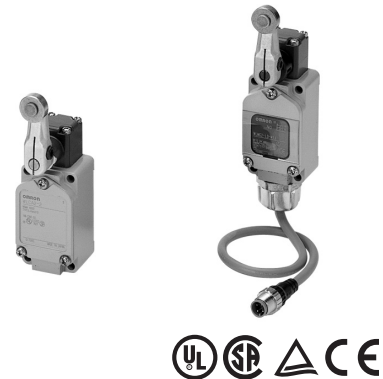


# Long-life Two-circuit Limit Switch

# WLM□

## New Long-life Limit Switches Added to the Wide Variety of WL Models

- Improved resistance to abrasion and smoother movement in the head section means that a mechanical life of 30,000,000 operations minimum is now a reality.
- Wiring and replacement for maintenance purposes are easy done.
- Fluorescent indicators improve visibility when setting stroke zones.



## Model Number Structure

### ■ Model Number Legend

WLM□-LD□  
 1            2

#### 1. Actuators

- CA2:     Roller lever: Standard
- GCA2:   Roller lever: High-precision
- H2:      Roller lever: Overtravel, general-purpose
- G2:      Roller lever: Overtravel, high-sensitivity

#### 2. Wiring Specifications

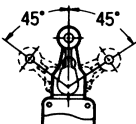
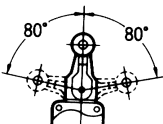
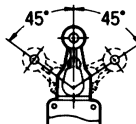
- Blank:    Screw terminal: G1/2 conduit
- K13A:    Direct-wired connector: 2-core, AC
- K13:      Direct-wired connector: 2-core, DC
- K43A:    Direct-wired connector: 4-core, AC
- K43:      Direct-wired connector: 4-core, DC
- M1J:     Pre-wired connector: 2-core, DC (See note.)
- AGJ03:   Pre-wired connector: 4-core, AC (See note.)
- DGJ03:   Pre-wired connector: 4-core, DC (See note.)

**Note:** With 0.3-m cable attached.

# Ordering Information

## ■ List of Models

### Roller Lever with LED

Item		Model				
Type		Standard	Overtravel		High-precision	
			General-purpose	High-sensitivity		
Overall movement						
Features		One-side operation not possible. Head can be mounted in any of the four directions. (See note 3.)			One-side operation possible. Head can be mounted in any of the four directions. (See note 3.)	
Screw terminal		WLMCA2-LD	WLMH2-LD	WLMG2-LD	WLMGCA2-LD	
Direct-wired connector	2-core	AC	WLMCA2-LDK13A	WLMH2-LDK13A	WLMG2-LDK13A	WLMGCA2-LDK13A
		DC	WLMCA2-LDK13	WLMH2-LDK13	WLMG2-LDK13	WLMGCA2-LDK13
	4-core	AC	WLMCA2-LDK43A	WLMH2-LDK43A	WLMG2-LDK43A	WLMGCA2-LDK43A
		DC	WLMCA2-LDK43	WLMH2-LDK43	WLMG2-LDK43	WLMGCA2-LDK43
Pre-wired connector (See note 2.)	2-core	DC	WLMCA2-LD-M1J	WLMH2-LD-M1J	WLMG2-LD-M1J	WLMGCA2-LD-M1J
	4-core	AC	WLMCA2-LD-AGJ03	WLMH2-LD-AGJ03	WLMG2-LD-AGJ03	WLMGCA2-LD-AGJ03
		DC	WLMCA2-LD-DGJ03	WLMH2-LD-DGJ03	WLMG2-LD-DGJ03	WLMGCA2-LD-DGJ03

**Note:** 1. The default setting is light-ON when not operating (NO connection). To switch to light-ON when operating, simply rotate the lamp holder by 180°. Contact your OMRON representative for details on the 2-core models.

2. 0.3-m cable attached.

3. One-side operation possible means that, by changing the direction of the operational plunger, one of three operating directions can be selected. One-side operation not possible means that only operation on both sides is possible. See page 106 for details.

### Applicable Cables

Use the Cables listed below with the Limit Switch with Connector.

