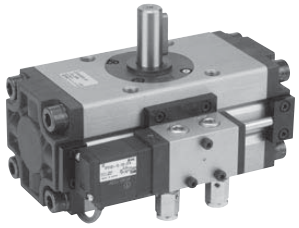
Rotary Actuator with Solenoid Valve

Series CVRA1

Rack & Pinion Style/Size: 50, 63, 80, 100

How to Order



Electrical entry

G	Grommet (Lead wire: 300 mm)	
H	Grommet (Lead wire: 600 mm)	
E	Grommet terminal	
T	Conduit terminal	
D	DIN terminal	
L	L plug connector	With lead wire
LN		Without lead wire
LO		Without connector
M	M plug connector	With lead wire
MN		Without lead wire
MO		Without connector

Light/Surge voltage suppressor

Nil	None
Z *	With light/surge voltage suppressor
S *	With surge voltage suppressor

* Light attached type (Z) is not available for grommet type. Surge voltage suppressor attached type is available only for grommet type.

Rated voltage

1	100 VAC 50/60 Hz
2	200 VAC 50/60 Hz
3	110 to 120 VAC, 50/60 Hz
4	220 VAC, 50/60 Hz
5	24 VDC
6	12 VDC
7	240 VAC, 50/60 Hz

* For other rated voltages, please consult with SMC.

Manual override

Nil	None
B	Locking B type
C	Locking C type

Solenoid valve configuration

1	Single solenoid
2	Double solenoid
3	Closed center
4	Exhaust center
5	Pressure center

Made to Order
Refer to page 235 for details.

Without auto switch CVRA1 **B W □ □ 50 – 90 □ – 1 1 G □ – □** —— **□**

With auto switch CDVRA1 **B S □ □ 50 – 90 □ – 1 1 G □ – □ – J59W □ –** **□**

Built-in magnet

With solenoid valve

Mounting style

B	Basic style
L *	Foot style

Note) No flange style "F" is available.

Shaft type

Standard	S	Single shaft
	W	Double shaft
Option	X	Single shaft with four chamfers
	Y	Double shaft key
	Z	Double shaft with four chamfers

* Refer to page 222 for the rod-end shape variations.

Type

Nil	Standard
U	Angle adjustable

Pattern

Nil	Standard
P	Combination of Simple specials/Made to Order

* Refer to pages 248 to 268 for details.

Size

50
63
80
100

Rotating angle

Standard	90	90°
	180	180°
Option	100	100°
	190	190°

Air cushion

Nil	None
C *	With air cushion

* Except angle adjustable type "U".

Number of auto switches

S	1 pc.
Nil	2 pcs.

Note) Maximum number of auto switches mountable is two.

Auto switch

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

Applicable Auto Switches/Refer to pages 807 to 856 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model	Lead wire length * (m) 0.5 (Nil)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24V	5V, 12V	—	F59	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				F5P	●	●	○	○		
				2-wire		12V		J59	●	●	○	○	—	
					—	—	100V, 200V	J51	●	●	○	—		
	Diagnosis indication (2-color)			3-wire (NPN)	24V	5V, 12V	—	F59W	●	●	○	○	IC circuit	
				3-wire (PNP)				F5PW	●	●	○	○		
				2-wire		12V		J59W	●	●	○	○	—	
	Diagnosis output (2-color)			4-wire (NPN)		5V, 12V		F59F	●	●	○	○	IC circuit	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equiv.)	—	5V	—	A56	●	●	—	—	IC circuit	—
				2-wire	24V	12V		A53	●	●	●	—	—	Relay, PLC
							100V, 200V	A54	●	●	●	—		
			No			12V	200 V or less	A64	●	●	—	—		
							—	A67	●	●	—	—	IC circuit	PLC
	Diagnosis indication (2-color)		Yes			—	—	A59W	●	●	—	—	—	Relay,PLC

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

* Refer to page 225 for applicable switches other than those indicated above.
* Auto switches are shipped together, (but not assembled).

* Auto switches marked with "○" are made-to-order specifications.

Made to Order Refer to pages 843 and 844 for detailed solid state auto switches with pre-wired connectors.

Made to Order

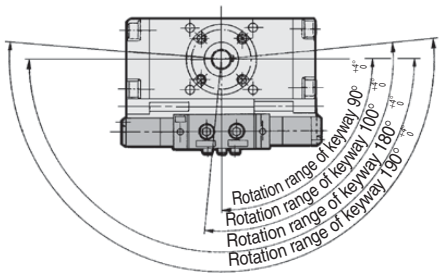
(Refer to pages 248 to 268 for details.)

Symbol	Specifications/Description	Applicable shaft type
—	Shaft type variations	S,X,Y,Z,T,J,K
XA1 to XA24	Shaft pattern sequencing I	S,W,Y
XA33 to XA46	Shaft pattern sequencing II	X,Z,T,J,K
XC7	Reversed shaft	S,W,X,T,J
XC8 to XC11	Change of rotation range	S,W,Y
XC30	Fluorine grease	S,W,X,Y,Z,T,J,K
XC31 to XC36	Change of rotation range and rotation direction of shaft	S,W,Y
XC37 to XC46	Change of rotation range and angle adjusting direction	S,W,Y
XC47 to XC58	Change of rotation range and angle adjusting direction (Angle adjusting screw is equipped on the left.)	S,W,Y
X6	Stainless steel specifications for main parts	S,W,X,Y,Z,T,J,K
X10	Both sides angle adjustable type	S,W,X,Y,Z,T,J,K
X11	One side angle adjustable, One side cushion	S,W,X,Y,Z,T,J,K

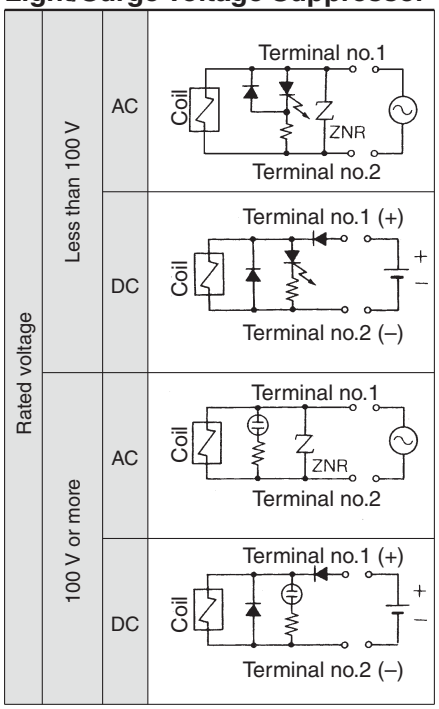
⚠Precautions

Be sure to read before handling. Refer to front matter 35 for Safety Instructions and pages 4 to 14 for Rotary Actuator and Auto Switch Precautions.

Rotation Range of Keyway Solenoid Valve Mounting Positions



Light/Surge Voltage Suppressor



Note) Light is not available on grommet type.

Specifications

Fluid			Air (Non-lube)
Proof pressure			1.35 MPa
Max. operating pressure			0.9 MPa
Min. operating pressure			0.15 MPa
Ambient and fluid temperature			0°C to 50°C (No freezing)
Lubrication			Non-lube
Mounting			Basic style, Foot style
Electrical entry			Grommet, Grommet terminal, Conduit terminal, DIN terminal, L plug connector, M plug connector
Coil rated voltage	AC		100, 200 V (50/60 Hz)
	DC		24 V
Allowable voltage change			–15 to +10% of the rated voltage
Coil insulation			Equivalent to B class (130°C)
Apparent power	AC	Inrush	5.6 VA (50 Hz), 5.0 VA (60 Hz)
		Holding	3.4 VA (50 Hz), 2.3 VA (60 Hz)
Power consumption	DC		1.8 W

Weight

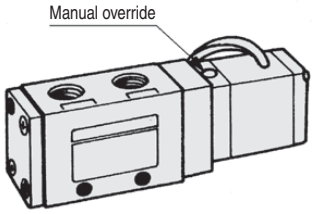
(kg)

Model	Additional weight	No. of positions/solenoids				
		2 position single	2 position double	3 position closed center	3 position exhaust center	3 position pressure center
CVRA1□□50 to 100	0.2	0.2	0.3	0.4	0.4	0.4

How to calculate weight
Weight = Basic weight * + Add'l weight + No. of positions/solenoids
* Refer to page 220 for basic weight.

Manual Override

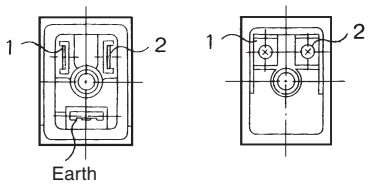
Non-locking push style is standard.



Electrical Wiring

The DIN terminal and the terminal pin (with light/surge voltage suppressor) are connected internally as shown below. Therefore, connect them the respective power supply terminals.

DIN terminal **With terminal block**



Terminal no.	1	2
DIN connector	+	–
Terminal connector	+	–

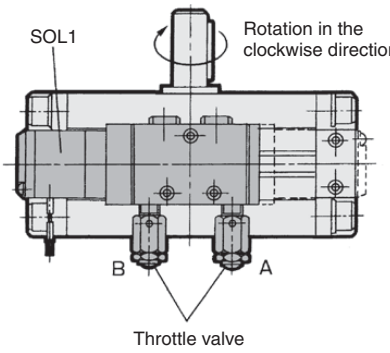
Instant Energizing Time

To operate the double solenoid type by applying an instantaneous current, ensure that the current is applied for at least 0.1 second.

How to Adjust the Rotation Speed

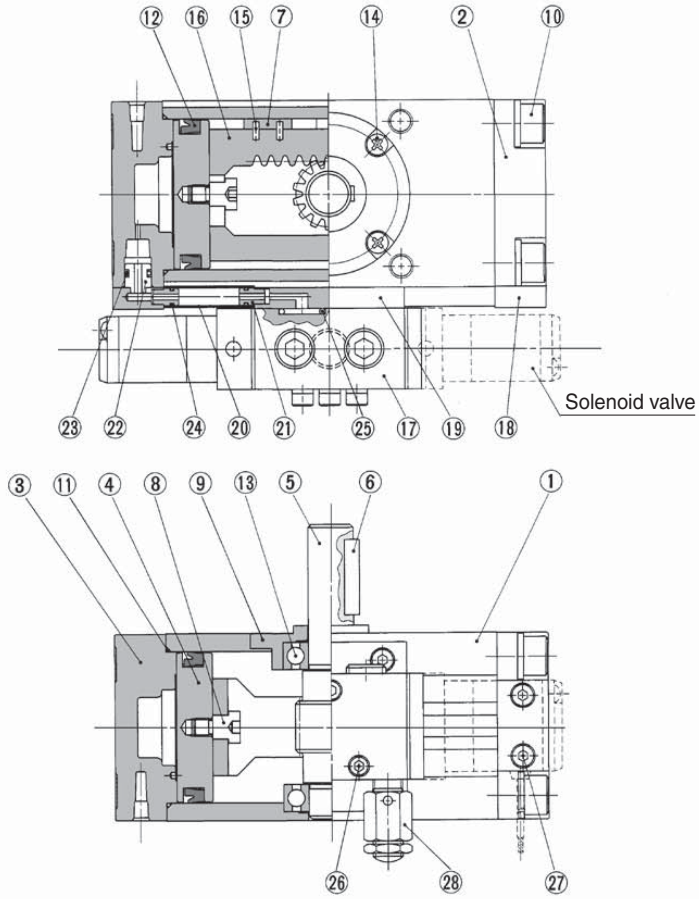
Rotation direction
When current is applied to SOL1, the shaft rotates clockwise.

How to adjust the rotation speed:
Turn the needle valve of the throttle valve clockwise to reduce the exhaust flow volume, thus slowing the rotation speed.
Throttle valve A regulates the clockwise rotation speed of the shaft and throttle valve B regulates the counterclockwise speed to the shaft.

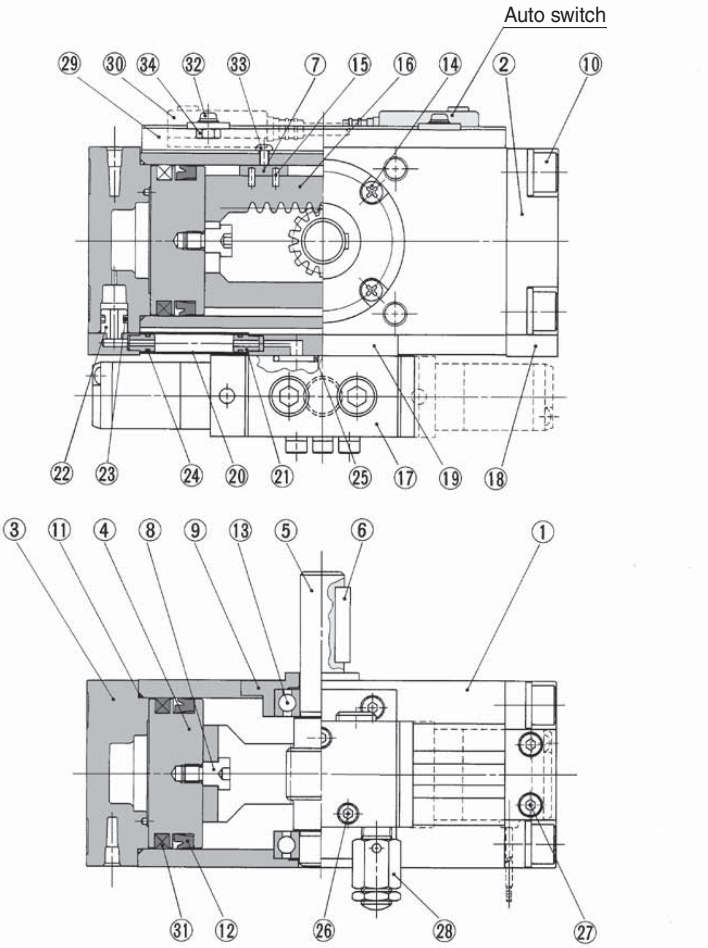


Construction

With solenoid valve



With solenoid valve and auto switch



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Right cover**	Aluminum alloy	Anodized
3	**Left cover**	Aluminum alloy	Anodized
4	**Piston**	Aluminum alloy	Chromated
5	**Shaft**	Chrome molybdenum steel	
6	**Parallel key**	Carbon steel	
7	**Slider**	Resin	
8	**Connecting screw**	Carbon steel	Zinc chromated
9	**Bearing retainer**	Aluminum alloy	Anodized
10	**Hexagon socket head cap screw with spring washer**	Chromium molybdenum steel	Black zinc chromated
11	**Tube gasket**	NBR	
12	**Piston seal**	NBR	
13	**Bearing**	Bearing steel	
14	**Round head Phillips screw**	Steel wire	Black zinc chromated
15	**Spring pin**	Steel wire	
16	**Rack**	Carbon steel	
17	**Solenoid valve**		

