Two-circuit Limit Switch

WL-N

Select the Best Two-circuit Switch for the Operating Environment and Application.

- Standard-feature crossbar contacts provide high contact reliability.
  Applicable to either standard loads or microloads.
- Standard features include 90° overtravel, one-side operation, and four-direction mounting.
- IP67 degree of protection.
- Approved standards: EN/IEC, UL, cUL, and CCC.
  Contact your OMRON representative for information on approved models.

⚠ Be sure to read ***Safety Precautions*** on page 24 to 26 and ***Safety Precautions for All Limit Switches***.

Features

Easy to Select

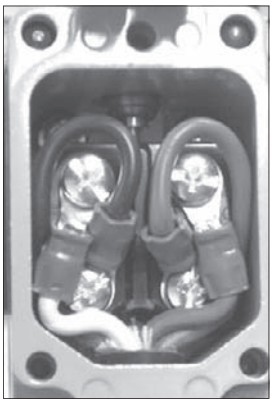
- The contacts can be used with either standard loads or microloads.
- Standard features include 90° overtravel, one-side operation, and four-direction mounting.

Easy to Work With

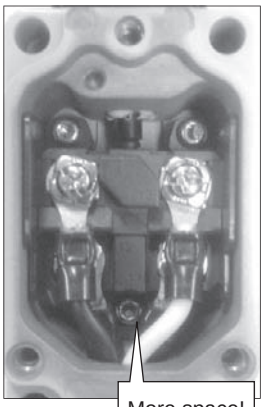
- Downsizing of the built-in switch has increased the space to house the wiring.
- Steel screws that are attracted by magnetic screwdrivers have been used for the terminal screws inside the Switches.
- Resin and elastomer resistance has replaced the insulating paper.

Internal Structure

WL



WL-N *1

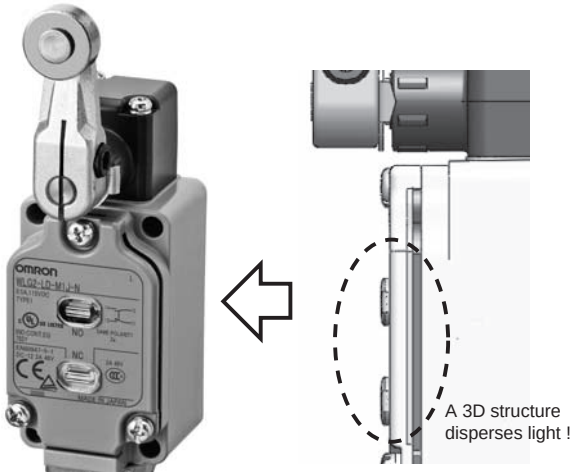


✻1. The wiring method is different for models with indicators.
Refer to ***Wring*** on page 25 under ***Safety Precautions***.

Easy tightening with magnetized screwdrivers!

Easy to See (Models with Operation Indicators)

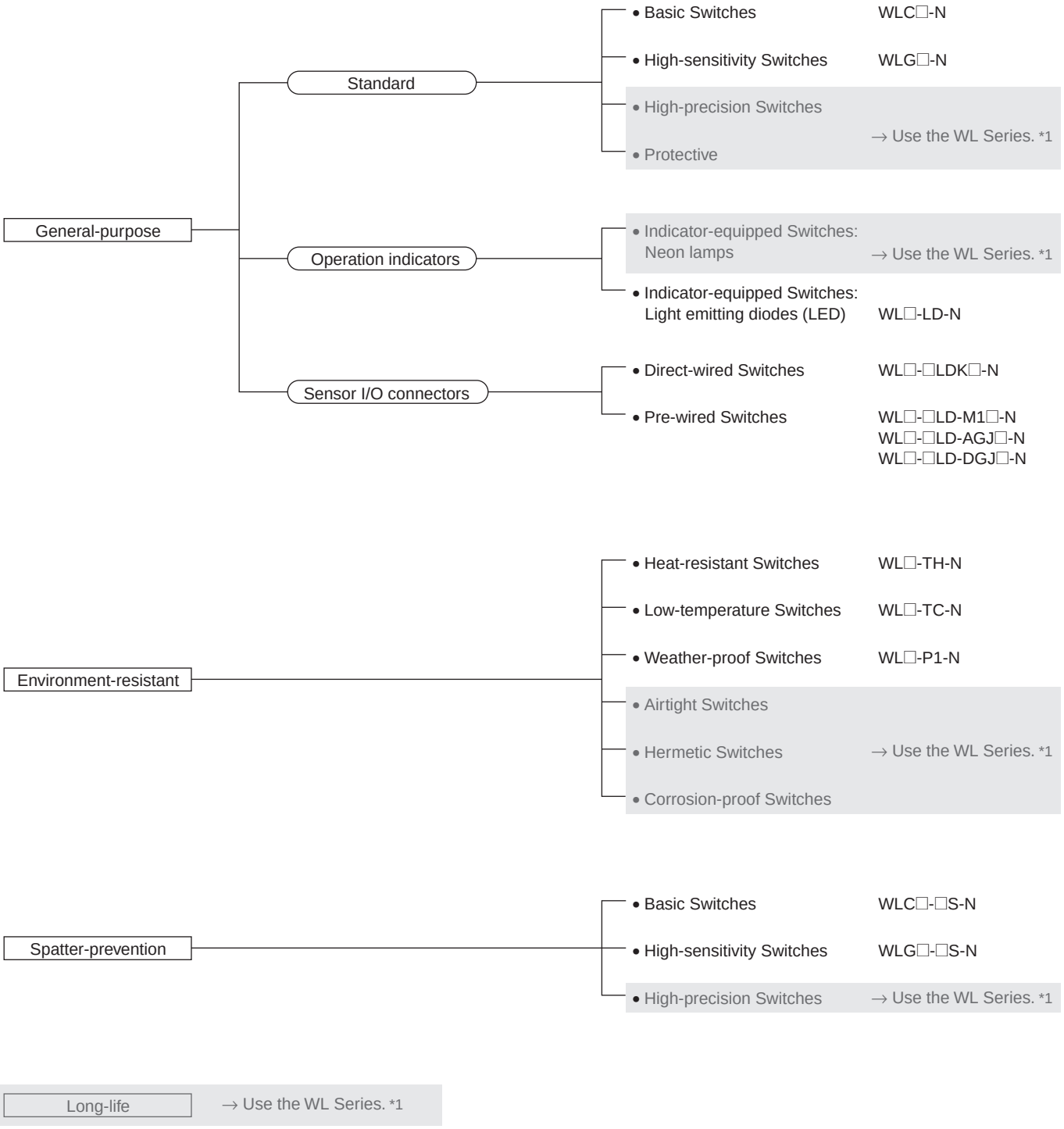
- An indicator with a wide field of view has been used.



Whether the indicator is lit can be clearly seen from the side.

Product Configuration

- Lineup of rotational lever models
- Additional series planned in the future: plunger models, fork lever lock models, and flexible rod models



✻1. Planned to be added to the WL-N Series in the future.

Model Number Structure

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

General-purpose Switches

WL□ - □ □ □ □ □ -N
(1) (2) (3) (4) (5) (6)

(1) Actuator and Property Specifications

Symbol	Lever	Pretravel (PT)
RCA2	Without Lever	15±5°
CA2	Roller lever: R38 mm	
CA2-7	Roller lever: R50 mm	
CA2-8	Roller lever: R63mm	
CA12	Adjustable roller lever: R25 to 89 mm	
CL	Adjustable rod lever: 25 to 140 mm	
RG2	Without Lever	10° $^{+2°}_{-1°}$
G2	Roller lever: R38 mm	
G12	Adjustable roller lever: R25 to 89 mm	
GL	Adjustable rod lever: 25 to 140 mm	

(2) Built-in Switch Type

Symbol	Specifications
Blank	Standard

(3) Conduit Size, Ground Terminal Specifications

Symbol	Specifications	
	Conduit Size	Ground terminal presence or absence
Blank	G1/2	Without ground terminal
G1	G1/2	With ground terminal *1
G	Pg13.5	

✻1. Cannot be combined with Connector Type models.

(4) Indicator Type

Symbol	Specifications
Blank	No indicator
LD	LED 10 to 115VAC/DC

(5) Lever Type

Symbol	Specifications
Blank	Standard lever (Allen-head bolt)
A	Double nut lever

(6) Connector Type

Symbol	Specifications				
	Shape		Voltage	Wiring locations	Connector pin No. *2
Blank	No Connector	—	—	—	—
K13A	Direct-wired Connector	Screw (M12)	AC	Only NO	③④
K13			DC	Only NO	③④
K43A			AC	NC+NO	NC: ①②, NO: ③④
K43			DC	NC+NO	NC: ①②, NO: ③④
-M1J	Pre-wired Connector *3	Screw (M12)	DC	Only NO	③④
-M1GJ			DC	Only NO	①④
-M1JB			DC	Only NC	③②
-AGJ			AC	NC+NO	NC: ①②, NO: ③④
-M1TJ		Smart Click	DC	Only NO	③④
-M1TJB			DC	Only NC	③②
-DTGJ			DC	NC+NO	NC: ①②, NO: ③④

✻2. Refer to ***Contact Forms*** on page 7 for details about connector pin numbers.
✻3. The standard cable length is 0.3 m. Contact your OMRON representative for information about other cable lengths.

