



# Operation Manual

## Model name

With auto switch Rotary actuator  
With angle adjuster Rotary actuator  
With auto switch angle adjuster Rotary actuator

## Part number / Series

CDRB2BW 10~ 40  
CRB2BWU 10~ 40  
CDRB2BWU 10~ 40

**SMC Corporation**

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# Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414, JIS B 8370 and other safety practices.



## Caution

Operator error could result in injury or equipment damage.



## Warning

Operator error could result in serious injury or loss of life.



## Danger

In extreme conditions, there is a possible result of serious injury or loss of life.



## Warning

### **1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**

Since the products specified here are used in various operating conditions, their compatibility for the specific Pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system.

This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

### **2. Only trained personnel should operate pneumatically operated machinery and equipment.**

Compressed air can be dangerous if an operator is unfamiliar with it.

Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

### **3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driven objects have been confirmed.

2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure or this equipment and exhaust all residual compressed air in the system.

3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

### **4. Contact SMC if the product is to be used in any of the following conditions.**

1. Conditions and environments beyond the given specifications, or if product is used outdoors.

2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.

3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

# 1, Outline

This operation manual is intended to be used for the compact rotary actuator vane type CRB2 series with auto switch unit and angle adjustment unit.

## 1-1 How to Order (with auto switch)

Size 10,15

**C**※ **R** **B** **2** **B** **W**※ **1** **8** **0** **S** - **9** **0** **L**

**D** With auto switch  
**Nil** Without auto switch  
(With auto switch unit and built-in magnet)

Mounting style  
**B** Basic style  
**F** Flange style

Shaft type  
**W** Double shaft with single flat

U With angle adjuster  
Nil Without angle adjuster

Rotating angle

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

Size  
10  
15

Number of auto switch  
**S** 1pc.※  
**Nil** 2pcs.※※

※ S(1 auto switch)is shipped with a right hand auto switch.  
※※ Nil(2 auto switches)is shipped with a right-hand and a left-hand switch.

Lead wire length  
**Nil** Grommet / read wire 0.5m  
**L** Grommet / read wire 3m

Auto switch  
**Nil** Without auto switch  
※For the applicable auto switch model, refer to the below.

Vane type  
**S** Single vane  
**D** Double vane

※Length sign of lead wire 0.5m...Nil(Example) 90  
3m...L(Example) 90L  
5m...Z(Example) 90Z

### Applicable Auto Switches

Applicable size	Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire type	Lead wire length(m)※				Applicable table		
					DC	AC			0.5 (Nil)	3 (L)	5 (Z)	None (N)			
For 10 and 15	Solid state switch	Grommet	Yes	2-Wire	24V	12V	—	Heavy-duty cord	●	●	—	—	IC circuit	Relay, PLC	
									●	●	—	—			
				3-Wire (NPN)					●	●	—	—			
									●	●	—	—			
				3-Wire (PNP)					●	●	—	—			
									●	●	—	—			
	Read switch	Grommet	No	2-Wire	24V	5V,12V	5V,12V,24V	90	Parallel cord	●	●	●	—	—	—
						5V,12V,100V	5V,12V,24V,100V	90A	Heavy-duty cord	●	●	●	—		
						—	—	97	Parallel cord	●	●	●	—		
						—	100V	93A	Heavy-duty cord	●	●	●	—		

Size 20,30,40

C \* R B 2 B W \* - 1 8 0 S - R 7 3 L

D	With auto switch
Nil	Without auto switch

(With auto switch unit and built-in magnet)

Mounting style

B	Basic style
F	Flange style

\*F : Except size 40

Shaft type

W	Double shaft with single flat (Size 20 to 30)
	Long shaft key, Short shaft with single flat (Size 40)

U	With angle adjuster
Nil	Without angle adjuster

Size

20
30
40

Rotating angle

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

Number of auto switch

S	1pc.*
Nil	2pcs.**

\* S(1 auto switch)is shipped with a right hand auto switch.  
 \*\* Nil(2 auto switches)is shipped with a right- hand and a left-hand switch.

Lead wire length

Nil	Grommet / read wire 0.5m
L	Grommet / read wire 3m
C	Connectors / read wire 0.5m
CL	Connectors / read wire 3m
CN	Connectors / read wire Nil

\* Conectors are available only for auto switch types D-R73, D-R80, D-T79

\*\* Lead wire with connector part nos.  
 D-LC05 : Lead wire 0.5m  
 D-LC30 : Lead wire 3 m  
 D-LC50 : Lead wire 5 m

Auto switch

Nil	Without auto switch
-----	---------------------

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

Vane type

S	Single vane
D	Double vane

\*Length sign of lead wire 0.5m...Nil(Example) R73  
 3m...L(Example) R73L  
 5m...Z(Example) R73Z  
 Connectors/None...CN(Example) R73CN

Applicable Auto Switches

Applicable size	Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire type	Lead wire length(m)**				Applicable table		
					DC	AC			0.5 (Nil)	3 (L)	5 (Z)	None (N)			
For 20, 30 and 40	Solid state switch	Grommet	YES	2-wire	24V	12V	—	Heavy-duty cord	●	●	—	—	—	Relay PLC	
		Connector							●	●	●	●			
		Grommet		3-wire (NPT)		●			●	—	—	IC circuit			
				3-wire (PNP)		●			●	—	—				
	Read switch	Grommet	YES	2-wire	—	—	100V		R73	●	●	—	—		—
		Connector					—		R73C	●	●	●	●		
		Grommet	NO			48V,100V	R80		●	●	—	—	IC circuit		
						—	24V or less		R80C	●	●	●			●



## 1 - 2 Specification of auto switch

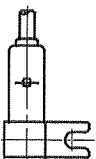
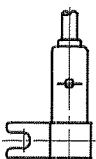
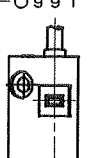
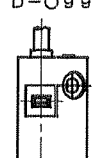
Applicable Auto Switch

Applicable series	Auto switch model		Electrical entry	Indicator light
CDRB2BW10,15 CDRB2BW10,15	Read switch	D-90, 90A	Grommet/2-wire	No
		D-97, 93A		Yes
	Solid state switch	D-S99,S99V	Grommet /3-wire(NPN)	Yes
		D-S9P,S9PV	Grommet /3-wire (PNP)	
D-T99,T99V		Grommet/2-wire		
CDRB2BW20 CDRB2BW30 CDRB2BW40	Read switch	D-R73	Grommet /2-wire, Connector /2-wire	Yes
		D-R80	Grommet /2-wire, Connector /2-wire	No
	Solid state switch	D-S79	Grommet /3-wire (NPN)	Yes
		D-T7P	Grommet /3-wire (PNP)	
		D-T79	Grommet /2-wire, Connector /2-wire	

Auto switch model/ Applicable

Model	Auto switch model		Load voltage	Maximum load voltage	Usage
	Light-handed	Left-handed		Range of load current	
D-9	D-90		AC,DC5,12,24V	50mA	Relay Sequence controller IC circuit
	D-90A		AC,DC5,12,24V	50mA	
	D-97		AC,DC100V	20mA	Relay Sequence controller
	D-93A		DC24V	5~40mA	
D-R7	D-R731	D-R732	AC100V	5~20mA	Relay Sequence controller
	D-R731C	D-R732C	DC24V	5~40mA	
			DC24V	5~40mA	
D-R8	D-R801	D-R802	AC,DC24V or less	50mA	Relay Sequence controller IC circuit
			AC,DC48V	40mA	
			AC,DC100V	20mA	
	D-R801C	D-R802C	AC,DC24V or less	50mA	
D-S7	D-S791	D-S792	DC5,12,24V	40mA or less	Relay Sequence controller IC circuit
D-S99	D-S991	D-S992			
D-T7	D-T791	D-T792	DC5,12,24V	40mA or less	Relay Sequence controller
	D-T791C	D-T792C			
D-T99	D-T991	D-T992			

Auto switch block type

Right hand type D-0001	Left hand type D-0002	CDRB2BW20, 30, 40
		Right hand auto switch & Left hand auto switch Each of one switch
D-0991	D-0992	CDRB2BW10, 15
		Right hand auto switch & Left hand auto switch Each of one switch

\* Operation time.....1.2ms

\* Impact-proof...30G(Read switch)100G(Solid state switch)

\* Operating temperature limit...5~60°C

\*lead wire length.....0.5m(Standard)



## 1 - 3 Specification of rotary actuator with angle adjuster

### Specifications

Model	Rotation adjustment range		Rubber bumper
	Single Vane Type※	Double Vane Type※※	
CRB2BWU 10	0° to 230°	0 to 90°	Yes
CRB2BWU 15	0° to 240°		
CRB2BWU 20			
CRB2BWU 30			
CRB2BWU 40	0° to 230°		

※ **Note1)** Use rotary actuator for 270°.  
**Note2)** Connection ports are side ports only. (Refer to "Cautions for handling" on page 23.)  
**Note3)** The allowable kinetic energy is the same as the specifications of the rotary actuator by itself.

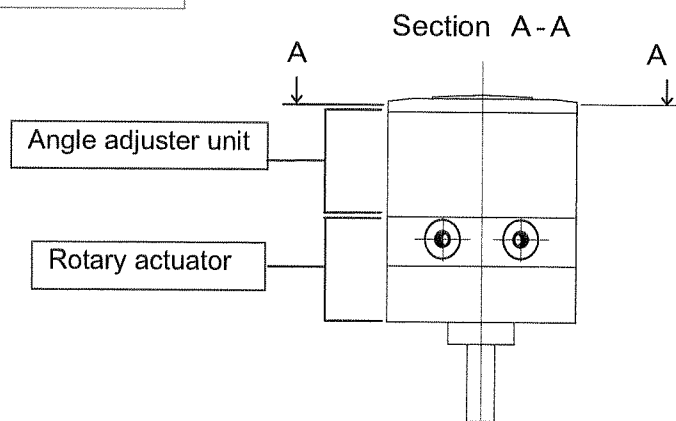
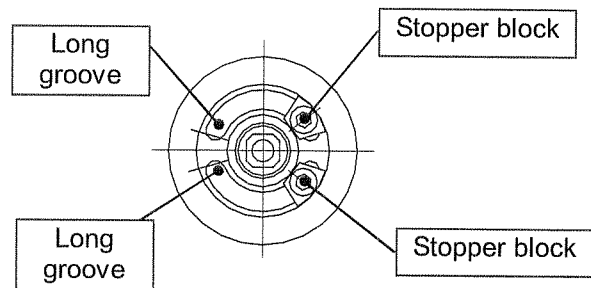
※※**Note1)** Since the maximum angle of the rotation adjustment range will be limited by the rotation when using a rotary actuator for 90°, make sure to take this into consideration when ordering. Rotary actuator for 90° should be used to adjust the angle of 85° or less as a guide.  
**Note2)** Connection ports are side ports only. (Refer to "Cautions for handling" on page 23.)  
**Note3)** The allowable kinetic energy is the same as the specifications of the rotary actuator by itself.

