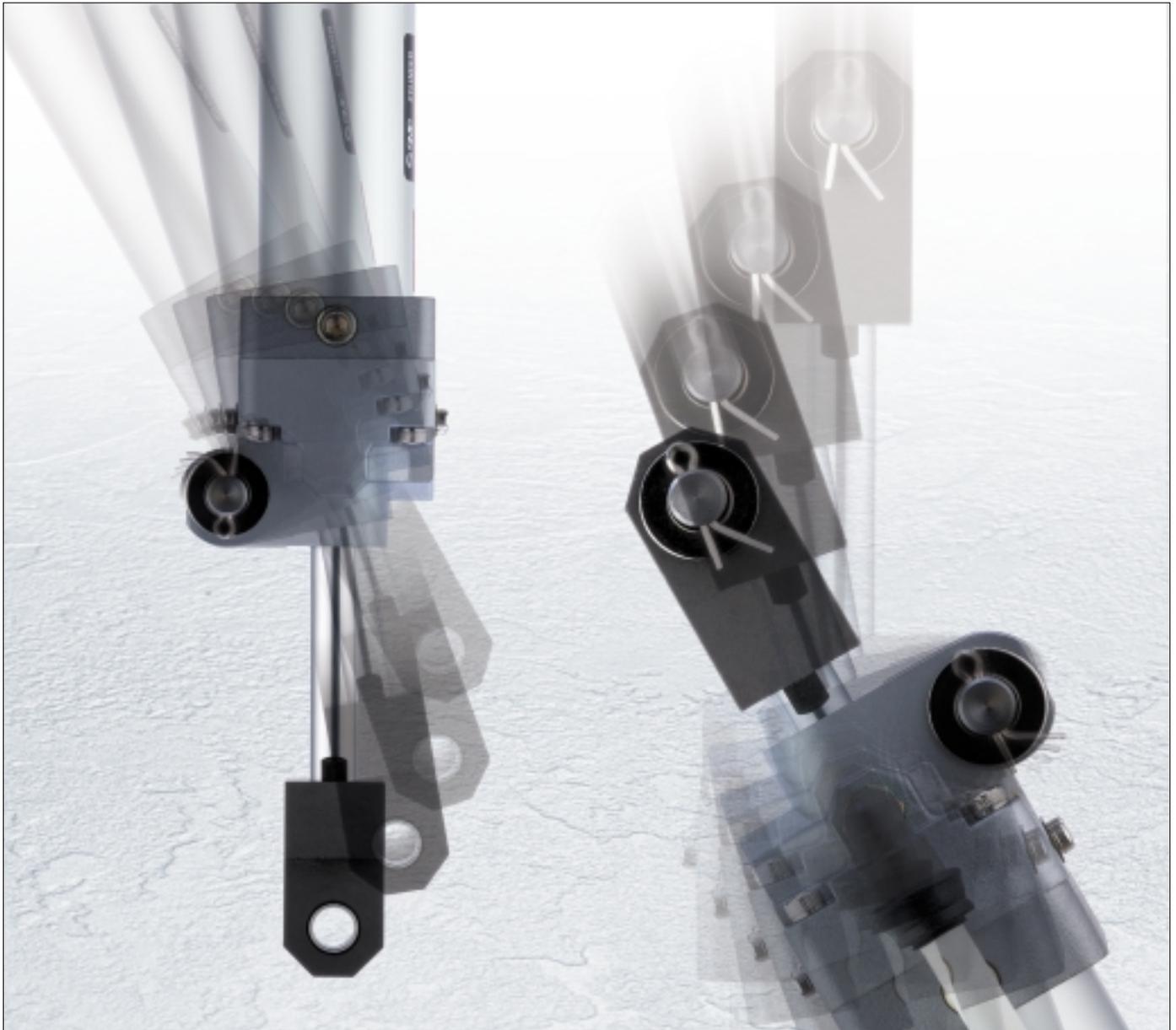




Clamp Cylinder with Lock  
**Series CLK1**



Maintains a clamped or unclamped state when air supply pressure drops or residual pressure is released

# Clamp Cylinder with Lock Series CLK1

Maintains a supply press

Clamped locking



**Can be locked at any position within the entire stroke**

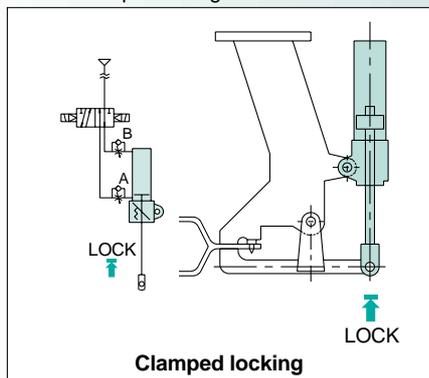
Locking is possible at any desired position.

Able to easily accommodate changes in work piece thickness.

**Clamped locking or unclamped locking can be selected**

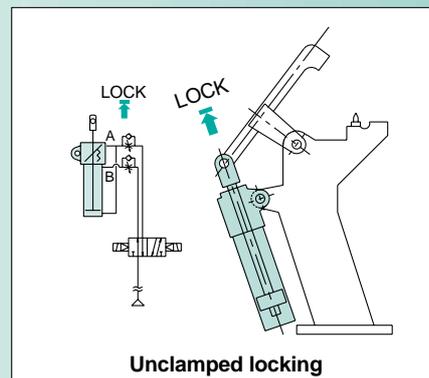
### Holding a clamped state

Prevents work piece slippage and dropping due to work piece weight



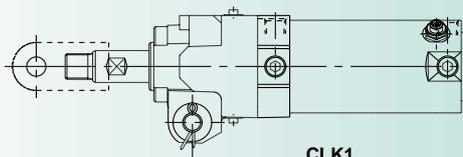
### Holding an unclamped state

Prevents dislocation of home position due to weight of clamp arm

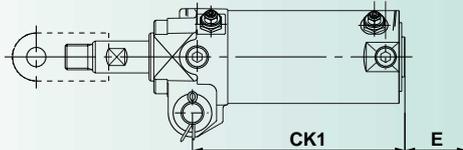


**Compact lock mechanism minimizes extension of length dimension**

Series CLK1 clamp cylinder with lock



Series CK1 clamp cylinder (without lock)

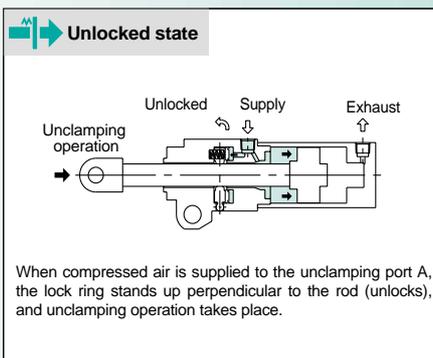
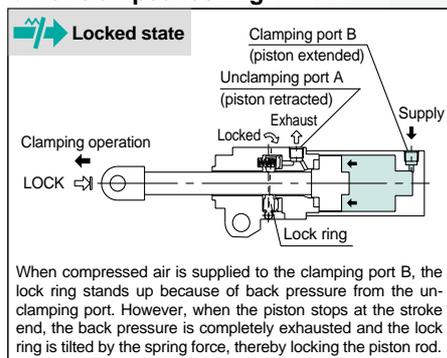


Extended dimension mm

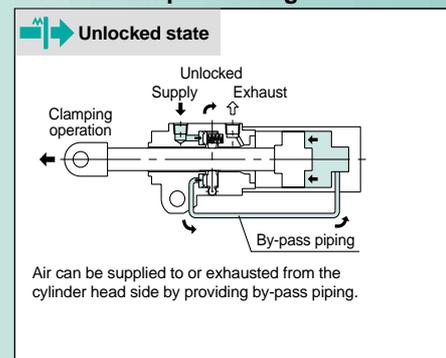
Bore size (mm)	E
ø40	34
ø50	38.5
ø63	42

## Operating Principle

### ● For clamped locking



### ● For unclamped locking

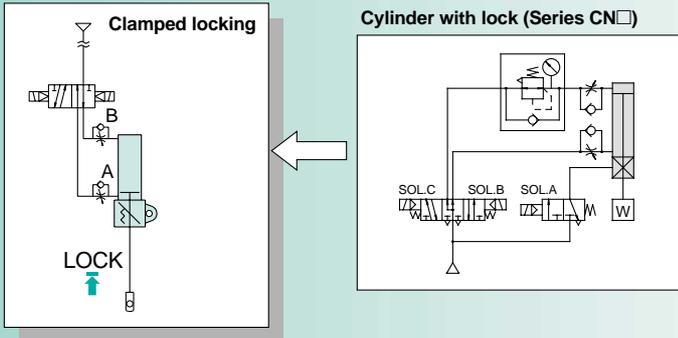


# Clamped or unclamped state when air pressure drops or residual pressure is released.

## Piping is not required for unlocking

Since a dedicated solenoid valve is not required for unlocking, reduction of initial costs and replacement of existing equipment can be easily accomplished.

### Clamp cylinder with lock



Unclamped locking

LOCK

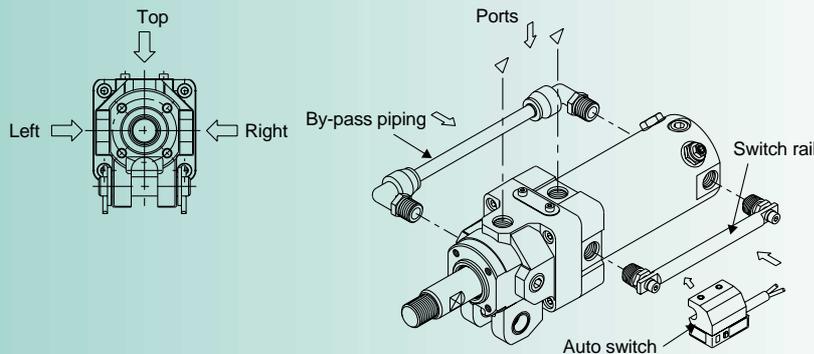


## Able to maintain an unlocked state

Assembly and maintenance simplified

## Port positions can be selected to accommodate mounting conditions

Positions of ports, by-pass piping and auto switch rails can be changed. (Refer to ordering instructions on pages 1 and 7 for details.)



## Series expanded to include sizes $\varnothing 32$ to $\varnothing 63$

Two series, four sizes and three types of clevis width standardized. Able to accommodate a wide range of equipment.

### Series Variations

Series	Bore size (mm)	Clevis width (mm)			Locking position	End bracket	Auto switch
		12	16.5	19.5			
Standard type	CLK1	32	○		Clamped locking	Single knuckle joint	<Reed switches> D-C7/8, D-B5/6 D-A3/4 <Solid state switches> D-H7, D-G3, D-K3 D-G5
		40		○			
		50		○ ○			
		63		○ ○			
With magnetic field resistant auto switch	CLK1P CLK1G	40		○	Unclamped locking	Double knuckle joint	<Reed switches> D-P7/8 (CLK1P) <Solid state switches> D-P5 (CLK1G)
		50		○ ○			
		63		○ ○			

# Clamp Cylinder with Lock/Standard Type

# Series CLK1

ø32, ø40, ø50, ø63

## How to Order

Without Auto Switch **CLK1**



With Auto Switch **CLK1 G**



Clamp cylinder with auto switch

Clevis width

ø32

A	12mm	ø32
---	------	-----

ø40, ø50, ø63

A	16.5mm	ø40, ø50, ø63
B	19.5mm	ø50, ø63

ø40 is only available with A:16.5mm clevis width.

Bore size

32	32mm
40	40mm
50	50mm
63	63mm

Cylinder stroke (mm)

32, 40, 50, 63	50, 75, 100, 125, 150
----------------	-----------------------

End bracket

Nil	None
I	Single knuckle joint
Y	Double knuckle joint

Accessories (options)

Nil	None
B	With limit switch mounting base
D	With dog fitting
K <small>Note 2)</small>	With pedestal (for 75, 100, 150 strokes only)

Note 1) Accessories (options) are not available with ø32.

Note 2) Clevis width B (19.5mm) is not available with mounting base K.

Note 3) List the necessary options.

Locking position

B	Clamp side lock
F	Unclamp side lock

Number of auto switches

Nil	2 pcs.
s	1 pc.
n	"n" pcs.

Auto switch type

Nil	Without auto switch (built-in magnet)
-----	---------------------------------------

\* Select applicable auto switch models from the table below.

**Built-in magnet cylinder part nos.**

In case of built-in magnets without auto switches, the auto switch type symbol is "Nil".  
(Example) CLK1GA50-100Y-B

Port position

Symbol	Position	Cylinder type	
		B (Clamp side locking)	F (Unclamp side locking)
Nil	Port on top		
2	Port on left		
3	Port on right		
4	Port on top		
5	Port on left		
6	Port on right		

⇒ Port    ⊕ By-pass piping

\* Lead wire length symbols  
0.5m..... Nil  
3m..... L  
5m..... Z  
None..... N  
(Example) C80CZ, C80CN

\* Solid state switches marked with a "O" symbol are produced upon receipt of order.

\* Do not use symbol "N" for no lead wire specification with types D-A3□A, A44A, G39A, and K39A.

## Applicable auto switches

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)*				Applicable load				
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)	None (N)					
Reed switch	—	Grommet	Yes	3 wire (NPN equiv.)	24V	5V	—	C76	●	●	—	—	IC circuit			
						12V	100V	C73	●	●	●	—	Relay, PLC			
						5V, 12V	100V or less	C80	●	●	—	—	IC circuit			
						12V	—	B53	●	●	●	—	PLC			
						12V	100V, 200V	B54	●	●	●	—	—			
		Connector	No	2 wire	24V	12V	200V or less	B64	●	●	—	—	Relay, PLC			
						12V	—	C73C	●	●	●	—	—			
						5V, 12V	24V or less	C80C	●	●	●	●	IC circuit			
						12V	—	A33	—	—	—	●	—	PLC		
						12V	100V, 200V	A34	—	—	—	●	—	—		
Solid state switch	—	Grommet	Yes	3 wire (NPN) 3 wire (PNP) 2 wire	24V	5V, 12V	—	H7A1	●	●	○	—	IC circuit			
						12V	—	H7A2	●	●	○	—	—			
						5V, 12V	—	H7B	●	●	○	—	—			
						12V	—	H7C	●	●	●	—	—			
						5V, 12V	—	G39A	—	—	—	●	—	IC circuit		
		Connector				No	2 wire	24V	12V	—	K39A	—	—	—	●	—
									5V, 12V	—	H7NW	●	●	○	—	IC circuit
									12V	—	H7PW	●	●	○	—	—
									5V, 12V	—	H7BW	●	●	○	—	—
									12V	—	G5NT	—	●	○	—	—
Grommet	Diagnostic indication (2 color indicator)	3 wire (NPN) 3 wire (PNP) 2 wire	24V	5V, 12V	—	H7NF	●	●	○	—	—					
				12V	—	H7LF	●	●	○	—	—					
				5V, 12V	—	—	—	—	—	—	—					
				12V	—	—	—	—	—	—	—					
Grommet	Diagnostic output (2 color indicator)	3 wire (NPN)	24V	5V, 12V	—	—	—	—	—	—	—					
				12V	—	—	—	—	—	—	—					
Grommet	Latch type with diagnostic output (2 color indicator)	4 wire (NPN)	24V	5V, 12V	—	—	—	—	—	—	—					
				12V	—	—	—	—	—	—	—					

\* Terminal conduit types D-A3□, A44, G39A, and K39A are not available with ø32.

# Clamp Cylinder with Lock **Series CLK1**

## Cylinder Specifications

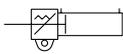


Fluid	Air
Proof pressure	1.5MPa
Maximum operating pressure	1.0MPa
Minimum operating pressure	0.2MPa
Ambient and fluid temperature	Without auto switch: -10°C to 70°C, With auto switch: -10 to 60°C
Piston speed	50 to 500mm/s
Cushion	Unclamp side (head side): Air cushion, Clamp side (rod side): Without cushion
Lubrication	Non-lube
Thread tolerance	JIS class 2
Stroke length tolerance	$\begin{matrix} +1.0 \\ 0 \end{matrix}$
Mounting	Double clevis*

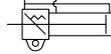
\* With pin and cotter pin

Clevis width	12mm	CLK1A, CLK1GA	ø32
	16.5mm	CLK1A, CLK1GA	ø40, ø50, ø63
	19.5mm	CLK1B, CLK1GB	ø50, ø63

## Symbols



Clamp side locking type



Unclamp side locking type

## Lock Specifications

Bore size (mm)	32	40	50	63
Locking action	Spring lock			
Unlocking pressure	0.2MPa or more			
Locking pressure	0.05MPa or less			
Locking direction	One direction (Clamp side, Unclamp side)			
Lock holding force N (Max. static load)	Equivalent to 0.5MPa			
	402	629	982	1559
Lock application	Drop prevention, Position holding			

## Standard Strokes

Bore size (mm)	Standard stroke (mm)
32, 40, 50, 63	50, 75, 100, 125, 150

## Accessories (Options)

Description	Series CLK1A			Series CLK1B
	ø32	ø40	ø50, ø63	ø50, ø63
Single knuckle joint*	CL1K32-17-R5004	CL1K40-17-R5006	CKA40-17-101B	CKB40-17-102B
Double knuckle joint*	CL1K32-18-R5004	CL1K40-18-R5006	CKA40-18-206C	CKB40-18-207B
Limit switch mounting base	CKM040-48-16070A			
Dog fitting	CKM040-42-16070			
Pedestal	75mm stroke	—	CKA40-40-209A	—
	100mm stroke	—	CKA40-40-210A	—
	150mm stroke	—	CKA40-40-211A	—

\* Single knuckle joint and double knuckle joint must be ordered separately.