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

Environment-resistant Switches

WL□ - □ □ □ □ □ -N
(1) (2) (3) (4) (5) (6)

(1) Actuator and Property Specifications

Symbol	Lever	Pretravel (PT)
RCA2	Without Lever	15±5°
CA2	Roller lever: R38 mm	
CA2-7	Roller lever: R50 mm	
CA2-8	Roller lever: R63mm	
CA12	Adjustable roller lever: R25 to 89 mm	
CL	Adjustable roller lever: 25 to 140 mm	
RG2	Without Lever	10° $^{+2°}_{-1°}$
G2	Roller lever: R38 mm	
G12	Adjustable roller lever: R25 to 89 mm	
GL	Adjustable rod lever: 25 to 140 mm	

(2) Environment-resistant Model Specifications

Symbol	Specifications
Blank	Standard
P1	Weather-proof

(3) Built-in Switch Type

Symbol	Specifications
Blank	Standard

(4) Temperature Type

Symbol	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

✻1. Cannot be combined with Weather-proof Switches.

(5) Conduit Size, Ground Terminal Specifications

Symbol	Specifications	
	Conduit Size	Ground terminal presence or absence
Blank	G1/2	Without ground terminal
G1	G1/2	With ground terminal
G	Pg13.5	

(6) Lever Type

Symbol	Specifications
Blank	Standard lever (Allen-head bolt material: steel)
A	Double nut lever (bolt material: stainless)

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

Spatter-prevention Switches

WL□ - □ □ □ □ S□ -N
(1) (2) (3) (4) (5) (6)

(1) Actuator and Property Specifications

Symbol	Lever	Pretravel (PT)
RCA2	Without Lever	15±5°
CA2	Roller lever: R38 mm	
RG2	Without Lever	10° $^{+2°}_{-1°}$
G2	Roller lever: R38 mm	

(2) Built-in Switch Type

Symbol	Specifications
Blank	Standard

(3) Conduit Size, Ground Terminal Specifications

Symbol	Specifications	
	Conduit Size	Ground terminal presence or absence
Blank	G1/2	Without ground terminal

(4) Indicator Type

Symbol	Specifications
LD	LED 10 to 115VAC/VDC

(5) Lever Type

Symbol	Specifications
Blank	Allen-head bolt lever (bolt material: stainless)
A	Double nut lever (bolt material: stainless)
F	Hexagonal head screw with hexagon socket lever (bolt material: stainless)

(6) Connector Type

Symbol	Specifications				
	Shape		Voltage	Wiring locations	Connector pin No. *1
Blank	Without connector	—	—	—	—
-DGJS	Pre-wired Connector *2	Screw (M12)	DC	NC+NO	NC: ① ②, NO: ③ ④
-DTGJS		Smart Click	DC	NC+NO	NC: ① ②, NO: ③ ④

∗1. Refer to ***Contact Forms*** on page 7 for details about connector pin numbers.
∗2. The standard cable length is 0.3 m. Contact your OMRON representative for information about other cable lengths.

Ordering Information

General-purpose Switches

Standard Switches

Actuator		Roller lever R38	Roller lever R50	Roller lever R63
Item	Pretravel (PT)	Model	Model	Model
Basic Switches	15±5°	WLCA2-N	WLCA2-7-N	WLCA2-8-N
High-sensitivity Switches	10° +2° -1°	WLG2-N	—	—

Actuator		Adjustable roller lever	Adjustable rod lever 25 to 140 mm
Item	Pretravel (PT)	Model	Model
Basic Switches	15±5°	WLCA12-N	WLCL-N
High-sensitivity Switches	10° +2° -1°	WLG12-N	WLGL-N

Indicator-equipped Switches

Actuator			Roller lever R38	Roller lever R50	Roller lever R63
Indicator	Item	Pretravel (PT)	Model	Model	Model
LED	Basic Switches	15±5°	WLCA2-LD-N	WLCA2-7LD-N	WLCA2-8LD-N
	High-sensitivity Switches	10° +2° -1°	WLG2-LD-N	—	—

Actuator			Adjustable roller lever	Adjustable rod lever 25 to 140 mm
Indicator	Item	Pretravel (PT)	Model	Model
LED	Basic Switches	15±5°	WLCA12-LD-N	WLCL-LD-N
	High-sensitivity Switches	10° +2° -1°	WLG12-LD-N	WLGL-LD-N

General-purpose Switches

Sensor I/O Connector Switches

Direct-wired Connectors

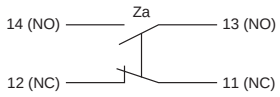
				Actuator	Roller lever R38
				Basic Switches	High-sensitivity Switches
Shape	Voltage	Wiring locations	Connector pin No.	Model	Model
Screw	AC	NO	③ ④	WLCA2-LDK13A-N	—
		NC + NO	NC ① ②, NO ③ ④	WLCA2-LDK43A-N	—
	DC	NO	③ ④	WLCA2-LDK13-N	WLG2-LDK13-N
		NC + NO	NC ① ②, NO ③ ④	WLCA2-LDK43-N	WLG2-LDK43-N

Pre-wired Connectors

				Actuator	Roller lever R38
				Basic Switches	High-sensitivity Switches
Shape	Voltage	Wiring locations	Connector pin No.	Model	Model
Screw	AC	NC + NO	NC ① ②, NO ③ ④	WLCA2-LD-AGJ-N	WLG2-LD-AGJ-N
	DC	NO	③ ④	WLCA2-LD-M1J-N	WLG2-LD-M1J-N
		NO	① ②	WLCA2-LD-M1GJ-N	WLG2-LD-M1GJ-N
		NC	③ ②	WLCA2-LD-M1JB-N	WLG2-LD-M1JB-N
Smart Click		NO	③ ④	—	WLG2-LD-M1TJ-N
		NC	③ ②	—	WLG2-LD-M1TJB-N

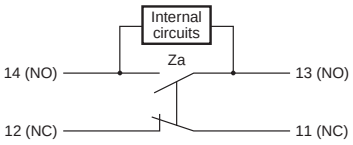
Contact Forms

Screw Terminal Switches



Screw Terminal Switches

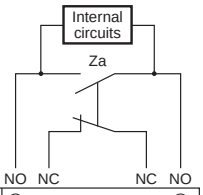
Indicator-equipped (Light-ON when Not Operating) Switches *1



Direct-wired Connectors/Pre-wired Connectors

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

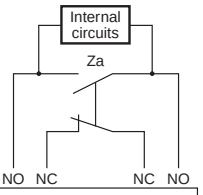
AC



WL□-□K13A-N	④ —	— ③
WL□-□K43A-N WL□-□-AGJ-N	④ ①	② ③

①②③④ indicate the connector pin number.

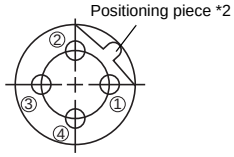
DC



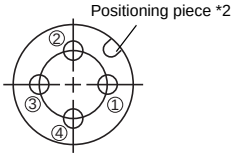
WL□-□K13-N WL□-□-M1J-N WL□-□-M1TJ-N	④ —	— ③
WL□-□-M1GJ-N	④ —	— ①
WL□-□-M1JB-N WL□-□-M1TJB-N	— ③	② —
WL□-□K43-N	④ ①	② ③

Connector Pin Layout Diagram

AC



DC

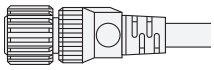
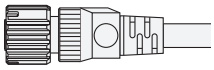


Note: Leakage current from indicator circuit may cause load's malfunction. Please check the load's OFF current before use the indicator-equipped switch.

∗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.

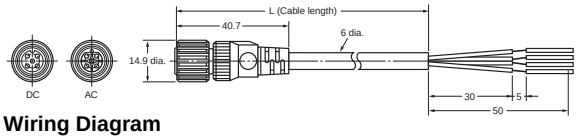
∗2. The position of the positioning piece is not always the same. If using an L-shaped connector causes problems in application, use a straight connector.

