# **Compact Rotary Actuator**

## CRQ2 Series

Rack & Pinion Type/Size: 10, 15, 20, 30, 40



### **Series Variations**

					Size			Page	
			10	15	20	30	40		
	Rotating angle	80° to 100° 170° to 190° 350° to 370°	-+		•		-	_	
Standard	Shaft type	Single shaft S Double shaft W	- <b>+</b> -	• •	• •	- <b>+</b>	• •	P. 235	
	Cushion	None     Rubber cushion     Air cushion	•	•	•	•	•	P. 242	
	Variations	With auto switch Copper-free (Standard) 20-	+	• •	•	- <b>•</b> -	• •		
de to Order	Shaft type	Single shaft with four chamfers X   Double shaft key Y   Double shaft with four chamfers Z   Single round shaft T   Double shaft (Without long shaft key) J   Double round shaft K	•	•				P. 243, P. 244	D-□
Ma	Pattern	Shaft end form	- <b>•</b> -	• •			• •	P. 246 to P. 260	
			1		Y	Y	Ŧ	233	



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# **Compact Rotary Actuator Rack & Pinion Type** CRQ2 Series



### Applicable Auto Switches/Refer to pages 797 to 850 for further information on auto switches.

	0	Electrical	۲. ق	Wiring		Load vo	Itage	Auto swit	ch model	*Lead	l wire	lengtl	h (m)	Dro wirod							
Type	function	entry	Indicat	(Output)		DC	AC	Perpendicular	In-line	0.5 (Nil)	1 (M)	3 (L)	5 (Z)	connector	Applical	ole load					
-				3-wire (NPN)		5 V 10 V	5 V 40 V		M9N	•	•	۰	0	0	IC						
itcl				3-wire (PNP)		5 V, 12 V	5 V, 12 V		M9PV	M9P	•	•	۰	0	0	circuit					
sw				2-wire		24 V 5 V, 12 V 12 V 5 V, 12 V	12 V		M9BV	M9B	•	•	•	0	0						
육				3-wire (NPN)	5 V 10 V			5 V 12 V	EV 10 V	EV 10 V	EV 10 V	5 V 12 V		M9NWV	M9NW	•		۰	0	0	IC
al	Diagnostic indication	Grommet	Yes	3-wire (PNP)	24 V		-	M9PWV	M9PW		•	۰	0	0	circuit	Relay,					
tat	(2-0001)			2-wire			12 V 5 V, 12 V		M9BWV	M9BW	•	•	•	0	0		110				
ds				3-wire (NPN)				5 V, 12 V		M9NAV*1	M9NA*1	0	0	٠	0	0	IC				
i.	(2-color)			3-wire (PNP)						M9PAV*1	M9PA*1	0	0	•	0	0	circuit				
0)	(2-0001)			2-wire		12 V		M9BAV*1	M9BA*1	0	0	•	0	0							
ed witch		- Y	Yes	Yes	3-wire (NPN equiv.)	_	5 V	-	A96V	A96	•	-	•	-	-	IC circuit	-				
to s		Grommet		a :- aux	10.1/	100 V	A93V*2	A93	•	۲	۲	•	—	—	Relay,						
au			No	∠-wire	24 V	12 V	100 V or less	A90V	A90	•	-	۲	-	-	IC circuit	PLC					

\*1 Although it is possible to mount water resistant type auto switches, note that the rotary actuator itself is not of water resistant construction.

\*2 1 m type lead wire is only applicable to D-A93

\* Lead wire length symbols: 0.5 m ······ Nil (Example) M9NW

1 m ····· M (Example) M9NWM

\* Auto switches marked with "O" are made to order specification.

3 m ······ L (Example) M9NWL 5 m ······ Z (Example) M9NWZ

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

\* Refer to pages 837 and 838 for the details of solid

state auto switch with pre-wired connector

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### Symbol



### Made to Order Refer to pages 246 to 260 for details.

Symbol	Specifications/Content	Applicable shaft type			
-	Shaft type variation	X, Y, Z, T, J, K			
XA1 to XA24	Shaft pattern sequencing I	S, W			
XA31 to XA59	Shaft pattern sequencing II	X, Y, Z, T, J, K			
XC7	Reversed shaft	S, W, X, T, J			
XC8 to XC11	Change of rotating range				
XC12 to XC15	Change of angle adjustable range (0° to 100°)				
XC16, XC17	Change of angle adjustable range (90° to 190°)	S, W, Y X*, Z*, T*, J*, K*			
XC18, XC19	Change of rotating range				
XC20, XC21	Change of angle adjustable range (90° to 190°)				
XC22	Without inner rubber bumper				
XC30	Fluorine grease	]			
XC69	Fluororubber seal	S, W, X, Y, Z,			
X6	Shaft and parallel key made of stainless steel	1, 0, 1			

\* Among the symbols XC8 to XC21, only XC12 and XC16 are compatible with shaft types X, Z, T, J and K.

