

Rotary Actuator

Series CRA1

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

RoHS



How to Order

CRA1 B S 50 - 90 Z -

With auto switch CDRA1 B S 50 - 90 Z - M9BW -

Built-in magnet

Mounting

B	Basic type
L	Foot type*
F	Flange type

* For foot bracket and part number, refer to page 2.
* Foot bracket is included in the same package, (but not assembled).

Rotating angle

90	90°
180	180°
100	100°
190	190°

Air cushion

—	None
C	With air cushion

Port type

Port type		50, 63	80	100
Size	Rc			
TF	G	1/8	1/4	3/8
TN	NPT			
TT	NPTF			

Shaft type

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

* Flange type is not available for T, J, K.
* T, J, K are made to order.

Size

50
63
80
100

Number of auto switches

—	2 pcs.
S	1 pc.

Note) Up to two auto switches are mountable.

Auto switch

—	Without auto switch (Built-in magnet)
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* For applicable auto switch model, refer to the table below.

Made to Order
Refer to page 2.

Applicable Auto Switches/Refer to Auto Switch Guide for further information on auto switches.

Applicable Auto Switch Selection Guide for Auto Switch																	
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto switch model		Lead wire length [m]				Pre-wired connector	Applicable load		
					DC		AC	Perpendicular	In-line	0.5 (—)	1 (M)	3 (L)	5 (Z)				
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	—	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○			
				2-wire				M9BV	M9B	●	●	●	○	○			
	3-wire (NPN)			5 V, 12 V		M9NWV		M9NW	●	●	●	○	○	—	IC circuit		
	3-wire (PNP)					M9PWV		M9PW	●	●	●	○	○				
	2-wire					M9BWV		M9BW	●	●	●	○	○				
	Diagnosis indication (2-colour indication)			5 V, 12 V	M9NAV**	M9NA**		○	○	●	○	○	—	IC circuit			
					3-wire (PNP)	M9PAV**		M9PA**	○	○	●	○			○		
					2-wire	M9BAV**		M9BA**	○	○	●	○			○		
					2-wire				○	○	●	○			○		
Water resistant (2-colour indication)	5 V, 12 V																
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	A96V	A96	●	—	●	—	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	A93V	A93	●	—	●	—	—	—	—	
			No	2-wire	24 V	12 V	100 V or less	A90V	A90	●	—	●	—	—	—	—	

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

* Lead wire length symbols: 0.5 m..... — (Example) M9NW
1 m..... M (Example) M9NWM
3 m..... L (Example) M9NWL
5 m..... Z (Example) M9NWZ

* Auto switches marked with "○" are produced upon receipt of order.

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



Refer to Auto Switch Guide for detailed solid state auto switches with pre-wired connectors.

Specifications



Basic type



Flange type



Foot type

Type	Pneumatic			
Size	50	63	80	100
Fluid	Air (Non-lube)			
Max. operating pressure	1.0 MPa			
Min. operating pressure	0.1 MPa			
Ambient and fluid temperature	0 to 60°C (No freezing)			
Cushion	Not attached, Air cushion			
Backlash	Within 1°			
Tolerance in rotating angle	+4° 0			

Effective Torque

Size	Operating pressure [MPa]										[N·m]
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	
50	1.85	3.71	5.57	7.43	9.27	11.2	13.0	14.9	16.7	18.5	
63	3.44	6.88	10.4	13.8	17.2	20.6	24.0	27.5	31.0	34.4	
80	6.34	12.7	19.0	25.3	31.7	38.0	44.4	50.7	57.0	63.4	
100	14.9	29.7	44.6	59.4	74.3	89.1	104	119	133	149	



Made to Order
(For details, refer to pages 11 to 23.)

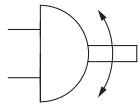
Symbol	Description	Applicable shaft type
XA1 to XA24	Shaft pattern sequencing I	S, W, Y
XA33 to XA59	Shaft pattern sequencing II	X, Z, T, J, K
XC7	Reversed shaft	S, W, X, T, J
XC8 to XC11	Change of rotation range	S, W, Y
XC30	Changed to fluorine grease	S, W, X, Y Z, T, J, K
XC31 to XC36	Change of rotation range and shaft rotation direction	S, W, Y
XC59 to XC61	Change of port location (Mounting location of the cover is changed.)	S, W, X, Y Z, T, J, K

Allowable Kinetic Energy/Adjustable Range of Rotation Time Safe in Operation

Size	Allowable kinetic energy [J]		Adjustable range of rotation time safe in operation [s/90°]
	Without air cushion	With air cushion*	
50	0.05	0.98	Cushion angle 35°
63	0.12	1.50	
80	0.16	2.00	
100	0.54	2.90	

* Allowable kinetic energy of the product with air cushion is the maximum absorbed energy when the cushion valve adjustment is optimised.

