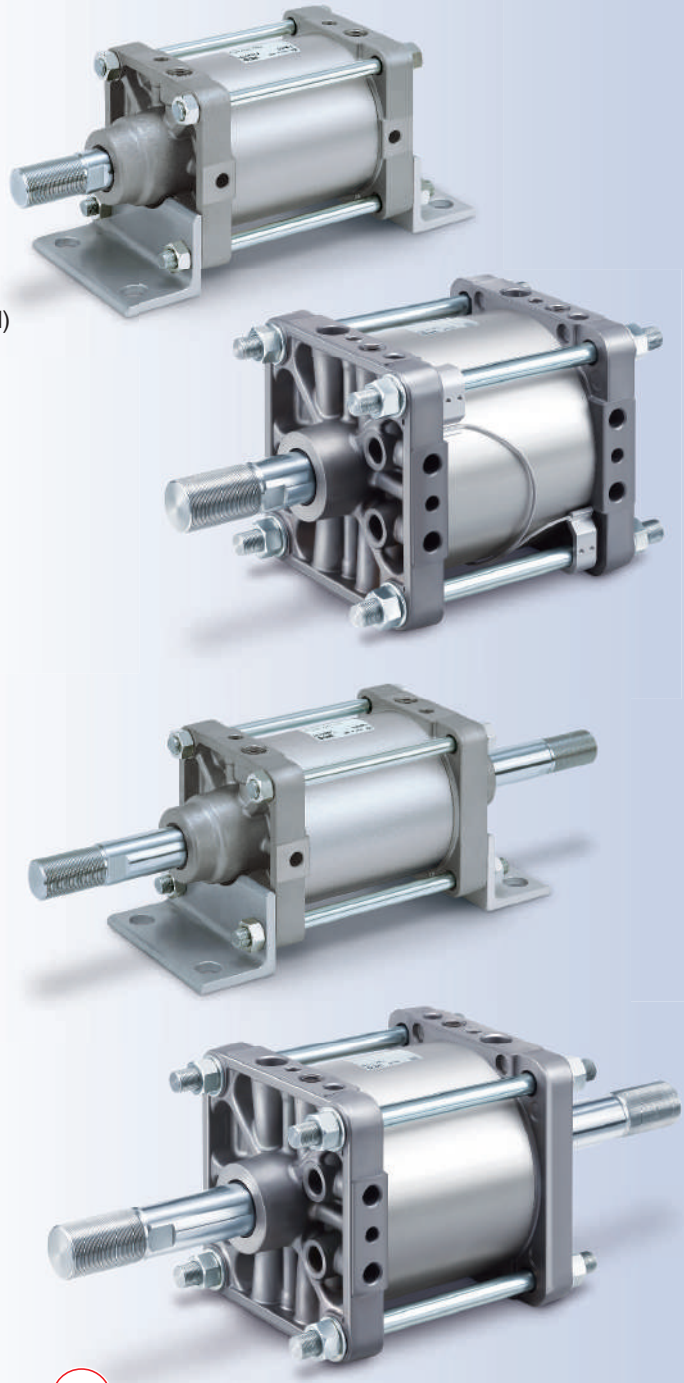
Air Cylinder

Ø 125, Ø 140, Ø 160, Ø 180, Ø 200, Ø 250, Ø 320

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

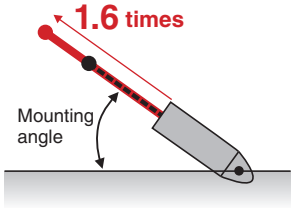
Allowable lateral load: Max. 900 N

(Ø 320, 100 mm stroke, with piston rod extended)

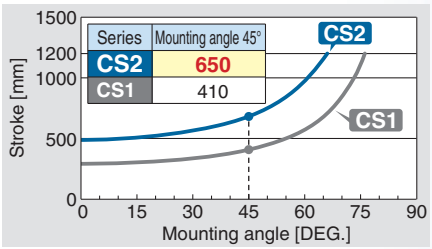
■ When using a rotating bracket:

