

Free position locking flat and compact cylinder UFCD Series

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Introducing the Free Position Locking Cylinder to the Flat Cylinder FCD Series!

Space-saving cylinder ensures safety during work in power failures or accidents.

UFCD Series



Free position locking mechanism

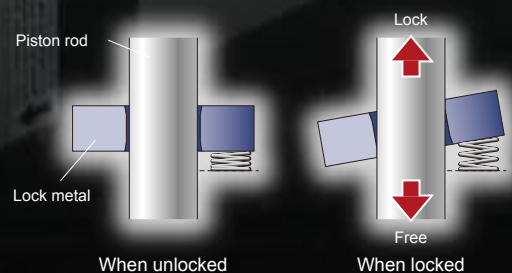
- If the piston rod is stationary, the cylinder can be locked at any position.
- Lock forward or backward.
- The lock's reverse direction is free, enabling caught workpieces, etc., to be removed easily.

Simple space-saving design

- The flat shape enables installation in small spaces or in a row.
- Simple design fits in other devices, while providing position locking.

Nonrotating mechanism not required

- The cylinder is oval and prevents rotation, so no separate nonrotating mechanism is required.



RoHS

RoHS-Compatible
All substances adversely affecting the environment, including lead and hexavalent chrome, have been eliminated.

Series variation



Free position locking flat and compact cylinder UFCD Series

● : Standard ○ : Option

Variation	Model no.	Bore size (mm)	Standard stroke length (mm)								Min. stroke length	Custom stroke length	Max. stroke length	Option	Switch	Page
			5	10	15	20	25	30	40	50	(mm)	(per mm)	(mm)	Rod end male thread N		
Double acting single rod type cushioned with switch	UFCD-KL	ø25, ø32, ø40, ø50, ø63 or equivalent	●	●	●	●	●	●	●	●	1	1	150	○	○	1



Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.

Observe warnings and precautions to ensure device safety.

Check that device safety is ensured, and manufacture a safe device.

WARNING

1 This product is designed and manufactured as a general industrial machine part. It must be handled by an operator having sufficient knowledge and experience in handling.

2 Use this product in accordance of specifications.

This product must be used within its stated specifications. Do not attempt to modify or additionally machine the product. This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.

(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.

② Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B8370 (pneumatic system rules)

JFPS2008 (principles for pneumatic cylinder selection and use)

Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, corporate standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

① Inspect and service the machine and devices after confirming safety of the entire system related to this product.


② Note that there may be hot or charged sections even after operation is stopped.


③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.


④ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions on the pages below to prevent accidents.

■ The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

 **DANGER:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

 **WARNING:** When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

 **CAUTION:** When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Disclaimer

1. CKD cannot be held liable for any business interruption, loss of profit, personal injury, delay cost, or any other ancillary or indirect loss, cost, or damage resulting from the use of or faults in the use of CKD products.

2. CKD cannot be held responsible for the following damage.

① Damage resulting from disaster or failure of CKD parts due to fire from reasons not attributable to CKD, or by intentional or negligence of a third party or customer.

② Damage that could have been avoided if customer equipment were provided with functions and structure, etc., generally accepted in the industry, when a CKD product is assembled into customer equipment.

③ Damage resulting from use exceeding the scope of specifications provided in CKD catalogs or instruction manuals, etc., or from actions not following precautions for installation, adjustment, or maintenance, etc.

④ Damage resulting from product modifications not approved by CKD, or from faults due to combination with other software or other connected devices.



Pneumatic components

Safety precautions

Always read this section before starting use.

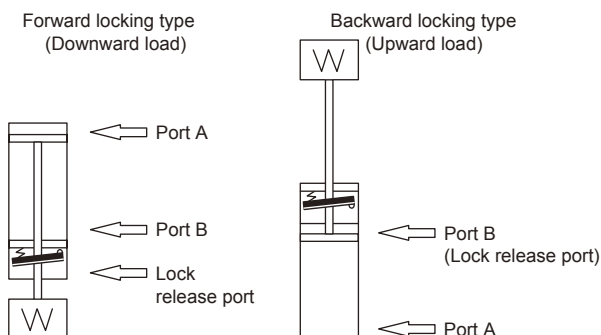
Refer to "Pneumatic Cylinders I (No. CB-29SA)" for the general cylinder or cylinder switch.

Free position locking flat and compact cylinder UFCD Series

Design & Selection

⚠ WARNING

- This cylinder is a cylinder with a position locking (holding cylinder static state) mechanism. Life drops markedly if used for emergency stops (stopping while the cylinder is moving).
- If back pressure is applied to the locking mechanism, the lock may be released. Use a discrete valve, or use an individual exhaust type manifold.
- Do not apply torque to the rod in locked state because holding force drops and create a hazard. Use a mechanism that does not rotate the rod.
- To release the lock, when using forward locking, supply pressure to port B, and when using backward locking, supply pressure to port A. Check that load is not applied to the locking mechanism. When both ports A and B are exhausted and the piston is locked, if pressure is supplied to port A for forward locking or to port B for backward locking, the lock may not be released or, even if released, the piston rod may pop out and creating a hazard.

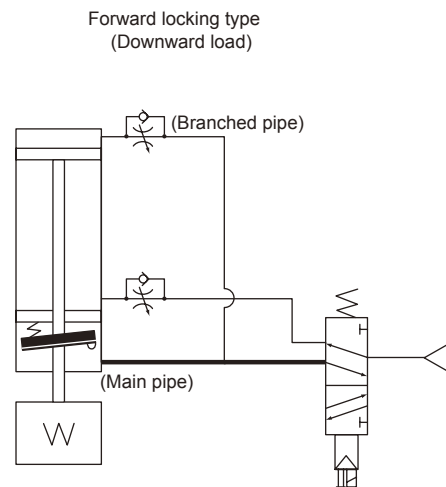


⚠ CAUTION

■ Basic circuit diagram

Pipe the air piping for forward locking type as shown below. Faults such as a delayed response may result if piping other than that below is used, such as independent piping to the position locking mechanism.

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).
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.