Connecting Sensor I/O connector cable (Socket)

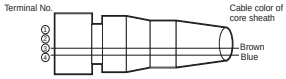
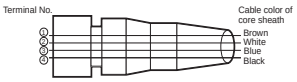
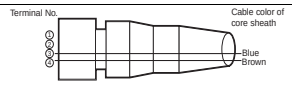
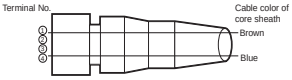
Type	AC/DC Type	Number of cable cores	Cable length L (m)	Model	Applicable limit switch models
M12 Screw (Straight) 	AC	2	2 m	XS2F-A421-DB0-F	WL□-□K13A-N
			5 m	XS2F-A421-GB0-F	
		4	2 m	XS2F-A421-D90-F	WL□-□K43A-N WL□-□-AGJ-N
			5 m	XS2F-A421-G90-F	
	DC	2	2 m	XS2F-D421-DD0	WL□-□K13-N WL□-□-M1J-N
			5 m	XS2F-D421-GD0	
			2 m	XS2F-D421-DA0-F	WL□-□-M1GJ□-N
			5 m	XS2F-D421-GA0-F	
		4	2 m	XS2F-D421-D80-F	WL□-□K43-N WL□-□-M1JB-N
			5 m	XS2F-D421-G80-F	
M12 Smart click type (Straight) 	DC	4	2 m	XS5F-D421-D80-F	WL□-□-M1TJ-N WL□-□-M1TJB-N
			5 m	XS5F-D421-G80-F	

Dimensions (Unit: mm)

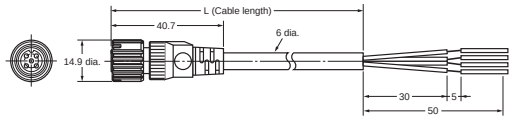
XS2F-□421-□□0-□
XS2F-D421-□D0



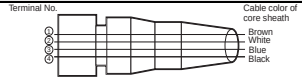
Wiring Diagram

AC/DC Type	Two-core model		Four-core model	
	Model	Wiring Diagram	Model	Wiring Diagram
AC	XS2F-A421-DB0-F XS2F-A421-GB0-F		XS2F-A421-D90-F XS2F-A421-G90-F	
DC	XS2F-D421-DD0 XS2F-D421-GD0		XS2F-D421-D80-F XS2F-D421-G80-F	
	XS2F-D421-DA0-F XS2F-D421-GA0-F			

XS5F-D421-□80-F



Wiring Diagram

AC/DC Type	Four-core model	
	Model	Wiring Diagram
DC	XS5F-D421-D80-F XS5F-D421-G80-F	

Environment-resistant Switches

Item		Pretravel (PT)	Actuator: Roller lever R38  Model	Adjustable roller lever  Model	Adjustable rod lever 25 to 140 mm  Model
Heat-resistant Switches	Basic Switches	15±5°	WLCA2-TH-N	WLCA12-TH-N	WLCL-TH-N
	High-sensitivity Switches	10° $^{+2°}_{-1°}$	WLG2-TH-N	WLG12-TH-N	WLGL-TH-N
Low-temperature Switches	Basic Switches	15±5°	WLCA2-TC-N	WLCA12-TC-N	WLCL-TC-N
	High-sensitivity Switches	10° $^{+2°}_{-1°}$	WLG2-TC-N	WLG12-TC-N	WLGL-TC-N
Weather-proof Switches	Basic Switches	15±5°	WLCA2-P1-N	WLCA12-P1-N	WLCL-P1-N
	High-sensitivity Switches	10° $^{+2°}_{-1°}$	WLG2-P1-N	WLG12-P1-N	WLGL-P1-N

Spatter-prevention Selection Switches

Item		Pretravel (PT)	Actuator: Roller lever R38  Double Nut Lever  Model	Allen-head Lever  Model
LED	Basic Switches	15±5°	WLCA2-LDAS-N	WLCA2-LDS-N
	High-sensitivity Switches	10° $^{+2°}_{-1°}$	WLG2-LDAS-N	WLG2-LDS-N

Individual Parts

Switches without levers / Heads / Actuators

General-purpose

Actuator type	Item	Pretravel (PT)	Set model	Switches without levers *1	Heads *2 (with Actuators)	Actuators *3
				Model	Model	Model
Roller lever 	Basic Switches	15±5°	WLCA2-N	WLRCA2-N	WL-1H1100-N	WL-1A100
	High-sensitivity Switches	10° +2° -1°	WLG2-N	WLRG2-N	WL-2H1100-N	
Adjustable roller lever 	Basic Switches	15±5°	WLCA12-N	WLRCA2-N	WL-1H2100-N	WL-2A100
	High-sensitivity Switches	10° +2° -1°	WLG12-N	WLRG2-N	WL-2H2100-N	
Adjustable rod lever 	Basic Switches	15±5°	WLCL-N	WLRCA2-N	WL-1H4100-N	WL-4A100
	High-sensitivity Switches	10° +2° -1°	WLGL-N	WLRG2-N	WL-2H4100-N	

✻1. The Switches without levers is not compatible with WL-series models.
✻2. The Heads is not compatible with WL-series models.
✻3. The actuator is common use in WL and WL-N.

Spatter-prevention Switches

Actuator type	Lever Type	Item	Set model	Switches without levers *1	Heads *2 (with Actuators)	Actuators *3
				Model	Model	Model
Roller lever 	Standard lever	Basic Switches	WLCA2-LDS-N	WLRCA2-LDS-N	WL-1H1100S-N	WL-1A103S
		High-sensitivity Switches	WLG2-LDS-N	WLRG2-LDS-N		
	Double nut lever	Basic Switches	WLCA2-LDAS-N	WLRCA2-LDS-N	WL-2H1100S-N	WL-1A105S
		High-sensitivity Switches	WLG2-LDAS-N	WLRG2-LDS-N		

✻1. The Switches without levers is not compatible with WL-series models.
✻2. The Heads is not compatible with WL-series models.
✻3. The actuator is common use in WL and WL-N.

Covers with Operation Indicators (See Note.)

General-purpose

Cover / Item	Covers *1 Model
LED	WL-LD-N

✻1. The cover is not compatible with WL-series models.

Spatter-prevention Switches

Cover / Item	Covers *1 Model
LED	WL-LDS-N

✻1. The cover is not compatible with WL-series models.

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."

Specifications

General-purpose/Environment-resistant Switches

Ratings

Screw Terminals

Item	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 Switches	AC 125	10		3	1.5	10		5	2.5
	250	10		2	1	10		3	1.5
	500	10		1.5	0.8	3		1.5	0.8
	DC 8	10		6	3	10		6	
	14	10		6	3	10		6	
	30	6		4	3	6		4	
	125	0.8		0.2	0.2	0.8		0.2	
	250	0.4		0.1	0.1	0.4		0.1	
High-sensitivity Switches	AC 125	5		—		—		—	
	250	5							
	DC 125	0.4		—		—		—	
	250	0.2							

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.
5. For PC loads, use the microload models.

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

✻ For high-sensitivity overtravel.

Minimum applicable load	5 VDC 1 mA, resistive load, P level

Indicator-equipped Switches

Model	Item	Max. rated voltage	Leakage current (mA)
WL-LD-N	LED	10 to 24 VAC/DC	Approx. 0.4
		115 VAC/DC	Approx. 0.5

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-N)
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 currentcarrying metal part and ground	2,200 VAC (1,500 VAC), 50/60 Hz for 1 min
	Between each terminal and non-currentcarrying metal part	2,200 VAC (1,500 VAC), 50/60 Hz for 1 min
Vibration resistance	Malfunction	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction	1,000 m/s^2 max.
	Malfunction	300 m/s^2
Ambient operating temperature		-10 to +80°C (with no icing) *4
Ambient operating humidity		35% to 95% RH
Weight		Approx. 255 g (in case of WLCA2-N)

Note: 1. The above figures are initial values.
2. 2. The figures in parentheses for dielectric strength are those for the highsensitivity 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 1,000,000 operations min. for high-sensitivity models.
500,000 operations min. for weather-proof models.
✻**3.** Durability is 500,000 operations min. for high-sensitivity models.
500,000 operations min. for weather-proof models.
✻**4.** For low-temperature models this is -40°C to +40°C (with no icing). For heatresistant models the range is +5°C to +120°C.

Spatter-prevention Switches

Ratings

Screw Terminals

Item	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□-LDS-N (Without high-sensitivity overtravel models)	AC 115	10		3	1.5	10		5	2.5
	DC 12	10		6	3	10		6	
	24	6		4	3	6		4	
	115	0.8		0.2	0.2	0.8		0.2	

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.

✻ Refer to the rating of a General-purpose / Weather-proof Switches type for the rating of a high-sensitivity overtravel type.

Inrush current (Without high-sensitivity overtravel models)	NC	30 A max.
	NO	20 A max.
Operating temperature		-10°C to +80°C (with no icing)
Operating humidity		35 to 95% RH

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-□S-N)
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 currentcarrying metal part and ground	2,200 VAC (1,500 VAC), 50/60 Hz for 1 min
	Between each terminal and non-currentcarrying metal part	2,200 VAC (1,500 VAC), 50/60 Hz for 1 min
Vibration resistance	Malfunction	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Destruction	1,000 m/s^2 max.
	Malfunction	300 m/s^2
Ambient operating temperature		-10 to +80°C (with no icing)
Ambient operating humidity		35% to 95% RH
Weight		Approx. 255 g (in case of WLCA2-□S-N)

Note: 1. The above figures are initial values.
2. 2. The figures in parentheses for dielectric strength are those for the highsensitivity 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 1,000,000 operations min. for high-sensitivity models.
500,000 operations min. for weather-proof models.
✻**3.** Durability is 500,000 operations min. for high-sensitivity models.
500,000 operations min. for weather-proof models.

