

# Thumbwheel Switch A7AS

Refer to *Warranty and Application Considerations* (page 1) and *Safety Precautions* (page 3).

## General-purpose Thumbwheel Switches

- A wide range of output codes are available.
- Use the back-mounting (screw-mounting) models to achieve a compact panel design.



## Model Number Structure

### ■ Model Number Legend

A7AS--  
           1    2    3

#### 1. Mounting Method

2: Snap-in (front mounting)

#### 2. Output Code Number

03: Decimal code output

06: Binary coded decimal output

07: 06 with component-adding provision

19: 03 with component-adding provision

#### 3. Unit Color

None: Light gray

1: Black (See note 2.)

# Ordering Information

## List of Models

### Push-operated Switches

| Output code number                                                       | Model Classification (See note 1.) | A7AS             |            |
|--------------------------------------------------------------------------|------------------------------------|------------------|------------|
|                                                                          |                                    | Snap-in          |            |
|                                                                          |                                    | Solder terminals |            |
|                                                                          | Terminals                          | Light gray       | Black      |
| 03 (decimal code)                                                        |                                    | A7AS-203         | A7AS-203-1 |
| 06 (binary coded decimal)                                                |                                    | A7AS-206         | A7AS-206-1 |
| 07 (binary coded decimal, with component-adding provision) (See note 5.) |                                    | A7AS-207         | A7AS-207-1 |
| 19 (decimal code, with component-adding provision)                       |                                    | A7AS-219         | A7AS-219-1 |

- Note:**
- The classification diagrams show 4 Switch Units combined with End Caps to create 4-digit displays.
  - The model numbers given above are for 1 Switch Unit.
  - Models with stoppers are also available. Add “-S□□” after the “103,” “106,” “107,” “119,” “203,” “206,” “207,” or “219” in the model number and specify the display range in the □□. For example, to specify the range 0 to 6, add “-S06” to the model number (e.g., A7AS-203-S06-1).
  - Models with +, – displays can also be produced. Add “-PM” after the “106” or “206” in the model number.
  - Models with diodes are available. Add “-D” to the model number.

### Accessories (Order Separately)

Use accessories, such as End Caps, Spacers, and Connectors with the Switch Units.

#### End Caps

| Accessory | Classification Color | A7AS               |                      |
|-----------|----------------------|--------------------|----------------------|
|           |                      | Light gray         | Black                |
| End Caps  |                      | A7AS-M             | A7AS-M-1             |
| Spacer    |                      | NRT-P□ (See note.) | NRT-P□-1 (See note.) |

**Note:** The □ in the Spacer model number stands for the engraved symbol.

#### Connectors

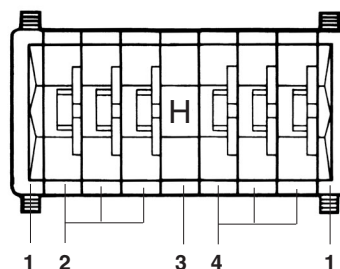
| Type             | Model | A7AS   |
|------------------|-------|--------|
| Solder terminals |       | NRT-C  |
| PCB terminals    |       | NRT-CP |

#### Spacers

| Symbol | A              | B   | C   | D   | E        | F  | G  |
|--------|----------------|-----|-----|-----|----------|----|----|
| Stamp  | No designation | SEC | MIN | H   | g        | kg | mm |
| Symbol | H              | J   | K   | L   | Q        | T  | U  |
| Stamp  | cm             | m   | °C  | PCS | x 10 SEC | 0  | •  |

## Ordering Procedure

Place orders as shown in the example below, specifying the model and number.



