Cat. No. X031-E1-08

OMRON

Thumbwheel Switches

Warranty and Application Considerations

Read and Understand this Catalog

Please read and understand this catalog before purchasing the product. Please consult your OMRON representative if you have any questions or comments.

■ Warranty and Limitations of Liability

Warranty and Limitations of Liability

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■ Application Considerations

Application Considerations

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- Systems, machines, and equipment that could present a risk to life or property.

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Disclaimers
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Safety Precautions

■ Meaning of Signal Words

The following signal word is used in this catalog.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

■ Meaning of Alert Symbols

The following alert symbol is used in this catalog.

	Indicates the possibility of electric shock under specific conditions.

■ Alert Statement in this Catalog

The following alert statement applies to the products in this catalog. This alert statement also appears at the locations needed in this catalog to attract your attention.

Please read the *Technical and Safety Information* section (page 4) of this catalog for other operation precautions.

⚠ WARNING	
Electric shock may possibly occur. Do not perform wiring work or touch the charged parts of terminals while power is supplied to the Switch.	

Technical and Safety Information

■ Precautions for Correct Use

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

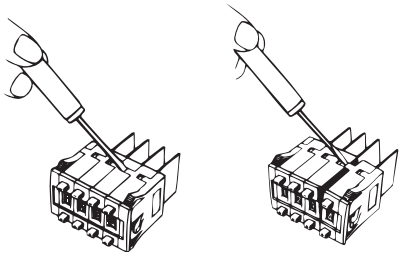
For precautionary information on individual products, refer to *Safety Precautions* in the relevant section.

Environment

- Do not use where gases are generated (ammonia, chlorine, sulfur dioxide).
- Although Switches are of nearly dust-proof construction, they are not drip-proof, therefore do not use in areas subject to water or oil exposure and do not operate with wet or oily hands. (The A7MD has a dust-proof construction on contact parts, but consider your installation location carefully. The A7MA is not of dust-proof construction.)
- Provide additional dust-proofing measures, such as using a dust-proof cover, when using in sand-exposed areas.

Handling

- After wiring has been completed, ensure an appropriate insulation distance.
- Do not use the Switch in the normally-pressed state. Doing so may occasionally result in premature deterioration of parts and changes in the characteristics.
- Do not touch charged parts, such as terminals, while the power is ON.
- Do not connect more than one power supply to a single Switch. Doing so may result in circuit malfunctions and short-circuits.
- When changing settings, do not touch the operating buttons if your fingers are wet or there is oil or any other foreign substance on your fingers.
- It is recommended that alcohol is used to wipe off dirt and smudges from the molded-plastic cases. Take care to prevent the alcohol from getting inside.
- Do not use thinner or other solutions which might damage the plastic.
- When connecting Switches, fit the mating parts together.
- When separating Switches, use a screwdriver as shown in the figure below; disconnect them by releasing the top and bottom hooks. Be careful not to bend the hooks.

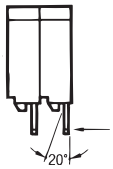


- Do not push the (+) and (–) operating push-buttons at the same time.
- Do not drop the Switch. Doing so may possibly result in deformation of the terminals, damage to the PCB, or damage to the resin catch (for connecting) on the side of the Switch.

Models with PCB Terminals

- When using models with PCB terminals, make the terminal insertion holes in the back board (mother board) 1 mm or larger in diameter.
- Do not use excessive force in handling models with PCB terminals. In particular, take care to avoid dropping them as the terminals might bend or break.

Reference: Terminals can withstand a force of 7.84 N for 1 minute or more (A7D: 4.9 N for 10 seconds or more), and survive bending of 20° without breaking after returning to original position. Withstanding the repetitive application of external pressure, however, is beyond the scope of Switch specifications.



The A7MD Switches are mounted on PCBs. When projecting the operating face from the back of a panel, refer to the recommended panel cutout dimensions. The A7MD Switches, however, cannot be mounted to panels individually.

Connectors

- Insert Connectors while keeping the arrow pointing up (refer to page 36, page 44, and page 57).
- Connector insertion load is about 14.7 N for each A7B-C and 34.3 N for each NRT-C.

Soldering

Note the following points when soldering printed circuit boards:

Automatic Soldering

Do not use dip cleaning. Doing so may result in flux penetration of the Switch interior, causing contact and rotational defects. Clean the flux as shown in Figure 1, tilting the Switch 80° or less and using a brush to apply the solvent only to the back of the board. It may also be cleaned by dipping only the back of the board into the solvent and then using a brush to clean.

