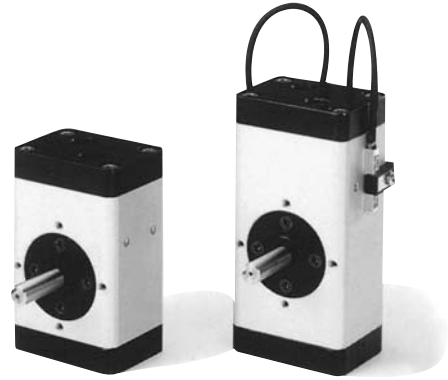
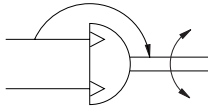


Symbol



Specifications

| Model | | CS-RAP□1 | CS-RAP□5 | CS-RAP□10 | CS-RAP□20 |
|--|--------------|--|---------------|------------------|---------------|
| Operating type | | Double acting piston type (Rack and pinion construction) | | | |
| Effective torque ^{Note} | N·m [ft·lbf] | 0.078 [0.058] | 0.373 [0.275] | 0.883 [0.651] | 1.863 [1.374] |
| Swing angle (Tolerance ^{+10°}) | CS-RAP□-90 | 90° | | | |
| | CS-RAP□-100 | 100° | | | |
| | CS-RAP□-180 | 180° | | | |
| | CS-RAP□-190 | 190° | | | |
| | CS-RAP□-360 | 360° | | | |
| Media | | Air | | | |
| Port size | | M5×0.8 | Rc1/8 | | |
| Rod diameter | mm [in.] | 4 [0.157] | 6 [0.236] | 8 [0.315] | 10 [0.394] |
| Operating pressure range | MPa [psi.] | 0.15~0.7 [22~102] | | 0.06~0.7 [9~102] | |
| Proof pressure | MPa [psi.] | 1.03 [149] | | | |
| Operating temperature range | °C [°F] | 0~50 [32~122] | | | |
| Allowable energy | J [in·lbf] | 0.001 [0.009] | 0.003 [0.027] | 0.008 [0.071] | 0.015 [0.133] |
| Lubrication | | Not required | | | |
| Cushion | | None | | | |

Note: Values are obtained when the air pressure is 0.49MPa [71psi].

Mass

| Model | Main body mass | Additional mass | |
|------------------|----------------|--------------------------|--|
| | | Double rod specification | With sensor switch specification ^{Note} |
| CS-RAP1-90,100 | 101 [3.56] | 2 [0.07] | With 1 sensor switch: 24 [0.85] With 2 sensor switches: 46 [1.62] |
| CS-RAP1-180,190 | 119 [4.20] | | |
| CS-RAP1-360 | 166 [5.86] | | |
| CS-RAP5-90,100 | 252 [8.89] | 4 [0.14] | |
| CS-RAP5-180,190 | 300 [10.58] | | |
| CS-RAP5-360 | 415 [14.64] | | |
| CS-RAP10-90,100 | 346 [12.20] | 10 [0.35] | |
| CS-RAP10-180,190 | 426 [15.03] | | |
| CS-RAP10-360 | 584 [20.60] | | |
| CS-RAP20-90,100 | 561 [19.79] | 16 [0.56] | |
| CS-RAP20-180,190 | 675 [23.81] | | |
| CS-RAP20-360 | 931 [32.84] | | |

Calculation example: Mass of CS-RAP1-180 with double rod and 1 sensor switch;
119+2+24=145g [5.1oz.]

Note: The additional mass of the sensor switch is the mass of the sensor holder and the sensor body only, and does not include the lead wire mass.

Order Codes

CS — **RAP** — — **S** —

Rotary actuator
Piston type

Clean system product

Swing angle
90 — 90°
100 — 100°
180 — 180°
190 — 190°
360 — 360°

Nominal torque
1 — 9.8N·cm [0.87in·lbf]
5 — 49N·cm [4.3in·lbf]
10 — 98N·cm [8.7in·lbf]
20 — 196N·cm [17.3in·lbf]

