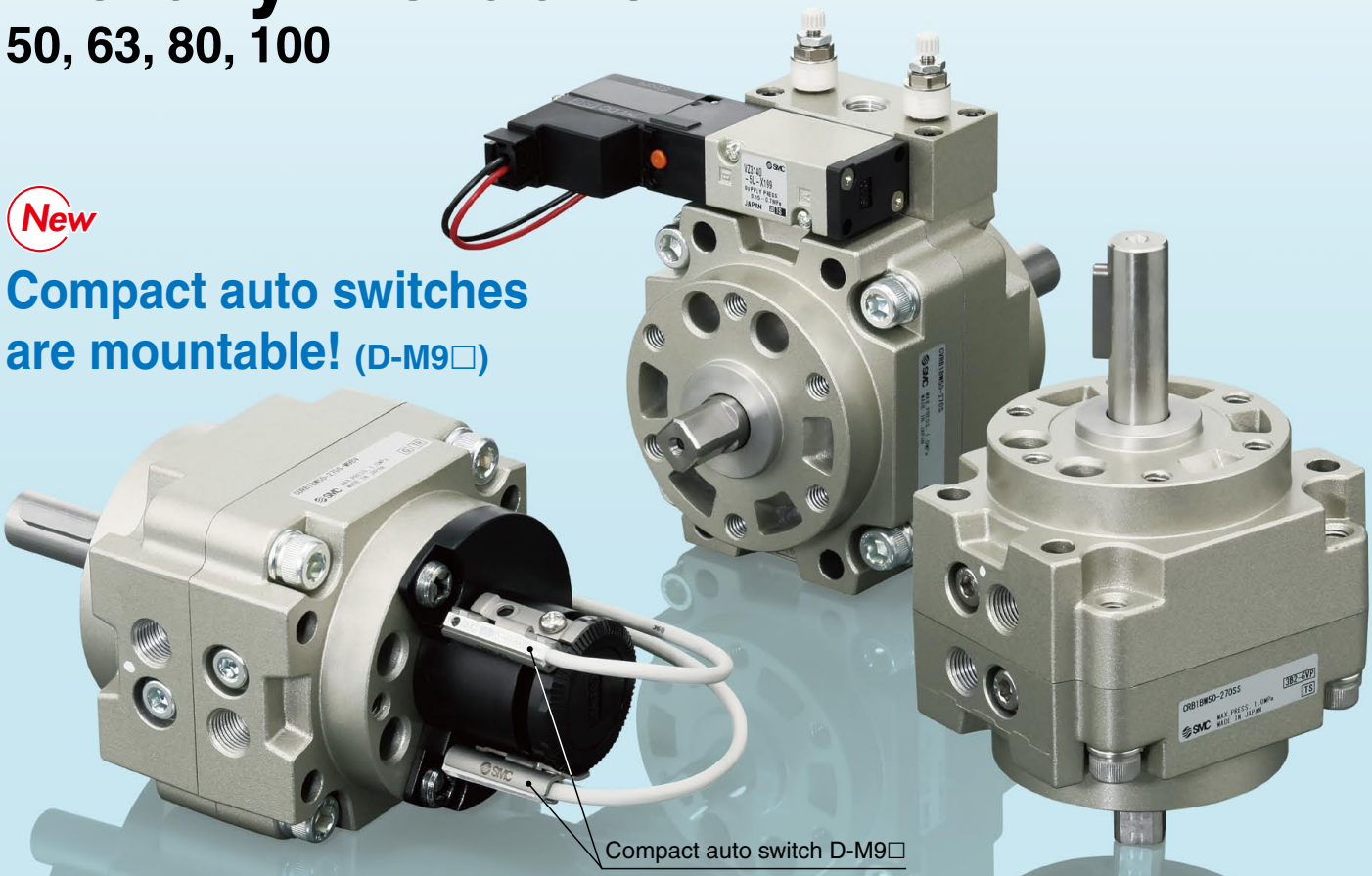
Vane Type Rotary Actuator

50, 63, 80, 100

New

New

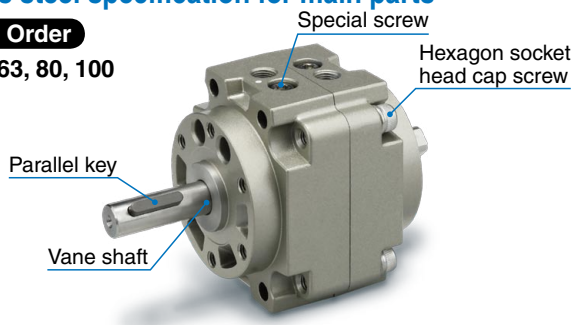
Compact auto switches are mountable! (D-M9□)



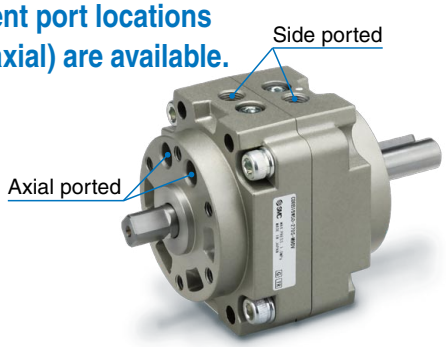
Stainless steel specification for main parts

Made to Order

Size: 50, 63, 80, 100

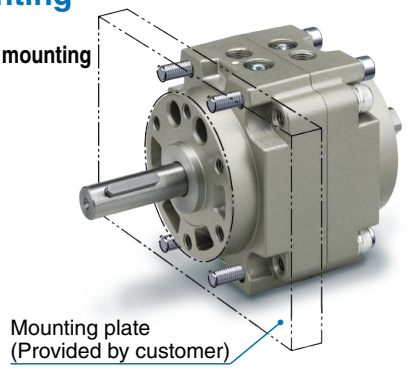


Two different port locations (side and axial) are available.



Mounting

Direct mounting



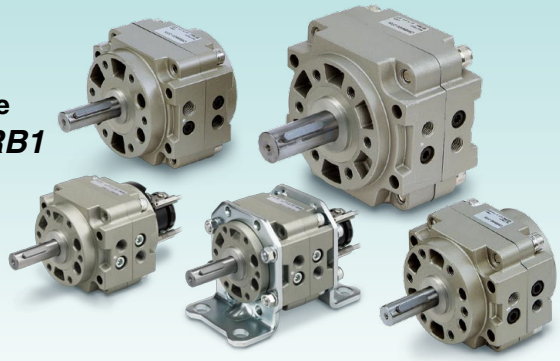
Foot mounting

Series CRB1

SMC

CAT.ES20-247A

Basic type
Series ***CRB1***



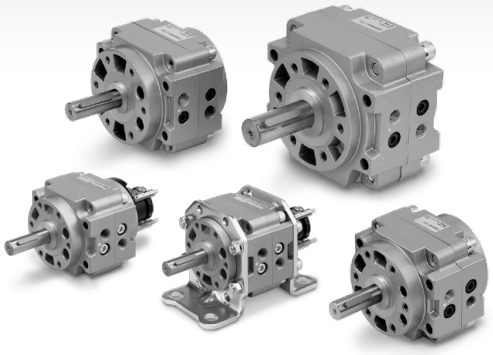
With solenoid valve
Series ***CVRB1***

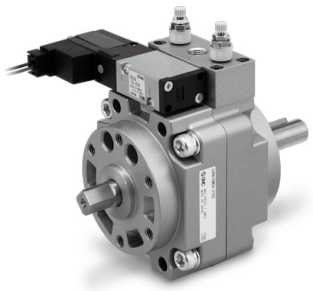
Series Variations

	Fluid			Air															
	Size			50				63				80				100			
	Vane type	S: Single vane D: Double vane		S		D		S		D		S		D		S		D	
	Port location	Side ported (Nil) Axial ported (E)		Side ported	Axial ported	Side ported	Axial ported	Side ported	Axial ported	Side ported	Axial ported	Side ported	Axial ported	Side ported	Axial ported	Side ported	Axial ported	Side ported	Axial ported
Standard	Rotating angle		90°	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			180°	●	●			●	●			●	●			●	●		
			270°	●	●			●	●			●	●			●	●		
		Semi-standard	100°	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			190°	●	●			●	●			●	●			●	●		
			280°	●	●			●	●			●	●			●	●		
	Shaft type	Double shaft	W	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Cushion	Rubber bumper		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Variations	Basic type		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		With auto switch		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		With One-touch fittings		●	●	●	●												
		Clean series	10-	●	●	●	●	●	●	●	●								
		Copper-free and fluorine-free	20-	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		With solenoid valve	CVRB1	●		●		●		●		●		●		●		●	
Option	Mounting	With foot bracket	L	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Made to Order	Material	Stainless steel specification for main parts		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Shaft type	Double shaft type	Double shaft (Long shaft with four chamfers) J	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Double shaft with four chamfers Z	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Double shaft key Y	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Double round shaft K	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		Single shaft type	Single shaft key S	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Single round shaft T	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
			Single shaft with four chamfers X	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Pattern	Shaft pattern		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		Rotation pattern		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

CONTENTS

Vane Type Rotary Actuator *Series CRB1*





Vane Type
Rotary Actuator
Series CRB1
Size: 50, 63, 80, 100

How to Order

Basic type CRB1 B W 80 – 90 S ☐ ——— ☐

With auto switch CDRB1 B W 80 – 90 S ☐ – M9B L ☐ – ☐

With auto switch
(With auto switch unit and built-in magnet)
∗ Refer to page 28 when the auto switch unit is needed separately.

Size

50
63
80
100

Shaft type

W	Double shaft (Long shaft key & Four chamfers)

Mounting

B	Basic
L	Foot

Refer to Table (1) below when foot bracket assembly is required separately.

Table (1): Foot Bracket Assembly Part Number

Model	Assembly part no.
CRB1LW50	P411020-5
CRB1LW63	P411030-5
CRB1LW80	P411040-5
CRB1LW100	P411050-5

Rotating angle

Classification	Symbol	Single vane	Double vane
Standard	90	90°	90°
	180	180°	—
	270	270°	—
Semi-standard	100	100°	100°
	190	190°	—
	280	280°	—

Vane type

S	Single vane
D	Double vane

Connecting port location

Nil	Side ported
E	Axial ported

Auto switch

Nil	Without auto switch (Built-in magnet)
M	Without D-M9 type auto switch (Built-in magnet)

∗ For applicable auto switch model, refer to the table below.
∗∗ The operating range and hysteresis of the D-M9☐ are different from those of the other auto switches. For details, refer to page 28.

Electrical entry/Lead wire length

Nil	Grommet/Lead wire: 0.5 m
M	Grommet/Lead wire: 1 m
L	Grommet/Lead wire: 3 m
CN	Connector/Without lead wire
C	Connector/Lead wire: 0.5 m
CL	Connector/Lead wire: 3 m

∗ Connectors are available only for the R73, R80, T79.
∗∗ Lead wire with connector part nos.
D-LC05: Lead wire 0.5 m
D-LC30: Lead wire 3 m
D-LC50: Lead wire 5 m

Number of auto switches

S	1 pc.∗
Nil	2 pcs.∗∗

∗ S: A right-hand auto switch is shipped.
∗∗ Nil: A right-hand switch and a left-hand switch are shipped.

Made to Order or Port thread type
Refer to pages 17 to 19, 26 and 27 for details about Made to Order specifications.

Nil	Rc
-XF∗	G
-XN∗	NPT

∗ Combination with Made to Order is not available.

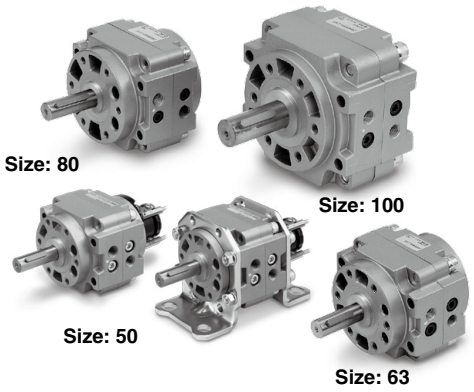
Applicable Auto Switches/Refer to the Best Pneumatics No.4 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire type	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	Oilproof heavy-duty cord	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9PV	M9P		●	●	●	○	—	○		
				2-wire	12 V		M9BV	M9B		●	●	●	○	—	○	—	
				3-wire (NPN)	5 V, 12 V		—	S79		●	—	●	○	—	○	IC circuit	
				3-wire (PNP)			—	S7P		●	—	●	○	—	○		
				2-wire	12 V		—	T79		●	—	●	○	—	○	—	
		Connector					—	T79C		●	—	●	●	●	—		
Reed auto switch	—	Grommet	Yes	2-wire	—	100 V	—	R73		●	—	●	○	—	—	—	
		Connector				—	—	R73C		●	—	●	●	●			
		Grommet	No		48 V, 100 V	100 V	—	R80		●	—	●	○	—		IC circuit	
		Connector			—	24 V or less	—	R80C		●	—	●	●	●		—	

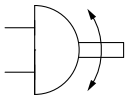
∗ Lead wire length symbols: 0.5 m ····· Nil (Example) R73C
3 m ····· L (Example) R73CL
5 m ····· Z (Example) R73CZ
None ····· N (Example) R73CN

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

- **Excellent reliability and durability. The use of bearings to support thrust and radial loads improves reliability and durability.**
- **The body of the rotary actuator can be mounted directly.**
- **Two different port locations (side and axial) are available.**



Symbol



Refer to pages 28 to 30 for actuators with auto switches.

- Auto switch unit and switch block unit
- Operating range and hysteresis
- How to change the auto switch detecting position
- Auto switch mounting
- Auto switch adjustment

Made to Order
(For details, refer to pages 17 to 19, 26 and 27.)

Symbol	Description
XA1 to XA24	Shaft type pattern
XC1	Addition of connection port
XC4	Change of rotating angle
XC5	Change of rotating angle
XC6	Change of rotating angle
XC7	Reversed shaft
XC26	Change of rotating angle
XC27	Change of rotation range and direction
XC30	Fluorine grease

Specifications

Size		50	63	80	100	50	63	80	100
Vane type		Single vane (S)				Double vane (D)			
Rotating angle	Standard	$90^{\circ}{}^{+4}_{0}$, $180^{\circ}{}^{+4}_{0}$, $270^{\circ}{}^{+4}_{0}$				$90^{\circ}{}^{+4}_{0}$			
	Semi-standard	$100^{\circ}{}^{+4}_{0}$, $190^{\circ}{}^{+4}_{0}$, $280^{\circ}{}^{+4}_{0}$				$100^{\circ}{}^{+4}_{0}$			
Fluid		Air (Non-lube)							
Proof pressure		1.5 MPa							
Ambient and fluid temperature		5 to 60°C							
Max. operating pressure		1.0 MPa							
Min. operating pressure		0.15 MPa							
Rotation time adjustment range		0.1 to 1 s/90°							
Allowable kinetic energy		0.082 J	0.12 J	0.398 J	0.6 J	0.112 J	0.16 J	0.54 J	0.811 J
Shaft load	Allowable radial load	245 N	390 N	490 N	588 N	245 N	390 N	490 N	588 N
	Allowable thrust load	196 N	340 N	490 N	539 N	196 N	340 N	490 N	539 N
Bearing		Bearing							
Port location		Side ported or Axial ported							
Port size	Side ported	1/8		1/4		1/8		1/4	
	Axial ported	1/8		1/4		1/8		1/4	
Mounting		Basic, Foot							

Volume

[cm³]

Classification	Rotating angle	Single vane (S)				Double vane (D)			
		50	63	80	100	50	63	80	100
Standard	90°	30	70	88	186	48	98	136	272
	180°	49	94	138	281	—	—	—	—
	270°	66	118	188	376	—	—	—	—
Semi-standard	100°	32	73	93	197	52	104	146	294
	190°	51	97	143	292	—	—	—	—
	280°	68	121	193	387	—	—	—	—

Weight

[g]

Model	Rotating angle	Single vane (S)				Double vane (D)			
		50	63	80	100	50	63	80	100
Main body	90°	810	1365	2070	3990	830	1410	2120	4150
	180°	790	1330	2010	3880	—	—	—	—
	270°	770	1290	1950	3760	—	—	—	—
	100°	808	1360	2065	3980	822	1400	2100	4100
	190°	788	1325	2005	3870	—	—	—	—
	280°	766	1285	1940	3735	—	—	—	—
Auto switch unit + 2 auto switches		65	85	95	165	65	85	95	165
Foot bracket assembly		384	785	993	1722	384	785	993	1722

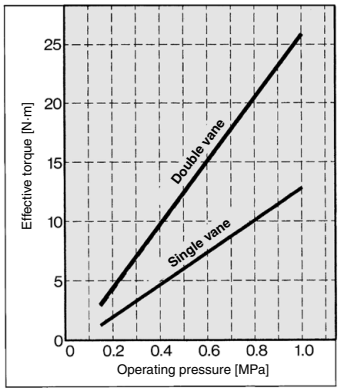
Mounting Bracket Assembly Part No.

