

Compact Horizontal Limit Switches

Model SL1-□□ | Mechanical life of 20 million operations. Robust long-life and maintenance-free compact horizontal-type limit switches with IP67 seal.



- Mechanical life exceeds 20 million operations, owing to a 2-piece spring mechanism
- High sensitivity (M.D. = 0.1 mm)
- Superior seal: oil-resistant/immersion-proof type (JIS) and IP67 (IEC). O-ring and integral diaphragm seal are built in
- Small, space-saving body can be tightly gang-mounted
- UL/CSA/CE/GB (CCC marking) -certified models are available (excluding some models)

PHOTOELECTRIC SENSORS & SWITCHES
MEASUREMENT SENSORS
PROXIMITY SWITCHES
LIMIT SWITCHES
SAFETY KEY SWITCHES

LIMIT SWITCHES WITH POSITIVE OPENING MECHANISM
GENERAL PURPOSE LIMIT SWITCHES
TECHNICAL GUIDE FOR LIMIT SWITCHES

EXPLOSION-PROOF SWITCHES

TECHNICAL GUIDE FOR EXPLOSION-PROOF SWITCHES

STANDARD □LS□

SPATTER-GUARDED □LS□□

1LS-J7□□

1LS-J8□□

1LS□-J401

VCL-□□

SL1-□□

SL1-□C

PERFORMANCE

	Item	Details
Standards	Compliance	NECA C 4508/JIS C 8201-5-1/IEC 60947-5-1
	Certification	UL 508/CSA C22.2 No.14/EN 60947-5-1/GB14048.5 (except high oil- and heat-resistance types)
Structure	Contact form	Single-Pole Double-Throw (SPDT; refer to contact diagram below)
	Contact type	Standard load type: pure silver rivet Low current load type: gold-plated rivet
	Terminal type	M3 screw
	Protective structure	IP67 (IEC 60529, JIS C 0920)
	Pollution level	3 (EN 60947-5-1)
Electrical performance	Electrical rating	See Table 1.
	Rated frequency	45 to 65 Hz and D.C.
	Insulation resistance	Between non-continuous terminals: 100 MΩ Between each terminal and non-live metal parts: 100 MΩ
	Rated insulation resistance (Ui)	250V Dielectric strength between each terminal and non-conducting metal parts: 2,000 Vac (45 to 65 Hz, 5 s, leak current 1 mA)
	Dielectric strength between contacts	1,000 Vac (50 to 60 Hz, 1 minutes, leak current 1 mA)
	Rated impulse dielectric strength (Uimp)	2,500V
	Switching overcurrent	Category II (IEC 60204-1)
	Initial contact resistance	Silver contacts: 50 mΩ max. (6 to 8 Vdc 1A, voltage drop method) Gold-plated contacts: 100 mΩ max. (6 to 8 Vdc 0.1A, voltage drop method)
	Contact minimum allowable load	Silver contacts: 5 mA 24 Vdc, 10 mA 12 Vdc Gold-plated contacts: 5 mA 5 Vdc
	Rated thermal current (Ith)	Silver contacts: 5A Gold-plated contacts: 1A (Temperature increase: 65°C max.)
	Short-circuit protection	M10A(IEC 60127) (TUV) Instant blowing fuse, 10A (silver contacts) or 3A (gold contacts) (CQC)
	Conditional rated short-circuit current	1,000A (power factor 0.5 to 0.7)
	Mechanical performance	Actuator strength
Terminal strength		Withstands tightening torque of 0.6 N·m for 1 minute
Impact resistance (malfunction)		300 m/s ² , contact opening for 1 ms max. in free position and total travel position (NECA C 4508)
Vibration resistance (malfunction)		1.5 mm peak-to-peak amplitude for 2 continuous hours Contact opening for 1 ms max. in free position and total travel position (NECA C 4508)
Allowable operating speed		0.02 mm/s to 0.5 m/s. 0.02 mm/s to 0.25 m/s on the SL1-B Series
Operating frequency		120 operations/minute. (60 operations/min for cold- and weather-resistant / high oil and heat resistance type).