Voltage	Core wires	Cable length	Model	Connection wires			
				1	2	3	4
AC	2	2 m	XS2F-A421-DB0-A	---	---	Brown	Blue
		5 m	XS2F-A421-GB0-A	---	---	Brown	Blue
	4	2 m	XS2F-A421-D90-A	Brown	White	Blue	Black
		5 m	XS2F-A421-G90-A	Brown	White	Blue	Black
DC	2	2 m	XS2F-D421-DD0	---	---	Blue	Brown
		5 m	XS2F-D421-GD0	---	---	Blue	Brown
	4	2 m	XS2F-D421-D80-A	Brown	White	Blue	Black
		5 m	XS2F-D421-G80-A	Brown	White	Blue	Black

# Specifications

## ■ Ratings

### General-purpose Ratings

Refer to these ratings before using the product.

#### Screw Terminal Models

Model	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
Standard, overtravel (except high-sensitivity), and high-precision	115 VAC	10		3	1.5	10		5	2.5
	12 VDC	10		6	3	10		6	
	24 VDC	6		4	3	6		4	
	48 VDC	3		2	1.5	3		2	
	115 VDC	0.8		0.2	0.2	0.8		0.2	
Overtravel (High-sensitivity)	115 VAC	5		---		---		---	
	115 VDC	0.4		---		---		---	

Inrush current	NC	30 A max. (15 A max. (See note))
	NO	20 A max. (10 A max. (See note))

Note: Only for high-sensitivity overtravel models.

### Direct-wired/Pre-wired Models

Model	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
DC	12 VDC	3	3	3	3	3	3	3	3
	24 VDC	3	3	3	3	3	3	3	3
	48 VDC	3	3	3	3	3	3	3	3
	115 VDC	0.8	0.8	0.2	0.2	0.8	0.8	0.2	0.2
AC	115 VAC	3	3	3	1.5	3	3	3	2.5

- Note: 1. The above figures are for standard 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.

## ■ Characteristics

Degree of protection	IP67
Durability (See note 2.)	Mechanical: 30,000,000 operations min. (10 mA at 24 VDC, resistive load) Electrical: 750,000 operations min. (10 A at 115 VAC, resistive load), but for high-precision models: 500,000 operations min. (10 A at 115 VAC, resistive load)
Operating speed	1 mm to 1 m/s (for WLMCA2)
Operating frequency	Mechanical: 120 operations/minute Electrical: 30 operations/minute
Rated frequency	50/60 Hz
Insulation resistance	100 MΩ min. (at 500 VDC)
Contact resistance	25 mΩ max. (initial value)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between non-continuous terminals. (Except connector models.) 2,200 VAC (1,500 V), 50/60 Hz for 1 min between non-current-carrying metal part and ground. 2,200 VAC (1,500 V), 50/60 Hz for 1 min between each terminal and non-current-carrying metal part.
Vibration resistance	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: 95% max.
Weight	Approx. 275 g (for WLMCA2)

- Note: 1. The figures in parentheses for dielectric strength, are those for overtravel (high-sensitivity) or connector models.  
 2. The 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.

Limit Switches

## ■ Operating Characteristics

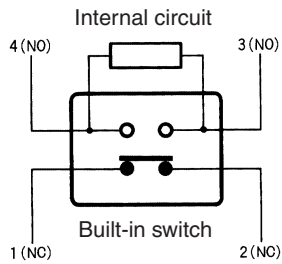
Operating characteristics	WLMCA2-LD□ Standard models	WLMH2-LD□ Overtravel models (general-purpose)	WLMG2-LD□ Overtravel models (high-sensitivity)	WLMGCA2-LD□ High-precision models
OF max.	9.81 N	9.81 N	9.81 N	13.34 N
RF min.	0.98 N	0.98 N	0.98 N	1.47 N
PT	15±5°	15±5°	10 <sup>+2°</sup> <sub>-1°</sub>	5 <sup>+2°</sup> <sub>0°</sub>
OT min.	30°	55°	65°	40°
MD max.	12°	12°	7°	3°

## ■ Contact Form

### Screw Terminal Models

#### WLM□-LD

Lamp-equipped: Light-ON when not operating

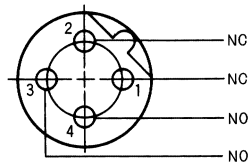
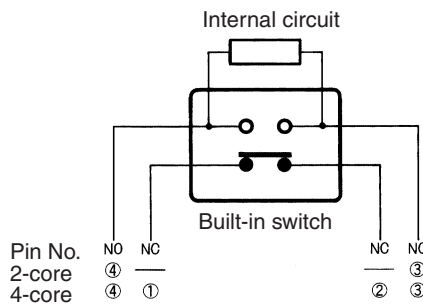