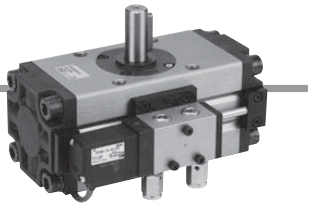
No.	Description	Material	Note
18	**Sub-plate**	Aluminum alloy	Anodized
19	**Sub-plate**	Aluminum alloy	Anodized
20	**Pipe**	Stainless steel	
21	**Fitting**	Aluminum alloy	Chromated
22	**Fitting**	Aluminum alloy	Chromated
23	**O-ring**	NBR	
24	**O-ring**	NBR	
25	**O-ring**	NBR	
26	**Hexagon socket head cap screw**	Steel wire	Black dyed
27	**Hexagon socket head cap screw**	Steel wire	Black dyed
28	**Metal valve**	Brass	
29	**Switch mounting rail**	Aluminum alloy	
30	**Auto switch**		
31	**Plastic magnet**	Magnetic material	
32	**Round head Phillips screw**	Steel wire	
33	**Round head Phillips screw**	Steel wire	
34	**Hexagon nut**	Steel wire	

With Solenoid Valve, With Solenoid Valve and Auto Switch/Replacement Parts

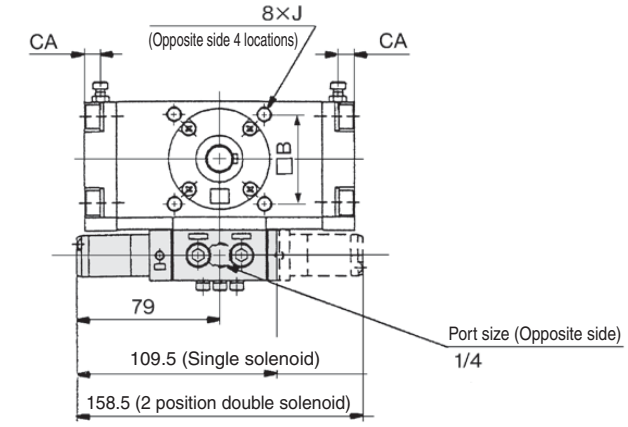
Type	Model	Description (The parts shown below are sets.)
C□VRA1□□50	P294020-49A	⑦, Slider : 2 pcs. ⑬, O-ring : 2 pcs. ⑪, Tube gasket : 2 pcs. ㉔, O-ring : 4 pcs. ⑫, Piston seal : 2 pcs. ㉕, O-ring : 2 pcs. ⑮, Spring pin : 4 pcs.
C□VRA1□□63	P294030-49A	
C□VRA1□□80	P294040-49	
C□VRA1□□100	P294050-49A	

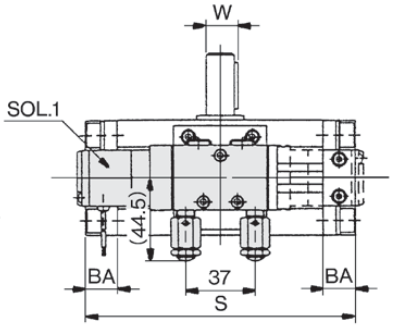
A grease pack (10 g) is included. If an additional grease pack is needed, order with the following part number.
Grease pack part no.: GR-S-010 (10 g)
∗ Individual part cannot be shipped.

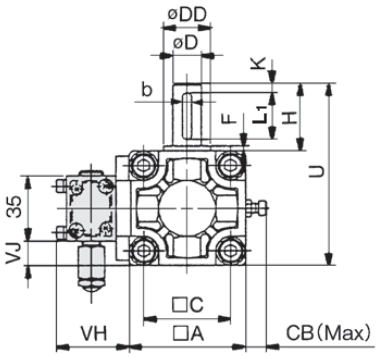
Size 50, 63, 80, 100/Basic Style: CVRA1BS50 to 100



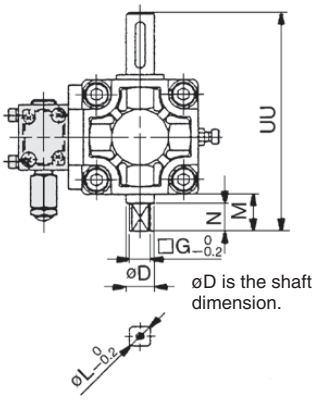
Single shaft type: CVRA1BS□50 to 100







Double shaft type: CVRA1BW□



Double Shaft Type

(mm)

Model	D(g6)	G	M	N	UU	L
CVRA1BW□50	15	11	20	15	118	14
CVRA1BW□63	17	13	22	17	139	16
CVRA1BW□80	20	15	25	20	167	19
CVRA1BW□100	25	19	30	25	202	24

Single Shaft Type

(mm)

Model	A	B	BA	C	CA	CB	D (g6)	DD (h9)	F	H	J	K	S *	U	W	Valve dimensions		Key dimensions	
																VH	VJ	b	L1
CVRA1BS□50	62	48	17	46	8.5	13	15	25	2.5	36	M8 x 1.25 depth 8	5	144 (177)	98	17	39	13.5	5 $^{0}_{-0.030}$	25
CVRA1BS□63	76	60	20	57	10	14	17	30	2.5	41	M10 x 1.5 depth 12	5	163 (201.5)	117	19.5	39	20.5	6 $^{0}_{-0.030}$	30
CVRA1BS□80	92	72	23.5	70	12	18	20	35	3	50	M12 x 1.75 depth 13	5	186 (230)	142	22.5	43	28.5	6 $^{0}_{-0.030}$	40
CVRA1BS□100	112	85	25	85	12.5	18	25	40	4	60	M12 x 1.75 depth 14	5	245 (311)	172	28	43	38.5	8 $^{0}_{-0.036}$	45

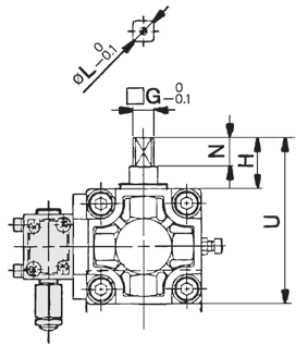
* ( ) are the dimensions for rotation of 180° and 190°.

Port Size

Model	Port size
CVRA1BS□50	Rc 1/4
CVRA1BS□63	Rc 1/4
CVRA1BS□80	Rc 1/4
CVRA1BS□100	Rc 1/4

Size 50, 63, 80, 100/Basic Style: CVRA1B, Foot Style: CVRA1L

Single shaft with four chamfers: CVRA1BX□

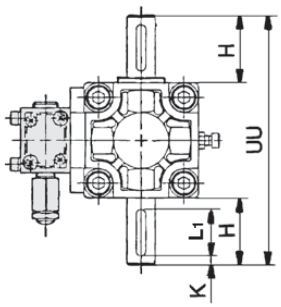


(mm)

Model	G	H	L	N	U
CVRA1BX□50	11	27	14	15	89
CVRA1BX□63	13	29	16	17	105
CVRA1BX□80	15	38	19	20	130
CVRA1BX□100	19	44	24	25	156

Note) Other dimensions are the same as the single shaft.

Double shaft key: CVRA1BY□

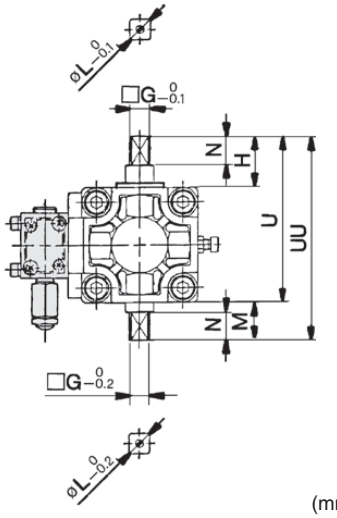


(mm)

Model	L1	H	K	UU
CVRA1BY□50	25	36	5	134
CVRA1BY□63	30	41	5	158
CVRA1BY□80	40	50	5	192
CVRA1BY□100	45	60	5	232

Note) Other dimensions are the same as the single shaft.

Double shaft with four chamfers: CVRA1BZ□

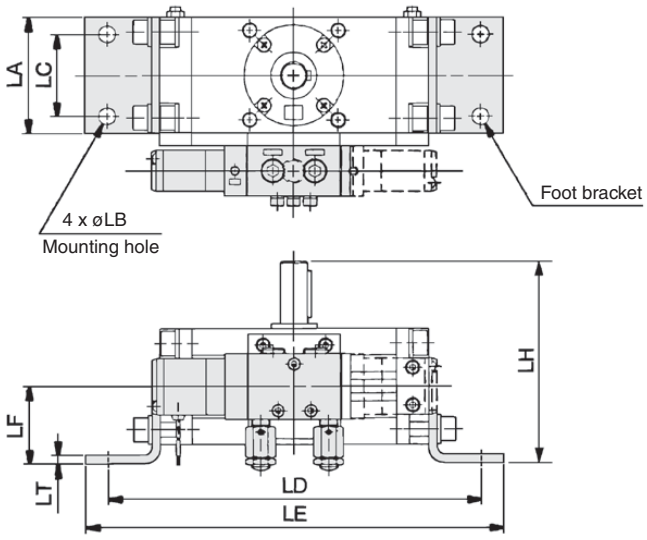


(mm)

Model	G	H	L	M	N	U	UU
CVRA1BZ□50	11	27	14	20	15	89	109
CVRA1BZ□63	13	29	16	22	17	105	127
CVRA1BZ□80	15	38	19	25	20	130	155
CVRA1BZ□100	19	44	24	30	25	156	186

Note) Other dimensions are the same as the single shaft.

Foot style: CVRA1L□□



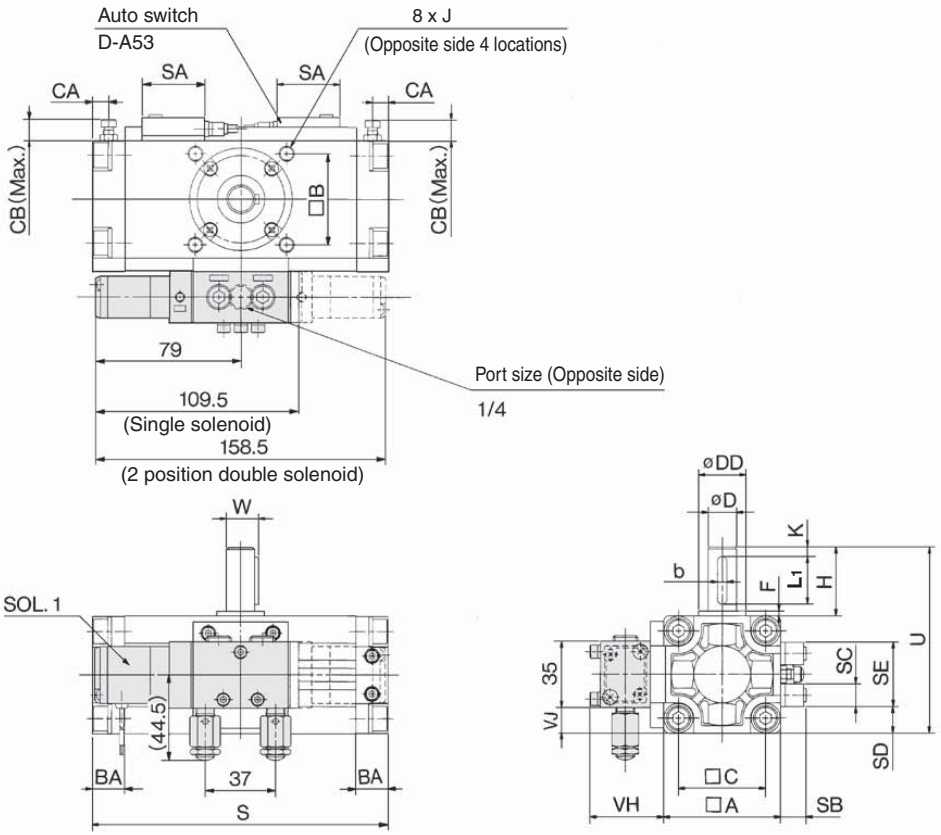
⋆ The dimensions below show pressurization to B port. (mm)

Model	LA	LB	LC	LD	LE	LF	LH	LT
CVRA1L□□50	62	9	44	200 (233)	224 (257)	41	108	4.5
CVRA1L□□63	76	11	55	235 (273.5)	263 (301.5)	48	127	5
CVRA1L□□80	92	13	67	274 (318)	316 (360)	58	154	6
CVRA1L□□100	112	13	87	333 (399)	375 (441)	73.5	189.5	6

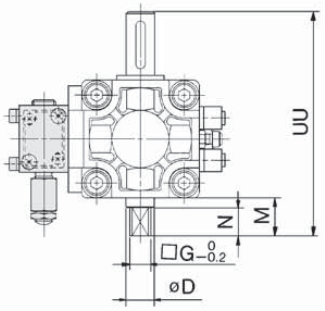
∗ ( ) are the dimensions for rotation of 180° and 190°.
Note) Other dimensions are the same as the single shaft.

Size 50, 63, 80, 100/Basic Style: CDVRA1BS50 to 100

Single shaft type: CDVRA1BS□50 to 100



Double shaft type: CDVRA1BW□



øD is the shaft dimension.

