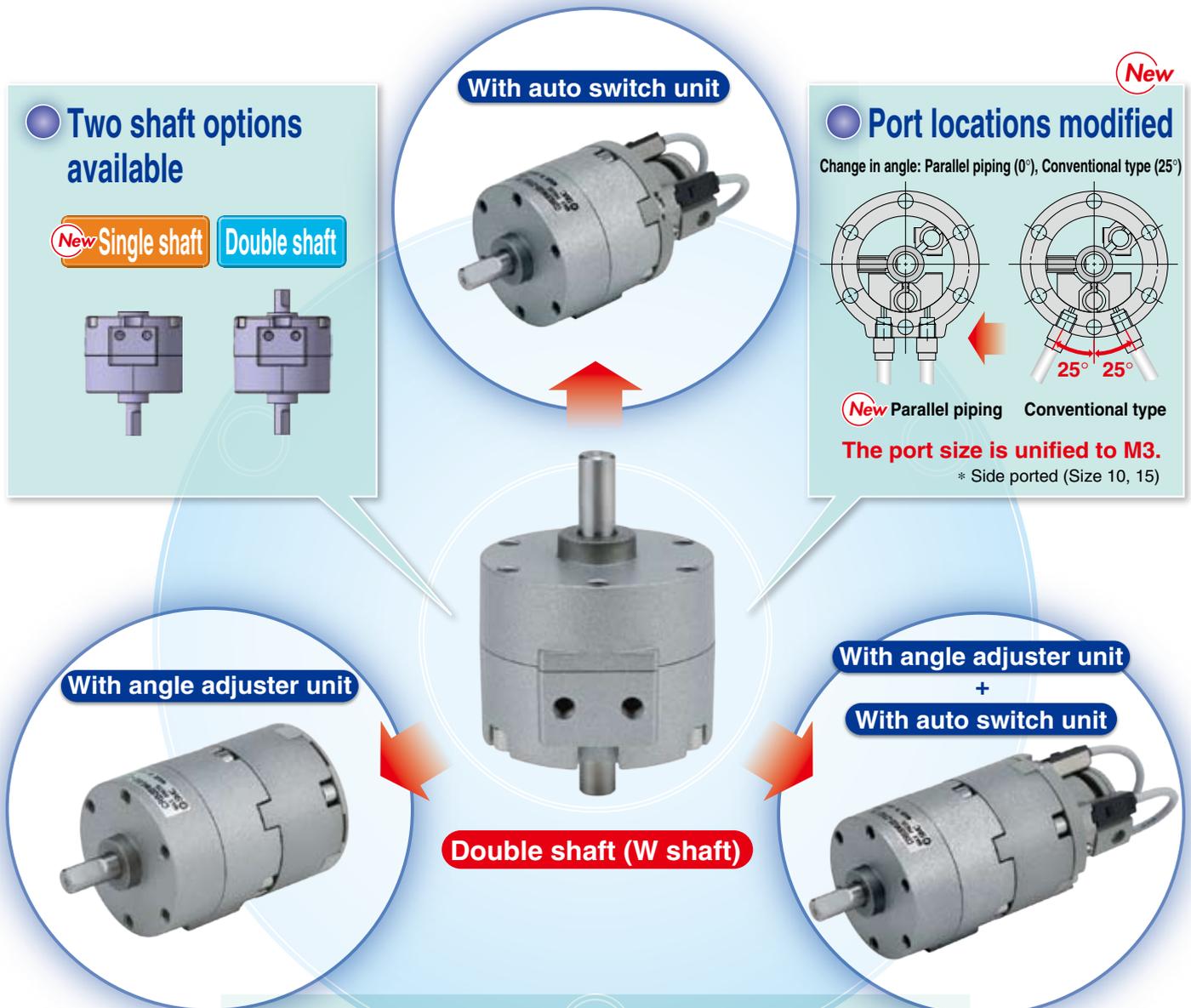


Rotary Actuator

Vane Type 10, 15, 20, 30, 40

New
RoHS

Many combinations available!



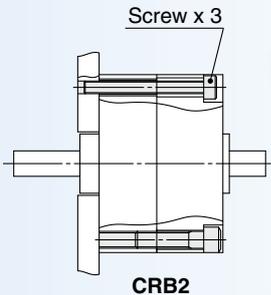
Rotating angle: 90°, 180°, 270°
All series can rotate up to 270°.
 The use of specially designed seals and stoppers now enables our compact vane type rotary actuators to rotate up to 270°. (Single vane type)

Rotating angle	Rotating angle adjustment range
270°	0 to 230° (Size 10, 40) 0 to 240° (Size 15 to 30)
180°	0 to 175°
90°	0 to 85°

Series CRB2



Series CRB2

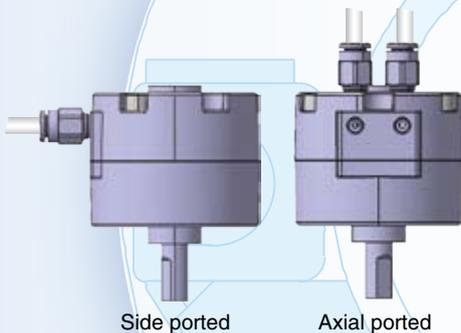


Direct mounting

The rotary actuator body can be mounted directly.
* Not possible for size 10 to 40 with unit(s).

The mounting position of the auto switch can be set freely.

The switch can be fixed in the desired position in the circumferential direction.



Connecting port location: Side ported or Axial ported

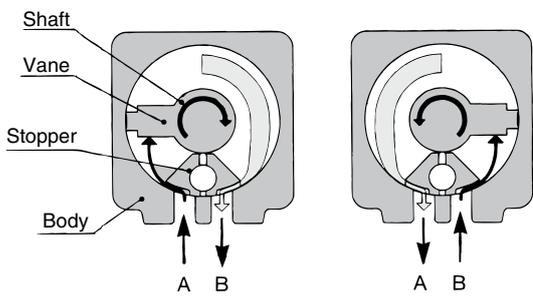
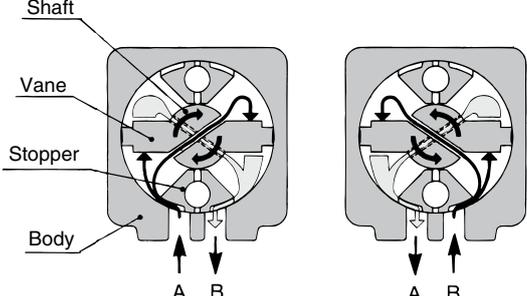
The port location can be selected according to the application.
(Size 10 to 40 with unit(s) are side ported only.)

Double vane type is standardized for 90° and 100°.

The outside dimensions of the double vane type are equivalent to those of the single vane type (except size 10). Double vane construction can get twice the torque of the single vane type.

Series	Vane type	Rotating angle	Size				
			10	15	20	30	40
Basic type CRB2	Single	90°	●	●	●	●	●
		100°					
		180°	●	●	●	●	●
		270°	●	●	●	●	●
With angle adjuster CRB2BWU	Double	90°	●	●	●	●	●
		100°	●	●	●	●	●
		180°					
		270°					

Vane Type

Series	Single vane (S)	Double vane (D)
CRB2	 <ol style="list-style-type: none"> 1. It consists of a shaft that is integrated with the vane that slides along the inner surface of the body, and a stopper. 2. The air that is supplied from port A pushes the vane, thus creating torque in the shaft. 3. The air in the exhaust chamber discharges via port B and rotates clockwise. 4. The vane stops as it comes in contact with the stopper. 5. Similarly, when air is supplied from port B, it rotates counterclockwise. 	 <ol style="list-style-type: none"> 1. It consists of a shaft that is integrated with the 2 vanes that slide along the inner surface and 2 stoppers. 2. The air that is supplied from port A passes through the passage in the shaft in order to also supply air to the other chamber. Thus, the air pushes 2 vanes and creates torque in the shaft. 3. Its movement consists of the same rotation as that of the single vane.

How to Mount Loads

How to connect a load directly to a single flat shaft

To secure the load, select a screw of an appropriate size from those listed in tables (1) and (2) by taking the shaft's single flat bearing stress strength into consideration.

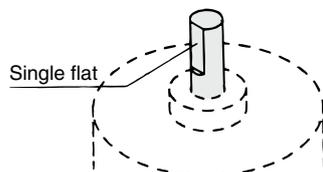


Table (1) Using Screw Directly (Fig. 1)

Series	Size	Shaft bore size	Screw
CRB2	10	4	M4 or larger
	15	5	M5 or larger
	20	6	
	30	8	M6 or larger

Table (2) Using Holding Block (Fig. 2)

Series	Size	Shaft bore size	Screw	Plate thickness (t)
CRB2	10	4	M3 or larger	2 or wider
	15	5		2.3 or wider
	20	6	M4 or larger	3.6 or wider
	30	8	M5 or larger	4 or wider

The plate thickness (t) in the table above indicates a reference value when a carbon steel is used. Besides, we do not manufacture a holding block.

Fig. 1

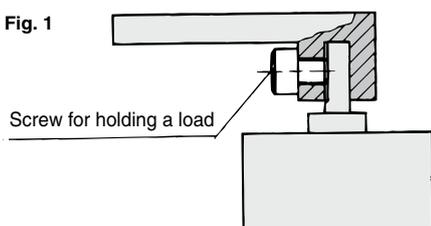
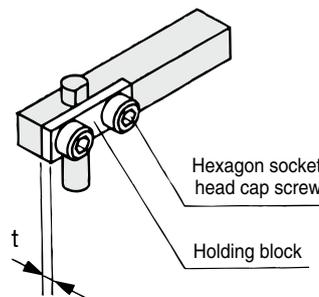
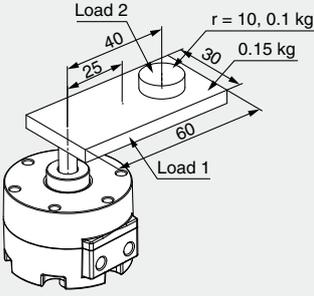


Fig. 2



Model Selection

Selection Procedures	Note	Selection Example
◆ Operating conditions		
Operating conditions are as follows: <ul style="list-style-type: none"> • Tentative model • Operating pressure (MPa) • Mounting orientation • Load type <ul style="list-style-type: none"> • Static load • Resistance load • Inertial load • Load dimensions (m) • Load mass (kg) • Rotation time (s) • Rotating angle (rad) 	<ul style="list-style-type: none"> • The unit for the rotating angle is radian. $180^\circ = \pi \text{rad}$ $90^\circ = \pi/2 \text{rad}$ 	 <p>Tentative model: CRB2BS30-180SZ Operating pressure: 0.4 MPa Mounting orientation: Vertical Load type: Inertial load Rotation time: 0.6 s Rotating angle: πrad (180°)</p>
1 Calculation of Moment of Inertia		
Calculate the inertial moment of load.	<ul style="list-style-type: none"> • Loads are generated from multiple parts. The inertial moment of each load is calculated, and then totaled. 	Inertial moment of load 1: I_1 $I_1 = 0.15 \times \frac{0.06^2 + 0.03^2}{12} + 0.15 \times 0.025^2 = 0.00015$ Inertial moment of load 2: I_2 $I_2 = 0.1 \times \frac{0.01^2}{2} + 0.1 \times 0.04^2 = 0.000165$ Total inertial moment: I $I = I_1 + I_2 = 0.000315 \text{ [kg}\cdot\text{m}^2\text{]}$
2 Calculation of Required Torque		
Calculate the required torque for each load type and confirm that the values fall in the effective torque range. <ul style="list-style-type: none"> • Static load (T_s) Required torque: $T = T_s$ • Resistance load (T_f) Required torque: $T = T_f \times (3 \text{ to } 5)$ • Inertial load (T_a) Required torque: $T = T_a \times 10$ 	<ul style="list-style-type: none"> • When the resistance load is rotated, the required torque calculated from the inertial load must be added. Required torque $T = T_f \times (3 \text{ to } 5) + T_a \times 10$ 	Inertial load: T_a $T_a = I \cdot \dot{\omega}$ $\dot{\omega} = \frac{2\theta}{t^2} \text{ [rad/s}^2\text{]}$ Required torque: T $T = T_a \times 10$ $= 0.000315 \times \frac{2 \times \pi}{0.6^2} \times 10 = 0.055 \text{ [N}\cdot\text{m]}$ $0.055 \text{ Nm} < \text{Effective torque OK}$
3 Confirmation of Rotation Time		
Confirm that the time falls in the rotation time adjustment range.	<ul style="list-style-type: none"> • Consider the time after converted in the time per 90°. $(0.6 \text{ s}/180^\circ \text{ is converted to } 0.3 \text{ s}/90^\circ)$ 	$0.04 \leq t \leq 0.3$ $t = 0.3 \text{ s}/90^\circ \text{ OK}$
4 Calculation of Kinetic Energy		
Calculate the kinetic energy of the load and confirm that the energy is within the allowable range.	<ul style="list-style-type: none"> • If the energy exceeds the allowable range, a suitable cushioning mechanism such as a shock absorber must be externally installed. 	Kinetic energy: E $E = \frac{1}{2} \cdot I \cdot \omega^2$ $\omega = \frac{2 \cdot \theta}{t}$ $E = \frac{1}{2} \times 0.000315 \times \left(\frac{2 \times \pi}{0.6} \right)^2 = 0.01725 \text{ [J]}$ $0.01725 \text{ [J]} < \text{Allowable energy OK}$
5 Confirmation of Allowable Load		
Confirm that the load applied to the product is within the allowable range.	<ul style="list-style-type: none"> • If the load exceeds the allowable range, a bearing or similar must be externally installed. 	Thrust load: M $0.15 \times 9.8 + 0.1 \times 9.8$ $= 2.45 \text{ [N]}$ $2.45 \text{ [N]} < \text{Allowable thrust load OK}$
6 Calculation of Air Consumption and Required Air Flow Capacity		
Air consumption and required air flow capacity are calculated when necessary.		

Refer to the Model Selection Software (Pneumatic Model Selection Program Ver.4.0) on the SMC website (<http://www.smcworld.com>) for details.

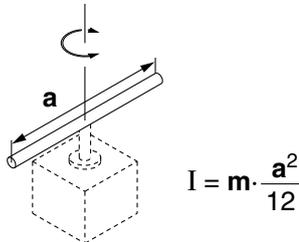
1 Calculation of Moment of Inertia

1-1 Equation Table of Moment of Inertia

I: Moment of inertia m: Load mass

1. Thin shaft

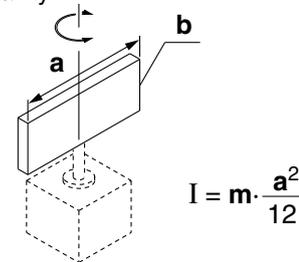
Position of rotational axis: Perpendicular to the shaft through the center of gravity



$$I = m \cdot \frac{a^2}{12}$$

2. Thin rectangular plate

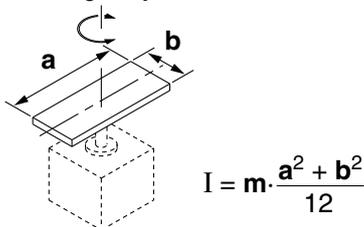
Position of rotational axis: Parallel to side b and through the center of gravity



$$I = m \cdot \frac{a^2}{12}$$

3. Thin rectangular plate (Including rectangular parallelepiped)

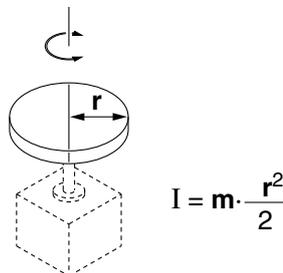
Position of rotational axis: Perpendicular to the plate through the center of gravity



$$I = m \cdot \frac{a^2 + b^2}{12}$$

4. Round plate (Including column)

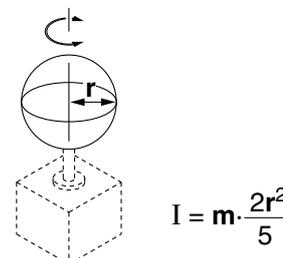
Position of rotational axis: Through the center axis



$$I = m \cdot \frac{r^2}{2}$$

5. Solid sphere

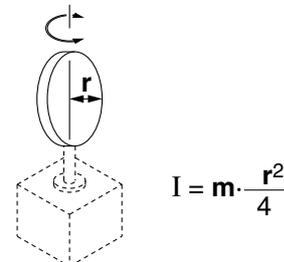
Position of rotational axis: Through the center of diameter



$$I = m \cdot \frac{2r^2}{5}$$

6. Thin round plate

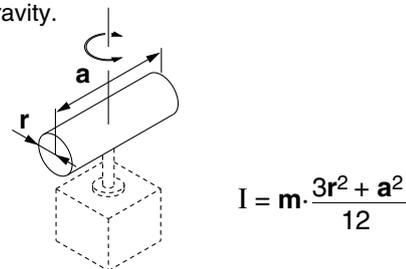
Position of rotational axis: Through the center of diameter



$$I = m \cdot \frac{r^2}{4}$$

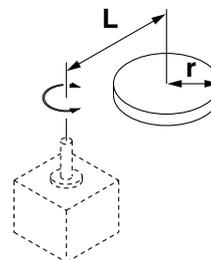
7. Cylinder

Position of rotational axis: Through the center of diameter and gravity.



$$I = m \cdot \frac{3r^2 + a^2}{12}$$

8. When the rotational axis and load center of gravity are not consistent

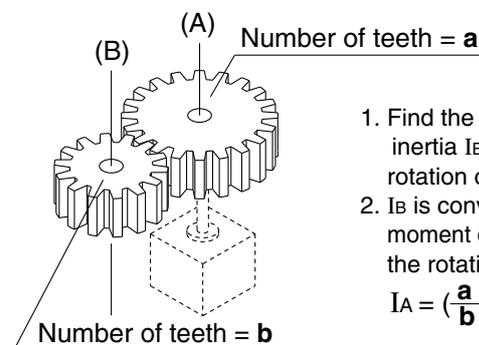


$$I = K + m \cdot L^2$$

K: Moment of inertia around the load center of gravity

4. Round plate $K = m \cdot \frac{r^2}{2}$

9. Gear transmission

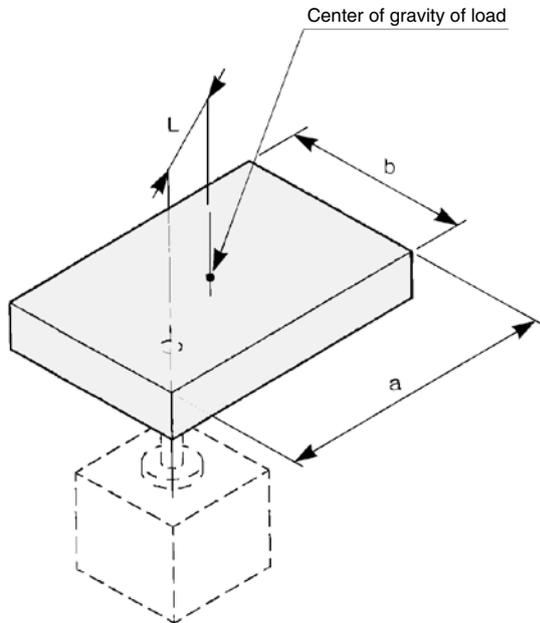


1. Find the moment of inertia I_B around the rotation of shaft (B).
2. I_B is converted to the moment of inertia I_A around the rotation of shaft (A).

$$I_A = \left(\frac{a}{b}\right)^2 \cdot I_B$$

1-2 Calculation Example of Moment of Inertia

1 If the shaft is located at a desired point of the load:



Example) 1. If the load is the thin rectangular plate:
Obtain the center of gravity of load as I_1 , a provisional shaft.

$$I_1 = m \cdot \frac{a^2 + b^2}{12}$$

2. Obtain the actual moment of inertia I_2 around the shaft, with the premise that the mass of the load itself is concentrated in the load's center of gravity point.

$$I_2 = m \cdot L^2$$

3. Obtain the actual moment of inertia I .

$$I = I_1 + I_2$$

(m : Mass of load
 L : Distance from the shaft to the center of gravity of load)

Calculation Example

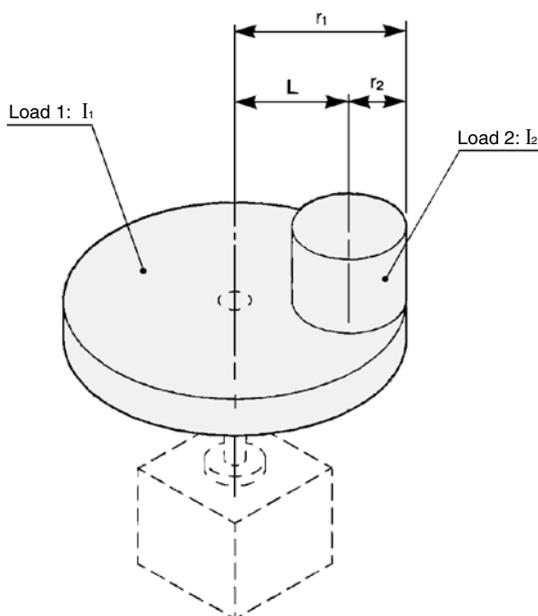
$a = 0.2 \text{ m}$, $b = 0.1 \text{ m}$, $L = 0.05 \text{ m}$, $m = 1.5 \text{ kg}$

$$I_1 = 1.5 \times \frac{0.2^2 + 0.1^2}{12} = 6.25 \times 10^{-3} \quad \text{kg} \cdot \text{m}^2$$

$$I_2 = 1.5 \times 0.05^2 = 3.75 \times 10^{-3} \quad \text{kg} \cdot \text{m}^2$$

$$I = (6.25 + 3.75) \times 10^{-3} = 0.01 \quad \text{kg} \cdot \text{m}^2$$

2 If the load is divided into multiple loads:



Example) 1. If the load is divided into the 2 cylinders:
{ The center of gravity of load 1 matches the shaft.
{ The center of gravity of load 2 differs from the shaft. }
Obtain the moment of inertia of load 1:

$$I_1 = m_1 \cdot \frac{r_1^2}{2}$$

2. Obtain the moment of inertia of load 2.

$$I_2 = m_2 \cdot \frac{r_2^2}{2} + m_2 \cdot L^2$$

3. Obtain the actual moment of inertia I .

$$I = I_1 + I_2$$

(m_1, m_2 : Mass of load 1 and 2
 r_1, r_2 : Radius of load 1 and 2
 L : Distance from the shaft to the center of gravity of load 2)