Life	Mechanical	Min. 20 million operations. Min. 2 million operations for the SL1-B Series. Min. 1 million operations for cold- and weather-resistant type. Min. 2 million operations for high oil and heat resistance type. (All values assume overtravel (O.T.) of 1/3 to 2/3 the rated amount.)
	Electrical	Standard load type: Min. 2 million operations (125 Vac 1A) Min. 300,000 operations (250 Vac 5A, 48 Vdc 2A, 30 Vdc 5A) Low current load type: Min. 5 million operations (125 Vac-0.1A, 48 Vdc-0.1A)
Ambient operating conditions	Temperature	Standard type: -10 to +70°C Cold and weather resistant type: -50 to +70°C -30 to +70°C for SL1-B , -40 to 70°C for SL1-P High oil and heat resistance type: 0 to 120°C
	Humidity	Max. 98% RH
Recommended tightening torque	Body	1.3 to 1.7 N·m (M4 hexagon socket head bolt)
	Terminal screw	0.4 to 0.6 N·m (M3 binding head machine screw)
	Panel mounting nut	4 to 6 N·m (M14 hexagonal nut)

● Attached Table 1. Electrical rating and circuit configuration

Item	Contact material	Electrical rating		
		Without indicator	With indicator	
			Code: E (Lit when not operating.) 100/200 VAC Neon lamp.	Code: F (Lit when not operating.) 24 VDC LED lamp.
Standard load type	Silver rivet	See Attached Table 2.	AC-12: 5A-200V	DC-12: 2A-24V
Low current load type	Gold plated rivet	See Attached Table 2.	AC-12: 0.1A-125V	DC-12: 0.1A-24V
Circuit configuration	-	<p>Roller lever type Roller plunger type</p>	<p>Power COM N.C. N.O. Neon lamp 100kΩ</p>	<p>Power COM N.C. N.O. 24kΩ LED</p> <p>Note</p>

Note: The model with an LED lamp has polarity. Pay attention to the polarity when wiring.

● Table 2. Electrical rating

Item	Contact material	JIS/IEC/EN/GB	UL/CSA
Standard load type	Silver	AC-15:3A-250V AC-12:5A-250V DC-12:2A-48V	5A-250 Vac General Use Load 5A-30 Vdc
Low current load type	Gold-plated	AC-12:0.1A-125V DC-12:0.1A-48V	0.1A-125 Vac General Use Load 0.1A-30 Vdc

● Reference ratings (Since values can vary due to operating environment and type of load, verify them on an operating unit.)

Standard load model with silver contacts

AC rating	125 Vac				250 Vac			
	Resistance	Induction	Electric motor		Resistance	Induction	Electric motor	
			N.C.	N.O.			N.C.	N.O.
Current (A)	5	3	1	2	5	3	0.5	1

DC rating	8 Vdc		14 Vdc		30 Vdc		115 Vdc		230 Vdc	
	Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction
Current (A)	5	3	5	3	5	3	0.5	0.1	0.25	0.05

Note: "Induction" refers to a load having a power factor of 0.4 and time constant of 7 ms (DC). "Electric motor" refers to a load having a value of six times the inrush current.

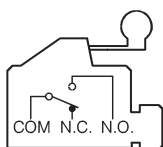
Low current load type with gold-plated contacts

AC rating	115 Vac	
	Resistance	Induction
Current (A)	0.1	—

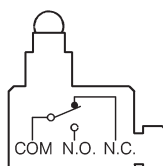
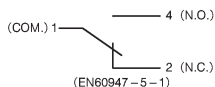
DC rating	8 Vdc		14 Vdc		30 Vdc	
	Resistance	Induction	Resistance	Induction	Resistance	Induction
Current (A)	0.1	—	0.1	—	0.1	—



