



## LIMIT SWITCH

# KL Series

### Features

Housing is made of durable aluminum die-casting.

Heat-resistance, oil-resistance, vibration-resistance structure (protection IP67)

Built-in double-pole double-break standard micro-switches

Operation Indicator (LED or Neon lamp) helps easier inspection and maintenance

Microload models are available



Actuator	Roller lever	75°	90°	Roller lever, adjustable roller lever, adjustable rod lever, fork lever lock
	Plunger		○	Top plunger, top roller plunger, sealed top roller plunger, top ball plunger, side roller plunger
	Flexible rod		○	Coil spring, coil spring aluminum rod
Load	Standard load	1a1b	○	Using of normal double pole, double break switch
	Microload	1a1b		
Environment-resistance specification	High enclosed		○	Using of hermetic sealed built-in switch
	Mold terminal			Lead wire attached Improved hermetic property with epoxy resin in receptacle part
	Heat-resistance	KL □□ -TH		Silicon rubber is used to improve heat-resistance Ambient temperature 120°C Available operation temperature (+5°C ~+120°C)
	Cold-resistance	KL □□ -TC		Silicon rubber is used to improve cold-resistance Ambient temperature -40°C Available operation temperature (-40°C ~+40°C)
Operation indicating lamp		KL □□ -LE	○	Operation state can be monitored easily.
		KL □□ -LD	○	Turn on lamp when operating, available to turn on lamp when not-in-operating



## CLASSIFICATION

KL □ □ - □ □ □ □ □ □ □ □  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

### ① Electric rating

-	Standard load
1	Microload

### ② Actuator

Code	Actuator
CA2	Roller lever (75° actuation)
CA2-2	Roller lever (90° actuation)
CA12	Adjustable roller lever (75° actuation)
CA12-2	Adjustable roller lever (90° actuation)
CL	Adjustable rod lever (75° actuation)
CL-2	Adjustable rod lever (90° actuation)
CA32-41	Fork lever lock
CA32-42	Fork lever lock
CA32-43	Fork lever lock
CA32-44	Fork lever lock
D	Top plunger
D2	Top roller plunger
D28	Sealed top roller plunger
D3	Top ball plunger
SD2	Side roller plunger
NJ	Coil spring
NJ-A2	Coil spring aluminum rod

### ③ Environment-resistance specification

-	Standard
T	Corrosion-resistance
A	Hermetic

### ④ Identification of operation

Code	Element
-	Standard
LE	Neon lamp
LD	LED

### ⑤ Lamp Wiring

2	Connecting with NC: Light ON when operating
3	Connecting with NO: Light ON when not operating

### ⑥ Temperature Specification

-	Standard -10°C ~ +80°C
TH	Heat-resistance +5°C ~ +120°C
TC	Cold-resistance -40°C ~ +40°C

※ Product for heat or cold resistance can be applied to roller lever type, adjustable roller lever type and adjustable rod lever type product.

### ⑦ Lever order specification

-	Standard
SA	Forged lever (Aluminum)
SS	STS lever
S50	S lever (Roller O.D. Ø50)
SA50	Forged lever (Roller O.D. Ø50)

### ⑧ Connector order specification

SC-D6SW	Seal connector (DC)
SC-A6SW	Seal connector (AC)

