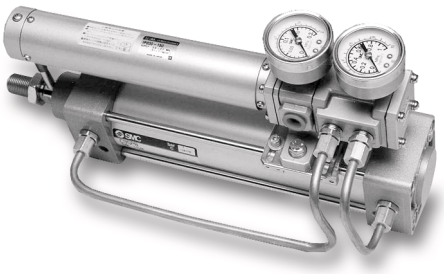
ISO/VDMA Cylinder

Series C95

ø32, ø40, ø50, ø63, ø80, ø100, ø125, ø160, ø200, ø250

Conforming to ISO 6431/CETOP RP43P/VDMA 24562



ISO Cylinder/Standard: Double Acting with Positioner

Series C95P

ø50, ø63, ø80, ø100

How to Order

Standard C95PD [B] [50] — [100] — [A53] [S]

Built-in magnet

Mounting

B	Basic/without bracket
L	Axial foot
G	Rear flange
C	Single rear clevis
D	Double rear clevis

Bore size

50	50mm
63	63mm
80	80mm
100	100mm

Stroke (mm)
Refer to standard stroke table on p.6-4 maximum 300mm

Auto switch

—	Without auto switch

∗ Refer to table below for selection of applicable auto switch.

Number of auto switches

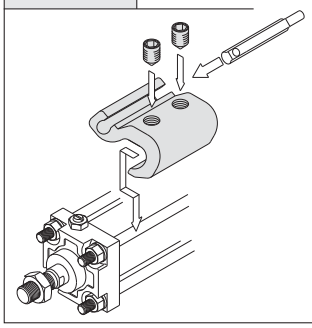
—	2
S	1
3	3
n	n

Applicable Auto Switches/Tie rod mounting

Style	Special function	Electrical entry	Indicator	Load voltage: Wiring (Output)	DC		AC	Auto switch model	Lead wire (m)∗: 0.5 (—)	3 (L)	5 (Z)	Applicable load		Mounting bracket
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	—	5V	—	A56	●	●	—	IC	—	ø32,ø40 BT-03
				2 wire	24V	12V	—	A53	●	●	●	—	Relay PLC	
						5V,12V	100V,200V	A54	●	●	●			
			No			5V,12V	—	A67	●	●	—	IC		
						12V	200V or less	A64	●	●	—			
	Diagnosis indication (2 colour)		Yes			—	—	A59W	●	●	—	—		
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V,12V	—	F59	●	●	○	IC	Relay PLC	ø50,ø63 BT-05
				3 wire (PNP)				F5P	●	●	○			
				2 wire	—	—	100V,200V	J51	●	●	○	—		
					24V	12V	—	J59	●	●	○			
	Diagnosis indication (2 colour)			3 wire (NPN)		5V,12V		F59W	●	●	○	IC		ø80,ø100 BT-06
				3 wire (PNP)				F5PW	●	●	○			
	Water resistant (2 colour)			2 wire		12V		J59W	●	●	○	—		
								F5BA	—	●	○			
	With timer			3 wire (NPN)		5V,12V		F5NT	—	●	○	IC		
	Diagnosis output (2 colour)							F59F	●	●	○			
	Latch diagnosis output (2 colour)			4 wire (NPN)		—		F5LF	●	●	○	—		

Table ①
Auto Switch Mounting Bracket for D-M9□

Bore size (mm)	Order No.
ø32, ø40	**BMB5-032**
ø50, ø63	**BA7-040**
ø80, ø100	**BA7-063**



Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage: DC		AC	Auto switch model: Electrical entry direction: Vertical	Lateral	Lead wire length (m) Note): 0.5 (Nil)	3 (L)	5 (Z)	Applicable load		Mounting bracket
Reed switch	—	Grommet	Yes	3 wire	—	5V	—	—	Z76	●	●	—	IC circuit	—	ø32,ø40 BMB4-032
				2 wire	24V	—	100V	—	Z73	●	●	●	—	Relay PLC	
			No			5V, 12V	100V or less	—	Z80	●	●	—	IC circuit		
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	Y69A	Y59A	●	●	○	IC circuit	Relay PLC	ø50,ø63 BMB4-050
				3 wire (PNP)				Y7PV	Y7P	●	●	○			
				2 wire		12V		Y69B	Y59B	●	●	○	—		
	Diagnostic indication (2 colour indicator)			3 wire (NPN)		5V, 12V		Y7NWV	Y7NW	●	●	○	IC circuit		ø80,ø100 BA4-063
				3 wire (PNP)				Y7PWV	Y7PW	●	●	○			
				2 wire		12V		Y7BWV	Y7BW	●	●	○	—		
	Water resistant (2 colour indicator)							—	Y7BA	—	●	—			
	——	Connector and Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	M9NV	M9N	●	●	○	IC circuit	Relay PLC	See Table ①
				3 wire (PNP)				M9PV	M9P	●	●	○			
				2 wire		12V		M9BV	M9B	●	●	○			

∗ Lead wire length 0.5m····· — (Example: A53)
3m····· L (Example: A53L)
5m····· Z (Example: A53Z)

○: Manufactured upon receipt of order.

Specifications

Application:
The positioner IP200 is capable of pneumatic positioning of the piston. Adjustable positions can be reached with high repeating accuracy. The piston stroke is in proportion to the air pressure input signal (0.02-0.01MPa). External forces on the position of the piston are reduced to a minimum by a special control system and an integrated function to revert the set position.
The IP200 shows excellent performance in remote control or standard control of flaps, proportioning devices, pumps, gears usw.

Specifications
- The bleed pressure acts directly onto the flapper plate. A change of the input signal will cause an instantaneous movement of the piston rod.
- easy and simple adjustment of neutral point and operation band from outside.
- Return spring is potected against accidental touches
- Positioner cylinder conforms to ISO and CETOP recommendations
- No change in dimensions with auto switch capability

Specifications

Fluid	Air 5μm filtration
Supply pressure "SUP" (MPa)	0.3 ~ 0.7
Signal pressure "SIG" (MPa)	0.02 ~ 0.1
Fluid temperature (ºC)	+5 to +60
Linearity	< 2%*
Hystereses	< 1%*
Repeatability	< 1%*
Sensitivity	< 1%*
Port size	G1/4
Gauge port	G1/8
Primary pressure	0.5% with 0.5MPa
Flow rate (l/min)	250 with 0.5MPa
Leakage	< 18 with 0.5MPa
Bore Size (mm)	40 to 100
Cylinder stroke (mm)	25 to 300
Standard stroke (mm)	50/100/150/200/250/300
Max. possible stroke (mm)	300

*different in % related to full span.

Part No: Mounting Bracket, Mounting Accessories

Description	ø50	ø63	ø80	ø100
L	L5050	L5063	L5080	L5100
F,G	F5050	F5063	F5080	F5100
C	C5050	C5063	C5080	C5100
D	D5050	D5063	D5080	D5100
DS	DS5050	DS5063	DS5080	DS5100
ES	ES5050	ES5063	ES5080	ES5100
E	E5050	E5063	E5080	E5100
GKM	GKM16_32	GKM16-32	GKM20-40	GKM20-40
KJ	KJ16D	KJ16D	KJ20D	KJ20D
JA	JA50-16-150	JA50-16-150	JAH50-20-150	JAH50-20-150

Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows.
Foot, Flange, Single clevis: Mounting bolts
Double rear clevis: (D,DS): Clevis pin
Note 3) GKM according to ISO 8140
Note 4) KJ according to ISO 8139
Note 5) Piston rod nut is standard

Weight accessories (kg)

Ø	50	63	80	100
L	0.38	0.46	0.89	1.09
F	0.47	0.58	1.30	1.81
C	0.37	0.60	1.07	1.73
D	0.45	0.71	1.28	2.11
E	0.42	0.52	0.94	1.40

Weight Table

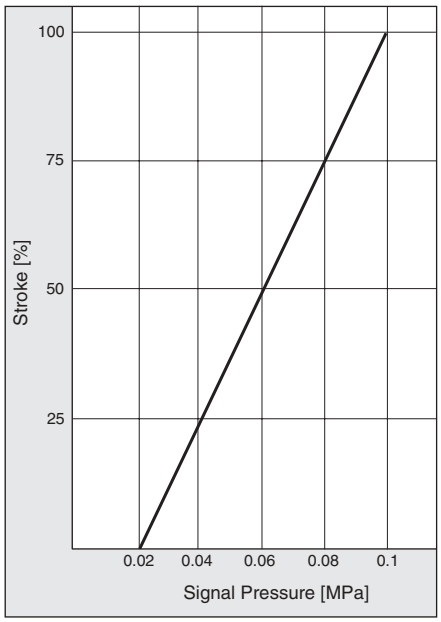
Weight (kg)					
	Ø	50	63	80	100
	B	2.27	2.79	4.11	5.13
Weight each 50mm stroke		0.32	0.33	0.48	0.62

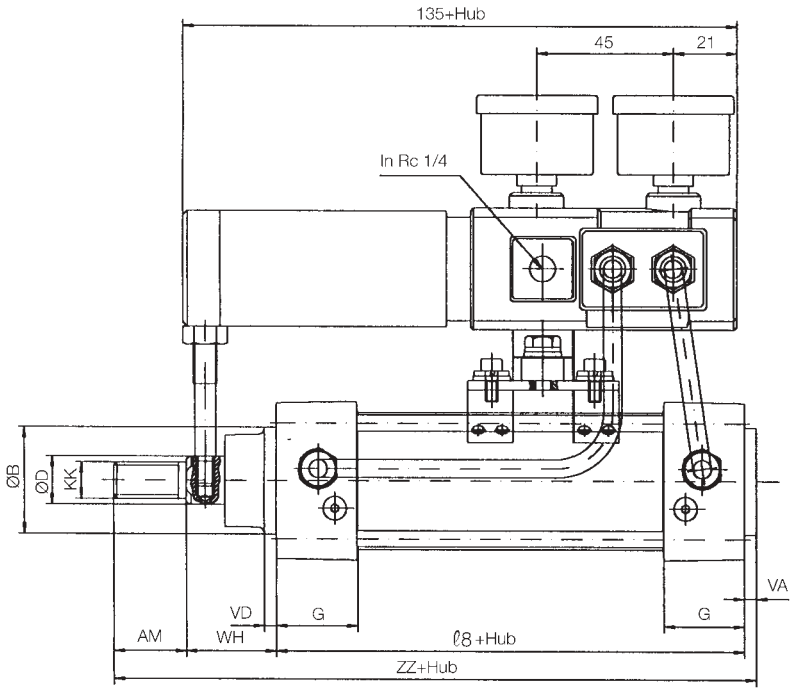
Example: C95PDB50-200
Cylinder Ø50mm, stroke 200mm
Bracket L
Weight = 2.72kg + (0.31kg x $\frac{200}{50}$) = 3.96kg

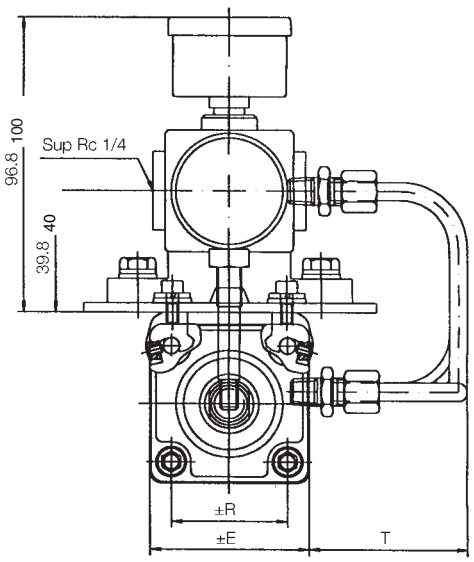
For dimensions of the brackets and accessories, please see C95S, page 1-206

Dimensions

Signal Pressure/Stroke Diagram







Ø	AM	ØB	ØD	±E	G	KK	l 8	±R	T	VA	VD	WH	ZZ
50	32	40	20	65	31.5	M16 x 1.5	106	46.5	53	4	6	37	179
63	32	45	20	75	31.5	M16 x 1.5	121	56.5	54	4	6	37	194
80	40	45	25	95	38	M20 x 1.5	128	72	54	4	8	46	218
100	40	55	30	114	38	M20 x 1.5	138	89	26	4	8	51	233

ISO Cylinder/Standard: Double Acting with Lock

Series C95N

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

Standard C95ND [B] [32] — [100] [W] — [A53] [S]

Built-in magnet

Mounting

B	Basic/without bracket
L	Axial foot
G	Rear flange
C	Single rear clevis
D	Double rear clevis
T	Trunion

Bore size

32	32mm
40	40mm
50	50mm
63	63mm
80	80mm
100	100mm

Stroke (mm)
Refer to standard stroke table on p.6-23.

Rod specifications

—	Hard chrome as standard
W	Double/through rod

Auto switch

—	Without auto switch

∗ Refer to table below for selection of applicable auto switch.

