ISO/VDMA Cylinder: Large Bore Size Type

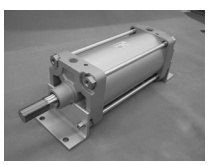
Series C95

Ø 160, Ø 200, Ø 250, Ø 320

RoHS

Conforming to ISO 15552/ISO 6431/CETOP RP43P/VDMA 24562

Series Variations

Series	Action	Type		Basic	Standard variations: Built-in magnet	Standard variations: Stainless steel rod	Option: Heat resistant	Bore [mm]	Page
Large Bore Size *Series C95* 	Double acting	Single rod	Non -lube	●	●	●	●	160 200 250 320	1
	Double acting	Double rod	Non -lube	●	●	●	●	160 200 250 320	

ISO/VDMA Cylinder: Large Bore Size Type
Double Acting, Single Rod/Double Rod

Series C95

Ø 160, Ø 200, Ø 250, Ø 320

How to Order

Without auto switch **C95S** **B** **160** – **100** **W**

With auto switch **C95SD** **B** **160** – **100** **W** – **A53** **S**

Built-in magnet

Mounting style

B	Basic/without bracket style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style
T	Centre trunnion style

Bore size

160	160 mm
200	200 mm
250	250 mm
320	320 mm

Stroke [mm]
Refer to "Standard Stroke" on page 2.

Rod

—	Single rod
W	Double rod

Auto switch

—	Without auto switch

∗ For the applicable auto switch model, refer to the table below.

Number of auto switches

—	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Applicable Auto Switches/Refer to the **Web Catalogue** for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Tie-rod mounting	Auto switch model: Band mounting	Lead wire length [m]: 0.5 (—)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	——	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9N**	—	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9P**	—	●	●	●	○	○		
				2-wire		12 V		**M9B**	—	●	●	●	○	○	—	
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	—	**G39**	—	—	—	—	—	IC circuit	
				2-wire		12 V		—	**K39**	—	—	—	—	—	—	
	Diagnostic indication (2-colour indicator)	Grommet		3-wire (NPN)		5 V, 12 V		**M9NW**	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PW**	—	●	●	●	○	○		
				2-wire		12 V		**M9BW**	—	●	●	●	○	○	—	
	Water resistant (2-colour indicator)			3-wire (NPN)		5 V, 12 V		**M9NA**∗1	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PA**∗1	—	○	○	●	○	○		
				2-wire		12 V		**M9BA**∗1	—	○	○	●	○	○	—	
	With diagnostic output (2-colour indicator)			4-wire (NPN)		5 V, 12 V		**F59F**	—	●	—	●	○	○	IC circuit	
Reed auto switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96**	—	●	—	●	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93**	—	●	●	●	●	—	—	Relay, PLC
						5 V, 12 V	100 V or less	**A90**	—	●	—	●	—	—	IC circuit	
			Yes			12 V	100 V, 200 V	**A54**	—	●	—	●	●	—	—	
			No				200 V or less	**A64**	—	●	—	●	—	—		
		Terminal conduit	Yes				—	—	**A33**	—	—	—	—	—	—	PLC
		DIN terminal					100 V, 200 V	—	**A34**	—	—	—	—	—		Relay, PLC
								—	**A44**	—	—	—	—	—		
	Diagnostic indication (2-colour indicator)	Grommet				—	—	**A59W**	—	●	—	●	—	—		

∗1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC regarding water-resistant types with the above model numbers.

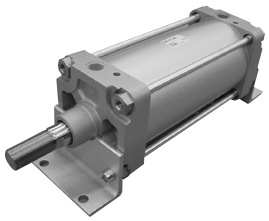
∗ Lead wire length symbols: 0.5 m····· — (Example) M9NW
1 m····· M (Example) M9NWM
3 m·····L (Example) M9NWL
5 m·····Z (Example) M9NWZ

∗ Solid state auto switches marked with a "○" are produced upon receipt of order.

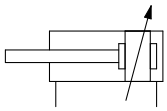
∗ Since there are applicable auto switches other than those listed above, refer to page 18 for details.

∗ Auto switches other than the D-G39/K39/A3□/A44 are shipped with the cylinder, but are not mounted to the cylinder. (Only the auto switch mounting brackets are assembled before shipment.)

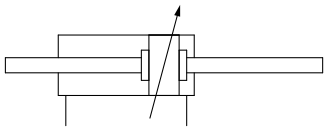
∗ D-G39/K39/A3□/A44 auto switches (band mounting type) can only be mounted on Ø 160 and Ø 200.



Symbol
Double acting



Air cushion + Bumper cushion



Specifications

Bore size [mm]		160	200	250	320
Action		Double acting			
Fluid		Air			
Proof pressure		1.5 MPa			
Max. operating pressure		1.0 MPa			
Min. operating pressure		0.05 MPa			
Ambient and fluid temperature		Without auto switch: -10 to 70 °C (No freezing) With auto switch: -10 to 60 °C (No freezing)			
Lubrication		Not required (Non-lube)			
Operating piston speed		50 to 500 mm/sec			
Allowable stroke tolerance	Up to 250	$^{+1.0}_{0}$ mm			$^{+2.0}_{0}$ mm
	251 to 1000	$^{+1.4}_{0}$ mm			$^{+2.4}_{0}$ mm
	1001 to 1500	$^{+1.8}_{0}$ mm			$^{+2.8}_{0}$ mm
	1501 to 2000	$^{+2.2}_{0}$ mm			$^{+3.2}_{0}$ mm
	2001 to 2400	$^{+2.6}_{0}$ mm			$^{+3.6}_{0}$ mm
Cushion		Both ends (Air cushion)			
Thread tolerance		JIS Class 2			
Port size		G 3/4		G 1	
Mounting		Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Centre trunnion style			

Minimum Stroke for Auto Switch Mounting

Refer to page 17 for “Minimum Stroke for Auto Switch Mounting”.

Standard Stroke

Bore size [mm]	Max. stroke∗	
	Single rod	Double rod
160	2000	1200
200	2000	
250	2400	
320	2400	

Intermediate strokes are available.
∗ Please consult with SMC for longer strokes.

Mounting Bracket Part No.

Bore size [mm]	160	200	250	320
Foot (1)	L5160	L5200	L5250	L5320
Flange	F5160	F5200	F5250	F5320
Single clevis	C5160	C5200	C5250	C5320
Double clevis	D5160	D5200	D5250	D5320

Note 1) Two foot brackets and mounting bolts (4 pieces) are included in this no.
Note 2) Accessories for mounting brackets are as follows
Foot, Flange, Single clevis: Mounting bolts
Double clevis : Clevis pin, Retaining rings, Mounting bolts

Theoretical Output

(N) OUT IN

Bore size [mm]	Rod diameter [mm]	Operating direction	Piston area (mm^2)	Operating pressure (MPa)								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
160	40	OUT	20106	4021	6032	8042	10053	12064	14074	16085	18095	20106
		IN	18850	3770	5655	7540	9425	11310	13195	15080	16965	18850
200	40	OUT	31416	6283	9425	12566	15708	18850	21991	25133	28274	31416
		IN	30159	6032	9048	12064	15080	18095	21111	24127	27143	30159
250	50	OUT	49087	9817	14726	19635	24544	29452	34361	39270	44178	49087
		IN	47124	9425	14137	18850	23562	28274	32987	37699	42412	47124
320	60	OUT	80425	16085	24127	32170	40212	48255	56297	64340	72382	80425
		IN	77597	15519	23279	31039	38799	46558	54318	62078	69838	77597

Note) Theoretical force (N) = Pressure (MPa) x Piston area (mm^2)

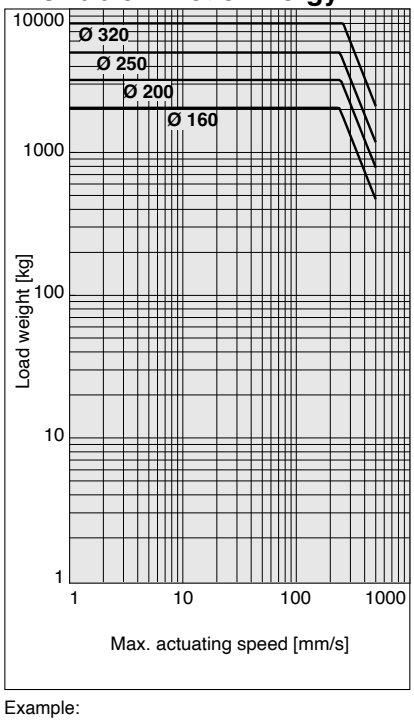
Weight/Aluminium Tube

[kg]

Bore size [mm]		160	200	250	320
Basic weight	Basic style	14.54	20.20	37.17	56.20
	Foot style	19.44	27.96	52.17	89.20
	Flange style	16.99	31.95	57.46	90.75
	Single clevis style	21.44	29.30	55.77	87.95
	Double clevis style	20.84	29.45	55.63	88.95
	Trunnion style	19.04	27.43	51.57	78.70
Additional weight per each 50 mm of stroke	All mounting brackets	0.83	0.9	1.6	2.94
Accessory	Single rod clevis	1.62	1.62	2.76	5.00
	Double clevis (With pin)	3.92	3.92	6.69	9.90

Calculation (Example) C95SD160-100
• Double clevis style weight 20.84 [kg]
• Additional weight ··· 0.83 (kg/50 mm stroke)
• Cylinder stroke ··· 100 [mm]
20.84 + 0.83 x 100 ÷ 50 = 22.50 kg

Allowable Kinetic Energy

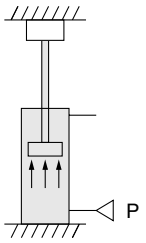


Example:
Load limit at rod end when air cylinder Ø 200 is actuated with max. actuating speed 500 mm/s. See the intersection of lateral axis 500 mm/s and Ø 200 line, and extend the intersection to left. Thus the allowable load is 800 kg.

