

MFC

Robot cylinder

Special

ø30/ø40/ø50/ø63/ø80

Overview

This is a cylinder with a structure that receives applied load with the whole frame, and has rotation-stop function and high lateral load resistance.

Features

Robot cylinder (MFC)

Rotation-stop and high lateral load resistant cylinder.

Robot cylinder with brake (MFC-B)

Integrated rotation-stop structure, high lateral load resistant brake cylinder.

Robot cylinder with brake and sensor (MFC-BS)

Cylinder with rotation-stop, high lateral load resistance, braking and traveled distance detection functions.



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Planned for end of production
February 2022

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Series variation



Discontinue

Robot cylinder MFC

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC**
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
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- MechHnd/Chuk
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- Ending

Variation	Model No. JIS symbol	Bore size (mm)	Standard stroke (mm)					
			50	75	100	150	200	
Double acting/ single rod with switch	MFC MFC-L 	ø30/ø40	●	●	●	●	●	
		ø50/ø63/ø80	●	●	●	●	●	
Double acting/ high load with switch	MFC-K MFC-KL 	ø30/ø40	●	●	●	●	●	
		ø50/ø63/ø80	●	●	●	●	●	
Double acting/ with brake and switch	MFC-B MFC-BL	ø30/ø40	●	●	●	●	●	
		ø50/ø63/ø80	●	●	●	●	●	
Double acting/with brake high load with switch	MFC-BK MFC-BKL	ø30/ø40	●	●	●	●	●	
		ø50/ø63/ø80	●	●	●	●	●	
Double acting/ with brake sensor	MFC-BS	ø30/ø40	●	●	●	●	●	
		ø50/ø63/ø80	●	●	●	●	●	
Double acting/ with brake sensor, high load	MFC-BSK	ø30/ø40	●	●	●	●	●	
		ø50/ø63/ø80	●	●	●	●	●	

●: Standard ○: Option ■: Not available

	300	Min. stroke (mm)	Max. stroke (mm)	Custom stroke (per mm)	Mounting				Cushion				Switch	Page
					Basic	Rod side foot	Rod side flange	Head side flange	Without cushion	Both sides cushioned	Rod side cushioned	Head side cushioned		
					00	LA	FA	FB	N	B	R	H		
●	●	5	500	5	●	●	●	●	●	●	●	●	○	1218
●	●	5	1000	5	●	●	●	●	●	●	●	●	○	1218
●	●	5	500	5	●	●	●	●	●	●	●	●	○	1226
●	●	5	1000	5	●	●	●	●	●	●	●	●	○	1226
●	●	5	500	5	●	●	●	●	●	●	●	●	■	1236
●	●	5	1000	5	●	●	●	●	●	●	●	●	■	1236
●	●	5	500	5	●	●	●	●	●	●	●	●	■	1236
●	●	5	1000	5	●	●	●	●	●	●	●	●	■	1236

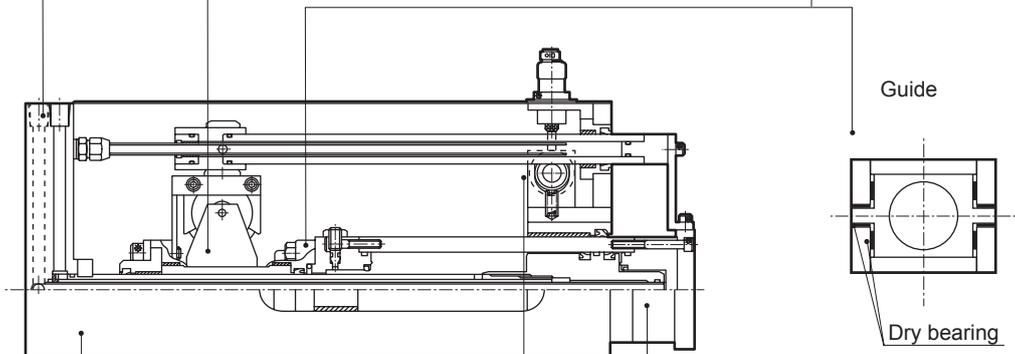
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Product introduction

● **Easy piping**
 Since cylinder port (for advance, return) and brake port are integrated at this position, piping is easy.

● **Excellent braking function**
 Unique brake mechanism enables stopping accuracy of ± 1.0 mm (at 300 mm/s)
 · Outstanding holding force twice the cylinder thrust (0.4 MPa)

● **Rotation stop mechanism**
 Dry bearing is installed on rod cover. A rotation-stop mechanism like the following figure is provided.



● **Compact design**
 Compact, requiring no separate anti-rotation mechanism and no guide for lateral load.

● **Detects travel distance of cylinder tube (BS type, BSK type)**
 The distance travelled is generated as a pulse from the rotary encoder that is directly connected to the rotator. Connection to an external controller enables detection and stop at any position.

● **Resistant to lateral load**
 Even under heavy loads, the robust cylinder tube eliminates the necessity for the guide. (Lateral load 10 times larger than a standard cylinder can be applied.)

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Discontinue

MEMO

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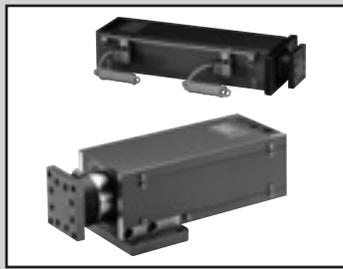
Discontinue

Robot cylinder Double acting/single rod
Double acting/high load

MFC/MFC-K Series

● Bore size: $\phi 30$, $\phi 40$, $\phi 50$, $\phi 63$, $\phi 80$

JIS symbol



Specifications

Item	MFC/MFC-L/MFC-K/MFC-KL					
Bore size mm	$\phi 30$	$\phi 40$	$\phi 50$	$\phi 63$	$\phi 80$	
Actuation	Double acting					
Working fluid	Compressed air					
Max. working pressure MPa	1.0 (≈ 150 psi, 10 bar)					
Min. working pressure MPa	0.15 (≈ 22 psi, 1.5 bar)					
Proof pressure MPa	1.6 (≈ 230 psi, 16 bar)					
Ambient temperature $^{\circ}\text{C}$	-10 (14 $^{\circ}\text{F}$) to 60 (140 $^{\circ}\text{F}$) (no freezing)					
Port size	Rc1/8		Rc1/4		Rc3/8	
Stroke tolerance mm	$^{+0.5}_{0}$ (Less than 350) $^{+1.0}_{0}$ (350 and over)					
Working piston speed mm/s	50 to 300 (no load)					
Cushion	Air cushion					
Effective air cushion length mm	15	13	22	22	26	
Lubrication	Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)					
Allowable absorbed energy J	Cushioned 0.9		Without cushion 4.3		8.4 15.8 27.9	
	Cannot absorb high energy generated by external load. We recommend using an external shock absorber.					

* Consult with CKD regarding low hydraulic specifications.

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)	Min. stroke (mm) * With switch
$\phi 30$	50/75/100/ 150/200/300	500	5	30
$\phi 40$				
$\phi 50$				
$\phi 63$	1000			
$\phi 80$				

*1 : The custom stroke is available in 5 mm increments.

*2 : The cushion effect may not be attained if the cylinder stroke is shorter than the effective cushion length.

Switch specifications

Item	Proximity 2-wire			Proximity 3-wire		
	R1	R2	R2Y (2-color LED)	R3	R3Y (2-color LED)	
Applications	Programmable controller, relay, compact solenoid valve	Dedicated for programmable controller		For programmable controller, relay, IC circuit, solenoid valve		
Output method	-			NPN output		
Power supply voltage/current	-			4.5 VDC to 28 VDC		
Load voltage/current	85 VAC to 265 VAC 5 to 100 mA	10 VDC to 30 VDC 5 to 30 mA		30 VDC or less 200 mA or less (R3), 100 mA or less (R3Y)		
Indicator	LED (Lit when ON) (R1, R2, R3)/Red/Green LED (Lit when ON) (R2Y, R3Y)					
Leakage current	1 mA or less at 100 VAC 2 mA or less at 200 VAC	1 mA or less	1.2 mA or less	10 μA or less		
Max. shock resistance	980 m/s ²					
Weight g	Grommet	1 m:42 3 m:100 5 m:158	1 m:56 3 m:114 5 m:172	1 m:42 3 m:100 5 m:158	1 m:56 3 m:114 5 m:172	
	Terminal box	68		82		68 82
Item	Reed 2-wire					
	R0	R4	R5	R6		
Applications	For relay, programmable controller	For high capacity relay, solenoid valve	For programmable controller, relay, IC circuit (without indicator lamp), serial connection	Dedicated for programmable controller I (with DC self-hold)		
Load voltage/current	12/24 VDC, 5 to 50 mA 110 VAC, 7 to 20 mA 220 VAC, 7 to 10 mA	110 VAC, 20 to 200 mA 220 VAC, 10 to 200 mA	5/12/24 VDC: 50 mA or less, 110 VAC: 20 mA or less, 220 VAC: 10 mA or less	24 VDC, 5 to 50 mA		
Indicator	LED (Lit when ON)	Neon lamp (Lit when OFF)	No indicator lamp	LED (Lit when ON)		
Leakage current	0 mA	1 mA or less	0 mA	0.1 mA or less		
Max. shock resistance	294 m/s ²					
Weight g	Grommet	1 m:42 3 m:100 5 m:158				
	Terminal box	68				

*1: Refer to Ending Page 1 for detailed switch specifications and dimensions.

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Cylinder weight (single rod/high load)

● Single rod: MFC/MFC-L

(Unit: kg)

Bore size (mm)	Product weight when stroke (S) = 0 mm					Additional weight per S = 100 mm	Switch weight	Mounting bracket weight	Switch rail weight for 0 mm stroke	Weight of rail holding bracket			Additional weight with switch rail S = 100 mm
	Basic (00)	Foot (LA)		Flange (FA)	Flange (FB)					5 to 200 mm	201 to 500 mm	501 to 1000 mm	
		St = under 300 mm	St ≥ 300 mm										
ø30	3.3	3.8	4.3	3.7	3.8	1.1	Refer to the weight in the switch specifications.	0.020	0.034	0.034	0.051	-	0.040
ø40	4.2	5.1	6.0	4.8	5.1	1.3			0.038	0.038	0.057	-	
ø50	9.3	11.1	12.9	10.5	11.1	2.5			0.049	0.052	0.078	0.130	
ø63	15.1	18.1	21.1	17.2	18.1	2.8			0.049	0.076	0.114	0.190	
ø80	29.1	34.6	40.1	33.0	34.6	4.2			0.060	0.086	0.129	0.215	

● High load: MFC-K/MFC-KL

(Unit: kg)

Bore size (mm)	Product weight when stroke (S) = 0 mm					Additional weight per S = 100 mm	Switch weight	Mounting bracket weight	Switch rail weight for 0 mm stroke	Weight of rail holding bracket			Additional weight with switch rail S = 100 mm
	Basic (00)	Foot (LA)		Flange (FA)	Flange (FB)					5 to 200 mm	201 to 500 mm	501 to 1000 mm	
		St = under 300 mm	St ≥ 300 mm										
ø30	5.5	6.3	7.1	6.1	6.2	1.1	Refer to the weight in the switch specifications.	0.020	0.073	0.034	0.051	-	0.040
ø40	7.4	8.9	10.3	8.3	8.7	1.3			0.083	0.038	0.057	-	
ø50	16.4	19.1	21.8	18.0	18.9	2.5			0.110	0.052	0.078	0.130	
ø63	26.7	31.1	35.5	29.4	30.8	2.8			0.125	0.076	0.114	0.190	
ø80	48.2	55.8	63.4	52.9	55.3	4.2			0.148	0.086	0.129	0.215	

(Example) Product weight of MFC-L-FA-30B-200-R0-R

- Product weight at 0 mm stroke (mounting: FA) 3.7 kg
- Additional weight per 200 mm stroke $1.1 \times \frac{200}{100} = 2.2$ kg
- Switch rail weight for 0 mm stroke 0.034 kg
- Rail holding bracket weight (stroke 200 mm) 0.034 kg
- Switch rail additional weight for 200 mm stroke $0.040 \times \frac{200}{100} = 0.080$ kg
- Weight of one RO switch 0.042 kg
- Weight of 1 mounting brackets 0.020 kg
- Product weight $3.7 + 2.2 + 0.034 + 0.034 + 0.080 + 0.042 + 0.020 = 6.110$ kg

MFC/MFC-K Series

Planned for end of production
February 2022

How to order

Without switch (without magnet for switch)



With switch (built-in magnet for switch)



A Model

B Mounting *1

C Bore size

D Cushion

E Stroke

F Switch model No.

G Switch quantity

Code	Description
A Model	
MFC	Basic
MFC-L	Basic with switch
MFC-K	High load
MFC-KL	High load with switch

B Mounting	
00	Basic
LA	Rod side foot
FA	Rod side flange
FB	Head side flange

C Bore size (mm)	
30	ø30
40	ø40
50	ø50
63	ø63
80	ø80

D Cushion	
B	Both sides cushioned
R	Rod side cushioned
H	Head side cushioned
N	Without cushion

E Stroke (mm)		
Bore size	Stroke *2	Custom stroke
ø30	5 to 500	In 5 mm increments
ø40	5 to 500	
ø50	5 to 1000	
ø63	5 to 1000	
ø80	5 to 1000	

F Switch model No.						
Grommet- Type	Terminal box Type	Contact	Voltage		Indicator	Lead wire
			AC	DC		
R 1*	R1B	Proximity	●		1-color LED	2-wire
R 2*	R2B			●		
R 3*	R3B			●		3-wire
R 0*	R0B	Reed	●	●	1-color LED	2-wire
R 4*	R4B		●			
R 5*	R5B		●	●	No indicator lamp	
R 6*	R6B			●	1-color LED	

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

G Switch quantity	
R	1 on rod side
H	1 on head side
D	2
T	3

⚠ Precautions for model No. selection

- *1 : Mounting bracket will be shipped assembled with the product.
- *2 : Refer to page 1218 for min. stroke with switch.

[Example of model No.]

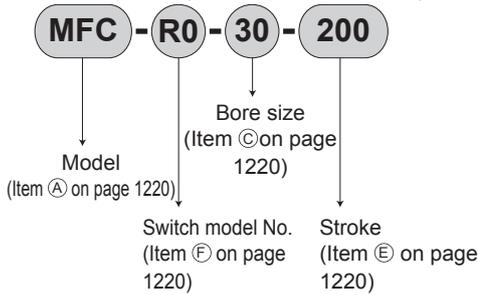
MFC-L-00-30B-50-R0-R

Model: Robot cylinder

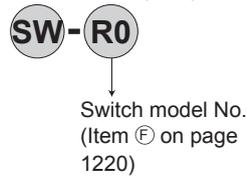
- A** Model : Basic/with switch
- B** Mounting : Basic
- C** Bore size : ø30 mm
- D** Cushion : Both sides cushioned
- E** Stroke : 50mm
- F** Switch model No. : Reed switch R0, lead wire length 1 m
- G** Switch quantity : 1 on rod side

How to order switch

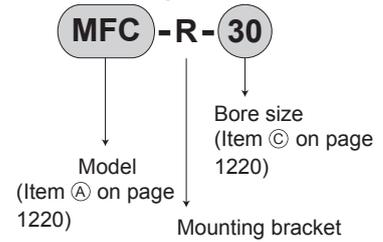
● Switch body + mounting bracket set (switch rail + rail mounting bracket + switch mounting bracket)



● Switch body only



● Mounting bracket set



● Terminal box only

· For R□B



Theoretical thrust table

(Unit: N)

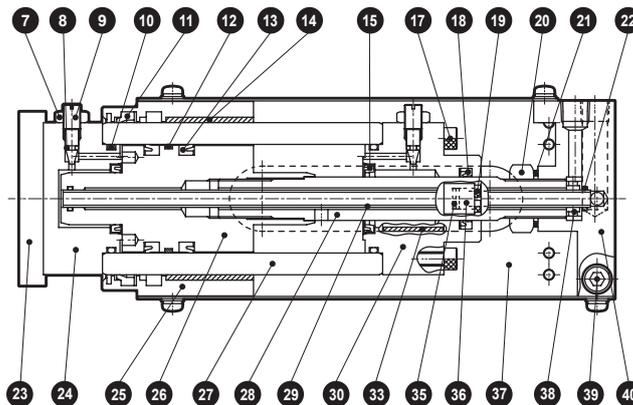
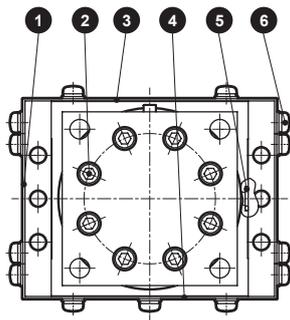
Bore size (mm)	Operating direction	Working pressure MPa									
		0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
ø30	Push	8.85x10 ¹	1.18x10 ²	1.78x10 ²	2.37x10 ²	2.96x10 ²	3.56x10 ²	4.15x10 ²	4.75x10 ²	5.34x10 ²	5.93x10 ²
	Pull	1.05x10 ²	1.41x10 ²	2.12x10 ²	2.82x10 ²	3.53x10 ²	4.24x10 ²	4.94x10 ²	5.65x10 ²	6.36x10 ²	7.06x10 ²
ø40	Push	1.58x10 ²	2.11x10 ²	3.16x10 ²	4.22x10 ²	5.27x10 ²	6.33x10 ²	7.38x10 ²	8.44x10 ²	9.50x10 ²	1.05x10 ³
	Pull	1.88x10 ²	2.51x10 ²	3.76x10 ²	5.02x10 ²	6.28x10 ²	7.53x10 ²	8.79x10 ²	1.00x10 ³	1.13x10 ³	1.25x10 ³
ø50	Push	2.46x10 ²	3.29x10 ²	4.94x10 ²	6.59x10 ²	8.24x10 ²	9.89x10 ²	1.15x10 ³	1.31x10 ³	1.48x10 ³	1.64x10 ³
	Pull	2.94x10 ²	3.92x10 ²	5.89x10 ²	7.85x10 ²	9.81x10 ²	1.17x10 ³	1.37x10 ³	1.57x10 ³	1.76x10 ³	1.96x10 ³
ø63	Push	4.20x10 ²	5.60x10 ²	8.40x10 ²	1.12x10 ³	1.40x10 ³	1.68x10 ³	1.96x10 ³	2.24x10 ³	2.52x10 ³	2.80x10 ³
	Pull	4.67x10 ²	6.23x10 ²	9.35x10 ²	1.24x10 ³	1.55x10 ³	1.87x10 ³	2.18x10 ³	2.49x10 ³	2.80x10 ³	3.11x10 ³
ø80	Push	6.80x10 ²	9.07x10 ²	1.36x10 ³	1.81x10 ³	2.26x10 ³	2.72x10 ³	3.17x10 ³	3.62x10 ³	4.08x10 ³	4.53x10 ³
	Pull	7.52x10 ²	1.00x10 ³	1.50x10 ³	2.01x10 ³	2.51x10 ³	3.01x10 ³	3.51x10 ³	4.02x10 ³	4.52x10 ³	5.02x10 ³