Number of auto switches

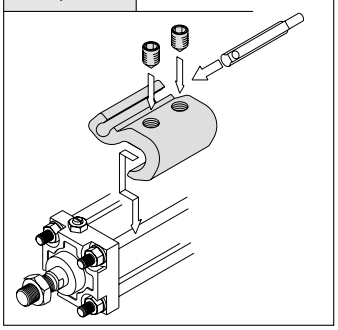
—	2
S	1
3	3
n	n

Applicable Auto Switches/Tie rod mounting

Style	Special function	Electrical entry	Indicator	Load voltage: Wiring (Output)	DC		AC	Auto switch model	Lead wire (m)∗: 0.5 (—)	3 (L)	5 (Z)	Applicable load		Mounting bracket
Reed switch	—	Grommet	Yes	3 wire (Equiv. to NPN)	—	5V	—	**A56**	●	●	—	IC	—	ø32,ø40 BT-03
				2 wire	24V	12V	—	**A53**	●	●	●	—	Relay PLC	
						5V,12V	100V,200V	**A54**	●	●	●			
			No			5V,12V	—	**A67**	●	●	—	IC		
						12V	200V or less	**A64**	●	●	—			
	Diagnosis indication (2 colour)		Yes			—	—	**A59W**	●	●	—	—		
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V,12V	—	**F59**	●	●	○	IC	Relay PLC	ø50,ø63 BT-05
				3 wire (PNP)				**F5P**	●	●	○			
				2 wire	—	—	100V,200V	**J51**	●	●	○	—		
					24V	12V	—	**J59**	●	●	○			
	Diagnosis indication (2 colour)			3 wire (NPN)		5V,12V		**F59W**	●	●	○	IC		ø80,ø100 BT-06
				3 wire (PNP)				**F5PW**	●	●	○			
				2 wire		12V		**J59W**	●	●	○	—		
	Water resistant (2 colour)							**F5BA**	—	●	○			
	With timer			3 wire (NPN)		5V,12V		**F5NT**	—	●	○	IC		
	Diagnosis output (2 colour)			4 wire (NPN)				**F59F**	●	●	○			
	Latch diagnosis output (2 colour)					—		**F5LF**	●	●	○	—		

Table ①
Auto Switch Mounting Bracket for D-M9□

Bore size (mm)	Order No.
ø32, ø40	**BMB5-032**
ø50, ø63	**BA7-040**
ø80, ø100	**BA7-063**



Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage: DC		AC	Auto switch model: Electrical entry direction: Vertical	Lateral	Lead wire length (m) Note): 0.5 (Nil)	3 (L)	5 (Z)	Applicable load		Mounting bracket
Reed switch	—	Grommet	Yes	3 wire	—	5V	—	—	**Z76**	●	●	—	IC circuit	—	ø32,ø40 BMB4-032
				2 wire	24V	—	100V	—	**Z73**	●	●	●	—	Relay PLC	
			No			5V, 12V	100V or less	—	**Z80**	●	●	—	IC circuit		
Solid state switch	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	**Y69A**	**Y59A**	●	●	○	IC circuit	Relay PLC	ø50,ø63 BMB4-050
				3 wire (PNP)				**Y7PV**	**Y7P**	●	●	○			
				2 wire		12V		**Y69B**	**Y59B**	●	●	○	—		
	Diagnostic indication (2 colour indicator)			3 wire (NPN)		5V, 12V		**Y7NWV**	**Y7NW**	●	●	○	IC circuit		ø80,ø100 BA4-063
				3 wire (PNP)				**Y7PWV**	**Y7PW**	●	●	○			
				2 wire		12V		**Y7BWV**	**Y7BW**	●	●	○	—		
	Water resistant (2 colour indicator)							—	**Y7BA**	—	●	—			
	——	Connector and Grommet	Yes	3 wire (NPN)	24V	5V,12V	—	**M9NV**	**M9N**	●	●	○	IC circuit	Relay PLC	See Table ①
				3 wire (PNP)				**M9PV**	**M9P**	●	●	○			
				2 wire		12V		**M9BV**	**M9B**	●	●	○			

∗ Lead wire length 0.5m····· — (Example: A53)
3m····· L (Example: A53L)
5m····· Z (Example: A53Z)

○: Manufactured upon receipt of order.

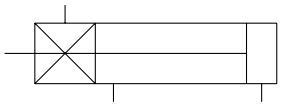
Series C95N
with lock

Cylinder Specifications

Bore Size [mm]	32, 40, 50, 63, 80, 100
Fluid	Air
Proof Pressure	1.5MPa
Max. operating pressure	1.0MPa
Min. operating pressure	0.08MPa
Piston speed	50 to 1000mm/s note)
Ambient and fluid temperature	Without autoswitch : -10ºC to 70ºC (without freezing) With autoswitch : -10ºC to 70ºC (without freezing)
Cushion	Double air side cushion
Stroke length tolerance	to 250: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$
Bracket type	Basic type, Axial foot type, Front flange type, Rear flange type, Single clevis type, Double clevis type

Note) Load limits exist depending upon piston speed when locked, mounting direction and operating pressure.

Cylinder with lock



Lock Specifications

Lock actuation	Spring lock (exhaust lock)
Unlocking pressure	≥0.25MPa
Locking pressure	≥0.20MPa
Max. operating pressure	1.0MPa
Locking direction	2 Two-way

Standard Stroke

Bore Size [mm]	Standard Stroke [mm]	Max. Stroke*
32	25,50,75,100,125,150,175,200,250,300,350,400,450,500	700
40	25,50,75,100,125,150,175,200,250,300,350,400,450,500	800
50	25,50,75,100,125,150,175,200,250,300,350,400,450,500,600	1000
63	25,50,75,100,125,150,175,200,250,300,350,400,450,500,600	
80	25,50,75,100,125,150,175,200,250,300,350,400,450,500,600,700,800	
100	25,50,75,100,125,150,175,200,250,300,350,400,450,500,600,700,800	

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

Stopping Accuracy

[mm]

Locking system	Piston speed [mm/s]			
	100	300	500	1000
Spring lock	±0.3	±0.6	±1.0	±2.0

Conditions/Horizontal supply pressure P=0.5MPa
Load weight ..... Upper limit of allowable value
Solenoid valve for locking mounted on the locking pdr
Maximum value of stopping position dispersion from 100 measurements

Spring Lock Holding Power (Maximum static Load)

Bore size [mm]	**32**	**40**	**50**	**63**	**80**	**100**
Holding power [N]	552	882	1370	2160	3430	5390

C95N Cylinder

Part No: Mounting Bracket, Mounting Accessories

Description	Bore size	ø32	ø40	ø50	ø63	ø80	ø100
L	Foot(1)	L5032	L5040	L5050	L5063	L5080	L5100
F,G	Flange	FN5032	FN5040	FN5050	FN5063	F5080	F5100
C	Single rear clevis	C5032	C5040	C5050	C5063	C5080	C5100
D	Double rear clevis	D5032	D5040	D5050	D5063	D5080	D5100
DS	Double rear clevis (for ES accessory)	DS5032	DS5040	DS5050	DS5063	DS5080	DS5100
ES	Angled rear clevis with ball joint	ES5032	ES5040	ES5050	ES5063	ES5080	ES5100
E	Angled rear clevis	E5032	E5040	E5050	E5063	E5080	E5100
C95-S	Trunnion pivot bracket	C95-S03	C95-S04	C95-S04	C95-S06	C95-S06	C95-S10
GKM	Rod clevis	GKM10-20	GKM12-24	GKM16_32	GKM16-32	GKM20-40	GKM20-40
KJ	Piston rod ball joint	KJ10D	KJ12D	KJ16D	KJ16D	KJ20D	KJ20D
JA	Floating joint	JA30-10-125	JA40-12-125	JA50-16-150	JA50-16-150	JAH50-20-150	JAH50-20-150

Note 1) Two foot brackets required for one cylinder.
Note 2) Accessories for each mounting bracket are as follows:Foot, Flange, Single clevis: Mounting bolts
Double rear clevis: (D,DS): Clevis pin
Note 3) C95-S: Set of 2 pcs.
Note 4) GKM according to ISO 8140
Note 5) KJ according to ISO 8139
Note 6) Piston rod nut is standard

Single Rod Weight Table

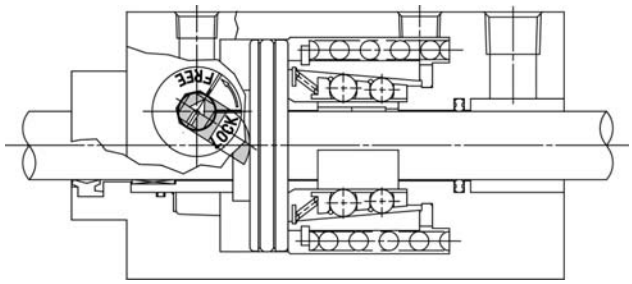
[kg]

Bore Size [mm]		32	40	50	63	80	100
Basic weight	Basic type B	1.40	2.15	3.53	5.18	8.99	12.72
	Trunnion T	0.15	0.26	0.34	0.57	1.03	1.71
Additional weight per 50mm of stroke	All mounting brackets	0.11	0.16	0.26	0.27	0.42	0.56

(Example) C95NDB32-100 (Standard, Ø32, 100er)
•Basic weight..... 1.40 (basic type, Ø32)
•Additional weight ..... 0.11/50mm stroke
•Cylinder stroke ..... 100mm stroke
1.40 + 0.11 x 100/50 = 3.02kg

Manual override for unlocking

In case the air supply is cut off or discharged, unlocking can be performed with a commercially available tool. The fail safe mechanism locks again when manual override is released.



Weight accessories [kg]

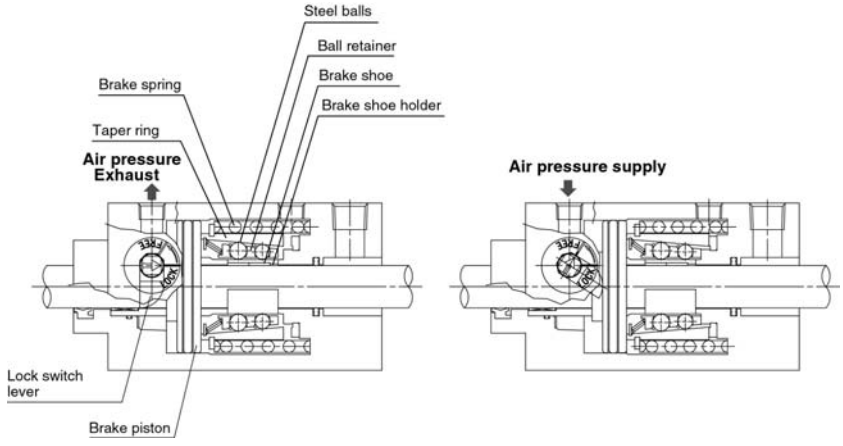
Ø	32	40	50	63	80	100
L	0.16	0.20	0.38	0.46	0.89	1.09
F	0.20	0.23	0.47	0.58	1.30	1.81
C	0.16	0.23	0.37	0.60	1.07	1.73
D	0.20	0.32	0.45	0.71	1.28	2.11

Example:

Cylinder Ø40 mm, Stroke 100 mm, bracket D

Weight = 0.84 kg + (0.16 kg x $\frac{100}{50}$) + 0.32 kg = 1.48 kg

Construction Principles



Locked condition

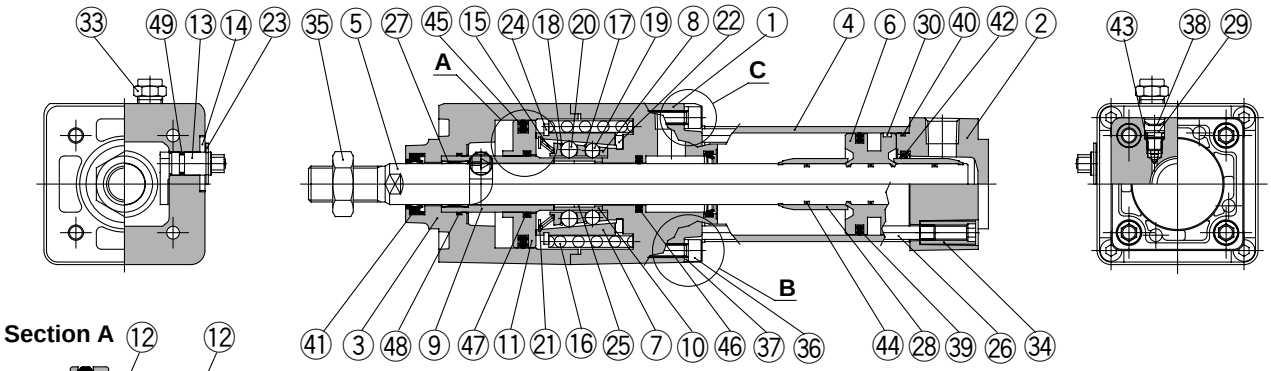
Unlocked condition

Spring lock (exhaust lock)

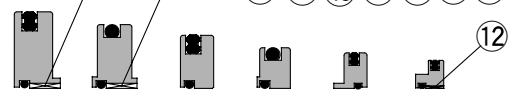
The spring force which acts upon the taper ring is magnified by a wedge effect, and is conveyed to all of the numeous steel balls which are arranged in two crcles. These act on the brake shoe holder and brake, which locks the piston rod by tightening against it with a large force.

Unlocking is accomplished when air pressure is supplied to the unlocking port. The brake piston and taper ring oppose the spring force, moving to the right side, and the ball retainer strikes the cover section A. The braking force is released as the steel balls are removed from the taper ring by the ball retainer.