Max. stroke increased by 1.6 times

410 mm stroke ➡ **650** mm stroke



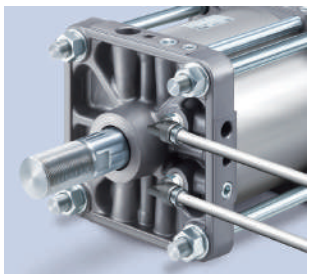
Maximum allowable stroke when using a clevis bracket



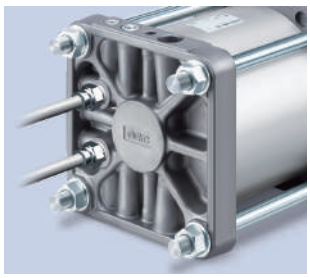
Improved Ease of Piping

Centralised piping ports in the axial direction increase piping flexibility.

(Axial centralised piping type)



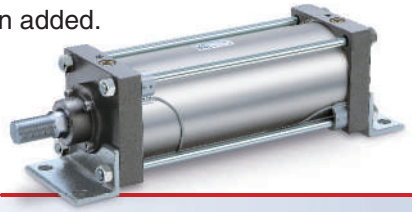
Rod side axial piping



Head side axial piping

New

- Bore size Ø 320 has been added to the standard type (single rod and double rod).
- A long stroke type (Ø 180 to Ø 320) has been added.



CS2 Series

SMC

CAT.EUS20-196D-UK

Lightweight

Weight reduced by a change in the cover material

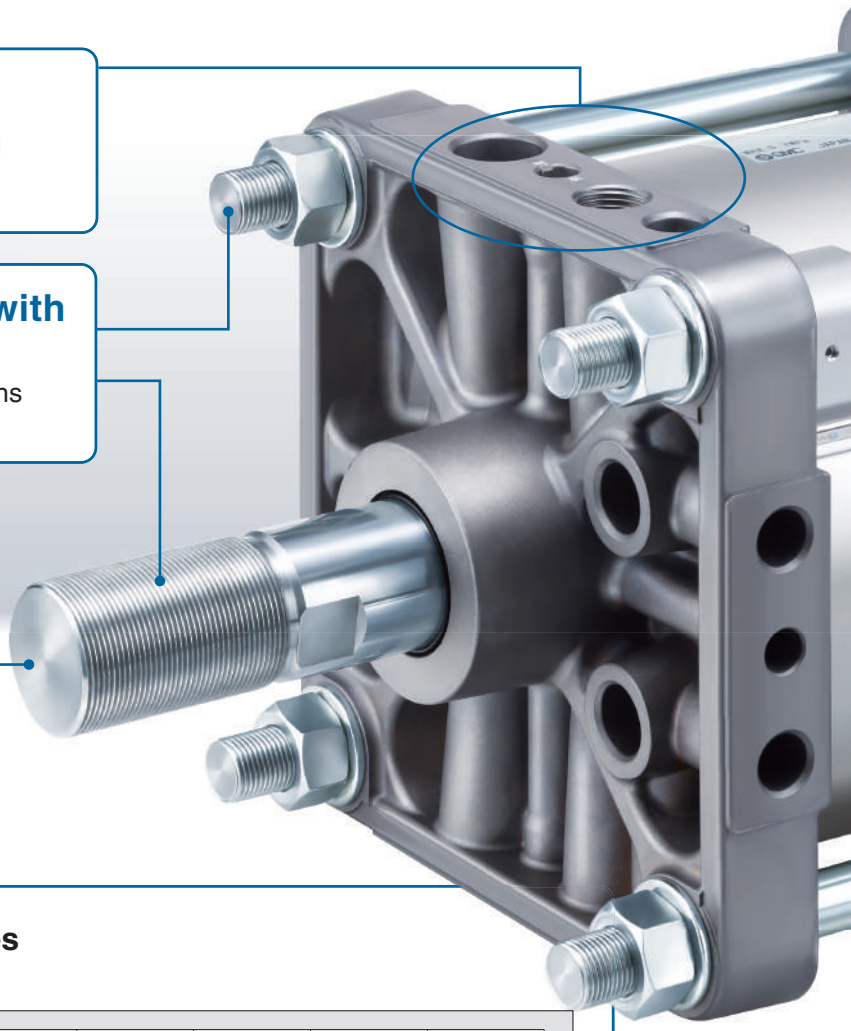
＊ Compared at a 100 mm stroke

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
New 320	**56.4**	128.1 (CS1 Ø 300)	65