Dip Soldering

When applying flux solvent, the dipping time is a maximum of 2 seconds. As shown in Figure 2, avoid flooding the top surface of the printed circuit board with flux. Using a brush to apply flux further reduces the danger of flux penetration. When cleaning flux with a brush, tilt the Switch 80° or less, as shown in Figure 1, in order to prevent flux from flowing onto the switch mounting surface. Clean flux as described above under *Automatic Soldering*.

Figure 1

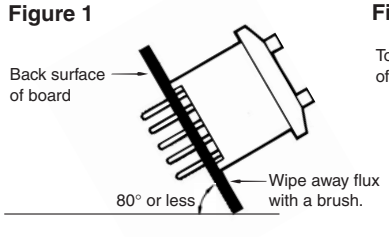
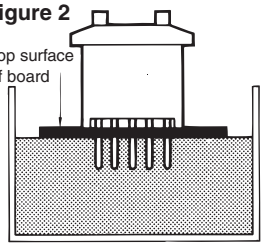


Figure 2



Using a Soldering Iron

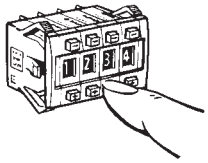
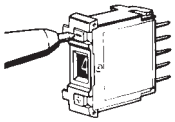
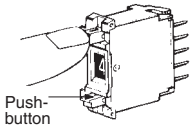
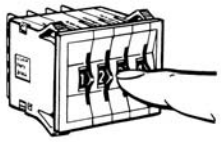
Use a 30-W soldering iron at a temperature of 350°C for a maximum of 3 seconds, and flush as described above.

Do not apply force to the terminals during soldering and for 3 minutes after soldering is completed. Doing so may result in conduction or operation failure.

Ensure that soldering flux and alcohol do not penetrate into the Switch interior

■ Selecting Thumbwheel Switches

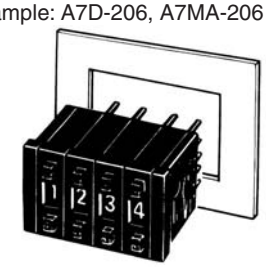
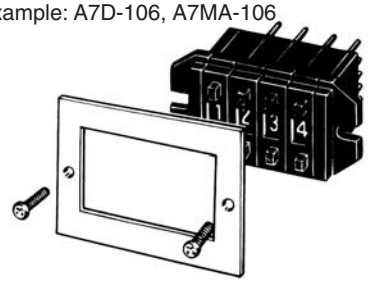
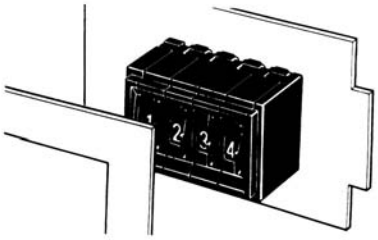
1. Operation Method

Mechanical types			
Push operated			Thumbwheel operated
Pressing the (+) button increments the numbers; pressing the (–) button decrements the numbers. 	Pen-push type Since the buttons do not protrude from the face of the switch, use a ball-point pen or other pointed object to set the value. 	Locking type When the push-button is bent on the face of the switch, accidentally pressing the switch will not change the number. Raise the push-button only for setting. 	Turning the internal wheels with the tip of the finger changes the numbers. 

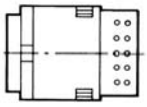
2. Configuration and Dimensions

Refer to the *Selection Guide* on page 12 to page 17 and the individual dimensions starting on page 7.

3. Mounting

Snap-in (front mounting)	Screw mounting (back mounting)	PCB panel mounting (stand-alone)
Snap-in mounting can be accomplished without the use of screws, by inserting the switch into a panel cutout of the designated dimensions. Example: A7D-206, A7MA-206 	The switch can be mounted with screws to the back of a panel. Example: A7D-106, A7MA-106 	The switch can be mounted to stand alone on a PC board by soldering. It fastens to a panel via the PC board. Example: A7MD 

4. Terminal Types

PCB terminals	Solder terminals
Insert directly into the printed circuit board and solder to make the circuit connections. Refer to *Soldering* on page 4. 	Terminals with gold plating for connectors are available. 

5. Output Codes

Output code type	Output type	Component - adding provision	PCB type	Output code number
Binary Code	Real Code	Without	Single-sided	01
Binary Coded Decimal Code	Real Code	Without	Single-sided	03
		With	Single-sided	19
Binary Coded Decimal Code	Real Code	Without	Single-sided	06
				14 (See note.)
		With	Single-sided	07
	Complement Code	Without	Single-sided	22
Binary Coded Hexadecimal Code	Real Code	Without	Single-sided	54
		With	Single-sided	55

Note: With terminal for odd parity check.