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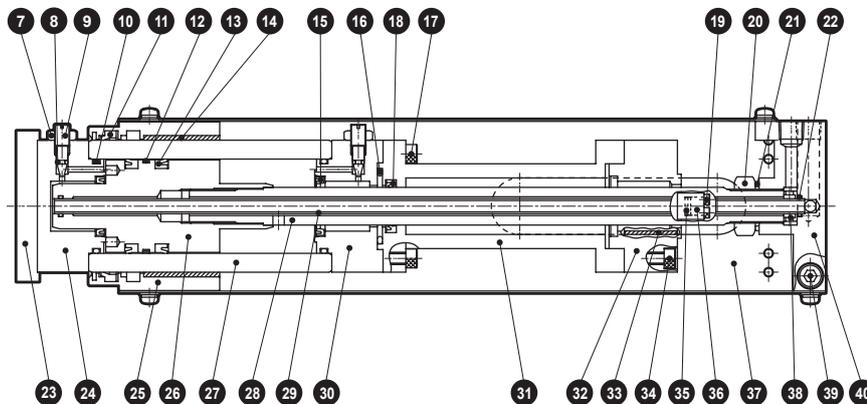
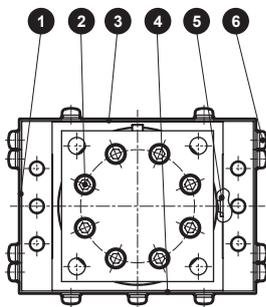
MFC/MFC-K Series

Internal structure and parts list (double acting/single rod / double acting/high load)

● MFC



● MFC-K



No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Middle cover	Aluminum plate		21	Seal washer	Nitrile rubber, steel	
2	Hexagon socket head cap screw	Steel		22	Gasket	Nitrile rubber	
3	Top cover	Steel plate		23	Head flange	Steel	
4	Bottom cover	Steel plate		24	Head cover	Cast iron	
5	Gasket	Nitrile rubber		25	Bearing housing	Cast iron	
6	Cross-recessed pan head screw, captive washer	Steel		26	Piston	Aluminum alloy	
7	Needle nut	Steel		27	Cylinder tube	Aluminum alloy	
8	Gasket	Nitrile rubber		28	Piston rod	Steel	
9	Cushion needle	Copper alloy		29	Pipe	Stainless steel	
10	Gasket	Nitrile rubber		30	Rod cover	Cast iron	
11	Dust wiper	Nitrile rubber		31	Packing holder	Steel	
12	Wear ring	Polyacetal resin		32	Guide cover	Cast iron	
13	Piston packing	Nitrile rubber		33	Rotation-stop plate	Dry bearing	
14	Bush	Dry bearing		34	Hexagon socket head cap screw	Steel	
15	Cushion packing	Nitrile rubber, steel		35	Magnet	Rare-earth	With switch only
16	Gasket	Nitrile rubber		36	Magnet holder	Aluminum alloy	With switch only
17	Hexagon socket head cap screw	Steel		37	Side guide	Steel	
18	Rod packing	Nitrile rubber		38	Pipe guide	Aluminum alloy	
19	Hexagon socket head cap screw	Steel	With switch only	39	Hexagon socket head cap screw	Steel	
20	Hexagon nut	Steel		40	Fixed guide	Cast iron	

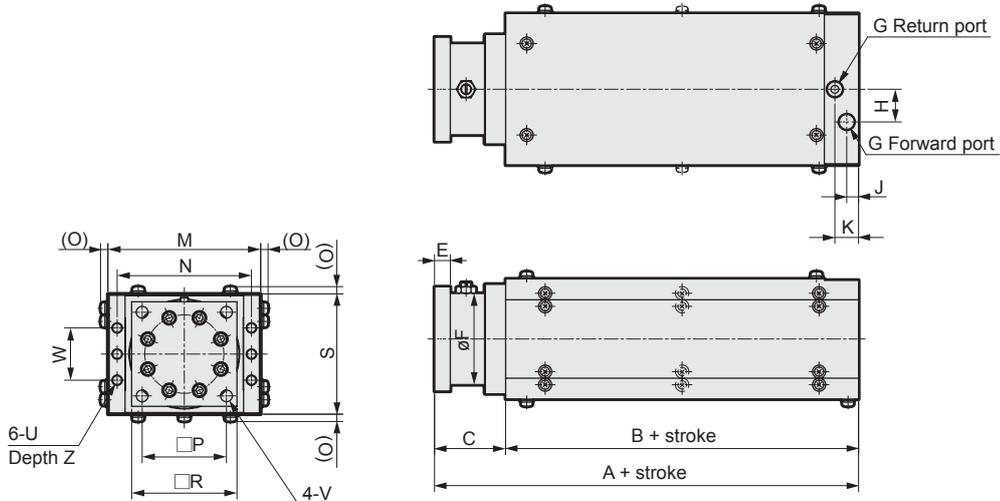
Repair parts list

Bore size (mm)	Kit No.	Repair parts No.
ø30	MFC-30K	
ø40	MFC-40K	12 13
ø50	MFC-50K	
ø63	MFC-63K	15 18
ø80	MFC-80K	

Dimensions



● MFC-(K) basic (00)

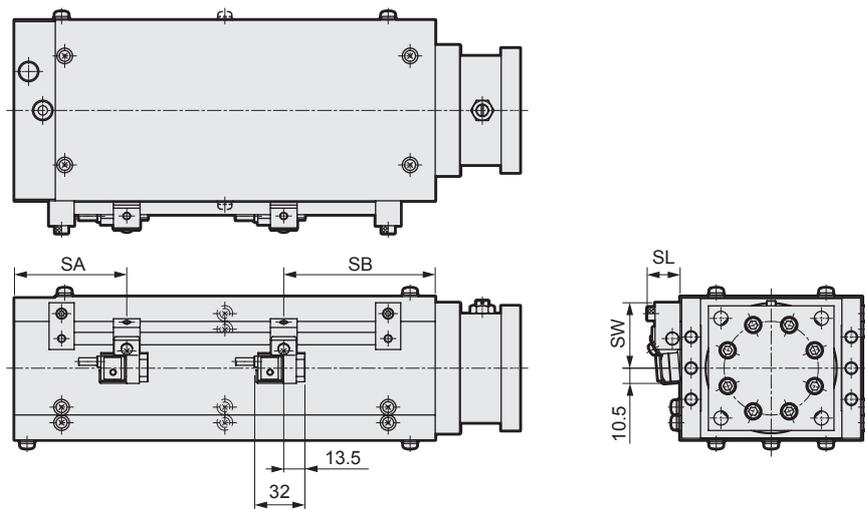


Code	Basic (00) basic dimensions																		
Bore size (mm)	A	Ⓐ	B	Ⓑ	C	E	F	G	H	J	K	M	Ⓜ	N	Ⓝ	O	P	R	S
ø30	151	249	120	218	31	8	45	Rc1/8	20	8	15	80	86	69	72	5	40	52	62
ø40	172	286	132	246	40	10	55	Rc1/8	20	8	16	90	96	79	82	5	50	63	72
ø50	222	376	168	322	54	12	70	Rc1/4	25	9	18	116	124	102	106	6	64	80	92
ø63	251	449	188	386	63	16	85	Rc1/4	25	9	18	136	144	122	126	6	80	100	112
ø80	298	522	225	449	73	19	110	Rc3/8	35	14	28	174	180	156	156	6	100	125	142

Code	Basic (00) basic dimensions				
Bore size (mm)	U	V	W	Z	Ⓩ
ø30	M 6	7	30	10	12
ø40	M 6	7	35	10	12
ø50	M 8	9	40	12	15
ø63	M10	11	58	15	18
ø80	M12	14	80	18	20

*1 : Codes with ○ indicate dimensions of high load.

● MFC-(K)L (with robot cylinder switch) basic



Unit: mm

Code	SW	SL	SA	SB	Ⓢ
Bore size (mm)					
ø30	31	20	50.5	69.5	167.5
ø40	35	20	55	77	191
ø50	42	21	71.5	96.5	250.5
ø63	52	21	68.5	119.5	317.5
ø80	59	21	92.5	132.5	356.5

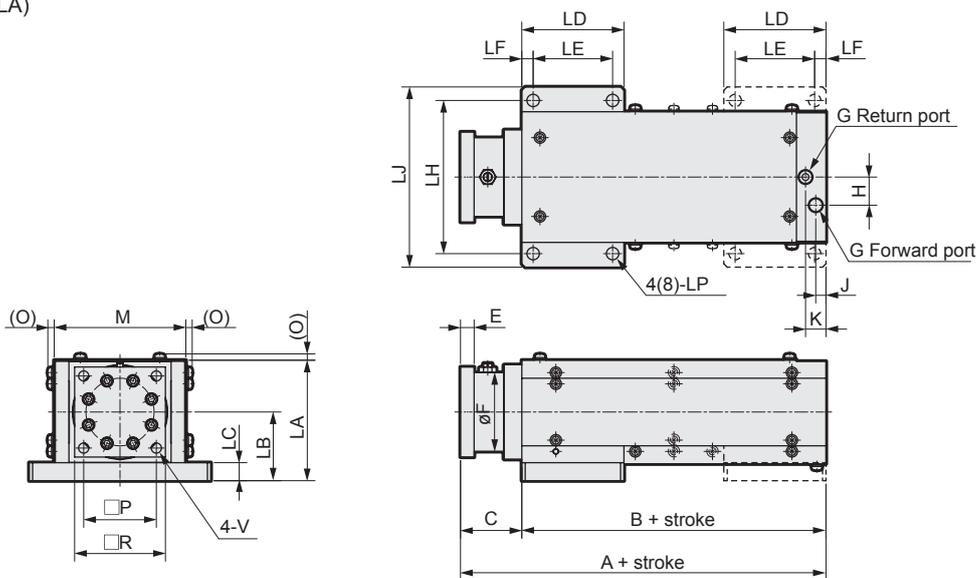
*1 : Codes with ○ indicate dimensions of high load.

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC**
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

MFC/MFC-K Series

Dimensions

● Rod side foot (LA)



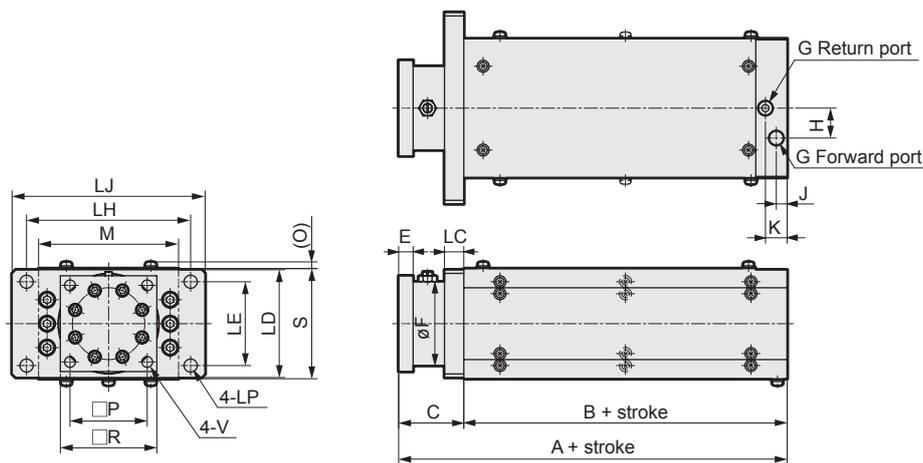
Note: Refer to page 1223 for switch dimensions with switch.

Code		Rod side foot (LA) basic dimensions																			
Bore size (mm)		A	(A)	B	(B)	C	E	F	G	H	J	K	M	(M)	O	P	R	V	LA	(LA)	LB
ø30		151	249	120	218	31	8	45	Rc1/8	20	8	15	80	86	5	40	52	7	71	73	40
ø40		172	286	132	246	40	10	55	Rc1/8	20	8	16	90	96	5	50	63	7	83	87	47
ø50		222	376	168	322	54	12	70	Rc1/4	25	9	18	116	124	6	64	80	9	107	110	61
ø63		251	449	188	386	63	16	85	Rc1/4	25	9	18	136	144	6	80	100	11	130	133	74
ø80		298	522	225	449	73	19	110	Rc3/8	35	14	28	174	180	6	100	125	14	163	166	92

Code		Rod side foot (LA) basic dimensions																
Bore size (mm)		(LB)	LC	(LC)	LD	(LD)	LE	(LE)	LF	(LF)	LH	(LH)	LJ	(LJ)	LP	(LP)	*1	*2
ø30		42	10	12	60	70	46	50	7	10	90	104	106	124	7	9	○	○
ø40		51	12	16	70	80	50	54	10	13	114	120	134	146	9	11	○	○
ø50		64	16	19	90	100	70	70	10	15	136	152	160	182	11	14	○	○
ø63		77	19	22	110	120	86	84	12	18	162	178	190	214	14	16	○	○
ø80		95	22	25	140	150	114	110	13	20	200	218	236	258	16	18	○	○

*1 : Codes with ○ indicate dimensions of high load.
 *2 : The following strokes include the stroke
 For ø30.....300 mm or more
 For ø40.....300 mm or more
 For ø50.....400 mm or more
 For ø63.....500 mm or more
 For ø80.....500 mm or more

● Rod side flange (FA)



Note: Refer to page 1223 for switch dimensions with switch.

Code		Rod side flange (FA) basic dimensions																			
Bore size (mm)		A	(A)	B	(B)	C	E	F	G	H	J	K	M	(M)	O	P	R	S	V	LC	(LC)
ø30		151	249	120	218	31	8	45	Rc1/8	20	8	15	80	86	5	40	52	62	7	10	12
ø40		172	286	132	246	40	10	55	Rc1/8	20	8	16	90	96	5	50	63	72	7	12	16
ø50		222	376	168	322	54	12	70	Rc1/4	25	9	18	116	124	6	64	80	92	9	16	19
ø63		251	449	188	386	63	16	85	Rc1/4	25	9	18	136	144	6	80	100	112	11	19	22
ø80		298	522	225	449	73	19	110	Rc3/8	35	14	28	174	180	0	100	125	142	14	22	25

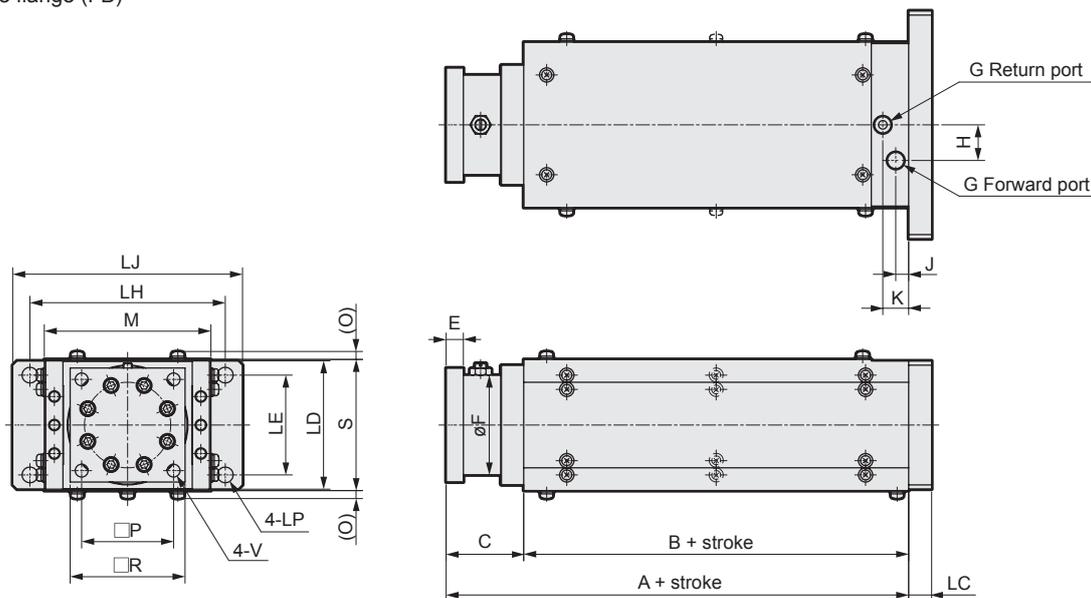
Code		Rod side flange (FA) basic dimensions								
Bore size (mm)		LE	(LE)	LH	(LH)	LJ	(LJ)	LP	(LP)	LD
ø30		46	40	90	104	106	124	7	9	60
ø40		50	44	114	120	134	146	9	11	70
ø50		70	60	136	152	160	182	11	14	90
ø63		86	74	162	178	190	214	14	16	110
ø80		114	100	200	218	236	258	16	18	140

*1 : Codes with ○ indicate dimensions of high load.

Dimensions



- Head side flange (FB)



Note: Refer to page 1223 for switch dimensions with switch.

