Air Cylinder

Series CM2

ø20, ø25, ø32, ø40

Series Variations

Series	Action	Rod	Cushion	Basic	Standard variations: Built-in One-touch fitting	Standard variations: With rod boot	Standard variations: Air-hydro	Standard variations: Clean series	Standard variations: Copper/ Fluorine-free	Bore size (mm)	Page
Standard *Series CM2* 	Double acting	Single rod	Rubber	●	●	●	●	●	●	20 25 32 40	128
			Air	●	●	●	●	●	●		
		Double rod	Rubber	●	●	●	●		●		146
			Air	●					●		
	Single acting	Single rod (Spring return/ Spring extend)	Rubber	●	●				●		156
Non-rotating Rod *Series CM2K* 	Double acting	Single rod	Rubber	●		●			●		171
			Air	●		●			●		
		Double rod	Rubber	●					●		176
			Air	●					●		
	Single acting	Single rod (Spring return/ Spring extend)	Rubber	●					●		181
Direct Mount *Series CM2R* 	Double acting	Single rod	Rubber	●			●	●	●		186
			Air	●					●		
Direct Mount, Non-rotating Rod *Series CM2RK* 	Double acting	Single rod	Rubber	●					●		193
Low Friction *Series CM2Q* 	Use the new **"Smooth Cylinder Series CM2Y"** to realize both-direction low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)										198
Centralized Piping *Series CM2□P* 	Double acting	Single rod	Rubber	●		●			●	20 25 32 40	199
With End Lock *Series CBM2* 	Double acting	Single rod	Rubber	●		●		● (Lock in head rod only)	●		204
			Air	●		●			●		

Low-speed cylinder *Series CM2X* 	Refer to Best Pneumatics No. 3.	

Combinations of Standard Products and Made to Order Specifications

Series CM2

Use the new "**Smooth Cylinder Series CM2Y**" to realize both-direction low friction and low-speed operation. (Refer to Best Pneumatics No. 3.)

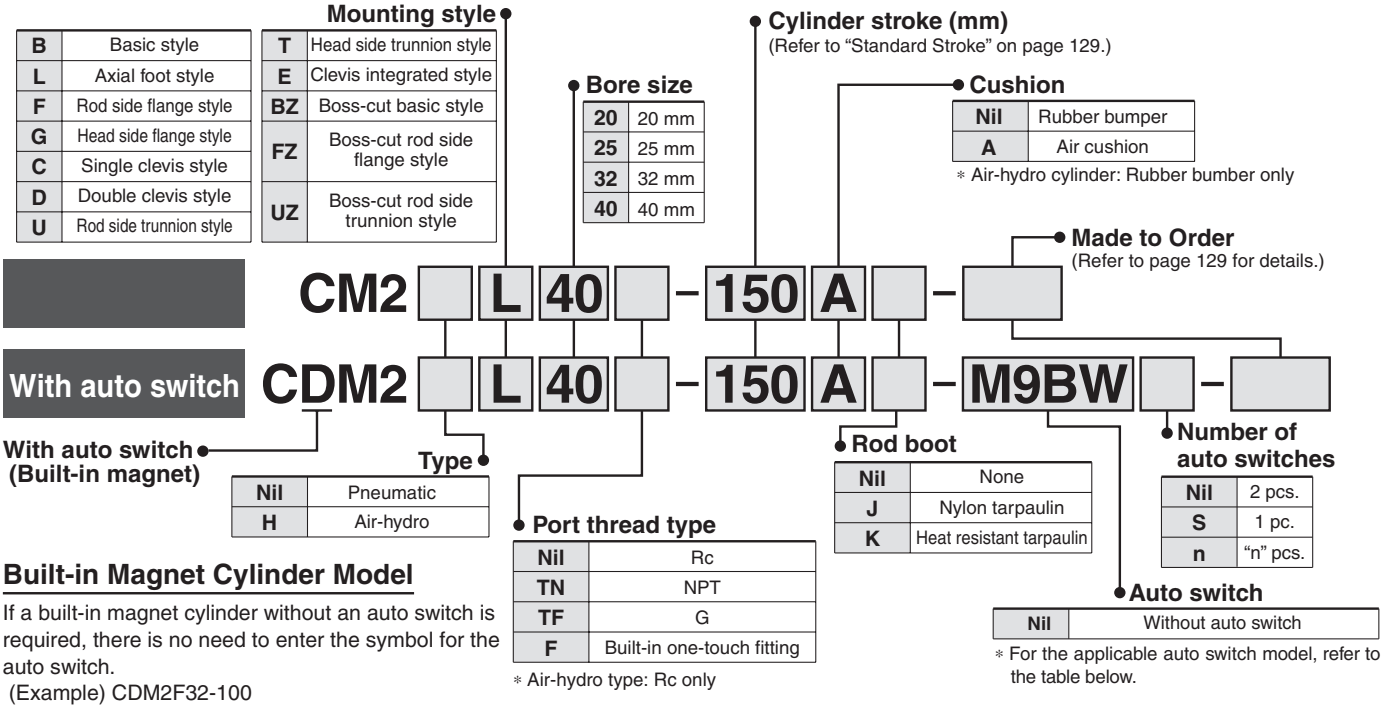
● : Standard
◎ : Made to Order specifications
○ : Special product (Contact SMC for details.)
— : Not available

Symbol	Specification	Applicable bore size	CM2 (Standard) Double acting Single rod Rubber	CM2 (Standard) Double acting Single rod Air	CM2 (Standard) Double acting Double rod Rubber	CM2 (Standard) Double acting Double rod Air	CM2 (Standard) Single acting Single rod Rubber	CM2 Double acting Single rod Rubber	CM2 Double acting Single rod Air	CM2K (Not-rotating) Double acting Double rod Rubber	CM2K (Not-rotating) Double acting Double rod Air	CM2K (Not-rotating) Single acting Single rod Rubber	CM2R (Direct mount) Double acting Single rod Rubber	CM2R (Direct mount) Double acting Single rod Air	CM2RK (Direct mount, Non-rotating) Double acting Single rod Rubber	CM2□P (Centralized Piping) Double acting Single rod Rubber	CM2□Q (Low Friction) Double acting Single rod Rubber	CBM2 (With end Lock) Double acting Single rod Rubber	CBM2 (With end Lock) Double acting Single rod Air	CM2X Low-speed cylinder Note 2) Double acting Single rod Rubber
			ø20 to ø40												ø20 to ø40					
Standard	Standard	ø20 to ø40	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
D	Built-in magnet		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
CM2□F	With one-touch fittings		●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○
CM2□-□ JK	With rod boot		●	●	●	●	○	●	●	○	○	○	○	○	○	●	○	●	—	○
CM2□H	Air-hydro type		●	—	●	—	—	—	—	—	—	—	●	—	—	—	—	—	—	—
10-, 11-	Clean series		●	●	●	●	○	—	—	—	—	—	●	○	—	○	○	● Note 3)	○	●
20-	Copper and Fluorine-free		●	●	●	●	●	●	●	●	●	●	●	●	●	○	—	●	○	—
CM2□ RV	Water resistant		●	●	●	○	○	—	—	—	—	—	○	○	—	○	—	● Note 3)	○	—
CM2□X	Low-speed cylinder		●	○	○	○	—	—	—	—	—	—	●	—	—	○	—	—	—	●
XB6	Heat-resistant cylinder (–10 to 150°C) Note 1)		◎	◎	◎	◎	○	◎	◎	◎	◎	○	◎	◎	◎	—	—	◎	○	—
XB7	Cold-resistant cylinder Note 1)		◎	○	◎	○	○	○	○	○	○	○	◎	○	○	—	—	—	—	—
XB9	Low-speed cylinder (5 to 50 mm/s)		◎	○	○	○	—	○	○	○	○	—	◎	○	○	○	—	◎	○	—
XB12	External stainless steel cylinder		◎	○	◎	○	◎	◎	○	○	○	◎	○	○	○	—	—	○	○	○
XB13	Low-speed cylinder (5 to 50 mm/s)		◎	○	○	○	—	○	○	○	○	—	◎	○	○	○	—	—	—	—
XC3	Special port position		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	—	◎	◎	○	◎
XC4	With heavy duty scraper		◎	◎	◎	◎	○	—	—	—	—	—	○	○	—	◎	—	◎ Note 3)	○	—
XC5	Heat-resistant cylinder (–10 to 110°C) Note 1)		◎	◎	◎	◎	○	○	○	○	○	○	◎	◎	○	—	—	○	○	—
XC6	Made of stainless steel		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	○
XC8	Adjustable stroke cylinder/Adjustable extension type		◎	◎	—	—	○	◎	◎	—	—	○	◎	○	◎	—	○	◎ Note 3)	○ Note 3)	—
XC9	Adjustable stroke cylinder/Adjustable retraction type		◎	◎	—	—	○	◎	◎	—	—	○	◎	◎	◎	—	○	○ Note 4)	○ Note 4)	—
XC10	Dual stroke cylinder/Double rod type		◎	○	—	—	○	◎	○	—	—	○	○	○	○	—	○	○	○	—
XC11	Dual stroke cylinder/Single rod type	ø20 to ø40	◎	◎	—	—	—	◎	◎	—	—	—	◎	◎	◎	—	○	○	○	—
XC12	Tandem cylinder		◎	○	—	—	—	○	—	—	—	—	◎	—	○	—	—	—	—	—
XC13	Auto switch rail mounting		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	◎	○	○
XC20	Head cover axial port		◎	○	—	—	◎	◎	○	—	—	◎	◎	○	◎	—	○	○ Note 4)	—	○
XC22	Fluororubber seal		◎	◎	◎	◎	○	◎	◎	◎	◎	○	◎	◎	◎	—	—	◎	◎	—
XC25	No fixed orifice of connecting port		◎	—	◎	—	◎	◎	—	◎	—	○	◎	—	◎	—	○	○	—	○
XC27	Double clevis pins made of stainless steel (Stainles steel 304)		◎	◎	—	—	◎	◎	◎	—	—	◎	—	—	—	○	○	◎	◎	○
XC29	Double knuckle joint with spring pin		◎	◎	◎	◎	◎	○	○	○	○	○	◎	◎	○	◎	○	◎	◎	○
XC35	With coil scraper		◎	○	◎	○	○	—	—	—	—	—	○	○	—	○	—	◎ Note 3)	○	—
XC38	Vacuum specification (Rod through-hole)		—	—	◎	◎	—	—	—	○	○	—	—	—	—	—	—	—	—	—
XC52	Mounting nut with set screw		◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	—	—	—	◎	◎	◎	◎	◎
XC92	Dust resistant cylinder		◎	○	○	○	○	—	—	—	—	—	○	—	—	○	—	○	—	—

Note 1) The products with an auto switch are not compatible.
Note 2) Refer to Best Pneumatics No. 3 for Low-speed cylinders.
Note 3) Available only for locking at head end.
Note 4) Available only for locking on rod side.

Air Cylinder: Standard Type
Double Acting, Single Rod
Series CM2
ø20, ø25, ø32, ø40

How to Order



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) CDM2F32-100

Applicable Auto Switch /Refer to pages 1263 to 1371 for further information on auto switches.

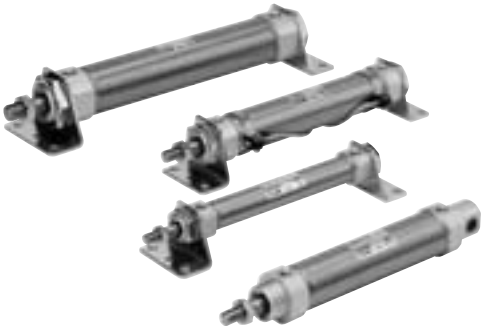
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model	Lead wire length (m) 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	●	●	●	○	—	○		
				2-wire		12V		M9B	●	●	●	○	—	○	—	
		Connector						H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)		5V, 12V		G39A **	—	—	—	—	●	—	IC circuit	
				2-wire		12V		K39A **	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)				M9PW	●	●	●	○	—	○		
				2-wire		12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)							H7BA ***	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	—
				2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			No				100V or less	A90	●	—	●	—	—	—	IC circuit	
			Yes				100V, 200V	B54 **	●	—	●	●	—	—	—	
			No				200V or less	B64 **	●	—	●	—	—	—		
		Connector	Yes				—	C73C	●	—	●	●	●	—		
			No				24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes				—	A33A **	—	—	—	—	●	—	—	PLC
							100V, 200V	A34A **	—	—	—	—	●	—		Relay, PLC
		DIN terminal						A44A **	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	B59W	●	—	●	—	—	—		

*** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. A water resistant type cylinder is recommended for use in an environment which requires water resistance.

* 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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
** D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

* Since there are other applicable auto switches than listed above, refer to page 218 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

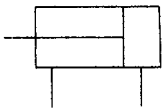


Clevis integrated

JIS Symbol

Double acting,
Single rod

With air cushion



Specifications

Bore size (mm)		20	25	32	40
Type		Pneumatic			
Action		Double acting, Single rod			
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.05 MPa			
Ambient and fluid temperature		Without auto switch: −10 to +70°C (No freezing) With auto switch: −10 to +60°C (No freezing)			
Lubrication		Not required (Non-lube)			
Stroke length tolerance		$^{+1.4}_{0}$ mm			
Piston speed		Rubber bumper: 50 to 750 mm/s, Air cushion: 50 to 1000 mm/s			
Cushion		Rubber bumper, Air cushion			
Allowable kinetic energy	**Rubber bumper**	0.27 J	0.4 J	0.65 J	1.2 J
	Air cushion (Effective cushion length (mm))	0.54 J (11.0)	0.78 J (11.0)	1.27 J (11.0)	2.35 J (11.8)

Standard Stroke

Bore size (mm)	Standard stroke (1) (mm)	Maximum stroke (mm)
20	25, 50, 75, 100, 125, 150 200, 250, 300	1000
25		1500
32		2000
40		2000

Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XB7	Cold resistant cylinder
—XB9	Low speed cylinder (10 to 50 mm/s)
—XB12	External stainless steel cylinder
—XB13	Low speed cylinder (5 to 50 mm/s)
—XC3	Special port location
—XC4	With heavy duty scraper
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extension type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC10	Dual stroke cylinder/Double rod type
—XC11	Dual stroke cylinder/Single rod type
—XC12	Tandem cylinder
—XC13	Auto switch mounting rail style
—XC20	Head cover axial port
—XC22	Fluororubber seals
—XC25	No fixed orifice of connecting port
—XC27	Double clevis pin and double knuckle pin made of stainless steel
—XC29	Double knuckle joint with spring pin
—XC35	With coil scraper
—XC52	Mounting nut with set screw
—XC92	Dust resistant cylinder

Rod Boot Material

Symbol	Rod boot material	Maximum ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.

Comparison of the Full Length Dimension (Versus standard type)

(mm)

ø20	ø25	ø32	ø40
▲13	▲13	▲13	▲16

Mounting style

■ Boss-cut basic style (BZ) ■ Boss-cut flange style (FZ)

■ Boss-cut trunnion style (UZ)

Mounting Bracket/Part No.

Mounting bracket	Min. order	Bore size (mm) 20	25	32	40	Description (for min. order)
Axial foot *	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Single clevis**	1	CM-C020B	CM-C032B		CM-C040B	1 single clevis, 3 liners
Double clevis*** (with pins)	1	CM-D020B	CM-D032B		CM-D040B	1 double clevis, 3 liners, 1 clevis pins, 2 retaining rings
Trunnion (with nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.

** 3 Liners are attached with a clevis bracket for adjusting the mounting angle.

*** Clevis pins and retaining rings (cotter pins for ø40) are attached.

Mounting Style and Accessory

Mounting \ Accessory	Standard equipment			Option					
	Mounting nut	Rod end nut	Clevis pin	Single knuckle joint	Double knuckle joint (3)	Clevis bracket (4)	Rod boot	Pivot bracket (6)	Pivot bracket pin (7)
Basic style	●(1 pc.)	●	—	●	●	—	●	—	—
Axial foot style	●(2)	●	—	●	●	—	●	—	—
Rod side flange style	●(1)	●	—	●	●	—	●	—	—
Head side flange style	●(1)	●	—	●	●	—	●	—	—
Clevis integrated style	—(1)	●	—	●	●	●	●	—	—
Single clevis style	—(1)	●	—	●	●	—	●	●	●
Double clevis style(3)	—(1)	●	●(5)	●	●	—	●	—	—
Rod side trunnion style	●(1)(2)	●	—	●	●	—	●	●	●
Head side trunnion style	●(1)(2)	●	—	●	●	—	●	●	●
Boss-cut basic style	●(1)	●	—	●	●	—	●	—	—
Boss-cut flange style	●(1)	●	—	●	●	—	●	—	—
Boss-cut trunnion style	●(1)	●	—	●	●	—	●	—	—

Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.
Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.
Note 3) Knuckle pin and snap ring (cotter pin for ø40) are shipped together with double clevis and double knuckle joint.
Note 4) Pin and snap ring are shipped together with clevis bracket.
Note 5) Clevis pins come with retaining rings (cotter pins for ø40).
Note 6) Pivot brackets do not come with pins and retaining rings.
Note 7) Pivot bracket pins come with retaining rings.

Mounting Bracket, Accessory/Material, Surface Treatment

Segment	Component parts	Material	Surface treatment
Mounting bracket	Foot	Rolled steel plate	Nickel plated
	Flange	Rolled steel plate	Nickel plated
	Single clevis	Rolled steel	Nickel plated
	Double clevis	Rolled steel	Nickel plated
	Trunnion	Cast iron	Electroless nickel plated
Accessory	Rod end nut	Carbon steel	Nickel plated
	Mounting nut	Carbon steel	Nickel plated
	Trunnion nut	Carbon steel	Nickel plated
	Clevis bracket	Rolled steel plate	Nickel plated
	Clevis pin	Carbon steel	(None)
	Single knuckle joint	Rolled steel ø40: Sulfur easy chipping steel	Electroless nickel plated
	Double knuckle joint	Rolled steel ø40: Cast iron	Electroless nickel plated Metallic bronze color painted for ø40
	Double clevis pin	Carbon steel	(None)
	Double knuckle joint pin	Carbon steel	(None)
	Pivot bracket	Rolled steel plate	Nickel plated
	Pivot bracket pin	Carbon steel	(None)

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
	Pivot bracket	0.06	0.06	0.06	0.06
	Pivot bracket pin	0.02	0.02	0.02	0.03

Calculation: (Example) **CM2L32-100**
- 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

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠ Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

2. Do not operate with the cushion needle in a fully closed condition.
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the “Hexagon wrench key: nominal size 1.5”.

3. Do not open the cushion needle wide excessively.
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

⚠ Caution

1. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

2. Use caution to the popping of a retaining ring.
When replacing rod seals and removing and mounting a snap ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

3. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

4. Do not use an air cylinder as an air-hydro cylinder.
If it uses turbine oil in place of fluids for cylinder, it may result in oil leakage.

5. Combine the rod end section, so that a rod boot might not be twisted.
If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

Air-hydro

CM2H | **Mounting style** | **Bore size** — **Stroke** | **Rod boot**

Air-hydro

A low hydraulic pressure cylinder used at a pressures of 1.0 MPa or below.
Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.

Specifications

Type	Air-hydro
Fluid	Turbine oil
Action	Double acting single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Min. operating pressure	0.18 MPa
Piston speed	15 to 300 mm/s
Ambient and fluid temperature	+5 to +60°C
Stroke length tolerance	$^{+1.4}_{0}$ mm
Cushion	Rubber bumper (Standard equipment)
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style

∗ Auto switch can be mounted. Dimensions are the same as standard type of series CM2.

- For construction, refer to page 134.
- Since the dimensions of mounting style is the same as pages 136 to 143, refer to those pages.

Built-in One-touch Fittings

CM2 | **Mounting style** | **Bore size** | **F** — **Stroke**

Built-in One-touch fittings

This type has the One-touch fitting integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.

Specifications

Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Rubber bumper
Piping	One-touch fittings
Piston speed	50 to 750 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style

∗ Auto switch can be mounted.

Applicable Tubing O.D./I.D.

Bore size (mm)	**20**	**25**	**32**	**40**
Applicable tubing O.D./I.D. (mm)	6/4	6/4	6/4	8/6
Applicable tubing material	Can be used for either nylon, soft nylon or polyurethane tubing.			

⚠ Caution

1. One-touch fitting cannot be replaced.
   • One-touch fitting is press-fit into the cover, thus cannot be replaced.
2. Refer to Fittings and Tubing Precautions (Best Pneumatics No. 6) for handling one-touch fittings.

- For construction, refer to page 134.
- For dimensions of each mounting style, refer to pages 136 to 143.
- For other specifications, refer to page 129.

Clean Series

10-CM2 | Mounting style | Bore size | Stroke

- **Clean Series (With relief port)**

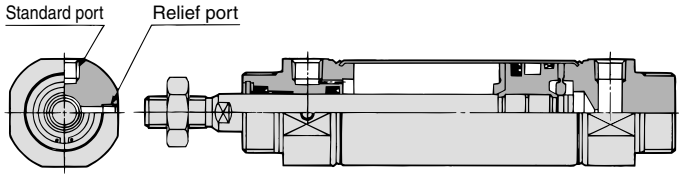
The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

Specifications

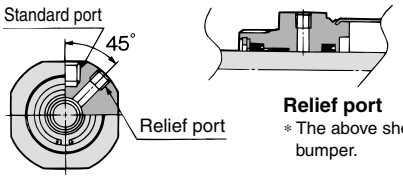
Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Rubber bumper, Air cushion
Relief port size	M5 x 0.8
Piston speed	30 to 400 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Boss-cut style

∗ Auto switch can be mounted.

Construction



ø20, ø25



Relief port
∗ The above shows the case of rubber bumper.

ø32, ø40

For details, refer to the separate catalog, "Pneumatic Clean Series".

Copper/Fluorine-free

20-CM2 | Mounting style | Bore size | Stroke

- **Copper/fluorine-free**

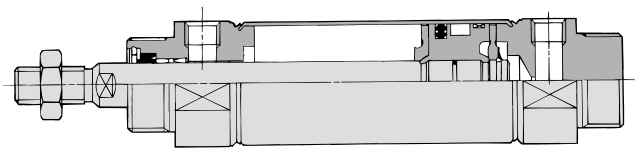
The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action	Double acting, Single rod	
Bore size (mm)	ø20, ø25, ø32, ø40	
Max. operating pressure	1.0 MPa	
Min. operating pressure	0.05 MPa	
Cushion	Rubber bumper	Air cushion
Piston speed	50 to 750 mm/s	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style	

∗ Auto switch can be mounted.

Construction



Water Resistant

CDM2 | Mounting style | Bore size | Port thread type | R | - | Stroke | A | - | H7BAL | -XC6

- With auto switch (Built-in magnet)
- Water resistant cylinder

R	NBR seals (Nitrile rubber)
V	FKM seals (Fluororubber)

- Cushion

Nil	Rubber bumper
A	Air cushion

- Water resistant 2-color indication solid state auto switch
- Made to Order

Ideal for use in a machine tool environment exposed to coolant mist.
Also suited for use in areas in which water splashes, such as food processing equipment or car washers.

⚠ Caution

Rod seal and scraper is not replaceable.
• Scraper is press-fit into the rod cover, thus cannot be replaced.

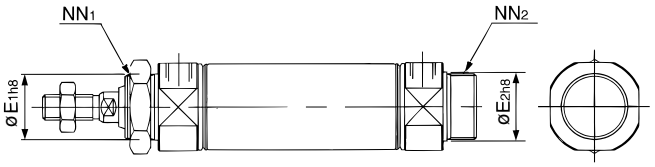
Details → Page 895

Specifications

Action	Double acting, Single rod
Bore size (mm)	20, 25, 32, 40
Cushion	Rubber bumper, Air cushion
Auto switch mounting	Band mounting
Made to Order	Piston rod, Rod end nut made of stainless steel (-XC6)

∗ Specifications other than the above are the same as the standard basic type.

Dimensions



Bore size (mm)	E_1	E_2 ∗	NN_1	NN_2 ∗
20	$22^{0}_{-0.033}$	$20^{0}_{-0.033}$	M22 x 1.5	M20 x 1.5

∗ Other dimensions are the same as double acting, single rod, standard type. (∗: Same as the standard.)

Mounting Bracket/Part No.

Mounting bracket	Min. order	Bore size (mm) 20	Description (for min. order)
Axial foot ∗∗	2	CM-L020C	2 foot, 1 mounting nut
Flange	1	CM-F020C	1 flange
Trunnion (with nuts)	1	CM-T020C	1 trunnion, 1 trunnion nut

∗ ø25 to ø40: Same as the standard type
∗∗ Order 2 foot brackets for every cylinder.

Low-speed Cylinder

CM2 X | Mounting style | Bore size | — | Stroke

- Low-speed Cylinder

Smooth operation with a little sticking and slipping at low speed. Can start smoothly with a little ejection even after being rendered for hours.

The dimensions are the same as the double acting, single rod type.
Refer to Best Pneumatics No. 3 for details.

Specifications

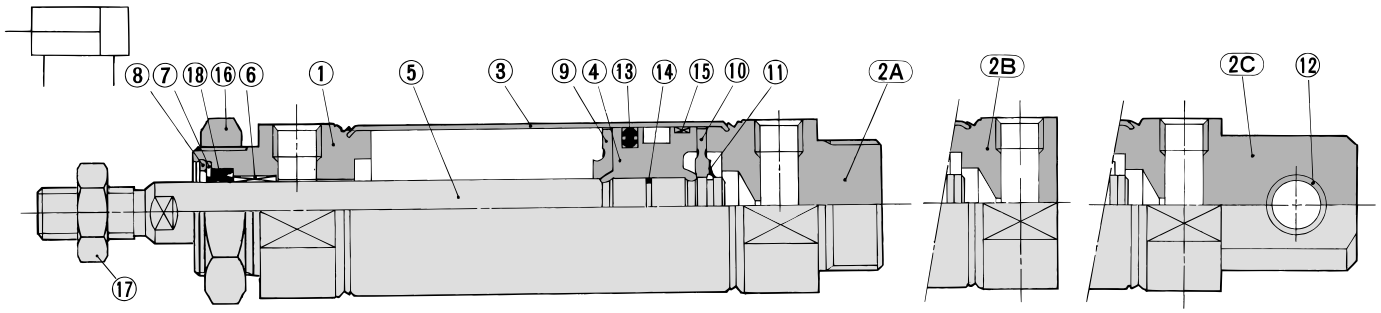
Bore size (mm)	20, 25, 32, 40
Type	Pneumatic
Action	Double acting, Single rod
Fluid	Air
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Min. operating pressure	0.025 MPa
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)
Cushion	Rubber bumper

Piston Speed

Bore size (mm)	20	25	32	40
Piston speed (mm/s)	0.5 to 300			
Allowable kinetic energy (J)	0.27	0.4	0.65	1.2

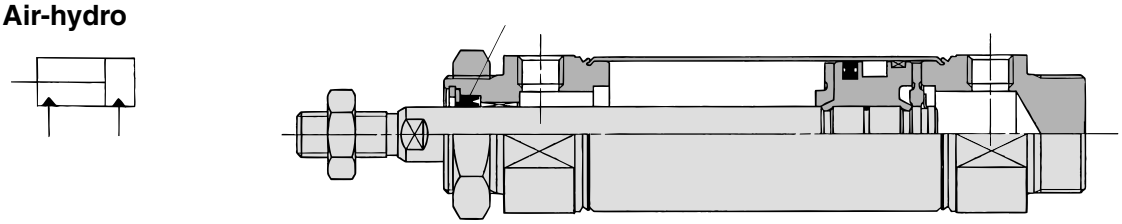
Refer to Best Pneumatics No. 3 for details.

Rubber bumper

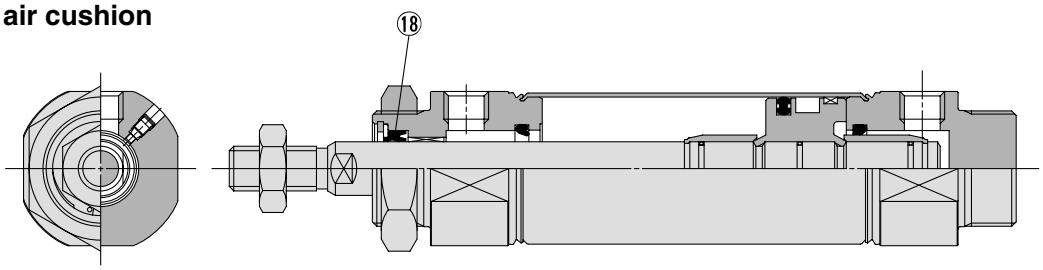


Boss-cut style Clevis integrated style

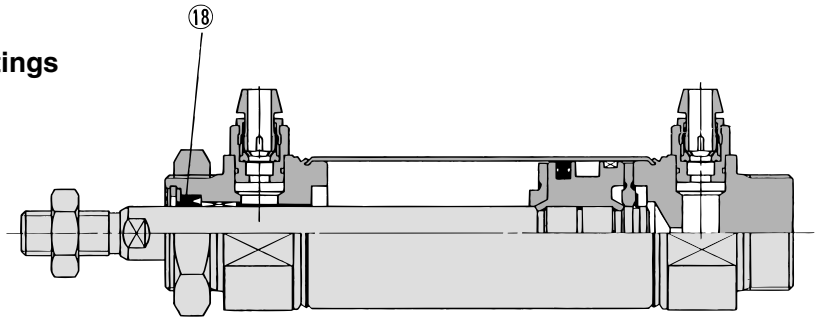
Air-hydro



With air cushion



Built-in One-touch fittings



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2A	**Head cover A**	Aluminum alloy	Clear anodized *
2B	**Head cover B**	Aluminum alloy	Clear anodized **
2C	**Head cover C**	Aluminum alloy	Clear anodized ***
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Stainless steel	
8	**Retaining ring**	Carbon steel	Phosphate coated
9	**Bumper A**	Urethane	
10	**Bumper B**	Urethane	
11	**Retaining ring**	Stainless steel	

* Basic style, ** Boss-cut style, *** Clevis integrated style

No.	Description	Material	Note
12	**Clevis bushing**	Copper oil-impregnated sintered alloy	
13	**Piston seal**	NBR	
14	**Piston gasket**	NBR	
15	**Wear ring**	Resin	
16	**Mounting nut**	Carbon steel	Nickel plated
17	**Rod end nut**	Carbon steel	Nickel plated

Replacement Part: Seal

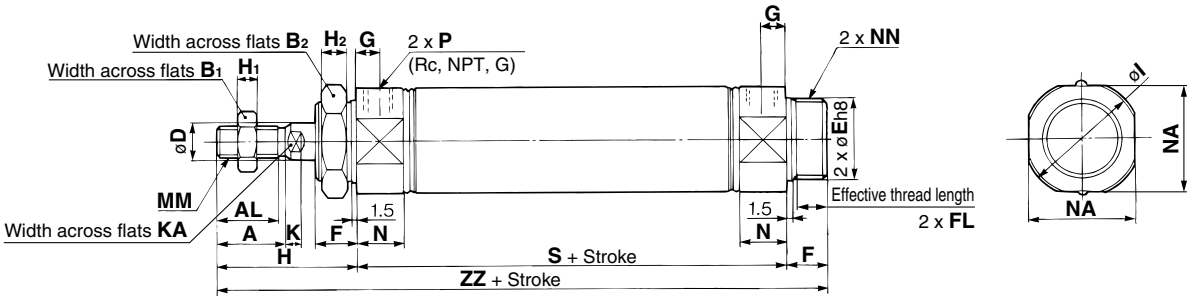
● With rubber bumper/With air cushion/Built-in One-touch fittings

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
18	**Rod seal**	NBR	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14LZ
● Air-hydro						
18	**Rod seal**	NBR	HDU-8	HDU-10	HDU-12L	HDU-14

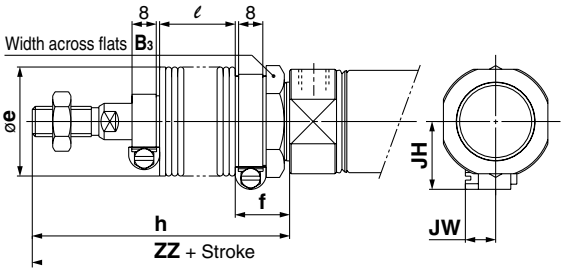
* Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic Style (B)

CM2B Bore size — Stroke

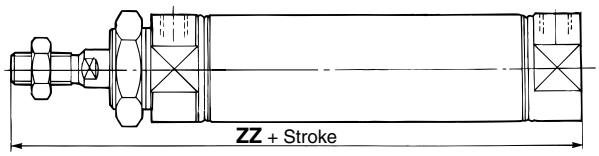


With rod boot

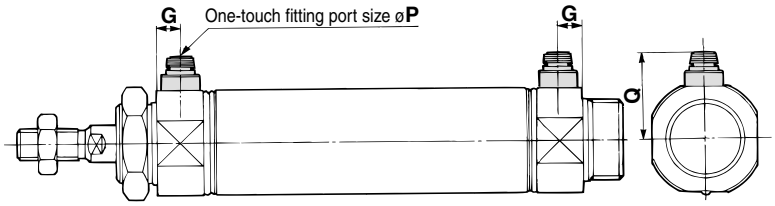


With air cushion

Boss-cut style



Built-in One-touch fittings



(mm)

Bore size	A	AL	B1	B2	D	E	F	FL	G	H	H1	H2	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

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B3	e	f	h							ℓ							ZZ						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125	143	156	168	181	206	231	256
25	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	147	160	172	185	210	235	260
32	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	149	162	174	187	212	237	262
40	41	46	20	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125	181	194	206	219	244	269	294

With Rod Boot (mm)

Bore size	JH	JW
20	23.5	10.5
25	23.5	10.5
32	23.5	10.5
40	27	10.5

Boss-cut Style

(mm)

Bore size	ZZ							
	Without rod boot	With rod boot						
		1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	103	130	143	155	168	193	218	243
25	107	134	147	159	172	197	222	247
32	109	136	149	161	174	199	224	249
40	138	165	178	190	203	228	253	278

With Air Cushion (mm)

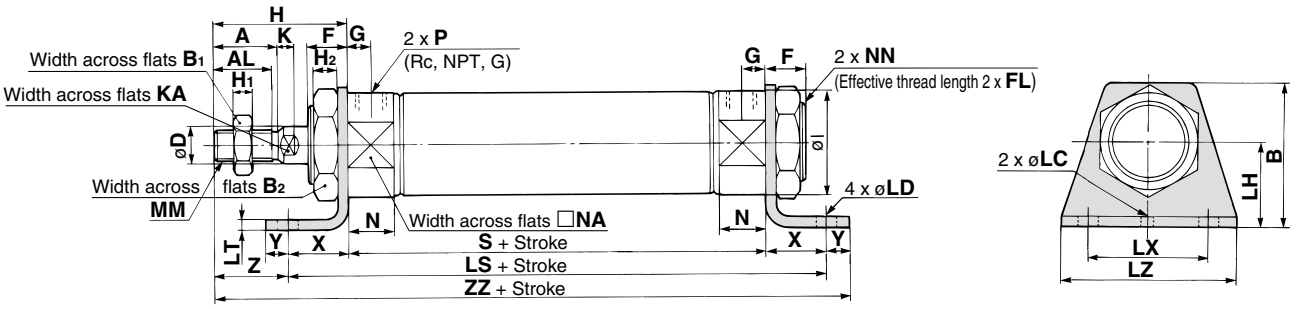
Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Built-in One-touch Fittings (mm)

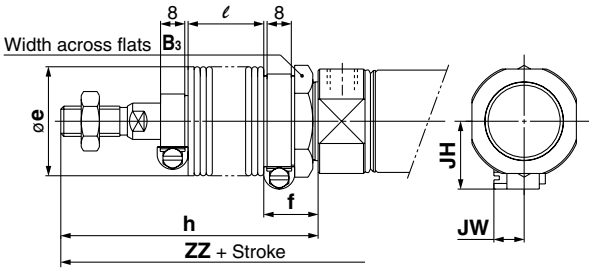
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Axial Foot Style (L)

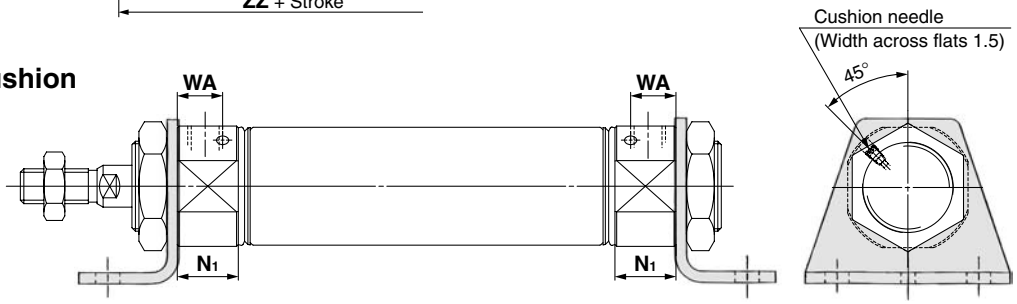
CM2L Bore size — Stroke



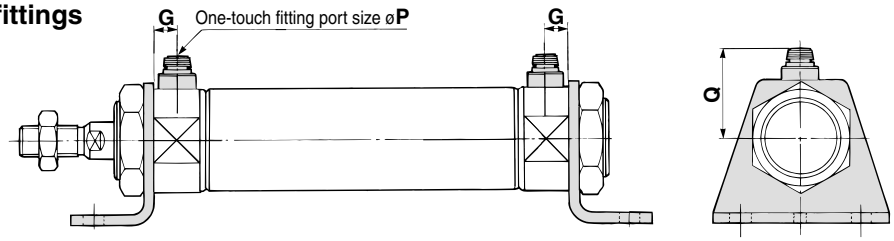
With rod boot



With air cushion



Built-in One-touch fittings



(mm)

Bore size	A	AL	B	B1	B2	D	F	FL	G	H	H1	H2	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

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B3	e	f	h							ℓ							Z						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	19.2	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125	48	61	73	86	111	136	161
25	32	36	19.2	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	52	65	77	90	115	140	165
32	32	36	19.2	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	52	65	77	90	115	140	165
40	41	46	21.2	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125	54	67	79	92	117	142	167

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	158	171	183	196	221	246	271	23.5	10.5
25	162	175	187	200	225	250	275	23.5	10.5
32	164	177	189	202	227	252	277	23.5	10.5
40	198	211	223	236	261	286	311	27	10.5

With Air Cushion

(mm)

Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

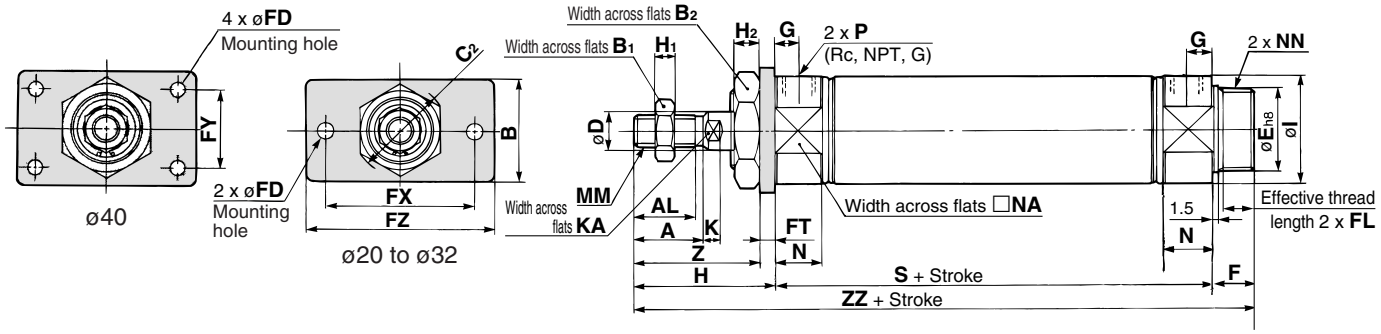
Built-in One-touch Fittings

(mm)

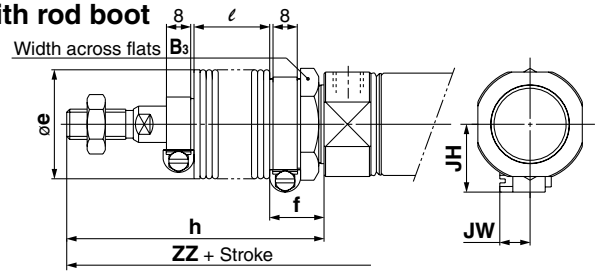
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Rod Side Flange Style (F)

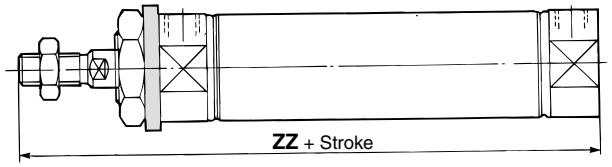
CM2F Bore size — Stroke



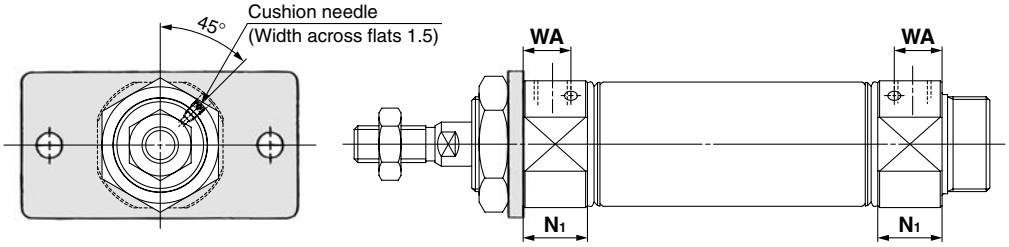
With rod boot



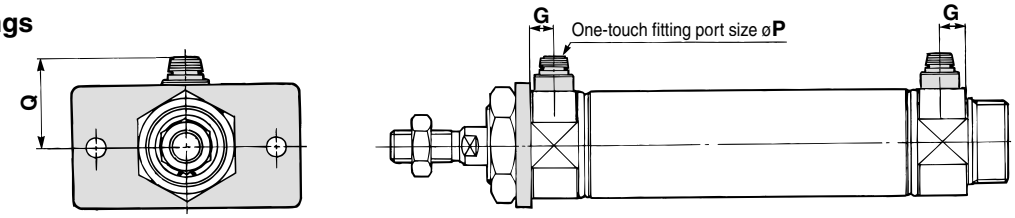
Boss-cut style



With air cushion



Built-in One-touch fittings



(mm)

Bore size	A	AL	B	B1	B2	C2	D	E	F	FL	FD	FT	FX	FY	FZ	G	H	H1	H2	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

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B3	e	f	h							ℓ								ZZ							
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	20	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125	143	156	168	181	206	231	256
25	32	36	20	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	147	160	172	185	210	235	260
32	32	36	20	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	149	162	174	187	212	237	262
40	41	46	23	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125	181	194	206	219	244	269	294

With Rod Boot (mm)