The solid dot • indicates that the internal switch is ON.

Dial	Output
+	•
–	•

Dial	Output
0	•
1	•
2	•
3	•
4	•
5	•
6	•
7	•
8	•
9	•

Dial	Output
0	
1	•
2	•
3	• •
4	•
5	• •
6	• •
7	• • •
8	•
9	• •

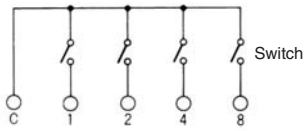
Dial	Output
0	• • • •
1	• • •
2	• • •
3	• •
4	• • •
5	• •
6	• •
7	•
8	• • •
9	• •

Dial	Output
0	
1	•
2	•
3	• •
4	•
5	• •
6	• •
7	• • •
8	•
9	• •
A	• •
B	• • •
C	• •
D	• • •
E	• • •
F	• • • •

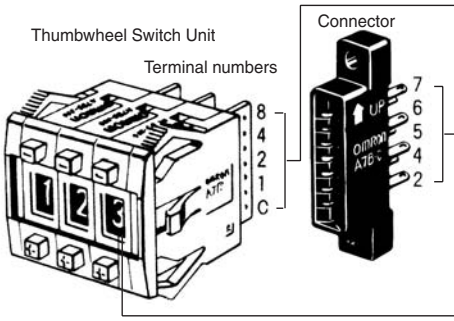
How to Read Output Codes

Example for Output Code 06

1. For example, when the dial position is “3,” the common terminal C on the Switch Unit is connected to terminals 1 and 2, as indicated by the solid dots in the output code table. The internal circuitry is shown below.



2. When a Switch is inserted into a Connector, e.g., for the A7BS, the common terminal C becomes connector terminal 2, and terminals 1 and 2 become connector terminals 4 and 5 respectively.
3. Switches with output codes 13 and 36 are double-sided PCB models equivalent to models with output codes 06 and 07. They have a twin contact configuration for high reliability.



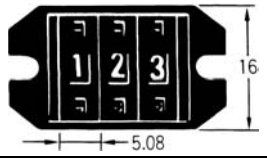
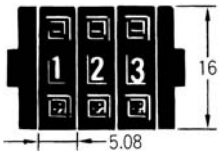
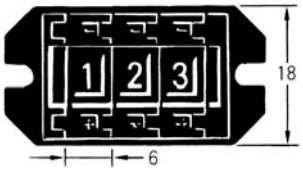
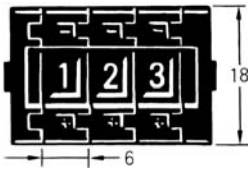
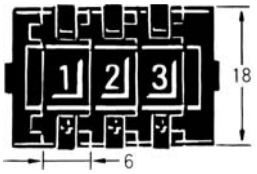
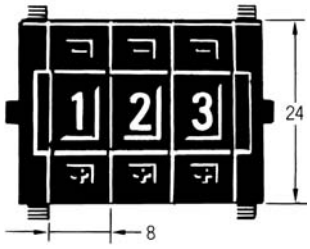
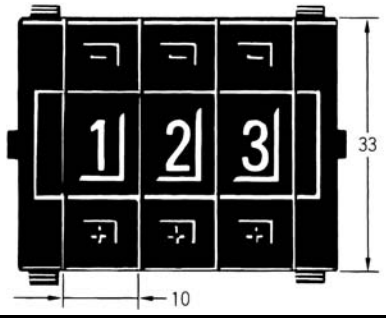
Example: A7BS
06: Binary coded decimal, single-sided PCB type

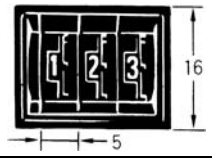
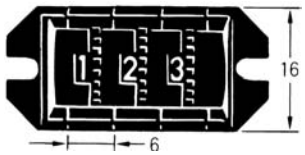
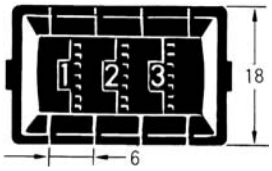
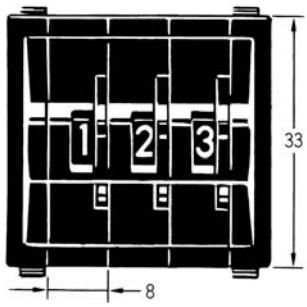
Model	Switch Unit or Connector	Common terminal number	Terminals connected to common			
A7BS	Switch Unit	C	1	2	4	8
	Connector	2	4	5	6	7
Dial	0					
	1		•			
	2			•		
	③		•	•		
	4				•	
	5		•		•	
	6			•	•	
	7		•	•	•	
	8					•
	9		•			•

The solid dot • indicates that the internal switch is ON.