Code	Head side flange (FB) basic dimensions																			
Bore size (mm)	A	Ⓐ	B	Ⓑ	C	E	F	G	H	J	K	M	Ⓜ	O	P	R	S	V	LC	Ⓒ
ø30	151	249	120	218	31	8	45	Rc1/8	20	8	15	80	86	5	40	52	62	7	10	12
ø40	172	286	132	246	40	10	55	Rc1/8	20	8	16	90	96	5	50	63	72	7	12	16
ø50	222	376	168	322	54	12	70	Rc1/4	25	9	18	116	124	6	64	80	92	9	16	19
ø63	251	449	188	386	63	16	85	Rc1/4	25	9	18	136	144	6	80	100	112	11	19	22
ø80	298	522	225	449	73	19	110	Rc3/8	35	14	28	174	180	6	100	125	142	14	22	25

Code	Head side flange (FB) basic dimensions									
Bore size (mm)	LE	Ⓔ	LH	Ⓕ	LJ	Ⓖ	LP	Ⓗ	LD	
ø30	46	40	90	104	106	124	7	9	60	
ø40	50	44	114	120	134	146	9	11	70	
ø50	70	60	136	152	160	182	11	14	90	
ø63	86	74	162	178	190	214	14	16	110	
ø80	114	100	200	218	236	258	16	18	140	

*1 : Codes with ○ indicate dimensions of high load.

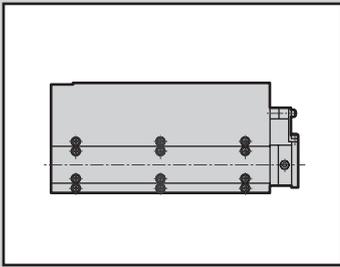
LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Discontinue

Robot cylinder/double acting/with brake
double acting/with brake high load

MFC-B/MFC-BK Series

● Bore size: $\varnothing 30$, $\varnothing 40$, $\varnothing 50$, $\varnothing 63$, $\varnothing 80$



Specifications

Item		MFC-B/MFC-BL/MFC-BK/MFC-BKL				
Bore size	mm	$\varnothing 30$	$\varnothing 40$	$\varnothing 50$	$\varnothing 63$	$\varnothing 80$
Actuation		Double acting/with brake				
Working fluid		Compressed air				
Max. working pressure	Cylinder section MPa	1.0 (≈ 150 psi, 10 bar)				
	Brake section MPa	1.0 (≈ 150 psi, 10 bar)				
Min. working pressure	Cylinder section MPa	0.15 (≈ 22 psi, 1.5 bar)				
	Brake section MPa	0.35 (≈ 51 psi, 3.5 bar)				
Proof pressure	MPa	1.6 (≈ 230 psi, 16 bar)				
Ambient temperature	$^{\circ}\text{C}$	-10 (14 $^{\circ}\text{F}$) to 50 (122 $^{\circ}\text{F}$) (no freezing)				
Port size		Rc1/8		Rc1/4		Rc3/8
Stroke tolerance	mm	$^{+0.5}_0$ (Less than 350) $^{+1.0}_0$ (350 and over)				
Working piston speed	mm/s	50 to 300 (no load)				
Cushion		Air cushion				
Effective cushion length	mm	15	13	22	22	26
Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)				
Allowable absorbed energy J	Cushioned	0.9	4.3	8.4	15.8	27.9
	Without cushion	Cannot absorb high energy generated by external load. We recommend using an external shock absorber.				

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)	Min. stroke (mm) * When with switch
$\varnothing 30$	50/75/100/150/200/300	500	5	30
$\varnothing 40$				
$\varnothing 50$				
$\varnothing 63$				
$\varnothing 80$		*2		

*1 : The custom stroke is available in 5 mm increments.

*2 : The cushion effect may not be attained if the cylinder stroke is shorter than the effective cushion length.

Switch specifications

Item	Proximity 2-wire			Proximity 3-wire	
	R1	R2	R2Y (2-color LED)	R3	R3Y (2-color LED)
Applications	Programmable controller, relay, compact solenoid valve	Dedicated for programmable controller		For programmable controller, relay, IC circuit, solenoid valve	
Output method	-			NPN output	
Power supply voltage/current	-			4.5 VDC to 28 VDC	
Load voltage/current	85 VAC to 265 VAC 5 to 100 mA	10 V to 30 VDC 5 to 30 mA		30 VDC or less 200 mA or less (R3), 100 mA or less (R3Y)	
Indicator	LED (Lit when ON) (R1, R2, R3)/Red/Green LED (Lit when ON) (R2Y, R3Y)				
Leakage current	1 mA or less with 100 VAC, 2 mA or less with 200 VAC	1 mA or less	1.2 mA or less	10 μA or less	
Max. shock resistance	980 m/s ²				
Weight g	Grommet	1 m:42 3 m:100 5 m:158	1 m:56 3 m:114 5 m:172	1 m:42 3 m:100 5 m:158	1 m:56 3 m:114 5 m:172
	Terminal box	68		68	
Item	Reed 2-wire				
	R0	R4	R5	R6	
Applications	For relay, programmable controller	For high capacity relay, solenoid valve	For programmable controller, relay, IC circuit (without indicator lamp), serial connection	Dedicated for programmable controller I (with DC self-hold)	
Load voltage/current	12/24 VDC, 5 to 50 mA 110 VAC, 7 to 20 mA 220 VAC, 7 to 10 mA	110 VAC, 20 to 200 mA 220 VAC, 10 to 200 mA	5/12/24 VDC: 50 mA or less, 110 VAC: 20 mA or less, 220 VAC: 10 mA or less	24 VDC, 5 to 50 mA	
Indicator	LED (Lit when ON)	Neon lamp (Lit when OFF)	No indicator lamp	LED (Lit when ON)	
Leakage current	0 mA	1 mA or less	0 mA	0.1 mA or less	
Max. shock resistance	294 m/s ²				
Weight g	Grommet	1 m:42 3 m:100 5 m:158			
	Terminal box	68			

*1: Refer to Ending Page 1 for detailed switch specifications and dimensions.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Cylinder weight (with brake/high load with brake)

● With brake: MFC-B/MFC-BL

(Unit: kg)

Bore size (mm)	When stroke (S) = 0 mm					Additional weight per S = 100 mm	Switch weight	Mounting bracket weight	Switch rail weight for 0 mm stroke	Weight of rail holding bracket			Additional weight with switch rail S = 100 mm
	Basic (00)	Foot (LA)		Flange (FA)	Flange (FB)					5 to 200 mm	201 to 500 mm	501 to 1000 mm	
		St = under 300 mm	St ≥ 300 mm										
ø30	5.7	6.2	6.7	6.1	6.2	1.2	Refer to the weight in the switch specifications.	0.020	0.058	0.034	0.051	-	0.040
ø40	9.1	10.0	10.9	9.7	10.0	1.5			0.064	0.038	0.057	-	
ø50	18.1	19.9	21.7	19.3	19.9	2.7			0.093	0.052	0.078	0.130	
ø63	28.1	31.1	34.1	30.2	31.1	3.0			0.098	0.076	0.114	0.190	
ø80	45.2	50.7	56.2	49.1	50.7	4.4			0.117	0.086	0.129	0.215	

● High load with brake: MFC-BK/MFC-BKL

(Unit: kg)

Bore size (mm)	When stroke (S) = 0 mm					Additional weight per S = 100 mm	Switch weight	Mounting bracket weight	Switch rail weight for 0 mm stroke	Weight of rail holding bracket			Additional weight with switch rail S = 100 mm
	Basic (00)	Foot (LA)		Flange (FA)	Flange (FB)					5 to 200 mm	201 to 500 mm	501 to 1000 mm	
		St = under 300 mm	St ≥ 300 mm										
ø30	8.1	8.9	9.7	8.7	8.8	1.2	Refer to the weight in the switch specifications.	0.020	0.097	0.034	0.051	-	0.040
ø40	12.7	14.2	15.6	13.6	14.0	1.5			0.109	0.038	0.057	-	
ø50	26.1	28.8	31.5	27.7	28.6	2.7			0.154	0.052	0.078	0.130	
ø63	40.8	45.2	49.6	43.5	44.9	3.0			0.176	0.076	0.114	0.190	
ø80	65.8	73.4	81.0	70.5	72.9	4.4			0.206	0.086	0.129	0.215	

(Example) Product weight of MFC-BL-00-30B-50-R0-R

- Product weight at 0 mm stroke (mounting: 00) 5.7 kg
- Additional weight per 50 mm stroke $1.1 \times \frac{50}{100} = 0.55$ kg
- Switch rail weight for 0 mm stroke 0.058 kg
- Rail holding bracket weight (stroke 50 mm) 0.034 kg
- Switch rail additional weight for 50 mm stroke $0.040 \times \frac{50}{100} = 0.020$ kg
- Weight of one RO switch 0.042 kg
- Weight of 1 mounting bracket 0.020 kg
- Product weight $5.7 + 0.55 + 0.058 + 0.034 + 0.020 + 0.042 + 0.020 = 6.424$ kg

MFC-B/MFC-BK Series

Planned for end of production
February 2022

How to order

Without switch (without magnet for switch)

MFC-B - 00 - 30 - B - 50

With switch (built-in magnet for switch)

MFC-BL - 00 - 30 - B - 50 - R0 - R

A Model

B Mounting *1

C Bore size

D Cushion

E Stroke

F Switch model No.

G Switch quantity

LCM
LCR
LCC
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MecHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Code	Description
A Model	
MFC-B	With brake
MFC-BL	With brake/with switch
MFC-BK	High load with brake
MFC-BKL	High load with brake/with switch

B Mounting	
00	Basic
LA	Rod side foot
FA	Rod side flange
FB	Head side flange

C Bore size (mm)	
30	ø30
40	ø40
50	ø50
63	ø63
80	ø80

D Cushion	
B	Both sides cushioned
R	Rod side cushioned
H	Head side cushioned
N	Without cushion

E Stroke (mm)		
Bore size	Stroke *2	Custom stroke
ø30	5 to 500	In 5 mm increments
ø40	5 to 500	
ø50	5 to 1000	
ø63	5 to 1000	
ø80	5 to 1000	

F Switch model No.						
Grommet	Terminal box Type	Contact	Voltage		Indicator	Lead wire
			AC	DC		
R 1*	R1B	Proximity	●		1-color LED	2-wire
R 2*	R2B			●		
R 3*	R3B			●		3-wire
R 0*	R0B	Reed	●	●	1-color LED	2-wire
R 4*	R4B		●			
R 5*	R5B		●	●	No indicator lamp	
R 6*	R6B			●	1-color LED	

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

G Switch quantity	
R	1 on rod side
H	1 on head side
D	2
T	3

⚠ Precautions for model No. selection

*1 : Mounting bracket will be shipped assembled with the product.

*2 : Refer to page 1226 for min. stroke with switch.

[Example of model No.]

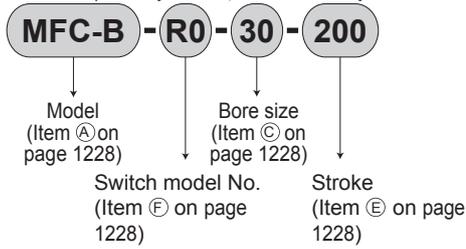
MFC-BL-00-30B-50-R0-R

Model: Robot cylinder

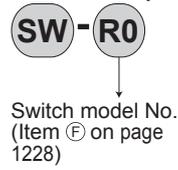
- A** Model : With brake, with switch
- B** Mounting : Basic
- C** Bore size : ø30 mm
- D** Cushion : Both sides cushioned
- E** Stroke : 50mm
- F** Switch model No.: Reed switch R0, lead wire length 1 m
- G** Switch quantity : 1 on rod side

How to order switch

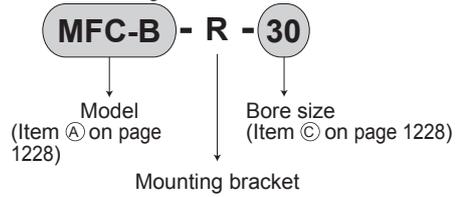
- Switch body + mounting bracket set (switch rail + rail mounting bracket + switch mounting bracket)



- Switch body only



- Mounting bracket set



- Terminal box only
· For R□B



Theoretical thrust table

(Unit: N)

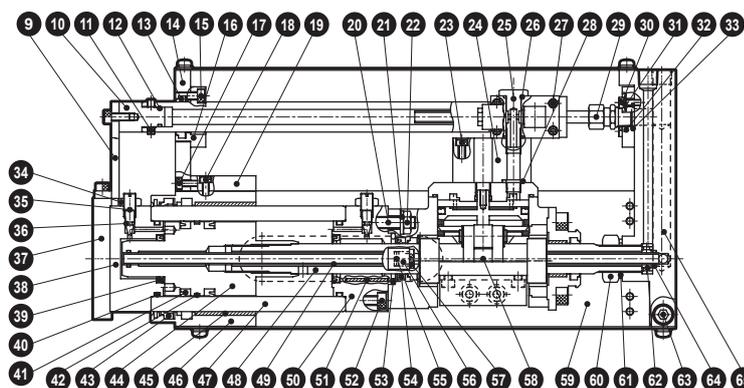
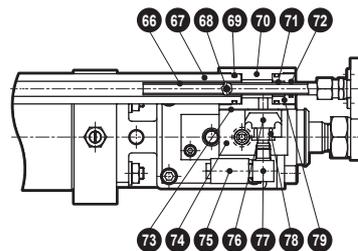
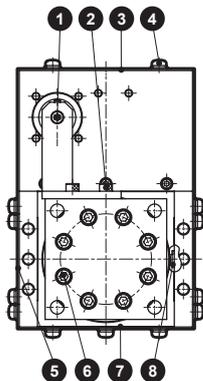
Bore size (mm)	Operating direction	Working pressure MPa									
		0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
ø30	Push	8.85x10 ¹	1.18x10 ²	1.78x10 ²	2.37x10 ²	2.96x10 ²	3.56x10 ²	4.15x10 ²	4.75x10 ²	5.34x10 ²	5.93x10 ²
	Pull	1.05x10 ²	1.41x10 ²	2.12x10 ²	2.82x10 ²	3.53x10 ²	4.24x10 ²	4.94x10 ²	5.65x10 ²	6.36x10 ²	7.06x10 ²
ø40	Push	1.58x10 ²	2.11x10 ²	3.16x10 ²	4.22x10 ²	5.27x10 ²	6.33x10 ²	7.38x10 ²	8.44x10 ²	9.50x10 ²	1.05x10 ³
	Pull	1.88x10 ²	2.51x10 ²	3.76x10 ²	5.02x10 ²	6.28x10 ²	7.53x10 ²	8.79x10 ²	1.00x10 ³	1.13x10 ³	1.25x10 ³
ø50	Push	2.46x10 ²	3.29x10 ²	4.94x10 ²	6.59x10 ²	8.24x10 ²	9.89x10 ²	1.15x10 ³	1.31x10 ³	1.48x10 ³	1.64x10 ³
	Pull	2.94x10 ²	3.92x10 ²	5.89x10 ²	7.85x10 ²	9.81x10 ²	1.17x10 ³	1.37x10 ³	1.57x10 ³	1.76x10 ³	1.96x10 ³
ø63	Push	4.20x10 ²	5.60x10 ²	8.40x10 ²	1.12x10 ³	1.40x10 ³	1.68x10 ³	1.96x10 ³	2.24x10 ³	2.52x10 ³	2.80x10 ³
	Pull	4.67x10 ²	6.23x10 ²	9.35x10 ²	1.24x10 ³	1.55x10 ³	1.87x10 ³	2.18x10 ³	2.49x10 ³	2.80x10 ³	3.11x10 ³
ø80	Push	6.80x10 ²	9.07x10 ²	1.36x10 ³	1.81x10 ³	2.26x10 ³	2.72x10 ³	3.17x10 ³	3.62x10 ³	4.08x10 ³	4.53x10 ³
	Pull	7.52x10 ²	1.00x10 ³	1.50x10 ³	2.01x10 ³	2.51x10 ³	3.01x10 ³	3.51x10 ³	4.02x10 ³	4.52x10 ³	5.02x10 ³

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC**
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

MFC-B/MFC-BK Series

Internal structure and parts list (with brake)

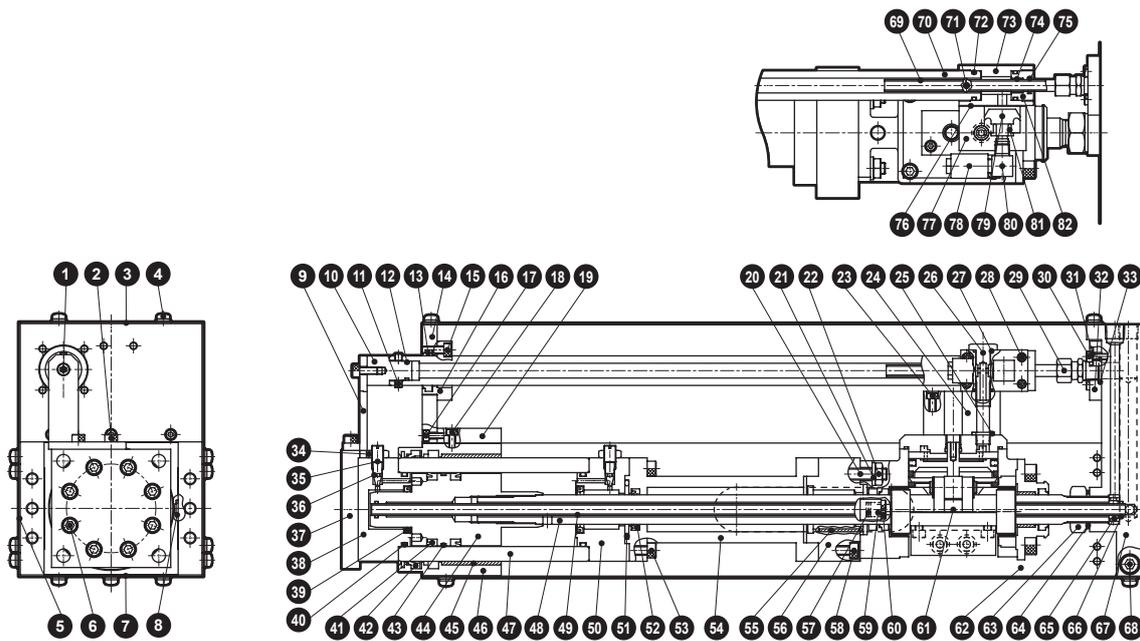
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- LCR
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- UCA2
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- LMB
- LML
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- UCAC2
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- NHS
- HRL
- LN
- Hand
- Chuk
- MecHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending



