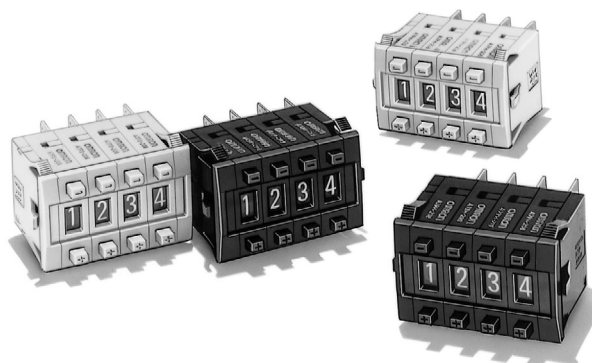# Thumbwheel Switch
# A7PS/A7PH

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

## Dust-tight, Easy-to-Use, Push-operated Switches with Large Display Characters

- Simple push mechanism and large, easy-to-view numeric display make setting easy.
- Dust penetration prevented with seal for the display windows.

# Model Number Structure

## ■ Model Number Legend

**A7P☐-2☐☐-☐**
    **1**   **2**   **3**

**1. Basic Model**

  S:    Snap-in (front mounting)
  H:    Snap-in (front mounting, long-life type)

**2. Output Code Number**

  03:    Decimal code output
  06:    Binary coded decimal output
  07:    06 with component-adding provision
  19:    Double-sided PCB version of 06 with component-adding provision
  54:    Binary coded hexadecimal code
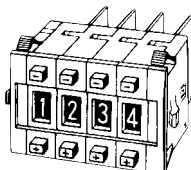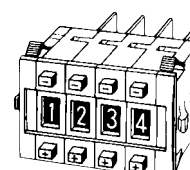  55:    54 with component-adding provision (See note.)

**3. Unit Color**

  None: Light gray
  1:    Black

**Note:** Output code number, 55, can be used for A7PS only.

# Ordering Information

## ■ List of Models

### Push-Operated Switches

| Model Classification (See note 1.) | A7PS | | A7PH | |
|---|---|---|---|---|
| | **Snap-in (front mounting)** | | **Snap-in (front mounting)** | |
| | | | **Long-life type** | |
| **Terminals** | **Solder terminals (See note 5.)** | | | |
| **Color** | **Light gray** | **Black** | **Light gray** | **Black** |
| **Output code number** | Model | | Model | |
| 03 (decimal code) | A7PS-203 | A7PS-203-1 | A7PH-203 | A7PH-203-1 |
| 06 (binary coded decimal) | A7PS-206 | A7PS-206-1 | A7PH-206 | A7PH-206-1 |
| 07 (binary coded decimal, with component-adding provision) (See note 6.) | A7PS-207 | A7PS-207-1 | A7PH-207 | A7PH-207-1 |
| 19 (decimal code, with component-adding provision) | A7PS-219 | A7PS-219-1 | A7PH-219 | A7PH-219-1 |
| 54 (binary coded hexadecimal) | A7PS-254 | A7PS-254-1 | A7PH-254 | A7PH-254-1 |
| 55 (binary coded hexadecimal, with component adding provision) (See note 6.) | A7PS-255 | A7PS-255-1 | --- | --- |

**Note: 1.** The classification diagrams show 4 Switch Units combined with End Caps to create 4-digit displays.

**2.** The model numbers given above are for 1 Switch Unit.

**3.** Models with stoppers are also available. Add "-S□□" after the "203," "206," "207," "219," "254," or "255" 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., A7PS-206-S06-1).

**4.** Models with +, − displays can also be produced. Add "-PM" after the "206" in the model number (e.g., A7PS-206-PM or A7PS-206-PM-1).

**5.** Models with PCB terminals are available.

**6.** Models with diodes are available. Add "-D" to the model number (e.g., A7PS-207-D or A7PS-207-D-1).

### Accessories (Order Separately)

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

| Accessory | Color | **Light gray** | **Black** |
|---|---|---|---|
| **End Caps** | | A7P-M (See note 2.) | A7P-M-1 (See note 2.) |
| **Spacer** | | A7P-P□ (See notes 1 and 2.) | A7P-P□-1 (See notes 1 and 2.) |
| **Connectors** | Solder terminals | NRT-C | |
| | PCB terminals | NRT-CP | |

**Note: 1.** The □ in the Spacer model number stands for a letter in the range A to U. (Refer to the table in the following explanation about Spacers.)