## Weights (Basic weight is for a 0mm stroke.)

Unit: kg

Bore size (mm)		32	40	50	63
Cylinder	Basic weight	F: 0.53, B: 0.51	F: 1.04, B: 0.98	F: 1.48, B: 1.42	F: 2.13, B: 2.07
	Additional weight per 25mm of stroke	0.05	0.08	0.11	0.13
Single knuckle joint		0.12	0.25	0.2	
Double knuckle joint (includes pin)		0.17	0.33	0.28	
Limit switch mounting base		—		0.22	
Dog fitting		—		0.12	
Pedestal		—		2.2	

Calculation

(Example) CLK1B50-100Y-B

• Basic weight ..... 1.42 (ø50)

• Additional weight ... 0.11/25mm

• Cylinder stroke ..... 100mm

• Double knuckle joint...0.28 (Y)

1.42 + 0.11 x 100/25 + 0.28 = 2.14kg

## Auto Switch Mounting Bracket Part Nos.

Auto switch model		Auto switch mounting bracket part no.			
		32	40	50	63
Reed switch	D-C73, C76, C80 D-C73C, C80C				
	D-H7A1, H7A2, H7B, H7C D-H7NW, H7PW, H7BW D-H7LF, H7NF	BMA2-032	BMA2-040	BMA2-050	BMA2-063
Solid state switch	D-B53, B54, B64, B59W	BA-32	BA-04	BA-05	BA-06
	D-G5NTL				
Reed switch	D-A33, A34, A44	—	BD1-04M	BD1-05M	BD1-06M
	D-G39, K39				

## Theoretical Output

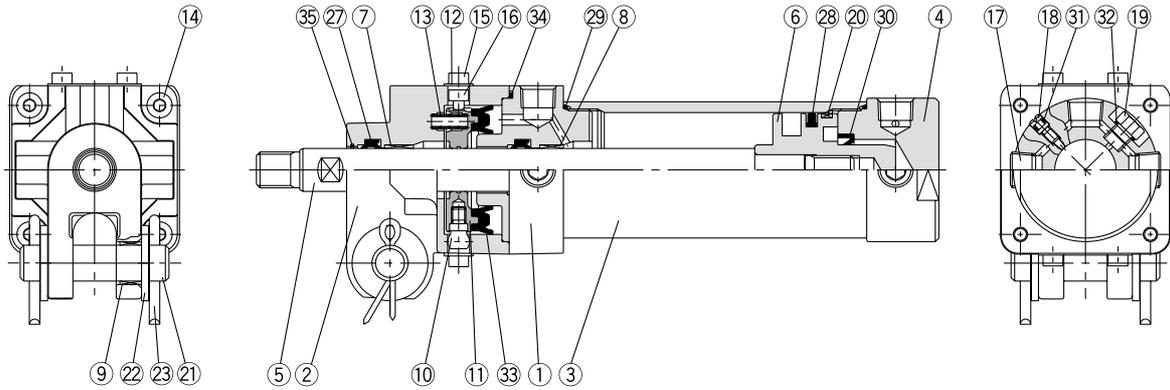
Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)			
				0.3	0.4	0.5	0.6
32	12	OUT	804	241	322	402	482
		IN	691	207	276	346	415
40	16	OUT	1260	378	504	630	756
		IN	1060	318	424	530	636
50	20	OUT	1960	588	784	980	1180
		IN	1650	495	660	825	990
63	20	OUT	3120	934	1250	1560	1870
		IN	2800	840	1120	1400	1680

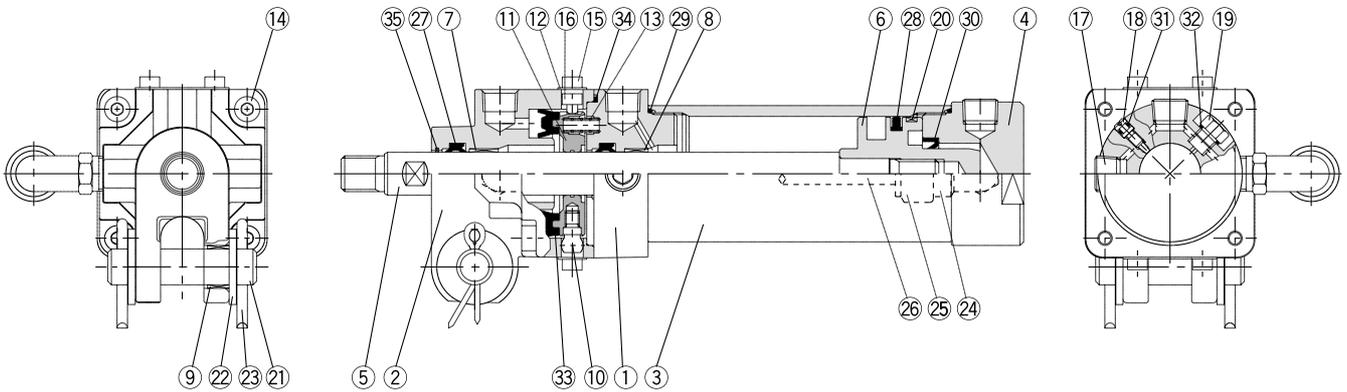
# Series CLK1

## Construction CLK1□32/Standard Type

### Clamp side lock (B)



### Unclamp side lock (F)



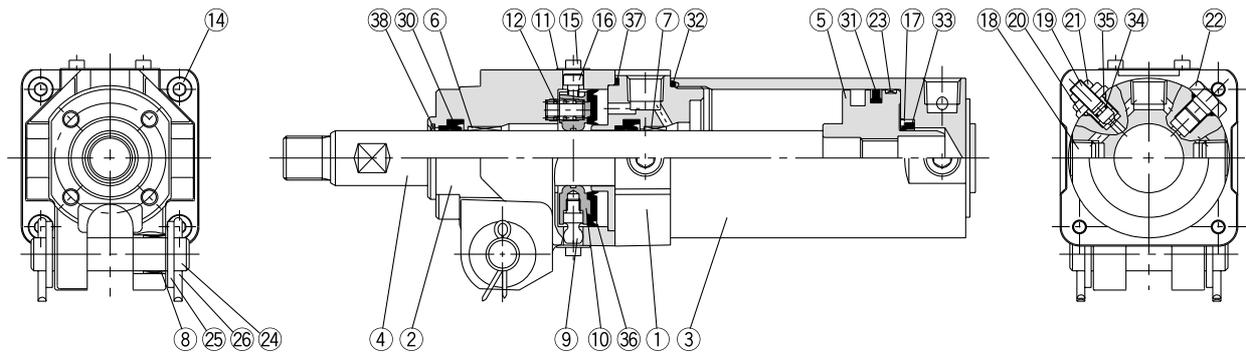
### Parts list

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Hard anodized
2	Cover	Aluminum alloy	Hard anodized
3	Cylinder tube	Aluminum alloy	Hard anodized
4	Head cover	Aluminum alloy	Chromated
5	Piston rod	Carbon steel	Hard chromium electro plated
6	Piston	Aluminum alloy	
7	Bushing	Lead-bronze casting	
8	Bushing	Lead-bronze casting	
9	Clevis bushing	Oil-impregnated sintered alloy	
10	Pivot	Carbon steel	Heat treated, Electroless nickel plated
11	Lock ring	Carbon steel	Heat treated
12	Dust cover	Stainless steel	
13	Brake spring	Steel wire	Zinc chromated
14	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
15	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
16	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
17	Hexagon socket head plug	Carbon steel	Rc1/8
18	Cushion valve	Free-cutting steel	Electroless nickel plated

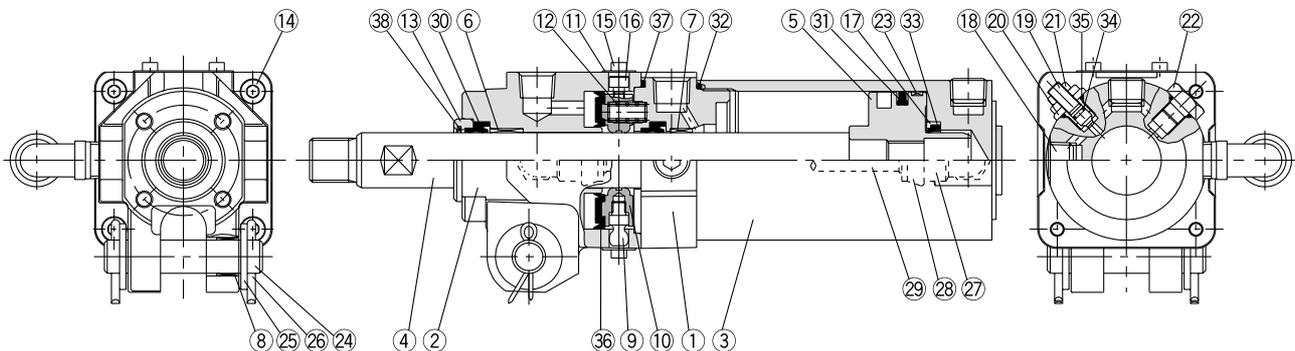
No.	Description	Material	Note
19	Plug	Free-cutting steel	
20	Wear ring	Resin	
21	Pin	Carbon steel	
22	Flat washer	Rolled steel	
23	Cotter pin	Low carbon steel wire rod	
24	FR One-touch fitting		KRL06-01S
25	Spatter cover		KR-06C
26	FR double layer tube		TRB0604W
27	Rod seal	NBR	
28	Piston seal	NBR	
29	Tube gasket	NBR	
30	Cushion seal	NBR	
31	Valve seal	NBR	
32	Plug seal	NBR	
33	Lock ring seal	NBR	
34	O-ring	NBR	
35	Coil scraper	Phosphor bronze	

## Construction CLK1□40, 50, 63/Standard Type

### Clamp side lock (B)



### Unclamp side lock (F)



### Parts list

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Hard anodized
2	Cover	Aluminum alloy	Hard anodized
3	Tube cover	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electro plated
5	Piston	Aluminum alloy	Chromated
6	Bushing	Lead-bronze casting	
7	Bushing	Lead-bronze casting	
8	Clevis bushing	Oil-impregnated sintered alloy	
9	Pivot	Carbon steel	Heat treated, Zinc chromated
10	Lock ring	Carbon steel	Heat treated
11	Dust cover	Carbon steel	Nickel plated
12	Brake spring	Steel wire	Zinc chromated
13	Retainer plate	Aluminum alloy	Clear anodized
14	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
15	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
16	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
17	Cushion seal retainer	Rolled steel	Zinc chromated
18	Hexagon socket head plug	Carbon steel	Rc1/4
19	Cushion valve	Free-cutting steel	Zinc chromated

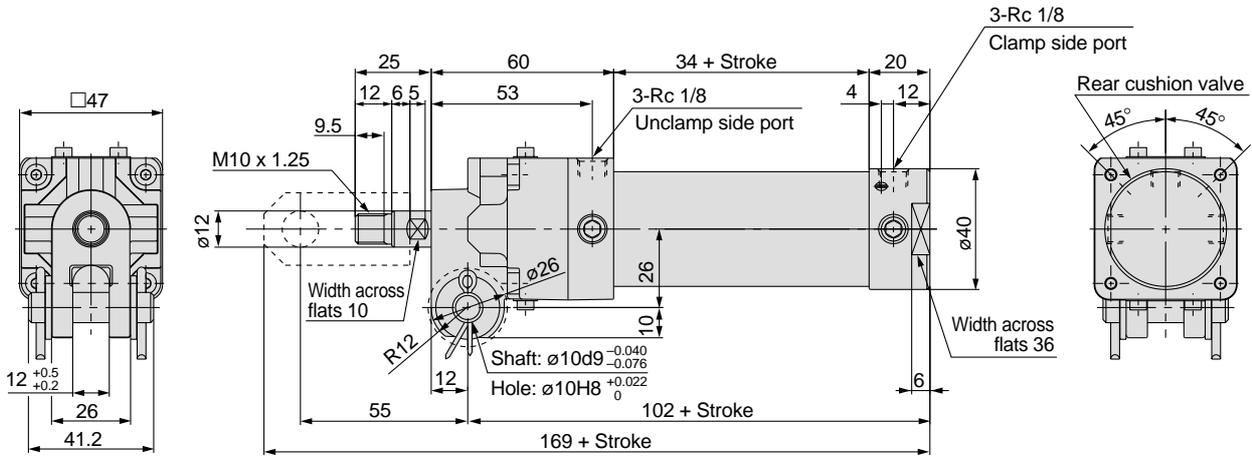
No.	Description	Material	Note
20	Valve retainer	Carbon steel	Zinc chromated
21	Lock nut	Carbon steel	Zinc chromated
22	Plug	Free-cutting steel	
23	Wear ring	Resin	
24	Pin	Carbon steel	
25	Flat washer	Rolled steel	
26	Cotter pin	Low carbon steel wire rod	
27	FR One-touch fitting		KRL08-02S
28	Spatter cover		KR-08C
29	FR double layer tube		TRB0806W
30	Rod seal	NBR	
31	Piston seal	NBR	
32	Tube gasket	NBR	
33	Cushion seal B	NBR	
34	Valve seal	NBR	
35	Valve gasket	NBR	
36	Lock ring seal	NBR	
37	O-ring	NBR	
38	Coil scraper	Phosphor bronze	

\* The retainer plate (number 13) is used only for unclamp side locking type ø50 and ø63.

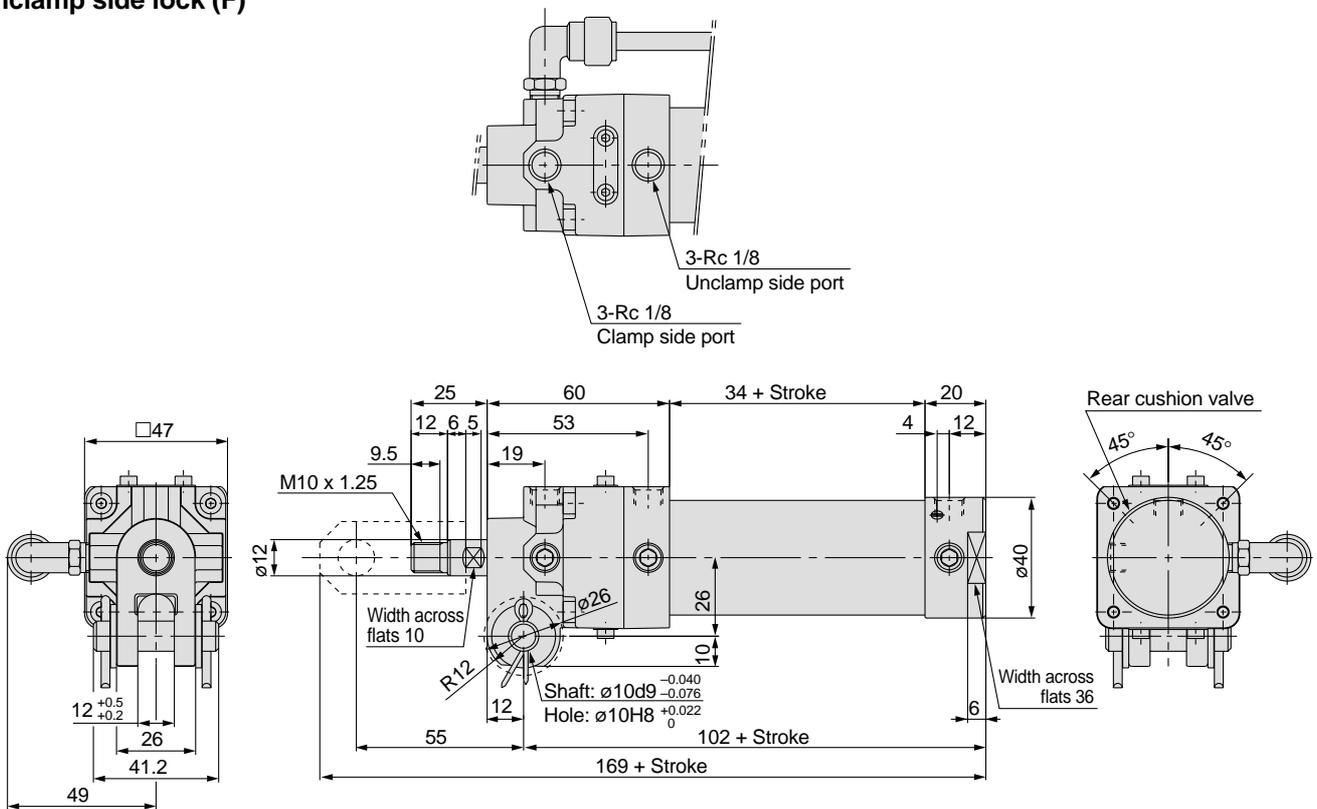
# Series CLK1

## Dimensions CLK1□32/Standard Type

### Clamp side lock (B)



### Unclamp side lock (F)

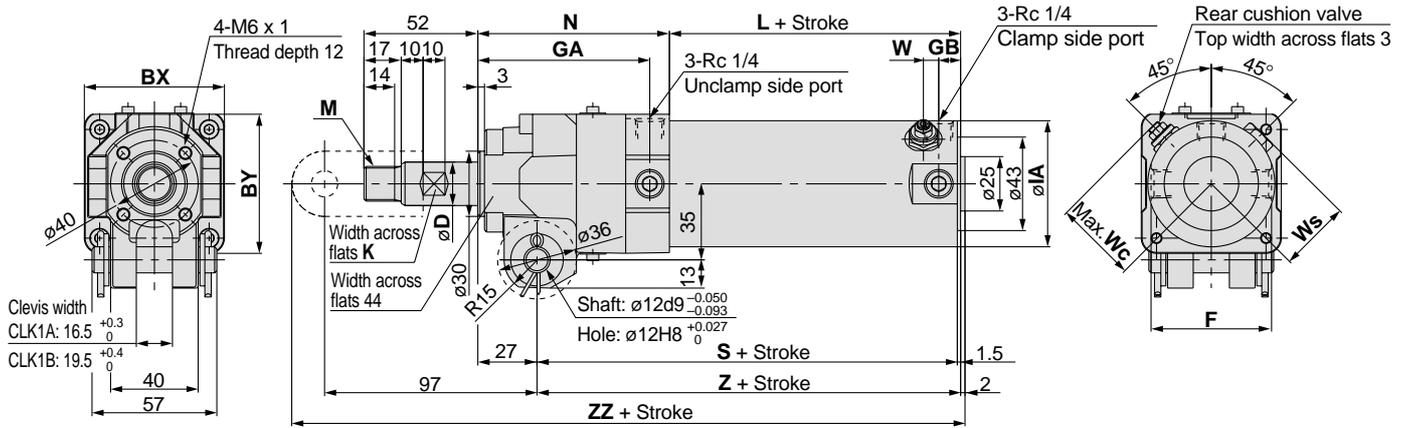


Note) Refer to pages 13 and 14 for accessories.

