

# FC□

Space saving structure

## Flat Cylinder Compact Demi

ø25, ø32, ø40, ø50, ø63

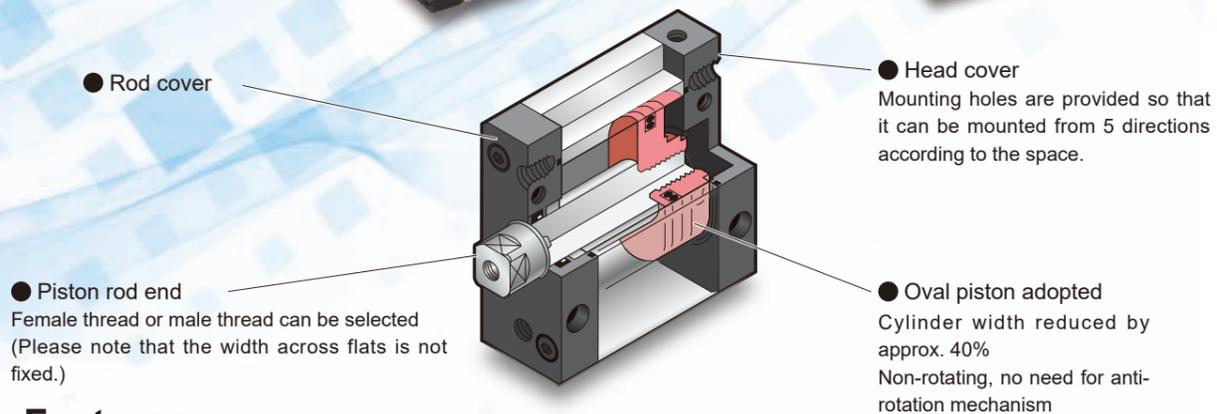


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## Space-saving and non-rotating with oval piston

ø25 ø32 ø40 ø50 ø63



### Features

#### Mountable from 5 directions

Mounting holes are provided in the cover, allowing direct mounting from 5 directions without mounting brackets.

#### Easy mounting alignment

An option with a spigot joint on the rod cover is available.

#### Oval piston adopted

The oval piston structure achieves piston rod non-rotation and high allowable rotational torque.

Reference:

Non-rotation accuracy equivalent to ø40 = ±0.5°

Allowable rotational torque = 2.5 N·m

\*The "non-rotation accuracy" value is the value when a torque load of 10% of the "allowable rotational torque" is applied to the tip of the piston rod.

### Space-saving

#### Comparison of width between SSD2 ø25 and FCD ø25

The width dimension is reduced to approximately 60% compared to a compact cylinder of the same bore size.



#### Comparison of height between SSD2 ø25 and FCD ø50

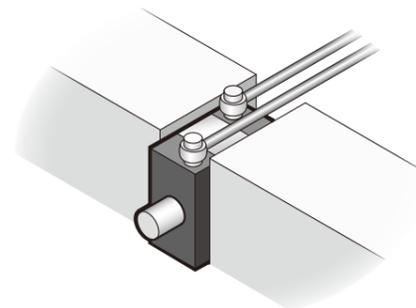
The height of FCD ø50 is 39 mm, which is 1 mm lower than the height of SSD ø25.



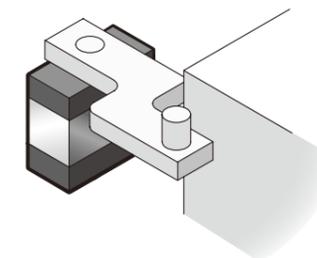
## Main application examples utilizing the flat shape

Various automations that were previously impossible are now possible.

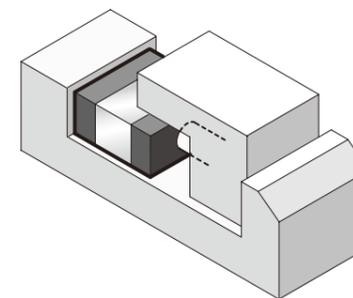
#### Installation in narrow spaces



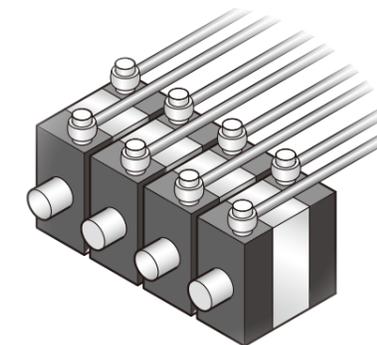
#### Positioning when there are obstacles (non-rotating function)



#### Clamp



#### Use side-by-side



### FC□ Series Product Lineup

●: Standard

Variation	Model No.	Bore size (mm)	Standard Stroke (mm)								
			5	10	15	20	25	30	40	50	
Single Acting, Push Type with Switch	FCS FCS-L	Equivalent to ø25, ø32	●	●							
		Equivalent to ø40, ø50, ø63		●		●					
Single Acting, Retracting Type with Switch	FCH FCH-L	Equivalent to ø25, ø32	●	●							
		Equivalent to ø40, ø50, ø63		●		●					
Double Acting, Single Rod Type with Switch	FCD FCD-L	Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	●
			●	●	●	●	●	●	●	●	●
Double Acting, Double Rod Type with Switch	FCD-D FCD-DL	Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	●
			●	●	●	●	●	●	●	●	●
Double acting, With cushion With Switch	FCD-K FCD-KL	Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	●
			●	●	●	●	●	●	●	●	●

●: Standard, ○: Option, ■: Not manufacturable

Space-Saving Type	Variation	Model No. Circuit Diagram Symbol	Bore Size (mm)	Standard Stroke (mm)							Min. Stroke (mm)	Intermediate stroke (per mm)	Maximum Stroke (mm)	Option			Switch	Page	Space-Saving Type	
				5	10	15	20	25	30	40				50	Piston Rod Material (Stainless Steel)	Rod end male thread				With spigot joint
															M	N				R
SSD2	Single Acting, Push Type with Switch	FCS FCS-L 	Equivalent to ø25, ø32	●	●	■	■	■	■	■	■	1	1	10	○	○	○	○	836	SSD2
SSG			Equivalent to ø40, ø50, ø63	■	●	■	●	■	■	■	■	■	1	1	20	○	○	○		○
SSD	Single Acting, Retracting Type with Switch	FCH FCH-L 	Equivalent to ø25, ø32	●	●	■	■	■	■	■	■	1	1	10	○	○	○	○	836	SSD
CAT			Equivalent to ø40, ø50, ø63	■	●	■	●	■	■	■	■	■	1	1	20	○	○	○		○
MDC2	Double Acting, Single Rod Type with Switch	FCD FCD-L 	Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	1	1	50	○	○	○	○	846	MDC2
SMG	Double Acting, Double Rod Type with Switch	FCD-D FCD-DL 	Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	1	1	50	○	○	○	○	852	SMG
MSD			Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	●	1	1	50	○	○	○		○
FC□	Double acting, With cushion, With switch	FCD-K FCD-KL 	Equivalent to ø25, ø32, ø40, ø50, ø63	●	●	●	●	●	●	●	●	1	1	150	○	○	○	○	858	FC□

Combination Availability Table for Variations and Option Items

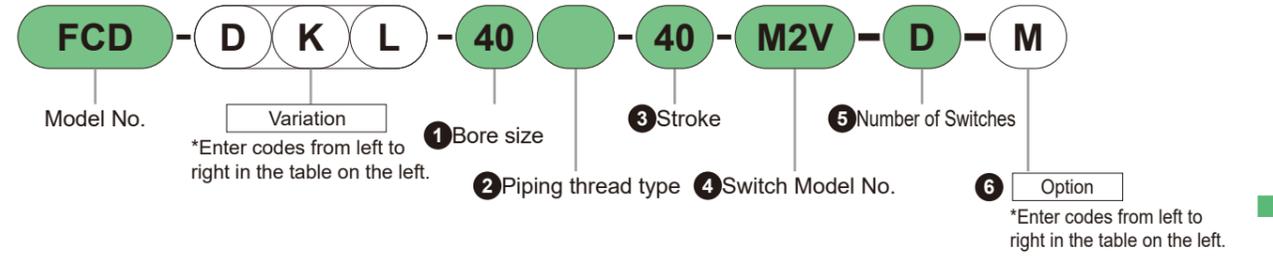
- ◎Mark: Option
- Mark: Custom Products
- △Mark: Manufacturable depending on conditions (Please consult)
- ×Mark: Not manufacturable

Space-Saving Type	Category	Category	Variation						Piping thread		Option		
			Double Acting Basic Type	Single Acting, Push Type	Single Acting, Retracting Type	Double Acting Double Rod Type	Double acting with cushion	With Cylinder Switch	NPT *1	G *1	Piston Rod Material (Stainless Steel)	Rod end male thread	With spigot joint
SSD2		Code	None	S	H	D	K	L	N	G	M	N	R
SSG		Double Acting Basic Type	Blank					◎	○	○	◎	◎	◎
SSD		Single Acting, Push Type	FCS		×	×	×	◎	○	○	◎	◎	◎
CAT		Single Acting, Retracting Type	FCH			×	×	◎	○	○	◎	◎	◎
MDC2		Double Acting Double Rod Type	FCD-D					◎	○	○	◎	◎	◎
SMG		Double acting with cushion	FCD-K					◎	○	○	◎	◎	◎
MSD		With Cylinder Switch	L						○	○	◎	◎	◎
		NPT *1	N						×		○	○	○
		G *1	G								○	○	○
		Piston Rod Material (Stainless Steel)	M								◎	○	
		Rod end male thread	N									◎	
		With spigot joint	R										◎
		Cylinder Switch	Separately Shown	×	×	×	×	×	◎	○	○	◎	◎

\*1: ø25 and ø32 cannot be manufactured.

Variation / Option combinability table

[Model Number Notation Example]



Model No.: Flat cylinder

- Variation Double rod/cushioned/with switch
- ① Bore size: ø40 mm or equivalent
- ② Port Thread Type: Rc Thread
- ③ Stroke: 40 mm
- ④ Switch Model No. Solid State M2V, Lead wire 1 m
- ⑤ Number of Switches: With 2 pcs.
- ⑥ Option: Piston Rod Material (Stainless Steel)



Flat Cylinder Compact Demi Single Acting, Push Type / Single Acting, Retracting Type

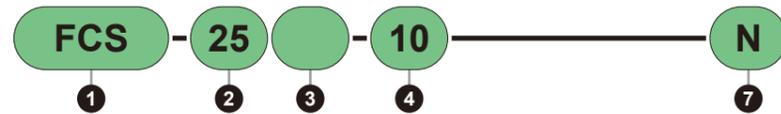
# FCS Series / FCH Series

● Tube bore:  $\phi 25$ ,  $\phi 32$ ,  $\phi 40$ ,  $\phi 50$ ,  $\phi 63$

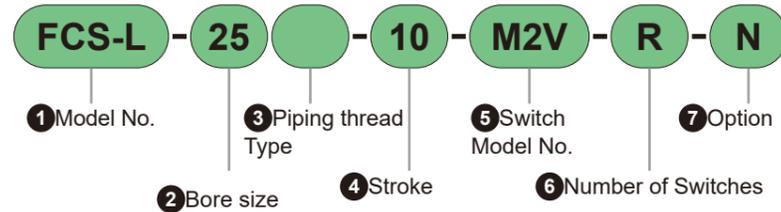


## Model No. Notation Method

Without Switch  
(Without magnet for switch)



With Switch  
(Built-in magnet for switch)



### 1 Model No.

Code	Content
FCS	Single Acting, Push Type
FCS-L	Single Acting/Push Type/With Switch
FCH	Single Acting, Retracting Type
FCH-L	Single Acting/Retracting Type/With Switch

### 2 Tube Inner Diameter (mm)

Code	Content
25	Equivalent to $\phi 25$
32	Equivalent to $\phi 32$
40	Equivalent to $\phi 40$
50	Equivalent to $\phi 50$
63	Equivalent to $\phi 63$

### 3 Piping thread type

Code	Content
Blank	M5 (Equivalent to $\phi 25$ , $\phi 32$ ) Rc thread (Equivalent to $\phi 40$ to $\phi 63$ )
NN	NPT thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )
GN	G thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )

### 4 Stroke (mm)

Bore size	Stroke	Intermediate Stroke
Equivalent to $\phi 25$ , $\phi 32$	1 to 10	Every 1 mm
Equivalent to $\phi 40$ to $\phi 63$	1 to 20	

\*1: For the minimum stroke with switch, see P. 838.