General-purpose/ Environment-resistant/ Spatter-prevention Switches

Approved Standards

Agency	Standard	File No.	Approved models
UL	UL508	Contact your OMRON representative for information	Contact your OMRON representative for information
	CSA C22.2 No.14		
TÜV Rheinland	EN60947-5-1		
CCC (CQC)	GB14048.5		

Approved Standard Ratings

UL/cUL (UL508, CSA C22.2 No.14)

Specifications			Approved Standards
Indicator	Sensor I/O connectors	Item	
No indicator	No Connector	Basic Switches	A600 1 A, 125 VDC
		High-sensitivity Switches	B600 0.5 A, 125 VDC
	Pre-wired Connector (AC)	Basic Switches and High-sensitivity Switches	C300 3 A, 250 VAC
	Pre-wired Connector (DC) Direct-wired Connector (DC)	Basic Switches	1 A, 125 VDC
		High-sensitivity Switches	0.5 A, 125 VDC
LED	No Connector	Basic Switches	A150 10 A, 115 VAC 1 A, 115 VDC
		High-sensitivity Switches	B150 5 A, 115 VAC 0.5 A, 115 VDC
	Pre-wired Connector (AC)	Basic Switches and High-sensitivity Switches	C150 3 A, 115 VAC
	Pre-wired Connector (DC) Direct-wired Connector (DC)	Basic Switches	1 A, 115 VDC
		High-sensitivity Switches	0.5 A, 115 VDC

A600 Authentication conditions

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

B600 Authentication conditions

Rated voltage	Energizing current	Current (A)		Volt-ampere (VA)	
		Make	Break	Make	Break
120 VAC 240 VAC 480 VAC 600 VAC	5 A	30 15 7.5 6	3 1.5 0.75 0.6	3,600	360

A150 Authentication conditions

Rated voltage	Energizing current	Current (A)		Volt-ampere (VA)	
		Make	Break	Make	Break
120 VAC	10 A	60	6	7,200	720

B150 Authentication conditions

Rated voltage	Energizing current	Current (A)		Volt-ampere (VA)	
		Make	Break	Make	Break
120 VAC	5 A	30	3	3,600	360

C150 Authentication conditions

Rated voltage	Energizing current	Current (A)		Volt-ampere (VA)	
		Make	Break	Make	Break
120 VAC	2.5 A	15	1.5	1,800	180

TUV (EN60947-5-1)

(Authenticated for ground terminal models and DC connector models only.)

Authentication conditions	Specification				
	With ground terminals				With DC Connector
	No indicator		LED		
Working load category	AC-15	DC-12	AC-15	DC-12	DC-12
Rated working voltage (Ue)	250 V	48 V	115 V	48 V	48 V
Rated working current (Ie)	2 A				
Conditional short-circuit current	100 A				
Short-circuit protective device (SCPD)	10 A, fuse type gG				
Rated insulation voltage (Ui)	250 V				48 V
Rated impulse dielectric strength (Uimp)	4 kV				800 V
Pollution degree	3				
Electric shock protection class	Class Ⅰ				Class Ⅲ

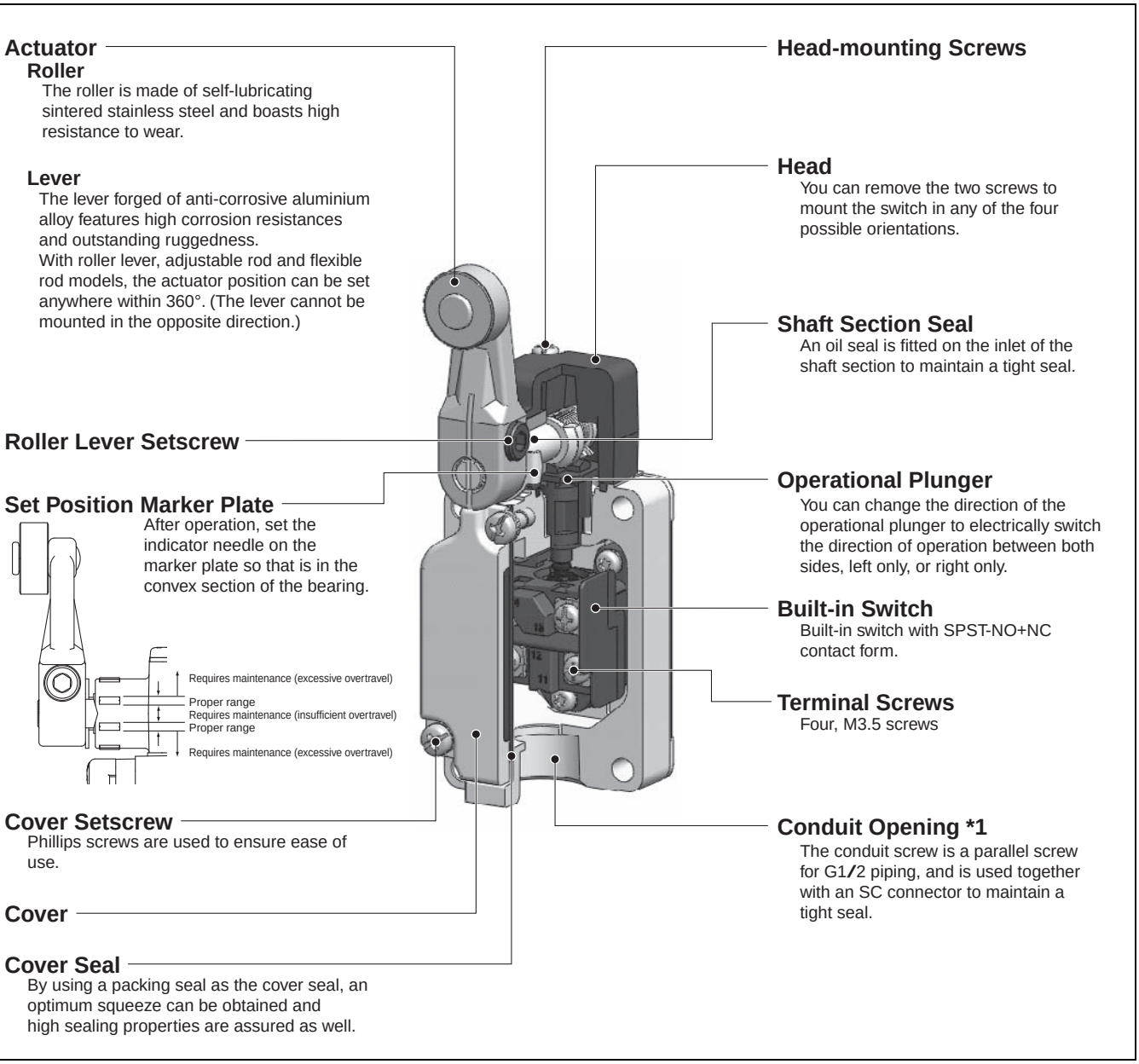
CCC (GB14048.5)

Authentication conditions	Specification					
	No indicator		LED		With DC Connector	With AC Connector
Working load category	AC-15	DC-13	AC-15	DC-13	DC-13	AC-15
Rated working voltage (Ue)	250 V	48 V	250 V	48 V	48 V	250 V
Rated working current (Ie)	2 A					
Conditional short-circuit current	1000 A					
Short-circuit protective device (SCPD)	10 A, fuse type gG					
Rated insulation voltage (Ui)	250 V					

Structure and Nomenclature

Structure

General-purpose Switches: WLCA2-N



✻1. The available conduit screws are Pg 13.5, M20 and 1/2-14 NPT.

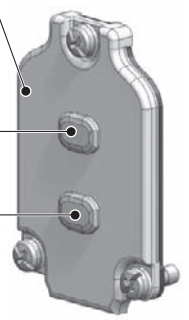
Indicators

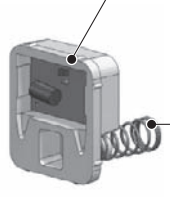
Indicator Covers
The indicator covered if outsert molded from diecast aluminum and has outstanding sealing properties.

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

Light-ON when Operating/Not Operating

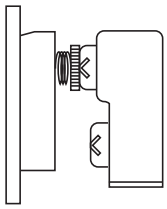
Indicators can be switched from light-ON when operating and light-ON when not operating, by simply rotating the indicator holder by 180°.



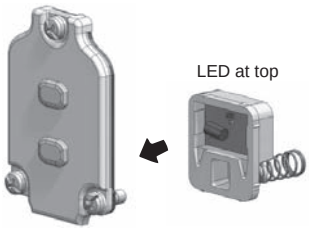


Indicator
The indicator is an LED. Models with LED indicators have a built-in rectifier stack, so it is not necessary to change the polarity.

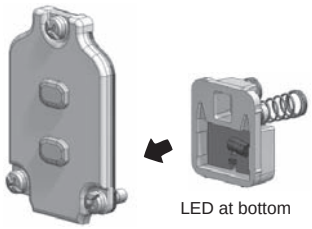
Contact Spring
The built-in switch's terminal screws are used to connect the indicator terminal. Since the connection spring (coil spring) is used for this connection, it will not be necessary to connect the indicator terminal. When a ground terminal is provided however, a lead wire must be used.



