

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
	Temperature-resistance		KL□□-T		Silicon rubber is used to improve temperature-resistance Available operation temperature (-40°C ~+120°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
T	Temperature-resistance -40°C ~ +120°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

MICRO SWITCH

FOOT SWITCH

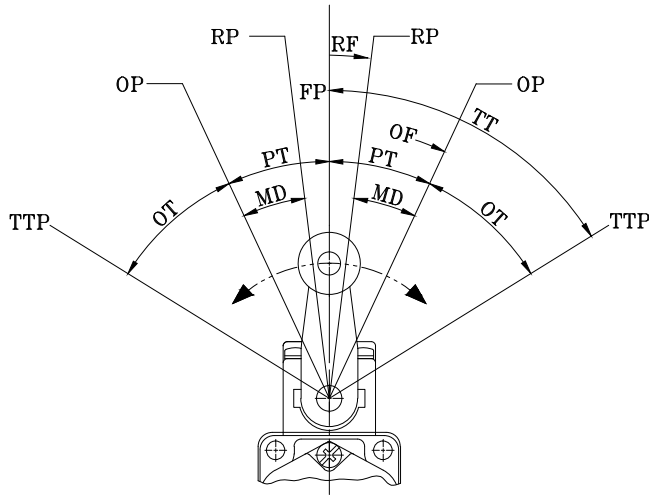
LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

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	

CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

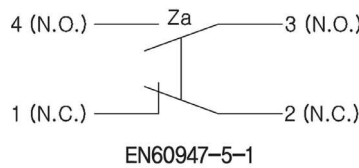
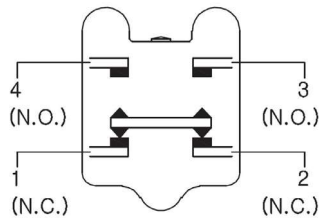
POWER SWITCH

HOIST SWITCH

CAM SWITCH

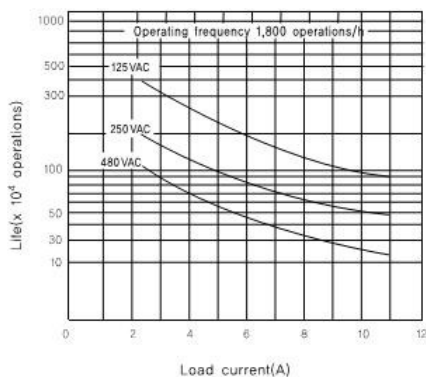
DPDB Operation

Double-pole, Double-break structure for circuit breaking



PROPERTY DATA

Electrical durability (cos ϕ =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)

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 ² of total travel position Non-directive actuation: 300 m/s ² of total travel position Others: 300 m/s ² 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 typeà5million operations, fork lever lock typeà2million 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 (UL certified 40°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

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

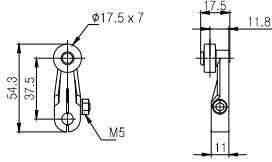
POWER SWITCH

HOIST SWITCH

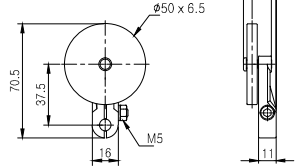
CAM SWITCH

LEVER TYPES & FIGURE

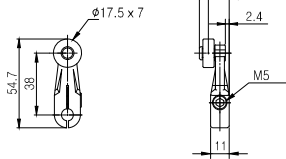
ROLLER LEVER (STANDARD)



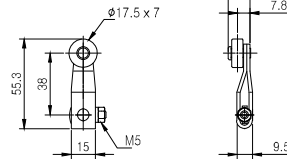
ROLLER LEVER(ON-DEMAND)- S50, SA50



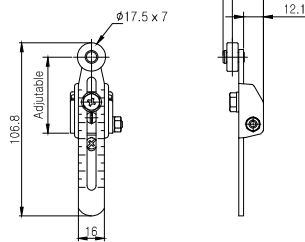
ROLLER LEVER(ON-DEMAND)-SA Forging



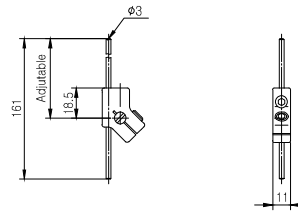
ROLLER LEVER(ON-DEMAND)-SS Stainless



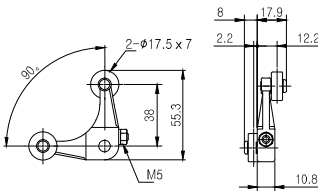
ADJUSTABLE ROLLER LEVER (STANDARD)



