

Air Cylinder

Ø 125, Ø 140, Ø 160, Ø 180, Ø 200, Ø 250

RoHS

Lightweight

Weight: Max. **65 %** reduction

39.1 kg → **13.4 kg**

(Compared with a Ø 180, 100 mm stroke CS1 (steel tube) series model)

High Rigidity

■ Allowable lateral load equal to the CS1 (steel tube) series

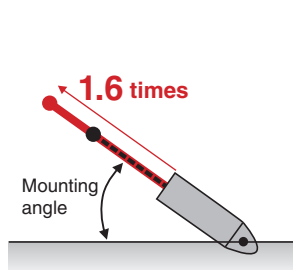
Allowable lateral load: Max. **700 N**

(Ø 250, 100 mm stroke, with piston rod extended)

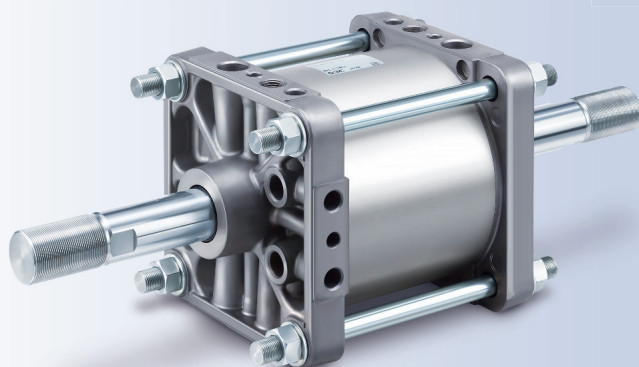
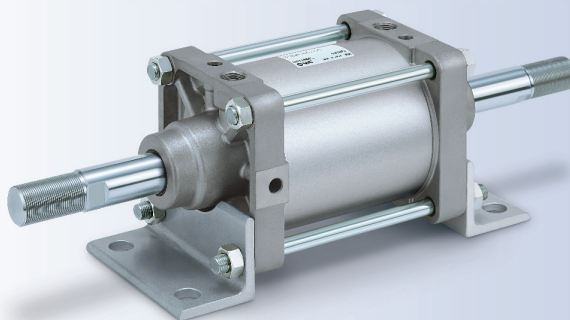
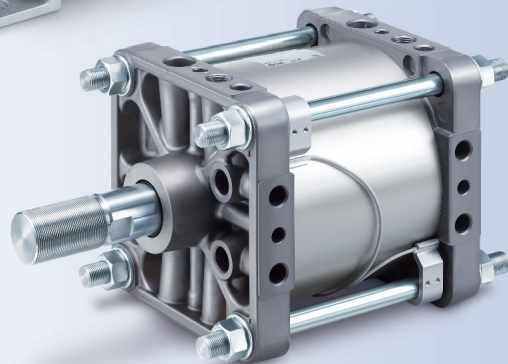
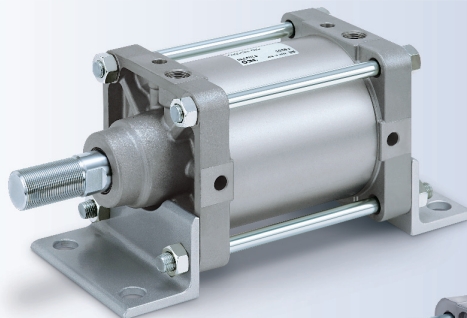
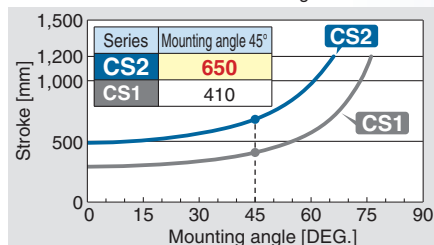
■ When using a rotating bracket:

Max. stroke increased by **1.6 times**

410 mm stroke → **650 mm** stroke



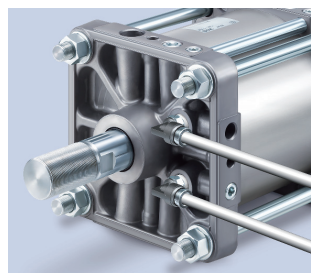
Maximum allowable stroke when using a clevis bracket



Improved Ease of Piping

Centralised piping ports in the axial direction increase piping flexibility.

(Axial centralised piping type)



Rod side axial piping



Head side axial piping

New

- Ø 180, Ø 200, and Ø 250 have been added.
- The axial centralised piping type has been added.
(Ø 180, Ø 200, and Ø 250 only)

CS2 Series



CAT.EUS20-196C-UK

Lightweight

Weight reduced by a change in the cover material

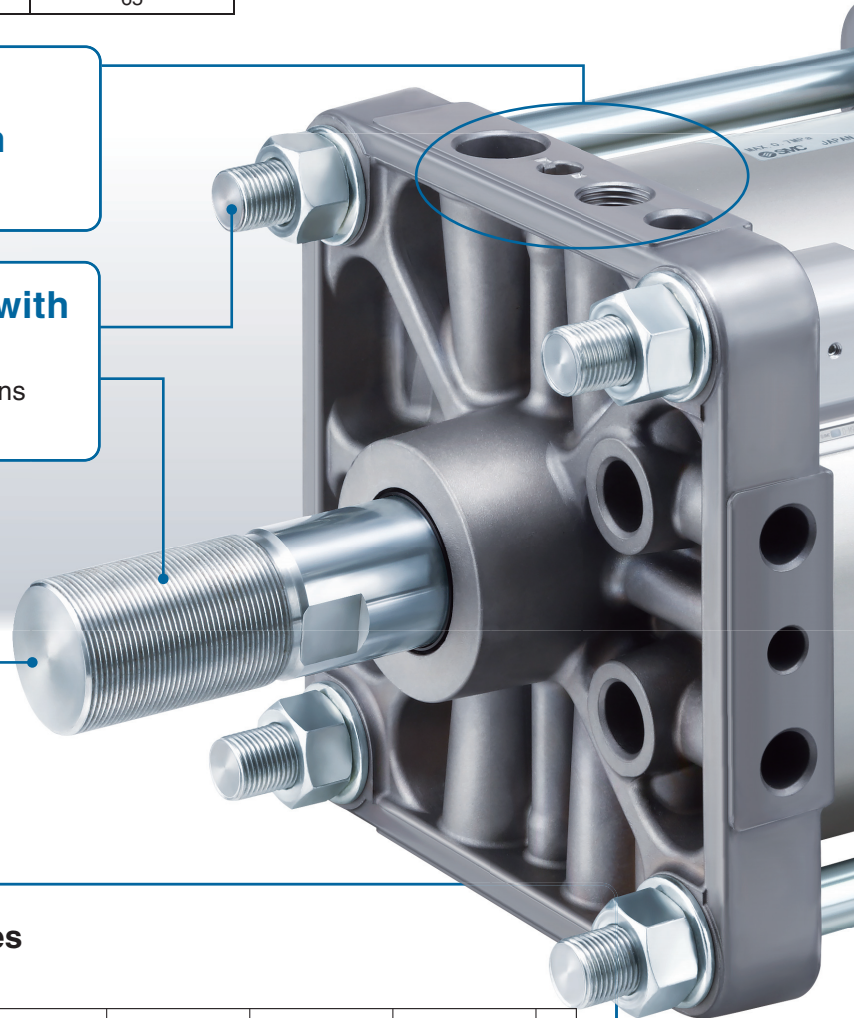
* Compared at a 100 mm stroke

Bore size [mm]	CS2 (Aluminium tube) [kg]	CS1 (Steel tube) [kg]	Reduction rate [%]
125	7.0	17.9	61
140	8.2	21.4	62
160	11.3	28.8	61
180	13.4	39.1	65
200	17.8	48.4	63
250	30.8	88.9	65

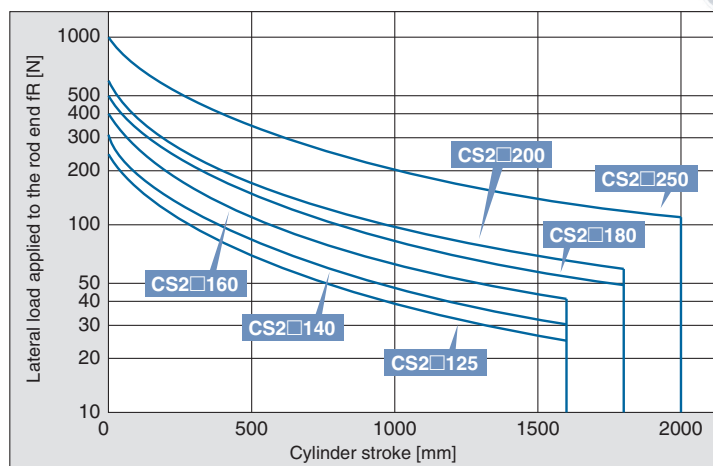
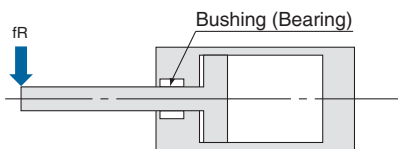
Ease of piping improved by placing the piping and cushion valve on the same side

Mounting is interchangeable with the CS1 series.

- Interchangeable cylinder mounting dimensions
- Interchangeable rod end thread sizes



■ Lateral load equal to the CS1 series



High Rigidity

Allowable lateral load: **Max. 700 N**

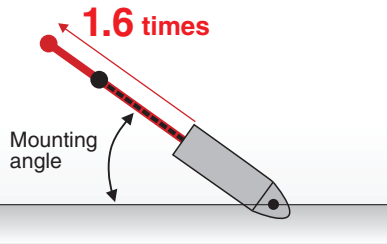
(Ø 250, 100 mm stroke, with piston rod extended)

■ When using a rotating bracket:
Max. stroke increased by 1.6 times

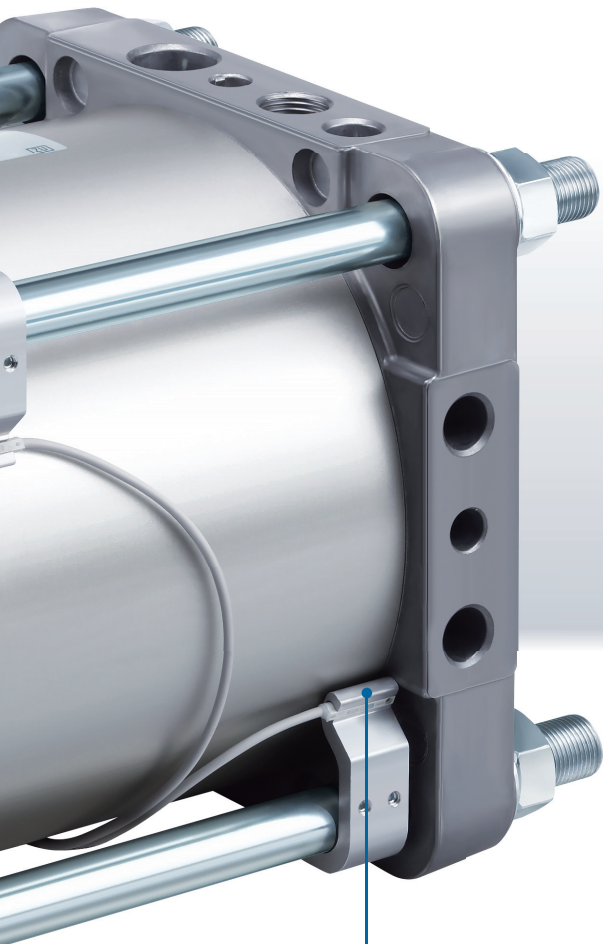
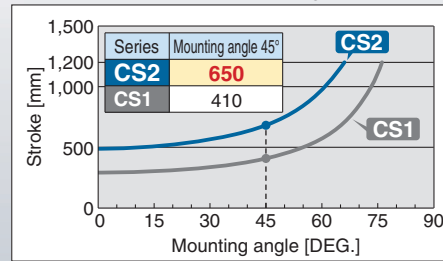
410 mm stroke → **650 mm** stroke

Lighter cylinder reduces self-weight deflection

Stroke range extended to widen use



Maximum allowable stroke when using a clevis bracket



Air cushion + **Bumper cushion** **Combined structure**

- The bumper cushion reduces the metal noise that occurs when the piston stops at the end of the stroke. (Ø 180, Ø 200, and Ø 250 only)

Auto switches can be mounted on Ø 125 to Ø 250.

- Solid state auto switch: D-M9□
- Reed auto switch: D-A9□
- Magnetic field-resistant auto switch: D-P3DWA

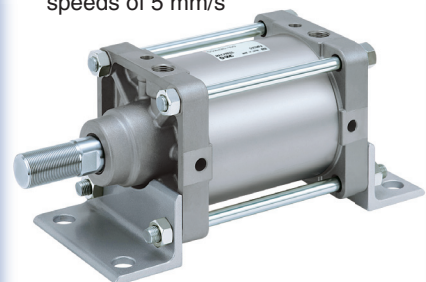


Smooth Cylinder

CS2Y Series

(Ø 125 to Ø 160 only)

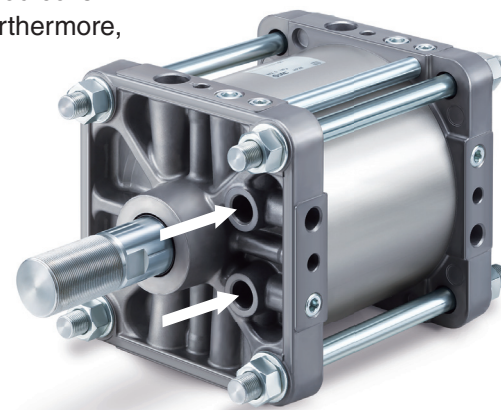
- Min. operating pressure: 0.005 MPa
- For stable operation even at low speeds of 5 mm/s



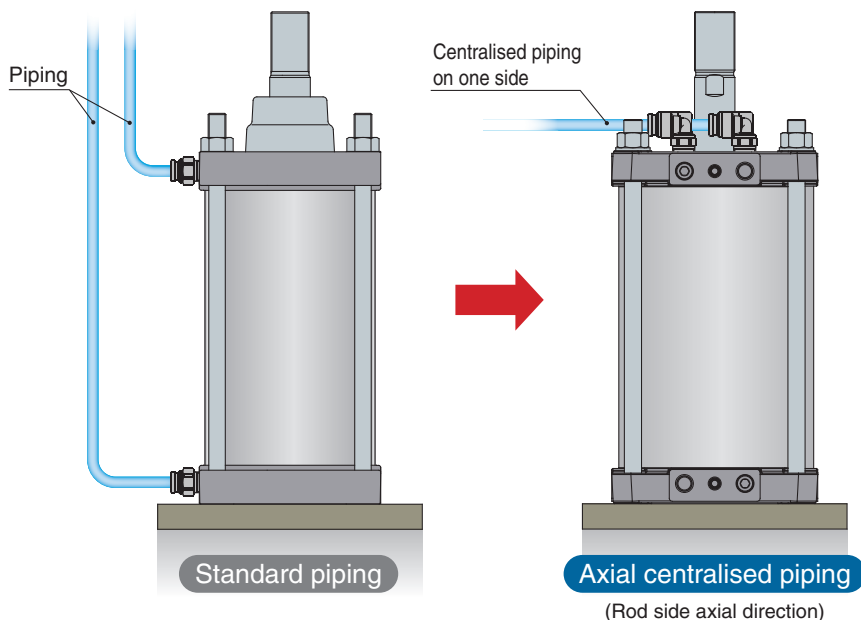
Axial Centralised Piping (Ø 180, Ø 200, and Ø 250 only)

Increased piping flexibility, Reduced piping labour



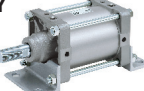
- Piping ports are located in the axial direction of the head cover or the rod cover.
- For long-stroke operation, the speed can be adjusted on one side. Furthermore, the piping has been simplified, resulting in improved ease of piping.



CS2□P Series



Series Variations

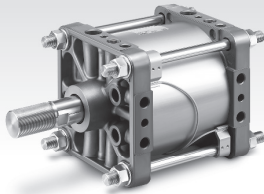
Series	Action	Type	Piping type	Standard variations		Bore size [mm]	Made to order (Ø 125 to Ø 160 only)	Page
				With rod boot	Copper-free			
 Standard CS2	Double acting	Single rod	Standard piping	●	●*1	125 140 160 180 200 250	<ul style="list-style-type: none"> • Change of rod end shape • Heat-resistant cylinder (0 to 150 °C) • Special port location • With heavy duty scraper • Heat-resistant cylinder (0 to 110 °C) • Adjustable stroke cylinder/ Adjustable retraction type • Dual stroke cylinder/Double rod type • Dual stroke cylinder/Single rod type • Change of trunnion bracket mounting position • Change of tie-rod length • Fluororubber seal • With split pins for double clevis pin/ double knuckle joint pin and flat washers • Double clevis and double knuckle joint pins made of stainless steel • Rod side trunnion • With coil scraper • Made of stainless steel (With hard chrome plated piston rod) • With rod end bracket 	6
		Double rod	Standard piping	●	●*1	19		
 Axial centralised piping CS2□P	Double acting	Single rod	Centralised piping	●		180 200 250		26
 Smooth Cylinder CS2Y	Double acting	Single rod	Standard piping	●		125 140 160		34

*1 Refer to the **catalogue** on <https://www.smc.eu> for details on copper-free products.

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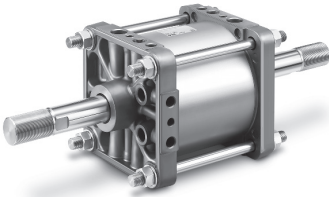
Air Cylinder *CS2 Series*

Combination of Standard Products and Made to Order Specifications p. 5



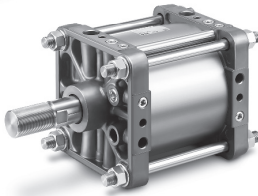
● Standard Type: Double Acting, Single Rod CS2 Series

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 Specifications p. 7
 Construction p. 10
 Dimensions p. 11
 Accessory Brackets p. 18



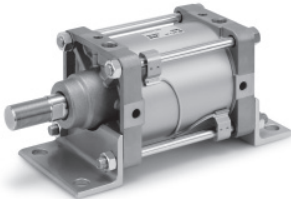
● Standard Type: Double Acting, Double Rod CS2W Series

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● Axial Centralised Piping Type: Double Acting, Single Rod CS2□P Series

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● Smooth Cylinder Type: Double Acting, Single Rod CS2Y Series

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• Simple Specials

-XA□ Change of Rod End Shape p. 44
 -XC14 Change of Trunnion Bracket Mounting Position p. 45
 -XC15 Change of Tie-rod Length p. 45

• Made to Order Common Specifications

-XB6 Heat-resistant Cylinder (0 to 150 °C) p. 46
 -XC3 Special Port Location p. 46
 -XC4 With Heavy Duty Scraper p. 47
 -XC5 Heat-resistant Cylinder (0 to 110 °C) p. 47
 -XC9 Adjustable Stroke Cylinder/Adjustable Retraction Type p. 48
 -XC10 Dual Stroke Cylinder/Double Rod Type p. 49
 -XC11 Dual Stroke Cylinder/Single Rod Type p. 50
 -XC22 Fluororubber Seal p. 51
 -XC26 With Split Pins for Double Clevis Pin/
 Double Knuckle Joint Pin and Flat Washers p. 51
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 -XC86 With Rod End Bracket p. 53

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Combination of Standard Products and Made to Order Specifications

CS2 Series

● : Standard
 ◎ : Made to order
 ○ : Special product (Please contact SMC for details.)
 — : Not available

Symbol	Specifications	Applicable bore size	CS2 (Standard)				CS2□P (Axial centralised piping)	CS2Y (Smooth cylinder)
			Double acting				Double acting	Double acting
			Single rod		Double rod		Single rod	Single rod
			Non-lube				Non-lube	Non-lube
			Ø 125 to Ø 160	Ø 180 to Ø 250	Ø 125 to Ø 160	Ø 180 to Ø 250	Ø 180 to Ø 250	Ø 125 to Ø 160
Standard	Standard		●	●	●	●	●	●
CDS2	Built-in magnet	Ø 125 to Ø 250	●	●	●	●	●	●
CS2□-□ ^J _K	With rod boot		●	●	●	●	●	●
20-	Copper and Fluorine-free *1		◎	—	◎	—	—	—
-XA□	Change of rod end shape		◎	—	◎	—	—	◎
-XB5	Oversized rod cylinder		○	—	○	—	—	○
-XB6	Heat-resistant cylinder (0 to 150 °C)		◎	—	◎	—	—	—
-XB7	Cold-resistant cylinder		○	—	○	—	—	—
-XB9	Low speed cylinder (5 to 50 mm/s)		○	—	○	—	—	○
-XC3	Special port location		◎	—	○	—	—	◎
-XC4	With heavy duty scraper		◎	—	◎	—	—	—
-XC5	Heat-resistant cylinder (0 to 110 °C)		◎	—	◎	—	—	—
-XC6*2	Made of stainless steel		Available as “-XC68”	—	Available as “-XC68”	—	—	—
-XC7	Tie-rod, cushion valve, tie-rod nut, etc. 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	Ø 125 to Ø 160	◎	—	—	—	—	○
-XC12	Tandem cylinder		○	—	—	—	—	—
-XC14	Change of trunnion bracket mounting position		◎	—	◎	—	—	◎
-XC15	Change of tie-rod length		◎	—	◎	—	—	◎
-XC22	Fluororubber seal		◎	—	◎	—	—	—
-XC26	With split pins for double clevis pin/ double knuckle joint pin and flat washers		◎	—	—	—	—	◎
-XC27	Double clevis and double knuckle joint pins made of stainless steel		◎	—	—	—	—	◎
-XC30	Rod side trunnion		◎	—	◎	—	—	◎
-XC35	With coil scraper		◎	—	◎	—	—	—
-XC39	Special trunnion bearing		○	—	○	—	—	○
-XC40	Clevis hole with bushing		○	—	—	—	—	○
-XC50	Knuckle fixed with nut		○	—	○	—	—	○
-XC68	Made of stainless steel (With hard chrome plated piston rod)		◎	—	◎	—	—	◎
-XC86	With rod end bracket		◎	—	○	—	—	◎

*1 For details, refer to the SMC website.

*2 The specification of “-XC6” made of stainless steel is available as “-XC68.”

Air Cylinder: Standard Type Double Acting, Single Rod

CS2 Series

RoHS

∅ 125, ∅ 140, ∅ 160, ∅ 180, ∅ 200, ∅ 250

How to Order

CS2 L 125 - 300

With auto switch CDS2 L 125 - 300 - M9BW

With auto switch (Built-in magnet)

Mounting

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

Bore size

125	125 mm
140	140 mm
160	160 mm
180	180 mm
200	200 mm
250	250 mm

Port thread type

—	Rc
TN	NPT
TF	G

* NPT and G threads are only applicable to ∅ 125 to ∅ 160.

Number of auto switches

—	2
3	3
S	1
n	n

Auto switch

—	Without auto switch
---	---------------------

* For applicable auto switches, refer to the table below.

Suffix for cylinder

Rod boot	—	None
	J	Nylon tarpaulin
	K	Heat-resistant tarpaulin

* The minimum stroke with a rod boot is 30 mm. (35 mm for ∅ 160 when the centre trunnion type is selected)

Cylinder stroke [mm]

Refer to "Maximum Strokes" on page 7.

Made to order

Refer to page 7 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) CDS2B125-200

Applicable Auto Switches/Refer to the catalogue on <https://www.smc.eu> for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load						
					DC	AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)								
Solid state auto switch	—	Grommet	—	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC circuit	Relay, PLC					
				3-wire (PNP)				M9P	●	●	●	○	○							
		2-wire		M9B	●	●	●	○	○	—										
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	G39	—	—	—	—	—	—		IC circuit				
	2-wire	—	—						—	—	—	—	—							
	Diagnostic indication (2-colour indicator)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	●	●	●	○	○	IC circuit						
				3-wire (PNP)				M9PW	●	●	●	○	○	—						
	Water resistant (2-colour indicator)	Grommet	—	2-wire	24 V	12 V	—	M9BW	●	●	●	○	○	—						
				3-wire (NPN)				M9NA*1	—	○	○	●	○	○		IC circuit				
	With diagnostic output (2-colour indicator)	Grommet	—	3-wire (PNP)	24 V	5 V, 12 V	—	M9PA*1	—	○	○	●	○	○		IC circuit				
2-wire				M9BA*1				—	○	○	○	○	○	—						
Magnetic field resistant (2-colour indicator)	Grommet	—	4-wire (NPN)	24 V	5 V, 12 V	—	F59F	—	●	—	●	○	○	IC circuit						
			2-wire (Non-polar)				P3DWA*2	—	●	—	●	●	○	—						
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96	●	—	●	—	—	IC circuit	—					
				No				2-wire	24 V	12 V	100 V	A93	—	●		●	●	—	IC circuit	
				Yes								A90	—	●		—	●	—		IC circuit
				No								A54	—	●		—	●	—		
		Terminal conduit	Yes	2-wire	24 V	12 V	200 V or less	—	A64	—	●	—	●	—	—	—				
									—	A33	—	—	—	—	—		PLC			
									—	A34	—	—	—	—	—			Relay, PLC		
									—	A44	—	—	—	—	—		—			
DIN terminal	Yes	2-wire	24 V	12 V	100 V, 200 V	—	—	—	—	—	—	—	—							
							—	A59W	—	●	—	●		—	—					
Diagnostic indication (2-colour indicator)	Grommet	—	—	—	—	—	—	—	●	—	●	—	—	—						

*1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance.

Please contact SMC regarding water-resistant types with the above model numbers.

*2 Excludes the D-P3DWA for ∅ 250

* Lead wire length symbols: 0.5 m..... — (Example) M9NW 3 m.....L (Example) M9NWL
1 m..... M (Example) M9NWM 5 m.....Z (Example) M9NWX

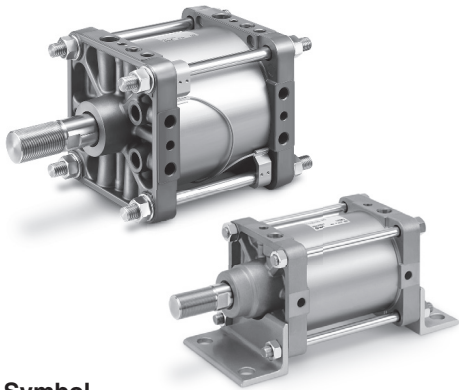
* Solid state auto switches marked with a "O" are produced upon receipt of order.

* Since there are applicable auto switches other than those listed above, refer to page 41 for details.

* D-A9□/M9□/M9□W/M9□A/P3DWA□ auto switches are shipped together with the product but do not come assembled. (Only the auto switch mounting brackets are assembled before shipment.)

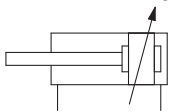
* D-G39/K39/A3□/A4□ auto switches (band mounting type) can only be mounted on ∅ 125 to ∅ 160.