### 5 Switch Model No.

For switch details, please refer to P. 869.  
Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1
			AC	DC	AC	DC	
Solid State	1-Color	2-wire	—	10 to 30	—	5 to 30	M2V□
			—	10 to 30	—	5 to 30	M2WV□
	2-Color	3-wire (NPN)	—	30 or less	—	100 or less	M3V□
			—	30 or less	—	100 or less	M3WV□
	1 color (customized product)	3-wire (PNP)	—	30 or less	—	100 or less	M3PV□
			—	30 or less	—	100 or less	M3WV□
Reed	1-Color	2-wire	110	12/24	7 to 20	5 to 50	M0V□
	No Indicator LED		110	5/12/24	20 or less	50 or less	M5V□

\*1: For "□" in the switch model number, enter the code selected from the "Lead wire length" table.

### \*Lead wire length

Code	Content
Blank	1 m (Standard)
3	3 m (Option)
5	5 m (Option)

Example) Lead wire length

1 m MOV  
3 m MOV 3  
5 m MOV 5

### 6 Number of Switches

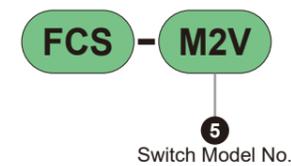
Code	Content
R	With 1 pc on rod side
H	With 1 pc on head side
D	With 2 pcs

### 7 Option

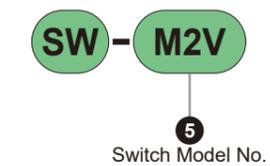
Code	Content	
Blank	Rod end female thread	
M	Piston Rod Material (Stainless Steel)	
N	Rod end male thread	
R	With spigot joint	

## Switch Single Unit Model No. Display Method

● Switch body + Mounting bracket set



● Switch body only



● Mounting bracket set



Specifications

Item	FCS FCS-L					FCH FCH-L				
	Bore size mm	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50
Actuation method	Single acting push type					Single acting retracting type				
Operating Fluid	Compressed Air									
Maximum operating pressure MPa	0.7									
Min. Operating Pressure MPa	0.12									
Proof pressure MPa	1.05									
Ambient Temperature °C	-10 to 60 (No freezing)									
Port Size	M5	Rc1/8	Rc1/4	M5	Rc1/8	Rc1/4	M5	Rc1/8	Rc1/4	M5
Stroke tolerance mm	+0.5 (to 50) 0									
Operating Piston Speed mm/s	50 to 500									
Cushion	None									
Lubrication	Not required (When lubricating, use turbine oil Class 1 ISO VG32)									
Allowable absorbed energy J	0.015	0.02	0.026	0.04	0.05	0.015	0.02	0.026	0.04	0.05

Note: Do not leave single acting cylinders pressurized. If left pressurized, the piston rod may not return by spring load when the pressure is released.

Non-rotation accuracy / Allowable rotational torque

Item	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Non-rotation accuracy *2	±1°	±0.8°	±0.5°	±0.5°	±0.5°
Allowable rotational torque N·m	1	1.6	2.5	3.9	5.9

\*1: Avoid use where rotational torque is applied impulsively or where the direction of torque load changes impulsively.

\*2: The "non-rotation accuracy" value is the value when a torque load of 10% of the "allowable rotational torque" is applied to the tip of the piston rod.

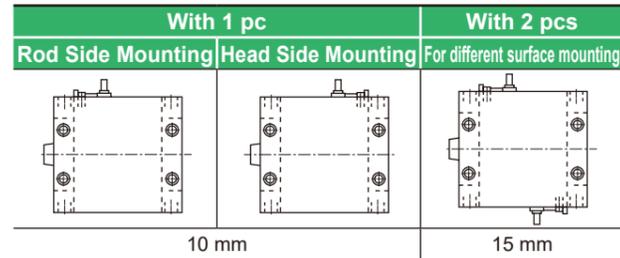
Stroke

Model No.	Bore Size (mm)	Standard Stroke (mm)	Maximum Stroke (mm)	Min. Stroke (mm)
FCS	Equivalent to ø25, ø32	5, 10	10	1
FCH	Equivalent to ø40, ø50, ø63	10, 20	20	

\*1: Intermediate strokes can be manufactured in 1 mm increments.

\*2: The minimum stroke varies depending on the switch mounting method. Please refer to the table below.

Min. Stroke with Switch



FCS/FCH Spring load

(Unit: N)

Bore Size (mm)	Stroke (mm)	At 0 Stroke	At Full Stroke Operation
Equivalent to ø25	5	27.4	35.3
	10	19.6	
Equivalent to ø32	5	36	47.5
	10	24.5	
Equivalent to ø40	10	38.5	47.6
	20	29.4	
Equivalent to ø50	10	56.5	74.9
	20	38.2	
Equivalent to ø63	10	92.2	119.8
	20	61.7	

Cylinder Weight / Theoretical Thrust Table

Cylinder Weight

(Unit: g)

Item	Product Weight when stroke (S) = 0 mm				Switch weight	Weight of mounting bracket	Added Weight per S = 10 mm	
	FCS		FCH					
Bore Size (mm)	Without Switch	With Switch	Without Switch	With Switch	Refer to the weight stated in the switch specifications on P. 869.	2		
Equivalent to ø25	155	217	135	197				26
Equivalent to ø32	220	310	190	280				37
Equivalent to ø40	345	468	310	433				46
Equivalent to ø50	545	733	485	673				71
Equivalent to ø63	1090	1226	965	976				90

(Example) Product Weight of FCS-32-10

- Product Weight at S=0 mm ..... 220 g
- Added weight at S=10 mm .....  $37 \text{ g} \times \frac{10}{10} = 37 \text{ g}$
- Product Weight .....  $220 \text{ g} + 37 \text{ g} = 257 \text{ g}$

Theoretical Thrust Table

●FCS

(Unit: N)

Bore Size (mm)	Operating Pressure MPa					
	0.2	0.3	0.4	0.5	0.6	0.7
Equivalent to ø25	63.2	$1.12 \times 10^2$	$1.62 \times 10^2$	$2.11 \times 10^2$	$2.60 \times 10^2$	$3.09 \times 10^2$
Equivalent to ø32	$1.08 \times 10^2$	$1.85 \times 10^2$	$2.63 \times 10^2$	$3.41 \times 10^2$	$4.18 \times 10^2$	$4.96 \times 10^2$
Equivalent to ø40	$2.11 \times 10^2$	$3.40 \times 10^2$	$4.69 \times 10^2$	$5.98 \times 10^2$	$7.27 \times 10^2$	$8.56 \times 10^2$
Equivalent to ø50	$3.11 \times 10^2$	$5.05 \times 10^2$	$6.98 \times 10^2$	$8.91 \times 10^2$	$1.08 \times 10^3$	$1.28 \times 10^3$
Equivalent to ø63	$5.16 \times 10^2$	$8.34 \times 10^2$	$1.15 \times 10^3$	$1.47 \times 10^3$	$1.79 \times 10^3$	$2.10 \times 10^3$

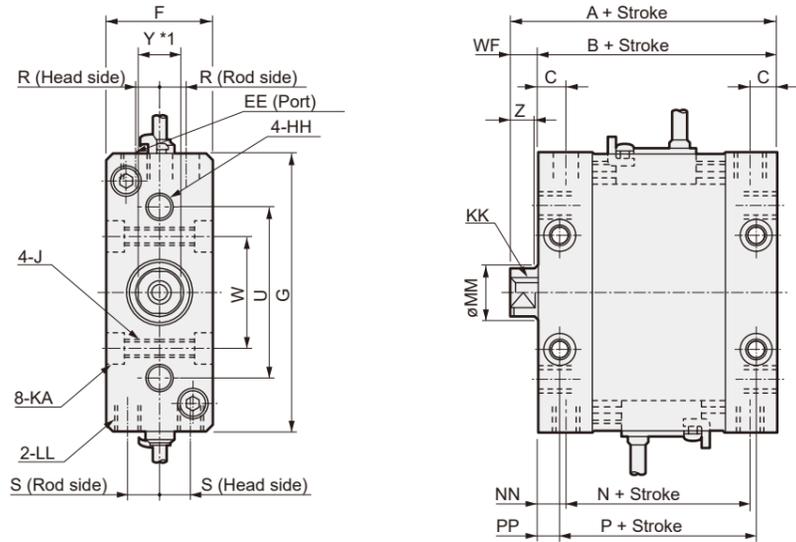
●FCH

(Unit: N)

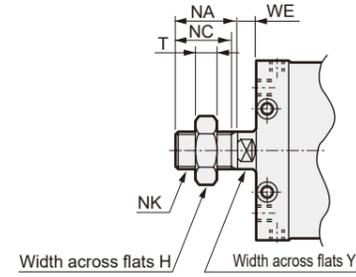
Bore Size (mm)	Operating Pressure MPa					
	0.2	0.3	0.4	0.5	0.6	0.7
Equivalent to ø25	40.6	78.5	$1.16 \times 10^2$	$1.54 \times 10^2$	$1.92 \times 10^2$	$2.30 \times 10^2$
Equivalent to ø32	67.5	$1.25 \times 10^2$	$1.83 \times 10^2$	$2.40 \times 10^2$	$2.98 \times 10^2$	$3.55 \times 10^2$
Equivalent to ø40	$1.70 \times 10^2$	$2.79 \times 10^2$	$3.88 \times 10^2$	$4.97 \times 10^2$	$6.06 \times 10^2$	$7.15 \times 10^2$
Equivalent to ø50	$2.49 \times 10^2$	$4.10 \times 10^2$	$5.72 \times 10^2$	$7.34 \times 10^2$	$8.96 \times 10^2$	$1.06 \times 10^3$
Equivalent to ø63	$4.53 \times 10^2$	$7.39 \times 10^2$	$1.03 \times 10^3$	$1.31 \times 10^3$	$1.60 \times 10^3$	$1.88 \times 10^3$

Outline Dimension Drawing

- FCS (Single acting push type, without switch)
- FCS-L (Single acting push type, with switch)



- Rod end male thread outline dimension drawing (Option Code N)



Code	Dimension without switch				Dimension with switch				Common dimension						
	A	B	N	P	A	B	N	P	C	EE	F	G	HH	J	KA
Equivalent to ø25	42	37	25	29	57	52	40	44	7.5	M5 Depth 4	25	55	M5 depth 7	M5 (Through)	—
Equivalent to ø32	45	38	26	30	60	53	41	45	7.5	M5 Depth 4	28	65	M6 Depth 8	M5 (Through)	—
Equivalent to ø40	54	46	30	34	69	61	45	49	8.5	Rc1/8	32	83	M8 Depth 10	M6 (Through)	9.5 Counterbore Depth 5.4
Equivalent to ø50	60.5	51	34	32	75.5	66	49	47	10.5	Rc1/8	39	101	M10 Depth 12	M8 (Through)	11 Counterbore Depth 6.5
Equivalent to ø63	71.5	62	42	42	86.5	77	57	57	11.5	Rc1/4	49	125	M12 Depth 15	M12 (Through)	17.5 Counterbore Depth 10.5

Code	Common dimension											
	KK	LL	MM	NN	PP	R	S	U	W	WF	Y	Z
Equivalent to ø25	M5 Depth 9	M5 depth 7	12	6	4	4.7	7	38	24	5	10	5
Equivalent to ø32	M6 depth 11	M6 Depth 8	16	6	4	6.2	8	45	30	7	14	7
Equivalent to ø40	M8 depth 13	M8 Depth 10	16	8	6	7.5	9	52	34	8	14	7
Equivalent to ø50	M8 depth 13	M10 Depth 12	20	8.5	9.5	9	10	62	40	9.5	17	8
Equivalent to ø63	M10 depth 15	M12 Depth 18	20	10	10	10.5	14	86	54	9.5	17	8

\*1: The width across flats of the Y portion is not fixed.  
 \*2: For dimensions of models with switches, see P. 864.