Double Shaft Type

(mm)

Model	D (g6)	G	M	N	UU	øL
CDVRA1BW□50	15	11	20	15	118	14
CDVRA1BW□63	17	13	22	17	139	16
CDVRA1BW□80	20	15	25	20	167	19
CDVRA1BW□100	25	19	30	25	202	24

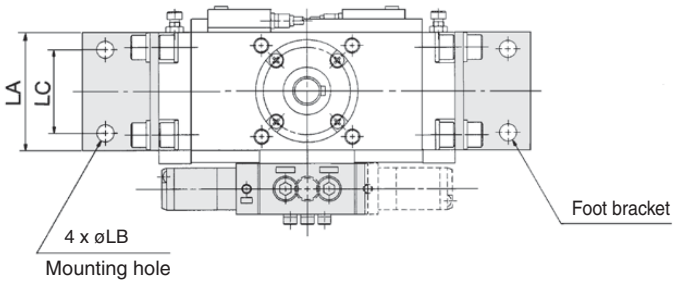
Single Shaft Type

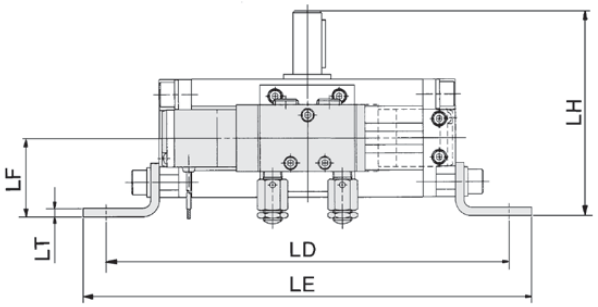
(mm)

Model	A	B	BA	C	CA	CB	øD (g6)	øDD (h9)	F	H	J	K	S	U	W	SA	SB	SC	SD	SE	Valve dimensions VH	Valve dimensions VJ	Key dimensions b	Key dimensions L1
CDVRA1BS□50	62	48	17	46	8.5	13	15	25	2.5	36	M 8 x 1.25 Depth 8	5	156 (189)	98	17	33	13.5	12	14	34	39	13.5	5 0 -0.030	25
CDVRA1BS□63	76	60	20	57	10	14	17	30	2.5	41	M10 x 1.5 Depth 12	5	175 (213.5)	117	19.5	33	14.5	12	21	34	39	20.5	6 0 -0.030	30
CDVRA1BS□80	92	72	23.5	70	12	18	20	35	3	50	M12 x 1.75 Depth 13	5	199 (243)	142	22.5	33	15.5	12	29	34	43	28.5	6 0 -0.030	40
CDVRA1BS□100	112	85	25	85	12.5	18	25	40	4	60	M12 x 1.75 Depth 14	5	259 (325)	172	28	33	16	12	39	34	43	38.5	8 0 -0.036	45

∗ ( ) are the dimensions for rotation of 180° and 190°.

Foot style: CDVRA1L□□





(mm)

Model	LA	LB	LC	LD	LE	LF	LH	LT
CDVRA1L□□50	62	9	44	212 (245)	236 (269)	41	108	4.5
CDVRA1L□□63	76	11	55	247 (285.5)	275 (313.5)	48	127	5
CDVRA1L□□80	92	13	67	287 (331)	329 (373)	58	154	6
CDVRA1L□□100	112	13	87	347 (413)	389 (455)	73.5	189.5	6

∗ ( ) are the dimensions for rotation of 180° and 190°.

Series CRA1 (Size 30, 50, 63, 80, 100)
Simple Specials:
-XA1 to -XA24: Shaft Pattern Sequencing I

Made to Order

Shaft shape pattern is dealt with simple Made-to-Order system. (Refer to front matter 32.)
Please contact SMC for a specification sheet when placing an order.

Shaft Pattern Sequencing I

Applicable shaft type: S, W, Y

How to Order

C | D | RA1 | B | S | | P | 50 | – | 90 | C | – | F59 | – | X | A2 | A24 | C10 | -X6

Built-in magnet

Nil	None
D	Built-in magnet

Mounting style

B	Basic style
L	Foot style

Shaft type

S	Single shaft key
W	Double shaft (Long shaft and with four chamfers)
Y	Double shaft key

Type

Nil	Pneumatic
H	Air-hydro

Pattern

Size

30
50
63
80
100

Rotating angle

90°
100°
180°
190°

Air cushion

Nil	None
C *	With air cushion

* For pneumatic type only.

Auto switch

Refer to page 219 for the part no. of auto switches.

Simple Specials, Made-to-Order symbol

- Refer to chart 1, 2 and 3 when the number of combinations is one or two.

* Combination of XA is possible for up to 2 types.

• Combination 3 Types

			• Combination of Applicable Chart
A1	A24	C30	Chart 1, 2
A2	A24	-X6	Chart 1, 3
A13	C8	C59	Chart 2, 7
A14	C60	-X6	Chart 2, 3, 8
A15	-X10	-X16	Chart 3, 9

Combination is available only when all the conditions are fulfilled in above combination chart.

• Combination 4 Types

				• Combination of Applicable Chart
A1	A2	C8	C59	Chart 1, 2, 7
A2	A24	C10	-X6	Chart 1, 2, 3, 8
A13	A24	-X6	-X16	Chart 1, 3, 9
A14	C11	C30	-X16	Chart 2, 3, 7, 8
A15	C60	-X10	-X16	Chart 2, 3, 8, 9
A14	C32	C61	C62	Chart 2, 7

Combination is available only when all the conditions are fulfilled in above combination chart.

* Combination of simple special and Made-to-Order is available for up to 4 types.
* Above is the typical example of combination.

How to order model with auto switches

Refer to page 219 for "How to Order" products with auto switch.

How to order model with solenoid valve

Refer to page 234 for "How to order" products with solenoid valve.

Refer to page 218 for "How to Order".

How to order angle adjustable type

Refer to page 240 for "How to Order" angle adjustable type.

Symbol

-XA1 to XA24

Combination Chart of Simple Specials for Tip End Shape

Chart 1. Combination between -XA□ and -XA□ (S, W, Y shaft)

Symbol	Description	Shaft direction		Shaft type			Combination			
		Upper	Lower	S	W	Y	XA1	XA2	XA13	XA24
XA 1	Female thread at the end	●	–	●	●	●	–	●	–	●
XA 2	Female thread at the end	–	●	●	●	●	●	–	–	●
XA13	Shaft through-hole	●	●	●	●	●	–	–	–	●
XA14	Shaft through-hole + Rod end female thread	●	–	●	●	●	–	–	–	●
XA15	Shaft through-hole + Rod end female thread	–	●	●	●	●	–	–	–	●
XA16	Shaft through-hole + Double shaft-end female threads	●	●	●	●	●	–	–	–	●
XA17	Shorted shaft (Long shaft with key)	●	–	●	●	●	–	●	●	–
XA18	Shorted shaft (Short shaft and with four sided chamfer)	–	●	–	●	●	W, Y *	–	W, Y *	–
XA19	Shorted shaft (Double shaft)	●	●	–	●	●	–	–	W, Y *	–
XA20	Reverse shaft, Shorted shaft	●	●	–	●	●	–	–	S, W *	–
XA24	Double key	●	–	●	●	●	–	–	–	–

* Corresponding shafts type available for combination.

Combination Chart of Made to Order

Chart 2. Combination between -XA□ and -XC□

Symbol	Description	Shaft type			Applicable size	Combination	
		S	W	Y		XA1,2,13 to 19	XA20,24
XC 7	Reversed shaft	●	●	–	50, 63, 80, 100	–	–
XC 8 to XC11	Change of rotating range	●	●	●		●	–
XC30	Fluorine grease	●	●	●	30 to 100	●	●
XC31 to XC36	Change of rotation range and shaft rotation direction	●	●	●	50, 63, 80, 100	●	–
XC37 to XC46	Change of rotation range and angle adjusting direction	●	●	●		●	–
XC47 to XC58	Change of rotation range and angle adjusting direction (Angle adjusting screw is equipped on the left.)	●	●	●		●	–
XC59 to XC61	Change of port direction	●	●	●	30 to 100	●	●
XC62	Reverse mounting of auto switch	●	●	●	50, 63, 80, 100	●	●
XC63	One side hydro, One side air	●	●	●		●	●
XC64	One side hydro, One side air	●	●	●		●	●

Chart 3. Combination between -XA□ and -X□

Symbol	Description	Shaft type			Applicable size	Combination	
		S	W	Y		XA1,2,13 to 20	XA24
X 6	Shaft, bolt made of stainless steel	●	●	●	30 to 100	●	●
X 7	Heat resistance (100°C)	●	●	●		●	●
X10	Angle adjustment for both sides	●	●	●	50 to 100	●	●
X11	Angle adjustment for single side, Air cushion with single side	●	●	●		●	●
X16	Fluororubber seal	●	●	●	30 to 100	●	●

* **Chart 7. For combination between -XC□ and -XC□, refer to page 257.**
Chart 8. For combination between -X□ and -XC□, refer to page 257.
Chart 9. For combination between -X□ and -X□, refer to page 266.

Series CRA1 (Size 30, 50, 63, 80, 100)
Simple Specials:
-XA1 to -XA24: Shaft Pattern Sequencing I

Made to Order

Shaft shape pattern is dealt with simple Made-to-Order system. (Refer to front matter 32.)
Please contact SMC for a specification sheet when placing an order.

Symbol

Shaft Pattern Sequencing I — -XA1 to XA17

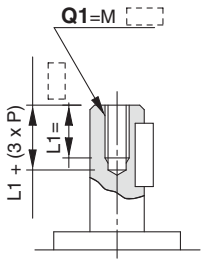
Applicable shaft type: S, W, Y

Additional Reminders

1. Enter the dimensions within a range that allows for additional machining.
2. SMC will make appropriate arrangements if no dimensional, tolerance, or finish instructions are given in the diagram.
3. The length of the unthreaded portion is 2 to 3 pitches.
4. Unless specified otherwise, the thread pitch is based on coarse metric threads.
P = Thread pitch
M3 x 0.5, M4 x 0.7, M 5 x 0.8
M6 x 1, M8 x 1.25, M10 x 1.5
5. Enter the desired figures in the portion of the diagram.
6. Chamfer face of the parts machining additionally is C0.5.

Symbol: A1
Machine female threads into the long shaft.
Note) Except flange style

The maximum dimension L1 is, as a rule, twice the thread size.
(Example) For M3: L1 = 6
• Applicable shaft types: S, W, Y

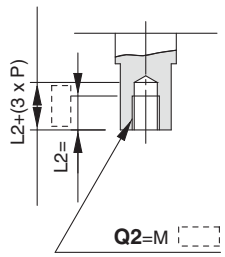


(mm)

Size	Q1
30	M3
50	M4, M5, M6
63	M4, M5, M6
80	M4, M5, M6, M 8
100	M5, M6, M8, M10

Symbol: A2
Machine female threads into the short shaft.
Note) Except flange style

The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M4: L2 = 8
• Applicable shaft types: S, W, Y

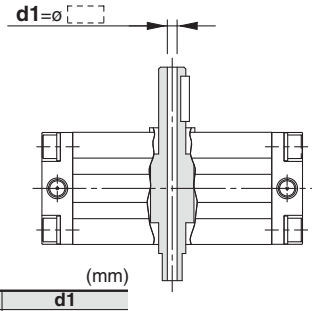


(mm)

Size	Q2
30	M3, M4
50	M4, M5, M6
63	M4, M5, M6
80	M4, M5, M6, M 8
100	M5, M6, M8, M10

Symbol: A13
Shaft with through-hole
Note) Except flange style

Minimum machining diameter for d1 is 0.1.
• Applicable shaft types: S, W, Y

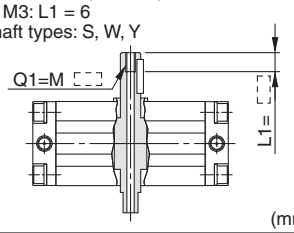


(mm)

Size	d1
30	ø2.5
50	ø4 to ø 7
63	ø4 to ø 8
80	ø6.8 to ø11
100	ø6.8 to ø13

Symbol: A14
Note) Except flange style

A special end is machined onto the long shaft, and a through-hole is drilled into it. Female threads are machined into the through-hole, whose diameter is equivalent to the pilot hole diameter.
The maximum dimension L1 is, as a rule, twice the thread size.
(Example) For M3: L1 = 6
• Applicable shaft types: S, W, Y

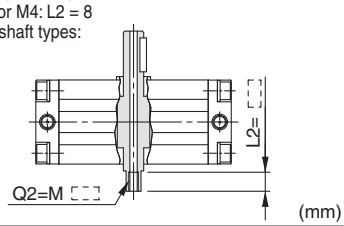


(mm)

Thread \ Size	30	50	63	80	100
M3 x 0.5	ø2.5	–	–	–	–
M5 x 0.8	–	ø4	ø4	–	–
M6 x 1	–	ø5	ø5	–	–
M8 x 1.25	–	–	ø6.8	ø 6.8	ø 6.8
M10 x 1.5	–	–	–	ø 8.5	ø 8.5
M12 x 1.75	–	–	–	ø10.3	ø10.3
Rc1/8	–	–	–	ø 8	ø 8
Rc1/4	–	–	–	–	ø11

Symbol: A15
Note) Except flange style

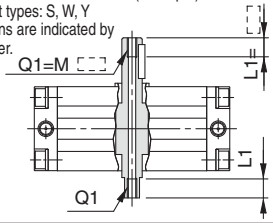
A special end is machined onto the short shaft, and a through-hole is drilled into it. Female threads are machined into the through-hole, whose diameter is equivalent to the pilot hole diameter. The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M4: L2 = 8
• Applicable shaft types: S, W, Y



(mm)

Thread \ Size	30	50	63	80	100
M3 x 0.5	ø2.5	–	–	–	–
M5 x 0.8	–	ø4	ø4	–	–
M6 x 1	–	ø5	ø5	–	–
M8 x 1.25	–	–	ø6.8	ø 6.8	ø 6.8
M10 x 1.5	–	–	–	ø 8.5	ø 8.5
M12 x 1.75	–	–	–	ø10.3	ø10.3
Rc1/8	–	–	–	ø 8	ø 8
Rc1/4	–	–	–	–	ø11

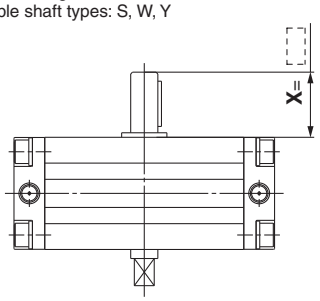
Symbol: A16
Note) Except flange style
A special end is machined onto both the long and short shafts, and a through-hole is drilled into both shafts. Female threads are machined into the through-holes, whose diameter is equivalent to the diameter of the pilot holes. The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M5: L1 = 10
• Applicable shaft types: S, W, Y
• Equal dimensions are indicated by the same marker.