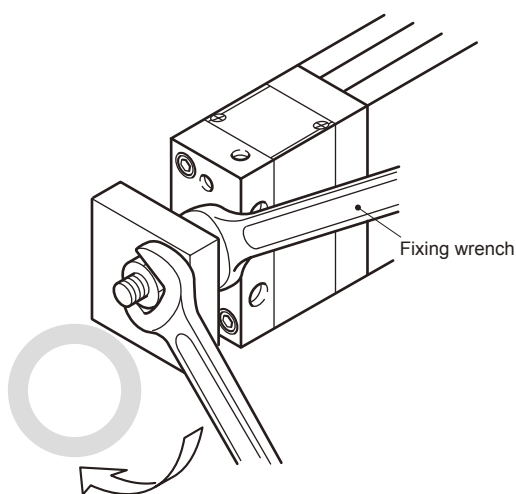
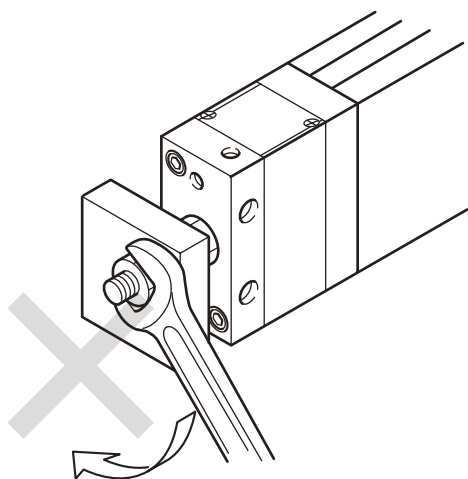
Installation & Adjustment

⚠ WARNING

- Do not apply grease to the piston rod because holding force drops and creates a hazard.
- Do not apply torque to the piston rod because holding force drops.

⚠ CAUTION

- Main piping in the basic circuit diagram on the previous page should be thicker and shorter than branch piping.
- When attaching a load to male threads, fix the wrench hook at the end of the rod with a wrench.



- When fixing onto female threads, fix the wrench hook at the end of the rod with a wrench using a standard tool (hexagon rod wrench), and tighten.

- Apply load on the piston rod so that it is in the axial direction. Avoid applying rotation torque. Otherwise, use within the specified rotation torque range.

Descriptions \ Model no.	ø25	ø32	ø40	ø50	ø63
Allowable torque (N·m)	1	1.6	2.5	3.9	5.9

- Avoid applying rotation torque with impact, or in ways that change the direction of the torque load instantly.
- When using several cylinders synchronized, install a separate guide.
If only cylinders are used, synchronization is not possible, the rod twists, and operation becomes faulty.

During Use & Maintenance

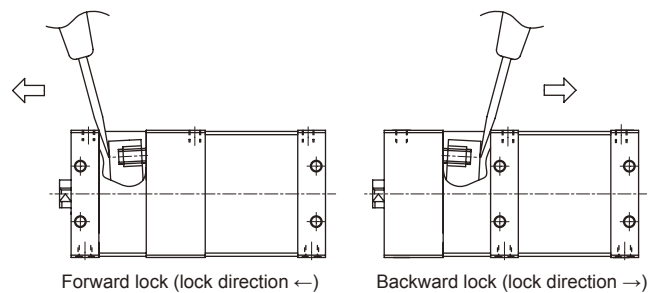
⚠ WARNING

- Do not lubricate the lock because holding force drops.
- Do not disassemble the unit, since this may cause a hazardous situation.
- To prevent faults, use a dust cover during operation except when manually releasing brakes.
- If no air pressure is supplied in vertical mounting, etc., holding force may not be sufficient when the lock is manually released. This may cause the rod to move (drop) with the load's weight. For safety, take the following measures before manually releasing the lock:
 - Move the load to the lowest end.
 - Provide a stopper on the load.
 - Supply air pressure to the cylinder and balance the load.

⚠ CAUTION

- When locking the first time after leaving the lock released for a long time, a delayed response occurs in the lock. Do not leave the lock pressurized, and operate the lock at each cylinder operation. (Use the basic circuit diagram shown on Intro 4.)
- If the cylinder is held while pressure is applied to the locking mechanism, the locking pin could dislocate and create a very hazardous situation. Do not use a 3-position closed center or 3-position P/A/B solenoid valve.
- Due to the structure, the piston rod drops by about 1 mm when the lock is applied.

■ How to unlock manually



- When the cover is removed and a minus headed screw driver is inserted and tilted lightly in the direction of arrow, the release lever rises, the lock is released, and the piston rod is freed.

- The cylinder may be damaged or may malfunction if a unit with excessive inertia, etc., is moved. Use within the allowable energy absorption range.



Free position locking flat and compact cylinder, double acting, single rod type

UFCD Series

- Bore size: $\varnothing 25$, $\varnothing 32$, $\varnothing 40$, $\varnothing 50$, $\varnothing 63$



Specifications

Descriptions		UFCD-KL				
Bore size	mm	$\varnothing 25$ or equivalent	$\varnothing 32$ or equivalent	$\varnothing 40$ or equivalent	$\varnothing 50$ or equivalent	$\varnothing 63$ or equivalent
Actuation		Double acting/cushioned				
Working fluid		Compressed air				
Max. working pressure	MPa	0.7				
Min. working pressure	MPa	0.25				
Withstanding pressure	MPa	1.05				
Ambient temperature	°C	-10 to 60 (no freezing)				
Port size		M5		Rc1/8		Rc1/4
Stroke tolerance	mm	+ 0.5 0 (to 50)				
Working piston speed	mm/s	50 to 500				
Cushion		Rubber cushion				
Lubrication		Not required (when lubricating, turbine oil Class 1 ISOVG32)				
Lock force	N	345	543	904	1350	2220
Allowable energy absorption	J	0.034	0.54	0.67	1.02	1.56

Non-rotating accuracy/allowable torque

Descriptions		$\varnothing 25$ or equivalent	$\varnothing 32$ or equivalent	$\varnothing 40$ or equivalent	$\varnothing 50$ or equivalent	$\varnothing 63$ or equivalent
Revolvable angle tolerance	Note 2	$\pm 1^\circ$	$\pm 0.8^\circ$	$\pm 0.5^\circ$	$\pm 0.5^\circ$	$\pm 0.5^\circ$
Allowable torque	N·m	1	1.6	2.5	3.9	5.9

Note 1: Avoid applying rotation torque with impact, or in ways that change the direction of the torque load instantly.

Note 2: "Nonrotating accuracy" is the value when a torque load equivalent to 10% of "tolerable rotation torque" is applied to the end of the piston rod.

Stroke length

Model no.	Bore size (mm)	Standard stroke length (mm) *	Max. stroke length (mm)	Min. stroke length (mm)
UFCD-KL	$\varnothing 25$, $\varnothing 32$, $\varnothing 40$, $\varnothing 60$, $\varnothing 63$ or equivalent	5, 10, 15, 20, 25, 30, 40, 50	150	1

Note 1: Custom stroke length is available per 1mm increment.

Note 2: Min. stroke length varies depending on installation method. Refer to the table below.

