(b)* in. (mm)	Width *(c)* in. (mm)		kg (lb)
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)

9007RA11



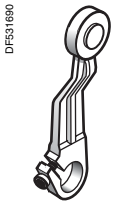
9007BA3

One-way cast zinc roller lever arm

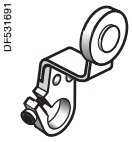
Arm	Roller		Catalog number	Weight
Length*(a)* in. (mm)	Diameter*(b)* in. (mm)	Width*(c)* in. (mm)		kg (lb)
Cast arm with steel roller				
1.38 (35)	1.25 (32)	0.25 (6.3)	**9007BA3**	0.07 (0.15)
1.5 (38)	1.25 (32)	0.25 (6.3)	**9007MA3**	0.10 (0.23)
2 (51)	1.25 (32)	0.25 (6.3)	**9007CA3**	0.12 (0.27)
2.5 (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
Length in. (mm)	Offset	Diameter in. (mm)	Width in. (mm)		kg (lb)
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)



9007KA11



9007KB11

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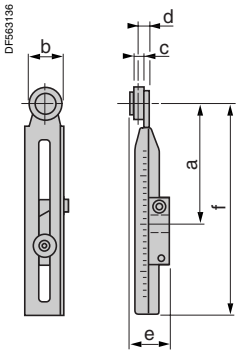
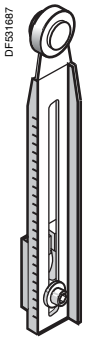
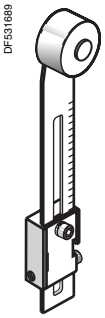
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Lever Arms for Rotary Heads



a: Length of lever Arm
b: Roller diameter
c: Roller width
d, e, f: see page 193

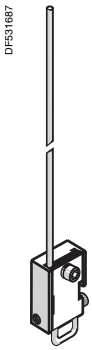


9007HA1

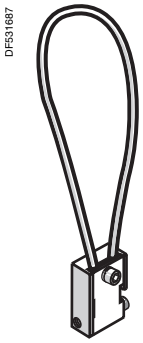


9007HA23

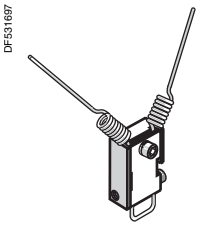
9007HA21



9007FA1



9007FA6



9007LA19

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**	**Catalog number**	**Weight kg (lb)**
	in. (mm)		
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:
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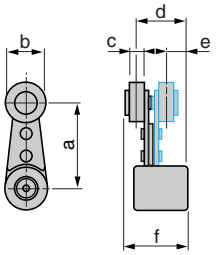

a: Length of lever Arm
b: Roller diameter
c: Roller width
d, e: see page 193

360° angular adjustable lever arm

360° angular adjustable lever arm		Roller		Catalog number	Weight
Length *(a)* **in. (mm)**	**Roller** *(1)* **position**	**Diameter** *(b)* **in. (mm)**	**Width** *(c)* **in. (mm)**		**kg (lb)**
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)
	Roller outside	0.75 (19)	0.25 (6.3)	**9007AA11M**	0.09 (0.20)
1.38 (35)	**Roller outside**	0.63 (16)	0.25 (6.3)	**9007BA1M**	0.09 (0.22)
	Roller inside	0.63 (16)	0.25 (6.3)	**9007BA5M**	0.10 (0.22)
	Roller outside	0.75 (19)	0.25 (6.3)	**9007BA11M**	0.10 (0.22)
1.5 (38)	**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)
	Roller outside	0.75 (19)	0.25 (6.3)	**9007MA11M**	0.11 (0.24)
2 (51)	**Roller outside**	0.63 (16)	0.25 (6.3)	**9007CA1M**	0.11 (0.24)
	Roller inside	0.63 (16)	0.25 (6.3)	**9007CA5M**	0.11 (0.24)
	Roller outside	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)
	Roller outside	0.75 (19)	0.25 (6.3)	**9007DA11M**	0.12 (0.27)
3 (76)	**Roller outside**	0.63 (16)	0.25 (6.3)	**9007EA1M**	0.12 (0.27)
	Roller inside	0.63 (16)	0.25 (6.3)	**9007EA5M**	0.12 (0.27)
	Roller outside	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.

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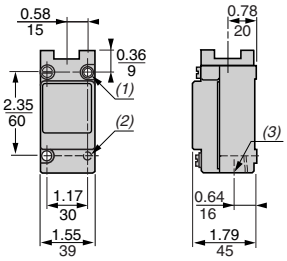
Limit Switches
9007C Heavy Duty Industrial—Plug-in Body, Metal
Bodies and Heads, Dimensions

Body

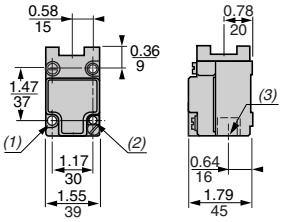
Standard



Dual dimensions: in. / 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.

Compact

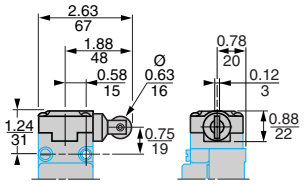


Dual dimensions: in. / mm

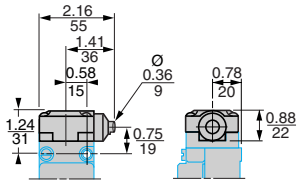
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.

Side plunger heads

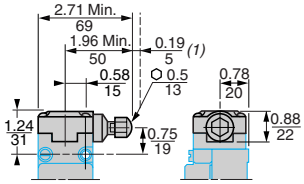
9007F



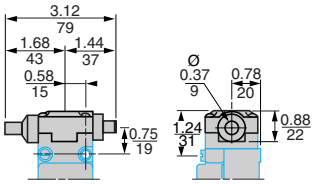
9007G



9007GD

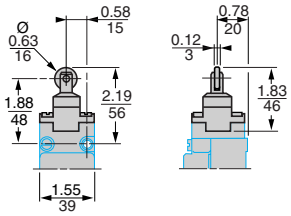


9007H

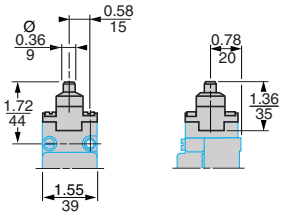


Top plunger heads

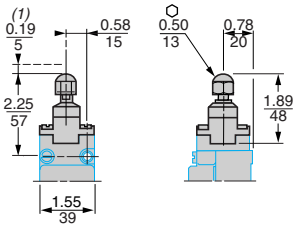
9007D



9007E



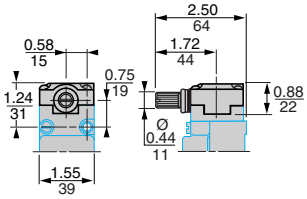
9007ED



1. Adjustable

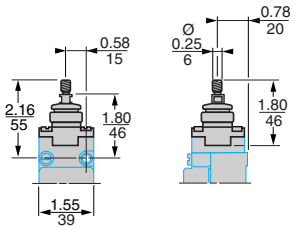
Rotary heads

9007C

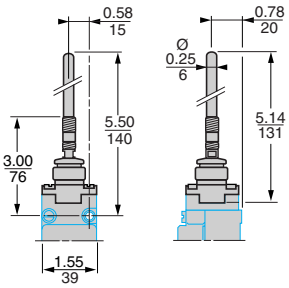


Multi-directional heads

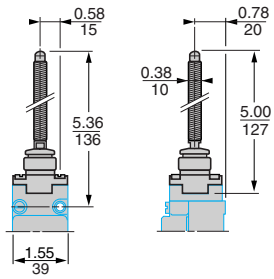
9007JKC



9007J

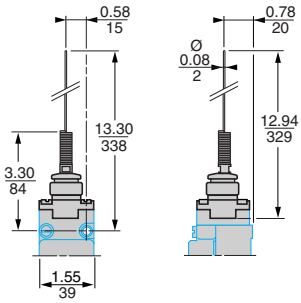


9007KC

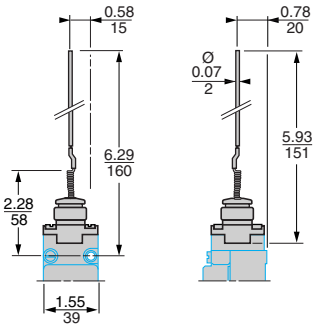


Multi-directional heads (continued)

9007K



9007L



Catalog numbers:
pages 184 and 185

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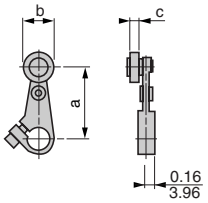
Lever arms

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

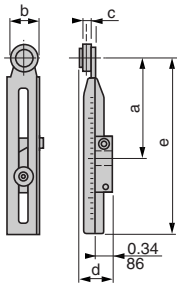


a: Length of lever Arm
b: Roller diameter
c: Roller width

a, b, c: pages 186 to 189

Adjustable length lever arms

9007HA• and 9007HA•••

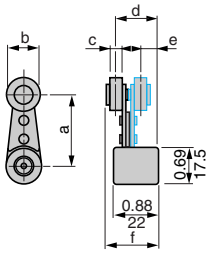


a: Length of lever Arm
b: Roller diameter
c: Roller width
d = 0.38/10
e= 4.38/111

a, b, c: page 190

360° angular adjustable lever arms

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

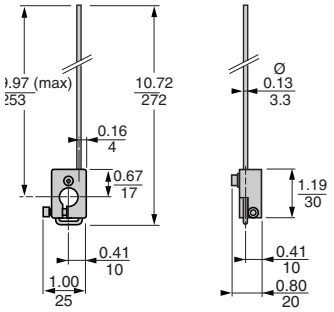


a: Length of lever Arm
b: Roller diameter
c: Roller width
d = 0.84/21
e = 0.38/10
f = 1.05/27

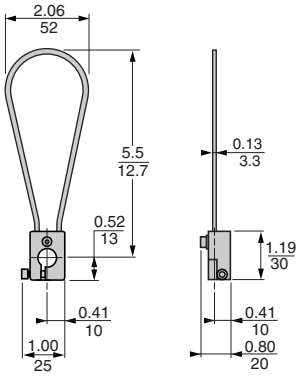
a, b, c: page 191

Rod type lever arms

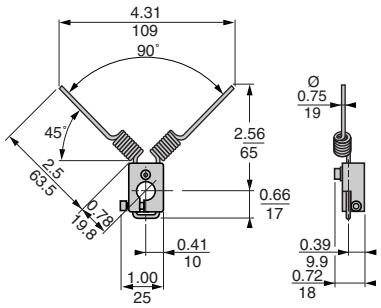
9007FA1



9007FA6



9007LA19



Catalog numbers:
pages 186 to 191

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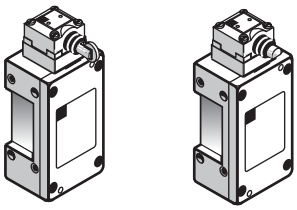
Hazardous Non-Plug-in Body Type *(1)*

With head for linear movement

side plunger



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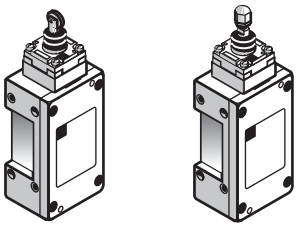
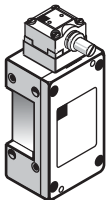
top plunger



Page 197

With head for rotary movement (lever)



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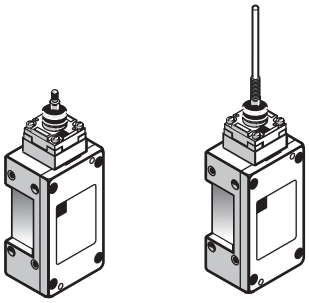
With head for multi-directional movement



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1. Factory modifications: see pages 172 to 176.

