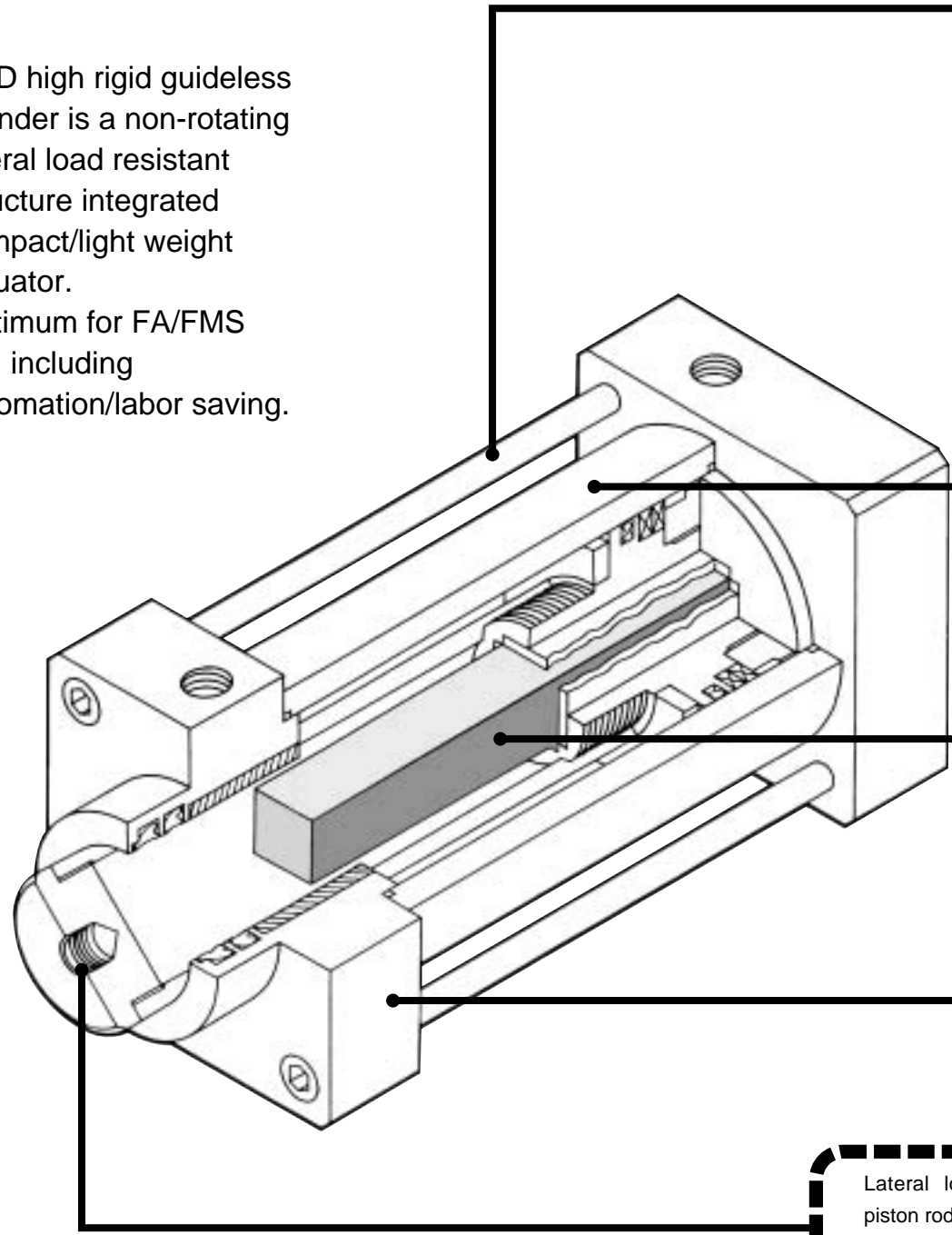


SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

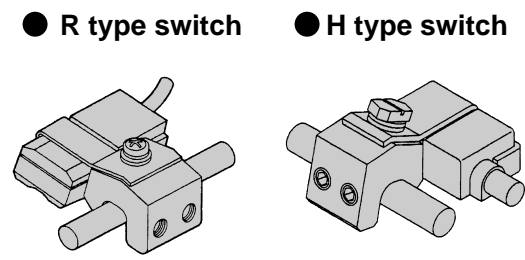
Withstanding to lateral load.

Guide not required high performance cylinder with non-rotating/lateral load resistant structure. ($\phi 40$, $\phi 50$, $\phi 63$, $\phi 80$, $\phi 100$)

CKD high rigid guideless cylinder is a non-rotating lateral load resistant structure integrated compact/light weight actuator. Optimum for FA/FMS etc. including automation/labor saving.



R and H type switch can be installed. It is easy position confirmation.



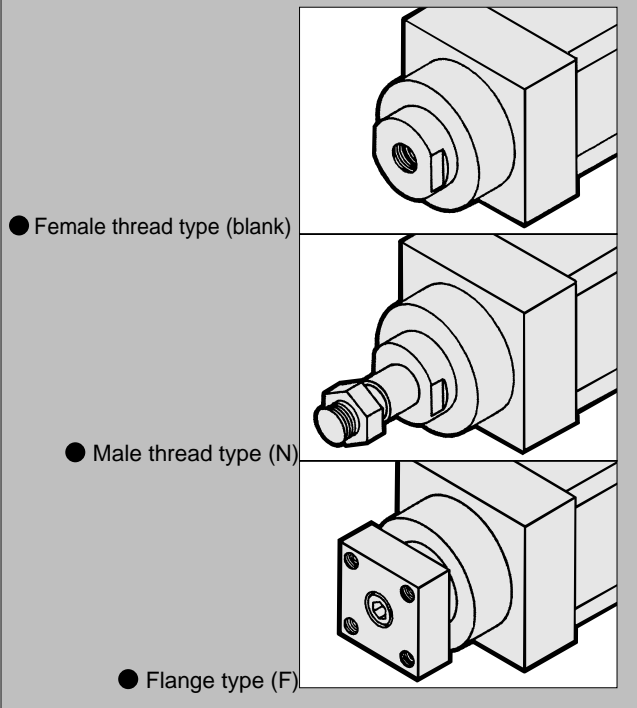
Aluminum tube provided. Light weight is realized.

Non-rotating structure, including square shaped non-rotating shaft and wide non-rotating plate (bearing), is integrated. This realizes compact devices.

Aluminum material used for cover/piston. Light weight is realized.

Lateral load resistant fat piston rod used.

● Rod end form can be selected. Rod end form can be chosen from female thread type (blank), male thread type (N), and flange type (F) according to applications.



- Female thread type (blank)
- Male thread type (N)
- Flange type (F)

High lateral load intensity

Large diameter piston rod is used. This enables withstanding a large lateral load.

Detecting switch available

2 types of proximity switch R type, strong magnetic field proof switch H type can be installed. Piston position confirmation is easy.

Compact design

Non-rotating structure integrated. A compact body is achieved.

Light in weight

Aluminum material is used except strength part. Light weight is achieved.

⚠ Read the safety precautions before starting use.