Construction

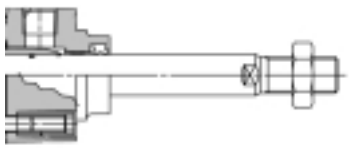


Section A 12 12

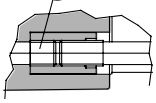


Ø100 Ø80 Ø63 Ø50 Ø40 Ø32

with through piston rod

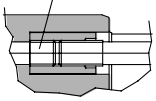


Section B 31



Ø80, Ø100

Section C 32



Ø80, Ø100

Parts list

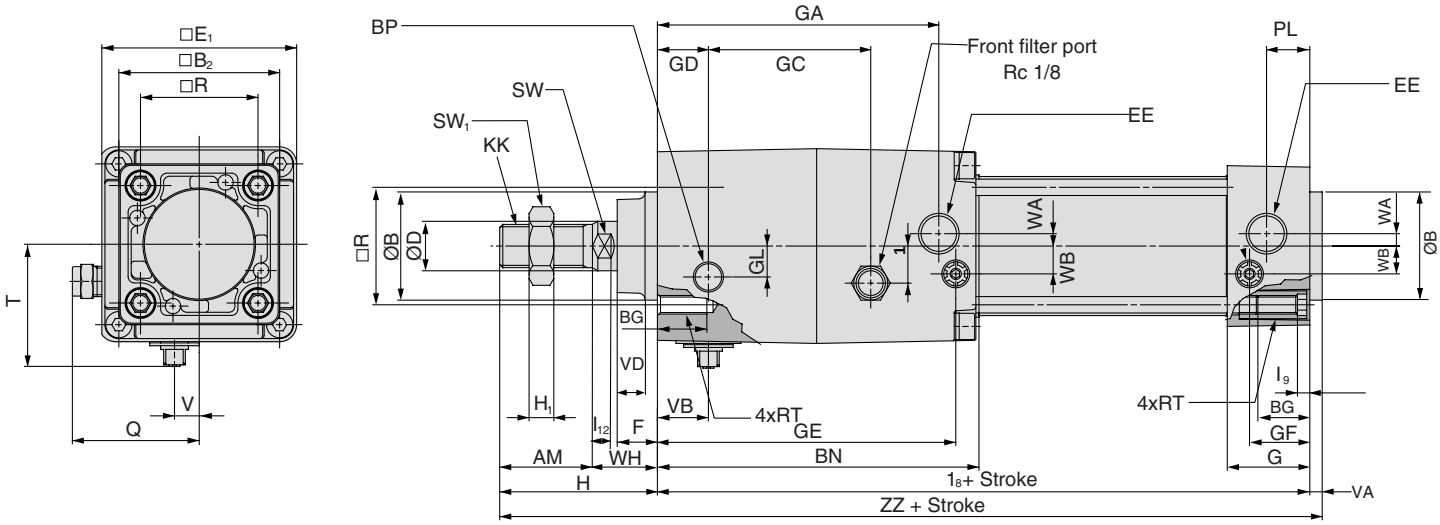
No.	Description		Material	Note
①	**Rod cover**		Aluminium alloy	Hard annodised & metallic coated
②	**Head cover**		Aluminium alloy	Chromated & metallic coated
③	**Cover**		Aluminium alloy	Hard annodised & metallic coated
④	**Cylinder tubing**		Aluminium alloy	Hard annodised
⑤	**Piston rod**		Carbon steel	Hard chrome plated
⑥	**Piston**		Aluminium alloy	Chromated
⑦	**Taper Ring**		Carbon steel	Heat treated
⑧	**Ball retainer**		Special resin	
⑨	**Piston guide**		Carbon steel	Zinc chromated
⑩	**Brake shoe holder**		Carbon steel	Heat treated
⑪	**Release piston**	Ø40	Aluminium alloy	Hard annodised
		Ø50		
		Ø63		
		Ø32	Carbon steel	Zinc chromated
		Ø80		
		Ø100		
⑫	**Release piston bushing**		Steel + special resin	Ø32, Ø80, Ø100 only
⑬	**Unlocking cam**		Carbon steel	Glossy chromated
⑭	**Washer**		Carbon steel	Black zinc chromated
⑮	**Retainer pre-load spring**		Carbon steel	Zinc chromated
⑯	**Brake spring**		Carbon steel	Zinc chromated
⑰	**Clip A**		Stainless steel	
⑱	**Clip B**		Stainless steel	
⑲	**Steel ball A**		Carbon steel	
⑳	**Steel ball B**		Carbon steel	
㉑	**Tooth ring**		Stainless steel	
㉒	**Damper**		Polyurethane rubber	
㉓	**C type retaining ring for unlocking cam shaft**		Carbon steel	
㉔	**C type retaining ring for taper ring**		Carbon steel	
㉕	**Brake shoe**		Special friction material	
㉖	**Tie rod**		Carbon steel	Chromated
㉗	**Bushing**		Lead-bronze casting	
㉘	**Cushion ring**		Brass	

Parts list

No.	Description	Material	Note
㉙	**Cushion valve**	Carbon steel	Nickel plated
㉚	**Wear ring**	PUR	
㉛	**Unit holding tie-rod A**	Carbon steel	Chromated Ø80, Ø100 only
㉜	**Unit holding tie-rod B**	Carbon steel	Chromaed Ø80, Ø100 only
㉝	**BC element**		
㉞	**Tie-rod nut**	Carbon steel	Nickel plated
㉟	**Rod end nut**	Carbon steel	Nickel plated
㊱	**Hexagon socket head cap screw**	Carbon steel	Nickel plated Ø32, Ø63 only
㊲	**Spring washer for hex. socket head cap screw**	Carbon steel	Nickel plated Ø32, Ø63 only
㊳	**Retaining ring**	Carbon steel	
㊴	**Piston seal**	NBR	
㊵	**Cylinder tube gasket**	NBR	
㊶	**Rod seal A**	NBR	
㊷	**Cushion seal**	NBR	
㊸	**Cushion valve seal**	NBR	
㊹	**Piston gasket**	NBR	
㊺	**Release piston gasket**	NBR	
㊻	**Rod seal B**	NBR	
㊼	**Release piston gasket**	NBR	
㊽	**Piston guide gasket**	NBR	
㊾	**Unlocking cam gasket**	NBR	

Dimensions

Basic type (B)

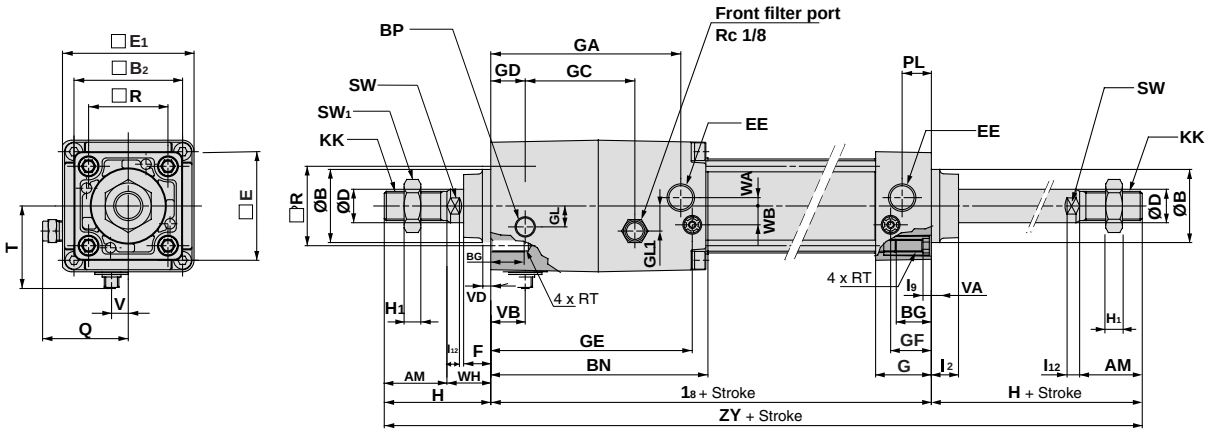


Bore size (mm)	AM	ØBe 11	□B2	BG	BN	BP	ØD	EE	□E	□E1	F	G	GA	GC	GD	GE	GF	GL	GL1	H	H1
32	22	30	46	16	97	G1/8	12	G1/8	46	54	13	27	83	45.5	13	88.5	18.3	7.5	12	48	6
40	24	35	52	16	104	G1/8	16	G1/4	52	63	13	27	91	52.5	16.5	96.5	19.5	10	12	54	8
50	32	40	65	16	120.5	G1/4	20	G1/4	65	75	14	31.5	104.5	58.5	19	111.2	22.4	11.5	15	69	11
63	32	45	75	16	134.5	G1/4	20	G3/8	75	90	14	31.5	119.5	68	23	123.5	20.7	17.5	12	69	11
80	40	45	95	16	169	G1/4	25	G3/8	95	102	20	38	150	81	33	157	26	22	18	86	13
100	40	55	114	16	189	G1/4	30	G1/2	114	116	20	38	170	96	37.5	177	26	25	20	91	16

Bore size (mm)	KK	I8	I9	I12	PL	Q	□R	RT	SW	SW1	T	V	VA	VB	VD	WA	WB	WH	ZZ
32	M10 x 1.25	164	4	6	13	37	32.5	M6	10	17	34	6.5	4	13	4	4	6.5	26	216
40	M12 x 1.25	182	4	6.5	14	41.5	38	M6	13	19	39.5	8	4	16.5	4	4	9	30	240
50	M16 x 1.5	195	5	8	15.5	47.5	46.5	M8	16	24	47	9	4	20	6	5	10.5	37	268
63	M16 x 1.5	224	5	8	16.5	55	56.5	M8	16	24	55.5	8.5	4	23	6	9	12	37	297
80	M20 x 1.5	259	5	10	19	61	72	M10	21	30	61.5	10.5	4	33	8	11.5	14	46	349
100	M20 x 1.5	289	5	10	19	68	89	M10	21	30	69.5	10.5	4	37.5	8	17	15	51	384

Dimensions

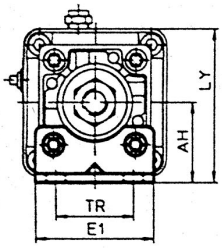
Double Rod (Option W)



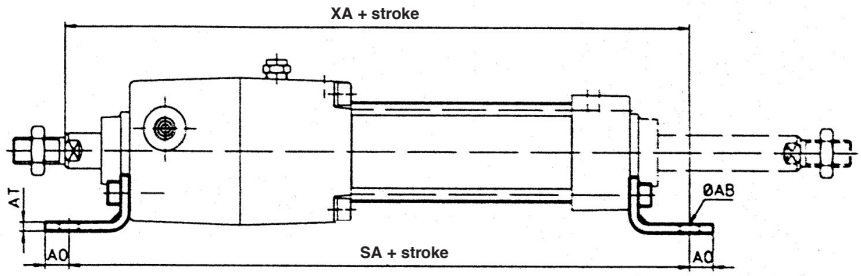
Bore size (mm)	AM	ØBe 11	□B_2	BG	BN	BP	ØD	EE	□E	□E_1	F	G	GA	GC	GD	GE	GF	GL	GL_1	H	H_1
32	22	30	46	16	97	G1/8	12	G1/8	46	54	13	27	83	45.5	13	88.5	18.3	7.5	12	48	6
40	24	35	52	16	104	G1/8	16	G1/4	52	63	13	27	91	52.5	16.5	96.5	19.5	10	12	54	8
50	32	40	65	16	120.5	G1/4	20	G1/4	65	75	14	31.5	104.5	58.5	19	111.2	22.4	11.5	15	69	11
63	32	45	75	16	134.5	G1/4	20	G3/8	75	90	14	31.5	119.5	68	23	123.5	20.7	17.5	12	69	11
80	40	45	95	16	169	G1/4	25	G3/8	95	102	20	38	150	81	33	157	26	22	18	86	13
100	40	55	114	16	189	G1/4	30	G1/2	114	116	20	38	170	96	37.5	177	26	25	20	91	16

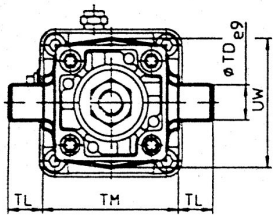
Bore size (mm)	KK	I_2	I_8	I_9	I_{12}	PL	Q	□R	RT	SW	SW_1	T	V	VA	VB	VD	WA	WB	WH	ZY
32	M10 x 1.25	15	164	4	6	13	37	32.5	M6	10	17	34	6.5	4	13	4	4	6.5	26	260
40	M12 x 1.25	17	182	4	6.5	14	41.5	38	M6	13	19	39.5	8	4	16.5	4	4	9	30	290
50	M16 x 1.5	24	195	5	8	15.5	47.5	46.5	M8	16	24	47	9	4	20	6	5	10.5	37	333
63	M16 x 1.5	24	224	5	8	16.5	55	56.5	M8	16	24	55.5	8.5	4	23	6	9	12	37	362
80	M20 x 1.5	30	259	5	10	19	61	72	M10	21	30	61.5	10.5	4	33	8	11.5	14	46	431
100	M20 x 1.5	32	289	5	10	19	68	89	M10	21	30	69.5	10.5	4	37.5	8	17	15	51	471