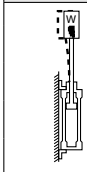
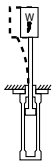
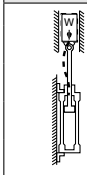
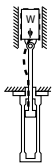
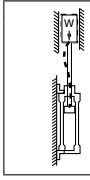
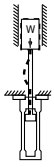
Relationship between Cylinder Size and Maximum Stroke

The below table shows the applicable maximum stroke (in cm units), found by calculation assuming the case where the force generated by the cylinder itself acts as buckling force on the piston rod, or piston rod and cylinder tube.
Therefore, it is possible to find the applicable maximum stroke for each cylinder size using the relationship between the size of the operating pressure and the cylinder support type, regardless of the load ratio.

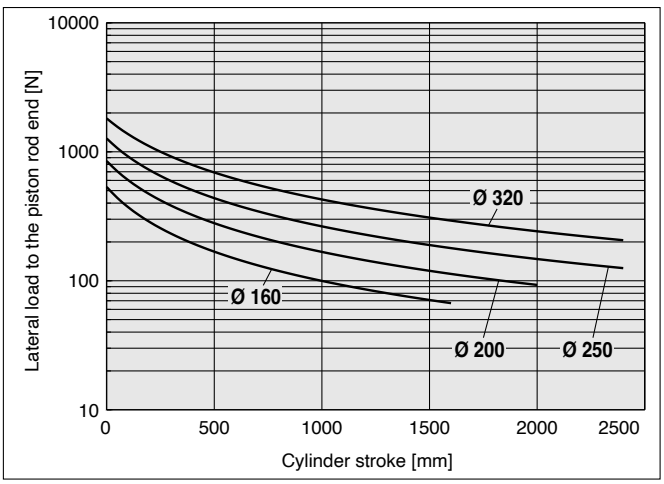
[Reference] If it is stopped with the external stopper on the cylinder extension side, even with a light load, the maximum generated force of the cylinder will act on the cylinder itself.



[cm]

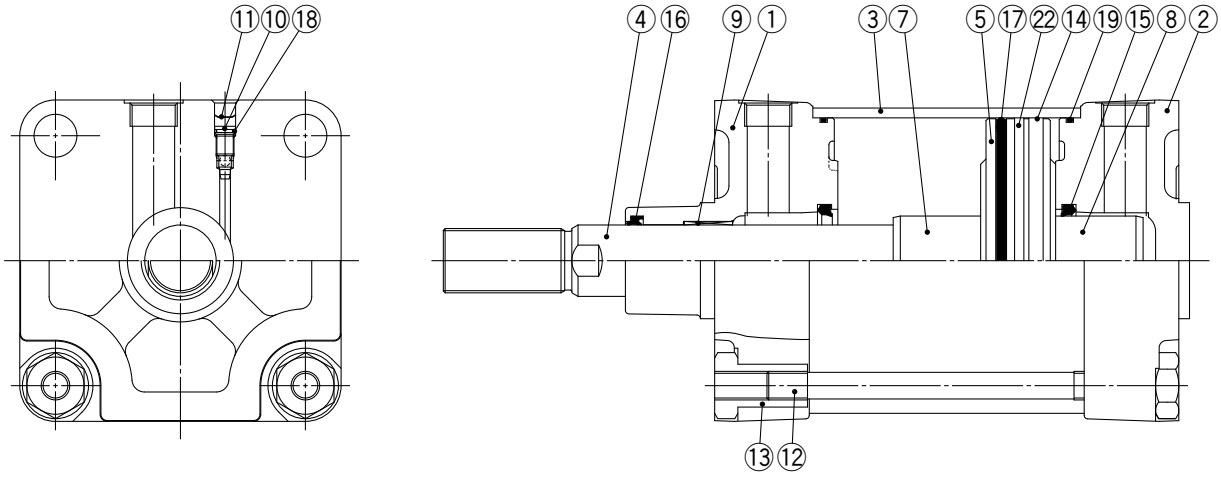
Mounting			Nominal symbol	Operating pressure [MPa]	Maximum stroke that can be used according buckling strength			
Mounting bracket diagram					**Ø 160**	**Ø 200**	**Ø 250**	**Ø 320**
Foot: **L**	Rod flange: **F**	Head flange: **G**	**L, F**	0.3	120	93	118	134
				0.5	90	69	88	100
				0.7	74	56	72	82
			G	0.3	50	36	47	53
				0.5	35	24	32	36
				0.7	27	18	24	27
Clevis: **C, D**		Centre trunnion: **T**	**C, D**	0.3	114	87	111	124
				0.5	84	63	81	91
				0.7	68	50	65	73
			T	0.3	162	125	159	178
				0.5	122	93	119	133
				0.7	100	77	97	109
Foot: **L**	Rod flange: **F**	Head flange: **G**	**L, F**	0.3	363	287	361	407
				0.5	279	219	277	312
				0.7	233	183	231	261
			G	0.3	172	133	169	190
				0.5	130	99	127	142
				0.7	107	81	104	117
Foot: **L**	Rod flange: **F**	Head flange: **G**	**L, F**	0.3	519	412	517	582
				0.5	399	316	397	448
				0.7	335	265	333	376
			G	0.3	250	196	247	277
				0.5	190	148	187	210
				0.7	158	122	155	174

Allowable Lateral Load



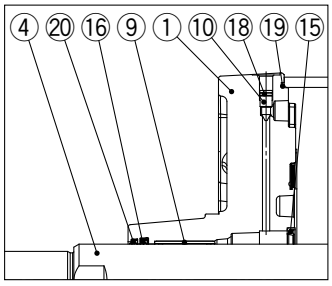
Construction (Single rod)

[First angle projection]

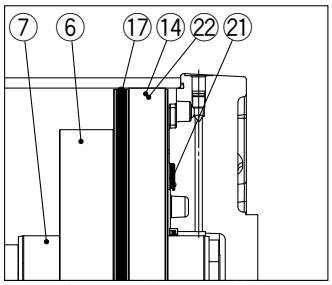


Component Parts

No.	Description	Material	Qty.	Note
1	Rod cover	Aluminium casting	1	
2	Head cover	Aluminium casting	1	
3	Cylinder tube	Aluminium alloy	1	
4	Piston rod	Carbon steel	1	
5	Piston	Aluminium alloy	1	
6	Piston spacer	Aluminium alloy	1	Ø 320
7	Cushion ring A	Rolled steel	1	
8	Cushion ring B	Rolled steel	1	
9	Bushing	Bearing alloy	1	
10	Cushion valve	Steel wire	2	
11	Snap ring	Steel for spring	2	Ø 160 to Ø 250
12	Tie rod	Carbon steel	4	
13	Tie rod nut	Carbon steel	8	
14	Wear ring	Resin	1	
15	Cushion seal	Urethane	2	Ø 160 to Ø 250
		NBR	2	Ø 320
16	Rod seal	NBR	1	
17	Piston seal	NBR	1	
18	Cushion valve seal	NBR	2	
19	Cylinder tube gasket	NBR	2	
20	Scraper	NBR	1	Ø 320
21	Bumper	Urethane	2	Ø 320
22	Magnet		(1)	



In case of Ø 320



In case of Ø 320

Replacement Parts: Seal Kit (Single rod)

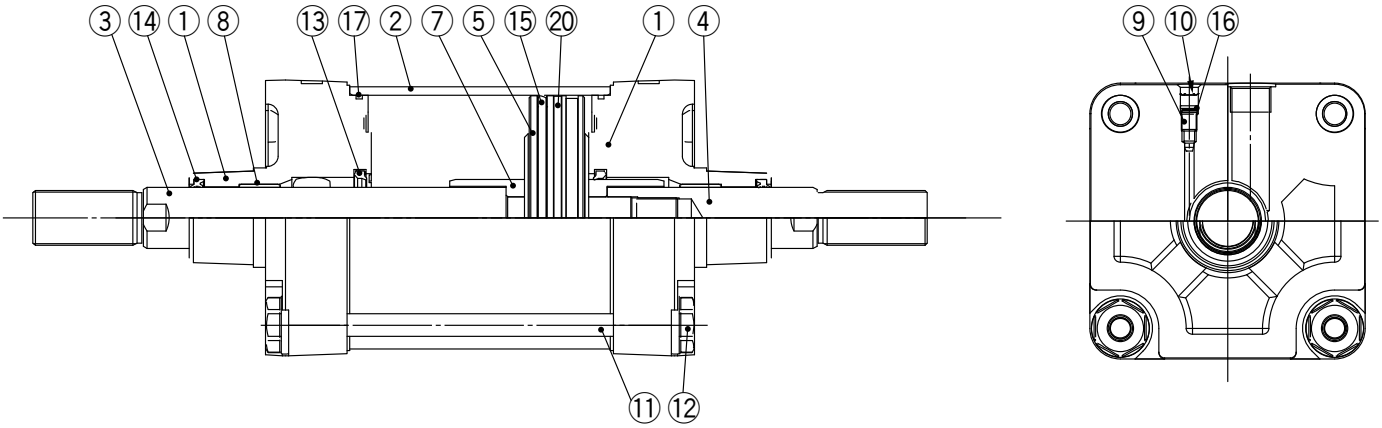
Bore size	Kit no.	Contents
160	CS95-160	⑭, ⑮, ⑰, ⑲ and grease pack are contained.
200	CS95-200	
250	CS95-250	
320	CS95-320	⑯, ⑰, ⑲, ⑳ and grease pack are contained.

