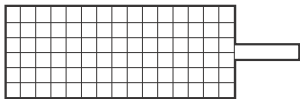
CAT. No. KS-570E

FUJIKURA COMPOSITES

Fujikura BF Cylinders

FC SERIES



FCS Single Action Push Type **FCD** Double Action Type

FUJIKURA COMPOSITES Inc.

Fujikura BF Cylinders

DESIGN CONCEPTION :

"No Leakage and Less Friction"

The main Design conception that lies extended at the basis of **BF Cylinders.**

"Precision Control rather than Power"

The main object of developing **BF Cylinders.**

INDEX

General Description of BF Cylinders

TYPES

FC Series : Single/Double Action ····· Standard Cylinders

FEATURES IN COMMON

BF Cylinders are bound together by unique unrivaled common features, which are all attributable to the rolling action of **BF Diaphragms**.

- **Perfect Leak-proof** ····· No Blow-By Leakage.
- **Very Low Friction** ····· : Responsive to minute pressure variations.
  : Virtually no hysteresis-loss in movement.
  : Low start up pressure as low as 0.01MPa.
  : Smooth "Non-Jarring" action.
  : Ready to start even after long interval.
- **Lubrication-Free** ····· No Lubricator required in the air line.
- **Excellent resistance to pressure** ··· Assured by the rolling principle of **BF Diaphragms**. (Molded products of durable fabric-reinforced NBR)

PREFERRED APPLICATIONS

BF Cylinders find its best applications in such cases where air leakage is not allowed and/or sensitive response is desired to minute pressure variations.

- Sensitive Actuators in Automatic Controllers & Instruments, Pressure rollers and Dancer rollers.
- Air line equipment in the clean factories disliking oil mist contamination.
- Polishing equipment for Lenses and Jewels.
- Precision actuators of constant output force. (Spot welder etc.)
- Actuator for emergency use.

FC series

Model FCS : Single Action (push)

Model FCD : Double Action

SPECIFICATIONS

Operating Style		Single Action (Push)/Double Action
Cylinder Diameter	mm	10 to 200
Stroke	mm	6 to 320
Working Fluid		Compressed Air (Non-Lubricated)
Working Pressure Range	MPa	0.01～0.7
Working Temperature Range	℃	0 to 60
Rod Bearing		Dry Bearing
Mounting		Direct, L, Front Flange, Rear Flange, Trunnion, Pivot-Mounting

FEATURES

- FC Series are standard type of **BF Cylinders**. They are designed in a variety of sizes from 10 to 200.
- Each size is available in both a single action and a double action style.
- A variety of mounts is provided.

NOTE

- Customers are requested to follow the " **BF Cylinders** Handling Manual " (KS-569E) before installing and putting in service.
- Large size **BF Cylinders** of 112mm and over in diameter are customized only for individual requirement.
  Customers are kindly advised to check up the delivery time.
- Consult Fujikura for any special requirements.

ORDERING DATA [Example]

FCD — **100** — **144** — **S0** — **P**

Cylinder dia. / Stroke

Model No.	
FCS	Single Action
FCD	Double Action

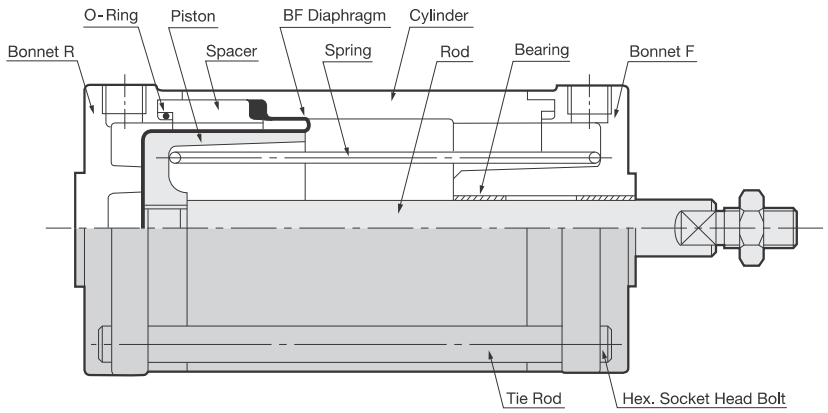
Spring	
None	In case of FCD
S0	None
S1	Standard Spring

Mount	
None	—
L	L
F	Front Flange
R	Rear Flange
T	Trunnion
P	Pivot

INTERNAL CONSTRUCTION/PARTS DESCRIPTION

(For Cylinders of 40mm and over in diameter)

SINGLE ACTION TYPE Model FCS-40 to-200

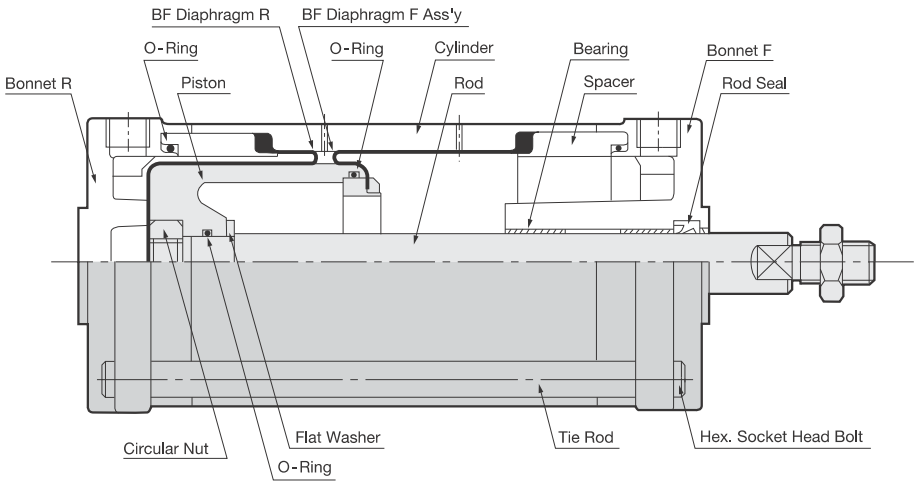


PARTS LIST

DESCRIPTION	MATERIAL
Bonnet F/R	Aℓ Alloy Die-Casting Aℓ Alloy Casting (FCS-160 & over)
O-Ring	NBR
Piston	Aℓ Alloy Casting
Cylinder/Spacer	Aℓ Alloy
Rod	Stainless Steel Hard Steel, Hard Chrome Plated (FCS-80 & over)
BF Diaphragm	Fabric Reinforced NBR
Return Spring	Spring Steel Wire
Bearing	Dry Bearing
Tie Rod	Carbon Steel

Note : 1. Aℓ parts are anodic treated.
2. Unless otherwise specified, steel parts are galvanized.
3. Aℓ die-casting parts are bake painted.

DOUBLE ACTION TYPE Model FCD-40 to-100

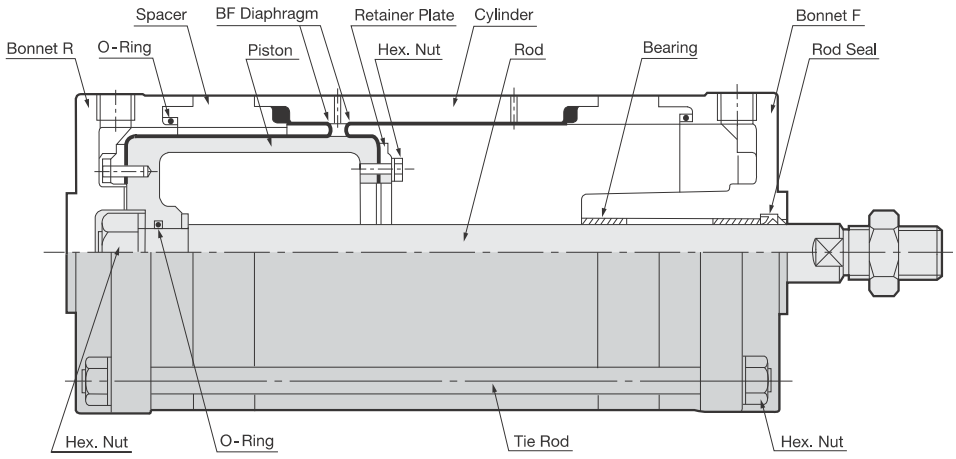


PARTS LIST

DESCRIPTION	MATERIAL
Bonnet F/R	Aℓ Alloy Die-Casting
Circular Nut	Carbon Steel
O-Ring	NBR
Piston	Aℓ Alloy Casting
BF Diaphragm R	Fabric Reinforced NBR
BF Diaphragm F Ass'y	Fabric Reinforced NBR with Fitting Caulked
Cylinder/Spacer	Aℓ Alloy
Rod	Stainless Steel Hard Steel, Hard Chrome Plated (FCD-80 & -100)
Bearing	Dry Bearing
Rod Seal	NBR
Tie Rod	Carbon Steel

Note : 1. Aℓ parts are anodic treated.
2. Unless otherwise specified, steel parts are galvanized.
3. Aℓ die-casting parts are bake painted.

DOUBLE ACTION TYPE Model FCD-112 to-200

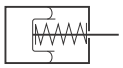


PARTS LIST

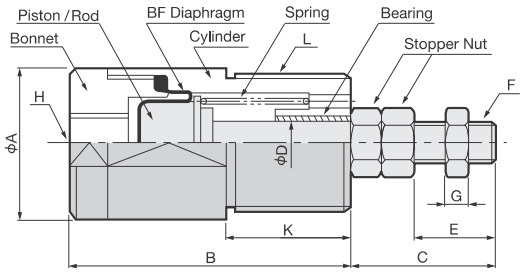
DESCRIPTION	MATERIAL
Bonnet F/R	Aℓ Alloy Die-Casting Aℓ Alloy Casting (FCD-160 & over)
Cylinder/Spacer	Aℓ Alloy Casting
Piston	Aℓ Alloy Casting
BF Diaphragm	Fabric Reinforced NBR
Retainer Plate	Aℓ Alloy Casting
Rod	Hard Steel, Hard Chrome Plated
Bearing	Dry Bearing
Rod Seal	NBR
Tie Rod	Carbon Steel

Note : 1. Aℓ parts are anodic treated.
2. Unless otherwise specified, steel parts are galvanized.
3. Aℓ die-casting parts are bake painted.