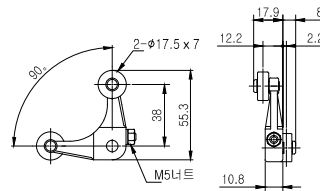
ADJUSTABLE ROD LEVER(STANDARD)



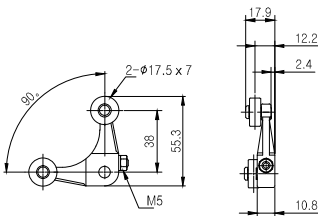
FORK LEVER(CA32-41)



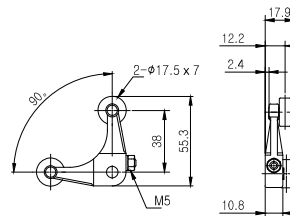
FORK LEVER(CA32-42)



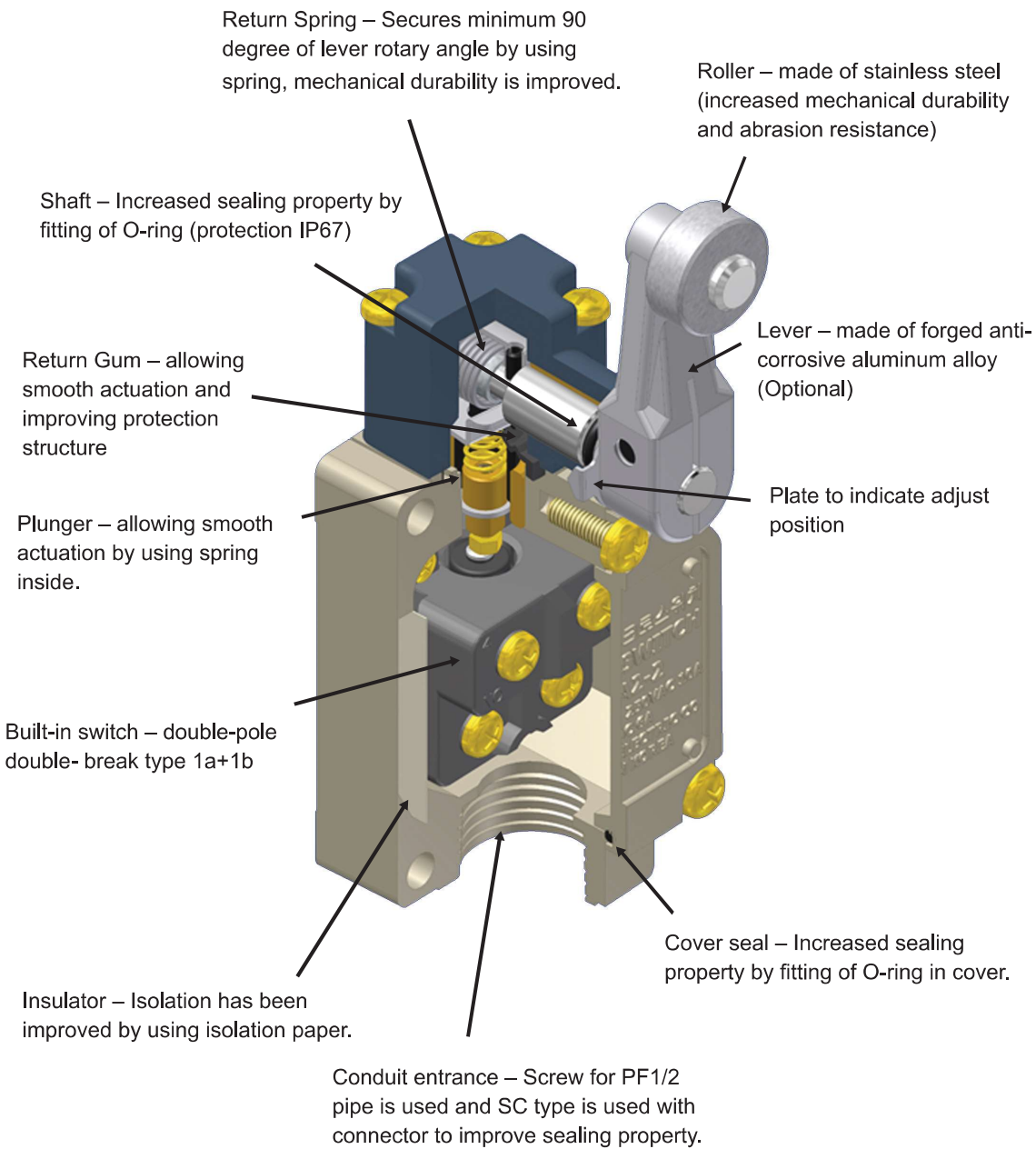
FORK LEVER(CA32-43)