No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Hexagon socket head cap screw	Steel		40	Gasket	Nitrile rubber	
2	Hexagon socket head cap screw	Steel		41	Piston packing	Nitrile rubber	
3	Top cover	Steel plate		42	Wear ring	Polyacetal resin	
4	Cross-recessed pan head screw, captive washer	Steel		43	Dust wiper	Nitrile rubber	
5	Middle cover	Aluminum plate		44	Piston	Aluminum alloy	
6	Hexagon socket head cap screw	Steel		45	Bush	Dry bearing	
7	Bottom cover	Steel plate		46	Bearing housing	Cast iron	
8	Gasket	Nitrile rubber		47	Cylinder tube	Aluminum alloy	
9	Piping end holder	Steel		48	Piston rod	Steel	
10	Piping end guide	Aluminum alloy		49	Pipe	Stainless steel	
11	Hexagon socket set screw	Steel		50	Rod cover	Cast iron	
12	Gasket	Nitrile rubber		51	Rotation-stop plate	Dry bearing	
13	Dust wiper	Nitrile rubber		52	Hexagon socket head cap screw	Steel	
14	Brake piping block (A)	Aluminum alloy		53	Gasket	Nitrile rubber	ø50 to ø80 only
15	Hexagon socket head cap screw	Steel		54	Rod packing	Nitrile rubber	
16	Brake piping holder	Steel		55	Magnet	Rare-earth	With switch only
17	Hexagon socket head cap screw	Steel		56	Magnet holder	Aluminum alloy	With switch only
18	Hexagon socket head cap screw	Steel		57	Hexagon socket head cap screw	Steel	With switch only
19	Brake piping block (B)	Aluminum alloy		58	Brake section		
20	Hexagon socket head cap screw (ø30, ø40) Hexagon socket set screw (ø63 to ø80)	Steel		59	Side guide	Steel	
21	Spring washer	Steel	ø50 to ø80 only	60	Hexagon nut	Steel	
22	Hexagon nut	Steel	ø50 to ø80 only	61	Seal washer	Nitrile rubber, steel	
23	Hexagon socket head cap screw	Steel		62	Pipe guide	Aluminum alloy	
24	Spacer	Aluminum alloy	ø50 to ø80 only	63	Hexagon socket head cap screw	Steel	
25	Nipple	Copper alloy		64	Gasket	Nitrile rubber	
26	Gasket	Nitrile rubber		65	Fixed guide	Cast iron	
27	Hexagon socket head cap screw	Steel		66	Piping pipe	Stainless steel	
28	Gasket	Nitrile rubber	ø50 to ø80 only	67	Piping rod	Steel	
29	Pipe joint	Copper alloy		68	Hexagon socket set screw	Steel	
30	Hexagon socket head cap screw	Steel		69	Gasket	Nitrile rubber	
31	Plain washer	Steel		70	Piping plate 1	Aluminum alloy	
32	Brake piping collar	Aluminum alloy		71	Bush	Dry bearing	
33	Gasket	Nitrile rubber		72	Piping packing	Nitrile rubber	
34	Needle nut	Steel		73	QEV gasket	Rubber cork	
35	Cushion needle	Copper alloy		74	QEV body	Aluminum alloy	
36	Gasket	Nitrile rubber		75	Silencer	Polyamide resin	
37	Head flange	Steel		76	Quick exhaust valve packing	Nitrile rubber	
38	Head cover	Cast iron		77	Elbow fitting	Copper alloy	
39	Cushion packing	Nitrile rubber, steel		78	Valve seat	Copper alloy	
				79	Piping plate 2	Aluminum alloy	

Note: Contact CKD when replacing repair parts.

Internal structure and parts list (with brake/high load)



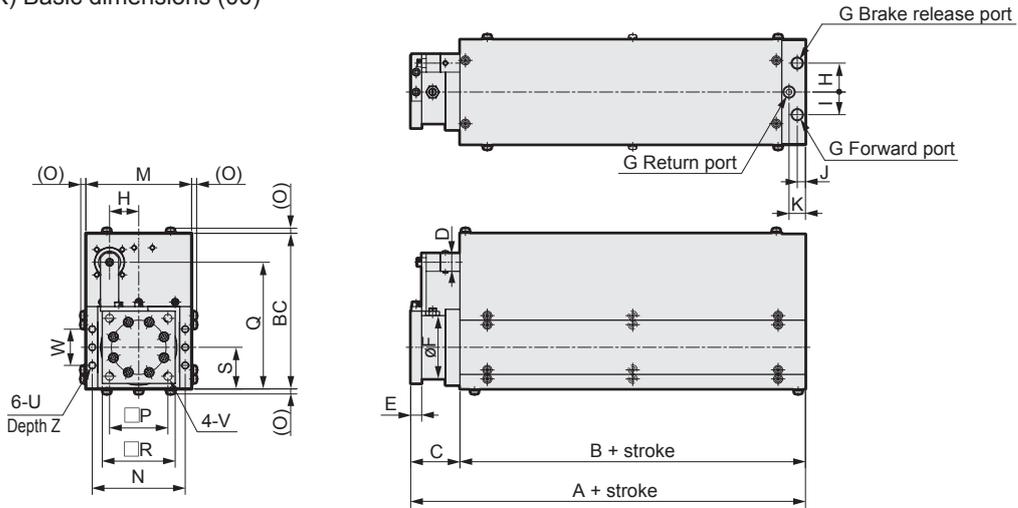
No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Hexagon socket head cap screw	Steel		42	Dust wiper	Nitrile rubber	
2	Hexagon socket head cap screw	Steel		43	Wear ring	Polyacetal resin	
3	Top cover	Steel plate		44	Piston	Aluminum alloy	
4	Cross-recessed pan head screw, captive washer	Steel		45	Bush	Dry bearing	
5	Middle cover	Aluminum plate		46	Bearing housing	Cast iron	
6	Hexagon socket head cap screw	Steel		47	Cylinder tube	Aluminum alloy	
7	Bottom cover	Steel plate		48	Piston rod	Steel	
8	Gasket	Nitrile rubber		49	Pipe	Stainless steel	
9	Piping end holder	Steel		50	Rod cover	Cast iron	
10	Piping end guide	Aluminum alloy		51	Gasket	Nitrile rubber	
11	Hexagon socket set screw	Steel		52	Rod packing	Nitrile rubber	
12	Gasket	Nitrile rubber		53	Hexagon socket head cap screw	Steel	
13	Dust wiper	Nitrile rubber		54	Packing holder	Steel	
14	Brake piping block (A)	Aluminum alloy		55	Rotation-stop plate	Dry bearing	
15	Hexagon socket head cap screw	Steel		56	Guide cover	Cast iron	
16	Brake piping holder	Steel		57	Magnet	Rare-earth	With switch only
17	Hexagon socket head cap screw	Steel		58	Hexagon socket head cap screw	Steel	
18	Hexagon socket head cap screw	Steel		59	Magnet holder	Aluminum alloy	With switch only
19	Brake piping block (B)	Aluminum alloy		60	Hexagon socket head cap screw	Steel	With switch only
20	Hexagon socket head cap screw (ø30, ø40) Hexagon socket set screw (ø63 to ø80)	Steel		61	Brake section		
21	Spring washer	Steel	ø50 to ø80 only	62	Side guide	Steel	
22	Hexagon nut	Steel	ø50 to ø80 only	63	Hexagon nut	Steel	
23	Hexagon socket head cap screw	Steel		64	Seal washer	Nitrile rubber, steel	
24	Spacer	Aluminum alloy	ø50 to ø80 only	65	Pipe guide	Aluminum alloy	
25	Gasket	Nitrile rubber	ø50 to ø80 only	66	Gasket	Nitrile rubber	
26	Nipple	Copper alloy		67	Fixed guide	Cast iron	
27	Gasket	Nitrile rubber		68	Hexagon socket head cap screw	Steel	
28	Hexagon socket head cap screw	Steel		69	Piping pipe	Stainless steel	
29	Pipe joint	Copper alloy		70	Piping rod	Steel	
30	Hexagon socket head cap screw	Steel		71	Hexagon socket set screw	Steel	
31	Plain washer	Steel		72	Gasket	Nitrile rubber	
32	Brake piping collar	Aluminum alloy		73	Piping plate 1	Aluminum alloy	
33	Gasket	Nitrile rubber		74	Bush	Dry bearing	
34	Needle nut	Steel		75	Piping packing	Nitrile rubber	
35	Cushion needle	Copper alloy		76	QEV gasket	Rubber cork	
36	Gasket	Nitrile rubber		77	QEV body	Aluminum alloy	
37	Head flange	Steel		78	Silencer	Polyamide resin	
38	Head cover	Cast iron		79	Quick exhaust valve packing	Nitrile rubber	
39	Cushion packing	Nitrile rubber, steel		80	Elbow fitting	Copper alloy	
40	Gasket	Nitrile rubber		81	Valve seat	Copper alloy	
41	Piston packing	Nitrile rubber		82	Piping plate 2	Aluminum alloy	

LCM
LCR
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LCX
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STS/STL
STR2
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JSK/M2
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LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

MFC-B/MFC-BK Series

Dimensions

● MFC-B (K) Basic dimensions (00)

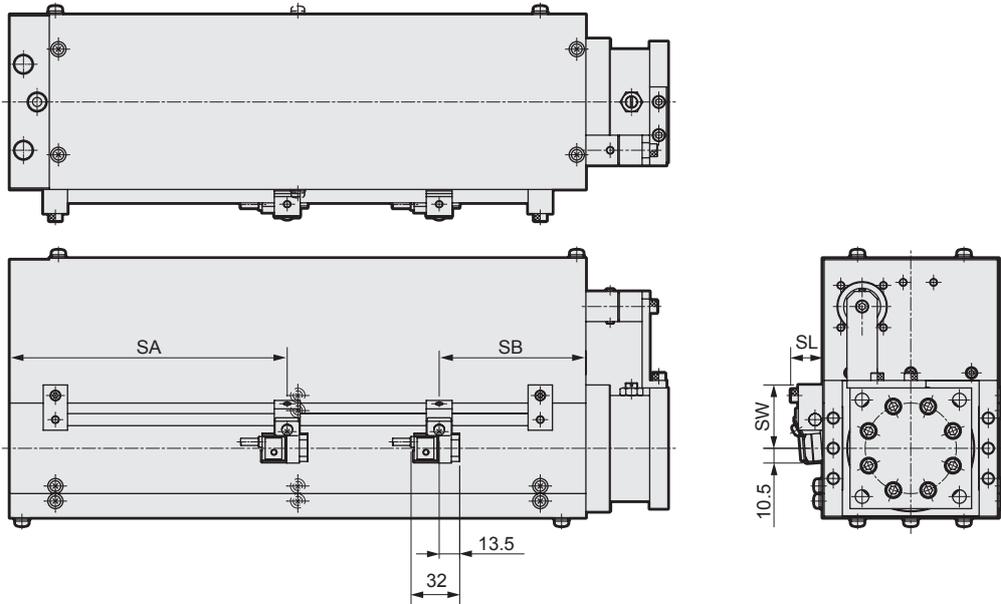


Code	Basic (00) basic dimensions																			
Bore size (mm)	A	(A)	B	(B)	BC	C	D	E	F	G	H	I	J	K	M	(M)	N	(N)	O	P
ø30	212	310	181	279	122	31	12	8	45	Rc1/8	20	20	8	15	80	86	69	72	5	40
ø40	238	352	198	312	162	40	16	10	55	Rc1/8	25	20	8	16	90	96	79	82	5	50
ø50	333	487	279	433	172	54	20	12	70	Rc1/4	32	25	9	18	116	124	102	106	6	64
ø63	375	573	312	510	188	63	20	16	85	Rc1/4	32	25	9	18	136	144	122	126	6	80
ø80	443	667	370	594	225	73	25	19	110	Rc3/8	36	35	14	28	174	180	156	159	6	100

*1 : Codes with ○ indicate dimensions of high load.

Code	Basic (00) basic dimensions								
Bore size (mm)	Q	R	S	T	U	V	W	Z	(Z)
ø30	88	52	31	20	M 6	7	30	10	12
ø40	105	63	36	25	M 6	7	35	10	12
ø50	140	80	46	32	M 8	9	40	12	15
ø63	161	100	56	32	M10	11	58	15	18
ø80	196	125	71	36	M12	14	80	18	20

● MFC-B(K) L (robot cylinder with brake, with switch)



Unit: mm

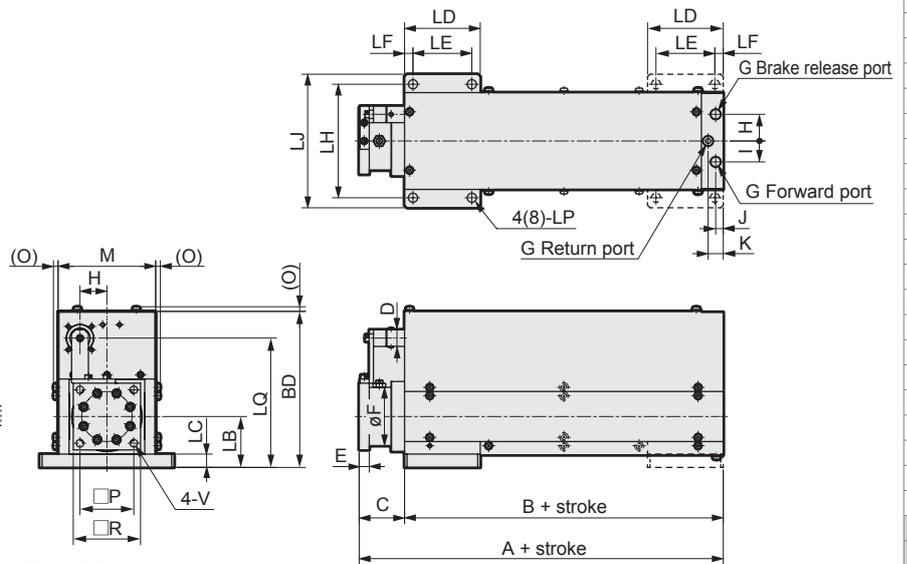
Code	SW	SL	SA	SB	(SB)
ø30	31	20	111.5	69.5	167.5
ø40	35	20	121	77	191
ø50	42	21	182.5	96.5	250.5
ø63	52	21	192.5	119.5	317.5
ø80	59	21	237.5	132.5	356.5

*1 : Codes with ○ indicate dimensions of high load.

*2 : For 30 to 50 mm stroke, switch can be installed bi-directionally as well as uni-directionally.

Dimensions

● Rod side foot (LA)



*1 : Codes with ○ indicate dimensions of high load.
 *2 : The following strokes include the dotted line

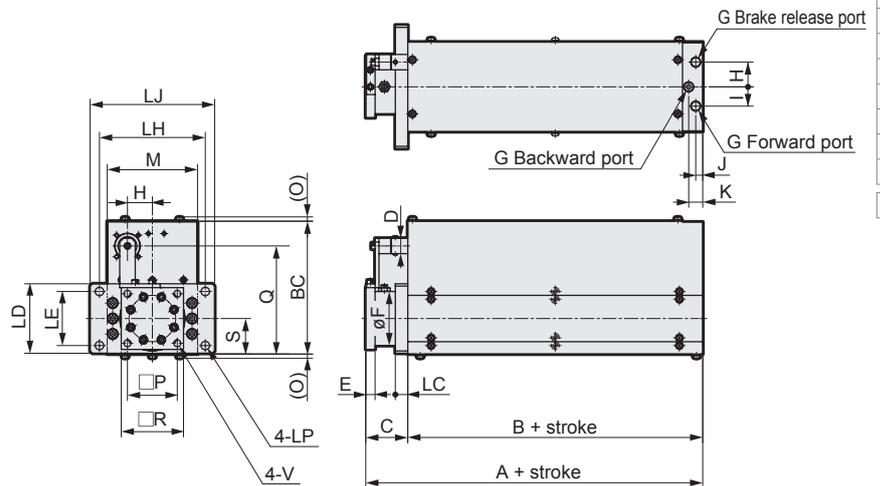
For ø30.....300 mm or more
 For ø40.....300 mm or more
 For ø50.....400 mm or more
 For ø63.....500 mm or more
 For ø80.....500 mm or more

Note: Refer to page 1232 for switch dimensions with switch.

Code		Rod side foot (LA) basic dimensions																		
Bore size (mm)	A	ⓐ	B	ⓑ	BD	ⓓD	C	D	E	F	G	H	I	J	K	LB	ⓁB	LC	ⓁC	LD
ø30	212	310	181	279	131	133	31	12	8	45	Rc1/8	20	20	8	15	40	42	10	12	60
ø40	238	352	198	312	173	177	40	16	10	55	Rc1/8	25	20	8	16	47	51	12	16	70
ø50	333	487	279	433	187	190	54	20	12	70	Rc1/4	32	25	9	18	61	64	16	19	90
ø63	375	573	312	510	206	209	63	20	16	85	Rc1/4	32	25	9	18	74	77	19	22	110
ø80	443	667	370	594	246	249	73	25	19	110	Rc3/8	36	35	14	28	92	95	22	25	140

Code		Rod side foot (LA) basic dimensions																	
Bore size (mm)	ⓁD	LE	ⓁE	LF	ⓁF	LH	ⓁH	LJ	ⓁJ	LP	ⓁP	LQ	ⓁQ	M	Ⓜ	O	P	R	V
ø30	70	46	50	7	10	90	104	106	124	7	9	97	99	80	86	5	40	52	7
ø40	80	50	54	10	13	114	120	134	146	9	11	116	120	90	96	5	50	63	7
ø50	100	70	70	10	15	136	152	160	182	11	14	155	158	116	124	6	64	80	9
ø63	120	86	84	12	18	162	178	190	214	14	16	179	182	136	144	6	80	100	11
ø80	150	114	110	13	20	200	218	236	258	16	18	217	220	174	180	6	100	125	14

● Rod side flange (FA)



*1 : Codes with ○ indicate dimensions of high load.

