

# Enclosed Switch SHL

## Subminiature Enclosed Switch (Measuring 48 x 17.5 x 45 mm) with High Sealing Property

- Built-in coil spring type basic switch housed in rigid zinc diecast alloy casting boasts long life and high precision.
- Requires nearly the same operating force as conventional basic precision switches (2.35 to 3.92 N).
- Molded terminal model is available.
- Operation indicator model is also available.
- Approved by EN, UL, CSA, and CCC (Chinese standard).



## Model Number Structure

### Model Number Legend

#### Standard Models

SHL-□55-□  
1 2

#### 1. Actuator

- D: Plunger
- Q: Panel mount plunger
- Q22: Panel mount roller plunger
- Q21: Panel mount crossroller plunger
- W: Short hinge lever
- W1: Hinge lever
- W2: Short hinge roller lever
- W21: Hinge roller lever
- W3: One-way action short hinge roller lever
- W31: One-way action hinge roller lever

#### 2. Rated Current

- None: Standard
- 01: Micro Load

**Note:** Refer to page 135 for *Molded Terminal Models*.

## Ordering Information

### List of Models

Actuator	Standard model	Micro voltage
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 crossroller plunger 	SHL-Q2155	SHL-Q2155-01
Short hinge lever 	SHL-W55	SHL-W55-01

Actuator	Standard model	Micro voltage
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

## Specifications

### ■ Approved Standards

Agency	Standard	File No.
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
TÜV Rheinland	EN60947-5-1	R9451332
CCC (CQC)	GB14048.5	2003010305072162

Note: Ask your OMRON representative for information on approved models.

### ■ Approved Standard Ratings

#### UL/CSA

#### A300

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
120 VAC	10 A	60 A	6 A	7,200 VA	720 VA
240 VAC		30 A	3 A		

#### TÜV (EN60947-5-1), CCC (GB14048.5)

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-□55-01	AC-14 0.1 A/125 V	0.5 A
	DC-12 0.1 A/48 V	0.5 A
SHL-□55-L	AC-15 2 A/125 V	5 A
SHL-□55-01L	AC-14 0.1 A/125 V	0.5 A
SHL-□55-01L2	DC-12 0.1 A/12 V	0.5 A
SHL-□55-L3	DC-12 2 A/24 V	4 A
SHL-□55-01L3	DC-12 0.1 A/24 V	0.5 A
SHL-□55-L4	DC-12 2 A/24 V	4 A
SHL-□55-01L4	DC-12 0.1 A/24 V	0.5 A

Note: For details on the above models, refer to "Molded Terminal Models" on page 135.

## ■ General Ratings

Rated voltage	Non-inductive load				Inductive load				Inrush current	
	Resistive load		Lamp load		Inductive load		Motor load		NC	NO
	NC	NO	NC	NO	NC	NO	NC	NO		
125 VAC	10 A		1.5 A		3 A		2.5 A		15 A max.	
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:**
1. The above figures are for steady-state currents.
  2. Inductive loads have a power factor of 0.4 min. (AC) and a time constant of 7 ms max. (DC).
  3. Lamp load has an inrush current of 10 times the steady-state current.
  4. Motor load has an inrush current of 6 times the steady-state current.

## Micro Voltage/Current Load Model

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

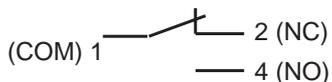
## ■ Characteristics (For SHL-W155)