JIS Symbol



Weights

Size	Standard weight		Additional weight			[kg]
	90°	180°	With auto switch*	Foot bracket	Flange bracket	
50	1.3	1.5	0.2	0.3	0.5	
63	2.2	2.6	0.4	0.5	0.9	
80	3.9	4.4	0.6	0.9	1.5	
100	7.3	8.3	0.9	1.2	2.0	

* With 2 auto switches

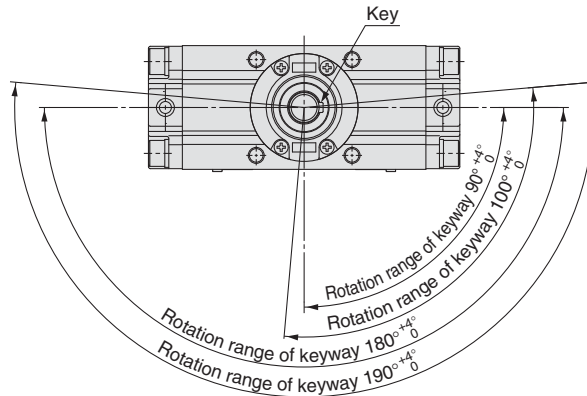
Foot Bracket/Part No.

Size	Foot bracket	Contents	Mounting screw size included in foot bracket
50	CRA1L50-Y-1Z	Foot bracket: 2 pcs. Mounting screw: 4 pcs. Collar: 4 pcs.	M8 x 1.25 x 35
63	CRA1L63-Y-1Z		M10 x 1.5 x 40
80	CRA1L80-Y-1Z		M12 x 1.75 x 50
100	CRA1L100-Y-1Z		M12 x 1.75 x 50

Rotation Range of Keyway/Auto Switch Mounting Position

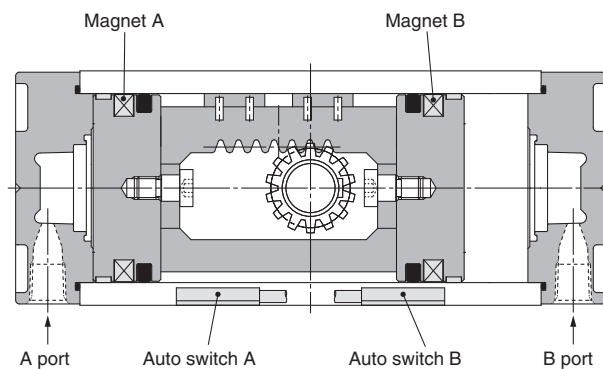
Size: 50 to 100

CDRA1□□50 to 100



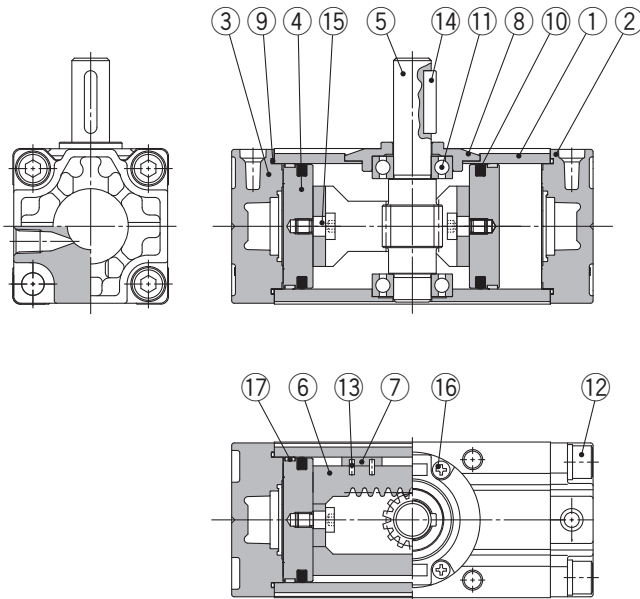
Working Principle

In the diagram below, the auto switch B is ON. When pressure is applied from A, the piston moves to B, causing the shaft to rotate clockwise. At this time, the magnet B goes out of the movement range of the auto switch B, causing the auto switch B to turn OFF. Furthermore, the piston moves to the right, causing the magnet A to enter the movement range of the auto switch A. As a result, the auto switch A turns ON.