Model FCS-10-6 to 20-22



Internal Construction Outline Dimensions



PARTS LIST

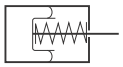
DESCRIPTION	MATERIAL
Piston/Rod	Stainless Steel
BF Diaphragm	Fabric Reinforced NBR
Bonnet	Brass
Cylinder	Brass
Spring	Spring Steel Wire
Bearing	Dry Bearing
Stopper Nut	Carbon Steel

F_0/F_1 : Spring force at zero/full stroke (N)
Ae : Effective area (mm^2)

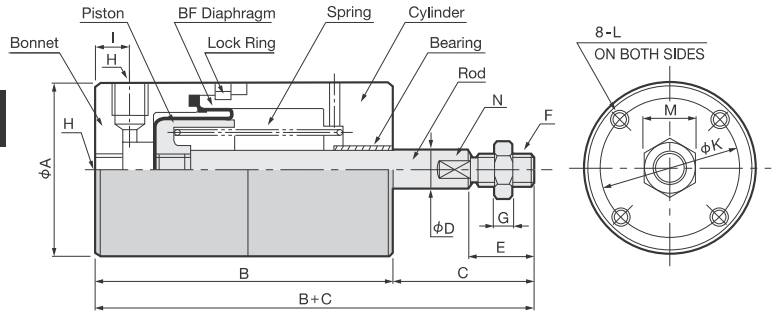
OUTLINE DIMENSIONS

Dc-STROKE	A	B	C	D	E	F	G	H	K	L	M	Ae	SPRING FORCE	
													F_0	F_1
10 – 6	18	35	18	5	10	M5×0.5	3.2	Rc 1/8	16	M16×1.5	8	57	0.3	0.9
12.5 – 11	20	45	20		12				20	M18×1.5		95	0.8	2
16 – 10	24	45	23	7	13	M6×0.75	3.6		20	M22×1.5	10	165	1.5	2.9
16		58							25					
20 – 8	28	44	26	8	16				20	M26×1.5		269	2	4.9
22		72							30					

Model FCS-25-6 to 31.5-35



Internal Construction Outline Dimensions



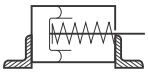
PARTS LIST

DESCRIPTION	MATERIAL
Bonnet	Aℓ Alloy
Piston	Aℓ Alloy
BF Diaphragm	Fabric Reinforced NBR
Lock Ring	Brass Wire
Spring	Spring Steel Wire
Cylinder	Aℓ Alloy
Bearing	Dry Bearing
Rod	Stainless Steel

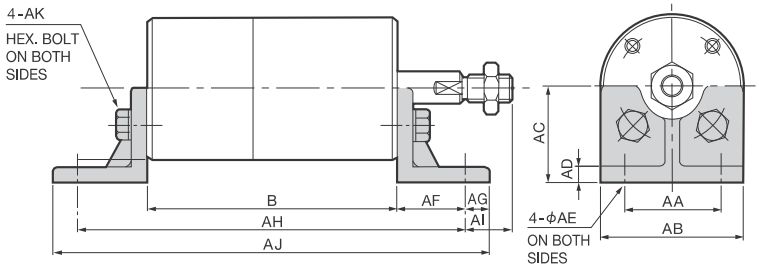
F_0/F_1 : Spring force at zero/full stroke (N)
Ae : Effective area (mm^2)
N : Wrench flat width

OUTLINE DIMENSIONS

Dc-STROKE	A	B	C	B+C	D	E	F	G	H	I	K	L	M	N	Ae	SPRING FORCE	
																F_0	F_1
25 – 6	38	46	30	76	8	12	M6 P=0.75	3.6	Rc 1/8	9	30	M4 DP6	10	6	400	3.4	6.9
16		63		93													
26		79		109													
31.5 – 14	45	61	36	97	10	16	M8 P=1	5	Rc 1/8	10	35	M5 DP7.5	13	8	660	4.9	11.8
24		78		114													
35		97		133													

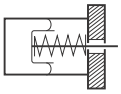


L Type Mount

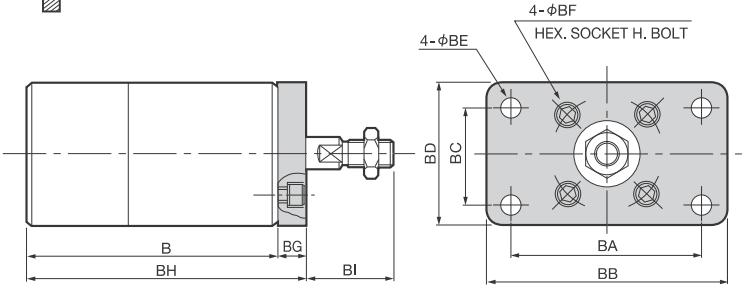


Dc-STROKE	B	AH	AJ
25 – 6	46	84	96
16	63	101	113
26	79	117	129
31.5 – 14	61	105	121
24	78	122	138
35	97	141	157

Dc	AA	AB	AC	AD	AE	AF	AG	AI	AK
25	25	38	25	4	6	19	6	11	M4×10
31.5	30	45	30	5	6	22	8	14	M5×12



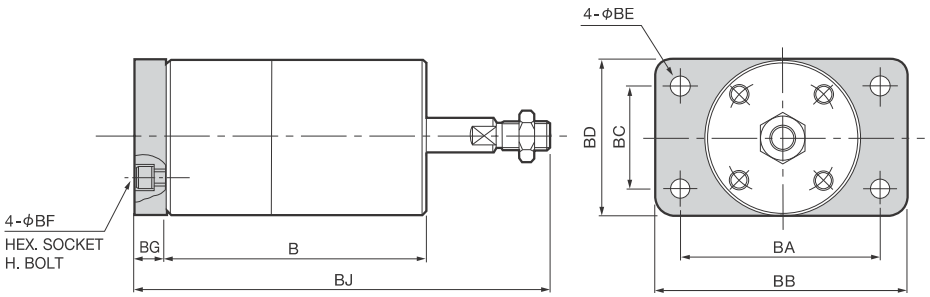
Front Flange Type Mount



Dc-STROKE	B	BH
25 – 6	46	52
16	63	69
26	79	85
31.5 – 14	61	69
24	78	86
35	97	105

Dc	BA	BB	BC	BD	BE	BF	BG	BI
25	50	65	25	38	5	M4×6	6	24
31.5	60	75	30	45	6	M5×8	8	28

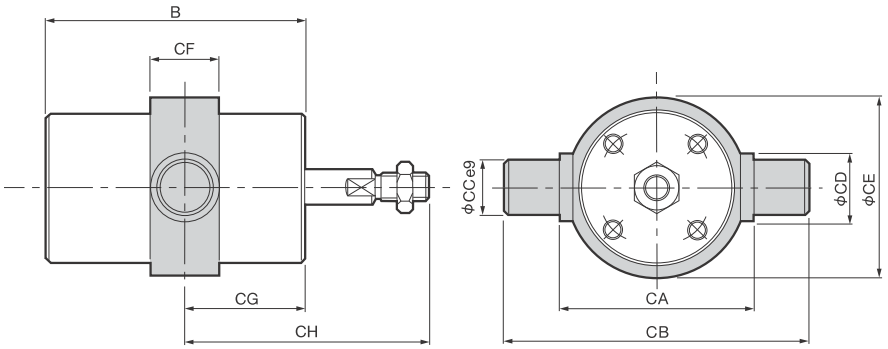
Rear Flange Type Mount



Dc-STROKE	B	BJ
25 – 6	46	82
16	63	99
26	79	115
31.5 – 14	61	105
24	78	122
35	97	141

Dc	BA	BB	BC	BD	BE	BF	BG
25	50	65	25	38	5	M4×6	6
31.5	60	75	30	45	6	M5×8	8

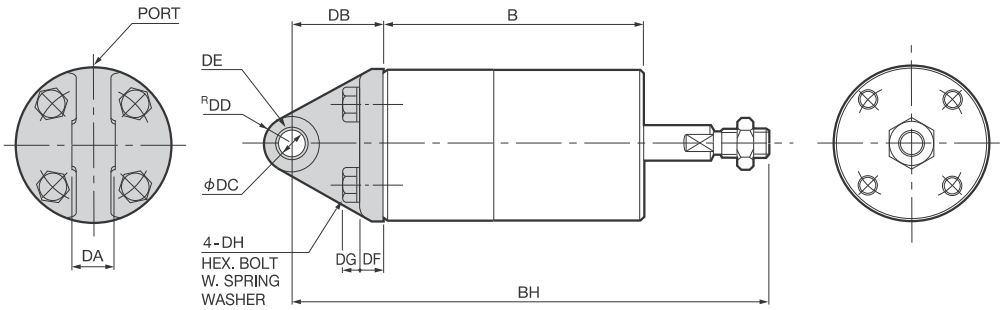
Trunnion Type Mount



Dc-STROKE	B	CG	CH
25 – 6	46	12	42
16	63	24	54
26	79	40	70
31.5 – 14	61	24	60
24	78	36	72
35	97	48	84

Dc	CA	CB	CC	CD	CE	CF
25	46	66	10	15	46	16
31.5	54	78	12	16	53	17

Pivot Type Mount

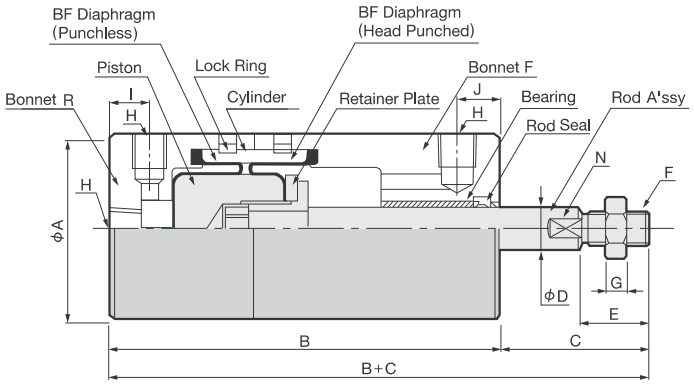


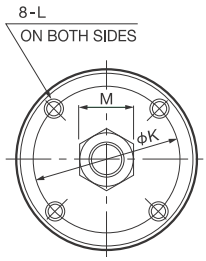
Dc-STROKE	B	BH
25 – 6	46	101
16	63	118
26	79	134
31.5 – 14	61	124
24	78	141
35	97	160

Dc	DA	DB	DC	DD	DE	DF	DG	DH
25	12	25	8	8	0812	6	3.8	M4×12
31.5	13	27	8	8	0812	7	4.8	M4×14

DE : Bearing Size No.