CONTROL COMPONENTS

SQUARE LIGHT

TOWER LIGHT

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

BUZZER

PHOTO SENSOR

PROXIMITY SENSOR

FLOATLESS LEVEL SWITCH

TIMER &amp; COUNTER

RELAY

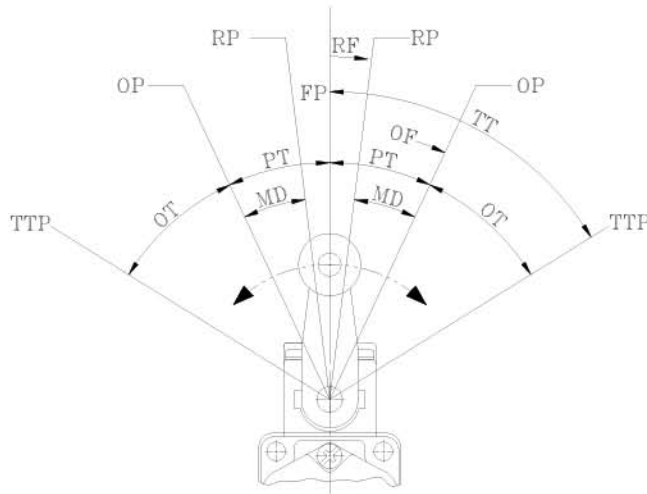
SOCKETS

TERMINAL BLOCK

CONTROL BOX

PID TEMP. CONTROLLER

## ACTATION RANGE GUIDE



OF	Required force to actuate	Required force to move from free position (FP) to operating position (OP)
RF	Return force	Required force to return from total travel position (TTP) to return position (RP)
PT	Movement to actuation	Distance or angle of movement from free position (FP) to operating position (OP)
MD	Movement differential	Distance or angle of movement from operating position (OP) to return position (RP)
OT	Movement after actuation	Distance or angle of movement from operating position (OP) to total travel position (TTP)
OP	Operating position	Actuator position when a contact point (NO (normal open)) is actuated (On) at free position (FP).
FP	Free position	Actuator position when no external force is applied to actuator
TTP	Total travel position	Actuator position when actuator arrives at stop.
RP	Return position	Actuator when a contact point (NO) is off at operating position (OP).
TT	Entire movement	Distance or angle of movement from free position (FP) to total travel position (TTP).



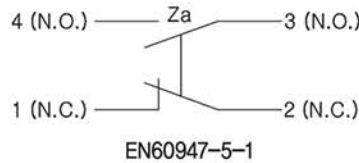
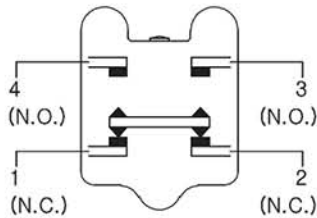
**RATINGS**

Normal open circuit

Rated Voltage	Non-inductive load				Inductive load			
	Resistance load		Lamp load		Resistance load		Motor load	
	NC	NO	NC	NC	NC	NO	NC	NO
AC125	10	10	3	1.5	6		5	2.5
AC250	10	10	2	1	6		3	1.5
AC480	6	6	1.5	0.8	3		1.5	0.8
AC600	3	1	1	0.5	1.5		1	0.5
DC8	10		6	3	6		6	
DC14	10		6	3	6		6	
DC30	6		4	3	6		6	
DC125	0.8		0.2	0.2	0.8		0.2	
DC250	0.4		0.1	0.1	0.4		0.1	

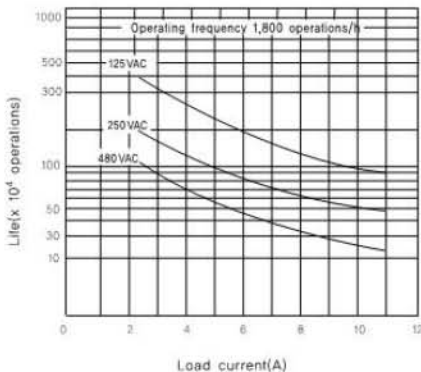
**DPDB Operation**

Double-pole, Double-break structure for circuit breaking



**PROPERTY DATA**

Electrical durability (cosθ=1)



Rated Voltage (V)	Resistance load (A)
AC 125	0.1
DC 30	

Operational load range: DC5~30V, 0.5~100mA

UL, cUL Safety standards, UL508	
Rated Voltage	Rated current
250VAC	10A(resistance load)
125VAC	10A(resistance load)