Seal kits consist of items ⑭ to ⑳ contained in one kit, and can be ordered using the order number for each respective tube bore size.

* The seal kit includes a grease pack. Order with one of the following part numbers when only the grease pack is required. Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

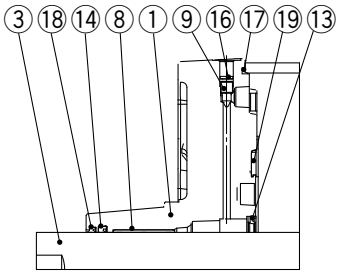
Construction (Double rod)

[First angle projection]

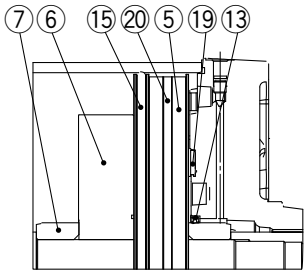


Component Parts

No.	Description	Material	QTY	NOTE
1	Rod cover	Aluminium casting	2	
2	Cylinder tube	Aluminium casting	1	
3	Piston rod A	Aluminium alloy	1	
4	Piston rod B	Carbon steel	1	
5	Piston	Aluminium alloy	1	
6	Piston sepacer	Aluminium alloy	1	Ø 320
7	Cushion ring A	Rolled steel	2	
8	Bushing	Bearing alloy	2	
9	Cushion valve	Steel wire	2	
10	Snap ring	Carbon steel	2	Ø 160 to Ø 250
11	Tie rod A	Carbon steel	4	
12	Tie rod nut	Carbon steel	8	
13	Cushion seal	Urethane	2	Ø 160 to Ø 250
		NBR	2	Ø 320
14	Rod seal	NBR	2	
15	Piston seal	NBR	1	
16	Cushion valve seal	NBR	2	
17	Cylinder tube gasket	NBR	2	
18	Scraper	NBR	2	Ø 320
19	Bumper	Urethane	2	Ø 320
20	Magnet		(1)	



In case of Ø 320



In case of Ø 320

Replacement Parts: Seal Kit (Double rod)

Bore size	Kit no.	Contents
160	CS95W-160	⑬, ⑭, ⑮, ⑰ and grease pack are contained.
200	CS95W-200	
250	CS95W-250	
320	CS95W-320	⑭, ⑮, ⑰, ⑱ and grease pack are contained.

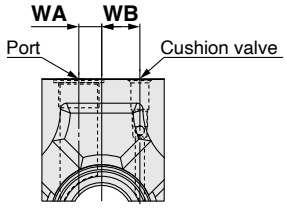
Seal kits consist of items ⑬ to ⑱ contained in one kit, and can be ordered using the order number for each respective tube bore size.

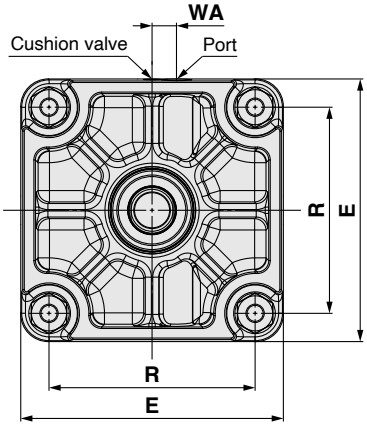
* The seal kit includes a grease pack. Order with one of the following part numbers when only the grease pack is required. Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

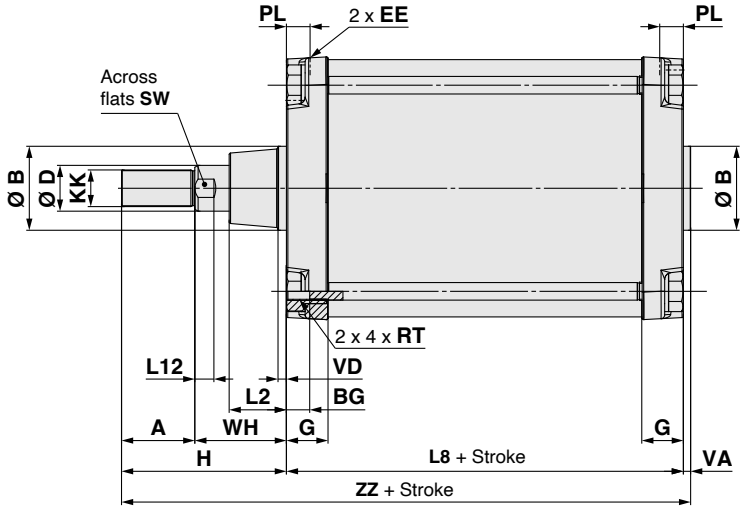
Dimensions: Without Mounting Bracket

[First angle projection]

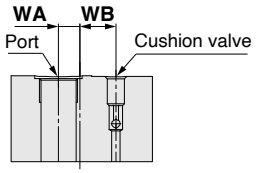
C95SB Bore size - Stroke (Single rod)

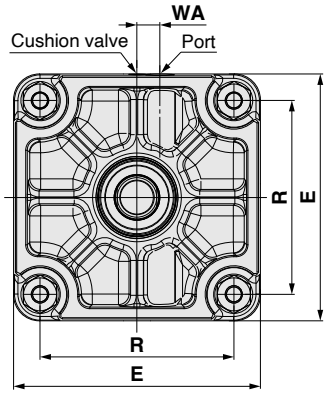


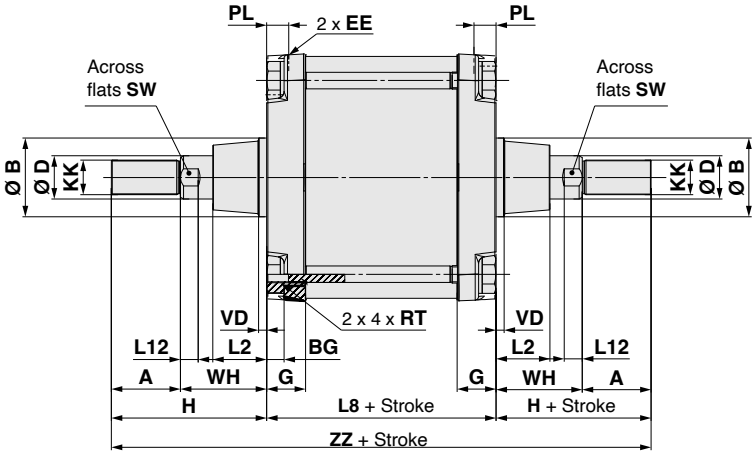




Bore size [mm]	A	Ø B d11	BG	Ø D	E	EE	G	H	KK	L2	L8	L12	PL	R	RT	SW	VA	VD	WA	WB	WH	ZZ
160	72	65	25	40	180	G3/4	55	152	M36 x 2	50	180	15	30	140	M16 x 2	36	6	8	15	25	80	338
200	72	75	25	40	220	G3/4	57	167	M36 x 2	55	180	15	35	175	M16 x 2	36	6	15	18	25	95	353
250	84	90	27	50	270	G1	59	189	M42 x 2	65	200	20	31	220	M20 x 2.5	46	10	20	20	28	105	399
320	96	110	30	60	344	G1	54.5	216	M48 x 2	75	220	25	31	270	M24 x 3	55	9.5	11	32	—	120	445.5





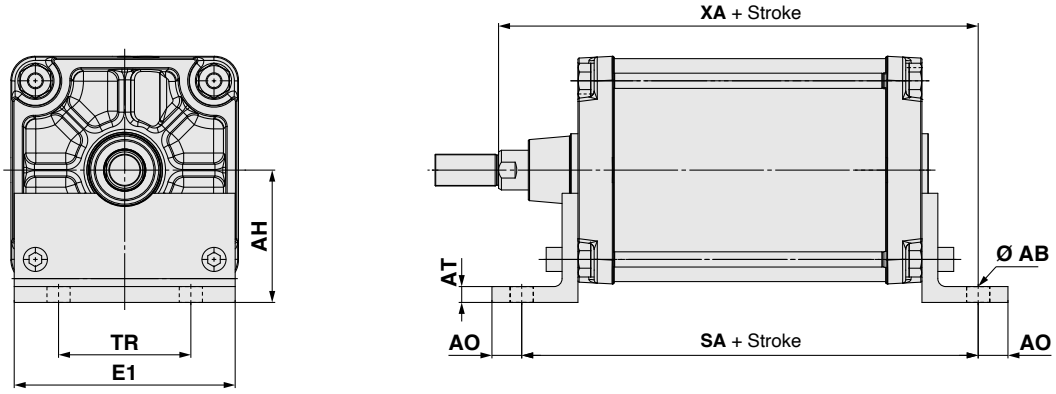


Bore size	Stroke range	A	Ø B d11	BG	Ø D	E	EE	G	H	KK	L2	L8	L12	PL	R	RT	SW	VD	WA	WB	WH	ZZ
Ø 160	Up to 1200	72	65	25	40	180	G3/4	55	152	M36 x 2	50	180	15	30	140	M16 x 2	36	8	15	25	80	484
Ø 200	Up to 1200	72	75	25	40	220	G3/4	57	167	M36 x 2	55	180	15	35	175	M16 x 2	36	15	18	25	95	514
Ø 250	Up to 1200	84	90	27	50	270	G1	59	189	M42 x 2	65	200	20	31	220	M20 x 2.5	46	20	20	28	105	578
Ø 320	Up to 1200	96	110	30	60	344	G1	54.5	216	M48 x 2	75	220	25	31	270	M24 x 3	55	11	32	—	120	652