FORK LEVER(CA32-44)



STRUCTURE



CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

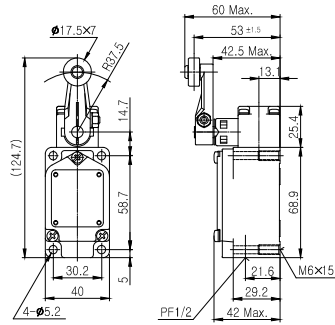
HOIST SWITCH

CAM SWITCH

KLCA2 Roller lever type



KLCA2
KLCA2-2



KLCA2
KLCA2-2



KLCA2-LD
KLCA2-2LD

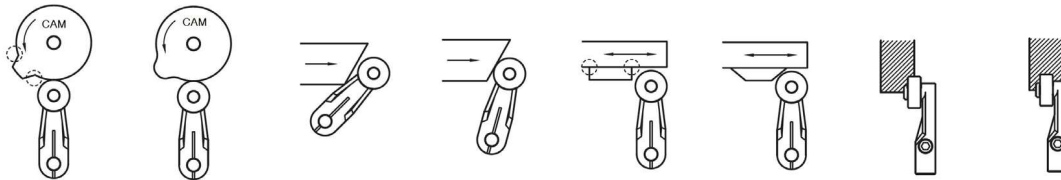
ACTUATION PROPERTY

Model	OF Max.	RF Max.	PT	OT Min.	MD Max.	Material	
KLCA2	910g	100g	20°	30°	12°	Body: Aluminium alloy die-casting Head: Aluminium alloy die-casting Roller: Stainless steel Protection degree: IP67	
KLCA2-2	910g	100g	30°	70°	10°		
KLCA2-LE	Optional parts						
KLCA2-2LE							
KLCA2-LD							
KLCA2-2LD							

NOTE

- Excessive force or impact to limit switch roller lever to activate switch may cause unstable actuation of actuator, shortening electrical and mechanical durability.
- Right and wrong examples of installation.

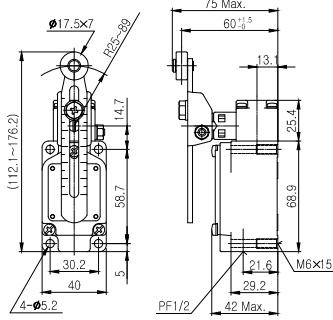
WRONG RIGHT WRONG RIGHT WRONG RIGHT WRONG RIGHT



KLCA12 Adjustable roller lever type



KLCA12
KLCA12-2



KLCA12
KLCA12-2



KLCA12-LD
KLCA12-2LD

CONTROL
COMPONENTS

MICRO
SWITCH

FOOT
SWITCH

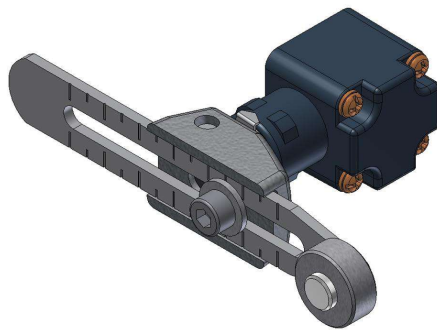
ACTUATION PROPERTY

Model	OF Max.	RF Max.	PT	OT Min.	MD Max.	Material	
KLCA12	290g	25g	20°	30°	12°	Body: Aluminium alloy die-casting Head: Aluminium alloy die-casting Roller: Stainless steel Protection degree: IP67	
KLCA12-2	290g	25g	20°	70°	10°		
KLCA12-LE	Optional parts						
KLCA12-2LE							
KLCA12-LD							
KLCA12-2LD							

LIMIT
SWITCH

POWER
SWITCH

NOTE

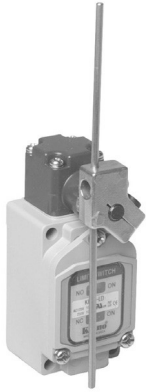


HOIST
SWITCH

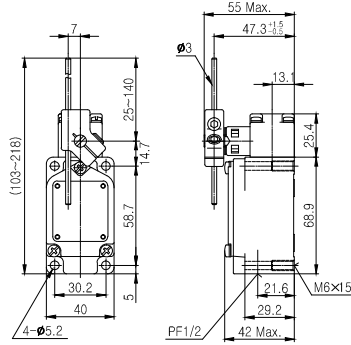
CAM
SWITCH

Please adjust the length of the lever by loosening the screw. (0~64mm)