Dimensions Brackets on Cylinder

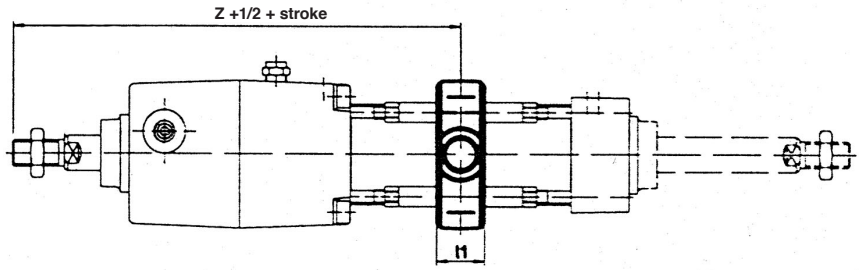


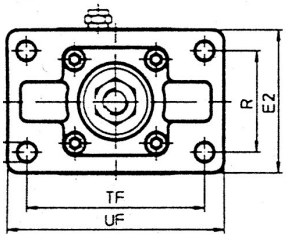
Axial Foot Type



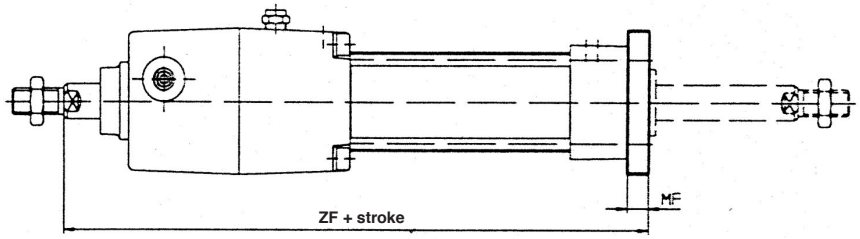


Trunnion Type

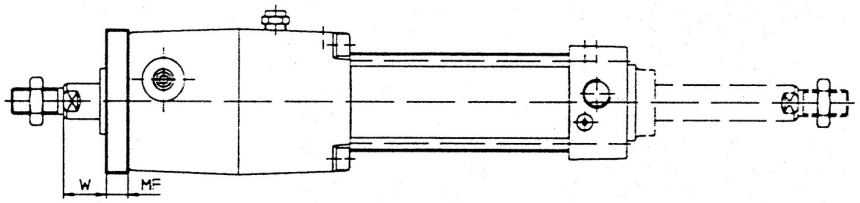




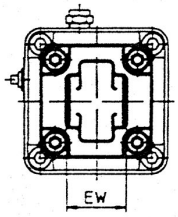
Rear Flange Type



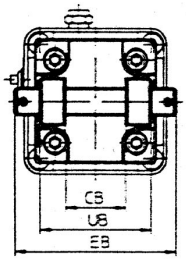
Front Flange Type

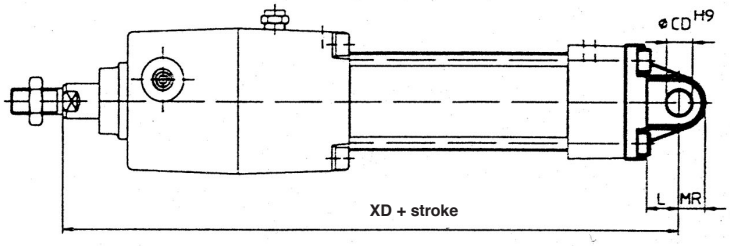


Single Clevis Type



Double Clevis Type





Bore size (mm)	Ø AB	AH	AD	AT	$CB_{1)}$	ØCD H9	E1	E2	EB	$EW_{2)}$	ØFB	L	LY	MF	MR	R	SA	ØTD e9	TF	TL	TM
32	7	32	10	4	26	10	48	56	65	26	7	12	59	10	9.5	38	212	12	72	12	50
40	9	36	11	4	28	12	55	65	75	28	9	15	67.5	10	12	46	238	16	83	16	63
50	9	45	12	5	32	12	68	77	80	32	9	15	82.5	12	12	52	259	16	100	16	75
63	9	50	12	5	40	16	80	92	90	40	9	20	95	12	16	62	288	20	115	20	90
80	12	63	14	6	50	16	100	100	110	50	12	20	114	16	16	63	341	20	126	20	110
100	14	71	16	6	60	20	120	120	140	60	14	25	129	16	20	75	371	25	150	25	132

1) +0.03/+0.1 2) -0.2/-0.6

Bore size (mm)	TR	UB	UF	UW	W	XA	XD	Z	ZF	I1
32	32	45	87	49	16	214	212	165	200	18
40	36	52	101	58	20	240	237	183.5	222	22
50	45	60	120	71	25	264	259	211	244	24
63	50	70	135	87	25	293	293	232.5	273	28
80	63	90	153	110	30	346	341	281	321	34
100	75	110	178	136	35	381	381	311	356	40

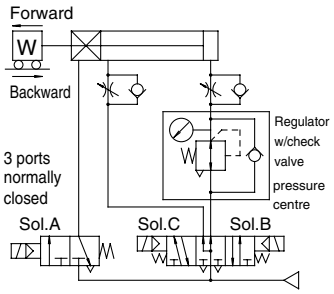
Specific Product Precaution

Air Pressure Circuits

⚠Warning

1. Basic Circuits

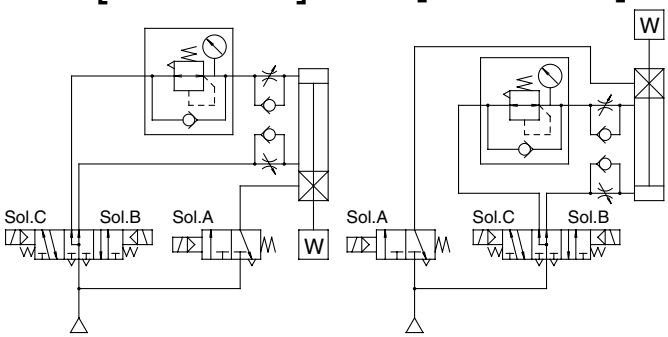
1. [Horizontal]



Sol.A	Sol.B	Sol.C	Action	
ON	ON	OFF	Forward	
OFF	OFF	OFF	Locked stop	0.5s or more
ON	OFF	OFF	Unlocked	0 to 0.5s
ON	ON	OFF	Forward	
ON	OFF	ON	Backward	
OFF	OFF	OFF	Locked stop	0.5s or more
ON	OFF	OFF	Unlocked	0 to 0.5s
ON	OFF	ON	Backward	

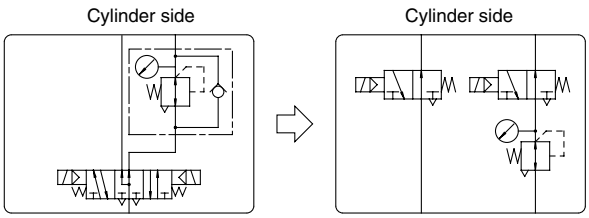
2. [Vertical]

[Load in direction of rod extension] [Load in direction of rod retraction]



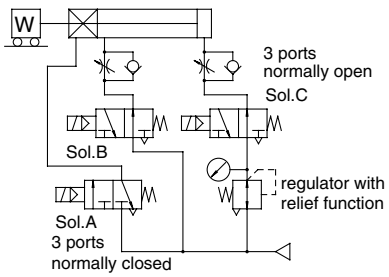
⚠Caution

1. A 3 position pressure centre solenoid valve and regulator with check valve can be replaced with two 3 port normally open valves and a regulator with relief function.



[Example]

1. [Horizontal]

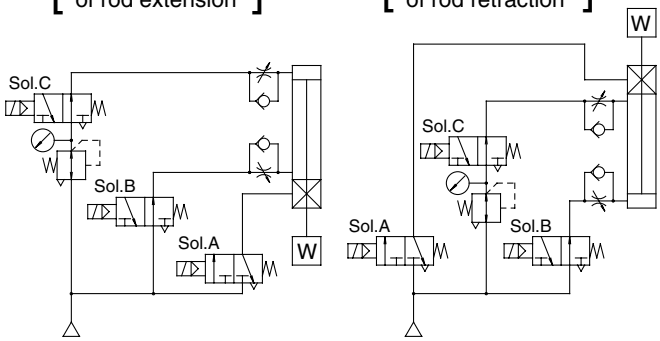


Air Pressure Circuits

⚠Caution

2. [Vertical]

[load in direction of rod extension] [Load in direction of rod retraction]



Manual Unlocking

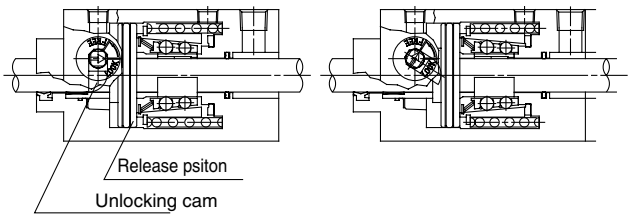
⚠Caution

1. The unlocking cam provided on the C95N Series is an emergency unlocking mechanism only.

During an emergency when the air supply is cut off, it is used to alleviate a problem by forcibly pushing the release piston back to release the lock. However, take note that the sliding resistance of the piston rod will be high compared to unlocking with air pressure.

2. When installing into equipment or machinery, etc., in cases where it will be necessary to hold an unlocked condition for an extended time, air pressure of 0.25MPa or more should be applied to the unlocking port.

3. Do not turn the unlocking cam (the arrow ⇐ on the unlocking cam head) past the FREE position. If it is turned too far there is a danger of damaging the unlocking cam.



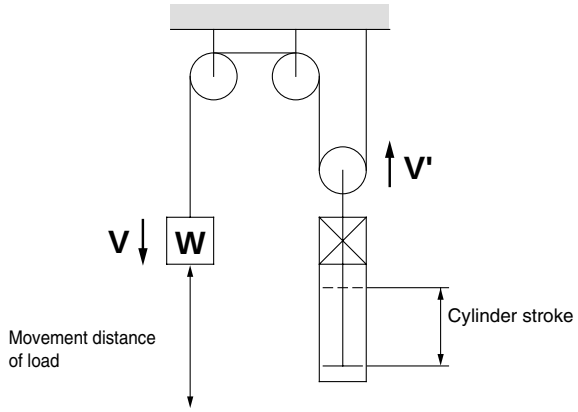
Locked condition Manually unlocked position

[Principle]
If the unlocking cam is turned counter clockwise with a tool such as an adjustable angle wrench, the release piston is pushed back and the lock is released. Since the lever will return to it's original position when released and become locked again, it should be held in this position for as long as unlocking is needed.

Precautions on Model Selection

⚠Caution

Example)



Selection Example

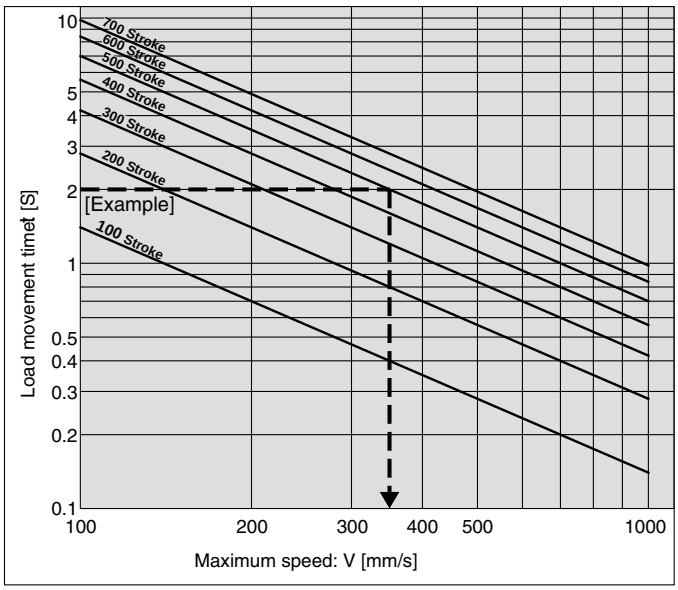
- **Load weight:** m=50kg
- **Movement distance:** Stroke=500mm
- **Movement time:** t=2s
- **Load condition:** Vertical downward=Load in direction of rod extension
- **Operating pressure:** P=0.4MPa

Step 1: From graph 1 find the maximum movement speed of the load
∴ Maximum speed V: approx 350mm/s

Step 2: Select graph 6 based upon the load condition and operating pressure, and then from the intersection of the maximum speed V=350mm/s found in step 1, and the load weight m=50kg
∴ **Ø63** →selecta C95NDB63 or larger bore size.

Step 1 Find the maximum load speed: V

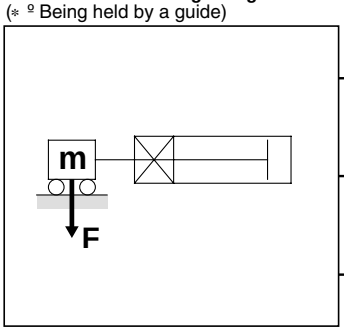
Graph 1



Step 2 Find the cylinder bore size

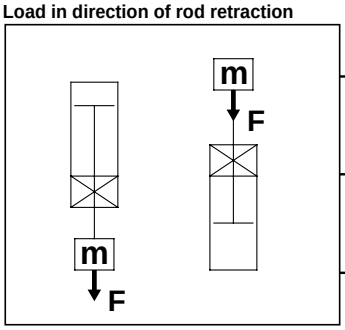
Load condition | Operating pressure

Direction of load at right angle to rod
(∗ º Being held by a guide)



- from 0.3MPa → **Graph 2**
- from 0.4MPa → **Graph 3**
- from 0.5MPa → **Graph 4**

Load in direction of rod extension
Load in direction of rod retraction

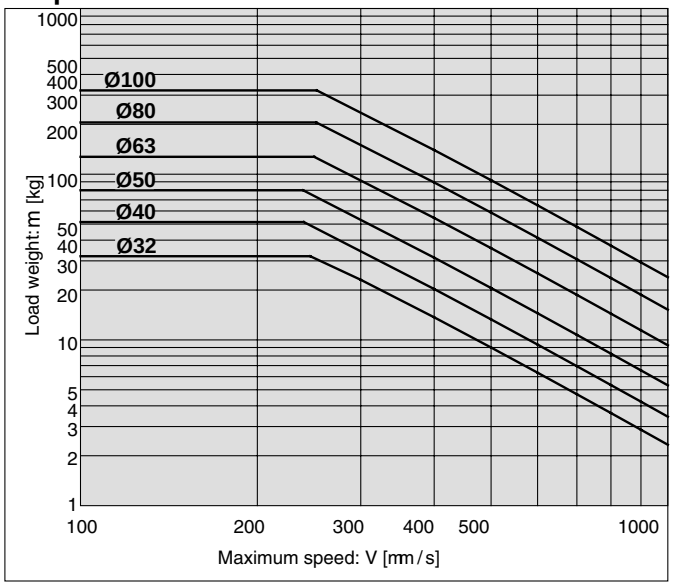


- from 0.3MPa → **Graph 5**
- from 0.4MPa → **Graph 6**
- from 0.5MPa → **Graph 7**