### Direct-wired Connector/Pre-wired Connector Models

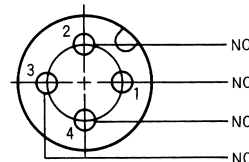
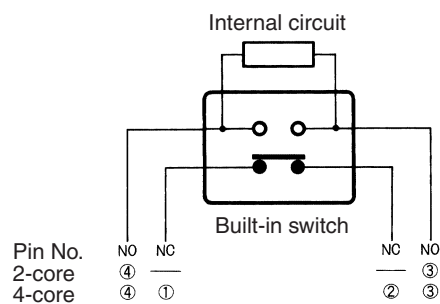
#### AC Models: WLM□-LD□□

Lamp-equipped: Light-ON when not operating (See note.)

AC model



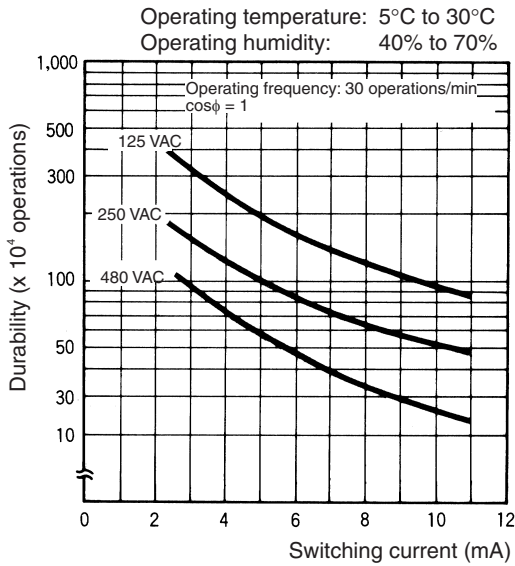
DC model



**Note:** Light-ON when not operating means that the lamp remains lit when the actuator is free, and goes out when the Limit Switch contacts (NO) close when the actuator rotates or is pushed down.

# Engineering Data

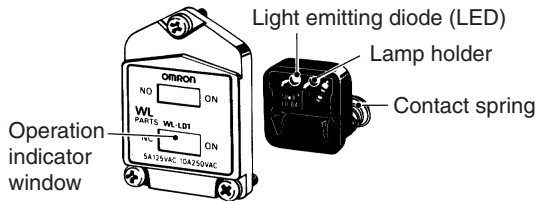
## Electrical Durability: $\cos\phi = 1$



## Lamp-equipped Models

The operating status of the Switch can be checked using a neon lamp or LED indicator.

Circuit checks and troubleshooting errors are easy done.



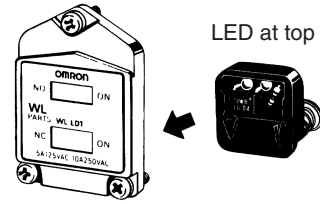
The built-in switch's terminal screws are used to connect the lamp terminal (indicator cover). Since the connection spring (coil spring) is used for this connection, it will not be necessary to connect to the lamp terminal. When a ground terminal is provided however, lead wire method must be used.

WL-LD has a built-in rectifier stack, so it will not be necessary to change the polarity.

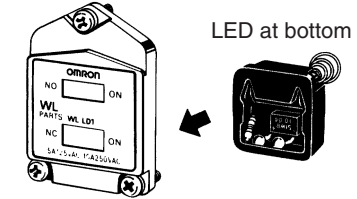
The indicator cover is molded from diecast aluminum and has outstanding sealing properties. Furthermore, regardless of whether the power is connected or not, the operating status is shown (operating or not operating), and indicators can be switched from light-ON when operating and light-ON when not operating, by simply rotating the lamp holder by 180°.

The lamp-equipped models are ideal in locations using a conveyor belt where items need to be checked, or locations that are difficult to inspect for faults.