KLCL Adjustable rod lever type



KLCL
KLCL-2



KLCL
KLCL-2

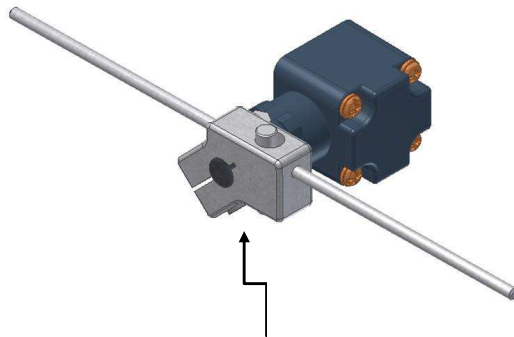


KLCL-LD
KLCL-2LD

ACTUATION PROPERTY

Model	OF Max.	RF Max.	PT	OT Min.	MD Max.	Material	
KLCL	290g	25g	20°	30°	12°	Body: Aluminium alloy die-casting Head: Aluminium alloy die-casting Roller: Stainless steel Protection degree: IP67	
KLCL-2	290g	25g	20°	70°	10°		
KLCL-LE	Optional parts						
KLCL-2LE							
KLCL-LD							
KLCL-2LD							

NOTE

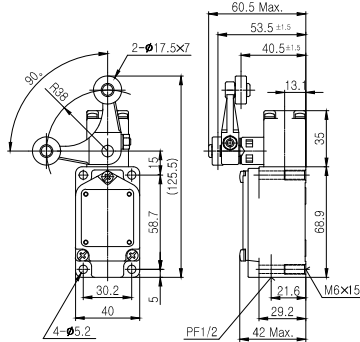


Please adjust the length of the rod by loosening the screw. (0~115mm)

KLCA32 Fork roller lever type



KLCA32-41



KLCA32-41 ~ 44



KLCA32-42



KLCA32-43



KLCA32-44

CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

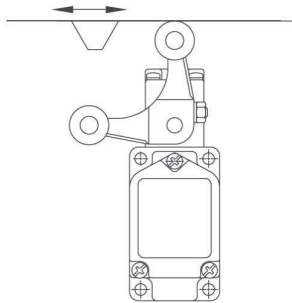
ACTUATION PROPERTY

Model	OF Max.	PT	OT Min.	Material	
KLCA32	1,220g	30°	30°	Body: Aluminium alloy die-casting	
KLCA32-LE	Optional parts			Head: Aluminium alloy die-casting	
KLCA32-LD				Roller: Stainless steel	
				Protection degree: IP67	

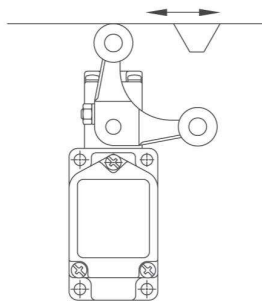
LIMIT SWITCH

POWER SWITCH

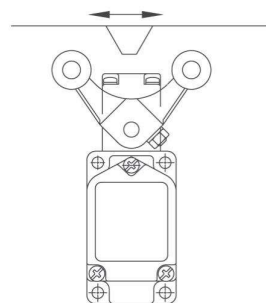
NOTE



NC current



NO current



NO current

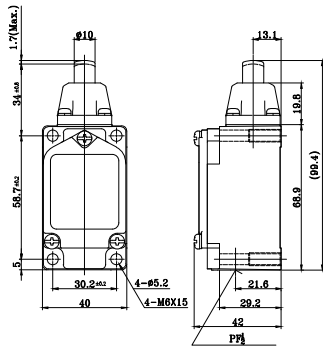
HOIST SWITCH

CAM SWITCH

KLD Top plunger type



KLD



KLD



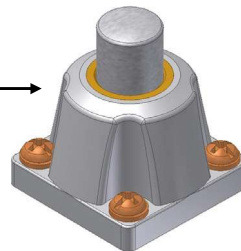
KLD-LD

ACTUATION PROPERTY

Model	OF Max.	RF Min.	PT Max.	OT Min.	MD Max.	Material
KLD	2,720g	820g	1.7mm	6.4mm	1mm	Body: Aluminium alloy die-casting
KLD-LE	Optional parts					Head: Aluminium alloy die-casting
KLD-LD						Roller: Stainless steel
						Protection degree: IP67

NOTE

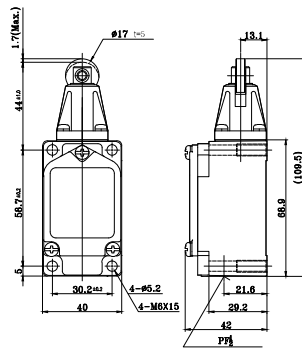
Please do not click the operation of more than 8mm from the tip of the plunger.