Internal Construction Outline Dimensions





PARTS LIST

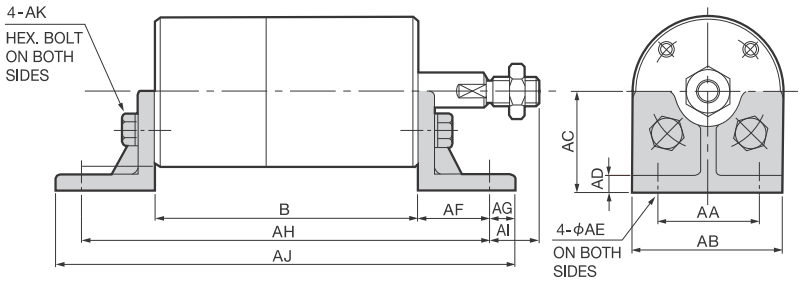
DESCRIPTION	MATERIAL
Bonnet	Aℓ Alloy
Piston	Aℓ Alloy
BF Diaphragm	Fabric Reinforced NBR
Lock Ring	Brass Wire
Cylinder	Aℓ Alloy
Retainer Plate	Aℓ Alloy
Bearing	Dry Bearing
Rod Seal	NBR
Rod Ass'y	Stainless Steel / Carbon Steel

OUTLINE DIMENSIONS

Ae : Effective area (mm²)
N : Wrench flat width

Dc-STROKE	A	B	C	B+C	D	E	F	G	H	I	J	K	L	M	N	Ae PUSH	Ae PULL
25 – 6	38	71	30	101	8	12	M6 P=0.75	3.6	Rc1/8	9	9	30	M4 DP6	10	6	400	350
16		86		116													
26		101		131													
31.5 – 14	45	85	36	121	10	16	M8 P=1	5	Rc1/8	10	10	35	M5 DP7.5	13	8	660	580
24		101		137													
35		118		154													

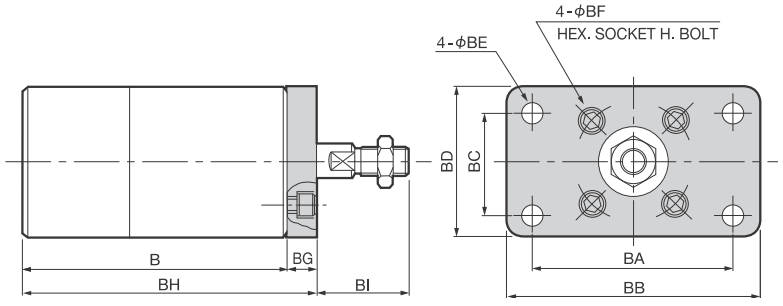
L Type Mount



Dc-STROKE	B	AH	AJ
25 – 6	71	109	121
16	86	124	136
26	101	139	151
31.5 – 14	85	129	145
24	101	145	161
35	118	162	178

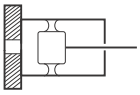
Dc	AA	AB	AC	AD	AE	AF	AG	AI	AK
25	25	38	25	4	6	19	6	11	M4×10
31.5	30	45	30	5	6	22	8	14	M5×12

Front Flange Type Mount

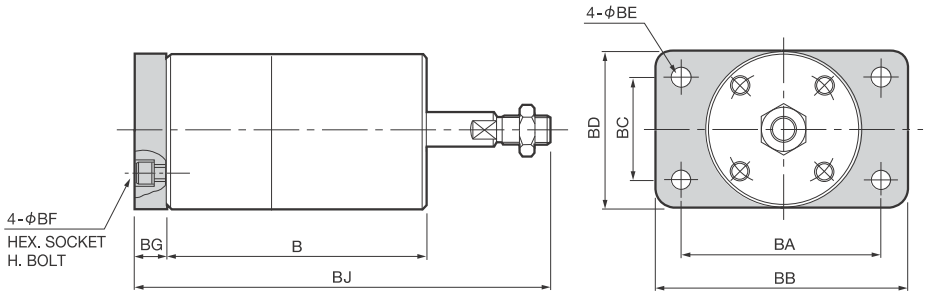


Dc-STROKE	B	BH
25 – 6	71	77
16	86	92
26	101	107
31.5 – 14	85	93
24	101	109
35	118	126

Dc	BA	BB	BC	BD	BE	BF	BG	BI
25	50	65	25	38	5	M4×6	6	24
31.5	60	75	30	45	6	M5×8	8	28

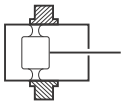


Rear Flange Type Mount

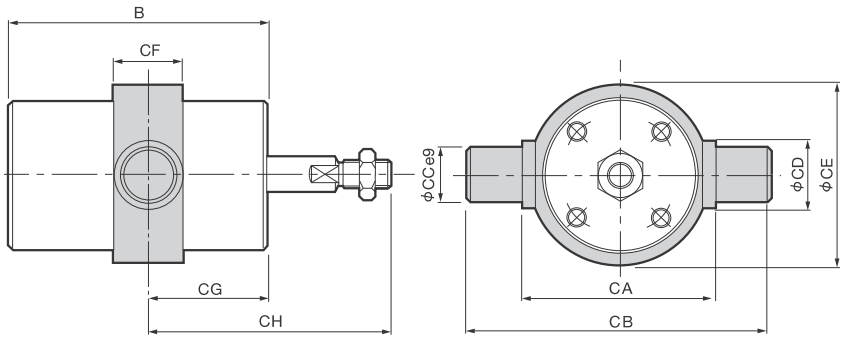


Dc-STROKE	B	BJ
25 – 6	71	107
16	86	122
26	101	137
31.5 – 14	85	129
24	101	145
35	118	162

Dc	BA	BB	BC	BD	BE	BF	BG
25	50	65	25	38	5	M4×6	6
31.5	60	75	30	45	6	M5×8	8

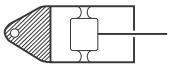


Trunnion Type Mount

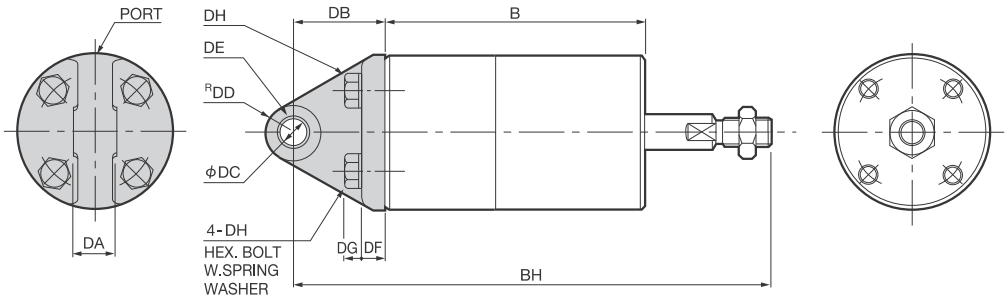


Dc-STROKE	B	CG	CH
25 – 6	71	26	56
16	86	33	63
26	101	38	68
31.5 – 14	85	44	80
24	101	60	96
35	118	67	103

Dc	CA	CB	CC	CD	CE	CF
25	46	66	10	15	46	16
31.5	54	78	12	16	53	17



Pivot Type Mount

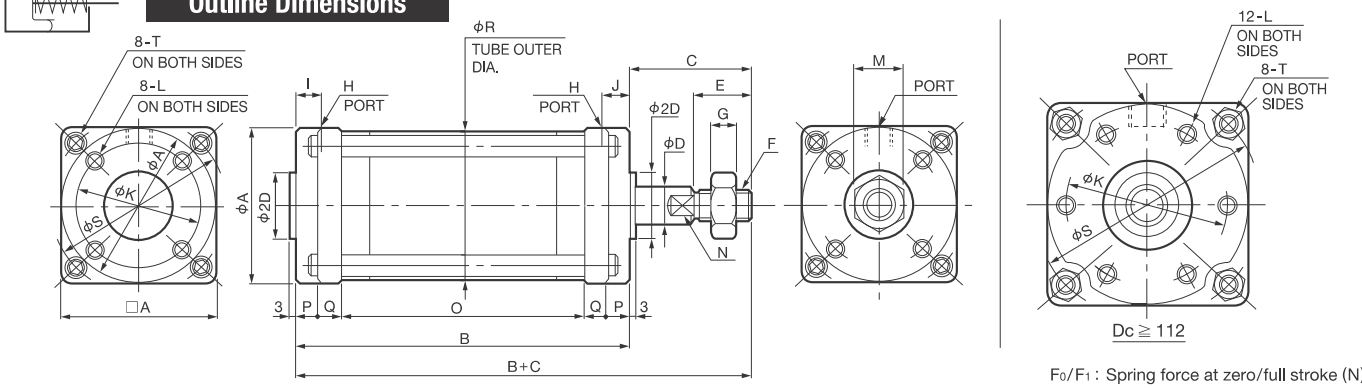


Dc-STROKE	B	BH
25 – 6	71	126
16	86	141
26	101	156
31.5 – 14	85	148
24	101	164
35	118	181

Dc	DA	DB	DC	DD	DE	DF	DG	DH
25	12	25	8	8	0812	6	3.8	M4×12
31.5	13	27	8	8	0812	7	4.8	M4×14

DE : Bearing Size No.

Outline Dimensions

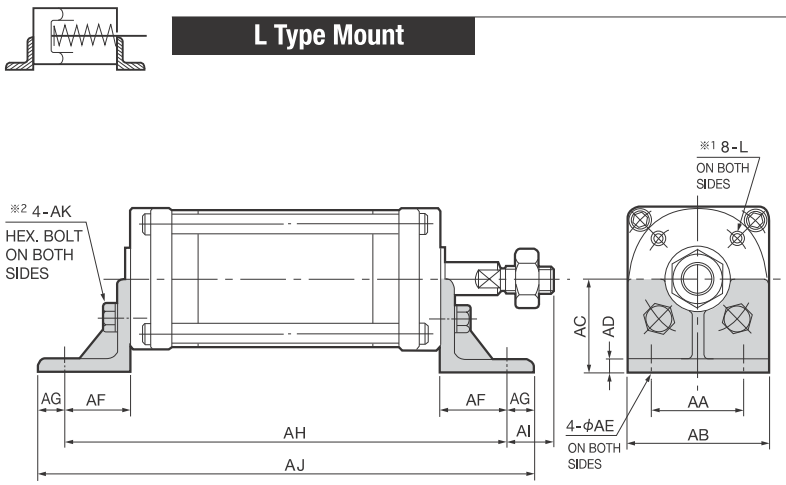


F_0/F_1 : Spring force at zero/full stroke (N)
Ae : Effective area (mm^2)
N : Wrench flat width

OUTLINE DIMENSIONS

Dc-STROKE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Ae	SPRING FORCE F_0	SPRING FORCE F_1
40 - 8	53	44	42	12	20	M10 × 1.25	6	Rc 1/8	9	—	42	M6 DP 9	17	10	14	8	7	51.5	61	M5	1100	7.8	19.6
24		68													38								
36		87													57								
48		105													75								
50 - 16	63	57	45	12	20	M10 × 1.25	6	Rc 1/8	10	—	50	M6 DP 9	17	10	25	8	8	61.5	73	M6	1770	14.7	29.4
36		87													55								
50		109													77								
64		130													98								
63 - 16	82	66	50	16	24	M12 × 1.5	7	Rc 1/4	12	—	63	M8 DP 12	19	13	26	9	11	78.5	94	M8	2730	23.5	47
42		105													65								
59		131													91								
78		160													120								
80 - 30	100	87	58	20	32	M16 × 1.5	10	Rc 1/4	14	—	80	M8 DP 12	24	17	39	10	14	97	114	M8	4540	39.2	78.4
62		135													87								
87		173													125								
108		205													157								
100 - 46	120	118	65	25	40	M20 × 1.5	12	Rc 1/4	14	—	98	M10 DP 15	30	22	64	11	16	117.5	136	M10	7240	61.7	127.4
86		178													124								
115		223													169								
144		268													214								
112 - 42	137	117	72	25	44	M22 × 1.5	13	Rc 3/8	18	—	112	M10 DP 15	32	22	55	12	19	135	156	M12	8820	76.4	158.8
88		186													124								
122		238													176								
156		290													228								
125 - 52	150	132	76	30	48	M24 × 1.5	14	Rc 3/8	18	—	125	M10 DP 15	36	24	58	16	20	149	170	M14	11100	95.1	198
102		207													133								
140		265													191								
178		322													249								
140 - 62	165	154	84	35	52	M27 × 1.5	16	Rc 3/8	18	—	140	M12 DP 18	41	30	74	16	24	164	190	M14	14100	119.6	254.8
122		244													164								
162		306													226								
204		370													290								