Note: Refer to page 1232 for switch dimensions with switch.

Code		Rod side flange (FA) basic dimensions																		
Bore size (mm)	A	ⓐ	B	ⓑ	BC	C	D	E	F	G	H	I	J	K	LC	ⓁC	LD	LE	ⓁE	LH
ø30	212	310	181	279	122	31	12	8	45	Rc1/8	20	20	8	15	10	12	60	46	40	90
ø40	238	352	198	312	162	40	16	10	55	Rc1/8	25	20	8	16	12	16	70	50	44	114
ø50	333	487	279	433	172	54	20	12	70	Rc1/4	32	25	9	18	16	19	90	70	60	136
ø63	375	573	312	510	188	63	20	16	85	Rc1/4	32	25	9	18	19	22	110	86	74	162
ø80	443	667	370	594	225	73	25	19	110	Rc3/8	36	35	14	28	22	25	140	114	100	200

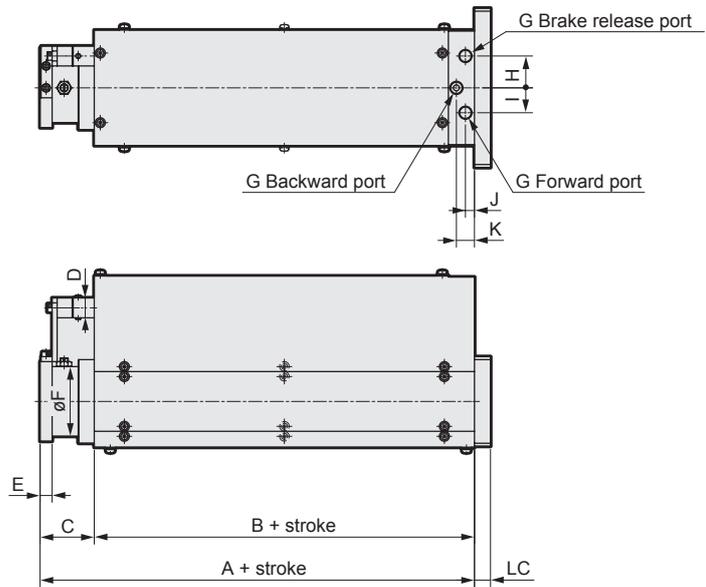
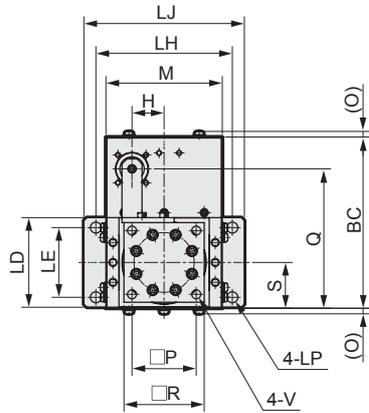
Code		Rod side flange (FA) basic dimensions												
Bore size (mm)	ⓁH	LJ	ⓁJ	LP	ⓁP	M	Ⓜ	O	P	Q	R	S	V	
ø30	104	106	124	7	9	80	86	5	40	88	52	31	7	
ø40	120	134	146	9	11	90	96	5	50	105	63	36	7	
ø50	152	160	182	11	14	116	124	6	64	140	80	46	9	
ø63	178	190	214	14	16	136	144	6	80	161	100	56	11	
ø80	218	236	258	16	18	174	180	6	100	196	125	71	14	

- LCM
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- LCG
- LCW
- LCX
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- STG
- STS/STL
- STR2
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- JSG
- JSC3/JSC4
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- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC**
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
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- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

MFC-B/MFC-BK Series

Dimensions

● Head side flange (FB)



*1 : Codes with ○ indicate dimensions of high load.

Note: Refer to page 1232 for switch dimensions with switch.

Code	Head side flange (FB) basic dimensions																			
Bore size (mm)	A	ⓐ	B	ⓑ	BC	C	D	E	F	G	H	I	J	K	LC	ⓐ	LD	LE	ⓓ	LH
ø30	212	310	181	279	122	31	12	8	45	Rc1/8	20	20	8	15	10	12	60	46	40	90
ø40	238	352	198	312	162	40	16	10	55	Rc1/8	25	20	8	16	12	16	70	50	44	114
ø50	333	487	279	433	172	54	20	12	70	Rc1/4	32	25	9	18	16	19	90	70	60	136
ø63	375	573	312	510	188	63	20	16	85	Rc1/4	32	25	9	18	19	22	110	86	74	162
ø80	443	667	370	594	225	73	25	19	110	Rc3/8	36	35	14	28	22	25	140	114	100	200

Code	Head side flange (FB) basic dimensions												
Bore size (mm)	ⓐ	LJ	ⓑ	LP	ⓓ	M	ⓓ	O	P	Q	R	S	V
ø30	104	106	124	7	9	80	86	5	40	88	52	31	7
ø40	120	134	146	9	11	90	96	5	50	105	63	36	7
ø50	152	160	182	11	14	116	124	6	64	140	80	46	9
ø63	178	190	214	14	16	136	144	6	80	161	100	56	11
ø80	218	236	258	16	18	174	180	6	100	196	125	71	14

Discontinue

MEMO

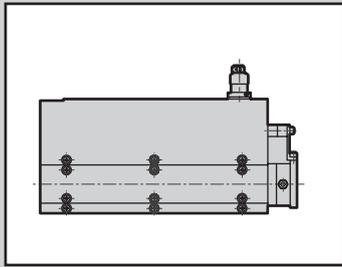
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LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Discontinue

Robot cylinder Double acting/with brake sensor
Double acting/with brake sensor, high load

MFC-BS/MFC-BSK Series

● Bore size: ø30, ø40, ø50, ø63, ø80



Specifications

Item		MFC-BS/MFC-BSK					
Bore size		mm	ø30	ø40	ø50	ø63	ø80
Actuation		Double acting/with brake sensor					
Working fluid		Compressed air					
Max. working pressure	Cylinder	MPa	1.0 (≈150 psi, 10 bar)				
	Brake section	MPa	1.0 (≈150 psi, 10 bar)				
Min. working pressure	Cylinder	MPa	0.15 (≈22 psi, 1.5 bar)				
	Brake section	MPa	0.35 (≈51 psi, 3.5 bar)				
Proof pressure		MPa	1.6 (≈230 psi, 16 bar)				
Ambient temperature		°C	0 (32°F) to 50 (122°F)				
Port size			Rc1/8		Rc1/4		Rc3/8
Stroke tolerance		mm	+0.5 (Less than 350) +1.0 (350 and over)				
Working piston speed		mm/s	50 to 300 (no load)				
Cushion			Air cushion				
Effective cushion length		mm	15	13	22	22	26
Stopping accuracy		mm	±1.0 (300 mm/s, no load)				
Holding force		N	431	765	1569	2451	3922
Resolution		mm	0.1				
Lubrication		Not required (use turbine oil class 1 ISO VG32 if necessary for lubrication)					
Allowable absorbed energy	Cushioned	J	0.9	4.3	8.4	15.8	27.9
	Without cushion	J	Cannot absorb high energy generated by external load. We recommend using an external shock absorber.				

* Consult with CKD regarding low hydraulic specifications.

Stroke

Bore size (mm)	Standard stroke (mm)	Max. stroke (mm)	Min. stroke (mm)
ø30	50/75/100/ 150/200/300	500	5
ø40			
ø50		1000	*2
ø63			
ø80			

*1 : The custom stroke is available in 5 mm increments.

*2 : The cushion effect may not be attained if the cylinder stroke is shorter than the effective cushion length.

Detector (encoder) specifications

Item	Specifications
Rated voltage (V)	5 to 12 VDC (±5%)
Current consumption (mA)	50
Output unit (mm/pulse)	0.1
Response frequency (kHz)	25
Output impedance (kΩ)	2.2
Output signal (V)	1(High)
	0(Low)
	11(MIN)
	0(MAX)

Cylinder weight (with brake/high load with brake sensor)

● With brake sensor: MFC-BS

(Unit: kg)

Bore size (mm)	Product weight when stroke (S) = 0 mm					Additional weight per S = 100 mm
	Basic (00)	Foot (LA)		Flange (FA)	Flange (FB)	
		St = under 300 mm	St = 300 mm and over			
ø30	6.0	6.5	7.0	6.4	6.5	1.2
ø40	9.4	10.3	11.2	10.0	10.3	1.5
ø50	18.6	20.4	22.2	19.8	20.4	2.7
ø63	28.6	31.6	34.6	30.7	31.6	3.0
ø80	45.7	51.2	56.7	49.6	51.2	4.4

● High load with brake sensor: MFC-BSK

(Unit: kg)

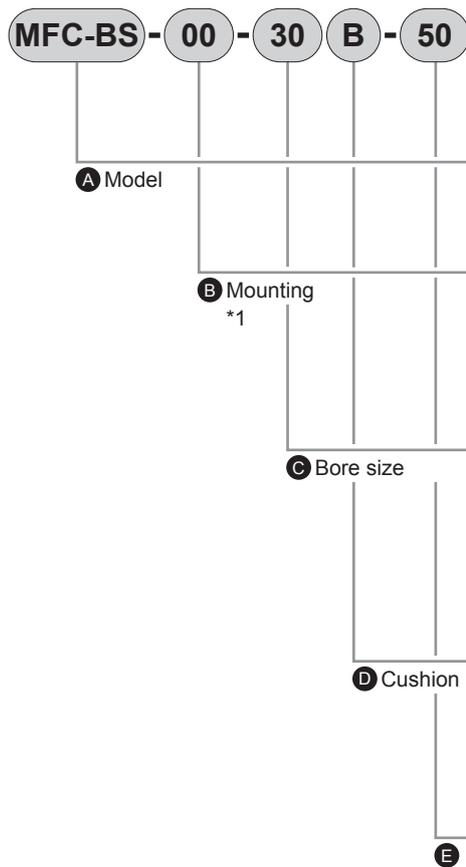
Bore size (mm)	Product weight when stroke (S) = 0 mm					Additional weight per S = 100 mm
	Basic (00)	Foot (LA)		Flange (FA)	Flange (FB)	
		St = under 300 mm	St = 300 mm and over			
ø30	8.4	9.2	10.0	9.0	9.1	1.2
ø40	13.0	14.5	15.9	13.9	14.3	1.5
ø50	26.6	29.3	32.0	28.2	29.1	2.7
ø63	41.3	45.7	50.1	44.0	45.4	3.0
ø80	66.3	73.9	81.5	71.0	73.4	4.4

Formula for product weight

(Example) Product weight of MFC-BS-FA-30B-200

- Product weight at 0 mm stroke (mounting: FA) 6.4 kg
- Additional weight per 200 mm stroke $1.2 \times \frac{200}{100} = 2.4$ kg
- Product weight $6.4 + 2.4 = 8.8$ kg

How to order



Planned for end of production
February 2022

Code	Description
A Model	
MFC-BS	With brake sensor
MFC-BSK	High load with brake sensor

B Mounting	
00	Basic
LA	Rod side foot
FA	Rod side flange
FB	Head side flange

C Bore size (mm)	
30	ø30
40	ø40
50	ø50
63	ø63
80	ø80

D Cushion	
B	Both sides cushioned
R	Rod side cushioned
H	Head side cushioned
N	Without cushion

E Stroke (mm)		
Bore size	Stroke	Custom stroke
ø30	5 to 500	In 5 mm increments
ø40	5 to 500	
ø50	5 to 1000	
ø63	5 to 1000	
ø80	5 to 1000	

Precautions for model No. selection

*1: Mounting bracket will be shipped assembled with the product.

[Example of model No.]

MFC-BS-00-30B-50

Model: Robot cylinder

- A** Model : With brake sensor
- B** Mounting : Basic
- C** Bore size : ø30 mm
- D** Cushion : Both sides cushioned
- E** Stroke : 50mm

Theoretical thrust table

(Unit: N)

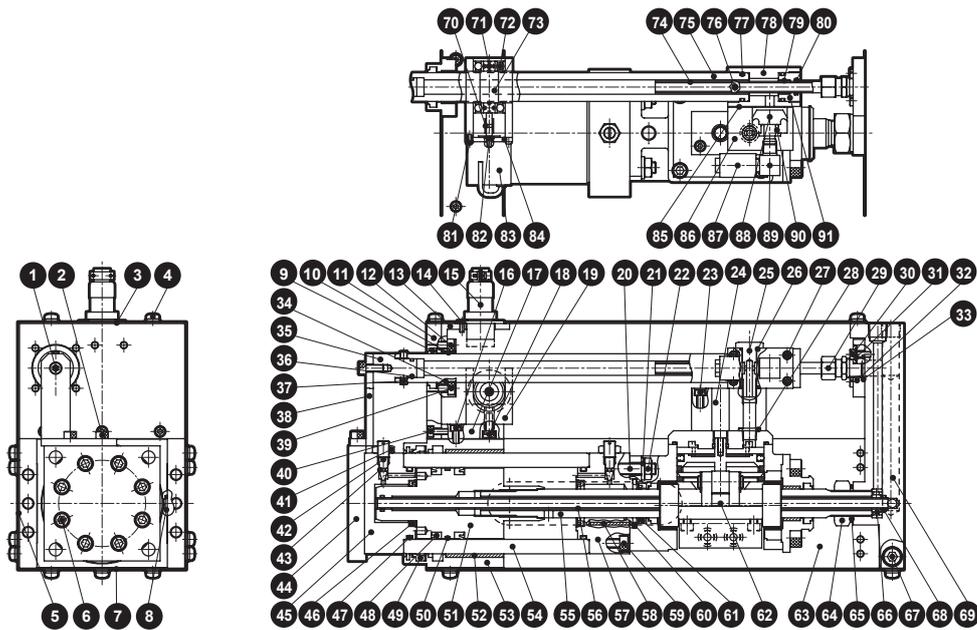
Bore size (mm)	Operating direction	Working pressure MPa									
		0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
ø30	Push	8.85 x 10	1.18 x 10 ²	1.78 x 10 ²	2.37 x 10 ²	2.96 x 10 ²	3.56 x 10 ²	4.15 x 10 ²	4.75 x 10 ²	5.34 x 10 ²	5.93 x 10 ²
	Pull	1.05 x 10 ²	1.41 x 10 ²	2.12 x 10 ²	2.82 x 10 ²	3.53 x 10 ²	4.24 x 10 ²	4.94 x 10 ²	5.65 x 10 ²	6.36 x 10 ²	7.06 x 10 ²
ø40	Push	1.58 x 10 ²	2.11 x 10 ²	3.16 x 10 ²	4.22 x 10 ²	5.27 x 10 ²	6.33 x 10 ²	7.38 x 10 ²	8.44 x 10 ²	9.50 x 10 ²	1.05 x 10 ³
	Pull	1.88 x 10 ²	2.51 x 10 ²	3.76 x 10 ²	5.02 x 10 ²	6.28 x 10 ²	7.53 x 10 ²	8.79 x 10 ²	1.00 x 10 ³	1.13 x 10 ³	1.25 x 10 ³
ø50	Push	2.46 x 10 ²	3.29 x 10 ²	4.94 x 10 ²	6.59 x 10 ²	8.24 x 10 ²	9.89 x 10 ²	1.15 x 10 ³	1.31 x 10 ³	1.48 x 10 ³	1.64 x 10 ³
	Pull	2.94 x 10 ²	3.92 x 10 ²	5.89 x 10 ²	7.85 x 10 ²	9.81 x 10 ²	1.17 x 10 ³	1.37 x 10 ³	1.57 x 10 ³	1.76 x 10 ³	1.96 x 10 ³
ø63	Push	4.20 x 10 ²	5.60 x 10 ²	8.40 x 10 ²	1.12 x 10 ³	1.40 x 10 ³	1.68 x 10 ³	1.96 x 10 ³	2.24 x 10 ³	2.52 x 10 ³	2.80 x 10 ³
	Pull	4.67 x 10 ²	6.23 x 10 ²	9.35 x 10 ²	1.24 x 10 ³	1.55 x 10 ³	1.87 x 10 ³	2.18 x 10 ³	2.49 x 10 ³	2.80 x 10 ³	3.11 x 10 ³
ø80	Push	6.80 x 10 ²	9.07 x 10 ²	1.36 x 10 ³	1.81 x 10 ³	2.26 x 10 ³	2.72 x 10 ³	3.17 x 10 ³	3.62 x 10 ³	4.08 x 10 ³	4.53 x 10 ³
	Pull	7.52 x 10 ²	1.00 x 10 ³	1.50 x 10 ³	2.01 x 10 ³	2.51 x 10 ³	3.01 x 10 ³	3.51 x 10 ³	4.02 x 10 ³	4.52 x 10 ³	5.02 x 10 ³

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

MFC-BS/MFC-BSK Series

Internal structure and parts list (with brake sensor)