Min. stroke length of type with switch

With 1 piece		With 2 pieces	
Rod end installation	Head end installation	Different surface installation	Same surface installation
10mm		15mm	35mm ($\varnothing 25$, 32, 40, 50) 30mm ($\varnothing 63$)

Switch specifications

● Proximity switch

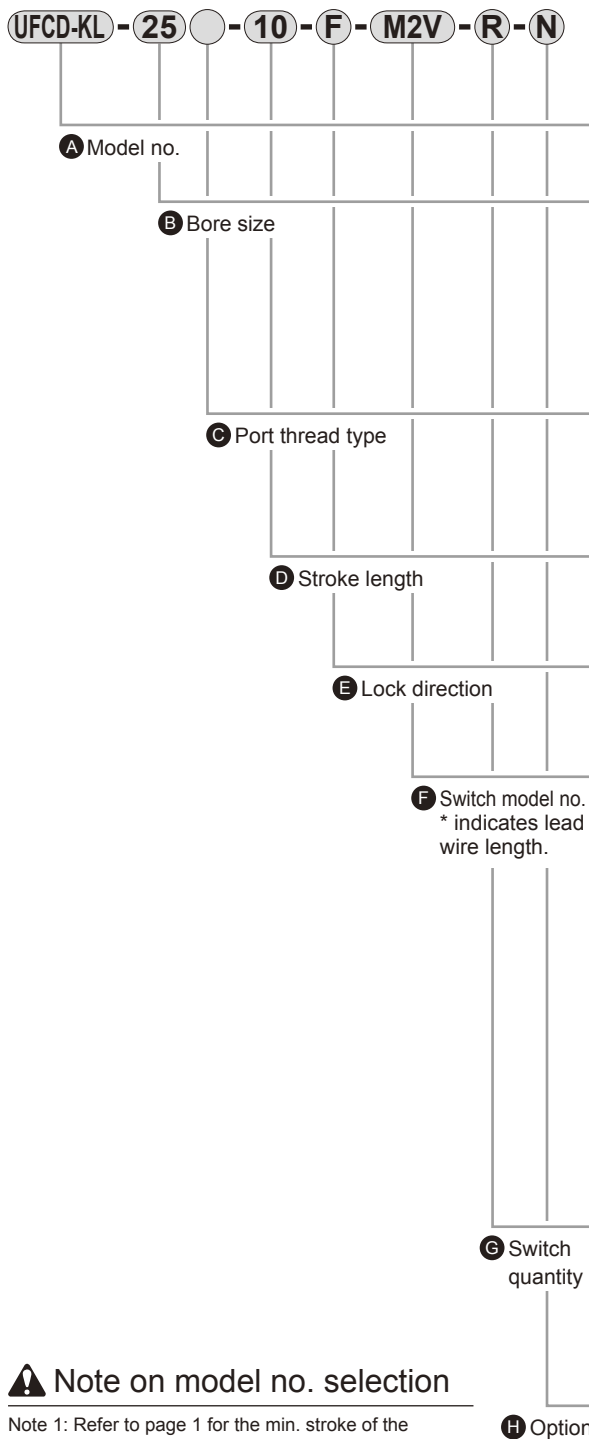
Descriptions	Proximity 2 wire		Proximity 3 wire		
	M2V	M2WV (2 color indicator type)	M3V	M3PV (Custom order)	M3WV (2 color indicator type)
Applications	Programmable controller		Programmable controller, relay, IC circuit, small solenoid valve		
Output method	-	NPN output	NPN output	PNP output	NPN output
Power voltage	-		4.5 to 28 VDC		10 to 28 VDC
Load voltage	10 to 30 VDC		30 VDC or less		
Load current	5 to 30mA		200mA or less	100mA or less	150mA or less
Light	LED (ON lighting)	Red/green LED (ON lighting)	LED (ON lighting)	Yellow LED (ON lighting)	Red/green LED (ON lighting)
Leakage current	1mA or less		10 μ A or less	0.05mA or less	10 μ A or less

● Reed switch

Descriptions	Reed 2 wire	
	MOV	M5V
Applications	Programmable controller, relay	Programmable controller, relay, IC circuit (without indicator light), serial connection
Load voltage	5 to 50mA with 12/24 VDC	50mA or less with 5/12/24 VDC
Load current	7 to 20mA with 110 VAC	20mA with 110 VAC
Light	LED (ON lighting)	Without indicator light
Leakage current	0mA	

Note 1: Refer to "Pneumatic Cylinders I (No. CB-29SA)" about other switch specifications.

How to order



Symbol	Descriptions		
A Model no.			
UFCD-KL	Double acting/cushioned, with switch		
B Bore size (mm)			
25	ø25		
32	ø32		
40	ø40		
50	ø50		
63	ø63		
C Port thread type			
Blank	Rc thread		
NN	NPT thread (ø40 and over) (custom order)		
GN	G thread (ø40 and over) (custom order)		
D Stroke length (mm)			
Bore size	Stroke length	Note 1	Custom stroke length
ø25 to ø63	1 to 150		1 mm increment
E Lock direction			
F	Forward lock		
B	Backward lock		
F Switch model no.			
Radial lead wire	Contact	Indicator	Lead wire
M2V*	Proximity	1 color indicator type	2-wire
M2WV*		2 color indicator type	
M3V*		1 color indicator type	3-wire
M3WV*		2 color indicator type	
M3PV*		1 color indicator type (custom order)	
M0V*	Reed	1 color indicator type	2-wire
M5V*		Without indicator light	
*Lead wire length			
Blank	1m (standard)		
3	3m (option)		
5	5m (option)		
G Switch quantity			
R	One on rod end		
H	One on head end		
D	Two		
T	Three		
H Option			
Blank	Rod end female thread		
N	Rod end male thread		

⚠ Note on model no. selection

Note 1: Refer to page 1 for the min. stroke of the cylinder with switch.

<Example of model number>

UFCD-KL-25-10-F-M2V-R-N

Model: Free position locking flat and compact cylinder

- A** Model no. : Double acting/cushioned, with switch
- B** Bore size : ø25mm
- C** Port thread type : Rc thread
- D** Stroke length : 10mm
- E** Lock direction : Forward lock
- F** Switch model no.: Proximity switch M2V, lead wire 1m
- G** Switch quantity : One on rod end
- H** Option : Rod end male thread

How to order switch

- Switch body + mounting bracket

FCS - M2V

↓
Switch model no.
(item ⑤ on previous page)

- Only switch body

SW - M2V

↓
Switch model no.
(item ⑤ on previous page)

- Mounting bracket

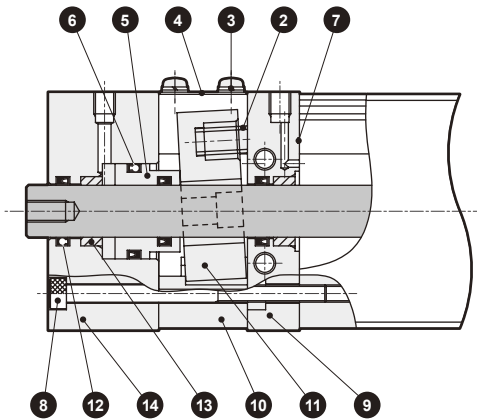
FCS - M

↓
Bracket

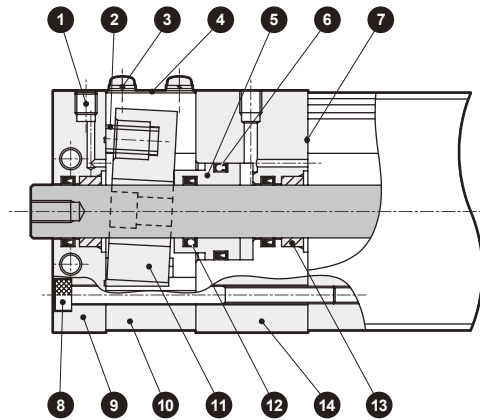
Internal structure and parts list

● UFCD-KL-25, 32

· Lock direction: F (forward lock)