# Clamp Cylinder with Lock **Series CLK1**

## Dimensions CLK1□40, 50, 63/Standard Type

### Clamp side lock (B)

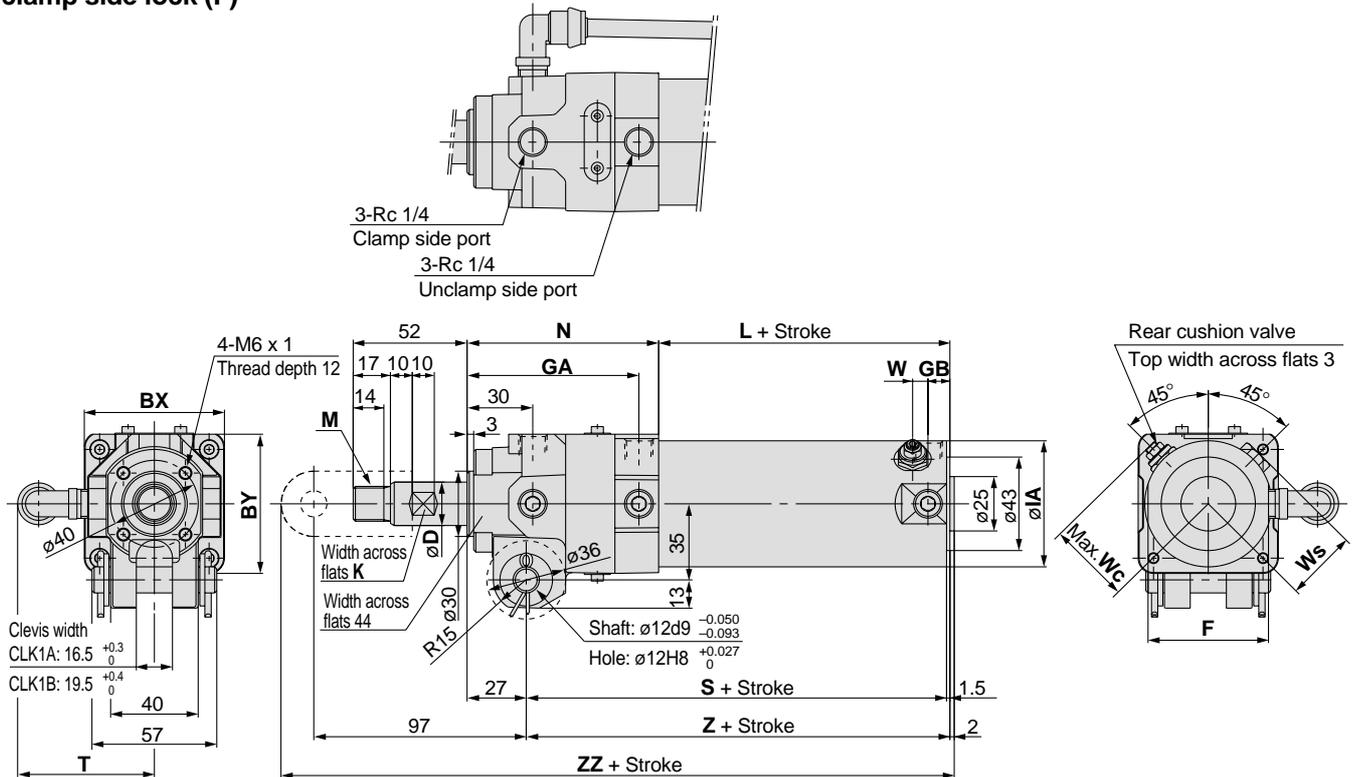


(mm)

Symbol	BX	BY	D	F	GA	GB	IA	K	L	M	N	S	W	Wc	Ws	Z	ZZ
Bore size																	
40	56	54	16	44	77	10	47	14	55	M12 x 1.5	86	112.5	5	39	27.5	114	228
50	64	64	20	55	78.5	10	58	17	58	M16 x 1.5	87.5	117	7	41	33	118.5	232.5
63	74	74	20	69	82	12	72	17	58	M16 x 1.5	91	120.5	5.5	48	39	122	236

Note) Refer to pages 13 and 14 for accessories.

### Unclamp side lock (F)



(mm)

Symbol	BX	BY	D	F	GA	GB	IA	K	L	M	N	S	T	W	Wc	Ws	Z	ZZ
Bore size																		
40	56	54	16	44	77	10	47	14	55	M12 x 1.5	86	112.5	57	5	39	27.5	114	228
50	64	64	20	55	78.5	10	58	17	58	M16 x 1.5	87.5	117	60	7	41	33	118.5	232.5
63	74	74	20	69	82	12	72	17	58	M16 x 1.5	91	120.5	67	5.5	48	39	122	236

Note) Refer to pages 13 and 14 for accessories.

# Clamp Cylinder with Lock With Magnetic Field Resistant Auto Switch

## Series **CLK1P/CLK1G** ø40, ø50, ø63

### How to Order

With Magnetic Field  
Resistant Reed Switch

**CLK1P** A 50 100 B P74L

With Magnetic Field  
Resistant Solid State Switch

**CLK1G** A 50 100 B P5DWL

#### Clevis width

<b>A</b>	16.5mm	ø40, ø50, ø63
<b>B</b>	19.5mm	ø50, ø63

ø40 bore size is only available  
with A:16.5mm clevis width.

#### Bore size

<b>40</b>	40mm
<b>50</b>	50mm
<b>63</b>	63mm

#### Cylinder stroke (mm)

<b>40, 50, 63</b>	50, 75, 100, 125, 150
-------------------	-----------------------

#### End bracket

<b>Nil</b>	Without fitting
<b>I</b>	Single knuckle joint
<b>Y</b>	Double knuckle joint

#### Locking position

<b>B</b>	Clamp side lock
<b>F</b>	Unclamp side lock

#### Number of auto switches

<b>Nil</b>	2 pcs.
<b>s</b>	1 pc.
<b>n</b>	"n" pcs.

#### Auto switch type

<b>Nil</b>	Without auto switch (built-in magnet) with switch rail	<b>CLK1P</b>
<b>P</b>		<b>CLK1G</b>

\* Select applicable auto switch models  
from the table below.

#### Built-in magnet cylinder part nos.

In case of built-in magnets without auto  
switches, the auto switch type symbol is  
as shown below.

For CLK1P (Example) CLK1PA50-100Y-B  
For CLK1G (Example) CLK1GA50-100Y-B-P

#### Port and switch rail position

Symbol	Position	Cylinder type	
		<b>B</b> (Clamp side lock)	<b>F</b> (Unclamp side lock)
<b>Nil</b>	Port on top Rail on right		
<b>2</b>	Port on left Rail on right		
<b>3</b>	Port on right Rail on left		
<b>4</b>	Port on top Rail on left		
<b>5</b>	Port on left Rail on top		
<b>6</b>	Port on right Rail on top		

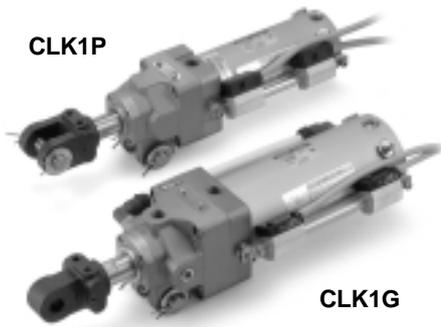
⇒ Port    ⊕ Switch rail    ⊕ By-pass piping

#### Magnetic field resistant auto switch types

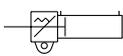
Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model	Lead wire length (m)*			Applicable load						
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)							
<b>Reed switch</b>	Lights when OFF	Grommet	Yes	2 wire	24V	—	100V	<b>P70</b>	●	●	●	Relay, PLC					
	—												100V	<b>P74</b>	●	●	●
	Lights when OFF																
	—												48V, 100V	100V	<b>P80</b>	●	●
<b>Solid state switch</b>	Diagnostic indication (2 color indicator)	Grommet	Yes	2 wire	24V	—	—	<b>P5DW</b>	—	●	●	Relay, PLC					
	Diagnostic indication (2 color indicator) with spatter resistant cable												<b>P5DWB</b>	—	●	●	

\* Lead wire length symbols 0.5m.....Nil (Example) P70  
3m.....L P70L  
5m.....Z P70Z

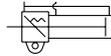
\* Type P5DW has a lead wire length of 3m or 5m. (0.5m length is not available.)



**Symbols**



Clamp side locking type



Unclamp side locking type

**Accessories (Options)**

Description	Series CLK1PA, CLK1GA		Series CLK1PB, CLK1GB
	ø40	ø50, ø63	ø50, ø63
Single knuckle joint	CL1K40-17-R5006	CKA40-17-101B	CKB40-17-102B
Double knuckle joint	CL1K40-18-R5006	CKA40-18-206C	CKB40-18-207B
Pedestal	75mm stroke	CKA40-40-209A	—
	100mm stroke	CKA40-40-210A	—
	150mm stroke	CKA40-40-211A	—

**Auto Switch Mounting Bracket Part Nos.**

Auto switch model		Auto switch mounting bracket part no.		
		40	50	63
Reed switch	D-P70, P74, P75, P80	BAP1-063		
Solid state switch	D-P5DW, P5DWB	BAP2-063		

**Auto Switch Unit Weights**

Auto switch model	Lead wire length		
	0.5m	3m	5m
D-P7 D-P8	0.05	0.19	0.32
D-P5DW D-P5DWB	—	0.15	0.24

**Auto Switch Mounting Bracket Unit Weight**

Part no.	Weight
BAP1-063 BAP2-063	0.03

**Cylinder Specifications**

Fluid	Air
Proof pressure	1.5MPa
Maximum operating pressure	1.0MPa
Minimum operating pressure	0.2MPa
Ambient and fluid temperature	Without auto switch: -10°C to 70°C, With auto switch: -10 to 60°C
Piston speed	50 to 500mm/s
Cushion	Unclamp side (head side): Air cushion, Clamp side (rod side): Without cushion
Lubrication	Non-lube
Thread tolerance	JIS class 2
Stroke length tolerance	+1.0 0
Mounting	Double clevis *

\* With pin and cotter pin

Clevis width	16.5mm	CLK1A, CLK1GA	ø40, ø50, ø63
	19.5mm	CLK1B, CLK1GB	ø50, ø63

**Lock Specifications**

Bore size (mm)	40	50	63
Locking action	Spring lock		
Unlocking pressure	0.2MPa or more		
Locking pressure	0.05MPa or less		
Locking direction	One direction (Clamp side, Unclamp side)		
Lock holding force N (Max. static load)	Equivalent to 0.5MPa		
	629	982	1559
Lock application	Drop prevention, Position holding		

**Standard Strokes**

Bore size (mm)	Standard stroke (mm)
40, 50, 63	50, 75, 100, 125, 150

**Weights (Basic weight is for a 0mm stroke.)**

Bore size (mm)		40	50	63
Cylinder	Basic weight	F: 1.08, B: 1.02	F: 1.56, B: 1.50	F: 2.31, B: 2.25
	Additional weight per 25mm of stroke	0.09	0.12	0.14
Single knuckle joint		0.25	0.2	
Double knuckle joint (includes pin)		0.33	0.28	

Note) Above values do not include the weight of auto switch or bracket.

Calculation

(Example) CLK1PB50-100Y-B

• Basic weight ..... 1.50 (ø50)

• Additional weight ... 0.12/25mm

• Cylinder stroke ..... 100mm

• Double knuckle joint...0.28 (Y)

1.50 + 0.12 x 100/25 + 0.28 = 2.26kg

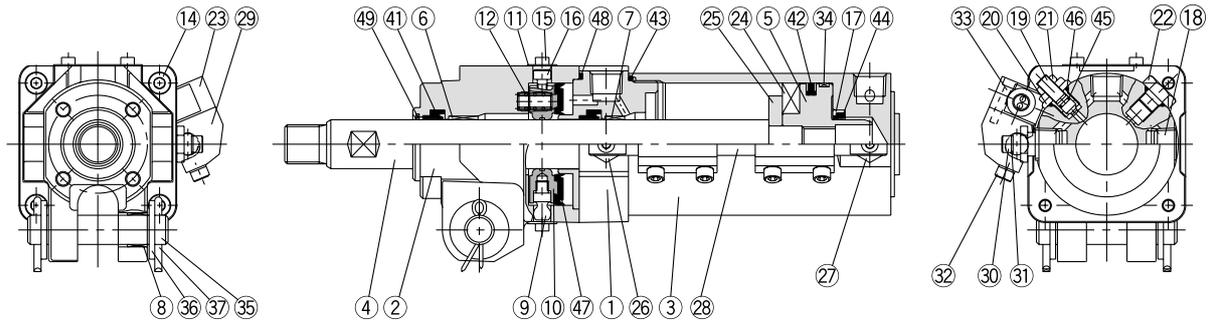
**Theoretical Output**

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm <sup>2</sup> )	Operating pressure (MPa)			
				0.3	0.4	0.5	0.6
40	16	OUT	1260	378	504	630	756
		IN	1060	318	424	530	636
50	20	OUT	1960	588	784	980	1180
		IN	1650	495	660	825	990
63	20	OUT	3120	934	1250	1560	1870
		IN	2800	840	1120	1400	1680

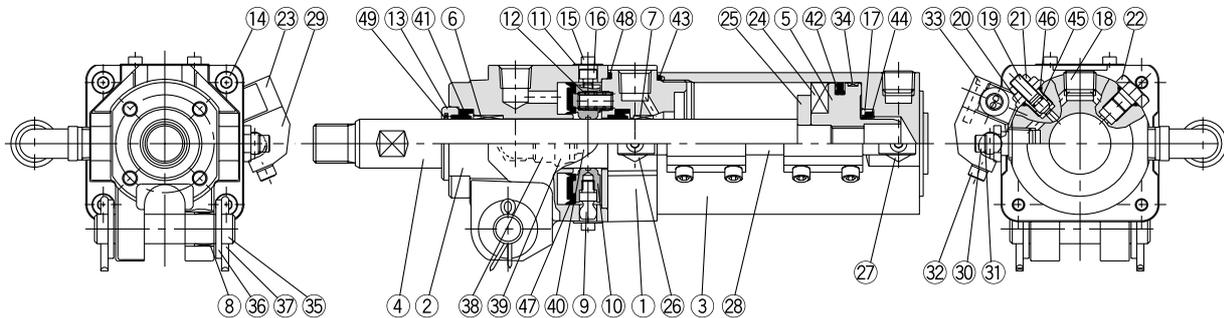
# Series CLK1P/CLK1G

## Construction CLK1P□40, 50, 63/With Magnetic Field Resistant Auto Switch Types D-P7, D-P8

### Clamp side lock (B)



### Unclamp side lock (F)



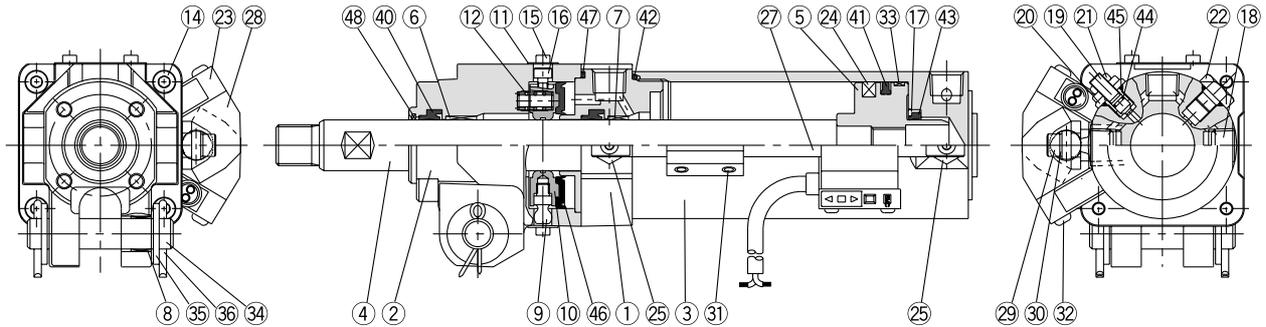
### Parts list

No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Hard anodized
2	Cover	Aluminum alloy	Hard anodized
3	Tube cover	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electro plated
5	Piston	Aluminum alloy	Chromated
6	Bushing	Lead-bronze casting	
7	Bushing	Lead-bronze casting	
8	Clevis bushing	Oil-impregnated sintered alloy	
9	Pivot	Carbon steel	Heat treated, Electroless nickel plated
10	Lock ring	Carbon steel	Heat treated
11	Dust cover	Stainless steel	
12	Brake spring	Steel wire	Zinc chromated
13	Retainer plate	Aluminum alloy	Clear anodized
14	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
15	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
16	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
17	Cushion seal retainer	Rolled steel	Zinc chromated
18	Hexagon socket head plug	Carbon steel	Rc 1/4
19	Cushion valve	Free-cutting steel	Zinc chromated
20	Valve retainer	Carbon steel	Zinc chromated
21	Lock nut	Carbon steel	Zinc chromated
22	Plug	Free-cutting steel	
23	Magnetic field resistant auto switch		
24	Magnet	Rare earth	Nickel plated
25	Magnet holder	Aluminum alloy	Chromated