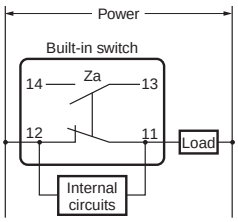
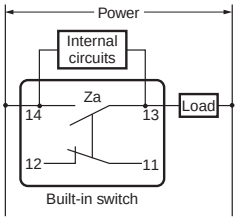
Light-ON when Operating



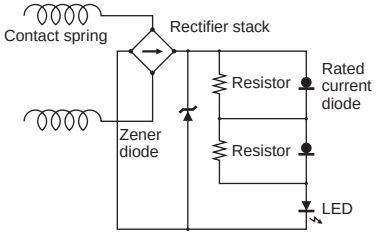
Light-ON when Not Operating



Operation

WL-LD-N	Light-ON when operating *1	
	Light-ON when not operating *2	

Internal Circuits

WL-LD-N	

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.

***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.

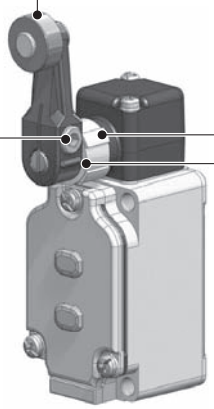
Spatter-prevention Switches: WLCA2-LDS-N

Actuator

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

Operating Lever
A baking finish is applied to the surface so that any adhering spatter is easily removed.

Roller Lever Setscrew
Stainless steel construction to prevent spatter adherence.
Double nut models are also available.



Screws
Externally visible screws on the head and cover are made of stainless steel to prevent spatter adherence.

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.

Dimensions and Operating Characteristics

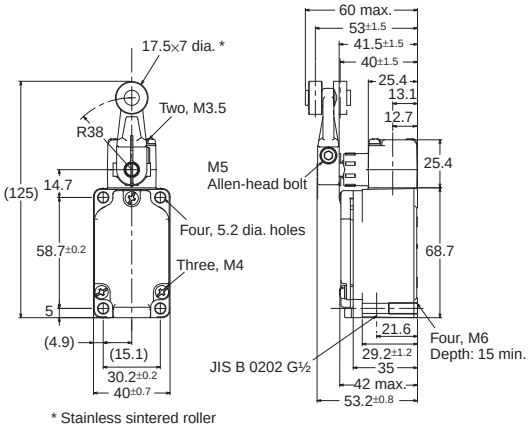
(Unit: mm)

General-purpose Models

Standard Models

Basic / High-sensitivity

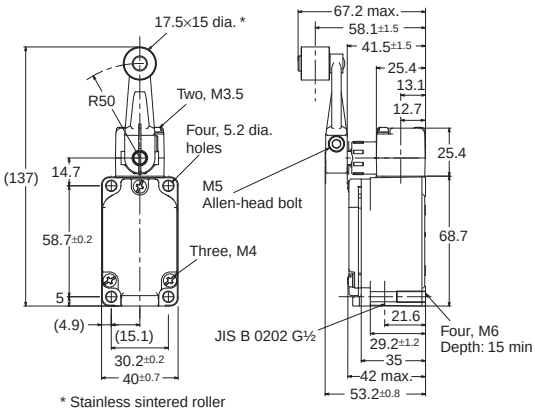
Roller lever R38
Basic **High-sensitivity**
WLCA2-N **WLG2-N**



* Stainless sintered roller

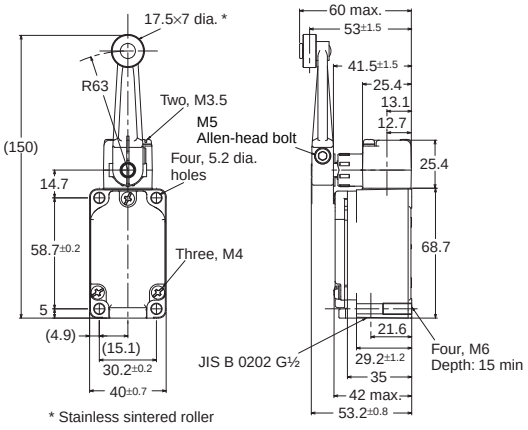
Only the external appearance of the set position indicator plate varies on high-sensitivity models.

Roller lever R50
Basic
WLCA2-7-N



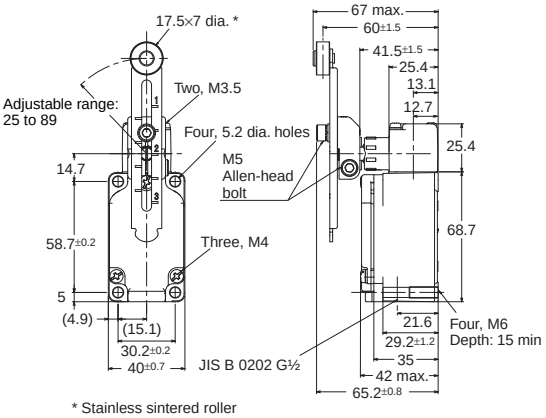
* Stainless sintered roller

Roller lever R63
Basic
WLCA2-8-N



* Stainless sintered roller

Adjustable roller lever
Basic **High-sensitivity**
WLCA12-N **WLG12-N**



* Stainless sintered roller

Only the external appearance of the set position indicator plate varies on high-sensitivity models.

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

Operating characteristics		Model	WLCA2-N	WLG2-N	WLCA2-7-N	WLCA2-8-N
Operating force	OF	max.	13.34 N	13.34 N	10.2 N	8.04 N
Release force	RF	min.	1.18 N	1.18 N	0.9 N	0.71 N
Pretravel	PT		15±5°	10° $^{+2°}_{-1°}$	15±5°	15±5°
Overtravel	OT	min.	70°	80°	70°	70°
Movement Differential	MD	max.	12°	7°	12°	12°

Operating characteristics		Model	WLCA12-N *1	WLG12-N *1
Operating force	OF	max.	13.34 N	13.34 N
Release force	RF	min.	1.18 N	1.18 N
Pretravel	PT		15±5°	10° $^{+2°}_{-1°}$
Overtravel	OT	min.	70°	80°
Movement Differential	MD	max.	12°	7°

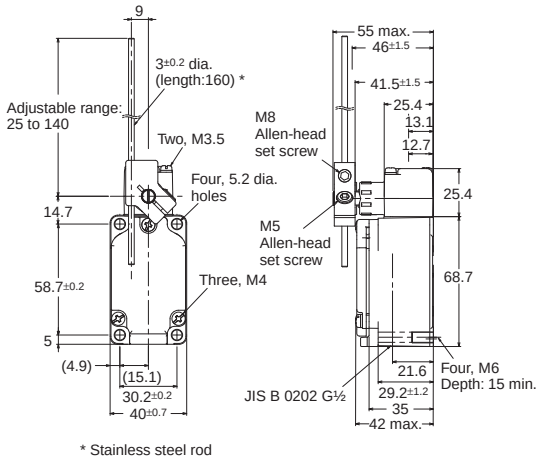
***1.** The operating characteristics for WLCA12 -N and WLG12-N are measured at the lever length of 38 mm.

Basic / High-sensitivity

Adjustable rod lever 25 to 140 mm

Basic **WLCL-N**

High-sensitivity **WLGL-N**



* Stainless steel rod

Only the external appearance of the set position indicator plate varies on high-sensitivity models.

Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

Operating characteristics		Model	WLCL-N *1	WLGL-N *1
Operating force	**OF**	**max.**	1.39 N	2.84 N
Release force	**RF**	**min.**	0.27 N	0.25 N
Pretravel	**PT**		15±5°	10° $^{+2°}_{-1°}$
Overtravel	**OT**	**min.**	70°	80°
Movement Differential	**MD**	**max.**	12°	7°

✻1. The operating characteristics for WLCL-N and WLGL-N are measured at the lever length of 140 mm.

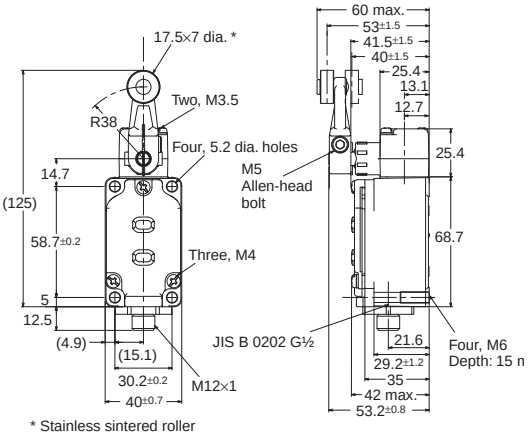
Sensor I/O connector Models

(For details about applicable cables, refer to ***Connecting Sensor I/O Connectors Cable and Socket*** on page 8.)