### Recommended torque for fixing the stopper block

Model	Tightening torque N.m
CRB2BWU 10	1.0 to 1.2
CRB2BWU 15	
CRB2BWU 20	2.5 to 2.9
CRB2BWU 30	3.4 to 3.9
CRB2BWU 40	

**Note:** The stopper block is temporarily fixed at the time of shipment.  
 The rotation angle of the product is set to 0 degree, so it will not rotate in the state in which it is shipped.

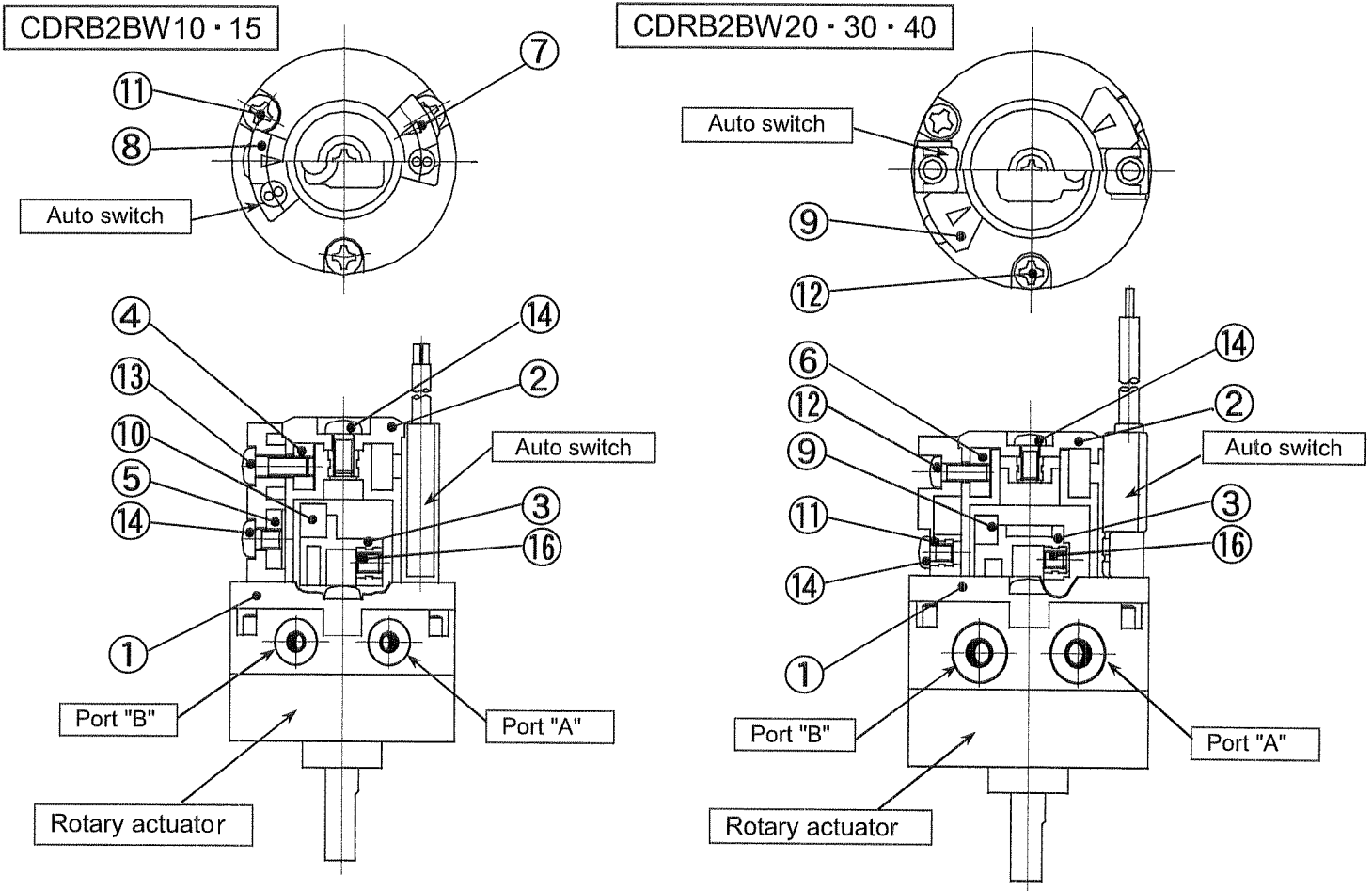
Please understand that the product will not be delivered with the angle adjusted.





## 2. Internal Construction and Description of individual Parts

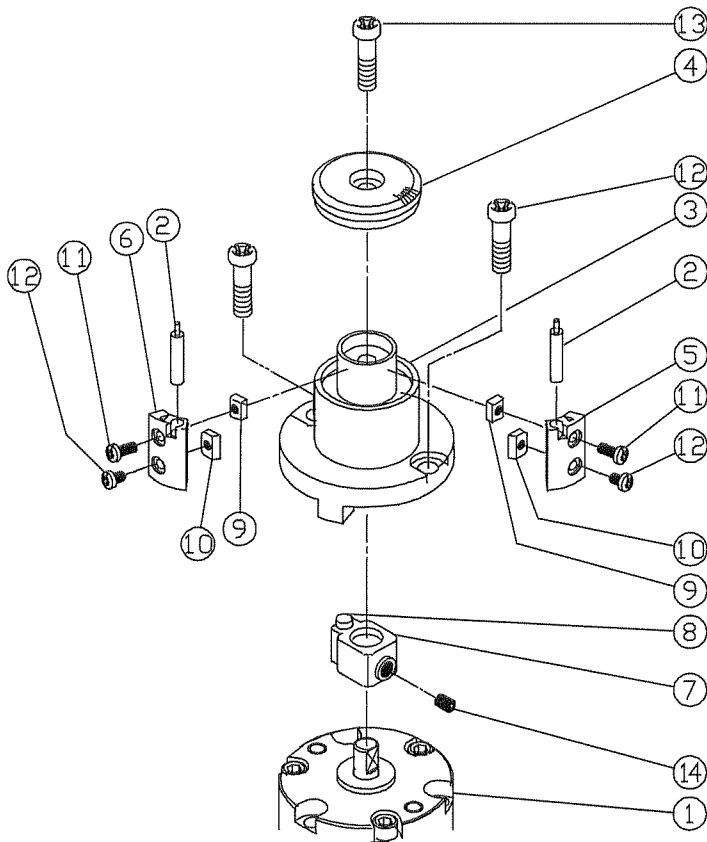
### 2 - 1 Auto switch Construction



#### Component Parts

No.	Description	Material	Note
1	Cover (A)	Resin	White
2	Cover (B)	Resin	White
3	Magnet lever	Resin	Black
4	Holding block (A)	Aluminum alloy	
5	Holding block (B)	Aluminum alloy	Unnecessary for the Solid state switch.
6	Holding block	Aluminum alloy	
7	Switch block (A)	Resin	White Unnecessary for the Solid state switch.
8	Switch block (B)	Resin	White Unnecessary for the Solid state switch.
9	Switch block	Resin	
10	Magnet	Magnetic body	
11	Arm	Stainless steel	
12	Round head Phillips screw	Stainless steel	
13	Round head Phillips screw	Stainless steel	
14	Round head Phillips screw	Stainless steel	※Rubber cap (Only CDRB2BW40).
15	Round head Phillips screw	Stainless steel	
16	Hexagon socket head cap screw	Stainless steel	

## ■ 2 - 2 Assembly and disassembly procedure of switch unit



### CDRB2BW10 · 15

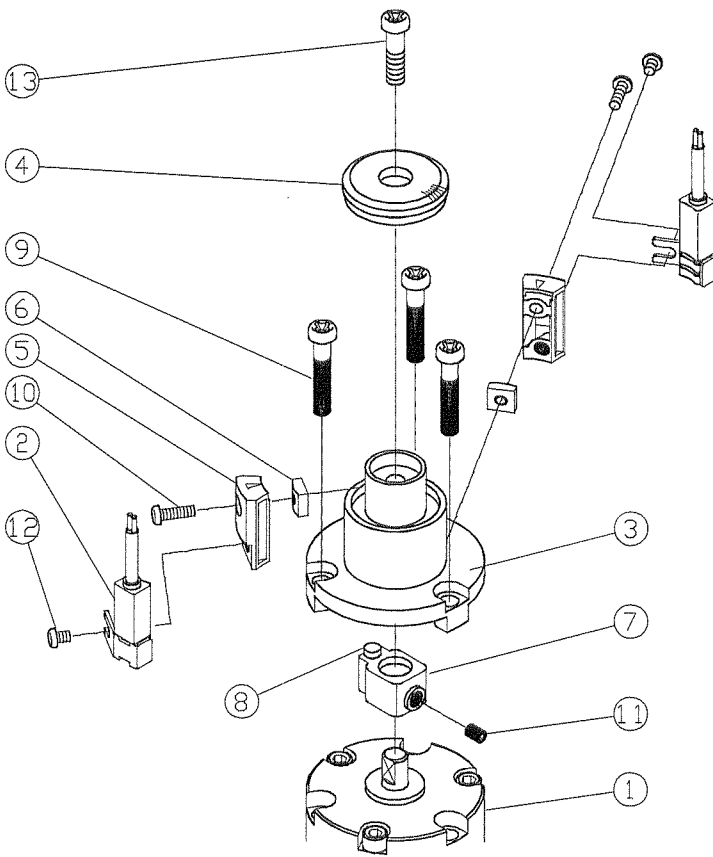
14	Hexagon socket head set screw	1	
13	Round head Phillips screw	1	
12	Round head Phillips screw	2	"CDRB2BW15" is 3 pieces
11	Round head Phillips screw	4	
10	Holding block (B)	2	
9	Holding block (A)	2	
8	Magnet	1	
7	Magnet lever	1	⑧ is contained
6	Switch block (B)	1	
5	Switch block (A)	1	
4	Cover (B)	1	
3	Cover(A)	1	
2	Auto switch	2	Product
1	Rotary actuator	1	Product
No.	Description	Number	Note

### Aassembling sequence

1. Mount the magnet lever 7 on the shaft of the body 1 and tighten with a hexagon socket head set screw 14.
2. Mount the cover (A) 3 on the body 1, and tighten with a cross recessed round head screw 12.  
(Use 3 cross recessed round head phillips screws 12 for CDRB2BW15.)
3. Insert the fixing block (A) 9 into the cover (A) 3, and put the cover (B) 4 on it. Then, tighten them with a cross recessed round head phillips screws 13.
4. Insert the auto switch 2 into the switch blocks (A) 5 and (B) 6 respectively, and tighten them with the fixing block (B) 10 and cross recessed round head screw 12.  
Note: When the solid state auto switch type is selected, the switch is already installed in the switch blocks (A) 5 and (B) 6, so in that case, skip step 4.
5. Mount the switch blocks (A) 5 and (B) 6 (or solid state switches) on the fixing block (A) 9, and tighten them with the cross recessed round head screw 12,

\* When disassembling the product, follow the mounting procedure in reverse.