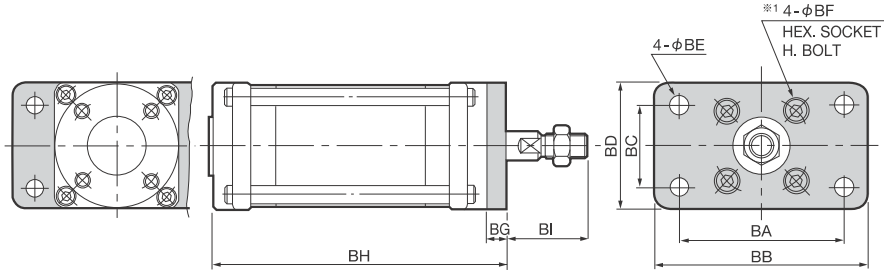
L Type Mount



Dc-STROKE	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
40 - 8	35	53	35	5	6.5	25	10	94	17	114	M6 × 14
24								118		138	
36								137		157	
48								155		175	
50 - 16	40	63	40	6	7.5	26	11	109	19	131	M6 × 14
36								139		161	
50								161		183	
64								182		204	
63 - 16	50	82	50	6	9.5	31	14	128	19	156	M8 × 20
42								167		195	
59								193		221	
78								222		250	
80 - 30	60	100	60	8	9.5	35	17	157	23	191	M8 × 20
62								205		239	
87								243		277	
108								275		309	
100 - 46	75	120	70	8	12	40	20	198	25	238	M10 × 25
86								258		298	
115								303		343	
144								348		388	
112 - 42	85	137	80	8	14	44	23	205	28	251	M10 × 25
88								274		320	
122								326		372	
156								378		424	
125 - 52	95	150	87	10	14	46	24	224	30	272	M10 × 25
102								299		347	
140								357		405	
178								415		463	
140 - 62	100	165	95	10	16	46	24	246	38	294	M12 × 30
122								336		384	
162								398		446	
204								462		510	

※1 : 12-L FOR Dc≧112 ON BOTH SIDES
※2 : 6-AK FOR Dc≧112 ON BOTH SIDES

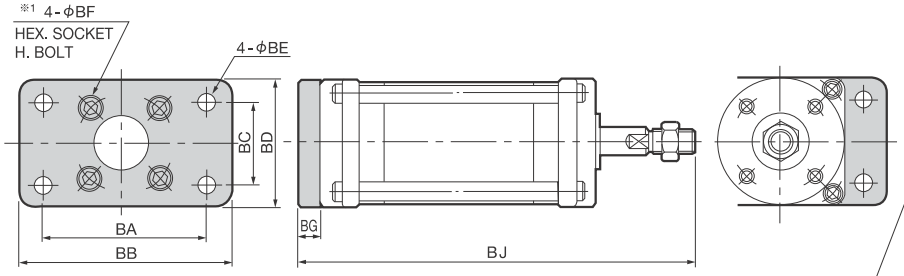
Front Flange Type Mount



※1: 6-φBF FOR Dc≧112

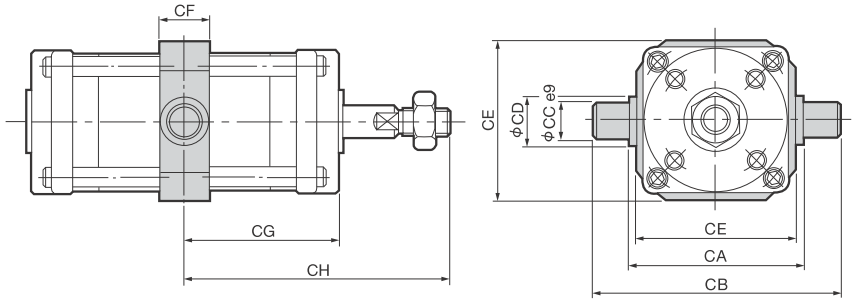
Dc-STROKE	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ
40 – 8	70	90	35	53	6.5	M6 × 10	9	53	33	95
24								77		119
36								96		138
48								114		156
50 – 16	80	100	40	63	7.5	M6 × 10	10	67	35	112
36								97		142
50								119		164
64								140		185
63 – 16	105	130	55	82	9.5	M8 × 12	12	78	38	128
42								117		167
59								143		193
78								172		222
80 – 30	120	150	70	100	9.5	M8 × 12	13	100	45	158
62								148		206
87								186		244
108								218		276
100 – 46	150	180	85	120	11.5	M10 × 16	14	132	51	197
86								192		257
115								237		302
144								282		347
112 – 42	166	195	100	137	14	M10 × 16	15	132	57	204
88								201		273
122								253		325
156								305		377
125 – 52	180	210	115	150	14	M10 × 16	16	148	60	224
102								223		299
140								281		357
178								338		414
140 – 62	195	225	125	165	16	M12 × 20	19	173	65	257
122								263		347
162								325		409
204								389		473

Rear Flange Type Mount



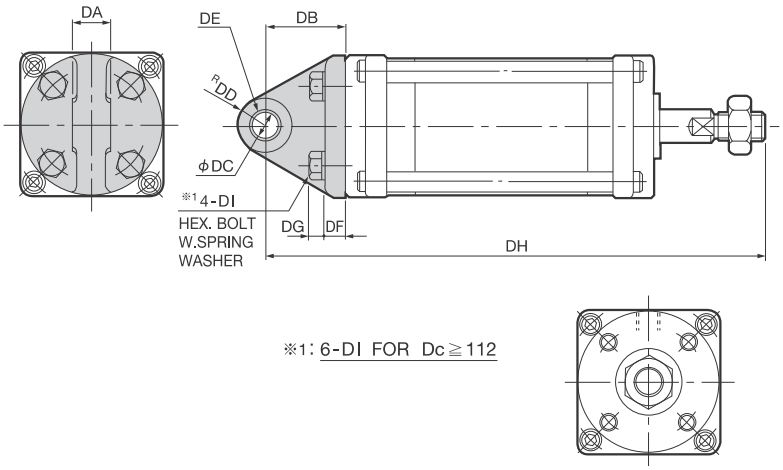
※1: 6-φBF FOR Dc≧112

Trunnion Type Mount



Dc-STROKE	CA	CB	CC	CD	CE	CF	CG	CH
40 – 8	64	92	14	18	60	18	—	—
24							34	76
36							43.5	85.5
48							52.5	94.5
50 – 16	74	106	16	20	70	20	28.5	73.5
36							43.5	88.5
50							54.5	99.5
64							65	110
63 – 16	94	134	20	25	88	25	33	83
42							52.5	102.5
59							65.5	115.5
78							80	130
80 – 30	114	168	25	30	108	30	43.5	101.5
62							67.5	125.5
87							86.5	144.5
108							102.5	160.5
100 – 46	134	194	30	35	128	35	59	124
86							89	154
115							111.5	176.5
144							134	199
112 – 42	156	216	30	35	150	35	58.5	130.5
88							93	165
122							119	191
156							145	217
125 – 52	170	234	32	38	164	38	66	142
102							103.5	179.5
140							132.5	208.5
178							161	237
140 – 62	190	260	35	42	184	42	77	161
122							122	206
162							153	237
204							185	269

Pivot Type Mount

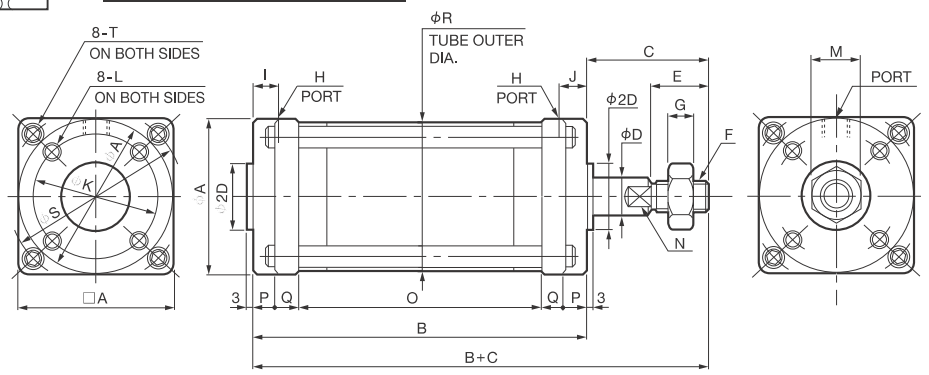


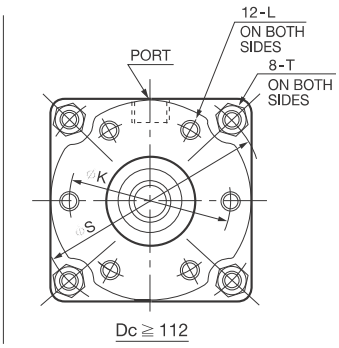
※1: 6-DI FOR Dc≧112

Dc-STROKE	DA	DB	DC	DD	DE	DF	DG	DH	DI
40 – 8	15	30	10	14	1015	8	5.5	116	M6 × 18
24								140	
36								159	
48								177	
50 – 16	15	33	10	14	1015	9	5.5	135	M6 × 18
36								165	
50								187	
64								208	
63 – 16	20	38	12	15	1220	10	7.5	154	M8 × 22
42								193	
59								219	
78								248	
80 – 30	20	44	15	16.5	1520	12	7.5	189	M8 × 22
62								237	
87								275	
108								307	
100 – 46	25	50	18	18	1825	15	9.5	233	M10 × 30
86								293	
115								338	
144								383	
112 – 42	28	54	18	20	1810 2pcs.	16	9.5	243	M10 × 30
88								312	
122								364	
156								416	
125 – 52	30	59	20	23	2010 2pcs.	17	9.5	267	M10 × 30
102								342	
140								400	
178								457	
140 – 62	34	64	22	25	2210 2pcs.	19	11	302	M12 × 35
122								392	
162								454	
204								518	

DE : Bearing Size No.