Degree of protections (see note 3)	IP67 (EN60947-5-1)
Durability (see note 4)	Mechanical: 10,000,000 operations min. Electrical: 500,000 operations min.
Operating speed	0.1 mm to 0.5 m/s (hinge lever models)
Operating frequency	Mechanical: 120 operations/min Electrical: 30 operations/min
Rated frequency	50/60 Hz
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	15 mΩ max. (initial value)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between terminals of the same polarity 2,000 VAC, 50/60 Hz for 1 min/Uimp at 2.5 kV (EN60947-5-1) between current-carrying metal part and ground, and between each terminal and non-current-carrying metal part
Rated insulation voltage (U <sub>i</sub> )	150 V (EN60947-5-1)
Switching overvoltage	1,000 VAC max., 300 VDC max. (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Short-circuit protective device (SCPD)	10 A fuse type gI or gG (IEC269)
Conditional short-circuit current	100 A (EN60947-5-1)
Conventional enclosed thermal current (I <sub>the</sub> )	5 A (EN60947-5-1)
Protection against electric shock	Class II (grounding not required with double insulation)
OFF reverse voltage	1,000 VAC max., 300 VDC max. (EN60947-5-1)
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> min. Malfunction: 300 m/s <sup>2</sup> min.
Ambient temperature	Operating: -10°C to 80°C (with no icing)
Ambient humidity	Operating: 35% to 95%
Weight (see note 5)	Approx. 62 to 72 g

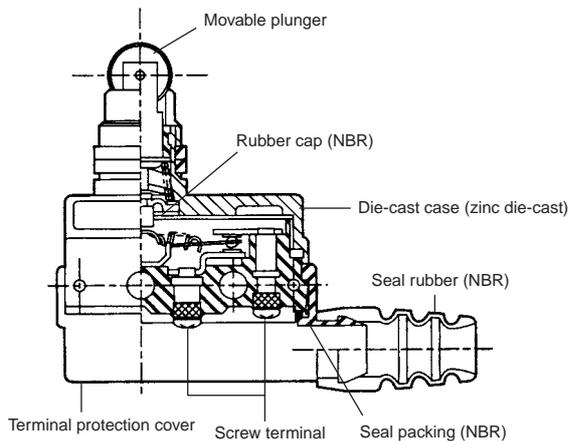
- Note:**
1. The above figures are for steady-state currents.
  2. The above ratings may vary depending on the model. Contact your OMRON representative for further details.
  3. The head section of the plunger type SHL-D(Q)□□ is excluded.
  4. Durability values are calculated at an operating temperature of 5°C to 35°C, and an operating humidity of 40% to 70%. Contact your OMRON sales representative for more detailed information on other operating environments.
  5. The values are for the plunger-type models.

# Connections

## ■ Contact Form



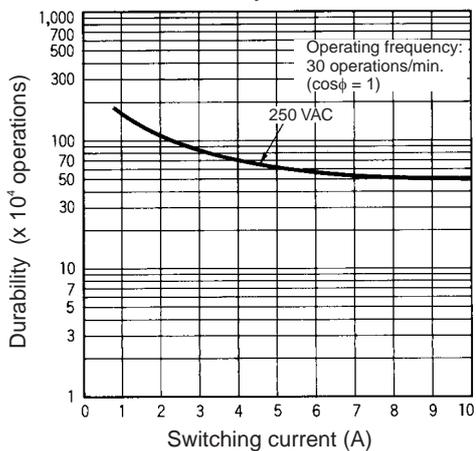
## Nomenclature



## Engineering Data

### ■ Electrical Durability

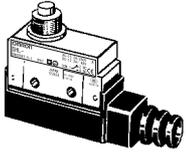
Ambient temperature: 5°C to 35°C  
 Ambient humidity: 40% to 50%



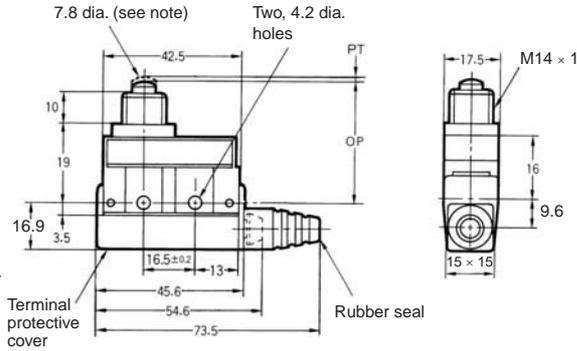
# Dimensions

**Note:** 1. All units are in millimeters unless otherwise indicated.  
 2. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.