■ 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 ⩽10^5 ohms/cm) F. Carbonaceous Dusts (Resistivity >10^2 ohm/cm but < 108ohm/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

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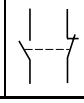
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location

Environment 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 alluminum, 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 **X**		Single break	**A**		–	**3**		– Double break
B **Y**		Single break	**B**		–	**2**		– Double break
C		–	**C**		–	**1**		Single break
Za		Same polarity	**Z**		"Same polarity" only			Double break
Zb		Electrically separate						

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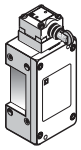
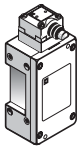
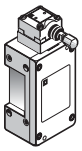
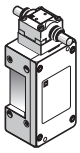
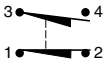
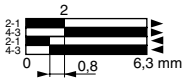
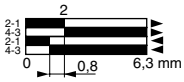
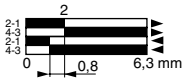
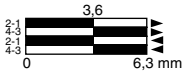
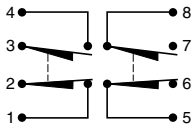
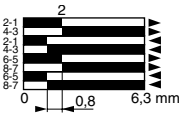
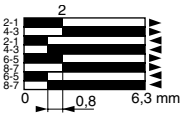
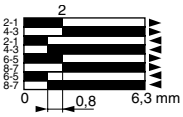
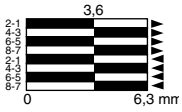
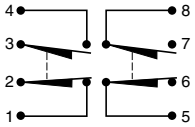
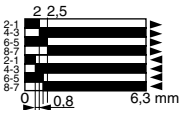
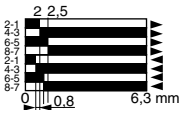
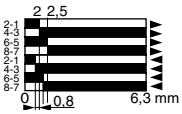
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location

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	*contact closed* *contact open*			

Characteristics (nominal operating data)

Switch actuation	On end		
Type of actuation			
Pre-travel	2 mm (0.08")		3.6 mm (0.14")
Pre-travel two Stage First stage	2 mm (0.08")		
First stage to second stage	0.5 mm (0.02")		
Total travel	6.3 mm (0.25")		
Differential	0.8 mm (0.03")		
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")		–
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 200 and 201

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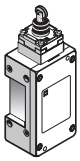
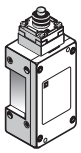
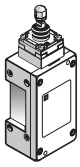
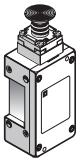
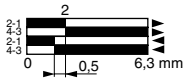
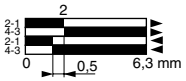
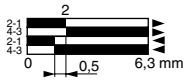
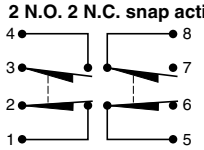
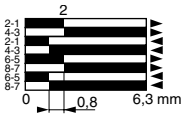
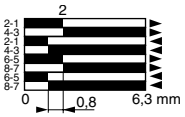
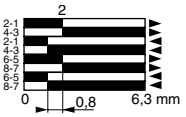
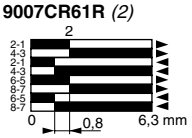
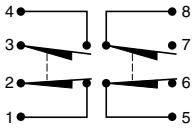
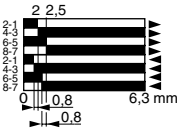
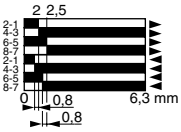
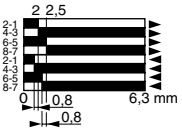
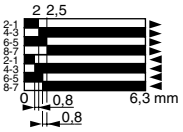
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location

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")		
Pre-travel two Stage First stage	2 mm (0.08")		
First stage to second stage	0.3 mm (0.01")		
Total travel	6.3 mm (0.25")		
Differential	0.5 mm (0.02")		
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")		
Cable entry	1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry		

1. To lock the nut in the desired position, crimp the slot near the bottom of the nut.
2. Does not include mushroom button. Must be ordered separately see page 185.

Dimensions:
pages 200 and 201

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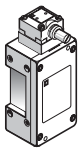
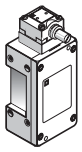
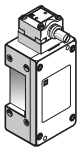
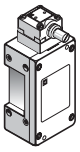
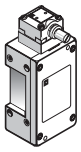
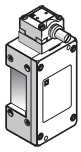
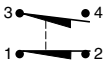
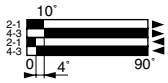
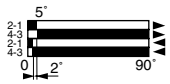
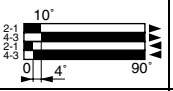
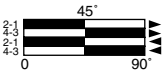
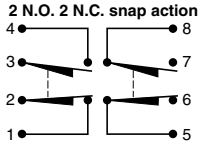
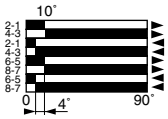
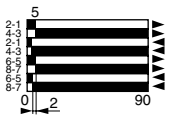
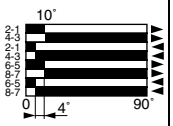
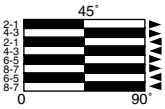
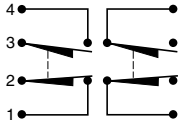
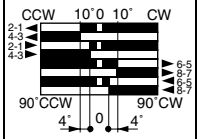
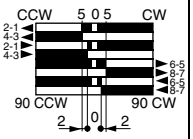
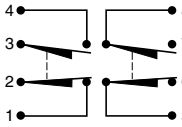
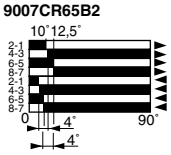
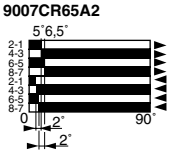
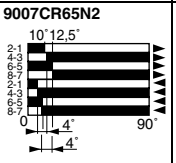
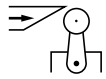
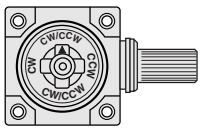
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location

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: Standard pre-travel spring return	Neutral position: Low differential spring return	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")	0.03 mm (± 0.001")	0.05 mm (± 0.002")	0.05 mm (± 0.002")	0.05 mm (± 0.002")	0.05 mm (± 0.002")
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 page 186 to 189.
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 200 and 201

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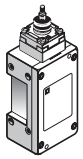
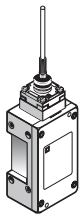
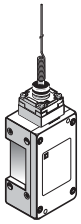
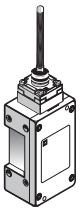
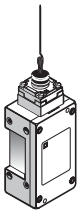
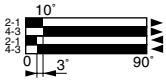
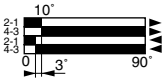
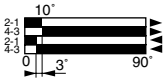
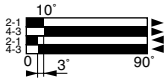
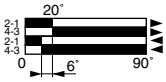
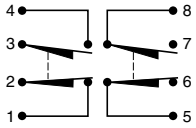
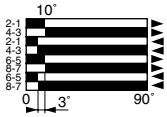
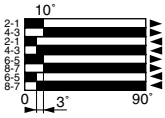
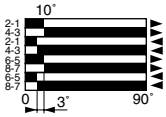
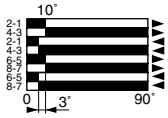
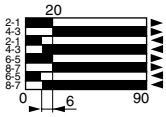
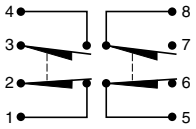
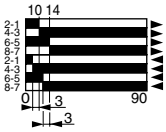
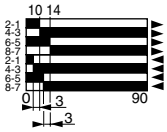
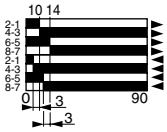
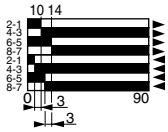
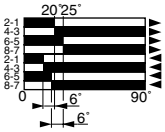
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location

Type of head	Flexible operator (wobble stick) e				
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		
- 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 185)

Dimensions:
pages 200 and 201

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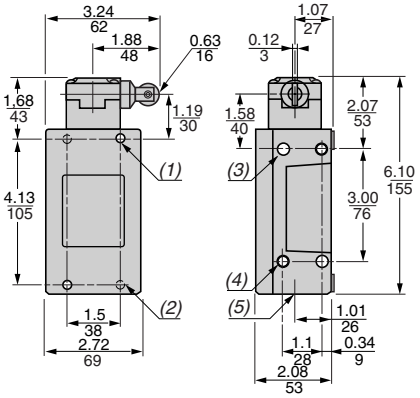
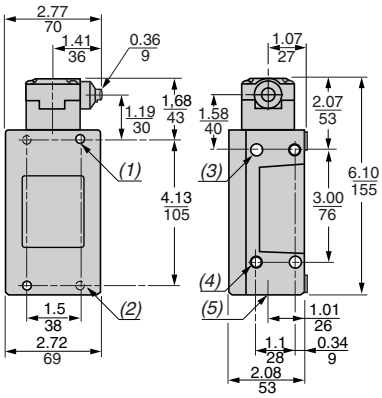
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location—Dimensions

Side Plunger

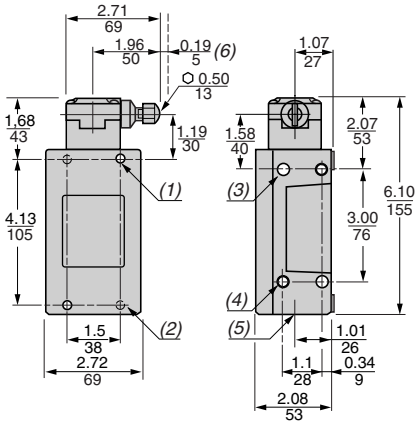
9007C••F



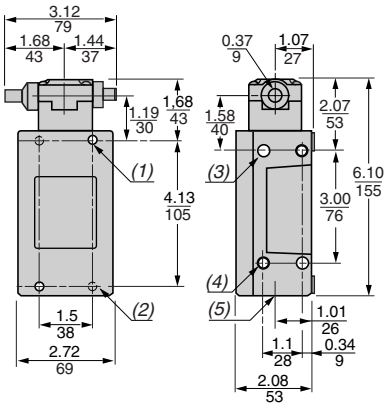
9007C••G



9007C••GD



9007C••H

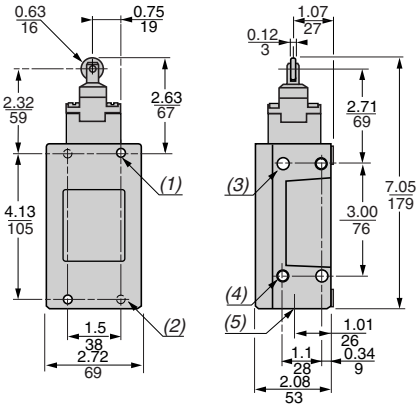


1. 2 x 0.27/7, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 3/4 NPT.
6. Adjustable.