CS2 Series



Symbol

Double acting, Air cushion



Made to Order Specifications (For details, refer to pages 43 to 53.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat-resistant cylinder (0 to 150 °C)
-XC3	Special port location
-XC4	With heavy duty scraper
-XC5	Heat-resistant cylinder (0 to 110 °C)
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC11	Dual stroke cylinder/Single rod type
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers
-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC68	Made of stainless steel (With hard chrome plated piston rod)
-XC86	With rod end bracket

* The made-to-order common specifications shown above are only applicable to Ø 125 to Ø 160.

Rod Boot Material

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	70 °C
K	Heat-resistant tarpaulin	110 °C*1

*1 Max. ambient temperature for rod boot itself

Refer to pages 38 to 42 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at Stroke End) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Operating Range
- Auto Switch Mounting Brackets/Part Nos.

Specifications

Bore size [mm]		125	140	160	180	200	250
Action		Double acting, Single rod					
Fluid		Air					
Proof pressure		1.57 MPa			1.2 MPa		
Maximum operating pressure		0.97 MPa			0.7 MPa		
Minimum operating pressure		0.05 MPa					
Piston speed		50 to 500 mm/s			50 to 300 mm/s		
Cushion		Air cushion			Air cushion + Bumper cushion		
Ambient and fluid temperatures	Without auto switch	0 to 70 °C (No freezing)					
	With auto switch	0 to 60 °C (No freezing)					
Lubrication		Not required (Non-lube)					
Stroke length tolerance [mm]	250 or less	+1.0 0			+2.0 0		
	251 to 1000	+1.4 0			+2.4 0		
	1001 to 1500	+1.8 0			+2.8 0		
	1501 to 1600	+2.2 0			+3.2 0		
Mounting		Basic, Foot, Rod flange, Head flange, Single clevis, Double clevis, Centre trunnion					

Maximum Strokes

* When using with auto switches, refer to the "Minimum Stroke for Auto Switch Mounting" table on page 40.

Mounting bracket	Maximum stroke [mm]	
	Basic, Head flange, Single clevis, Double clevis, Centre trunnion	Foot, Rod flange
Bore size		
125	1000 or less	1600 or less
140		
160	1200 or less	1569 or less
180		
200	998 or less	
250	813 or less	

* For Ø 180, Ø 200, and Ø 250, cylinders whose strokes exceed the lengths shown in the table to the right are categorised as class 2 pressure vessels under the Class 2 Pressure Vessel Act. Only the CS1 series is applicable for class 2 pressure vessels to be used or installed in Japan. For laws and regulations, refer to the CS 1 series (catalogue on <https://www.smc.eu>).

Bore size [mm]	Cylinder stroke [mm]
180	1569
200	998
250	813

Accessories

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

* If using the rod end nut with a single knuckle joint or a double knuckle joint, use the type with a rod end bracket (-XC86) or order the accessory separately. For part numbers and dimensions of accessories, refer to page 18.

Mounting Bracket Part Nos.

Bore size [mm]	125	140	160	180	200	250
Foot*1	CS2-L12	CS2-L14	CS2-L16	CS2-L18	CS2-L20	CS2-L25
Flange	CS2-F12	CS2-F14	CS2-F16	CS2-F18	CS2-F20	CS2-F25
Single clevis	CS2-C12	CS2-C14	CS2-C16	CS2-C18	CS2-C20	CS2-C25
Double clevis*2	CS2-D12	CS2-D14	CS2-D16	CS2-D18	CS2-D20	CS2-D25

*1 Order two foot brackets per cylinder.

*2 When ordering the double clevis type, the clevis pin and 2 split pins are included as accessories.

Weight (Guide)

Bore size [mm]		125	140	160	180	200	250
Basic weight	Basic	5.5	6.5	9.1	10.9	14.8	25.7
	Foot	7.5	9.5	12.5	15.6	20.3	36.6
	Rod flange	8.6	12.1	15.8	20.5	26.6	47.5
	Head flange	8.6	12.1	15.8	20.5	26.6	47.5
	Single clevis	8.6	10.8	14.6	19.2	24.8	44.0
	Double clevis	9.0	11.6	15.5	20.9	26.6	47.1
	Trunnion	9.6	12.3	15.5	21.6	28.8	52.0
Additional weight with magnet (With built-in magnet and auto switch)		0.1	0.1	0.1	0.1	0.2	0.2
Additional weight per 100 mm of stroke		1.6	1.7	2.3	2.5	3.0	5.1
Accessories	Single knuckle	1.0	1.2	1.6	3.1	2.9	5.4
	Double knuckle (Knuckle pin, Split pin)	1.4	1.9	2.5	4.8	4.6	9.3
	Rod end nut	0.2	0.2	0.3	0.4	0.9	1.3

Calculation: (Example) **CS2L160-500**

- Basic weight 12.5 [kg]
 - Additional weight ... 2.3 [kg/100 mm]
 - Cylinder stroke 500 [mm]
- $12.5 + 2.3 \times 500/100 = 24.0$ [kg]

Theoretical Output



Unit: N

Bore size [mm]	Rod size [mm]	Operating direction	Piston area [mm ²]	Operating pressure [MPa]								
				0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
125	32	OUT	12300	2460	3690	4920	6150	7380	8610	9840	11100	12300
		IN	11500	2300	3450	4600	5750	6900	8050	9200	10400	11500
140	32	OUT	15400	3080	4620	6160	7700	9240	10800	12300	13900	15400
		IN	14600	2920	4380	5840	7300	8760	10200	11700	13100	14600
160	38	OUT	20100	4020	6030	8040	10100	12100	14100	16100	18100	20100
		IN	19000	3800	5700	7600	9500	11400	13300	15200	17100	19000
180	40	OUT	25400	5080	7620	10200	12700	15200	17800	—	—	—
		IN	24200	4840	7260	9680	12100	14520	16940	—	—	—
200	45	OUT	31400	6280	9420	12600	15700	18800	22000	—	—	—
		IN	29800	5960	8940	11930	14910	17890	20870	—	—	—
250	56	OUT	49100	9820	14700	19600	24600	29500	34400	—	—	—
		IN	46600	9320	13980	18640	23310	27970	32630	—	—	—

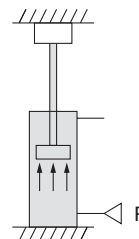
CS2 Series

Relationship between Cylinder Size and Maximum Stroke

The below table shows the applicable maximum stroke (in cm units), found by calculation assuming the case where the force generated by the cylinder itself acts as buckling force on the piston rod, or piston rod and cylinder tube.

Therefore, it is possible to find the applicable maximum stroke for each cylinder size using the relationship between the size of the operating pressure and the cylinder support type, regardless of the load ratio.

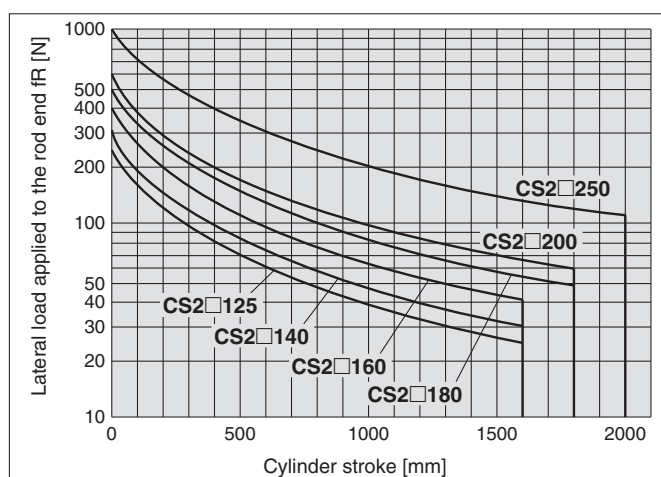
[Reference] If it is stopped with the external stopper on the cylinder extension side, even with a light load, the maximum generated force of the cylinder will act on the cylinder itself.



[cm]

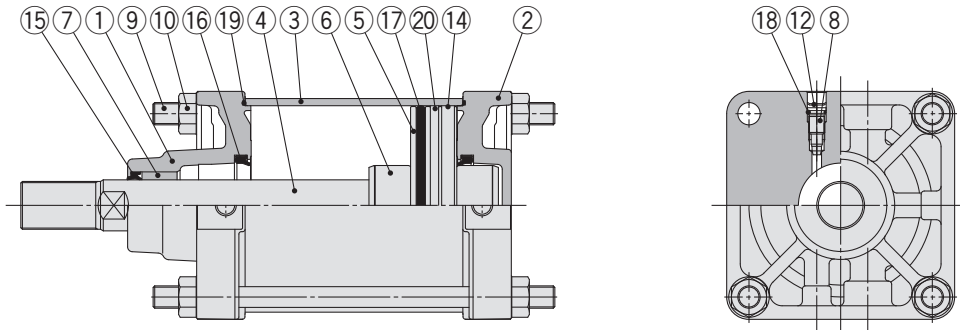
Mounting			Operating pressure [MPa]	Applicable maximum stroke according to buckling strength					
Support bracket nominal symbol and schematic diagram		Nominal symbol		125	140	160	180	200	250
Foot: L	Rod flange: F	Head flange: G	0.3	103	92	113	108	124	155
		L, F	0.5	79	70	86	81	94	118
			0.7	66	58	72	67	78	98
			0.3	45	38	47	46	54	67
		G	0.5	33	27	34	33	39	49
			0.7	26	22	27	26	31	39
			0.3	96	83	106	102	118	147
Clevis: C, D		Centre trunnion: T	0.5	71	61	76	75	88	109
		C, D	0.7	59	50	62	61	72	89
			0.3	135	119	147	146	167	208
			0.5	101	89	111	110	127	158
		T	0.7	84	74	91	91	105	131
			0.3	301	267	330	324	370	460
			0.5	231	207	253	248	284	354
Foot: L	Rod flange: F	Head flange: G	0.7	193	172	212	208	239	297
		L, F	0.3	144	126	156	154	177	220
			0.5	109	94	118	116	134	167
			0.7	90	78	97	96	111	138
		G	0.3	433	386	476	462	528	655
			0.5	334	297	367	355	406	505
			0.7	281	250	309	299	342	425
Foot: L	Rod flange: F	Head flange: G	0.3	210	185	229	223	256	317
		L, F	0.5	160	141	175	170	195	242
			0.7	134	117	129	142	163	202
			0.3	210	185	229	223	256	317
		G	0.5	160	141	175	170	195	242
			0.7	134	117	129	142	163	202

Allowable Lateral Load (Same as the CS1 series)

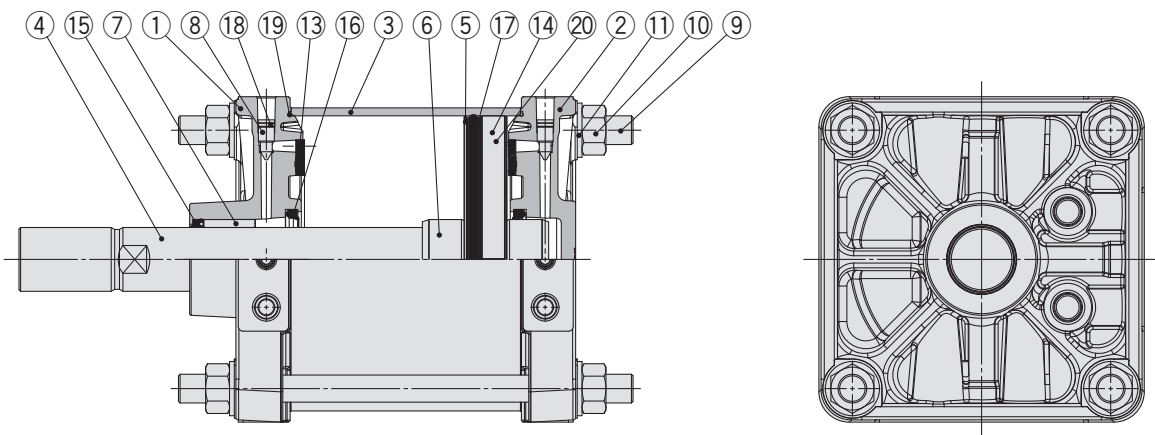


Construction

Ø 125 to Ø 160



Ø 180 to Ø 250



Component Parts

No.	Description	Material	Qty.	Note
1	Rod cover	Aluminium die-cast	1	
2	Head cover	Aluminium die-cast	1	
3	Cylinder tube	Aluminium alloy	1	
4	Piston rod	Carbon steel	1	
5	Piston	Aluminium alloy	1	
6	Cushion ring	Stainless steel	2	Ø 125 to Ø 180
		Rolled steel	2	Ø 200, Ø 250
7	Bushing	Bearing alloy	1	
8	Cushion valve	Rolled steel	2	Ø 125 to Ø 160
		Brass	2	Ø 180 to Ø 250
9	Tie-rod	Carbon steel	4	
10	Tie-rod nut	Rolled steel	8	
11	Flat washer	Rolled steel	8	Ø 180 to Ø 250
12	Retaining ring	Spring steel	2	Ø 125 to Ø 160
13	Bumper	Urethane	2	Ø 180 to Ø 250
14	Wear ring	Resin	1	
15	Rod seal	NBR	1	
16	Cushion seal	Urethane	2	Ø 125 to Ø 200
		NBR	2	Ø 250

Component Parts

No.	Description	Material	Qty.	Note
17	Piston seal	NBR	1	
18	Cushion valve seal	NBR	2	
19	Cylinder tube gasket	NBR	2	
20	Magnet*1	—	1	

*1 Built-in magnet type with auto switch

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
125	CS2-125A-PS	Set of nos. 15, 16, 17, 19
140	CS2-140A-PS	
160	CS2-160A-PS	
180	CS2-180A-PS	Set of nos. 16, 17, 19
200	CS2-200A-PS	
250	CS2-250A-PS	Set of nos. 17, 19

* The seal kit includes a grease pack (40 g). Order with one of the following part numbers when only the grease pack is required.

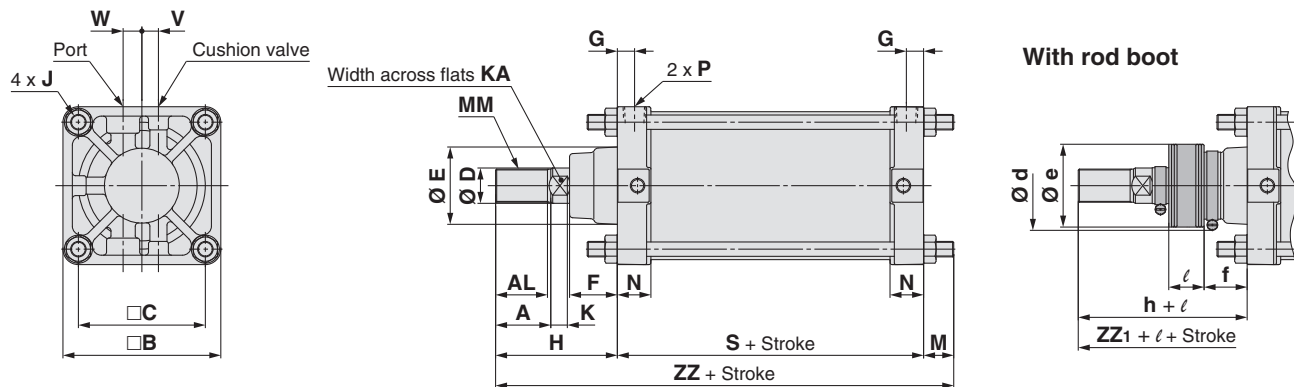
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

CS2 Series

Dimensions

Basic: CS2B

Ø 125 to Ø 160



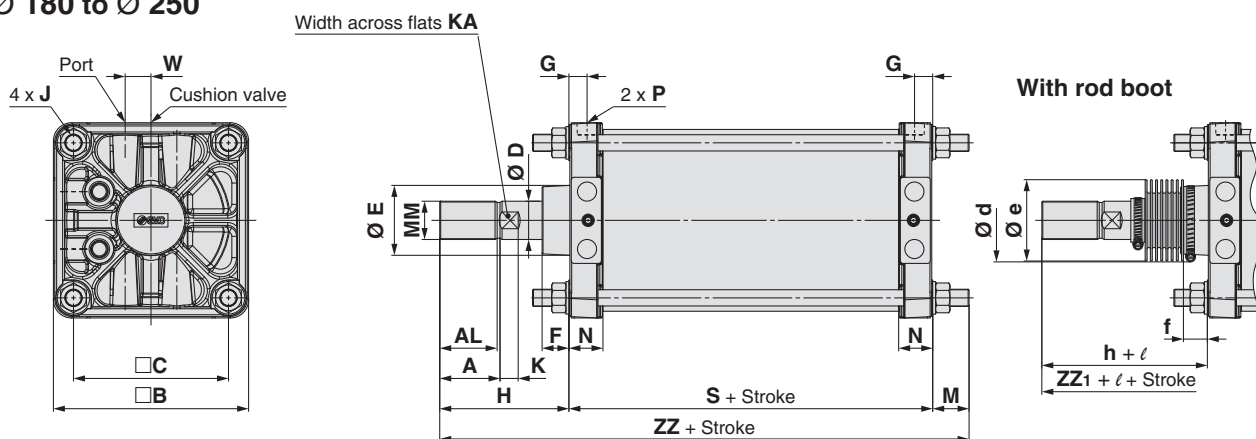
[mm]

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

[mm]

Bore size	N	P	S	Without rod boot		With rod boot					
				H	ZZ	d	e	f	h	ℓ	ZZ1
125	30.5	1/2	98	110	235	82	75	40	133	1/5 stroke	258
140	30.5	1/2	98	110	235	82	75	40	133	1/5 stroke	258
160	34.5	3/4	106	120	256.5	82	75	40	141	1/5 stroke	277.5

Ø 180 to Ø 250



[mm]

Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	K	KA	M	MM	N	P
180	Up to 1200	63	60	204	162	40	73.5	28	19	M18 x 1.5	17	36	35	M40 x 1.5	35.6	1/2
200	Up to 998	63	60	226	182	45	78.5	32	19	M20 x 1.5	20	41	35	M45 x 1.5	35.6	1/2
250	Up to 813	71	67	277	225	56	90.4	43	23	M24 x 1.5	22	50	41.5	M56 x 2	45.6	3/4

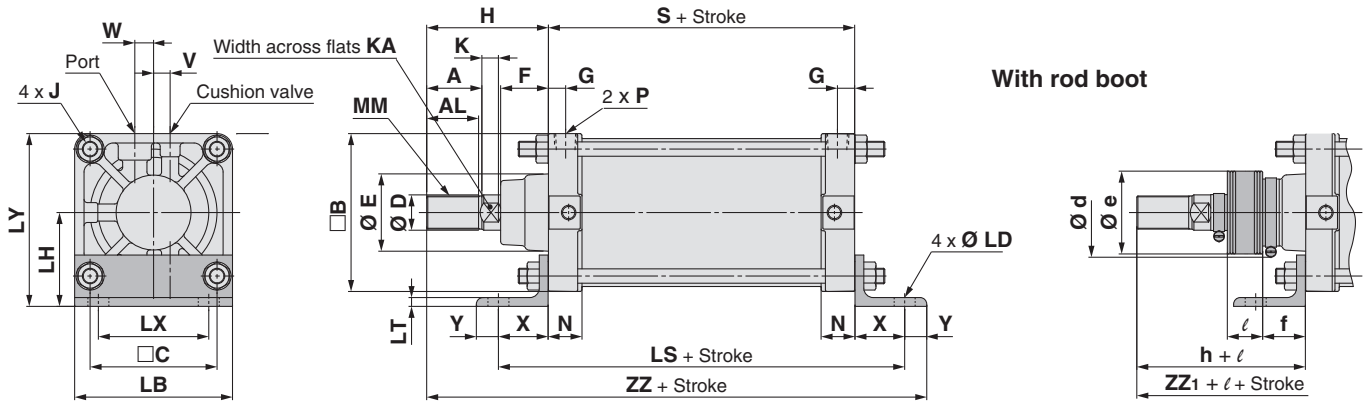
[mm]

Bore size	S	W	Without rod boot		With rod boot					
			H	ZZ	d	e	f	h	ℓ	ZZ1
180	115	27	135	285	92	85	25	153	1/5 stroke	303
200	120	27	135	290	96	90	29	153	1/5 stroke	308
250	141	32	160	342.5	108	105	36	176	1/6 stroke	358.5

Dimensions

Foot: CS2L

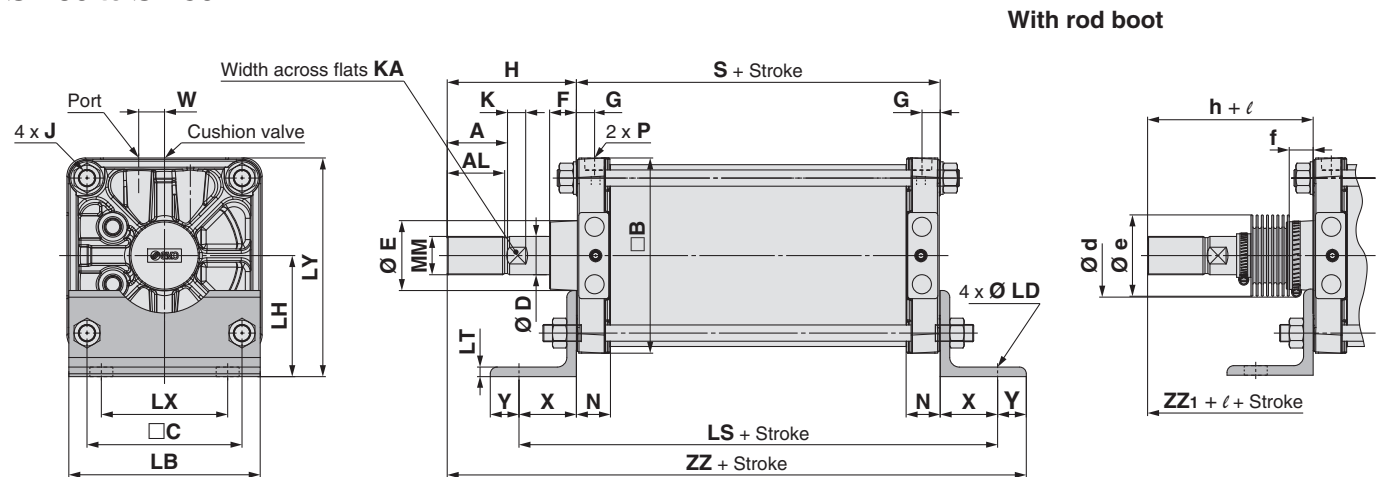
Ø 125 to Ø 160



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

Bore size	LT	LX	LY	MM	N	P	S	X	Y	Without rod boot		With rod boot					ZZ1
										H	ZZ	d	e	f	h	l	
125	8	100	156.5	M30 x 1.5	30.5	1/2	98	45	20	110	273	82	75	40	133	1/5 stroke	296
140	9	112	178.5	M30 x 1.5	30.5	1/2	98	45	30	110	283	82	75	40	133	1/5 stroke	306
160	9	118	194.5	M36 x 1.5	34.5	3/4	106	50	25	120	301	82	75	40	141	1/5 stroke	322

Ø 180 to Ø 250



Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	K	KA	LB	LD	LH	LS	LT	LX
180	Up to 1569	63	60	204	162	40	73.5	28	19	M18 x 1.5	17	36	204	24	125	235	10	132
200	Up to 998	63	60	226	182	45	78.5	32	19	M20 x 1.5	20	41	226	24	132	240	10	150
250	Up to 813	71	67	277	225	56	90.4	43	23	M24 x 1.5	22	50	277	29	160	301	12	180

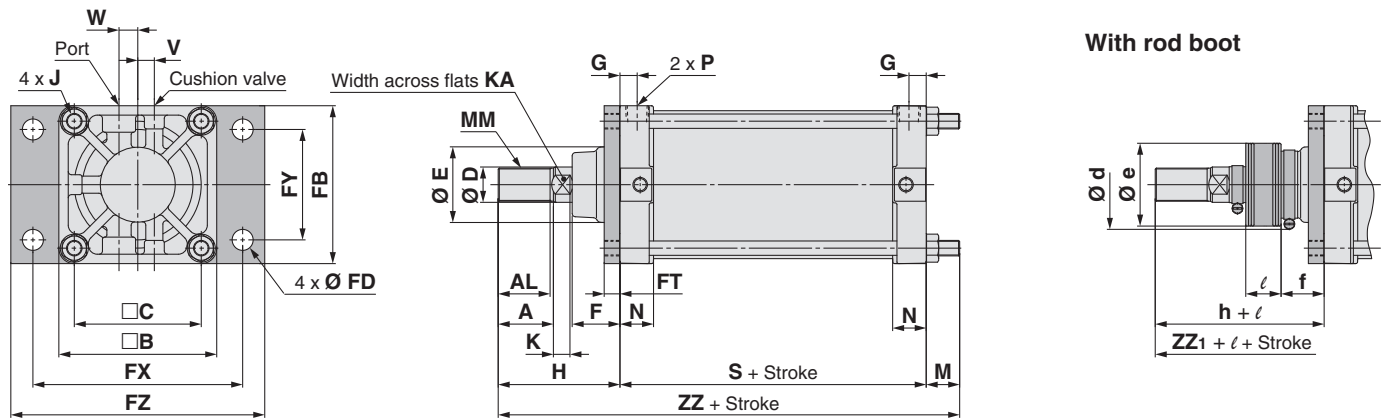
Bore size	LY	MM	N	P	S	W	X	Y	Without rod boot		With rod boot					ZZ1
									H	ZZ	d	e	f	h	l	
180	227	M40 x 1.5	35.6	1/2	115	27	60	30	135	340	92	85	25	153	1/5 stroke	358
200	245	M45 x 1.5	35.6	1/2	120	27	60	30	135	345	96	90	29	153	1/5 stroke	363
250	298.5	M56 x 2	45.6	3/4	141	32	80	40	160	421	108	105	36	176	1/6 stroke	437

CS2 Series

Dimensions

Rod flange: CS2F

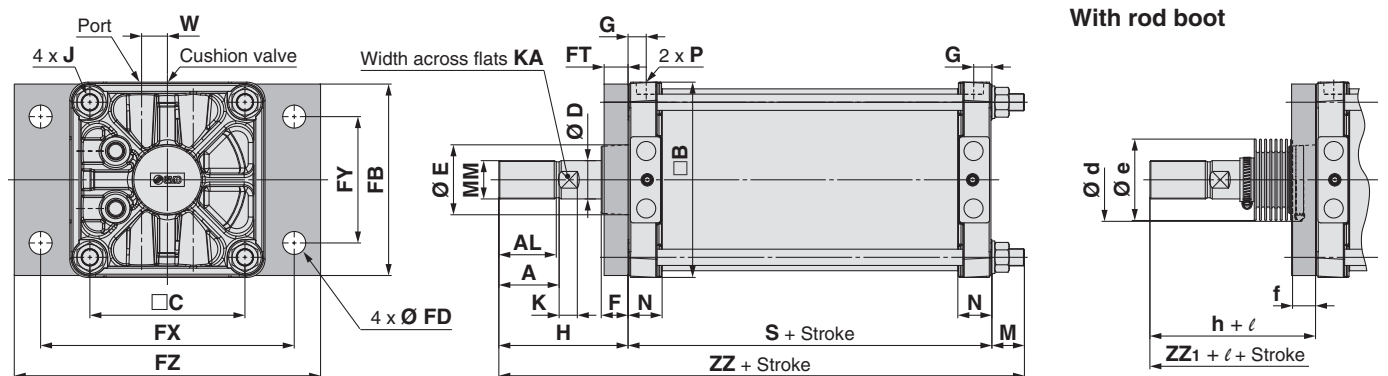
Ø 125 to Ø 160



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

Bore size	W	K	KA	M	MM	N	P	S	Without rod boot		With rod boot					
									H	ZZ	d	e	f	h	l	ZZ1
125	17	15	27	13	M30 x 1.5	30.5	1/2	98	110	221	82	75	40	133	1/5 stroke	244
140	17	15	27	13	M30 x 1.5	30.5	1/2	98	110	221	82	75	40	133	1/5 stroke	244
160	20	17	34	15	M36 x 1.5	34.5	3/4	106	120	241	82	75	40	141	1/5 stroke	262