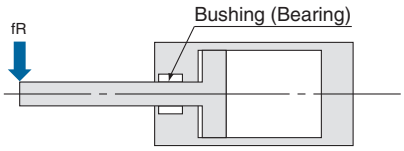
Ease of piping improved by placing the piping and cushion valve on the same side

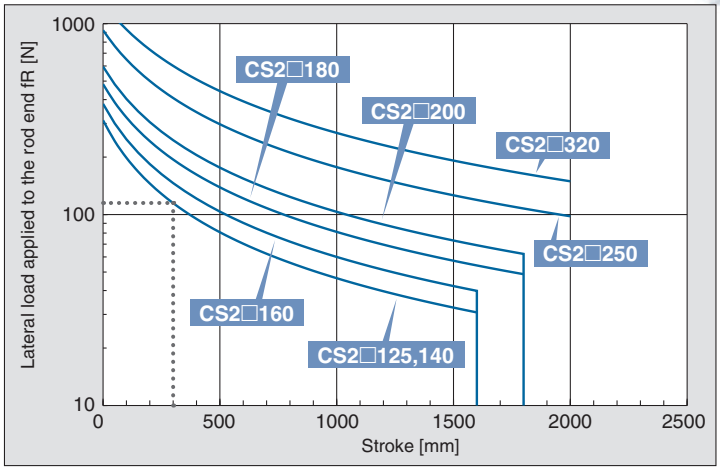
Mounting is interchangeable with the CS1 series.

- Interchangeable cylinder mounting dimensions
- Interchangeable rod end thread sizes



Lateral load equal to the CS1 series





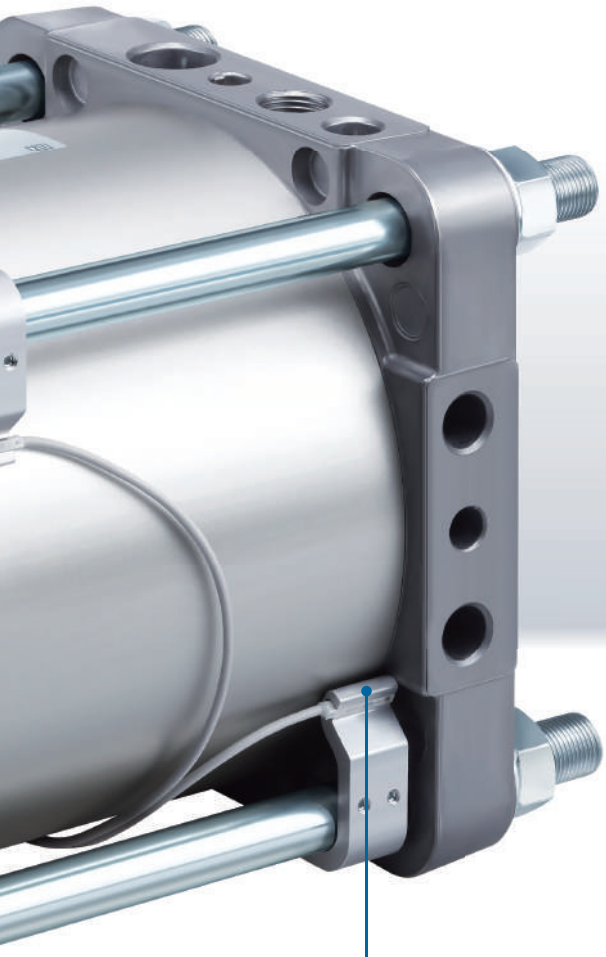
High Rigidity

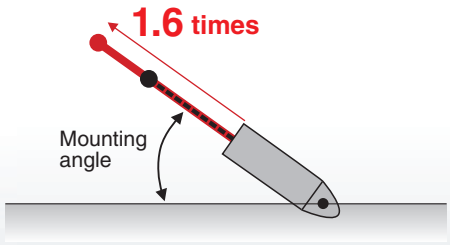
Allowable lateral load: Max. 900 N

(Ø 320, 100 mm stroke, with piston rod extended)