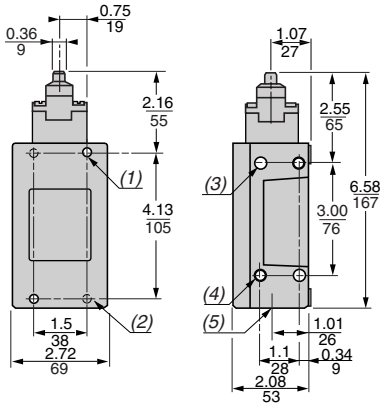
Dual dimensions: in. / mm

Top Plunger

9007C••D



9007C••E



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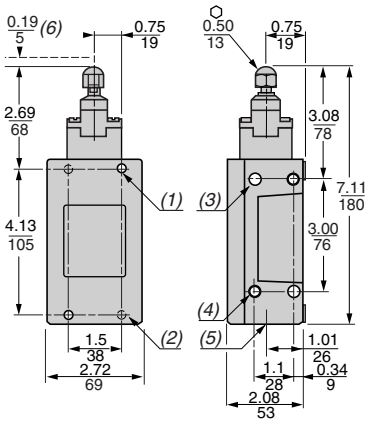

1. 2 x 0.27/7, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 3/4 NPT.
6. Adjustable.

Dual dimensions: in. / mm

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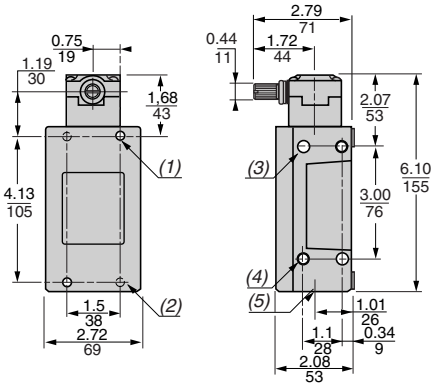
Limit Switches
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal
Hazardous Location—Dimensions

Rotary

9007C••••

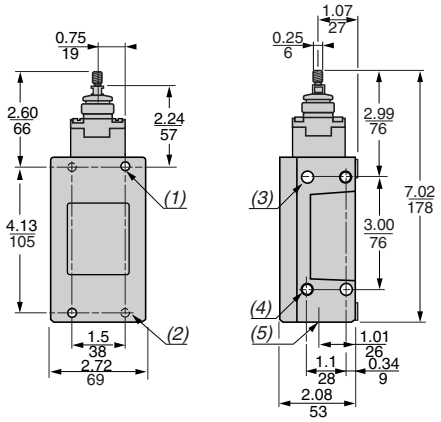


1. 2 x 0.27/7, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 1/4 NPT.

Dual dimensions: in. / mm

Wobble stick

9007C••JKC



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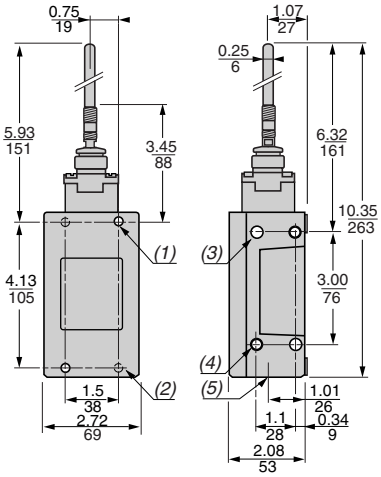

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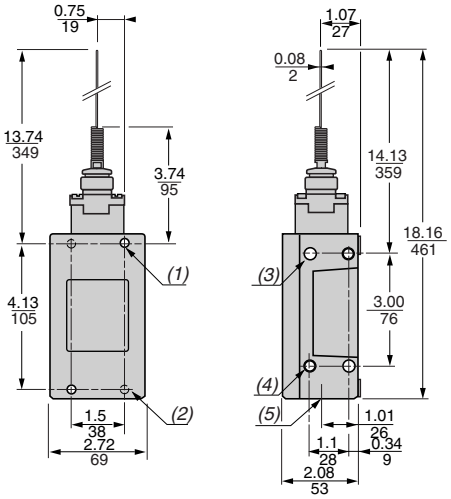

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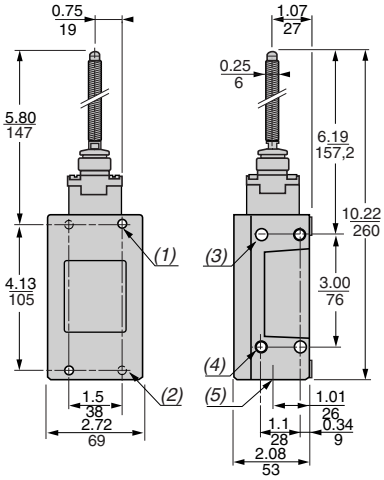

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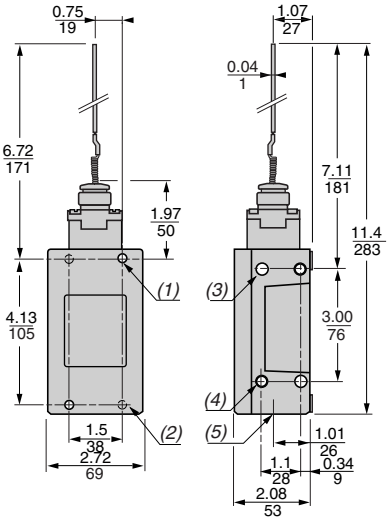

1. 2 x 0.27/7, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 1/4 NPT.

Dual dimensions: in. / mm

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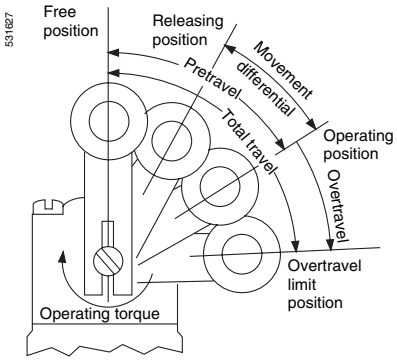

Figure 1: Rotary lever type

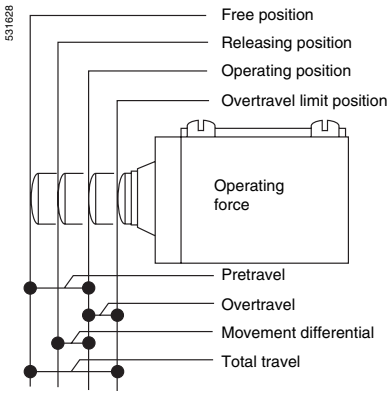

Figure 2: Linear (or Plunger) type

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.)

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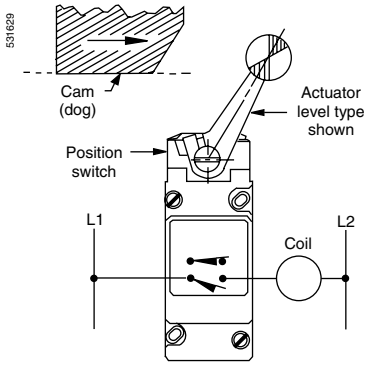

Figure 3—Limit switch

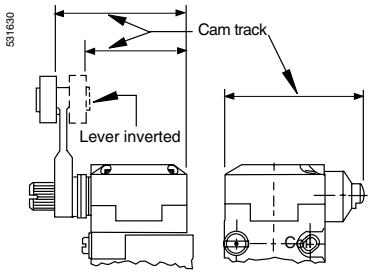

Figure 4—Cam track dimension

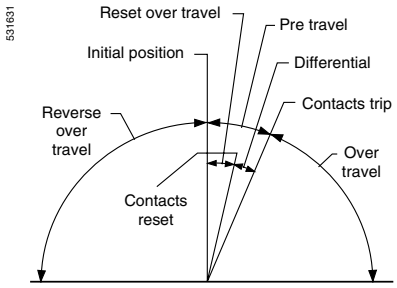

Figure 5—Contact travel

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.

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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.

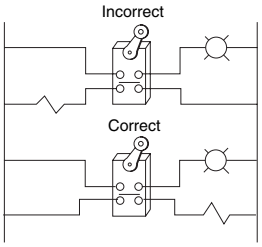
Direct opening travel (also known as positive opening travel)—Minimum travel from the actuator free position to the position where the direct opening operation is completed. Usually longer than the normal pre-travel.

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.

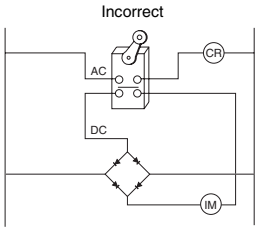
Polarity

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 205.



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).



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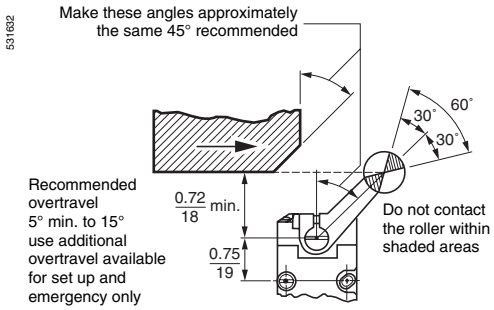

Figure 6

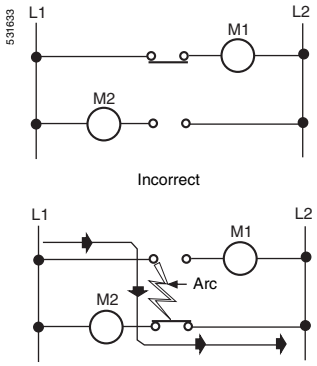

Figure 7—Contacts connected to opposite polarities.
Line to line short (bold line) can occure through arc drawn when contacts operate

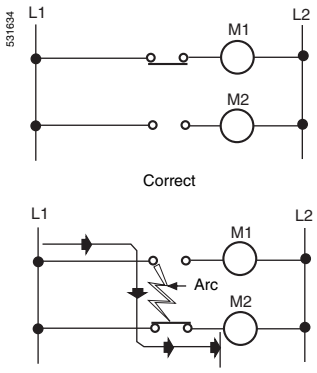

Figure 8—Contacts connected to same polarity. Line to line short cannot occur when contacts operate

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.

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Terminal Identification

European (IEC) contact terminals marking

Single pole	Double pole 1st pole	2nd 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

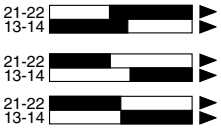
Each terminal is marked with 2 digits: First digit indicates the pole (circuit). The second digit indicates the type of contact:
_1–_2 is N.C., _3–_4 is N.O.
i.e.: 11–12, 21–22 are N.C. 13–14, 23–24 are N.O.
Example of European Terminal Markings:
For switch elements without isolated contacts:
11-12 Is 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

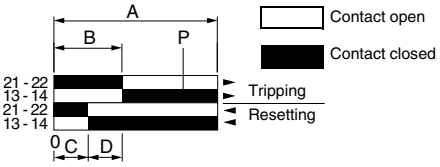
Single pole	Double pole 1st pole	2nd pole
1-2	1-2	5-6
3-4	3-4	7-8
1-2	1-2	5-6
3-4	3-4	7-8

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.

