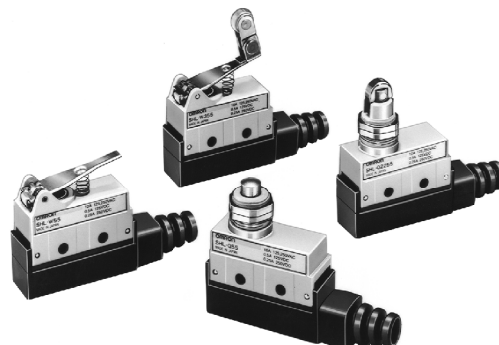


Enclosed Switch

SHL

Subminiature Enclosed Switch

- Coil-spring switch housed in rigid zinc diecast alloy boasts long life and high precision
- Requires nearly the same operating force as a conventional precision switch (0.53 to 0.88 lbf)
- Molded terminal model is available
- UL, CSA and/or EN (IEC) approvals
- Operation-indicator models are available



Ordering Information

■ LIMIT SWITCHES

Actuator type	Part number	
	Standard model	Micro voltage/current load model
Plunger	SHL-D55	SHL-D55-01
Panel mount plunger	SHL-Q55	SHL-Q55-01
Panel mount roller plunger	SHL-Q2255	SHL-Q2255-01
Panel mount cross roller plunger	SHL-Q2155	SHL-Q2155-01
Short hinge lever	SHL-W55	SHL-W55-01
Hinge lever	SHL-W155	SHL-W155-01
Short hinge roller lever	SHL-W255	SHL-W255-01
Hinge roller lever	SHL-W2155	SHL-W2155-01
One-way action short hinge roller lever	SHL-W355	SHL-W355-01
One-way action hinge roller lever	SHL-W3155	SHL-W3155-01

Note: For customized models, refer to Molded Terminal Models or Operation-Indicator Equipped Models at the end of this data sheet.

Specifications

■ RATINGS

General Ratings

Rated voltage	Non-inductive load				Inductive load				Inrush current
	Resistive load		Lamp load (See Note 2.)		Inductive load (See Note 1.)		Motor load (See Note 3.)		
	NC	NO	NC	NO	NC	NO	NC	NO	
125 VAC	10 A		1.5 A		3 A		2.5 A		15 A
250 VAC	10 A		1.5 A		2 A		1.5 A		
480 VAC	2 A		---		---		---		
8 VDC	10 A		2 A		5 A		2 A		
14 VDC	10 A		2 A		5 A		2 A		
30 VDC	5 A		1.5 A		1.5 A		1.5 A		
125 VDC	0.4 A		0.4 A		0.05 A		0.05 A		
250 VDC	0.2 A		0.2 A		0.03 A		0.03 A		

Note: Inductive loads have a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).

Lamp load has an inrush current of 10 times the steady-state current.

Motor load has an inrush current of 6 times the steady-state current.

UL/CSA Approved Rating

A300

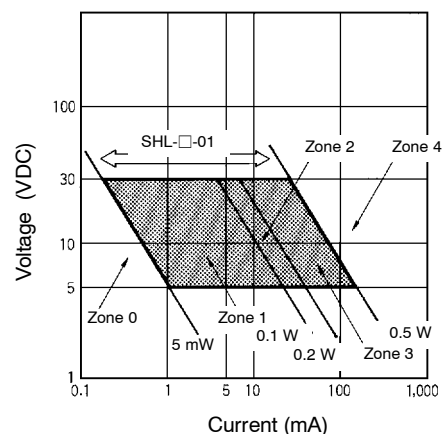
TÜV Rheinland Approved Ratings (EN60947-5-1)

