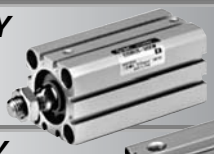
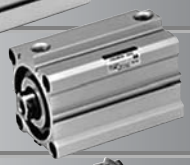
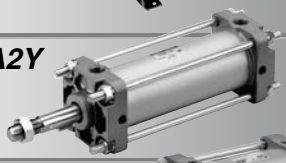
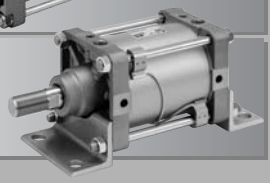
Smooth Cylinder/Low Speed Cylinder

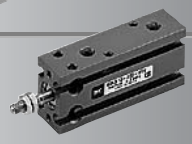
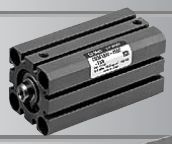
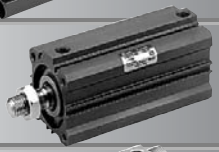
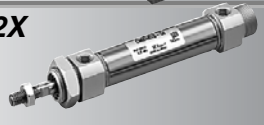
Series C□Y/C□X

Series Variations

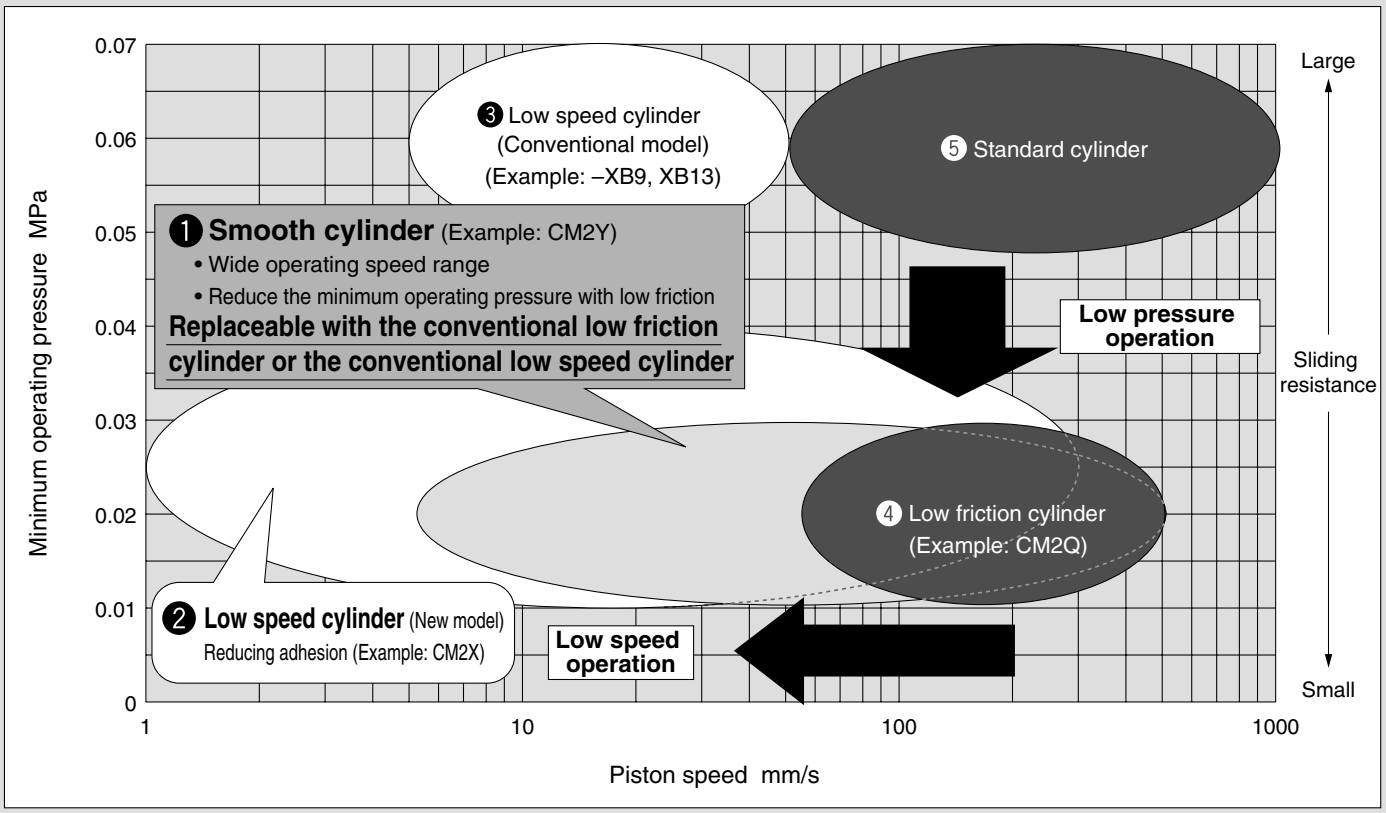
Smooth Cylinder *CQSY/CQ2Y/CM2Y/CG1Y/CA2Y/CS2Y* P. 1047

Series	Action	Bore size (mm)	Minimum operating pressure (MPa)	Page
CQSY 	Double acting	12, 16	0.03	P. 1048
		20, 25	0.02	
CQ2Y 		32, 40	0.02	P. 1056
		50, 63, 80, 100	0.01	
CM2Y 		20, 25, 32, 40	0.02	P. 1069
CG1Y 		20, 25, 32, 40	0.02	P. 1083
		50, 63, 80, 100	0.01	
CA2Y 		40	0.02	P. 1094
		50, 63, 80, 100	0.01	
CS2Y 		125, 140, 160	0.005	P. 1108-1

Low Speed Cylinder *CJ2X/CUX/CQSX/CQ2X/CM2X* P. 1111

Series	Action	Bore size (mm)	Minimum operating speed (mm/s)	Page
CJ2X 	Double acting	10, 16	1	P. 1114
CUX 		10, 16	1	P. 1124
		20, 25, 32	0.5	
CQSX 		12, 16	1	P. 1129
		20, 25	0.5	
CQ2X 		32, 40, 50, 63, 80, 100	0.5	P. 1136
CM2X 		20, 25, 32, 40	0.5	P. 1148

Smooth Cylinder/Low Speed Cylinder



❶ Smooth cylinder

- **Low speed operation (from 5 mm/s)**
- **Low pressure operation**
- **Pressure on both sides**

• Pressing force control
• Balance control of winders, etc.
• General low-speed operating applications
• Tension control

❷ Low speed cylinder (New model)

- **Low speed operation (from 1 mm/s)**
- **Low pressure operation**
- **Pressure on both sides**
- **Reducing adhesion**

• Load transfer without a lateral load (Lightweight trays, etc.)
• Transfer with less adhesion (Wafers, etc.)
• Higher-accuracy pressing force control

❸ Low speed cylinder (Conventional model)

- **Low speed operation**

❹ Low friction cylinder

- **Low pressure operation**
- **Pressure on a single side**

❺ Standard non-lube cylinder

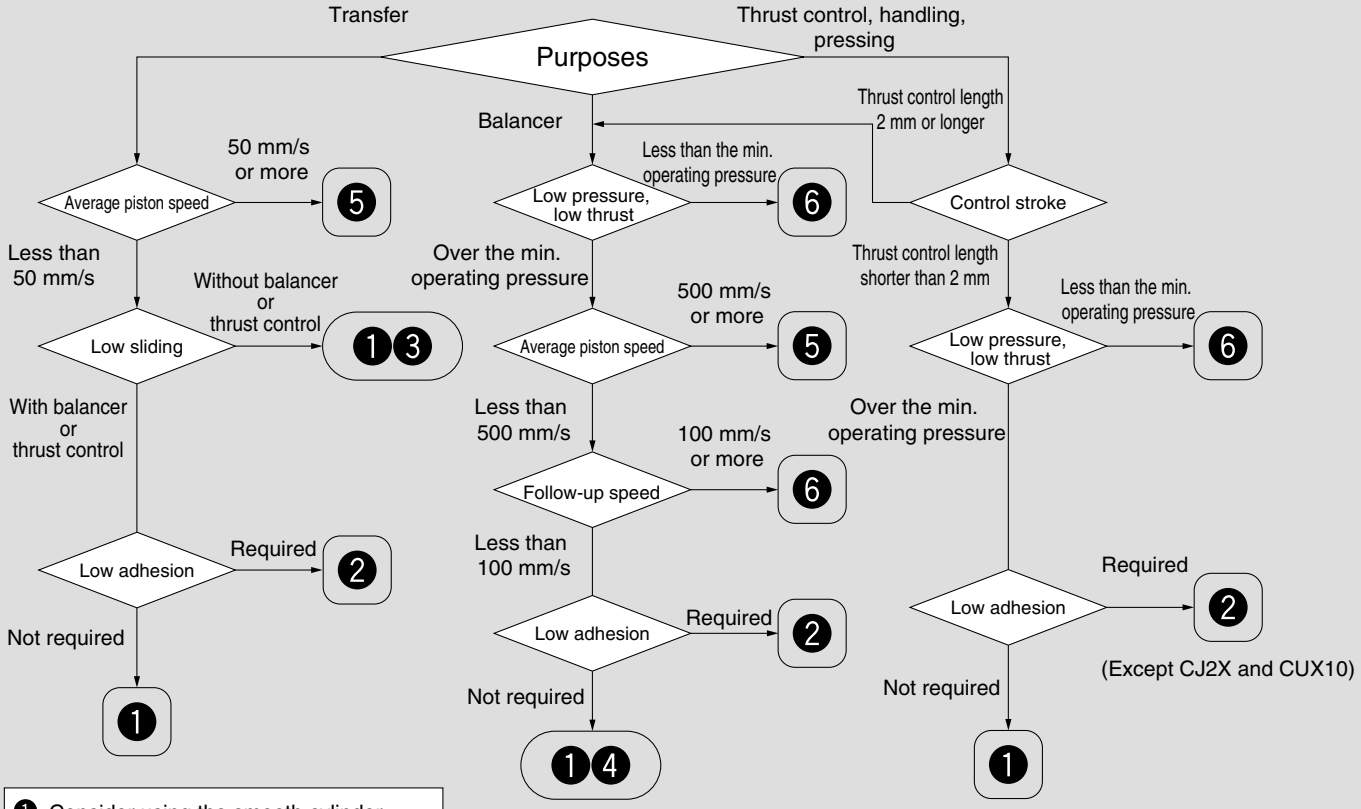
- **General applications**

Superiority in low speed/low friction

Function	❶ Smooth cylinder	❷ Low speed cylinder (New model)	❸ Low speed cylinder (Conventional model)	❹ Low friction cylinder	❺ Standard non-lube cylinder
① Low pressure operation	◎	CJ2X, CUX10 : x Others : ◎	△	◎	△
② Low speed operation	○	◎	○	△	△
③ Reducing adhesion	○	◎	○	△	△
④ Reducing protrusion	○	◎	○	△	△
⑤ Pressing force control	◎	CJ2X, CUX10 : x Others : ◎	○	△	△
⑥ Low sliding	◎	◎	○	◎	△

◎: Excellent ○: Good △: Usable x: Handle with caution

Selection Procedures



❶ Consider using the smooth cylinder.
❷ Consider using the low speed cylinder (new model).
❸ Consider using the low speed cylinder (conventional model).
❹ Consider using the low friction cylinder
❺ Consider using the standard non-lube cylinder
❻ Consult with SMC.

Glossary explanation

Average piston speed	Cylinder full stroke (length) divided by air pressure operating time.
Adhesive phenomenon	Protrusion or delay occurs when cylinders are not operated for long hours.
Thrust control	Control the pressing force by controlling air pressure in the cylinder.
Balancer	Cylinders move along with the moving workpiece.
Balancer follow-up speed	The speed of an air cylinder moving along with the workpiece at a small stroke.
Calculating thrust controlled.	Calculate the cylinder thrust multiplying piston area by pressure. Piston area varies depending on models and bore sizes.

Applicable Model/Size

Type	❶ Smooth cylinder	❷ Low speed cylinder (New model)	❸ Low speed cylinder (Conventional model)	❹ Low friction cylinder	Repre-sentative model
Compact	●	●	●		CQS
	●	●	●		CQ2
Round	●	●	●	*	CM2
	●		●	*	CG1
Tie-rod			●	●	MB
	●			*	CA2
				**	CS1
	●				CS2
Small		●	●	●	CJ2
Free mount		●	●		CU

●: Standard
*: ❶ Change this to a smooth cylinder.
**: ❶ Change this to a smooth cylinder (CS2).

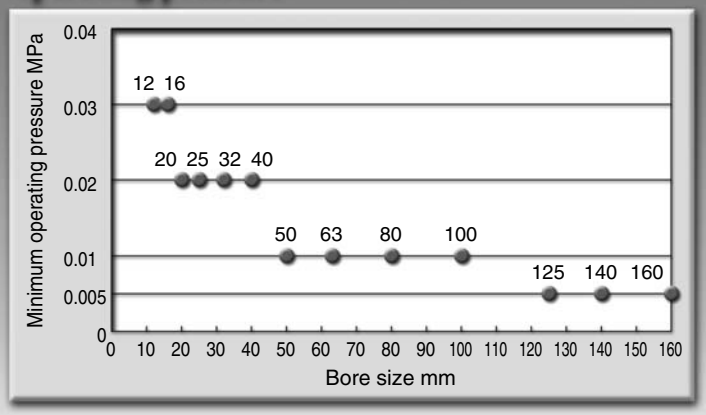
Bore size (mm)	❶ Smooth cylinder						❷ Low speed cylinder (New model)				
	Compact		Round		Tie-rod		Compact		Round	Small	Free mount
ø10										●	●
ø12	●						●				
ø16	●						●			●	●
ø20	●		●	●			●		●		●
ø25	●		●	●			●		●		●
ø32		●	●	●				●	●		●
ø40		●	●	●	●			●	●		
ø50		●		●	●			●			
ø63		●		●	●			●			
ø80		●		●	●			●			
ø100		●		●	●			●			
ø125						●					
ø140						●					
ø160						●					
Model	CQSY	CQ2Y	CM2Y	CG1Y	CA2Y	CS2Y	CQSX	CQ2X	CM2X	CJ2X	CUX
	P. 1048	P. 1056	P. 1069	P. 1083	P. 1094	P. 1108-1	P. 1129	P. 1136	P. 1148	P. 1114	P. 1124

Smooth Cylinder

Series CQSY/CQ2Y/CM2Y/CG1Y/CA2Y/CS2Y

ø12 to ø25 ø32 to ø100 ø20 to ø40 ø20 to ø100 ø40 to ø100 ø125 to ø160

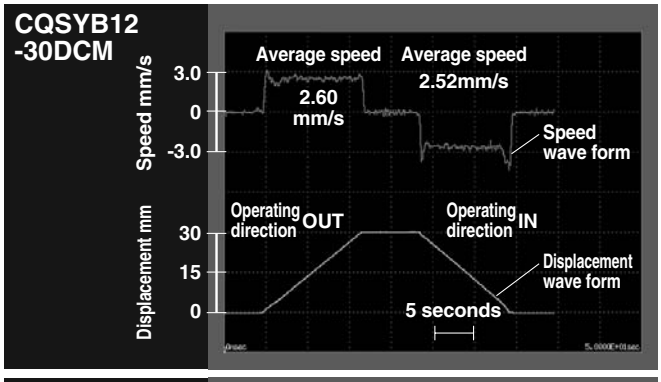
Minimum operating pressure 0.005 to 0.03 MPa

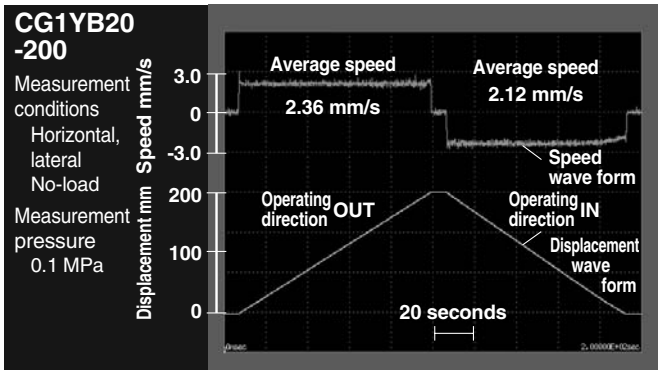


(Measurement based on JIS B8377)

Stable operation possible even at a low speed of 5 mm/s (Measurement based on JIS B 8377)

Smooth operation with less sticking and slipping

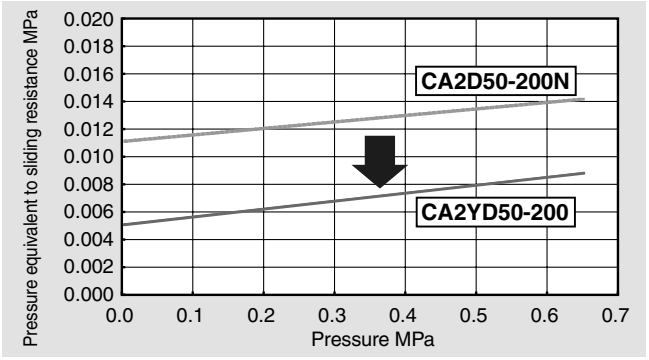




Sliding resistance

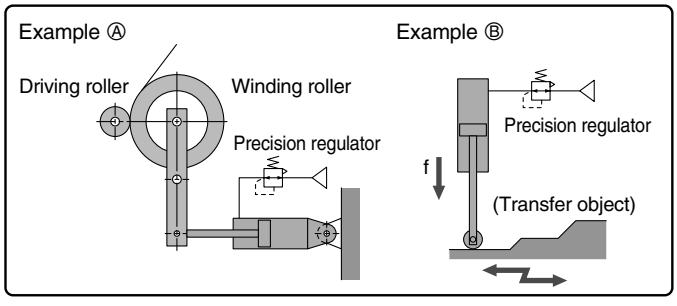
Bi-directional low-friction operation possible.

Pressure can be controlled regardless of its direction.



Application Example

Smooth cylinder combined with precision regulator (e.g. Series IR)



Smooth Cylinder

Series CQSY

ø12, ø16, ø20, ø25

How to Order

CQSY **B** **20** – **30** **D** **C**

With auto switch **CDQSY** **B** **20** – **30** **D** **C** – **M9BW** ☐

With auto switch
(Built-in magnet)

Mounting style

B	Through-hole/Both ends tapped (Standard)
L	Foot style
F	Rod side flange style
G	Head side flange style
D	Double clevis style

∗ Mounting brackets are not mounted and are supplied loose at the time of shipment.

Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 1049.

Action

D	Double acting

Bumper/Rod end thread

C	Rubber bumper & Rod end female thread
CM	Rubber bumper & Rod end male thread

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDQSYL25-30D

Applicable Auto Switch/Refer to pages 1719 to 1827 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: Perpendicular	Auto switch model: In-line	Lead wire (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Magnetic field resistant (2-color indication)			2-wire (Non-polar)		—		—	**P3DW****	●	—	●	●	○		
Reed switch	—	Grommet	Yes	3-wire (Equiv. NPN)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**A93V**	**A93**	●	—	●	—	—	—	Relay, PLC
			No				100V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

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

∗ ○: Manufactured upon receipt of order.
∗∗ D-P3DW☐ is compatible with ø25.
It is mounted away from the port side to avoid interference with fittings.

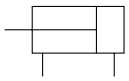
∗ In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1055.
∗ Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector. For D-P3DW☐, refer to pages 1773-1 and 1773-2.
∗ Auto switches are not mounted and are supplied loose at the time of shipment.
Note) Please also confirm whether the selected auto switch can be mounted at the desired position. Auto switches of models A9☐V, M9☐V and M9☐WV may not be mounted on the side with ports due to the cylinder stroke or the size of the fittings.

Specifications

Bore size (mm)	12	16	20	25
Type	Pneumatic (Non-lube)			
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	1.05 MPa			
Maximum operating pressure	0.7 MPa			
Ambient and fluid temperature	Without auto switch –10 to 70°C (with no freezing)			
	With auto switch –10 to 60°C (with no freezing)			
Cushion	Rubber bumper			
Rod end thread	Female thread			
Stroke length tolerance	$^{+1.0}_{0}$ mm Note)			
Mounting	Through-hole/Both ends tapped common			
Operating piston speed	5 to 500 mm/s			
Allowable leakage rate	0.5 ℓ/min (ANR) or less			

Note) Stroke length tolerance does not include the amount of bumper change.

JIS Symbol



Minimum Operating Pressure

Unit: MPa

Bore size (mm)	12	16	20	25
Minimum operating pressure	0.03		0.02	

Standard Stroke

Bore size (mm)	Standard stroke (mm)
12, 16	5, 10, 15, 20, 25, 30
20, 25	5, 10, 15, 20, 25, 30, 35, 40, 45, 50

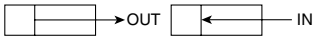
Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents	
12	CQSY12-PS	Piston seal	1 pc.
16	CQSY16-PS	Rod seal	1 pc.
20	CQSY20-PS	Tube gasket	1 pc.
25	CQSY25-PS	Grease pack (10 g)	1 pc.

When only grease for maintenance is necessary, please order by the following part numbers.

Grease pack part no.: **GR-L-005** (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Theoretical Output



Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm^2)	Operating pressure (MPa)		
				0.3	0.5	0.7
12	6	IN	84.8	25	42	59
		OUT	113	34	57	79
16	8	IN	151	45	75	106
		OUT	201	60	101	141
20	10	IN	236	71	118	165
		OUT	314	94	157	220
25	12	IN	378	113	189	264
		OUT	491	147	245	344

Intermediate Stroke

Method		Installation of spacer on standard stroke body.	
Model no.		Refer to page 1048 for standard model no.	
Standard stroke	Method	Intermediate strokes at 1 mm intervals are available by using spacers with standard stroke cylinders.	
	Stroke range	Bore size (mm)	Stroke range (mm)
		12, 16	1 to 29
		20, 25	1 to 49
Example		Part no.: CQSYB25-47DC CQSYB25-50DC with 3 mm width spacer inside. B dimension is 77.5 mm. Calculation:ø25, B dimension 27.5 mm (without auto switch) 27.5 (B dimension) + 50 (st) = 77.5 (mm)	

Mass/Without Auto Switch

(g)

Bore size (mm)	Cylinder stroke (mm)									
	5	10	15	20	25	30	35	40	45	50
12	37	43	50	57	63	70	—	—	—	—
16	49	57	66	74	83	92	—	—	—	—
20	75	88	101	114	127	140	153	165	178	191
25	109	125	140	156	172	188	204	220	236	252

Mass/With Auto Switch (Built-in magnet)

(g)

Bore size (mm)	Cylinder stroke (mm)									
	5	10	15	20	25	30	35	40	45	50
12	45	51	58	65	71	78	—	—	—	—
16	59	67	76	85	94	103	—	—	—	—
20	106	119	132	145	157	170	183	195	208	221
25	151	167	183	199	215	231	246	262	278	294

Additional Mass

(g)

Bore size (mm)		**12**	**16**	**20**	**25**
Rod end male thread	Male thread	1.5	3	6	12
	Nut	1	2	4	8
Foot style (Including mounting bolt)		55	65	159	181
Rod side flange style (Including mounting bolt)		58	70	143	180
Head side flange style (Including mounting bolt)		56	66	137	171
Double clevis style (Including pin, snap ring, bolt)		34	40	92	127

For standard strokes

Calculation: (Example) **CQSYD20-20DCM**

- Basic mass: CQSYB20-20DC ····· 114 g
- Additional mass: Rod end male thread ····· 10 g
  : Double clevis style ····· 92 g

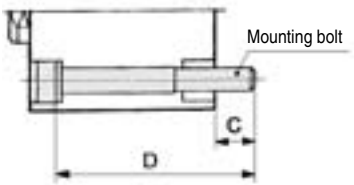
216 g

Mounting Bolt for CQSYB without Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CQSYB is available as an option.

Ordering: Add the word "Bolt" in front of the bolts to be used.

Example) Bolt M3 x 30 L 4 pcs.



Note) When mounting a cylinder with through-hole, be sure to use the attached plain washer.

Cylinder model	C	D	Mounting bolt size
CQSYB12-5DC	6.5	30	M3 x 30L
-10DC		35	x 35L
-15DC		40	x 40L
-20DC		45	x 45L
-25DC		50	x 50L
-30DC		55	x 55L
CQSYB16-5DC	6.5	30	M3 x 30L
-10DC		35	x 35L
-15DC		40	x 40L
-20DC		45	x 45L
-25DC		50	x 50L
-30DC		55	x 55L
CQSYB20-5DC	6.5	30	M5 x 30L
-10DC		35	x 35L
-15DC		40	x 40L
-20DC		45	x 45L

Cylinder model	C	D	Mounting bolt size
CQSYB20-25DC	6.5	50	M5 x 50L
-30DC		55	x 55L
-35DC		60	x 60L
-40DC		65	x 65L
-45DC		70	x 70L
-50DC		75	x 75L
CQSYB25-5DC	8.5	35	M5 x 35L
-10DC		40	x 40L
-15DC		45	x 45L
-20DC		50	x 50L
-25DC		55	x 55L
-30DC		60	x 60L
-35DC		65	x 65L
-40DC		70	x 70L
-45DC		75	x 75L
-50DC		80	x 80L

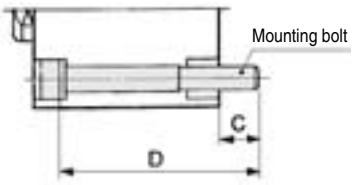
Material: Chromium molybdenum steel
Surface material: Nickel plated

Mounting Bolt for CDQSYB with Auto Switch

Mounting method: Mounting bolt for through-hole mounting style of CDQSYB is available as an option.

Ordering: Add the word "Bolt" in front of the bolts to be used.

Example) Bolt M3 x 35 L 4 pcs.



Note) When mounting a cylinder with through-hole, be sure to use the attached plain washer.

Cylinder model	C	D	Mounting bolt size
CDQSYB12-5DC	6.5	35	M3 x 35L
-10DC		40	x 40L
-15DC		45	x 45L
-20DC		50	x 50L
-25DC		55	x 55L
-30DC		60	x 60L
CDQSYB16-5DC	6.5	35	M3 x 35L
-10DC		40	x 40L
-15DC		45	x 45L
-20DC		50	x 50L
-25DC		55	x 55L
-30DC		60	x 60L
CDQSYB20-5DC	6.5	40	M5 x 40L
-10DC		45	x 45L
-15DC		50	x 50L
-20DC		55	x 55L

Cylinder model	C	D	Mounting bolt size
CDQSYB20-25DC	6.5	60	M5 x 60L
-30DC		65	x 65L
-35DC		70	x 70L
-40DC		75	x 75L
-45DC		80	x 80L
-50DC		85	x 85L
CDQSYB25-5DC	8.5	45	M5 x 45L
-10DC		50	x 50L
-15DC		55	x 55L
-20DC		60	x 60L
-25DC		65	x 65L
-30DC		70	x 70L
-35DC		75	x 75L
-40DC		80	x 80L
-45DC		85	x 85L
-50DC		90	x 90L

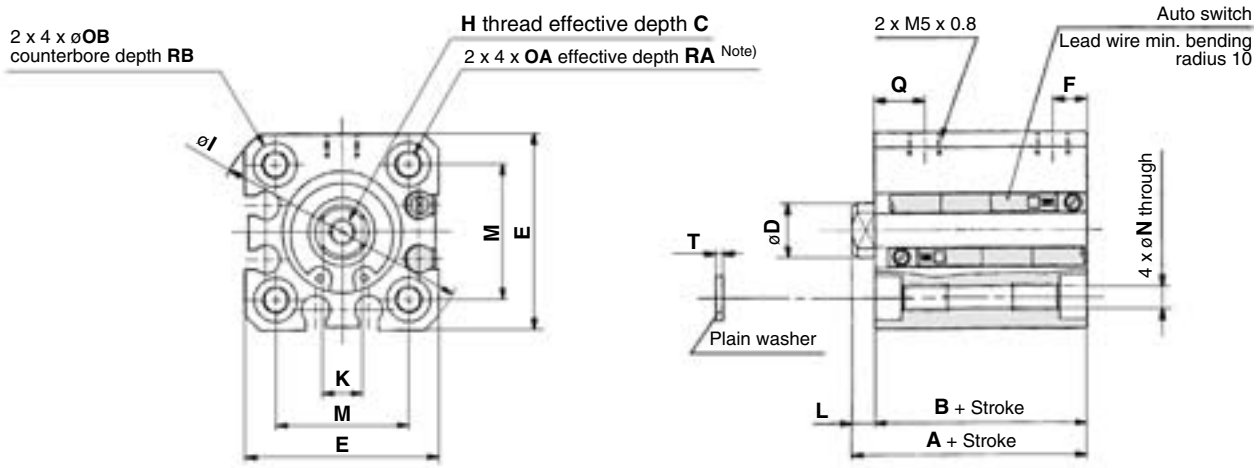
Material: Chromium molybdenum steel
Surface material: Nickel plated

Dimensions/ø12 to ø25

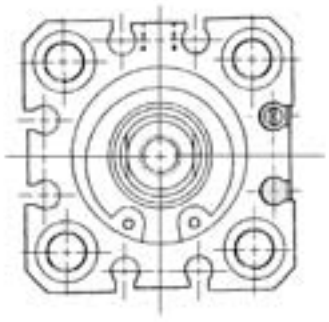
Basic style (Through-hole/Both ends tapped): CQSYB/CDQSYB

ø12

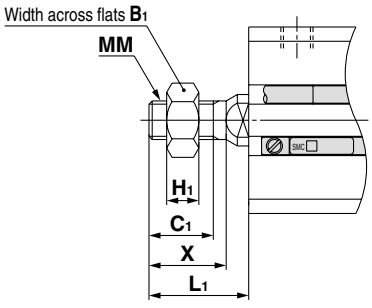
ø16



ø20, ø25



Rod end male thread



Rod End Male Thread

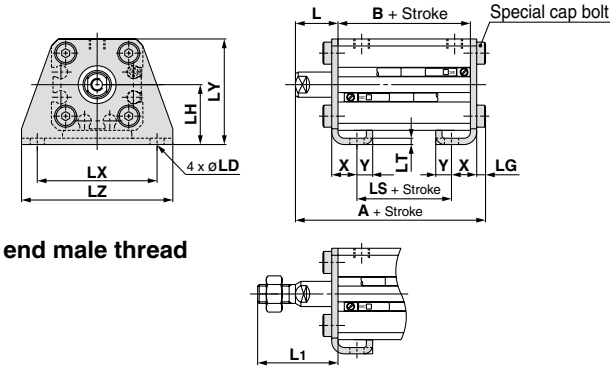
Bore size (mm)	B_1	C_1	H_1	L_1	MM	X
12	8	9	4	14	M5 x 0.8	10.5
16	10	10	5	15.5	M6 x 1.0	12
20	13	12	5	18.5	M8 x 1.25	14
25	17	15	6	22.5	M10 x 1.25	17.5

Basic Style

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		C	D	E	F	H	I	K	L	M	N	OA	OB	Q	RA	RB	T
		A	B	A	B																
12	5 to 30	25.5	22	30.5	27	6	6	25	5	M3 x 0.5	32	5	3.5	15.5	3.5	M4 x 0.7	6.5	7.5	7	4	0.5
16	5 to 30	25.5	22	30.5	27	8	8	29	5	M4 x 0.7	38	6	3.5	20	3.5	M4 x 0.7	6.5	7.5	7	4	0.5
20	5 to 50	29	24.5	39	34.5	7	10	36	5.5	M5 x 0.8	47	8	4.5	25.5	5.4	M6 x 1.0	9	9	10	7	1
25	5 to 50	32.5	27.5	42.5	37.5	12	12	40	5.5	M6 x 1.0	52	10	5	28	5.4	M6 x 1.0	9	11	10	7	1

Note) Threaded through hole is used for the standard of ø20 with 5 to 10 mm strokes and ø25 with a 5 mm stroke.

Foot style: CQSYL/CDQSYL



Rod end male thread

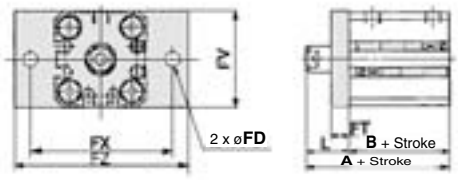
Foot Style

Bore size (mm)	Stroke range (mm)	Without auto switch			With auto switch		
		A	B	LS	A	B	LS
12	5 to 30	40.3	22	10	45.3	27	15
16	5 to 30	40.3	22	10	45.3	27	15
20	5 to 50	46.2	24.5	12.5	56.2	34.5	22.5
25	5 to 50	49.7	27.5	12.5	59.7	37.5	22.5

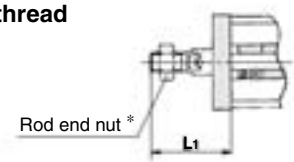
Bore size (mm)	L	L_1	LD	LG	LH	LT	LX	LY	LZ	X	Y
12	13.5	24	4.5	2.8	17	2	34	29.5	44	8	4.5
16	13.5	25.5	4.5	2.8	19	2	38	33.5	48	8	5
20	14.5	28.5	6.6	4	24	3.2	48	42	62	9.2	5.8
25	15	32.5	6.6	4	26	3.2	52	46	66	10.7	5.8

Foot bracket material: Carbon steel
Surface material: Nickel plated

Rod side flange style: CQSYF/CDQSYF



Rod end male thread



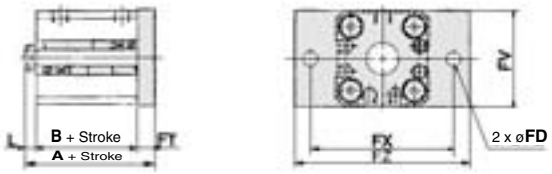
Rod Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch	
		A	B	A	B
12	5 to 30	35.5	22	40.5	27
16	5 to 30	35.5	22	40.5	27
20	5 to 50	39	24.5	49	34.5
25	5 to 50	42.5	27.5	52.5	37.5

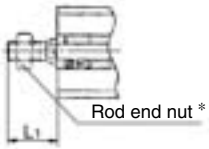
Bore size (mm)	FD	FT	FV	FX	FZ	L	L_1
12	4.5	5.5	25	45	55	13.5	24
16	4.5	5.5	30	45	55	13.5	25.5
20	6.6	8	39	48	60	14.5	28.5
25	6.6	8	42	52	64	15	32.5

Flange bracket material: Carbon steel
Surface material: Nickel plated

Head side flange style: CQSYG/CDQSYG



Rod end male thread



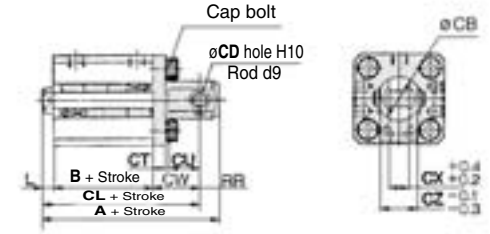
Head Side Flange Style

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch	
		A	B	A	B
12	5 to 30	31	22	36	27
16	5 to 30	31	22	36	27
20	5 to 50	37	24.5	47	34.5
25	5 to 50	40.5	27.5	50.5	37.5

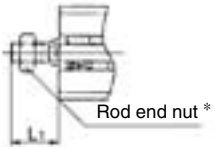
Bore size (mm)	FD	FT	FV	FX	FZ	L	L_1
12	4.5	5.5	25	45	55	3.5	14
16	4.5	5.5	30	45	55	3.5	15.5
20	6.6	8	39	48	60	4.5	18.5
25	6.6	8	42	52	64	5	22.5

Flange bracket material: Carbon steel
Surface material: Nickel plated

Double clevis style: CQSYD/CDQSYD



Rod end male thread



Double Clevis Style

Bore size (mm)	Stroke range (mm)	Without auto switch			With auto switch		
		A	B	CL	A	B	CL
12	5 to 30	45.5	22	39.5	50.5	27	44.5
16	5 to 30	46.5	22	40.5	51.5	27	45.5
20	5 to 50	56	24.5	47	66	34.5	57
25	5 to 50	62.5	27.5	52.5	72.5	37.5	62.5

Bore size (mm)	CB	CD	CT	CU	CW	CX	CZ	L	L_1	RR
12	12	5	4	7	14	5	10	3.5	14	6
16	14	5	4	10	15	6.5	12	3.5	15.5	6
20	20	8	5	12	18	8	16	4.5	18.5	9
25	24	10	5	14	20	10	20	5	22.5	10

Double clevis bracket material: Carbon steel
Surface material: Nickel plated

* For details about the rod end nut and accessory brackets, refer to page 1142.

Minimum Auto Switch Mounting Stroke

(mm)

Number of auto switches	D-M9□V	D-A9□V	D-A9□ D-M9□WV	D-M9□ D-M9□W	D-P3DW□ Note 2)
1 pc.	5	5	10 Note 1)	15 Note 1)	15
2 pcs.	5	10	10	15 Note 1)	15

Note 1) Consult with SMC for shorter stroke length other than indicated in the table.
Note 2) ø25 is only applicable for D-P3DW□.