Calculation Example

$m_1 = 2.5 \text{ kg}$, $m_2 = 0.5 \text{ kg}$, $r_1 = 0.1 \text{ m}$, $r_2 = 0.02 \text{ m}$, $L = 0.08 \text{ m}$

$$I_1 = 2.5 \times \frac{0.1^2}{2} = 1.25 \times 10^{-2} \quad \text{kg} \cdot \text{m}^2$$

$$I_2 = 0.5 \times \frac{0.02^2}{2} + 0.5 \times 0.08^2 = 0.33 \times 10^{-2} \quad \text{kg} \cdot \text{m}^2$$

$$I = (1.25 + 0.33) \times 10^{-2} = 1.58 \times 10^{-2} \quad \text{kg} \cdot \text{m}^2$$

Rotary Actuator/Vane Type

Series *CRB2*

Size: 10, 15, 20, 30, 40

Basic type
Series *CRB2*



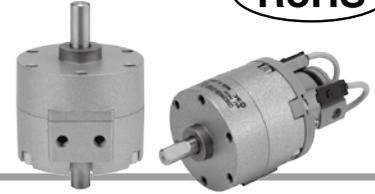
With angle adjuster
Series *CRB2BWU*



		Fluid		Air																	
		Size		10				15				20, 30				40					
		Vane type		S		D		S		D		S		D		S		D			
Port location		Side ported (Nil) Axial ported (E)		Side ported	Axial ported																
Standard	Rotating angle	90°		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
		100°				●	●			●	●			●	●			●	●		
		180°		●	●			●	●			●	●			●	●			●	●
		270°		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Shaft type	Single shaft		S		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Double shaft		W		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Cushion	Rubber bumper				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Variations	With auto switch (W shaft)				●	●			●	●			●	●			●	●			
	With angle adjuster (W shaft)				●	●			●	●			●	●			●	●			
	With auto switch and angle adjuster (W shaft)				●	●			●	●			●	●			●	●			
Option	Mounting	With flange		F		●	●	●	●	●	●	●	●	●	●	●	●	●			
Made to Order	Shaft type	Long shaft without single flat & Short shaft with single flat		J		●	●	●	●	●	●	●	●	●	●	●	●	●	●		
		Long shaft without keyway & Short shaft with single flat																			
		Same length double long shaft with single flat on both shafts		Y		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		Double shaft key																			
	Double round shaft		K		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Single round shaft		T		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Pattern	Shaft pattern				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Rotating angle pattern				●	●			●	●			●	●			●	●			

Rotary Actuator Vane Type Series **CRB2**

Size: 10, 15, 20, 30, 40



How to Order

Without auto switch
CRB2 **B** **S** **□** **□** - **180** **S** **E** **Z** **□**

With auto switch
Size: 10, 15
CDRB2 **F** **W** **□** **□** - **180** **S** **Z** - **T99** **L** **□** **□**

With auto switch
Size: 20, 30, 40
CDRB2 **B** **W** **□** **□** - **180** **S** **Z** - **T79** **L** **□** **□**

Size
10
15
20
30
40

Connecting port location
Nil Side ported
E Axial ported

Mounting
B Basic type
F Flange type
* F: Except size 40

Vane type
S Single vane
D Double vane

Auto switch
Nil Without auto switch (Built-in magnet)

Number of auto switches
S 1 pc. *
Nil 2 pcs. **

Shaft type
S Single shaft *
W Double shaft **
J Simple Specials
K Simple Specials
T Simple Specials
Y Simple Specials

Patterned sequencing order
Nil Standard
P Simple Specials/Made to Order
* For details, refer to pages 19 to 30.

Rotating angle
Single vane: 90, 180, 270
Double vane: 90, 100

Electrical entry/Lead wire length
Nil Grommet/Lead wire: 0.5 m
L Grommet/Lead wire: 3 m
C Connector/Lead wire: 0.5 m
CL Connector/Lead wire: 3 m
CN Connector/Without lead wire

Made to Order
For details, refer to the table below.

With auto switch
(With auto switch unit and built-in magnet)
* Refer to page 33 when the auto switch unit is needed separately.

* Single shaft with single flat (size 10 to 30); Key (size 40)
** Double shaft with single flat (Size 10 to 30)
Long shaft key, Short shaft with single flat (Size 40)
Refer to Page 4 for details of simple specials J, K, T and Y.
Note) When an auto switch is mounted to the rotary actuator, only shaft types W and J are available.

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

Applicable size	Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire type	Lead wire length (m) ^①				Pre-wired connector	Applicable load
						DC	AC	Perpendicular	In-line		0.5 (Nil)	3 (L)	5 (Z)	None (N)		
For 10, 15	Solid state auto switch	—	Grommet	Yes	3-wire (NPN) 3-wire (PNP)	5 V, 12 V	—	S99V S99	Oilproof heavy-duty vinyl cord	●	●	○	—	○	IC circuit	
								S9PV S9P		●	●	○	—			
								T99V T99		●	●	○	—			
	Reed auto switch	—	Grommet	No	2-wire	24 V	5 V, 12 V	5 V, 12 V, 24 V	—	90	●	●	●	—	○	IC circuit
							5 V, 12 V, 100 V	5 V, 12 V, 24 V, 100 V	—	90A	●	●	●	—		
							—	—	—	97	●	●	●	—		
For 20, 30, 40	Solid state auto switch	—	Grommet	Yes	3-wire (NPN) 3-wire (PNP)	5 V, 12 V	—	—	S79	●	●	○	—	○	IC circuit	
								—	S7P	●	●	○	—			
								—	T79	●	●	○	—			
	Reed auto switch	—	Connector	Yes	2-wire	24 V	—	—	T79C	●	●	●	●	—	—	Relay, PLC
							—	—	R73	●	●	○	—			
							—	—	R73C	●	●	●	●			
Reed auto switch	—	Grommet	No	2-wire	48 V, 100 V	100 V	—	R80	●	●	○	—	—	IC circuit		
						—	—	R80C	●	●	●	●				
						—	24 V or less	—	—	—	—	—				

* 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.

* Auto switches are shipped together, (but not assembled).

Flange Assembly Part No.

(For details, refer to page 5.)

Model	Assembly part no.
CRB2F□10	P211070-2
CRB2F□15	P211090-2
CRB2F□20	P211060-2
CRB2F□30	P211080-2

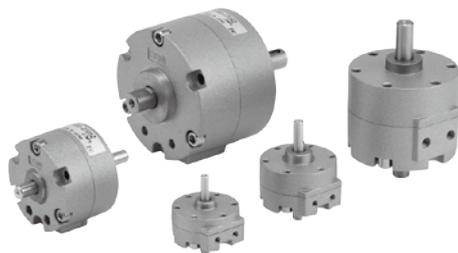


Made to Order
(For details, refer to pages 19 to 23, 29, 30.)

Symbol	Description
XA1 to XA24	Shaft type pattern
XC1	Add connecting ports
XC2	Change threaded hole to through-hole
XC3	Change the screw position
XC4	Change the rotation range
XC5	Change rotation range between 0 to 200°
XC6	Change rotation range between 0 to 110°
XC7	Reversed shaft
XC30	Fluorine grease

The above may not be selected when the product comes with an auto switch or angle adjustment unit.
For details, refer to pages 19, 20, 24, 25, 29.

Single Vane Specifications



Model (Size)	CRB2B□10-□S	CRB2B□15-□S	CRB2B□20-□S	CRB2B□30-□S	CRB2B□40-□S	
Vane type	Single vane					
Rotating angle	90°,180°	270°	90°,180°	270°	90°,180°,270°	
Fluid	Air (Non-lube)					
Proof pressure (MPa)	1.05			1.5		
Ambient and fluid temperature	5 to 60°C					
Max. operating pressure (MPa)	0.7			1.0		
Min. operating pressure (MPa)	0.2	0.15				
Rotation time adjustment range s/90° ^{Note 1)}	0.03 to 0.3			0.04 to 0.3	0.07 to 0.5	
Allowable kinetic energy (J) ^{Note 2)}	0.00015	0.001	0.003	0.02	0.04	
		0.00025	0.0004	0.015	0.03	
Shaft load (N)	Allowable radial load	15	15	25	30	60
	Allowable thrust load	10	10	20	25	40
Bearing type	Bearing					
Port location	Side ported or Axial ported					
Port size (Side ported, Axial ported)	M3 x 0.5			M5 x 0.8		
Angle adjustable range ^{Note 3)}	0 to 230°		0 to 240°		0 to 230°	
Mounting	Basic type, Flange type				Basic type	
Auto switch	Mountable (Side ported only)					

Note 2) The upper numbers in this section in the table indicate the energy factor when the rubber bumper is used (at the end of the rotation), and the lower numbers indicate the energy factor when the rubber bumper is not used.

Note 3) Adjustment range in the table is for 270°. For 90° and 180°, refer to page 15.

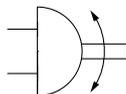
Double Vane Specifications

Model (Size)	CRB2B□10-□D	CRB2B□15-□D	CRB2B□20-□D	CRB2B□30-□D	CRB2B□40-□D	
Vane type	Double vane					
Rotating angle	90°,100°					
Fluid	Air (Non-lube)					
Proof pressure (MPa)	1.05			1.5		
Ambient and fluid temperature	5 to 60°C					
Max. operating pressure (MPa)	0.7			1.0		
Min. operating pressure (MPa)	0.2	0.15				
Rotation time adjustment range s/90° ^{Note 1)}	0.03 to 0.3			0.04 to 0.3	0.07 to 0.5	
Allowable kinetic energy (J)	0.0003	0.0012	0.0033	0.02	0.04	
	15	15	25	30	60	
Shaft load (N)	Allowable radial load	15	15	25	30	60
	Allowable thrust load	10	10	20	25	40
Bearing type	Bearing					
Port location	Side ported or Axial ported					
Port size (Side ported, Axial ported)	M3 x 0.5			M5 x 0.8		
Angle adjustable range ^{Note 3)}	0 to 90°					
Mounting	Basic type, Flange type				Basic type	
Auto switch	Mountable (Side ported only)					

Note 1) Make sure to operate within the speed regulation range. Exceeding the maximum speed (0.3 sec/90°) can cause the unit to stick or not operate.

Note 3) Adjustment range in the table is for 100°. For 90°, refer to page 15.

JIS Symbol



Volume

(cm³)

Vane type	Single vane												Double vane												
Model	CRB2B□10-□S	CRB2B□15-□S	CRB2B□20-□S	CRB2B□30-□S	CRB2B□40-□S	CRB2B□10-□D	CRB2B□15-□D	CRB2B□20-□D	CRB2B□30-□D	CRB2B□40-□D	CRB2B□10-□D	CRB2B□15-□D	CRB2B□20-□D	CRB2B□30-□D	CRB2B□40-□D										
Rotation	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	100°	90°	100°	90°	100°	90°	100°	90°	100°			
Volume	1 (0.6)	1.2	1.5	1.5 (1.0)	2.9	3.7	4.8 (3.6)	6.1	7.9	11.3 (8.5)	15	20.2	25 (18.7)	31.5	41	1.0	1.1	2.6	2.7	5.6	5.7	14.4	14.5	33	34

* Values inside () are volume of the supply side when A port is pressurized.

Weight

(g)

Vane type	Single vane												Double vane												
Model	CRB2BW10-□S	CRB2BW15-□S	CRB2BW20-□S	CRB2BW30-□S	CRB2BW40-□S	CRB2BW10-□D	CRB2BW15-□D	CRB2BW20-□D	CRB2BW30-□D	CRB2BW40-□D	CRB2BW10-□D	CRB2BW15-□D	CRB2BW20-□D	CRB2BW30-□D	CRB2BW40-□D										
Rotating angle	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	100°	90°	100°	90°	100°	90°	100°	90°	100°			
Rotary actuator body	27	26.7	26.4	48.4	47.4	46.4	104	103	101	199	194	189	385	374	363	42.7	43.7	55.4	58.4	119	142	219	239	398	444
Flange assembly	9		10			19			25			—			9		10		19		25		—		
Auto switch unit	15		20			28			38			43			15		20		28		38		43		
Angle adjuster unit	30		47			90			150			203			30		47		90		150		203		

Series CRB2

Rotary Actuator: Replaceable Shaft

A shaft can be replaced with a different shaft type, except for standard shaft type.

Without auto switch CRB2B J P Size — Rotating angle Vane type Port location Z — Made to Order

● Patterned sequencing order

Nil	Without Made to Order
P	Simple Specials/Made to Order

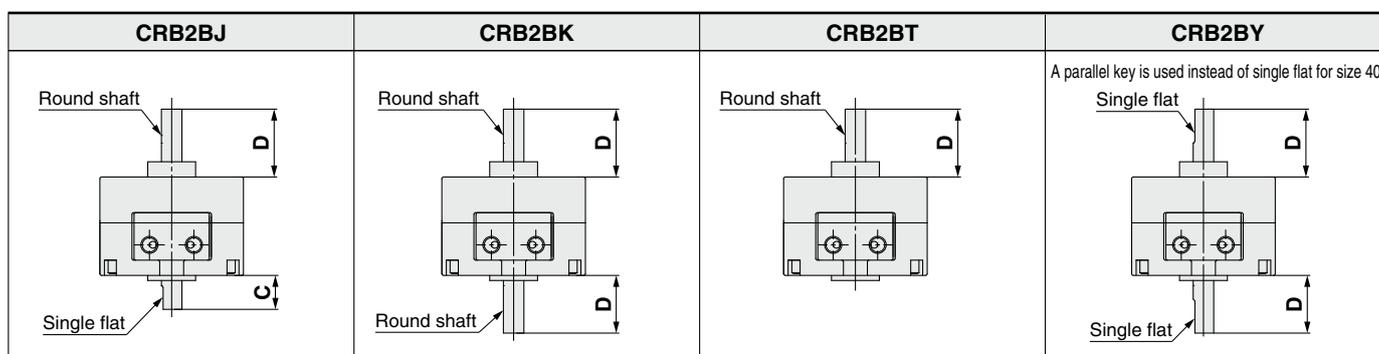
Shaft type ●

Symbol	Shaft type	Shaft-end shape	Size				
			10	15	20	30	40
J	Double shaft	Long shaft without single flat & Short shaft with single flat	●	●	●	●	
		Long shaft without keyway & Short shaft with single flat					●
K	Double shaft	Double round shaft	●	●	●	●	●
T	Single shaft	Single round shaft	●	●	●	●	●
Y	Double shaft	Same length double long shaft with single flat on both shafts	●	●	●	●	
		Double shaft key					●

● Made to Order

Symbol	Description
XA31 to XA58	Shaft type pattern
XC1	Add connecting ports
XC2	Change threaded holes to through-holes
XC3	Change the screw position
XC4	Change the rotation range
XC5	Change rotation range between 0 and 200°
XC6	Change rotation range between 0 and 110°
XC7	Reversed shaft
XC30	Fluorine grease

For details, refer to pages 24 to 30.



(mm)

Size	10	15	20	30	40
C	8	9	10	13	15
D	14	18	20	22	30

Note) Dimensions and tolerance of the shaft and single flat (a parallel key for size 40) are the same as the standard.

With auto switch With angle adjuster unit CDRB2B J U P Size — Rotating angle Vane type Z — Made to Order

● Patterned sequencing order

Nil	Without Made to Order
P	Simple Specials/Made to Order

● With auto switch ● With angle adjuster unit

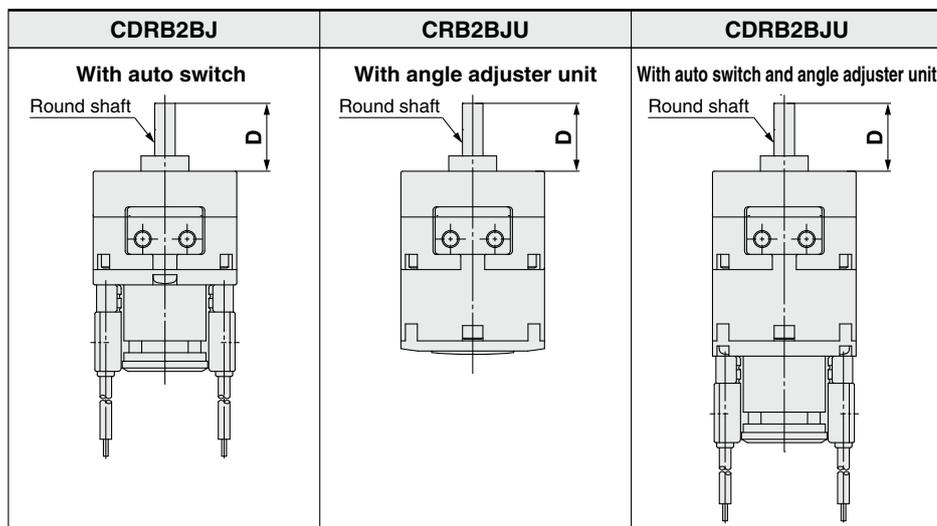
Shaft type ●

Symbol	Shaft type	Shaft end shape	Size				
			10	15	20	30	40
J	Double shaft	Long shaft without single flat & Short shaft with single flat	●	●	●	●	
		Long shaft without keyway & Short shaft with single flat					●

● Made to Order

Symbol	Description
XA31 to XA58	Shaft type pattern
XC1	Add connecting port
XC2	Change threaded hole to through-hole
XC3	Change the screw position
XC4	Change rotation range
XC5	Change rotation range between 0 and 200°
XC6	Change rotation range between 0 and 110°
XC7	Reversed shaft
XC30	Fluorine grease

The above may not be selected when the product comes with an auto switch or angle adjustment unit. For details, refer to pages 24, 25, 29.



(mm)

Size	10	15	20	30	40
D	14	18	20	22	30

Note 1) Only side ports are available for connecting port location.
 Note 2) Dimensions and tolerance of the shaft and single flat (a parallel key for size 40) are the same as the standard.

Optional Specifications: Flange (Size: 10, 15, 20, 30)

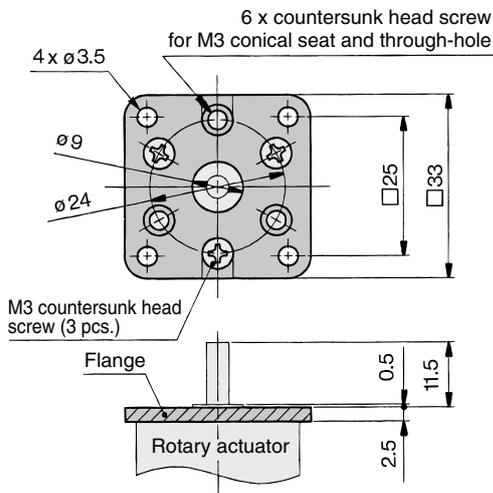


Basic type	Type			Flange assembly part no.
	With auto switch	With angle adjuster	With angle adjuster and auto switch	
CRB2F□10	CDRB2FW10	CRB2FWU10	CDRB2FWU10	P211070-2
CRB2F□15	CDRB2FW15	CRB2FWU15	CDRB2FWU15	P211090-2
CRB2F□20	CDRB2FW20	CRB2FWU20	CDRB2FWU20	P211060-2
CRB2F□30	CDRB2FW30	CRB2FWU30	CDRB2FWU30	P211080-2

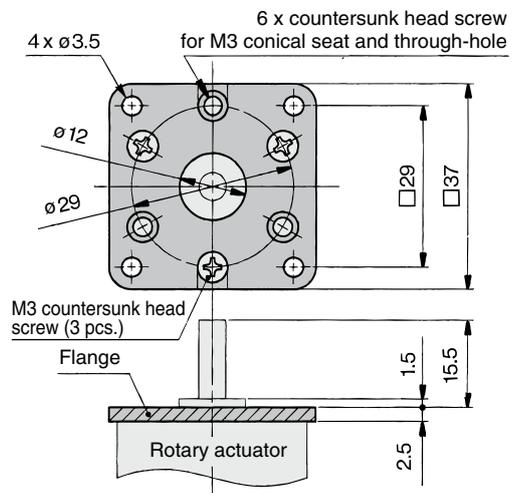
Note 1) The flange (with countersunk head screws) is not mounted on the actuator at the time of shipment.

Note 2) The flange can be mounted on the rotary actuator at 60° intervals.