Direct-wired Connector

Roller lever

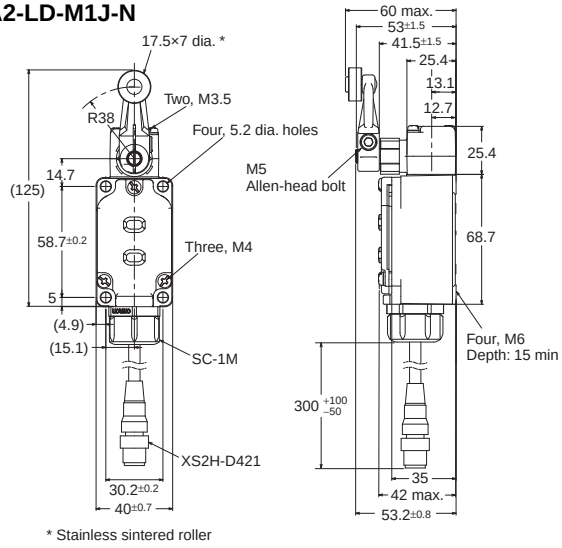
WLCA2-LDK13-N



Pre-wired

Roller lever

WLCA2-LD-M1J-N



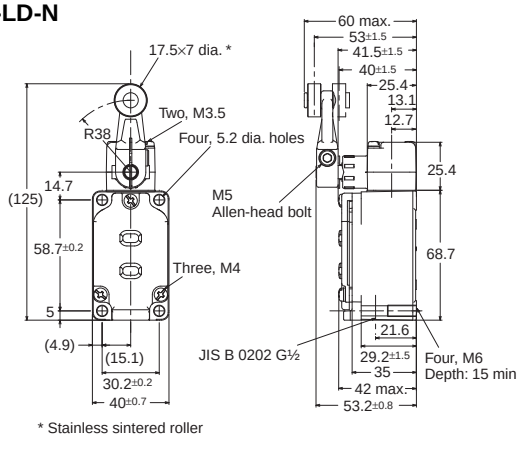
Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.
2. The following diagrams are for a indicator-equipped models.

Operating characteristics			Model	WLCA2-LDK13-N WLCA2-LD-M1J-N
Operating force	OF	max.		13.34 N
Release force	RF	min.		1.18 N
Pretravel	PT			15±5°
Overtravel	OT	min.		70°
Movement Differential	MD	max.		12°

Operation indicator Models

Roller lever

WLCA2-LD-N

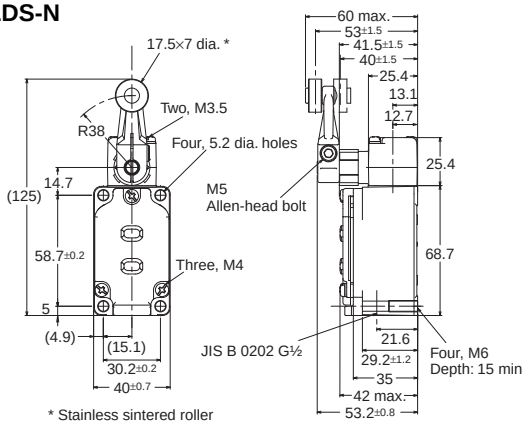


Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

Operating characteristics			Model	WLCA2-LD-N
Operating force	OF	max.		13.34 N
Release force	RF	min.		1.18 N
Pretravel	PT			15±5°
Overtravel	OT	min.		70°
Movement Differential	MD	max.		12°

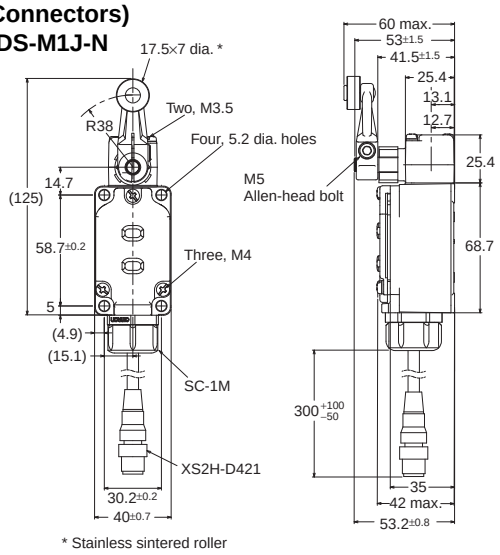
Spatter-prevention Models

Roller lever
(Screw terminals)
WLCA2-LDS-N



* Stainless sintered roller

Roller lever
(Pre-wired Connectors)
WLCA2-LDS-M1J-N



* Stainless sintered roller

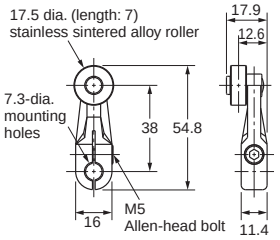
Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

Operating characteristics		Model	WLCA2-LDS-N WLCA2-LDS-M1J-N
Operating force	**OF**	**max.**	13.34 N
Release force	**RF**	**min.**	1.18 N
Pretravel	**PT**		15±5°
Overtravel	**OT**	**min.**	70°
Movement Differential	**MD**	**max.**	12°

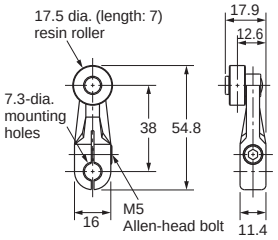
Actuators (Levers Only)

Lever: Only rotating lever models are illustrated.

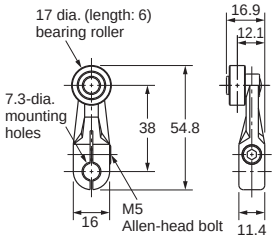
WL-1A100
Standard Lever



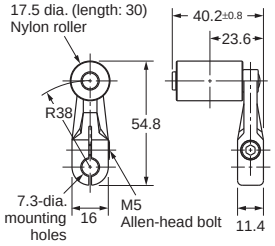
WL-1A115
Resin Roller



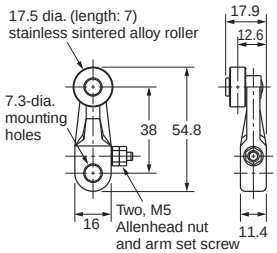
WL-1A400
Bearing Roller



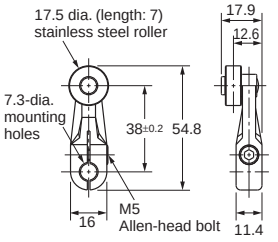
WL-1A118
Nylon Roller:
Roller Width: 30 mm



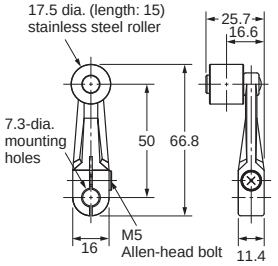
WL-1A105
Double Nuts



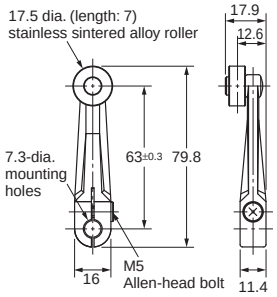
WL-1A103S
Spatter



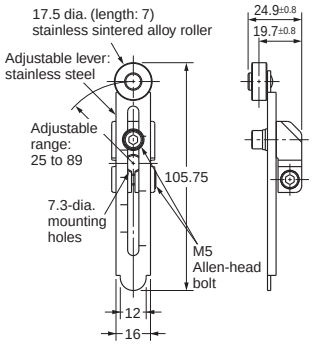
WL-1A200
Lever Length: 50
Roller Width: 15