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

High rigid guideless cylinder
Special type

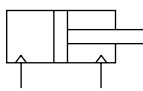
Series variation

High rigid guideless cylinder GLC Series

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

- SCP*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD*
- FC*
- STK
- ULK*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC**
- Ending

- SCP*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD*
- FC*
- STK
- ULK*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC**
- Ending

Variation	Model no.	Bore size (mm)	Standard stroke length (mm)					Stroke length (mm)			Min. stroke length (mm)	Max. stroke length (mm)	Custom stroke length (per mm)	Mounting style				Rod end form			Piping port position				Switch	Page	
			100	200	300	400	500	600	700	800				Basic type	Axial foot type	Rod end flange type	Head end flange type	Female thread type	Male thread type	Flange type	Top from rod end	Right from rod end	Left from rod end	Bottom from rod end			
			●	●	●	●	●	■	■	■				00	LB	FA	FB	Blank	N	F	Blank	R	T	S			
Double acting 	GLC	φ40, φ50, φ63	●	●	●	●	●	■	■	■	5	500	5	●	●	●	●	●	◎	◎	●	◎	◎	◎	◎	2374	
		φ80	●	●	●	●	●	●	●	■		●		●	●	●	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎
		φ100	●	●	●	●	●	●	●	●		●		800	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		◎



Pneumatic components

Safety precautions

Always read this section before starting use.

Refer to Intro 71 for general precautions of the cylinder, and to Intro 78 for general precautions of the cylinder switch.

High rigid guideless cylinder GLC Series

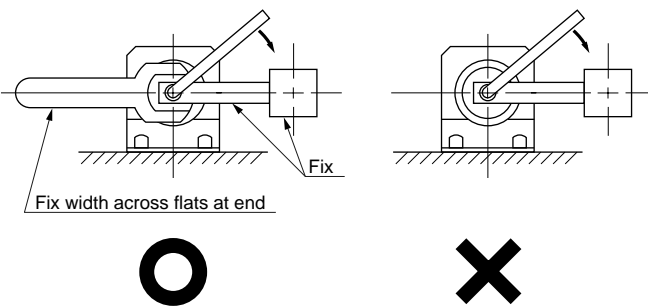
Installation & Adjustment

⚠ WARNING

■ Cushion is provided with a rubber cushion. Use this cushion within allowable energy absorption. The product may be damaged if allowable values are exceeded.

■ Assembling the piston rod end

When installing a jig, etc., on the end of the piston rod (female thread, male thread, flange), do not apply a torque 5 times or higher than the allowable torque to the cylinder or piston rod. Failure to observe this may damage the baffle mechanism. When coupling, fix width across flats at the rod end and the end flange.



- SCP*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD*
- FC*
- STK
- ULK*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC
- Ending

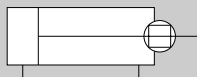


High rigid guideless cylinder (double acting)

GLC Series

● Bore size: ϕ 40, ϕ 50, ϕ 63, ϕ 80, ϕ 100

JIS symbol



Specifications

Descriptions	GLC				
Bore size mm	ϕ 40	ϕ 50	ϕ 63	ϕ 80	ϕ 100
Actuation	Double acting				
Working fluid	Compressed air				
Max. working pressure MPa	1.0				
Min. working pressure MPa	0.15				
Withstanding pressure MPa	1.6				
Ambient temperature $^{\circ}\text{C}$	-10 to 60 (no freezing)				
Port size Rc	1/8	1/4		3/8	
Stroke tolerance mm	$^{+0.5}_0$ (300 mm stroke or less), $^{+1.0}_0$ (more than 300 mm stroke)				
Working piston speed mm/s	50 to 500 (Use within the allowable energy absorption.)				
Cushion	Rubber cushion				
Lubrication	Not required (use turbine oil Class 1 ISO VG32 when are lubricated.)				
Allowable energy absorption J	0.73	1.01	2.42	4.63	9.94

Stroke length

Bore size (mm)	Standard stroke length (mm)	Max. stroke length (mm)	Min. stroke length (mm)
ϕ 40	100, 200, 300, 400, 500	500	5
ϕ 50			
ϕ 63			
ϕ 80	100, 200, 300, 400, 500, 600, 700	700	5
ϕ 100	100, 200, 300, 400, 500, 600, 700, 800	800	

Note 1: Custom stroke length is available per 5mm increment.

Note 2: For types with switch, minimum stroke length varies depending on installation method. Refer to the below table.

Min. stroke length of type with switch

Rough sketch	When installed on the same plane		When installed on different planes	
	R type switch	H type switch	R type switch	H type switch
	ϕ 40	34	20	25
	ϕ 50	34		
	ϕ 63	20		
	ϕ 80			
	ϕ 100			

Switch specifications

● R type switch

Descriptions	Proximity 2 wire		Proximity 3 wire
	R1	R2	R3
Applications	Programmable controller, relay, small solenoid valve	Programmable controller	Programmable controller, relay, small solenoid valve
Output method	-		NPN output
Power voltage	-		4.5 to 28 VDC
Load voltage	85 to 265 VAC	10 to 30 VDC	30 VDC or less
Load current	5 to 100mA	5 to 30mA	200mA or less
Light	LED (ON lighting)		
Leakage current	1mA or less with 100 VAC 2mA or less with 200 VAC	1mA or less	10 μA or less

Descriptions	Reed 2 wire								
	R0			R4		R5			R6
Applications	Relay, programmable controller			High capacity relay, solenoid valve		Programmable controller, relay, IC circuit (w/o light), serial connection			Programmable controller (with DC self hold)
Load voltage	12/24 VDC	110 VAC	220 VAC	110 VAC	220 VAC	5/12/24 VDC	110 VAC	220 VAC	24 VDC
Load current	5 to 50mA	7 to 20mA	7 to 10mA	20 to 200mA	10 to 200mA	50mA or less	20mA or less	10mA or less	5 to 50mA
Light	LED (ON lighting)			Neon light (OFF lighting)		None			LED (ON lighting)
Leakage current	0mA			1mA or less		0mA			0.1mA or less

● H type switch

Descriptions	Reed 2 wire	
	H0	
Applications	Relay, programmable controller	
Load voltage	12/24 VDC	110 VAC
Load current	5 to 50mA	7 to 20mA
Light	Green LED (ON lighting)	
Leakage current	10 μA or less	

Note 1: Refer to Ending 1 for other switch specifications.

Cylinder weight

Bore size (mm)	Product weight when stroke length (S) 0mm			Weight per switch			Additional weight per S = 50mm	N type additional weight	F type additional weight
	Basic type (00)	Axial foot type (LB)	Flange type (FA/FB)	R type		H type			
				Grommet	Terminal box				
φ40	1.15	1.3	1.4	0.08	0.07	0.11	0.3	0.07	0.17
φ50	1.68	1.8	2.24				0.48	0.09	0.3
φ63	2.4	2.7	3.0				0.6	0.13	0.35
φ80	4.4	4.8	5.5	0.09	0.08	0.12	0.97	0.24	1.0
φ100	6.93	7.8	9.0				1.02	0.46	1.4

Product weight formula

(E.g.) Product weight of GLC-00-40-200-R0-D-R

● Product weight when S = 0mm: 1.15Kg

● Additional weight when S = 200mm: $0.3 \times \frac{200}{50} = 1.2\text{Kg}$

● Additional weight of two switches: $0.08 \times 2 = 0.16\text{Kg}$

● Product weight: $1.15\text{Kg} + 1.2\text{Kg} + 0.16\text{Kg} = 2.51\text{Kg}$

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
MLR2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

High rigid guideless cylinder
Special type

How to order

● Without switch
GLC - **LB** - **40** - **100** - **N** **R**

● With R type switch
GLC - **LB** - **40** - **100** - **R0** - **R** - **N** **R**

● With H type (strong magnetic field type) switch
GLC-L2 - **LB** - **40** - **100** - **H0** - **R** - **N** **R**

A Mounting style

B Bore size

C Stroke length

D Switch model no.