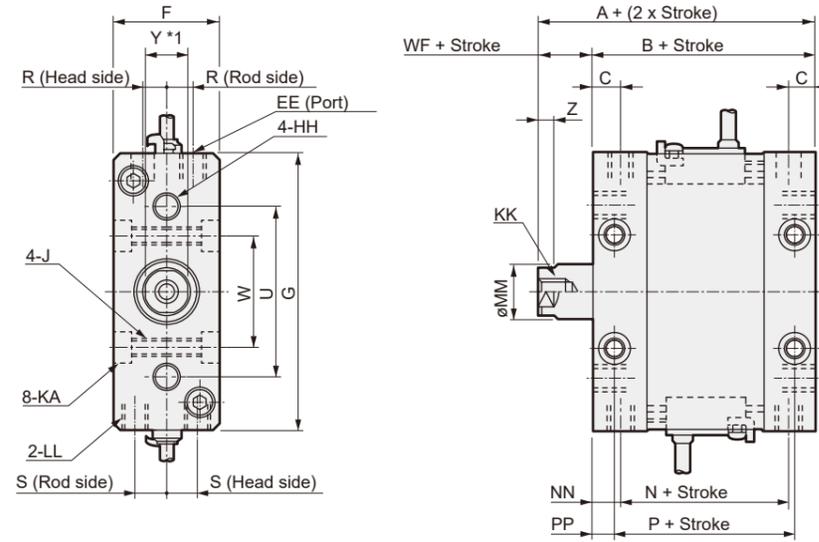
● Rod end male thread dimension table

Code	H	NA	NC	NK	T	WE
Equivalent to ø25	17	22	20	M10 × 1.25	6	5
Equivalent to ø32	22	22	20	M14 × 1.5	8	7
Equivalent to ø40	22	22	20	M14 × 1.5	8	7
Equivalent to ø50	27	28	26	M18 × 1.5	11	8
Equivalent to ø63	27	28	26	M18 × 1.5	11	8

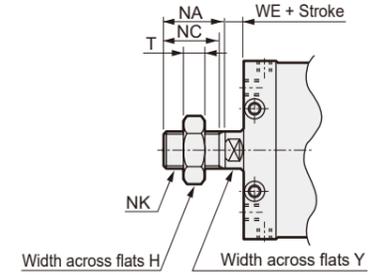
Outline Dimension Drawing

Outline Dimension Drawing

- FCH (Single acting retracting type, without switch)
- FCH-L (Single acting retracting type, with switch)



- Rod end male thread outline dimension drawing (Option Code N)



Code	Dimension without switch				Dimension with switch				Common dimension						
	A	B	N	P	A	B	N	P	C	EE	F	G	HH	J	KA
Equivalent to ø25	37	32	20	24	52	47	35	39	7.5	M5 Depth 4	25	55	M5 depth 7	M5 (Through)	—
Equivalent to ø32	40	33	21	25	55	48	36	40	7.5	M5 Depth 4	28	65	M6 Depth 8	M5 (Through)	—
Equivalent to ø40	49	41	25	29	64	56	40	44	8.5	Rc1/8	32	83	M8 Depth 10	M6 (Through)	9.5 Counterbore Depth 5.4
Equivalent to ø50	55.5	46	29	27	70.5	61	44	42	10.5	Rc1/8	39	101	M10 Depth 12	M8 (Through)	11 Counterbore Depth 6.5
Equivalent to ø63	66.5	57	37	37	81.5	72	52	52	11.5	Rc1/4	49	125	M12 Depth 15	M12 (Through)	17.5 Counterbore Depth 10.5

Code	Common dimension											
	KK	LL	MM	NN	PP	R	S	U	W	WF	Y	Z
Equivalent to ø25	M5 Depth 9	M5 depth 7	12	6	4	4.7	7	38	24	5	10	5
Equivalent to ø32	M6 depth 11	M6 Depth 8	16	6	4	6.2	8	45	30	7	14	7
Equivalent to ø40	M8 depth 13	M8 Depth 10	16	8	6	7.5	9	52	34	8	14	7
Equivalent to ø50	M8 depth 13	M10 Depth 12	20	8.5	9.5	9	10	62	40	9.5	17	8
Equivalent to ø63	M10 depth 15	M12 Depth 18	20	10	10	10.5	14	86	54	9.5	17	8

\*1: The width across flats of the Y portion is not fixed.  
 \*2: For dimensions of models with switches, see P. 864.

● Rod end male thread dimension table

Code	H	NA	NC	NK	T	WE
Equivalent to ø25	17	22	20	M10 × 1.25	6	5
Equivalent to ø32	22	22	20	M14 × 1.5	8	7
Equivalent to ø40	22	22	20	M14 × 1.5	8	7
Equivalent to ø50	27	28	26	M18 × 1.5	11	8
Equivalent to ø63	27	28	26	M18 × 1.5	11	8

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC

Cylinder Switch

Ending

Cylinder Switch

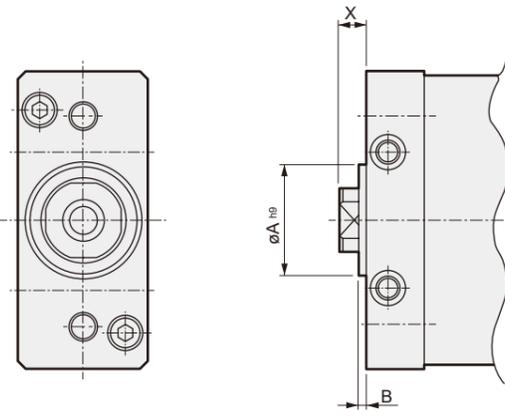
Ending

Outer Dimensions Diagram with Option

● Dimension drawing with spigot joint (Option Code R)

MEMO

Space-Saving Type  
SSD2  
SSG  
SSD  
CAT  
MDC2  
SMG  
MSD  
FC



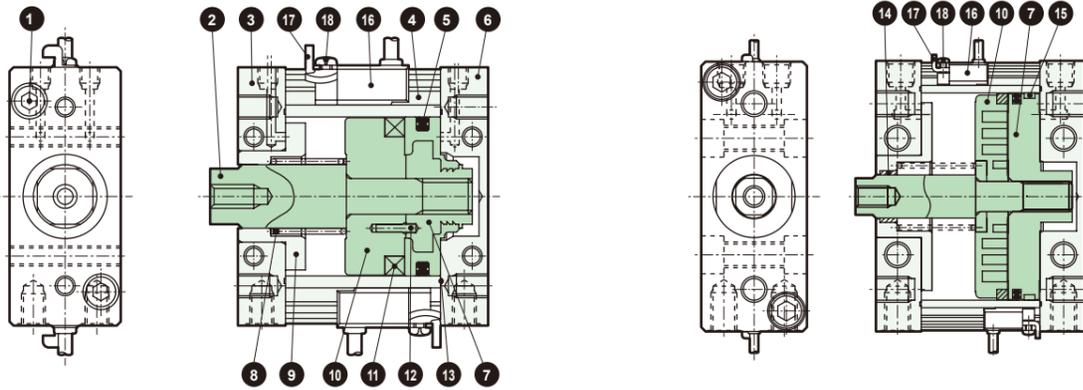
Code	A	B	X
Equivalent to $\phi 25$	20	$2_{-0.4}^0$	5
Equivalent to $\phi 32$	24	$2_{-0.4}^0$	7
Equivalent to $\phi 40$	28	$2_{-0.4}^0$	8
Equivalent to $\phi 50$	32	$2_{-0.4}^0$	9.5
Equivalent to $\phi 63$	32	$2_{-0.4}^0$	9.5

Space-Saving Type  
SSD2  
SSG  
SSD  
CAT  
MDC2  
SMG  
MSD  
FC

Internal Structure Diagram/Material

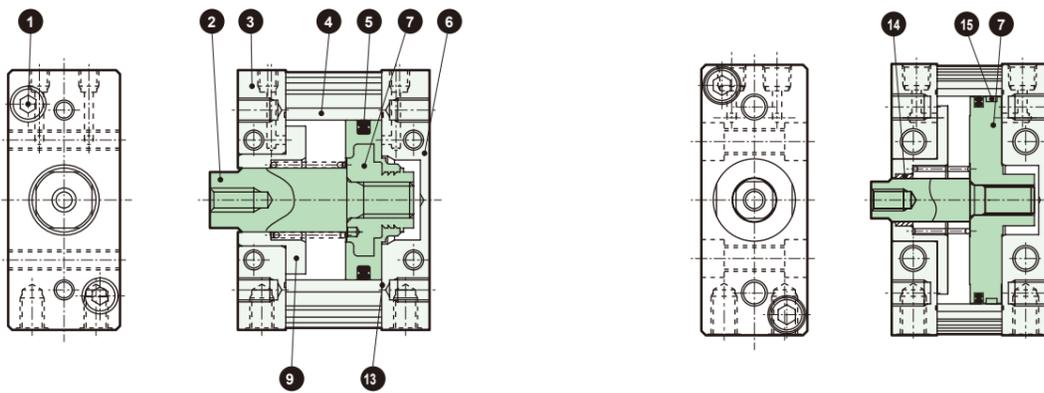
●FCS-L (Single acting, Push type, With switch)  
Equivalent to ø25 to ø40

Equivalent to ø50 to ø63



●FCS (Single acting, Push type)  
Equivalent to ø25 to ø40

Equivalent to ø50 to ø63



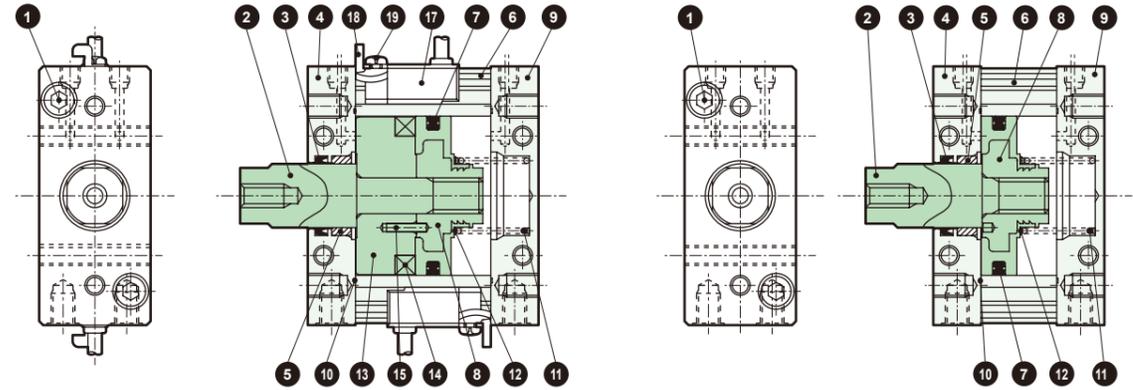
Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Steel	Zinc Chromate	9	Bushing spacer	Aluminum Alloy	Equivalent to ø25 to ø40 Alumite ø50, ø63 or equivalent: Chromate
2	Piston Rod	Steel	Industrial Hard Chrome Plating	10	Spacer	Equivalent to ø25 to ø50: Aluminum Alloy Equivalent to ø63 Polyamide	Equivalent to ø25 to ø50: Chromate
3	Rod Cover	Aluminum Alloy	Black anodized	11	Magnet	Plastic	
4	Tube	Aluminum Alloy	Hard Anodized	12	Spring Pin	Steel	
5	Piston Packing	Nitrile Rubber		13	Cover gasket	Nitrile Rubber	
6	Head Cover	Aluminum Alloy	Black anodized	14	Bushing	Aluminum Alloy	Alumite
7	Piston	Equivalent to ø25 to ø50: Aluminum alloy, polyacetal resin	Equivalent to ø63 Chromate	15	Wear Ring	Polyacetal Resin	Equivalent to ø63 only
		Equivalent to ø63 Aluminum Alloy		With Switch			
8	Spring	Steel	Electrodeposition Coating	16	Switch		
				17	Mounting bracket	Stainless Steel	
				18	Pan Head Screw	Stainless Steel	

Internal Structure Diagram/Material

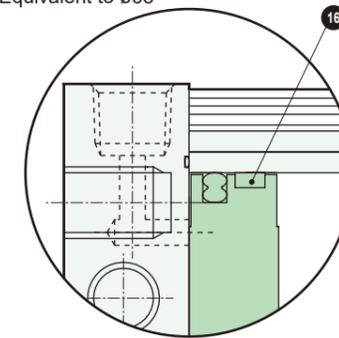
Internal Structure Diagram/Material

●FCH-L (Single acting, Retracting type, With switch)

●FCH



Equivalent to ø63



Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Steel	Zinc Chromate	10	Cover gasket	Nitrile Rubber	
2	Piston Rod	Steel	Industrial Hard Chrome Plating	11	Spring	Steel	Electrodeposition Coating
3	Rod Packing	Nitrile Rubber		12	Spring retainer	Stainless Steel	
4	Rod Cover	Aluminum Alloy	Black anodized	13	Spacer	Equivalent to ø25 to ø50: Aluminum Alloy	Equivalent to ø25 to ø50: Chromate
5	Bushing	Oil-impregnated Bearing Alloy				Equivalent to ø63 Polyamide	
6	Tube	Aluminum Alloy	Hard Anodized	14	Magnet		
7	Piston Packing	Nitrile Rubber		15	Spring Pin	Steel	
8	Piston	Equivalent to ø25 to ø50: Aluminum alloy, polyacetal resin	Equivalent to ø63 Chromate	16	Wear Ring	Polyacetal Resin	Equivalent to ø63 only
		Equivalent to ø63 Aluminum Alloy		With Switch			
		17		Switch			
				18	Mounting bracket	Stainless Steel	
9	Head Cover	Aluminum Alloy	Black anodized	19	Pan Head Screw	Stainless Steel	

For maintenance parts, please visit the CKD Equipment Product Site (<https://www.ckd.co.jp/kiki/en/>) → "model No." → Maintenance Parts .