- A7AS-M (End Caps): 1 pair
- A7AS-203 (Switch Unit): 3
- NRT-PD (Spacer): 1
- A7AS-206 (Switch Unit): 3

# Specifications

## ■ Characteristics

| Item                                |                                                | A7AS                                               |
|-------------------------------------|------------------------------------------------|----------------------------------------------------|
| Switching capacity (resistive load) |                                                | 50 VAC or 28 VDC<br>1 mA to 0.1 A                  |
| Continuous carry current            |                                                | 1 A max.                                           |
| Contact resistance                  |                                                | 300 mΩ max.                                        |
| Insulation resistance               | Between non-connected terminals                | 10 MΩ min. (at 500 VDC)                            |
|                                     | Between terminal and non-current carrying part | 100 MΩ min. (at 500 VDC)                           |
| Dielectric strength                 | Between non-connected terminals                | 600 VAC, 50/60 Hz for 1 min                        |
|                                     | Between terminal and non-current carrying part | 1,000 VAC, 50/60 Hz for 1 min                      |
| Vibration resistance                | Malfunction                                    | 10 to 55 Hz, 1.5-mm double amplitude               |
| Shock resistance                    | Malfunction                                    | 490 m/s <sup>2</sup> min.                          |
| Durability                          | Mechanical                                     | 1,000,000 operations min.                          |
|                                     | Electrical                                     | 50,000 operations min.                             |
| Ambient temperature (with no icing) |                                                | Operating: -40°C to 85°C<br>Storage: -40°C to 85°C |
| Ambient humidity                    |                                                | Operating: 45% to 85%                              |
| Max. operating force                |                                                | 3.92 N max.                                        |

## ■ Output Codes/Terminals

### How to Read Output Codes

#### Example for A7AS with Output Code 06

For example, when the dial position is "3," the common terminal C on the Switch is connected to terminals 1 and 2. When the Switch is inserted into the Connector, the common terminal C becomes connector terminal 3, and terminals 1 and 2 become connector terminals 5 and 7 respectively.

#### Output Code 03 (Decimal Code)

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common |   |   |   |   |   |   |   |    |    |  |
|-------|--------------------------|------------------------|-------------------------------|---|---|---|---|---|---|---|----|----|--|
|       |                          |                        | 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  |  |
| A7AS  | Switch Unit              | C                      | 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  |  |
|       | Connector                | 6                      | 1                             | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 |  |
| Dial  | 0                        |                        | •                             |   |   |   |   |   |   |   |    |    |  |
|       | 1                        |                        |                               | • |   |   |   |   |   |   |    |    |  |
|       | 2                        |                        |                               |   | • |   |   |   |   |   |    |    |  |
|       | 3                        |                        |                               |   |   | • |   |   |   |   |    |    |  |
|       | 4                        |                        |                               |   |   |   | • |   |   |   |    |    |  |
|       | 5                        |                        |                               |   |   |   |   | • |   |   |    |    |  |
|       | 6                        |                        |                               |   |   |   |   |   | • |   |    |    |  |
|       | 7                        |                        |                               |   |   |   |   |   |   | • |    |    |  |
|       | 8                        |                        |                               |   |   |   |   |   |   |   | •  |    |  |
|       | 9                        |                        |                               |   |   |   |   |   |   |   |    | •  |  |

**Note:** The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

#### Output Codes 06 (Binary Coded Decimal) and 13 (See note.)

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common |   |   |    |
|-------|--------------------------|------------------------|-------------------------------|---|---|----|
|       |                          |                        | 1                             | 2 | 4 | 8  |
| A7AS  | Switch Unit              | C                      | 1                             | 2 | 4 | 8  |
|       | Connector                | 3                      | 5                             | 7 | 9 | 11 |
| Dial  | 0                        |                        |                               |   |   |    |
|       | 1                        |                        | •                             |   |   |    |
|       | 2                        |                        |                               | • |   |    |
|       | 3                        |                        | •                             | • |   |    |
|       | 4                        |                        |                               |   | • |    |
|       | 5                        |                        | •                             |   | • |    |
|       | 6                        |                        |                               | • | • |    |
|       | 7                        |                        | •                             | • | • |    |
|       | 8                        |                        |                               |   |   | •  |
|       | 9                        |                        | •                             |   |   | •  |

**Note:** 1. Switches with output code 13 are double-sided PCB models.  
2. The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