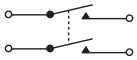
Wiring diagrams

Form A
SPST-NO

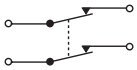
Form B
SPST-NC

Form C
SPDT

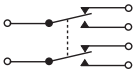
Form AA
DPST-NO



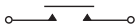
Form BB
DPST-NC



Form CC
DPDT

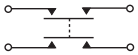


Form X
SPST-NO-DB

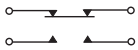


Form Y
SPST-NC-DB

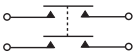
Form Zb
SPDT isolated contacts



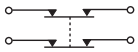
Form Z
DPDT-DB



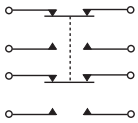
Form XX
DPST-NO-DB



Form YY
DPST-NC-DB



Form ZZ
DPDT-DB



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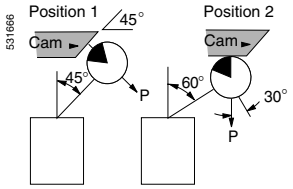

Figure 1A cam design for speeds up to 50 fpm

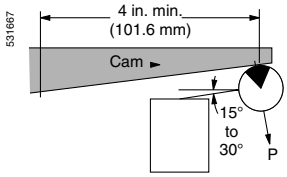

Figure 1B cam design for speeds from 50 to 200 fpm (15.2 to 60.9 mpm).

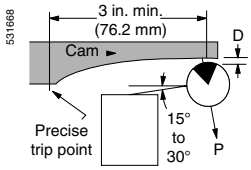

Figure 1C cam design for speeds from 200 to 400 fpm (60.9 to 121.9 mpm).

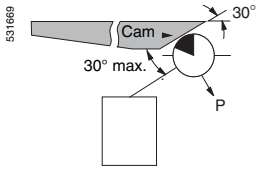

Figure 2

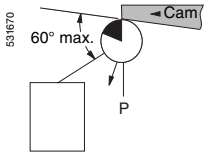

Figure 3

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.

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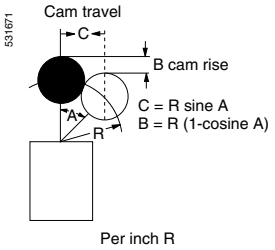

Application information (continued)

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 (0.005mm)	0.017 (0.43mm)	**46°**	0.305 (7.7mm)	0.719 (18.2mm)
2°	0.0006 (0.015mm)	0.035 (0.89mm)	**47°**	0.318 (8.1mm)	0.731 (18.6mm)
3°	0.0014 (0.035mm)	0.052 (1.3mm)	**48°**	0.331 (8.4mm)	0.743 (18.9mm)
4°	0.002 (0.05mm)	0.070 (1.8mm)	**49°**	0.344 (8.7mm)	0.755 (19.2mm)
5°	0.004 (0.101mm)	0.087 (2.2mm)	**50°**	0.357 (9.0mm)	0.766 (19.4mm)
6°	0.005 (0.127mm)	0.105 (2.6mm)	**51°**	0.371 (9.4mm)	0.777 (19.7mm)
7°	0.007 (0.178mm)	0.122 (3.1mm)	**52°**	0.384 (9.7mm)	0.788 (20.0mm)
8°	0.010 (0.254mm)	0.139 (3.5mm)	**53°**	0.398 (10.1mm)	0.799 (20.3mm)
9°	0.012 (0.304mm)	0.156 (4.0mm)	**54°**	0.412 (10.4mm)	0.809 (20.5mm)
10°	0.015 (0.381mm)	0.174 (4.4mm)	**55°**	0.426 (11.0mm)	0.819 (20.8mm)
11°	0.018 (0.457mm)	0.191 (4.8mm)	**56°**	0.441 (11.2mm)	0.829 (21.0mm)
12°	0.022 (0.559mm)	0.208 (5.3mm)	**57°**	0.455 (11.5mm)	0.839 (21.3mm)
13°	0.026 (0.660mm)	0.225 (5.7mm)	**58°**	0.485 (12.3mm)	0.857 (21.7mm)
14°	0.030 (0.762mm)	0.242 (6.1mm)	**59°**	0.485 (12.3mm)	0.857 (21.7mm)
15°	0.034 (0.863mm)	0.259 (6.6mm)	**60°**	0.500 (12.7mm)	0.866 (22mm)
16°	0.039 (0.990mm)	0.276 (7.2mm)	**61°**	0.515 (13.1mm)	0.875 (22.2mm)
17°	0.044 (1.12mm)	0.292 (7.4mm)	**62°**	0.531 (13.5mm)	0.883 (22.4mm)
18°	0.049 (1.24mm)	0.309 (7.8mm)	**63°**	0.546 (14.0mm)	0.891 (22.6mm)
19°	0.054 (1.37mm)	0.326 (8.3mm)	**64°**	0.562 (14.3mm)	0.899 (22.8mm)
20°	0.060 (1.52mm)	0.342 (8.7mm)	**65°**	0.577 (14.6mm)	0.906 (23.0mm)
21°	0.066 (1.67mm)	0.358 (9.1mm)	**66°**	0.593 15.0(mm)	0.914 (23.2mm)
22°	0.073 (1.85mm)	0.375 (9.5mm)	**67°**	0.609 15.5(mm)	0.921 (23.4mm)
23°	0.079 (2.00mm)	0.391 (9.9mm)	**68°**	0.625 (16.0mm)	0.927 (23.5mm)
24°	0.086 (2.2mm)	0.407 (10.3mm)	**69°**	0.642 (16.3mm)	0.934 (23.7mm)
25°	0.094 (2.38mm)	0.423 (10.7mm)	**70°**	0.658 (16.7mm)	0.940 (23.9mm)
26°	0.101 (2.56mm)	0.438 (11.1mm)	**71°**	0.674 (17.1mm)	0.946 (24.0mm)
27°	0.109 (2.77mm)	0.454 (11.5mm)	**72°**	0.691 (17.5mm)	0.951 (24.1mm)
28°	0.117 (2.9mm)	0.469 (12mm)	**73°**	0.708 (18.0mm)	0.956 (24.3mm)
29°	0.125 (3.17mm)	0.485 (12.3mm)	**74°**	0.724 (18.4mm)	0.961 (24.4mm)
30°	0.134 (3.40mm)	0.500 (12.7mm)	**75°**	0.741 (19.0mm)	0.966 (24.5mm)
31°	0.143 (3.6mm)	0.515 (13.1mm)	**76°**	0.758 (19.2mm)	0.970 (24.6mm)
32°	0.152 (3.9mm)	0.530 (13.4mm)	**77°**	0.775 (20.0mm)	0.974 (24.7mm)
33°	0.161 (4.1mm)	0.545 (14.0mm)	**78°**	0.792 (20.1mm)	0.978 (24.8mm)
34°	0.171 (4.3mm)	0.559 (14.2mm)	**79°**	0.809 (20.5mm)	0.982 (24.9mm)
35°	0.181 (4.6mm)	0.574 (14.6mm)	**80°**	0.826 (21.0mm)	0.985 (25.0mm)
36°	0.191 (4.8mm)	0.588 (15mm)	**81°**	0.844 (21.4mm)	0.988 (25.1mm)
37°	0.201 (5.1mm)	0.602 (15.3mm)	**82°**	0.861 (21.8mm)	0.990 (25.1mm)
38°	0.212 (5.4mm)	0.616 (15.6mm)	**83°**	0.878 (22.3mm)	0.993 (25.2mm)
39°	0.223 (5.7mm)	0.629 (16.0mm)	**84°**	0.895 (22.7mm)	0.995 (25.3mm)
40°	0.234 (6.0mm)	0.643 (16.3mm)	**85°**	0.913 (23.2mm)	0.996 (25.3mm)
41°	0.245 (6.2mm)	0.656 (16.6mm)	**86°**	0.930 (23.6mm)	0.9976 (25.3mm)
42°	0.257 (6.5mm)	0.669 (17.0mm)	**87°**	0.948 (24.0mm)	0.9986 (25.4mm)
43°	0.269 (6.8mm)	0.682 (17.3mm)	**88°**	0.965 (24.5mm)	0.9994 (25.4mm)
44°	0.281 (7.1mm)	0.695 (17.6mm)	**89°**	0.983 (25.0mm)	0.9999 (25.4mm)
45°	0.293 (7.4mm)	0.707 (18mm)	**90°**	1.000 (25.4mm)	1.000 (25.4mm)

(1) Refer to document SM444R1 for additional information regarding Cam speed and angles.

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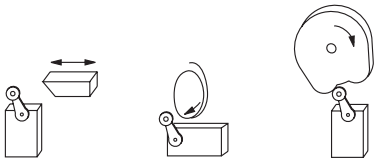
Lever Actuators

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



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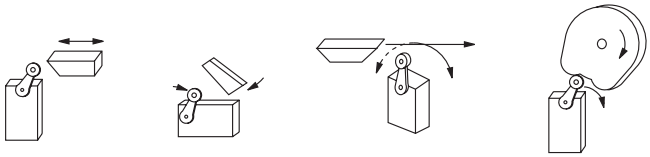
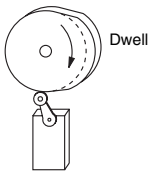


Dwelling Requirements

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



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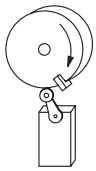
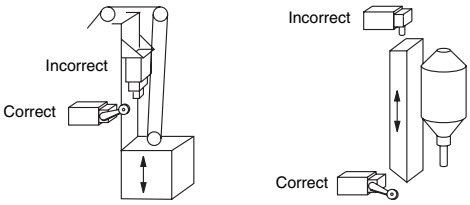
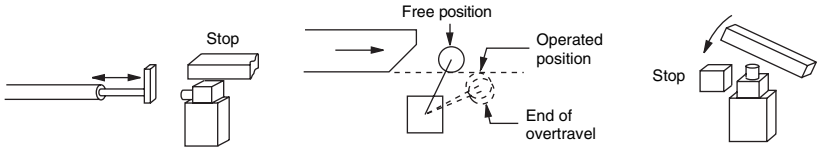


Overtravel limitations

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



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Description

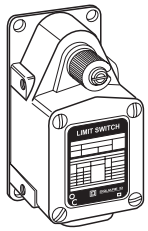
9007T Mill Switches
Use the 9007T Mill switches instead of other limit switches in the following applications:

1. *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.*
2. *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.*
3. *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



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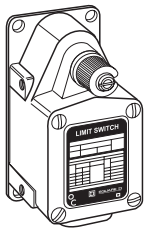
9007FT Foundry Switches



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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" 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" (6.35 mm) diameter. Two tapped holes on each side of switch allows side mounting.

Contacts — SPDT[1] 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.