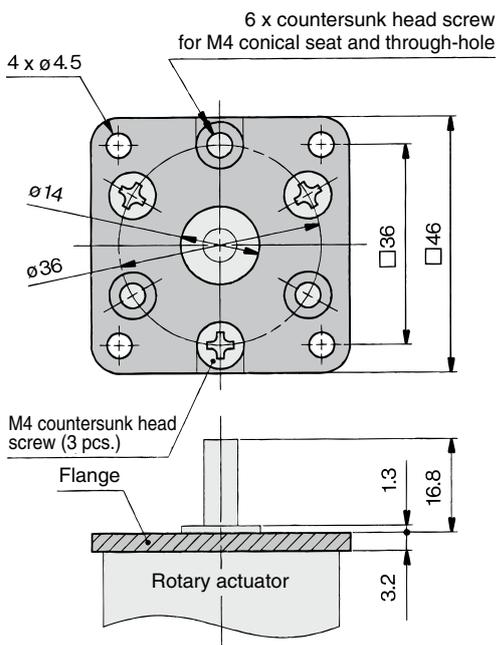
**Assembly Part No.: P211070-2
(for C□RB2F□□10)**



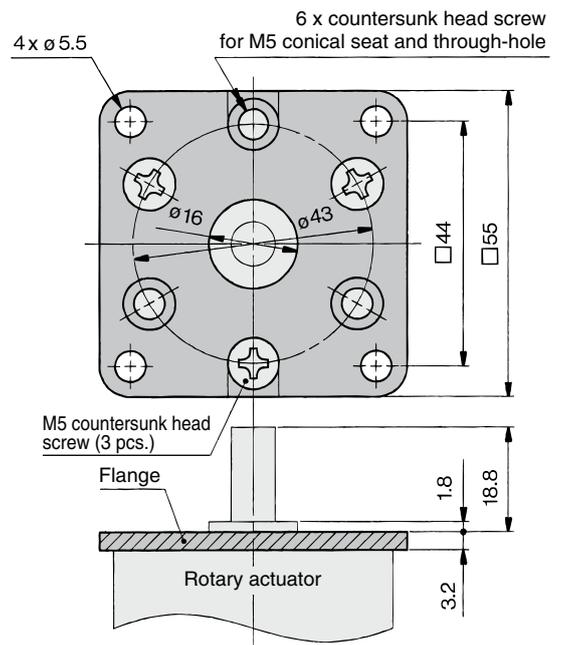
**Assembly Part No.: P211090-2
(for C□RB2F□□15)**



**Assembly Part No.: P211060-2
(for C□RB2F□□20)**



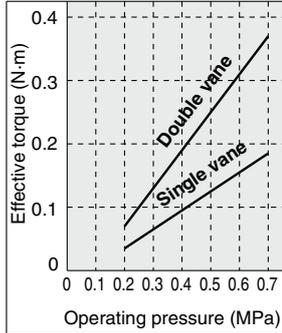
**Assembly Part No.: P211080-2
(for C□RB2F□□30)**



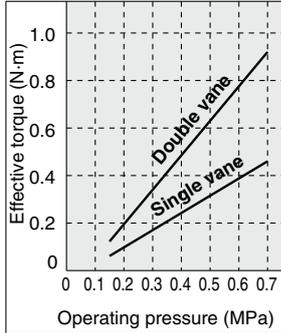
Series CRB2

Effective Output

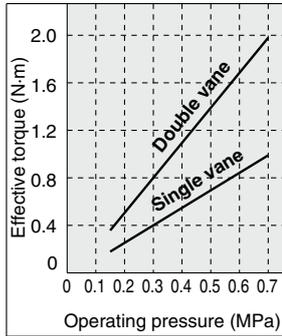
CRB2B□10



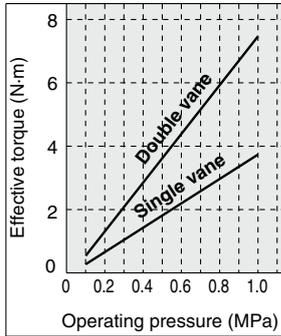
CRB2B□15



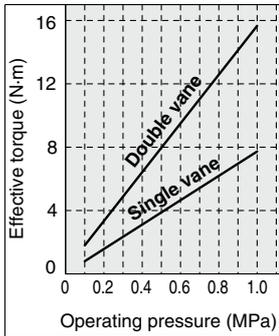
CRB2B□20



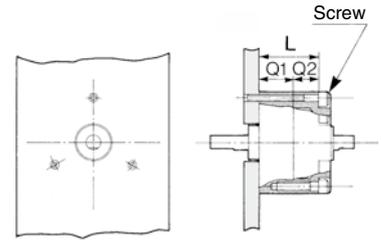
CRB2B□30



CRB2B□40



Direct Mounting of Body



Dimension "L" of the actuators is provided in the table below for JIS standard hexagon socket head cap screws. If these types of screw are used, their heads will fit in the mounting hole.

Reference screw size

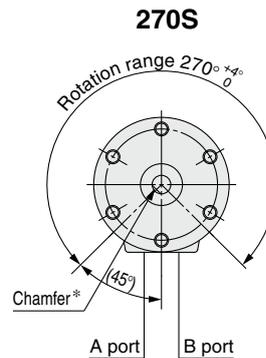
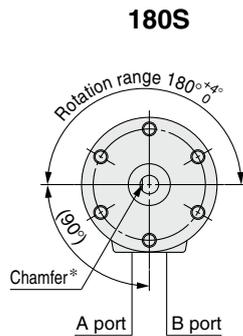
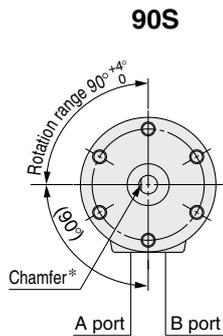
Model	L	Screw
CRB2B□10	11.5*	M2.5
CRB2B□15	16	M2.5
CRB2B□20	24.5	M3
CRB2B□30	34.5	M4
CRB2B□40	39.5	M4

* Only the size 10 actuators have different L dimensions for single and double vane.
Double vane: L = 20.5
* Refer to page 10 for Q1 and Q2 dimensions.

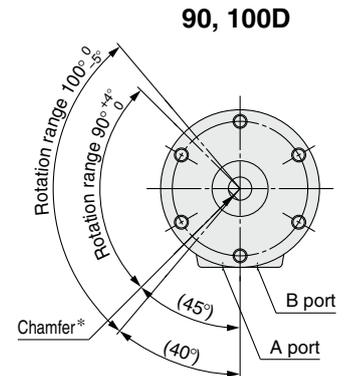
Chamfered Position and Rotation Range: Top View from Long Shaft Side

Chamfered positions shown below illustrate the conditions of actuators when B port is pressurized.

Single vane



Double vane



* For size 40 actuators, a parallel key will be used instead of chamfer.

Note 1) For single vane type, the tolerance of rotating angle of 90°, 180°, 270° will be $^{+5}_{0}$ for size 10 only.

For double vane type, the tolerance of rotating angle of 90° will be $^{+5}_{0}$ for size 10 only.

Note 2) The chamfered position of the double vane type shows the 90° specification position.

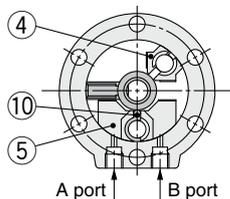
Construction

Single vane

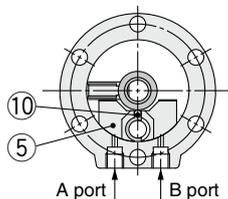
- Figures for 90° and 180° show the condition of the actuators when B port is pressurized, and the figure for 270° shows the position of the ports during rotation.

CRB2BS10/15/20/30/40-□SZ

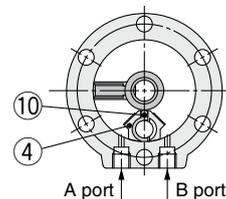
For 90°
(Viewed from the output shaft side)



For 180°
(Viewed from the output shaft side)



For 270°
(Viewed from the output shaft side)

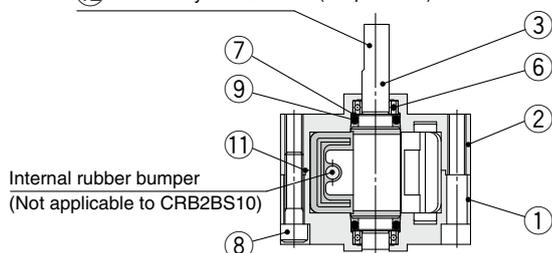


Component Parts

No.	Description	Material	Note
1	Body (A)	Aluminum die-casted	Painted
2	Body (B)	Aluminum die-casted	Painted
3	Vane shaft	Stainless steel*	
4	Stopper	Resin	For 270°
5	Stopper	Resin	For 180°
6	Bearing	High carbon chrome bearing steel	
7	Back-up ring	Stainless steel	
8	Hexagon socket head cap screw	SCM	Special screw
9	O-ring	NBR	
10	Stopper seal	NBR	Special seal
11	O-ring	NBR	Size 40 only
12	Parallel key	Carbon steel	Size 40 only

* The material is carbon steel for size 30 and 40.

⑫ Parallel key for size 40 (Output shaft)

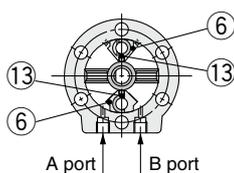
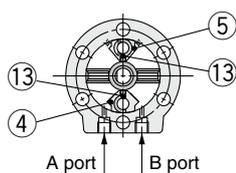


Double vane

- Figures below show the intermediate rotation position when A or B port is pressurized.

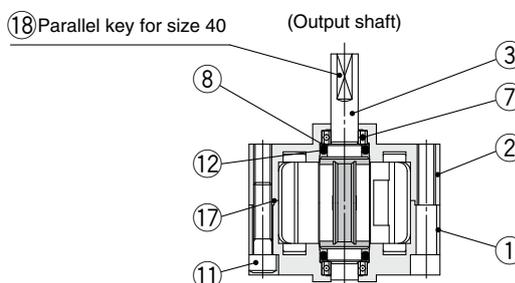
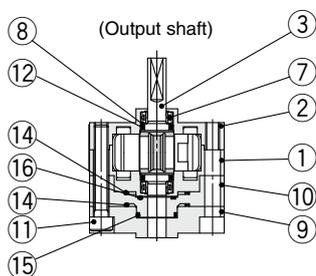
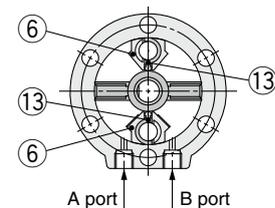
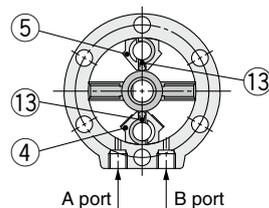
CRB2BS10-□DZ

For 90° (Viewed from the output shaft side) **For 100°** (Viewed from the output shaft side)



CRB2BS15/20/30/40-□DZ

For 90° (Viewed from the output shaft side) **For 100°** (Viewed from the output shaft side)



Component Parts

No.	Description	Material	Note
1	Body (A)	Aluminum die-casted	Painted
2	Body (B)	Aluminum die-casted	Painted
3	Vane shaft	Carbon steel	
4	Stopper	Stainless steel*	
5	Stopper	Resin	
6	Stopper	Stainless steel*	
7	Bearing	High carbon chrome bearing steel	
8	Back-up ring	Stainless steel	
9	Cover	Aluminum alloy	

* For size 40, material for ④⑥ is die-cast aluminum.

No.	Description	Material	Note
10	Plate	Resin	
11	Hexagon socket head cap screw	SCM	Special screw
12	O-ring	NBR	
13	Stopper seal	NBR	Special seal
14	Gasket	NBR	Special seal
15	O-ring	NBR	
16	O-ring	NBR	
17	O-ring	NBR	Size 40 only
18	Parallel key	Carbon steel	Size 40 only

Series CRB2

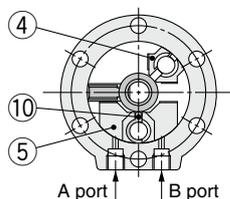
Construction

Single vane

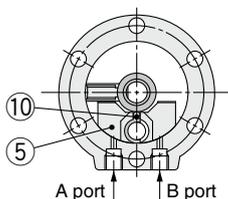
- Figures for 90° and 180° show the condition of the actuators when B port is pressurized, and the figure for 270° shows the position of the ports during rotation.

CRB2BW10/15/20/30/40-□SZ

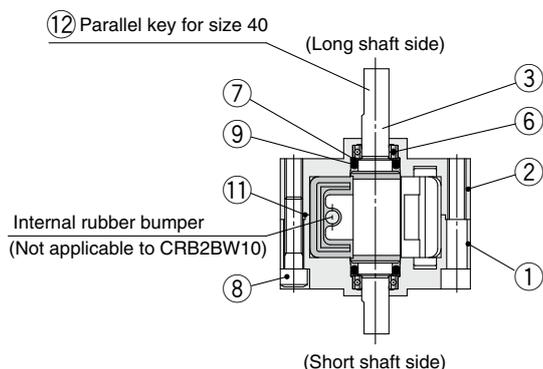
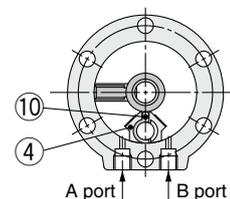
For 90°
(Viewed from the long shaft side)



For 180°
(Viewed from the long shaft side)



For 270°
(Viewed from the long shaft side)



Component Parts

No.	Description	Material	Note
1	Body (A)	Aluminum die-casted	Painted
2	Body (B)	Aluminum die-casted	Painted
3	Vane shaft	Stainless steel*	
4	Stopper	Resin	For 270°
5	Stopper	Resin	For 180°
6	Bearing	High carbon chrome bearing steel	
7	Back-up ring	Stainless steel	
8	Hexagon socket head cap screw	SCM	Special screw
9	O-ring	NBR	
10	Stopper seal	NBR	Special seal
11	O-ring	NBR	Size 40 only
12	Parallel key	Carbon steel	Size 40 only

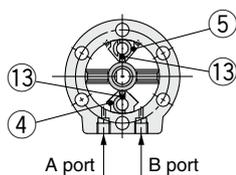
* The material is carbon steel for size 30 and 40.

Double vane

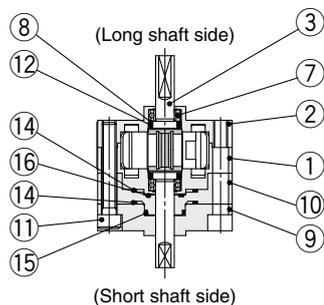
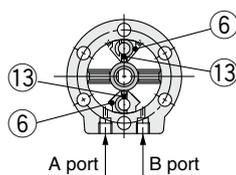
- Figures below show the intermediate rotation position when A or B port is pressurized.

CRB2BW10-□DZ

For 90°
(Viewed from the long shaft side)

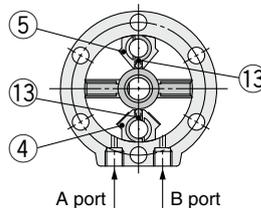


For 100°
(Viewed from the long shaft side)

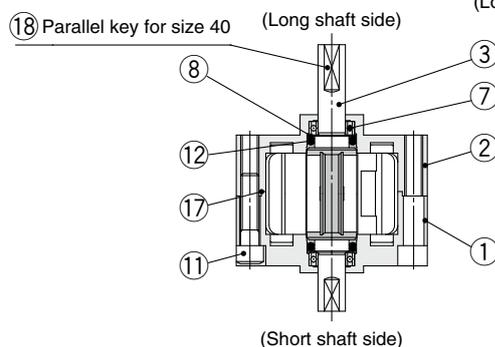
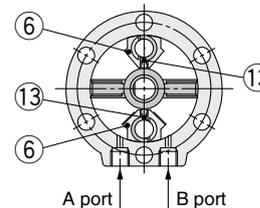


CRB2BW15/20/30/40-□DZ

For 90°
(Viewed from the long shaft side)



For 100°
(Viewed from the long shaft side)



Component Parts

No.	Description	Material	Note
1	Body (A)	Aluminum die-casted	Painted
2	Body (B)	Aluminum die-casted	Painted
3	Vane shaft	Carbon steel	
4	Stopper	Stainless steel*	
5	Stopper	Resin	
6	Stopper	Stainless steel*	
7	Bearing	High carbon chrome bearing steel	
8	Back-up ring	Stainless steel	
9	Cover	Aluminum alloy	

* For size 40, material for ④⑥ is die-cast aluminum.

No.	Description	Material	Note
10	Plate	Resin	
11	Hexagon socket head cap screw	SCM	Special screw
12	O-ring	NBR	
13	Stopper seal	NBR	Special seal
14	Gasket	NBR	Special seal
15	O-ring	NBR	
16	O-ring	NBR	
17	O-ring	NBR	Size 40 only
18	Parallel key	Carbon steel	Size 40 only

Construction (With auto switch)

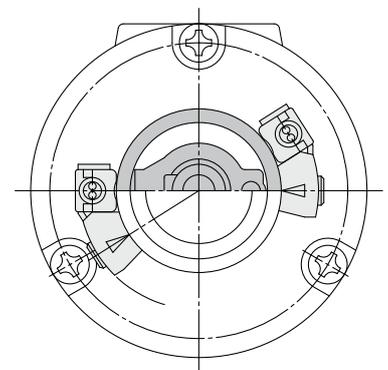
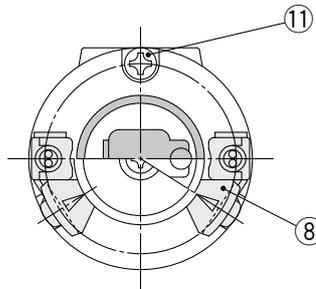
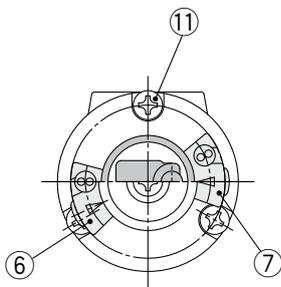
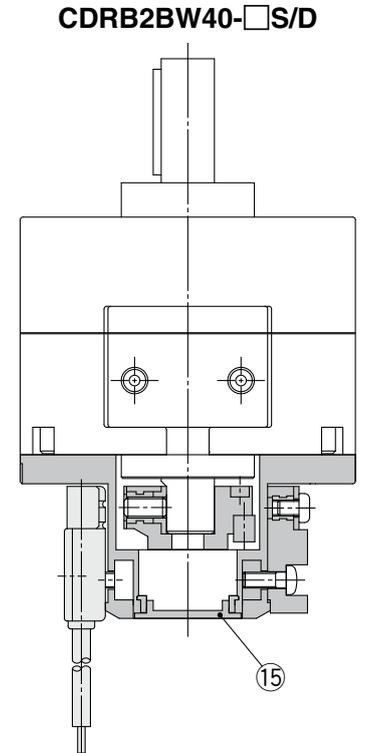
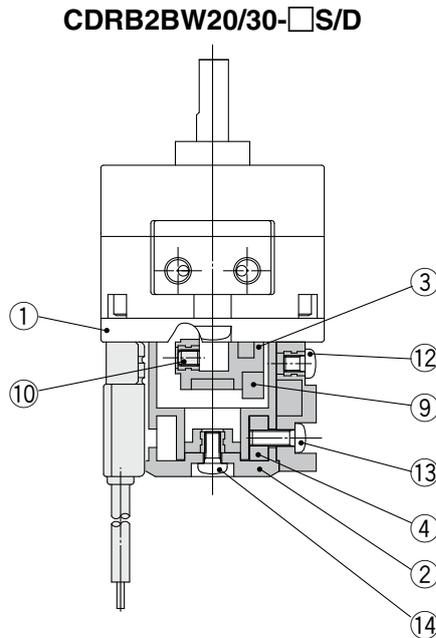
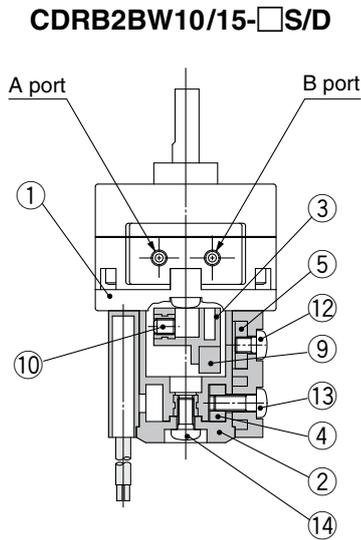
Single vane

(The unit is common for single vane type and double vane type.)

- Following figures show actuators for 90° and 180° when B port is pressurized.

Double vane

- Following figures show the intermediate rotation position when A or B port is pressurized.



Component Parts

No.	Description	Material
1	Cover (A)	Resin
2	Cover (B)	Resin
3	Magnet lever	Resin
4	Holding block	Stainless steel
5	Holding block (B)	Aluminum alloy
6	Switch block (A)	Resin
7	Switch block (B)	Resin
8	Switch block	Resin
9	Magnet	

No.	Description	Material
10	Hexagon socket head set screw	Stainless steel
11	Cross recessed round head screw	Stainless steel
12	Cross recessed round head screw	Stainless steel
13	Cross recessed round head screw	Stainless steel
14	Cross recessed round head screw	Stainless steel
15	Rubber cap	NBR

* For the CDRB2BW10, 2 cross recessed round head screws ⑪ are required.

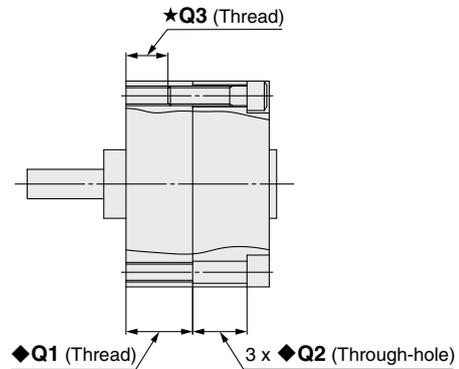
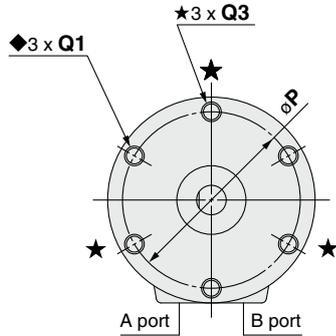
Series CRB2

Dimensions: 10, 15, 20, 30, 40 (The size 10 double vane type is indicated on page 11.)

- For single vane type, the figures below show actuators for 90° and 180° when B port is pressurized.
For double vane type, the figures below show the intermediate rotation position when the A or B port is pressurized.

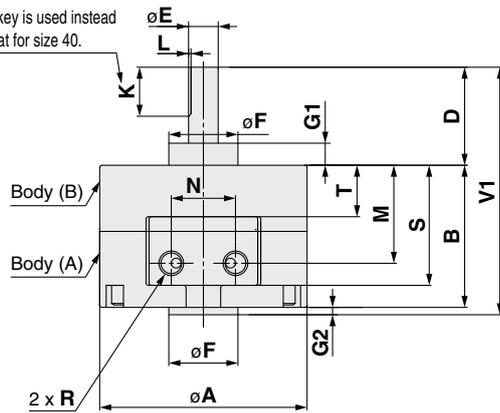
Single shaft/CRB2BS□-□S/D

<Port location: Side ported>

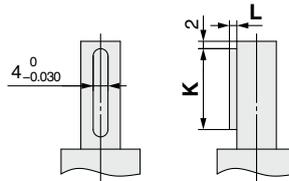


Single shaft

A parallel key is used instead of single flat for size 40.