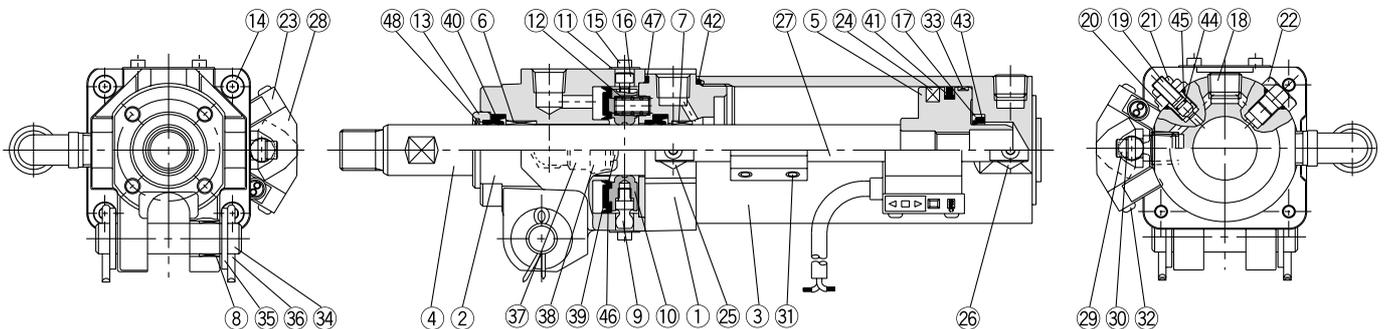
No.	Description	Material	Note
26	Switch mounting plug R	Free-cutting steel	
27	Switch mounting plug H	Free-cutting steel	
28	Switch mounting rod	Carbon steel	Chromated
29	Switch mounting bracket B	Aluminum alloy	
30	Hexagon socket head cap screw	Chrome molybdenum steel	Zinc chromated
31	Flat washer	Steel wire	Zinc chromated
32	Hexagon socket head set screw	Chrome molybdenum steel	Zinc chromated
33	Round head Phillips screw	Chrome molybdenum steel	Black zinc chromated
34	Wear ring	Resin	
35	Pin	Carbon steel	
36	Flat washer	Rolled steel	
37	Cotter pin	Low carbon steel wire rod	
38	FR One-touch fitting		KRL08-02S
39	Spatter cover		KR-08C
40	FR double layer tube		TRB0806W
41	Rod seal	NBR	
42	Piston seal	NBR	
43	Tube gasket	NBR	
44	Cushion seal B	NBR	
45	Valve seal	NBR	
46	Valve gasket	NBR	
47	Lock ring seal	NBR	
48	O-ring	NBR	
49	Coil scraper	Phosphor bronze	

**Construction CLK1G□40, 50, 63/With Magnetic Field Resistant Auto Switch Type D-P5**

**Clamp side lock (B)**



**Unclamp side lock (F)**



**Parts list**

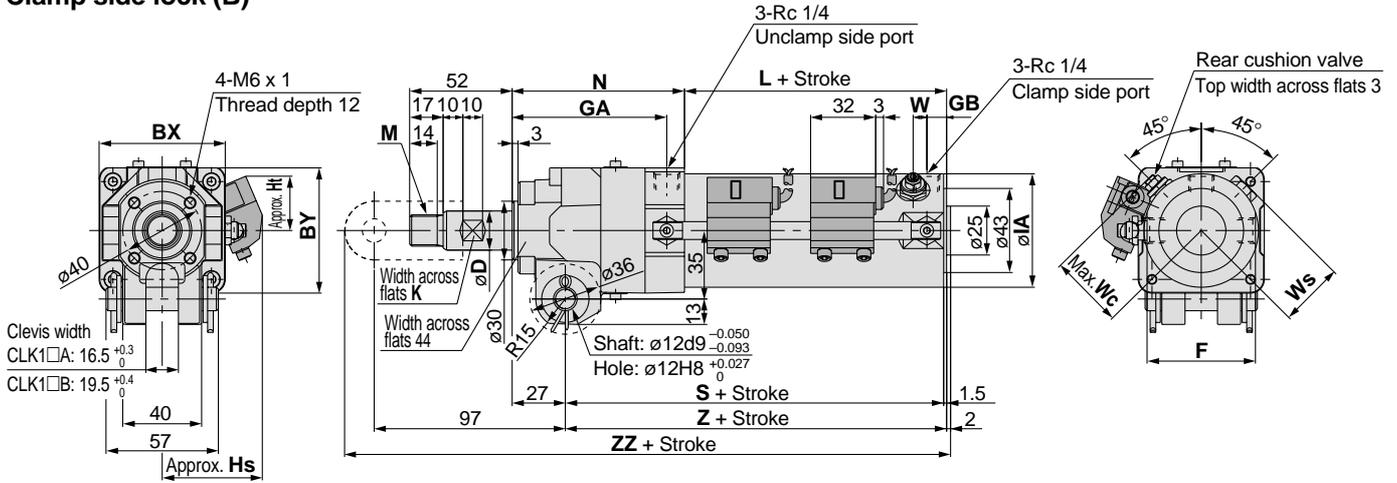
No.	Description	Material	Note
1	Rod cover	Aluminum alloy	Hard anodized
2	Cover	Aluminum alloy	Hard anodized
3	Tube cover	Aluminum alloy	Hard anodized
4	Piston rod	Carbon steel	Hard chromium electro plated
5	Piston	Aluminum alloy	Chromated
6	Bushing	Lead-bronze casting	
7	Bushing	Lead-bronze casting	
8	Clevis bushing	Oil-impregnated sintered alloy	
9	Pivot	Carbon steel	Heat treated, Zinc plated
10	Lock ring	Carbon steel	Heat treated
11	Dust cover	Stainless steel	
12	Brake spring	Steel wire	Zinc chromated
13	Retainer plate	Aluminum alloy	Clear anodized
14	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
15	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
16	Hexagon socket head cap screw	Chrome molybdenum steel	Nickel plated
17	Cushion seal retainer	Rolled steel	Zinc chromated
18	Hexagon socket head plug	Carbon steel	Rc 1/4
19	Cushion valve	Free-cutting steel	Zinc chromated
20	Valve retainer	Carbon steel	Zinc chromated
21	Lock nut	Carbon steel	Zinc chromated
22	Plug	Free-cutting steel	
23	Magnetic field resistant auto switch		
24	Magnet	Rare earth	Nickel plated

No.	Description	Material	Note
25	Switch mounting plug R	Free-cutting steel	
26	Switch mounting plug H	Free-cutting steel	
27	Switch mounting rod	Carbon steel	Chromated
28	Switch mounting bracket B	Aluminum alloy	
29	Hexagon socket head cap screw	Chrome molybdenum steel	Zinc chromated
30	Flat washer	Steel wire	Zinc chromated
31	Hexagon socket head set screw	Chrome molybdenum steel	Zinc chromated
32	Round head Phillips screw	Chrome molybdenum steel	Black zinc chromated
33	Wear ring	Resin	
34	Pin	Carbon steel	
35	Flat washer	Rolled steel	
36	Cotter pin	Low carbon steel wire rod	
37	FR One-touch fitting		KRL08-02S
38	Spatter cover		KR-08C
39	FR double layer tube		TRB0806W
40	Rod seal	NBR	
41	Piston seal	NBR	
42	Tube gasket	NBR	
43	Cushion seal B	NBR	
44	Valve seal	NBR	
45	Valve gasket	NBR	
46	Lock ring seal	NBR	
47	O-ring	NBR	
48	Coil scraper	Phosphor bronze	

# Series CLK1P/CLK1G

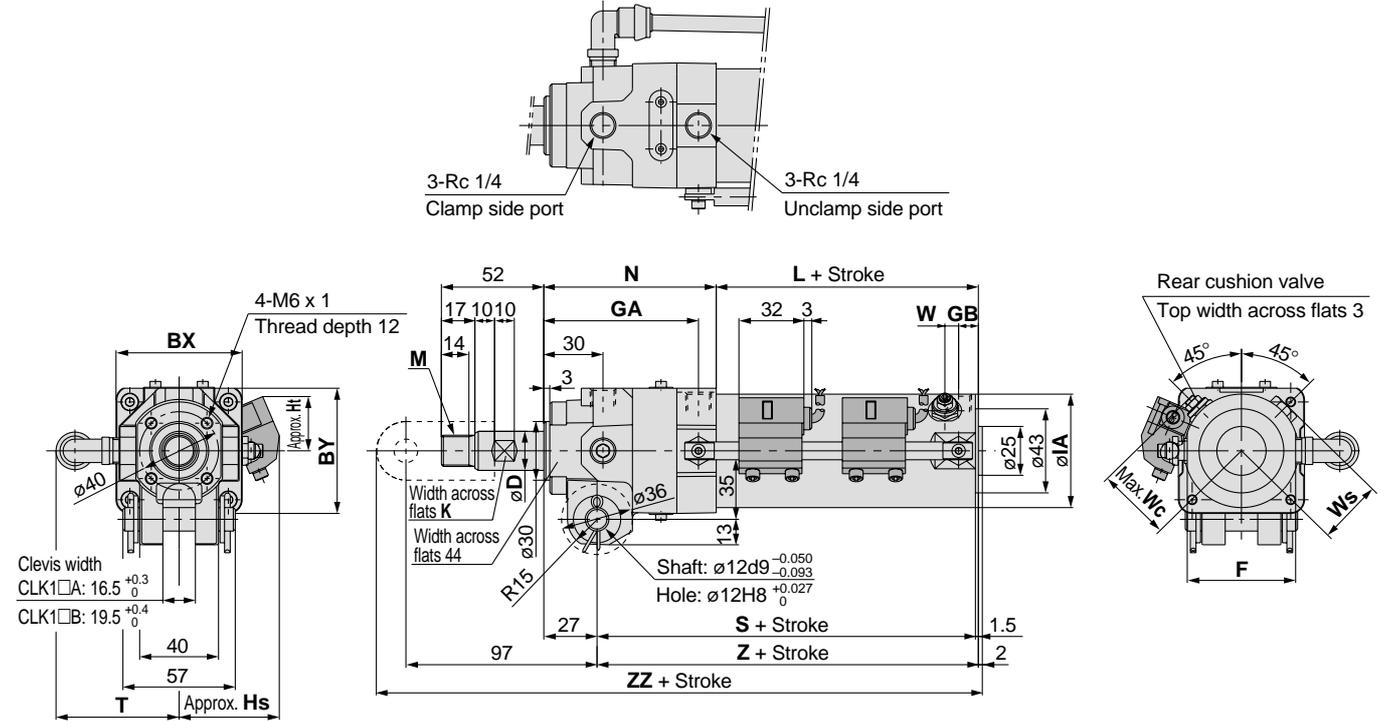
## Dimensions CLK1P□40, 50, 63/With Magnetic Field Resistant Reed Switch (D-P7, D-P8)

### Clamp side lock (B)



Symbol	BX	BY	D	F	GA	GB	IA	K	L	M	N	S	W	Wc	Ws	Z	ZZ	Hs	Ht
40	56	54	16	44	77	10	47	14	65	M12 x 1.5	86	122.5	5	39	27.5	124	238	45	28
50	64	64	20	55	78.5	10	58	17	58	M16 x 1.5	87.5	117	7	41	33	118.5	232.5	49	28
63	74	74	20	69	82	12	72	17	58	M16 x 1.5	91	120.5	5.5	48	39	122	236	54.5	28

### Unclamp side lock (F)



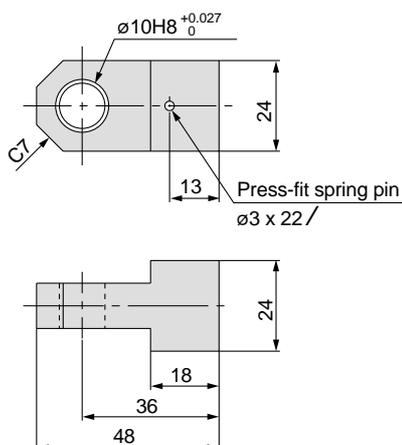
Symbol	BX	BY	D	F	GA	GB	IA	K	L	M	N	S	T	W	Wc	Ws	Z	ZZ	Hs	Ht
40	56	54	16	44	77	10	47	14	65	M12 x 1.5	86	122.5	57	5	39	27.5	124	238	45	28
50	64	64	20	55	78.5	10	58	17	58	M16 x 1.5	87.5	117	60	7	41	33	118.5	232.5	49	28
63	74	74	20	69	82	12	72	17	58	M16 x 1.5	91	120.5	67	5.5	48	39	122	236	54.5	28



# Series CLK1 Accessory Dimensions

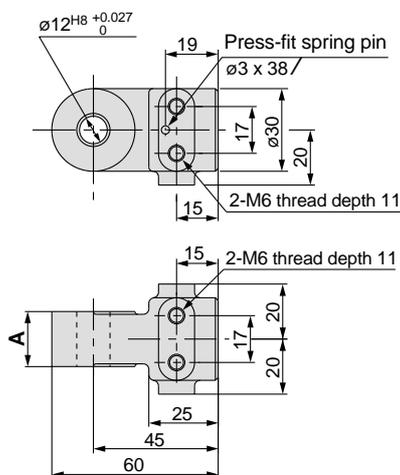
## Single Knuckle Joint

For  $\varnothing 32$



**CL1K32-17-R5004**

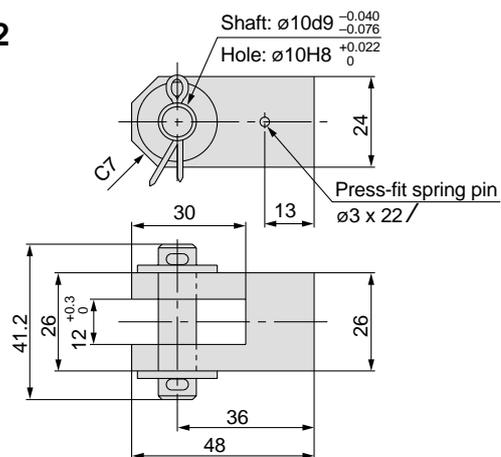
For  $\varnothing 40, \varnothing 50, \varnothing 63$



Part no.	A	Applicable clamp cylinder
<b>CL1K40-17-R5006</b>	$16.5^{+0.3}_0$	Series CLK1A ( $\varnothing 40$ )
<b>CKA40-17-101B</b>	$16.5^{+0.3}_0$	Series CLK1A ( $\varnothing 50, \varnothing 63$ )
<b>CKB40-17-102B</b>	$19.5^{+0.7}_{+0.3}$	Series CLK1B ( $\varnothing 50, \varnothing 63$ )

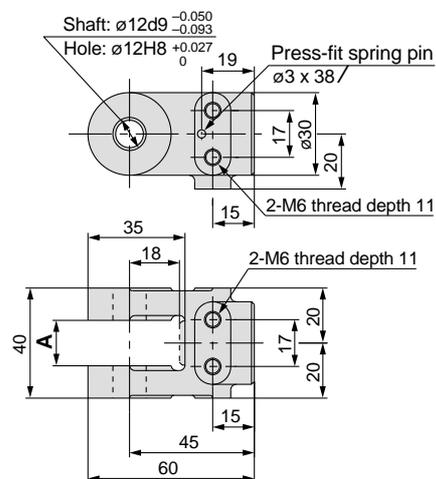
## Double Knuckle Joint

For  $\varnothing 32$



**CL1K32-18-R5004**

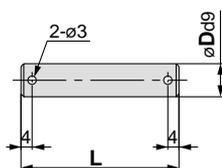
For  $\varnothing 40, \varnothing 50, \varnothing 63$



Part no.	A	Applicable clamp cylinder
<b>CL1K40-18-R5006</b>	$16.5^{+0.3}_0$	Series CLK1A ( $\varnothing 40$ )
<b>CKA40-18-206C</b>	$16.5^{+0.3}_0$	Series CLK1A ( $\varnothing 50, \varnothing 63$ )
<b>CKB40-18-207B</b>	$19.5^{+0.7}_{+0.3}$	Series CLK1B ( $\varnothing 50, \varnothing 63$ )

\* Pin, cotter pin, and flat washer are included with double knuckle joint.