Model		Foot bracket assembly part number	Description
Basic type	With auto switch		
CRB1LW50	**CDRB1LW50**	P411020-5	· 2 foot brackets · 8 mounting bolts · 8 mounting nuts · 8 washers
CRB1LW63	**CDRB1LW63**	P411030-5	
CRB1LW80	**CDRB1LW80**	P411040-5	
CRB1LW100	**CDRB1LW100**	P411050-5	

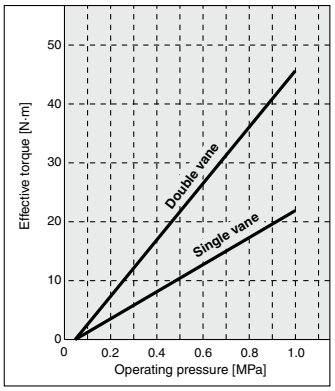
∗ Refer to page 12 for detailed dimensions.

Effective Output

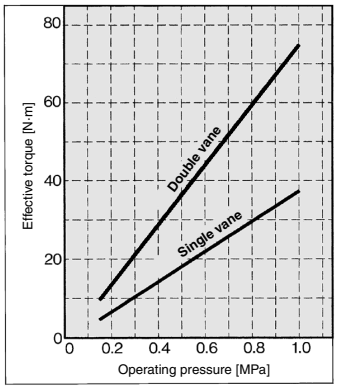
Size: 50



Size: 63



Size: 80



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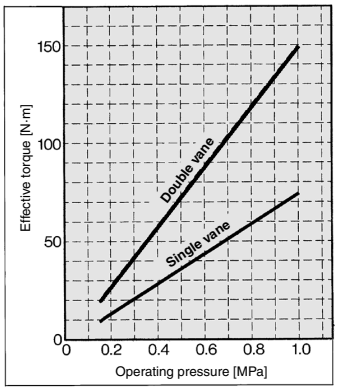
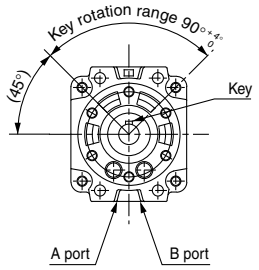
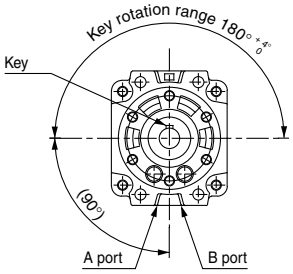
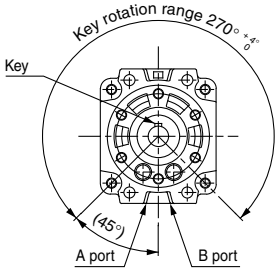
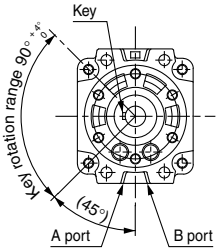
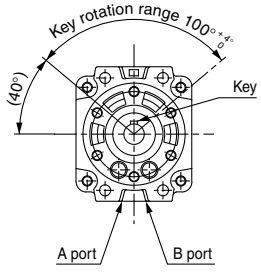
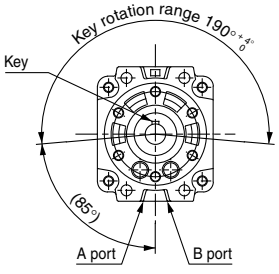
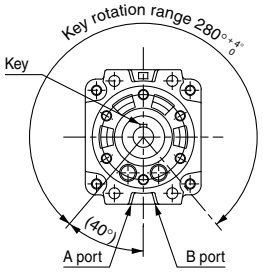
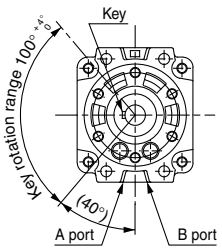
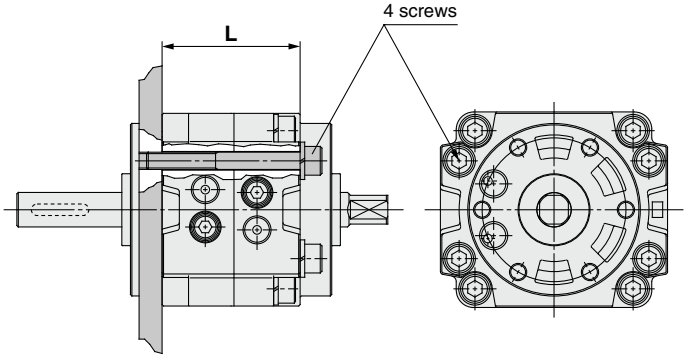


Key Position and Rotation Range

(Top View from Long Shaft Side)
Key positions in the figures below show the intermediate rotation position when A or B port is pressurized.

	Single vane type			Double vane type
	90°	**180°**	**270°**	**90°**
Standard				
	100°	**190°**	**280°**	**100°**
Semi-standard				

Direct Mounting of Body



Reference Screw Size

Size	L	Screw
50	48	M 6
63	52	M 8
80	60	M 8
100	80	M10

With One-touch Fittings

CRB1 [Mounting] **W50F** – [Rotating angle] [Vane type] [Port location]

With One-touch fittings

With One-touch fittings facilitate the piping work and greatly reduce the installation space.

Specifications

Vane type	Single vane	Double vane
Size	**50**	
Operating pressure range [MPa]	0.15 to 1.0	
Speed regulation range [s/90°]	0.1 to 1	
Port location	Side ported or Axial ported	
Piping	With One-touch fittings	
Mounting	Basic, Foot	
Variations	Basic type, With auto switch	

Applicable Tubing and Size

Applicable tubing O.D/I.D [mm]	**ø6/ø4**
Applicable tubing material	Nylon, Soft nylon, Polyurethane

Refer to page 13 for external dimensions.

Clean Series

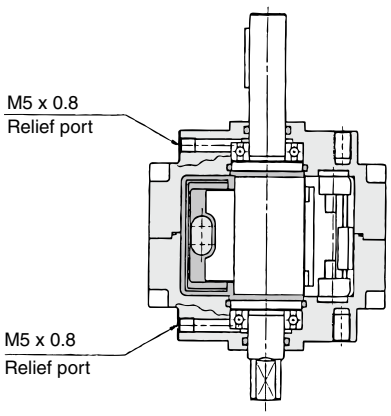
10 – CRB1BW [Size] – [Rotating angle] [Vane type] [Port location]

Clean series, with relief port

The double-seal construction of the actuator shaft section of these series to channel exhaust through the relief ports directly to the outside of a clean room environment allows operation of these cylinders in a class 100 clean room.

Specifications

Vane type	Single/Double vane	
Size	**50**	**63**
Operating pressure range [MPa]	0.15 to 1.0	
Speed regulation range [s/90°]	0.1 to 1	
Port location	Side ported or Axial ported	
Piping	Screw-in type	
Relief port size	M5 x 0.8	
Mounting	Basic	
Variations	Basic type, With auto switch	
Allowable kinetic energy	0.029 J	0.042 J



The internal construction of the figure above shows a single vane type.

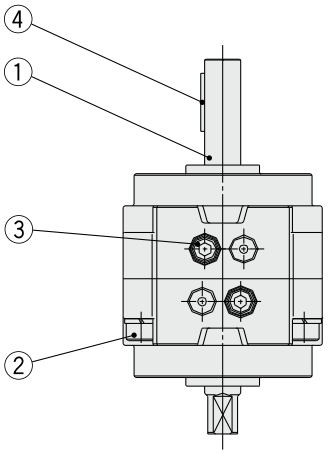
Stainless Steel Specification for Main Parts

CDRB1 | Mounting | W | Size | — | Rotating angle | Vane type | Port location | S

Auto switch

Nil	Basic type
D	With auto switch (With switch unit)

Stainless steel specification for main parts



Specifications

Vane type	Single/Double vane			
Size	**50**	**63**	**80**	**100**
Operating pressure range [MPa]	0.15 to 1.0			
Speed regulation range [s/90°]	0.1 to 1			
Port location	Side ported or Axial ported			
Piping	Screw-in type			
Mounting	Basic, Foot			
Variations	Basic type, With auto switch			
Allowable kinetic energy	0.029 J	0.042 J	0.142 J	0.212 J

Stainless Steel Parts

	Description
1	**Vane shaft**
2	**Hexagon socket head cap screw**
3	**Special screw**
4	**Parallel key**

∗ Individual part cannot be shipped.

Rotary Actuator: Replaceable Shaft

A shaft can be replaced with a different shaft type except for standard shaft type (W).

Without auto switch **CRB1B** **J** **Size** – **Rotating angle** **Vane type** **Port location** – **Made to Order**

Shaft type

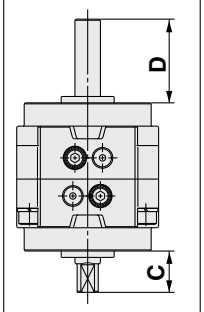
J	Double shaft (Long shaft with four chamfers)
K	Double round shaft
S	Single shaft key
T	Single round shaft
X	Single shaft with four chamfers
Y	Double shaft key
Z	Double shaft with four chamfers

Made to Order

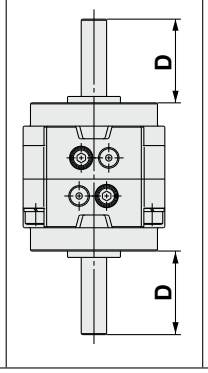
Symbol	Description
XA31 to XA60	Shaft type pattern
XC1	Addition of connection port
XC4	Change of rotating angle
XC5	Change of rotating angle
XC6	Change of rotating angle
XC7	Reversed shaft
XC26	Change of rotating angle
XC27	Change of rotation range and direction
XC30	Fluorine grease

∗ Refer to pages 20 to 27 for details.

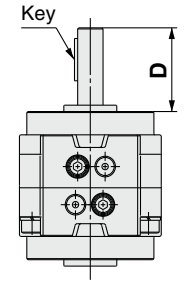
J



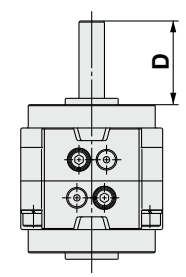
K



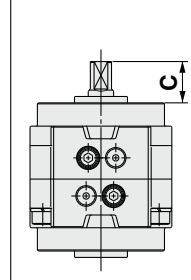
S



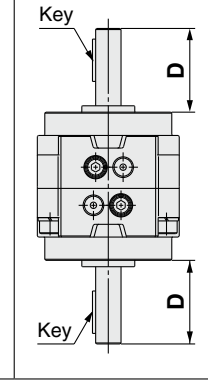
T



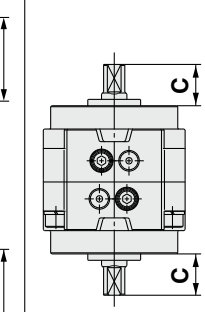
X



Y



Z



[mm]

Size	C	D
50	19.5	39.5
63	21	45
80	23.5	53.5
100	30	65

Note) Dimensions and tolerance of the shaft and keyway are the same as the standard.

With auto switch **CDRB1B** **J** **Size** – **Rotating angle** **Vane type** **Port location** – **Made to Order**

With auto switch

Shaft type

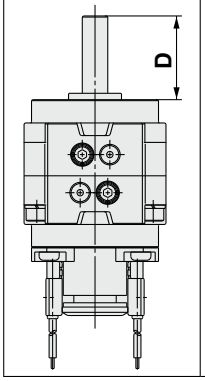
J	Double shaft (Long shaft with four chamfers)
Z	Double shaft with four chamfers

Made to Order

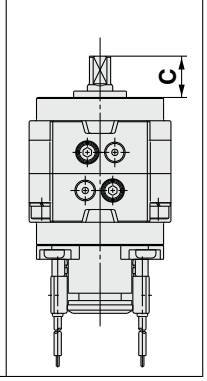
Symbol	Description
XA31 to XA60	Shaft type pattern
XC1	Addition of connection port
XC4	Change of rotating angle
XC5	Change of rotating angle
XC6	Change of rotating angle
XC7	Reversed shaft
XC26	Change of rotating angle
XC27	Change of rotation range and direction
XC30	Fluorine grease

The above may not be selected when the product comes with an auto switch. Refer to pages 20 to 27 for details.

J



Z



[mm]

Size	C	D
50	19.5	39.5
63	21	45
80	23.5	53.5
100	30	65

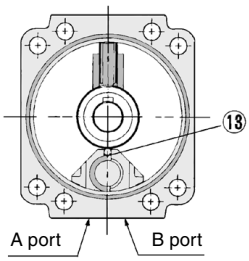
Note) Dimensions and tolerance of the shaft and keyway are the same as the standard.

Construction

Basic type (Keys in the figures below show the intermediate rotation position.)