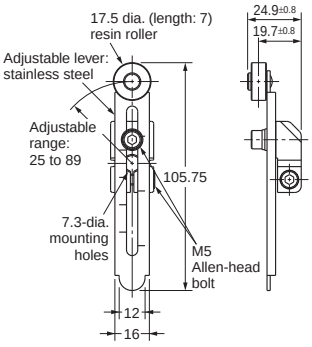
WL-1A300
Lever Length: 63



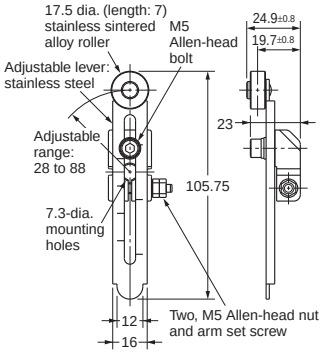
WL-2A100



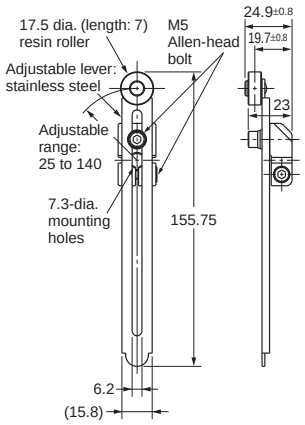
WL-2A111
Resin Roller



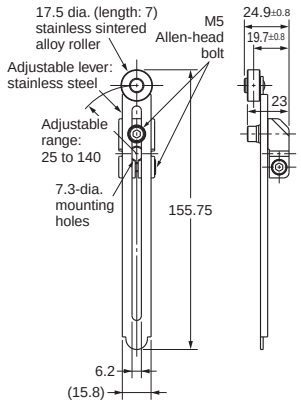
WL-2A107
Double Nuts



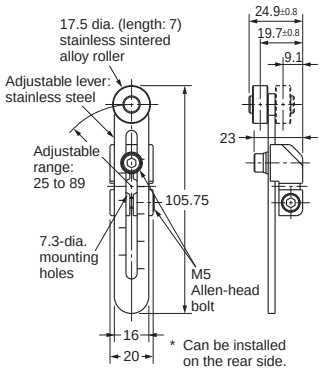
WL-2A108
Resin Roller



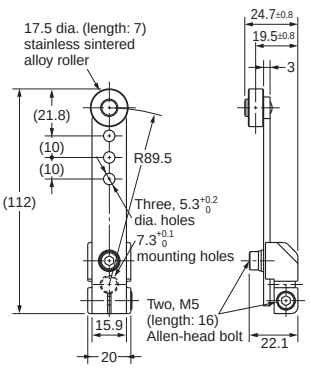
WL-2A122



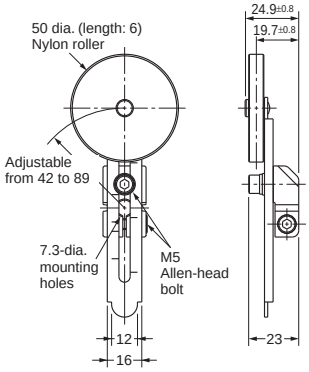
WL-2A106



WL-2A130



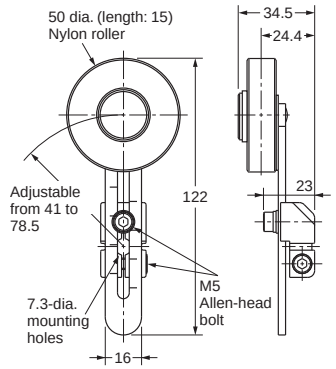
WL-2A104



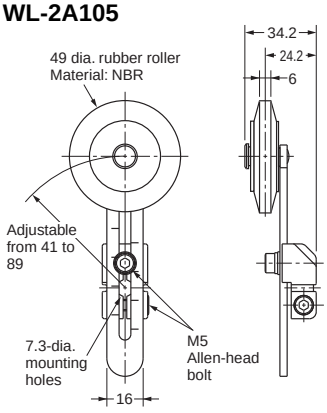
Note: 1. Unless otherwise indicated, a tolerance of ±0.4 mm applies to all dimensions.

Lever: Only rotating lever models are illustrated.

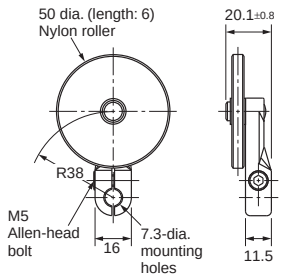
WL-2A110



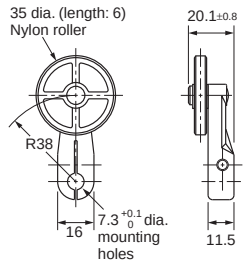
WL-2A105



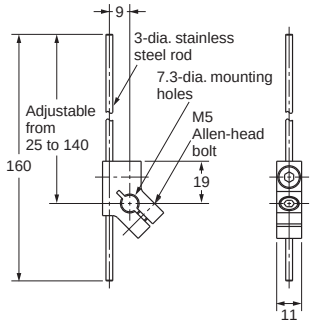
WL-1A106



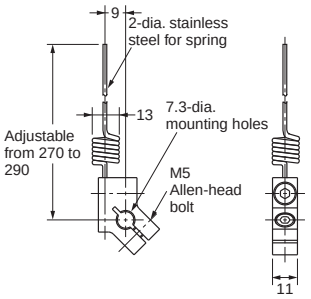
WL-1A110



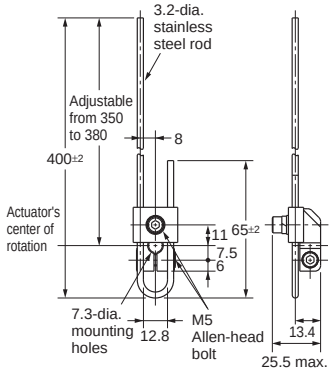
WL-4A100



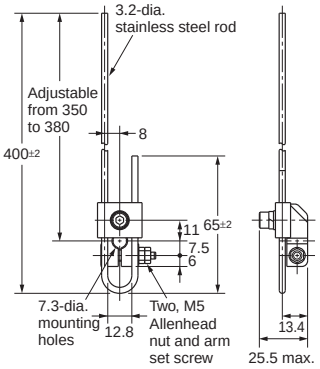
WL-4A201



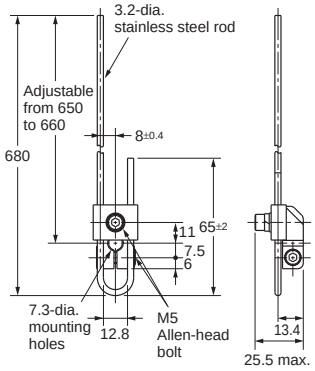
WL-3A100



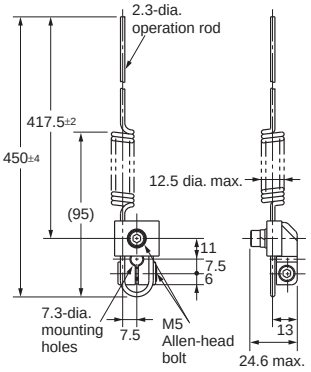
WL-3A106
Double Nut



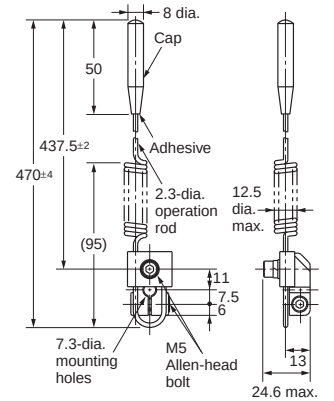
WL-3A108



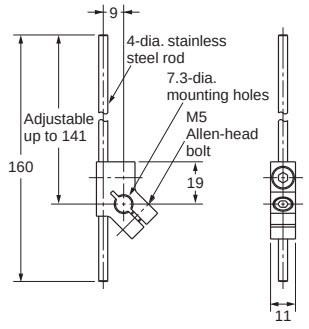
WL-3A200



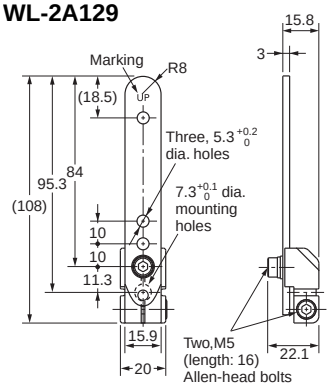
WL-3A203



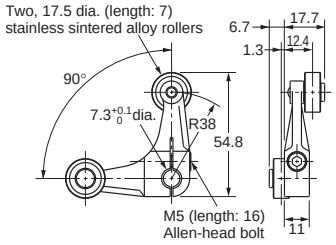
WL-4A112



WL-2A129

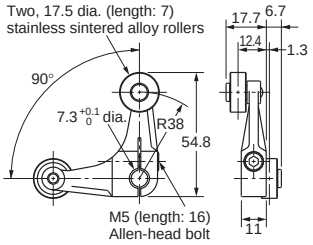


WL-5A101



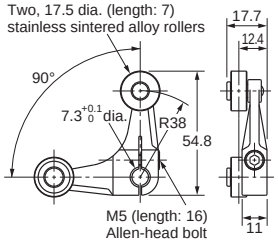
WL-5A100 has a plastic roller

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

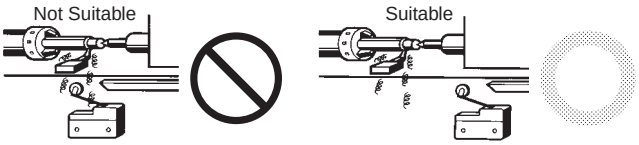
Precautions for Safe Use

- Be sure to ground. If not, there is the possibility that electrical shock occurs.
- Do not touch charged switch terminals while the switch has carry current, otherwise there is the possibility that electrical shock occurs.
- Do not disassemble the limit switch or touch inside of it under supplying power, otherwise there is the possibility that electrical shock occurs.
- Do not touch the wire or rod type actuator in order to prevent injury.
- Connect a fuse which has 1.5 to 2 times higher breaking current than the switch rated current to the switch in series in order to prevent the switch from short-circuit damage.
  On the occasion when using the switch with GB ratings, use a 10A fuse that complies IEC60269, either type gG.
- The durability of switch is depends on the operating condition. Be sure to check the condition with actual using condition before using, and use with the number of times of operating without a performance problem.
- Do not drop the switch. Otherwise, there is the possibility that the switch functions may be spoiled.
- Do not connect a Single Limit Switch to two power supplies that are different in polarity or type.
- Be sure to keep the load current less than the rated value. Otherwise, there is the possibility that the switch may be damage and/or burnout.
- Do not use the Switch by itself in atmospheres containing flammable or explosive gases. Arcs and heating resulting from switching may cause fire or explosion.
- Be sure to prevent the foreign materials such like a scrapped cable intrusion in to the switch when wiring. Otherwise, there is the possibility of spoiling the normal operation.
- Never wire to the wrong terminals.
- Do not store or use the switch with following place.
  - Where the temperature fluctuates greatly
  - Where the humidity is very high and condensation may occur.
  - Where the vibration is too much
  - Where receiving direct sunshine.
  - Where receiving salty wind.
- Do not disassemble and/or modify the switch at anytime. Otherwise, there is the possibility of spoiling the normal operation.
- Do not apply the force such like deformation and/or degeneration to the switch. Otherwise, there is the possibility that the switch functions may be spoiled.