Outline Dimensions



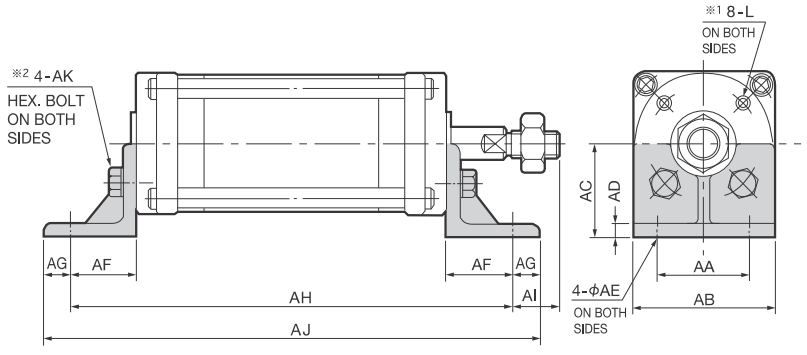


OUTLINE DIMENSIONS

Ae : Effective area (mm²)
N : Wrench flat width

Dc-STROKE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Ae PUSH	Ae PULL
40 – 8	53	54	42	12	20	M10 × 1.25	6	Rc 1/8	9	9	42	M6 DP 9	17	10	24	8	7	51.5	61	M5	1100	980
24		78													48							
36		97													67							
48		116													86							
50 – 16	63	67	45	12	20	M10 × 1.25	6	Rc 1/8	10	10	50	M6 DP 9	17	10	35	8	8	61.5	73	M6	1770	1650
36		97													65							
50		119													87							
64		141													109							
63 – 16	82	79	50	16	24	M12 × 1.5	7	Rc 1/4	12	12	63	M8 DP 12	19	13	39	9	11	78.5	94	M8	2730	2530
42		118													78							
59		145													105							
78		175													135							
80 – 30	100	100	58	20	32	M16 × 1.5	10	Rc 1/4	14	14	80	M8 DP 12	24	17	52	10	14	97	114	M8	4540	4230
62		148													100							
87		187													139							
108		220													172							
100 – 46	120	132	65	25	40	M20 × 1.5	12	Rc 1/4	14	14	98	M10 DP 15	30	22	78	11	16	117.5	136	M10	7240	6750
86		192													138							
115		239													185							
144		284													230							
112 – 42	137	138	72	25	44	M22 × 1.5	13	Rc 3/8	18	18	112	M10 DP 15	32	22	76	12	19	135	156	M12	8820	8330
88		207													145							
122		260													198							
156		313													251							
125 – 52	150	153	76	30	48	M24 × 1.5	14	Rc 3/8	18	18	125	M10 DP 15	36	24	81	16	20	149	170	M14	11100	10400
102		228													156							
140		287													215							
178		346													274							
140 – 62	165	173	84	35	52	M27 × 1.5	16	Rc 3/8	18	18	140	M12 DP 18	41	30	93	16	24	164	190	M14	14100	13300
122		263													183							
162		326													246							
204		392													312							

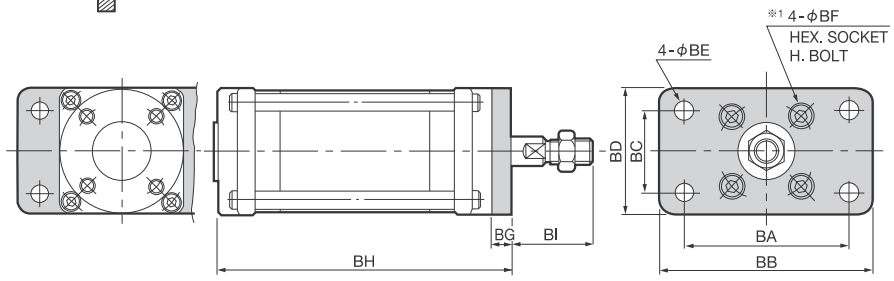
L Type Mount



※1 : 12-L FOR Dc≧112 ON BOTH SIDES
※2 : 6-AK FOR Dc≧112 ON BOTH SIDES

Dc-STROKE	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
40 – 8	35	53	35	5	6.5	25	10	104	17	124	M6 × 14
24								128		148	
36								147		167	
48								166		186	
50 – 16	40	63	40	6	7.5	26	11	119	19	141	M6 × 14
36								149		171	
50								171		193	
64								193		215	
63 – 16	50	82	50	6	9.5	31	14	141	19	169	M8 × 20
42								180		208	
59								207		235	
78								237		265	
80 – 30	60	100	60	8	9.5	35	17	170	23	204	M8 × 20
62								218		252	
87								257		291	
108								290		324	
100 – 46	75	120	70	8	12	40	20	212	25	252	M10 × 25
86								272		312	
115								319		359	
144								364		404	
112 – 42	85	137	80	8	14	44	23	226	28	272	M10 × 25
88								295		341	
122								348		394	
156								401		447	
125 – 52	95	150	87	10	14	46	24	245	30	293	M10 × 25
102								320		368	
140								379		427	
178								438		486	
140 – 62	100	165	95	10	16	46	24	265	38	313	M12 × 30
122								355		403	
162								418		466	
204								484		532	

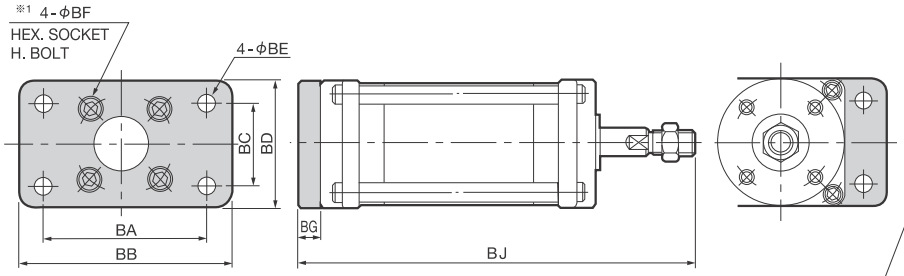
Front Flange Type Mount



※1: 6-φBF FOR Dc≧112

Dc-STROKE	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ
40 – 8	70	90	35	53	6.5	M6 × 10	9	63	33	105
24								87		129
36								106		148
48								125		167
50 – 16	80	100	40	63	7.5	M6 × 10	10	77	35	122
36								107		152
50								129		174
64								151		196
63 – 16	105	130	55	82	9.5	M8 × 14	12	91	38	141
42								130		179
59								157		207
78								187		237
80 – 30	120	150	70	100	9.5	M8 × 14	13	113	45	171
62								161		219
87								200		258
108								233		291
100 – 46	150	180	85	120	11.5	M10 × 16	14	146	51	211
86								206		271
115								253		318
144								298		363
112 – 42	166	195	100	137	14	M10 × 16	15	153	57	225
88								222		294
122								275		347
156								328		400
125 – 52	180	210	115	150	14	M10 × 16	16	169	60	245
102								244		320
140								303		379
178								362		438
140 – 62	195	225	125	165	16	M12 × 20	19	192	65	276
122								282		366
162								345		429
204								411		495

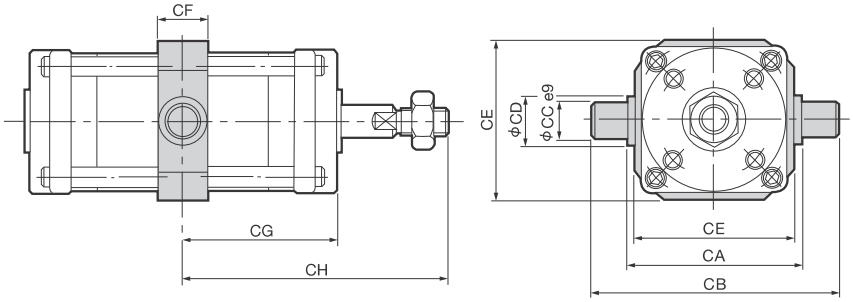
Rear Flange Type Mount



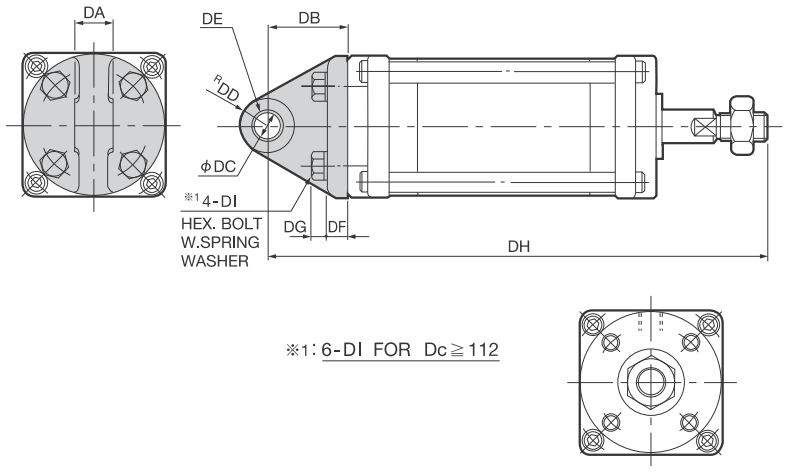
※1: 6-φBF FOR Dc≧112

Dc-STROKE	CA	CB	CC	CD	CE	CF	CG	CH
40 – 8	64	92	14	18	60	18	27	69
24							39	81
36							48.5	90.5
48							58	100
50 – 16	74	106	16	20	70	20	33.5	78.5
36							48.5	93.5
50							59.5	104.5
64							70.5	115.5
63 – 16	94	134	20	25	88	25	39.5	89.5
42							59	109
59							72.5	122.5
78							87.5	137.5
80 – 30	114	168	25	30	108	30	50	108
62							74	132
87							93.5	151.5
108							110	168
100 – 46	134	194	30	35	128	35	66	131
86							96	161
115							119.5	184.5
144							142	207
112 – 42	156	216	30	35	150	35	69	141
88							103.5	175.5
122							130	202
156							156.5	228.5
125 – 52	170	234	32	38	164	38	76.5	152.5
102							114	190
140							143.5	219.5
178							173	249
140 – 62	190	260	35	42	184	42	86.5	170.5
122							131.5	215.5
162							163	247
204							196	280

Trunnion Type Mount



Pivot Type Mount

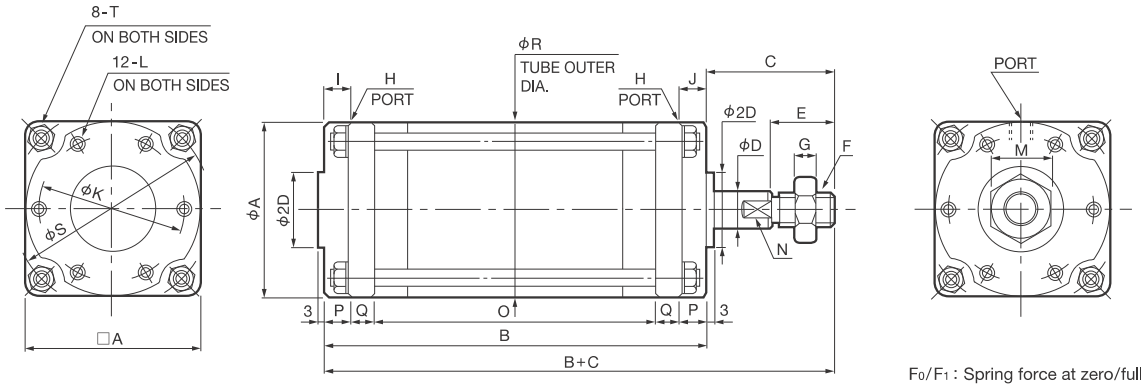


※1: 6-DI FOR Dc≧112

Dc-STROKE	DA	DB	DC	DD	DE	DF	DG	DH	DI
40 – 8	15	30	10	14	1015	8	5.5	126	M6 × 18
24								150	
36								169	
48								188	
50 – 16	15	33	10	14	1015	9	5.5	145	M6 × 18
36								175	
50								197	
64								219	
63 – 16	20	38	12	15	1220	10	7.5	167	M8 × 22
42								206	
59								233	
78								263	
80 – 30	20	44	15	16.5	1520	12	7.5	202	M8 × 22
62								250	
87								289	
108								322	
100 – 46	25	50	18	18	1825	15	9.5	247	M10 × 30
86								307	
115								354	
144								399	
112 – 42	28	54	18	20	1810 2pcs.	16	9.5	264	M10 × 30
88								333	
122								386	
156								439	
125 – 52	30	59	20	23	2010 2pcs.	17	9.5	288	M10 × 30
102								363	
140								422	
178								481	
140 – 62	34	64	22	25	2210 2pcs.	19	11	321	M12 × 35
122								411	
162								474	
204								570	

DE: Bearing Size No.