Dimensions: Cylinder Mounting Accessory (Single rod)

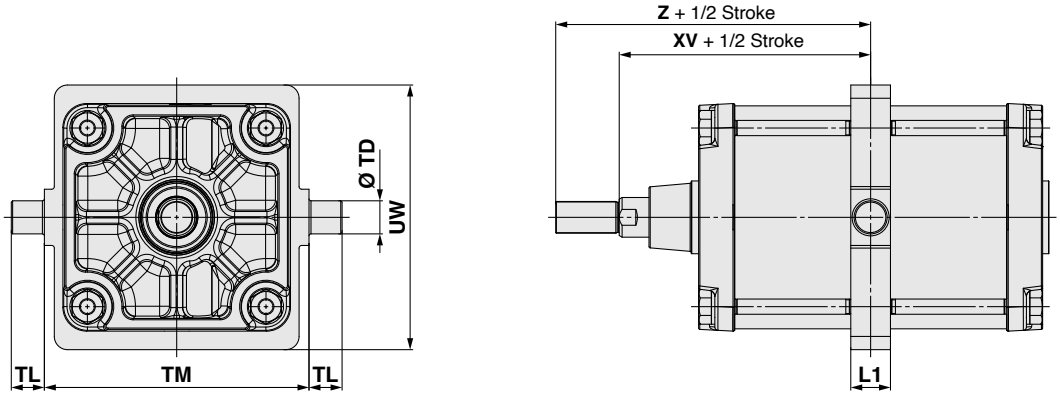
[First angle projection]

Foot style (L)



Bore size [mm]	E1	TR	AO	AT	XA	SA	AH	Ø AB
160	Max. 195	115	Max. 25	9	320	300	115	18
200	Max. 238	135	Max. 35	12	345	320	135	22
250	Max. 290	165	Max. 40	14.5	380	350	165	26
320	Max. 334	200	Max. 45	24	425	390	200	35

Centre trunnion style (T)

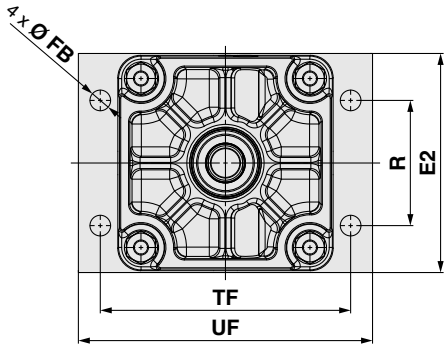


Bore size [mm]	L1	XV	Z	TL h14	Ø TD e8	TM h14	UW
160	Max. 50	170	242	32	32	200	Max. 220
200	Max. 50	185	257	32	32	250	Max. 260
250	Max. 60	205	289	40	40	320	Max. 320
320	Max. 70	230	326	50	50	400	Max. 400

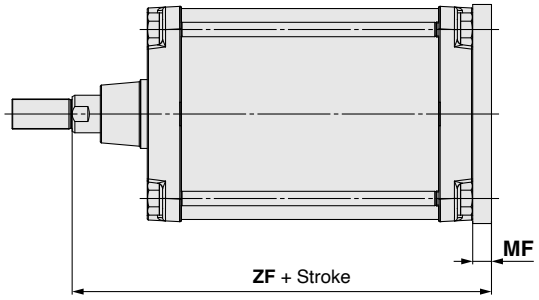
Dimensions: Cylinder Mounting Accessory (Single rod)

[First angle projection]

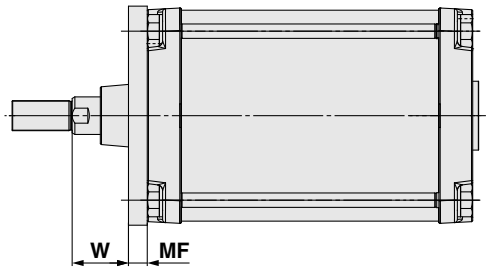
Flange style (F, G)



Mounting at the back (G)

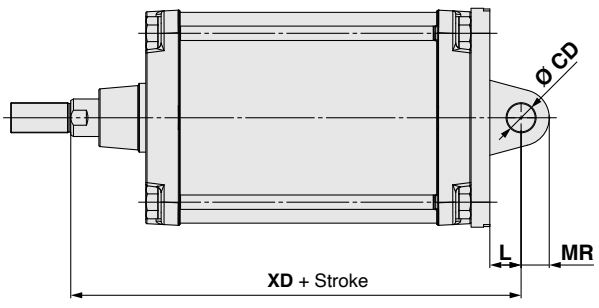


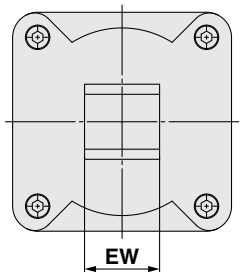
Mounting at the front (F)



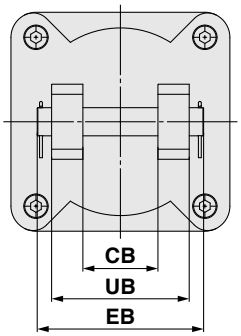
Bore size [mm]	R	W	MF	ZF	Ø FB	TF	UF	E2
160	115	60	20	280	18	230	Max. 280	Max. 195
200	135	70	25	300	22	270	Max. 320	Max. 238
250	165	80	25	330	26	330	Max. 395	Max. 290
320	200	90	30	370	33	400	Max. 475	Max. 353

Head side single clevis style (C)





Head side double clevis style (D)

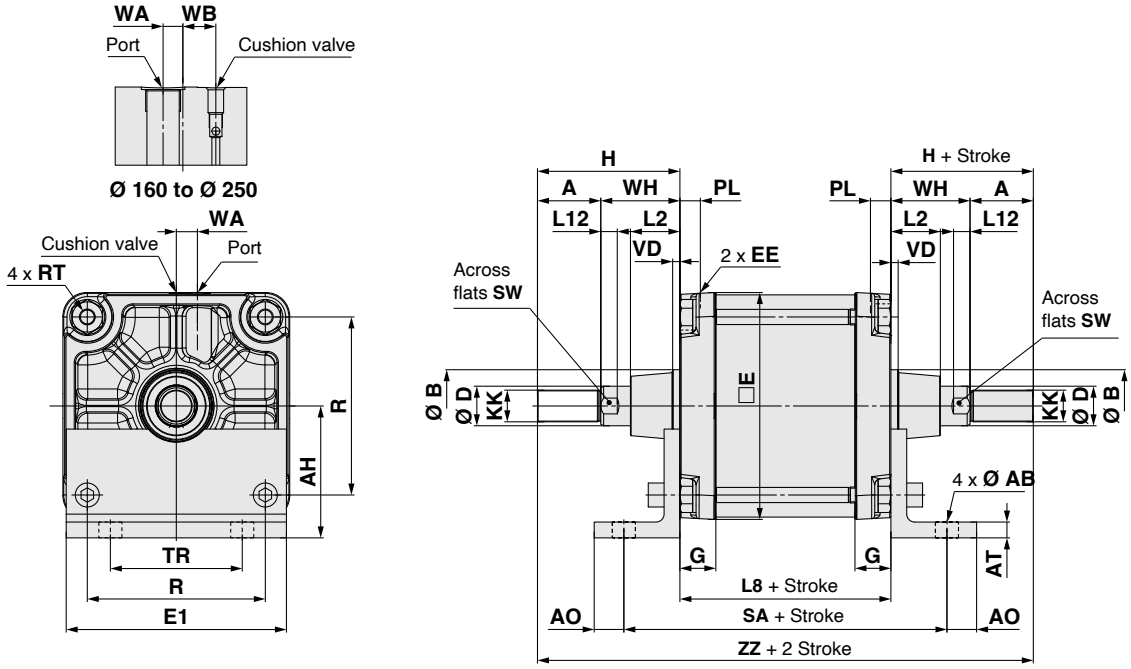


Bore size [mm]	Ø CD H9	EB	L	XD	UB h14	CB H14	EW -0.5 -1.2	MR
160	30	Max. 209	Min. 35	315	170	90	90	Max. 31
200	30	Max. 209	Min. 35	335	170	90	90	Max. 31
250	40	Max. 249	Min. 45	375	200	110	110	Max. 41
320	45	Max. 269	Min. 50	420	220	120	120	Max. 46