### Moisture Control Tube IDK Series

When operating an actuator with a small diameter and a short stroke at a high frequency, the dew condensation (water droplet) may occur inside the piping depending on the conditions.

Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to <u>the IDK Series in the</u> <u>Best Pneumatics No.6.</u>

### Specifications

Size	10	15	20	30	40		
Fluid			Air (Non-lube)	)			
Max. operating pressure	0.7	MPa		1.0 MPa			
Min. operating pressure	0.15 MPa 0.1 MPa						
Ambient and fluid temperature	e 0° to 60°C (No freezing)						
Cushion	Rubber	bumper	Not at	tached, Air cu	ushion		
Angle adjustment range		Ro	tation end ±5°	>			
Rotation		90	°, 180°, 360°				
Port size	M5 x 0.8 Rc 1/8, G 1/8, NPT 1/8, NPTF						
Output (N⋅m)*	0.3	0.75	1.8 3.1 5.3				

\* Output under the operating pressure at 0.5 MPa. Refer to page 32 for further information.

### Allowable Kinetic Energy and Rotation Time Adjustment Range

		Allowable kinetic energy										
Size	Allow	able kinetic ener	Cushion angle	adjustment range								
	Without cushion	Rubber bumper	Cushion angle	Rotation time (s/90°)								
10	—	0.00025	—	_	0.2 to 0.7							
15	—	0.00039	—	_	0.2 to 0.7							
20	0.025	_	0.12	40°	0.2 to 1							
30	0.048	_	0.25	40°	0.2 to 1							
40	0.081	-	0.4	40°	0.2 to 1							

Allowable kinetic energy for the bumper equipped type

Maximum absorbed energy under proper adjustment of the cushion needles.

If operated where the kinetic energy exceeds the allowable value, this may cause damage to the internal parts and result in product failure. Please pay special attention to the kinetic energy levels when designing, adjusting and during operation to avoid exceeding the allowable limit.

### Weight

			(g)						
Sizo	Standard weight*								
Size	90°	180°	360°						
10	120	150	200						
15	220	270	380						
20	600	700	1000						
30	900	1100	1510						
40	1400	1600	2280						

\* Excluding the weight of auto switch.

## A Precautions

- Be sure to read this before handling the products.
- Refer to back page 50 for Safety Instructions and pages 4 to
- 14 for Rotary Actuator and Auto Switch Precautions.

### A Caution

(1) The angle adjusting screw (angle adjustment bolt) is set at random near the maximum rotating angle. Therefore, it must be readjusted to obtain the angle that suits your application.

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### Construction

### Basic type Size 10/15





### **Component Parts**

_	-			
No.	Description	Material	Note	
1	Body	Aluminum alloy	Anodized	
2	Cover	Aluminum alloy	Chromated, painted	
3	Plate	Aluminum alloy	Chromated	
4	End cover	Aluminum alloy	Chromated, painted	
5	Piston	Stainless steel		
6	o. <i>i</i> .	Stainless steel	Size: 10, 15	
	Shaft	Chrome molybdenum steel	Size: 20, 30, 40	
7	Seal retainer	Aluminum alloy	Chromated	
8	Bearing retainer	Aluminum alloy	Chromated	
9	Wearing	Resin		
10	Hexagon socket head cap screw	Stainless steel		
	Hexagon nut	Che el usire	Size: 10, 15	
11	Small hexagon nut	Steel wire	Size: 20, 30, 40	
12	Cross recessed No. 0 screw	Steel wire		
	Cross recessed No. 0 screw	0	Size: 10, 15	
13	Cross recessed screw	Steel wire	Size: 20, 30, 40	