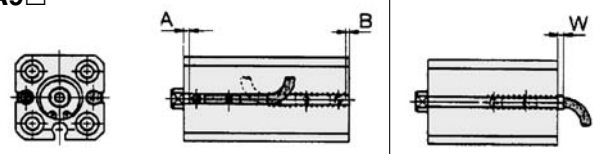
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

ø12

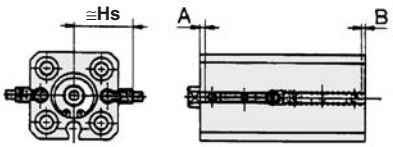
Mounting

a) b)

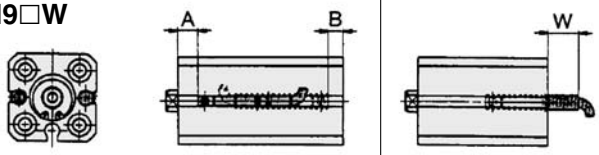
D-A9□



D-A9□V
D-M9□V
D-M9□WV



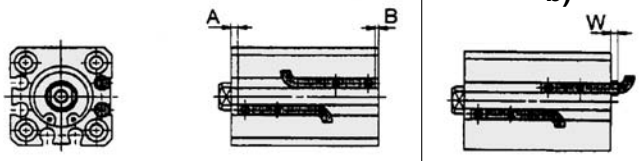
D-M9□
D-M9□W

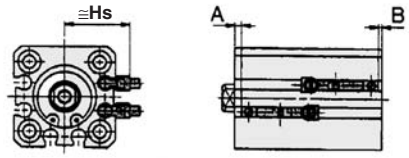


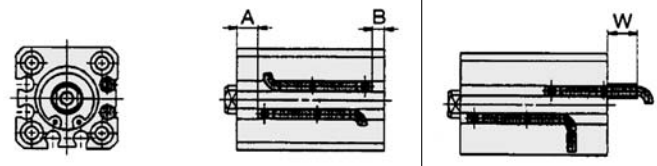
ø16 to ø25

Mounting

a) b)

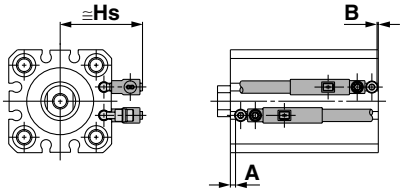






D-P3DW□

ø25



Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size	D-A9□			D-A9□V			D-M9□/M9□W			D-M9□V/M9□WV			D-P3DW□		
	A	B	W	A	B	Hs	A	B	W	A	B	Hs	A	B	Hs
12	1.5	0	1.5 [4] [5]	1.5	0	17	5.5	3.5	5.5	5.5	3.5	19.5	—	—	—
16	2	0	2 [4.5]	2	0	19	6	4	6	6	4	21.5	—	—	—
20	6	3.5	–1.5 [1]	6	3.5	22.5	10	7.5	2.5	10	7.5	25	—	—	—
25	7	5.5	–3.5 [–1]	7	5.5	24.5	11	9.5	0.5	11	9.5	27	1.5	0	32

Note 1) [ ]: Denotes the values of D-A93.
Note 2) Adjust the auto switch after confirming the operating conditions in the actual setting.
Note 3) The product is shipped out of the factory in installation state "a)". To change the electrical entry direction of the switch on the head, refer to installation state "b)".
Note 4) Negative figures for W indicate an auto switch is mounted inward from the edge of the cylinder body.

Operating Range

(mm)

Auto switch model	Bore size (mm)			
	12	**16**	**20**	**25**
D-A9□/A9□V	6	7.5	10	10
D-M9□/M9□V **D-M9□W/M9□WV**	3	3.5	5.5	4.5
D-P3DW□	—	—	—	5.5

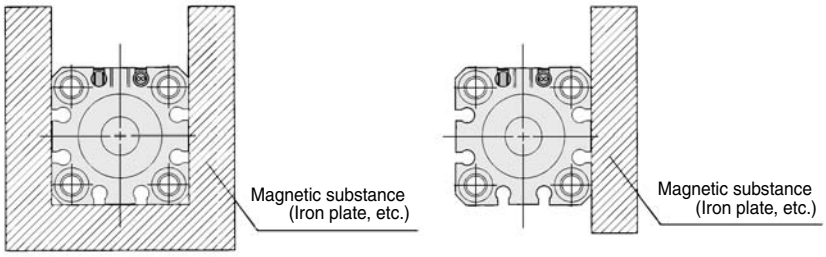
∗ Since this is a guideline including hysteresis, not meant to be guaranteed.
(assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.

Besides the models listed in How to Order, the following auto switches are applicable.
∗ For solid state auto switches, auto switches with a pre-wired connector are also available. Refer to pages 1784 and 1785 for details.
∗ Normally closed (NC = b contact), solid state auto switch (D-F9G/F9H type) are also available. For details, refer to page 1746.

⚠ Precautions

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

• If the cylinder is used in an application in which a magnetic material is placed in close contact around the cylinder as shown in the graph on the right (including cases in which even one of the sides is in close contact) the operation of auto switches could become unstable. Therefore, please check with SMC for this type of application.



Smooth Cylinder

Series CQ2Y

ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CQ2Y **B** **32** **□** – **30** **D** **C** **□**

With auto switch **CDQ2Y** **B** **32** **□** – **30** **D** **C** **□** – **M9BW** **□**

With auto switch
(Built-in magnet)

Mounting style

B	Through-hole (Standard)
A	Both ends tapped
L	Foot style
F	Rod side flange style
G	Head side flange style
D	Double clevis style

∗ Mounting brackets are not mounted and are supplied loose at the time of shipment.

Bore size

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

Thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on next page.

Action

D	Double acting

Cushion

C	Rubber bumper

Body option

Nil	Standard (Rod end female thread)
M	Rod end male thread

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDQ2YL40-50D

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

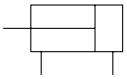
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model Perpendicular	Auto switch model In-line	Lead wire (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9PV**	**M9P**	●	●	●	○	—	○		
				2-wire	12 V		**M9BV**	**M9B**	●	●	●	○	—	○	—	
		Connector					**J79C**	—	●	—	●	●	●	—		
	Diagnostic indication (2-color)	Grommet		3-wire (NPN)	5 V, 12 V	—	**M9NWV**	**M9NW**	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			**M9PWV**	**M9PW**	●	●	●	○	—	○		
				2-wire	12 V		**M9BWV**	**M9BW**	●	●	●	○	—	○	—	
	With diagnostic output (2-color)			4-wire	5 V, 12 V		—	**F79F**	●	—	●	○	—	○	IC circuit	
	Magnetic field resistant (2-color)			2-wire (Non-polar)	—		—	**P3DW**	●	—	●	●	—	○	—	
							—	**P4DW**	—	—	●	●	—	○		
Reed switch	—	Grommet	Yes	3-wire (Equiv. NPN)	—	5 V	—	**A96V**	●	—	●	—	—	—	IC circuit	—
				2-wire		—	200 V	**A72**	●	—	●	—	—	—	—	Relay, PLC
					24 V	12 V	100 V	**A93V**	●	—	●	—	—	—		
			No			5 V, 12 V	100 V or less	**A90V**	●	—	●	—	—	—	IC circuit	
		Connector	Yes			12 V	—	**A73C**	●	—	●	●	●	—	—	
			No			5 V, 12 V	24 V or less	**A80C**	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color)	Grommet	Yes			—	—	**A79W**	●	—	●	—	—	—	—	

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) J79CN

∗ ○: Manufactured upon receipt of order.
∗ D-P4DWL is available for ø40 to ø100.
∗ Only D-P4DW is assembled at the time of shipment.

∗ In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1068.
∗ Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector. For D-P3DW□, refer to pages 1773-1 and 1773-2.
∗ When D-A9□(V)/M9□(V)/M9□W(V) types with ø32 to ø50 are mounted on a side other than the port side, order auto switch mounting brackets separately. Refer to page 1067 for details.
∗ Auto switches are not mounted and are supplied loose at the time of shipment.

JIS Symbol



Specifications

Bore size (mm)	32	40	50	63	80	100
Type	Pneumatic (Non-lube)					
Fluid	Air					
Proof pressure	1.05 MPa					
Maximum operating pressure	0.7 MPa					
Ambient and fluid temperature	Without auto switch –10 to 70°C (with no freezing)					
	With auto switch –10 to 60°C (with no freezing)					
Cushion	Rubber bumper (Standard)					
Rod end thread	Female thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm Note)					
Mounting	Through-hole					
Operating piston speed range	5 to 500 mm/s					
Allowable leakage rate	0.5 ℓ/min (ANR) or less					

Note) Stroke length tolerance does not include the amount of bumper change.

Minimum Operating Pressure

Unit: MPa

Bore size (mm)	32	40	50	63	80	100
Minimum operating pressure	0.02		0.01			

Standard Stroke

Bore size (mm)	Standard stroke (mm)
32, 40	5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100
50, 63, 80, 100	10, 15, 20, 25, 30, 35, 40, 45, 50, 75, 100

Theoretical Output

Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
32	IN	181	302	422
	OUT	241	402	563
40	IN	317	528	739
	OUT	377	628	880
50	IN	495	825	1155
	OUT	589	982	1374
63	IN	841	1402	1962
	OUT	935	1559	2182
80	IN	1361	2268	3175
	OUT	1508	2513	3519
100	IN	2144	3574	5003
	OUT	2356	3927	5498

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents	
32	CQ2Y32-PS		
40	CQ2Y40-PS	Piston seal	1 pc.
50	CQ2Y50-PS	Rod seal	1 pc.
63	CQ2Y63-PS	Gasket	1 pc.
80	CQ2Y80-PS	Grease pack (10 g)	1 pc.
100	CQ2Y100-PS		

When only grease for maintenance is necessary, please order by the following part numbers.

Grease pack part no.: **GR-L-005** (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Intermediate Stroke

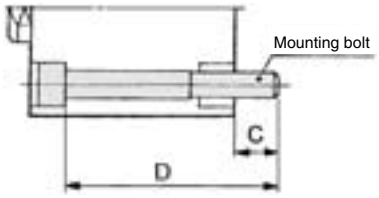
Method		Installation of spacer on standard stroke body.	
Model no.		Refer to page 1056 for standard model no.	
Standard stroke	Method	Intermediate strokes at 1 mm intervals are available by using spacers with standard stroke cylinders.	
	Stroke range	Bore size (mm)	Stroke range (mm)
		32 to 100	1 to 99
Example		Part no.: CQ2YB50-57DC CQ2YB50-75DC with 18 mm width spacer inside. B dimension is 125.5 mm. Calculation:ø50, B dimension 50.5 mm (without switch) 50.5 (B dimension) + 75 (st) = 125.5 (mm)	

Mounting Bolt

Mounting method: Mounting bolt for through-hole mounting style of CQ2YB is available as an option.

Ordering: Add the word “Bolt” in front of the bolts to be used.

Example) Bolt M3 x 25L 2 pcs.



Mounting Bolt for CQ2YB without Auto Switch

Cylinder model	C	D	Mounting bolt size
CQ2YB32- 5DC	9	40	M5 x 40L
- 10DC		45	x 45L
- 15DC		50	x 50L
- 20DC		55	x 55L
- 25DC		60	x 60L
- 30DC		65	x 65L
- 35DC		70	x 70L
- 40DC		75	x 75L
- 45DC		80	x 80L
- 50DC		85	x 85L
- 75DC		120	x 120L
-100DC		145	x 145L
CQ2YB40- 5DC	7.5	45	M5x 45L
- 10DC		50	x 50L
- 15DC		55	x 55L
- 20DC		60	x 60L
- 25DC		65	x 65L
- 30DC		70	x 70L
- 35DC		75	x 75L
- 40DC		80	x 80L
- 45DC		85	x 85L
- 50DC		90	x 90L
- 75DC		125	x 125L
-100DC		150	x 150L
CQ2YB50- 10DC	12.5	55	M6 x 55L
- 15DC		60	x 60L
- 20DC		65	x 65L
- 25DC		70	x 70L
- 30DC		75	x 75L
- 35DC		80	x 80L
- 40DC		85	x 85L
- 45DC		90	x 90L
- 50DC		95	x 95L
- 75DC		130	x 130L
-100DC		155	x 155L

Cylinder model	C	D	Mounting bolt size
CQ2YB63- 10DC	14.5	60	M8 x 60L
- 15DC		65	x 65L
- 20DC		70	x 70L
- 25DC		75	x 75L
- 30DC		80	x 80L
- 35DC		85	x 85L
- 40DC		90	x 90L
- 45DC		95	x 95L
- 50DC		100	x 100L
- 75DC		135	x 135L
-100DC		160	x 160L
CQ2YB80- 10DC	15	65	M10 x 65L
- 15DC		70	x 70L
- 20DC		75	x 75L
- 25DC		80	x 80L
- 30DC		85	x 85L
- 35DC		90	x 90L
- 40DC		95	x 95L
- 45DC		100	x 100L
- 50DC		105	x 105L
- 75DC		140	x 140L
-100DC		165	x 165L
CQ2YB100- 10DC	15.5	75	M10 x 75L
- 15DC		80	x 80L
- 20DC		85	x 85L
- 25DC		90	x 90L
- 30DC		95	x 95L
- 35DC		100	x100L
- 40DC		105	x 105L
- 45DC		110	x 110L
- 50DC		115	x 115L
- 75DC		150	x 150L
-100DC		175	x 175L

Material: Chromium molybdenum steel
Surface material: Nickel plated

Mounting Bolt for CDQ2YB with Auto Switch (Built-in Magnet)

Cylinder model	C	D	Mounting bolt size
CDQ2YB32- 5	9	50	M5 x 50L
- 10		55	x 55L
- 15		60	x 60L
- 20		65	x 65L
- 25		70	x 70L
- 30		75	x 75L
- 35		80	x 80L
- 40		85	x 85L
- 45		90	x 90L
- 50		95	x 95L
- 75		120	x 120L
-100		145	x 145L
CDQ2YB40- 5	7.5	55	M5 x 55L
- 10		60	x 60L
- 15		65	x 65L
- 20		70	x 70L
- 25		75	x 75L
- 30		80	x 80L
- 35		85	x 85L
- 40		90	x 90L
- 45		95	x 95L
- 50		100	x 100L
- 75		125	x 125L
-100		150	x 150L
CDQ2YB50- 10	12.5	65	M6 x 65L
- 15		70	x 70L
- 20		75	x 75L
- 25		80	x 80L
- 30		85	x 85L
- 35		90	x 90L
- 40		95	x 95L
- 45		100	x 100L
- 50		105	x 105L
- 75		130	x 130L
-100		155	x 155L

Cylinder model	C	D	Mounting bolt size
CDQ2YB63- 10	14.5	70	M8 x 70L
- 15		75	x 75L
- 20		80	x 80L
- 25		85	x 85L
- 30		90	x 90L
- 35		95	x 95L
- 40		100	x 100L
- 45		105	x 105L
- 50		110	x 110L
- 75		135	x 135L
-100		160	x 160L
CDQ2YB80- 10	15	75	M10 x 75L
- 15		80	x 80L
- 20		85	x 85L
- 25		90	x 90L
- 30		95	x 95L
- 35		100	x 100L
- 40		105	x 105L
- 45		110	x 110L
- 50		115	x 115L
- 75		140	x 140L
-100		165	x 165L
CDQ2YB100- 10	15.5	85	M10 x 85L
- 15		90	x 90L
- 20		95	x 95L
- 25		100	x 100L
- 30		105	x 105L
- 35		110	x 110L
- 40		115	x 115L
- 45		120	x 120L
- 50		125	x 125L
- 75		150	x 150L
-100		175	x 175L

Material: Chromium molybdenum steel
Surface material: Nickel plated

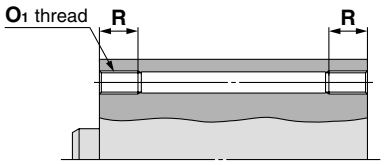
ø32 to ø50

(Types with auto switch and without auto switch only differ in the A and B dimensions. Please refer to the table below.)

Through-hole: CQ2YB/CDQ2YB

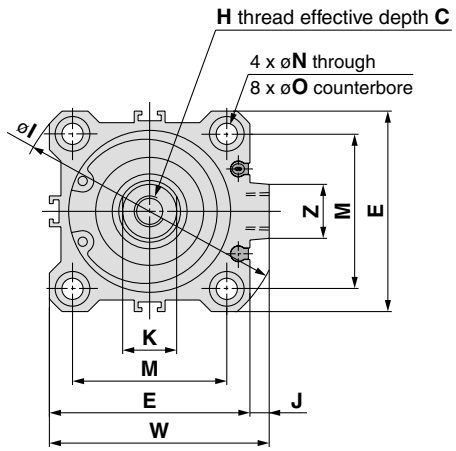
Both ends tapped style: CQ2YA/CDQ2YA

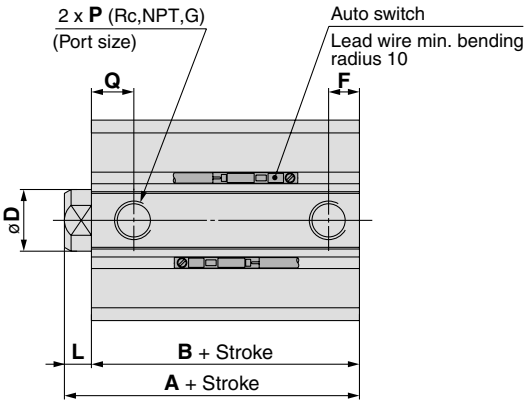
CDQ2YA



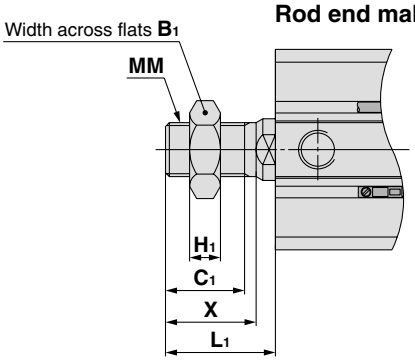
Both Ends Tapped (mm)

Bore size (mm)	O1	R
32	M6 x 1.0	10
40	M6 x 1.0	10
50	M8 x 1.25	14





Rod end male thread



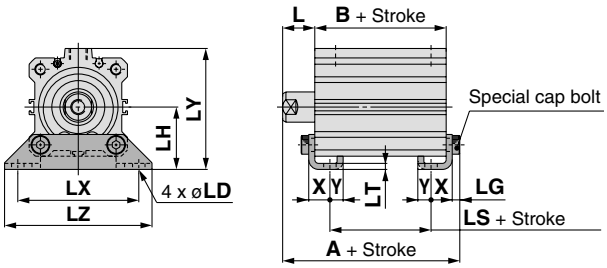
Rod End Male Thread (mm)

Bore size (mm)	B1	C1	H1	L1	MM	X
32	22	20.5	8	28.5	M14 x 1.5	23.5
40	22	20.5	8	28.5	M14 x 1.5	23.5
50	27	26	11	33.5	M18 x 1.5	28.5

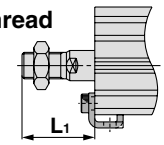
(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		C	D	E	F	H	I	J	K	L	M	N	O	P	Q	W	Z
		A	B	A	B																
32	5 to 50	40	33	50	43	13	16	45	7.5	M8 x 1.25	60	4.5	14	7	34	5.5	9 depth 7	1/8	10.5	49.5	14
	75, 100	50	43																		
40	5 to 50	46.5	39.5	56.5	49.5	13	16	52	8	M8 x 1.25	69	5	14	7	40	5.5	9 depth 7	1/8	11	57	14
	75, 100	56.5	49.5																		
50	10 to 50	48.5	40.5	58.5	50.5	15	20	64	10.5	M10 x 1.5	86	7	17	8	50	6.6	11 depth 8	1/4	10.5	71	19
	75, 100	58.5	50.5																		

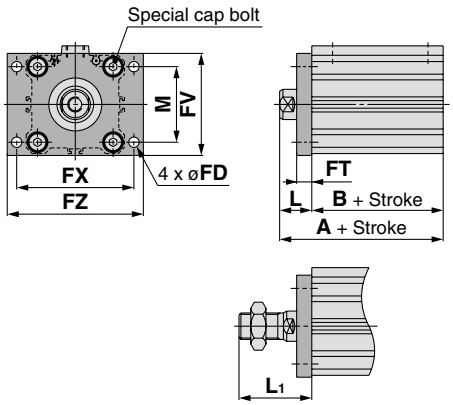
Foot style: CQ2YL/CDQ2YL



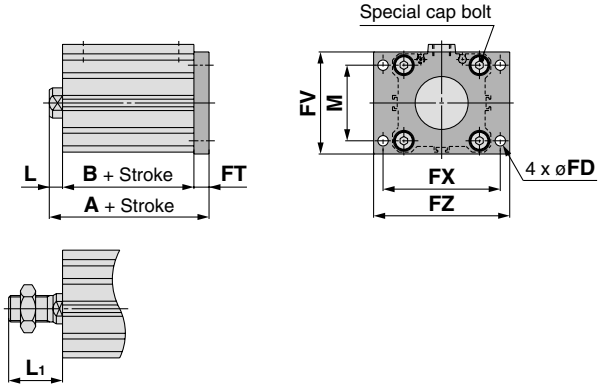
Rod end male thread



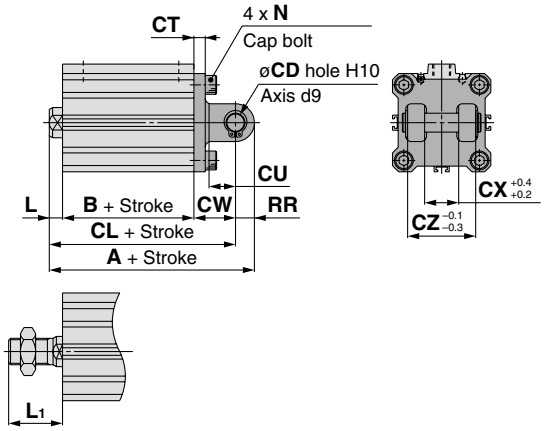
Rod side flange style: CQ2YF/CDQ2YF



Head side flange style: CQ2YG/CDQ2YG



Double clevis style: CQ2YD/CDQ2YD



Foot Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	LS	With auto switch A	B	LS	L	L1	LD
32	5 to 50	57.2	33	17	67.2	43	27	17	38.5	6.6
	75, 100	67.2	43	27						
40	5 to 50	63.7	39.5	23.5	73.7	49.5	33.5	17	38.5	6.6
	75, 100	73.7	49.5	33.5						
50	10 to 50	66.7	40.5	17.5	76.7	50.5	27.5	18	43.5	9
	75, 100	76.7	50.5	27.5						

Bore size (mm)	Stroke range (mm)	LG	LH	LT	LX	LY	LZ	X	Y
32	5 to 50	4	30	3.2	57	57	71	11.2	5.8
	75, 100								
40	5 to 50	4	33	3.2	64	64	78	11.2	7
	75, 100								
50	10 to 50	5	39	3.2	79	78	95	14.7	8
	75, 100								

Foot bracket material: Carbon steel
Surface material: Nickel plated

Rod Side Flange Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ
32	5 to 50	50	33	60	43	5.5	8	48	56	65
	75, 100	60	43							
40	5 to 50	56.5	39.5	66.5	49.5	5.5	8	54	62	72
	75, 100	66.5	49.5							
50	10 to 50	58.5	40.5	68.5	50.5	6.6	9	67	76	89
	75, 100	68.5	50.5							

Bore size (mm)	Stroke range (mm)	L	L1	M
32	5 to 50	17	38.5	34
	75, 100			
40	5 to 50	17	38.5	40
	75, 100			
50	10 to 50	18	43.5	50
	75, 100			

Flange bracket material: Carbon steel
Surface material: Nickel plated

Head Side Flange Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	With auto switch A	L	L1
32	5 to 50	48	58	7	28.5
	75, 100	58			
40	5 to 50	54.5	64.5	7	28.5
	75, 100	64.5			
50	10 to 50	57.5	67.5	8	33.5
	75, 100	67.5			

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Flange bracket material: Carbon steel
Surface material: Nickel plated

Double Clevis Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	CL	With auto switch A	B	CL	CD	CT	CU
32	5 to 50	70	33	60	80	43	70	10	5	14
	75, 100	80	43	70						
40	5 to 50	78.5	39.5	68.5	88.5	49.5	78.5	10	6	14
	75, 100	88.5	49.5	78.5						
50	10 to 50	90.5	40.5	76.5	100.5	50.5	86.5	14	7	20
	75, 100	100.5	50.5	86.5						

Bore size (mm)	Stroke range (mm)	CW	CX	CZ	L	L1	N	RR
32	5 to 50	20	18	36	7	28.5	M6 x 1.0	10
	75, 100							
40	5 to 50	22	18	36	7	28.5	M6 x 1.0	10
	75, 100							
50	10 to 50	28	22	44	8	33.5	M8 x 1.25	14
	75, 100							

Double clevis bracket material: Cast iron
Surface treatment: Painted

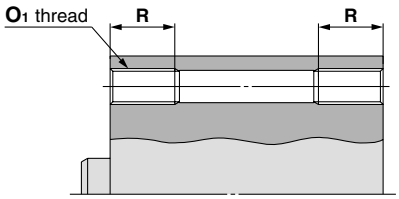
∗ For details about the rod end nut and accessory brackets, refer to page 1142.
∗ Double clevis pins and retaining rings are included.

ø63 to ø100

(Types with auto switch and without auto switch only differ in the A and B dimensions. Please refer to the table below.)

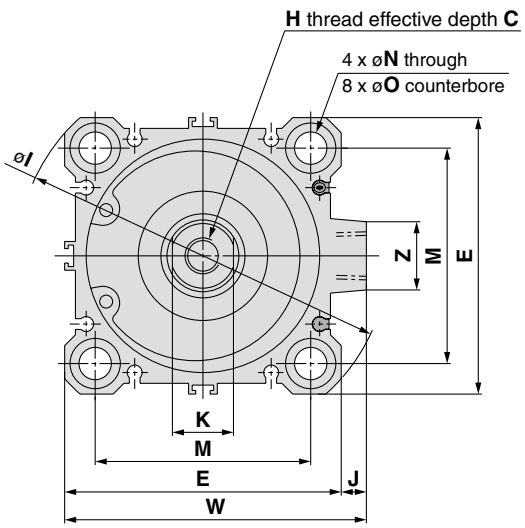
Through-hole: CQ2YB/CDQ2YB

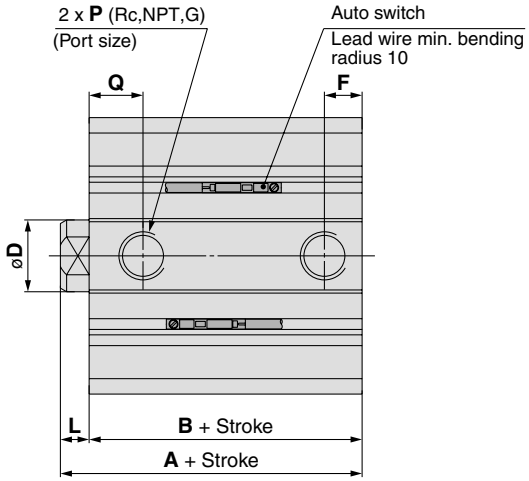
Both ends tapped style: CQ2YA/CDQ2YA



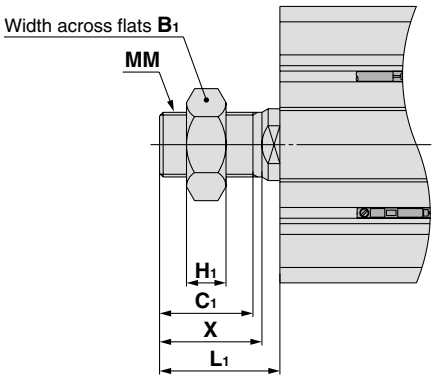
Both Ends Tapped (mm)

Bore size (mm)	O1	R
63	M10 x 1.5	18
80	M12 x 1.75	22
100	M12 x 1.75	22





Rod end male thread



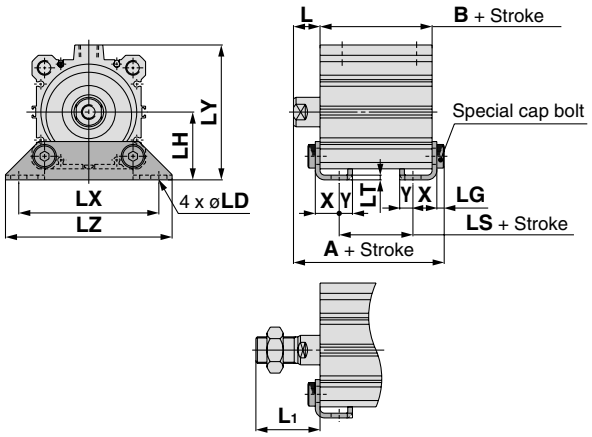
Rod End Male Thread (mm)

Bore size (mm)	B1	C1	H1	L1	MM	X
63	27	26	11	33.5	M18 x 1.5	28.5
80	32	32.5	13	43.5	M22 x 1.5	35.5
100	41	32.5	16	43.5	M26 x 1.5	35.5

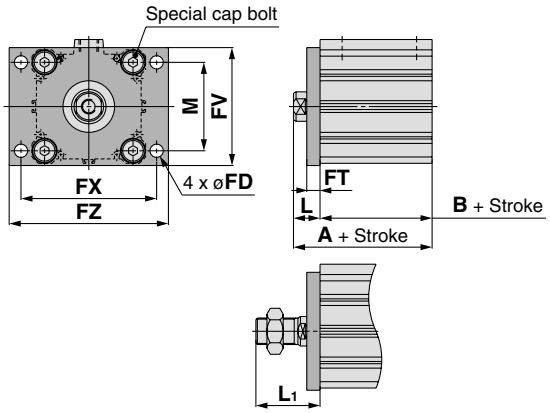
(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch		With auto switch		C	D	E	F	H	I	J	K	L	M	N	O	P	Q	W	Z
		A	B	A	B																
63	10 to 50	54	46	64	56	15	20	77	10.5	M10 x 1.5	103	7	17	8	60	9	14 depth 10.5	1/4	15	84	19
	75, 100	64	56																		
80	10 to 50	63.5	53.5	73.5	63.5	21	25	98	12.5	M16 x 2.0	132	6	22	10	77	11	17.5 depth 13.5	3/8	16	104	26
	75, 100	73.5	63.5																		
100	10 to 50	75	63	85	73	27	30	117	13	M20 x 2.5	156	6.5	27	12	94	11	17.5 depth 13.5	3/8	23	123.5	26
	75, 100	85	73																		

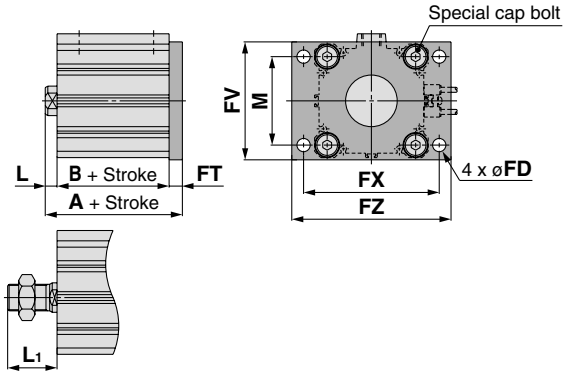
Foot style: CQ2YL/CDQ2YL



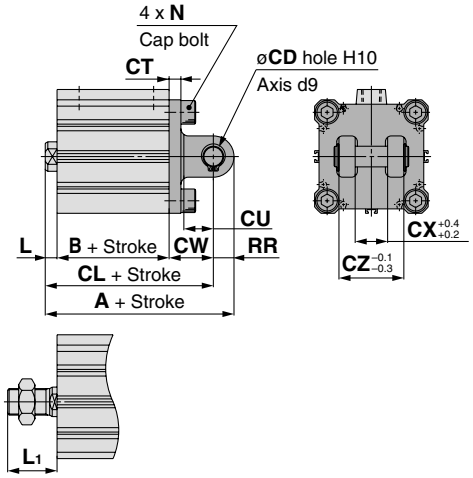
Rod side flange style: CQ2YF/CDQ2YF



Head side flange style: CQ2YG/CDQ2YG



Double clevis style: CQ2YD/CDQ2YD



Foot Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	LS	With auto switch A	B	LS	L	L1	LD
63	10 to 50	72.2	46	20	82.2	56	30	18	43.5	11
	75, 100	82.2	56	30						
80	10 to 50	85	53.5	23.5	95	63.5	33.5	20	53.5	13
	75, 100	95	63.5	33.5						
100	10 to 50	98	63	29	108	73	39	22	53.5	13
	75, 100	108	73	39						

Bore size (mm)	Stroke range (mm)	LG	LH	LT	LX	LY	LZ	X	Y
63	10 to 50	5	46	3.2	95	91.5	113	16.2	9
	75, 100								
80	10 to 50	7	59	4.5	118	114	140	19.5	11
	75, 100								
100	10 to 50	7	71	6	137	136	162	23	12.5
	75, 100								

Foot bracket material: Carbon steel
Surface material: Nickel plated

Rod Side Flange Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	With auto switch A	B	FD	FT	FV	FX	FZ
63	10 to 50	64	46	74	56	9	9	80	92	108
	75, 100	74	56							
80	10 to 50	73.5	53.5	83.5	63.5	11	11	99	116	134
	75, 100	83.5	63.5							
100	10 to 50	85	63	95	73	11	11	117	136	154
	75, 100	95	73							

Bore size (mm)	Stroke range (mm)	L	L1	M
63	10 to 50	18	43.5	60
	75, 100			
80	10 to 50	20	53.5	77
	75, 100			
100	10 to 50	22	53.5	94
	75, 100			

Flange bracket material: Carbon steel
Surface material: Nickel plated

Head Side Flange Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	With auto switch A	L	L1
63	10 to 50	63	73	8	33.5
	75, 100	73			
80	10 to 50	74.5	84.5	10	43.5
	75, 100	84.5			
100	10 to 50	86	96	12	43.5
	75, 100	96			

(* Dimensions except A, L and L1 are the same as rod side flange style.)

Flange bracket material: Carbon steel
Surface material: Nickel plated

Double Clevis Style

(mm)

Bore size (mm)	Stroke range (mm)	Without auto switch A	B	CL	With auto switch A	B	CL	CD	CT	CU
63	10 to 50	98	46	84	108	56	94	14	8	20
	75, 100	108	56	94						
80	10 to 50	119.5	53.5	101.5	129.5	63.5	111.5	18	10	27
	75, 100	129.5	63.5	111.5						
100	10 to 50	142	63	120	152	73	130	22	13	31
	75, 100	152	73	130						

Bore size (mm)	Stroke range (mm)	CW	CX	CZ	L	L1	N	RR
63	10 to 50	30	22	44	8	33.5	M10 x 1.5	14
	75, 100							
80	10 to 50	38	28	56	10	43.5	M12 x 1.75	18
	75, 100							
100	10 to 50	45	32	64	12	43.5	M12 x 1.75	22
	75, 100							

Double clevis bracket material: Cast iron
Surface treatment: Painted

* For details about the rod end nut and accessory brackets, refer to page 1142.
* Double clevis pins and retaining rings are included.