## CDRB2BW20 · 30

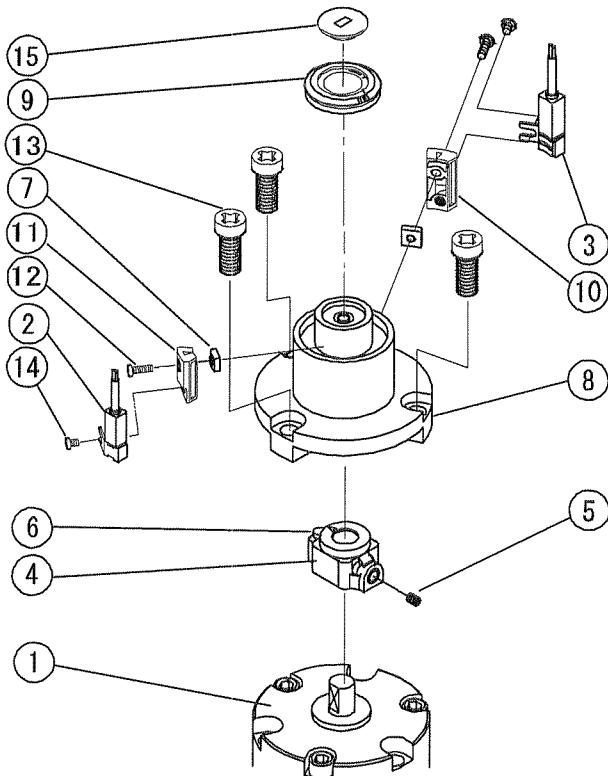


13	Round head Phillips screw	1	
12	Round head Phillips screw	2	
11	Hexagon socket head set screw	1	
10	Round head Phillips screw	2	
9	Round head Phillips screw	3	
8	Magnet	1	
7	Magnet lever	1	⑧ is contained
6	Holding block	2	
5	Switch block	2	
4	Cover (B)	1	
3	Cover(A)	1	
2	Auto switch	2	Product
1	Rotary actuator	1	Product
No	Description	Number	Note

### Assembling sequence

1. Mount the magnet lever 7 on the shaft of the body 1 and tighten with a hexagon socket head set screw 11.
2. Mount the cover (A) 3 on the body 1, and tighten with a cross recessed round head phillips screw 9.
3. Holding block 6 into the cover (A) 3, and put the cover (B) 4 on it. Then, tighten them with a cross recessed round head phillips screw 13.
4. Holding block 6 on the switch block 5, and tighten them temporarily with the round head phillips screw 10.
5. Mount the auto switch 2 on the switch block 5, and tighten them with the cross recessed round head phillips screw 12.

\* When disassembling the product, follow the mounting procedure in reverse.



## CDRB2BW40

15	Rubber cap	1	
14	Round head Phillips screw	2	
13	Round head Phillips screw	3	
12	Round head Phillips screw	2	
11	Switch block (B)	1	
10	Switch block (A)	1	
9	Cover(B)	1	
8	Cover(A)	1	
7	Holding block	2	
6	Magnet	1	
5	Hexagon socket head set screw	1	
4	Magnet lever	1	⑥is contained
3	Auto switch(Light hand type)	1	
2	Auto switch (Left hand type)	1	
1	Rotary actuator	1	Product
No.	Description	Number	Note

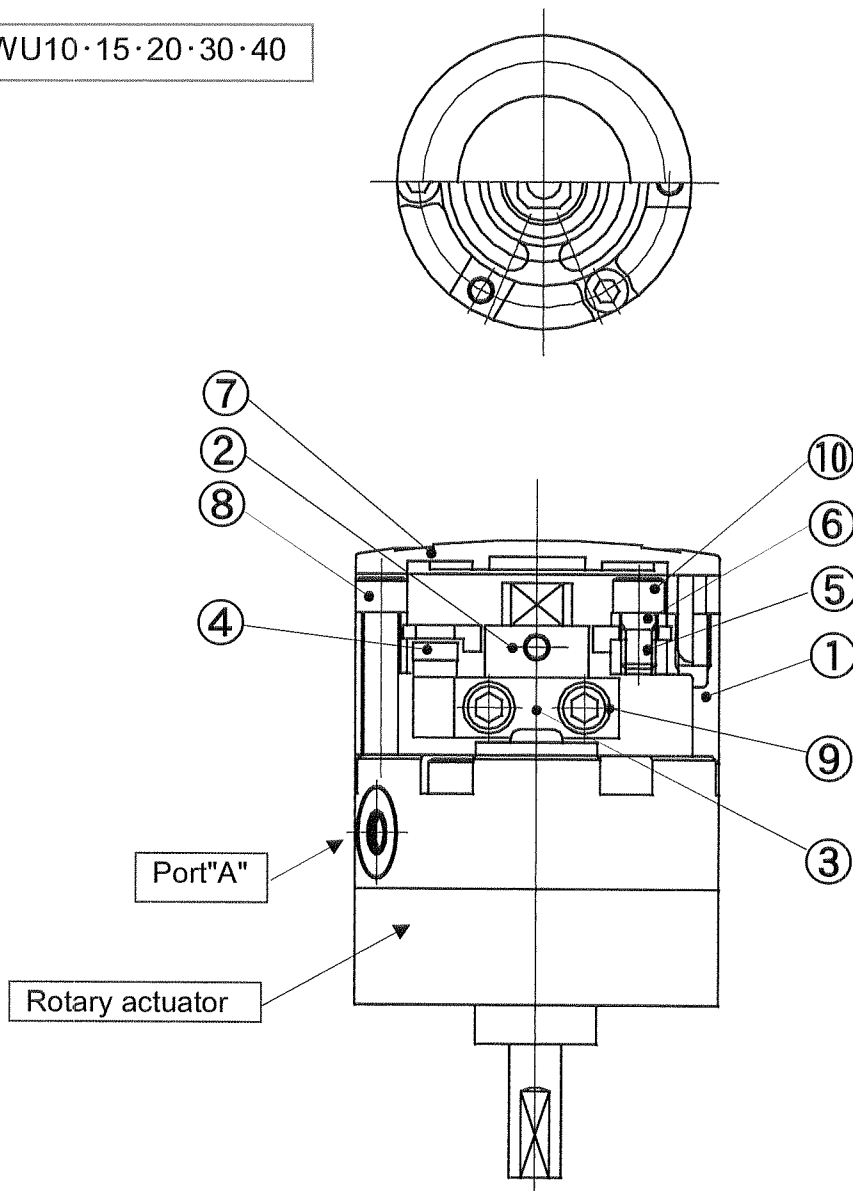
### Assembling sequence

1. Mount the magnet lever 4 on the shaft of the body 1 and tighten with a hexagon socket head set screw 5.
2. Mount the cover (A) 8 on the body 1, and tighten with a cross recessed round head phillips screw 13.
3. Holding block 7 into the cover (A) 8, and put the cover (B) 9 on it.  
Then, mount them with a rubber cap 15.
4. Insert the auto switch 2 and 3 into the switch blocks (A) 10 and (B) 11 respectively. and tighten them with the holding block 7 and cross recessed round head phillips screw 12.
5. Mount the switch blocks (A) 10 and (B) 11 on the fixing block 7, and tighten them temporarily with the cross recessed round head phillips screw 12.

\* When disassembling the product, follow the mounting procedure in reverse.

## 2 - 3 Internal structure of angle adjuster

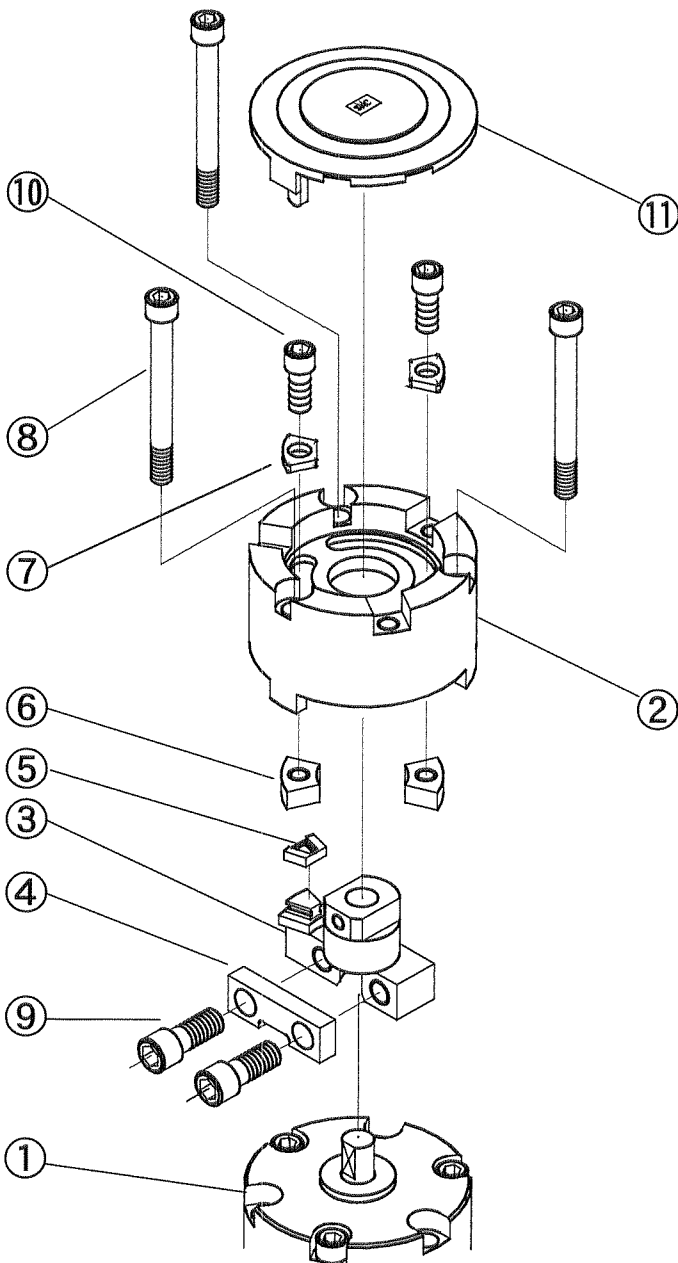
CRB2BWU10·15·20·30·40



### Component Parts

No.	Description	Material	Note
1	Stopper ring	Aluminum die casting	
2	Stopper lever	Carbon steel	
3	Lever retainer	Carbon steel	
4	Rubber bumper	NBR	
5	Stopper block	Carbon steel	
6	Block retainer	Carbon steel	
7	Cap	Resin	
8	Hexagon socket head cap screw	Stainless steel	
9	Hexagon socket head cap screw	Stainless steel	
10	Hexagon socket head cap screw	Stainless steel	