Selection Graphs

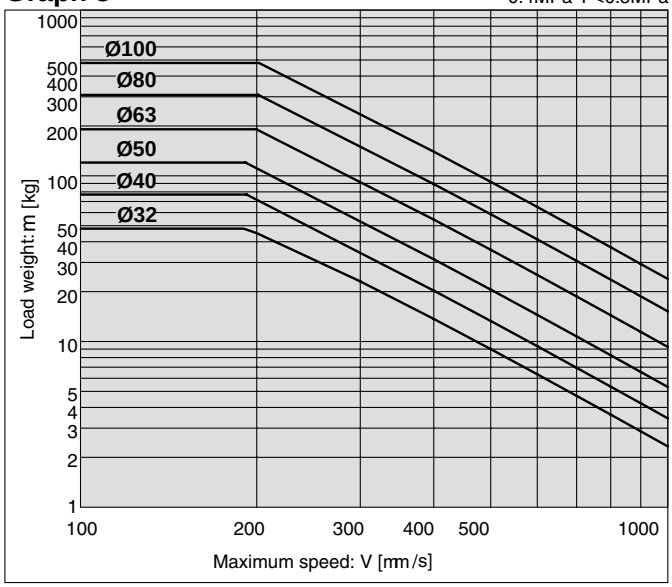
Graph 2

0.3MPa″ P<0.4MPa



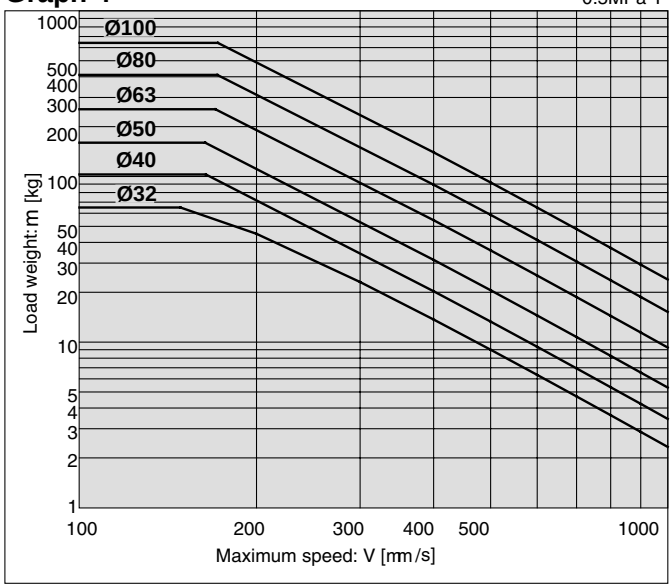
Graph 3

0.4MPa″ P<0.5MPa



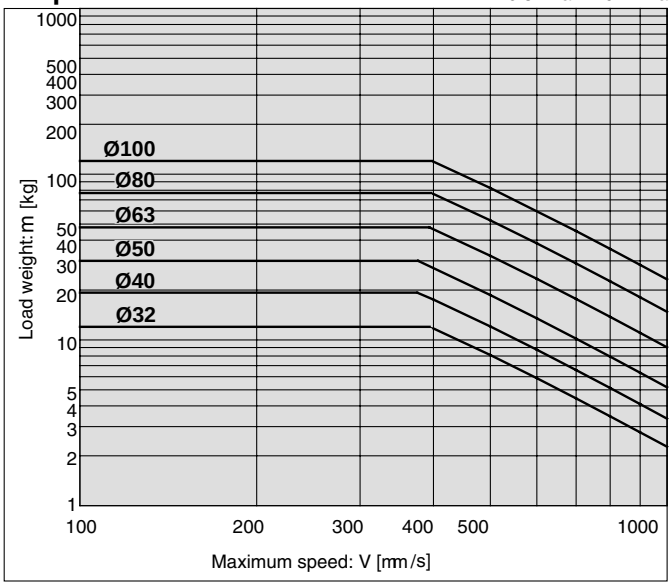
Graph 4

0.5MPa″ P



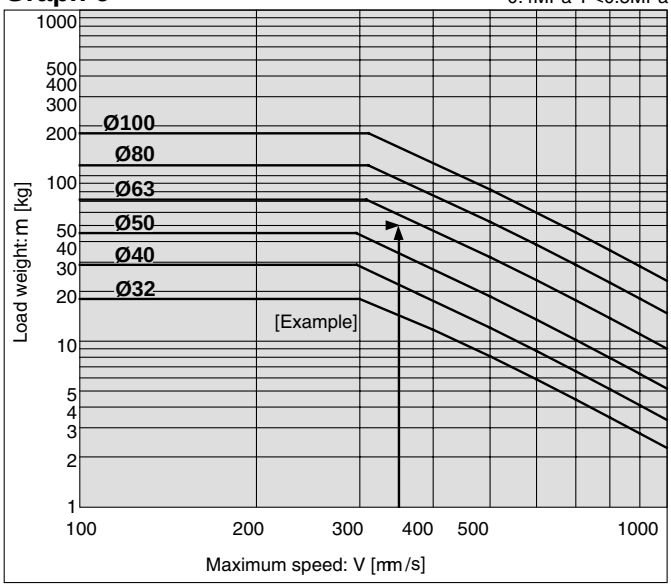
Graph 5

0.3MPa″ P<0.4MPa



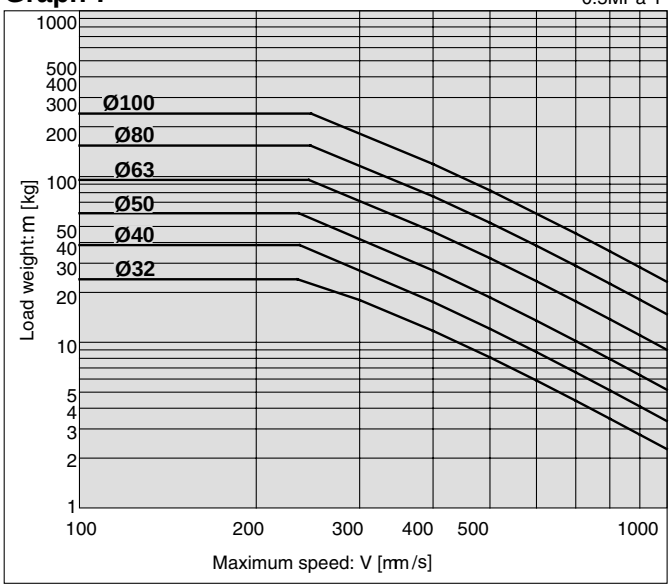
Graph 6

0.4MPa″ P<0.5MPa



Graph 7

0.5MPa″ P



Series C95
Auto Switch Specifications

Applicable Auto Switch

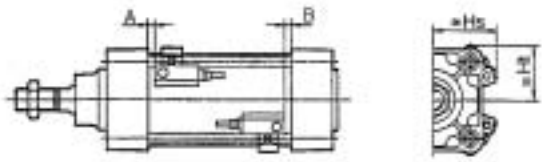
Style	Auto switch model	Electrical entry (function)
Reed switch	**D-A5□/A6**	Grommet
	D-A59W	Grommet (2 color indication)
Solid state switch	**D-F5□/J5**	Grommet
	D-F5□W/J59W	Grommet (2 color indication)
	D-F5BAL	Grommet (2 color indication, Water resistant)
	D-F5□F	Grommet (2 color indication, diagnostic output)
	D-F5NTL	Grommet (Timer)

Minimum Strokes for Auto Switch Mounting

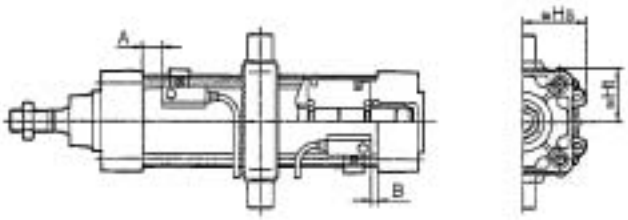
Style	Auto switch model	No. of auto switches	Support bracket except center trunnion						Center trunnion					
			ø32	ø40	ø50	ø63	ø80	ø100	ø32	ø40	ø50	ø63	ø80	ø100
Reed switch	**D-A5, D-A6**	2 (On different faces or same face)	15				20		60		80	105	110	115
		1												
	D-A59W	2 (On different faces or same face)	20				25		60	70	85	110	115	120
		1	15											
Solid state switch	**D-F5/J5**	2 (On different faces or same face)	15				25		60	70	85	110	115	120
		1	10											
	D-F5NTL	2 (On different faces or same face)	15				25		70	75	95	120	125	130
		1	10											
	D-F5□W D-J59W D-F5BAL D-F5□F D-F5LF	2 (On different faces or same face)	15				25		70	75	90	120	125	130
		1	10											

Auto Switch Mounting Position and Mounting Height

Reed switch



Solid state switch



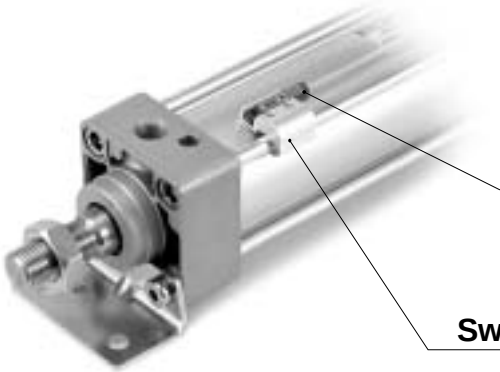
Auto Switch Mounting Position

Bore size (mm)	D-A5/D-A6		D-A59W		D-F5 D-J5		D-F5 W D-J59W D-F5BAL		D-F5NTL	
	A	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**
ø32	10.5	0	14.5	2	17	4.5	21	8.5	22	9.5
ø40	21.5	0	25.5	2	28	4.5	32	8.5	33	9.5
ø50	23	0	27	2.5	29.5	5	33.5	9	34.5	10
ø63	28	0	32	2.5	34.5	5	38.5	9	39.5	10
ø80	28	2.5	22	6.5	24.5	9	28.5	13	29.5	14
ø100	28	2.5	32	6.5	34.5	9	38.5	13	39.5	14

Auto Switch Mounting Height

Bore size (mm)	D-A5 D-A6 D-A59W		D-F5, D-J5 D-F5 W, D-J59W D-F5BAL, D-F5NTL	
	Ht	**Hs**	**Ht**	**Hs**
ø32	24.5	35	25	32.5
ø40	27.5	38.5	27.5	36.5
ø50	34.5	43.5	34	41
ø63	39.5	48.5	39	46
ø80	46.5	55	46.5	52.5
ø100	55	62	55	59.5

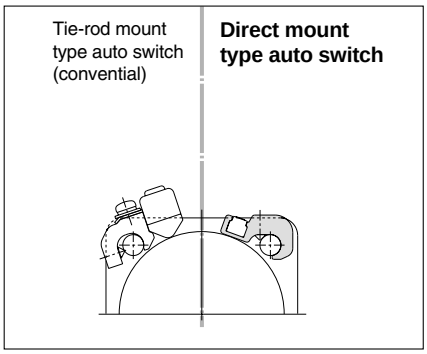
Direct mount auto switches can be installed on tie-rod type cylinders



Direct mount type auto switches can now be attached to the tie-rods by using a special switch mounting bracket.

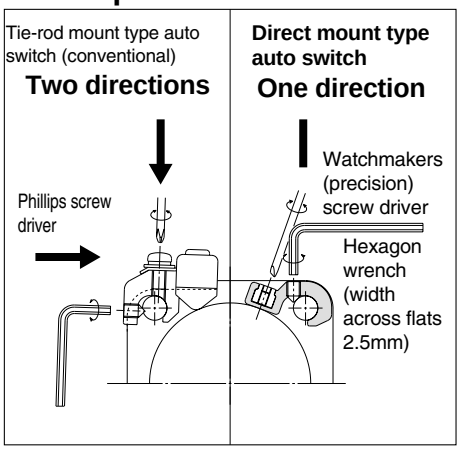
Smaller size

Protrusion of auto switches has been reduced



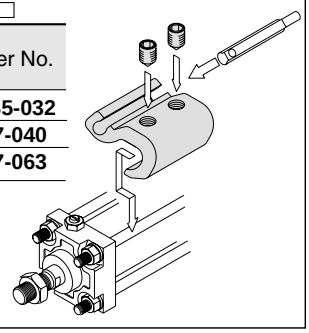
Easier handling

Auto switch mounting and positioning can be performed from one direction



Auto Switch Mounting Bracket for D-M9□

Bore size (mm)	Order No.
ø32, ø40	**BMB5-032**
ø50, ø63	**BA7-040**
ø80, ø100	**BA7-063**



Switch Mounting Bracket Models

Bore size [mm]	Mounting bracket model	Accessory	Auto switch
32, 40	**BMB4-032**	Screw (M4 x 6L) 2 pcs.	Reed-Switch D-Z7 D-Z80
50, 63	**BMB4-050**		Solid state D-Y5 D-Y6 D-Y7
80, 100	**BA4-063**		

Applicable Auto Switches

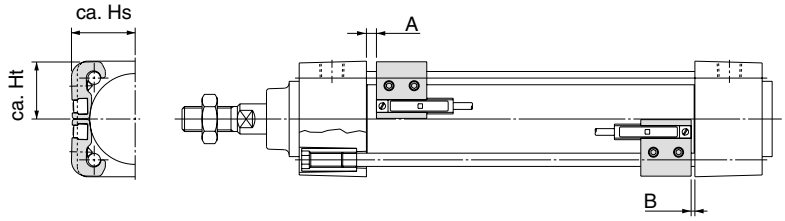
auto switch models		Model	Special function	Electrical Entry	Indicator light	Wiring (output)	Load voltage			Lead wire length [m]			Applicable loads	
Electrical entry direction							DC		AC	0.5 (–)	3 (L)	5 (Z)		
Vertical	In-line													
—	**Z76**	**Reed-Switch**	—	Grommet	Yes	3-wire	—	5V	—	●	●	—	IC	—
—	**Z73**					2-wire	24V	12V	100V	●	●	●	—	Relay, PLC
—	**Z80**				No			5V, 12V	100V	●	●	—	IC	
Y69A	**Y59A**	**Solid state Switch**	—	Grommet	Yes	3-wire (NPN)	24V	5V	—	●	●	○	IC	Relay, PLC
Y7PV	**Y7P**					3-wire (PNP)		12V		●	●	○		
Y69B	**Y59B**					2-wire		12V		●	●	○	—	
Y7NWV	**Y7NW**		Diagnostic indication (2-colour indicator)			3-wire (NPN)		5V		●	●	○	IC	
Y7PWV	**Y7PW**					3-wire (PNP)		12V		●	●	○		
Y7BWV	**Y7BW**					2-wire		12V		●	●	○	—	
—	**Y7BA**		Water resistant (2colour indicator)							—	●	—		
M9NV	**M9N**	**Solid state Switch**	—	Connector and Grommet	Yes	3 wire (NPN)	24V	5V, 12V	—	●	●	○	IC circuit	Relay PLC
M9PV	**M9P**					3 wire (PNP)				●	●	○		
M9BV	**M9B**					2 wire		12V		●	●	○		

∗ Lead wire length 0.5m····· — (Example: A53)
3m····· L (Example: A53L)
5m····· Z (Example: A53Z)

○: Manufactured upon receipt of order.