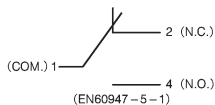
CONTACT FORM



Roller lever type



Roller plunger type



STANDARDS

	Approving body	Standard	File No.
Certification	UL	UL 508 CSA C22.2 No.14	E 96090
	TÜV	EN 60947-5-1	R2-50006349
	CQC	GB 14048.5	2003010305083850

ORDER GUIDE

Without cable

Actuator		Basic catalog listing	Options			
Name	Shape		Low current load K	Cold- and weather-resistant L	Cold- and weather-resistant + low current load KL	High temperature and high oil resistance V
Roller plunger		SL1-A	SL1-AK	SL1-AL	SL1-AKL	SL1-AV
Boot seal roller plunger		SL1-B	SL1-BK	SL1-BL	—	SL1-BV
Cross roller plunger		SL1-D	SL1-DK	SL1-DL	SL1-DKL	SL1-DV
Long roller plunger		SL1-E	SL1-EK	SL1-EL	—	SL1-EV
Plunger		SL1-H	SL1-HK	SL1-HL	SL1-HKL	SL1-HV
Short roller lever		SL1-P	SL1-PK	SL1-PL	SL1-PKL	SL1-PV

*1: Use with SL1-PA12.

With cable

Actuator		Options			
Name	Shape	No resin filling A: Cable exits on right B: Cable exits on left	With resin filling X: Cable exits on right Y: Cable exits on left	No resin filling+low current load A: Cable exits on right B: Cable exits on left	Resin filling+low current load X: Cable exits on right Y: Cable exits on left
		Roller plunger		SL1-A□G*	SL1-A□G*
Boot seal roller plunger		SL1-B□G*	SL1-B□G*	SL1-BK□G*	SL1-BK□G*
Cross roller plunger		SL1-D□G*	SL1-D□G*	SL1-DK□G*	SL1-DK□G*
Long roller plunger		SL1-E□G*	SL1-E□G*	SL1-EK□G*	SL1-EK□G*
Plunger		SL1-H□G*	SL1-H□G*	SL1-HK□G*	SL1-HK□G*
Short roller lever		SL1-P□G*	SL1-P□G*	SL1-PK□G*	SL1-PK□G*

*Asterisk (*) after G indicates selectable cable length (1/2/3/5 m).

*Model with indicator is available for SL1 switches with cable, except for those without resin filling.

Options		
High temperature and high oil resistance + low current load KV	Without cover N *1	Without cover + low current load KN *1
SL1-AKV	SL1-AN	SL1-AKN
—	—	SL1-BKN
—	SL1-DN	SL1-DKN
—	SL1-EN	—
—	SL1-HN	SL1-HKN
SL1-PKV	SL1-PN	—

Options			
Resin filling+AC indicator X:Cable exits on right Y:Cable exits on left	Resin filling+DC indicator X:Cable exits on right Y:Cable exits on left	Resin filling+low current load +AC indicator X:Cable exits on right Y:Cable exits on left	Resin filling+low current load +DC indicator X:Cable exits on right Y:Cable exits on left
SL1-AE	SL1-AF	SL1-AKE	SL1-AKF
SL1-BE	SL1-BF	SL1-BKE	SL1-BKF
SL1-DE	SL1-DF	SL1-DKE	SL1-DKF
SL1-EE	SL1-EF	SL1-EKE	SL1-EKF
SL1-HE	SL1-HF	SL1-HKE	SL1-HKF
SL1-PE	SL1-PF	SL1-PKE	SL1-PKF

