Rotary Actuator
\( \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100 \)

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

Mounting interchangeable with the existing model

Weight is reduced by up to 14%.
- Lightweight body by changing the body and the cover shape

<table>
<thead>
<tr>
<th>Size</th>
<th>New CRA1[kg]</th>
<th>Existing model[kg]</th>
<th>Reduction rate [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1.3</td>
<td>1.5</td>
<td>13</td>
</tr>
<tr>
<td>63</td>
<td>2.2</td>
<td>2.5</td>
<td>12</td>
</tr>
<tr>
<td>80</td>
<td>3.9</td>
<td>4.3</td>
<td>10</td>
</tr>
<tr>
<td>100</td>
<td>7.3</td>
<td>8.5</td>
<td>14</td>
</tr>
</tbody>
</table>

Auto switch can be mounted from the front.
- Auto switch can be mounted from the front at any position on the mounting groove.
- Auto switch can be mounted after installation or when installation condition is changed.

Series CRA1

CAT.EUS20-232A-UK
Series CRA1 ø50, ø63, ø80, ø100

Easy adjustment of cushion valve
- Cushion valve shape is changed so it can be adjusted using a hexagon wrench only.
- No protrusion from the body.
- Retaining ring is used to prevent drop-out.

Port, cushion and auto switch are on the same surface. Easy to handle.

Cushion seal is replaceable.
Cushion seal has been made replaceable. (Not possible for existing model. Cushion seal only)
- Slider
- Piston seal
- Spring pin
- Cushion seal (New)

Interchangeable with existing model.
Exterior dimension, shaft diameter, and mounting dimension are interchangeable with existing model.

Compact auto switches are mountable.
- Solid state auto switch
  - D-M9□
  - D-M9□W
- Reed auto switch
  - D-A9□

Many variations of shaft type

New Series CRA1
Standard: 8 types
Existing model: 2 types
Semi-standard: 6 types

- Shaft type can be selected to suit the specification.
- Part number is assigned for shaft types (single round shaft, double shaft (round shaft, with four chamfers), double round shaft).

- Single shaft with four chamfers: CRA1BX
- Double shaft with key: CRA1BY
- Double shaft with four chamfers: CRA1BZ
- Single round shaft: CRA1BT
- Double shaft (round shaft, with four chamfers): CRA1BJ
- Double round shaft: CRA1BK

Double shaft: CRA1BW

Features 1

Featuring high precision, compact, and easy to handle, these actuators are ideal for various applications. The easy adjustment of cushion valve allows for precise control, while the compact auto switches are easily mountable. The cushion seal is designed to be replaceable, ensuring durability and ease of maintenance. The series includes a variety of shaft types, suitable for different specifications.

Series CRA1 ø50, ø63, ø80, ø100

Cushion seal (New)

Port, cushion and auto switch are on the same surface. Easy to handle.

Cushion seal is replaceable.
Cushion seal has been made replaceable. (Not possible for existing model. Cushion seal only)
- Slider
- Piston seal
- Spring pin
- Cushion seal (New)

Interchangeable with existing model.
Exterior dimension, shaft diameter, and mounting dimension are interchangeable with existing model.

Compact auto switches are mountable.
- Solid state auto switch
  - D-M9□
  - D-M9□W
- Reed auto switch
  - D-A9□

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Double shaft: CRA1BW

Features 1

Featuring high precision, compact, and easy to handle, these actuators are ideal for various applications. The easy adjustment of cushion valve allows for precise control, while the compact auto switches are easily mountable. The cushion seal is designed to be replaceable, ensuring durability and ease of maintenance. The series includes a variety of shaft types, suitable for different specifications.
### Series Variations

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
<th>Hydraulic oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 30</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>Size 50</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>Size 80</td>
<td>50</td>
<td>63</td>
</tr>
</tbody>
</table>

#### Standard

- **Rotating angle**
  - 90°
  - 100°
  - 180°
  - 190°

- **Shaft type**
  - Single shaft: S
  - Double shaft: W
  - Single shaft with four chamfers: X
  - Double shaft with key: Y
  - Double shaft with four chamfers: Z
  - Single round shaft: T
  - Double shaft (round shaft, with four chamfers): J
  - Double round shaft: K

- **Cushion**
  - None
  - Air cushion

- **Variations**
  - With auto switch
  - Angle adjustable type
  - Clean series: 11-
  - With one-touch fittings

- **Mounting bracket**
  - Flange: F
  - Foot: L

#### Made to Order

- **Shaft type**
  - Single shaft: S
  - Single shaft with four chamfers: X
  - Double shaft with key: Y
  - Double shaft with four chamfers: Z

- **Pattern**
  - Shaft-end shape
  - Rotation range
  - Port location

- **Stainless steel shaft/bolt/parallel key**: -X6
- **Operating temperature**: Heat resistant 100°C -X7
- **Both sides angle adjustable type**: -X10
- **One side angle adjustable, one side with cushion type**: -X11
- **Fluororubber seal**: -X16

Refer to digital catalogue in www.smc.eu for details on .
**With auto switch**

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).