KLD2 Roller plunger type



KLD2



KLD2



KLD2-LD

CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

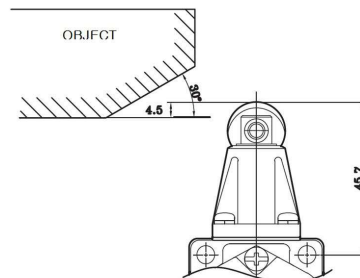
CAM SWITCH

ACTUATION PROPERTY

Model	OF Max.	RF Min.	PT Max.	OT Min.	MD Max.	Material
KLD2	2,850g	810g	1.7mm	5.6mm	1mm	Body: Aluminium alloy die-casting
KLD2-LE	Optional parts					Head: Aluminium alloy die-casting
KLD2-LD						Roller: Stainless steal
						Protection degree: IP67

NOTE

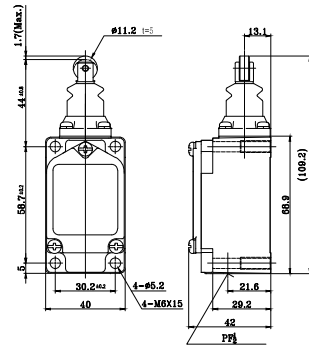
For side actuation of the product, recommended dimension is indicated as shown in the diagram.



KLD28 Sealed top roller plunger type



KLD28



KLD28



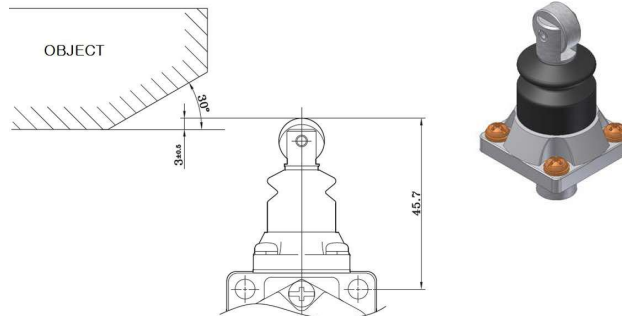
KLD28-LD

ACTUATION PROPERTY

Model	OF Max.	RF Min.	PT Max.	OT Min.	MD Max.	Material
KLD28	1,700g	450g	1.7mm	5.6mm	1mm	Body: Aluminium alloy die-casting
KLD28-LE	Optional parts					Head: Aluminium alloy die-casting
KLD28-LD						Roller: Stainless steel
						Protection degree: IP67

NOTE

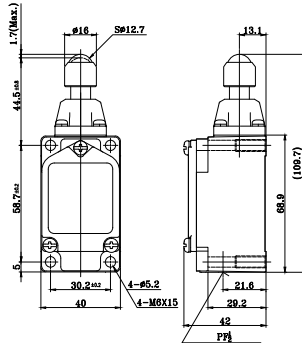
For side actuation of the product, recommended dimension is indicated as shown in the diagram.



KLD3 Top ball plunger type



KLD3



KLD3



KLD3-LD

CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

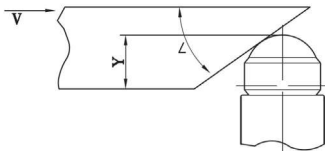
CAM SWITCH

ACTUATION PROPERTY

Model	OF Max.	RF Min.	PT Max.	OT Min.	MD Max.	Material
KLD3	2,720g	820g	1.7mm	4mm	1mm	Body: Aluminium alloy die-casting
KLD3-LE	Optional parts					Head: Aluminium alloy die-casting
KLD3-LD						Roller: Stainless steel
						Protection degree: IP67

NOTE

For side actuation of the product, recommended dimension is indicated as shown in the diagram.



