Two-circuit Limit Switch/Long-life Two-circuit Limit Switch

# WL/WLM

CSM_WL_WLM_DS_E_17_1

## Wide Range of Two-circuit Switches; Select One for the Operating Environment/Application

- A wide selection of models are available, including the overtravel models with greater OT, indicator-equipped models for checking operation, low-temperature models,
  heat-resistant models, and corrosion-proof models.
- Microload models are added to the product lineup.
- Approved standards: EC/IEC, UL, CSA, CCC (Chinese standard).
  Contact your OMRON representative for information on approved models.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Be sure to read *Safety Precautions* on page 39 to 42 and *Safety Precautions for All Limit Switches*.

## Features

### Standard Models

**Many Variations in Standard Limit Switches**

**A Wide Range of Models**

The WL Series provides a complete range of Limit Switches with a long history of meeting user needs. Select environment-resistant specifications, actuators for essentially any workpiece, operating sensitivity matched to the workpiece, operation indicators to aid operation and maintenance, and various wiring specifications.

### Environment-resistant Models

**Select from Six Types of Environment Resistance**

The series includes Airtight Switches, Hermetic Switches, Heat-resistant Switches, Low-temperature Switches, Corrosion-proof switches, and Weather-proof Switches. Select the one required by the onsite environment.

### Spatter-prevention Models

**Excellent Performance on Arc Welding Lines or Sites with Spattering Cutting Powder**

**Ideal for Welding Sites**

Stainless steel and resins that resist adhesion of spatters are used to prevent troubles caused by zinc powder generated during welding.

### Long-life Models

**Mechanical Endurance of 30 Million Operations**

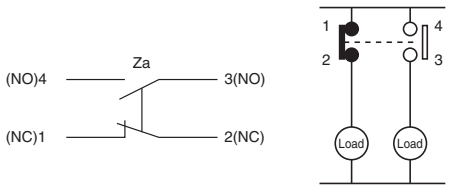
**Long-life Models for High-frequency Applications**

Long life has been achieved by increasing the resistance to friction and creating better sliding properties in the head mechanism. Greater visibility is provided when setting with a fluorescent display for setting the stroke.

### Features Common to All Models

**DPDB Operation**

The double-pole, double-break structure ensures circuit braking.




**Degree of Protection; IP67**

O-rings, cover seals, and other measures provide a water-proof, drip-proof structure (IP67).

**Approved Standards to Aid Export Machines**

Various WL/WLM switches are approved by UL, CSA, TÜV, EN/IEC, and CCC making them ideal for export machines.

**High-precision Models Available in All Switch Types; Ideal for Position Control**

High-precision models achieve a very small movement to operation (approx. 5°) and a repeat accuracy that is twice that of basic models.

**Operation Indicators for Easier Daily Inspections***

Confirm operation with a neon lamp or LED for easier startup confirmations and maintenance.

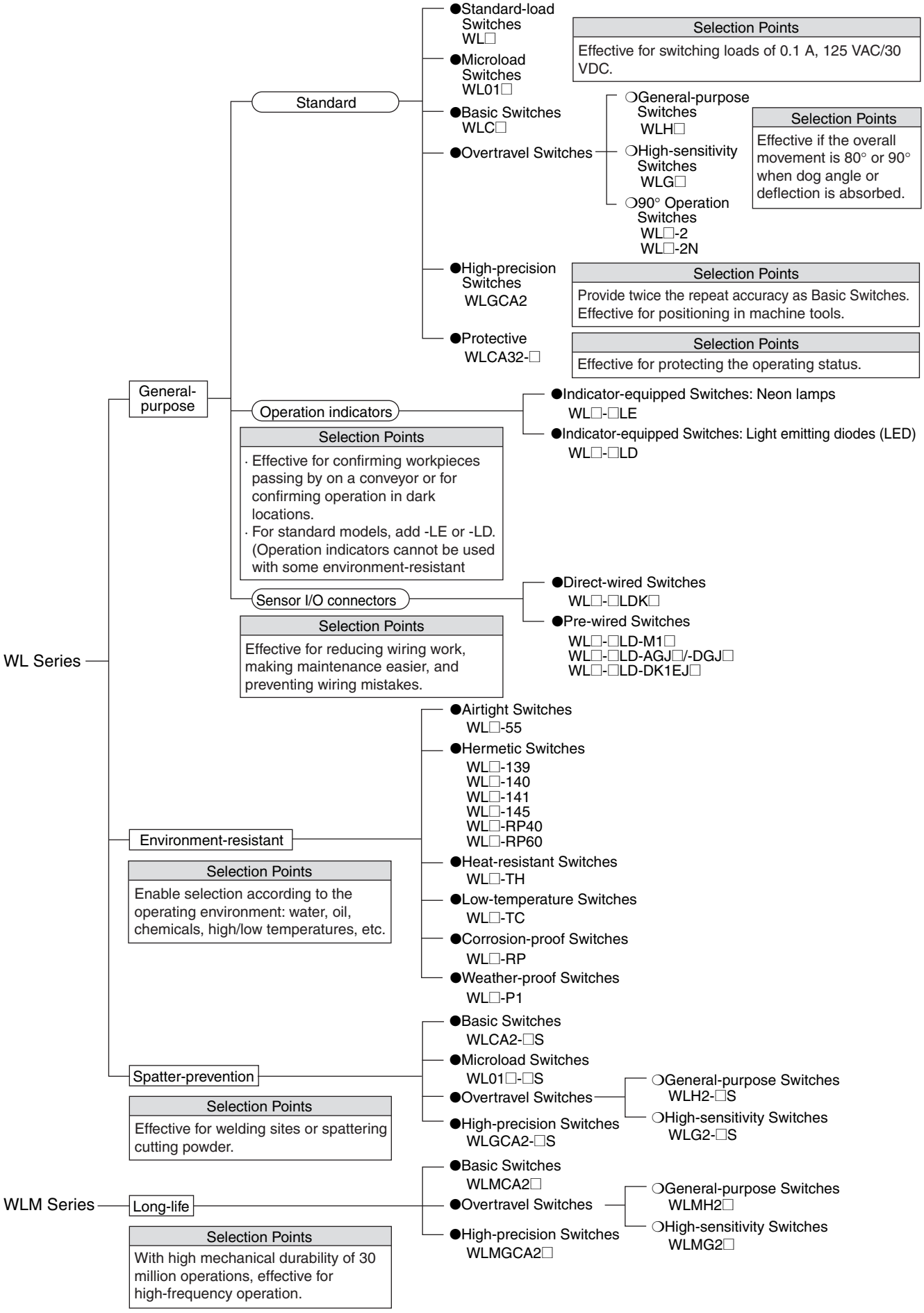
* Operation indicators are provided on Indicator-equipped switches, Spatter-prevention Basic Switches, and Long-life Basic Switches.


**Models with Connectors to Reduce Wiring**

Reduce wiring with one-touch connection. Models with direct-wired and prewired connectors that make Switch replacement easier are also available.

## Product Configuration

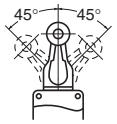
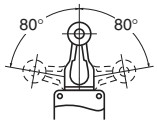
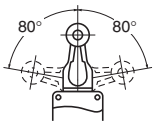
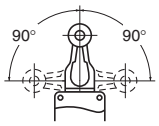
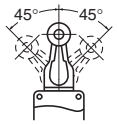
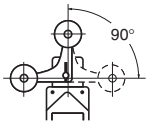
### Selection by Purpose



## Tables of Models

**General-purpose Switches** | **Spatter-prevention Switches** | **Long-life Switches**

### Heads (Roller levers only)

| Type | General purpose | Features | Head specifications | | Spatter prevention | Long-life |
|---|---|---|---|---|---|---|
| | Model | Total travel (TT) | One-side operation | Head mounting | Model | Model |
| **Basic** | **WLC□** | • With a Roller Lever   | Possible *1 (Except for long-life models.) | Any of 4 directions | **WLCA2-□S** | **WLMCA2□** |
| **General-purpose Overtravel** | **WLH□** | • Overtravel is large, making setting the dog easier.<br>• Mounting is compatible with WLH2.   | Not possible *2 | Any of 4 directions | **WLH2-□S** | **WLH2□** |
| **High-sensitivity Overtravel** | **WLG□** | • Operation is highly sensitive with only 10° pretravel.<br>• Overtravel is large, making setting the dog easier.<br>• Mounting is compatible with WLG2.   | Not possible *2 | Any of 4 directions | **WLG2-□S** | **WLMG2□** |
| **Overtravel, 90° operation** | **WL□-2** | • Overtravel is large, making setting the dog easier.<br>• Mounting is compatible with WLCA2-2.   | Not possible *2 | Any of 4 directions | — | — |
| | **WL□-2N** | | Possible *1 | Either of 2 directions | | |
| **High-precision** | **WLGCA2** | • Repeat accuracy is twice that basic models.<br>• Operation is highly sensitive with only 5° pretravel.<br>• Ideal for positioning, e.g.,   | Possible *1 | Any of 4 directions | **WLGCA2-□S** | **WLMGCA2□** |
| **Maintained** | **WLCA32-□** | • When the dog throws the lever, the output is reversed and the reversed output is held even after the dog passed. The original status is returned to only after the dog passed.   | — | Any of 4 directions | — | — |

*1. One-side operation means that three operational directions can be selected electrically, according to the change in direction of the operating plunger. The operating plunger is set for operation on both sides before delivery.
*2. Those models for which one-side operation is impossible can only operate on both sides.

### Connectors and Conduits

| Wiring type | General-purpose | Connector/conduit specifications | Spatter-prevention | Long-life |
|---|---|---|---|---|
| | Model | | Model | Model |
| **Direct-wired connector** | **WL□-□LDK□** | • SC-2F/-4F Connector built-in | — | **WLM□-LDK□** |
| **Pre-wired connector** | **WL□-□LD-M1□**<br>**WL□-□LD-□GJ□**<br>**WL□-□LD-DK1EJ□** | • XS2H-series Pre-wired Connector built-in | **WL□-□S-M1□J-1**<br>**WL□-□S-DGJS03** | **WLM□-LD-M1J**<br>**WLM□-LD-□GJ□** |
| **Conduit (screw terminal)** | **WL□-□**<br>**WL□-□G1□**<br>**WL□-□G□**<br>**WL□-□Y□**<br>**WL□-□TS□** | • G1/2 with no ground terminal<br>• G1/2 with ground terminal<br>• Pg13.5 with ground terminal<br>• M20 with ground terminal<br>• 1/2 14NPT with ground terminal | — | **WLM□-LD**<br>—<br>—<br>—<br>— |

## Environment-resistant Switches

| Item | | Environment-resistant | | |
|---|---|---|---|---|
| Type | Model | Application | Environment-resistant construction | Applicable models |
| **Airtight seal** | **WL□-55** | For uses in locations subject to cutting oil or water | Uses the W-10FB3-55 Airtight Built-in Switch.<br>Note: Use the SC Connector for the conduit opening. | All models except the low-temperature and heat-resistant models<br>Note: Models can be produced using standard actuators. |
| **Hermetic seal (Molded terminals/ Anti-coolant)** | **WL□-139**<br>**WL□-140**<br>**WL□-141**<br>**WL□-145**<br>**WL□-RP40**<br>**WL□-RP60** | | Refer to page 25 for information on the environment-resistant construction of Switches with Hermetic Seals. | All models except the low-temperature and heat-resistant models<br>Note: Models can be produced using standard actuators. Only the WLCA2, WLGCA2, or WLH2 can be produced for the WL□-141 and WL□-145. |
| **Low-temperature** * | **WL□-TC** | Can be used at a temperature of –40°C (operating temperature range: –40 to 40°C), but cannot withstand icing. | • Uses a general-purpose built-in switch.<br>• Silicone rubber is used for rubber parts such as the O-ring, gasket, etc. | All models except airtight seal, hermetic seal, heat-resistant, corrosion-proof, and indicator-equipped models |
| **Heat-resistant** * | **WL□-TH** | Can be used in temperatures of 120°C (operating temperature range: 5 to 120°C). | • Uses a special built-in switch made from heat-resistant resin.<br>• Silicone rubber is used for rubber parts such as the O-ring, gasket etc. | All models except airtight seal, hermetic seal, heat-resistant, corrosion-proof, and indicator-equipped, nylon roller (WLCA2-26N), seal roller models, and resin rod (WLNJ-2) models |
| **Corrosion-proof** | **WL□-RP** | For use in locations subject to corrosive gases and chemicals. | • Diecast parts, such as the switch box, are made of corrosion-proof aluminum.<br>• Rubber sealing parts are made of fluorine rubber which aids in resisting oil, chemicals and adverse weather conditions.<br>• Exposed nuts and screws (except the actuator section) are made of stainless steel.<br>• Moving and rotary parts such as rollers are made of sintered stainless steel or stainless steel.<br>• The Head, box, and cover are yellow. | All models except overtravel (90° operation), fork lever lock (WLCA32-41 to -43), low-temperature, heat-resistant, and indicator-equipped models |
| **Weather-proof** * | **WL□-P1** | For use in parking lots and other outdoor locations. | • Rubber parts are made from silicone rubber, which has a high-tolerance to deterioration over time and changes in temperature.<br>• Rollers are made of stainless steel to improve corrosion resistance.<br>• Exposed nuts and screws are made of stainless steel. | Only basic (WLCA2/CA12/CL), general-purpose overtravel (WLH2/H12/HL) and high-sensitivity overtravel (WLG2/G12/GL) models (excluding heat-resistant models). |

* Weather Resistance, Cold Resistance, and Heat Resistance
Silicon rubber is used to increase resistance to weather, cold, and heat. Silicon rubber, however, can generate silicon gas. (This can occur at room temperature, but the amount of silicon gas generated increases at higher temperatures.) Silicon gas will react as a result of arc energy and form silicon oxide ($SiO_2$). If silicon oxide accumulates on the contacts, contact interference can occur and can interfere with the device. Before using a Switch, test it under actual application conditions (including the environment and operating frequency) to confirm that no problems will occur in actual.

## Selection Guide

**With the WL Series, OMRON will combine the switch, Actuator, and wiring method required to build the ideal switch for your application.**

**The WL Series consists of four basic types: General-purpose, Environment-resistant, Spatter-prevention, and Long-life Switches. WLCA2 Switches can be used for the most common applications.**

### According to Operating Environment

| | Environment | Key specifications | Models | |
|---|---|---|---|---|
| Ambient operating temperature | Normal | −10°C +80°C<br>Water-resistant to IP67. | WL□<br>WLM□ | General-purpose Switches<br>Long-life Switches |
| | High-temperature | +5°C +120°C<br>To increase heat resistance, the rubber material (silicon rubber) and the material of the built-in switch have been changed. | WL□-TH | Heat-resistant Switches *1 |
| | Low-temperature | −40°C +40°C<br>To increase resistance to cold, silicon rubber and other measures are used. | WL□-TC | Low-temperature Switches *1 |
| Operating environment | Outdoors | Rubber parts are made from silicone rubber, which has a high-tolerance to deterioration over time and changes in temperature. Rollers are made of stainless steel to improve corrosion resistance. Exposed nuts and screws are made of stainless steel. | WL□-P1 | Weather-proof Switches *1 |
| | Chemicals and oil | Corrosion-proof aluminum diecast has been used for the housing, fluorine rubber has been used for rubber parts, and stainless steel has been used for screws and nuts (except for actuator) to increase resistance to oils, chemicals, and weather. | WL□-RP | Corrosion-proof Switches *1 |
| | Water drops and mist | Uses an airtight built-in switch. | WL□-55 | Airtight Switches *1 |
| | Constant water drops and mist | Cables attached. Uses a general-purpose built-in switch. The case cover and conduit opening are molded from epoxy resin to increase the seal. The cover cannot be removed. | WL□-139 | Hermetic, Molded-terminal Switches *1, *2 |
| | | Cables attached. Uses an airtight built-in switch. The case cover and box interior are molded from epoxy resin to increase the seal. The cover cannot be removed. The SC connector can be removed, so it is possible to use flexible conduits for the cable. | WL□-RP40 | Hermetic, Molded-terminal Switches *1, *2 |
| | | Cables attached. Uses an airtight built-in switch. The cover screws, case cover, box interior, and conduit opening are molded from epoxy resin to increase the seal. (The cover cannot be removed.) | WL□-140 | Hermetic, Molded-terminal Switches *1, *2 |
| | Constant water drops or splattering cutting powder | Cables attached. Uses an airtight built-in switch. The cover screws, case cover, box interior, conduit opening, box head, and head screws are molded from epoxy resin to increase the seal. (The cover cannot be removed.) The Head opening is protected from cutting powder. -141: The Head section is molded from epoxy resin; Head direction cannot be changed. -145: The Head section is molded from epoxy resin; Head can be in any of 4 directions. | WL□-141, -145 | Hermetic, Molded-terminal Switches *1, *2 (Only the WLCA2, WLG2, WLGCA2, and WLH2 can be produced.) |
| | Coolant | Cables attached. Uses an airtight built-in switch. The case cover, box interior, conduit opening, and head screws are molded from epoxy resin to increase the seal. (The cover cannot be removed.) Rubber parts are made from fluorine rubber to increase resistance to coolant. | WL□-RP60 | Hermetic, Molded-terminal Switches *1, *2 |
| | Spattering from welding | To prevent spatter during welding, a heat-resistant resin is used for the indicator cover and screws and rollers are all made from stainless steel. | WL□-S | Spatter-prevention Switches |

*1. Not all functions can be combined with environment-resistant switches. Refer to the applicable models on the previous page.
*2. Refer to page 25 for information on the construction of Hermetic Switches.

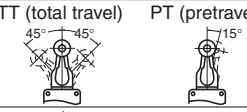
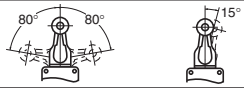
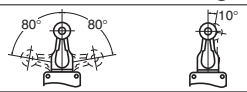
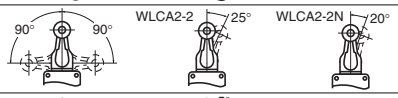
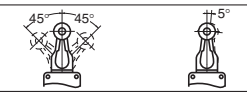
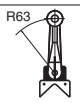
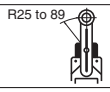
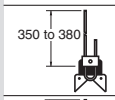
## According to Application Conditions

| | Conditions | Key specifications | Models |
|---|---|---|---|
| Load | Switching standard loads | 10 A at 125,250, or 500 VAC<br>0.8 A at 125 VDC<br>0.4 A at 250 VDC | WL□ General-purpose Switches<br>WL□-S Spatter-prevention Switches<br>WLM□ Long-life Switches |
| Load | Switching microloads | 0.1 A at 125 VAC, resistive load<br>0.1 A at 30 VDC, resistive load | WL01□ General-purpose Microload Switches<br>WL01□-S Spatter-prevention Microload Switches |
| Durability | Normal durability | Mechanical: 15 million operation min.<br>(10 million operation min. for overtravel general-purpose or high-sensitivity models or flexible rod models) | WL□ General-purpose Switches<br>WL□-S Spatter-prevention Switches |
| Durability | Long-life | Mechanical: 30 million operation min. | WLM□ Long-life Switches |

## According to Ease of Installation and Maintenance

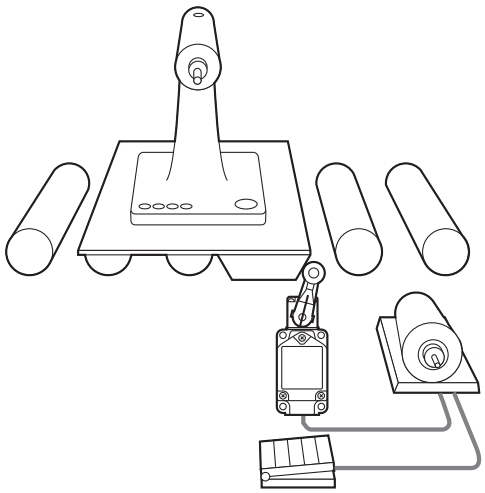
| | Conditions | Key specifications | Models |
|---|---|---|---|
| Operation indicator | Daily inspections and maintenance checks | Switching light-ON between operating/not operating. (Switching not possible for models with molded terminals.)<br>Neon lamp<br>125 to 250 VAC | WL□-LE<br>General-purpose, Indicator-equipped (Neon Lamp) Switches<br>WL□-LES<br>Spatter-prevention, Indicator-equipped (Neon Lamp) Switches |
| Operation indicator | | Switching light-ON between operating/not operating. (Switching not possible for models with molded terminals.)<br>LED<br>10 to 115 VAC/DC | WL□-LD<br>General-purpose, Indicator-equipped (LED) Switches<br>WL□-LDS<br>Spatter-prevention, Indicator-equipped (LED) Switches |
| Wiring specification | Screw tightening and installation | Screw terminals. No ground terminal.<br>Conduit size: G1/2 | WL□ General-purpose Switches<br>WLM□ Long-life Switches |
| Wiring specification | | Screw terminals. Ground terminal.<br>Conduit size: 4 sizes | WL□ General-purpose Switches |
| Wiring specification | One-touch connector attachment | Direct-wired connector, 2-conductor.<br>Greatly reduces wiring work.<br>Water-proof to IP67. | WL□-□LDK13<br>General-purpose, Direct-wired Connector Switches<br>WLM□-LDK13<br>Long-life, Direct-wired Connector Switches |
| Wiring specification | | Direct-wired connector, 4-conductor.<br>Greatly reduces wiring work.<br>Water-proof to IP67. | WL□-□LDK43<br>General-purpose, Direct-wired Connector Switches<br>WLM□-LDK43<br>Long-life, Direct-wired Connector Switches |
| Wiring specification | Connector attachment in control and relay boxes | Pre-wired connector, 2-conductor.<br>Greatly reduces wiring work.<br>Water-proof to IP67. | WL□-□LD-M1J<br>General-purpose, Pre-wired Connector Switches<br>WL□-□S-M1J-1<br>Spatter-prevention, Pre-wired Connector Switches<br>WLM□-LD-M1J<br>Long-life, Pre-wired Connector Switches |
| Wiring specification | | Pre-wired connector, 4-conductor.<br>Greatly reduces wiring work.<br>Water-proof to IP67. | WL□-□LD-□GJO3<br>General-purpose, Pre-wired Connector Switches<br>WL□-□S-□GJSO3<br>Spatter-prevention, Pre-wired Connector Switches<br>WLM□-LD-□GJO3<br>Long-life, Pre-wired Connector Switches |