* indicates lead wire length.

E Switch quantity

F Rod end form

G Piping port position

Symbol	Descriptions
A Mounting style	
00	Basic type
LB	Axial foot type
FA	Rod end flange type
FB	Head end flange type

B Bore size (mm)	
40	φ 40
50	φ 50
63	φ 63
80	φ 80
100	φ 100

C Stroke length (mm)		
Bore size	Stroke length	Custom stroke length
φ 40	5 to 500	Per 5mm
φ 50	5 to 500	
φ 63	5 to 500	
φ 80	5 to 700	
φ 100	5 to 800	

D Switch model no.					
Grommet type	Terminal box type		Contact	Indicator	Lead wire
	Standard type	Splash-proof			
R1*	R1B	R1A	Proximity	1 color indicator type	2-wire
R2*	R2B	R2A			
R3*	R3B	R3A			3-wire
R0*	R0B	R0A	Reed	1 color indicator type	2-wire
R4*	R4B	R4A			
R5*	R5B	R5A		Without indicator light	
R6*	R6B	R6A		1 color indicator type	
H0*	-	-		Strong magnetic field proof	2-wire

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

E Switch quantity	
R	1 on rod end
H	1 on head end
D	2
T	3
4	4 (When more than 4 pieces, indicate switch quantity.)
5	5

F Rod end form	
Blank	Female thread type
N	Male thread type
F	Flange type

G Piping port position	
Blank	Top from rod end
R	Right from rod end
T	Left from rod end
S	Bottom from rod end

<Example of model number>

GLC-LB-40-100-R0-R-N-R

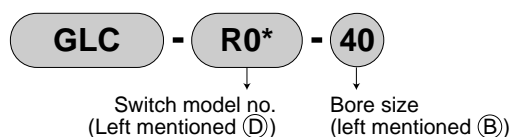
Model no.: High rigid guideless cylinder double acting

- A** Mounting style : Axial foot type
- B** Bore size : φ 40mm
- C** Stroke length : 100mm
- D** Switch model no. : Proximity R0 switch, lead wire 1m
- E** With switch quantity : One on rod end
- F** Rod end form : Male thread type
- G** Piping port position : Right from rod end

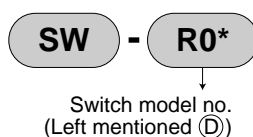
- SCP*2
- CMK2
- CMA2
- SCM
- SCG
- SCA2
- SCS
- CKV2
- CA/OV2
- SSD
- CAT
- MDC2
- MVC
- SMD2
- MSD*
- FC*
- STK
- ULK*
- JSK/M2
- JSG
- JSC3
- USSD
- USC
- JSB3
- LMB
- STG
- STS/L
- LCS
- LCG
- LCM
- LCT
- LCY
- STR2
- UCA2
- HCM
- HCA
- SRL2
- SRG
- SRM
- SRT
- MRL2
- MRG2
- SM-25
- CAC3
- UCAC
- RCC2
- MFC
- SHC
- GLC**
- Ending

How to order R type switch

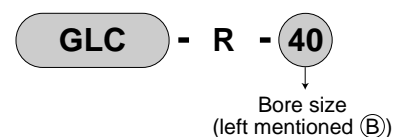
A) Switch body + bracket



B) Only switch body

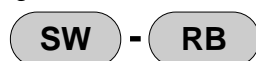


C) Mounting bracket



D) Only terminal box

● R * B

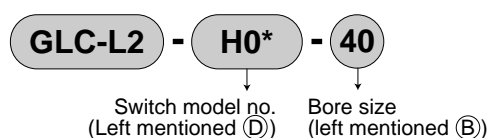


● R * A

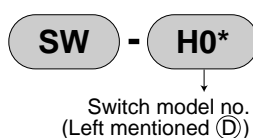


How to order H type switch

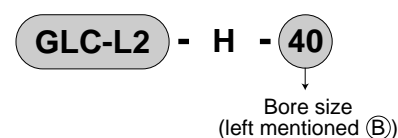
A) Switch body + mounting bracket



B) Only switch body



C) Mounting bracket



How to order mounting bracket

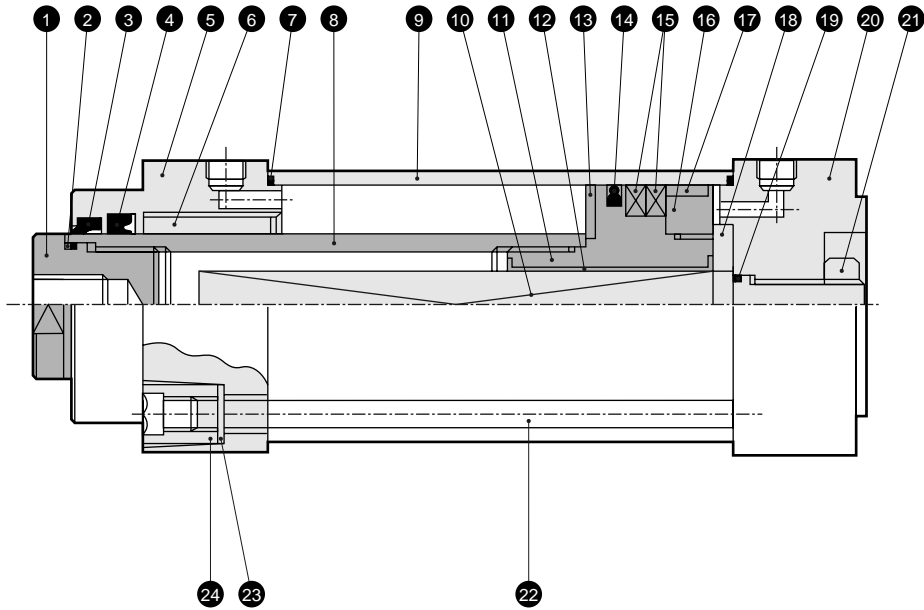
Bore size (mm)	φ 40	φ 50	φ 63	φ 80	φ 100
Mounting bracket					
Foot (LB)	GLC-40-LB	GLC-50-LB	GLC-63-LB	GLC-80-LB	GLC-100-LB
Flange (FA/FB)	GLC-40-FA	GLC-50-FA	GLC-63-FA	GLC-80-FA	GLC-100-FA

Note 1: The foot type mounting bracket is supplied as a two-piece set.

