

Выключатель концевой, путевой Минск т.80447584780

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каталог, описание, технические, характеристики, datasheet, параметры, маркировка, габариты, фото, даташит,



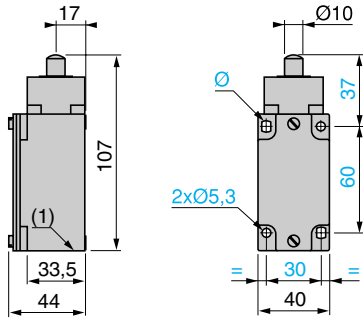
QR код

Limit Switches

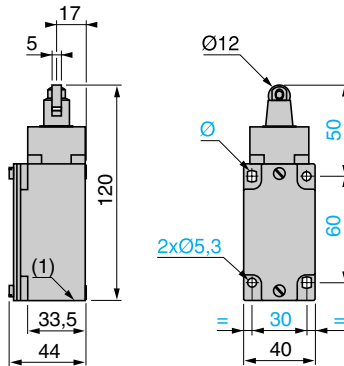
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

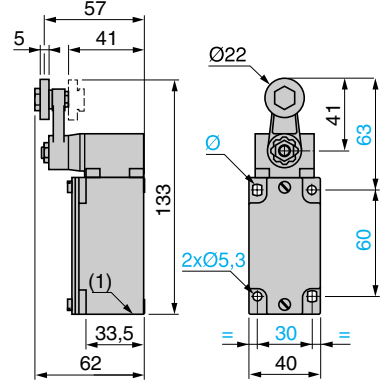
XCKJ•61
ZCKJ•+ ZCKE61



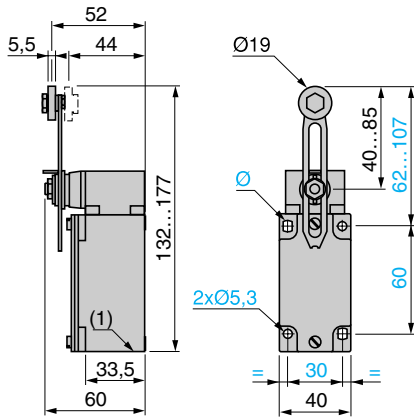
XCKJ•67
ZCKJ•+ ZCKE67



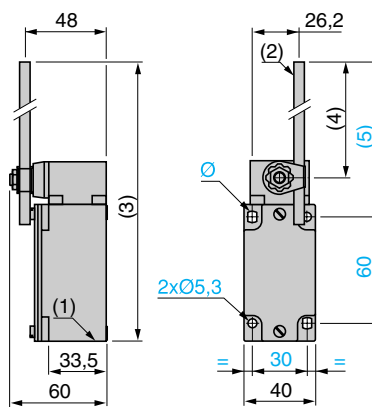
XCKJ•051•
ZCKJ•+ ZCKE05 + ZCKY11 or Y13



XCKJ•0541
ZCKJ•+ ZCKE05 + ZCKY41



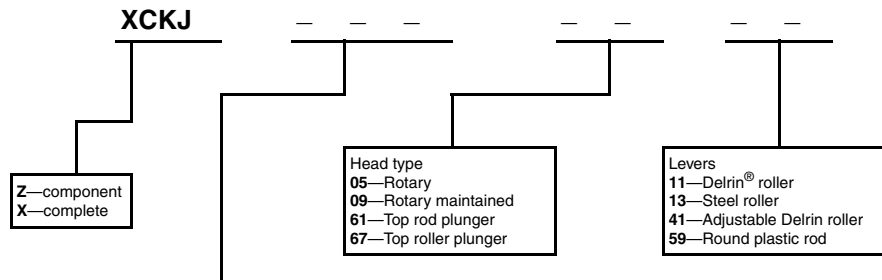
XCKJ•0559
ZCKJ•+ ZCKE05 + ZCKY59



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

For Interpretation of the Complete Switch Catalog Number Only

Note: See following pages for the complete switch offering

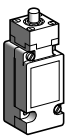
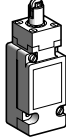

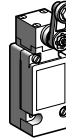
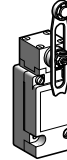
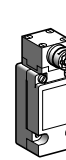

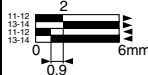
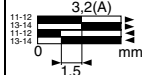
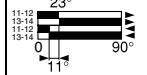
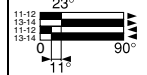
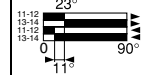
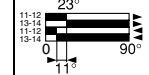
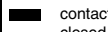
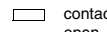


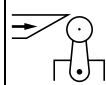
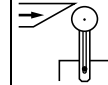



Switch type	
1	SPDT Non-plug-in
2	2SPDT Non-plug-in
4	2SPDT Non-plug-in for 2 step or neutral position
5	SPDT Non-plug-in slow make slow break
8	SPDT Gold Contacts
11	SPDT Plug-in
21	2SPDT Plug-in
41	2SPDT Plug-in for 2 step or neutral position

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

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

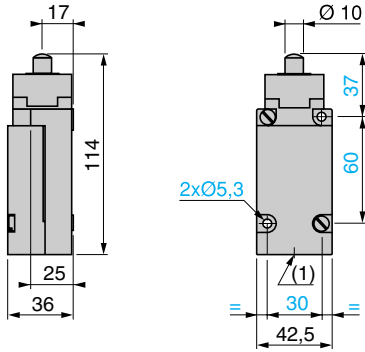
1. Form conforming to EN 50041. See page 23.
2. Switches with gold contacts: please consult your local sales office.
3. Adjustable throughout 360° in 5° steps, or in 45° steps by reversing the lever mounting or clamp.
4. Value taken with actuator operating at 100 mm (3.94 in.) from the mounting.

Limit Switches

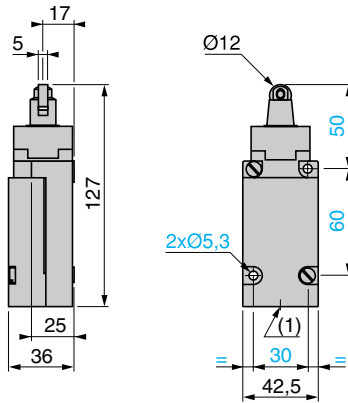
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

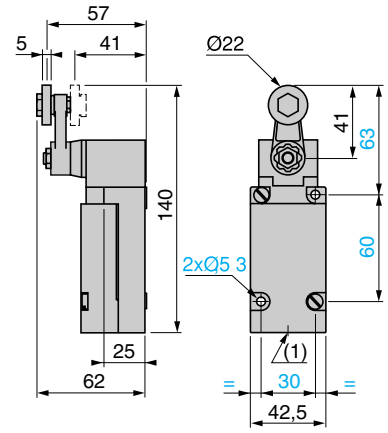
XCKJ1611



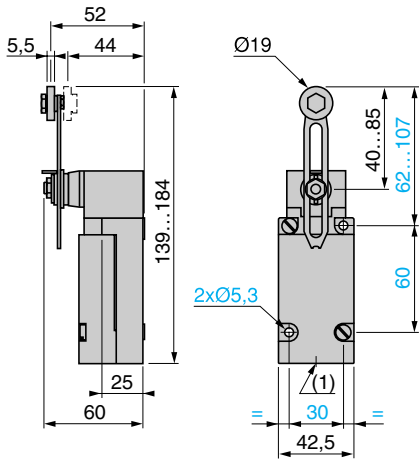
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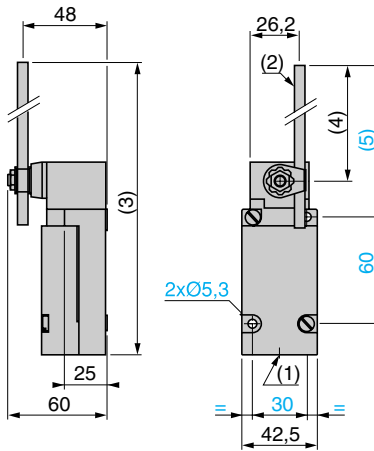
XCKJ110511, XCKJ110513



XCKJ110541



XCKJ110559

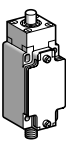
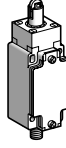
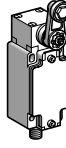
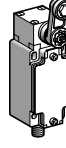



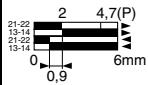
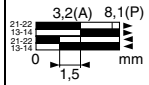
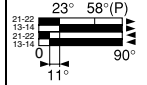
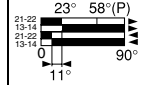
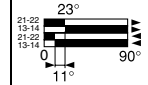
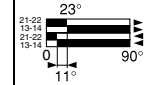









1. Tapped entry for 1/2" NPT conduit.
2. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.).
3. 289 max.
4. 190 max.
5. 212 max.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

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

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

Catalog numbers of suitable pre-wired female connectors

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

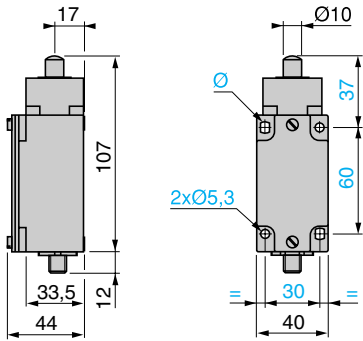
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

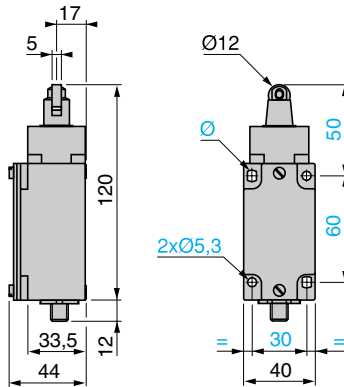
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral M12 Connector

Dimensions

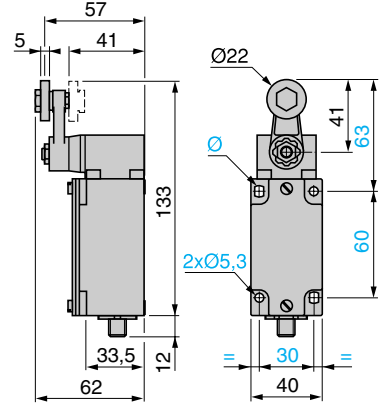
XCKJ161D



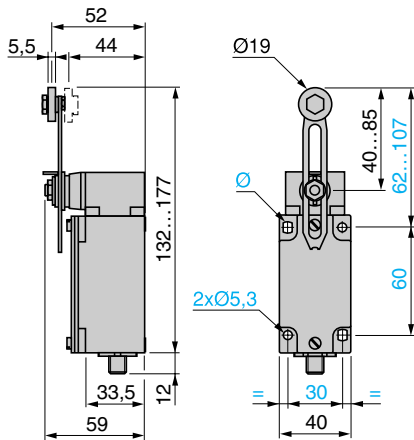
XCKJ167D



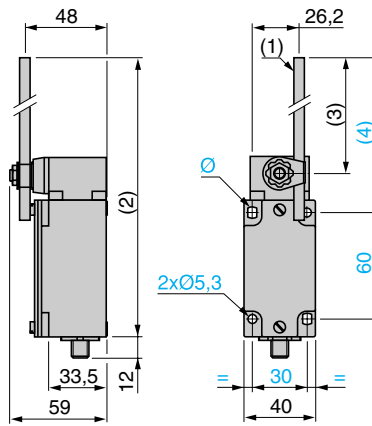
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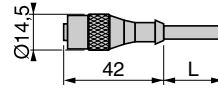
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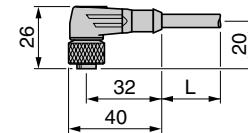
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XZCP1164L•



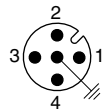
XZCP1264L•



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

Connections

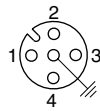
Limit switch XCKJ••••D



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



Pre-wired female connector XZCP1•64L•

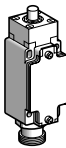
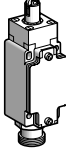
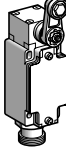
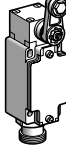
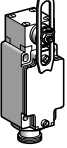
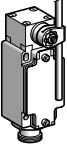

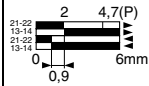
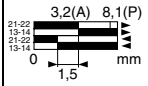
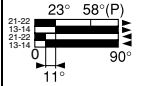
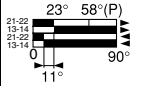
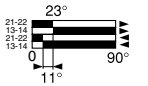
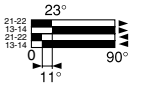











- 1 = brown
- 2 = white
- 3 = blue
- 4 = black
- 5 = ⊥ yellow/green

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

Type of head	Plunger (mounting by the body)		Rotary (mounting by the body) (switches supplied for actuation from left AND right)			
	Form B (1)	Form C (1)	Form A (1)		Form D (1)	
						
Type of operator	Metal end plunger	Steel roller plunger	Thermoplastic roller lever (2)	Steel roller lever (2)	Variable length thermoplastic roller lever (2)	Round thermoplastic rod lever, Ø 6 mm (0.24 in.) (2) (3)
Catalog numbers (4)						
 2-pole N/C + N/O snap action (XE2SP2151)	XCKJ161A 	XCKJ167A 	XCKJ10511A 	XCKJ10513A 	XCKJ10541A 	XCKJ10559A 
	Weight, kg (lb)	0.430 (0.948)	0.455 (1.003)	0.480 (1.058)	0.490 (1.080)	0.485 (1.069)
Contact operation	 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)		
	For positive opening	50 N (11.24 lb)	40 N (8.99 lb)	0.50 N•m (4.43 lb-in)	—	—
Connection	7/8" 16UN 5-pin connector, Ui = 250 V; Ie = 6 A (see suitable pre-wired female connectors below).					

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

Catalog numbers of suitable pre-wired female connectors

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

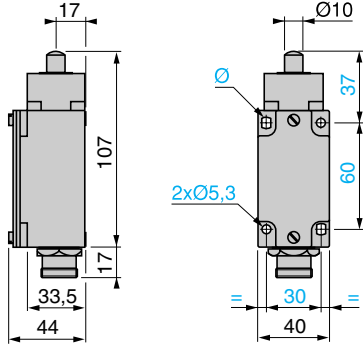
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

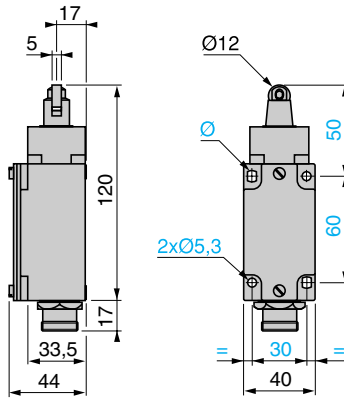
XCKJ—Complete Switches, Fixed Non-plug-in Body, Integral 7/8" 16UN connector

Dimensions

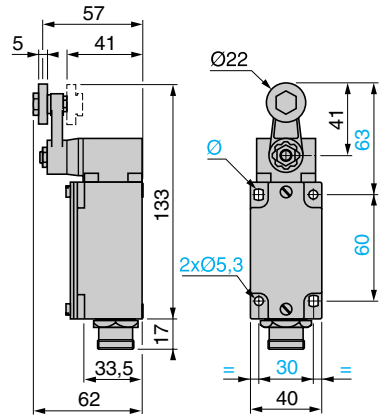
XCKJ161A



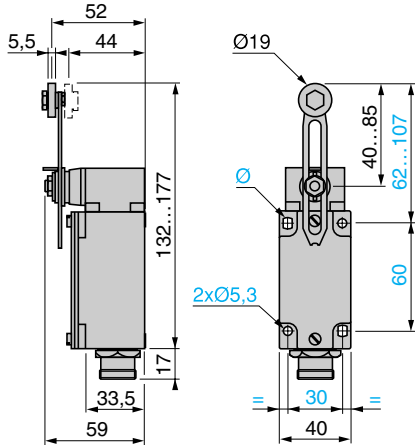
XCKJ167A



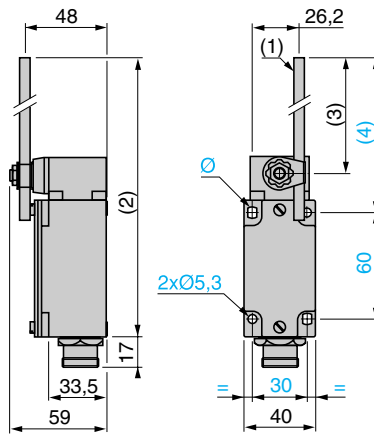
XCKJ1051•A



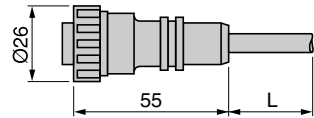
XCKJ10541A



XCKJ10559A



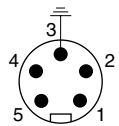
XZCP1771L•



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

Connections

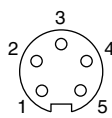
Limit switch XCKJ••••A



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



Pre-wired female connector XZCP1771L•

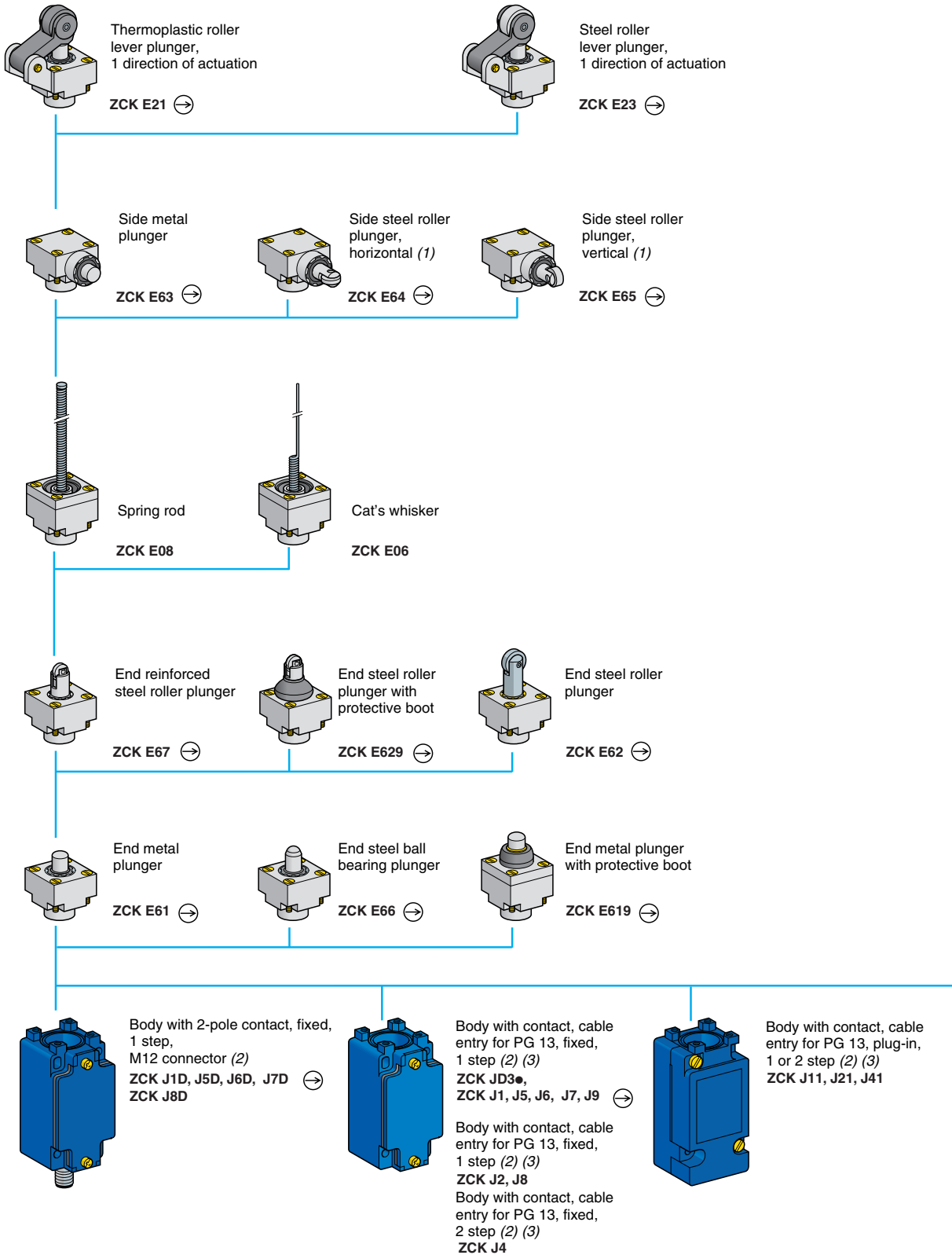


- 1 = black
- 2 = blue
- 3 = yellow/green \perp
- 4 = brown
- 5 = white

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

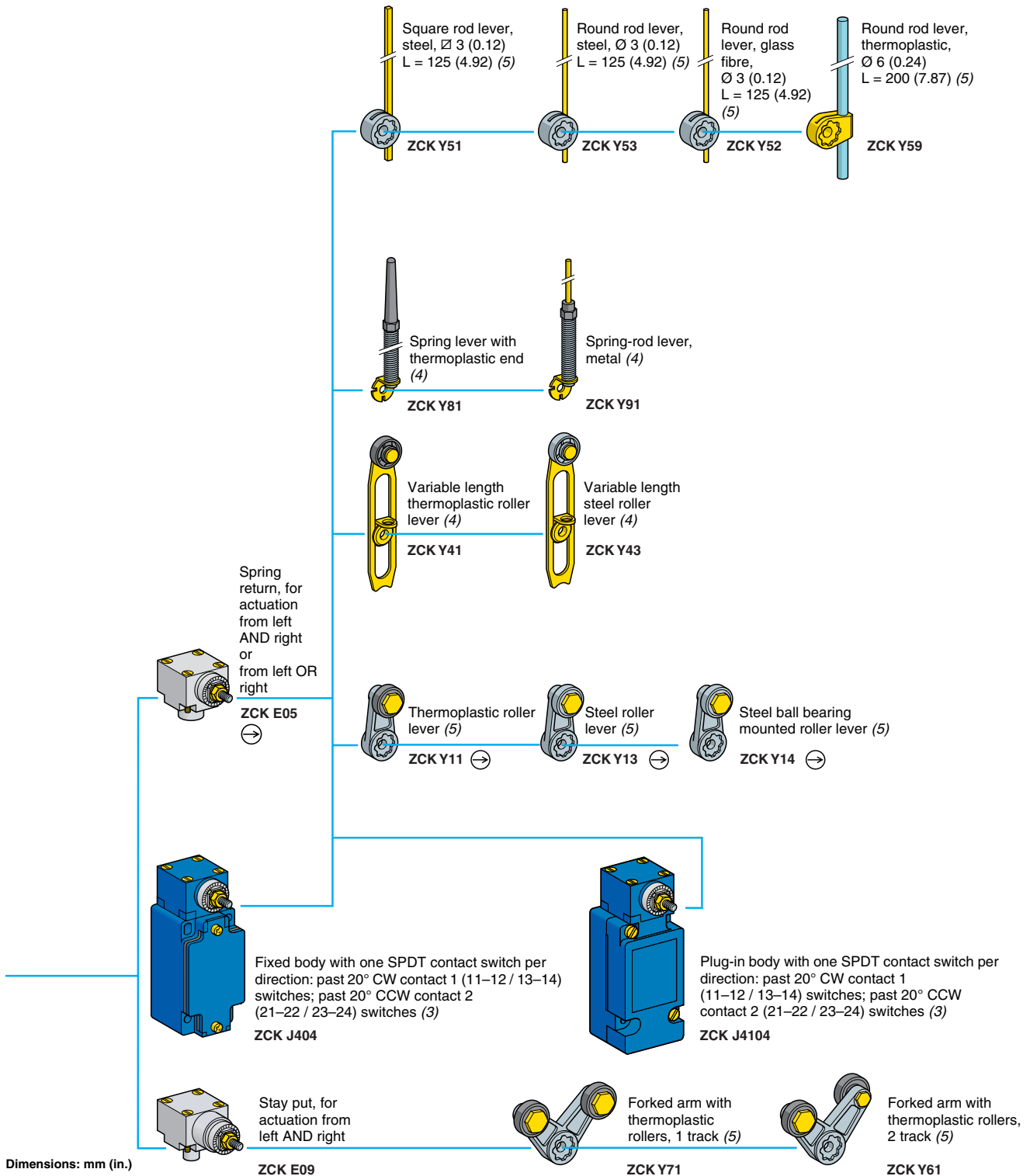


1. Cannot be used with bodies ZCKJ4 and ZCKJ41.
 2. For further details, see page 110.
 3. For a cable entry tapped ISO M20 x 1.5, add H29 to the catalog number. Example: ZCKJ1 becomes ZCKJ1H29.
 For a cable entry tapped 1/2" NPT, do not add an H code to the catalog number. Example: ZCKJ1.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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



Dimensions: mm (in.)

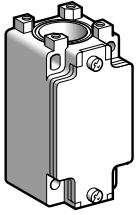
⊙: head assuring positive opening operation, when properly mounted and using a conforming operator.

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

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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



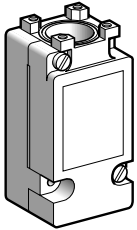
Fixed bodies with 2-pole contact						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
1 step	N/C + N/O snap action (XE2S P2151)		⊕	1/2" NPT	ZCKJ1	0.310 (0.683)
				ISO M20 x 1.5	ZCKJ1H29	0.310 (0.683)
	2 C/O simultaneous, snap action (XES P2021)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

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

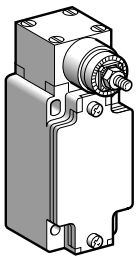
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

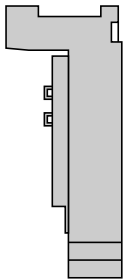
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry



ZCKJ•1



ZCKJ404



ZCKJ0•

Plug-in bodies with contact						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
1 step	Single-pole C/O snap action		—	1/2" NPT	ZCKJ11	0.300 (0.661)
				ISO M20 x 1.5	ZCKJ11H29	0.300 (0.661)
	Double-pole 2 C/O simultaneous, snap action		—	1/2" NPT	ZCKJ21	0.300 (0.661)
				ISO M20 x 1.5	ZCKJ21H29	0.300 (0.661)
2 step	Double-pole 2 C/O staggered, snap action		—	1/2" NPT	ZCKJ41	0.300 (0.661)
				ISO M20 x 1.5	ZCKJ41H29	0.300 (0.661)
Bodies with contact, with rotary head (without operating lever)						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
Fixed non-plug-in body						
Neutral position 1 from the left AND 1 from the right	One SPDT contact switch per direction: past 20° CW contact 1 (11–12 / 13–14) switches; past 20° CCW contact 2 (21–22 / 23–24) switches		—	1/2" NPT	ZCKJ404	0.455 (1.003)
				ISO M20 x 1.5	ZCKJ404H29	0.455 (1.003)
Plug-in body						
Neutral position 1 from the left AND 1 from the right	One SPDT contact switch per direction: past 20° CW contact 1 (11–12 / 13–14) switches; past 20° CCW contact 2 (21–22 / 23–24) switches		—	1/2" NPT	ZCKJ4104	0.465 (1.025)
				ISO M20 x 1.5	ZCKJ4104H29	0.465 (1.025)
Plug-in housing switch top only						
Description	For use with	Contacts	Catalog number	Weight kg (lb)		
Single-pole 1 C/O with positive opening operation	ZCKJ11	Silver	ZCKJ01	0.150 (0.331)		
Double-pole 2 C/O simultaneous with positive opening operation	ZCKJ21	Silver	ZCKJ02	0.160 (0.353)		
Double-pole 1 C/O + 1 C/O neutral position	ZCKJ41	Silver	ZCKJ04	0.160 (0.353)		

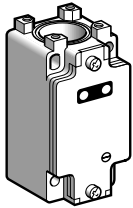
1. Ⓢ: N/C contact with positive opening operation, when properly mounted and using a conforming operator.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

With Indicator Light Module

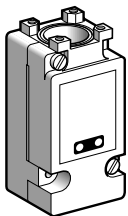


Fixed non-plug-in bodies with 2-pole contact						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
With module comprising 1 LED, 24 V$\overline{\text{---}}$						
1 step	N/C + N/O snap action (XE2S P2151)		\oplus	1/2" NPT	ZCKJ120	0.320 (0.705)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

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

Indicator light module characteristics

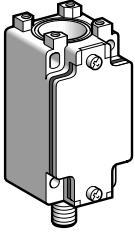
Type of indicator	1 LED or 2 LEDs	2 neon lights	
Rated insulation voltage	$\overline{\text{---}}$ 50 V, conforming to IEC 60947-1	250 V \sim , conforming to IEC 60947-1	
Current consumption	7 mA per LED	2.5 mA per neon	5 mA per neon
Rated operational voltage	24 V $\overline{\text{---}}$	110/120 V \sim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



Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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



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

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

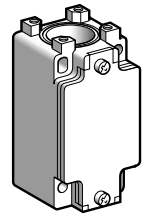
Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

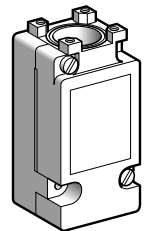
XCKJ—Modular, Fixed Non-plug-in or Plug-in Bodies with 1/2" NPT Cable Entry

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

Body with contacts—For plunger or rotary head



ZCKJ1



ZCKJ11

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

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

Setup:
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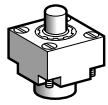
Dimensions:
page 124

Limit Switches

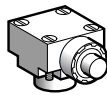
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

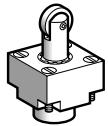
Low-Temperature Applications (−40 °F / −40 °C)



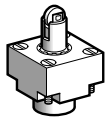
ZCKE616



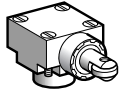
ZCKE636



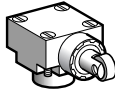
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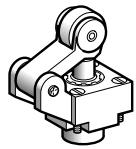
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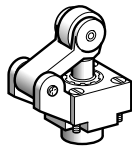
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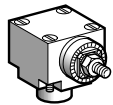
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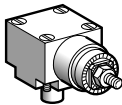
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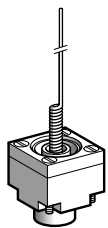
ZCKE236



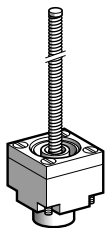
ZCKE056



ZCKE096



ZCKE066



ZCKE086

Plunger heads

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

Rotary heads (without operating lever)

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

Multi-directional heads

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

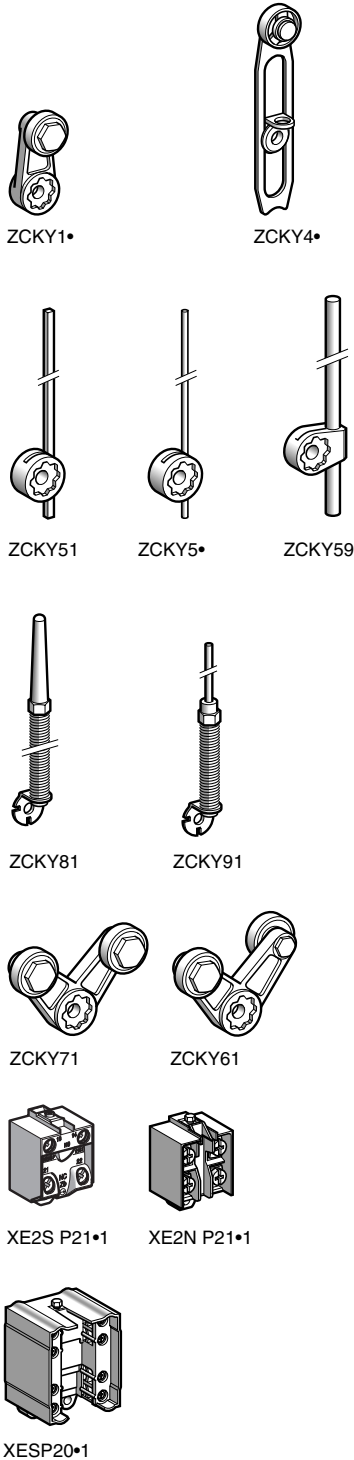
1. ⊖ : Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

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



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

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

Setup:
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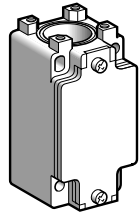
Dimensions:
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Limit Switches

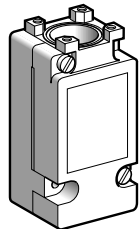
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

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



ZCKJ•



ZCKJ•15

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

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

Setup:
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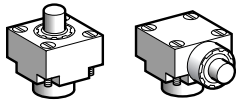
Dimensions:
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Limit Switches

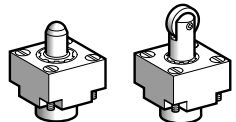
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

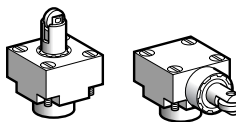
High-Temperature Applications (+248 °F /+120 °C)



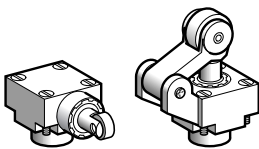
ZCKE615 ZCKE635



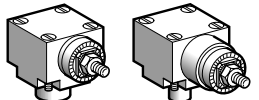
ZCKE665 ZCKE625



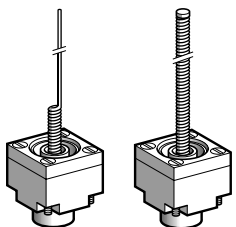
ZCKE675 ZCKE645



ZCKE655 ZCKE235



ZCKE055 ZCKE095



ZCKE065 ZCKE085

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

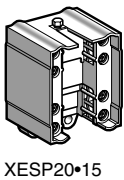
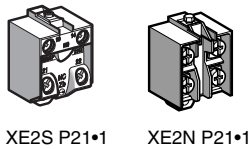
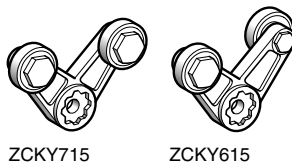
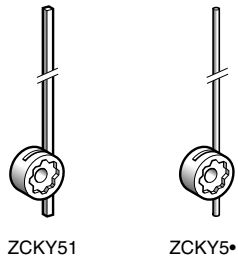
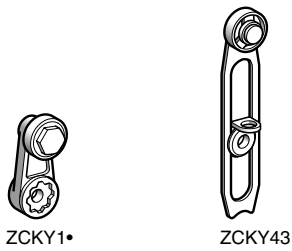
1. ⊖ : Operating head able to guarantee positive opening operation, when properly mounted and using a conforming operator. The positive opening feature requires additional travel past the trip point. See the contact function diagrams.