**2.** The minimum ordering unit is 10.

### End Caps

End Caps are used on the Switch Units at each end and allow all the Switch Units to be securely mounted to a panel. They come in pairs, one for the left and one for the right.
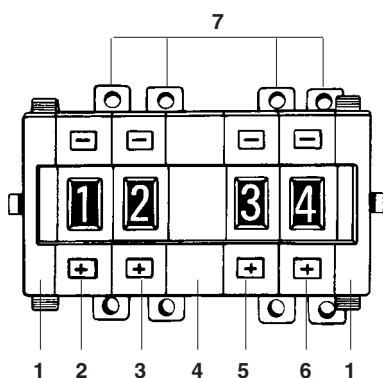
### Spacers

Spacers are used for creating extra space or gaps between the Switch Units and have the same dimensions as the Switch Units themselves.

There are also Spacers with engraved characters or symbols that can be used for indicating units, such as time and length. (Refer to the following table.) Consult your OMRON representative for details.

| 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.

**1.** A7P-M (End Caps): 1 set
**2.** A7PS-203 (Switch Unit): 1 piece
**3.** A7PS-206 (Switch Unit): 1 piece
**4.** A7P-PA (Spacer): 1 piece
**5.** A7PS-207 (Switch Unit): 1 piece
**6.** A7PS-219 (Switch Unit): 1 piece

**Note:** Standard products are not factory-assembled for shipment. Contact your OMRON representative for details on ordering factory-assembled sets.

**7.** NRT-C (Connector): 4 pieces

# Specifications

## ■ Characteristics

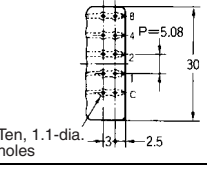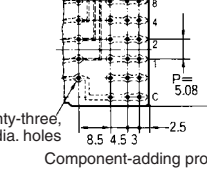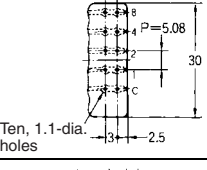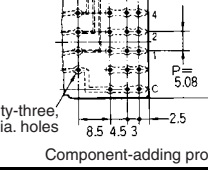| Item | | A7PS | A7PH |
|---|---|---|---|
| Switching capacity (resistive load) | | 50 VAC or 5 to 28 VDC<br>1 mA to 0.1 A | 125 VAC or 5 to 28 VDC<br>10 µA to 0.15 A |
| Continuous carry current | | 1 A max. | 3 A max. |
| Contact resistance | | 200 mΩ max. | |
| Insulation resistance | Between non-connected terminals | 10 MΩ min. (at 500 VDC) | 100 MΩ min. (at 500 VDC) |
| | Between terminal and non-current carrying part | 1,000 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 | | 10 to 55 Hz, 1.5-mm double amplitude for 2 hours min. | |
| Shock resistance | | 490 m/s$^2$ min. | |
| Durability | Mechanical | 100,000 operations min. | 2,000,000 operations min. |
| | Electrical | 50,000 operations min. | 1,000,000 operations min. |
| Ambient temperature | | Operating: –10°C to 65°C | |
| Ambient humidity | | Operating: 45% to 85% | |
| Max. operating force | | 6.37 N max. | |
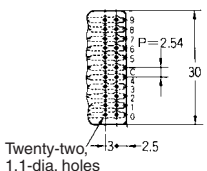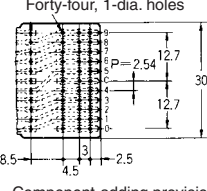
# ■ Output Codes/Terminals

Switches with output codes 06 or 07 both use binary coded decimal but Switches with output code 07 have a component-adding provision. Similarly, Switches with output codes 54 or 55 both use binary coded hexadecimal but Switches with output code 55 have a component-adding provision.