Mass/Without Auto Switch

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
32	142	163	184	204	225	246	267	287	308	329	482	587
40	224	247	270	293	316	339	362	386	409	432	616	736
50	—	400	436	472	508	545	581	617	653	690	982	1170
63	—	589	630	671	712	753	794	835	876	916	1264	1475
80	—	1079	1147	1215	1282	1350	1418	1486	1554	1622	2194	2528
100	—	1863	1953	2044	2135	2226	2316	2407	2498	2589	3393	3853

Standard stroke

Calculation: (Example) **CQ2YD32-20DCM**

- Basic mass: CQ2YB32-20DC ·····204 g
- Additional mass: Both ends tapped style····· 6 g
  Rod end male thread····· 43 g
  Double clevis style ·····151 g

404 g

Mass/With Auto Switch (Built-in magnet)

(g)

Bore size (mm)	Cylinder stroke (mm)											
	5	10	15	20	25	30	35	40	45	50	75	100
32	201	222	243	263	284	305	326	346	367	388	493	598
40	300	323	347	370	393	416	439	462	485	508	628	748
50	—	518	554	590	626	663	699	735	771	808	996	1184
63	—	748	788	829	870	911	952	993	1034	1075	1286	1497
80	—	1340	1408	1476	1543	1611	1679	1747	1815	1883	2217	2552
100	—	2242	2333	2424	2514	2605	2696	2787	2877	2968	3428	3888

Additional Mass

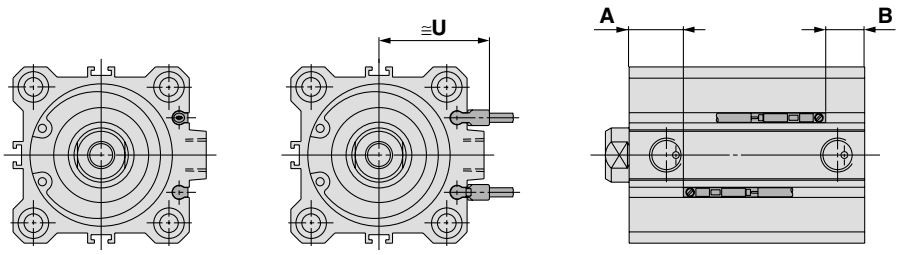
(g)

Bore size (mm)		**32**	**40**	**50**	**63**	**80**	**100**
Both ends tapped style		6	6	6	19	45	45
Rod end male thread	Male thread	26	27	53	53	120	175
	Nut	17	17	32	32	49	116
Foot style (Including mounting bolt)		143	155	243	324	696	1062
Rod side flange style (Including mounting bolt)		180	214	373	559	1056	1365
Head side flange style (Including mounting bolt)		165	198	348	534	1017	1309
Double clevis style (Including pin, retaining ring, bolt)		151	196	393	554	1109	1887

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

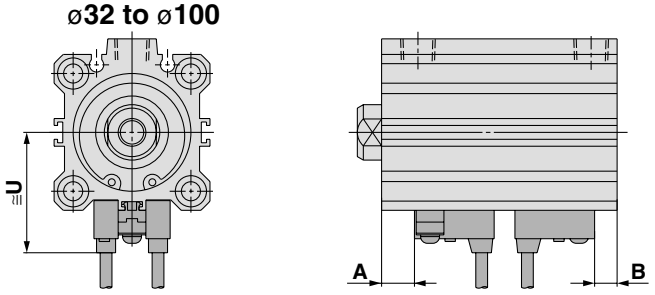
ø32 to ø100

D-A9□
D-M9□
D-M9□W
D-A9□V
D-M9□V
D-M9□WV



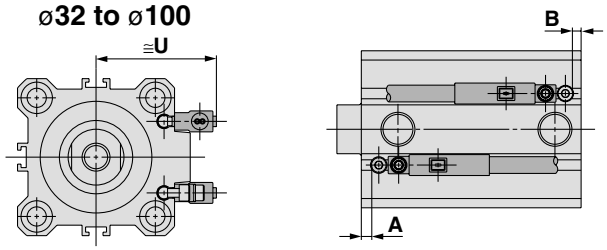
D-A7□
D-A80
D-A7□H
D-A80H
D-F7□
D-J79
D-F7□W
D-J79W
D-F79F
D-F7NTL
D-A73C
D-A80C
D-J79C
D-A79W
D-F7□WV
D-F7□V

ø32 to ø100



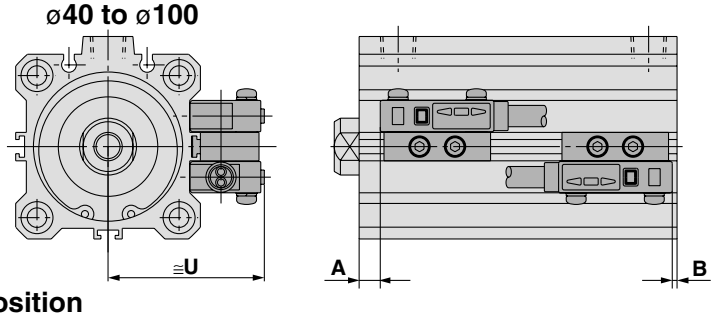
D-P3DW□

ø32 to ø100



D-P4DWL

ø40 to ø100



Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV		D-A73 D-A80		D-A72/A7□H/A80H D-A73C/A80C/F7□ D-F79F/J79/F7□V D-J79C/F7□W D-J79W/F7□WV		D-F7NTL		D-A79W		D-P3DW□		D-P4DWL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
32	14	9	18	13	15	10	15.5	10.5	20.5	15.5	12.5	7.5	8.5	4	—	—
40	17.5	12	21.5	16	18.5	13	19	13.5	24	18.5	16	10.5	12	6.5	14.5	9
50	15	15.5	19	19.5	16	16.5	16.5	17	21.5	22	13.5	14	9.5	9.5	12	12.5
63	17.5	18.5	21.5	22.5	18.5	19.5	19	20	24	25	16	17	12	12.5	14.5	15.5
80	20.5	23	24.5	27	21.5	24	22	24.5	27	29.5	19	21.5	15	17	17.5	20
100	23.5	29.5	27.5	33.5	24.5	30.5	25	31	30	36	22	28	18	24	20.5	26.5

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	D-A9□V	D-M9□V D-M9□WV	D-A7□ D-A80	D-A7□H D-A80H D-F7□ D-J79 D-F7□W D-J79W D-F79F D-F7NTL	D-A73C D-A80C	D-F7□V D-F7□WV	D-J79C	D-A79W	D-P3DW□	D-P4DWL
	U	U	U	U	U	U	U	U	U	U
32	27	29	31.5	32.5	38.5	35	38	34	34.5	—
40	30.5	32.5	35	36	42	38.5	41.5	37.5	38	44
50	36.5	38.5	41	42	48	44.5	47.5	43.5	44	50
63	40	42	47.5	48.5	54.5	51	54	50	47.5	56.5
80	50	52	57.5	58.5	64.5	61	64	60	57.5	66.5
100	60	62	67.5	68.5	74.5	71	74	70	67.5	76.5

Minimum Auto Switch Mounting Stroke

(mm)

Number of auto switches	D-M9□V D-F7□V D-J79C	D-A9□V D-A7□ D-A80 D-A73C D-A80C	D-A9□	D-M9□WV D-F7□WV	D-M9□ D-M9□W D-A7□H D-A80H D-F7□ D-J79	D-A79W	D-F7□W D-J79W D-F79F D-F7NTL	D-P3DW□	D-P4DWL
1 pc.	5	5	10	10	15	15	20	15	15
2 pcs.	5	10	10	15	15	20	20	15	15

Operating Range

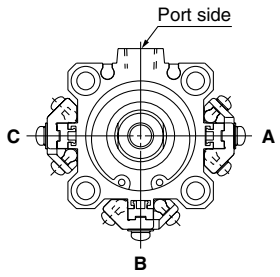
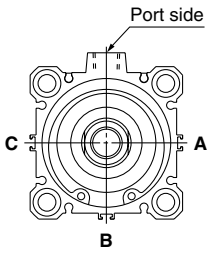
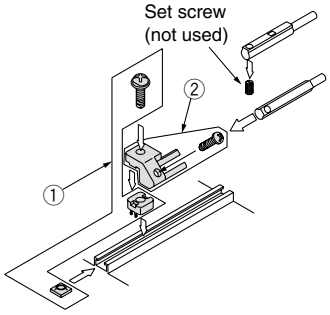
(mm)

Auto switch model	Bore size (mm)					
	32	40	50	63	80	100
D-A9□(V)	9.5	9.5	9.5	11.5	9	11.5
D-M9□(V) D-M9□W(V)	6	5.5	6.5	7.5	7.5	8.5
D-A7□(H)(C) D-A80□(H)(C)	12	11	10	12	12	13
D-A79W	13	14	14	16	15	17
D-F7□(V) D-J79(C) D-F7□W(V) D-F7NTL D-F79F	6	6	6	6.5	6.5	7
D-P3DW□	6.5	6.5	5.5	7.5	7	8.5
D-P4DWL	—	5	5	5	5	5.5

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.

∗ Auto switch mounting brackets BQ2-012 are not used for sizes over ø32 of D-A9□(V)/M9□(V)/M9□W(V) types. The above values indicate the operating range when mounted with the conventional auto switch installation groove.

Auto Switch Mounting Bracket/Part No.

Auto switch mounting surface / Auto switch model	Bore size (mm) 32, 40, 50		Bore size (mm) 63, 80, 100
			
	Auto switch mounting surface		Auto switch mounting surface
Auto switch model	Port side	A, B, C	Port, A, B, C side
D-A9□ **D-A9□V** **D-M9□** **D-M9□V** **D-M9□W** **D-M9□WV**	No auto switch mounting bracket necessary.	①BQ-2 ②BQ2-012 Two types of auto switch mounting bracket are used as a set. 	No auto switch mounting bracket necessary.

Note 1) For CDQ2Y□32 to 50, when mounting compact auto switches on one of the three sides other than the port side (above A, B, C side) in the figure above, a separate auto switch mounting bracket is necessary as shown in the table above, so please order one separately from the cylinder.
(The same is true when mounting compact auto switches with the auto switch mounting rail, not using the compact auto switch mounting groove, for CDQ2Y□63 to 100.)
Example
CDQ2YB32-100DM-M9BW·····1 unit
BQ-2·····2 pcs.
BQ2-012·····2 pcs.

Note 2) When the cylinder is shipped, an auto switch mounting bracket and auto switch are included in the shipment.

Auto switch model	Bore size (mm) 32	Bore size (mm) 40 to 100
D-A7□/A80 **D-A73C/A80C** **D-A7□H/A80H** **D-A79W** **D-F7□/J79** **D-F7□V** **D-J79C** **D-F7□W/J79W** **D-F7□WV** **D-F79F/F7NTL**	BQ-2	
D-P3DW□	BQ3-032S	
D-P4DWL	—	BQP1-050

Note) When the cylinder is shipped, an auto switch mounting bracket and auto switch are included in the shipment. However, ø40 to ø100 D-P4DWL are assembled at the time of shipment.

Auto Switch Mounting Bracket Mass

Mounting bracket part no.	Applicable cylinder bore size	Mass (g)
BQ-2	ø32 to ø100	1.5
BQ3-032S	ø32 to ø100	2.5
BQP1-050	ø40 to ø100	16

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted.
For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features	Applicable bore size
Reed	D-A73	Grommet (Perpendicular)	—	ø32 to ø100
	D-A80		Without indicator light	
	D-A73H, A76H	Grommet (In-line)	—	
	D-A80H		Without indicator light	
Solid state	D-F7NV, F7PV, F7BV	Grommet (Perpendicular)	—	ø32 to ø100
	D-F7NWV, F7BWV		Diagnostic indication (2-color indication)	
	D-F79, F7P, J79	Grommet (In-line)	—	
	D-F79W, F7PW, J79W		Diagnostic indication (2-color indication)	
	D-F7NTL		With timer	
	D-P5DWL		Magnetic field resistant (2-color indication)	ø40 to ø100

∗ With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 and 1785.
∗ Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page 1746.

Smooth Cylinder

Series CM2Y

ø20, ø25, ø32, ø40

How to Order

CM2Y **L** **40** **□** – **150** – **□**

With auto switch **CDM2Y** **L** **40** **□** – **150** – **M9BW** **□** **□**

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
C	Single clevis style
D	Double clevis style
U	Rod side trunnion style
T	Head side trunnion style
E	Integral clevis style
BZ	Boss-cut basic style
FZ	Boss-cut rod side flange style
UZ	Boss-cut rod side trunnion style

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm

Thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 1070.

Number of auto switches

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

Auto switch

Nil	Without auto switch

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

Made to Order
For details, refer to page 1070.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDM2YB20-100

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model	Lead wire (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	——	Grommet	Yes	3-wire (NPN)	5 V, 12 V		**M9N**	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			**M9P**	●	●	●	○	—	○		
				2-wire	12 V		**M9B**	●	●	●	○	—	○	—	
		Connector					**H7C**	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5 V, 12 V		**G39A**	—	—	—	—	●	—	IC circuit	
				2-wire	12 V		**K39A**	—	—	—	—	●	—	—	
	Diagnostic indication (2-color)	Grommet		3-wire (NPN)	5 V, 12 V		**M9NW**	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			**M9PW**	●	●	●	○	—	○		
				2-wire	12 V		**M9BW**	●	●	●	○	—	○	—	
	With diagnostic output (2-color)			4-wire (NPN)	5 V, 12 V		**H7NF**	●		●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (Equiv. NPN)	—	5 V	—	**A96**	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	**A93**	●	—	●	—	—	—	—	Relay, PLC
			No				100 V or less	**A90**	●	—	●	—	—	—	IC circuit	
			Yes				100 V, 200 V	**B54**	●	—	●	●	—	—	—	
			No				200 V or less	**B64**	●	—	●	—	—	—		
		Connector	Yes				—	**C73C**	●	—	●	●	●	—		
			No				24 V or less	**C80C**	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes				—	**A33A**	—	—	—	—	●	—	—	PLC
							100 V, 200 V	**A34A**	—	—	—	—	●	—		Relay, PLC
		DIN terminal						**A44A**	—	—	—	—	●	—		
	Diagnostic indication (2-color)	Grommet				—	—	**B59W**	●	—	●	—	—	—		

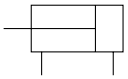
∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) H7CN

∗ ○: Manufactured upon receipt of order.
∗ D-A9□V□/M9□V□/M9□WV□/M9□A(V)L types cannot be mounted.
∗ Do not add the suffix (N) indicating "no lead wire" to the part numbers of models D-A3□A, A44A, G39A and K39A.

∗ In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1082.
∗ Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)
∗ D-C7□□/C80□/H7□□ auto switches are assembled at the time of shipment.

Integral clevis

JIS Symbol
Double acting: Single rod



Made to Order

Made to Order
(For details, refer to pages 1836, 1851 to 1954.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC3	Special port location
—XC6	Made of stainless steel
—XC9	Adjustable stroke cylinder/adjustable retraction type
—XC13	Auto switch rail mounting style
—XC20	Head cover axial port

⚠ Precautions

Be sure to read before handling. Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Handling Precautions

⚠Warning

1. Do not rotate the cover

• When installing a cylinder or screwing a fitting into the port, the coupling portion of the cover may be damaged if the cover rotates.

⚠Caution

1. Be careful of the retaining ring to pop out.

• When replacing the rod seal, be careful of the retaining ring not to pop out while removing it.

Replacement Part: Rod Seal

Bore size (mm)	Part no.
20	PDU-8Z
25	PDU-10Z
32	PDU-12LZ
40	PDU-14LZ

Grease Pack for Maintenance

When only grease for maintenance is necessary, please order by the following part numbers.

Grease pack part no.: GR-L-005 (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Specifications

Bore size (mm)	20	25	32	40
Action	Double acting, Single rod			
Piston speed	5 to 500 mm/s			
Fluid	Air			
Proof pressure	1.05 MPa			
Maximum operating pressure	0.7 MPa			
Ambient and fluid temperature	Without auto switch –10 to 70°C (with no freezing)			
	With auto switch –10 to 60°C (with no freezing)			
Lubrication	Non-lube			
Stroke length tolerance	$^{+1.4}_{0}$ mm			
Cushion	Rubber bumper			
Allowable leakage rate	0.5 ℓ/min (ANR) or less			

Minimum Operating Pressure

Unit: MPa

Bore size (mm)	20	25	32	40
Minimum operating pressure	0.02			

Mounting Bracket Part No.

Mounting bracket	Minimum order	Bore size (mm) 20	25	32	40	Description (when ordering a minimum number)
Axial foot*	2	CM-L020B	CM-L032B		CM-L040B	Foot 2 pcs., Mounting nut 1 pc.
Flange	1	CM-F020B	CM-F032B		CM-F040B	Flange 1 pc.
Single clevis**	1	CM-C020B	CM-C032B		CM-C040B	Single clevis 1 pc., Liner 3 pcs.
Double clevis (with pin) **, ***	1	CM-D020B	CM-D032B		CM-D040B	Double clevis 1 pc., Liner 3 pcs., Clevis pin 1 pc., Retaining ring 2 pcs.
Trunnion (with nut)	1	CM-T020B	CM-T032B		CM-T040B	Trunnion 1 pc., Trunnion nut 1 pc.

* When ordering foot brackets, order 2 pieces per cylinder unit.
** Three liners are included in the clevis bracket for adjusting an angle when mounting it.
*** Clevis pins and retaining rings (cotter pins for ø40) are included.

Mounting Bracket and Accessory

Mounting \ Accessory	Standard: Mounting nut	Rod end nut	Clevis pin	Option: Single knuckle joint	Double knuckle joint Note 3)	Clevis bracket Note 4)
Basic style	● (1 pc.)	●	—	●	●	—
Axial foot style	● (2)	●	—	●	●	—
Rod side flange style	● (1)	●	—	●	●	—
Head side flange style	● (1)	●	—	●	●	—
Integral clevis style	— Note 1)	●	—	●	●	●
Single clevis style	— Note 1)	●	—	●	●	—
Double clevis style Note 3)	— Note 1)	●	● Note 5)	●	●	—
Rod side trunnion style	● (1) Note 2)	●	—	●	●	—
Head side trunnion style	● (1) Note 2)	●	—	●	●	—
Boss-cut basic style	● (1)	●	—	●	●	—
Boss-cut flange style	● (1)	●	—	●	●	—
Boss-cut trunnion style	● (1)	●	—	●	●	—

Note 1) Mounting nuts are not attached to the integral clevis, single clevis and double clevis types.
Note 2) Trunnion nuts are mounted on the rod side trunnion style and head side trunnion style.
Note 3) Pins and retaining rings (cotter pins in case of ø40) are packed with the double clevis and double knuckle joint styles.
Note 4) Pins and retaining rings are packed with clevis brackets.
Note 5) Retaining rings (cotter pins for ø40) are included in clevis pins.

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20, 25, 32, 40	25, 50, 75, 100, 125, 150, 200, 250, 300

Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) As the stroke increases, more sliding resistance may result due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide.

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Basic style	0.14	0.21	0.28	0.56
	Axial foot style	0.29	0.37	0.44	0.83
	Flange style	0.20	0.30	0.37	0.68
	Clevis integrated style	0.12	0.19	0.27	0.52
	Single clevis style	0.18	0.25	0.32	0.65
	Double clevis style	0.19	0.27	0.33	0.69
	Trunnion style	0.18	0.28	0.34	0.66
	Boss-cut basic style	0.13	0.19	0.26	0.53
	Boss-cut flange style	0.19	0.28	0.35	0.65
	Boss-cut trunnion style	0.17	0.26	0.32	0.63
Additional mass per each 50 mm of stroke		0.04	0.06	0.08	0.13
Option bracket	Clevis bracket (With pin)	0.07	0.07	0.14	0.14
	Single knuckle joint	0.06	0.06	0.06	0.23
	Double knuckle joint (With pin)	0.07	0.07	0.07	0.20

Calculation: (Example) **CM2YL32-100**
- Basic mass·····0.44 (Foot style, ø32)
- Additional mass·····0.08/50 stroke
- Cylinder stroke·····100 stroke

0.44 + 0.08 x 100/50 = 0.60 kg

Low Friction Cylinder Mounting

CM2Y [Mounting style] [Bore size] – [Stroke] – **X1854**

• **Same mounting specification as CM2Q**

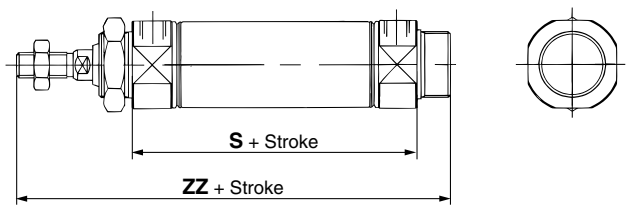
In order to adjust the mounting dimensions of the low friction cylinder (CM2Q), extend the longitudinal dimension (S, ZZ) by 3 mm.

Specifications

Cylinder bore size (mm)	20	25	32	40
Action	Double acting, Single rod			
Direction of low friction	Dual directions			
Fluid	Air			
Proof pressure	1.05 MPa			
Maximum operating pressure	0.7 MPa			

∗ Low friction operates in dual directions.

Dimensions

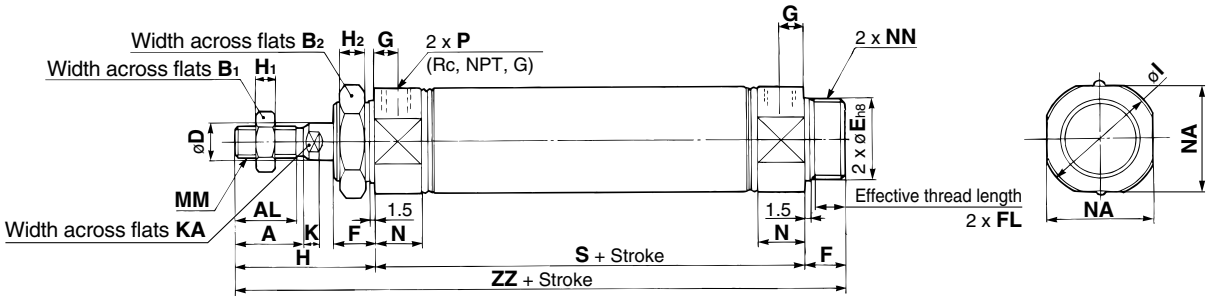


Bore size (mm)	S	ZZ
20	65	119
25	65	123
32	67	125
40	91	157

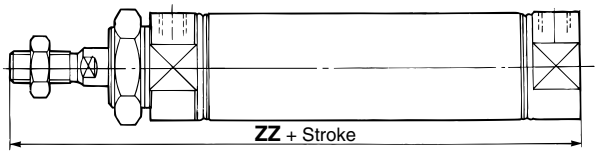
∗ Add 3 mm to S and ZZ dimensions of the double acting, single rod type on pages 1072 to 1076 for the dimensions for each mounting bracket other than the basic style.

Basic Style (B)

CM2YB **Bore size** — **Stroke**



Boss-cut



(mm)

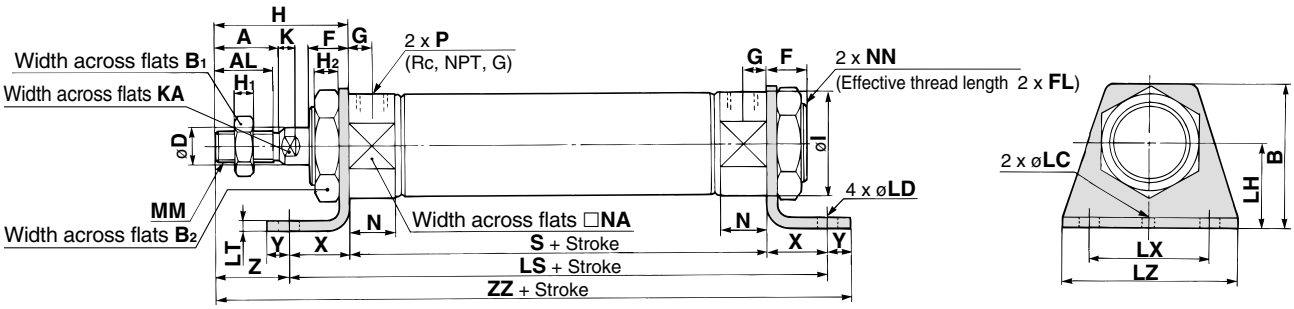
Bore size (mm)	A	AL	B_1	B_2	D	E	F	FL	G	H	H_1	H_2	I	K	KA	MM	N	NA	NN	P	S	ZZ
20	18	15.5	13	26	8	$20^{0}_{-0.033}$	13	10.5	8	41	5	8	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8	62	116
25	22	19.5	17	32	10	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8	62	120
32	22	19.5	17	32	12	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8	64	122
40	24	21	22	41	14	$32^{0}_{0.039}$	16	13.5	11	50	8	10	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4	88	154

Boss-cut (mm)

Bore size (mm)	ZZ
20	103
25	107
32	109
40	138

Axial Foot Style (L)

CM2YL **Bore size** — **Stroke**

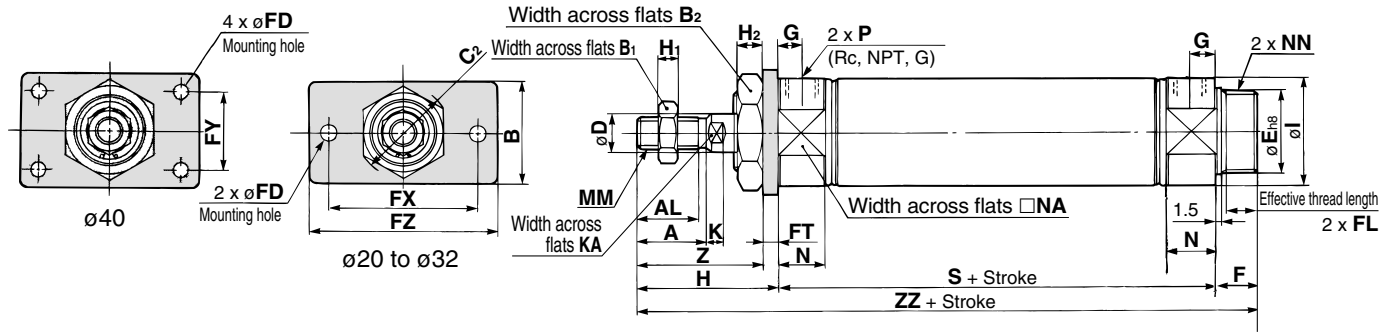


(mm)

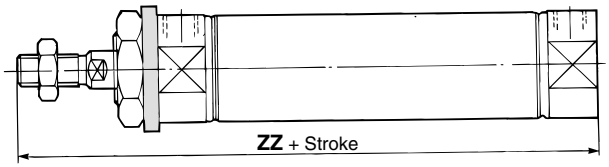
Bore size (mm)	A	AL	B	B_1	B_2	D	F	FL	G	H	H_1	H_2	I	K	KA	LC	LD	LH	LS	LT	LX	LZ	MM	N	NA	NN	P	S	X	Y	Z	ZZ
20	18	15.5	40	13	26	8	13	10.5	8	41	5	8	28	5	6	4	6.8	25	102	3.2	40	55	M8 x 1.25	15	24	M20 x 1.5	1/8	62	20	8	21	131
25	22	19.5	47	17	32	10	13	10.5	8	45	6	8	33.5	5.5	8	4	6.8	28	102	3.2	40	55	M10 x 1.25	15	30	M26 x 1.5	1/8	62	20	8	25	135
32	22	19.5	47	17	32	12	13	10.5	8	45	6	8	37.5	5.5	10	4	6.8	28	104	3.2	40	55	M10 x 1.25	15	34.5	M26 x 1.5	1/8	64	20	8	25	137
40	24	21	54	22	41	14	16	13.5	11	50	8	10	46.5	7	12	4	7	30	134	3.2	55	75	M14 x 1.5	21.5	42.5	M32 x 2	1/4	88	23	10	27	171

Rod Side Flange Style (F)

CM2YF | **Bore size** | — | **Stroke** | |



Boss-cut style



(mm)

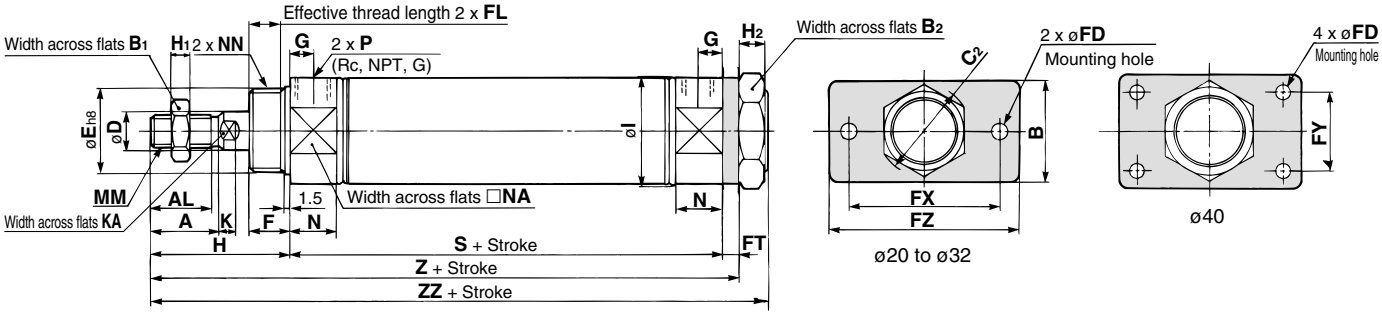
Bore size (mm)	A	AL	B	B_1	B_2	C_2	D	E	F	FL	FD	FT	FX	FY	FZ	G	H	H_1	H_2	I	K	KA	MM	N	NA	NN	P	S	Z	ZZ
20	18	15.5	34	13	26	30	8	$20^{0}_{-0.033}$	13	10.5	7	4	60	—	75	8	41	5	8	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8	62	37	116
25	22	19.5	40	17	32	37	10	$26^{0}_{-0.033}$	13	10.5	7	4	60	—	75	8	45	6	8	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8	62	41	120
32	22	19.5	40	17	32	37	12	$26^{0}_{-0.033}$	13	10.5	7	4	60	—	75	8	45	6	8	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8	64	41	122
40	24	21	52	22	41	47.3	14	$32^{0}_{-0.039}$	16	13.5	7	5	66	36	82	11	50	8	10	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4	88	45	154

Boss-cut Style (mm)

Bore size (mm)	ZZ
20	103
25	107
32	109
40	138

Head Side Flange Style (G)

CM2YG **Bore size** — **Stroke** □



(mm)

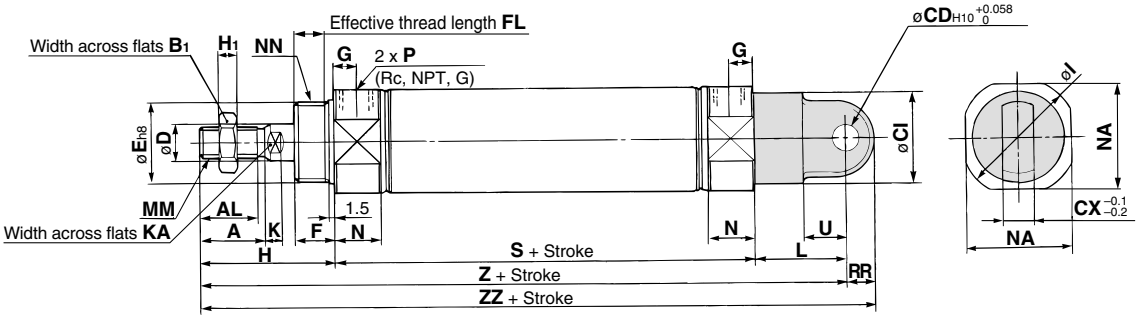
Bore size (mm)	A	AL	B	B_1	B_2	C_2	D	E	F	FL	FD	FT	FX	FY	FZ	G	H	H_1	H_2	I
20	18	15.5	34	13	26	30	8	$20^{0}_{-0.033}$	13	10.5	7	4	60	—	75	8	41	5	8	28
25	22	19.5	40	17	32	37	10	$26^{0}_{-0.033}$	13	10.5	7	4	60	—	75	8	45	6	8	33.5
32	22	19.5	40	17	32	37	12	$26^{0}_{-0.033}$	13	10.5	7	4	60	—	75	8	45	6	8	37.5
40	24	21	52	22	41	47.3	14	$32^{0}_{-0.039}$	16	13.5	7	5	66	36	82	11	50	8	10	46.5

(mm)

Bore size (mm)	K	KA	MM	N	NA	NN	P	S	Z	ZZ
20	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8	62	107	116
25	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8	62	111	120
32	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8	64	113	122
40	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4	88	143	154

Single Clevis Style (C)

CM2YC **Bore size** — **Stroke** □

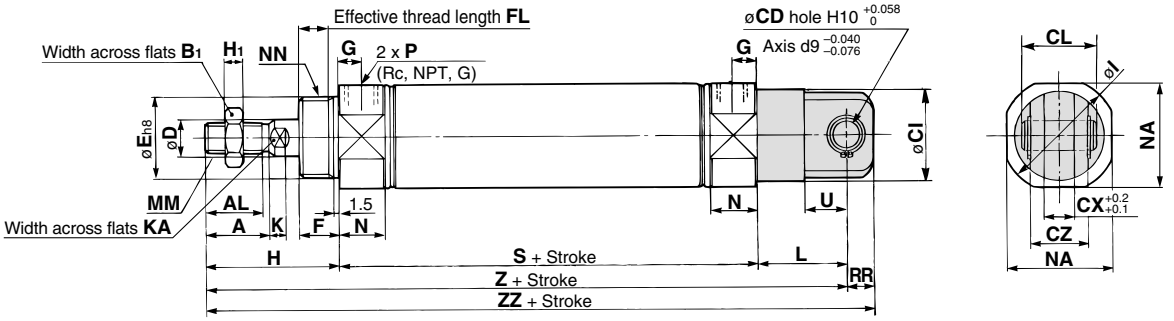


(mm)

Bore size (mm)	A	AL	B_1	CI	CD	CX	D	E	F	FL	G	H	H_1	I	K	KA	L	MM	N	NA	NN	P	RR	S	U	Z	ZZ
20	18	15.5	13	24	9	10	8	$20^{0}_{-0.033}$	13	10.5	8	41	5	28	5	6	30	M8 x 1.25	15	24	M20 x 1.5	1/8	9	62	14	133	142
25	22	19.5	17	30	9	10	10	$26^{0}_{-0.033}$	13	10.5	8	45	6	33.5	5.5	8	30	M10 x 1.25	15	30	M26 x 1.5	1/8	9	62	14	137	146
32	22	19.5	17	30	9	10	12	$26^{0}_{-0.033}$	13	10.5	8	45	6	37.5	5.5	10	30	M10 x 1.25	15	34.5	M26 x 1.5	1/8	9	64	14	139	148
40	24	21	22	38	10	15	14	$32^{0}_{-0.039}$	16	13.5	11	50	8	46.5	7	12	39	M14 x 1.5	21.5	42.5	M32 x 2	1/4	11	88	18	177	188

Double Clevis Style (D)

CM2YD Bore size — Stroke



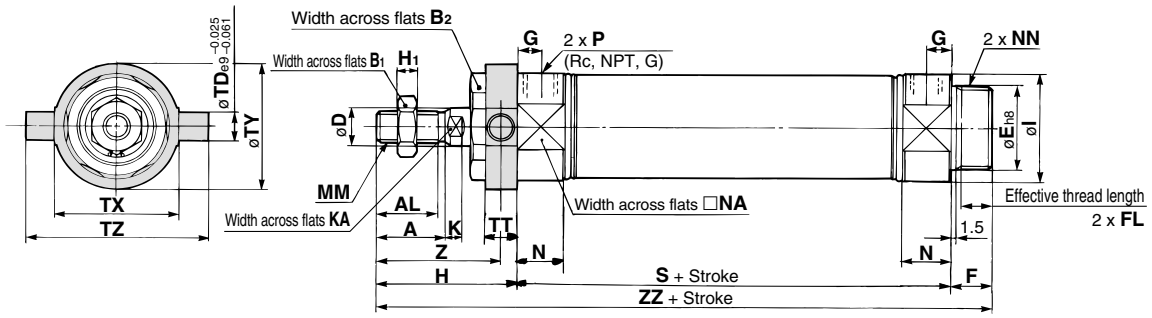
(mm)

Bore size (mm)	A	AL	B1	CD	CI	CL	CX	CZ	D	E	F	FL	G	H	H1	I	K	KA	L	MM	N	NA	NN	P	RR	S	U	Z	ZZ
20	18	15.5	13	9	24	25	10	19	8	20 $^{0}_{-0.033}$	13	10.5	8	41	5	28	5	6	30	M8 x 1.25	15	24	M20 x 1.5	1/8	9	62	14	133	142
25	22	19.5	17	9	30	25	10	19	10	26 $^{0}_{-0.033}$	13	10.5	8	45	6	33.5	5.5	8	30	M10 x 1.25	15	30	M26 x 1.5	1/8	9	62	14	137	146
32	22	19.5	17	9	30	25	10	19	12	26 $^{0}_{-0.033}$	13	10.5	8	45	6	37.5	5.5	10	30	M10 x 1.25	15	34.5	M26 x 1.5	1/8	9	64	14	139	148
40	24	21	22	10	38	41.2	15	30	14	32 $^{0}_{-0.039}$	16	13.5	11	50	8	46.5	7	12	39	M14 x 1.5	21.5	42.5	M32 x 2	1/4	11	88	18	177	188

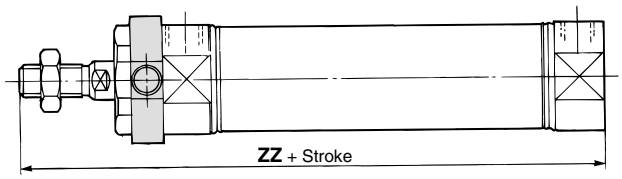
∗ Clevis pin and snap ring (cotter pin for bore size ø40) are shipped together.