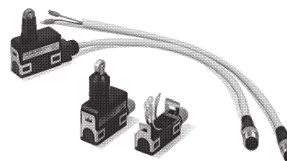


AUXILIARY PARTS

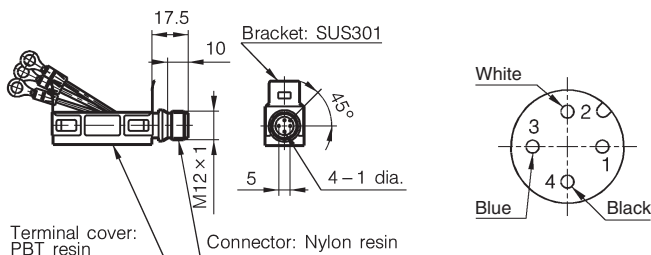
Name	Appearance	Specifications	Catalog listing
PA5 Series connector cover		For DC type, 3 leads	SL1-PA5I3
Terminal cover set		Cover, panel mounting nuts (2), cap nut, washer and seals (for 5.8 to 7.8 mm dia. cable and for 7.9 to 9.6 mm dia. cable)	SL1-PA12
Seal		for 7.9 to 9.6 mm dia. cable (set of 10): Standard type: NBR containing PVC.	SL1-PA22
		for 7.9 to 9.6 mm dia. cable (set of 10): Cold- and weather-resistant type: fluorosilicone rubber.	SL1-PA23
		for 7.9 to 9.6 mm dia. cable (set of 10): High temperature and high oil resistance type: fluorocarbon rubber.	SL1-PA24

Connector for SL1 Series

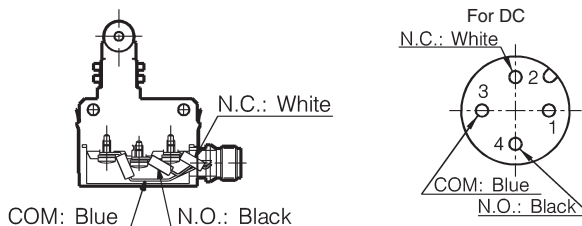
Switches in the SL1 Series can be modified into the connector type by attaching the SL1-PA5I3 onto the SL1 switch body, as shown below. Either replace the terminal cover of the SL1 standard type switch with a sealed connector with cable, or use the switch without a terminal cover.