## How to Read Output Codes

### Example for 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 number | Terminals |
|---|---|
| 03 | <br>Twenty-two,<br>1.1-dia. holes<br>P=2.54 · 30 · 3 · 2.5 |
| 19 | Forty-four, 1-dia. holes<br><br>Component-adding provision<br>P=2.54 · 12.7 · 30 · 12.7 · 8.5 · 4.5 · 3 · 2.5 |
| 06 | <br>Ten, 1.1-dia. holes<br>P=5.08 · 30 · 3 · 2.5 |
| 07 | <br>Twenty-three,<br>1.1-dia. holes<br>Component-adding provision<br>P=5.08 · 30 · 8.5 4.5 3 · 2.5 |
| 54 | <br>Ten, 1.1-dia. holes<br>P=5.08 · 30 · 3 · 2.5 |
| 55 | <br>Twenty-three,<br>1.1-dia. holes<br>Component-adding provision<br>P=5.08 · 30 · 8.5 4.5 3 · 2.5 |

## Output Codes 03 and 19

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Switch Unit | C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **03, 19** | 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 and 07

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common | | | |
|---|---|---|---|---|---|---|
| | Switch Unit | C | 1 | 2 | 4 | 8 |
| **06** | Connector | 3 | 5 | 7 | 9 | 11 |
| **07** | Connector | 1, 3 (See note 1.) | | | | |
| **Dial** | 0 | | | | | |
| | 1 | | • | | | |
| | 2 | | | • | | |
| | 3 | | • | • | | |
| | 4 | | | | • | |
| | 5 | | • | | • | |
| | 6 | | | • | • | |
| | 7 | | • | • | • | |
| | 8 | | | | | • |
| | 9 | | • | | | • |

**Note: 1.** Terminal 3 is the common terminal for the component-adding provision.

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

## Output Codes 54 and 55

| Model | Switch Unit or Connector | Common terminal number | Terminals connected to common | | | |
|---|---|---|---|---|---|---|
| | Switch Unit | C | 1 | 2 | 4 | 8 |
| 54 | Connector | 3 | 5 | 7 | 9 | 11 |
| 55 | Connector | 1, 3 (See note 2.) | | | | |
| **Dial** | | 0 | | | | |
| | | 1 | • | | | |
| | | 2 | | • | | |
| | | 3 | • | • | | |
| | | 4 | | | • | |
| | | 5 | • | | • | |
| | | 6 | | • | • | |
| | | 7 | • | • | • | |
| | | 8 | | | | • |
| | | 9 | • | | | • |
| | | A | | • | | • |
| | | B | • | • | | • |
| | | C | | | • | • |
| | | D | • | | • | • |
| | | E | | • | • | • |
| | | F | • | • | • | • |

**Note: 1.** The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).
**2.** Terminal 3 is the common terminal for the component-adding provision.

# Dimensions

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

## ■ Push-operated Switches

**A7PS-2**□□**(-1)**
**A7PH-2**□□**(-1)**
**Solder Terminals**



10±0.1  A

33

4.6  4.3

4.5  8.6  1  P=10±0.2
B

7.2  (See note)
3  33.5

22.6

30

Solder terminal

Panel thickness: 1 to 3

**Panel Cutout**

31 0 −0.4

B +1 0
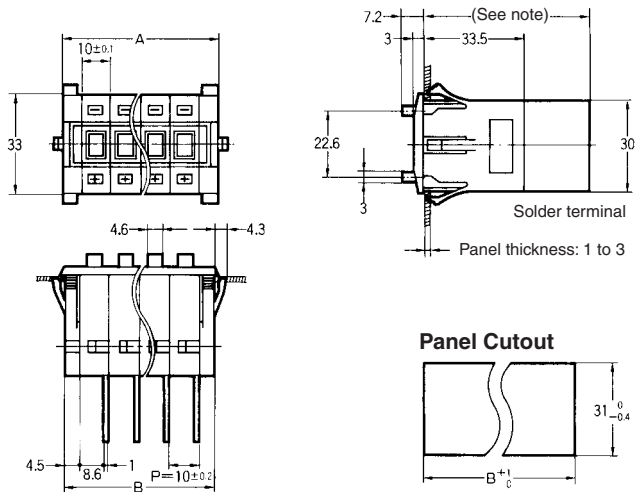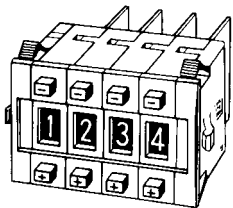
| Number of Switches (n) | A (n x 10 + 12) | B (n x 10 + 9) |
|---|---|---|
| 1 | 22 mm | 19 mm |
| 2 | 32 mm | 29 mm |
| 3 | 42 mm | 39 mm |
| 4 | 52 mm | 49 mm |
| 5 | 62 mm | 59 mm |
| 6 | 72 mm | 69 mm |
| 7 | 82 mm | 79 mm |
| 8 | 92 mm | 89 mm |
| 9 | 102 mm | 99 mm |
| 10 | 112 mm | 109 mm |

**Note: 1.** The dimensions above include both End Caps, and will increase 10 mm for each Spacer inserted.
**2.** Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
The tolerance for multiple connection is ±(number of units x 0.4) mm.