Interpretation of Catalog Numbers:
page 235

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Limit Switches
9007T and FT Severe Duty Mill and Foundry Switches
Conforming to NEMA A600 and UL508

Environment 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	0.5" 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	Volts	AC Inductive 35% Power Factor Make Amperes	AC Inductive 35% Power Factor Make VA	AC Inductive 35% Power Factor Break Amperes	AC Inductive 35% Power Factor Break VA	AC Inductive 35% Power Factor Continuous Carrying Amperes	AC Resistive 75% Power Factor Make, Break and Continuous Carrying Amperes		Volts	DC Inductive and Resistive Make and Break Amperes Single Throw	DC Inductive and Resistive Make and Break Amperes Double Throw	DC Inductive and Resistive Continuous Carrying Amperes
SPDT Quick Make and Break	120	150	18,000	20	2400	20	20		120	5.0	º	20
	240	75	18,000	12.5	3000	20	20		250	1.0	º	20
	480	37.5	18,000	6.25	3000	20	20		600	0.2	º	20
	600	30	18,000	5	3000	20	20					
All Slow Make and Break	120	60	7200	6	720	20	10	20	º	º	º	º
	240	30	7200	3	720	20	10	20	º	º	º	º
	480	15	7200	1.5	720	20	10	20	º	º	º	º
	600	12	7200	1.2	720	20	10	20	º	º	º	º

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 233.

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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 A B CW A B	Initial position and CCW A B Middle CW A B Final CW A B	Spring return of arm to initial pos. Contact pos. maintained until operated in reverse direction CCW A B CW A B If high speed cam or snap-back is present, use No. 12	Initial position A B CCW A B CW A B	Initial position and CW A B CCW A B	Initial position and CW A B Middle CCW A B Final CCW A B

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" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
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 A B CCW A B	Initial position If high speed cam or snap-back is present, use No. 12 A B CCW A B CW A B	Initial position and CCW A B CW A B	Initial position A B CCW A B CW A B	Initial position and CW A B CCW A B	CCW A B CW A B

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" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.						
	③	③				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 213

Dimensions:
pages 218 to 221

Interpretation of Catalog Numbers:
page 235

Base Plates:
pages 217 and 218

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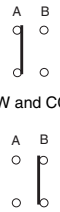
Limit Switches
9007T Severe Duty Mill Switches
Standard Operating Sequences

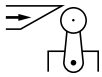
Standard Catalog Numbers

Base Plate

Surface Mounted

A **B** **C** **D**	**9007TSA1** **9007TSB1** **9007TSC1** **9007TSD1**	**9007TSA2** **9007TSB2** **9007TSC2** **9007TSD2**	**9007TSA3** **9007TSB3** **9007TSC3** **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  CW and CCW 	Initial position CW and CCW Middle Final 	Initial position CW and CCW

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" (0.10 mm)	± 0.004" (0.10 mm)	± 0.004" (0.10 mm)
Cable entry (metric available)	0.5" NPT	0.5" NPT	0.5" 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" (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 214.

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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 A B CW A B	Initial position and CCW A B Middle CW A B Final CW A B	Spring return of arm to initial pos. Contact pos. maintained until operated in reverse direction CCW CW A B A B If high speed cam or snap-back is present, use No. 12	Initial position A B CCW CW A B A B	Initial position and CW A B CCW A B	Initial position and CW A B Middle CCW A B Final CCW A B

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" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
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 A B CCW A B	Initial position If high speed cam or snap-back present, use No. 12 A B CCW CW A B A B	Initial position and CCW A B CW A B	Initial position A B CCW CW A B A B	Initial position and CW A B CCW A B	CCW A B CW A B

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" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.						
	③	③				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 215

Dimensions:
pages 218 to 221

Interpretation of Catalog Numbers:
page 235

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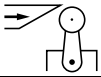
Limit Switches
9007FT Severe Duty Foundry Switches
Standard Operating Sequences

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 CW and CCW 	Initial position CW and CCW Middle Final 	Initial position CW and CCW

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" (0.10mm)	± 0.004" (0.10mm)	± 0.004" (0.10mm)
Cable entry (metric available)	0.5" NPT	0.5" NPT	0.5" 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" (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).

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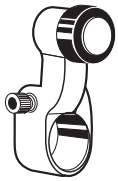
Limit Switches
9007T and FT Severe Duty Mill and Foundry Switches
Lever Arms and Renewal Parts

Standard Roller

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)

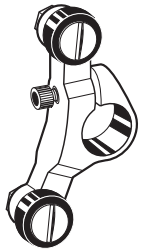
1. Does not include lever arm clamp or rod. If lever arm clamp is required, use 9007R16 or R17.



Offset Type

Offset Type (used to obtain different cam track dimensions)

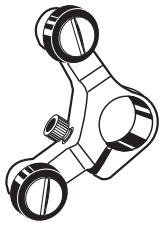
Arm	Steel Roller			Catalog Number	Weight lb (kg)
Length in. (mm)	Diameter in. (mm)	Roller Position	Width in. (mm)		
1.5 (38.1)	0.75 (19)	Inside offset	0.25 (6.3)	**9007C1**	0.50 (0.227)
1.5 (38.1)	1.0 (25.4)	Inside offset	0.25 (6.3)	**9007C2**	0.50 (0.227)
1.5 (38.1)	1.38 (35)	Inside offset	0.25 (6.3)	**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)	**9007**E4	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

120° Forked (used with 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

90° Forked (used with 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 218 to 221

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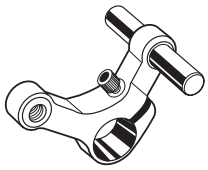
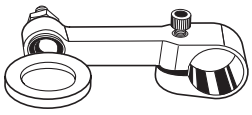
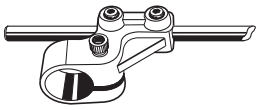


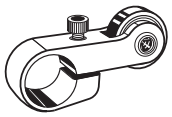
With Reset



Cable Operated

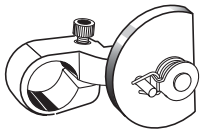


Rod Type
(rod not included)

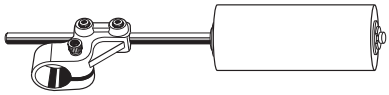


Ball Bearing Type

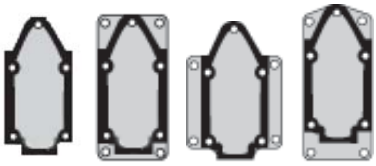
Weld-On Type



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 Length in. (mm)	**Steel roller Diameter in. (mm)**	**Roller Roller Position**	**Width in. (mm)**	**Catalog Number**	**Weight lb (kg)**
1.5 (38.1)	0.75 (19)	None	None	**9007Y3**	-
2.5" (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" (214.3) long with 1.5" (38.1) dia. 3.75" (95.2) Delrin® roller				**9007R21**	1.63 (0.739)
8.44" (214.3) long with 0.88" (22.3) dia. 3.75" (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 mm^2); recommended terminal clamp torque 13 – 16 lb-in. (1.46 – 1.80 N•m).

Optional Conduit Threads

Description Metric	Catalog Number	Weight lb (kg)
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 S to K	Contact Configuration Changes From:
For example: TUB1 changes to TYB1 TSB1 changes to TKB1		

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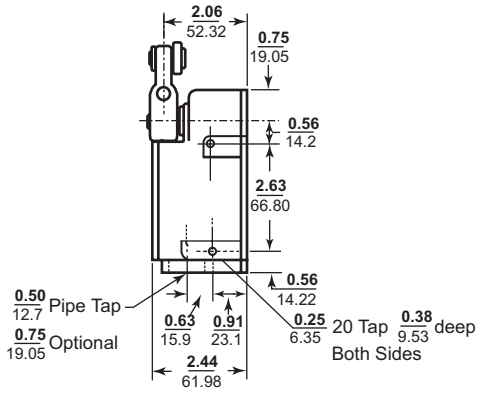
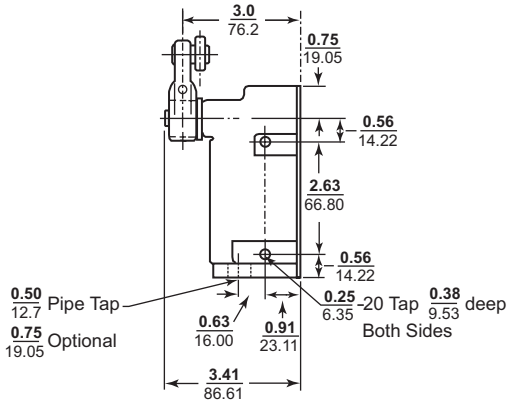
Limit Switches
9007T and FT Severe Duty Mill and Foundry Switches
Dimensions

Surface Mounting

Type T

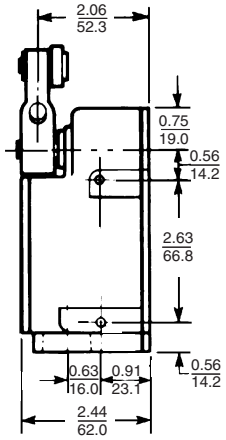


Type FT

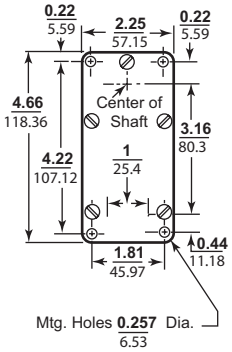


Base Plates

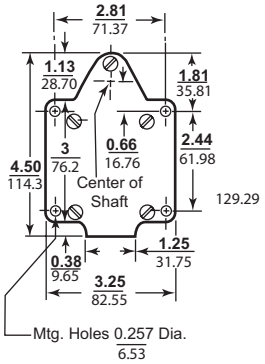
Style A



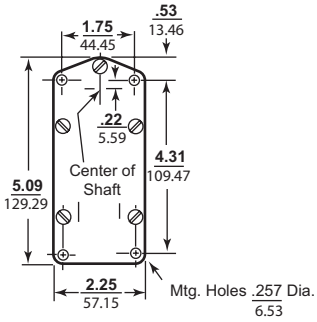
Style B



Style C



Style D



Dual dimensions: in. / mm

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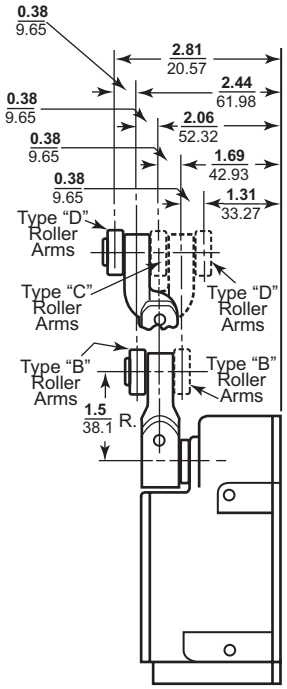
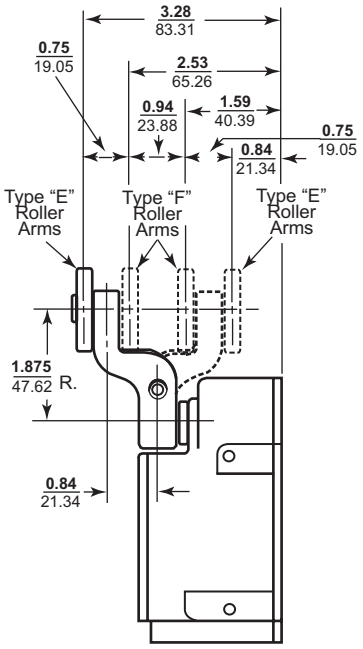
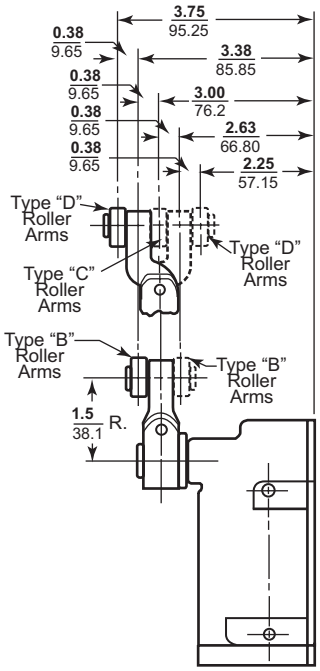
CAM Track Dimensions