Bore size	JH	JW
20	23.5	10.5
25	23.5	10.5
32	23.5	10.5
40	27	10.5

Boss-cut Style

(mm)

Bore size	ZZ							
	Without rod boot	With rod boot						
		1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	103	130	143	155	168	193	218	243
25	107	134	147	159	172	197	222	247
32	109	136	149	161	174	199	224	249
40	138	165	178	190	203	228	253	278

With Air Cushion (mm)

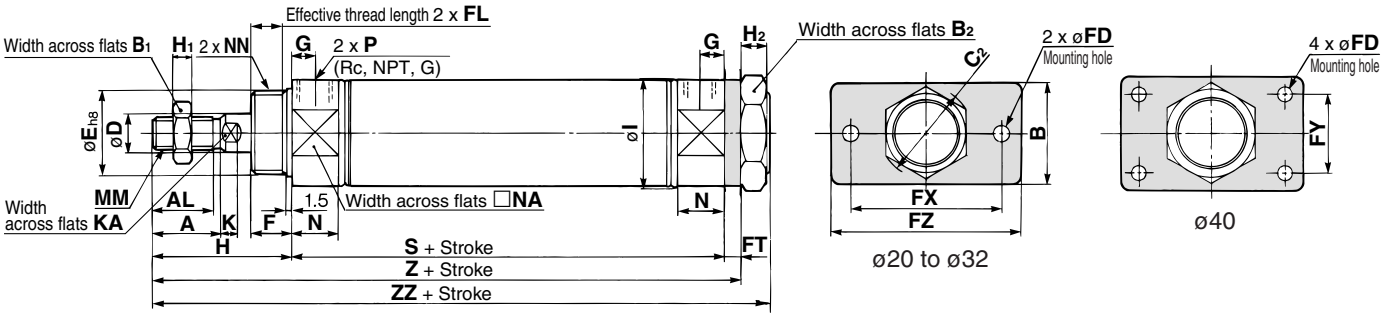
Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Built-in One-touch Fittings (mm)

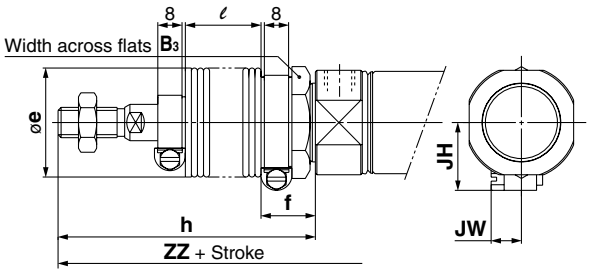
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Head Side Flange Style (G)

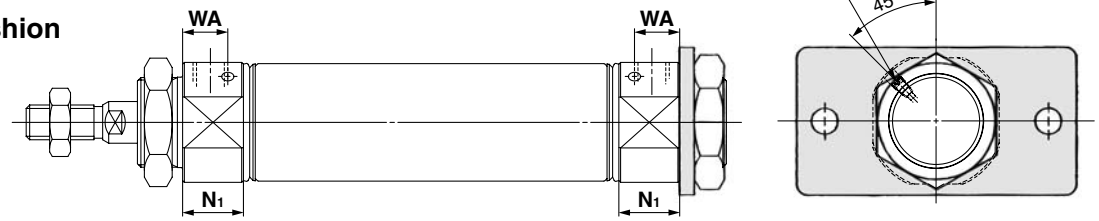
CM2G Bore size — Stroke



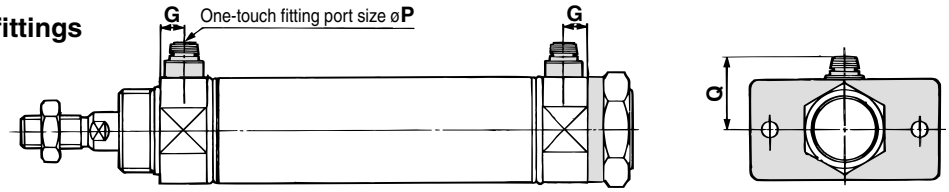
With rod boot



With air cushion



Built-in One-touch fittings



(mm)

Bore size	A	AL	B	B1	B2	C2	D	E	F	FL	FD	FT	FX	FY	FZ	G	H	H1	H2	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	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

With Air Cushion (mm)

Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Built-in One-touch Fittings (mm)

Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

With Rod Boot

(mm)

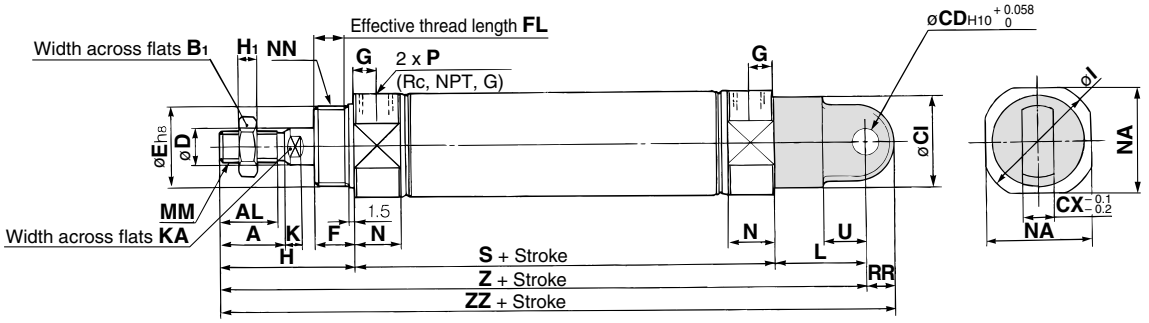
Symbol / Stroke / Bore size	B3	e	f	h							ℓ								ZZ						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125	143	156	168	181	206	231	256
25	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	147	160	172	185	210	235	260
32	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	149	162	174	187	212	237	262
40	41	46	20	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125	181	194	206	219	244	269	294

With Rod Boot (mm)

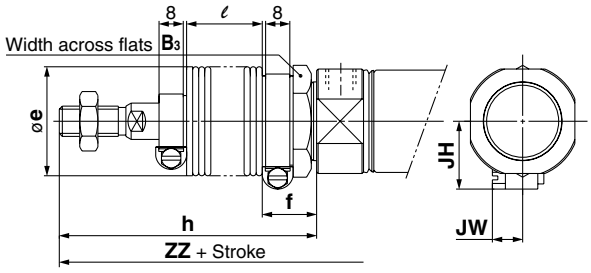
Bore size	JH	JW
20	23.5	10.5
25	23.5	10.5
32	23.5	10.5
40	27	10.5

Single Clevis Style (C)

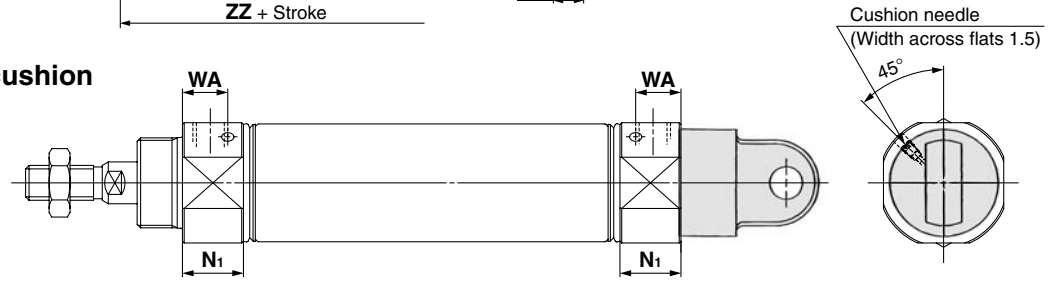
CM2C Bore size — Stroke



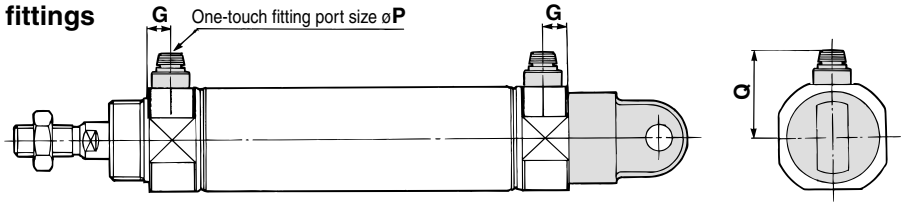
With rod boot



With air cushion



Built-in One-touch fittings



(mm)

Bore size	A	AL	B1	CI	CD	CX	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	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

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B3	e	f	h							ℓ							Z						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125	160	173	185	198	223	248	273
25	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	164	177	189	202	227	252	277
32	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	166	179	191	204	229	254	279
40	41	46	20	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125	204	217	229	242	267	292	317

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	169	182	194	207	232	257	282	23.5	10.5
25	173	186	198	211	236	261	286	23.5	10.5
32	175	188	200	213	238	263	288	23.5	10.5
40	215	228	240	253	278	303	328	27	10.5

With Air Cushion

(mm)

Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

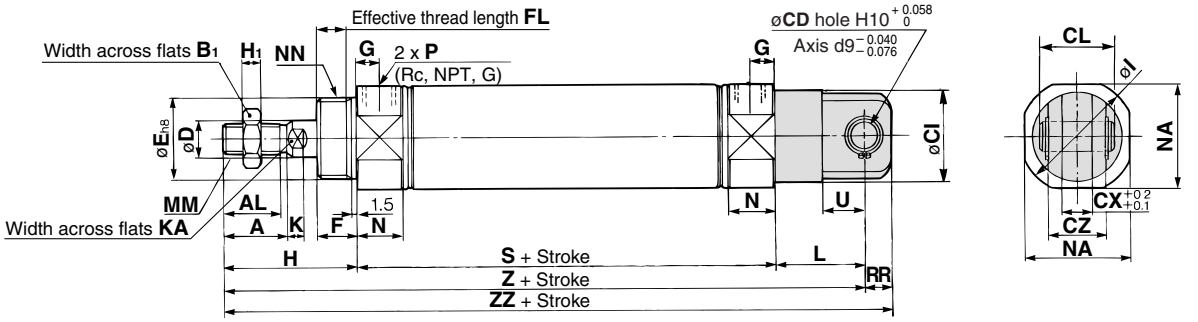
Built-in One-touch Fittings

(mm)

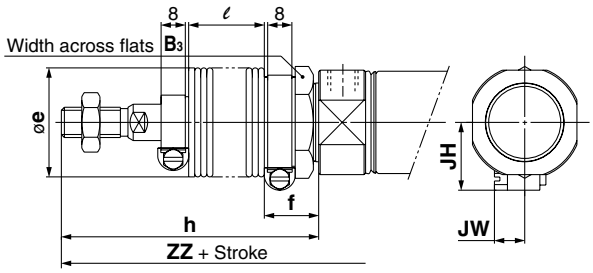
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Double Clevis Style (D)

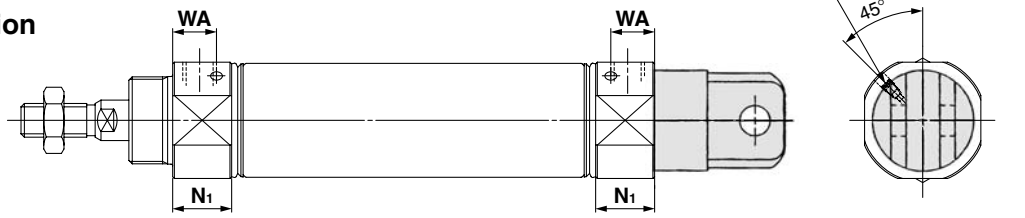
CM2D Bore size — Stroke



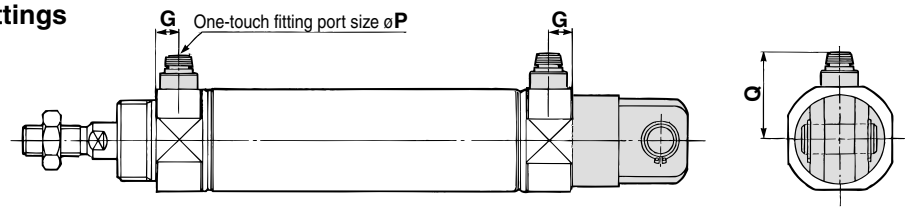
With rod boot



With air cushion



Built-in One-touch fittings



(mm)

Bore size	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 −0.033 0	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 −0.033 0	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 −0.033 0	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 −0.039 0	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.

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B3	e	f	h							ℓ								Z							
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125	160	173	185	198	223	248	273
25	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	164	177	189	202	227	252	277
32	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125	166	179	191	204	229	254	279
40	41	46	20	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125	204	217	229	242	267	292	317

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	169	182	194	207	232	257	282	23.5	10.5
25	173	186	198	211	236	261	286	23.5	10.5
32	175	188	200	213	238	263	288	23.5	10.5
40	215	228	240	253	278	303	328	27	10.5

With Air Cushion

(mm)

Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

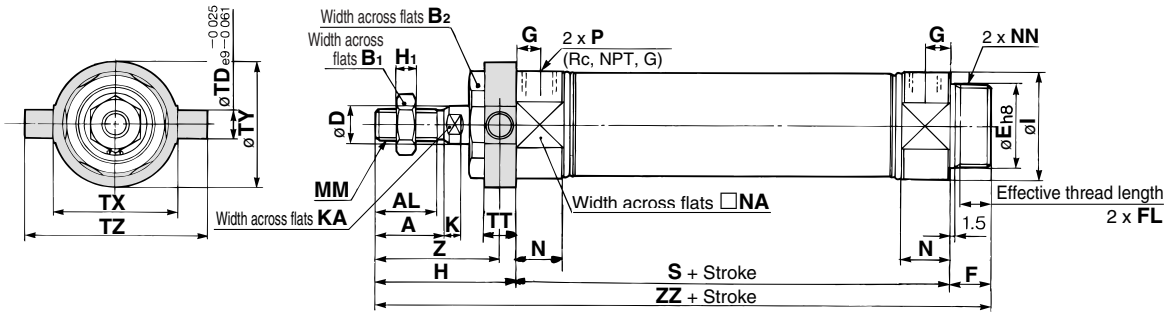
Built-in One-touch Fittings

(mm)

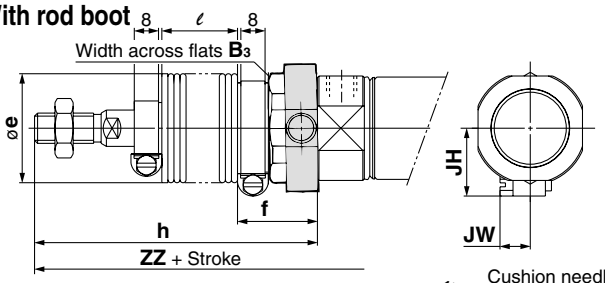
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Rod Side Trunnion Style (U)

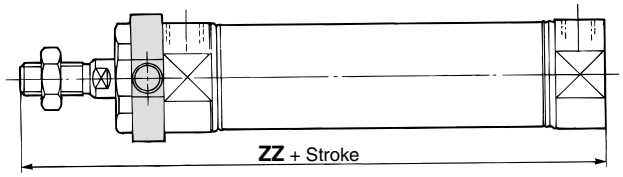
CM2U Bore size — Stroke



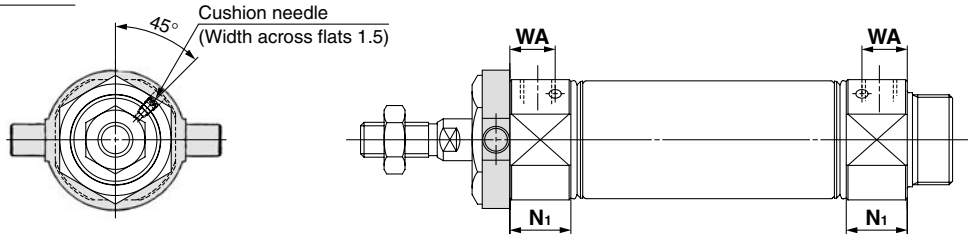
With rod boot



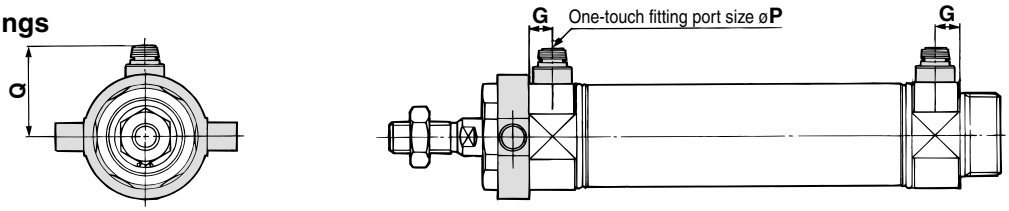
Boss-cut style



With air cushion



Built-in One-touch fittings



(mm)

Bore size	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	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

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B_3	e	f	h						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	25	68	81	93	106	131	156	181
25	32	36	25	72	85	97	110	135	160	185
32	32	36	25	72	85	97	110	135	160	185
40	41	46	26	77	90	102	115	140	165	190

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	ℓ							Z							ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	12.5	25	37.5	50	75	100	125	63	76	88	101	126	151	176	143	156	168	181	206	231	256	23.5	10.5
25	12.5	25	37.5	50	75	100	125	67	80	92	105	130	155	180	147	160	172	185	210	235	260	23.5	10.5
32	12.5	25	37.5	50	75	100	125	67	80	92	105	130	155	180	149	162	174	187	212	237	262	23.5	10.5
40	12.5	25	37.5	50	75	100	125	71.5	84.5	96.5	109.5	134.5	159.5	184.5	181	194	206	219	244	269	294	27	10.5

Boss-cut Style

(mm)

Bore size	ZZ							
	Without rod boot	With rod boot						
		1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	103	130	143	155	168	193	218	243
25	107	134	147	159	172	197	222	247
32	109	136	149	161	174	199	224	249
40	138	165	178	190	203	228	253	278

With Air Cushion

(mm)

Bore size	N_1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

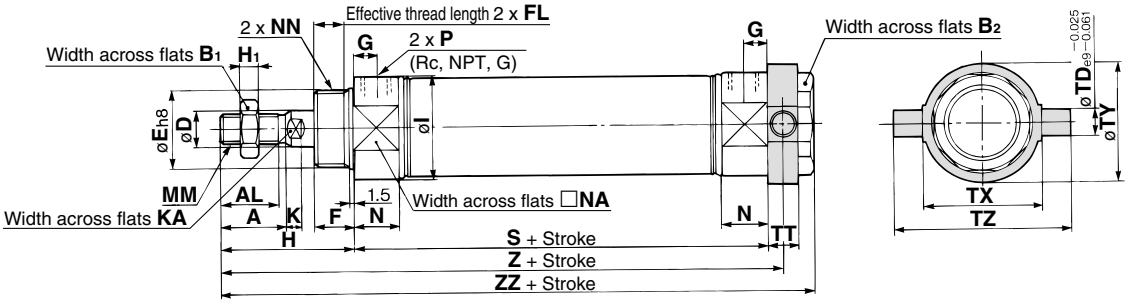
Built-in One-touch Fittings

(mm)

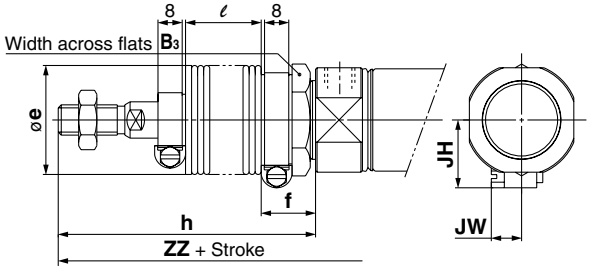
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Head Side Trunnion Style (T)

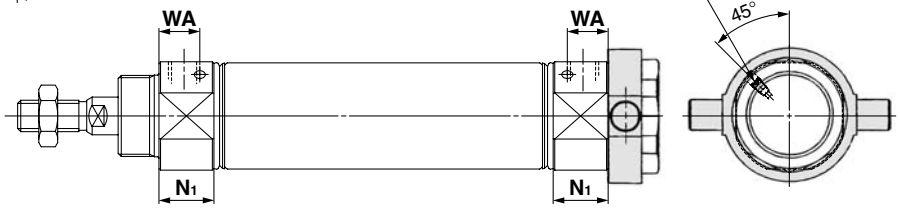
CM2T Bore size — Stroke



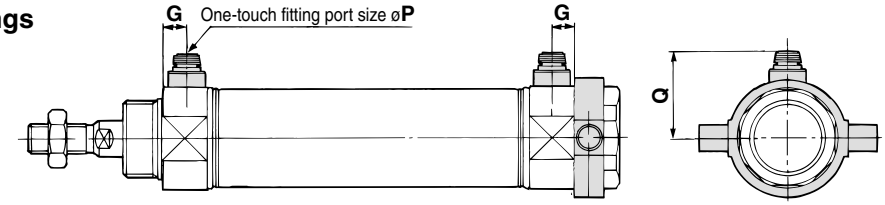
With rod boot



With air cushion



Built-in One-touch fittings



(mm)

Bore size	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	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

With Rod Boot

(mm)

Symbol / Stroke / Bore size	B3	e	f	h						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181
25	32	36	18	72	85	97	110	135	160	185
32	32	36	18	72	85	97	110	135	160	185
40	41	46	20	77	90	102	115	140	165	190

With Rod Boot

(mm)

Symbol / Stroke / Bore size	ℓ							Z							ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	12.5	25	37.5	50	75	100	125	135	148	160	173	198	223	248	145	158	170	183	208	233	258	23.5	10.5
25	12.5	25	37.5	50	75	100	125	139	152	164	177	202	227	252	149	162	174	187	212	237	262	23.5	10.5
32	12.5	25	37.5	50	75	100	125	141	154	166	179	204	229	254	151	164	176	189	214	239	264	23.5	10.5
40	12.5	25	37.5	50	75	100	125	170.5	183.5	195.5	208.5	233.5	258.5	283.5	181	194	206	219	244	269	294	27	10.5

With Air Cushion

(mm)

Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

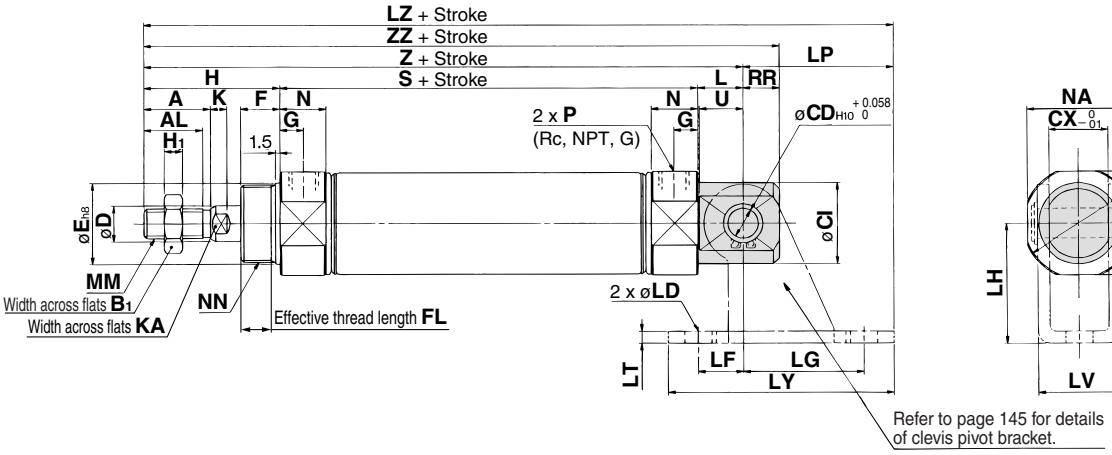
Built-in One-touch Fittings

(mm)

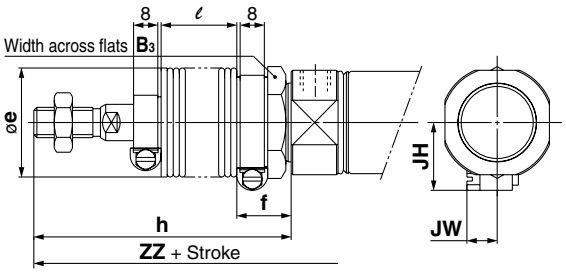
Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Clevis Integrated Style (E)

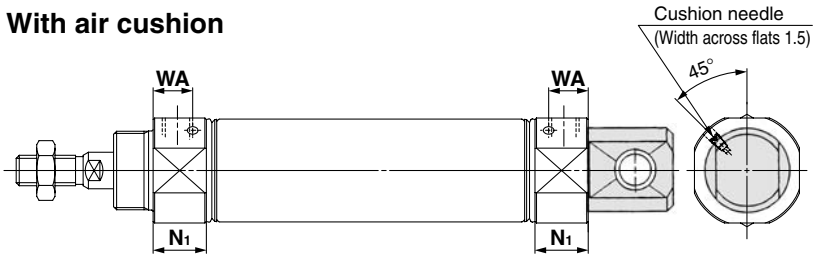
CM2E Bore size — Stroke



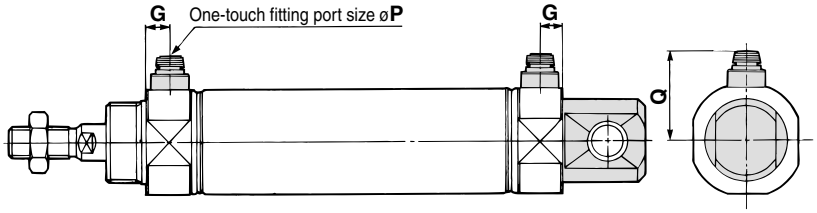
With rod boot



With air cushion



Built-in One-touch fittings



(mm)

Bore size	A	AL	B1	CD	CI	CX	D	E	F	FL	G	H	H1	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	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

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	B3	e	f	h						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181
25	32	36	18	72	85	97	110	135	160	185
32	32	36	18	72	85	97	110	135	160	185
40	41	46	20	77	90	102	115	140	165	190

With Rod Boot

(mm)

Bore size \ Symbol / Stroke	ℓ							Z							ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	12.5	25	37.5	50	75	100	125	142	155	167	180	205	230	255	151	164	176	189	214	239	264	23.5	10.5
25	12.5	25	37.5	50	75	100	125	146	159	171	184	209	234	259	155	168	180	193	218	243	268	23.5	10.5
32	12.5	25	37.5	50	75	100	125	151	164	176	189	214	239	264	163	176	188	201	226	251	276	23.5	10.5
40	12.5	25	37.5	50	75	100	125	180	193	205	218	243	268	293	192	205	217	230	255	280	319	27	10.5

With Air Cushion

(mm)

Bore size	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Built-in One-touch Fittings

(mm)

Bore size	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

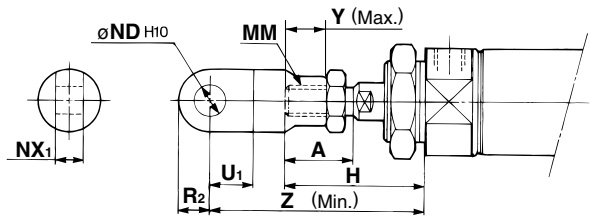
Clevis Pivot Bracket

(mm)

Bore size	LD	LF	LG	LH	LP	LT	LV	LY	LZ
20	6.8	15	30	30	37	3.2	18.4	59	152
25	6.8	15	30	30	37	3.2	18.4	59	156
32	9	15	40	40	50	4	28	75	174
40	9	15	40	40	50	4	28	75	203

Accessory Bracket Dimensions

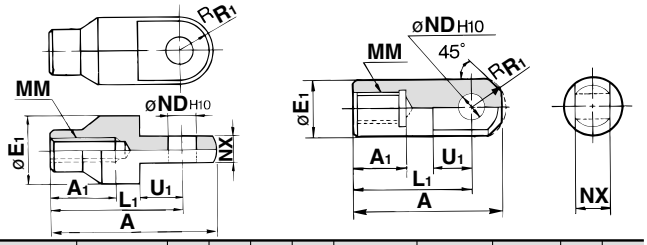
Single Knuckle Joint (mm)



Bore size	A	H	MM	ND_{H10}	NX_1	U_1	R_2	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

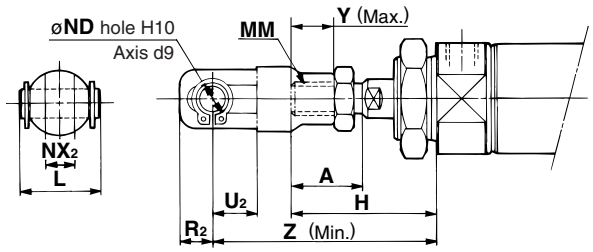
Single Knuckle Joint (mm)

I-020B/032B Material: Rolled steel **I-040B** Material: Free cutting sulfur steel



Part no.	Applicable bore size	A	A_1	E_1	L_1	MM	ND_{H10}	NX	R_1	U_1
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

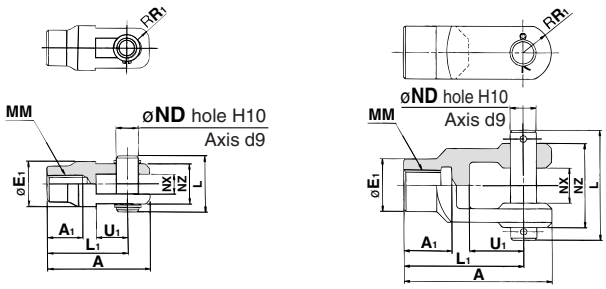
Double Knuckle Joint (mm)



Bore size	A	H	L	MM	ND	NX_2	R_2	U_2	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



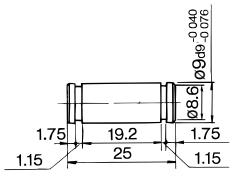
Part no.	Applicable bore size	A	A_1	E_1	L	L_1	MM	ND	NX	NZ	R_1	U_1	Applicable pin part number	Retaining ring Cotter pin size
Y-020B	20	46	16	20	25	36	M8 x 1.25	9	$9^{+0.2}_{+0.1}$	18	5	14	CDP-1	Type C 9 for axis
Y-032B	25, 32	48	18	20	25	38	M10 x 1.25	9	$9^{+0.2}_{+0.1}$	18	5	14	CDP-1	Type C 9 for axis
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 40) are attached.

Double Clevis Pin/Material: Carbon steel (mm)

Bore size/ø20, ø25, ø32

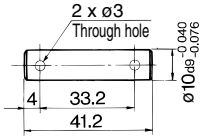
CDP-1



Retaining ring: Type C9 for axis

Bore size/ø40

CDP-2



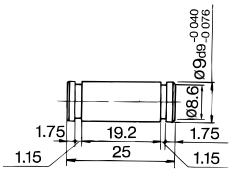
Cotter pin
ø3 x 18ℓ

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

Double Knuckle Pin/Material: Carbon steel (mm)

Bore size/ø20, ø25, ø32

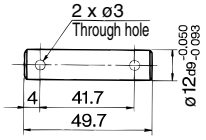
CDP-1



Retaining ring: Type C9 for axis

Bore size/ø40

CDP-3

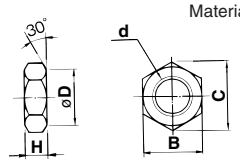


Cotter pin
ø3 x 18ℓ

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

Rod End Nut (mm)

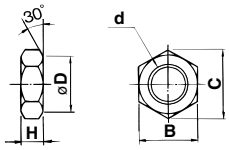
Material: Carbon steel



Part no.	Applicable bore size	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)

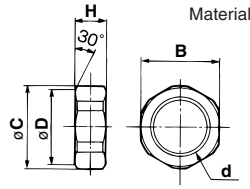
Material: Carbon steel



Part no.	Applicable bore size	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)

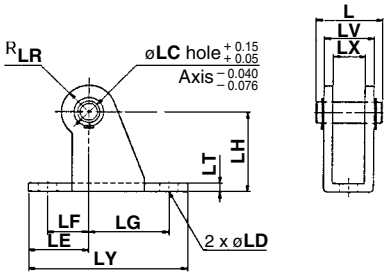
Material: Carbon steel



Part no.	Applicable bore size	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

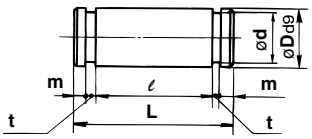


Part no.	Applicable bore size	L	LC	LD	LE	LF	LG	LH	LR	LT	LX	LY	LV	Applicable pin part no.
CM-E020B	**20, 25**	24.5	8	6.8	22	15	30	30	10	3.2	12	59	18.4	CD-S02
CM-E032B	**32, 40**	34	10	9	25	15	40	40	13	4	20	75	28	CD-S03

Note 1) Clevis pins and retaining rings (cotter pins for ø40) are attached.
Note 2) It cannot be used for single clevis style (CM2C) and double clevis style (CM2D).

Clevis Pin (For CM2E) (mm)

Material: Carbon steel

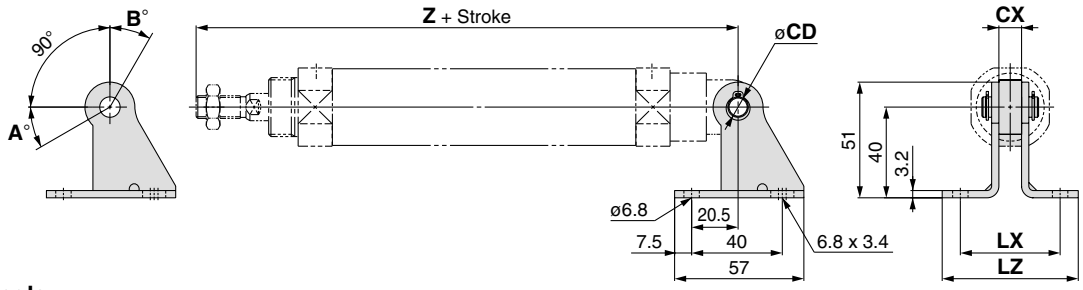


Part no.	Applicable bore size	D_{d9}	d	L	ℓ	m	t	Applicable retaining ring part no.
CD-S02	**20, 25**	$8^{-0.040}_{-0.076}$	7.6	24.5	19.5	1.6	0.9	Type C 8 for axis
CD-S03	**32, 40**	$10^{-0.040}_{-0.076}$	9.6	34	29	1.35	1.15	Type C 10 for axis

Note) Retaining rings are attached.

Regarding mounting bracket, accessory made of stainless steel (Some are not available.), refer to page 1408 for -XB12, External stainless steel cylinder.

Single Clevis



Rotation Angle

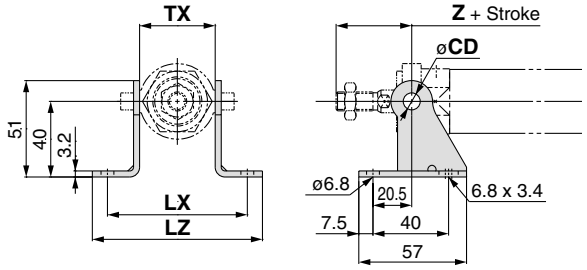
Bore size (mm)	A°	B°	A° + B° + 90°
20	25	85	200
25, 32	21	81	192
40	26	86	202

(mm)

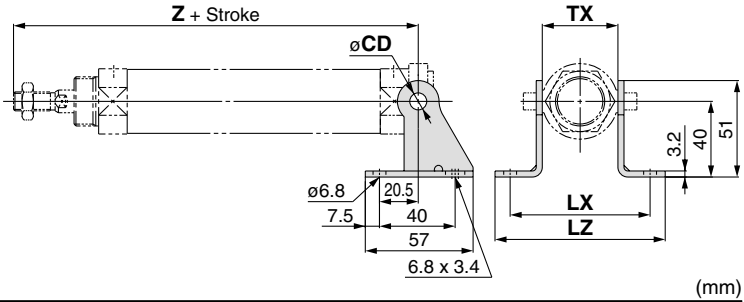
Mounting	Part no.	Applicable bore size	CX	Z + Stroke	CD	LX	LZ
CM2C (Single clevis style)	CM-B032	**20**	10	133	9	44	60
		25		137			
		32		139			
	CM-B040	**40**	15	177	10	49	65

Note) Pivot brackets do not come with pivot bracket pins and retaining rings.

Rod Side Trunnion



Head Side Trunnion



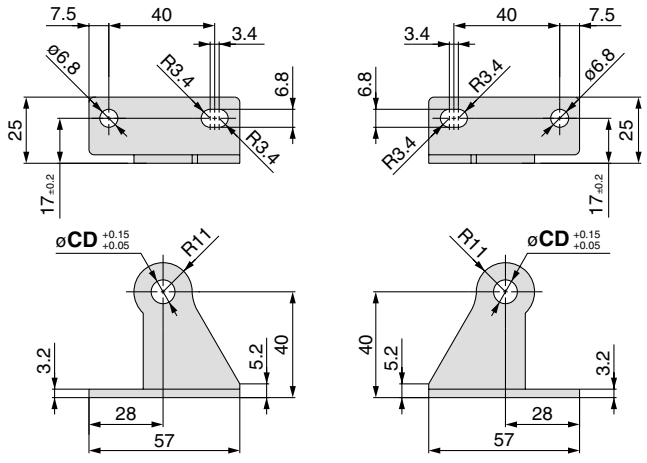
(mm)

Mounting	Part no.	Applicable bore size	TX	Rod side trunnion Z + Stroke	Head side trunnion Z + Stroke	CD	LX	LZ
CM2U/CM2T (Rod side/Head side trunnion)	CM-B020	**20**	32	36	108	8	66	82
	CM-B032	**25**	40	40	112	9	74	90
		32			114			
	CM-B040	**40**	53	44.5	143.5	10	87	103

Note) Pivot brackets do not come with pivot bracket pins and retaining rings.

Pivot Bracket

∗ 2 brackets per set

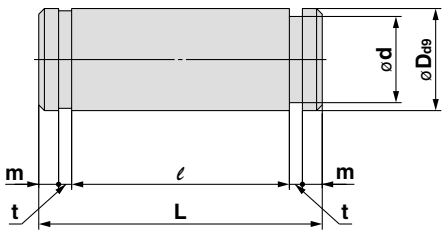


(mm)

Part no.	CD
CM-B020 (2)	8
CM-B032	9
CM-B040	10

Note 1) Pivot brackets do not come with pivot bracket pins and retaining rings.
Note 2) Only for trunnion type

Pivot Bracket Pin (For CM2C)



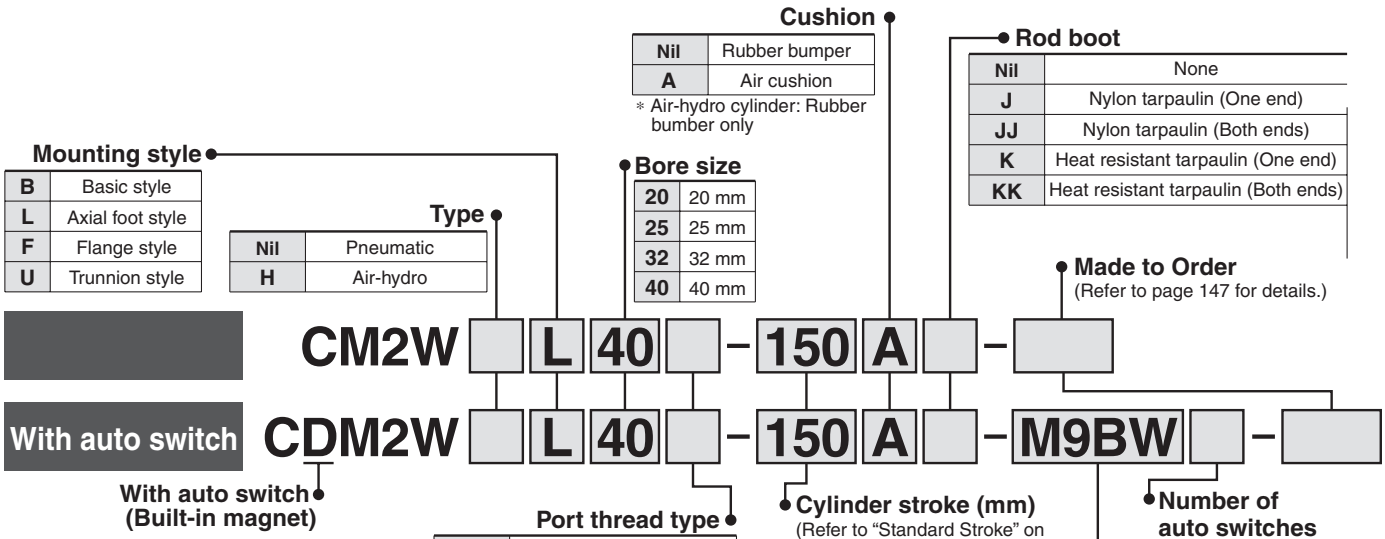
(mm)

Applicable bore size	Part no.	Dd9	d	L	ℓ	m	t	Applicable retaining ring part no.
20 to 32	CDP-1	$9^{-0.040}_{-0.076}$	8.6	25	19.2	1.75	1.15	Type C 9 for axis
40	CD-S03	$10^{-0.040}_{-0.076}$	9.6	34	29	1.75	1.15	Type C 10 for axis

Note) Pivot bracket pins come with retaining rings.

Air Cylinder: Standard Type
Double Acting, Double Rod
Series CM2W
ø20, ø25, ø32, ø40

How to Order



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) CDM2WF32-100

Applicable Auto Switch /Refer to pages 1263 to 1371 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	Lead wire length (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)	24V	5V, 12V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	●	●	●	○	—	○		
				2-wire		12V		M9B	●	●	●	○	—	○	—	
		Connector						H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)		5V, 12V		G39A **	—	—	—	—	●	—	IC circuit	
				2-wire		12V		K39A **	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)				M9PW	●	●	●	○	—	○		
				2-wire		12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)							H7BA ***	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
							100V or less	A90	●	—	●	—	—	—	IC circuit	
			Yes				100V, 200V	B54 **	●	—	●	●	—	—	—	
			No				200V or less	B64 **	●	—	●	—	—	—		
		Connector	Yes				—	C73C	●	—	●	●	●	—	—	
			No				24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes				—	A33A **	—	—	—	—	●	—	—	PLC
							100V, 200V	A34A **	—	—	—	—	●	—		
		DIN terminal						A44A **	—	—	—	—	●	—		Relay, PLC
	Diagnostic indication (2-color indication)	Grommet				—	—	B59W	●	—	●	—	—	—		

*** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
** D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Specifications

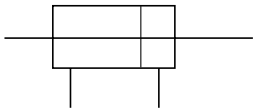
Bore size (mm)		20	25	32	40
Action		Double acting, Double rod			
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.08 MPa			
Ambient and fluid temperature		Without auto switch: −10 to 70°C (No freezing) With auto switch: −10 to 60°C (No freezing)			
Lubrication		Not required (Non-lube)			
Stroke length tolerance		$^{+1.4}_{0}$ mm			
Piston speed		Rubber bumper: 50 to 750 mm/s, Air cushion: 50 to 1000 mm/s			
Cushion		Rubber bumper, Air cushion			
Allowable kinetic energy	**Rubber bumper**	0.27 J	0.4 J	0.65 J	1.2 J
	Air cushion (Effective cushion length (mm))	0.54 J (11.0)	0.78 J (11.0)	1.27 J (11.0)	2.35 J (11.8)

Standard Stroke

Bore size (mm)	Standard stroke (1) (mm)	Maximum stroke (mm)
20	25, 50, 75, 100, 125, 150 200, 250, 300	500
25		
32		
40		

Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

JIS Symbol
Double acting



Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XB7	Cold resistant cylinder
—XB12	External stainless steel cylinder
—XC3	Special port location
—XC4	With heavy duty scraper
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut made of stainless steel
—XC13	Auto switch mounting rail style
—XC22	Fluororubber seals
—XC25	No fixed orifice of connecting port
—XC29	Double knuckle joint with spring pin
—XC35	With coil scraper
—XC38	Vacuum (Rod through-hole)
—XC52	Mounting nut with set screw

Accessory Bracket

For mounting brackets, refer to pages 144 and 145.