## 2 - 4 Assembly and disassembly procedure of angle adjuster



CRB2BWU10·15·20·30·40

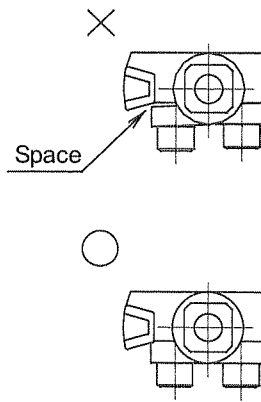


Figure 1

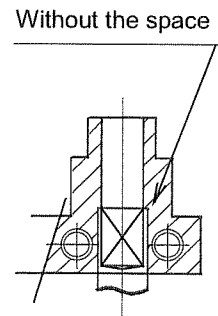


Figure 2

11	Cap	1	
10	Hexagon socket head cap screw	2	Size 40 is 4 pieces.
9	Hexagon socket head cap screw	2	
8	Hexagon socket head cap screw	3	Size 10 is 2 pieces.
7	Block retainer	2	
6	Stopper block	2	
5	Rubber bumper	1	
4	Lever retainer	1	
3	Stopper lever	1	
2	Stopper ring	1	
1	Rotary actuator	1	Product
No.	Description	Number	Note

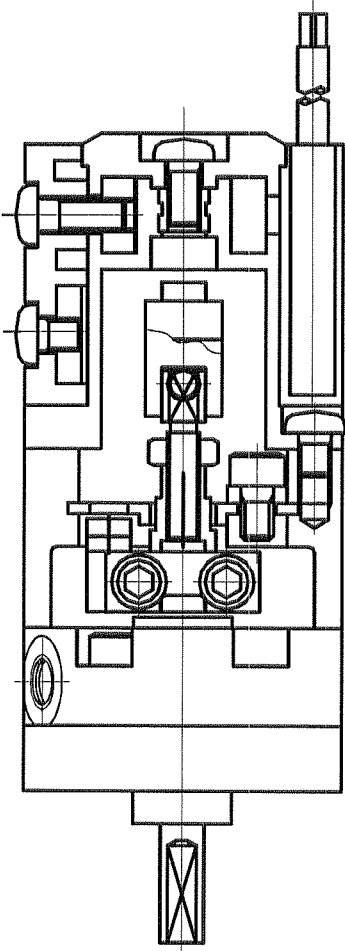
### Assembling sequence

1. Mount the rubber bumper 5 on the stopper lever 3.
2. Insert the stopper lever 3 into the shaft of the body 1, and tighten them with the lever retainer 4 with the hexagon socket head cap screw 9. (Refer to Figures 1 and 2 for the cautions on mounting.)
3. Mount the stopper block 6 on the stopper ring 2, and tighten them temporarily with the block retainer 7 and hexagon socket head cap screw 10.
4. Mount the stopper ring 2 on the body 1, and tighten them with the hexagon socket head cap screw 8. (Use 2 hexagon socket head cap screws 8 for CRB2BWU10.)
5. Mount the cap 11 on the stopper ring 2.

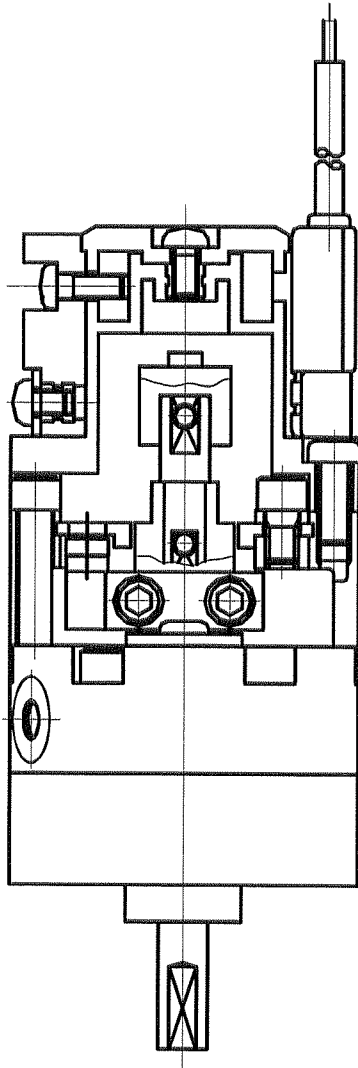
\* When disassembling the product, follow the mounting procedure in reverse.

## 2 - 5 Switch+ angle adjuster unit internal structure

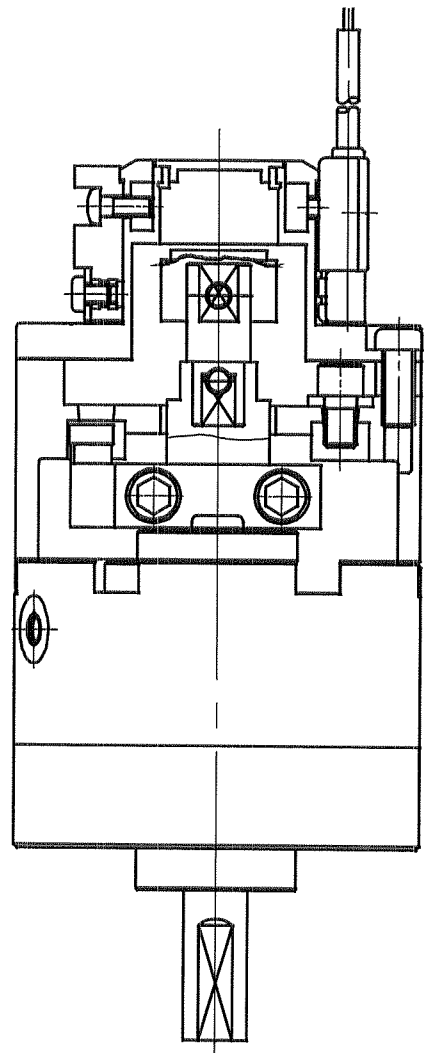
CDRB2BWU10·15



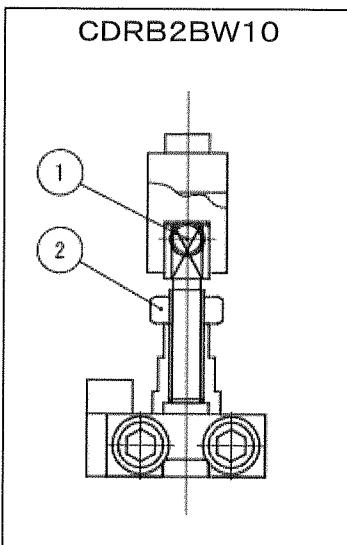
CDRB2BWU20·30



CDRB2BWU40



CDRB2BW10



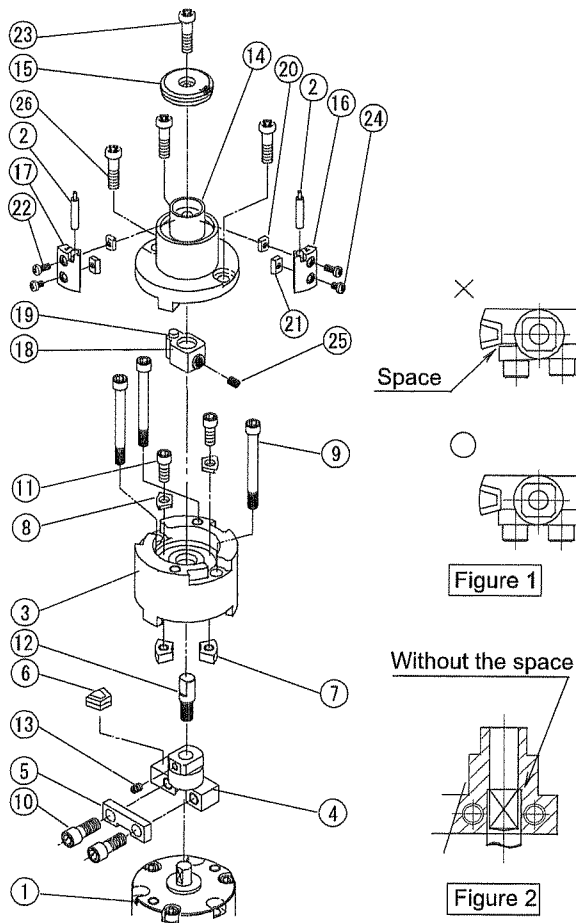
It is possible to mount both the auto switch unit and angle adjustment unit, but the components 1, 2 and 3 stated below need to be added.