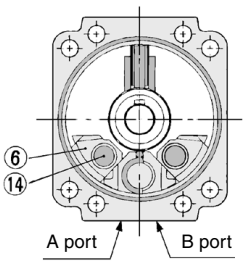
For 270° (Top view from long shaft side)

Single vane



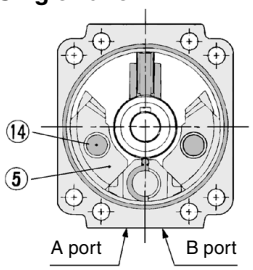
For 180° (Top view from long shaft side)

Single vane



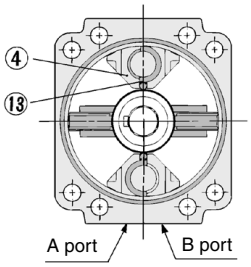
For 90° (Top view from long shaft side)

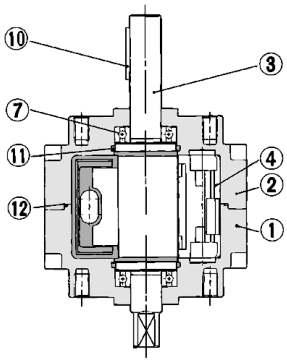
Single vane



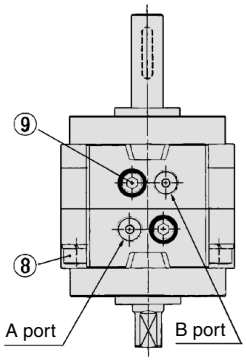
For 90° (Top view from long shaft side)

Double vane





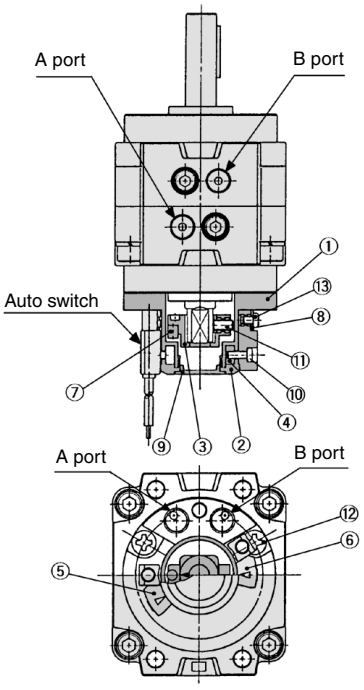
(Long shaft side)

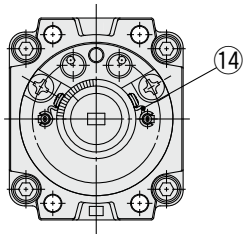


(Short shaft side)

With auto switch

(Keys in the figures below show the actuator for 180° when A port is pressurized.)





D-M9□

Component Parts

No.	Description	Material	Note
1	**Body (A)**	Aluminum alloy	Painted
2	**Body (B)**	Aluminum alloy	Painted
3	**Vane shaft**	Carbon steel*	
4	**Stopper**	Aluminum alloy	
5	**Stopper**	Resin	For 90°
6	**Stopper**	Resin	For 180°
7	**Bearing**	Bearing steel	
8	**Hexagon socket head cap screw (with washer)**	Chrome molybdenum steel	
9	**Special screw**	Chrome molybdenum steel	
10	**Parallel key**	Carbon steel	
11	**O-ring**	NBR	
12	**O-ring**	NBR	Special O-ring
13	**Stopper seal**	NBR	Special seal
14	**Holding rubber**	NBR	

∗ Individual part cannot be shipped.
∗ The material is chrome molybdenum steel for double vane type.

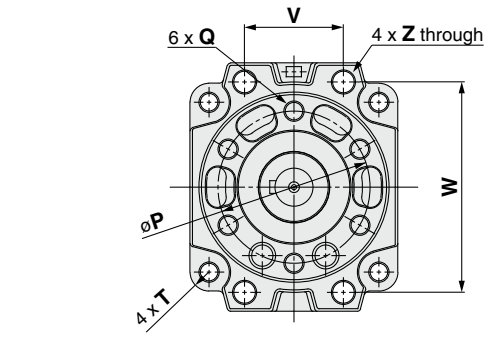
Component Parts

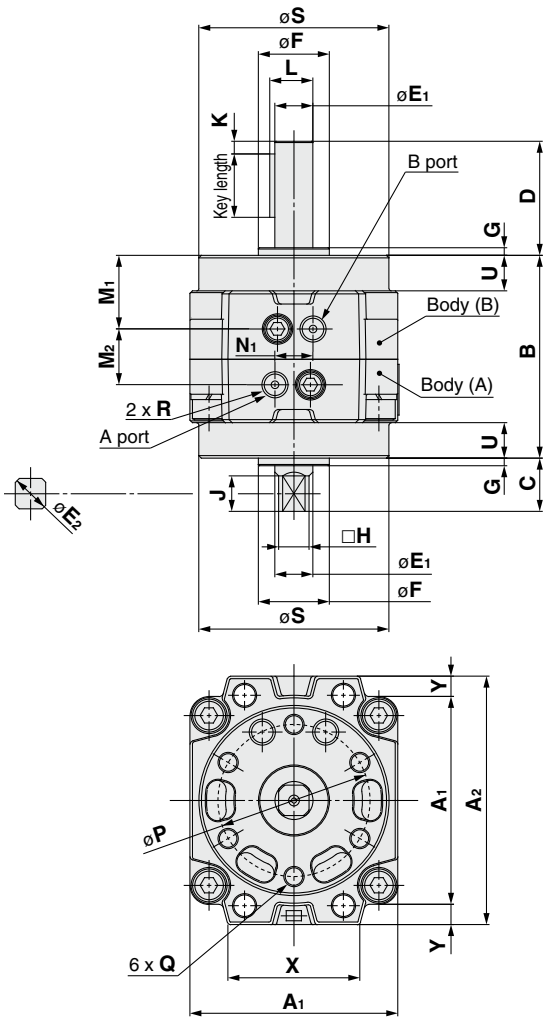
No.	Description	Material	Note
1	**Cover (A)**	Resin	
2	**Cover (B)**	Resin	
3	**Magnet lever**	Resin	
4	**Holding block**	Stainless steel	
5	**Switch block (A)**	Resin	
6	**Switch block (B)**	Resin	
7	**Magnet**	—	
8	**Arm**	Stainless steel	
9	**Rubber cap**	NBR	
10	Cross recessed round head screw	Stainless steel	
11	Hexagon socket head set screw	Stainless steel	
12	Cross recessed round head screw	Chrome molybdenum steel	For size 50, 63, 80
	Hexagon socket head cap screw	Chrome molybdenum steel	For size 100
13	Cross recessed round head screw	Stainless steel	
14	**Switch holder**	Stainless steel	

∗ Individual part cannot be shipped. Please purchase the whole unit. (Refer to page 28.)

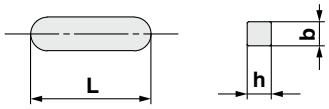
Dimensions: 50, 63, 80, 100

Single vane type/Double vane type
CRB1BW□-□S/D
<Port location: Side ported>

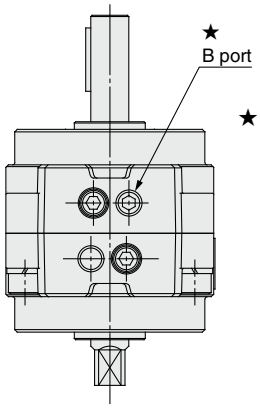




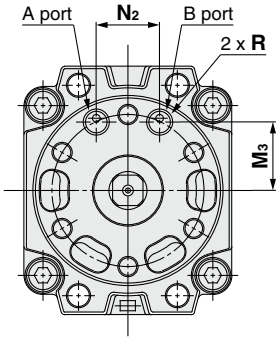
Key Dimensions

Key dimension			
Size	**b** (h9)	**h** (h9)	**L**
50	$4^{0}_{-0.030}$	$4^{0}_{-0.030}$	20
63	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	25
80	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	36
100	$7^{0}_{-0.036}$	$7^{0}_{-0.036}$	40

Axial ported (Port location): CRB1BW□-□SE, CRB1BW□-□DE



★ If B port of Body (B) is machined, the port is plugged with Rc1/8.



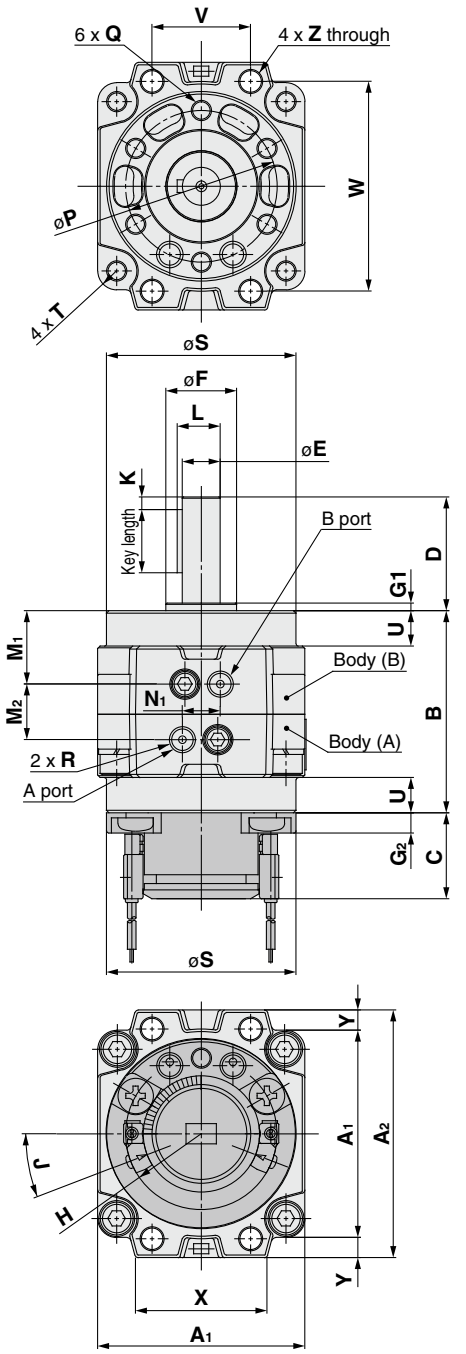
[mm]

Size	A1	A2	B	C	D	E1 (g6)	E2 (h9)	F (h9)	G	H	J	K	L	M1	M2	M3	N1	N2	P	Q	R (*)	S	T	U	V	W	X	Y	Z
50	67	78	70	19.5	39.5	$12^{-0.006}_{-0.017}$	$11.9^{0}_{-0.043}$	$25^{0}_{-0.052}$	3	10	13	5	13.5	26	18	21	14	18	50	M6 x 1 depth 9	1/8	60	R6	11	34	66	46	5.5	6.5
63	82	98	80	21	45	$15^{-0.006}_{-0.017}$	$14.9^{0}_{-0.043}$	$28^{0}_{-0.052}$	3	12	14	5	17	29	22	27	15	25	60	M8 x 1.25 depth 10	1/8	75	R7.5	14	39	83	52	8	9
80	95	110	90	23.5	53.5	$17^{-0.006}_{-0.017}$	$16.9^{0}_{-0.043}$	$30^{0}_{-0.052}$	3	13	16	5	19	30	30	29	20	30	70	M8 x 1.25 depth 12	1/4	88	R8	15	48	94	63	7.5	9
100	125	140	103	30	65	$25^{-0.007}_{-0.020}$	$24.9^{0}_{-0.052}$	$45^{0}_{-0.062}$	4	19	22	5	28	35.5	32	38	24	38	80	M10 x 1.5 depth 13	1/4	108	R11	11.5	60	120	78	7.5	11

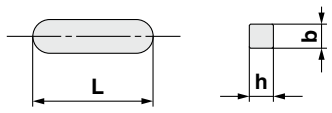
∗ For single vane type: Above figures show actuators for 180° when B port is pressurized.
∗ For double vane type: Figures above show the intermediate rotation position when the A or B port is pressurized.
∗ In addition to Rc, G and NPT are also available for connection ports.

Dimensions: 50, 63, 80, 100 (With auto switch)

Single vane type/Double vane type
CDRB1BW□-□S/D
<Port location: Side ported>

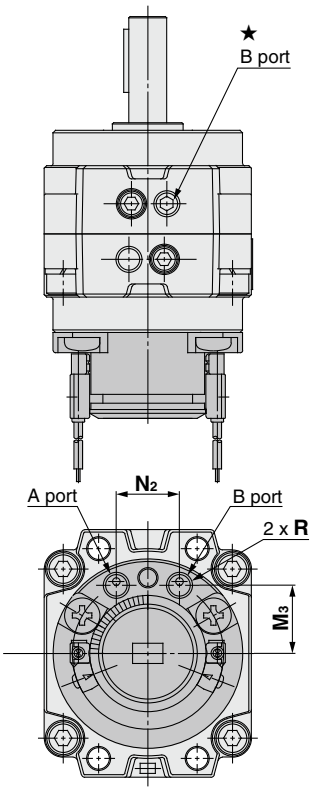


Key Dimensions

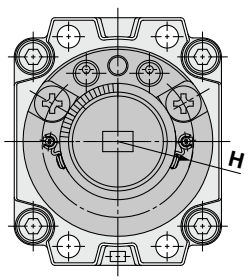


Size	**b** (h9)	**h** (h9)	**L**
50	$4^{0}_{-0.030}$	$4^{0}_{-0.030}$	20
63	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	25
80	$5^{0}_{-0.030}$	$5^{0}_{-0.030}$	36
100	$7^{0}_{-0.036}$	$7^{0}_{-0.036}$	40

Axial ported (Port location): CDRB1BW□-□SE, CDRB1BW□-□DE



★ If B port of Body (B) is machined, the port is plugged with Rc1/8.



D-M9□

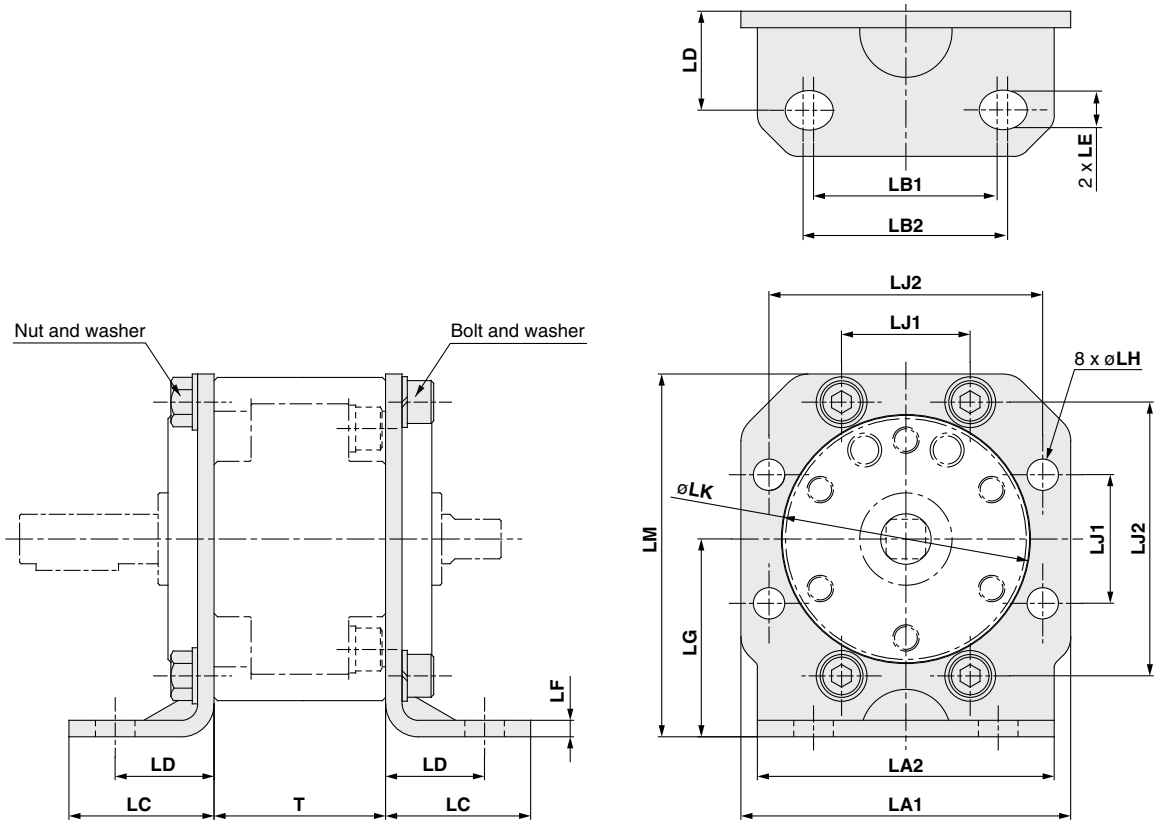
[mm]

Size	A1	A2	B	C	D	E (g6)	F (h9)	G1	G2	H (R)	J	K	L	M1	M2	M3	N1	N2	P	Q	R (*)	S	T	U	V	W	X	Y	Z
50	67	78	70	32	39.5	$12^{-0.006}_{-0.017}$	$25^{0}_{-0.052}$	3	6.5	R22.5	32.5	5	13.5	26	18	21	14	18	50	M6 x 1 depth 9	1/8	60	R6	11	34	66	46	5.5	6.5
63	82	98	80	34	45	$15^{-0.006}_{-0.017}$	$28^{0}_{-0.052}$	3	8	R30	21	5	17	29	22	27	15	25	60	M8 x 1.25 depth 10	1/8	75	R7.5	14	39	83	52	8	9
80	95	110	90	34	53.5	$17^{-0.006}_{-0.017}$	$30^{0}_{-0.052}$	3	8	R30	21	5	19	30	30	29	20	30	70	M8 x 1.25 depth 12	1/4	88	R8	15	48	94	63	7.5	9
100	125	140	103	39	65	$25^{-0.007}_{-0.020}$	$45^{0}_{-0.062}$	4	13	R30	21	5	28	35.5	32	38	24	38	80	M10 x 1.5 depth 13	1/4	108	R11	11.5	60	120	78	7.5	11

∗ For single vane type: Above figures show actuators for 180° when B port is pressurized.
∗ For double vane type: Figures above show the intermediate rotation position when the A or B port is pressurized.
∗ In addition to Rc, G and NPT are also available for connection ports.