CONTROL COMPONENTS

SQUARE LIGHT

TOWER LIGHT

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

BUZZER

PHOTO SENSOR

PROXIMITY SENSOR

FLOATLESS LEVEL SWITCH

TIMER & COUNTER

RELAY

SOCKETS

TERMINAL BLOCK

CONTROL BOX

PID TEMP. CONTROLLER



## CHARACTERISTICS

Items	Actuator		Roller lever	Adjustable roller lever	Adjustable rod lever	Fork lever lock	Plunger	Flexible Rod
	Model number		KLCA2	KLCA12	KLCL	KLCA32-41	KLD	KLNJ
			KLCA2-2	KLCA12-2	KLCL-2	KLCA32-42	KLD2	KLNJ-A2
			KLCA2-S50			KLCA32-43	KLD28	
			KLCA2-SA50			KLCA32-44	KLD3	
					KLSD2			
External specification	Standard specification		IEC					
	Certified specification		CE, certified for electric product safety					
Structure	Contact point type		Dual terminal 2 circuit switch					
	Load	Standard load	Silver alloy					
		Microload	Silver (gold plating)					
Protection structure		IP67(IEC60529), KLD2(IP47)						
Electrical properties	Withstand voltage		Between live parts: AC1,000V 60/60Hz for 1minute Between dead parts: AC2,000V 50/60Hz for 1 minute					
	Isolation resistance		Isolation resistance 100MΩ or more(DC500V isolation resistance gauge)					
	Contact resistance (initial value)	Standard load	25mΩ or below					
Allowed operating velocity			1 mm/s ~ 1 m/s					
Mechanical performance	Impact resistance		Roller lever : 200 m/s <sup>2</sup> of total travel position Non-directive actuation: 300 m/s <sup>2</sup> of total travel position Others: 300 m/s <sup>2</sup> free position and total travel position (Contact point in free position and total travel position or total travel position)					
	Vibration-resistance		Double vibration width: 1.5 mm, frequency 10~55Hz, for 2 consecutive hours (Others: free position and total travel position)					
Durability	Mechanical		10 million operations <plunger type ÷ 5million operations, fork lever lock type ÷ 2million operations>					
	Electrical		750,000 operations (when resistance is loaded 250VAC 10A)					
	Electrical (microload)		1 million operations					
Operating frequency	Mechanical		120operations/min					
	Electrical		30operations/min					
Environment conditions	Ambient temperature		-10°C ~ +80°C					



**LEVER TYPES AND FIGURE**

Model No.	Actuator	Model No.	Actuator
KLCA2(75°Max.) KLCA2-2(90°Max.) Roller lever		KLCA-S50 Ø50 Roller lever	
Right / Left		Right / Left	
KLCA12(75°Max.) KLCA12-2(90°Max.) Adjustable roller lever		KLSD2 Side roller plunger	
Right / Left		Right / Left	
KLCL(75°Max.) KLCL-2(90°Max.) Rod lever		KLNJ-A2 Coil spring aluminium rod	
Right / Left		Non-directional	
KLCA32-41, 42, 43, 44 FORK roller lever		KLD3 Top ball plunger	
Right / Left (90°Max.)		Up / Down	
KLNJ Coil spring		KLD28 Sealed top roller plunger	
Non-directional		Up / Down	
KLD2 Top roller plunger		KLD Top plunger	
Up / Down		Up / Down	

CONTROL COMPONENTS

SQUARE LIGHT

TOWER LIGHT

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

BUZZER

PHOTO SENSOR

PROXIMITY SENSOR

FLOATLESS LEVEL SWITCH

TIMER & COUNTER

RELAY

SOCKETS

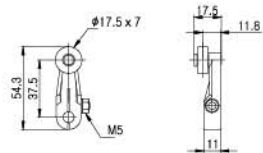
TERMINAL BLOCK

CONTROL BOX

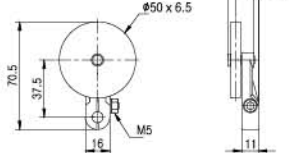
PID TEMP. CONTROLLER

**LEVER TYPES AND FIGURE**

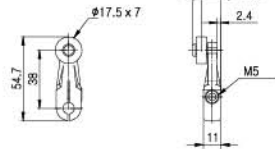
ROLLER LEVER (STANDARD)