## According to Form of Operation

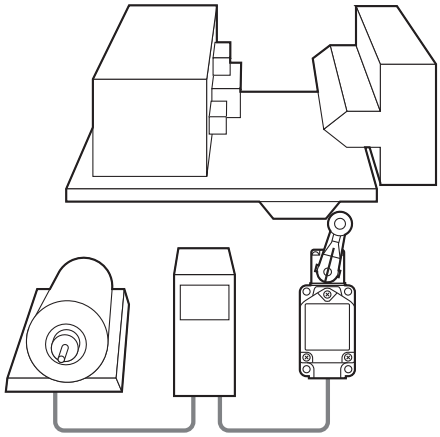
| | Detection object | Key specifications | Models | |
|---|---|---|---|---|
| Operation angles | General |   | WLCA2<br>WLCA2-□S<br>WLMCA2 | General-purpose Switches<br>Spatter-prevention Switches<br>Long-life Switches |
| | Passing dogs |   | WLH2<br>WLH2-□S<br>WLMH2 | General-purpose Switches<br>Spatter-prevention Switches<br>Long-life Switches |
| | Passing dogs, high sensitivity |   | WLG2<br>WLG2-□S<br>WLMG2 | General-purpose Switches<br>Spatter-prevention Switches<br>Long-life Switches |
| | Passing dogs |   | WLCA2-2<br>WLCA2-2N | General-purpose Switches<br>General-purpose Switches |
| | High precision |   | WLGCA2<br>WLGCA2-□S<br>WLMGCA2 | General-purpose Switches<br>Spatter-prevention Switches<br>Long-life Switches |
| Actuators | Dogs and workpieces (Mounts in any of 4 directions) |   ● Short lever<br>● One-Horizontal operation possible. (WLCA□ only)<br>● Head mounts in any of 4 directions. | WL□2<br>WL□2-□S<br>WLM□2 | Roller Lever Actuators<br>Roller Lever Actuators<br>Roller Lever Actuators |
| | |   ● Medium lever<br>● One-Horizontal operation possible. (WLCA□ only)<br>● Head mounts in any of 4 directions. | WL□2-7 | Roller Lever Actuators |
| | |   ● Long lever<br>● One-Horizontal operation possible. (WLCA□ only)<br>● Head mounts in any of 4 directions. | WL□2-8 | Roller Lever Actuators |
| | Adjustable between dog and lever |   ● One-Horizontal operation possible. (WLCA□ only)<br>● Head mounts in any of 4 directions. | WL□12 | Adjustable Roller Lever Actuators |
| | Dogs or workpieces with large deflection |   ● One-Horizontal operation possible. (WLCL only)<br>● Head mounts in any of 4 directions. | WL□L | Adjustable Rod Lever Actuators |
| | |   ● One-Horizontal operation not possible.<br>● Head mounts in any of 4 directions. | WLHAL4 | Adjustable Rod Lever Actuator |
| | |   ● One-Horizontal operation not possible.<br>● Head mounts in any of 4 directions. | WLHAL5 | Rod Spring Lever Actuator |
| | Round-trip operation of passing dogs |  ● Head mounts in any of 4 directions. | WLCA32-41 | Fork Lever Lock Actuator |
| | |  ● Head mounts in any of 4 directions. | WLCA32-42 | Fork Lever Lock Actuator |
| | |  ● Head mounts in any of 4 directions. | WLCA32-43 | Fork Lever Lock Actuator |
| | |  ● Head mounts in any of 4 directions. | WLCA32-44 | Fork Lever Lock Actuator |
| | Cams or workpieces with vertical movement |  | WLD | Top Plunger Actuator |
| | |  ● Head mounts in any of 4 directions. | WLSD | Horizontal Plunger Actuator |
| | |  | WLD3 | Top-ball Plunger Actuator |
| | |  ● Head mounts in any of 4 directions. | WLSD3 | Horizontal-ball Plunger Actuator |
| | |  ● Available in sealed models. (WLD28□) | WLD2<br>WLD28 | Top-roller Plunger Actuator<br>Sealed Top-roller Plunger Actuator |
| | |  | WLSD2 | Horizontal-roller Plunger Actuator |

## Application Examples

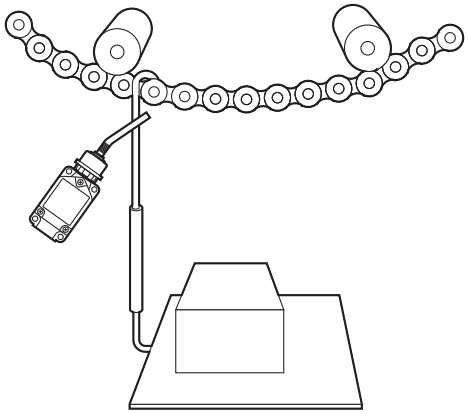
**Positioning on Production Lines**



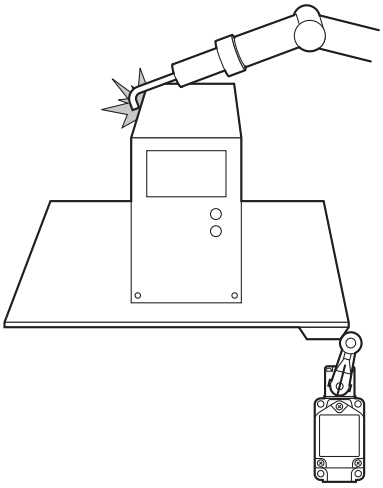
**High-precision Positioning of Machine Tools**



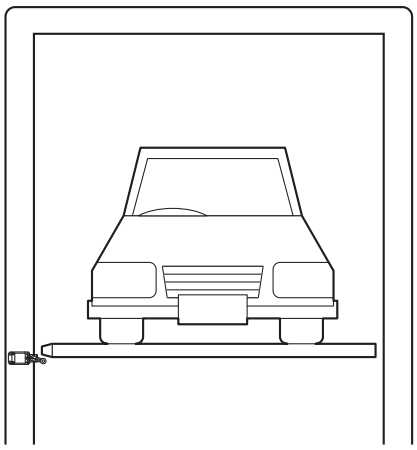
**Positioning on Suspended Conveyors**



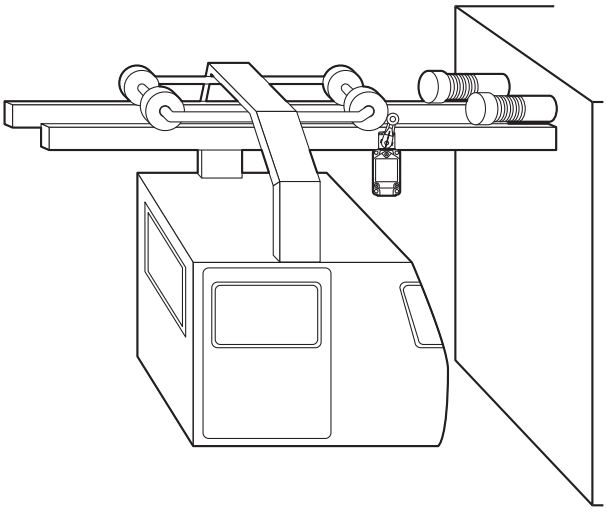
**Pallet Detection in Arc Welding Lines**



**Multilevel Car Parking Towers**



**Limit Detection is Transport Systems**



# Model Number Structure

## Model Number Legend (Not all combinations are possible. Ask your OMRON representative for details.)

### General-purpose and Environment-resistant Switches

WL □□-□□□□□□□□□□
(1) (2) (3) (4) (5) (6) (7) (8) (9)(10)

### (1) Electrical Rating

| | |
|---|---|
| **Blank** | Standard load |
| **01** | Microload |

Note: Dimensions are the same as the standard models.

### (2) Actuator and Head Specifications

| Symbol | Actuator type | Switch without lever |
|---|---|---|
| **CA2** | Roller lever: Standard model R38 | WLRCA2 |
| **CA2-7** | Roller lever: Standard model R50 | WLRCA2 |
| **CA2-8** | Roller lever: Standard model R63 | WLRCA2 |
| **H2** | Roller lever: General-purpose overtravel model, 80° | WLRH2 |
| **G2** | Roller lever: High-sensitivity overtravel, 80° | WLRG2 |
| **CA2-2** | Roller lever: Overtravel, 90° | WLRCA2-2 |
| **CA2-2N** | Roller lever: Overtravel, 90° | WLRCA2-2N |
| **GCA2** | Roller lever: High-precision R38 | WLRGCA2 |
| **CA12** | Adjustable roller lever: Standard | WLRCA2 |
| **H12** | Adjustable roller lever: General-purpose overtravel model, 80° | WLRH2 |
| **G12** | Adjustable roller lever: High-sensitivity overtravel, 80° | WLRG2 |
| **CA12-2** | Adjustable roller lever: Overtravel, 90° | WLRCA2-2 |
| **CA12-2N** | Adjustable roller lever: Overtravel, 90° | WLRCA2-2N |
| **CL** | Adjustable rod lever: Standard, 25 to 140 mm | WLRCL |
| **HL** | Adjustable rod lever: General-purpose overtravel model, 80°, 25 to 140 mm | WLRH2 |
| **HAL4** | Adjustable rod lever: General-purpose overtravel model, 80°, 350 to 380 mm | WLRH2 |
| **GL** | Adjustable rod lever: High-sensitivity overtravel, 80°, 25 to 140 mm | WLRG2 |
| **CL-2** | Adjustable rod lever: Overtravel, 90°, 25 to 140 mm | WLRCA2-2 |
| **CL-2N** | Adjustable rod lever: Overtravel, 90°, 25 to 140 mm | WLRCA2-2N |
| **HAL5** | Rod spring lever: General-purpose overtravel model, 80° | WLRH2 |
| **CA32-41** | Fork lever lock: Maintained, WL-5A100 | WLRCA32 |
| **CA32-42** | Fork lever lock: Maintained, WL-5A102 | WLRCA32 |
| **CA32-43** | Fork lever lock: Maintained, WL-5A104 | WLRCA32 |
| **D** | Plunger: Top plunger | — |
| **D2** | Plunger: Top-roller plunger | — |
| **D28** | Plunger: Sealed top-roller plunger | — |
| **D3** | Plunger: Top-ball plunger | — |
| **SD** | Plunger: Horizontal plunger | — |
| **SD2** | Plunger: Horizontal-roller plunger | — |
| **SD3** | Plunger: Horizontal-ball plunger | — |
| **NJ** | Flexible rod: Coil spring | — |
| **NJ-30** | Flexible rod: Coil spring, multi-wire | — |
| **NJ-2** | Flexible rod: Coil spring, resin rod | — |
| **NJ-S2** | Flexible rod: Steel wire | — |

### (3) Environment-resistant Model Specifications

| | |
|---|---|
| **Blank** | Standard |
| **RP** | Corrosion-proof *1 |
| **P1** | Weather-proof *1 |

Note: Dimensions are the same as the standard models.
*1. Refer to page 4 for applicable models.

### (4) Built-in Switch Type

| | |
|---|---|
| **Blank** | Standard |
| **55** | Hermetically sealed *1 |

Note: Dimensions are the same as the standard models.
*1. Refer to page 4 for applicable models.

### (5) Temperature Specifications

| | |
|---|---|
| **Blank** | Standard: –10°C to +80°C |
| **TH** | Heat-resistant: +5°C to +120°C *1 |
| **TC** | Low-temperature: –40°C to +40°C *1 |

Note: Dimensions are the same as the standard models.
*1. Refer to page 4 for applicable models.

### (7) Conduit Size, Ground Terminal Specifications *2

| | |
|---|---|
| **Blank** | G1/2 without ground terminal |
| **G1** | G1/2 with ground terminal |
| **G** | Pg13.5 with ground terminal |
| **Y** | M20 with ground terminal |
| **TS** | 1/2-14NPT with ground terminal |

Note: Dimensions are the same as the standard models.
*2. Models with ground terminals are approved by EN/IEC (CE marking).

### (6) Hermetic Model Specifications

| | |
|---|---|
| **Blank** | No cables or molding |
| **139** | General-purpose built-in switch with cables attached and molded conduit opening and cover (cover cannot be removed). * |
| **140** | Airtight built-in switch with cables attached and molded conduit opening, cover, and box interior cover screws (cover cannot be removed). * |
| **141** | Airtight built-in switch with cables attached and molded conduit opening, cover, head, box interior, cover screws, and head screws (cover cannot be removed, Head direction cannot be changed). The Head opening is created to protect it from cutting powder. * |
| **145** | Airtight built-in switch with cables attached and molded conduit opening, cover, box interior, and cover screws (cover cannot be removed, Head can be mounted in any of 4 directions). The Head opening is created to protect it from cutting powder. * |
| **RP40** | Airtight built-in switch with cables attached and molded cover and box interior (cover cannot be removed, Head direction can be changed). SC Connector can be removed, so it is possible to use flexible conduits for the cable. * |
| **RP60** | Airtight built-in switch with cables attached, fluorine rubber used, and molded conduit opening, cover, and box interior (cover cannot be removed, Head direction cannot be changed). * |

* Refer to page 4 for applicable models.

### (8) Indicator Type

| Symbol | Element | Voltage | Leakage current |
|---|---|---|---|
| **Blank** | No indicator | | |
| **LE** | Neon lamp | 125 to 250 VAC | Approx. 0.6 to 1.9 mA |
| **LD** | LED | 115 VAC/VDC | Approx. 0.5 mA |
| | | 10 to 24 VAC/VDC | Approx. 0.4 mA |

Note: Dimensions are the same for both LE and LD models.

### (9) Indicator Wiring

| | |
|---|---|
| **2** | NC connection: Light-ON when operating |
| **3** | NO connection: Light-ON when not operating |

Note: Include the indicator wiring specification only when a (6) hermetic seal and (8) operation indicator have been selected.

### (10) Lever Type

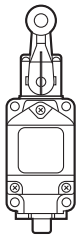
| | |
|---|---|
| **Blank** | Standard lever |
| **A** | Double nut lever |

## General-purpose Switches

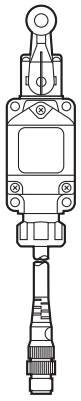
### Sensor I/O Connector Switches

WL □□-□ LD □
(1) (2) (3) (4) (5)

**Direct-wired Connector**



**Pre-wired Connector**



#### (1) Electrical Rating

| | |
|---|---|
| **Blank** | Standard load |
| **01** | Microload |

Note: Dimensions are the same as the standard models.

#### (2) Actuator Type

| | |
|---|---|
| **CA2** | Roller lever: Standard model |
| **GCA2** | Roller lever: High-precision model |
| **H2** | Roller lever: General-purpose overtravel model |
| **G2** | Roller-lever: High-sensitivity over-travel model |
| **D2** | Top-roller plunger |
| **D28** | Sealed top-roller plunger |

#### (3) Built-in Switch Type

| | |
|---|---|
| **Blank** | Standard |
| **55** | Hermetically sealed |

Note: Dimensions are the same as the standard models.

#### (4) Indicator Type

| | |
|---|---|
| **LD** | LED, 10 to 115 VAC/DC |

#### (5) Wiring Specifications

| | |
|---|---|
| **K13A** | Direct-wired Connector (2-conductor: AC, NO wiring, connector pins No. 3, 4) |
| **K13** | Direct-wired Connector (2-conductor: DC, NO wiring, connector pins No. 3, 4) |
| **K43A** | Direct-wired Connector (4-conductor: AC) |
| **K43** | Direct-wired Connector (4-conductor: DC) |
| **-M1J** * | Pre-wired Connector *2 (2-conductor: DC, NO wiring, connector pins No. 3, 4) |
| **-M1GJ** *1 | Pre-wired Connector *2 (2-conductor: DC, NO wiring, connector pins No. 1, 4) |
| **-M1JB** | Pre-wired Connector *2 (2-conductor: DC, NC wiring, connector pins No. 3, 2) |
| **-AGJ03** | Pre-wired Connector *2 (4-conductor, AC) |
| **-DGJ03** *1 | Pre-wired Connector *2 (4-conductor, DC) |
| **-DK1EJ03** *1 | Pre-wired Connector *2 (3-conductor: DC, NO wiring, connector pins No. 2, 3, 4) |

*1. Models with pre-wired connectors and DC specifications have EN/IEC approval (CE marking).
*2. With 0.3-m cable attached.

## Spatter-prevention Switches

WL □□-□□S □
(1) (2) (3) (4) (5)

#### (1) Electrical Rating

| | |
|---|---|
| **Blank** | Standard load |
| **01** | Microload |

Note: Dimensions are the same as the standard models.

#### (2) Actuator Type

| | |
|---|---|
| **CA2** | Roller lever: Standard model |
| **GCA2** | Roller lever: High-precision model |
| **H2** | Roller lever: General-purpose Overtravel model |
| **G2** | Roller lever: High-sensitivity Overtravel model |
| **D28** | Sealed top-roller plunger |

#### (3) Built-in Switch Type

| | |
|---|---|
| **Blank** | Standard |
| **55** | Hermetically sealed |

Note: Dimensions are the same as the standard models.

#### (4) Indicator Type

| | |
|---|---|
| **LD** | LED, AC/DC |
| **LE** | Neon lamp |

Note: Dimensions are the same for both LE and LD models.

#### (5) Wiring Specifications

| | |
|---|---|
| **Blank** | Screw terminal: G1/2 conduit |
| **-M1J-1** *1 | Pre-wired Connector *2 (2-conductor: DC, NO wiring, connector pins No. 3, 4) |
| **-M1GJ-1** *1 | Pre-wired Connector *2 (2-conductor: DC, NO wiring, connector pins No. 1, 4) |
| **-DGJS03** *1 | Pre-wired Connector *2 (4-conductor: DC) |

*1. Models with pre-wired connectors and DC specifications are approved by EN/IEC (CE marking) except for LE Models (Neon Lamp Models).
*2. With 0.3-m cable attached.

## Long-life Switches

WLM□-LD□
(1) (2) (3)

#### (1) Actuator

| | |
|---|---|
| **CA2** | Roller lever: Standard model |
| **GCA2** | Roller lever: High-precision model |
| **H2** | Roller lever: General-purpose overtravel model |
| **G2** | Roller lever: High-sensitivity overtravel model |

#### (2) Indicator Type

| | |
|---|---|
| **LD** | LED, 10 to 115 VAC/DC |

#### (3) Wiring Specifications

| | |
|---|---|
| **Blank** | Screw terminal: G1/2 conduit |
| **K13A** | Direct-wired Connector: 2-conductor, AC |
| **K13** | Direct-wired Connector: 2-conductor, DC |
| **K43A** | Direct-wired Connector: 4-conductor, AC |
| **K43** | Direct-wired Connector: 4-conductor, DC |
| **-M1J** | Pre-wired Connector: 2-conductor, DC * |
| **-AGJ03** | Pre-wired Connector: 4-conductor, AC * |
| **-DGJ03** | Pre-wired Connector: 4-conductor, DC * |

* With 0.3-m cable attached.

# Ordering Information

## General-purpose Switches

### Standard Switches

Note: Models are also available with ground terminals.

**Lever**

| Item | | Actuator | Roller lever R38 | Roller lever R50 | Roller lever R63 |
|---|---|---|---|---|---|
| | | | Model | Model | Model |
| Basic | | Standard load | WLCA2 | WLCA2-7 | WLCA2-8 |
| | | Microload | WL01CA2 | WL01CA2-7 | WL01CA2-8 |
| Overtravel | General-purpose | Standard load | WLH2 | — | — |
| | | Microload | WL01H2 | — | — |
| | High-sensitivity | Standard load | WLG2 | — | — |
| | | Microload | WL01G2 | — | — |
| | 90° operation | Standard load | WLCA2-2 | — | — |
| | | Microload | WL01CA2-2 | — | — |
| | | Standard load | WLCA2-2N | — | — |
| | | Microload | WL01CA2-2N | — | — |
| High-precision | | Standard load | WLGCA2 | — | — |
| | | Microload | WL01GCA2 | — | — |

| Item | | Actuator | Adjustable roller lever | Adjustable rod lever 25 to 140mm | Adjustable rod lever 350 to 380mm | Rod spring lever |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Basic | | Standard load | WLCA12 | WLCL | — | — |
| | | Microload | WL01CA12 | WL01CL | — | — |
| Overtravel | General-purpose | Standard load | WLH12 | WLHL | WLHAL4 | WLHAL5 |
| | | Microload | WL01H12 | WL01HL | — | — |
| | High-sensitivity | Standard load | WLG12 | WLGL | — | — |
| | | Microload | WL01G12 | WL01GL | — | — |
| | 90° operation | Standard load | WLCA12-2 | WLCL-2 | — | — |
| | | Microload | WL01CA12-2 | — | — | — |
| | | Standard load | WLCA12-2N | WLCL-2N | — | — |
| | | Microload | WL01CA12-2N | WL01CL-2N | — | — |

| Item | | Actuator | Fork lever lock (with WL-5A100 plastic roller lever) | Fork lever lock (with WL-5A102 plastic roller lever) | Fork lever lock (with WL-5A104 plastic roller lever) | Fork lever lock (with WL-5A104 plastic roller lever) |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Maintained | | Standard load | WLCA32-41 | WLCA32-42 | WLCA32-43 | WLCA32-44 |
| | | Microload | WL01CA32-41 | — | WL01CA32-43 | WL01CA32-44 |

**Plunger**

| Item | | Actuator | Top plunger | Top-roller plunger | Top-ball plunger | Sealed top-roller plunger |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Top plunger | | Standard load | WLD | WLD2 | WLD3 | WLD28 |
| | | Microload | WL01D | WL01D2 | WL01D3 | WL01D28 |

| Item | | Actuator | Horizontal plunger | Horizontal-roller plunger | Horizontal-ball plunger |
|---|---|---|---|---|---|
| | | | Model | Model | Model |
| Side plunger | | Standard load | WLSD | WLSD2 | WLSD3 |
| | | Microload | WL01SD | WL01SD2 | WL01SD3 |

**Flexible Rod**

| Item | | Actuator | Coil spring (spring diameter: 6.5) | Coil spring (spring diameter: 4.8) | Coil spring (resin rod diameter: 8) | Steel wire (wire diameter: 1) |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Flexible rod | | Standard load | WLNJ | WLNJ-30 | WLNJ-2 | WLNJ-S2 |
| | | Microload | WL01NJ | WL01NJ-30 | WL01NJ-2 | WL01NJ-S2 |

## General-purpose Switches

### Indicator-equipped Switches

**Lever**

| Item | | Actuator | Roller lever R38 | Roller lever R50 | Roller lever R63 | Adjustable roller lever |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Basic | | Neon lamp | WLCA2-LE | WLCA2-7LE | WLCA2-8LE | WLCA12-LE |
| | | LED | WLCA2-LD | WLCA2-7LD | WLCA2-8LD | WLCA12-LD |
| Overtravel | General-purpose | Neon lamp | WLH2-LE | — | — | WLH12-LE |
| | | LED | WLH2-LD | — | — | WLH12-LD |
| | High-sensitivity | Neon lamp | WLG2-LE | — | — | WLG12-LE |
| | | LED | WLG2-LD | — | — | WLG12-LD |
| | 90° operation | Neon lamp | WLCA2-2LE | — | — | WLCA12-2LE |
| | | LED | WLCA2-2LD | — | — | WLCA12-2LD |
| | | Neon lamp | WLCA2-2NLE | — | — | WLCA12-2NLE |
| | | LED | WLCA2-2NLD | — | — | WLCA12-2NLD |
| High-precision | | Neon lamp | WLGCA2-LE | — | — | — |
| | | LED | WLGCA2-LD | — | — | — |

| Item | | Actuator | Adjustable rod lever 25 to 140 mm | Adjustable rod lever 350 to 380 mm | Rod spring lever |
|---|---|---|---|---|---|
| | | | Model | Model | Model |
| Basic | | Neon lamp | WLCL-LE | — | — |
| | | LED | WLCL-LD | — | — |
| Overtravel | General-purpose | Neon lamp | WLHL-LE | WLHAL4-LE | WLHAL5-LE |
| | | LED | WLHL-LD | WLHAL4-LD | WLHAL5-LD |
| | High-sensitivity | Neon lamp | WLGL-LE | — | — |
| | | LED | WLGL-LD | — | — |
| | 90° operation | Neon lamp | WLCL-2LE | — | — |
| | | LED | WLCL-2LD | — | — |
| | | Neon lamp | WLCL-2NLE | — | — |
| | | LED | WLCL-2NLD | — | — |

| Item | | Actuator | Fork lever lock (with WL-5A100 Plastic Roller Lever) | Fork lever lock (with WL-5A102 Plastic Roller Lever) | Fork lever lock (with WL-5A104 Plastic Roller Lever) |
|---|---|---|---|---|---|
| | | | Model | Model | Model |
| Maintained | | Neon lamp | WLCA32-41LE | WLCA32-42LE | WLCA32-43LE |
| | | LED | WLCA32-41LD | — | WLCA32-43LD |