Rod Boot Material

Symbol		Rod boot material	Maximum ambient temperature
One side	Both sides		
J	**JJ**	Nylon tarpaulin	70°C
K	**KK**	Heat resistant tarpaulin	110°C *

* Maximum ambient temperature for the rod boot itself.

Mounting Bracket/Part No.

Mounting bracket	Min. order	Bore size (mm)				Description (for min. order)
		20	**25**	**32**	**40**	
Axial foot	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Trunnion (with nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Mounting Style and Accessory

Mounting \ Accessory	Standard equipment		Option		
	Mounting nut	Rod end nut	Single knuckle joint	Double knuckle joint (2)	Rod boot
Basic style	● (1 pc.)	● (2 pcs.)	●	●	●
Axial foot style	● (2)	● (2)	●	●	●
Flange style	● (1)	● (2)	●	●	●
Trunnion style	● (1) (1)	● (2)	●	●	●
Note					One/Both side(s)

Note 1) Trunnion nuts are attached for trunnion style.
Note 2) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double knuckle joint.

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Basic style	0.16	0.25	0.32	0.65
	Axial foot style	0.31	0.41	0.48	0.92
	Flange style	0.22	0.34	0.41	0.77
	Trunnion style	0.20	0.32	0.38	0.75
Additional mass per each 50 mm of stroke		0.06	0.09	0.13	0.19
Option bracket	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) **CM2WL32-100**
- Basic mass·····0.48 (Foot style, ø32)
- Additional mass·····0.13/50 st
- Cylinder stroke·····100 st

0.48 + 0.13 x 100/50 = 0.74 kg

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠ Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

2. Do not operate with the cushion needle in a fully closed condition.
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the “Hexagon wrench key: nominal size 1.5”.

3. Do not open the cushion needle wide excessively.
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

⚠ Caution

1. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

2. Use caution to the popping of a retaining ring.
When replacing rod seals and removing and mounting a retaining ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

3. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

4. Do not use an air cylinder as an air-hydro cylinder.
If it uses turbine oil in place of fluids for cylinder, it may result in oil leakage.

5. Combine the rod end section, so that a rod boot might not be twisted.
If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

Air-hydro

CM2WH | Mounting style | Bore size | — | Stroke | Rod boot

Air-hydro

A low hydraulic pressure cylinder used at a pressures of 1.0 MPa or below.
Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.

Specifications

Type	Air-hydro type
Fluid	Turbine oil
Action	Double acting, Double rod
Bore size (mm)	ø20, ø25, ø32, ø40
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Min. operating pressure	0.18 MPa
Piston speed	15 to 300 mm/s
Ambient and fluid temperature	+5 to +60°C
Thread tolerance **Stroke length tolerance**	$^{+1.4}_{0}$ mm
Cushion	Rubber bumper (Standard equipment)
Mounting	Basic style, Axial foot style, Flange style, Trunnion style

∗ Auto switch can be mounted.

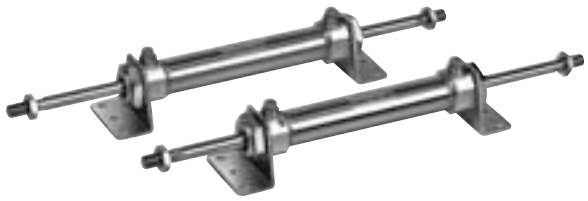
- For construction, refer to page 151.
- Since the dimensions of mounting style is the same as pages 153 to 155, refer to those pages.

Built-in One-touch Fittings

CM2W | Mounting style | Bore size | **F** | — | Stroke

Built-in One-touch fittings

This type has the One-touch fitting integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.



Specifications

Action	Double acting, Double rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.08 MPa
Cushion	Rubber bumper
Piping	One-touch fitting
Piston speed	50 to 750 mm/s
Mounting	Basic style, Axial foot style, Flange style, Trunnion style

∗ Auto switch can be mounted.

Applicable Tubing O.D./I.D.

Bore size (mm)	**20**	**25**	**32**	**40**
Applicable tubing O.D./I.D. (mm)	6/4	6/4	6/4	8/6
Applicable tubing material	Can be used for either nylon, soft nylon or polyurethane tube.			

⚠ Caution

1. One-touch fitting cannot be replaced.
   • One-touch fitting is press-fit into the cover, thus cannot be replaced.
2. Refer to Fittings and Tubing Precautions (Best Pneumatics No. 6) for handling one-touch fittings.

- For construction, refer to page 151.
- For dimensions of each mounting style, refer to pages 153 to 155.
- For other specifications, refer to page 147.

Clean Series

10-CM2W | **Mounting style** | **Bore size** — **Stroke**

Clean Series (With relief port)

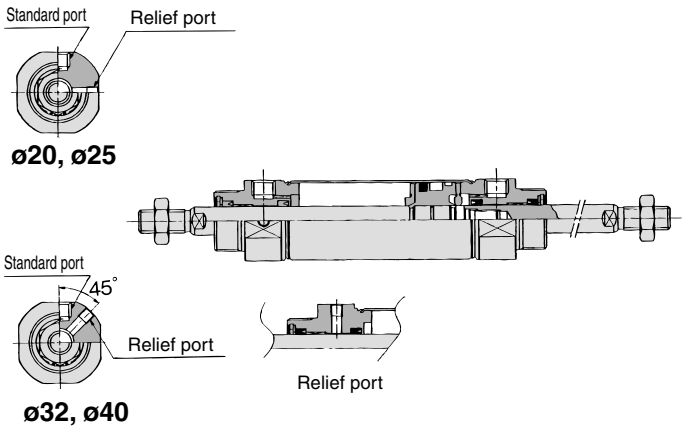
The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

Specifications

Action	Double acting, Double rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.08 MPa
Cushion	Rubber bumper
Relief port size	M5 x 0.8
Piston speed	30 to 400 mm/s
Mounting	Basic style, Axial foot style, Flange style

∗ Auto switch can be mounted.

Construction



For details, refer to the separate catalog, "Pneumatic Clean Series".

Copper/Fluorine-free

20-CM2W | **Mounting style** | **Bore size** — **Stroke**

Copper/fluorine-free

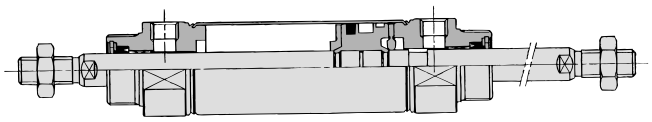
The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action	Double acting, Double rod	
Bore size (mm)	ø20, ø25, ø32, ø40	
Max. operating pressure	1.0 MPa	
Min. operating pressure	0.08 MPa	
Cushion	Rubber bumper	Air cushion
Piston speed	50 to 750 mm/s	50 to 1000 mm/s
Mounting	Basic style, Axial foot style, Flange style, Trunnion style	

∗ Auto switch can be mounted.

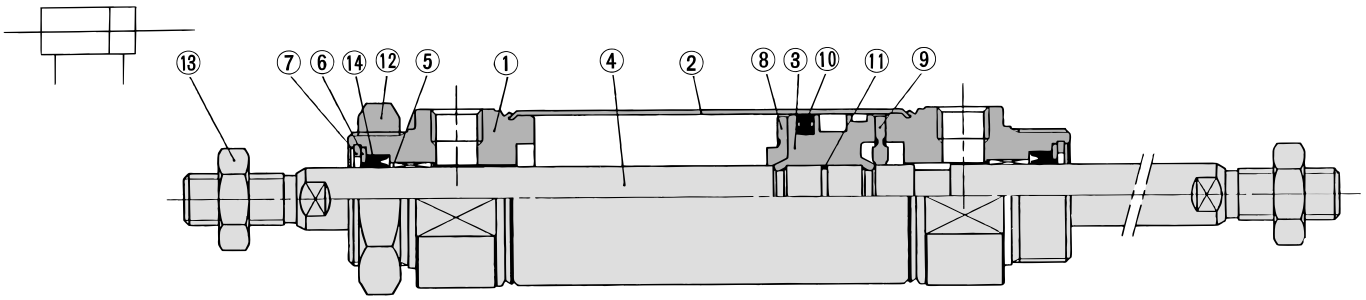
Construction



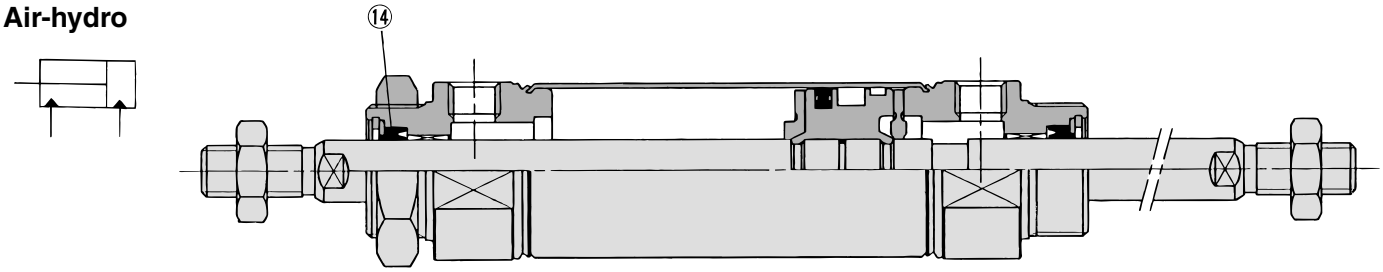
The above shows the case of rubber bumper.

Construction

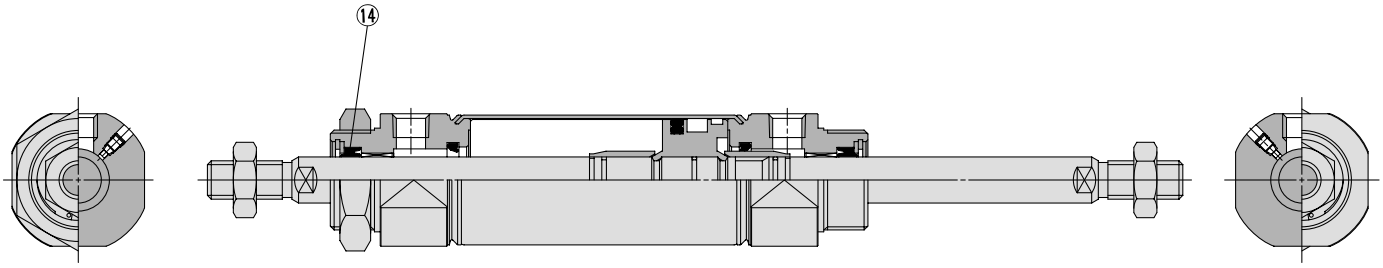
Rubber bumper



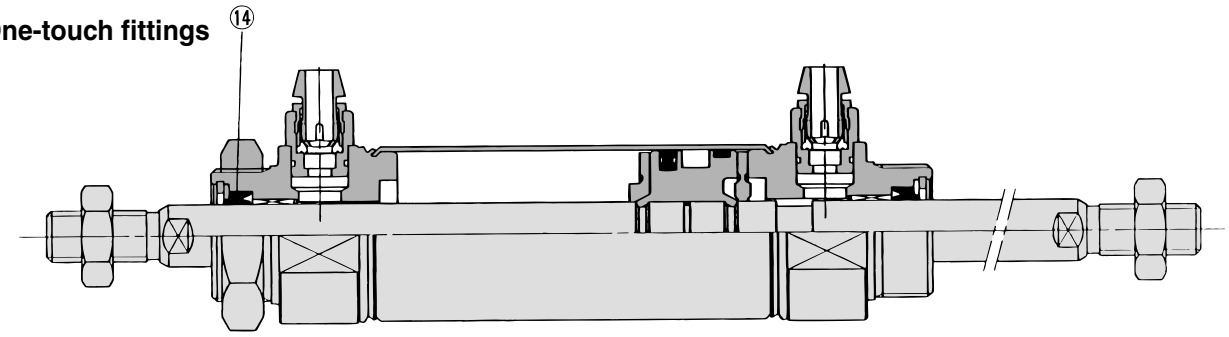
Air-hydro



With air cushion



Built-in One-touch fittings



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Cylinder tube**	Stainless steel	
3	**Piston**	Aluminum alloy	Chromated
4	**Piston rod**	Carbon steel	Hard chrome plated
5	**Bushing**	Copper oil-impregnated sintered alloy	
6	**Seal retainer**	Stainless steel	
7	**Retaining ring**	Carbon steel	Phosphate coated
8	**Bumper A**	Urethane	
9	**Bumper B**	Urethane	
10	**Piston seal**	NBR	
11	**Piston gasket**	NBR	
12	**Mounting nut**	Carbon steel	Nickel plated
13	**Rod end nut**	Carbon steel	Nickel plated

Replacement Part: Seal

●With rubber bumper/Air Cushion/Built-in One-touch Fittings

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
14	**Rod seal**	NBR	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14LZ

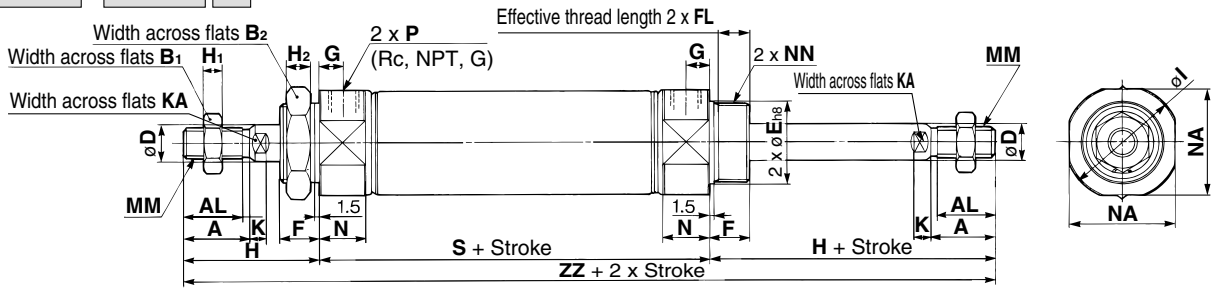
●Air-hydro

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
14	**Rod seal**	NBR	HDU-8	HDU-10	HDU-12L	HDU-14

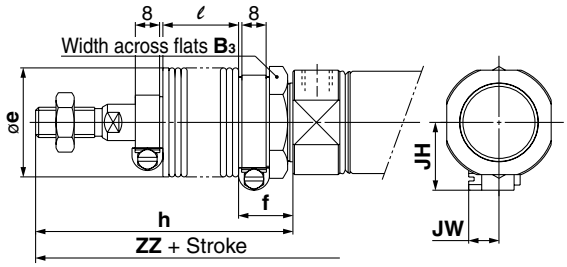
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic Style (B)

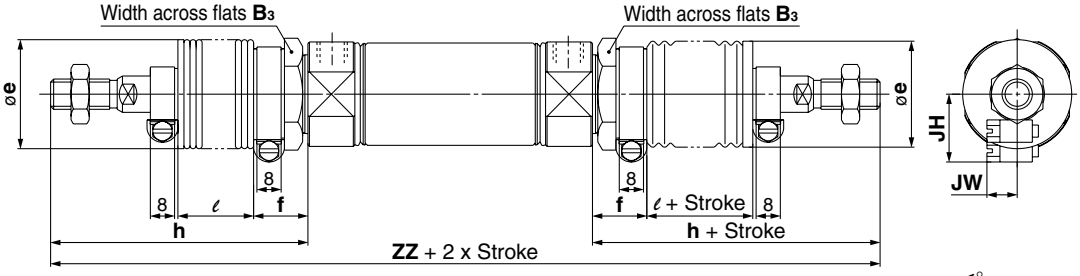
CM2WB Bore size — Stroke



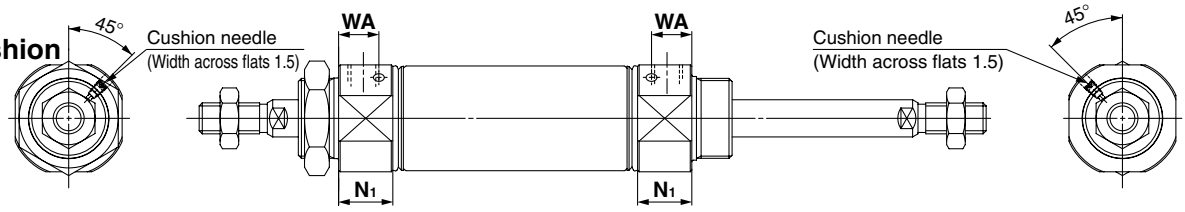
With rod boot (One side)



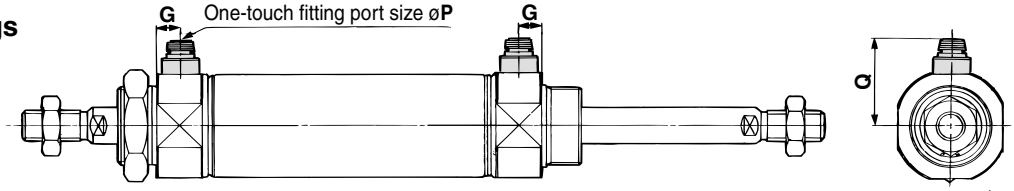
With rod boot (Both sides)



With air cushion



Built-in One-touch fittings



(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	144
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	152
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	154
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	188

With Rod Boot

(mm)

Bore size (mm)	B_3	e	f	h					ℓ					ZZ (Both sides)				
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300
20	30	36	18	68	81	93	106	131	12.5	25	37.5	50	75	198	224	248	274	324
25	32	36	18	72	85	97	110	135	12.5	25	37.5	50	75	206	232	256	282	332
32	32	36	18	72	85	97	110	135	12.5	25	37.5	50	75	208	234	258	284	334
40	41	46	20	77	90	102	115	140	12.5	25	37.5	50	75	242	268	292	318	368

With Rod Boot

(mm)

Bore size (mm)	ZZ (One side)						JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300			
20	171	184	196	209	234		23.5	10.5
25	179	192	204	217	242		23.5	10.5
32	181	194	206	219	244		23.5	10.5
40	215	228	240	253	278		27	10.5

With Air Cushion

(mm)

Bore size (mm)	N_1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

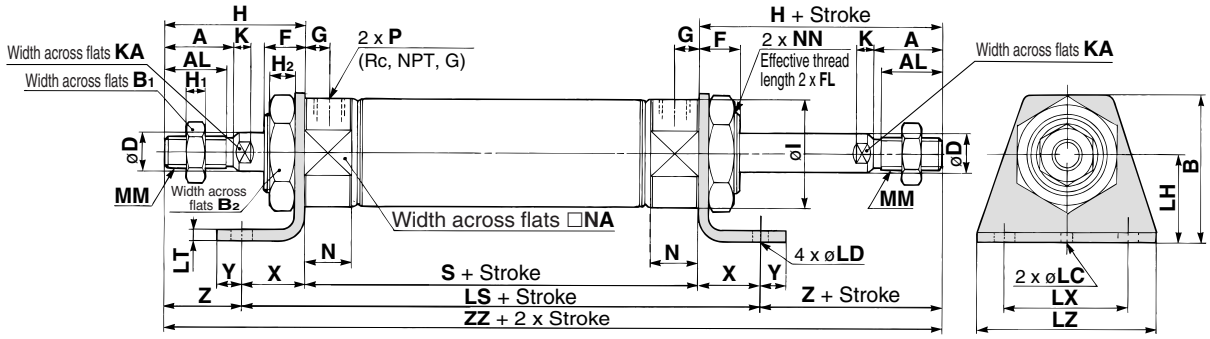
Built-in One-touch Fittings

(mm)

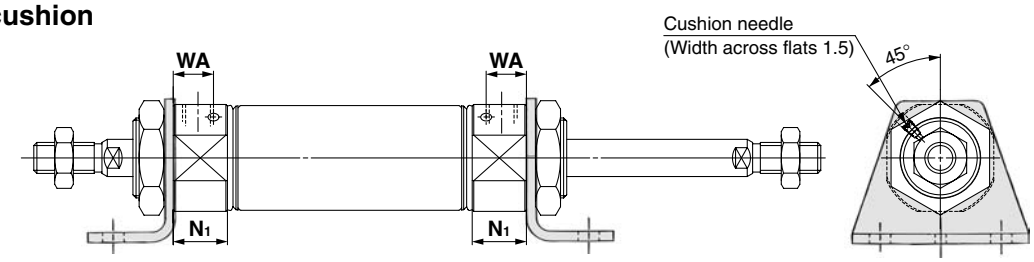
Bore size (mm)	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

Axial Foot Style (L)

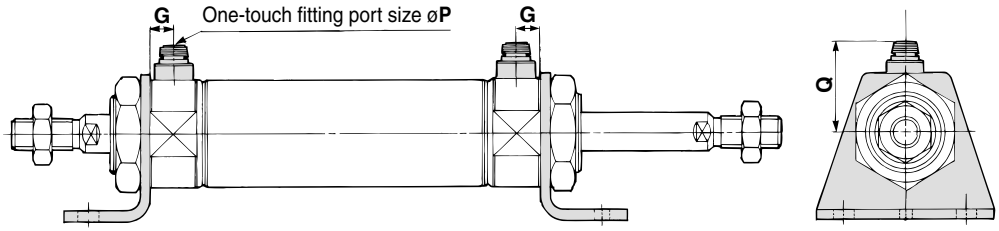
CM2WL Bore size — Stroke



With air cushion



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B	B1	B2	D	F	FL	G	H	H1	H2	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	144
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	152
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	154
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	188

With Air Cushion (mm)

Bore size (mm)	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Built-in One-touch Fittings (mm)

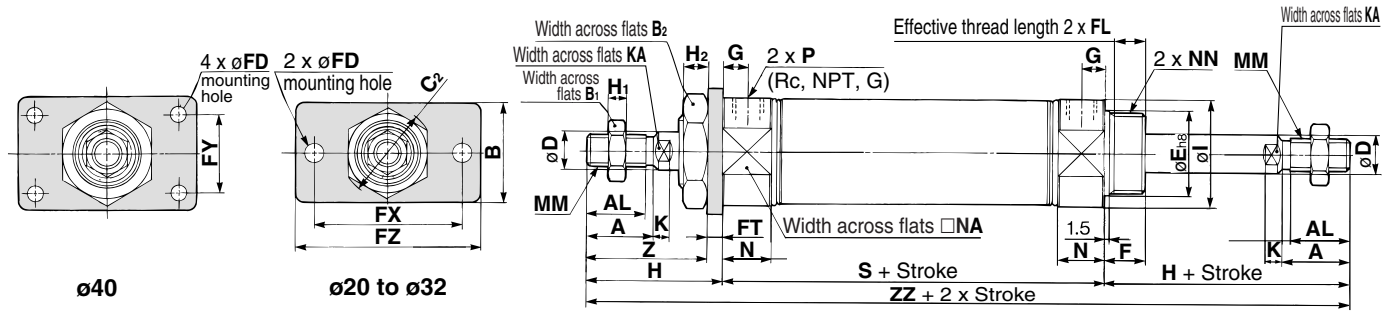
Bore size (mm)	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

∗ In the case of with rod boot, refer to basic style on page 152 and f dimension on page 136.

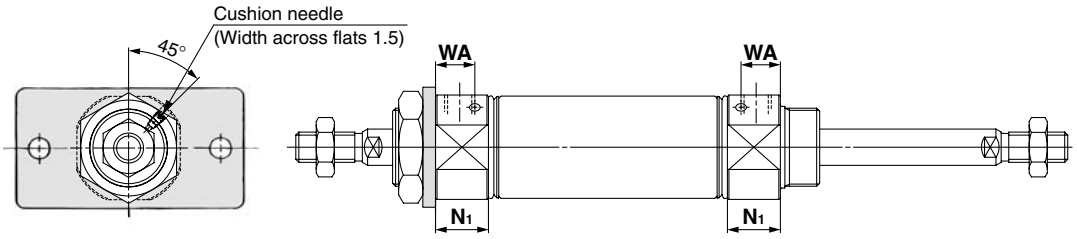
Series CM2W

Flange Style (F)

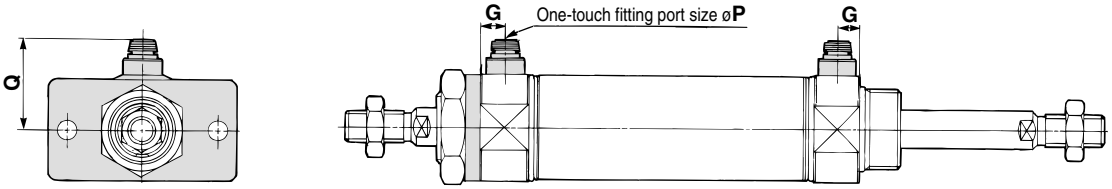
CM2WF **Bore size** — **Stroke** □



With air cushion



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B	B_1	B_2	C_2	D	E	F	FD	FL	FT	FX	FY	FZ	G	H	H_1	H_2	I	K	KA	MM
20	18	15.5	34	13	26	30	8	$20^{0}_{-0.033}$	13	7	10.5	4	60	—	75	8	41	5	8	28	5	6	M8 x 1.25
25	22	19.5	40	17	32	37	10	$26^{0}_{-0.033}$	13	7	10.5	4	60	—	75	8	45	6	8	33.5	5.5	8	M10 x 1.25
32	22	19.5	40	17	32	37	12	$26^{0}_{-0.033}$	13	7	10.5	4	60	—	75	8	45	6	8	37.5	5.5	10	M10 x 1.25
40	24	21	52	22	41	47.3	14	$32^{0}_{-0.039}$	16	7	13.5	5	66	36	82	11	50	8	10	46.5	7	12	M14 x 1.5

(mm)

Bore size (mm)	N	NA	NN	P	S	Z	ZZ
20	15	24	M20 x 1.5	1/8	62	37	144
25	15	30	M26 x 1.5	1/8	62	41	152
32	15	34.5	M26 x 1.5	1/8	64	41	154
40	21.5	42.5	M32 x 2	1/4	88	45	188

With Air Cushion (mm)

Bore size (mm)	N_1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

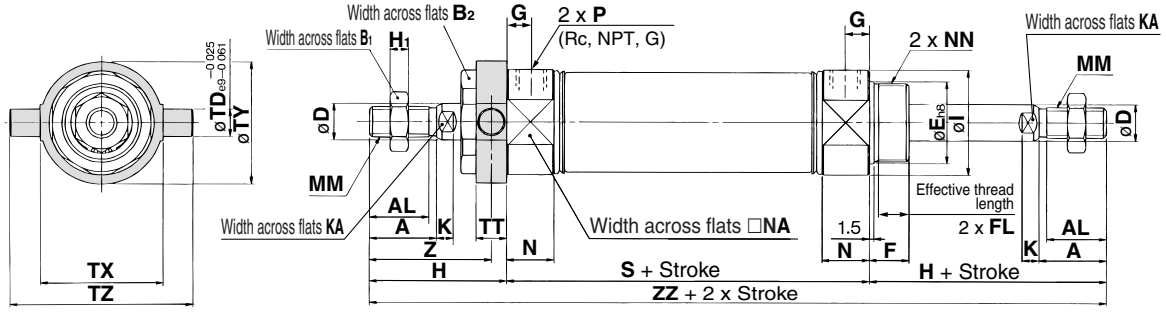
Built-in One-touch Fittings (mm)

Bore size (mm)	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

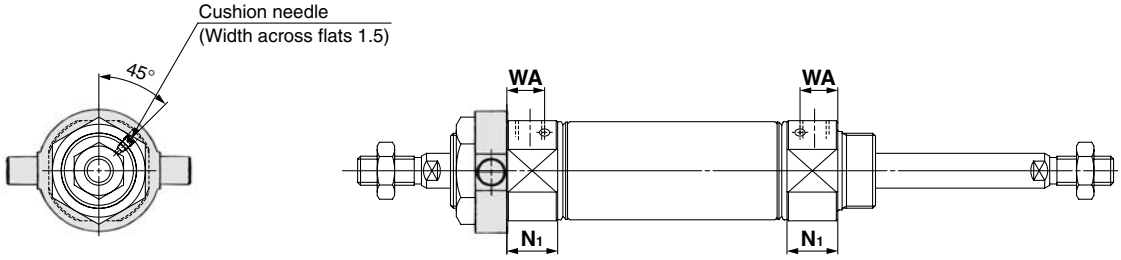
* In the case of with rod boot, refer to basic style on page 152 and f dimension on page 137.

Trunnion Style (U)

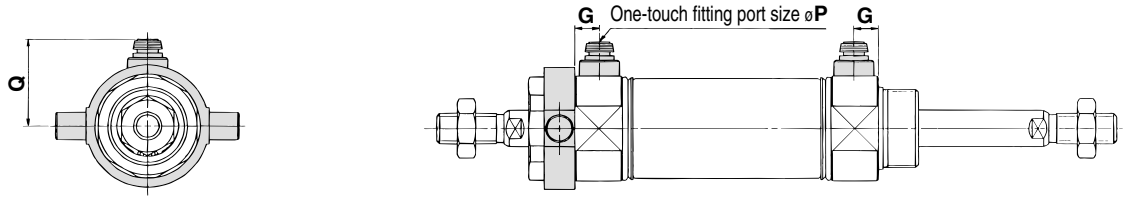
CM2WU Bore size — Stroke



With air cushion



Built-in One-touch fittings



(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	S
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	62
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	62
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	64
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	88

(mm)

Bore size (mm)	TD	TT	TX	TY	TZ	Z	ZZ
20	8	10	32	32	52	36	144
25	9	10	40	40	60	40	152
32	9	10	40	40	60	40	154
40	10	11	53	53	77	44.5	188

With Air Cushion (mm)

Bore size (mm)	N_1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Built-in One-touch Fittings (mm)

Bore size (mm)	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

∗ In the case of with rod boot, refer to basic style on page 152 and f dimension on page 141.

Air Cylinder: Standard Type
Single Acting, Spring Return/Extend
Series CM2
ø20, ø25, ø32, ø40

How to Order

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	Clevis integrated style
BZ	Boss-cut basic style
FZ	Boss-cut rod side flange style
UZ	Boss-cut rod side trunnion style

Piping

Nil	Rc (Screw-in piping)
F	Built-in One-touch fittings

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 157.)

Made to Order
(Refer to page 157 for details.)

CM2 L 32 □ – 150 S – □

With auto switch

CDM2 L 32 □ – 150 S – M9BW □ – □

With auto switch (Built-in magnet)

Bore size

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

Action

S	Single acting, Spring return
T	Single acting, Spring extend

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.

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) CDM2F40-100T

Applicable Auto Switch/Refer to pages 1263 to 1371 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 length (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)	5V, 12V		M9N	●	●	●	○	○	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	●	●	●	○	○	○		
				2-wire	12V		M9B	●	●	●	○	○	○	—	
		Connector					H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5V, 12V		G39A	—	—	—	—	●	—	IC circuit	
				2-wire	12V	—	K39A	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	○	○	IC circuit	
				3-wire (PNP)			M9PW	●	●	●	○	○	○		
				2-wire	12V		M9BW	●	●	●	○	○	○	—	
	Water resistant (2-color indication)						H7BA ∗∗	—	—	●	○	○	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5V, 12V		H7NF	●	—	●	○	○	○	IC circuit	
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5V	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			Yes			100V or less	A90	●	—	●	—	—	—	IC circuit	
			No			100V, 200V	B54	●	—	●	●	—	—	—	
			Yes			200V or less	B64	●	—	●	—	—	—		
		Connector	No			—	C73C	●	—	●	●	●	—		
			Yes		12V	24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes			—	A33A	—	—	—	—	●	—	—	PLC
						100V, 200V	A34A	—	—	—	—	●	—	—	Relay, PLC
		DIN terminal					A44A	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet			—	—	B59W	●	—	●	—	—	—		

∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Specifications

Bore size (mm)		20	25	32	40
Action		Single acting, Spring return/Single acting, Spring extend			
Type		Pneumatic			
Cushion		Rubber bumper			
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure	Single acting, Spring return	0.18 MPa			
	Single acting, Spring extend	0.23 MPa			
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Lubrication		Not required (Non-lube)			
Stroke length tolerance		$^{+1.4}_{0}$ mm			
Piston speed		50 to 750 mm/s			
Allowable kinetic energy (J)		0.27	0.4	0.65	1.2

Standard Stroke

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

Note 1) Other intermediate strokes can be manufactured upon receipt of order.
Manufacture of intermediate strokes at 1 mm intervals is possible.
(Spacers are not used.)
Note 2) Please contact SMC for longer strokes.

Mounting Bracket

For the mounting bracket part numbers other than basic style, refer to page 158.

Theoretical Output

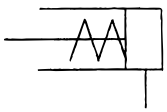
Refer to "Theoretical Output 1" on page 1573.

Spring Reaction Force

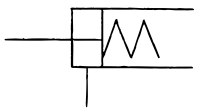
Refer to page 1570 (Table 3: Spring Reaction Force).

JIS Symbol

Single acting, Spring return



Spring extend



Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB12	External stainless steel cylinder
—XC3	Special port location
—XC6	Piston rod and rod end nut made of stainless steel
—XC13	Auto switch mounting rail style
—XC20	Head cover axial port
—XC25	No fixed orifice of connecting port
—XC27	Double clevis pin and double knuckle pin made of stainless steel
—XC29	Double knuckle joint with spring pin
—XC52	Mounting nut with set screw

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.

Comparison of the Full Length Dimension (Versus standard type) (mm)

ø20	ø25	ø32	ø40
▲13	▲13	▲13	▲16

Mounting style

■ Boss-cut basic style (BZ) ■ Boss-cut flange style (FZ)
■ Boss-cut trunnion style (UZ)

Mounting Style and Accessory

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

Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.
Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.
Note 3) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double clevis and double knuckle joint.
Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.
Note 5) Clevis pins and retaining rings (cotter pins for ø40) are attached.

Mounting Bracket/Part No.

Mounting bracket	Min. order	Bore size (mm)				Description (for min. order)
		20	25	32	40	
Axial foot *	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Single clevis	1	CM-C020B	CM-C032B		CM-C040B	1 single clevis, 3 liners
Double clevis ** *** (with pins)	1	CM-D020B	CM-D032B		CM-D040B	1 double clevis, 3 liners, 1 clevis pins, 2 retaining rings
Trunnion (with nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.
** 3 Liners are attached with a clevis bracket for adjusting the mounting angle.
*** Clevis pins and retaining rings (cotter pins for ø40) are attached.

Accessory Bracket

For mounting brackets, refer to pages 144 and 145

Mass

Spring Return

(kg)

Bore size (mm)		20	25	32	40
Basic mass	25 stroke	0.20	0.30	0.42	0.77
	50 stroke	0.22	0.33	0.46	0.84
	75 stroke	0.27	0.42	0.58	1.03
	100 stroke	0.29	0.45	0.63	1.09
	125 stroke	0.35	0.54	0.76	1.29
	150 stroke	0.37	0.57	0.80	1.36
	200 stroke	—	—	0.97	1.61
	250 stroke	—	—	—	1.87
Mounting bracket mass	Foot style	0.15	0.16	0.16	0.27
	Flange style	0.06	0.09	0.09	0.12
	Single clevis style	0.04	0.04	0.04	0.09
	Double clevis style	0.05	0.06	0.06	0.13
	Trunnion style	0.04	0.07	0.07	0.10
	Clevis integrated style	–0.02	–0.02	–0.01	–0.04
	Boss-cut basic style	–0.01	–0.02	–0.02	–0.03
	Boss-cut flange style	0.05	0.07	0.07	0.09
	Boss-cut trunnion style	0.03	0.05	0.05	0.07
	Pivot bracket (With pin)	0.07	0.07	0.14	0.14
Option bracket	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) **CM2L32-100S** (Bore size ø32, Foot style, 100 stroke)
0.63 (Basic mass) + 0.16 (Mounting bracket mass) = 0.79 kg

Spring Extend

(kg)

Bore size (mm)		20	25	32	40
Basic mass	25 stroke	0.19	0.29	0.40	0.74
	50 stroke	0.21	0.32	0.44	0.81
	75 stroke	0.25	0.39	0.54	0.97
	100 stroke	0.27	0.42	0.58	1.03
	125 stroke	0.32	0.49	0.69	1.20
	150 stroke	0.34	0.52	0.73	1.27
	200 stroke	—	—	0.88	1.49
	250 stroke	—	—	—	1.72
Mounting bracket mass	Foot style	0.15	0.16	0.16	0.27
	Flange style	0.06	0.09	0.09	0.12
	Single clevis style	0.04	0.04	0.04	0.09
	Double clevis style	0.05	0.06	0.06	0.13
	Trunnion style	0.04	0.07	0.07	0.10
	Clevis integrated style	–0.02	–0.02	–0.01	–0.04
	Boss-cut basic style	–0.01	–0.02	–0.02	–0.03
	Boss-cut flange style	0.05	0.07	0.07	0.09
	Boss-cut trunnion style	0.03	0.05	0.05	0.07
	Pivot bracket (With pin)	0.07	0.07	0.14	0.14
Option bracket	Single knuckle joint	0.06	0.06	0.06	0.23
	Double knuckle joint (With pin)	0.07	0.07	0.07	0.20

Built-in One-touch Fitting

CM2 [Mounting style] [Bore size] **F** – [Stroke] [Action]

F: Built-in One-touch fitting

This type has the One-touch fitting integrated in a cylinder, which enables to reduce the piping labor and installing space dramatically.

- For construction, refer to page 161.
- For dimensions of each mounting style, refer to pages 163 to 170.
- For other specifications, refer to page 157.

Specifications

Action	Single acting, Spring return	Single acting, Spring extend
Bore size (mm)	ø20, ø25, ø32, ø40	
Max. operating pressure	1.0 MPa	
Min. operating pressure	0.18 MPa	0.23 MPa
Cushion	Rubber bumper	
Piping	Built-in One-touch fitting	
Piston speed	50 to 750 mm/s	
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style	

∗ Auto switch can be mounted.

Applicable Tubing O.D./I.D.

Bore size (mm)	20	25	32	40
Applicable tubing O.D./I.D. (mm)	6/4	6/4	6/4	8/6
Applicable tubing material	Can be used for either nylon, soft nylon or polyurethane tubing.			

⚠ Caution

1. One-touch fitting cannot be replaced.
   • One-touch fitting is press-fit into the cover, thus cannot be replaced.
2. Refer to Fittings and Tubing Precautions (Best Pneumatics No. 6) for handling one-touch fittings.

Copper/Fluorine-free

20-CM2 | **Mounting style** | **Bore size** – **Stroke** | **Action**

Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action	Single acting, Spring return	Single acting, Spring extend
Bore size (mm)	ø20, ø25, ø32, ø40	
Max. operating pressure	1.0 MPa	
Min. operating pressure	0.18 MPa	0.23 MPa
Cushion	Rubber bumper	
Piston speed	50 to 750 mm/s	
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style	

∗ Auto switch can be mounted.

Construction

∗ The above shows the case of single acting, spring return type.

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precoutions

⚠Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

⚠Caution

1. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

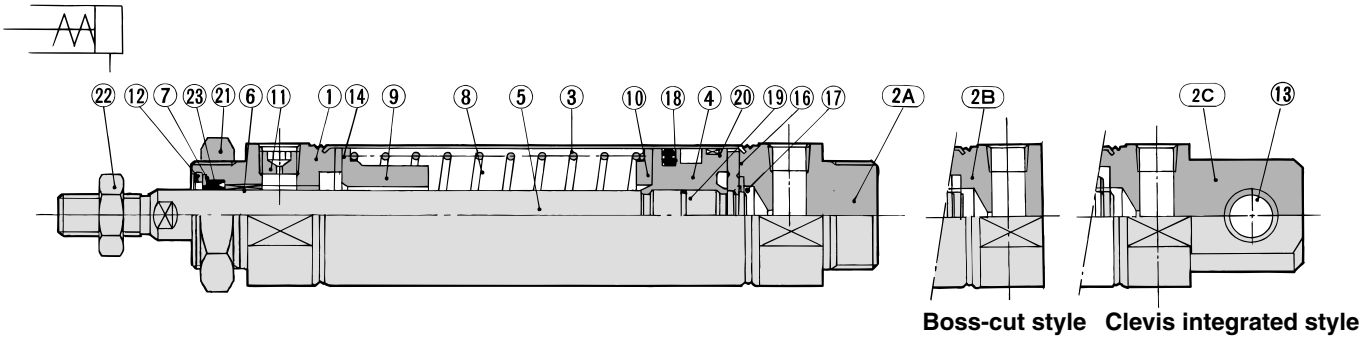
2. Use caution to the popping of a retaining ring.
When replacing rod seals and removing and mounting a retaining ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

3. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

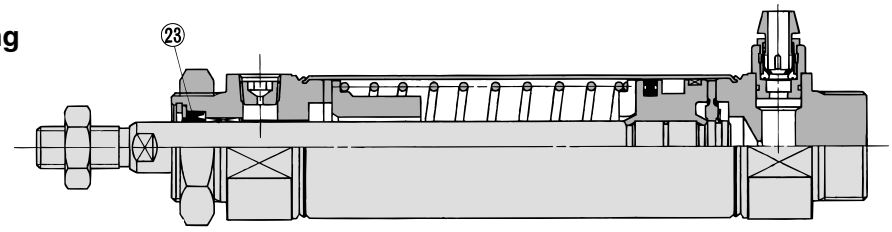
4. One-touch fitting cannot be replaced.
One-touch fitting is press-fit into the cover, thus cannot be replaced.