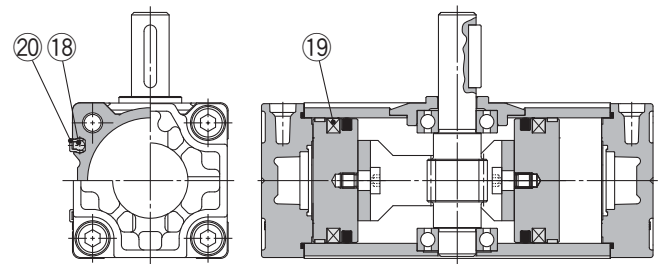


Construction

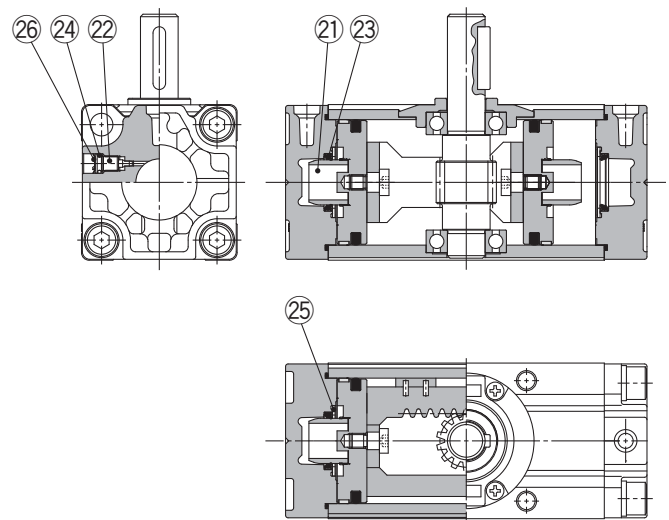
Without air cushion



Without air cushion With auto switch



With air cushion



Component Parts

No.	Description	Material	Note
1	Body	Aluminium alloy	Anodised
2	Right cover	Aluminium alloy	Metallic coating
3	Left cover	Aluminium alloy	Metallic coating
4	Piston	Aluminium alloy	
5	Shaft	Alloy steel	
6	Rack	Carbon steel	Nitrided
7	Slider	Resin	
8	Bearing retainer	Aluminium alloy	Chromated
9	Tube gasket	NBR	
10	Piston seal	NBR	
11	Bearing	High carbon chrome bearing steel	
12	Hexagon socket head cap screw with washer	Alloy steel	Zinc chromated
13	Spring pin	Steel	Zinc chromated
14	Parallel key	Carbon steel	
15	Connecting screw	Carbon steel	Zinc chromated
16	Cross-recessed pan head tapping screw	Steel	Zinc chromated
17	Wear ring	Resin	
18	Auto switch	—	
19	Magnet	—	
20	Switch spacer	Resin	
21	Cushion ring	Aluminium alloy	Anodised
22	Cushion valve	Steel	Zinc chromated
23	Cushion seal	Urethane	
24	O-ring	NBR	
25	Seal retainer	Steel	
26	Retaining ring	Steel	

Replacement Parts/Cushion Seal (Corresponding parts shown below are set.)

Size	Replacement parts		
	Without air cushion		With air cushion
CRA1□□50	P694020-20		P694020-21
CRA1□□63	P694030-20		P694030-21
CRA1□□80	P694040-20		P694040-21
CRA1□□100	P694050-20		P694050-21
Corresponding parts	No.	Description	Qty.
	7	Slider	2
	9	Tube gasket	2
	10	Piston seal	2
	13	Spring pin	4
	23	Cushion seal*	2

Note) When ordering spare parts, write "1" for one set of the parts per actuator.

* For model with air cushion

A grease pack (10 g) is included. If an additional grease pack is needed, order with the following part number.