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

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



Operating levers for rotary heads

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

For actuation by any moving part

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

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

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

2- or double-pole contact blocks

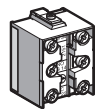
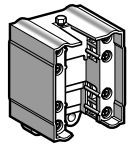
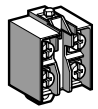
Type of operator	Function diagram	For body type	Positive operation (1)	Catalog number	Weight kg (lb)
1 N/C + 1 N/O snap action		ZCKJ1	⊖	XE2SP2151	0.020 (0.044)
1 N/C + 1 N/O break before make slow break		ZCKJ5	⊖	XE2NP2151	0.020 (0.044)
2 C/O simultaneous snap action		ZCKJ25	—	XESP20215	0.045 (0.099)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

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

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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



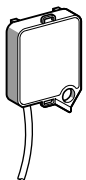
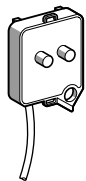
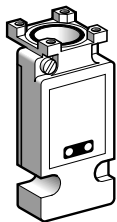
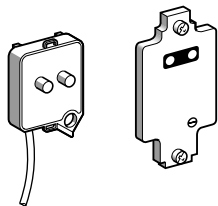
Contact blocks					
Type of contact	Function diagram	For bodies	Positive operation (1)	Catalog number	Weight kg (lb)
2-pole contact					
N/C + N/O snap action		ZCKJ1 ZCKJ1D	⊕	XE2S P2151	0.020 (0.044)
N/C + N/O break before make, slow break		ZCKJ5 ZCKJ5D	⊕	XE2N P2151	0.020 (0.044)
2 C/O simultaneous,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

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

Limit Switches

Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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



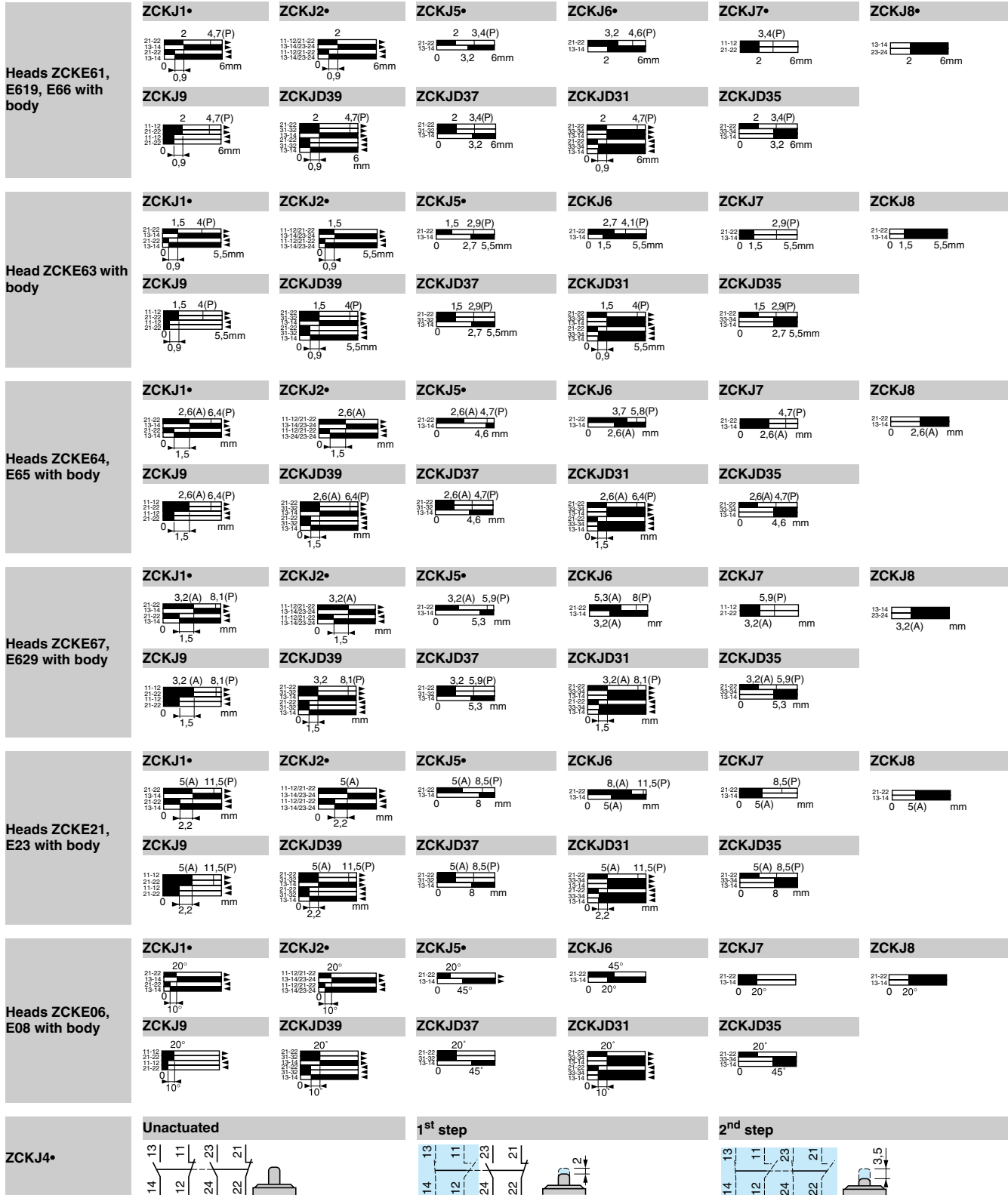
Covers + indicator light module				
For use with	Number and type of indicators	Voltage	Catalog number	Weight kg (lb)
Fixed non-plug-in body	1 LED	24 V \cdots	ZCK Z020	0.060 (0.132)
	2 LEDs	24 V \cdots	ZCK Z021	0.060 (0.132)
	2 neon lights	110/120 V \sim	ZCK Z033	0.060 (0.132)
		220/240 V \sim	ZCK Z034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

Limit Switches

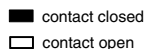
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

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



Contact operation



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

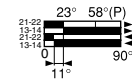
Limit Switches

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

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

Head ZCKE05 with body

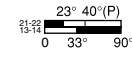
ZCKJ1•



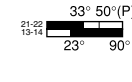
ZCKJ2•



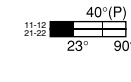
ZCKJ5•



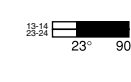
ZCKJ6



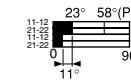
ZCKJ7



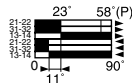
ZCKJ8



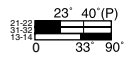
ZCKJ9



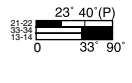
ZCKJD39



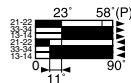
ZCKJD37



ZCKJD39

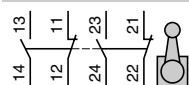


ZCKJD31

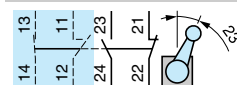


ZCKJ4•

Unactuated



1st step, actuated from left or right

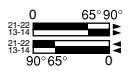


2nd step, actuated from left or right

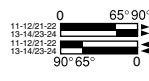


Head ZCKE09 with body

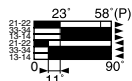
ZCKJ1•



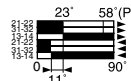
ZCKJ2•



ZCKJD31

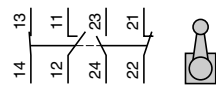


ZCKJD39

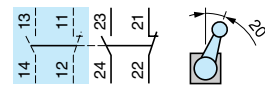


ZCKJ404, J4104 (body with head)

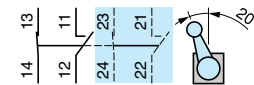
Unactuated



Actuated from left



Actuated from right



Contact operation

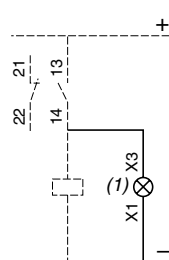
■ contact closed
□ contact open

(P) = positive opening point

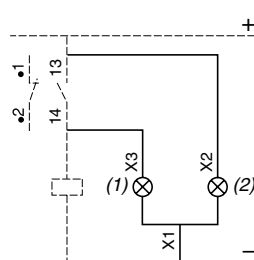
Wiring diagrams

Indicator light modules

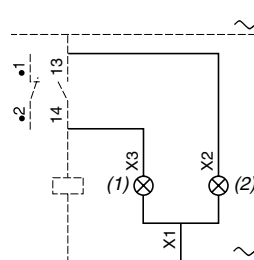
1 LED, 24 V_{DC}



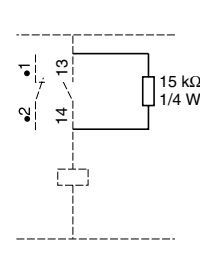
2 LEDs, 24 V_{DC}



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

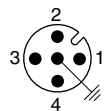


Module with resistor



1. Orange indicator
2. Green indicator

ZCKJ•D



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



Limit Switches

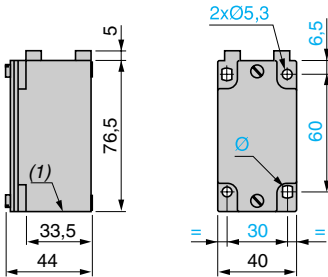
Osiswitch® Classic, Metal, Conforming to CENELEC EN 50041

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

Bodies

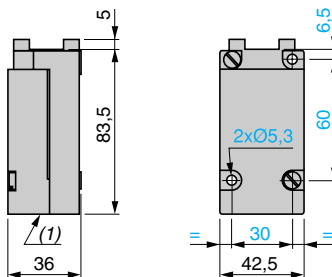
Non-plug-in

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



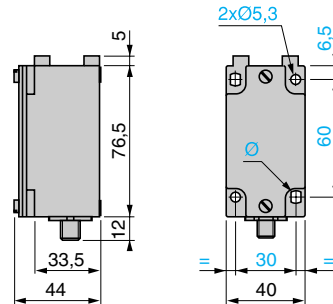
Plug-in

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



Non-plug-in

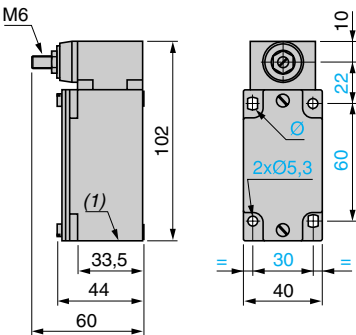
ZCKJ1D, J5D, J6D, J7D, J8D



Bodies with rotary head mounted

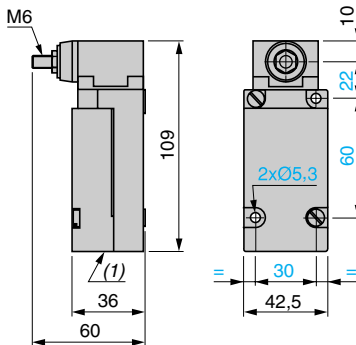
Non-plug-in

ZCKJ404, ZCKJ404H29



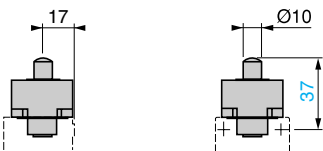
Plug-in

ZCKJ4104, ZCKJ4104H29

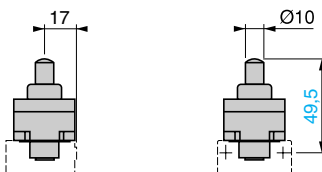


Plunger heads

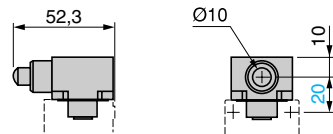
ZCKE61



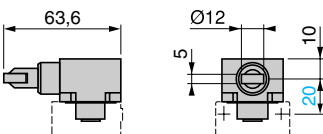
ZCKE619



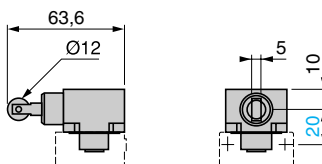
ZCKE63



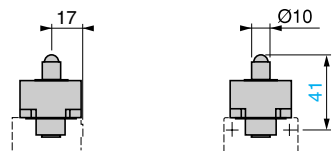
ZCKE64



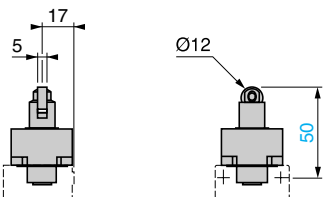
ZCKE65



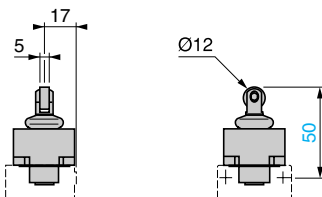
ZCKE66



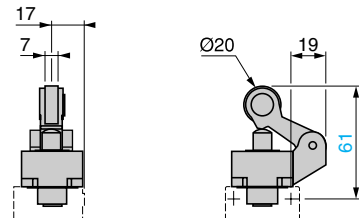
ZCKE62, ZCKE67



ZCKE629



ZCKE21, E23

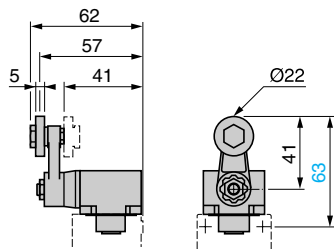


1: 1 tapped entry for 1/2" NPT.
Ø: 2 elongated holes Ø 5.3 x 7.3.

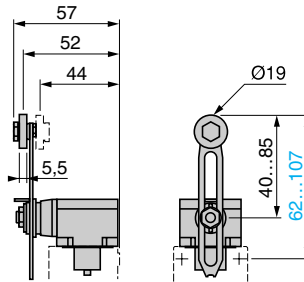
Limit Switches

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

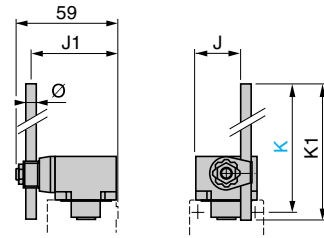
Rotary head ZCKE05 with operating lever ZCKY11, Y13, Y14



ZCKY41, Y43

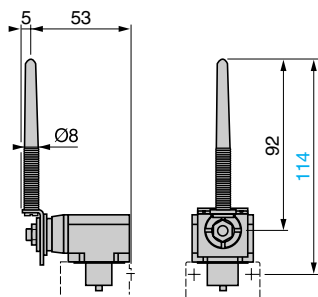


ZCKY51, Y52, Y53, Y59

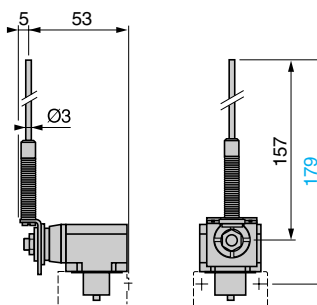


	J	J1	K max	K1	Ø
ZCKY51	20	49	137	123	Ø 3
ZCKY52	20	49	137	125	Ø 3
ZCKY53	20	49	137	125	Ø 3
ZCKY59	26.2	48	212	200	Ø 6

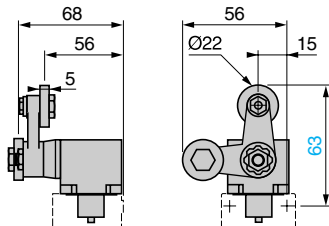
ZCKY81



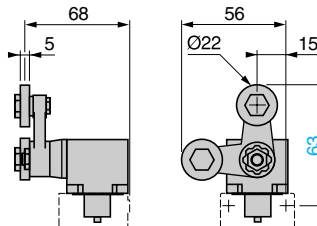
ZCKY91



Rotary head ZCKE09 with operating lever ZCKY61

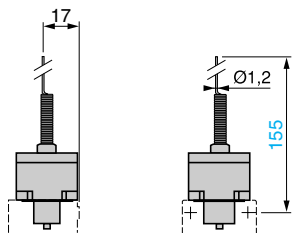


ZCKY71

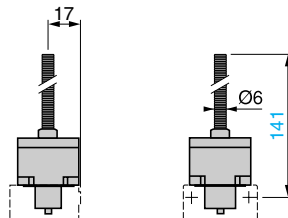


Multi-directional heads

ZCKE06



ZCKE08



NOTE: Operating lever spindle threaded M6.

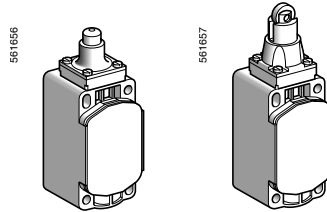
Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated

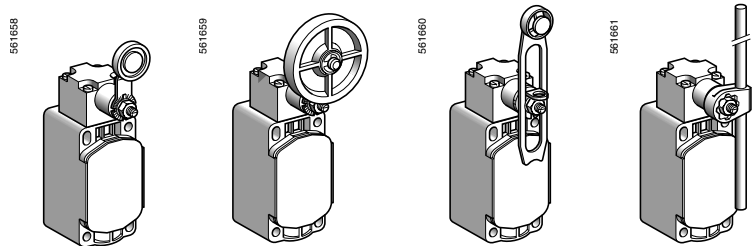
■ XCKS
fixed, non-plug-in body with 1 cable entry

□ With head for linear movement (plunger) operators



Page 128

□ With head for rotary movement (lever) operators



Page 128

Environmental characteristics

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

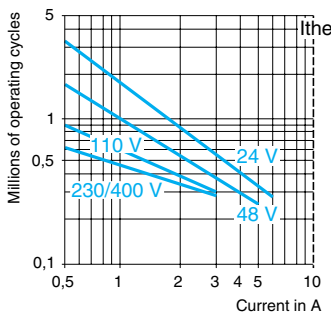
Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated

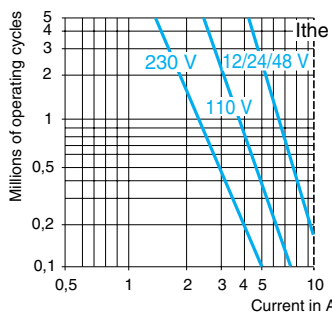
Contact block characteristics		
Rated operational characteristics	XE2•P	~ AC-15; A300 (Ue = 240 V, Ie = 3 A); Ithe = 10 A --- DC-13; Q300 (Ue = 250 V, Ie = 0,27 A), conforming to IEC 60947-5-1 Appendix A, EN 60947-5-1
	XE3•P	~ AC-15; B300 (Ue = 240 V, Ie = 1,5 A); Ithe = 6 A --- DC-13; R300 (Ue = 250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

XE2SP21•1, XE2SP2141

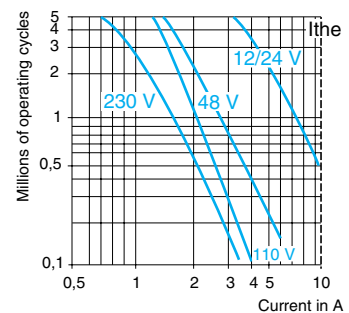


a.c. supply
~ 50/60 Hz
~ inductive circuit

XE2NP21•1



XESP3021



d.c. supply ---

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
~	W	10	7	4

Power switched in W for 5 million operating cycles.

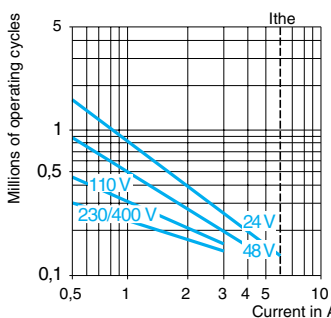
Voltage	V	24	48	120
~	W	13	9	7

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
~	W	10	7	4

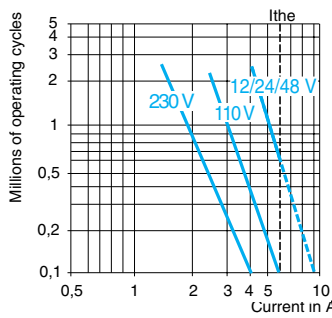
For XE2SP•151 on ~ or ---, N/C and N/O contacts simultaneously loaded to the values shown with reverse polarity.

XE3SP••••



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

XE3NP••••



d.c. supply ---

Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
~	W	3	2	1


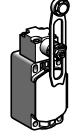







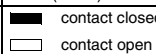
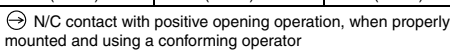





Power switched in W for 5 million operating cycles.

Voltage	V	24	48	120
~	W	4	3	2

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

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

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

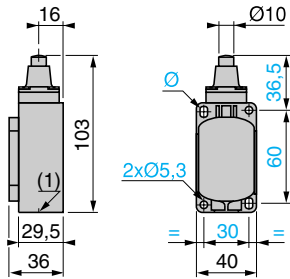
- Form conforming to EN 50041. See page 23.
- Switches with gold contacts or eyelet type connections: please consult your local sales office.
- To convert PG 13 to 1/2" NPT, use adapter DE9RA1212. For ISO M20 x 1.5, add H29 to the end of the catalog number. Example: XCKS101 becomes XCKS101H29.
- Adjustable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

Limit Switches

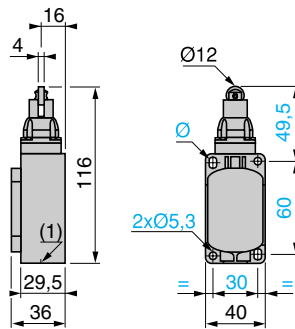
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

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

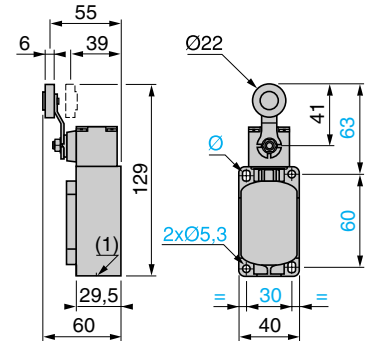
XCKS-01
ZCKS• + ZCKD01



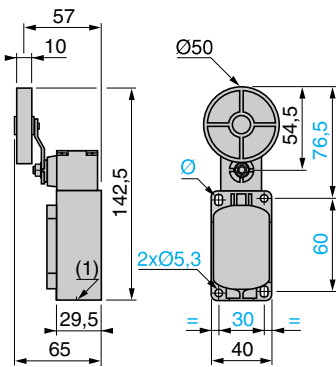
XCKS-02
ZCKS• + ZCKD02



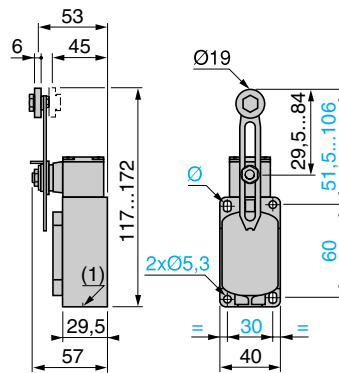
XCKS-31
ZCKS• + ZCKD31



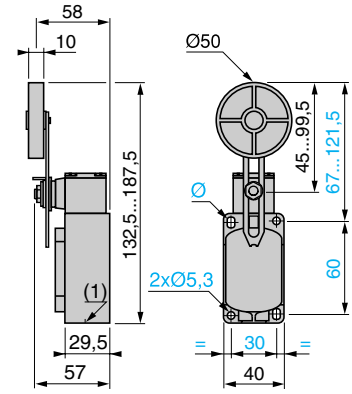
XCKS-39
ZCKS• + ZCKD39



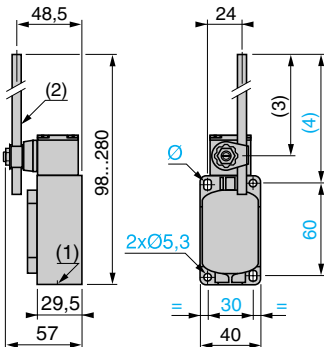
XCKS-41
ZCKS• + ZCKD41



XCKS-49
ZCKS• + ZCKD49



XCKS-59
ZCKS• + ZCKD59

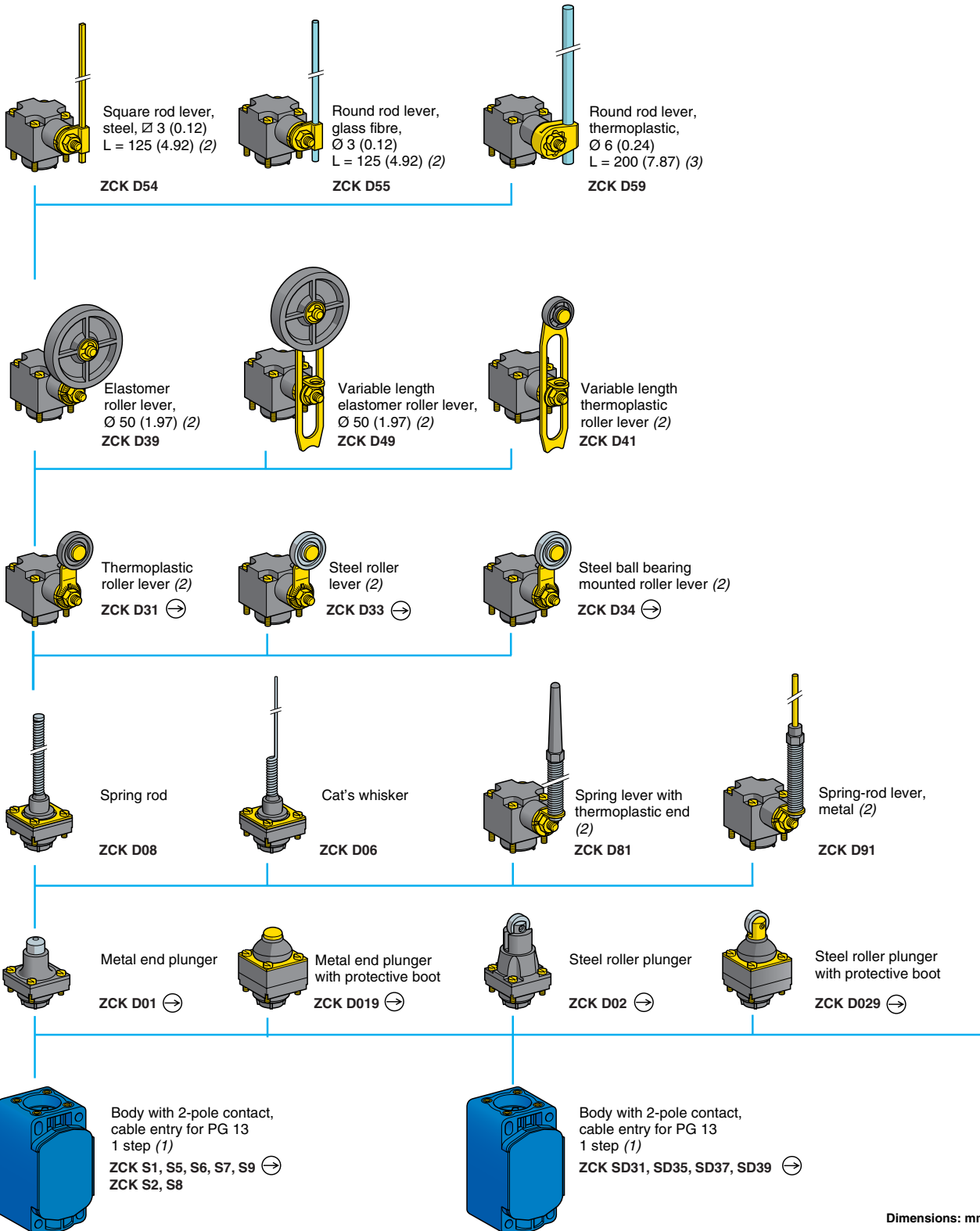


1. 1 tapped entry for PG 13 conduit thread (convertible to 1/2" NPT using adapter DE9RA1212, included); or
1 tapped entry for ISO M20 x 1.5 conduit thread (with suffix H29 added to the catalog number).
 2. Rod Ø 6 mm (0.24 in.), length 200 mm (7.87 in.)
 3. 190 max.
 4. 212 max.
- Ø: 2 elongated holes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

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



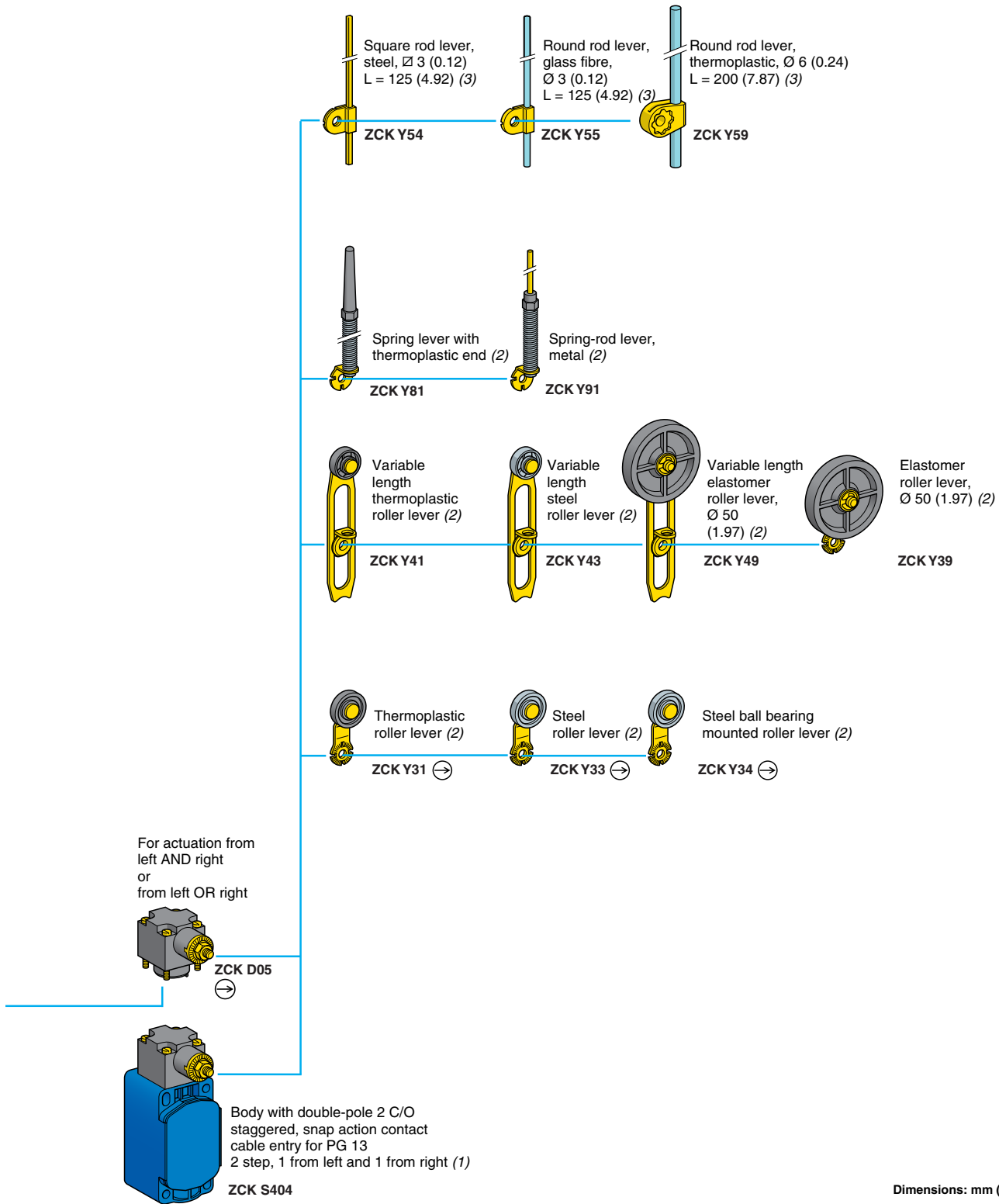
Dimensions: mm (in.)

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

Limit Switches

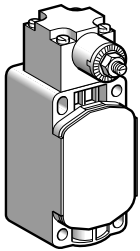
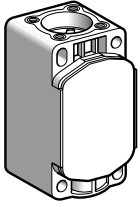
Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



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

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



Limit Switches

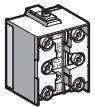
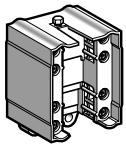
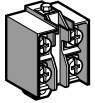
Bodies with 2-pole contact						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
1 step	N/C + N/O snap action (XE2S P2151)		⊕	1/2" NPT	ZCKS1	0.080 (0.176)
				ISO M20 x 1.5	ZCKS1H29	0.080 (0.176)
	2 C/O simultaneous, snap action (XES P3021)		-	1/2" NPT	ZCKS2	0.080 (0.176)
				ISO M20 x 1.5	ZCKS2H29	0.080 (0.176)
	N/C + N/O break before make, slow break (XE2N P2151)		⊕	1/2" NPT	ZCKS5	0.080 (0.176)
				ISO M20 x 1.5	ZCKS5H29	0.080 (0.176)
	N/O + N/C make before make, slow break (XE2N P2161)		⊕	1/2" NPT	ZCKS6	0.080 (0.176)
				ISO M20 x 1.5	ZCKS6H29	0.080 (0.176)
	N/C + N/C simultaneous, slow break (XE2N P2141)		⊕	1/2" NPT	ZCKS7	0.080 (0.176)
				ISO M20 x 1.5	ZCKS7H29	0.080 (0.176)
	N/O + N/O simultaneous, slow break (XE2N P2131)		-	1/2" NPT	ZCKS8	0.080 (0.176)
				ISO M20 x 1.5	ZCKS8H29	0.080 (0.176)
N/C + N/C snap action (XE2S P2141)		⊕	1/2" NPT	ZCKS9	0.080 (0.176)	
			ISO M20 x 1.5	ZCKS9H29	0.080 (0.176)	
Bodies with double-pole contact and spring return rotary head						
Without operating lever						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
2 step 1 from left and 1 from right	2 C/O staggered, snap action		-	1/2" NPT	ZCKS404	0.150 (0.331)
				ISO M20 x 1.5	ZCKS404H29	0.150 (0.331)
Bodies with 3-pole contact and 1 cable entry						
Type	With contact block	Function diagram	Positive operation (1)	Cable entry	Catalog number	Weight kg (lb)
1 step	N/C + N/O + N/O snap action (XE3S P2151)		⊕	1/2" NPT	ZCKSD31	0.080 (0.176)
				ISO M20 x 1.5	ZCKSD31H29	0.080 (0.176)
	N/C + N/C + N/O snap action (XE3S P2141)		⊕	1/2" NPT	ZCKSD39	0.080 (0.176)
				ISO M20 x 1.5	ZCKSD39H29	0.080 (0.176)
	N/C + N/C + N/O break before make, slow break (XE3N P2141)		⊕	1/2" NPT	ZCKSD37	0.080 (0.176)
				ISO M20 x 1.5	ZCKSD37H29	0.080 (0.176)
	N/C + N/O + N/O break before make, slow break (XE3N P2151)		⊕	1/2" NPT	ZCKSD35	0.080 (0.176)
				ISO M20 x 1.5	ZCKSD35H29	0.080 (0.176)

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

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

XCKS—Double Insulated, Modular



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

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

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

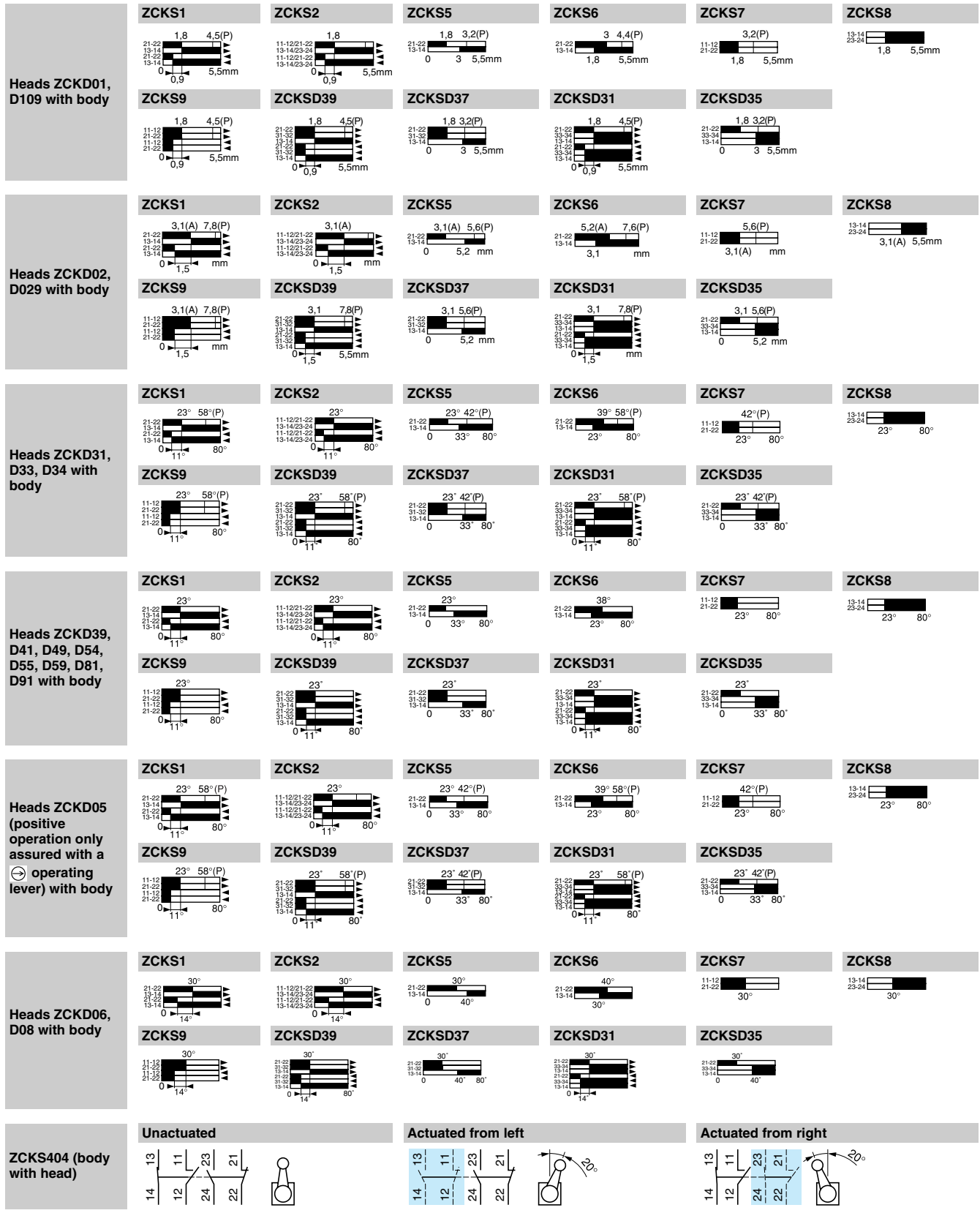
1/2" NPT Adapter

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

Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 5041

XCKS—Double Insulated, Modular



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

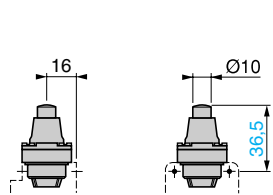
Limit Switches

Osiswitch® Classic, Plastic, Conforming to CENELEC EN 50041

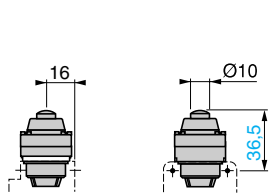
XCKS—Double Insulated, Modular

Plunger heads

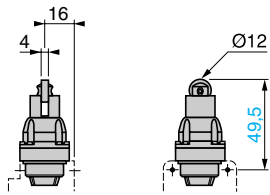
ZCKD01



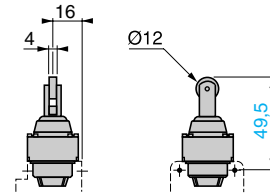
ZCKD019



ZCKD02

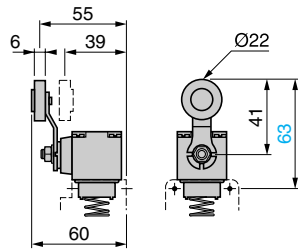


ZCKD029

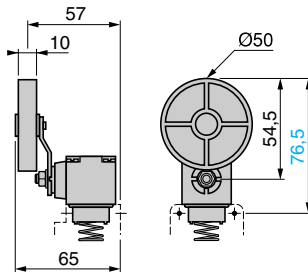


Rotary heads

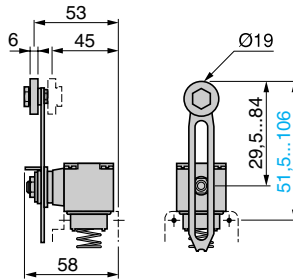
ZCKD31, D33, D34



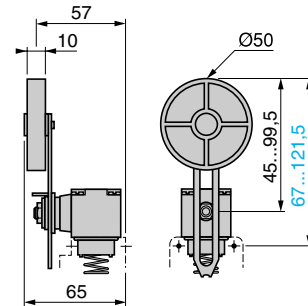
ZCKD39



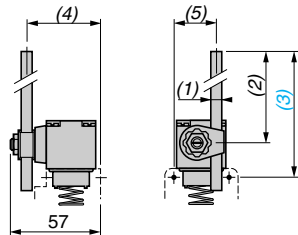
ZCKD41



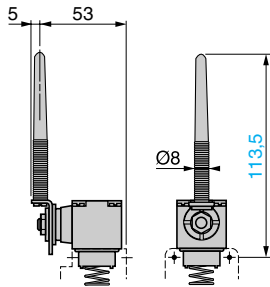
ZCKD49



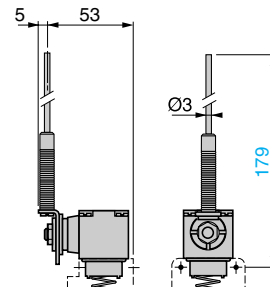
ZCKD54, D55, D59



ZCKD81



ZCKD91

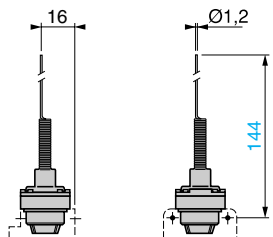


ZCK	(1) rod	(2)	(3)	(4)	(5)
D54	Ø 3, L = 125	115 max.	137 max.	49	24
D55	Ø 3, L = 125	115 max.	137 max.	49	24
D59	Ø 6, L = 200	190 max.	212 max.	46.5	26.2

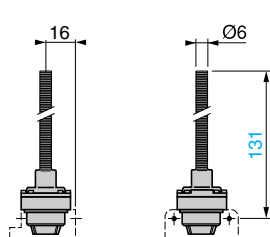
NOTE: operating lever spindle threaded M6.

