UCAC

Position locking clamp cylinder

50, 63 mm bore

With brake

Overview

Position locking clamp cylinder is developed to increase MAINTENABILITY in equipment. When shut down, new swash plate mechanism locks piston rod to prevent a load falling down by self-weight. One way locking mechanism allows movement of the rod to the opposite direction. This enables emergent work piece removal.

Features

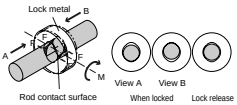
Can be locked at any position.
When emergency, rod is locked by supplying and exhausting air.

2 types of locking directions
For locking direction, forward locking and backward locking types can be selected.

One way locked and freely moved to opposite direction
When a work piece is pinched, the work can be picked out because the piston rod can be moved to lock free direction.

Various detecting switch installation available.
Diverse types of cylinder switch such as proximity, strong magnetic field proof etc. are available.

Position locking structure.
New swash plate type locking mechanism enables free position locking. Applying torque M to lock metal generates axial force F. This force holds the rod position.



CONTENTS

Series variation

●: Standard, ◎: Option, ■: Not available

Variation	Model No. JIS symbol	Bore size (mm)	Stroke length (mm) 50	75	100	125	150	Max. stroke (mm)	Option/accessory: Bellows (100 °C) K	Limit switch bracket D	Limit switch bracket D1	Toggle bracket Q	Rod clevis FCD 400 Y	Rod clevis SS 400 Y1	Rod eye SS 400 I	Switch	Page
Double acting/ single rod type	UCAC	50, 63	●	●	●	●	●	150	◎	◎	◎	◎	◎	◎	◎	◎	946

Pneumatic Components

Safety Precautions

Always read before starting use

Refer to Intro 45 for general details on the cylinder, and to Intro 52 for details on the cylinder switch.

Clamp cylinder with position locking UCAC Series

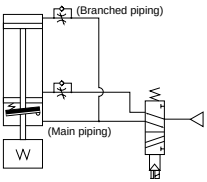
CAUTION Design & Selection

Basic circuit diagram

Pipe air piping for this cylinder as shown below. Contact CKD when using different piping, such as piping independently to the position locking section.

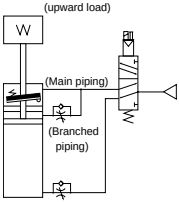
1 As shown below, branch the piping to this cylinder at a position behind the valve, and pipe to the position locking section (connect main pipe to lock release port) and to the cylinder section (connect branched pipe to cylinder port).

Forward locking type
(downward load)



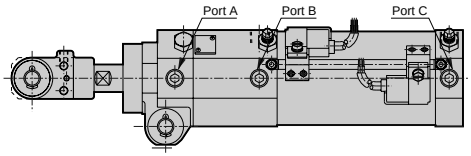
2 If cylinder operation is faster than lock release, the lock may not be released or, even if released, the piston rod may pop out. This is hazardous, so design piping so that lock release is faster than cylinder operation.

Backward locking type
(upward load)



3 The UCAC piping port position may be changed in the same way as the CAC3 Series, but check the pressure port when making changes.

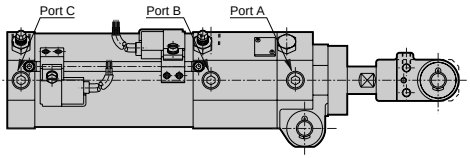
Changing the port position to the right (locking direction F1 is on right side as standard)



Port / Lock direction	Port A	Port B	Port C
Forward locking F type Note 1	PUSH side port	PULL side port	Plugged
Backward locking B type	Plugged	PULL side port	PUSH side port

Note 1: Locking direction F2 type has a by-pass tube so the port cannot be changed to the right side.

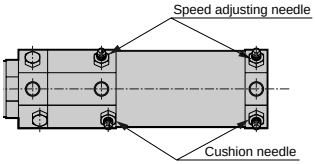
Changing the port position to the left



Port / Lock direction	Port A	Port B	Port C
Forward locking F type Note 1	PUSH side port	PULL side port	Plugged
Backward locking B type	Plugged	PULL side port	PUSH side port

Note 1: Locking direction F type has a by-pass tube so the port cannot be changed to the left side.