Rod material
Stainless

Rod type
Blank — Single rod type
D — Double rod type

Number of sensor switches
1 — With 1 sensor switch
2 — With 2 sensor switches

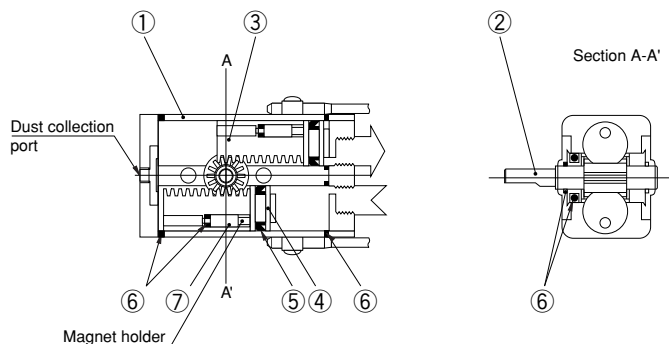
Lead wire length
A — 1000mm [39in.]
B — 3000mm [118in.]

Sensor switch
Blank — Without sensor switch
CS5T — 2-lead wire Reed switch type without indicator lamp (DC5~28V, AC85~115V)
CS11T — 2-lead wire Reed switch type with indicator lamp (DC10~28V)
ZC130 — 2-lead wire Solid state type with indicator lamp (DC10~28V)
ZC153 — 3-lead wire Solid state type with indicator lamp (DC4.5~28V)
● For details of sensor switches, see p.111~121.

Blank — Standard specification
S — Sensor switch use specification

Inner Construction and Major Parts

● Sensor switch use specification



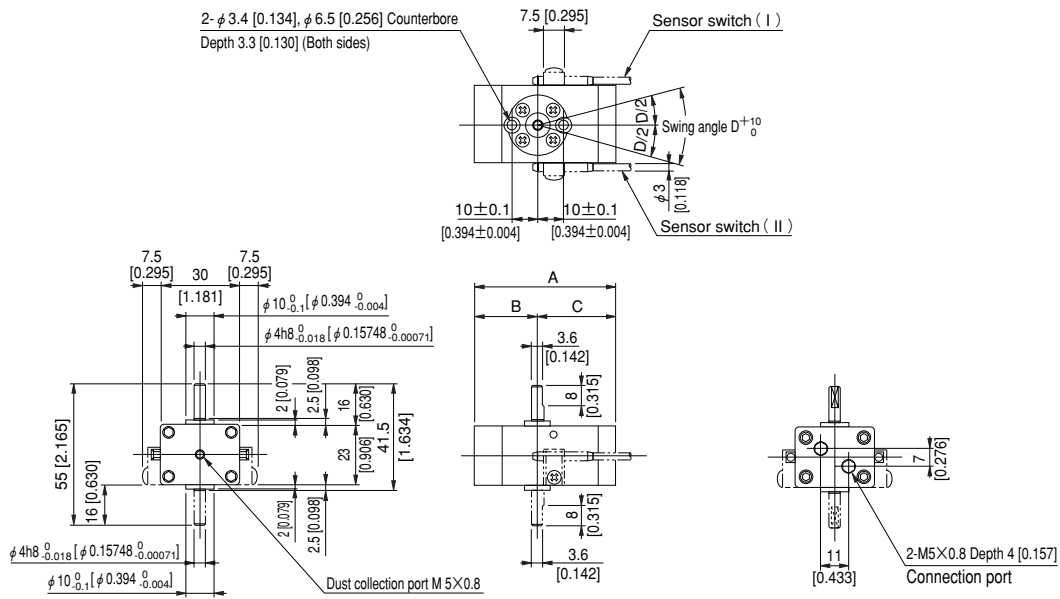
Major Parts and Materials

| No. | Parts | Materials |
|-----|-------------|--------------------------|
| ① | Main body | Aluminum (anodized) |
| ② | Rod pinion | Stainless steel (SUS304) |
| ③ | Rack | Plastic |
| ④ | Piston | |
| ⑤ | Piston seal | Synthetic rubber (NBR) |
| ⑥ | O-ring | |
| ⑦ | Magnet | Plastic magnet |