## Plunger SHL-D55, SHL-D55-01

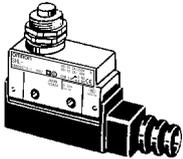


**Note:** Stainless steel pin plunger

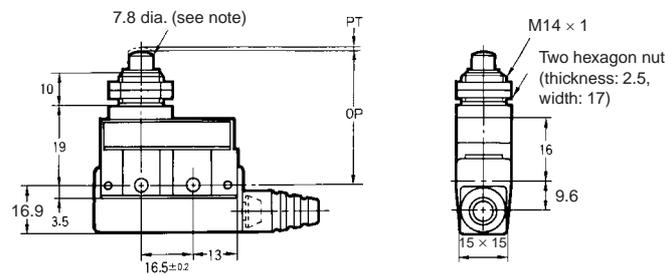


Model	SHL-D55 SHL-D55-01
OF max.	9.81 N
RF min.	1.96 N
PT max.	1.5 mm
OT min.	2 mm
MD max.	0.5 mm
OP	34 ± 0.8 mm
FP max.	---

## Panel Mount Plunger SHL-Q55, SHL-Q55-01

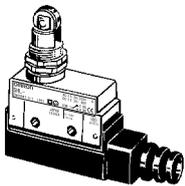


**Note:** Stainless steel pin plunger

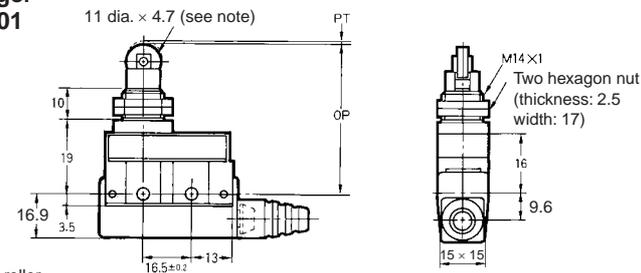


Model	SHL-Q55 SHL-Q55-01
OF max.	9.81 N
RF min.	1.96 N
PT max.	1.5 mm
OT min.	2 mm
MD max.	0.5 mm
OP	34 ± 0.8 mm
FP max.	---

## Panel Mount Roller Plunger SHL-Q2255, SHL-Q2255-01

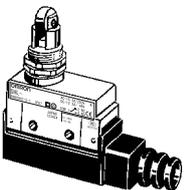


**Note:** Stainless sintered alloy roller

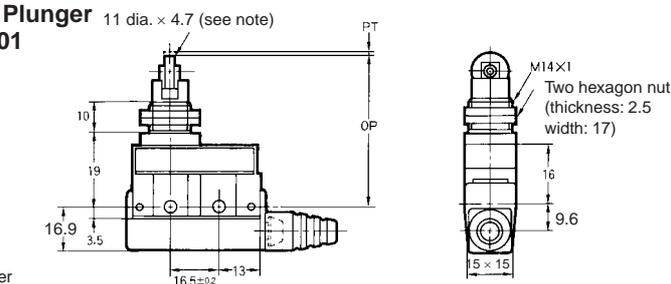


Model	SHL-Q2255 SHL-Q2255-01
OF max.	9.81 N
RF min.	1.96 N
PT max.	1.5 mm
OT min.	2 mm
MD max.	0.5 mm
OP	43 ± 0.8 mm
FP max.	---

## Panel Mount Crossroller Plunger SHL-Q2155, SHL-Q2155-01



**Note:** Stainless sintered alloy roller

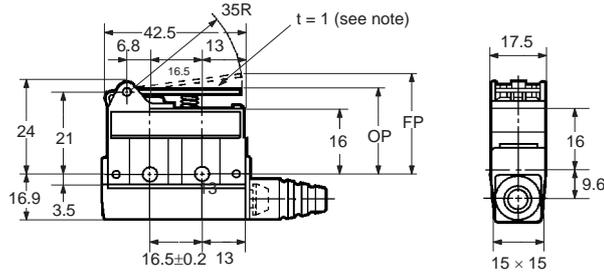


Model	SHL-Q2155 SHL-Q2155-01
OF max.	9.81 N
RF min.	1.96 N
PT max.	1.5 mm
OT min.	2 mm
MD max.	0.5 mm
OP	43 ± 0.8 mm
FP max.	---