4 Do not mistake the speed adjustment needle for the cushion needle.



WARNING — Installation & Adjustment

1 Do not disassemble the unit, since this may cause a hazardous situation.

CAUTION — Installation & Adjustment

1 Before connection, flush piping size sufficiently to prevent foreign matter and cutting chips, etc., from entering the cylinder.

2 Check that load is applied axially to the piston rod.

3 Handle carefully to prevent scratching or denting the piston rod sliding section.
Rough handling could damage packing seal and result in air leaks.

CAUTION — During use & Maintenance

1 The cushion absorbs kinetic energy that the piston acquires using air compressibility, and prevent the piston and cover from colliding at the stroke end.
The cushion is not used to decelerate the piston near the stroke end.
The following table shows the kinetic energy that can be absorbed by the cushion. If kinetic energy exceeds these values, or if bounding caused by air compressibility is to be avoided, consider using another shock absorber.

$$\text{Kinetic energy (J)} = \frac{1}{2} \times \text{weight (kg)} \times \{\text{speed (m/s)}\}^2$$

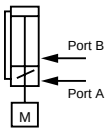
Cushion characteristics table

Bore size (mm)	Effective cushion length (mm)	Allowable energy absorption (J)	
		With cushion	Without cushion
50 dia.	13.5	6.54	0.14
63 dia.	13.5	11.63	0.21

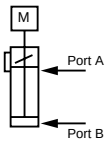
2 Do not apply torque to the rod when locked as the holding force could drop and be dangerous.
Use a mechanism that does not rotate the rod.

3 Supply pressure to port B, and release brakes after the load is removed from the locking mechanism.
If pressure is supplied to port A when both ports A and B are exhausted and the piston is locked, the lock may not be released or the piston rod may pop out even if the lock is released. This can be extremely hazardous.

Forward locking type



Backward locking type



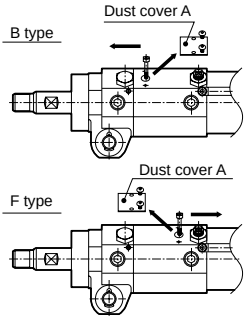
4 The lock may be released if the cylinder is held while pressure is applied on the lock mechanism.
Do not use a 3-position closed center or 3-position PAB port connection solenoid valve.

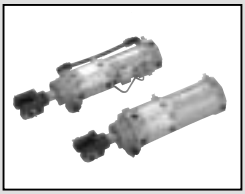
5 If a back pressure is applied while locked, the lock may be released. Use a discrete solenoid valve for brake release, or use an individual exhaust type manifold.

6 Do not use with the by-pass tube disconnected as lock response could be delayed.

7 Note that due to the structure a 1 mm deviation may occur in stopping with the lock.

8 Manual release
1. Remove dust cover A.
2. Screw the M4 hexagon socket head cap screw (length 40 or more) into the lock metal screw.
3. The rod is freed when the hexagon socket head cap screw is tilted in the direction of the arrow.





Position locking clamp cylinder

UCAC Series

• Bore size: 50, 63 mm

JIS symbol • Double acting/single rod type

Specifications

Descriptions		UCAC	
Bore size	mm	50 dia.	63 dia.
Actuation		Double acting	
Working fluid		Compressed air	
Max. working pressure	MPa	1.0	
Min. working pressure	MPa	0.25	
Withstanding pressure	MPa	1.6	
Ambient temperature	°C	5 to 60	
Port size		Rc1/4	
Standard stroke length	mm	50, 75, 100, 125, 150	
Stroke length tolerance		$^{+1.0}_{0}$	
Working piston speed	mm/s	50 to 400	50 to 300
Cushion (both sides)		Air cushion	
Lubrication		Not available	
Mounting style		Clevis	
Position locking mechanism		Forward lock or backward lock	
Holding force	N	1470	
Allowable energy absorption J	Cushioned	6.54	11.63
	No cushion	0.137	0.206

Note: No cushion type can not absorb a large energy generated by an external load.
We recommend to use an external shock absorber together.