Model	Category and rating	I _{the}
SHL-□55	AC-15 2 A/125 V	5 A
	DC-12 2 A/48 V	4 A
SHL-□5501	AC-14 0.1 A/125 V	0.5 A
	DC-12 0.1 A/48 V	0.5 A
SHL-□55L	AC-15 2 A/125 V	5 A
SHL-□5501L	AC-14 0.1 A/125 V	0.5 A
SHL-□55L2	DC-12 2 A/12 V	4 A
SHL-□5501L2	DC-12 0.1 A/12 V	0.5 A
SHL-□55L3	DC-12 2 A/24 V	4 A
SHL-□5501L3	DC-12 0.1 A/24 V	0.5 A
SHL-□55L4	DC-12 2 A/24 V	4 A
SHL-□5501L4	DC-12 0.1 A/24 V	0.5 A
SHL-□55L5	DC-12 2 A/48 V	4 A
SHL-□5501L5	DC-12 0.1 A/48 V	0.5 A

Micro Voltage/Current Load Model

Rated voltage	Non-inductive load	
	Resistive load	
	NC	NO
125 VAC	0.1 A	
8 VDC	0.1 A	
30 VDC	0.1 A	

Note: This type is ideal for use in the load range (Zones 1 through 3) shown below.

**CHARACTERISTICS**

Operating speed		0.1 mm to 50 cm m/s for SHL-Q2255 (0.0039 to 19.68 in/s)
Operating frequency	Mechanical	120 operations/min
	Electrical	30 operations/min
Insulation resistance		100 MΩ min. (at 500 VDC)
Rated insulation voltage (U _i)		150 V (IEC947-5-1)
Rated impulse withstand voltage (U _{imp})		2.5 kV (IEC947-5-1)
Switching overvoltage		1,000 VAC, 300 VDC max. (IEC947-5-1)
Short-circuit protective device		10 A fuse (type gG) (IEC269)
Conditional short-circuit current		100 A (IEC947-5-1)
Contact resistance		15 mΩ (initial)
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between non-continuous terminals 1,500 VAC, 50/60 Hz for 1 min between each terminal and non-current-carrying metal part
Vibration resistance	Malfunction	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction	1,000 m/s ² (approx. 100G) 3.281 ft/sec ²
	Malfunction	300 m/s ² (approx. 30G) 984 ft/sec ²
Ambient temperature (See Note.)	Operating	-10°C to 80°C (14°F to 176°F)
Ambient humidity	Operating	95% max.
Operating environment pollution level		Pollution degree 3 (IEC947-5-1)
Life expectancy	Mechanical	10,000,000 operations min. (at rated OT value)
	Electrical	See <i>Engineering Data</i> .
Enclosure ratings	IEC	IP67
Clearance and creepage		Double insulation
Weight		Approx. 62 to 72 g (2.19 to 2.54 oz)

Note: Temperature range below 0°C are based on absence freezing moisture or water.

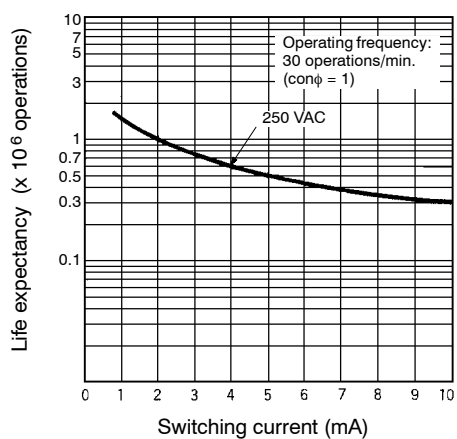
■ OPERATING CHARACTERISTICS

Model	SHL-D55 SHL-D55-01	SHL-Q55 SHL-Q55-01	SHL-Q2255 SHL-Q2255-01	SHL-Q2155 SHL-Q2155-01	SHL-W55 SHL-W55-01
OF max.	9.81 N (1,000 gf) 2.21 lbf	9.81 N (1,000 gf) 2.21 lbf	9.81 N (1,000 gf) 2.21 lbf	9.81 N (1,000 gf) 2.21 lbf	3.14 N (320 gf) 2.21 lbf
RF min.	1.96 N (200 gf) 0.44 lbf	1.96 N (200 gf) 0.44 lbf	1.96 N (200 gf) 0.44 lbf	1.96 N (200 gf) 0.44 lbf	0.78 N (80 gf) 0.44 lbf
PT max.	1.5 mm	1.5 mm	1.5 mm	1.5 mm	8 mm
OT min.	2 mm	2 mm	2 mm	2 mm	3 mm
MD max.	0.5 mm	0.5 mm	0.5 mm	0.5 mm	2.5 mm
OP	34±0.8 mm	34±0.8 mm	43±0.8 mm	43±0.8 mm	21.5±1 mm
FP max.	---	---	---	---	29.5 mm