Rod Side Trunnion Style (U)

CM2YU Bore size — Stroke



Boss-cut style



(mm)

Bore size (mm)	A	AL	B1	B2	D	E	F	FL	G	H	H1	I	K	KA	MM	N	NA	NN	P
20	18	15.5	13	26	8	20 $^{0}_{-0.033}$	13	10.5	8	41	5	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8
25	22	19.5	17	32	10	26 $^{0}_{-0.033}$	13	10.5	8	45	6	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8
32	22	19.5	17	32	12	26 $^{0}_{-0.033}$	13	10.5	8	45	6	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8
40	24	21	22	41	14	32 $^{0}_{-0.039}$	16	13.5	11	50	8	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4

(mm)

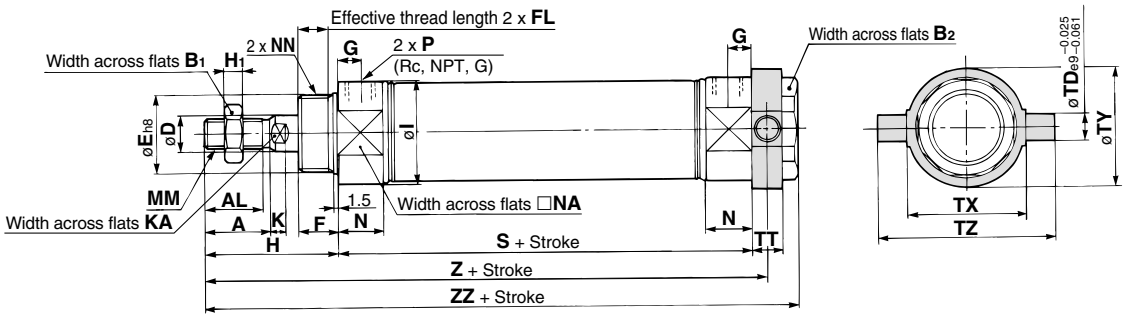
Bore size (mm)	S	TD	TT	TX	TY	TZ	Z	ZZ
20	62	8	10	32	32	52	36	116
25	62	9	10	40	40	60	40	120
32	64	9	10	40	40	60	40	122
40	88	10	11	53	53	77	44.5	154

Boss-cut Style (mm)

Bore size (mm)	ZZ
20	103
25	107
32	109
40	138

Head Side Trunnion Style (T)

CM2YT [Bore size] — [Stroke] [ ]



(mm)

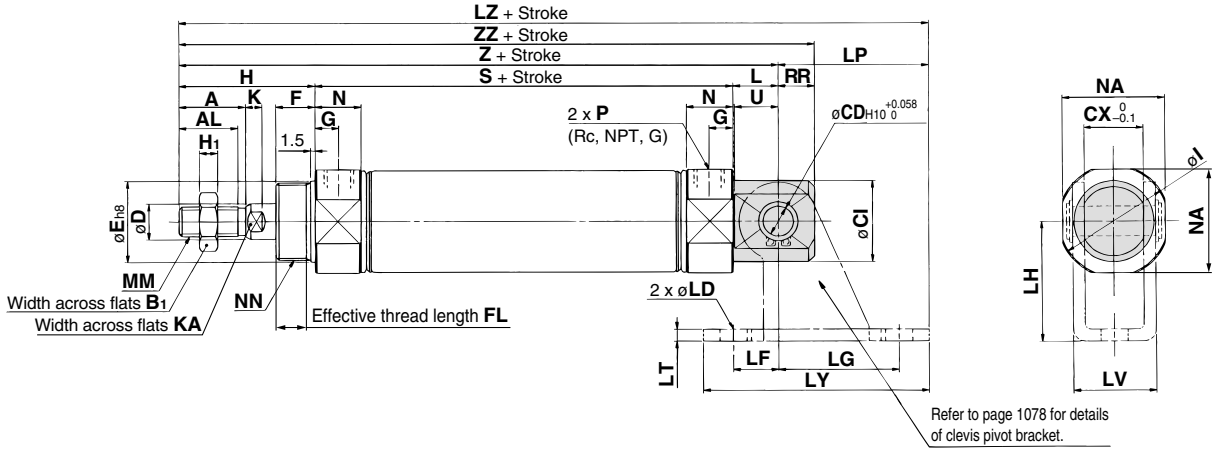
Bore size (mm)	A	AL	B_1	B_2	D	E	F	FL	G	H	H_1	I	K	KA	MM	N	NA	NN	P
20	18	15.5	13	26	8	$20^{0}_{-0.033}$	13	10.5	8	41	5	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8
25	22	19.5	17	32	10	$26^{0}_{-0.033}$	13	10.5	8	45	6	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8
32	22	19.5	17	32	12	$26^{0}_{-0.033}$	13	10.5	8	45	6	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8
40	24	21	22	41	14	$32^{0}_{-0.039}$	16	13.5	11	50	8	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4

(mm)

Bore size (mm)	S	TD	TT	TX	TY	TZ	Z	ZZ
20	62	8	10	32	32	52	108	118
25	62	9	10	40	40	60	112	122
32	64	9	10	40	40	60	114	124
40	88	10	11	53	53	77	143.5	154

Clevis Integrated Style (E)

CM2YE [Bore size] — [Stroke] [ ]



(mm)

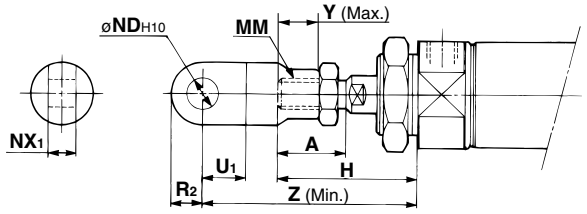
Bore size (mm)	A	AL	B_1	CD	CI	CX	D	E	F	FL	G	H	H_1	I	K	KA	L	MM	N	NA	NN
20	18	15.5	13	8	20	12	8	$20^{0}_{-0.033}$	13	10.5	8	41	5	28	5	6	12	M8 x 1.25	15	24	M20 x 1.5
25	22	19.5	17	8	22	12	10	$26^{0}_{-0.033}$	13	10.5	8	45	6	33.5	5.5	8	12	M10 x 1.25	15	30	M26 x 1.5
32	22	19.5	17	10	27	20	12	$26^{0}_{-0.033}$	13	10.5	8	45	6	37.5	5.5	10	15	M10 x 1.25	15	34.5	M26 x 1.5
40	24	21	22	10	33	20	14	$32^{0}_{-0.039}$	16	13.5	11	50	8	46.5	7	12	15	M14 x 1.5	21.5	42.5	M32 x 2

(mm)

Bore size (mm)	P	RR	S	U	Z	ZZ
20	1/8	9	62	11.5	115	124
25	1/8	9	62	11.5	119	128
32	1/8	12	64	14.5	124	136
40	1/4	12	88	14.5	153	165

Accessory Bracket Dimensions

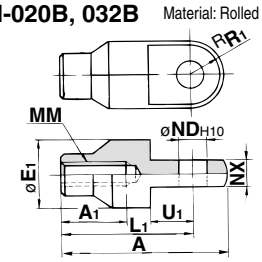
Single Knuckle Joint (mm)



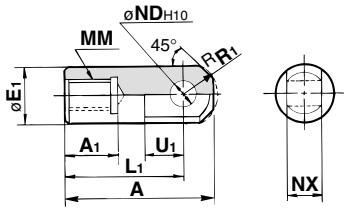
Bore size	A	H	MM	NDH10	NX1	U1	R2	Y	Z
20	18	41	M8 x 1.25	9 $^{+0.058}_{0}$	9 $^{-0.1}_{-0.2}$	14	10	11	66
25, 32	22	45	M10 x 1.25	9 $^{+0.058}_{0}$	9 $^{-0.1}_{-0.2}$	14	10	14	69
40	24	50	M14 x 1.5	12 $^{+0.070}_{0}$	16 $^{-0.1}_{-0.3}$	20	14	13	92

Single Knuckle Joint (mm)

I-020B, 032B Material: Rolled steel

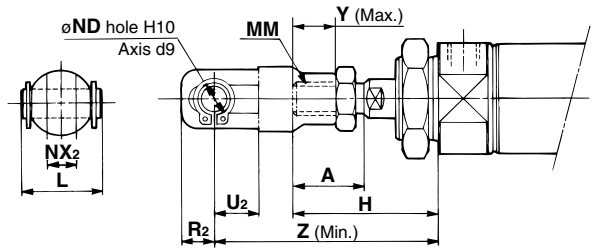


I-040B Material: Free cutting sulfur steel



Part no.	Applicable bore size (mm)	A	A1	E1	L1	MM	NDH10	NX	R1	U1
I-020B	**20**	46	16	20	36	M8 x 1.25	9 $^{+0.058}_{0}$	9 $^{-0.1}_{-0.2}$	10	14
I-032B	**25, 32**	48	18	20	38	M10 x 1.25	9 $^{+0.058}_{0}$	9 $^{-0.1}_{-0.2}$	10	14
I-040B	**40**	69	22	24	55	M14 x 1.5	12 $^{+0.070}_{0}$	16 $^{-0.1}_{-0.3}$	15.5	20

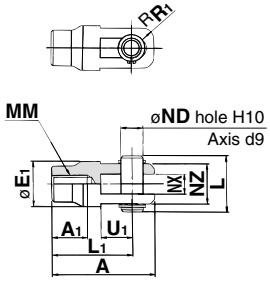
Double Knuckle Joint (mm)



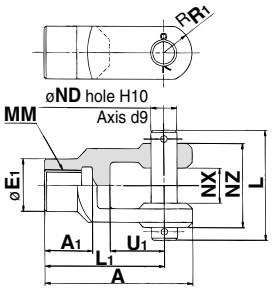
Bore size	A	H	L	MM	ND	NX2	R2	U2	Y	Z
20	18	41	25	M8 x 1.25	9	9 $^{+0.2}_{+0.1}$	10	14	11	66
25, 32	22	45	25	M10 x 1.25	9	9 $^{+0.2}_{+0.1}$	10	14	14	69
40	24	50	49.7	M14 x 1.5	12	16 $^{+0.3}_{+0.1}$	13	25	13	92

Double Knuckle Joint (mm)

Y-020B, Y-032B Material: Rolled steel



Y-040B Material: Cast iron



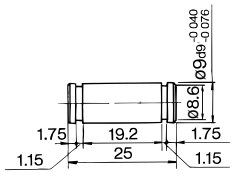
Part no.	Applicable bore size	A	A1	E1	L	L1	MM	ND	NX	NZ	R1	U1	Applicable pin part number	Retaining ring Cotter pin size
Y-020B	20	46	16	20	25	36	M8 x 1.25	9	9 $^{+0.2}_{+0.1}$	18	5	14	CDP-1	Type C 9 for axis
Y-032B	25, 32	48	18	20	25	38	M10 x 1.25	9	9 $^{+0.2}_{+0.1}$	18	5	14	CDP-1	Type C 9 for axis
Y-040B	40	68	22	24	49.7	55	M14 x 1.5	12	16 $^{+0.3}_{+0.1}$	38	13	25	CDP-3	ø3 x 18ℓ

∗ Clevis pin and retaining ring (cotter pin for ø40) are attached.

Double Clevis Pin/Material: Carbon steel (mm)

Bore size: ø20, ø25, ø32

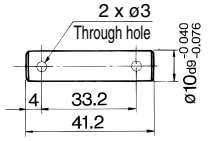
CDP-1



Retaining ring: Type C9 for axis

Bore size: ø40

CDP-2



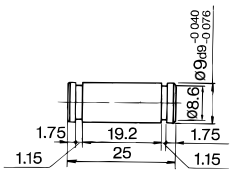
Cotter pin
ø3 x 18ℓ

∗ Retaining rings (cotter pins for ø40) are included.

Double Knuckle Pin/Material: Carbon steel (mm)

Bore size: ø20, ø25, ø32

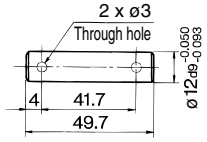
CDP-1



Retaining ring: Type C9 for axis

Bore size: ø40

CDP-3

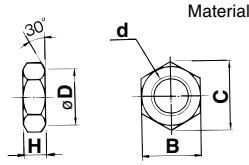


Cotter pin
ø3 x 18ℓ

∗ Retaining rings (cotter pins for ø40) are included.

Rod End Nut (mm)

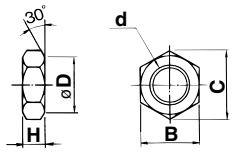
Material: Carbon steel



Part no.	Applicable bore size (mm)	B	C	D	d	H
NT-02	**20**	13	15.0	12.5	M8 x 1.25	5
NT-03	**25, 32**	17	19.6	16.5	M10 x 1.25	6
NT-04	**40**	22	25.4	21.0	M14 x 1.5	8

Mounting Nut (mm)

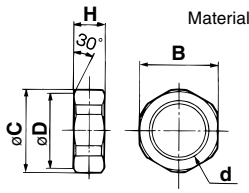
Material: Carbon steel



Part no.	Applicable bore size (mm)	B	C	D	d	H
SN-020B	**20**	26	30	25.5	M20 x 1.5	8
SN-032B	**25, 32**	32	37	31.5	M26 x 1.5	8
SN-040B	**40**	41	47.3	40.5	M32 x 2.0	10

Trunnion Nut (mm)

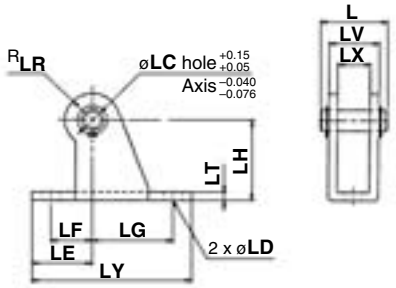
Material: Carbon steel



Part no.	Applicable bore size (mm)	B	C	D	d	H
TN-020B	**20**	26	28	25.5	M20 x 1.5	10
TN-032B	**25, 32**	32	34	31.5	M26 x 1.5	10
TN-040B	**40**	41	45	40.5	M32 x 2	10

Clevis Pivot Bracket (For CM2E) (mm)

Material: Rolled steel plate

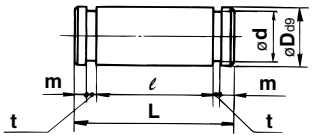


Part no.	Applicable bore size (mm)	L	LC	LD	LE	LF	LG	LH	LR	LT	LX	LY	LV	Applicable pin part no.
CM-E020B	**20, 25**	24.5	8	6.8	22	15	30	30	10	3.2	12	59	18.4	CD-S02
CM-E032B	**32, 40**	34	10	9	25	15	40	40	13	4	20	75	28	CD-S03

Note 1) Clevis bracket pins and retaining rings are included.
Note 2) It cannot be used for single clevis style (CM2C) and double clevis style (CM2D).

Clevis Pin (For CM2E) (mm)

Material: Carbon steel



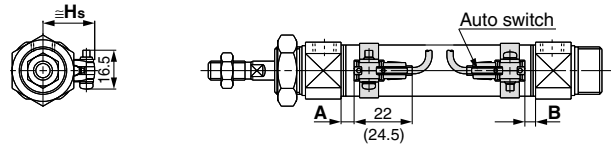
Part no.	Applicable bore size (mm)	D_{d9}	d	L	ℓ	m	t	Applicable retaining ring part no.
CD-S02	**20, 25**	$8^{-0.040}_{-0.076}$	7.6	24.5	19.5	1.6	0.9	Type C 8 for axis
CD-S03	**32, 40**	$10^{-0.040}_{-0.076}$	9.6	34	29	1.35	1.15	Type C 10 for axis

Note) Retaining rings are included.

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

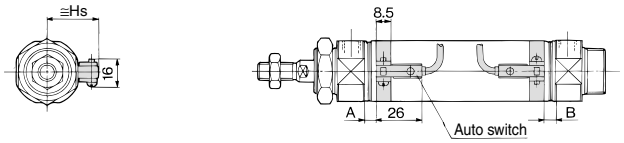
Reed auto switch

D-A9□

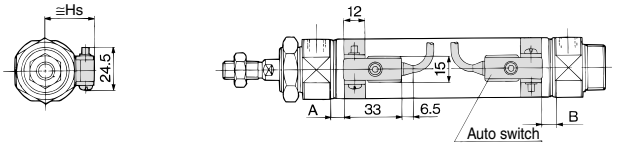


( ): For D-A93 type

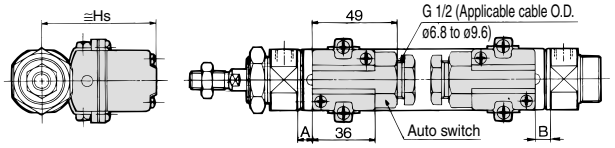
D-C7/C8



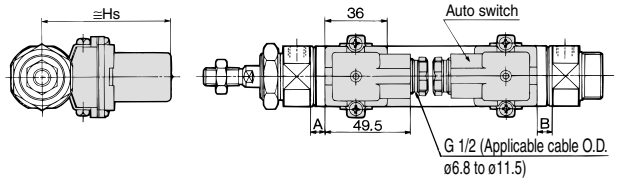
D-B5/B6/B59W



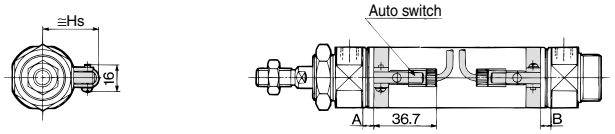
D-A33A/A34A



D-A44A

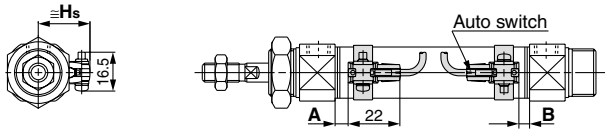


D-C73C/C80C

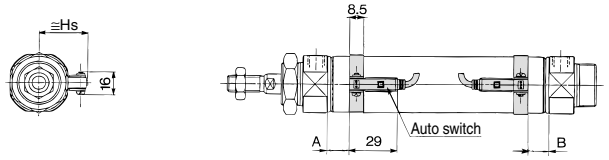


Solid state auto switch

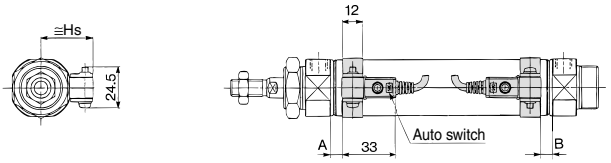
D-M9□
D-M9□W



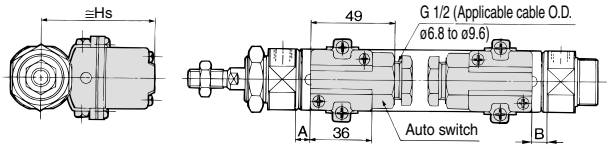
D-H7□/H7□W/H7NF



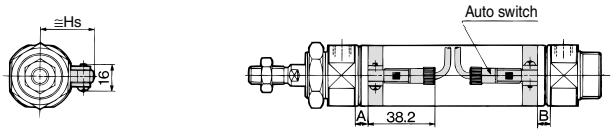
D-G5NTL



D-G39A/K39A



D-H7C



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

Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size (mm)	D-A9□		D-M9□ D-M9□W		D-B5□ D-B64		D-C7□ D-C80 D-C73C D-C80C		D-B59W		D-A3□A D-G39A D-K39A D-A44A		D-H7□ D-H7C D-H7□W D-H7NF		D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	6.5	5.5	10.5	9.5	1	0	7	6	4	3	0.5	0	6	5	2.5	1.5
25	6.5	5.5	10.5	9.5	1	0	7	6	4	3	0.5	0	6	5	2.5	1.5
32	7.5	6.5	11.5	10.5	2	1	8	7	5	4	1.5	0.5	7	6	3.5	2.5
40	13.5	11.5	17.5	15.5	7	6	13	12	10	9	6.5	5.5	12	11	8.5	7.5

Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

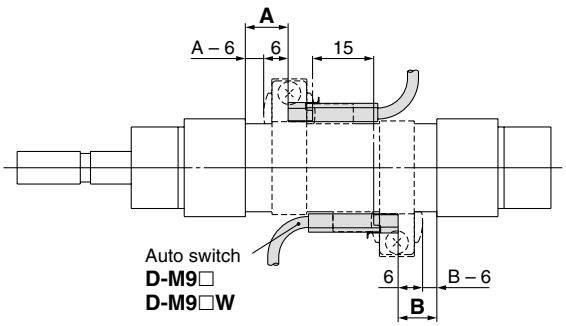
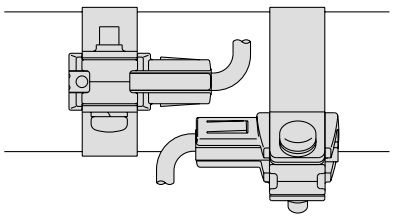
Auto switch model / Bore size (mm)	D-A9□ D-M9□ D-M9□W	D-B5□ D-B64 D-B59W D-G5NTL D-H7C	D-C7□ D-C80 D-H7□ D-H7□W D-H7NF	D-C73C D-C80C	D-A3□A D-G39A D-K39A	D-A44A
	Hs	Hs	Hs	Hs	Hs	Hs
20	22	25.5	22.5	25	60	69.5
25	24.5	28	25	27.5	62.5	72
32	28	31.5	28.5	31	66	75.5
40	32	35.5	32.5	35	70	79.5

Minimum Auto Switch Mounting Stroke

n: No. of auto switch (mm)

Auto switch model	No. of auto switch mounted				
	1 pc.	2 pcs.		n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9□ **D-M9□** **D-M9□W**	10	15 Note 1)	45 Note 1)	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	45 + 45 (n-2)
D-C7□ **D-C80**	10	15	50	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 45 (n-2)
D-H7□ **D-H7□W** **D-H7NF**	10	15	60	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	60 + 45 (n-2)
D-C73C **D-C80C** **D-H7C**	10	15	65	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	65 + 50 (n-2)
D-B5□/B64 **D-G5NTL**	10	15	75	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	75 + 55 (n-2)
D-B59W	15	20	75	$20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	75 + 55(n-2)
D-A3□A/G39A **D-K39A/A44A**	10	35	100	35 + 30(n-2)	100 + 100 (n-2)

Note 1) Auto switch mounting (The adjustment as shown in the figures below is required with the following stroke ranges.)

Auto switch model	With 2 auto switches	
	Different surfaces Note 1)	Same surface Note 1)
	 The proper auto switch mounting position is 6 mm inward from the switch holder edge.	 The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.
D-A93	—	45 to less than 50 stroke
D-M9□ **D-M9□W**	15 to less than 20 stroke	45 to less than 55 stroke

Operating Range

(mm)

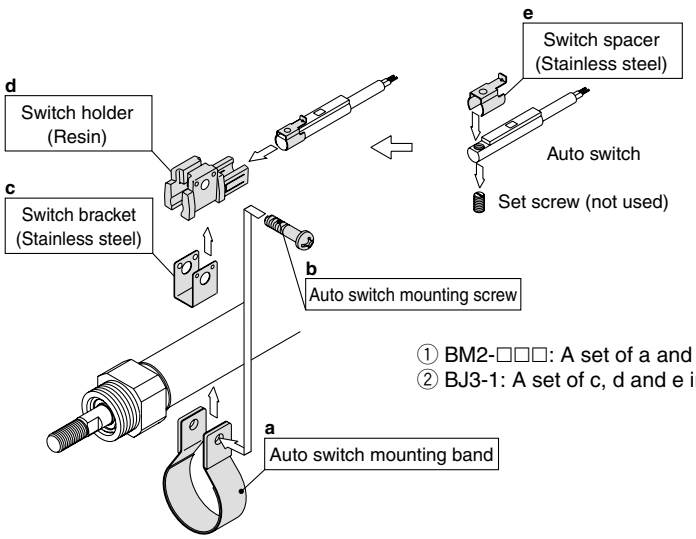
Auto switch model	Bore size (mm)			
	20	**25**	**32**	**40**
D-A9□	6	6	6	6
D-M9□ **D-M9□W**	3.5	3	3.5	3
D-C7□/C80 **D-C73C/C80C**	7	8	8	8
D-B5□/B64 **D-A3□A/A44A**	8	8	9	9
D-B59W	12	12	13	13
D-H7□/H7□W **D-G5NTL/H7NF**	4	4	4.5	5
D-H7C	7	8.5	9	10
D-G39A/K39A	8	9	9	9

* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion) There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)			
	20	25	32	40
D-A9□ **D-M9□** **D-M9□W**	Note) ①BM2-020 ②BJ3-1	Note) ①BM2-025 ②BJ3-1	Note) ①BM2-032 ②BJ3-1	Note) ①BM2-040 ②BJ3-1
D-C7□/C80 **D-C73C/C80C** **D-H7□** **D-H7□W** **D-H7NF**	BM2-020	BM2-025	BM2-032	BM2-040
D-B5□/B64 **D-B59W** **D-G5NTL**	BA2-020	BA2-025	BA2-032	BA2-040
D-A3□A/A44A **D-G39A/K39A**	BM3-020	BM3-025	BM3-032	BM3-040

Note) Two kinds of auto switch mounting brackets are used as a set.



① BM2-□□□: A set of a and b in the figure.
② BJ3-1: A set of c, d and e in the figure.

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted.
For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features
Reed	D-B53, C73, C76	Grommet (In-line)	—
	D-C80		Without indicator light
Solid state	D-H7A1, H7A2, H7B		—
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)
	D-G5NTL		With timer

∗ With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 and 1785.
∗ Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page 1746.
∗ Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

Smooth Cylinder

Series CG1Y

ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100

How to Order

CG1Y [L] [25] [ ] – [100] – [ ]

With auto switch **CDG1Y** [L] [25] [ ] – [100] – [M9BW] [ ] – [ ]

With auto switch
(Built-in magnet)

Mounting style

B	Basic style
L	Axial foot style
F	Rod side flange style
G	Head side flange style
U *	Rod side trunnion style
T *	Head side trunnion style
D	Clevis style

* Not available at ø80 and ø100.
Note) Mounting brackets are not mounted and are supplied loose at the time of shipment.

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

Port thread type

Nil	Rc	ø20 to ø100
TN	NPT	ø20 to ø100
TF	M5 x 0.8	ø20, ø25
	G	ø32 to ø100

Auto switch

Nil	Without auto switch

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

Cylinder stroke (mm)
Refer to "Standard Stroke" on next page.

Made to Order
For details, refer to page 1084.

Number of auto switches

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

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDG1YB32-150

Applicable Auto Switch/Refer to pages 1719 to 1827 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model ø20 to ø63	Auto switch model ø80, ø100	Lead wire (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	24 V	M9N	—	●	●	●	○	—	○	IC circuit	Relay, PLC
							—	G59	●	—	●	○	—	○		
				3-wire (PNP)			M9P	—	●	●	●	○	—	○		
							—	G5P	●	—	●	○	—	○		
				2-wire	12 V		M9B	—	●	●	●	○	—	○	—	
							—	K59	●	—	●	○	—	○		
		Connector					H7C	—	●	—	●	●	●	—		
	Diagnostic indication (2-color)	Grommet		3-wire (NPN)	5 V, 12 V		M9NW	—	●	●	●	○	—	○	IC circuit	
							—	G59W	●	—	●	○	—	○		
				3-wire (PNP)			M9PW	—	●	●	●	○	—	○		
							—	G5PW	●	—	●	○	—	○		
				2-wire	12 V		M9BW	—	●	●	●	○	—	○	—	
							—	K59W	●	—	●	○	—	○		
	Water resistant (2-color)						H7BA	G5BA	—	—	●	○	—	○		
	With diagnostic output (2-color)			4-wire(NPN)	5 V, 12 V		H7NF	G59F	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (Equiv. NPN)	—	5 V	—	A96	—	●	—	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93	—	●	—	●	—	—	—	—	Relay, PLC
			No				100 V or less	A90	—	●	—	●	—	—	—	IC circuit	
			Yes				100 V, 200 V	B54		●	—	●	●	—	—	—	
			No				200 V or less	B64		●	—	●	—	—	—	—	
		Connector	Yes				—	C73C	—	●	—	●	●	●	—		
			No				24 V or less	C80C	—	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color)	Grommet	Yes		—	—	B59W			●	—	●	—	—	—	—	

* Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ
None ····· N (Example) H7CN

* ○: Manufactured upon receipt of order.
* D-A9□V/M9□V/M9□WV/M9□A(V)L types cannot be mounted.

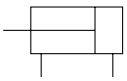
* In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1093.
* Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped.)

Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Type	Non-lube							
Fluid	Air							
Proof pressure	1.05 MPa							
Maximum operating pressure	0.7 MPa							
Ambient and fluid temperature	Without auto switch –10 to 70°C (with no freezing)							
	With auto switch –10 to 60°C (with no freezing)							
Operating piston speed	5 to 500 mm/s							
Stroke length tolerance	Up to 300 $^{st\ +\ 1.4}_{0}$ mm							
Cushion	Rubber bumper							
Mounting	Basic, Axial foot, Rod side flange, Head side flange, Rod side trunnion, Head side trunnion, Clevis (in case of 90° change in port location)							
Allowable leakage rate	0.5 ℓ/min (ANR) or less							

∗ Rod side trunnion and head side trunnion styles are not available at ø80 and ø100.

JIS Symbol



Minimum Operating Pressure

Unit: MPa

Bore size (mm)	20	25	32	40	50	63	80	100
Minimum operating pressure	0.02				0.01			

Made to Order

(For details, refer to pages 1836, 1882 and 1917.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC6	Made of stainless steel
—XC20	Head cover axial port

Standard Stroke

Bore size (mm)	Standard stroke (mm) Note 1)
20	25, 50, 75, 100, 125, 150, 200
25, 32, 40, 50, 63, 80, 100	25, 50, 75, 100, 125, 150, 200, 250, 300

Note 1) Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) Please consult with SMC for strokes outside the above ranges.
Note 3) As the stroke increases, more sliding resistance may result due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide.

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents	
20	CG1Y20-PS	Piston seal	1 pc.
25	CG1Y25-PS	Rod seal	1 pc.
32	CG1Y32-PS	Tube gasket	2 pcs.
40	CG1Y40-PS	Grease pack (10 g)	1 pc.

When only grease for maintenance is necessary, please order by the following part numbers.

Grease pack part no.: **GR-L-005** (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm) 20	25	32	40	50	63	80	100	Description
Foot	2[Note]	CG-L020	CG-L025	CG-L032	CG-L040	CG-L050	CG-L063	CG-L080	CG-L100	Foot x 2, Bracket mounting bolt x 8
Flange	1	CG-F020	CG-F025	CG-F032	CG-F040	CG-F050	CG-F063	CG-F080	CG-F100	Flange x 1, Bracket mounting bolt x 4
Trunnion pin	1	CG-T020	CG-T025	CG-T032	CG-T040	CG-T050	CG-T063	—	—	Trunnion pin x 2, Trunnion pivot bracket x 2, Flat washer x 2
Clevis	1	CG-D020	CG-D025	CG-D032	CG-D040	CG-D050	CG-D063	CG-D080	CG-D100	Clevis x 1, Bracket mounting bolt x 4, Clevis pin x 1, Retaining ring x 2
Pivot bracket	1	CG-020-24A	CG-025-24A	CG-032-24A	CG-040-24A	CG-050-24A	CG-063-24A	CG-080-24A	CG-100-24A	Pivot bracket x 1

Note) Order two foot brackets per cylinder.

Mass

(mm)

Bore size (mm)		20	25	32	40	50	63	80	100
Basic mass	Basic style	0.11	0.18	0.28	0.44	0.83	1.17	2.23	3.43
	Axial foot style	0.22	0.31	0.44	0.66	1.31	1.89	3.19	5.18
	Flange style	0.19	0.28	0.42	0.64	1.17	1.67	2.94	4.78
	Trunnion style	0.12	0.20	0.31	0.49	0.97	1.31	—	—
	Clevis style	0.16	0.26	0.43	0.67	1.23	1.85	2.94	4.71
Pivot bracket		0.08	0.09	0.17	0.25	0.44	0.80	0.98	1.75
Single knuckle joint		0.05	0.09	0.09	0.10	0.22	0.22	0.39	0.57
Double knuckle joint (With pin)		0.05	0.09	0.09	0.13	0.26	0.26	0.64	1.31
Additional mass per each 50 mm of stroke		0.05	0.07	0.09	0.15	0.22	0.26	0.35	0.49

Calculation: (Example) **CG1YL20-100**
(Foot style, ø20, 100 st)

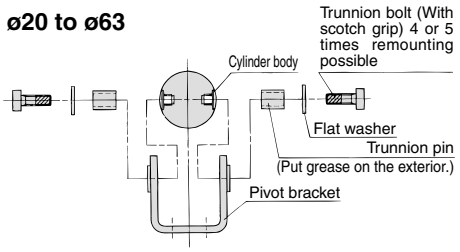
- Basic mass····· 0.22 (Foot, ø20)
- Additional mass····· 0.05/50 stroke
- Cylinder stroke····· 100 stroke
- 0.22 + 0.05 x 100/50 = 0.32 kg

Mounting Procedure

Mounting procedure for trunnion

Follow the procedures below when mounting a pivot bracket on the trunnion.

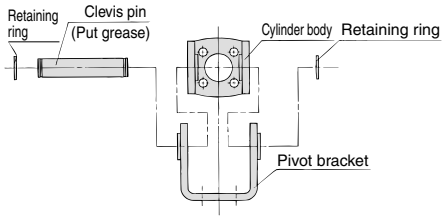
ø20 to ø63



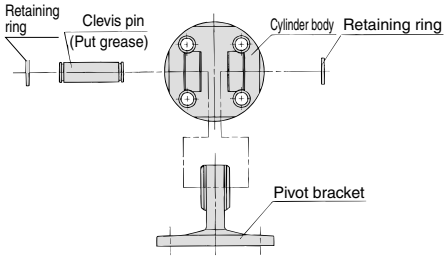
Mounting procedure for clevis

Follow the procedures below when mounting a pivot bracket on the clevis style.

ø20 to ø63



ø80, ø100



⚠Precautions

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠Warning

1. Operate within the specified cylinder speed.
Otherwise, cylinder and seal damage may occur.

2. When operating a cylinder as a single side fixed (Basic/flange style), a bending moment generated at the stroke end due to vibration will be applied to the cylinder, which may damage it. In such cases, install a bracket to prevent vibration or lower the piston speed until the cylinder does not vibrate at the stroke end.

⚠Caution

1. Tighten clevis bracket mounting bolts with the proper tightening torque shown listed below.
ø20: 1.5 N·m, ø25 to 32: 2.9 N·m, ø40: 4.9 N·m,
ø50: 11.8 N·m, ø63 to 80: 24.5 N·m, ø100: 42.2 N·m

Disassembly/Replacement

⚠Caution

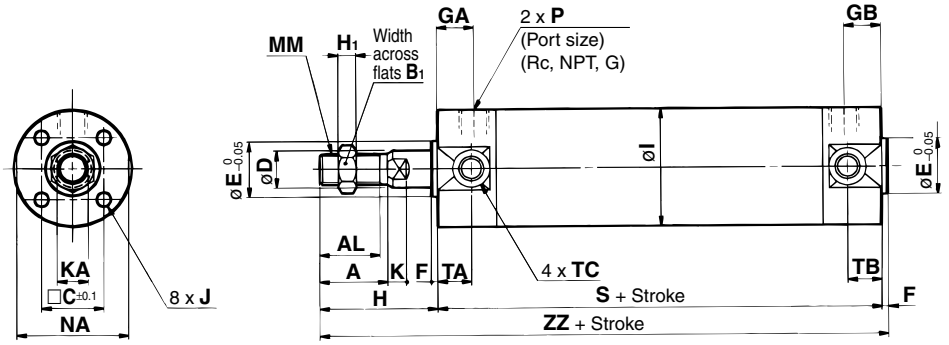
1. Do not replace the bushings.
The bushings are press-fit. To replace them, they must be replaced together with the cover assembly.

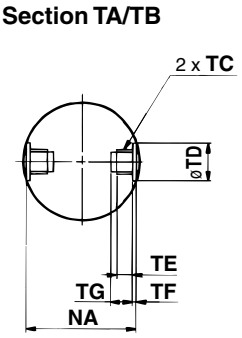
2.To replace a seal, apply grease to the new seal before installing it.
If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.

3. Those with a bore of ø50 or more cannot be disassembled.
When disassembling cylinders with bore sizes of ø20 through ø40, grip the double flat part of either the head cover or the rod cover with a vise and loosen the other side with a wrench or a monkey wrench, etc., and then remove the cover. When re-tightening, tighten approximately 2 degrees more than the original position. (Cylinders with ø50 or larger bore sizes are tightened with a large tightening torque and cannot be disassembled. Please contact SMC when disassembly is required.)

Dimensions: ø20 to ø100

Basic style: CG1YB





Section TA/TB

(mm)

Bore size (mm)	TC*	TDH9	TE	TF	TG
20	M5 x 0.8	$8^{+0.08}_{0}$	4	0.5	5.5
25	M6 x 0.75	$10^{+0.08}_{0}$	5	1	6.5
32	M8 x 1.0	$12^{+0.08}_{0}$	5.5	1	7.5
40	M10 x 1.25	$14^{+0.08}_{0}$	6	1.25	8.5
50	M12 x 1.25	$16^{+0.08}_{0}$	7.5	2	10
63	M14 x 1.5	$18^{+0.08}_{0}$	11.5	3	14.5

* Trunnion mounting taps for the width across flats NA are not attached to ø80 and ø100 types.

(mm)

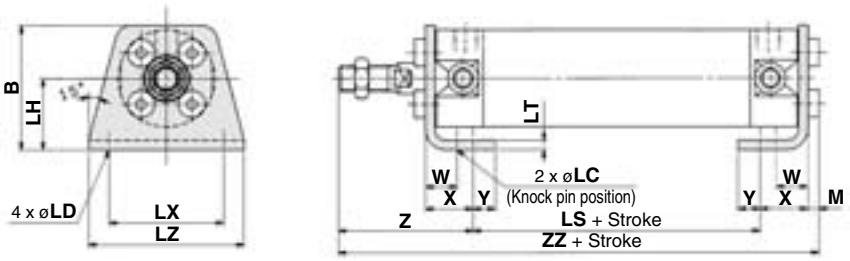
Bore size (mm)	Stroke range (mm)	A	AL	B1	C	D	E	F	H	H1	I	J	K	KA	MM	NA
20	Up to 200	18	15.5	13	14	8	12	2	35	5	26	M4 x 0.7 depth 7	5	6	M8 x 1.25	24
25	Up to 300	22	19.5	17	16.5	10	14	2	40	6	31	M5 x 0.8 depth 7.5	5.5	8	M10 x 1.25	29
32	Up to 300	22	19.5	17	20	12	18	2	40	6	38	M5 x 0.8 depth 8	5.5	10	M10 x 1.25	35.5
40	Up to 300	30	27	19	26	16	25	2	50	8	47	M6 x 1 depth 12	6	14	M14 x 1.5	44
50	Up to 300	35	32	27	32	20	30	2	58	11	58	M8 x 1.25 depth 16	7	18	M18 x 1.5	55
63	Up to 300	35	32	27	38	20	32	2	58	11	72	M10 x 1.5 depth 16	7	18	M18 x 1.5	69
80	Up to 300	40	37	32	50	25	40	3	71	13	89	M10 x 1.5 depth 22	10	22	M22 x 1.5	80
100	Up to 300	40	37	41	60	30	50	3	71	16	110	M12 x 1.75 depth 22	10	26	M26 x 1.5	100

(mm)

Bore size (mm)	Stroke range (mm)	S	TA	TB	ZZ	Rc, NPT port			G port		
						GA	GB	P	GA	GB	P
20	Up to 200	77	11	11	114	12	12	1/8	12	12	M5 x 0.8
25	Up to 300	77	11	11	119	12	12	1/8	12	12	M5 x 0.8
32	Up to 300	79	11	11	121	12	12	1/8	10	10	1/8
40	Up to 300	87	12	12	139	13	13	1/8	10	10	1/8
50	Up to 300	102	13	13	162	14	14	1/4	12	12	1/4
63	Up to 300	102	13	13	162	14	14	1/4	12	12	1/4
80	Up to 300	122	—	—	196	20	20	3/8	17	17	3/8
100	Up to 300	122	—	—	196	20	20	1/2	17	17	1/2

With Mounting Bracket

Axial foot style: CG1YL



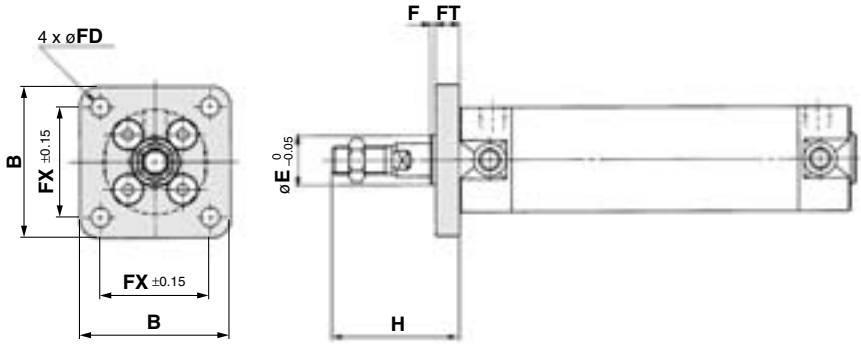
Axial Foot Style

(mm)

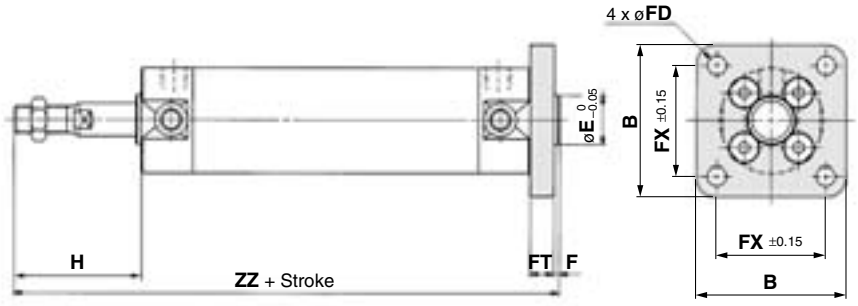
Bore size (mm)	B	LC	LD	LH	LS	LT	LX	LZ	M	W	X	Y	Z	ZZ
20	34	4	6	20	53	3	32	44	3	10	15	7	47	118
25	38.5	4	6	22	53	3	36	49	3.5	10	15	7	52	123.5
32	45	4	7	25	53	3	44	58	3.5	10	16	8	53	125.5
40	54.5	4	7	30	60	3	54	71	4	10	16.5	8.5	63.5	144
50	70.5	5	10	40	67	4.5	66	86	5	17.5	22	11	75.5	169.5
63	82.5	5	12	45	67	4.5	82	106	5	17.5	22	13	75.5	169.5
80	101	6	11	55	74	4.5	100	125	5	20	28.5	14	95	202.5
100	121	6	14	65	74	6	120	150	7	20	30	16	95	206

∗ Other dimensions are the same as basic style.