(mm)

Thread \ Size	30	50	63	80	100
M3 x 0.5	ø2.5	–	–	–	–
M5 x 0.8	–	ø4	ø4	–	–
M6 x 1	–	ø5	ø5	–	–
M8 x 1.25	–	–	ø6.8	ø 6.8	ø 6.8
M10 x 1.5	–	–	–	ø 8.5	ø 8.5
M12 x 1.75	–	–	–	ø10.3	ø10.3
Rc1/8	–	–	–	ø 8	ø 8
Rc1/4	–	–	–	–	ø11

Symbol: A17
• Shorten the long shaft.
• Applicable shaft types: S, W, Y



(mm)

Size	X
30	15 to 25
50	18.5 to 36
63	21 to 41
80	25 to 50
100	32.5 to 60

SMC

Symbol

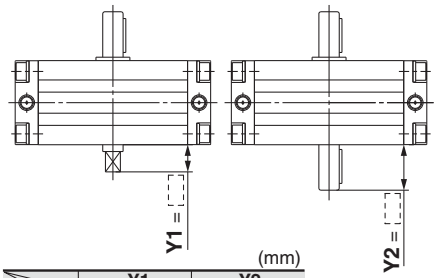
Shaft Pattern Sequencing I

-XA18 to XA24

Applicable shaft type: S, W, Y

Symbol: A18

Shorten the long shaft.
• Applicable shaft types: W, Y

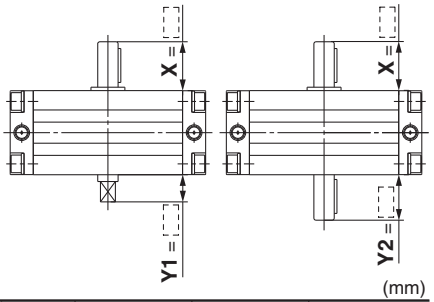


(mm)

Size \ Shaft types	Y1 W	Y2 Y
30	3 to 8	15 to 25
50	1 to 20	18.5 to 36
63	1 to 22	21 to 41
80	1 to 25	25 to 50
100	1 to 30	32.5 to 60

Symbol: A19

Both the long shaft and short shaft are shortened.
• Applicable shaft type: W, Y

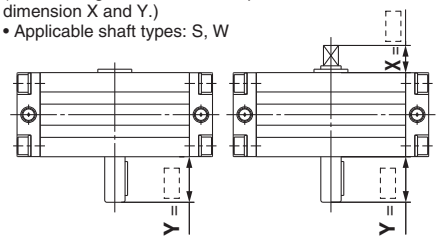


(mm)

Size \ Shaft types	X W	X Y	Y1 W	Y2 Y
30	15 to 25		3 to 8	15 to 25
50	18.5 to 36		1 to 20	18.5 to 36
63	21 to 41		1 to 22	21 to 41
80	25 to 50		1 to 25	25 to 50
100	32.5 to 60		1 to 30	32.5 to 60

Symbol: A20

Reverse the assembly of the shaft. (Thus shortening the long end and the short end of the shaft.)
(If shortening the shaft is not required, indicate "∗" for dimension X and Y.)
• Applicable shaft types: S, W

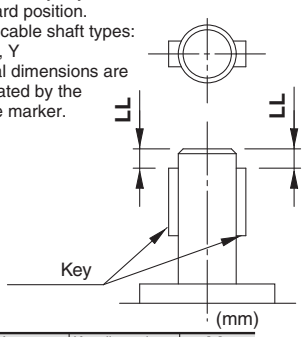


(mm)

Size \ Shaft types	X W	Y S	Y W
50	2 to 11		18.5 to 36
63	2.5 to 16.5		21 to 41
80	3 to 20		25 to 50
100	3 to 22		32.5 to 60

Symbol: A24

Double key
Keys and keyways are machined at 180° from the standard position.
• Applicable shaft types: S, W, Y
• Equal dimensions are indicated by the same marker.



(mm)

Size	Key dimensions	LL
30	3 x 3 x 14	3
50	5 x 5 x 25	5
63	6 x 6 x 30	5
80	6 x 6 x 40	5
100	8 x 7 x 45	5

Series CRA1 (Size 30, 50, 63, 80, 100)
Simple Specials:
-XA33 to -XA59: Shaft Pattern Sequencing II

Made to Order

Shaft shape pattern is dealt with simple Made-to-Order system. (Refer to front matter 32.)
Please contact SMC for a specification sheet when placing an order.

Shaft Pattern Sequencing II

Applicable shaft type: X, Z, T, J, K

How to Order

C | D | RA1 | B | J | | P | 50 | – | 90 | C | – | F59 | – X | A34 | A37 | C59 | -X6

Built in magnet

Nil	None
D	Built-in magnet

Mounting style

B	Basic style
L	Foot style

Shaft type

X	Single shaft with four chamfers
Z	Double shaft with four chamfers
T	Single round shaft
J	Double shaft (Long shaft without key & with four chamfers)
K	Double round shaft

Type

Nil	Pneumatic
H	Air-hydro

Pattern

Size

30
50
63
80
100

Ratating angle

90°
100°
180°
190°

Suffix symbol

Nil	Without air cushion
C *	With air cushion

* For pneumatic type only.

Auto switch

Refer to page 219 for the part no. of auto switches.

Simple Specials, Made-to-Order symbol

- Refer to chart 4, 5 and 6 when the number of combinations is one or two.

* Combination of XA is possible for up to 2 types.

• Combination 3 Types

			• Combination of Applicable Chart
A33	A34	C30	Chart 4, 5
A34	A37	-X6	Chart 4, 6
A35	C30	C59	Chart 5, 7
A40	C60	-X6	Chart 5, 6, 8
A43	-X10	-X16	Chart 6, 9

Combination is available only when all the conditions are fulfilled in above combination chart.

• Combination 4 Types

				• Combination of Applicable Chart
A33	A34	C30	C59	Chart 4, 5, 7
A34	A37	C59	-X6	Chart 4, 5, 6, 8
A35	A36	-X6	-X16	Chart 4, 6, 9
A43	C59	C62	-X16	Chart 5, 6, 7, 8
A45	C60	-X10	-X16	Chart 5, 6, 8, 9
A46	C30	C61	C62	Chart 5, 7

Combination is available only when all the conditions are fulfilled in above combination chart.

* Combination of simple special and Made-to-Order, it is possible for up to 4 types.
* Above is the typical example of combination.

How to order model with auto switches

Refer to page 219 for "How to Order" products with auto switch.

How to order model with solenoid valve

Refer to page 234 for "How to order" products with solenoid valve,

How to order angle adjustable type

Refer to page 240 for "How to Order" angle adjustable type.

Refer to page 218 for "How to Order".

Symbol
-XA33 to XA59

Combination Chart of Simple Specials for Tip End Shape

Chart 4. Combination between -XA□ and -XA□

Symbol	Description	Shaft direction		Shaft type					Combination									
		Upper	Lower	X	Z	T	J	K	∗ Corresponding shafts type available for combination									
XA33	Female thread at the end	●	–	–	–	●	●	●	**XA33**									
XA34	Female thread at the end	–	●	–	–	●	●	●	T, J, K ∗	**XA34**								
XA35	Female thread at the end	●	–	●	●	–	–	–	—	—	**XA35**							
XA36	Female thread at the end	–	●	●	●	–	–	–	—	—	X,Z ∗	**XA36**						
XA37	Stepped round shaft	●	–	–	–	●	●	●	—	T, J, K ∗	—	—	**XA37**					
XA38	Stepped round shaft	–	●	–	–	–	–	●	K ∗	—	—	—	K ∗					
XA40	Shaft through hole	●	●	–	–	●	–	●	—	—	—	—	—					
XA41	Shaft through hole	●	●	●	●	–	●	–	—	—	—	—	—					
XA43	Shaft through-hole + Double shaft-end-female threads	●	●	–	–	●	–	●	—	—	—	—	—					
XA44	Shaft through-hole + Double shaft-end-female threads	●	●	●	●	–	●	–	—	—	—	—	—	**XA38**				
XA45	Middle-cut chamfer	●	–	–	–	●	●	●	—	T, J, K ∗	—	—	—	K ∗	**XA40**	**XA41**	**XA45**	
XA46	Middle-cut chamfer	–	●	–	–	–	–	●	K ∗	—	—	—	K ∗	—	—	—	K ∗	**XA46**
XA51	Change of long shaft length (Without keyway)	●	–	–	–	●	●	●	—	T, J, K ∗	—	—	—	K ∗	T, K ∗	J ∗	—	K ∗
XA52	Change of short shaft length (Without keyway)	–	●	–	–	–	–	●	K ∗	—	—	—	—	—	K ∗	—	K ∗	—
XA53	Change of double shaft length (Both without keyway)	●	●	–	–	–	–	●	—	—	—	—	—	—	K ∗	—	—	—
XA54	Change of long shaft length (With four chamfers)	●	–	●	●	–	–	–	—	—	—	X, Z ∗	—	—	—	X, Z ∗	—	—
XA55	Change of short shaft length (With four chamfers)	–	●	–	●	–	●	–	J ∗	—	Z ∗	—	J ∗	—	—	J, Z ∗	J ∗	—
XA56	Change of double shaft length (Both with four chamfers)	●	●	–	●	–	–	–	—	—	—	—	—	—	—	Z ∗	—	—
XA57	Change of double shaft length (Without keyway, With hour chamfers)	●	●	–	–	–	●	–	—	—	—	—	—	—	—	J ∗	—	—
XA58	Reversed shaft, Change of shaft length (With four chamfers, Without keyway)	●	●	–	–	●	●	–	—	—	—	—	—	—	T ∗	J ∗	—	—
XA59	Reversed shaft, Change of shaft length (With four chamfers)	–	●	●	–	–	–	–	—	—	—	—	—	—	—	X ∗	—	—

Combination Chart of Made to Order

Chart 5. Combination between -XA□ and -XC□

Symbol	Description	Shaft type					Applicable size	Combination
		X	Z	T	J	K		XA33 to 38, 40 to 46, 51 to 59
XC7	Reversed shaft	●	–	●	●	–	50, 63, 80, 100	–
XC8 to XC11	Change of rotating range	–	–	–	–	–		–
XC30	Fluorine grease	●	●	●	●	●	30 to 100	●
XC31 to XC36	Change of rotation range and shaft rotation direction	–	–	–	–	–	50, 63, 80, 100	–
XC37 to XC46	Change of rotation range and angle adjusting direction	–	–	–	–	–		–
XC47 to XC58	Change of rotation range and angle adjusting direction (Angle adjusting screw is equipped on the left.)	–	–	–	–	–		–
XC59 to XC61	Change of port direction	●	●	●	●	●	30 to 100	●
XC62	Reverse mounting of auto switch	●	●	●	●	●	50, 63, 80, 100	●
XC63	One side hydro, One side air	●	●	●	●	●		●
XC64	One side hydro, One side air	●	●	●	●	●		●

Chart 6. Combination between -XA□ and -X□

Symbol	Description	Shaft type					Applicable size	Combination
		X	Z	T	J	K		XA33 to 38, 40 to 46, 51 to 59
X6	Shaft, bolt made of stainless steel	●	●	●	●	●	30 to 100	●
X7	Heat resistance (100°C)	●	●	●	●	●		●
X10	Angle adjustment for both sides	●	●	●	●	●	50 to 100	●
X11	Angle adjustment for single side, Air cushion with single side	●	●	●	●	●		●
X16	Fluororubber seal	●	●	●	●	●	30 to 100	●

∗ **Chart 7. For combination between -XC□ and -XC□, refer to page 257.**
Chart 8. For combination between -X□ and -XC□, refer to page 257.
Chart 9. For combination between -X□ and -X□, refer to page 266.

Series CRA1 (Size 30, 50, 63, 80, 100)
Simple Specials:
-XA33 to -XA59: Shaft Pattern Sequencing II

Made to Order

Shaft shape pattern is dealt with simple Made-to-Order system. (Refer to front matter 32.)
Please contact SMC for a specification sheet when placing an order.

Symbol

Shaft Pattern Sequencing II — -XA33 to XA41

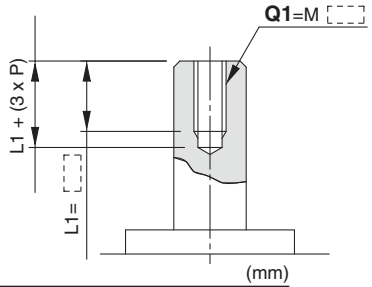
Applicable shaft type: X, Z, T, J, K

Additional Reminders

1. Enter the dimensions within a range that allows for additional machining.
2. SMC will make appropriate arrangements if no dimensional, tolerance, or finish instructions are given in the diagram.
3. The length of the unthreaded portion is 2 to 3 pitches.
4. Unless specified otherwise, the thread pitch is based on coarse metric threads.
   P = Thread pitch
   M3 x 0.5, M4 x 0.7, M 5 x 0.8
   M6 x 1, M8 x 1.25, M10 x 1.5
5. Enter the desired figures in the portion of the diagram.
6. Chamfer face of the parts machining additionally is C0.5.