### 



### CRBC2 CRB1 MSU CRJ CRA1 CRA1 CR02 MSQ MSQ MSZ CR02X MRQ

### Component Parts

Basic type Size 20/30/40

No.	Description	Material	Note
14	Hexagon socket head set screw	Chrome molybdenum steel	
15	Bearing	Bearing steel	
16	Parallel key	Carbon steel	Size: 20, 30, 40 only
17	Steel ball	Stainless steel	Size: 20, 30, 40 only
18	Type CS retaining ring	Stainless steel	
19	Seal	NBR	
20	Gasket	NBR	
21	Piston seal	NBR	
22	Cushion seal	Rubber material	Size: 20, 30, 40 only with cushion
23	Seal washer	NBR	
24	Magnet	—	With auto switch only
25	Cushion valve assembly		Size: 20, 30, 40 with cushion only
26	Cushion pad	Rubber material	Size: 10,15

### **Replacement Parts**

Description			Part no.		
Description	10	15	20	30	40
Seal kit	P473010-1	P473020-1	P473030-1	P473040-1	P473050-1

A grease pack (10 g) is included. When you need a grease pack only, order with the following part number. Grease pack part no: GR-S-010 (10g)

	No.	Description	Qty.	Note
	19	Seal	1	
		Gasket for cover	2	0
Applicable parts	20	Gasket for endcover	1	Size: 10, 15
Applicable parts		Gasket	4	Size: 20, 30, 40
	21	Piston seal	4	
	23	Seal washer	2	

\* A set includes all parts above.

\* Individual part cannot be shipped.

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### Construction

With auto switch Size 10/15





With auto switch Size 20/30/40





With cushion Size 20/30/40





With auto switch and cushion Size 20/30/40





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### Compact Rotary Actuator Rack & Pinion Type CRQ2 Series

### Dimensions









With double shaft



												(mm)
Size	Rotating angle	A	AU*	в	ва	вв	вс	BD	BU	D (g6)	DD (h9)	н
10	90°, 180°, 360°	42.4	(8.5)	29	8.5	17	6.7	2.2	16.7	5	12	18
15	90°, 180°, 360°	53.6	(9.5)	31	9	26.4	10.6	_	23.1	6	14	20

Size	Rotating angle	W	Q	S	US	UW	ab	М	TA	TC	TD
10	90°		17	56		44	6			8	15.4
	180°	4.5		69	35			9	15.5		
	360°			97							
	90°			65							
15	180°	5.5	20	82	40	50	7	10	16	9	17.6
	360°			116							

\* AU dimension is not the dimension at the time of shipment, since its dimension is for adjustment parts. S: Upper 90°, Middle 180°, Lower 360°

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### Dimensions



вв

Α



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s

BA

BA

(AU) Max

																			<u> </u>
Size	Rotating angle	A	AU*	в	ва	BB	вс	BD	BE	BU	CA	СВ	D (g6)	DD (h9)	F	н	J	JA	JB
20	90°, 180°, 360°	63	(11)	50	14	34	14.5		—	30.4	7	5	10	25	2.5	30	M 8 x 1.25	11	6.5
30	90°, 180°, 360°	69	(11)	68	14	39	16.5	49	16	34.7	8.1	5.3	12	30	3	32	M10 x 1.5	14	8.5
40	90°, 180°, 360°	78	(13)	76	16	47	18.5	55	16	40.4	8.3	5.5	15	32	3	36	M10 x 1.5	14	8.6

Cizo	Rotating		v	•		w	Key dim	ensions	110	тл	тв	то	тр	TF	TG	ті	11104	6	м	N	
3126	angle	33	r	a	3	vv	b	L1	03	IA	ю			(H9)	(H9)	1.	0.0	G	IVI	IN	L .
	90°				104																
20	180°	_	3	29	130	11.5	4 <sub>-0.03</sub>	20	59	24.5	1	13.5	27	4	4	2.5	74	8 _0.1	15	11	9.6 .0.1
	360°				180																
	90°				122																
30	180°	M5 x 0.8	4	33	153	13.5	4 <sub>-0.03</sub>	20	65	27	2	19	36	4	4	2.5	83	10 _0.1	18	13	11.4 .0.1
	360°	departo			216																
	90°	Mount			139																
40	180°	depth 7	5	37	177	17	5 <sub>-0.03</sub>	25	73	32.5	2	20	39.5	5	5	3.5	93	11 <sub>-0.1</sub>	20	15	14 .0.1
	360°				253																

\* AU dimension is not the dimension at the time of shipment, since its dimension is for adjustment parts. \*\* In addition to Rc 1/8, G 1/8, NPT 1/8, NPTF 1/8 are also available. S: Upper 90°, Middle 180°, Lower 360°

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### **Rotation Range**

When pressurized from the port indicated by the arrow, the shaft will rotate in a clockwise direction.