External dimensions



Wiring diagrams



Assembly method

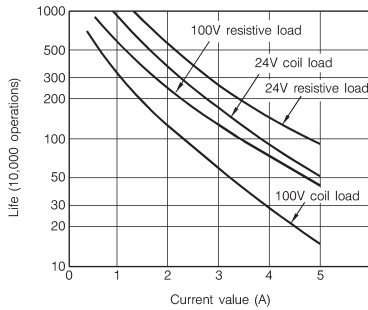




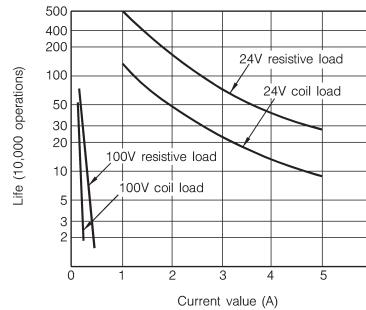
ELECTRICAL LIFE

● Normal load type

Contacts used for AC

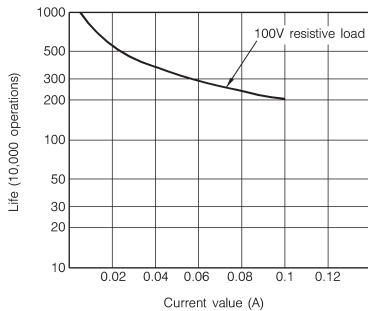


Contacts used for DC

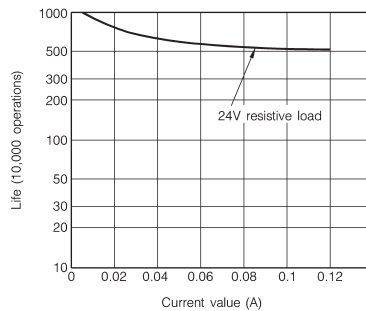


● Low current load type

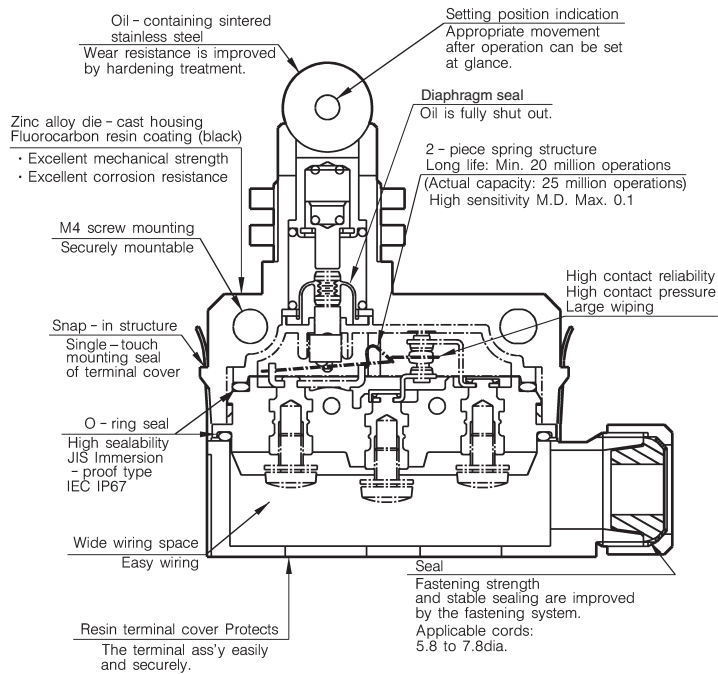
Contacts used for AC



Contacts used for DC



STRUCTURAL DIAGRAM



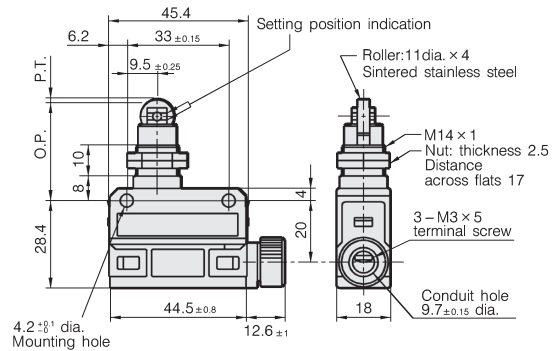
■ APPEARANCE, OPERATING CHARACTERISTICS AND EXTERNAL DIMENSIONS

(unit: mm)

Roller plunger type



Catalog listing	SL1-A□□□
Operating force O.F. (max. N)	11.8
Release force R.F. (min. N)	4.9
Pretravel P.T. (max. mm)	1.5
Overtravel O.T. (min. mm)	3
Movement differential M.D. (max. mm)	0.1
Operating position O.P. (mm)	31.4±0.8

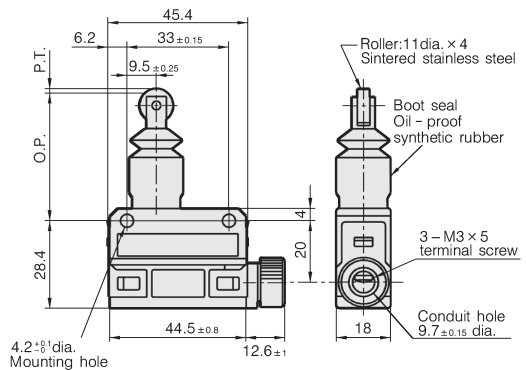


*Dimensional tolerance is ±0.4 unless otherwise specified.

Boot seal roller plunger type



Catalog listing	SL1-B□□□
Operating force O.F. (max. N)	11.8
Release force R.F. (min. N)	4.9
Pretravel P.T. (max. mm)	1.5
Overtravel O.T. (min. mm)	3
Movement differential M.D. (max. mm)	0.1
Operating position O.P. (mm)	41.4±0.8

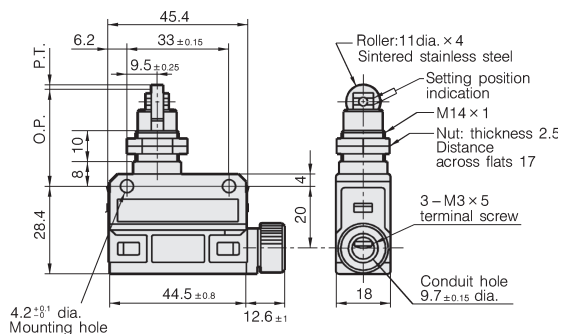


*Dimensional tolerance is ±0.4 unless otherwise specified.