**Short Hinge Lever**  
SHL-W55, SHL-W55-01

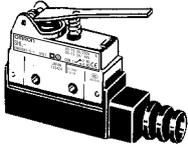


Note: Stainless steel lever

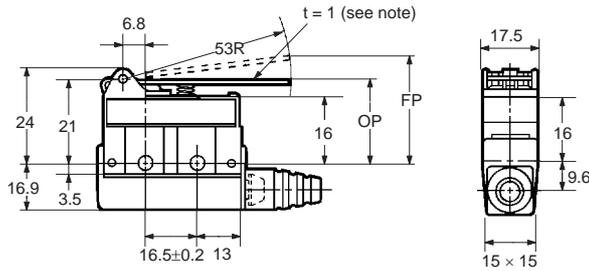


Model	SHL-W55 SHL-W55-01
OF max.	3.14 N
RF min.	0.78 N
PT max.	8 mm
OT min.	3 mm
MD max.	2.5 mm
OP	21.5±1 mm
FP max.	29.5 mm

**Hinge Lever**  
SHL-W155, SHL-W155-01

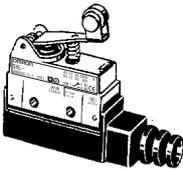


Note: Stainless steel lever

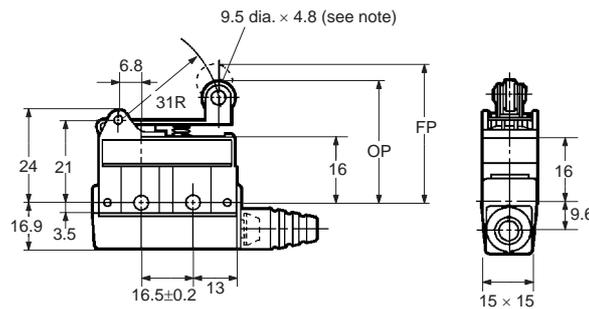


Model	SHL-W155 SHL-W155-01
OF max.	2.35 N
RF min.	0.44 N
PT max.	13 mm
OT min.	5 mm
MD max.	4 mm
OP	21.5±1 mm
FP max.	34.5 mm

**Short Hinge Roller Lever**  
SHL-W255, SHL-W255-01

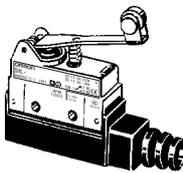


Note: Sintered stainless roller

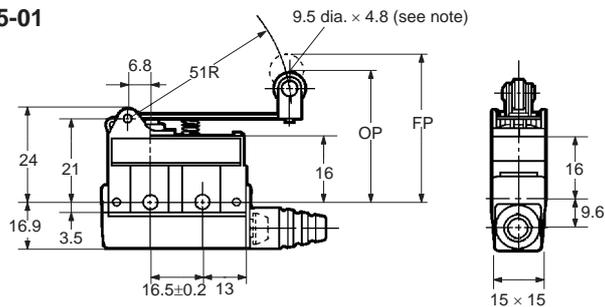


Model	SHL-W255 SHL-W255-01
OF max.	3.92 N
RF min.	0.78 N
PT max.	8 mm
OT min.	3 mm
MD max.	2.5 mm
OP	33±1 mm
FP max.	41 mm

**Hinge Roller Lever**  
SHL-W2155, SHL-W2155-01

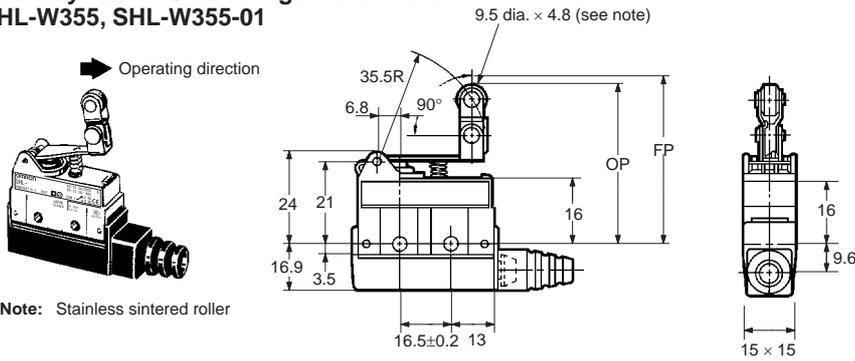


Note: Sintered stainless roller



Model	SHL-W2155 SHL-W2155-01
OF max.	2.55 N
RF min.	0.49 N
PT max.	13 mm
OT min.	5.5 mm
MD max.	4 mm
OP	33.5±1 mm
FP max.	46.5 mm