SCP*2
CMK2
CMA2
SCM
SCG
SCA2
SCS
CKV2
CA/OV2
SSD
CAT
MDC2
MVC
SMD2
MSD*
FC*
STK
ULK*
JSK/M2
JSG
JSC3
USSD
USC
JSB3
LMB
STG
STS/L
LCS
LCG
LCM
LCT
LCY
STR2
UCA2
HCM
HCA
SRL2
SRG
SRM
SRT
MRL2
MRG2
SM-25
CAC3
UCAC
RCC2
MFC
SHC
GLC
Ending

High rigid guideless cylinder
Special type

Internal structure and parts list



No.	Parts name	Material	Remarks	No.	Parts name	Material	Remarks
1	Cap	Steel	Phosphoric acid mangan	13	Cushion rubber	Urethane rubber	
2	Gasket	Nitrile rubber		14	Piston packing seal	Nitrile rubber	
3	Dust wiper	Nitrile rubber		15	Magnet	Plastic	
4	Rod packing seal	Nitrile rubber		16	Piston (B)	Aluminum alloy	
5	Rod cover	Aluminum alloy	Black alumite	17	Wear ring	Polyacetal	
6	Bush	Copper alloy casting		18	Cushion rubber	Urethane rubber	
7	Cylinder gasket	Nitrile rubber		19	Gasket	Nitrile rubber	
8	Piston rod	Steel	Industrial chrome plating	20	Head cover	Aluminum alloy	Black alumite
9	Cylinder tube	Aluminum alloy	Hard alumite	21	Lock nut	Steel	Zinc chromate
10	Non-rotating shaft	Steel	Industrial chrome plating	22	Tie rod	Steel	Zinc chromate
11	Piston (A)	Aluminum alloy		23	Conical spring washer	Steel	
12	Non-rotating plate	Oil impregnated bearing alloy		24	Round nut	Steel	Zinc chromate

Repair parts list

Bore size (mm)	Kit No.	Repair parts number
φ 40	GLC-40K	3 4 7 12 14 17
φ 50	GLC-50K	
φ 63	GLC-63K	
φ 80	GLC-80K	
φ 100	GLC-100K	

Note 1: When placing an order of repair parts, indicate kit number.

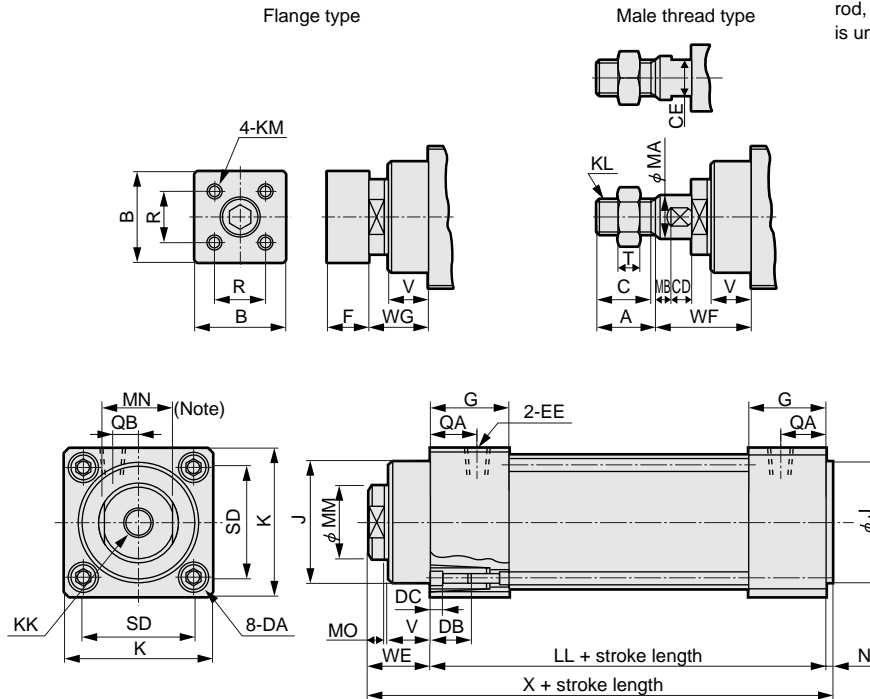
Note 2: The procedures for replacing the consumable parts are different from the general-purpose cylinder. Refer to the guide-less cylinder "Disassembly and Assembly Procedures" (SM-323965).

Dimensions

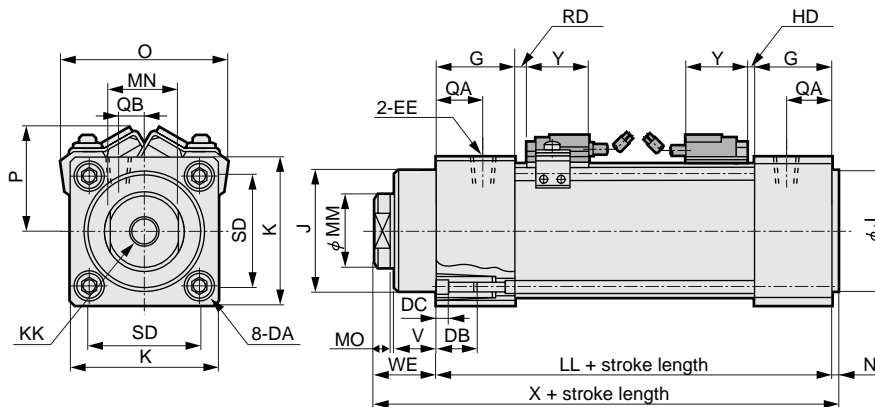


● Basic type (00)

(Note: Position of width across flats (MN dimensions) of female thread type since the cap is screwed into piston rod, the following diagram (vertical) is unstable.)



Basic type with R, H type switch (00)



Bore size (mm)	Basic type (00) basic dimensions																						
	A	B	C	CD	CE	DA	DB	DC	EE	F	G	J	K	KK	KL	KM	LL	MA	MB	MM	MN	MO	N
φ 40	21.5	35	20	6.5	14	M8	12	4	Rc1/8	18	30	40	57	M10 depth 15	M14 x 1.5	M6	97	17	11.5	25	23	8	2
φ 50	23.5	45	22	9	17	M8	12	4	Rc1/4	20	34	52	66	M12 depth 18	M16 x 1.5	M8	107	19	11.5	35	31	8	2
φ 63	26.5	50	25	10	17	M8	12	4	Rc1/4	20	34	64	80	M14 depth 20	M18 x 1.5	M8	110.5	21	11.5	40	36	8	2
φ 80	30	70	29	14	22	M12	16	5	Rc3/8	27	41	75	98	M18 depth 25	M22 x 1.5	M10	134.5	26	12	50	44	10	2
φ 100	34.5	80	34	13.5	27	M12	16	5	Rc3/8	30	46	95	118	M20 depth 30	M27 x 2	M10	151.5	34	13.5	60	54	10	2
Bore size (mm)	R type switch													H type switch									
	QA	QB	R	SD	T	V	WE	WF	WG	X	O	P	Reed R0, R4, R5, R6		Proximity R1, R2, R3		Y	O	P	HD	RD	Y	
													HD	RD	HD	RD							
φ 40	18	7	24	40.5	8	20	35	54.5	33.5	134	66	39.5	3	0	4	0	31.5	66	39.5	4	0	33.5	
φ 50	20	10	32	48	10	20	35	56.5	33.5	144	74	44.5	5.5	2.5	6	3	31.5	74	44.5	6	3	33.5	
φ 63	22	10	36	59	11	24	39	62.5	37.5	151.5	90	51	7	4.5	7.5	5	31.5	90	51	7.5	5	33.5	
φ 80	25	10	50	74	13	27	44	72	42.5	180.5	114	59.5	14.5	7	15	7.5	31.5	114	59.5	15	7.5	33.5	
φ 100	25	10	60	90	16	27	47	77.5	45.5	200.5	128	67	18.5	8.5	19.5	10	31.5	128	67	19.5	10	33.5	

- SCP*2
- CMK2
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- UCAC
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- SHC
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Ending