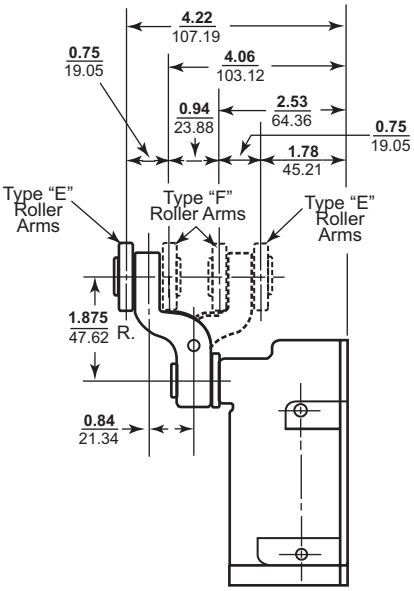
Type T





Type FT





Dual dimensions: in. / mm

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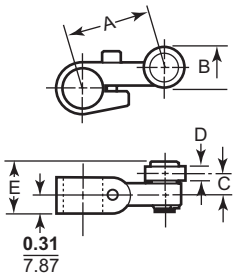
Limit Switches
9007T and FT Severe Duty Mill and Foundry Switches
Dimensions

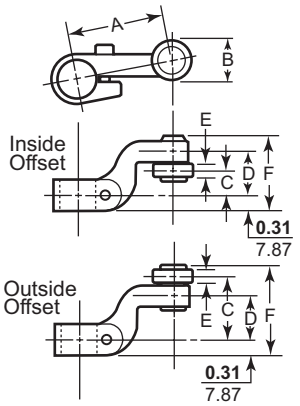
Type T and FT Lever Arms

Standard Roller

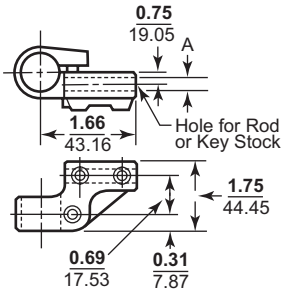


For dimension A refer to page 12.

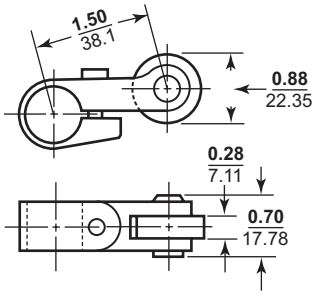
Offset Type



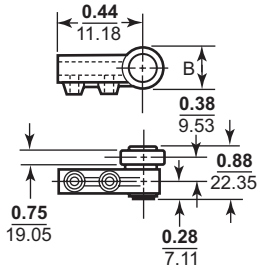
Adjustable Length Rod Type



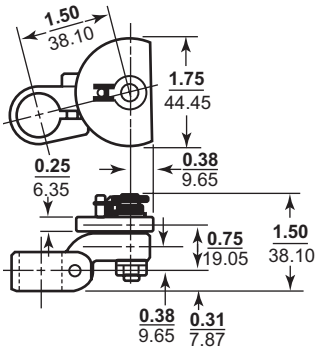
Ball Bearing Roller Type B16



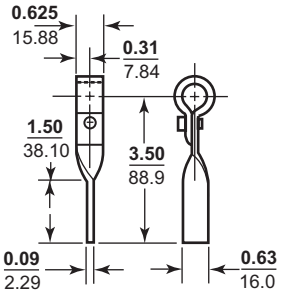
Roller Arm for use with Type R17



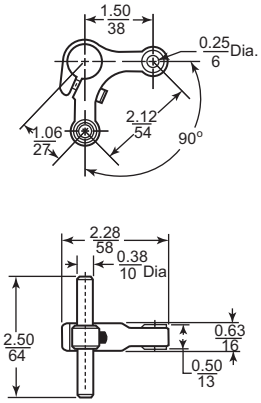
1-Way Roller Type D4



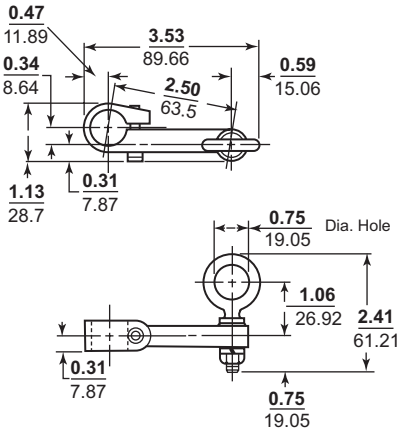
Weld-On Arm Type G10



Cable Operated with Reset Type Y3



Cable Operated Type B27



Dual dimensions: in. / mm

NOTE: All levers on this page can be used on Type C limit switches by installing the 9007S9 hub.

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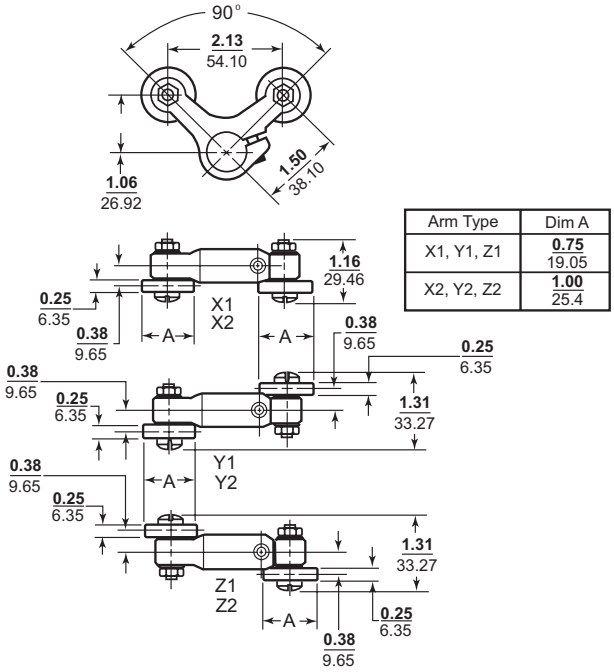
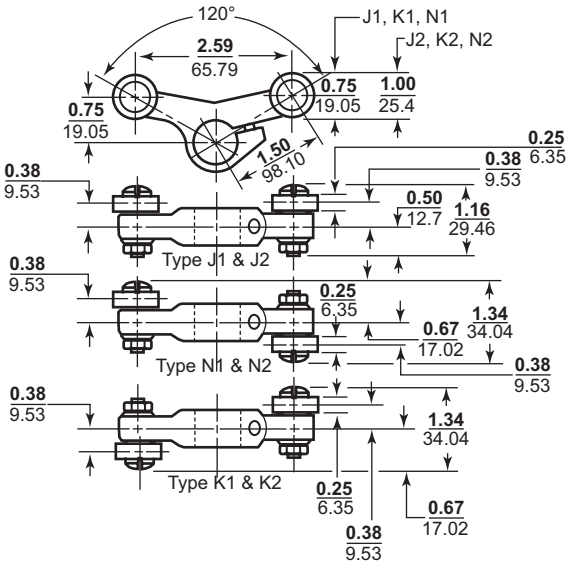
Type T and FT Lever Arms (continued)

90° Forked



Arm Type	Dim A
X1, Y1, Z1	0.75 / 19.05
X2, Y2, Z2	1.00 / 25.4

120° Forked



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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:

1 *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.*
2 *Where an operating sequence is required that is not possible on other limit switches (35 choices with the L switches).*
3 *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

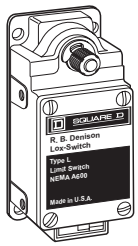
The L300W Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around 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



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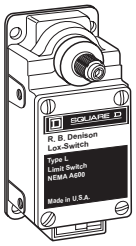
L300 Foundry



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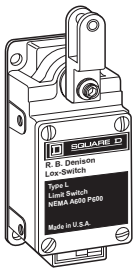
- Model L300 is an extra heavy duty version for very aggressive environments
  - The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing.
  - Heavy duty stainless steel springs and hardened spring operators permit longer life under 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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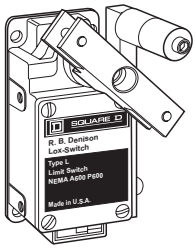
L2153 Mill and Foundry



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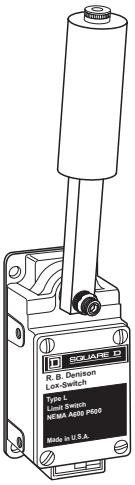
Belt Conveyors

L525 Mill and Foundry



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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.

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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

Environment 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	0.5" 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

Maximum current ratings for control circuit contacts

Contacts	AC								DC			
	Volts	Inductive 35% Power Factor					Resistive 75% Power Factor		Volts	Inductive and Resistive		
		Make		Break		Continuous Carrying Amperes	Make, Break and Continuous Carrying Amperes			Make and Break Amperes		Continuous Carrying Amperes
		Amperes	VA	Amperes	VA					Single Throw	Double Throw	
SPDT Quick Make and Break	120	150	18,000	20	2400	20	20		120	5.0	º	20
	240	75	18,000	12.5	3000	20	20		250	1.0	º	20
	480	37.5	18,000	6.25	3000	20	20		600	0.2	º	20
	600	30	18,000	5	3000	20	20					
All Slow Make and Break	120	60	7200	6	720	20	10	20	…	…	…	…
	240	30	7200	3	720	20	10	20	…	…	…	…
	480	15	7200	1.5	720	20	10	20	…	…	…	…
	600	12	7200	1.2	720	20	10	20	…	…	…	…

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 233.