For maintenance parts, please visit the CKD Equipment Product Site (<https://www.ckd.co.jp/kiki/en/>) → "model No." → Maintenance Parts .

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC

Cylinder Switch

Ending

Cylinder Switch

Ending



Flat Cylinder Compact Demi Double Acting, Single Rod Type

# FCD Series

● Tube bore:  $\phi 25$ ,  $\phi 32$ ,  $\phi 40$ ,  $\phi 50$ ,  $\phi 63$

Circuit Diagram Symbol

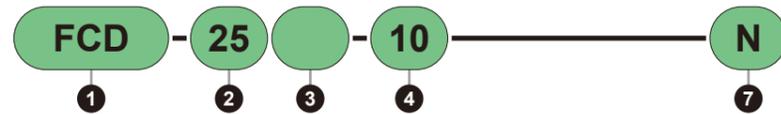


## FCD Series

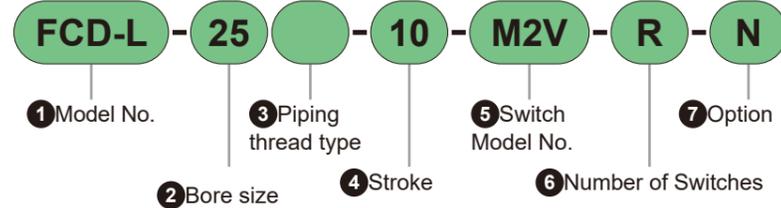
Model No. Notation Method

### Model No. Notation Method

Without Switch  
(Without magnet for switch)



With Switch  
(Built-in magnet for switch)



#### 1 Model No.

Code	Content
FCD	Double Acting Type
FCD-L	Double-acting type, With switch

#### 2 Tube Inner Diameter (mm)

Code	Content
25	Equivalent to $\phi 25$
32	Equivalent to $\phi 32$
40	Equivalent to $\phi 40$
50	Equivalent to $\phi 50$
63	Equivalent to $\phi 63$

#### 3 Piping thread type

Code	Content
Blank	M5 (Equivalent to $\phi 25$ , $\phi 32$ ) Rc thread (Equivalent to $\phi 40$ to $\phi 63$ )
NN	NPT thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )
GN	G thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )

#### 4 Stroke (mm)

Bore size	Stroke	Intermediate Stroke
Equivalent to $\phi 25$ to $\phi 63$	1 to 50	Every 1 mm

\*1: For the minimum stroke with switch, see P. 848.

#### 5 Switch Model No.

For switch details, please refer to P. 869.  
Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1 L-shape
			AC	DC	AC	DC	
Solid State	1-Color	2-wire	—	10 to 30	—	5 to 30	M2V□
			—	10 to 30	—	5 to 30	M2WV□
	2-Color	3-wire (NPN)	—	30 or less	—	100 or less	M3V□
			—	30 or less	—	100 or less	M3WV□
Reed	1-Color (Custom order)	3-wire (PNP)	—	30 or less	—	100 or less	M3PV□
			No Indicator LED	2-wire	110	12/24	7 to 20
110	5/12/24	20 or less			50 or less	M5V□	

\*1: For "□" in the switch model number, enter the code selected from the "Lead wire length" table.

#### \*Lead wire length

Code	Content
Blank	1 m (Standard)
3	3 m (Option)
5	5 m (Option)

Example) Lead wire length  
1 m MOV □  
3 m MOV □  
5 m MOV □

#### 6 Number of Switches

Code	Content
R	With 1 pc on rod side
H	With 1 pc on head side
D	With 2 pcs
T	With 3 pcs

#### 7 Option

Code	Content
Blank	Rod end female thread
M	Piston Rod Material (Stainless Steel)
N	Rod end male thread
R	With spigot joint

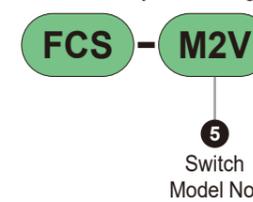
#### About Custom Product Specifications

For details, see P. 865.

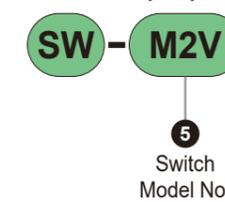
Code	Content
-A2	With 2 Rod Nuts
Rod End Shape Modification	Refer to Ending 11.

#### Switch Single Unit Model No. Display Method

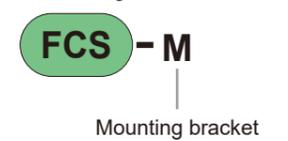
● Switch body + Mounting bracket set



● Switch body only



● Mounting bracket set



Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC□

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC□

Cylinder Switch

Ending

Cylinder Switch

Ending

Specifications

Item	FCD FCD-L				
	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Bore size mm	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Actuation method	Double Acting Type				
Operating Fluid	Compressed Air				
Maximum operating pressure MPa	0.7				
Min. Operating Pressure MPa	0.07				
Proof pressure MPa	1.05				
Ambient Temperature °C	-10 to 60 (No freezing)				
Port Size	M5		Rc1/8		Rc1/4
Stroke tolerance mm	+0.5 (to 50) 0				
Operating Piston Speed mm/s	50 to 500				
Cushion	None				
Lubrication	Not required (When lubricating, use turbine oil Class 1 ISO VG32)				
Allowable absorbed energy J	0.015	0.02	0.026	0.04	0.05

Non-rotation accuracy / Allowable rotational torque

Item	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Non-rotation accuracy *2	±1°	±0.8°	±0.5°	±0.5°	±0.5°
Allowable rotational torque N·m	1	1.6	2.5	3.9	5.9

\*1: Avoid use where rotational torque is applied impulsively or where the direction of torque load changes impulsively.

\*2: The "non-rotation accuracy" value is the value when a torque load of 10% of the "allowable rotational torque" is applied to the tip of the piston rod.

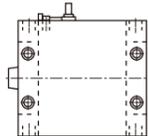
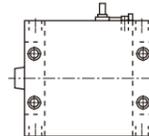
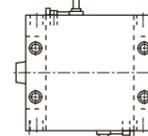
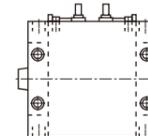
Stroke

Model No.	Bore Size (mm)	Standard Stroke (mm)	Maximum Stroke (mm)	Min. Stroke (mm)
FCD	ø25, ø32 ø40, ø50 Equivalent to ø63	5/10/15/20/25/ 30/40/50	50	1

\*1: Intermediate strokes can be manufactured in 1 mm increments.

\*2: The minimum stroke varies depending on the switch mounting method. Please refer to the table below.

Min. Stroke with Switch

With 1 pc		With 2 pcs	
Rod Side Mounting	Head Side Mounting	For different surface mounting	In case of same surface mounting
			
10 mm		15 mm	35 mm (Equivalent to ø25, 32, 40, 50) 30 mm (Equivalent to ø63)

Cylinder Weight

(Unit: g)

Item	Product Weight when stroke (S) = 0 mm		Switch weight	Weight of mounting bracket	Added Weight per S = 10 mm
	FCD				
Bore size (mm)	Without Switch	With Switch	Refer to the weight stated in the switch specifications on P. 869.		
Equivalent to ø25	130	192			
Equivalent to ø32	185	275			
Equivalent to ø40	300	423			
Equivalent to ø50	470	658			
Equivalent to ø63	950	1086			

(Example) Product Weight of FCD-32-20

- Product Weight at S=0 mm ..... 185 g
- Added weight at S=20 mm .....  $37 \text{ g} \times \frac{20}{10} = 74 \text{ g}$
- Product Weight .....  $185 \text{ g} + 74 \text{ g} = 259 \text{ g}$

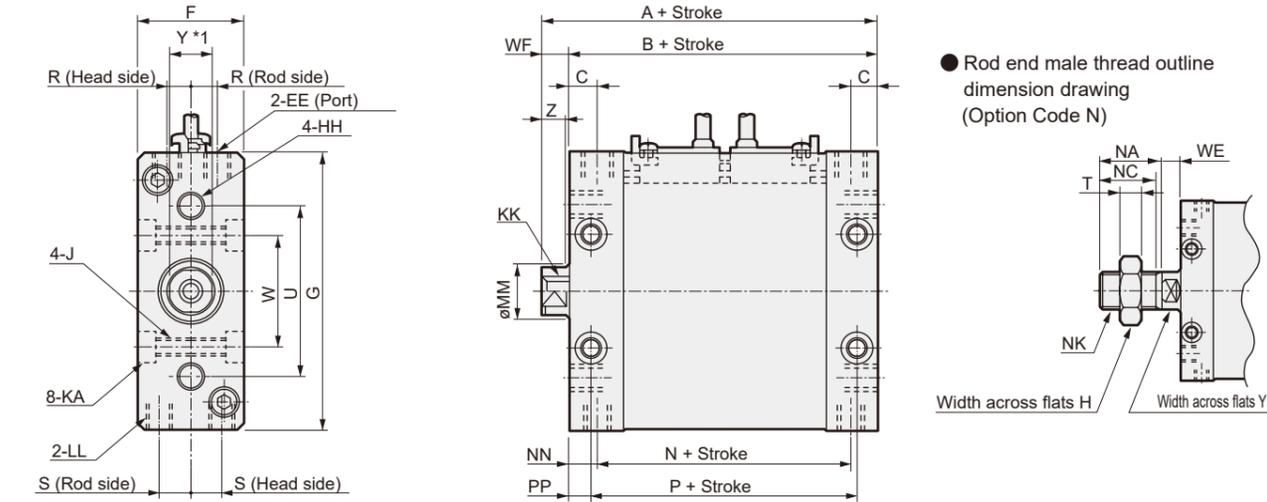
Theoretical Thrust Table

(Unit: N)