Seals

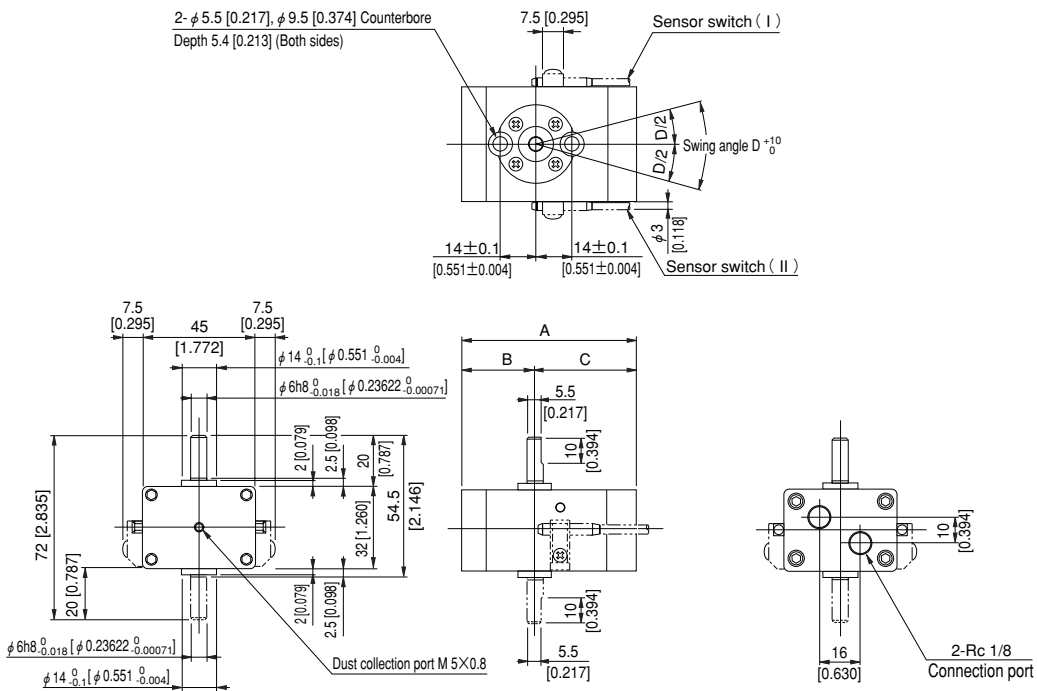
| Model | Item Q'ty | O-ring | | | Piston seal |
|--|----------------------------|---------------------------|------------------------------|--------|-------------|
| | | 4 | 2 | 2 | 2 |
| CS-RAP <input type="checkbox"/> 1 | IN 10 | I.D ϕ 6 × ϕ 1.2 | I.D ϕ 9 × ϕ 1.5 | PPY-10 | |
| CS-RAP <input type="checkbox"/> 5 | IN 16 | I.D ϕ 9 × ϕ 1.5 | I.D ϕ 14 × ϕ 1.5 | PPY-16 | |
| CS-RAP <input type="checkbox"/> 10 | IN 20 | P8 | I.D ϕ 19 × ϕ 0.6 | PPY-20 | |
| CS-RAP <input type="checkbox"/> 20 | I.D ϕ 25 × ϕ 1.5 | P10 | I.D ϕ 24.6 × ϕ 0.7 | PPY-25 | |

CS-RAP□1



| Code | A | B | C | D |
|-----------|------------|------------|------------|------|
| Model | | | | |
| RAP□1-90 | 56 [2.205] | 25 [0.984] | 31 [1.220] | 90° |
| RAP□1-100 | | | | 100° |
| RAP□1-180 | 68 [2.677] | 31 [1.220] | 37 [1.457] | 180° |
| RAP□1-190 | | | | 190° |
| RAP□1-360 | 96 [3.780] | 45 [1.772] | 51 [2.008] | 360° |