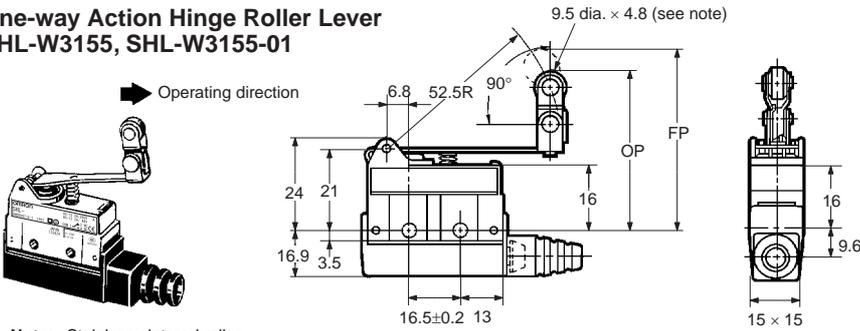
**One-way Action Short Hinge Roller Lever**  
**SHL-W355, SHL-W355-01**



Note: Stainless sintered roller

Model	SHL-W355 SHL-W355-01
OF max.	3.92 N
RF min.	0.78 N
PT max.	8 mm
OT min.	3 mm
MD max.	2.5 mm
OP	44.5±1 mm
FP max.	52.5 mm

**One-way Action Hinge Roller Lever**  
**SHL-W3155, SHL-W3155-01**



Note: Stainless sintered roller

Model	SHL-W3155 SHL-W3155-01
OF max.	2.55 N
RF min.	0.49 N
PT max.	13 mm
OT min.	5.5 mm
MD max.	4 mm
OP	44.5±1 mm
FP max.	57.5 mm

# Molded Terminal Models

## Model Number Legend

### Molded Terminal Models

SHL-□55-□□M□  
 1 2 3 4

Items 1 (Actuator) and 2 (Rated Current) are the same as those in *Standard Models*.

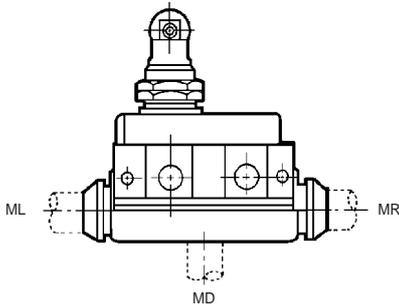
#### 3. Operation Indicator

- None: Not provided
- L2: LED: 12 V
- L3: LED: 24 V
- L4: LED: 24 V

#### 4. Location of Lead Outlet

- R: Right-hand
- L: Left-hand
- D: Underside

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	Model
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 cabtire cable)	0.75 mm <sup>2</sup>	30/0.18 dia.	3-core 7 dia.	Black: COM White: NO Red: NC	3 m

## Operation Indicator-equipped Models

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.

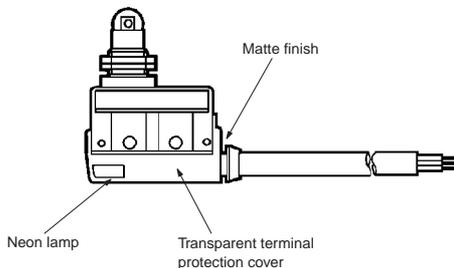
The operation indicator is designed to illuminate when the Switch is not operating. (Because of the molded terminal model, any change to the Switch wiring cannot be made.)

### AC Operation

A neon lamp indicator is provided. The operating voltage is 90 to 250 VAC.