Dimensions

Option: Foot bracket



[mm]

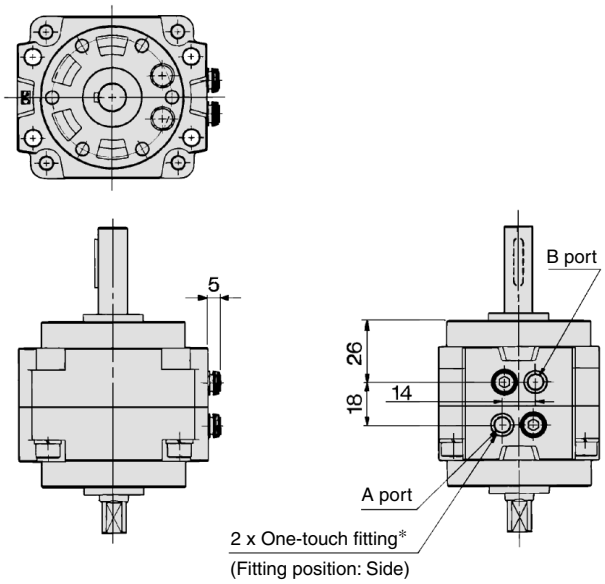
Size	Foot bracket assembly part number	LA1	LA2	LB1	LB2	LC	LD	LE	LF	LG	LH	LJ1	LJ2	LK	LM	T
50	P411020-5	78	70	45	50	36	25.5	ø10	4.5	45	7.5	34	66	60.5	84	48
63	P411030-5	100	90	56		44	30	ø12	5	60	9.5	39	83	75.5	110	52
80	P411040-5	111	100	63		46	32	ø12	6	65	9.5	48	94	88.5	120.5	60
100	P411050-5	141	126	80		55	39.5	ø14	6	80	11.5	60	120	108.5	150.5	80

Note 1) The foot bracket (with bolt, nut, and washer) is not mounted on the actuator at the time of shipment.
Note 2) The foot bracket can be mounted on the rotary actuator at 90° intervals.
Note 3) Refer to the foot bracket assembly part number in the table at right when foot bracket assembly is required separately.

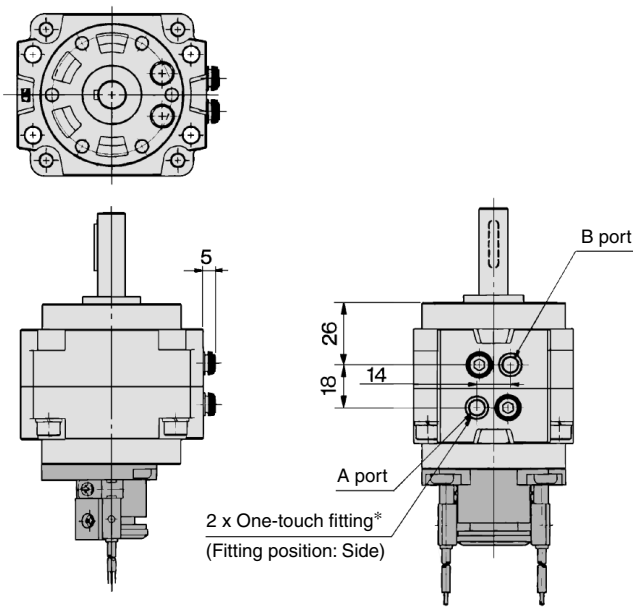
Model		Foot bracket assembly part number
Basic type	With auto switch	
CRB1LW50	**CDRB1LW50**	P411020-5
CRB1LW63	**CDRB1LW63**	P411030-5
CRB1LW80	**CDRB1LW80**	P411040-5
CRB1LW100	**CDRB1LW100**	P411050-5

With One-touch Fittings: 50

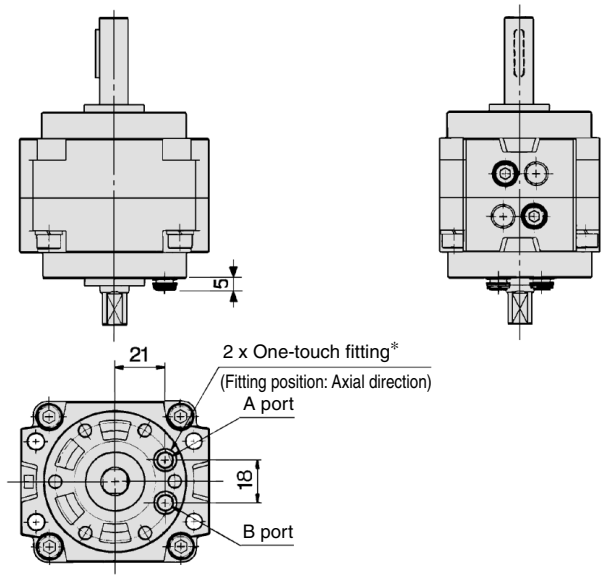
Basic type
CRB1□W50F-□□
<Port location: Side ported>



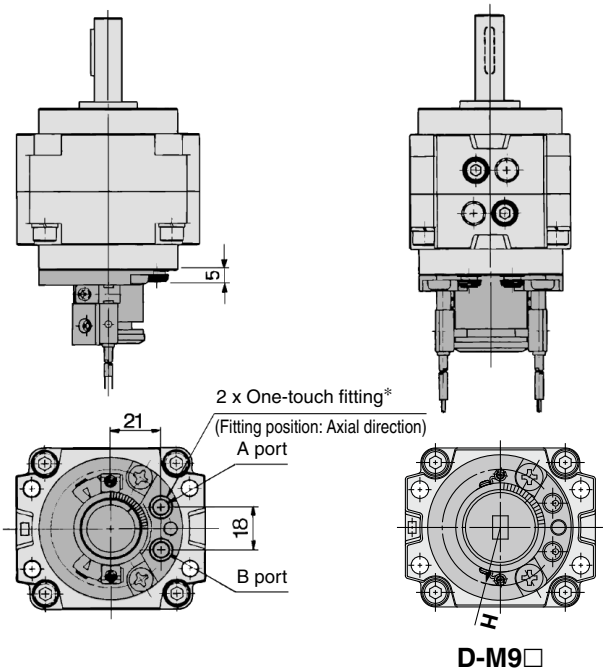
With auto switch
CDRB1□W50F-□□-□
<Port location: Side ported>



CRB1□W50F-□□E
<Port location: Axial ported>



CDRB1□W50F-□□E-□
<Port location: Axial ported>



D-M9□

Applicable Tubing and O.D/I.D

Applicable tubing O.D/I.D [mm]	ø**6**/ø**4**
Applicable tubing material	Nylon, Soft nylon, Polyurethane

* Dimensions not indicated in the above figures are the same as size 50 actuator.
* Keys in the figures above show the intermediate rotation position for single vane type.

Rotary Actuator with Solenoid Valve

Series CVRB1

Size: 50, 63, 80, 100

How to Order

Rotary Actuator

Rotary **CDVRB1 B W 80 – 90 S – M9B L □ – □**

Auto switch

Nil	Basic type
D	With auto switch (With auto switch unit and built-in magnet)

Mounting

B	Basic
L	Foot

Shaft type

W	Double shaft (Long shaft key & Four chamfers)

Size

50
63
80
100

Rotating angle

90	90°
100	100°
180	180°
190	190°
270	270°
280	280°

Vane type

S	Single vane
D	Double vane

Auto switch

Nil	Without auto switch (Built-in magnet)
M	Without D-M9 type auto switch (Built-in magnet)

∗ For applicable auto switch model, refer to the table below.
∗∗ The operating range and hysteresis of the D-M9□ are different from those of the other auto switches. For details, refer to page 28.

Number of auto switches

S	1 pc.∗
Nil	2 pcs.∗∗

∗ S: A right-hand auto switch is shipped.
∗∗ Nil: A right-hand switch and a left-hand switch are shipped.

Electrical entry/Lead wire length

Nil	Grommet/Lead wire: 0.5 m
M	Grommet/Lead wire: 1 m
L	Grommet/Lead wire: 3 m
CN	Connector/Without lead wire
C	Connector/Lead wire: 0.5 m
CL	Connector/Lead wire: 3 m

∗ Connectors are available only for the R73, R80, T79.
∗∗ Lead wire with connector part nos.
D-LC05: Lead wire 0.5 m
D-LC30: Lead wire 3 m
D-LC50: Lead wire 5 m

Made to Order
For details, refer to pages 17 to 19, 26 and 27.

How to Order (Example)

When ordering the rotary actuator with solenoid valve, CVRB1 series, specify the models of both the rotary and the valve (solenoid valve).
Note) For the valve, add ∗ in front of the part number when ordering.
Example) CDVRB1BW80-90S-R73 ···1 pc.
∗VZ5140-5LZ ·····1 pc.

Solenoid Valve

Valve **VZ 3 1 40 – 5 L □ □ – X199**

Valve series

3	VZ3000 series	C□VRB1BW50,63
5	VZ5000 series	C□VRB1BW80,100

Type of actuation

1	2-position single solenoid
2	2-position double solenoid

Rated voltage

1	100 VAC 50/60 Hz
2	200 VAC 50/60 Hz
5	24 VDC

Electrical entry

Grommet	L plug connector	M plug connector	DIN terminal
G: Lead wire length 300 mm	L: With lead wire (Wire length: 300 mm)	M: With lead wire (Wire length: 300 mm)	D: With connector
H: Lead wire length 600 mm	LO: Without connector	MO: Without connector	DO: Without connector

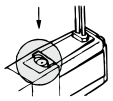
Light/Surge voltage suppressor

Nil	Without light/surge voltage suppressor
S	With surge voltage suppressor
Z Note)	With light/surge voltage suppressor

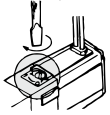
Note) GZ, HZ and DOZ are not available.

Manual

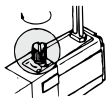
Nil: Non-locking push type



B: Locking B type (Slotted)



C: Locking C type (Manual)



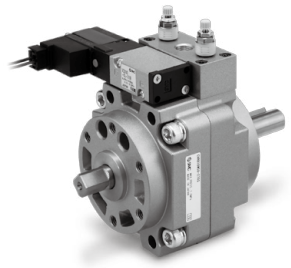
Suffix
For VZ3000 series only

Applicable Auto Switches/Refer to the Best Pneumatics No.4 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire type	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	None (N)	Pre-wired connector	Applicable load:	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	5 V, 12 V	—	M9NV	M9N	Oilproof heavy-duty cord	●	●	●	○	—	○	IC circuit	Relay, PLC
				3-wire (PNP)			M9PV	M9P		●	●	●	○	—	○		
				2-wire	12 V		M9BV	M9B		●	●	●	○	—	○	—	
				3-wire (NPN)	5 V, 12 V		—	S79		●	—	●	○	—	○	IC circuit	
				3-wire (PNP)			—	S7P		●	—	●	○	—	○		
				2-wire	12 V		—	T79		●	—	●	○	—	○	—	
		Connector					—	T79C		●	—	●	●	●	—		
Reed auto switch	—	Grommet	Yes	2-wire	—	100 V	—	R73		●	—	●	○	—	—	—	
		Connector				—	—	R73C		●	—	●	●	●			
		Grommet	No		48 V, 100 V	100 V	—	R80		●	—	●	○	—		IC circuit	
		Connector			—	24 V or less	—	R80C		●	—	●	●	●		—	

∗ Lead wire length symbols:
0.5 m ····· Nil (Example) R73C
3 m ····· L (Example) R73CL
5 m ····· Z (Example) R73CZ
None ····· N (Example) R73CN

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



Made to Order

(For details, refer to pages 17 to 19, 26 and 27.)

Symbol	Description
XA1 to XA24	Shaft type pattern
XC1	Addition of connection port
XC4	Change of rotating angle
XC5	Change of rotating angle
XC6	Change of rotating angle
XC7	Reversed shaft
XC26	Change of rotating angle
XC27	Change of rotation range and direction
XC30	Fluorine grease

Refer to pages 28 to 30 for actuators with auto switches.

- Auto switch unit and switch block unit
- Operating range and hysteresis
- How to change the auto switch detecting position
- Auto switch mounting
- Auto switch adjustment

Solenoid Valve Specifications

Model			VZ3000/5000 series
Manual override			Non-locking push type Locking type (Slotted), Locking type (Manual)
Pilot exhaust type			Pilot valve individual exhaust
Mounting position			Free
Impact/Vibration resistance [m/s²] Note 1)			300/50
Enclosure			Dusttight
Electrical entry			Grommet (G)/(H), L plug connector (L), M plug connector (M), DIN terminal (D)
Coil rated voltage [V]	**AC 50/60 Hz**		100, 200
	DC		24
Allowable voltage fluctuation [%]			−15 to +10 of rated voltage
Power consumption [W] [Current mA] Note 2)	**DC**		1.8 (With light: 2.1) (24 VDC: 75 [With light: 87.5])
Apparent power [VA] Note 2) **[Current mA]**	**AC**	**Inrush**	4.5 to 50 Hz, 4.2/60 Hz [100 VAC: 45/50 Hz, 42/60 Hz; 200 VAC: 22.5/50 Hz, 21/60 Hz]
		Holding	3.5/50 Hz, 3/60 Hz [100 VAC: 35/50 Hz, 30/60 Hz; 200 VAC: 17.5/50 Hz, 15/60 Hz]
Surge voltage suppressor			DC: Diode, AC: ZNR
Indicator light			DC: LED (Red), AC: Neon bulb

∗ Option

Note 1) Impact resistance: No malfunction occurred in the impact test using a drop impact tester. The test was performed at both energized and de-energized states to the axis and right angle direction of the main valve and armature.
Vibration resistance: No malfunction occurred in the one-sweep test between 45 and 2000 Hz. A test was performed at both energized and de-energized states to the axis and right angle direction of the main valve and armature. (Value in the initial stage.)