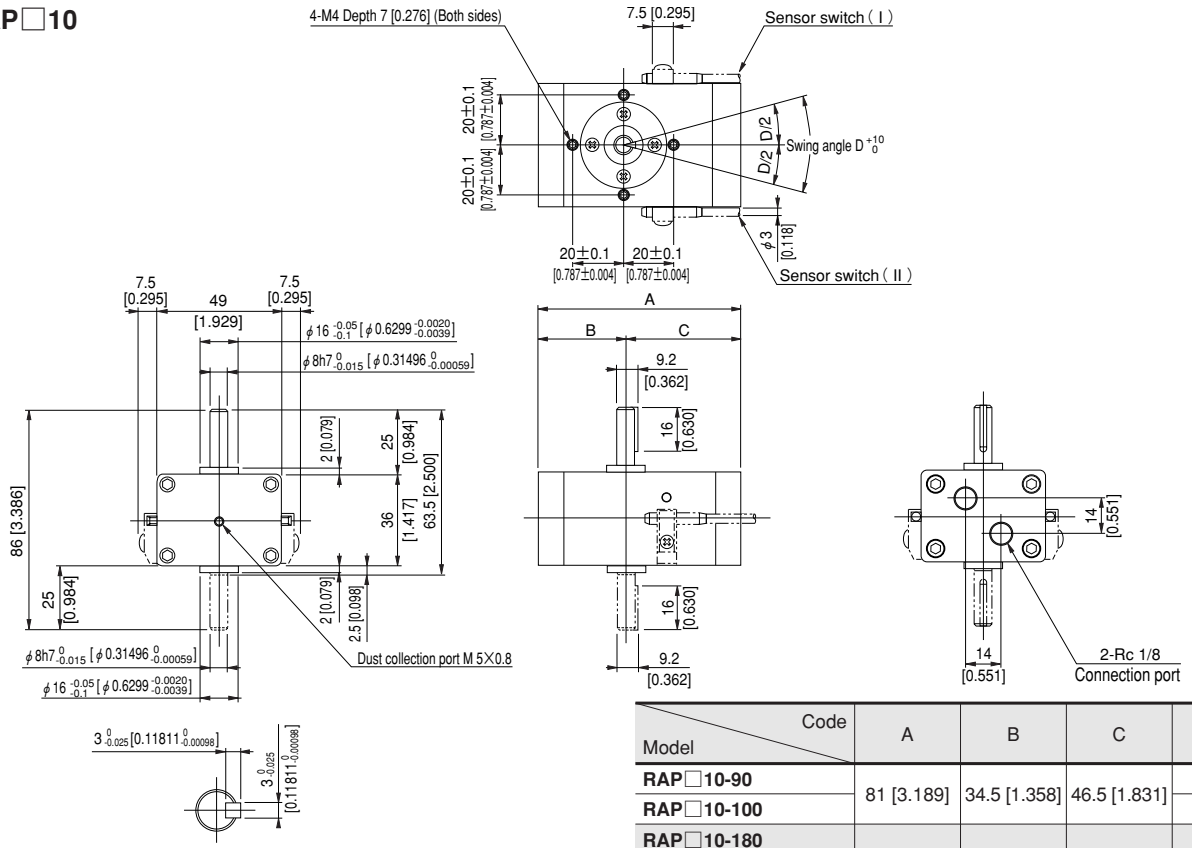
CS-RAP□5



| Code | A | B | C | D |
|-----------|-------------|--------------|--------------|------|
| Model | | | | |
| RAP□5-90 | 70 [2.756] | 30.5 [1.201] | 39.5 [1.555] | 90° |
| RAP□5-100 | | | | 100° |
| RAP□5-180 | 86 [3.386] | 35.5 [1.398] | 50.5 [1.988] | 180° |
| RAP□5-190 | | | | 190° |
| RAP□5-360 | 124 [4.882] | 55 [2.165] | 69 [2.717] | 360° |