Ø 180 to Ø 250



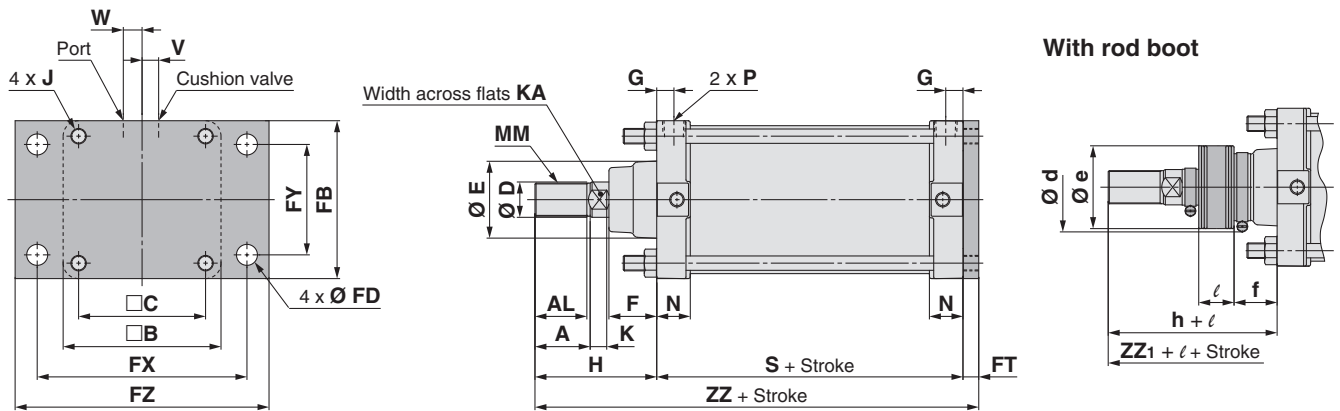
Bore size	Stroke range	A	AL	B	C	D	E	F	FB	FD	FT	FX	FY	FZ	G	J	K
180	Up to 1569	63	60	204	162	40	73.5	28	200	24	25	265	132	320	19	M18 x 1.5	17
200	Up to 998	63	60	226	182	45	78.5	32	225	24	25	280	150	335	19	M20 x 1.5	20
250	Up to 813	71	67	277	225	56	90.4	43	275	29	30	355	180	420	23	M24 x 1.5	22

Bore size	KA	M	MM	N	P	S	W	Without rod boot		With rod boot					
								H	ZZ	d	e	f	h	l	ZZ1
180	36	31	M40 x 1.5	35.6	1/2	115	27	135	281	92	85	25	153	1/5 stroke	299
200	41	31	M45 x 1.5	35.6	1/2	120	27	135	286	96	90	29	153	1/5 stroke	304
250	50	35	M56 x 2	45.6	3/4	141	32	160	336	108	105	36	176	1/6 stroke	352

Dimensions

Head flange: CS2G

Ø 125 to Ø 160



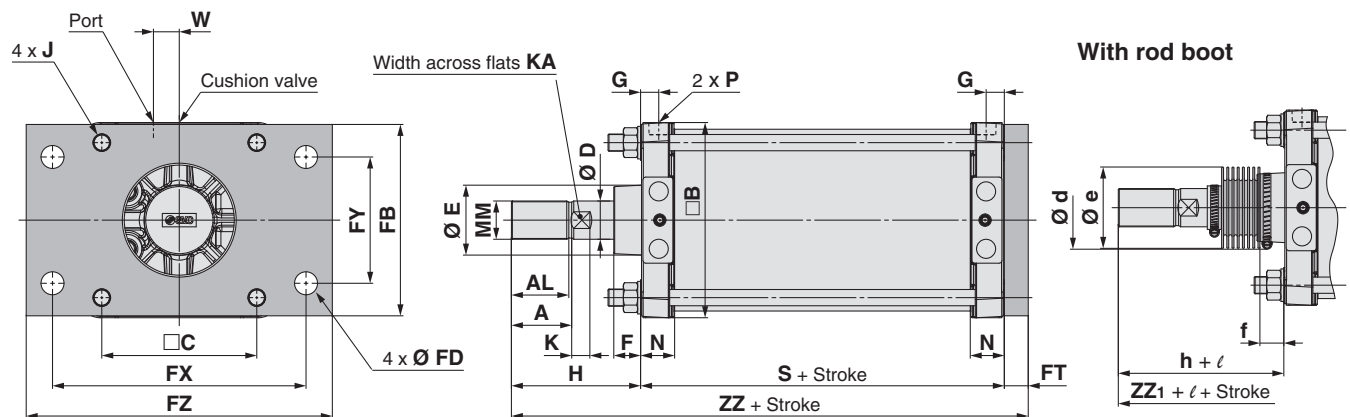
[mm]

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

[mm]

Bore size	W	K	KA	MM	N	P	S	Without rod boot		With rod boot					
								H	ZZ	d	e	f	h	l	ZZ1
125	17	15	27	M30 x 1.5	30.5	1/2	98	110	222	82	75	40	133	1/5 stroke	245
140	17	15	27	M30 x 1.5	30.5	1/2	98	110	228	82	75	40	133	1/5 stroke	251
160	20	17	34	M36 x 1.5	34.5	3/4	106	120	246	82	75	40	141	1/5 stroke	267

Ø 180 to Ø 250



[mm]

Bore size	Stroke range	A	AL	B	C	D	E	F	FB	FD	FT	FX	FY	FZ	G	J	K
180	Up to 1200	63	60	204	162	40	73.5	28	200	24	25	265	132	320	19	M18 x 1.5	17
200	Up to 998	63	60	226	182	45	78.5	32	225	24	25	280	150	335	19	M20 x 1.5	20
250	Up to 813	71	67	277	225	56	90.4	43	275	29	30	355	180	420	23	M24 x 1.5	22

[mm]

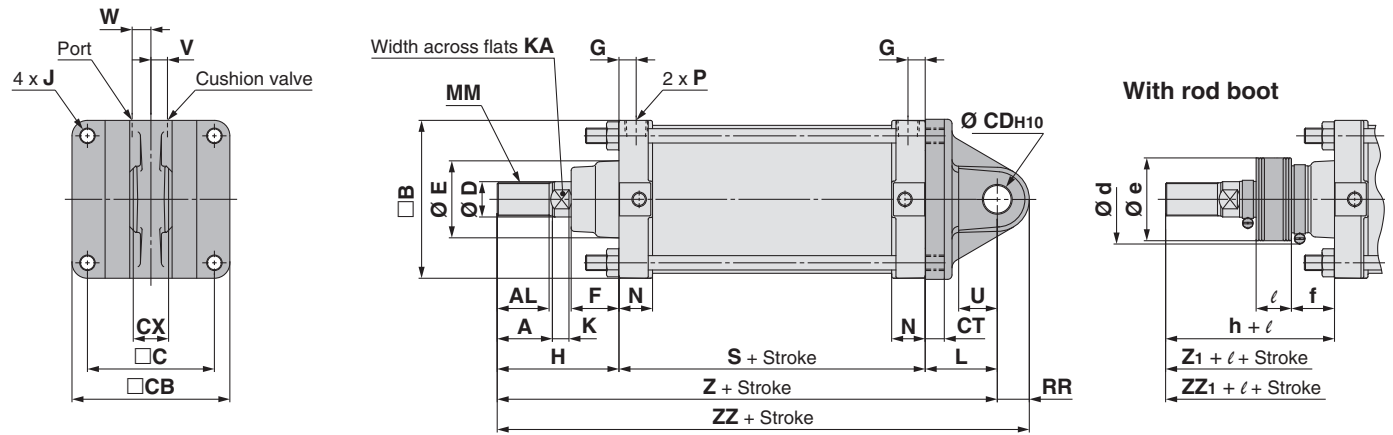
Bore size	KA	MM	N	P	S	W	Without rod boot		With rod boot					
							H	ZZ	d	e	f	h	l	ZZ1
180	36	M40 x 1.5	35.6	1/2	115	27	135	275	92	85	25	153	1/5 stroke	293
200	41	M45 x 1.5	35.6	1/2	120	27	135	280	96	90	29	153	1/5 stroke	298
250	50	M56 x 2	45.6	3/4	141	32	160	331	108	105	36	176	1/6 stroke	347

CS2 Series

Dimensions

Single clevis: CS2C

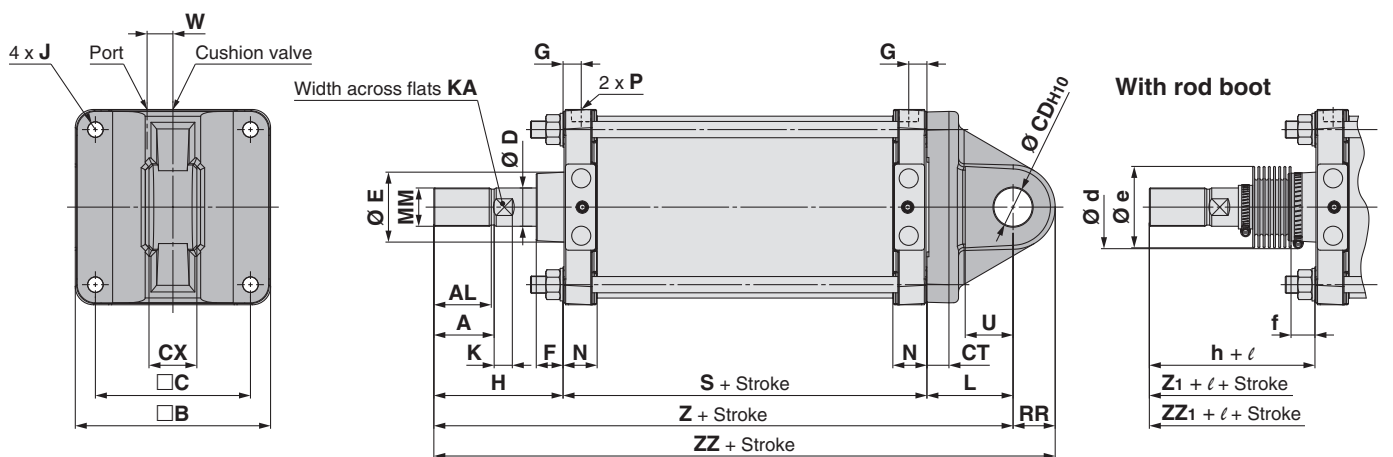
Ø 125 to Ø 160



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

Bore size	KA	L	MM	N	P	S	U	RR	Without rod boot			With rod boot						
									H	Z	ZZ	d	e	f	h	l	Z1	ZZ1
125	27	65	M30 x 1.5	30.5	1/2	98	35	29	110	273	302	82	75	40	133	1/5 stroke	296	325
140	27	75	M30 x 1.5	30.5	1/2	98	40	32	110	283	315	82	75	40	133	1/5 stroke	306	338
160	34	80	M36 x 1.5	34.5	3/4	106	45	36	120	306	342	82	75	40	141	1/5 stroke	327	363

Ø 180 to Ø 250



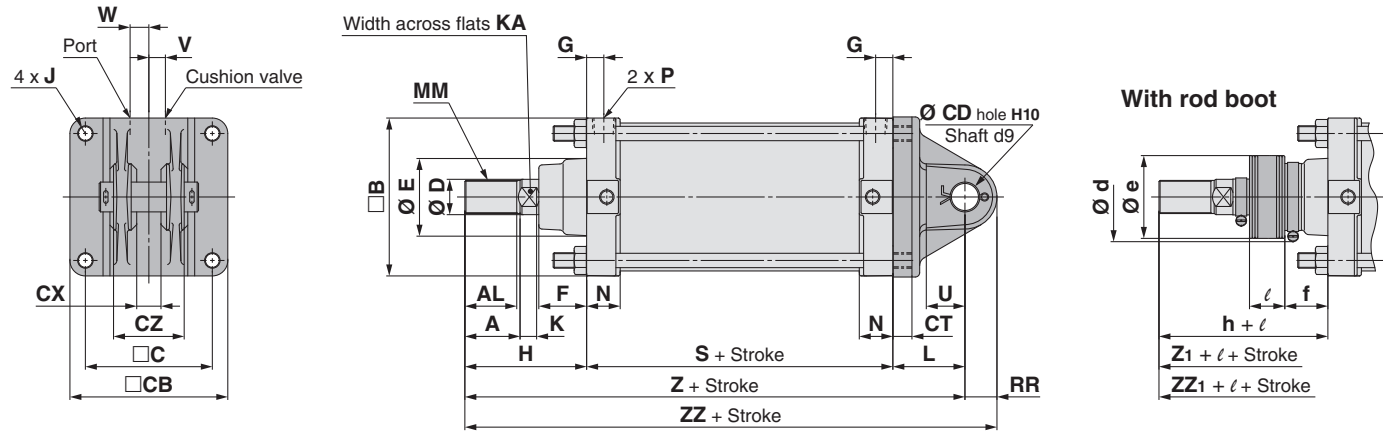
Bore size	Stroke range	A	AL	B	C	CDH10	CT	CX	D	E	F	G	J	K	KA	L
180	Up to 1200	63	60	204	162	40 ^{+0.100} ₀	23	50 ^{-0.1} _{-0.3}	40	73.5	28	19	M18 x 1.5	17	36	90
200	Up to 998	63	60	226	182	40 ^{+0.100} ₀	25	50 ^{-0.1} _{-0.3}	45	78.5	32	19	M20 x 1.5	20	41	90
250	Up to 813	71	67	277	225	50 ^{+0.100} ₀	30	63 ^{-0.1} _{-0.3}	56	90.4	43	23	M24 x 1.5	22	50	110

Bore size	MM	N	P	RR	S	U	W	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	l	Z1	ZZ1
180	M40 x 1.5	35.6	1/2	44	115	50	27	135	340	384	92	85	25	153	1/5 stroke	358	402
200	M45 x 1.5	35.6	1/2	44	120	50	27	135	345	389	96	90	29	153	1/5 stroke	363	407
250	M56 x 2	45.6	3/4	55	141	65	32	160	411	466	108	105	36	176	1/6 stroke	427	482

Dimensions

Double clevis: CS2D

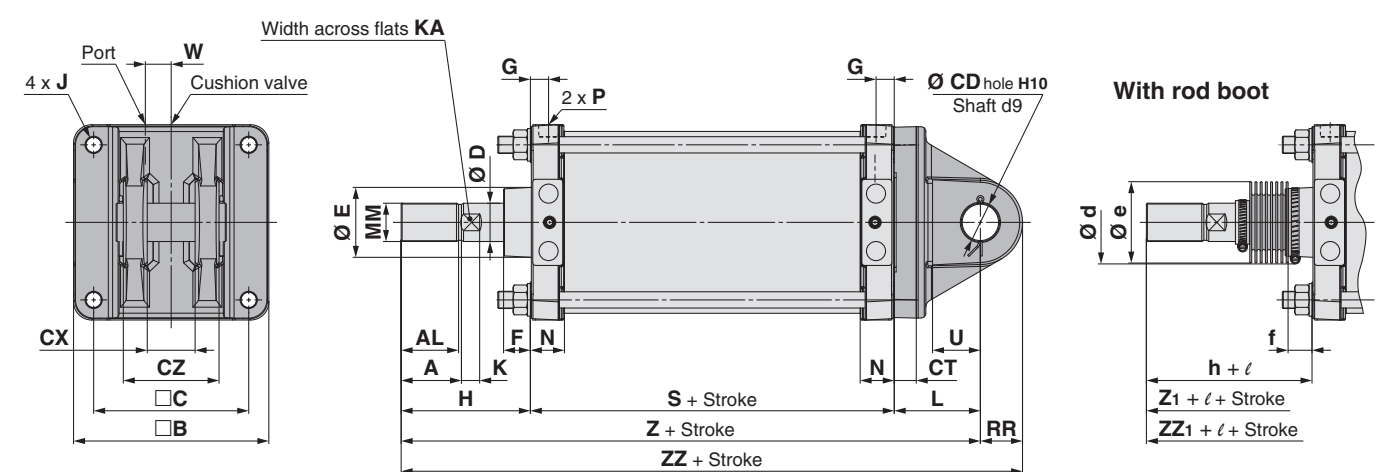
Ø 125 to Ø 160



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

Bore size	K	KA	L	MM	N	P	S	U	RR	Without rod boot			With rod boot						
										H	Z	ZZ	d	e	f	h	ℓ	Z1	ZZ1
125	15	27	65	M30 x 1.5	30.5	1/2	98	35	29	110	273	302	82	75	40	133	1/5 stroke	296	325
140	15	27	75	M30 x 1.5	30.5	1/2	98	40	32	110	283	315	82	75	40	133	1/5 stroke	306	338
160	17	34	80	M36 x 1.5	34.5	3/4	106	45	36	120	306	342	82	75	40	141	1/5 stroke	327	363

Ø 180 to Ø 250



Bore size	Stroke range	A	AL	B	C	CDH10	CT	CX	CZ	D	E	F	G	J	K	KA	L
180	Up to 1200	63	60	204	162	40 ^{-0.100} ₀	23	50 ^{-0.3} _{-0.1}	100 ^{-0.1} _{-0.3}	40	73.5	28	19	M18 x 1.5	17	36	90
200	Up to 998	63	60	226	182	40 ^{-0.100} ₀	25	50 ^{-0.3} _{-0.1}	100 ^{-0.1} _{-0.3}	45	78.5	32	19	M20 x 1.5	20	41	90
250	Up to 813	71	67	277	225	50 ^{-0.100} ₀	30	63 ^{-0.3} _{-0.1}	126 ^{-0.1} _{-0.3}	56	90.4	43	23	M24 x 1.5	22	50	110

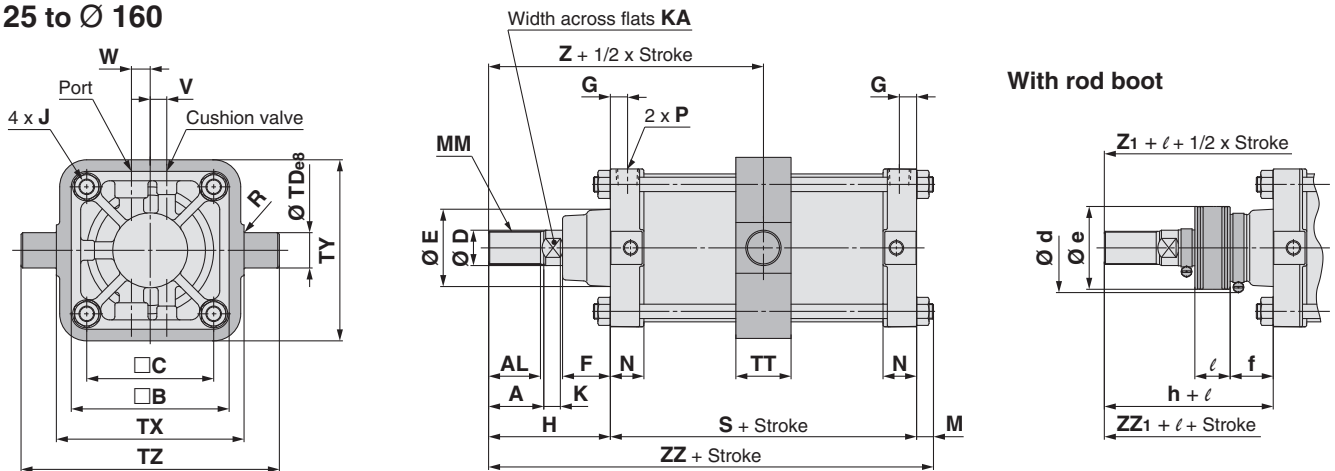
Bore size	MM	N	P	RR	S	U	W	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	ℓ	Z1	ZZ1
180	M40 x 1.5	35.6	1/2	44	115	50	27	135	340	384	92	85	25	153	1/5 stroke	358	402
200	M45 x 1.5	35.6	1/2	44	120	50	27	135	345	389	96	90	29	153	1/5 stroke	363	407
250	M56 x 2	45.6	3/4	55	141	65	32	160	411	466	108	105	36	176	1/6 stroke	427	482

CS2 Series

Dimensions

Centre trunnion: CS2T

Ø 125 to Ø 160



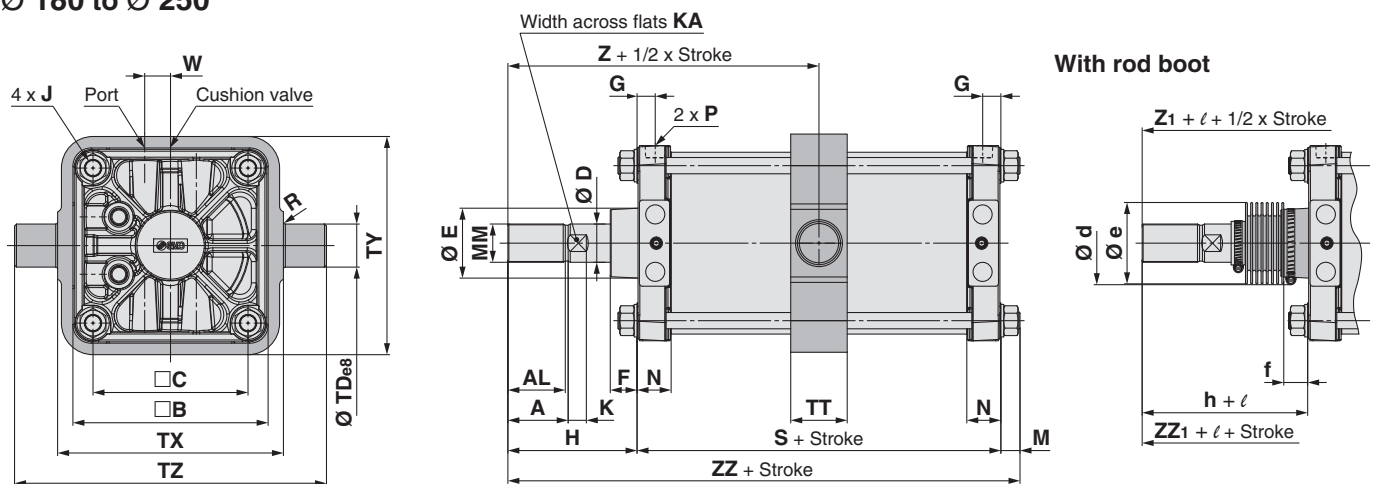
[mm]

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

[mm]

Bore size	P	R	S	TDe8	TT	TX	TY	TZ	Without rod boot			With rod boot						
									H	Z	ZZ	d	e	f	h	ℓ	Z1	ZZ1
125	1/2	1	98	32 ^{-0.050} _{-0.089}	50	170	164	234	110	159	221	82	75	40	133	1/5 stroke	182	244
140	1/2	1.5	98	36 ^{-0.050} _{-0.089}	55	190	184	262	110	159	221	82	75	40	133	1/5 stroke	182	244
160	3/4	1.5	106	40 ^{-0.050} _{-0.089}	60	212	204	292	120	173	241	82	75	40	141	1/5 stroke	194	262

Ø 180 to Ø 250



[mm]

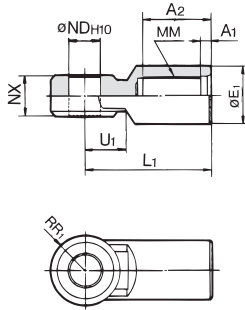
Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	K	KA	M	MM	N	P	R
180	25 to 1200	63	60	204	162	40	73.5	28	19	M18 x 1.5	17	36	20	M40 x 1.5	35.6	1/2	2
200	25 to 998	63	60	226	182	45	78.5	32	19	M20 x 1.5	20	41	21	M45 x 1.5	35.6	1/2	2
250	25 to 813	71	67	277	225	56	90.4	43	23	M24 x 1.5	22	50	25	M56 x 2	45.6	3/4	3

[mm]

Bore size	S	TDe8	TT	TX	TY	TZ	W	Without rod boot			With rod boot						
								H	Z	ZZ	d	e	f	h	ℓ	Z1	ZZ1
180	115	45 ^{-0.050} _{-0.089}	59	236	228	326	27	135	192.5	270	92	85	25	153	1/5 stroke	210.5	288
200	120	45 ^{-0.050} _{-0.089}	59	265	257	355	27	135	195	276	96	90	29	153	1/5 stroke	213	294
250	141	56 ^{-0.060} _{-0.106}	69	335	325	447	32	160	230.5	326	108	105	36	176	1/6 stroke	246.5	342

Accessory Brackets

I Type Single Knuckle Joint

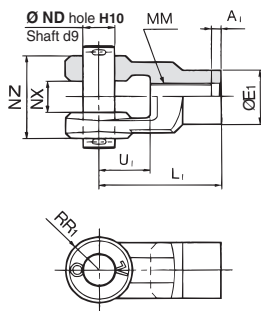


Material: Cast iron

Part no.	Applicable bore size [mm]	A ₁	A ₂	E ₁	L ₁	MM	ND _{H10}	NX	RR ₁	U ₁
I-12A	125	8	54	46	100	M30 x 1.5	25 ^{+0.084} ₀	32 ^{-0.1} _{-0.3}	27	33
I-14A	140	8	54	48	105	M30 x 1.5	28 ^{+0.084} ₀	36 ^{-0.1} _{-0.3}	30	39
I-16A	160	8	60	55	110	M36 x 1.5	32 ^{+0.1} ₀	40 ^{-0.1} _{-0.3}	34	39
I-18A	180	8	67	70	125	M40 x 1.5	40 ^{+0.1} ₀	50 ^{-0.1} _{-0.3}	42.5	44
I-20A	200	8	67	70	125	M45 x 1.5	40 ^{+0.1} ₀	50 ^{-0.1} _{-0.3}	42.5	44
I-25A	250	9	75.5	86	160	M56 x 2	50 ^{+0.1} ₀	63 ^{-0.1} _{-0.3}	53	66

- * Use a single knuckle joint individually.
(Screw it entirely over the rod end threads and tighten it.)
- * Extend the dimensions of A and H when using a single knuckle joint together with a rod end nut.
For dimensions A and H, refer to made-to-order -XC86 with rod end bracket (p. 53).
When ordering, please use simple special -XA0 (p. 44).