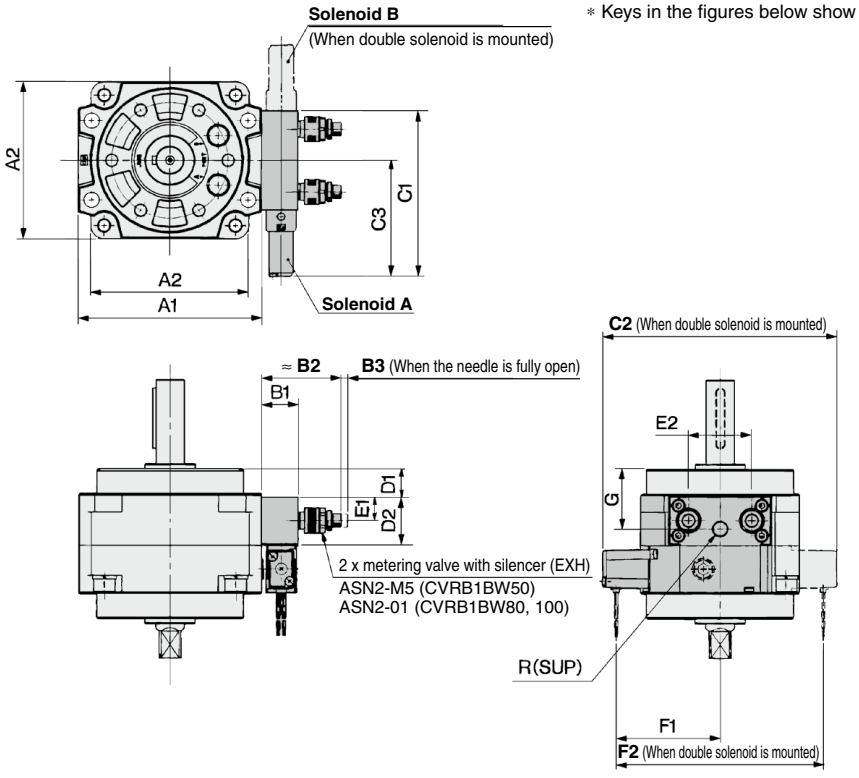
Note 2) At the rated voltage.

About rotary actuator specifications

The vibration adjustment range differs from that of the standard series.
With solenoid valve: 0.3 to 1 s/90°
Other specifications and structures are similar to those of the standard CRB1 series. Refer to pages 4 and 9.

Dimensions

∗ Keys in the figures below show the intermediate rotation position for single vane type.



Note 1) Solenoid valve in external appearance is for VZ$^{3}_{5}$140-1G.
Note 2) Solenoid valve dimensions: 2-position single solenoid, ( ): 2-position double solenoid.

[mm]

Size	A1	A2	B1	B2	B3	C1	C2	C3	D1	D2	E1	E2	F1	F2	G	R
50	78	67	18	36	2.8	82.5	120 (136.5)	60 (61)	12	24	11.5	30	52 (53)	104 (120.5)	25	1/8
63	98	82	18	36	2.8	88	102 (136.5)	60 (61)	16	24	11.5	30	52 (53)	104 (120.5)	27.5	1/8
80	110	95	22	48	4	100	140 (155)	70 (71)	17	29	14	38	62 (63)	124 (139)	36	1/8
100	140	125	22	48	4	100	140 (155)	70 (71)	23.5	29	14	38	62 (63)	124 (139)	42.5	1/8

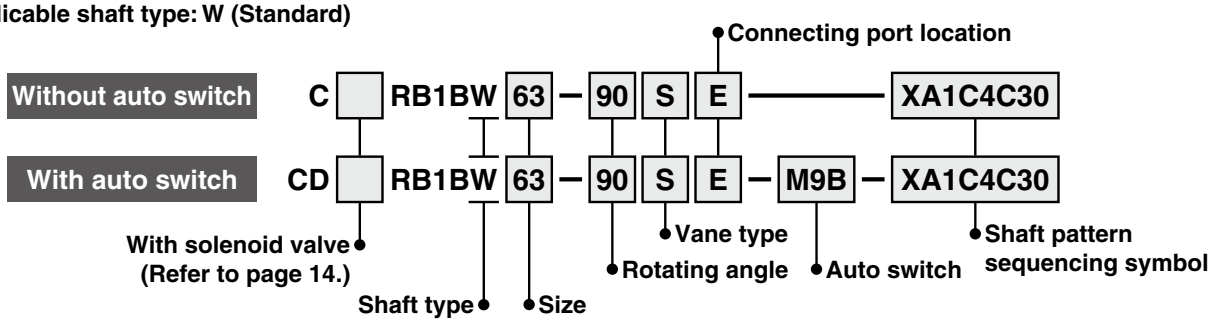
Series CRB1 (Size: 50, 63, 80, 100)
Simple Specials
-XA1 to -XA24: Shaft Pattern Sequencing I

Shaft shape pattern is dealt with simple made-to-order system. (Refer to the Best Pneumatics No.4.)
Please contact SMC for a specification sheet when placing an order.

Shaft Pattern Sequencing I

Symbol
-XA1 to XA24

Applicable shaft type: W (Standard)



Shaft Pattern Sequencing Symbol

● Axial: Top (Long shaft side)

Symbol	Description	Size			
		50	63	80	100
XA1	Shaft-end female thread	●	●	●	●
XA14*	Shaft through-hole + Shaft-end female thread	●	●	●	●
XA17*	Change of long shaft length (Change of key length)	●	●	●	●
XA24*	Double key	●	●	●	●

* The vane type for the shaft through-hole is compatible with single vanes only.

● Axial: Bottom (Short shaft side)

Symbol	Description	Size			
		50	63	80	100
XA2*	Shaft-end female thread	●	●	●	●
XA15*	Shaft through-hole + Shaft-end female thread	●	●	●	●
XA18*	Change of short shaft length	●	●	●	●

* The vane type for the shaft through-hole is compatible with single vanes only.

● Double Shaft

Symbol	Description	Size			
		50	63	80	100
XA13*	Shaft through-hole	●	●	●	●
XA16*	Shaft through-hole + Double shaft-end female threads	●	●	●	●
XA19*	Change of double shaft length	●	●	●	●
XA20*	Reversed shaft, Change of double shaft length	●	●	●	●

* The vane type for the shaft through-hole is compatible with single vanes only.
* The product with an auto switch is available only for XA1, 14, 17 and 24.

Combination

XA□ Combination

Symbol	Description	Axial direction		Combination										
		Up	Down											
XA1	Shaft-end female thread	●	—	XA1										
XA2	Shaft-end female thread	—	●	●	XA2									
XA13	Shaft through-hole	●	●	—	—	XA13								
XA14	Shaft through-hole + Shaft-end female thread	●	—	—	—	—	XA14							
XA15	Shaft through-hole + Shaft-end female thread	—	●	—	—	—	—	XA15						
XA16	Shaft through-hole + Double shaft-end female threads	●	●	—	—	—	—	—	XA16					
XA17	Change of long shaft length (Change of key length)	●	—	—	●	●	—	●	—	XA17				
XA18	Change of short shaft length	—	●	●	—	●	●	—	—	—	XA18			
XA19	Change of double shaft length	●	●	—	—	●	—	—	—	—	—	XA19		
XA20	Reversed shaft, Change of double shaft length	●	●	—	—	●	—	—	—	—	—	—	XA20	
XA24	Double key	●	—	●	●	●	●	●	●	●	●	●	●	XA24

A total of two XA□ combinations is available.
Example: XA1A24

XA□, XC□ Combination

Combination other than -XA□, such as Made to Order (-XC□), is also available.
Refer to pages 26 to 27 for details about made-to-order specifications.

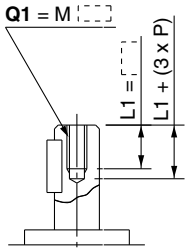
Symbol	Description	Size	XA1, XA2 XA13 to 20, 24
XC1	Addition of connection port	50, 63 80,100	●
XC4	Change of rotating angle		●
XC5	Change of rotating angle		●
XC6	Change of rotating angle		●
XC7	Reversed shaft		—
XC26	Change of rotating angle		●
XC27	Change of rotation range and direction		●
XC30	Fluorine grease		●

A total of four XA□ and XC□ combinations is available.
Example: XA1A24C1C30

Axial: Top (Long shaft side)

Symbol: A1 Machine female threads into the long shaft.

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



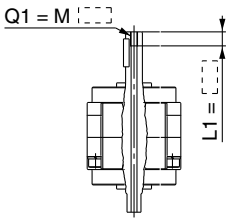
[mm]

Size	Q1
50	M3, M4, M5
63	M4, M5, M6
80	M4, M5, M6
100	M5, M6, M8

Symbol: A14 Applicable to single vane type only

A special end is machined onto the long shaft, and a through-hole is drilled into it. 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 type: W

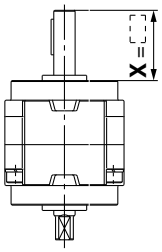


[mm]

Thread \ Size	50	63	80	100
M5 x 0.8	ø4.2	ø4.2	ø4.2	—
M6 x 1	—	ø5	ø5	ø5
M8 x 1.25	—	—	—	ø6.8

Symbol: A17 Shorten the long shaft.

- Applicable shaft type: W



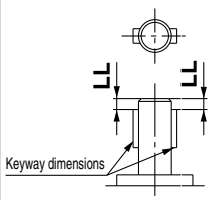
[mm]

Size	X
50	24.5 to 39.5
63	28 to 45
80	30.5 to 53.5
100	40 to 65

Symbol: A24 Double key

Keys and keyways are machined at 180° of standard position.

- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.



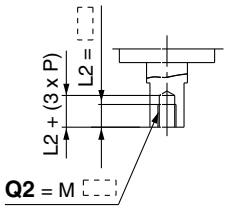
[mm]

Size	Keyway dimension	LL
50	4 x 4 x 20	5
63	5 x 5 x 25	
80	5 x 5 x 36	
100	7 x 7 x 40	

Axial: Bottom (Short shaft side)

Symbol: A2 Machine female threads into the short shaft.

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



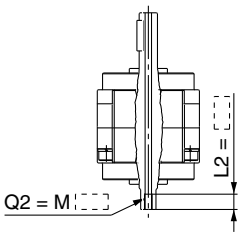
[mm]

Size	Q2
50	M3, M4, M5
63	M4, M5, M6
80	M4, M5, M6
100	M5, M6, M8

Symbol: A15 Applicable to single vane type only

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 type: W

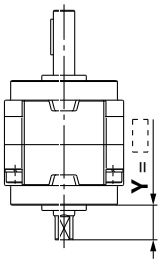


[mm]

Thread \ Size	50	63	80	100
M5 x 0.8	ø4.2	ø4.2	ø4.2	—
M6 x 1	—	ø5	ø5	ø5
M8 x 1.25	—	—	—	ø6.8

Symbol: A18 Shorten the short shaft.

- Applicable shaft type: W



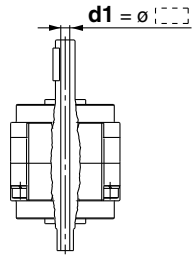
[mm]

Size	Y
50	4 to 19.5
63	4 to 21
80	4 to 23.5
100	5 to 30

Double Shaft

Symbol: A13 Applicable to single vane type only

Shaft with through-hole
- Minimum machining diameter for d1 is 0.1.
- Applicable shaft type: W

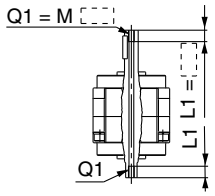


[mm]

Size	d1
50	ø4 to ø5
63	ø4 to ø6
80	ø4 to ø6.5
100	ø5 to ø8

Symbol: A16 Applicable to single vane type only

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 type: W
- Equal dimensions are indicated by the same marker.

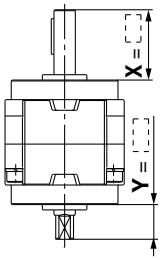


[mm]

Thread \ Size	50	63	80	100
M5 x 0.8	ø4.2	ø4.2	ø4.2	—
M6 x 1	—	ø5	ø5	ø5
M8 x 1.25	—	—	—	ø6.8

Symbol: A19 Shorten both long and short shafts.

- Applicable shaft type: W

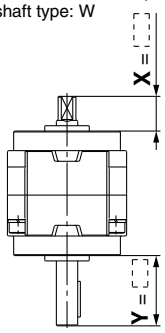


[mm]

Size	X	Y
50	24.5 to 39.5	4 to 19.5
63	28 to 45	4 to 21
80	30.5 to 53.5	4 to 23.5
100	40 to 65	5 to 30

Symbol: A20 The rotation axis is reversed.

(If shortening the shaft is not required, indicate "✻" for dimension X, Y.)
- Applicable shaft type: W



[mm]

Size	X	Y
50	4 to 19.5	24.5 to 39.5
63	4 to 21	28 to 45
80	4 to 23.5	30.5 to 53.5
100	5 to 30	40 to 65

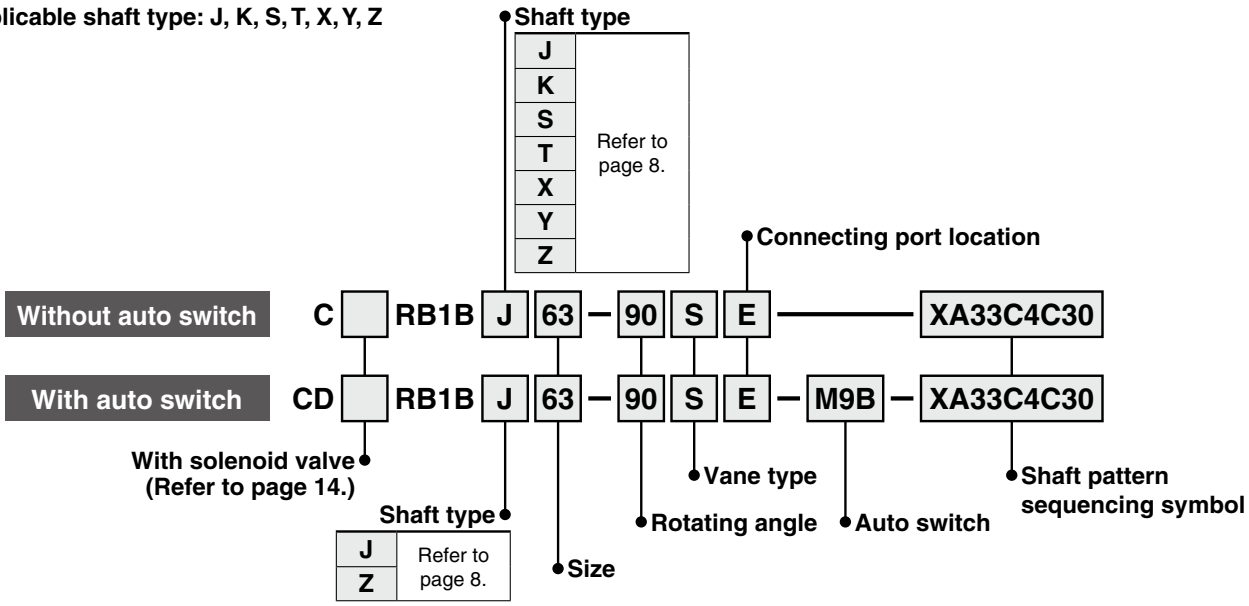
Series ***CRB1*** (Size: 50, 63, 80, 100)
Simple Specials
-XA31 to -XA60: Shaft Pattern Sequencing Ⅱ

Shaft shape pattern is dealt with simple made-to-order system. (Refer to the Best Pneumatics No.4.)
Please contact SMC for a specification sheet when placing an order.