Light-ON when Operating



Light-ON when Not Operating



## Indicator Lamp and Load Operation

When the indicator lamp is set to light-ON when operating, connect the load on the NC side, and set so that the load turns ON when the actuator is free.

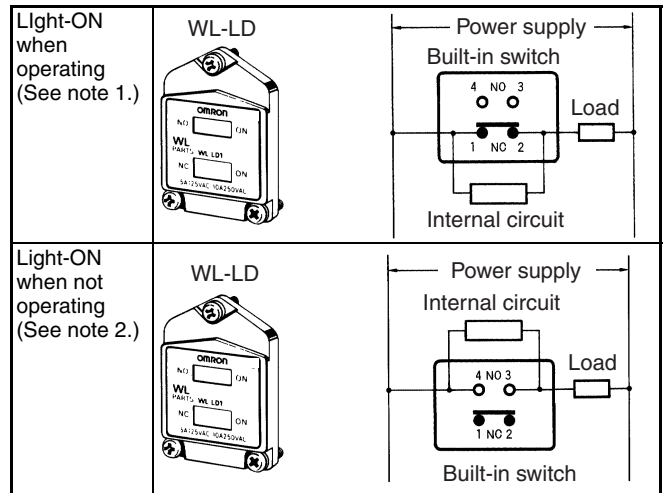
When the indicator lamp is set to light-ON when not operating, connect the load on the NO side, and set so that the load turns ON when the actuator is pushed down.

### Light-ON when Operating

When the Switch's contacts and the internal circuit of the lamp holder are connected in parallel, there is large resistance from the internal circuit, so the current will flow through the Switch's contacts and the load will turn ON.

When the contacts and the internal circuit are separated, only a small voltage, enough to light the indicator lamp will flow to the lamp, but the load will not turn ON.

## Operation



**Note: 1.** Light-ON when operating means that the lamp lights when the Limit Switch contacts (NC) release, or when the actuator rotates or is pushed down.

**2.** Light-ON when not operating means the lamp remains lit when the actuator is free, or when the Limit Switch contacts (NO) close when the actuator rotates or is pushed down.