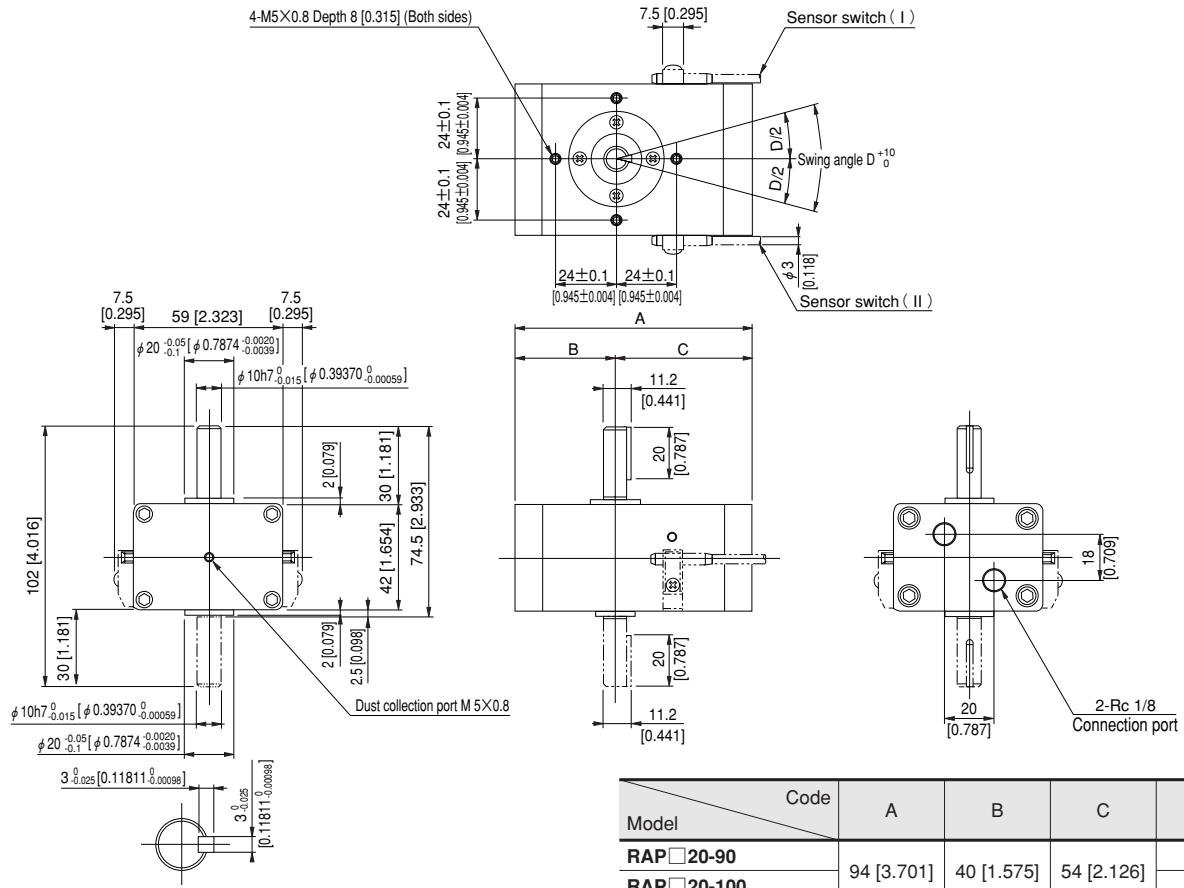
Dimensions mm [in.]

CS-RAP □ 10



| Code | A | B | C | D |
|--------------|-------------|--------------|--------------|------|
| Model | | | | |
| RAP □ 10-90 | 81 [3.189] | 34.5 [1.358] | 46.5 [1.831] | 90° |
| RAP □ 10-100 | | | | 100° |
| RAP □ 10-180 | 103 [4.055] | 44 [1.732] | 59 [2.323] | 180° |
| RAP □ 10-190 | | | | 190° |
| RAP □ 10-360 | 151 [5.945] | 67 [2.638] | 84 [3.307] | 360° |

CS-RAP □ 20



| Code | A | B | C | D |
|--------------|-------------|------------|------------|------|
| Model | | | | |
| RAP □ 20-90 | 94 [3.701] | 40 [1.575] | 54 [2.126] | 90° |
| RAP □ 20-100 | | | | 100° |
| RAP □ 20-180 | 120 [4.724] | 52 [2.047] | 68 [2.677] | 180° |
| RAP □ 20-190 | | | | 190° |
| RAP □ 20-360 | 179 [7.047] | 80 [3.150] | 99 [3.898] | 360° |

ROTARY ACTUATORS RAP SERIES

Sensor Switches

Order Codes

| | | Sensor switch model | Lead wire length | Holder / nominal torque | | | |
|------------------|------------------------------------|----------------------|------------------|-------------------------|--------|-------|--------------------|
| Solid state type | 2-lead wire With indicator lamp | DC10~28V | CS- | ZC130 | A B | -RAPS | 1 5 10 20 |
| Solid state type | 3-lead wire With indicator lamp | DC4.5~28V | | ZC153 | | | |
| Reed switch type | 2-lead wire Without Indicator lamp | DC5~28V AC85~115V | | CS5T | | | |
| Reed switch type | 2-lead wire With indicator lamp | DC10~28V | | CS11T | | | |

● For details of sensor switches, see p.111~121.

● Order code for holder only

CS — C1-RAPS
Clean system product

Nominal torque
1
5
10
20

● A : 1000mm [39in.]
● B : 3000mm [118in.]

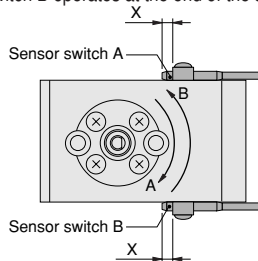
● Blank: Without holder
-RAPS: With holder

● Blank : Without holder
1 : For RAPS1
5 : For RAPS5
10 : For RAPS10
20 : For RAPS20

Note: When ordering with holder, enter the nominal torque.