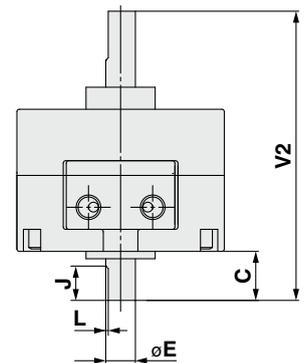
Size 40



Key dimensions			
Model	b (h9)	h (h9)	L1
CRB2B□40	4_{-0.030}^0	4_{-0.030}^0	20

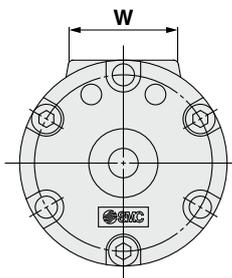
Double shaft/CRB2BW□-□S/D

<Port location: Side ported>

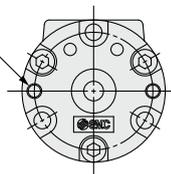


CRB2B□10-□S

<Port location: Side ported>

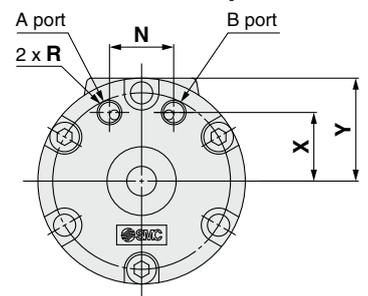


2 x M3 x 0.5 (Depth 4)
Size 10 only
(for mounting unit)



CRB2B□□-□SE/DE

<Port location: Axial ported>



Model	A	B	C	D	E(g7)	F(h9)	G1	G2	J	K	L	M	N	P	Q			R	S	T	V1	V2	W	X	Y
															◆Q1	◆Q2	★Q3								
CRB2B□10-□S	29	15	8	14	4_{-0.004}^{-0.016}	9_{-0.036}^0	3	1	5	9	0.5	9.5	9.5	24	M3	6	—	M3	14	3.6	30	37	19.8	8.5	14.5
CRB2B□10-□SE															6										
CRB2B□15-□□	34	20	9	18	5_{-0.004}^{-0.016}	12_{-0.043}^0	4	1.5	6	10	0.5	14	10	29	M3	6	M3	M3	19	7.6	39.5	47	21	11	17
CRB2B□15-□□E															(10)		(5)								
CRB2B□20-□□	42	29	10	20	6_{-0.004}^{-0.016}	14_{-0.043}^0	4.5	1.5	7	10	0.5	20	13	36	M4	11	M4	M5	24.5	10.5	50.5	59	22	14	21
CRB2B□20-□□E															(13.5)		(7.5)								
CRB2B□30-□□	50	40	13	22	8_{-0.005}^{-0.020}	16_{-0.043}^0	5	2	8	12	1.0	26	14	43	M5	16.5	M5	M5	34.5	14	64	75	24	15.5	25
CRB2B□30-□□E															(18)		(10)								
CRB2B□40-□□	63	45	15	30	10_{-0.005}^{-0.020}	25_{-0.052}^0	6.5	4.5	9	20	1.5	31	20	56	M5	17.5	M5	M5	39.8	17	79.5	90	30	21	31.6
CRB2B□40-□□E															(16)		(10)								

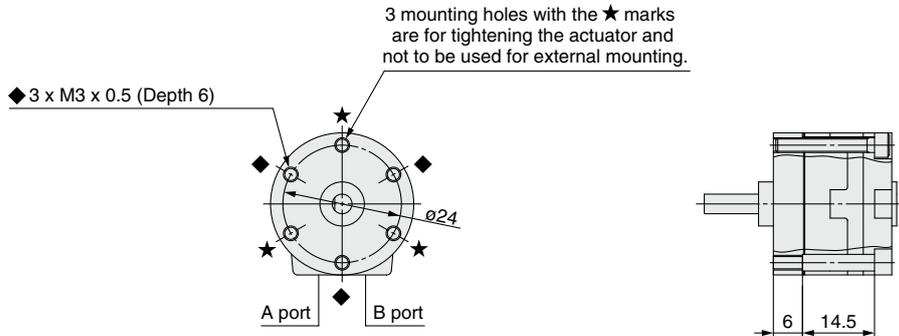
Dimensions: 10

Double vane

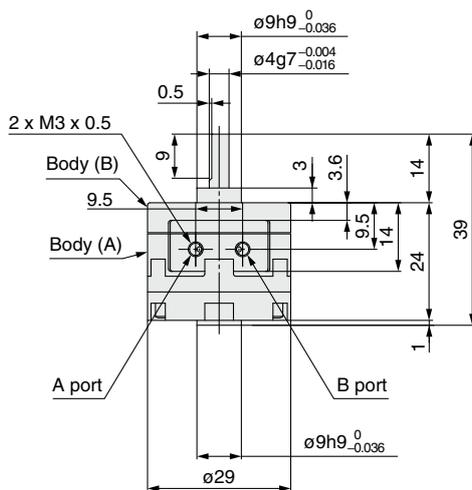
• Following figures show the intermediate rotation position when A or B port is pressurized.

Single shaft/CRB2BS□-10D

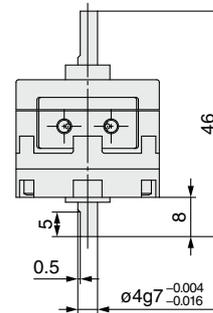
<Port location: Side ported>



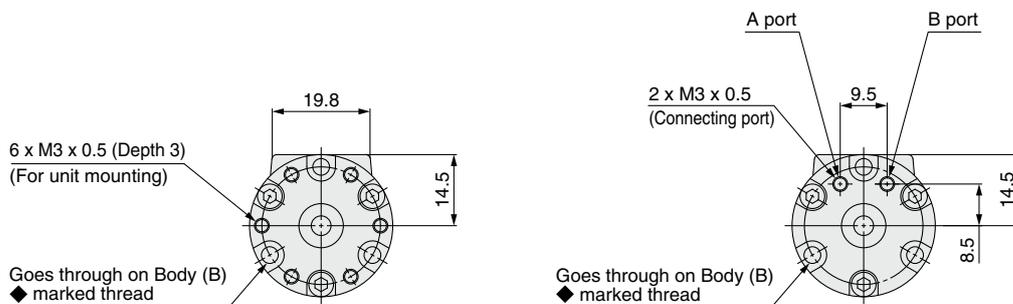
Single shaft



Double shaft/CRB2BW10-D
<Port location: Side ported>



CRB2B□10-□DE
<Port location: Axial ported>

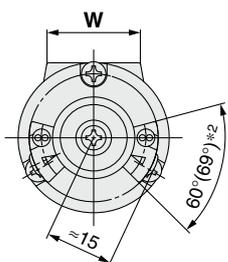
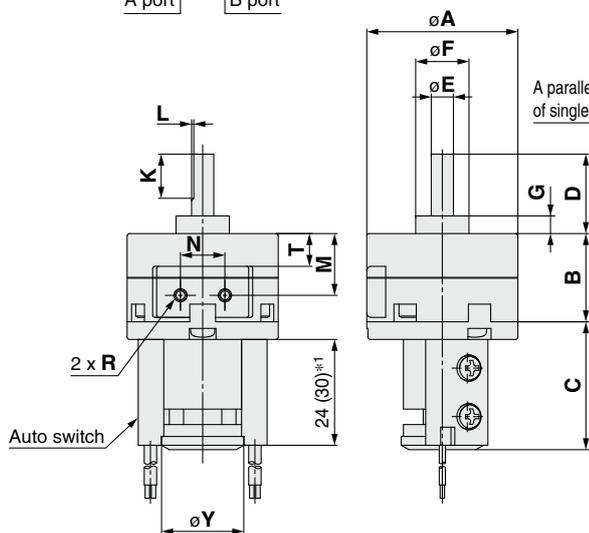
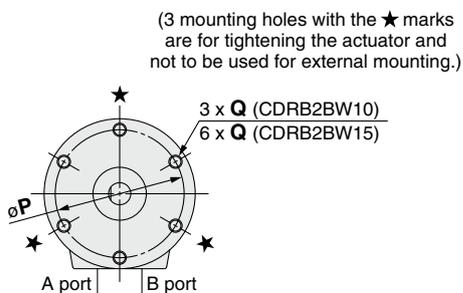


Series CDRB2

Dimensions: 10, 15, 20, 30, 40 (The size 10 double vane type is indicated on page 13.)

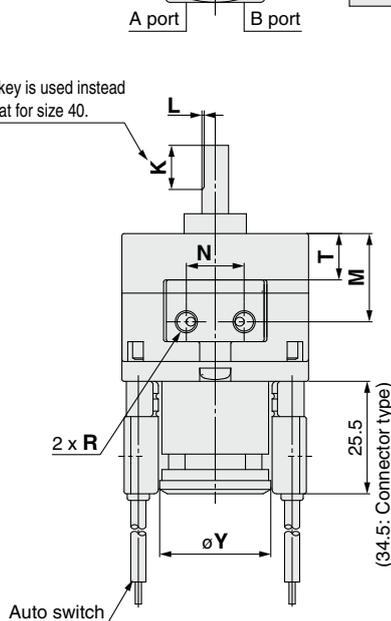
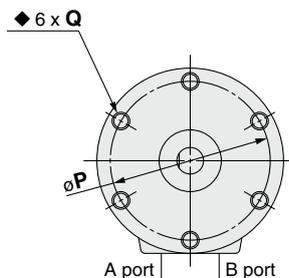
- For single vane type, the figures below show actuators for 90° and 180° when B port is pressurized.
For double vane type, the figures below show the intermediate rotation position when the A or B port is pressurized.

CDRB2BW10/15-□S
CDRB2BW15-□D

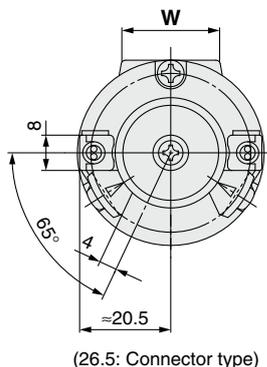


- *1. The length is 24 when any of the following auto switches are used:
D-90/90A/S99(V)/T99(V)/S9P(V)
The length is 30 when any of the following auto switches are used:
D-97/93A
- *2. The angle is 60° when any of the following auto switches are used:
D-90/90A/97/93A
The angle is 69° when any of the following auto switches are used:
D-S99(V)/T99(V)/S9P(V)

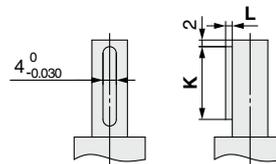
CDRB2BW20/30/40-□S/D



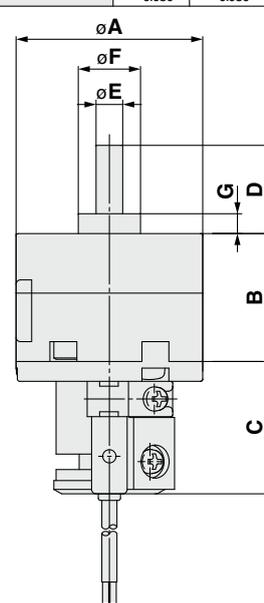
CDRB2BW20/30-□S/D



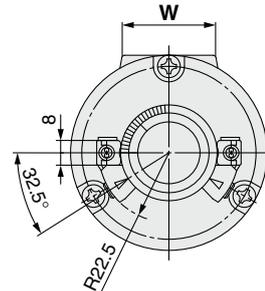
Size 40



Key dimensions			
Model	b (h9)	h (h9)	L1
CRB2B□40	4 ⁰ _{-0.030}	4 ⁰ _{-0.030}	20



CDRB2BW40-□S/D



Model	A	B	C	D	E (g7)	F (h9)	G	K	L	M	N	P	Q	R	T	W	Y
CDRB2BW10-□S	29	15	29	14	4 ^{-0.004} _{-0.016}	9 ⁰ _{-0.036}	3	9	0.5	9.5	9.5	24	M3 x 0.5 depth 6	M3	3.6	19.8	18.5
CDRB2BW15-□S	34	20	29	18	5 ^{-0.004} _{-0.016}	12 ⁰ _{-0.043}	4	10	0.5	14	10	29	M3 x 0.5 depth 5	M3	7.6	21	18.5
CDRB2BW20-□S	42	29	30	20	6 ^{-0.004} _{-0.016}	14 ⁰ _{-0.043}	4.5	10	0.5	20	13	36	M4 x 0.7 depth 7	M5	10.5	22	25
CDRB2BW30-□S	50	40	31	22	8 ^{-0.005} _{-0.020}	16 ⁰ _{-0.043}	5	12	1.0	26	14	43	M5 x 0.8 depth 10	M5	14	24	25
CDRB2BW40-□S	63	45	31	30	10 ^{-0.005} _{-0.020}	25 ⁰ _{-0.052}	6.5	20	1.5	31	20	56	M5 x 0.8 depth 10	M5	17	30	31

Rotary Actuator with Angle Adjuster Vane Type

Series CRB2BWU

Size: 10, 15, 20, 30, 40

RoHS



How to Order

Without auto switch
CRB2 **B** WU - **180** **S** Z

With auto switch
Size: 10, 15
CDRB2 **F** WU - **180** **S** Z - **T99** **L**

With auto switch
Size: 20, 30, 40
CDRB2 **B** WU - **180** **S** Z - **T79** **L**

With auto switch
(With auto switch unit and built-in magnet)
* Refer to page 33 when the auto switch unit is needed separately.

Mounting

B	Basic type
F	Flange type

* F: Except size 40

With angle adjuster unit
* Refer to page 33 when the angle adjuster unit is needed separately.

Patterned sequencing order

Nil	Standard
P	Simple Specials/Made to Order

* For details, refer to pages 19 to 30.

Rotating angle

	90	90°
Single vane	180	180°
	270	270°
Double vane	90	90°
	100	100°

Size

10
15
20
30
40

Vane type

S	Single vane
D	Double vane

Auto switch

Nil	Without auto switch (Built-in magnet)
------------	---------------------------------------

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

Made to Order
For details, refer to the table below.

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

* 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

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

Applicable size	Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire type	Lead wire length (m)*				Pre-wired connector	Applicable load
						DC	AC	Perpendicular	In-line		0.5 (Nil)	3 (L)	5 (Z)	None (N)		
For 10, 15	Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	—	—	—	Oilproof heavy-duty vinyl cord	●	●	○	—	○	IC circuit
					3-wire (PNP)						●	●	○	—	○	
					12 V						●	●	○	—	○	
	Reed auto switch	—	Grommet	No	2-wire	5 V, 12 V, 100 V	5 V, 12 V, 24 V, 100 V	—	90	Vinyl parallel cord	●	●	●	—	—	IC circuit
						—	—	—	90A	Oilproof heavy-duty vinyl cord	●	●	●	—	—	
						—	100V	—	97	Vinyl parallel cord	●	●	●	—	—	
For 20, 30, 40	Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	—	—	Oilproof heavy-duty vinyl cord	●	●	○	—	○	IC circuit	
					3-wire (PNP)					●	●	○	—	○		
					12 V					●	●	○	—	○		
	Reed auto switch	—	Connector	No	2-wire	—	100 V	—	T79	Oilproof heavy-duty vinyl cord	●	●	●	—	—	Relay, PLC
						—	—	—	T79C	●	●	●	—	—		
						—	—	—	R73	●	●	○	—	—		
Reed auto switch	—	Grommet	No	2-wire	48 V, 100 V	100 V	—	R73C	Oilproof heavy-duty vinyl cord	●	●	●	—	—	IC circuit	
					—	24 V or less	—	R80	●	●	○	—	—			
					—	—	—	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.

* Auto switches are shipped together, (but not assembled).



Made to Order

(For details, refer to pages 19 to 23, 29, 30.)

Symbol	Description
XA1 to XA24	Shaft type pattern
XC1	Add connecting ports
XC2	Change threaded hole to through-hole
XC3	Change the screw position
XC4	Change the rotation range
XC5	Change rotation range between 0 and 200°
XC6	Change rotation range between 0 and 110°
XC7	Reversed shaft
XC30	Fluorine grease

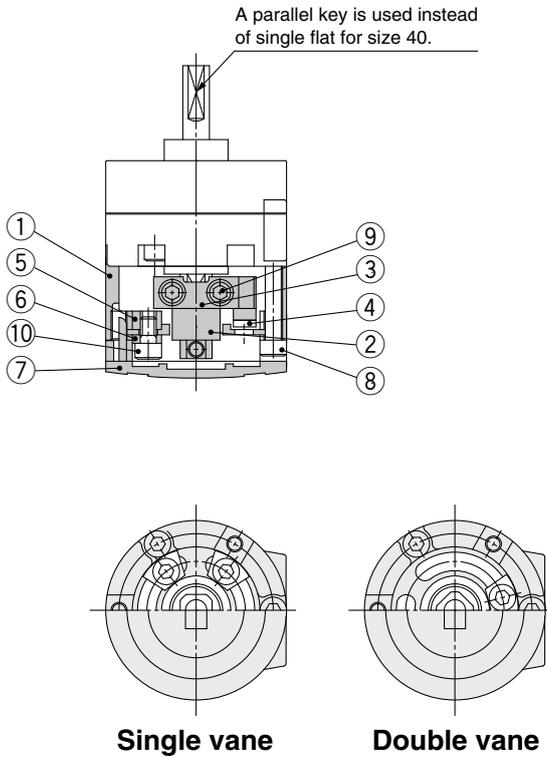
The above may not be selected when the product comes with an auto switch or angle adjuster unit. For details, refer to pages 19, 20, 24, 25, 29.

Construction: 10, 15, 20, 30, 40

- The unit is common for single vane type and double vane type.

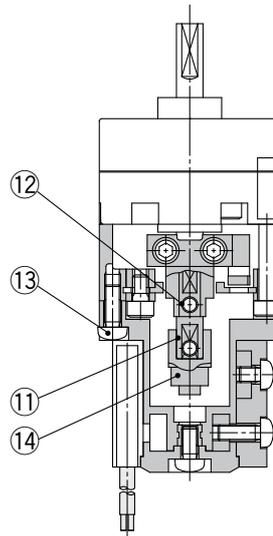
With angle adjuster

CRB2BWU10/15/20/30/40-□S/D

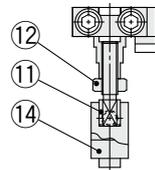


With angle adjuster and auto switch

CDRB2BWU10/15-□S/D

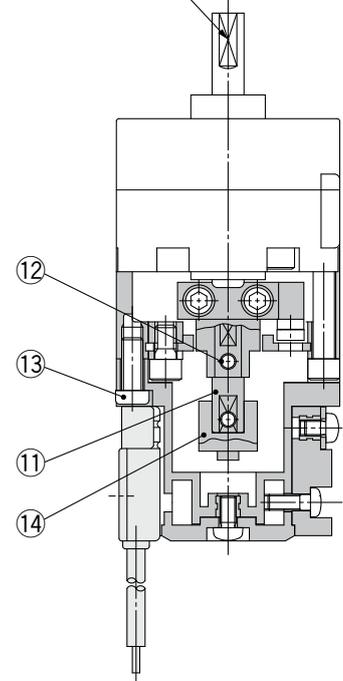


CDRB2BWU10



CDRB2BWU20/30/40-□S/D

A parallel key is used instead of single flat for size 40.



Component Parts

No.	Description	Material	Note
1	Stopper ring	Aluminum die-casted	
2	Stopper lever	Carbon steel	
3	Lever retainer	Carbon steel	Zinc chromated
4	Rubber bumper	NBR	
5	Stopper block	Carbon steel	Zinc chromated
6	Block retainer	Carbon steel	Zinc chromated
7	Cap	Resin	
8	Hexagon socket head cap screw	Stainless steel	Special screw
9	Hexagon socket head cap screw	Stainless steel	Special screw
10	Hexagon socket head cap screw	Stainless steel	Special screw
11	Joint		
12	Hexagon socket head cap screw	Stainless steel	Hexagon nut will be used for size 10 only.
	Hexagon nut	Stainless steel	
13	Cross recessed round head screw	Stainless steel	
14	Magnet lever	—	

⚠ Specific Product Precautions

Be sure to read before handling. Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Rotary Actuator Precautions and Auto Switch Precautions.

Angle Adjuster Unit

⚠ Caution

1. Since the maximum angle of the rotating angle adjustment range will be limited by the rotation of the rotary actuator, make sure to take this into consideration when ordering.

Rotating angle of rotary actuator	Rotating angle adjustment range
270° ⁺⁴ / ₀	0° to 230° (Size: 10, 40) *1
	0° to 240° (Size: 15, 20, 30)
180° ⁺⁴ / ₀	0° to 175°
90° ⁺⁴ / ₀	0° to 85°

- *1. The maximum adjustment angle of the angle adjuster unit for size 10 and 40 is 230°.
- 2. Connecting ports are side ported only.
- 3. The allowable kinetic energy is the same as the specifications of the rotary actuator.
- 4. Use a 100° rotary actuator when you desire to adjust the angle to 90° using a double vane type.

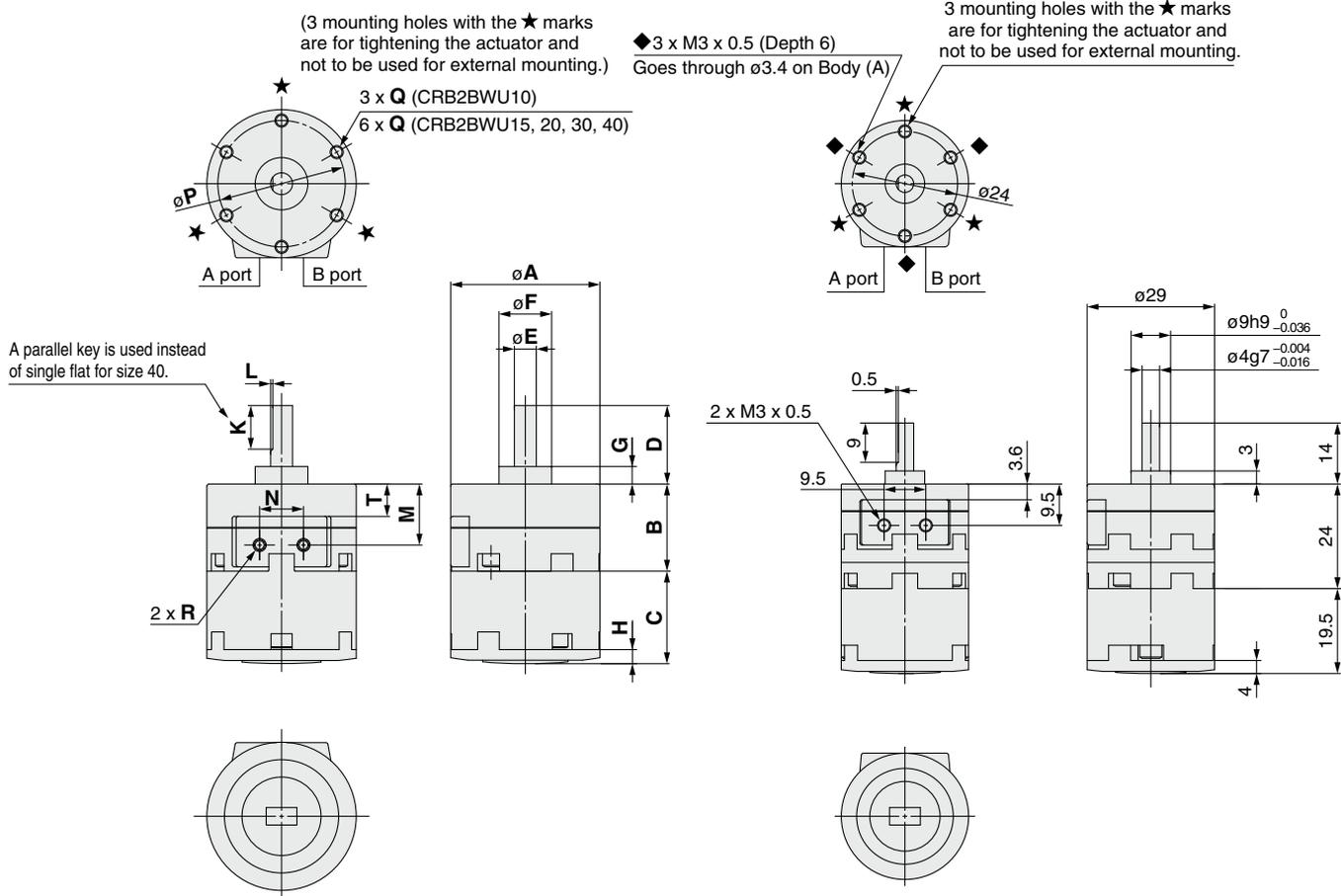
Series CRB2BWU

Dimensions: 10, 15, 20, 30, 40

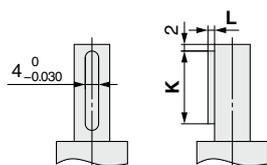
- For single vane type, the figures below show actuators for 90° (without unit) when the B port is pressurized.
For double vane type, the figures below show the intermediate rotation position when the A or B port is pressurized.