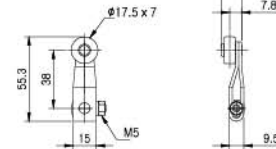
ROLLER LEVER(ON-DEMAND)-S50, SA50



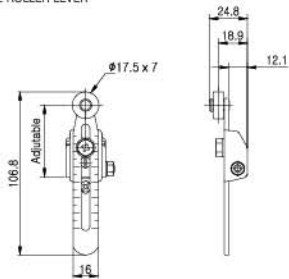
ROLLER LEVER(ON-DEMAND)-SA Forging



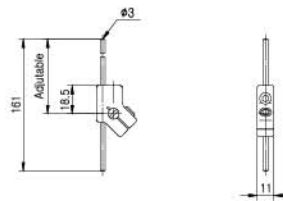
ROLLER LEVER(ON-DEMAND)-SS Stainless



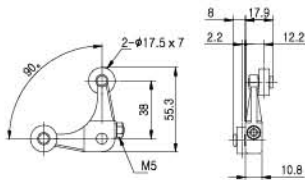
ADJUSTABLE ROLLER LEVER (STANDARD)



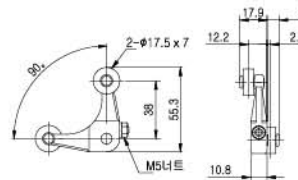
ADJUSTABLE ROD LEVER(STANDARD)



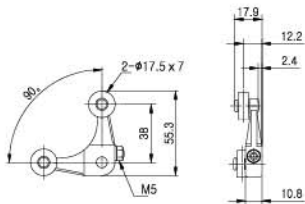
FORK LEVER(CA32-41)



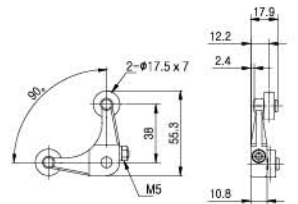
FORK LEVER(CA32-42)



FORK LEVER(CA32-43)



FORK LEVER(CA32-44)





**STRUCTURE**

- CONTROL COMPONENTS
- SQUARE LIGHT
- TOWER LIGHT
- MICRO SWITCH
- FOOT SWITCH
- LIMIT SWITCH**
- POWER SWITCH
- HOIST SWITCH
- CAM SWITCH
- BUZZER
- PHOTO SENSOR
- PROXIMITY SENSOR
- FLOATLESS LEVEL SWITCH
- TIMER & COUNTER
- RELAY
- SOCKETS
- TERMINAL BLOCK
- CONTROL BOX
- PID TEMP. CONTROLLER

Return Spring - Secures minimum 90 degree of lever rotary angle by using spring, mechanical durability is improved.

Roller - made of stainless steel (increased mechanical durability and abrasion resistance)

Shaft - Increased sealing property by fitting of O-ring (protection IP67)

Lever - made of forged anti-corrosive aluminum alloy (Optional)

Return Gum - allowing smooth actuation and improving protection structure

Plate to indicate adjust position

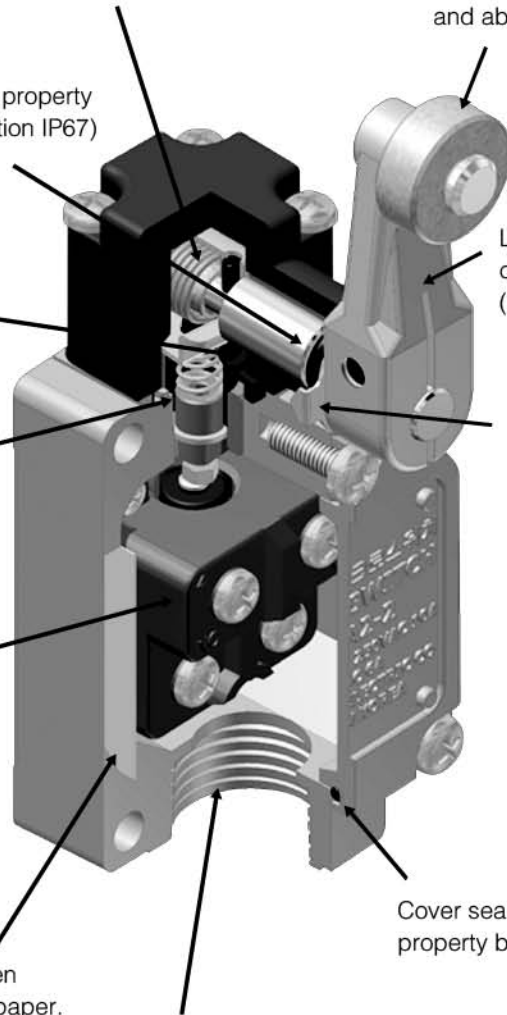
Plunger - allowing smooth actuation by using spring inside.