Shaft Pattern Sequencing Ⅱ

Symbol: **-XA31 to XA60**

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



Shaft Pattern Sequencing Symbol

● **Axial: Top (Long shaft side)**

Symbol	Description	Shaft type	Size
XA31	Shaft-end female thread	S, Y	50, 63, 80, 100
XA33	Shaft-end female thread	J, K, T	
XA35	Shaft-end female thread	X, Z	
XA37	Stepped round shaft	J, K, T	
XA45	Middle-cut chamfer	J, K, T	
XA48	Change of long shaft length (With keyway)	S, Y	
XA51	Change of long shaft length (Without keyway)	J, K, T	
XA54	Change of long shaft length (With four chamfers)	X, Z	

● **Axial: Bottom (Short shaft side)**

Symbol	Description	Shaft type	Size
XA32	Shaft-end female thread	S, Y	50, 63, 80, 100
XA34	Shaft-end female thread	K, T	
XA36	Shaft-end female thread	J, X, Z	
XA38	Stepped round shaft	K	
XA46	Middle-cut chamfer	K	
XA49	Change of short shaft length (With keyway)	Y	
XA52	Change of short shaft length (Without keyway)	K	
XA55	Change of short shaft length (With four chamfers)	J, Z	

● **Double Shaft**

Symbol	Description	Shaft type	Size
XA39*	Shaft through-hole	S, Y	50, 63, 80, 100
XA40*	Shaft through-hole	K, T	
XA41*	Shaft through-hole	J, X, Z	
XA42*	Shaft through-hole + Double shaft-end female threads	S, Y	
XA43*	Shaft through-hole + Double shaft-end female threads	K, T	
XA44*	Shaft through-hole + Double shaft-end female threads	J, X, Z	
XA50	Change of double shaft length (Both sides with keyway)	Y	
XA53	Change of double shaft length (Without keyway)	K	
XA56	Change of double shaft length (Both sides with four chamfers)	Z	
XA57	Change of double shaft length (With four chamfers, without keyway)	J	
XA58	Reversed shaft, Change of double shaft length (With four chamfers, without keyway)	J, T	
XA59	Reversed shaft, Change of shaft length (With four chamfers)	X	
XA60	Reversed shaft, Change of shaft length (With keyway)	S	

∗ The vane type for the shaft through-hole is compatible with single vanes only.
∗ The product with an auto switch is available only for J and Z shafts of XA33, 35, 37 45, 51 and 54.

Combination

XA□ Combination

Symbol	Description	Axial direction		Applicable shaft type							Combination												
		Up	Down	J	K	S	T	X	Y	Z	∗ These are shaft types that can be combined.												
XA31	Shaft-end female thread	●	—	—	—	●	—	—	●	—	**XA31**												
XA32	Shaft-end female thread	—	●	—	—	●	—	—	●	—	●	**XA32**											
XA33	Shaft-end female thread	●	—	●	●	—	●	—	—	—	—	—	**XA33**										
XA34	Shaft-end female thread	—	●	—	●	—	●	—	—	—	—	—	●	**XA34**									
XA35	Shaft-end female thread	●	—	—	—	—	—	●	—	●	—	—	—	—	**XA35**								
XA36	Shaft-end female thread	—	●	●	—	—	—	●	—	●	—	—	J∗	—	X, Z∗	**XA36**							
XA37	Stepped round shaft	●	—	●	●	—	●	—	—	—	—	—	—	K, T∗	—	J∗	**XA37**						
XA38	Stepped round shaft	—	●	—	●	—	—	—	—	—	—	—	K∗	—	—	—	●						
XA39	Shaft through-hole	●	●	—	—	●	—	—	●	—	—	—	—	—	—	—	—	**XA38**					
XA40	Shaft through-hole	●	●	—	●	—	●	—	—	—	—	—	—	—	—	—	—	K∗	**XA39**				
XA41	Shaft through-hole	●	●	●	—	—	—	●	—	●	—	—	—	—	—	—	—	—	●	**XA40**			
XA42	Shaft through-hole + Double shaft-end female threads	●	●	—	—	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	**XA41**		
XA43	Shaft through-hole + Double shaft-end female threads	●	●	—	●	—	●	—	—	—	—	—	—	—	—	—	—	—	Y∗	—	—	**XA45**	
XA44	Shaft through-hole + Double shaft-end female threads	●	●	●	—	—	—	●	—	●	—	—	—	—	—	—	—	—	—	—	—	—	**XA46**
XA45	Middle-cut chamfer	●	—	●	●	—	●	—	—	—	—	—	—	K, T∗	—	J∗	—	K∗	**XA39**	**XA40**	**XA41**	**XA45**	
XA46	Middle-cut chamfer	—	●	—	●	—	—	—	—	—	—	—	K∗	—	—	—	K∗	—	—	—	—	K∗	**XA46**
XA48	Change of long shaft length (With keyway)	●	—	—	—	●	—	—	●	—	—	●	—	—	—	—	—	—	●	—	—	—	—
XA49	Change of short shaft length (With keyway)	—	●	—	—	—	—	—	●	—	Y∗	—	—	—	—	—	—	—	Y∗	—	—	—	—
XA50	Change of double shaft length (Both sides with keyway)	●	●	—	—	—	—	—	●	—	—	—	—	—	—	—	—	—	Y∗	—	—	—	—
XA51	Change of long shaft length (Without keyway)	●	—	●	●	—	●	—	—	—	—	—	—	K, T∗	—	J∗	—	K∗	—	K, T∗	J∗	—	K∗
XA52	Change of short shaft length (Without keyway)	—	●	—	●	—	—	—	—	—	—	—	K∗	—	—	—	—	—	—	K∗	—	K∗	—
XA53	Change of double shaft length (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 sides with four chamfers)	●	●	—	—	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—	Z∗	—	—
XA57	Change of double shaft length (With four chamfers, without keyway)	●	●	●	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	J∗	—	—
XA58	Reversed shaft, Change of double shaft length (With four chamfers, without keyway)	●	●	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	T∗	J∗	—	—
XA59	Reversed shaft, Change of shaft length (With four chamfers)	—	●	—	—	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	X∗	—	—
XA60	Reversed shaft, Change of shaft length (With keyway)	—	●	—	—	●	—	—	—	—	—	—	—	—	—	—	—	—	S∗	—	—	—	—

Combinations of XA39 to XA44 with others are not available.
The vane type for the shaft through-hole is compatible with single vanes only.
A total of two XA□ combinations is available.
Example: XA31A32

XA□, XC□ Combination

Combination other than XA□, such as Made to Order (XC□), is also available.
Refer to pages 26 and 27 for details about made-to-order specifications.

Symbol	Description	Applicable shaft type	XA31 to XA60
		J, K, S, T, X, Y, Z	
XC1	Addition of connection port	●	●
XC4	Change of rotating angle	●	●
XC5	Change of rotating angle	●	●
XC6	Change of rotating angle	●	●
XC7	Reversed shaft	J, S, T, X	—
XC26	Change of rotating angle	●	●
XC27	Change of rotation range and direction	●	●
XC30	Fluorine grease	●	●

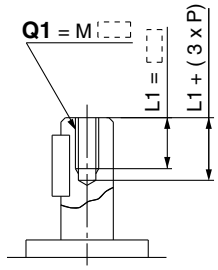
∗ The vane type for the shaft through-hole is compatible with single vanes only.
A total of four XA□ and XC□ combinations is available.
Example: XA31A32C1C30
XA32C1C4C30
∗ The product with an auto switch is available only for J and Z shafts of XA33, 35, 37, 45, 51 and 54.

Axial: Top (Long shaft side)

Symbol: A31

Machine female threads into the long shaft.

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



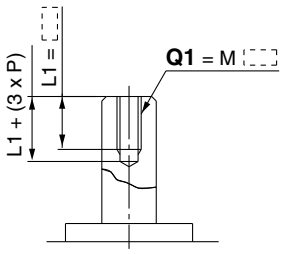
[mm]

Size \ Shaft type	Q1	
	S	Y
50	M3, M4, M5	
63	M4, M5, M6	
80	M4, M5, M6	
100	M5, M6, M8	

Symbol: A33

Machine female threads into the long shaft.

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



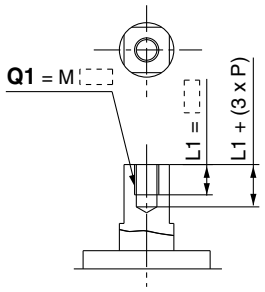
[mm]

Size \ Shaft type	Q1		
	J	K	T
50	M3, M4, M5, M6		
63	M4, M5, M6		
80	M4, M5, M6, M8		
100	M5, M6, M8, M10		

Symbol: A35

Machine female threads into the long shaft.

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



[mm]

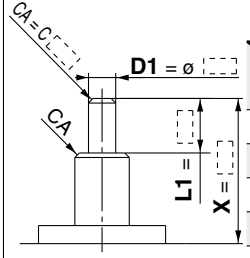
Size \ Shaft type	Q1	
	X	Z
50	M3, M4, M5	
63	M4, M5, M6	
80	M4, M5, M6	
100	M5, M6, M8	

Symbol: A37

The long shaft can be further shortened by machining it into a stepped round shaft.

(If shortening the shaft is not required, indicate "∗" for dimension X.)
(If not specifying dimension CA, indicate "∗" instead.)

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



[mm]

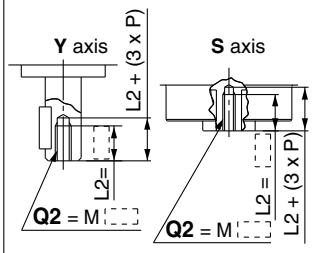
Size \ Shaft type	X			L1 max			D1		
	J	K	T	J	K	T	J	K	T
50	4 to 39.5			X-3			3 to 11.9		
63	4 to 45			X-3			3 to 14.9		
80	4 to 53.5			X-3			3 to 16.9		
100	5 to 65			X-4			3 to 24.9		

Axial: Bottom (Short shaft side)

Symbol: A32

Machine female threads into the short shaft.

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



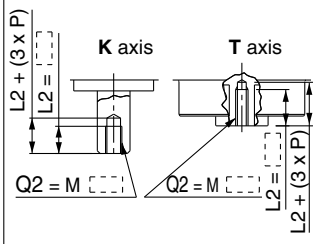
[mm]

Size \ Shaft type	Q2	
	S	Y
50	M3, M4, M5, M6	M3, M4, M5
63	M4, M5, M6	M4, M5, M6
80	M4, M5, M6, M8	M4, M5, M6
100	M5, M6, M8, M10	M5, M6, M8

Symbol: A34

Machine female threads into the short shaft.

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



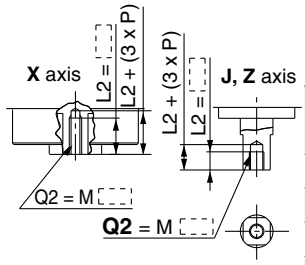
[mm]

Size \ Shaft type	Q2	
	K	T
50	M3, M4, M5, M6	
63	M4, M5, M6	
80	M4, M5, M6, M8	
100	M5, M6, M8, M10	

Symbol: A36

Machine female threads into the short shaft.

- The maximum dimension L2 is, as a rule, twice the thread size.
  (Example) For M3: L2 = 6
- Applicable shaft type: J, X, Z



[mm]

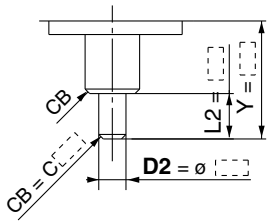
Size \ Shaft type	Q2		
	X	J	Z
50	M3, M4, M5, M6	M3, M4, M5	
63	M4, M5, M6	M4, M5, M6	
80	M4, M5, M6, M8	M4, M5, M6	
100	M5, M6, M8, M10	M5, M6, M8	

Symbol: A38

The short shaft can be further shortened by machining it into a stepped round shaft.

(If shortening the shaft is not required, indicate "∗" for dimension Y.)
(If not specifying dimension CB, indicate "∗" instead.)

- Equal dimensions are indicated by the same marker.
- Applicable shaft type: K



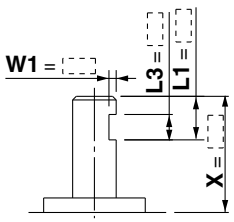
[mm]

Size	Y	L2 max	D2
50	4 to 39.5	Y-3	3 to 11.9
63	4 to 45	Y-3	3 to 14.9
80	4 to 53.5	Y-3	3 to 16.9
100	5 to 65	Y-4	3 to 24.9

Axial: Top (Long shaft side)

Symbol: A45 The long shaft can be further shortened by machining a middle-cut chamfer into it.
(The position of the chamfer is same as the standard one.)

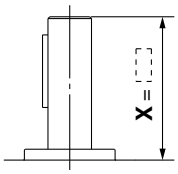
(If shortening the shaft is not required, indicate "∗" for dimension X.)
- Minimum machining dimension is 0.1.
- Applicable shaft type: J, K, T



[mm]

Size	X (J)	X (K)	X (T)	W1 (J)	W1 (K)	W1 (T)	L1 max (J)	L1 max (K)	L1 max (T)	L3 max (J)	L3 max (K)	L3 max (T)
50	11.5 to 39.5			1 to 6			X-3			L1-2		
63	12.5 to 45			1 to 7.5			X-3			L1-2		
80	13.5 to 53.5			1 to 8.5			X-3			L1-2		
100	18.5 to 65			1 to 12.5			X-4			L1-2		

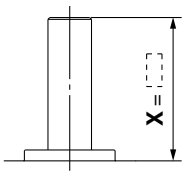
Symbol: A48 Shorten the long shaft.
- Applicable shaft type: S, Y



[mm]

Size	X
50	24.5 to 39.5
63	28 to 45
80	30.5 to 53.5
100	40 to 65

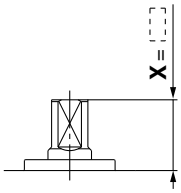
Symbol: A51 Shorten the long shaft.
- Applicable shaft type: J, K, T



[mm]

Size	X
50	4 to 39.5
63	4 to 45
80	4 to 53.5
100	5 to 65

Symbol: A54 Shorten the long shaft.
- Applicable shaft type: X, Z



[mm]

Size	X
50	4 to 19.5
63	4 to 21
80	4 to 23.5
100	5 to 30

⚠ Caution

For the shaft patterns A45 and A46, a middle-cut chamfer may interfere with the center hole if the W1/W2 dimensions and (L1 – L3), (L2 – L4) dimensions are less than what are shown in the table below.

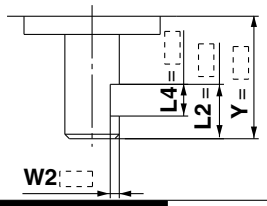
[mm]

Size	W1 W2	L1-L3 L2-L4
50	4.5 to 6	2 to 5.5
63	6 to 7.5	2 to 3
80	6.5 to 8.5	2 to 6.5
100	10.5 to 12.5	2 to 6.5

Axial: Bottom (Short shaft side)

Symbol: A46 The short shaft can be further shortened by machining a middle-cut chamfer into it.
(The position of the chamfer is same as the standard one.)