Bore size (mm)	Operating Direction	Operating Pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
Equivalent to ø25	Push	49.3	73.9	98.5	$1.48 \times 10^2$	$1.97 \times 10^2$	$2.46 \times 10^2$	$2.96 \times 10^2$	$3.45 \times 10^2$
	Pull	37.9	56.9	75.9	$1.14 \times 10^2$	$1.52 \times 10^2$	$1.90 \times 10^2$	$2.28 \times 10^2$	$2.66 \times 10^2$
Equivalent to ø32	Push	77.6	$1.16 \times 10^2$	$1.55 \times 10^2$	$2.33 \times 10^2$	$3.10 \times 10^2$	$3.88 \times 10^2$	$4.66 \times 10^2$	$5.43 \times 10^2$
	Pull	57.5	86.3	$1.15 \times 10^2$	$1.73 \times 10^2$	$2.30 \times 10^2$	$2.88 \times 10^2$	$3.45 \times 10^2$	$4.03 \times 10^2$
Equivalent to ø40	Push	$1.29 \times 10^2$	$1.94 \times 10^2$	$2.58 \times 10^2$	$3.87 \times 10^2$	$5.16 \times 10^2$	$6.45 \times 10^2$	$7.75 \times 10^2$	$9.04 \times 10^2$
	Pull	$1.09 \times 10^2$	$1.63 \times 10^2$	$2.18 \times 10^2$	$3.27 \times 10^2$	$4.36 \times 10^2$	$5.45 \times 10^2$	$6.54 \times 10^2$	$7.63 \times 10^2$
Equivalent to ø50	Push	$1.93 \times 10^2$	$2.90 \times 10^2$	$3.86 \times 10^2$	$5.80 \times 10^2$	$7.73 \times 10^2$	$9.66 \times 10^2$	$1.16 \times 10^3$	$1.35 \times 10^3$
	Pull	$1.62 \times 10^2$	$2.43 \times 10^2$	$3.24 \times 10^2$	$4.85 \times 10^2$	$6.47 \times 10^2$	$8.09 \times 10^2$	$9.71 \times 10^2$	$1.13 \times 10^3$
Equivalent to ø63	Push	$3.18 \times 10^2$	$4.77 \times 10^2$	$6.36 \times 10^2$	$9.53 \times 10^2$	$1.27 \times 10^3$	$1.59 \times 10^3$	$1.91 \times 10^3$	$2.22 \times 10^3$
	Pull	$2.86 \times 10^2$	$4.30 \times 10^2$	$5.73 \times 10^2$	$8.59 \times 10^2$	$1.15 \times 10^3$	$1.43 \times 10^3$	$1.72 \times 10^3$	$2.00 \times 10^3$

Outline Dimension Drawing

- FCD (Double acting type, without switch)
- FCD-L (Double acting type, with switch)



Code	Dimension without switch				Dimension with switch				Common dimension						
	A	B	N	P	A	B	N	P	C	EE	F	G	HH	J	KA
Equivalent to ø25	37	32	20	24	52	47	35	39	7.5	M5 Depth 4	25	55	M5 depth 7	M5 (Through)	—
Equivalent to ø32	40	33	21	25	55	48	36	40	7.5	M5 Depth 4	28	65	M6 Depth 8	M5 (Through)	—
Equivalent to ø40	49	41	25	29	64	56	40	44	8.5	Rc1/8	32	83	M8 Depth 10	M6 (Through)	9.5 Counterbore Depth 5.4
Equivalent to ø50	55.5	46	29	27	70.5	61	44	42	10.5	Rc1/8	39	101	M10 Depth 12	M8 (Through)	11 Counterbore Depth 6.5
Equivalent to ø63	66.5	57	37	37	81.5	72	52	52	11.5	Rc1/4	49	125	M12 Depth 15	M12 (Through)	17.5 Counterbore Depth 10.5

Code	Common dimension												
	KK	LL	MM	NN	PP	R	S	U	W	WF	Y	Z	
Equivalent to ø25	M5 Depth 9	M5 depth 7	12	6	4	4.7	7	38	24	5	10	5	
Equivalent to ø32	M6 depth 11	M6 Depth 8	16	6	4	6.2	8	45	30	7	14	7	
Equivalent to ø40	M8 depth 13	M8 Depth 10	16	8	6	7.5	9	52	34	8	14	7	
Equivalent to ø50	M8 depth 13	M10 Depth 12	20	8.5	9.5	9	10	62	40	9.5	17	8	
Equivalent to ø63	M10 depth 15	M12 Depth 18	20	10	10	10.5	14	86	54	9.5	17	8	

\*1: The width across flats of the Y portion is not fixed.  
 \*2: For dimensions of models with switches, see P. 864.

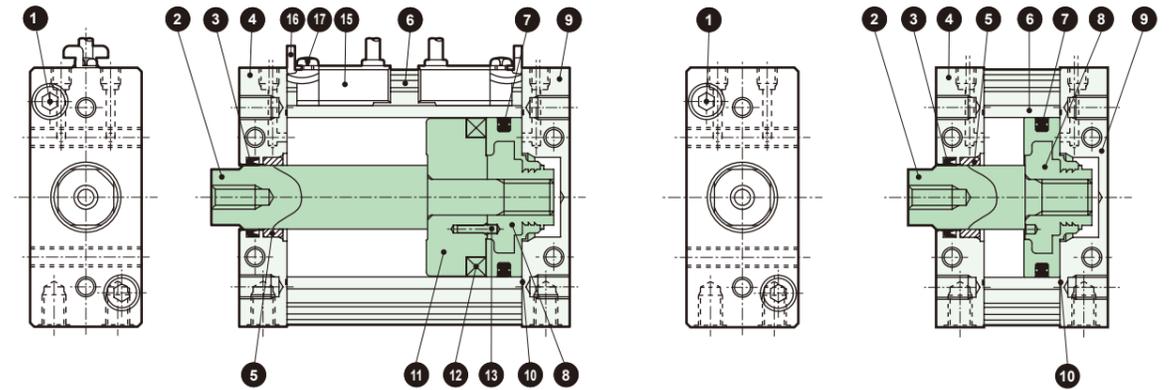
● Rod end male thread dimension table

Code	H	NA	NC	NK	T	WE
Equivalent to ø25	17	22	20	M10 × 1.25	6	5
Equivalent to ø32	22	22	20	M14 × 1.5	8	7
Equivalent to ø40	22	22	20	M14 × 1.5	8	7
Equivalent to ø50	27	28	26	M18 × 1.5	11	8
Equivalent to ø63	27	28	26	M18 × 1.5	11	8

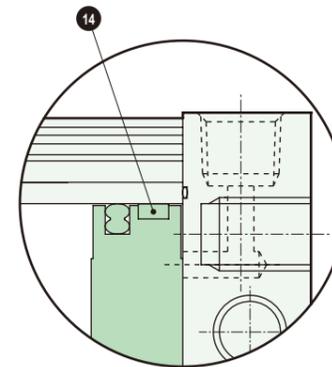
Internal Structure Diagram/Material

Internal Structure Diagram/Material

- FCD-L (with switch)



Equivalent to ø63



Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Steel	Zinc Chromate	9	Head Cover	Aluminum Alloy	Black anodized
2	Piston Rod	Steel	Industrial Hard Chrome Plating	10	Cover gasket	Nitrile Rubber	
3	Rod Packing	Nitrile Rubber		11	Spacer	Equivalent to ø25 to ø50: Aluminum Alloy	Equivalent to ø25 to ø50: Chromate
4	Rod Cover	Aluminum Alloy	Black anodized			Equivalent to ø63 Polyamide	
5	Bushing	Oil-impregnated Bearing Alloy		12	Magnet	Plastic	
6	Tube	Aluminum Alloy	Hard Anodized	13	Spring Pin	Steel	
7	Piston Packing	Nitrile Rubber		14	Wear Ring	Polyacetal Resin	Equivalent to ø63 only
8	Piston	Equivalent to ø25 to ø50: Aluminum alloy, polyacetal resin Equivalent to ø63 Aluminum Alloy	Equivalent to ø63 Chromate	With Switch			
				15	Switch		
				16	Mounting bracket	Stainless Steel	
				17	Pan Head Screw	Stainless Steel	

For maintenance parts, please visit the CKD Equipment Product Site (<https://www.ckd.co.jp/kiki/en/>) → "model No." → Maintenance Parts.

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC□

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC□

Cylinder Switch

Ending

Cylinder Switch

Ending



Flat Cylinder Compact Demi Double Acting, Double Rod Type

# FCD-D Series

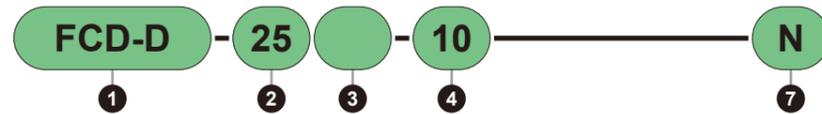
● Tube bore:  $\phi 25$ ,  $\phi 32$ ,  $\phi 40$ ,  $\phi 50$ ,  $\phi 63$

Circuit Diagram Symbol

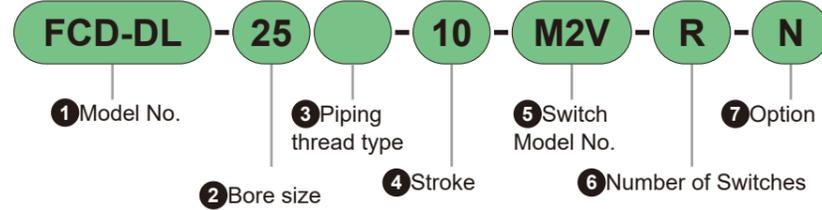


## Model No. Notation Method

Without Switch  
(Without magnet for switch)



With Switch  
(Built-in magnet for switch)



### 1 Model No.

Code	Content
<b>FCD-D</b>	Double Acting/Double Rod Type
<b>FCD-DL</b>	Double-acting, Double rod type, With switch

### 2 Tube Inner Diameter (mm)

Code	Content
<b>25</b>	Equivalent to $\phi 25$
<b>32</b>	Equivalent to $\phi 32$
<b>40</b>	Equivalent to $\phi 40$
<b>50</b>	Equivalent to $\phi 50$
<b>63</b>	Equivalent to $\phi 63$

### 3 Piping thread type

Code	Content
<b>Blank</b>	M5 (Equivalent to $\phi 25$ , $\phi 32$ ) Rc thread (Equivalent to $\phi 40$ to $\phi 63$ )
<b>NN</b>	NPT thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )
<b>GN</b>	G thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )

### 4 Stroke (mm)

Bore size	Stroke	Intermediate Stroke
Equivalent to $\phi 25$ to $\phi 63$	<b>1 to 50</b>	Every 1 mm

\*1: For the minimum stroke with switch, see P. 854.

### 5 Switch Model No.

For switch details, please refer to P. 869.  
Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1 L-shape
			AC	DC	AC	DC	
Solid State	1-Color	2-wire	—	10 to 30	—	5 to 30	<b>M2V</b> □
	2-Color		—	10 to 30	—	5 to 30	<b>M2WV</b> □
	1-Color	3-wire (NPN)	—	30 or less	—	100 or less	<b>M3V</b> □
	2-Color		—	30 or less	—	100 or less	<b>M3WV</b> □
Reed	1 color (customized product)	3-wire (PNP)	—	30 or less	—	100 or less	<b>M3PV</b> □
	1-Color No Indicator LED	2-wire	110	12/24	7 to 20	5 to 50	<b>M0V</b> □
			110	5/12/24	20 or less	50 or less	<b>M5V</b> □

\*1: For "□" in the switch model number, enter the code selected from the "Lead wire length" table.

### \*Lead wire length

Code	Content
<b>Blank</b>	1 m (Standard)
<b>3</b>	3 m (Option)
<b>5</b>	5 m (Option)

Example) Lead wire length  
1 m MOV □  
3 m MOV □**3**  
5 m MOV □**5**

### 6 Number of Switches

Code	Content
<b>R</b>	With 1 pc on rod side
<b>H</b>	With 1 pc on head side
<b>D</b>	With 2 pcs
<b>T</b>	With 3 pcs

### 7 Option

Code	Content
<b>Blank</b>	Rod end female thread
<b>M</b>	Piston Rod Material (Stainless Steel)
<b>N</b>	Rod end male thread
<b>R</b>	With spigot joint

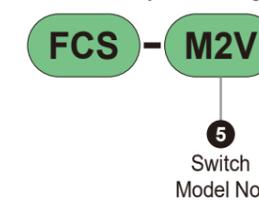
### About Custom Product Specifications

For details, see P. 865.

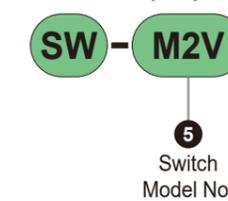
Code	Content
<b>-A2</b>	With 2 Rod Nuts
<b>Rod End Shape Modification</b>	Refer to Ending 11.