Rod side flange style: CG1YF



Head side flange style: CG1YG



Flange Style

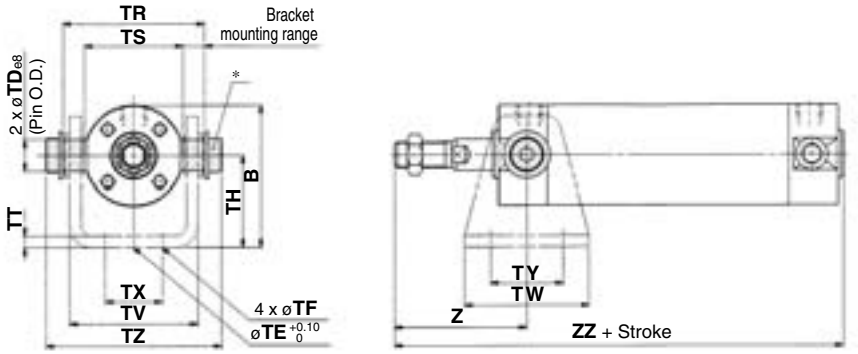
(mm)

Bore size (mm)	B	E	F	FX	FD	FT	H	Head side flange ZZ
20	40	12	2	28	5.5	6	35	120
25	44	14	2	32	5.5	7	40	126
32	53	18	2	38	6.6	7	40	128
40	61	25	2	46	6.6	8	50	147
50	76	30	2	58	9	9	58	171
63	92	32	2	70	11	9	58	171
80	104	40	3	82	11	11	71	207
100	128	50	3	100	14	14	71	210

Note) End boss is machined on the flange for øE.
∗ Other dimensions are the same as basic style.

With Mounting Bracket

Rod side trunnion style: CG1YU



Trunnion Style

(mm)

Bore size (mm)	B	TDe8	TE	TF	TH	TR	TS	TT	TV
20	38	8 −0.025 −0.047	10	5.5	25	39	28	3.2	(35.8)
25	45.5	10 −0.025 −0.047	10	5.5	30	43	33	3.2	(39.8)
32	54	12 −0.032 −0.059	10	6.6	35	54.5	40	4.5	(49.4)
40	63.5	14 −0.032 −0.059	10	6.6	40	65.5	49	4.5	(58.4)
50	79	16 −0.032 −0.059	20	9	50	80	60	6	(72.4)
63	96	18 −0.032 −0.059	20	11	60	9	74	8	(90.4)

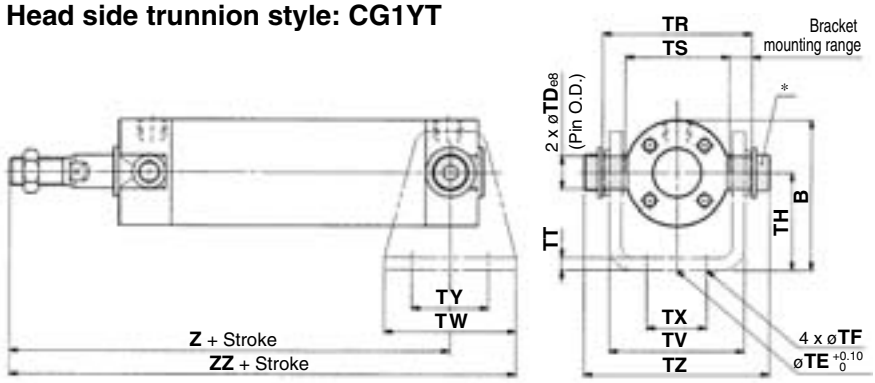
Bore size (mm)	TW	TX	TY	TZ	Rod side	Head side	
					Z	Z	ZZ
20	42	16	28	47.6	46	101	122
25	42	20	28	53	51	106	127
32	48	22	28	67.7	51	108	132
40	56	30	30	78.7	62	125	153
50	64	36	36	98.6	71	147	179
63	74	46	46	119.2	71	147	184

∗ Consists of pin, flat washer and hexagon socket head cap bolt.

Note) Refer to page 1089 for pivot bracket.

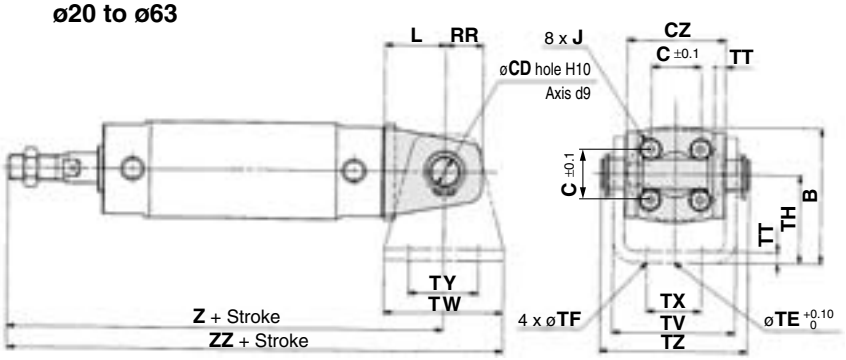
∗ Other dimensions are the same as basic style.

Head side trunnion style: CG1YT



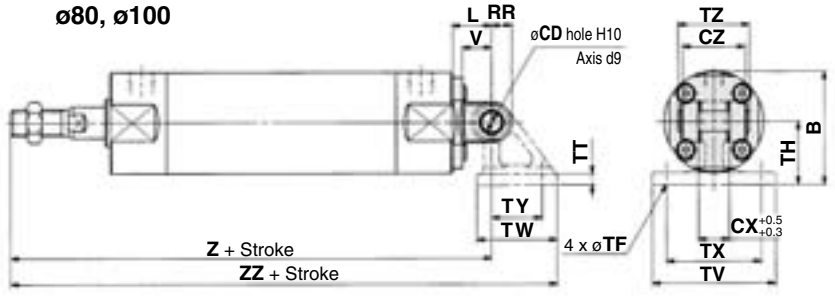
Clevis style: CG1YD

ø20 to ø63



(The above shows the case port location is changed by 90°.)

ø80, ø100



Clevis Style

(mm)

Bore size (mm)	B	CD	CX	CZ	L	RR	V	TE	TF	TH
20	38	8	—	29	14	11	—	10	5.5	25
25	45.5	10	—	33	16	13	—	10	5.5	30
32	54	12	—	40	20	15	—	10	6.6	35
40	63.5	14	—	49	22	18	—	10	6.6	40
50	79	16	—	60	25	20	—	20	9	50
63	96	18	—	74	30	22	—	20	11	60
80	99.5	18	28	56	35	18	26	—	11	55
100	120	22	32	64	43	22	32	—	13.5	65

Bore size (mm)	TT	TV	TW	TX	TY	TZ	Z	ZZ	Applicable pin part no.
20	3.2	(35.8)	42	16	28	43.4	126	147	CD-G02
25	3.2	(39.8)	42	20	28	48	133	154	CD-G25
32	4.5	(49.4)	48	22	28	59.4	139	163	CD-G03
40	4.5	(58.4)	56	30	30	71.4	159	187	CD-G04
50	6	(72.4)	64	36	36	86	185	217	CD-G05
63	8	(90.4)	74	46	46	105.4	190	227	CD-G06
80	11	110	72	85	45	64	228	286.5	IY-G08
100	12	130	93	100	60	72	236	312.5	IY-G10

Note) Refer to page 1089 for pivot bracket.

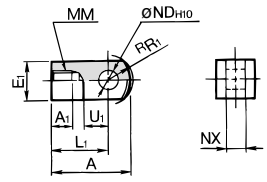
∗ Other dimensions are the same as basic style.

∗ Clevis pin and retaining ring are attached for the clevis style.

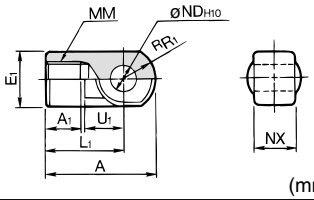
Accessory Bracket Dimensions

Single Knuckle Joint

I-G02/G03
Material: Rolled steel



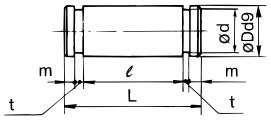
I-G04/G05/G08/G10
Material: Cast iron



(mm)

Part no.	Applicable bore (mm)	A	A_1	E_1	L_1	MM	R_1	U_1	ND_{H10}	NX
I-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	$8^{+0.058}_{0}$	$8^{-0.2}_{-0.4}$
I-G03	25,32	41	10.5	□20	30	M10 x 1.25	12.8	14	$10^{+0.058}_{0}$	$10^{-0.2}_{-0.4}$
I-G04	40	42	14	ø22	30	M14 x 1.5	12	14	$10^{+0.058}_{0}$	$18^{-0.3}_{-0.5}$
I-G05	50,63	56	18	ø28	40	M18 x 1.5	16	20	$14^{+0.070}_{0}$	$22^{-0.3}_{-0.5}$
I-G08	80	71	21	ø38	50	M22 x 1.5	21	27	$18^{+0.070}_{0}$	$28^{-0.3}_{-0.5}$
I-G10	100	79	21	ø44	55	M26 x 1.5	24	31	$22^{+0.084}_{0}$	$32^{-0.3}_{-0.5}$

Knuckle Pin

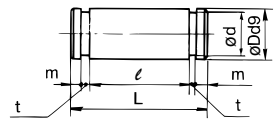


Material: Carbon steel (mm)

Part no.	Applicable bore (mm)	Dd9	L	d	ℓ	m	t	Applicable retaining ring
IY-G02	20	$8^{-0.040}_{-0.076}$	21	7.6	16.2	1.5	0.9	Type C 8 for axis
IY-G03	25, 32	$10^{-0.040}_{-0.076}$	25.6	9.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04	40	$10^{-0.040}_{-0.076}$	41.6	9.6	36.2	1.55	1.15	Type C 10 for axis
IY-G05	50, 63	$14^{-0.050}_{-0.093}$	50.6	13.4	44.2	2.05	1.15	Type C 14 for axis
IY-G08	80	$18^{-0.050}_{-0.093}$	64	17	56.2	2.55	1.35	Type C 18 for axis
IY-G10	100	$22^{-0.065}_{-0.117}$	72	21	64.2	2.55	1.35	Type C 22 for axis

∗ Retaining rings are shipped together.

Clevis Pin

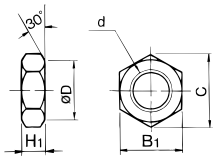


Material: Carbon steel (mm)

Part no.	Applicable bore (mm)	Dd9	L	d	ℓ	m	t	Applicable retaining ring
CD-G02	20	$8^{-0.040}_{-0.076}$	43.4	7.6	38.6	1.5	0.9	Type C 8 for axis
CD-G25	25	$10^{-0.040}_{-0.076}$	48	9.6	42.6	1.55	1.15	Type C 10 for axis
CD-G03	32	$12^{-0.050}_{-0.093}$	59.4	11.5	54	1.55	1.15	Type C 12 for axis
CD-G04	40	$14^{-0.050}_{-0.093}$	71.4	13.4	65	2.05	1.15	Type C 14 for axis
CD-G05	50	$16^{-0.050}_{-0.093}$	86	15.2	79.6	2.05	1.15	Type C 16 for axis
CD-G06	63	$18^{-0.050}_{-0.093}$	105.4	17	97.8	2.45	1.35	Type C 18 for axis

∗ Retaining rings are shipped together.
∗ Clevis pin and knuckle pin are common for bore size ø80 and ø100.

Rod End Nut

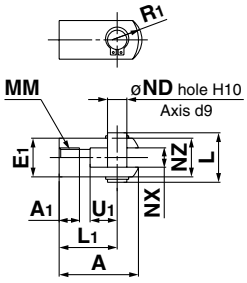


Material: Rolled steel (mm)

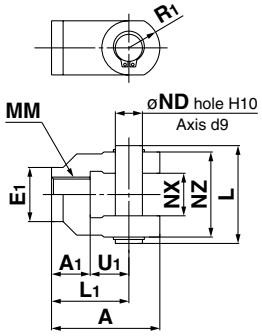
Part no.	Applicable bore (mm)	d	H_1	B_1	C	D
NT-02	20	M8 x 1.25	5	13	(15)	12.5
NT-03	25, 32	M10 x 1.25	6	17	(19.6)	16.5
NT-G04	40	M14 x 1.5	8	19	(21.9)	18
NT-05	50, 63	M18 x 1.5	11	27	(31.2)	26
NT-08	80	M22 x 1.5	13	32	(37.0)	31
NT-10	100	M26 x 1.5	16	41	(47.3)	39

Double Knuckle Joint

Y-G02/G03
Material: Rolled steel



Y-G04/G05/G08/G10
Material: Cast iron



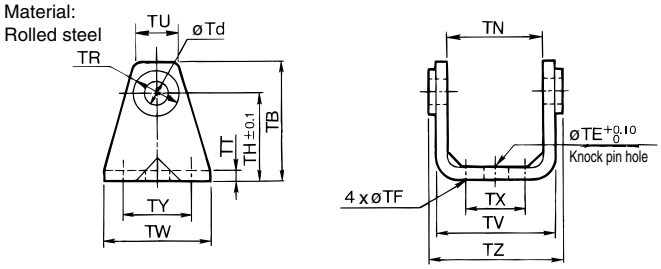
(mm)

Part no.	Applicable bore (mm)	A	A_1	E_1	L_1	MM	R_1	U_1	ND	NX	NZ	L	Applicable pin part no.
Y-G02	20	34	8.5	□16	25	M8 x 1.25	10.3	11.5	8	$8^{+0.4}_{+0.2}$	16	21	IY-G02
Y-G03	25, 32	41	10.5	□20	30	M10 x 1.25	12.8	14	10	$10^{+0.4}_{+0.2}$	20	25.6	IY-G03
Y-G04	40	42	16	ø22	30	M14 x 1.5	12	14	10	$18^{+0.5}_{+0.3}$	36	41.6	IY-G04
Y-G05	50, 63	56	20	ø28	40	M18 x 1.5	16	20	14	$22^{+0.5}_{+0.3}$	44	50.6	IY-G05
Y-G08	80	71	23	ø38	50	M22 x 1.5	21	27	18	$28^{+0.5}_{+0.3}$	56	64	IY-G08
Y-G10	100	79	24	ø44	55	M26 x 1.5	24	31	22	$32^{+0.5}_{+0.3}$	64	72	IY-G10

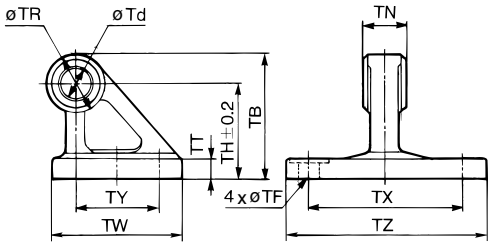
∗ Knuckle pin and retaining ring are shipped together.

Pivot Bracket (Order separately)

ø20 to ø63
Material:
Rolled steel



ø80, ø100
Material: Cast iron



(mm)

Part no.	Applicable bore (mm)	TB	Td	TE	TF	TH	TN	TR	TT
CG-020-24A	20	36	8	10	5.5	25	(29.3)	13	3.2
CG-025-24A	25	43	10	10	5.5	30	(33.1)	15	3.2
CG-032-24A	32	50	12	10	6.6	35	(40.4)	17	4.5
CG-040-24A	40	58	14	10	6.6	40	(49.2)	21	4.5
CG-050-24A	50	70	16	20	9	50	(60.4)	24	6
CG-063-24A	63	82	18	20	11	60	(74.6)	26	8
CG-080-24A	80	73	18	—	11	55	28^{-01}_{-03}	36	11
CG-100-24A	100	90	22	—	13.5	65	32^{-01}_{-08}	50	12

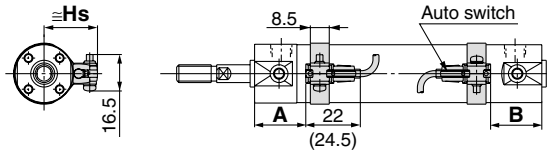
Part no.	Applicable bore (mm)	TU	TV	TW	TX	TY	TZ	Applicable pin O.D.
CG-020-24A	20	(18.1)	(35.8)	42	16	28	38.3	$8d_9$ $^{-0.040}_{-0.076}$
CG-025-24A	25	(20.7)	(39.8)	42	20	28	42.1	$10d_9$ $^{-0.040}_{-0.076}$
CG-032-24A	32	(23.6)	(49.4)	48	22	28	53.8	$12d_9$ $^{-0.050}_{-0.093}$
CG-040-24A	40	(27.3)	(58.4)	56	30	30	64.6	$14d_9$ $^{-0.050}_{-0.093}$
CG-050-24A	50	(29.7)	(72.4)	64	36	36	79.2	$16d_9$ $^{-0.050}_{-0.093}$
CG-063-24A	63	(34.3)	(90.4)	74	46	46	97.2	$18d_9$ $^{-0.050}_{-0.093}$
CG-080-24A	80	—	—	72	85	45	110	$18d_9$ $^{-0.050}_{-0.093}$
CG-100-24A	100	—	—	93	100	60	130	$22d_9$ $^{-0.065}_{-0.117}$

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

Reed auto switch

D-A9□

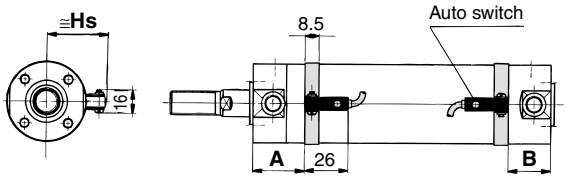
ø20 to ø63



( ): For D-A93 type

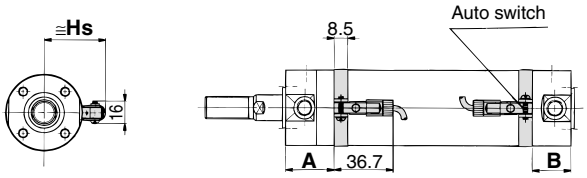
D-C7, C8

ø20 to ø63



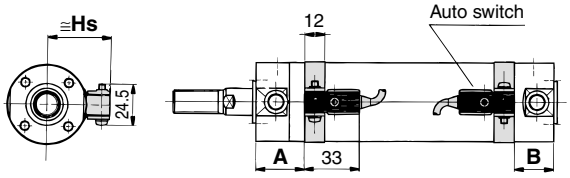
D-C73C, C80C

ø20 to ø63



D-B5, B6, B59W

ø20 to ø100

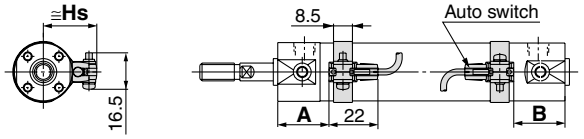


Solid state auto switch

D-M9□

D-M9□W

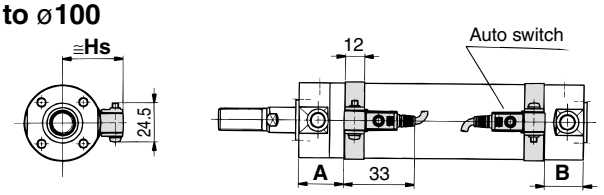
ø20 to ø63



D-G5, K5, G5□W

D-K59W, D-G59F, D-G5NTL

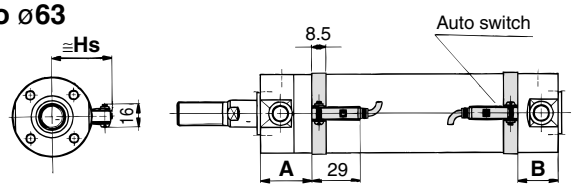
ø20 to ø100



D-H7□, H7□W

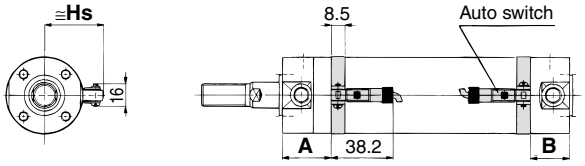
D-H7NF

ø20 to ø63



D-H7C

ø20 to ø63



Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size (mm)	D-A9□		D-M9□ D-M9□W		D-C7/C8 D-C73C D-C80C		D-B5 D-B6		D-B59W		D-H7□ D-H7C D-H7□W D-H7NF		D-G5□W D-K59W D-G59F D-G5 D-K5 D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	29	28	33	32	29.5	28.5	23.5	22.5	26.5	25.5	28.5	27.5	25	24
25	29	28	33	32	29.5	28.5	23.5	22.5	26.5	25.5	28.5	27.5	25	24
32	30	29	34	33	30.5	29.5	24.5	23.5	27.5	26.5	29.5	28.5	26	25
40	35	32	39	36	35.5	32.5	29.5	26.5	32	29.5	34.5	31.5	31	28
50	42	40	46	44	42.5	40.5	36.5	34.5	39.5	37.5	41.5	39.5	38	36
63	42	40	46	44	42.5	40.5	36.5	34.5	39.5	37.5	41.5	39.5	38	36
80	—	—	—	—	—	—	46.5	44.5	49.5	47.5	—	—	48	46
100	—	—	—	—	—	—	46.5	44.5	49.5	47.5	—	—	48	46

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size (mm)	D-A9□ D-M9□ D-M9□W	D-C7/C8 D-H7□ D-H7□W D-H7NF	D-C73C D-C80C	D-B5/B6 D-K59W D-B59W D-G5NTL D-G5/K5 D-G59F D-G5□W D-H7C
	Hs	Hs	Hs	Hs
20	24	24.5	27	27.5
25	26.5	27	29.5	30
32	30	30.5	33	33.5
40	34.5	35	37.5	38
50	40	40.5	43	43.5
63	47	47.5	50	50.5
80	—	—	—	59
100	—	—	—	69.5

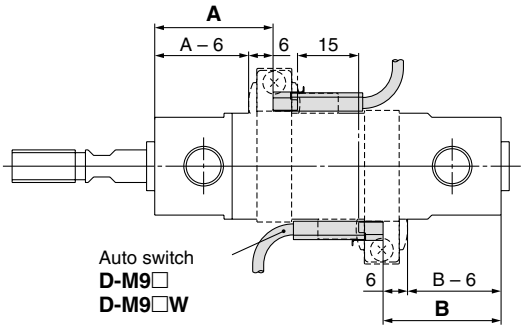
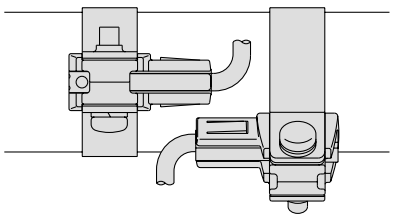
Note) Adjust the auto switch after confirming the operating conditions in the actual setting.

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	No. of auto switch mounted				
	1 pc.	2 pcs.		n pcs.	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9□ **D-M9□** **D-M9□W**	10	15 Note 1)	45 Note 1)	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	45 + 45 (n-2)
D-C7□ **D-C80**	10	15	50	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	50 + 45 (n-2)
D-H7□ **D-H7□W** **D-H7NF**	10	15	60	$15 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6···)	60 + 45 (n-2)
D-C73C **D-C80C**	10	15	65	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	65 + 50 (n-2)
D-B5□ **D-B64** **D-G5□** **D-K59□**	10	15	75	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	75 + 55(n-2)
D-B59W	15	20	75	$20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6···)	75 + 55(n-2)

Note 1) Auto switch mounting

Auto switch model	With 2 auto switches	
	Different surfaces Note 1)	Same surface Note 1)
	 The proper auto switch mounting position is 6 mm inward from the switch holder edge.	 The auto switch is mounted by slightly displacing it in a direction (cylinder tube circumferential exterior) so that the auto switch and lead wire do not interfere with each other.
D-A93	—	Less than 50 strokes Note 2)
D-M9□ **D-M9□W**	Less than 20 strokes Note 2)	Less than 55 strokes Note 2)

Note 2) Minimum stroke for mounting auto switches in the other mounting styles mentioned in note 1.

Operating Range

(mm)

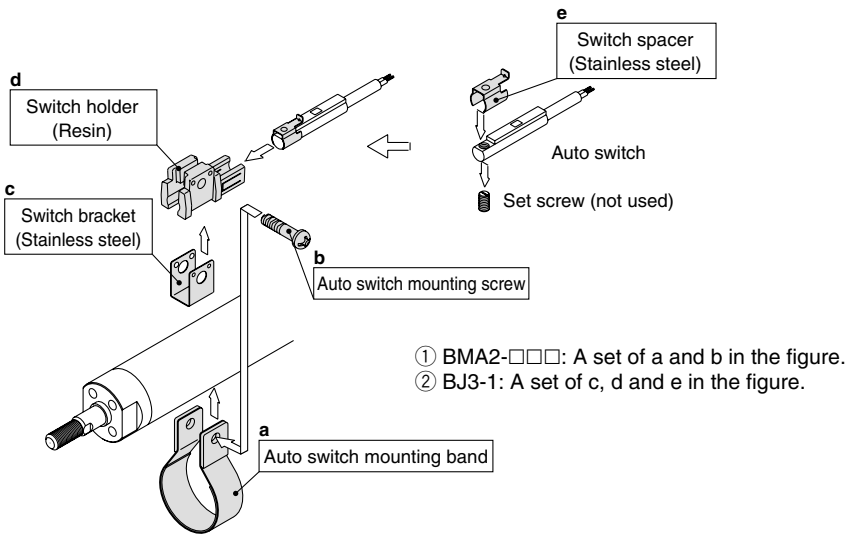
Auto switch model	Bore size							
	20	25	32	40	50	63	80	100
D-A9□	7	6	8	8	8	9	—	—
D-M9□ D-M9□W	4.5	5	4.5	5.5	5	5.5	—	—
D-C7/C80 D-C73C/C80C	8	10	9	10	10	11	—	—
D-B5□/B64	8	10	9	10	10	11	11	11
D-B59W	13	13	14	14	14	17	16	18
D-H7□/H7□W D-H7NF	4	4	4.5	5	6	6.5	—	—
D-H7C	7	8.5	9	10	9.5	10.5	—	—
D-G5□/G5□W/G59F D-G5BAL/K59/K59W	4	4	4.5	5	6	6.5	6.5	7
D-G5NTL	4	4	4.5	5	6	6.5	6.5	7
D-G5NBL	35	40	40	45	45	45	45	50

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion)
There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-A9□ D-M9□ D-M9□W	Note) ①BMA2-020 ②BJ3-1	Note) ①BMA2-025 ②BJ3-1	Note) ①BMA2-032 ②BJ3-1	Note) ①BMA2-040 ②BJ3-1	Note) ①BMA2-050 ②BJ3-1	Note) ①BMA2-063 ②BJ3-1	—	—
D-C7□/C80 D-C73C D-C80C D-H7□ D-H7□W D-H7NF	BMA2-020	BMA2-025	BMA2-032	BMA2-040	BMA2-050	BMA2-063	—	—
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NTL D-G5NBL	BA-01	BA-02	BA-32	BA-04	BA-05	BA-06	BA-08	BA-10

Note) Two kinds of auto switch mounting brackets are used as a set.



① BMA2-□□□: A set of a and b in the figure.
② BJ3-1: A set of c, d and e in the figure.

Cylinder Bracket by Stroke/Auto Switch Mounting Surface

Auto switch mounting surface varies depending on mounting brackets and cylinder strokes. Refer to the table below.

(mm)

No. of auto switches	Basic style, Foot style, Flange style, Clevis style			Trunnion style		
	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)	1 (Rod cover side)	2 (Different surfaces)	2 (Same surface)
Switch mounting surface / Switch type	Port surface 	Port surface 	Port surface 			
D-A9□ D-M9□ D-M9□W	10 st or more	15 to 44st	45 st or more	10 st or more	15 to 44 st	45 st or more
D-C7/C8	10 st or more	15 to 49st	50 st or more	10 st or more	15 to 49 st	50 st or more
D-H7□/H7□W D-H7NF	10 st or more	15 to 59st	60 st or more	10 st or more	15 to 59 st	60 st or more
D-C73C/C80C/H7C	10 st or more	15 to 64st	65 st or more	10 st or more	15 to 64 st	65 st or more
D-B5/B6/G5/K5 D-G5□W/K59W D-G59F/G5NTL	10 st or more	15 to 74st	75 st or more	10 st or more	15 to 74 st	75 st or more
D-B59W	15 st or more	20 to 74st	75 st or more	15 st or more	20 to 74 st	75 st or more

∗ Trunnion style is not available for bore sizes ø80 and ø100.

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted.
For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features	Applicable bore size
Reed	D-C73, C76	Grommet (In-line)	—	ø20 to ø63
	D-C80		Without indicator light	
	D-B53		—	ø20 to ø100
Solid state	D-H7A1, H7A2, H7B		—	ø20 to ø63
	D-H7NW, H7PW, H7BW		Diagnostic indication (2-color indication)	
	D-G5NTL		With timer	ø20 to ø100

∗ With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 to 1785.
∗ Normally closed (NC = b contact), solid state auto switches (D-F9G, F9H type) are also available. For details, refer to page 1746.
∗ Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

Smooth Cylinder

Series CA2Y

ø40, ø50, ø63, ø80, ø100

How to Order

CA2Y [L] [40] [ ] – [150] – [ ]

With auto switch **CDA2Y** [L] [40] [ ] – [150] – [M9BW] [ ] [ ]

With auto switch
(Built-in magnet)

Mounting style

B	Basic 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

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

Thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to "Standard Stroke" on page 1095.

Auto switch

Nil	Without auto switch

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

Number of auto switches

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

Made to Order
For details, refer to page 1095.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDA2YB40-100

Applicable Auto Switch/Refer to pages 1719 to 1827 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 (m): 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC
								—	G59	●	—	●	○	○		
				3-wire (PNP)				M9P	—	●	●	●	○	○		
								—	G5P	●	—	●	○	○		
				2-wire		12 V		M9B	—	●	●	●	○	○	—	
								—	K59	●	—	●	○	○		
					—	—	100 V, 200 V	J51	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	12 V	—	G39C	G39	—	—	—	—	—	IC circuit	
				2-wire				K39C	K39	—	—	—	—	—		
	Diagnostic indication (2-color)	Grommet		3-wire (NPN)		5 V, 12 V		M9NW	—	●	●	●	○	○		
								—	G59W	●	—	●	○	○		
				3-wire (PNP)				M9PW	—	●	●	●	○	○		
								—	G5PW	●	—	●	○	○		
				2-wire		12 V		M9BW	—	●	●	●	○	○	—	
								—	K59W	●	—	●	○	○		
	With diagnostic output (2-color)			4-wire(NPN)		5 V, 12 V		F59F	G59F	●	—	●	○	○	IC circuit	
	Magnetic field resistant (2-color)			2-wire (Non-polar)		—		P3DW	—	●	—	●	●	○	—	
								P4DW	—	—	—	●	●	○		
Reed switch	—	Grommet	Yes	3-wire (Equiv. NPN)	—	5 V	—	A96**	—	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93**	—	●	—	●	—	—	—	Relay, PLC
			No				100 V or less	A90**	—	●	—	●	—	—	IC circuit	
			Yes				100 V, 200 V	A54	B54	●	—	●	●	—	—	
			No				200 V or less	A64	B64	●	—	●	—	—		
		Terminal conduit	Yes				—	A33C	A33	—	—	—	—	—	—	
							100 V, 200 V	A34C	A34	—	—	—	—	—		PLC
		DIN terminal						A44C	A44	—	—	—	—	—		Relay, PLC
	Diagnostic indication (2-color)	Grommet				—	—	A59W	B59W	●	—	●	—	—		

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

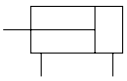
∗ ○: Manufactured upon receipt of order.
∗∗ D-A9□/A9□V types cannot be mounted on ø50.

∗ In addition to the models in the above table, there are some other auto switches that are applicable. For more information, refer to page 1108.
∗ Refer to pages 1784 and 1785 for details of auto switches with a pre-wired connector. For D-P3DW□, refer to pages 1773-1 and 1773-2.
∗ D-A9□/M9□□□/P3DW□ auto switches are shipped together (not assembled). (Only auto switch mounting brackets are assembled before shipped for D-A9□ and M9□□□.)

Specifications

Bore size (mm)	40	50	63	80	100
Action	Double acting				
Operating piston speed	5 to 500 mm/s				
Fluid	Air				
Proof pressure	1.05 MPa				
Maximum operating pressure	0.7 MPa				
Ambient and fluid temperature	Without auto switch –10 to 70°C (with no freezing)				
	With auto switch –10 to 60°C (with no freezing)				
Cushion	None				
Lubrication	Not required (Non-lube)				
Mounting	Basic, Axial foot, Front flange, Rear flange, Single clevis, Double clevis Center trunnion				
Allowable leakage rate	0.5 ℓ/min (ANR)				

JIS Symbol



Minimum Operating Pressure

Unit: MPa

Bore size (mm)	40	50	63	80	100
Minimum operating pressure	0.02	0.01			

Standard Stroke

Bore size (mm)	Standard stroke (mm)
40	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500
50, 63	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600
80, 100	25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 350, 400, 450, 500, 600, 700

Note 1) Intermediate strokes not listed above are also available. Please consult with SMC for strokes outside the above ranges.
Note 2) As the stroke increases, more sliding resistance may result due to the deflection of the piston rod and other factors. Take measures such as the installation of a guide.

Accessory

Mounting		Basic	Foot	Front flange	Rear flange	Single clevis	Double clevis	Center trunnion
Standard	Rod end nut	●	●	●	●	●	●	●
	Clevis pin	—	—	—	—	—	●	—
Option	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (with pin)	●	●	●	●	●	●	●

Made to Order
(For details, refer to pages 1829 to 1954.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC6	Made of stainless steel
—XC7	Tie-rod, cushion valve and tie-rod nut made of stainless steel
—XC9	Adjustable stroke cylinder/adjustable retraction type
—XC14	Change of trunnion bracket mounting position
—XC15	Change of tie-rod length
—XC27	Double clevis and double knuckle joint pins made of stainless steel
—XC28	Compact flange made of SS400
—XC29	Double knuckle joint with spring pin
—XC30	Rod side trunnion
—XC65	-XC6 + -XC7

Replacement Parts: Seal Kit

Bore size (mm)	Kit no.	Contents
40	CA2Y40-PS	Rod seal 1 pc.
50	CA2Y50-PS	Piston seal 1 pc.
63	CA2Y63-PS	Cylinder tube gasket 2 pcs.
80	CA2Y80-PS	Grease pack (10 g) 1 pc.
100	CA2Y100-PS	

When only grease for maintenance is necessary, please order by the following part numbers.
Grease pack part no.: **GR-L-005** (5 g)
GR-L-010 (10 g)
GR-L-150 (150 g)

Mass

(kg)

Bore size (mm)		40	50	63	80	100
Basic mass	Basic style	0.89	1.36	2.00	3.48	4.87
	Axial foot style	1.08	1.58	2.34	4.15	5.86
	Flange style	1.26	1.81	2.79	4.93	6.79
	Single clevis style	1.12	1.70	2.63	4.59	6.65
	Double clevis style	1.16	1.79	2.79	4.88	7.17
	Trunnion style	1.25	1.84	2.80	5.03	7.15
Additional mass per each 50 mm of stroke		0.22	0.28	0.37	0.52	0.65
Accessory	Single knuckle	0.23	0.26	0.26	0.60	0.83
	Double knuckle (With pin)	0.37	0.43	0.43	0.87	1.27

Calculation: (Example) **CA2YL40-100**/Axial foot
- Basic mass·····1.08 kg
- Additional mass·····0.22/50 stroke
- Cylinder stroke·····100 stroke

1.08 + 0.22 x 100/50 = 1.52 kg

Low Friction Cylinder Mounting (Accessory)

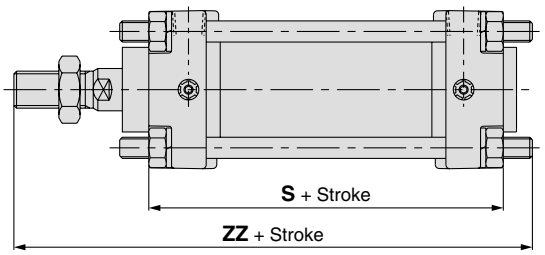
CDA2Y [Mounting style] [Bore size] – [Stroke] – **X1854**

• **Same mounting specification as CDA2Q**

In order to adjust the mounting dimensions of the low friction cylinder (CDA2Q), extend the longitudinal dimension (S, ZZ) by 10 mm.

∗ Cylinders without a built-in magnet can be interchangeable.