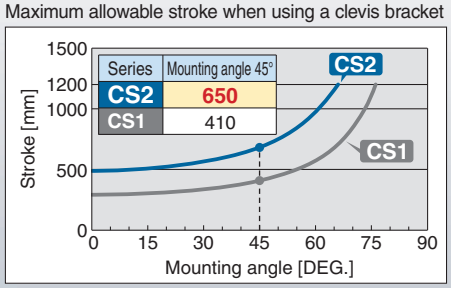
■ When using a rotating bracket:
Max. stroke increased by 1.6 times

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, Ø 250, and Ø 320 only)

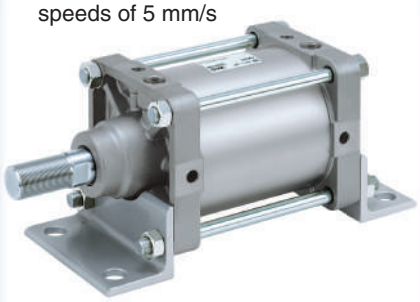
Auto switches can be mounted on Ø 125 to Ø 320.

- Solid state auto switch: D-M9□
- Reed auto switch: D-A9□
- Magnetic field-resistant auto switch: D-P3DWA (Ø 125 to Ø 200 only)

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

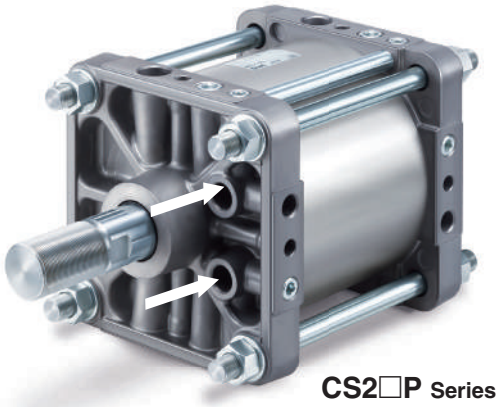


For details, refer to the **catalogue on https://www.smc.eu**.

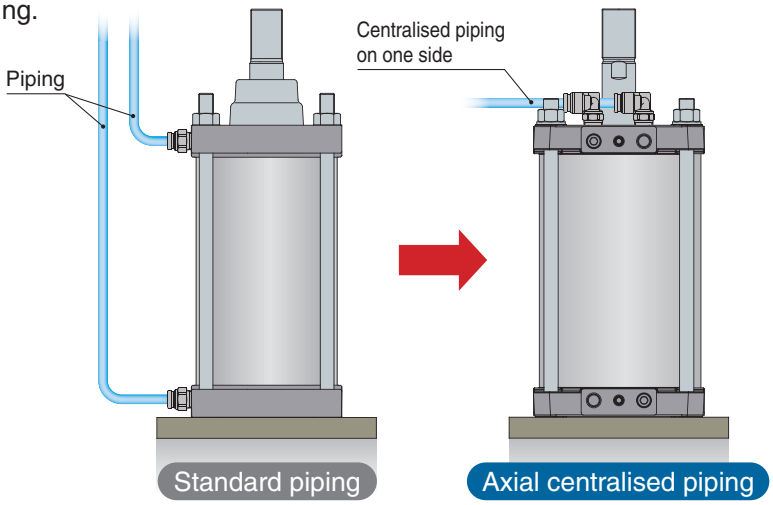
Axial Centralised Piping (Ø 180, Ø 200, and Ø 250 only)