Dimensions: Cylinder Mounting Accessory (Double rod)

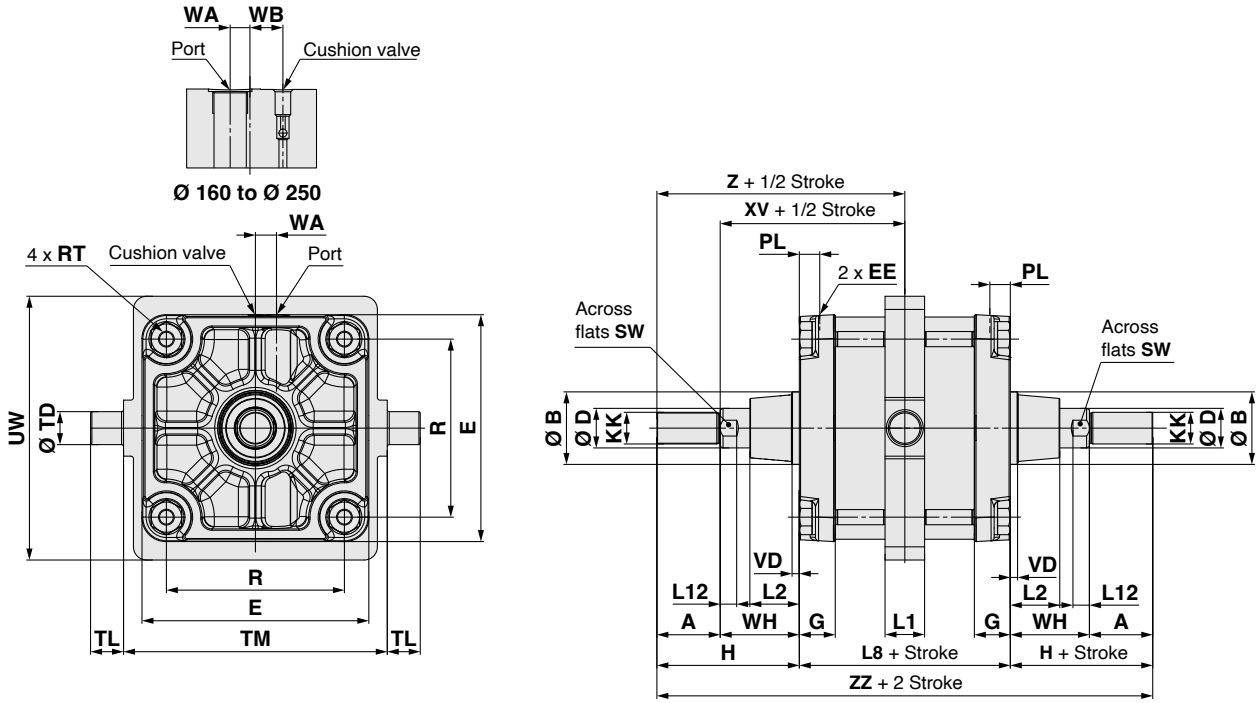
[First angle projection]

Foot style (L)



Bore size	Stroke range	A	Ø B d11	Ø D	E	EE	G	H	KK	L2	L8	L12	PL	R	RT	SW	VD	WA	WB	WH	Ø AB H14	AH	SA	AT	TR	E1	AO	ZZ
Ø 160	Up to 1200	72	65	40	180	G3/4	55	152	M36 x 2	50	180	15	30	140	M16 x 2	36	8	15	25	80	18	115	300	9	115	195	25	484
Ø 200	Up to 1200	72	75	40	220	G3/4	57	167	M36 x 2	55	180	15	35	175	M16 x 2	36	15	18	25	95	22	135	320	12	135	238	35	514
Ø 250	Up to 1200	84	90	50	270	G1	59	189	M42 x 2	65	200	20	31	220	M20 x 2.5	46	20	20	28	105	26	165	350	14.5	165	290	40	578
Ø 320	Up to 1200	96	110	60	344	G1	54.5	216	M48 x 2	75	220	25	31	270	M24 x 3	55	11	32	—	120	35	200	390	24	200	334	45	652

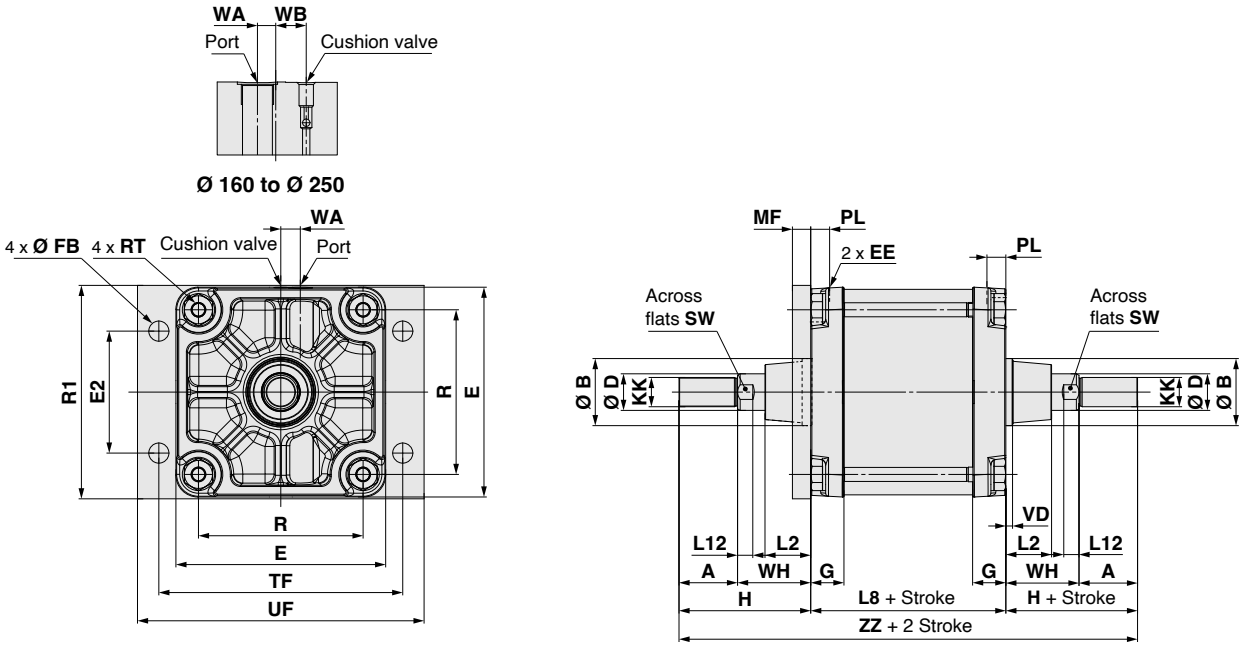
Centre trunnion style (T)



Bore size	Stroke range	A	Ø B d11	Ø D	E	EE	G	H	KK	L2	L8	L12	PL	R	RT	SW	VD	WA	WB	WH	Ø TD e8	TL h14	L1	TM h14	UW	XV	Z	ZZ
Ø 160	Up to 1200	72	65	40	180	G3/4	55	152	M36 x 2	50	180	15	30	140	M16 x 2	36	8	15	25	80	32	32	50	200	220	170	242	484
Ø 200	Up to 1200	72	75	40	220	G3/4	57	167	M36 x 2	55	180	15	35	175	M16 x 2	36	15	18	25	95	32	32	50	250	260	180	257	514
Ø 250	Up to 1200	84	90	50	270	G1	59	189	M42 x 2	65	200	20	31	220	M20 x 2.5	46	20	20	28	105	40	40	60	320	320	205	289	578
Ø 320	Up to 1200	96	110	60	344	G1	54.5	216	M48 x 2	75	220	25	31	270	M24 x 3	55	11	32	—	120	50	50	60	400	400	230	326	652

Dimensions: Cylinder Mounting Accessory (Double rod)

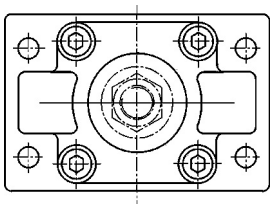
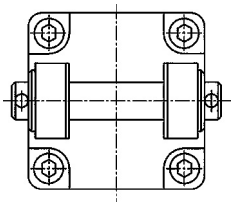
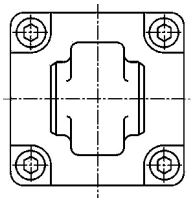
Flange style (F, G)

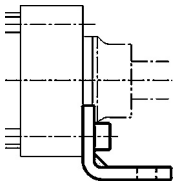


Bore size	Stroke range	A	Ø B d11	Ø D	E	EE	G	H	KK	L2	L8	L12	PL	R	RT	SW	VD	WA	WB	WH	W	E2	Ø FB	MF	TF	R1	UF	ZZ
Ø 160	Up to 1200	72	65	40	180	G3/4	55	152	M36 x 2	50	180	15	30	140	M16 x 2	36	8	15	25	80	60	195	18	20	230	115	280	484
Ø 200	Up to 1200	72	75	40	220	G3/4	57	167	M36 x 2	55	180	15	35	175	M16 x 2	36	15	18	25	95	70	238	22	25	270	135	320	514
Ø 250	Up to 1200	84	90	50	270	G1	59	189	M42 x 2	65	200	20	31	220	M20 x 2.5	46	20	20	28	105	80	290	26	25	330	165	395	578
Ø 320	Up to 1200	96	110	60	344	G1	54.5	216	M48 x 2	75	220	25	31	270	M24 x 3	55	11	32	—	120	90	350	33	30	400	200	470	652

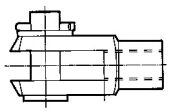
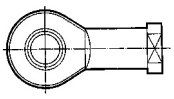
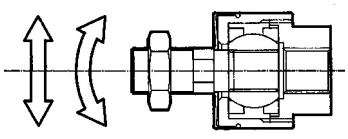
Accessory

Mounting Accessory, Cylinder

Bore size [mm]	**F** Rod/Head end flange	**D** Female head end clevis (Corresponds to E accessories)	**C** Male head end clevis
	 Supplied with 4 screws.	 Supplied with bolt, safety device and 4 screws.	 Supplied with 4 screws.
160	F5160	D5160	C5160
200	F5200	D5200	C5200
250	F5250	D5250	C5250
320	F5320	D5320	C5320
	See page 9 for dimensions.	See page 10 for dimensions.	See page 11 for dimensions.