Switch specifications

• One color/bi-color indicator

Descriptions	Proximity 2 wire		Proximity 3 wire		Reed 2 wire			
	T2H/T2V	T2YH/T2YV	T3H/T3V	T3YH/T3YV	T0H/T0V		T5H/T5V	
Applications	Programmable controller		Programmable controller, relay		Programmable controller, relay		Programmable controller, relay, IC circuit (without indicator light), serial connection	
Power voltage	———		DC10 to 28V		———			
Load voltage	DC10 to 30V		DC30V or less		DC12/24V	AC110V	DC5/12/24V	AC110V
Current	5 to 20mA (Note 1)		100mA or less	50mA or less	5 to 50mA	7 to 20mA	50mA or less	20mA or less
Light	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Red/green LED (ON lighting)	LED ON lighting		———	

Note 1: Max. load current above: 20mA is the value at 25 °C. When ambient temperature around a switch is higher than 25 °C, the value is lower than 20mA. (5 to 10mA at 60 °C).

• Strong magnetic field

Descriptions	Reed 2 wire
	T2YD
Applications	Only for programmable controller
Light	Red/green LED (ON lighting)
Load voltage	DC24V±10%
Load current	5 to 20mA

Cylinder mass

(Unit: kg)

Bore size (mm)		Product mass when stroke length =0mm	Additional mass per stroke length =100mm	Accessory mass			
				Rod clevis	Rod eye	Limit switch bracket	Dog bracket
50 dia.	Advance lock: F	1.65	0.40	0.37	0.27	0.18	0.08
	Return lock: B	1.6	0.39				
63 dia.	Advance lock: F	2.2	0.40				
	Return lock: B	2.15	0.39				

How to order

• Without switch

UCAC - A - 50 R - 50 R - B ———— Y

• With switch

UCAC - A - 50 R - 50 R - B - T0H - D B - Y

Ⓐ Clevis width Note 1
Ⓑ Bore size
Ⓒ Cushion
Ⓓ Stroke length
Ⓔ Speed adjusting needle
Ⓕ Lock direction
Ⓖ Switch model No.
Ⓗ Switch quantity
Ⓘ Switch installation position Note 2
Ⓙ Accessory Note 3

Symbol	Descriptions
Ⓐ Clevis width (mm)	
A	16.5
B	19.5
AL	16.5 (axial foot type)
BL	19.5 (axial foot type)
Ⓑ Bore size (mm)	
50	50 dia.
63	63 dia.
Ⓒ Cushion	
Blank	Both sides cushion
R	Rod side cushion
H	Head side cushion
N	No cushion
Ⓓ Stroke length (mm)	
50	50
75	75
100	100
125	125
150	150
Ⓔ Speed adjusting needle	
Blank	Both sides
R	Rod side
H	Head side
N	Blank
Ⓕ Lock direction/by-pass tube position	
F	Forward lock (by-pass tube position F, port position F1)
F1	Forward lock (by-pass tube position F1, port position F2)
F2	Forward lock (by-pass tube position F2, port position F1)
B	Backward lock

Ⓖ Switch model No.

Axial lead wire	Radial lead wire	Contact	Display	Lead wire
T0H *	T0V *	Reed	1 color indicator	2 wire
T5H *	T5V *			
T2H *	T2V *	Proximity	1 color indicator	2 wire
T3H *	T3V*			3 wire
T2YH *	T2YV*		2 color indicator	2 wire
T3YH *	T3YV*			3 wire
T2YD *	–		Switch for strong magnetic field	2 wire
T2YDT *	–			

*Lead wire length (m)	
Blank	1 (standard)
3	3 (option)
5	5 (option)

Ⓗ Switch quantity	
R	One on rod side
H	One on head side
D	Two

Ⓘ Switch installation position	
Blank	
B	
C	

Ⓙ Accessory			
* Y	Rod clevis (FCD400)		Standard
* Y1	Rod clevis (SS400)		
Blank	No brackets		
I	Rod eye (SS400)		Option
K	Bellows (neoprene)		
D	Dog selected	Limit switch	
D1	No dog		
Q	Toggle bracket		

⚠ Cautions for model No. selection

Note 1: For A/B/AL/BL, clevis pin/split pin/plain washer are attached.
Clevis width and rod clevis width are same dimensions.

Note 2: Switches can not be installed on the same side of by-pass tube installed position.

Note 3: Pin/split pin/plain washer are attached to * Y/* Y1.