CRB2BWU10/15/20/30/40-□S CRB2BWU15/20/30/40-□D

CRB2BWU10-□D



Size 40



Key dimensions			
Model	b (h9)	h (h9)	L1
CRB2BWU40	$4_{-0.030}^0$	$4_{-0.030}^0$	20

Model	A	B	C	D	E (g7)	F (h9)	G	K	L	M	N	P	Q	R	T
CRB2BWU10-□S	29	15	19.5	14	$4_{-0.016}^{-0.004}$	$9_{-0.036}^0$	3	9	0.5	9.5	9.5	24	M3 x 0.5 depth 6	M3	3.6
CRB2BWU15-□S	34	20	21.2	18	$5_{-0.016}^{-0.004}$	$12_{-0.043}^0$	4	10	0.5	14	10	29	M3 x 0.5 depth 5	M3	7.6
CRB2BWU20-□S	42	29	25	20	$6_{-0.016}^{-0.004}$	$14_{-0.043}^0$	4.5	10	0.5	20	13	36	M4 x 0.7 depth 7	M5	10.5
CRB2BWU30-□S	50	40	29	22	$8_{-0.020}^{-0.005}$	$16_{-0.043}^0$	5	12	1.0	26	14	43	M5 x 0.8 depth 10	M5	14
CRB2BWU40-□S	63	45	36.3	30	$10_{-0.020}^{-0.005}$	$25_{-0.052}^0$	6.5	20	1.5	31	20	56	M5 x 0.8 depth 10	M5	17

Rotary Actuator with Angle Adjuster Vane Type **Series CRB2BWU**

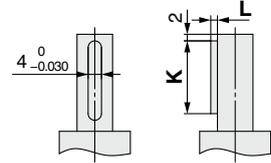
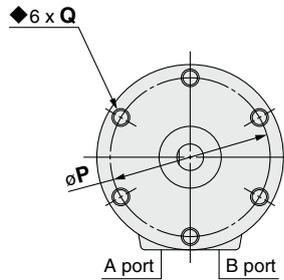
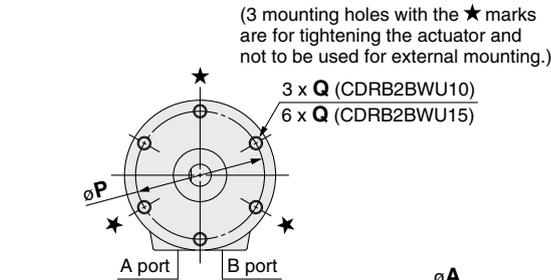
Dimensions: 10, 15, 20, 30, 40 (The size 10 double vane type is indicated on page 18.)

- For single vane type, the figures below show actuators for 90° (without unit) when the B port is pressurized.
For double vane type, the figures below show the intermediate rotation position when the A or B port is pressurized.

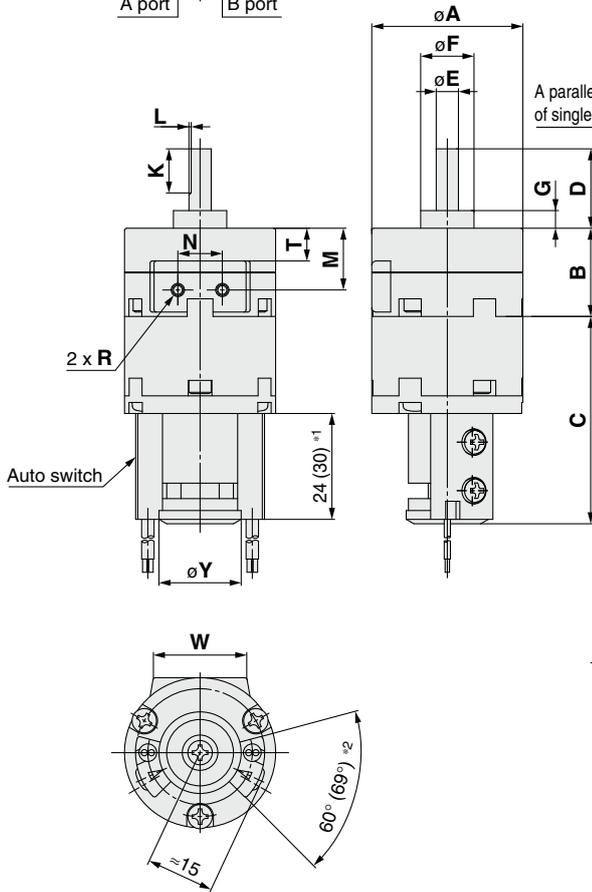
CDRB2BWU10/15-□S CDRB2BWU15-□D

CDRB2BWU20/30/40-□S/D

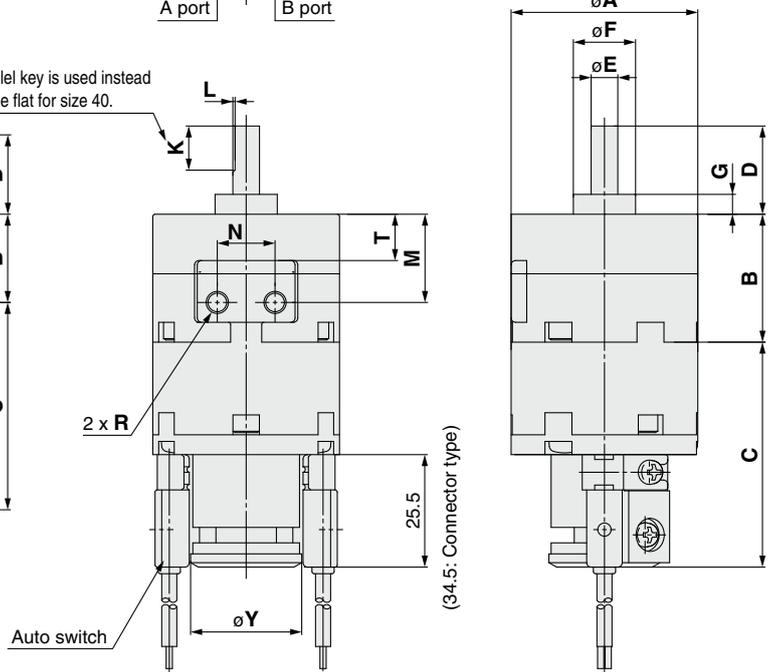
Size 40



Key dimensions	L1		b	h
Model	b (h9)	h (h9)	L1	
CDRB2BWU40	4 ⁰ _{-0.030}	4 ⁰ _{-0.030}	20	

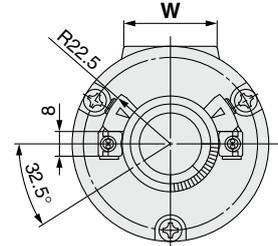
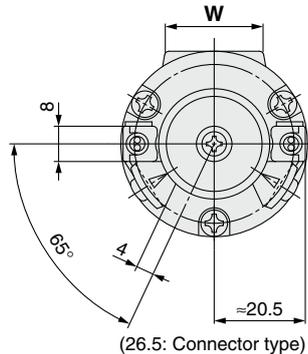


A parallel key is used instead of single flat for size 40.



CDRB2BWU20/30-□S/D

CDRB2BWU40-□S/D



- * 1. The length is 24 when any of the following auto switches are used:
D-90/90A/S99(V)/T99(V)/S9P(V)
The length is 30 when any of the following auto switches are used:
D-97/93A
- * 2. The angle is 60° when any of the following auto switches are used:
D-90/90A/97/93A
The angle is 69° when any of the following auto switches are used:
D-S99(V)/T99(V)/S9P(V)

Model	A	B	C	D	E(g7)	F(h9)	G	K	L	M	N	P	Q	R	T	W	Y
CDRB2BWU10-□S	29	15	45.5	14	4 ^{-0.004} _{-0.016}	9 ⁰ _{-0.036}	3	9	0.5	9.5	9.5	24	M3 x 0.5 depth 6	M3	3.6	19.8	18.5
CDRB2BWU15-□S	34	20	47	18	5 ^{-0.004} _{-0.016}	12 ⁰ _{-0.043}	4	10	0.5	14	10	29	M3 x 0.5 depth 5	M3	7.6	21	18.5
CDRB2BWU15-□D																	
CDRB2BWU20-□S	42	29	51	20	6 ^{-0.004} _{-0.016}	14 ⁰ _{-0.043}	4.5	10	0.5	20	13	36	M4 x 0.7 depth 7	M5	10.5	22	25
CDRB2BWU20-□D																	
CDRB2BWU30-□S	50	40	55.5	22	8 ^{-0.005} _{-0.020}	16 ⁰ _{-0.043}	5	12	1.0	26	14	43	M5 x 0.8 depth 10	M5	14	24	25
CDRB2BWU30-□D																	
CDRB2BWU40-□S	63	45	62.2	30	10 ^{-0.005} _{-0.020}	25 ⁰ _{-0.052}	6.5	20	1.5	31	20	56	M5 x 0.8 depth 10	M5	17	30	31
CDRB2BWU40-□D																	

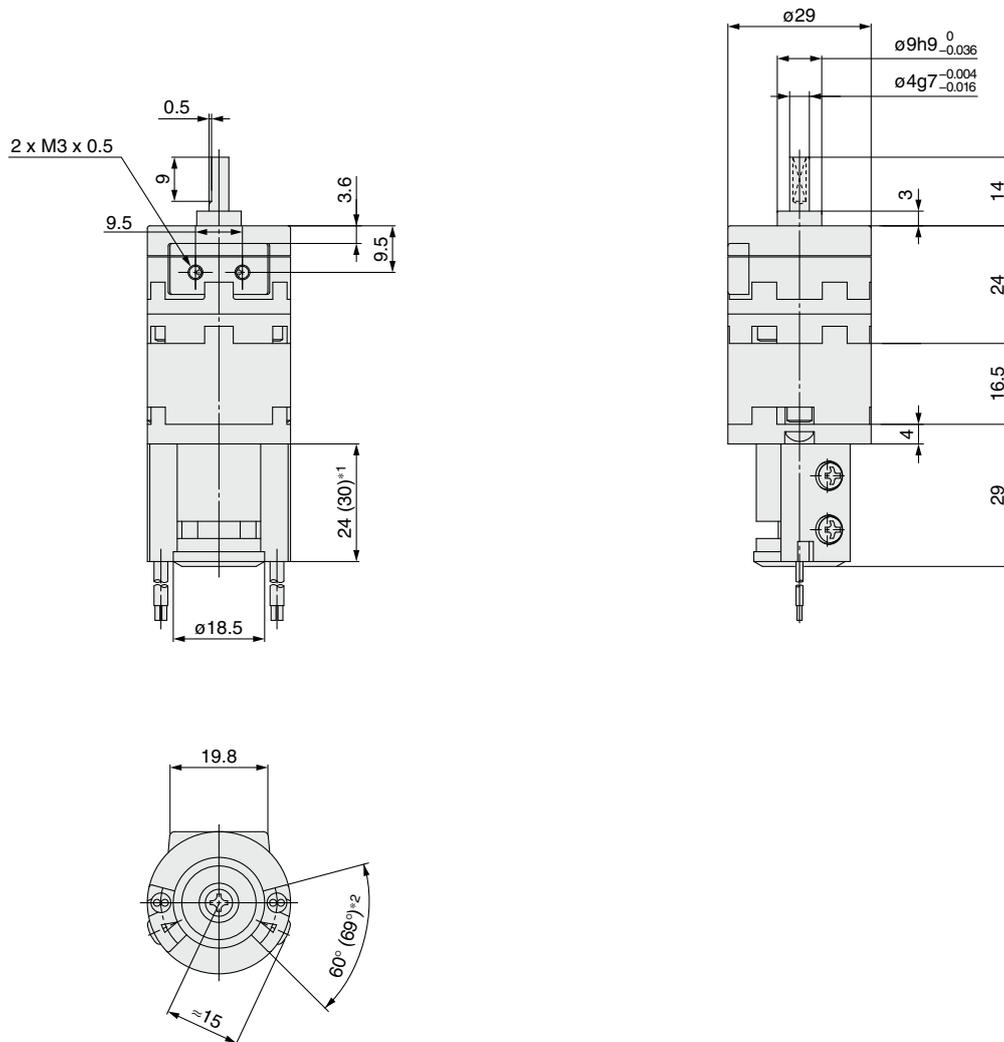
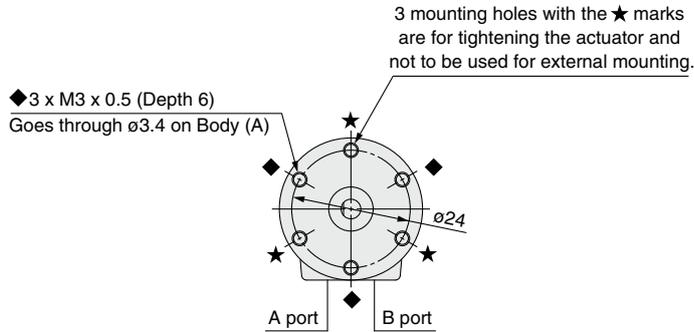
Series CRB2BWU

Dimensions: 10

Double vane

- Figures show the intermediate rotation position when the A or B port is pressurized.

CDRB2BWU10-□D



*1. The length is 24 when any of the following auto switches are used: D-90/90A/S99(V)/T99(V)/S9P(V)
The length is 30 when any of the following auto switches are used: D-97/93A

*2. The angle is 60° when any of the following auto switches are used: D-90/90A/97/93A
The angle is 69° when any of the following auto switches are used: D-S99(V)/T99(V)/S9P(V)

Series **CRB2** (Size: 10, 15, 20, 30, 40)

Simple Specials

-XA1 to -XA24: Shaft Pattern Sequencing I

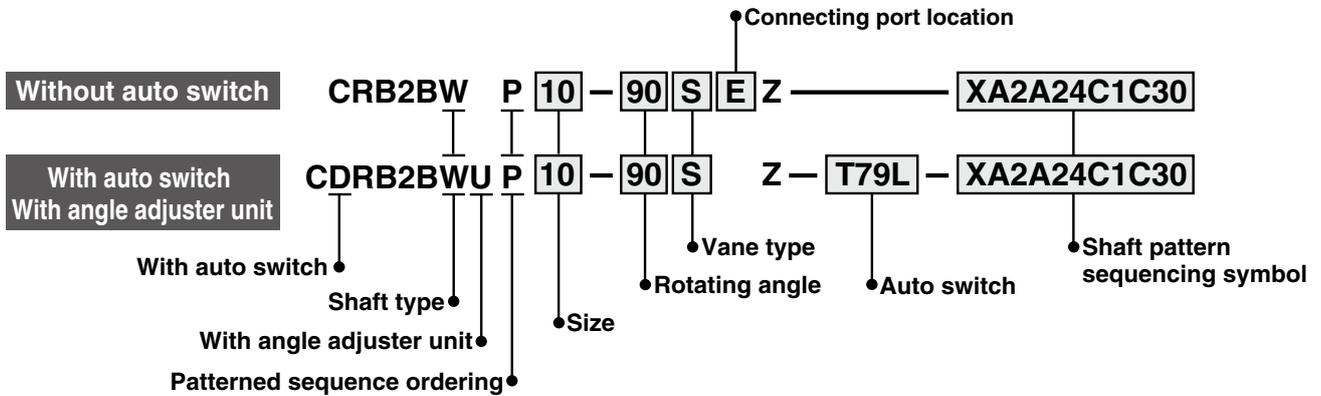
Shaft shape pattern is dealt with simple made-to-order system. (Refer to Best Pneumatics No.4)
Please contact SMC for a specification sheet when placing an order.

Symbol

Shaft Pattern Sequencing I

-XA1 to -XA24

Applicable shaft type: W (Standard)



Shaft Pattern Sequencing Symbol

●Axial: Top (Long shaft side)

Symbol	Description	Applicable size				
		10	15	20	30	40
XA1	Shaft-end female thread		●	●	●	
XA3	Shaft-end male thread	●	●	●	●	
XA5	Stepped round shaft	●	●	●	●	
XA7	Stepped round shaft with male thread	●	●	●	●	
XA9	Modified length of standard chamfer	●	●	●	●	
XA11	Double-sided chamfer	●	●	●	●	
XA14*	Shaft through-hole + Shaft-end female thread		●	●	●	●
XA17	Shortened shaft	●	●	●	●	●
XA21	Stepped round shaft with double-sided chamfer	●	●	●	●	
XA23	Right-angle chamfer	●	●	●	●	
XA24	Double key					●

* These specifications are not available for rotary actuators with auto switch and/or with angle adjuster unit.

●Axial: Bottom (Short shaft side)

Symbol	Description	Applicable size				
		10	15	20	30	40
XA2*	Shaft-end female thread		●	●	●	●
XA4*	Shaft-end male thread	●	●	●	●	●
XA6*	Stepped round shaft	●	●	●	●	●
XA8*	Stepped round shaft with male thread	●	●	●	●	●
XA10*	Modified length of standard chamfer	●	●	●	●	●
XA12*	Double-sided chamfer	●	●	●	●	●
XA15*	Shaft through-hole + Shaft-end female thread		●	●	●	●
XA18*	Shortened shaft	●	●	●	●	●
XA22*	Stepped round shaft with double-sided chamfer	●	●	●	●	●

●Double Shaft

Symbol	Description	Applicable size				
		10	15	20	30	40
XA13*	Shaft through-hole		●	●	●	●
XA16*	Shaft through-hole + Double shaft-end female thread		●	●	●	●
XA19*	Shortened shaft	●	●	●	●	
XA20*	Reversed shaft	●	●	●	●	●

Series CRB2

Combination

XA□ Combination

Symbol	Combination																														
XA1	XA1																														
XA2	●	XA2																													
XA3	—	●	XA3																												
XA4	●	—	●	XA4																											
XA5	—	●	—	●	XA5																										
XA6	●	—	●	—	●	XA6																									
XA7	—	●	—	●	—	●	XA7																								
XA8	●	—	●	—	●	—	●	XA8																							
XA9	—	●	—	●	—	●	—	●	XA9																						
XA10	●	—	●	—	●	—	●	—	●	XA10																					
XA11	—	●	—	●	—	●	—	●	—	●	XA11																				
XA12	●	—	●	—	●	—	●	—	●	—	●	XA12																			
XA13	—	●	—	●	—	●	—	●	—	●	—	●	XA13																		
XA14	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA14																
XA15	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA15														
XA16	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA16												
XA17	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA17										
XA18	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA18									
XA19	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA19								
XA20	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA20						
XA21	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA21				
XA22	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA22			
XA23	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA23		
XA24	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	—	●	XA24

A combination of up to two XA□s are available.
 Example: -XA2A24

XA□, XC□ Combination

Combination other than -XA□, such as Made to Order (-XC□), is also available.
 Refer to pages 29 to 30 for details on the made-to-order specifications.

Symbol	Description	Applicable size	Combination
			XA1 to XA24
XC1*	Add connecting port	10, 15, 20, 30, 40	●
XC2*	Change threaded holes to through-holes	15, 20, 30, 40	●
XC3*	Change the screw position	10, 15, 20, 30, 40	●
XC4	Change rotation range		●
XC5*	Change rotation range between 0 to 200°		●
XC6*	Change rotation range between 0 to 110°		●
XC7*	Reversed shaft		—
XC30	Fluorine grease		●

* These specifications are not available for rotary actuators with auto switch and/or with angle adjuster unit.

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

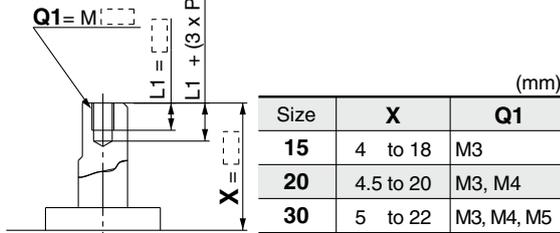
Example: -XA2A24C1C30
 -XA2C1C4C30

Axial: Top (Long shaft side)

Symbol: A1 The long shaft can be further shortened by machining female threads into it.

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

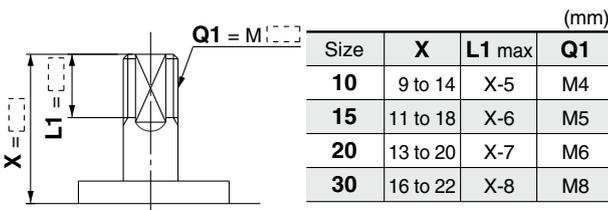
- Not available for size 10.
- The maximum dimension L1 is, as a rule, twice the thread size.
- (Example) For M3: L1 = 6 mm
- Applicable shaft type: W



Symbol: A3 The long shaft can be further shortened by machining male threads into it.