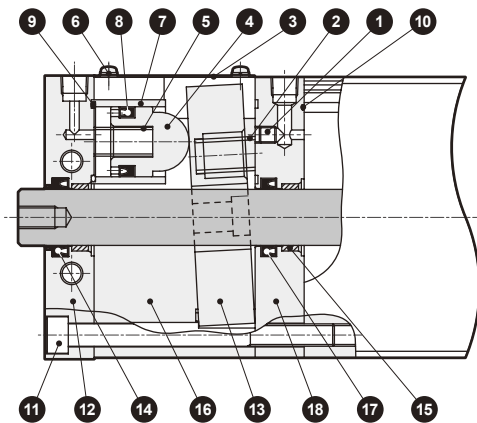
· Lock direction: B (backward lock)



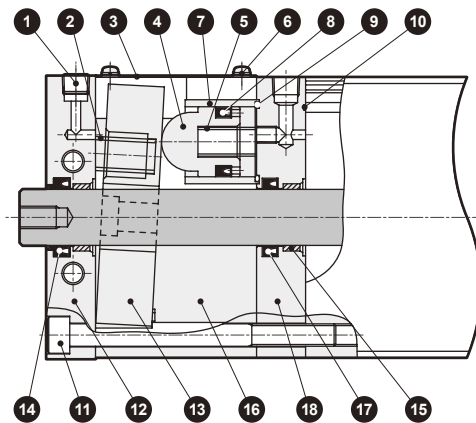
No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Hexagon socket head cap bolt	Alloy steel	Blackening	8	Hexagon socket head cap bolt	Alloy steel	Blackening
2	Spring	Steel	Blackening	9	Rod cover	Aluminum alloy	
3	Pan head semi screw with cross-head socket	Steel	Trivalent chromate	10	Lock tube	Aluminum alloy	
4	Dust cover	Stainless steel		11	Lock plate	Special steel	Trivalent chromate
5	Release piston	Bronze casting		12	Rod packing seal	Nitrile rubber	
6	Piston packing seal	Nitrile rubber		13	Metal bush	Oil-less metal	
7	Gasket	Nitrile rubber		14	Lock	Nitrile rubber	Black alumite

● UFCD-KL-40 to 63

· Lock direction: F (forward lock)



· Lock direction: B (backward lock)

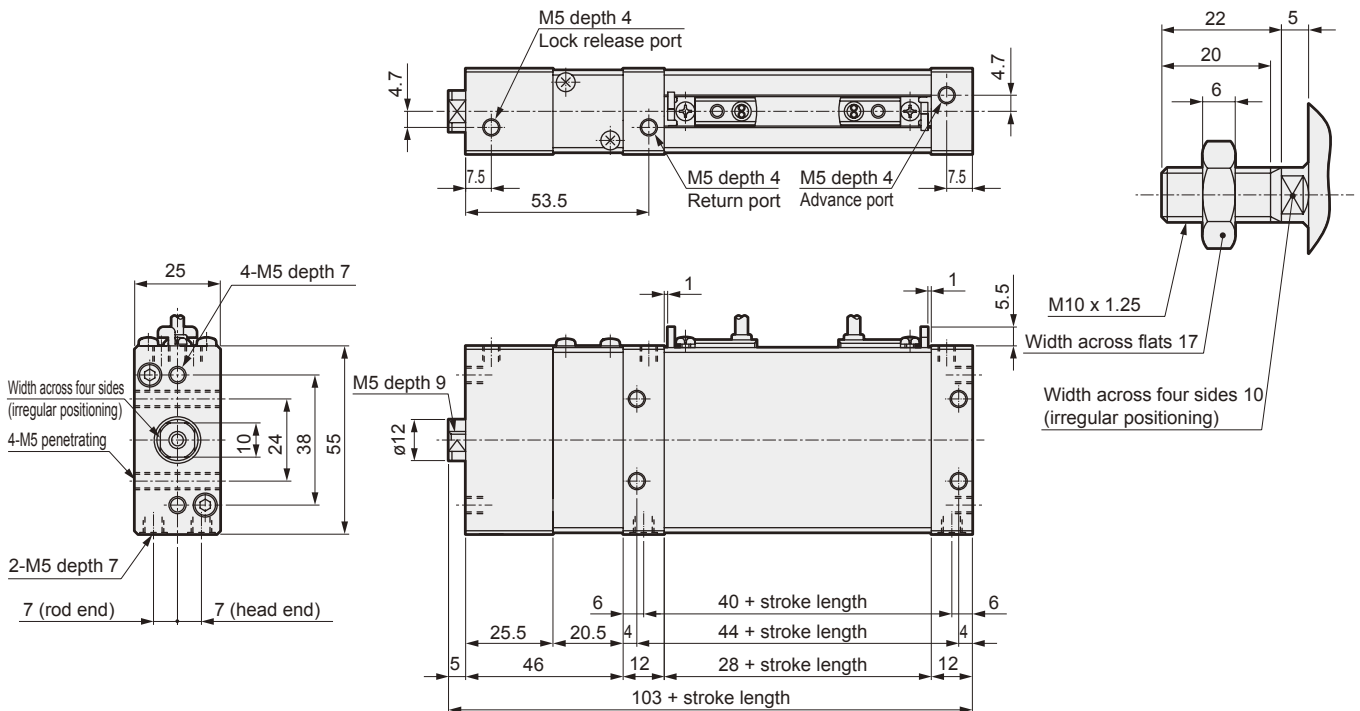


No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	F type: Hexagon socket head tapered screw plug	Alloy steel		9	O ring	Nitrile rubber	
	B type: Hexagon socket head set screw	Alloy steel		10	Gasket	Nitrile rubber	
2	Brake spring	Steel	Blackening	11	Hexagon socket head cap bolt	Alloy steel	
3	Dust cover	Stainless steel		12	Rod cover	Aluminum alloy	
4	Piston	ø40, ø50: bronze casting ø63: aluminum		13	Lock plate	Special steel	Trivalent chromate
5	Piston spring	Steel		14	Rod packing seal	Nitrile rubber	
6	Pan head semi screw with cross-head socket	Steel		15	Metal bush	Oil-less metal	
7	Release piston tube	Stainless steel		16	Lock tube	Aluminum alloy	Hard alumite
8	Piston packing seal	Nitrile rubber		17	Rod packing seal	Nitrile rubber	
				18	Lock	Aluminum alloy	Black alumite