### Rotating angle: 90°

### Rotating angle: 180°



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### Unit Used as Flange Mount

The L dimensions of this unit are shown in the table below. When hexagon socket head cap bolt of the JIS standard is used, the head of the bolt will recess into the groove of actuator.



Size	L	Screw
10	13	M4
15	16	M4
20	22.5	M6
30	24.5	M8
40	28.5	M8

### Auto Switch Proper Mounting Position at Rotation End



	Botating	S	olid stat	e switch		Reed switch							
Size	Rotating angle	A	в	Operating angle (θ m)	Hystere- sis angle	A	в	Operating angle (θ m)	Hystere- sis angle				
	90°	19	25.5			15	21.5						
10	180°	22	35	61°	5°	18	31	63°	12°				
	360°	29	56.5	]		25	52.5	]					
	90°	22.5	31			18.5	27						
15	180°	26.5	43.5	47°	4°	22.5	39.5	52°	<b>9</b> °				
	360°	34.5	68.5			30.5	64.5						
	90°	40	52.5			36	48.5						
20	180°	46	71.5	40°	4°	42	67.5	41°	9°				
	360°	59.5	110			55.5	106						
	90°	47	63			43	59						
30	180°	55	86	29°	2°	51	82	32°	7°				
	360°	66	129.5			62	125.5						
	90°	54	73			50	69						
40	180°	63.5	101.5	24°	2°	59.5	97.5	24°	5°				
	360°	76.5	156			72.5	152						

Operating angle  $\theta$  m: The value of the individual switch's movement range Lm as represented by an angle.

Hysteresis angle: Value of the switch's hysteresis as represented by an angle.

Note) Since the above values are only provided as a guideline, they are not guaranteed. In the actual setting, adjust them after confirming the auto switch performance.

## Compact Rotary Actuator Rack & Pinion Type CRQ2 Series

### Shaft Type Variation, Four Chamfers (Size 20/30/40)

### Shaft Type: X, Z



Specifications		
Fluid	Air (Non-lube)	
Applicable shaft type	Single w/ four chamfers (X), Double w/ four chamfers (Z)	
Applicable size	20, 30, 40	CBB 2
Max. operating pressure	1.0 MPa	
Min. operating pressure	0.1 MPa	CRB1
Cushion	Not attached, Air cushion	
Rotation	80° to 100°, 170° to 190°, 350° to 370°	MSU
Port size	Rc 1/8, G 1/8, NPT 1/8, NPTF 1/8	
Auto switch	Mountable	υKJ

### Dimensions



Note) Dimension parts different from the standard conform to the general tolerance.

### Shaft Type Variation, Double Shaft With Key (Size 20/30/40) 2

C RQ2B Size Rotating angle CDRQ2B Refer to "How to Order" on page 235 for further information. Shaft type Double shaft with key Y

### Specifications

Fluid	Air (Non-lube)
Applicable shaft type	Double shaft with key (Y)
Applicable size	20, 30, 40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.1 MPa
Cushion	Not attached, Air cushion
Rotating angle	80° to 100°, 170° to 190°, 350° to 370°
Port size	Rc 1/8, G 1/8, NPT 1/8, NPTF 1/8
Auto switch	Mountable



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17 Note) Dimension parts different from the standard conform to the general tolerance.

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CRA1

**CR02** 

MSO

MSZ

CRQ2X MSQX

MRQ

Shaft Type: Y

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### 3 Shaft Type Variation/Without Keyway

### C RQ2B Shaft type Size Rotating angle • Refer to "How to Order" on page 235 for further information. T Single round shaft J Double (Without long shaft key, with four chamfers on short ) K Double round shaft K Double round shaft

### Specifications

Fluid	Air (N	on-lube)				
Applicable shaft type	Single round shaft (T), Double s	shaft (J), Double round shaft (K)				
Applicable size	10, 15	20, 30, 40				
Max. operating pressure	0.7 MPa	1.0 MPa				
Min. operating pressure	0.15 MPa	0.1 MPa				
Cushion	Rubber bumper	Not attached, Air cushior				
Rotating angle	80° to 100°, 170° to 190°, 350° to 37					
Port size	M5 x 0.8	Rc 1/8, G 1/8, NPT 1/8, NPTF 1/8				
Auto switch	Mountable					

### Dimensions



Note) Dimension parts different from the standard conform to the general tolerance.