### Component Parts

No.	Description	Material	Note
1	Joint		
2	Hexagon socket head Cap screw	Stainless steel	For CDRB2BWU10 only: (2) hexagon nut
	Hexagon nut		
3	Round head Phillips screw	Stainless steel	



## 2 - 6 Switch+ angle adjuster unit Assembly and disassembly procedure



### CDRB2BWU10,15

26	Round head Phillips screw	3	Size 10 is 2 pieces.
25	Hexagon socket head set screw	1	
24	Round head Phillips screw	2	Size 10 is 4 pieces.
23	Round head Phillips screw	1	
22	Round head Phillips screw	2	
21	Holder block(B)	2	
20	Holder block(A)	2	
19	Magnet	1	
18	Magnet lever	1	⑱ is contained
17	Switch block (B)	1	
16	Switch block (A)	1	
15	Cover(B)	1	
14	Cover(A)	1	
13	Hexagon socket head set screw	1	
12	Joint	1	
11	Hexagon socket head cap screw	2	
10	Hexagon socket head cap screw	2	
9	Hexagon socket head cap screw	3	
8	Block retainer	2	
7	Stopper block	2	
6	Rubber bumper	1	
5	Lever retainer	1	
4	Stopper lever	1	
3	Stopper ring	1	
2	Auto switch	2	
1	Rotary actuator	1	
No.	Description	Number	Note

### Assembling sequence

1. Mount the stopper lever 4 to the rubber bumper 6.
2. Insert the stopper lever 4 into the shaft of the body 1, and tighten them with the lever retainer 5 and hexagon socket head cap screws 11. (Refer to Figures 1 and 2 for the cautions on mounting.)
3. Mount the stopper block 7 on the stopper ring 3, and tighten them temporarily with the block retainer 8 and hexagon socket head cap screws 11.
4. Mount the joint 12 on the stopper lever 4, and tighten them with the hexagon socket head set screw 13. (For CDRB2BWU15)
5. Mount the stopper ring 3 on the body 1, and tighten them with the hexagon socket head cap screw 9. (Use 3 hexagon socket head cap screws for CDRB2BWU15.)
6. Screw in the joint 12 to the stopper lever 4 completely, and tighten them with the hexagon nut 13. (For CDRB2BWU10)
7. Mount the joint 12 on the magnet lever 18, and tighten them with the hexagon socket head set screw 27.
8. Mount the cover (A) 14 on the stopper ring 3, and tighten them with a cross recessed round head screw 22. (Use 3 cross recessed round head screws for CDRB2BWU10)
9. Insert the fixing block (A) 20 into the cover (A) 14, and put the cover (B) 15 on it. Then, tighten them with a cross recessed round head screw 26.
10. Insert the auto switch 3 into the switch blocks (A) 16 and (B) 17 respectively, and tighten them with the fixing block (B) 21 and cross recessed round head screw 24.  
Note: When the solid state auto switch type is selected, the switch is already installed in the switch blocks (A) 16 and (B) 17, so in that case, skip step 10.
11. Mount the switch blocks (A) 16 and (B) 17 (or solid state switches) on the fixing block (A) 20, and tighten them with the cross recessed round head screw 25.

\* When disassembling the product, follow the mounting procedure in reverse.



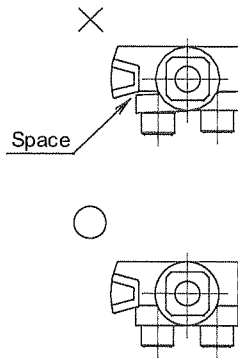
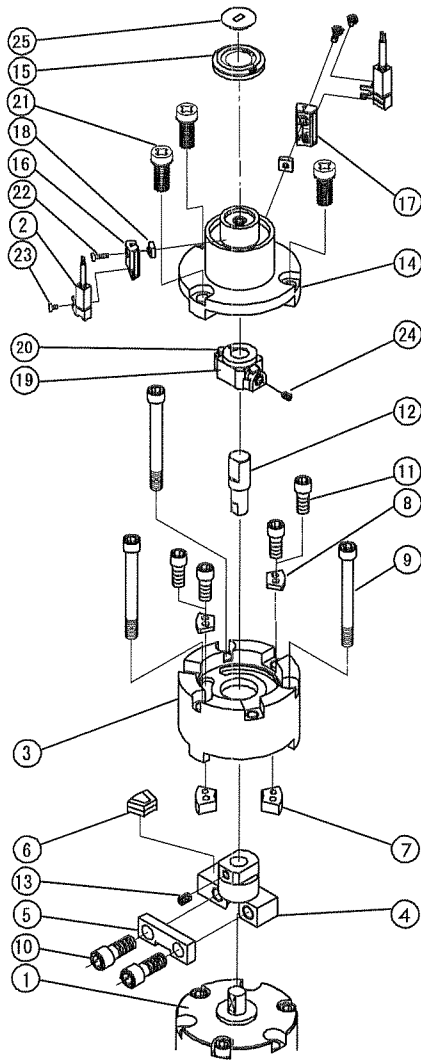


Figure 1

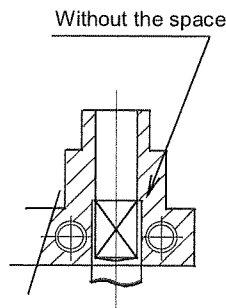


Figure 2

## CDRB2BWU40

25	Rubber cap	1	
24	Hexagon socket head set screw	1	
23	Round head Phillips screw	2	
22	Round head Phillips screw	2	
21	Round head Phillips screw	3	
20	Magnet	1	
19	Magnet lever	1	⑳is contained
18	Holding block	2	
17	Switch block (B)	1	
16	Switch block (A)	1	
15	Cover (B)	1	
14	Cover (A)	1	
13	Hexagon socket head set screw	1	
12	Joint	1	
11	Hexagon socket head cap screw	4	
10	Hexagon socket head cap screw	2	
9	Hexagon socket head cap screw	3	
8	Block retainer	2	
7	Stopper block	2	
6	Rubber bumper	1	
5	Lever retainer	1	
4	Stopper lever	1	
3	Stopper ring	1	
2	Auto switch	2	
1	Rotary actuator	1	Product
No.	Description	Number	Note

## Assembling sequence

1. Mount the stopper lever 4 to the rubber bumper 6.
2. Insert the stopper lever 4 into the shaft of the body 1, and tighten them with the lever retainer 5 and hexagon socket head cap screws 10.  
(Refer to Figures 1 and 2 for the cautions on mounting.)
3. Mount the stopper block 7 on the stopper ring 3, and tighten them temporarily with the block retainer 8 and hexagon socket head cap screws 11.
4. Mount the joint 12 on the stopper lever 4, and tighten them with the hexagon socket head set screw 13.
5. Mount the stopper ring 3 on the body 1, and tighten them with the hexagon socket head cap screw 9.
6. Screw in the joint 12 to the magnet lever 19 completely, and tighten them with the hexagon socket head set screw 24.
7. Mount the cover (A) 14 on the stopper ring 3, and tighten them with a cross recessed round head Phillips screw 21.
8. Insert the holding block 18 into the cover (A) 14, and put the cover (B) 15 and rubber cap 25 on it.
9. Mount the holding block 18 on the switch block 16, and tighten them with the cross recessed round head Phillips screw 22.
10. Mount the auto switch 2 on the switch block 16, and tighten them with the cross recessed round head Phillips screw 23.

\* When disassembling the product, follow the mounting procedure in reverse.

### 3. Adjustment method

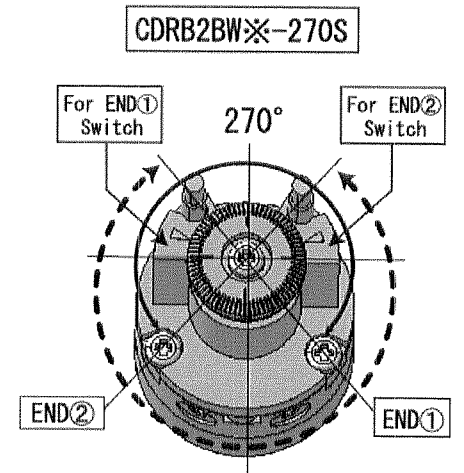
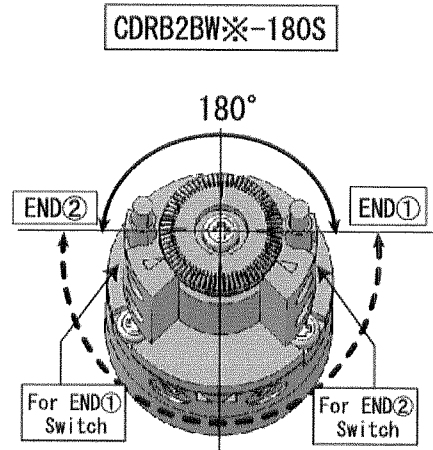
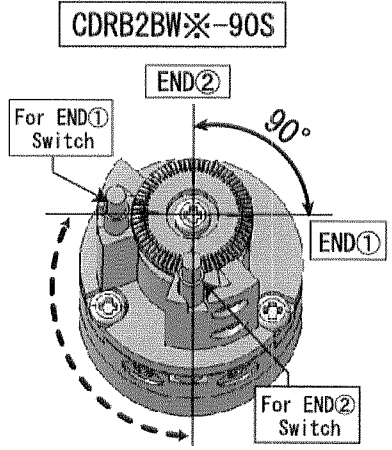
#### 3 - 1 Switch unit

#### How to adjust the switch detection position

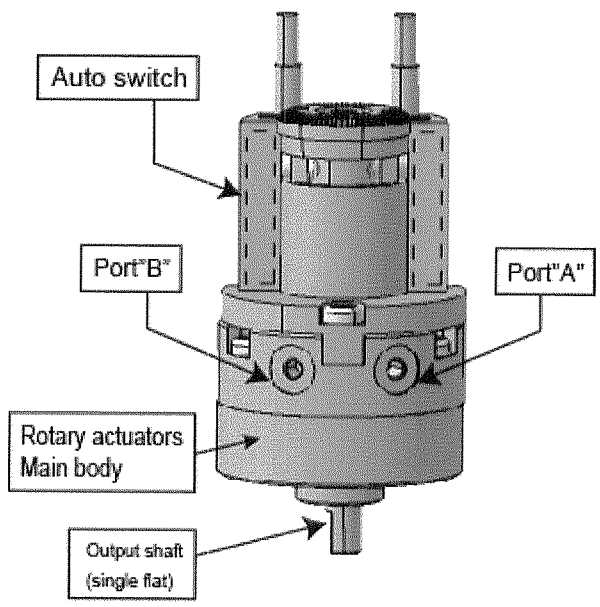
The figures below show the rotation range of each type, and it is possible to achieve the maximum sensitivity position with the indicated switch position.