Bore size [mm]	**L** Foot
	 Supplied with two pieces Supplied with 4 screws
160	L5160
200	L5200
250	L5250
320	L5320
	See page 9 for dimensions.

Mounting Accessory, Rod

Bore size [mm]	**GKM** Rod clevis ISO 8140	**KJ** Piston rod ball joint ISO 8139	**JA** Floating joint
	 Supplied with bolts and safety devices.		
160	GKM35-54	KJ36D	JA160-36-200
200	GKM35-54	KJ36D	JA160-36-200
250	GKM40-84	KJ42D	
320	GKM50-96	KJ48D	
	See page 14 for dimensions.	See page 14 for dimensions.	See page 14 for dimensions.

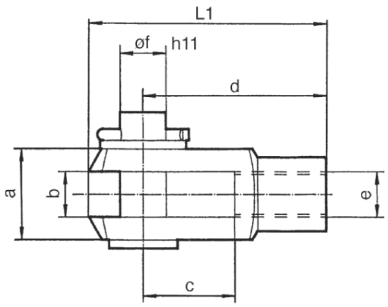
Dimensions: Piston Rod Mounting Accessory

[First angle projection]

Piston Rod Clevis (ISO 8140)
Steel, Zinc Chromate Plated

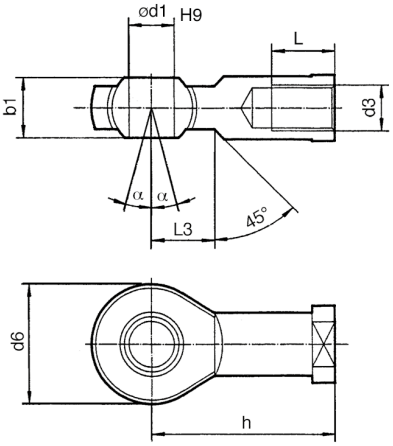
Part no.	Bore size [mm]	e	b		d	Ø f h11	L1 max.	c min.	a max.	L min.
GKM35-54	**160/200**	M36 x 2	35	+0.60 +0.15	144	35	201	54*	70	57
GKM40-84	**250**	M42 x 2	40	+0.60 +0.15	168	40	245	84	85	77
GKM50-96	**320**	M48 x 2	50	+0.60 +1.15	192	50	265	96	96	73

∗ Dimension c for GKM35-54 is substandard of ISO 8140.
It is min.72 in ISO 8140 standard.



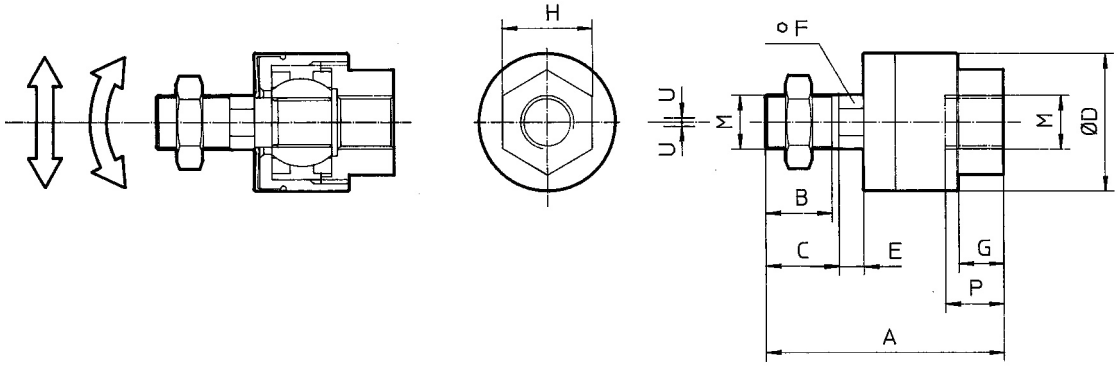
Piston Rod Ball Joint (ISO 8139)
Steel, Zinc Chromate Plated

Part no.	Bore size [mm]	d3	d1 H9	h	d6 max.	b1 h12	L min.	α	L3
KJ36D	**160/200**	M36 x 2	35	125	80	43	56	19°	41
KJ42D	**250**	M42 x 2	40	142	91	49	60	16°	45
KJ48D	**320**	M48 x 2	50	162	117	60	65	14°	58



Floating Joint JA
Steel

Bore size [mm]	M	Part no.	A	B	C	Ø D	E	F	G	H	P	U	Load [kN]	Weight [g]	Angle
160, 200	M36 x 2	**JA160-36-200**	178	51	55	96	16	55	24	55	42	3	71	4700	5°



Auto Switch Mounting

Auto Switch Proper Mounting Position (Detection at Stroke End) and Mounting Height

Auto Switch Mounting Position

Bore size [mm]	D-M9□(V) D-M9□W(V) D-M9□A(V)		D-A9□(V)		D-F5□/F5□W D-J59/J59W D-F59F/F5BAL		D-F5NTL		D-A5□/A6□		D-A59W		D-Y59□/Y69□ D-Y7P(V)/Y7□W(V) D-Y7BAL D-Z7□/Z80		D-G39/K39 D-A3□/A44	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
160	29.5	28.5	25.5	24.5	26	25	31	30	19.5	18.5	23.5	22.5	23	22	19.5	18.5
200	27	27	23	23	23.5	23.5	28.5	28.5	17	17	21	21	20.5	20.5	17	17
250	30	40	26	36	26.5	36.5	31.5	41.5	20	30	24	34	—	—	—	—
320	77	22	73	18	—	—	—	—	—	—	—	—	—	—	—	—

Auto Switch Mounting Height

Bore size [mm]	D-M9□ D-M9□W D-M9□A D-A9□		D-M9□V D-M9□WV D-M9□AV D-A9□V		D-F5□/F5□W D-J59/J59W D-F59F/F5BAL D-F5NTL		D-A5□/A6□ D-A59W		D-Y59□ D-Y7P/Y7□W D-Z7□/Z80		D-Y69□ D-Y7PV/Y7□WV		D-Y7BAL		D-G39/K39 D-A3□		D-A44	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
160	85	83.5	87.5	83.5	89	86	90	86	84.5	83	84.5	83	89.5	83	134.5	—	144.5	—
200	106	106	106	106	102	104	102.5	104	100.5	100.5	100.5	100.5	103	100.5	154	—	164	—
250	130.5	131.5	130.5	131.5	127	128	127	128	—	—	—	—	—	—	—	—	—	—
320	153.5	153.5	153.5	153.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Minimum Stroke for Auto Switch Mounting

[mm]