Y Type Double Knuckle Joint

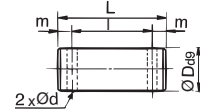


Material: Cast iron

Part no.	Applicable bore size [mm]	A ₁	E ₁	L ₁	MM	ND _{H10}	NX	NZ	RR ₁	U ₁
Y-12A	125	8	46	100	M30 x 1.5	25 ^{+0.084} ₀	32 ^{+0.3} _{-0.1}	64 ^{-0.1} _{-0.3}	27	42
Y-14A	140	8	48	105	M30 x 1.5	28 ^{+0.084} ₀	36 ^{+0.3} _{-0.1}	72 ^{-0.1} _{-0.3}	30	47
Y-16A	160	8	55	110	M36 x 1.5	32 ^{+0.1} ₀	40 ^{+0.3} _{-0.1}	80 ^{-0.1} _{-0.3}	34	46
Y-18A	180	8	70	125	M40 x 1.5	40 ^{+0.1} ₀	50 ^{+0.3} _{-0.1}	100 ^{-0.1} _{-0.3}	42.5	54
Y-20A	200	8	70	125	M45 x 1.5	40 ^{+0.1} ₀	50 ^{+0.3} _{-0.1}	100 ^{-0.1} _{-0.3}	42.5	54
Y-25A	250	9	86	160	M56 x 2	50 ^{+0.1} ₀	63 ^{+0.3} _{-0.1}	126 ^{-0.1} _{-0.3}	53	81

- * Use a double knuckle joint individually.
(Screw it entirely over the rod end threads and tighten it.)
- * Extend the dimensions of A and H when using a double knuckle joint together with a rod end nut.
For dimensions A and H, refer to made-to-order -XC86 with rod end bracket (p. 49).
When ordering, please use simple special -XA0 (p. 40).
- * A pin and split pin are included with the double knuckled joint.

Knuckle Pin / Clevis Pin

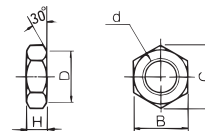


Material: Carbon steel

Part no.	Applicable bore size [mm]	Dd ₉	L	ℓ	m	d (Drill through)	Applicable split pin
IY-12	125	25 ^{-0.065} _{-0.117}	79.5	69.5	5	4	Ø 4 x 40
IY-14	140	28 ^{-0.065} _{-0.117}	86.5	76.5	5	4	Ø 4 x 40
IY-16	160	32 ^{-0.080} _{-0.142}	94.5	84.5	5	4	Ø 4 x 40
IY-18	180, 200	40 ^{-0.080} _{-0.142}	115	105	5	4	Ø 4 x 55
IY-25	250	50 ^{-0.080} _{-0.142}	144	132	6	5	Ø 5 x 65

* Split pin is included.

Rod End Nut



Material: Rolled steel

Part no.	Applicable bore size [mm]	d	H	B	C	D
NT-12	125, 140	M30 x 1.5	18	46	53.1	44
NT-16	160	M36 x 1.5	21	55	63.5	53
NT-18	180	M40 x 1.5	23	60	69.3	57
NT-20	200	M45 x 1.5	27	70	80.8	67
NT-25	250	M56 x 2	34	85	98.1	82

Air Cylinder: Standard Type Double Acting, Double Rod

CS2W Series

RoHS

∅ 125, ∅ 140, ∅ 160, ∅ 180, ∅ 200, ∅ 250

How to Order

CS2W L 125 - 100 -

With auto switch CDS2W L 125 - 100 - M9BW -

With auto switch (Built-in magnet)

Double rod type

Mounting

B	Basic
L	Foot
F	Flange
T	Centre trunnion

Bore size

125	125 mm
140	140 mm
160	160 mm
180	180 mm
200	200 mm
250	250 mm

Port thread type

—	Rc
TN	NPT
TF	G

* NPT and G threads are only applicable to ∅ 125 to ∅ 160.

Cylinder stroke [mm]

Refer to "Maximum Strokes" on page 20.

Made to order
Refer to page 20 for details.

Number of auto switches

—	2
3	3
S	1
n	n

Auto switch

—	Without auto switch
---	---------------------

* For applicable auto switches, refer to the table below.

Suffix for cylinder

Single side rod boot	J	Nylon tarpaulin
	K	Heat-resistant tarpaulin
Both side rod boot	JJ	Nylon tarpaulin
	KK	Heat-resistant tarpaulin

* The minimum stroke with a rod boot is 30 mm. (35 mm for ∅ 160 when the centre trunnion type is selected)

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) CDS2WB125-100

Applicable Auto Switches/Refer to the catalogue on <https://www.smc.eu> for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load										
					DC	AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)												
Solid state auto switch	—	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	●	○	○	IC circuit										
				3-wire (PNP)				M9P	●	●	●	○	○											
		2-wire		M9B	●	●	●	○	○	—														
		Terminal conduit		3-wire (NPN)	24 V	5 V, 12 V	—	G39	—		—	—	—	—	IC circuit									
	2-wire	K39	—	—				—	—	—	—	—	—											
	Diagnostic indication (2-colour indicator)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	●	●	●	○	○	IC circuit	Relay, PLC									
				3-wire (PNP)				M9PW	●	●	●	○	○											
				2-wire				M9BW	●	●	●	○	○											
				3-wire (NPN)				M9NA*1	—	○	○	●	○			○	IC circuit							
				3-wire (PNP)				M9PA*1	—	○	○	●	○			○								
2-wire				M9BA*1				—	○	○	●	○	○			—								
With diagnostic output (2-colour indicator)	4-wire (NPN)	5 V, 12 V	F59F	●	—	●	○	○	IC circuit															
Magnetic field resistant (2-colour indicator)	2-wire (Non-polar)	—	P3DWA*2	●	—	●	●	○	—															
Reed auto switch	—	Grommet	Yes	2-wire	24 V	12 V	—	A96	●	●	●	—	—	IC circuit	Relay, PLC									
								12 V	100 V	A93	●	●	●	—		—								
								5 V, 12 V	100 V or less	A90	●	●	—	—		IC circuit								
								100 V, 200 V	200 V or less	A54	●	—	●	●		—								
								200 V or less	A64	●	—	●	—	—										
		Terminal conduit	No					—	—	—	—	—	—	A33		—	—	—	—	—	PLC			
														A34		—	—	—	—	—	—	—		
														A44		—	—	—	—	—	Relay, PLC			
														DIN terminal		Yes	—	—	—	—			—	—
																					Grommet	Yes		
Diagnostic indication (2-colour indicator)	—	—	A59W	●	—	●	—	—																

*1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance.

Please contact SMC regarding water-resistant types with the above model numbers.

*2 Excludes the D-P3DWA for ∅ 250

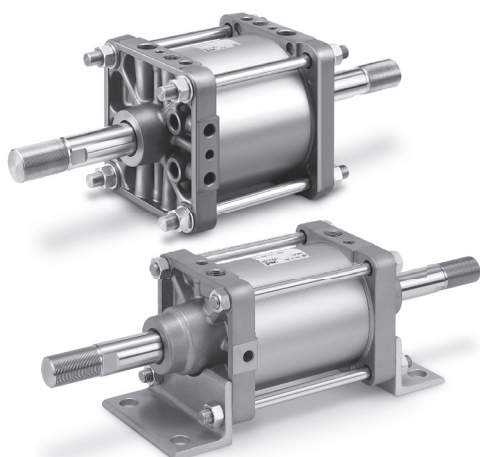
* Lead wire length symbols: 0.5 m..... (Example) M9NW 3 m.....L (Example) M9NWL
1 m.....M (Example) M9NWM 5 m.....Z (Example) M9NWZ

* Solid state auto switches marked with a "O" are produced upon receipt of order.

* Since there are applicable auto switches other than those listed above, refer to page 41 for details.

* D-A9□/M9□/M9□W/M9□A/P3DWA□ auto switches are shipped together with the product but do not come assembled. (Only the auto switch mounting brackets are assembled before shipment.)

* D-G39/K39/A3□/A4□ auto switches (band mounting type) can only be mounted on ∅ 125 to ∅ 160.

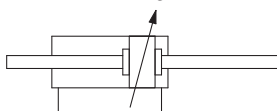


Specifications

Bore size [mm]		125	140	160	180	200	250
Action		Double acting, Double rod					
Fluid		Air					
Proof pressure		1.57 MPa			1.2 MPa		
Maximum operating pressure		0.97 MPa			0.7 MPa		
Minimum operating pressure		0.05 MPa					
Piston speed		50 to 500 mm/s			50 to 300 mm/s		
Cushion		Air cushion			Air cushion + Bumper cushion		
Ambient and fluid temperatures	Without auto switch	0 to 70 °C (No freezing)					
	With auto switch	0 to 60 °C (No freezing)					
Lubrication		Not required (Non-lube)					
Stroke length tolerance [mm]	250 or less	+1.0 0			+2.0 0		
	251 to 1000	+1.4 0			+2.4 0		
	1001 to 1200	—			+1.8 0		+2.8 0
Mounting		Basic, Foot, Flange, Centre trunnion					

Symbol

Double acting, Air cushion



Made to Order Common Specifications
(For details, refer to pages 43 to 53.)

Symbol	Specifications
-XA□	Change of rod end shape
-XB6	Heat-resistant cylinder (0 to 150 °C)
-XC4	With heavy duty scraper
-XC5	Heat-resistant cylinder (0 to 110 °C)
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC22	Fluororubber seal
-XC30	Rod side trunnion
-XC35	With coil scraper
-XC68	Made of stainless steel (With hard chrome plated piston rod)

* The made-to-order common specifications shown above are only applicable to Ø 125 to Ø 160.

Rod Boot Material

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	70 °C
K	Heat-resistant tarpaulin	110 °C*1

*1 Max. ambient temperature for rod boot itself

Refer to pages 38 to 42 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at Stroke End) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Operating Range
- Auto Switch Mounting Brackets/Part Nos.

Maximum Strokes

* When using with auto switches, refer to the "Minimum Stroke for Auto Switch Mounting" table on page 40.

Bore size	Maximum stroke [mm]
125, 140	1000 or less
160, 180	1200 or less
200	998 or less
250	813 or less

Accessories

Mounting		Basic	Foot	Flange	Centre trunnion
Option	Rod end nut	●	●	●	●
	Single knuckle joint	●	●	●	●
	Double knuckle joint (Knuckle pin, Split pin)	●	●	●	●
	Rod boot	●	●	●	●

* If using the rod end nut with a single knuckle joint or a double knuckle joint, please refer to page 18.

Mounting Bracket Part Nos.

Bore size [mm]	125	140	160	180	200	250
Foot*1	CS2-L12	CS2-L14	CS2-L16	CS2-L18	CS2-L20	CS2-L25
Flange	CS2-F12	CS2-F14	CS2-F16	CS2-F18	CS2-F20	CS2-F25

*1 Order two foot brackets per cylinder.

Weight (Guide)

Bore size [mm]		125	140	160	180	200	250
Basic weight	Basic	6.4	7.6	10.0	12.6	16.8	29.4
	Foot	8.4	10.6	13.4	17.4	22.3	40.4
	Flange	9.5	13.1	16.7	22.3	28.6	51.2
	Trunnion	10.5	13.3	16.4	23.3	30.8	55.7
Additional weight with magnet (With built-in magnet and auto switch)		0.1	0.1	0.1	0.1	0.2	0.2
Additional weight per 100 mm of stroke		2.2	2.3	3.2	3.5	4.3	7.1
Accessories	Single knuckle	1.0	1.2	1.6	3.1	3.0	5.4
	Double knuckle (Knuckle pin, Split pin)	1.4	1.9	2.5	4.8	4.6	9.3
	Rod end nut	0.2	0.2	0.3	0.4	0.9	1.3

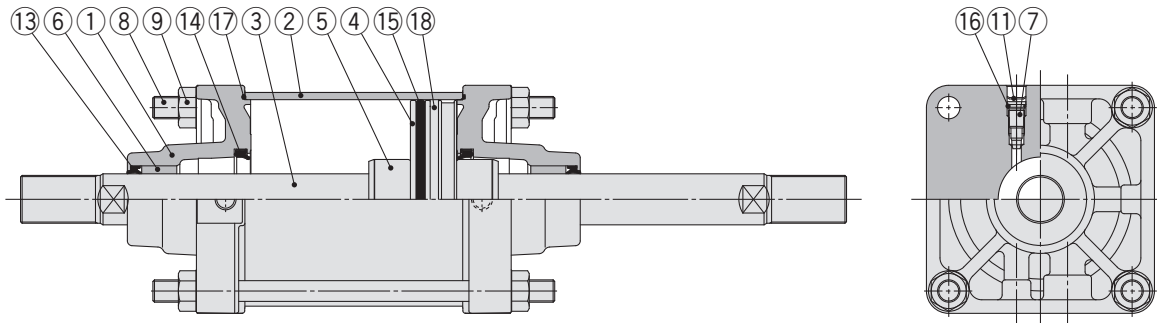
Calculation: (Example) **CS2WL160-500**

- Basic weight 13.4 [kg]
 - Additional weight 3.2 [kg/100 mm]
 - Cylinder stroke 500 [mm]
- 13.4 + 3.2 x 500/100 = 29.4 [kg]

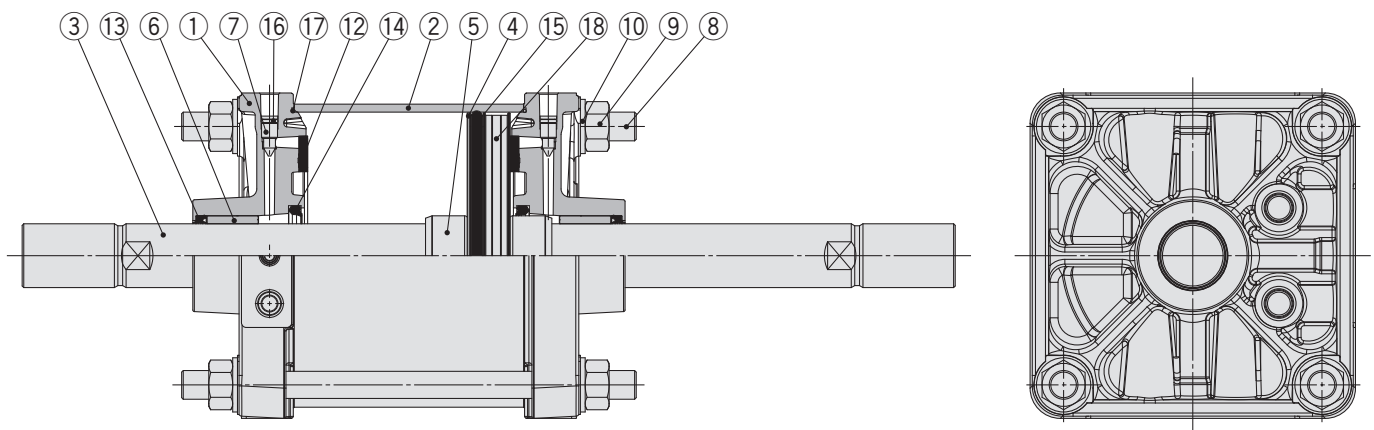
CS2W Series

Construction

Ø 125 to Ø 160



Ø 180 to Ø 250



Component Parts

No.	Description	Material	Qty.	Note
1	Rod cover	Aluminium die-cast	2	
2	Cylinder tube	Aluminium alloy	1	
3	Piston rod	Carbon steel	1	
4	Piston	Aluminium alloy	1	
5	Cushion ring	Stainless steel	2	Ø 125 to Ø 180
		Rolled steel	2	Ø 200, Ø 250
6	Bushing	Bearing alloy	2	
7	Cushion valve	Rolled steel	2	Ø 125 to Ø 160
		Brass	2	Ø 180 to Ø 250
8	Tie-rod	Carbon steel	4	
9	Tie-rod nut	Rolled steel	8	
10	Flat washer	Rolled steel	8	Ø 180 to Ø 250
11	Retaining ring	Spring steel	2	Ø 125 to Ø 160
12	Bumper	Urethane	2	Ø 180 to Ø 250
13	Rod seal	NBR	2	
14	Cushion seal	Urethane	2	Ø 125 to Ø 200
		NBR	2	Ø 250

Component Parts

No.	Description	Material	Qty.	Note
15	Piston seal	NBR	1	
16	Cushion valve seal	NBR	2	
17	Cylinder tube gasket	NBR	2	
18	Magnet	—	1	

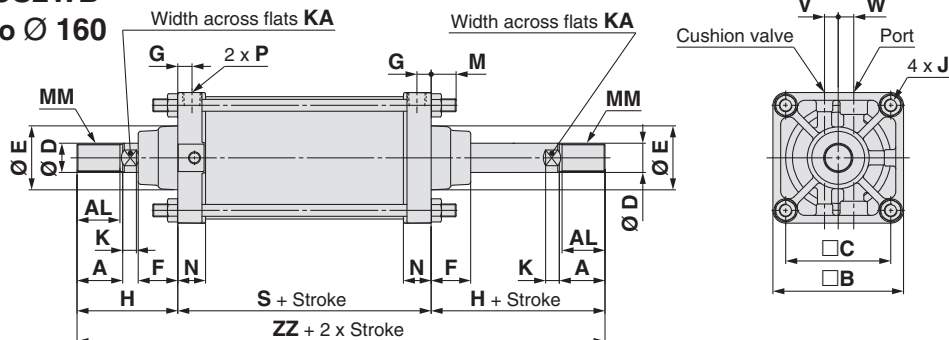
Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
125	CS2W125A-PS	Set of nos. 13, 14, 15, 17
140	CS2W140A-PS	
160	CS2W160A-PS	

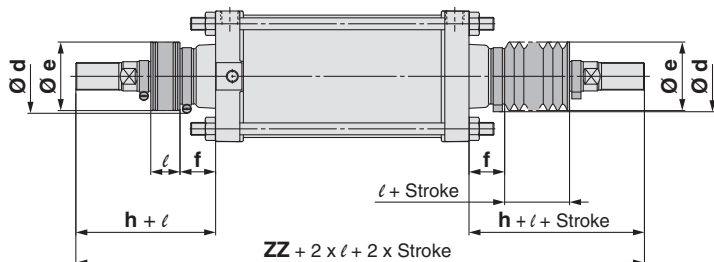
* The seal kit includes a grease pack (40 g). Order with one of the following part numbers when only the grease pack is required.
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

Dimensions

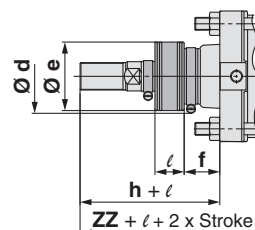
Basic: CS2WB Ø 125 to Ø 160



With rod boot (Both sides)



With rod boot (One side)

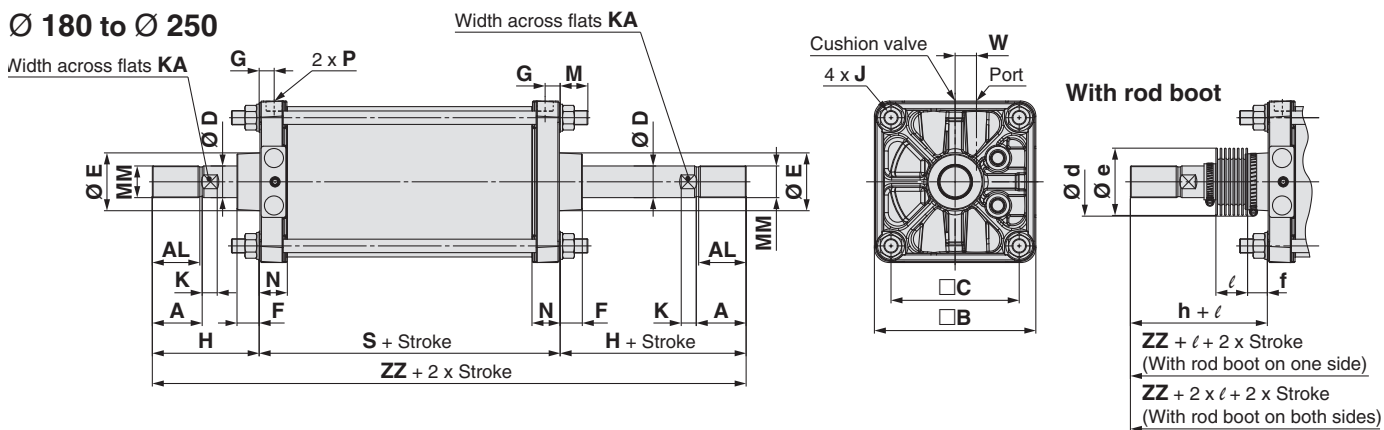


Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	V	W	K	KA	M	MM	N	P	S
125	Up to 1000	50	47	143	115	32	71	43	15	M14 x 1.5	15	17	15	27	27	M30 x 1.5	30.5	1/2	98
140	Up to 1000	50	47	157	128	32	71	43	15	M14 x 1.5	15	17	15	27	27	M30 x 1.5	30.5	1/2	98
160	Up to 1200	56	53	177	144	38	78.5	42	18	M16 x 1.5	15	20	17	34	30.5	M36 x 1.5	34.5	3/4	106

[mm]

Bore size	Without rod boot		With rod boot (One side)						(Both sides)	
	H	ZZ	d	e	f	h	l	ZZ	ZZ	
125	110	318	82	75	40	133	1/5 stroke	341	364	
140	110	318	82	75	40	133	1/5 stroke	341	364	
160	120	346	82	75	40	141	1/5 stroke	367	388	

Ø 180 to Ø 250



Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	K	KA	M	MM	N	P	S	W
180	Up to 1200	63	60	204	162	40	73.5	28	19	M18 x 1.5	17	36	35	M40 x 1.5	35.6	1/2	115	27
200	Up to 998	63	60	226	182	45	78.5	32	19	M20 x 1.5	20	41	35	M45 x 1.5	35.6	1/2	120	27
250	Up to 813	71	67	277	225	56	90.4	43	23	M24 x 1.5	22	50	41.5	M56 x 2	45.6	3/4	141	32

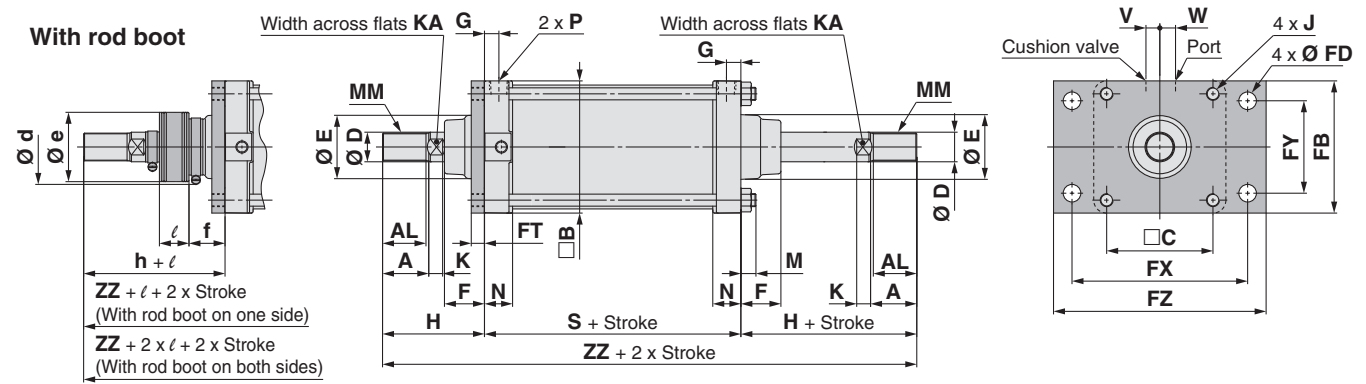
[mm]

Bore size	Without rod boot		With rod boot (One side)						(Both sides)	
	H	ZZ	d	e	f	h	l	ZZ	ZZ	
180	135	385	92	85	25	153	1/5 stroke	403	421	
200	135	390	96	90	29	153	1/5 stroke	408	426	
250	160	461	108	105	36	176	1/6 stroke	477	493	

Dimensions

Flange: CS2WF

Ø 125 to Ø 160

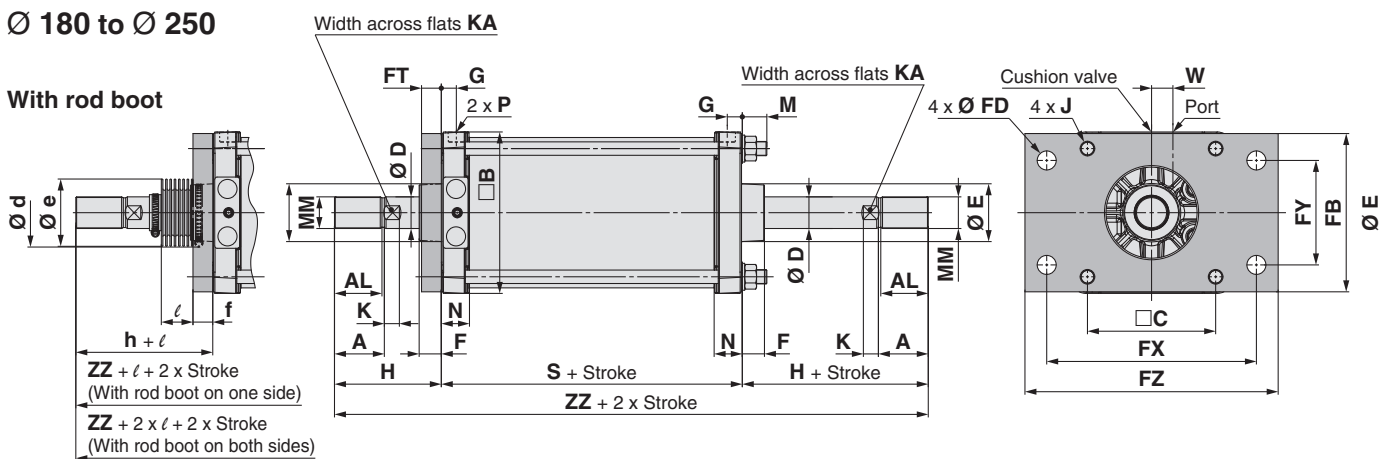


Bore size	Stroke range	A	AL	B	C	D	E	F	FB	FD	FT	FX	FY	FZ	G	J	V	W	K	KA	M
125	Up to 1000	50	47	143	115	32	71	43	145	19	14	190	100	230	15	M14 x 1.5	15	17	15	27	13
140	Up to 1000	50	47	157	128	32	71	43	160	19	20	212	112	255	15	M14 x 1.5	15	17	15	27	13
160	Up to 1200	56	53	177	144	38	78.5	42	180	19	20	236	118	275	18	M16 x 1.5	15	20	17	34	15

Bore size	MM	N	P	S	[mm]																
					Without rod boot					With rod boot (One side)								(Both sides)			
					H	ZZ	d	e	f	h	ℓ	ZZ	ZZ								
125	M30 x 1.5	30.5	1/2	98	110	318	82	75	40	133	1/5 stroke	341	364								
140	M30 x 1.5	30.5	1/2	98	110	318	82	75	40	133	1/5 stroke	341	364								
160	M36 x 1.5	34.5	3/4	106	120	346	82	75	40	141	1/5 stroke	367	388								