### Shaft Type: T, J, K

## *CRQ2 Series* (Size: 10, 15, 20, 30, 40) Simple Specials: -XA1 to -XA24: Shaft Pattern Sequencing I

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

Symbol

-XA1 to XA24

### Shaft Pattern Sequencing I

Applicable shaft type: S, W



### Chart 1. Combination between -XA and -XA (S, W shaft) Top port Shaft type Applicable Symbol Description Combination ower S W size Inn XA 1 Female thread at the end • • 10 15 XA 1 ٠ \* Describes the combination available for corresponding shaft shapes. XA 2 Female thread at the end • • • 20, 30, 40 • XA 2 XA 3 XA 3 Tip end of male thread • • . . W/ \* XA 4 Tip end of male thread — W \* XA 4 ● — ● XA 5 XA 5 Stepped round shaft • • • XA 6 Stepped round shaft . W/ \* W \* - W \* XA 6 XA 7 Round shaft with steps and male thread ۲ . . ۲ - • -• XA 7 10, 15 . W \* W \* - W \* - W \* XA 8 XA 8 Round shaft with steps and male thread XA 9 Change of the length of standard chamfered face • . . • • -● — ● XA 9 W \* - W \* - W \* - W \* XA10 XA10 Change of the length of standard chamfered face . W ∛ XA11 Two-sided chamfer • . . • ● - ● - ● - ● XA11 w \* XA12 Two-sided chamfer . \**\**/ ₹ W \* W \* XA12 XA13 Shaft through-hole . • • -XA13 . ۲ . XA14 Shaft through-hole and female thread -\_ \_ \_ -• • \_ - XA14 • . 10 15 • • -• • — XA15 — — XA15 Shaft through-hole and female thread • 20, 30, 40 XA16 Shaft through-hole and female thread . . \_ — XA16 • • • -XA17 Shortened shaft • • • • • • 🔵 🦳 XA17 . 10.15 XA18 Shortened shaft • \_ 10, 15, 20, 30, 40 W \* - w\* - w\* - w \* -W \* - W \* - W \* W \* - - W \* XA18 \_ - W\* XA19 Shortened shaft 10.15 - • XA20 Reversed shaft 10, 15, 20, 30, 40 XA20 • -XA21 Stepped round shaft with double-sided chamfe . • • ٠ • XA21 . • W \* - w \* - w \* - w \* - w \* W \* - - - w \* XA22 Stepped round shaft with double-sided chamfer 10, 15 - - W \* XA22 XA23 Right-angle chamfer . . - • - • - • -. XA24 Double key - • • 20, 30, 40 • - . . . .

### Combination Chart of Made to Order

### Chart 2. Combination between -XA and -XC (Made to Order/ Details of -XC, refer to page 256.)

Sumbol	Description	Applicable	Combination	Sumbol	Description	Applicable	Combination	1			
Symbol	Description	size	XA1 to XA24		Description	size	XA1 to XA24	i i			
XC 7	Reversed shaft		-	XC18	Channes of unbedience under		•	í –			
XC 8			•	XC19	Change of rotating range	20 20 40	•	í –			
XC 9	Channel of antation and a				•	XC20 Change in angle adjustable		20, 30, 40	•	í –	
XC10	Change of rotating range		•	XC21	range 90° to 190°		•	í –			
XC11		10.15	•	XC22	Without inner rubber bumper	10, 15	•	í –			
XC12		20, 30, 40	•	XC30	Fluorine grease	10, 15, 20, 30, 40	•	i i			
XC13	Change in angle adjustable	-,, -	•	XC69	Fluororubber seal	10, 15, 20, 30, 40	•	i i			
XC14	range 0° to 100°		•								
XC15			•								
XC16	Change in angle adjustable		•								
XC17	range 90° to 190°		•	] * Ch	Chart 5. Herer to page 256 for combination available between -XC□ and -XC□						