**Plunger**

| Item | | Actuator | Top plunger | Top-roller plunger | Top-ball plunger | Sealed top-roller plunger |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Top plunger | | Neon lamp | WLD-LE | WLD2-LE | WLD3-LE | WLD28-LE |
| | | LED | WLD-LD | WLD2-LD | WLD3-LD | WLD28-LD |

| Item | | Actuator | Horizontal plunger | Horizontal-roller plunger | Horizontal-ball plunger |
|---|---|---|---|---|---|
| | | | Model | Model | Model |
| Side plunger | | Neon lamp | WLSD-LE | WLSD2-LE | WLSD3-LE |
| | | LED | WLSD-LD | WLSD2-LD | WLSD3-LD |

**Flexible Rod**

| Item | | Actuator | Coil spring (spring diameter: 6.5) | Coil spring (spring diameter: 4.8) | Coil spring (resin rod diameter: 8) | Steel wire (wire diameter: 1) |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Flexible rod | | Neon lamp | WLNJ-LE | WLNJ-30LE | WLNJ-2LE | WLNJ-S2LE |
| | | LED | WLNJ-LD | WLNJ-30LD | WLNJ-2LD | WLNJ-S2LD |

## General-purpose Switches

### Sensor I/O Connector Switches

#### Direct-wired Connectors

| Actuator | Wiring | | | | Built-in switch specification | Basic | Overtravel | | High-precision |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | General-purpose | High-sensitivity | |
| | | | | | | Model | Model | Model | Model |
| Roller lever  | 2-conductor | DC | NO | connector pins No. 3, 4 | Standard | WLCA2-LDK13 | WLH2-LDK13 | WLG2-LDK13 | WLGCA2-LDK13 |
| | | | | | Airtight seal | WLCA2-55LDK13 | WLH2-55LDK13 | WLG2-55LDK13 | WLGCA2-55LDK13 |
| | 4-conductor | DC | | | Standard | WLCA2-LDK43 | WLH2-LDK43 | WLG2-LDK43 | WLGCA2-LDK43 |
| | | | | | Airtight seal | WLCA2-55LDK43 | WLH2-55LDK43 | WLG2-55LDK43 | WLGCA2-55LDK43 |
| Top-roller plunger  | 2-conductor | DC | NO | connector pins No. 3, 4 | Standard | WLD2-LDK13 | — | — | — |
| | | | | | Airtight seal | WLD2-55LDK13 | — | — | — |
| | 4-conductor | DC | | | Standard | WLD2-LDK43 | — | — | — |
| | | | | | Airtight seal | WLD2-55LDK43 | — | — | — |

#### Pre-wired Connectors

| Actuator | Wiring | | | | Built-in switch specification | Basic | Overtravel | | High-precision |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | General-purpose | High-sensitivity | |
| | | | | | | Model | Model | Model | Model |
| Roller lever  | 2-conductor | DC | NO | connector pins No. 3, 4 | Standard | WLCA2-LD-M1J | WLH2-LD-M1J | WLG2-LD-M1J | WLGCA2-LD-M1J |
| | | | | | Airtight seal | WLCA2-55LD-M1J | — | — | WLGCA2-55LD-M1J |
| | | | | connector pins No. 1, 4 | Standard | WLCA2-LD-M1GJ | WLH2-LD-M1GJ | WLG2-LD-M1GJ | WLGCA2-LD-M1GJ |
| | | | | | Airtight seal | WLCA2-55LD-M1GJ | — | WLG2-55LD-M1GJ | — |
| | | | NC | connector pins No. 3, 2 | Standard | — | — | WLG2-LD-M1JB | — |
| | | | | | Airtight seal | WLCA2-55LD-M1JB | — | WLG2-55LD-M1JB | WLGCA2-55LD-M1JB |
| | 4-conductor | DC | | | Standard | WLCA2-LD-DGJ03 | WLH2-LD-DGJ03 | WLG2-LD-DGJ03 | — |
| | | | | | Airtight seal | WLCA2-55LD-DGJ03 | — | WLG2-55LD-DGJ03 | WLGCA2-55LD-DGJ03 |
| | 3-conductor | DC | | connector pins No. 2, 3, 4 | Standard | WLCA2-LD-DK1EJ03 | — | WLG2-LD-DK1EJ03 | — |
| | | | | | Airtight seal | WLCA2-55LD-DK1EJ03 | — | WLG2-55LD-DK1EJ03 | — |
| Top-roller plunger  | 2-conductor | DC | NO | connector pins No. 3, 4 | Standard | WLD2-LD-M1J | — | — | — |
| | | | | | Airtight seal | WLD2-55LD-M1J | — | — | — |
| | | | | connector pins No. 1, 4 | Standard | WLD2-LD-M1GJ | — | — | — |
| | | | | | Airtight seal | WLD2-55LD-M1GJ | — | — | — |
| | | | NC | connector pins No. 3, 2 | Standard | — | — | — | — |
| | | | | | Airtight seal | WLD2-55LD-M1JB | — | — | — |
| | 4-conductor | DC | | | Standard | WLD2-LD-DGJ03 | — | — | — |
| | | | | | Airtight seal | — | — | — | — |
| | 3-conductor | DC | | connector pins No. 2, 3, 4 | Standard | WLD2-LD-DK1EJ03 | — | — | — |
| | | | | | Airtight seal | WLD2-55LD-DK1EJ03 | — | — | — |

## Environment-resistant Switches

Note: Models are also available with ground terminals.

| Item | | | Actuator | | Roller lever R38 | | |
|---|---|---|---|---|---|---|---|
| | | | | | Basic | Overtravel | |
| | | | | | | General-purpose | High-sensitivity |
| | | | | | Model | Model | Model |
| Airtight seal | | | No indicator | | WLCA2-55 | WLH2-55 | WLG2-55 |
| | | | Indicator | LED | WLCA2-55LD | WLH2-55LD | WLG2-55LD |
| | | | | Neon | WLCA2-55LE | WLH2-55LE | WLG2-55LE |
| Hermetic seal | Molded terminals | -139 | No indicator | | WLCA2-139 | WLH2-139 | WLG2-139 |
| | | | Indicator | NC wiring | WLCA2-139LD2 | — | — |
| | | | | NO wiring | WLCA2-139LD3 | — | WLG2-139LD3 |
| | | -140 | No indicator | | WLCA2-140 | WLH2-140 | WLG2-140 |
| | | | Indicator | NC wiring | WLCA2-140LD2 | — | WLG2-140LD2 |
| | | | | NO wiring | WLCA2-140LD3 | — | WLG2-140LD3 |
| | | -141 | No indicator | | WLCA2-141 | WLH2-141 | WLG2-141 |
| | | | Indicator | NC wiring | WLCA2-141LD2 | — | WLG2-141LD2 |
| | | | | NO wiring | WLCA2-141LD3 | WLH2-141LD3 | WLG2-141LD3 |
| | Anti-coolant | | No indicator | | WLCA2-RP60 | WLH2-RP60 | WLG2-RP60 |
| | | | Indicator | NC wiring | WLCA2-RP60LD2 | — | WLG2-RP60LD2 |
| | | | | NO wiring | WLCA2-RP60LD3 | WLH2-RP60LD3 | WLG2-RP60LD3 |
| Heat-resistant | | | No indicator | | WLCA2-TH | WLH2-TH | WLG2-TH |
| Low-temperature | | | | | WLCA2-TC | WLH2-TC | WLG2-TC |
| Corrosion-proof | | | | | WLCA2-RP | WLH2-RP | WLG2-RP |
| Weather-proof | | | | | WLCA2-P1 | WLH2-P1 | WLG2-P1 |

| Item | | | Actuator | | Roller lever R38 | | |
|---|---|---|---|---|---|---|---|
| | | | | | Overtravel | | High-precision |
| | | | | | 90° (-2 model) | 90° (-2N model) | |
| | | | | | Model | Model | Model |
| Airtight seal | | | No indicator | | WLCA2-255 | WLCA2-2N55 | WLGCA2-55 |
| | | | Indicator | LED | WLCA2-255LD | WLCA2-2N55LD | WLGCA2-55LD |
| | | | | Neon | WLCA2-255LE | WLCA2-2N55LE | WLGCA2-55LE |
| Hermetic seal | Molded terminals | -139 | No indicator | | WLCA2-2139 | WLCA2-2N139 | WLGCA2-139 |
| | | | Indicator | NC wiring | WLCA2-2139LD2 | — | WLGCA2-139LD2 |
| | | | | NO wiring | WLCA2-2139LD3 | — | WLGCA2-139LD3 |
| | | -140 | No indicator | | — | WLCA2-2N140 | WLGCA2-140 |
| | | | Indicator | NC wiring | — | — | WLGCA2-140LD2 |
| | | | | NO wiring | — | — | WLGCA2-140LD3 |
| | | -141 | No indicator | | — | — | WLGCA2-141 |
| | | | Indicator | NC wiring | — | — | — |
| | | | | NO wiring | — | — | WLGCA2-141LD3 |
| | Anti-coolant | | No indicator | | WLCA2-2RP60 | — | WLGCA2-RP60 |
| | | | Indicator | NC wiring | WLCA2-2RP60LD2 | — | WLGCA2-RP60LD2 |
| | | | | NO wiring | WLCA2-2RP60LD3 | — | WLGCA2-RP60LD3 |
| Heat-resistant | | | No indicator | | WLCA2-2TH | WLCA2-2NTH | WLGCA2-TH |
| Low-temperature | | | | | WLCA2-2TC | WLCA2-2NTC | WLGCA2-TC |
| Corrosion-proof | | | | | — | — | WLGCA2-RP |

| Item | | | | Actuator | Adjustable roller lever | | |
|---|---|---|---|---|---|---|---|
| | | | | | Basic | Overtravel | |
| | | | | | | General-purpose | High-sensitivity |
| | | | | | Model | Model | Model |
| Airtight seal | | | No indicator | | WLCA12-55 | — | — |
| | | | Indicator | LED | WLCA12-55LD | — | — |
| | | | | Neon | WLCA12-55LE | — | — |
| Hermetic seal | Molded terminals | -139 | No indicator | | WLCA12-139 | — | — |
| | | -140 | | | WLCA12-140 | — | — |
| | | -141 | | | WLCA12-141 | — | — |
| | Anti-coolant | | | | WLCA12-RP60 | — | — |
| Heat-resistant | | | No indicator | | WLCA12-TH | WLH12-TH | WLG12-TH |
| Low-temperature | | | | | WLCA12-TC | WLH12-TC | WLG12-TC |
| Corrosion-proof | | | | | WLCA12-RP | WLH12-RP | WLG12-RP |
| Weather-proof | | | | | WLCA12-P1 | WLH12-P1 | WLG12-P1 |

| Item | | Actuator | Adjustable roller lever | |
|---|---|---|---|---|
| | | | Overtravel | |
| | | | 90° (-2 model) | 90° (-2N model) |
| | | | Model | Model |
| Heat-resistant | | No indicator | WLCA12-2TH | WLCA12-2NTH |
| Low-temperature | | | WLCA12-2TC | WLCA12-2NTC |

| Item | | | | Actuator | Adjustable rod lever 25 to 140 mm | | |
|---|---|---|---|---|---|---|---|
| | | | | | Basic | Overtravel | |
| | | | | | | General-purpose | High-sensitivity |
| | | | | | Model | Model | Model |
| Airtight seal | | | No indicator | | WLCL-55 | — | — |
| | | | Indicator | LED | WLCL-55LD | — | — |
| | | | | Neon | — | — | — |
| Hermetic seal | Molded terminals | -139 | No indicator | | WLCL-139 | — | — |
| | | -140 | | | WLCL-140 | — | — |
| | | -141 | | | — | — | — |
| | Anti-coolant | | | | WLCL-RP60 | — | — |
| Heat-resistant | | | No indicator | | WLCL-TH | WLHL-TH | WLGL-TH |
| Low-temperature | | | | | WLCL-TC | WLHL-TC | WLGL-TC |
| Corrosion-proof | | | | | WLCL-RP | WLHL-RP | WLGL-RP |
| Weather-proof | | | | | WLCL-P1 | WLHL-P1 | WLGL-P1 |

| Item | | Actuator | Adjustable rod lever 25 to 140 mm | |
|---|---|---|---|---|
| | | | Overtravel | |
| | | | 90° (-2 model) | 90° (-2N model) |
| | | | Model | Model |
| Heat-resistant | | No indicator | WLCL-2TH | WLCL-2NTH |
| Low-temperature | | | WLCL-2TC | WLCL-2NTC |
| Corrosion-proof | | | WLCL-2RP | — |

| Item | Actuator | | | Top-roller plunger  | Sealed top-roller plunger  | Horizontal plunger  |
|---|---|---|---|---|---|---|
| | | | | Model | Model | Model |
| Airtight seal | | No indicator | | WLD2-55 | WLD28-55 | WLSD-55 |
| | | Indicator | LED | WLD2-55LD | WLD28-55LD | WLSD-55LD |
| | | | Neon | WLD2-55LE | WLD28-55LE | — |
| Hermetic seal | Molded terminals | -139 | No indicator | WLD2-139 | WLD28-139 | WLSD-139 |
| | | -140 | | — | WLD28-140 | — |
| | Anti-coolant | | | WLD2-RP60 | WLD28-RP60 | WLSD-RP60 |
| Heat-resistant | | | No indicator | WLD2-TH | WLD28-TH | WLSD-TH |
| Low-temperature | | | | WLD2-TC | — | WLSD-TC |
| Corrosion-proof | | | | WLD2-RP | WLD28-RP | WLSD-RP |

Note: The standard cable length for models with airtight seals is 5 m.

| Item | Actuator | | | Horizontal-roller plunger  | Coil spring (spring diameter: 6.5)  | Coil spring (resin rod diameter: 8)  |
|---|---|---|---|---|---|---|
| | | | | Model | Model | Model |
| Airtight seal | | No indicator | | WLSD2-55 | WLNJ-55 | WLNJ-255 |
| | | Indicator | LED | WLSD2-55LD | WLNJ-55LD | WLNJ-255LD |
| | | | Neon | — | — | — |
| Hermetic seal | Molded terminals | -139 | No indicator | WLSD2-139 | WLNJ-139 | — |
| | | -140 | | WLSD2-140 | WLNJ-140 | WLNJ-2140 |
| | Anti-coolant | | | WLSD2-RP60 | WLNJ-RP60 | WLNJ-2RP60 |
| Heat-resistant | | | No indicator | WLSD2-TH | WLNJ-TH | — |
| Low-temperature | | | | WLSD2-TC | WLNJ-TC | WLNJ-2TC |
| Corrosion-proof | | | | WLSD2-RP | WLNJ-RP | WLNJ-2RP |

Note: The standard cable length for models with airtight seals is 5 m.

## Spatter-prevention Switches

| Item | | | Actuator: Roller lever — Double nut lever | Roller lever — Allen-head lever | Sealed top-roller plunger |
|---|---|---|---|---|---|
| | | | Model | Model | Model |
| Neon lamp operation indicator | Basic | | WLCA2-LEAS | WLCA2-LES | WLD28-LES |
| | Overtravel | General-purpose | WLH2-LEAS | WLH2-LES | — |
| | | High-sensitivity | WLG2-LEAS | WLG2-LES | — |
| | High-precision | | — | WLGCA2-LES | — |
| LED operation indicator | Basic | | WLCA2-LDAS | WLCA2-LDS | WLD28-LDS |
| | Overtravel | General-purpose | WLH2-LDAS | WLH2-LDS | — |
| | | High-sensitivity | WLG2-LDAS | WLG2-LDS | — |
| | High-precision | | — | WLGCA2-LDS | — |

Note: Ask your OMRON representative about WL01□-□S Microload Switches.

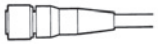
## Long-life Switches

| Actuator | | | Item: LED operation indicator *1 — Basic | Overtravel: General-purpose | Overtravel: High-sensitivity | High-precision |
|---|---|---|---|---|---|---|
| | | | Model | Model | Model | Model |
| Roller lever, screw terminal | | | WLMCA2-LD | WLMH2-LD | WLMG2-LD | WLMGCA2-LD |
| Roller lever, direct-wired connector | 2-conductor | AC | WLMCA2-LDK13A | WLMH2-LDK13A | WLMG2-LDK13A | WLMGCA2-LDK13A |
| | | DC | WLMCA2-LDK13 | WLMH2-LDK13 | WLMG2-LDK13 | WLMGCA2-LDK13 |
| | 4-conductor | AC | WLMCA2-LDK43A | WLMH2-LDK43A | WLMG2-LDK43A | WLMGCA2-LDK43A |
| | | DC | WLMCA2-LDK43 | WLMH2-LDK43 | WLMG2-LDK43 | WLMGCA2-LDK43 |
| Roller lever, pre-wired connector *2 | 2-conductor | DC | WLMCA2-LD-M1J | WLMH2-LD-M1J | WLMG2-LD-M1J | WLMGCA2-LD-M1J |
| | 4-conductor | DC | WLMCA2-LD-DGJ03 | WLMH2-LD-DGJ03 | WLMG2-LD-DGJ03 | — |

*1. The default setting is “light-ON when not operating.”
Turn the lamp holder by 180° to change the setting to “light-ON when operating”. (Ask your OMRON representative about 2-conductor models.)
*2. With 0.3-m cable attached.

## Connecting Cables

Straight Cable



| Voltage specification | Number of conductors | Cable length | Model |
|---|---|---|---|
| AC | 2 | 2 m | XS2F-A421-DB0-F |
| | | 5 m | XS2F-A421-GB0-F |
| | 4 | 2 m | XS2F-A421-D90-F |
| | | 5 m | XS2F-A421-G90-F |
| DC | 2 | 2 m | XS2F-D421-DD0 |
| | | 5 m | XS2F-D421-GD0 |
| | 4 | 2 m | XS2F-D421-D80-F |
| | | 5 m | XS2F-D421-G80-F |

## Individual Parts

### Heads

| Actuator type | Set model | Head model (with Actuator) |
|---|---|---|
| Roller lever  | WLCA2 | **WL-1H1100** |
| | WLG2 | **WL-2H1100** |
| | WLH2 | **WL-2H1100-1** * |
| | WLCA2-2 | **WL-3H1100** |
| | WLCA2-2N | **WL-6H1100** |
| Adjustable roller lever  | WLCA12 | **WL-1H2100** |
| | WLG12 | **WL-2H2100** |
| | WLH12 | **WL-2H2100-1** * |
| | WLCA12-2 | **WL-3H2100** |
| | WLCA12-2N | **WL-6H2100** |
| Adjustable rod lever  | WLCL | **WL-4H4100** |
| | WLGL | **WL-2H4100** |
| | WLCL-2 | **WL-3H4100** |
| | WLCL-2N | **WL-6H4100** |

| Actuator type | Set model | Head model (with Actuator) |
|---|---|---|
| Top plunger  | WLD | **WL-7H100** |
| | WLD2 | **WL-7H200** |
| | WLD3 | **WL-7H300** |
| | WLD28 | **WL-7H400** |
| Horizontal plunger  | WLSD | **WL-8H100** |
| | WLSD2 | **WL-8H200** |
| | WLSD3 | **WL-8H300** |
| Fork lever lock  | WLCA32-41 | **WL-5H5100** |
| | WLCA32-42 | **WL-5H5102** |
| | WLCA32-43 | **WL-5H5104** |
| | WLCA32-44 | **WL-5H5104** |
| Coil spring  | WLNJ | **WL-9H100** |
| | WLNJ-30 | **WL-9H200** |
| | WLNJ-2 | **WL-9H300** |
| | WLNJ-S2 | **WL-9H400** |

* The model number of Heads without levers are same as those of Heads with levers without the numbers at the end.
Example: WL-1H1100 becomes WL-1H without the lever.
However, the WLH2 and WLH12 become WL-2H-1 and the WLGCA2 becomes WL-1H-1 for the Heads without levers.
Other Heads are also available. Ask your OMRON representative.

### Switches without levers

| Actuator type | | Switches without levers  |
|---|---|---|
| | | Model |
| Switches for roller levers  | Basic R38 | **WLRCA2** |
| | High-precision R38 | **WLRGCA2** |
| | High-sensitivity overtravel, 80° | **WLRG2** |
| | General-purpose overtravel, 80° | **WLRH2** |
| | Overtravel, 90° operation | **WLRCA2-2** |
| | Overtravel, 90° operation | **WLRCA2-2N** |
| Switches for adjustable roller levers  | Basic | **WLRCA2** |
| | High-sensitivity overtravel, 80° | **WLRG2** |
| | General-purpose overtravel, 80° | **WLRH2** |
| | Overtravel, 90° operation | **WLRCA2-2** |
| | Overtravel, 90° operation | **WLRCA2-2N** |
| Switches for adjustable rod lever  | Basic, 25 to 140 mm | **WLRCL** |
| | High-sensitivity overtravel, 80°, 25 to 140 mm | **WLRG2** |
| | Overtravel, 90° operation, 25 to 140 mm | **WLRCA2-2** |
| | Overtravel, 90° operation, 25 to 140 mm | **WLRCA2-2N** |
| Switches for top plungers  | — | — |
| Switches for horizontal plungers  | — | — |
| Switches for fork lever locks  | Maintained, WL-5A100<br>Maintained, WL-5A102<br>Maintained, WL-5A104 | **WLRCA32** |
| Switches for coil springs  | — | — |

### Covers with Operation Indicators

| Cover | Cover only with indicator  |
|---|---|
| Item | Model |
| Neon lamp | **WL-LE** |
| LED | **WL-LD** |

Note: The default setting is "light-ON when not operating."
Turn the lamp holder by 180° to change the setting to "light-ON when operating."