Ø 180 to Ø 250

With rod boot



Bore size	Stroke range	A	AL	B	C	D	E	F	FB	FD	FT	FX	FY	FZ	G	J	K	KA	M
180	Up to 1200	63	60	204	162	40	73.5	28	200	24	25	265	132	320	19	M18 x 1.5	17	36	31
200	Up to 998	63	60	226	182	45	78.5	32	225	24	25	280	150	335	19	M20 x 1.5	20	41	31
250	Up to 813	71	67	277	225	56	90.4	43	275	29	30	355	180	420	23	M24 x 1.5	22	50	35

Bore size	MM	N	P	S	W	[mm]															
						Without rod boot					With rod boot (One side)								(Both sides)		
						H	ZZ	d	e	f	h	ℓ	ZZ	ZZ							
180	M40 x 1.5	35.6	1/2	115	27	135	385	92	85	25	153	1/5 stroke	403	421							
200	M45 x 1.5	35.6	1/2	120	27	135	390	96	90	29	153	1/5 stroke	408	426							
250	M56 x 2	45.6	3/4	141	32	160	461	108	105	36	176	1/6 stroke	477	493							

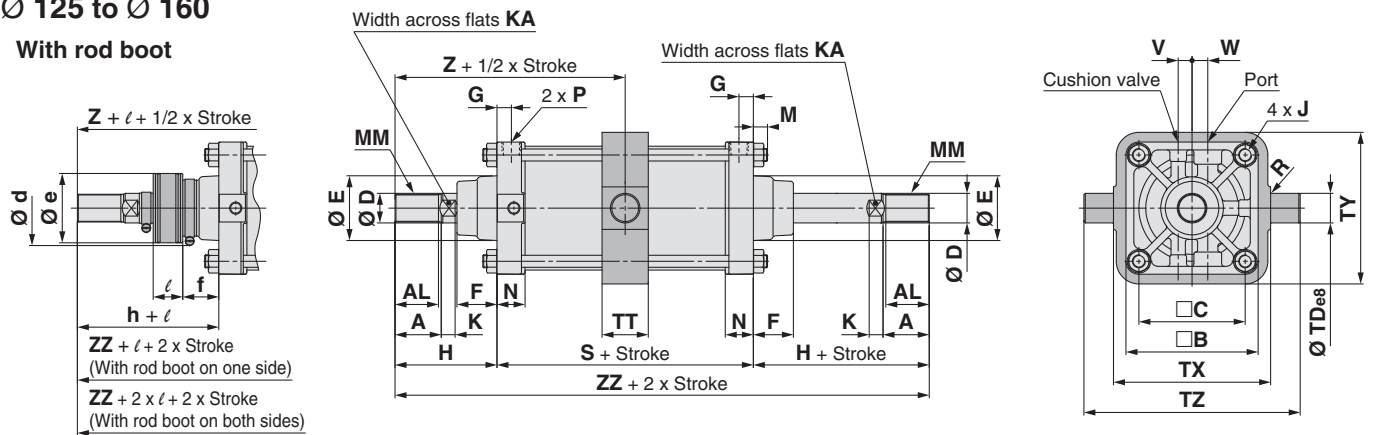
CS2W Series

Dimensions

Centre trunnion: CS2WT

Ø 125 to Ø 160

With rod boot

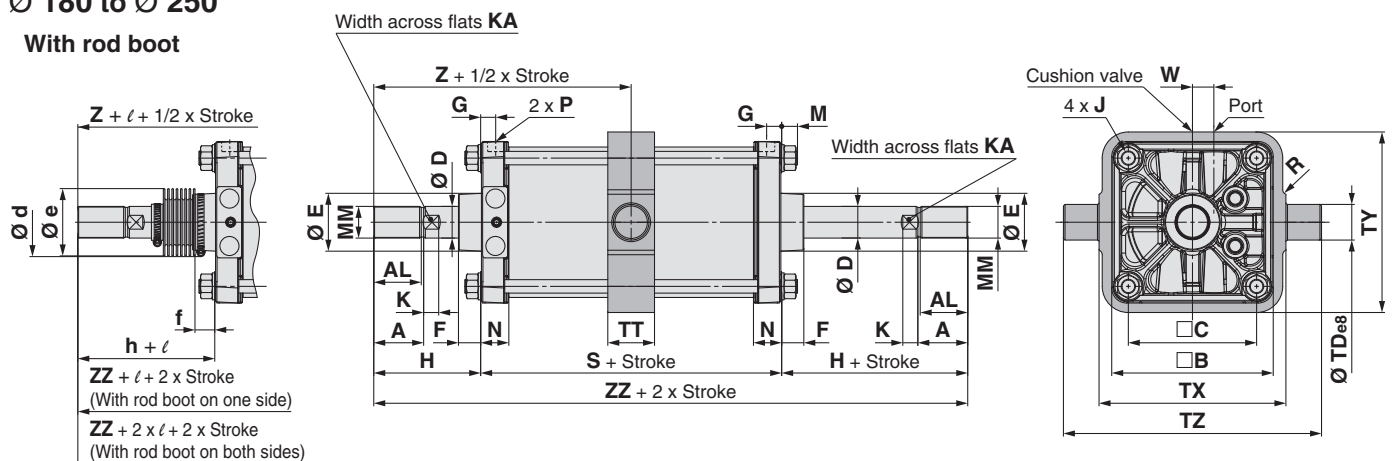


Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	V	W	K	KA	M	MM	N	P	R	S
125	25 to 1000	50	47	143	115	32	71	43	15	M14 x 1.5	15	17	15	27	13	M30 x 1.5	30.5	1/2	1	98
140	30 to 1000	50	47	157	128	32	71	43	15	M14 x 1.5	15	17	15	27	13	M30 x 1.5	30.5	1/2	1.5	98
160	35 to 1200	56	53	177	144	38	78.5	42	18	M16 x 1.5	15	20	17	34	15	M36 x 1.5	34.5	3/4	1.5	106

Bore size	TD _{e8}	TT	TX	TY	TZ	Without rod boot			With rod boot (One side)							Both sides		
						H	Z	ZZ	d	e	f	h	l	Z	ZZ	ZZ		
125	32 ^{-0.050} _{-0.089}	50	170	164	234	110	159	318	82	75	40	133	1/5 stroke	182	341	364		
140	36 ^{-0.050} _{-0.089}	55	190	184	262	110	159	318	82	75	40	133	1/5 stroke	182	341	364		
160	40 ^{-0.050} _{-0.089}	60	212	204	292	120	173	346	82	75	40	141	1/5 stroke	194	367	388		

Ø 180 to Ø 250

With rod boot



Bore size	Stroke range	A	AL	B	C	D	E	F	G	J	K	KA	M	MM	N	P	R	S	TD _{e8}
180	25 to 1200	63	60	204	162	40	73.5	28	19	M18 x 1.5	17	36	20	M40 x 1.5	35.6	1/2	2	115	45 ^{-0.050} _{-0.089}
200	25 to 998	63	60	226	182	45	78.5	32	19	M20 x 1.5	20	41	21	M45 x 1.5	35.6	1/2	2	120	45 ^{-0.050} _{-0.089}
250	25 to 813	71	67	277	225	56	90.4	43	23	M24 x 1.5	22	50	25	M56 x 2	45.6	3/4	3	141	56 ^{-0.060} _{-0.106}

Bore size	TT	TX	TY	TZ	W	Without rod boot			With rod boot (One side)							Both sides		
						H	Z	ZZ	d	e	f	h	l	Z	ZZ	ZZ		
180	59	236	228	326	27	135	192.5	388	92	85	25	153	1/5 stroke	210.5	406	424		
200	59	265	257	355	27	135	195	393	96	90	29	153	1/5 stroke	213	411	429		
250	69	335	325	447	32	160	230.5	465	108	105	36	176	1/6 stroke	246.5	481	497		

Air Cylinder: Axial Centralised Piping Type Double Acting, Single Rod

CS2□P Series

∅ 180, ∅ 200, ∅ 250



How to Order

CS2 L 180 P H - 300

With auto switch CDS2 L 180 P H - 300 - M9BW

With auto switch (Built-in magnet)

Mounting

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

Bore size

180	180 mm
200	200 mm
250	250 mm

Number of auto switches

—	2
3	3
S	1
n	n

Auto switch

—	Without auto switch
---	---------------------

* For applicable auto switches, refer to the table below.

Suffix for cylinder

Rod boot	—	None
	J	Nylon tarpaulin
	K	Heat-resistant tarpaulin

* The minimum stroke with a rod boot is 30 mm. (35 mm for ∅ 160 when the centre trunnion type is selected)

Position of centralised piping

H	Head side axial direction
R	Rod side axial direction

Cylinder stroke [mm]
Refer to "Maximum Strokes" on page 27.

* Only the head side axial direction is available for the rod flange type, and only the rod side axial direction is available for the head flange and clevis types.

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) CDS2B180PH-200

Applicable Auto Switches/Refer to the catalogue on <https://www.smc.eu> for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load			
					DC	AC	Tie-rod mounting	Band mounting	0.5 (—)	1 (M)	3 (L)	5 (Z)					
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9N	—	●	●	●	○	○	IC circuit	Relay, PLC		
				3-wire (PNP)			M9P	—	●	●	●	○	○				
				2-wire	M9B		—	●	●	●	○	○	—				
				3-wire (NPN)	M9NW		—	●	●	●	○	○	IC circuit				
	Diagnostic indication (2-colour indicator)			3-wire (PNP)	M9PW		—	●	●	●	○	○	—				
				2-wire	M9BW		—	●	●	○	○	—					
	Water resistant (2-colour indicator)			3-wire (NPN)	M9NA*1		—	○	○	●	○	○	—				
				3-wire (PNP)	M9PA*1		—	○	○	●	○	○	IC circuit				
	With diagnostic output (2-colour indicator)			2-wire	M9BA*1		—	○	○	●	○	○	—				
				4-wire (NPN)	F59F		—	●	—	●	○	○	IC circuit				
Magnetic field resistant (2-colour indicator)	2-wire (Non-polar)	P3DWA*2	—	●	—	●	●	○	—								
	—	—	—	—	—	—	—	—	—								
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	24 V	A96	—	●	—	●	—	—	IC circuit	Relay, PLC		
				12 V			A93	—	●	●	●	—	—				
				5 V, 12 V	A90		—	●	—	●	—	—	IC circuit				
				12 V	A54		—	●	—	●	—	—					
		Terminal conduit	Yes	2-wire	12 V		—	A64	—	●	—	—	—	—		—	
							—	A33	—	—	—	—	—	—		PLC	
		DIN terminal	Yes	2-wire	12 V		100 V, 200 V	—	A34	—	—	—	—	—		—	Relay, PLC
							—	A44	—	—	—	—	—	—			
Diagnostic indication (2-colour indicator)	Grommet	Yes	2-wire	—	—	A59W	—	●	—	●	—	—	—				
				—	—	—	—	—	—	—	—	—					

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

*2 Excludes the D-P3DWA for ∅ 250

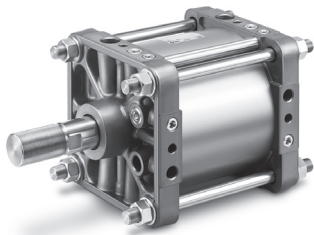
* Lead wire length symbols: 0.5 m.....— (Example) M9NW 3 m.....L (Example) M9NWL
1 m.....M (Example) M9NWM 5 m.....Z (Example) M9NWZ

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

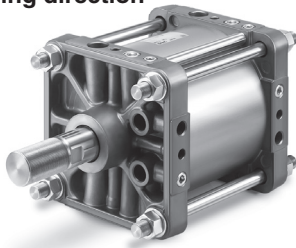
* Since there are applicable auto switches other than those listed above, refer to page 41 for details.

* D-A9□/M9□/M9□W/M9□A/P3DWA□ auto switches are shipped together with the product but do not come assembled. (Only the auto switch mounting brackets are assembled before shipment.)

CS2□P Series



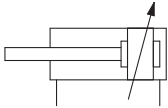
Head side piping direction



Rod side piping direction

Symbol

Double acting, Air cushion



Rod Boot Material

Symbol	Material	Max. ambient temp.
J	Nylon tarpaulin	70 °C
K	Heat-resistant tarpaulin	110 °C*1

*1 Max. ambient temperature for rod boot itself

Specifications

Bore size [mm]		180	200	250
Action		Double acting, Single rod		
Fluid		Air		
Proof pressure		1.2 MPa		
Maximum operating pressure		0.7 MPa		
Minimum operating pressure		0.05 MPa		
Piston speed		50 to 300 mm/s		
Cushion		Air cushion + Bumper cushion		
Ambient and fluid temperatures	Without auto switch	0 to 70 °C (No freezing)		
	With auto switch	0 to 60 °C (No freezing)		
Lubrication		Not required (Non-lube)		
Stroke length tolerance [mm]	250 or less	+2.0 0		
	251 to 1000	+2.4 0		
	1001 to 1200	+2.8 0		
Mounting		Basic, Foot, Rod flange, Head flange, Single clevis, Double clevis, Centre trunnion		

Maximum Strokes

* When using with auto switches, refer to the "Minimum Stroke for Auto Switch Mounting" table on page 40.

Bore size	Mounting bracket	Maximum stroke [mm]	
		Basic, Foot, Rod flange, Head flange, Single clevis, Double clevis, Centre trunnion	
180		1200 or less	
200		998 or less	
250		813 or less	

Accessories

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

* If using the rod end nut with a single knuckle joint or a double knuckle joint, use the type with a rod end bracket (-XC86) or order the accessory separately. For part numbers and dimensions of accessories, refer to page 18.

Mounting Bracket Part Nos.

Bore size [mm]	180	200	250
Foot*1	CS2-L18	CS2-L20	CS2-L25
Flange	CS2-F18	CS2-F20	CS2-F25
Single clevis	CS2-C18	CS2-C20	CS2-C25
Double clevis*2	CS2-D18	CS2-D20	CS2-D25

*1 Order two foot brackets per cylinder.

*2 When ordering the double clevis type, the clevis pin and 2 split pins are included as accessories.

Refer to pages 38 to 42 for cylinders with auto switches.

- Auto Switch Proper Mounting Position (Detection at Stroke End) and Mounting Height
- Minimum Stroke for Auto Switch Mounting
- Operating Range
- Auto Switch Mounting Brackets/Part Nos.

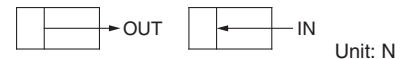
Weight (Guide)

Bore size [mm]		180	200	250
Basic weight	Basic	11.0	15.0	25.9
	Foot	15.7	20.5	36.8
	Rod flange	20.6	26.8	47.7
	Head flange	20.6	26.8	47.7
	Single clevis	19.3	25.0	44.2
	Double clevis	21.0	26.8	47.3
	Trunnion	21.7	29.0	52.2
Additional weight with magnet (With built-in magnet and auto switch)		0.1	0.2	0.2
Additional weight per 100 mm of stroke		2.5	3.0	5.2
Accessories	Single knuckle	3.1	2.9	5.4
	Double knuckle (Knuckle pin, Split pin)	4.8	4.6	9.3
	Rod end nut	0.4	0.9	1.3

Calculation: (Example) **CS2L180PH-500**

- Basic weight 15.7 [kg]
 - Additional weight ... 2.5 [kg/100 mm]
 - Cylinder stroke 500 [mm]
- $15.7 + 2.5 \times 500/100 = 28.2$ [kg]

Theoretical Output

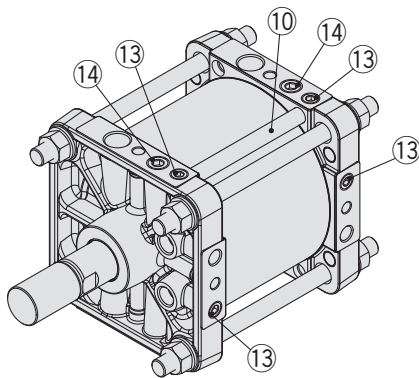
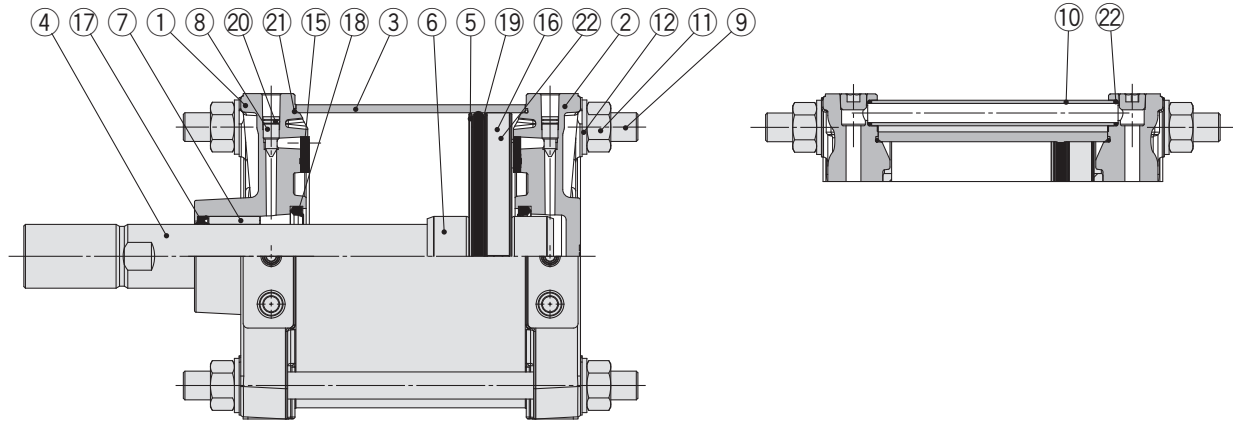


Bore size [mm]	Rod size [mm]	Operating direction	Piston area [mm ²]	Operating pressure [MPa]					
				0.2	0.3	0.4	0.5	0.6	0.7
180	40	OUT	25400	5080	7620	10200	12700	15200	17800
		IN	24200	4840	7260	9680	12100	14520	16940
200	45	OUT	31400	6280	9420	12600	15700	18800	22000
		IN	29800	5960	8940	11930	14910	17890	20870
250	56	OUT	49100	9820	14700	19600	24600	29500	34400
		IN	46600	9320	13980	18640	23310	27970	32630

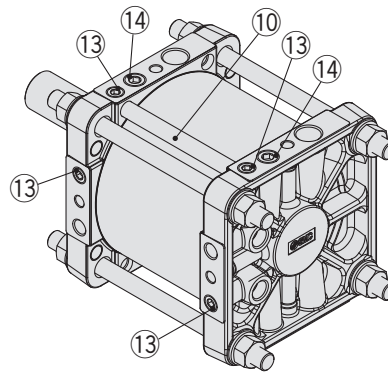
CS2□P Series

Construction

Ø 180 to Ø 250



Rod side axial direction



Head side axial direction

Component Parts

No.	Description	Material	Qty.	Note
1	Rod cover	Aluminium die-cast	1	
2	Head cover	Aluminium die-cast	1	
3	Cylinder tube	Aluminium alloy	1	
4	Piston rod	Carbon steel	1	
5	Piston	Aluminium alloy	1	
6	Cushion ring	Stainless steel	2	Ø 180
		Rolled steel	2	Ø 200, Ø 250
7	Bushing	Bearing alloy	1	
8	Cushion valve	Brass	2	
9	Tie-rod	Carbon steel	4	
10	Pipe	Aluminium alloy	1	
11	Tie-rod nut	Rolled steel	8	
12	Flat washer	Rolled steel	8	
13	Hexagon socket head plug	Rolled steel	4	
14	Hexagon socket head plug	Rolled steel	4	
15	Bumper	Urethane	2	
16	Wear ring	Resin	1	

Component Parts

No.	Description	Material	Qty.	Note
17	Rod seal	NBR	1	
18	Cushion seal	Urethane	2	Ø 180, Ø 200
		NBR	2	Ø 250
19	Piston seal	NBR	1	
20	Cushion valve seal	NBR	2	
21	Cylinder tube gasket	NBR	2	
22	Pipe gasket	NBR	2	
23	Magnet	—	1	

Replacement Parts/Seal Kit

Bore size [mm]	Kit no.	Contents
180	CS2P180A-PS	Set of nos. 18, 19, 21, 22
200	CS2P200A-PS	Set of nos. 19, 21, 22
250	CS2P250A-PS	Set of nos. 19, 21, 22

* The seal kit includes a grease pack (40 g). Order with one of the following part numbers when only the grease pack is required.

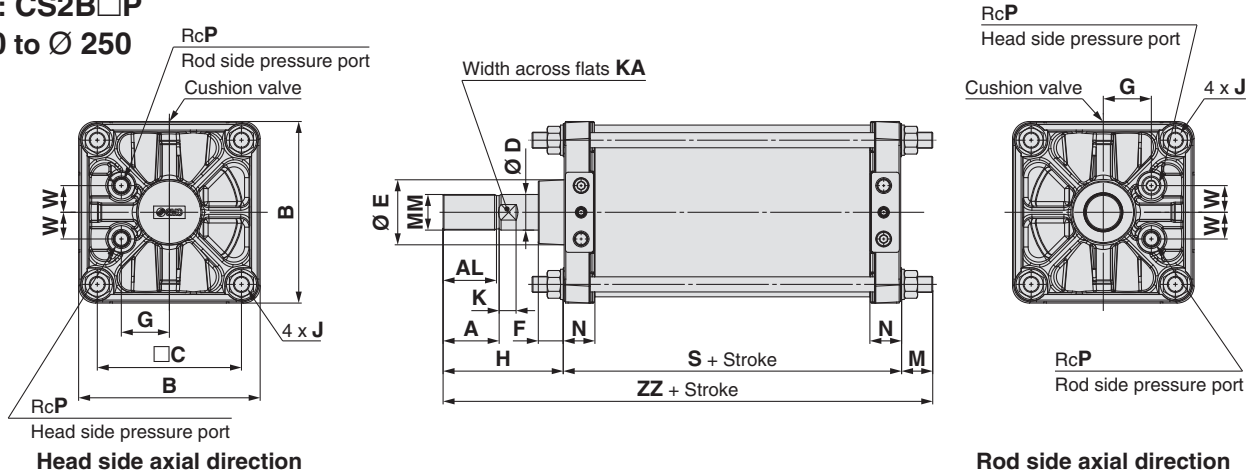
Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

The accessory bracket and rod boot mounting dimensions are the same as those of the standard type. For details, refer to pages 11 to 18.

Dimensions

Basic: CS2B□P

Ø 180 to Ø 250



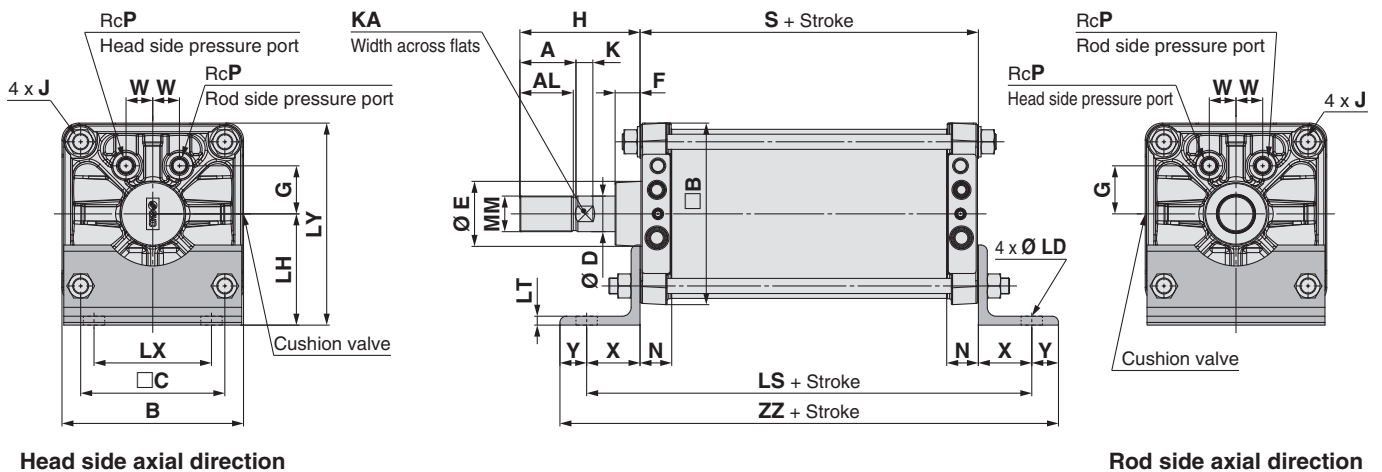
Bore size	Stroke range	A	AL	B	C	D	E	F	G	H	J	K	KA	M	MM	N
180	Up to 1200	63	60	204	162	40	73.5	28	54	135	M18 x 1.5	17	36	35	M40 x 1.5	35.6
200	Up to 998	63	60	226	182	45	78.5	32	60	135	M20 x 1.5	20	41	35	M45 x 1.5	35.6
250	Up to 813	71	67	277	225	56	90.4	41	78	160	M24 x 1.5	22	50	41.5	M56 x 2	45.6

[mm]

Bore size	P	S	W	ZZ
180	1/2	115	30	285
200	1/2	120	30	290
250	3/4	141	45	342.5

Foot: CS2L□P

Ø 180 to Ø 250



[mm]

Bore size	Stroke range	A	AL	B	C	D	E	F	G	H	J	K	KA	LB	LD	LH	LS	LT
180	Up to 1200	63	60	204	162	40	73.5	28	54	135	M18 x 1.5	17	36	204	24	125	235	10
200	Up to 998	63	60	226	182	45	78.5	32	60	135	M20 x 1.5	20	41	226	24	132	240	10
250	Up to 813	71	67	277	225	56	90.4	43	78	160	M24 x 1.5	22	50	277	29	160	301	12

[mm]

Bore size	LX	LY	MM	N	P	S	W	X	Y	ZZ
180	132	227	M40 x 1.5	35.6	1/2	115	30	60	30	340
200	150	245	M45 x 1.5	35.6	1/2	120	30	60	30	345
250	180	298.5	M56 x 2	45.6	3/4	141	45	80	40	421

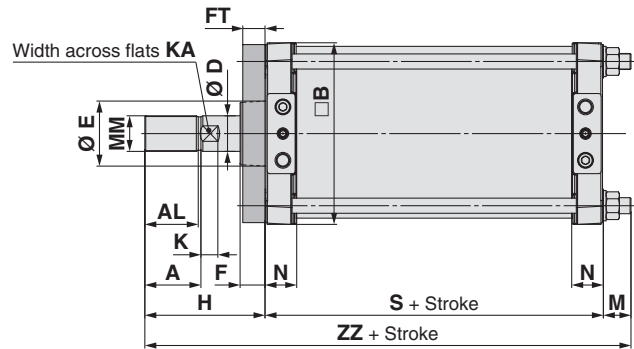
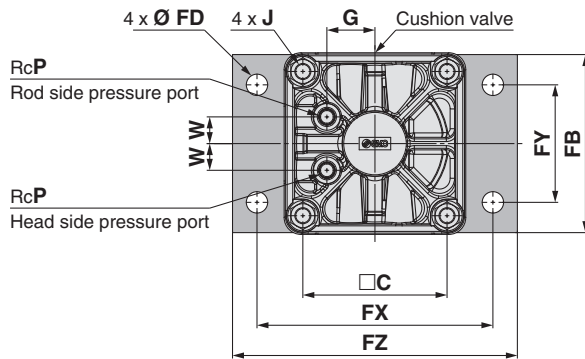
CS2□P Series

The accessory bracket and rod boot mounting dimensions are the same as those of the standard type. For details, refer to pages 11 to 18.