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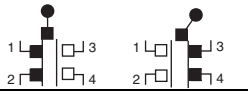
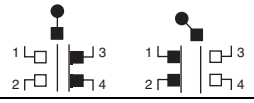
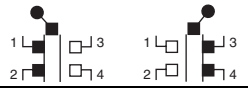
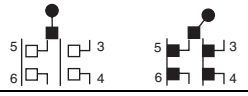
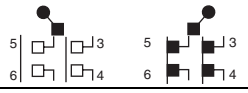
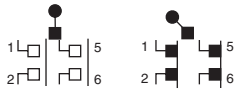
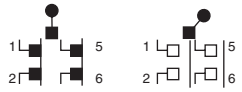
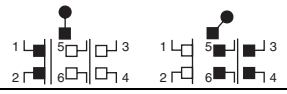
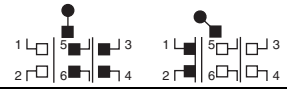
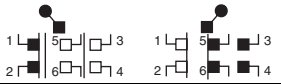
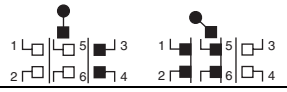
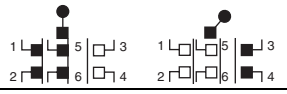
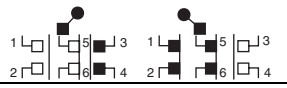
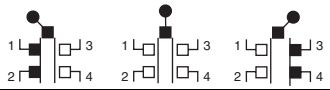
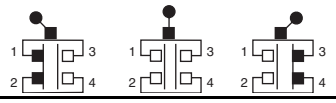
Limit Switches
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches
L100 Mill Switches

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 225)	1.51 (0.68)
Snap-action CCW spring return	190 oz-in (1.34 N•m)		**L100WS2M2**	**A** (see page 225)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		**L100WS2M3**	**A** (see page 225)	1.51 (0.68)
Snap action CW spring return	190 oz-in (1.34 N•m)		**L100WDR2M4**	**A** (see page 225)	1.51 (0.68)
Snap action CCW spring return	190 oz-in (1.34 N•m)		**L100WDR2M5**	**A** (see page 225)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		**L100WDR2M6**	**A** (see page 225)	1.51 (0.68)
Snap action CCW spring return	190 oz-in (1.34 N•m)		**L100WDL2M7**	**A** (see page 225)	1.51 (0.68)
Snap action CW spring return	190 oz-in (1.34 N•m)		**L100WDL2M8**	**A** (see page 225)	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 225)	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 225)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		**L100WTR2M12**	**A** (see page 225)	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 225)	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 225)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		**L100WTL2M15**	**A** (see page 225)	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 225)	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 225)	1.51 (0.68)

Dimensions:
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Operating Data:
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Interpretaton of Catalog Numbers:
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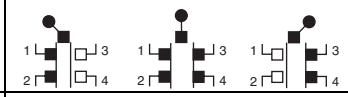
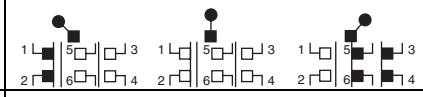
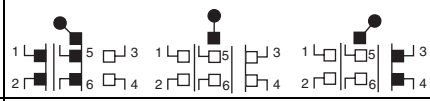
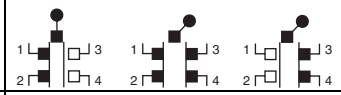
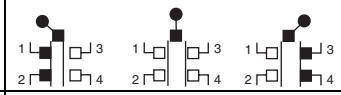
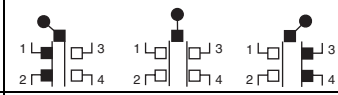
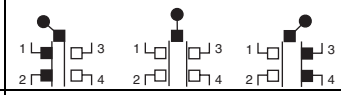
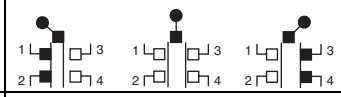
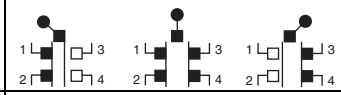
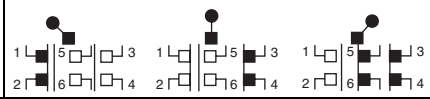
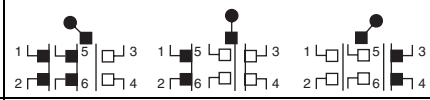
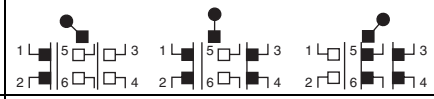
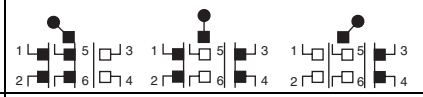
L100 Mill Switches (continued)

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)		**L100WNCS2M34**	**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	± 0.03×	-	-	± 0.03×
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:
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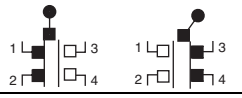
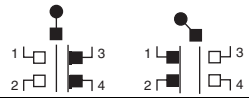
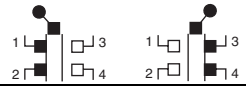
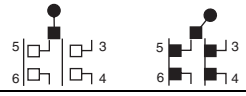
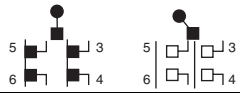
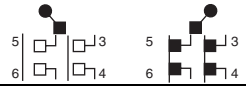
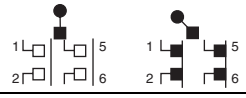
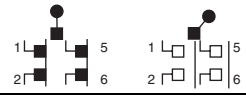
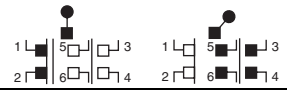
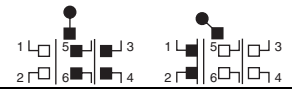
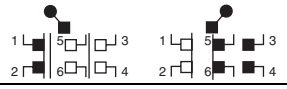
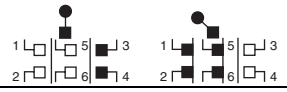
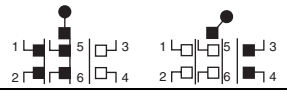
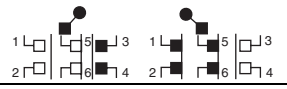
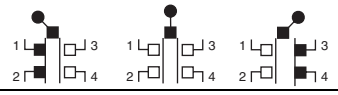
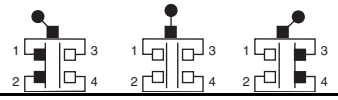
L300 Foundry Switches

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 227)	1.54 (0.70)
Snap-action CCW spring return	190 oz-in (1.34 N•m)		**L300WS2M2**	**A** (see page 227)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		**L300WS2M3**	**A** (see page 227)	1.54 (0.70)
Snap action CW spring return	190 oz-in (1.34 N•m)		**L300WDR2M4**	**A** (see page 227)	1.54 (0.70)
Snap action CCW spring action	190 oz-in (1.34 N•m)		**L300WDR2M5**	**A** (see page 227)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		**L300WDR2M6**	**A** (see page 227)	1.54 (0.70)
Snap action CCW spring return	190 oz-in (1.34 N•m)		**L300WDL2M7**	**A** (see page 227)	1.54 (0.70)
Snap action CW spring return	190 oz-in (1.34 N•m)		**L300WDL2M8**	**A** (see page 227)	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 227)	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 227)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		**L300WTR2M12**	**A** (see page 227)	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 227)	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 227)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action, 3 poles	45 oz-in (0.32 N•m)		**L300WTL2M15**	**A** (see page 227)	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 227)	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 227)	1.54 (0.70)

Dimensions:
page 234

Operating Data:
page 227

Interpretaton of Catalog Numbers:
page 235

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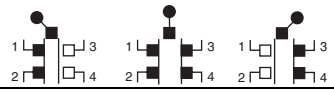
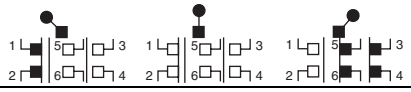
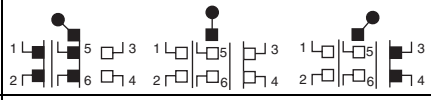
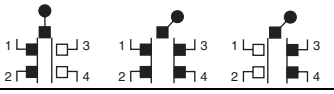
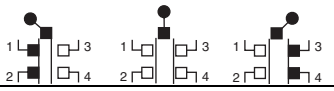
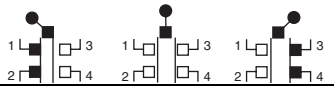
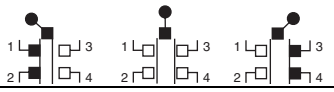
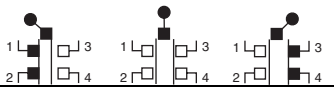
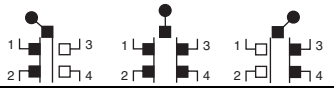
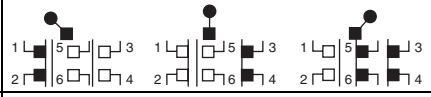
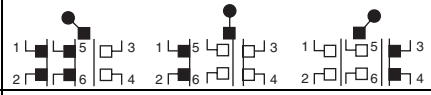
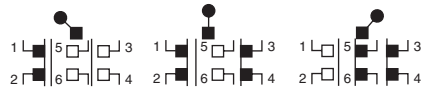
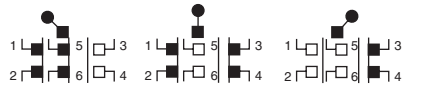
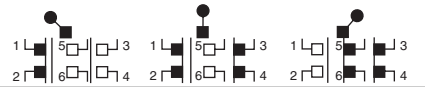
L300 Foundry Switches (continued)

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	± 0.03×	-	-	± 0.03×
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 234

Operating Sequences for Conveyor Belts:
page 229

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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 231 (order separately).
2. To complete the catalog number, refer to page 235 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	± 0.03°
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	–

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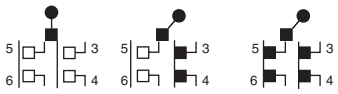
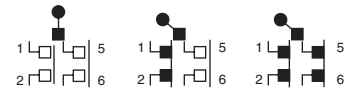
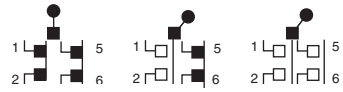
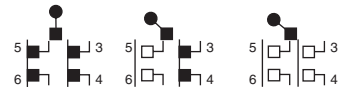
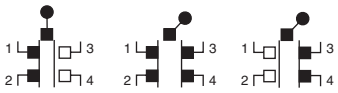
L525
Belt Conveyor Switches

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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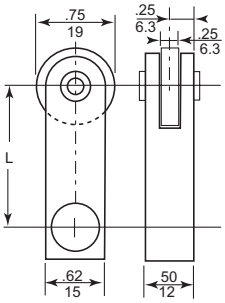
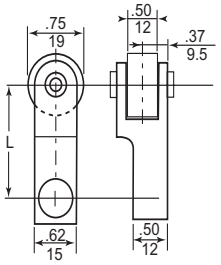
Lever Arms

Lever arms are constructed of machined aluminum.