#### Output Codes 07 (Binary Coded Decimal with Component-adding Provision) and 36 (See note 1.)

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common |   |   |    |
|-------|--------------------------|------------------------|-------------------------------|---|---|----|
|       |                          |                        | 1                             | 2 | 4 | 8  |
| A7AS  | Switch Unit              | C                      | 1                             | 2 | 4 | 8  |
|       | Connector                | 1, 3<br>(See note 2.)  | 5                             | 7 | 9 | 11 |
| Dial  | 0                        |                        |                               |   |   |    |
|       | 1                        |                        | •                             |   |   |    |
|       | 2                        |                        |                               | • |   |    |
|       | 3                        |                        | •                             | • |   |    |
|       | 4                        |                        |                               |   | • |    |
|       | 5                        |                        | •                             |   | • |    |
|       | 6                        |                        |                               | • | • |    |
|       | 7                        |                        | •                             | • | • |    |
|       | 8                        |                        |                               |   |   | •  |
|       | 9                        |                        | •                             |   |   | •  |

**Note:** 1. Switches with output code 36 are double-sided PCB models.  
2. Terminal 3 is the common terminal for the component-adding provision.  
3. The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

#### Output Code 19 (Decimal Code with Component-adding Provision)

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common |   |   |   |   |   |   |   |    |    |  |
|-------|--------------------------|------------------------|-------------------------------|---|---|---|---|---|---|---|----|----|--|
|       |                          |                        | 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  |  |
| A7AS  | Switch Unit              | C                      | 0                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  | 9  |  |
|       | Connector                | 6                      | 1                             | 2 | 3 | 4 | 5 | 7 | 8 | 9 | 10 | 11 |  |
| Dial  | 0                        |                        | •                             |   |   |   |   |   |   |   |    |    |  |
|       | 1                        |                        |                               | • |   |   |   |   |   |   |    |    |  |
|       | 2                        |                        |                               |   | • |   |   |   |   |   |    |    |  |
|       | 3                        |                        |                               |   |   | • |   |   |   |   |    |    |  |
|       | 4                        |                        |                               |   |   |   | • |   |   |   |    |    |  |
|       | 5                        |                        |                               |   |   |   |   | • |   |   |    |    |  |
|       | 6                        |                        |                               |   |   |   |   |   | • |   |    |    |  |
|       | 7                        |                        |                               |   |   |   |   |   |   | • |    |    |  |
|       | 8                        |                        |                               |   |   |   |   |   |   |   | •  |    |  |
|       | 9                        |                        |                               |   |   |   |   |   |   |   |    | •  |  |

**Note:** The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

## Terminals

| Output code                        | 03                              | 06 (13)                         | 07 (36)                                                  | 19                                                             |
|------------------------------------|---------------------------------|---------------------------------|----------------------------------------------------------|----------------------------------------------------------------|
| <b>A7AS<br/>(solder terminals)</b> | <p>Twenty-two, 1-dia. holes</p> | <p>Twenty-two, 1-dia. holes</p> | <p>Forty-four, 1 dia.<br/>Component-adding provision</p> | <p>Forty-four, 1-dia. holes<br/>Component-adding provision</p> |

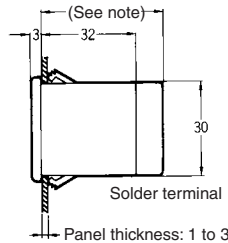
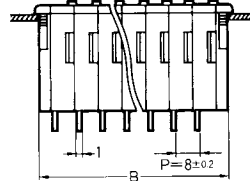
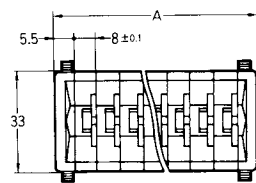
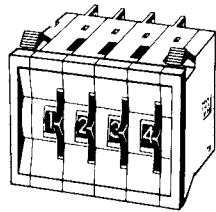
- Note:** 1. Switches with output code 13 are double-sided PCB models equivalent to models with output code 06.  
 2. Switches with output code 36 are double-sided PCB models equivalent to models with output code 07.

## Dimensions

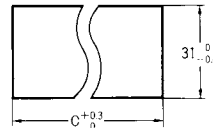
**Note:** All units are in millimeters unless otherwise indicated.