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



(Rod side axial direction)

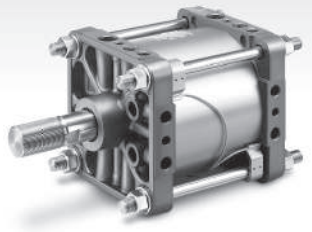
Series Variations

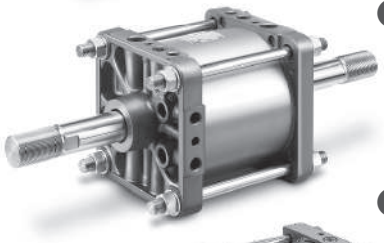
Series	Action	Type	Piping type	Standard variations: With rod boot	Standard variations: Copper-free	Bore size [mm]	Made to order	Page
Standard CS2 	Double acting	Single rod	Standard piping	●	●*1	125, 140, 160, 180, 200, 250, 320	● Change of rod end shape ● Heat-resistant cylinder (0 to 150 °C) ● Special 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 acting	Double rod	Standard piping	●	●*1	125, 140, 160, 180, 200, 250, 320		27
Long stroke CS2-V 	Double acting	Single rod	Standard piping	●		180, 200, 250, 320	● Change of rod end shape ● Change of trunnion bracket mounting position ● Change of tie-rod length	40
Axial centralised piping CS2□P 	Double acting	Single rod	Centralised piping	●		180, 200, 250		51
Smooth Cylinder CS2Y 	Double acting	Single rod	Standard piping	●		125, 140, 160		Refer to the **catalogue on https://www.smc.eu**.

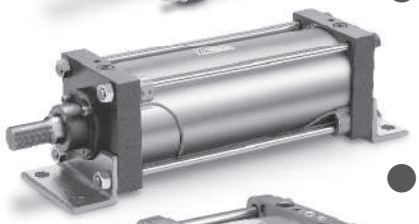
*1 Refer to the **catalogue on https://www.smc.eu** for details on copper-free products (Ø 125 to Ø 160).

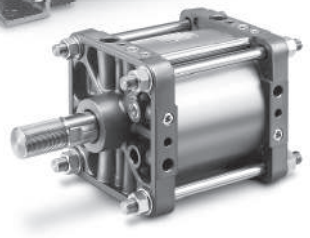
CONTENTS

Air Cylinder *CS2 Series*









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) Double acting Single rod Non-lube Ø 125 to Ø 160	CS2 (Standard) Double acting Single rod Non-lube Ø 180 to Ø 320	CS2 (Standard) Double acting Double rod Non-lube Ø 125 to Ø 160	CS2 (Standard) Double acting Double rod Non-lube Ø 180 to Ø 320	CS2-V (Long stroke) Double acting Single rod Non-lube Ø 180 to Ø 320	CS2□P (Axial centralised piping) Double acting Single rod Non-lube Ø 180 to Ø 250
Standard	Standard	Ø 125 to Ø 320	●	●	●	●	●	●
CDS2	Built-in magnet		●	●	●	●	●	●
CS2□-□ J K	With rod boot		●	●	●	●	●	●
20-	Copper and Fluorine-free *1		◎	○	◎	○	○	○
-XA□	Change of rod end shape	Ø 125 to Ø 320	◎	◎	◎	◎	◎	◎
-XB5	Oversized rod cylinder		○	○	○	○	○	○
-XB6	Heat-resistant cylinder (0 to 150 °C)		◎	○	◎	○	○	○
-XB7	Cold-resistant cylinder		○	—	○	—	—	—
-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"					
-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		◎	○	—	—	—	—
-XC12	Tandem cylinder	Ø 125 to Ø 320	○	○	—	—	—	—
-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

Ø 125, Ø 140, Ø 160, Ø 180, Ø 200, Ø 250, Ø 320

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
320	320 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.