Precautions for Correct Use

Environment

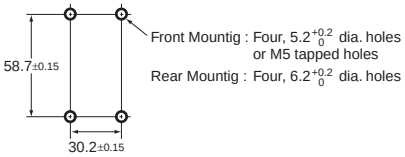
- Take special care to use where there is fine powder, mud and/or foreign materials stacking. And check the condition with actual using condition before using. Then use without a performance problem.
- This switch is only for indoor use. If it is used in outdoor, it may be cause of switch failure.
- Do not keep the Switch in locations with corrosive gas, such as sulfuric gas (H_2S or SO_2), ammonium gas (NH_3), nitric gas (HNO_3), or chlorine gas (Cl_2), or high temperature and humidity. Otherwise, contact failure or corrosion damage may result.
- 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.

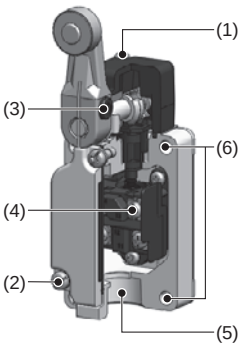
Installing the Switch

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



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	Torque	Screw type
(1)	Head mounting screw	0.78 to 0.88 N•m	M3.5 screw
(2)	Cover mounting screw	1.18 to 1.37 N•m	M4 screw
(3)	Allen-head bolt (for securing the roller lever)	4.90 to 5.88 N•m	M5 hexagon socket head cap screw
(3)	Allen-head bolt (for securing the adjustable rod lever)	0.88 to 1.08 N•m	M8 hexagon socket set screw
(4)	Terminal screw	0.59 to 0.78 N•m	M3.5 screw
(5)	Connector	1.77 to 2.16 N•m	G1/2orPg13.5orM20or 1/2-14NPT
(6)	Unit mounting screw	4.90 to 5.88 N•m	M5 hexagon socket head cap screw

Wring

In the case of mounting screw

- Use M3.5-nylon insulation covered crimp terminals (round type) for wiring.
  Ex.) V1.25-M3.5(RAP1.25-3.5) (J.S.T. Mfg. Co.,Ltd.)
- Appropriate wire size is AWG16 (1.25mm^2).
- Do not supply electric power when wiring.
  Otherwise electric shock may result.
- Do not pull out the wires with excessive force.
  It may cause of coming off the wire.
- Use crimp terminals for wiring.
- In the case of lump unit, to avoid interference between lump unit and crimp terminals, wire according to right wiring figure.
  Attach the lump unit spring to terminal screw certainly otherwise itÅfs possible to be destroyed or shorted.
- The ground terminal is only installed on models with ground terminals.

In the case of prewired connecter and direct connecter

- Holding the connecter certainly when pulling connecter.
- Don't pull the cable holding it.

How to handle

Changing direction of the head

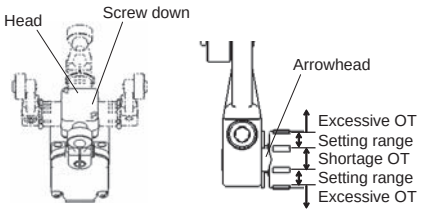
- By removing the screws in the two corners of the head, the head can be set any of four directions. Be sure to change the plunger for internal operations at the same time.

Built-in Switch

- Do not remove or replace the built-in switch.

Overtravel Markers

- To allow the roller lever type actuator to travel properly, set the roller lever according to the dog or cam stroke so that the arrowhead of the lever is positioned within overtravel markers as shown.



Connectors

- Tighten the connector with the appropriate torque to prevent deformation.
- Use the OMRON type SC connector series, which is prepared separately, suitable for outer diameter of cable and inner diameter of seal rubber.
- Make sure to wrap the connector with the seal tape, except the connector which has O-ring, to keep the sealability.
- To conform to CSA, use a CSA certified water tight treated conduit hub.
- 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.

Microload Applications

- The switch contacts can be used both for standard loads and microloads, but once a contact has been used to open and close a load it can no longer be used for lower loads. Doing so will damage the contact surface and reduce contact reliability.
- If an inrush current or other sudden load occurs during a switch operation, the switch will begin to degrade severely which can result in reduced durability.
  Use a contact protection circuit if required.
- Minimum operating load: 5 VDC 1 mA, resistive load, P level

Note: The P level indicates the standard malfunction level at a reliability level of 60% (λ60).
(JISC5003) $\lambda 60 = 0.1 \times 10^{-6}$ per operation, which indicates an estimated malfunction of 1 out of every 10,000,000 operations at a reliability level of 60%.

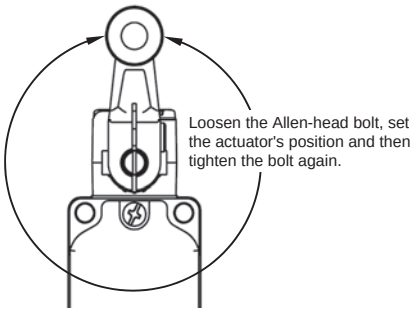
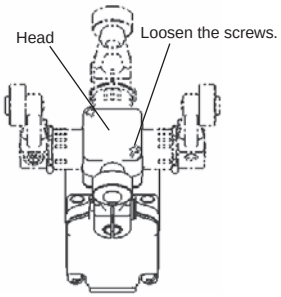
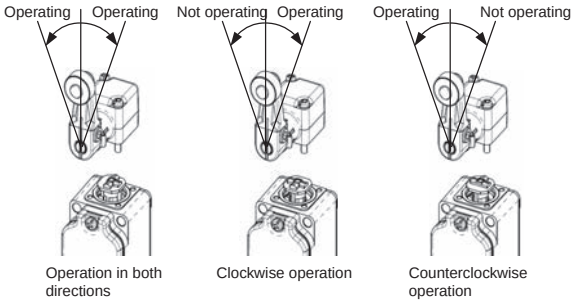
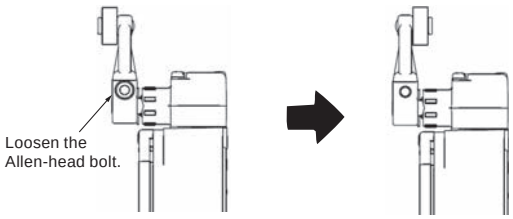
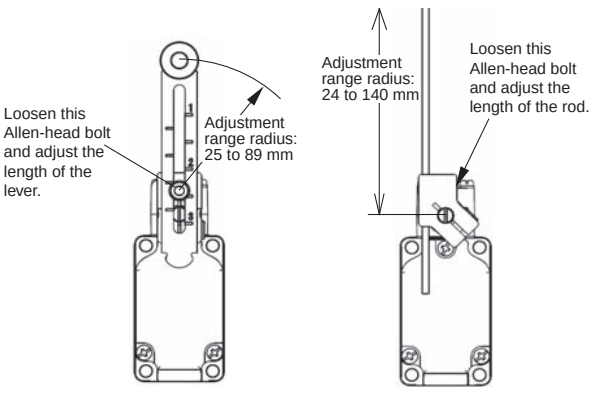
Indicator

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 indicatorequipped switch.

Others

- For long term (over a year) storage, check according to Operating characteristics, Contact resistance and Dielectric strength at least. And check with using condition.

Using the Switches

Item	Applicable models and Actuators	Details
Changing the Installation Position of the Actuator 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. When the lever only moves forwards and backwards, it will not contact the lamp cover.	Roller Levers: WLCA2-N, WLG2-N Adjustable Roller Levers: WLCA12-N, WLG12-N Adjustable Rod Levers: WLCL-N, WLGL-N	
Changing the Orientation of the Head By removing the two screws 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.	Roller Levers: WLCA2-N, WLG2-N Adjustable Roller Levers: WLCA12-N, WLG12-N Adjustable Rod Levers: WLCL-N, WLGL-N	
Changing the Operating Direction 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.	Roller Levers: WLCA2-N, WLG2-N Adjustable Roller Levers: WLCA12-N, WLG12-N Adjustable Rod Levers: WLCL-N, WLGL-N	The output of the Switch will be changed, regardless of which direction the lever is pushed. The output of the Switch will only be changed when the lever is pushed in one direction. 
Installing the Roller on the Inside 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: WLCA2-N, WLG2-N	
Adjusting the Length of the Rod or Lever The length of the rod or lever can be adjusted by loosening the Allen-head bolt.	Adjustable Roller Levers: WLCA12-N, WLG12-N Adjustable Rod Levers: WLCL-N, WLGL-N	

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