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## Simple Specials CRQ2 Series



## CRQ2 Series (Size: 10, 15, 20, 30, 40) **Simple Specials:** -XA1 to -XA24: Shaft Pattern Sequencing I

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

### **Shaft Pattern Sequencing I**

### Additional Reminders

- 1. Enter the dimensions within a range that allows for additional machining.
- 2. Unless indicated otherwise, the dimensional tolerance conforms to the general tolerance. SMC will make appropriate arrangements
- 3. The length of the unthreaded portion is 2 to 3 pitches.
- 4. Unless specified otherwise, the thread pitch is based on coarse metric threads. M3 x 0 5 M4 x 0 7 M5 x 0 8
  - M6 x 1
- 5. Enter the desired figures in the \_\_\_\_ portion of the diagram
- 6. XA9 to XA24 are the standard products that have been additionally machined.
- 7. Chamfer face of the parts machining additionally is C0.5.

### Symbol: A11

- The long shaft can be further shortened by machining
- a double-sided chamfer on to it. Since L1 is a standard chamfer, dimension E1 is 0.5
- or more (If altering the standard chamfer and shortening the shaft are
- not required, indicate "\*" for both the L1 and X dimensions.) · Applicable shaft types: S, W



### Symbol: A14

A special end is machined onto the long shaft, and a through-hole is drilled into it. Female threads are machined into the through-hole, whose diameter is equivalent to the pilot hole diameter.

 The maximum dimension L1 is, as a rule, twice the thread size



### 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 types: S, W



### Size

Symbol: A12 The short shaft can be further shortened by machining a double-sided chamfer on to it

 Since L2 is a standard chamfer, dimension E2 is 0.5 or more

(If altering the standard chamfer and shortening the shaft are not required, indicate "+" for both the L2 and Y dimensions.) · Applicable shaft type: W



### 1bol: A15

A special end is machined onto the short shaft, and a through-hole is drilled into it. Female threads are machined into the through-hole, whose diameter is equivalent to the pilot hole diameter.

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



### Symbol: A10







### Symbol: A16

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Thread M3 x 0.5

M4 x 0.7

M5 x 0.8

ø2.5 ø2.5 ø2.5

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. size. (Example) For M5: L1 = 10



ø3.3 ø3.3 ø3.3

ø4.2

ø4.2

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## Simple Specials CRQ2 Series