### Switch Single Unit Model No. Display Method

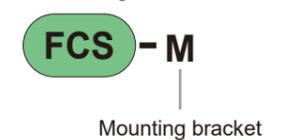
● Switch body + Mounting bracket set



● Switch body only



● Mounting bracket set



Specifications

Item	FCD-D				
	FCD-DL				
Bore size mm	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Actuation method	Double Acting/Double Rod Type				
Operating Fluid	Compressed Air				
Maximum operating pressure MPa	0.7				
Min. Operating Pressure MPa	0.10				
Proof pressure MPa	1.05				
Ambient Temperature °C	-10 to 60 (No freezing)				
Port Size	M5		Rc1/8		Rc1/4
Stroke tolerance mm	+0.5 (to 50) 0				
Operating Piston Speed mm/s	50 to 500				
Cushion	None				
Lubrication	Not required (When lubricating, use turbine oil Class 1 ISO VG32)				
Allowable absorbed energy J	0.015	0.02	0.026	0.04	0.05

Non-rotation accuracy / Allowable rotational torque

Item	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Non-rotation accuracy *2	±1°	±0.8°	±0.5°	±0.5°	±0.5°
Allowable rotational torque N·m	1	1.6	2.5	3.9	5.9

\*1: Avoid use where rotational torque is applied impulsively or where the direction of torque load changes impulsively.

\*2: The "non-rotation accuracy" value is the value when a torque load of 10% of the "allowable rotational torque" is applied to the tip of the piston rod.

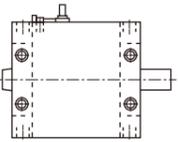
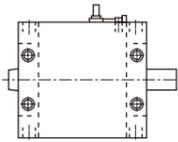
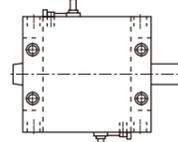
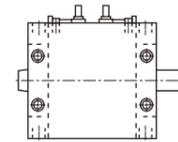
Stroke

Model No.	Bore Size (mm)	Standard Stroke (mm)	Maximum Stroke (mm)	Min. Stroke (mm)
FCD-D	ø25, ø32 ø40, ø50 Equivalent to ø63	5 / 10 / 15 / 20 / 25 30 / 40 / 50	50	1

\*1: Intermediate strokes can be manufactured in 1 mm increments.

\*2: The minimum stroke varies depending on the switch mounting method. Please refer to the table below.

Min. Stroke with Switch

With 1 pc		With 2 pcs	
Rod Side Mounting	Head Side Mounting	For different surface mounting	In case of same surface mounting
			
10 mm		15 mm	35 mm (Equivalent to ø25, 32, 40, 50) 30 mm (Equivalent to ø63)

Cylinder Weight

(Unit: g)

Item	Product Weight when stroke (S) = 0 mm		Switch weight	Weight of mounting bracket	Added Weight per S = 10 mm
	FCD-D				
Bore Size (mm)	Without Switch	With Switch	Refer to the weight stated in the switch specifications on P. 869.		
Equivalent to ø25	145	220			
Equivalent to ø32	215	330			
Equivalent to ø40	330	478			
Equivalent to ø50	545	773			
Equivalent to ø63	1050	1226			

(Example) Product Weight of FCD-D-32-20

- Product Weight at S=0 mm ..... 215 g
- Added weight at S=20 mm .....  $52 \text{ g} \times \frac{20}{10} = 106 \text{ g}$
- Product Weight .....  $215 \text{ g} + 106 \text{ g} = 321 \text{ g}$

Theoretical Thrust Table

(Unit: N)

Bore size (mm)	Operating Direction	Operating Pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
Equivalent to ø25	Push/Pull	37.9	56.9	75.9	$1.14 \times 10^2$	$1.52 \times 10^2$	$1.90 \times 10^2$	$2.28 \times 10^2$	$2.66 \times 10^2$
Equivalent to ø32	Push/Pull	57.5	86.3	$1.15 \times 10^2$	$1.73 \times 10^2$	$2.30 \times 10^2$	$2.88 \times 10^2$	$3.45 \times 10^2$	$4.03 \times 10^2$
Equivalent to ø40	Push/Pull	$1.09 \times 10^2$	$1.63 \times 10^2$	$2.18 \times 10^2$	$3.27 \times 10^2$	$4.36 \times 10^2$	$5.45 \times 10^2$	$6.54 \times 10^2$	$7.63 \times 10^2$
Equivalent to ø50	Push/Pull	$1.62 \times 10^2$	$2.43 \times 10^2$	$3.24 \times 10^2$	$4.85 \times 10^2$	$6.47 \times 10^2$	$8.09 \times 10^2$	$9.71 \times 10^2$	$1.13 \times 10^3$
Equivalent to ø63	Push/Pull	$2.86 \times 10^2$	$4.30 \times 10^2$	$5.73 \times 10^2$	$8.59 \times 10^2$	$1.15 \times 10^3$	$1.43 \times 10^3$	$1.72 \times 10^3$	$2.00 \times 10^3$

Space-Saving Type

Space-Saving Type

SSD2

SSD2

SSG

SSG

SSD

SSD

CAT

CAT

MDC2

MDC2

SMG

SMG

MSD

MSD

FC

FC

Cylinder Switch

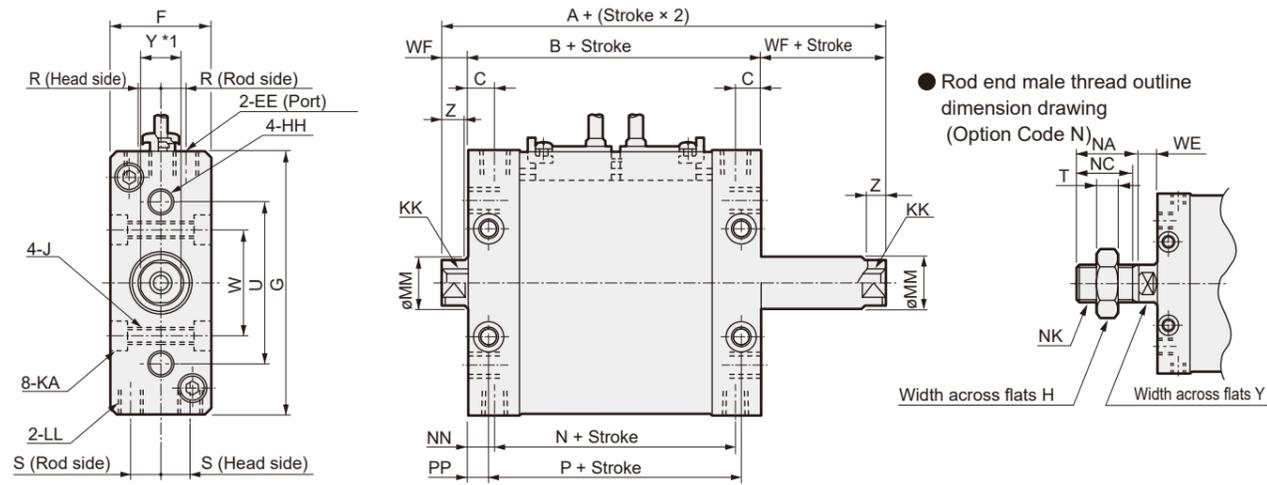
Cylinder Switch

Ending

Ending

Outline Dimension Drawing

- FCD (Double acting double rod type, without switch)
- FCD-DL (Double acting double rod type, with switch)



Code	Dimension without switch				Dimension with switch				Common dimension						
	A	B	N	P	A	B	N	P	C	EE	F	G	HH	J	KA
Equivalent to ø25	42	32	20	24	57	47	35	39	7.5	M5 Depth 4	25	55	M5 depth 7	M5 (Through)	—
Equivalent to ø32	47	33	21	25	62	48	36	40	7.5	M5 Depth 4	28	65	M6 Depth 8	M5 (Through)	—
Equivalent to ø40	57	41	25	29	72	56	40	44	8.5	Rc1/8	32	83	M8 Depth 10	M6 (Through)	9.5 Counterbore Depth 5.4
Equivalent to ø50	65	46	29	27	80	61	44	42	10.5	Rc1/8	39	101	M10 Depth 12	M8 (Through)	11 Counterbore Depth 6.5
Equivalent to ø63	76	57	37	37	91	72	52	52	11.5	Rc1/4	49	125	M12 Depth 15	M12 (Through)	17.5 Counterbore Depth 10.5

Code	Common dimension												
	KK	LL	MM	NN	PP	R	S	U	W	WF	Y	Z	
Equivalent to ø25	M5 Depth 9	M5 depth 7	12	6	4	4.7	7	38	24	5	10	5	
Equivalent to ø32	M6 depth 11	M6 Depth 8	16	6	4	6.2	8	45	30	7	14	7	
Equivalent to ø40	M8 depth 13	M8 Depth 10	16	8	6	7.5	9	52	34	8	14	7	
Equivalent to ø50	M8 depth 13	M10 Depth 12	20	8.5	9.5	9	10	62	40	9.5	17	8	
Equivalent to ø63	M10 depth 15	M12 Depth 18	20	10	10	10.5	14	86	54	9.5	17	8	

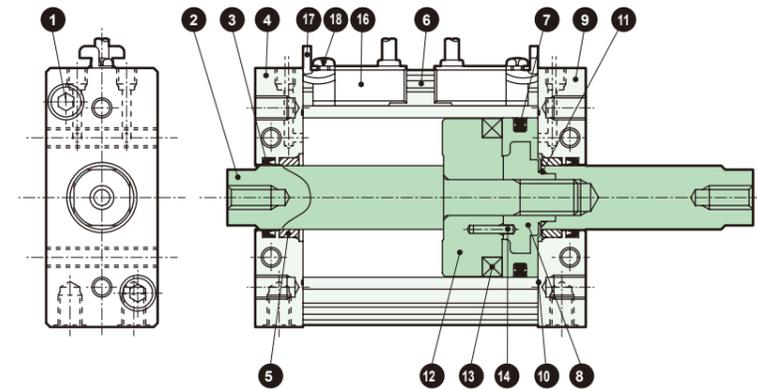
\*1: The width across flats of the Y portion is not fixed.  
\*2: For dimensions of models with switches, see P. 864.

● Rod end male thread dimension table

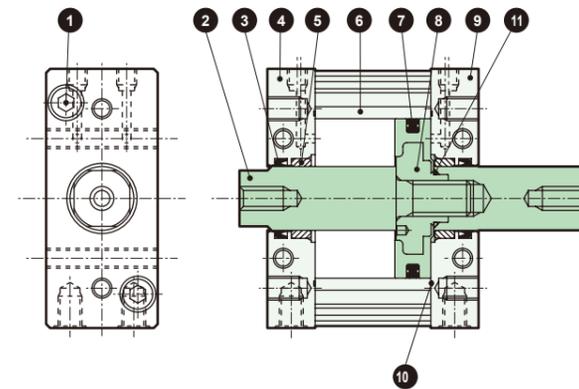
Code	H	NA	NC	NK	T	WE
Equivalent to ø25	17	22	20	M10 × 1.25	6	5
Equivalent to ø32	22	22	20	M14 × 1.5	8	7
Equivalent to ø40	22	22	20	M14 × 1.5	8	7
Equivalent to ø50	27	28	26	M18 × 1.5	11	8
Equivalent to ø63	27	28	26	M18 × 1.5	11	8

Internal Structure Diagram/Material

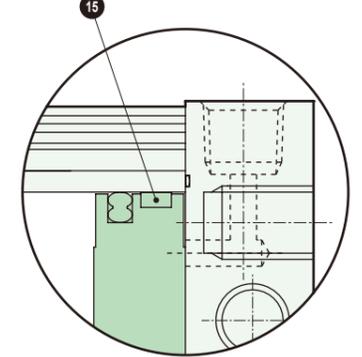
- FCD-DL (with switch)



- FCD-D



Equivalent to ø63



Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Steel	Zinc Chromate	10	Cover gasket	Nitrile Rubber	
2	Piston Rod	Steel	Industrial Hard Chrome Plating	11	Piston Gasket	Nitrile Rubber	
3	Rod Packing	Nitrile Rubber		12	Spacer	Equivalent to ø25 to ø50: Aluminum Alloy Equivalent to ø63 Polyamide	Equivalent to ø25 to ø50: Chromate
4	Rod Cover	Aluminum Alloy	Black anodized	13	Magnet	Plastic	
5	Bushing	Oil-Impregnated Bearing Alloy		14	Spring Pin	Steel	
6	Tube	Aluminum Alloy	Hard Anodized	15	Wear Ring	Polyacetal Resin	Equivalent to ø63 only
7	Piston Packing	Nitrile Rubber		With Switch			
8	Piston	Equivalent to ø25 to ø63: Aluminum alloy, polyacetal resin Equivalent to ø63 Aluminum Alloy	Equivalent to ø63 Chromate	16	Switch		
				17	Mounting bracket	Stainless Steel	
				18	Pan Head Screw	Stainless Steel	
9	Head Cover	Aluminum Alloy	Black anodized				

For maintenance parts, please visit the CKD Equipment Product Site (<https://www.ckd.co.jp/kiki/en/>) → "model No." → Maintenance Parts .