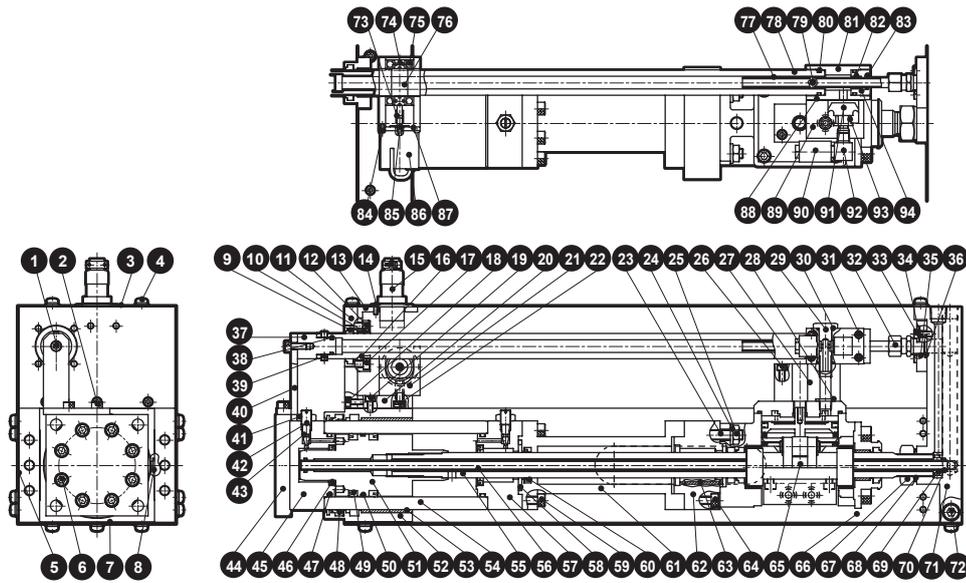
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- LCR
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- UCA2
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- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MecHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending



No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Hexagon socket head cap screw	Steel		46	Cushion packing	Nitrile rubber, steel	
2	Hexagon socket head cap screw	Steel		47	Gasket	Nitrile rubber	
3	Top cover	Steel plate		48	Piston packing	Nitrile rubber	
4	Cross-recessed pan head screw, captive washer	Steel		49	Dust wiper	Nitrile rubber	
5	Middle cover	Aluminum plate		50	Wear ring	Polyacetal resin	
6	Hexagon socket head cap screw	Steel		51	Piston	Aluminum alloy	
7	Bottom cover	Steel plate		52	Bush	Dry bearing	
8	Gasket	Nitrile rubber		53	Bearing housing	Cast iron	
9	Dust wiper	Nitrile rubber		54	Cylinder tube	Aluminum alloy	
10	Bush	Dry bearing		55	Piston rod	Steel	
11	Brake piping block (A)	Aluminum alloy		56	Pipe	Stainless steel	
12	Hexagon socket head cap screw	Steel		57	Rod cover	Cast iron	
13	Metal connector holder	Aluminum alloy (ø30)		58	Rotation-stop plate	Dry bearing	
14	Cross-recessed flat head machine screw	Steel		59	Hexagon socket head cap screw	Steel	
15	Metal connector	Steel (ø40 to ø80)		60	Gasket	Nitrile rubber	
16	Hexagon socket head cap screw	Steel		61	Rod packing	Nitrile rubber	
17	Brake piping block (B)	Aluminum alloy		62	Brake section		
18	Hexagon socket head cap screw	Steel		63	Side guide	Steel	
19	Detector	Aluminum alloy		64	Hexagon nut	Steel	
20	Hexagon socket head cap screw (ø30, ø40) Hexagon socket set screw (ø63 to ø80)	Steel		65	Seal washer	Nitrile rubber, steel	
21	Spring washer	Steel	ø50 to ø80 only	66	Pipe guide	Aluminum alloy	
22	Hexagon nut	Steel	ø50 to ø80 only	67	Hexagon socket head cap screw	Steel	
23	Hexagon socket head cap screw	Steel		68	Gasket	Nitrile rubber	
24	Spacer	Aluminum alloy	ø50 to ø80 only	69	Fixed guide	Cast iron	
25	Nipple	Copper alloy		70	Coupling	Urethane rubber	
26	Gasket	Nitrile rubber		71	Detection spring	Piano wire	
27	Hexagon socket head cap screw	Steel		72	Ball bearing	Cast iron	
28	Gasket	Nitrile rubber	ø50 to ø80 only	73	Rotor	Copper alloy	
29	Pipe joint	Copper alloy		74	Piping pipe	Stainless steel	
30	Hexagon socket head cap screw	Steel		75	Piping rod	Steel	
31	Plain washer	Steel		76	Hexagon socket set screw	Steel	
32	Brake piping collar	Aluminum alloy		77	Gasket	Nitrile rubber	
33	Gasket	Nitrile rubber		78	Piping plate 1	Aluminum alloy	
34	Brake piping holder	Steel		79	Bush	Dry bearing	
35	Piping end guide	Aluminum alloy		80	Piping packing	Nitrile rubber	
36	Gasket	Nitrile rubber		81	Cross-recessed pan head machine screw	Steel	
37	Hexagon socket set screw	Steel		82	Cross-recessed flat head machine screw	Steel	
38	Piping end holder	Steel		83	Rotary encoder		
40	Hexagon socket head cap screw	Steel		84	Encoder base	Aluminum alloy	
41	Needle nut	Steel		85	QEV gasket	Rubber cork	
42	Cushion needle	Copper alloy		86	QEV body	Aluminum alloy	
43	Gasket	Nitrile rubber		87	Silencer	Polyamide resin	
44	Head flange	Steel		88	Quick exhaust valve packing	Nitrile rubber	
45	Head cover	Cast iron		89	Elbow fitting	Copper alloy	
				90	Valve seat	Copper alloy	
				91	Piping plate 2	Aluminum alloy	

Note: Contact CKD when replacing repair parts.

Internal structure and parts list (with brake sensor/high load)



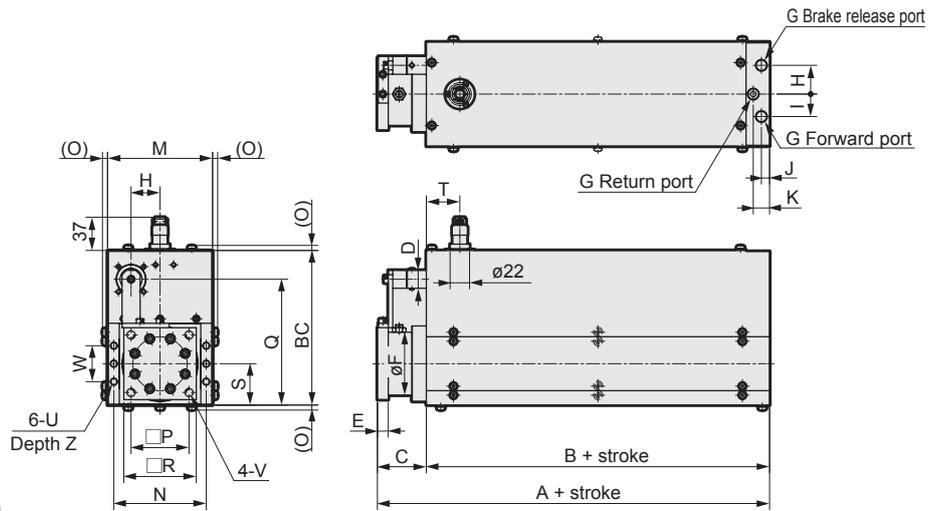
No.	Part name	Material	Remarks	No.	Part name	Material	Remarks
1	Hexagon socket head cap screw	Steel		47	Gasket	Nitrile rubber	
2	Hexagon socket head cap screw	Steel		48	Dust wiper	Nitrile rubber	
3	Top cover	Steel plate		49	Piston packing	Nitrile rubber	
4	Cross-recessed pan head screw, captive washer	Steel		50	Wear ring	Polyacetal resin	
5	Middle cover	Aluminum plate		51	Piston	Aluminum alloy	
6	Hexagon socket head cap screw	Steel		52	Bearing housing	Cast iron	
7	Bottom cover	Steel plate		53	Bush	Dry bearing	
8	Gasket	Nitrile rubber		54	Cylinder tube	Aluminum alloy	
9	Dust wiper	Nitrile rubber		55	Piston rod	Steel	
10	Bush	Dry bearing		56	Pipe	Stainless steel	
11	Brake piping block (A)	Aluminum alloy		57	Rod cover	Cast iron	
12	Hexagon socket head cap screw	Steel		58	Gasket	Nitrile rubber	
13	Metal connector holder	Aluminum alloy (ø30) Steel (ø40 to ø80)		59	Hexagon socket head cap screw	Steel	
14	Cross-recessed flat head machine screw	Steel		60	Rod packing	Nitrile rubber	
15	Metal connector			61	Packing holder	Steel	
16	Brake piping holder	Steel		62	Guide cover	Cast iron	
17	Hexagon socket head cap screw	Steel		63	Rotation-stop plate	Dry bearing	
18	Hexagon socket head cap screw	Steel		64	Hexagon socket head cap screw	Steel	
19	Hexagon socket head cap screw	Steel		65	Brake section		
20	Brake piping block (B)	Aluminum alloy		66	Side guide	Steel	
21	Detector	Aluminum alloy		67	Hexagon nut	Steel	
22	Hexagon socket head cap screw	Steel		68	Seal washer	Nitrile rubber, steel	
23	Hexagon socket head cap screw (ø30, ø40) Hexagon socket set screw (ø63 to ø80)	Steel		69	Pipe guide	Aluminum alloy	
24	Spring washer	Steel	ø50 to ø80 only	70	Gasket	Nitrile rubber	
25	Hexagon nut	Steel	ø50 to ø80 only	71	Fixed guide	Cast iron	
26	Hexagon socket head cap screw	Steel		72	Hexagon socket head cap screw	Steel	
27	Spacer	Aluminum alloy	ø50 to ø80 only	73	Coupling	Urethane rubber	
28	Gasket	Nitrile rubber	ø50 to ø80 only	74	Detection spring	Piano wire	
29	Nipple	Copper alloy		75	Ball bearing	Cast iron	
30	Gasket	Nitrile rubber		76	Rotor	Copper alloy	
31	Hexagon socket head cap screw	Steel		77	Piping pipe	Stainless steel	
32	Pipe joint	Copper alloy		78	Piping rod	Steel	
33	Hexagon socket head cap screw	Steel		79	Hexagon socket set screw	Steel	
34	Plain washer	Steel		80	Gasket	Nitrile rubber	
35	Brake piping collar	Aluminum alloy		81	Piping plate 1	Aluminum alloy	
36	Gasket	Nitrile rubber		82	Bush	Dry bearing	
37	Piping end guide	Aluminum alloy		83	Piping packing	Nitrile rubber	
38	Gasket	Nitrile rubber		84	Cross-recessed pan head machine screw	Steel	
39	Hexagon socket set screw	Steel		85	Cross-recessed flat head machine screw	Steel	
40	Piping end holder	Steel		86	Rotary encoder		
41	Needle nut	Steel		87	Encoder base	Aluminum alloy	
42	Cushion needle	Copper alloy		88	QEV gasket	Rubber cork	
43	Gasket	Nitrile rubber		89	QEV body	Aluminum alloy	
44	Head flange	Steel		90	Silencer	Polyamide resin	
45	Head cover	Cast iron		91	Quick exhaust valve packing	Nitrile rubber	
46	Cushion packing	Nitrile rubber, steel		92	Elbow fitting	Copper alloy	
				93	Valve seat	Copper alloy	
				94	Piping plate 2	Aluminum alloy	

LCM
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LCX
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STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

MFC-BS/MFC-BSK Series

Dimensions

● MFC-BS(K) Basic dimensions (00)

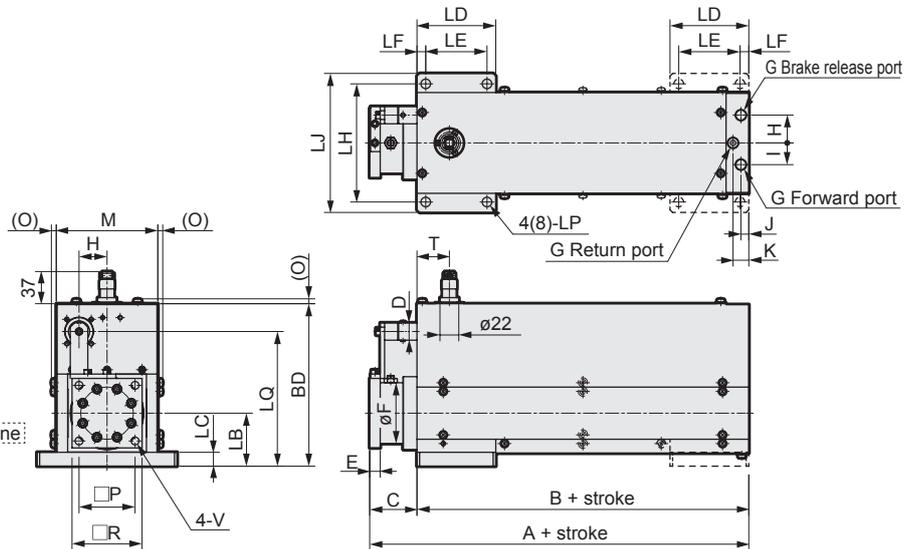


*1 : Codes with ○ indicate dimensions of high load.

Code		Basic (00) basic dimensions																			
Bore size (mm)		A	Ⓐ	B	Ⓑ	BC	C	D	E	F	G	H	I	J	K	M	Ⓜ	N	Ⓝ	O	P
ø30		212	310	181	279	122	31	12	8	45	Rc1/8	20	20	8	15	80	86	69	72	5	40
ø40		238	352	198	312	162	40	16	10	55	Rc1/8	25	20	8	16	90	96	79	82	5	50
ø50		333	487	279	433	172	54	20	12	70	Rc1/4	32	25	9	18	116	124	102	106	6	64
ø63		375	573	312	510	188	63	20	16	85	Rc1/4	32	25	9	18	136	144	122	126	6	80
ø80		443	667	370	594	225	73	25	19	110	Rc3/8	36	35	14	28	174	180	156	159	6	100

Code		Basic (00) basic dimensions								
Bore size (mm)		Q	R	S	T	U	V	W	Z	⓪
ø30		88	52	31	55	M 6	7	30	10	12
ø40		105	63	36	40	M 6	7	35	10	12
ø50		140	80	46	37	M 8	9	40	12	15
ø63		161	100	56	37	M10	11	58	15	18
ø80		196	125	71	37	M12	14	80	18	20

● Rod side foot (LA)



*1 : Codes with ○ indicate dimensions of high load.

*2 : The following strokes include the dotted line area.

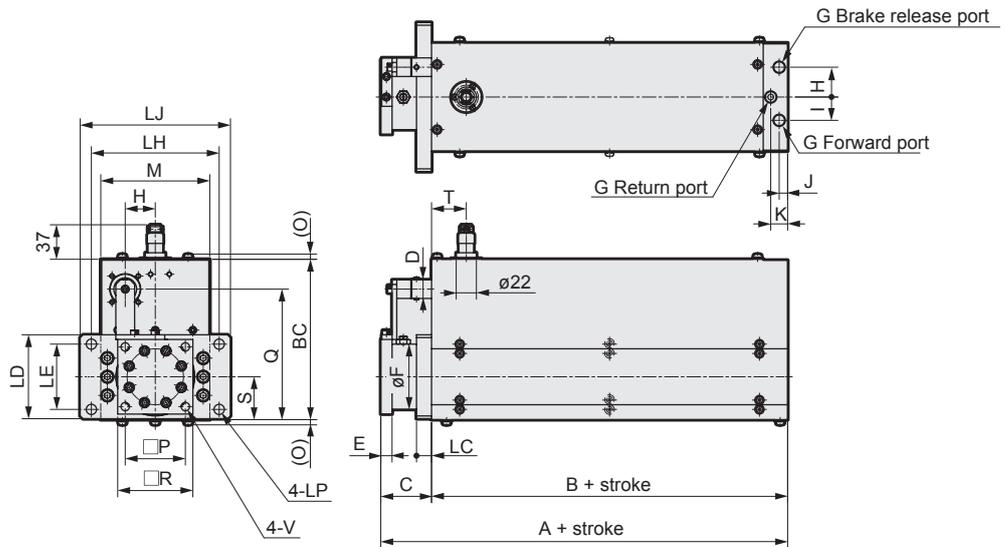
For ø30.....300 mm or more
 For ø40.....300 mm or more
 For ø50.....400 mm or more
 For ø63.....500 mm or more
 For ø80.....500 mm or more

Code		Rod side foot (LA) basic dimensions																			
Bore size (mm)		A	Ⓐ	B	Ⓑ	BD	ⓁD	C	D	E	F	G	H	I	J	K	LB	ⓁB	LC	ⓁC	LD
ø30		212	310	181	279	131	133	31	12	8	45	Rc1/8	20	20	8	15	40	42	10	12	60
ø40		238	352	198	312	173	177	40	16	10	55	Rc1/8	25	20	8	16	47	51	12	16	70
ø50		333	487	279	433	187	190	54	20	12	70	Rc1/4	32	25	9	18	61	64	16	19	90
ø63		375	573	312	510	206	209	63	20	16	85	Rc1/4	32	25	9	18	74	77	19	22	110
ø80		443	667	370	594	246	249	73	25	19	110	Rc3/8	36	35	14	28	92	95	22	25	140

Code		Rod side foot (LA) basic dimensions																			
Bore size (mm)		ⓁD	LE	ⓁE	LF	ⓁF	LH	ⓁH	LJ	ⓁJ	LP	ⓁP	LQ	ⓁQ	M	Ⓜ	O	P	R	T	V
ø30		70	46	50	7	10	90	104	106	124	7	9	97	99	80	86	5	40	52	55	7
ø40		80	50	54	10	13	114	120	134	146	9	11	116	120	90	96	5	50	63	40	7
ø50		100	70	70	10	15	136	152	160	182	11	14	155	158	116	124	6	64	80	37	9
ø63		120	86	84	12	18	162	178	190	214	14	16	179	182	136	144	6	80	100	37	11
ø80		150	114	110	13	20	200	218	236	258	16	18	217	220	174	180	6	100	125	37	14

Dimensions

● Rod side flange (FA)

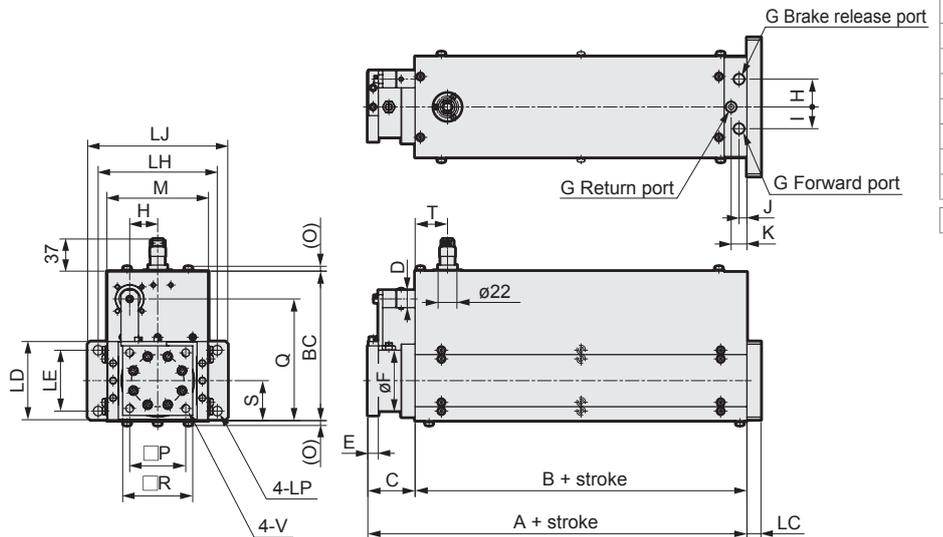


*1 : Codes with ○ indicate dimensions of high load.