Dimensions

Rod flange: CS2F□P

Ø 180 to Ø 250

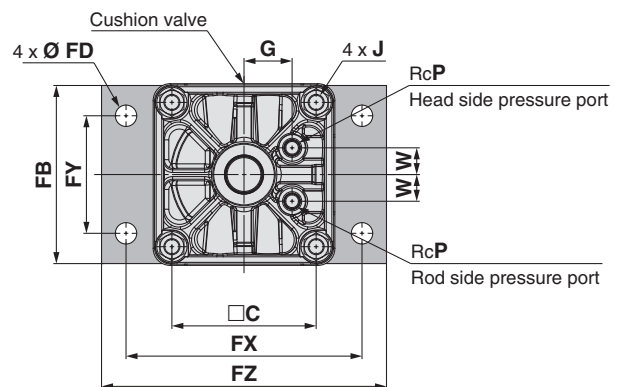
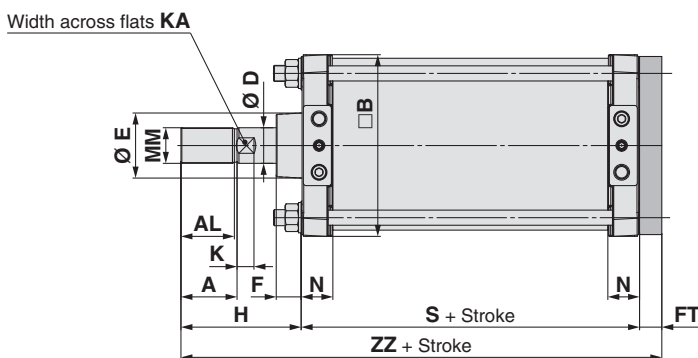


Bore size	Stroke range	A	AL	B	C	D	E	F	FB	FD	FT	FX	FY	FZ	G	H	J	K
180	Up to 1200	63	60	204	162	40	73.5	28	200	24	25	265	132	320	54	135	M18 x 1.5	17
200	Up to 998	63	60	226	182	45	78.5	32	225	24	25	280	150	335	60	135	M20 x 1.5	20
250	Up to 813	71	67	277	225	56	90.4	41	275	29	30	355	180	420	78	160	M24 x 1.5	22

Bore size	KA	M	MM	N	P	S	W	ZZ
180	36	31	M40 x 1.5	35.6	1/2	115	30	281
200	41	31	M45 x 1.5	35.6	1/2	120	30	286
250	50	35	M56 x 2	45.6	3/4	141	45	336

Head flange: CS2G□P

Ø 180 to Ø 250



Bore size	Stroke range	A	AL	B	C	D	E	F	FB	FD	FT	FX	FY	FZ	G	H	J	K
180	Up to 1200	63	60	204	162	40	73.5	28	200	24	25	265	132	320	54	135	M18 x 1.5	17
200	Up to 998	63	60	226	182	45	78.5	32	225	24	25	280	150	335	60	135	M20 x 1.5	20
250	Up to 813	71	67	277	225	56	90.4	43	275	29	30	355	180	420	78	160	M24 x 1.5	22

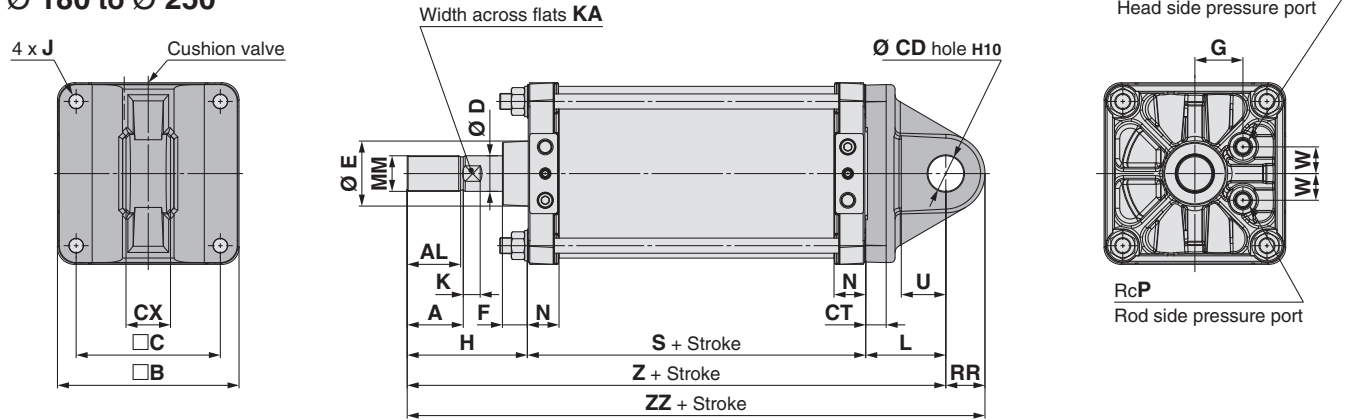
Bore size	KA	MM	N	P	S	W	ZZ
180	36	M40 x 1.5	35.6	1/2	115	30	275
200	41	M45 x 1.5	35.6	1/2	120	30	280
250	50	M56 x 2	45.6	3/4	141	45	331

The accessory bracket and rod boot mounting dimensions are the same as those of the standard type. For details, refer to pages 11 to 18.

Dimensions

Single clevis: CS2C□P

Ø 180 to Ø 250



[mm]

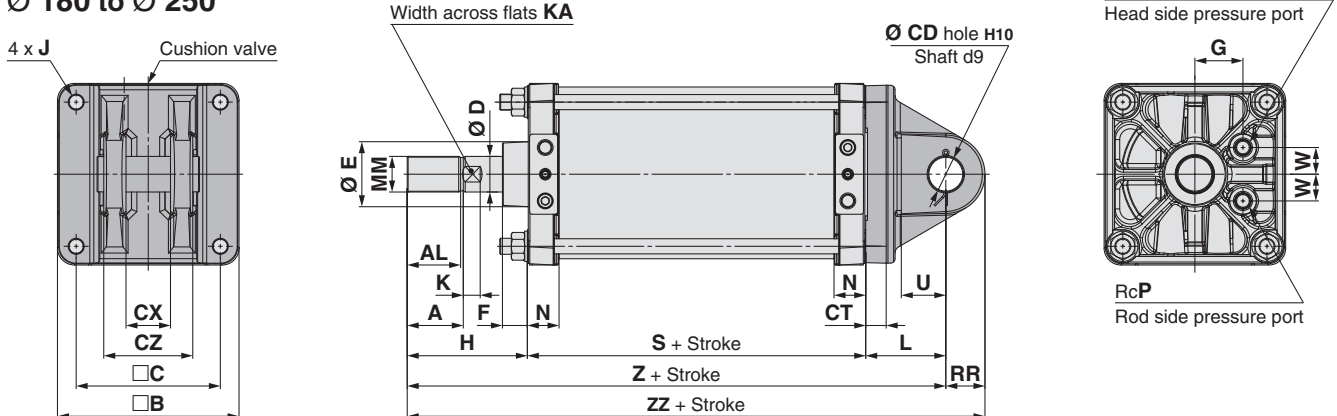
Bore size	Stroke range	A	AL	B	C	CDH10	CT	CX	D	E	F	G	H	J	K	KA	L
180	Up to 1200	63	60	204	162	40 ^{+0.100} ₀	23	50 ^{-0.1} _{-0.3}	40	73.5	28	54	135	M18 x 1.5	17	36	90
200	Up to 998	63	60	226	182	40 ^{+0.100} ₀	25	50 ^{-0.1} _{-0.3}	45	78.5	32	60	135	M20 x 1.5	20	41	90
250	Up to 813	71	67	277	225	50 ^{+0.100} ₀	30	63 ^{-0.1} _{-0.3}	56	90.4	41	78	160	M24 x 1.5	22	50	110

[mm]

Bore size	MM	N	P	RR	S	U	W	Z	ZZ
180	M40 x 1.5	35.6	1/2	44	115	50	30	340	384
200	M45 x 1.5	35.6	1/2	44	120	50	30	345	389
250	M56 x 2	45.6	3/4	55	141	65	45	411	466

Double clevis: CS2D□P

Ø 180 to Ø 250



[mm]

Bore size	Stroke range	A	AL	B	C	CDH10	CT	CX	CZ	D	E	F	G	H	J	K	KA	L
180	Up to 1200	63	60	204	162	40 ^{+0.100} ₀	23	50 ^{+0.3} _{+0.1}	100 ^{-0.1} _{-0.3}	40	73.5	28	54	135	M18 x 1.5	17	36	90
200	Up to 998	63	60	226	182	40 ^{+0.100} ₀	25	50 ^{+0.3} _{+0.1}	100 ^{-0.1} _{-0.3}	45	78.5	32	60	135	M20 x 1.5	20	41	90
250	Up to 813	71	67	277	225	50 ^{+0.100} ₀	30	63 ^{+0.3} _{+0.1}	126 ^{-0.1} _{-0.3}	56	90.4	43	78	160	M24 x 1.5	22	50	110

[mm]

Bore size	MM	N	P	RR	S	U	W	Z	ZZ
180	M40 x 1.5	35.6	1/2	44	115	50	30	340	384
200	M45 x 1.5	35.6	1/2	44	120	50	30	345	389
250	M56 x 2	45.6	3/4	55	141	65	45	411	466

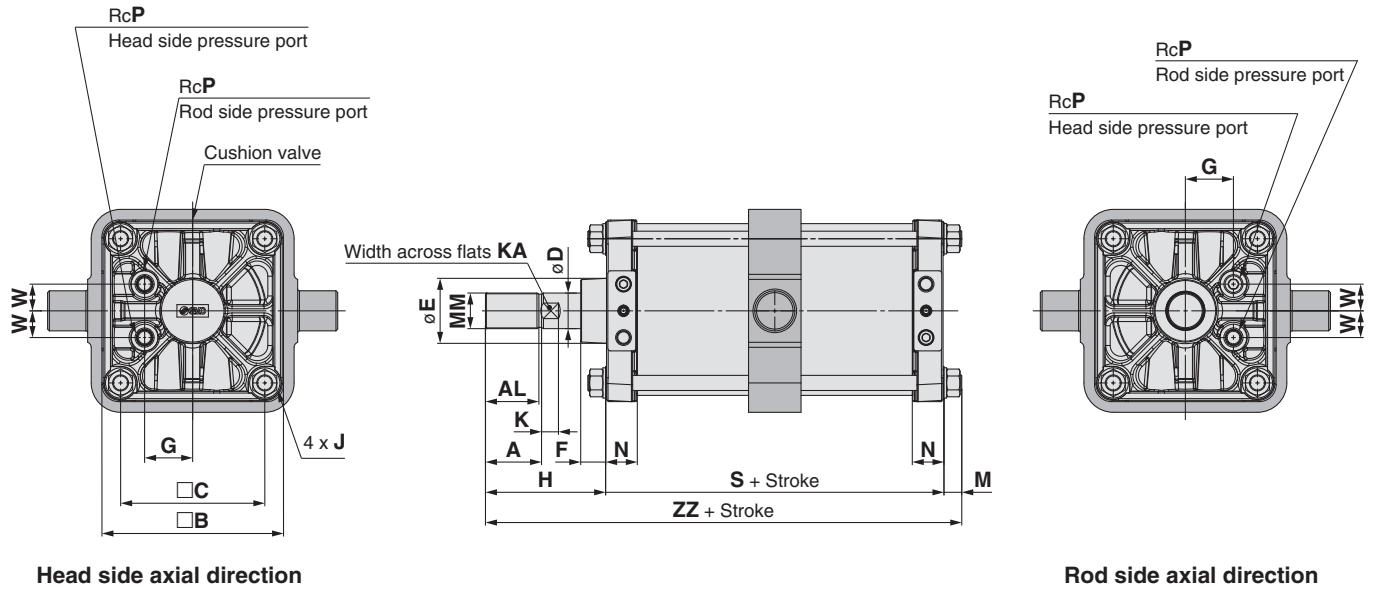
CS2□P Series

The accessory bracket and rod boot mounting dimensions are the same as those of the standard type. For details, refer to pages 11 to 18.

Dimensions

Centre trunnion: CS2T□P

Ø 180 to Ø 250



Bore size	Stroke range	A	AL	B	C	D	E	F	G	H	J	K	KA	M	MM	N	P
180	25 to 1200	63	60	204	162	40	73.5	28	54	135	M18 x 1.5	17	36	20	M40 x 1.5	35.6	1/2
200	25 to 998	63	60	226	182	45	78.5	32	60	135	M20 x 1.5	20	41	21	M45 x 1.5	35.6	1/2
250	25 to 813	71	67	277	225	56	90.4	43	78	160	M24 x 1.5	22	50	25	M56 x 2	45.6	3/4

Bore size	R	S	TDe8	TT	TX	TY	TZ	W	Z	ZZ
180	2	115	45 ^{-0.050} _{-0.089}	59	236	228	326	30	192.5	270
200	2	120	45 ^{-0.050} _{-0.089}	59	265	257	355	30	195	276
250	3	141	56 ^{-0.060} _{-0.106}	69	335	325	447	45	230.5	326

Smooth Cylinder

Series CS2Y

Ø 125, Ø 140, Ø 160

How to Order

CS2Y L 160 - 300

With auto switch CDS2Y L 160 - 300 - M9BW

With auto switch (Built-in magnet)

Smooth Cylinder

Mounting

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

Bore size

125	125 mm
140	140 mm
160	160 mm

Port thread type

—	Rc
TN	NPT
TF	G

Number of auto switches

—	2 pcs.
S	1 pc.
3	3 pcs.
n	"n" pcs.

Auto switch

—	Without auto switch
---	---------------------

Suffix for cylinder

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

Cylinder stroke [mm]

Refer to the next page for the "Maximum Stroke" table.

Built-in Magnet Cylinder Model

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

(Example) CDS2YL125-200

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

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

Applicable Auto Switches / Refer to the catalogue on <https://www.smc.eu> for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)				Pre-wired connector	Applicable load		
					DC	AC	Tie-rod mounting	Band mounting	0.5 (-)	1 (M)	3 (L)	5 (Z)		IC circuit	Relay, PLC	
Solid state switch	—	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	M9N	●	●	○	○	—	—	—	
				3-wire (PNP)				M9P	●	●	○	○				
		2-wire		—	12 V	M9B	●	●	○	○	—	—				
		—		—	100 V, 200 V	J51	●	●	○	○						
	Terminal conduit	Grommet	No	3-wire (NPN)	24 V	5 V, 12 V	—	G39	—	—	—	—	—	—	—	
				2-wire				—	12 V	K39	—	—				—
	Diagnostic indication (2-colour indication)	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NW	●	●	○	○	—	—	—	
				3-wire (PNP)				M9PW	●	●	○	○				
				2-wire				M9BW	●	●	○	○				
				3-wire (NPN)				M9NA	○	○	●	●				
Water resistant (2-colour indication)	Grommet	No	3-wire (PNP)	24 V	5 V, 12 V	—	M9PA	○	○	●	●	—	—	—		
			2-wire				M9BA	○	○	●	●					
Diagnostic indication (2-colour indication)	Grommet	No	4-wire (NPN)	24 V	5 V, 12 V	—	F59F	●	—	●	○	—	—	—		
			—				—	—	—	—	—					
Reed switch	—	Grommet	Yes	3-wire (NPN equivalent)	24 V	5 V	—	A96	●	—	●	—	—	—	—	
				—				A93	●	—	●	—				
				—				A90	●	—	●	—				
				—				A54	●	—	●	—				
		Terminal conduit	Grommet	No	2-wire	24 V	12 V	—	A64	●	—	●	—	—	—	—
									—	A33	—	—	—			
		DIN terminal	Grommet	Yes	2-wire	24 V	12 V	—	A34	—	—	—	—	—	—	—
									—	A44	—	—	—			
Diagnostic indication (2-colour indication)	Grommet	No	2-wire	24 V	12 V	—	A59W	●	—	●	—	—	—	—		
							—	—	—	—	—				—	

* Lead wire length symbols: 0.5 m — (Example) M9NW
 1 m M (Example) M9NWM
 3 m L (Example) M9NWL
 5 m Z (Example) M9NWX

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

* Since there are applicable auto switches other than listed, refer to page 41 for details.

* For details about auto switches with pre-wired connector, refer to the catalogue on <https://www.smc.eu>.

* D-A9□, M9□, M9□W, M9□AL are shipped together (but not assembled). (Only auto switch mounting bracket is assembled at the time of shipment.)

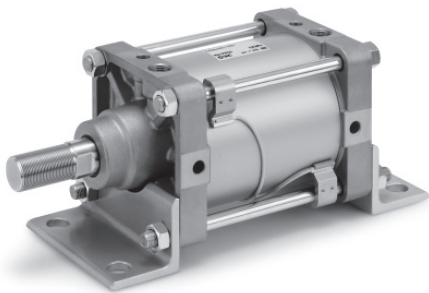
CS2 Y Series

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

Low sliding resistance

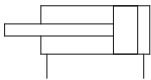
Min. operating pressure — 0.005 MPa

Auto switch mounting is possible.



Symbol

Double acting/Without cushion



Made to Order Common Specifications
(For details, refer to pages 43 to 53.)

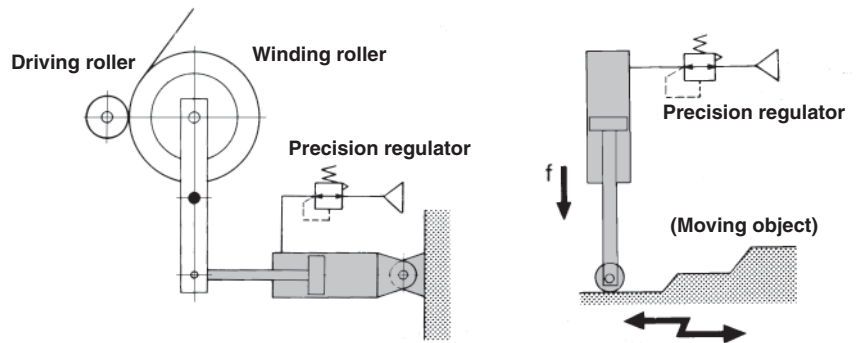
Symbol	Specifications
-XA□	Change of rod end shape
-XC3	Special port position
-XC9	Adjustable stroke cylinder/Adjustable retraction type
-XC10	Dual stroke cylinder/Double rod type
-XC14	Change of trunnion bracket mounting position
-XC15	Change of tie-rod length
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers
-XC27	Double clevis and double knuckle pins made of stainless steel
-XC30	Rod side trunnion
-XC68	Made of stainless steel (with hard chrome plated piston rod)
-XC86	With rod end bracket

Refer to pages 38 to 42 for cylinders with auto switches.

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

Application Example

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



Specifications

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

* If an air cushion is not used, set the energy at the stroke end to 0.36J (Ø 125, Ø 140) or less, 0.3J (Ø 160) or less.

Minimum Operating Pressure

Unit: MPa

Bore size (mm)	125	140	160
Minimum operating pressure	0.005 MPa*		

* If a cushion is used, this value will not include the operating pressure within the cushion stroke.

Maximum Strokes

Mounting bracket	Bore size [mm]		[mm]	
	125	140	125	140
Basic, Head flange, Single clevis, Double clevis, Centre trunnion	1000 or less	1600 or less	1000 or less	1600 or less
	1200 or less	1600 or less	1200 or less	1600 or less
	1200 or less	1600 or less	1200 or less	1600 or less

Accessories

For details, refer to page 221.

Mounting	Accessories							
	Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Centre trunnion	
Standard	—	—	—	—	—	●	—	
Option	Rod end nut	●	●	●	●	●	●	
	Single knuckle joint	●	●	●	●	●	●	
	Double knuckle joint (with knuckle pin, split pin)	●	●	●	●	●	●	
	Rod boot	●	●	●	●	●	●	

Mounting Brackets/Part No.

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

* Order two foot brackets per cylinder.

** When ordering the double clevis type, the clevis pin and 2 split pins are included as accessories.

Rod Boot Material

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

* Maximum ambient temperature for the rod boot itself.

Weights

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

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

- Basic weight.....12.45 [kg]
- Additional weight.....2.23 (kg/100 mm)
- Cylinder stroke.....500 [mm]

$$12.45 + 2.23 \times 500/100 = \mathbf{23.60 \text{ kg}}$$

Replacement Parts: Seal kit.

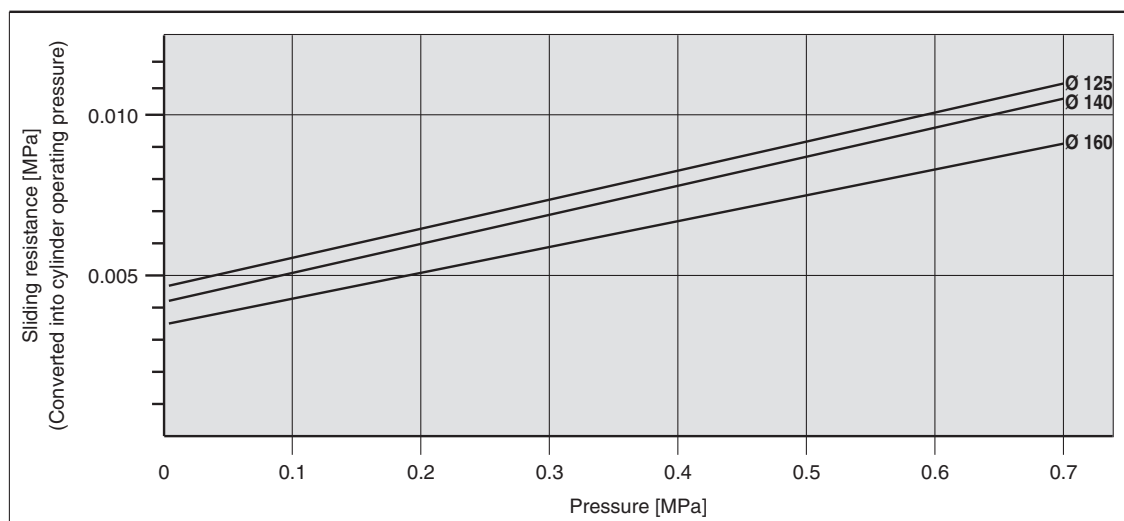
Bore size (mm)	Kit no.	Content
125	CS2Y125A-PS	Without cushion
140	CS2Y140A-PS	· Rod seal 1 pc.
160	CS2Y160A-PS	· Piston seal 1 pc.
		· Tube gasket 2 pcs.
125	CS2Y125AA-PS	With single-side cushion
140	CS2Y140AA-PS	· Rod seal 1 pc.
160	CS2Y160AA-PS	· Cushion seal 2 pcs.
		· Piston seal 1 pc.
		· Tube gasket 2 pcs.
125	CS2Y125AR-PS	With single-side cushion
140	CS2Y140AR-PS	· Rod seal 1 pc.
160	CS2Y160AR-PS	· Cushion seal 1 pc.
		· Piston seal 1 pc.
		· Tube gasket 2 pcs.

* Seal kit does not include a grease pack.

Order with the following part number when only the grease pack is needed.

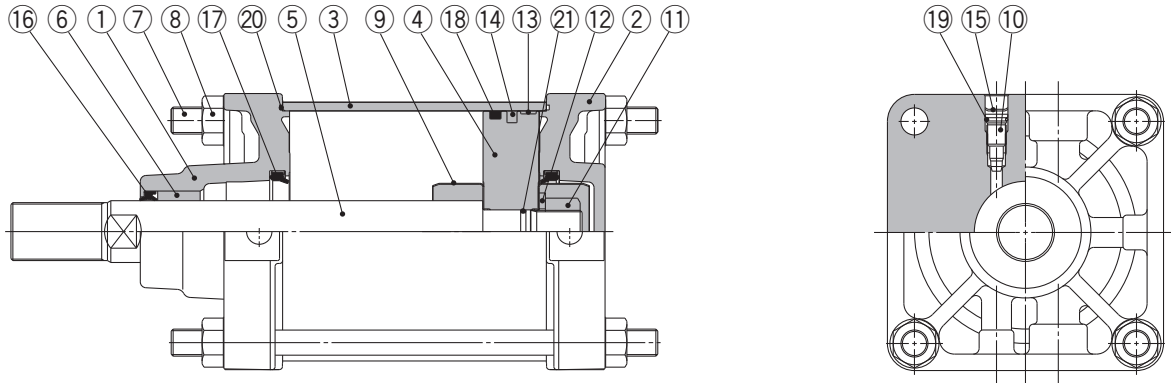
Grease pack part number: GR-L-005 (5 g), GR-L-010 (10 g), GR-L-150 (150 g)

Sliding Resistance



CS2 Y Series

Construction



Component Parts

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

* For types with built-in magnet or with auto switch.

** Used with cushion only.

Replacement Parts: Seal kit.

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

* Seal kit does not include a grease pack.

Order with the following part number when only the grease pack is needed.

Grease pack part number: GR-L-005 (5 g), GR-L-010 (10 g), GR-L-150 (150 g)

Dimensions

External dimensions are the same as the CS2 standard type. Refer to pages 11 to 17.

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

<Tie-rod mounting>

D-M9□/M9□V

D-M9□W/M9□WV

D-M9□A/M9□AV

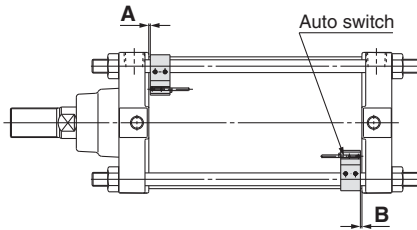
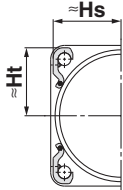
D-A9□/A9□V

D-Z7□/Z80

D-Y59□/Y69□/Y7P/Y7PV

D-Y7□W/Y7□WV

D-Y7BA

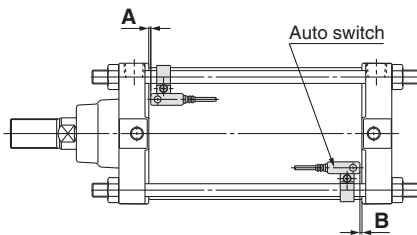
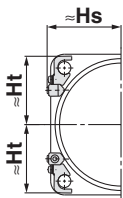


D-F5□/J59/D-F5NT

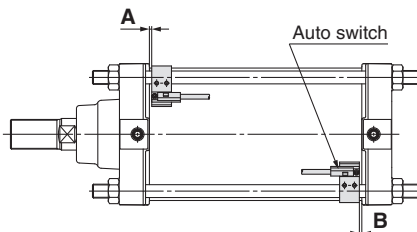
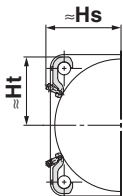
D-F5BAL/F59F

D-F5□W/J59□W

D-A5□/A6□



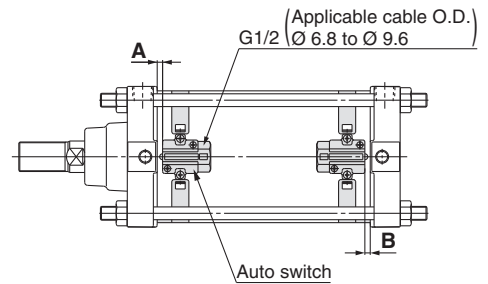
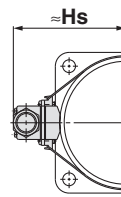
D-P3DWA



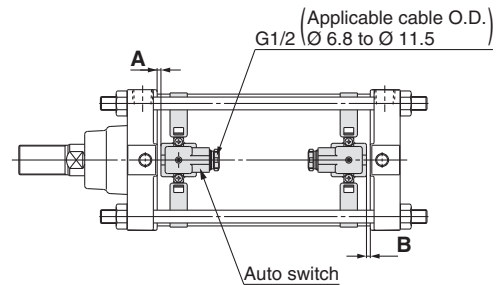
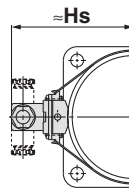
<Band mounting>

D-G3/K3

D-A3□



D-A44



* The indicator light faces the inside.