Construction

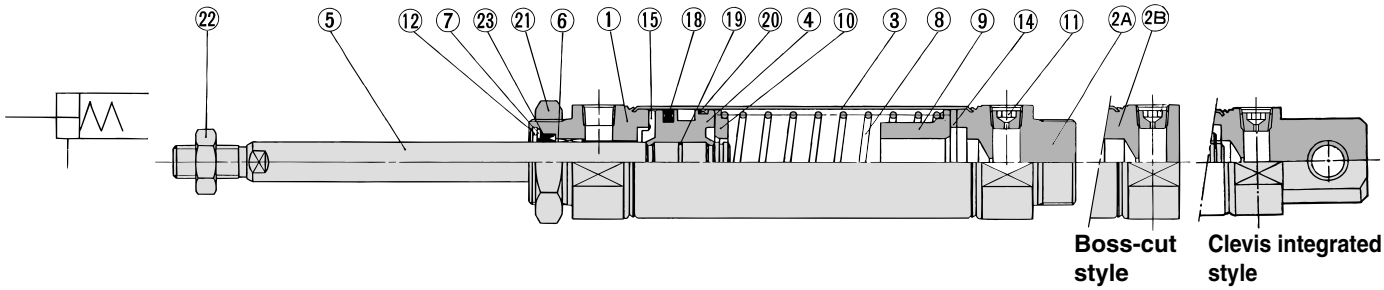
Spring return



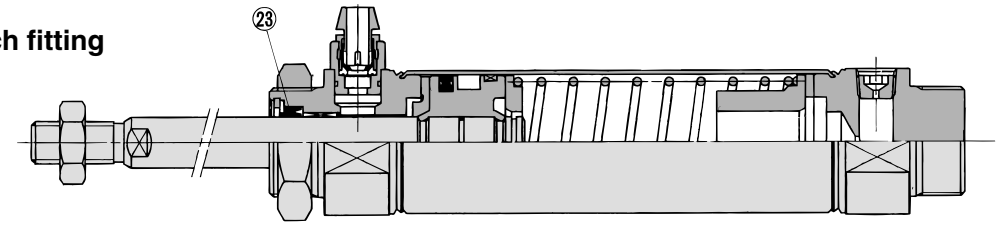
Spring return, Built-in One-touch fitting



Spring extend



Spring extend, Built-in One-touch fitting



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2A	**Head cover A**	Aluminum alloy	Clear anodized *
2B	**Head cover B**	Aluminum alloy	Clear anodized **
2C	**Head cover C**	Aluminum alloy	Clear anodized ***
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chromium electroplated
6	**Bushing**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Stainless steel	
8	**Return spring**	Steel wire	Zinc chromated
9	**Spring guide**	Aluminum alloy	Chromated
10	**Spring seat**	Aluminum alloy	Chromated
11	**Plug with fixed orifice**	Alloy steel	Black zinc chromated
12	**Retaining ring**	Carbon steel	Phosphate coated

* Basic style, ** Boss-cut style, *** Clevis integrated style

No.	Description	Material	Note
13	**Clevis bushing**	Copper oil-impregnated sintered alloy	
14	**Bumper**	Urethane	
15	**Bumper A**	Urethane	
16	**Bumper B**	Urethane	
17	**Retaining ring**	Stainless steel	
18	**Piston seal**	NBR	
19	**Piston gasket**	NBR	
20	**Wear ring**	Resin	
21	**Mounting nut**	Carbon steel	Nickel plated
22	**Rod end nut**	Carbon steel	Nickel plated

Replacement Part: Seal

●With Rubber Bumper, Built-in One-touch Fitting

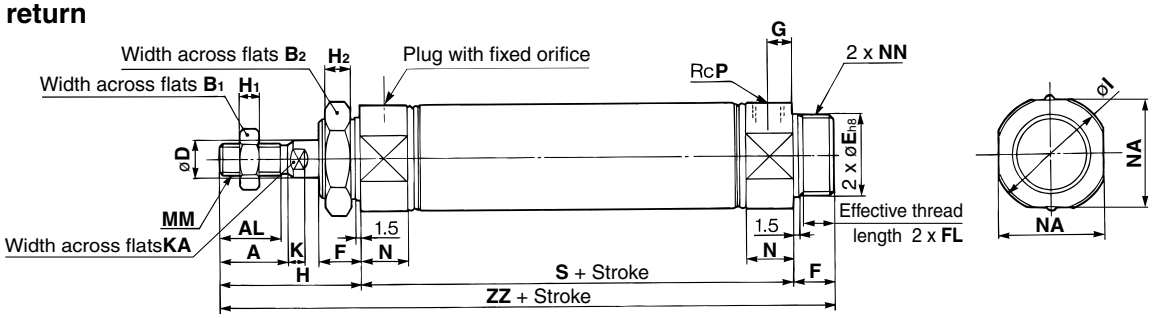
No.	Description	Material	Part no.			
			20	25	32	40
23	**Rod seal**	NBR	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14LZ

* Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

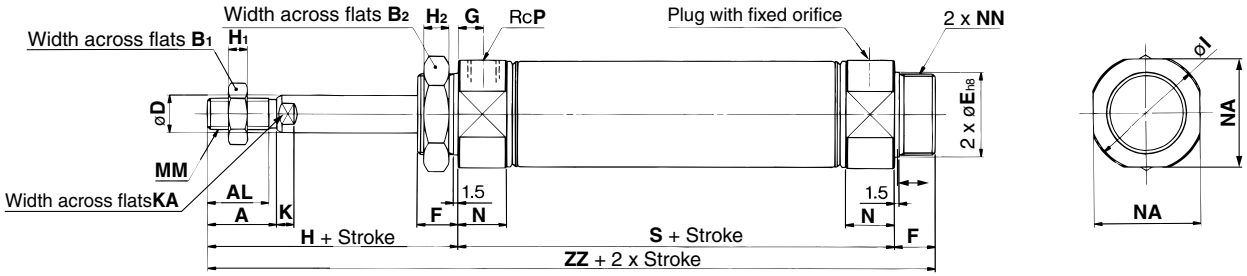
Basic Style (B)

CM2B Bore size — Stroke S T

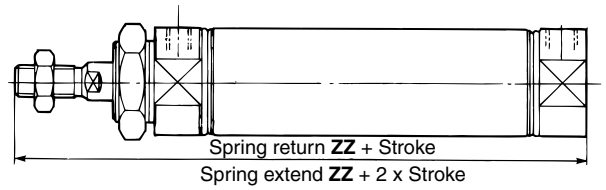
Spring return



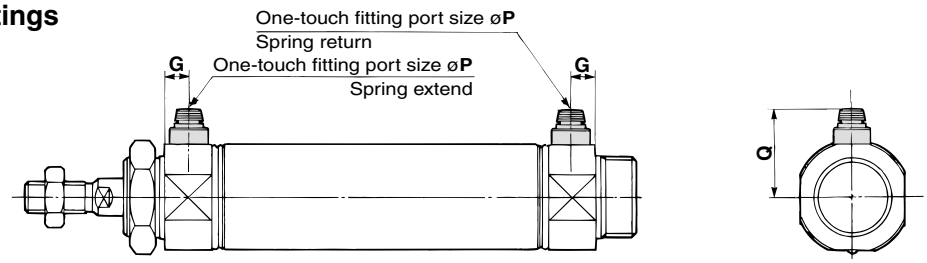
Spring extend



Boss-cut style



Built-in One-touch fittings



(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
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
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
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
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

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50		51 to 100		101 to 150		151 to 200		201 to 250	
	S	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**
20	87	141	112	166	137	191	—	—	—	—
25	87	145	112	170	137	195	—	—	—	—
32	89	147	114	172	139	197	164	222	—	—
40	113	179	138	204	163	229	188	254	213	279

Boss-cut Style

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50	51 to 100	101 to 150	151 to 200	201 to 250
	ZZ	**ZZ**	**ZZ**	**ZZ**	**ZZ**
20	128	153	178	—	—
25	132	157	182	—	—
32	134	159	184	209	—
40	163	188	213	238	263

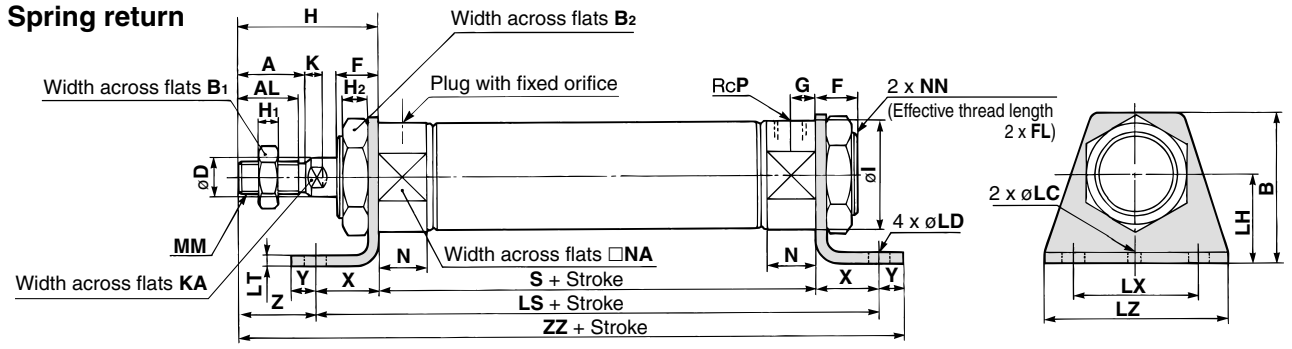
Built-in One-touch Fittings (mm)

Bore size (mm)	G	P	Q
20	8	6	21.5
25	8	6	24.5
32	8	6	27
40	11	8	32.5

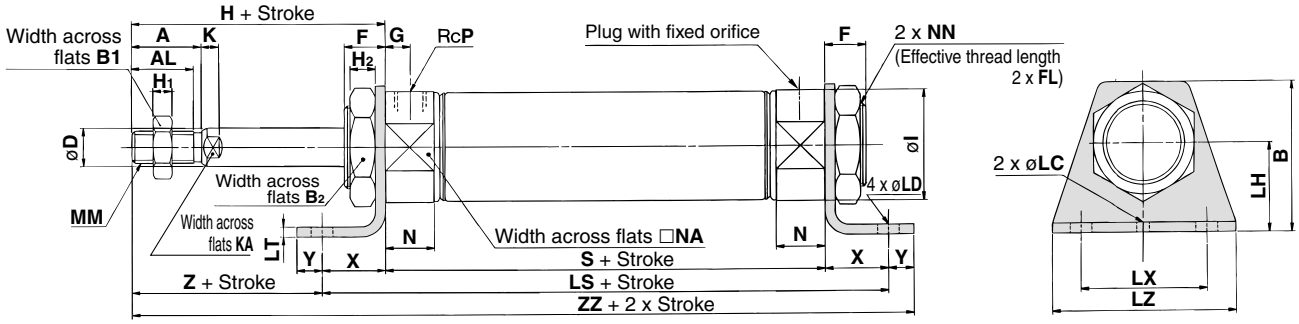
Axial Foot Style (L)

CM2L **Bore size** — **Stroke** S T

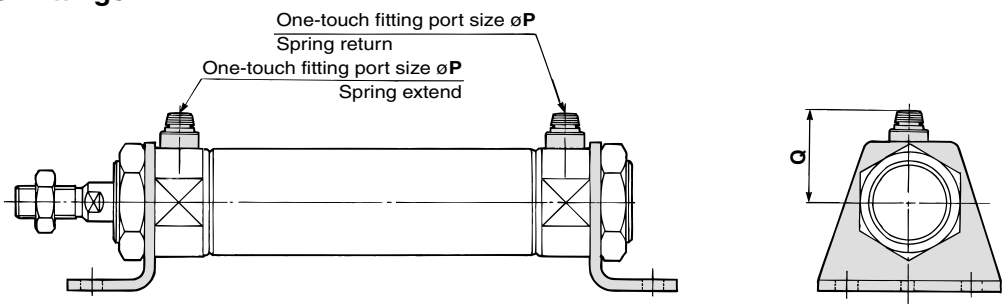
Spring return



Spring extend



Built-in One-touch fittings



(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	LT	LX	LZ	MM	N	NA	NN	P	X	Y	Z
20	18	15.5	40	13	26	8	13	10.5	8	41	5	8	28	5	6	4	6.8	25	3.2	40	55	M8 x 1.25	15	24	M20 x 1.5	1/8	20	8	21
25	22	19.5	47	17	32	10	13	10.5	8	45	6	8	33.5	5.5	8	4	6.8	28	3.2	40	55	M10 x 1.25	15	30	M26 x 1.5	1/8	20	8	25
32	22	19.5	47	17	32	12	13	10.5	8	45	6	8	37.5	5.5	10	4	6.8	28	3.2	40	55	M10 x 1.25	15	34.5	M26 x 1.5	1/8	20	8	25
40	24	21	54	22	41	14	16	13.5	11	50	8	10	46.5	7	12	4	7	30	3.2	55	75	M14 x 1.5	21.5	42.5	M32 x 2	1/4	23	10	27

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50			51 to 100			101 to 150			151 to 200			201 to 250		
	LS	***S***	**ZZ**	**LS**	**S**	**ZZ**	**LS**	**S**	**ZZ**	**LS**	**S**	**ZZ**	**LS**	**S**	**ZZ**
20	127	87	156	152	112	181	177	137	206	—	—	—	—	—	—
25	127	87	160	152	112	185	177	137	210	—	—	—	—	—	—
32	129	89	162	154	114	187	179	139	212	204	164	237	—	—	—
40	159	113	196	184	138	221	209	163	246	234	188	271	259	213	296

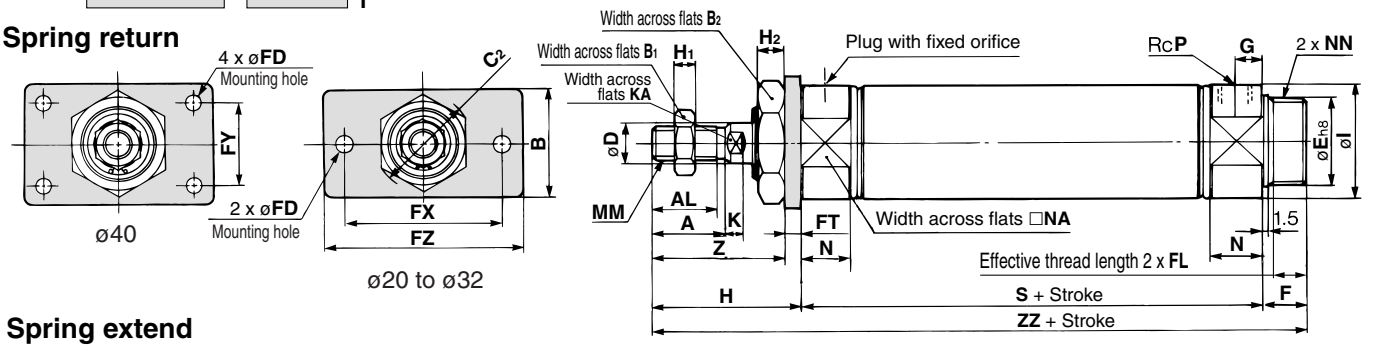
Built-in One-touch Fittings (mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

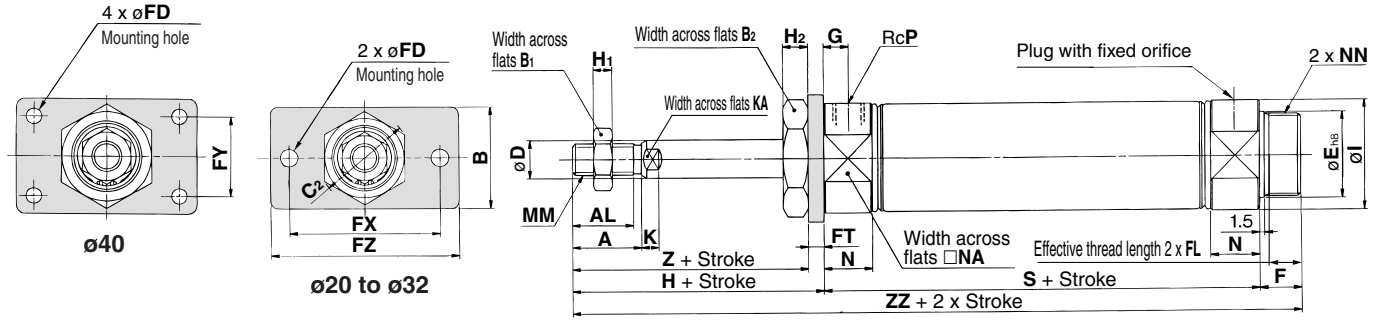
Rod Side Flange Style (F)

CM2F Bore size — Stroke S T

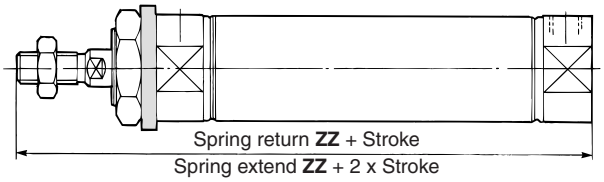
Spring return



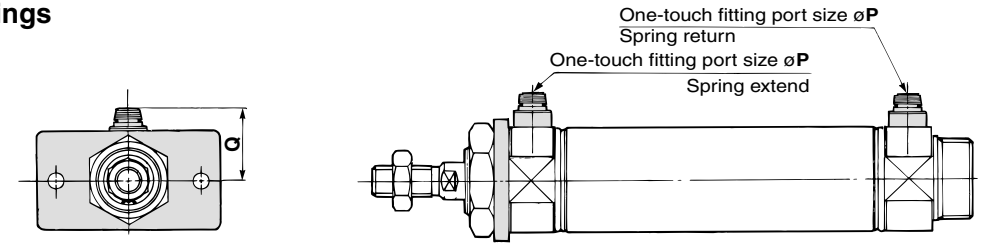
Spring extend



Boss-cut style



Built-in One-touch fittings



(mm)

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

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50		51 to 100		101 to 150		151 to 200		201 to 250	
	S	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**
20	87	141	112	166	137	191	—	—	—	—
25	87	145	112	170	137	195	—	—	—	—
32	89	147	114	172	139	197	164	222	—	—
40	113	179	138	204	163	229	188	254	213	279

Boss-cut Style

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50	51 to 100	101 to 150	151 to 200	201 to 250
	ZZ	**ZZ**	**ZZ**	**ZZ**	**ZZ**
20	128	153	178	—	—
25	132	157	182	—	—
32	134	159	184	209	—
40	163	188	213	238	263

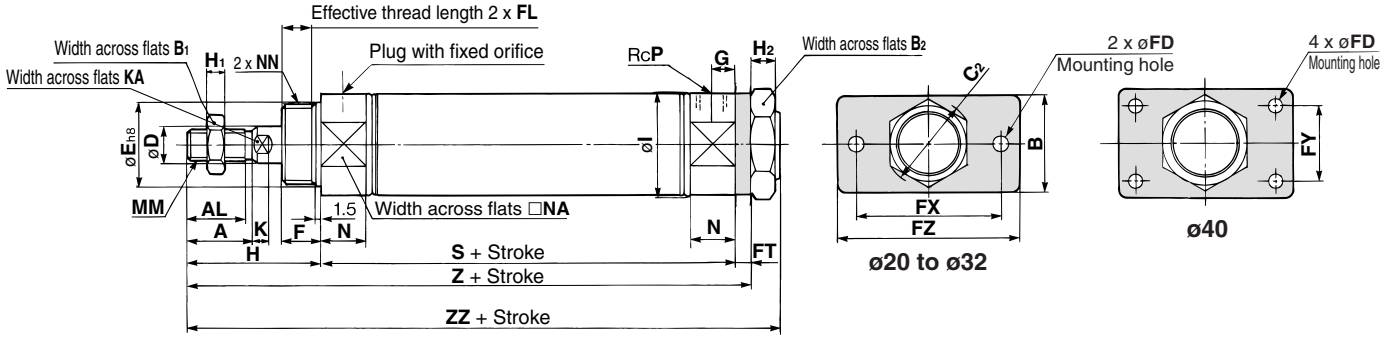
Built-in One-touch Fittings (mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

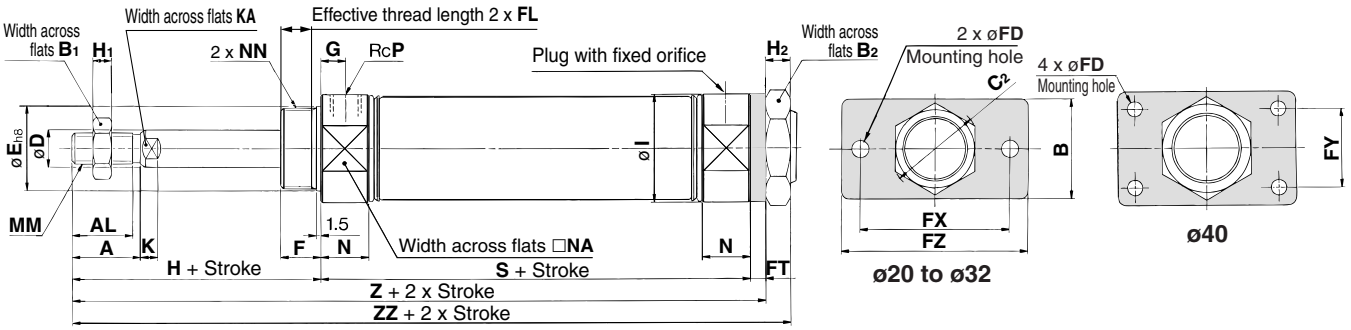
Head Side Flange Style (G)

CM2G Bore size — Stroke S T

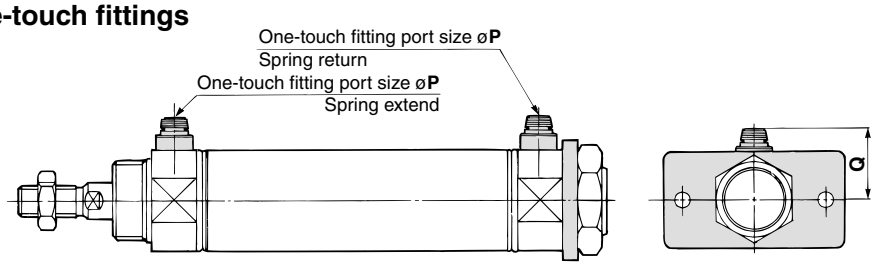
Spring return



Spring extend



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B	B_1	B_2	C_2	D	E	F	FD	FL	FT	FX	FY	FZ	G	H	H_1	H_2	I	K	KA	MM	N	NA	NN	P
20	18	15.5	34	13	26	30	8	$20^{0}_{-0.033}$	13	7	10.5	4	60	—	75	8	41	5	8	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8
25	22	19.5	40	17	32	37	10	$26^{0}_{-0.033}$	13	7	10.5	4	60	—	75	8	45	6	8	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8
32	22	19.5	40	17	32	37	12	$26^{0}_{-0.033}$	13	7	10.5	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
40	24	21	52	22	41	47.3	14	$32^{0}_{-0.039}$	16	7	13.5	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

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50			51 to 100			101 to 150			151 to 200			201 to 250		
	S	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**
20	87	132	141	112	157	166	137	182	191	—	—	—	—	—	—
25	87	136	145	112	161	170	137	186	195	—	—	—	—	—	—
32	89	138	147	114	163	172	139	188	197	164	213	222	—	—	—
40	113	168	179	138	193	204	163	218	229	188	243	254	213	268	279

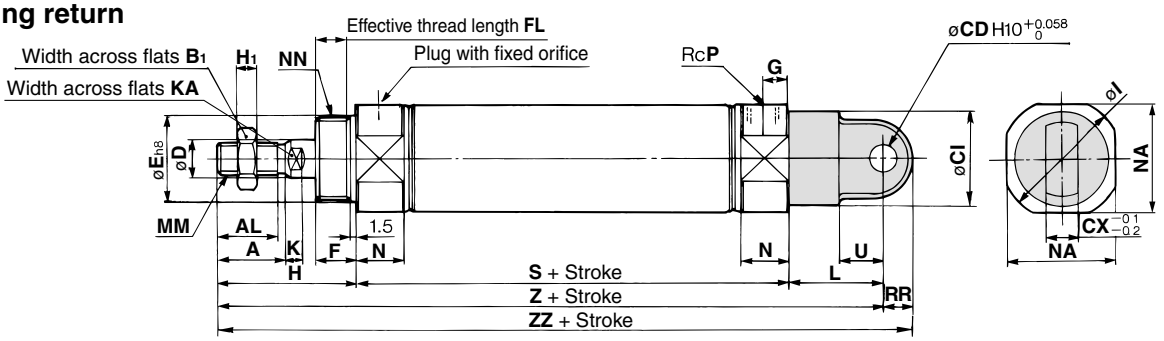
Built-in One-touch Fittings (mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

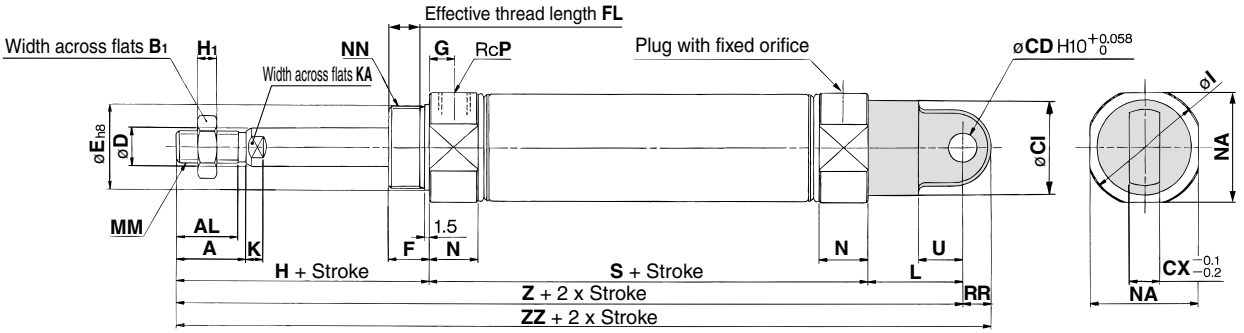
Single Clevis Style (C)

CM2C **Bore size** — **Stroke** S T

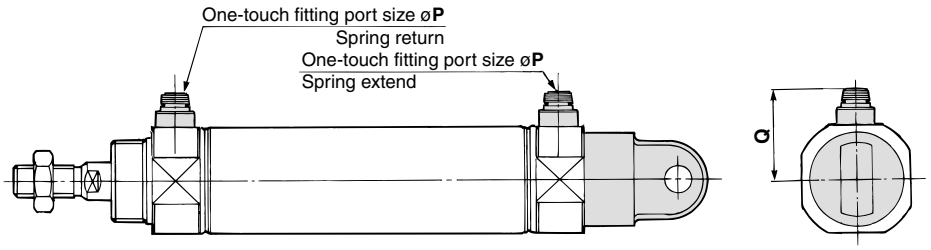
Spring return



Spring extend



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B1	CD	CI	CX	D	E	F	FL	G	H	H1	I	K	KA	L	MM	N	NA	NN	P	RR	U
20	18	15.5	13	9	24	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	14
25	22	19.5	17	9	30	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	14
32	22	19.5	17	9	30	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	14
40	24	21	22	10	38	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	18

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50			51 to 100			101 to 150			151 to 200			201 to 250		
	S	Z	ZZ	S	Z	ZZ	S	Z	ZZ	S	Z	ZZ	S	Z	ZZ
20	87	158	167	112	183	192	137	208	217	—	—	—	—	—	—
25	87	162	171	112	187	196	137	212	221	—	—	—	—	—	—
32	89	164	173	114	189	198	139	214	223	164	239	248	—	—	—
40	113	202	213	138	227	238	163	252	263	188	277	288	213	302	313

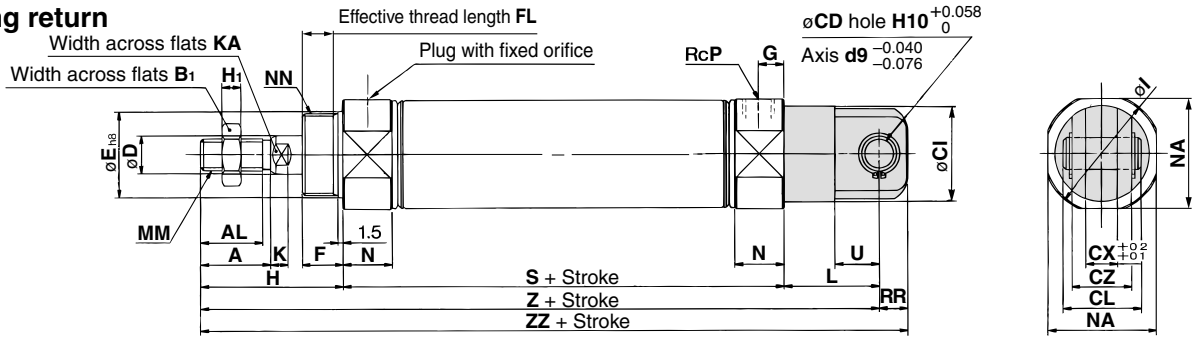
Built-in One-touch Fittings (mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

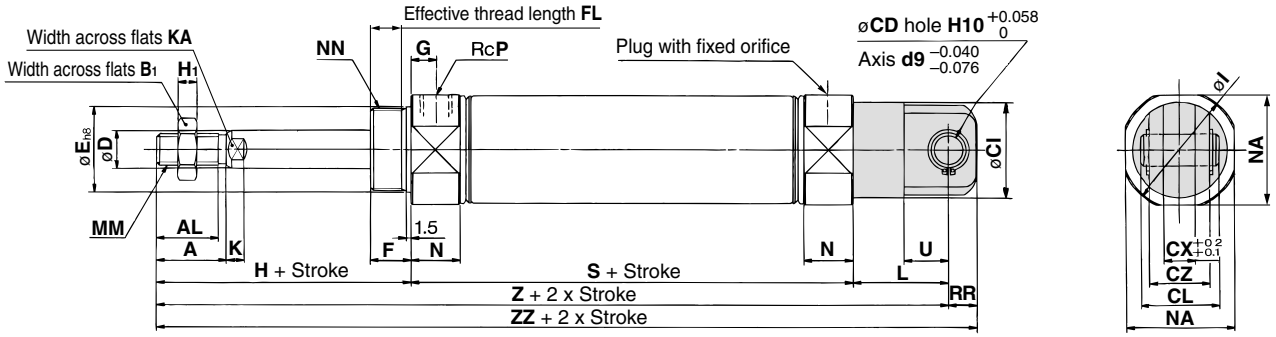
Double Clevis Style (D)

CM2D **Bore size** — **Stroke** S T

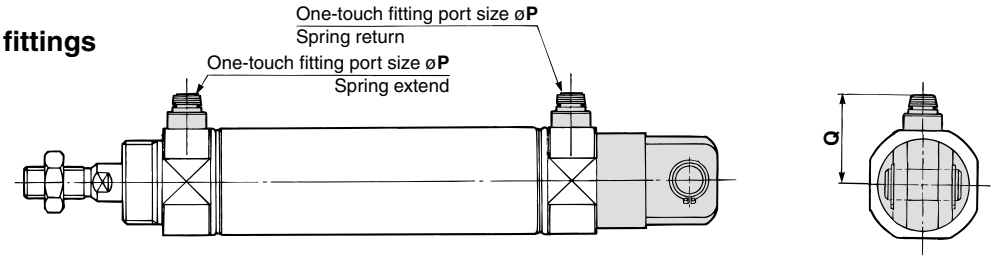
Spring return



Spring extend



Built-in One-touch fittings



(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	U
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	14
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	14
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	14
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	18

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50			51 to 100			101 to 150			151 to 200			201 to 250		
	S	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**
20	87	158	167	112	183	192	137	208	217	—	—	—	—	—	—
25	87	162	171	112	187	196	137	212	221	—	—	—	—	—	—
32	89	164	173	114	189	198	139	214	223	164	239	248	—	—	—
40	113	202	213	138	227	238	163	252	263	188	277	288	213	302	313

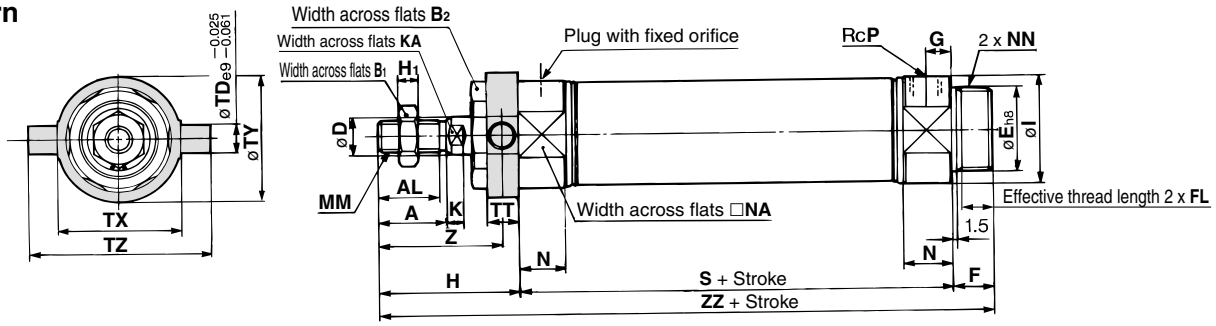
Built-in One-touch Fittings (mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

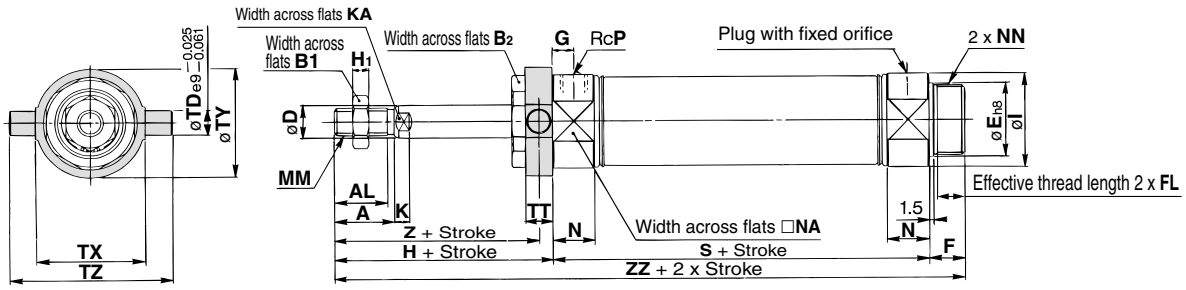
Rod Side Trunnion Style (U)

CM2U **Bore size** — **Stroke** S T

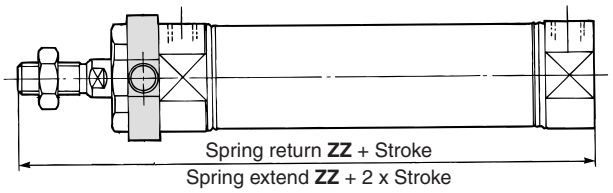
Spring return



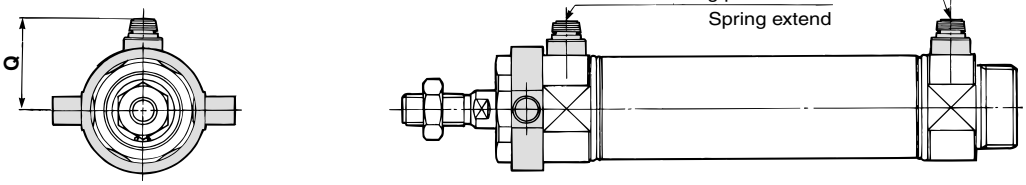
Spring extend



Boss-cut style



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B1	B2	D	E	F	FL	G	H	H1	I	K	KA	MM	N	NA	NN	P	TD	TT	TX	TY	TZ	Z
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	8	10	32	32	52	36
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	9	10	40	40	60	40
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	9	10	40	40	60	40
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	10	11	53	53	77	44.5

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50		51 to 100		101 to 150		151 to 200		201 to 250	
	S	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**
20	87	141	112	166	137	191	—	—	—	—
25	87	145	112	170	137	195	—	—	—	—
32	89	147	114	172	139	197	164	222	—	—
40	113	179	138	204	163	229	188	254	213	279

Boss-cut Style

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50	51 to 100	101 to 150	151 to 200	201 to 250
	ZZ	**ZZ**	**ZZ**	**ZZ**	**ZZ**
20	128	153	178	—	—
25	132	157	182	—	—
32	134	159	184	209	—
40	163	188	213	238	263

Built-in One-touch Fittings

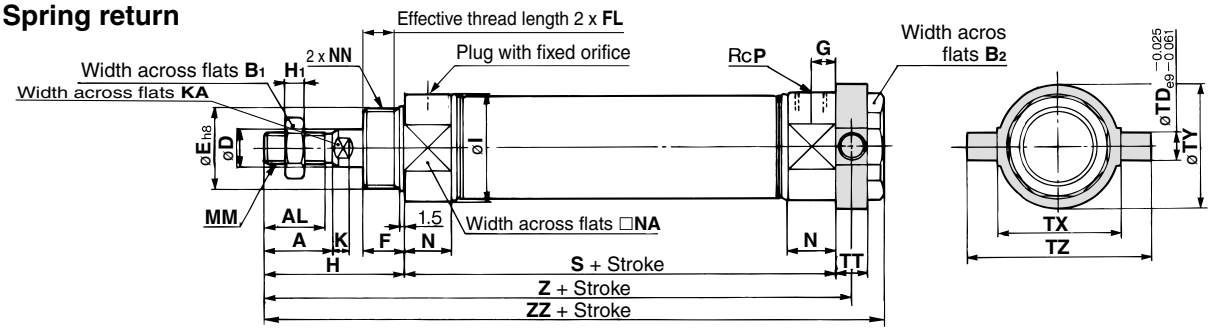
(mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

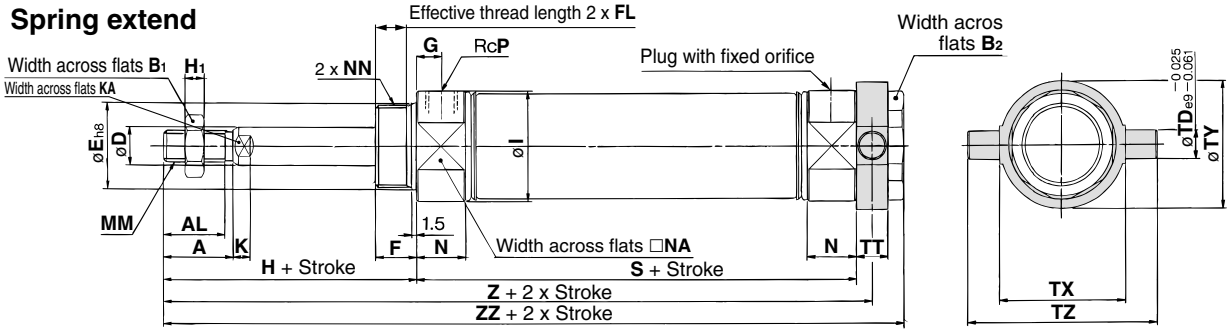
Head Side Trunnion Style (T)

CM2T **Bore size** — **Stroke** S T

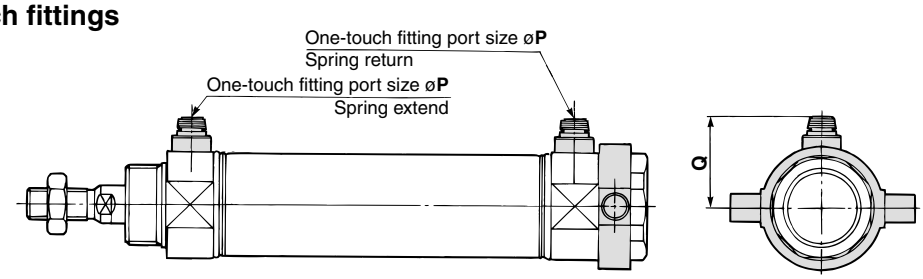
Spring return



Spring extend



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B1	B2	D	E	F	FL	G	H	H1	I	K	KA	MM	N	NA	NN	P	TD	TT	TX	TY	TZ
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	8	10	32	32	52
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	9	10	40	40	60
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	9	10	40	40	60
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	10	11	53	53	77

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50			51 to 100			101 to 150			151 to 200			201 to 250		
	S	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**
20	87	133	143	112	158	168	137	183	193	—	—	—	—	—	—
25	87	137	147	112	162	172	137	187	197	—	—	—	—	—	—
32	89	139	149	114	164	174	139	189	199	164	214	224	—	—	—
40	113	168.5	179	138	193.5	204	163	218.5	229	188	243.5	254	213	268.5	279

Built-in One-touch Fittings

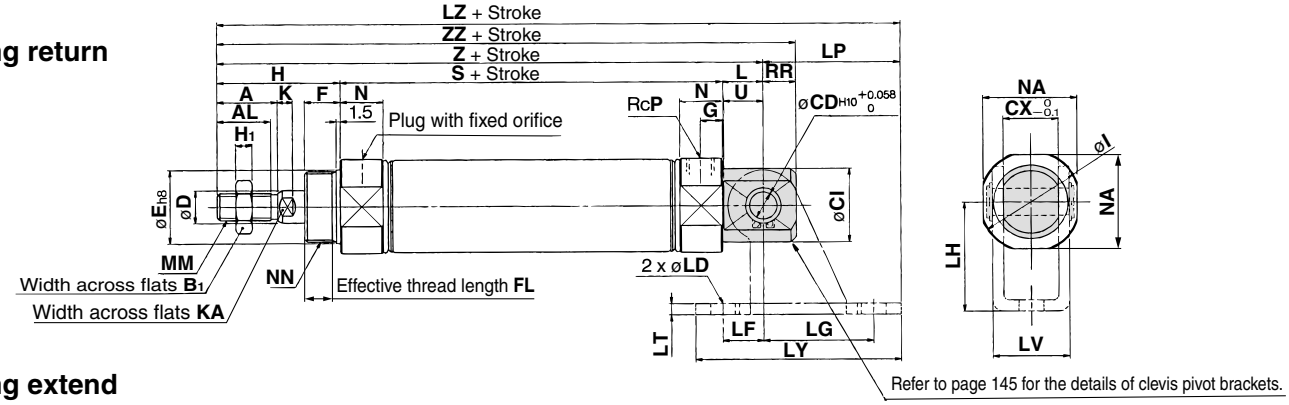
(mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

Clevis Integrated Style (E)

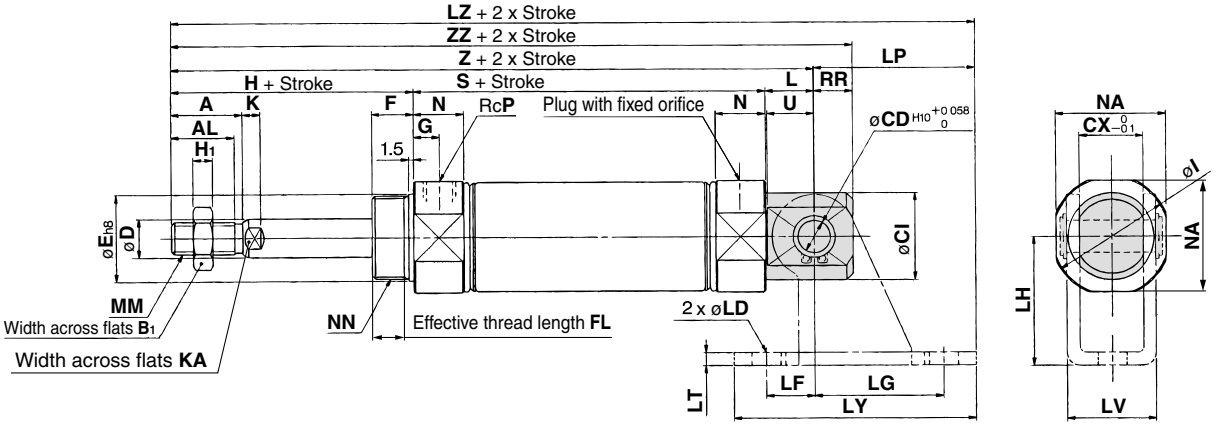
CM2E **Bore size** — **Stroke** S T

Spring return

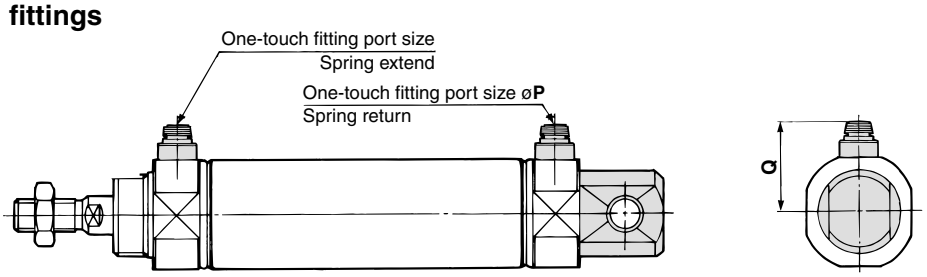


Refer to page 145 for the details of clevis pivot brackets.