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

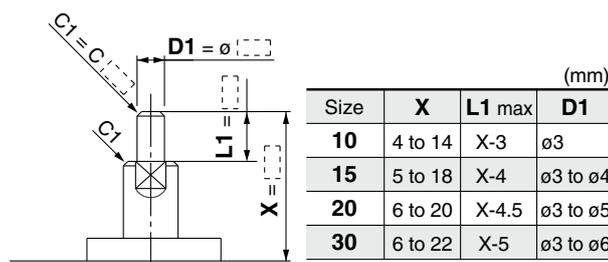
- Applicable shaft type: W



Symbol: A5 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.)

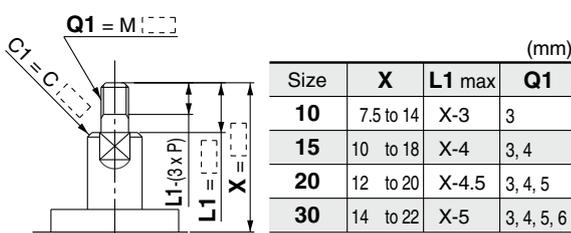
- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.
- (If not specifying dimension C1, indicate "*" instead.)



Symbol: A7 The long shaft can be further shortened by machining it into a stepped round shaft with male threads.

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

- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.
- (If not specifying dimension C1, indicate "*" instead.)

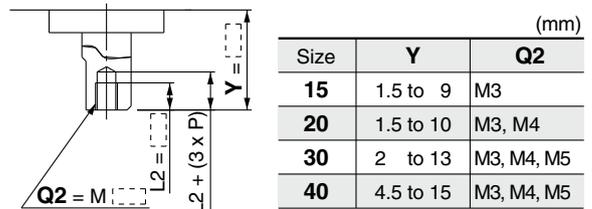


Axial: Bottom (Short shaft side)

Symbol: A2 The short shaft can be further shortened by machining female threads into it.

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

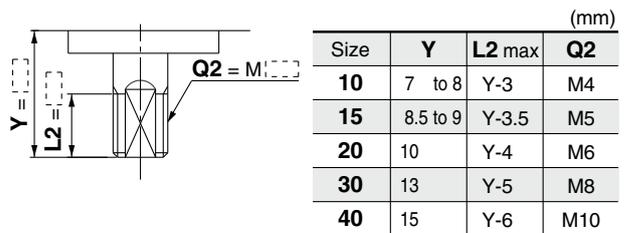
- Not available for size 10.
- The maximum dimension L2 is, as a rule, twice the thread size.
- (Example) For M3: L2 = 6 mm
- Applicable shaft type: W



Symbol: A4 The short shaft can be further shortened by machining male threads into it.

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

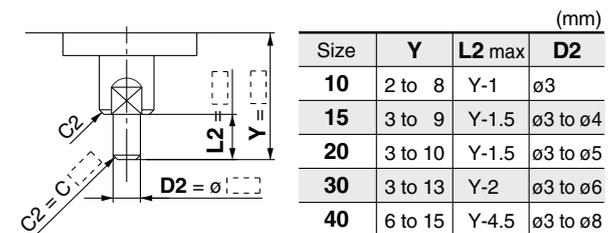
- Applicable shaft type: W



Symbol: A6 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.)

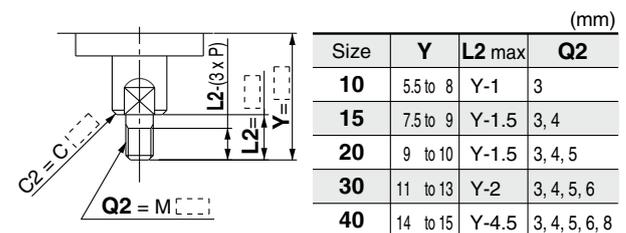
- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.
- (If not specifying dimension C2, indicate "*" instead.)



Symbol: A8 The short shaft can be further shortened by machining it into a stepped round shaft with male threads.

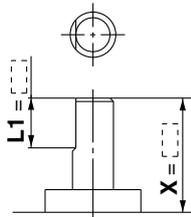
(If shortening the shaft is not required, indicate "*" for dimension Y.)

- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.
- (If not specifying dimension C2, indicate "*" instead.)



Axial: Top (Long shaft side)

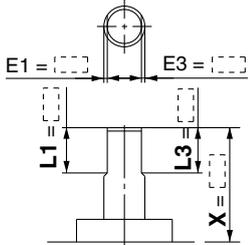
Symbol: A9 The long shaft can be further shortened by changing the length of the standard chamfer on the long shaft side.
(If shortening the shaft is not required, indicate "*" for dimension X.)
• Applicable shaft type: W



Size	X	L1
10	5 to 14	9-(14-X) to (X-3)
15	8 to 18	10-(18-X) to (X-4)
20	10 to 20	10-(20-X) to (X-4.5)
30	10 to 22	12-(22-X) to (X-5)

Symbol: A11 The long shaft can be further shortened by machining a double-sided chamfer onto it.
(If altering the standard chamfer and shortening the shaft are not required, indicate "*" for both the L1 and X dimensions.)

- Since L1 is a standard chamfer, dimension E1 is 0.5 mm or more, and 1 mm or more with a shaft bore size of $\phi 30$.
- Applicable shaft type: W

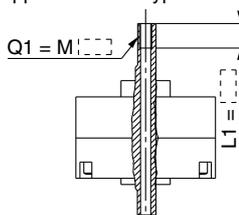


Size	X	L1	L3 max
10	5 to 14	9-(14-X) to (X-3)	X-3
15	8 to 18	10-(18-X) to (X-4)	X-4
20	10 to 20	10-(20-X) to (X-4.5)	X-4.5
30	10 to 22	12-(22-X) to (X-5)	X-5

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-hole, whose diameter is equivalent to the pilot hole diameter.

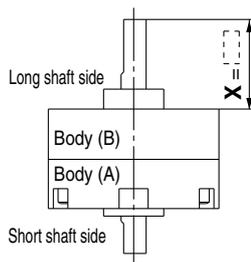
- Not available for size 10.
- The maximum dimension L1 is, as a rule, twice the thread size.
(Example) For M3: L1 max. = 6 mm
- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: W



Thread	Size	15	20	30	40
M3 x 0.5	$\phi 2.5$				
M4 x 0.7	—	$\phi 3.3$	$\phi 3.3$	—	—
M5 x 0.8	—	—	$\phi 4.2$	—	—

Symbol: A17 The long shaft is shortened.

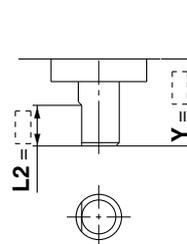
- Applicable shaft type: W



Size	X
10	3 to 14
15	4 to 18
20	4.5 to 20
30	5 to 22
40	18 to 33

Axial: Bottom (Short shaft side)

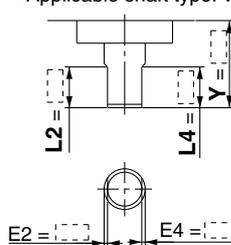
Symbol: A10 The short shaft can be further shortened by changing the length of the standard chamfer on the short shaft side.
(If shortening the shaft is not required, indicate "*" for dimension Y.)
• Applicable shaft type: W



Size	Y	L2
10	3 to 8	5-(8-Y) to (Y-1)
15	3 to 9	6-(9-Y) to (Y-1.5)
20	3 to 10	7-(10-Y) to (Y-1.5)
30	5 to 13	8-(13-Y) to (Y-2)
40	7 to 15	9-(15-Y) to (Y-2)

Symbol: A12 The short shaft can be further shortened by machining a double-sided chamfer onto it.
(If altering the standard chamfer and shortening the shaft are not required, indicate "*" for both the L2 and Y dimensions.)

- Since L2 is a standard chamfer, dimension E2 is 0.5 mm or more, and 1 mm or more with shaft bore size of $\phi 30$ and $\phi 40$.
- Applicable shaft type: W

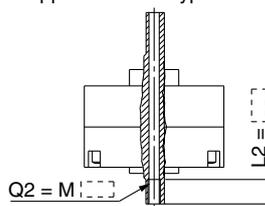


Size	Y	L2	L4 max
10	3 to 8	5-(8-Y) to (Y-1)	Y-1
15	3 to 9	6-(9-Y) to (Y-1.5)	Y-1.5
20	3 to 10	7-(10-Y) to (Y-1.5)	Y-1.5
30	5 to 13	8-(13-Y) to (Y-2)	Y-2
40	7 to 15	9-(15-Y) to (Y-2)	Y-2

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.

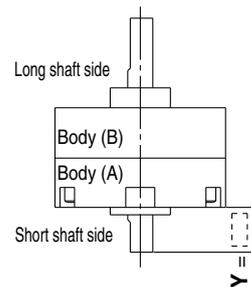
- A parallel key is used on the long shaft for size 40.
- Not available for size 10.
- The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M4: L2 max. = 8 mm
- Applicable shaft type: W



Thread	Size	15	20	30	40
M3 x 0.5	$\phi 2.5$				
M4 x 0.7	—	$\phi 3.3$	$\phi 3.3$	—	—
M5 x 0.8	—	—	$\phi 4.2$	—	—

Symbol: A18 The short shaft is shortened.

- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: W

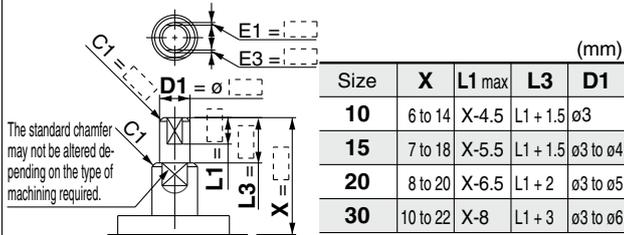


Size	Y
10	1 to 8
15	1.5 to 9
20	1.5 to 10
30	2 to 13
40	4.5 to 15

Axial: Top (Long shaft side)

Symbol: A21 The long shaft can be further shortened by machining it into a stepped round shaft with a double-sided chamfer. (If shortening the shaft is not required, indicate "*" for dimension X.)

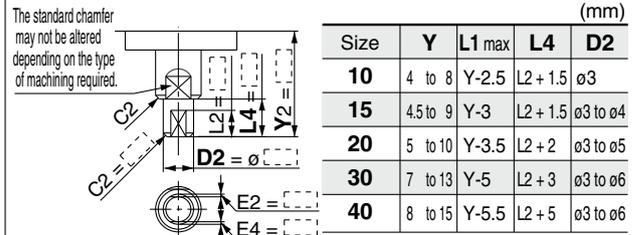
- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.
- (If not specifying dimension C1, indicate "*" instead.)



Axial: Bottom (Short shaft side)

Symbol: A22 The short shaft can be further shortened by machining it into a stepped round shaft with a double-sided chamfer. (If shortening the shaft is not required, indicate "*" for dimension Y.)

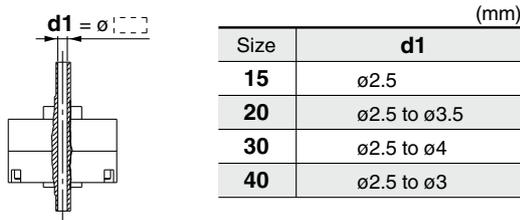
- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.
- (If not specifying dimension C2, indicate "*" instead.)



Double Shaft

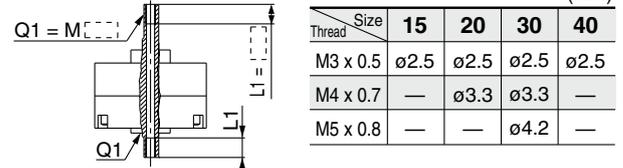
Symbol: A13 Applicable to single vane type only
Shaft with through-hole

- Not available for size 10.
- Minimum machining diameter for d1 is 0.1 mm.
- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: W



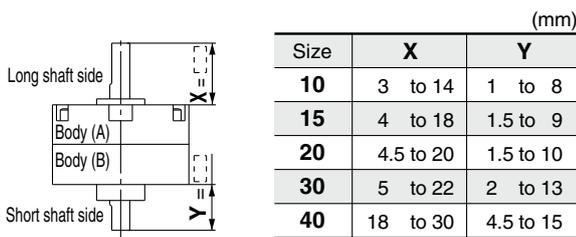
Symbol: A16 Applicable to single vane type only
A special end is machined onto both the long and short shafts, and a through-hole is drilled into both shafts. Female threads are machined into the through-holes, whose diameter is equivalent to the diameter of the pilot holes.

- Not available for size 10.
- The maximum dimension L1 is, as a rule, twice the thread size.
- (Example) For M5: L1 max. = 10 mm
- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: W
- Equal dimensions are indicated by the same marker.



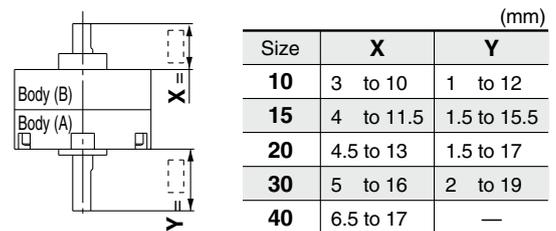
Symbol: A19 Both the long shaft and short shaft are shortened.

- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: W



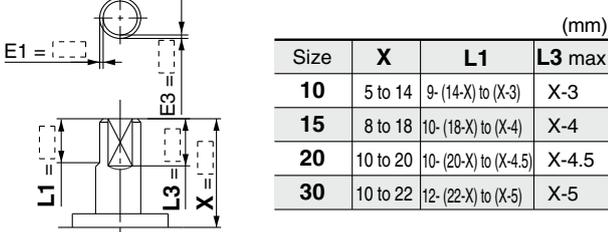
Symbol: A20 The shafts are reversed.
(Both the long shaft and the short shaft are shortened.)

- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: W



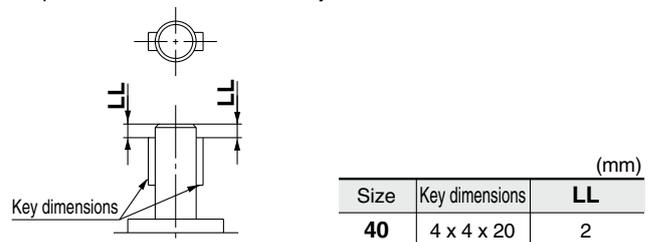
Symbol: A23 The long shaft can be further shortened by machining right-angle double-sided chamfer onto it.
(If altering the standard chamfer and shortening the shaft are not required, indicate "*" for both the L1 and X dimensions.)

- Since L1 is a standard chamfer, dimension E1 is 0.5 mm or more, and 1 mm or more with a shaft bore size of ø30 and ø40.
- Applicable shaft type: W



Symbol: A24 Double key
Keys and keyways are machined additionally at 180° from the standard position.

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



Series CRB2 (Size: 10, 15, 20, 30, 40)

Simple Specials

-XA31 to -XA58: Shaft Pattern Sequencing II

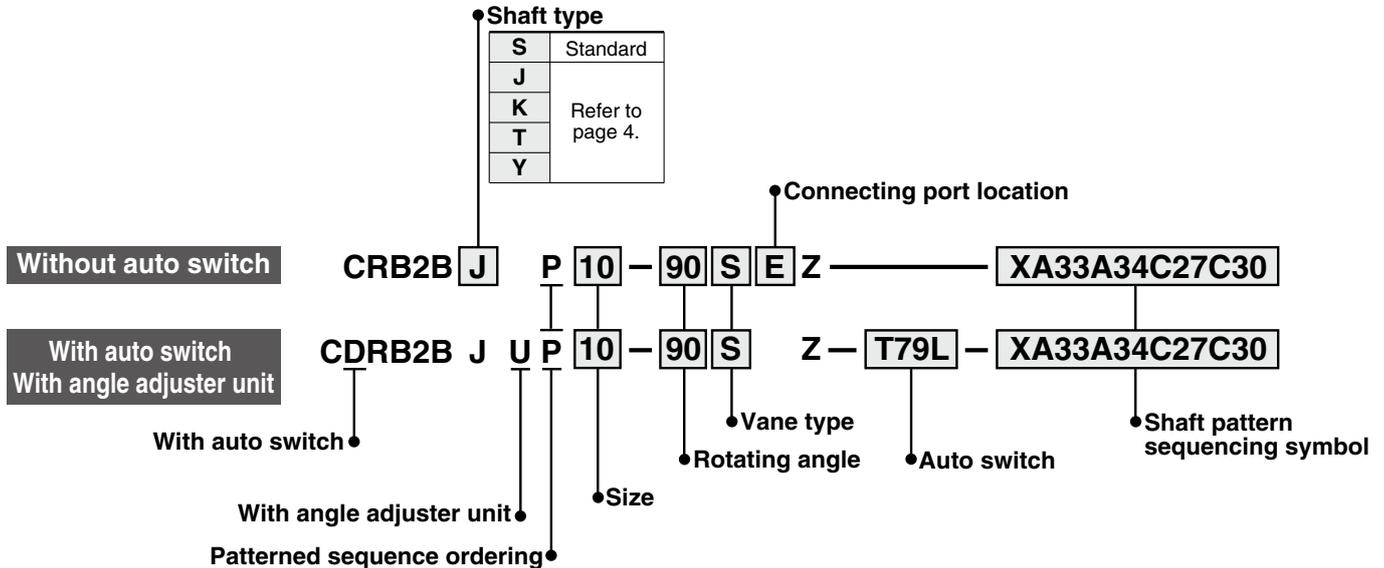
Shaft shape pattern is dealt with simple made-to-order system. (Refer to Best Pneumatics No.4)
Please contact SMC for a specification sheet when placing an order.

Symbol

Shaft Pattern Sequencing II

-XA31 to -XA58

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



Shaft Pattern Sequencing Symbol

● Axial: Top (Long shaft side)

Symbol	Description	Shaft type	Applicable size				
			10	15	20	30	40
XA31	Shaft-end female thread	S, Y		●	●	●	
XA33	Shaft-end female thread	J, K, T		●	●	●	●
XA37	Stepped round shaft	J, K, T	●	●	●	●	●
XA45	Middle-cut chamfer	J, K, T	●	●	●	●	●
XA47	Machined keyway	J, K, T			●	●	
XA48	Change of long shaft length	S, Y	●	●	●	●	●
XA51	Change of long shaft length	J, K, T	●	●	●	●	●

● Axial: Bottom (Short shaft side)

Symbol	Description	Shaft type	Applicable size				
			10	15	20	30	40
XA32	Shaft-end female thread	S, Y		●	●	●	
XA34	Shaft-end female thread	J, K, T		●	●	●	●
XA38	Stepped round shaft	K	●	●	●	●	●
XA46	Middle-cut chamfer	K	●	●	●	●	●
XA49	Change of short shaft length	Y	●	●	●	●	●
XA52	Change of short shaft length	K	●	●	●	●	●
XA55	Change of short shaft length	J	●	●	●	●	●

● Double Shaft

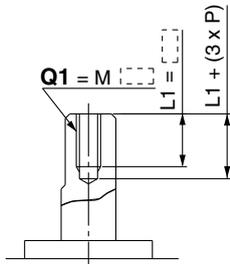
Symbol	Description	Shaft type	Applicable size				
			10	15	20	30	40
XA39*	Shaft through-hole	S, Y		●	●	●	●
XA40*	Shaft through-hole	K, T		●	●	●	●
XA41*	Shaft through-hole	J		●	●	●	●
XA42*	Shaft through-hole + Shaft-end female thread	S, Y		●	●	●	●
XA43*	Shaft through-hole + Shaft-end female thread	K, T		●	●	●	●
XA44*	Shaft through-hole + Shaft-end female thread	J		●	●	●	●
XA50*	Change of double shaft length	Y	●	●	●	●	●
XA53*	Change of double shaft length	K	●	●	●	●	●
XA57*	Change of double shaft length	J	●	●	●	●	●
XA58*	Reversed shaft, Change of double shaft length	J	●	●	●	●	●

* These specifications are not available for rotary actuators with auto switch and/or with angle adjuster unit.

Axial: Top (Long shaft side)

Symbol: A31 Female threads are machined into the long shaft.

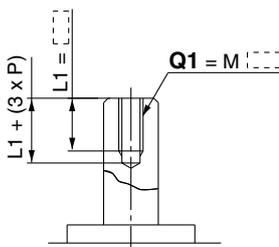
- The maximum dimension L1 is, as a rule, twice the thread size.
(Example) For M3: L1 = 6 mm
- Applicable shaft type: S, Y



Size	Q1	
	S	Y
10	Not available	
15	M3	
20	M3, M4	
30	M3, M4, M5	

Symbol: A33 Female threads are machined into the long shaft.

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

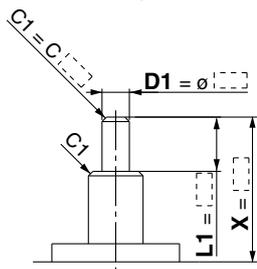


Size	Q1		
	J	K	T
10	Not available		
15	M3		
20	M3, M4		
30	M3, M4, M5		
40	M3, M4, M5		

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.)

- Applicable shaft type: J, K, T
- Equal dimensions are indicated by the same marker.
(If not specifying dimension C1, indicate "*" instead.)



Size	X	L1max	D1	
			Ø3	Ø3.9
10	4 to 14	X-3	Ø3 to Ø3.9	
15	5 to 18	X-4	Ø3 to Ø4.9	
20	6 to 20	X-4.5	Ø3 to Ø5.9	
30	6 to 22	X-5	Ø3 to Ø7.9	
40	8 to 30	X-6.5	Ø3 to Ø9.9	

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 model.)

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

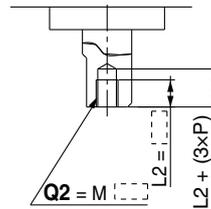
- Applicable shaft type: J, K, T

Size	X																	
	J			K			T			W1			L1max			L3max		
	J	K	T	J	K	T	J	K	T	J	K	T	J	K	T			
10	6.5 to 14			0.5 to 2			X-3			L1-1								
15	8 to 18			0.5 to 2.5			X-4			L1-1								
20	9 to 20			0.5 to 3			X-4.5			L1-1								
30	11.5 to 22			0.5 to 4			X-5			L1-2								
40	15.5 to 30			0.5 to 5			X-5.5			L1-2								

Axial: Bottom (Short shaft side)

Symbol: A32 Female threads are machined into the short shaft.