**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 round shaft with round shaft
- **K** Double round shaft

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

**Applicable Auto Switches**

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Special function</th>
<th>Electrical entry</th>
<th>Wiring (Output)</th>
<th>Load voltage</th>
<th>Auto switch model</th>
<th>Lead wire length [m]</th>
<th>Pre-wired connector</th>
<th>Applicable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid state auto switch</td>
<td>—</td>
<td>—</td>
<td>3-wire (NPN)</td>
<td>5 V, 12 V</td>
<td>M9NV</td>
<td>—</td>
<td>0.5 (-)</td>
<td>IC circuit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>12 V</td>
<td>M9PV</td>
<td>—</td>
<td>1 (-)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>5 V, 12 V</td>
<td>M9BV</td>
<td>—</td>
<td>3 (-)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>12 V</td>
<td>M99WV</td>
<td>—</td>
<td>5 (-)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9PVW</td>
<td>—</td>
<td>7 (-)</td>
<td>—</td>
</tr>
<tr>
<td>Water resistant</td>
<td>Grommet</td>
<td>Yes</td>
<td>2-wire</td>
<td>12 V</td>
<td>M9BVW</td>
<td>—</td>
<td>9 (-)</td>
<td>—</td>
</tr>
<tr>
<td>(2-colour indication)</td>
<td></td>
<td></td>
<td>3-wire (NPN)</td>
<td>12 V</td>
<td>M9NA**</td>
<td>—</td>
<td>11 (-)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-wire (PNP)</td>
<td>5 V, 12 V</td>
<td>M9PA**</td>
<td>—</td>
<td>13 (-)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>M9BAW**</td>
<td>—</td>
<td>15 (-)</td>
<td>—</td>
</tr>
<tr>
<td>Indicator light</td>
<td>Grommet</td>
<td>Yes</td>
<td>3-wire (NPN equivalent)</td>
<td>5 V</td>
<td>A96V</td>
<td>—</td>
<td>17 (-)</td>
<td>—</td>
</tr>
<tr>
<td>Reed switch</td>
<td></td>
<td></td>
<td>2-wire</td>
<td>12 V</td>
<td>A93V</td>
<td>—</td>
<td>19 (-)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>24 V</td>
<td>A90V</td>
<td>—</td>
<td>21 (-)</td>
<td>—</td>
</tr>
</tbody>
</table>

**How to Order**

**CRA1**

**B** S 50 — 90 Z —

**CDRA1**

**B** S 50 — 90 Z — M9BW

**Made to Order**

- 2 pcs.
- 1 pc.

Refer to page 2.

**Number of auto switches**

- Without auto switch (Built-in magnet)

Note) Up to two auto switches are mountable.

**Auto switch**

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

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

**References**

- Lead wire length symbols: 0.5 m — (Example) M99NW
  - 1 m — (Example) M99NW
  - 3 m — (Example) M99NW
  - 5 m — (Example) M99NW
- Auto switches marked with "*" are produced upon receipt of order.
- Auto switches are shipped together, (but not assembled).
Specify the kinetic energy of the product with air cushion is the maximum absorbed energy when the cushion valve adjustment is optimised.

With 2 auto switches:

<table>
<thead>
<tr>
<th>Foot Bracket/Part No.</th>
<th>Contents</th>
<th>Mounting screw size included in foot bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>CRA1L50-Y-1Z</td>
<td>M8 x 1.25 x 35</td>
</tr>
<tr>
<td>63</td>
<td>CRA1L63-Y-1Z</td>
<td>M10 x 1.5 x 40</td>
</tr>
<tr>
<td>80</td>
<td>CRA1L80-Y-1Z</td>
<td>M12 x 1.75 x 50</td>
</tr>
<tr>
<td>100</td>
<td>CRA1L100-Y-1Z</td>
<td>M12 x 1.75 x 50</td>
</tr>
</tbody>
</table>

Effective Torque

<table>
<thead>
<tr>
<th>Size</th>
<th>Operating pressure [MPa]</th>
<th>[N·m]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>50</td>
<td>3.71</td>
<td>0.2</td>
</tr>
<tr>
<td>63</td>
<td>6.88</td>
<td>0.3</td>
</tr>
<tr>
<td>80</td>
<td>10.4</td>
<td>0.4</td>
</tr>
<tr>
<td>100</td>
<td>17.2</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Allowable Kinetic Energy/Adjustable Range of Rotation

Time Safe in Operation

<table>
<thead>
<tr>
<th>Size</th>
<th>Allowable kinetic energy [J]</th>
<th>Adjustable range of rotation time safe in operation [s/90°]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without air cushion</td>
<td>With air cushion*</td>
</tr>
<tr>
<td>50</td>
<td>0.05</td>
<td>0.98</td>
</tr>
<tr>
<td>63</td>
<td>0.12</td>
<td>1.50</td>
</tr>
<tr>
<td>80</td>
<td>0.16</td>
<td>2.00</td>
</tr>
<tr>
<td>100</td>
<td>0.54</td>
<td>2.90</td>
</tr>
</tbody>
</table>

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

Weights

<table>
<thead>
<tr>
<th>Size</th>
<th>Standard weight 90°</th>
<th>180°</th>
<th>With auto switch*</th>
<th>Foot bracket</th>
<th>Flange bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1.3</td>
<td>1.5</td>
<td>0.2</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>63</td>
<td>2.2</td>
<td>2.6</td>
<td>0.4</td>
<td>0.5</td>
<td>0.9</td>
</tr>
<tr>
<td>80</td>
<td>3.9</td>
<td>4.4</td>
<td>0.6</td>
<td>0.9</td>
<td>1.5</td>
</tr>
<tr>
<td>100</td>
<td>7.3</td>
<td>8.3</td>
<td>0.9</td>
<td>1.2</td>
<td>2.0</td>
</tr>
</tbody>
</table>

* With 2 auto switches
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

![Diagram of Without air cushion]

### With auto switch

![Diagram of With auto switch]

### With air cushion

![Diagram of With air cushion]

## Component Parts

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

## Replacement Parts/Cushion Seal

### Size

<table>
<thead>
<tr>
<th>Size</th>
<th>Replacement parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRA150</td>
<td>P694020-20</td>
</tr>
<tr>
<td>CRA163</td>
<td>P694030-20</td>
</tr>
<tr>
<td>CRA180</td>
<td>P694040-20</td>
</tr>
<tr>
<td>CRA1100</td>
<td>P694050-20</td>
</tr>
</tbody>
</table>

### Corresponding parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Slider</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Tube gasket</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>Piston seal</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>Spring pin</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>Cushion seal</td>
<td>2</td>
</tr>
</tbody>
</table>

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  | S  | SB | SC | SD | SE | U  | W  | BA | BB | BC | CA | CB | Key dimensions |
|--------|-----------|----|----|----|--------|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----| Note |
| 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 | 5.3 | 25 |
| C¬RA1BS63 | 1/8 | 76 | 60 | 57 | 17 | 30 | 2.5 | 41 | M10 x 1.5 depth 12 | 5 | 175 (213) | 1.5 | 5 | 21.5 | 33 | 163 (201) | 117 | 19.5 | 20 | 10 | 7 | 11 | 8 | 6.3 | 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 | 6.3 | 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 | 8.3 | 45 |