Grease pack part number: GR-S-010 (10 g)

Series CDRA1

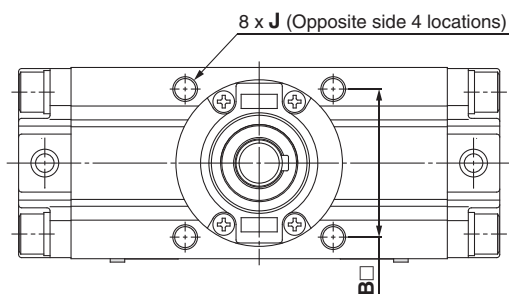
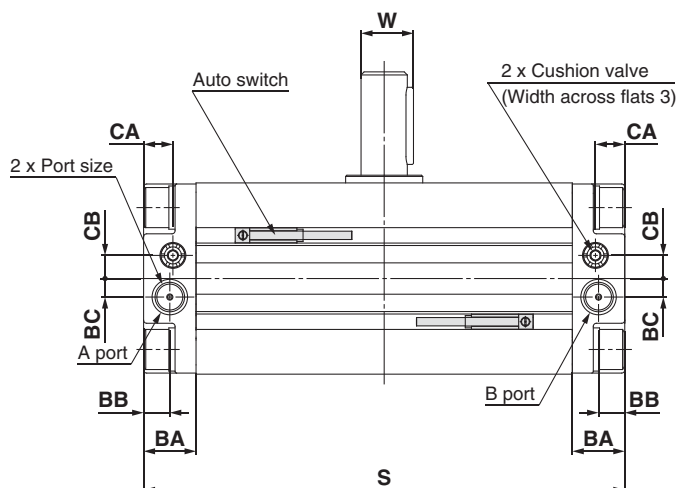
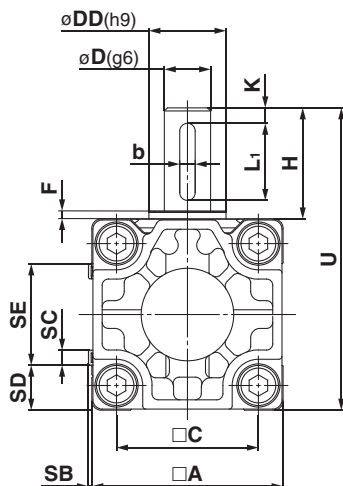
Dimensions/Basic Type: C□RA1B□

Size: 50/63/80/100

Single shaft: C□RA1BS



Single shaft



- The dimensions above show pressurisation to B port.
- Drawing shows the auto switch mounted on the port side.
- * () are the dimensions for rotation of 180° and 190°.

Model	Port size	A	B	C	D (g6)	DD (h9)	F	H	J	K	With auto switch					Without auto switch	U	W	BA	BB	BC	CA [*]	CB [*]	Key dimensions (Note)	
											S	SB	SC	SD	SE	S								b	L ₁
C□RA1BS50	1/8	62	48	46	15	25	2.5	36	M8 x 1.25 depth 8	5	156 (189)	1.5	5	14.5	33	144 (177)	98	17	17	8.5	6	9.5	7.5	5 ⁰ _{-0.030}	25
C□RA1BS63	1/8	76	60	57	17	30	2.5	41	M10 x 1.5 depth 12	5	175 (213.5)	1.5	5	21.5	33	163 (201.5)	117	19.5	20	10	7	11	8	6 ⁰ _{-0.030}	30
C□RA1BS80	1/4	92	72	70	20	35	3	50	M12 x 1.75 depth 13	5	199 (243)	1.5	5	29.5	33	186 (230)	142	22.5	23.5	12	8	13	9	6 ⁰ _{-0.030}	40
C□RA1BS100	3/8	112	85	85	25	40	4	60	M12 x 1.75 depth 14	5	259 (325)	1.5	5	39.5	33	245 (311)	172	28	25	12.5	8	14	10	8 ⁰ _{-0.036}	45

Note) A parallel key is included in the same package, (but not assembled).