## CRQ2 Series (Size: 10, 15, 20, 30, 40) Simple Specials: -XA31 to -XA59: Shaft Pattern Sequencing II

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

### Shaft Pattern Sequencing II

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



Symbol

																			-X/	<b>A</b> 31	to	XA	59	
					_				_															CRB
com	bination Chart	of	Sim	nple	e Sp	pec	ial	s fo	or T	ip End	Sh	ape	)											CDI
hart	3 Combination bet	wo	on -)	۲A	an	ч-х	ΔΠ	(x )	v 7	тлк	shaf	te)												UKE
nurt		Ton	nort			Shaf	t type	(74)	• • • •	Annlicable		.0)												MS
ymbol	Description	Upper	Lower	J	к	Т	X	Y	Z	size					Comb	oinatic	on							
(A31	Female thread at the end	•	-	_	-	-	-	•	-		XA31						* C	orres	nondi	na sh	afte ti	me		I CE
A32	Female thread at the end	-	•	-	-	-	-	۲	-	20, 30, 40	Y *	XA32	1				. 0.	/ailah	nle for	comb	ninatir	n		
A33	Female thread at the end	٠	-	•	٠	٠	-	-	-	10, 15,	-	-	XA33	]			u	ranac		com	manc			CD
A34	Female thread at the end	-	٠	-	٠	٠	•	-	- 1	20, 30, 40	-	-	K, T *	XA34	]									UN
A35	Female thread at the end	۲	-	-	-	-	•	-	•	20. 20. 40	-	-	-	X *	XA35	]								0.0
A36	Female thread at the end	-	•	۰	-	-	-	-	۲	20, 30, 40	-	-	J*	-	Z *	XA36	]							UK
A37	Stepped round shaft	•	-	۲	۲	۲	—	-	-	10, 15,	-	-	-	KT *	-	J*	XA37							
A38	Stepped round shaft	-	•	-	٠	-	-	-	-	20, 30, 40	-	-	K*	-	-	-	Κ*							M
\39	Shaft through hole	•	•	-	-	-	-	٠	-	20, 30, 40	-	-	-	-	-	-	-							
A40	Shaft through hole	•	•	—	۲	۲	-	-	-	10, 15,	-	-	-	-	-	-	-							М
A41	Shaft through hole	٠	•	٠	-	-	٠	-	٠	20, 30, 40	-	-	-	-	-	-	-							
A42	Shaft through hole and female thread	•	•	-	-	-	-	٠	-	20, 30, 40	-	-	-	-	-	-	-							CR
A43	Shaft through hole and female thread	•	•	-	•	٠	-	-	-		-	-	-	-	-	-	-							MS
A44	Shaft through hole and female thread	٠	•	٠	-	-	٠	-	٠	10, 15,	-	-	-	-	-	-	-	XA38						
A45	Middle-cut chamfer	•	-	۲	۲	۲	-	-	-	20, 30, 40	-	-	-	K *	-	J*	-	Κ*	XA39	XA40	XA41	XA45	]	MI
A46	Middle-cut chamfer	-	•	—	٠	-	-	-	-	1	-	-	K *	-	-	-	Κ*	-	-	-	_	K *	XA46	
A48	Change of long shaft length	٠	-	-	-	-	-	٠	-		-	Y *	-	-	-	-	-	-	Y *	-	- 1		-	
A49	Change of short shaft length	-	•	-	-	-	-	•	-	20, 30, 40	Y *	-	-	-	-	-	-	-	Y *	-			-	
A50	Change of double shaft length	•	•	-	-	-	-	٠	-		-	-	-	-	-	-	-	-	Y *	-	-	-	-	
A51	Change of long shaft length	٠	-	٠	٠	۲	-	-	-	10.15	-	-	-	K, T *	-	J*	-	Κ*	-	K, T *	J*	-	К*	
A52	Change of short shaft length	-	•	-	٠	-	-	-	-	10, 15,	-	-	K *	-	-	-	Κ*	-	-	K *	-	Κ*	-	
A53	Change of double shaft length	•	•	-	٠	-	-	-	-	20, 30, 40	-	-	-	-	-	-	-	-	-	Κ*	-	_	-	
A54	Change of long shaft length	•	-	-	-	-		-	•		-	-	-	X *	-	Z *	-	-	-	-	X, Z *		-	
A55	Change of short shaft length	-	٠	٠	-	-	-	-		20, 30, 40	-	-	J *	-	Z *	-	J *	-	-	-	J, Z *	J*	-	
A56	Change of double shaft length	٠	•	-	-	-	-	-		1	-	-	-	-	-	-	-	-	-	-	Z *		-	
A57	Change of double shaft length	٠	•	٠	-	-	-	-	-	10, 15,	-	-	-	-	-	-	-	-	-	-	J*	- 1	-	
A58	Reversed shaft, Change of double shaft length	٠	٠	٠	-	٠	-	-	-	20, 30, 40	-	-	-	-	-	-	-	-	-	Τ*	J *	- 1	-	
A59	Reversed shaft. Change of double shaft length	•	•	-	-	-	•	-	-	20, 30, 40	-	-	-	-	-	-	-	-	-	-	X*		-	

### **Combination Chart of Made to Order**

Chart 4. Combination between -XA and -XC (Made to Order/Details of -XC , refer to page 256.)

			Combination
Symbol	Description	Applicable size	XA31 to XA59
XC 7	Reversed shaft		-
XC 8			•
XC 9	Chappen of rotating range		•
XC10	Change of rotating range		•
XC11		10.15	•
XC12		20 30 40	•
XC13	Change in angle adjustable range 0° to 100°	20, 30, 40	•
XC14			•
XC15			•
XC16	Change in angle adjustable range 90° to 190°		•
XC17	Change in angle adjustable range 50 to 150		•
XC18	Change of rotating range		•
XC19	Change of rotating range	20 30 40	•
XC20	Change in angle adjustable range 00° to 100°	20, 00, 40	•
XC21	Change in angle adjustable range 50 to 190		•
XC22	Without inner rubber bumper	10, 15	•
XC30	Fluorine grease	10, 15, 20, 30, 40	•
XC69	Fluororubber seal	10, 15, 20, 30, 40	•

\* Chart 5. Refer to page 256 for combination available between -XC $\square$  and -XC $\square.$ 