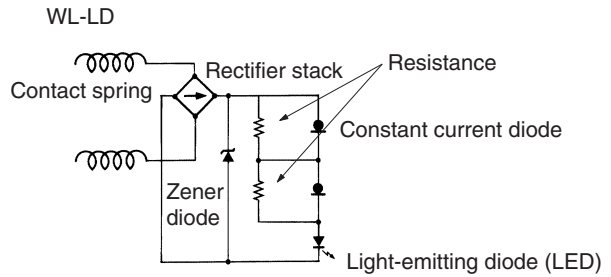
Limit Switches

Models/Ratings

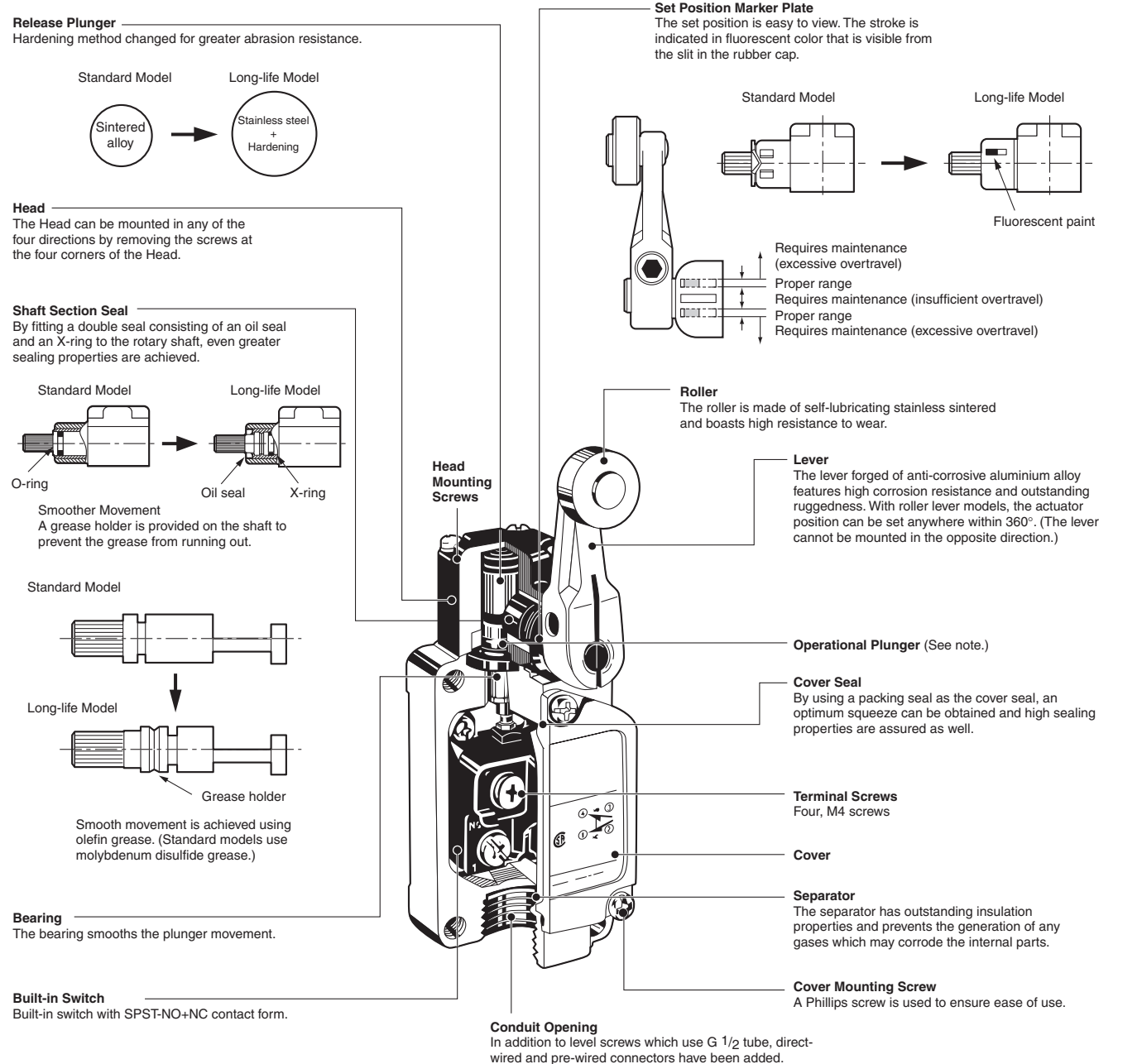
Operating characteristics	Maximum rated voltage	Leakage current	Lamp-equipped Switch	Lamp-equipped cover only
LED	10 to 115 VAC, DC	Approx. 1 mA	WL□-LD (See note 1.)	WL-LD

- Note:** 1. In the model number, □ indicates the actuator number. For example, MCA2, etc.  
 2. The default setting is "light-ON when not operating." Turn the lamp holder by 180° to change the setting to "light-ON when operating."

Internal Circuits



Nomenclature

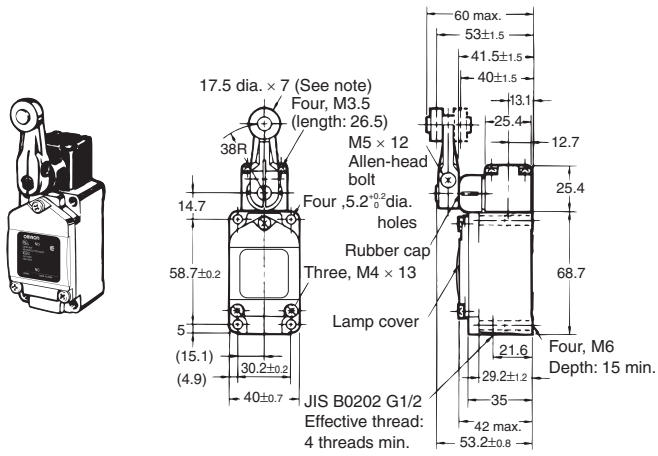


**Note:** By changing the direction of the operational plunger, any one of the three operational directions (both sides, left, or right) can be selected. (Only applicable to the WLMGCA2-□.)