**Spatter-prevention Products**

**Head (with actuator)**

| Complete Heads with allen-head levers | Double Nut Lever |
|---|---|
| Model | Model |
| **WL-1H1100S** (for WLCA2-□ or WLGCA2-□) | **WL-2H1100S** (for WLH2-□ or WLG2-□) |

**Lever**

| Allen-head Lever | Double Nut Lever |
|---|---|
| Model | Model |
| **WL-1A103S** Roller lever | **WL-1A105S** Roller Lever |

**Cover with indicator**

| Cover with Indicator |
|---|
| Model |
| Neon lamp **WL-LES** |
| LED (LED) **WL-LDS** |

**Switches without Levers**

| Switches without levers |
|---|
| Model |
| **WLRCA2-LDS** |
| **WLRH2-LES** **WLRH2-LDS** |
| **WLRG2-LDS** |
| **WLRGCA2-LES** |

## WL Head Replacement

Heads can be replaced within the same model group. They cannot be replaced between different model groups.

| Group No. | Set model number | Head model number (with Actuator) |
|---|---|---|
| 1 | WLCA2 | **WL-1H1100** |
| | WLCA2-7 | **WL-1H1200** |
| | WLCA2-8 | **WL-1H1300** |
| | WLCA12 | **WL-1H2100** |
| 2 | WLCL | **WL-4H4100** * |
| 3 | WLH2 | **WL-2H1100-1** |
| | WLH12 | **WL-2H2100-1** |
| | WLHL | **WL-2H4100** |
| | WLHAL4 | **WL-2H4106** |
| | WLHAL5 | **WL-2H4107** |
| 4 | WLCA2-2N | **WL-6H1100** |
| | WLCA12-2N | **WL-6H2100** |
| | WLCL-2N | **WL-6H4100** |
| 5 | WLCA2-2 | **WL-3H1100** |
| | WLCA12-2 | **WL-3H2100** |
| | WLCL-2 | **WL-3H4100** |
| 6 | WLG2 | **WL-2H1100** |
| | WLG12 | **WL-2H2100** |
| | WLGL | **WL-2H4100** |
| 7 | WLCA32-41 | **WL-5H5100** |
| | WLCA32-42 | **WL-5H5102** |
| | WLCA32-43 | **WL-5H5104** |
| | WLCA32-44 | **WL-5H5104** |
| 8 | WLD | **WL-7H100** |
| | WLD2 | **WL-7H200** |
| | WLD3 | **WL-7H300** |
| 9 | WLD28 | **WL-7H400** * |
| 10 | WLSD | **WL-8H100** |
| | WLSD2 | **WL-8H200** |
| | WLSD3 | **WL-8H300** |
| 11 | WLNJ | **WL-9H100** |
| | WLNJ-30 | **WL-9H200** |
| 12 | WLNJ-2 | **WL-9H300** * |
| 13 | WLNJ-S2 | **WL-9H400** * |

* This Heads are special and must be used. Do not use any other Head.

# Specifications

## Approved Standards

| Agency | Standard | File No. | Approved models |
|---|---|---|---|
| UL | UL508 | E76675 | Contact your OMRON representative for information on approved models. |
| CSA | CSA C22.2 No.14 | LR45746 | |
| TÜV Rheinland | EN60947-5-1 | J50022353, J9950023, J9950959 | |
| CCC (CQC) | GB14048.5 | 2004010305128675 | |

## General-purpose/Weather-proof Switches

# Ratings

### Standard-load Switches

| Item / Model | Rated voltage (V) | Non-inductive load (A) | | | | Inductive load (A) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Resistive load | | Lamp load | | Inductive load | | Motor load | |
| | | NC | NO | NC | NO | NC | NO | NC | NO |
| Basic models, overtravel models (except for high-sensitivity models), and high-precision models | 125 VAC | 10 | | 3 | 1.5 | 10 | | 5 | 2.5 |
| | 250 VAC | 10 | | 2 | 1 | 10 | | 3 | 1.5 |
| | 500 VAC | 10 | | 1.5 | 0.8 | 3 | | 1.5 | 0.8 |
| | 8 VDC | 10 | | 6 | 3 | 10 | | 6 | |
| | 14 VDC | 10 | | 6 | 3 | 10 | | 6 | |
| | 30 VDC | 6 | | 4 | 3 | 6 | | 4 | |
| | 125 VDC | 0.8 | | 0.2 | 0.2 | 0.8 | | 0.2 | |
| | 250 VDC | 0.4 | | 0.1 | 0.1 | 0.4 | | 0.1 | |
| High-sensitivity overtravel models | 125 VAC | 5 | | — | | — | | — | |
| | 250 VAC | 5 | | | | | | | |
| | 125 VDC | 0.4 | | — | | — | | — | |
| | 250 VDC | 0.2 | | | | | | | |

| Inrush current | | |
|---|---|---|
| | NC | 30 A max. (15 A max. *) |
| | NO | 20 A max. (10 A max. *) |

* For high-sensitivity overtravel models.

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. A lamp load has an inrush current of 10 times the steady-state current.
4. A motor load has an inrush current of 6 times the steady-state current.
5. For PC loads, use the microload models.

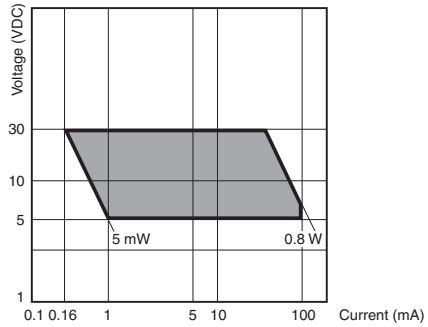
| Minimum applicable load | 5 VDC 160 mA |
|---|---|

### Microload Switches (Refer to these ratings before using the product.)

| Rated voltage (V) | Rated current (A) - Resistive load |
|---|---|
| AC 125 | 0.1 |
| DC 30 | |

Operation in the following ranges will produce optimum performance.

| Recommended load range | 5 to 30 VDC<br>0.5 to 100 mA |
|---|---|




| Recommended load range | 5 VDC 1 mA |
|---|---|

# Approved Standard Ratings

### UL/CSA

### Standard-load Switches: A600, NEMA

| Rated voltage | Carry current | Current (A) | | Volt-amperes (VA) | |
|---|---|---|---|---|---|
| | | Make | Break | Make | Break |
| 120 VAC | 10 A | 60 | 6 | 7,200 | 720 |
| 240 VAC | | 30 | 3 | | |
| 480 VAC | | 15 | 1.5 | | |
| 600 VAC | | 12 | 1.2 | | |

### Microload Switches

0.1 A 125 VAC, 0.1 A 30 VDC

### TÜV (EN60947-5-1) (Only models with ground terminals are approved.)

| Model | Application category and ratings | Thermal current ($I_{the}$) | Indicator |
|---|---|---|---|
| WL□ | AC-15: 2 A/250 V<br>DC-12: 2 A/48 V | 10 A | — |
| WL01□ | AC-14: 0.1 A/125V<br>DC-12: 0.1 A/48 V | 0.5 A | — |
| WL□-LE | AC-15: 2 A/250 V | 10 A | Neon lamp |
| WL01□-LE | AC-14: 0.1 A/125 V | 0.5 A | Neon lamp |
| WL□-LD | AC-15: 2 A/115 V<br>DC-12: 2 A/48 V | 10 A | LED |
| WL01□-LD | AC-14: 0.1 A/115 V<br>DC-12: 0.1 A/48 V | 0.5 A | LED |

Note: As an example, AC-15: 2 A/250 V means the following:

| Application category | AC-15 |
|---|---|
| Rated operating current (Ie) | 2A |
| Rated operating voltage (Ue) | 250V |

## Indicator-equipped Switches

| Model | Item | Max. rated voltage (V) | Leakage current (mA) |
|---|---|---|---|
| WL-LE | Neon lamp | 125 AC | Approx. 0.6 |
| | | 250 AC | Approx. 1.9 |
| WL-LD | LED | 115 AC/DC | Approx. 0.5 |
| | | 10 to 24 AC/DC | Approx. 0.4 |

# Characteristics

| | | |
|---|---|---|
| Degree of protection | | IP67 |
| Durability *1 | Mechanical | 15,000,000 operations min. *2 |
| | Electrical | 750,000 operations min. *3 |
| Operating speed | | 1 mm/s to 1 m/s (in case of WLCA2) |
| Operating frequency | Mechanical | 120 operations/minute min. |
| | Electrical | 30 operations/minute min. |
| Rated frequency | | 50/60 Hz |
| Insulation resistance | | 100 MΩ min. (at 500 VDC) |
| Contact resistance | | 25 mΩ max. (initial value for the built-in switch when tested alone) *6 |
| Dielectric strength | Between terminals of the same polarity | 1,000 VAC (600 VAC), 50/60 Hz for 1 min |
| | Between current-carrying metal part and ground | 2,200 VAC (1,500 VAC), 50/60 Hz for 1 min/Uimp 2.5 kV |
| | Between each terminal and non-current-carrying metal part | 2,200 VAC (1,500 VAC), 50/60 Hz for 1 min/Uimp 2.5 kV |
| Rated insulation voltage (Ui) | | 250 V (EN60947-5-1) |
| Pollution degree (operating environment) | | 3 (EN60947-5-1) |
| Short-circuit protective device (SCPD) | | 10 A, fuse type gG or gI (IEC60269) |
| Conditional short-circuit current | | 100 A (EN60947-5-1) |
| Conventional enclosed thermal current (Ithe) | | 10 A, 0.5 A (EN60947-5-1) |
| Protection against electric shock | | Class I |
| Vibration resistance | Malfunction | 10 to 55 Hz, 1.5-mm double amplitude *4 |
| Shock resistance | Destruction | 1,000 m/s² max. |
| | Malfunction | 300 m/s² max. *4 |
| Ambient operating temperature | | –10°C to +80°C (with no icing) *5 |
| Ambient operating humidity | | 35% to 95% RH |
| Weight | | Approx. 275 g (in case of WLCA2) |

Note: 1. The above figures are initial values.
2. The figures in parentheses for dielectric strength are those for the high-sensitivity overtravel models.

*1. The values are calculated at an operating temperature of +5°C to +35°C and an operating humidity of 40% to 70%RH. Contact your OMRON sales representative for more detailed information on other operating environments.
*2. Durability is 10,000,000 operations min. for general-purpose or high-sensitivity overtravel models, and for flexible rod models.
500,000 operations min. for weather-proof models.
*3. Durability is 500,000 operations min. for high-sensitivity models. All microload models are 1,000,000 operations min.
500,000 operations min. for weather-proof models.
*4. Except flexible rod models. The shock resistance (malfunction) for microload models is 200 m/s² max.
*5. For low-temperature models this is –40°C to +40°C (with no icing). For heat-resistant models the range is +5°C to +120°C.
*6. For microload models, the contact resistance is 50 mΩ max. (initial value for built-in switch).

## Spatter-prevention Switches

### Ratings

#### Screw terminals

| Item / Model | Rated voltage (V) | Non-inductive load (A) | | | | Inductive load (A) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Resistive load | | Lamp load | | Inductive load | | Motor load | |
| | | NC | NO | NC | NO | NC | NO | NC | NO |
| WL□-LES | 125 VAC | 10 | | 3 | 1.5 | 10 | | 5 | 2.5 |
| | 250 VAC | 10 | | 2 | 1 | 10 | | 3 | 1.5 |
| WL□-LDS | 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 | |

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. A lamp load has an inrush current of 10 times the steady-state current.
4. A motor load has an inrush current of 6 times the steady-state current.

| | | |
|---|---|---|
| Inrush current | NC | 30 A max. |
| | NO | 20 A max. |
| Operating temperature | | –10°C to +80°C (with no icing) |
| Operating humidity | | 35% to 95%RH max. |

### Approved Standard Ratings

#### UL/CSA

**LE Switches (Neon lamp): A300**

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

**LD Switches (LED)**

| Rated voltage | Carry current |
|---|---|
| 115 VAC | 10 A |
| 115 VDC | 0.8 A |

#### CCC (GB14048.5)

| Model | Application category and ratings |
|---|---|
| WL□ | AC-15: 2 A/250 V<br>DC-12: 2 A/48 V |
| WL01□ | AC-14: 0.1 A/125V<br>DC-12: 0.1 A/48 V |
| WL□-LE | AC-15: 2 A/250 V |
| WL01□-LE | AC-14: 0.1 A/125 V |
| WL□-LD | AC-15: 2 A/115 V<br>DC-12: 2 A/48 V |
| WL01□-LD | AC-14: 0.1 A/115 V<br>DC-12: 0.1 A/48 V |

Note: As an example, AC-15: 2 A/250 V means the following:

| | |
|---|---|
| Application category | AC-15 |
| Rated operating current (Ie) | 2 A |
| Rated operating voltage (Ue) | 250 V |

### Characteristics

| | | |
|---|---|---|
| Degree of protection | | IP67 |
| Durability *1 | Mechanical | 15,000,000 operations min. *2 |
| | Electrical | 750,000 operations min. *3 |
| Operating speed | | 1 mm/s to 1 m/s (in case of WLCA2) |
| Operating frequency | Mechanical | 120 operations/minute min. |
| | Electrical | 30 operations/minute min. |
| Rated frequency | | 50/60 Hz |
| Insulation resistance | | 100 MΩ min. (at 500 VDC) |
| Contact resistance | | 25 mΩ max. (initial value for the built-in switch when tested alone) |
| Dielectric strength | Between terminals of the same polarity | 1,000 VAC (600 VAC), 50/60 Hz for 1 min |
| | Between current-carrying metal part and ground | 2,200 VAC (1,500 VAC), 50/60 Hz for 1 min/Uimp 2.5 kV |
| | Between each terminal and non-current-carrying metal part | 2,200 VAC (1,500 VAC), 50/60 Hz for 1 min/Uimp 2.5 kV |
| Rated insulation voltage (Ui) | | 250 V (EN60947-5-1) |
| Pollution degree (operating environment) | | 3 (EN60947-5-1) |
| Short-circuit protective device (SCPD) | | 10 A, fuse type gG or gI (IEC60269) |
| Conditional short-circuit current | | 100 A (EN60947-5-1) |
| Conventional enclosed thermal current (Ithe) | | 10 A, 0.5 A (EN60947-5-1) |
| Protection against electric shock | | Class I |
| Vibration resistance | Malfunction | 10 to 55 Hz, 1.5-mm double amplitude |
| Shock resistance | Destruction | 1,000 m/s² max. |
| | Malfunction | 300 m/s² max. |
| Ambient operating temperature | | –10°C to +80°C (with no icing) |
| Ambient operating humidity | | 35% to 95%RH |
| Weight | | Approx. 275 g (in case of WLCA2) |

Note: 1. The above figures are initial values.
2. The figures in parentheses for dielectric strength are those for the high-sensitivity overtravel models.

*1. The values are calculated at an operating temperature of +5°C to +35°C and an operating humidity of 40% to 70%RH. Contact your OMRON sales representative for more detailed information on other operating environments.
*2. Durability is 10,000,000 operations min. for general-purpose or high-sensitivity overtravel models.
*3. Durability is 500,000 operations min. for high-precision models. All microload models however, are 1,000,000 operations min.

## Long-life Switches

## Ratings

### General Ratings (Refer to these ratings before using the product.)

#### Screw Terminal Switches

| Item / Model | Rated voltage (V) | Non-inductive load (A) | | | | Inductive load (A) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Resistive load | | Lamp load | | Inductive load | | Motor load | |
| | | NC | NO | NC | NO | NC | NO | NC | NO |
| Basic models, overtravel models, (except for high-sensitivity models), and high-precision models | 115 AC | 10 | | 3 | 1.5 | 10 | | 5 | 2.5 |
| | 12 DC | 10 | | 6 | 3 | 10 | | 6 | |
| | 24 DC | 6 | | 4 | 3 | 6 | | 4 | |
| | 48 DC | 3 | | 2 | 1.5 | 3 | | 2 | |
| | 115 DC | 0.8 | | 0.2 | 0.2 | 0.8 | | 0.2 | |
| High-sensitivity overtravel models | 115 AC | 5 | | — | | — | | — | |
| | 115 DC | 0.4 | | — | | — | | — | |

| | | |
|---|---|---|
| Inrush current | NC | 30 A max. (15 A max. *) |
| | NO | 20 A max. (10 A max. *) |

* For high-sensitivity overtravel models.

#### Direct-wired Connector and Pre-wired Connector Switches

| Model | Rated voltage (V) | Non-inductive load (A) | | | | Inductive load (A) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Resistive load | | Lamp load | | Inductive load | | Motor load | |
| | | NC | NO | NC | NO | NC | NO | NC | NO |
| DC | 12 DC | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 24 DC | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 48 DC | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 115 DC | 0.8 | 0.8 | 0.2 | 0.2 | 0.8 | 0.8 | 0.2 | 0.2 |
| AC | 115 AC | 3 | 3 | 3 | 1.5 | 3 | 3 | 3 | 2.5 |

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. A lamp load has an inrush current of 10 times the steady-state current.
4. A motor load has an inrush current of 6 times the steady-state current.

## Characteristics

| | | |
|---|---|---|
| Degree of protection | | IP67 |
| Durability * | Mechanical | 30,000,000 operations min. |
| | Electrical | 30,000,000 operations min. (10 mA at 24 VDC, resistive load)<br>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/s to 1 m/s (in case of WLCA2) |
| 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 for the built-in switch when tested alone) |
| Dielectric strength (50/60 Hz for 1 min) | Between terminals of the same polarity | 1,000 VAC (except connector models) |
| | Between current-carrying metal part and ground | 2,200 VAC (1,500 V) |
| | Between each terminal and non-current-carrying metal part | 2,200 VAC (1,500 V) |
| Vibration resistance | Malfunction | 10 to 55 Hz, 1.5-mm double amplitude |
| Shock resistance | Destruction | 1,000 m/s² max. |
| | Malfunction | 300 m/s² max. |
| Ambient operating temperature | | –10°C to +80°C (with no icing) |
| Ambient operating humidity | | 35% to 95%RH |
| Weight | | Approx. 275 g (in case of WLCA2) |

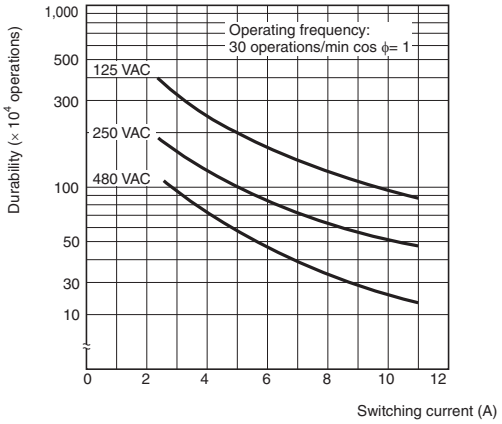
Note: The figures in parentheses for dielectric strength, are those for overtravel (high-sensitivity) or connector models.

* The values are calculated at an operating temperature of +5°C to +35°C, and an operating humidity of 40% to 70%RH. Contact your OMRON sales representative for more detailed information on other operating environments.

## Engineering Data

### Electrical Durability: cosϕ= 1

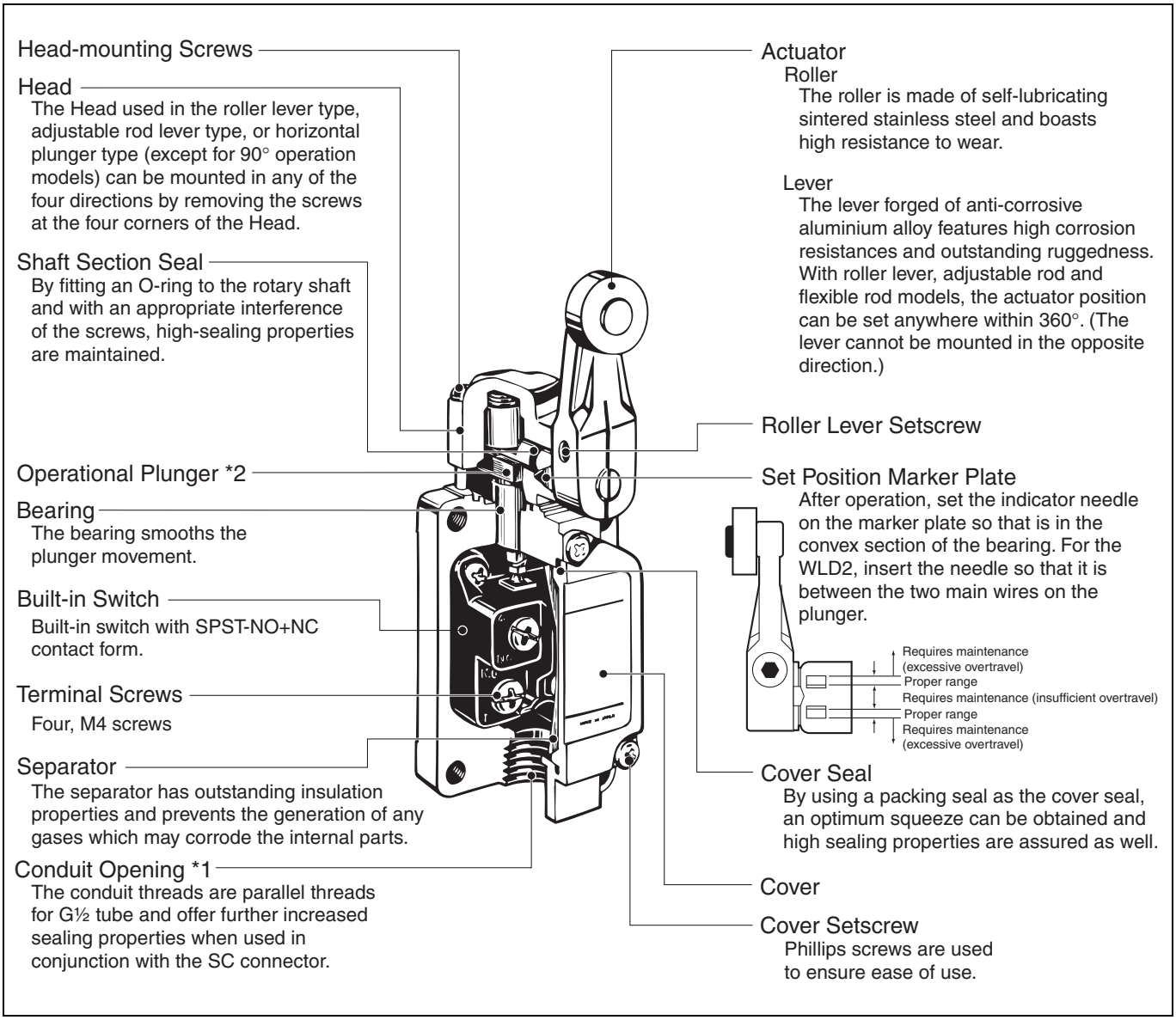
(Operating temperature: +5°C to +35°C, operating humidity: 40% to 70%RH)



## Structure and Nomenclature

### Structure

**General-purpose Switches: WLCA2**




*1. The display for conduit threads has changed from PF½ to G½, according to revisions of JIS B 0202. This is only a change in the display, so the thread size and pitch have not changed. (Conduit threads Pg 13.5 and ½-14NPT are also available.)
*2. By changing the orientation of the operational plunger, any one of the three operational directions (both sides, left, or right) can be selected electrically.

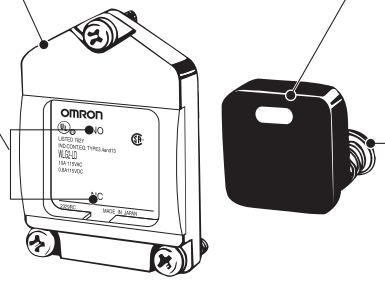
## Indicators

### Indicator Covers
The indicator covered if outsert molded from diecast aluminum and has outstanding sealing properties.

### Indicator Windows
Operation (i.e., light-ON when operating or light-ON when not operating) depends on whether a neon lamp or LED is used.