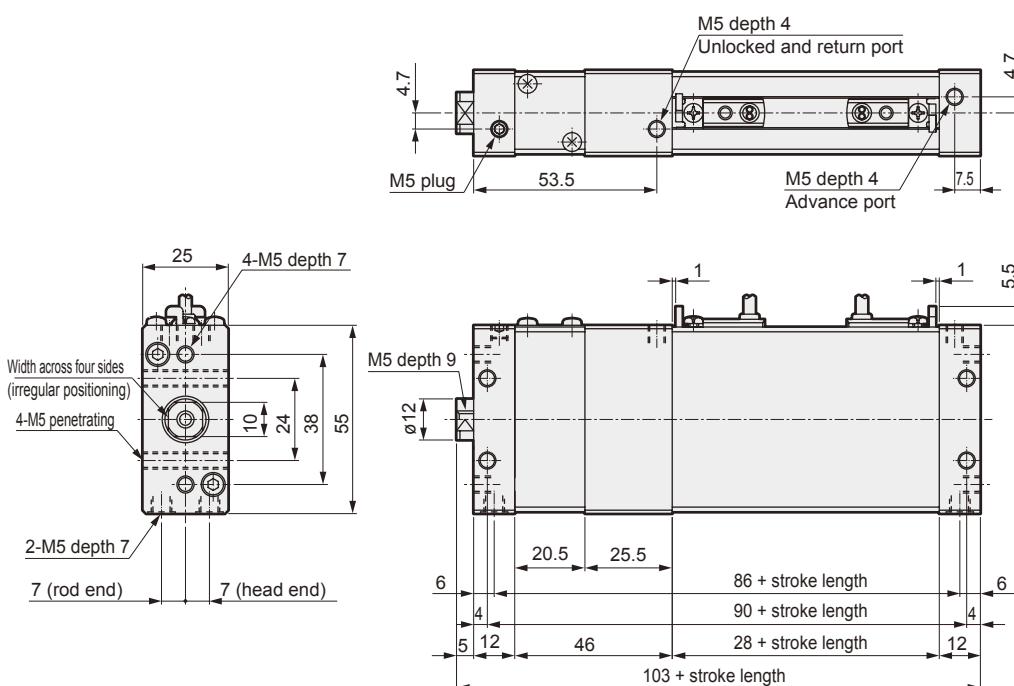
Dimensions (ø25)

● UFCD-KL-25-F (forward lock)

● Rod end male thread (option symbol N)



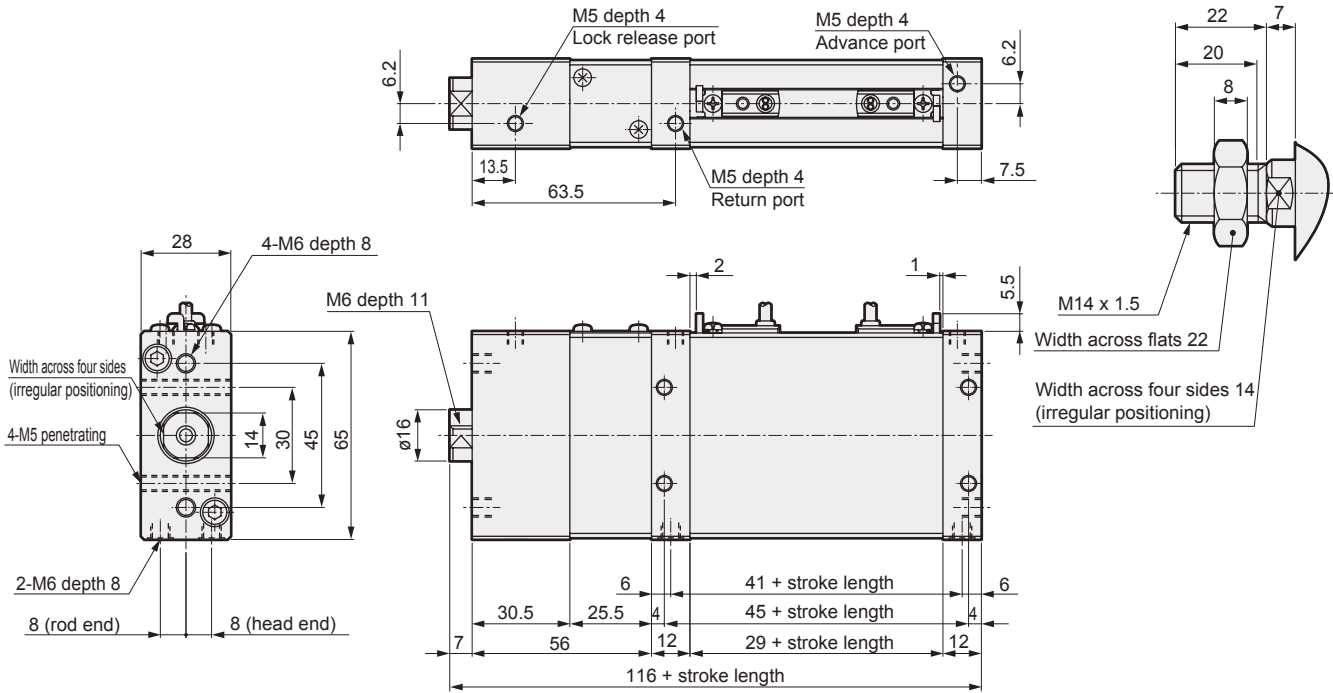
● UFCD-KL-25-B (backward lock)