Cross roller plunger type



Catalog listing	SL1-D□□□
Operating force O.F. (max. N)	11.8
Release force R.F. (min. N)	4.9
Pretravel P.T. (max. mm)	1.5
Overtravel O.T. (min. mm)	3
Movement differential M.D. (max. mm)	0.1
Operating position O.P. (mm)	31.4±0.8

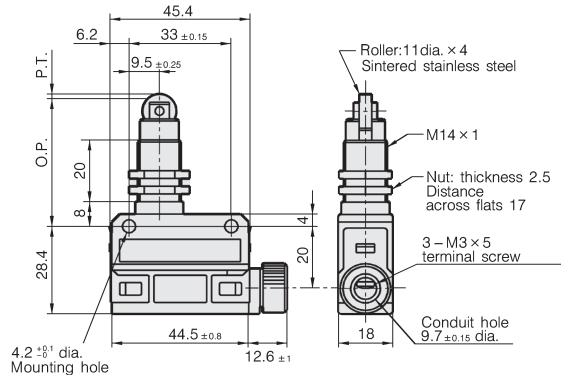


*Dimensional tolerance is ±0.4 unless otherwise specified.

Long roller plunger type



Catalog listing	SL1-E□□□
Operating force O.F. (max. N)	11.8
Release force R.F. (min. N)	4.9
Pretravel P.T. (max. mm)	1.5
Overtravel O.T. (min. mm)	3
Movement differential M.D. (max. mm)	0.1
Operating position O.P. (mm)	41.4±0.8

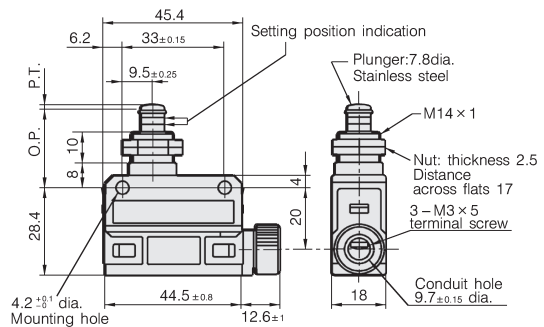


*Dimensional tolerance is ±0.4 unless otherwise specified.

Plunger type



Catalog listing	SL1-H□□□
Operating force O.F. (max. N)	11.8
Release force R.F. (min. N)	4.9
Pretravel P.T. (max. mm)	1.5
Overtravel O.T. (min. mm)	3
Movement differential M.D. (max. mm)	0.1
Operating position O.P. (mm)	25.4±0.8

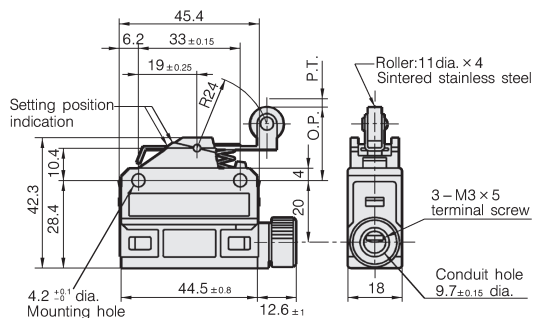


*Dimensional tolerance is ±0.4 unless otherwise specified.

Short roller lever type



Catalog listing	SL1-P□□□
Operating force O.F. (max. N)	4.0
Release force R.F. (min. N)	0.78
Pretravel P.T. (max. mm)	2
Overtravel O.T. (min. mm)	4
Movement differential M.D. (max. mm)	0.3
Operating position O.P. (mm)	23.1±0.8



*Dimensional tolerance is ±0.4 unless otherwise specified.



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Advanced Automation Company

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