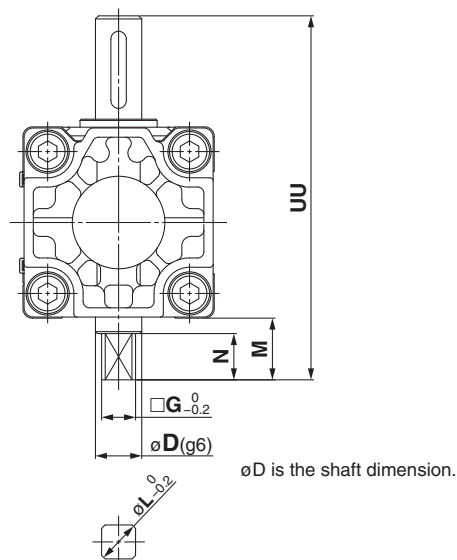
* For model with air cushion

Dimensions/Basic Type: C□RA1B□

Size: 50/63/80/100

Double shaft: C□RA1BW

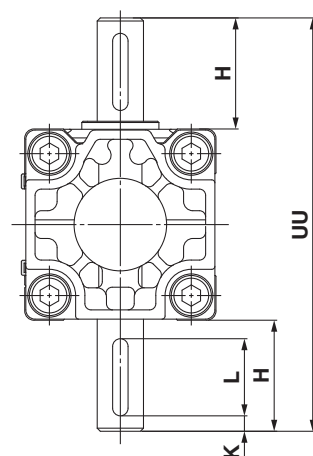
Double shaft



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

Model	D (g6)	G	M	N	UU	L
C□RA1BW50	15	11	20	15	118	14
C□RA1BW63	17	13	22	17	139	16
C□RA1BW80	20	15	25	20	167	19
C□RA1BW100	25	19	30	25	202	24

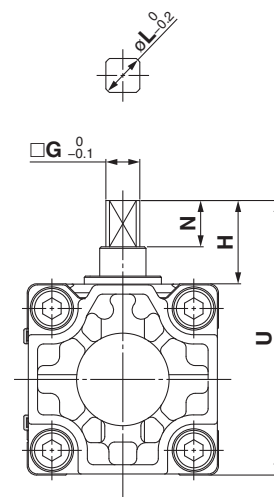
Double shaft with key: C□RA1BY



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

Model	H	K	UU	L
C□RA1BY50	36	5	134	25
C□RA1BY63	41	5	158	30
C□RA1BY80	50	5	192	40
C□RA1BY100	60	5	232	45

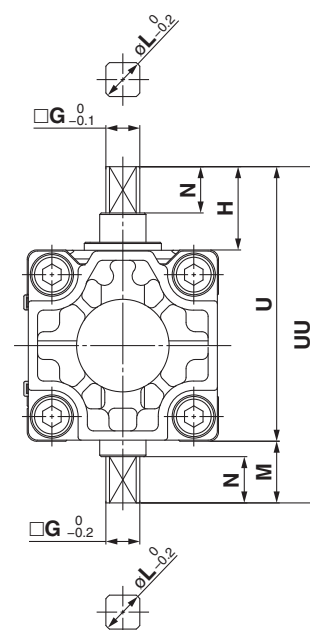
Single shaft with four chamfers: C□RA1BX



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

Model	G	H	N	U	L
C□RA1BX50	11	27	15	89	14
C□RA1BX63	13	29	17	105	16
C□RA1BX80	15	38	20	130	19
C□RA1BX100	19	44	25	156	24

Double shaft with four chamfers: C□RA1BZ



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

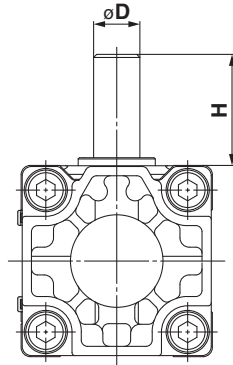
Model	G	H	M	N	U	UU	L
C□RA1BZ50	11	27	20	15	89	109	14
C□RA1BZ63	13	29	22	17	105	127	16
C□RA1BZ80	15	38	25	20	130	155	19
C□RA1BZ100	19	44	30	25	156	186	24

Series CDRA1

Dimensions/Basic Type: C□RA1B□

Size: 50/63/80/100

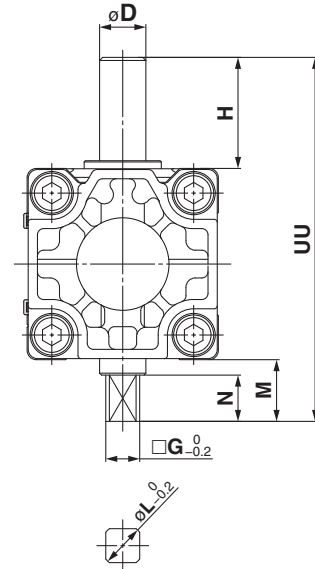
Single round shaft: C□RA1BT



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

Model	D (g6)	H
C□RA1BT50	15	36
C□RA1BT63	17	41
C□RA1BT80	20	50
C□RA1BT100	25	60

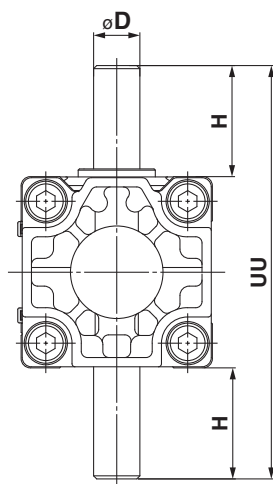
Double shaft (round shaft, with four chamfers): C□RA1BJ