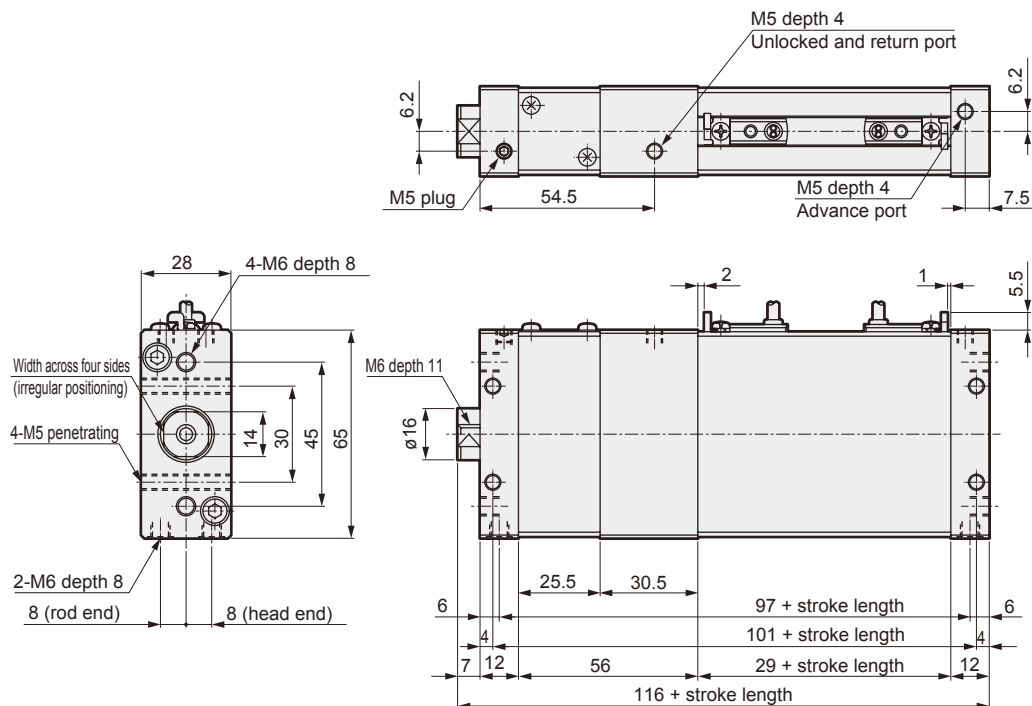
Dimensions (ø32)

● UFCD-KL-32-F (forward lock)

● Rod end male thread (option symbol N)



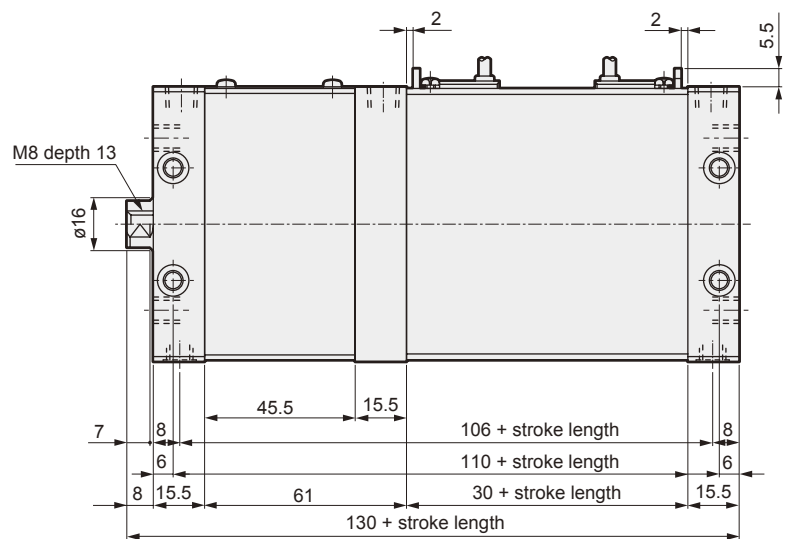
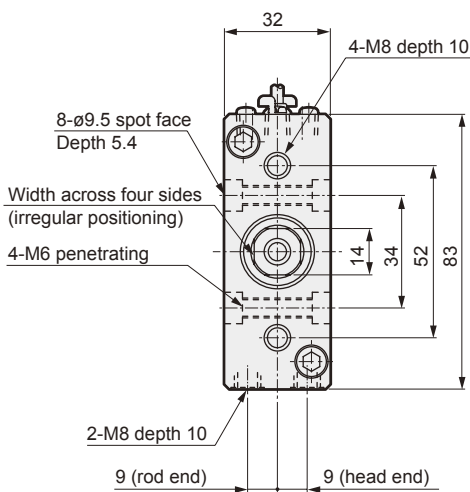
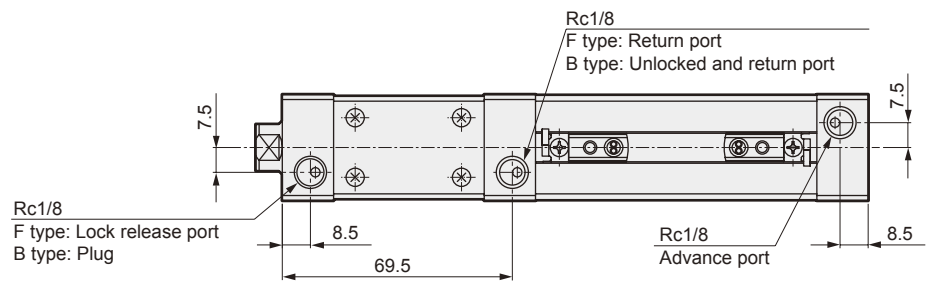
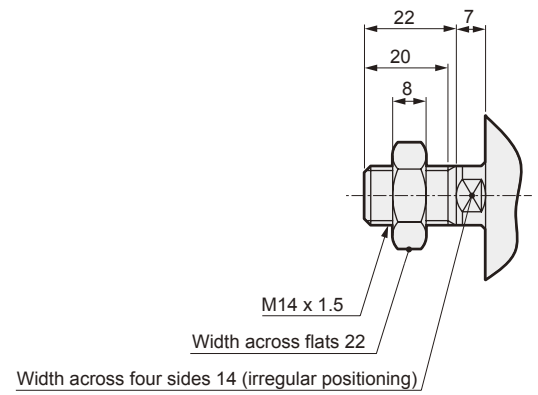
● UFCD-KL-32-B (backward lock)



Dimensions (ø40)

● UFCD-KL-40-F/B (forward lock/backward lock)