Swing End Detection and Mounting Location of Sensor Switch

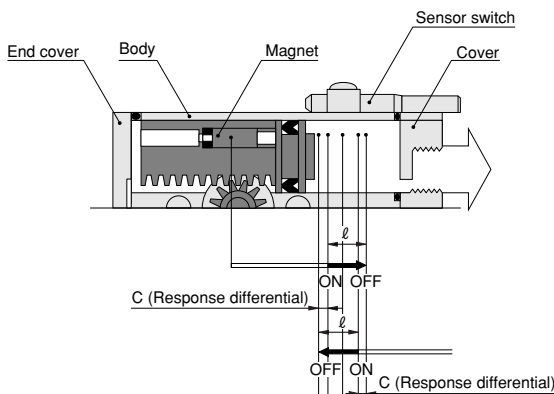
When the sensor switch is mounted in the location shown in the diagram, the magnet comes to the maximum sensing location of the sensor switch at the end of the swing. At this time, the sensor switch A operates at the end of the swing in the A direction, and sensor switch B operates at the end of the swing in the B direction.



- Notes: 1. Do not mount the sensor switch in the reverse direction.
2. When an external stopper, etc., limits the swing angle, note that there may be cases where the sensor switch does not operate within the above adjusting range.

| Model | X : Maximum sensing location mm [in.] | | |
|--------|--|-------------|-------------|
| | ZC130, ZC153 | CS5T | CS11T |
| RAPS1 | 6.5 [0.256] | 5.0 [0.197] | 8.5 [0.335] |
| RAPS5 | 7.0 [0.276] | 5.5 [0.217] | 9.0 [0.354] |
| RAPS10 | 6.5 [0.256] | 5.0 [0.197] | 8.5 [0.335] |
| RAPS20 | | | |

Sensor Switch Operating Range and Response Differential

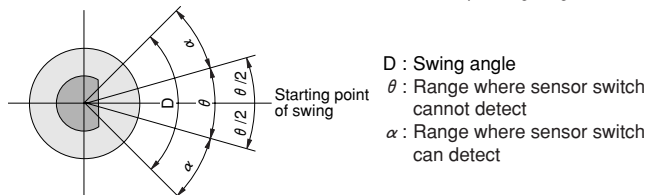


| CS5T □ | | CS11T □ | | ZC1 □□□ | |
|---------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|
| Operating range ℓ | Response differential C | Operating range ℓ | Response differential C | Operating range ℓ | Response differential C |
| 4.7~10.8 [0.185~0.425] | 1.4 [0.055] or less | 6.8~9.5 [0.268~0.374] | 1.4 [0.055] or less | 1.5~4.7 [0.059~0.185] | 0.3 [0.012] or less |

Remark: The above table shows reference values.

Reference

- When use of an external stopper limits the swing angle, 2 sensor switches can be used up to the angle (α) shown below. The recommended type of the sensor switch is a solid state sensor switch for its short operating range.

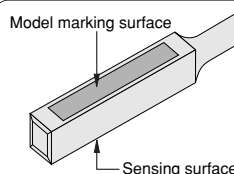


| Model | Swing angle | θ Note | α |
|--------|-------------|---------------|----------|
| RAPS1 | 90° | 56° | 17° |
| | 100° | | 22° |
| | 180° | | 62° |
| | 190° | | 67° |
| | 360° | | 130° |
| RAPS5 | 90° | 42° | 24° |
| | 100° | | 29° |
| | 180° | | 69° |
| | 190° | | 74° |
| | 360° | | 95° |
| RAPS10 | 90° | 32° | 29° |
| | 100° | | 34° |
| | 180° | | 70° |
| | 190° | | 75° |
| | 360° | | 70° |
| RAPS20 | 90° | 26° | 32° |
| | 100° | | 37° |
| | 180° | | 50° |
| | 190° | | 55° |
| | 360° | | 55° |

Note: Two sensor switches may be ON at the same time when the angle adjustment is set to this value or below.

Remark: For the use of reed type sensor switches, or for swing starting points other than those listed above, consult us.

● Caution when installing RAP with sensor switch



In the ZC type sensor switches, the opposite side from the model marking surface is the sensing surface side. Mount it so that the cylinder magnet comes to the sensing surface side.