Port thread type

—	Rc
TN	NPT
TF	G

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 Ø 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

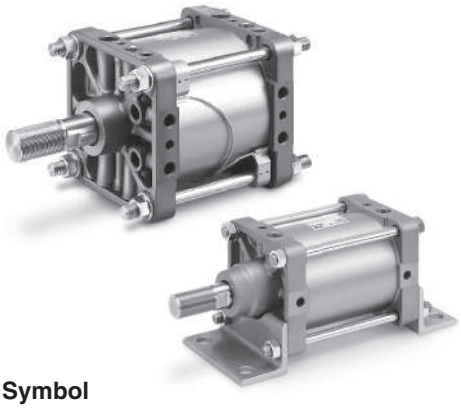
Applicable Auto Switches/Refer to the **catalogue on https://www.smc.eu** for further information on auto switches.

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

∗1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC regarding water-resistant types with the above model numbers.
∗2 The D-P3DWA is not applicable to bore sizes Ø 250 and Ø 320.

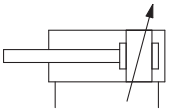
∗ Lead wire length symbols: 0.5 m····· — (Example) M9NW
1 m····· M (Example) M9NWM
3 m····· L (Example) M9NWL
5 m····· Z (Example) M9NWZ

∗ Solid state auto switches marked with a "○" are produced upon receipt of order.
∗ Since there are applicable auto switches other than those listed above, refer to page 63 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□/A44 auto switches (band mounting type) can only be mounted on Ø 125 to Ø 160.



Symbol

Double acting, Air cushion



Made to Order Specifications

(For details, refer to pages 65 to 75.)

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

∗ Refer to page 5 for details on whether or not to use a made-to-order product with the above common specifications.

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 59 to 63 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	320
Action		Double acting, Single rod						
Fluid		Air						
Proof pressure		1.57 MPa			1.2 MPa			
Max. operating pressure		0.97 MPa			0.7 MPa			
Min. 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						
Allowable kinetic energy (When air cushion is activated)		32.3 J	44.6 J	58.8 J	78.4 J	98 J	147 J	265 J

Maximum Strokes

∗ When using with auto switches, refer to the "Minimum Stroke for Auto Switch Mounting" table on page 61.

[mm]

Bore size \ Mounting bracket	Maximum stroke	
	Basic, Head flange, Single clevis, Double clevis, Centre trunnion	Foot, Rod flange
125	1000 or less	1600 or less
140		
160	1200 or less	
180		1569 or less
200	998 or less	
250	813 or less	
320	495 or less	

∗ For bore sizes Ø 180 to Ø 320, cylinders whose strokes exceed the lengths shown in the table to the right are categorized as class 2 pressure vessels under the Class 2 Pressure Vessel Act. Only the long stroke specification (page 40) is selectable for class 2 pressure vessels to be used or installed in Japan. For laws and regulations, refer to the CS1 series (**catalogue on https://www.smc.eu**).

∗ A bore size Ø 320 class 2 pressure vessel is available as a special product.

∗ For bore size Ø 180, the 1201 to 1569 stroke range for mounting bracket types other than the foot bracket and rod flange is only selectable with the individual made-to-order specification -X1034. As this specification exceeds the stroke limit, be sure to check the operating conditions, such as buckling of the piston rod, before deciding to use the product.

Bore size [mm]	Cylinder stroke [mm]
180	1569
200	998
250	813
320	495

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 26.

Mounting Bracket Part Nos.

Bore size [mm]	125	140	160	180	200	250	320
Foot	CS2-L12	CS2-L14	CS2-L16	CS2-L18	CS2-L20	CS2-L25	CS2-L32
Flange	CS2-F12	CS2-F14	CS2-F16	CS2-F18	CS2-F20	CS2-F25	CS2-F32
Single clevis	CS2-C12	CS2-C14	CS2-C16	CS2-C18	CS2-C20	CS2-C25	CS2-C32
Double clevis	CS2-D12	CS2-D14	CS2-D16	CS2-D18	CS2-D20	CS2-D25	CS2-D32

∗ When ordering foot brackets, order two pieces per cylinder.

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

∗ Mounting nuts are included in the brackets for bore size Ø 320.