Outline Dimensions

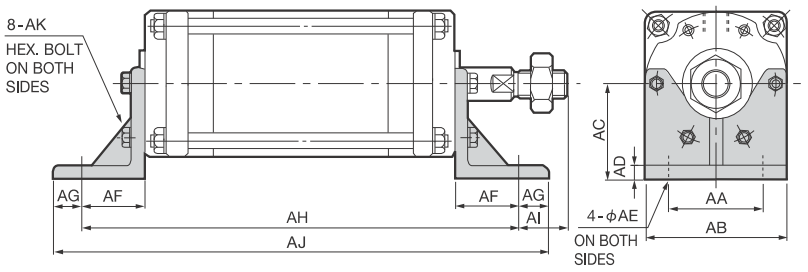


F_0/F_1 : Spring force at zero/full stroke (N)
Ae : Effective area (mm^2)
N : Wrench flat width

OUTLINE DIMENSIONS

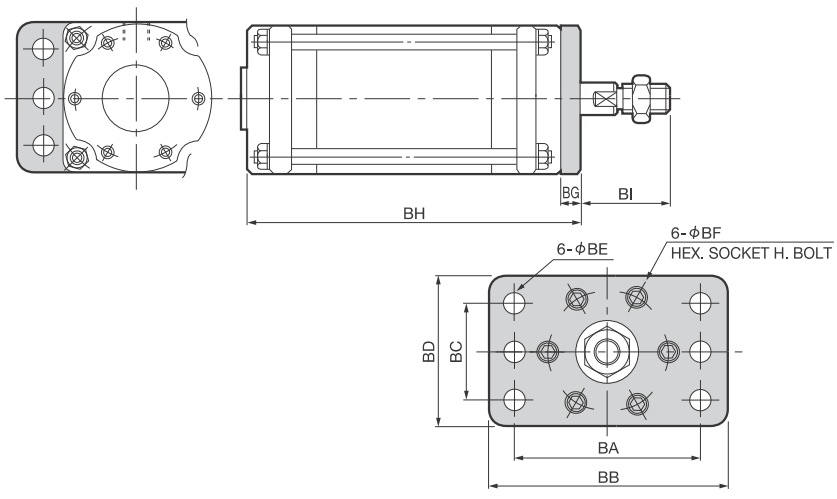
Dc-STROKE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Ae	SPRING FORCE F_0	SPRING FORCE F_1
160 – 82	185	184	94	35	60	M30 × 1.5	18	Rc 1/2	22	—	160	M12 DP 18	46	30	86	23	26	185	215	M16	18600	158.8	356.7
142		274													176								
192		351													253								
240		425													327								
180 – 96	205	213	104	40	64	M33 × 1.5	20	Rc 1/2	22	—	176	M14 DP 21	50	36	101	26	30	205	238	M18	23800	205.8	490
168		321													209								
226		410													298								
280		493													381								
200 –112	225	244	120	45	72	M36 × 1.5	21	Rc 3/4	24	—	194	M16 DP 24	55	41	118	28	35	225	262	M20	29600	254.8	656.6
192		364													238								
256		462													336								
320		560													434								

L Type Mount

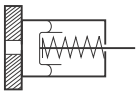


Dc-STROKE	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
160 – 82	115	185	105	13	18	49	26	282	19	334	M12 × 30
142								372		424	
192								449		501	
240								523		575	
180 – 96	130	205	115	14	18	52	28	317	24	373	M14 × 35
168								425		481	
226								514		570	
280								597		653	
200 – 112	140	225	125	14	18	52	28	348	40	404	M16 × 35
192								468		524	
256								566		622	
320								664		720	

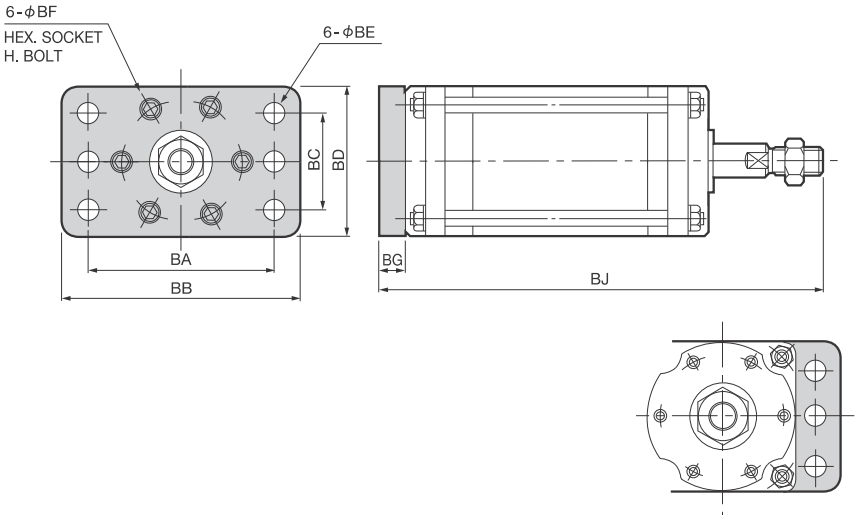
Front Flange Type Mount



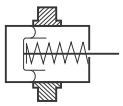
Dc-STROKE	BA	BB	BC	BD	BE	BF	BG	BH	BI
160 – 82	220	260	140	185	16	M12 × 20	19	203	75
142								293	
192								370	
240								444	
180 – 96	250	300	160	205	18	M14 × 25	22	235	82
168								343	
226								432	
280								515	
200 – 112	275	320	180	225	18	M16 × 25	25	269	95
192								389	
256								487	
320								585	



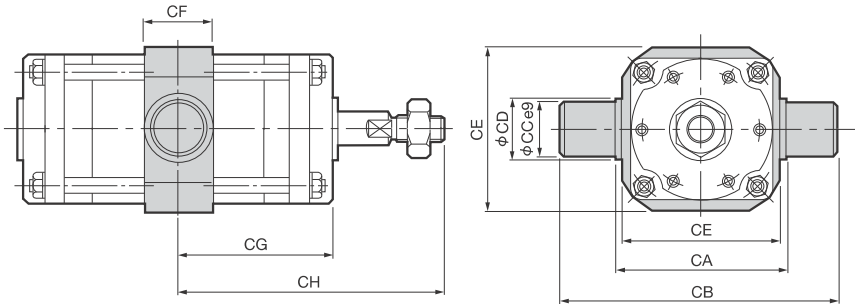
Rear Flange Type Mount



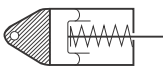
Dc-STROKE		BA	BB	BC	BD	BE	BF	BG	BJ
160 –	82	220	260	140	185	16	M12 × 20	19	297
	142								387
	192								464
	240								538
180 –	96	250	300	160	205	18	M14 × 25	22	339
	168								447
	226								536
	280								619
200 –	112	275	320	180	225	18	M16 × 25	25	389
	192								509
	256								607
	320								705



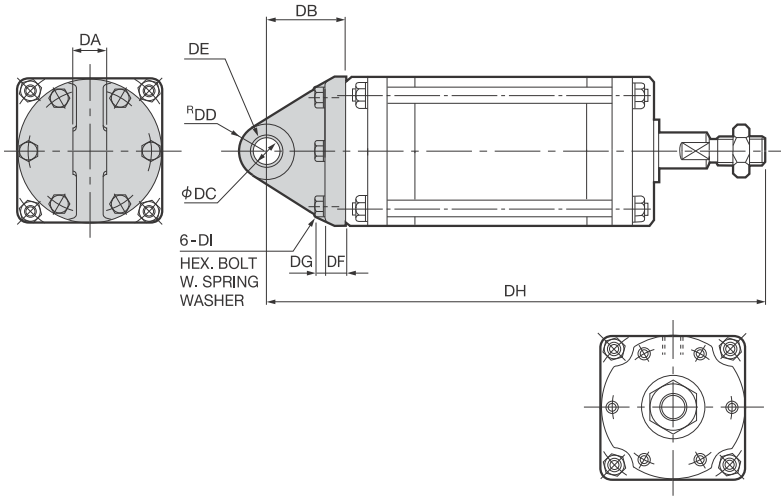
Trunnion Type Mount



Dc-STROKE		CA	CB	CC	CD	CE	CF	CG	CH
160 –	82	215	295	40	60	205	60	92	186
	142							137	231
	192							175.5	269.5
	240							212.5	306.5
180 –	96	235	325	45	63	225	63	106.5	210.5
	168							160.5	264.5
	226							205	309
	280							246.5	350.5
200 –	112	260	350	45	65	250	65	122	242
	192							182	302
	256							231	351
	320							280	400



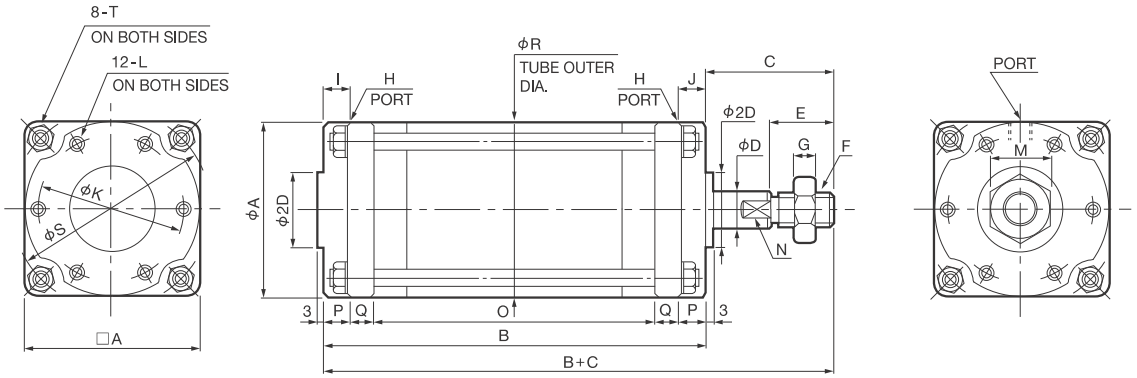
Pivot Type Mount



Dc-STROKE		DA	DB	DC	DD	DE	DF	DG	DH	DI
160 –	82	38	70	25	28	2510 2pcs.	21	11	348	M12 × 40
	142								438	
	192								515	
	240								589	
180 –	96	42	77	28	32	2812 2pcs.	24	12.5	394	M14 × 45
	168								502	
	226								591	
	280								674	
200 –	112	45	85	30	34	3012 2pcs.	26	14	449	M16 × 50
	192								569	
	256								667	
	320								765	

DE : Bearing Size No.