**Note:** If the output code is 03, 06 or 54, the dimension is 43; if the output code is 07, 19 or 55, the dimension is 55.
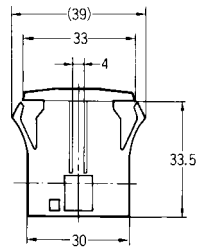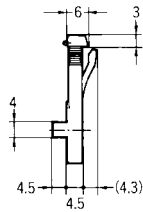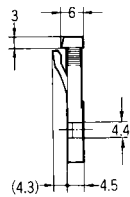
# ■ Accessories (Order Separately)

## End Caps for Push-operated Switches

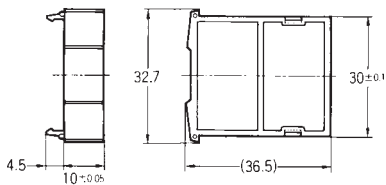**A7P-M(-1) Snap-in Panel Mounting**
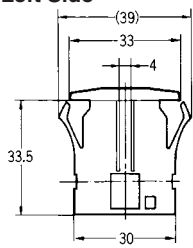
**Left Side**　**Right Side**



## Spacers for Push-operated Switches

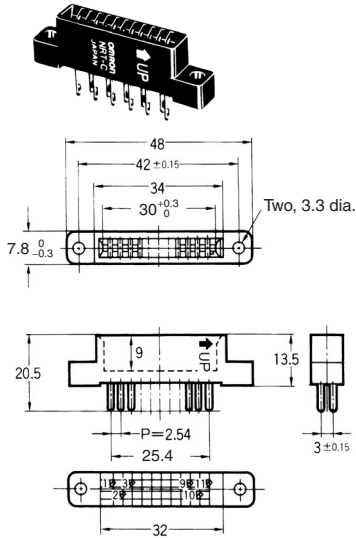**A7P-P□(-1) Snap-in Panel Mounting**



**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 39.)
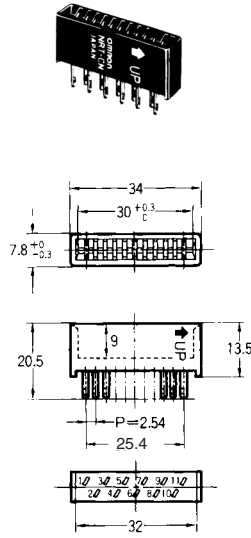
## Connectors

These devices allow Switches to be quickly removed for maintenance and inspection of connectivity, and quickly re-installed.
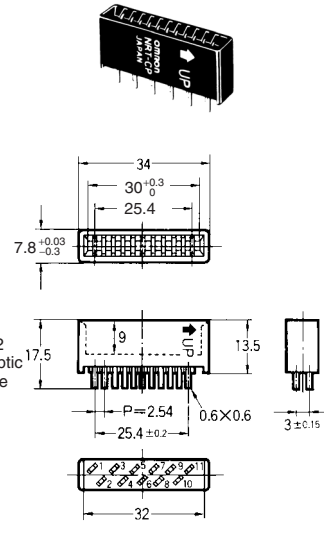
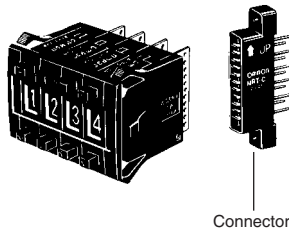**NRT-C**
Solder Terminals

**NRT-CN**
Solder Terminals

**NRT-CP**
PCB Terminals

### Inserting Connectors
Insert Connectors with the "UP" arrow pointing up.

Connector

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

# 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.

Do not push the (+) and (−) operating push-buttons at the same time.

## 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.