<Example of model number>

UCAC-A-50R-50R-B-T0H-DB-Y

Model: Position locking clamp cylinder double acting

Ⓐ Clevis width	: 16.5mm
Ⓑ Bore size	: 50mm
Ⓒ Cushion	: Rod side cushion
Ⓓ Stroke	: 50mm
Ⓔ Speed adjusting needle	: Rod side
Ⓕ Switch model No	: Reed T0H switch, lead wire 1m
Ⓖ Switch quantity	: Two
Ⓗ Switch installation position	: B
Ⓘ Accessory	: Rod clevis

How to order (Strong magnetic field proof)

• Without switch

UCAC-L2 - A - 50 R - 50 R - B ——— Y

• With switch

UCAC-L2 - A - 50 R - 50 R - B - H0 - D B - Y

Ⓑ Bore size

Ⓒ Cushion

Ⓐ Clevis width
Note 1

Ⓓ Stroke length

Ⓔ Speed adjusting needle

Ⓕ Lock direction

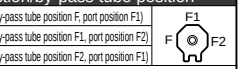
Ⓖ Switch model No.

Ⓗ Switch quantity

Ⓘ Switch installation position

Ⓙ Accessory
Note 3

Symbol	Descriptions
Ⓐ Clevis width (mm)	
A	16.5
B	19.5
AL	16.5 (axial foot type)
BL	19.5 (axial foot type)
Ⓑ Bore size (mm)	
50	50 dia.
63	63 dia.
Ⓒ Cushion	
Blank	Both sides cushion
R	Rod side cushion
H	Head side cushion
N	No cushion
Ⓓ Stroke length (mm)	
50	50
75	75
100	100
125	125
150	150
Ⓔ Speed adjusting needle	
Blank	Both sides
R	Rod side
H	Head side
N	Blank
Ⓕ Lock direction/by-pass tube position	
F	Forward lock (by-pass tube position F, port position F1)
F1	Forward lock (by-pass tube position F1, port position F2)
F2	Forward lock (by-pass tube position F2, port position F1)
B	Backward lock



Ⓖ Switch model No.

Axial lead wire	Contact	Display	Lead wire
H0*	Reed	Switch for strong magnetic field	2 wire

*Lead wire length(m)	
Blank	1 (standard)
3	3 (option)
5	5 (option)

Ⓗ Switch quantity	
R	One on rod side
H	One on head side
D	Two

Ⓘ Switch installation position	
Blank	B Blank C (A) Note 2
B	
C	

Ⓙ Accessory			
* Y	Rod clevis (FCD400)		Standard
* Y1	Rod clevis (SS400)		
Blank	No brackets		
I	Rod eye (SS400)		Option
K	Bellows (neoprene)		
D	Dog selected	Limit switch	
D1	No dog		
Q	Toggle bracket		

⚠ Cautions for model No. selection

Note 1: For A/B/AL/BL., clevis pin/split pin/plain washer are attached.
- Clevis width and rod clevis width are same dimensions.
- Switch installation minimum stroke length is 36mm.
- When 50 mm stroke or less, lead wire faces to each cover side.

Note 2: Switches can not be installed on the same side of by-pass tube installed position.

Note 3: Pin/split pin/plain washer are attached to * Y/* Y1.

<Example of model number>

UCAC-L2-A-50R-50R-B-H0-DB-Y

Model: Position locking clamp cylinder double acting

Ⓐ Clevis width	: 16.5mm
Ⓑ Bore size	: 50mm
Ⓒ Cushion	: Rod side cushion
Ⓓ Stroke	: 50mm
Ⓔ Speed adjusting needle	: Rod side
Ⓕ Switch model No	: Reed H0 switch, lead wire 1m
Ⓖ Switch quantity	: Two
Ⓗ Switch installation position	: B
Ⓘ Accessory	: Rod clevis

How to order switch

T type (one color/bi-color indicator) cylinder switch

• Switch main body + mounting bracket

CAC3 - T0H3 - 50 - 50

G: Switch model No. (Previous page G)

B: Bore size (Previous page B)

D: Stroke length (Previous page D)

• Switch only

SW T0H3

G: Switch model No. (Previous page G)

• Bracket kit

CAC3 - T - 50

B: Bore size (Previous page B)