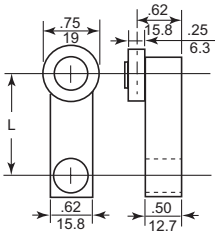
Dual dimensions: in. (mm)



Style A



Style B



Style C

Style A Steel Roller

Arm Length	Steel roller Diameter	Steel roller Width	Catalog Number ♦	Weight lb (kg)
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)

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 Length	Steel roller Diameter	Steel roller Width	Catalog Number	Weight lb (kg)
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 Length	Steel roller Diameter	Steel roller Width	Catalog Number	Weight lb (kg)
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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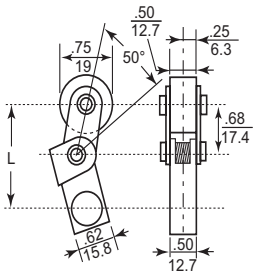
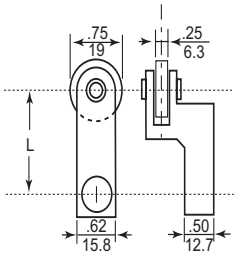
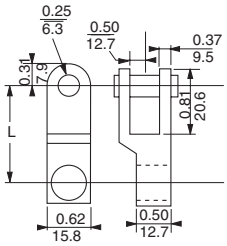
Limit Switches
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches
L100/L300 Lever Arms

Dual dimensions: in. (mm)



Style E





Style K

Style E One Way Steel Roller

Arm Length	Steel roller Diameter	Steel roller Width	Catalog Number	Weight lb (kg)
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 Length	Steel roller Diameter	Roller Position Offset	Roller Position Width	Catalog Number	Weight lb (kg)
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)

◆ Example: AC — This is the complete catalog number to order.

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 Length	Steel roller Diameter	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)

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)

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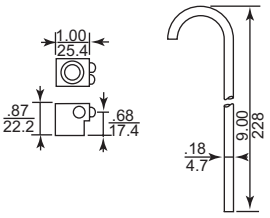
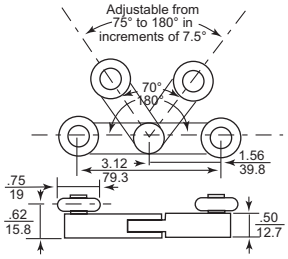
Limit Switches
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches
Lever Arms

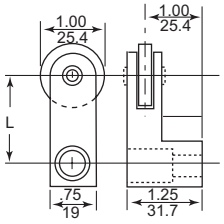
Dual dimensions: in. (mm)



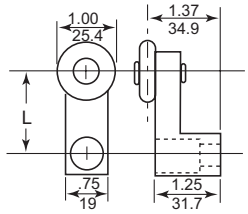
Style R



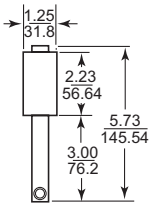
Style V



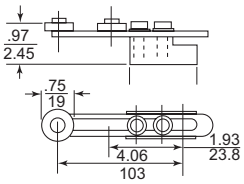
Style LA



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)

Arm Length	Steel roller Diameter	Description	Width	Catalog Number	Weight lb (kg)
				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 Length	Steel roller Diameter	Description	Width	Catalog Number	Weight lb (kg)
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 Length	Steel roller Diameter	Description	Width	Catalog Number	Weight lb (kg)
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 Length	Steel roller Diameter	Description	Catalog Number	Weight lb (kg)
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 Length	Steel roller Diameter	Description	Width	Catalog Number	Weight lb (kg)
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 234

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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 Full Catalog Number	Catalog Number Add Prefix	Weight lb (kg)
0.75" conduit opening Available on 2 circuit switches. Standard on 3 circuit switches	L100WS2M1 changes to **G**L100WS2M1	**G**	1.54 (0.70)
High temperature 0 to +350 °F (-17.7 to +176.6 °C) ■ Metal front cover only	L100WS2M1 changes to **H**L100WS2M1	**H**	1.54 (0.70)
Low temperature -20 to 200 °F (-28.8 to +93.3 °C) ■	L100WS2M1 changes to **T**L100WS2M1	**T**	1.54 (0.70)
High shock Available only on operating sequences 1, 2, 4, 5, 7-11, 13, 14	L100WS2M1 changes to L**526**WS2M1 L300WS2M1 changes to L**326**WS2M1	**526/326**	1.54 (0.70)
Gold contacts	L100WS2M1 changes to L**522**WS2M1 L300WS2M1 changes to L**322**WS2M1	**522/322**	1.54 (0.70)
Metric conduit threads M20 (20 mm)	L100WS2M1 changes to ML100WS2M1	**M**	1.54 (0.70)

Wiring

Description	Example Full Catalog Number	Catalog Number Add Prefix	Weight lb (kg)
Straight male receptacle 4-pin ▲ Factory prewired	L100WS2M1 changes to **P**L100WS2M1	**P**	1.54 (0.70)
90° Angle male receptacle 4-pin ▲ Factory prewired—facing right	L100WS2M1 changes to **AP**L100WS2M1	**AP**	1.54 (0.70)
Ministyle male receptacle † 8 A max. 5-pin (double circuit) 7 A max. 7-pin (triple circuit)	L100WS2M1 changes to **B**L100WS2M1	**B** **B**	1.54 (0.70)
		Add Suffix	**lb (kg)**
Potted and prewired 5 wires 6 feet (1.8 mm) long 5 wires 12 feet (3.6 mm) long 5 wires 18 feet (5.5 mm) long	L100WS2M1 changes to L100WS2M1**P** L100WS2M1 changes to L100WS2M1**P12** L100WS2M1 changes to L100WS2M1**P18**	**P** **P12** **P18**	1.54 (0.70)

Front Covers

Description	Example Full Catalog Number	Catalog Number Add Suffix	Weight lb (kg)
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 L100WS2**PF** 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 connector 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.

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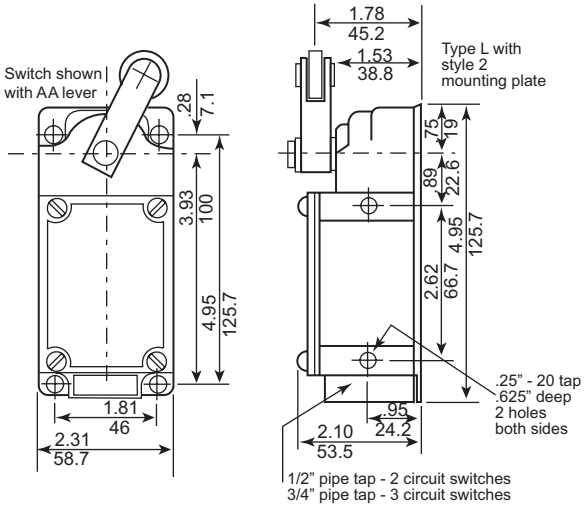
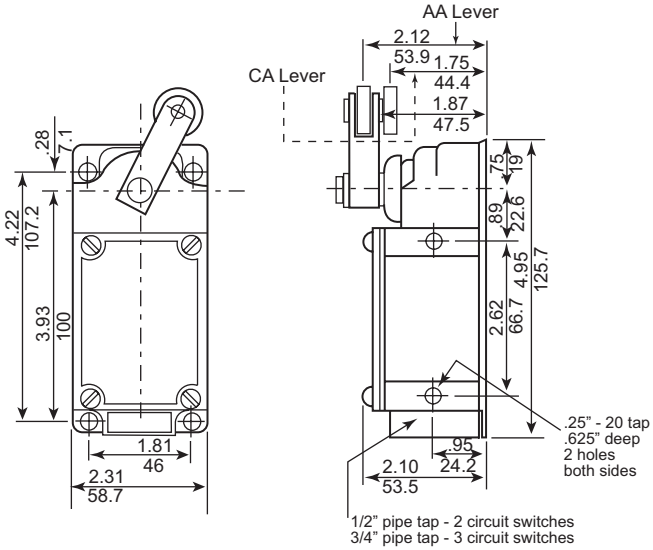
Limit Switches
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches
Dimensions

Switches

Type L100

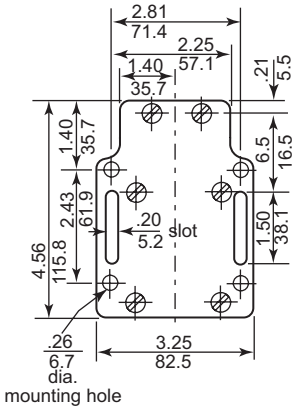


Type L300

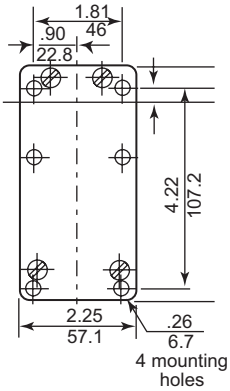


Base Plates

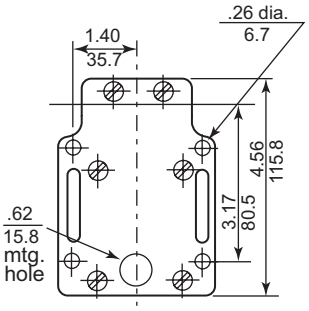
Style 1



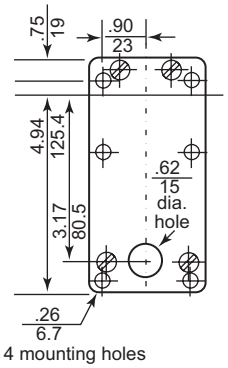
Style 2



Style 3

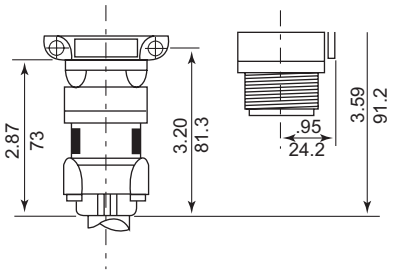


Style 4

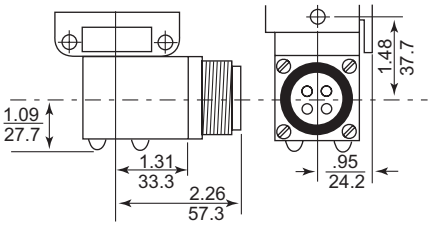


Receptacles

PL



APL



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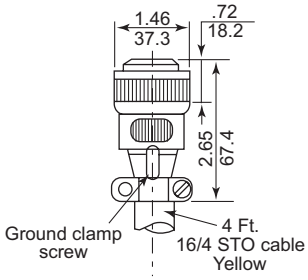

Dual dimensions: in. / mm

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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

Housing

Mill	100
Foundry	300
Belt Conveyor	525

L14* and L2153 pull cord switches

Function

Two circuit single operation	WS
Two circuit dual operation	WD
Triple circuit	WT
Neutral	WN

Mounting Plate

Style 1	1
Style 2	2
Style 3	3
Style 4	4

Front Cover

M	Standard metal
PF	Transparent plastic
GF	Transparent plastic with neon light

The only modifications to the existing catalog numbers are:

b Base Plates:
- Select style 1, 2, 3 or 4

b Front Covers: Select metal, transparent plastic, or transparent plastic with neon light.

For special features see page 233.

9007T and FT

9007 T U B 4 M11

Enclosure Type
T - Mill casting
FT - Foundry casting

Contact Switch Type
Universal U (3 point contacts Y)
Standard S (3 point contacts X)

Base Plate
A - No holes in base plate - mount to side of casting.
B - End mounting holes, rectangular
C - Side mounting holes, wide plate
D - Tapered end, mounting holes

Contact Sequence
1-11 for Universal
12 Maintained
1 - 3 for Standard
(see catalog for explanation of contact sequences)

Forms
M Metric threads

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03/2007