Multi-directional heads

ZCKD06



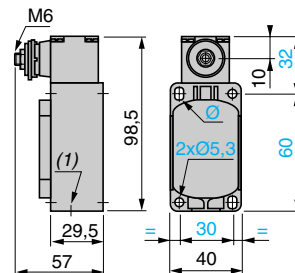
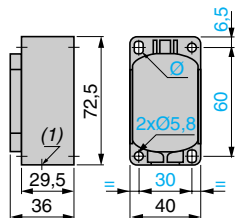
ZCKD08



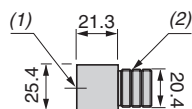
Bodies with contacts

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

ZCKS404, S404H29



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



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

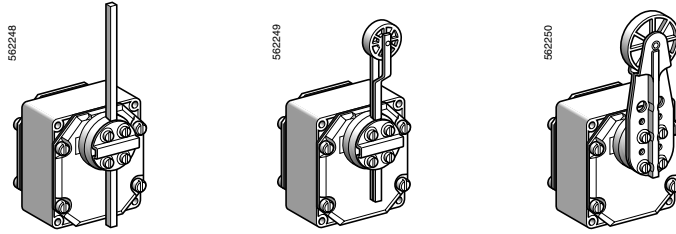
1. 1 tapped entry for PG 13 conduit thread (convertible to 1/2" NPT using adapter DE9RA1212); or 1 tapped entry for ISO M20 x 1.5 conduit thread (with suffix H29 added to the catalog number).
- Ø: 2 elongated holes Ø 5.3 x 7.3.

Limit Switches

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

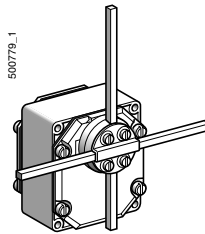
■ XCR

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



Page 138

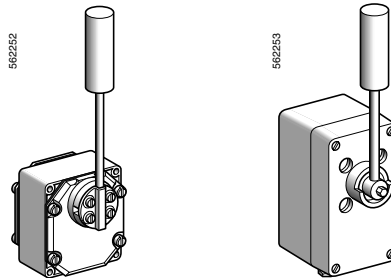
□ With head for rotary movement operators, stay put
1 contact actuation position per direction



Page 138

■ XCRT

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



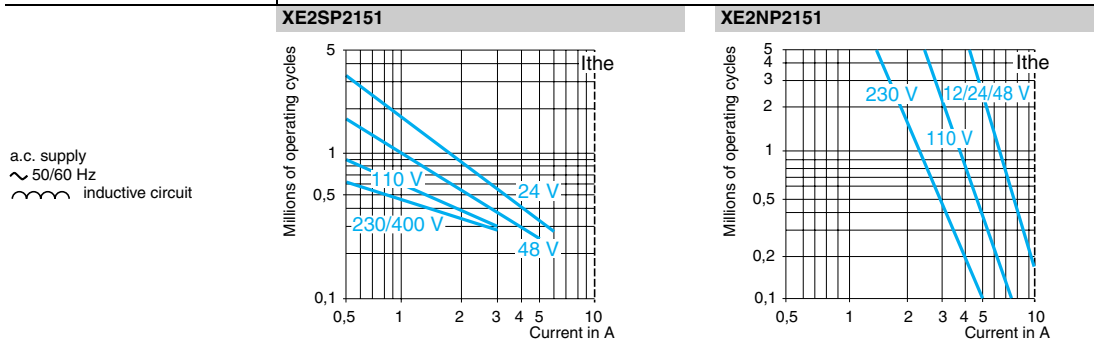
Page 140

Limit Switches

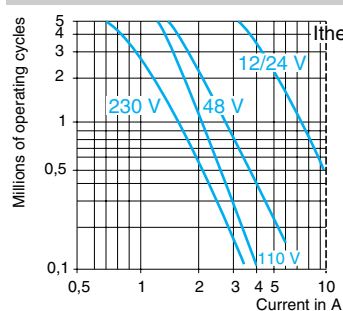
Osiswitch® Classic, For Hoisting, Mechanical Handling, and Conveyor Belt Shift Monitoring XCR and XCRT

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

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



XCRT contacts



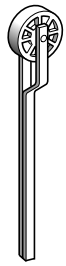
d.c. supply =	Voltage	24 V	48 V	120 V
Power switched in W for 5 million operating cycles W	XE2SP2151	10	7	4
	XE2NP2151	13	9	7
	XCRT contacts	10	7	4

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

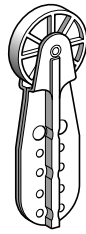
Limit Switches

Osiswitch® Classic, For Hoisting and Material Handling

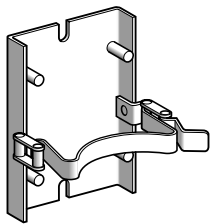
XCR—Complete Switches with One Cable Entry



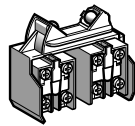
XCRZ02



XCRZ05



XCRZ09



XCRZ1•

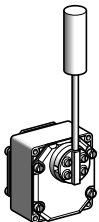
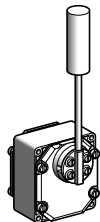
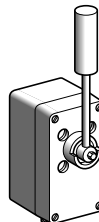
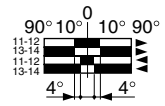
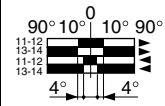
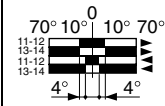
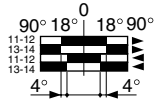
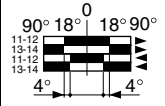
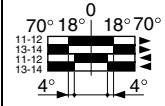
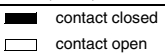
Separate components

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

Limit Switches

Osiswitch® Classic, For Conveyor Belt Shift Monitoring


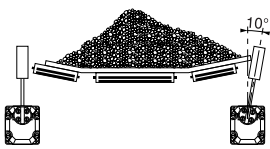
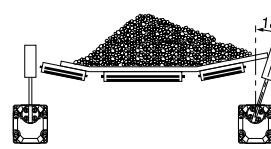
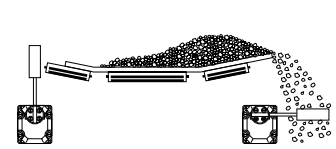
XCRT—Complete Switches with One Cable Entry and 1/2" NPT Adapter Included

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

Complementary characteristics not shown under general characteristics (page 127)

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

Switch operation

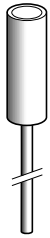
Normal position	Fault signalling	Stopping of the conveyor belt	Maximum rotation
			

Dimensions:
page 143

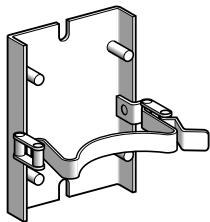
Limit Switches

Osiswitch® Classic, For Conveyor Belt Shift Monitoring

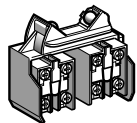
XCRT—Complete Switches with One Cable Entry and 1/2" NPT Adapter Included



XCRZ9**



XCRZ09



XCRZ42

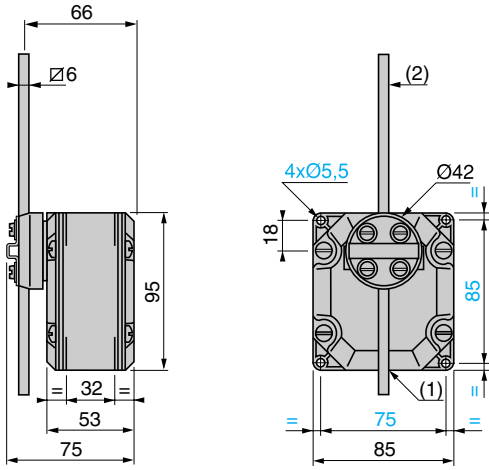
Separate components

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)

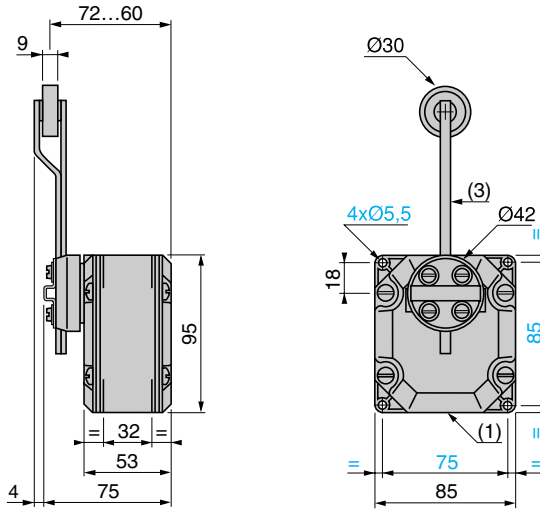
Limit Switches

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

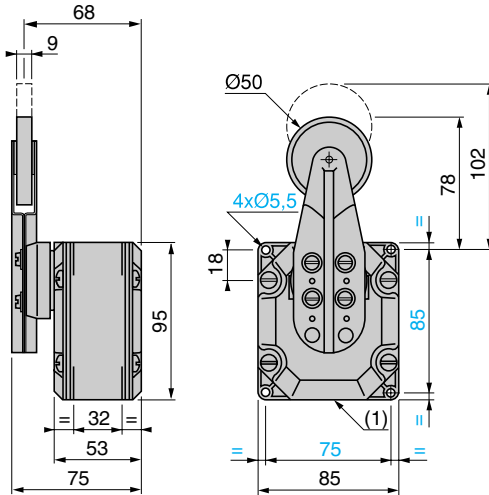
XCRA11, B11, A51, B51



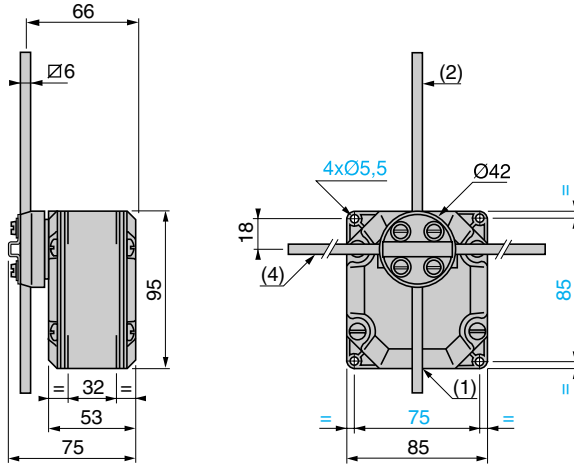
XCRA12, B12, A52, B52



XCRA15, B15, A55, B55



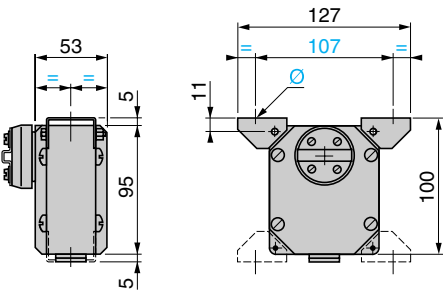
XCRE18, E58, F17, F57



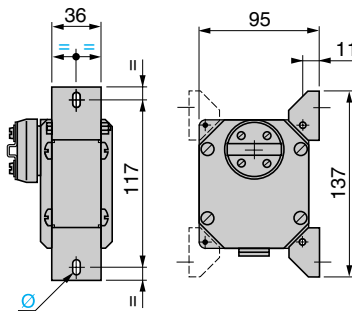
- 1. 1 tapped entry for PG 13 conduit thread.
- 2. Rod length: 200 mm (7.87 in.).
- 3. Rod + roller length: 160 mm (6.30 in.).
- 4. Rod length: 300 mm (11.81 in.) for XCRF17 and F57, 200 mm (7.87 in.) for XCR E18 and E58.

Supplementary mounting using 2 adjustable lugs (included with switch)

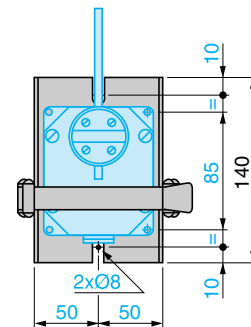
Horizontally positioned



Vertically positioned



Quick mounting/release bracket XCRZ09



Ø: 1 elongated hole Ø 6 x 8.

Characteristics:
pages 137 and 138

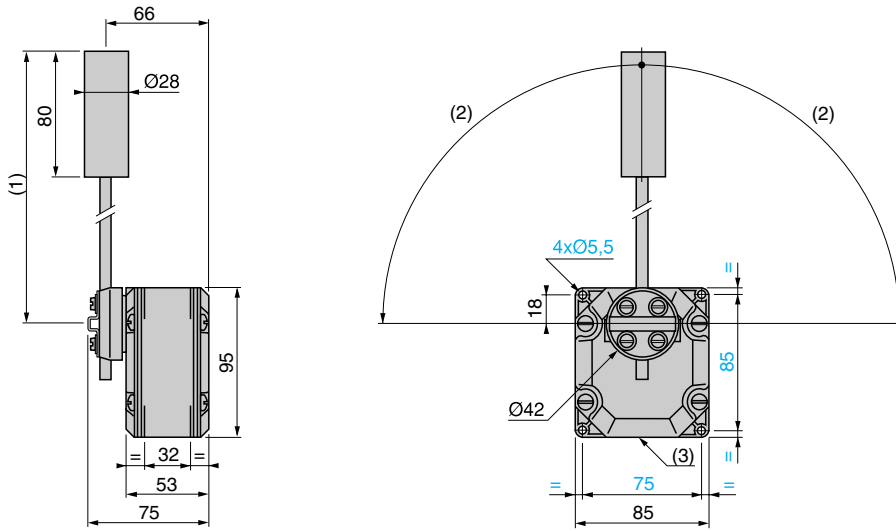
Catalog numbers:
page 138

Operation:
page 138

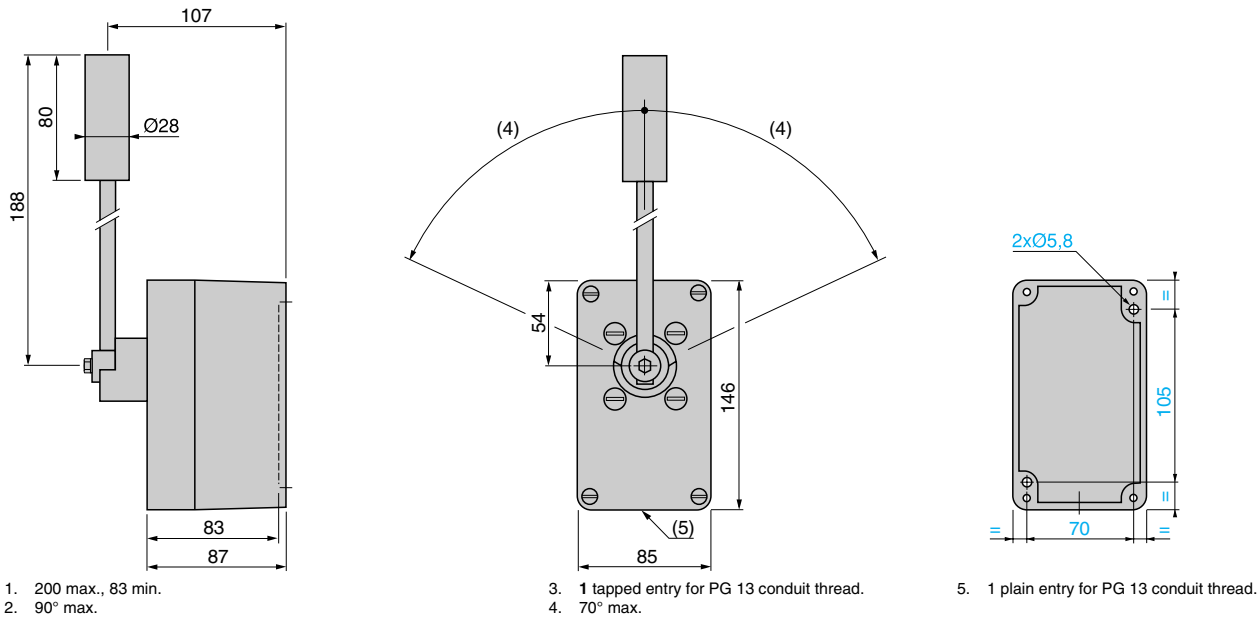
Limit Switches

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

XCRT115, T215



XCRT315



1. 200 max., 83 min.

2. 90° max.

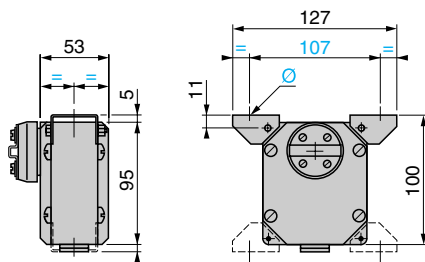
3. 1 tapped entry for PG 13 conduit thread.

4. 70° max.

5. 1 plain entry for PG 13 conduit thread.

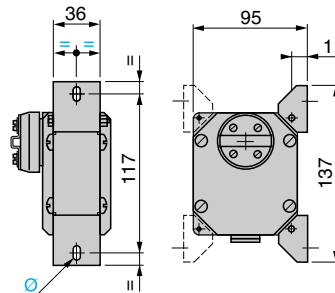
Supplementary mounting using 2 adjustable lugs (included with XCRT115 and T215)

Horizontally positioned

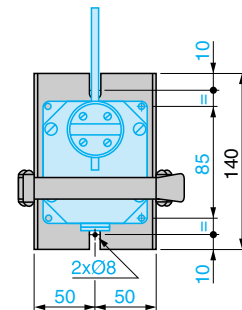


Ø: 1 elongated hole Ø 6 x 8.

Vertically positioned



Quick mounting/release bracket XCRZ09



Characteristics:
pages 137 and 140

Catalog numbers:
page 140

Operation:
page 141

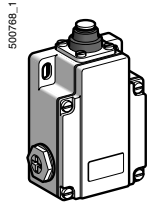
Limit Switches

Osiswitch® Classic, For Material Handling

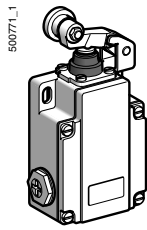
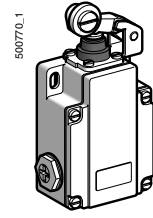
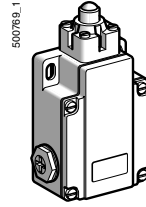
XC1AC

■ XC1AC
with slow break contacts

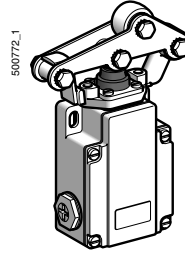
□ With head for linear movement (plunger)



Page 146



Page 146



Limit Switches

Osiswitch® Classic, For Material Handling

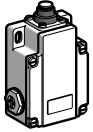
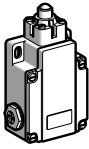


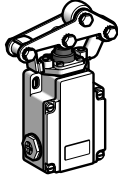
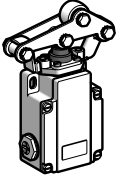

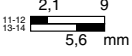
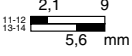
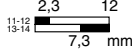
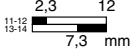
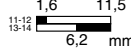
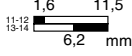

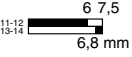
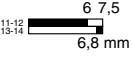
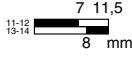
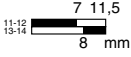
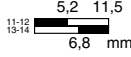
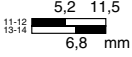

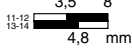
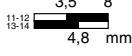
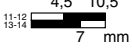
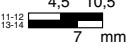
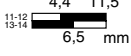
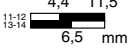

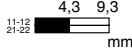
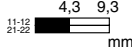


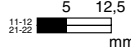
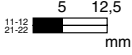

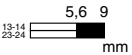
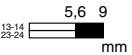
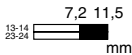
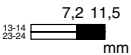

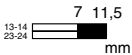

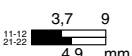
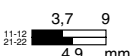
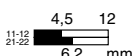
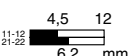
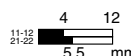
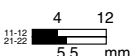

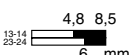
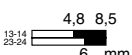
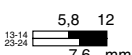

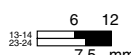
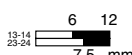
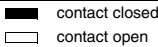


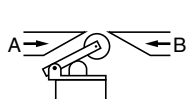
XC1AC

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

Limit Switches

Osiswitch® Classic, For Material Handling

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

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

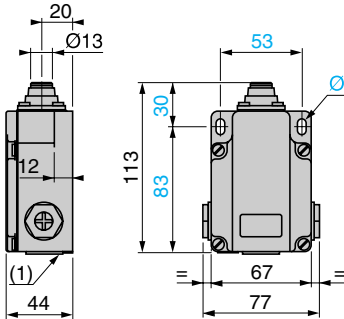
1. For a 45° cam the maximum actuation speed becomes 0.5 m/s (1.64 ft/s) and for a 15° cam, 1 m/s (3.28 ft/s).

Limit Switches

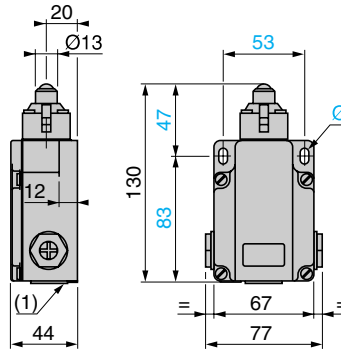
Osiswitch® Classic, For Material Handling

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

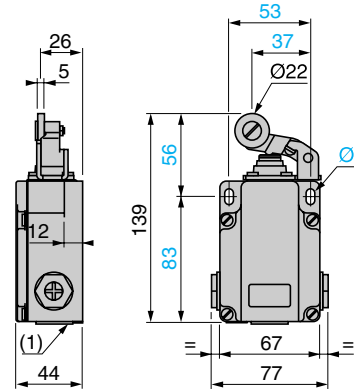
XC1AC1•1



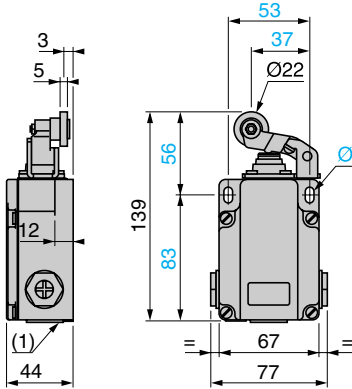
XC1AC1•5



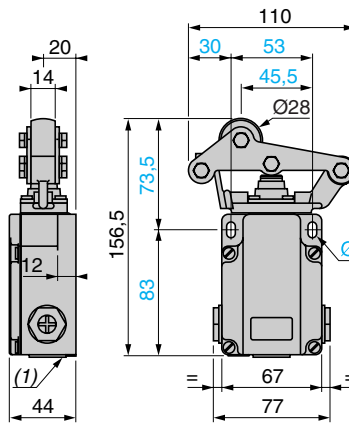
XC1AC1•6



XC1AC1•8

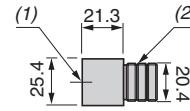


XC1AC1•7, XC1AC1•9



DE9RA1212

(PG 13 to 1/2" NPT adapter)



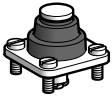
1. Tapped entry for 1/2" NPT conduit
2. PG 13 threaded sleeve

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

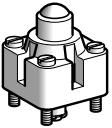
Limit Switches

Osiswitch® Classic, For Material Handling

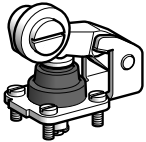
XC1AC—Renewal Parts



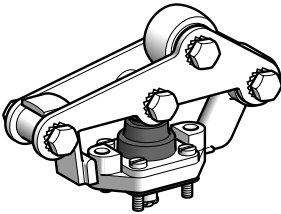
ZC1AC001



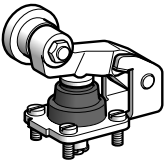
ZC1AC005



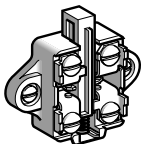
ZC1AC006



ZC1AC007
ZC1AC009



ZC1AC008



ZC1AZ1•

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

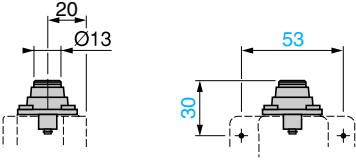
Limit Switches

Osiswitch® Classic, For Material Handling

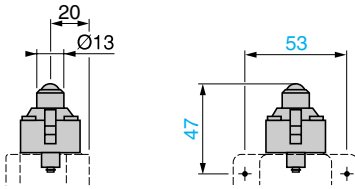
XC1AC—Renewal Parts

Dimensions

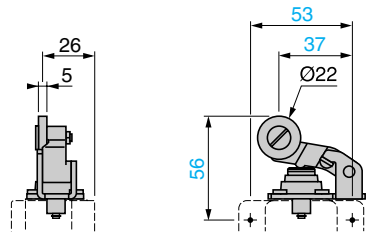
ZC1AC001



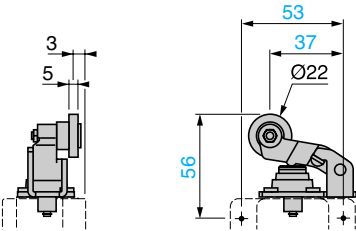
ZC1AC005



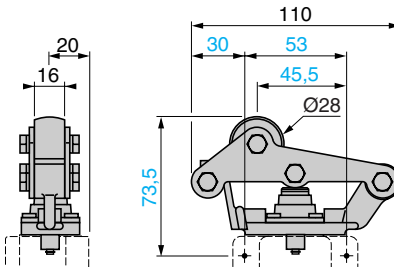
ZC1-AC006



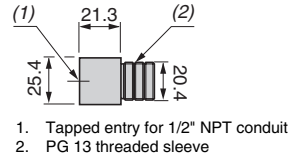
ZC1AC008



ZC1AC007, AC009



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



Limit Switches
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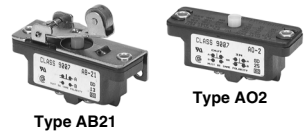
Limit Switches

Snap Action Industrial Switches

Class 9007

Industrial Snap Switches and Limit Switches without Enclosures

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



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

Quick Make and Break

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

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

Maximum Current Ratings For Control Contacts—All Types

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

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



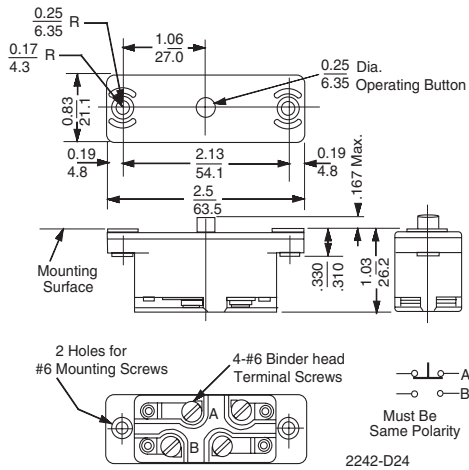
Limit Switches

Snap Action Industrial Switches

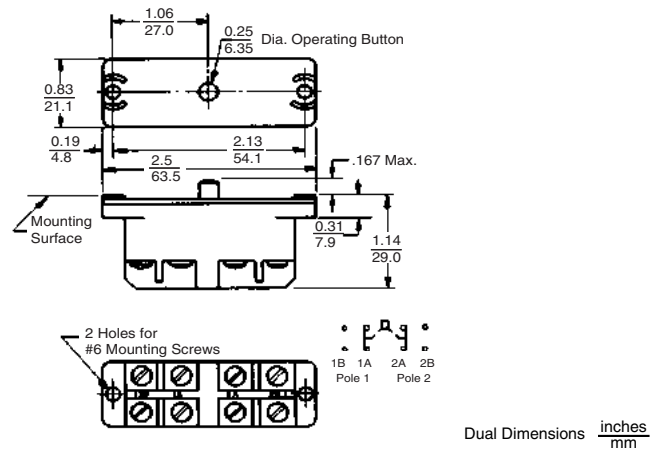
Class 9007

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

Class 9007 Type AO, Single-Pole Snap Switch



Class 9007 Type CO, Two-Pole Snap Switch

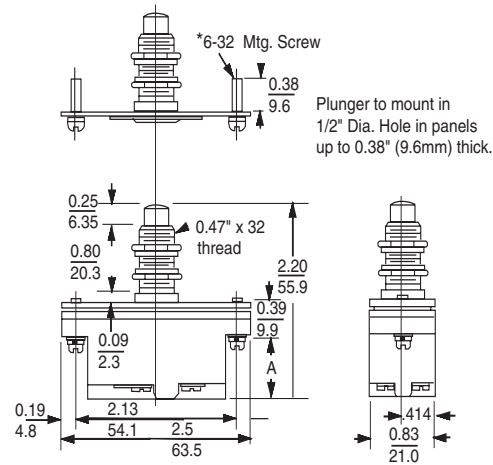


	Operating Data, in. (mm)	
	AO1, 1A, 1B	AO2, 2A, 2B
Pre-travel	0.057-0.074 (1.4-1.8)	0.057-0.074 (1.4-1.8)
Differential	0.015-0.025 (0.6-0.6)	0.035-0.046 (0.9-1.16)
Total travel	0.103-0.125 (2.6-3.2)	0.103-0.125 (2.6-3.2)
Operating force	7-11 oz (0.05-0.08 N)	10-14 oz (0.07-0.1 N)

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

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

Type AP201, 221, and CP221



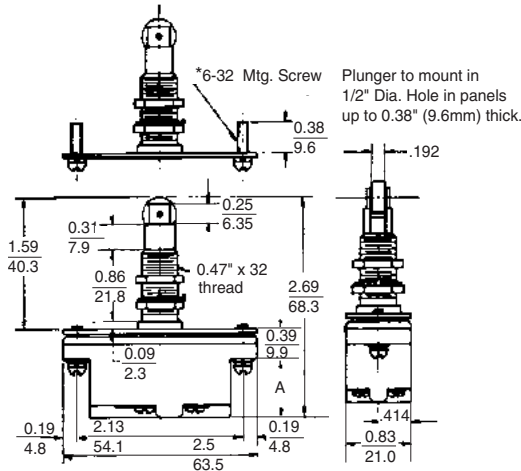
NOTE: Type AP221 shown.

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

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

Note: Shipping weight 0.25 lb (0.11 kg).

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



NOTE: Type AP321 shown.

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

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

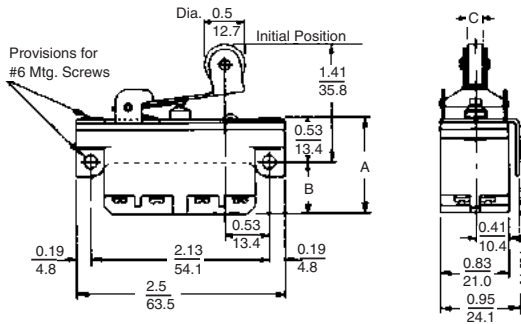
Limit Switches

Snap Action Industrial Switches

Class 9007

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

Types AB21 through 24 and CB31 through 34



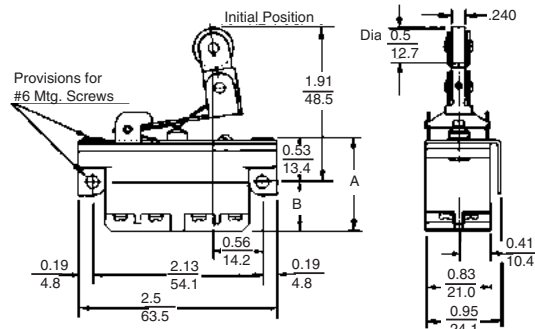
Note: Type CB31 RH mounting shown.
Type AB41 and CB41 same as above except without side mounting plates.

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

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

Note: Shipping weight 0.25 lb (0.11 kg).

Types AB25, 26 and CB35, 36



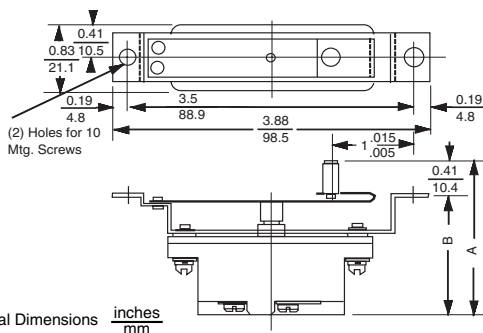
Note: Type CB35 mounting shown.

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

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

Types AC1 and CC1

Dimensions



Note: Type AC1 shown.

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

Note: Shipping weight 0.25 lb (0.11 kg).

Operating Data

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

Limit Switches

Miniature

Class 9007 Type MS and ML



Shown with Standard Bottom Entrance Cable



Shown with 4-Pin Micro-Connector

Description

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

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

Features

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

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

Options

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

Rotary Head

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

Bulkhead Mounted Mini-Switches

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

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



File E42259
CCN NKCR



File LR 25490
Class 3211 03

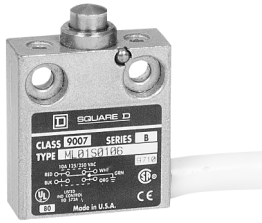


Marking

Limit Switches

Miniature

Class 9007 Types MS and ML



Shown with Side-Entrance Cable

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

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

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

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

Type ML Circuit—Form Z	Electrical Rating/SPDT-DB Silver Contacts		
	Voltage	Make	Break
1 N.O.—1 N.C.	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	MS	ML
		Parallel roller plunger		Bushing mounted—parallel roller plunger			
Operating Force/Torque		80 oz (0.6 N)					
Contact		SPDT					
Form		Form C	Form Z	Form C	Form Z		
Contact Type		Silver MS02S0100	ML02S0100	MS07S0100	ML07S0100		
		Gold MS02G0100	—	MS07G0100	—		

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

Rotary lever, CW and CCW							
MS	ML	MS	ML	Omnidirectional—wire whisker (NEMA Types 1, 2, 12, 13 only)			
Operating Force/Torque		48 oz-in (0.3 N•m)		15 oz-in (0.1 N•m)			
Contact		SPDT					
Form		Form C	Form Z	Form C			
Contact Type		Silver MS04S0100	ML04S0100	MS05S0100			
		Gold MS04G0100	—	MS05G0100			

Limit Switches

Limit Switches

Miniature

Class 9007 Type MS and ML

Description / Functional Diagram

Booted Devices								
MS	ML	MS	ML	MS	ML	MS	ML	
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 158 and add the designator (up to three) to the end of the catalog number, if applicable. See the example on page 158 for conductor length selection.