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

* For model with air cushion
**Series CDRA1**

**Dimensions/Basic Type: C□RA1B□**

**Size:** 50/63/80/100

**Double shaft:** C□RA1BW

**Double shaft with key:** C□RA1BY

**Double shaft with four chamfers:** C□RA1BZ

**Single shaft with four chamfers:** C□RA1BX

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

<table>
<thead>
<tr>
<th>Model</th>
<th>D (g6)</th>
<th>G</th>
<th>H</th>
<th>M</th>
<th>N</th>
<th>UU</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>C□RA1BW50</td>
<td>15</td>
<td>11</td>
<td>20</td>
<td>15</td>
<td>118</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>C□RA1BW63</td>
<td>17</td>
<td>13</td>
<td>22</td>
<td>17</td>
<td>139</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>C□RA1BW80</td>
<td>20</td>
<td>15</td>
<td>25</td>
<td>20</td>
<td>167</td>
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<td>25</td>
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<table>
<thead>
<tr>
<th>Model</th>
<th>H</th>
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<tbody>
<tr>
<td>C□RA1BY50</td>
<td>36</td>
<td>5</td>
<td>134</td>
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</tr>
<tr>
<td>C□RA1BY63</td>
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<td>C□RA1BY80</td>
<td>50</td>
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<td>C□RA1BY100</td>
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<table>
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<tr>
<th>Model</th>
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<th>H</th>
<th>M</th>
<th>N</th>
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<tbody>
<tr>
<td>C□RA1BX50</td>
<td>11</td>
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<td>29</td>
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<tr>
<td>C□RA1BX80</td>
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<td>20</td>
<td>130</td>
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<td>C□RA1BX100</td>
<td>19</td>
<td>44</td>
<td>25</td>
<td>156</td>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Series CDRA1

Rotary Actuator
Rack & Pinion Type

---

*øD is the shaft dimension.*
Series CDRA1

Dimensions/Basic Type: C☐RA1B☐

Size: 50/63/80/100
Single round shaft: C☐RA1BT
Double shaft (round shaft, with four chamfers): C☐RA1BJ

Double round shaft: C☐RA1BK

<table>
<thead>
<tr>
<th>Model</th>
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<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>C☐RA1BT50</td>
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<td>C☐RA1BT63</td>
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<tr>
<td>C☐RA1BT80</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>C☐RA1BT100</td>
<td>25</td>
<td>60</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>D (g6)</th>
<th>G</th>
<th>H</th>
<th>M</th>
<th>N</th>
<th>UU</th>
<th>L</th>
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<tbody>
<tr>
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<td>C☐RA1BJ63</td>
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<td>13</td>
<td>41</td>
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<td>17</td>
<td>139</td>
<td>16</td>
</tr>
<tr>
<td>C☐RA1BJ80</td>
<td>20</td>
<td>15</td>
<td>50</td>
<td>25</td>
<td>20</td>
<td>167</td>
<td>19</td>
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<tr>
<td>C☐RA1BJ100</td>
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<td>60</td>
<td>30</td>
<td>25</td>
<td>202</td>
<td>24</td>
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</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>D (g6)</th>
<th>H</th>
<th>UU</th>
</tr>
</thead>
<tbody>
<tr>
<td>C☐RA1BK50</td>
<td>15</td>
<td>36</td>
<td>134</td>
</tr>
<tr>
<td>C☐RA1BK63</td>
<td>17</td>
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</tr>
<tr>
<td>C☐RA1BK80</td>
<td>20</td>
<td>50</td>
<td>192</td>
</tr>
<tr>
<td>C☐RA1BK100</td>
<td>25</td>
<td>60</td>
<td>232</td>
</tr>
</tbody>
</table>

Note) Other dimensions are the same as the single shaft type.
Dimensions/Foot Type: C\textsuperscript{LA}RA1\textsubscript{L}, Flange Type: C\textsuperscript{LA}RA1\textsubscript{F}

Size: 50/63/80/100

Foot type: C\textsuperscript{LA}RA1\textsubscript{L}

Flange type
Single shaft: C\textsuperscript{LA}RA1\textsubscript{FS}

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\textdegree and 190\textdegree.

Note) Other dimensions are the same as the basic type.
Series CDRA1

Dimensions/Flange Type: C□RA1F

Size: 50/63/80/100

Flange type
Double shaft: C□RA1FW

Flange type
Single shaft with four chamfers: C□RA1FX

Flange type
Double shaft with key: C□RA1FY

Flange type
Double shaft with four chamfers: C□RA1FZ

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

<table>
<thead>
<tr>
<th>Model</th>
<th>H</th>
<th>N</th>
<th>U</th>
<th>UU</th>
</tr>
</thead>
<tbody>
<tr>
<td>C□RA1FW50</td>
<td>39</td>
<td>15</td>
<td>114</td>
<td>134</td>
</tr>
<tr>
<td>C□RA1FW63</td>
<td>45</td>
<td>17</td>
<td>136</td>
<td>158</td>
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<td>C□RA1FW80</td>
<td>55</td>
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<td>165</td>
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<td>25</td>
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</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>H</th>
<th>N</th>
<th>U</th>
<th>UU</th>
</tr>
</thead>
<tbody>
<tr>
<td>C□RA1FX50</td>
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<td>105</td>
<td></td>
</tr>
<tr>
<td>C□RA1FX63</td>
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<td>17</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>C□RA1FX80</td>
<td>43</td>
<td>20</td>
<td>153</td>
<td></td>
</tr>
<tr>
<td>C□RA1FX100</td>
<td>44</td>
<td>25</td>
<td>174</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>H</th>
<th>N</th>
<th>U</th>
<th>UU</th>
</tr>
</thead>
<tbody>
<tr>
<td>C□RA1FY50</td>
<td>39</td>
<td>114</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>C□RA1FY63</td>
<td>45</td>
<td>136</td>
<td>177</td>
<td></td>
</tr>
<tr>
<td>C□RA1FY80</td>
<td>55</td>
<td>165</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td>C□RA1FY100</td>
<td>60</td>
<td>190</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

Note) The dimensions of shaft key and four chamfers are the same as the basic type.