Spring extend



Built-in One-touch fittings



(mm)

Bore size (mm)	A	AL	B1	CD	CI	CX	D	E	F	FL	G	H	H1	I	K	KA	L	MM	N	NA	NN	P	RR	U
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	1/8	9	11.5
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	1/8	9	11.5
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	1/8	12	14.5
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	1/4	12	14.5

Dimensions by Stroke

(mm)

Bore size (mm) \ Stroke / Symbol	1 to 50			51 to 100			101 to 150			151 to 200			201 to 250		
	S	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**	**S**	**Z**	**ZZ**
20	87	140	149	112	165	174	137	190	199	—	—	—	—	—	—
25	87	144	153	112	169	178	137	194	203	—	—	—	—	—	—
32	89	149	161	114	174	186	139	199	211	164	224	236	—	—	—
40	113	178	190	138	203	215	163	228	240	188	253	265	213	278	290

Clevis Pivot Bracket

(mm)

Bore size (mm)	LD	LF	LG	LH	LP	LT	LV	LY	1 to 50	51 to 100	101 to 150	151 to 200	201 to 250
									LZ	**LZ**	**LZ**	**LZ**	**LZ**
20	6.8	15	30	30	37	3.2	18.4	59	177	202	227	—	—
25	6.8	15	30	30	37	3.2	18.4	59	181	206	231	—	—
32	9	15	40	40	50	4	28	75	199	224	249	274	—
40	9	15	40	40	50	4	28	75	228	253	278	303	328

Built-in One-touch Fittings

(mm)

Bore size (mm)	P	Q
20	6	21.5
25	6	24.5
32	6	27
40	8	32.5

Air Cylinder: Non-rotating Rod Type
Double Acting, Single Rod
Series CM2K
ø20, ø25, ø32, ø40

How to Order

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	Clevis integrated style
BZ	Boss-cut basic style
FZ	Boss-cut rod side flange style
UZ	Boss-cut rod side trunnion style

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 172.)

Bore size

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

Cushion

Nil	Rubber bumper
A	Air cushion

Made to Order
(Refer to page 172 for details.)

CM2K L 40 – 150 A □ – □

With auto switch: CDM2K L 40 – 150 A □ – M9BW □ – □

With auto switch (Built-in magnet)

Rod boot

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

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.

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) CDM2KF32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 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 length (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)	5V, 12V		M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	●	●	●	○	—	○		
				2-wire	12V		M9B	●	●	●	○	—	○	—	
		Connector					H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5V, 12V		G39A **	—	—	—	—	●	—	IC circuit	
				2-wire	12V	—	K39A **	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PW	●	●	●	○	—	○		
				2-wire	12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)						H7BA ***	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			Yes				100V or less	A90	●	—	●	—	—	—	IC circuit	
			No				100V, 200V	B54 **	●	—	●	●	—	—	—	
			Yes				200V or less	B64 **	●	—	●	—	—	—		
		Connector	No				—	C73C	●	—	●	●	●	—		
							24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes				—	A33A **	—	—	—	—	●	—	—	PLC
							100V, 200V	A34A **	—	—	—	—	●	—		Relay, PLC
		DIN terminal						A44A **	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	B59W	●	—	●	—	—	—		

*** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
** D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

A cylinder which rod does not rotate because of the hexagonal rod shape.

Non-rotating accuracy
ø20, ø25—±0.7°
ø32, ø40—±0.5°

Can operate without lubrication.

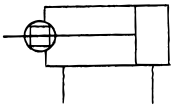
The same installation dimensions as the standard cylinder.

Auto switches can also be mounted.

It can be installed with auto switches to simplify the detection of the stroke position of the cylinder.

JIS Symbol

Double acting,
Single rod



Specifications

Bore size (mm)		20	25	32	40
Rod non-rotating accuracy		±0.7°		±0.5°	
Type		Pneumatic			
Action		Double acting, Single rod			
Fluid		Air			
Cushion		Rubber bumper			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.05 MPa			
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Lubrication		Not required (Non-lube)			
Stroke length tolerance		$^{+1.4}_{0}$ mm			
Piston speed		50 to 500 mm/s			
Cusion		Rubber bumper, Air cushion			
Allowable kinetic energy	**Rubber bumper**	0.27 J	0.4 J	0.65 J	1.2 J
	Air cushion (Effective cushion length (mm))	0.54 J (11.0)	0.78 J (11.0)	1.27 J (11.0)	2.35 J (11.8)

Standard Stroke

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

Note 1) Other intermediate strokes can be manufactured upon receipt of order.
Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) The maximum limit is 1000 stroke, but the products that exceed the standard stroke might not be able to fulfill the specifications.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XB12	External stainless steel cylinder
—XC3	Special port location
—XC6	Piston rod and rod end nut made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extention type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC10	Dual stroke cylinder/Double rod type
—XC11	Dual stroke cylinder/Single rod type
—XC13	Auto switch mounting rail style
—XC20	Head cover axial port
—XC22	Fluororubber seals
—XC25	No fixed orifice of connecting port
—XC27	Double clevis pin and double knuckle pin made of stainless steel
—XC52	Mounting nut with set screw

Mounting Bracket/Part No.

Mounting bracket	Min. order	Bore size (mm) 20	25	32	40	Description (for min. order)
Axial foot *	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Single clevis**	1	CM-C020B	CM-C032B		CM-C040B	1 single clevis, 3 liners
Double clevis** *** (with pins)	1	CM-D020B	CM-D032B		CM-D040B	1 double clevis, 3 liners, 1 clevis pins, 2 retaining rings
Trunnion (with nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.
** 3 Liners are attached with a clevis bracket for adjusting the mounting angle.
*** Clevis pins and retaining rings (cotter pins for ø40) are attached.

Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.

Comparison of the Full Length Dimension (Versus standard type) (mm)

ø20	ø25	ø32	ø40
▲13	▲13	▲13	▲16

Mounting style

■ Boss-cut basic style (BZ) ■ Boss-cut flange style (FZ)
■ Boss-cut trunnion style (UZ)

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Copper/Fluorine-free

20-CM2K **Mounting style** **Bore size** **Stroke**

Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Rubber bumper
Piston speed	50 to 500 mm/s
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Head side trunnion style, Rod side trunnion style, Clevis integrated style, Boss-cut style

Mounting Style and Accessory

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

Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.
Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.
Note 3) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double clevis and double knuckle joint.
Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.
Note 5) Clevis pins come with retaining rings (cotter pins for ø40).

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Basic style	0.14	0.21	0.28	0.57
	Axial foot style	0.29	0.37	0.44	0.84
	Flange style	0.20	0.30	0.37	0.69
	Clevis integrated style	0.12	0.19	0.27	0.53
	Single clevis style	0.18	0.25	0.32	0.66
	Double clevis style	0.19	0.27	0.33	0.70
	Trunnion style	0.18	0.28	0.34	0.67
	Boss-cut basic style	0.13	0.19	0.26	0.53
	Boss-cut flange style	0.19	0.28	0.35	0.66
	Boss-cut trunnion style	0.17	0.26	0.32	0.63
Additional mass per each 50 mm of stroke		0.04	0.07	0.09	0.14
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) **CM2KL32-100**
- Basic mass·····0.44 (Foot style, ø32)
- Additional mass·····0.09/0.50 stroke
- Cylinder stroke····· 100 stroke

0.44 + 0.09 x 100/50 = 0.62 kg

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

2. Do not operate with the cushion needle in a fully closed condition.
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".

3. Do not open the cushion needle wide excessively.
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

⚠Caution

1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.
If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy.
Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable rotational torque	ø20	ø25	ø32	ø40
(N·m or less)	0.2	0.25	0.25	0.44

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.

Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.

2. When replacing rod seals, please contact SMC.
Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

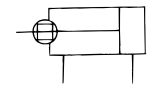
3. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

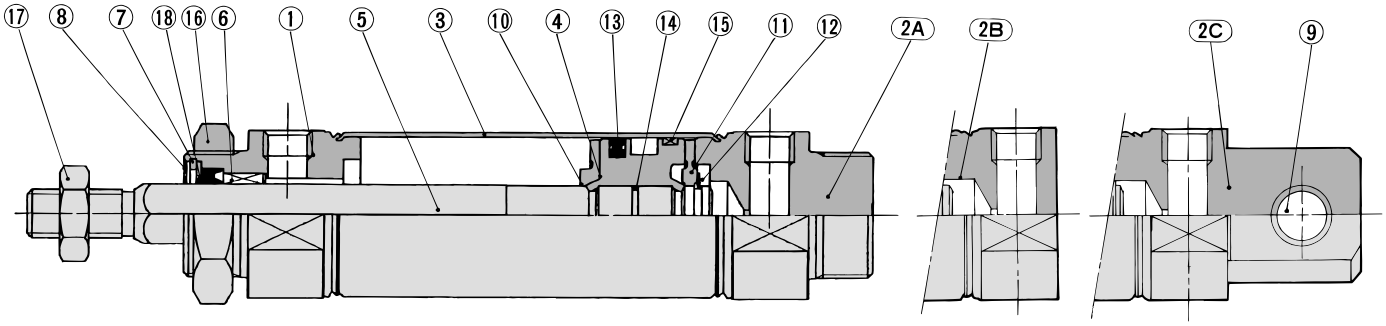
4. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

5. Combine the rod end section, so that a rod boot might not be twisted.
If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

Construction

Rubber bumper

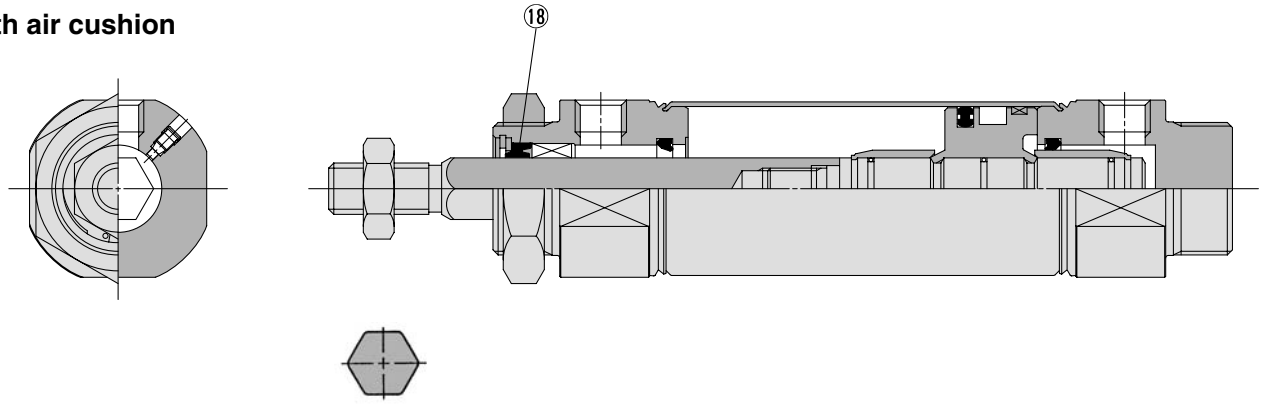




Boss-cut style **Clevis integrated style**

Rod section

With air cushion



Rod section

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2A	**Head cover A**	Aluminum alloy	Clear anodized *
2B	**Head cover B**	Aluminum alloy	Clear anodized **
2C	**Head cover C**	Aluminum alloy	Clear anodized ***
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Stainless steel	
6	**Non-rotating guide**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Carbon steel	Nickel plated
8	**Retaining ring**	Carbon steel	Phosphate coated
9	**Clevis bushing**	Copper oil-impregnated sintered alloy	
10	**Bumper A**	Urethane	
11	**Bumper B**	Urethane	

∗ Basic style, ∗∗ Boss-cut style, ∗∗∗ Clevis integrated style

No.	Description	Material	Note
12	**Retaining ring**	Stainless steel	
13	**Piston seal**	NBR	
14	**Piston gasket**	NBR	
15	**Wear ring**	Resin	
16	**Mounting nut**	Carbon steel	Nickel plated
17	**Rod end nut**	Carbon steel	Nickel plated

Replacement Part: Seal

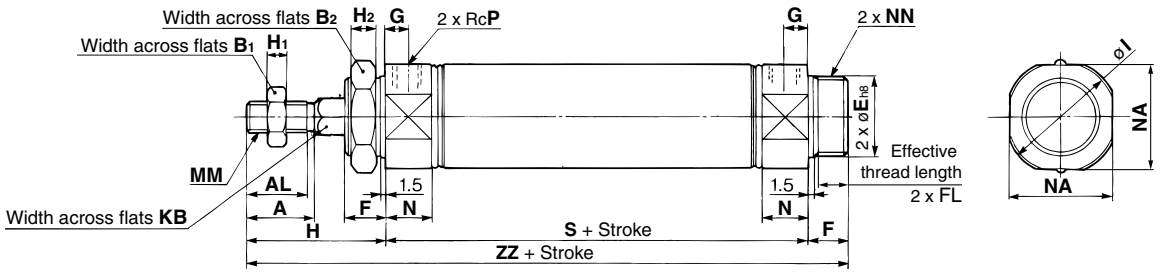
With rubber bumper / With air cushion

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
18	**Rod seal**	NBR	PDR-8W	PDR-10W	PDR-12W	PDR-14W

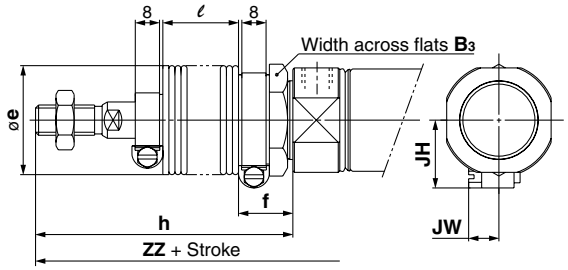
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: **GR-S-010** (10 g)

Basic Style (B)

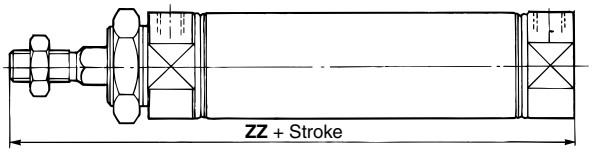
CM2KB **Bore size** — **Stroke** ☐



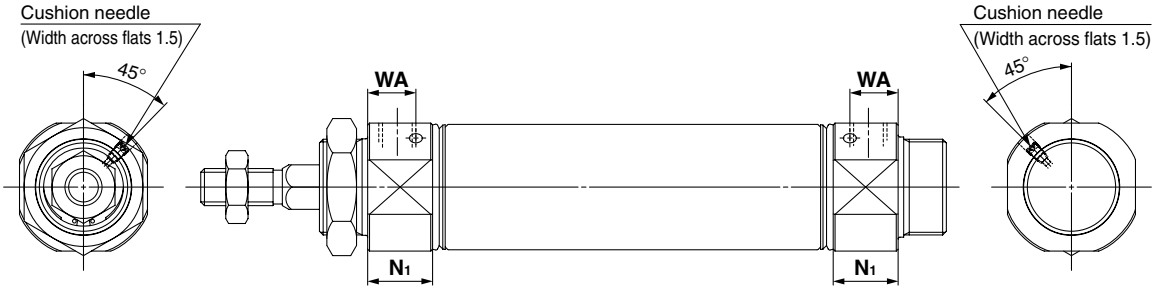
With rod boot



Boss-cut style



With air cushion



(mm)

Bore size (mm)	A	AL	B1	B2	E	F	FL	G	H	H1	H2	I	KB	MM	N	NA	NN	P	S	ZZ
20	18	15.5	13	26	$20^{0}_{-0.033}$	13	10.5	8	41	5	8	28	8.2	M8 x 1.25	15	24	M20 x 1.5	1/8	62	116
25	22	19.5	17	32	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	33.5	10.2	M10 x 1.25	15	30	M26 x 1.5	1/8	62	120
32	22	19.5	17	32	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	37.5	12.2	M10 x 1.25	15	34.5	M26 x 1.5	1/8	64	122
40	24	21	22	41	$32^{0}_{-0.039}$	16	13.5	11	50	8	10	46.5	14.2	M14 x 1.5	21.5	42.5	M32 x 2	1/4	88	154

With Rod Boot

(mm)

Symbol / Stroke / Bore size (mm)	B3	e	f	h					ℓ					ZZ					JH	JW
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300		
20	30	36	18	68	81	93	106	131	12.5	25	37.5	50	75	143	156	168	181	206	23.5	10.5
25	32	36	18	72	85	97	110	135	12.5	25	37.5	50	75	147	160	172	185	210	23.5	10.5
32	32	36	18	72	85	97	110	135	12.5	25	37.5	50	75	149	162	174	187	212	23.5	10.5
40	41	46	20	77	90	102	115	140	12.5	25	37.5	50	75	181	194	206	219	244	27	10.5

Boss-cut Style

(mm)

Bore size (mm)	ZZ					
	Without rod boot	With rod boot				
		1 to 50	51 to 100	101 to 150	151 to 200	201 to 300
20	103	130	143	155	168	193
25	107	134	147	159	172	197
32	109	136	149	161	174	199
40	138	165	178	190	203	228

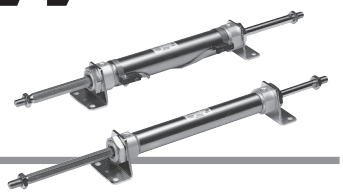
With Air Cushion (mm)

Bore size (mm)	N1	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Dimensions of Each Mounting Bracket

The dimensions are the same as standard type, double acting, single rod, except the configuration of the piston rod. Refer to pages 136 to 143. Specifications for the auto switch equipped type are the same as Series CDM2 standard type.

Air Cylinder: Non-rotating Rod Type
Double Acting, Double Rod
Series CM2KW
ø20, ø25, ø32, ø40



How to Order

Mounting style

B	Basic style
L	Axial foot style
F	Flange style
U	Trunnion style

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 177.)

Cushion

Nil	Rubber bumper
A	Air cushion

Made to Order
(Refer to page 177 for details.)

CM2KW L 40 – 150 A – □

With auto switch **CDM2KW** L 40 – 150 A – M9BW □ – □

With auto switch (Built-in magnet)

Non-rotating rod type

Bore size

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

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.

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) CDM2KWF32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 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 length (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)	5V, 12V		M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	●	●	●	○	—	○		
				2-wire	12V		M9B	●	●	●	○	—	○	—	
		Connector					H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5V, 12V		G39A **	—	—	—	—	●	—	IC circuit	
				2-wire	12V	—	K39A **	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PW	●	●	●	○	—	○		
				2-wire	12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)						H7BA ***	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			Yes			100V or less	A90	●	—	●	—	—	—	IC circuit	
			No			100V, 200V	B54 **	●	—	●	●	—	—	—	
			Yes			200V or less	B64 **	●	—	●	—	—	—		
		Connector	No			—	C73C	●	—	●	●	●	—		
			Yes			24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes			—	A33A **	—	—	—	—	●	—	—	PLC
						100V, 200V	A34A **	—	—	—	—	●	—	—	Relay, PLC
		DIN terminal					A44A **	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	B59W	●	—	●	—	—	—		

∗∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
∗∗ D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

A cylinder which rod does not rotate because of the hexagonal rod shape.

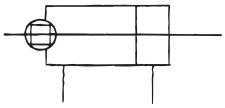
Non-rotating accuracy
ø20, ø25—±0.7°
ø32, ø40—±0.5°

Can operate without lubrication.

The same installation dimensions as the standard cylinder.

Auto switches can also be mounted.
It can be installed with auto switches to simplify the detection of the stroke position of the cylinder.

JIS Symbol
Double acting,
Double rod



Made to Order Specifications
(For details, refer to pages 1395 to 1498.)

Symbol	Specifications
—XB6	Heat resistant cylinder (150°C)
—XC3	Special port location
—XC6	Piston rod and rod end nut made of stainless steel
—XC13	Auto switch mounting rail style
—XC22	Fluororubber seals
—XC52	Mounting nut with set screw

Specifications

Bore size (mm)	20	25	32	40
Rod non-rotating accuracy	±0.7°		±0.5°	
Action	Pneumatic			
Cushion	Rubber bumper			
Action	Double acting, Double rod			
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1.0 MPa			
Minimum operating pressure	0.08 MPa			
Ambient and fluid temperature	Without auto switch: –10 to +70°C (No freezing) With auto switch: –10 to +60°C (No freezing)			
Lubrication	Not required (Non-lube)			
Stroke length tolerance	$^{+1.4}_{0}$ mm			
Piston speed	50 to 500 mm/s			
Allowable kinetic energy	0.27 J	0.4 J	0.65 J	1.2 J

Standard Stroke

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

Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) The maximum limit is 500 stroke, but the products that exceed the standard stroke might not be able to fulfill the specifications.

Accessory Bracket
Refer to pages 144 and 145 for accessory bracket, since it is the same as standard type, double acting, single rod.

Mounting Style and Accessory

Mounting \ Accessory	Standard equipment		Option	
	Mounting nut	Rod end nut	Single knuckle joint	Double knuckle joint (2)
Basic style	● (1 pc.)	● (2 pcs.)	●	●
Axial foot style	● (2)	● (2)	●	●
Flange style	● (1)	● (2)	●	●
Trunnion style	● (1) (1)	● (2)	●	●

Note 1) Trunnion nuts are attached for trunnion style.
Note 2) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double knuckle joint.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Basic style	0.16	0.25	0.32	0.66
	Axial foot style	0.31	0.41	0.48	0.93
	Flange style	0.22	0.34	0.41	0.78
	Trunnion style	0.20	0.32	0.38	0.76
Additional mass per each 50 mm of stroke		0.06	0.1	0.14	0.20
Option bracket	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) **CM2KWL32-100**

- Basic mass ——— 0.48 (Foot, ø32)
- Additional mass ——— 0.14/50 st
- Cylinder stroke: 100 st

0.48 + 0.14 x 100/50 = 0.76 kg

Mounting Bracket/Part No.

Mounting bracket	Min. order	Bore size (mm)				Description (for min. order)
		20	25	32	40	
Axial foot *	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Trunnion (with nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠ Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

2. Do not operate with the cushion needle in a fully closed condition.
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the “Hexagon wrench key: nominal size 1.5”.

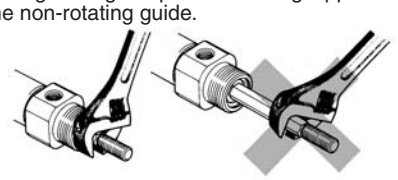
3. Do not open the cushion needle wide excessively.
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

⚠ Caution

1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.
If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy.
Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable rotational torque (N·m or less)	ø20	ø25	ø32	ø40
	0.2	0.25	0.25	0.44

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.
Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.



2. When replacing rod seals, please contact SMC.
Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

3. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

4. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

5. Combine the rod end section, so that a rod boot might not be twisted.
If a rod boot is installed with being twisted when installing a cylinder, it will cause a rod boot to fail during operation.

With Air Cushion

CM2KW Mounting style | Bore size | Stroke | **A** | Rod boot

A: With air cushion

The cushion mechanism is provided for covers in both sides to absorb the impacts when operating at a high speed, thus giving no vibrations to a surrounding area and a long service life brought to cylinder.

Refer to page 147 for the specifications and allowable kinetic energy since this cylinder has the same specification as the double acting double rod model.

Copper/Fluorine-free

20-CM2KW Mounting style | Bore size | Stroke

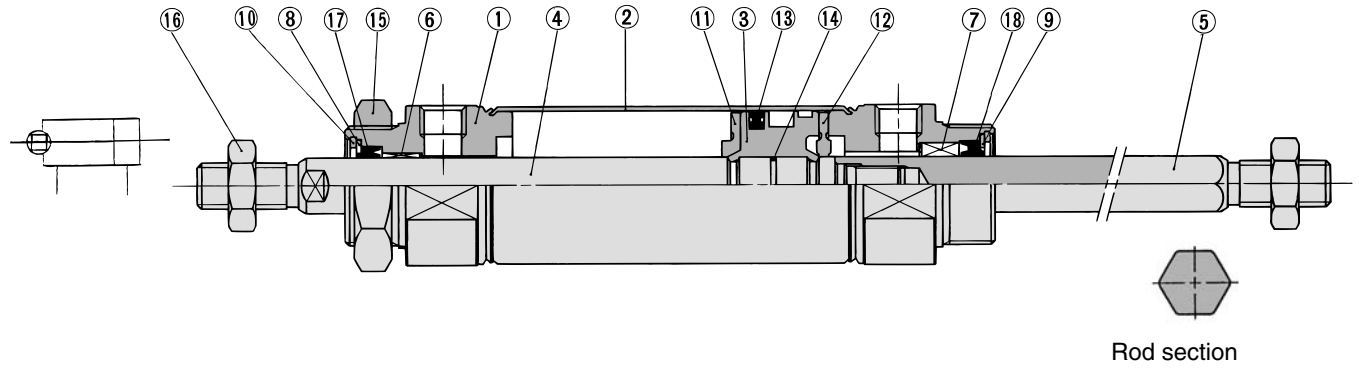
20: Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color

Refer to page 147 for the specifications since this cylinder has the same specification as the double acting double rod model.

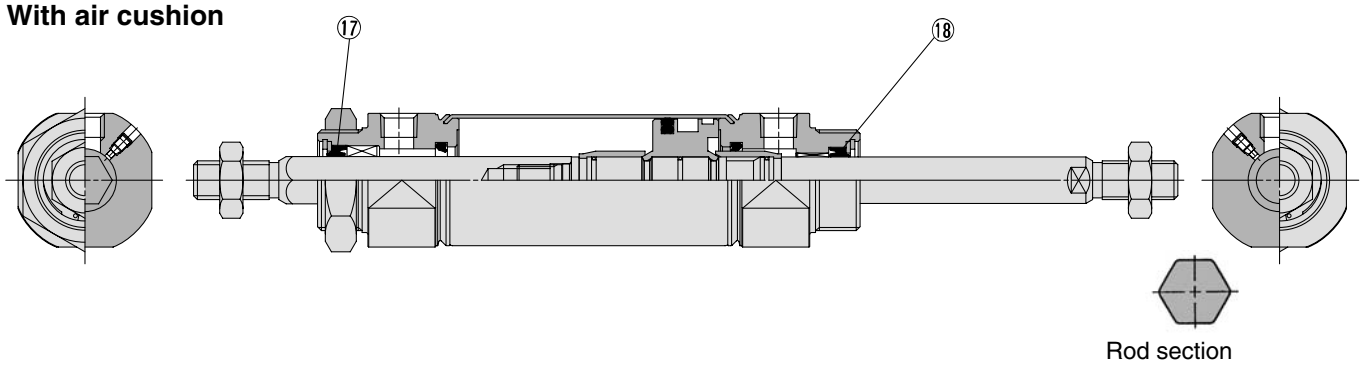
Construction

Rubber bumper



Rod section

With air cushion



Rod section

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Cylinder tube**	Stainless steel	
3	**Piston**	Aluminum alloy	Chromated
4	**Piston rod A**	Carbon steel	Hard chrome plated
5	**Piston rod B**	Stainless steel	
6	**Bushing**	Copper oil-impregnated sintered alloy	
7	**Non-rotating guide**	Copper oil-impregnated sintered alloy	
8	**Seal retainer A**	Stainless steel	
9	**Seal retainer B**	Carbon steel	Nickel plated
10	**Retaining ring**	Carbon steel	Phosphate coated
11	**Bumper A**	Urethane	
12	**Bumper B**	Urethane	
13	**Piston seal**	NBR	
14	**Piston gasket**	NBR	
15	**mounting nut**	Carbon steel	Nickel plated
16	**Rod end nut**	Carbon steel	Nickel plated

Replacement Part: Seal

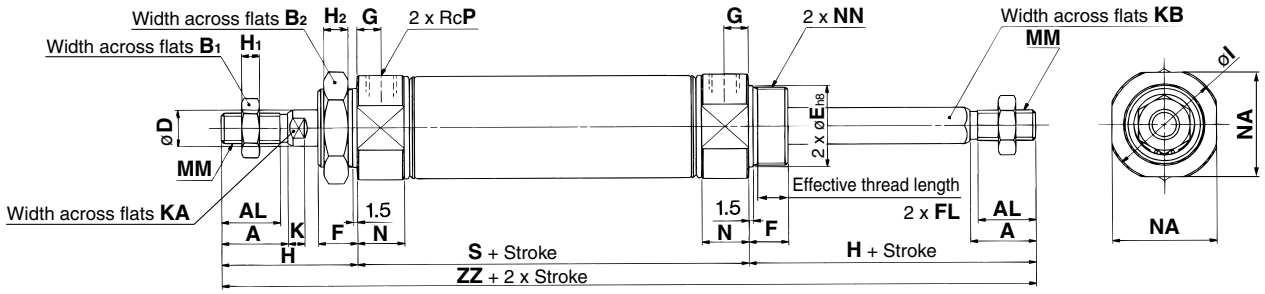
● **With Rubber Bumper, With Air Cushion, Built-in One-touch Fittings**

No.	Description	Material	Bore size (mm)			
			20	**25**	**32**	**40**
17	**Rod seal A**	NBR	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14LZ
18	**Rod seal B**	NBR	PDR-8W	PDR-10W	PDR-12W	PDR-14W

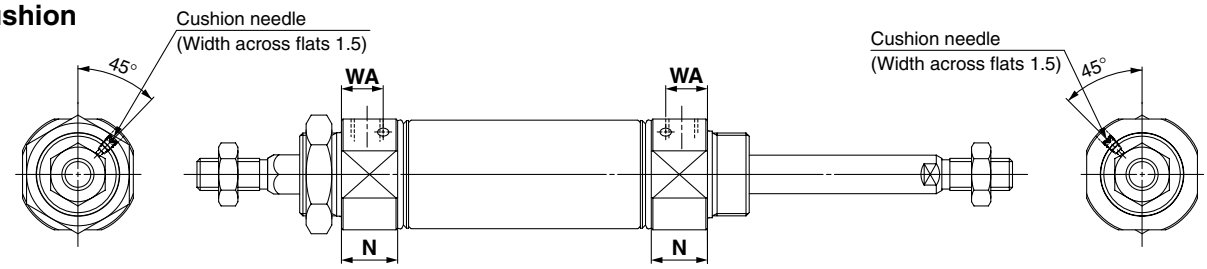
∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: **GR-S-010** (10 g)

Basic Style (B)

CM2KWB Bore size — Stroke



With air cushion



(mm)

Bore size	A	AL	B_1	B_2	D	E	F	FL	G	H	H_1	H_2	I	K	KA	KB	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	8.2	M8 x 1.25	15	24	M20 x 1.5	1/8	62	144
25	22	19.5	17	32	10	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	33.5	5.5	8	10.2	M10 x 1.25	15	30	M26 x 1.5	1/8	62	152
32	22	19.5	17	32	12	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	37.5	5.5	10	12.2	M10 x 1.25	15	34.5	M26 x 1.5	1/8	64	154
40	24	21	22	41	14	$32^{0}_{-0.033}$	16	13.5	11	50	8	10	46.5	7	12	14.2	M14 x 1.5	21.5	42.5	M32 x 2	1/4	88	188

With Air Cushion

(mm)

Bore size	N	WA
20	17.5	13
25	17.5	13
32	17.5	13
40	21.5	16

Dimensions of Each Mounting Bracket

External dimensions of each mounting bracket other than basic style are the same as standard type, double acting, double rod (except KA dimensions). Refer to pages 153 to 155.

Air Cylinder: Non-rotating Rod Type
Single Acting, Spring Return/Extend
Series CM2K
ø20, ø25, ø32, ø40

How to Order

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	Clevis integrated style
BZ	Boss-cut basic style
FZ	Boss-cut rod side flange style
UZ	Boss-cut rod side trunnion style

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 182.)

Action

S	Single acting, Spring return
T	Single acting, Spring extend

Made to Order
(Refer to page 182 for details.)

CM2K **L** **32** – **150** **S** – □

With auto switch: CDM2K **L** **32** – **150** **S** – **M9BW** □ – □

With auto switch (Built-in magnet)

Bore size

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

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.

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) CDM2KF32-100T

Applicable Auto Switch
/Refer to pages 1263 to 1371 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 length (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	24 V	12 V	—	K39A	—	—	—	—	●	—	—
	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)						H7BA **	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5 V, 12 V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24 V	12 V	100 V	A93	●	—	●	—	—	—	—	Relay, PLC
							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 indication)	Grommet				—	—	B59W	●	—	●	—	—	—		

∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

A cylinder which rod does not rotate because of the hexagonal rod shape.

Non-rotating accuracy
ø20, ø25—±0.7°
ø32, ø40—±0.5°

Can operate without lubrication.

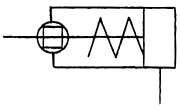
The same installation dimensions as the standard cylinder.

Auto switches can also be mounted.

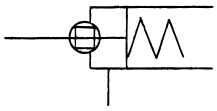
It can be installed with auto switches to simplify the detection of the stroke position of the cylinder.

JIS Symbol

Single acting, Spring return



Spring extend



Made to Order Specifications
(For details, refer to pages 1395 to 1498.)

Symbol	Specifications
—XB12	External stainless steel cylinder
—XC3	Special port location
—XC6	Piston rod and rod end nut made of stainless steel
—XC13	Auto switch mounting rail style
—XC20	Head cover axial port
—XC27	Double clevis pin and double knuckle pin made of stainless steel
—XC52	Mounting nut with set screw

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Specifications

Bore size (mm)		20	25	32	40
Rod non-rotating accuracy		±0.7		±0.5	
Action		Spring acting, Spring return/Spring extend			
Fluid		Air			
Cushion		Rubber bumper			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure	Spring return	0.18 MPa			
	Spring extend	0.23 MPa			
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Lubrication		Not required (Non-lube)			
Stroke length tolerance		$^{+1.4}_{0}$ mm			
Piston speed		50 to 500 mm/s			
Allowable kinetic energy		0.27 J	0.4 J	0.65 J	1.2 J

Standard Stroke

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

Note 1) Other intermediate strokes can be manufactured upon receipt of order.
Manufacture of intermediate strokes at 1 mm intervals is possible.
(Spacers are not used.)
Note 2) Please contact SMC for longer strokes.

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm) 20	25	32	40	Description (for min. order)
Axial foot *	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Single clevis**	1	CM-C020B	CM-C032B		CM-C040B	1 single clevis, 3 liners
Double clevis*** (with pins)	1	CM-D020B	CM-D032B		CM-D040B	1 double clevis, 3 liners, 1 clevis pin, 2 retaining rings
Trunnion (with nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.
** 3 Liners are attached with a clevis bracket for adjusting the mounting angle.
*** Clevis pins and retaining rings (cotter pins for ø40) are attached.

Theoretical Output

Refer to “Theoretical Output 1” on page 1573.

Spring Reaction Force

Refer to “Spring Reaction Force 3” on page 1570.

Boss-cut style

Boss for the head side cover bracket is eliminated and the total length of cylinder is shortened.

Comparison of the Full Length Dimension (Versus standard type) (mm)

ø20	ø25	ø32	ø40
▲13	▲13	▲13	▲16

Mounting style

- ■ Boss-cut basic style (BZ)
- ■ Boss-cut flange style (FZ)
- ■ Boss-cut trunnion style (UZ)

Mounting Style and Accessory

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

Note 1) Mounting nuts are not attached for clevis integrated style, single clevis, and double clevis styles.
Note 2) Trunnion nuts are attached for rod side trunnion and head side trunnion styles.
Note 3) Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double clevis and double knuckle joint.
Note 4) Pin and retaining ring are shipped together with clevis pivot bracket.
Note 5) Clevis pins come with retaining rings (cotter pins for ø40).

Mass

Spring Return/( ): Denotes Spring Extend.

(kg)

Bore size (mm)		20	25	32	40
Basic mass	25 stroke	0.20 (0.19)	0.31 (0.30)	0.43 (0.41)	0.78 (0.75)
	50 stroke	0.23 (0.21)	0.34 (0.33)	0.48 (0.45)	0.86 (0.83)
	75 stroke	0.29 (0.25)	0.43 (0.41)	0.61 (0.56)	1.08 (0.99)
	100 stroke	0.31 (0.27)	0.47 (0.44)	0.66 (0.60)	1.14 (1.06)
	125 stroke	0.37 (0.32)	0.56 (0.52)	0.81 (0.72)	1.34 (1.23)
	150 stroke	0.39 (0.34)	0.59 (0.55)	0.85 (0.76)	1.39 (1.31)
	200 stroke	— (—)	— (—)	1.04 (0.92)	1.71 (1.54)
	250 stroke	— (—)	— (—)	— (—)	2.00 (1.78)
Mounting bracket mass	Foot style	0.15 (0.15)	0.16 (0.16)	0.16 (0.16)	0.27 (0.27)
	Flange style	0.06 (0.06)	0.09 (0.09)	0.09 (0.09)	0.12 (0.12)
	Single clevis style	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)	0.09 (0.09)
	Double clevis style	0.05 (0.05)	0.06 (0.06)	0.06 (0.06)	0.13 (0.13)
	Trunnion style	0.04 (0.04)	0.07 (0.07)	0.07 (0.07)	0.10 (0.10)
	Integral clevis style	–0.02 (–0.02)	–0.02 (–0.02)	–0.01 (–0.01)	–0.04 (–0.04)
	Boss-cut basic style	–0.01 (–0.01)	–0.02 (–0.02)	–0.02 (–0.02)	–0.03 (–.03)
	Boss-cut flange style	0.05 (0.05)	0.07 (0.07)	0.07 (0.07)	0.09 (0.09)
	Boss-cut trunnion style	0.03 (0.03)	0.05 (0.05)	0.05 (0.05)	0.07 (0.07)
	Clevis bracket (With pin)	0.07 (0.07)	0.07 (0.07)	0.14 (0.14)	0.14 (0.14)
Option bracket	Single knuckle joint	0.06 (0.06)	0.06 (0.06)	0.06 (0.06)	0.23 (0.23)
	Double knuckle joint (With pin)	0.07 (0.07)	0.07 (0.07)	0.07 (0.07)	0.20 (0.20)

Calculation:
(Example) **CM2KL32-100S** (Bore size ø32, Foot style, 100 stroke)
0.66 (Basic mass) + 0.16 (Mounting bracket mass) = 0.82 kg

Copper/Fluorine-free

20-CM2K | Mounting style | Bore size | – | Stroke | Action

Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

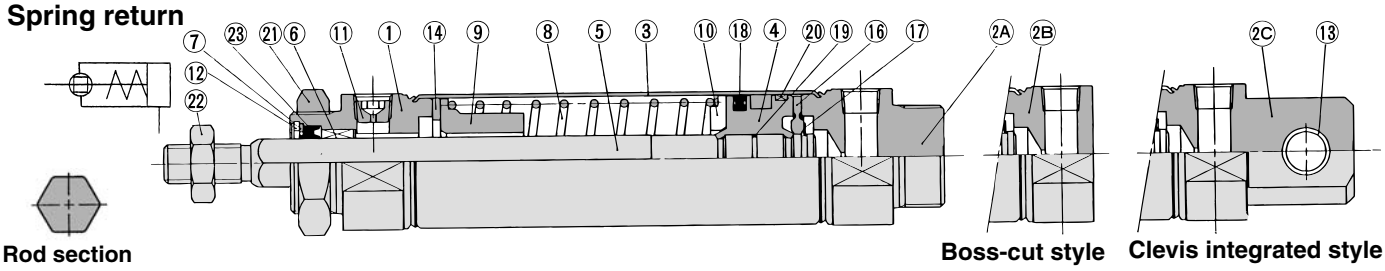
Specifications

Action	Single acting, Spring return	Single acting, Spring extend
Bore size (mm)	ø20, ø25, ø32, ø40	
Max. operating pressure	1.0 MPa	
Min. operating pressure	0.18 MPa	0.23 MPa
Cushion	Rubber bumper	
Piston speed	50 to 500 mm/s	
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style, Clevis integrated style, Boss-cut style	

∗ Auto switch can be mounted.