Flat Cylinder Compact Demi Double Acting, With Cushion

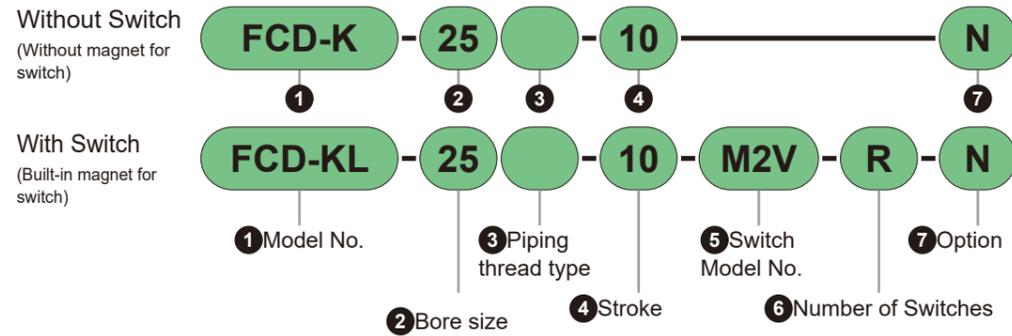
# FCD-K Series

● Tube bore:  $\phi 25$ ,  $\phi 32$ ,  $\phi 40$ ,  $\phi 50$ ,  $\phi 63$

Circuit Diagram Symbol



## Model No. Notation Method



### 1 Model No.

Code	Content
<b>FCD-K</b>	Double acting type, With cushion
<b>FCD-KL</b>	Double acting type, With cushion, With switch

### 2 Tube Inner Diameter (mm)

Code	Content
<b>25</b>	Equivalent to $\phi 25$
<b>32</b>	Equivalent to $\phi 32$
<b>40</b>	Equivalent to $\phi 40$
<b>50</b>	Equivalent to $\phi 50$
<b>63</b>	Equivalent to $\phi 63$

### 3 Piping thread type

Code	Content
<b>Blank</b>	Rc Thread
<b>NN</b>	NPT thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )
<b>GN</b>	G thread (custom order) (Equivalent to $\phi 40$ to $\phi 63$ )

### 4 Stroke (mm)

Bore size	Stroke	Intermediate Stroke
Equivalent to $\phi 25$ to $\phi 63$	<b>1 to 150</b>	Every 1 mm

\*1: For the minimum stroke with switch, see P. 860.

### 5 Switch Model No.

For switch details, please refer to P. 869.  
Switches are included to the product and shipped.

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead Wire *1 L-shape
			AC	DC	AC	DC	
Solid State	1-Color	2-wire	—	10 to 30	—	5 to 30	<b>M2V</b> □
	2-Color		—	10 to 30	—	5 to 30	<b>M2WV</b> □
	1-Color	3-wire (NPN)	—	30 or less	—	100 or less	<b>M3V</b> □
	2-Color		—	30 or less	—	100 or less	<b>M3WV</b> □
Reed	1 color (customized product)	3-wire (PNP)	—	30 or less	—	100 or less	<b>M3PV</b> □
	1-Color No Indicator LED	2-wire	110	12/24	7 to 20	5 to 50	<b>M0V</b> □
110	5/12/24		20 or less	50 or less	<b>M5V</b> □		

\*1: For "□" in the switch model number, enter the code selected from the "Lead wire length" table.

### \*Lead wire length

Code	Content
<b>Blank</b>	1 m (Standard)
<b>3</b>	3 m (Option)
<b>5</b>	5 m (Option)

Example) Lead wire length  
1 m MOV □  
3 m MOV **3**  
5 m MOV **5**

### 6 Number of Switches

Code	Content
<b>R</b>	With 1 pc on rod side
<b>H</b>	With 1 pc on head side
<b>D</b>	With 2 pcs
<b>T</b>	With 3 pcs

### 7 Option

Code	Content
<b>Blank</b>	Rod end female thread
<b>M</b>	Piston Rod Material (Stainless Steel)
<b>N</b>	Rod end male thread
<b>R</b>	With spigot joint

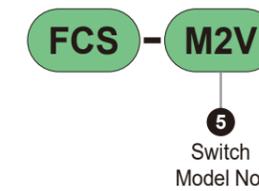
### About Custom Product Specifications

For details, see P. 865.

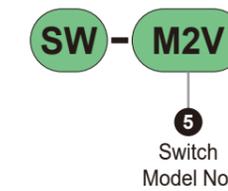
Code	Content
<b>-A2</b>	With 2 Rod Nuts
<b>Rod End Shape Modification</b>	Refer to Ending 11.

### Switch Single Unit Model No. Display Method

● Switch body + Mounting bracket set



● Switch body only



● Mounting bracket set



Specifications

Item	FCD-K FCD-KL				
	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Bore size mm					
Actuation method	Double acting, With cushion				
Operating Fluid	Compressed Air				
Maximum operating pressure MPa	0.7				
Min. Operating Pressure MPa	0.07				
Proof pressure MPa	1.05				
Ambient Temperature °C	-10 to 60 (No freezing)				
Port Size	M5		Rc1/8		Rc1/4
Stroke tolerance mm	+1.5 (to 50), +2.0 (to 150) 0 0				
Operating Piston Speed mm/s	50 to 500				
Cushion	Rubber Cushion				
Lubrication	Not required (When lubricating, use turbine oil Class 1 ISO VG32)				
Allowable absorbed energy J	0.34	0.54	0.67	1.02	1.56

Non-rotation accuracy / Allowable rotational torque

Item	Equivalent to ø25	Equivalent to ø32	Equivalent to ø40	Equivalent to ø50	Equivalent to ø63
Non-rotation accuracy *2	±1°	±0.8°	±0.5°	±0.5°	±0.5°
Allowable rotational torque N·m	1	1.6	2.5	3.9	5.9

\*1: Avoid use where rotational torque is applied impulsively or where the direction of torque load changes impulsively.

\*2: The "non-rotation accuracy" value is the value when a torque load of 10% of the "allowable rotational torque" is applied to the tip of the piston rod.

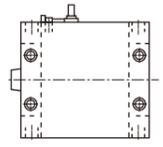
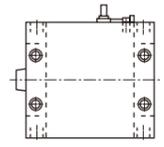
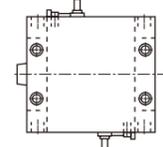
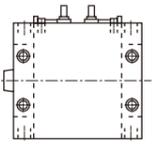
Stroke

Model No.	Bore Size (mm)	Standard Stroke (mm)	Maximum Stroke (mm)	Min. Stroke (mm)
FCD-K	ø25, ø32 ø40, ø50 Equivalent to ø63	5 / 10 / 15 / 20 / 25 30 / 40 / 50	150	1

\*1: Intermediate strokes can be manufactured in 1 mm increments.

\*2: The minimum stroke varies depending on the switch mounting method. Please refer to the table below.

Min. Stroke with Switch

With 1 pc		With 2 pcs	
Rod Side Mounting	Head Side Mounting	For different surface mounting	In case of same surface mounting
			
10 mm		15 mm	35 mm (Equivalent to ø25, 32, 40, 50) 30 mm (Equivalent to ø63)

Cylinder Weight

(Unit: g)

Item	Product Weight when stroke (S) = 0 mm		Switch weight	Weight of mounting bracket	Added Weight per S = 10 mm
	FCD-K				
Bore Size (mm)	Without Switch	With Switch			
Equivalent to ø25	155	221	Refer to the weight stated in the switch specifications on P. 869.	2	26
Equivalent to ø32	225	316			37
Equivalent to ø40	355	481			46
Equivalent to ø50	550	741			71
Equivalent to ø63	1135	1196			90

(Example) Product Weight of FCD-K-32-20

- Product Weight at S=0 mm ..... 225 g
- Added weight at S=20 mm .....  $37 \text{ g} \times \frac{20}{10} = 74 \text{ g}$
- Product Weight .....  $225 \text{ g} + 74 \text{ g} = 299 \text{ g}$

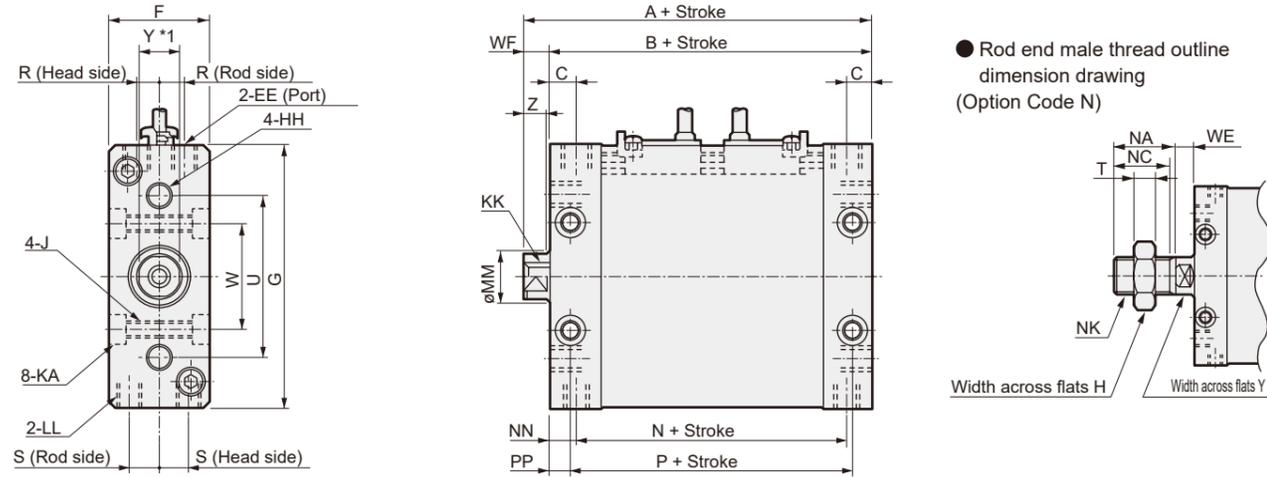
Theoretical Thrust Table

(Unit: N)

Bore size (mm)	Operating Direction	Operating Pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
Equivalent to ø25	Push	49.3	73.9	98.5	$1.48 \times 10^2$	$1.97 \times 10^2$	$2.46 \times 10^2$	$2.96 \times 10^2$	$3.45 \times 10^2$
	Pull	37.9	56.9	75.9	$1.14 \times 10^2$	$1.52 \times 10^2$	$1.90 \times 10^2$	$2.28 \times 10^2$	$2.66 \times 10^2$
Equivalent to ø32	Push	77.6	$1.16 \times 10^2$	$1.55 \times 10^2$	$2.33 \times 10^2$	$3.10 \times 10^2$	$3.88 \times 10^2$	$4.66 \times 10^2$	$5.43 \times 10^2$
	Pull	57.5	86.3	$1.15 \times 10^2$	$1.73 \times 10^2$	$2.30 \times 10^2$	$2.88 \times 10^2$	$3.45 \times 10^2$	$4.03 \times 10^2$
Equivalent to ø40	Push	$1.29 \times 10^2$	$1.94 \times 10^2$	$2.58 \times 10^2$	$3.87 \times 10^2$	$5.16 \times 10^2$	$6.45 \times 10^2$	$7.75 \times 10^2$	$9.04 \times 10^2$
	Pull	$1.09 \times 10^2$	$1.63 \times 10^2$	$2.18 \times 10^2$	$3.27 \times 10^2$	$4.36 \times 10^2$	$5.45 \times 10^2$	$6.54 \times 10^2$	$7.63 \times 10^2$
Equivalent to ø50	Push	$1.93 \times 10^2$	$2.90 \times 10^2$	$3.86 \times 10^2$	$5.80 \times 10^2$	$7.73 \times 10^2$	$9.66 \times 10^2$	$1.16 \times 10^3$	$1.35 \times 10^3$
	Pull	$1.62 \times 10^2$	$2.43 \times 10^2$	$3.24 \times 10^2$	$4.85 \times 10^2$	$6.47 \times 10^2$	$8.09 \times 10^2$	$9.71 \times 10^2$	$1.13 \times 10^3$
Equivalent to ø63	Push	$3.18 \times 10^2$	$4.77 \times 10^2$	$6.36 \times 10^2$	$9.53 \times 10^2$	$1.27 \times 10^3$	$1.59 \times 10^3$	$1.91 \times 10^3$	$2.22 \times 10^3$
	Pull	$2.86 \times 10^2$	$4.30 \times 10^2$	$5.73 \times 10^2$	$8.59 \times 10^2$	$1.15 \times 10^3$	$1.43 \times 10^3$	$1.72 \times 10^3$	$2.00 \times 10^3$