# Dimensions

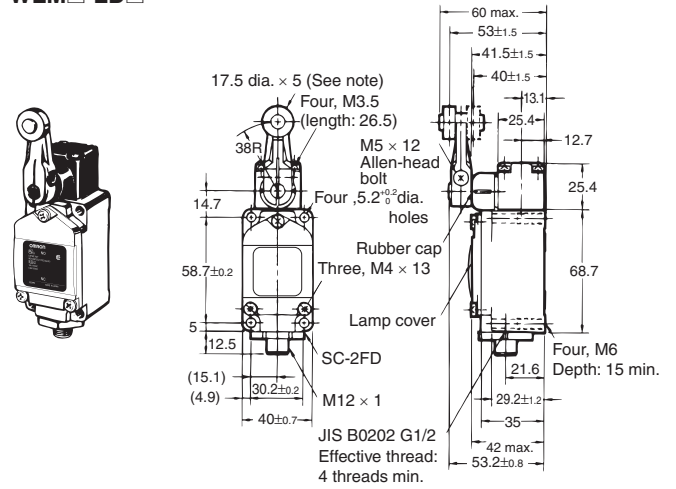
## Rotating Lever Models: Standard

### Screw Terminals WLM□-LD



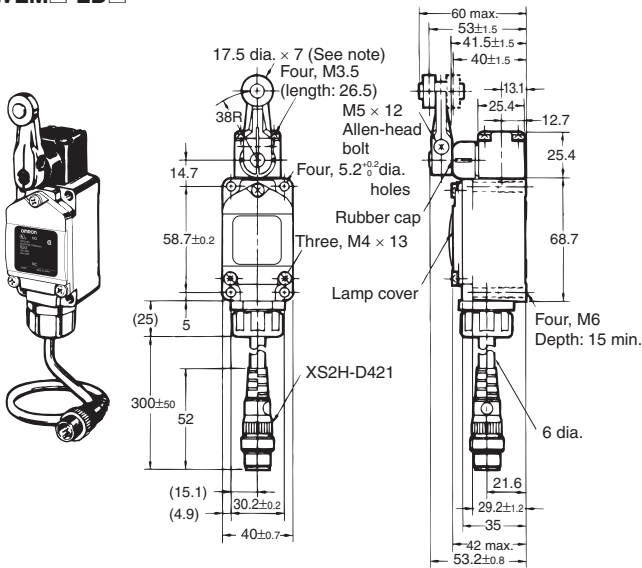
Note: Stainless steel roller

### Direct-wired Connectors WLM□-LD□



Note: Stainless steel roller

### Pre-wired Connectors WLM□-LD□

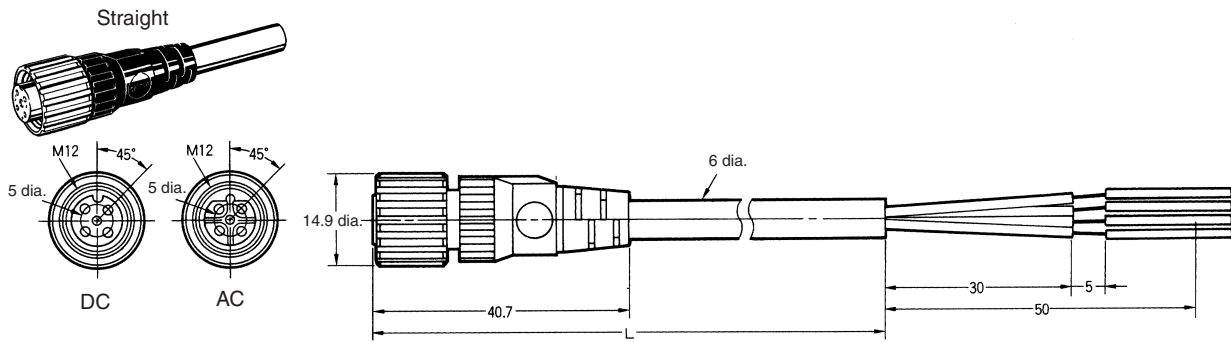


Note: Stainless steel roller

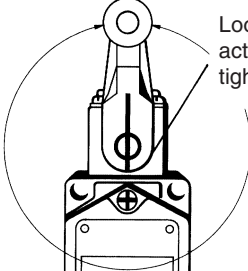
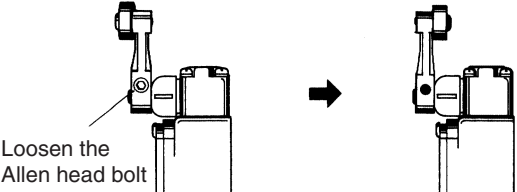
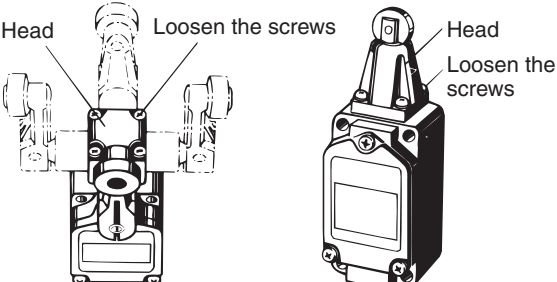
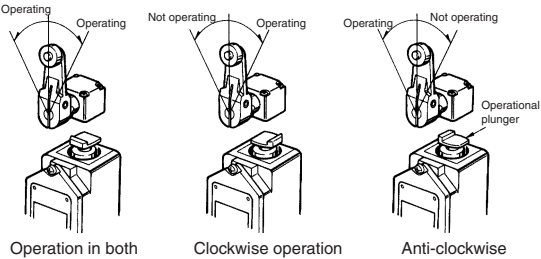
Note: Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

## Accessories

### Cable



## Installation

Item	Appropriate model/actuator	Details
<p><b>Changing the installation position of the actuator</b></p> <p>By loosening the Allen-head bolt on the actuator lever, the position of the actuator can be set anywhere within 360°.</p> <p>With Lamp-equipped Switches, the actuator lever comes in contact with the top of the lamp cover, so use caution when rotating and setting the lever.</p>	<p>Roller Levers: WLMCA2□, WLMH2□, WLMG2□, WLMGCA2□</p>	 <p>Loosen the M5 × 12 bolt, set the actuator's position and then tighten the bolt again.</p>
<p><b>Installing the roller on the inside</b></p> <p>By installing the roller lever in the opposite direction, the roller can be installed on the inside. (Set so that operation can be completed within a 180° level range.)</p>	<p>Roller Levers: WLMCA2□, WLMH2□, WLMG2□, WLMGCA2□</p>	 <p>Loosen the Allen head bolt</p>
<p><b>Changing the orientation of the head</b></p> <p>By removing the screws in the four corners of the Head, the Head can be set in any of the four directions. Be sure to change the plunger for internal operations at the same time. (The operational plunger does not need to be changed on overtravel general-purpose and overtravel high-sensitivity models.)</p>	<p>Roller Levers: WLMCA2□, WLMH2□, WLMG2□, WLMGCA2□</p>	 <p>Head Loosen the screws</p> <p>Head Loosen the screws</p>