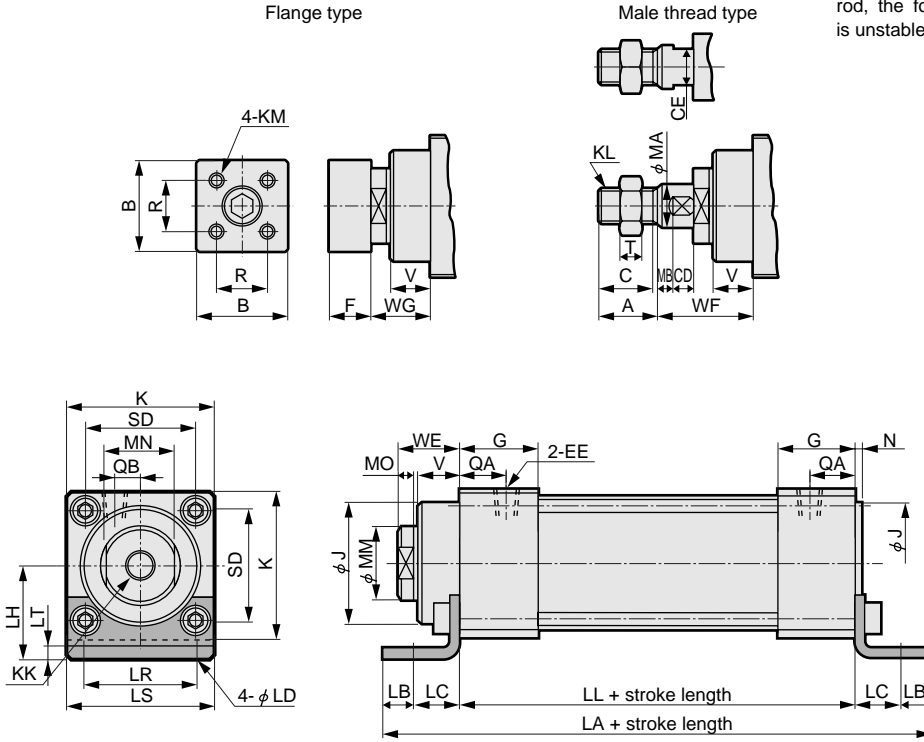
High rigid guideless cylinder
Special type

Dimensions

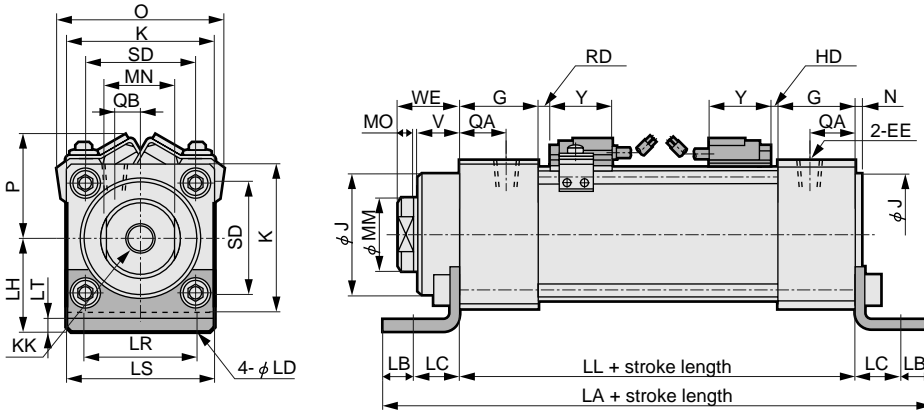


● Axial foot type (LB)

(Note: Position of width across flats (MN dimensions) of female thread type since the cap is screwed into piston rod, the following diagram (vertical) is unstable.)



● Axial foot type with R, H type switch (LB)

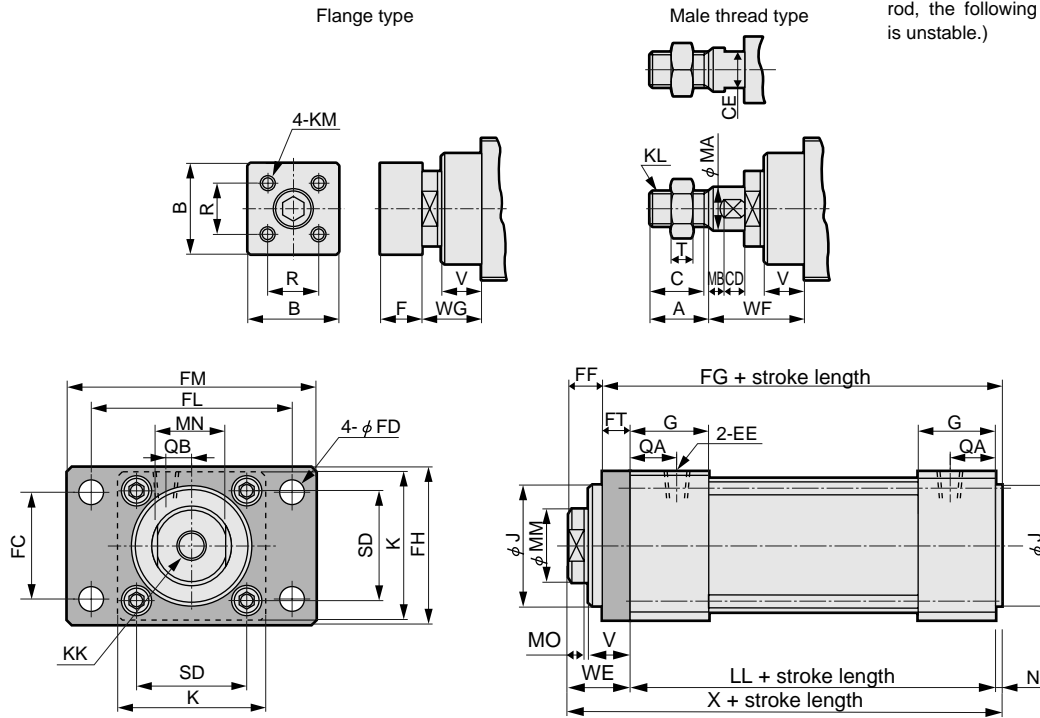


Bore size (mm)	Basic dimensions																									
	A	B	C	CD	CE	EE	F	G	J	K	KK	KL	KM	LL	MA	MB	MM	MN	MO	N	QA	QB	R			
φ 40	21.5	35	20	6.5	14	Rc1/8	18	30	40	57	M10 depth 15	M14 x 1.5	M6	97	17	11.5	25	23	8	2	18	7	24			
φ 50	23.5	45	22	9	17	Rc1/4	20	34	52	66	M12 depth 18	M16 x 1.5	M8	107	19	11.5	35	31	8	2	20	10	32			
φ 63	26.5	50	25	10	17	Rc1/4	20	34	64	80	M14 depth 20	M18 x 1.5	M8	110.5	21	11.5	40	36	8	2	22	10	36			
φ 80	30	70	29	14	22	Rc3/8	27	41	75	98	M18 depth 25	M22 x 1.5	M10	134.5	26	12	50	44	10	2	25	10	50			
φ 100	34.5	80	34	13.5	27	Rc3/8	30	46	95	118	M20 depth 30	M27 x 2	M10	151.5	34	13.5	60	54	10	2	25	10	60			
Bore size (mm)															R type switch						H type switch					
	SD	T	V	WE	WF	WG	LA	LB	LC	LD	LH	LR	LS	LT	O	P	Reed R0/4/5/6		Prox. R1/2/3		Y	O	P	HD	RD	Y
																	HD	RD	HD	RD						
φ 40	40.5	8	20	35	54.5	33.5	156	10	19.5	9	40	40	57	3.2	66	39.5	3	0	4	0	31.5	66	39.5	4	0	33.5
φ 50	48	10	20	35	56.5	33.5	175	12	22	9	40	46	66	4.5	74	44.5	5.5	2.5	6	3	31.5	74	44.5	6	3	33.5
φ 63	59	11	24	39	62.5	37.5	194.5	12	30	11	50	60	80	4.5	90	51	7	4.5	7.5	5	31.5	90	51	7.5	5	33.5
φ 80	74	13	27	44	72	42.5	236.5	14	37	14	60	74	98	6.0	114	59.5	14.5	7	1.5	7.5	31.5	114	59.5	15	7.5	33.5
φ 100	90	16	27	47	77.5	45.5	255.5	21	31	14	67	80	118	6.0	128	67	18.5	8.5	19.5	10	31.5	28	67	19.5	10	33.5