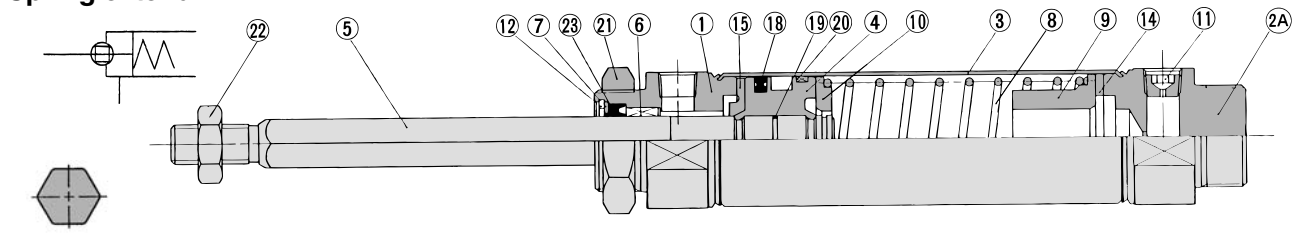
Construction

Spring return



Rod section **Boss-cut style** **Clevis integrated style**

Spring extend



Rod section

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2A	**Head cover A**	Aluminum alloy	Clear anodized *
2B	**Head cover B**	Aluminum alloy	Clear anodized **
2C	**Head cover C**	Aluminum alloy	Clear anodized ***
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Stainless steel	
6	**Non-rotating guide**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Carbon steel	Nickel plated
8	**Return spring**	Steel wire	Zinc chromated
9	**Spring guide**	Aluminum alloy	Chromated
10	**Spring seat**	Aluminum alloy	Chromated
11	**Plug with fixed orifice**	Alloy steel	Black zinc chromated

∗ Basic style, ∗∗ Boss-cut style, ∗∗∗ Clevis integrated style

No.	Description	Material	Note
12	**Retaining ring**	Carbon steel	Phosphate coated
13	**Clevis bushing**	Copper oil-impregnated sintered alloy	
14	**Bumper**	Urethane	
15	**Bumper A**	Urethane	
16	**Bumper B**	Urethane	
17	**Retaining ring**	Stainless steel	
18	**Piston seal**	NBR	
19	**Piston gasket**	NBR	
20	**Wear ring**	Resin	
21	**Mounting nut**	Carbon steel	Nickel plated
22	**Rod end nut**	Carbon steel	Nickel plated

Replacement Parts: Seal

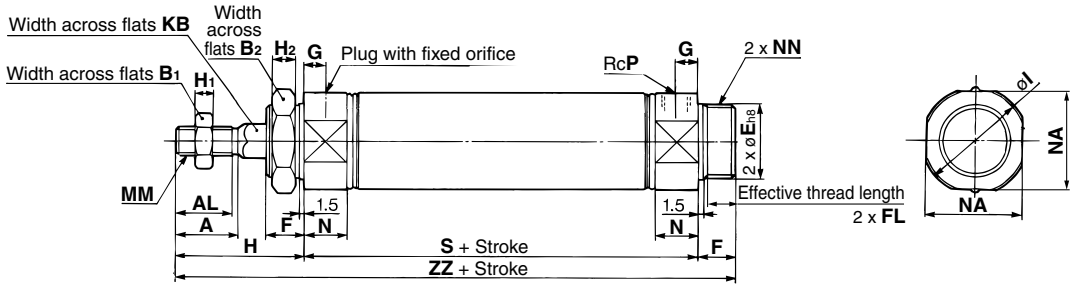
No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
23	**Rod seal**	NBR	PDR-8W	PDR-10W	PDR-12W	PDR-14W

*Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.:GR-S-010(10g)

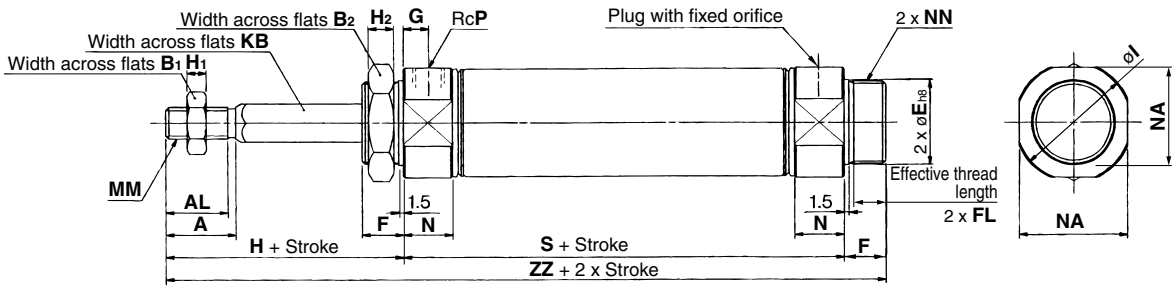
Basic Style (B)

CM2KB Bore size — Stroke S/T

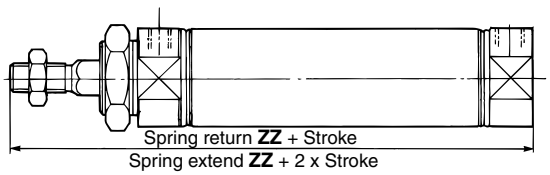
Spring return



Spring extend



Boss-cut style



(mm)

Bore size	A	AL	B_1	B_2	E	F	FL	G	H	H_1	H_2	I	KB	MM	N	NA	NN	P
20	18	15.5	13	26	$20^{0}_{-0.033}$	13	10.5	8	41	5	8	28	8.2	M8 x 1.25	15	24	M20 x 1.5	1/8
25	22	19.5	17	32	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	33.5	10.2	M10 x 1.25	15	30	M26 x 1.5	1/8
32	22	19.5	17	32	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	37.5	12.2	M10 x 1.25	15	34.5	M26 x 1.5	1/8
40	24	21	22	41	$32^{0}_{-0.039}$	16	13.5	11	50	8	10	46.5	14.2	M14 x 1.5	21.5	42.5	M32 x 2	1/4

Dimensions by Stroke

(mm)

Bore size \ Stroke / Symbol	1 to 50		51 to 100		101 to 150		151 to 200		201 to 250	
	S	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**	**S**	**ZZ**
20	87	141	112	166	137	191	—	—	—	—
25	87	145	112	170	137	195	—	—	—	—
32	89	147	114	172	139	197	164	222	—	—
40	113	179	138	204	163	229	188	254	213	279

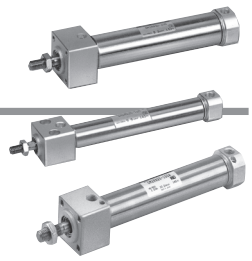
Boss-cut Style

(mm)

Bore size \ Stroke / Symbol	1 to 50	51 to 100	101 to 150	151 to 200	201 to 250
	ZZ	**ZZ**	**ZZ**	**ZZ**	**ZZ**
20	128	153	178	—	—
25	132	157	182	—	—
32	134	159	184	209	—
40	163	188	213	238	263

External dimensions of each mounting bracket other than basic style are the same as standard type, single acting, spring return/spring extend (except piston rod configuration). Refer to pages 163 to 170.
Specifications with auto switch are the same as standard type (CDM2- □S/T).

Air Cylinder: Direct Mount Type
Double Acting, Single Rod
Series CM2R
ø20, ø25, ø32, ø40



How to Order

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 187.)

Type

Nil	Pneumatic
H	Air-hydro

Cushion

Nil	Rubber bumper
A	Air cushion

* Air-hydro cylinder: Rubber bumper only

Made to Order
(Refer to page 187 for details.)

Without auto switch: CM2 □ R A 20 – 100 A – □

With auto switch: CDM2 □ R A 20 – 100 A – M9BW □ – □

With auto switch (Built-in magnet)

Mounting style

A	Bottom mounting style
B	Front mounting style

Bore size

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

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) CDM2RB32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 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 length (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)	5V, 12V		M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	●	●	●	○	—	○		
				2-wire	12V		M9B	●	●	●	○	—	○	—	
		Connector					H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5V, 12V		G39A **	—	—	—	—	●	—	IC circuit	
				2-wire	12V	—	K39A **	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PW	●	●	●	○	—	○		
				2-wire	12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)						H7BA ***	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			Yes				100V or less	A90	●	—	●	—	—	—	IC circuit	
			No				100V, 200V	B54 **	●	—	●	●	—	—	—	
			Yes				200V or less	B64 **	●	—	●	—	—	—		
		Connector	No				—	C73C	●	—	●	●	●	—		
							24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes				—	A33A **	—	—	—	—	●	—	—	PLC
							100V, 200V	A34A **	—	—	—	—	●	—		Relay, PLC
		DIN terminal						A44A **	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	—	B59W	●	—	●	—	—	—		

*** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

* 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

* Solid state auto switches marked with "○" are produced upon receipt of order.
* D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
* Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
** D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

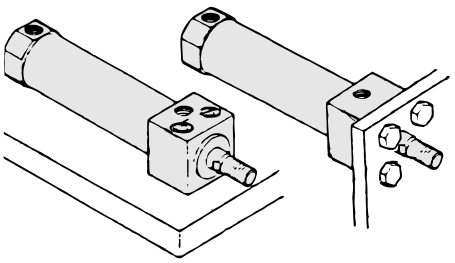
* Since there are other applicable auto switches than listed above, refer to page 218 for details.
* For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
* D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Series CM2R direct mount cylinder can be installed directly through the use of a square rod cover.

Space saving has been realized.
Because it is a directly mounted style without using brackets, its overall length is shorter, and its installation pitch can be made smaller. Thus, the space that is required for installation has been dramatically reduced.

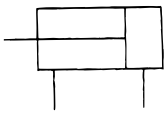
Improved installation accuracy and strength
A centering boss has been provided to improve the installation accuracy. Also, because it is the directly mounted style, the strength has been increased.

Two styles of installation
Two styles of installations are available and can be selected according to the purpose: the front mounting style or the bottom mounting style.



Bottom mounting style **Front mounting style**

JIS Symbol
Double acting



Specifications

Bore size (mm)		20	25	32	40
Action		Double acting, Single rod			
Fluid		Air			
Proof pressure		1.5 MPa			
Maximum operating pressure		1.0 MPa			
Minimum operating pressure		0.05 MPa			
Ambient and fluid temperature		Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Lubrication		Not required (Non-lube)			
Stroke length tolerance		$^{+1.4}_{0}$ mm			
Piston speed		Rubber bumper: 50 to 750 mm/s, Air cusion: 50 to 1000 mm/s			
Cushion		Rubber bumper, Air cushion			
Allowable kinetic energy	**Rubber bumper**	0.27 J	0.4 J	0.65 J	1.2 J
	Air cushion (Effective cushion length (mm))	0.54 J (11.0)	0.78 J (11.0)	1.27 J (11.0)	2.35 J (11.8)

Standard Stroke

Bore size (mm)	Standard stroke (mm) (1)	Maximum manufacturable stroke (mm)(2)
20	25, 50, 75, 100, 125, 150	1000
25	25, 50, 75, 100, 125, 150, 200	1500
32	25, 50, 75, 100, 125, 150, 200	2000
40	25, 50, 75, 100, 125, 150, 200, 250, 300	2000

Note 1) Other intermediate strokes can be manufactured upon receipt of order.
Manufacture of intermediate strokes at 1 mm intervals is possible.
(Spacers are not used.)
Note 2) Refer to next page for Precations.

Tightening Torque: Tighten the cylinder mounting bolts for the bottom mounting Style (Series CM2RA) with the following tightening torque.

Bore size (mm)	Hexagon socket head cap screw size	Tightening torque(N·m)
20	M5 x 0.8	2.4 to 3.6
25	M6	4.2 to 6.2
32	M8	10.0 to 15.0
40	M10	19.6 to 29.4

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XB7	Cold resistant cylinder
—XB9	Low speed cylinder (10 to 50 mm/s)
—XB13	Low speed cylinder (5 to 50 mm/s)
—XC3	Special port location
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extension type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC11	Dual stroke cylinder/Single rod type
—XC12	Tandem cylinder
—XC13	Auto switch mounting rail style
—XC20	Head cover axial port
—XC22	Fluororubber seals
—XC25	No fixed orifice of connecting port
—XC29	Double knuckle joint with spring pin

Accessory

Accessory / Mounting	Standard equipment	Option	
	Rod end nut	Single knuckle joint	Double knuckle joint (With pin) *
Bottom mounting style	●	●	●
Front mounting style	●	●	●

* Knuckle pin and retaining ring (cotter pin for ø40) are shipped together.

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Bottom mounting style	0.14	0.23	0.32	0.62
	Front mounting style	0.14	0.22	0.32	0.61
Additional mass per each 50 mm of stroke		0.04	0.06	0.08	0.13

Calculation: (Example)**CM2RA32-100**
(ø32, 100 stroke, Bottom mounting)
- Basic mass·····0.32kg
- Additional mass·····0.08kg
- Cylinder stroke·····100mm

0.32 + 0.08 x 100/50 = 0.48kg

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Operating Precautions

⚠Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

2. Do not operate with the cushion needle in a fully closed condition.
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the "Hexagon wrench key: nominal size 1.5".

3. Do not open the cushion needle wide excessively.
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

4. In the case of exceeding the standard stroke length, implement an intermediate support.
When using cylinder with longer stroke, implement an intermediate support for preventing the joint of rod cover and cylinder tube from being broken by vibration or external load.

⚠Caution

1. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

2. Use caution to the popping of a retaining ring.
When replacing rod seals and removing and mounting a retaining ring, use a proper tool (retaining ring plier: tool for installing a type C retaining ring). Even if a proper tool is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier. Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

3. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

4. Do not use an air cylinder as an air-hydro cylinder.
If it uses turbine oil in place of fluids for cylinder, it may result in oil leakage.

Clean Series

10-CM2R | **Mounting style** | **Bore size** | **Stroke**

Clean Series (with relief port)

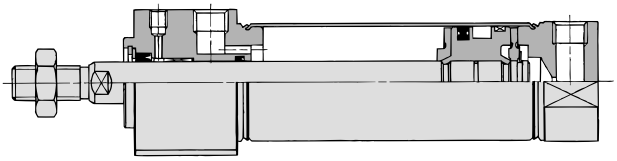
The type which is applicable for using inside the clean room graded Class 100 by making an actuator's rod section a double seal construction and discharging by relief port directly to the outside of clean room.

Specifications

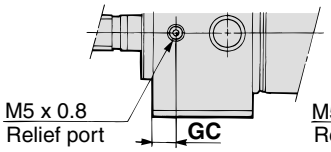
Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Rubber bumper (Standard equipment)
Relief port size	M5 x 0.8
Piston speed	30 to 400 mm/s
Mounting	Bottom mounting style, Front mounting style

* Auto switch can be mounted.

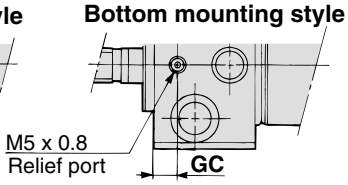
Construction



Front mounting style



Bottom mounting style



(mm)

Bore size (mm)	GC
20	6
25	6
32	7
40	9

For details, refer to the separate catalog, "Pneumatic Clean Series".

Air-hydro

CM2HR | **Mounting style** | **Bore size** — **Stroke**

• **Air-hydro**

A low hydraulic pressure cylinder used at a pressures of 1.0 MPa or below.
Through the concurrent use of a CC series air-hydro unit, it is possible to operate at a constant or low speeds or to effect an intermediate stop, just like a hydraulic unit, while using pneumatic equipment such as a valve.

Specifications

Type	Air-hydro
Fluid	Turbine oil
Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Min. operating pressure	0.18 MPa
Piston speed	15 to 300 mm/s
Cushion	Rubber bumper
Ambient and fluid temperature	+5 to +60°C
Thread tolerance **Stroke length tolerance**	$^{+1.4}_{0}$ mm
Mounting	Bottom mounting style, Front mounting style

∗ Auto switches can be mounted. Dimensions are the same as the standard type of Series CM2R.

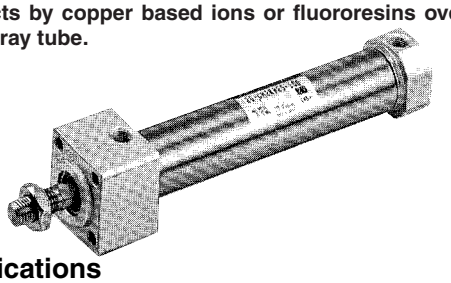
• For construction, refer to page 190.
• Since the dimensions of mounting style is the same as pages 191and 192, refer to those pages.

Copper/Fluorine-free

20-CM2R | **Mounting style** | **Bore size** — **Stroke**

• **Copper/fluorine-free**

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.



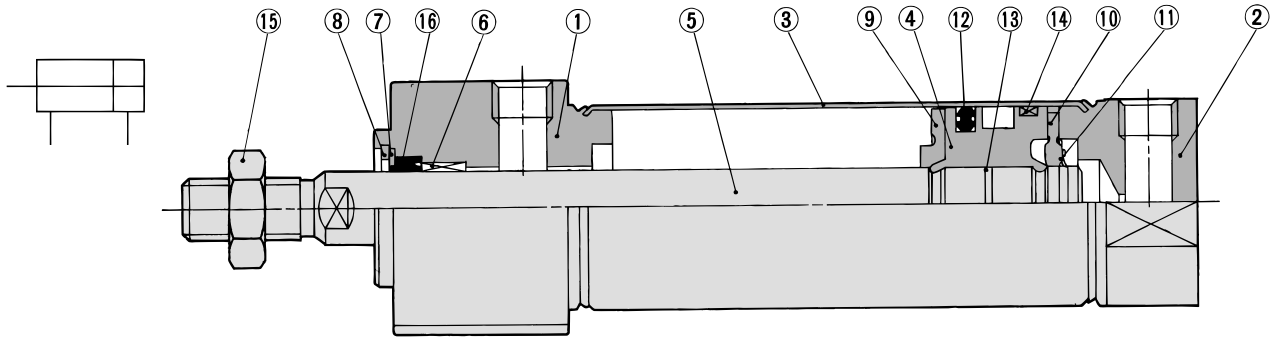
Specifications

Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Rubber bumper
Piston speed	50 to 750 mm/s
Mounting	Bottom mounting style Front mounting style

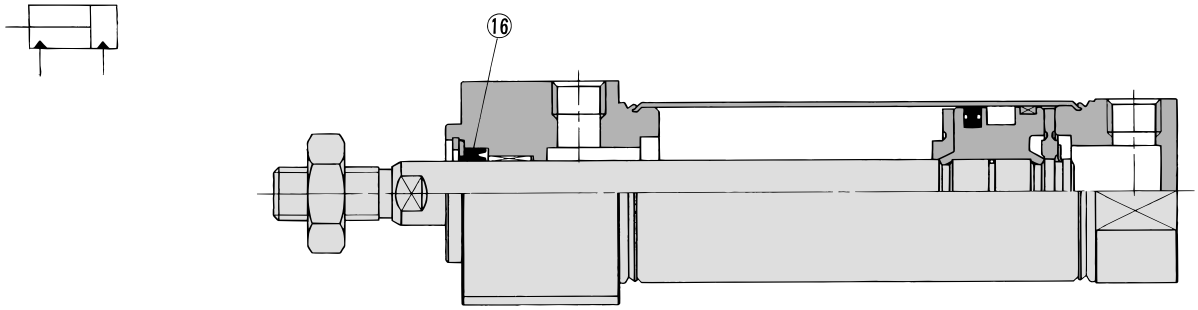
∗ Auto switch can be mounted.

Construction

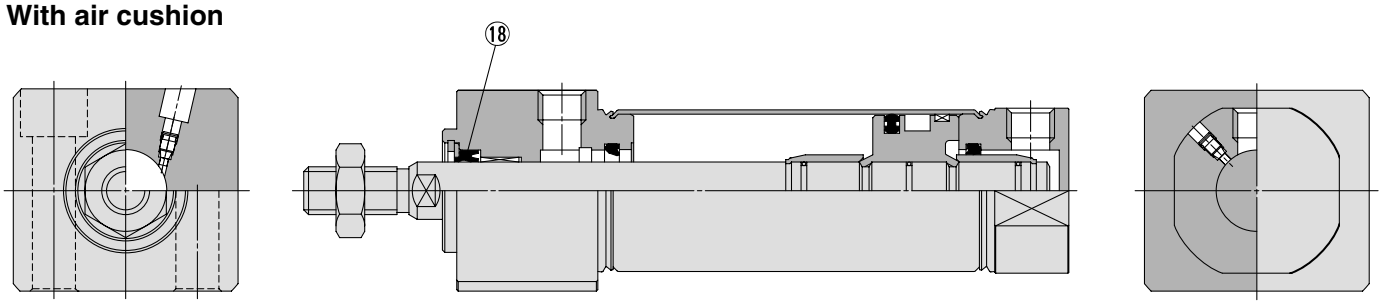
Rubber bumper



Air-hydro



With air cushion



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Head cover**	Aluminum alloy	Clear anodized
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Stainless steel	
8	**Retaining ring**	Carbon steel	Phosphate coated
9	**Bumper A**	Urethane	
10	**Bumper B**	Urethane	
11	**Retaining ring**	Stainless steel	
12	**Piston seal**	NBR	
13	**Piston gasket**	NBR	
14	**Wear ring**	Resin	
15	**Rod end nut**	Carbon steel	Nickel plated

Replacement Part: Seal

● **With Rubber Bumper, With Air Cushion**

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
16	**Rod seal**	NBR	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14LZ

● **Air-hydro**

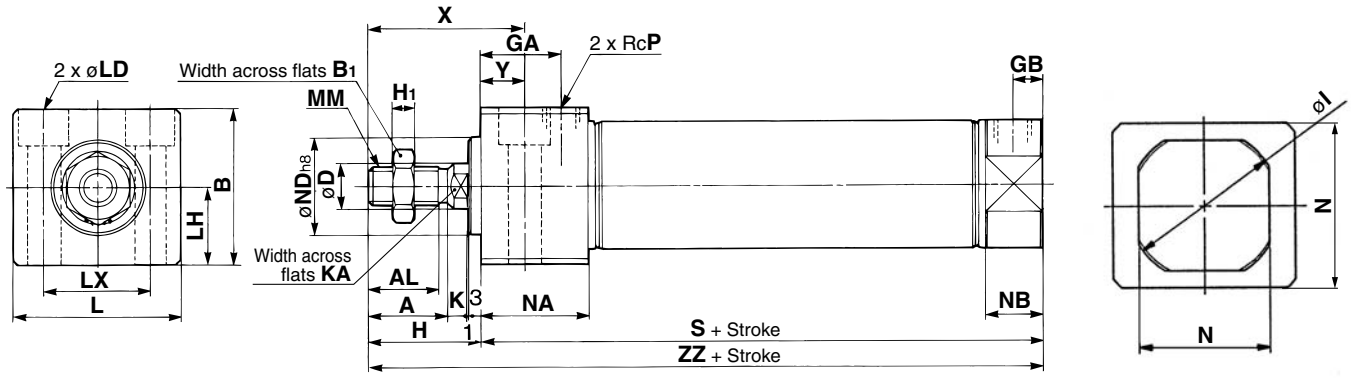
No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
16	**Rod seal**	NBR	HDU-8	HDU-10	HDU-12L	HDU-14

∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

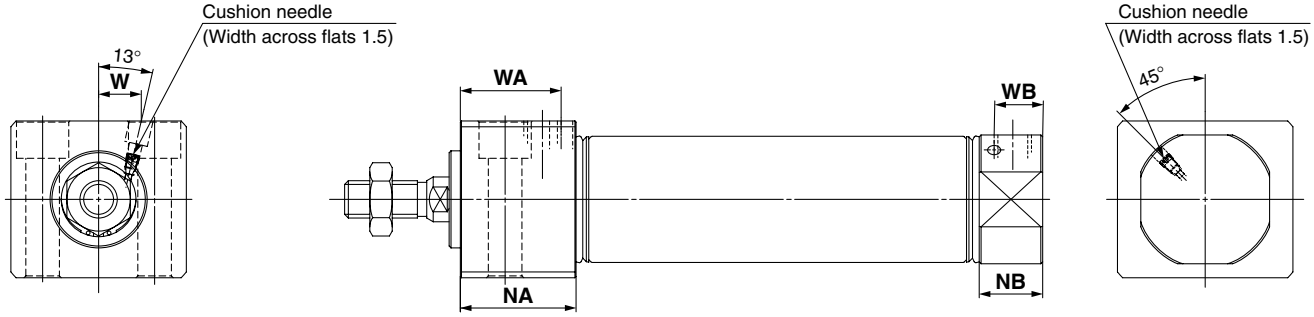
For proper auto switch mounting position (at stroke end), refer to pages 215 to 217, since the operating range is the same as standard type, single rod.

Bottom Mounting Style

CM2RA Bore size — Stroke



With air cushion



(mm)

Bore size	Stroke range
20	1 to 150
25	1 to 200
32	1 to 200
40	1 to 300

(mm)

Bore size	A	AL	B	B_1	D	GA	GB	H	H_1	I	K	KA	L	LD	LH	LX	MM	N	NA	NB	ND	P	S	X	Y	ZZ
20	18	15.5	30.3	13	8	22	8	27	5	28	5	6	33.5	ø5.5, ø9.5 counterbore depth 6.5	15	21	M8 x 1.25	24	29	15	$20^{0}_{-0.033}$	1/8	76	39	12	103
25	22	19.5	36.3	17	10	22	8	31	6	33.5	5.5	8	39	ø6.6, ø11 counterbore depth 7.5	18	25	M10 x 1.25	30	29	15	$26^{0}_{-0.033}$	1/8	76	43	12	107
32	22	19.5	42.3	17	12	22	8	31	6	37.5	5.5	10	47	ø9, ø14 counterbore depth 10	21	30	M10 x 1.25	34.5	29	15	$26^{0}_{-0.033}$	1/8	78	43	12	109
40	24	21	52.3	22	14	27	11	34	8	46.5	7	12	58.5	ø11, ø17.5 counterbore depth 12.5	26	38	M14 x 1.5	42.5	37.5	21.5	$32^{0}_{-0.039}$	1/4	104	49	15	138

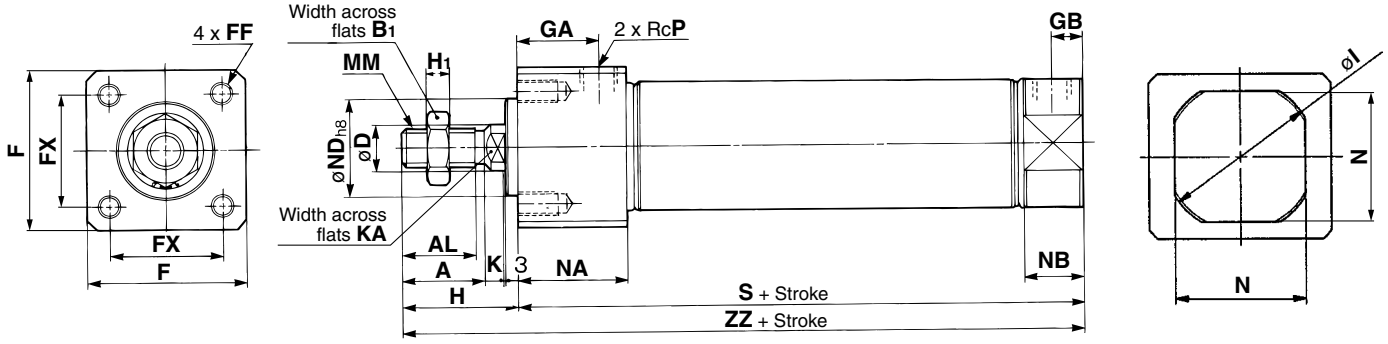
With Air Cushion

(mm)

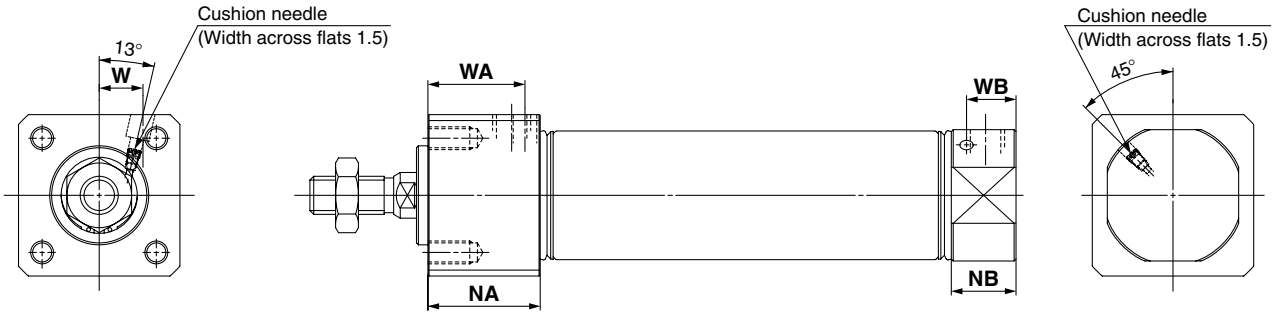
Bore size	NA	NB	WA	WB	W
20	31.5	17.5	27	13	8.5
25	31.5	17.5	27	13	10.5
32	31.5	17.5	27	13	11.5
40	37.5	21.5	32	16	15

Front Mounting Style

CM2RB Bore size — Stroke



With air cushion



(mm)

Bore size	Stroke range
20	1 to 150
25	1 to 200
32	1 to 200
40	1 to 300

(mm)

Bore size	A	AL	B_1	D	F	FF	FX	GA	GB	H	H_1	I	K	KA	MM	N	NA	NB	ND	P	S	ZZ
20	18	15.5	13	8	30.4	M5 x 0.8 depth 9	22	22	8	27	5	28	5	6	M8 x 1.25	24	29	15	$20^{0}_{-0.033}$	1/8	76	103
25	22	19.5	17	10	36.4	M6 x 1 depth 11	26	22	8	31	6	33.5	5.5	8	M10 x 1.25	30	29	15	$26^{0}_{-0.033}$	1/8	76	107
32	22	19.5	17	12	42.4	M6 x 1 depth 11	30	22	8	31	6	37.5	5.5	10	M10 x 1.25	34.5	29	15	$26^{0}_{-0.033}$	1/8	78	109
40	24	21	22	14	52.4	M8 x 1.25 depth 14	36	27	11	34	8	46.5	7	12	M14 x 1.5	42.5	37.5	21.5	$32^{0}_{-0.039}$	1/4	104	138

With Air Cushion

(mm)

Bore size	NA	NB	WA	WB	W
20	31.5	17.5	27	13	8.5
25	31.5	17.5	27	13	10.5
32	31.5	17.5	27	13	11.5
40	37.5	21.5	32	16	15

Air Cylinder: Direct Mount, Non-rotating Rod Type
Double Acting, Single Rod
Series CM2RK
ø20, ø25, ø32, ø40

How to Order

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 194.)

Made to Order
(Refer to page 194 for details.)

	CM2RK	A	20	–	100	–		
With auto switch	CDM2RK	A	20	–	100	–	M9BW	–

With auto switch (Built-in magnet)

Mounting style

A	Bottom mounting style
B	Front mounting style

Bore size

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

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) CDM2RKB32-100

Applicable Auto Switch/Refer to pages 1263 to 1371 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 length (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)	5V, 12V		M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	●	●	●	○	—	○		
				2-wire	12V		M9B	●	●	●	○	—	○	—	
		Connector					H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5V, 12V		G39A	—	—	—	—	●	—	IC circuit	
				2-wire	12V		K39A	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PW	●	●	●	○	—	○		
				2-wire	12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)						H7BA **	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	—
			No	2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			Yes				100V or less	A90	●	—	●	—	—	—	IC circuit	
			No				100V, 200V	B54	●	—	●	●	—	—	—	
			Yes				200V or less	B64	●	—	●	—	—	—		
		Connector	No				—	C73C	●	—	●	●	●	—		
							24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes				—	A33A	—	—	—	—	●	—	—	PLC
							100V, 200V	A34A	—	—	—	—	●	—		Relay, PLC
		DIN terminal						A44A	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet			—	—		B59W	●	—	●	—	—	—		

∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Series CM2R direct mount cylinder can be installed directly through the use of a square rod cover.

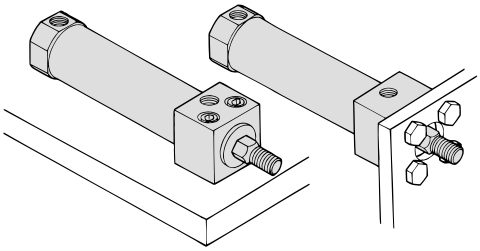
Non-rotating accuracy
A type of cylinder in which the rod does not rotate because of its hexagonal shape Cylinder

ø20, ø25—±0.7°
ø32, ø40—±0.5°

Space-saving configuration
Because it is a directly mounted style without using brackets, its overall length is shorter, and its installation pitch can be made smaller. Thus, the space that is required for installation has been dramatically reduced.

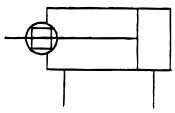
Improved installation accuracy and strength
A centering boss has been provided to improve the installation accuracy. Also, because it is the directly mounted style, the strength has been increased.

Two styles of installation
Two styles of installations are available and can be selected according to the purpose: the front mounting style or the bottom mounting style.



Bottom mounting style **Front mounting style**

JIS Symbol
Double acting



Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XC3	Special port location
—XC6	Piston rod and rod end nut made of stainless steel
—XC8	Adjustable stroke cylinder/Adjustable extension type
—XC9	Adjustable stroke cylinder/Adjustable retraction type
—XC11	Dual stroke cylinder/Single rod type
—XC13	Auto switch mounting rail style
—XC20	Head cover axial port
—XC22	Fluororubber seals
—XC25	No fixed orifice of connecting port

Specifications

Bore size (mm)	20	25	32	40
Rod non-rotating accuracy	±0.7°		±0.5°	
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1.0 MPa			
Minimum operating pressure	0.05 MPa			
Ambient and fluid temperature	Without auto switch: −10 to 70°C (No freezing) With auto switch: −10 to 60°C (No freezing)			
Lubrication	Not required (Non-lube)			
Stroke length tolerance	$^{+1.4}_{0}$ mm			
Piston speed	50 to 500 mm/s			
Cushion	Rubber bumper			
Allowable kinetic energy	0.27 J	0.4 J	0.65 J	1.2 J

Standard Stroke

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

Note 1) Other intermediate strokes can be manufactured upon receipt of order.
∗ Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)
Note 2) The maximum limit is 1000 stroke, but the products that exceed the standard stroke might not be able to fulfill the specifications.

Tightening Torque: Tighten the cylinder mounting bolts for the bottom mounting Style (Series CM2RA) with the following tightening torque.

Bore size (mm)	Hexagon socket head cap bolt size	Tightening torque(N·m)
20	M5 x 0.8	2.4 to 3.6
25	M6	4.2 to 6.2
32	M8	10.0 to 15.0
40	M10	19.6 to 29.4

Refer to pages 214 to 218 for cylinders with an auto switch.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Copper/Fluorine-free

20-CM2RK **Mounting style** **Bore size** — **Stroke**

Copper/fluorine-free

The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action	Double acting, Single rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.05 MPa
Cushion	Rubber bumper
Piston speed	50 to 500 mm/s
Mounting	Bottom mounting style, Front mounting style

∗ Auto switch can be mounted.

Accessory

Accessory / Mounting	Standard equipment	Option	
	Rod end nut	Single knuckle joint	Double knuckle joint (With pin)∗
Bottom mounting style	●	●	●
Front mounting style	●	●	●

∗ Knuckle pin and retaining ring (cotter pin for bore size ø40) are shipped together.

Mass

(kg)

Bore size (mm)		20	25	32	40
Basic mass	Bottom mounting style	0.14	0.23	0.32	0.63
	Front mounting style	0.14	0.22	0.32	0.62
Additional mass per each 50 mm of stroke		0.04	0.07	0.09	0.14

Calculation: (Example) **CM2RKA32-100** (ø32, 100 stroke, Bottom mounting)
- Basic mass·····0.32 kg
- Additional mass·····0.09 kg
- Cylinder stroke·····100 mm

0.32 + 0.09 x 100/50 = 0.50 kg

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Caution on Handling/Disassembly

⚠ Warning

1. Do not rotate the cover.
If a cover is rotated when installing a cylinder or screwing a fitting into the port, it is likely to damage the junction part with cover.

2. Do not operate with the cushion needle in a fully closed condition.
Using it in the fully closed state will cause the cushion seal to be damaged. When adjusting the cushion needle, use the “Hexagon wrench key: nominal size 1.5”.

3. Do not open the cushion needle wide excessively.
If the cushion needle were set to be completely wide (more than 3 turns from fully closed), it would be equivalent to the cylinder with no cushion, thus making the impacts extremely high. Do not use it in such a way. Besides, using with fully open could give damage to the piston or cover.

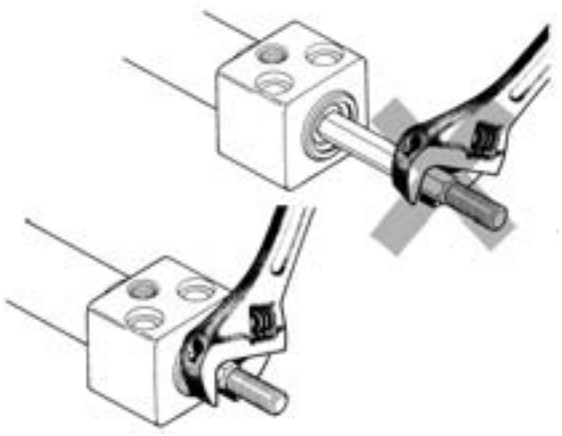
4. In the case of exceeding the standard stroke length, implement an intermediate support.
When using cylinder with longer stroke, implement an intermediate support for preventing the joint of rod cover and cylinder tube from being broken by vibration or external load.

⚠ Caution

1. Avoid using the air cylinder in such a way that rotational torque would be applied to the piston rod.
If rotational torque is applied, the non-rotating guide will become deformed, thus affecting the non-rotating accuracy.
Refer to the table below for the approximate values of the allowable range of rotational torque.

Allowable rotational torque (N·m or less)	ø20	ø25	ø32	ø40
	0.2	0.25	0.25	0.44

To screw a bracket or a nut onto the threaded portion at the tip of the piston rod, make sure to retract the piston rod entirely, and place a wrench over the flat portion of the rod that protrudes.
Tighten it by giving consideration to prevent the tightening torque from being applied to the non-rotating guide.

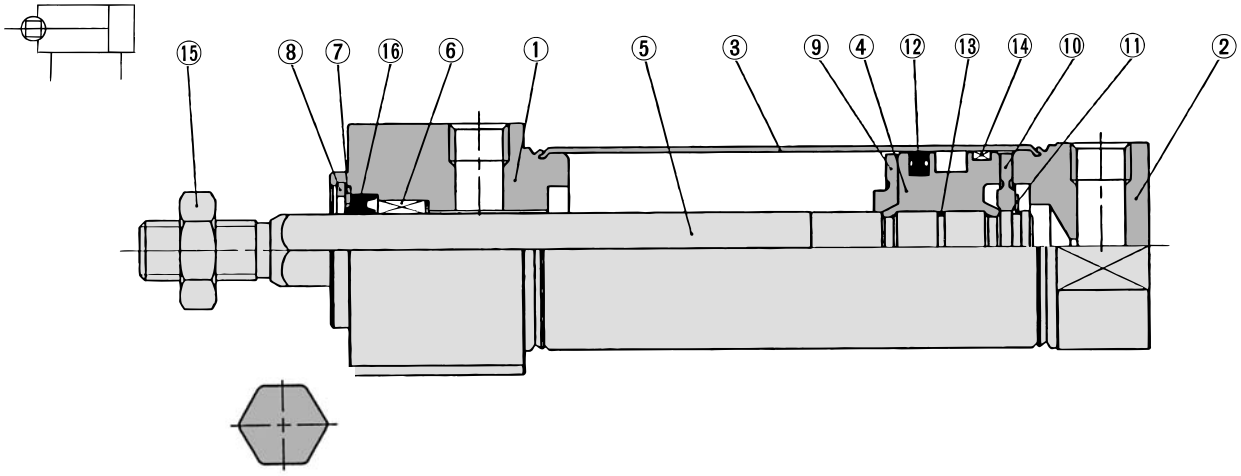


2. When replacing rod seals, please contact SMC.
Air leakage may be happened, depending on the position in which a rod seal is fitted. Thus, please contact SMC when replacing them.

3. Not able to disassemble.
Cover and cylinder tube are connected to each other by caulking method, thus making it impossible to disassemble. Therefore, internal parts of a cylinder other than rod seal are not replaceable.

4. Do not touch the cylinder during operation.
Use caution when handling a cylinder, which is running at a high speed and a high frequency, because the surface of a cylinder tube could get so hot enough as to cause you get burned.