Auto switch mode	Number of auto switches	Brackets other than centre trunnion				Centre trunnion			
		Ø 160	Ø 200	Ø 250	Ø 320	Ø 160	Ø 200	Ø 250	Ø 320
D-M9□ D-M9□W	2 (Different surfaces, same surface), 1	10	←	←	←	105	105	125	170
	n	10 + 40(n-2)/2 n = 2, 4, 6, 8···	←	←	←	105 + 40(n-4)/2 n = 4, 8, 12, 16···	105 + 40(n-4)/2 n = 4, 8, 12, 16···	125 + 40(n-4)/2 n = 4, 8, 12, 16···	170 + 40(n-4)/2 n = 4, 8, 12, 16···
D-M9□V D-M9□WV	2 (Different surfaces, same surface), 1	10	←	←	←	80	80	100	145
	n	10 + 30(n-2)/2 n = 2, 4, 6, 8···	←	←	←	80 + 30(n-4)/2 n = 4, 8, 12, 16···	80 + 30(n-4)/2 n = 4, 8, 12, 16···	100 + 30(n-4)/2 n = 4, 8, 12, 16···	145 + 30(n-4)/2 n = 4, 8, 12, 16···
D-M9□A	2 (Different surfaces, same surface), 1	15	←	←	←	110	110	130	175
	n	15 + 40(n-2)/2 n = 2, 4, 6, 8···	←	←	←	110 + 40(n-4)/2 n = 4, 8, 12, 16···	110 + 40(n-4)/2 n = 4, 8, 12, 16···	130 + 40(n-4)/2 n = 4, 8, 12, 16···	175 + 40(n-4)/2 n = 4, 8, 12, 16···
D-M9□AV	2 (Different surfaces, same surface), 1	15	←	←	←	85	85	105	150
	n	15 + 30(n-2)/2 n = 2, 4, 6, 8···	←	←	←	85 + 30(n-4)/2 n = 4, 8, 12, 16···	85 + 30(n-4)/2 n = 4, 8, 12, 16···	105 + 30(n-4)/2 n = 4, 8, 12, 16···	150 + 30(n-4)/2 n = 4, 8, 12, 16···
D-A9□	2 (Different surfaces, same surface), 1	10	←	←	←	100	100	120	165
	n	10 + 40(n-2)/2 n = 2, 4, 6, 8···	←	←	←	100 + 40(n-4)/2 n = 4, 8, 12, 16···	100 + 40(n-4)/2 n = 4, 8, 12, 16···	120 + 40(n-4)/2 n = 4, 8, 12, 16···	165 + 40(n-4)/2 n = 4, 8, 12, 16···
D-A9□V	2 (Different surfaces, same surface), 1	10	←	←	←	75	75	95	140
	n	10 + 30(n-2)/2 n = 2, 4, 6, 8···	←	←	←	75 + 30(n-4)/2 n = 4, 8, 12, 16···	75 + 30(n-4)/2 n = 4, 8, 12, 16···	95 + 30(n-4)/2 n = 4, 8, 12, 16···	140 + 30(n-4)/2 n = 4, 8, 12, 16···
D-F5□/F5□W D-J59/J59W D-F5BAL D-F59F	2 (Different surfaces, same surface), 1	10	←	←	—	135	135	155	—
	n	10 + 55(n-4)/2 n = 4, 8, 12, 16···	←	←		135 + 55(n-4)/2 n = 4, 8, 12, 16···	135 + 55(n-4)/2 n = 4, 8, 12, 16···	155 + 55(n-4)/2 n = 4, 8, 12, 16···	
D-F5NTL	2 (Different surfaces, same surface), 1	15	←	←	—	150	145	165	—
	n	15 + 55(n-4)/2 n = 4, 8, 12, 16···	←	←		150 + 55(n-4)/2 n = 4, 8, 12, 16···	145 + 55(n-4)/2 n = 4, 8, 12, 16···	165 + 55(n-4)/2 n = 4, 8, 12, 16···	
D-A5□/A6□	2 (Different surfaces, same surface), 1	10	←	←	—	125	125	145	—
	n	10 + 55(n-4)/2 n = 4, 8, 12, 16···	←	←		125 + 55(n-4)/2 n = 4, 8, 12, 16···	125 + 55(n-4)/2 n = 4, 8, 12, 16···	145 + 55(n-4)/2 n = 4, 8, 12, 16···	
D-A59W	2 (Different surfaces, same surface), 1	20	←	←	—	135	135	155	—
	n	20 + 55(n-2)/2 n = 2, 4, 6, 8···	←	←		135 + 55(n-4)/2 n = 4, 8, 12, 16···	135 + 55(n-4)/2 n = 4, 8, 12, 16···	155 + 55(n-4)/2 n = 4, 8, 12, 16···	
D-Y59□ D-Y7P/Y7□W	2 (Different surfaces, same surface), 1	10	←	—	—	110	110	—	—
	n	10 + 40(n-2)/2 n = 2, 4, 6, 8···	←			110 + 40(n-4)/2 n = 4, 8, 12, 16···	110 + 40(n-4)/2 n = 4, 8, 12, 16···		
D-Y69□ D-Y7PV/Y7□WV	2 (Different surfaces, same surface), 1	10	←	—	—	85	80	—	—
	n	10 + 30(n-2)/2 n = 2, 4, 6, 8···	←			85 + 30(n-4)/2 n = 4, 8, 12, 16···	80 + 30(n-4)/2 n = 4, 8, 12, 16···		
D-Y7BAL	2 (Different surfaces, same surface), 1	10	←	—	—	120	120	—	—
	n	10 + 45(n-2)/2 n = 2, 4, 6, 8···	←			120 + 45(n-4)/2 n = 4, 8, 12, 16···	120 + 45(n-4)/2 n = 4, 8, 12, 16···		
D-G39/K39 D-A3□	1	10	10	—	—	140	140	—	—
	2 (Same surface)	100	100			140	140		
	2 (Different surfaces)	35	35			140	140		
	n (Same surface)	100 + 100(n-2) n = 2, 3, 4, 5···	←			140 + 100(n-2) n = 2, 4, 6, 8···	140 + 100(n-2) n = 2, 4, 6, 8···		
	n (Different surfaces)	35 + 30(n-2) n = 2, 3, 4, 5···	←			140 + 100(n-2) n = 2, 4, 6, 8···	140 + 100(n-2) n = 2, 4, 6, 8···		
D-A44	1	10	10	—	—	100	100	—	—
	2 (Same surface)	55	55			100	100		
	2 (Different surfaces)	35	35			100	100		
	n (Same surface)	55 + 55(n-2) n = 2, 3, 4, 5···	←			100 + 100(n-2) n = 2, 4, 6, 8···	100 + 100(n-2) n = 2, 4, 6, 8···		
	n (Different surfaces)	35 + 30(n-2) n = 2, 3, 4, 5···	←			100 + 100(n-2) n = 2, 4, 6, 8···	100 + 100(n-2) n = 2, 4, 6, 8···		

Operating Range

[mm]

Auto switch model	Bore size			
	160	200	250	320
D-M9□/M9□V **D-M9□W/M9□WV** **D-M9□A/M9□AV**	6.5	7		
D-A9□/A9□V	11.5	12.5	11	13
D-F5□/F5□W **D-J59/J59W** **D-F5BAL**∗2 **D-F59F/F5NTL**	5.5	6		—
D-A5□/A6□	10	10	9	—
D-A59W	17	17	16	—
D-Y59□/Y69□ **D-Y7P(V)/Y7□W(V)** **D-Y7BAL**∗1	7	8	—	—
D-Z7□/Z80	13	14.5	—	—
D-G39/K39	10	10	—	—
D-A3□/A44	10	10	—	—

Auto Switch Mounting Brackets/Part Nos.

Auto switch model	Bore size [mm]			
	160	200	250	320
D-M9□/M9□V **D-M9□W/M9□WV** **D-M9□A/M9□AV**∗1 **D-A9□/A9□V**	BS5-160	BS5-160	BS5-200	BS5-250
D-F5□/F5□W **D-J59/J59W** **D-F5BAL**∗2 **D-F59F/F5NTL** **D-A5□/A6□** **D-A59W**	BT-16	BT-16	BT-20	—
D-Y59□/Y69□ **D-Y7P(V)/Y7□W(V)** **D-Y7BAL**∗1 **D-Z7□/Z80**	BS4-160	BS4-160	—	—
D-G39/K39 **D-A3□/A44**	BS1-160	BS1-200	—	—

[Stainless Steel Mounting Screw]

∗1 When using the D-M9□A/M9□AV or Y7BAL, do not use the steel set screws which are included with the auto switch mounting brackets above (BA4-080, BA7-080, BS5-□□□, BS4-□□□).
Order a stainless steel screw kit (BBA1) separately, and use the M4 x 8 L stainless steel set screws included in the BBA1.
When ordered cylinder with D-M9□A/M9□AV or Y7BAL, the screws of the switch mounting bracket have been changed to stainless steel.

∗2 When using the D-F5BAL, do not use the steel set screws which are included with the auto switch mounting brackets above (BT-□□).
Order a stainless steel screw kit (BBA1) separately, and use the M4 x 8 L stainless steel set screws included in the BBA1.
When D-F5BAL is shipped independently, the BBA1 is attached.
When ordered cylinder with D-F5BAL, the screws of the switch mounting bracket have been changed to stainless steel.

Other than the applicable auto switches listed in "How to Order," the following auto switches are also mountable.
Refer to the **Web Catalogue** for the detailed specifications.

Type	Model	Electrical entry	Features
Reed	D-A90V	Grommet (Perpendicular)	Without indicator light
	D-A93V, A96V		—
	D-Z73, Z76	Grommet (In-line)	
	D-A53, A56		
	D-A67		Without indicator light
	D-Z80		
Solid state	D-F59, F5P, J59	Grommet (In-line)	—
	D-Y59A, Y59B, Y7P		
	D-F59W, F5PW, J59W		2-colour indicator
	D-Y7NW, Y7PW, Y7BW		
	D-F5BA, Y7BA		Water-resistant (2-colour indicator)
	D-F5NT		With timer
	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		
	D-M9NWV, M9PWV, M9BWV		2-colour indicator
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAV, M9PAV, M9BAV		Water-resistant (2-colour indicator)

∗ With pre-wired connector is also available for solid state switches. For details, refer to the **Web Catalogue**.
∗ Normally closed (NC = b contact) solid state auto switches (D-M9□E (V), D-Y7G/Y7H) are also available. For details, refer to the **Web Catalogue**.

Made to Order

These changes are dealt with Simple Specials System.