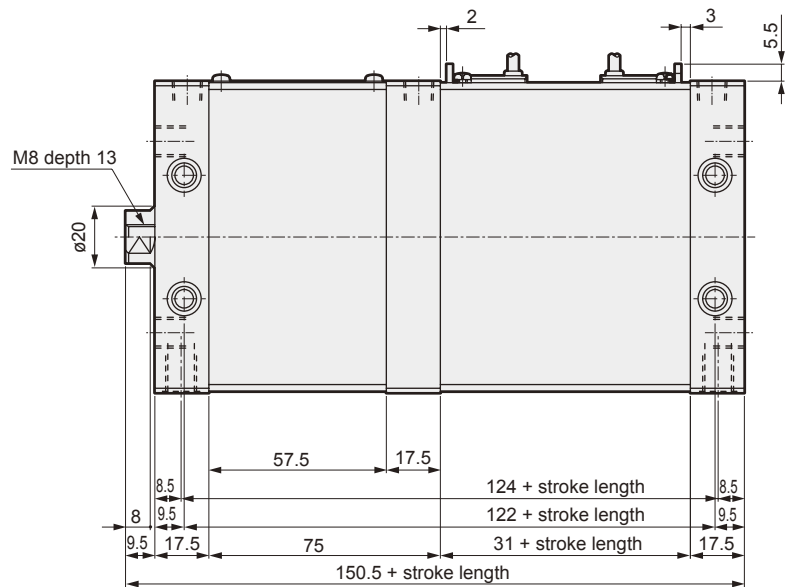
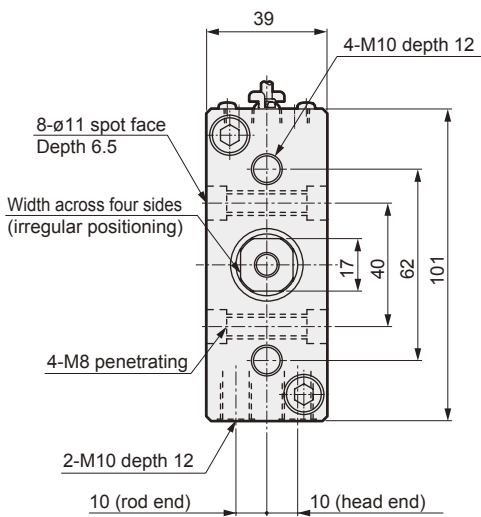
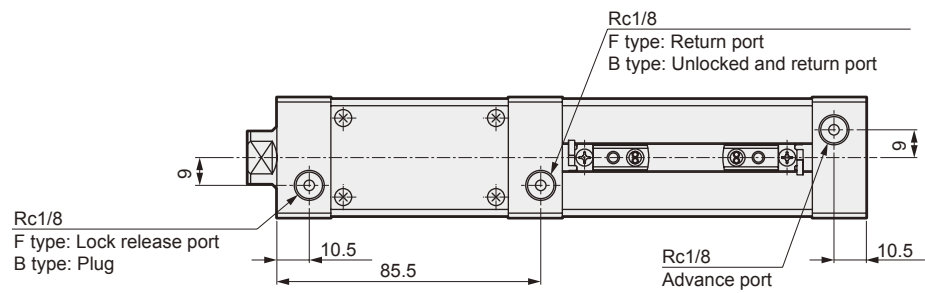
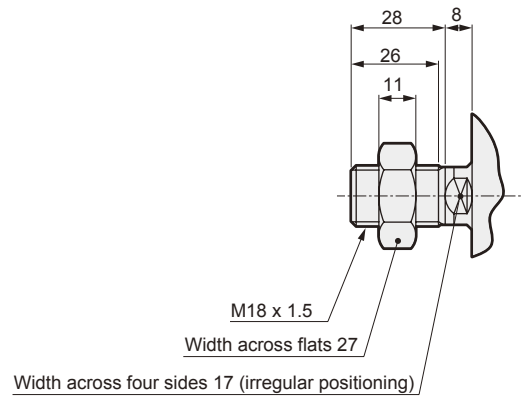
● Rod end male thread (option symbol N)



Dimensions (ø50)

● UFCD-KL-50-F/B (forward lock/backward lock)

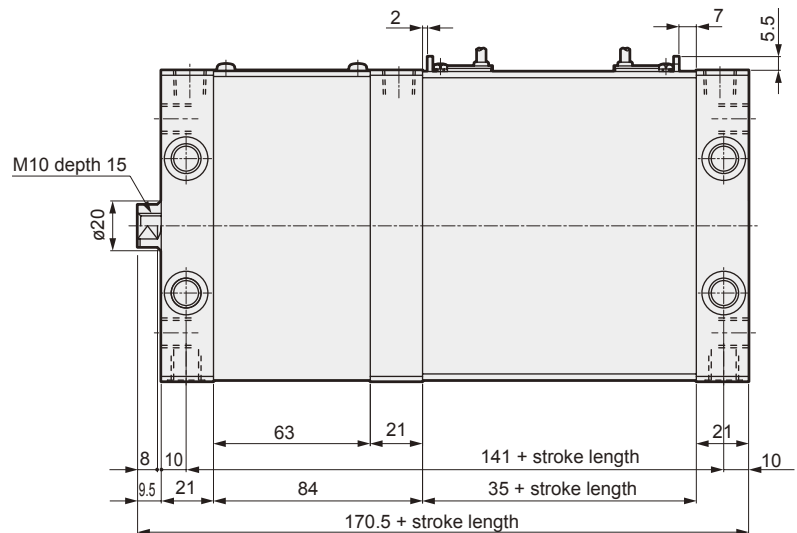
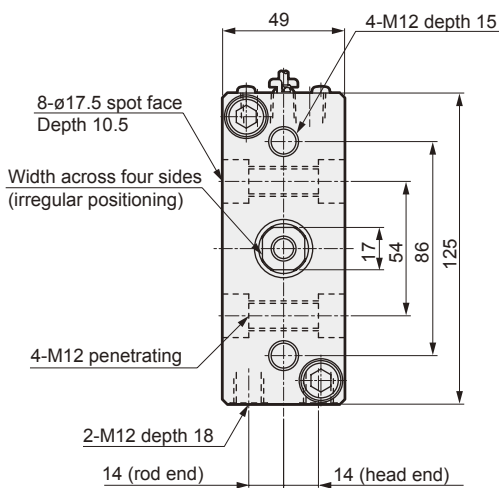
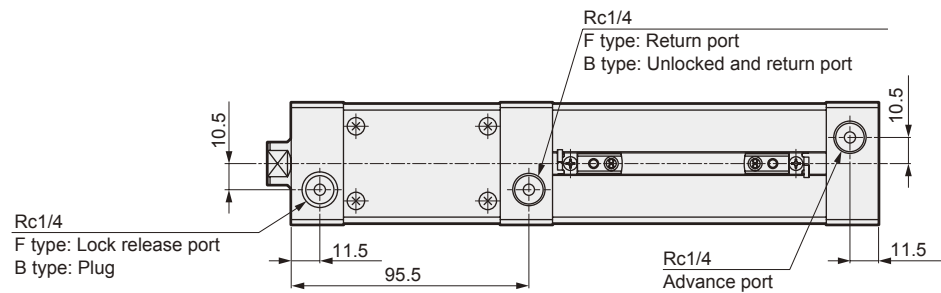
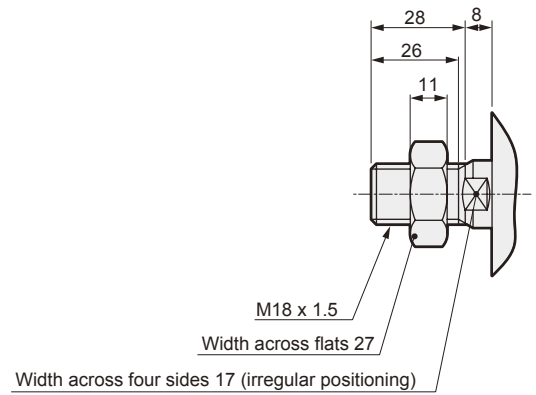
● Rod end male thread (option symbol N)



Dimensions (ø63)