## Pin

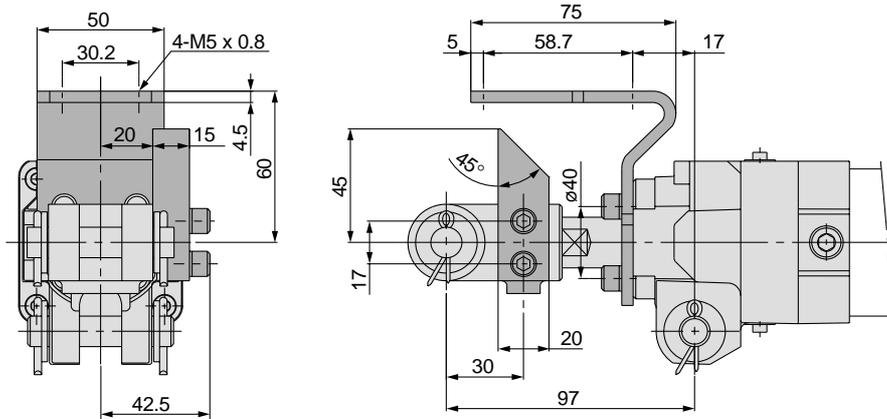


Part no.	D	L	Applicable double knuckle joint
<b>CDP-2</b>	$10^{-0.040}_{-0.076}$	41.2	For $\varnothing 32$
<b>C1K040-23-54806</b>	$12^{-0.050}_{-0.093}$	57	For $\varnothing 40, \varnothing 50, \varnothing 63$

# Series CLK1P/CLK1G Accessory Dimensions

## Limit Switch Mounting Base/Dog Fitting

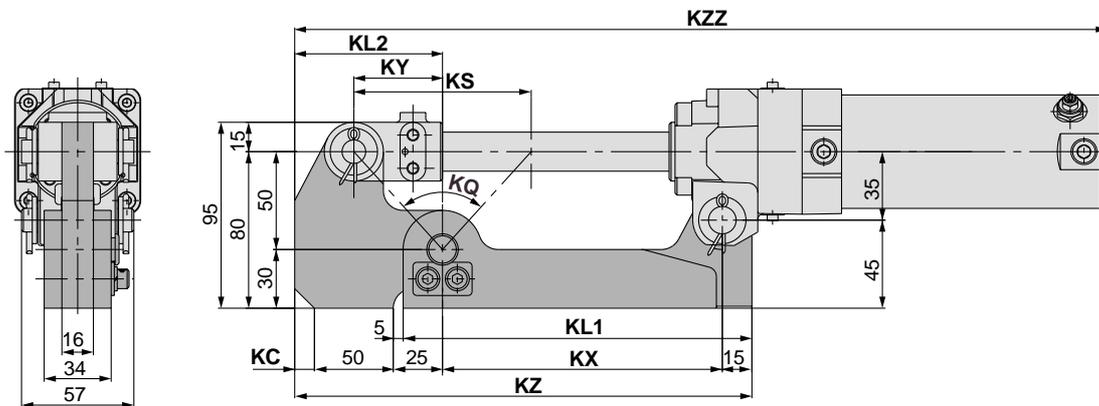
CKM040-48-16070A



Note 1) Limit switch mounting base and dog fitting can be repositioned by removing the hexagon socket head cap screw.

Note 2) Dog fitting can be used when the mounting hole size is 97mm.

## Pedestal

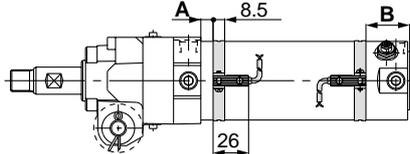
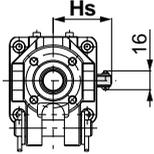


Type	KL1	KL2	KX	KZ	KY	KS	KQ	KC	KZZ			Applicable cylinder
									Bore size			
									40	50	63	
CKA40-40-209A	167	75	132	222	35	70	69° 59'	0	398	402.5	406	CLK1A40-75Y, CLK1A50-75Y, CLK1A63-75Y
CKA40-40-210A	177	75	142	232	45	90	83° 58'	0	433	437.5	441	CLK1A40-100Y, CLKA50-100Y, CLK1A63-100Y
CKA40-40-211A	202	85	167	267	70	140	108° 55'	10	518	522.5	526	CLK1A40-150Y, CLK1A50-150Y, CLK1A63-150Y

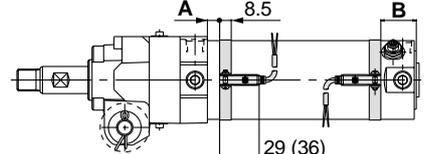
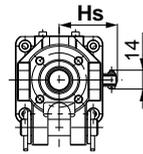
# Series CLK1P/CLK1G

## Auto Switches/Proper Mounting Position and Height for Stroke End Detection

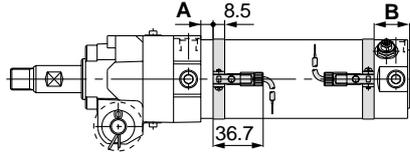
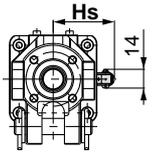
D-C7, D-C8



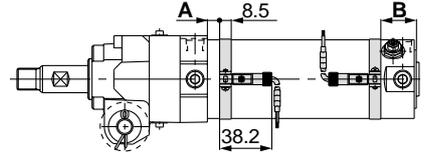
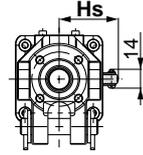
D-H7, D-H7□W, D-H7□F



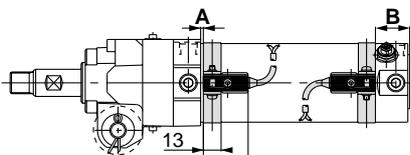
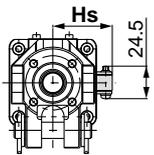
D-C73C



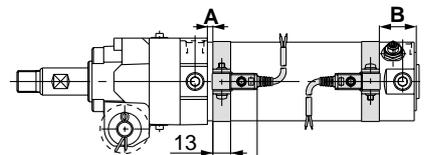
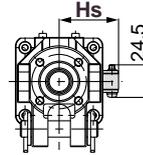
D-H7C



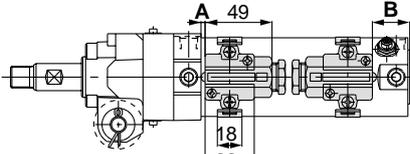
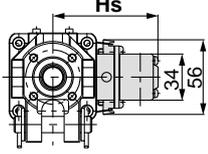
D-B5, B6



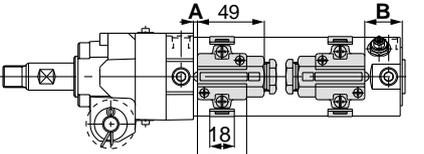
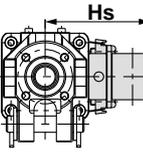
D-G5NT



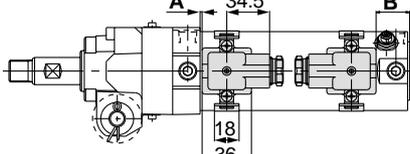
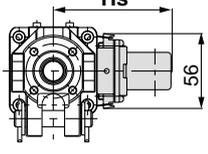
D-A3



D-G3, D-K3



D-A4



## Minimum Strokes for Auto Switch Mounting

Minimum strokes are as follows based on the space required for mounting auto switches.

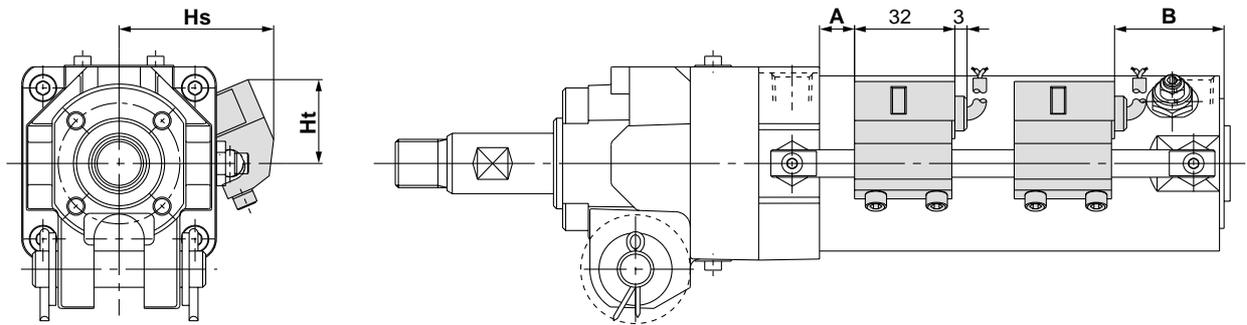
Model	Auto switch quantity				1 pc.
	2 pcs.		"n" pcs.		
	Different sides	Same side	Different sides	Same side	
D-C7, D-C8	15	50	$15 + 45 \left(\frac{n-2}{2}\right)$ (n = 2, 4, 6...)	$50 + 45 (n-2)$	10
D-C73C	15	65	$15 + 50 \left(\frac{n-2}{2}\right)$ (n = 2, 4, 6...)	$65 + 50 (n-2)$	
D-H7, D-H7□W D-H7□F	15	60	$15 + 45 \left(\frac{n-2}{2}\right)$ (n = 2, 4, 6...)	$65 + 45 (n-2)$	
D-H7C	15	65	$15 + 50 \left(\frac{n-2}{2}\right)$ (n = 2, 4, 6...)	$65 + 50 (n-2)$	
D-G5NTL	15	75	$15 + 50 \left(\frac{n-2}{2}\right)$ (n = 2, 4, 6...)	$75 + 50 (n-2)$	
D-A3 D-G3, D-K3	35	100	$35 + 30 (n-2)$	$100 + 100 (n-2)$	
D-A4	35	55	$35 + 30 (n-2)$	$50 + 50 (n-2)$	

Auto switch part no.	Symbol	Auto switch positioning and mounting			
		32	40	50	63
D-C7, D-C8	A	4	6.5	8	8
	B	31.5	29.5	31	31
	Approx. Hs	30.5	35	40.5	40.5
D-C73C	A	4	6.5	8	8
	B	31.5	29.5	31	31
	Approx. Hs	33	37.5	43	43
D-H7, D-H7□W D-H7□F	A	3	5.5	7	7
	B	30.5	28.5	30	30
	Approx. Hs	30.5	35	40.5	47.5
D-H7C	A	3	5.5	7	7
	B	31.5	28.5	30	30
	Approx. Hs	30.5	38	43	50
D-B5, D-B6	A	0 (1)	0.5	2	2
	B	33.5	23.5	25	25
	Approx. Hs	25.5 (28.5)	38	43.5	50.5
D-G5NTL	A	0	2	3.5	3.5
	B	27	25	26.5	26.5
	Approx. Hs	33.5	38	43.5	50.5
D-A3 D-G3, D-K3	A	—	0	1.5	1.5
	B	—	23	24.5	24.5
	Approx. Hs	—	71.5	77	84
D-A4	A	—	0	1.5	1.5
	B	—	23	24.5	24.5
	Approx. Hs	—	82.5	88	95

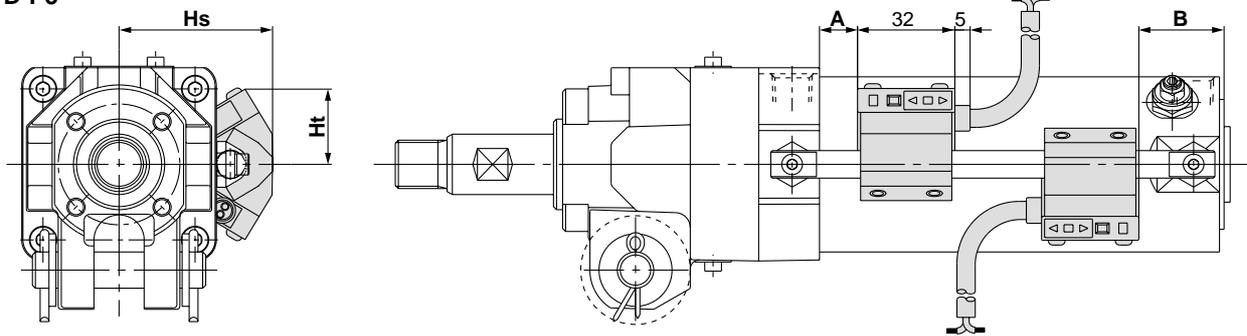
\* Values inside ( ) are for type D-B59W.

**With Magnetic Field Resistant Auto Switch**

**D-P7, D-P8**



**D-P5**



**Minimum Strokes for Auto Switch Mounting**

Minimum strokes are as follows based on the space required for mounting auto switches.

Model	Auto switch quantity		
	2 pcs. Same side	"n" pcs. Same side	1 pc.
<b>D-P7, D-P8</b>	50	50 + 65(n-2)	50
<b>D-P5</b>			

Auto switch part no.	Symbol	Auto switch positioning and mounting		
		40	50	63
<b>D-P7, D-P8</b>	<b>A</b>	8	0	0
	<b>B</b>	25	25	25
	Approx. Hs	45	49	54.5
	Approx. Ht	28	28	28
<b>D-P5</b>	<b>A</b>	3	4.5	4.5
	<b>B</b>	26	27.5	27.5
	Approx. Hs	46	50	56
	Approx. Ht	26	26	26

# Series CLK1 Auto Switch Specifications

## Contact Protection Boxes/CD-P11, CD-P12

### <Applicable switch models>

D-C7/C8, D-C73C/C80C, D-B53, D-P75

The above auto switches do not have internal contact protection circuits.

1. The operating load is an induction load.
2. The length of wiring to the load is 5m or more.
3. The load voltage is 100VAC.

A contact protection box should be used in any of the above situations.

Otherwise, the life of the contacts may be reduced. (They may stay on continuously.)

Further, even in the case of types having an internal contact protection circuit (D-B54, D-B64, D-B59W, D-P70, D-P74), if the length of the wiring to the load is extremely long (30m or more) and a PLC having a large rush current is used, confirm whether a contact protection box may be necessary.

### Contact protection box specifications

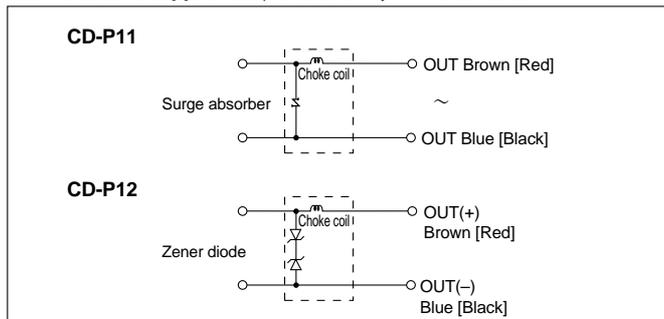
Part no.	CD-P11		CD-P12
Load voltage	100VAC	200VAC	24VDC
Maximum load current	25mA	12.5mA	50mA

\* Lead wire length ..... Switch connection side 0.5m  
Load connection side 0.5m

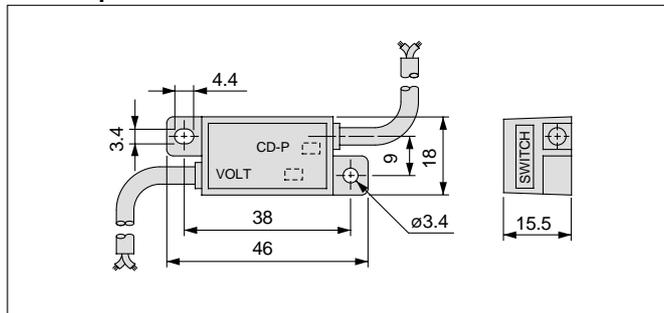


### Contact protection box internal circuits

Lead wire colors inside [ ] are those prior to conformity with IEC standards.



### Contact protection box dimensions



### Contact protection box connection

To connect a switch unit to a contact protection box, connect the lead wire from the side of the contact protection box marked SWITCH to the lead wire coming out of the switch unit.

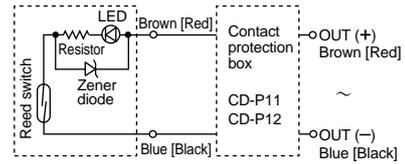
Moreover, the switch unit should be kept as close as possible to the contact protection box, with a lead wire length of no more than 1m.