Dimensions

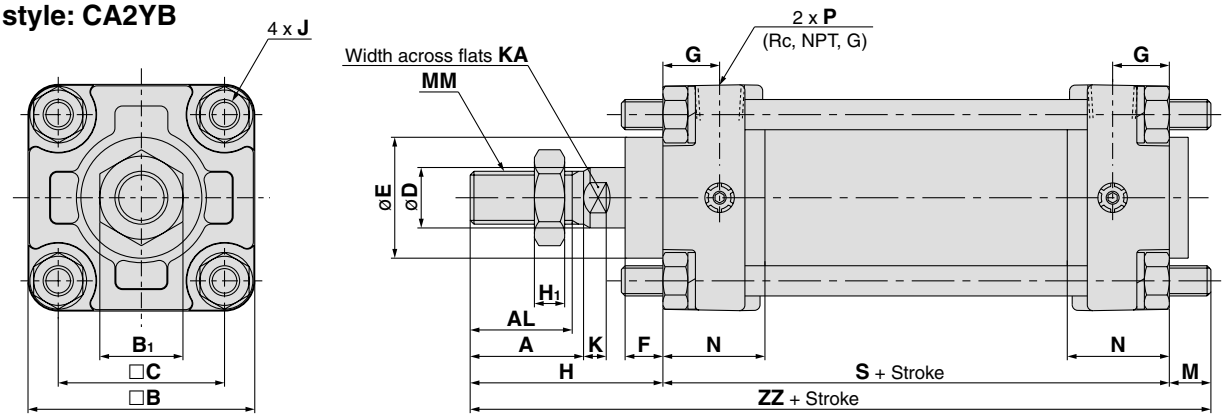


Bore size (mm)	S	ZZ
40	94	156
50	100	169
63	108	180
80	126	214
100	136	225

∗ Add 10 mm to S and ZZ dimensions of the double acting, single rod type on pages 1097 to 1101 for the dimensions for each mounting bracket other than the basic style.

Dimensions: ø40 to ø100

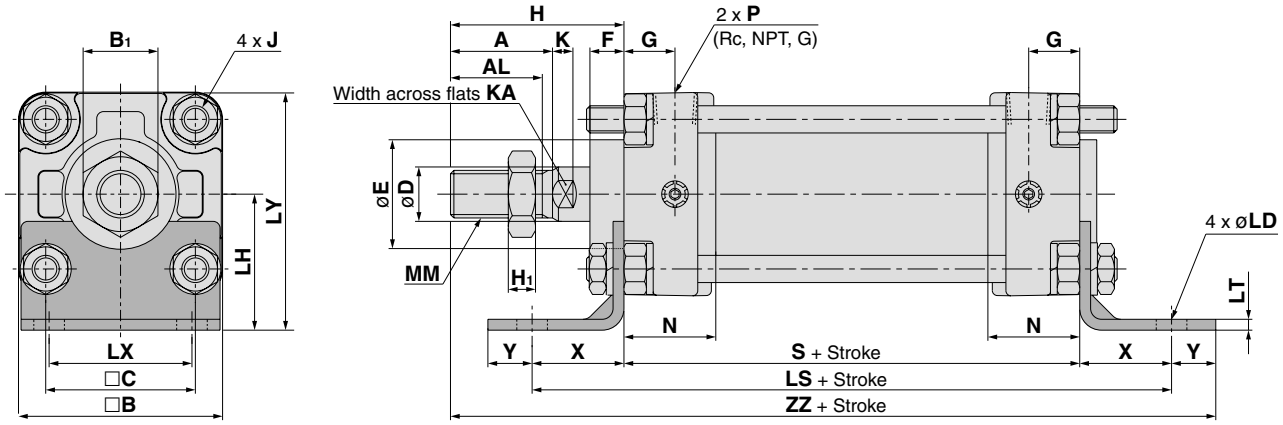
Basic style: CA2YB



(mm)

Bore size (mm)	Stroke range	A	AL	□B	B1	□C	D	E	F	G	H	H1	J	K	KA	M	MM	N	P	S	ZZ
40	Up to 500	30	27	60	22	44	16	32	10	15	51	8	M8 x 1.25	6	14	11	M14 x 1.5	27	1/4	84	146
50	Up to 600	35	32	70	27	52	20	40	10	17	58	11	M8 x 1.25	7	18	11	M18 x 1.5	30	3/8	90	159
63	Up to 600	35	32	85	27	64	20	40	10	17	58	11	M10 x 1.25	7	18	14	M18 x 1.5	31	3/8	98	170
80	Up to 700	40	37	102	32	78	25	52	14	21	71	13	M12 x 1.75	10	22	17	M22 x 1.5	37	1/2	116	204
100	Up to 700	40	37	116	41	92	30	52	14	21	72	16	M12 x 1.75	10	26	17	M26 x 1.5	40	1/2	126	215

Axial foot: CA2YL

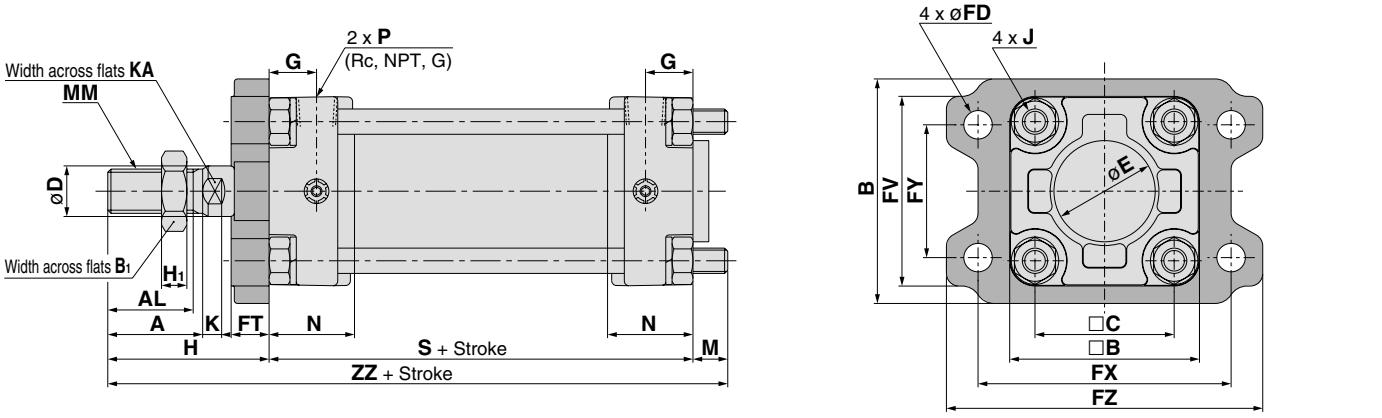


(mm)

Bore size (mm)	A	AL	B	B1	C	D	E	F	G	H1	J	K	KA	LD	LH	LS	LT	LX	LY
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	9.0	40	138	3.2	42	70
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	9.0	45	144	3.2	50	80
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	11.5	50	166	3.2	59	93
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	13.5	65	204	4.5	76	116
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	13.5	75	212	6.0	92	133

Bore size (mm)	MM	N	P	S	X	Y	H	ZZ
40	M14 x 1.5	27	1/4	84	27	13	51	175
50	M18 x 1.5	30	3/8	90	27	13	58	188
63	M18 x 1.5	31	3/8	98	34	16	58	206
80	M22 x 1.5	37	1/2	116	44	16	71	247
100	M26 x 1.5	40	1/2	126	43	17	72	258

Rod Side Flange Style: CA2YF

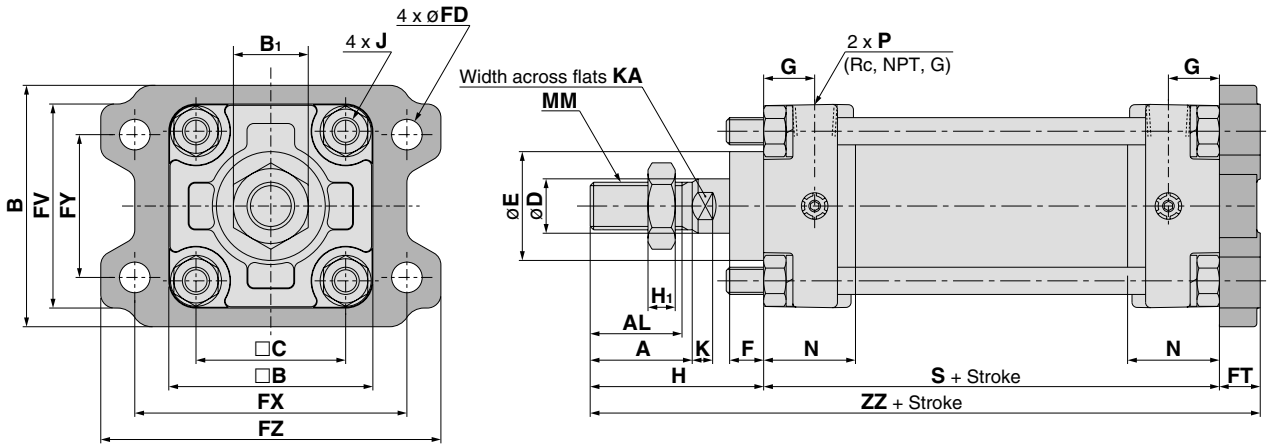


(mm)

Bore size (mm)	A	AL	FB	B	B_1	C	D	E	FV	FD	FT	FX	FY	FZ	G	H_1	J	K	KA	M	MM
40	30	27	71	60	22	44	16	32	60	9.0	12	80	42	100	15	8	M8 x 1.25	6	14	11	M14 x 1.5
50	35	32	81	70	27	52	20	40	70	9.0	12	90	50	110	17	11	M8 x 1.25	7	18	11	M18 x 1.5
63	35	32	101	85	27	64	20	40	86	11.5	15	105	59	130	17	11	M10 x 1.25	7	18	14	M18 x 1.5
80	40	37	119	102	32	78	25	52	102	13.5	18	130	76	160	21	13	M12 x 1.75	10	22	17	M22 x 1.5
100	40	37	133	116	41	92	30	52	116	13.5	18	150	92	180	21	16	M12 x 1.75	10	26	17	M26 x 1.5

Bore size (mm)	N	P	S	H	ZZ
40	27	1/4	84	51	146
50	30	3/8	90	58	159
63	31	3/8	98	58	170
80	37	1/2	116	71	204
100	40	1/2	126	72	215

Head Side Flange Style: CA2YG

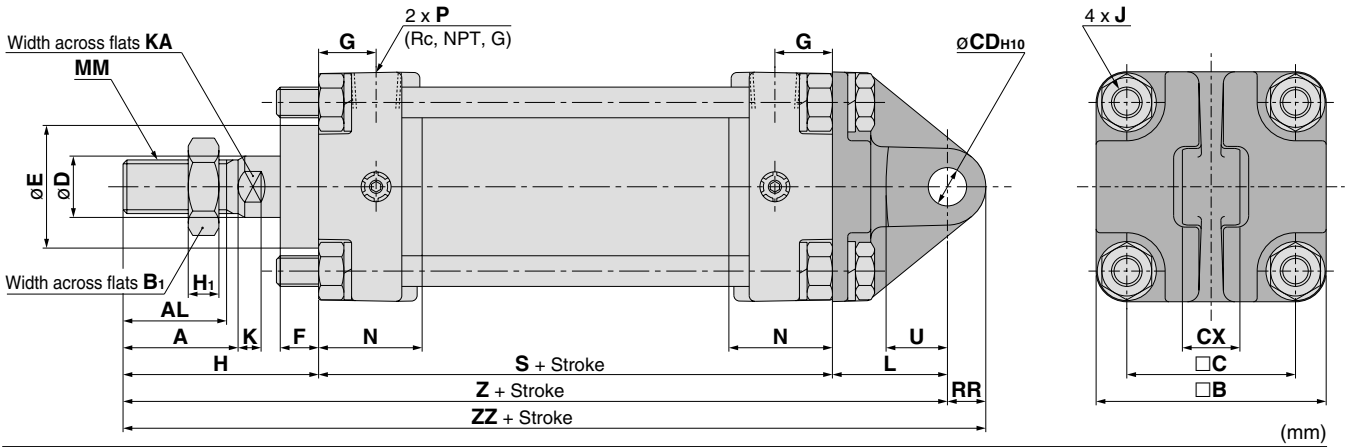


(mm)

Bore size (mm)	A	AL	FB	B	B_1	C	D	E	F	FV	FD	FT	FX	FY	FZ	G	H_1	J	K	KA
40	30	27	71	60	22	44	16	32	10	60	9.0	12	80	42	100	15	8	M8 x 1.25	6	14
50	35	32	81	70	27	52	20	40	10	70	9.0	12	90	50	110	17	11	M8 x 1.25	7	18
63	35	32	101	85	27	64	20	40	10	86	11.5	15	105	59	130	17	11	M10 x 1.25	7	18
80	40	37	119	102	32	78	25	52	14	102	13.5	18	130	76	160	21	13	M12 x 1.75	10	22
100	40	37	133	116	41	92	30	52	14	116	13.5	18	150	92	180	21	16	M12 x 1.75	10	26

Bore size (mm)	MM	N	P	S	H	ZZ
40	M14 x 1.5	27	1/4	84	51	147
50	M18 x 1.5	30	3/8	90	58	160
63	M18 x 1.5	31	3/8	98	58	171
80	M22 x 1.5	37	1/2	116	71	205
100	M26 x 1.5	40	1/2	126	72	216

Single Clevis Style: CA2YC

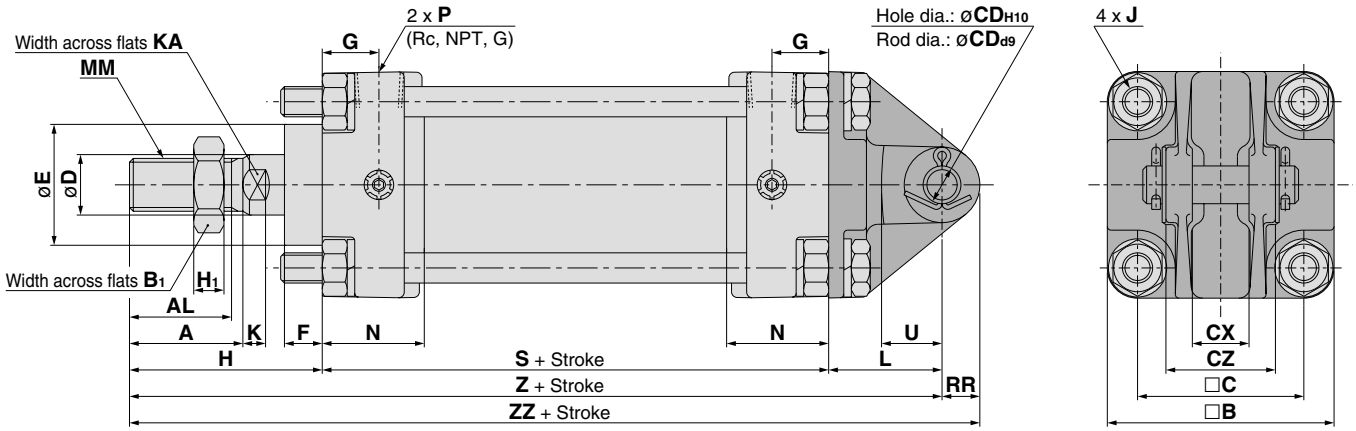


(mm)

Bore size (mm)	A	AL	B	B_1	C	CD^{H10}	CX	D	E	F	G	H_1	J	K	KA	L	MM
40	30	27	60	22	44	$10^{+0.058}_{0}$	$15.0^{-0.1}_{-0.3}$	16	32	10	15	8	M8 x 1.25	6	14	30	M14 x 1.5
50	35	32	70	27	52	$12^{+0.070}_{0}$	$18.0^{-0.1}_{-0.3}$	20	40	10	17	11	M8 x 1.25	7	18	35	M18 x 1.5
63	35	32	85	27	64	$16^{+0.070}_{0}$	$25.0^{-0.1}_{-0.3}$	20	40	10	17	11	M10 x 1.25	7	18	40	M18 x 1.5
80	40	37	102	32	78	$20^{+0.084}_{0}$	$31.5^{-0.1}_{-0.3}$	25	52	14	21	13	M12 x 1.75	10	22	48	M22 x 1.5
100	40	37	116	41	92	$25^{+0.084}_{0}$	$35.5^{-0.1}_{-0.3}$	30	52	14	21	16	M12 x 1.75	10	26	58	M26 x 1.5

Bore size (mm)	N	P	RR	S	U	H	Z	ZZ
40	27	1/4	10	84	16	51	165	175
50	30	3/8	12	90	19	58	183	195
63	31	3/8	16	98	23	58	196	212
80	37	1/2	20	116	28	71	235	255
100	40	1/2	25	126	36	72	256	281

Double Clevis Style: CA2YD



∗ Double clevis pins, double knuckle pins and retaining rings are shipped together.

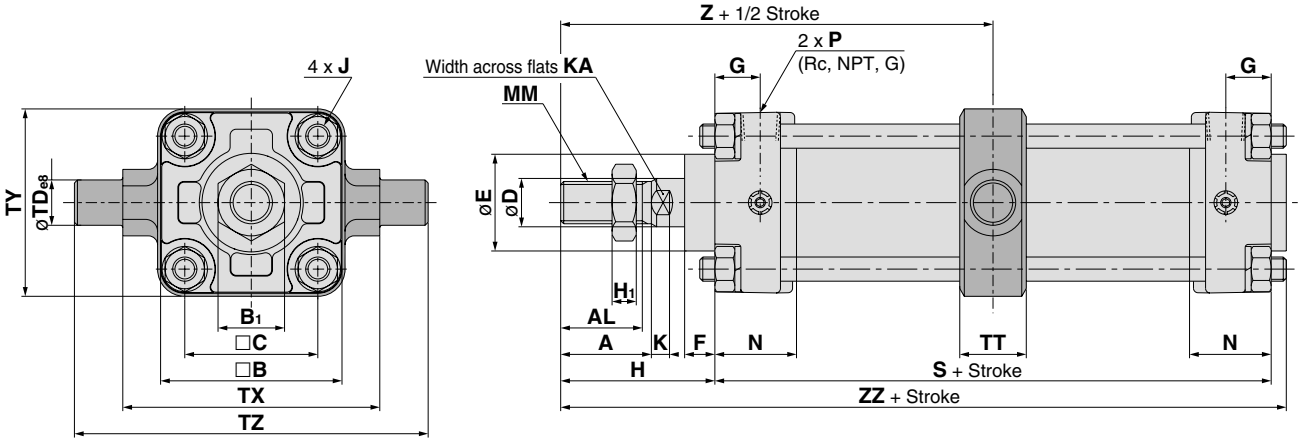
(mm)

Bore size (mm)	A	AL	B	B_1	C	CD	CX	CZ	D	E	F	G	H_1	J	K	KA	L	MM
40	30	27	60	22	44	$10^{+0.058}_{0}$	$15.0^{+0.3}_{+0.1}$	29.5	16	32	10	15	8	M8 x 1.25	6	14	30	M14 x 1.5
50	35	32	70	27	52	$12^{+0.070}_{0}$	$18.0^{+0.3}_{+0.1}$	38	20	40	10	17	11	M8 x 1.25	7	18	35	M18 x 1.5
63	35	32	85	27	64	$16^{+0.070}_{0}$	$25.0^{+0.3}_{+0.1}$	49	20	40	10	17	11	M10 x 1.25	7	18	40	M18 x 1.5
80	40	37	102	32	78	$20^{+0.084}_{0}$	$31.5^{+0.3}_{+0.1}$	61	25	52	14	21	13	M12 x 1.75	10	22	48	M22 x 1.5
100	40	37	116	41	92	$25^{+0.084}_{0}$	$35.5^{+0.3}_{+0.1}$	64	30	52	14	21	16	M12 x 1.75	10	26	58	M26 x 1.5

Bore size (mm)	N	P	RR	S	U	H	Z	ZZ
40	27	1/4	10	84	16	51	165	175
50	30	3/8	12	90	19	58	183	195
63	31	3/8	16	98	23	58	196	212
80	37	1/2	20	116	28	71	235	255
100	40	1/2	25	126	36	72	256	281

∗ Clevis pins, flat washers and cotter pins are included.

Center Trunnion Style: CA2YT



(mm)

Bore size (mm)	A	AL	B	B_1	C	D	E	F	G	H_1	J	K	KA	MM	N	P	S	TDe8
40	30	27	60	22	44	16	32	10	15	8	M8 x 1.25	6	14	M14 x 1.5	27	1/4	84	$15^{-0.032}_{-0.059}$
50	35	32	70	27	52	20	40	10	17	11	M8 x 1.25	7	18	M18 x 1.5	30	3/8	90	$15^{-0.032}_{-0.059}$
63	35	32	85	27	64	20	40	10	17	11	M10 x 1.25	7	18	M18 x 1.5	31	3/8	98	$18^{-0.032}_{-0.059}$
80	40	37	102	32	78	25	52	14	21	13	M12 x 1.75	10	22	M22 x 1.5	37	1/2	116	$25^{-0.040}_{-0.073}$
100	40	37	116	41	92	30	52	14	21	16	M12 x 1.75	10	26	M26 x 1.5	40	1/2	126	$25^{-0.040}_{-0.073}$

Bore size (mm)	TT	TX	TY	TZ	H	Z	ZZ
40	22	85	62	117	51	93	140
50	22	95	74	127	58	103	154
63	28	110	90	148	58	107	162
80	34	140	110	192	71	129	194
100	40	162	130	214	72	135	206

∗ Do not disassemble the trunnion style. It is extremely difficult to align the axial center of the trunnion with the axial center of the cylinder. Thus, if this style of cylinder is disassembled and reassembled, it is likely that the required dimensional accuracy cannot be attained, which may cause malfunction.

Trunnion and Double Clevis Mounting Bracket

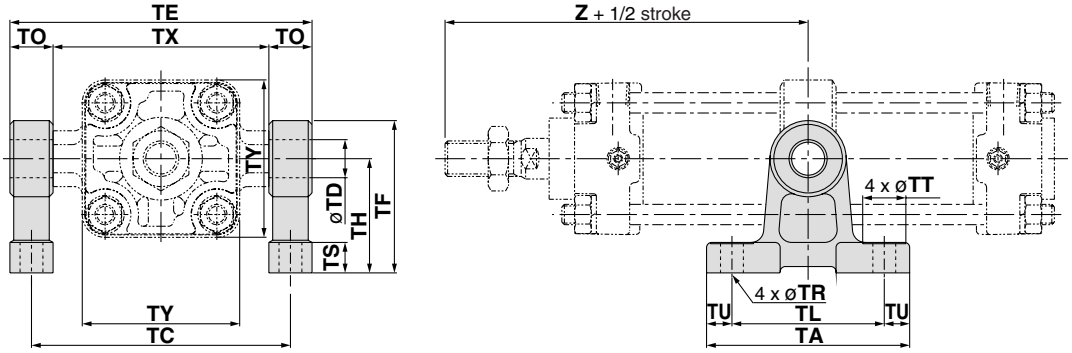
• Strength is the same as cylinder brackets.

Description \ Bore size	40	50	63	80	100
Trunnion mounting bracket	CA2-S04		CA2-S06	MB-S10	
Double clevis bracket	CA2-B04	CA2-B05	CA2-B06	CA2-B08	CA2-B10

Note) 1. The above brackets cannot be specified in the part number of the cylinder.
2. They must be ordered separately from the cylinder.
3. When the trunnion brackets are specified, two pieces should be ordered for each cylinder.

Trunnion bracket
Material: Cast iron

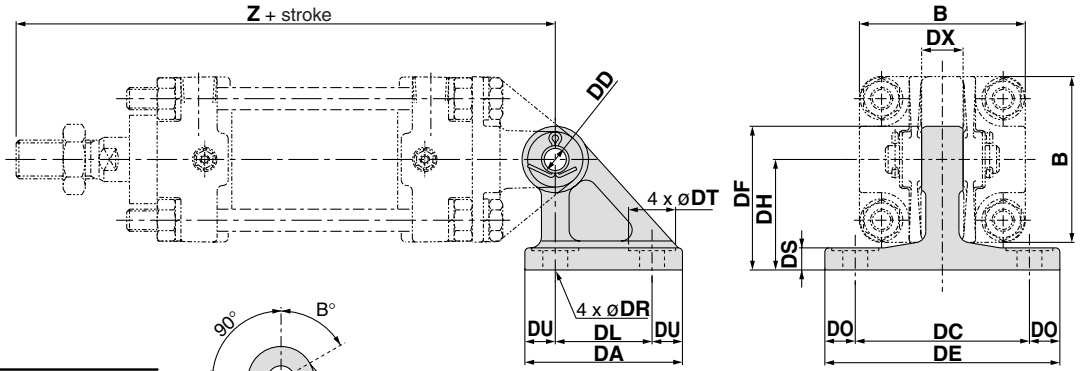
∗ This assembly drawing is provided as a reference. The trunnion bracket must be ordered separately.



(mm)

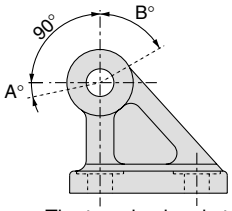
Part no.	Bore size (mm)	TA	TL	TU	TC	TX	TE	TO	TR	TT	TS	TH	TF	TY	Z	TD-H10 (Hole)
CA2-S04	40	80	60	10	102	85	119	17	9	17	12	45	60	62	93	$15^{+0.070}_{0}$
	50	80	60	10	112	95	129	17	9	17	12	45	60	74	103	$15^{+0.070}_{0}$
CA2-S06	63	100	70	15	130	110	150	20	11	22	14	55	73	90	107	$18^{+0.070}_{0}$
MB-S10	80	120	90	15	166	140	192	26	13.5	24	17	75	100	110	129	$25^{+0.084}_{0}$
	100	120	90	15	188	162	214	26	13.5	24	17	75	100	130	135	$25^{+0.084}_{0}$

Double clevis bracket
Material: Cast iron



Rotation

Bore size (mm)	A°	B°	A° + B° + 90°
40 to 100	12°	60°	162°

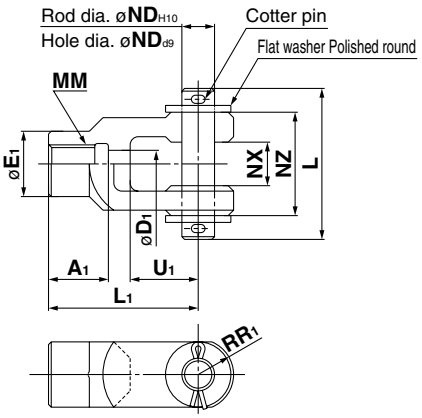


Note) This assembly drawing is provided as a reference. The trunnion bracket must be ordered separately. (mm)

Part no.	Bore size (mm)	DA	DL	DU	DC	DX	DE	DO	DR	DT	DS	DH	DF	B	Z	DDH10 (Hole)
CA2-B04	40	57	35	11	65	15	85	10	9	17	8	40	52	60	165	$10^{+0.058}_{0}$
CA2-B05	50	57	35	11	65	18	85	10	9	17	8	40	52	70	183	$12^{+0.070}_{0}$
CA2-B06	63	67	40	13.5	80	25	105	12.5	11	22	10	50	66	85	196	$16^{+0.070}_{0}$
CA2-B08	80	93	60	16.5	100	31.5	130	15	13.5	24	12	65	90	102	235	$20^{+0.084}_{0}$
CA2-B10	100	93	60	16.5	100	35.5	130	15	13.5	24	12	65	90	116	256	$25^{+0.084}_{0}$

Accessory Dimensions

Y Type Double Knuckle Joint

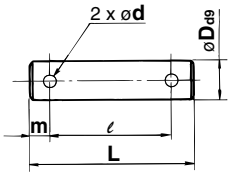


Material: Cast iron (mm)

Part no.	Applicable bore size (mm)	A$_1$	E$_1$	D$_1$	L$_1$	MM	RR$_1$	U$_1$	ND	NX	NZ	L	Cotter pin size	Flat washer size
Y-04D	**40**	22	24	10	55	M14 x 1.5	13	25	12	$16^{+0.3}_{+0.1}$	38	55.5	ø3 x 18ℓ	Polished round 12
Y-05D	**50, 63**	27	28	14	60	M18 x 1.5	15	27	12	$16^{+0.3}_{+0.1}$	38	55.5	ø3 x 18ℓ	Polished round 12
Y-08D	**80**	37	36	18	71	M22 x 1.5	19	28	18	$28^{+0.3}_{+0.1}$	55	76.5	ø4 x 25ℓ	Polished round 18
Y-10D	**100**	37	40	21	83	M26 x 1.5	21	38	20	$30^{+0.3}_{+0.1}$	61	83	ø4 x 30ℓ	Polished round 20

∗ Knuckle pin, cotter pin and flat washer are included.

Clevis Pin/Knuckle Pin

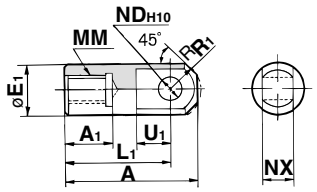


Material: Carbon steel (mm)

Part no.	Applicable bore size (mm)		Dd9	L	ℓ	m	d drill through	Applicable cotter pin	Applicable flat washer
	Clevis	Knuckle							
CDP-2A	**40**	—	$10^{-0.040}_{-0.076}$	46	38	4	3	ø3 x 18ℓ	Polished round 10
CDP-3A	**50**	**40, 50, 63**	$12^{-0.050}_{-0.093}$	55.5	47.5	4	3	ø3 x 18ℓ	Polished round 12
CDP-4A	**63**	—	$16^{-0.050}_{-0.093}$	71	61	5	4	ø4 x 25ℓ	Polished round 16
CDP-5A	—	**80**	$18^{-0.050}_{-0.093}$	76.5	66.5	5	4	ø4 x 25ℓ	Polished round 18
CDP-6A	**80**	**100**	$20^{-0.065}_{-0.117}$	83	73	5	4	ø4 x 30ℓ	Polished round 20
CDP-7A	**100**	—	$25^{-0.065}_{-0.117}$	88	78	5	4	ø4 x 36ℓ	Polished round 24

∗ Cotter pin and flat washer are included.

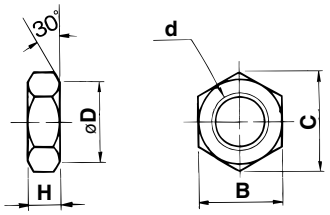
I Type Single Knuckle Joint



Material: Free cutting sulfur steel (mm)

Part no.	Applicable bore size (mm)	A	A$_1$	E$_1$	L$_1$	MM	R$_1$	U$_1$	ND^{H10}	NX
I-04A	**40**	69	22	24	55	M14 x 1.5	15.5	20	$12^{+0.070}_{0}$	$16^{-0.1}_{-0.3}$
I-05A	**50, 63**	74	27	28	60	M18 x 1.5	15.5	20	$12^{+0.070}_{0}$	$16^{-0.1}_{-0.3}$
I-08A	**80**	91	37	36	71	M22 x 1.5	22.5	26	$18^{+0.070}_{0}$	$28^{-0.1}_{-0.3}$
I-10A	**100**	105	37	40	83	M26 x 1.5	24.5	28	$20^{+0.084}_{0}$	$30^{-0.1}_{-0.3}$

Rod End Nut (Standard option)



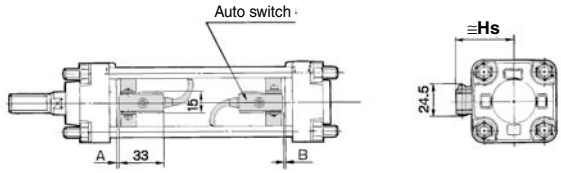
Material: Rolled steel (mm)

Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-04	**40**	M14 x 1.5	8	22	25.4	21
NT-05	**50, 63**	M18 x 1.5	11	27	31.2	26
NT-08	**80**	M22 x 1.5	13	32	37.0	31
NT-10	**100**	M26 x 1.5	16	41	47.3	39

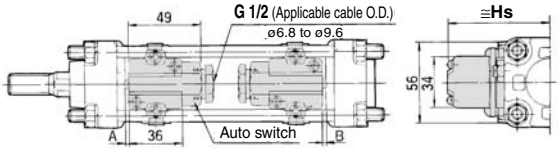
Auto Switch Proper Mounting Position (Detection at Stroke End) and Its Mounting Height

<Band mount type>

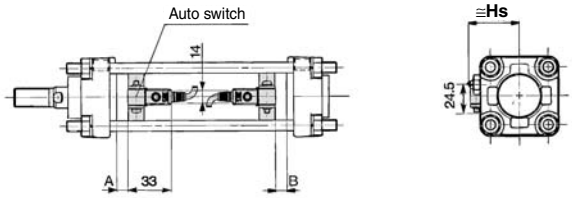
D-B5□/B64/B59W



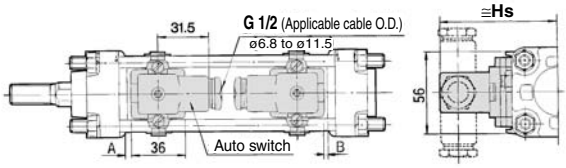
D-A3□
D-G39/K39



D-G5□/K59
D-G5□W/K59W
D-G59F/G5NTL

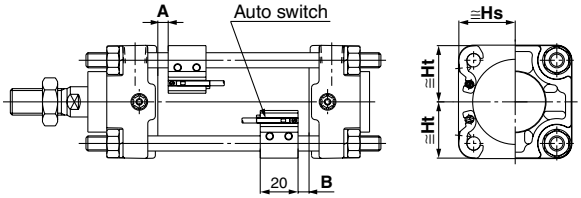


D-A44

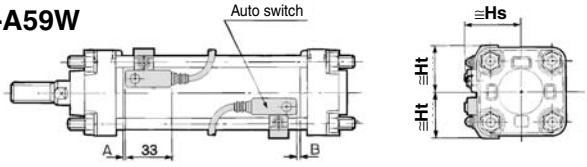


<Tie-rod mount type>

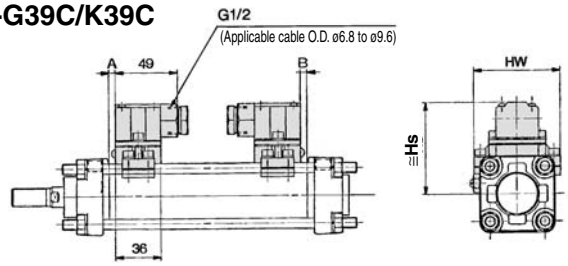
D-A9□/A9□V **D-Z7□/Z80**
D-M9□/M9□V **D-Y59□/Y69□/Y7P/Y7PV**
D-M9□W/M9□WV **D-Y7□W/Y7□WV**



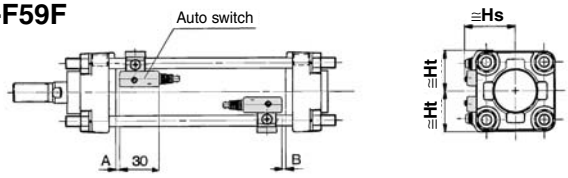
D-A5□/A6□
D-A59W



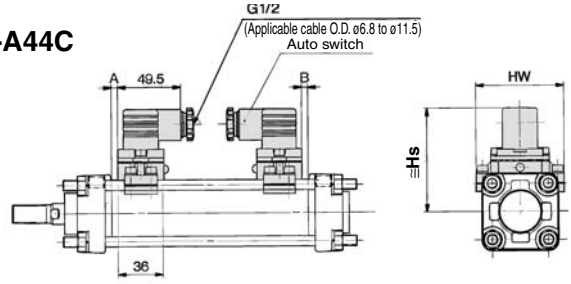
D-A3□C
D-G39C/K39C



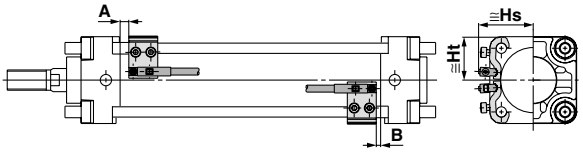
D-F5□/J5□
D-F5NTL
D-F5□W/J59W
D-F59F



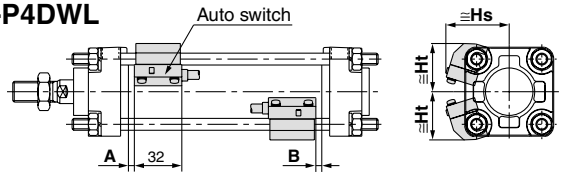
D-A44C



D-P3DW□



D-P4DWL



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

Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size	Note 2) D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV		D-B59W D-Z7□ D-Z80 D-Y59□ D-Y69□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV		D-P3DW□		D-P4DWL		D-A5□ D-A6□ D-A3□ D-A3□C D-A44 D-A44C D-G39 D-G39C D-K39 D-K39C		D-B5□ D-B64		D-F5□ D-J5□ D-F59F D-F5□W D-J59W		D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G59F		D-A59W		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
40	6	4	10	8	3.5	1.5	6	3	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
50	—	—	10	8	3.5	1.5	5.5	3.5	3	1	0	0	0.5	0	6.5	4.5	2	0	4	2	11.5	9.5
63	8.5	7.5	12.5	11.5	6	5	3	1.5	5.5	4	2.5	1.5	3	2	9	8	4.5	3.5	6.5	5.5	14	13
80	12	10	16	14	9.5	7.5	6	4.5	9	7	6	4	6.5	4.5	4.5	12.5	8	6	10	8	17.5	15.5
100	13.5	12.5	17.5	16.5	11	10	8	6.5	10.5	9	7.5	6.5	8	7	14	13	9.5	8.5	11.5	10.5	19	18

Note 1) Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	Note 2) D-A9□ D-M9□ D-M9□W		Note 2) D-A9□V		D-M9□V D-M9□WV		D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W		D-Y69□ D-Y7PV D-Y7□WV		D-P3DW□		D-P4DWL		D-B5□ D-B64 D-B59W D-G5□ D-K59 D-G5NTL D-G5□W D-K59W D-G59F	D-A3□ D-G39 D-K39	D-A44	D-A5□ D-A6□ D-A59W		D-F5□ D-J59 D-F5□W D-J59W D-F59F D-F5NTL		D-A3□C D-G39C D-K39C		D-A44C	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Hw	Hs	Hw
40	30	30	31	30	34	30	30	30	30	30	38	30	42.5	33	37	71.5	81.5	38.5	31.5	38	31.5	73	69	81	69
50	34	34	—	—	38	34	34	34	34	34	42	34	46.5	37.5	42	76.5	86.5	42	35.5	42	35.5	78.5	77	86.5	77
63	41	41	41.5	41	44	41	41	41	41	41	49	41	52	43	49	83.5	93.5	46.5	43	47	43	85.5	91	93.5	91
80	49.5	49	50	49	52.5	49	49.5	49	49.5	49	56	49	58.5	51.5	57.5	92	102	53.5	51	53.5	51	94	107	102	107
100	56.5	56	58.5	56	61	56	56.5	55.5	57.5	55.5	65	56	66	58.5	68	102.5	112.5	61.5	57.5	61	57.5	104	121	112	121

Note 2) D-A9□/A9□V types cannot be mounted on ø50.