<table>
<thead>
<tr>
<th>Model</th>
<th>H</th>
<th>N</th>
<th>U</th>
<th>UU</th>
</tr>
</thead>
<tbody>
<tr>
<td>C□RA1FZ50</td>
<td>30</td>
<td>15</td>
<td>105</td>
<td>125</td>
</tr>
<tr>
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<tr>
<td>C□RA1FZ80</td>
<td>43</td>
<td>20</td>
<td>153</td>
<td>178</td>
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<tr>
<td>C□RA1FZ100</td>
<td>44</td>
<td>25</td>
<td>174</td>
<td>204</td>
</tr>
</tbody>
</table>
Auto Switch Proper Mounting Position (Detection at Rotation End)

CDRA1□□50 to 100

Auto switch model | D-M9□□M9□□V | D-M9□□W/M9□□WV | D-M9□□A/M9□□AV |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Proper mounting position A [mm]</td>
<td>Operating range θ [°]</td>
<td>Proper mounting position A [mm]</td>
</tr>
<tr>
<td>CDRA1□□50-90</td>
<td>22.5</td>
<td>30°</td>
<td>18.5</td>
</tr>
<tr>
<td>CDRA1□□50-180</td>
<td>39</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>CDRA1□□63-90</td>
<td>25</td>
<td>26°</td>
<td>21</td>
</tr>
<tr>
<td>CDRA1□□63-180</td>
<td>44.5</td>
<td></td>
<td>40.5</td>
</tr>
<tr>
<td>CDRA1□□80-90</td>
<td>27.5</td>
<td>23°</td>
<td>23.5</td>
</tr>
<tr>
<td>CDRA1□□80-180</td>
<td>49.5</td>
<td></td>
<td>45.5</td>
</tr>
<tr>
<td>CDRA1□□100-90</td>
<td>42.5</td>
<td>15°</td>
<td>38.5</td>
</tr>
<tr>
<td>CDRA1□□100-180</td>
<td>75.5</td>
<td></td>
<td>71.5</td>
</tr>
</tbody>
</table>

* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately ±30% dispersion) There may be the case to change substantially depending on an ambient environment. Adjust the auto switch after confirming the operating conditions in the actual setting.

Switch Spacer Part No.

<table>
<thead>
<tr>
<th>Size</th>
<th>50</th>
<th>63</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch spacer part no.</td>
<td>BMY3-016</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The above part number includes one switch spacer.
* Two switch spacers are included with the product with built-in magnet.

Auto Switch Mounting

To fix the auto switch, hold the switch spacer, and insert into the groove. Make sure that the switch spacer is in the right position or correct the position if necessary, then slide the auto switch in the groove so that it goes into the spacer. Confirm where the mounting position is, and tighten the auto switch mounting screw using a flat head screwdriver.

Switch mounting screw (Not attached to switch) (M2.5 x 4L)

Flat head watchmakers’ screwdriver

Note) When tightening an auto switch mounting screw, use a watchmakers’ screwdriver with a handle of approximately 5 to 6 mm in diameter. Also, tighten with a torque of about 0.1 to 0.15 N·m. As a guide, turn about 90° past the point at which tightening can first be felt.
Series CRA1
Simple Specials 1

Shaft shape pattern is dealt with simple made-to-order system. A specification sheet is available for ordering. Please access SMC website, or consult your nearest sales branch.

How to Order

<table>
<thead>
<tr>
<th>Symbol</th>
<th>-XA1 to -XA24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable shaft type:</td>
<td>S, W, Y</td>
</tr>
</tbody>
</table>

**Shaft Pattern Sequencing**

- **Magnet**
  - None
  - Built-in magnet

- **Mounting**
  - B Basic type
  - L Foot type

- **Shaft type**
  - S Single shaft
  - W Double shaft
  - Y Double shaft with key

- **Size**
  - 50
  - 63
  - 80
  - 100

- **Port type**
<table>
<thead>
<tr>
<th>Size</th>
<th>Port type</th>
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</thead>
<tbody>
<tr>
<td>50, 63</td>
<td>G</td>
</tr>
<tr>
<td>80</td>
<td>NPT</td>
</tr>
<tr>
<td>100</td>
<td>NPTF</td>
</tr>
</tbody>
</table>

- **Number of auto switches**
  - 2 pcs.
  - 1 pc.

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

- **Air cushion**
  - None
  - With air cushion

- **Rotating angle**
  - 90°
  - 180°
  - 100°
  - 190°

**Simple Specials, Made-to-Order symbol**
- Refer to Chart (1), (2) when the number of combinations is one or two.
- Combination of XA is possible for up to 2 types.

**Combination**
- **3 types**
  - Combination of applicable chart
  - Chart (1), (2)

- **4 types**
  - Combination of applicable chart
  - Chart (1), (2), (5)

Combination is available only when all the conditions are fulfilled in above combination chart.

- **Combination of simple special and made-to-order is available for up to 4 types.**
- **Above is the typical example of combination.**
## Shaft Pattern Sequencing I

Applicable shaft type: S, W, Y

### Combination Chart of Simple Specials for Shaft-End Shape

**Chart (1) Combination between XA□ and XA□ (S, W, Y shaft)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Axial direction</th>
<th>Applicable shaft type</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>XA1</td>
<td>Shaft-end female thread</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XA2</td>
<td>Shaft-end female thread</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XA13</td>
<td>Shaft through-hole</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XA14</td>
<td>Shaft through-hole + Shaft-end female thread</td>
<td>●</td>
<td>—</td>
<td>●</td>
</tr>
<tr>
<td>XA15</td>
<td>Shaft through-hole + Shaft-end female thread</td>
<td>—</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XA16</td>
<td>Shaft through-hole + Double shaft-end female thread</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XA17</td>
<td>Shortened shaft (Long shaft with key)</td>
<td>●</td>
<td>—</td>
<td>●</td>
</tr>
<tr>
<td>XA18</td>
<td>Shortened shaft (Short shaft with key and with four chamfers)</td>
<td>—</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>XA19</td>
<td>Shortened shaft (Double shaft)</td>
<td>●</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>XA20</td>
<td>Reversed shaft, Shortened shaft</td>
<td>●</td>
<td>●</td>
<td>—</td>
</tr>
<tr>
<td>XA24</td>
<td>Double key</td>
<td>●</td>
<td>—</td>
<td>●</td>
</tr>
</tbody>
</table>

*Shaft type available for combination.