**Light-ON when Operating/Not Operating**

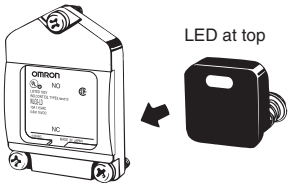
Indicators can be switched from light-ON when operating and light-ON when not operating, by simply rotating the indicator holder by 180°.
(Molded terminals cannot be switched in this way.)



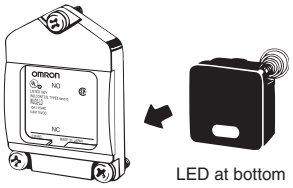
### Indicator
The indicator is either a neon lamp or an LED. Models with LED indicators have a built-in rectifier stack, so it is not necessary to change the polarity.

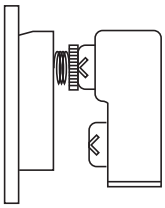
### Contact Spring
The built-in switch's terminal screws are used to connect the indicator terminal. Since the connection spring (coil spring) is used for this connection, it will not be necessary to connect the indicator terminal. When a ground terminal is provided however, a lead wire must be used.

**Light-ON when Operating**

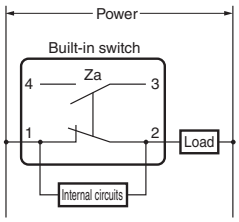
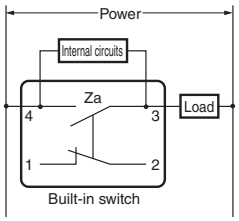



**Light-ON when Not Operating**



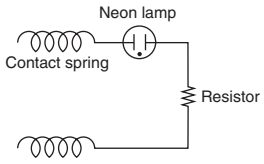
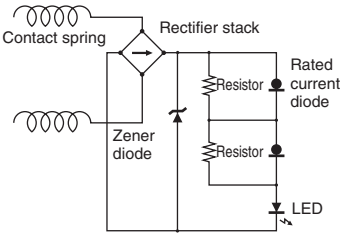
### Operation

| | | |
|---|---|---|
| WL-LE<br>WL-LD | **Light-ON when operating *1** |  |
| | **Light-ON when not operating *2** |  |





### Internal Circuits

| | |
|---|---|
| **WL-LE** |  |
| **WL-LD** |  |





Note: 1. The indicator cover cannot be replaced on the molded terminals. In all cases the indicator does not light when the load is ON.
2. Leakage current from indicator circuit may cause load's malfunction. Please check the load's OFF current before use the indicator-equipped switch.

*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.

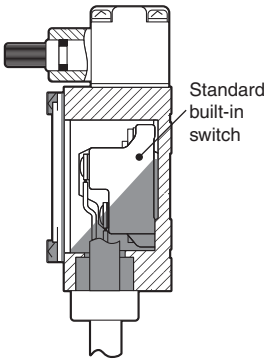
*2. Light-ON when not operating means the lamp remains lit when the actuator is free, or when the Limit Switch contacts (NO) close when the actuator rotates or is pushed down.

## Environment-resistant Switches

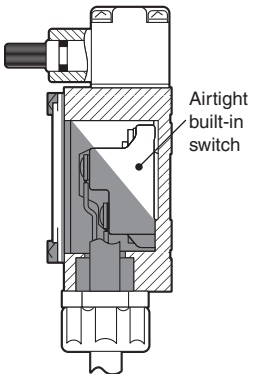
### Mold Specifications for Hermetic Seal Switches

: Molded parts

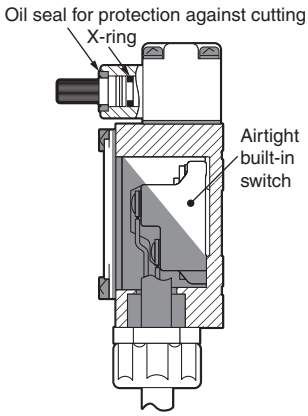
**WL□-139**



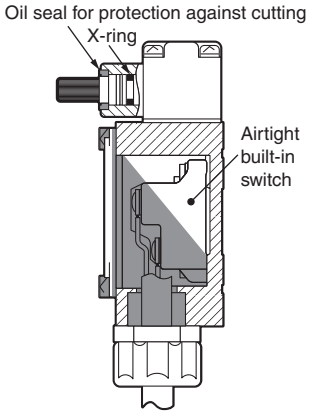

**WL□-140**



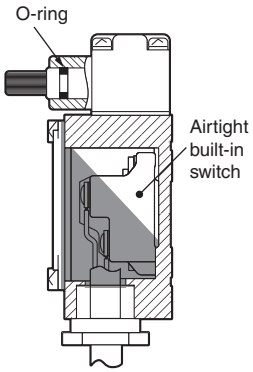

**WL□-141**



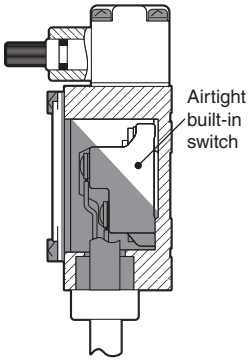

**WL□-145**




**WL□-RP40**




**WL□-RP60**




* Florine rubber is used for all rubber parts.

| Model | Cable specifications |
|---|---|
| WL□-139 | Standard 5-m VCT (vinyl cabtire cable) cable attached. Finished diameter: 11.5 mm, 4-conductor. |
| WL□-140<br>WL□-141<br>WL□-145<br>WL□RP40<br>WL□RP60 | Standard 5-m VCT cable, with high flexibility and good anti-oil properties attached. Finished diameter: 11.5 mm, 4-conductor. |

## Spatter-prevention Switches: WLCA2-LEAS

**Actuator**

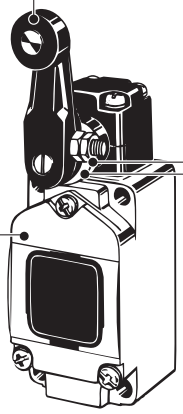
Roller, Roller Axis
Using stainless steel prevents spatter from adhering.

Operating Lever
Melamine sinter-painted, it is easy to peel off the spatter.

Double Nut
SUS is used for double nut.

**Lamp Cover**

- Heat-resistant resin is used for the lamp cover.
- By using spherical surface for the display part, it disperses the direction of spatter.

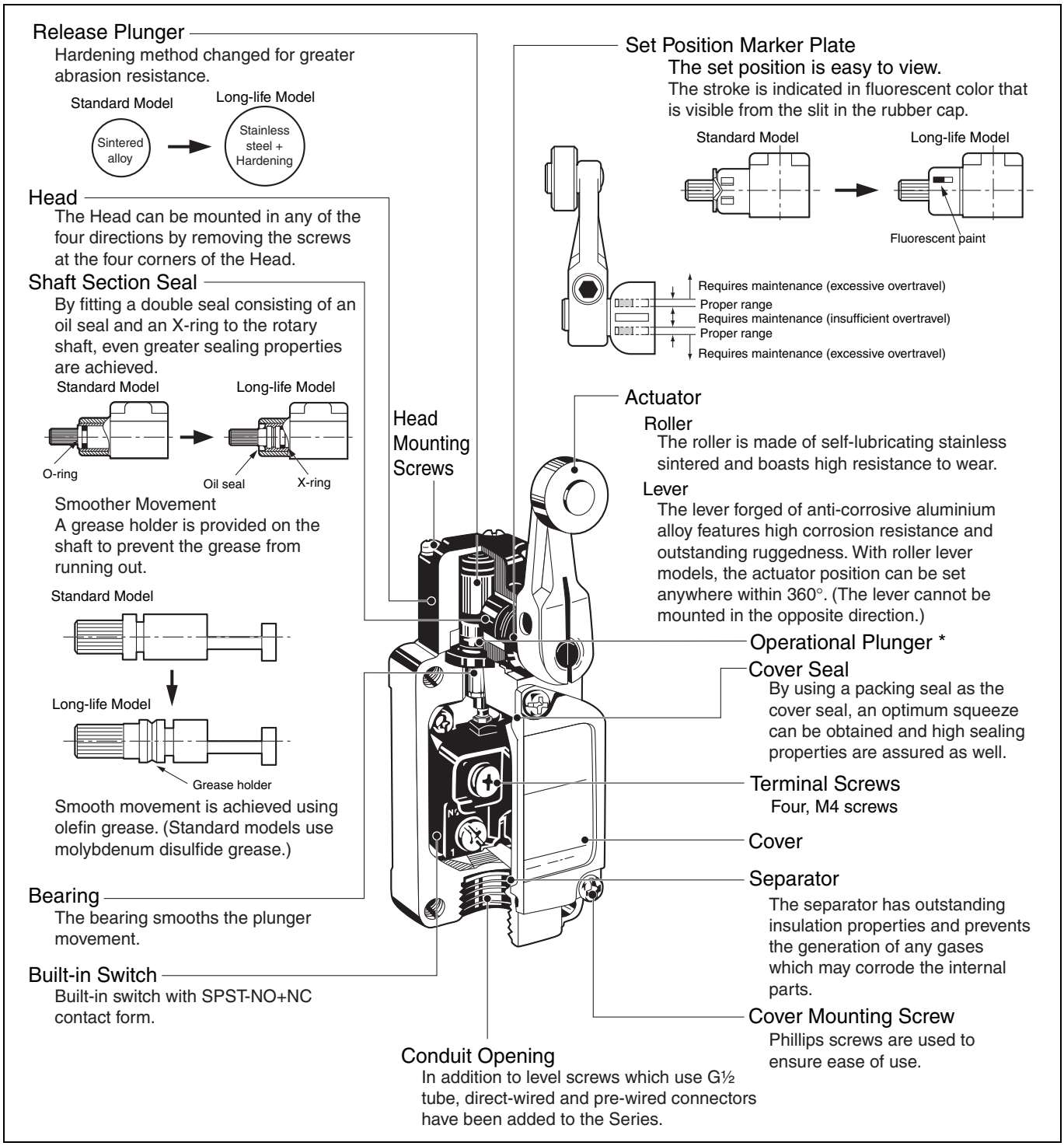


**Screws**
SUS is used, preventing spatter from adhering.

**Head Cap**
Using fluororesin prevents spatter from adhering.
*Spatter means the zinc powder produced when welding. Adhering spatter to the Limit Switch may cause malfunction of lever or lamp cover.

The lack of gap prevents spatter powder from clogging.

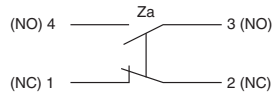
## Long-life Switches: WLMGCA2-LD



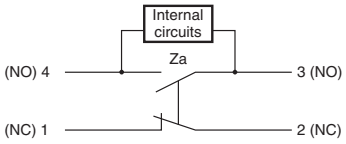

* By changing the direction of the operational plunger, any one of the three operational directions (both sides, left, or right) can be selected.

## Contact Forms

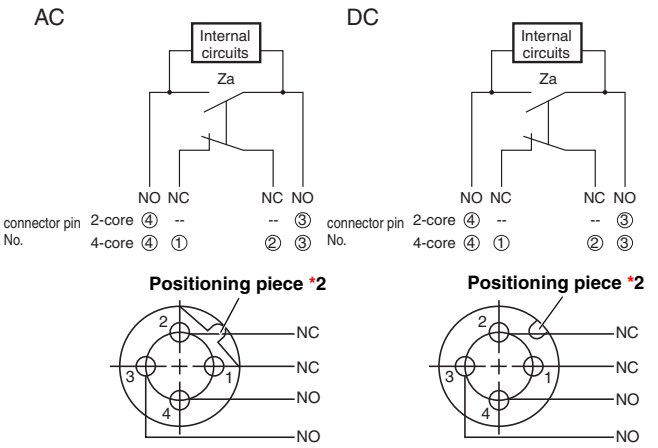
### Screw Terminal Switches



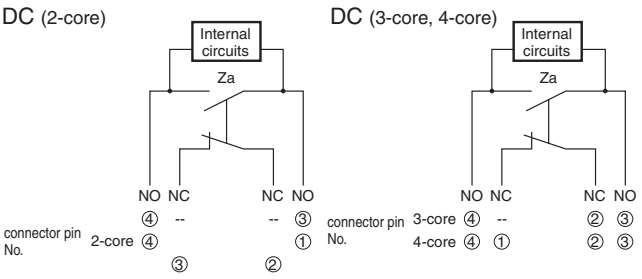

### Screw Terminal Switches Indicator-equipped (Light-ON when Not Operating) Switches *1




### Direct-wired Connector Switches Indicator-equipped (Light-ON when Not Operating) Switches *1




### Pre-wired Connector Switches Indicator-equipped (Light-ON when Not Operating) Switches *1




Note: Leakage current from indicator circuit may cause load's malfunction. Please check the load's OFF current before use the indicator-equipped switch.

*1. Light-ON when not operating means the indicator is lit when the actuator is free and is not light when the Switch contacts (NO) close when the actuator rotates or is pushed down.

*2. The position of the positioning piece is not always the same. If using an L-shaped connector causes problems in application, use a straight connector.

## Dimensions and Operating Characteristics

(Unit: mm)

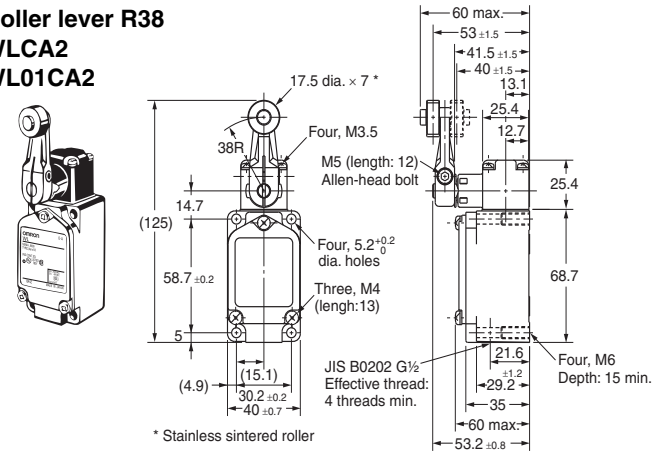
### General-purpose Models

### Standard Models

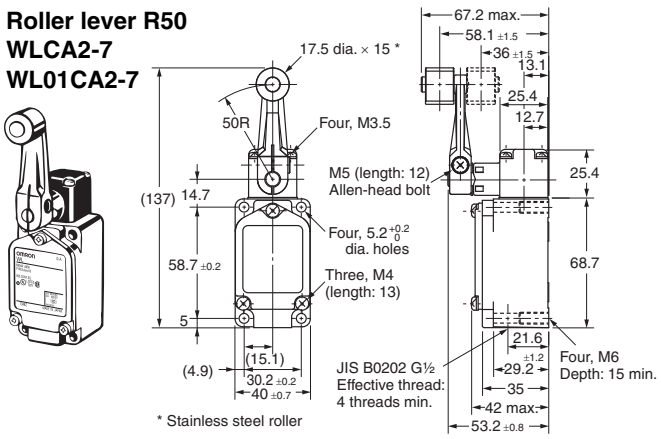
**Basic**

**Rotating Lever**..... For all models WL□ indicates a standard-load model and WL01□ indicates a microload model.

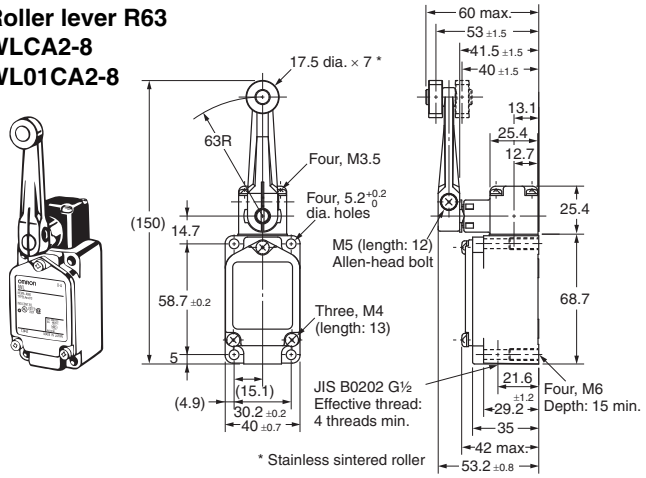
**Roller lever R38**
**WLCA2**
**WL01CA2**



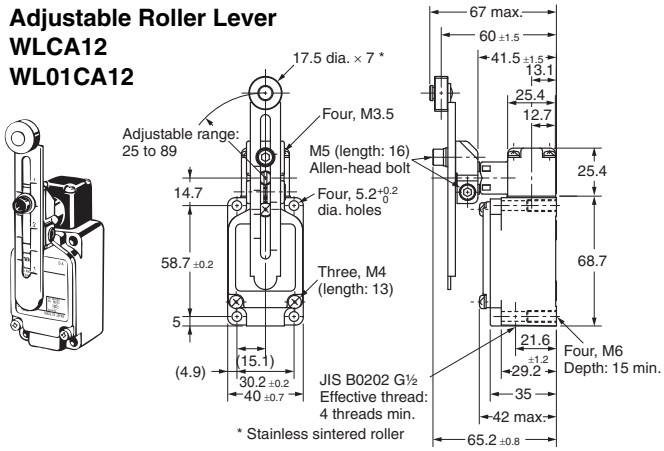

**Roller lever R50**
**WLCA2-7**
**WL01CA2-7**



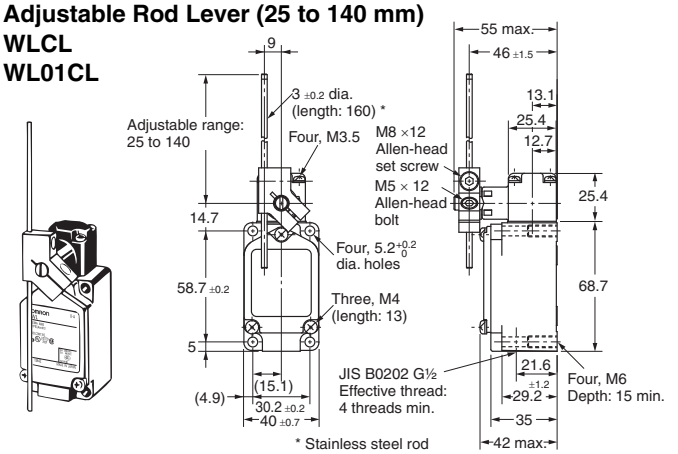

**Roller lever R63**
**WLCA2-8**
**WL01CA2-8**




**Adjustable Roller Lever**
**WLCA12**
**WL01CA12**

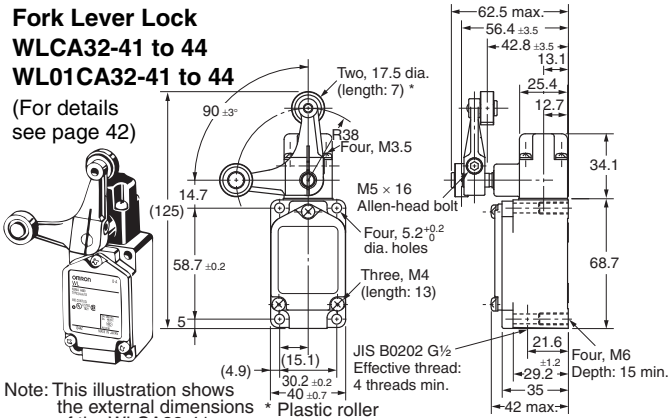



**Adjustable Rod Lever (25 to 140 mm)**
**WLCL**
**WL01CL**




**Fork Lever Lock**
**WLCA32-41 to 44**
**WL01CA32-41 to 44**

(For details see page 42)




Note: This illustration shows the external dimensions of the WLCA32-41.

(Models WLCA32-041 to -044 and WL01CA32-041 to -044 have stainless steel rollers.)

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

| Operating characteristics \ Model | | WLCA2 WL01CA2 | WLCA2-7 WL01CA2-7 | WLCA2-8 WL01CA2-8 | WLCA12 *1 WL01CA12 *1 | WLCL *2 WL01CL *2 |
|---|---|---|---|---|---|---|
| Operating force | OF max. | 13.34 N | 10.2 N | 8.04 N | 13.34 N | 1.39 N |
| Release force | RF min. | 2.23 N | 1.67 N | 1.34 N | 2.23 N | 0.27 N |
| Pretravel | PT | 15° ±5° | 15° ±5° | 15° ±5° | 15° ±5° | 15° ±5° |
| Overtravel | OT min. | 30° | 30° | 30° | 30° | 30° |
| Movement Differential | MD max. | 12° | 12° | 12° | 12° | 12° |

*1. The operating characteristics for WLCA12 and WL01CA12 are measured at the lever length of 38 mm.

*2. The operating characteristics for WLCL and WL01CL are measured at the rod length of 140 mm.

| Operating characteristics \ Model | WLCA32-41 to 44 *1 WL01CA32-41 to 44 *1 |
|---|---|
| Force necessary to reverse the direction of the lever: Max. | 11.77 N |
| Movement until the lever reverses | 50° ±5° |
| Movement until switch operation: Min. | 55° |
| Movement after switch operation: Max. | 35° |

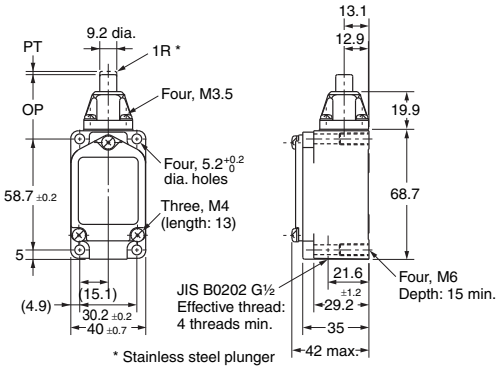
**OF and RF for WLCA12, with a lever length of 89 mm.**

| | WLCA12, WL01CA12 |
|---|---|
| OF | 5.68 N |
| RF | 0.95 N |

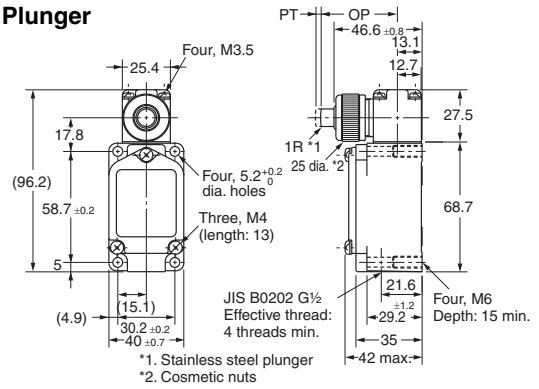
**Basic**

**Plunger** ..... For all models WL□ indicates a standard-load model and WL01□ indicates a microload model.

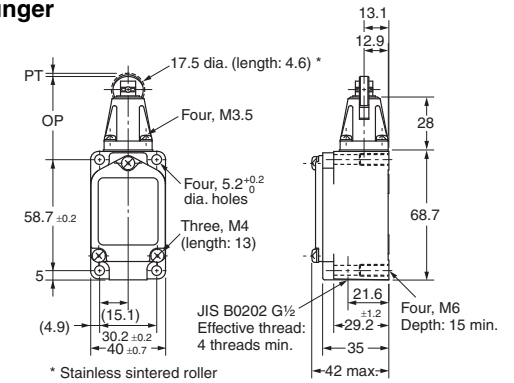
## Top Plunger
**WLD**
**WL01D**



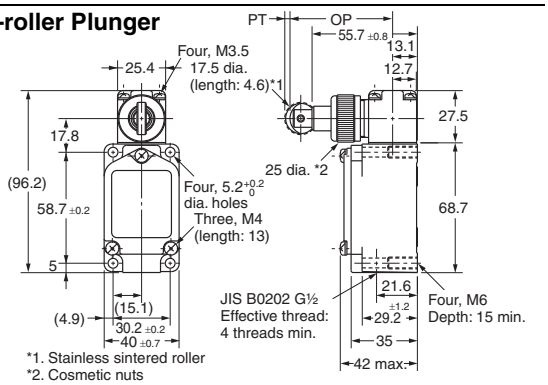

## Horizontal Plunger
**WLSD**
**WL01SD**




## Top-roller Plunger
**WLD2**
**WL01D2**

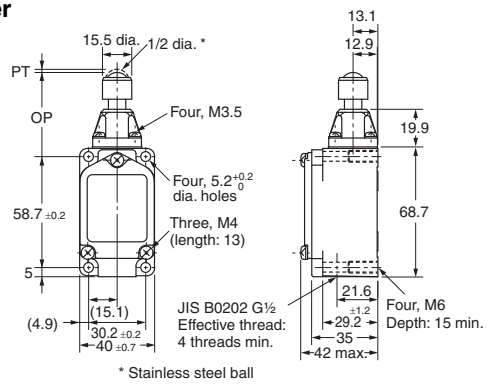



## Horizontal-roller Plunger
**WLSD2**
**WL01SD2**

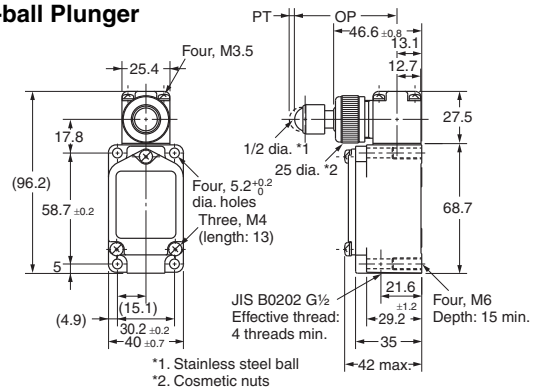



Note: The WLSD21 model, which has the roller rotated by 90° is also available.