Model	SHL-W155 SHL-W155-01	SHL-W255 SHL-W255-01	SHL-W2155 SHL-W2155-01	SHL-W355 SHL-W355-01	SHL-W3155 SHL-W3155-01
OF max.	2.35 N (240 gf) 0.53 lbf	3.92 N (400 gf) 0.88 lbf	2.55 N (260 gf) 0.57 lbf	3.92 N (400 gf) 0.88 lbf	2.55 N (260 gf) 0.57 lbf
RF min.	0.44 N (45 gf) 0.10 lbf	0.78 N (80 gf) 0.18 lbf	0.49 N (50 gf) 0.11 lbf	0.75 N (80 gf) 0.17 lbf	0.49 N (50 gf) 0.11 lbf
PT max.	13 mm	8 mm	13 mm	8 mm	13 mm
OT min.	5 mm	3 mm	5.5 mm	3 mm	5.5 mm
MD max.	4 mm	2.5 mm	4 mm	2.5 mm	4 mm
OP	21.5±1 mm	33±1 mm	33.5±1 mm	44.5±1 mm	44.5±1 mm
FP max.	34.5 mm	41 mm	46.5 mm	52.5 mm	57.5 mm

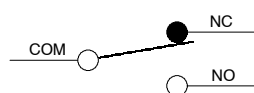
Engineering Data

■ ELECTRICAL LIFE EXPECTANCY



Operation

CONTACT FORM

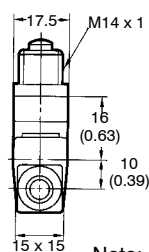
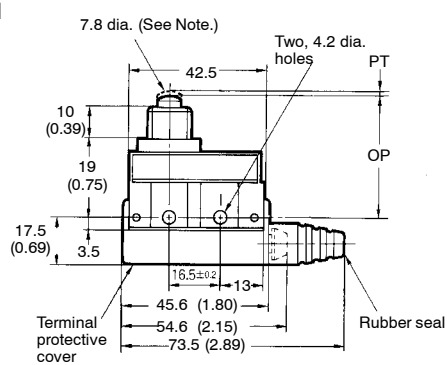
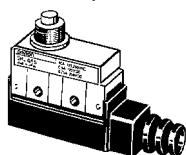


Dimensions

Unit: mm (inch)

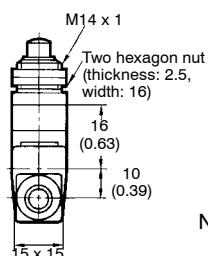
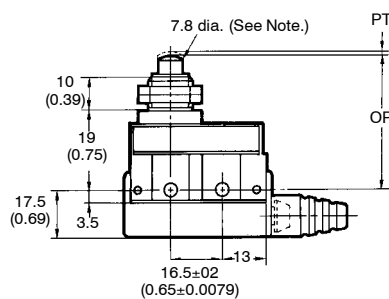
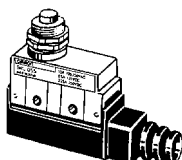
LIMIT SWITCHES

SHL-D55, SHL-D55-01



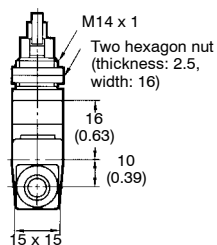
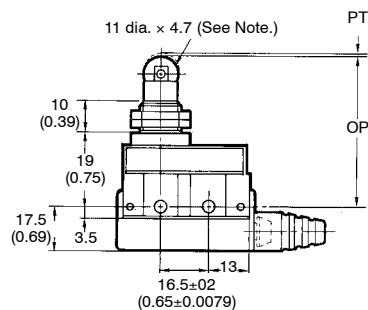
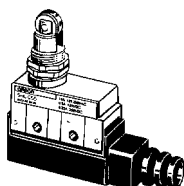
Note: Stainless steel pin plunger