Symbol: A33
Machine female threads into the long shaft.
Note) Except flange style

The maximum dimension L1 is, as a rule, twice the thread size.
(Example) For M3: L1 = 6
• Applicable shaft types: J, K, T

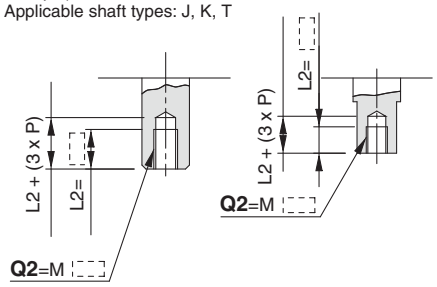


(mm)

Size	Q1
30	M3
50	M4, M5, M6, M 8
63	M4, M5, M6, M 8, M10
80	M4, M5, M6, M 8, M10, M12
100	M5, M6, M8, M10, M12

Symbol: A34
Machine female threads into the short shaft.
Note) Except flange style

The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M3: L2 = 6
• Applicable shaft types: J, K, T

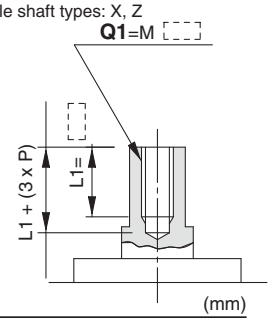


(mm)

Size	Q2
30	M3
50	M4, M5, M6, M 8
63	M4, M5, M6, M 8, M10
80	M4, M5, M6, M 8, M10, M12
100	M5, M6, M8, M10, M12

Symbol: A35
Machine female threads into the shaft.
Note) Except flange style

The maximum dimension L1 is, as a rule, twice the thread size.
(Example) For M3: L1 = 6
• Applicable shaft types: X, Z

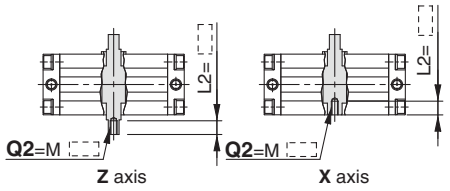


(mm)

Size	Q1
30	M3
50	M4, M5, M6, M 8
63	M4, M5, M6, M 8, M10
80	M4, M5, M6, M 8, M10, M12
100	M5, M6, M8, M10, M12

Symbol: A36
Machine female threads into the short shaft.
Note) Except flange style

The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M4: L2 = 8
• Applicable shaft types: X, Z

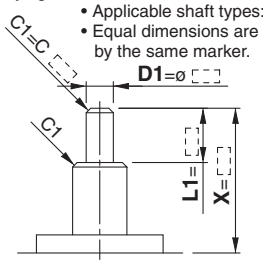


(mm)

Size	Q2
30	M3
50	M4, M5, M6, M 8
63	M4, M5, M6, M 8, M10
80	M4, M5, M6, M 8, M10, M12
100	M5, M6, M8, M10, M12

Symbol: A37
Note) Except flange style

The long shaft can be further shortened by machining it into a stepped round shaft.
• Minimum machining diameter is 0.1.
(If shortening the shaft is not required, indicate "∗" for dimension X.)
(If not specifying dimension C1, indicate "∗" instead.)
• Applicable shaft types: J, K, T
• Equal dimensions are indicated by the same marker.

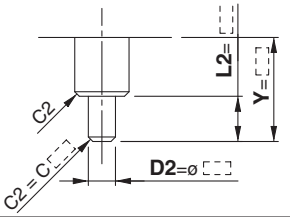


(mm)

Size	X	L1max	D1
30	3 to 25	X-2	ø5 to ø7.9
50	3.5 to 36	X-2.5	ø5 to ø14.9
63	3.5 to 41	X-2.5	ø5 to ø16.9
80	4 to 50	X-3	ø8 to ø19.9
100	5 to 60	X-4	ø8 to ø24.9

Symbol: A38
Note) Except flange style

The short shaft can be further shortened by machining it into a stepped round shaft.
• Minimum machining diameter is 0.1.
(If shortening the shaft is not required, indicate "∗" for dimension Y.)
(If not specifying dimension C2, indicate "∗" instead.)
• Applicable shaft type: K
• Equal dimensions are indicated by the same marker.

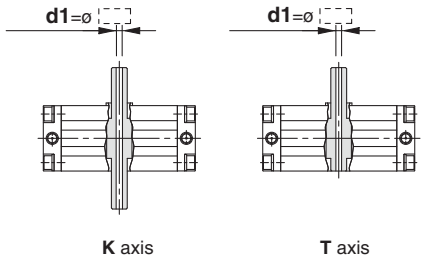


(mm)

Size	Y	L2 max	D2
30	3 to 25	Y-2	ø5 to ø7.9
50	1 to 36	Y	ø5 to ø14.9
63	1 to 41	Y	ø5 to ø16.9
80	1 to 50	Y	ø8 to ø19.9
100	1 to 60	Y	ø8 to ø24.9

Symbol: A40
Shaft with through-hole
Note) Except flange style

• Minimum machining diameter for d1 is 0.1.
• Applicable shaft types: K, T

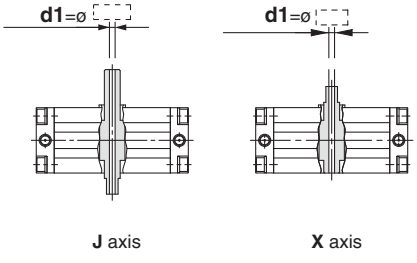


(mm)

Size	d1
30	ø2.5
50	ø4 to ø7.5
63	ø4 to ø8
80	ø6.8 to ø11
100	ø6.8 to ø13

Symbol: A41
Shaft with through-hole
Note) Except flange style

• Minimum machining diameter for d1 is 0.1.
• Applicable shaft types: J, X, Z



(mm)

Size	d1
30	ø2.5
50	ø4 to ø7.5
63	ø4 to ø8
80	ø6.8 to ø11
100	ø6.8 to ø13

Symbol

Shaft Pattern Sequencing II

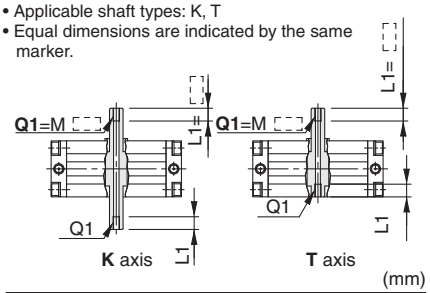
-XA43 to XA55

Applicable shaft type: X, Z, T, J, K

Symbol: A43

Shaft through-hole and female thread
Note) Except flange style

- Applicable shaft types: K, T
- Equal dimensions are indicated by the same marker.



(mm)

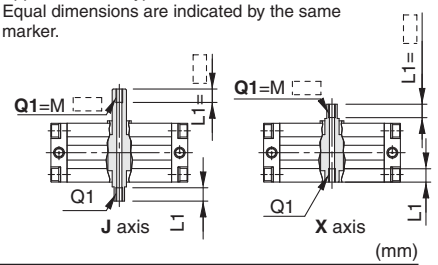
Size / Thread	30	50	63	80	100
M 3 x 0.5	ø2.5	–	–	–	–
M 5 x 0.8	–	ø4	ø4	–	–
M 6 x 1	–	ø5	ø5	–	–
M 8 x 1.25	–	–	ø6.8	ø 6.8	ø 6.8
M10 x 1.5	–	–	–	ø 8.5	ø 8.5
M12 x 1.75	–	–	–	ø10.3	ø10.3
Rc 1/8	–	–	–	ø 8	ø 8
Rc 1/4	–	–	–	–	ø11

Symbol: A44

Note) Except flange style

Shaft through-hole and female thread machining

- Applicable shaft types: J, X, Z
- Equal dimensions are indicated by the same marker.



(mm)

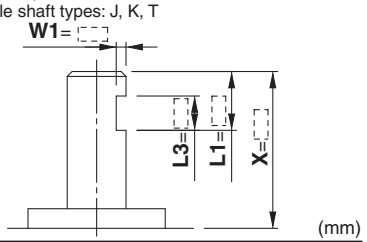
Size / Thread	30	50	63	80	100
M 3 x 0.5	ø2.5	–	–	–	–
M 5 x 0.8	–	ø4	ø4	–	–
M 6 x 1	–	ø5	ø5	–	–
M 8 x 1.25	–	–	ø6.8	ø 6.8	ø 6.8
M10 x 1.5	–	–	–	ø 8.5	ø 8.5
M12 x 1.75	–	–	–	ø10.3	ø10.3
Rc 1/8	–	–	–	ø 8	ø 8
Rc 1/4	–	–	–	–	ø11

Symbol: A45

Note) Except flange style

The long shaft can be further shortened by machining a middle-cut chamfer into it.

- Minimum machining diameter is 0.1.
  (The position is that of the standard flat at the keyway portion.)
  (If shortening the shaft is not required, indicate "∗" for dimension X.)
- Applicable shaft types: J, K, T



(mm)

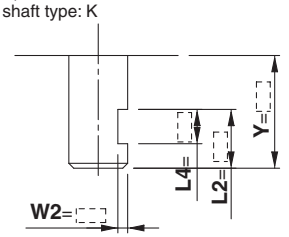
Size	X	W1	L1 max	L3 max
30	8.5 to 25	1 to 2	X-2	L1-2
50	12.5 to 36	1 to 5.5	X-2.5	L1-2
63	13.5 to 41	1 to 6.5	X-2.5	L1-2
80	16.5 to 50	1 to 8	X-3	L1-3
100	21 to 60	1.5 to 10.5	X-4	L1-4

Symbol: A46

Note) Except flange style

The short shaft can be further shortened by machining a middle-cut chamfer into it.

- Minimum machining diameter is 0.1.
  (The position is that of the standard flat at the keyway portion.)
  (If shortening the shaft is not required, indicate "∗" for dimension Y.)
- Applicable shaft type: K



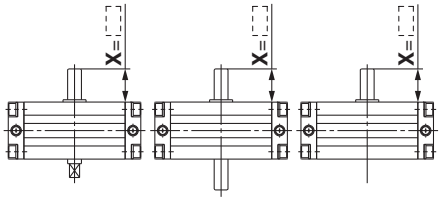
(mm)

Size	Y	W2	L2 max	L4 max
30	8.5 to 25	1 to 2	Y-2	L2-2
50	10 to 36	1 to 5.5	Y	L2-2
63	11 to 41	1 to 6.5	Y	L2-2
80	13.5 to 50	1 to 8	Y	L2-3
100	17 to 60	1.5 to 10.5	Y	L2-4

Symbol: A51

Shorten the long shaft.

- Applicable shaft types: J, K, T



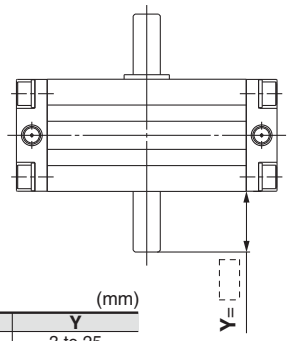
(mm)

Size	X
30	3 to 25
50	3.5 to 36
63	3.5 to 41
80	4 to 50
100	5 to 60

Symbol: A52

Shorten the short shaft.

- Applicable shaft type: K



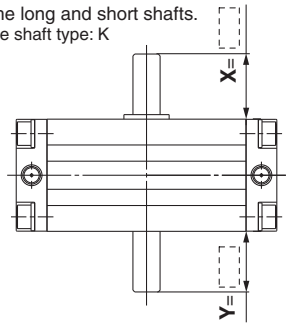
(mm)

Size	Y
30	3 to 25
50	1 to 36
63	1 to 41
80	1 to 50
100	1 to 60

Symbol: A53

Shorten the long and short shafts.

- Applicable shaft type: K



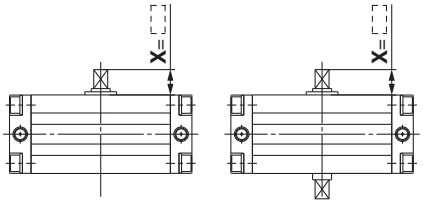
(mm)

Size	X	Y
30	3 to 25	3 to 25
50	3.5 to 36	1 to 36
63	3.5 to 41	1 to 41
80	4 to 50	1 to 50
100	5 to 60	1 to 60

Symbol: A54

Shorten the long shaft.

- Applicable shaft types: X, Z



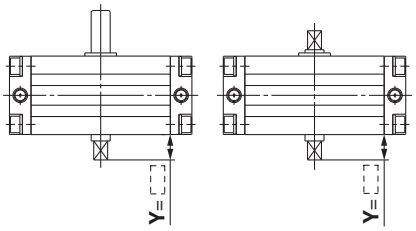
(mm)

Size	X
30	3 to 13
50	3.5 to 27
63	3.5 to 29
80	4 to 38
100	5 to 44

Symbol: A55

Shorten the short shaft.

- Apricable shaft types: J, Z



(mm)

Size	Y
30	3 to 10
50	1 to 20
63	1 to 22
80	1 to 25
100	1 to 30

Series CRA1 (Size 30, 50, 63, 80, 100)
Simple Specials:
-XA33 to -XA59: Shaft Pattern Sequencing II

Made to Order

Shaft shape pattern is dealt with simple Made-to-Order system. (Refer to front matter 32.)
Please contact SMC for a specification sheet when placing an order.

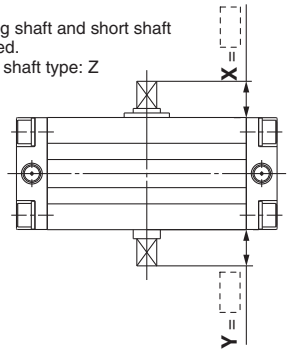
Symbol

Shaft Pattern Sequencing II — -XA56 to XA59

Applicable shaft type: X, Z, T, J, K

Symbol: A56

Both the long shaft and short shaft are shortened.
• Applicable shaft type: Z

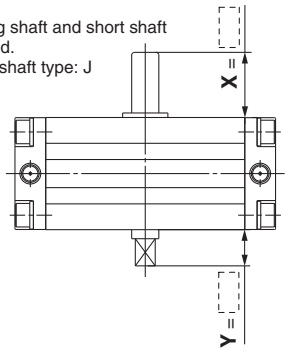


(mm)

Size	X	Y
30	3 to 13	3 to 10
50	3.5 to 27	1 to 20
63	3.5 to 29	1 to 22
80	4 to 38	1 to 25
100	5 to 44	1 to 30

Symbol: A57

Both the long shaft and short shaft are shortened.
• Applicable shaft type: J

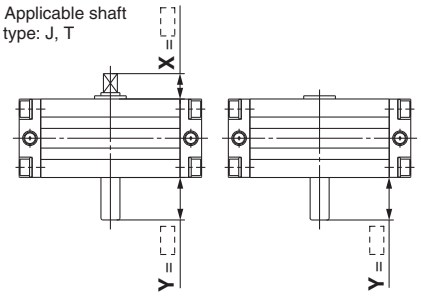


(mm)

Size	X	Y
30	3 to 25	3 to 10
50	3.5 to 36	1 to 20
63	3.5 to 41	1 to 22
80	4 to 50	1 to 25
100	5 to 60	1 to 30

Symbol: A58

The rotation axis is reversed, and then shorten the long and short shafts.
• Applicable shaft type: J, T

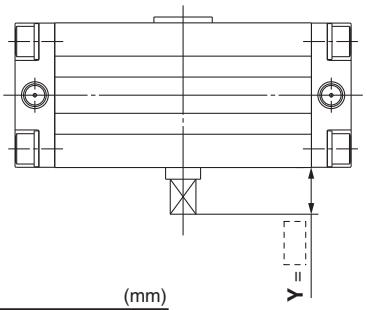


(mm)

Size	Y
50	1 to 36
63	1 to 41
80	1 to 50
100	1 to 60

Symbol: A59

The rotation axis is reversed, and then shorten the long and short shafts.
• Applicable shaft type: X



(mm)

Size	Y1
50	1 to 27
63	1 to 29
80	1 to 38
100	1 to 44

Made to Order Specifications 1

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

Made to Order

How to Order

C | D | RA1 | B | S | | P | 50 | 90 | C | F59 | X | C59 | C62 | -X10 | -X16

Magnet

Nil	None
D	Built-in magnet

Mounting style

B	Basic style
L	Foot style
F	Flange style

Shaft type

S	Single shaft key
W	Double shaft (Long shaft and with four chamfers)
Y	Double shaft key
X	Single shaft with four chamfers
Z	Double shaft with four chamfers
T	Single round shaft
J	Double shaft (Long shaft without key & with four chamfers)
K	Double round shaft

Type

Nil	Pneumatic
H	Air-hydro

Pattern

Size

30
50
63
80
100

Rotating angle

90°
100°
180°
190°

Air cushion

Nil	None
C *	With air cushion

* For pneumatic type only.