Code	Rod side flange (FA) basic dimensions																			
Bore size (mm)	A	(A)	B	(B)	BC	C	D	E	F	G	H	I	J	K	LC	(LC)	LD	LE	(LE)	LH
ø30	212	310	181	279	122	31	12	8	45	Rc1/8	20	20	8	15	10	12	60	46	40	90
ø40	238	352	198	312	162	40	16	10	55	Rc1/8	25	20	8	16	12	16	70	50	44	114
ø50	333	487	279	433	172	54	20	12	70	Rc1/4	32	25	9	18	16	19	90	70	60	136
ø63	375	573	312	510	188	63	20	16	85	Rc1/4	32	25	9	18	19	22	110	86	74	162
ø80	443	667	370	594	225	73	25	19	110	Rc3/8	36	35	14	28	22	25	140	114	100	200

Code	Rod side flange (FA) basic dimensions													
Bore size (mm)	(LH)	LJ	(LJ)	LP	(LP)	M	(M)	O	P	Q	R	S	T	V
ø30	104	106	124	7	9	80	86	5	40	88	52	31	55	7
ø40	120	134	146	9	11	90	96	5	50	105	63	36	40	7
ø50	152	160	182	11	14	116	124	6	64	140	80	46	37	9
ø63	178	190	214	14	16	136	144	6	80	161	100	56	37	11
ø80	218	236	258	16	18	174	180	6	100	196	125	71	37	14

● Head side flange (FB)



*1 : Codes with ○ indicate dimensions of high load.

Code	Head side flange (FB) basic dimensions																			
Bore size (mm)	A	(A)	B	(B)	BC	C	D	E	F	G	H	I	J	K	LC	(LC)	LD	LE	(LE)	LH
ø30	212	310	181	279	122	31	12	8	45	Rc1/8	20	20	8	15	10	12	60	46	40	90
ø40	238	352	198	312	162	40	16	10	55	Rc1/8	25	20	8	16	12	16	70	50	44	114
ø50	333	487	279	433	172	54	20	12	70	Rc1/4	32	25	9	18	16	19	90	70	60	136
ø63	375	573	312	510	188	63	20	16	85	Rc1/4	32	25	9	18	19	22	110	86	74	162
ø80	443	667	370	594	225	73	25	19	110	Rc3/8	36	35	14	28	22	25	140	114	100	200

Code	Head side flange (FB) basic dimensions													
Bore size (mm)	(LH)	LJ	(LJ)	LP	(LP)	M	(M)	O	P	Q	R	S	T	V
ø30	104	106	124	7	9	80	86	5	40	88	52	31	55	7
ø40	120	134	146	9	11	90	96	5	50	105	63	36	40	7
ø50	152	160	182	11	14	116	124	6	64	140	80	46	37	9
ø63	178	190	214	14	16	136	144	6	80	161	100	56	37	11
ø80	218	236	258	16	18	174	180	6	100	196	125	71	37	14

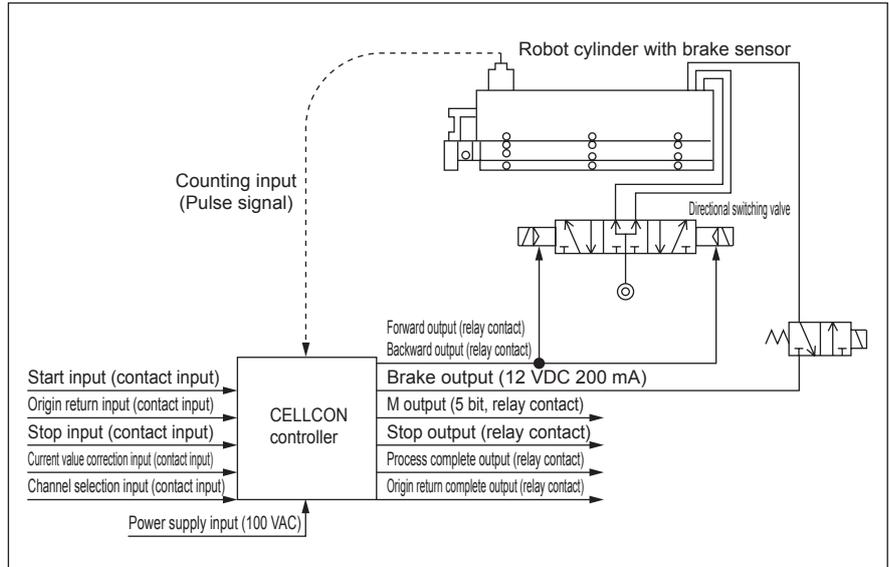
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- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

MFC-B/MFC-BS Series

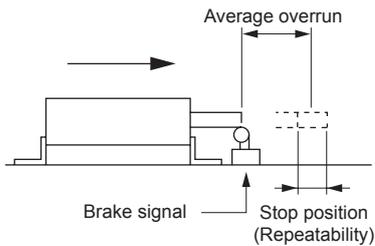
- LCM
- LCR
- LCC
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
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- RRC
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- RV3*
- NHS
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- LN
- Hand
- Chuk
- MecHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

Robot cylinder with brake sensor flow chart

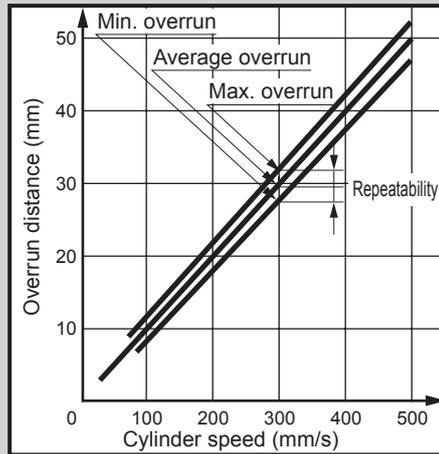
- (1) The number of pulse signals is generated according to the travel distance of the sleeve from the robot cylinder.
- (2) At the preset value of the CELLCON controller, an OFF signal is outputted to the solenoid valve for brake release and to the direction switching valve.
- (3) The piston brakes will make an immediate intermediate stop.
- (4) In response to signals output from the CELLCON controller, the sleeve moves forward or backward and stops at the next set position.



Stopping accuracy and overrun distance



Characteristics table at right shows the value at no load, and 1 m pipe length between brake release port and valve.



Discontinue

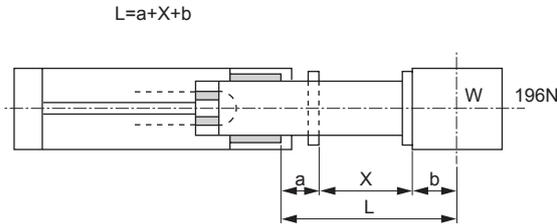
MEMO

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MechHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Selection guide

Conditions.....Stroke 300 (mm), load on the end (196 N), eccentricity 200 (mm)
 Distance from flange end to center of gravity of load 100 (mm)

(1) First, calculate lateral load moment L·W.



a: Dimensions of projecting section (m)
 b: Distance from flange end to center of gravity of load (m)
 X: Stroke (m)

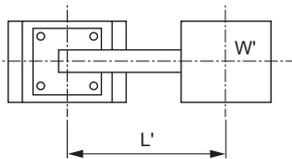
* First, substitute 0.067 (m) of intermediate bore size for ø50 for a dimension.

$$L = 0.067 + 0.3 + 0.1 \quad L \cdot W = 0.467 \times 196 = 91.5 \text{ (N}\cdot\text{m)}$$

$$= 0.467 \text{ (m)}$$

$$W = 196 \text{ N}$$

(2) Calculate the rotation torque L'·W'.



$$W' = 196 \text{ (N)}$$

$$L' = 0.2 \text{ (m)}$$

$$L' \cdot W' = 0.2 \times 196 = 39.2 \text{ (N}\cdot\text{m)}$$

(3) Obtain total moment M.

$$M = (\text{lateral load moment } L \cdot W) + (\text{angular moment } L' \cdot W')$$

$$= 91.5 + 39.2 = 130.7 \text{ (N}\cdot\text{m)}$$

(4) Find the bore size that meets conditions with 300 mm stroke according to maximum allowable moment table.

In this case, ø50 bore is obtained. (when close to allowable value, increase the bore size.)

*When bore size selected here is any size other than ø50, substitute a dimension of the bore size selected at (4) for (1) again, and select the model for the rest according to steps (3) → (4).

(5) Read the min. working pressure at M = 130.7(N·m) from the graph.

Graph shows 0.35 MPa.

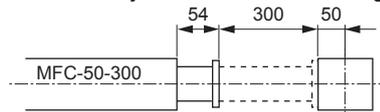
Selection method

Conditions.....Stroke 300 mm, load on the end 196 N

(1) Determine the bore size according to stroke: maximum allowable load table on the following page.

For above conditions, the value that meets 300 mm stroke and 196 N is ø50 bore size.

(2) Find the distance from the shoulder of the robot cylinder to the center of gravity of the load on the tip.



(Distance from end of flange to center of gravity should be 50 mm.)

$$L = 54 + 300 + 50 = 404 \text{ (mm)}$$

$$= 0.404 \text{ (m)}$$

(3) Calculate self-weight moment caused by the tube, etc.

$$M = 0.3^2/2 \times 15 \times 9.8 + 0.404 \times 3.6 \times 9.8$$

$$= 6.615 + 14.253 = 20.868 \approx 20.9 \text{ (N}\cdot\text{m)}$$

$$W \cdot L + M = 196 \times 0.404 + 20.9 = 100.08 \approx 100.1 \text{ (N}\cdot\text{m)}$$

(4) The graph of MFC-50 at 100.1 (N·m) shows that the min. working pressure is 0.27 (MPa) with load on the end of 196 (N) and center of gravity 50 (mm) for MFC-50-300.

Stroke: Max. allowable load table

(Unit: N)

Specifications	Standard					High load				
	ø30	ø40	ø50	ø63	ø80	ø30	ø40	ø50	ø63	ø80
Bore size (mm)										
Stroke (mm)										
50	428	688	1552	1971	3206	653	1050	2365	3018	4925
75	335	549	1271	1632	2687	514	843	1945	2512	4150
100	274	456	1073	1390	2307	423	703	1650	2150	3582
150	199	336	813	1063	1785	312	526	1263	1665	2807
200	153	263	650	854	1443	246	419	1021	1355	2301
300	101	178	453	598	1017	170	295	733	980	1679
400	70	128	337	445	760	128	224	567	760	1309
500	50	95	260	342	579	101	179	458	615	1060
600	-	-	203	266	454	-	-	380	512	885
700	-	-	160	208	355	-	-	322	434	752
800	-	-	129	161	273	-	-	276	372	646
900	-	-	95	121	204	-	-	240	323	560
1000	-	-	70	87	145	-	-	209	281	482

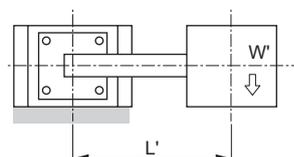
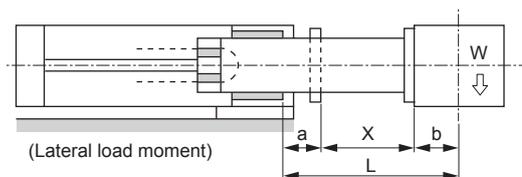
Note: Lateral load differs depending on bore size and stroke.
Refer to the value above to select the model.

Stroke: Max. allowable moment table

(Unit: N·m)

Specifications	Standard					High load				
	ø30	ø40	ø50	ø63	ø80	ø30	ø40	ø50	ø63	ø80
Bore size (mm)										
Stroke (mm)										
50	40.3	70.9	181.6	248.4	436.1	61.4	108.2	276.7	380.3	669.9
75	39.9	70.4	180.5	246.6	432.7	61.2	108	276.2	379.4	668.2
100	39.5	69.8	179	245	429	61.1	108	276	379	667
150	38.6	68.4	177.3	240.4	421.4	60.6	106.9	274.2	376.3	662.5
200	37.5	66.8	174	236	413	60	106	273	374	658
300	34.8	62.9	167	225	393	58.7	104	269	369	649
400	31.5	58.1	158	212	370	57	102	265	362	637
500	27.4	52.5	148	197	340	55	99	260	355	622
600	-	-	136	181	312	-	-	254	347	608
700	-	-	123	162	279	-	-	248	337	592
800	-	-	108	141	242	-	-	240	327	573
900	-	-	92.4	118	202	-	-	232	316	553
1000	-	-	74.8	93.8	158	-	-	223	303	531

Total moment $M = (\text{lateral load moment } L \cdot W) + (\text{angular moment } L' \cdot W')$

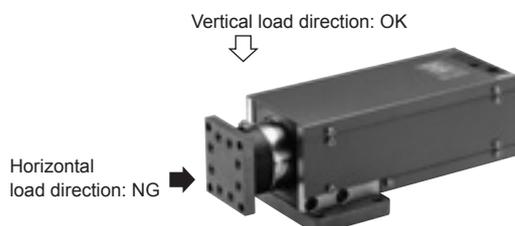


- W : Load (N)
- $L = a + x + b$ (m)
- x : Stroke (m)
- b : Distance from flange end to center of gravity of load (m)
- a : Dimensions of projecting section (m)

Unit (m)

Bore size (mm)	ø30	ø40	ø50	ø63	ø80
Code					
a	0.04	0.053	0.067	0.076	0.086

⚠ Note: Load direction



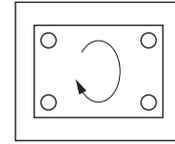
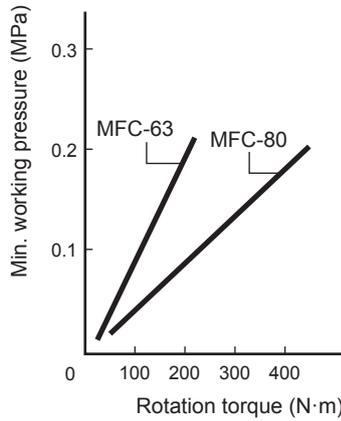
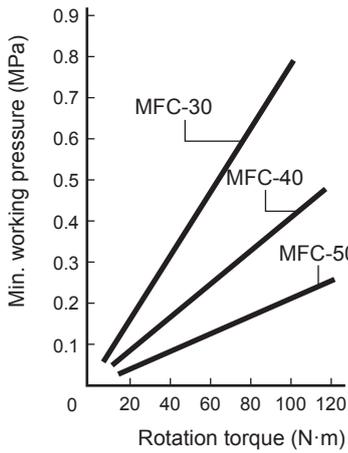
- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
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- GLC
- MFC**
- BBS
- RRC
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- NHS
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MFC Series

Technical data (1)

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
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- Chuk
- MecHnd/Chuk
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- SpdContr
- Ending

Relation between torque and min. working pressure

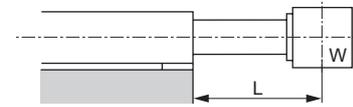


Rotation torque

Relation between load and min. working pressure for stroke

M: Self-weight moment by tube, etc. (N·m)

$$M = \frac{X^2}{2} \times a \cdot g + L \cdot F \cdot g \left\{ = \frac{X^2}{2} \times a + L \cdot F \right\}$$



Bore size (mm)	a	F
ø30	7	1.0
ø40	9	1.7
ø50	15	3.6
ø63	20	6.1
ø80	35	11.5

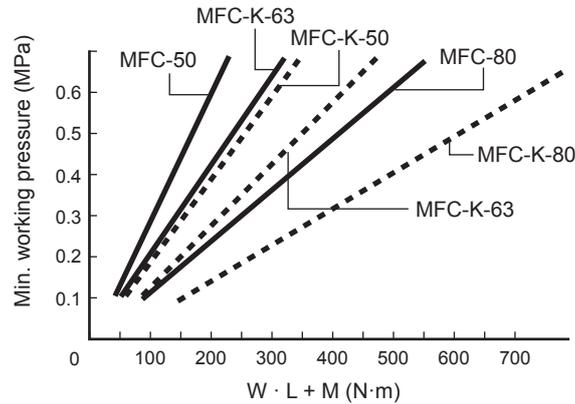
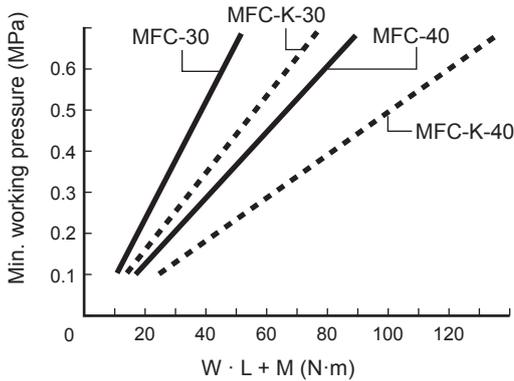
X: Stroke (m)

a: Tube weight (kg) per 1 m

F: The end of flange/head cover weight (kg)

W: Load on tip (N)

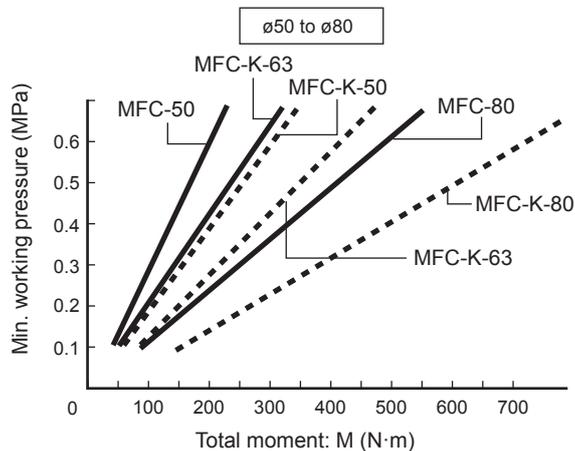
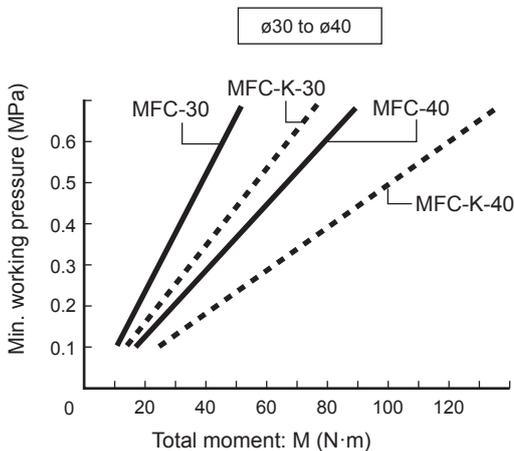
L: Distance (m) from center of gravity of load on tip W to shoulder of robot cylinder



Note: Select within the max. allowable load. (70% or less of the max. allowable load is ideal.)