Auto Switches

How to install auto switches



Auto Switch mounting positions and dimensions [mm]

Bore Size [mm]	All models		D-Z7/Z8, D-Y5/Y7 (W)		D-Y6, D-Y7 (W) V		D-Y7BA	
	A	B	Hs	Ht	Hs	Ht	Hs	Ht
32	14	1.5	25.5	23	26.5	23	30	23
40	25	1.5	29.5	26	30	26	34	26
50	26.5	2	33.5	31	34.5	31	38	31
63	31.5	2	39	36	40	36	43	36
80	31.5	6	47.5	45	48.5	45	52	45
100	31.5	6	55.5	53.5	56.5	53.5	60	53.5

Auto switch operating ranges [mm]

Bore Size [mm]	D-Z7 D-Z8	D-Y5/Y7 (W) D-Y6/Y7 (W) V	D-Y7BA
32	7.5	5.5	3.5
40	8.5	5.5	3.5
50	7.5	7	3.5
63	9.5	7.5	4
80	9.5	6.5	4.5
100	10.5	5.5	5

Note) This is a standard including hysteresis, and is not guaranteed. (variations as much as 30%)
There may be large changes depending on the ambient environment.

Minimum length [mm]

Auto Switch	with bracket T					
	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100
D-Z7/Z8, D-Y5/Y7 (W)	80	85	90	90	95	100
D-Y6/Y7 (W) V	60	85	65	70	75	85
D-Y7BA	55	90	90	100	105	110

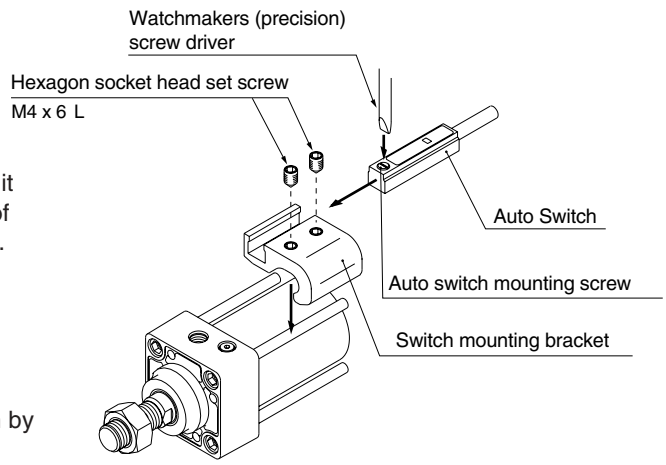
Mounting and Movement of Auto Switches

Caution!

When tightening the auto switch mounting screw, use a watchmakers screw driver with a handle diameter of about 5 to 6mm.
Furthermore, use a tightening torque of 0.05 to 0.1 Nm. As a rule, it should be turned about 90º from the point at which tightening can be felt. Use a tightening torque of 1 to 1.2 Nm for the hexagon socket head set screws (M4 x 0.7).

1. Place the mounting bracket on the cylinder tie-rod, and secure it in the detection position with the set screw so that the bottom of the mounting bracket makes firm contact with the cylinder tube. (Use a hexagon wrench)
2. Insert an auto switch into the switch mounting groove of the mounting bracket, and place it in the approximate auto switch mounting position.
3. After confirming the detection position, secure the auto switch by tightening the mounting screw which is included with it.
4. Return to step 2 to change the detection position.

Note) In order to protect the auto switch, install it so that its body is housed at least 15mm inside the switch mounting groove.



Adjustment

⚠ Warning

① **Do not open the cushion valve above the stopper.**
Cushionvalves are provided with a crimp (ø32) or a retaining ring (ø40 to ø100) 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
32, 40, 50	MB-32-10-C1247	2.5	JIS 4648 Hex spanner wrench 2.5
63, 80, 100	MB-63-10-C1250	4	JIS 4648 Hex spanner wrench 4

②**When replacing brackets, use the hexagon wrenches shown below.**

Bore size (mm)		Bolt	Width across flats	Tightening torque (Nm)
32, 40		MB-32-48-C1247	4	4.9
50, 63		MB-50-48-C1249	5	11
80, 100	Foot	MB-80-48AC1251	6	25
	Others	MB-80-48BC1251		

With Non-rotating Rod (Double Acting: Single Rod)

Operating Precautions

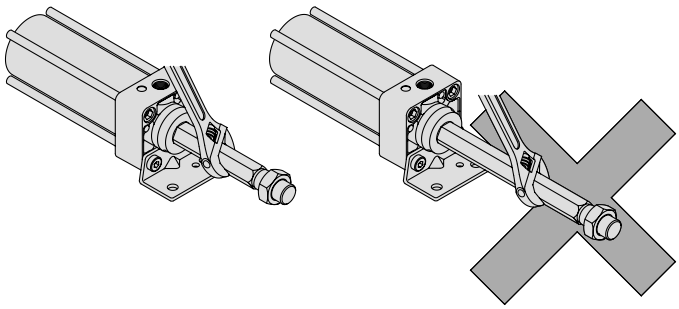
⚠ Caution

① **Do not apply more than the allowable rotating torque to the piston rod.**
If more than the allowable rotating torque is applied, the non-rotating guide will be deformed and there will be a significant loss of rotational accuracy. This may cause damage to the machinery.

Mounting & Piping

⚠ Caution

① **Mounting of a work piece at the rod end.**
When screwing a fitting or nut, etc. onto the threads at the end of the piston rod, push the piston rod into its fully retracted position, and grasp the protruding section with a wrench.
Furthermore, when tightening, take care that the torque is not applid to the non-rotating guide.

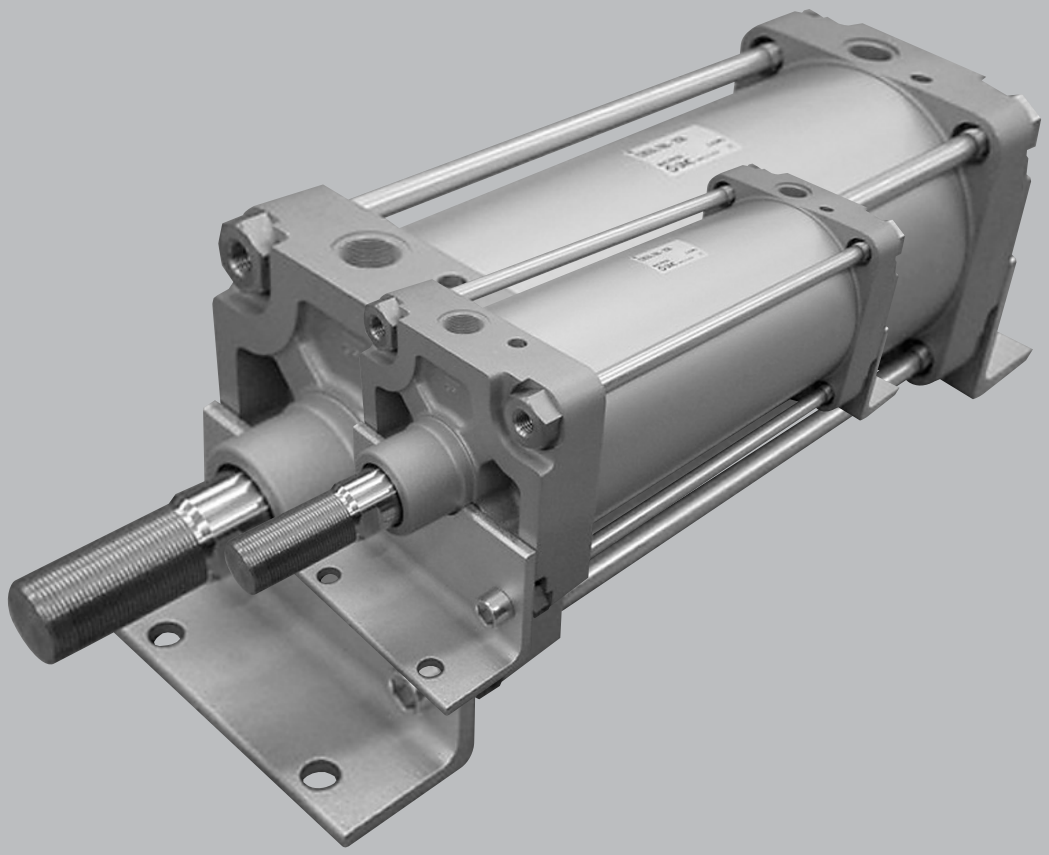


ISO/VDMA Cylinder: Large Bore Size Type

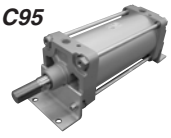
Series C95

ø160, ø200, ø250

Conforming to 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	6-38

ISO/VDMA Cylinder: Large Bore Size Type
Double Acting, Single Rod
Series C95
ø160, ø200, ø250

How to Order

Without auto switch C95S B 160 100

With auto switch C95SD B 160 100 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	Center trunnion style

Bore size

160	160 mm
200	200 mm
250	250 mm

Stroke (mm)
Refer to "Standard Stroke" on page 6-40.

Auto switch

Nil	Without auto switch

* For the applicable auto switch model, refer to the

Number of auto switches

Nil	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Applicable Auto Switch/Tie-rod Mounting

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 (Nil)	3 (L)	5 (Z)	Applicable load	
Reed switch	—	Grommet	Yes	3-wire (Equiv. to NPN)	—	5 V	—	A56	—	●	●	—	IC	—
				2-wire	24 V	12 V	—	A53	—	●	●	●	—	Relay, PLC
							100 V, 200 V	A54	—	●	●	●		
			No			5 V, 12 V	—	A67	—	●	●	—	IC	
						12 V	200 V or less	A64	—	●	●	—	—	
	Diagnostic indication (2-color)					—	—	A59W	—	●	●	—		
	—		Yes	3-wire	—	5 V	—	Z76	—	●	●	—	IC	— Note)
				2-wire	24 V	12 V	AC 100	Z73	—	●	●	●	—	Relay, PLC Note)
			No			5 V, 12 V	100 V or less	Z80	—	●	●	—	IC	
		Terminal conduit	Yes			12 V	—	—	A33	—	—	—	—	PLC Note)
							100 V, 200 V	—	A34	—	—	—	—	Relay, PLC Note)
		DIN terminal						—	A44	—	—	—		
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	F59	—	●	●	○	IC	Relay, PLC
				3-wire (PNP)				F5P	—	●	●	○		
				2-wire	—	—	100 V, 200 V	J51	—	●	●	○	—	
					24 V	12 V	—	J59	—	●	●	○		
	Diagnostic indication (2-color)			3-wire (NPN)		5 V, 12 V		F59W	—	●	●	○	IC	
				3-wire (PNP)				F5PW	—	●	●	○		
				2-wire		12 V		J59W	—	●	●	○	—	
	Water resistant (2-color)							F5BAL	—	—	●	○		
	With timer			3-wire (NPN)		5 V, 12 V		F5NTL	—	—	●	○	IC	
	Diagnostic output (2-color)			4-wire (NPN)				F59F	—	●	●	○		
	—			3-wire (NPN)		5 V, 12 V		Y59A	—	●	●	○	IC	Relay, PLC
				2-wire		12 V		Y59B	—	●	●	○	—	
				3-wire (PNP)		5 V, 12 V		Y7P	—	●	●	○	IC	Note)
	Diagnostic indication (2-color)			3-wire (NPN)				Y7NW	—	●	●	○		
				3-wire (PNP)				Y7PW	—	●	●	○		
				2-wire		12 V		Y7BW	—	●	●	○	—	
	Water resistant (2-color)							Y7BAL	—	—	●	○		
	—	Terminal conduit		3-wire (NPN)		5 V, 12 V		—	G39	—	—	—	IC	
				2-wire		12 V		—	K39	—	—	—	—	
	——	Grommet	Yes	3 wire (NPN)	24V	5V,12V	—	M9NV	M9N	●	●	○	IC	Note) Relay PLC
				3 wire (PNP)				M9PV	M9P	●	●	○		
				2 wire		12V		M9BV	M9B	●	●	○		

* Lead wire length symbols: 0.5 m ····· Nil (Example) A53
3 m ····· L (Example) A53L
5 m ····· Z (Example) A53Z

○: Manufactured upon receipt of order.
Note) Switch can not be mounted on ø250

Mounting Bracket Part No.