#### Example:

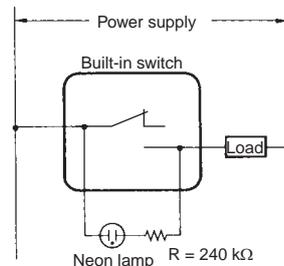
Basic type: SHL-Q2255-01MR  
 When placing your order for the molded terminal model with an neon lamp operation indicator, specify the model number as SHL-Q2255-01LMR.



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.

### Contact 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.

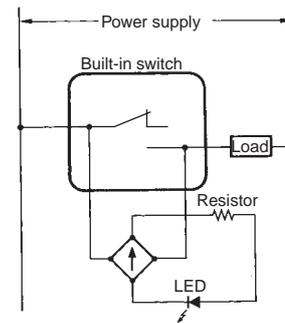
Voltage ratings of LED indicators are as shown in the table below.

### Example:

Basic type: SHL-Q2255-01MR

When placing your order for the molded terminal with an LED indicator rated at 24 V, specify the model number as SHL-Q2255-01L3MR.

## Contact Circuit



Type	Voltage rating	Lamp current	Internal resistance
L2	12 V	Approx. 2.4 mA	4.3 kΩ
L3	24 V	Approx. 2 mA	10 kΩ
L4	24 V	Approx. 1.2 mA	18 kΩ

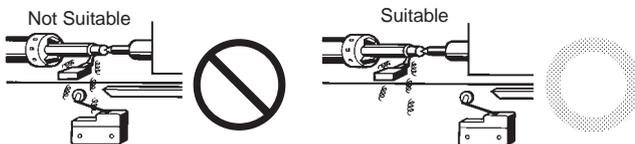
## Precautions

Refer to the "Precautions for General-purpose Limit Switches (Including Multiple Limit Switches, Mechanical Touch Switches, High-precision Switches, Touch Switches, On-site Flexible Switches; Not Including Safety Switches)" on page 17.

### Correct Use

#### Operating Environment

- Seal material may deteriorate if a Switch is used outdoor or where subject to special cutting oils, solvents, or chemicals. Always appraise performance under actual application conditions and set suitable maintenance and replacement periods.
- Install Switches where they will not be directly subject to cutting chips, dust, or dirt. The Actuator and Switch must also be protected from the accumulation of cutting chips or sludge.



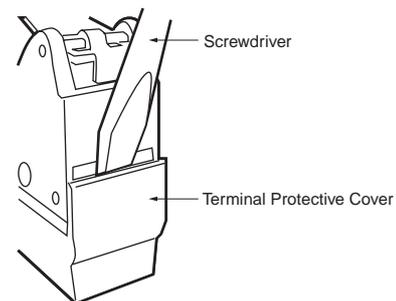
- Constantly subjecting a Switch to vibration or shock can result in wear, which can lead to contact interference with contacts, operation failure, reduced durability, and other problems. Excessive vibration or shock can lead to false contact operation or damage. Install Switches in locations not subject to shock and vibration and in orientations that will not produce resonance.
- The Switches have physical contacts. Using them in environments containing silicon gas will result in the formation of silicon oxide (SiO<sub>2</sub>) due to arc energy. If silicon oxide accumulates on the contacts, contact interference can occur. If silicon oil, silicon filling agents, silicon cables, or other silicon products are present near the Switch, suppress arcing with contact protective circuits (surge killers) or remove the source of silicon gas.

#### Connections

Be sure to connect a fuse with a breaking current 1.5 to 2 times the rated current to the Limit Switch in series in order to protect the Limit Switch from damage due to short-circuiting. When using the Limit Switch under the EN ratings, use a gI or gG 10-A fuse that conforms to IEC269.

### Handling

When detaching the Terminal Protective Cover, insert a screwdriver and apply a force in the opening direction. Do not use excess force to remove the cover. Doing so may cause deformation in the fitting section and reduce the holding force.



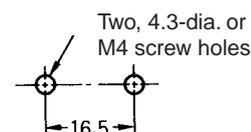
When mounting the Terminal Protective Cover to the case, align the cover on the case and then press the cover down to mount it firmly. If the cover is pressed down in an inclined position, rubber packing will deform and thus affect the sealing capability.