Auto switch

Refer to page 219 for the part no. of auto switches.

Simple Specials, Made-to-Order symbol

- When the number of combinations are one or two, please refer to chart 7 and 8.

* Combination of XA is possible for up to 2 types.

• Combination 3 Types

C7	C30	C59
C31	C60	-X6
C59	-X10	-X16

• Combination of Applicable Chart

Chart 7
Chart 7, 8
Chart 8, 9

Combination is available only when all the conditions are fulfilled in above combination chart.

• Combination 4 Types

C7	C30	C59	C62
C31	C60	C30	-X6
C59	C62	-X10	-X16

• Combination of Applicable Chart

Chart 7
Chart 7, 8
Chart 7, 8, 9

Combination is available only when all the conditions are fulfilled in above combination chart.

* Combination of Made-to-Order is available up to 4 types.
* Above is the typical example of combination.
* Chart 9. For combination chart between -X□ and -X□, refer to page 266.

How to order model with auto switches

Refer to page 219 for "How to Order" products with auto switch.

How to order model with solenoid valve

Refer to page 234 for "How to order" products with solenoid valve,

How to order angle adjustable type

Refer to page 240 for "How to Order" angle adjustable type.

Refer to page 218 for "How to Order".

Combination Chart of Made to Order

Chart 7. Combination between -XC□ and -XC□

Part no.	Description	Shaft type S	W	X	Y	Z	T	J	K	Applicable size	Combination
XC 7	Reversed shaft	●	●	●	—	—	●	●	—	50, 63 80, 100	XC7 — ＊ Corresponding shafts type available for combination
XC 8 to XC11	Change of rotating range	●	●	—	●	—	—	—	—		XC 8 to XC11 —
XC30	Fluorine grease	●	●	●	●	●	●	●	●	30 to 100	S, W, X, T, J * / S, W, Y * / XC30
XC31 to XC36	Changes of rotation range and the revolving direction of shaft	●	●	—	●	—	—	—	—	50, 63 80, 100	— / — / S, W, Y * / XC31 to XC36
XC37 to XC46	Changes of rotation range and the angle adjustment direction	●	●	—	●	—	—	—	—		— / — / S, W, Y * / — / XC37 to XC46
XC47 to XC58	Change of rotation range and angle adjusting direction (Angle adjustment screw is set on the left side.)	●	●	—	●	—	—	—	—		— / — / — / — / — / XC47 to XC58
XC59 to XC61	Change of port direction	●	●	●	●	●	●	●	●	30 to 100	S, W, X, T, J * / ● / S, W, Y * / S, W, Y * / S, W, Y * / S, W, Y * / XC59 to XC61
XC62	Reverse mounting of auto switch	●	●	●	●	●	●	●	●	50, 63 80, 100	● / ● / ● / ● / ● / ● / ● / XC62
XC63	One side hydro, One side air	●	●	●	●	●	●	●	●		● / ● / — / ● / — / — / ● / ●
XC64	One side hydro, One side air	●	●	●	●	●	●	●	●		● / ● / — / ● / — / — / ● / ●

Chart 8. Combination between -X□ and -XC□ (Refer to page 266 for Made-to-Order/details on -X□.)

Part no.	Description	Shaft type S	W	X	Y	Z	T	J	K	Applicable size	XC7	XC8 to 11	XC30	XC31 to 36	XC37 to 58	XC59 to 61	XC62	XC63	XC64
X 6	Shaft, Bolt, Parallel key stainless steel spec.	●	●	●	●	●	●	●	●	30 to 100	●	●	●	●	—	●	●	●	●
X 7	Heat resistance (100°C)	●	●	●	●	●	●	●	●		●	●	—	●	●	●	—	—	—
X10	Angle adjustment for both sides	●	●	●	●	●	●	●	●	50 to 100	●	—	●	—	—	●	●	—	—
X11	Angle adjustment for single side, Air cushion with single side	●	●	●	●	●	●	●	●		●	—	—	—	—	●	●	—	—
X16	Fluororubber seal	●	●	●	●	●	●	●	●	30 to 100	●	●	●	●	●	●	●	—	—

Series CRA1
Made to Order Specifications 2

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

Made to Order

1 Reversed Shaft

Symbol: **-XC7**

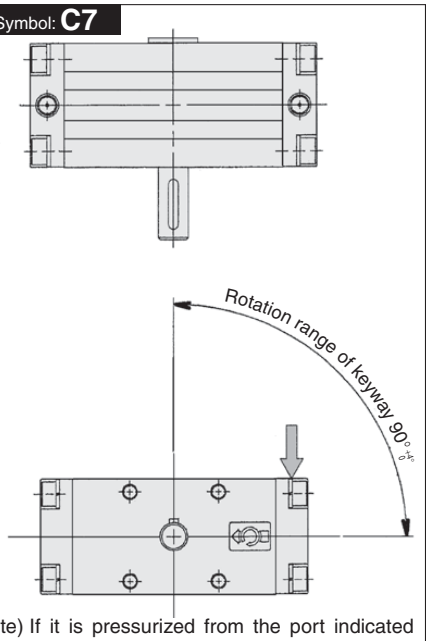
CRA1 | Refer to "How to Order" on page 257. | — XC7

Reverse mounting of rotation shaft (-XC7)

Specifications

Applicable size	50, 63, 80, 100
Applicable shaft type	Shaft S, W, X, T, J

Symbol: **C7**



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

2 Change of Rotating Range

Symbol: **-XC8 to -XC11**

CRA1 | Refer to "How to Order" on page 257. | — XC8

Symbol: XC8 to -XC11

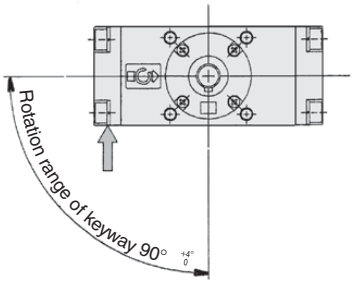
Specifications

Applicable size	50, 63, 80, 100
Applicable shaft type	Shaft S, W, Y

The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: **C8**

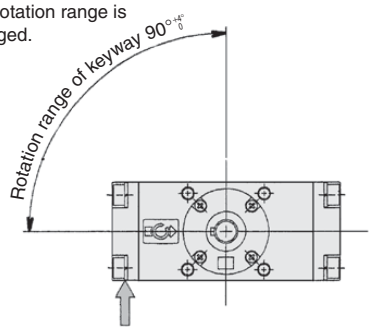
The rotation range is changed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: **C9**

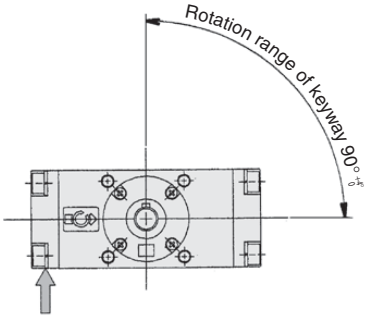
The rotation range is changed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: **C10**

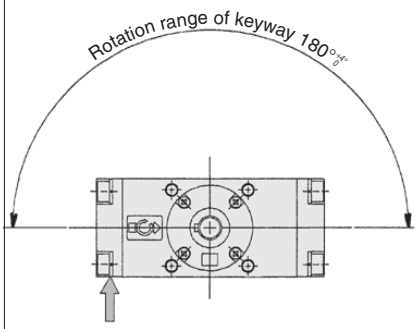
The rotation range is changed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: **C11**

The rotation range is changed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

3 Fluorine Grease

Symbol: **-XC30**

CRA1 | Refer to "How to Order" on page 257. | —XC30

Fluorine grease

Lubricant oil in the seal part of packing and inner wall of the cylinder is changed to fluoro type.
(Not the low speed specifications.)

Specifications

Applicable size	30, 50, 63, 80, 100
Applicable shaft type	S, W, X, Y, Z, T, J, K

∗ Refer to page 220 for other specifications.
∗∗ Except air-hydro type.

4 Reversed Shaft

Symbol
-XC31 to XC36

CRA1 Refer to "How to Order" on page 257. **—XC31**

Specifications

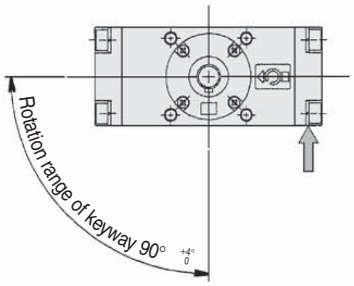
Applicable size	**50, 63, 80, 100**
Applicable shaft type	Shaft S, W, Y

• **Change of the rotation range and the rotation direction of shaft (-XC31 to XC36)**

The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: C31

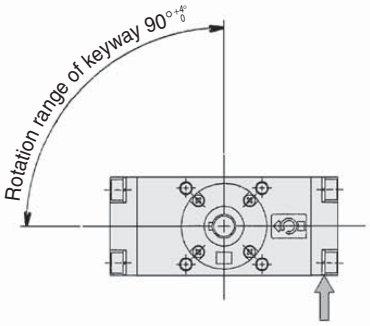
The rotation range is changed and the rotating direction is reversed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C32

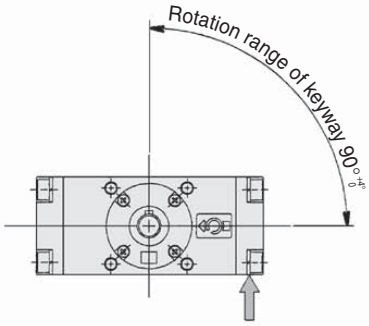
The rotation range is changed and the rotating direction is reversed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C33

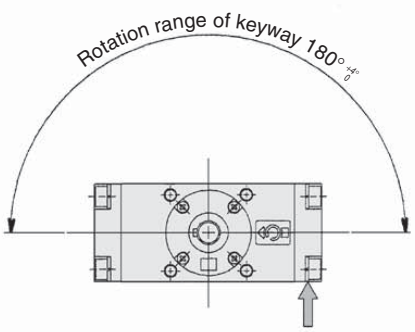
The rotation range is changed and the rotating direction is reversed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C34

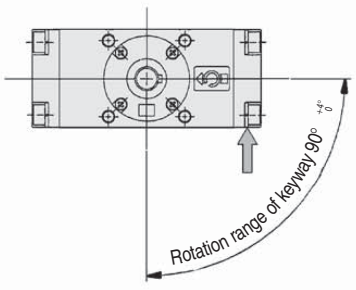
The rotation range is changed and the rotating direction is reversed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C35

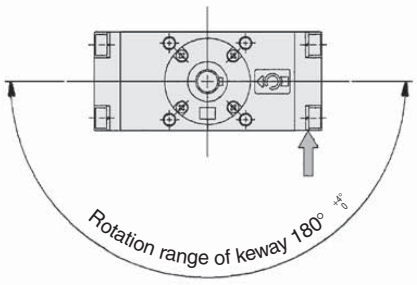
The rotation range is changed and the rotating direction is reversed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C36

The rotation range is changed and the rotating direction is reversed.



Note) If it is pressurized from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Made to Order Specifications 3

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

Made to Order

5 Change of Rotation Range and Angle adjusting direction

Symbol
-XC37 to XC42

CRA1 | **Refer to "How to Order" on page 257.** | **—XC37**

Change of rotation range and angle adjusting direction (-XC37 to XC42)

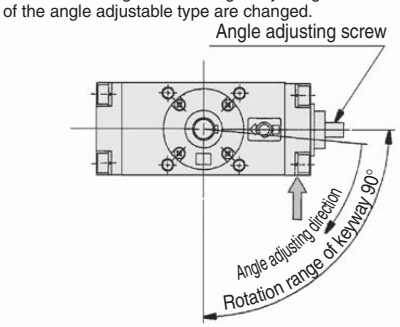
Specifications

Applicable size	**50, 63, 80, 100**
Applicable shaft type	Shaft S, W, Y

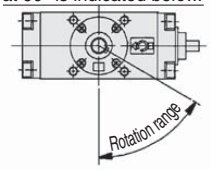
The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: C37

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



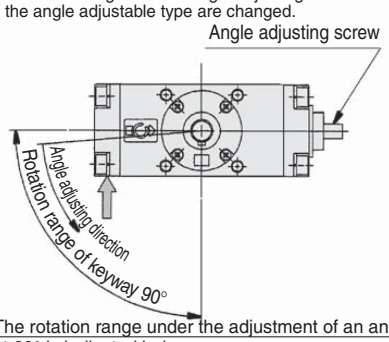
The rotation range under the adjustment of an angle at 60° is indicated below.



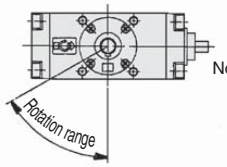
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C38

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



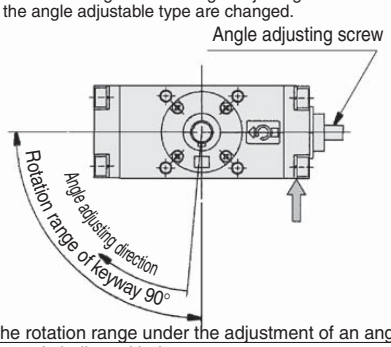
The rotation range under the adjustment of an angle at 60° is indicated below.