Bore size (mm)	160	200	250
Foot (1)	L5160	L5200	L5250
Flange	F5160	F5200	F5250
Single clevis	C5160	C5200	C5250
Double clevis	D5160	D5200	D5250

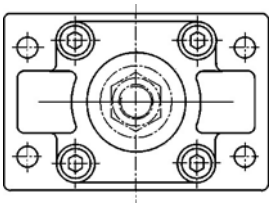
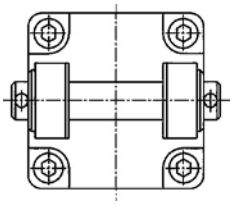
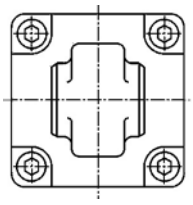
Note 1) Two foot brackets and mounting bolts (4 pieces) are included in this no. (ø160 to ø250)
Note 2) Accessories for mounting brackets are as follows
Foot, Flange, Single clevis: Mounting bolts
Double clevis : Clevis pin, Retaining rings, Mounting bolts

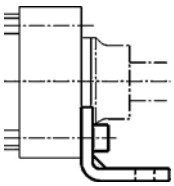
Auto Switch Mounting Bracket Part No.

Bore size (mm)	160	200	250
D-A3/A4/K3/G3	BS1-160	BS1-200	—
D-A5/A6/F5/J5	BT-16	BT-16	BT-20
D-Z□/Y□	BS4-160	BS4-160	—
D-M9□	BS5-160	BS5-160	—

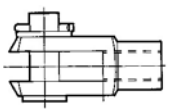
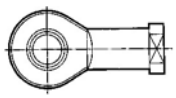
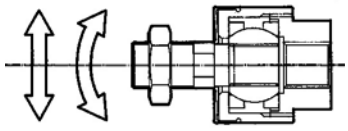
Accessory

Mounting Accessory, Cylinder

Bore size (mm)	**F** Rod/Head side flange	**D** Female head side clevis (Corresponds to E accessories)	**C** Male head side 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
	See page 6-43 for dimensions.	See page 6-43 for dimensions	See page 6-44 for dimensions.

Bore size (mm)	**L** Foot
	 Supplied with two pieces Supplied with 4 screws
160	L5160
200	L5200
250	L5250
	See page 6-43 for dimensions.

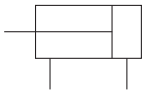
Mounting Accessory, Rod

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	
	See page 6-45 for dimensions.	See page 6-45 for dimensions.	See page 6-45 for dimensions.

Specifications

Bore size (mm)	160	200	250
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: $^{+1.0}_{0}$, 251 to 1000: $^{+1.4}_{0}$, 1001 to 1500: $^{+1.8}_{0}$		
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, Center trunnion style		

JIS Symbol
Double acting



Minimum Stroke for Auto Switch Mounting

Refer to page 12 for “Minimum Stroke for Auto Switch Mounting”.

Standard Stroke

Bore size (mm)	Max. * stroke
160	1600
200	2000
250	2400

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

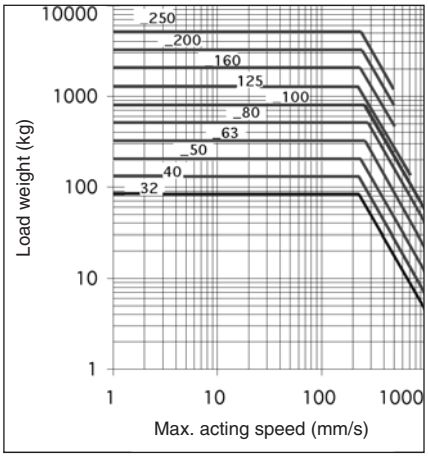
Theoretical Output

(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

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

Allowable Kinetic Energy



Example: Load limit at rod end when air cylinder ø200 is actuated with max. actuating speed 500 mm/s. See the intersection of lateral axis 500 mm/s and ø200 line, and extend the intersection to left.
Thus the allowable load is 800 kg.

Weight/Aluminum Tube

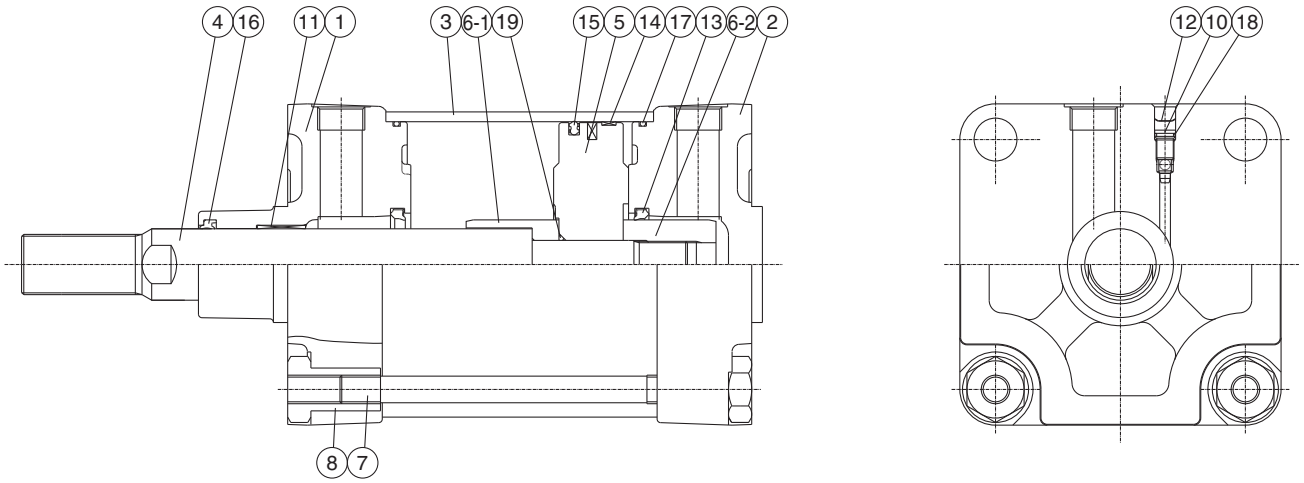
(kg)

Bore size (mm)		160	200	250	
Basic weight	Basic style	14.54	20.20	37.17	
	Foot style	4.90	7.76	15.00	
	Flange style	2.45	11.75	20.29	
	Single clevis style	6.90	9.10	18.60	
	Double clevis style	6.30	9.25	18.46	
	Trunnion style	4.50	7.23	14.40	
Additional weight per each 50 mm of stroke	All mounting brackets	0.83	0.90	1.60	
Accessory	Single rod clevis	1.62	1.62	2.76	
	Double clevis (With pin)	3.92	3.92	6.69	

Calculation: (Example) CP95SD160-100
• Basic weight ····· 14.54 (kg) (Basic, ø160)
• Mounting ····· 6.30 (kg) (Double clevis)
• Additional weight ··· 0.83 (kg/50 st)
• Cylinder stroke ····· 100 (st)
14.54 + 0.83 x 100 50 + 6.30 = 22.50 kg

Construction

[First angle projection]



Component Parts

No.	Description	Material	Qty.	Note
①	Rod cover	Aluminum casted	1	
②	Head cover	Aluminum casted	1	
③	Cylinder tube	Aluminum alloy	1	
④	Piston rod	Carbon steel	1	
⑤	Piston	Aluminum alloy	1	
⑥-1	Cushion ring A	Rolled steel	1	
⑥-2	Cushion ring B	Rolled steel	1	
⑦	Tie-rod	Carbon steel	4	
⑧	Tie-rod nut	Steel	8	
⑩	Cushion valve	Steel wire	2	
⑪	Bushing	Lead-bronze casted	1	
⑫	Snap ring	Steel for spring	2	
⑬	Cushion seal	Urethane	2	
⑭	Wear ring	Resin	1	
⑮	Piston seal	NBR	1	
⑯	Rod seal	NBR	1	
⑰	Cylinder tube gasket	NBR	2	
⑱	Cushion valve seal	NBR	2	
⑲	Piston gasket	NBR	1	
⑳	Magnet ring		1	

Replacement Parts: Seal Kit

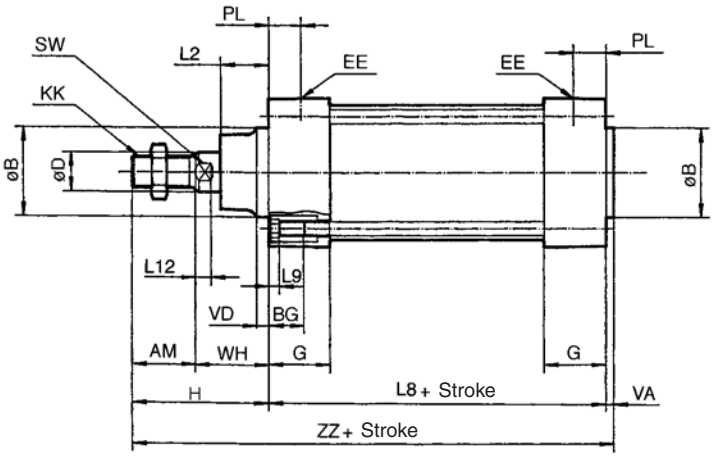
Bore size (mm)	Kit no.	Contents
160	CS95-160	Kits include items ⑬ to ⑰ from the table above.
200	CS95-200	
250	CS95-250	

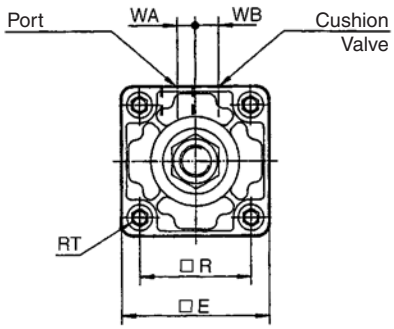
∗ Seal kits consist of items ⑬ to ⑰ contained in one kit, and can be ordered using the order number for each respective tube bore size.

Dimensions: Without Mounting Bracket

[First angle projection]

C95SB Bore size - Stroke



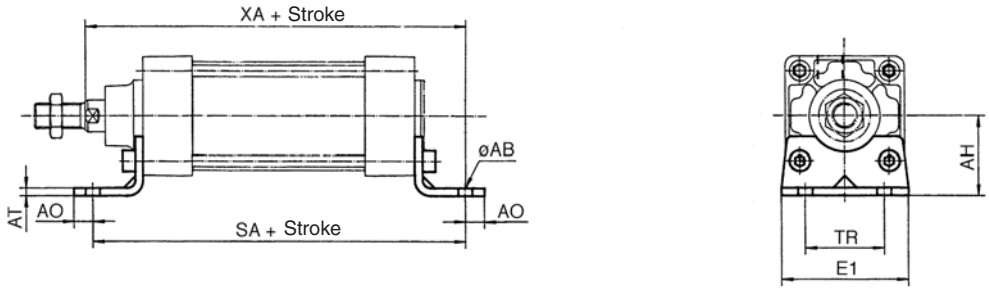


Bore size (mm)	AM	øB e11	øD	EE	PL	RT	L12	KK	SW	G	BG (Min.)	L8	VD	VA	WA	WB	WH	ZZ	□E	□R	L2	L9
160	72	65	40	G 3/4	30	M16 x 2	15	M36 x 2	36	55	27	180	8	6	15	25	80	338	180	140	50	0
200	72	75	40	G 3/4	35	M16 x 2	15	M36 x 2	36	57	27	180	15	6	18	25	95	353	220	175	55	0
250	84	90	50	G 1	31	M20 x 2.5	20	M42 x 2	46	59	29	200	20	10	20	28	105	399	270	220	65	0

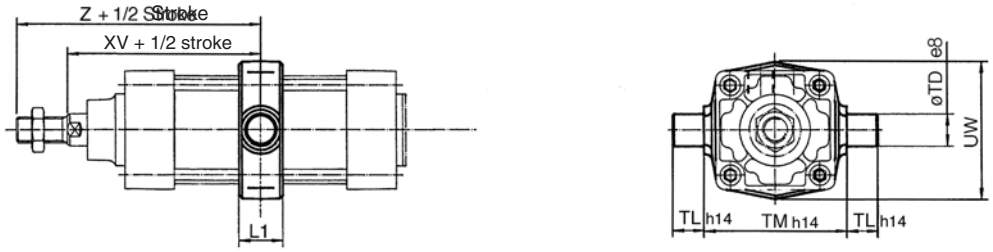
Dimensions: Cylinder Mounting Accessory

[First angle projection]

Foot style (L)

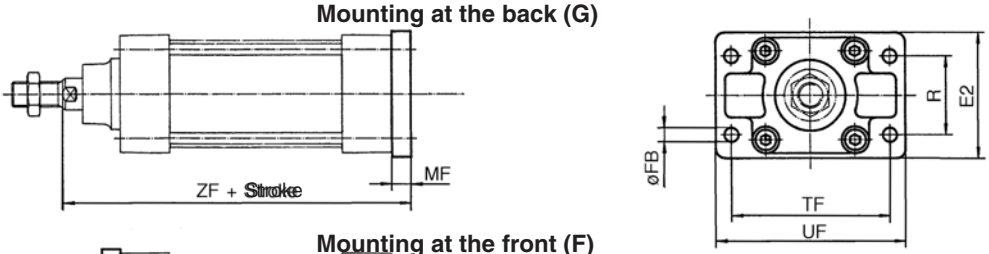


Center trunnion style (T)