SHL-Q55, SHL-Q55-01



Note: Stainless steel pin plunger

SHL-Q2255, SHL-Q2255-01

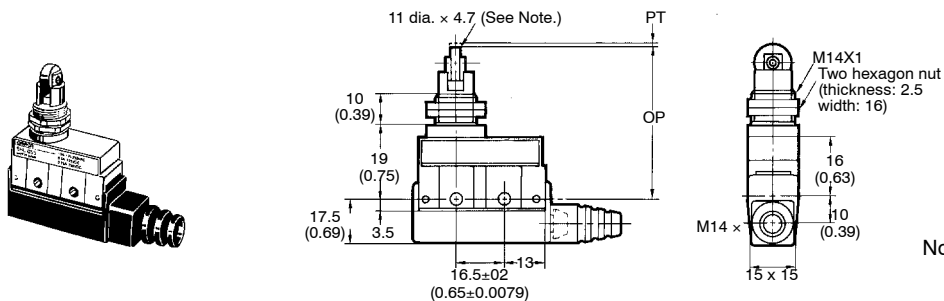


Note: Sintered stainless alloy roller

Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

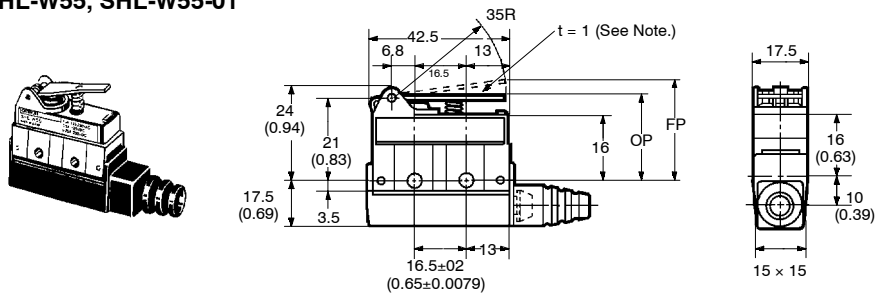
Unit: mm (inch)