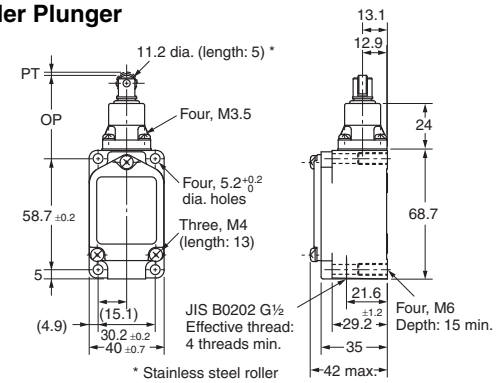
## Top-ball Plunger
**WLD3**
**WL01D3**




## Horizontal-ball Plunger
**WLSD3**
**WL01SD3**




## Sealed Top-roller Plunger
**WLD28**
**WL01D28**



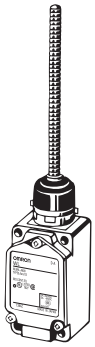

Note: Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

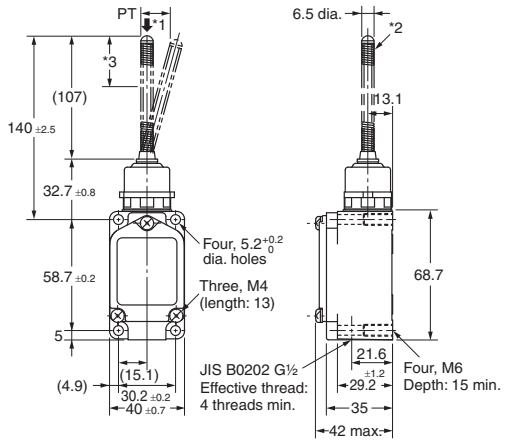
| Operating characteristics | Model | WLD WL01D | WLD2 WL01D2 | WLD3 WL01D3 | WLD28 WL01D28 | WLSD2 WL01SD2 | WLSD3 WL01SD3 | WLSD WL01SD |
|---|---|---|---|---|---|---|---|---|
| Operating force | OF max. | 26.67 N | 26.67 N | 26.67 N | 16.67 N | 40.03 N | 40.03 N | 40.03 N |
| Release force | RF min. | 8.92 N | 8.92 N | 8.92 N | 4.41 N | 8.89 N | 8.89 N | 8.89 N |
| Pretravel | PT max. | 1.7 mm | 1.7 mm | 1.7 mm | 1.7 mm | 2.8 mm | 2.8 mm | 2.8 mm |
| Overtravel | OT min. | 6.4 mm | 5.6 mm | 4 mm | 5.6 mm | 5.6 mm | 4 mm | 6.4 mm |
| Movement Differential | MD max. | 1 mm | 1 mm | 1 mm | 1 mm | 1 mm | 1 mm | 1 mm |
| Operating Position | OP | 34 ±0.8 mm | 44 ±0.8 mm | 44.5 ±0.8 mm | 44 ±0.8 mm | 54.2 ±0.8 mm | 54.1 ±0.8 mm | 40.6 ±0.8 mm |
| Total travel Position | TTP max. | 29.5 mm | 39.5 mm | 41 mm | 39.5 mm | — | — | — |

## Basic

**Flexible Rod**..... For all models WL□ indicates a standard-load model and WL01□ indicates a microload model.

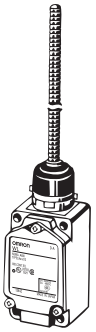
### Coil Spring
### WLNJ
### WL01NJ

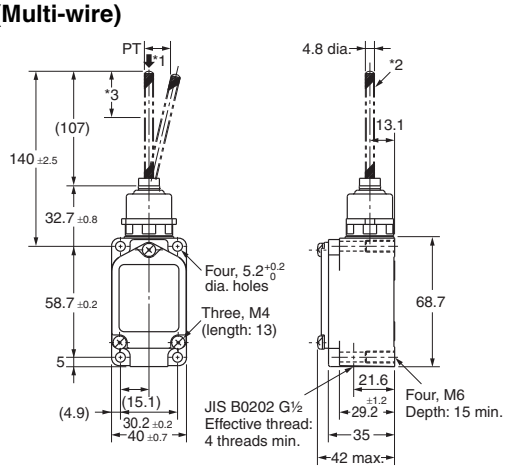





*1. The coil spring may be operated from any direction except the axial direction (↓).
*2. Stainless steel coil spring
*3. Optimum operating range of the coil spring is within 1/3 of the entire length from the top end.

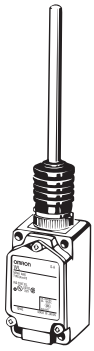
### Coil Spring (Multi-wire)
### WLNJ-30
### WL01NJ-30

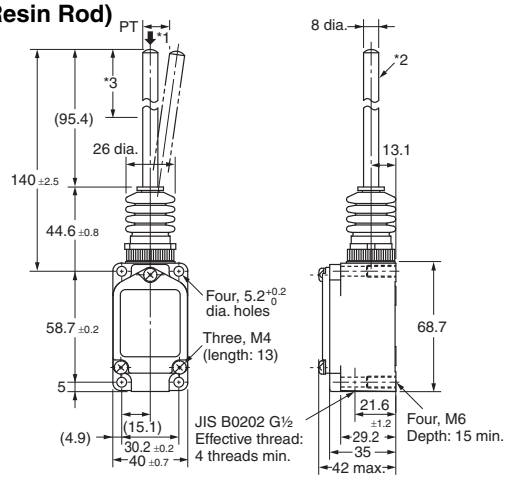





*1. The coil spring may be operated from any direction except the axial direction (↓).
*2. Piano wire coil
*3. Optimum operating range of the coil spring is within 1/3 of the entire length from the top end.

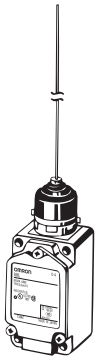
### Coil Spring (Resin Rod)
### WLNJ-2
### WL01NJ-2

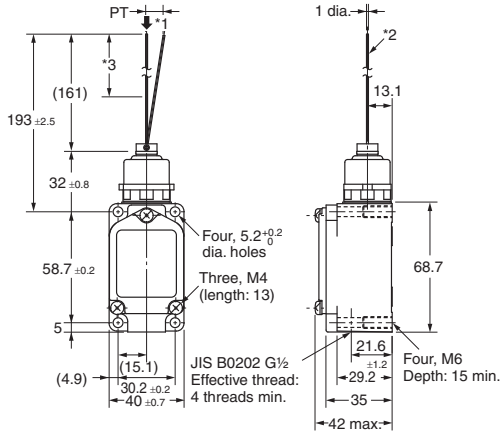





*1. The resin rod may be operated from any direction except the axial direction (↓).
*2. Polyamide resin rod
*3. Optimum operating range of the resin rod is within 1/3 of the entire length from the top end.

### Steel Wire
### WLNJ-S2
### WL01NJ-S2






*1. The steel wire may be operated from any direction except the axial direction (↓).
*2. Stainless steel wire
*3. Optimum operating range of the steel wire is within 1/3 of the entire length from the top end.

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

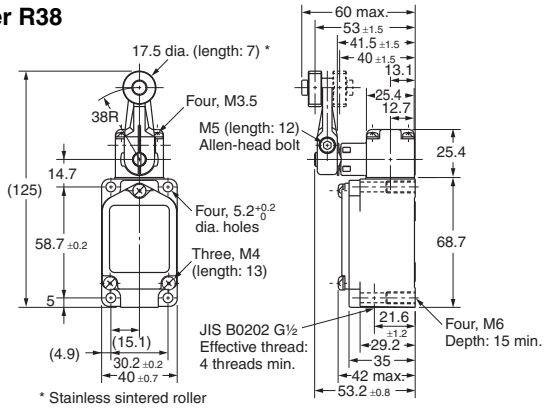
| Operating characteristics / Model | | WLNJ * WL01NJ * | WLNJ-30 * WL01NJ-30 * | WLNJ-2 * WL01NJ-2 * | WLNJ-S2 * WL01NJ-S2 * |
|---|---|---|---|---|---|
| Operating force | OF max. | 1.47 N | 1.47 N | 1.47 N | 0.28 N |
| Pretravel | PT | 20 ±10mm | 20 ±10mm | 40 ±20mm | 40 ±20mm |

* These values are taken from the top end of the wire or spring.

## Overtravel

**General-purpose/High-sensitivity Models** ..... For all models WL□ indicates a standard-load model and WL01□ indicates a microload model.

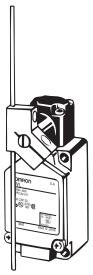
### Roller Lever R38
**WLH2**
**WL01H2**
**WLG2**
**WL01G2**

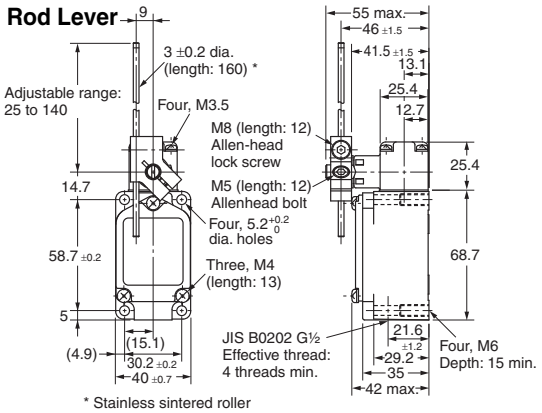



* Stainless sintered roller

Note: 1. WL□G2 is identical to other models except in the shape of the set position marker plate.
2. The built-in switch for WLH2 is W-10FB3.
3. The built-in switch for WLG2 is W-10FB3-8.

### Adjustable Rod Lever
**WLHL**
**WL01HL**
**WLGL**
**WL01GL**

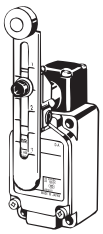


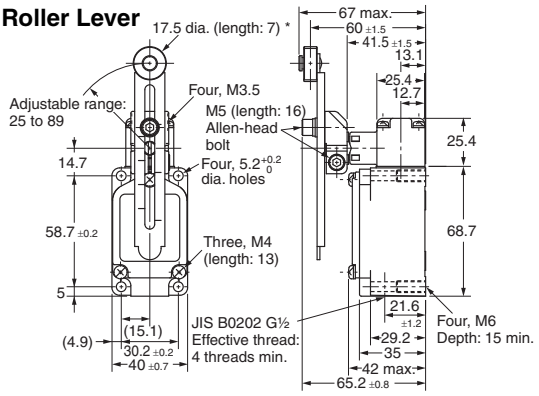



* Stainless sintered roller

Note: 1. WL□GL is identical to other models except in the shape of the set position marker plate.
2. The built-in switch for WLHL is W-10FB3.
3. The built-in switch for WLGL is W-10FB3-8.

### Adjustable Roller Lever
**WLH12**
**WL01H12**
**WLG12**
**WL01G12**

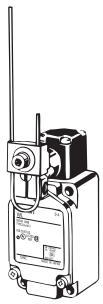


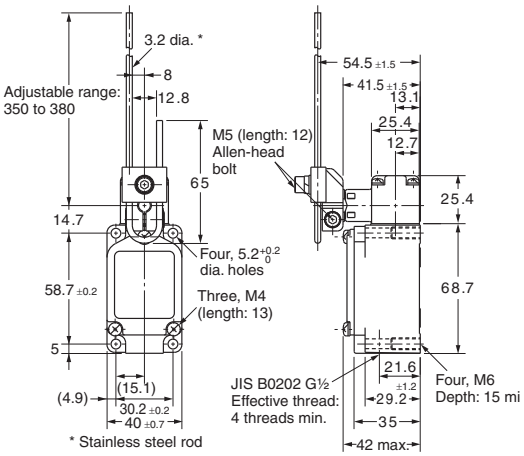



* Stainless sintered roller

Note: 1. WL□G12 is identical to other models except in the shape of the set position marker plate.
2. The built-in switch for WLH12 is W-10FB3.
3. The built-in switch for WLG12 is W-10FB3-8.

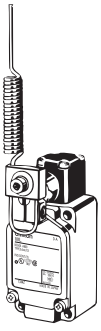
### Adjustable Rod Lever
**WLHAL4**
**WL01HAL4**

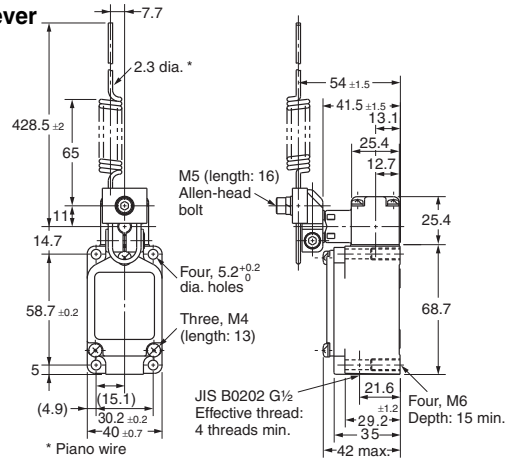





* Stainless steel rod

### Rod Spring Lever
**WLHAL5**
**WL01HAL5**






* Piano wire

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

**OF and RF for WLH12 and WL01H12, with a lever length of 89 mm.**

| | WLH12, WLA01H12 | WLG12, WL01G12 |
|---|---|---|
| **OF** | 4.18 N | 4.18 N |
| **RF** | 0.42 N | 0.42 N |

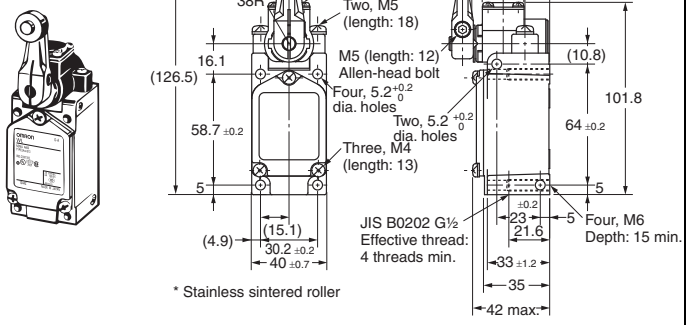
| Operating characteristics | Model | WLH2 WL01H2 | WLG2 WL01G2 | WLH12 *1 WL01H12 *1 | WLG12 *1 WL01G12 *1 | WLHL *1 WL01HL *1 | WLGL *2 WL01GL *2 | WLHAL4 *3 WL01HAL4 *3 | WLHAL5 WL01HAL5 |
|---|---|---|---|---|---|---|---|---|---|
| **Operating force** | **OF max.** | 9.81 N | 9.81 N | 9.81 N | 9.81 N | 2.84 N | 2.84 N | 0.98 N | 0.90 N |
| **Release force** | **RF min.** | 0.98 N | 0.98 N | 0.98 N | 0.98 N | 0.25 N | 0.25 N | 0.15 N | 0.09 N |
| **Pretravel** | **PT** | 15° ±5° | 10° +2° −1° | 15° ±5° | 10° +2° −1° | 15° ±5° | 10° +2° −1° | 15° ±5° | 15° ±5° |
| **Overtravel** | **OT min.** | 55° | 65° | 55° | 65° | 55° | 65° | 55° | 55° |
| **Movement Differential** | **MD max.** | 12° | 7° | 12° | 7° | 12° | 7° | 12° | 12° |

Note: With WLHAL4, WL01HAL4, WLHAL5, and WL01HAL5, the actuator's tare is large, so depending on the installation direction, they may not be properly reset. Always install so that the actuator is facing downwards.
*1. The operating characteristics of WLH12, WL01HL12, WLG12, and WL01G12 are measured at the lever length of 38 mm.
*2. The operating characteristics of WLHL, WL01HL, WLGL, and WL01GL are measured at the rod length of 140 mm.
*3. The operating characteristics of WLHAL4, and WL01HAL4 are measured at the rod length of 380 mm.

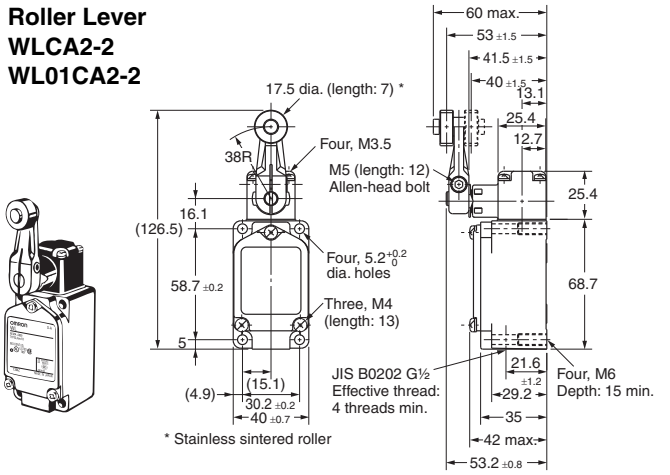
## Overtravel

**Side-installation Models**... For all models WL□ indicates a standard-load model and WL01□ indicates a microload model.

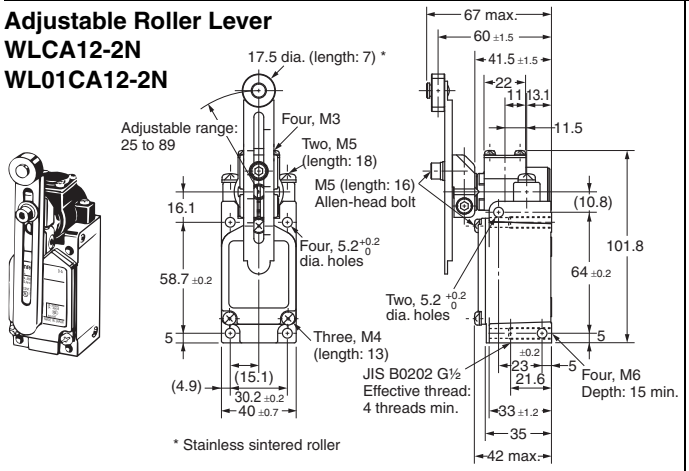
### Roller Lever
### WLCA2-2N
### WL01CA2-2N



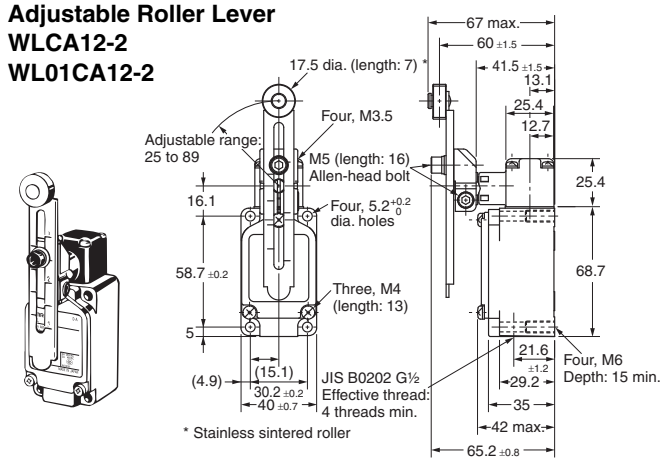

### Roller Lever
### WLCA2-2
### WL01CA2-2



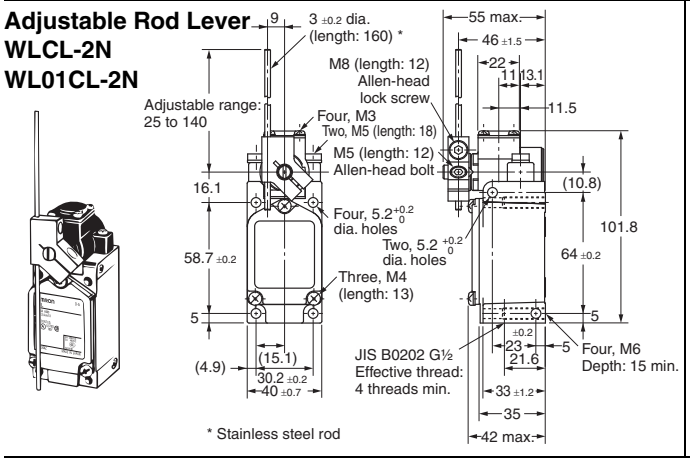

### Adjustable Roller Lever
### WLCA12-2N
### WL01CA12-2N



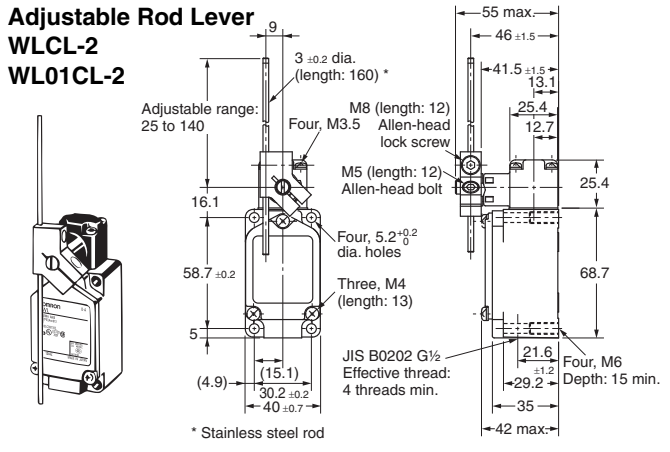

### Adjustable Roller Lever
### WLCA12-2
### WL01CA12-2




### Adjustable Rod Lever
### WLCL-2N
### WL01CL-2N




### Adjustable Rod Lever
### WLCL-2
### WL01CL-2




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

| Operating characteristics / Model | | WLCA2-2N WL01CA2-2N | WLCA12-2N *1 WL01CA12-2N *1 | WLCL-2N *2 WL01CL-2N *2 | WLCA2-2 WL01CA2-2 | WLCA12-2 *1 WL01CA12-2 *1 | WLCL-2 *2 WL01CL-2 *2 |
|---|---|---|---|---|---|---|---|
| Operating force | OF max. | 9.61 N | 9.61 N | 2.84 N | 8.83 N | 8.83 N | 2.55 N |
| Release force | RF min. | 1.18 N | 1.18 N | 0.25 N | 0.49 N | 0.49 N | 0.1 N |
| Pretravel | PT | 20° max. | 20° max. | 20° max. | 25° ±5° | 25° ±5° | 25° ±5° |
| Overtravel | OT min. | 70° | 70° | 70° | 60° | 60° | 60° |
| Movement Differential | MD max. | 10° | 10° | 10° | 16° | 16° | 16° |

*1. The operating characteristics of WLCA12-2N and WL01CA12-2N are measured at the lever length of 38 mm.
*2. The operating characteristics of WLCL-2N and WL01CL-2N are measured at the rod length of 140 mm.