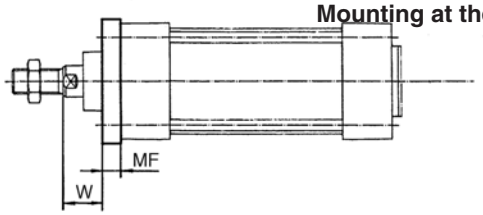


Flange style (F, G)

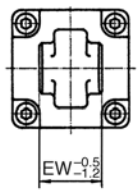
Mounting at the back (G)



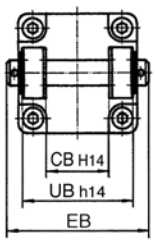
Mounting at the front (F)

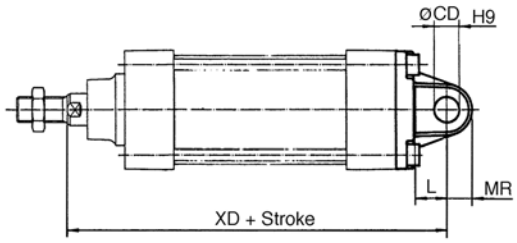


Head side single clevis style (C)



Head side double clevis style (D)



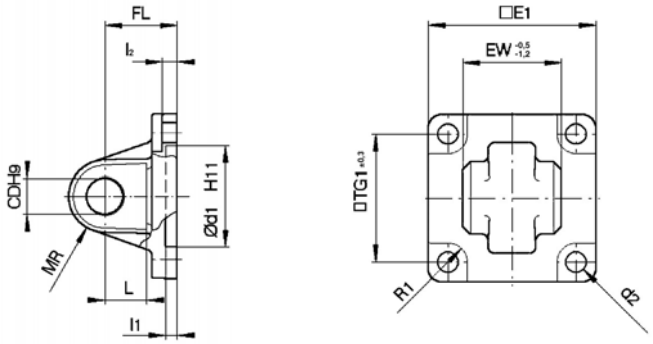


Bore (mm)	E1	R	W	MF	ZF	øFB	øCD H9	EB	L	XD	UB h14	CB H14	EW -0.5 -1.2	MR	TR	AO	AT	XA	SA	AH	øAB	L1	XV	Z	TL h14	øTD e8	TM h14	UW	TF	UF	E2
160	Max. 195	115	60	20	280	18	30	Max. 209	Min. 35	315	170	90	90	Max. 31	115	Max. 25	9	320	300	115	18	Max. 50	170	242	32	32	200	Max. 220	230	Max. 280	Max. 195
200	Max. 238	135	70	25	300	22	30	Max. 209	Min. 35	335	170	90	90	Max. 31	135	Max. 35	12	345	320	135	22	Max. 50	185	257	32	32	250	Max. 260	270	Max. 320	Max. 238
250	Max. 290	165	80	25	330	26	40	Max. 249	Min. 45	375	200	110	110	Max. 41	165	Max. 40	14.5	380	350	165	26	Max. 60	205	289	40	40	320	Max. 320	330	Max. 395	Max. 290

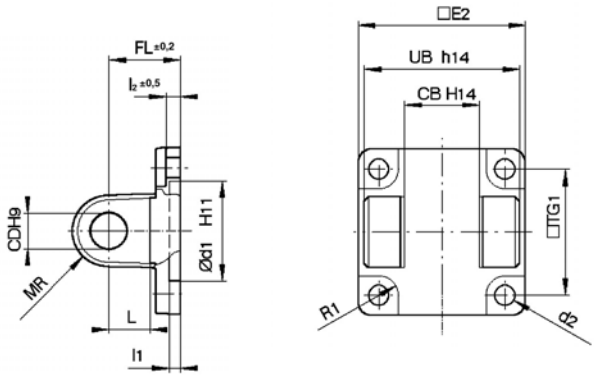
Dimensions: Cylinder Mounting Accessory C, D, E and CR

[First angle projection]

Mounting style (C)



Mounting style (D)



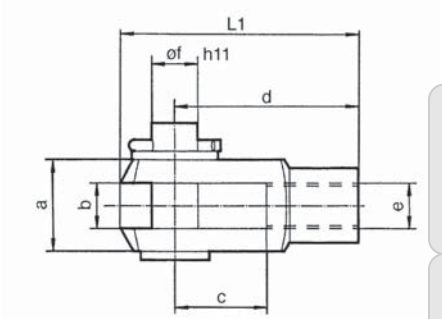
Bore size (mm)	□E1	EW	□TG1	FL	l1	l2	ød1	CD	MR	d2	R1	□E2	UB	CB
160	180	90	140	55	7	10	65	30	25	18	13	180	170	90
200	220	90	175	60	7	11	75	30	25	18	13	220	170	90
250	270	110	220	70	11	11	90	40	40	22	16.5	270	200	110

Dimensions: Piston Rod Mounting Accessory

[First angle projection]

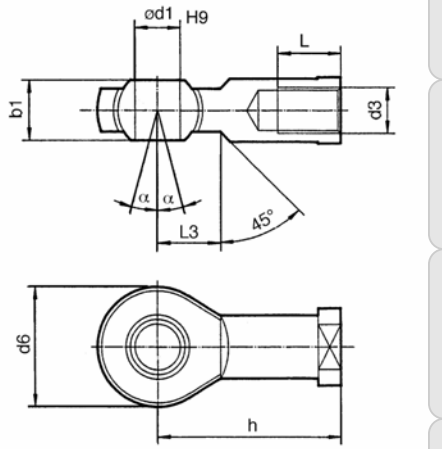
Piston Rod Clevis (ISO 8140)
Steel, Zinc Chromate Plated

Part no.	Bore size (mm)	e	b		d	øf 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



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	16	55
KJ42D	**250**	M42 x 2	40	142	90	49	60	4	46

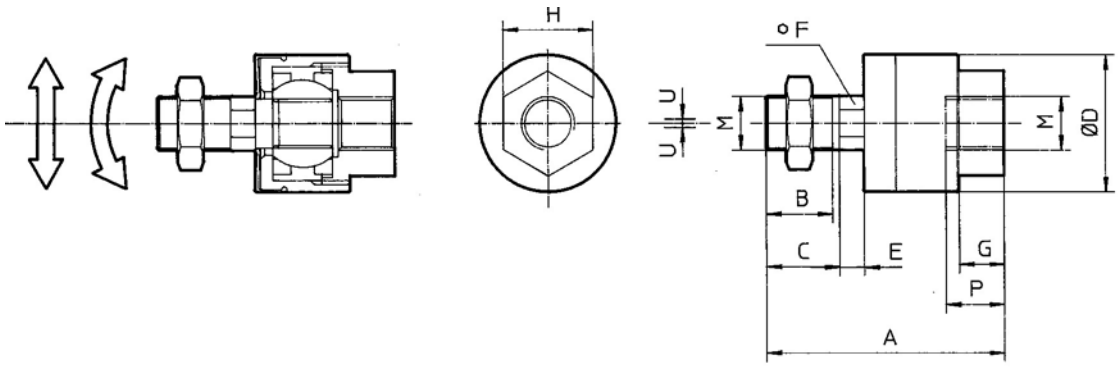


Dimensions: Piston Rod Mounting Accessory

[First angle projection]

Floating Joint JA
Steel

Bore size (mm)	M	Part no.	A	B	C	øD	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 Specifications

Applicable Auto Switch

Type	Auto switch model	Electrical entry (Function)
Reed switch	**D-A5□/A6□**	Grommet
	D-A59W	Grommet (2-color indication)
	D-Z7□/Z80	Grommet
	D-A3□	Terminal conduit
	D-A44	DIN terminal
Solid state switch	**D-F5□/J5□**	Grommet
	D-F5□W/J59W	Grommet (2-color indication)
	D-F5BAL	Grommet (2-color indication, Water resistant)
	D-F59F	Grommet (2-color indication, Diagnostic output)
	D-F5NTL	Grommet (With timer)
	D-Y59□	Grommet (In-line)
	D-Y69□	Grommet (Perpendicular)
	D-Y7P	Grommet (In-line)
	D-Y7PV	Grommet (Perpendicular)
	D-Y7□W	Grommet (2-color indication, In-line)
	D-Y7□WV	Grommet (2-color indication, Perpendicular)
	D-Y7BAL	Grommet (Water resistant, In-line)
	D-G39/K39	Terminal conduit

Minimum Stroke for Auto Switch Mounting

Auto switch model	No. of auto switches	Support bracket except center trunnion			Center trunnion		
		ø160	**ø200**	**ø250**	**ø160**	**ø200**	**ø250**
A5□ **A6□**	1, 2	10	10	10	125	125	145
	n	10 + 55(n-2)/2 n = 2, 4, 6, 8···	←	←	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···
A59W	2	←	←	←	135	135	155
	n	←	←	←	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···
	1	15	15	15	135	135	155
F5□(W)/J5□/J59W **F5BAL/F59F**	1, 2	10	←	←	135	135	155
	n	10 + 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···
F5NTL	1, 2	15	15	15	150	145	165
	n	15 + 55(n-2)/2 n = 2, 4, 6, 8···	←	←	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...
A3□ **K3□** **G3□**	1	10	10	—	140	140	—
	2 (Same side)	100	100	—	140	140	—
	2 (Different sides)	35	35	—	140	140	—
	n (Same side)	←	←	—	140 + 100(n-2) n = 2, 4, 6, 8···	140 + 100(n-2) n = 2, 4, 6, 8···	—
	n (Different sides)	←	←	—	140 + 100(n-2) n = 2, 4, 6, 8···	140 + 100(n-2) n = 2, 4, 6, 8···	—
A44	1	10	10	—	100	100	—
	2 (Same side)	55	55	—	100	100	—
	2 (Different sides)	35	35	—	100	100	—
	n (Same side)	←	←	—	100 + 100(n-2) n = 2, 4, 6, 8···	100 + 100(n-2) n = 2, 4, 6, 8···	—
	n (Different sides)	←	←	—	100 + 100(n-2) n = 2, 4, 6, 8···	100 + 100(n-2) n = 2, 4, 6, 8···	—
Z7□/Z80	1, 2	10	10	—	120	110	—
	n	←	←	—	120 + 55(n-4)/2 n = 4, 8, 12, 16···	110 + 55(n-4)/2 n = 4, 8, 12, 16···	—
Y59□/Y7P **Y7□W**	1, 2	10	10	—	110	110	—
	n	←	←	—	110 + 55(n-4)/2 n = 4, 8, 12, 16···	110 + 55(n-4)/2 n = 4, 8, 12, 16···	—
Y69□/Y7PV **Y7□WV**	1, 2	10	10	—	85	80	—
	n	←	←	—	85 + 55(n-4)/2 n = 4, 8, 12, 16···	80 + 55(n-4)/2 n = 4, 8, 12, 16···	—
Y7BAL	1, 2	10	10	—	120	120	—
	n	←	←	—	120 + 55(n-4)/2 n = 4, 8, 12, 16···	120 + 55(n-4)/2 n = 4, 8, 12, 16···	—

Auto Switch Mounting Position and Mounting Height

[First angle projection]

Auto Switch Mounting Position

Bore size (mm)	D-A5□ D-A6□		D-A59W		D-F5□, D-F5□W D-J5□, D-J59W D-F59F, D-F5BAL		D-F5NTL		D-Z7□, D-Y59□, D-Y7BAL D-Z80, D-Y69□ D-Y7P(V), D-Y7□W(V)		D-A3□, D-G39 D-A44, D-K39	
	A	B	A	B	A	B	A	B	A	B	A	B
160	19.5	18.5	23.5	22.5	26	25	31	30	23	22	19.5	18.5
200	17	17	21	21	23.5	23.5	28.5	28.5	20.5	20.5	17	17
250	20	30	24	34	26.5	36.5	31.5	41.5	—	—	—	—

Auto Switch Mounting Height

Bore size (mm)	D-A5□ D-A6□ D-A59W		D-F5□, D-F5□W, D-F5NTL D-J5□, D-J59W D-F59F, D-F5BAL		D-A3□, D-G39 D-K39		D-A44		D-Z7□, D-Y59□ D-Z80, D-Y7P D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-Y7BAL	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
160	90	86	89	86	134.5	—	144.5	—	84.5	83	84.5	83	89.5	83
200	102.5	104	102	104	154	—	164	—	100.5	100.5	100.5	100.5	103	100.5
250	127	128	127	128	—	—	—	—	—	—	—	—	—	—

Switch Hysteresis

Bore size (mm)	ON-OFF switch hysteresis	
	Reed switch	Solid state switch
160 to 200	≤ 2 mm	≤ 1 mm
250	≤ 3 mm	≤ 1 mm

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted. For detailed specifications, refer to page 8-1.

Type	Model	Electrical entry	Features
Solid state switch	D-F5NTL	Grommet (In-line)	With timer
	D-Y69A/Y69B/Y7PV	Grommet (Perpendicular)	—
	D-Y7NWV/Y7PWV/Y7BWV		2-color indication

∗ With pre-wire connector is available for solid state auto switches. For details, refer to page 8-1.
∗ Normally closed (NC = b contact), solid state switch (D-Y7G/Y7H type) are also available. For details, refer to page 8-1.

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 (ø160 to ø250) 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	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	Foot	M20 x 2.5 x 35l	17	193.5
	Others	M20 x 2.5 x 30l	17	