Outline Dimensions

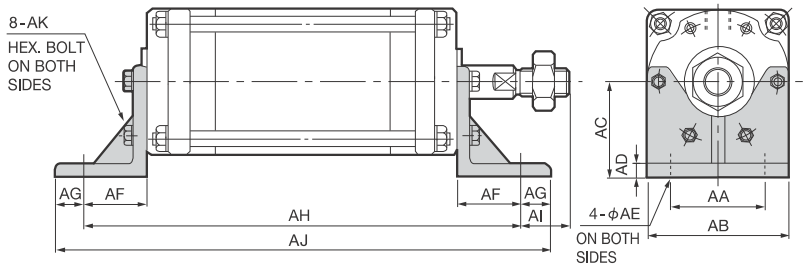


Ae : Effective area (mm²)
N : Wrench flat width

OUTLINE DIMENSIONS

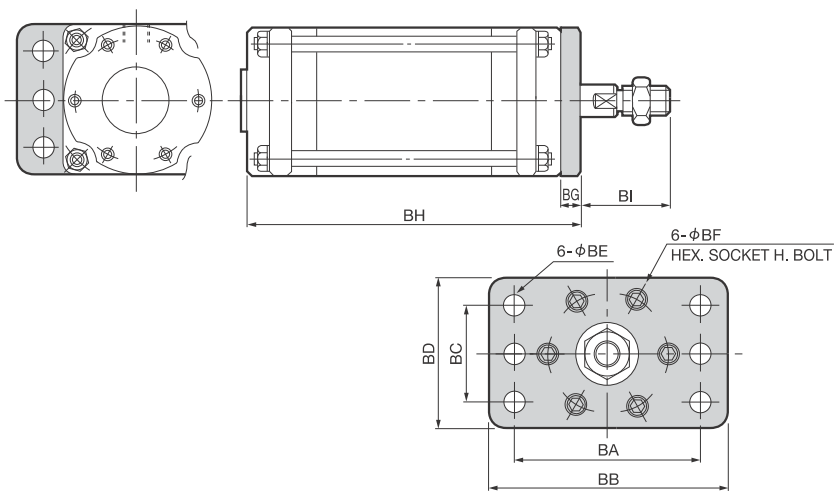
Dc-STROKE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Ae PUSH	Ae PULL
160 – 82	185	230	94	35	60	M30 × 1.5	18	Rc 1/2	22	22	160	M12 DP 18	46	30	132	23	26	185	215	M16	18600	17600
142		320													222							
192		399													301							
240		475													377							
180 – 96	205	260	104	40	64	M33 × 1.5	20	Rc 1/2	22	22	176	M14 DP 21	50	36	148	26	30	205	238	M18	23800	22500
168		368													256							
226		459													347							
280		544													432							
200 –112	225	292	120	45	72	M36 × 1.5	21	Rc 3/4	24	24	194	M16 DP 24	55	41	166	28	35	225	262	M20	29600	28000
192		412													286							
256		512													386							
320		612													486							

L Type Mount

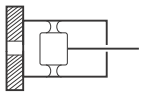


Dc-STROKE	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
160 – 82	115	185	105	13	18	49	26	328	45	380	M12 × 30
142								418		470	
192								497		549	
240								573		625	
180 – 96	130	205	115	14	18	52	28	364	52	420	M14 × 35
168								472		528	
226								563		619	
280								648		704	
200 – 112	140	225	125	14	18	52	28	396	68	452	M16 × 35
192								516		572	
256								616		672	
320								716		772	

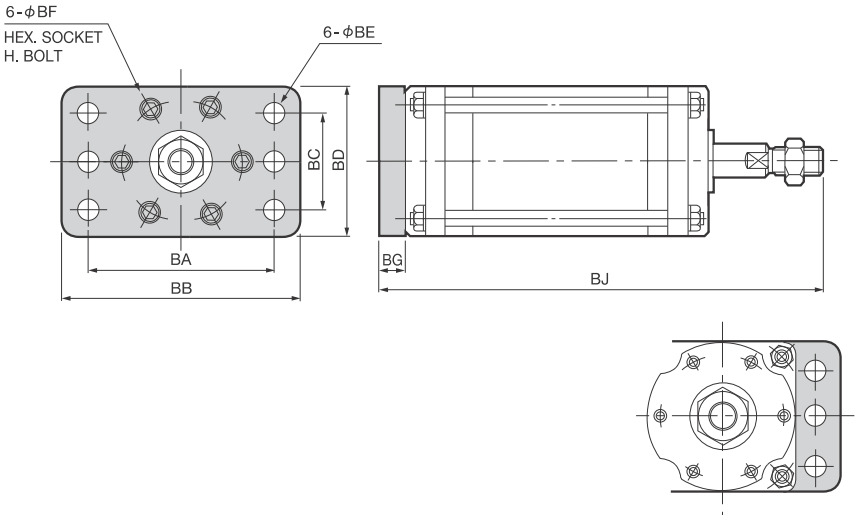
Front Flange Type Mount



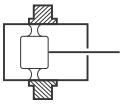
Dc-STROKE	BA	BB	BC	BD	BE	BF	BG	BH	BI
160 – 82	220	260	140	185	16	M12 × 20	19	249	75
142								339	
192								418	
240								494	
180 – 96	250	300	160	205	18	M14 × 25	22	282	82
168								390	
226								481	
280								566	
200 – 112	275	320	180	225	18	M16 × 25	25	317	95
192								437	
256								537	
320								637	



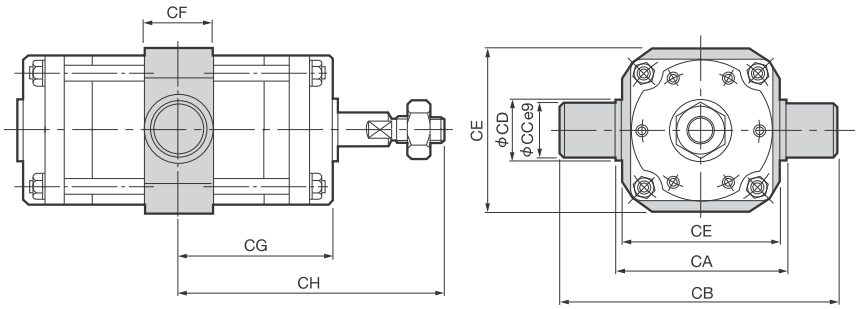
Rear Flange Type Mount



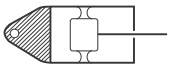
Dc-STROKE		BA	BB	BC	BD	BE	BF	BG	BJ
160 –	82	220	260	140	185	16	M12 × 20	19	343
	142								433
	192								512
	240								588
180 –	96	250	300	160	205	18	M14 × 25	22	386
	168								494
	226								585
	280								670
200 –	112	275	320	180	225	18	M16 × 25	25	437
	192								557
	256								657
	320								757



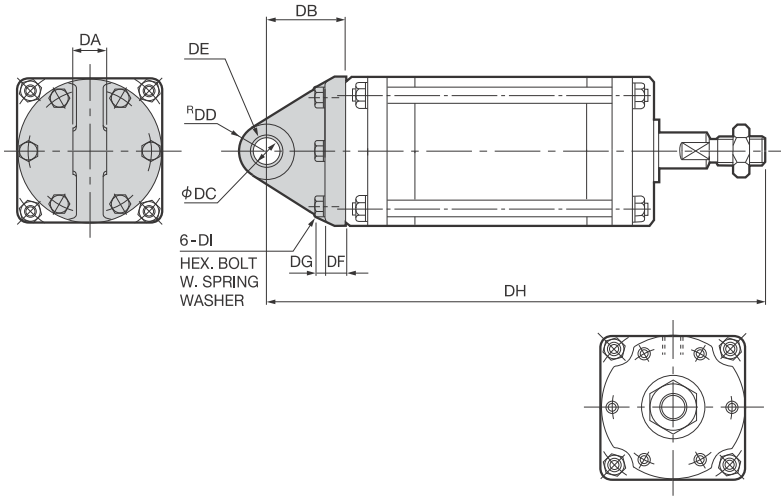
Trunnion Type Mount



Dc-STROKE		CA	CB	CC	CD	CE	CF	CG	CH
160 –	82	215	295	40	60	205	60	115	209
	142							160	254
	192							199.5	293.5
	240							237.5	331.5
180 –	96	235	325	45	63	225	63	130	234
	168							184	288
	226							229.5	333.5
	280							272	376
200 –	112	260	350	45	65	250	65	146	266
	192							206	326
	256							256	376
	320							306	426



Pivot Type Mount



Dc-STROKE		DA	DB	DC	DD	DE	DF	DG	DH	DI
160 –	82	38	70	25	28	2510 2pcs.	21	11	394	M12 × 40
	142								484	
	192								563	
	240								639	
180 –	96	42	77	28	32	2812 2pcs.	24	12.5	441	M14 × 45
	168								549	
	226								640	
	280								725	
200 –	112	45	85	30	34	3012 2pcs.	26	14	497	M16 × 50
	192								617	
	256								717	
	320								817	

DE : Bearing Size No.

MEMO

MEMO

Fujikura's Pneumatic Control Products Line

■ General Guide		Cat. No. KS-572E
■ Fujikura BF Cylinder	**Series FC**	Cat. No. KS-570E
■ Super Precision Air Regulators	**Series RS**	Cat. No. KS-128E
■ Super Precision Air Relays	**Series RR**	
■ Precision Air Regulators	**Series RP**	Cat. No. KS-129E
■ Precision Vacuum Pressure Regulators	**Series RV**	Cat. No. KS-131E

[Please request respective catalog for detailed contents of each product.]

Note: Specifications subject to change without notice for improvements and modifications.

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FUJIKURA BF CYLINDER HANDLING INSTRUCTION

Note : Keep this Handling Instruction in a place so that it can be used whenever required.