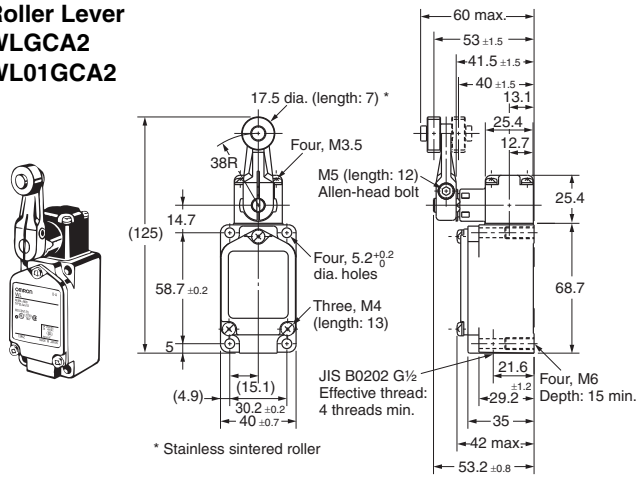
**OF and RF for WLCA12-2N and WL01CA12-2N, with a lever length of 89 mm.**

| | WLCA12-2N, WLA01CA12-2N |
|---|---|
| OF | 4.10 N |
| RF | 0.50 N |

### High-precision Models

WL□ are Standard Models and WL01□ are Microload Models.

**Roller Lever**
**WLGCA2**
**WL01GCA2**




| Operating characteristics | Model | WLGCA2<br>WL01GCA2 |
|---|---|---|
| Operating force | OF max. | 13.34 N |
| Release force | RF min. | 1.47 N |
| Pretravel | PT | 5° +2° 0° |
| Overtravel | OT min. | 40° |
| Movement Differential | MD max. | 3° |

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

## Sensor I/O Connector Switches

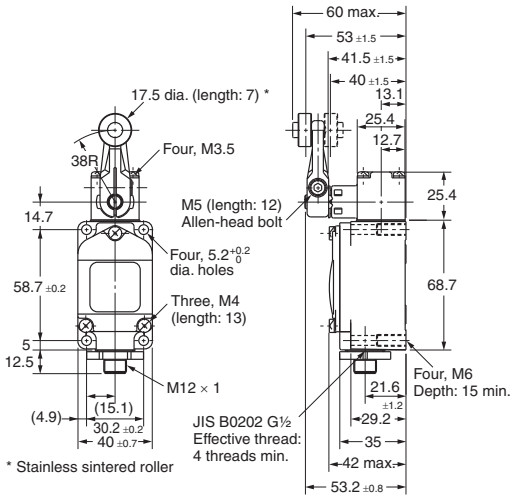
### Direct-wired Connector/Pre-wired Connector Models

Refer to page 17 for the connecting cable.

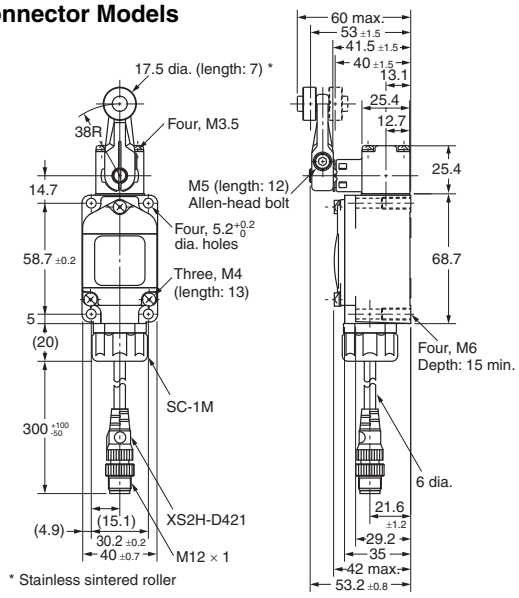
**Roller Lever Plungers** ..... WL□ are Standard Models and WL01□ are Microload Models.

**Standard Models (WLCA2), High-precision Models (WLGCA2),**
**Overtravel General-purpose Models (WLH2), Overtravel High-sensitivity Models (WLG2)**

**Connector Models**




**Pre-wired Connector Models**

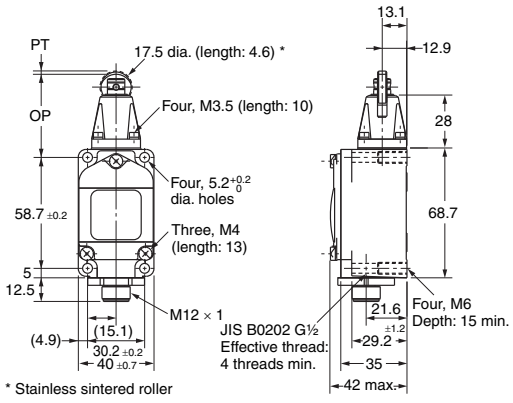



Note: 1. Only the dimension of the set position marker plate is different for WLG2 Models.
2. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.
3. The models with operation indicators are shown in the above diagrams.

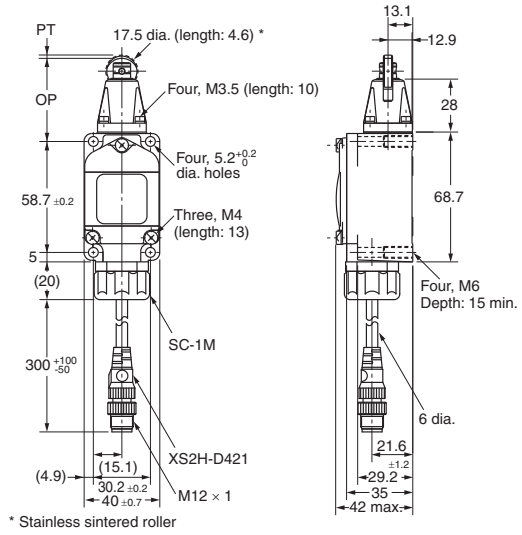
| Operating characteristics | Actuator | Standard roller lever actuator | High-precision roller lever actuator | Overdrive general-purpose actuator | Overdrive high-sensitivity actuator |
|---|---|---|---|---|---|
| Operating force | OF max. | 13.34 N | 13.34 N | 9.81 N | 9.81 N |
| Release force | RF min. | 2.23 N | 1.47 N | 0.98 N | 0.98 N |
| Pretravel | PT | 15° ±5° | 5° +2° 0° | 15° ±5° | 10° +2° 0° |
| Overtravel | OT min. | 30° | 40° | 55° | 65° |
| Movement Differential | MD max. | 12° | 3° | 12° | 7° |

## Top-roller Plunger (WLD2)

### Direct-wired Connector Models




### Pre-wired Connector Models

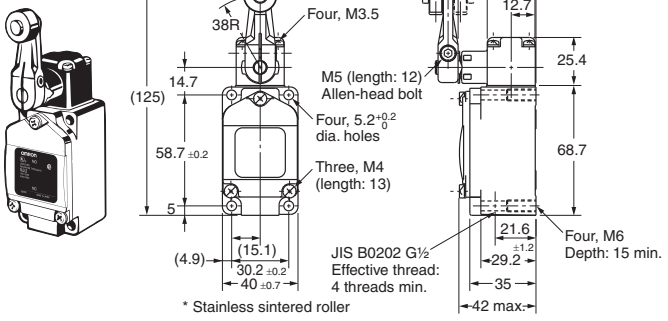



Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.
2. The following diagrams are for a indicator-equipped models.

| Operating characteristics | Actuator | Top-roller plunger |
|---|---|---|
| Operating force | OF max. | 26.67 N |
| Release force | RF min. | 8.92 N |
| Pretravel | PT max. | 1.7 mm |
| Overtravel | OT min. | 5.6 mm |
| Movement Differential | MD max. | 1 mm |
| Operating Position | OP | 44 ±0.8mm |
| Total travel Position | TTP max. | 39.5 mm |

## Indicator-equipped Models

### Roller Lever
### WLCA2-LE/LD
### WL01CA2-LE/LD

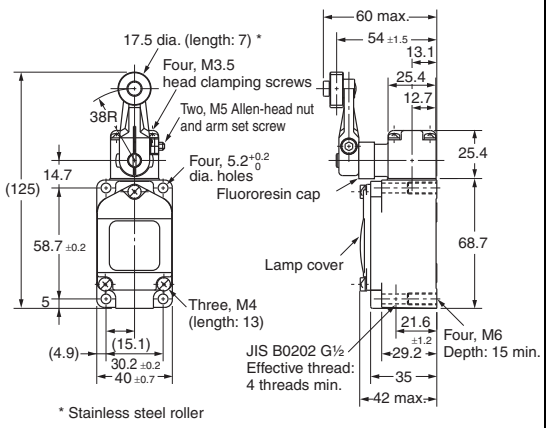



Note: Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

| Operating characteristics | Actuator | WLCA2-LE/LD WL01CA2-LE/LD |
|---|---|---|
| Operating force | OF max. | 13.34 N |
| Release force | RF min. | 2.23 N |
| Pretravel | PT | 15° ±5° |
| Overtravel | OT min. | 30° |
| Movement Differential | MD max. | 12° |

## Spatter-prevention Models

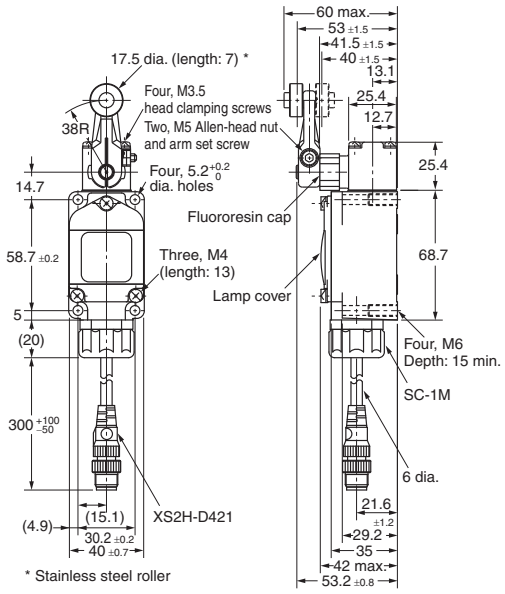
### Roller Lever (Screw Terminals)
**WLCA2-□S/WL01□-□S**
**WLH2-□S/WLG2-□S**
**WLGCA2-□S**




* Stainless steel roller

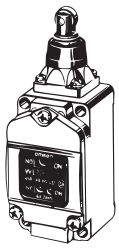
### Roller Lever (Pre-wired connectors)
**WLCA2-□S-M1J*/WL01□-□S-M1J***
**WLH2-□S-M1J*/WLG2-□S-M1J***
**WLGCA2-□S-M1J***

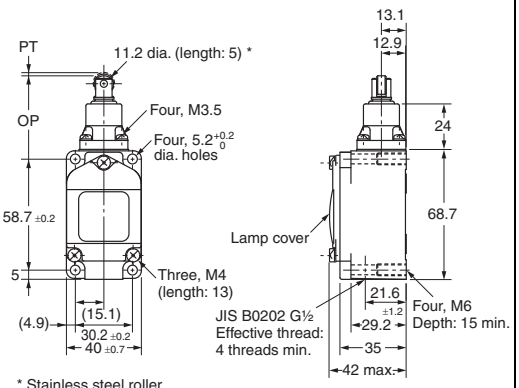
* External dimensions are the same even for different core wires.




* Stainless steel roller

### Sealed Top-roller Plunger (Screw Terminals)
**WLD28-□S**

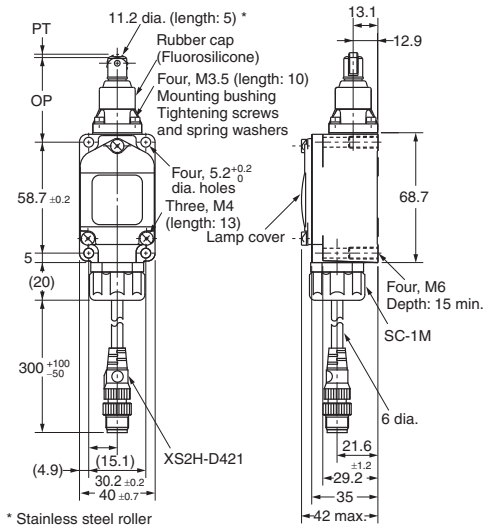





* Stainless steel roller

### Sealed Top-roller Plunger (Pre-wired connectors)
**WLD28-□S-M1J***

* External dimensions are the same even for different core wires.




* Stainless steel roller

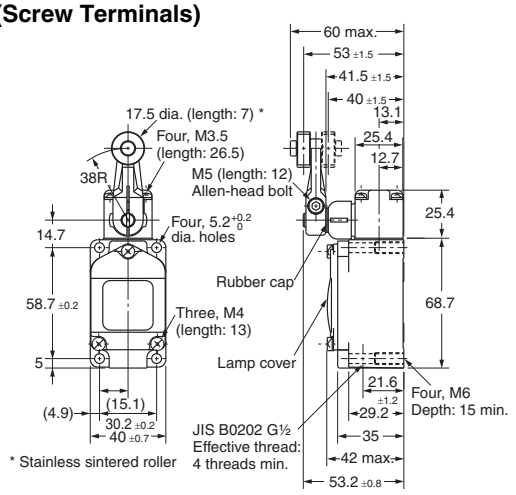
Note: Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

| Operating characteristics | Actuator | Roller Lever | | | | Sealed Top-roller Plunger |
|---|---|---|---|---|---|---|
| | | Basic | Overtravel models | | High-precision | |
| | | | General-purpose | High-sensitivity | | |
| Operating force | OF max. | 13.34 N | 9.81 N | 9.81 N | 13.34 N | 16.67 N |
| Release force | RF min. | 2.23 N | 0.98 N | 0.98 N | 1.47 N | 4.41 N |
| Pretravel | PT | 15° ±5° | 15° ±5° | 10° +2° −1° | 5° +2° 0° | 1.7 mm max. |
| Overtravel | OT min. | 30° | 55° | 65° | 40° | 5.6 mm |
| Movement Differential | MD max. | 12° | 12° | 7° | 3° | 1 mm |
| Operating Position | OP | — | — | — | — | 44 ±0.8 mm |
| Total travel Position | TTP max. | — | — | — | — | 39.5 mm |

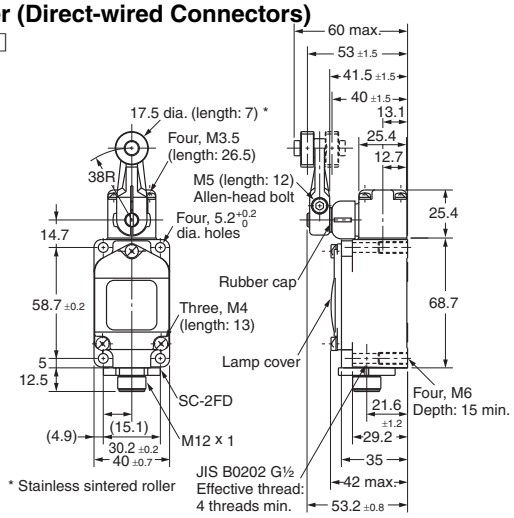
## Long-life Models

### Rotating Lever Models

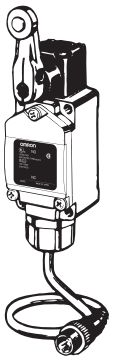
#### Roller Lever (Screw Terminals)
**WLM□-LD**

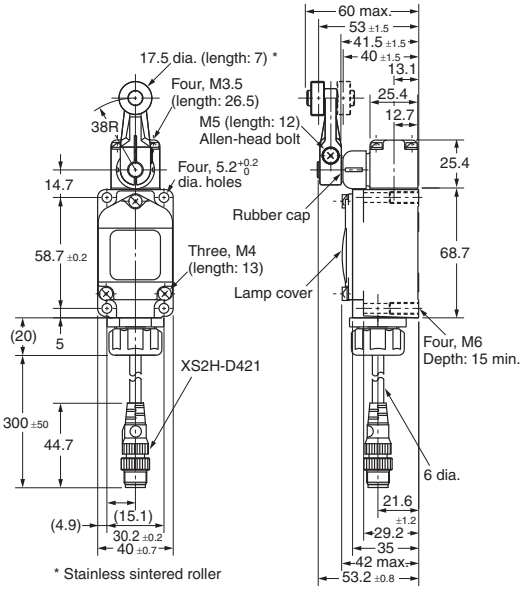



#### Roller Lever (Direct-wired Connectors)
**WLM□-LD□**




#### Roller Lever (Pre-wired Connectors)
**WLM□-LD□**





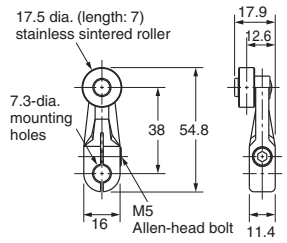

Note: Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

| Operating characteristics | Model | WLMCA2-LD□ Basic models | WLMH2-LD□ General-purpose overtravel models | WLMG2-LD□ High-sensitivity overtravel models | WLMGCA2-LD□ High-precision models |
|---|---|---|---|---|---|
| Operating force | OF max. | 9.81 N | 9.81 N | 9.81 N | 13.34 N |
| Release force | RF min. | 0.98 N | 0.98 N | 0.98 N | 1.47 N |
| Pretravel | PT | 15° ±5° | 15° ±5° | $10^{\circ}{}^{+2^{\circ}}_{-1^{\circ}}$ | $5^{\circ}{}^{+2^{\circ}}_{0^{\circ}}$ |
| Overtravel | OT min. | 30° | 55° | 65° | 40° |
| Movement Differential | MD max. | 12° | 12° | 7° | 3° |

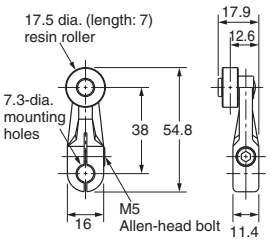
## Actuators (Levers Only)