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	Number of auto switch		Brackets other than center trunnion	Center trunnion				
				ø40	ø50	ø63	ø80	ø100
D-A9□	2 (Different surfaces and same surface) With 1		15	75	—	80	85	90
	n		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$75 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-A9□V	2 (Different surfaces and same surface) With 1		10	50	—	55	60	65
	n		$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$50 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□ D-M9□W	2 (Different surfaces and same surface) With 1		15	80		85	90	95
	n		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□V D-M9□WV	2 (Different surfaces and same surface) With 1		10	55		60	65	70
	n		$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$55 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$60 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$70 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-A5□/A6 D-F5□/J5 D-F5□W/J59W D-F59F	2 (Different surfaces and same surface) With 1		15	90		100	110	120
	n (Same surface)		$15 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$90 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$100 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-A59W	2 (Different surfaces and same surface)		20	90		100	110	120
	n (Same surface)		$20 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$90 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$100 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
	1		15	90		100	110	120
D-F5NTL	2 (Different surfaces and same surface) With 1		25	110		120	130	140
	n (Same surface)		$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$110 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$120 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$130 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$140 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-B5□/B64 D-G5□/K59 D-G5□W D-K59W D-G59F D-G5NTL	With 2	Different surfaces	15	90		100	110	
		Same surface	75					
	With n	Different surfaces	$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ···)	$90 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ···)		$100 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ···)	$110 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
		Same surface	75 + 50 (n – 2) (n = 2, 3, 4, ···)	90 + 50 (n – 2) (n = 2, 4, 6, 8, ···)		100 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	110 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	
	1		10	90		100	110	
D-B59W	With 2	Different surfaces	20	90		100	110	
		Same surface	75					
	With n	Different surfaces	$20 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8, ···)	$90 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ···)		$100 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ···)	$110 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16, ···)	
		Same surface	75 + 50 (n – 2) (n = 2, 3, 4, ···)	90 + 50 (n – 2) (n = 2, 4, 6, 8, ···)		100 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	110 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	
	1		15	90		100	110	
D-A3□ D-G39 D-K39	With 2	Different surfaces	35	75		80	90	
		Same surface	100	100		100	100	
	With n	Different surfaces	35 + 30 (n – 2) (n = 2, 3, 4, ···)	75 + 30 (n – 2) (n = 2, 4, 6, 8, ···)		80 + 30 (n – 2) (n = 2, 4, 6, 8, ···)	90 + 30 (n – 2) (n = 2, 4, 6, 8, ···)	
		Same surface	100 + 100 (n – 2) (n = 2, 3, 4, ···)			100 + 100 (n – 2) (n = 2, 4, 6, 8, ···)		
	1		10	75		80	90	
D-A44	With 2	Different surfaces	35	75		80	90	
		Same surface	55					
	With n	Different surfaces	35 + 30 (n – 2) (n = 2, 3, 4, ···)	75 + 30 (n – 2) (n = 2, 4, 6, 8, ···)		80 + 30 (n – 2) (n = 2, 4, 6, 8, ···)	90 + 30 (n – 2) (n = 2, 4, 6, 8, ···)	
		Same surface	55 + 50 (n – 2) (n = 2, 3, 4, ···)	75 + 50 (n – 2) (n = 2, 4, 6, 8, ···)		80 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	90 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	
	1		10	75		80	90	

Minimum Auto Switch Mounting Stroke

(mm)

Auto switch model	Number of auto switch		Brackets other than center trunnion	Center trunnion				
				ø40	ø50	ø63	ø80	ø100
D-A3□C D-G39C D-K39C	With 2	Different surfaces	20	75		80	90	
		Same surface	100	100		100	100	
	With n	Different surfaces	20 + 35 (n – 2) (n = 2, 3, 4, ···)	75 + 35 (n – 2) (n = 2, 4, 6, 8, ···)		80 + 35 (n – 2) (n = 2, 4, 6, 8, ···)	90 + 35 (n – 2) (n = 2, 4, 6, 8, ···)	
		Same surface	100 + 100 (n – 2) (n = 2, 3, 4, 5···)	100 + 100(n – 2) (n = 2, 4, 6, 8, ···)				
	1		10	75		80	90	
D-A44C	With 2	Different surfaces	20	75		80	90	
		Same surface	55					
	With n	Different surfaces	20 + 35 (n – 2) (n = 2, 3, 4, ···)	75 + 35 (n – 2) (n = 2, 4, 6, 8, ···)		80 + 35 (n – 2) (n = 2, 4, 6, 8, ···)	90 + 35 (n – 2) (n = 2, 4, 6, 8, ···)	
		Same surface	55 + 50 (n – 2) (n = 2, 3, 4, ···)	75 + 50 (n – 2) (n = 2, 4, 6, 8, ···)		80 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	90 + 50 (n – 2) (n = 2, 4, 6, 8, ···)	
	1		10	75		80	90	
D-Z7□/Z80 D-Y59□/Y7P D-Y7□W	2 (Different surfaces and same surface) With 1		15	80	85	90	95	105
	n		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$80 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-Y69□/Y7PV D-Y7□WV	2 (Different surfaces and same surface) With 1		10	65		75	80	90
	n		$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$65 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-P3DW□	2 (Different surfaces and same surface) With 1		15	85				
	n		$15 + 50\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$85 + 50\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)				
D-P4DWL	2 (Different surfaces and same surface) With 1		15	120		130	140	
	n		$15 + 65\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$120 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)		$130 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$140 + 65\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	

Operating Range

(mm)

Auto switch model	Bore size				
	40	50	63	80	100
D-A9□/A9□V	7	—	9	9	9
D-M9□/M9□V D-M9□W/M9□WV	4.5	5	5.5	5	6
D-Z7□/Z80	8.5	7.5	9.5	9.5	10.5
D-A3□/A44 D-A3□C/A44C	9	10	11	11	11
D-A5□/A6□					
D-B5□/B64					
D-A59W	13	13	14	14	15
D-B59W	14	14	17	16	18
D-Y59□/Y69□ D-Y7P/Y7□V D-Y7□W/Y7□WV	8	7	5.5	6.5	6.5

(mm)

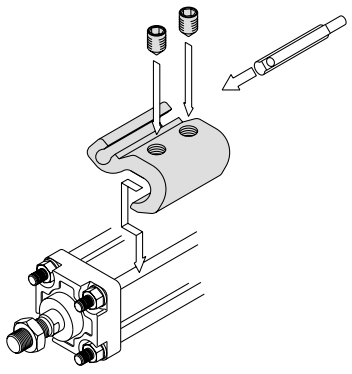
Auto switch model	Bore size				
	40	50	63	80	100
D-F5□/J5□/F5□W D-J59W D-F5NTL/F59F	4	4	4.5	4.5	4.5
D-G5□/K59/G5□W D-K59W D-G5NTL/G59F	5	6	6.5	6.5	7
D-G39/K39 D-G39C/K39C	9	9	10	10	11
D-P3DW□	4.5	5	6	5.5	6
D-P4DWL	4	4	4.5	4	4.5

∗ Since this is a guideline including hysteresis, not meant to be guaranteed. (assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.
Note) D-A9□/A9□V types cannot be mounted on ø50.

Auto Switch Mounting Bracket/Part No.

<Tie-rod mounting>

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A9□/A9□V D-M9□/M9□V D-M9□W/M9□WV	BA7-040	BA7-040	BA7-063	BA7-080	BA7-080
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W/J59W D-F59F/F5NTL	BT-04	BT-04	BT-06	BT-08	BT-08
D-A3□C/A44C D-G39C/K39C	BA3-040	BA3-050	BA3-063	BA3-080	BA3-100
D-Z7□/Z80 D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV	BA4-040	BA4-040	BA4-063	BA4-080	BA4-080
D-P3DW□	BMB8-050S	BMB8-050S	BA7T-063S	BA7T-080S	BA7T-080S
D-P4DWL	BAP2-040	BAP2-040	BAP2-063	BAP2-080	BAP2-080



• Mounting example of D-A9□(V)/M9□(V)/M9□W(V)

<Band mounting>

Auto switch model	Bore size (mm)				
	40	50	63	80	100
D-A3□/A44 D-G39/K39	BD1-04M	BD1-05M	BD1-06M	BD1-08M	BD1-10M
D-B5□/B64 D-B59W D-G5□/K59 D-G5□W/K59W D-G59F D-G5NTL	BA-04	BA-05	BA-06	BA-08	BA-10

∗ Auto switch mounting brackets are included in D-A3□C/A44C/G39C/K39C types. Indicate as follows depending on the cylinder size when ordering.
(Example) ø40: D-A3□C-4, ø50: D-A3□C-5, ø63: D-A3□C-6, ø80: D-A3□C-8, ø100: D-A3□C-10

Other than the applicable auto switches listed in “How to Order”, the following auto switches can be mounted.
For detailed specifications, refer to pages 1719 to 1827.

Auto switch type	Model	Electrical entry (Direction)	Features	Applicable bore size
Reed	D-A93V, A96V	Grommet (Perpendicular)	—	ø40, ø63, ø80, ø100
	D-A90V		Without indicator light	
	D-A53, A56, B53, Z73, Z76	Grommet (In-line)	—	ø40 to ø100
	D-A67, Z80		Without indicator light	
Solid state	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—	ø40 to ø100
	D-Y69A, Y69B, Y7PV			
	D-M9NWV, M9PWV, M9BWV		Diagnostic indication (2-color indication)	
	D-Y7NWV, Y7PWV, Y7BWV			
	D-Y59A, Y59B, Y7P	Grommet (In-line)	—	
	D-F59, F5P, J59			
	D-Y7NW, Y7PW, Y7BW		Diagnostic indication (2-color indication)	
	D-F59W, F5PW, J59W			
	D-F5NTL, G5NTL		With timer	
	D-P5DWL		Magnetic field resistant (2-color indication)	

∗ With pre-wired connector is available for solid state auto switches. For details, refer to pages 1784 and 1785.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H/Y7G/Y7H types) are also available. Refer to pages 1746 and 1748 for details.
∗ Wide range detection type, solid state auto switches (D-G5NBL type) are also available. Refer to page 1776 for details.

Smooth Cylinder

Series CS2Y

ø125, ø140, ø160

How to Order

CS2 Y L 160 □ – 300 □ – □

With auto switch CDS2 Y L 160 □ – 300 □ – M9BW □ – □

With auto switch
(Built-in magnet)

Smooth Cylinder

Mounting

B	Basic
L	Foot
F	Rod flange
G	Head flange
C	Single clevis
D	Double clevis
T	Center trunnion

Bore size

125	125 mm
140	140 mm
160	160 mm

Port thread type

Nil	Rc
TN	NPT
TF	G

Cylinder stroke (mm)
Refer to the next page for the "Maximum Stroke" table.

Number of auto switches

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

Auto switch

Nil	Without auto switch

∗ Refer to the table below for the applicable auto switch model.

Made to Order
For details, refer to the next page.

Suffix for cylinder

Rod boot	J	Nylon tarpaulin
	K	Heat resistant tarpaulin
With/without cushihon	A	With double-side cushion
	R	With rod cushion
	H	With head cushion
	Nil	Without cushion

∗ When more than one symbol is specified, indicate them in alphabetical order.

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without auto switch is required, there is no need to enter the symbol for auto switch.
(Example) CDS2YL125-200

Applicable Auto Switches / For detailed auto switch specifications, refer to Best Pneumatics No. 2.

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)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state 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	—	●	●	●	○	○	—	
					—	—	100 V, 200 V	J51	—	●	—	●	○	—		
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	—	G39	—	—	—	—	—	IC circuit	
				2-wire		12 V		—	K39	—	—	—	—	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5 V, 12 V		M9NW	—	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PW	—	●	●	●	○	○		
				2-wire		12 V		M9BW	—	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NA	—	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PA	—	○	○	●	○	○		
				2-wire		12 V		M9BA	—	○	○	●	○	○	—	
	Diagnostic indication (2-color indication)			4-wire (NPN)		5 V, 12 V		F59F	—	●	—	●	○	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	—	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93	—	●	—	●	—	—	—	Relay, PLC
			No			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
							100 V, 200 V	—	A34	—	—	—	—	—		Relay, PLC
		DIN terminal						—	A44	—	—	—	—	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	A59W	—	●	—	●	—	—		

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

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

∗ Since there are applicable auto switches other than listed, refer to page 1108-13 for details.
∗ For details about auto switches with pre-wired connector, refer to Best Pneumatics No. 2.
∗ D-A9□, M9□, M9□W, M9□AL are shipped together (but not assembled). (Only auto switch mounting bracket is assembled at the time of shipment.)

Designed with a low sliding resistance of the piston, this air cylinder is ideal for applications such as contact pressure control, which requires smooth movements at low pressure.

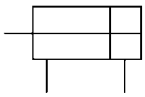
Low sliding resistance

Min. operating pressure — 0.005 MPa

Auto switch mounting is possible

JIS Symbol

Double acting



Made to Order specifications
(For details, refer to Series CS2 Catalog (CAT.ES20-196).)

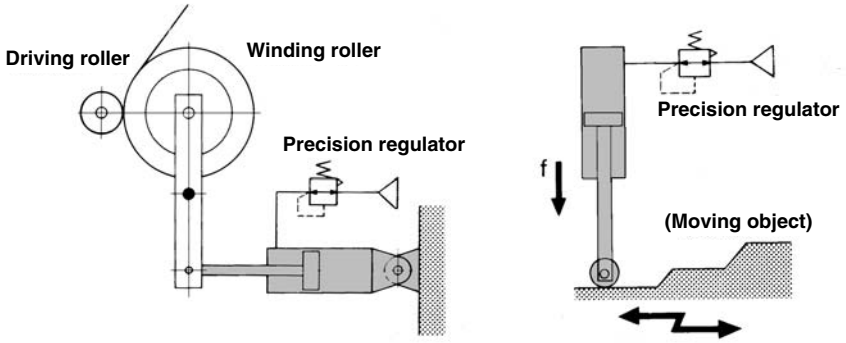
Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port position
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC26	Double clevis pin/Double knuckle pin with split pin and flat washer
-XC27	Double clevis pin and double knuckle pin made of stainless steel
-XC30	Rod side trunnion mounted on the front of the rod cover
-XC68	Made of stainless steel (With hard chrome plated piston rod)
-XC86	With rod end bracket

For the specifications of cylinders with auto switch, please refer to pages 1108-11 to 1108-13.

- Minimum stroke for auto switch mounting
- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Operating range
- Auto switch mounting bracket part no.

Application Example

Low friction cylinder is used in combination with precision regulator (Series IR).



Specifications

Bore size (mm)	125	140	160
Action	Double acting, Single rod		
Direction of low friction	Both directions		
Fluid	Air		
Proof pressure	1.05 MPa		
Maximum operating pressure	0.7 MPa		
Minimum operating pressure	0.005 MPa*		
Ambient and fluid temperature	Without auto switch	0 to 70°C (No freezing)	
	With auto switch	0 to 60°C (No freezing)	
Allowable leakage	Less than 0.5 ℓ/min (ANR)		
Cushion	Without cushion** (manufacturable with cushion)		
Lubrication	Not required (Non-lube)		
Mounting	Basic, Foot, Rod flange, Head flange, Single clevis, Double clevis, Center trunnion		

* If a cushion is used, this value will not include the operating pressure within the cushion stroke.
* If an air cushion is not used, set the energy at the stroke end to 0.36J or less.

Maximum Stroke

(mm)

Tube material	Aluminum alloy	Carbon steel tube	
Mounting bracket / Bore size (mm)	Basic, Head flange, Single clevis, Double clevis, Center trunnion Rod flange	Basic, Head flange, Single clevis, Double clevis, Center trunnion	Foot, Rod flange
125	1000 or less	1000 or less	1600 or less
140	1000 or less	1000 or less	1600 or less
160	1200 or less	1200 or less	1600 or less

Accessory

Mounting		Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Center trunnion
Standard equipment	Clevis pin	—	—	—	—	—	●	—
Option	Rod end nut	●	●	●	●	●	●	●
	Single knuckle joint	●	●	●	●	●	●	●
	Double knuckle joint (Knuckle pin, Split pin)	●	●	●	●	●	●	●
	Rod boot	●	●	●	●	●	●	●

Mounting Bracket Part No.

Bore size (mm)	125	140	160
Foot*	CS2–L12	CS2–L14	CS2–L16
Flange	CS2–F12	CS2–F14	CS2–F16
Single clevis	CS2–C12	CS2–C14	CS2–C16
Double clevis**	CS2–D12	CS2–D14	CS2–D16

* Order two foot brackets per cylinder.
** When ordering the double clevis style, the clevis pin and 2 split pins are included as accessories.

Rod Boot Material

Symbol	Material	Max. ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

* Maximum ambient temperature for the rod boot itself.

Weight

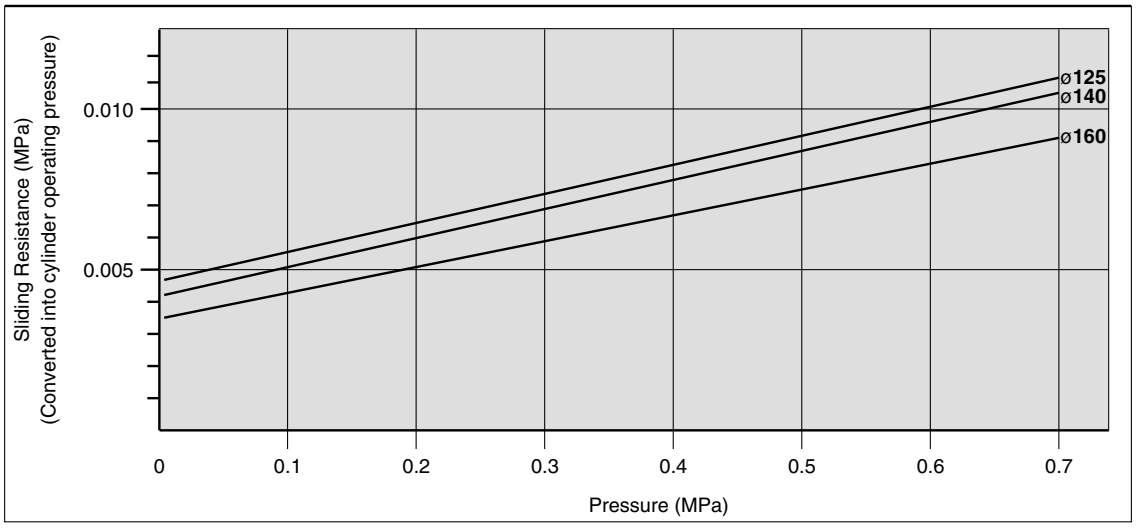
(kg)

Bore size (mm)		125	140	160
Basic weight	Basic	5.46	6.50	9.07
	Foot	7.49	9.50	12.45
	Rod flange	8.51	12.03	15.80
	Head flange	8.51	12.03	15.80
	Single clevis	8.53	10.79	14.56
	Double clevis	8.99	11.54	15.41
	Trunnion	9.59	12.23	15.47
Additional weight with magnet (With built-in magnet and auto switch)		0.07	0.07	0.08
Additional weight per each 100 mm of stroke		1.55	1.67	2.23
Accessory bracket	Single knuckle	0.91	1.16	1.56
	Double knuckle (With Knuckle pin, Split pin)	1.37	1.81	2.48
	Rod end nut	0.16	0.16	0.23

Calculation: (Example) **CS2Y160-500**

- Basic weight ····· 12.45 (kg)
- Additional weight ····· 2.23 (kg/100 mm)
- Cylinder stroke ····· 500 (mm)
- 12.45 + 2.23 x 500/100 = 23.60 (kg)

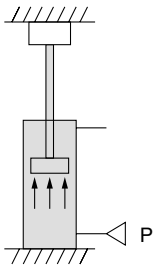
Sliding Resistance



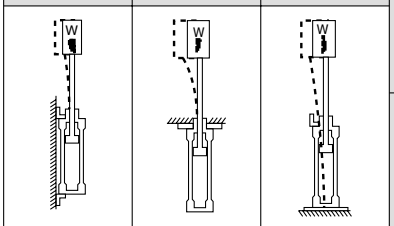
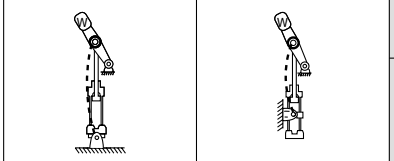
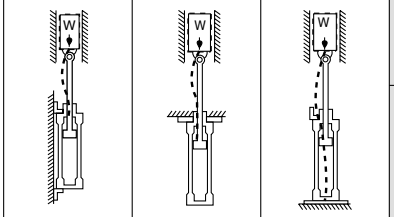
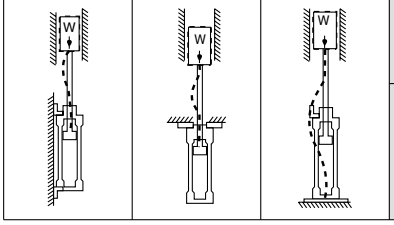
Relation between Cylinder Size and Maximum Stroke

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.

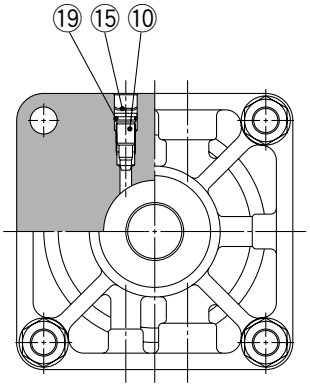
[Reference] If it is stopped with the external stopper on the cylinder extension side, even with a light load, the maximum generated force of the cylinder will act on the cylinder itself.

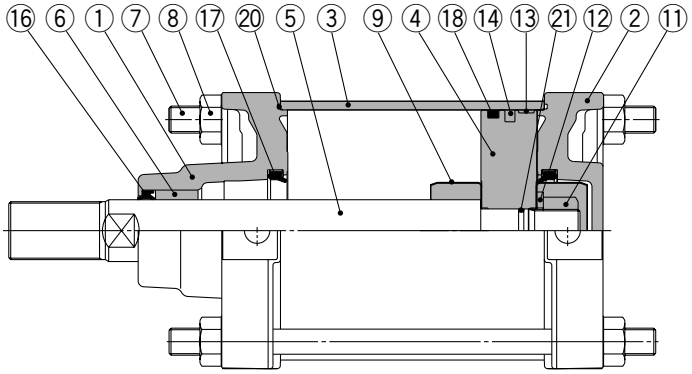


(cm)

Mounting			Nominal symbol	Operating pressure (MPa)	Applicable max. stroke according to buckling strength (cm)		
Support bracket nominal symbol and schematic diagram					**125**	**140**	**160**
Foot: **L**	Rod flange: **F**	Head flange: **G**	**L, F**	0.3	103	92	113
				0.5	79	70	86
				0.7	66	58	72
			G	0.3	45	38	47
				0.5	33	27	34
				0.7	26	22	27
Clevis: **C, D**		Center trunnion: **T**	**C, D**	0.3	96	83	106
				0.5	71	61	76
				0.7	59	50	62
			T	0.3	135	119	147
				0.5	101	89	111
				0.7	84	74	91
Foot: **L**	Rod flange: **F**	Head flange: **G**	**L, F**	0.3	301	267	330
				0.5	231	207	253
				0.7	193	172	212
			G	0.3	144	126	156
				0.5	109	94	118
				0.7	90	78	97
Foot: **L**	Rod flange: **F**	Head flange: **G**	**L, F**	0.3	433	386	476
				0.5	334	297	367
				0.7	281	250	309
			G	0.3	210	185	229
				0.5	160	141	175
				0.7	134	117	129

Construction





Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum die-cast	Chromated
2	**Head cover**	Aluminum die-cast	Chromated
3	**Cylinder tube**	Aluminum alloy	Hard anodized
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Oil-impregnated sintered alloy	
7	**Tie-rod**	Carbon steel	Zinc chromated
8	**Tie-rod nut**	Rolled steel	Nickel plated
9	**Cushion ring**	Stainless steel	
10	**Cushion valve**	Rolled steel	Nickel plated
11	**Piston nut**	Carbon steel	Nickel plated
12	**Flat washer**	Carbon steel	Nickel plated
13	**Wear ring**	Resin	
14	**Magnet**∗	—	
15	**Retaining ring**	Spring steel	Phosphate treatment
16	**Rod seal**	NBR	
17	**Cushion seal**∗∗	Urethane	
18	**Piston seal**	NBR	
19	**Valve seal**	NBR	
20	**Tube gasket**	NBR	
21	**Piston gasket**	NBR	

∗ For types with built-in magnet or with auto switch.
∗∗ Used with cushion only.

Replacement Parts: Seal kit.

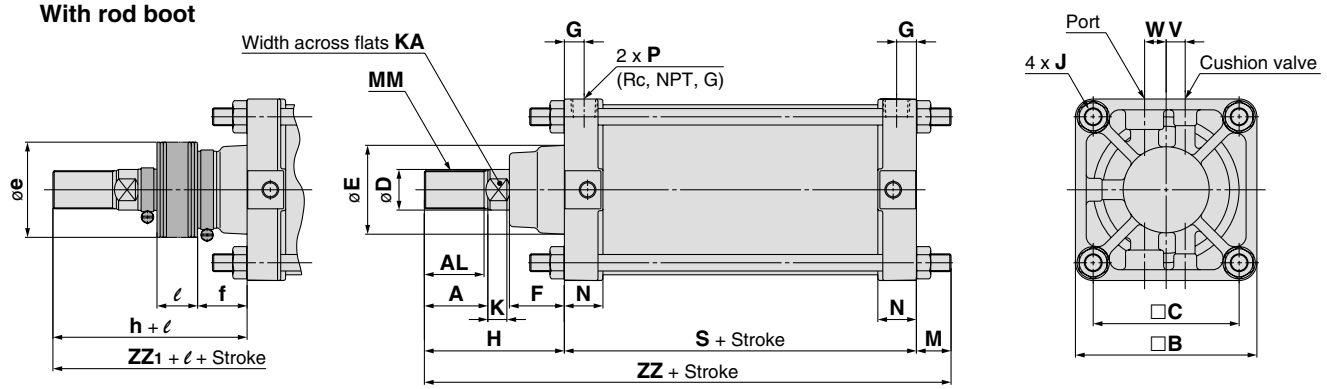
Bore size (mm)	Kit no.	Content
125	CS2Y125A-PS	Without cushion Consists of Component Part Numbers ⑯, ⑱, and ⑳
140	CS2Y140A-PS	
160	CS2Y160A-PS	
125	CS2Y125AA-PS	With single-side cushion Consists of Component Part Numbers ⑯, ⑰ (two), ⑱, and ⑳
140	CS2Y140AA-PS	
160	CS2Y160AA-PS	
125	CS2Y125AR-PS	With single-side cushion Consists of Component Part Numbers ⑯, ⑰ (one), ⑱ and ⑳.
140	CS2Y140AR-PS	
160	CS2Y160AR-PS	

∗ Seal kit does not include a grease pack.
Order with the following part number when only the grease pack is needed.
Grease pack part number: GR-L-005 (5 g), **GR-S-010** (10 g), **GR-L-150** (150g)

Dimensions

Basic: CS2YB

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	□B	□C	D	E	F	G	J	V	W	K	KA	M	MM
125	Up to 1000	50	47	143	115	32	71	43	15	M14 x 1.5	15	17	15	27	27	M30 x 1.5
140	Up to 1000	50	47	157	128	32	71	43	15	M14 x 1.5	15	17	15	27	27	M30 x 1.5
160	Up to 1200	56	53	177	144	38	78.5	42	18	M16 x 1.5	15	20	17	34	30.5	M36 x 1.5

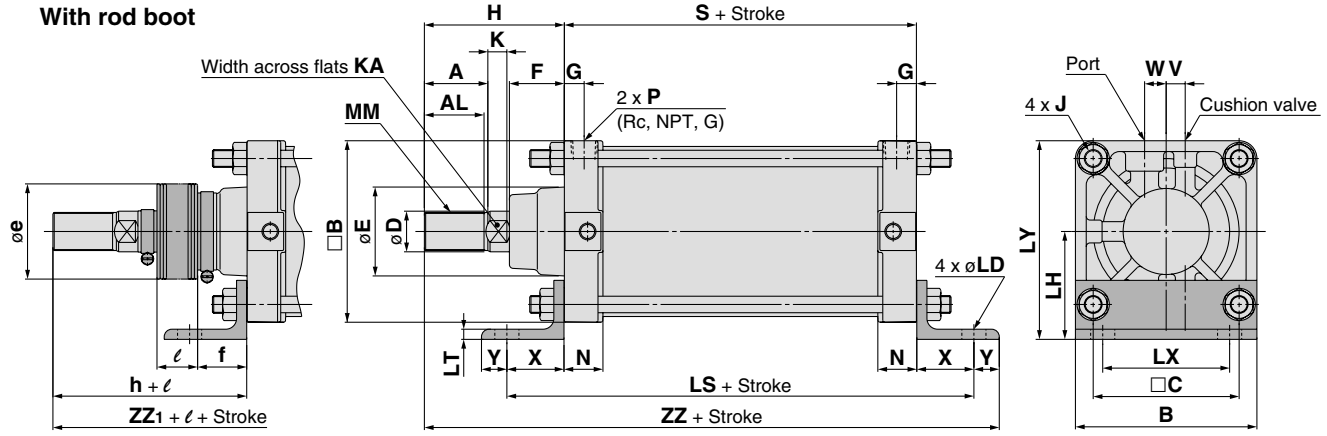
(mm)

Bore size (mm)	N	P	S	Without rod boot		With rod boot				
				H	ZZ	e	f	h	ℓ	ZZ1
125	30.5	1/2	98	110	235	75	40	133	1/5 stroke	258
140	30.5	1/2	98	110	235	75	40	133	1/5 stroke	258
160	34.5	3/4	106	120	256.5	75	40	141	1/5 stroke	277.5

∗ The minimum stroke with rod boot is 30 mm or more.
∗∗ For auto switch mounting position and its mounting height, refer to page 1108-11.
∗∗∗ Refer to “Minimum Stroke for Auto Switch Mounting” on page 1108-12.

Foot: CS2YL

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	□B	B	□C	D	E	F	G	J	V	W	K	KA	LD	LH	LS
125	Up to 1600	50	47	143	143	115	32	71	43	15	M14 x 1.5	15	17	15	27	19	85	188
140	Up to 1600	50	47	157	157	128	32	71	43	15	M14 x 1.5	15	17	15	27	19	100	188
160	Up to 1600	56	53	177	177	144	38	78.5	42	18	M16 x 1.5	15	20	17	34	19	106	206

(mm)

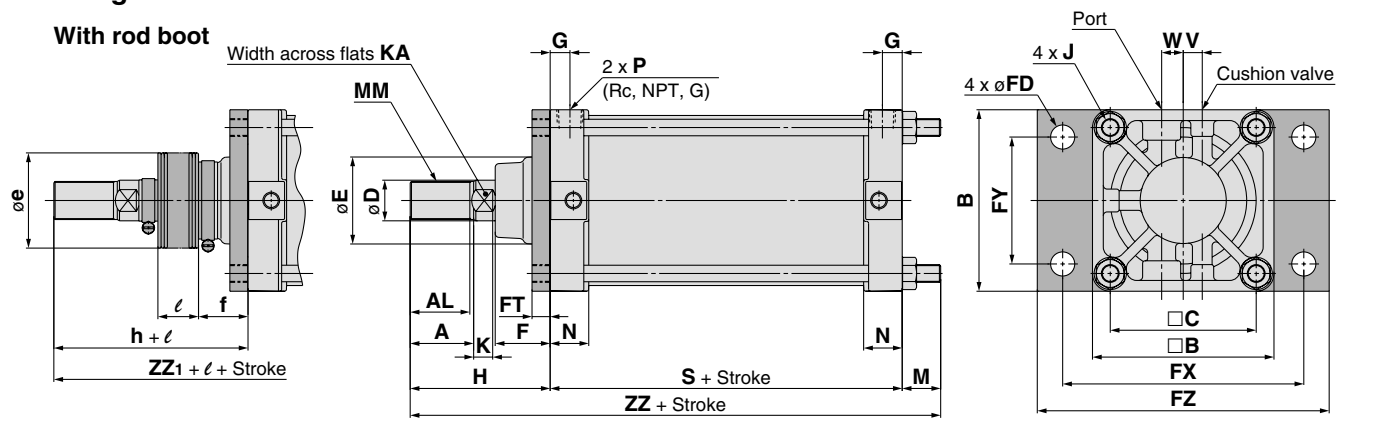
Bore size (mm)	LT	LX	LY	MM	N	P	S	X	Y	Without rod boot		With rod boot				
										H	ZZ	e	f	h	ℓ	ZZ1
125	8	100	156.5	M30 x 1.5	30.5	1/2	98	45	20	110	273	75	40	133	1/5 stroke	296
140	9	112	178.5	M30 x 1.5	30.5	1/2	98	45	30	110	283	75	40	133	1/5 stroke	306
160	9	118	194.5	M36 x 1.5	34.5	3/4	106	50	25	120	301	75	40	141	1/5 stroke	322

∗ The minimum stroke with rod boot is 30 mm or more.
∗∗ For auto switch mounting position and its mounting height, refer to page 1108-11.
∗∗∗ Refer to “Minimum Stroke for Auto Switch Mounting” on page 1108-12.

Dimensions

Rod flange: CS2YF

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	□B	B	□C	D	E	F	FD	FT	FX	FY	FZ	G	J	V
125	Up to 1600	50	47	143	145	115	32	71	43	19	14	190	100	230	15	M14 x 1.5	15
140	Up to 1600	50	47	157	160	128	32	71	43	19	20	212	112	255	15	M14 x 1.5	15
160	Up to 1600	56	53	177	180	144	38	78.5	42	19	20	236	118	275	18	M16 x 1.5	15

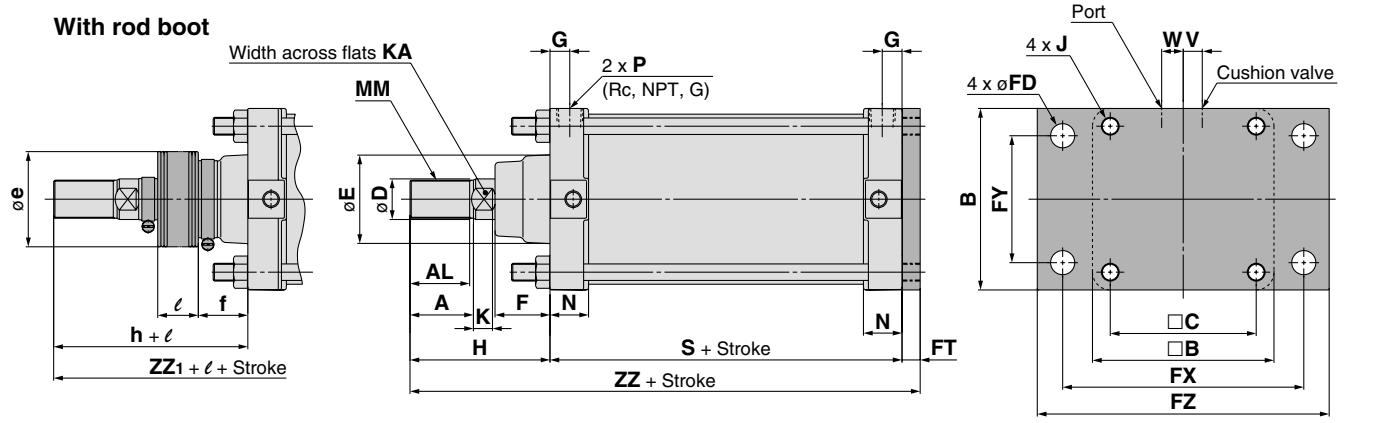
(mm)

Bore size (mm)	W	K	KA	M	MM	N	P	S	Without rod boot		With rod boot				
									H	ZZ	e	f	h	ℓ	ZZ1
125	17	15	27	13	M30 x 1.5	30.5	1/2	98	110	221	75	40	133	1/5 stroke	244
140	17	15	27	13	M30 x 1.5	30.5	1/2	98	110	221	75	40	133	1/5 stroke	244
160	20	17	34	15	M36 x 1.5	34.5	3/4	106	120	241	75	40	141	1/5 stroke	262

∗ The minimum stroke with rod boot is 30 mm or more.
∗∗ For auto switch mounting position and its mounting height, refer to page 1108-11.
∗∗∗ Refer to "Minimum Stroke for Auto Switch Mounting" on page 1108-12.