### ■ Push-operated Switches

**A7AS-2□□(-1)  
Solder terminals**



**Panel Cutout**



**Note:** If the output code is 03 or 06, the dimension is 41.5; if the output code is 07 or 19, the dimension is 53.5.

| Number of Switches (n) | A (8n + 11) | B (8n + 8) | C (B + 1) |
|------------------------|-------------|------------|-----------|
| 1                      | 19 mm       | 16 mm      | 17 mm     |
| 2                      | 27 mm       | 24 mm      | 25 mm     |
| 3                      | 35 mm       | 32 mm      | 33 mm     |
| 4                      | 43 mm       | 40 mm      | 41 mm     |
| 5                      | 51 mm       | 48 mm      | 49 mm     |
| 6                      | 59 mm       | 56 mm      | 57 mm     |
| 7                      | 67 mm       | 64 mm      | 65 mm     |
| 8                      | 75 mm       | 72 mm      | 73 mm     |
| 9                      | 83 mm       | 80 mm      | 81 mm     |
| 10                     | 91 mm       | 88 mm      | 89 mm     |

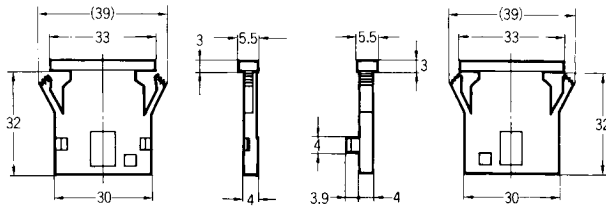
- Note:** 1. The dimensions above include both End Caps, and will increase 8 mm for each additional Switch inserted.  
 2. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions. The tolerance for multiple connection is  $\pm(\text{number of units} \times 0.4)$  mm.

## End Caps for Push-operated Switches

### A7AS-M(-1) Snap-in Panel Mounting

Left Side

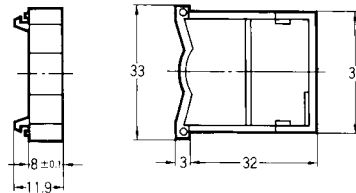
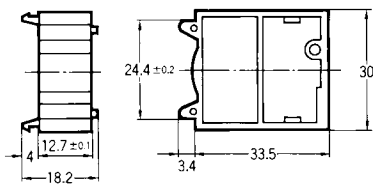
Right Side



## Spacers for Thumbwheel Switches

### SRT-P□ Screw Panel Mounting

### NRT-P□ Snap-in Panel Mounting



**Note:** The □ in the Spacer model number stands for a letter in the range A to U. (Refer to the table under the explanation about Spacers on page 52.)

## ■ Accessories (Order Separately)

### Connectors

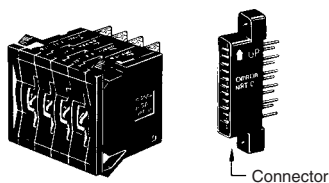
The Switch Units can be installed using snap-in mounting, allowing easy maintenance and inspections after wiring is completed.

| Model                     | NRT-C (solder terminals) | NRT-CN (solder terminals) | NRT-CP (PCB terminals) |
|---------------------------|--------------------------|---------------------------|------------------------|
| Applicable models         | A7AS                     | A7AS                      | A7AS                   |
| Appearance and dimensions |                          |                           |                        |

**Note:** Unless otherwise indicated, dimensional tolerances for dimensions in the models above are  $\pm 0.4$  mm.

#### Inserting Connectors

Insert Connectors with the "UP" arrow pointing up.



## Safety Precautions

### ■ Precautions for Correct Use

Please observe the following precautions to prevent failure to operate, malfunction, or undesirable effect on product performance.

Refer to *Precautions for Correct Use* on page 4 for information common to all models.

### Handling

The molded components of the Switch use polyacetal resin and ABS resin. It is recommended that alcohol is used to wipe off dirt and smudges from the molded components. Take care to prevent the alcohol from getting inside.

Do not use thinner or other solutions which might damage the resin.

### Screw-mounting Models

Tighten mounting screws to a torque between 0.39 to 0.59 N·m, using M3 screws. Use plain washers or spring washers together with the screws.

### Soldering

Refer to *Precautions for Correct Use* on page 4.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.