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

Auto Switch Proper Mounting Position

[mm]

Auto switch model	D-M9□ D-M9□V D-M9□W D-M9□WV D-M9□A D-M9□AV		D-A9□ D-A9□V		D-Y5□/Y6□ D-Y7P/Y7PV D-Y7□W D-Y7□WV D-Y7BA D-Z7□/Z80		D-G39 D-K39 D-A3□ D-A44		D-A5□ D-A6□		D-A59W		D-F5□ D-F5□W D-J59 D-J59W D-F5BA D-F59F		D-F5NT		D-P3DWA	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
125	13	12	9	8	6.5	5.5	3	2	3	2	7	6	9.5	8.5	14.5	13.5	8.5	7.5
140	13	12	9	8	6.5	5.5	3	2	3	2	7	6	9.5	8.5	14.5	13.5	8.5	7.5
160	13	12	9	8	6.5	5.5	3	2	3	2	7	6	9.5	8.5	14.5	13.5	8.5	7.5
180	21	11	17	7	—	—	—	—	11	1	15	5	17.5	7.5	22.5	12.5	16.5	6.5
200	23.5	13.5	19.5	9.5	—	—	—	—	13.5	3.5	17.5	7.5	20	10	25	15	19	9
250	24	14	20	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Provided as guidelines for auto switch proper mounting position (detection at stroke end)
Adjust the auto switch after confirming the operating conditions in the actual setting.

Auto Switch Mounting Height

[mm]

Auto switch model	D-M9□ D-M9□W D-M9□A D-A9□		D-M9□V D-M9□WV D-M9□AV D-A9□V		D-Y5□/Y6□ D-Y7P D-Y7PV D-Y7□W D-Y7□WV D-Y7BA D-Z7□/Z80		D-G39 D-K39 D-A3□		D-A44		D-A5□ D-A6□ D-A59W		D-F5□ D-F5□W D-J59 D-J59W D-F5BA D-F59F D-F5NT		D-P3DWA	
	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Hs	Hs	Ht	Hs	Ht	Hs	Ht	Hs	Ht
125	69	69.5	71.5	69.5	69	69.5	116	116	126	75.5	69.5	74.5	70	76	69.5	69.5
140	76	76	77.5	76	76	76	124	124	134	81	76.5	80	76.5	82	76	76
160	85	85	86	85	85	85	134.5	134.5	144.5	89	87.5	88	87.5	91	85	85
180	95	95	95.5	95	—	—	—	—	—	97	97.5	96	97.5	100	95	95
200	106	106	106	106	—	—	—	—	—	107	108	107	108	111	106	106
250	130.5	131.5	130.5	131.5	—	—	—	—	—	—	—	—	—	—	—	—

Minimum Stroke for Auto Switch Mounting

n: Number of auto switches [mm]

Auto switch model	Number of auto switches	Brackets other than centre trunnion	Centre trunnion					
			125	140	160	180	200	250
D-M9□ D-M9□W	2 (Different surfaces, same surface), 1	15	105	110	115	115	125	
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$125 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	
D-M9□V D-M9□VV	2 (Different surfaces, same surface), 1	10	80	85	90	100	110	
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$100 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$110 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	
D-M9□A	2 (Different surfaces, same surface), 1	20	115	120	120	130	130	
	n	$20 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$120 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$120 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$130 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$130 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	
D-M9□AV	2 (Different surfaces, same surface), 1	15	90	95	105	115	115	
	n	$15 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$105 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$115 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$115 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	
D-A9□	2 (Different surfaces, same surface), 1	15	100	105	110	110	120	
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$100 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$120 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	
D-A9□V	2 (Different surfaces, same surface), 1	10	75	80	85	95	105	
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$75 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$80 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$85 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$105 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	
D-F5□/J59 D-F5□W D-J59W D-F5BA D-F59F D-A5□/A6□ D-A59W	2 (Different surfaces, same surface), 1	25	125	135	150	—	—	
	n (Same surface)	$25 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$125 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$135 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$150 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	—	—	
D-F5NT	2 (Different surfaces, same surface), 1	35	145	155	165	—	—	
	n (Same surface)	$35 + 55 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$145 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$155 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$165 + 55 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	—	—	
D-G39 D-K39 D-A3□	2	Different surfaces Same surface	35 100	110			—	—
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	$110 + 30(n-2)$ (n = 2, 4, 6, 8...)*1			—	—
		Same surface	$100 + 100(n-2)$ (n = 2, 3, 4, 5...)	$110 + 100(n-2)$ (n = 2, 4, 6, 8...)*1			—	—
	1		15	110			—	—
D-A44	2	Different surfaces Same surface	35 55	110			—	—
	n	Different surfaces	$35 + 30(n-2)$ (n = 2, 3, 4, 5...)	$110 + 30(n-2)$ (n = 2, 4, 6, 8...)*1			—	—
		Same surface	$55 + 55(n-2)$ (n = 2, 3, 4, 5...)	$110 + 50(n-2)$ (n = 2, 4, 6, 8...)*1			—	—
	1		15	110			—	—
D-Y59□ D-Y7P D-Y7□W D-Z7□ D-Z80	2 (Different surfaces, same surface), 1	15	105	110	115	—	—	
	n	$15 + 40 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$105 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$110 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$115 + 40 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	—	—	
D-Y69□ D-Y7PV D-Y7□WV	2 (Different surfaces, same surface), 1	10	90	95	100	—	—	
	n	$10 + 30 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$90 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$95 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$100 + 30 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	—	—	
D-Y7BA	2 (Different surfaces, same surface), 1	20	115	120	125	—	—	
	n	$20 + 45 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$115 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$120 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$125 + 45 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	—	—	
D-P3DWA	2 (Different surfaces, same surface), 1	20	105	110	115	125	—	
	n	$20 + 50 \frac{(n-2)}{2}$ (n = 2, 4, 6, 8...)*1	$105 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$110 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$115 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	$125 + 50 \frac{(n-4)}{2}$ (n = 4, 8, 12, 16...)*2	—	

*1 When "n" is an odd number, an even number that is one larger than the odd number is to be used for the calculation.

*2 When "n" is an odd number, a multiple of 4 that is larger than the odd number is to be used for the calculation.

Operating Range

Auto switch model	Bore size [mm]					
	125	140	160	180	200	250
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV	6	6.5	6.5	7.5	8.5	9
D-A9□/A9□V	12	12.5	11.5	11	16.5	15
D-Z7□/Z80	14	14.5	13	—	—	—
D-A3□/A44	10	10	10	—	—	—
D-A5□/A6□	10	10	10	13	16.5	—
D-A59W	17	17	17	17	22	—
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA	12	13	7	—	—	—
D-F5□/J59/F5□W D-J59W/F5BA D-F5NT/F59F	5	5	5.5	5.5	6	—
D-G39/K39	11	11	10	—	—	—
D-P3DWA	7	7	7	7.5	8.5	—

* Values which include hysteresis are for reference purposes only. They are not a guarantee (assuming approximately ± 3.0 % dispersion) and may change substantially depending on the ambient environment.

Auto Switch Mounting Brackets/Part Nos.

Auto switch model	Bore size [mm]					
	125	140	160	180	200	250
D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V	BS5-125	BS5-125	BS5-160	BS5-180	BS5-200	BS5-250
D-F5□/J59 D-F5NT D-F5□W/J59W D-F5BAL/F59F D-A5□/A6□ D-A59W	BT-12	BT-12	BT-16	BT-18A	BT-20	—
D-G39/K39 D-A3□/A44	BS1-125	BS1-140	BS1-160	—	—	—
D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA D-Z7□/Z80	BS4-125	BS4-125	BS4-160	—	—	—
D-P3DWA	BS7-125S	BS7-125S	BS7-160S	BS7-180S	BS7-200S	—

[Stainless Steel Mounting Screw]

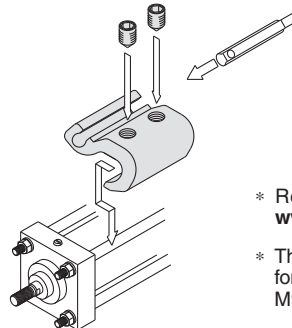
The following stainless steel mounting screw kit (including set screws) is available. Use it in accordance with the operating environment. (Since the auto switch mounting bracket is not included, order it separately.)

BBA1: For D-A5/A6/F5/J5 types

The above stainless steel screws are used when a cylinder is shipped with the D-F5 BA auto switch. When only one auto switch is shipped independently, the BBA1 is attached.

* When using the D-M9□A/M9□AV or Y7 BA, do not use the steel set screws which are included with the auto switch mounting brackets above (BS5-□□□, BS4-□□□).

Order a stainless steel screw kit (BBA1) separately, and use the M4 x 8 L stainless steel set screws included in the BBA1.



* Refer to the **catalogue on <https://www.smc.eu>** for details on the BBA1.

* The figure shows the mounting example for the D-A9□(V)/M9□(V)/M9□W(V)/M9□A(V)

Other than the applicable auto switches listed in “How to Order,” the following auto switches are also mountable. Refer to the **catalogue on <https://www.smc.eu>** for the detailed specifications.

Type	Model	Electrical entry	Features
Reed	D-A90V	Grommet (Perpendicular)	Without indicator light
	D-A93V, A96V		—
	D-Z73, Z76		—
	D-A53, A56	Grommet (In-line)	Without indicator light
	D-A67		—
	D-Z80		—
Solid state	D-F59, F5P, J59	Grommet (In-line)	—
	D-Y59A, Y59B, Y7P		2-colour indicator
	D-F59W, F5PW, J59W		Water-resistant (2-colour indicator)
	D-Y7NW, Y7PW, Y7BW		With timer
	D-F5BA, Y7BA		—
	D-F5NT	Grommet (Perpendicular)	—
	D-M9NV, M9PV, M9BV		2-colour indicator
	D-Y69A, Y69B, Y7PV		—
	D-M9NWV, M9PWV, M9BWW		2-colour indicator
	D-Y7NWV, Y7PWV, Y7BWW		Water-resistant (2-colour indicator)
	D-M9NAV, M9PAV, M9BAV		—

* With pre-wired connector is also available for solid state switches. For details, refer to the **catalogue on <https://www.smc.eu>**.

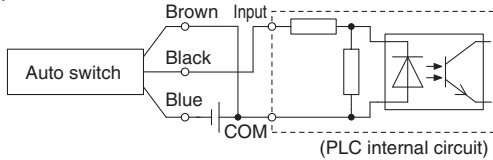
* Normally closed (NC = b contact) solid state auto switches (D-Y7G/Y7H) are also available. For details, refer to the **catalogue on <https://www.smc.eu>**.

Prior to Use

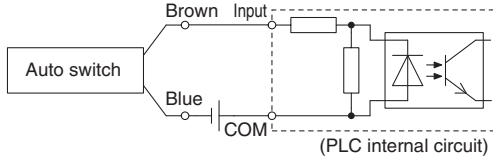
Auto Switch Connections and Examples

Sink Input Specifications

3-wire, NPN

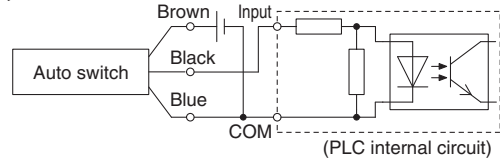


2-wire

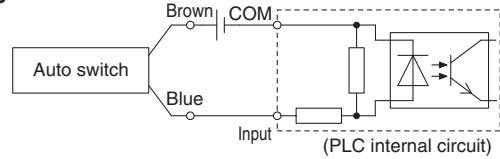


Source Input Specifications

3-wire, PNP



2-wire

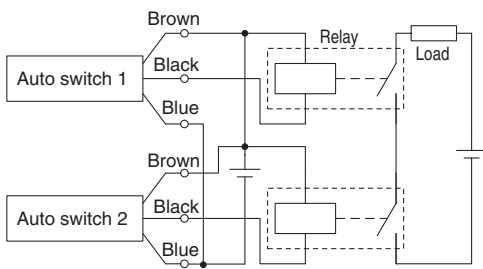


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

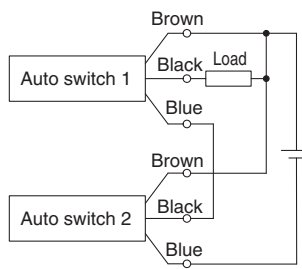
Examples of AND (Series) and OR (Parallel) Connections

* When using solid state auto switches, ensure the application is set up so the signals for the first 50 ms are invalid. Depending on the operating environment, the product may not operate properly.

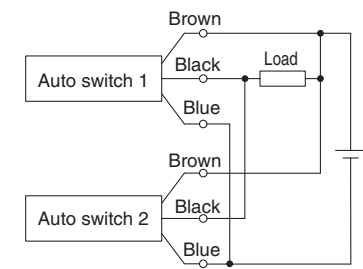
3-wire AND connection for NPN output (Using relays)



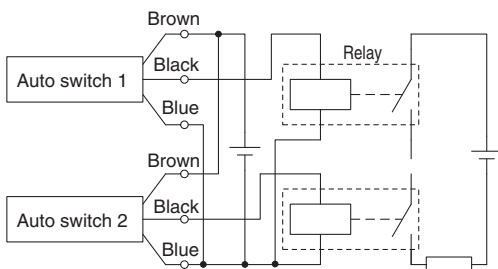
(Performed with auto switches only)



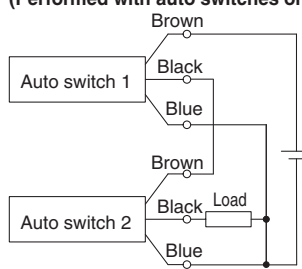
3-wire OR connection for NPN output



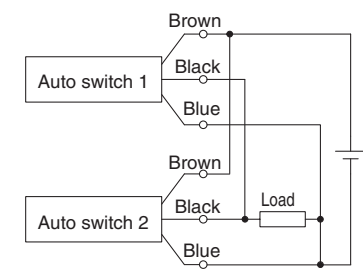
3-wire AND connection for PNP output (Using relays)



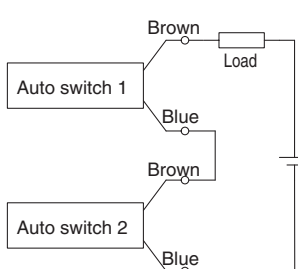
(Performed with auto switches only)



3-wire OR connection for PNP output



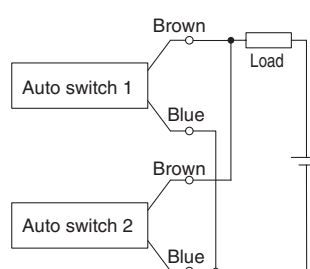
2-wire AND connection



When two auto switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up when both of the auto switches are in the ON state. Auto switches with a load voltage less than 20 V cannot be used. Please contact SMC if using AND connection for a heat-resistant solid state auto switch or a trimmer switch.

Example) Load voltage at ON
 Power supply voltage: 24 VDC
 Internal voltage drop: 4 V
 Load voltage at ON = Power supply voltage –
 Internal voltage drop x 2 pcs.
 = 24 V – 4 V x 2 pcs.
 = 16 V

2-wire OR connection



(Solid state)
 When two auto switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

(Reed)
 Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of auto switches in the ON state, the indicator lights may sometimes grow dim or not light up, due to the dispersion and reduction of the current flowing to the auto switches.

Example) Load voltage at OFF
 Leakage current: 1 mA
 Load impedance: 3 kΩ
 Load voltage at OFF = Leakage current x 2 pcs. x
 Load impedance
 = 1 mA x 2 pcs. x 3 kΩ
 = 6 V

Simple Specials/Made to Order Common Specifications

Please contact SMC for detailed specifications, delivery, and prices.

Simple Specials

The following special specifications can be ordered as a simplified Made-to-Order. Please contact your local sales representative for more details.

Symbol	Specifications	CS2 (Standard type)				Page
		Double acting				
		Single rod		Double rod		
		Non-lube				
		Ø 125 to Ø 160	Ø 180 to Ø 250	Ø 125 to Ø 160	Ø 180 to Ø 250	
-XA□	Change of rod end shape	●		●		44
-XC14	Change of trunnion bracket mounting position	●		●		45
-XC15	Change of tie-rod length	●		●		45

Made to Order Common Specifications

Symbol	Specifications	CS2 (Standard type)				Page
		Double acting				
		Single rod		Double rod		
		Non-lube				
		Ø 125 to Ø 160	Ø 180 to Ø 250	Ø 125 to Ø 160	Ø 180 to Ø 250	
-XB6	Heat-resistant cylinder (0 to 150 °C)	●		●		46
-XC3	Special port location	●				46
-XC4	With heavy duty scraper	●		●		47
-XC5	Heat-resistant cylinder (0 to 110 °C)	●		●		47
-XC9	Adjustable stroke cylinder/Adjustable retraction type	●				48
-XC10	Dual stroke cylinder/Double rod type	●				49
-XC11	Dual stroke cylinder/Single rod type	●				50
-XC22	Fluororubber seal	●		●		51
-XC26	With split pins for double clevis pin/double knuckle joint pin and flat washers	●				51
-XC27	Double clevis and double knuckle joint pins made of stainless steel	●				52
-XC30	Rod side trunnion	●		●		52
-XC35	With coil scraper	●		●		52
-XC68	Made of stainless steel (With hard chrome plated piston rod)	●		●		53
-XC86	With rod end bracket	●				53

Air Cylinder/CS2 Series Simple Specials

The following changes are dealt with through the Simple Specials System.

Symbol

-XA0 to XA30

1 Change of Rod End Shape

Applicable Series

Description	Model	Action	Symbol for change of rod end shape	Note
Standard type	CS2	Double acting, Single rod	XA0 to 30	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	XA0 to 30	Ø 125 to Ø 160 only
	CS2Y	Double acting, Single rod	XA0 to 30	Ø 125 to Ø 160 only

Precautions

- SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
- Standard dimensions marked with "*" will be as follows to the rod diameter (D). Enter any special dimension you require.
 $D \leq 6 \text{ mm} \blacklozenge D - 1 \text{ mm}$, $6 < D \leq 25 \text{ mm} \blacklozenge D - 2 \text{ mm}$, $D > 25 \text{ mm} \blacklozenge D - 4 \text{ mm}$
- In the case of the double rod type and single acting retraction type, enter the dimensions when the rod is retracted.
- Only one side of a double rod can be manufactured.
- "A0" is the same shape as the standard type. (The specifications of A0 are that only dimensions A and H are changed from the standard type.)

Symbol: A0 	Symbol: A1 	Symbol: A2 	Symbol: A3 	Symbol: A4
Symbol: A5 	Symbol: A6 	Symbol: A7 	Symbol: A8 	Symbol: A9
Symbol: A10 	Symbol: A11 	Symbol: A12 	Symbol: A13 	Symbol: A14
Symbol: A15 	Symbol: A16 	Symbol: A17 	Symbol: A18 	Symbol: A19
Symbol: A20 	Symbol: A21 	Symbol: A22 	Symbol: A23 	Symbol: A24
Symbol: A25 	Symbol: A26 	Symbol: A27 	Symbol: A28 	Symbol: A29
Symbol: A30 				

2 Change of Trunnion Bracket Mounting Position

Symbol
-XC14

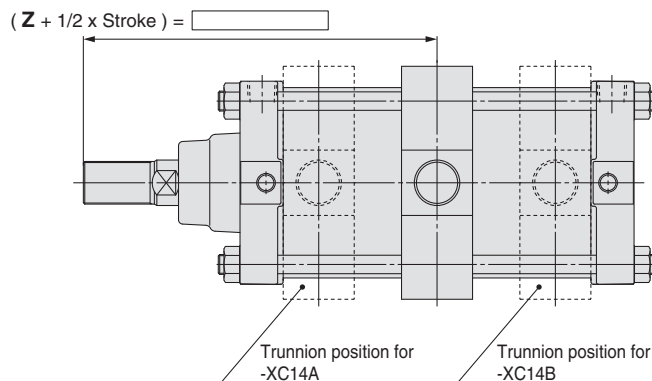
The position for mounting the trunnion pivot bracket on the cylinder can be moved from the standard mounting position to any desired position.

Applicable Series

Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

Precautions

1. Specify "Z + 1/2 x Stroke" in the case the trunnion bracket position is not -XC14A, -XC14B or trunnion is not a centre trunnion.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. The possible range of trunnion bracket mounting position is indicated in the table below.
4. Some trunnion mounting positions do not allow auto switch mounting. Please consult with SMC for more information.
5. The CS2 series has a greater range of trunnion bracket mounting positions than CS1 series, so the value of "Z + 1/2 x Stroke" at -XC14A and -XC14B is different.



Bore size	Symbol	Z + 1/2 x Stroke [mm]					
		For -XC14A	For -XC14B	For -XC14		Reference Standard (Centre trunnion)	Minimum stroke
				Minimum	Maximum		
125		165.5	152.5 + Stroke	166	152 + Stroke	159 + 1/2 x Stroke	25
140		168	150 + Stroke	168.5	149.5 + Stroke	159 + 1/2 x Stroke	30
160		186	160 + Stroke	186.5	159.5 + Stroke	173 + 1/2 x Stroke	35

3 Change of Tie-rod Length

Symbol
-XC15

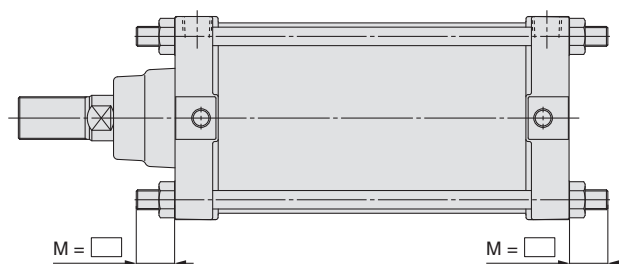
Cylinder with M dimension for tie-rod length changed from the standard length

Applicable Series

Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

Precautions

1. To order, specify the M dimension as well as the part number.
2. SMC will make appropriate arrangements if no dimension, tolerance, or finish instructions are given in the diagram.
3. Tie-rod length changeable range is described in the below.
4. The M dimension of the bracket mounting side of flange (F, G), clevis (C, D) types cannot be specified.



Tie-rod Length Changeable Range

[mm]

Bore size	125			140			160		
	L	B, F, G, C, D, T	L	B, F, G, C, D, T	L	B, F, G, C, D, T			
M Min.	20	12	21	12	23	14			
M Max.	110								

Made to Order Common Specifications

Please contact SMC for detailed dimensions, specifications, and delivery times.

1 Heat-resistant Cylinder (0 to 150 °C)

Symbol
-XB6

The seal material and grease used in this air cylinder have been changed so that it can be used at temperatures up to 150 °C.

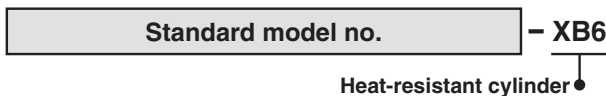
Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only Excludes the cylinder with auto switch
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only Excludes the cylinder with auto switch

Specifications

Ambient temperature range	0 °C to 150 °C
Seal material	Fluororubber
Grease	Heat-resistant grease
Specifications other than the above and external dimensions	Same as the standard type

How to Order



- * Operate without lubrication from a pneumatic system lubricator.
- * Please contact SMC for details on the maintenance intervals for this cylinder as they differ from those of the standard cylinder.
- * In principle, it is impossible to make a heat-resistant cylinder with a built-in magnet or with an auto switch.
- * Piston speed ranges from 50 to 500 mm/s

Warning Precautions

Be aware that smoking cigarettes, etc., after your hands have come into contact with the grease used in this cylinder can create a gas that is hazardous to humans.

2 Special Port Location

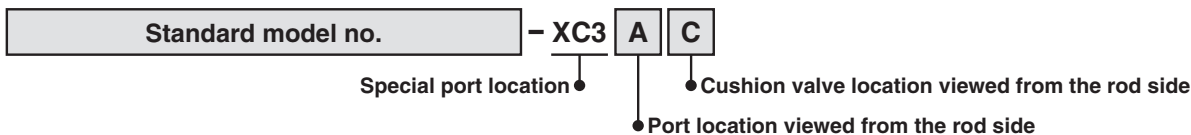
Symbol
-XC3

The locations of the connection port of the rod/head cover and the cushion valve for this cylinder are different than those of the standard type.

Applicable Series

Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only

How to Order



* For port locations, refer to the following diagrams and select either A, B, C, or D.

Specifications: Same as the standard type

Relationship between Port Location and Cushion Valve Location

Corresponding symbol of mounting bracket (Positional relationships)						
Basic	Foot	Rod flange	Head flange	Single clevis	Double clevis	Centre trunnion

1. The position symbols for the port and cushion valve have to be looked at from the rod side, as in the figures above. (In the case of standard cylinders, the port must be positioned on the upper side.) Define the upper side to be A, with B, C, and then D following in clockwise order.
2. -XC3AA is not available in terms of the position between the port and cushion valve, since it is available in the standard products.

3 With Heavy Duty Scraper

Symbol
-XC4

With the heavy duty scraper on the wiper ring, this cylinder is suitable for use in environments where die-cast equipment, construction machinery or industrial vehicles are exposed to dirt or sand, or in environments with significant amounts of dust.

Applicable Series

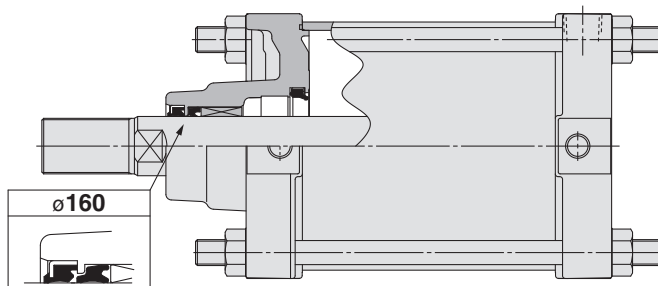
Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

How to Order

Standard model no. **-XC4**
With heavy duty scraper

Specifications: Same as the standard type

Construction (Dimensions are the same as the standard type.)