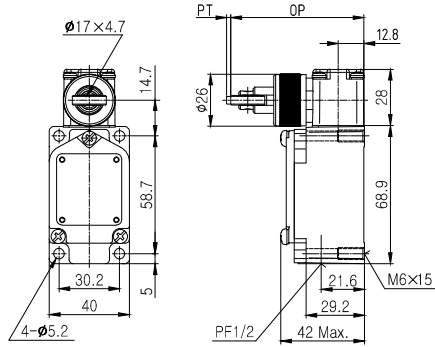
L(Degree)	Vmax(m/s)	y
30°	0.25	0.6~0.8(TT)
20°	0.5	0.5~0.7(TT)



KLSD2 Side roller plunger type



KLSD2



KLSD2



KLSD2-LD

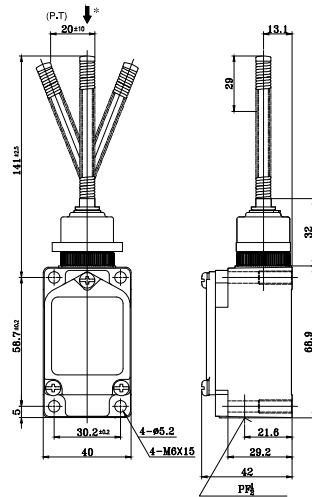
ACTUATION PROPERTY

Model	OF Max.	RF Min.	PT Max.	OT Min.	MD Max.	Material
KLSD2	4,087g	97g	2.77mm	5.6mm	1mm	Body: Aluminium alloy die-casting
KLSD2-LE	Optional parts					Head: Aluminium alloy die-casting
KLSD2-LD						Roller: Stainless steal
						Protection degree: IP67

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 steel
			Protection degree: IP67

CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

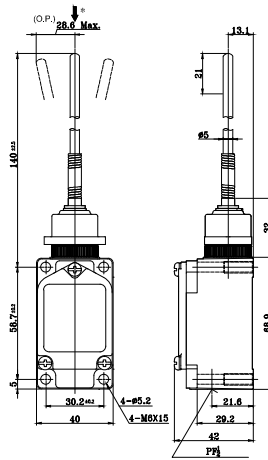
HOIST SWITCH

CAM SWITCH

KLNJ - A2 Coil spring & Aluminium rod type



KLNJ



KLNJ-A2



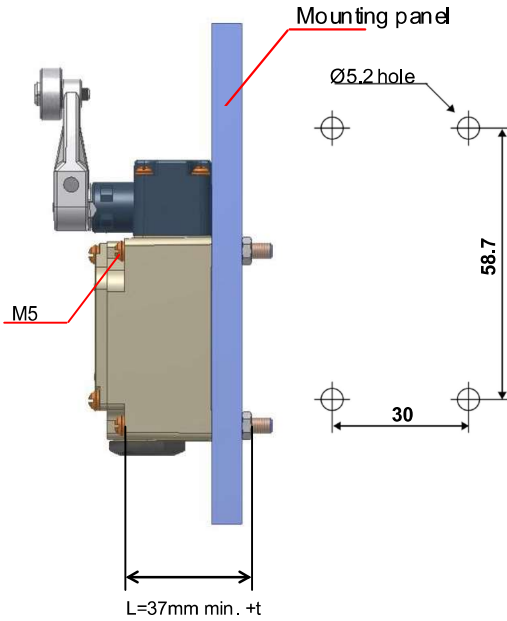
KLNJ-LD

ACTUATION PROPERTY

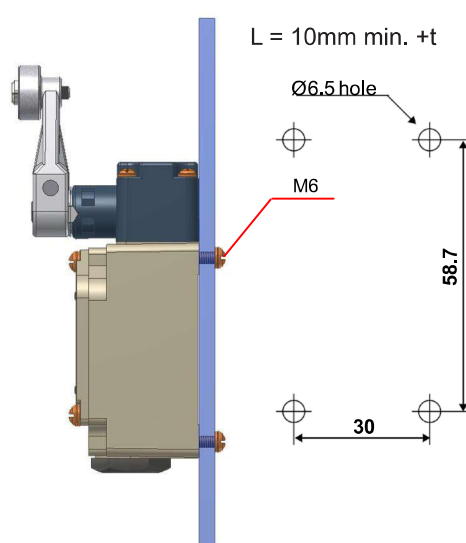
Model	OF Max.	PT Max.	Material
KLNJ-A2	150g	28.6mm	Body: Aluminium alloy die-casting
KLNJ-A2LE	Optional parts		Head: Aluminium alloy die-casting
KLNJ-A2LD			Roller: Stainless steel
			Protection degree: IP67