### Combination Chart of Made to Order

**Chart (2) Combination between XA□ and XC□**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable shaft type</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>XC7</td>
<td>Reversed shaft</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XC8 to XC11</td>
<td>Change of rotation range</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XC30</td>
<td>Changed to fluorine grease</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XC31 to XC36</td>
<td>Change of rotation range and shaft rotation direction</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>XC59 to XC61</td>
<td>Change of port location</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>
Additional Reminders

1. Enter the dimensions within a range that allows for additional machining.
2. SMC will make appropriate adjustments if no dimensional, tolerance, or finish instructions are given in the diagram.
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.
5. Enter the desired figures in the portion of the diagram.
6. Chamfer face of the parts machining additionally is C0.5.

Symbol: A2 Female threads are machined into the short shaft.
Note) Except flange type
The maximum dimension L2 is, as a rule, twice the thread size. (Example) For M5: L2 = 10
• Applicable shaft type: S, W, Y

Symbol: A3 Female threads are machined into the long shaft.
Note) Except flange type
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 diameter of the pilot hole. The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M5: L1 = 10
• Applicable shaft type: S, W, Y

Symbol: A4 The long shaft is shortened.
• Applicable shaft type: S, W, Y

Symbol: A5 Equal dimensions are indicated by the same marker.

Symbol: A6 Made to Order
Series CRA1
Simple Specials 2
Shaft shape pattern is dealt with simple made-to-order system. A specification sheet is available for ordering. Please access SMC website, or consult your nearest sales branch.

Applicable shaft type: S, W, Y

Symbol: A1 Female threads are machined into the long shaft.
Note) Except flange type
The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M4: L1 = 8
• Applicable shaft type: S, W, Y

Symbol: A13 Shaft through-hole
Note) Except flange type
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 diameter of the pilot hole. The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M5: L1 = 10
• Applicable shaft type: S, W, Y

Symbol: A14 Note) Except flange type
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 diameter of the pilot hole. The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M5: L1 = 10
• Applicable shaft type: S, W, Y

Symbol: A15 Note) Except flange type
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 M5: L2 = 10
• Applicable shaft type: S, W, Y

Symbol: A16 Note) Except flange type
A special end is machined onto both the long and short shafts, and a through-hole is drilled into both shafts. Female threads are machined into the through-holes, whose diameter is equivalent to the diameter of the pilot holes. The maximum dimension L1 is, as a rule, twice the thread size. (Example) For M5: L1 = 10
• Applicable shaft type: S, W, Y

Equal dimensions are indicated by the same marker.
**Shaft Pattern Sequencing I**

**Applicable shaft type: S, W, Y**

**Symbol: A18**
- The short shaft is shortened.
- Applicable shaft type: W, Y

<table>
<thead>
<tr>
<th>Size</th>
<th>Y1 Keyway</th>
<th>Y2 Keyway</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1 to 20</td>
<td>18.5 to 36</td>
</tr>
<tr>
<td>63</td>
<td>1 to 22</td>
<td>21 to 41</td>
</tr>
<tr>
<td>80</td>
<td>1 to 25</td>
<td>25 to 50</td>
</tr>
<tr>
<td>100</td>
<td>1 to 30</td>
<td>32.5 to 60</td>
</tr>
</tbody>
</table>

**Symbol: A19**
- Both the long shaft and short shaft are shortened.
- Applicable shaft type: W, Y

<table>
<thead>
<tr>
<th>Size</th>
<th>X Keyway</th>
<th>Y1 Keyway</th>
<th>Y2 Keyway</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>18.5 to 36</td>
<td>1 to 20</td>
<td>18.5 to 36</td>
</tr>
<tr>
<td>63</td>
<td>21 to 41</td>
<td>1 to 22</td>
<td>21 to 41</td>
</tr>
<tr>
<td>80</td>
<td>25 to 50</td>
<td>1 to 25</td>
<td>25 to 50</td>
</tr>
<tr>
<td>100</td>
<td>32.5 to 60</td>
<td>1 to 30</td>
<td>32.5 to 60</td>
</tr>
</tbody>
</table>

**Symbol: A20**
- The shafts are reversed. Both the long shaft and short shaft can be further shortened.
- Applicable shaft type: S, W

<table>
<thead>
<tr>
<th>Size</th>
<th>X Keyway</th>
<th>Y1 Keyway</th>
<th>Y2 Keyway</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>2 to 11</td>
<td>18.5 to 36</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>2.5 to 16.5</td>
<td>21 to 41</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>3 to 20</td>
<td>25 to 50</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>3 to 22</td>
<td>32.5 to 60</td>
<td></td>
</tr>
</tbody>
</table>

**Symbol: A24**
- Double key
- Keys and keyways are machined additionally at 180° from the standard position.
- Applicable shaft type: S, W, Y
- Equal dimensions are indicated by the same marker.

<table>
<thead>
<tr>
<th>Size</th>
<th>Keyway Dimensions</th>
<th>LL</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>5 x 5 x 25</td>
<td>5</td>
</tr>
<tr>
<td>63</td>
<td>6 x 6 x 30</td>
<td>5</td>
</tr>
<tr>
<td>80</td>
<td>6 x 6 x 40</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>8 x 7 x 45</td>
<td>5</td>
</tr>
</tbody>
</table>
**Series CRA1**

**Simple Specials 3**

Shaft shape pattern is dealt with simple made-to-order system. A specification sheet is available for ordering. Please access SMC website, or consult your nearest sales branch.