CDRB2BW 10·15

The number of switches is one respectively.

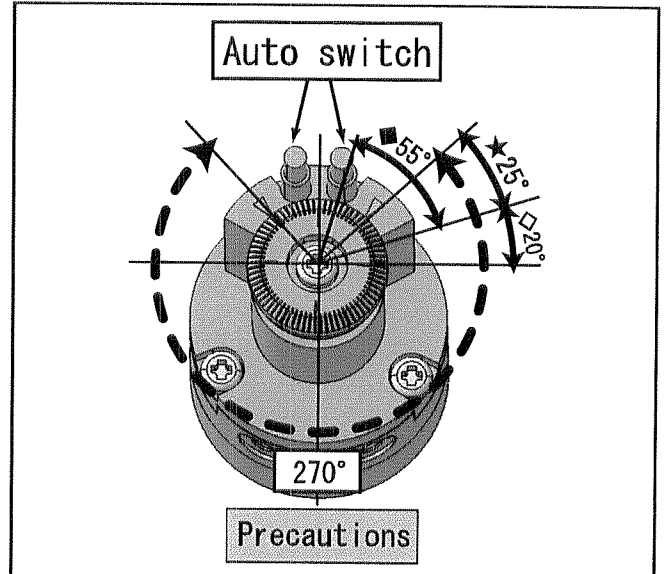


→ Rotation range of the single flat of the output shaft  
 - - - - -> Rotation range of the built-in magnet



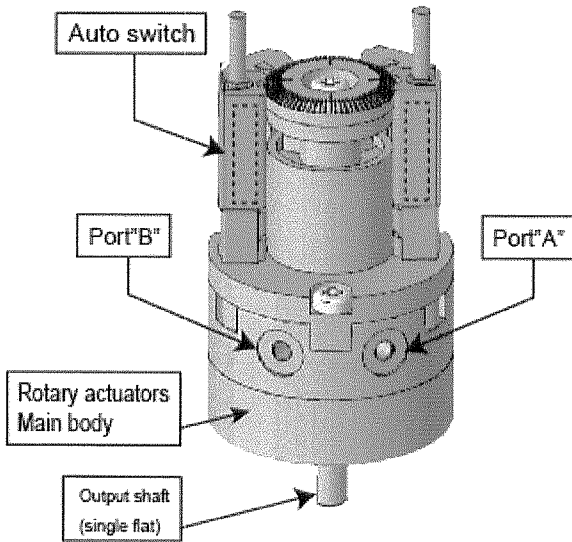
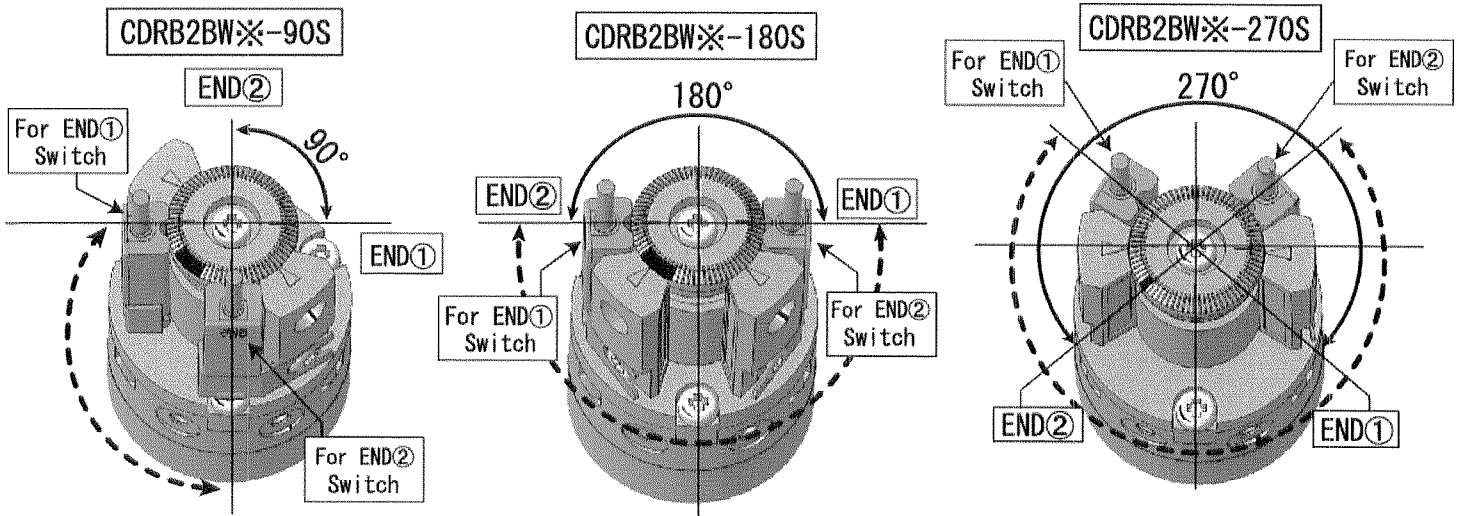
The solid line arrow in the figure showing the rotation range indicates the rotation range of the single flat of the output shaft. When the single flat of the output shaft faces the rotation end 1 (END 1), the END1 switch operates, and when it faces the rotation end 2 (END 2), the END2 switch operates. →

The broken line arrow shows the rotation range of the built-in magnet. The operation angle of the switch can be reduced by moving the END1 switch clockwise and the END 2 switch counterclockwise. - - - - ->



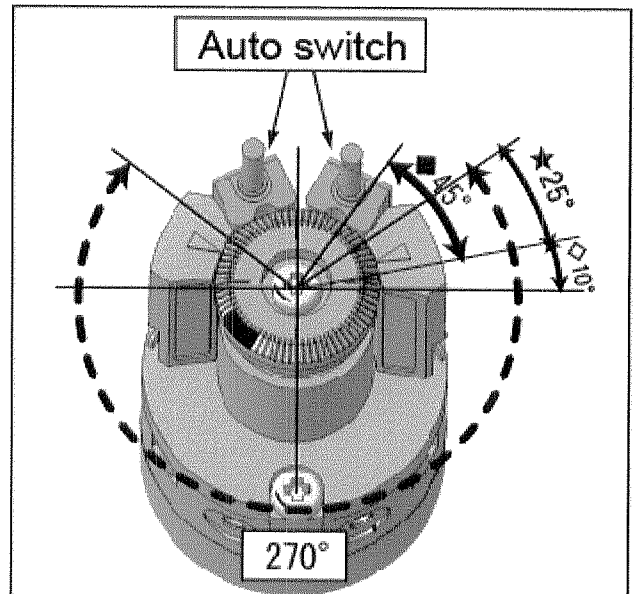
**For 270°**  
 Even if the switch is adjacent and installed as shown in the above figure, the operating angle degree of the switch is 110°(normal-width  $\blacklozenge$ 55°). And, the switch is turned on from this side the swing edge  $\star$  25°. In the stop switch, it stops within the range of 20° because switch actuation range becomes  $\blacklozenge$  20°. switch actuation range.

CDRB2BW 20 · 30 · 40



The solid line arrow in the figure showing the rotation range indicates the rotation range of the single flat of the output shaft. When the single flat of the output shaft faces the rotation end 1 (END 1), the END1 switch operates, and when it faces the rotation end 2 (END 2), the END2 switch operates. →

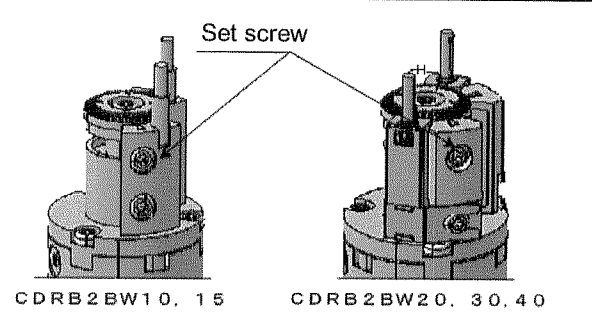
The broken line arrow shows the rotation range of the built-in magnet. The operation angle of the switch can be reduced by moving the END1 switch clockwise and the END 2 switch counterclockwise. - - - - →



**For 270°**  
 Even if the switch is adjacent and installed as shown in the above figure, the operating angle degree of the switch is 90°(normal-width  $\diamond 45^\circ$ ). And, the switch is turned on from this side the swing edge  $\star 25^\circ$ . In the stop switch, it stops within the range of 10° because switch actuation range becomes  $\diamond 10^\circ$ , switch actuation range.

**How to move the switch detection**

When setting the detection position, loosen the set screw to move the switch, and fix it at the required position. At this time, if the set screw is tightened too strongly, it will break and it will not be able to fix the screw, so keep the tightening torque around 0.49Nm.



### 3 - 2 Explanation of the operation and hysteresis angles

(Example) CDRB2BW20、30-270S

Rotary actuator ···· 270°

Operating angle degree of switch ···· 90°

When the switch is mounted at the intermediate position of the rotation.

As shown in the figure on the right, when the magnet rotates in the direction indicated by the arrow along with the shaft rotation the switch turns on when the magnet passes through the point A and when it passes through the point B, the switch turns off.