Built-in switch - double-pole double-break type 1a+1b

Cover seal - Increased sealing property by fitting of O-ring in cover.

Insulator - Isolation has been improved by using isolation paper.

Conduit entrance - Screw for PF1/2 pipe is used and SC type is used with connector to improve sealing property.



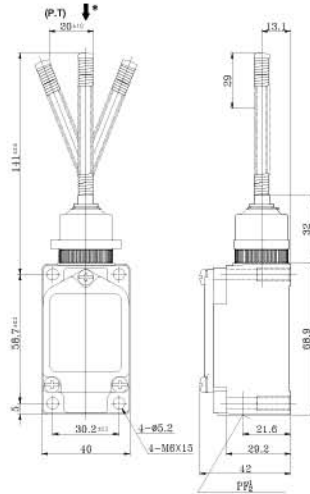




**KLNJ Coil spring type**



**KLNJ**



**KLNJ**



**KLNJ-LD**

**ACTUATION PROPERTY**

Model	OF Max.	PT Max.	Material
KLNJ	150g	20mm ± 10	Body: Aluminium alloy die-casting
KLNJ-LE	Optional parts		Head: Aluminium alloy die-casting
KLNJ-LD			Roller: Stainless steal
			Protection degree: IP67

CONTROL COMPONENTS

SQUARE LIGHT

TOWER LIGHT

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

BUZZER

PHOTO SENSOR

PROXIMITY SENSOR

FLOATLESS LEVEL SWITCH

TIMER & COUNTER

RELAY

SOCKETS

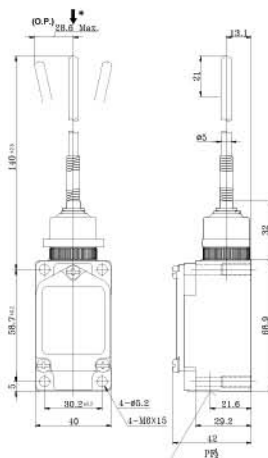
TERMINAL BLOCK

CONTROL BOX

PID TEMP. CONTROLLER

**KLNJ - A2 Coil spring & Aluminium rod type**


KLNJ



KLNJ-A2



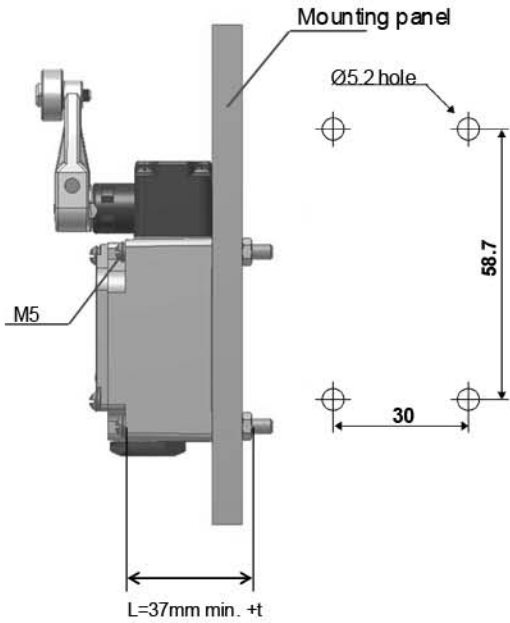
KLNJ-LD

**ACTUATION PROPERTY**

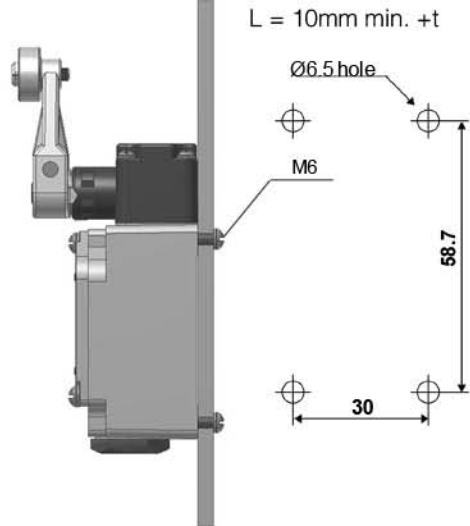
Model	OF Max.	PT Max.	Material
KLNJ-A2	150g	28.6mm	Body: Aluminium alloy die-casting
KLNJ-A2LE	Optional parts		Head: Aluminium alloy die-casting
KLNJ-A2LD			Roller: Stainless steel
			Protection degree: IP67

**Mounting**

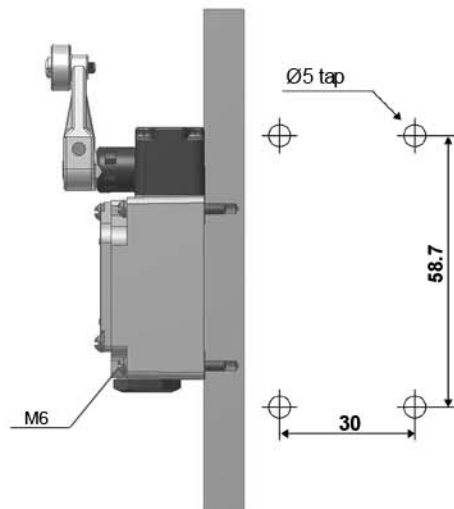
**Front mounting**



**Rear mounting**



**Tap mounting**



To install the Switch, make a mounting panel, as shown in the diagram

$L = 29.2\text{mm} + \text{Tap depth}$   
 Tap depth = 8mm min.