<p><b>Changing the operating direction</b></p> <p>By removing the Head on models which can operate on one-side, and then changing the direction of the operational plunger, one of three operating directions can be selected.</p> <p>The tightening torque for the screws on the Head is 0.78 to 0.88 N·m.</p>	<p>Roller Levers: WLMGCA2□</p>	<p>The output of the Switch will be changed, regardless of which direction the lever is pushed.</p> <p>The output of the Switch will only be changed when the lever is pushed in one direction.</p>  <p>Operating Not operating Operating Not operating</p> <p>Operational plunger</p> <p>Operation in both directions Clockwise operation Anti-clockwise operation</p>



# Precautions

## Correct Use

When wiring terminal screws, use M4 round crimp terminals and tighten screws to the recommended torque. Wiring with broken wires, or the incorrect crimp terminals, or not tightening screws to the recommended torque can lead to short-circuits, leakage current, and fire.

When performing internal wiring there is a chance of short-circuit, leakage current, or fire, so be sure to protect the inside of the Switch from splashes of oil or water, corrosive gases, and cutting powder.

Using an inappropriate connector or assembling Switches incorrectly (assembly, tightening torque) can result in malfunction, leakage current, or fire, so be sure to read the instruction manual thoroughly beforehand.

Even when the connector is assembled and set correctly, the end of the cable and the inside of the Switch may come in contact. This can lead to malfunction, leakage current, or fire, so be sure to protect the end of the cable from splashes of oil or water and corrosive gases.