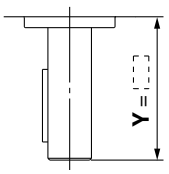
(If shortening the shaft is not required, indicate "∗" for dimension X.)
- Minimum machining dimension is 0.1.
- Applicable shaft type: K



[mm]

Size	Y	W2	L2 max	L4 max
50	11.5 to 39.5	1 to 6	Y-3	L2-2
63	12.5 to 45	1 to 7.5	Y-3	L2-2
80	13.5 to 53.5	1 to 8.5	Y-3	L2-2
100	18.5 to 65	1 to 12.5	Y-4	L2-2

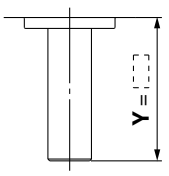
Symbol: A49 Shorten the short shaft.
- Applicable shaft type: Y



[mm]

Size	Y
50	24.5 to 39.5
63	28 to 45
80	30.5 to 53.5
100	40 to 65

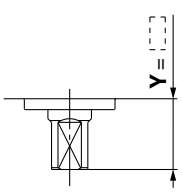
Symbol: A52 Shorten the long shaft.
- Applicable shaft type: K



[mm]

Size	Y
50	4 to 39.5
63	4 to 45
80	4 to 53.5
100	5 to 65

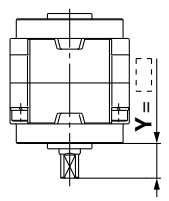
Symbol: A55 Shorten the short shaft.
- Applicable shaft type: J, Z



[mm]

Size	Y
50	4 to 19.5
63	4 to 21
80	4 to 23.5
100	5 to 30

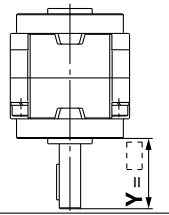
Symbol: A59 Reverse the assembly of the shaft, and shorten the long shaft.
- Applicable shaft type: X



[mm]

Size	Y
50	4 to 19.5
63	4 to 21
80	4 to 23.5
100	5 to 30

Symbol: A60 Reverse the assembly of the shaft, and shorten the long shaft.
- Applicable shaft type: S



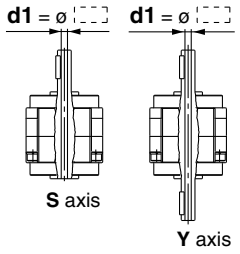
[mm]

Size	Y
50	24.5 to 39.5
63	28 to 45
80	30.5 to 53.5
100	40 to 65

Double Shaft

Symbol: A39
Applicable to single vane type only

Shaft with through-hole
- Minimum machining diameter for d1 is 0.1.
- Applicable shaft type: S, Y

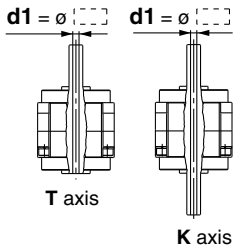


[mm]

Size \ Shaft type	d1 S	d1 Y
50	ø4 to ø5	
63	ø4 to ø6	
80	ø4 to ø6.5	
100	ø5 to ø8	

Symbol: A40
Applicable to single vane type only

Shaft with through-hole
- Minimum machining diameter for d1 is 0.1.
- Applicable shaft type: K, T

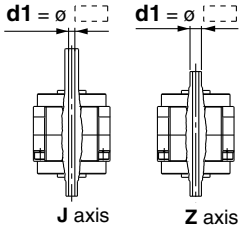


[mm]

Size \ Shaft type	d1 K	d1 T
50	ø4 to ø 5.5	
63	ø4 to ø 6	
80	ø4 to ø 7.5	
100	ø5 to ø10	

Symbol: A41
Applicable to single vane type only

Shaft with through-hole
- Minimum machining diameter for d1 is 0.1.
- Applicable shaft type: J, X, Z

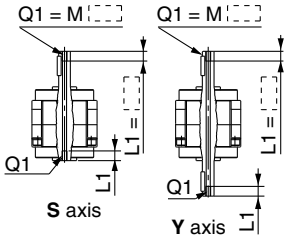


[mm]

Size \ Shaft type	d1 J	d1 X	d1 Z
50	ø4 to ø5		
63	ø4 to ø6		
80	ø4 to ø6.5		
100	ø5 to ø8		

Symbol: A42
Applicable to single vane type only

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.
- Applicable shaft type: S, Y • Equal dimensions are indicated by the same marker.

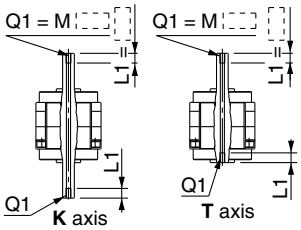


[mm]

Size	50		63		80		100	
Shaft type / Thread	S	Y	S	Y	S	Y	S	Y
M5 x 0.8	ø4.2		ø4.2		ø4.2		ø4.2	
M6 x 1	—		ø5		ø5		ø5	
M8 x 1.25	—		—		—		ø6.8	

Symbol: A43
Applicable to single vane type only

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

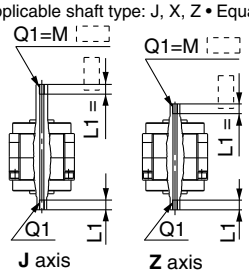


[mm]

Size	50		63		80		100	
Shaft type / Thread	K	T	K	T	K	T	K	T
M5 x 0.8	ø4.2		ø4.2		ø4.2		ø4.2	
M6 x 1	ø5		ø5		ø5		ø5	
M8 x 1.25	—		—		ø6.8		ø6.8	
M10 x 1.5	—		—		—		ø8.6	

Symbol: A44
Applicable to single vane type only

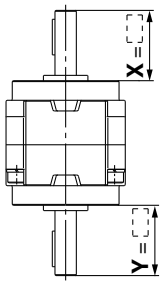
A special end is machined onto both the long and short shafts, and a through-hole is drilled into both shafts. Female threads are machined into the through-holes, whose diameter is equivalent to the diameter of the pilot holes.
- The maximum dimension L1 is, as a rule, twice the thread size.
- Applicable shaft type: J, X, Z • Equal dimensions are indicated by the same marker.



[mm]

Size	50			63			80			100		
Shaft type / Thread	J	X	Z	J	X	Z	J	X	Z	J	X	Z
M5 x 0.8	ø4.2			ø4.2			ø4.2			ø4.2		
M6 x 1	—			ø5			ø5			ø5		
M8 x 1.25	—			—			—			ø6.8		

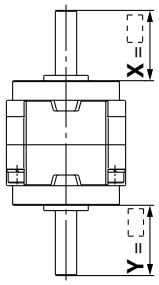
Symbol: A50
Shorten both long and short shafts.
- Applicable shaft type: Y



[mm]

Size	X	Y
50	24.5 to 39.5	24.5 to 39.5
63	28 to 45	28 to 45
80	30.5 to 53.5	30.5 to 53.5
100	40 to 65	40 to 65

Symbol: A53
Shorten both long and short shafts.
- Applicable shaft type: K



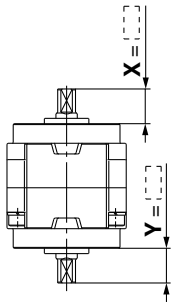
[mm]

Size	X	Y
50	4 to 39.5	4 to 39.5
63	4 to 45	4 to 45
80	4 to 53.5	4 to 53.5
100	5 to 65	5 to 65

Double Shaft

Symbol: A56 Shorten both long and short shafts.

• Applicable shaft type: Z

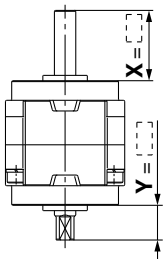


[mm]

Size	X	Y
50	4 to 19.5	4 to 19.5
63	4 to 21	4 to 21
80	4 to 23.5	4 to 23.5
100	5 to 30	5 to 30

Symbol: A57 Shorten both long and short shafts.

• Applicable shaft type: J



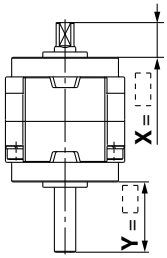
[mm]

Size	X	Y
50	4 to 39.5	4 to 19.5
63	4 to 45	4 to 21
80	4 to 53.5	4 to 23.5
100	5 to 65	5 to 30

Symbol: A58 The rotation axis is reversed.
The long shaft and short shaft are shortened.

(If shortening the shaft is not required, indicate "∗" for dimension X, Y.)

• Applicable shaft type: J, T

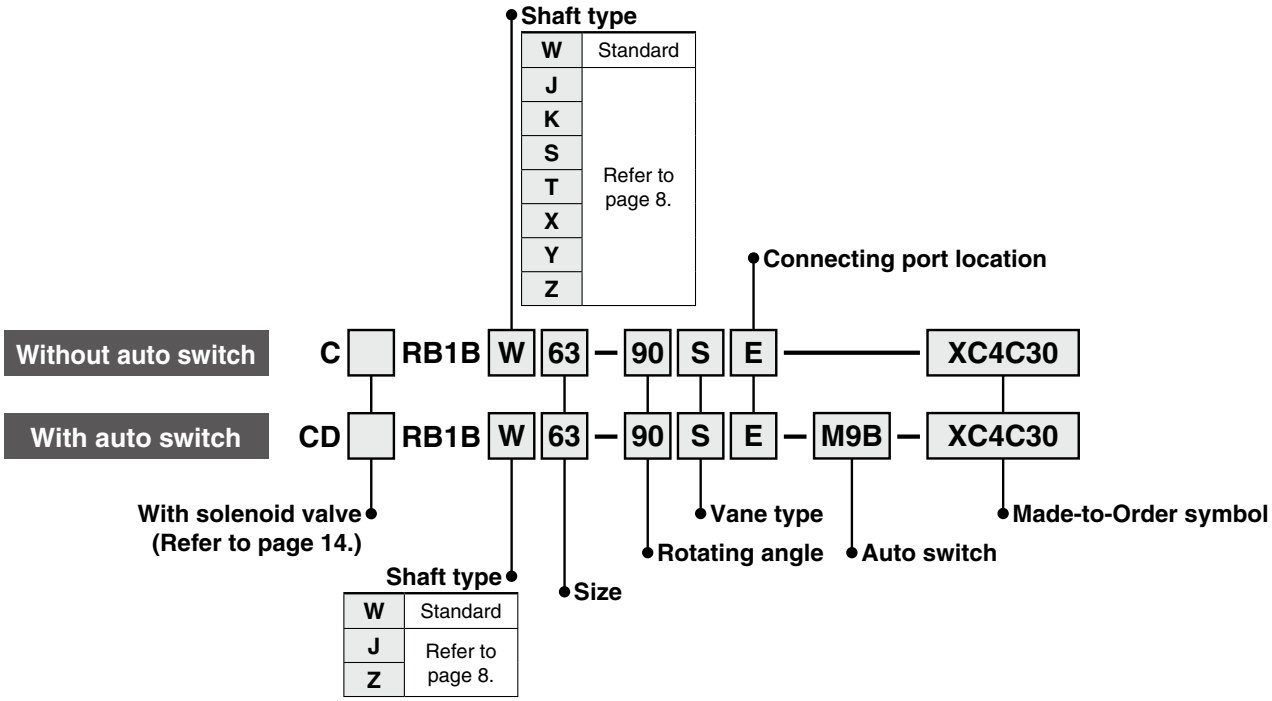


[mm]

Size	X	Y
50	4 to 19.5	4 to 39.5
63	4 to 21	4 to 45
80	4 to 23.5	4 to 53.5
100	5 to 30	5 to 65

Series CRB1 (Size: 50, 63, 80, 100)
Made to Order
XC1, 4, 5, 6, 7, 26, 27, 30

How to Order



Made-to-Order Symbol

Symbol	Description	Applicable shaft type W, J, K, S, T, X, Y, Z	Size
XC1	Addition of connection port	●	50, 63, 80, 100
XC4	Change of rotating angle	●	
XC5	Change of rotating angle	●	
XC6	Change of rotating angle	●	
XC7*	Reversed shaft	●	
XC26	Change of rotating angle	●	
XC27	Change of rotation range and direction	●	
XC30	Fluorine grease	●	

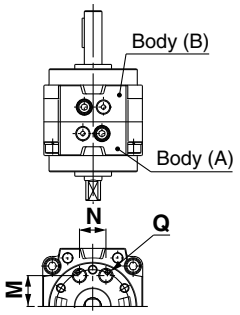
* This specification is not available for rotary actuators with auto switch unit.

Combination

Symbol	Combination XC1	Combination XC30
XC1	—	●
XC4	●	●
XC5	●	●
XC6	●	●
XC7	●	●
XC26	●	●
XC27	●	●
XC30	●	—

Symbol: C1

Add connection ports on Body (A).
(An additionally machined port will have an aluminum surface since it will be left unfinished.)

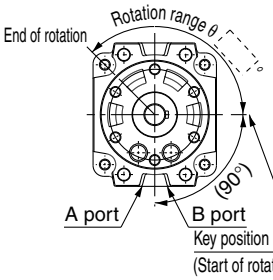


[mm]

Size	Q	M	N
50	Rc1/8	21	18
63	Rc1/8	27	25
80	Rc1/4	29	30
100	Rc1/4	38	38

Symbol: C4

Change of rotating angle. (Applicable to single vane type only)
Start of rotation is horizontal line (90° down from the top to the right side).

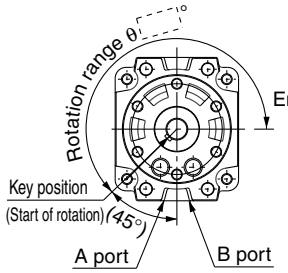


[mm]

Size	Rotation range θ
50	$45^{\circ}{}^{+8^{\circ}}_{0}$, $90^{\circ}{}^{+8^{\circ}}_{0}$, $135^{\circ}{}^{+6^{\circ}}_{0}$
63	
80	
100	

Start of rotation is the position of the key when A port is pressurized.
(Top view from long shaft side)

Symbol: C5 Change of rotating angle. (Applicable to single vane type only) Start of rotation is 45° up from the bottom of the vertical line to the left side.

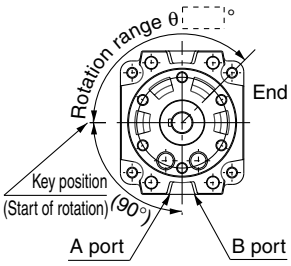


[mm]

Size	Rotation range θ
50	$45^{\circ}{}^{+8^{\circ}}_{0}$, $90^{\circ}{}^{+6^{\circ}}_{0}$, $135^{\circ}{}^{+6^{\circ}}_{0}$
63	
80	$180^{\circ}{}^{+4^{\circ}}_{0}$, $225^{\circ}{}^{+4^{\circ}}_{0}$
100	

Start of rotation is the position of the key when B port is pressurized.
(Top view from long shaft side)

Symbol: C6 Change of rotating angle. (Applicable to single vane type only) Start of rotation is horizontal line (90° down from the top to the left side).

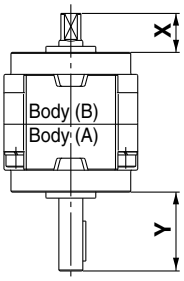


[mm]

Size	Rotation range θ
50	$45^{\circ}{}^{+8^{\circ}}_{0}$, $90^{\circ}{}^{+8^{\circ}}_{0}$, $135^{\circ}{}^{+6^{\circ}}_{0}$
63	
80	
100	

Start of rotation is the position of the key when B port is pressurized.
(Top view from long shaft side)

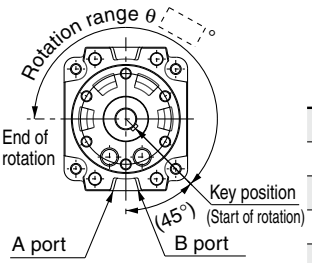
Symbol: C7 The shafts are reversed.