CONTROL COMPONENTS

SQUARE LIGHT

TOWER LIGHT

MICRO SWITCH

FOOT SWITCH

**LIMIT SWITCH**

POWER SWITCH

HOIST SWITCH

CAM SWITCH

BUZZER

PHOTO SENSOR

PROXIMITY SENSOR

FLOATLESS LEVEL SWITCH

TIMER & COUNTER

RELAY

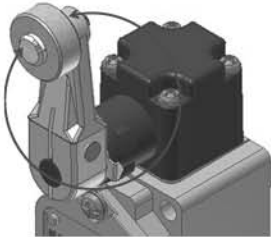


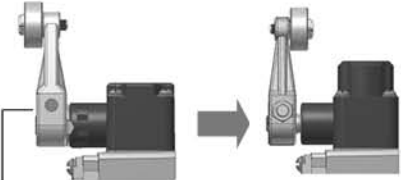


SOCKETS

TERMINAL BLOCK

CONTROL BOX

PID TEMP. CONTROLLER

## USING THE SWITCHES

Instructions	Applicable actuators	Description
<p><b>The position to install actuator can be changed.</b> Actuator position can be adjusted 360° by loosening hex bolt at actuator lever. In case the actuation indicating lamp is attached, please be careful to set the lever rotation because actuator lever may touch the top of lamp cover. Symmetrical lever does not touch the lamp cover.</p>	Roller lever, Adjustable roller lever, Adjustable rod lever	<p>Loosen M5 bolt and adjust its position. And then fix the bolt.</p> 
<p><b>Head direction can be changed.</b> By unscrewing 4 of corner screws of the head it can be adjusted to any of 4 directions. In this case the control plunger inside shall be adjusted as same.</p>	Roller lever, Adjustable roller lever, Adjustable rod lever, Roller plunger, Side roller, Plunger	 
<p><b>Roller can be installed inside.</b> Roller can be installed inside by attaching roller upside down. (Please set to stop actuation within 180° horizontal range).</p>	Roller lever, Fork lever LOCK	 <p>Loosen hex bolt or nut.</p>
<p><b>Lever rod length can be adjusted.</b> Lever or rod length can be adjusted by loosening hex bolt.</p>	Adjustable roller lever, Adjustable roller lever,	 <p>Loosen hex bolt and adjust lever length.</p>  <p>Rod length can be adjusted by unscrewing nut.</p>