**Shaft Pattern Sequencing II**

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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>-XA33 to -XA59</th>
</tr>
</thead>
</table>

**How to Order**

- **C**  
  - Magnet  
    - D: Built-in magnet

- **D**  
  - Basic type
  - Foot type

- **RA1**  
  - Single shaft with four chamfers
  - Double shaft with four chamfers
  - Single round shaft
  - Double shaft (round shaft, with four chamfers)
  - Double round shaft

- **B**  
  - Size
    - 50
    - 63
    - 80
    - 100

- **J**  
  - 90°
  - 180°
  - 100°
  - 190°

- **Z**  
  - Port type
    - Size
      - 50
      - 63
      - 80
      - 100
      - Rc
    - G
    - NPT
    - NPTF

- **90**
  - 2 pcs.

- **S**  
  - 1 pc.

- **M9BW**  
  - Without auto switch (Built-in magnet)

- **X**  
  - None
  - With air cushion

- **A33**  
  - Combination of simple special and made-to-order, is available for up to 4 types.
  - Combination is available only when all the conditions are fulfilled in above combination chart.

- **A34**  
  - Combination of simple special and made-to-order, is available for up to 4 types.

- **C8**  
  - Combination of simple special and made-to-order, is available for up to 4 types.

- **C30**  
  - Above is the typical example of combination.

**Simple Specials, Made-to-Order symbol**

- Refer to Chart (3), (4), (5) when the number of combinations is one or two.
- Combination of XA is possible for up to 2 types.
## Chart (3) Combination between XA□ and XA□

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Axial direction</th>
<th>Applicable shaft type</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>XA33</td>
<td>Shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA33</td>
</tr>
<tr>
<td>XA34</td>
<td>Shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA34</td>
</tr>
<tr>
<td>XA35</td>
<td>Shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA35</td>
</tr>
<tr>
<td>XA36</td>
<td>Shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA36</td>
</tr>
<tr>
<td>XA37</td>
<td>Stepped round shaft</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA37</td>
</tr>
<tr>
<td>XA38</td>
<td>Stepped round shaft</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA38</td>
</tr>
<tr>
<td>XA40</td>
<td>Shaft through-hole</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA40</td>
</tr>
<tr>
<td>XA41</td>
<td>Shaft through-hole</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA41</td>
</tr>
<tr>
<td>XA42</td>
<td>Shaft through-hole + Double shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA42</td>
</tr>
<tr>
<td>XA43</td>
<td>Shaft through-hole + Double shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA43</td>
</tr>
<tr>
<td>XA44</td>
<td>Shaft through-hole + Double shaft-end female thread</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA44</td>
</tr>
<tr>
<td>XA45</td>
<td>Middle-cut chamfer</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA45</td>
</tr>
<tr>
<td>XA46</td>
<td>Middle-cut chamfer</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA46</td>
</tr>
<tr>
<td>XA51</td>
<td>Change of long shaft length (Without keyway)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA51</td>
</tr>
<tr>
<td>XA52</td>
<td>Change of short shaft length (Without keyway)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA52</td>
</tr>
<tr>
<td>XA53</td>
<td>Change of double shaft length (Both without keyway)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA53</td>
</tr>
<tr>
<td>XA54</td>
<td>Change of double shaft length (Both with four chamber)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA54</td>
</tr>
<tr>
<td>XA55</td>
<td>Change of short shaft length (With four chambers)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA55</td>
</tr>
<tr>
<td>XA56</td>
<td>Change of double shaft length (Both with four chambers)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA56</td>
</tr>
<tr>
<td>XA57</td>
<td>Change of double shaft length (Both with keyway)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA57</td>
</tr>
<tr>
<td>XA58</td>
<td>Reversed shaft, Change of shaft length (With four chambers, Without keyway)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA58</td>
</tr>
<tr>
<td>XA59</td>
<td>Reversed shaft, Change of shaft length (With four chambers, With keyway)</td>
<td>-</td>
<td>X, Z, T, J, K</td>
<td>XA59</td>
</tr>
</tbody>
</table>

* Shaft type available for combination.

## Chart (4) Combination between XA□ and XC□

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable shaft type</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>XA33 to XA36</td>
<td>Shaft-end female thread</td>
<td>X, Z, T, J, K</td>
<td>XA33 to 38, 40 to 46, 51 to 59</td>
</tr>
<tr>
<td>XA37 to XA40</td>
<td>Shaft-end female thread</td>
<td>X, Z, T, J, K</td>
<td>XA37 to 38, 40 to 46, 51 to 59</td>
</tr>
<tr>
<td>XA41 to XA44</td>
<td>Shaft-end female thread</td>
<td>X, Z, T, J, K</td>
<td>XA41 to 38, 40 to 46, 51 to 59</td>
</tr>
<tr>
<td>XA45 to XA48</td>
<td>Shaft-end female thread</td>
<td>X, Z, T, J, K</td>
<td>XA45 to 38, 40 to 46, 51 to 59</td>
</tr>
</tbody>
</table>

Note: The tables provide combinations for various shaft types and modifications, including changes to port location, rotation range, and keyway, among others.
Applicable shaft type: X, Z, T, J, K

### Additional Reminders

1. Enter the dimensions within a range that allows for additional machining.
2. SMC will make appropriate arrangements if no dimensional, tolerance, or finish instructions are given in the diagram.
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.
   - \( P = \) Thread pitch
     - M4 x 0.7, M5 x 0.8
5. Enter the desired figures in the portion of the diagram.
6. Chamfer face of the parts machining additionally.

### Symbol: A33

The maximum dimension \( L_1 \) is, as a rule, twice the thread size.
- \( L_1 + (3 \times P) \)
- \( L_1 + (3 \times P) \)
- \( L_1 + (3 \times P) \)

#### Size
- Q1
  - 50: M4, M5, M6, M8
  - 63: M4, M5, M6, M8, M10, M12
  - 80: M4, M5, M6, M8, M10, M12
  - 100: M5, M6, M8, M10, M12

### Symbol: A36

The maximum dimension \( L_2 \) is, as a rule, twice the thread size.
- \( L_2 + (3 \times P) \)
- \( L_2 + (3 \times P) \)
- \( L_2 + (3 \times P) \)

#### Size
- Q2
  - 50: M4, M5, M6, M8
  - 63: M4, M5, M6, M8, M10, M12
  - 80: M4, M5, M6, M8, M10, M12
  - 100: M5, M6, M8, M10, M12