Head flange: CS2YG

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	□B	B	□C	D	E	F	FD	FT	FX	FY	FZ	G	J	V
125	Up to 1000	50	47	143	145	115	32	71	43	19	14	190	100	230	15	M14 x 1.5	15
140	Up to 1000	50	47	157	160	128	32	71	43	19	20	212	112	255	15	M14 x 1.5	15
160	Up to 1200	56	53	177	180	144	38	78.5	42	19	20	236	118	275	18	M16 x 1.5	15

(mm)

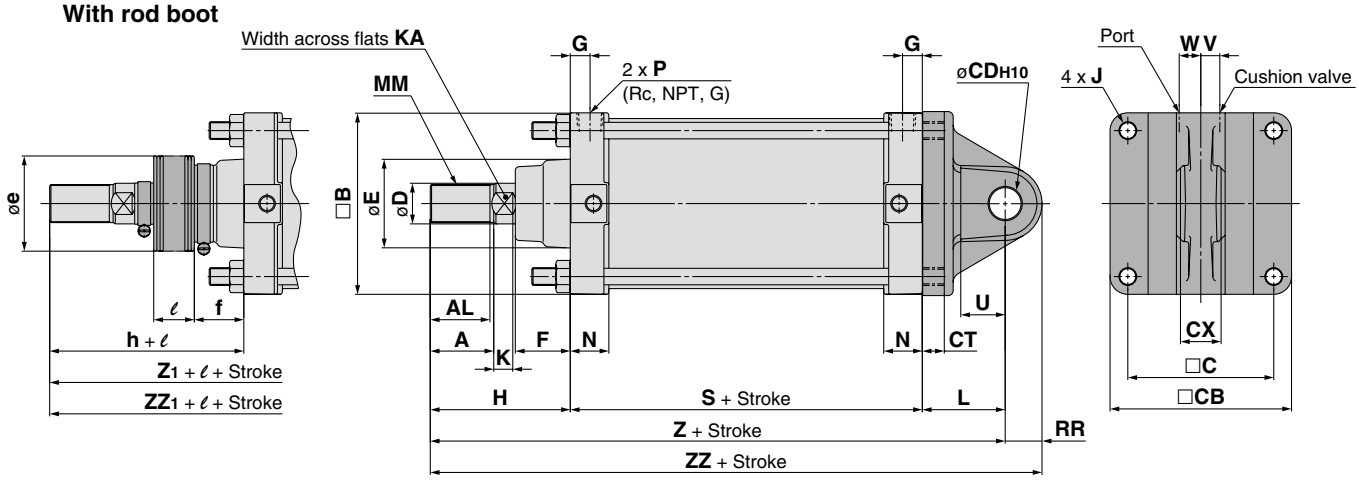
Bore size (mm)	W	K	KA	MM	N	P	S	Without rod boot		With rod boot				
								H	ZZ	e	f	h	ℓ	ZZ1
125	17	15	27	M30 x 1.5	30.5	1/2	98	110	222	75	40	133	1/5 stroke	245
140	17	15	27	M30 x 1.5	30.5	1/2	98	110	228	75	40	133	1/5 stroke	251
160	20	17	34	M36 x 1.5	34.5	3/4	106	120	246	75	40	141	1/5 stroke	267

∗ The minimum stroke with rod boot is 30 mm or more.
∗∗ For auto switch mounting position and its mounting height, refer to page 1108-11.
∗∗∗ Refer to "Minimum Stroke for Auto Switch Mounting" on page 1108-12.

Dimensions

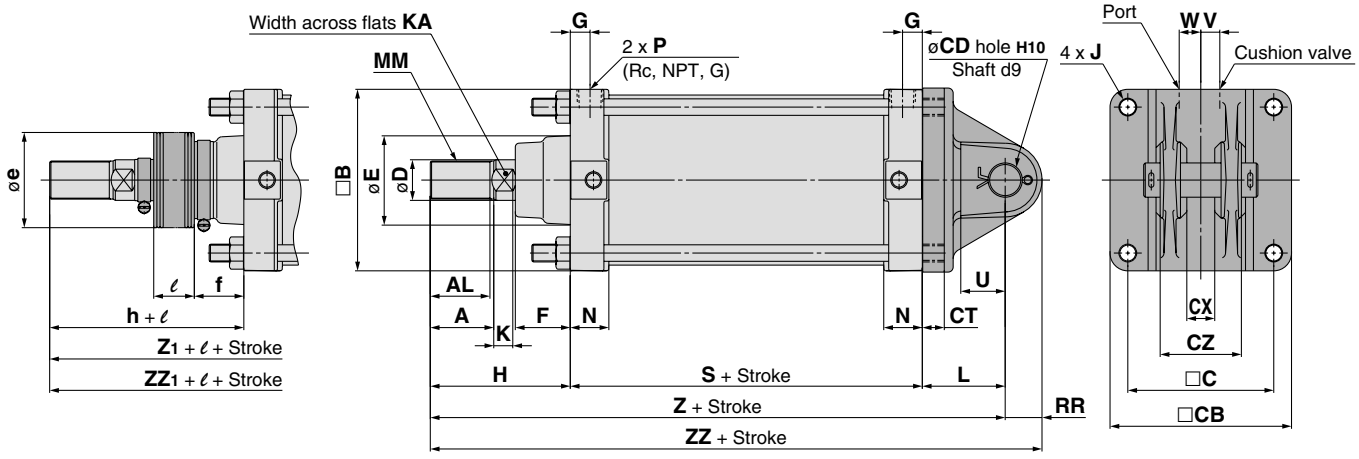
Single clevis: CS2YC

With rod boot



Double clevis: CS2YD

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	□B	□C	□CB	CDH10	CT	Single clevis	Double clevis		D	E	F	G	J	V	W
									CX	CX	CZ							
125	Up to 1000	50	47	143	115	145	$25^{+0.084}_{0}$	17	$32^{-0.1}_{-0.3}$	$32^{+0.3}_{+0.1}$	$64^{0}_{-0.2}$	32	71	43	15	M14 x 1.5	15	17
140	Up to 1000	50	47	157	128	160	$28^{+0.084}_{0}$	17	$36^{-0.1}_{-0.3}$	$36^{+0.3}_{+0.1}$	$72^{0}_{-0.2}$	32	71	43	15	M14 x 1.5	15	17
160	Up to 1200	56	53	177	144	180	$32^{+0.100}_{0}$	20	$40^{-0.1}_{-0.3}$	$40^{+0.3}_{+0.1}$	$80^{0}_{-0.2}$	38	78.5	42	18	M16 x 1.5	15	20

(mm)

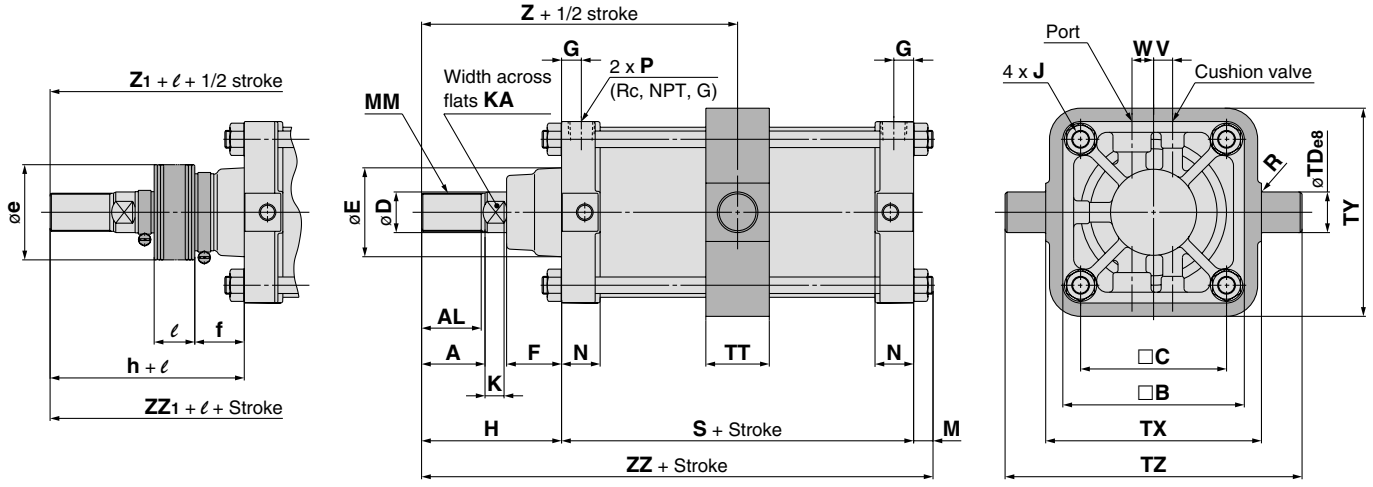
Bore size (mm)	K	KA	L	MM	N	P	S	U	RR	Without rod boot			With rod boot					
										H	Z	ZZ	e	f	h	ℓ	Z1	ZZ1
125	15	27	65	M30 x 1.5	30.5	1/2	98	35	29	110	273	302	75	40	133	1/5 stroke	296	325
140	15	27	75	M30 x 1.5	30.5	1/2	98	40	32	110	283	315	75	40	133	1/5 stroke	306	338
160	17	34	80	M36 x 1.5	34.5	3/4	106	45	36	120	306	342	75	40	141	1/5 stroke	327	363

∗ The minimum stroke with rod boot is 30 mm or more.
∗∗ For auto switch mounting position and its mounting height, refer to page 1108-11.
∗∗∗ Refer to “Minimum Stroke for Auto Switch Mounting” on page 1108-12.

Dimensions

Center trunnion: CS2YT

With rod boot



(mm)

Bore size (mm)	Stroke range (mm)	A	AL	□B	□C	D	E	F	G	J	V	W	K	KA	M	MM	N
125	25 to 1000	50	47	143	115	32	71	43	15	M14 x 1.5	15	17	15	27	13	M30 x 1.5	30.5
140	30 to 1000	50	47	157	128	32	71	43	15	M14 x 1.5	15	17	15	27	13	M30 x 1.5	30.5
160	35 to 1200	56	53	177	144	38	78.5	42	18	M16 x 1.5	15	20	17	34	15	M36 x 1.5	34.5

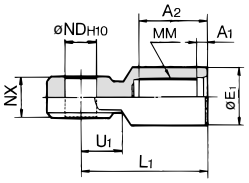
(mm)

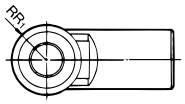
Bore size (mm)	P	R	S	TDe8	TT	TX	TY	TZ	Without rod boot			With rod boot					
									H	Z	ZZ	e	f	h	ℓ	Z1	ZZ1
125	1/2	1	98	32 $^{-0.050}_{-0.089}$	50	170	164	234	110	159	221	75	40	133	1/5 stroke	182	244
140	1/2	1.5	98	36 $^{-0.050}_{-0.089}$	55	190	184	262	110	159	221	75	40	133	1/5 stroke	182	244
160	3/4	1.5	106	40 $^{-0.050}_{-0.089}$	60	212	204	292	120	173	241	75	40	141	1/5 stroke	194	262

∗ The minimum stroke with rod boot is 30 mm or more for ø125, ø140 and 35 mm or more for ø160.
∗∗ For auto switch mounting position and its mounting height, refer to page 1108-11.
∗∗∗ Refer to “Minimum Stroke for Auto Switch Mounting” on page 1108-12.

Smooth Cylinder / *Series CS2Y*
Accessory Bracket

I Type Single Knuckle Joint*

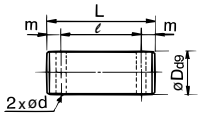




Material: Cast iron

Part no.	Applicable bore size (mm)	A_1	A_2	E_1	L_1	MM	ND_{H10}	NX	RR_1	U_1
I-12A	**125**	8	54	46	100	M30 x 1.5	$25^{+0.084}_{0}$	$32^{-0.1}_{-0.3}$	27	33
I-14A	**140**	8	54	48	105	M30 x 1.5	$28^{+0.084}_{0}$	$36^{-0.1}_{-0.3}$	30	39
I-16A	**160**	8	60	55	110	M36 x 1.5	$32^{+0.1}_{0}$	$40^{-0.1}_{-0.3}$	34	39

Knuckle Pin / Clevis Pin

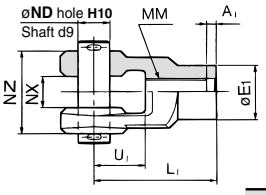


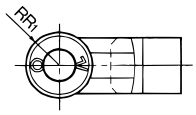
Material: Carbon steel

Part no.	Applicable bore size (mm)	D_{d9}	L	ℓ	m	d (Drill through)	Applicable split pin
IY-12	**125**	$25^{-0.065}_{-0.117}$	79.5	69.5	5	4	ø4 x 40
IY-14	**140**	$28^{-0.065}_{-0.117}$	86.5	76.5	5	4	ø4 x 40
IY-16	**160**	$32^{-0.080}_{-0.142}$	94.5	84.5	5	4	ø4 x 40

* Split pin is included.

Y Type Double Knuckle Joint*





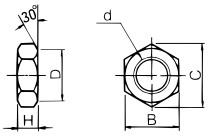
Material: Cast iron

Part no.	Applicable bore size (mm)	A_1	E_1	L_1	MM	ND_{H10}	NX	NZ	RR_1	U_1
Y-12A	**125**	8	46	100	M30 x 1.5	$25^{+0.084}_{0}$	$32^{+0.3}_{+0.1}$	$64^{-0.1}_{-0.3}$	27	42
Y-14A	**140**	8	48	105	M30 x 1.5	$28^{+0.084}_{0}$	$36^{+0.3}_{+0.1}$	$72^{-0.1}_{-0.3}$	30	47
Y-16A	**160**	8	55	110	M36 x 1.5	$32^{+0.1}_{0}$	$40^{+0.3}_{+0.1}$	$80^{-0.1}_{-0.3}$	34	46

* Use a single knuckle joint or a double knuckle joint individually.
  (Screw it entirely over the rod end threads and tighten it.)
* Extend the dimensions of A, H. when using a single/double knuckle joint together with a rod end nut.
  (To extend dimensions A, H, refer to the below table, and specify the product as made-to-order -XA0.)
* A pin and split pin are included with the double knuckled joint.

● "Made to order" with rod end bracket (-XC86) is available when ordering cylinders and accessories together. Please refer to Series CS2 Catalog (CAT.ES20-196) for details.

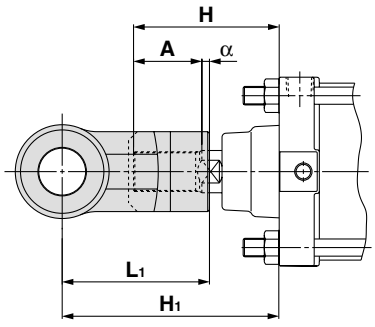
Rod End Nut



Material: Rolled steel

Part no.	Applicable bore size (mm)	d	H	B	C	D
NT-12	**125, 140**	M30 x 1.5	18	46	53.1	44
NT-16	**160**	M36 x 1.5	21	55	63.5	53

Single/Double Knuckle Joint



Bore size (mm) \ Symbol	H	A	α	L_1	H_1	Applicable knuckle joint part number	
						I type single knuckle	Y type double knuckle
125	110	50	3.5	100	156.5	I-12A	Y-12A
140	110	50	3.5	105	161.5	I-14A	Y-14A
160	120	56	3.5	110	170.5	I-16A	Y-16A

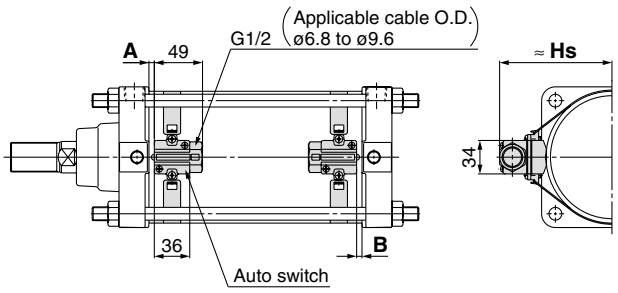
A, H Dimensions when Mounting a Single/Double Knuckle Joint together with a Rod End Nut

Bore size (mm)	A	H
125	65	125
140	65	125
160	76	140

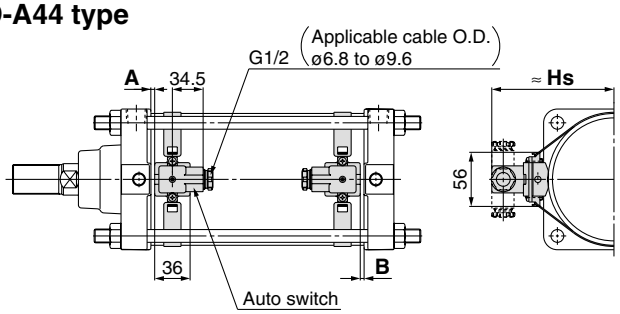
Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

<Band mounting>

D-A3□ type
D-G3/K3 type



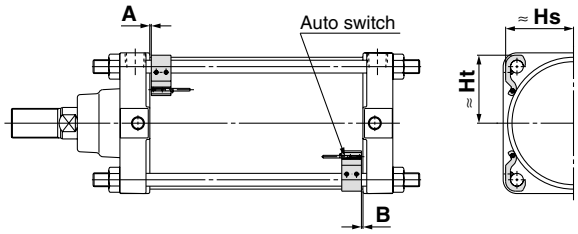
D-A44 type



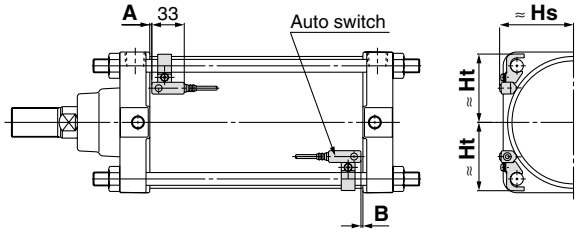
∗ The indicator light faces the inside.

<Tie-rod mounting>

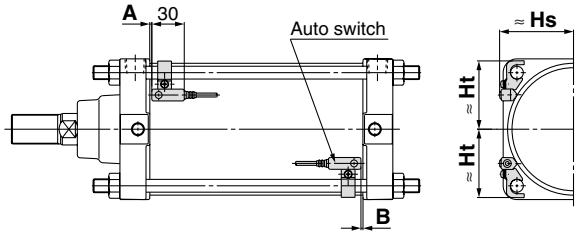
D-A9□/A9□V type **D-Z7□/Z80 type**
D-M9□/M9□V type **D-Y59□/Y69□/Y7P/Y7PV type**
D-M9□W/M9□WV type **D-Y7□W/Y7□WV type**
D-M9□AL/M9□AVL type **D-Y7BAL type**



D-A5□/A6□ type



D-F5□/J5□/D-F5NTL type
D-F5BAL/F59F type
D-F5□W/J59W type



Auto Switch Proper Mounting Position

(mm)

Auto switch model / Bore size	D-A9□ D-A9□V		D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□AL D-M9□AVL		D-Z7□/Z80 D-Y5□/Y6□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-A5□ D-A6□ D-A3□ D-A44 D-G39 D-K39		D-A59W		D-F5□W D-J59W D-F5BAL D-F5□ D-J5□ D-F59F		D-F5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
125	9	8	13	12	6.5	5.5	3	2	7	6	9.5	8.5	14.5	13.5
140	9	8	13	12	6.5	5.5	3	2	7	6	9.5	8.5	14.5	13.5
160	9	8	13	12	6.5	5.5	3	2	7	6	9.5	8.5	14.5	13.5

∗ Provided as guidelines for auto switch proper mounting position (detection at stroke end). When setting an auto switch, confirm the operation and adjust its mounting position.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	D-A9□ D-A9□V D-M9□ D-M9□W D-M9□AL		D-M9□V D-M9□WV D-M9□AVL		D-Z7□/Z80 D-Y5□/Y6□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BAL		D-A3□ D-G39 D-K39	D-A44	D-A5□ D-A6□ D-A59W		D-F5□ D-J5□ D-F5□W D-J59W D-F5BAL D-F59F D-F5NTL	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Ht	Hs	Ht
125	69	69.5	71.5	69.5	69	69.5	116	126	75.5	69.5	74.5	70
140	76	76	77.5	76	76	76	124	134	81	76.5	80	76.5
160	85	85	86	85	85	85	134.5	144.5	89	87.5	88	87.5

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches (mm)

Auto switch model	Number of auto switches mounted		Mounting brackets other than center trunnion	Center trunnion		
				ø125	ø140	ø160
D-A9□	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		15	100	105	110
	With n pcs.		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$100 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-A9□V	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		10	75	80	85
	With n pcs.		$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$75 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□ D-M9□W	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		15	105	110	115
	With n pcs.		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$115 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□V D-M9□WV	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		10	80	85	90
	With n pcs.		$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$80 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$85 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$90 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-M9□AL	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		20	115	120	
	With n pcs.		$20 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$115 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$120 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
D-M9□AVL	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		15	90	95	
	With n pcs.		$15 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$90 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
D-A5□/A6□ D-A59W D-F5□/J5□ D-F5□W D-J59W D-F5BAL D-F59F	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		25	125	135	
	With n pcs. (Same surface)		$25 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$125 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$135 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
D-F5NTL	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		35	145	155	
	With n pcs. (Same surface)		$35 + 55\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$145 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$155 + 55\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	
D-A3□ D-G39 D-K39	With 2 pcs.	Different surfaces	35	110		
		Same surface	100			
	With n pcs.	Different surfaces	35 + 30(n – 2)	110 + 30(n – 2) (n = 2, 4, 6, 8···)		
		Same surface	100 + 100(n – 2)	110 + 100(n – 2) (n = 2, 4, 6, 8···)		
	With 1 pc.		15	110		
D-A44	With 2 pcs.	Different surfaces	35	110		
		Same surface	55			
	With n pcs.	Different surfaces	35 + 30(n – 2)	110 + 30(n – 2) (n = 2, 4, 6, 8···)		
		Same surface	55 + 55(n – 2)	110 + 50(n – 2) (n = 2, 4, 6, 8···)		
	With 1 pc.		15	110		
D-Z7□ D-Z80 D-Y59□ D-Y7P D-Y7□W	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		15	105	110	115
	With n pcs.		$15 + 40\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$105 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$110 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$115 + 40\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-Y69□ D-Y7PV D-Y7□WV	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		10	90	95	100
	With n pcs.		$10 + 30\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$90 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$95 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$100 + 30\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)
D-Y7BAL	With 2 pcs. (Different surfaces, Same surface), With 1 pc.		20	115	120	125
	With n pcs.		$20 + 45\frac{(n-2)}{2}$ (n = 2, 4, 6, 8···)	$115 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$120 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)	$125 + 45\frac{(n-4)}{2}$ (n = 4, 8, 12, 16···)

Operating Range

(mm)

Auto switch model	Bore size		
	125	**140**	**160**
D-A9□/A9□V	12	12.5	11.5
D-M9□/M9□V **D-M9□W/M9□WV** **D-M9□AL/M9□AVL**	6	6.5	6.5
D-Z7□/Z80	14	14.5	13
D-A3□/A44 **D-A5□/A6□**	10	10	10
D-A59W	17	17	17
D-Y59□/Y69□ **D-Y7P/Y7PV** **D-Y7□W/Y7□WV** **D-Y7BAL**	12	13	7
D-F5□/J5□/F5□W **D-J59W/F5BAL** **D-F5NTL/F59F**	5	5	5.5
D-G39/K39	11	11	10

∗ Since this is a guideline including hysteresis, not meant to be guaranteed.
(Assuming approximately ±30% dispersion.)
There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

Auto switch model	Bore size (mm)		
	ø125	**ø140**	**ø160**
D-A9□/A9□V **D-M9□/M9□V** **D-M9□W/M9□WV** **D-M9□AL/M9□AVL**	BS5-125	BS5-125	BS5-160
D-A5□/A6□ **D-A59W** **D-F5□/J5□** **D-F5NTL** **D-F5□W/J59W** **D-F5BAL/F59F**	BT-12	BT-12	BT-16
D-A3□/A44 **D-G39/K39**	BS1-125	BS1-140	BS1-160
D-Z7□/Z80 **D-Y59□/Y69□** **D-Y7P/Y7PV** **D-Y7□W/Y7□WV** **D-Y7BAL**	BS4-125	BS4-125	BS4-160

[Mounting screws set made of stainless steel]

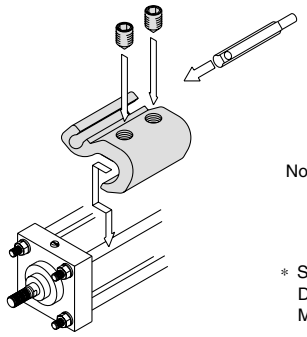
The following set of mounting screws made of stainless steel (including set screws) is also available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)

BBA1: For D-A5, A6, F5, J5 type

"D-F5BAL" auto switch is set on the cylinder with the stainless steel screws above when shipped.

When only an auto switch is shipped independently, "BBA1" screws are attached.

Note) When using the D-M9□AL/M9□AVL or Y7BAL model, do not use the steel set screw which is included with the auto switch mounting bracket in the above table (BS5-□□□, BS4-□□□). Please separately prepare the stainless steel screw set (BBA1), and select and use the M4 x 8L stainless steel set screw included in BBA1.



Note 1) Refer to Best Pneumatics No. 2 for the details of BBA1 screws.

∗ Shows an example of mounting the D-A9□(V), M9□(V), M9□W(V), M9□A(V)L model.

Other than the applicable auto switches listed in "How to Order", the following auto switches can be mounted.
For detailed specifications, refer to Best Pneumatics No. 2.

Type	Model	Electrical entry (Direction)	Features
Reed auto switch	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 auto switch	D-F59, F5P, J59	Grommet (in-line)	—
	D-Y59A, Y59B, Y7P		
	D-F59W, F5PW, J59W		2-color indication
	D-Y7NW, Y7PW, Y7BW		
	D-F5BAL, Y7BAL		Water resistant (2-color indication)
	D-F5NTL		With timer
	D-M9NV, M9PV, M9BV	Grommet (Perpendicular)	—
	D-Y69A, Y69B, Y7PV		
	D-M9NWV, M9PWV, M9BWV		2-color indication
	D-Y7NWV, Y7PWV, Y7BWV		
	D-M9NAVL, M9PAVL, M9BAVL		Water resistant (2-color indication)

∗ With pre-wired connector is available for solid state auto switches. For details, refer to Best Pneumatics No. 2.
∗ Normally closed (NC = b contact), solid state switches (D-F9G, F9H, Y7G, Y7H type) are also available. For details, refer to Best Pneumatics No. 2.

Smooth Cylinder
Specific Product Precautions 1

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

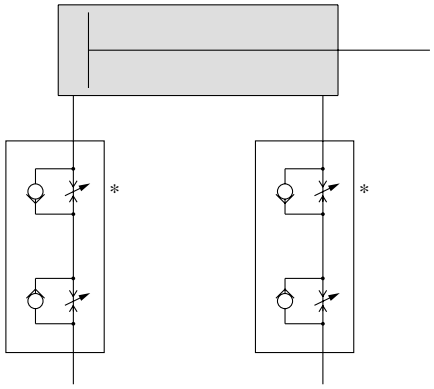
Recommended Pneumatic Circuit

Refer to the diagrams below when controlling speed with the smooth cylinder.

⚠Warning

Horizontal operation (Speed control)

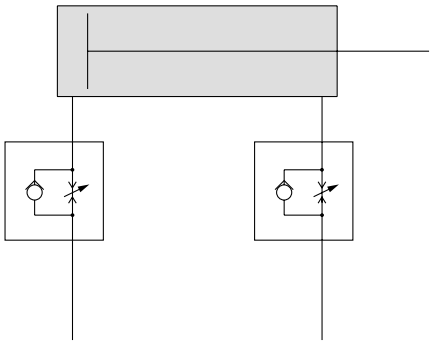
I



Dual speed controller

Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

II

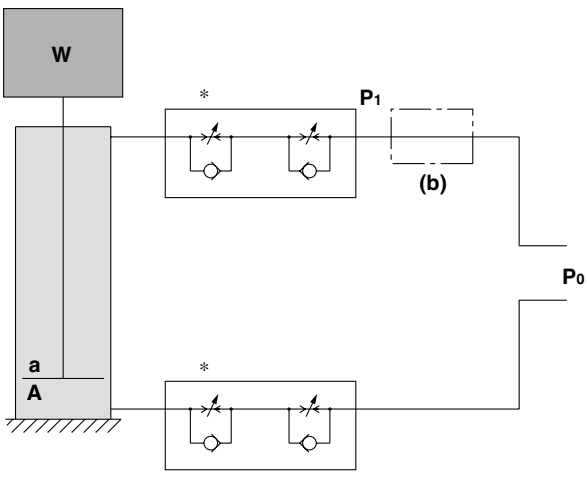


Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

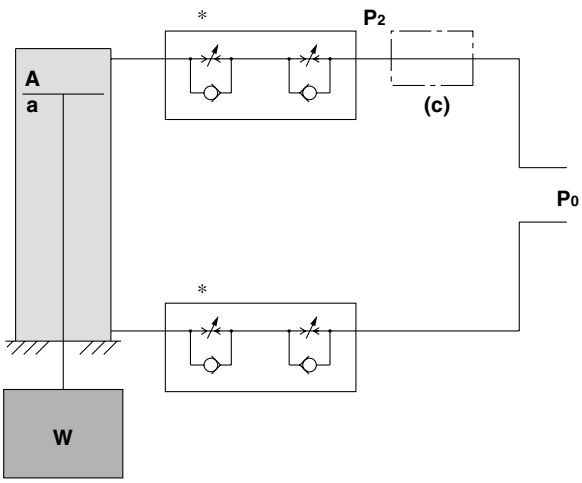
Vertical operation (Speed control)

I



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
(2) Depending on the size of the load, installing a regulator with check valve at position **(b)** can reduce lurching during descent and operation delay during ascent.
As a guide,
when **W + P0a>P0A**,
adjust **P1** to make **W + P1a = P0A**.

II



(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
(2) Installing a regulator with check valve at position **(c)** can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust **P2** to make **W + P2A = P0a**.

W: Load (N) **P0**: Operating pressure (MPa) **P1, P2**: Reduced pressure (MPa) **a**: Rod side piston area (mm^2) **A**: Head side piston area (mm^2)

Smooth Cylinder
Specific Product Precautions 2

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Lubricant

⚠Caution

1. Operate without lubrication.

Lubrication may cause malfunction.

2. Do not use grease not specified by SMC.

Using grease other than that specified may cause malfunction.

- Order using the following part numbers when only maintenance grease is needed.

Grease

Volume	Part no.
5 g	GR-L-005
10 g	GR-L-010
150 g	GR-L-150

3. Do not wipe off grease from the sliding part of the air cylinder.

Wiping grease from the sliding part of the air cylinder forcefully may cause malfunction.

Air Source

⚠Caution

1. Take measure to prevent pressure fluctuations.

Pressure fluctuations may cause malfunction.

Related Products:
Made to Order Specifications:
-XB13: Low Speed Cylinder
5 to 50 mm/s (CY1/CY3: 7 to 50 mm/s)

Made to Order

Symbol

Low Speed Cylinder — -XB13

CG1 — Standard model no. — XB13

MB — Standard model no. — XB13

Low speed cylinder ●

CY1 / CY3 — Standard model no. — XB13

MGP^{M}_{L} — Standard model no. — XB13

MGGM — Standard model no. — XB13

MGCM — Standard model no. — XB13

CX2 — Standard model no. — XB13

CXW^{M}_{L} — Standard model no. — XB13

CXS^{M}_{L} — Standard model no. — XB13

MXH / MXU — Standard model no. — XB13

CXT^{M}_{L} / $CXSJ^{M}_{L}$ — Standard model no. — XB13

Low speed cylinder ●

Note) Operate without lubrication from a pneumatic system lubricator.

Specifications

Applicable cylinder	Air cylinder Standard		Magnetically coupled rodless cylinder	Compact guide cylinder	Guide cylinder		Slide unit		Dual rod cylinder		Compact slide		Platform cylinder
					Slide bearing								
Series	CG1	MB	CY^{1}_{3}	MGP^{M}_{L}	MGGM	MGCM	CX2	CXW^{M}_{L}	$CXSJ^{M}_{L}$	CXS^{M}_{L}	MXH	MXU	CXT^{M}_{L}
Action	Double acting, Single rod		Double acting										
Bore size (mm)	20, 25, 32 40, 50, 63 80, 100	32, 40 50, 63 80, 100	CY3B: 6, 10, 15, 20, 25, 32 40, 50, 63 CY1S, CY1L: 6 to 40	12, 16, 20 25, 32, 40 50, 63, 80 100	20, 25, 32 40, 50, 63 80, 100	20, 25 32, 40 50	10, 15 25	10, 16 20, 25 32	6, 10 15, 20 25, 32	6, 10 15, 20 25, 32	6, 10 16, 20	6, 10 16	12, 16 20, 25 32, 40
Piston speed	5 to 50 mm/s		7 to 50 mm/s	5 to 50 mm/s	5 to 50 mm/s								
Cushion	Rubber bumper	Air cushion on both ends	Rubber bumper		Rubber bumper (Basic cylinder)		Shock absorber (CX2: Option)		Rubber bumper				
Auto switch	Mountable												
Mounting	Basic Foot Flange Trunnion Clevis	Basic Foot Flange Clevis Trunnion	Basic Slider	Basic	Basic Front mounting Flange		Basic						
Dimensions	Dimensions and specifications are the same as standard products of double acting.												
Additional specifications													

∗ No shock absorber is available for the Series MGGM.

Related Products:
Speed Controller for Low Speed Operation

The effective area of controlled flow is approximately 1/10 of the standard type.
These controllers are suitable for controlling the speed of microspeed cylinders.
The dual type speed controller is especially suitable for cylinders with a small bore size.

Elbow/Universal Type

Air Flow/Effective Area

Model		AS12□1FM-M5 AS13□1FM-M5	AS22□1FM-□01 AS23□1FM-□01		AS22□1FM-□02 AS23□1FM-□02		
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø3.2, ø4	ø6, ø8	ø4	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø1/8", ø5/32"	ø3/16", ø1/4" ø5/16"	ø5/32"	ø3/16"	ø1/4", ø5/16" ø3/8"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38		
	Effective area (mm²)	0.1	0.2		0.6		
Free flow	Flow rate (ℓ/min (ANR))	100	180	230	260	390	460
	Effective area (mm²)	1.5	2.7	3.5	4	6	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

In-line Type

Air Flow/Effective Area

Model		AS1001FM	AS2001FM		AS2051FM	
Tubing O.D.	Metric size	ø3.2, ø4, ø6	ø4	ø6	ø6	ø8
	Inch size	ø1/8", ø5/32", ø3/16" ø1/4"	ø5/32"	ø3/16", ø1/4"	ø3/16"	ø1/4", ø5/16"
Controlled flow	Air flow (ℓ/min (ANR))	7	12		38	
	Effective area (mm²)	0.1	0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))	100	130	230	290	460
	Effective area (mm²)	1.5	2	3.5	4.5	7

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Elbow Type (Metal body)

Air Flow/Effective Area

Model			AS12□0M		AS22□0M-□01		AS22□0M-□02	
Port size		Cylinder side	M5 x 0.8	10-32 UNF	R 1/8	NPT 1/8	R 1/4	NPT 1/4
		Tube side			Rc 1/8		Rc 1/4	
Controlled flow	Air flow (ℓ/min (ANR))		7		12		38	
	Effective area (mm²)		0.1		0.2		0.6	
Free flow	Flow rate (ℓ/min (ANR))		105		280		420	
	Effective area (mm²)		1.6		4.3		6.5	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Dual Type

Air Flow/Effective Area

Model		ASD230FM-M5	ASD330FM-□01	ASD430FM-□02	
Tubing O.D.	Metric size	ø4, ø6	ø6, ø8	ø6	ø8, ø10
	Inch size	ø1/8", ø5/32" ø3/16", ø1/4"	ø3/16", ø1/4"	—	ø1/4", ø5/16" ø3/8"
Controlled flow (Free flow)	Air flow (ℓ/min (ANR))	7	12	38	
	Effective area (mm²)	0.1	0.2	0.6	

Note) Supply pressure: 0.5 MPa, Temperature: 20°C

Low Speed Cylinder Specific Product Precautions

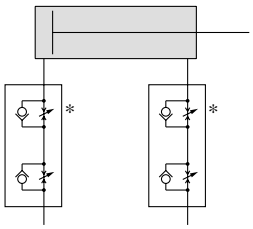
Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Recommended Pneumatic Circuit

⚠Warning

Horizontal Operation

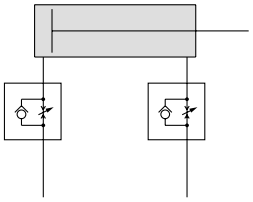
I



Dual speed controller

Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip. More stable low speed operation can be achieved than meter-in circuit alone.

II

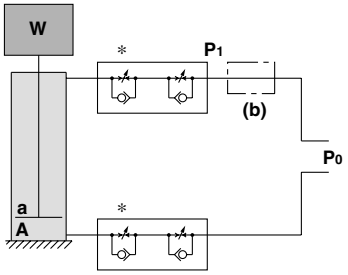


Meter-in speed controller

Meter-in speed controllers can reduce lurching while controlling the speed. The two adjustment needles facilitate adjustment.

Vertical Operation

I



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(2) Depending on the size of the load, installing a regulator with check valve at position **(b)** can deduce lurching during descent and operation delay during ascent.
As a guide,
when **W + P0a>P0A**,
adjust **P1** to make **W + P1a = P0A**.

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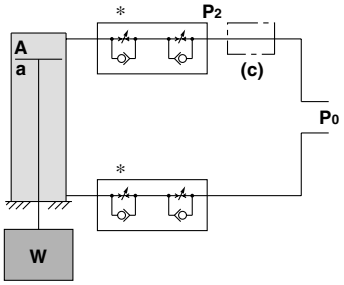

(1) Speed is controlled by meter-out circuit. Using concurrently the meter-in circuit can alleviate the stick-slip.*
(2) Installing a regulator with check valve at position **(c)** can reduce lurching during descent and operation delay during ascent.
As a guide,
adjust **P2** to make **W + P2A = P0a**.

W: Load (N) **P0**: Operating pressure (MPa) **P1, P2**: Reduced pressure (MPa) **a**: Rod side piston area (mm^2) **A**: Head side piston area (mm^2)

⚠Warning

Since **C□J2X**, **C□UX10** are subject to internal leakage due to their construction, the speed may not be fully controlled with the meter-out controller (*) during low speed operation.

Selection

⚠Caution

1. **Operate within the standard strokes.**
   Operating with the stroke exceeding the standard stroke may cause malfunction.
2. **Provide a construction that does not apply a lateral load to the cylinder.**
   Applying a lateral load to the cylinder may cause malfunction.
3. **Do not use the product at a high frequency.**
   Use it at 30 cpm or less as a guideline.
4. **Do not wipe out the grease in the sliding part of the air cylinder.**
   Doing so forcefully may cause malfunction.

Pneumatic Circuit

⚠Caution

1. **The piping length between the speed controller and the cylinder port must be kept as short as possible.**
   If the speed controller and the cylinder port are far apart, speed adjustment may be unstable.
2. **Use a low speed controller to easily adjust for low speed operation or a dual speed controller (Series ASD) to prevent cylinders from popping out.**
   (When the low speed controller is used, the maximum speed may be limited.)