**Lever: Only rotating lever models are illustrated.**

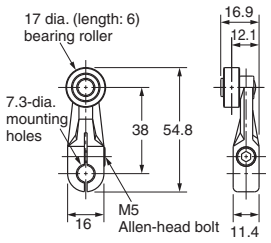
### WL-1A100
### Standard Lever



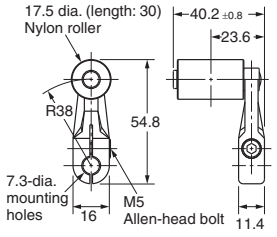

### WL-1A115
### Resin Roller



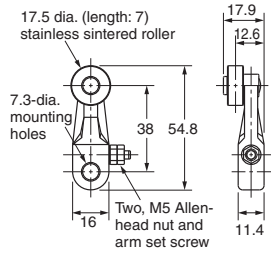

### WL-1A400
### Bearing Roller



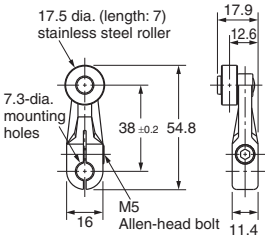

### WL-1A118
### Nylon Roller:
### Roller Width: 30 mm



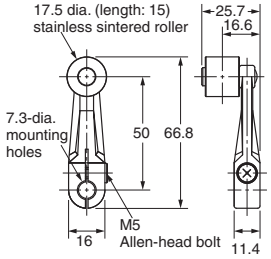

### WL-1A105
### Double Nuts



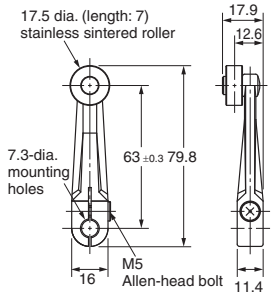

### WL-1A103S
### Spatter Prevention



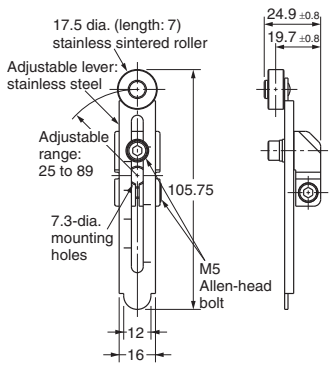

### WL-1A200
### Lever Length: 50
### Roller Width: 15



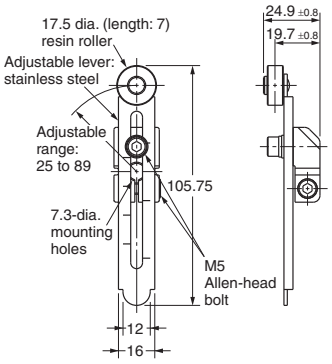

### WL-1A300
### Lever Length: 63



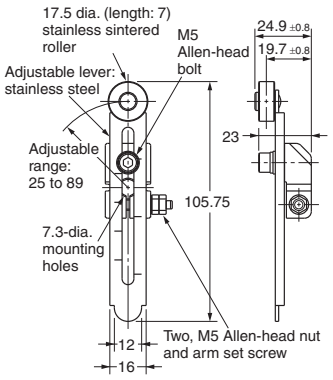

### WL-2A100



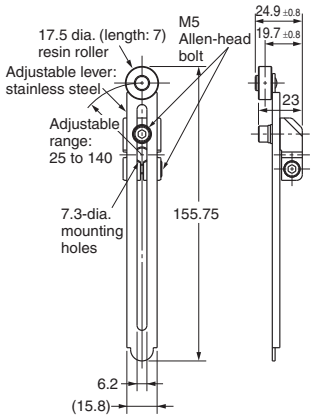

### WL-2A111
### Resin Roller



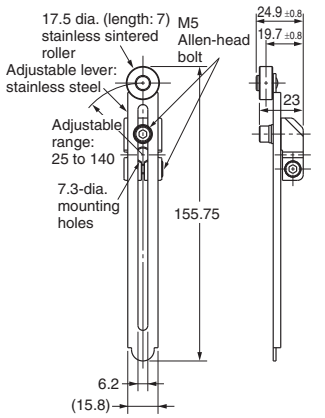

### WL-2A107
### Double Nuts



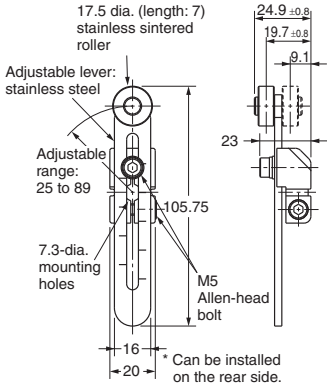

### WL-2A108
### Resin Roller



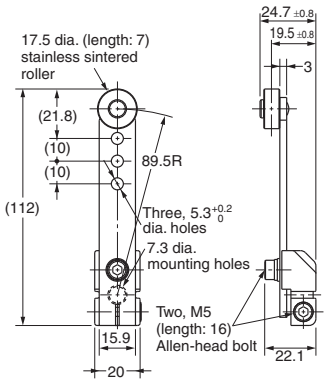

### WL-2A122



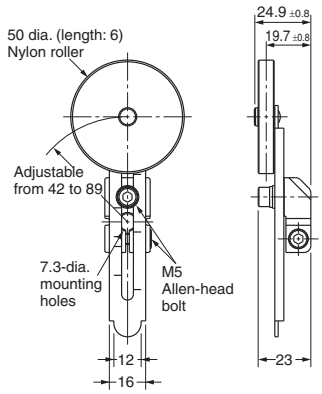

### WL-2A106




### WL-2A130



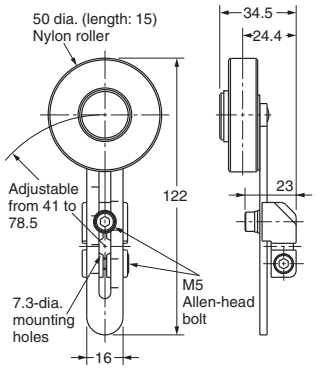

### WL-2A104



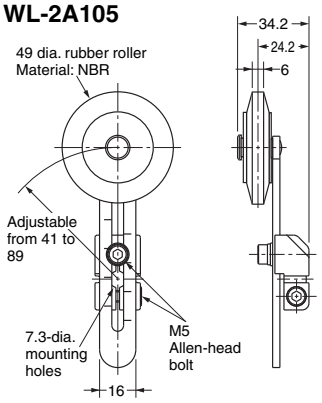

Note: Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

**Lever: Only rotating lever models are illustrated.**

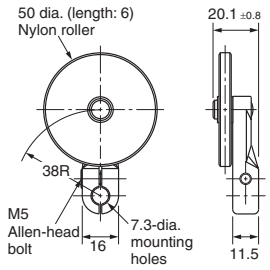
### WL-2A110



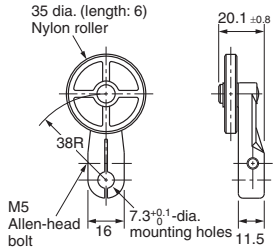

### WL-2A105



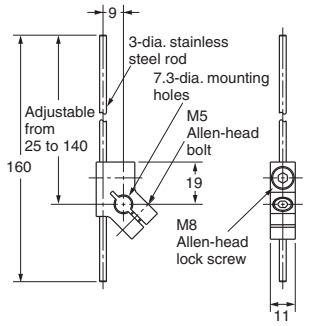

### WL-1A106



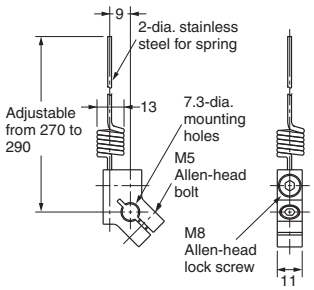

### WL-1A110



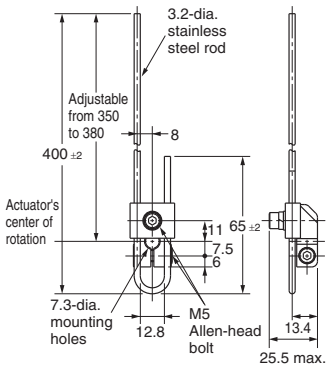

### WL-4A100



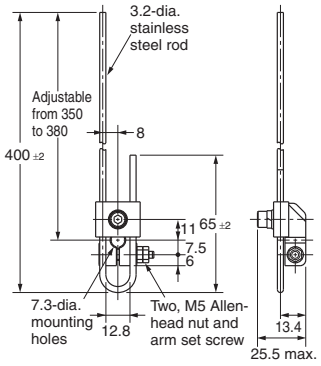

### WL-4A201



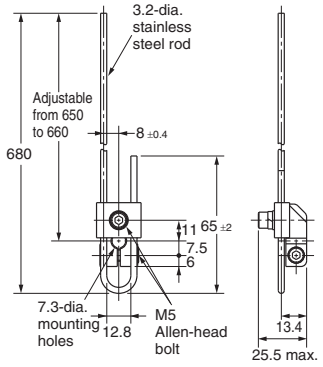

### WL-3A100



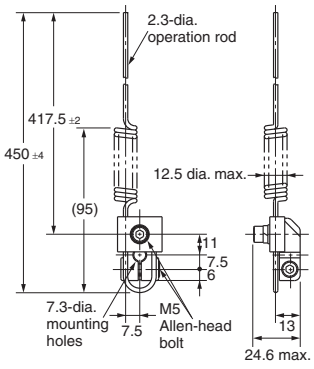

### WL-3A106
### Double Nut



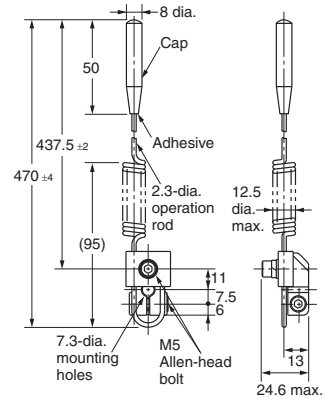

### WL-3A108



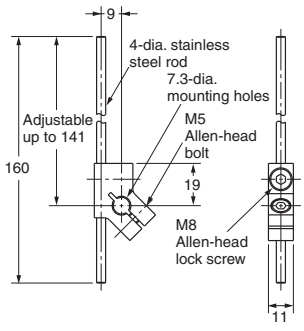

### WL-3A200



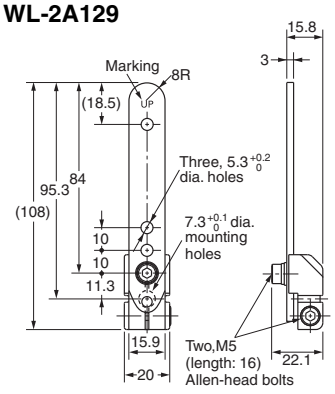

### WL-3A203



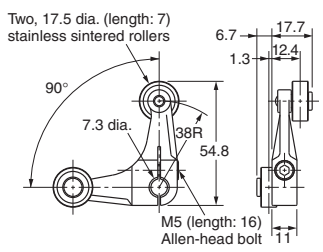

### WL-4A112




### WL-2A129

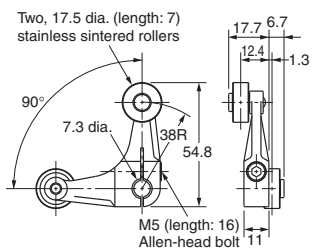



### WL-5A101



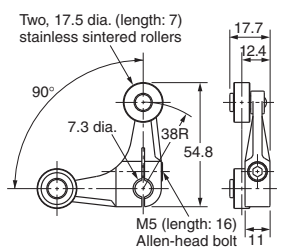

WL-5A100 has a plastic roller

### WL-5A103




WL-5A102 has a plastic roller

### WL-5A105




WL-5A104 has a plastic roller

Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.
2. When using the adjustable roller (rod) lever, make sure that the lever is facing downwards. Use caution, as telegraphing (the Switch turns ON and OFF repeatedly due to inertia) may occur.

# Safety Precautions

**Refer to *Safety Precautions for All Limit Switches*.**

## Precautions for Safe Use

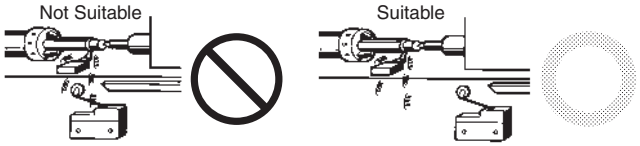
- When a rod or wired-type actuator is used, do not touch the top end of the actuator. Doing so may result in injury.
  (Applicable models)
  WLHAL5 and WL01HAL5 Rod Spring Levers and WLNJ-S2 and WL01NJ-S2 Steel-wire Actuators.
- A short-circuit may cause damage to the Switch, so insert a circuit breaker fuse, of 1.5 to 2 times the rated current, in series with the Switch.
- In order to meet EN approval ratings, use a 10-A fuse that corresponds to IEC60269, either a gI or gG for general-purpose types and spatter-prevention models only.

## Precautions for Correct Use

- When wiring terminal screws, use M4 round crimp terminals and tighten screws to the recommended torque. Wiring with bare wires, or 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.

### Operating Environment

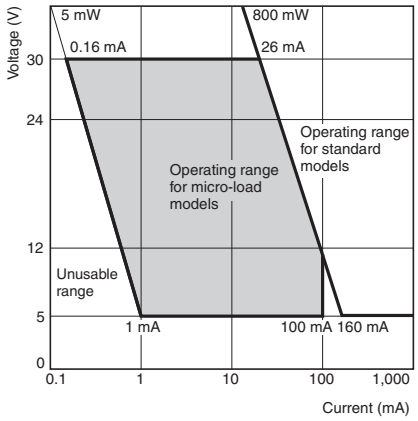
- Seal material may deteriorate if a Switch is used outdoor or where subject to special cutting oils, solvents, or chemicals. Always appraise performance under actual application conditions and set suitable maintenance and replacement periods.
- Install Switches where they will not be directly subject 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 ($SiO_2$) 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.

### Using Switches for Micro Loads

Contact faults may occur if a Switch for a general-load is used to switch a micro load circuit. Use switches in the ranges shown in the diagram below. However, even when using micro load models within the operating range shown here, if inrush current occurs when the contact is opened or closed, it may increase contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% ($\lambda_{60}$).
The equation, $\lambda_{60} = 0.5 \times 10^{-6}$/operations indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.

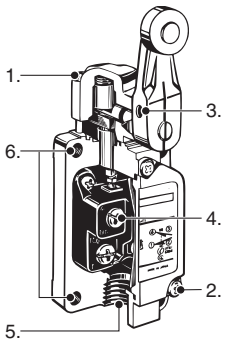


### Built-in Switch

Do not remove or replace the built-in switch. If the position of the built-in switch moves, it can cause reduced performance, and if 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.
- 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.

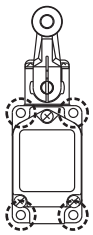
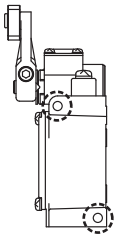



| No. | Type | Appropriate tightening torque |
|---|---|---|
| 1. | Head mounting screw | 0.78 to 0.88 N·m |
| 2. | Cover mounting screw | 1.18 to 1.37 N·m |
| 3. | Allen-head bolt (for securing the lever) | 4.90 to 5.88 N·m |
| 4. | Terminal screw | 0.59 to 0.78 N·m |
| 5. | Connector | 1.77 to 2.16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

### Installing the Switch

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

### Mounting

| WL | | Mounting locations |
|---|---|---|
| Front Mountig/ Rear Mountig | Front Mountig : Four, 5.2 $^{+0.2}_{0}$ dia. holes or M5 tapped holes<br>Rear Mountig : Four, 6.2 $^{+0.2}_{0}$ dia. holes<br>58.7 ±0.15<br>30.2 ±0.15 |  |
| **In case of side mounting for overtravel,90° WL□-□□2N** | | **Mounting locations** |
| Side Mountig | Two, 5.2 $^{+0.2}_{0}$ dia. holes<br>64 ±0.15<br>23 ±0.15 |  |

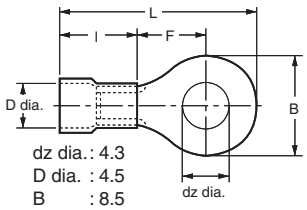
### Connectors

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. Refer to *Limit Switch Connectors* for details on SC Connectors.

### Wiring

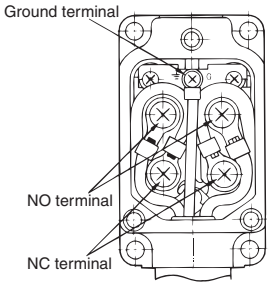
- Use 1.25-mm² lead wires and M4-insulation covered crimp terminals for wiring.

#### Crimp Terminal External Dimensions




dz dia.: 4.3
D dia. : 4.5
B : 8.5
L : 21.0
F : 7.8
l : 9.0 (mm)

#### Wiring Method Switch Box Section




- The ground terminal is only installed on models with ground terminals.

### Rotating Lever Set Position (General-purpose or Spatter-prevention Switches Only)

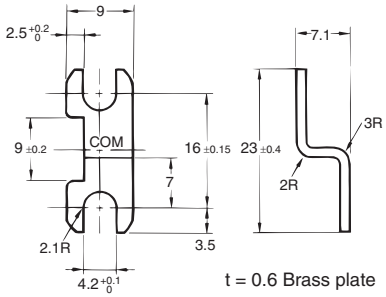
All rotating lever models, except the fork lever lock models, have a set position marker plate. (See page 23.) After operation, set the indicator needle on the marker plate so that is in the convex section of the bearing.

### Operation Set Position (Long-life Switches Only)

For all Long-life Switching, 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 switch. When ordering, specify WL Terminal Plate (product code: WL-9662F).

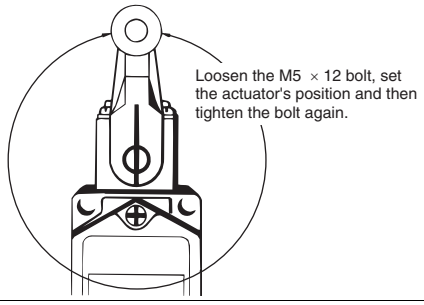
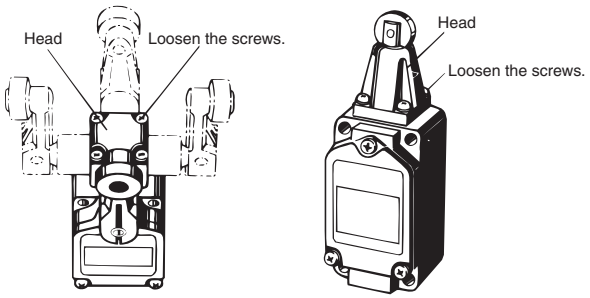
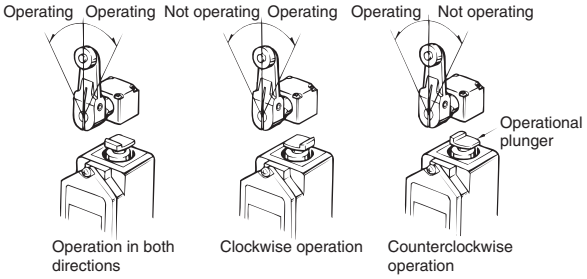
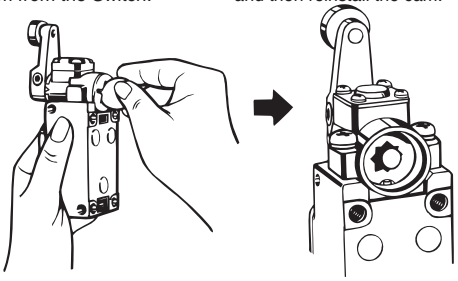
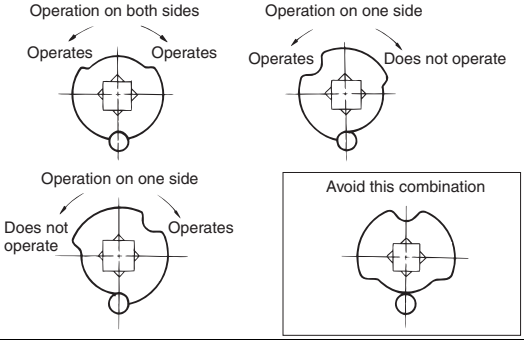


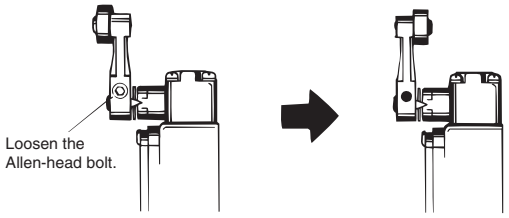
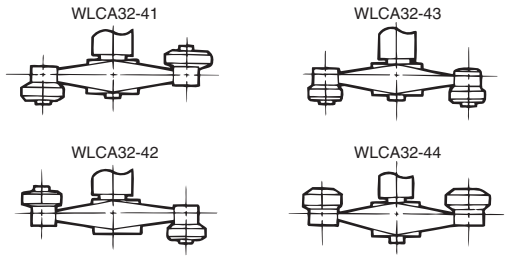
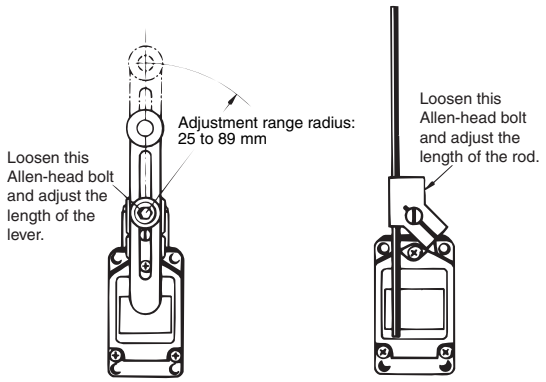

t = 0.6 Brass plate

### Indicator

Indicator-equipped switch has contacts and indicator in parallel. When contacts are open, leakage current flows through the indicator circuit and may cause load's malfunction.
Please check the load's OFF current before use the indicator-equipped switch.

## Using the Switches

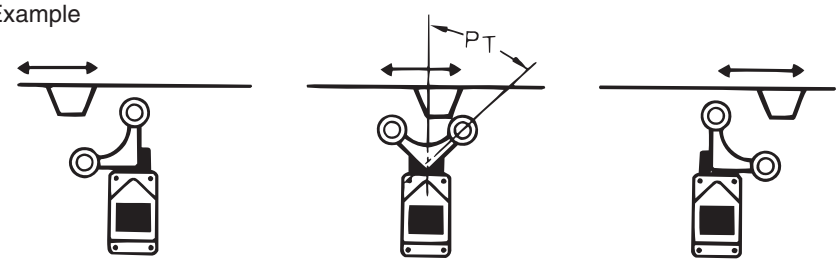
| Item | Applicable models and Actuators | Details |
|---|---|---|
| **Changing the Installation Position of the Actuator**<br>By loosening the Allen-head bolt on the actuator lever, the position of the actuator can be set anywhere within the 360°. With Indicator-equipped Switches, the actuator lever comes in contact with the top of the indicator cover, so use caution when rotating and setting the lever.<br>When the lever only moves forwards and backwards, it will not contact the lamp cover (except for long-life models). | Roller Levers:<br>WLCA2, WL01CA2, WLCA2-2, WL01CA2-2, WLH2,WL01H2, WLG2, WL01G2, WLMCA2□, WLMH2□, WLMG2□, WLMGCA2□<br>Adjustable Roller Levers:<br>WLCA12, WL01CA12, WLCA12-2, WL01CA12-2, WLH12, WL01H12, WLG12, WL01G12,<br>Adjustable Rod Levers:<br>WLCL, WL01CL, WLCL-2, WL01CL-2, WLHL, WL01HL, WLGL, WL01GL |  |
| **Changing the Orientation of the Head**<br>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 general-purpose and high-sensitivity overtravel models.) The roller plunger can be set in either two positions at 90°.<br>WLCA2-2N and WL01CA2-2N can be set only in either the forward or backward direction. | Roller Levers:<br>WLCA□, WL01CA□, WLCA□-2, WL01CA□-2, WLGCA□, WLH□, WL01H□, WLG□, WL01G□, WLMCA2□, WLMH2□, WLMG2□, WLMGCA2□<br>Adjustable Rod Levers:<br>WLCL, WL01CL, WLCL-2, WL01CL-2<br>Horizontal Plungers:<br>WLSD□, WL01SD□<br>Top-roller Plungers:<br>WLD2, WL01D2<br>Sealed Top-roller Plungers:<br>WLD28, WL01D28<br>Does not include -RP60 Series or -141 Series. |  |
| **Changing the Operating Direction**<br>By removing the Head on models which can operate on one-side only, and then changing the direction of the operational plunger, one of three operating directions can be selected. For overtravel 90° operation models, one of three operating directions can be selected by loosening the rubber holder using either a coin or a flat-blade screwdriver and changing the direction of the internal rubber section.<br>The tightening torque for the screws on the Head is 0.78 to 0.88 N•m. | Roller Levers:<br>WLCA2, WL01CA2, WLGCA2, WLMGCA2□<br>Adjustable Roller Levers:<br>WLCA12, WL01CA12<br>Adjustable Rod Levers:<br>WLCL, WL01CL<br>Overtravel Models:<br>WLCA□-2N, WL01CA□-2N | One-side Operation for General-purpose and High-precision Switches<br>The output of the Switch will be changed, regardless of which direction the lever is pushed.<br>The output of the Switch will only be changed when the lever is pushed in one direction.<br>  <br>Cam Direction Changing Procedure for Overtravel, 90° Operation Switches<br>Loosen the cam holder with a coin or screwdriver. Take out the cam from the Switch.<br>Change the direction of the cam as required by your intended operation and then reinstall the cam.<br>  <br>Relationship of cam to operation as observed from the rear of Switch<br>  |

| Item | Applicable models and Actuators | Details |
|---|---|---|
| **Installing the Roller on the Inside**<br>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.) | Roller Levers:<br>WLCA□, WL01CA□, WLH□, WLCA□-2, WL01CA□-2, WLMCA2□, WLMH2□, WLMG2□, WLMGCA2□, WLG□, except for the adjustable roller levers.<br>Fork Lever Locks:<br>WLCA32-4□, WL01CA32-4□ |  |
| **Selecting the Roller Position**<br>There are four types of fork lever lock for use depending on the roller position. | Fork Lever Locks:<br>WLCA32-4□, WL01CA32-4□ |  <br>Note: An explanation of the operation of fork lever locks is provided after this table. |
| **Adjusting the Length of the Rod or Lever**<br>The length of the rod or lever can be adjusted by loosening the Allen-head bolt. | Adjustable Roller Levers:<br>WLCA12, WL01CA12 etc.<br>Adjustable Rod Levers:<br>WLCL, WL01CL, etc. | WLCA12 etc.<br>  |

### Operation of Fork Lever Locks

The fork lever lock is configured so that the dog pushes the lever to reverse the output and this reversed state is maintained even after the dog continues on. If the dog then pushes the lever from the opposite direction, the lever will return to its original position.

Example




NC terminal: ON NO terminal: ON NO terminal: ON

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