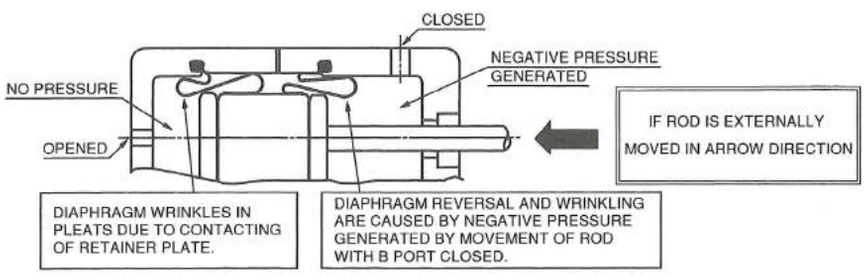
1. Precautions for Safety

⚠ CAUTION:

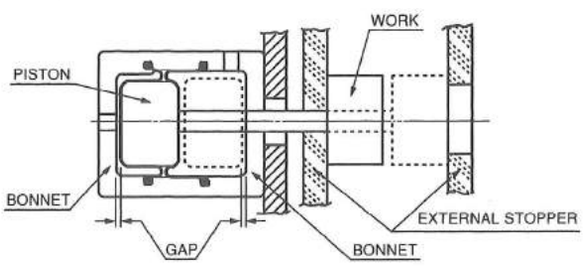
Be sure to observe the following precautions for safety.
If not so, the BF Cylinder could not only make its full peculiar functions, but also might cause the cylinder-coupled machine to do unexpected operation, resulting in occurrence of an accident involving a human life.

1 The thin diaphragm(s) contained in BF Cylinder are in an unstable state when no operating pressure is applied. Should Cylinder Rod be pulled out or pushed in during such condition, the diaphragm(s) would be caused to reverse or wrinkle in pleats between Piston and Cylinder wall as illustrated.
Be sure to apply a slight (at most 0.1 kgf/cm^2) pressure in BF Cylinder before moving Rod externally.

2 Do not carry BF Cylinder about with its Rod grasped so that the same troubles as stated in 1 will not occur.



3 Internal shock load on Bonnet acted by Piston may cause failure of BF Cylinder body. Provide external stoppers on the machine parts at the stroke ends or reinforcing members (such as tie rods) on Cylinder to allow Cylinder body to be free from shock load.



4 When BF Cylinder is required to operate at a very low speed or to carry fluctuating load, select a Cylinder size of good output allowance.

5 Do not apply lateral or eccentric axial load at the Rod end.

6 If necessary, install accessory pneumatic equipment in the pipe line preferably in close proximity to BF Cylinder.

7 Cylinder speed control should be performed by means of meter-out device.

8 Use filter and pressure reducing valve in the pipe line.

9 Automatic oiling device such as oiler may be installed in the pipe line. In this case, use well refined mineral oil such as hydraulic fluid.

10 BF Cylinders are used for a variety of applications. Customers are requested to pay reasonable attention according to each way of use or operating circumstances.

11 For protecting BF Diaphragm(s) from failure, do not apply excess pressure to BF Cylinder exceeding the specified allowable maximum operating pressure.

2. Cautions for Handling

Customers are advised to read thoroughly the following Handling Instructions before placing the BF Cylinder at service, and are requested, when replacing its diaphragm, to handle it with care observing the cautions stated below, because BF Diaphragm is sensitive functional rubber parts.

2-1. Prevention of BF Diaphragm's wrinkling

a) Do not move Rod externally with no operating pressure applied for preventing BF Diaphragm's wrinkling in pleats. (Fig.1)
Once generated, the wrinkling can not be corrected even though air pressure is applied on the high pressure side, and would cause premature failure of BF Diaphragm during service operation.
As a general rule, Rod must be moved by operating air force.
Note : When manual driving of Rod with zero operating-pressure is required from necessity,
(1) In Single acting type cylinder:
With the air port opened to atmosphere, pull Rod out slowly with as small stroke as possible.
(2) In Double acting type cylinder:
With the air port of exhaust side plugged up by finger and the air port of suction side opened to atmosphere, move Rod slowly so that the air is released gradually from the plugged port to maintain invariably some residual pressure in the exhaust side.

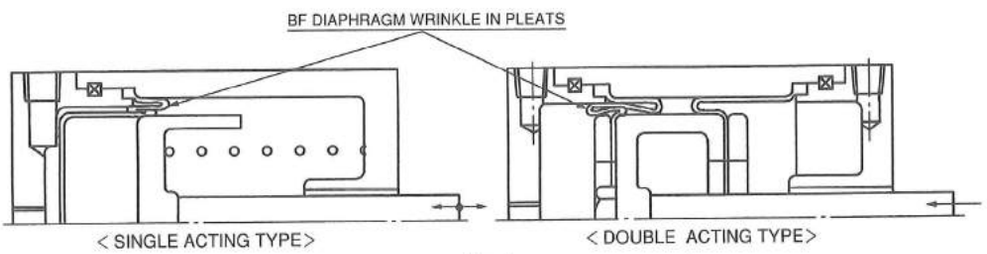


Fig.1

b) Be sure BF Cylinder is kept always with its Rod upward during handling to prevent unexpected rod protrusion due to gravity. (For return-spring-less Single acting type and also for Double acting type cylinders, especially special care must be taken for Super Cylinder of spring-less type.)

c) Provide meter-out device respectively by means of speed control valve preferably in close proximity to each air port of Cylinder so that a residual pressure of at least 0.1 kgf/cm^2 may be applied on each BF Diaphragm in the exhausting stroke during cylinder operations.
(For Double acting cylinders only.)

2-2. Prevention of BF Diaphragm's Twisting

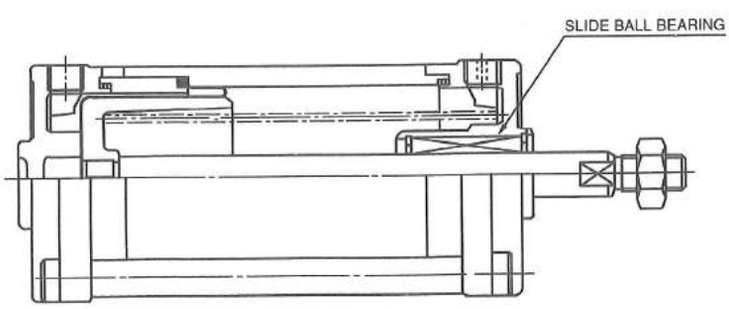
a) As a rule, do not apply torque to rotate Rod during handling for avoiding BF Diaphragm failure.

b) Do not apply torque to rotate Rod especially with pressure applied on Piston or even with no pressure applied in case after long term use.

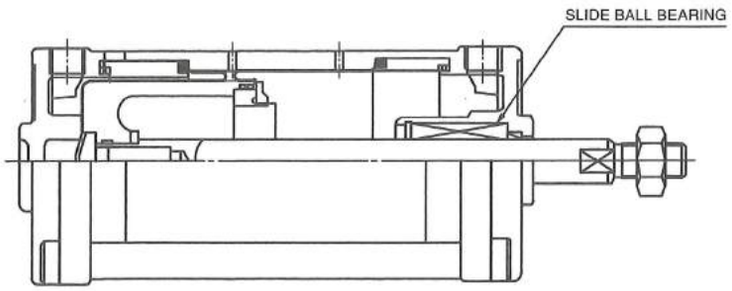
2-3. Lateral Load on Rod

a) Do not apply lateral load on the Rod end.
Bending deflection of Rod due to lateral load would cause increased frictional resistance, leading to premature wear of the bearing metal of the BF Cylinder.

b) In a design case involving unavoidable lateral load, or when minimum rod-friction is desired, a type of BF Cylinder with slide ball bearing Super Cylinder is available for use. (Consult our company.) (Fig.2-1, 2-2)



BF CYLINDER - SINGLE ACTING TYPE
Fig.2–1



BF CYLINDER - DOUBLE ACTING TYPE

Fig.2–2

2-4. No lubrication oil is required.

BF Cylinder requires no lubrication oil because of BF Diaphragm's rolling action, eliminating the need to install oiler in the pipe line.

2-5. Do not tighten excessively the pipe joints of Cylinder.

Although BF Cylinder body is made of high strength aluminum alloy, care must be taken to ensure that the pipe threads of Cylinder are not damaged due to excessive tightening of connecting pipe joints.

2-6. Internal shock load on Bonnet acted by Piston may cause failure of BF Cylinder body. Provide external stoppers on the machine parts at the stroke ends or reinforcing members (such as tie rods) on Cylinder to allow Cylinder body to be free from shock load.(Fig.3)

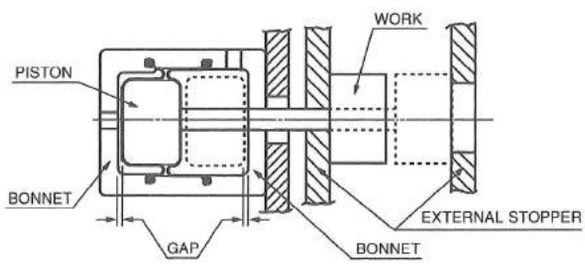


Fig.3

2-7. Installing BF Diaphragm

a) When replacing BF Diaphragm, be sure BF Diaphragm is installed so that the fabric side comes in contact with the side walls of Cylinder and Piston and the rubber side faces inside the annular convolution (pressure side).(Fig.4)

⚠ CAUTION:

If reversely installed, BF Diaphragm would be damaged promptly during service operation.

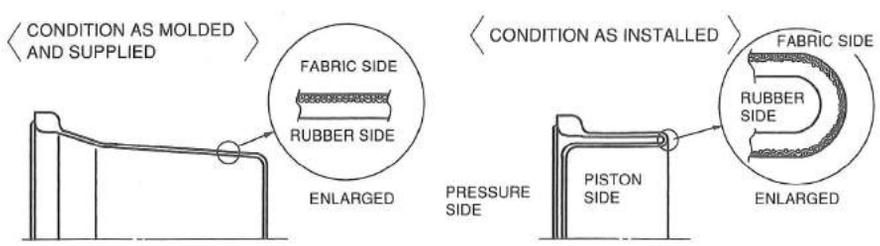


Fig.4

b) Apply lubricant such as molybdenum disulfide powder to both surfaces of BF Diaphragm before installing.

3. Installing BF Cylinder to Machine

3-1. Installing BF Cylinder Body to Machine Body

Regardless of the Cylinder type (single acting or double acting) and the installing position (upward, downward, or sideways), provide, as a rule, a temporary lock to hold Rod at the fully retracted position before installing Cylinder body (or Bonnet) to the machine body.

3-2. Coupling Rod End to Movable Parts of Machine

a) Apply a slight air pressure thru the rod side port to assure regular rolling action of BF Diaphragm of front side.

b) Then, apply an air pressure thru the piston side port to protrude Rod all the way out.

Note : (b) term is not necessary for an upwardly installed Cylinder.

c) Tighten securely the nut to couple Rod end to the movable parts of machine with the rod end double flats held by a spanner wrench to prevent rotation of Rod.

3-3. Preventing wrinkling in Pleats of BF Diaphragm to be caused by Unexpected Protrusion of Rod (for Cylinders to be installed downward).

In cases where BF Cylinder is installed downward, special attention must be paid to prevent the wrinkling in pleats of BF Diaphragm caused by unexpected protrusion of Rod under the condition when air pressure supply is cut off.

a) Prior to transporting or transferring the BF Cylinder-installed machine, provide a temporary mechanical lock on Rod.

b) After finishing daily operating work, move Rod all the way down to stop at this safe position, then cut off whole air pressure supply.

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