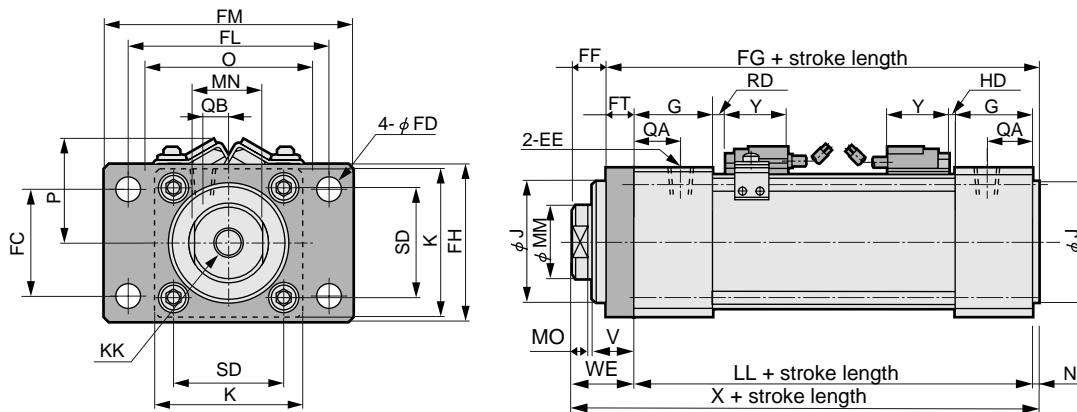
Dimensions

● Rod end flange type (FA)

(Note: Position of width across flats (MN dimensions) of female thread type since the cap is screwed into piston rod, the following diagram (vertical) is unstable.)



● Rod end flange type with R, H type switch (FA)



Bore size (mm)	Basic dimensions																									
	A	B	C	CD	CE	EE	F	G	J	K	KK	KL	KM	LL	MA	MB	MM	MN	MO	N	QA	QB	R	SD		
φ 40	21.5	35	20	6.5	14	Rc1/8	18	30	40	57	M10 depth 15	M14 x 1.5	M6	97	17	11.5	25	23	8	2	18	7	24	40.5		
φ 50	23.5	45	22	9	17	Rc1/4	20	34	52	66	M12 depth 18	M16 x 1.5	M8	107	19	11.5	35	31	8	2	20	10	32	48		
φ 63	26.5	50	25	10	17	Rc1/4	20	34	64	80	M14 depth 20	M18 x 1.5	M8	110.5	21	11.5	40	36	8	2	22	10	36	59		
φ 80	30	70	29	14	22	Rc3/8	27	41	75	98	M18 depth 25	M22 x 1.5	M10	134.5	26	12	50	44	10	2	25	10	50	74		
φ 100	34.5	80	34	13.5	27	Rc3/8	30	46	95	118	M20 depth 30	M27 x 2	M10	151.5	34	13.5	60	54	10	2	25	10	60	90		
Bore size (mm)														R type switch						H type switch						
	T	V	WE	WF	WG	X	FC	FD	FF	FG	FH	FL	FM	FT	O	P	Reed R0/4/5/6		Prox. R1/2/3		Y	O	P	HD	RD	Y
																	HD	RD	HD	RD						
φ 40	8	20	35	54.5	33.5	134	40	9	23	111	57	80	100	12	66	39.5	3	0	4	0	31.5	66	39.5	4	0	33.5
φ 50	10	20	35	56.5	33.5	144	47	9	23	122	65	85	108	12	74	44.5	5.5	2.5	6	3	31.5	74	44.5	6	3	33.5
φ 63	11	24	39	62.5	37.5	151.5	60	11	23	129.5	80	106	130	16	90	51	7	4.5	7.5	5	31.5	90	51	7.5	5	33.5
φ 80	13	27	44	72	42.5	180.5	74	14	25	156	98	125	153	19	114	59.5	14.5	7	1.5	7.5	31.5	114	59.5	15	7.5	33.5
φ 100	16	27	47	77.5	45.5	200.5	88	14	28	172.5	118	144	180	19	128	67	18.5	8.5	19.5	10	31.5	128	67	19.5	10	33.5

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Ending

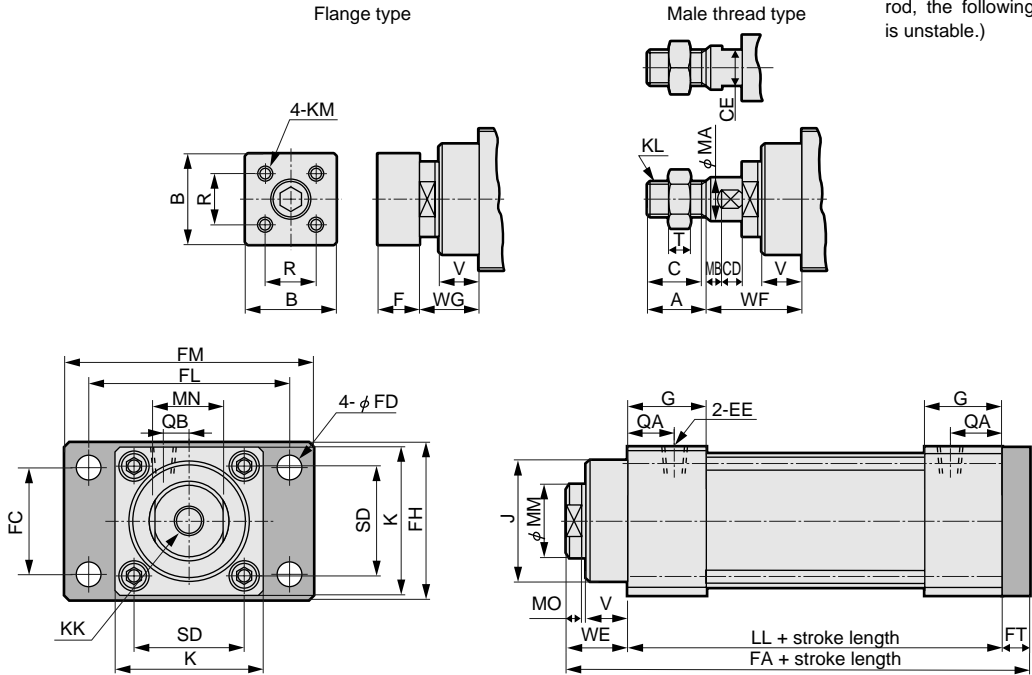
High rigid guideless cylinder
Special type