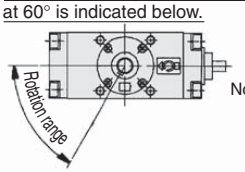
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C39

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



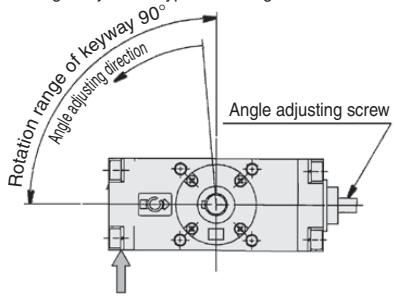
The rotation range under the adjustment of an angle at 60° is indicated below.



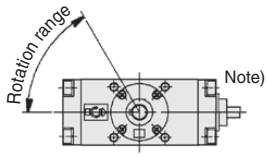
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C40

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



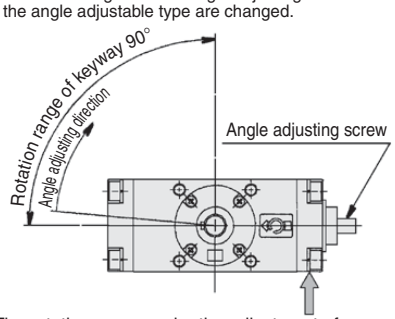
The rotation range under the adjustment of an angle at 60° is indicated below.



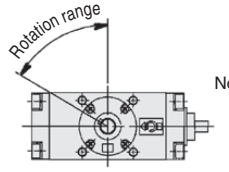
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C41

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



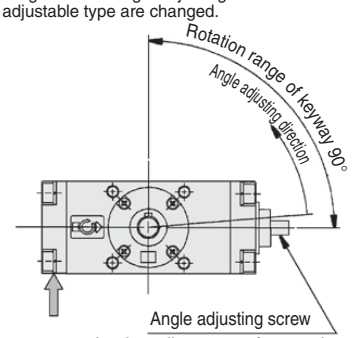
The rotation range under the adjustment of an angle at 60° is indicated below.



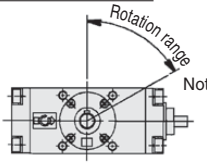
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C42

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



The rotation range under the adjustment of an angle at 60° is indicated below.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol

Change of Rotation Range and Angle adjusting direction -XC43 to XC46

CRA1 | **Refer to "How to Order" on page 257.** —**XC43**

- **Change of rotation range and angle adjusting direction (-XC43 to XC46)**

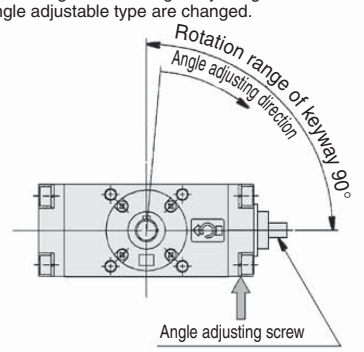
Specifications

Applicable size	**50, 63, 80, 100**
Applicable shaft type	Shaft S, W, Y

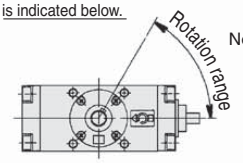
The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: C43

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



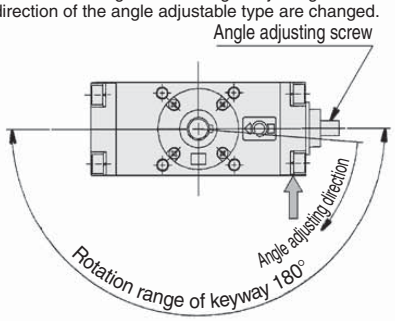
The rotation range under the adjustment of an angle at 60° is indicated below.



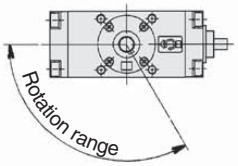
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C44

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



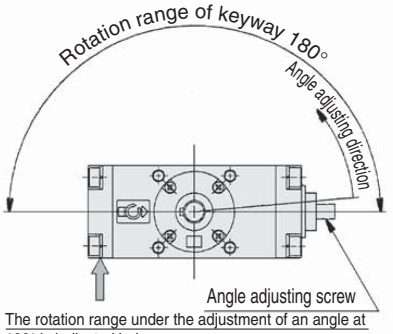
The rotation range under the adjustment of an angle at 120° is indicated below.



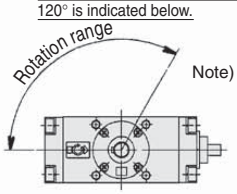
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C45

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



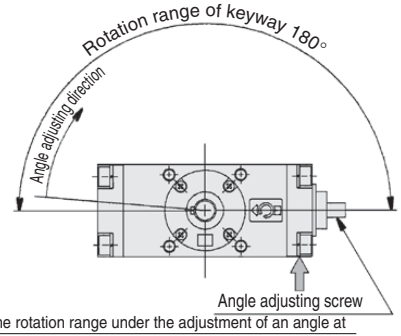
The rotation range under the adjustment of an angle at 120° is indicated below.



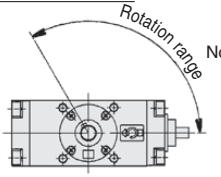
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C46

The rotation range and the angle adjusting direction of the angle adjustable type are changed.



The rotation range under the adjustment of an angle at 120° is indicated below.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Made to Order Specifications 4

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

Made to Order

6 Change of Rotation Range and Angle Adjusting Direction (Angle adjusting screw moved to the left)

Symbol
-XC47 to XC52

CRA1 Refer to "How to Order" on page 257. **—XC47**

Specifications

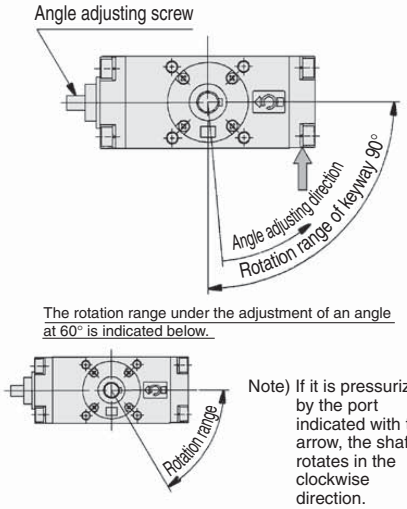
Applicable size	**50, 63, 80, 100**
Applicable shaft type	Shaft S, W, Y

• Change of rotation range and angle adjusting direction (Angle adjusting screw moved to the left) (-XC47 to XC52)

The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: C47

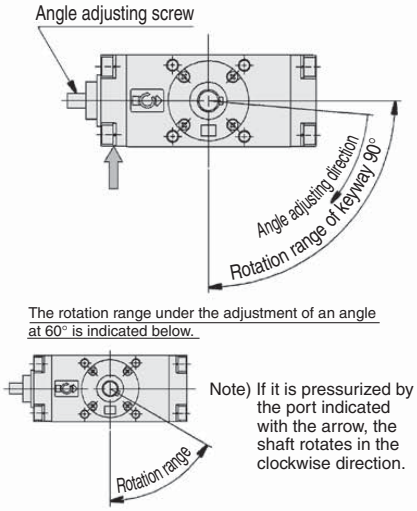
For the angle adjusting type, angle adjusting screws are mounted to the left cover.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C48

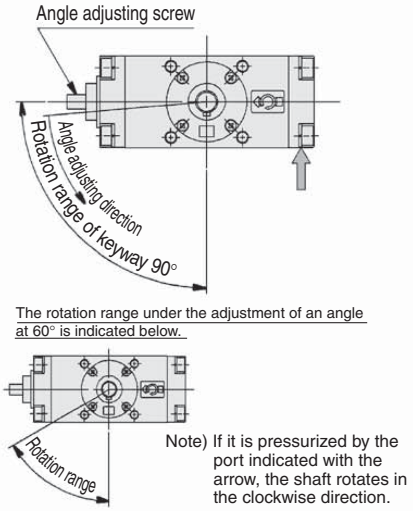
For the angle adjusting type, angle adjusting screws are mounted to the left cover.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C49

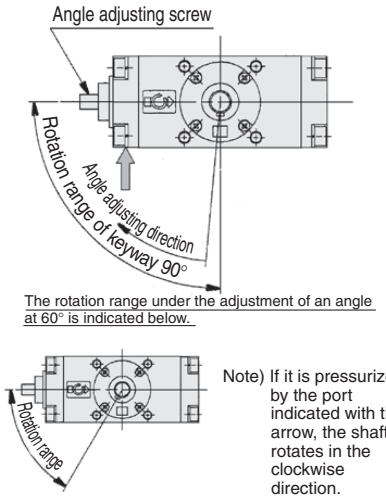
For the angle adjusting type, angle adjusting screws are mounted to the left cover.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C50

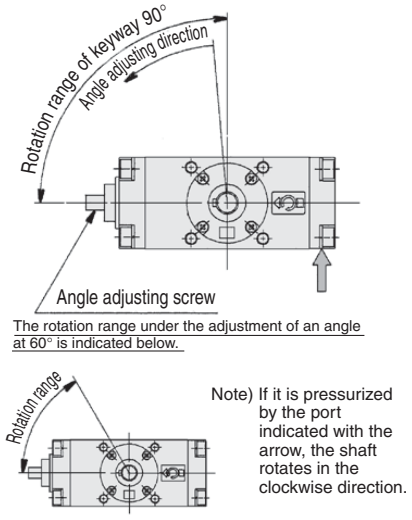
For the angle adjusting type, angle adjusting screws are mounted to the left cover.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C51

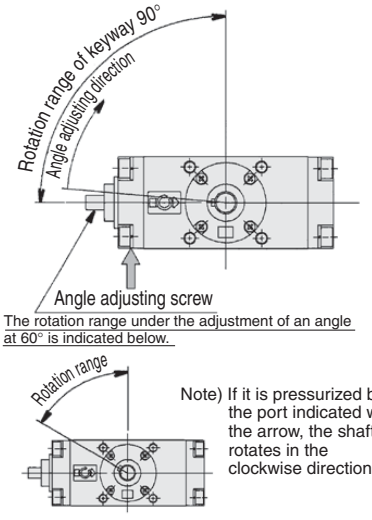
For the angle adjusting type, angle adjusting screws are mounted to the left cover.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C52

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol

Change of Rotation Range and Angle Adjusting Direction (Angle adjusting screw moved to the left) -XC53 to XC58

CRA1 | **Refer to "How to Order" on page 257.** | **—XC53**

• Change of rotation range and angle adjusting direction (Angle adjusting screw moved to the left) (-XC53 to XC58)

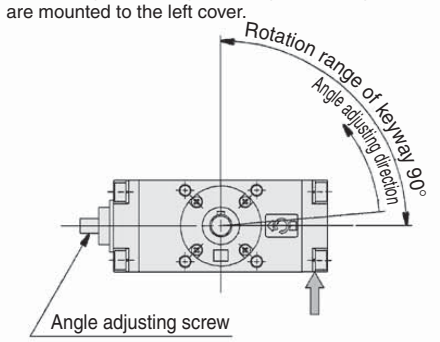
Specifications

Applicable size	**50, 63, 80, 100**
Applicable shaft type	Shaft S, W, Y

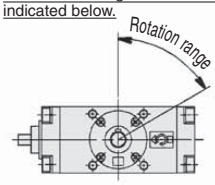
The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: C53

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



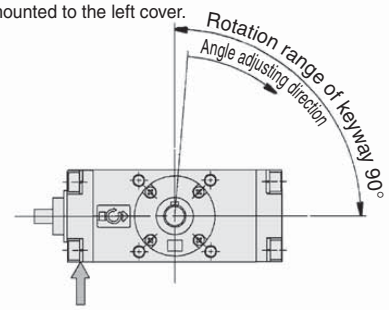
The rotation range under the adjustment of an angle at 60° is indicated below.



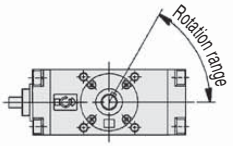
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C54

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



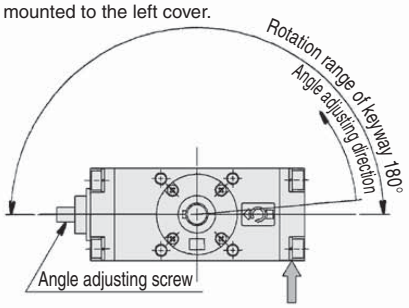
The rotation range under the adjustment of an angle at 60° is indicated below.



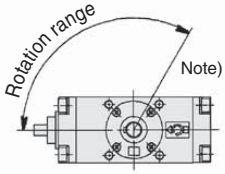
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C55

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



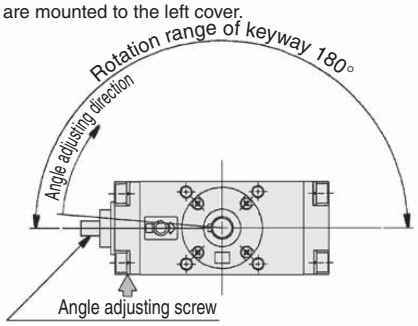
The rotation range under the adjustment of an angle at 120° is indicated below.



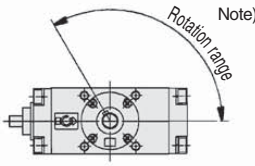
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C56

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



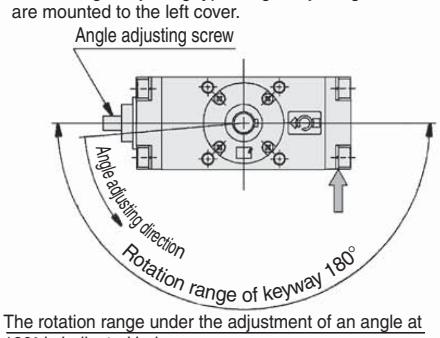
The rotation range under the adjustment of an angle at 120° is indicated below.



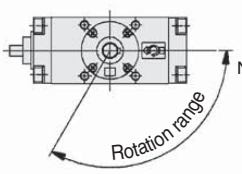
Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C57

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



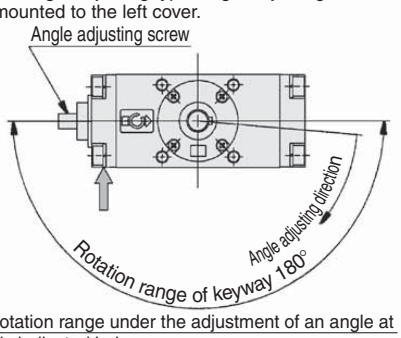
The rotation range under the adjustment of an angle at 120° is indicated below.