## Environmental Precautions

When the Switch is used in locations subject to splashes of water or oil, the material of the seal, which ensures the sealing properties of the Switch, may undergo changes in shape and quality. This is due to deterioration (including expansion and contraction), and may result in reduced performance, ineffective return, and ineffective sealing (leading to ineffective contact, insulation, leakage current, and fire). Confirm the possible effects of the operating environment on the Switch before use.

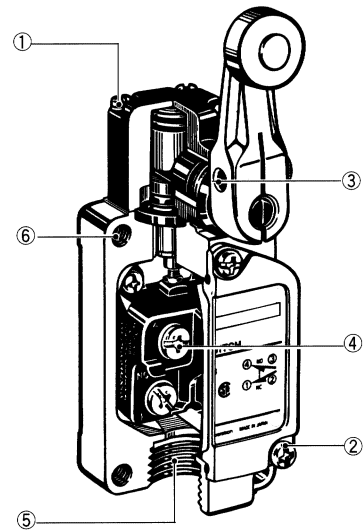
## Built-in Switch

Do not replace the built-in switch. If the position of the insulation sheet moves (separator), the insulation may become ineffective.

## Tightening Torque

If screws are too loose they can lead to an early malfunction of the Switch, so ensure that all screws are tightened using the correct torque.

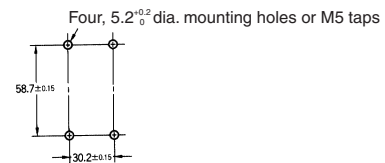
No.	Type	Torque
1	Head mounting screw	0.78 to 0.88 N·m
2	Cover mounting screw	1.18 to 1.37 N·m
3	Allen-head bolt (for securing the lever)	4.90 to 5.88 N·m
4	Terminal screw	0.59 to 0.78 N·m
5	Connector	1.77 to 2.16 N·m
6	Main Unit screws	4.90 to 5.88 N·m



In particular, when changing the direction of the Head, make sure that all screws are tightened again to the correct torque. Do not allow foreign objects to fall into the Switch.

## Installing the Switch

To install the Switch, make a mounting panel, as shown in the following diagram, and tighten screws using the correct torque.



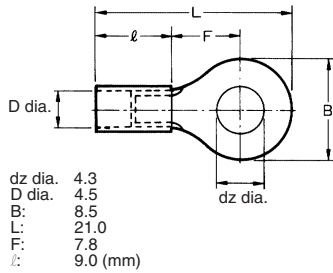
## Connectors

Either the easy-to-use Allen-head nut or the SC Connector can be used as connectors. To ensure high-sealing properties, use the SC Connector. (SC-1M to -5M and others.)

## Wiring

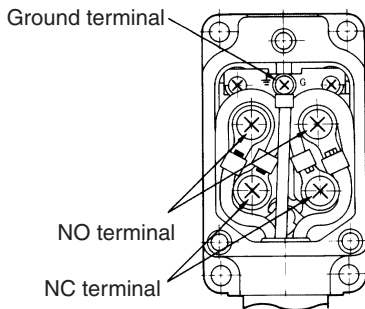
Use 1.25-mm lead wires and M4-insulation covered crimp terminals for wiring.

### Crimp Terminal External Dimensions



### Wiring Method

Switch Box Section



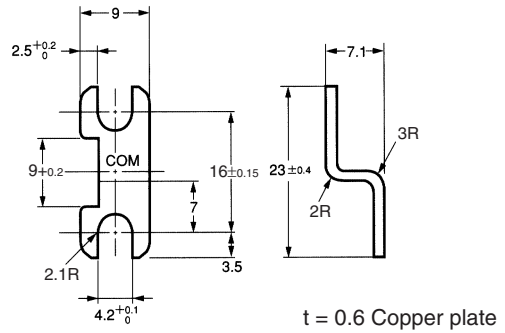
**Note:** Ground terminals are not installed on the standard models.

## Operation Set Position

There is a set position marker slit on the rubber cap of the head. After operation, set the slit on the rubber cap so that the fluorescent color on the shaft section can be seen.

### Terminal Plate

By using a short circuit plate, as shown in the following diagram, the Switch can be fabricated into a single-polarity double-break model. When ordering specify WL Terminal-Plate (IWPA01).



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.  
 To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.