Dimensions

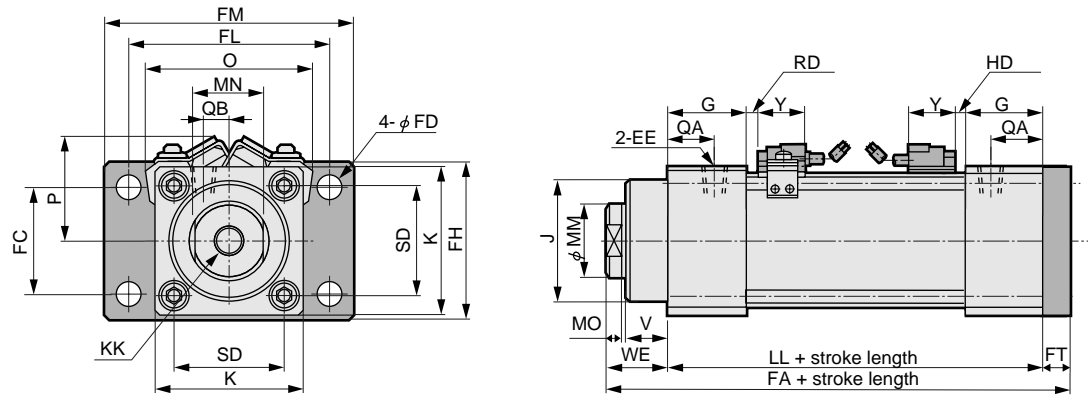


● Head end flange type (FB)

(Note: Position of width across flats (MN dimensions) of female thread type since the cap is screwed into piston rod, the following diagram (vertical) is unstable.)



● Head end flange type with R, H type switch (FB)



Bore size (mm)	Basic dimensions																							
	A	B	C	CD	CE	EE	F	G	J	K	KK	KL	KM	LL	MA	MB	MM	MN	MO	QA	QB	R	SD	
φ 40	21.5	35	20	6.5	14	Rc1/8	18	30	40	57	M10 depth 15	M14 x 1.5	M6	97	17	11.5	25	23	8	18	7	24	40.5	
φ 50	23.5	45	22	9	17	Rc1/4	20	34	52	66	M12 depth 18	M16 x 1.5	M8	107	19	11.5	35	31	8	20	10	32	48	
φ 63	26.5	50	25	10	17	Rc1/4	20	34	64	80	M14 depth 20	M18 x 1.5	M8	110.5	21	11.5	40	36	8	22	10	36	59	
φ 80	30	70	29	14	22	Rc3/8	27	41	75	98	M18 depth 25	M22 x 1.5	M10	134.5	26	12	50	44	10	25	10	50	74	
φ 100	34.5	80	34	13.5	27	Rc3/8	30	46	95	118	M20 depth 30	M27 x 2	M10	151.5	34	13.5	60	54	10	25	10	60	90	
Bore size (mm)													R type switch					H type switch						
	T	V	WE	WF	WG	FA	FC	FD	FH	FL	FM	FT	O	P	Reed R0/4/5/6		Prox. R1/2/3		Y	O	P	HD	RD	Y
φ 40	8	20	35	54.5	33.5	144	40	9	57	80	100	12	66	39.5	3	0	4	0	31.5	66	39.5	4	0	33.5
φ 50	10	20	35	56.5	33.5	154	47	9	65	85	108	12	74	44.5	5.5	2.5	6	3	31.5	74	44.5	6	3	33.5
φ 63	11	24	39	62.5	37.5	165.5	60	11	80	106	130	16	90	51	7	4.5	7.5	5	31.5	90	51	7.5	5	33.5
φ 80	13	27	44	72	42.5	197.5	74	14	98	125	153	19	14	59.5	14.5	7	1.5	7.5	31.5	114	59.5	15	7.5	33.5
φ 100	16	27	47	77.5	45.5	217.5	88	14	118	144	180	19	128	67	18.5	8.5	19.5	10	31.5	128	67	19.5	10	33.5

Selection guide

Conditions...Stroke length $\chi=300\text{mm}$, end load weight $m=15\text{kg}$, eccentricity $L_2=50\text{mm}$, distance from end to center of gravity of load $b=50\text{mm}$, force applied to rod end $F=mxg$ (N)

(g: Gravity acceleration 9.8m/S^2)

(1) At first, calculate lateral load moment $F \cdot L$.

* At first, substitute the intermediate value such as 3.4 (cm) of 63mm bore to a dimension.

$$L = 3.4 + 30 + 5 = 38.4(\text{cm}) = 0.384(\text{m})$$

$$F = 15 \times 9.8 = 147 (\text{N})$$

$$F \cdot L = 147 \times 0.384 = 56.4 (\text{N} \cdot \text{m})$$

(2) Calculate self-weight moment M caused by piston rod etc.

$$\begin{aligned} M &= \frac{\chi^2}{2} \times C \times g + (a + \chi) \times D \times g \\ &= \frac{30^2}{2} \times 0.043 \times 9.8 + (3.4 + 30) \\ &\quad \times 0.24 \times 9.8 \\ &= 268.2(\text{N} \cdot \text{cm}) \approx 2.7(\text{N} \cdot \text{m}) \end{aligned}$$

(3) The total of (1) and (2) is lateral load moment.

$$F \cdot L + M = 56.4 + 2.7 = 59.1 (\text{N} \cdot \text{m})$$

(4) Calculate torque $F \cdot L_2$.

$$\begin{aligned} L_2 &= 5(\text{cm}) = 0.05(\text{m}) \\ F &= 147 (\text{N}) \\ F \cdot L_2 &= 147 \times 0.05 = 7.35 (\text{N} \cdot \text{m}) \end{aligned}$$

(5) Refer to the right allowable lateral load moment table and allowable torque table to check if each moment should be allowable value or less.

Lateral load moment in this time 59.1 (N·m)
Torque 7.35 (N·m)

Allowable lateral load moment

$\phi 50$: 92.8N·m : OK

$\phi 63$: 144.6N·m : OK

Allowable torque

$\phi 50$: 4.2N·m : NG

$\phi 63$: 8.8N·m : OK

In this case, for lateral load moment, 50mm bore is acceptable but torque is more than allowable value. Therefore, select 63mm bore cylinder.

Select both lateral load moment and torque within the allowable value or less like this.

(6) The minimum working pressure is the sum of lateral load moment and torque.

$$0.23\text{MPa} + 0.18\text{MPa} = 0.41\text{MPa}$$

Find the working pressure according to the graph on the following page.

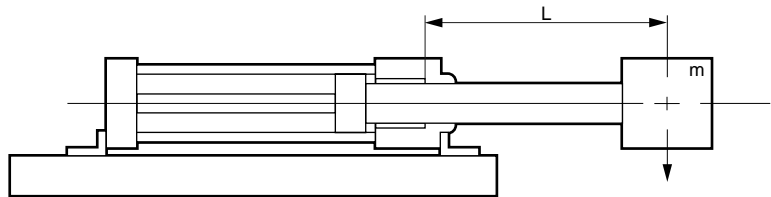
(Lateral load moment)

(Torque)

m : Load weight kg
 $L = a + \chi + b$ cm
 χ : Stroke length cm
 b : Distance from top to load center cm
 a : Dimensions of projecting section cm
 M : Self-weight moment = $\frac{\chi^2}{2} \times C \times g + (a + \chi) \times D \times g$
 g : Gravity acceleration 9.8 m/s^2
 C : Piston rod weight per unit length kg/cm
 D : Cap weight kg