• Mounting tie rod kit

UCAC - 50 - Tie rod kit - 50

B: Bore size (Previous page B)

D: Stroke length (Previous page D)

Strong magnetic field proof switch

• T type cylinder switch

• Switch main body + mounting bracket

CAC3 - T2YD - 50 - 50

G: Switch model No. (Previous page G)

B: Bore size (Previous page B)

D: Stroke length (Previous page D)

• Switch only

SW - T2YD

G: Switch model No. (Previous page G)

• Bracket kit

CAC3 - T - 50

B: Bore size (Previous page B)

• Mounting tie rod kit

UCAC - 50 - Tie rod kit - 50

B: Bore size (Previous page B)

D: Stroke length (Previous page D)

• H type cylinder switch

• Switch main body + mounting bracket

CAC3-L2 - H03 - 50 - 50

G: Switch model No. (Previous page G)

B: Bore size (Previous page B)

D: Stroke length (Previous page D)

• Switch only

SW - H03

G: Switch model No. (Previous page G)

• Bracket kit

CAC3-L2 - H - 50

B: Bore size (Previous page B)

• Mounting tie rod kit

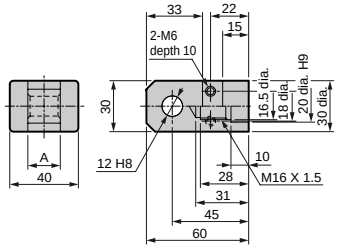
UCAC - 50 - Tie rod kit - 50

B: Bore size (Previous page B)

D: Stroke length (Previous page D)

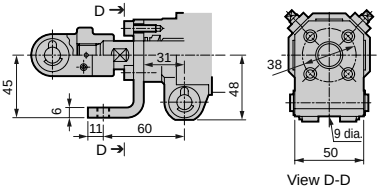
Accessory dimensions

• Rod eye (material SS400)

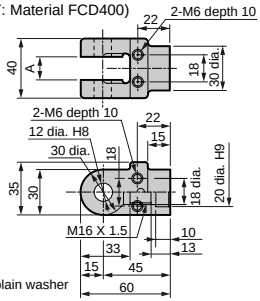


Part number	A	Applicable clamp
CAC3-IB	19.5 $^{0.1}_{0.2}$	UCAC-A, UCAC-B

• Axial foot type (material SPHC)



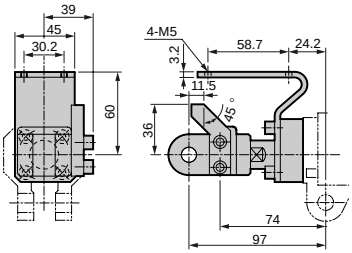
• Rod clevis (Y: Material FCD400)



• Pin, split pin, plain washer

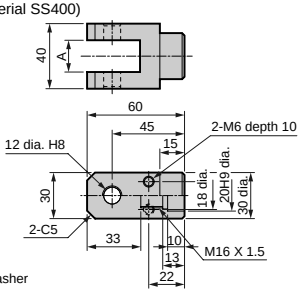
Part number	A	Applicable clamp
CAC3-YB	16.5 $^{+0.2}_{+0.1}$	UCAC-A
CAC3-YB	19.5 $^{+0.2}_{+0.1}$	UCAC-B

• Limit switch bracket (product number CAC3-L) (material SPCC)
• Dog bracket (product number CAC3-D) (material SS400)



• For a limit switch, use one equivalent to WLH2 type (OMRON).

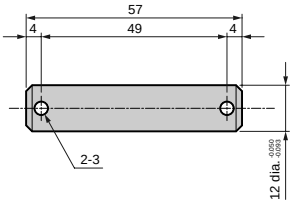
• Rod clevis (Y1: Material SS400)



• Pin, split pin, plain washer

Part number	A	Applicable clamp
CAC3-Y$_1$A	16.5 $^{+0.2}_{+0.1}$	UCAC-A
CAC3-Y$_1$B	19.5 $^{+0.1}_{+0.2}$	UCAC-B