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## CRQ2 Series (Size: 10, 15, 20, 30, 40) Simple Specials: -XA31 to -XA59: Shaft Pattern Sequencing II

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

### Shaft Pattern Sequencing II

### Additional Reminders

- Enter the dimensions within a range that allows for additional machining.
- Unless indicated otherwise, the dimensional tolerance conforms to the general tolerance. SMC will make appropriate arrangements.
- The length of the unthreaded portion is 2 to 3 pitches.
- 4. Unless specified otherwise, the thread pitch is based on coarse metric threads. M3 x 0.5, M4 x 0.7, M5 x 0.8
  - M6 x 1
- Enter the desired figures in the <u>III</u> portion of the diagram.
- XA31 to XA59 are the standard products that have been additionally machined.
- Chamfer face of the parts machining additionally is C0.5.

### Symbol: A33



### Symbol: A36

- Machine female threads into the short shaft.
- The maximum dimension L2 is, as a rule, twice the thread size.
- (Example) For M4: L2 = 8
- Applicable shaft types: J, Z





Machine female threads into the long shaft. • The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M3: L1 = 6 • Applicable shaft type: Y Q1 = M []]] Q1 = M []]]









### Symbol: A37

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



### Symbol: A32





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**SMC** 

## Simple Specials CRQ2 Series



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### Shaft Pattern Sequencing II



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**SMC** 

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## **CRQ2** Series Made to Order Specifications 1



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



### **Combination Chart of Made to Order**

### Chart 5. Combination between -XC and -XC

Symbol	Description	Applicable size		Combi	nation	
XC7	Reversed shaft					
XC8 to XC11	Change of rotating range					
XC12 to XC15	Change in angle adjustable range $0^\circ$ to $100^\circ$	10, 15, 20, 30, 40				
XC16 XC17	Change in angle adjustable range $90^\circ$ to $190^\circ$					
XC18 XC19	Change of rotating range	00 00 40	XC7			
XC20 XC21	Change in angle adjustable range 90° to 190° $$	20, 30, 40	to XC17	XC18 to		
XC22	Without inner rubber bumper	10, 15	•	XC21	XC22	
XC30	Fluorine grease	10, 15, 20, 30, 40	•	•	•	XC30
XC69	Fluororubber seal	10, 15, 20, 30, 40	•	•	•	•

## Made to Order Specifications CRQ2 Series



Size 10, 15

		()
Size	М	н
10	10	17 (—)*
15	11	19 (—)*
20	16.5	28.5 (19.5)*
30	20	30 (22)*
40	22	34 (25)*

\* For X shaft

(mm)

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## *CRQ2 Series* Made to Order Specifications 2



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



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## Made to Order Specifications CRQ2 Series



## CRQ2 Series Made to Order Specifications 3



Symbol

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



C RQ2B CDRQ2B	Refer to "How to Order" on page 235.	- XC22
	Without in	nner

Without inner	
rubber bumper	

5 Fluorine Grease	-XC30
C RQ2B CDRQ2B Refer to "How to Order" on page 235.	- xc30
Fluorine g	rease •

Fluorine grease is used as lubricant oil in seal part of packing and inner wall of cylinder. (Not for low-speed specification.)

### Specifications

Fluid	Air (Non-lube)	
Applicable size	10, 15	
Max. operating pressure	0.7 MPa	
Min. operating pressure	0.15 MPa	
Port size	M5 x 0.8	
Rotation	80° to 100°, 170° to 190°, 350° to 370°	
Applicable shaft type	S, W, X, Y, Z, T, J, K	
Auto switch	Mountable	
*Refer to page 236 for other specifications.		

pag

Refer to pages 239 and 240 for other specifications.



Seal material is changed to fluororubber.

Stainless steel is used as a substitute material for standard parts when used under conditions with a possibility of oxidization or decay.

Fluid	Air (Non-lube)
Applicable shaft type	S, W, X, Y, Z, T, J, K
Applicable size	20, 30, 40
Max. operating pressure	1.0 MPa
Min. operating pressure	0.1 MPa
Cushion	Not attached, Air cushion
Rotation range	80° to 100°, 170° to 190°, 350° to 370°
Stainless steel part	Shaft, Parallel key
Port size	Rc 1/8, G 1/8, NPT 1/8, NPTF 1/8
Auto switch	Mountable

**SMC**