## Auto Switch Internal Circuits

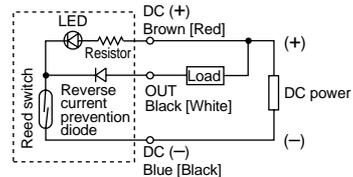
Lead wire colors inside [ ] are those prior to conformity with IEC standards.

### Reed switches

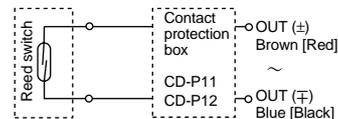
#### D-C73



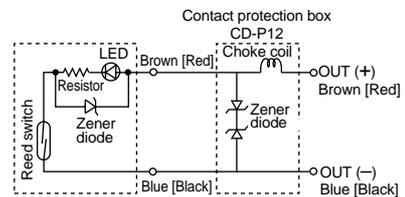
#### D-C76



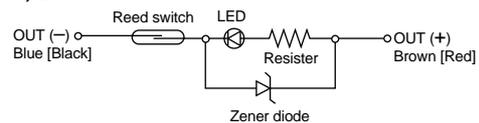
#### D-C80, D-C80C



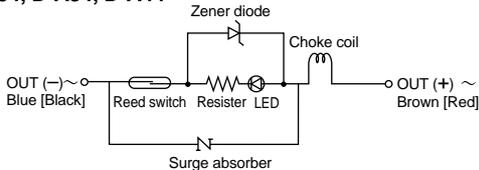
#### D-C73C



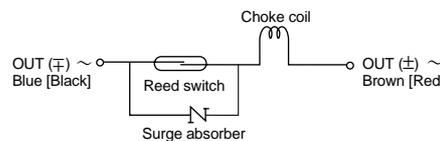
#### D-B53, D-A33



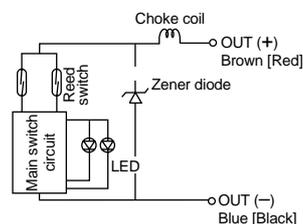
#### D-B54, D-A34, D-A44



#### D-B64



#### D-B59W



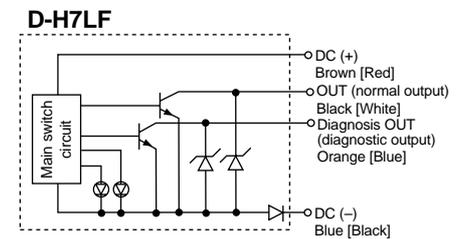
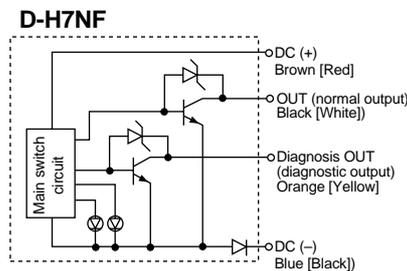
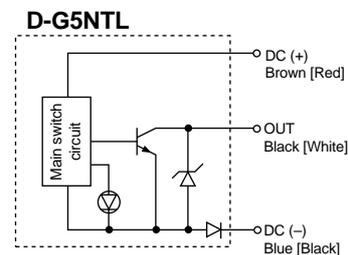
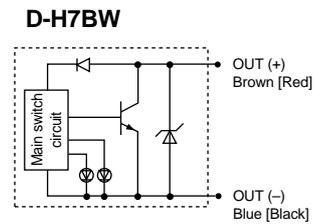
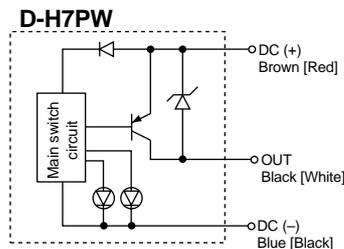
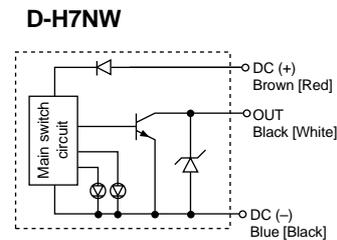
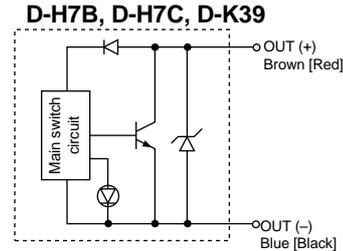
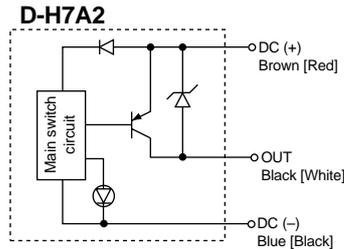
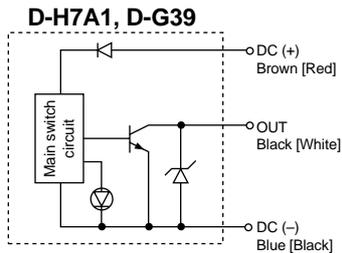
Refer to pages 20 and 21 for magnetic field resistant auto switches.

# Series CLK1 Auto Switch Specifications

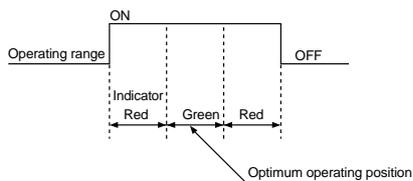
## Auto Switch Internal Circuits

Lead wire colors inside [ ] are those prior to conformity with IEC standards.

### Solid state switches



### Indicator light/Display method (D-H7□W, H7□F)



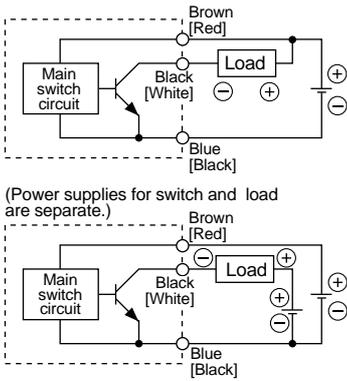
Refer to pages 20 and 21 for magnetic field resistant auto switches.

# Series CLK1 Auto Switch Connections and Examples

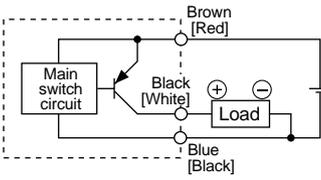
## Basic Wiring

Lead wire colors inside [ ] are those prior to conformity with IEC standards.

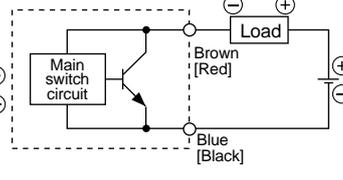
### Solid state 3 wire, NPN



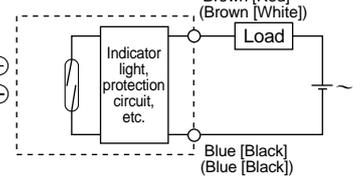
### Solid state 3 wire, PNP



### 2 wire <Solid state>



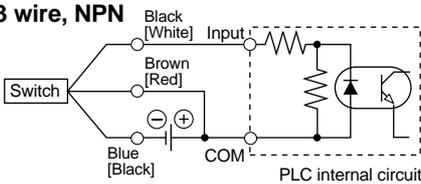
### 2 wire <Reed switch>



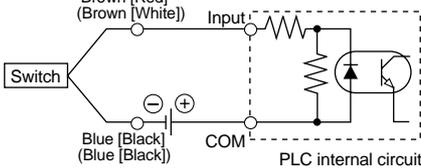
## Examples of Connection to PLC

### Sink input specifications

#### 3 wire, NPN

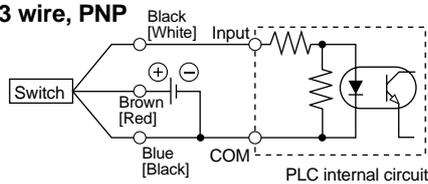


#### 2 wire

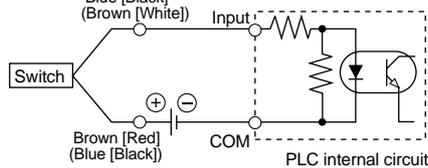


### Source input specifications

#### 3 wire, PNP



#### 2 wire

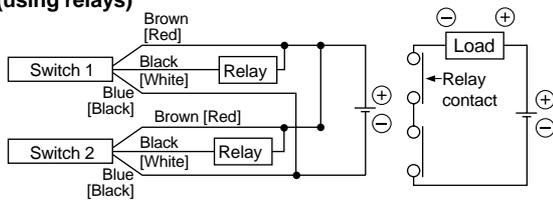


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

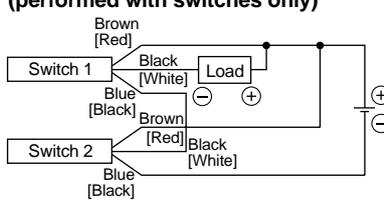
Lead wire colors inside ( ) are for types D-P7 and D-P8.

## Connection Examples for AND (Series) and OR (Parallel)

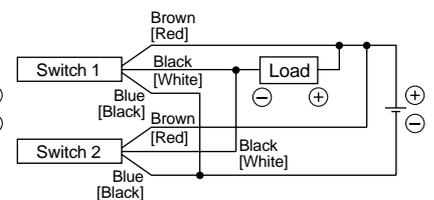
### 3 wire AND connection for NPN output (using relays)



### AND connection for NPN output (performed with switches only)

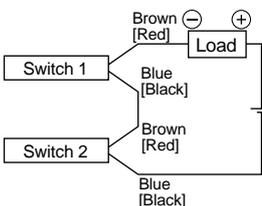


### OR connection for NPN output



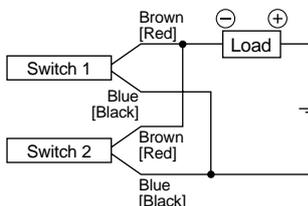
The indicator lights will light up when both switches are turned ON.

### 2 wire with 2 switch AND connection



When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up if both of the switches are in the ON state. (Except D-P70 and D-P75.)

### 2 wire with 2 switch OR connection



#### <Solid state \*>

When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

\* (Because their indicator light lights up in the OFF condition, reed switch types D-P70 and D-P75 are included.)

#### <Reed switch>

Except for D-P70 and D-P75, the load voltage will not increase when turned OFF because there is no current leakage. However, due to the number of switches in the ON state, the indicator lights will sometimes dim or not light up, because of dispersion and reduction of the current flowing to the switches.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Internal voltage drop} \times 2 \text{ pcs.} \\ &= 24\text{V} - 4\text{V} \times 2 \text{ pcs.} \\ &= 16\text{V} \end{aligned}$$

Example: Power supply is 24VDC  
Internal voltage drop in switch is 4V

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega \\ &= 6\text{V} \end{aligned}$$

Example: Load impedance is 3kΩ  
Leakage current from switch is 1mA

# Magnet Field Resistant 2 Color Indication Auto Switches Rail Mount Type D-P5DWL

## Grommet

For use in environments with magnetic field disturbance (AC magnetic field).

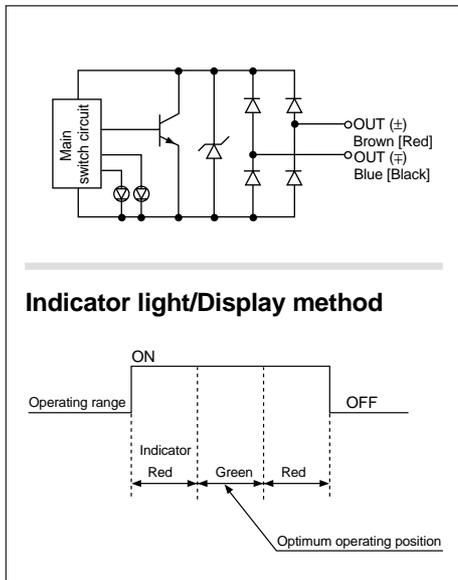


## Caution

### Usage Precautions

For use with single-phase AC welders.  
Cannot be used with DC inverter welders (includes rectifying type), arc welders, or condenser type welders.

## Auto Switch Internal Circuits



Lead wire colors inside [ ] are those prior to conformity with IEC standards.

## Auto Switch Specifications

D-P5DW (with indicator light)	
Auto switch part no.	<b>D-P5DWL</b>
Wiring	2 wire (non-polar)
Applicable load	24VDC relay, PLC
Load voltage	24VDC (20m to 28VDC)
Load current	6 to 40mA or less
Internal voltage drop	5V or less
Leakage current	1mA or less at 24VDC
Operating time	40ms or less
Indicator light	Actuated position..... Red LED lights up Optimum operating position..... Green LED lights up

- Lead wire ————— Oil resistant heavy duty vinyl cord,  $\phi 6$ , 0.5mm<sup>2</sup>, 2 wire (Brown, Blue [Red, Black]), 3m
- Impact resistance ——— 1000m/s<sup>2</sup>
- Insulation resistance ——— 50M $\Omega$  or more at 500VAC (between lead wire and case)
- Withstand voltage ——— 1000VDC for 1 min. (between lead wire and case)
- Ambient temperature ——— -10 to 60°C
- Enclosure ————— IEC529 standard IP67, watertight construction (JIS 0920)

## Magnetic Field Resistance

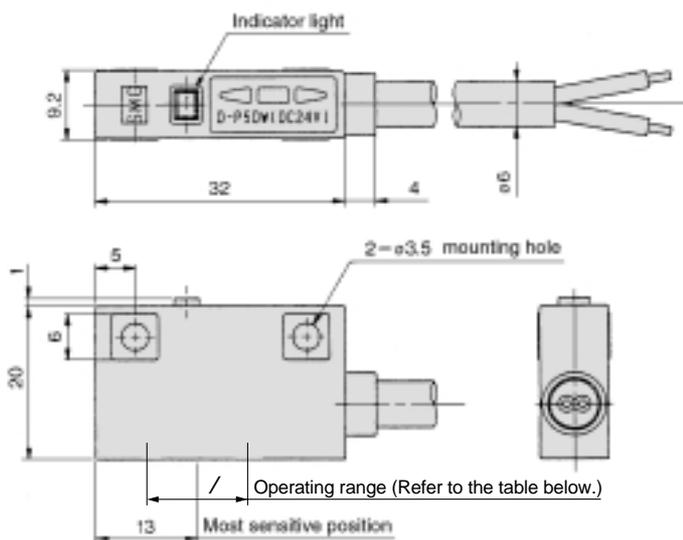
When the AC welding current is 16000A or less, the operational distance between the welding conductor (welding gun or cable) and the cylinder or auto switch is 0mm.  
Consult SMC when exceeding 16000A.

## Auto Switch Weights

Model	Lead wire length	
	3m	5m *
<b>D-P5DWL</b>	150	240

\* Indicate "Z" at the end of the model number for 5m lead wire.

## Dimensions



## Operating range (Dimension /)

Cylinder series	Applicable bore size (mm)		
	40	50	63
<b>CLK1G□</b>	4	4	4.5

# Magnetic Field Resistant Reed Switches D-P70/P74/P75/P80

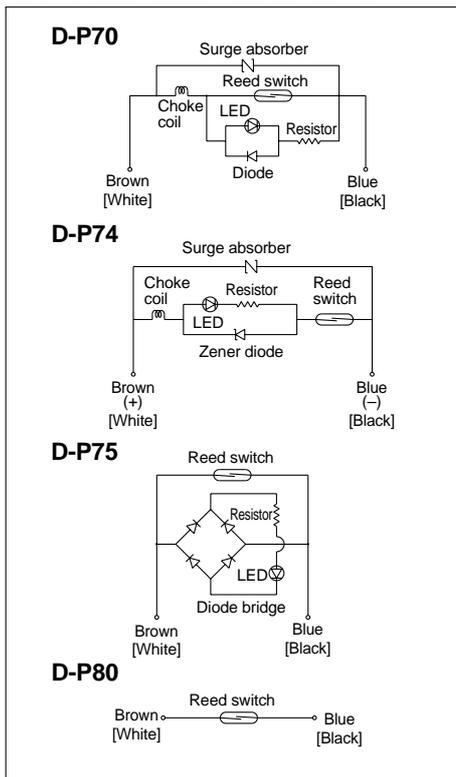
## Grommet



### ⚠ Caution

Refer to "Magnetic Field Resistant Reed Switches/Specific Product Precautions" (pages 31 and 32).