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

Model	D (g6)	G	H	M	N	UU	L
C□RA1BJ50	15	11	36	20	15	118	14
C□RA1BJ63	17	13	41	22	17	139	16
C□RA1BJ80	20	15	50	25	20	167	19
C□RA1BJ100	25	19	60	30	25	202	24

Double round shaft: C□RA1BK



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

Model	D (g6)	H	UU
C□RA1BK50	15	36	134
C□RA1BK63	17	41	158
C□RA1BK80	20	50	192
C□RA1BK100	25	60	232

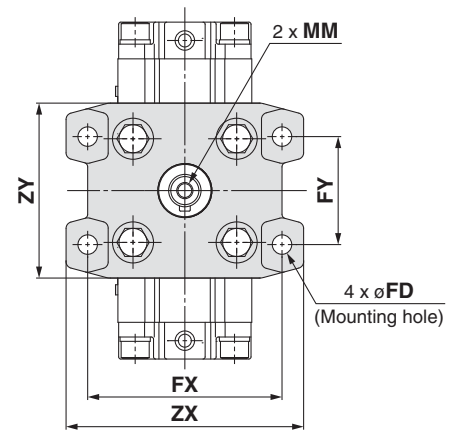
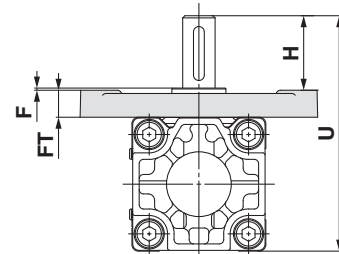
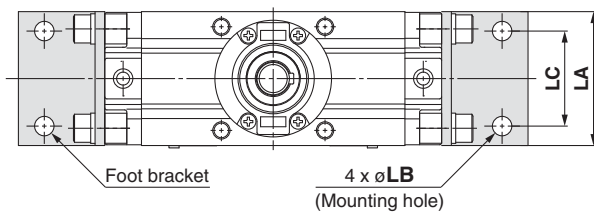
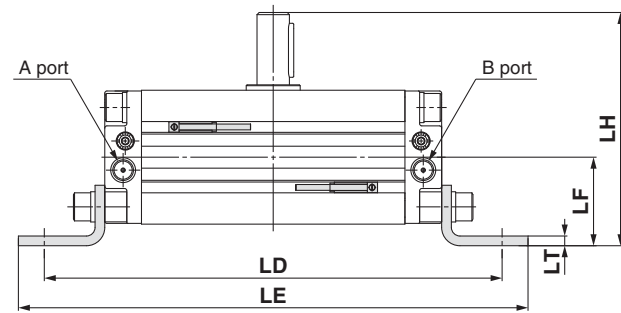
Dimensions/Foot Type: C□RA1L, Flange Type: C□RA1F

Size: 50/63/80/100

Foot type: C□RA1L□

Flange type

Single shaft: C□RA1FS



- Dimensions above show pressurisation to B port.
- Drawing shows the auto switch mounted on the port side.
- * () are the dimensions for rotating angle of 180° and 190°.

Model	LA	LB	LC	With auto switch		Without auto switch	
				LD	LE	LD	LE
C□RA1L□50	62	9	44	212 (245)	236 (269)	200 (233)	224 (257)
C□RA1L□63	76	11	55	247 (285.5)	275 (313.5)	235 (273.5)	263 (301.5)
C□RA1L□80	92	13	67	287 (331)	329 (373)	274 (318)	316 (360)
C□RA1L□100	112	13	87	347 (413)	389 (455)	333 (399)	375 (441)

Model	LF	LH	LT
C□RA1L□50	41	108	4.5
C□RA1L□63	48	127	5
C□RA1L□80	58	154	6
C□RA1L□100	73.5	189.5	6

Note) Other dimensions are the same as the basic type.

Model	F	H	MM	U	FD	FT	FX	FY	ZX	ZY
C□RA1F□50	4	39	M6 x 1.0 depth 12	114	9	13	90	50	110	81
C□RA1F□63	5	45	M6 x 1.0 depth 12	136	11.5	15	105	59	130	101
C□RA1F□80	5	55	M8 x 1.25 depth 16	165	13.5	18	130	76	160	119
C□RA1F□100	5	60	M10 x 1.5 depth 20	190	13.5	18	150	92	180	133