Construction



Rod section

Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Head cover**	Aluminum alloy	Clear anodized
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Stainless steel	
6	**Non-rotating guide**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Carbon steel	Nickel plated
8	**Retaining ring**	Carbon steel	Phosphate coated
9	**Bumper A**	Urethane	
10	**Bumper B**	Urethane	
11	**Retaining ring**	Stainless steel	
12	**Piston seal**	NBR	
13	**Piston gasket**	NBR	
14	**Wear ring**	Resin	
15	**Rod end nut**	Carbon steel	Nickel plated

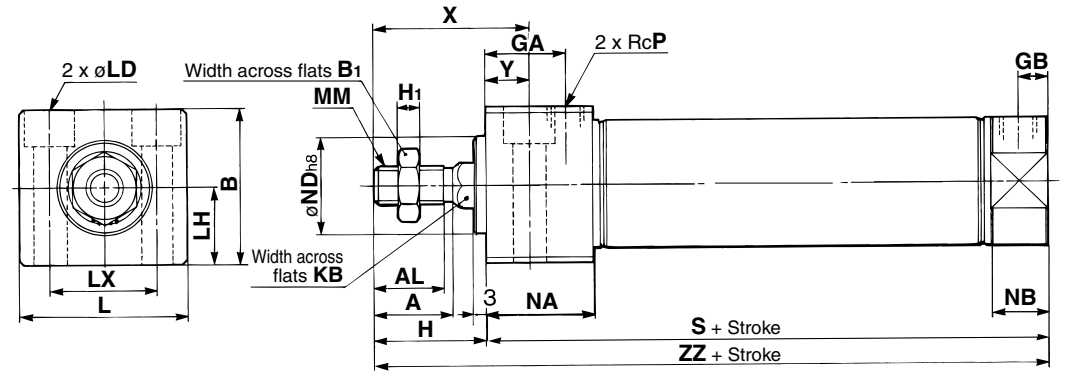
Replacement Part: Seal

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
16	**Rod seal**	NBR	PDR-8W	PDR-10W	PDR-12W	PDR-14W

∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Bottom Mounting Style

CM2RKA Bore size — Stroke



(mm)

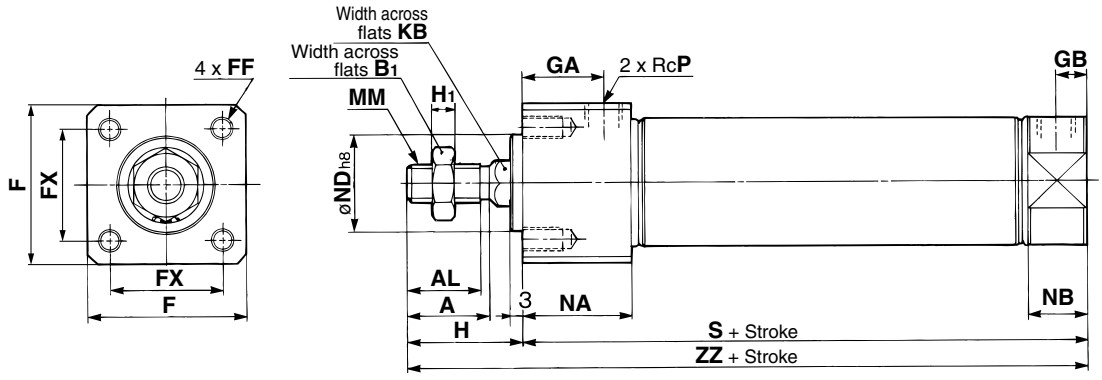
Bore size	Stroke range
20	1 to 150
25	1 to 200
32	1 to 200
40	1 to 300

(mm)

Bore size	A	AL	B	B_1	GA	GB	H	H_1	I	KB	L	LD	LH	LX	MM	N	NA	NB	ND	P	S	X	Y	ZZ
20	18	15.5	30.3	13	22	8	27	5	28	8.2	33.5	ø5.5, ø9.5 counterbore depth 6.5	15	21	M8 x 1.25	24	29	15	$20^{0}_{-0.033}$	1/8	76	39	12	103
25	22	19.5	36.3	17	22	8	31	6	33.5	10.2	39	ø6.6, ø11 counterbore depth 7.5	18	25	M10 x 1.25	30	29	15	$26^{0}_{-0.033}$	1/8	76	43	12	107
32	22	19.5	42.3	17	22	8	31	6	37.5	12.2	47	ø9, ø14 counterbore depth 10	21	30	M10 x 1.25	34.5	29	15	$26^{0}_{-0.033}$	1/8	78	43	12	109
40	24	21	52.3	22	27	11	34	8	46.5	14.2	58.5	ø11, ø17.5 counterbore depth 12.5	26	38	M14 x 1.5	42.5	37.5	21.5	$32^{0}_{-0.039}$	1/4	104	49	15	138

Front Mounting Style

CM2RKB Bore size — Stroke



(mm)

Bore size	Stroke range
20	1 to 150
25	1 to 200
32	1 to 200
40	1 to 300

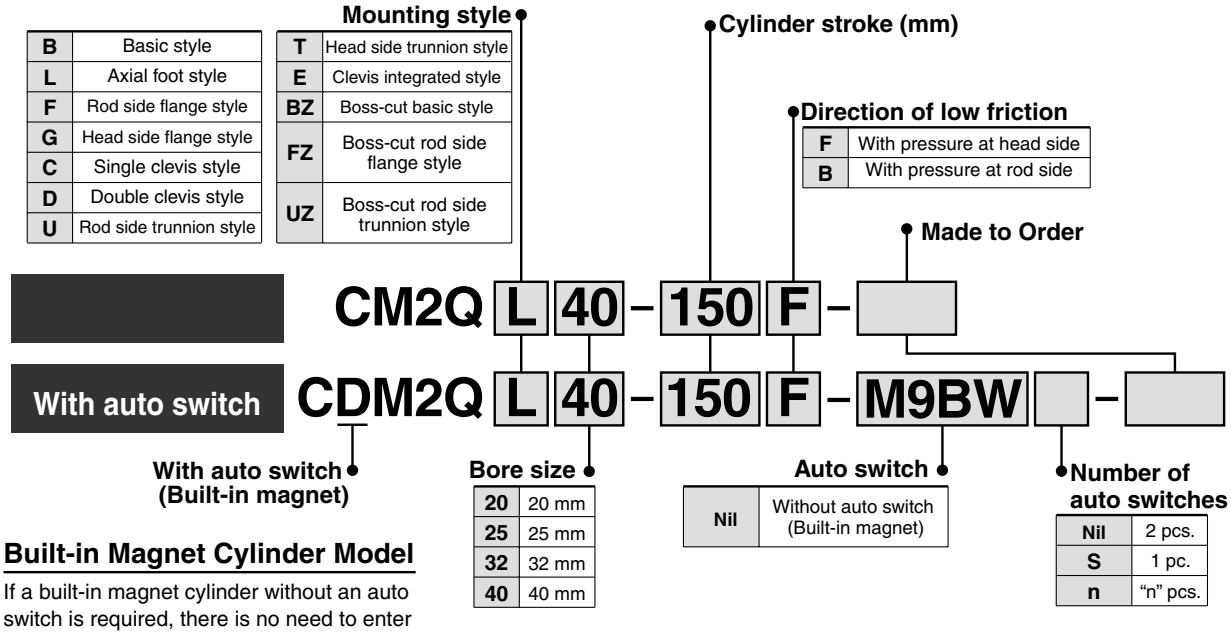
(mm)

Bore size	A	AL	B_1	F	FF	FX	GA	GB	H	H_1	I	KB	MM	N	NA	NB	ND	P	S	ZZ
20	18	15.5	13	30.4	M5 x 0.8 depth 9	22	22	8	27	5	28	8.2	M8 x 1.25	24	29	15	$20^{0}_{-0.033}$	1/8	76	103
25	22	19.5	17	36.4	M6 x 1 depth 11	26	22	8	31	6	33.5	10.2	M10 x 1.25	30	29	15	$26^{0}_{-0.033}$	1/8	76	107
32	22	19.5	17	42.4	M6 x 1 depth 11	30	22	8	31	6	37.5	12.2	M10 x 1.25	34.5	29	15	$26^{0}_{-0.033}$	1/8	78	109
40	24	21	22	52.4	M8 x 1.25 depth 14	36	27	11	34	8	46.5	14.2	M14 x 1.5	42.5	37.5	21.5	$32^{0}_{-0.039}$	1/4	104	138

Air Cylinder: Low Friction Type
Double Acting, Single Rod
Series CM2Q
ø20, ø25, ø32, ø40

Use the new **"Smooth Cylinder Series CM2Y"** to realize both-direction low friction and low-speed operation.
(Refer to **Best Pneumatics No. 3**.)

How to Order

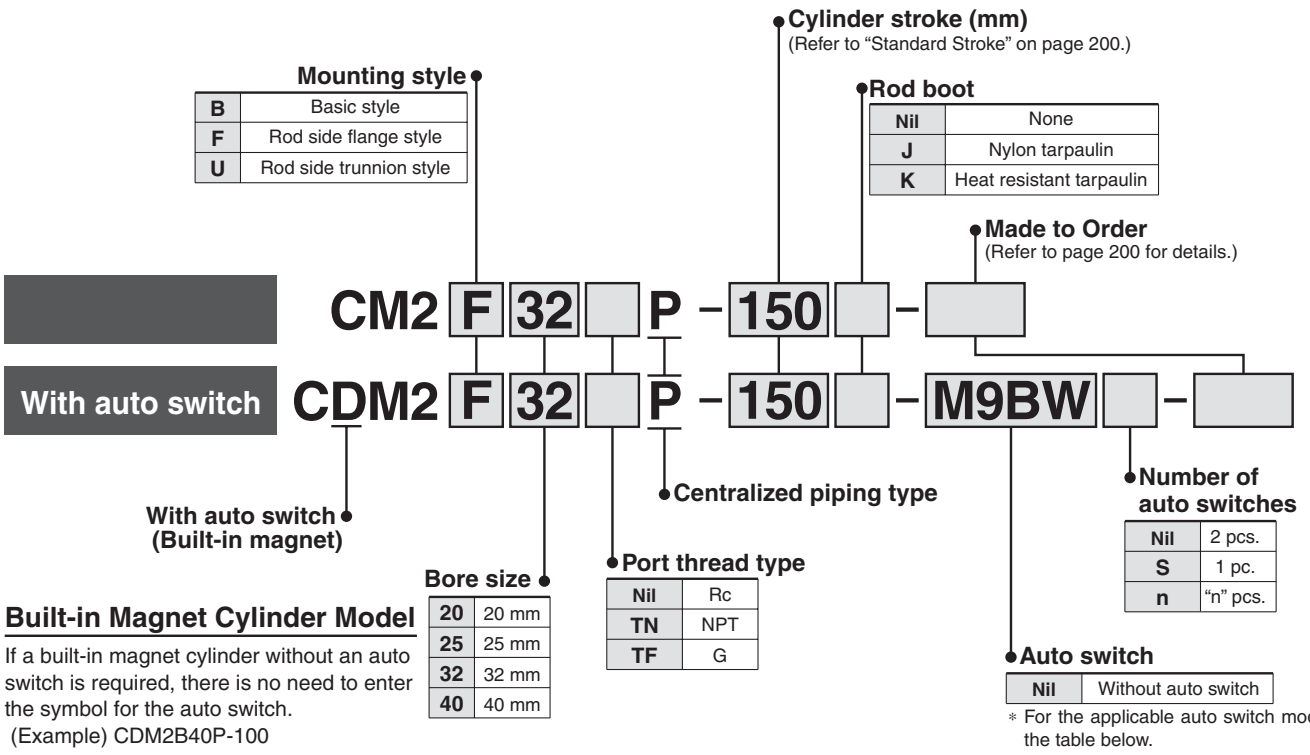


Built-in Magnet Cylinder Model

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) CDM2QF32-100B

Air Cylinder: Centralized Piping Type
Double Acting, Single Rod
Series CM2□P
ø20, ø25, ø32, ø40

How to Order



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

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) CDM2B40P-100

Applicable Auto Switch/Refer to pages 1263 to 1371 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	Lead wire length (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)	24V	5V, 12V	—	M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9P	●	●	●	○	—	○		
				2-wire		12V		M9B	●	●	●	○	—	○	—	
		Connector						H7C	●	—	●	●	●	—		
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)		5V, 12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)				M9PW	●	●	●	○	—	○		
				2-wire		12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)							H7BA**	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)		5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	—	A96	●	—	●	—	—	—	IC circuit	—
			Yes	2-wire	24V	12V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			No				100V or less	A90	●	—	●	—	—	—	IC circuit	
			Yes				100V, 200V	B54	●	—	●	●	—	—	—	
			No				200V or less	B64	●	—	●	—	—	—		
		Connector	Yes				—	C73C	●	—	●	●	●	—		
			No				24V or less	C80C	●	—	●	●	●	—	IC circuit	
	Diagnostic indication (2-color indication)		Yes			—	—	B59W	●	—	●	—	—	—	—	

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

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

∗ D-A9□V□/M9□V□/M9□WV□ and D-M9□A(V)L cannot be mounted.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.

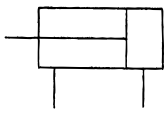
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.

∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

A cylinder in which two piping ports are provided in the head cover, enabling pipes to be connected only in the axial direction.

JIS Symbol

Double acting,
Single rod



Specifications

Bore size (mm)	20	25	32	40
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1.0 MPa			
Minimum operating pressure	0.05 MPa			
Ambient and fluid temperature	Without auto switch: −10 to 70°C (No freezing) With auto switch: −10 to 60°C (No freezing)			
Lubrication	Not required (Non-lube)			
Stroke length tolerance	$^{+1.4}_{0}$ mm			
Cushion	Rubber bumper			
Piston speed	50 to 700 mm/s	50 to 650 mm/s	50 to 590 mm/s	50 to 420 mm/s
Allowable kinetic energy	0.27 J	0.4 J	0.65 J	1.2 J

Standard Stroke

Bore size (mm)	Standard stroke (1) (mm)	Maximum manufacturable stroke (2) (mm)
20	25, 50, 75, 100, 125, 150 200, 250, 300	1000
25		
32		
40		

Note 1) Other intermediate strokes can be manufactured upon receipt of order. Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Note 2) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

Made to Order Specifications

(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XC4	With heavy duty scraper
—XC6	Piston rod and rod end nut made of stainless steel
—XC29	Double knuckle joint with spring pin
—XC52	Mounting nut with set screw

Mounting Style and Accessory

Mounting \ Accessory	Standard equipment		Option		
	Mounting nut	Rod end nut	Single knuckle joint	Double knuckle joint (With pin)*	Rod boot
Basic style	● (1 pc.)	●	●	●	●
Rod side Flange side style	● (1)	●	●	●	●
Rod side trunnion style	● (1)	●	●	●	●

* Pin and retaining ring (cotter pin for bore size ø40) are shipped together with double knuckle joint.

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)				Description (for min. order)
		20	25	32	40	
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Trunnion (With nuts)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

* Order 2 foot brackets for each cylinder unit.

⚠ Precautions

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Rod Boot Material

Symbol	Rod boot material	Maximum ambient temperature
J	Nylon tarpaulin	70°C
K	Heat resistant tarpaulin	110°C*

* Maximum ambient temperature for the rod boot itself.

Mass

(kg)

Bore size (mm)		**20**	**25**	**32**	**40**
Basic mass	Basic style	0.14	0.21	0.27	0.58
	Rod side flange style	0.20	0.30	0.36	0.70
	Rod side trunnion style	0.18	0.28	0.33	0.68
Additional mass per each 50 mm of stroke		0.05	0.08	0.10	0.17
Option bracket	Single knuckle joint	0.06	0.06	0.06	0.23
	Double knuckle (with pin)	0.07	0.07	0.07	0.20

Calculation: (Example) **CM2F32P-100**
- Basic mass·····0.36
- Additional mass·····0.10
- Cylinder stroke·····100 stroke

0.36 + 0.10 x 100/50 = 0.56 kg

Copper/Fluorine-free

20-CM2 Mounting style Bore size P — Stroke

Copper/fluorine-free

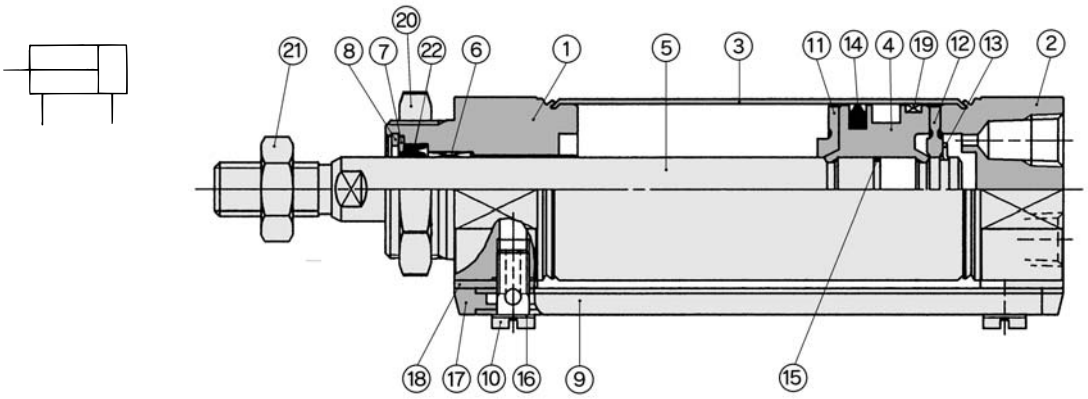
The type which prevents copper based ions from generating by changing the copper based materials into electroless nickel plated treatment or non-copper materials in order to eliminate the effects by copper based ions or fluororesins over the color cathode ray tube.

Specifications

Action		Double acting, Single rod
Bore size (mm)		ø20, ø25, ø32, ø40
Max. operating pressure		1.0 MPa
Min. operating pressure		0.05 MPa
Piston speed	**ø20**	50 to 700 mm/s
	ø25	50 to 650 mm/s
	ø32	50 to 590 mm/s
	ø40	50 to 420 mm/s
Mounting		Basic style, Rod side flange style, Rod side trunnion style

* Auto switch can be mounted.

Construction



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Head cover**	Aluminum alloy	Clear anodized
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Stainless steel	
8	**Retaining ring**	Carbon steel	Phosphate coated
9	**Pipe**	Aluminum alloy	Clear anodized
10	**Stud**	Brass	Electroless nickel plated
11	**Bumper A**	Urethane	
12	**Bumper B**	Urethane	

No.	Description	Material	Note
13	**Retaining ring**	Stainless steel	
14	**Piston seal**	NBR	
15	**Piston gasket**	NBR	
16	**Gasket**	Resin	
17	**Pipe gasket**	Urethane rubber	
18	**Spacer gasket**	Resin	Except ø25
19	**Wear ring**	Resin	
20	**mounting nut**	Carbon steel	Nickel plated
21	**Rod end nut**	Carbon steel	Nickel plated

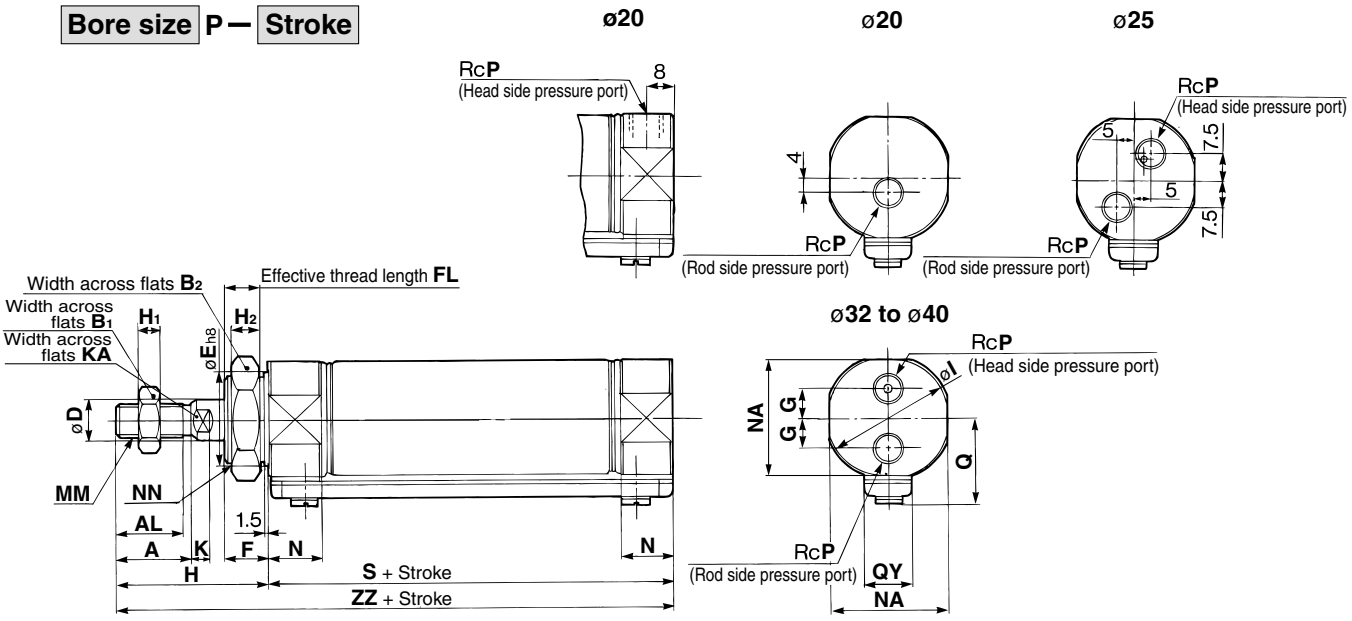
Replacement Part: Seal

No.	Description	Material	Part no.			
			20	**25**	**32**	**40**
22	**Rod seal**	NBR	PDU-8Z	PDU-10Z	PDU-12LZ	PDU-14Z

∗ Since the seal kit does not include a grease pack, order it separately.
Grease pack part no.: GR-S-010 (10 g)

Basic Style (B)

Bore size **P** — **Stroke**



(mm)

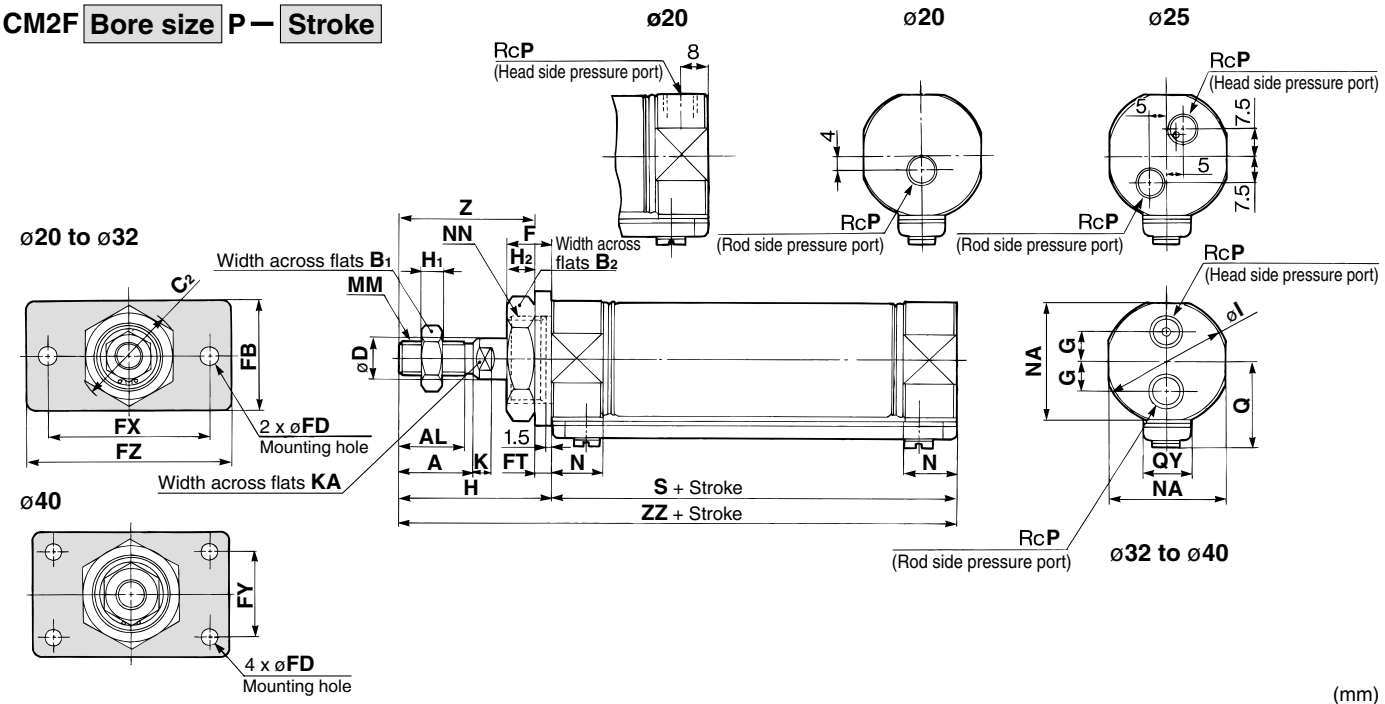
Bore size	A	AL	B_1	B_2	D	E	F	FL	G	H	H_1	H_2	I	K	KA	MM	N	NA	NN	P	Q	QY	S	ZZ
20	18	15.5	13	26	8	$20^{0}_{-0.033}$	13	10.5	—	41	5	8	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8	19.8	14	62	103
25	22	19.5	17	32	10	$26^{0}_{-0.033}$	13	10.5	—	45	6	8	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8	22	14	62	107
32	22	19.5	17	32	12	$26^{0}_{-0.033}$	13	10.5	9	45	6	8	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8	25.8	16	64	109
40	24	21	22	41	14	$32^{0}_{-0.039}$	16	13.5	10.5	50	8	10	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4	29.8	16	88	138

∗ The dimensions of air cylinders with a rod boot are the same as the standard, double acting/single rod boss-cut style. Refer to page 135.

SMC

Rod Side Flange Style (F)

CM2F Bore size P— Stroke



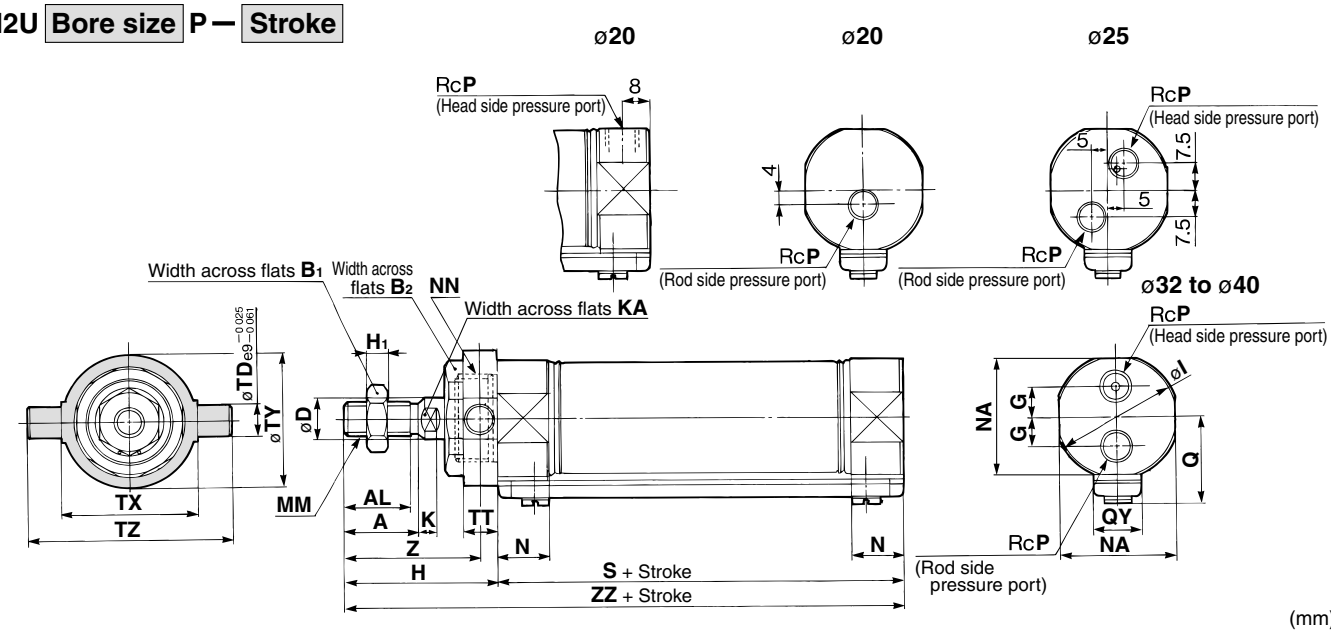
(mm)

Bore size	A	AL	B_1	B_2	C_2	D	F	FB	FD	FT	FX	FY	FZ	G	H	H_1	H_2	I	K	KA	MM	N	NA	NN	P	Q	QY	S	Z	ZZ
20	18	15.5	13	26	30	8	13	34	7	4	60	—	75	—	41	5	8	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8	19.8	14	62	37	103
25	22	19.5	17	32	37	10	13	40	7	4	60	—	75	—	45	6	8	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8	22	14	62	41	107
32	22	19.5	17	32	37	12	13	40	7	4	60	—	75	9	45	6	8	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8	25.8	16	64	41	109
40	24	21	22	41	47.3	14	16	52	7	5	66	36	82	10.5	50	8	10	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4	29.8	16	88	45	138

* The dimensions of air cylinders with a rod boot are the same as the standard, double acting/single rod boss-cut style. Refer to page 137.

Rod Side Trunnion Style (U)

CM2U Bore size P— Stroke



(mm)

Bore size	A	AL	B_1	B_2	D	G	H	H_1	I	K	KA	MM	N	NA	NN	P	Q	QY	S	TD	TT	TX	TY	TZ	Z	ZZ
20	18	15.5	13	26	8	—	41	5	28	5	6	M8 x 1.25	15	24	M20 x 1.5	1/8	19.8	14	62	8	10	32	32	52	36	103
25	22	19.5	17	32	10	—	45	6	33.5	5.5	8	M10 x 1.25	15	30	M26 x 1.5	1/8	22	14	62	9	10	40	40	60	40	107
32	22	19.5	17	32	12	9	45	6	37.5	5.5	10	M10 x 1.25	15	34.5	M26 x 1.5	1/8	25.8	16	64	9	10	40	40	60	40	109
40	24	21	22	41	14	10.5	50	8	46.5	7	12	M14 x 1.5	21.5	42.5	M32 x 2	1/4	29.8	16	88	10	11	53	53	77	44.5	138

* The dimensions of air cylinders with a rod boot are the same as the standard, double acting/single rod boss-cut style. Refer to page 141.

Air Cylinder: With End Lock

Series CBM2

ø20, ø25, ø32, ø40

How to Order

CBM2 L 40 – 150 □ □ – H N – □

With auto switch **CDBM2** L 40 – 150 □ □ – H N – 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

Bore size

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

Cylinder stroke (mm)
(Refer to "Standard Stroke" on page 205.)

Cushion

Nil	Rubber bumper
A	Air cushion

Rod boot

Nil	None
J	Nylon tarpaulin
K	Heat resistant tarpaulin

Lock position

H	Head end lock
R	Rod end lock
W	Double end lock

Manual release type

N	Non-lock type
L	Lock type

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.

Made to Order
(Refer to page 205 for details.)

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) CDBM2L40-100-HN

Applicable Auto Switch/Refer to pages 1263 to 1371 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 length (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)	5V, 12V		M9N	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9P	●	●	●	○	—	○		
				2-wire	12V		M9B	●	●	●	○	—	○	—	
		Connector					H7C	●	—	●	●	●	—		
		Terminal conduit		3-wire (NPN)	5V, 12V		G39A **	—	—	—	—	●	—	IC circuit	
				2-wire	12V		K39A **	—	—	—	—	●	—	—	
	Diagnostic indication (2-color indication)	Grommet		3-wire (NPN)	5V,12V		M9NW	●	●	●	○	—	○	IC circuit	
				3-wire (PNP)			M9PW	●	●	●	○	—	○		
				2-wire	12V		M9BW	●	●	●	○	—	○	—	
	Water resistant (2-color indication)						H7BA ***	—	—	●	○	—	○		
	With diagnostic output (2-color indication)			4-wire (NPN)	5V, 12V		H7NF	●	—	●	○	—	○	IC circuit	
Reed switch	——	Grommet	Yes	3-wire (NPN equivalent)	—	5V	A96	●	—	●	—	—	—	IC circuit	—
				2-wire	24V	100V	A93	●	—	●	—	—	—	—	Relay, PLC
			No			100V or less	A90	●	—	●	—	—	—	IC circuit	
			Yes			100V, 200V	B54 **	●	—	●	●	—	—	—	
			No			200V or less	B64 **	●	—	●	—	—	—		
		Connector	Yes			—	C73C	●	—	●	●	●	—		
			No			24V or less	C80C	●	—	●	●	●	—	IC circuit	
		Terminal conduit	Yes			—	A33A **	—	—	—	—	●	—	—	PLC
						100V, 200V	A34A **	—	—	—	—	●	—		Relay, PLC
		DIN terminal					A44A **	—	—	—	—	●	—		
	Diagnostic indication (2-color indication)	Grommet				—	B59W	●	—	●	—	—	—		

∗∗∗ Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance. Consult with SMC regarding water resistant types with the above model numbers.

∗ 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

∗ Solid state auto switches marked with "○" are produced upon receipt of order.
∗ D-A9□V/M9□V/M9□WV and D-M9□A(V)L cannot be mounted.
∗ Do not indicate suffix "N" for no lead wire on D-A3□A/A44A/G39A/K39A models.
∗∗ D-A3□A/A44A/G39A/K39A/B54/B64 cannot be mounted on bore sizes ø20 and ø25 cylinder with air cushion.

∗ Since there are other applicable auto switches than listed above, refer to page 218 for details.
∗ For details about auto switches with pre-wired connector, refer to pages 1328 and 1329.
∗ D-A9□/M9□/M9□W auto switches are shipped together (not assembled). (However, auto switch mounting brackets are assembled when being shipped.)

Holds the cylinder's home position even if the air supply is cut off.

When air is discharged at the stroke end position, the lock engages to maintain the rod in that position.

Non-lock type and lock type are standardized for manual release.

Auto switch is mountable.

Made to Order Specifications
(For details, refer to pages 1373 to 1498.)

Symbol	Specifications
—XA□	Change of rod end shape
—XB6	Heat resistant cylinder (150°C)
—XB9	Low speed cylinder (10 to 50 mm/s)
—XC3	Special port location
—XC4 *	With heavy duty scraper
—XC5	Heat resistant cylinder (110°C)
—XC6	Piston rod and rod end nut made of stainless steel
—XC8 *	Adjustable stroke cylinder/Adjustable extension type
—XC13	Auto switch mounting rail style
—XC22	Fluororubber seals
—XC25	No fixed orifice of connecting port
—XC27	Double clevis pin and double knuckle pin made of stainless steel
—XC29	Double knuckle joint with spring pin
—XC35	With coil scraper
—XC52	Mounting nut with set screw

* Available only for locking at head end

Specifications

Bore size (mm)	20	25	32	40
Type	Pneumatic			
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1.0 MPa			
Minimum operating pressure	0.15 MPa *			
Ambient and fluid temperature	Without auto switch: –10 to 70°C (No freezing) With auto switch: –10 to 60°C (No freezing)			
Cushion	Rubber bumper, Air cushion			
Lubrication	Not required (Non-lube)			
Stroke length tolerance	$^{+1.4}_{0}$ mm			
Piston speed	Rubber bumper	50 to 750 mm/s		
	Air cushion	50 to 1000 mm/s		
Mounting	Basic style, Axial foot style, Rod side flange style, Head side flange style, Single clevis style, Double clevis style, Rod side trunnion style, Head side trunnion style			

* 0.05 MPa for other part than the lock unit

Lock Specifications

Lock position	Head end, Rod end, Double end			
Holding force (Max.) (N)	**ø20**	**ø25**	**ø32**	**ø40**
	215	330	550	860
Backlash	1 mm or less			
Manual release	Non-lock type, Lock type			

Allowable Kinetic Energy

Bore size (mm)		20	25	32	40
Rubber bumper	Allowable kinetic energy (J)	0.27	0.4	0.65	1.2
Air cushion	Effective cushion length (mm)	11.0	11.0	11.0	11.8
	Cushion sectional area (cm^2)	2.09	3.30	5.86	9.08
	Kinetic energy absorbable (J)	0.54	0.78	1.27	2.35

Standard Stroke

Bore size (mm)	Standard stroke (mm)	Long stroke * (mm)	Maximum manufacturable stroke (mm)
20	25, 50, 75, 100, 125, 150, 200, 250 300	400	1000
25		450	
32		450	
40		500	

* Long stroke applies to the axial foot style and the rod side flange style only.
When using other types of mounting brackets or exceeding the long stroke limit, the maximum allowable stroke will be determined by the stroke selection table listed on front matter 28.
* Manufacture of intermediate strokes at 1 mm intervals is possible. (Spacers are not used.)

Refer to pages 214 to 218 for cylinders with auto switches.

- Minimum stroke for auto switch mounting
- Proper auto switch mounting position (detection at stroke end) and mounting height
- Operating range
- Switch mounting bracket: Part no.

Accessory /For details, refer to pages 144 and 145, since it is the same as Series CM2 standard type.

Standard equipment	Mounting nut, Rod end nut, Clevis pin, Lock release bolt (N type only)
Option	Single knuckle joint, Double knuckle joint (With pin)

∗ Mounting nuts are not equipped to single clevis and double clevis.

Rod Boot Material

Symbol	Rod boot material	Max. ambient temperature
J	Nylon tarpaulin	60°C
K	Heat resistant tarpaulin	110°C ∗

∗ Maximum ambient temperature for the rod boot itself.

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
	Single clevis	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
Additional mass per each 50 mm of stroke		0.04	0.06	0.08	0.13
Accessory	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

Lock Unit Additional Mass

(kg)

Bore size (mm)		20	25	32	40
Manual release non-lock type (N)	Head end lock (H)	0.02	0.02	0.02	0.04
	Rod end lock (R)	0.01	0.01	0.01	0.02
	Double end lock (W)	0.03	0.03	0.03	0.06
Manual release lock type (L)	Head end lock (H)	0.03	0.03	0.03	0.06
	Rod end lock (R)	0.02	0.02	0.02	0.04
	Double end lock (W)	0.05	0.05	0.05	0.10

Calculation: (Example) **CBM2L32-100-HN**
- Basic mass ····· 0.44 (Foot style, ø32)
- Additional mass ····· 0.08/50 stroke
- Cylinder stroke ····· 100 stroke
- Locking mass ····· 0.02 (Locking at head end, Manual release non-locking type)

0.44 + 0.08 x 100/50 + 0.02 = 0.62 kg

Mounting Bracket Part No.

Mounting bracket	Min. order	Bore size (mm)				Description (for min. order)
		20	25	32	40	
Axial foot ∗	2	CM-L020B	CM-L032B		CM-L040B	2 foot, 1 mounting nut
Flange	1	CM-F020B	CM-F032B		CM-F040B	1 flange
Single clevis∗∗	1	CM-C020B	CM-C032B		CM-C040B	1 single clevis, 3 liners
Double clevis (With pin) ∗∗ ∗∗∗	1	CM-D020B	CM-D032B		CM-D040B	1 double clevis, 3 liners, 1 clevis pin, 2 retaining rings
Trunnion (With nut)	1	CM-T020B	CM-T032B		CM-T040B	1 trunnion, 1 trunnion nut

∗ Order 2 foot brackets for each cylinder unit.
∗∗ 3 Liners are attached with a clevis bracket for adjusting the mounting angle.
∗∗∗ Clevis pins and retaining rings (cotter pins for ø40) are attached.

Double Rod Type End Lock Cylinder

CBM2W | **Mounting style** | **Bore size** | **—** | **Stroke** | **— H** | **Manual release type**

Double rod type end lock cylinder

Specifications

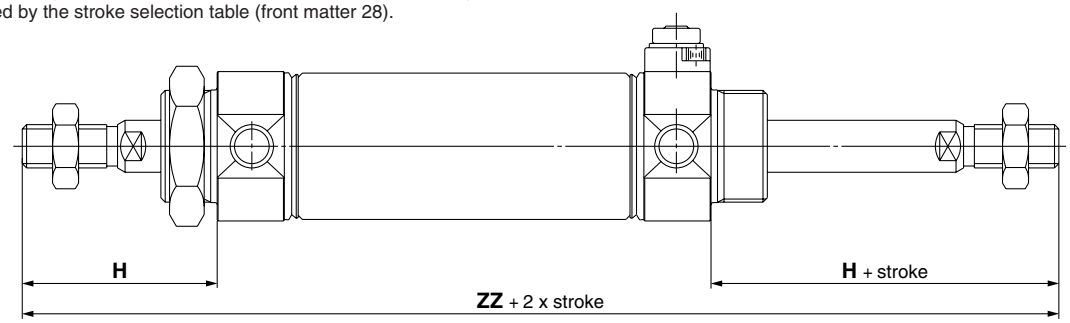
Action	Double acting, Double rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.15 MPa
Cushion	Rubber bumper
Piston speed	50 to 750 mm/s
Mounting	Basic style, Foot style, Flange style, Trunnion style
Lock position	Head end lock
Maximum manufacturable stroke	500 mm

Note 1) Auto switch can be mounted.
Note 2) Refer to the Precautions on page 210 when mounting flanges and trunnion brackets on the end lock side.
Note 3) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

Dimensions

Bore size (mm)	H	ZZ
20	41	144
25	45	152
32	45	154
40	50	188

∗ Dimensions for other bore sizes are the same as the double acting single rod model.



Non-rotating Rod Type End Lock Cylinder

CBM2K | **Mounting style** | **Bore size** | **—** | **Stroke** | **— H** | **Manual release type**

Non-rotating rod type end lock cylinder

Specifications

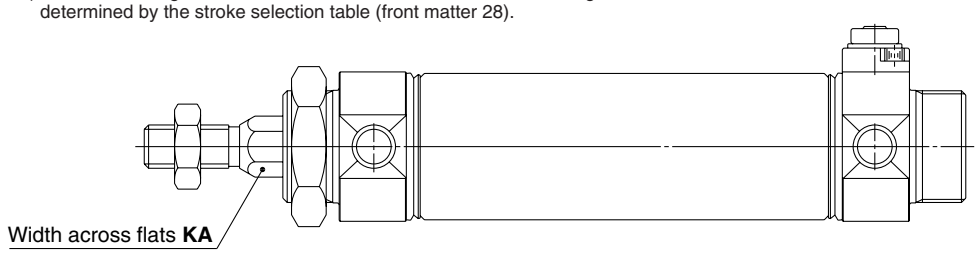
Action	Double acting, Double rod
Bore size (mm)	ø20, ø25, ø32, ø40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.15 MPa
Cushion	Rubber bumper
Piston speed	50 to 500 mm/s
Mounting	Basic, foot, rod side flange, head side flange, single clevis, double clevis, rod side trunnion, head side trunnion
Lock position	Head end lock
Maximum manufacturable stroke	1000 mm

Note 1) Auto switch can be mounted.
Note 2) Refer to the Precautions on page 210 for the head side flange and head side trunnion styles.
Note 3) When exceeding 300 strokes, the allowable maximum stroke length is determined by the stroke selection table (front matter 28).

Dimensions

Bore size (mm)	KA
20	8.2
25	10.2
32	12.2
40	14.2

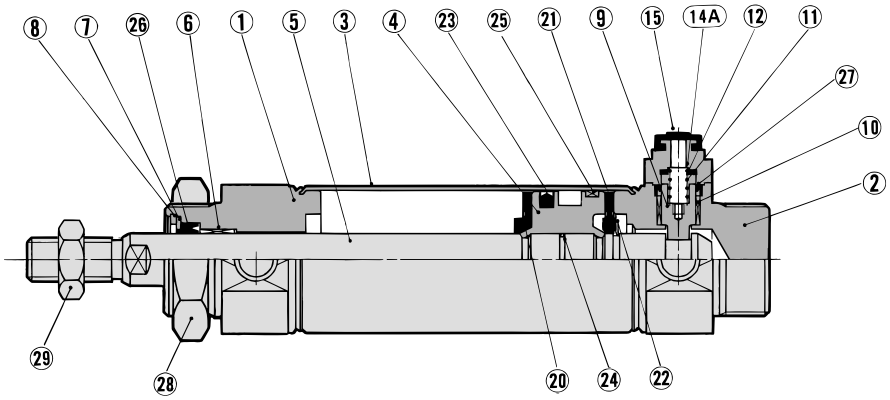
∗ Dimensions for other bore sizes are the same as the double acting single rod model.