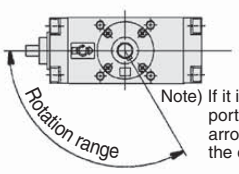
Note)If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Symbol: C58

For the angle adjusting type, angle adjusting screws are mounted to the left cover.



The rotation range under the adjustment of an angle at 120° is indicated below.



Note) If it is pressurized by the port indicated with the arrow, the shaft rotates in the clockwise direction.

Made to Order Specifications 5

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

Made to Order

7 Change of Port Location (Mounting location of the cover is changed.)

Symbol
-XC59 to XC61

CRA1 **Refer to "How to Order" on page 257.** **—XC59**

Port position is changed.
(-XC59 to XC61)

Specifications

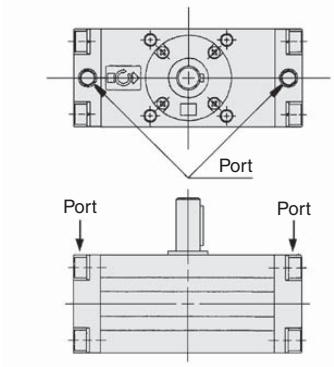
∗ Except for the solenoid valve equipped style.

Applicable size	**30, 50, 63, 80, 100**
Applicable shaft type	Shaft S, W, X, Y Z, T, J, K

The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications. For the bumper equipped type, the needle position is on the opposite side of the port.

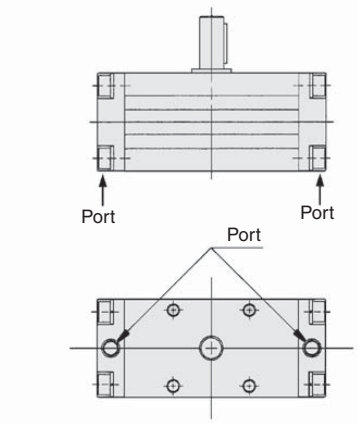
Symbol: C59

Direction of the port is changed. (Upwards)



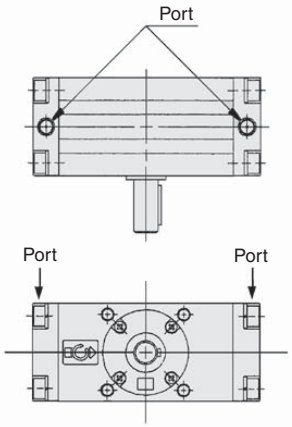
Symbol: C60

Direction of the port is changed. (Downwards)



Symbol: C61

Direction of the port is changed. (Backwards)



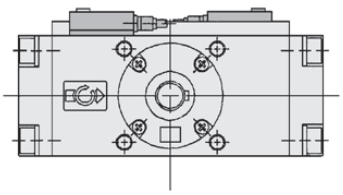
8 Reverse Mounting of the Auto Switch Against the Standard

Symbol
-XC62

CRA1 **Refer to"How to Order" auto switch equipped type on page 219.** **— XC62**

Symbol: C62

The auto switch is reverse mounted to the standard.



9 One Side Air-hydro, One Side Air Type

Symbol
-XC63, -XC64

CRA1 **Refer to"How to Order" on page 257.** **—XC63**

• One side air-hydro, one side air
-XC63: Left side air
Right side air-hydro
-XC64: Left side air-hydro
Right side air

Specifications

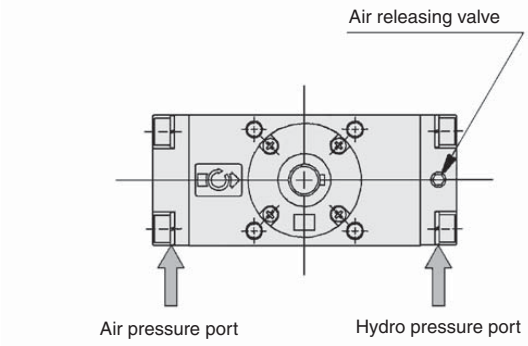
Applicable size	**50, 63, 80, 100**
Applicable shaft type	Shaft S, W, X, Y Z, T, J, K

∗ Except for the solenoid valve equipped type, angle adjustable type and air cushion equipped type.

The patterns with the rotation angle of 90° and 180° are applicable to the respective patterns with the rotation angles of 100° and 190° of the Made-to-Order specifications.

Symbol: **C63**

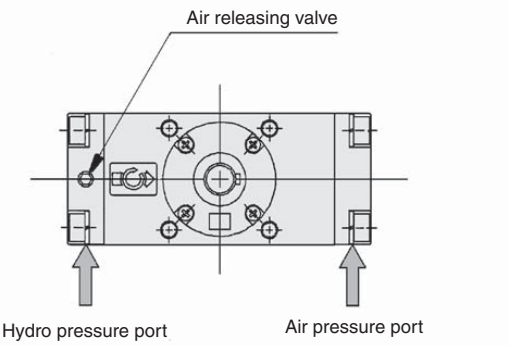
One side air, one side air-hydro specifications (Left side air, right side hydro)



The figure shows the pressurized situation to the hydro pressure port.

Symbol: **C64**

One side air, one side air-hydro specifications (Left side hydro, right side air)



The figure shows the pressurized situation to the air pressure port.

Series CRA1
Made to Order Specifications: -X6 to -X16

Made to Order

How to Order

C **D** RA1 B S **[ ]** **P** 50 — 90 **S** – **F59** – **X6** – **X16**

- **D**: Built-in magnet
- **[ ]**: Type

Nil	Standard
U	Angle adjustable type

- **P**: Pattern
- **S**: Suffix symbol

Nil	-X7, -X16
S	-X6
U	-X10
C	-X11

∗ Refer to pages 267 and 268 for details.

- **F59**: Auto switch
- **X6** – **X16**: Made-to-Order symbol
  - Combination is available only when all the conditions are fulfilled in above combination chart 9.

∗ Combination of Made-to-Order for -X is available up to 2 kinds.
∗ Above is the typical example of combination.

Combination Chart of Made to Order

Chart 9. Combination between -X□ and -X□ (S, W, X, Y, Z, T, J, K shaft)

Part no.	Description	Shaft type								Applicable size	Combination		
		S	W	X	Y	Z	T	J	K				
X 6	Shaft, Bolt, Parallel key stainless steel spec.	●	●	●	●	●	●	●	●	30 to 100	**X6**		
X 7 *	Heat resistance (100°C)	●	●	●	●	●	●	●	●		●	**X7**	
X10	Angle adjustment for both sides	●	●	●	●	●	●	●	●	50 to 100	—	●	
X11	Angle adjustment for single side, Air cushion with single side	●	●	●	●	●	●	●	●		—	●	**X10 to X11**
X16	Fluororubber seal	●	●	●	●	●	●	●	●	30 to 100	●	—	●

*X7: Not available for the built-in magnet type.

1 Shaft, Bolt, Parallel Key Made of Stainless Steel Spec. Symbol -X6

C□RA1 | Refer to "How to Order" on pages 218, 219 and 234. | S — X6

Stainless steel for main part

For applications in areas that pose a risk of rust or corrosion, a portion of the materials used in the standard parts has been changed to stainless steel.

Specifications

Type	Pneumatic
Size	**30, 50, 63, 80, 100**
Fluid	Air (Non-lube)
Max. operating pressure	1.0 MPa
Min. operating pressure	0.1 MPa
Stainless steel part	Shaft, Bolt, Parallel key
Cushion	30 — Without cushion 50 to 100 — With or without air cushion
Auto switch	Mountable

∗ Refer to page 220 for other specifications.
∗∗ Except for the angle adjustable type.

2 Heat Resistant Type Symbol -X7

CRA1 | Refer to "How to Order" on pages 218 and 240. | — X7

Heat resistant type

In this rotary actuator, the material of the seals has been changed to the heat resistant type (to withstand up to 100°C), for applications in environments that exceed the standard specification temperatures of 0 to 60°C.

Specifications

Type	Pneumatic
Size	**30, 50, 63, 80, 100**
Rotation	90°, 180° (Size 30 to 100) 100°, 190° (Size 50 to 100)
Ambient and fluid temperature	0 to 100°C
Lubrication	ISO VG32
Seal material	FKM
Shaft type	Single shaft, Double shaft, Single shaft with four chamfers, Double shaft key, Double shaft with four chamfers, Double round shaft, Double shaft (Round shaft, with four chamfers), Double round shaft
Cushion	30 — Without cushion 50 to 100 — With or without air cushion
Auto switch	Not mountable

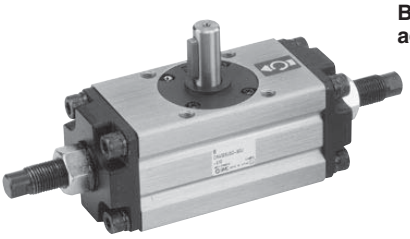
∗ Refer to page 220 for other specifications.
∗∗ Except for models with solenoid valve.

3 Both Sides Angle Adjustable Type Symbol -X10

Refer to "How to Order" on page 214.

C□RA1 | Mounting | Shaft type | U | Size | Rotation | U-X10

Both sides angle adjustable type



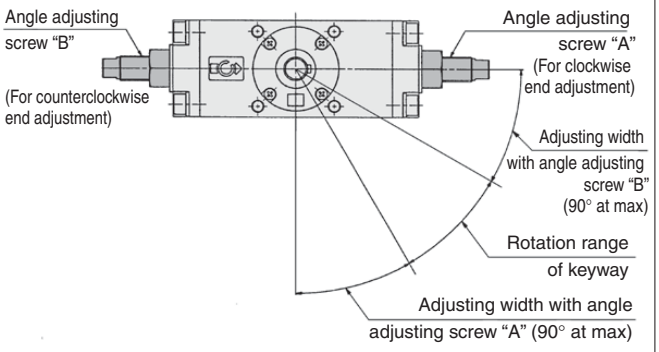
Specifications

Type	Pneumatic
Size	**50, 63, 80, 100**
Rotation	90°, 180°, 100°, 190°
Shaft type	Single shaft (S), Double shaft (W), Single shaft with four chamfers (X), Double shaft key (Y), Double shaft with four chamfers (Z), Single round shaft (T), Double shaft/Round shaft, with four chamfers (J), Double round shaft (K)
Cushion	None
Variation	With auto switch, With solenoid valve

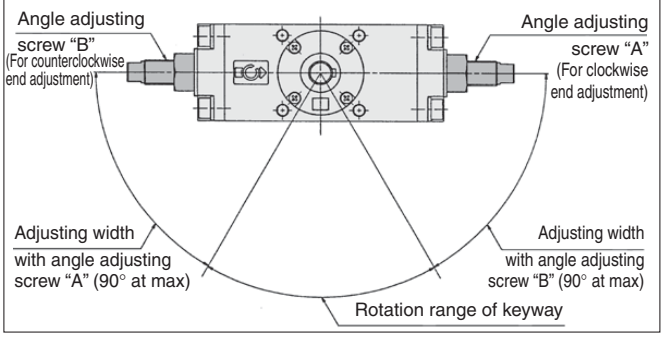
∗ Refer to page 220 for other specifications.

Adjusting direction: Adjusting direction "A": When angle adjusting screw on "A" side is screwed into the right direction.
Adjusting direction "B": When angle adjusting screw on "B" side is screwed into the right direction.

Rotation at 90°



Rotation at 180°



Series CRA1
Made to Order Specifications 7

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

Made to Order

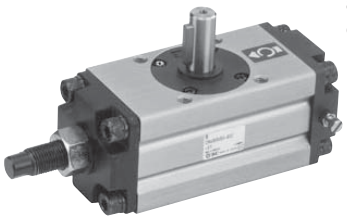
4 One Side Angle Adjustable, One Side Cushion

Symbol **-X11**

Refer to "How to Order" on page 214.

C□RA1 | Mounting | Shaft type | U | Size | Rotation | C-X11

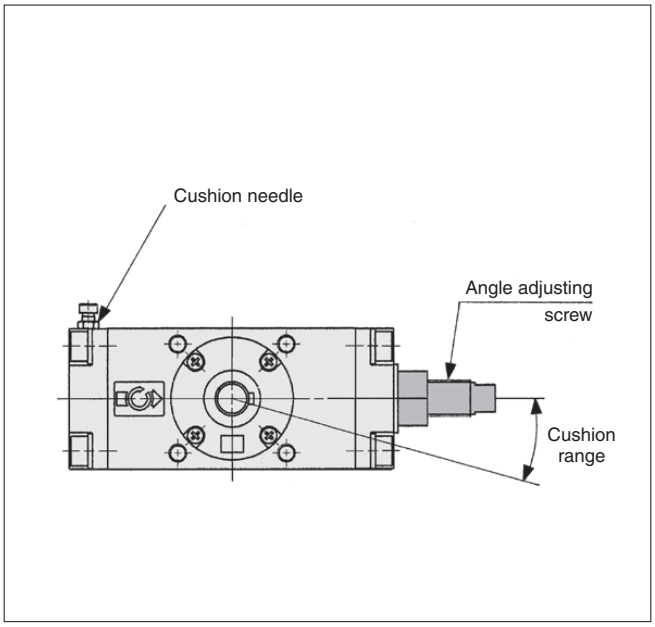
One side angle adjustable, one side cushion



Specifications

Type	Pneumatic
Size	**50, 63, 80, 100**
Rotation	90°, 180°, 100°, 190°
Shaft type	Single shaft (S), Double shaft (W), Single shaft with four chamfers (X), Double shaft key (Y), Double shaft with four chamfers (Z), Single round shaft (T), Double shaft/Round shaft, with four chamfers (J), Double round shaft (K)
Cushion	With cushion on one side
Auto switch	Mountable
Variation	With auto switch, With solenoid valve

∗ Refer to page 220 for other specifications.



∗ Refer to pages 230, 231 and 237 for dimensions.

5 Fluororubber Seal

Symbol **-X16**

CDRA1 | Refer to "How to Order" on pages 219 and 240. | — X16

Fluororubber seal

Seal is now changed to fluororubber.

Specifications

Type	Pneumatic
Size	**30, 50, 63, 80, 100**
Fluid	Air (Non-lube)
Max. operating pressure	1.0 MPa
Min. operating pressure	0.1 MPa
Ambient and fluid temperature	0°C to 60°C (No freezing)
Seal material	FKM
Cushion	30 — Without cushion 50 to 100 — With or without air cushion
Auto switch	Mountable

∗ Refer to page 220 for other specifications.
∗∗ Except for models with solenoid valve.