● UFCD-KL-63-F/B (forward lock/backward lock)

● Rod end male thread (option symbol N)



MEMO

Related products



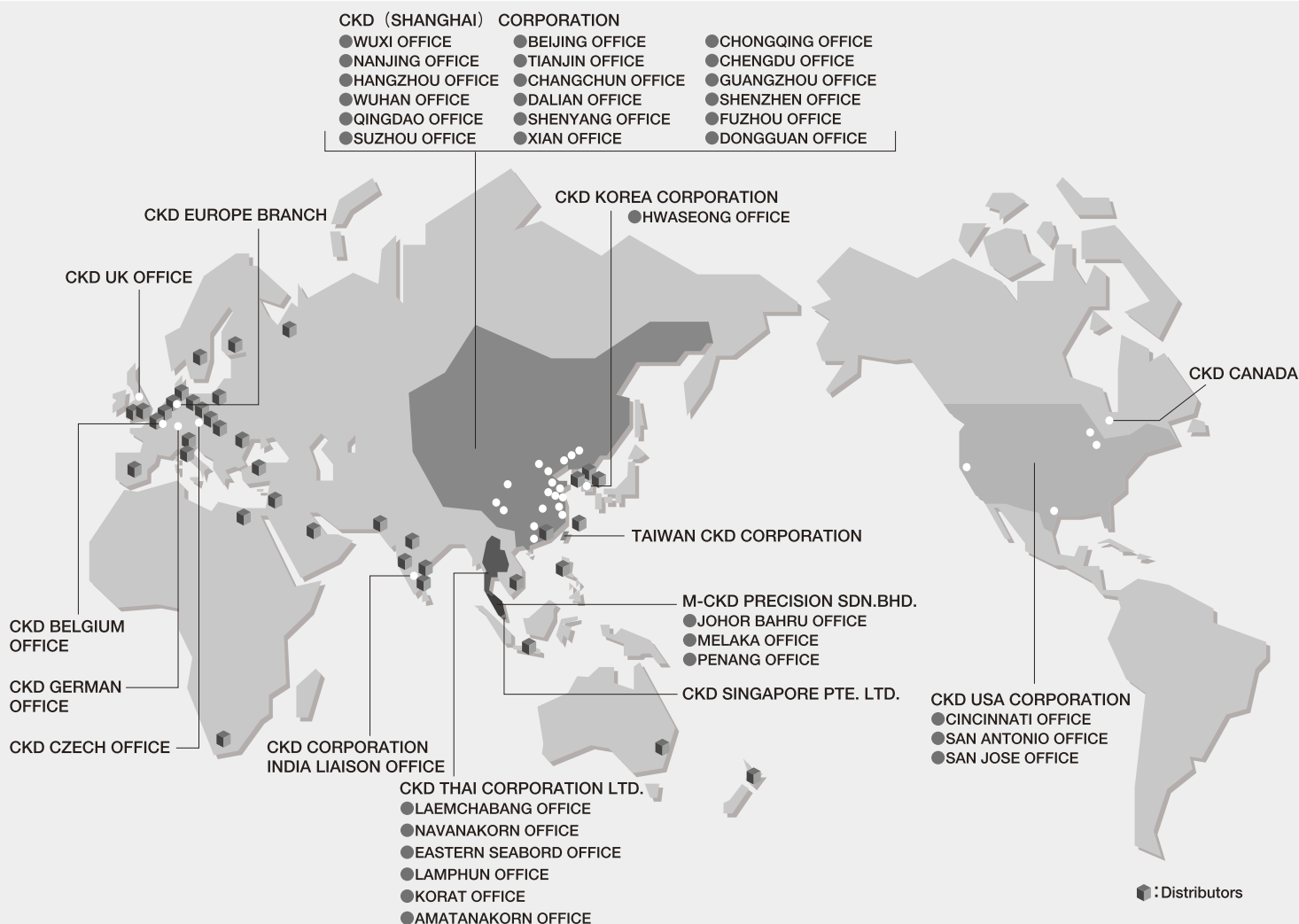
Position locking flat clamp cylinder CACF Series (custom order)

A front crevice fitting has been installed on the UFCD Series. This space-saving clamp cylinder uses a narrow width. This cylinder is ideal for using several in a row or for installation in small spaces.



Position locking compact cylinder USSD Series

This space-saving cylinder is compact and thin, and the position locking section does not protrude. The position is locked at any position in the stroke, the same as for the UFCD Series.



CKD Corporation

- OVERSEAS DPT. SALES DIV. 2-250 Uji Komaki, Aichi 485-8551, Japan
- PHONE +81-(0)568-74-1338 FAX +81-(0)568-77-3461

U.S.A

CKD USA CORPORATION

- HEADQUARTERS

4080 Winnetka Avenue, Rolling Meadows, IL 60008 USA
PHONE +1-847-368-0539 FAX +1-847-788-0575

EUROPE

CKD EUROPE BRANCH

De Fruittuinen 28 Hoofddorp 2132NZ The Netherlands
PHONE +31-(0)23-5541490 FAX +31-(0)23-5541491

Malaysia

M-CKD PRECISION SDN.BHD.

- HEADQUARTERS

Lot No.6,Jalan Modal 23/2, Seksyen 23, Kawasan, MIEL,
Fasa 8, 40300 Shah Alam,Selangor Darul Ehsan, Malaysia
PHONE +60-(0)3-5541-1468 FAX +60-(0)3-5541-1533

Thailand

CKD THAI CORPORATION LTD.

- SALES HEADQUARTERS-BANGKOK OFFICE

Suwan Tower, 14/1 Soi Saladaeng 1, North Sathorn Rd., Bangrak,
Bangkok 10500 Thailand
PHONE +66-(0)2-267-6300 FAX +66-(0)2-267-6305

Website <http://www.ckd.co.jp/>

Singapore

CKD SINGAPORE PTE LTD.

705 Sims Drive #03-01/02, Shun Li Industrial Complex,
387384 Singapore
PHONE +65-6744-2623 FAX +65-6744-2486

Taiwan

TAIWAN CKD CORPORATION

1F., No.16, Wucyuan 5th Rd., Wugu Township, Taipei Country 248,
Taiwan (R.O.C)
PHONE +886-(0)2-2298-2866 FAX +886-(0)2-2298-0322

China

CKD (SHANGHAI) CORPORATION

- SALES HEADQUARTERS / SHANGHAI OFFICE

Room 1903, 333 Jiujiang Road, Shanghai, 200001, China
PHONE +86-(0)21-63602277 FAX +86-(0)21-63511661

Korea

CKD KOREA CORPORATION

Room No.1105, 11th FL, The Korea Teachers Pention B/L. 27-2,
Yoido-Dong, Youngdeungpo-Gu, Seoul, 150-742, Korea
PHONE +82-(0)2-783-5201~5203 FAX +82-(0)2-783-5204

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