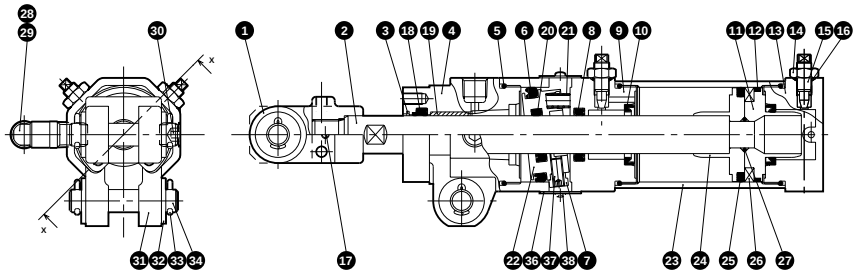
• Clevis pin (product number CAC3-P) (material SGD400)



• Split pin, plain washer

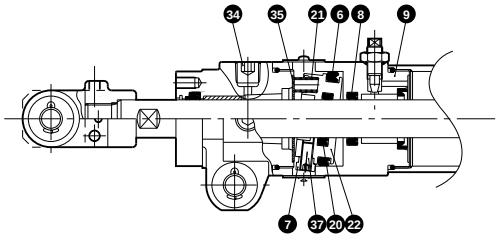
Internal structure and parts list

• (UCAC-F) with forward lock



X-X cross section

• (UCAC-B) with backward lock



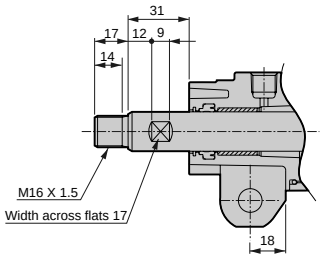
X-X cross section

Parts list

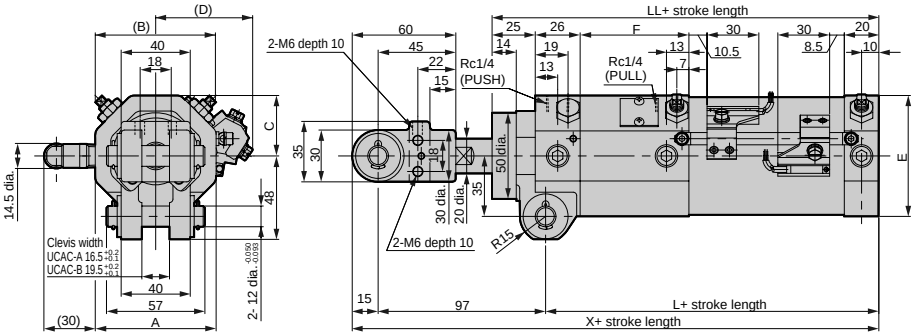
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Rod clevis	Cast iron		20	Lock rod packing seal	Nitrile rubber	
2	Piston rod	Steel		21	Lock spring	Piano wire	
3	Metal scraper	Copper alloy		22	Lock metal	Cast iron	
4	Rod cover	Aluminum alloy die casting		23	Cylinder tube	Aluminum alloy	
5	Cylinder gasket	Nitrile rubber		24	Piston (R)	Aluminum alloy die casting	
6	Lock piston packing seal	Nitrile rubber		25	Piston packing seal	Nitrile rubber	
7	Fulcrum nut	Steel		26	Magnet	Plastic	
8	Rod packing seal	Nitrile rubber		27	Piston gasket	Nitrile rubber	
9	Intermediate cover	Aluminum alloy		28	By-pass tube		Not required at PULL side lock (B)
10	Cushion packing seal	Urethane rubber, steel		29	Push in joint		Not required at PULL side lock (B)
11	Piston (H)	Aluminum alloy die casting		30	Sunk plug with sealant	Steel	
12	Wear ring	Resin		31	For clevis bush	Resin	
13	Head cover	Aluminum alloy die casting		32	Plain washer	Steel	
14	Hexagon nut	Copper alloy		33	Split pin	Steel	
15	Needle	Copper alloy		34	Clevis pin	Steel	
16	Needle gasket	Nitrile rubber		35	Washer	Steel	Not required at PULL side lock (B)
17	Spring pin	Steel		36	Dust cover	Aluminum alloy	
18	Rod packing seal	Nitrile rubber		37	Hexagon socket head set screw	Alloy steel	
19	Bush	Copper		38	Machine screw	Steel	