Lever Arm Selection

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

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

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



Lever

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

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

Specialty Arms and Options

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

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

Limit Switches

Miniature

Class 9007 Type MS and ML

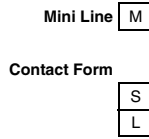
Catalog Number Interpretation and Options

For Interpretation of the Catalog Number Only

9007 M S 0 1 S 0 1 0 0



9007MS02 Shown with M12 Connector



Actuator Type

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

Conductor Length Options

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

Contact Type

S	10 A Silver Contacts (standard)
G	Gold Contacts

Examples

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

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

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

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

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

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

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

Male Plug (face) Pin-outs

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

Limit Switches

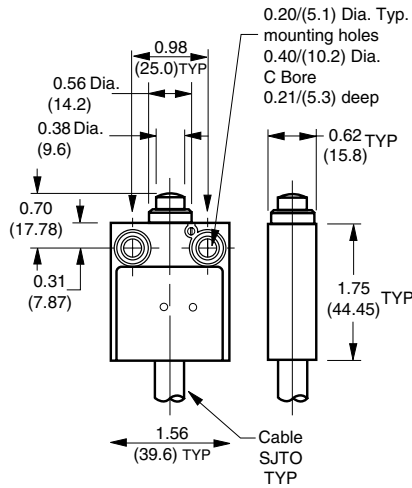
Miniature

Class 9007 Type MS and ML

Dimensions

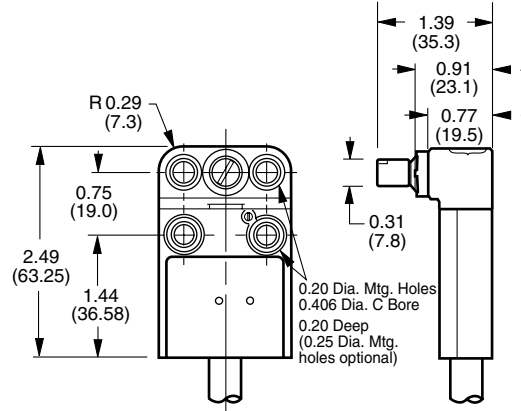
Top Push Plunger

MS01, MLO1



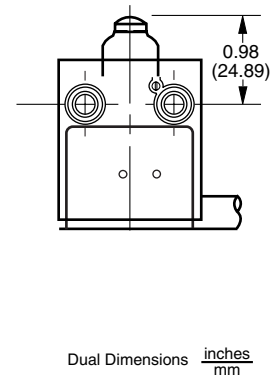
Rotary Lever

MSO4, MLO4



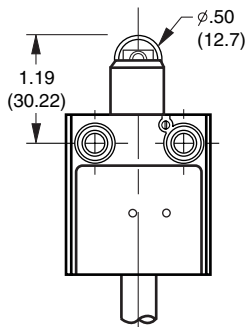
Booted Top Push Plunger with Mid-Side Entry Cable

MS10, ML10



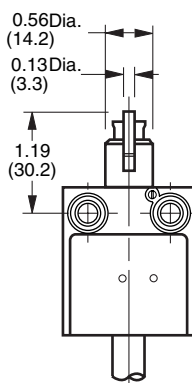
Parallel Roller Plunger

MS02, ML02



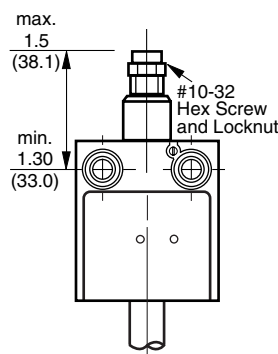
Cross Roller Plunger

MS03, ML03



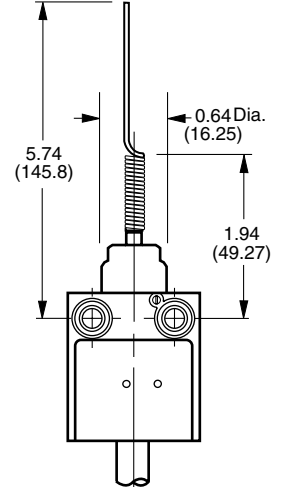
Adjustable Top Push Plunger

MS09, ML09



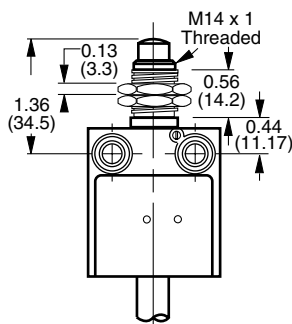
Omini-directional

MS05, ML05



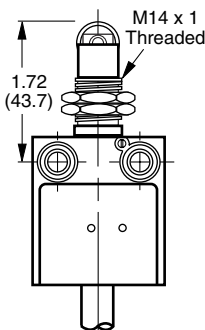
Bushing Mounted Top Push Plunger

MS06, ML06



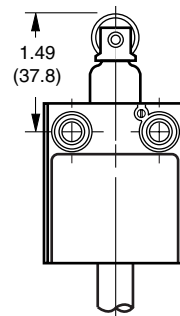
Bushing Mounted Parallel Roller Plunger

MS07, ML07



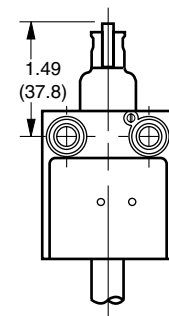
Parallel Booted Roller Plunger

MS12, ML12



Cross-Booted Roller Plunger

MS13, ML13



Limit Switches

Limit Switches

Miniature Enclosed Reed

Class 9007 Type XA



Straight Plunger



Roller Plunger



Cross Roller Plunger

Description and Specifications

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

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

NOTE:

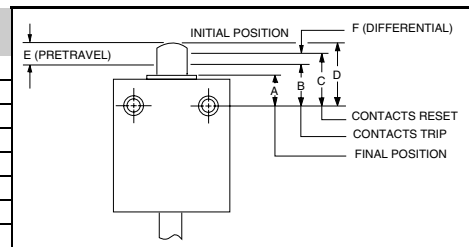
- Because reed switches are operated by a magnet, they should not be installed in areas where strong magnetic fields may be present. The devices should always be checked for proper operation after installation.
- Type XA **cannot be used in Division 2 locations** since the National Electrical Code (NEC)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

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

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

Operating Data

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



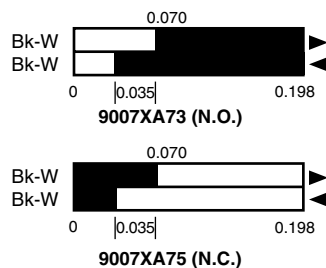
Contacts	The contact is a fully encapsulated, hermetically sealed reed, suitable for controlling solid-state loads as well as industrial relays. Switches can also be used as inputs to intrinsically safe systems. Use of a transient suppressor extends the life of the switch when used on heavy electrical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

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

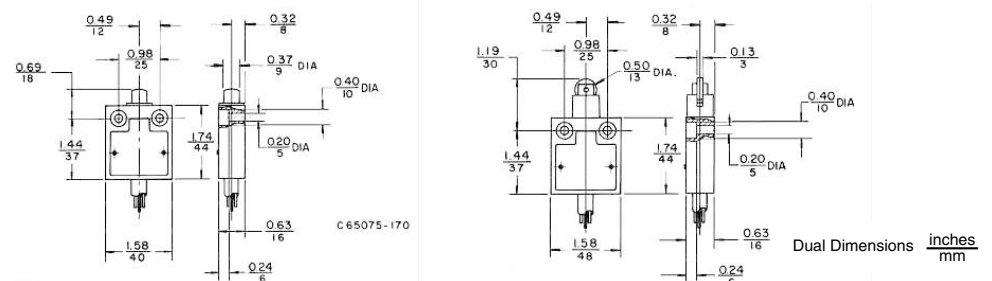
Maximum Current Ratings for Control Circuit Contacts—Type XA

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

Contact Diagrams



Dimensions



Limit Switches

9007AW Heavy Duty Industrial Precision, Oiltight



Lever Arm Type



Plunger Type

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

Lever Arm And Plunger Types

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

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

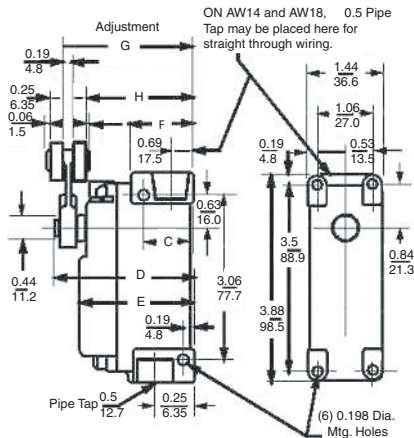
■ Field convertible to CW operation.

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

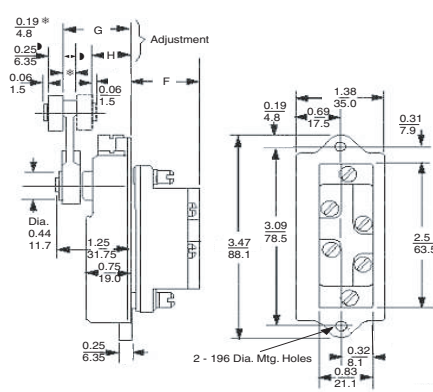
Lever arms, see page 190.

Approximate Dimensions

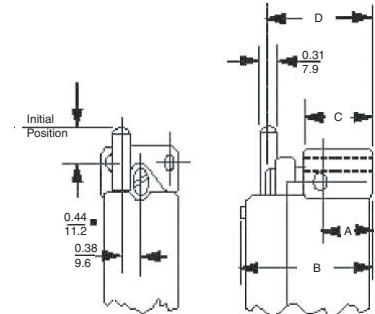
Type AW



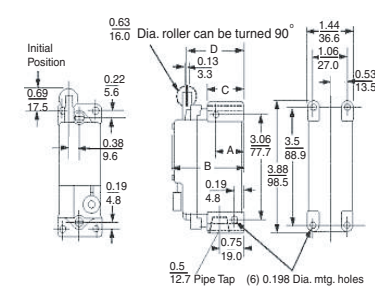
Type AO



Type AW42, 46, 48, and 49



Type AW32, 36, and 38



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

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

Limit Switches

Limit Switches

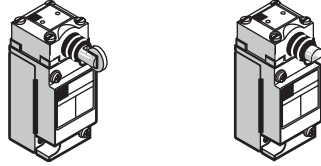
9007C Heavy Duty Industrial—Plug-in Body, Metal Standard and Compact

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

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

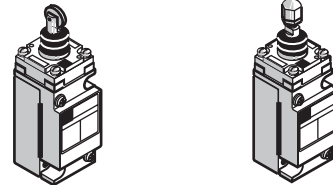
With reed contacts

With head for linear movement side plunger



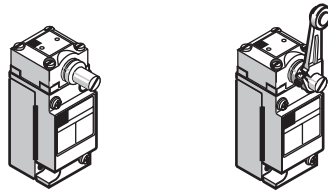
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Page 168

top plunger



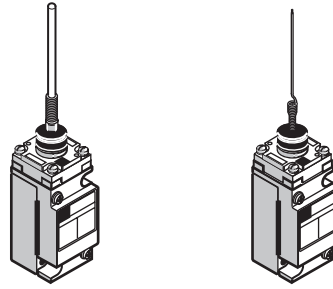
Page 165
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With head for rotary movement (lever)



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Page 170

With head for multi-directional movement

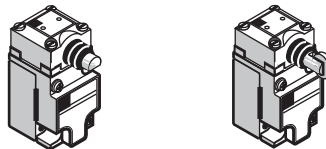


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Page 171

With reed contacts

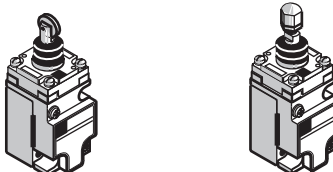
Compact plug-in body type with one cable entry (1)

With head for linear movement Side plunger



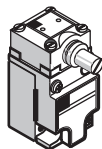
Page 172

Top plunger



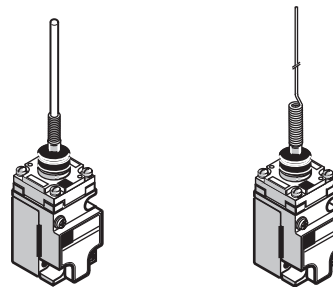
Page 173

With head for rotary movement (lever)



Page 174

With head for multi-directional movement



Page 175

1. Factory modifications: see pages 176 to 180

Limit Switches

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

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

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

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

Types of contact elements

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

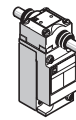
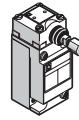
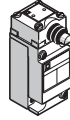
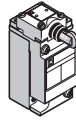
IEC 60947-5-1			NEMA			JIS		
Form	Symbol	Description	Form	Symbol	Description	Form	Symbol	Description
A		Single break	A		—	3		—
X		—						Double break
B		Single break	B		—	2		—
Y		—						Double break
C		—	C		—	1		Single break
Za		Same polarity	Z		"Same polarity" only			Double break
Zb		Electrically separate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

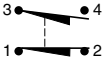
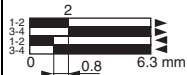
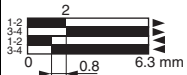
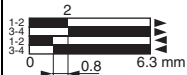
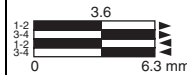
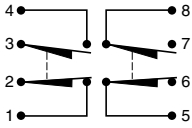

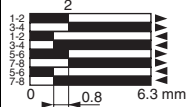

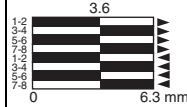
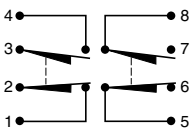
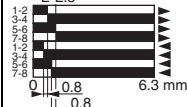
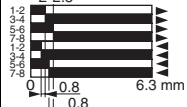
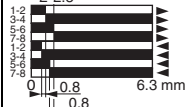
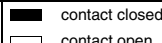

Limit Switches

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

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

Standard plug-in body type




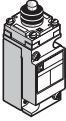


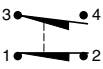
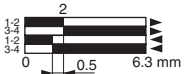
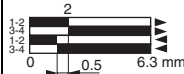
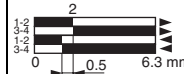
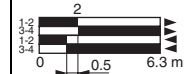
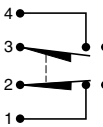
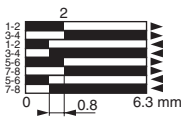
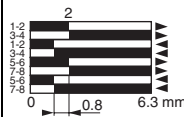
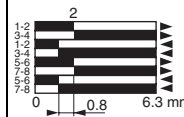
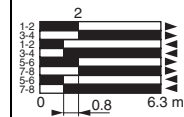
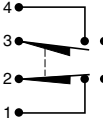
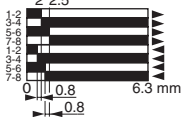
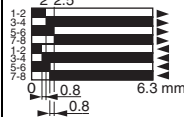
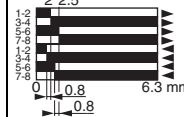
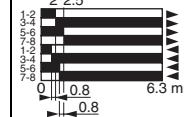



Type of operator	Side roller plunger, spring return, vertical roller (1)	Side push rod plunger, spring return	Side push rod plunger, adjustable (2) spring return	Side push rod plunger, maintained contact
Catalog numbers				
1 N.O. 1 N.C. snap action 	9007C54F 	9007C54G 	9007C54GD 	9007C54H 
2 N.O. 2 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				
Characteristics (nominal operating data)				
Switch actuation	On end			
Type of actuation				
Pre-travel	2 mm (0.08 in.)			3.6 mm (0.14 in.)
Pre-travel two Stage	First stage	2 mm (0.08 in.)		
	First stage to second stage	0.5 mm (0.02 in.)		
Total travel	6.3 mm (0.25 in.)			
Differential	0.8 mm (0.03 in.)			
Reverse overtravel	—			
Minimum force or torque	1 pole & 2 pole	4 lb (17.8 N)		7 lb (31.1 N)
Terminal wire sizes (Cabling/Screw Clamp)	1 or 2, 12–22AWG (2.05–0.644 mm ²) wires maximum			
Repeatability (linear travel of cam)	0.03 mm (0.001 in.)			—
Cable entry	1/2-14 NPT standard, optional M20 x 1.5 mm for ISO cable entry			

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

Dimensions:
pages 182 to 185

Limit Switches

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

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

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

Dimensions:
pages 182 to 185

Limit Switches

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

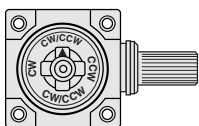
Type of head Rotary (lever arm type) (1)

Standard plug-in body type



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

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






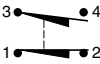
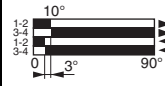
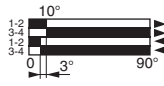
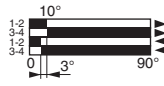
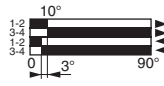
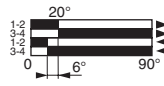
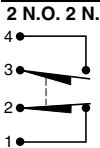
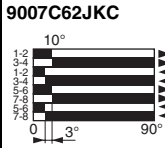
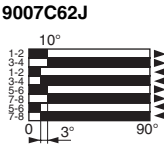
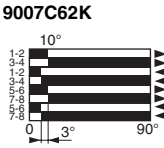
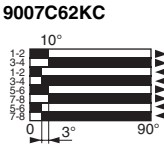
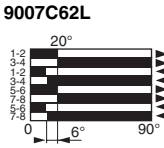
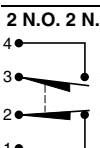
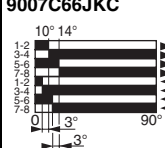
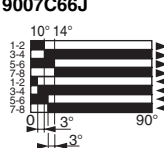
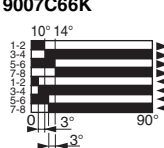
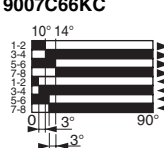
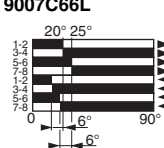





Mode of operation of the lever arm is easily convertible to clockwise or both. Simply pull out and rotate the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW.

Dimensions:
pages 182 to 185

Limit Switches

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

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 189.

Dimensions:
pages 182 to 185

Limit Switches

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


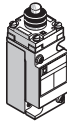
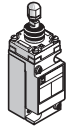
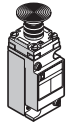

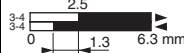
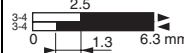



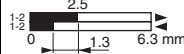
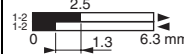

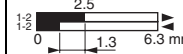



Type of head		Side Plunger (mounting by the body)			
Standard plug-in body type					
Type of operator		Side roller plunger spring return vertical roller (1)	Side push rod plunger spring return	Side push rod plunger adjustable (2) spring return	Side push rod plunger maintained contact
Catalog numbers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

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

Dimensions:
pages 182 to 185

Limit Switches

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

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

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

Dimensions:
pages 182 to 185


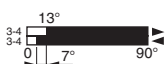


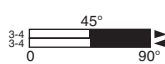

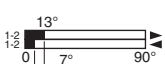
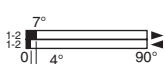
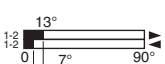
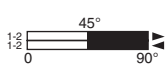
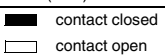
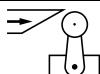
Limit Switches

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

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

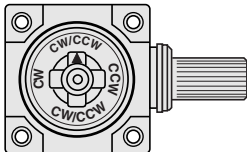
Standard plug-in body type



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

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







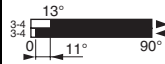
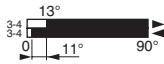
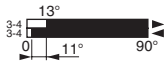
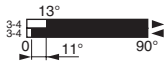
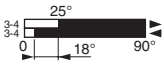

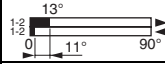
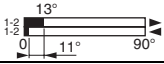
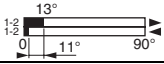
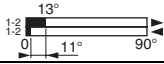
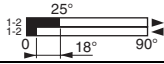



Mode of operation of the lever arm is easily convertible to clockwise or both.
Simply pull out and rotate the arrow to the letters representing the desired direction—CW, CCW, or CW/CCW.



Dimensions:
pages 182 to 185

Limit Switches

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

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

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

Dimensions:
 pages 182 to 185

Limit Switches

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

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

Compact plug-in body type



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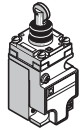
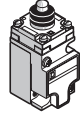
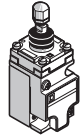
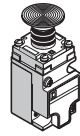
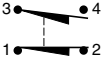
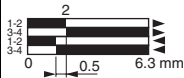
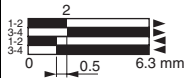
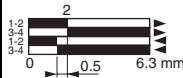
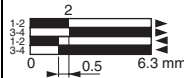




Characteristics (nominal operating data)

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

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

Limit Switches

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

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

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

Dimensions:
pages 182 to 185

Limit Switches

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

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

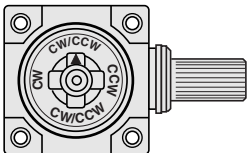
Compact plug-in body type



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

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

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



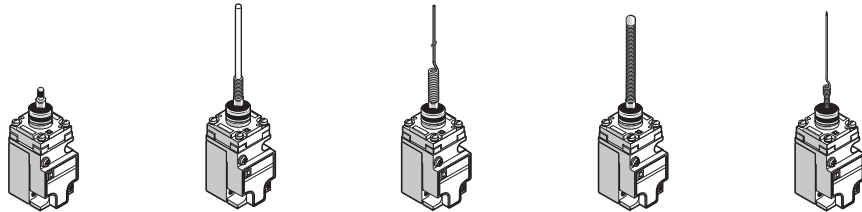
Dimensions:
pages 182 to 185

Limit Switches

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

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

Compact plug-in body type



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

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

Dimensions:
pages 182 to 185

Limit Switches

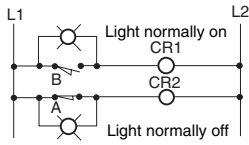
9007C Heavy Duty Industrial—Plug-in Body, Metal

Factory Modifications (Forms)

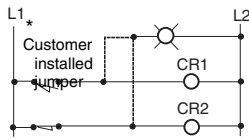


S9

Rotary head shown with S9 option



Form P5 Thru P9



Form P10

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

Special features and modifications

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

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

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

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

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

Addition of LED pilot light (1)

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

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

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

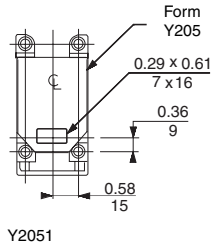
Examples of complete units with pilot lights in standard plug-in body type

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

Limit Switches

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

Factory Modifications (Forms)



Special features and modifications (continued)

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

Manifold mounting

Description	Suffix to add to the device catalog number	Weight kg (lb)
Manifold mounting available on standard and compact types. Replaces existing type B installations if new hole is drilled to match knockout. Supersedes type C with form Y205. Receptacle is furnished with a wiring hole and a gasket in the base.	Y2051	0.57 (1.25)
Special chemical resistant coating (includes Viton® fluorocarbon seals—Y140, and stainless steel head and body screws) (1)	L3	0.57 (1.25)
Low temperature – lever types only: limit switch will operate in an ambient temperature range of -40 to 185 °F (standard limit switch ambient temperature range is -20 to 185 °F). Minimum temperature is based on the absence of freezing moisture or water.	Y128	0.57 (1.25)
Viton fluorocarbon gaskets and seals (1) Substitution of Viton fluorocarbon gaskets and seals on:		
Lever arm type, standard box (Viton fluorocarbon shaft seals on lever arm types as standard)	Y140	0.57 (1.25)
Lever arm type, compact box (Viton fluorocarbon shaft seals on lever arm types as standard)	Y140	0.57 (1.25)
Plunger type, standard box	Y140	0.57 (1.25)
Plunger type, compact box	Y140	0.57 (1.25)
Substitution of Viton fluorocarbon boot only on plunger type switches	Y1401	0.57 (1.25)

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

Mini and micro connectors, ISO M20 (Form M11)

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

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

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

Limit Switches

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

Factory Modifications (Forms)



Y190•

Standard body shown with Y190• option

Special features and modifications (continued)

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

Pre-wired receptacle (1) (2)

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

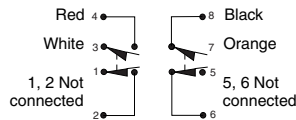
1. Plug and cable assemblies: see accessories page 181
2. Not available with P10 or for Hazardous location switches

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

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



Form Y1901, Y1903



Form Y19013



Form Y1905

Limit Switches

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

Factory Modifications (Forms)



Y18**
Terminal base shown
with Y18** option

Special features and modifications (continued)

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

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

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

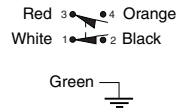
- Not for 9007CR Hazardous location devices
- Wire entry completely sealed with epoxy resin.

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

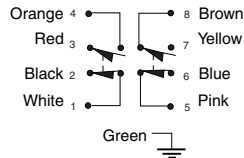
Description	Suffix to add to the device catalog number	Weight kg (lb)	
Lever type limit switch furnished with a boot around the shaft	On all 9007C and 9007CR lever type switches	Y33	0.01 (0.01)
Dust boot only	See accessories, page 181		

Wiring Diagrams

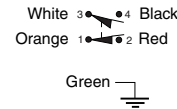
Forms Y1851 and Y1853



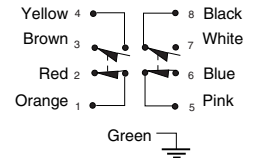
Forms Y1852 and Y1854



Forms Y1855 and Y1857



Forms Y1856 and Y1858



Limit Switches

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

Factory Modifications (Forms)

Special features and modifications (continued)

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

Optional shafts

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

Switch with adapter plate

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

Direct acting contacts / Positive opening contacts ☞ Y1561

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

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

Electrical contact ratings

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

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

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

Limit Switches

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

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

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

Limit Switches

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

Dimensions—Standard Body

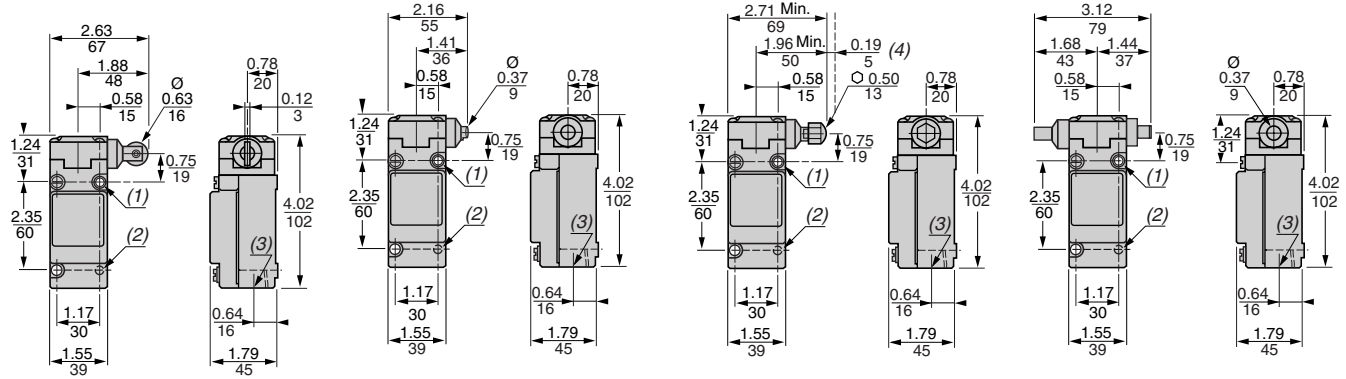
Side Plunger

9007C••F

9007C••G

9007C••GD

9007C••H



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

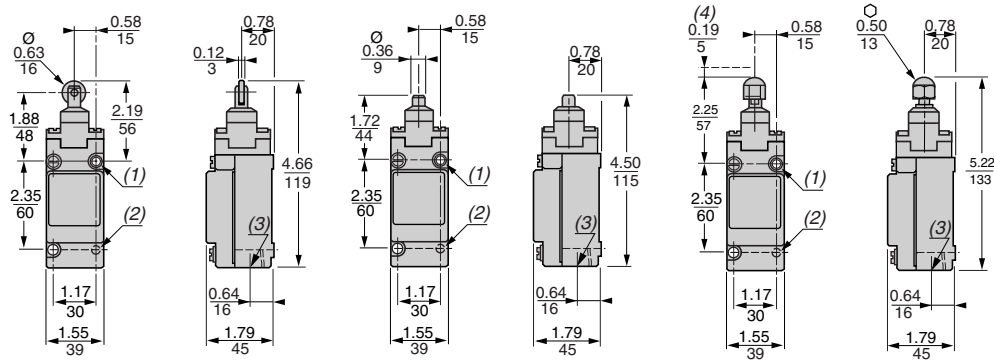
1. 2 x 0.20/5 x 0.22/6 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.29/7 DP.
3. 1/2 14 NPT.
4. Adjustable.

Top Plunger

9007C••D

9007C••E

9007C••ED



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

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

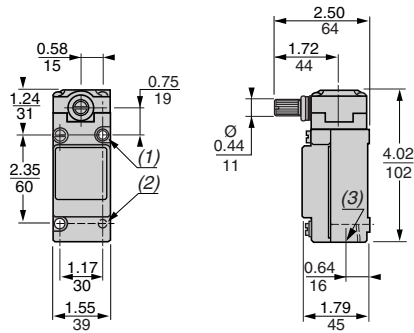
Limit Switches

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

Dimensions—Standard Body

Rotary

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



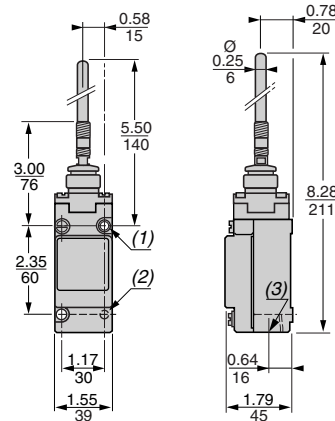
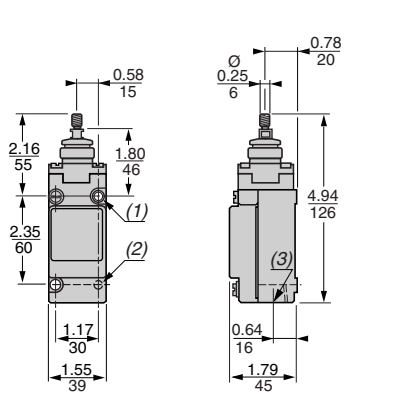
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

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

Wobble stick

9007C**JKC

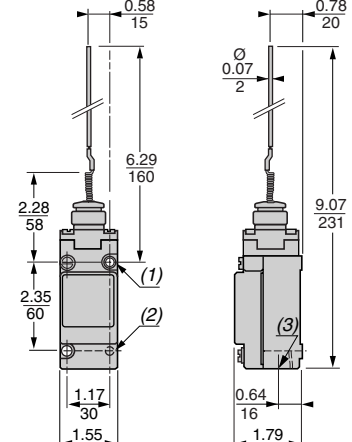
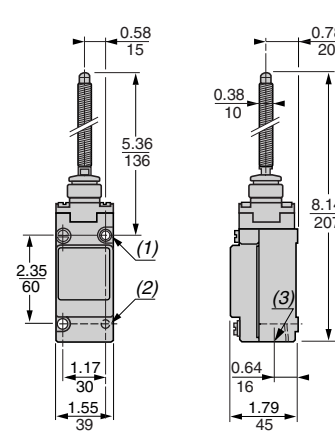
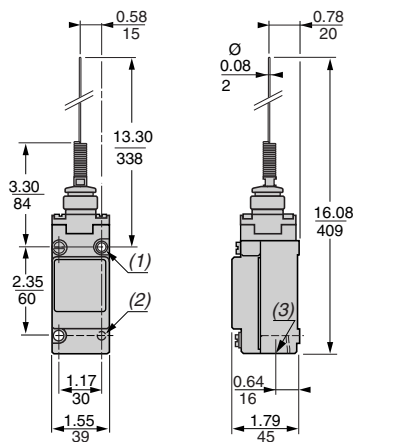
9007C**J



9007C**K

9007C**KC

9007C**L



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

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

Limit Switches

Limit Switches

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

Dimensions—Compact Body

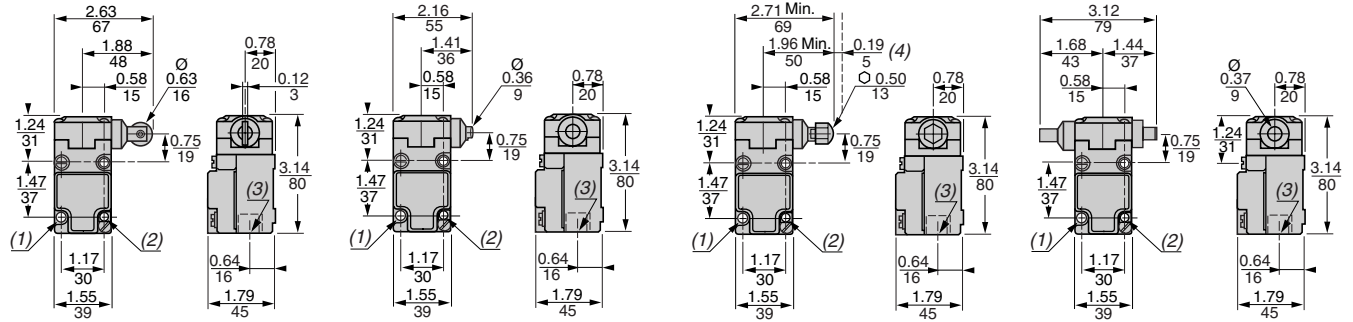
Side Plunger

9007C52F

9007C52G

9007C52GD

9007C52H



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

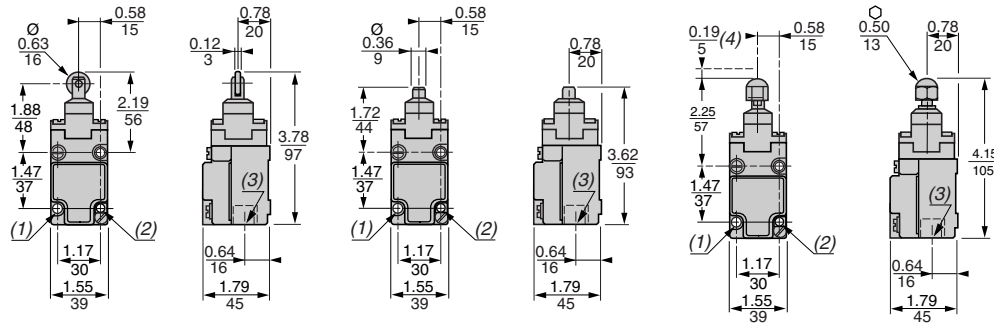
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.
4. Adjustable.

Top Plunger

9007C52D

9007C52E

9007C52ED



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

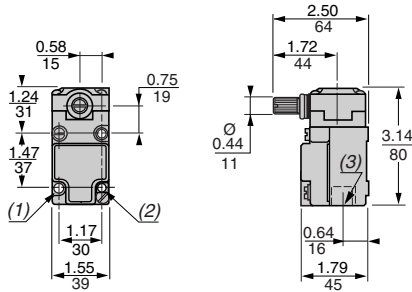
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.
4. Adjustable.