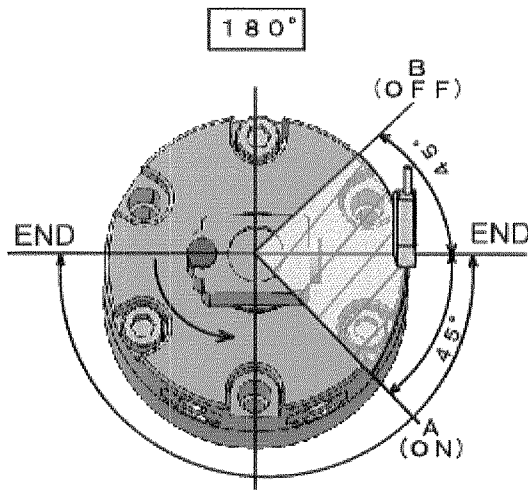
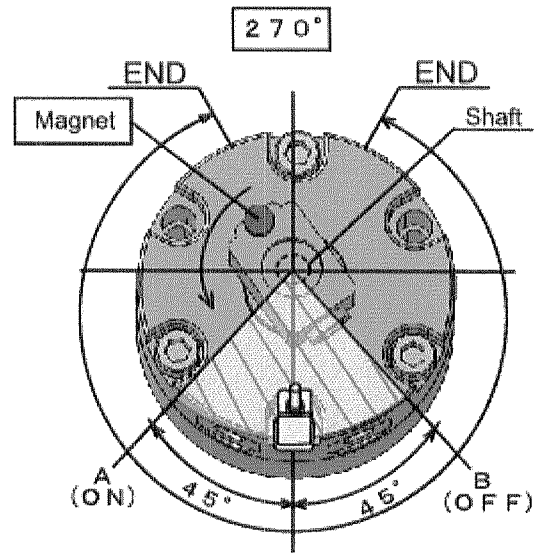


Figure (1)

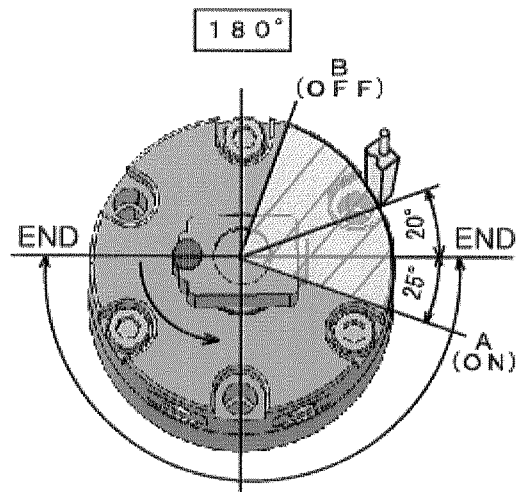


Figure (2)

As shown in the figure (1) above, when the magnet rotates in the direction indicated by the arrow, the switch turns on at the position 45 degrees away from the rotation end where the switch is mounted. If the switch is moved by 20 degrees as shown in Figure (2), it will be possible to turn on the switch at the position 25 degrees away from the rotation end.

As shown in the figure (3) on the right, when the magnet rotates in the direction indicated by arrow A, the switch turns on at point a.

When the magnet rotates in the opposite direction indicated by arrow B, the switch turns off at point b.

(Example) CDRB2BW20、30-180S

Rotary actuator ···· 180°

Actuation range ···· 10°

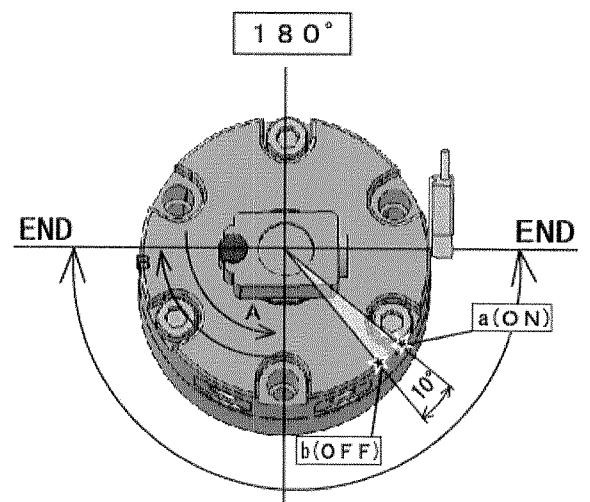
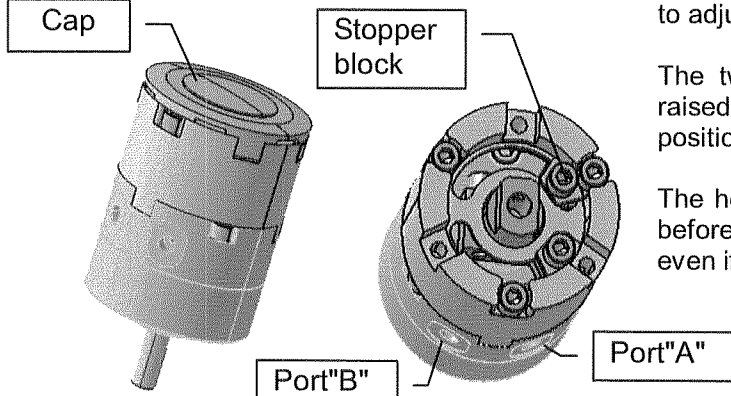


Figure (3)



### 3 – 3 Angle adjuster unit

#### Rotation setting example

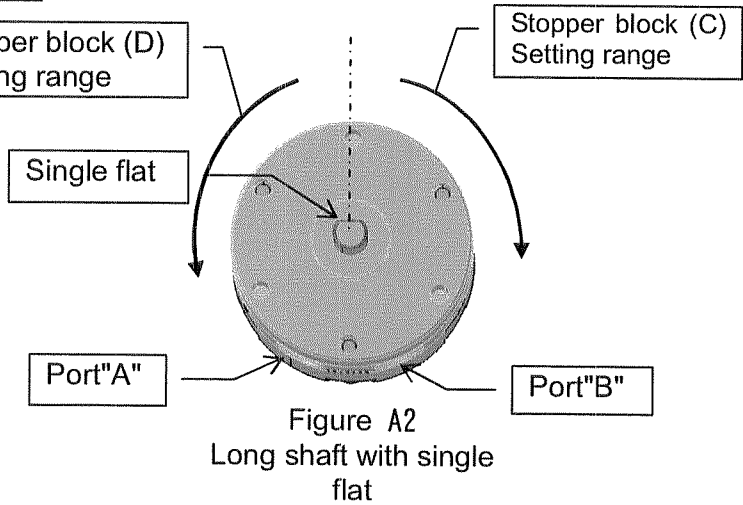
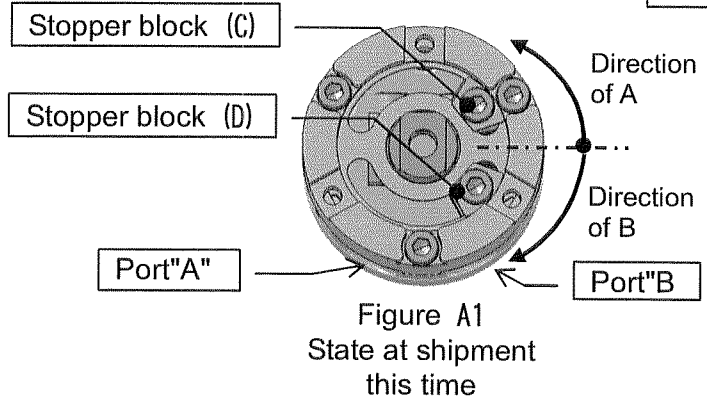


Remove the cap (rubber) on the right, slide the stopper block through the long oval slot and fix it at an appropriate position to adjust the rotation angle and position.

The two spanner flats integrated with the output shaft are raised, which enables manual operation, and is useful for positioning.

The hexagon socket head cap screw is tightened temporarily before shipment as shown on the right, so it may not operate even if air is supplied.

[For the single vane type]



- ① Figure A1 shows the state when rotation angle is set to 0 degree. (Before shipment)
- ② As shown in Figure A1, by moving stopper block (C) in direction A or stopper block (D) in direction B, the rotation angle can be adjusted continuously from 0 to a maximum angle of 240 degrees (0 to 230 degrees for CRB2BWU10) when the base rotary has 270 degrees specification. (Refer to Figure B1.)
- ③ Rotation range of the single flat of output shaft according to the operation (2) is shown in A2.

Long shaft with single flat  
Rotation range

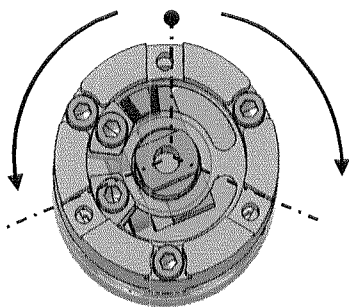


Figure B1. Example of maximum rotation angle adjustment in 270 degrees specification

Long shaft with single flat  
Rotation range

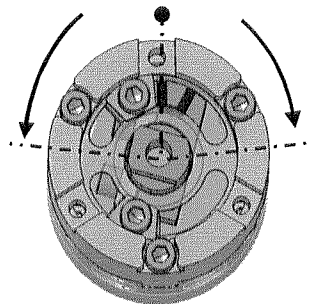


Figure B2. Example of maximum rotation angle adjustment in 180 degrees specification  
(Note: Maximum adjustable angle: 175 degrees)

Long shaft with single flat  
Rotation range

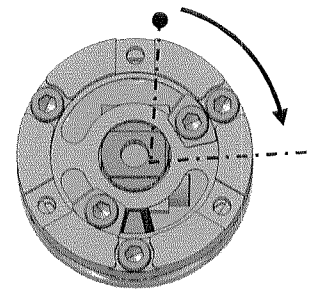
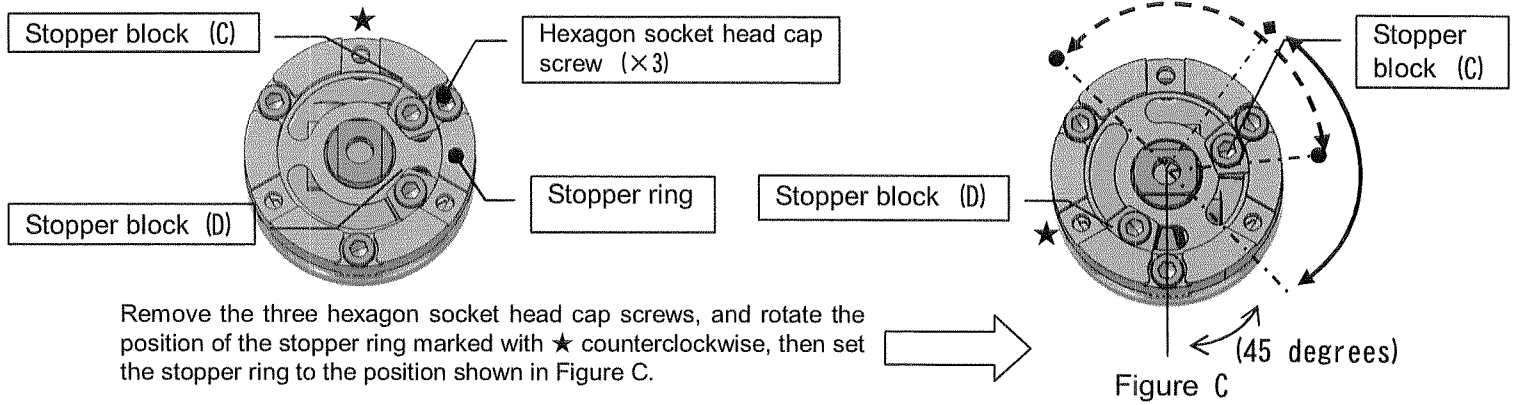


Figure B3. Example of maximum rotation angle adjustment in 90 degrees specification  
(Note: Maximum adjustable angle: 85 degrees)



Other adjustment examples (When base rotary has 270 degrees specification.)