For details, refer to the Simple Specials System in our website.
http://www.smc.eu

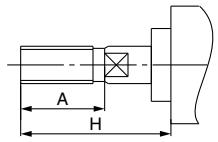
1 Change of Rod End Shape

Symbol
-XA0 to -XA30

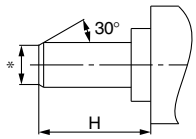
⚠ Precautions

1. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
2. Standard dimensions marked with "∗" will be as follows to the rod diameter (D). Enter any special dimension you desire.
   D ≤ 6 → D – 1 mm, 6 < D ≤ 25 → D – 2 mm, D > 25 → D – 4 mm
3. In the case of double rod type and single acting retraction type, enter the dimensions when the rod is retracted.
4. Only the single side of a double rod is able to manufacture.

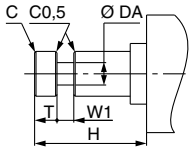
Symbol: A0



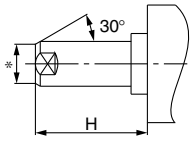
Symbol: A1



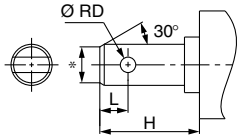
Symbol: A2



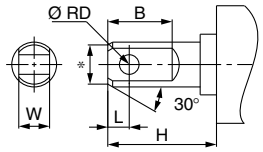
Symbol: A3



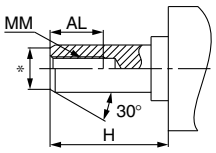
Symbol: A4



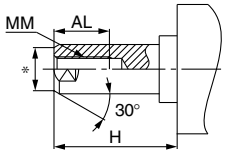
Symbol: A5



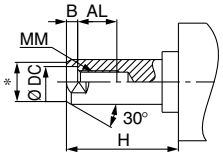
Symbol: A6



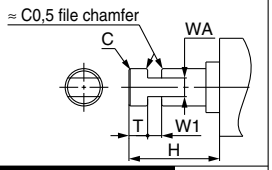
Symbol: A7



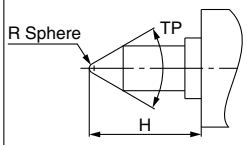
Symbol: A8



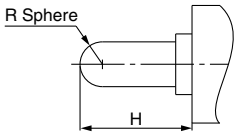
Symbol: A9



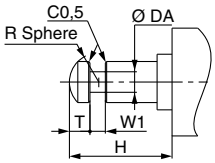
Symbol: A10



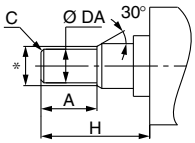
Symbol: A11



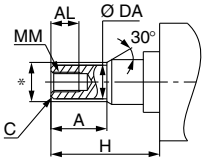
Symbol: A12



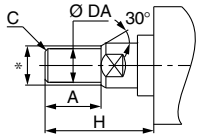
Symbol: A13



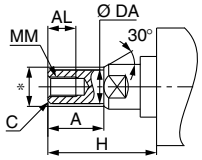
Symbol: A14



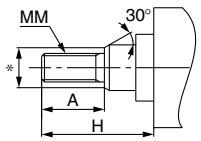
Symbol: A15



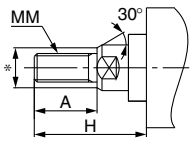
Symbol: A16



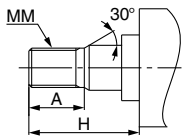
Symbol: A17



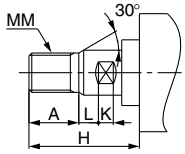
Symbol: A18



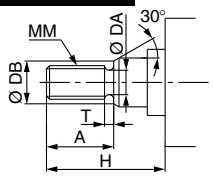
Symbol: A19



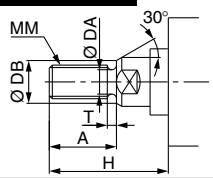
Symbol: A20



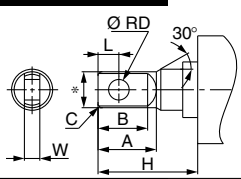
Symbol: A21



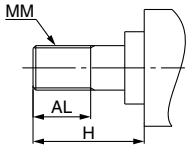
Symbol: A22



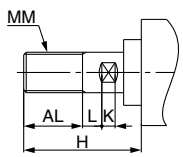
Symbol: A23



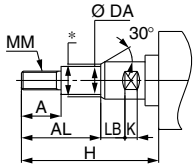
Symbol: A24



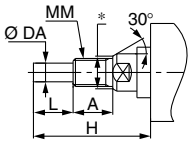
Symbol: A25



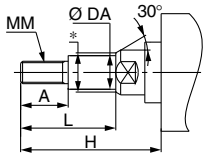
Symbol: A26



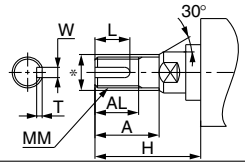
Symbol: A27



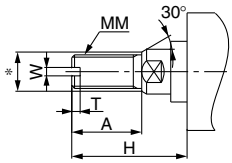
Symbol: A28



Symbol: A29



Symbol: A30



Symbol

9 Made of Stainless Steel — -XC6

Suitable for the cases it is likely to generate rust by being immersed in the water and corrosion.

How to Order

Standard model no. – XC6

Made of stainless steel

Specifications

Parts changed to stainless steel	Piston rod, Rod end nut
Specifications other than above and external dimensions	Same as standard type

Specific Product Precautions

Be sure to read before handling.

Adjustment

⚠Warning

1. Do not open the cushion valve above the stopper.

Cushion valves are provided with a retaining ring (Ø 160 to Ø 250) as a stopping mechanism, and the cushion valve should not be opened above that point.

If air is supplied and operation started without confirming the above condition, the cushion valve may be ejected from the cover.

Bore size (mm)	Cushion valve	Width across flats	Socket wrench
160, 200 250,320	MB-A2-10-EA064	4	JIS 4648 Hex spanner wrench 4

2. Be certain to activate the air cushion at the stroke end.

When it is intended to use the cushion valve in the fully opened position, select a style with a damper. If this is not done, the tie-rods or piston rod assembley will be damaged.

3. When replaceing brackets, use the hexagon wrench shown below.

Bore size (mm)		Bolt	Width across flats	Tightening torque (Nm)
160, 200		M16 x 2 x 30ℓ	14	99
250, 320	Foot	M20 x 2.5 x 35ℓ	17	193.5
	Others	M20 x 2.5 x 30ℓ	17	

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [1)], and other safety regulations.

⚠ **Danger:**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning:**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution:**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

1) ISO 4414: Pneumatic fluid power – General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power – General rules and safety requirements for systems and their components.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Our products cannot be used beyond their specifications.
Our products are not developed, designed, and manufactured to be used under the following conditions or environments.
Use under such conditions or environments is not covered.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogues and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

⚠ Caution

We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.
Use in non-manufacturing industries is not covered.
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. [2)] Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

SMC Corporation (Europe)

Austria	+43 (0)2262622800	www.smc.at	office.at@smc.com
Belgium	+32 (0)33551464	www.smc.be	info@smc.be
Bulgaria	+359 (0)2807670	www.smc.bg	sales.bg@smc.com
Croatia	+385 (0)13707288	www.smc.hr	sales.hr@smc.com
Czech Republic	+420 541424611	www.smc.cz	office.at@smc.com
Denmark	+45 70252900	www.smcdk.com	smc.dk@smc.com
Estonia	+372 651 0370	www.smcee.ee	info.ee@smc.com
Finland	+358 207513513	www.smc.fi	smc.fi@smc.com
France	+33 (0)164761000	www.smc-france.fr	supportclient.fr@smc.com
Germany	+49 (0)61034020	www.smc.de	info.de@smc.com
Greece	+30 210 2717265	www.smchellas.gr	sales@smchellas.gr
Hungary	+36 23513000	www.smc.hu	office.hu@smc.com
Ireland	+353 (0)14039000	www.smcautomation.ie	technical.ie@smc.com
Italy	+39 03990691	www.smcitalia.it	mailbox.it@smc.com
Latvia	+371 67817700	www.smc.lv	info.lv@smc.com
Lithuania	+370 5 2308118	www.smclt.lt	info.lt@smc.com
Netherlands	+31 (0)205318888	www.smc.nl	info@smc.nl
Norway	+47 67129020	www.smc-norge.no	post.no@smc.com
Poland	+48 22 344 40 00	www.smc.pl	office.pl@smc.com
Portugal	+351 214724500	www.smc.eu	apoiocliente.pt@smc.com
Romania	+40 213205111	www.smcromania.ro	office.ro@smc.com
Russia	+7 (812)3036600	www.smc.eu	sales@smcru.com
Slovakia	+421 (0)413213212	www.smc.sk	sales.sk@smc.com
Slovenia	+386 (0)73885412	www.smc.si	office.si@smc.com
Spain	+34 945184100	www.smc.eu	post.es@smc.com
Sweden	+46 (0)86031240	www.smc.nu	order.se@smc.com
Switzerland	+41 (0)523963131	www.smc.ch	helpcenter.ch@smc.com
Turkey	+90 212 489 0 440	www.smcturkey.com.tr	satis.tr@smc.com
UK	+44 (0)845 121 5122	www.smc.uk	sales.gb@smc.com
South Africa	+27 10 900 1233	www.smcza.co.za	Sales.za@smc.com

Printing DQ 00 Printed in Spain