Limit Switches

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

Rotary

9007C52•• A, B, C, N, T5, T10



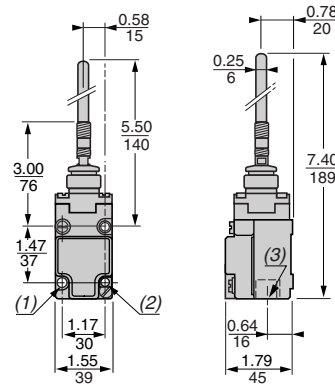
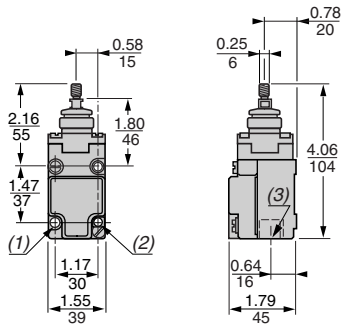
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

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

Wobble stick

9007C52JKC

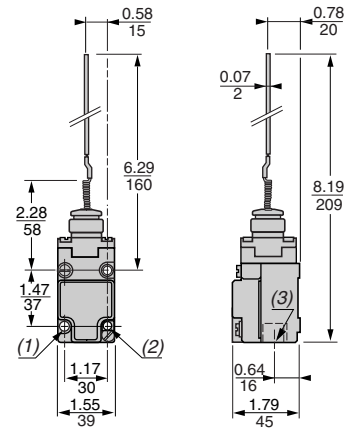
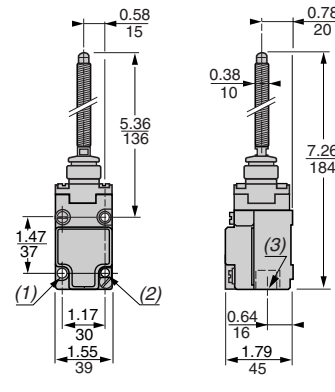
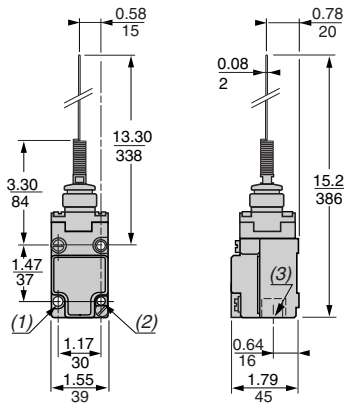
9007C52J



9007C52K

9007C52KC

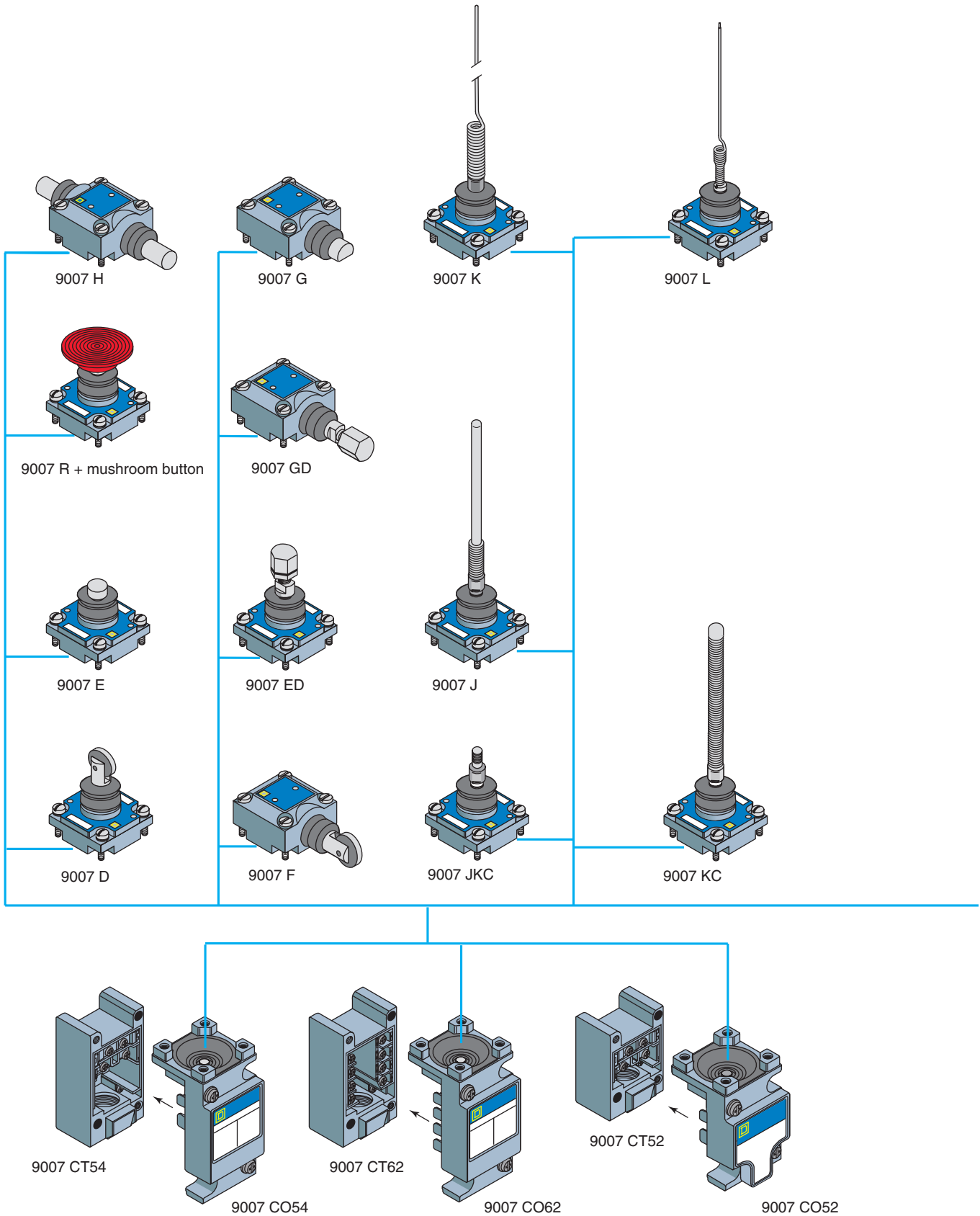
9007C52L



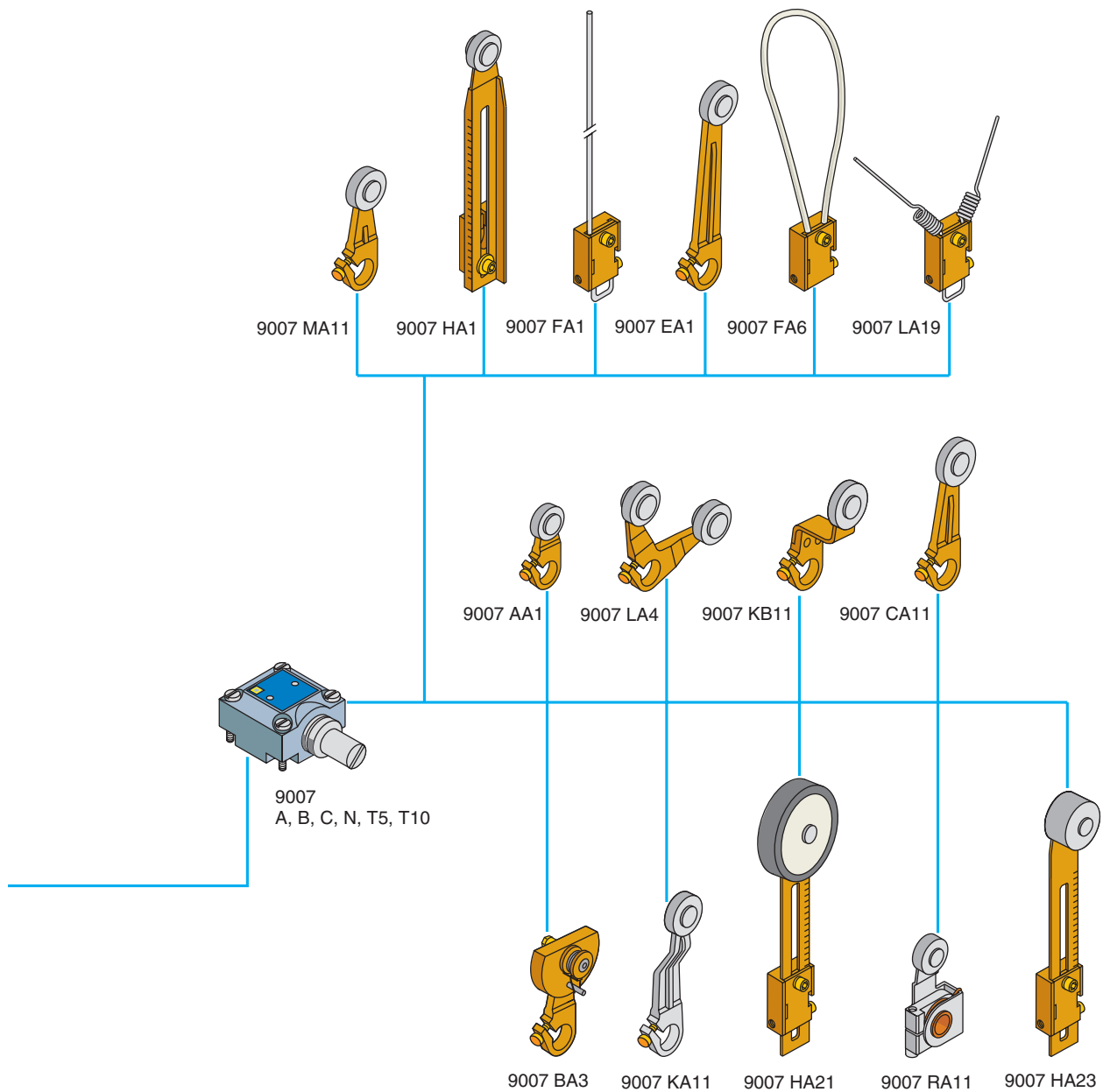
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

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

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



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

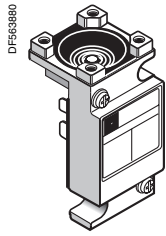


Limit Switches

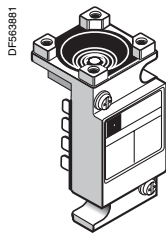
Limit Switches

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

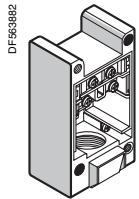
Adaptable Sub-Assemblies



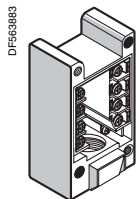
9007CO54



9007CO62



9007CT54



9007CT62

Limit Switches

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

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

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

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

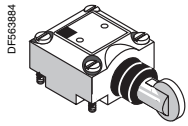
1. Acceptable wire sizes: 12-22 AWG (2.05 mm²-0.644mm²). Recommended terminal clamp torque: 7 lb-in (0.80 N•m).
2. Reed switches: plug-in switches less heads are not available as separate units. Order complete plug-in unit with a head. Example: 9007C084B2.

Dimensions:
page 196

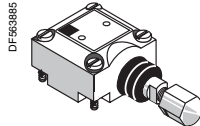
Limit Switches

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

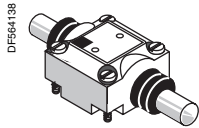
Adaptable Sub-Assemblies



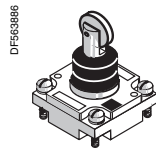
9007F



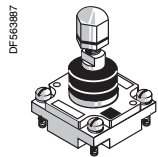
9007GD



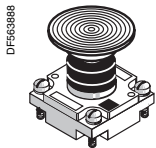
9007H



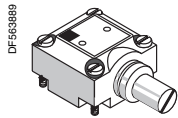
9007D



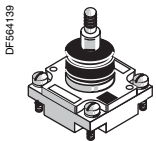
9007ED



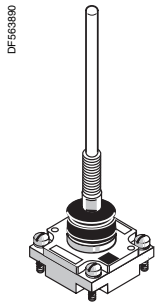
9007R + mushroom button



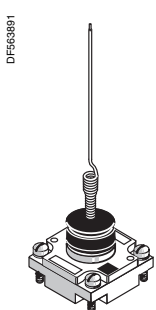
9007C



9007JKC



9007J



9007L

Heads for linear, rotary and multi-directional movements

Side plunger heads

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

Top plunger heads

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

Rotary heads (without lever arm type)

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

Multi-directional head

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

Accessories

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

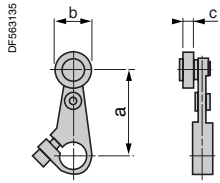
- Field convertible to horizontal.
- Acceptable wire sizes: 12-22 AWG (2.05 mm²-0.644mm²).
Recommended terminal clamp torque: 7 lb-in (0.80 N•m).

Dimensions:
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Limit Switches

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

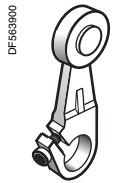
Lever Arms for Rotary Heads



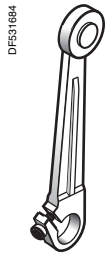
a: Length of lever Arm
b: Roller diameter
c: Roller width



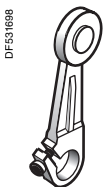
9007AA1



9007MA11



9007EA1



9007CA11

Cast zinc lever arms with standard roller

Lever arms with steel roller (1)

Arm	Steel roller		Catalog number	Weight kg (lb)
	Length (a) in. (mm)	Diameter (b) in. (mm)		
0.88 (22)		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

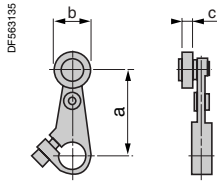
Arm	Nylon roller		Catalog number	Weight kg (lb)
	Length (a) in. (mm)	Diameter (b) in. (mm)		
0.88 (22)		0.25 (6.3)	9007AA8	0.02 (0.05)
		0.63 (16)	9007AA17	0.03 (0.07)
1.38 (35)	0.75 (19)	0.25 (6.3)	9007BA18	0.03 (0.07)
		0.63 (16)	9007BA8	0.05 (0.10)
	1 (25.4)	0.25 (6.3)	9007BA17	0.05 (0.11)
		0.63 (16)	9007BA4	0.03 (0.06)
1.5 (38)	0.75 (19)	0.25 (6.3)	9007BA13	0.05 (0.10)
		0.63 (16)	9007MA18	0.03 (0.06)
	0.63 (16)	0.25 (6.3)	9007MA18	0.05 (0.10)
		0.63 (16)	9007MA17	0.05 (0.10)
2 (51)	1 (25.4)	0.25 (6.3)	9007MA4	0.05 (0.10)
		0.63 (16)	9007MA13	0.05 (0.12)
	0.75 (19)	0.25 (6.3)	9007MA18	0.05 (0.10)
		0.63 (16)	9007CA18	0.05 (0.10)
2.5 (63.5)	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)
3 (76)	0.75 (19)	0.25 (6.3)	9007DA18	0.03 (0.07)
		0.63 (16)	9007DA8	0.06 (0.13)
	1 (25.4)	0.25 (6.3)	9007DA17	0.06 (0.13)
		0.63 (16)	9007DA4	0.06 (0.14)
3 (76)	0.75 (19)	0.25 (6.3)	9007DA13	0.07 (0.15)
		0.63 (16)	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.

Limit Switches

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

Lever Arms for Rotary Heads



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

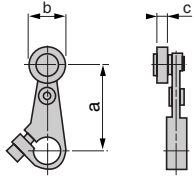
Cast zinc lever arms (continued)				
Lever arms with ball bearing roller				
Arm	Ball bearing roller		Catalog number	Weight kg (lb)
Length (a) in. (mm)	Diameter (b) in. (mm)	Width (c) in. (mm)		
0.88 (22)	0.69 (17.5)	0.25 (6.3)	9007AA9	0.04 (0.09)
1.38 (35)	0.69 (17.5)	0.25 (6.3)	9007BA9	0.04 (0.09)
1.5 (38)	0.69 (17.5)	0.25 (6.3)	9007MA9	0.04 (0.09)
2 (51)	0.69 (17.5)	0.25 (6.3)	9007CA9	0.04 (0.09)
2.5 (63.5)	0.69 (17.5)	0.25 (6.3)	9007DA9	0.04 (0.09)
3 (76)	0.69 (17.5)	0.25 (6.3)	9007EA9	0.04 (0.09)
Lever arms with roller on opposite side to standard				
Lever arm	Roller on opposite side		Catalog number	Weight kg (lb)
Length (a) in. (mm)	Diameter (b) in. (mm)	Width (c) in. (mm)		
0.88 (22)	0.63 (16)	0.25 (6.3)	9007AA5	0.04 (0.09)
	0.63 (16)	0.63 (16)	9007AA6	0.04 (0.09)
1.38 (35)	0.75 (19)	0.25 (6.3)	9007BA15	0.04 (0.09)
	0.63 (16)	0.25 (6.3)	9007BA5	0.04 (0.09)
	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)
	0.75 (19)	0.25 (6.3)	9007EA15	0.04 (0.09)
3 (76)	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)

Limit Switches

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

Lever Arms for Rotary Heads

DF563135



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

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

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

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

DF531682



9007LA4

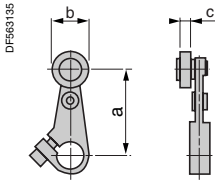
Limit Switches

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Limit Switches

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

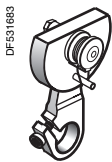
Lever Arms for Rotary Heads



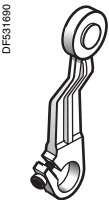
a: Length of lever Arm
b: Roller diameter
c: Roller width



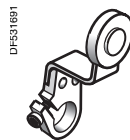
9007RA11



9007BA3



9007KA11



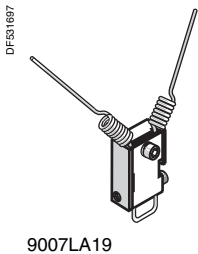
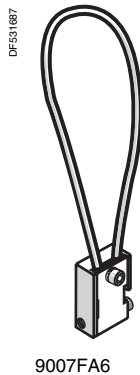
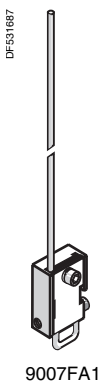
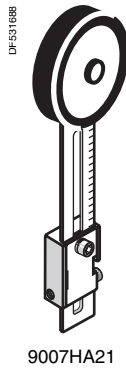
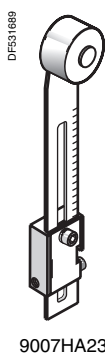
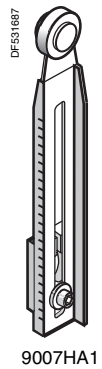
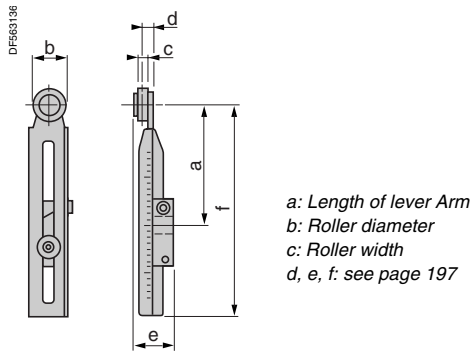
9007KB11

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

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



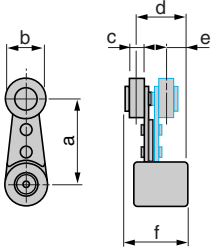
Adjustable length lever arm				
Lever arm	Roller		Catalog number	Weight kg (lb)
Dimensions length (a) in. (mm)	Diameter (b) in. (mm)	Width (c) in. (mm)		
Adjustable length arm with steel roller				
Non-bendable, adjustable from 0.88 (22) to 4 (101)	0.63 (16)	0.25 (6.3)	9007HA1	0.05 (0.12)
	0.63 (16)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

Dimensions:
page 197

Limit Switches

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

Lever Arms for Rotary Heads



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

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

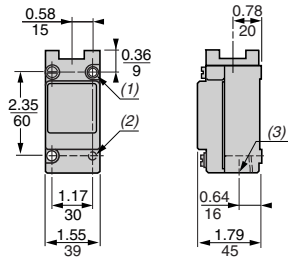
1. Roller can be changed in the field from roller outside to roller inside position or vice versa.

Limit Switches

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

Body

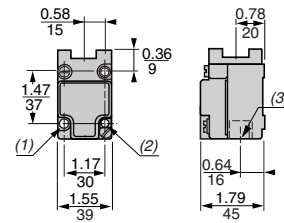
Standard



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

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

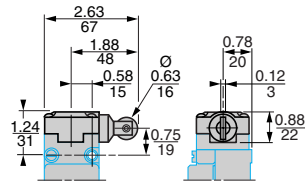


Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

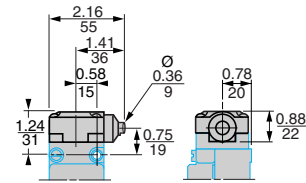
1. 2 x 0.20/5 HLS.
2. 2 x 10-24 Tapped HLS Back Mtg 0.20/5 DP.
3. 1/2 14 NPT.

Side plunger heads

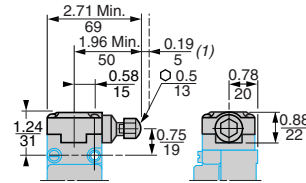
9007F



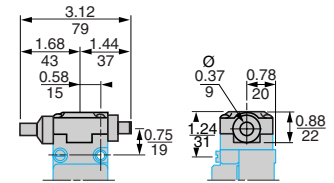
9007G



9007GD

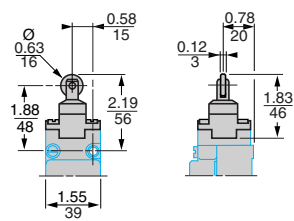


9007H

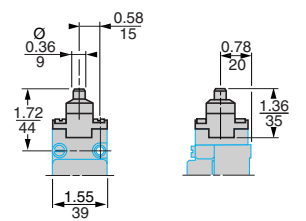


Top plunger heads

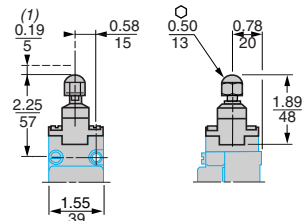
9007D



9007E



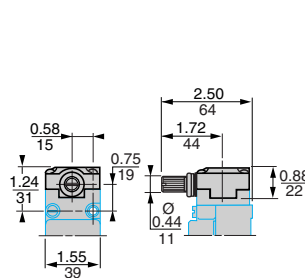
9007ED



1. Adjustable

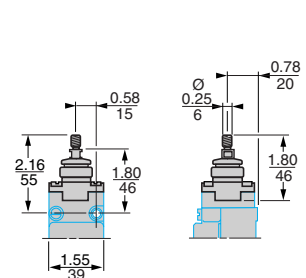
Rotary heads

9007C

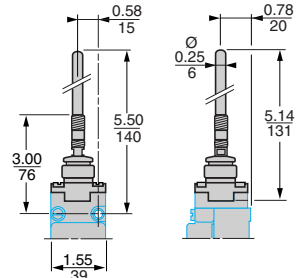


Multi-directional heads

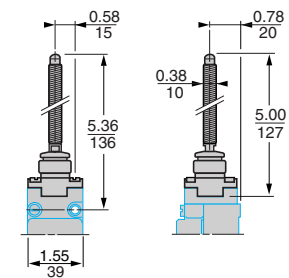
9007JKC



9007J

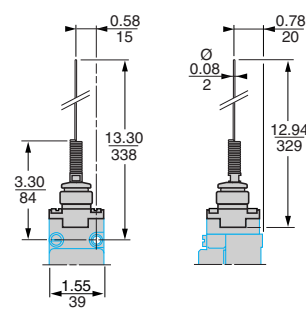


9007KC

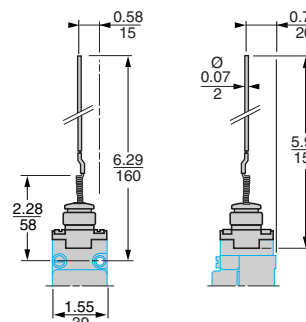


Multi-directional heads (continued)

9007K



9007L



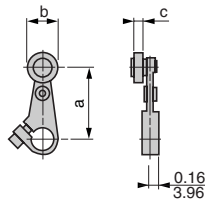
Catalog numbers:
pages 188 and 189

Limit Switches

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

Lever arms

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

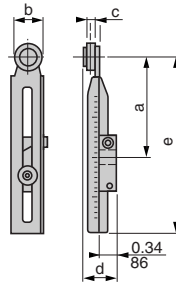


a: Length of lever Arm
b: Roller diameter
c: Roller width

a, b, c: pages 190 to 193

Adjustable length lever arms

9007HA* and 9007HA***

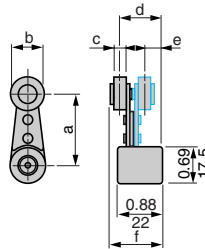


a: Length of lever arm
b: Roller diameter
c: Roller width
d = 0.38/10
e = 4.38/111

a, b, c: page 194

360° angular adjustable lever arms

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



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

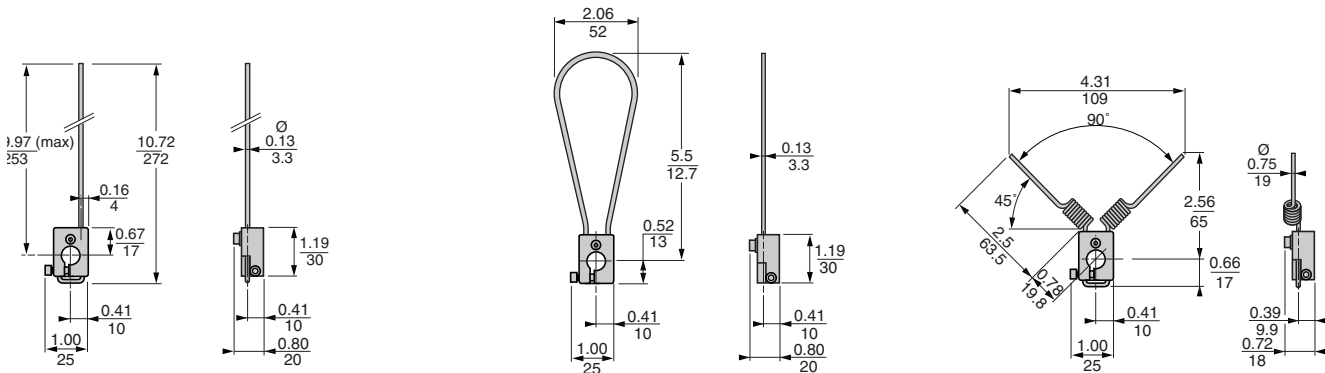
a, b, c: page 195

Rod type lever arms

9007FA1

9007FA6

9007LA19



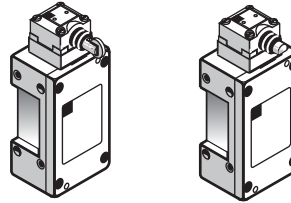
Catalog numbers:
pages 190 to 195

Limit Switches

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

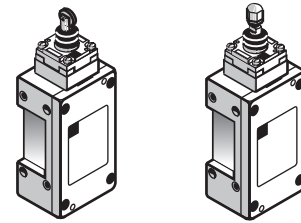
Hazardous Non-Plug-in Body Type (1)

With head for linear movement
side plunger



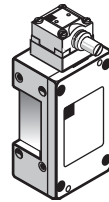
Page 200

top plunger



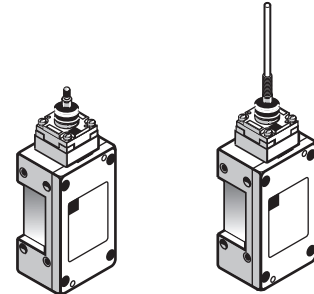
Page 201

With head for rotary movement (lever)



Page 202

With head for multi-directional movement



Page 203

1. Factory modifications: see pages 176 to 180.

Application Information—Hazardous Locations

Classification of hazardous locations

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

- **Classes**

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

- **Groups**

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

- **Divisions**

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

The table below summarizes the classifications described above.

Summary of Classification Chart

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

Limit Switches

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

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

Types of contact elements

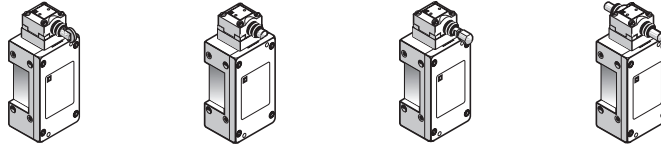
IEC 60947-5-1			NEMA			JIS		
Form	Symbol	Description	Form	Symbol	Description	Form	Symbol	Description
A		Single break	A		—	3		—
X		—						Double break
B		Single break	B		—	2		—
Y		—						Double break
C		—	C		—	1		Single break
Za		Same polarity	Z		"Same polarity" only			Double break
Zb		Electrically separate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

Limit Switches

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

Type of head Side Plunger (mounting by the body)

Hazardous location non-plug-in body type



Type of operator	Side roller plunger spring return vertical roller (1)	Side push rod plunger spring return	Side push rod plunger adjustable (2) spring return	Side push rod plunger maintained contact
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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	
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Characteristics (nominal operating data)

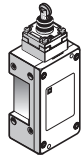
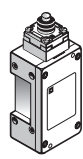
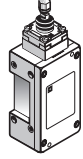
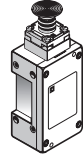
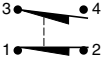








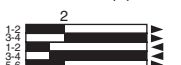
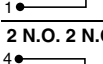
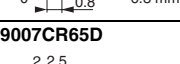
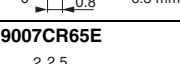
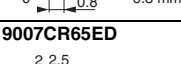
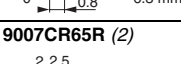



Switch actuation	On end				
Type of actuation					
Pre-travel	2 mm (0.08 in.) 3.6 mm (0.14 in.)				
Pre-travel two Stage	<table border="1"> <tr> <td>First stage</td> <td>2 mm (0.08 in.)</td> </tr> <tr> <td>First stage to second stage</td> <td>0.5 mm (0.02 in.)</td> </tr> </table>	First stage	2 mm (0.08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

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

Dimensions:
pages 204 and 205

Limit Switches

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

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

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

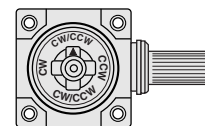
Dimensions:
pages 204 and 205

Limit Switches

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

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

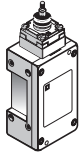
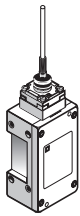
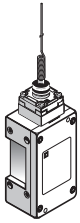
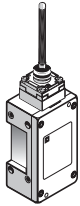
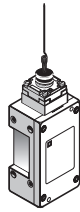
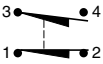
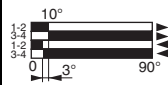
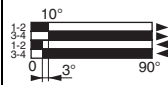
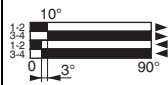
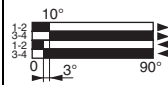
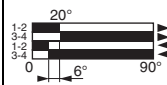
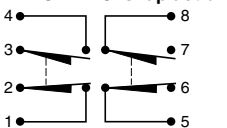
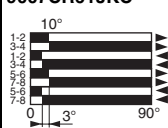
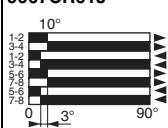
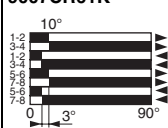
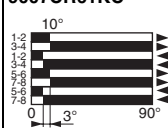
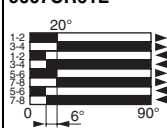
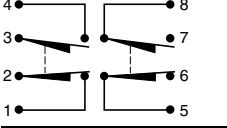
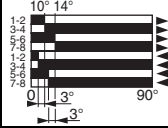
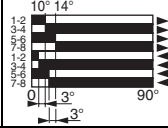
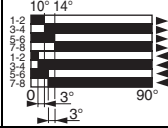
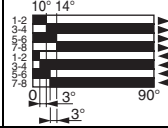
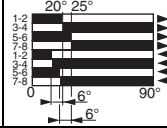



- Lever arm type must be ordered separately from page 190 to 193.
- These devices are factory set to operate the contacts in **both** the CW and CCW directions. **Mode of operation** is field convertible to CW only or CCW only.
To order factory converted devices: For CCW only operation, change the 2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



Dimensions:
pages 204 and 205

Limit Switches

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

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

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

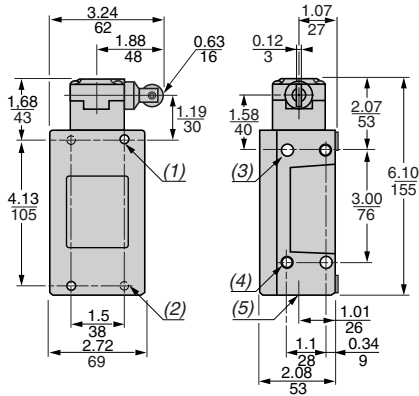
Dimensions:
pages 204 and 205

Limit Switches

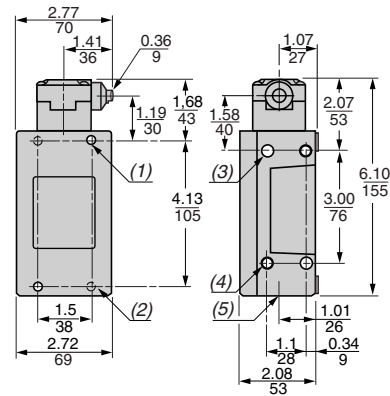
9007C Heavy Duty Industrial—Non-Plug-in Body, Metal Hazardous Location—Dimensions

Side Plunger

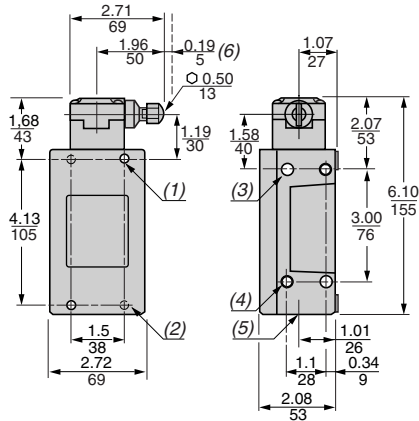
9007C••F



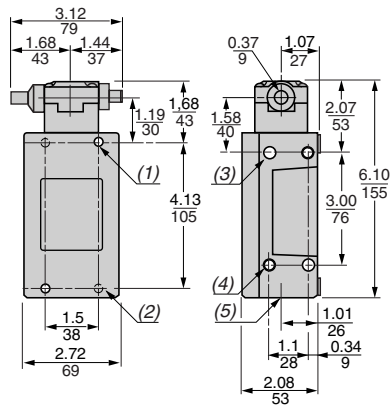
9007C••G



9007C••GD



9007C••H

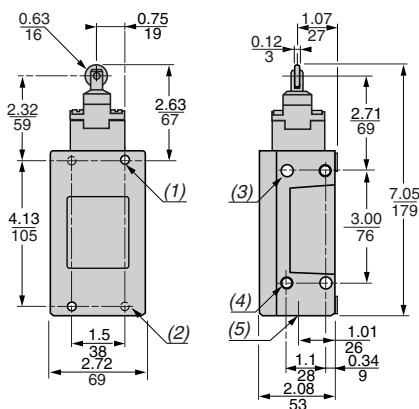


1. 2 x 0.277, front Mtg. holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 3/4 NPT.
6. Adjustable.

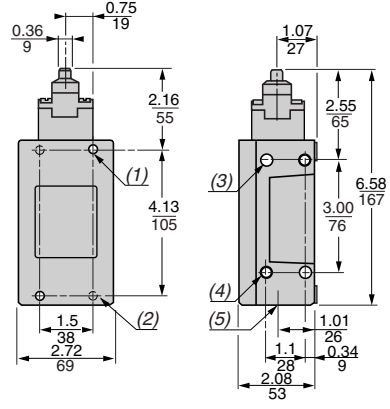
Dual dimensions: $\frac{\text{in.}}{\text{mm}}$

Top Plunger

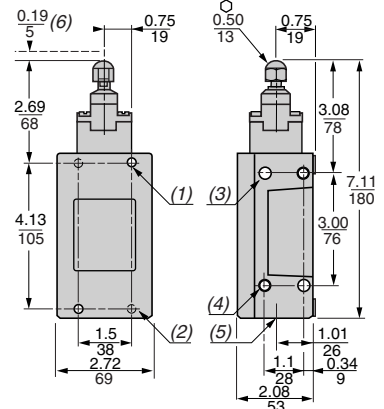
9007C••D



9007C••E



9007C••ED



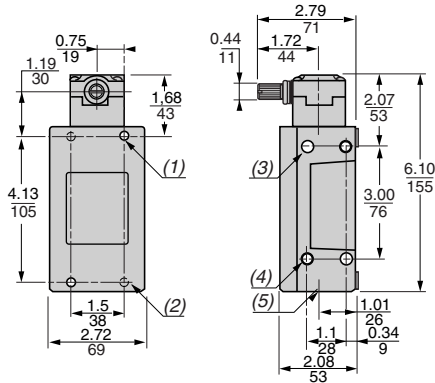
1. 2 x 0.277, front Mtg. holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.26/7 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 3/4 NPT.
6. Adjustable.

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

Limit Switches

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

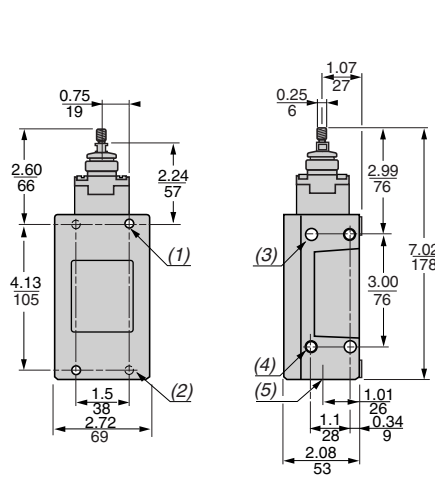
Rotary
9007C***



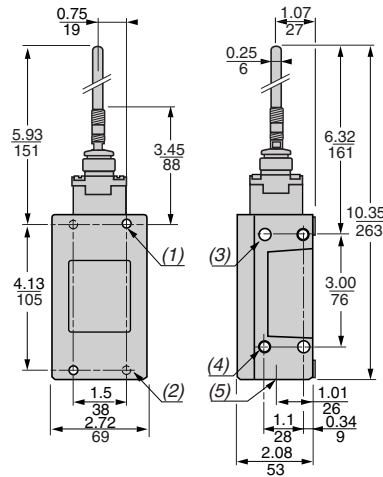
1. 2 x 0.2777, front Mtg holes.
2. 2 x 0.63/16 1/4-20 DP UNC-2B back mounting holes.
3. 2 x 0.2677 dia. holes, back Mtg. holes.
4. 2 1/4-20 UNC-2B, both sides 0.32/8 DP.
5. 1/2 or 1/4 NPT.