When stroke load and rotation torque activate at the same time, the min. working pressure is their sum.

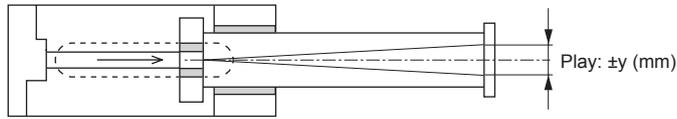
Graph of min. working pressure - total moment



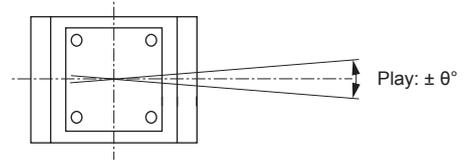
Play of lateral direction, backlash of rotating direction

Calculate the backlash value according to the following formula.

1) Play in the lateral direction



2) Play in the rotating direction



Standard

Bore size (mm)	Play: $\pm y$ (mm)	Stroke (mm)		
		100	500	1000
ø30	$y = (78 + \text{stroke}) \times 6 \times 10^{-3}$	1.07	3.47	—
ø40	$y = (92 + \text{stroke}) \times 5.3 \times 10^{-3}$	1.02	3.14	—
ø50	$y = (119 + \text{stroke}) \times 3.9 \times 10^{-3}$	0.85	2.41	4.36
ø63	$y = (143 + \text{stroke}) \times 3 \times 10^{-3}$	0.73	1.93	3.43
ø80	$y = (162 + \text{stroke}) \times 2.7 \times 10^{-3}$	0.71	1.79	3.14

Bore size (mm)	Play: $\pm \theta^\circ$
ø30	0.15°
ø40	0.14°
ø50	0.11°
ø63	0.087°
ø80	0.068°

High load

Bore size (mm)	Play: $\pm y$ (mm)	Stroke (mm)		
		100	500	1000
ø30	$y = (143 + \text{stroke}) \times 2 \times 10^{-3}$	0.49	1.29	—
ø40	$y = (168 + \text{stroke}) \times 1.8 \times 10^{-3}$	0.48	1.20	—
ø50	$y = (222 + \text{stroke}) \times 1.3 \times 10^{-3}$	0.42	0.94	1.59
ø63	$y = (275 + \text{stroke}) \times 1.0 \times 10^{-3}$	0.38	0.78	1.28
ø80	$y = (311 + \text{stroke}) \times 9 \times 10^{-4}$	0.37	0.73	1.18

Applications of diversely multifunctional robot cylinder

Applications

<p>1 Movement to conveyor</p> <p>Directly install a conveying pallet on the top of robot cylinder, lift up products one by one, and move them to the conveyor by an air cylinder.</p>	<p>3 Nut mounting to slanted plate</p> <p>Install a robot cylinder which moves in slanted direction on the top of robot cylinder that moves horizontally, then install a nut runner on the top of that. Operate both robot cylinders systematically and mount the nut on the slanted plate.</p>
<p>2 Nut installation</p> <p>Install a nut runner on the top of robot cylinder, and perform nut fixing. Since nut height differs depending on the manufacturing lot, adjust the height by changing the stop position of robot cylinder.</p>	<p>4 Loader and unloader</p> <p>Using a simple robot with robot cylinder, load and unload workpieces to machine A and B. X-axis and Y-axis each use robot cylinder with brake and sensor.</p>

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC**
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- RRC
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- RV3*
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- HRL
- LN
- Hand
- Chuk
- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending



Safety Precautions

Be sure to read this section before use.

Refer to Intro Page 73 for general information of the cylinder, and to Intro Page 80 for general information of the cylinder switch.

Product-specific cautions : Robot cylinder MFC Series

Design/selection

WARNING

- **Design a structure that prevents person(s) from coming into contact with the driven workpiece as well as the moving parts of the cylinder with brakes.**
Provide a protective cover so that no human body directly touches the unit. In case of possible contact, provide safety measures such as a sensor for emergency stop before making contact and a buzzer to warn of danger.
- **Use a balanced circuit that accommodates the protrusion of the piston rod.**
If the cylinder is stopped part-way in the stroke with the brake, etc., and air pressure is applied to one side of the cylinder, the piston rod will pop out at high speeds when the brake is released. This could cause physical harm, such as pinched hands or feet, or mechanical damage. Use a balance circuit, such as the basic circuit, to prevent popping out.
- **The holding force (max. static load) is the ability to hold static load that is not accompanied by vibration or shock, in a state where the brake is operating under no load.**
Take care when constantly using near the upper limit of the holding force.
- **Do not apply loads with impact, strong vibration, or torque while brakes are activated.**
If load is externally applied with impact, or if strong vibration or rotational force is externally applied, the holding force can be reduced, creating a dangerous situation.
- **Consider the stopping accuracy and overrun distance during the braking.**
Because a mechanical lock is applied, the cylinder does not stop instantly when the stop signal is issued, but stops with a time-wise delay. The stroke at which the cylinder slides due to this delay is the overrun distance. In addition, the max. and min. width of the overrun distance is the stopping accuracy.
 - To achieve the required stop position, move the limit switch forward by the overrun distance.
 - The limit switch must have a detection length (dog length) of the overrun distance + α .
 - The operating range of CKD cylinder switches is 7 to 16 mm, depending on the switch model. If overrun distance exceeds this, provide self-holding of the contact at the switch load.

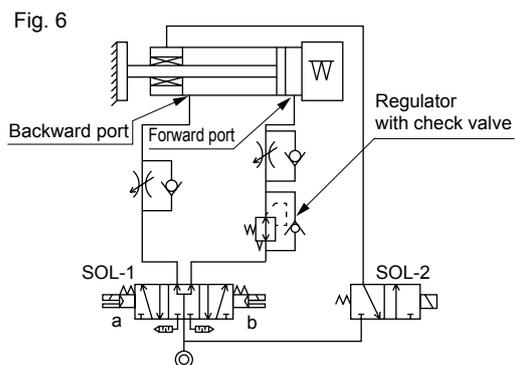
- **In order to improve stopping accuracy, ensure that the brake stops the cylinder as soon as possible after receiving the stop signal.**
Use a high-response DC control electricity circuit or solenoid valve, and set the solenoid valve as close to the cylinder as possible.

- **The stopping accuracy is susceptible to fluctuations in piston speed.**
If the piston speed changes due to load fluctuations or by some disturbance while the cylinder is moving, the stopping position may vary sharply. Make sure that the piston speed stays the same up to just before the stop position. As well, since the speed changes significantly in the cushioned range and in the acceleration range after starting operation, the variability of the stopping position will increase.

■ Basic circuit

● Horizontal load

When piping is as shown in Fig. 6, equal pressure is applied to both ends of the piston when stopped to prevent the cylinder tube from popping out when the brakes are released. Install a regulator with check valve on the head side to maintain thrust balance.



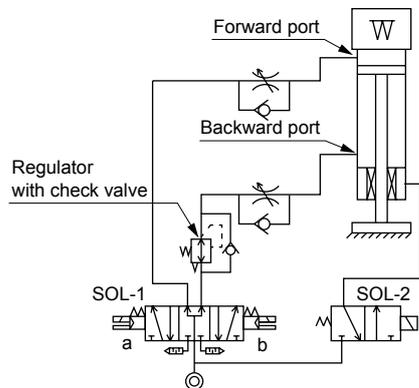
a SOL-1 b		SOL-2	Operational status
OFF	OFF	OFF	Stop
ON	OFF	ON	Reverse
OFF	ON	ON	Forward

● For upward vertical load

If the load is facing upward as shown in Fig.7, the cylinder tube moves incorrectly in the load direction when brakes are released. Install a regulator with a check valve on the rod side to reduce thrust in the load direction and balance the load.

LCM
LCR
LCG
LCW
LCX
STM
STG
STS/STL
STR2
UCA2
ULK*
JSK/M2
JSG
JSC3/JSC4
USSD
UFCD
USC
UB
JSB3
LMB
LML
HCM
HCA
LBC
CAC4
UCAC2
CAC-N
UCAC-N
RCS2
RCC2
PCC
SHC
MCP
GLC
MFC
BBS
RRC
GRC
RV3*
NHS
HRL
LN
Hand
Chuk
MecHnd/Chuk
ShkAbs
FJ
FK
SpdContr
Ending

Fig. 7

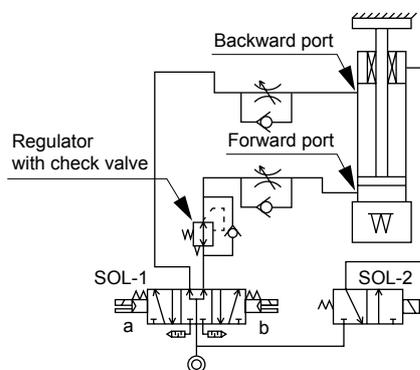


a SOL-1 b		SOL-2	Operational status
OFF	OFF	OFF	Stop
ON	OFF	ON	Rise
OFF	ON	ON	Drop

● For downward vertical load

If the load is facing downward as shown in Fig.8, the cylinder tube moves incorrectly in the load direction when brakes are released. Install a regulator with a check valve on the head side to reduce thrust in the load direction and balance the load.

Fig. 8



a SOL-1 b		SOL-2	Operational status
OFF	OFF	OFF	Stop
ON	OFF	ON	Rise
OFF	ON	ON	Drop

- If back pressure is applied to the locking mechanism, the lock may be released. Use a discrete brake release solenoid valve, or use an individual exhaust manifold.
- Use a 3-position PAB connection (pressurization on both sides) solenoid valve for the cylinder drive to prevent the piston from popping out when starting.
- To maintain balance of the thrust, including the load, the side with the larger thrust should have a regulator with a check valve.

CAUTION

■ Stopping accuracy

- Stopping pitch and load factor

Stopping accuracy differs with stopping pitch and load factor. The load factor below is recommended for achieving specified stopping accuracy.

Stop pitch	Load factor
50 mm or less	20% of thrust
50 mm to 100 mm	40% of thrust
100 mm or more	60% of thrust

- Selection of solenoid for brake

The stopping accuracy and overrun distance will change according to the responsiveness of the solenoid valve for brake. Use a solenoid valve described in the Related Products Selection Guide. Connect the solenoid valve directly to the brake port to improve stopping accuracy.

- When using a PLC

If a PLC is used as the electric control unit for the solenoid valve for brake, stopping accuracy drops due to scan time (computing time). When using a PLC, do not assemble the solenoid valve for brake into the PLC circuit.

- Do not make major changes in applied load when stopped with brakes, or the stopping position may change.

- LCM
- LCR
- LCG
- LCW
- LCX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC**
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
- PCC
- SHC
- MCP
- GLC
- MFC**
- BBS
- RRC
- GRC
- RV3*
- NHS
- HRL
- LN
- Hand
- Chuk
- MechHnd/Chuk
- ShkAbs
- FJ
- FK
- SpdContr
- Ending

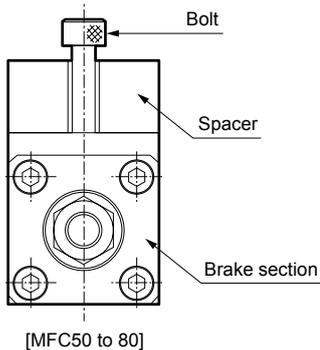
- LCM
- LCR
- LCG
- LCW
- L CX
- STM
- STG
- STS/STL
- STR2
- UCA2
- ULK*
- JSK/M2
- JSG
- JSC3/JSC4
- USSD
- UFCD
- USC
- UB
- JSB3
- LMB
- LML
- HCM
- HCA
- LBC
- CAC4
- UCAC2
- CAC-N
- UCAC-N
- RCS2
- RCC2
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Mounting, installation and adjustment

⚠ WARNING

- If attaching a jig or other device to the end flange, retract the cylinder tube all the way to the stroke end and fasten the jig so that the allowable lateral load or torque of the cylinder and cylinder tube will not be exceeded.
- Release brakes before coupling the load to the end of the rod.
- If the brake is released while air is applied to only one side of the cylinder, the piston rod can pop out at high speed, creating a dangerous situation. When releasing the brake during adjustment or other maintenance, always observe the following:
 - Check that no one is in the movable range of the load and that no problems will arise if the load moves when brakes are released.
 - When releasing the brake, perform position locking or take other measures:
 - Place the load to the bottom end
 - Pressurize both sides
 - Place a strut to prevent the load from falling.
 - Confirm that air is not pressured on only one side of the cylinder when releasing brakes.

■ How to manually release the brake (ø50 to ø80)



- The brakes are released when a bolt is screwed into the female thread on the top of the brakes. Always remove the release bolt during normal use.
- The appropriate bolt size and screw insertion depth are shown in the following table.

Bore size (mm)	Bolt size		Screw insertion depth
	Nominal	Length	
ø50	M10	65 or more	4 rotations or less
ø63	M12	45 or more	
ø80	M14	55 or more	

- (ø50 to ø80) When manually releasing the brakes, the brakes can be released by screwing a bolt into the brake release female screws. However, if the bolt is screwed in too far, the brakes could be damaged. Therefore, always screw in with the optimal number of turns.
- Brakes are released manually (ø50 to ø80) or by pressurizing the brake release port. When mounting the load, the brake release operation may cause the load to fall; make sure to check that the brake is operational when the manual release operation is set to default or when there is no air in the brake release port.
- Do not apply to the cylinder any force that exceeds the brake holding force listed in the catalog.
- If there is any play, such as looseness, in the brake signal dog, stopping accuracy is affected. Securely fix to eliminate play, etc.
- If the cylinder speed is fast, the detection dog must be long enough to match relay response time. If the dog is short, the stop signal is not output and operation does not stop.

⚠ CAUTION

- Adjust the air balance in the cylinder. With brakes released, place a load on the cylinder and balance the load by adjusting pneumatic pressure applied to the cylinder rod side and head side. Malfunctions such as the cylinder tube popping out during brake release or abnormal brake release can be prevented by accurately balancing the load.
- Adjust the installation position of the detector parts, including the cylinder switch. When braking, consider the overrun distance vis-a-vis the desired stop position and adjust the installation positions for detector parts, including the cylinder switch.
- Load fluctuations during the reciprocating stroke of the cylinder can cause inconsistent piston speed, leading to greater variation in the stop position. Adjust the mounting of the load so as to prevent any load fluctuations during the reciprocating stroke of the cylinder, especially before the stop position.

Mounting, installation and adjustment

- Since the speed changes significantly in the cushioned range and in the acceleration range after starting operation, the variability of the stopping position will increase. For this reason, the accuracy described in the specifications may not be obtained when a step just after start of the operation has a short stroke length to the next point.

- Tube sliding section maintenance
Be careful to avoid scratching or denting the sliding section of the cylinder tube. Such scratches and dents can cause damage to packings, resulting in leakage and/or brake failure.

Use/maintenance

WARNING

- The required grease is applied to brakes. Avoid applying extra grease and do not wipe grease off.
- Always use the product with the dust cover on, except for when performing manual release, in order to prevent failure or malfunction.

CAUTION

- Air supply pipes that are too narrow or too long can reduce stopping accuracy.
- Frictional resistance increases and causes the piston speed to change when the cylinder has been stopped for a long time, such as when using first thing in the morning or afternoon. This may impair stopping accuracy. Conduct conditioning operations to obtain a stable stopping accuracy.

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