Mounting

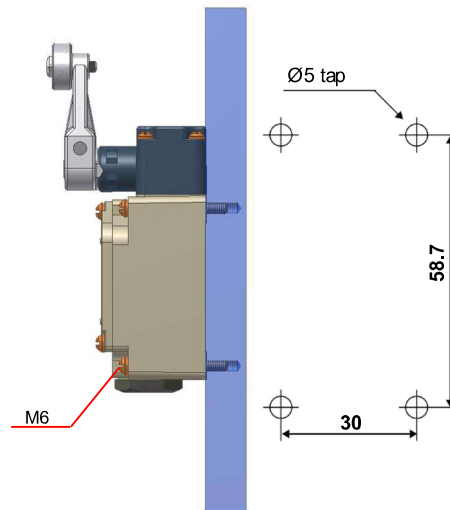
Front mounting



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

MICRO SWITCH

FOOT SWITCH

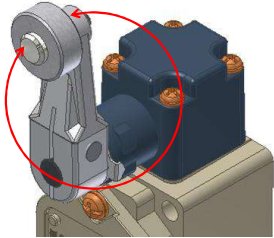
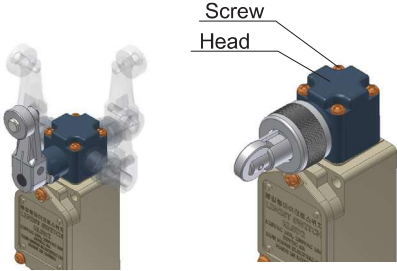
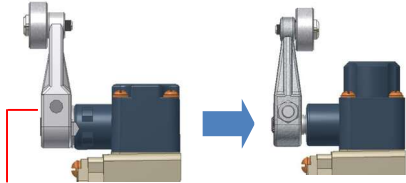

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

USING THE SWITCHES

Instructions	Applicable actuators	Description
<p>The position to install actuator can be changed.</p> <p>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>	<p>Roller lever, Adjustable roller lever, Adjustable rod lever</p>	<p>Loosen M5 bolt and adjust its position. And then fix the bolt.</p> 
<p>Head direction can be changed.</p> <p>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>	<p>Roller lever, Adjustable roller lever, Adjustable rod lever, Roller plunger, Side roller, Plunger</p>	
<p>Roller can be installed inside.</p> <p>Roller can be installed inside by attaching roller upside down. (Please set to stop actuation within 180° horizontal range).</p>	<p>Roller lever, Fork lever LOCK</p>	 <p>Loosen hex bolt or nut.</p>
<p>Lever rod length can be adjusted.</p> <p>Lever or rod length can be adjusted by loosening hex bolt.</p>	<p>Adjustable roller lever, Adjustable roller lever,</p>	 <p>Loosen hex bolt and adjust lever length.</p> <p>Rod length can be adjusted by unscrewing nut.</p>

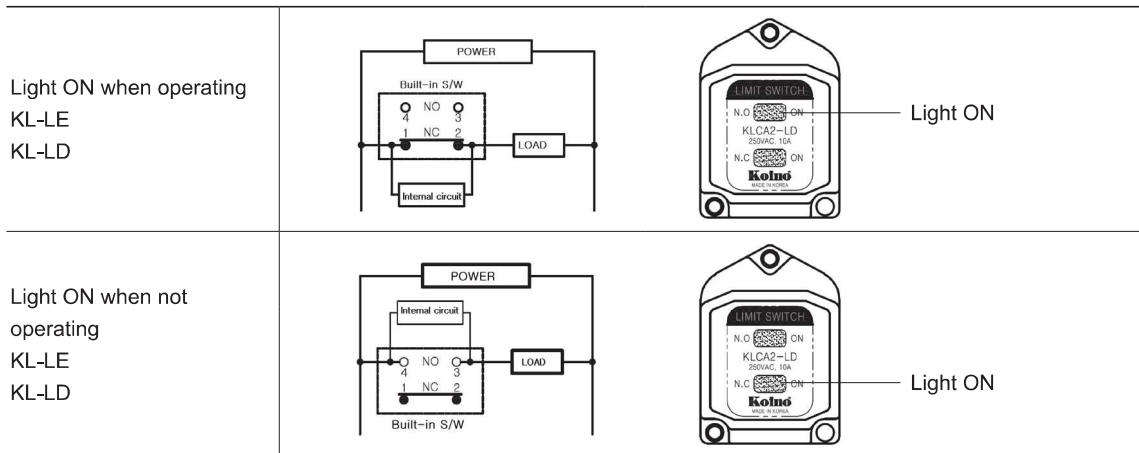
LAMP INDICATOR

- 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

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH

SEAL CONNECTOR & CABLE

KL Series

KL series main body can be used as connector type by assembling components .