## Auto Switch Internal Circuits



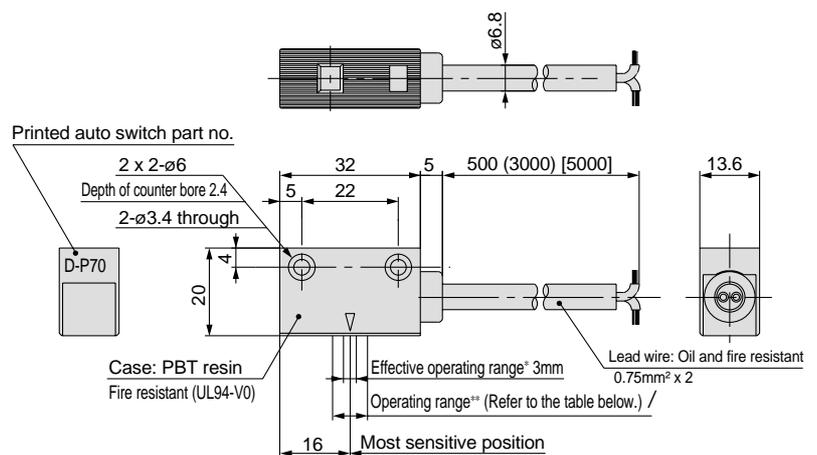
## Auto Switch Specifications

D-P70, D-P74, D-P75 (with indicator light)			
Auto switch part no.	D-P70	D-P74	D-P75
Electrical entry	Grommet		
Application	Relay, PLC		PLC
Load voltage	100VAC	24VDC	100VDC
Max. load voltage/Load current range	20mA	5 to 40mA	5 to 20mA
40mA			
Contact protection circuit	Yes		
Internal voltage drop (internal resistance)	(10Ω or less)	2.4V or less	(0)
Leakage current	1.8mA	0	1.2mA
Indicator light	Red LED lights up when OFF	Red LED lights up when ON	Red LED lights up when OFF

D-P80 (without indicator light)			
Auto switch part no.	D-P80		
Electrical entry	Grommet		
Application	Relay, PLC		
Load voltage	24V <sup>AC</sup> <sub>DC</sub> or less	48V <sup>AC</sup> <sub>DC</sub>	100V <sup>AC</sup> <sub>DC</sub>
Maximum load voltage	50mA	40mA	20mA
Contact protection circuit	No		
Internal resistance	0		

- Operating time — 1.2ms
  - Lead wire — Oil resistant, fire resistant heavy duty cord, ø6.8, 0.75mm<sup>2</sup>; 2 wire (Brown, Blue [White, Black]), 0.5m\*
  - Impact resistance — 300m/s<sup>2</sup>
  - Insulation resistance — 50MΩ or more at 500VAC (between lead wire and case)
  - Ambient temperature — -10 to 60°C
  - Enclosure — IEC standard IP67, watertight (JISCO920), oil proof construction
- \* Indicate "L" for 3m lead wire and "Z" for 5m lead wire at the end of an auto switch part number.

## Auto Switch Dimensions



## Operating range ( Dimension / )

Cylinder series	Applicable bore sizes (mm)		
	40	50	63
CLK1P□	7	8	8

\* Effective operating range:  
The range with enough magnetic force to resist malfunction due to the outside magnetic field when the switch is ON.

\*\* Operating range:  
The range within which the switch turns ON.





# Series CLK1 Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of "**Caution**", "**Warning**" or "**Danger**". To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

 **Caution** : Operator error could result in injury or equipment damage.

 **Warning** : Operator error could result in serious injury or loss of life.

 **Danger** : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414 : Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems

Note 2) JIS B 8370 : General Rules for Pneumatic Equipment

## **Warning**

### **1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

### **2. Only trained personnel should operate pneumatically operated machinery and equipment.**

Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

### **3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

### **4. Contact SMC if the product is to be used in any of the following conditions:**

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.



# Series CLK1 Actuator Precautions 1

Be sure to read before handling.

## Precautions on design

### ⚠ Warning

1. **There is a possibility of dangerous sudden action by air cylinders if sliding parts of machinery are twisted due to external forces, etc.**

In such cases, human injury may occur; e.g., by catching hands or feet in the machinery, or damage to the machinery itself may occur. Therefore, the machine should be designed to avoid such dangers.

2. **A protective cover is recommended to minimize the risk of personal injury.**

If a stationary object and moving parts of a cylinder are in close proximity, personal injury may occur. Design the structure to avoid contact with the human body.

3. **Securely tighten all stationary parts and connected parts so that they will not become loose.**

When a cylinder operates with high frequency or is installed where there is a lot of vibration, ensure that all parts remain secure.

4. **A deceleration circuit or shock absorber, etc., may be required.**

When a driven object is operated at high speed or the load is heavy, a cylinder's cushion will not be sufficient to absorb the shock. Install a deceleration circuit to reduce the speed before cushioning, or install an external shock absorber to relieve the shock. In this case, the rigidity of the machinery should also be examined.

5. **Consider emergency stops.**

Design so that human injury and/or damage to machinery and equipment will not be caused when machinery is stopped by a safety device under abnormal conditions, a power outage or a manual emergency stop.

6. **Consider the action when operation is restarted after an emergency stop or abnormal stop.**

Design the machinery so that human injury or equipment damage will not occur upon restart of operation. When the cylinder has to be reset at the starting position, install safe manual control equipment.

## Selection

### ⚠ Warning

1. **Check the specifications.**

The products advertised in this catalog are designed according to use in industrial compressed air systems. If the products are used in conditions where pressure, temperature, etc., are out of specification, damage and/or malfunction may be caused. Do not use in these conditions.

Consult SMC if you use a fluid other than compressed air.

### ⚠ Caution

1. **Operate within the limits of the maximum usable stroke.**

The piston rod will be damaged if operated beyond the maximum stroke.

Refer to the air cylinder model selection procedures for the maximum usable stroke.

2. **Operate the piston within a range such that collision damage will not occur at the stroke end.**

Operate within a range such that damage will not occur when the piston having inertial force stops by striking the cover at the stroke end. Refer to the cylinder model selection procedure for the range within which damage will not occur.

3. **Use a speed controller to adjust the cylinder drive speed, gradually increasing from a low speed to the desired speed setting.**

## Mounting

### ⚠ Caution

1. **Be certain to match the rod shaft center with the load and direction of movement when connecting.**

When not properly matched, problems may arise with the rod and tubing, and damage may be caused due to friction on areas such as the inner tube surface, bushings, rod surface and seals.

2. **Do not scratch or dent the sliding parts of the cylinder tube or piston rod, etc., by striking or grasping them with other objects.**

Cylinder bores are manufactured to precise tolerances, so that even a slight deformation may cause faulty operation. Moreover, scratches or dents, etc., in the piston rod may lead to damaged seals and cause air leakage.

3. **Prevent the seizure of rotating parts.**

Prevent the seizure of rotating parts (pins, etc.) by applying grease.

4. **Do not use until you verify that the equipment can operate properly.**

After mounting, repair or modification, etc., connect the air supply and electric power, and then confirm proper mounting by means of appropriate function and leak inspections.

5. **Instruction manual.**

The product should be mounted and operated after thoroughly reading the manual and understanding its contents.

Keep the instruction manual where it can be referred to as needed.



# Series CLK1 Actuator Precautions 2

Be sure to read before handling.

## Piping

### ⚠ Caution

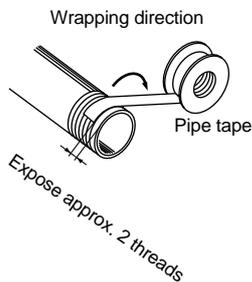
#### 1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.

#### 2. Wrapping of pipe tape

When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealing material do not get inside the piping.

Also, when pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the pipe.



## Cushions

### ⚠ Caution

#### 1. Readjust using the cushion needle.

Cushions are adjusted at the time of shipment, however, the cushion needle on the cover should be readjusted when the product is put into service, based upon factors such as the size of the load and the operating speed. When the cushion needle is turned clockwise, the cushion contracts and its effectiveness is increased.

#### 2. Do not operate with the cushion needle in a fully closed condition.

This will cause damage to the seals.

## Lubrication

### ⚠ Caution

#### 1. Lubrication of cylinder

The cylinder has been lubricated for life at the factory and can be used without any further lubrication.

## Air Supply

### ⚠ Warning

#### 1. Use clean air.

If compressed air includes chemicals, synthetic oils containing organic solvents, salt or corrosive gases, etc., it can cause damage or malfunction.

### ⚠ Caution

#### 1. Install air filters.

Install air filters at the upstream side of valves. The filtration degree should be 5 $\mu$ m or finer.

#### 2. Install an air dryer, after cooler or water separator, etc.

Air that includes much condensate causes malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, after cooler or water separator, etc.

#### 3. Use the product within the range of specifications for fluid temperature and ambient temperature.

Take measures to prevent freezing, since moisture in circuits will be frozen under 5°C, and this may cause damage to seals and lead to malfunction.

Refer to the "Air Cleaning Equipment" catalog for details on compressed air quality.

## Operating Environment

### ⚠ Warning

#### 1. Do not use in environments where there is a danger of corrosion.

Refer to the construction drawings regarding cylinder materials.

#### 2. In dirty locations or where water, oil, etc., splash on the equipment, take suitable measures to protect the rod.

## Maintenance

### ⚠ Warning

#### 1. Maintenance should be done according to the procedure indicated in the instruction manual.

If handled improperly, malfunction and damage of machinery or equipment may occur.

#### 2. Machine maintenance, and supply and exhaust of compressed air.

When machinery is serviced, first check measures to prevent dropping of driven objects and run-away of equipment, etc. Then cut off the supply pressure and electric power, and exhaust all compressed air from the system.

When machinery is restarted, check that operation is normal with actuators in the proper positions.

### ⚠ Caution

#### 1. Drain flushing.

Remove condensate from air filters regularly. (Refer to specifications.)



# Series CLK1 Auto Switch Precautions 1

Be sure to read before handling.

## Design and Selection

### Warning

#### 1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the range of specifications of load current, voltage, temperature or impact.

#### 2. Take precautions when multiple cylinders are used close together.

When multiple auto switch cylinders are used in close proximity, magnetic field interference may cause the switches to malfunction. Maintain a minimum cylinder separation of 40mm.

#### 3. Pay attention to the length of time that a switch is ON at an intermediate stroke position.

When an auto switch is placed at an intermediate position of the stroke and a load is driven at the time the piston passes, the auto switch will operate, but if the speed is too great the operating time will be shortened and the load may not operate properly. The maximum detectable piston speed is:

$$V(\text{mm/s}) = \frac{\text{Auto switch operating range (mm)}}{\text{Time load applied (ms)}} \times 1000$$

#### 4. Wiring should be kept as short as possible.

##### <Reed switch>

As the length of the wiring to a load gets longer, the rush current at switching ON becomes greater, and this may shorten the product's life. (The switch will stay ON all the time.)

- 1) For an auto switch without a contact protection circuit, use a contact protection box when the wire length is 5m or longer.
- 2) Even if an auto switch has a built-in contact protection circuit, when the wiring is more than 30m long, it is not able to adequately absorb the rush current and its life may be reduced. It is again necessary to connect a contact protection box in order to extend its life. Please contact SMC in this case.

##### <Solid state switch>

- 3) Although wire length should not affect switch function, use a wire 100m or shorter.

#### 5. Take precautions for the internal voltage drop of the switch.

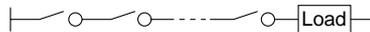
##### <Reed switch>

- 1) Switches with an indicator light (Except D-C76)

- If auto switches are connected in series as shown below, take note that there will be a large voltage drop because of internal resistance in the light emitting diodes. (Refer to internal voltage drop in the auto switch specifications.)

[The voltage drop will be "n" times larger when "n" auto switches are connected.]

Even though an auto switch operates normally, the load may not operate.



- In the same way, when operating under a specified voltage, although an auto switch may operate normally, the load may not operate. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of switch} \geq \text{Minimum operating voltage of load}$$

- 2) If the internal resistance of a light emitting diode causes a problem, select a switch without an indicator light (Model D-C80).

##### <Solid state switch>

- 3) Generally, the internal voltage drop will be greater with a 2 wire solid state auto switch than with a reed switch. Take the same precautions as in 1).

Also, note that a 12VDC relay is not applicable.

#### 6. Pay attention to leakage current.

##### <Solid state switch>

With a 2 wire solid state auto switch, current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

$$\text{Operating current of load} > \text{Leakage current (OFF condition)}$$

If the criteria given in the above formula are not met, it will not reset correctly (stays ON). Use a 3 wire switch if this specification will not be satisfied.

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

#### 7. Do not use a load that generates surge voltage.

##### <Reed switch>

If driving a load such as a relay that generates a surge voltage, use a switch with a built-in contact protection circuit or use a contact protection box.

##### <Solid state switch>

Although a zener diode for surge protection is connected at the output side of a solid state auto switch, damage may still occur if the surge is applied repeatedly. When a load, such as a relay or solenoid, which generates surge is directly driven, use a type of switch with a built-in surge absorbing element.

#### 8. Cautions for use in an interlock circuit.

When an auto switch is used for an interlock signal requiring high reliability, devise a double interlock system to avoid trouble by providing a mechanical protection function, or by also using another switch (sensor) together with the auto switch. Also perform periodic maintenance and confirm proper operation.

#### 9. Ensure sufficient clearance for maintenance activities.

When designing an application, be sure to allow sufficient clearance for maintenance and inspections.



# Series CLK1 Auto Switch Precautions 2

Be sure to read before handling.

## Mounting and Adjustment

### Warning

#### 1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (300m/s<sup>2</sup> or more for reed switches and 1000m/s<sup>2</sup> or more for solid state switches) while handling.

Although the body of the switch may not be damaged, the inside of the switch could be damaged and cause a malfunction.

#### 2. Do not carry a cylinder by the auto switch lead wires.

Never carry a cylinder by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the switch to be damaged by the stress.

#### 3. Mount switches using the proper fastening torque.

When a switch is tightened beyond the range of fastening torque, the mounting screws, mounting bracket or switch may be damaged. On the other hand, tightening below the range of fastening torque may allow the switch to slip out of position.

#### 4. Mount a switch at the center of the operating range.

Adjust the mounting position of an auto switch so that the piston stops at the center of the operating range (the range in which a switch is ON).

(The mounting position shown in a catalog indicates the optimum position at stroke end.) If mounted at the end of the operating range (around the borderline of ON and OFF), operation will be unstable.

## Wiring

### Warning

#### 1. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from applying bending stress or stretching force to the lead wires.

#### 2. Be sure to connect the load before power is applied.

<2 wire type>

If the power is turned ON when an auto switch is not connected to a load, the switch will be instantly damaged because of excess current.

#### 3. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

#### 4. Do not wire with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits including auto switches may malfunction due to noise from these other lines.

#### 5. Do not allow short circuit of loads.

<Reed switch>

If the power is turned ON with a load in a short circuited condition, the switch will be instantly damaged because of excess current flow into the switch.

<Solid state switch>

All models of PNP output type switches do not have built-in short circuit protection circuits. If loads are short circuited, the switches will be instantly damaged.

\* Take special care to avoid reverse wiring with the power supply line (brown) and the output line (black) on 3 wire type switches.

#### 6. Avoid incorrect wiring.

<Reed switch>

\* A 24VDC switch with indicator light has polarity. The brown lead wire is (+) and the blue lead wire is (-).

1) If connections are reversed, a switch will operate, however, the light emitting diode will not light up.

Also note that a current greater than that specified will damage a light emitting diode and it will no longer operate.

Applicable models:

D-C73, C73C

D-B53, B54

2) Note however, that in the case of 2 color indicator type auto switches (D-B59W), if the wiring is reversed, the switch will be in a normally ON condition.

<Solid state switch>

1) If connections are reversed on a 2 wire type switch, the switch will not be damaged if protected by a protection circuit, but the switch will always stay in an ON state. However, it is still necessary to avoid reversed connections, since the switch could be damaged by a load short circuit in this condition.

\*2) If connections are reversed (power supply line + and power supply line -) on a 3 wire type switch, the switch will be protected by a protection circuit. However, if the power supply line (+) is connected to the blue wire and the power supply line (-) is connected to the black wire, the switch will be damaged.

#### \* Lead wire color changes

Lead wire colors of SMC switches have been changed in order to meet NECA Standard 0402 for production beginning September, 1996 and thereafter. Please refer to the tables provided.

Special care should be taken regarding wire polarity during the time that the old colors still coexist with the new colors.

##### 2 wire

	Old	New
Output (+)	Red	Brown
Output (-)	Black	Blue

##### Solid state with diagnostic output

	Old	New
Power supply (+)	Red	Brown
GND	Black	Blue
Output	White	Black
Diagnostic output	Yellow	Orange

##### 3 wire

	Old	New
Power supply (+)	Red	Brown
GND	Black	Blue
Output	White	Black

##### Solid state with latch type diagnostic output

	Old	New
Power supply (+)	Red	Brown
GND	Black	Blue
Output	White	Black
Latch type diagnostic output	Yellow	Orange



# Series CLK1 Auto Switch Precautions 3

Be sure to read before handling.

## Operating Environment

### Warning

#### 1. Never use in an atmosphere of explosive gases.

The structure of auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion.

#### 2. Do not use in an area where a magnetic field is generated.

Auto switches will malfunction or magnets inside cylinders will become demagnetized. (Consult SMC regarding the availability of a magnetic field resistant auto switch.)

#### 3. Do not use in an environment where the auto switch will be continually exposed to water.

Although switches, except for a few models, satisfy IEC standard IP67 construction (JIS C 0920: watertight construction), do not use switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside switches may cause malfunction.

#### 4. Do not use in an environment with oil or chemicals.

Consult SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

#### 5. Do not use in an environment with temperature cycles.

Consult SMC if switches are used where there are temperature cycles other than normal air temperature changes, as they may be adversely affected.

#### 6. Do not use in an environment where there is excessive impact shock.

##### <Reed switch>

When excessive impact (300m/s<sup>2</sup> or more) is applied to a reed switch during operation, the contact point will malfunction and generate or cut off a signal momentarily (1ms or less). Consult SMC regarding the need to use a solid state switch depending upon the environment.