### Symbol: A38

The short shaft can be further shortened by machining it into a stepped round shaft.
- \( D_2 = \) Depth
- \( D_1 = \) Length

#### Size
- Y
  - 50: 1 to 36
  - 63: 1 to 41
  - 80: 1 to 50
  - 100: 1 to 60

#### Size
- \( L_2 \max \)
  - 50: 3.5 to 36
  - 63: 3.5 to 41
  - 80: 4 to 50
  - 100: 5 to 60

### Symbol: A34

Female threads are machined into the short shaft.
- \( Q2 = \) Diameter

#### Size
- Q2
  - 50: M4, M5, M6, M8
  - 63: M4, M5, M6, M8, M10, M12
  - 80: M4, M5, M6, M8, M10, M12
  - 100: M5, M6, M8, M10, M12

### Symbol: A40

Shaft through-holes
- \( d_1 \)

#### Size
- \( d_1 \)
  - 50: ø4 to ø7.5
  - 63: ø4 to ø8
  - 80: ø6.8 to ø11
  - 100: ø6.8 to ø13

### Symbol: A41

Shaft through-holes
- \( d_1 \)

#### Size
- \( d_1 \)
  - 50: ø4 to ø7.5
  - 63: ø4 to ø8
  - 80: ø6.8 to ø11
  - 100: ø6.8 to ø13
Shaft Pattern Sequencing II

Symbol: A43  Shaft through-hole and female thread
(Note) Except flange type
• Applicable shaft type: K, T
• Equal dimensions are indicated by the same marker.

Symbol: A44  Note) Except flange type
Shaft through-hole and female thread machining
• Applicable shaft type: J, X, Z
• Equal dimensions are indicated by the same marker.

Symbol: A46  Note) Except flange type
The short shaft can be further shortened by machining a middle-cut chamfer into it.
• The minimum unit of the dimensions within a range that allows for machining is 0.1.
  (The position of the middle-cut chamfer is on the standard chamfer at the keyway portion.)
• Applicable shaft type: K

Symbol: A51  The long shaft is shortened.
• Applicable shaft type: J, K, T

Symbol: A52  The short shaft is shortened.
• Applicable shaft type: K

Symbol: A53  Both the long and short shaft are shortened.
• Applicable shaft type: K

Symbol: A54  The long shaft is shortened.
• Applicable shaft type: X, Z

Symbol: A55  The short shaft is shortened.
• Applicable shaft type: J, Z

---

Note) Except flange type
Shaft through-hole and female thread machining

---

Note) Except flange type
The long shaft can be further shortened by machining a middle-cut chamfer into it.
• The minimum unit of the dimensions within a range that allows for machining is 0.1.
  (The position of the middle-cut chamfer is on the standard chamfer at the keyway portion.)
• Applicable shaft type: J, K, T

---

Note) Except flange type
The short shaft is shortened.
• Applicable shaft type: K

---

Note) Except flange type
The short shaft can be further shortened by machining a middle-cut chamfer into it.
• The minimum unit of the dimensions within a range that allows for machining is 0.1.
  (The position of the middle-cut chamfer is on the standard chamfer at the keyway portion.)
• Applicable shaft type: J, K, T
Series \textit{CRA1}

Simple Specials 5

Shaft shape pattern is dealt with simple made-to-order system. A specification sheet is available for ordering. Please access SMC website, or consult your nearest sales branch.

\textbf{Shaft Pattern Sequencing II}

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

\textbf{Symbol: A56}

Both the long shaft and short shaft are shortened.
- Applicable shaft type: Z

<table>
<thead>
<tr>
<th>Size</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>3.5 to 27</td>
<td>1 to 20</td>
</tr>
<tr>
<td>63</td>
<td>3.5 to 29</td>
<td>1 to 22</td>
</tr>
<tr>
<td>80</td>
<td>4 to 38</td>
<td>1 to 25</td>
</tr>
<tr>
<td>100</td>
<td>5 to 44</td>
<td>1 to 30</td>
</tr>
</tbody>
</table>

\textbf{Symbol: A57}

Both the long shaft and short shaft are shortened.
- Applicable shaft type: J

<table>
<thead>
<tr>
<th>Size</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>3.5 to 36</td>
<td>1 to 20</td>
</tr>
<tr>
<td>63</td>
<td>3.5 to 41</td>
<td>1 to 22</td>
</tr>
<tr>
<td>80</td>
<td>4 to 50</td>
<td>1 to 25</td>
</tr>
<tr>
<td>100</td>
<td>5 to 60</td>
<td>1 to 30</td>
</tr>
</tbody>
</table>

\textbf{Symbol: A59}

The shafts are reversed, and both the long shaft and short shaft are shortened.
- Applicable shaft type: X

<table>
<thead>
<tr>
<th>Size</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1 to 27</td>
</tr>
<tr>
<td>63</td>
<td>1 to 29</td>
</tr>
<tr>
<td>80</td>
<td>1 to 38</td>
</tr>
<tr>
<td>100</td>
<td>1 to 44</td>
</tr>
</tbody>
</table>

\textbf{Symbol: A58}

The shafts are reversed, and both the long shaft and short shaft are shortened.
- Applicable shaft type: J, T

<table>
<thead>
<tr>
<th>Size</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1 to 36</td>
</tr>
<tr>
<td>63</td>
<td>1 to 41</td>
</tr>
<tr>
<td>80</td>
<td>1 to 50</td>
</tr>
<tr>
<td>100</td>
<td>1 to 60</td>
</tr>
</tbody>
</table>
### How to Order

<table>
<thead>
<tr>
<th>C</th>
<th>D</th>
<th>RA1</th>
<th>B</th>
<th>S</th>
<th>50</th>
<th>Z</th>
<th>M9BW</th>
<th>X</th>
<th>C8</th>
<th>C30</th>
<th>C59</th>
</tr>
</thead>
</table>

#### Magnet
- None
- Built-in magnet

#### Mounting
- B: Basic type
- L: Foot type
- F: Flange type

#### Shaft type
- S: Single shaft
- W: Double shaft
- X: Double 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

#### Size
- 50
- 63
- 80
- 100

#### Rotating angle
- 90°
- 180°
- 100°
- 190°

#### Port type
<table>
<thead>
<tr>
<th>Size</th>
<th>Port type</th>
</tr>
</thead>
<tbody>
<tr>
<td>50, 63, 80, 100</td>
<td>Rc, G, NPT, NPTF</td>
</tr>
</tbody>
</table>

#### Air Cushion
- None
- With air cushion

#### Auto Switch
- Without auto switch (Built-in magnet)

#### Simple Specials, Made-To-Order symbol
- When the number of combinations are one or two, refer to Chart (5).
- Combination of XA is possible for up to 2 types.