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

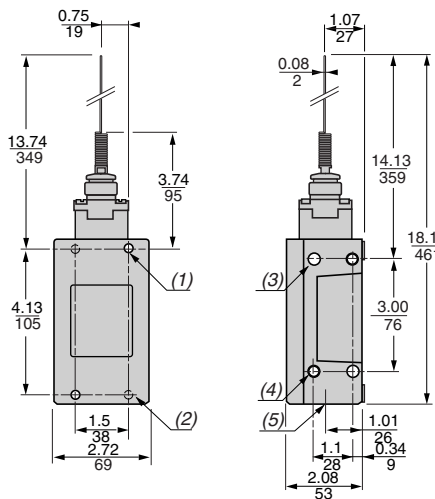
Wobble stick
9007C**JKC



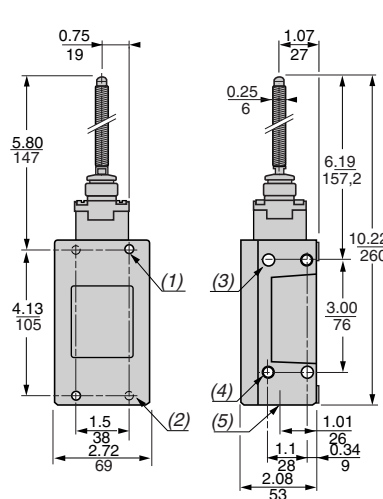
9007C**J



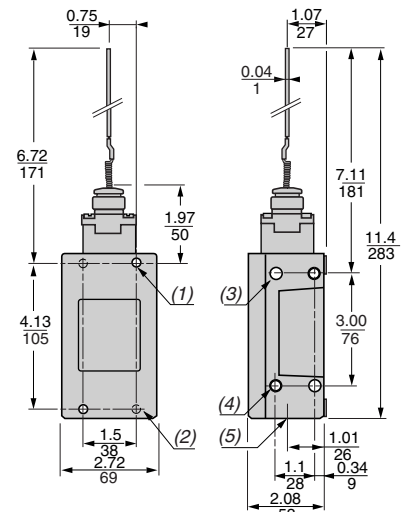
9007C**K



9007C**KC



9007C**L



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

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

Limit Switches

9007C Heavy Duty Industrial

Technical Information

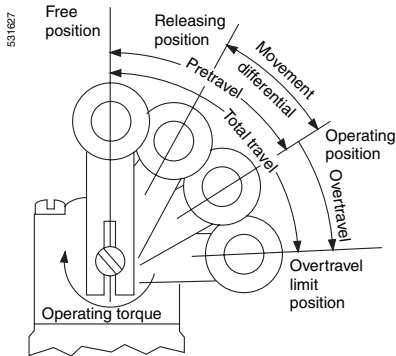


Figure 1: Rotary lever type

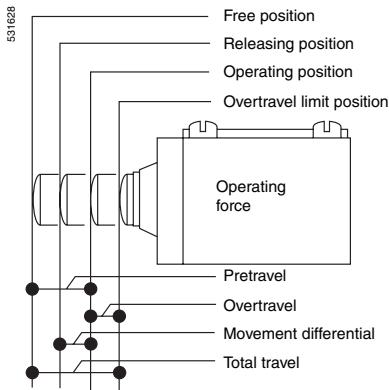


Figure 2: Linear (or Plunger) type

Glossary

CCW—Counterclockwise only (for lever types).

CW—Clockwise only (for lever types).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Limit Switches

9007C Heavy Duty Industrial

Technical Information

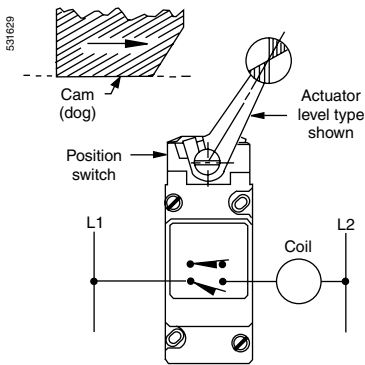


Figure 3—Limit switch

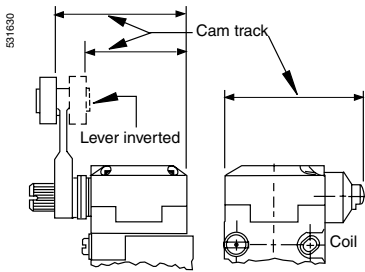


Figure 4—Cam track dimension

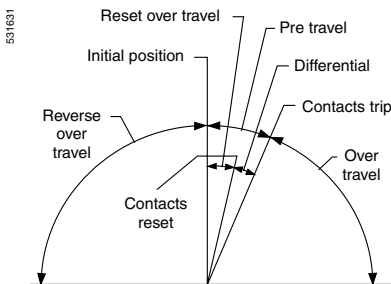


Figure 5—Contact travel

Glossary (continued)

Definition of limit switch terms

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

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

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

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

Cam track dimension—The distance from the switch mounting surface to some point on the roller or actuator.

Differential—The distance that the limit switch actuator moves, from the trip point to the reset point of the contacts.

Direct-acting/positive opening contacts—Normally closed contacts that are moved directly by the operating shaft. They are slow make-slow break contacts and have a shorter life than snap action contacts due to longer arcing times. In general, these should only be used where movement of actuator must break welded contacts, as in a crane safety limit switch. (Snap action positive opening contacts are available in the Telemecanique® XCKJ limit switch.)

Maintained contacts—Contacts that remain in the tripped position until the return travel of the cam moves the switch actuator back and resets the contacts.

Neutral (free or normal) position limit switch—A lever arm type switch with two sets of contacts. One set operates when the shaft is rotated clockwise; the other operates when the shaft is rotated counterclockwise.

Operating force—The force required to move limit switch actuator to cause the contacts to change state.

Overtravel—The distance that the position switch actuator may move beyond the trip point, (see figure 5) without damage to the switch.

Pole—The number of moveable contacts in a switching mechanism. A single pole device may be 1 N.O., 1 N.C. or 1 N.O. and 1 N.C. with a single set of moveable contacts is used to bridge those stationary contacts. A double or two pole switch has two moveable contacts.

Positive break contacts—Normally closed contacts with a special mechanism to ensure opening. Can be snap acting positive break or direct acting slow make, slow break type. The slow break direct acting type is not recommended for high cycle applications due to shorter life.

Pre-travel—The distance that the limit switch actuator must move to trip the contacts.

Reed contacts—A mechanism consists of a set of contacts hermetically sealed in a glass envelope and actuated by a magnet attached to the operator. This sealed construction keeps contaminants out of the contact area, making the reed switch ideal for low voltage, low current circuits such as programmable controllers.

Reset point—The position of the actuator at which the contacts return to the normal position.

Snap action contacts—Contacts that move rapidly to open or closed position and are relatively independent of cam speed. Because of shorter arcing times, snap acting contacts have longer contact life than slow make and break contacts and should be used where fast moving cams are encountered or where good repeat accuracy is required.

Spring return—Contacts that return to their original position when the actuating force is removed.

Definition

Slow break contacts—The speed of transfer of the moveable contacts is dependent on the speed of the operator. The amount of travel of the moveable contacts is also dependent on the amount of travel by the operator. Slow make and break contacts have the same trip and reset points, and do not have the differential travel common to snap switches.

Snap action contacts—The speed of transfer of the moveable contacts is not dependent on the speed of the operator. The amount of travel of the moveable contacts is also not dependent on the amount of travel by the operator. The movement of the moveable contacts are determined by a preset travel, after this point is reached, the contacts will trip. Snap action contacts have different trip and reset points, the difference is identified as “differential.”

Flexible operators—Flexible resilient or elastic operators, i.e., wobble sticks, do not ensure direct opening/positive opening action.

Isolated contacts—Single-pole double-throw (SPDT) contacts with four terminals which have two isolated contact bars mechanically linked. No polarity restrictions apply. Different (isolated) power supplies can also be applied.

Same polarity—Single-pole double throw (SPDT) contacts with four terminals that require the supply to be applied with the same polarity (i.e., L1 or +) on the same side of the contact bar. Two different supplies are not allowed in this configuration. (The loads should always be on the same side of the contact bar.)

Direct opening contact (also known as positive opening contacts)—A normally closed contact element coupled with the switch actuator via a non-resilient (non-elastic) member so that full contact opening is obtained when the actuator is moved through the direct opening travel by applying a direct opening force. The contact element will shear open in the event of sticking contacts or broken springs. Proper fusing of the control circuit is required. Direct opening contacts meet IEC 60947-5-1 requirements.

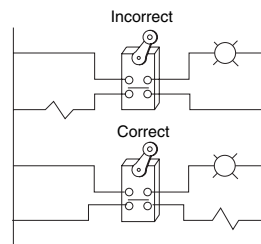
Direct opening travel (also known as positive opening travel)—Minimum travel from the actuator free position to the position where the direct opening operation is completed. Usually longer than the normal pre-travel.

Reed contacts—Contact mechanism consists of a set of contacts hermetically sealed in a glass envelope and actuated by a magnet attached to the operator. This sealed construction keeps contaminants out of the contact area, making the reed switch the ideal switch for low voltage, low current circuits such as programmable controllers.

NOTE: Because reed switches are operated by a magnet, they should not be installed in areas where strong magnetic fields may be present. The devices should always be checked for proper operation after installation.

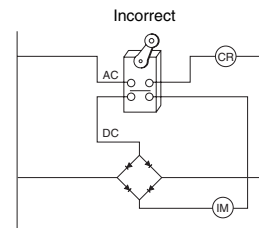
Polarity

Opposite polarities should not be connected to the contacts of one limit switch unless the limit switch is specifically designed for such service (isolated contacts—no polarity). See page 209.



Power sources

Power from different sources should not be connected to the contacts of one limit switch unless the switch is specifically designed for such service (isolated contacts—no polarity).



Limit Switches

9007C Heavy Duty Industrial

Technical Information

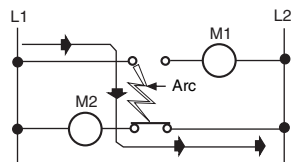
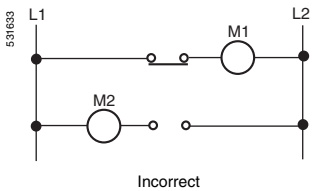
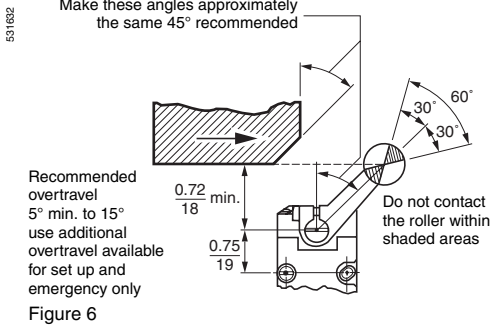


Figure 7—Contacts connected to opposite polarities. Line to line short (bold line) can occur through arc drawn when contacts operate

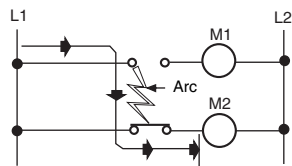
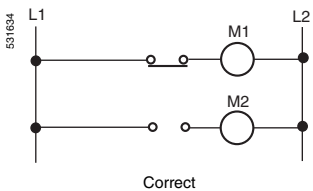


Figure 8—Contacts connected to same polarity. Line to line short cannot occur when contacts operate

Overriding Cams

The cam trailing edge on overriding cams must also be considered for maximum switch life (see figure 6). Lever arm snap back causes shock loads which reduce switch life. Also, with reversing cams the trailing edge becomes a leading edge on the return stroke. The overtravel of the limit switch should not be exceeded, but 5° minimum to 15° travel past the trip point is recommended. Additional travel should only be used for set up and emergencies. Cam design procedures for limit switches with other than lever arm actuators vary from switch type to switch type and are discussed along with other limit switch application design suggestions in additional literature "Proper Application of Limit Switches" (SM444).

Contacts

- Make sure the electrical load is within limit switch contact ratings.
- The single pole, double throw contacts of a snap switch used in a limit switch should not be used on opposite polarities. When load M1 is connected between the contact and line L2, and load M2 is connected between the other contact and line L1 (figure 7), a line-to-line short (bold line) can occur through the arc, which may be drawn as the contacts operate. When contacts are connected to the same polarity (figure 8), this line-to-line short cannot occur.
- The same result can occur if different power sources are connected to the single-pole, double-throw contacts of a snap switch.
- With limit switches having reed contacts, some form of transient protection should be used. This protects the small contacts from damaging surges and increases contact life.

Coolant

- When possible, avoid mounting limit switches where they will be constantly exposed to coolant, chips, etc. Although designed for such applications, switches last longer when not exposed to these contaminants.
- Make sure cover screws are tightened to ensure a good oiltight seal.
- When possible, avoid using fire-resistant coolants of the phosphate ester type. Equipment exposed to these coolants requires special seals and gaskets. Viton® fluoroelastomer, resistant to these types of coolants, is the standard shaft seal material on Type C lever arm types. If required, all gaskets, as well as boots on plunger types, can be furnished in Viton material.

Recommendations for Conduit Installation

Limit switch leakage is often traced to the conduit system. Coolant or condensation in the conduit line can enter the switch through the conduit entry. Oil tightness depends on the condition of the conduit connection and seal. Recommendations for installing conduit to position switches are as follows:

- To ensure an oiltight seal, use thread sealant and a conduit seal or a sealing bushing around the conduit fitting. Otherwise, the fitting probably will leak.
- Limit switches should be installed with the conduit end down whenever possible.
- If condensation or moisture is present inside the conduit, a Square D® conduit seal can be inserted into the conduit entry. The conduit fitting can then be connected in the normal manner. Thread sealant and a sealing bushing must still be used.
- Often a junction box fills with coolant and/or condensation, which backs up into the position limit through the conduit. A simple solution is to drill a hole in the bottom of the junction box to allow the liquid to drain out.
- If conduit leakage is severe, pre-wired and potted position limit (Forms Y184• and Y185•) should be used. The switches are pre-wired with either individual wires or multiconductor STOWA cord, and the receptacle is sealed with a potting material.
- The Square D limit switch is available with a pre-wired male plug receptacle. The connector provides an effective oiltight seal when used with the appropriate female connector cord.

Limit Switches

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Technical Information

Terminal Identification

European (IEC) contact terminals marking

Single pole	Double pole	
	1 st pole	2 nd pole
11-12	11-12	21-22
13-14	13-14	23-24
11-12	11-12	21-22
13-14	13-14	23-24

Each terminal is marked with 2 digits: First digit indicates the pole (circuit). The second digit indicates the type of contact:

_1-_2 is N.C., _3-_4 is N.O.

i.e.: 11-12, 21-22 are N.C. 13-14, 23-24 are N.O.

Example of European Terminal Markings:

For switch elements without isolated contacts:

11-12 Is the N.C. contact of pole No. 1, 13-14 Is the N.O. contact of pole No. 2

For switch elements with isolated contacts:

13-14 Is the N.O. contact of pole No. 1, 21-22 Is the N.C. contact of pole No. 2

Example of US Terminal Markings

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

Each contact terminal is marked with one digit, i.e., 1-2, 3-4, 5-6,7-8.

Example of US Terminal Markings:

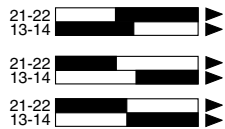
For most snap switch elements (isolated contacts not usually on US manufactured switches):

1-2 is the N.C. contact of pole No. 1,

3-4 is the N.O. contact of pole No. 1

5-6 is the N.C. contact of pole No. 2,

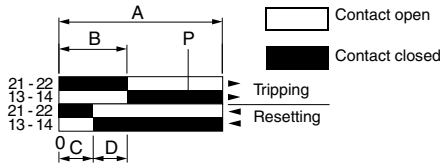
7-8 is the N.O. contact of pole No. 2



Make-before-break (overlapping) SPDT: the normally open contact closes before the normally closed contact opens.

Break-before-make (offset) SPDT: the normally closed contact opens before the normally open contact closes.

Simultaneous make and break SPDT: the normally closed contact opens at the same time as the normally open contact closes.



A = Maximum travel of the operator in mm or degrees.

B = Tripping travel of the contact.

C = Resetting travel of contact.

D = B-C = Differential travel.

P = Point from which positive opening is assured.

NOTE: The arrows indicate direction of actuation clockwise (CW) and return for simplicity reasons. For counterclockwise (CCW) only direction of actuation is reversed.

Wiring diagrams

Form A SPST-NO



Form B SPST-NC



Form C SPDT



Form AA DPST-NO



Form BB DPST-NC



Form CC DPDT



Form X SPST-NO-DB



Form Y SPST-NC-DB



Form Zb SPDT isolated contacts



Form Z DPDT-DB



Form XX DPST-NO-DB



Form YY DPST-NC-DB



Form ZZ DPDT-DB



Limit Switches

9007C Heavy Duty Industrial Cam Design

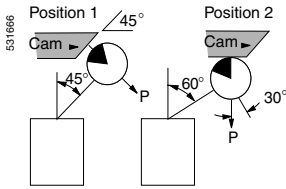


Figure 1A cam design for speeds up to 50 fpm

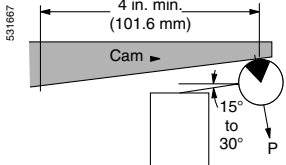


Figure 1B cam design for speeds from 50 to 200 fpm (15.2 to 60.9 mpm).

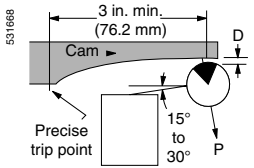


Figure 1C cam design for speeds from 200 to 400 fpm (60.9 to 121.9 mpm).

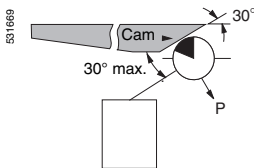


Figure 2

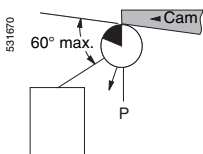


Figure 3

Application information

Excessive impact from improperly designed actuating systems is without question the leading cause of premature failure of the electromechanical limit switch. At slow speed, impact is rarely troublesome, but as speed increases, impact applied to the switch becomes a critical problem. In today's higher speed machines, therefore, it is important to give proper consideration to correctly designed actuating systems. These recommendations are designed to assist you in obtaining greater life from your limit switches. The black sector in the roller indicates the recommended design limits of the angle of pressure shown in the illustrations as "P". Three main design and installation considerations are:

- The pressure applied by the actuating mechanism to switch operating lever should approximate direction of lever rotation with a variation not to exceed 30°.
- Since the angle of pressure changes drastically with rotation of the lever, the cam must be designed for proper pressure angles at all positions of the lever travel.
- The switch operating levers should be positioned as nearly parallel with the leading edges of the cams as possible.

Considering these three factors:

- The cam in Figure 1A is satisfactory for speeds up to 50 fpm (15.2 mpm)
- The cam in Figure 1B is suitable for speeds up to 200 fpm (60.9 mpm) (nonuniform acceleration of switch lever)
- The cam in Figure 1C is satisfactory for speeds up to 400 fpm (121.9 mpm) (uniform or other controlled acceleration)

Designing proper pressure angles for overriding cams for electromechanical limit switches

Don't underestimate the importance of adjusting the cams and operating levers in electromechanical limit switches to provide the proper pressure angles in every travel position. Without the means to control the angle of pressure or the limit of override, the operating lever may spring back with damaging results. *Lever flyback usually causes double pulsing of the contacts, and places additional stresses on the mechanical system of the limit switch.* The excessive impacts absorbed from inadequately designed actuating devices eventually leads to abnormal wear and premature failure of the limit switch.

By looking closely at the actuating angles of the cam surface, designers and engineers can obtain the maximum operating life from electromechanical limit switches. The following recommendations help provide a workable knowledge of proper lever and cam angles—and how they are applied to secure optimum conditions:

- Actuating cam on machinery or slide should provide a trailing edge so that upon overriding the operating lever will not snap back.
- During the approach phase, **the pressure angle of the cam should not vary from the lever angle more than 30°.**
- On the override phase, **the angle of the trailing edge of the cam to the lever should be no more than 60°.**

If these guidelines are followed, the switch operating levers will always be approximately parallel with the leading edges of the actuating surfaces or cams.

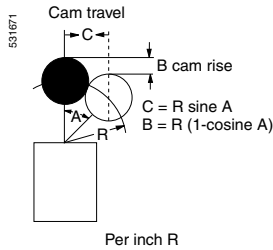
Figure 2 shows leading edge of cam about to depress and actuate the electromechanical limit switch. The black sector of the roller indicates the recommended design limits of the angle of pressure shown in drawings as "P".

Figure 3 shows operating lever roller following the trailing edge of the cam on the override cycle. Unless a one-way lever is used, the cam will operate the switch on the return cycle.

Limit Switches

9007C Heavy Duty Industrial

Linear/Angular Lever Travel



Application information (continued)

The table below can assist the designer of machine tools and conveyors, the plant engineer, or the maintenance personnel responsible for keeping this equipment in a satisfactory operating condition.

The design engineer will find the table useful in making trouble-free cam layouts. For example, if the recommended operating travel for a switch is between 15° and 30°, use the table to figure cam rise and travel. This aids in determining what type of cam to design, its dimensions, etc.

The plant engineer can use the table to determine where to position levers on replacement switches or revamped circuitry to operate existing cams. The engineer can also use the table to position the lever in proper relationship to the cam, and to find out whether switches and cams are installed properly to obtain maximum switch life.

All dimensions in the table are for 1 in. (25.4 mm) levers. If you use longer levers, multiply the figures by the increased lever length. For example, for a 2 in. (50.8 mm) lever, use the multiplier 2.

All limit switches have a recommended operating travel and for best performance should be installed within these limits. (1)

Dual dimensions: in. (mm)

A	B	C	A	B	C
1°	0.0002 (0.005 mm)	0.017 (0.43 mm)	46°	0.305 (7.7 mm)	0.719 (18.2 mm)
2°	0.0006 (0.015 mm)	0.035 (0.89 mm)	47°	0.318 (8.1 mm)	0.731 (18.6 mm)
3°	0.0014 (0.035 mm)	0.052 (1.3 mm)	48°	0.331 (8.4 mm)	0.743 (18.9 mm)
4°	0.002 (0.05 mm)	0.070 (1.8 mm)	49°	0.344 (8.7 mm)	0.755 (19.2 mm)
5°	0.004 (0.101 mm)	0.087 (2.2 mm)	50°	0.357 (9.0 mm)	0.766 (19.4 mm)
6°	0.005 (0.127 mm)	0.105 (2.6 mm)	51°	0.371 (9.4 mm)	0.777 (19.7 mm)
7°	0.007 (0.178 mm)	0.122 (3.1 mm)	52°	0.384 (9.7 mm)	0.788 (20.0 mm)
8°	0.010 (0.254 mm)	0.139 (3.5 mm)	53°	0.398 (10.1 mm)	0.799 (20.3 mm)
9°	0.012 (0.304 mm)	0.156 (4.0 mm)	54°	0.412 (10.4 mm)	0.809 (20.5 mm)
10°	0.015 (0.381 mm)	0.174 (4.4 mm)	55°	0.426 (11.0 mm)	0.819 (20.8 mm)
11°	0.018 (0.457 mm)	0.191 (4.8 mm)	56°	0.441 (11.2 mm)	0.829 (21.0 mm)
12°	0.022 (0.559 mm)	0.208 (5.3 mm)	57°	0.455 (11.5 mm)	0.839 (21.3 mm)
13°	0.026 (0.660 mm)	0.225 (5.7 mm)	58°	0.468 (12.3 mm)	0.857 (21.7 mm)
14°	0.030 (0.762 mm)	0.242 (6.1 mm)	59°	0.485 (12.3 mm)	0.857 (21.7 mm)
15°	0.034 (0.863 mm)	0.259 (6.6 mm)	60°	0.500 (12.7 mm)	0.866 (22 mm)
16°	0.039 (0.990 mm)	0.276 (7.2 mm)	61°	0.515 (13.1 mm)	0.875 (22.2 mm)
17°	0.044 (1.12 mm)	0.292 (7.4 mm)	62°	0.531 (13.5 mm)	0.883 (22.4 mm)
18°	0.049 (1.24 mm)	0.309 (7.8 mm)	63°	0.546 (14.0 mm)	0.891 (22.6 mm)
19°	0.054 (1.37 mm)	0.326 (8.3 mm)	64°	0.562 (14.3 mm)	0.899 (22.8 mm)
20°	0.060 (1.52 mm)	0.342 (8.7 mm)	65°	0.577 (14.6 mm)	0.906 (23.0 mm)
21°	0.066 (1.67 mm)	0.358 (9.1 mm)	66°	0.593 15.0 (mm)	0.914 (23.2 mm)
22°	0.073 (1.85 mm)	0.375 (9.5 mm)	67°	0.609 15.5 (mm)	0.921 (23.4 mm)
23°	0.079 (2.00 mm)	0.391 (9.9 mm)	68°	0.625 (16.0 mm)	0.927 (23.5 mm)
24°	0.086 (2.2 mm)	0.407 (10.3 mm)	69°	0.642 (16.3 mm)	0.934 (23.7 mm)
25°	0.094 (2.38 mm)	0.423 (10.7 mm)	70°	0.658 (16.7 mm)	0.940 (23.9 mm)
26°	0.101 (2.56 mm)	0.438 (11.1 mm)	71°	0.674 (17.1 mm)	0.946 (24.0 mm)
27°	0.109 (2.77 mm)	0.454 (11.5 mm)	72°	0.691 (17.5 mm)	0.951 (24.1 mm)
28°	0.117 (2.9 mm)	0.469 (12 mm)	73°	0.708 (18.0 mm)	0.956 (24.3 mm)
29°	0.125 (3.17 mm)	0.485 (12.3 mm)	74°	0.724 (18.4 mm)	0.961 (24.4 mm)
30°	0.134 (3.40 mm)	0.500 (12.7 mm)	75°	0.741 (19.0 mm)	0.966 (24.5 mm)
31°	0.143 (3.6 mm)	0.515 (13.1 mm)	76°	0.758 (19.2 mm)	0.970 (24.6 mm)
32°	0.152 (3.9 mm)	0.530 (13.4 mm)	77°	0.775 (20.0 mm)	0.974 (24.7 mm)
33°	0.161 (4.1 mm)	0.545 (14.0 mm)	78°	0.792 (20.1 mm)	0.978 (24.8 mm)
34°	0.171 (4.3 mm)	0.559 (14.2 mm)	79°	0.809 (20.5 mm)	0.982 (24.9 mm)
35°	0.181 (4.6 mm)	0.574 (14.6 mm)	80°	0.826 (21.0 mm)	0.985 (25.0 mm)
36°	0.191 (4.8 mm)	0.588 (15 mm)	81°	0.844 (21.4 mm)	0.988 (25.1 mm)
37°	0.201 (5.1 mm)	0.602 (15.3 mm)	82°	0.861 (21.8 mm)	0.990 (25.1 mm)
38°	0.212 (5.4 mm)	0.616 (15.6 mm)	83°	0.878 (22.3 mm)	0.993 (25.2 mm)
39°	0.223 (5.7 mm)	0.629 (16.0 mm)	84°	0.895 (22.7 mm)	0.995 (25.3 mm)
40°	0.234 (6.0 mm)	0.643 (16.3 mm)	85°	0.913 (23.2 mm)	0.996 (25.3 mm)
41°	0.245 (6.2 mm)	0.656 (16.6 mm)	86°	0.930 (23.6 mm)	0.9976 (25.3 mm)
42°	0.257 (6.5 mm)	0.669 (17.0 mm)	87°	0.948 (24.0 mm)	0.9986 (25.4 mm)
43°	0.269 (6.8 mm)	0.682 (17.3 mm)	88°	0.965 (24.5 mm)	0.9994 (25.4 mm)
44°	0.281 (7.1 mm)	0.695 (17.6 mm)	89°	0.983 (25.0 mm)	0.9999 (25.4 mm)
45°	0.293 (7.4 mm)	0.707 (18 mm)	90°	1.000 (25.4 mm)	1.000 (25.4 mm)

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

Limit Switches

9007C Heavy Duty Industrial

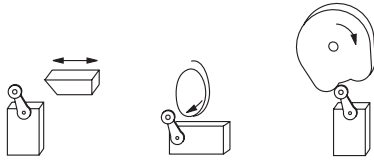
Installation Considerations

Lever Actuators

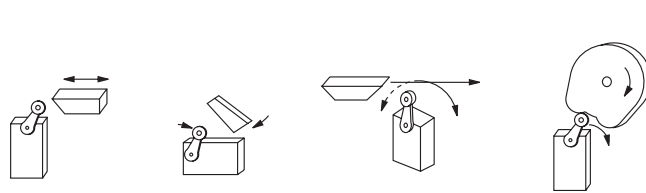
For limit switches with lever actuators, the actuating force should be applied as nearly perpendicular to the lever as practical and perpendicular to the shaft axis about which the lever rotates.

Lever Actuators

Correct



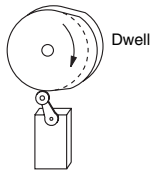
Incorrect



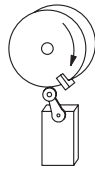
Dwelling Requirements

Where relatively fast motions are involved, the cams should be so designed that the limit switch will be held operated long enough to operate relays, valves, etc.

Correct

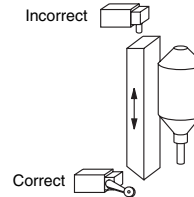
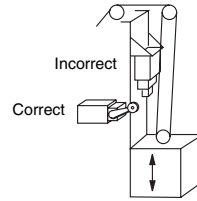


Incorrect

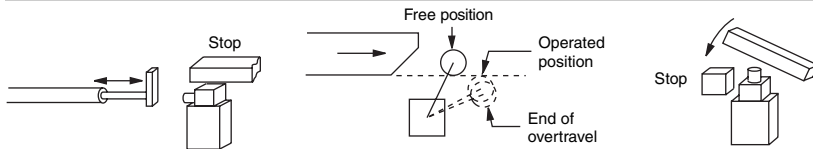


Overtravel limitations

Operating mechanisms for limit switches should be so designed that, under any operating or emergency conditions, the limit switch is not operated beyond its overtravel limit position. A limit switch should not be used as a mechanical stop.



Correct



Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

Conforming to NEMA A600 and UL508

Description

9007T Mill Switches

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

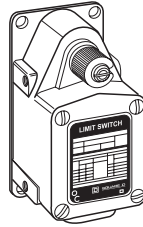
- Where the current load exceeds the typical heavy duty limit switch contact rating of 10 A and falls within the range of up to 20 A continuous.
- Where an operating sequence is required that is not possible on other limit switches. Fifteen sequences are available. Universal type has twelve different operating sequences with CW only, CCW only and neutral position. Standard type has three operating sequences with CW and CCW operation.
- Where higher reset forces are required due to foreign material interfering with lever arm operation, or where long heavy arms must reset against gravity.

9007FT Foundry Switches

The 9007FT Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around the shaft. The devices can withstand hot falling sand up to 300° F (149° C.).

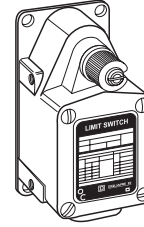
9007 (convertible sequence)

9007T Mill Switches



Page 216

9007FT Foundry Switches



Page 218

Application Information

Type T — Ideal for applications requiring extra heavy duty contact ratings, or higher operating and reset forces. Rugged mechanical construction with several different operating sequences in one basic switch.

Type FT — Designed specifically for rough foundry application. The shaft is entirely beyond the switch case to prevent jamming of the lever arm due to build up of sand. A dust boot is furnished as standard to further prevent sand packing and allow free movement of the lever arm. An extra long shaft bearing makes the switch extremely rugged and able to handle the rough applications encountered in foundries, mills, machine tool and similar industries. The switch will withstand hot falling sand up to 300° F (149° C).

Type T and FT

Enclosure — Oil-tight, dust-tight, water-tight, drip-tight meets NEMA Types 2, 4, and 13 requirements. Die cast zinc construction.

Operating Sequences — Fifteen sequences available. Universal type has 12 different operating sequences with CW only, CCW only, and neutral position operation. Standard type has three operating sequences with CW and CCW operation. Various sequences will give quick make and break, spring return with maintained contact, or slow make and break. Most sequences are convertible by removing the base plate and adjusting the positioning plate and/or latches

Ambient Temperature Range — 10° F (-12.2° C) to 185° F (85° C) ambient at full rated load, up to 220° F (104° C) ambient with single coil load.

Lever Arm — Die cast zinc construction with hardened, oil-impregnated, sintered iron rollers.

Conduit — 0.5 in. standard / 20 mm optional—Form M11

Mounting — Four baseplates provide end or side mounting holes and/or manifold mounting. All mounting holes are 0.25 in. (6.35 mm) diameter. Two tapped holes on each side of switch allows side mounting.

Contacts — SPDT¹ double break and three point double throw single break. Silver contact tips. Phenolic contact block. Nylon liner. Polarity must be the same on double throw contacts.

1. Single pole, double throw.

Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

Conforming to NEMA A600 and UL508

Environmental characteristics	
Conforming to standards	UL508
Product certifications	UL Listed, CSA Certified, CE Marked
Protective treatment	Corrosion resistant gray paint
Ambient air temperature	-10 to +185 °F (-23 to +85 °C) Housing can withstand falling sand at +300 °F (+149 °C)
Vibration resistance	10G (10–55 Hz)
Shock resistance	30G
Electric shock protection	Class O
Degree of protection	NEMA Types 1, 2, 4, 12, 13, IP65, 66, 67
Cable entry or connector	1/2" NPT (metric available)
Materials	Cast zinc

Contact block characteristics	
Rated operational characteristics hard contacts	AC Voltage
	NEMA A600 Ithe = 20 A 20 A Resistive and continuous
Rated operational characteristics hard contacts	DC Voltage
	NEMA P 600 Ithe = 20 A 20 A Resistive and continuous
Rated insulation voltage	600 V
Rated impulse withstand voltage	2,500 Vac for 1 minute for CE, 2,200 Vac for 1 minute for UL, and 2,640 Vac for 1 minute for CSA
Positive opening	No
Short circuit protection	20 A Bussmann Class CC KTK-R-20 fuse, non-time-delay
Terminal wire sizes (Cabling/Screw Clamp)	12 – 22 AWG (3.31 mm ² – 0.326 mm ²) wire max.
Maximum actuation speed	15.2 mpm / 27.4 mpm (50 fpm / 90 fpm) with 45 ° Cam angle, levers only

Maximum current ratings for control circuit contacts												
Contacts	AC							DC				
	Volts	Inductive 35% Power Factor				Continuous Carrying Amperes	Resistive 75% Power Factor		Volts	Inductive and Resistive		Continuous Carrying Amperes
		Make Amperes		Break VA			Make, Break and Continuous Carrying Amperes			Make and Break Amperes		
			VA	Amperes	VA				Single Throw	Double Throw		
SPDT Quick Make and Break	120	150	18,000	20	2400	20	20	120	5.0	∅	20	
	240	75	18,000	12.5	3000	20	20	250	1.0	∅	20	
	480	37.5	18,000	6.25	3000	20	20	600	0.2	∅	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 237.


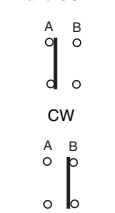
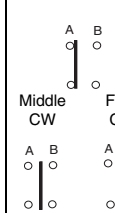
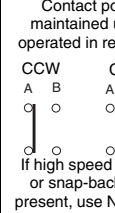
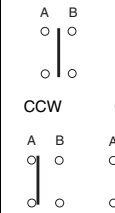
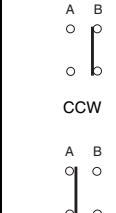
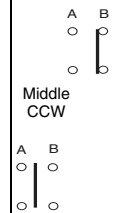
Limit Switches

9007T Severe Duty Mill Switches

Universal Operating Sequences

Universal Catalog Numbers

Base Plate







Surface Mounted	A	9007TUA1	9007TUA2	9007TUA3	9007TUA4	9007TUA5	9007TUA6
	B	9007TUB1	9007TUB2	9007TUB3	9007TUB4	9007TUB5	9007TUB6
	C	9007TUC1	9007TUC2	9007TUC3	9007TUC4	9007TUC5	9007TUC6
	D	9007TUD1	9007TUD2	9007TUD3	9007TUD4	9007TUD5	9007TUD6
	No. 1	No. 2	No. 3 ④	No. 4	No. 5	No. 6	
	SPDT Spring Return CW Only	SPDT Spring Return CW Only	SPDT Maintained Contact	SPDT Spring Return Neutral Position	SPDT Spring Return CCW Only	SPDT Spring Return CCW Only	
	Initial position and CCW 	Initial position and CCW 	Spring return of arm to initial pos. Contact pos. maintained until operated in reverse CCW CW 	Initial position 	Initial position and CW 	Initial position and CW 	

Characteristics

Nominal Operating Data


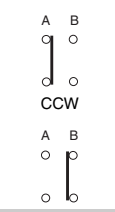
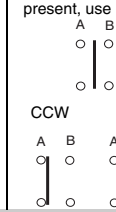
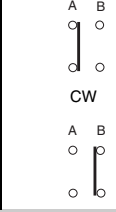
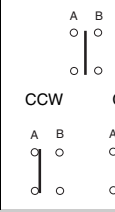
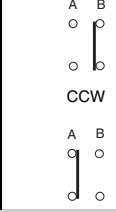
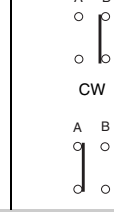
Pre-travel ①	14°	Int. Pos. 9°, Final 16°	7°	6°	14°	Int. Pos. 9°, Final 16°
Total travel	88°	88°	81°	81°	88°	88°
Differential	12°	5°	7°	5°	12°	5°
Operating torque	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)
Repeat accuracy ②	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						
Weight lb (kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)

Universal Catalog Numbers (continued)

Base Plate






Surface Mounted	A	9007TUA7	9007TUA8	9007TUA9	9007TUA10	9007TUA11	9007TUA12
	B	9007TUB7	9007TUB8	9007TUB9	9007TUB10	9007TUB11	9007TUB12
	C	9007TUC7	9007TUC8	9007TUC9	9007TUC10	9007TUC11	9007TUC12
	D	9007TUD7	9007TUD8	9007TUD9	9007TUD10	9007TUD11	9007TUD12
	No. 7	No. 8 ④	No. 9	No. 10	No. 11	No. 12	
	SPDT Maintained	SPDT Maintained Neutral Position	SPDT Spring Return Slow Make, Slow Break	SPDT Spring Return Slow Make, Slow Break	SPDT Spring Return Slow Mak, Slow Break	SPDT Maintained	
	If high speed cam or snap-back present, use No. 12 	Initial position If high speed cam or snap-back is present, use No. 12 	Initial position and CCW 	Initial position 	Initial position and CW 	CCW 	

Characteristics

Nominal Operating Data

Pre-travel ①	10°	6°	12°	3°	12°	45°
Total travel	85°	81°	87°	81°	87°	90°
Differential	12°	10°	0°	0°	0°	0°
Operating torque	2.5 lb-in (0.28 N•m)	2.5 lb-in (0.28 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	8 lb-in (0.9 N•m)
Repeat accuracy ②	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						Not adjustable
Weight lb (kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)

Footnotes: see page 217

Dimensions:
pages 222 to 225

Interpretation of Catalog Numbers:
page 239

Base Plates:
pages 221 and 222

Limit Switches

9007T Severe Duty Mill Switches

Standard Operating Sequences

Standard Catalog Numbers

Base Plate

Surface
Mounted



A	9007TSA1	9007TSA2	9007TSA3		
B	9007TSB1	9007TSB2	9007TSB3		
C	9007TSC1	9007TSC2	9007TSC3		
D	9007TSD1	9007TSD2	9007TSD3		
No. 1		No. 2		No. 3	
SPDT Spring Return CW & CCW		SPDT Spring Return CW & CCW		SPDT Spring Return CW & CCW Slow Make, Slow Break	
Initial position		Initial position		Initial position	

Characteristics (nominal operating data)

Switch actuation	By 30° cam		
Type of actuation			
Pre-travel ①	14°	Int. Pos. 9°, Final 16°	9°
Total travel	89°	89°	89°
Differential	12°	Int. Pos. 5.5°, Final 7.5°	5°
Reverse overtravel	N/A (future availability)	N/A (future availability)	N/A (future availability)
Operating torque/force 1 pole & 2 pole	10 lb-in (1.13 N•m)	10 lb-in (1.13 N•m)	10 lb-in (1.13 N•m)
Terminal wire sizes (Cabling/Screw Clamp)	#12–22 AWG (3.31–0.326 mm ²)	#12–22 AWG (3.31–0.326 mm ²)	#12–22 AWG (3.31–0.326 mm ²)
Repeatability ② (linear travel of cam)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)
Cable entry (metric available)	1/2" NPT	1/2" NPT	1/2" NPT
Weight lb (kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)	2.35 lb. (1.07 kg)

① The pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to free travel of lever arm at initial position.