SHL-Q2155, SHL-Q2155-01



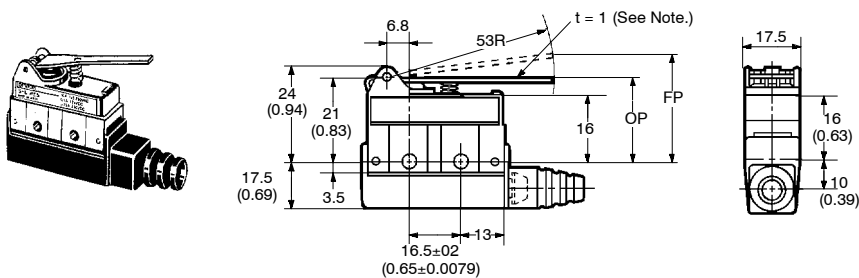
Note: Sintered stainless alloy roller

SHL-W55, SHL-W55-01



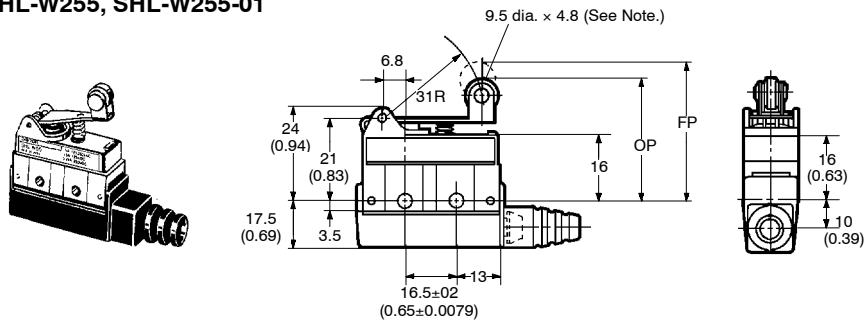
Note: Stainless steel lever

SHL-W155, SHL-W155-01



Note: Stainless steel lever

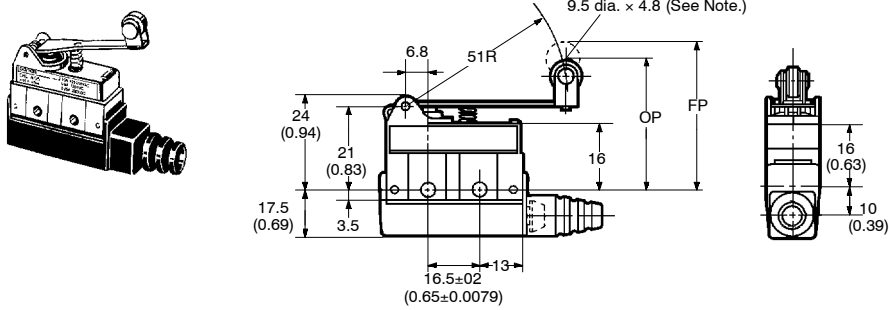
SHL-W255, SHL-W255-01



Note: Sintered stainless roller

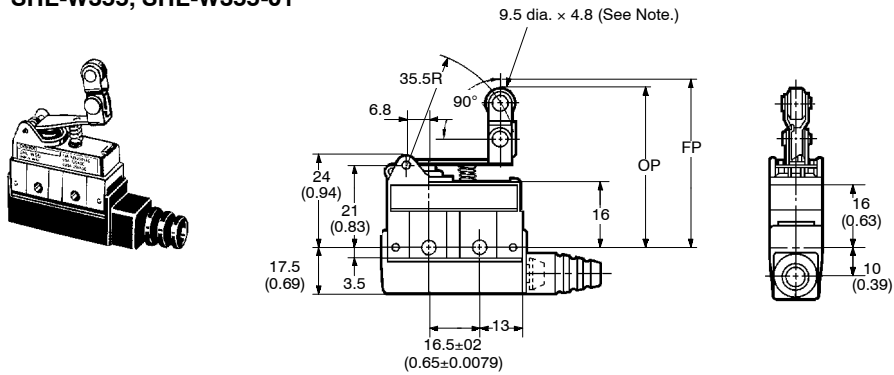
Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

SHL-W2155, SHL-W2155-01



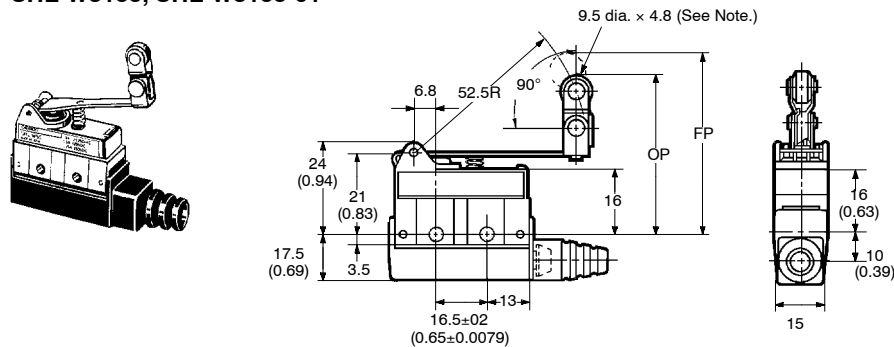
Note: Sintered stainless roller

SHL-W355, SHL-W355-01



Note: Sintered stainless roller

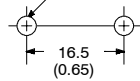
SHL-W3155, SHL-W3155-01



Note: Sintered stainless roller

Mounting Holes

Two, 4.3 dia. or M4 mounting holes



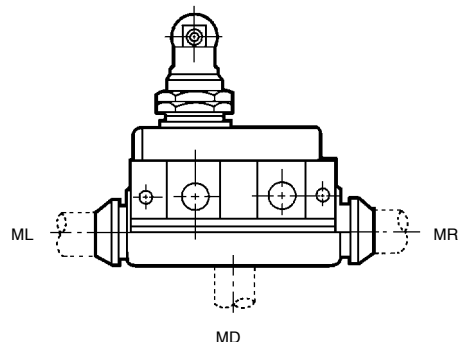
Note: Unless otherwise specified, a tolerance of ± 0.4 mm applies to all dimensions.