#### Combination 3 types
- Chart (5) Combination is available only when all the conditions are fulfilled in above combination chart.
- Combination of made-to-order is available up to 3 types.

#### Number of Auto Switches
- 2 pcs.
- 1 pc.

#### Auto Switch and Port Type
- For auto switch model refer to page 1.
- Auto switches are shipped together, (but not assembled).

### Combination Chart of Made to Order

#### Chart (5) Combination between XA□ and XC□

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable shaft type</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>XC7</td>
<td>Reversed shaft</td>
<td>S - - - - - -</td>
<td>XC7</td>
</tr>
<tr>
<td>XC8 to XC11</td>
<td>Change of rotation range</td>
<td>S, W, X, T, J, Y</td>
<td>XC8 to XC11</td>
</tr>
<tr>
<td>XC30</td>
<td>Changed to fluorine grease</td>
<td>S, W, X, T, J, Y</td>
<td>S, W, Y*</td>
</tr>
<tr>
<td>XC31 to XC36</td>
<td>Changes of port location</td>
<td>S, W, Y*</td>
<td>S, W, Y*</td>
</tr>
<tr>
<td>XC59 to XC61</td>
<td>Change of port location</td>
<td>S, W, Y*</td>
<td>S, W, Y*</td>
</tr>
</tbody>
</table>

* Shaft type available for combination.
**Series CRA1**

**Made to Order 2**

Please contact SMC for further details about dimensions, specifications and delivery.

1. **Reversed Shaft**  
   Symbol: -XC7
   CRA1 Refer to “How to Order” on page 1.  
   -XC7
   **Specifications**
   - **Applicable size:** 50, 63, 80, 100
   - **Applicable shaft type:** S, W, X, T, J

2. **Change of Rotation Range**  
   Symbol: -XC8 to -XC11
   CRA1 Refer to “How to Order” on page 1.  
   -XC8
   **Specifications**
   - **Applicable size:** 50, 63, 80, 100
   - **Applicable shaft type:** S, W, Y
   The patterns with the rotation range of 90° and 180° are applicable to the respective patterns with the rotation range of 100° and 190° of the semi-standard specifications.

3. **Changed to Fluorine Grease**  
   Symbol: -XC30
   CRA1 Refer to “How to Order” on page 1.  
   -XC30
   **Specifications**
   - **Applicable size:** 50, 63, 80, 100
   - **Applicable shaft type:** S, W, X, Y, Z, T, J, K
   ∗ Refer to page 2 for other specifications.

Note: If it is pressurised from the port indicated with the arrow, the shaft rotates in the clockwise direction.

Lubricant oil in the seal part of packing and inner wall of the cylinder is changed to fluoro type.  
(Not the low speed specifications)
4 Change of Rotation Range and Shaft Rotation Direction

CRA1 Refer to “How to Order” on page 1.

Symbol -XC31 to -XC36

Specifications

<table>
<thead>
<tr>
<th>Applicable size</th>
<th>50, 63, 80, 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable shaft type</td>
<td>S, W, Y</td>
</tr>
</tbody>
</table>

The patterns with the rotation range of 90° and 180° are applicable to the respective patterns with the rotation range of 100° and 190° of the semi-standard specifications.

Symbol: C31
The rotation range is changed and the rotation direction is reversed.

Symbol: C32
The rotation range is changed and the rotation direction is reversed.

Symbol: C33
The rotation range is changed and the rotation direction is reversed.

Symbol: C34
The rotation range is changed and the rotation direction is reversed.

Symbol: C35
The rotation range is changed and the rotation direction is reversed.

Symbol: C36
The rotation range is changed and the rotation direction is reversed.

Note) If it is pressurised from the port indicated with the arrow, the shaft rotates in the clockwise direction.

CRA1 Made to Order Series CRA1
Series **CRA1**

**Made to Order 3**

Please contact SMC for further details about dimensions, specifications and delivery.

---

5 **Change of Port Location (Mounting location of the cover is changed.)** -XC59 to -XC61

**Symbol**

- **C59**
  - The port direction is changed. (Upward)

- **C60**
  - The port direction is changed. (Downward)

- **C61**
  - The port direction is changed. (Backward)

**Specifications**

<table>
<thead>
<tr>
<th>Applicable size</th>
<th>50, 63, 80, 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable shaft type</td>
<td>S, W, X, Y, Z, T, J, K</td>
</tr>
</tbody>
</table>

The patterns with the rotation range of 90° and 180° are applicable to the respective patterns with the rotation range of 100° and 190° of the semi-standard specifications.

Refer to “How to Order” on page 1.

---

Made to Order 3
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: Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

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

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

Caution

1. The responsibility for the safe operation of the equipment is the responsibility of the person who designs or decides its specifications. The responsibility for the safe operation of the equipment is the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of 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.

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 machinery 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.

4. Contact SMC beforehand and take special consideration of safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

Warning

1. The compatibility of the product is the responsibility of the person who 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.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion, operation and maintenance of machines or equipment including our product catalogue.

3. An application which could have negative effects on people, property, or other applications unsuitable for the standard specifications described in the product catalogue.

4. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

Danger

1. The use of SMC products with production equipment for the manufacture of products is cut, and read and understand the specific product precautions of all relevant products carefully.

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

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

Limited warranty and Disclaimer

Limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

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.

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*1) ISO 4413: Hydraulic fluid power – General rules relating to systems.
ISO 4414: Pneumatic 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.

Limited warranty and Disclaimer

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

Compliance Requirements

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. 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 catalogue for the particular products.

4. 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.

Safety Instructions

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