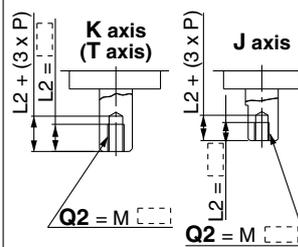
- The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M4: L2 = 8 mm
However, for M5 with S shaft, the maximum dimension L2 is 1.5 times the thread size.
- Applicable shaft type: S, Y



Size	Q2	
	S	Y
10	Not available	
15	M3	
20	M3, M4	
30	M3, M4, M5	

Symbol: A34 Female threads are machined into the short shaft.

- The maximum dimension L2 is, as a rule, twice the thread size.
(Example) For M3: L2 = 6 mm
However, for M5 with T shaft, the maximum dimension L2 is 1.5 times the thread size.
- Applicable shaft type: J, K, T

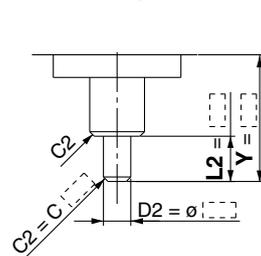


Size	Q2		
	J	K	T
10	Not available		
15	M3		
20	M3, M4		
30	M3, M4, M5		
40	M3, M4, M5		

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.)

- Applicable shaft type: K
- Equal dimensions are indicated by the same marker.
(If not specifying dimension C2, indicate "*" instead.)



Size	Y	L2max	Q2	
			Ø3	Ø3.9
10	2 to 14	Y-1	Ø3 to Ø3.9	
15	3 to 18	Y-1.5	Ø3 to Ø4.9	
20	3 to 20	Y-1.5	Ø3 to Ø5.9	
30	3 to 22	Y-2	Ø3 to Ø7.9	
40	6 to 30	Y-4.5	Ø5 to Ø9.9	

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 model.)

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

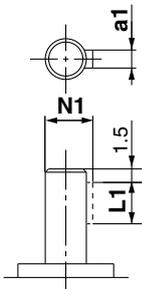
- Applicable shaft type: K

Size	Y											
	J		K		T		W2		L2max		L4max	
	J	K	J	K	J	K	J	K	J	K	J	K
10	4.5 to 14		0.5 to 2		Y-1		L2-1					
15	5.5 to 18		0.5 to 2.5		Y-1.5		L2-1					
20	6 to 20		0.5 to 3		Y-1.5		L2-1					
30	8.5 to 22		0.5 to 4		Y-2		L2-2					
40	13.5 to 30		0.5 to 5		Y-4.5		L2-2					

Axial: Top (Long shaft side)

Symbol: A47 Machine a keyway into the long shaft. (The position of the keyway is the same as the standard model.) The key must be ordered separately.

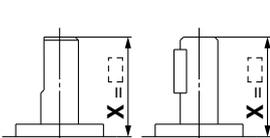
- Applicable shaft type: J, K, T



Size	a1	L1	N1
20	2h9 _{0.025} ⁰	10	6.8
30	3h9 _{0.025} ⁰	14	9.2

Symbol: A48 The long shaft is shortened.

- Applicable shaft type: S, Y

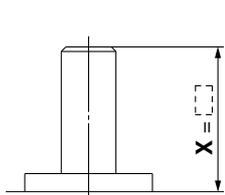


Size 10 to 30 Size 40

Size	X
10	3 to 14
15	4 to 18
20	4.5 to 20
30	5 to 22
40	18 to 30

Symbol: A51 The long shaft is shortened.

- Applicable shaft type: J, K, T

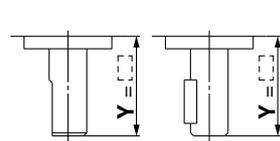


Size	X
10	3 to 14
15	4 to 18
20	4.5 to 20
30	5 to 22
40	6.5 to 30

Axial: Bottom (Short shaft side)

Symbol: A49 The short shaft is shortened.

- Applicable shaft type: Y

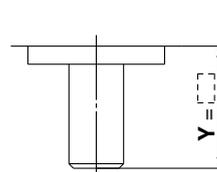


Size 10 to 30 Size 40

Size	Y
10	1 to 14
15	1.5 to 18
20	1.5 to 20
30	2 to 22
40	18 to 30

Symbol: A52 The short shaft is shortened.

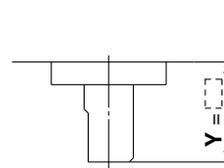
- Applicable shaft type: K



Size	Y
10	1 to 14
15	1.5 to 18
20	1.5 to 20
30	2 to 22
40	4.5 to 30

Symbol: A55 The short shaft is shortened.

- Applicable shaft type: J

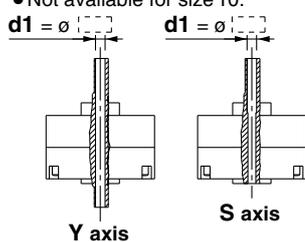


Size	Y
10	1 to 8
15	1.5 to 9
20	1.5 to 10
30	2 to 13
40	4.5 to 15

Double Shaft

Symbol: A39 Applicable to single vane type only

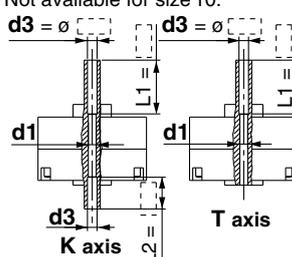
- Shaft with through-hole (Additional machining of S, Y shaft)
- Applicable shaft type: S, Y
- Equal dimensions are indicated by the same marker.
- Not available for size 10.
- A parallel key is used on the long shaft for size 40.
- Minimum machining diameter for d1 is 0.1 mm.



Size	Shaft type	
	S	Y
	d1	
15	ø2.5	
20	ø2.5 to ø3.5	
30	ø2.5 to ø4	
40	ø2.5 to ø3	

Symbol: A40 Applicable to single vane type only

- Shaft with through-hole (Additional machining of K, T shaft)
- Applicable shaft type: K, T
- Equal dimensions are indicated by the same marker.
- Not available for size 10.
- d1 = ø2.5, L1 = 18 (max.) for size 15 ; minimum machining diameter for d1 is 0.1 mm.
- d1 = d3 for size 20 to 40.



Size	Shaft type			
	K	T	K	T
	d1		d3	
15	ø2.5		ø2.5 to ø3	
20	—		ø2.5 to ø4	
30	—		ø2.5 to ø4.5	
40	—		ø2.5 to ø5	

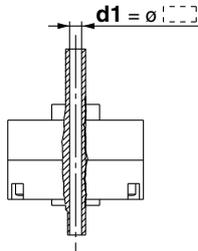
Series CRB2

Symbol: A41

Applicable to single vane type only

Shaft with through-hole

- Not available for size 10.
- Applicable shaft type: J
- Equal dimensions are indicated by the same marker.



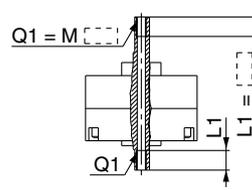
Size	d1 (mm)
15	ø2.5
20	ø2.5 to ø3.5
30	ø2.5 to ø4
40	ø2.5 to ø4.5

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.

- Not available for size 10.
- The maximum dimension L1 is, as a rule, twice the thread size.
- A parallel key is used on the long shaft for size 40.
- Applicable shaft type: S, Y
- Equal dimensions are indicated by the same marker.



Thread	Size 15		Size 20		Size 30		Size 40	
	S	Y	S	Y	S	Y	S	Y
M3 x 0.5	ø2.5	ø2.5	ø2.5	ø2.5	ø2.5	ø2.5	—	—
M4 x 0.7	—	—	ø3.3	ø3.3	—	—	—	—
M5 x 0.8	—	—	—	—	ø4.2	—	—	—

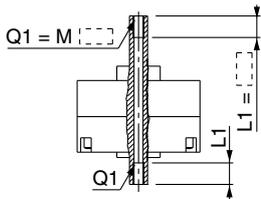
Symbol: A43

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.

- Not available for size 10.
- 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.

(Example) For M5: L1 max. = 10 mm
However, for M5 on the short shaft of T shaft: L1 max. = 7.5 mm



Thread	Size 15		Size 20		Size 30		Size 40	
	K	T	K	T	K	T	K	T
M3 x 0.5	ø2.5	ø2.5	ø2.5	ø2.5	ø2.5	ø2.5	—	—
M4 x 0.7	—	—	ø3.3	ø3.3	ø3.3	ø3.3	—	—
M5 x 0.8	—	—	—	—	ø4.2	ø4.2	—	—

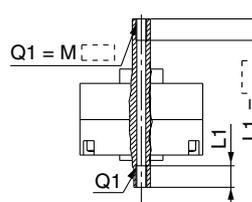
Symbol: A44

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.

- Not available for size 10.
- The maximum dimension L1 is, as a rule, twice the thread size.
- Applicable shaft type: J
- Equal dimensions are indicated by the same marker.

(Example) For M5: L1 max. = 10 mm

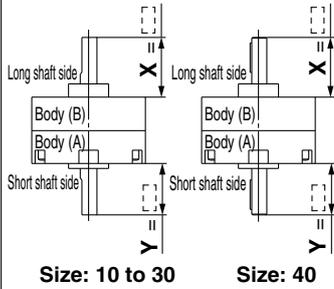


Thread	Size 15		Size 20		Size 30		Size 40	
	M3 x 0.5	ø2.5	ø2.5	ø2.5	ø2.5	ø2.5	ø2.5	—
M4 x 0.7	—	—	ø3.3	ø3.3	ø3.3	ø3.3	—	—
M5 x 0.8	—	—	—	—	ø4.2	ø4.2	—	—

Symbol: A50

Both the long shaft and the short shaft are shortened.

- Applicable shaft type: Y

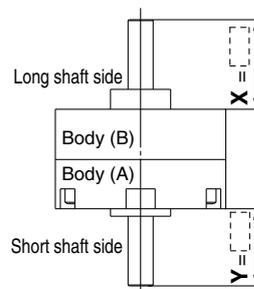


Size	X (mm)	Y (mm)
10	3 to 14	1 to 14
15	4 to 18	1.5 to 18
20	4.5 to 20	1.5 to 20
30	5 to 22	2 to 22
40	18 to 30	18 to 30

Symbol: A53

Both the long shaft and the short shaft are shortened.

- Applicable shaft type: K

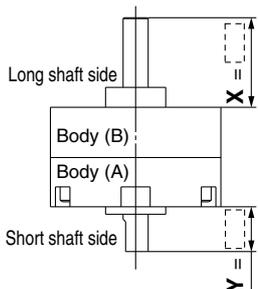


Size	X (mm)	Y (mm)
10	3 to 14	1 to 14
15	4 to 18	1.5 to 18
20	4.5 to 20	1.5 to 20
30	5 to 22	2 to 22
40	6.5 to 30	4.5 to 30

Symbol: A57

Both the long shaft and the short shaft are shortened.

- Applicable shaft type: J



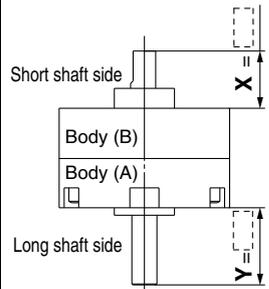
Size	X (mm)	Y (mm)
10	3 to 14	1 to 14
15	4 to 18	1.5 to 18
20	4.5 to 20	1.5 to 20
30	5 to 22	2 to 22
40	6.5 to 30	4.5 to 30

Symbol: A58

The shafts are reversed. Additionally, both the long shaft and the short shaft are shortened.

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

- Applicable shaft type: J



Size	X (mm)	Y (mm)
10	3 to 10	1 to 12
15	4 to 11.5	1.5 to 15.5
20	4.5 to 13	1.5 to 17
30	5 to 16	2 to 19
40	6.5 to 17	4.5 to 28

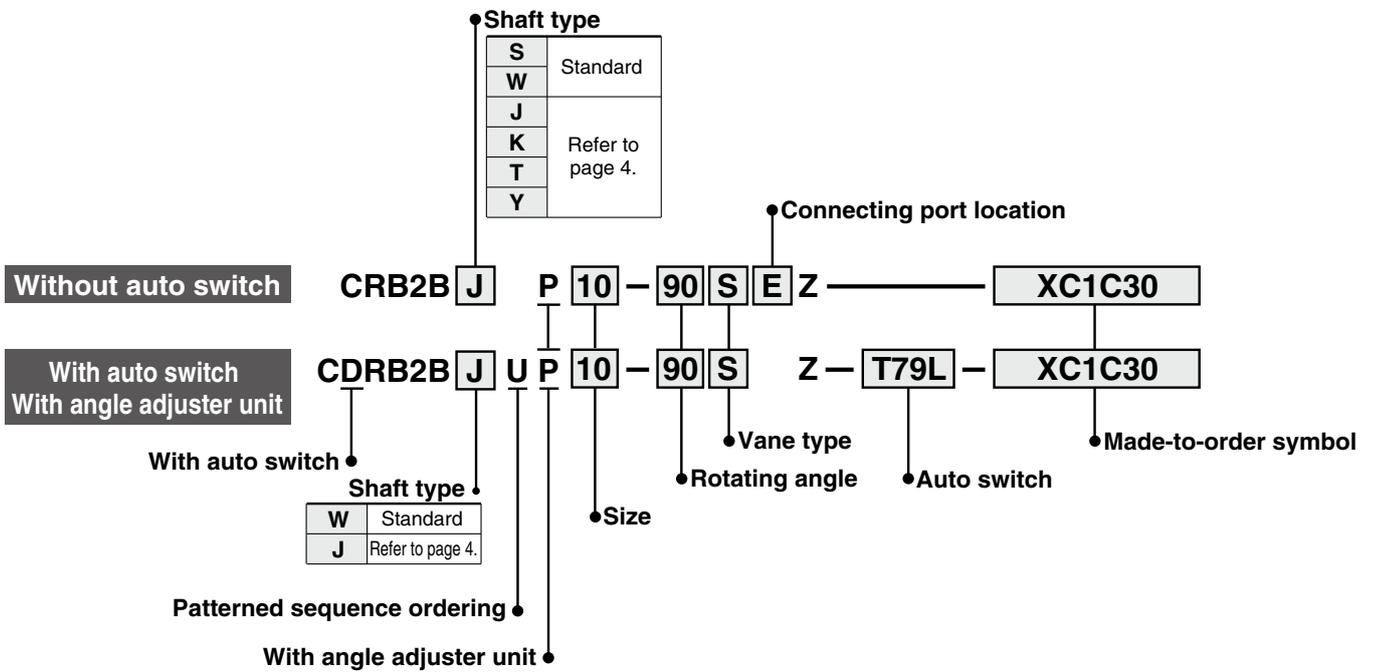
Series CRB2 (Size 10, 15, 20, 30, 40)

Made to Order

-XC1, 2, 3, 4, 5, 6, 7, 30

Symbol

-XC1 to -XC7, -XC30



Made to Order Symbol

Symbol	Description	Applicable shaft type	Applicable size
		W, J, K, S, T, Y	
XC1*	Add connecting ports	●	10
XC2*	Change threaded holes to through-holes	●	
XC3*	Change the screw position	●	
XC4	Change the rotation range	●	20
XC5*	Change rotation range between 0 to 200°	●	
XC6*	Change rotation range between 0 to 110°	●	30
XC7*	Reversed shaft	W, J	
XC30	Fluorine grease	●	40

* These specifications are not available for rotary actuators with auto switch and/or angle adjuster unit.

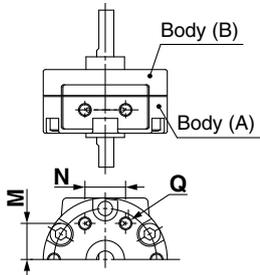
Combination

Symbol	Combination						
XC1	●						
XC2	●	●					
XC3	●		●				
XC4	●	●	●	●			
XC5	●	●	●	—	●		
XC6	●	●	●	—	—	●	
XC7	●	●	●	●	●	—	●
XC30	●	●	●	●	●	●	●

Series CRB2

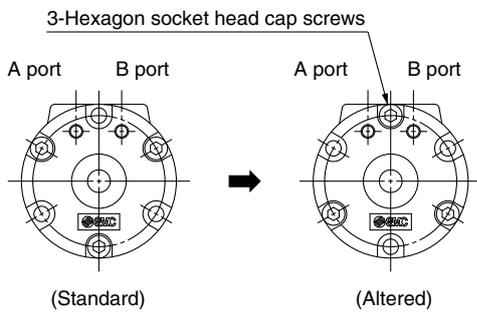
Symbol: C1 The connecting ports are added on the Body (A) end surface. (It will have an aluminum surface since the additional machining will be left unfinished.)

- A parallel key is used instead of chamfer on the long shaft for size 40.
- Not available for the rotary actuator with auto switch.



Size	Q	M	N
10	M3	8.5	9.5
15	M3	11	10
20	M5	14	13
30	M5	15.5	14
40	M5	21	20

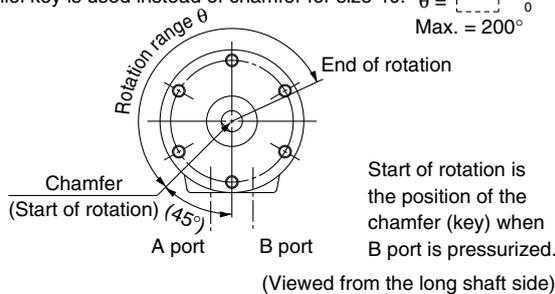
Symbol: C3 The position of the screws for tightening the actuator body is changed.



(Viewed from the short shaft side)

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

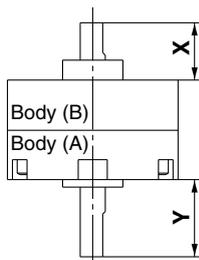
- Rotation tolerance for CRB2BW10 is $+5^{\circ}_0$.
- Port size for CRB2BW10, 15 is M3.
- A parallel key is used instead of chamfer for size 40. $\theta = \text{[]}^{\circ} +4^{\circ}_0$
Max. = 200°



(Viewed from the long shaft side)

Symbol: C7 The shafts are reversed.

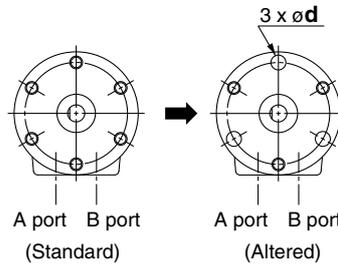
- A parallel key is used instead of chamfer on the long shaft for size 40.



Size	Y	X
10	12	10
15	15.5	11.5
20	17	13
30	19	16
40	28	17

Symbol: C2 The threaded holes on the Body (B) are changed to through-holes. (It will have an aluminum surface since the additional machining will be left unfinished.)

- Not available for the rotary actuator with auto switch.



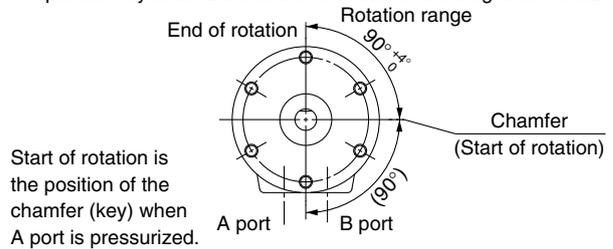
Size	d
15	3.4
20	4.5
30	5.5
40	5.5

(Viewed from the long shaft side)

Symbol: C4 Applicable to single vane type only
The rotation range is changed. Rotating angle 90°.

Starts of rotation is the horizontal line (90° down from the top to the right side).

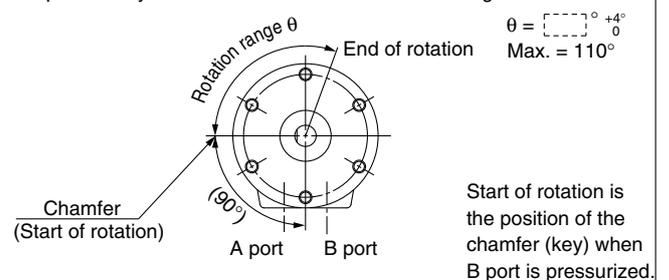
- Rotation tolerance for CRB2BW10 is $+5^{\circ}_0$.
- A parallel key is used instead of chamfer on the long shaft for size 40.



(Viewed from the long shaft side)

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

- Rotation tolerance for CRB2BW10 is $+5^{\circ}_0$.
- A parallel key is used instead of chamfer on the long shaft for size 40.