Customized Models

Molded Terminal Models

■ ORDERING INFORMATION

Use of the molded terminal model is recommended in locations subject to excessive dust, oil drips, or moisture. All types of SHL switches can be fabricated into a molded terminal version. In this case, the molded terminal model will have the same dimensions and operating characteristics as the basic model from which the molded terminal model is fabricated.



Suffix by Location of Lead Outlet

Location of lead outlet	Part number
Right-hand	SHL-□-MR
Left-hand	SHL-□-ML
Underside	SHL-□-MD

Note: Three leads (COM, NO, and NC) are provided for terminal connections.

Example:

Basic type: SHL-Q2255

Location of lead outlet: Right-hand

When placing your order for the above switch, specify the model number as SHL-Q2255-MR

Lead Supplies

Leads	Nominal cross-sectional area	No. of conductors/cond. dia.	Finished outside diameter	Terminal connections	Standard length
VCTF (Vinyl cabtyre cable)	0.75 mm ²	30/0.18 mm (0.007 in) dia.	3-core 7.2 mm (0.28 in) dia.	Black: COM White: NO Red: NC	3 m (118.11 in)

Operation-Indicator Equipped Model _____

■ ORDERING INFORMATION

UL, CSA and/or EN (IEC) approved models are available.

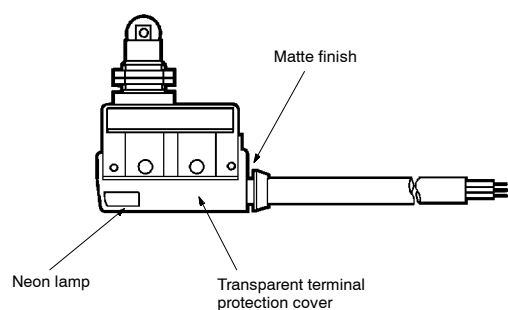
The molded terminal model may be equipped with an operation indicator (neon lamp or LED) upon request to facilitate maintenance and inspection.

The operation indicator is designed to illuminate when the switch is not operating. (Because of the molded terminal model, any change to the switch wiring cannot be made.)

■ AC OPERATION

A neon lamp indicator is provided.

The operating voltage is 90 to 250 VAC.



Operating characteristics are the same as the basic model from which the operation indicator equipped model is fabricated.

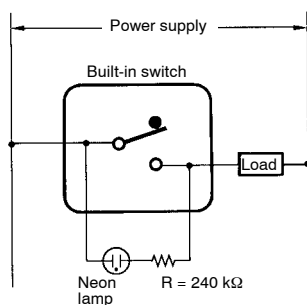
Dimension are the same as the standard model.

Example:

Basic type: SHL-Q2255-01MR

When placing your order for the molded terminal model with a neon lamp operation indicator, specify the model number as SHL-Q2255-01LMR.

Internal Circuit



■ DC OPERATION

LED indicator is provided.

As a rectifier stack is incorporated into the unit and no directionality exists for connection of + and -, this type can also be operated on AC.

Voltage ratings of LED indicators are as shown in the table below.

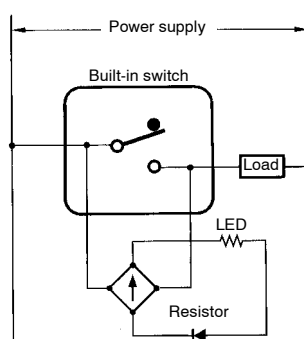
The switch case has a protrusion to facilitate visual confirmation of LED indicator.

Example:

Basic type: SHL-Q2255-01MR

When placing your order for the molded terminal with an LED indicator rated at 12 V, specify the model number as SHL-Q2255-01L2MR.

Contact Circuit



Type	Voltage rating	Lamp current	Internal resistance
L2	12 V	Approx. 2.4 mA	4.2 kΩ
L3	24 V	Approx. 2 mA	10 kΩ
L4	24 V	Approx. 1.2 mA	18 kΩ
L5	48 V	Approx. 2.1 mA	22 kΩ

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.

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