[mm]

Size	Y	X
50	39.5	19.5
63	45	21
80	53.5	23.5
100	56	30

Symbol: C26 Change of rotating angle. (Applicable to single vane type only) Start of rotation is 45° up from the bottom of the vertical line to the right side.

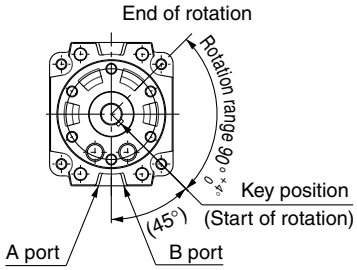


[mm]

Size	Rotation range θ
50	
63	$45^{\circ}{}^{+8^{\circ}}_{0}$, $90^{\circ}{}^{+6^{\circ}}_{0}$, $135^{\circ}{}^{+6^{\circ}}_{0}$
80	$180^{\circ}{}^{+4^{\circ}}_{0}$, $225^{\circ}{}^{+4^{\circ}}_{0}$
100	

Start of rotation is the position of the key when A port is pressurized.
(Top view from long shaft side)

Symbol: C27 Change of rotating angle. (Applicable to double vane type only) Rotating angle 90° Start of rotation is 45° up from the bottom of the vertical line of the right side.



Start of rotation is the position of the key when A port is pressurized.
(Top view from long shaft side)

Symbol: C30 Change the standard grease to fluorine grease.
(Not for low-speed specification.)

Auto Switch Mounting

Auto Switch Unit and Switch Block Unit

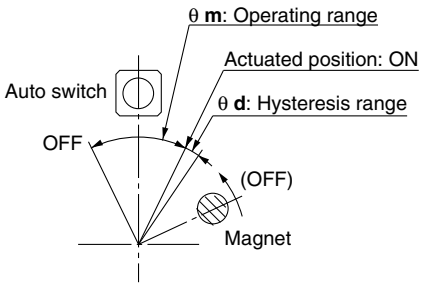
Unit Part Number

Size	For D-M9□		For D-S/T79□, D-R73/80□		
	Auto switch unit part number*1	Switch block unit part number	Auto switch unit part number*1	Switch block unit part number*2	
		Common to right-hand and left-hand		For right-hand	For left-hand
50	P411020-1M	P811010-8M	P411020-1	P411020-8	P411020-9
63	P411030-1M		P411030-1	P411040-8	P411040-9
80	P411040-1M		P411040-1		
100	P411050-1M		P411050-1		

*1 An auto switch will not be included, please order it separately.
*2 Auto switch unit comes with one right-hand and one left-hand switch blocks that are used for addition or when the switch block is damaged.

Operating Range and Hysteresis

* **Operating range**: θ **m**
  The range between the position where the auto switch turns ON as the magnet inside the auto switch unit moves and the position where the auto switch turns OFF as the magnet travels the same direction.
* **Hysteresis range**: θ **d**
  The range between the position where the auto switch turns ON as the magnet inside the auto switch unit moves and the position where the auto switch turns OFF as the magnet travels the opposite direction.



D-M9□

Size	θ **m**: Operating range	θ **d**: Hysteresis range
50	86°	10°
63, 80, 100	70°	10°

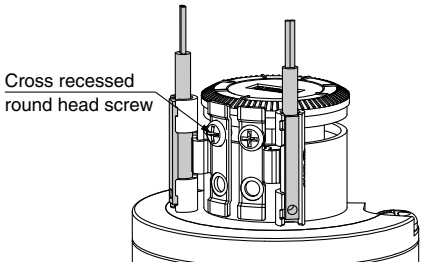
D-S/T79□, D-R73/80□

Size	θ **m**: Operating range	θ **d**: Hysteresis range
50	52°	8°
63, 80, 100	38°	7°

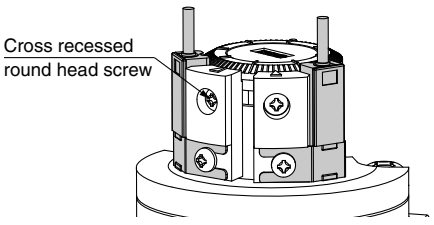
Note) Since the figures in the above table are provided as a guideline only, they cannot be guaranteed. Adjust the auto switch after confirming the operating conditions in the actual setting.

How to Change the Auto Switch Detecting Position

* When setting the detecting position, loosen the cross recessed round head screw a bit and move the auto switch to the preferred position and then tighten again and fix it. At this time, if tightened too much, screw can become damaged and unable to fix position. Proper tightening torque: 0.4 to 0.6 [N·m]
  When tightening the cross recessed round head screw, take care that the auto switch does not tilt.



D-M9□
Size: 50 to 100

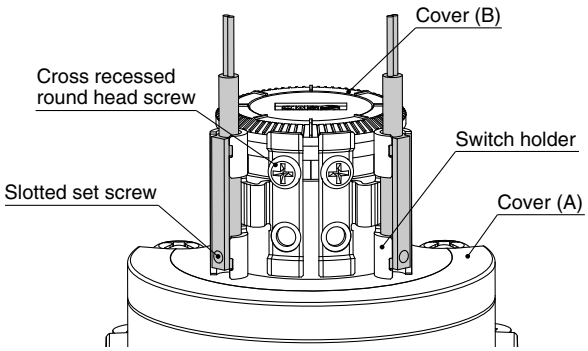


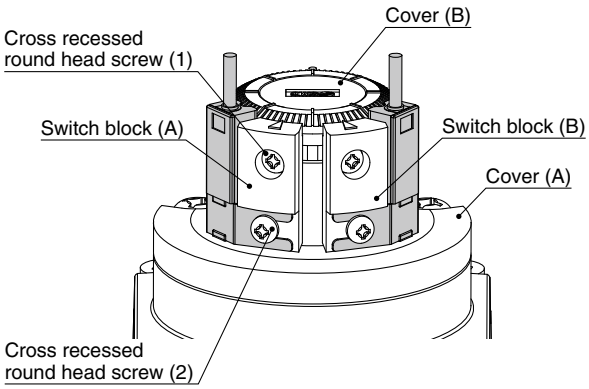
D-S/T79□
D-R73/R80□
Size: 50 to 100

Auto Switch Mounting

External view and descriptions of auto switch unit

The following shows the external view and typical descriptions of the auto switch unit.



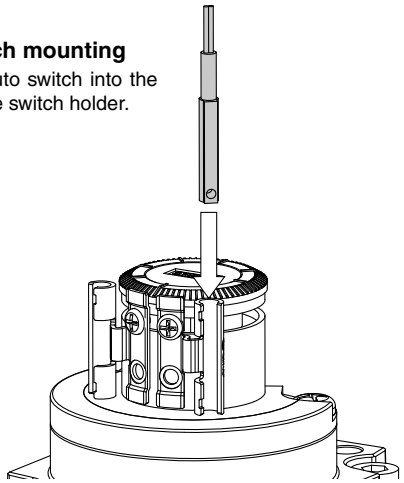


Mounting Procedure

<Applicable auto switch>
Solid state auto switch
D-M9□

1. Auto switch mounting

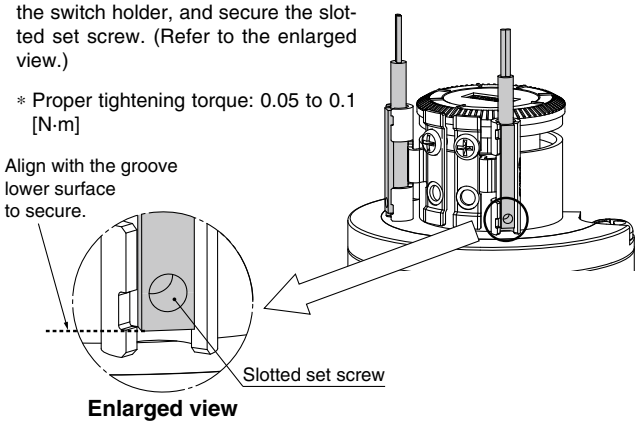
Insert the auto switch into the groove of the switch holder.



2. Auto switch securing

Align the auto switch with the lower surface of the groove on the side of the switch holder, and secure the slotted set screw. (Refer to the enlarged view.)

∗ Proper tightening torque: 0.05 to 0.1 [N·m]



Enlarged view

3. Switch holder securing

After the actuated position has been adjusted with the cross recessed round head screw, use the auto switch.

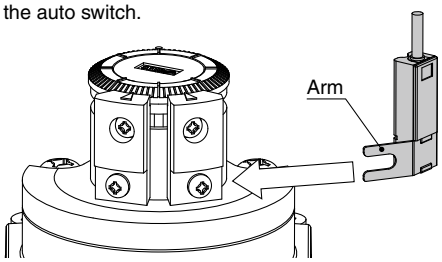
∗ When tightening the screw, take care that the auto switch does not tilt.

Mounting Procedure

<Applicable auto switch>
Solid state auto switch
D-S79, S7P
D-T79, T79C
Reed auto switch
D-R73/R73C (With indicator light)
D-R80/R80C (Without indicator light)

1. Auto switch mounting

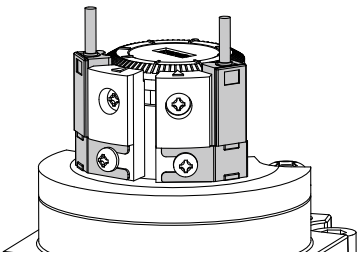
Loosen the cross recessed round head screw (2), and insert the arm of the auto switch.



2. Auto switch securing

Set the auto switch so that it is in contact with the switch block, and tighten the cross recessed round head screw (2).

∗ Proper tightening torque: 0.4 to 0.6 [N·m]



3. Switch holder securing

After the actuated position has been adjusted with the cross recessed round head screw (1), use the auto switch.

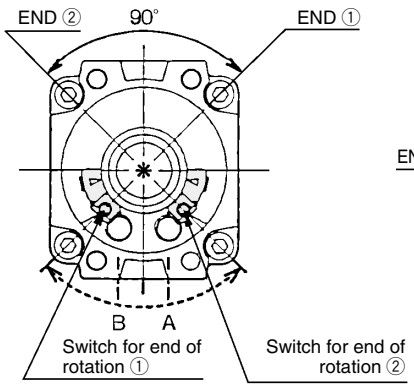
∗ Proper tightening torque: 0.4 to 0.6 [N·m]

Auto Switch Adjustment

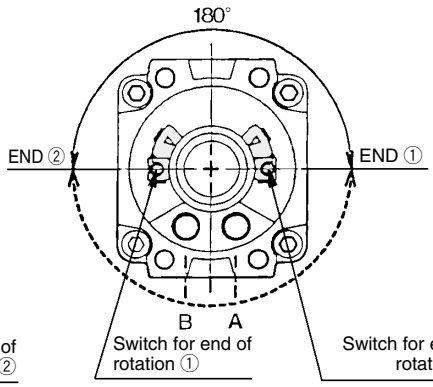
Rotation range of the output shaft key (keyway) and auto switch mounting position
<Applicable models / Size: 50, 63, 80, 100>

<Single vane>

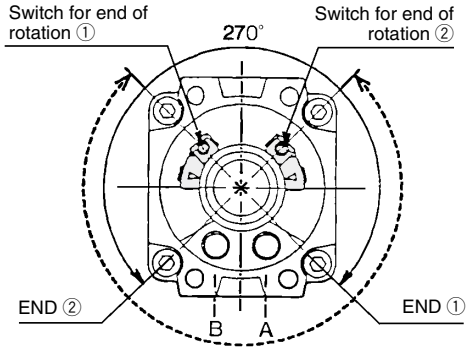
Rotating angle: **90°**



Rotating angle: **180°**

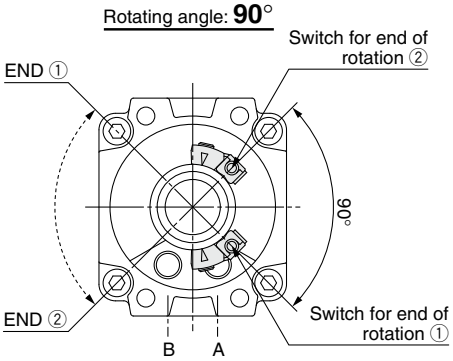


Rotating angle: **270°**

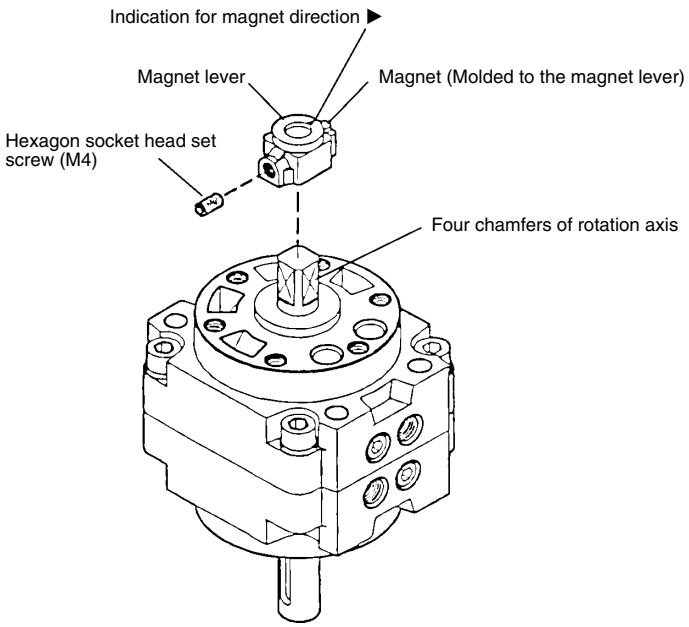


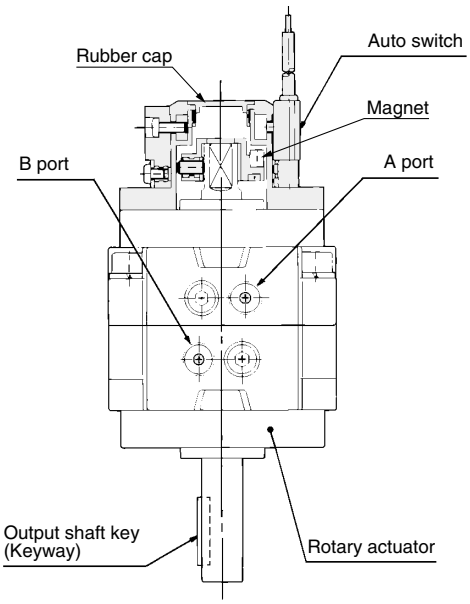
<Double vane>

Rotating angle: **90°**



* Solid-lined curves indicate the rotation range of the output key (keyway). When the key is pointing to end of rotation ① the switch for end of rotation ① will operate, and when the key is pointing to end of rotation ②, the switch for end of rotation ② will operate.
* Broken-lined curves indicate the rotation range of the built-in magnet. Rotation range of the switch can be decreased by either moving the switch for end of rotation ② clockwise or moving the switch for end of rotation ② counterclockwise. Auto switch in the figures above is at the most sensitive position.
* Each auto switch unit comes with one right-hand and one left-hand switch.
* The magnet position can be checked with a convenient ▶ indication by removing a rubber cap when adjusting the auto switch position.
* For standard products, a magnet is mounted on the opposite side of the output shaft key.
* Since four chamfers are machined into the axis of rotation, a magnet position can be readjusted at 90° intervals.





⚠ Safety Instructions

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

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

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

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

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

⚠ Warning

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

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

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

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

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

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

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

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

⚠ Caution

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

The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

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

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

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

⚠ Caution

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

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