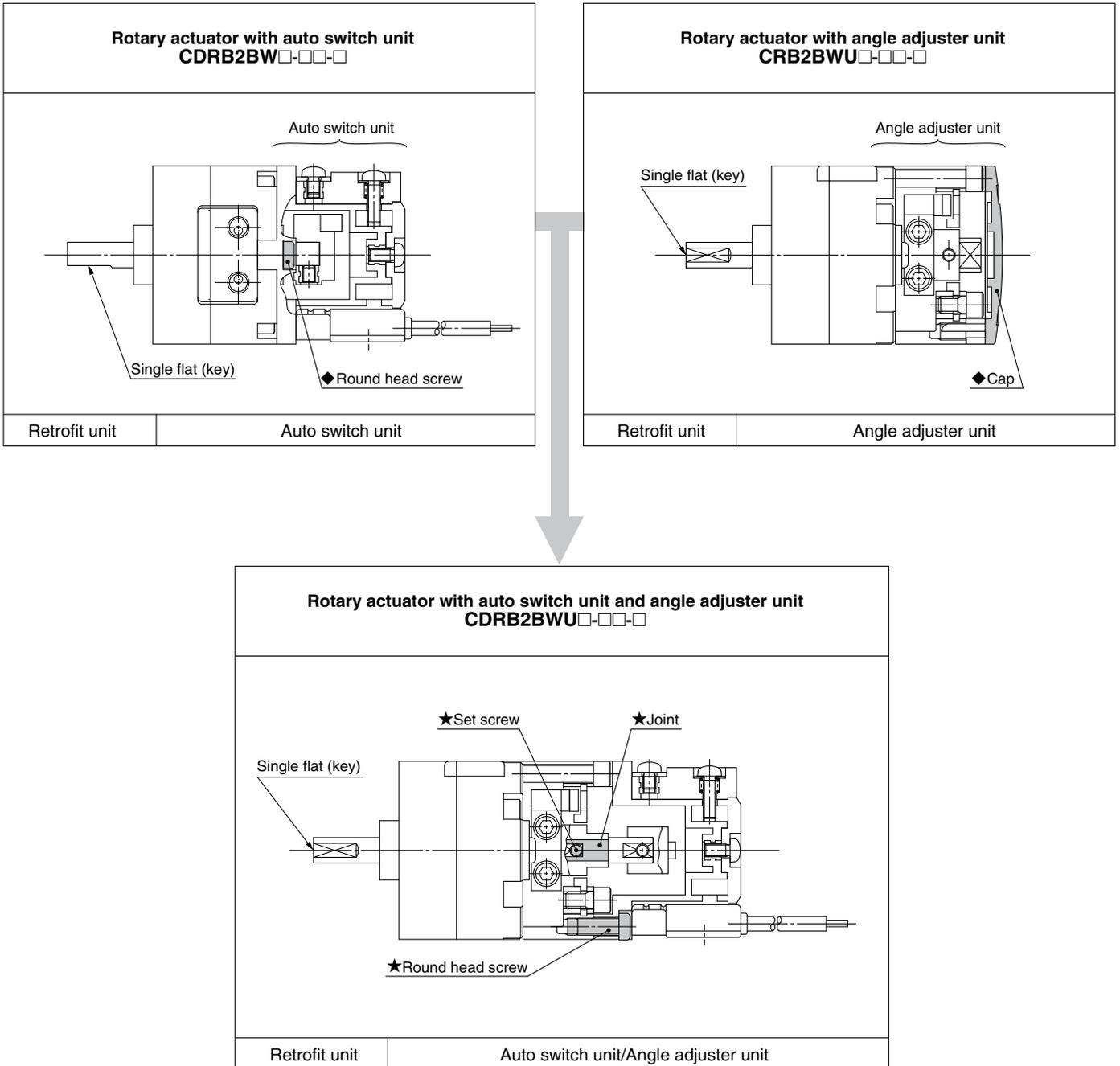
(Viewed from the long shaft side)

Symbol: C30 The standard grease is changed to fluovine grease. (Not for low-speed specification.)

Rotary Actuator Series **CRB2** Component Unit

Auto Switch Unit and Angle Adjuster Unit

Series CRB2 Auto switch unit and/or angle adjuster unit can be mounted on the rotary actuator vane type.



- * The rotary actuator with auto switch and angle adjuster is basically a combination of the auto switch unit and angle adjuster unit. The items marked with ★ are additional parts required for connection (joint assembly parts), and the items marked with ◆ are unnecessary.
- * To order the joint assembly separately, order it using the joint unit part number.

1 Auto Switch Unit Part No.

Each unit can be retrofitted to the rotary actuator.

Series	Model	Vane type	Unit part no.
CRB2	CDRB2BW10	Single/Double	P611070-1
	CDRB2BW15		P611090-1
	CDRB2BW20		P611060-1
	CDRB2BW30		P611080-1
	CDRB2BW40		P611010-1

* Auto switch unit can be ordered separately if the rotary actuator with auto switch is required after the product being delivered. Since the auto switch will not be included, please order separately.

2 Switch Block Unit Part No.

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.

Series	Model	Unit part no.	
CRB2	CDRB2BW10,15	Right-handed	P611070-8
		Left-handed	P611070-9
	CDRB2BW20,30	Right-handed	P611060-8
		Left-handed	
	CDRB2BW40	Right-handed	P611010-8
		Left-handed	P611010-9

* Solid state switch for size 10 and 15 requires no switch block, therefore the unit part number will be P211070-13.

3 Angle Adjuster Unit Part No.

Each unit can be retrofitted to the rotary actuator.

Series	Model	Vane type	Unit part no.
CRB2	CRB2BWU10	Single/Double	P811010-3
	CRB2BWU15		P811020-3
	CRB2BWU20		P811030-3
	CRB2BWU30		P811040-3
	CRB2BWU40		P811050-3

4 Auto Switch Angle Adjuster Unit Part No.

Each unit can be retrofitted to the rotary actuator.

Series	Model	Vane type	Unit part no.
CRB2	CDRB2BWU10	Single/Double	P811010-4
	CDRB2BWU15		P811020-4
	CDRB2BWU20		P811030-4
	CDRB2BWU30		P811040-4
	CDRB2BWU40		P811050-4

5 Joint Unit Part No.

Joint unit is required to retrofit the angle adjuster unit to a rotary actuator with auto switch or to retrofit the auto switch unit to a rotary actuator with angle adjuster.

Series	Model	Vane type	Unit part no.
CRB2	CDRB2BWU10	Single/Double	P211070-10
	CDRB2BWU15		P211090-10
	CDRB2BWU20		P211060-10
	CDRB2BWU30		P211080-10
	CDRB2BWU40		P211010-10

Series CRB2

Angle Adjustment Setting

Specifications

Single Vane

Model	Rotating angle adjustment range	Rubber bumper
CRB2BWU10	0 to 230°	Yes
CRB2BWU15	0 to 240°	
CRB2BWU20		
CRB2BWU30		
CRB2BWU40	0 to 230°	

Note 1) Use rotary actuator for 270°.

Note 2) Connecting ports are side ported only.

Note 3) The allowable kinetic energy is the same as the specifications of the rotary actuator.

Double Vane

Model	Rotating angle adjustment range	Rubber bumper
CRB2BWU10	0 to 90°	Yes
CRB2BWU15		
CRB2BWU20		
CRB2BWU30		
CRB2BWU40		

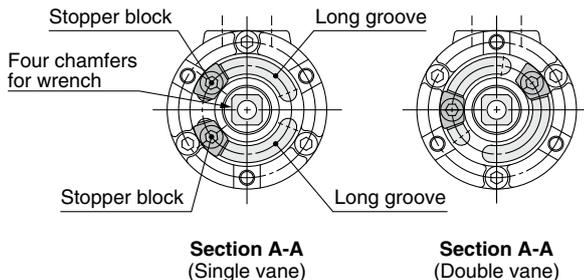
Note 1) Since the maximum angle of the rotating angle adjustment range will be limited by the rotation when using a rotary actuator for 90°, make sure to take this into consideration when ordering. Rotary actuator for 90° should be used to adjust the angle of 85° or less as a guide.

Note 2) Connecting ports are side ported only.

Note 3) The allowable kinetic energy is the same as the specifications of the rotary actuator.

Rotating Angle Adjustment Method

Remove the resin cap in the illustrations below, slide the stopper block on the long groove and lock it into the appropriate position to adjust the rotating angle and rotating position. Protruding four chamfers for wrench on the output shaft that rotates allows manual operation and convenient positioning. (Refer to the rotating angle setting examples shown in the next page for details.)

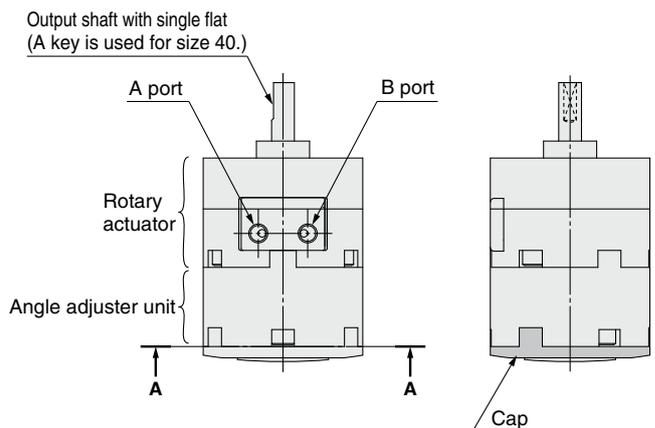


Note) For size 40, each stopper block comes with 2 holding screws.

Recommended Tightening Torque for Holding Stopper Block

Model	Tightening torque (N·m)
CRB2BWU10	1.0 to 1.2
CRB2BWU15	
CRB2BWU20	2.5 to 2.9
CRB2BWU30	3.4 to 3.9
CRB2BWU40	

Note) Stopper block is tightened temporarily at the time of shipment. Angle is not adjusted before shipment.

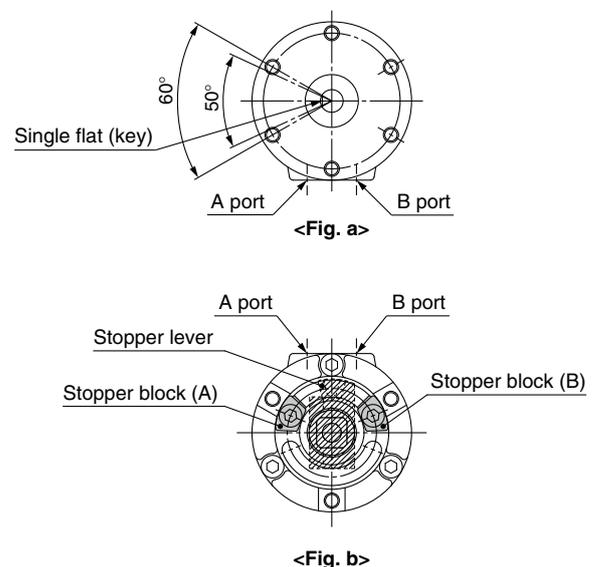


Other Operating Method

Although one stopper block is mounted on each long groove for standard specifications as shown in the illustrations below, 2 stopper blocks can be mounted on one long groove.

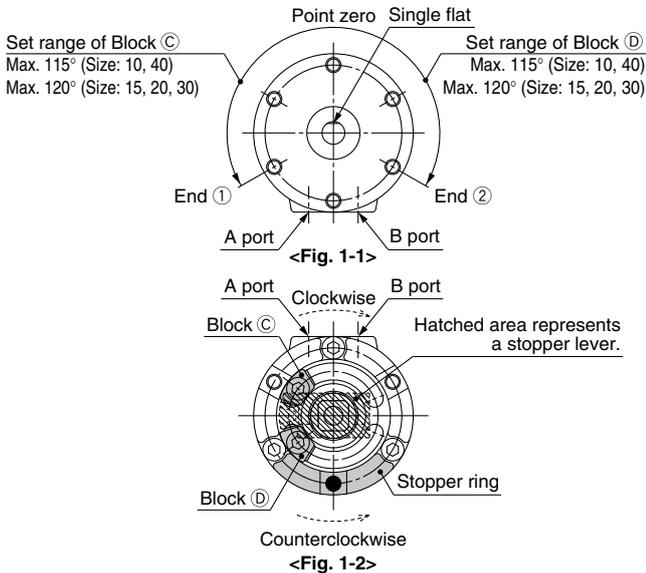
Angle adjustment range when 2 stopper blocks are mounted on one long groove
 Size: 10, 4050°
 Size: 15, 20, 3060°

As shown in <Fig.b>, when mounting 2 stopper blocks on one long groove, by revolving each stopper block (A)(B), the rotation range of the output shaft with single flat (key) is adjustable, as described in <Fig.a>, within either left 50° or 60° against port A and B.
 (Rotation range of single flat (key) when mounting 2 stopper blocks on the other side's groove is the opposite side from <Fig.a> and the setting range is within either right 50° or 60° against port A and B.)



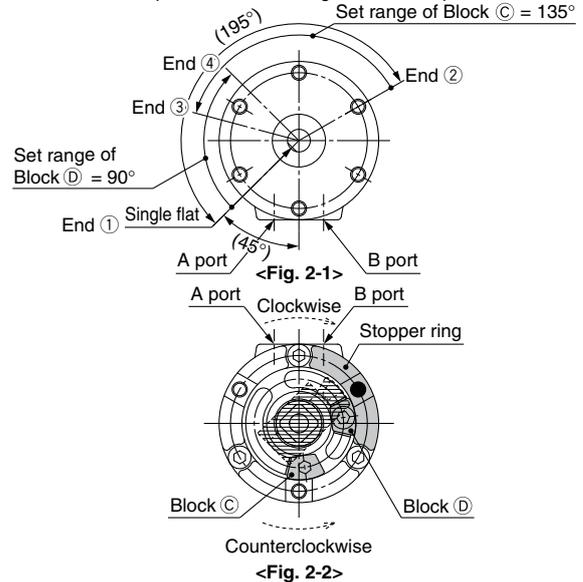
Rotating Angle Setting Examples

Example 1 The stopper ring is mounted on the standard position.
(Rotary actuator with a rotating angle of 270° is used.)



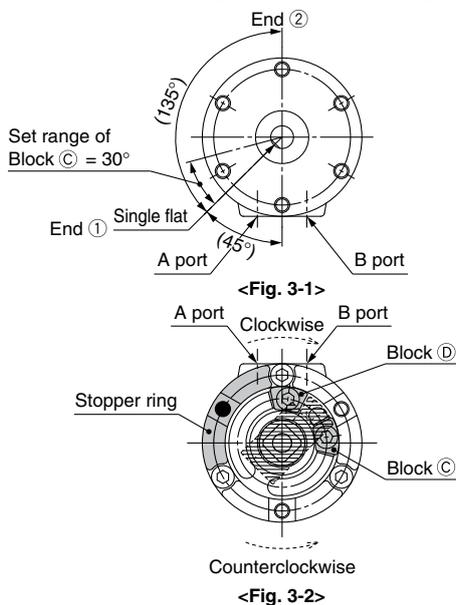
Lock Block D in Fig. 1-2, and move Block C clockwise to allow the rotation of the shaft with single flat in Fig. 1-1 from point zero to End ①. When Block C is locked and Block D is moved counterclockwise, the shaft with single flat in Fig. 1-1 rotates from point zero to End ②. The maximum rotation range of the shaft with single flat is as follows: Sizes 10, 40: up to 230°; Sizes 15, 20, 30: up to 240° (Fig. 1-2 shows when the rotating angle is 0°.)

Example 2 The stopper ring is mounted on 120° counterclockwise from the standard position shown in Fig. 1-2 of Example 1.



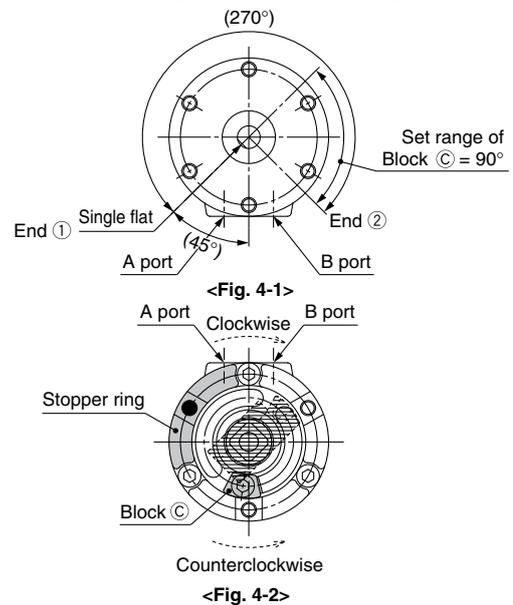
The maximum rotation range of the shaft with single flat in Fig. 2-2 is 195°, from End ① to End ②. The rotation range of the shaft with single flat in Fig. 2-1 decreases to the range between End ② and ③ when moving Block C in Fig. 2-2 clockwise, and similarly when moving Block D counterclockwise, the rotation range decreases to the range between End ① and ④. However, since the internal stopper will come into contact with the vane at End ① position of the shaft with single flat in Fig. 2-1, make sure that the stopper lever stops at Block D when adjusting.

Example 3 The stopper ring is mounted on 120° clockwise from the standard position shown in Fig. 1-2 of Example 1 as in Fig. 4-2 of Example 4.



Lock Block C in Fig. 3-2 and move Block D counterclockwise to allow the rotation of the shaft with single flat in Fig. 3-1 from End ① to End ②. However, since the internal stopper will come into contact with the vane at End ① position of the shaft with single flat make sure that the stopper lever stops at Block C when adjusting. End ① side can be adjusted within 30° by moving Block C counterclockwise.

Example 4 The stopper ring is mounted on 120° clockwise from the standard position shown in Fig. 1-2 of Example 1 as in Fig. 3-2 of Example 3.



The maximum rotation range of the shaft with single flat is 270°, from End ① to End ②, when using the actuator for 270° and End ① side in Fig. 4-1 is stopped using the internal stopper and End ② side is adjusted using Block C. The rotation range can be adjusted within 90° in End ② side. Note that Block C cannot be moved and set 90° or more counterclockwise from its position in Fig. 4-2 since the internal stopper will come into contact with the vane.

Note 1) Mounting of the stopper ring shown in Examples 2, 3, 4 are not applicable for size 10.

Note 2) ● marks in the illustrations above indicate the mounting position of the stopper ring.

Note 3) Select the appropriate rotation of the rotary actuator after careful consideration of the content of "Angle Adjustment Setting".

Note 4) For size 40, each block comes with 2 holding screws.

Series CDRB2 With Auto Switch

Applicable Auto Switches

Applicable series	Auto switch model		Electrical entry
CDRB2BW10/15	Reed	D-90/90A	Grommet, 2-wire
		D-97/93A	
	Solid state	D-S99/S99V*	Grommet, 3-wire (NPN)
		D-S9P/S9PV*	Grommet, 3-wire (PNP)
		D-T99/T99V	Grommet, 2-wire
CDRB2BW20/30/40	Reed	D-R73	Grommet, 2-wire
		D-R80	Connector, 2-wire
	Solid state	D-S79*	Grommet, 3-wire (NPN)
		D-S7P*	Grommet, 3-wire (PNP)
		D-T79	Grommet, 2-wire; Connector, 2-wire

* Solid state switch with 3-wire type has no connector type.

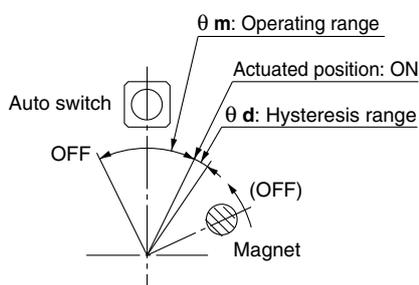
Operating Range and Hysteresis

* Operating range: θm

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 switch turns OFF as the magnet travels the same direction.

* Hysteresis range: θd

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.

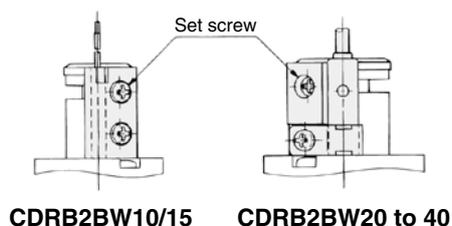


Model	θm : Operating range	θd : Hysteresis range
CDRB2BW10/15	110°	10°
CDRB2BW20/30	90°	
CDRB2BW40	52°	8°

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

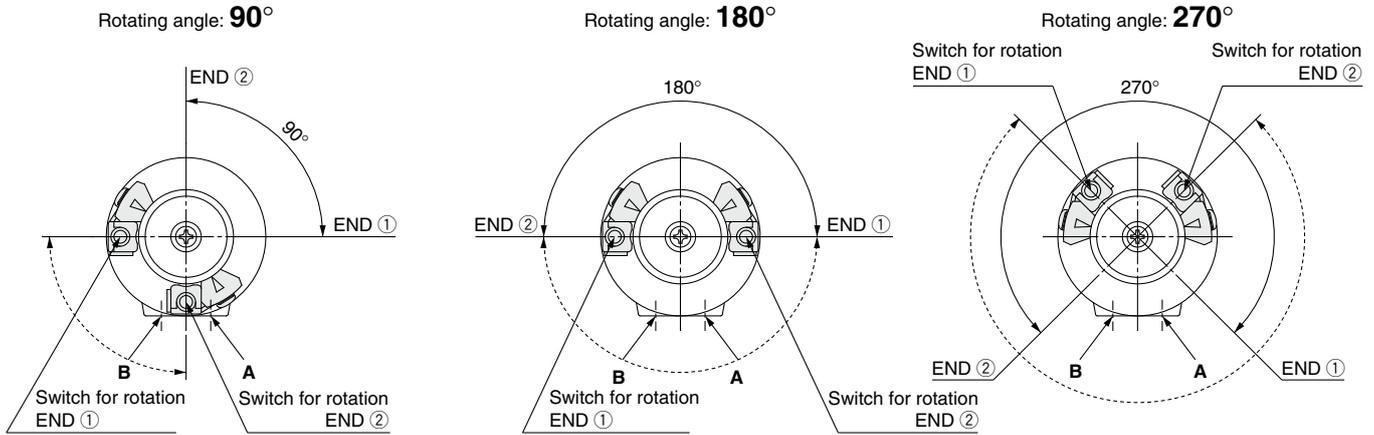
* When setting the detecting position, loosen the tightening screw a bit and move the auto switch to the preferred position and then tighten again and fix it. At this time, if tightened too much, screw can become damaged and unable to fix position. Be sure to set the tightening torque around 0.49 N·m.



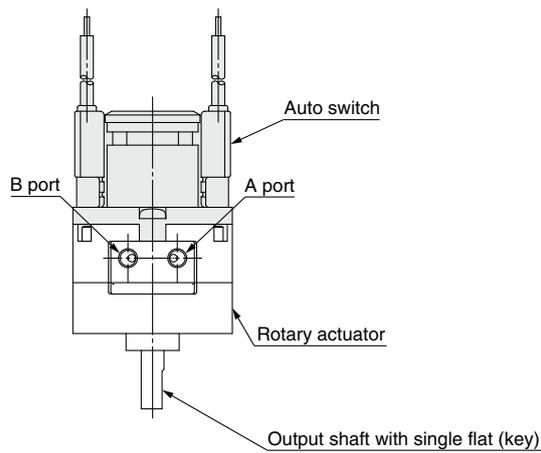
Auto Switch Adjustment

Rotation range of the output shaft with single flat (key for size 40 only) and auto switch mounting position
 <Applicable models/Size: 10, 15, 20, 30, 40>

<Single vane>



- * Solid-lined curves indicate the rotation range of the output shaft with single flat (key). When the single flat (key) is pointing to the END ① direction, the switch for rotation END ① will operate, and when the single flat (key) is pointing to the END ② direction, the switch for rotation END ② will operate.
- * Broken-lined curves indicate the rotation range of the built-in magnet. Operating angle of the switch can be decreased by either moving the switch for rotation END ① clockwise or moving the switch for rotation END 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.



CDRB2BW10 to 40

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.*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.

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

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