Remove the three hexagon socket head cap screws, and rotate the position of the stopper ring marked with ★ counterclockwise, then set the stopper ring to the position shown in Figure C.

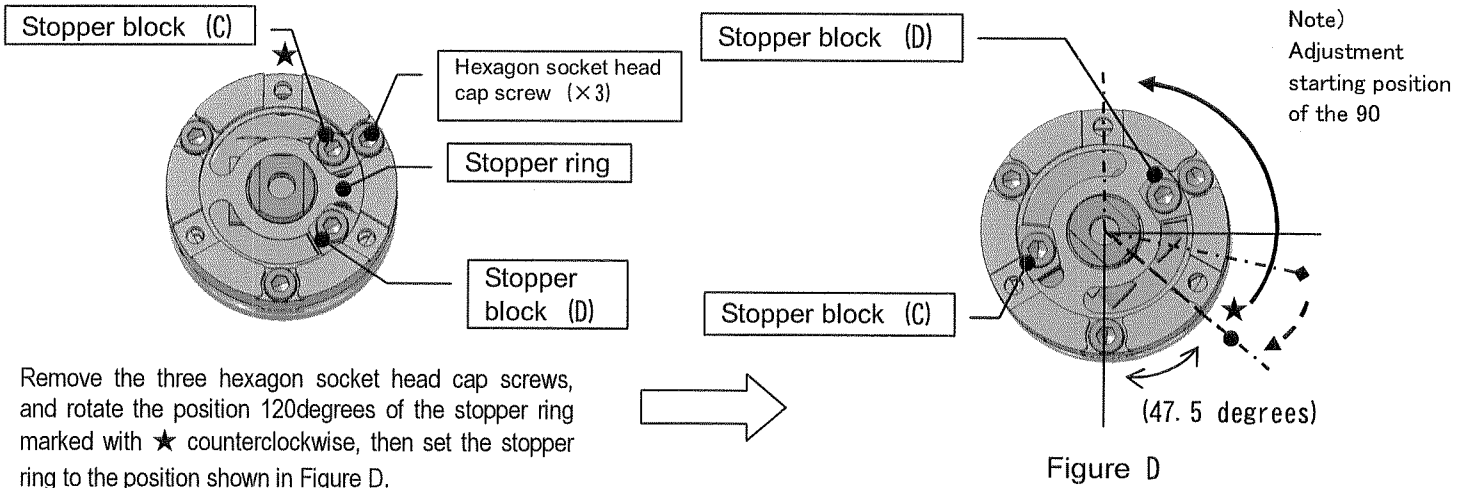
The single flat in the long-shaft side can be set within the range indicated by the arrow (broken line) by moving the stopper block (C).

Base rotary	●Maximum adjustable angle from the position marked with
270°specification	About 135°
180°specification	About 132°
90°specification	About 42°

The single flat in the long-shaft side can be adjusted within the range indicated by the arrow (solid line) by moving the stopper block (D).

Base rotary	◆Maximum adjustable angle from the position marked with.
270°specification	About 90°(Note)
180°90°specification	About 45°

Note) When setting the maximum angle to 90 degrees, the product might be stopped by the stopper in the product, so be sure that the stopper lever is stopped by the stopper block (D) when adjusting it.



Remove the three hexagon socket head cap screws, and rotate the position 120degrees of the stopper ring marked with ★ counterclockwise, then set the stopper ring to the position shown in Figure D.

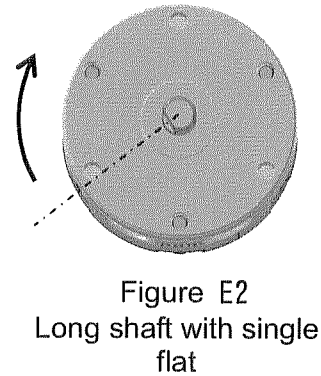
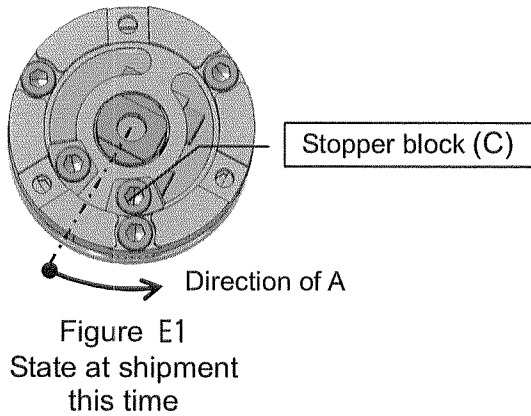
The single flat in the long-shaft side can be set within the range indicated by the arrow (broken line) by moving the stopper block (C).

Base rotary	◆Maximum adjustable angle from the position marked with.
270°specification	About 27°

The single flat in the long-shaft side can be adjusted within the range indicated by the arrow (solid line) by moving the stopper block (D).

Base rotary	●Maximum adjustable angle from the position marked with
270°specification	About 135°
180°specification	About 87°
90°specification	About 42°(Note)

[For the double vane type]



④ Figure E1 shows the condition in which rotation angle is set to 0 degree. (Before shipment)

⑤ As shown in Figure E1, when the stopper block (C) moves in the direction of A, the rotation angle can be adjusted continuously from 0 to a maximum angle of 90 degrees when the base rotary has 100 degrees specification. (Refer to Figure B1.)

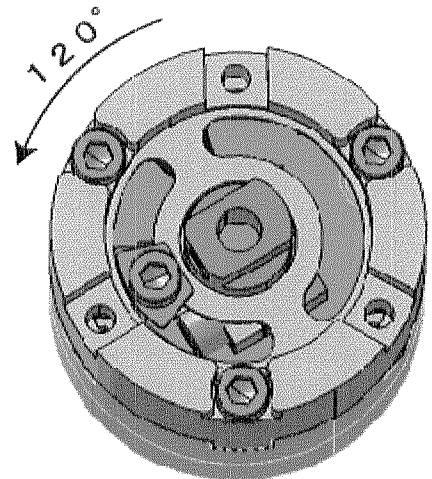
⑥ Rotation range of the single flat of output shaft according to the operation (2) is shown in E2.

**How to use**

① In the standard specification, one stopper block is mounted on each long oval slot, but it is possible to mount two stopper blocks on it.  
Angle adjustment range when two stopper blocks are mounted onto one long oval slot.

- CRB2BWU 10 . . . . . 50°
- CRB2BWU15,20,30 . . . . . 60°

② As shown on the right, it is possible to achieve 270 degrees of rotation by displacing the position of the stopper ring mounted on the body from the ports A and B by 120 degrees, and stopping one side of the ring with one stopper block, and the other side of the ring with the internal stopper installed in the actuator. (Except for CRB2BWU10)



## 4. Handling notes

### 4 - 1 Cautions for handling of the switch unit

- (1) Be sure to connect a load to the switch before turning the power supply on.
- (2) Do not let objects drop onto or dent the product or subject it to strong impact when handling.
- (3) Do not use the product in the presence of a strong magnetic field.
- (4) When using two or more cylinders with auto switches closely in parallel, keep them at least 40mm apart.

#### Reed auto switch type

- (1) A light emitting diode is used for the indicator light for D-R73 (for DC24V), so it has polarity. When used at DC24V, the black lead wire is negative and red lead wire is positive. If these lead wires are connected reversely, the switch will work but the indicator light will not light up.
- (2) Operate within the operating current range. If the actuator is used at a current less than the operating current range, the indicator light will not light up. If the current exceeds the operating current range, the indicator light will be broken.
- (3) D-R73 can be used in parallel, but when it is connected in series, the voltage drop will increase due to internal resistance of the light emitting diode.  
(Approx. 2V for each switch)
- (4) A contact protection circuit is not installed in D-R7, D-R8 and D-9 switches. If inductive load is connected, the lead wire is 5m or longer, or the current is AC100V, use the contact protection box shown on the right.

Product number	Working voltage	Length of lead wire
CD-P11	AC100V	Auto switch connection side 0.5m
CD-P12	CD24V	Load connection side 0.5m

#### Solid state auto switch

- (1) This actuator has reverse connection protection, output failure protection, and excessive load protection, so if wiring is wrongly connected, the switch will be protected, but depending on the wiring condition, the load might be adversely affected, so please connect the wiring carefully.
- (2) Do not connect the switches with two wire type (D-T79, D-T99 types) in series or parallel, because they may malfunction due to current leakage and internal voltage drop.
- (3) D-T79 and D-T99 types satisfy the input specifications of most sequence controllers, as the internal voltage drop is less than 3V and current leakage is less than 1Mpa, but if there is a problem, use D-S79 or D-S99 types.

#### ■ 4 - 2 Angle adjuster unit handling attention

Use the actuator within the allowable kinetic energy, otherwise there is a risk of deviation of the set rotation time, or breakage of parts.

Table 1 Moment of inertia

Model	Allowable kinetic energy(J)	
	Single	Double
CRB2BWU 10	0.00015	0.0003
CRB2BWU 15	0.001	0.0012
CRB2BWU 20	0.003	0.0033
CRB2BWU 30	0.02	
CRB2BWU 40	0.04	

How to calculate the load energy

$$E = \frac{1}{2} \cdot I \cdot \omega^2$$

$$\omega = \frac{2\theta}{t}$$

E : Kinetic energy (J)

I : Moment of inertia (kg · m<sup>2</sup>)

※ ω : Speed (rad/s)

θ : Rotation angle (rad)

180° = 3.14 rad

t : Rotation time (s)

The angular speed at the end of the isometric acceleration operation can be obtained as ω.

Table 2 Safely operable rotation time adjustment range.

Model	Rotation time (s / 90° )
CRB2BWU 10	0.03 ~ 0.3
CRB2BWU 15	
CRB2BWU 20	
CRB2BWU 30	0.04 ~ 0.3
CRB2BWU 40	0.07 ~ 0.5

Revision history
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**SMC Corporation** URL <http://www.smcworld.com>

Note This manual is subject to changes without prior notice.  
Also, the description of a product used in this manual might be used as a trade name.  
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