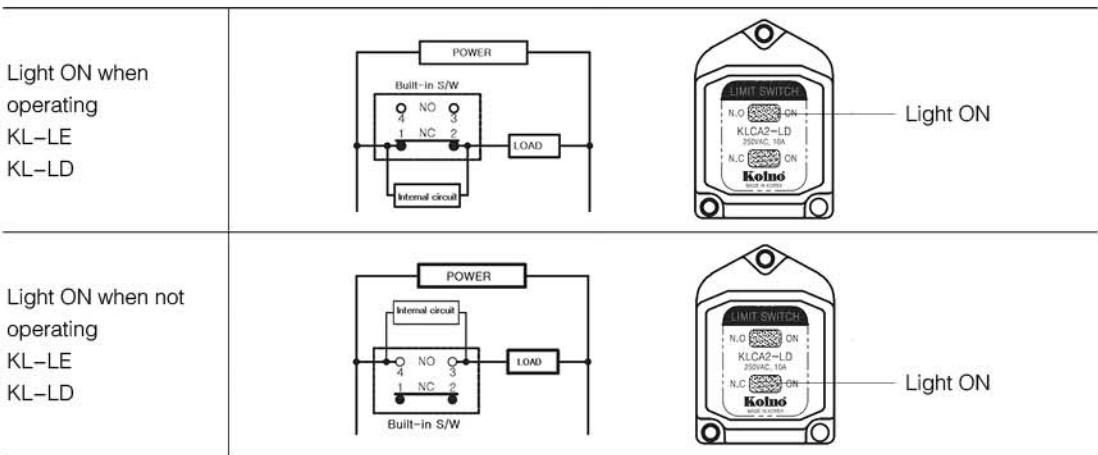
**LAMP INDICATOR**

- It is convenient to check operation state and circuit and to find actuation by neon lamp (for AC power) or LED (for DC power).
- Lamp terminal (indicating lamp cover) connection is made through contact spring (coil spring) by using terminal screw of built-in switch. No wiring is required for lamp terminal.
- Indicating lamp cover is made of transparent resin together with aluminum die-casting so as to assure high sealing property, which allows normal operation even in the environment with cutting oil. Also, it enables monitoring the operating state. Further, it is easy to switch either light ON when Operating or light ON when not operating.
- This is most suitable to verify passing of goods in conveyor line or verifying operation in an area where verification is not easy.
- It's not necessary to change polarity for LED type because LED type has rectifying element internally.

**Ratings**

	Rated voltage	Leakage current	Switch to install lamp	Lamp cover Type
Neon lamp	125VAC	0.7mA Max	KL □ -LE	KL-LE
LED	AC/DC 12~25V	4mA Max	KL □ -LE	KL-LD

**Operation**



Factory setting is at "light ON when operating" mode.  
For "light ON when not operating" mode, please switch LED to downward direction as shown in the figure.

CONTROL COMPONENTS

SQUARE LIGHT

TOWER LIGHT

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

BUZZER

PHOTO SENSOR

PROXIMITY SENSOR

FLOATLESS LEVEL SWITCH

TIMER & COUNTER

RELAY

SOCKETS

TERMINAL BLOCK

CONTROL BOX

PID TEMP. CONTROLLER