② Linear travel of cam on 1.5 in. (38.1mm) lever arm.

③ Remove spring from the positioning plate.

④ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present. The application should be checked and No. 12 sequences substituted where possible.

Note: For Type FT foundry switches, change the "T" at the beginning of the equivalent Type number above to "FT" (Example: FTUB1). See page 218.


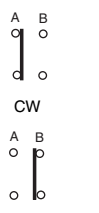
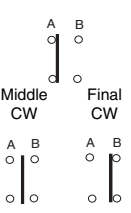
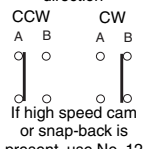
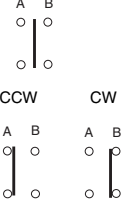
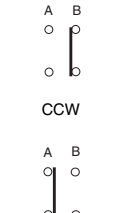
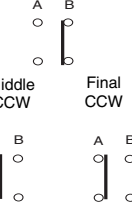
Limit Switches

9007FT Severe Duty Foundry Switches

Universal Operating Sequences

Universal Catalog Numbers

Base Plate







Surface Mounted	A	9007FTUA1	9007FTUA2	9007FTUA3	9007FTUA4	9007FTUA5	9007FTUA6
	B	9007FTUB1	9007FTUB2	9007FTUB3	9007FTUB4	9007FTUB5	9007FTUB6
C	9007FTUC1	9007FTUC2	9007FTUC3	9007FTUC4	9007FTUC5	9007FTUC6	9007FTUC6
D	9007FTUD1	9007FTUD2	9007FTUD3	9007FTUD4	9007FTUD5	9007FTUD6	9007FTUD6
	No. 1	No. 2	No. 3 ④	No. 4	No. 5	No. 6	
	SPDT Spring Return CW Only	SPDT Spring Return CW Only	SPDT Maintained Contact	SPDT Spring Return Neutral Position	SPDT Spring Return CCW Only	SPDT Spring Return CCW Only	
	Initial position and CCW 	Initial position and CCW 	Spring return of arm to initial pos. Contact pos. maintained until operated in reverse direction CCW CW 	Initial position 	Initial position and CW 	Initial position and CW 	

Characteristics

Nominal Operating Data


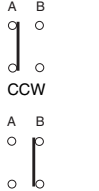
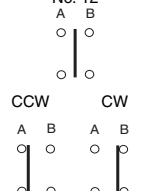
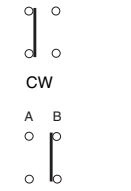
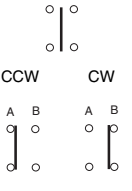
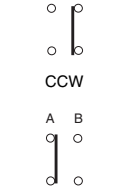
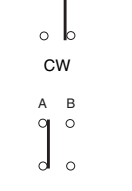
Pre-travel ①	14°	Int. Pos. 9°, Final 16°	7°	6°	14°	Int. Pos. 9°, Final 16°
Total travel	88°	88°	81°	81°	88°	88°
Differential	12°	5°	7°	5°	12°	5°
Operating torque	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)
Repeat accuracy ②	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						
Weight lb (kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)

Universal Catalog Numbers (continued)

Base Plate






Surface Mounted	A	9007FTUA7	9007FTUA8	9007FTUA9	9007FTUA10	9007FTUA11	9007FTUA12
	B	9007FTUB7	9007FTUB8	9007FTUB9	9007FTUB10	9007FTUB11	9007FTUB12
C	9007FTUC7	9007FTUC8	9007FTUC9	9007FTUC10	9007FTUC11	9007FTUC12	9007FTUC12
D	9007FTUD7	9007FTUD8	9007FTUD9	9007FTUD10	9007FTUD11	9007FTUD12	9007FTUD12
	No. 7	No. 8 ④	No. 9	No. 10	No. 11	No. 12	
	SPDT Maintained	SPDT Maintained Neutral Position	SPDT Spring Return Slow Make, Slow Break	SPDT Spring Return Slow Make, Slow Break	SPDT Spring Return Slow Make, Slow Break	SPDT Maintained	
	If high speed cam or snap-back present, use No. 12 	Initial position If high speed cam or snap-back present, use No. 12 	Initial position and CCW 	Initial position 	Initial position and CW 	CCW 	

Characteristics

Nominal Operating Data

Pre-travel ①	10°	6°	12°	3°	12°	45°
Total travel	85°	81°	87°	81°	87°	90°
Differential	12°	10°	0°	0°	0°	0°
Operating torque	2.5 lb-in (0.28 N•m)	2.5 lb-in (0.28 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	12 lb-in (1.35 N•m)	8 lb-in (0.9 N•m)
Repeat accuracy ②	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)

To convert sequences, remove base plate, position plate and latches. Reassemble positioning plate and latches as shown.

						Not adjustable
Weight lb (kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)	2.57 lb (1.17 kg)

Footnotes: see page 219

Dimensions:
pages 222 to 225

Interpretation of Catalog Numbers:
page 239

Limit Switches

9007FT Severe Duty Foundry Switches

Standard Operating Sequences

Standard Catalog Numbers

Base Plate

Surface
Mounted



A	9007FTSA1	9007FTSA2	9007FTSA3
B	9007FTSB1	9007FTSB2	9007FTSB3
C	9007FTSC1	9007FTSC2	9007FTSC3
D	9007FTSD1	9007FTSD2	9007FTSD3
No. 1		No. 2	
Single Pole Double Throw Spring Return CW & CCW		Single Pole Double Throw Spring Return CW & CCW	
Initial position 		Initial position 	
CW and CCW 		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 in. (0.10 mm)	± 0.004 in. (0.10 mm)	± 0.004 in. (0.10 mm)
Cable entry (metric available)	1/2" NPT	1/2" NPT	1/2" NPT
Weight lb (kg)	2.57 lb. (1.17 kg)	2.57 lb. (1.17 kg)	2.57 lb. (1.17 kg)

① The pre-travel listed may vary up to 5° additional for universal switches or up to 2° additional for standard switches due to free travel of lever arm at initial position.

② Linear travel of cam on 1.5 in. (38.1mm) lever arm.

③ Remove spring from the positioning plate.

④ Sequence 3, 7, and 8 devices are available but are not recommended where high speed cams or lever arm snap-back is present. The application should be checked and No. 12 sequences substituted where possible.

Note: Type FT Foundry Switches are obtained by changing the "T" at the beginning of the equivalent type number to "FT" (Example: FTUB1).

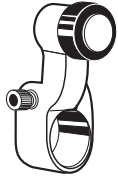
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

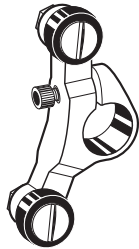
Lever Arms and Renewal Parts



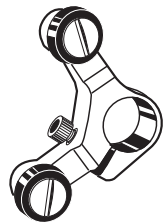
Standard Roller



Offset Type



120° Forked



90° Forked

Standard Roller

Arm		Steel Roller		Catalog Number	Weight lb (kg)
Length in. (mm)	Diameter in. (mm)	Roller Position	Width in. (mm)		
1.5 (38.1)	0.75 (19)	Optional	0.25 (6.3)	9007B1	0.17 (0.077)
1.5 (38.1)	1.0 (25.4)	Optional	0.25 (6.3)	9007B2	0.19 (0.086)
1.5 (38.1)	1.38 (35)	Optional	0.25 (6.3)	9007B3	0.23 (0.104)
2.5 (63.5)	0.75 (19)	Optional	0.25 (6.3)	9007B7	0.25 (0.113)
2.5 (63.5)	1.0 (25.4)	Optional	0.25 (6.3)	9007B8	0.25 (0.113)
2.5 (63.5)	1.38 (35)	Optional	0.25 (6.3)	9007B9	0.27 (0.122)
1.5 (38.1)	0.75 (19)	Optional	0.5 (12.7)	9007B12	0.34 (0.154)
1.5 (38.1)	1.0 (25.4)	Optional	0.5 (12.7)	9007B13	0.34 (0.154)
1.5 (38.1)	1.38 (35)	Optional	0.5 (12.7)	9007B14	0.42 (0.191)
5 (127)	0.75 (19)	Optional	0.25 (6.3)	9007B19	1.00 (0.454)
2.88 (73.1)	0.75 (19)	No roller	—	9007B21	0.20 (0.091)
2.5 (63.5)	0.75 (19)	Optional	0.5 (12.7)	9007B22	0.22 (0.100)
2.5 (63.5)	1.0 (25.4)	Optional	0.5 (12.7)	9007B23	0.28 (0.127)
2.5 (63.5)	1.38 (35)	Optional	0.5 (12.7)	9007B24	0.36 (0.163)
Adjustable ⁽¹⁾	0.75 (19)	Optional	0.25 (6.3)	9007R18	0.50 (0.227)
Adjustable ⁽¹⁾	1.0 (25.4)	Optional	0.25 (6.3)	9007R19	0.50 (0.227)
Adjustable ⁽¹⁾	1.38 (35)	Optional	0.25 (6.3)	9007R20	0.50 (0.227)

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

Offset Type (for obtaining different cam track dimensions)

Arm		Steel Roller		Catalog Number	Weight lb (kg)
Length in. (mm)	Diameter in. (mm)	Roller Position	Width in. (mm)		
1.5 (38.1)	0.75 (19)	Inside offset	0.25 (6.3)	9007C1	0.50 (0.227)
1.5 (38.1)	1.0 (25.4)	Inside offset	0.25 (6.3)	9007C2	0.50 (0.227)
1.5 (38.1)	1.38 (35)	Inside offset	0.25 (6.3)	9007C3	0.50 (0.227)
1.5 (38.1)	0.75 (19)	Outside offset	0.25 (6.3)	9007D1	0.18 (0.082)
1.5 (38.1)	1.0 (25.4)	Outside offset	0.25 (6.3)	9007D2	0.18 (0.082)
1.5 (38.1)	1.38 (35)	Outside offset	0.25 (6.3)	9007D3	0.18 (0.082)
1.88 (48)	0.75 (19)	Outside offset	0.25 (6.3)	9007E4	0.20 (0.091)
1.88 (48)	1.0 (25.4)	Outside offset	0.25 (6.3)	9007E5	0.27 (0.122)
1.88 (48)	1.38 (35)	Outside offset	0.25 (6.3)	9007E6	0.27 (0.122)
1.88 (48)	0.75 (19)	Inside offset	0.25 (6.3)	9007F4	0.30 (0.136)
1.88 (48)	1.0 (25.4)	Inside offset	0.25 (6.3)	9007F5	0.30 (0.136)
1.88 (48)	1.38 (35)	Inside offset	0.25 (6.3)	9007F6	0.30 (0.136)

120° Forked (for maintained contact lever arm type switches)

Arm		Steel Roller		Catalog Number	Weight lb (kg)
Length in. (mm)	Diameter in. (mm)	Roller Position	Width in. (mm)		
1.5 (38.1)	0.75 (19)	Same side	0.25 (6.3)	9007J1	0.31 (0.141)
1.5 (38.1)	1.0 (25.4)	Same side	0.25 (6.3)	9007J2	0.40 (0.181)
1.5 (38.1)	0.75 (19)	LH on opp. side	0.25 (6.3)	9007K1	0.50 (0.227)
1.5 (38.1)	1.0 (25.4)	LH on opp. side	0.25 (6.3)	9007K2	0.50 (0.227)
1.5 (38.1)	0.75 (19)	RH on opp. side	0.25 (6.3)	9007N1	0.66 (0.299)
1.5 (38.1)	1.0 (25.4)	RH on opp. side	0.25 (6.3)	9007N2	0.70 (0.316)

90° Forked (for maintained contact lever arm type switches)

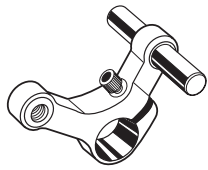
Arm		Steel Roller		Catalog Number	Weight lb (kg)
Length in. (mm)	Diameter in. (mm)	Roller Position	Width in. (mm)		
1.5 (38.1)	0.75 (19)	Same side	0.25 (6.3)	9007X1	0.30 (0.136)
1.5 (38.1)	1.0 (25.4)	Same side	0.25 (6.3)	9007X2	0.40 (0.181)
1.5 (38.1)	0.75 (19)	RH on opp. side	0.25 (6.3)	9007Y1	0.50 (0.227)
1.5 (38.1)	1.0 (25.4)	RH on opp. side	0.25 (6.3)	9007Y2	0.50 (0.227)
1.5 (38.1)	0.75 (19)	LH on opp. side	0.25 (6.3)	9007Z1	0.66 (0.299)
1.5 (38.1)	1.0 (25.4)	LH on opp. side	0.25 (6.3)	9007Z2	0.70 (0.316)

Dimensions:
pages 222 to 225

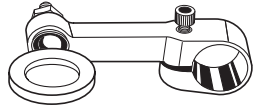
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

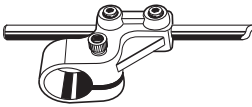
Lever Arms and Renewal Parts



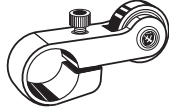
With Reset



Cable Operated



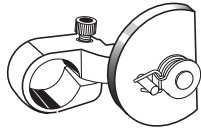
Rod Type
(rod not included)



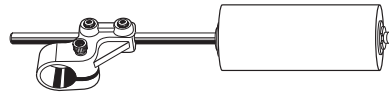
Ball Bearing Type



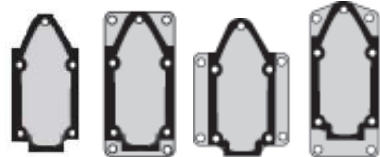
Weld-On Type



1-Way Roller Type



Conveyor Side Guide
(use with 9007R16 or R17)



Style A Style B Style C Style D

Base Plates

Cable operated					
Arm	Steel roller	Roller		Catalog Number	Weight lb (kg)
Length in. (mm)	Diameter in. (mm)	Roller Position	Width in. (mm)		
1.5 (38.1)	0.75 (19)	None	None	9007Y3	—
2.5 in. (63.5mm) long with eyebolt 0.25 (6.3mm) I.D. instead of roller.				9007B27	—
Rod Type (used on conveyor systems or where unusual shapes are required)					
Adjustable	0.75 (19)	0.19 (4.8)	None	9007R16	0.18 (0.081)
Adjustable	0.75 (19)	0.25 (6.3)	None	9007R17	0.18 (0.081)
1. Rod not included 2. Key stock not included					
Ball Bearing Type (for abrasive dust areas or with high speed cams)					
1.5 (38.1)	0.75 (19)	Center	0.28 (7.1)	9007B16	0.15 (0.068)
Weld-On Type (used where a special operator is required to weld to lever)					
3.5 (89)	0.75 (19)	None	None	9007G10	0.50 (0.227)
One Way Roller Type (used with reversible cams for one way operations)					
1.5 (38.1)	0.75 (19)	Outside offset	0.25 (6.3)	9007D4	0.64 (0.290)
Conveyor Side Guide					
8.44 in. (214.3) long with 1.5 in. (38.1) dia. 3.75 in. (95.2) Delrin® roller				9007R21	1.63 (0.739)
8.44 in. (214.3) long with 0.88 in. (22.3) dia. 3.75 in. (95.2) Delrin roller				9007R22	1.42 (0.644)

Separate Base Plates (2)			
Style	Mounting Holes	Catalog Number	Weight lb (kg)
A	None (1)	2934D32G1	
B	End	2934D14G1	0.34 (0.154)
C	Side	2934D33G1	0.42 (0.191)
D	End	2934D34G1	0.36 (0.163)

- No mounting holes in base plate. Side mounting holes in switch case must be used.
- Acceptable wire sizes 14 – 18 AWG (2.08 – 0.823 mm²); recommended terminal clamp torque 13 – 16 lb-in. (1.46 – 1.80 N•m).

Optional Conduit Threads		
Description	Catalog Number	Weight lb (kg)
Metric		
M20 - 20mm (per B.S. 4568)	M11	—
Example: 9007TUB4M11		

Three Point Contacts — Ordering Information		
Select Type number of desired contact operating sequence for standard contact switch.		
Change the letter following "T" or "FT" as shown below.		
Change: For example: TUB1 changes to TYB1 TSB1 changes to TKB1	U to Y S to K	Contact Configuration Changes From:

Limit Switches

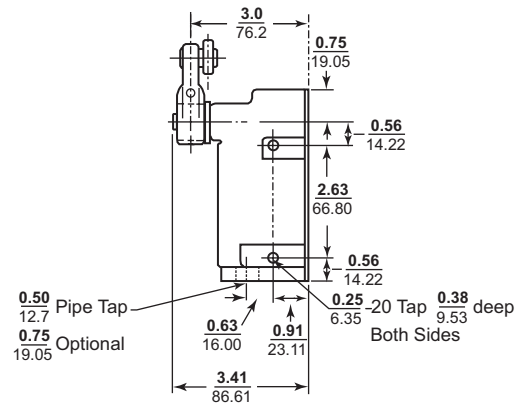
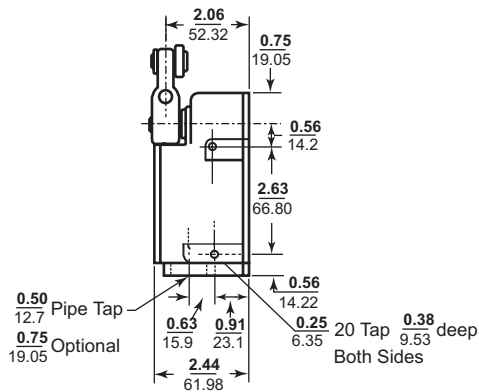
9007T and FT Severe Duty Mill and Foundry Switches

Dimensions

Surface Mounting

Type T

Type FT



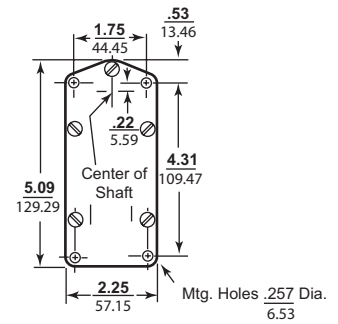
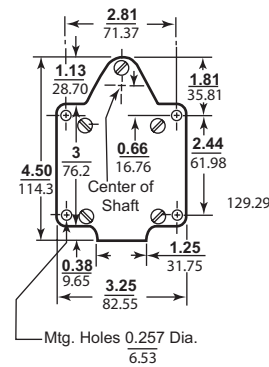
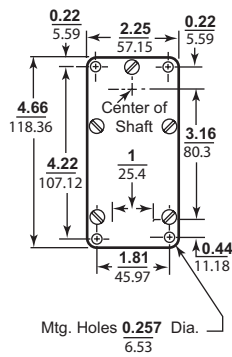
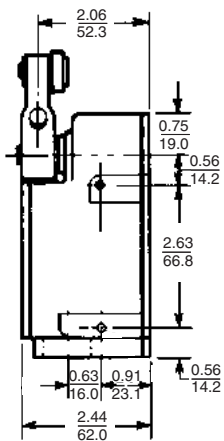
Base Plates

Style A

Style B

Style C

Style D



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

Limit Switches

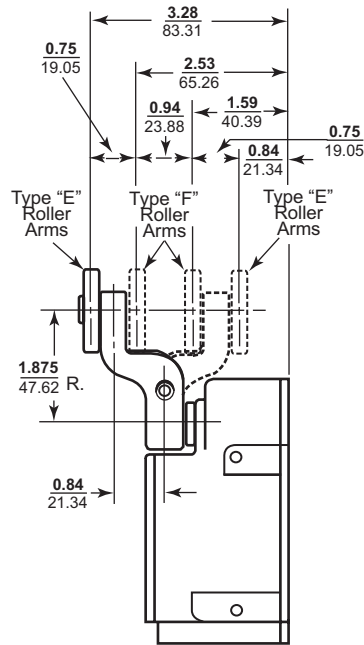
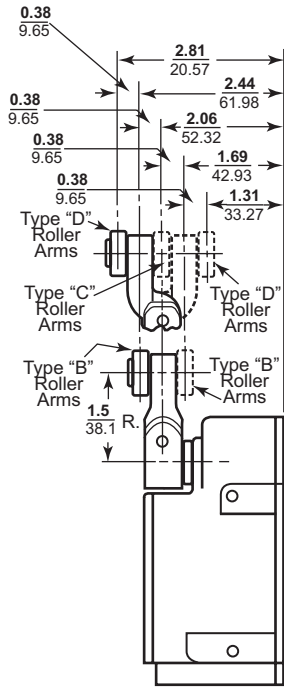
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

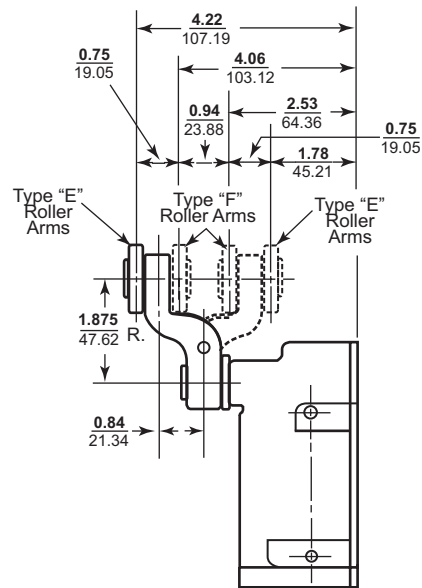
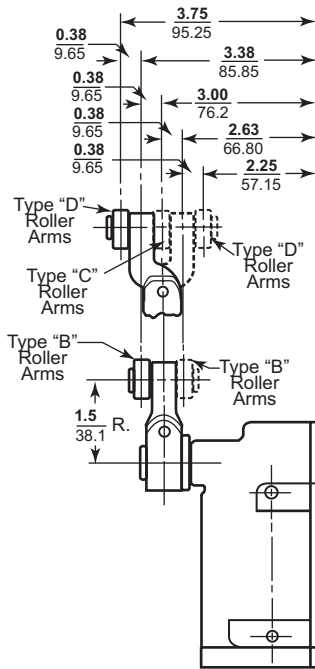
Dimensions

CAM Track Dimensions

Type T



Type FT



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

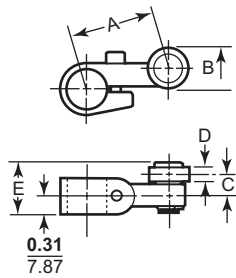
Limit Switches

9007T and FT Severe Duty Mill and Foundry Switches

Dimensions

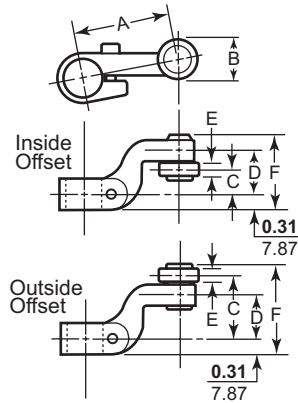
Type T and FT Lever Arms

Standard Roller

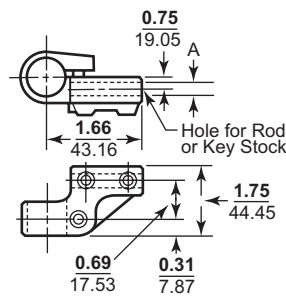


For dimension A refer to page 12.

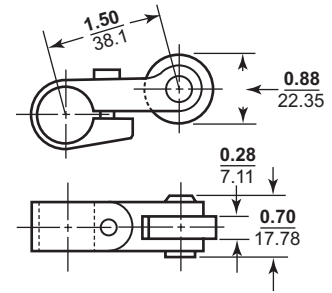
Offset Type



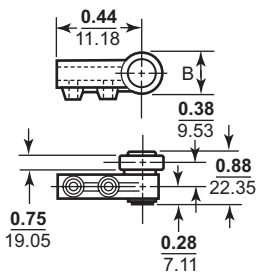
Adjustable Length Rod Type



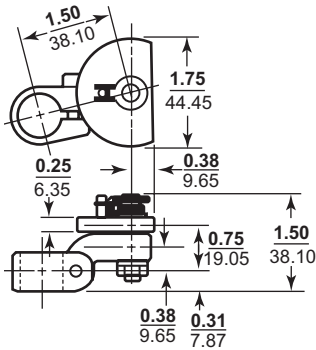
Ball Bearing Roller Type B16



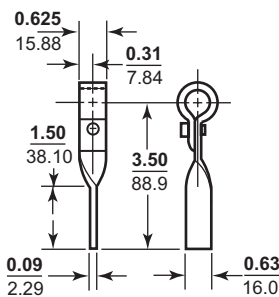
Roller Arm for use with Type R17



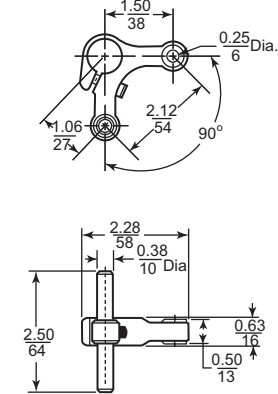
1-Way Roller Type D4



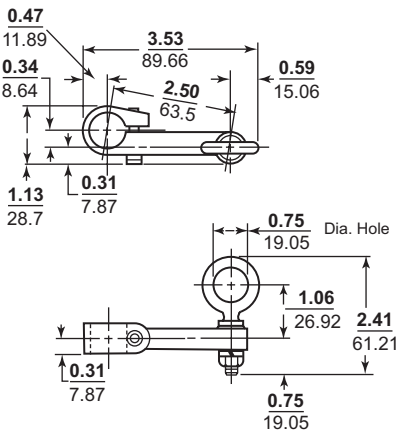
Weld-On Arm Type G10



Cable Operated with Reset Type Y3



Cable Operated Type B27



Limit Switches

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

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

Limit Switches

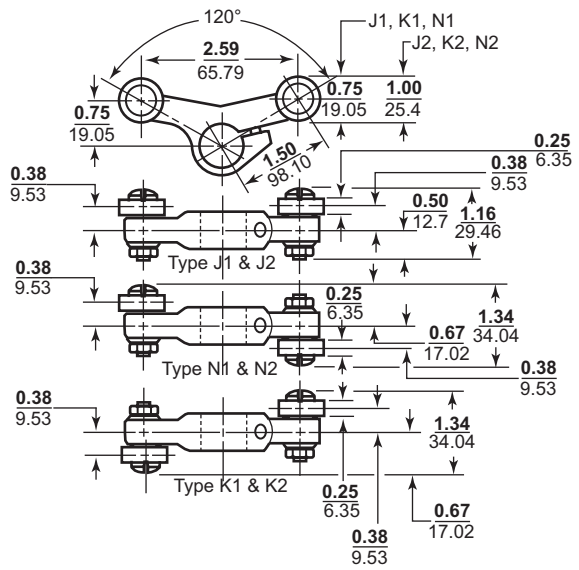
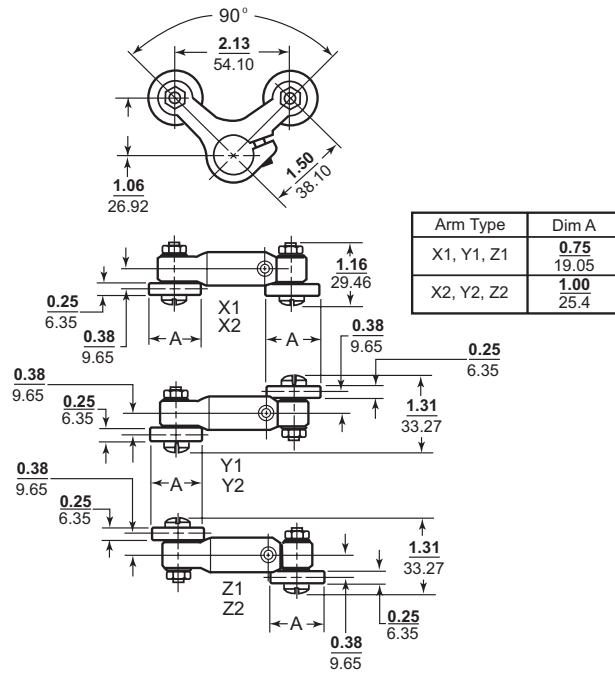
9007T and FT Severe Duty Mill and Foundry Switches

Dimensions

Type T and FT Lever Arms (continued)

90° Forked

120° Forked



Limit Switches

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

L100, L300 Mill and Foundry Switches, L140, L2153 Cable Pulls, L529 Belt Conveyor

Conforming to NEMA A600 and UL508

Description

L100W Switches ♦

Use the L100W Mill switches instead of other limit switches in the following applications:

- Where the current load exceeds the typical heavy duty limit switch contact rating of 10 A and falls within the range of up to 20 A continuous.
- Where an operating sequence is required that is not possible on other limit switches (35 choices with the L switches).
- Where higher reset forces are required due to foreign material interfering with lever arm operation, or where long heavy arms must reset against gravity.

♦ L switches are not preceded by 9007. They are known as the R.B. Denison® Lox Switch™ L, and include conveyor belt and slack cable pull switches in the product offering.

L300W Switches

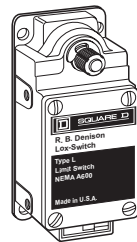
The L300W Foundry switches are for use in foundries or mills where the applications described above are required, and where falling foundry sand or similar material could build up and jam the operating mechanism. The shaft has a dust boot and extends from the switch case, preventing sand build up around the shaft. The devices can withstand hot falling sand up to 300° F (149° C).

Features L100, L300, L140, L2153, L525

- Captive cover screws
- Heavy duty snap action mechanism prevents teasing or false contact opening.
- Positive trip action prevents the lever from slipping around the 0.5 in. (12.7 mm) shaft even if not properly tightened.
- High current capability. 20 A maximum continuous
- Isolated (no polarity) double and triple circuits with double break (throw) action
- Wide 0.25 in. (6.3 mm) contact gap ensures very high shock and vibration resistance.
- Easy to access contacts allow for easy inspection and replacement.
- Stamped contact configuration number for easy identification even if the switch is painted
- Many contact arrangements to solve difficult applications
- Model L300 is an extra heavy duty version for very aggressive environments.
 - The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing.
 - Heavy duty stainless steel springs and hardened spring operators permit longer life under extreme lever fly-back and high impact.
 - Same parameters as L100 models, except that the distance between the back of the switch and the lever is increased by 0.34 in. (8.6 mm).
- Two and three circuits in CW, CCW, neutral position, spring return and maintained, snap action or slow-make slow-break, two steps (L525) are available.
- 2 circuit models can be CW or CCW field converted.
- Wide range of options: high shock and vibration, with gold contact, low or very high temperature
- 0.5 in. (12.7 mm) NPT conduit entrance standard on 2-pole models (5 wires max.)
- 0.75 in. (19 mm) NPT conduit entrance standard on 3-pole models (7 wires max.)

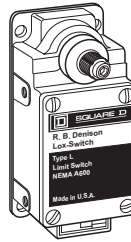
L100, L300 Switches (fixed sequence)

L100 Mill



Page 228

L300 Foundry

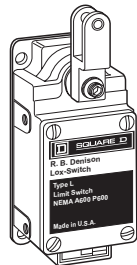


Page 230

- Model L300 is an extra heavy duty version for very aggressive environments
 - The booted shaft design prevents penetration of foreign materials such as sand, dust, or grit between the shaft and the bushing.
 - Heavy duty stainless steel springs and hardened spring operators permit longer life under extreme lever fly-back and high impact.
 - Same parameters as L100 models, except that the distance between the back of the switch and the lever is increased by 0.34 in. (8.6 mm).

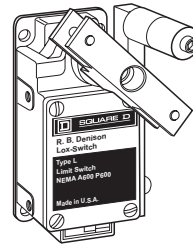
Cable Pulls (fixed sequence)

L140 Mill and Foundry



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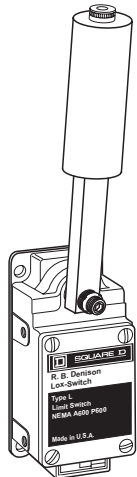
L2153 Mill and Foundry



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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.

Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches L100, L300 Mill and Foundry Switches, L140, L2153 Cable Pulls, L529 Belt Conveyor

Environmental characteristics	
Conforming to standards	UL508
Product certifications	UL Listed, CSA Certified, CE Marked
Protective treatment	Corrosion resistant gray paint
Ambient air temperature	-10 to +185 °F (-23 to +85 °C) With H prefix: -10 to +350 °F (-23 to +177 °C). (1)
Vibration resistance	10G (10–55 Hz)
Shock resistance	30G
Electric shock protection	Class O
Degree of protection	NEMA Types 1, 2, 4, 12, 13, IP65, 66, 67
Cable entry or connector	1/2" NPT (metric available)
Materials	Cast zinc ⬤

1. For a switch with an ambient temperature rating up to 350 °F (177 °C), add an H to the beginning of the catalog number.
For example, change catalog number L100WS2M2 to HL100WS2M2.

Contact block characteristics		
Rated operational characteristics hard contacts	AC Voltage	NEMA A600 Ithe = 20 A 20 A Resistive and continuous
	DC Voltage	NEMA P600 Ithe = 20 A 20 A Resistive and continuous
Rated insulation voltage		600 V
Rated impulse withstand voltage		2,500 Vac for 1 minute for CE, 2,200 Vac for 1 minute for UL, and 2,640 Vac for 1 minute for CSA
Positive opening		No
Short circuit protection		20 A Bussmann Class CC KTK-R-20 fuse, non-time-delay
Terminal wire sizes (Cabling/Screw Clamp)		12 – 22 AWG (3.31 mm ² – 0.326 mm ²) wire max.
Maximum actuation speed		15.2 mpm / 27.4 mpm (50 fpm / 90 fpm) with 45 ° Cam angle, levers only

Contacts	AC							DC				
	Volts	Inductive 35% Power Factor				Con- tinuous Carrying Amperes	Resistive 75% Power Factor		Volts	Inductive and Resistive		Con- tinuous Carrying Amperes
		Make Amperes	VA	Break Amperes	VA		Make, Break and Continuous Carrying Amperes	Make and Break Amperes		Single Throw	Double Throw	
SPDT Quick Make and Break	120	150	18,000	20	2400	20	20	120	5.0	Ⓢ	20	
	240	75	18,000	12.5	3000	20	20	250	1.0	Ⓢ	20	
	480	37.5	18,000	6.25	3000	20	20	600	0.2	Ⓢ	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 237.