#### 7. Do not use in an area where surges are generated.

##### <Solid state switch>

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) which generate a large amount of surge in the area around cylinders with solid state auto switches, this may cause deterioration or damage to the switches. Avoid sources of surge generation and disorganized lines.

#### 8. Avoid accumulation of iron waste or close contact with magnetic substances.

When a large amount of ferrous waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with an auto switch cylinder, it may cause the auto switch to malfunction due to a loss of the magnetic force inside the cylinder.

## Maintenance

### Warning

#### 1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected auto switch malfunction.

##### 1) Securely tighten switch mounting screws.

If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.

##### 2) Confirm that there is no damage to lead wires.

To prevent faulty insulation, replace switches or repair lead wires, etc., if damage is discovered.

##### 3) Confirm the lighting of the green light on a 2 color indicator type switch.

Confirm that the green LED is on when stopped at the established position. If the red LED is on, the mounting position is not appropriate. Readjust the mounting position until the green LED lights up.

## Other

### Warning

#### 1. Consult SMC concerning water resistance, elasticity of lead wires, and usage of general purpose auto switches at welding sites, etc.



# Series CLK1 Specific Product Precautions 1

Be sure to read before handling. Refer to pages 23 through 25 for safety instructions and common precautions.

## Selection

### Warning

- Do not use for intermediate cylinder stops.**  
This cylinder is designed to lock in either a clamped or unclamped condition. Do not perform intermediate stops while the cylinder is operating, as this will shorten its service life.
- Select the correct locking position, as this cylinder does not generate holding force opposite to the locking direction.**  
The clamp side lock does not generate holding force in the cylinder's extending direction, and the unclamp side lock does not generate holding force in the cylinder's retracting direction (free).
- Even when locked, there may be stroke movement of about 0.5 to 1mm in the locking direction due to external forces such as the weight of the work piece.**  
Even when locked, if air pressure drops, stroke movement of about 0.5 to 1mm may be generated in the locking direction of the lock mechanism due to external forces such as the work piece weight.
- When locked, do not apply impact loads, strong vibration or rotational force, etc.**  
This will lead to lock mechanism damage and reduced service life, etc.

## Pneumatic Circuits

### Warning

- Do not use 3 position valves.**  
The lock may be released due to the inflow of the unlocking pressure.
- Install speed controllers for meter-out control.**  
Malfunction may occur if meter-in control is used.
- Be careful of reverse exhaust pressure flow from a common exhaust type manifold.**  
Since the lock may be released due to reverse exhaust pressure flow, use an individual exhaust type manifold or single type valve.

## Mounting

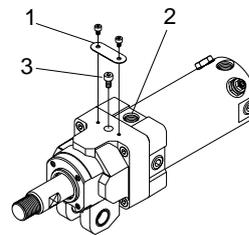
### Caution

- Be sure to connect the load to the rod end with the cylinder in an unlocked condition.**  
If this is done when in a locked condition, it may cause damage to the lock mechanism.

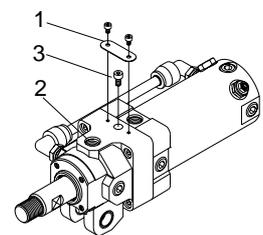
## Preparing for Operation

### Warning

- When shipped from the factory, an unlocked condition is maintained by the unlocking bolt. Be sure to remove this bolt before operating.**  
Step 1) With no air pressure in the cylinder, clamp side locking operates when the piston rod is retracted, and unclamp side locking operates when it is extended.  
Step 2) Remove the dust proof cover 1.  
Step 3) Supply air pressure of 0.2MPa or more to port 2 in the figure below.  
Step 4) Remove the unlocking bolt 3 using a hexagon wrench.



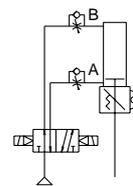
Clamp side locking type



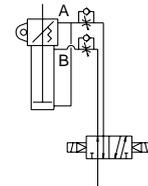
Unclamp side locking type

- Adjust the speed controller and the retraction side air cushion.**  
If there is excessive impact or collision noise at the stroke end, the connection may become loose and cause damage to machinery.
- Before restarting operation from the locked position, be sure to restore air pressure to the B port in the figure below.**

It is very dangerous to apply pressure to the A port with the B port in an unpressurized state, because the cylinder will move suddenly when unlocked.



Clamp side locking type



Unclamp side locking type



# Series CLK1 Specific Product Precautions 2

Be sure to read before handling. Refer to pages 23 through 25 for safety instructions and common precautions.

## Maintaining an Unlocked Condition

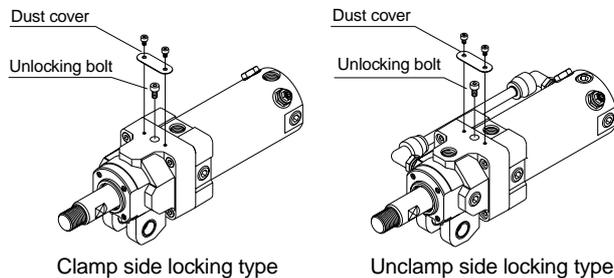
### Warning

1. To maintain an unlocked condition, be sure to follow the steps shown below.

Step 1) After carefully confirming safety, operate a switching valve (solenoid valve, etc.) so that clamp side locking operates when the piston rod is retracted, and unclamp side locking operates when it is extended. Furthermore, air pressure of 0.2MPa or more is required when this is done.

Step 2) Remove the dust proof cover.

Step 3) Screw in the accessory unlocking bolt (hexagon socket headcap screw  $\phi 32$ : M3 x 8/,  $\phi 40$ : M4 x 8/,  $\phi 50$ : M4 x 8/,  $\phi 63$ : M5 x 10/).



2. When the locking mechanism is to be used again, be sure to remove the unlocking bolt.

The locking mechanism will not work when the unlocking bolt is screwed in. Remove the unlocking bolt following the steps shown in the section on preparing for operation.

## Maintenance

### Caution

1. In order to maintain good performance, use with clean unlubricated air.

If lubricated air, compressor oil or drainage, etc., enters the cylinder, there is a danger of sharply reducing the locking performance.

2. Do not apply grease to the piston rod.

There is a danger of sharply reducing the locking performance.

3. Never disassemble the lock unit.

It contains a heavy duty spring which is dangerous. There is also a danger of reducing the locking performance.

## Position Change of Piping Port and Switch Rail (by-pass piping)

### Warning

1. Piping port position, switch rail position, and by-pass piping position can be selected by the part number. However, if there is an error in ordering and changes to the positions are required, please note the following.

a. Move all the parts that are aligned in a straight line in the stroke direction by 90° or 180° around the circumference of the cylinder.

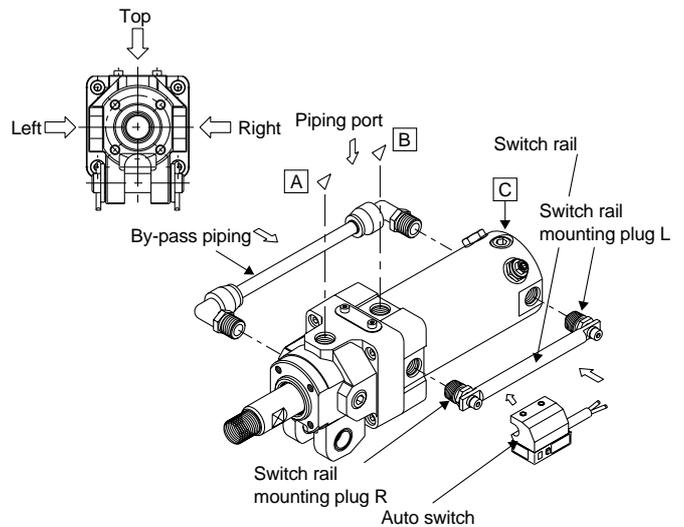
Never move parts in the stroke direction, as this will cause malfunction.

b. Do not operate with any parts removed. When the cylinder is operated with any part removed, malfunction will occur and it is very dangerous.

c. Although fittings with sealant are used for pipe fittings and switch mounting plugs, wind them with pipe tape to prevent air leakage when reassembling after position changes.

d. Switch rail mounting plugs R and L have different lengths; be sure to use the correct plug when reassembling.

The short plug (mounting plug R) is used on the rod side.



Unclamp side locking type



# Series CLK1 Magnetic Field Resistant Reed Switches Specific Product Precautions 1

Be sure to read before handling. Refer to pages 23 through 25 for safety instructions and common precautions.

## Handling

Magnetic field resistant auto switches D-P7 and D-P8 are specifically for use with magnetic field resistant cylinders and are not compatible with general auto switches or cylinders. Magnetic field resistant cylinders are labeled as follows.

Magnetic field resistant cylinder with built-in magnet  
(For use with auto switch type D-P7)

### Mounting:

1. The minimum stroke for mounting magnetic field resistant auto switches is 45mm.
2. In order to fully use the capacity of magnetic field resistant auto switches, strictly observe the following precautions.
  - 1) Do not allow the magnetic field to occur when the cylinder piston is moving.
  - 2) When a welding cable or welding gun electrodes are near the cylinder, change the auto switch position to fall within the operational ranges shown in the graphs on page 32, or move the welding cable away from the cylinder.
  - 3) Cannot be used in an environment where welding cables surround the cylinder.
  - 4) Consult SMC when a welding cable and welding gun electrodes (something energized with secondary current) are near multiple switches.
3. In an environment where spatter directly hits the lead wire, cover the lead wire with protective tubing. Use protective tubing with a bore size of  $\varnothing 8$  or more that has excellent heat resistance and flexibility.
4. Be careful not to drop objects, make dents, or apply excessive impact force when handling.
5. When operating two or more parallel and closely positioned cylinders with magnetic field resistant auto switches, separate the auto switches from the other cylinder tubes by an additional 30mm or more.
6. Avoid wiring in a manner in which repeated bending stress or tension is applied to lead wires.
7. Consult SMC regarding use in an environment with constant water and coolant splashing.

### Contact capacity:

Never operate a load that exceeds the maximum contact capacity of the auto switch.

### Wiring/Current and Voltage

1. Always connect the auto switch to the power supply after the load has been connected.
2. Auto switch type D-P74 has polarity when used at 24VDC. The white lead wire is positive (+), and the black lead wire is negative (-). When the connection is reversed, the switch operates, but the LED will not light up. Furthermore, when more than the standard current is used, the LED will be damaged and will not function.
3. With auto switch types D-P70 and D-P75, the indicator light turns on when the switch is OFF and this causes leakage current. (With type D-P70...Max. 1.8mA, with type D-P75...Max. 1.2mA leakage.) This may cause a problem with a control circuit that operates on very low current.
4. Series connection  
When switches are connected in series as shown below:
  - 1) With type D-P74...Note that the voltage drop (2.4V) due to the internal resistance of the LED increases.
  - 2) With type D-P70, P75...There is no functional problem except dimming of the indicator light. (Limit the switches connected in series to approximately two pieces.)
  - 3) When the internal resistance of the LED causes a problem, use a switch without indicator light (type D-P8).



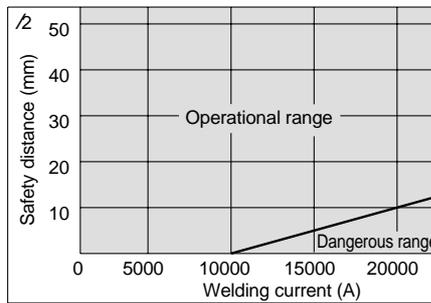
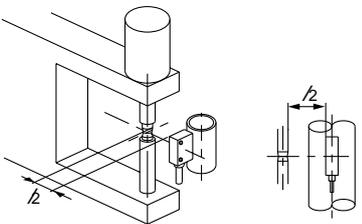
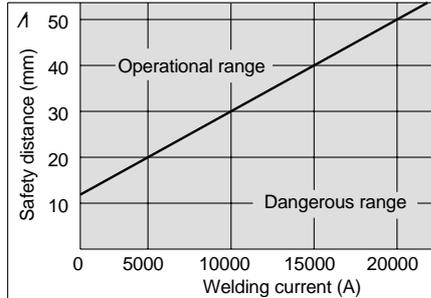
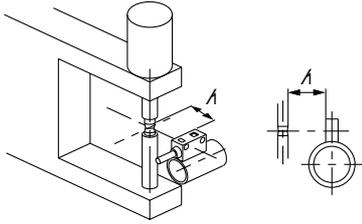


# Series CLK1 Magnetic Field Resistant Reed Switches Specific Product Precautions 2

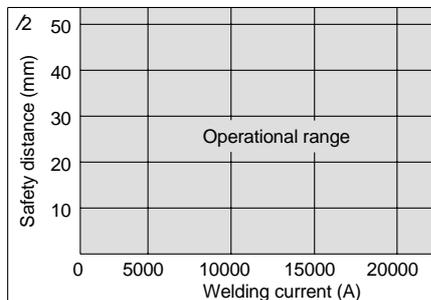
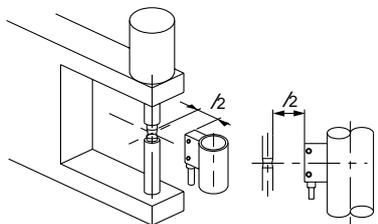
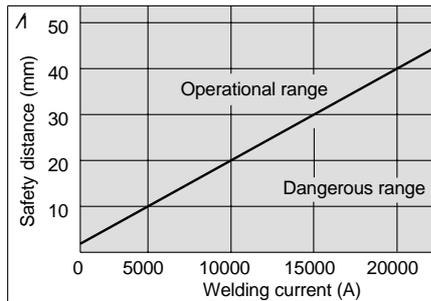
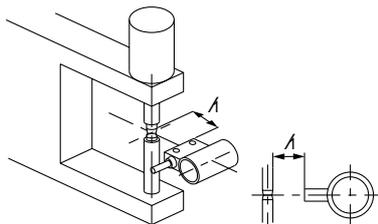
Be sure to read before handling. Refer to pages 23 through 25 for safety instructions and common precautions.

## Data/Magnetic Field Resistant Reed Switch (D-P7, D-P8) Safety Distance

### Safety distance from side of auto switch

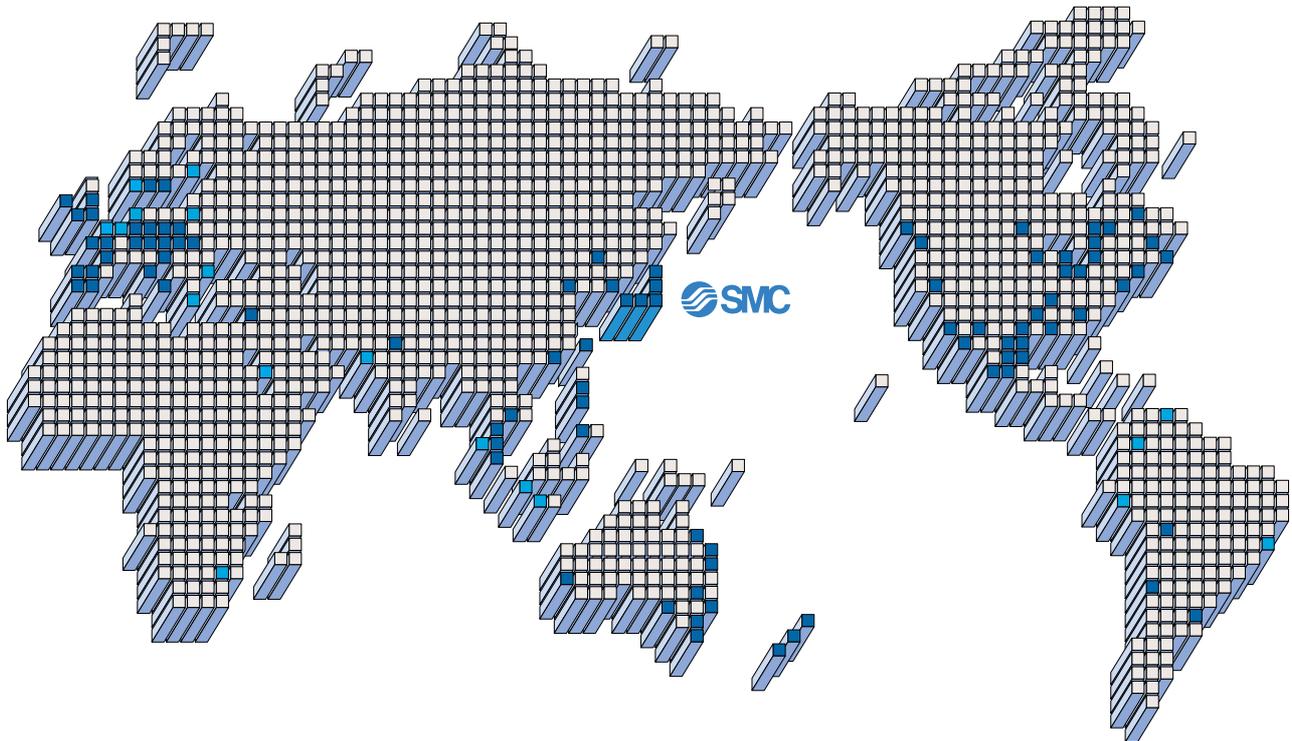


### Safety distance from top of auto switch





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