Outline Dimension Drawing

- FCD-K (Double acting type with cushion, without switch)
- FCD-KL (Double acting type with cushion, with switch)



Code	Dimension without switch				Dimension with switch				Common dimension						
	A	B	N	P	A	B	N	P	C	EE	F	G	HH	J	KA
Equivalent to ø25	47	42	30	34	62	57	45	49	7.5	M5 Depth 4	25	55	M5 depth 7	M5 (Through)	—
Equivalent to ø32	50	43	31	35	65	58	46	50	7.5	M5 Depth 4	28	65	M6 Depth 8	M5 (Through)	—
Equivalent to ø40	59	51	35	39	74	66	50	54	8.5	Rc1/8	32	83	M8 Depth 10	M6 (Through)	9.5 Counterbore Depth 5.4
Equivalent to ø50	65.5	56	39	37	80.5	71	54	52	10.5	Rc1/8	39	101	M10 Depth 12	M8 (Through)	11 Counterbore Depth 6.5
Equivalent to ø63	76.5	67	47	47	91.5	82	62	62	11.5	Rc1/4	49	125	M12 Depth 15	M12 (Through)	17.5 Counterbore Depth 10.5

Code	Common dimension												
	KK	LL	MM	NN	PP	R	S	U	W	WF	Y	Z	
Equivalent to ø25	M5 Depth 9	M5 depth 7	12	6	4	4.7	7	38	24	5	10	5	
Equivalent to ø32	M6 depth 11	M6 Depth 8	16	6	4	6.2	8	45	30	7	14	7	
Equivalent to ø40	M8 depth 13	M8 Depth 10	16	8	6	7.5	9	52	34	8	14	7	
Equivalent to ø50	M8 depth 13	M10 Depth 12	20	8.5	9.5	9	10	62	40	9.5	17	8	
Equivalent to ø63	M10 depth 15	M12 Depth 18	20	10	10	10.5	14	86	54	9.5	17	8	

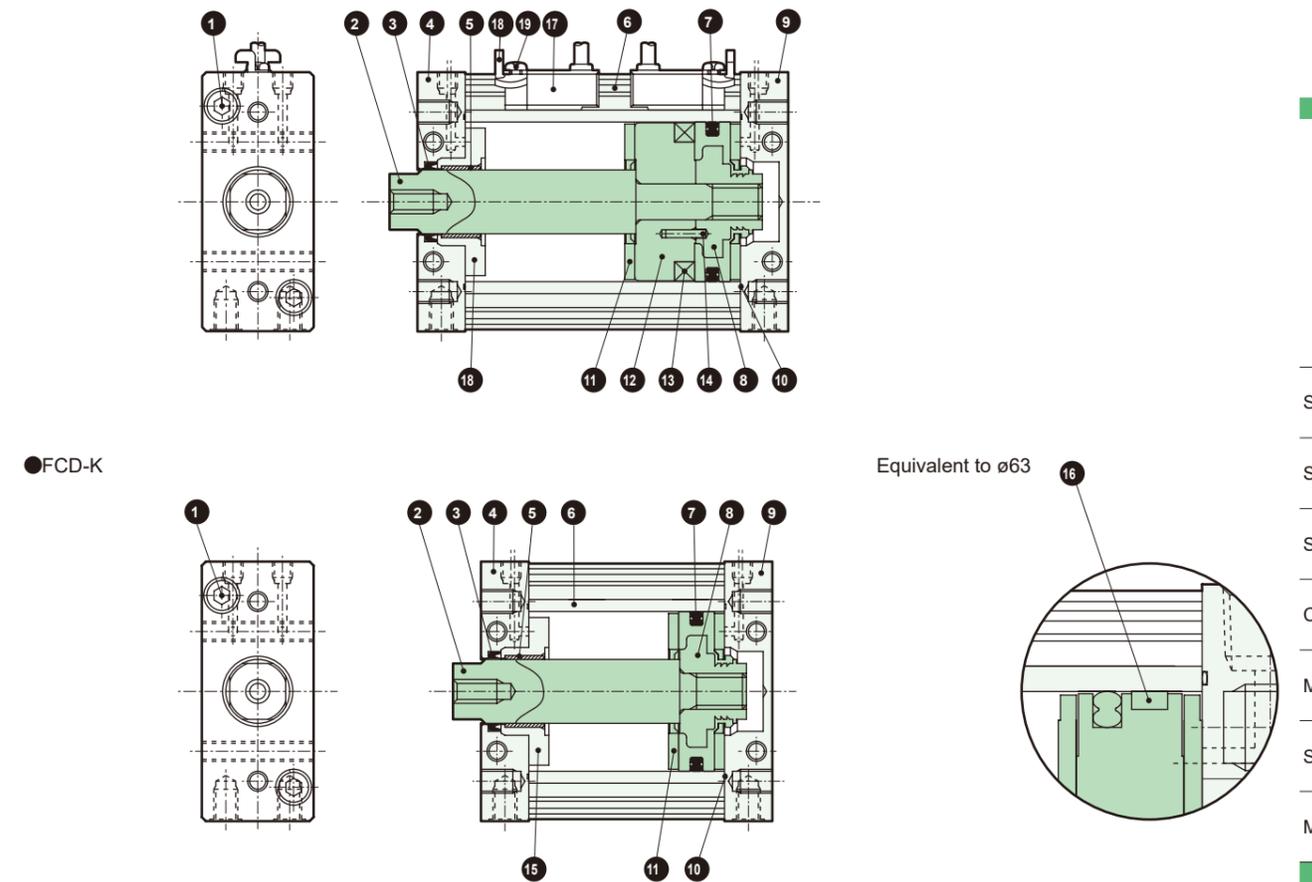
\*1: The width across flats of the Y portion is not fixed.  
\*2: For dimensions of models with switches, see P. 864.

● Rod end male thread dimension table

Code	H	NA	NC	NK	T	WE
Equivalent to ø25	17	22	20	M10 × 1.25	6	5
Equivalent to ø32	22	22	20	M14 × 1.5	8	7
Equivalent to ø40	22	22	20	M14 × 1.5	8	7
Equivalent to ø50	27	28	26	M18 × 1.5	11	8
Equivalent to ø63	27	28	26	M18 × 1.5	11	8

Internal Structure Diagram/Material

- FCD-KL (with switch)

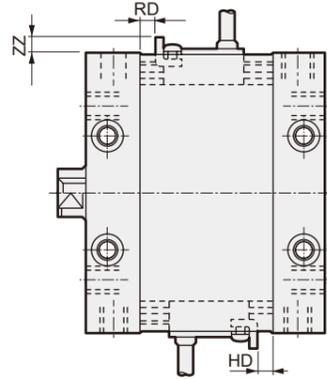


Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Steel	Zinc Chromate	10	Cover gasket	Nitrile Rubber	
2	Piston Rod	Steel	Industrial Hard Chrome Plating	11	Cushion Rubber	Urethane Rubber	
3	Rod Packing	Nitrile Rubber		12	Spacer	Equivalent to ø25 to ø50: Aluminum Alloy Equivalent to ø63 Polyamide	Equivalent to ø25 to ø50: Chromate
4	Rod Cover	Aluminum Alloy	Black anodized	13	Magnet	Plastic	
5	Bushing	Oil-Impregnated Bearing Alloy		14	Spring Pin	Steel	
6	Tube	Aluminum Alloy	Hard Anodized	15	Bushing spacer	Aluminum Alloy	Equivalent to ø63 Chromate
7	Piston Packing	Nitrile Rubber		16	Wear Ring	Polyacetal Resin	Equivalent to ø63 only
8	Piston	Equivalent to ø25 to ø50: Aluminum Alloy, Polyacetal Resin Equivalent to ø63 Aluminum Alloy	Equivalent to ø63 Chromate	With Switch			
				17	Switch		
9	Head Cover	Aluminum Alloy	Black anodized	18	Mounting bracket	Stainless Steel	
				19	Pan Head Screw	Stainless Steel	

For maintenance parts, please visit the CKD Equipment Product Site (<https://www.ckd.co.jp/kiki/en/>) → "model No." → Maintenance Parts.

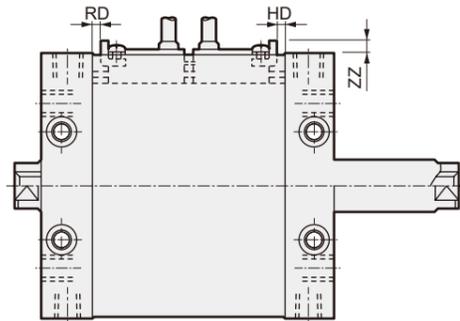
FC Series Outline Dimension Drawing with Switch

- FCS-L/FCH-L/FCD-L/FCD-KL
- M2V, M3V, M2WV, M3WV, M3PV, M0V, M5V



Code	ZZ	FCS-L		FCH-L FCD-L		FCD-KL	
Bore Size (mm)		RD	HD	RD	HD	RD	HD
Equivalent to ø25	5.5 or less	3.5	0	0	0	6	1
Equivalent to ø32	5.5 or less	4.5	0	0	0	7	1
Equivalent to ø40	5.5 or less	4.5	0	0	0	7	2
Equivalent to ø50	5.5 or less	4.5	0.5	0	0.5	7	3
Equivalent to ø63	5.5 or less	4.5	4.5	0	4.5	7	7

- FCD-DL
- M2V, M3V, M2WV, M3WV, M3PV, M0V, M5V



Code	ZZ	FCD-DL	
Bore Size (mm)		RD	HD
Equivalent to ø25	5.5 or less	0	0
Equivalent to ø32	5.5 or less	0	0
Equivalent to ø40	5.5 or less	0	0
Equivalent to ø50	5.5 or less	0	4.5
Equivalent to ø63	5.5 or less	0	4.5

With 2 rod nuts (-A2)

Content: Shipped with 2 rod nuts, same as standard.

Model No. Notation Method

**FCD - 25 - 10 - NA2**

Model No.

See the FC Series Model Number Notation Method.

Note: Since the piston rod tip shape is standard female thread, be sure to include the "N" code.

Outer Dimensions Diagram

Except for the two rod nuts, it is the same as the rod end male thread type (-N).

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC

Cylinder Switch

Ending

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC

Cylinder Switch

Ending



# To Use This Product Safely

Be sure to read this before use.

For general cylinder information, see Intro 41, and for cylinder switches, see P. 924.

MEMO

Individual Precautions: Flat compact cylinder FC□ Series

## During Design/Selection

### 1. Common

#### ⚠ Caution

■ Avoid using the piston rod in a way that applies rotational torque. If unavoidable, use within the allowable rotational torque range.

Item	Model No.	ø25	ø32	ø40	ø50	ø63
		Equivalent	Equivalent	Equivalent	Equivalent	Equivalent
Allowable rotational torque (N·m)		1	1.6	2.5	3.9	5.9

● Do not use in a way that rotational torque is applied impulsively or the direction of torque load changes instantaneously.

### 2. Single acting type FCS/FCH

#### ⚠ Caution

■ Do not leave pressurized. If left pressurized, the piston rod may not return by spring force when the pressure is released.

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC□

Space-Saving Type

SSD2

SSG

SSD

CAT

MDC2

SMG

MSD

FC□

Cylinder Switch

Ending

For precautions regarding mounting, installation, adjustment, use, and maintenance, please see "Precautions for Use" in this catalog and the CKD Components Product website (<https://www.ckd.co.jp/kiki/en/>) -> "Model No." -> [Instruction Manual](#).

Cylinder Switch

Ending