Limit Switches

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

L100 Mill Switches

L100 Mill Switches					
Description	Operating Torque	Contact Diagram	Catalog Number	Operating Data	Weight, lb (kg)
Snap-action CW spring return	190 oz-in (1.34 N•m)		L100WS2M1	A (see page 229)	1.51 (0.68)
Snap-action CCW spring return	190 oz-in (1.34 N•m)		L100WS2M2	A (see page 229)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L100WS2M3	A (see page 229)	1.51 (0.68)
Snap action CW spring return	190 oz-in (1.34 N•m)		L100WDR2M4	A (see page 229)	1.51 (0.68)
Snap action CCW spring return	190 oz-in (1.34 N•m)		L100WDR2M5	A (see page 229)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L100WDR2M6	A (see page 229)	1.51 (0.68)
Snap action CCW spring return	190 oz-in (1.34 N•m)		L100WDL2M7	A (see page 229)	1.51 (0.68)
Snap action CW spring return	190 oz-in (1.34 N•m)		L100WDL2M8	A (see page 229)	1.51 (0.68)
Snap action CW 1 N.C./ 2 N.O. spring return	190 oz-in (1.34 N•m)		L100WTR2M10	A (see page 229)	1.51 (0.68)
Snap action CCW 1 N.O./ 2 N.C. spring return	190 oz-in (1.34 N•m)		L100WTR2M11	A (see page 229)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action 3 poles	45 oz-in (0.32 N•m)		L100WTR2M12	A (see page 229)	1.51 (0.68)
Snap action CCW 2 N.O./ 1 N.C. spring return	190 oz-in (1.34 N•m)		L100WTL2M13	A (see page 229)	1.51 (0.68)
Snap action CW 1 N.O./ 2 N.C. spring return	190 oz-in (1.34 N•m)		L100WTL2M14	A (see page 229)	1.51 (0.68)
Maintained contact ■ CW and CCW snap action 3 poles	45 oz-in (0.32 N•m)		L100WTL2M15	A (see page 229)	1.51 (0.68)
Neutral position ■ spring return slow make and break 1 N.O. contact per direction	95 oz-in (0.67 N•m)		L100WN2M16	B (see page 229)	1.51 (0.68)
Neutral position ■ spring return slow make and break 1 N.O. contact for both directions	95 oz-in (0.67 N•m)		L100WN2M17	B (see page 229)	1.51 (0.68)

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Interpretation of Catalog Numbers:
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Limit Switches

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

L100 Mill Switches

L100 Mill Switches (continued)					
Description	Operating Torque	Contact Diagram	Catalog Number	Operating Data	Weight, lb (kg)
Neutral position ■ spring return slow make and break 1 N.C.-CW, 1 N.C.-CCW	95 oz-in (0.67 N•m)		L100WNC2M18	B (see table below)	1.51 (0.68)
Neutral position ■ spring return slow make and break 2 N.O.-CW, 1 N.O.-CCW	95 oz-in (0.67 N•m)		L100WTRN2M20	B (see table below)	1.51 (0.68)
Neutral position ■ spring return slow make and break N.O.-CW, 2 N.O.-CCW	95 oz-in (0.67 N•m)		L100WTLN2M21	B (see table below)	1.51 (0.68)
Slow make-before-break CW spring return	170 oz-in (1.2 N•m)		L100WS02M22	C (see table below)	1.51 (0.68)
Slow make-before-break CCW spring return	170 oz-in (1.2 N•m)		L100WS02M23	C (see table below)	1.51 (0.68)
Neutral position ■ N.O.-CW, N.O.-CCW spring return snap action	170 oz-in (1.2 N•m)		L100WNS2M26	D (see table below)	1.51 (0.68)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CCW only	170 oz-in (1.2 N•m)		L100WNSR2M28	D (see table below)	1.51 (0.68)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CW only	170 oz-in (1.2 N•m)		L100WNSL2M29	D (see table below)	1.51 (0.68)
Neutral position ■ N.C.-CW, N.C.-CCW spring return snap action	170 oz-in (1.2 N•m)		L100WNC2M34	D (see table below)	1.51 (0.68)
Neutral position ■ N.O.-CW, N.O./N.C.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L100WTRN1C2M38	B (see table below)	1.51 (0.68)
Neutral position ■ N.O./N.C.-CW, N.O.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L100WTLN1C2M39	B (see table below)	1.51 (0.68)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L100WTRN2C2M40	B (see table below)	1.51 (0.68)
Neutral position ■ N.C.-CW, N.O./N.C.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L100WTLN2M41	B (see table below)	1.51 (0.68)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return snap action	95 oz-in (0.67 N•m)		L100WTRN2CS2M48	D (see table below)	1.51 (0.68)

Operating Data for Contact Arrangements				
	A	B	C	D
Pretravel	17° nominal	7° maximum	7° nominal	9° nominal
Differential travel	11° nominal	4° maximum	—	6° nominal
Overlapping travel	—	—	4° nominal	—
Total travel	80°	70°	80°	70°
Recommended installation travel	20°–35°	10° – 25°	20° – 35°	13° – 30°
Repetitive accuracy of switch	± 0.03x	—	—	± 0.03x
Operating torque, max with return spring	190 oz-in (1.34 N•m)	95 oz-in (0.67 N•m)	170 oz-in (1.2 N•m)	170 oz-in (1.2 N•m)
Maintained contact	45 oz-in (0.317 N•m)	—	—	45 oz-in (0.317 N•m)

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Limit Switches

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

L300 Foundry Switches

L300 Foundry Switches					
Description	Operating Torque	Contact Diagram	Catalog Number	Operating Data	Weight, lb (kg)
Snap-action CW spring return	190 oz-in (1.34 N•m)		L300WS2M1	A (see page 231)	1.54 (0.70)
Snap-action CCW spring return	190 oz-in (1.34 N•m)		L300WS2M2	A (see page 231)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L300WS2M3	A (see page 231)	1.54 (0.70)
Snap action CW spring return	190 oz-in (1.34 N•m)		L300WDR2M4	A (see page 231)	1.54 (0.70)
Snap action CCW spring action	190 oz-in (1.34 N•m)		L300WDR2M5	A (see page 231)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action	45 oz-in (0.32 N•m)		L300WDR2M6	A (see page 231)	1.54 (0.70)
Snap action CCW spring return	190 oz-in (1.34 N•m)		L300WDL2M7	A (see page 231)	1.54 (0.70)
Snap action CW spring return	190 oz-in (1.34 N•m)		L300WDL2M8	A (see page 231)	1.54 (0.70)
Snap action CW 1 N.C./2 N.O. spring return	190 oz-in (1.34 N•m)		L300WTR2M10	A (see page 231)	1.54 (0.70)
Snap action CCW 1 N.O./2 N.C. spring return	190 oz-in (1.34 N•m)		L300WTR2M11	A (see page 231)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action 3 poles	45 oz-in (0.32 N•m)		L300WTR2M12	A (see page 231)	1.54 (0.70)
Snap action CCW 2 N.O./1 N.C. spring return	190 oz-in (1.34 N•m)		L300WTL2M13	A (see page 231)	1.54 (0.70)
Snap action CW 1 N.O./2 N.C. spring return	190 oz-in (1.34 N•m)		L300WTL2M14	A (see page 231)	1.54 (0.70)
Maintained contact ■ CW and CCW snap action 3 poles	45 oz-in (0.32 N•m)		L300WTL2M15	A (see page 231)	1.54 (0.70)
Neutral position ■ spring return slow make and break 1 N.O. contact per direction	95 oz-in (0.67 N•m)		L300WN2M16	B (see page 231)	1.54 (0.70)
Neutral position ■ spring return slow make and break 1 N.O. contact for both directions	95 oz-in (0.67 N•m)		L300WN2M17	B (see page 231)	1.54 (0.70)

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Limit Switches

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

L300 Foundry Switches

L300 Foundry Switches (continued)					
Description	Operating Torque	Contact Diagram	Catalog Number	Operating Data	Weight, lb (kg)
Neutral position ■ spring return slow make and break 1 N.C.-CW, 1 N.C.-CCW	95 oz-in (0.67 N•m)		L300WNC2M18	B (see table below)	1.54 (0.70)
Neutral position ■ spring return slow make and break 2 N.O.-CW, 1 N.O.-CCW	95 oz-in (0.67 N•m)		L300WTRN2M20	B (see table below)	1.54 (0.70)
Neutral position ■ spring return slow make and break N.O.-CW, 2 N.O.-CCW	95 oz-in (0.67 N•m)		L300WTLN2M21	B (see table below)	1.54 (0.70)
Slow make-before-break CW spring return	170 oz-in (1.2 N•m)		L300WS02M22	C (see table below)	1.54 (0.70)
Slow make-before-break CCW spring return	170 oz-in (1.2 N•m)		L300WS02M23	C (see table below)	1.54 (0.70)
Neutral position ■ N.O.-CW, N.O.-CCW spring return snap action	170 oz-in (1.2 N•m)		L300WNS2M26	D (see table below)	1.54 (0.70)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CCW only	170 oz-in (1.2 N•m)		L300WNSR2M28	D (see table below)	1.54 (0.70)
Neutral position ■ N.O.-CW, N.O.-CCW maintained in CW only	170 oz-in (1.2 N•m)		L300WNSL2M29	D (see table below)	1.54 (0.70)
Neutral position ■ N.C.-CW, N.C.-CCW spring return snap action	170 oz-in (1.2 N•m)		L300WNCS2M34	D (see table below)	1.54 (0.70)
Neutral position ■ N.O.-CW, N.O./N.C.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L300WTRN1C2M38	B (see table below)	1.54 (0.70)
Neutral position ■ N.O./N.C.-CW, N.O.-CCW Spring return slow make and break	95 oz-in (0.67 N•m)		L300WTLN1C2M39	B (see table below)	1.54 (0.70)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L300WTRN2C2M40	B (see table below)	1.54 (0.70)
Neutral position ■ N.C.-CW, N.O./N.C.-CCW spring return slow make and break	95 oz-in (0.67 N•m)		L300WTLN2M41	B (see table below)	1.54 (0.70)
Neutral position ■ N.O./N.C.-CW, N.C.-CCW spring return snap action	95 oz-in (0.67 N•m)		L300WTRN2CS2M48	D (see table below)	1.54 (0.70)

Operating Data for Contact Arrangements	A	B	C	D
Pretravel	17° nominal	7° maximum	7° nominal	9° nominal
Differential travel	11° nominal	4° maximum	—	6° nominal
Overlapping travel	—	—	4° nominal	—
Total travel	80°	70°	80°	70°
Recommended installation travel	20°-35°	10° - 25°	20° - 35°	13° - 30°
Repetitive accuracy of switch	± 0.03x	—	—	± 0.03x
Operating torque, max with return spring	190 oz-in (1.34 N•m)	95 oz-in (0.67 N•m)	170 oz-in (1.2 N•m)	170 oz-in (1.2 N•m)
Maintained contact	45 oz-in (0.317 N•m)	—	—	45 oz-in (0.317 N•m)

Dimensions:
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Operating Sequences for Conveyor Belts:
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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 235 (order separately).
2. To complete the catalog number, refer to page 239 and add the suffix for the mounting plate style and the front cover material.

L2153 Dual Pull Stop

Description	Catalog Number	Weight lb (kg)
Dual pull cord switch—maintained contacts (stop and lever included)	L2153	2.04 (0.93)

Characteristics

Pretravel	17° ± 2°
Differential travel	11° ± 2°
Overlapping travel	—
Total travel	80°
Recommended installation travel	—
Repetitive accuracy of switch	± 0.03x
Operating torque, max with return spring	13–27 lb-in (1.47–3.05 N•m)
Reset torque	7–19 lb-in (0.79–2.14 N•m)
Temperature range	-20 to 120 °F (-6.6 to 48.8 °C)
Maintained contact	—

Limit Switches

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

L525 Belt Conveyor Switches

L525 Belt Conveyor Switches				
Description	Operating Torque	Contact Diagram	Catalog Number	Weight lb (kg)
2 step sequence CW spring return, snap action, 2 N.O.	150 oz-in (1.06 N•m)		L525WDR2M56	1.5 (0.68)
2 step sequence CCW spring return, snap action, 2 N.O.	150 oz-in (1.06 N•m)		L525WDL2M57	1.5 (0.68)
2 step sequence CW spring return, snap action, 2 N.C.	150 oz-in (1.06 N•m)		L525WDL2M58	1.5 (0.68)
2 Step sequence CCW spring return, snap action, 2 N.C	150 oz-in (1.06 N•m)		L525WDR2M59	1.5 (0.68)
2 Step sequence CW spring return, snap action, N.O./N.C	150 oz-in (1.06 N•m)		L100WS0S2M60	1.5 (0.68)

■ Two step snap action. One normally closed, one normally open; CW operation to first step to 2-C. Further CW operation to second step, 1-O, 1-C. Spring return. Pretravel 9° nominal. Additional travel 8° nominal. Differential second step 7° nominal. Differential first step 7° nominal.

Characteristics

Pretravel	12° nominal
Additional travel	8° nominal
Differential travel	7× nominal
Total travel	75° nominal
Operating torque, max with return spring	150 oz-in nominal (1.06 N•m)

Dimensions:
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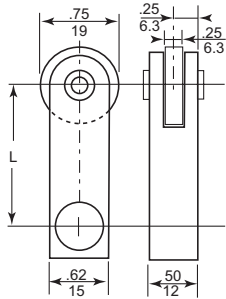
Limit Switches

R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches L100/L300 Lever Arms

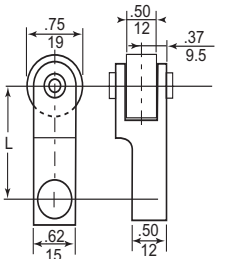
Lever Arms

Lever arms are constructed of machined aluminum.

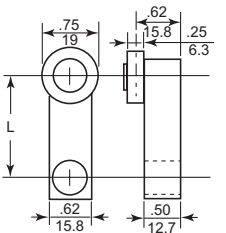
Dual dimensions: in. (mm)



Style A



Style B



Style C

Style A Steel Roller				
Arm	Steel roller		Catalog Number ♦	Weight lb (kg)
Length	Diameter	Width		
1.25 (31.7)	0.75 (19)	0.25 (6.3)	AC	0.06 (0.027)
1.50 (38.1)	0.75 (19)	0.25 (6.3)	AA	0.06 (0.027)
1.75 (44.4)	0.75 (19)	0.25 (6.3)	AD	0.07 (0.031)
2.00 (50.8)	0.75 (19)	0.25 (6.3)	AH	0.08 (0.036)
2.25 (57.1)	0.75 (19)	0.25 (6.3)	AJ	0.09 (0.041)
2.50 (63.5)	0.75 (19)	0.25 (6.3)	AO	0.10 (0.045)
2.75 (69.8)	0.75 (19)	0.25 (6.3)	AK	0.10 (0.045)
3.00 (76.2)	0.75 (19)	0.25 (6.3)	AB	0.11 (0.050)
3.50 (88.9)	0.75 (19)	0.25 (6.3)	AL	0.12 (0.054)
4.00 (101.6)	0.75 (19)	0.25 (6.3)	AM	0.13 (0.059)
4.50 (114.3)	0.75 (19)	0.25 (6.3)	AN	0.14 (0.064)
5.00 (127.0)	0.75 (19)	0.25 (6.3)	AP	0.16 (0.073)
5.50 (139.7)	0.75 (19)	0.25 (6.3)	AQ	0.18 (0.082)
6.00 (152.4)	0.75 (19)	0.25 (6.3)	AR	0.20 (0.091)

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

Style A Options		
Diameter	Description	Catalog Number—Add Suffix
1.00 (25.4)	Roller	1
1.25 (32)	Roller	4
1.50 (38.1)	Roller	2
—	Nylon roller	N
0.75 (19)	Ball bearing roller	R
—	Stainless steel roller	NS

Style B Steel Roller				
Arm	Steel roller		Catalog Number	Weight lb (kg)
Length	Diameter	Width		
1.50 (38.1)	0.75 (19)	0.50 (12.7)	BA	0.06 (0.027)
2.00 (50.8)	0.75 (19)	0.50 (12.7)	BH	0.08 (0.036)
2.50 (63.5)	0.75 (19)	0.50 (12.7)	BO	0.10 (0.045)
3.00 (76.2)	0.75 (19)	0.50 (12.7)	BB	0.12 (0.054)
4.00 (101.6)	0.75 (19)	0.50 (12.7)	BM	0.13 (0.059)
4.50 (114.3)	0.75 (19)	0.50 (12.7)	BN	0.14 (0.064)
5.50 (139.7)	0.75 (19)	0.50 (12.7)	BQ	0.18 (0.082)
6.00 (152.4)	0.75 (19)	0.50 (12.7)	BR	0.20 (0.091)

Style B Options		
Diameter	Description	Catalog Number—Add Suffix
—	Nylon roller	N
1.50 (38.1)	Roller	2

Style C Steel Roller On Side				
Arm	Steel roller		Catalog Number	Weight lb (kg)
Length	Diameter	Width		
1.25 (31.7)	0.75 (19)	0.25 (6.3)	CC	0.06 (0.027)
1.50 (38.1)	0.75 (19)	0.25 (6.3)	CA	0.06 (0.027)
1.75 (44.4)	0.75 (19)	0.25 (6.3)	CD	0.07 (0.031)
2.00 (50.8)	0.75 (19)	0.25 (6.3)	CH	0.08 (0.036)
2.50 (63.5)	0.75 (19)	0.25 (6.3)	CO	0.10 (0.045)
3.00 (76.2)	0.75 (19)	0.25 (6.3)	CB	0.11 (0.050)
3.50 (88.9)	0.75 (19)	0.25 (6.3)	CL	0.12 (0.054)
4.00 (101.6)	0.75 (19)	0.25 (6.3)	CM	0.13 (0.059)
6.00 (152.4)	0.75 (19)	0.25 (6.3)	CR	0.20 (0.091)

Style C Options		
Diameter	Description	Catalog Number—Add Suffix
1.0 (24.5)	Roller	1
1.25 (32)	Roller	4
1.50 (38.1)	Roller	2
—	Nylon roller	N

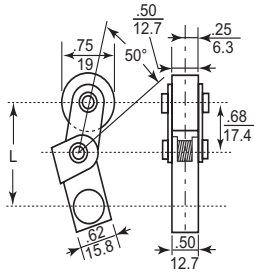
Dimensions:
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Limit Switches

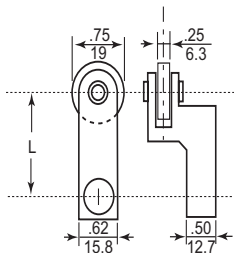
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

L100/L300 Lever Arms

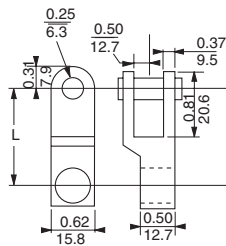
Dual dimensions: in. (mm)



Style E



Style F



Style K

Style E One Way Steel Roller

Arm	Steel roller		Catalog Number	Weight lb (kg)
Length	Diameter	Width		
1.50 (38.1)	0.75 (19)	0.50 (12.7)	EA	0.30 (0.136)
1.75 (44.4)	0.75 (19)	0.50 (12.7)	ED	0.40 (0.181)
3.00 (76.2)	0.75 (19)	0.50 (12.7)	EB	0.50 (0.227)

Style E Options

Diameter in. (mm)	Description	Catalog Number Add Suffix
—	Nylon roller	N

Style F Offset Steel Roller

Arm	Steel roller	Roller Position		Catalog Number	Weight lb (kg)
Length	Diameter	Offset	Width		
1.50 (38.1)	0.75 (19)	0.62 (15.8)	0.15 (3.8)	FB	0.06 (0.027)
1.50 (38.1)	0.75 (19)	0.87 (22.2)	0.15 (3.8)	FA	0.06 (0.027)
1.50 (38.1)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FC	0.06 (0.027)
2.00 (50.8)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FE	0.08 (0.036)
2.50 (63.5)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FG	0.10 (0.045)
3.00 (76.2)	0.75 (19)	0.62 (15.8)	0.15 (3.8)	FI	0.11 (0.050)
3.00 (76.2)	0.75 (19)	1.00 (25.4)	0.15 (3.8)	FJ	0.11 (0.050)

Style F Options

Diameter	Description	Catalog Number—Add Suffix
1.00 (24.5)	Roller	1
—	Nylon roller	N

Style K (for use with L140 cable pulls)

Arm	Steel roller	Description	Catalog Number ♦	Weight lb (kg)
1.50 (38.1)	—	—	KA	0.05 (0.023)
2.50 (63.5)	—	—	KO	0.08 (0.036)
3.00 (76.2)	—	—	KB	0.09 (0.041)

♦ Example: KA — This is the complete catalog number to order.

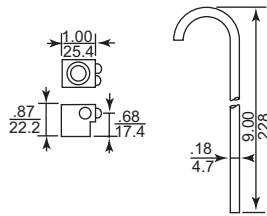
Style L (renewal parts for L2153 dual pull stop)

Description	Catalog Number	Weight lb (kg)
Lever	AL1746	0.25 (0.113)
Mechanical stop	AL1649	0.10 (0.045)

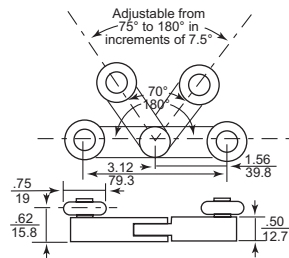
Limit Switches

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

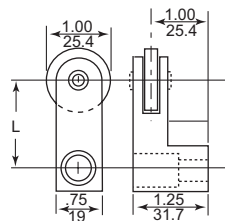
Dual dimensions: in. (mm)



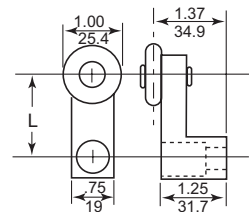
Style R



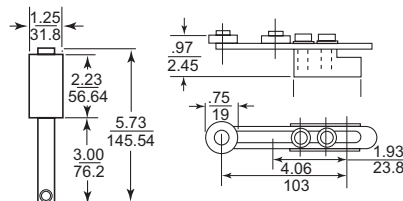
Style V



Style LA



Style LC



Rolling Pin

Adjustable Rolling Pin

Style R Steel Rod

Description	Catalog Number	Weight lb (kg)
Hub only	R	0.10 (0.045)
Rod only	R9	0.09 (0.041)

Style V Yoke (for maintained position switches)

Description	Catalog Number	Weight lb (kg)
Yoke	VA	0.50 (0.227)

Style V Options

Diameter	Description	Catalog Number—Add Suffix
1.0 (24.5)	Roller	1
—	Nylon roller	N
0.75 (19)	Ball bearing roller	R

Style LA (to pass over switch cover)

Arm	Catalog Number	Weight lb (kg)
Length		
1.50 (30)	LAA1	0.12 (0.054)
2.00 (50)	LAH1	0.12 (0.054)
2.50 (63)	LA01	0.12 (0.054)

Style LA Options

Diameter	Description	Catalog Number—Add Suffix
1.5 (38)	Roller	2
—	Nylon roller	N

Style LC (to pass over switch cover)

Arm	Catalog Number	Weight lb (kg)
Length		
1.50 (30)	LCA1	0.12 (0.054)
2.00 (50)	LCH1	0.12 (0.054)
2.50 (63)	LCO1	0.13 (0.059)

Style LC Options

Diameter	Description	Catalog Number—Add Suffix
1.25 (32)	Roller	4
1.5 (38)	Roller	2
—	Nylon roller	N

Rolling Pin (for use with 2 step switches for conveyor or belt applications)

Arm	Catalog Number	Weight lb (kg)	
Length			
2.25 (75.1)	AL1650	0.30 (0.136)	
2.25 (75.1)	High temp. Teflon® material	AL16501	0.33 (0.150)
3.0 (50.8)	AL1802	0.33 (0.150)	

Rolling Pin (adjustable)

Arm	Steel roller	Width	Catalog Number	Weight lb (kg)
Length	Diameter			
2.00 (51) to 4.00 (102)	0.75 (19)	0.25 (6.3)	AL1650	0.30 (0.136)

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

Note: No hub component is needed for Type AL rolling pins. The arm mounts directly onto the shaft of the switch.

Dimensions:
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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	Catalog Number	Weight lb (kg)
	Full Catalog Number	Add Prefix	
0.75 in. conduit opening Available on 2 circuit switches. Standard on 3 circuit switches	L100WS2M1 changes to GL100WS2M1	G	1.54 (0.70)
High temperature 0 to +350 °F (-17.7 to +176.6 °C) ■ Metal front cover only	L100WS2M1 changes to HL100WS2M1	H	1.54 (0.70)
Low temperature -20 to 200 °F (-28.8 to +93.3 °C) ■	L100WS2M1 changes to TL100WS2M1	T	1.54 (0.70)
High shock Available only on operating sequences 1, 2, 4, 5, 7-11, 13, 14	L100WS2M1 changes to L526WS2M1	526	1.54 (0.70)
	L300WS2M1 changes to L326WS2M1	326	
Gold contacts	L100WS2M1 changes to L522WS2M1	522	1.54 (0.70)
	L300WS2M1 changes to L322WS2M1	322	
Metric conduit threads M20 (20 mm)	L100WS2M1 changes to ML100WS2M1	M	1.54 (0.70)

Wiring			
Description	Example	Catalog Number	Weight lb (kg)
	Full Catalog Number	Add Prefix	
Straight male receptacle 4-pin ▲ Factory prewired	L100WS2M1 changes to PL100WS2M1	P	1.54 (0.70)
90° Angle male receptacle 4-pin ▲ Factory prewired—facing right	L100WS2M1 changes to APL100WS2M1	AP	1.54 (0.70)
Ministyle male receptacle † 8 A max. 5-pin (double circuit) or 7 A max. 7-pin (triple circuit)	L100WS2M1 changes to BL100WS2M1	B	1.54 (0.70)
Potted and prewired	Example	Add Suffix	Weight lb (kg)
	Full Catalog Number		
5 wires 6 feet (1.8 mm) long	L100WS2M1 changes to L100WS2M1P	P	1.54 (0.70)
5 wires 12 feet (3.6 mm) long	L100WS2M1 changes to L100WS2M1P12	P12	
5 wires 18 feet (5.5 mm) long	L100WS2M1 changes to L100WS2M1P18	P18	

Front Covers			
Description	Example	Catalog Number	Weight lb (kg)
	Full Catalog Number	Add Suffix	
Standard metal		M	—
Transparent plastic cover with metal frame		PF	—
Transparent plastic cover with metal frame and Neon indicator light (not connected)		GF	—
	L100WS2M1 changes to L100WS2PF 1		1.54 (0.70)

Accessories			
Description		Catalog Number	Weight lb (kg)
Sealed female plug and cable for P and AP connector			
4 pin, #16 AWG STO cable 140 °F (60 °C)	4 ft. (1.21 m)	1010004	1.20 (0.54)
	6 ft. (1.82 m)	1010006	1.25 (0.57)
	10 ft. (3.04 m)	10100010	1.50 (0.68)
Sealed female plug and cable for ministyle connector (B)			
5 pin, #16 AWG STO cable 221 °F (105 °C)	3 ft. (0.91 m)	BH2053	1.50 (0.68)
	6 ft. (1.82 m)	BH2056	1.70 (0.77)
	12 ft. (3.65 m)	BH20512	2.10 (0.95)

- Other options available — contact your local field office for details.
- ▲ Receptacle is a 4-pin male APL/PL-SWTS, Cannon part # MS3102E20-4P-F79 or equal.
- † Ministyle male connectors are:
 - 5-pin: Brad Harrison #41310 (or equal)
 - 7-pin: Brad Harrison #42805 (or equal)
- The minimum temperatures listed are based on the absence of freezing moisture or water.

Limit Switches

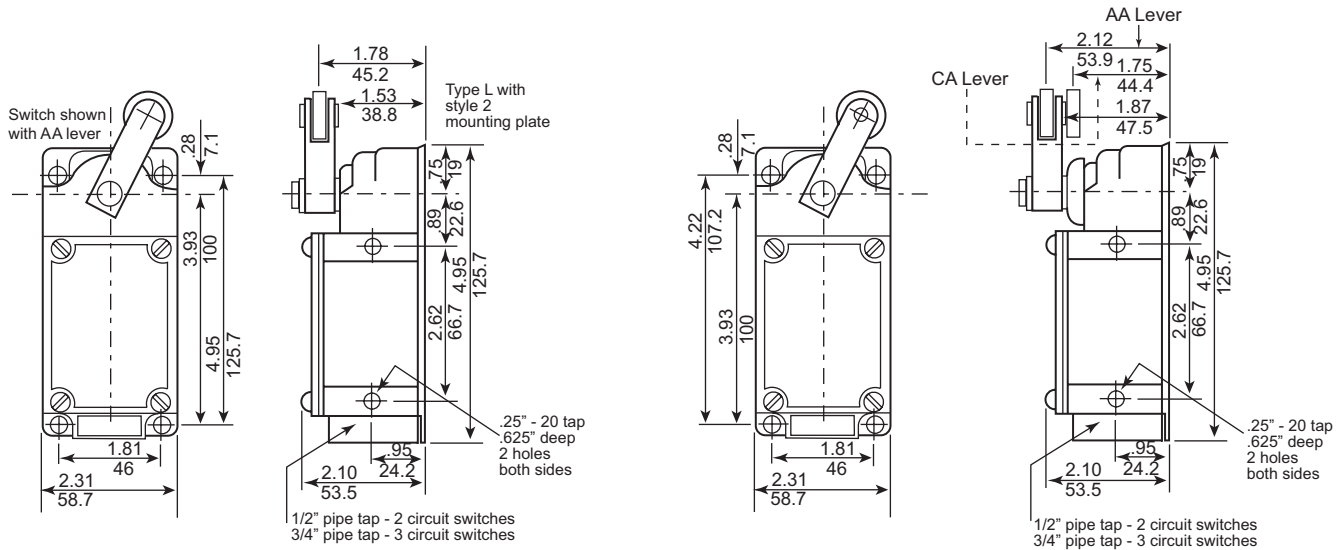
R.B.Denison® Lox-Switch™ L Severe Duty Mill and Foundry Switches

Dimensions

Switches

Type L100

Type L300



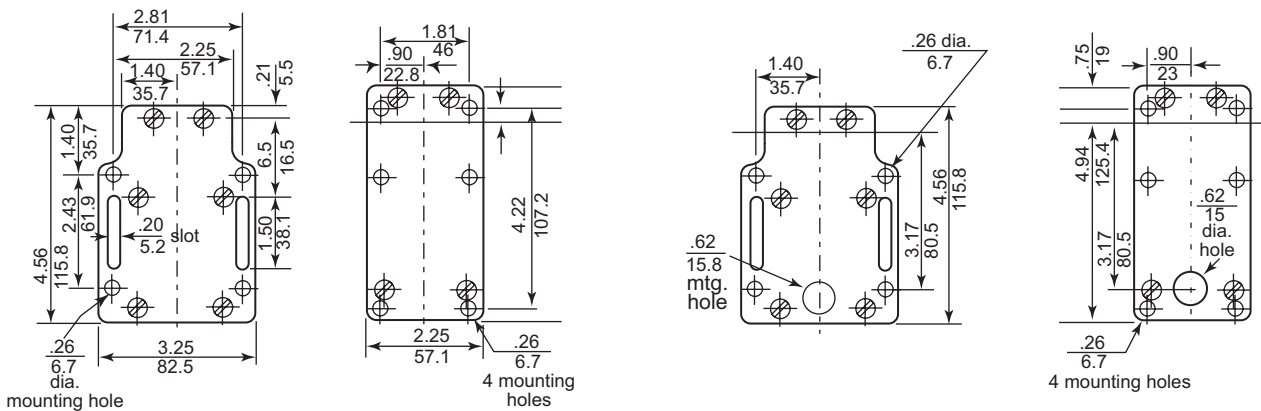
Base Plates

Style 1

Style 2

Style 3

Style 4

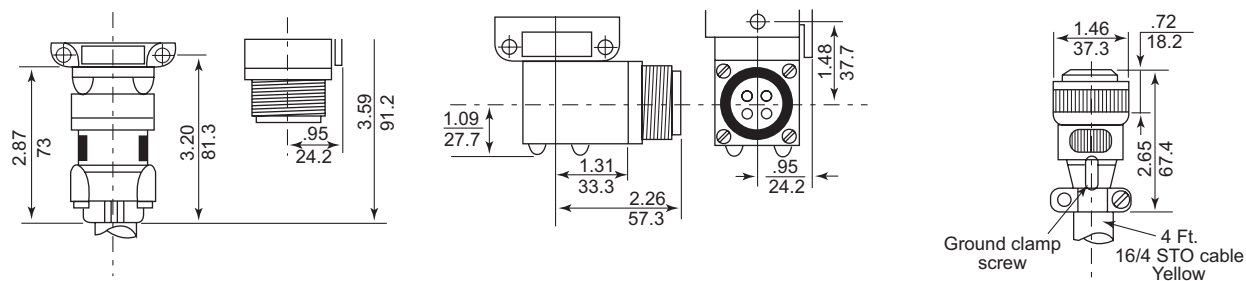


Receptacles

PL

APL

101000



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

Limit Switches

Interpretation of Catalog Numbers

Severe Duty Mill and Foundry Switches

Interpretation of Catalog Numbers

The interpretation of catalog numbers is intended to help you understand how the catalog number is laid out. It is to be used with existing numbers only. The table below should not be used to generate new catalog numbers. If the contact sequence required is not listed, contact your local field office.

L100 and L300

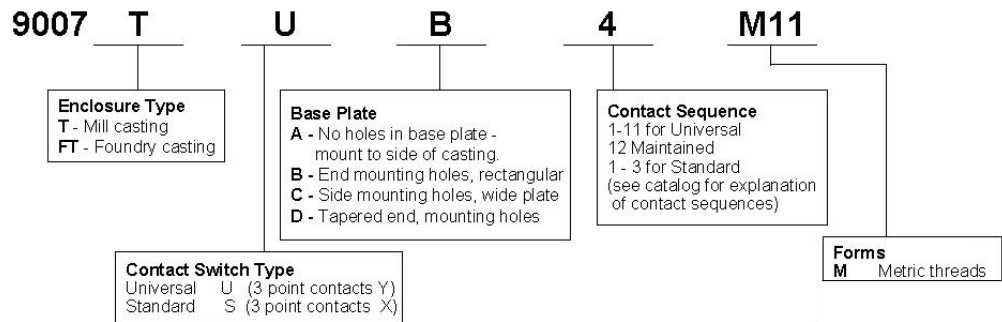


Style	Housing			Function		Mounting Plate	Front Cover		Contact Arrangement	
L	1	0	0	W	S	2	P	F	1 to 60	
Mill	100	L14" and L2153 pull cord switches			WS	Style 1	1	M	Standard metal	
Foundry	300					Style 2	2	PF	Transparent plastic	
Belt Conveyor	525					Style 3	3	GF	Transparent plastic with neon light	
Two circuit single operation				Style 4		4				
Two circuit dual operation				WD						
Triple circuit				WT						
Neutral				WN						

The only modifications to the existing catalog numbers are:

- Base Plates: Select style 1, 2, 3 or 4
 - Front Covers: Select metal, transparent plastic, or transparent plastic with neon light.
- For special features see page 237.

9007T and FT



Sensors, Limit Switches, and Connector Cables

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2358C22G6	189	9007AA1	190	9007C54***	9	9007CA1M	195
2358C22G8	189	9007AA11M	195	9007C54B2M11	177	9007CA1S	192
2358C6G2	189	9007AA17	190	9007C54B2P6	176	9007CA2	190
2358C6G3	189	9007AA18M	195	9007C54B2Y1901	178	9007CA2S	192
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7A7N	157	9007B13	220	9007C54FY1901	178	9007CO62	188
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7DN	157	9007B24	220	9007C54LP6	176	9007CT11	181
7F1N	157	9007B27	221	9007C54LY1901	178	9007CT12	181
7F2N	157	9007B3	220	9007C54LY19019	178	9007CT13 (2)	181
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7F4N	157	9007B8	220	9007C62***	9	9007CT54	188
7F7N	157	9007B9	220	9007C62B2M11	177	9007CT54	188
7J1N	157	9007BAOS	192	9007C62B2P6	176	9007CT62	188
7J2N	157	9007BA1	190	9007C62B2Y19016	178	9007CT62	188
7J3N	157	9007BA11	190	9007C62DM11	177	9007CT62	188
7J4N	157	9007BA11M	195	9007C62DP6	176	9007D	189
7J7N	157	9007BA12	190	9007C62DY19016	178	9007D1	220
7JX4N	157	9007BA13	190	9007C62EM11	177	9007D2	220
7N	157	9007BA15	191	9007C62EP6	176	9007D3	220
7S	157	9007BA17	190	9007C62EY19016	178	9007D4	221
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7XA2	157	9007BA1M	195	9007C62FY19016	178	9007DA11	190
7XA2N	157	9007BA1S	192	9007C62FY1912	178	9007DA11M	195
7XA3N	157	9007BA2	190	9007C62JM11	177	9007DA12	190
7XA4N	157	9007BA2S	192	9007C62JP6	176	9007DA13	190
7XA7N	157	9007BA3	193	9007C62JY19016	178	9007DA15	191
7XB1N	157	9007BA3S	193	9007C62LM11	177	9007DA17	190
7XB2	157	9007BA4	190	9007C62LP6	176	9007DA18	190
7XB2N	157	9007BA4S	192	9007C62LY19016	178	9007DA18M	195
7XB3N	157	9007BA5	191	9007C66***	9	9007DA1M	195
7XB4N	157	9007BA5M	195	9007C68***	9	9007DA1S	192
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9007EA1M	195	9007FTUD11	218	9007MA11	190	9007TUB1	216
9007EA1S	192	9007FTUD12	218	9007MA11M	195	9007TUB10	216
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