### Mounting

Secure the Switch with two M4 screws and washers. The tightening torque applied to each terminal must be 1.18 to 1.37 N·m. Tighten the screws to the specified torque. An excessive tightening torque may damage the Switch and cause a malfunction.

When mounting the panel mount-type Switch with screws on a side surface, remove the hexagonal nuts from the actuator.

#### Mounting Holes



When mounting the panel mount type (SHL-Q55, SHL-Q2255, or SHL-Q2155) on a panel, tighten the hexagonal nuts of the actuator to a torque less than 7.84 N·m.

## Tightening Torque

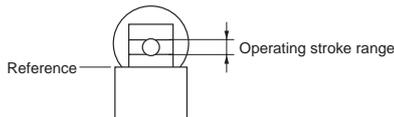
A loose screw may result in a malfunction. Be sure to tighten each screw to the proper tightening torque as shown below.

No.	Type	Torque
1	Terminal screw (M3 screw)	0.24 to 0.44 N-m
2	Panel mounting screw (M4 screw)	1.18 to 1.37 N-m

When wiring, use M3 round solderless terminals and apply insulation shielding to the connections. Tighten the terminals screws to 0.24 to 0.44 N-m.

## Operating Stroke

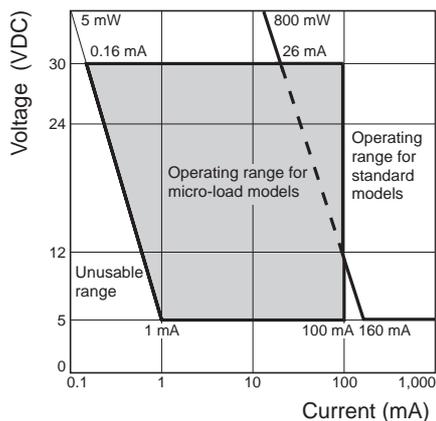
Ensure that the operating stroke for roller plunger models is within the set position display.



## Micro Load Applicable Ranges

When using a Limit Switch for opening or closing micro-load circuit (zones 1 through 3), contact failure may occur if a Limit Switch with ordinary contact specifications is used. Therefore, when using Limit Switches in the micro-load range, use ones with contact specifications that are suited to each zone.

Use the SHL-□-01 micro-load models within the zones (1 through 3) shown in the following diagram.



The above diagram is for standard conditions (5°C to 35°C, 40% to 70%). Since the values vary depending on the operating environment conditions, contact your OMRON representative for further details.

## Others

The standard seal rubber for the lead wire outlet is one that allows 6- to 8-dia. cables. The appropriate nominal cross-section of the lead wire is 0.75 mm<sup>2</sup>. (When the sealing capability is required over a long period of time, use mold specifications.)

# Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. **Prices; Payment Terms.** All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. **Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. **Interest.** Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. **Orders.** Omron will accept no order less than \$200 net billing.
6. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. **Force Majeure.** Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Omron:
  - a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
  - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
  - c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
  - d. Delivery and shipping dates are estimates only; and
  - e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. **Claims.** Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. **Warranties.** (a) **Exclusive Warranty.** Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) **Limitations.** OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) **Buyer Remedy.** Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See <http://oeweb.omron.com> or contact your Omron representative for published information.
14. **Limitation on Liability; Etc.** OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. **Indemnities.** Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. **Property; Confidentiality.** Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. **Export Controls.** Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (ii) sale of products to "forbidden" or other proscribed persons; and (iii) disclosure to non-citizens of regulated technology or information.
18. **Miscellaneous.** (a) **Waiver.** No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) **Assignment.** Buyer may not assign its rights hereunder without Omron's written consent. (c) **Law.** These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) **Amendment.** These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) **Definitions.** As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

## Certain Precautions on Specifications and Use

1. **Suitability of Use.** Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
  - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
  - (ii) Use in consumer products or any use in significant quantities.
  - (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
  - (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. **Programmable Products.** Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. **Performance Data.** Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. **Errors and Omissions.** Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Complete "Terms and Conditions of Sale" for product purchase and use are on Omron's website at [www.omron247.com](http://www.omron247.com) – under the "About Us" tab, in the Legal Matters section.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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