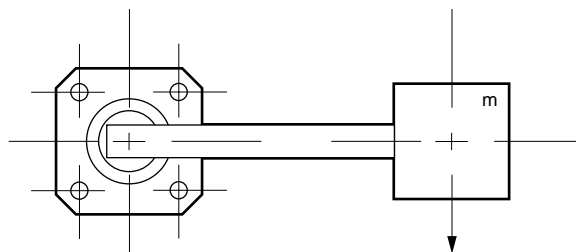
	$\phi 40$	$\phi 50$	$\phi 63$	$\phi 80$	$\phi 100$
a	3.2	3.4	3.4	3.6	3.9
C	0.013	0.037	0.043	0.074	0.097
D	0.06	0.17	0.24	0.35	0.68

Allowable lateral load moment



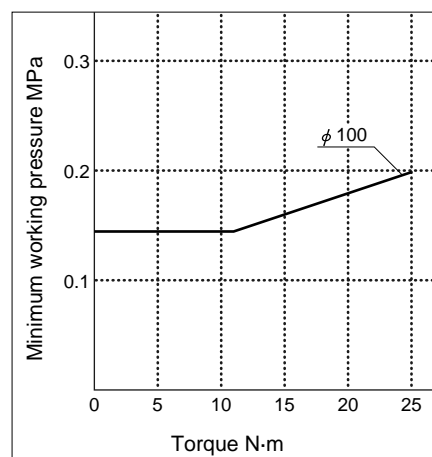
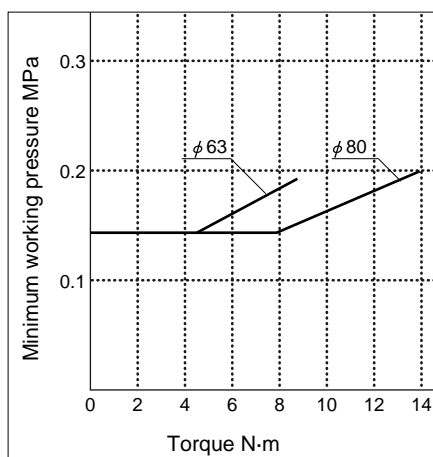
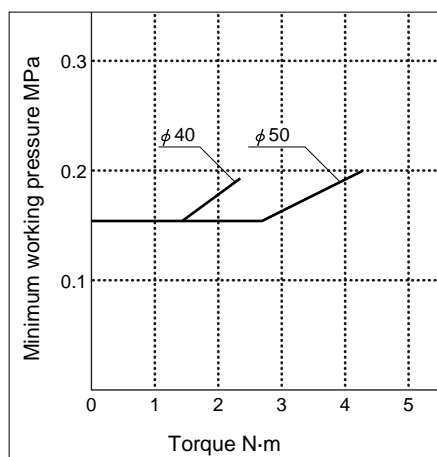
Bore size	Allowable lateral load moment
$\phi 40$	54.6 N·m
$\phi 50$	92.8 N·m
$\phi 63$	144.6 N·m
$\phi 80$	275.0 N·m
$\phi 100$	468.1 N·m

Allowable torque



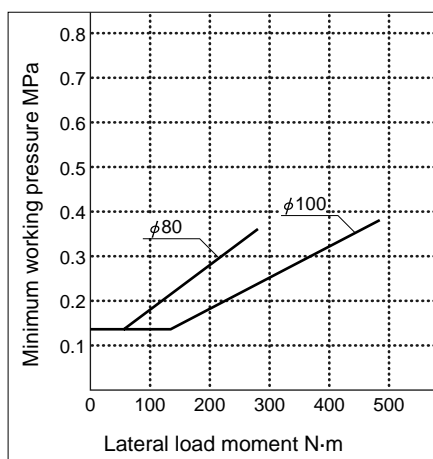
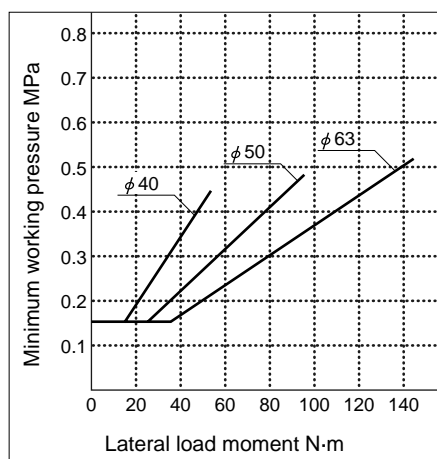
Bore size	Allowable torque
$\phi 40$	2.4 N·m
$\phi 50$	4.2 N·m
$\phi 63$	8.8 N·m
$\phi 80$	13.8 N·m
$\phi 100$	19.9 N·m

Relation between torque and minimum working pressure



Note: Select within the allowable torque. (The ideal torque is not greater than 70% of allowable torque.)

Relation between lateral load moment and minimum working pressure



Note: Select within the allowable lateral load moment. (The ideal value is not greater than 70% of allowable lateral load moment.)

Allowable energy absorption

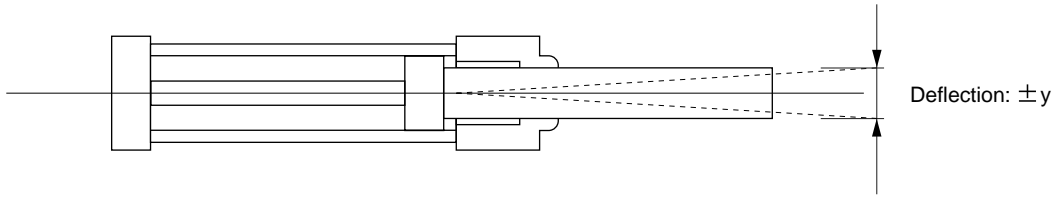
Bore size	Allowable energy absorption J
φ 40	0.73
φ 50	1.01
φ 63	2.42
φ 80	4.63
φ 100	9.94

- SCP*2
- CMK2
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Ending

High rigid guideless cylinder
Special type

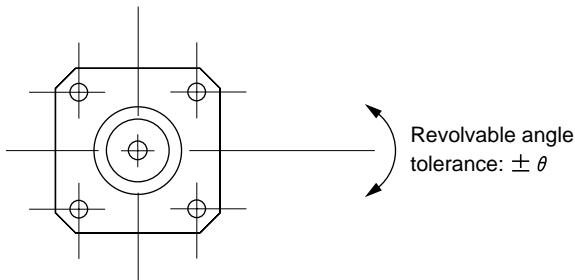
Deflection



(Unit: mm)

Bore size	Deflection: $\pm y$ (default)	Standard stroke length						
		100	200	300	400	500	600	700
$\phi 40$	$y = (74 + \text{stroke length}) \times 3.66 \times 10^{-3}$	0.64	1.00	1.37	1.73	2.10	-	-
$\phi 50$	$y = (82.5 + \text{stroke length}) \times 3.50 \times 10^{-3}$	0.64	0.99	1.34	1.69	2.04	-	-
$\phi 63$	$y = (88 + \text{stroke length}) \times 3.36 \times 10^{-3}$	0.63	0.98	1.30	1.64	1.98	-	-
$\phi 80$	$y = (108 + \text{stroke length}) \times 2.80 \times 10^{-3}$	0.58	0.86	1.14	1.42	1.70	1.98	2.26
$\phi 100$	$y = (122.5 + \text{stroke length}) \times 2.86 \times 10^{-3}$	0.64	0.92	1.21	1.50	1.78	2.07	2.35

Revolvable angle tolerance



(Unit: degree)

Bore size	Revolvable angle tolerance: $\pm \theta$ (default)
$\phi 40$	0.57
$\phi 50$	0.38
$\phi 63$	0.33
$\phi 80$	0.28
$\phi 100$	0.24

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- Ending