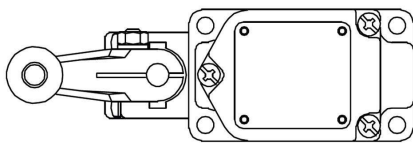
SEAL CONNECTOR

ITEM	PRODUCT NAME	POWER	NUMBER OF COR WIRES
KL□□-SC-D6SW	Seal connector type	Direct current (DC)	4 wires
KL□□-SC-A6SW		Alternating current (AC)	4 wires

SPECIFICATION

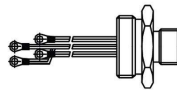
Rated Current	10A	6A
Rated voltage	AC125V	AC 250V
Contact resistance	40mΩ or below(DC20mV or below, at 100mA or below)	
Insulation resistance	100MΩ or above(at DC500V)	
Dielectric strength	AC 1500V 1min.(Between live parts / Between dead parts)	
Protection	IP67(IEC529)	
Tightening torque	0.8 NM	
Tensile strength	98N	
Operating temperature	-25°C ~+70°C	
Contact pin material	Brass (gold plating)	
Fixture material	Brass (nickel plating)	
Pin block material	PBT Glass(UL94-V0)	
O-ring material	NBR	
Housing material	Polyester elastomer	
Cord property (cable)	Increased resistance to oil / increased flexibility (300V 80°C)	

COMBINATION



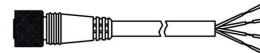
Limit switch

+



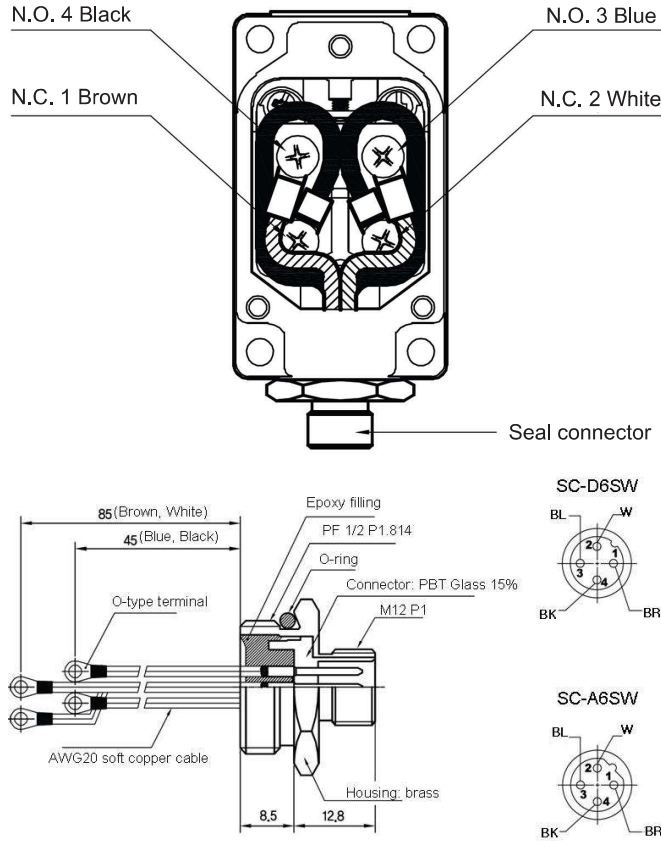
Seal connector

+





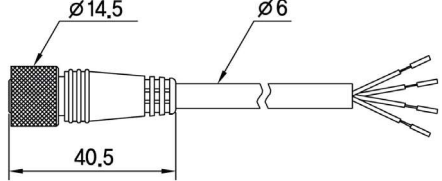

Connector cable

WIRING METHOD



CONNECTOR CABLE

ITEM	CORE WIRE	POWER	CORD LENGTH	WIRE COLOR	MATERIAL
D6SW-1	4 wires	Direct current (DC)	2 m	1(brown), 2(white), 3(blue), 4(black)	Soft PVC
A6SW-1	4 wires	Alternating current (AC)	2 m	1(brown), 2(white), 3(blue), 4(black)	Soft PVC

	ITEM	SHAPE	OUTER DIAGRAM
	D6SW-1		
	A6SW-1		

CONTROL COMPONENTS

MICRO SWITCH

FOOT SWITCH

LIMIT SWITCH

POWER SWITCH

HOIST SWITCH

CAM SWITCH