Caution

Do not replace heavy duty scrapers.

- Since heavy duty scrapers are press-fit, do not replace the cover only, but rather the entire rod cover assembly.

4 Heat-resistant Cylinder (0 to 110 °C)

Symbol
-XC5

The seal material used in this air cylinder has been updated for heat resistance (up to 110 °C) for use under severe ambient temperatures which exceed the standard specifications of 0 to 70 °C.

Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

How to Order

Standard model no. **-XC5**
Heat-resistant cylinder

Specifications

Ambient temperature range	0 °C to 110 °C
Seal material	Fluororubber
With auto switch	Unavailable*1
Specifications other than the above and external dimensions	Same as the standard type

*1 Manufacturing built-in magnet type and the one with auto switch is impossible.

* Please contact SMC for details on the maintenance intervals for this cylinder as they differ from those of the standard cylinder.

* Material of rod boot is heat-resistant tarpaulin.

5 Adjustable Stroke Cylinder/Adjustable Retraction Type

Symbol
-XC9

The retract stroke of the cylinder can be adjusted by the adjustment bolt.

Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only (Excludes the head flange and clevis types)

How to Order

CS2 **Mounting type** **Bore size** **Port suffix** - **Stroke** **Suffix** **Stroke adjustment symbol** - **XC9**

* Excludes the head flange and clevis types

Adjustable stroke cylinder/
Adjustable retraction type

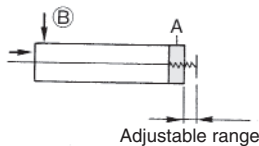
(After adjusting the stroke, the both-side cushion type becomes a single-side cushion type.)

Specifications

Series	Stroke adjustment symbol	Stroke adjustment range [mm]
CS2	A	0 to 25
	B	0 to 50

* Specifications other than the above are the same as the standard type.

Symbol

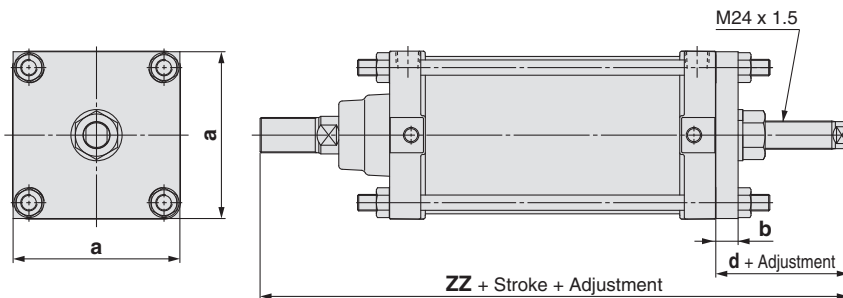


Precautions

⚠ Caution

1. When air is supplied to the cylinder, if the stroke adjustment bolt is loosened in excess of the allowable stroke adjustment amount, be aware that the stroke adjustment bolt could fly off or air could be discharged, which could injure personnel or damage the peripheral equipment.
2. Adjust the stroke when the cylinder is not pressurised. If it is adjusted while in a pressurised state, the seal of the adjustment section could become deformed, leading to air leakage.

Dimensions (Dimensions other than those below are the same as the standard type.)



Bore size	a	b	d	ZZ
125	142	19	63	271
140	155	19	63	271
160	174	19	59	285

6 Dual Stroke Cylinder/Double Rod Type

Two cylinders are integrated into one in a back-to-back configuration allowing for the cylinder stroke to be controlled in three steps.

Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only (* Excludes the clevis and trunnion types)

How to Order

CS2 **Mounting type** **Bore size** **Port suffix** - **Stroke A** **Suffix** + **Stroke B** **Suffix** - **XC10**
 * Excludes the clevis and trunnion types Dual stroke cylinder ●

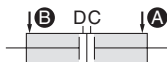
Specifications

Series	Bore size [mm]	Max. manufacturable stroke [mm]
CS2	125, 140	1000
	160	1200

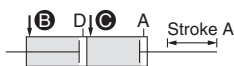
* Specifications other than the above are the same as the standard type.

Symbol

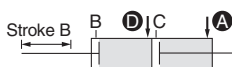
Function



When air pressure is supplied to ports **A** and **B**, both strokes A and B retract.



When air pressure is supplied to ports **B** and **C**, stroke A is operated.



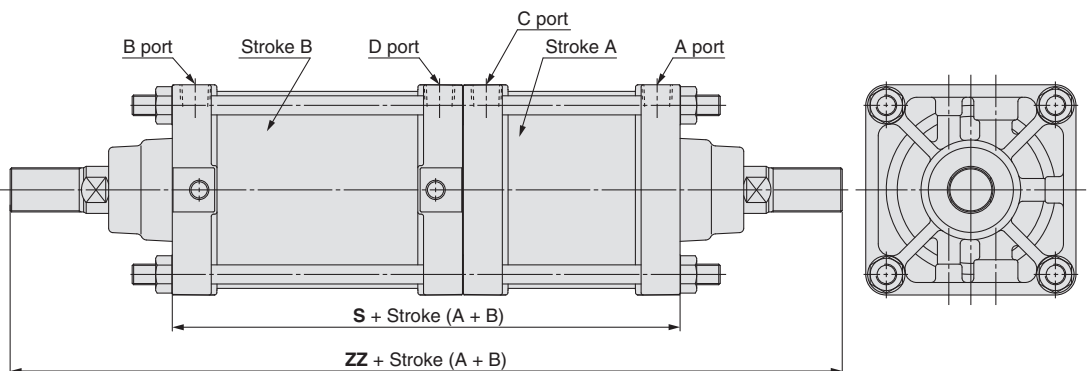
When air pressure is supplied to ports **A** and **D**, stroke B is operated.



When air pressure is supplied to ports **C** and **D**, both strokes A and B are operated.

Dimensions (Dimensions other than those below are the same as the standard type.)

Bore size	[mm]	
	S	ZZ
125	196	416
140	196	416
160	212	452



* For the rod flange type (F), the flange bracket will be attached on the stroke A side.

Symbol
-XC11

7 Dual Stroke Cylinder/Single Rod Type

Two cylinders can be integrated by connecting them in line, and the cylinder stroke can be controlled in two stages in both directions.

Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only * Excludes the trunnion type

Specifications: Same as the standard type

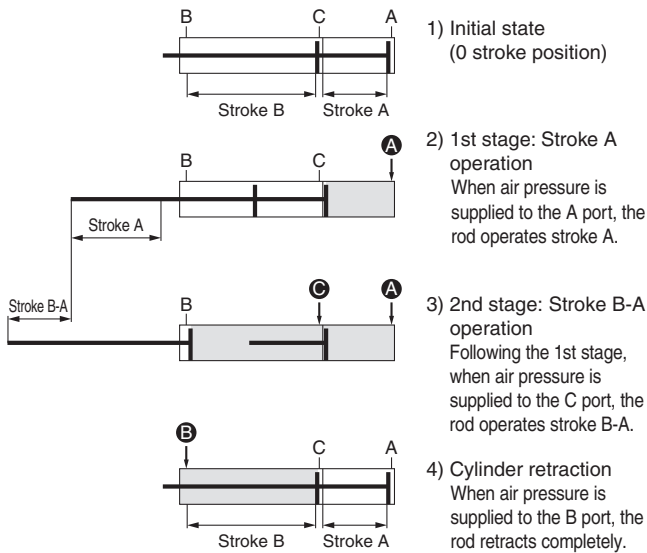
(Please contact SMC for each manufacturable stroke length.)

How to Order

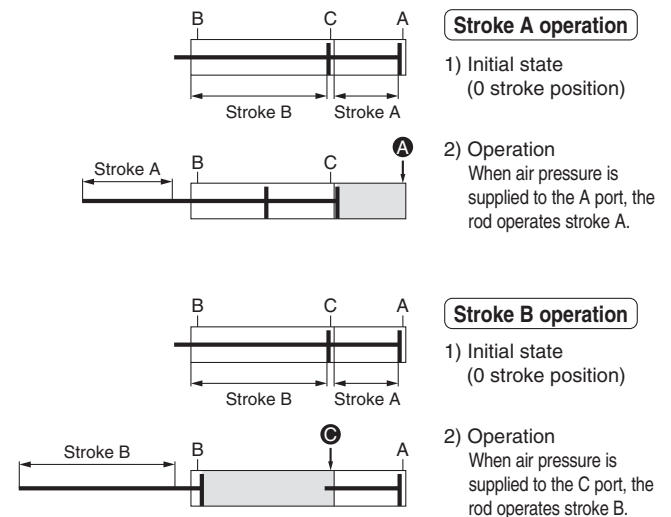
CS2 **Mounting type** **Bore size** **Port suffix** - **Stroke A** **Suffix** + **Stroke B-A** **Suffix** - **XC11**
* Excludes the trunnion type

Dual stroke cylinder/Single rod type

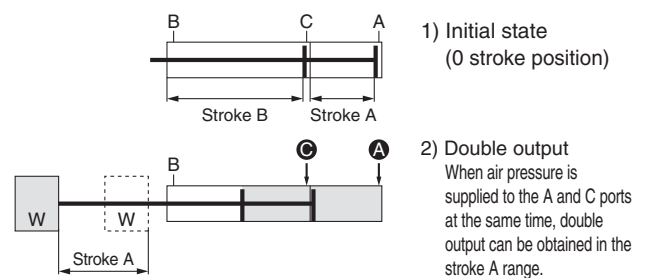
Functional description of dual stroke cylinder



Stroke A and stroke B can be operated individually.



Double output is possible.

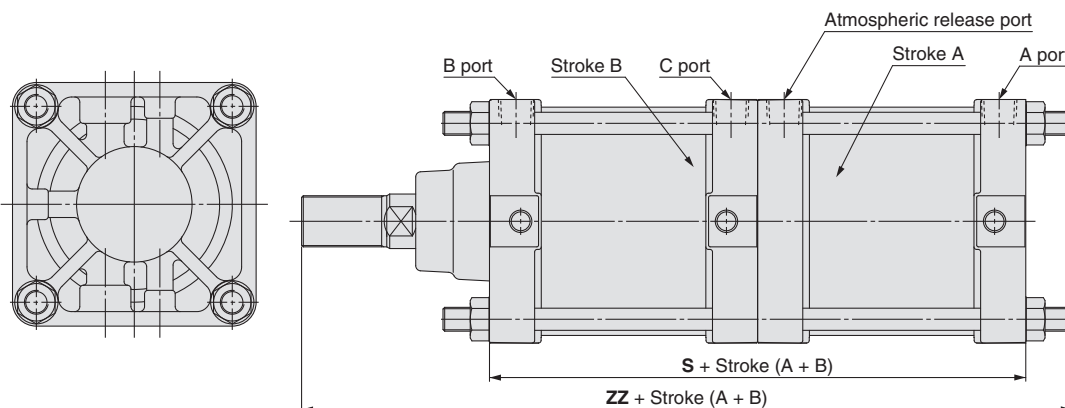


Precautions

⚠ Caution

- Do not supply air until the cylinder is fixed with the attached bolt.
- If air is supplied before securing the cylinder, the cylinder could lurch, posing a risk of bodily injury or damage to the peripheral equipment.

Dimensions (Dimensions other than those below are the same as the standard type.)



Bore size	[mm]	
	S	ZZ
125	197	334
140	197	334
160	213	363.5

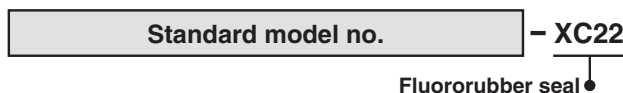
8 Fluororubber Seal

Symbol
-XC22

Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

How to Order



Specifications

Seal material	Fluororubber
Ambient temperature range	With auto switch : 0 °C to 60 °C (No freezing)*1 Without auto switch: 0 °C to 70 °C
Specifications other than the above and external dimensions	Same as the standard type

*1 Please contact SMC, since the type of chemical and the operating temperature may not allow the use of this product.

* Cylinders with auto switches can also be produced; however, auto switch related parts (auto switch units, mounting brackets, built-in magnets) are the same as standard products. Before using these, please contact SMC regarding their suitability for the operating environment.

9 With Split Pins for Double Clevis Pin/Double Knuckle Joint Pin and Flat Washers

Symbol
-XC26

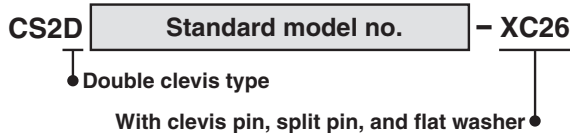
A flat washer has been added for the double clevis (one of the mounting types) or double knuckle joint (one of the accessories).

Applicable Series

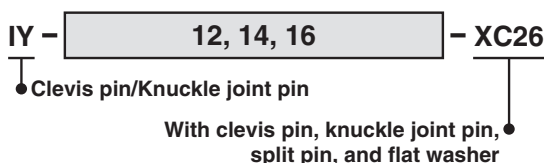
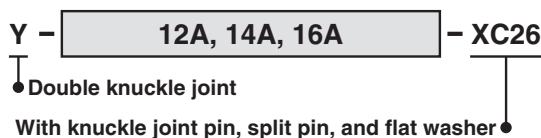
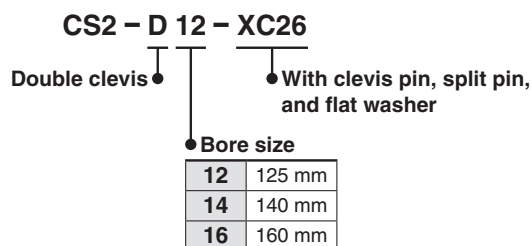
Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only

How to Order

• Product



• Parts assembly

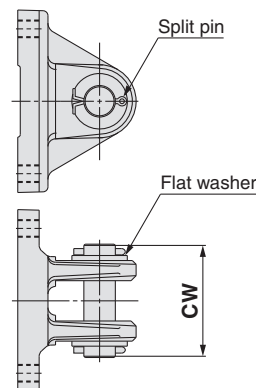


Specifications

Mounting type	Double clevis type (D), double knuckle joint only
Changed parts	Clevis pin, knuckle joint pin, flat washer
Specifications other than the above	Same as the standard type

Dimensions (Dimensions other than those below are the same as the standard type.)

Double clevis

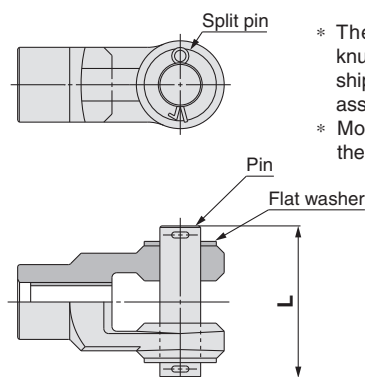


* The mounting bracket, split pin, clevis pin, and flat washer are shipped together but do not come assembled.

* Mounting method is the same as the standard type.

Bore size	CW
125	90
140	104
160	113

Double knuckle joint



* The mounting bracket, split pin, knuckle joint pin and flat washer are shipped together but do not come assembled.

* Mounting method is the same as the standard type.

Bore size	L
125	90
140	104
160	113

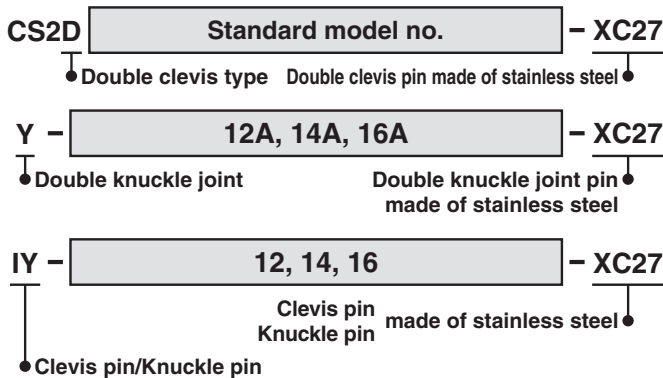
10 Double Clevis and Double Knuckle Joint Pins Made of Stainless Steel Symbol **-XC27**

To prevent the oscillating portion of the double clevis or the double knuckle joint from rusting, the material of the pin and the retaining ring (split pin) has been changed to stainless steel.

Applicable Series

Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only

How to Order

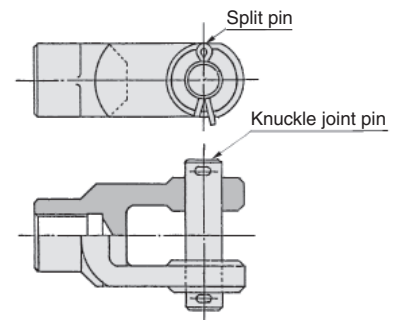


Specifications

Mounting type	Double clevis type (D), double knuckle joint only
Changed parts	Clevis pin, knuckle joint pin, split pin
Specifications other than the above	Same as the standard type

Dimensions: Same as the standard type

* The mounting bracket, split pin, clevis pin, and knuckle joint pin are shipped together but do not come assembled.



* Mounting method is the same as the standard type.

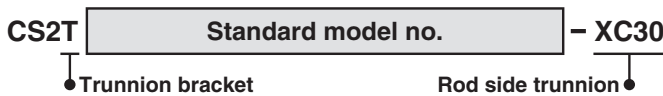
11 Rod Side Trunnion Symbol **-XC30**

This cylinder shortens the distance between the fulcrum and the rod end by installing a trunnion bracket in front of the rod side cover.

Applicable Series

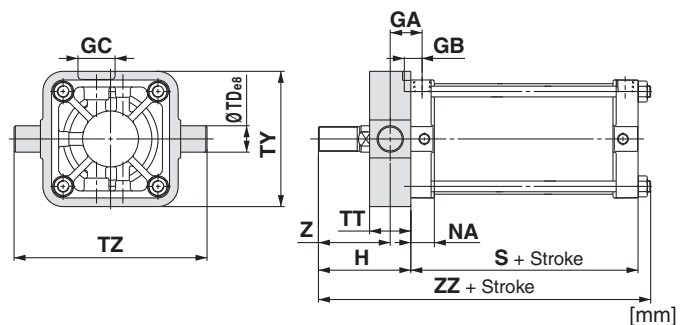
Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

How to Order



Specifications: Same as the standard type

Dimensions (Dimensions other than those below are the same as the standard type.)



Bore size	GA	GB	GC	NA	S	TDe8	TT	TY	TZ	H	Z	ZZ
125	38	23	45	28.5	96	32 ^{-0.050} _{-0.089}	50	164	234	112	87	221
140	40.5	23	45	28.5	96	36 ^{-0.050} _{-0.089}	55	184	262	112	84.5	221
160	46	26	50	32.5	104	40 ^{-0.050} _{-0.089}	60	204	292	122	92	241

12 With Coil Scraper Symbol **-XC35**

Removes frost, ice, weld spatter, cutting chips, etc. adhered to the piston rod, protecting the seals.

Applicable Series

Description	Model	Action	Note
Air cylinder	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

How to Order



Specifications: Same as the standard type

Dimensions: Same as the standard type

CS2 Series

13 Made of Stainless Steel (With Hard Chrome Plated Piston Rod)

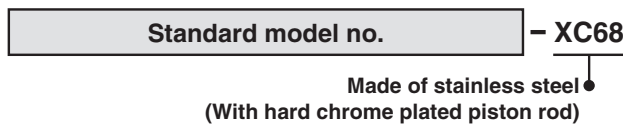
Symbol
-XC68

Suitable for cases where immersion in water leads to corrosion or the generation of rust.

Applicable Series

Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only
	CS2W	Double acting, Double rod	Ø 125 to Ø 160 only

How to Order



Specifications

Parts changed to stainless steel	Piston rod
Specifications other than the above and external dimensions	Same as the standard type

Maximum Strokes

[mm]	
Double acting, Single rod	Double acting single rod with rod boot
1600	1400

14 With Rod End Bracket

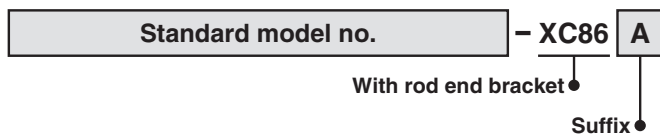
Symbol
-XC86

A model with the rod end bracket to simplify the order process

Applicable Series

Description	Model	Action	Note
Standard type	CS2	Double acting, Single rod	Ø 125 to Ø 160 only

How to Order

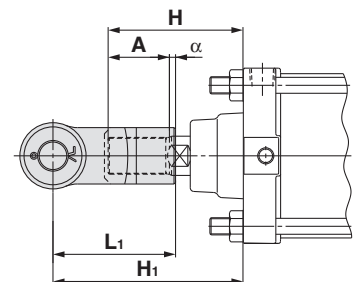


A	Description
A	With rod end nut
B	With double knuckle joint
C	With single knuckle joint
D	With double knuckle joint and rod end nut
E	With single knuckle joint and rod end nut
F	With rod end nut (For knuckle joint)

- * Rod end brackets are shipped together with the product but do not come assembled.
- * A pin and two split pins are attached for double knuckle joint.
- * XC86A to C: Standard type, XC86D to F: Standard type except for rod end thread length (A and H dimensions)

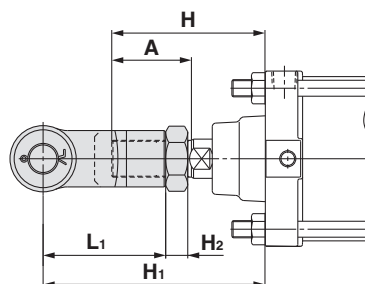
Dimensions (Dimensions other than those below are the same as the standard type.)

XC86B, XC86C

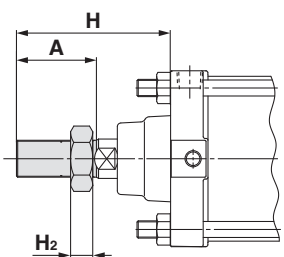


Bore size [mm]	Symbol					Applicable knuckle joint part no.	
	H	A	α	L ₁	H ₁	I type single knuckle	Y type double knuckle
125	110	50	3.5	100	156.5	I-12A	Y-12A
140	110	50	3.5	105	161.5	I-14A	Y-14A
160	120	56	3.5	110	170.5	I-16A	Y-16A

XC86D, XC86E



XC86F



Bore size [mm]	Symbol					Applicable knuckle joint part no.		Applicable rod end nut
	H	A	L ₁	H ₁	H ₂	I type single knuckle	Y type double knuckle	
125	125	65	100	181	18	I-12A	Y-12A	NT-12
140	125	65	105	186	18	I-14A	Y-14A	NT-12
160	140	76	110	198	21	I-16A	Y-16A	NT-16



CS2 Series

Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smc.eu>

Handling

Warning

1. Do not use the cylinder as a shock absorber.

Using the cylinder as a shock absorber may cause damage.

2. Do not open the cushion valve too far. Be sure to stay within the allowable number of rotations when opening.

Although a retaining ring is installed or caulked as a retaining mechanism for the cushion valve, do not open the cushion valve too far. Be sure to stay within the allowable number of rotations when opening.

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

The allowable number of rotations refers to the number of rotations until the restrictor of the cushion valve is completely opened from a completely closed state.

To adjust the cushion valve, use a JIS B 4 6 4 8 hexagon wrench key 4 (width across flats of cushion valve: 4).

Allowable Number of Rotations

Bore size [mm]	Allowable number of rotations
125, 140, 160	5
180, 200, 250	6

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

Mounting

Caution

1. Regarding the installation of a knuckle joint

Please contact SMC if a knuckle joint must be installed on the piston rod by using the rod end nut.

2. Regarding the screw-in of fittings when piping

When ports and fittings are screwed in, tighten them with the proper tightening torque below.

Bore size [mm]	Connecting thread nominal size	Proper tightening torque [N·m]
125, 140	1/2	28 to 30
160	3/4	
180, 200	1/2	
250	3/4	

3. Do not place tape or other objects onto the painted surface of the mounting bracket.

The paint of the mounting bracket is dried naturally, so it may peel off if tape or another object is placed onto it.

Disassembly/Assembly

Caution

1. Do not damage the cushion rings during removal or assembly.

If a cushion ring bumps against something during removal or assembly, the air cushion may not function properly due to cushion ring deformation.



CS2Y Series Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smc.eu>

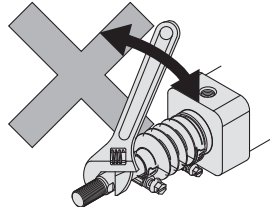
Operating Precautions

Warning

- 1. Do not use the cylinder as a shock absorber.**
Using the cylinder as a shock absorber may cause damage.
- 2. Do not open the cushion valve beyond the stopper.**
As a retaining mechanism for the cushion valve, retaining ring is installed, and the cushion valve should not be opened beyond that point.
If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.
To adjust the cushion valve, use the JIS B 4648 hexagon wrench key 4 (width across flats of cushion valve: 4).
- 3. Use the air cushion at the end of cylinder stroke.**

Caution

- 1. Do not use a pneumatic type as an air-hydro cylinder.**
It can cause oil leak.
- 2. Do not rotate the piston rod when the rod boot is fixed.**
Before rotating the piston rod, loosen the band to avoid twisting the rod boot.
- 3. Install the rod boot with the breathing hole facing downwards or in a direction suitable to prevent dust, moisture etc. from entering easily into the rod boot.**



- 4. Regarding the installation of a knuckle joint**
Please contact SMC if a knuckle joint must be installed on the piston rod by using the rod end nut.
- 5. Regarding the screw-in of fittings when piping**
When ports and fittings are screwed in, tighten them with the proper tightening torque below.

Bore size [mm]	Connecting thread nominal size	Proper tightening torque N·m
125, 140	1/2	28 to 30
160	3/4	

- 6. Do not deform cushion rings when removing and assembling.**
Cushion rings are press molded products. If a cushion ring bumps with something when removing and assembling, the air cushion may not function properly due to cushion ring deformation.
- 7. Do not place tape or other objects onto the painted surface of the unit.**
The paint of the CS cylinder is dried naturally, so it may peel off if tape or another object is placed onto it.

Disassembly/Replacement

Caution

- 1. Do not replace the bushing.**
As the bushing is press-fit, replace the cover assembly when the bushing must be replaced.
- 2. When a seal is replaced, apply grease to the new seal before it is assembled.**
If the cylinder is put into operation without applying grease to the seal, it could cause the seal to wear significantly, leading to premature air leakage.
- 3. Do not disassemble the trunnion type cylinder because the mounting precision is required.**
The trunnion type cylinder may lose dimensional accuracy and malfunction when it is disassembled and reassembled because the axial centre of the trunnion and that of the cylinder will not be aligned easily.

Safety Instructions

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

Caution:

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning:

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger:

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

- 1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

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

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

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

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.²⁾ Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
 2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
 3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.
- 2) Vacuum pads are excluded from this 1 year warranty. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

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

Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.

Revision History

Edition C	- Bore sizes Ø 180, Ø 200, and Ø 250 have been added to the single rod and double rod types. - The axial centralized piping type (Ø 180, Ø 200, and Ø 250) has been added. - Number of pages has been increased from 32 to 58.	AO
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