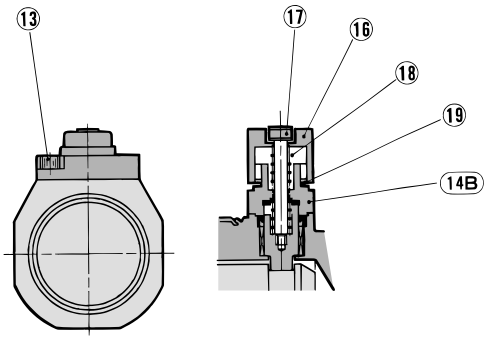
Construction

Head end lock

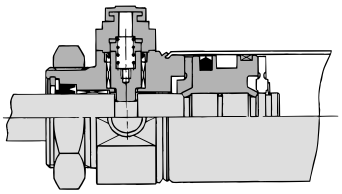
Manual release (Non-lock type): Suffix N



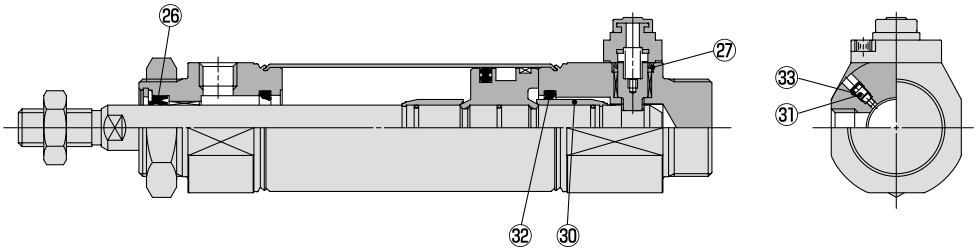
Manual release (Lock type): Suffix L



Rod end lock



With air cushion



Component Parts

No.	Description	Material	Note
1	**Rod cover**	Aluminum alloy	Clear anodized
2	**Head cover**	Aluminum alloy	Clear anodized
3	**Cylinder tube**	Stainless steel	
4	**Piston**	Aluminum alloy	Chromated
5	**Piston rod**	Carbon steel	Hard chrome plated
6	**Bushing**	Copper oil-impregnated sintered alloy	
7	**Seal retainer**	Stainless steel	
8	**Retaining ring**	Carbon steel	Phosphate coated
9	**Lock piston**	Carbon steel	Hard chrome plated, Heat treated
10	**Lock bushing**	Copper alloy	
11	**Lock spring**	Stainless steel	
12	**Bumper**	Urethane	
13	**Hexagon socket head cap screw**	Alloy steel	Black zinc chromated
14A	**Cap A**	Aluminum die-casted	Black painted
14B	**Cap B**	Carbon steel	Oxide film treated
15	**Rubber cap**	Synthetic rubber	
16	**M/O knob**	Zinc die-casted	Black painted
17	**M/O bolt**	Alloy steel	Black zinc chromated
18	**M/O spring**	Steel wire	Zinc chromated
19	**Stopper ring**	Carbon steel	Zinc chromated
20	**Bumper A**	Urethane	
21	**Bumper B**	Urethane	
22	**Retaining ring**	Stainless steel	
23	**Piston seal**	NBR	
24	**Piston gasket**	NBR	
25	**Wear ring**	Resin	
28	**Mounting nut**	Carbon steel	Nickel plated
29	**Rod end nut**	Carbon steel	Nickel plated
30	**Cushion ring**	Aluminum alloy	Anodized
31	**Cushion needle**	Alloy steel	Electroless nickel plated
32	**Cushion seal**	Urethane	

Component Parts

No.	Description	Material	Note
26	**Rod seal**	NBR	
27	**Lock piston seal**	NBR	
33	**Cushion needle seal**	NBR	

Replacement Parts: Seal Kit

With lock in single end

Bore size (mm)	20	25	32	40
Kit no.	CBM2-20-PS	CBM2-25-PS	CBM2-32-PS	CBM2-40-PS

With lock at double ends

Kit no.	CBM2-20-PS-W	CBM2-25-PS-W	CBM2-32-PS-W	CBM2-40-PS-W

* Seal kit includes ㉖ and ㉗. Order the seal kit, based on each bore size. (Except ㉝.)
* Seal kit includes a grease pack (10 g). Order with the following part number when only the grease pack is needed.
  Grease pack part number: GR-S-010 (10 g)

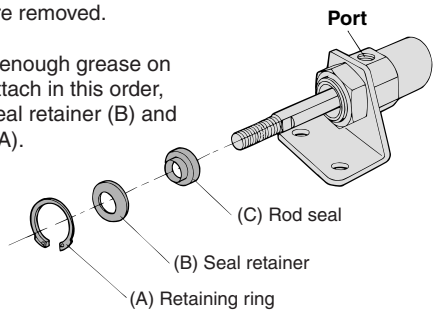
How to Change Seal Kit

<Removal>

- Remove the retaining ring (A) by using a tool for installing a type C retaining ring for hole. Shut off the port on the rod cover by finger and then pull out the piston rod, and the seal retainer (B) and the rod seal (C) are removed.

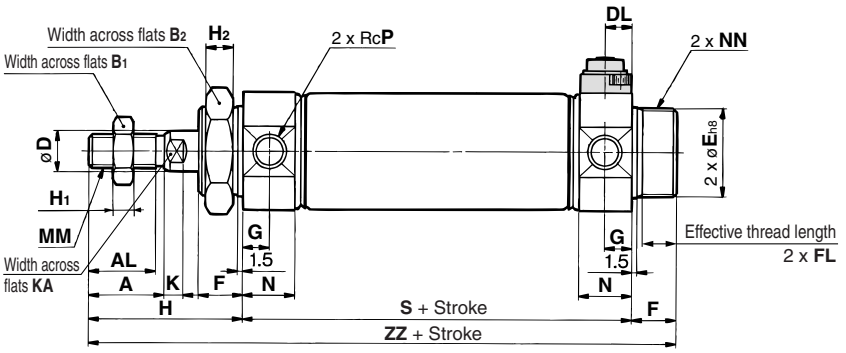
<Mounting>

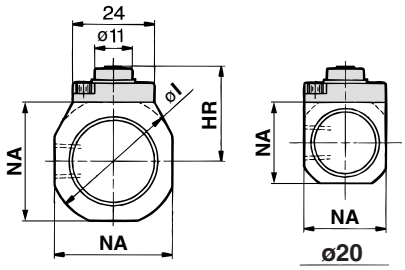
- After applying enough grease on the rod seal, attach in this order, rod seal (C), seal retainer (B) and retaining ring (A).



Basic Style (Dimensions are common irrespective of the lock position; rod end, head end, or double end.)

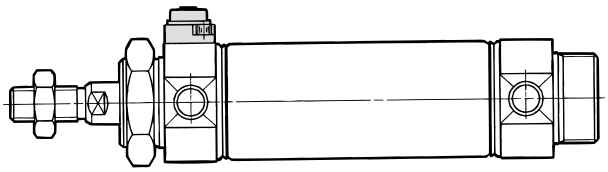
Head end lock: CBM2B Bore size – Stroke -HN

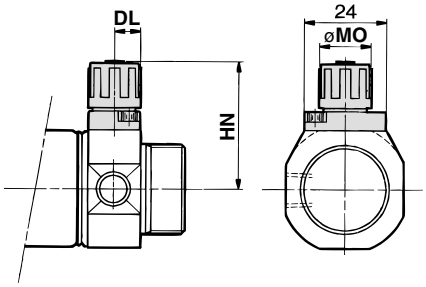




Manual release (Non-lock type): Suffix N

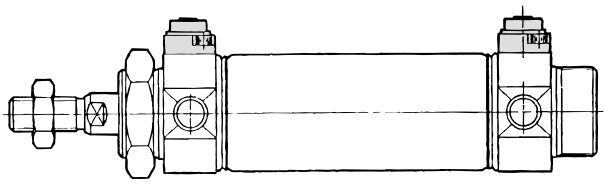
Rod end lock: CBM2B Bore size – Stroke -RN



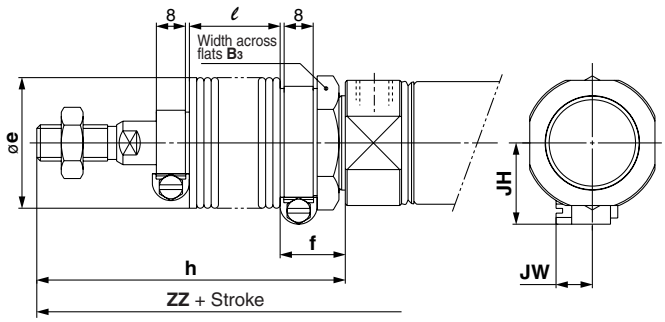


Manual release (Lock type): Suffix L

Double end lock: CBM2B Bore size – Stroke -WN



With rod boot



(mm)

Bore size (mm) \ Symbol	Stroke range	A	AL	B1	B2	D	DL	E	F	FL	G	H	H1	H2	HR	HN (Max.)	I	K	KA	MM	MO	N	NA	NN	P	S	ZZ
20	Up to 300	18	15.5	13	26	8	7.5	$20^{0}_{-0.033}$	13	10.5	8	41	5	8	22.3	34	28	5	6	M8 x 1.25	15	15	24	M20 x 1.5	1/8	62	116
25	Up to 300	22	19.5	17	32	10	7.5	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	25.3	37	33.5	5.5	8	M10 x 1.25	15	15	30	M26 x 1.5	1/8	62	120
32	Up to 300	22	19.5	17	32	12	7.5	$26^{0}_{-0.033}$	13	10.5	8	45	6	8	27.6	39.3	37.5	5.5	10	M10 x 1.25	15	15	34.5	M26 x 1.5	1/8	64	122
40	Up to 300	24	21	22	41	14	10.7	$32^{0}_{-0.039}$	16	13.5	11	50	8	10	33.6	47.8	46.5	7	12	M14 x 1.5	19	21.5	42.5	M32 x 2	1/4	88	154

With Rod Boot

(mm)

Bore size (mm) \ Symbol	B3	e	f	h							ℓ						
				1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500
20	30	36	18	68	81	93	106	131	156	181	12.5	25	37.5	50	75	100	125
25	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125
32	32	36	18	72	85	97	110	135	160	185	12.5	25	37.5	50	75	100	125
40	41	46	20	77	90	102	115	140	165	190	12.5	25	37.5	50	75	100	125

With Rod Boot

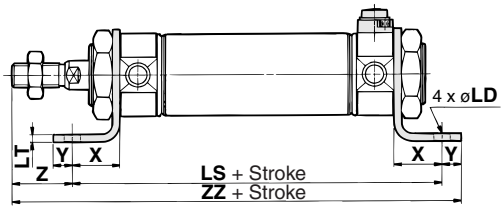
(mm)

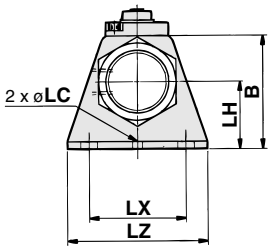
Bore size (mm) \ Symbol	ZZ							JH	JW
	1 to 50	51 to 100	101 to 150	151 to 200	201 to 300	301 to 400	401 to 500		
20	143	156	168	181	206	231	256	23.5	10.5
25	147	160	172	185	210	235	260	23.5	10.5
32	149	162	174	187	212	237	262	23.5	10.5
40	181	194	206	219	244	269	294	27	10.5

* For details about the rod end nut and accessory, refer to pages 144 and 145.

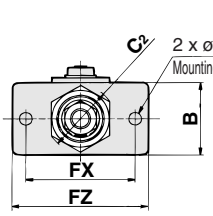
With Mounting Bracket (For dimensions not indicated below, refer to page 209.)

Axial foot style: CBM2L Bore size – Stroke -H -R -W N L

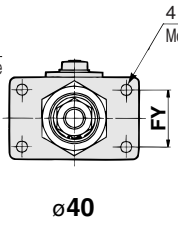




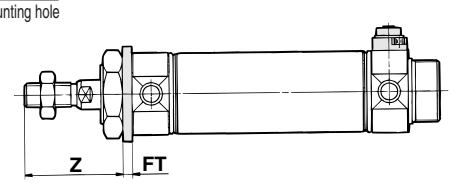
Rod side flange style: CBM2F Bore size – Stroke -H -R -W N L



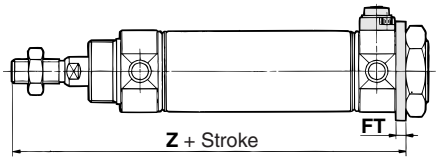
øB20 to ø32



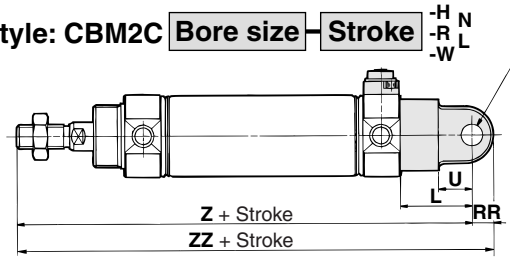
ø40

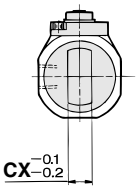


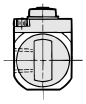
Head side flange style: CBM2G Bore size – Stroke -H -R -W N L



Single clevis style: CBM2C Bore size – Stroke -H -R -W N L

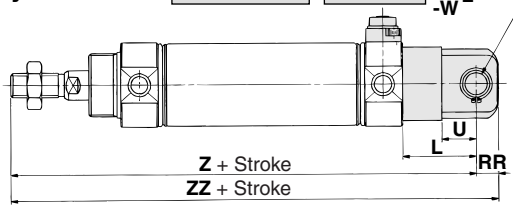


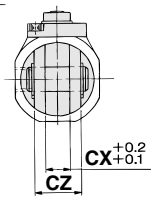


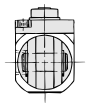


ø20

Double clevis style: CBM2D Bore size – Stroke -H -R -W N L



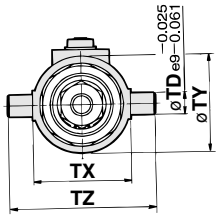


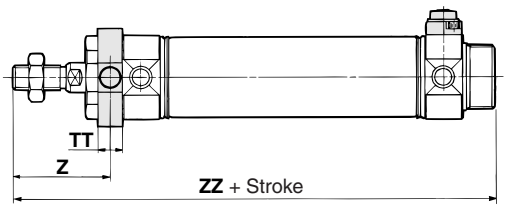


ø20

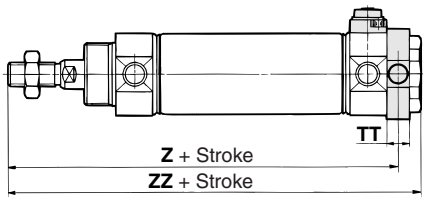
∗ Clevis pin and retaining ring (cotter pin for bore size ø40) are shipped together.

Rod side trunnion style: CBM2U Bore size – Stroke -H -R -W N L





Head side trunnion style: CBM2T Bore size – Stroke -H -R -W N L



(mm)

Bore size (mm)	Axial foot style														Flange style										Clevis style									Trunnion style									
	Stroke range	B	LC	LD	LH	LS	LT	LX	LZ	X	Y	Z	ZZ	Stroke range		B	C_2	FD	FT	FX	FY	FZ	Z		Stroke range	CD	CX	CZ	L	RR	U	Z	ZZ	Stroke range	TD	TT	TX	TY	TZ	Z		ZZ	
														Rod side	Head side								Rod side	Head side																	Rod side	Head side	Rod side	Head side
20	to 400	40	4	6.8	25	102	3.2	40	55	20	8	21	131	Up to 400	Up to 300	34	30	7	4	60	—	75	37	107	Up to 300	9	10	19	30	9	14	133	142	Up to 300	8	10	32	32	52	36	108	116	118
25	to 450	47	4	6.8	28	102	3.2	40	55	20	8	25	135	Up to 450	Up to 300	40	37	7	4	60	—	75	41	111	Up to 300	9	10	19	30	9	14	137	146	Up to 300	9	10	40	40	60	40	112	120	122
32	to 450	47	4	6.8	28	104	3.2	40	55	20	8	25	137	Up to 450	Up to 300	40	37	7	4	60	—	75	41	113	Up to 300	9	10	19	30	9	14	139	148	Up to 300	9	10	40	40	60	40	114	122	124
40	to 500	54	4	7	30	134	3.2	55	75	23	10	27	171	Up to 500	Up to 300	52	47.3	7	5	66	36	82	45	143	Up to 300	10	15	30	39	11	18	177	188	Up to 300	10	11	53	53	77	44.5	143.5	154	154

∗ Dimensions other than mentioned above are the same as on page 209.

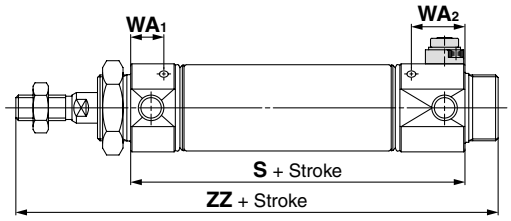
Precautions on Trunnion Style, Flange Style

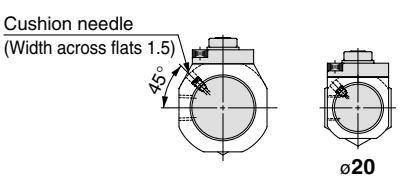
1. Trunnion style
(1) With lock in rod side of the rod side trunnion style (2) With lock in head side of the head side trunnion style (3) With lock in both sides. For above cases, use caution since the trunnion pin and fittings may be interfered with each other because the trunnion pin and port are very closed to each other.

2. Flange style (ø20 to ø32)
(1) With lock in rod side of the rod side flange style (2) With lock in head side of the head side flange style (3) With lock in both sides. For above cases, use caution since the bolt for mounting a cylinder and fittings may be interfered with each other. Refer to “Special Port Position” in “Made to Order Specifications” on page 1416.

With Air Cushion (For dimensions not indicated below, refer to pages 209 and 210.)

Basic style
Head end lock: CBM2B Bore size – Stroke A-HN





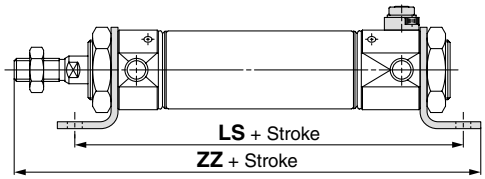
Manual release (Non-lock type): Suffix N

With Air Cushion

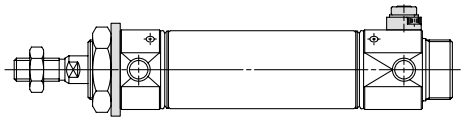
(mm)

Bore size (mm)	S			WA1			WA2			ZZ		
	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock
20	72	73	83	13	24	24	23	13	23	126	127	137
25	72	73	83	13	24	24	23	13	23	130	131	141
32	72	75	83	13	24	24	21	13	21	130	133	141
40	93	96	101	16	24	24	21	16	21	159	162	167

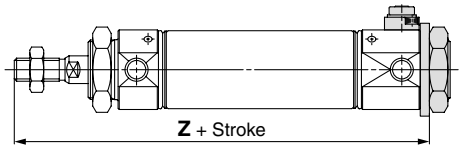
Axial foot style: CBM2L Bore size – Stroke A-H/R/W N/L



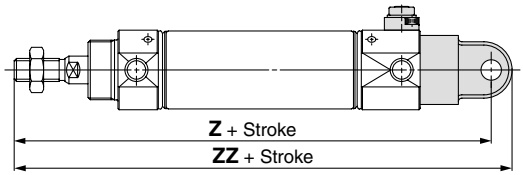
Rod side flange style: CBM2F Bore size – Stroke A-H/R/W N/L



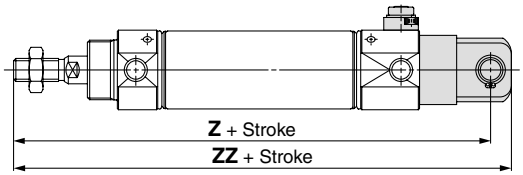
Head side flange style: CBM2G Bore size – Stroke A-H/R/W N/L



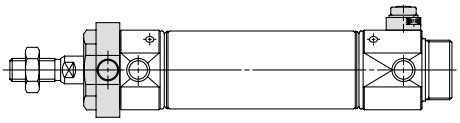
Single clevis style: CBM2C Bore size – Stroke A-H/R/W N/L



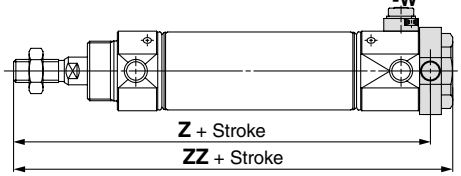
Double clevis style: CBM2D Bore size – Stroke A-H/R/W N/L



Rod side trunnion style: CBM2U Bore size – Stroke A-H/R/W N/L



Head side trunnion style: CBM2T Bore size – Stroke A-H/W N/L



(mm)

Bore size (mm)	Axial foot style						Head side flange style		
	LS			ZZ			Z		
	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock
20	112	113	123	141	142	152	117	118	128
25	112	113	123	145	146	156	121	122	132
32	112	115	123	145	148	156	121	124	132
40	139	142	147	176	179	184	148	151	156

(mm)

Bore size (mm)	Clevis style						Head side trunnion style					
	Z			ZZ			Z			ZZ		
	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock	Head end lock	Rod end lock	Double end lock
20	143	144	154	152	153	163	118	119	129	128	129	139
25	147	148	158	156	157	167	122	123	133	132	133	143
32	147	150	158	156	159	167	122	125	133	132	135	143
40	182	185	190	193	196	201	148.5	151.5	156.5	159	162	167

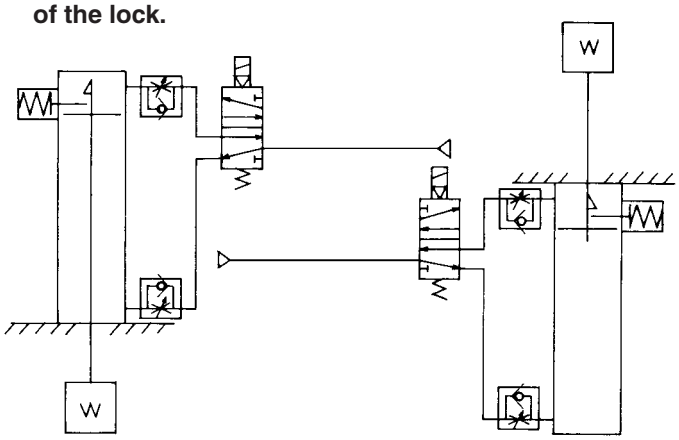
Series CBM2
Specific Product Precautions 1

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Use the Recommended Pneumatic Circuit

⚠ Caution

●This is necessary for proper operation and release of the lock.



Head end lock　　Rod end lock

Operating Precautions

⚠ Caution

1. Do not use 3 position solenoid valves.
Avoid use in combination with 3 position solenoid valves (especially closed center metal seal types). If pressure is trapped in the port on the lock mechanism side, the cylinder cannot be locked. Furthermore, even after being locked, the lock may be released after some time, due to air leaking from the solenoid valve and entering the cylinder.

2. Back pressure is required to release end lock.
Be sure air is supplied to side of cylinder without the locking mechanism, as above, prior to supplying air pressure to the side with end lock or lock may not be released. (Refer to “Releasing the Lock”.)

3. Release the lock when mounting or adjusting the cylinder.
If mounting or other work is performed when the cylinder is locked, the lock unit may be damaged.

4. Operate with a load ratio of 50% or less.
If the load ratio exceeds 50%, this may cause problems such as failure of the lock to release, or damage to the lock unit.

5. Do not operate multiple cylinders in synchronization.
Avoid applications in which two or more end lock cylinders are synchronized to move one workpiece, as one of the cylinder locks may not be able to release when required.

6. Use a speed controller with meter-out control.
Lock cannot be released occasionally by meter-in control.

7. Be sure to operate completely to the cylinder stroke end on the side with the lock.
If the cylinder piston does not reach the end of the stroke, locking might not work or locking might not be released.

Operating Pressure

⚠ Caution

1. Use pressures over 0.15 MPa at port with locking mechanism.

Exhaust Speed

⚠ Caution

1. Locking will occur automatically if the pressure applied to the port on the lock mechanism side falls to 0.05 MPa or less. In cases where the piping on the lock mechanism side is long and thin, or the speed controller is separated at some distance from the cylinder port, the exhaust speed will be reduced. Take note that some time may be required for the lock to engage. In addition, clogging of a silencer mounted on the solenoid valve exhaust port can produce the same effect.

Relation to Cushion

⚠ Caution

1. When cushion valve at side with locking mechanism is fully opened or closed, piston rod may reached at stroke end. Thus lock is not established. And when locking is done at cushion valve fully closed, adjust cushion valve since lock may not be released.

Releasing the Lock

⚠ Warning

1. Before releasing the lock, be sure to supply air to the side without the lock mechanism, so that there is no load applied to the lock mechanism when it is released. (Refer to the recommended pneumatic circuits.) If the lock is released when the port on the other side is in an exhaust state, and with a load applied to the lock unit, the lock unit may be subjected to an excessive force and be damaged. Furthermore, sudden movement of the piston rod is very dangerous.

Series CBM2
Specific Product Precautions 2

Be sure to read before handling. Refer to front matters 54 and 55 for Safety Instructions and pages 3 to 11 for Actuator and Auto Switch Precautions.

Manual Release

⚠ Caution

1. Manual release (Non-lock type)

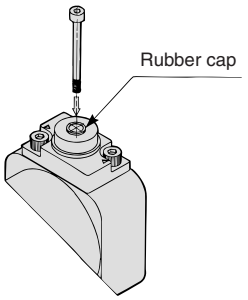
Insert the accessory bolt from the top of the rubber cap (it is not necessary to remove the rubber cap), and after screwing it into the lock piston, pull it to release the lock. If you stop pulling the bolt, the lock will return to an operational state.

Thread sizes, pulling forces and strokes are as shown below.

Bore size (mm)	Thread size	Pulling force	Stroke (mm)
20, 25, 32	M2.5 x 0.45 x 25ℓ or more	4.9 N	2
40	M3 x 0.5 x 30ℓ or more	10 N	3

Remove the bolt for normal operation.

It can cause lock malfunction or faulty release.

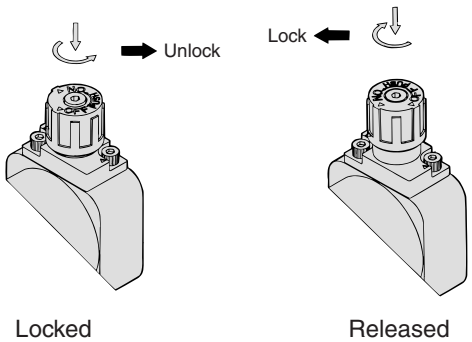


2. Manual release (Lock type)

While pushing the M/O knob, turn it 90° counterclockwise. The lock is released (and remains in a released state) by aligning the ▲ mark on the cap with the ▼ OFF mark on the M/O knob.

When locking is desired, turn M/O button clockwise 90° while pushing fully, correspond ▲ on cap and ▼ ON mark on M/O button. The correct position is confirmed by a click sound "click".

If not confirmed, locking is not done.

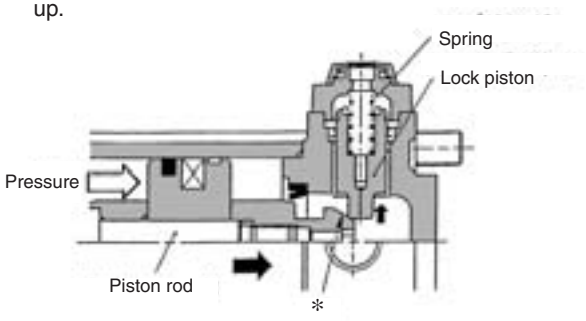


Working Principle

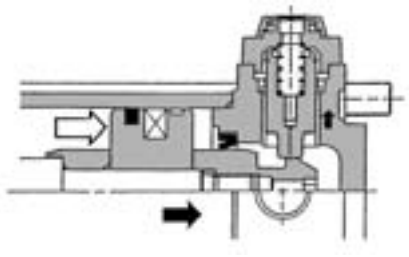
The figures below are for Series CBA2.

●Head end lock (Rod end lock is the same, too.)

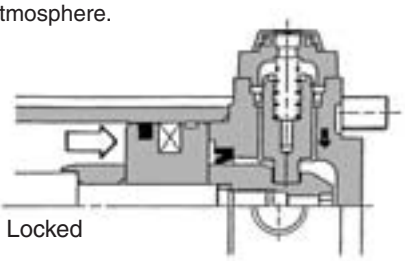
1. When the piston rod is getting closer to the stroke end, the taper part (∗) of the piston rod edge will push the lock piston up.



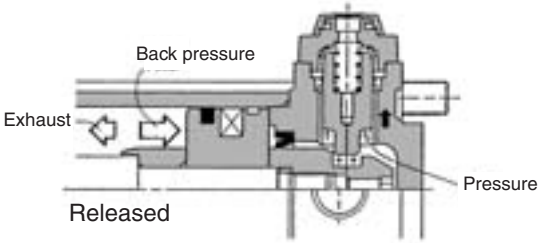
2. Lock piston is pushed up further.



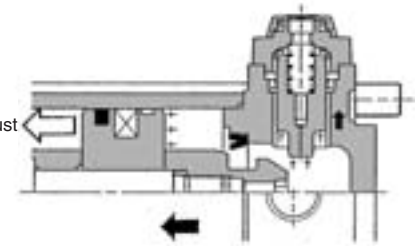
3. Lock piston is pushed up into the groove of piston rod to lock it. (Lock piston is pushed up by spring force.) At this time, it is exhausted from port in head side and introduced to atmosphere.



4. When pressure is supplied in the head side, lock piston will be pushed up to release the lock.



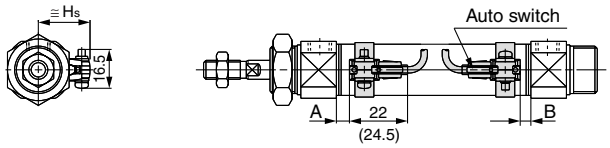
5. Lock will be released, then cylinder will move forward.



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

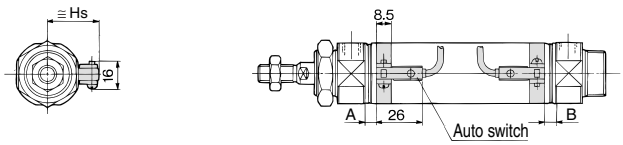
Reed auto switch

D-A9□

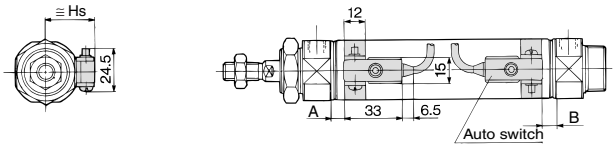


( ): Dimensions of D-A93 type

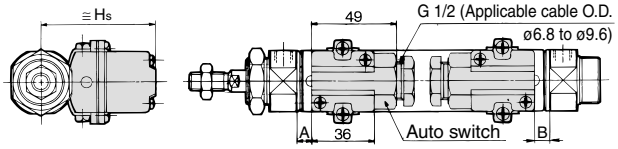
D-C7/C8



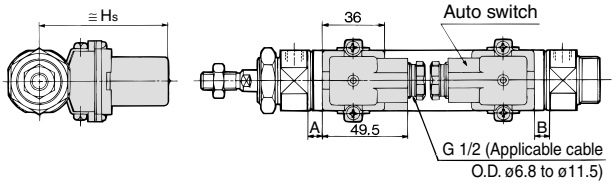
D-B5/B6/B59W



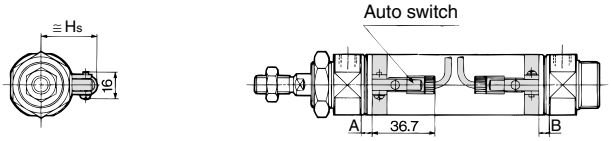
D-A33A/A34A



D-A44A

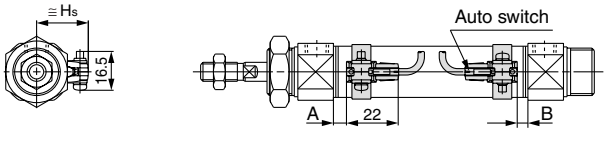


D-C73C/C80C

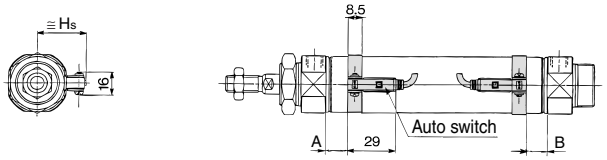


Solid state auto switch

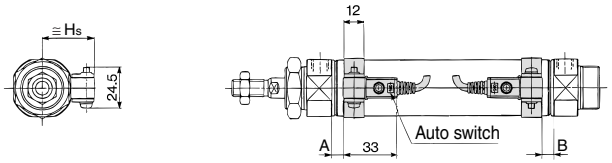
D-M9□
D-M9□W



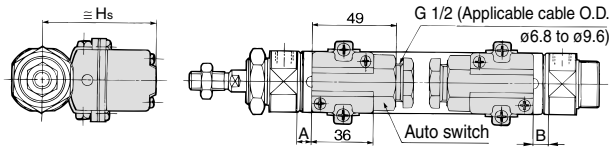
D-H7□/H7□W/H7NF/H7BAL



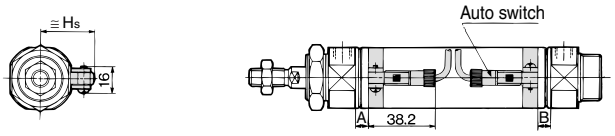
D-G5NTL



D-G39A/K39A



D-H7C



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

Proper Auto Switch Mounting Position (Excluding Single Acting Type)

(mm)

Auto switch model / Bore size	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-H7BAL D-H7NF		D-G5NTL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
20	6.5 (4)	5.5 (3)	10.5 (8)	9.5 (7)	1 (—)	0 (—)	7 (5)	6 (4)	4 (2)	3 (1)	0.5 (—)	0 (—)	6 (4)	5 (3)	2.5 (0.5)	1.5 (0)
25	6.5 (4)	5.5 (3)	10.5 (8)	9.5 (7)	1 (—)	0 (—)	7 (5)	6 (4)	4 (2)	3 (1)	0.5 (—)	0 (—)	6 (4)	5 (3)	2.5 (0.5)	1.5 (0)
32	7.5 (5)	6.5 (4)	11.5 (9)	10.5 (8)	2 (0)	1 (0)	8 (6)	7 (5)	5 (3)	4 (2)	1.5 (0)	0.5 (0)	7 (5)	6 (4)	3.5 (1.5)	2.5 (0.5)
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

∗ ( ): Setting position for the auto switch with an air cushion.
D-B5/B6/A3□A/A44A/G39A/K39A cannot be mounted on the bore size ø20 and ø25 cylinder with an air cushion.
Note) Adjust the auto switch after confirming the operating condition in the actual setting.

Auto Switch Mounting Height

(mm)

Auto switch model / Bore size	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-H7BAL 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

Proper Auto Switch Mounting Position (Detection at stroke end) and Mounting Height: Single Acting/Spring Return Type (S), Spring Extend Type (T)

Proper Auto Switch Mounting Position: Standard Type/Spring Return Type (S), Non-rotating Rod Type/Spring Return Type (S)

(mm)

Auto switch model	Bore size	A Dimensions					B
		Up to 15st	51 to 100st	101 to 150st	151 to 200st	201 to 250st	
D-A9□	20	31.5	56.5	81.5	—	—	5.5
	25	31.5	56.5	81.5	—	—	5.5
	32	32.5	57.5	82.5	107.5	—	6.5
	40	38.5	63.5	88.5	113.5	138.5	11.5
D-M9□ D-M9□W	20	35.5	60.5	85.5	—	—	9.5
	25	35.5	60.5	85.5	—	—	9.5
	32	36.5	61.5	86.5	111.5	—	10.5
	40	42.5	67.5	92.5	117.5	142.5	15.5
D-B5□ D-B64	20	26	51	76	—	—	0
	25	26	51	76	—	—	0
	32	27	52	77	102	—	1
	40	32	57	82	107	132	6
D-C7□ D-C80 D-C73C D-C80C	20	32	57	82	—	—	6
	25	32	57	82	—	—	6
	32	33	58	83	108	—	7
	40	38	63	88	113	138	12
D-B59W	20	29	54	79	—	—	3
	25	29	54	79	—	—	3
	32	30	55	80	105	—	4
	40	35	60	85	110	135	9
D-A3□A D-G39A D-K39A D-A44A	20	25.5	50.5	75.5	—	—	0
	25	25.5	50.5	75.5	—	—	0
	32	26.5	51.5	76.5	101.5	—	0.5
	40	31.5	56.5	81.5	106.5	131.5	5.5
D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF	20	31	56	81	—	—	5
	25	31	56	81	—	—	5
	32	32	57	82	107	—	6
	40	37	62	87	112	137	11
D-G5NTL	20	27.5	52.5	77.5	—	—	1.5
	25	27.5	52.5	77.5	—	—	1.5
	32	28.5	53.5	78.5	103.5	—	2.5
	40	33.5	58.5	83.5	108.5	133.5	7.5

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

Proper Auto Switch Mounting Position: Standard Type/Spring Extend Type (T), Non-rotating Rod Type/Spring Extend Type (T)

(mm)

Auto switch model	Bore size	A	B Dimensions				
			Up to 15st	51 to 100st	101 to 150st	151 to 200st	201 to 250st
D-A9□	20	6.5	30.5	55.5	80.5	—	—
	25	6.5	30.5	55.5	80.5	—	—
	32	7.5	31.5	56.5	81.5	106.5	—
	40	13.5	36.5	61.5	86.5	111.5	136.5
D-M9□ D-M9□W	20	10.5	34.5	59.5	84.5	—	—
	25	10.5	34.5	59.5	84.5	—	—
	32	11.5	35.5	60.5	85.5	110.5	—
	40	17.5	40.5	65.5	90.5	115.5	140.5
D-B5□ D-B64	20	1	25	50	75	—	—
	25	1	25	50	75	—	—
	32	2	26	51	76	101	—
	40	7	31	56	81	106	131
D-C7□ D-C80 D-C73C D-C80C	20	7	31	56	81	—	—
	25	7	31	56	81	—	—
	32	8	32	57	82	107	—
	40	13	37	62	87	112	137
D-B59W	20	4	28	53	78	—	—
	25	4	28	53	78	—	—
	32	5	29	54	79	104	—
	40	10	34	59	84	109	134
D-A3□A D-G39A D-K39A D-A44A	20	0.5	24.5	49.5	74.5	—	—
	25	0.5	24.5	49.5	74.5	—	—
	32	1.5	25.5	50.5	75.5	100.5	—
	40	6.5	30.5	55.5	80.5	105.5	130.5
D-H7□ D-H7C D-H7□W D-H7BAL D-H7NF	20	6	30	55	80	—	—
	25	6	30	55	80	—	—
	32	7	31	56	81	106	—
	40	12	36	61	86	111	136
D-G5NTL	20	2.5	26.5	51.5	76.5	—	—
	25	2.5	26.5	51.5	76.5	—	—
	32	3.5	27.5	52.5	77.5	102.5	—
	40	8.5	32.5	57.5	81.5	107.5	132.5

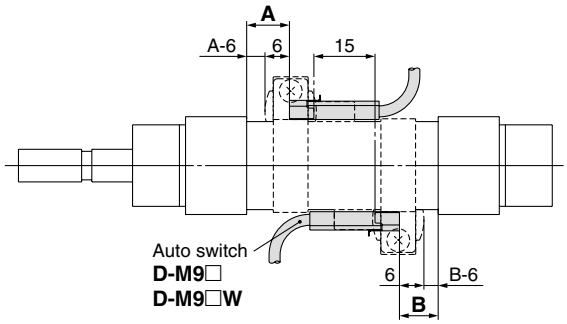
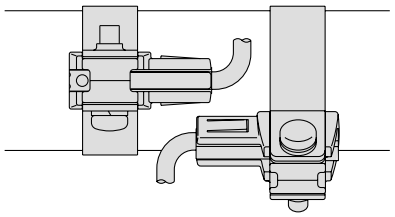
Note) Adjust the auto switch after confirming the operating condition in the actual setting.

Minimum Auto Switch Mounting Stroke

n: No. of auto switch (mm)

Auto switch model	No. of auto switch mounted				
	1	2		n	
		Different surfaces	Same surface	Different surfaces	Same surface
D-A9□ **D-M9□** **D-M9□W**	10	15 (1)	45 (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-H7BAL** **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(2) **D-G39A** **D-K39A** **D-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 (1)	Same surface (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

Note 2) D-A3□A/A44A/G39A/K39A cannot be mounted on the centralized piping type Series CDM2□P.

Operating Range

(mm)

Auto switch model	Bore size			
	20	**25**	**32**	**40**
D-A9□	6	6	6	6
D-M9□ **D-M9□W**	3	3	4	3.5
D-C7□/C80 **D-C73C/C80C**	7	8	8	8
D-B5□/B64 **D-A3□A/A44A**Note)	8	8	9	9
D-B59W	12	12	13	13
D-H7□/H7□W/H7BAL **D-G5NTL/H7NF**	4	4	4.5	5
D-H7C	7	8.5	9	10
D-G39A/K39A Note)	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.

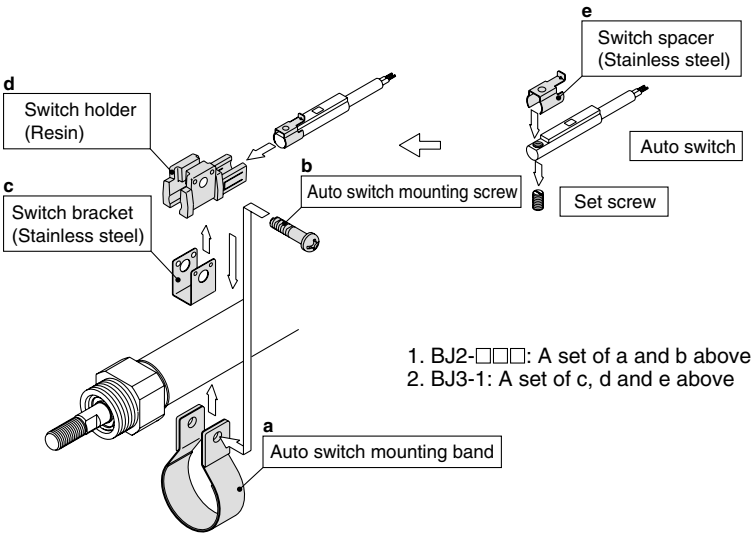
Note) D-A3□A/A44A/G39A/K39A cannot be mounted on the centralized piping type Series CDM2□P.

Auto Switch Mounting Bracket: Part No.

Auto switch model	Bore size (mm)			
	ø20	ø25	ø32	ø40
D-A9□ **D-M9□** **D-M9□W**	Note 1) ①BM2-020 ②BJ3-1	Note 1) ①BM2-025 ②BJ3-1	Note 1) ①BM2-032 ②BJ3-1	Note 1) ①BM2-040 ②BJ3-1
D-C7□/C80 **D-C73C/C80C** **D-H7□** **D-H7□W** **D-H7BAL** **D-H7NF**	BM2-020	BM2-025	BM2-032	BM2-040
D-B5□/B64 **D-B59W** **D-G5NTL** **D-G5NBL**	BA2-020	BA2-025	BA2-032	BA2-040
D-A3□A/A44A Note 2) **D-G39A/K39A**	BM3-020	BM3-025	BM3-032	BM3-040

Note 1) Two kinds of auto switch brackets are used as a set.
Note 2) D-A3□A/A44A/G39A/K39A cannot be mounted on the centralized piping type Series CDM2□P.

[Mounting screw set made of stainless steel]
The following set of mounting screws made of stainless steel (including nuts) is available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.)
BBA4: For D-C7/C8/H7 types
Note 3) Refer to page 1358 for the details of BBA4 screws.
The above stainless steel screws are used when a cylinder is shipped with D-H7BAL type auto switches. When only an auto switch is shipped independently, BBA4 screws are attached.



Besides the models listed in How to Order, the following auto switches are applicable.
Refer to pages 1263 to 1371 for the detailed specifications.

Auto switch type	Part no.	Electrical entry (Entry direction)	Features
Reed	D-B53, C73, C76	Grommet (In-line)	—
	D-C80		Without indicator light
Sold state	D-H7A1, H7A2, H7B		—
	D-H7NW, H7PW, H7BW		Diagnosis indication (2-color indication)
	D-G5NTL		With timer

∗ For solid state switches, auto switches with a pre-wired connector are also available. Refer to pages 1328 and 1329 for details.
∗ Normally closed (NC = b contact) solid state auto switches (D-F9G/F9H types) are also available. Refer to page 1290 for details.
∗ A wide range detection type, solid state auto switch (D-GNBL type) is also available. Refer to page 1320 for details.