Dimensions

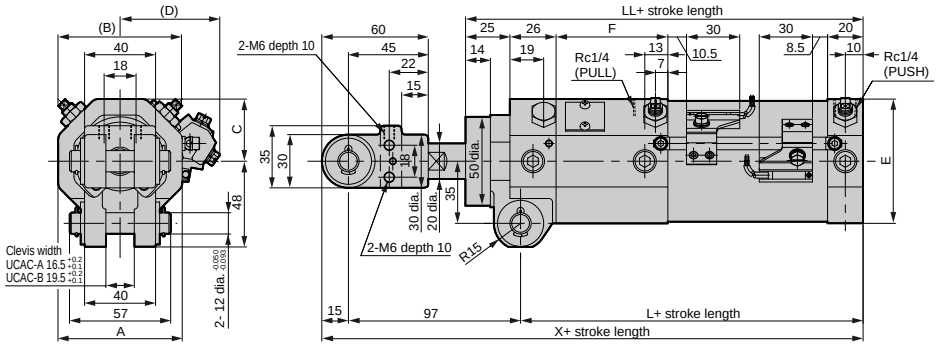
• No knuckle



• (UCAC-F) with forward lock



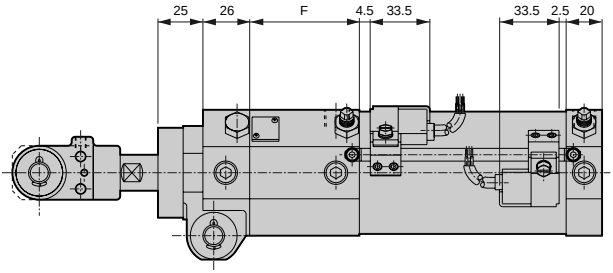
• (UCAC-B) with reverse locking



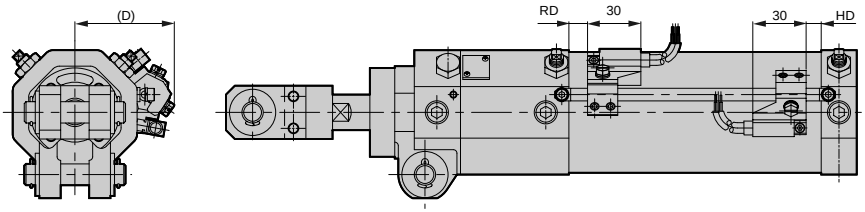
Symbol / Bore size (mm)	A	(B)	C	(D)	E	F	L	LL	X
50 dia.	60	68	30	50	60	61	141	172	253
63 dia.	70	72	35	56	70	63	143	174	255

Dimensions

• H type switch installation position



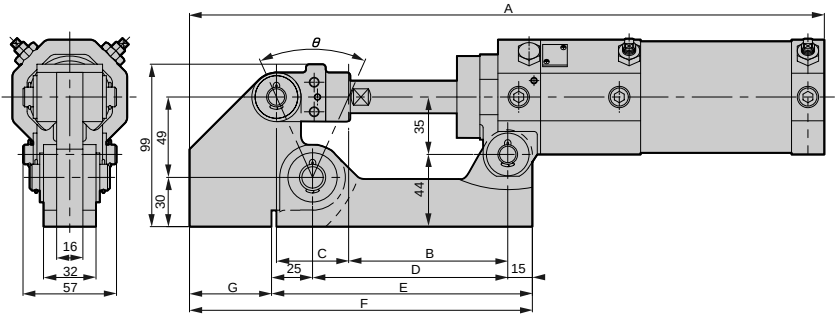
• T2YD type switch installation position



Symbol / Bore size (mm)	HD	RD	(D)	F
50 dia.	8.5	10.5	50	61
63 dia.	8.5	10.5	56	63

Dimensions

• Toggle bracket dimensions



Symbol / Model No.	Stroke length	A	B	C	D	E	F	G	θ°
UCAC-A-50 * -Q	50	387	97	44	119	159	209	50	48
UCAC-A-75 * -Q	75	435	107	70	142	182	232	50	71
UCAC-A-100 * -Q	100	478	115	90	160	200	250	50	85
UCAC-A-125 * -Q	125	531	128	120	188	228	278	50	101
UCAC-A-150 * -Q	150	576	128	140	198	238	298	60	110