■ Appearance/Dimensions

Note: The model names used below are basic product names used to categorize the different Switches in the series.

Model	Appearance/dimensions	Page
A7D-1		19
A7DP (A7D-2 is the same size.)		
A7CN-1		24
A7CN-2		
A7CN-L2		
A7BS (A7BL is the same size.)		30
A7PH (A7PS is the same size.)		38

Model	Appearance/dimensions	Page
A7MD		45
A7MA-1		
A7MA-2		
A7AS		51

■ Model Number Legend

Product Model Classification

The following classification applies to Thumbwheel Switches as a general rule.

A7□□□-□□□-□□□□-□
1 2 3 4 5

1. Basic Model
The product series is classified by basic model names.
A7AS, A7BS, A7CN, A7D, etc.

2. Mounting Method
The methods for attaching the switch to the panel are classified by a number.
1: Screw mounting (back mounting)
2: Snap-in (front mounting)

3. Output Code Number
Output code type is indicated by 2 digits.
01: Binary code output
03: Decimal code output
06: Binary coded decimal output
54: Binary coded hexadecimal code

4. Special Specifications
Special specifications are designated after the hyphen.

Terminals
-P2: PCB terminals (may be omitted when only the PCB terminals are available)

Stoppers
-S: External stoppers (only for A7BS-20□).
-S□□: Internal stoppers (-S15 indicates that the switch display is limited to 1 to 5).

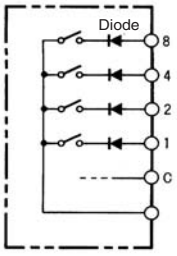
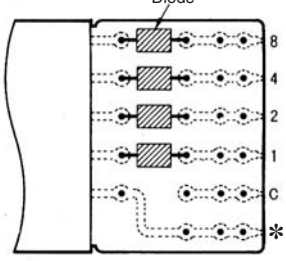
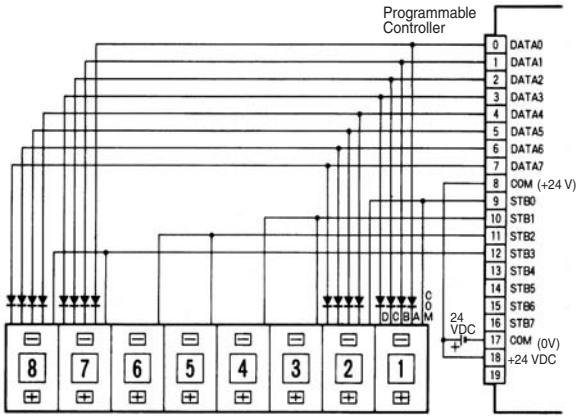
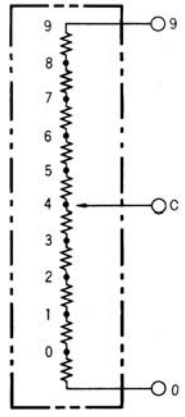
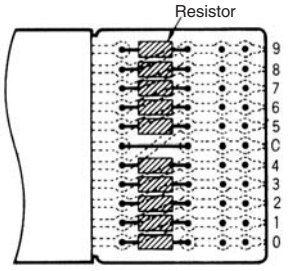
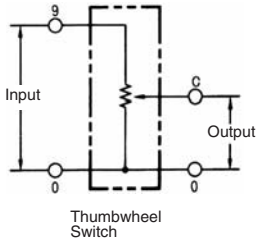
Dial Display
-PM: +/– alternating display
-MP: –/+ alternating display

Built-in Diode (Refer to page 10 for details.)
-D: Cathode common
-D1: Anode common

5. Unit Color
None: Light gray
-1: Black

Switches with Component-adding Provision

To add diodes or resistors to Thumbwheel Switch circuits, use models with terminals that allocate component-adding provisions (e.g., output codes 07, 19, 55, etc.).

Examples	Circuit example	Circuit board	Application example
For mounting diodes	 Thumbwheel Switch (e.g., A7PS-207)	 Thumbwheel Switch (e.g., A7PS-207) **Note:** Use the terminal marked with the asterisk ✻ if the common terminal needs no resistor or diode.	For Programmable Controller inputs (OMRON SYSMAC C500 or C2000H)  Thumbwheel Switch
For mounting resistors	 Thumbwheel Switch	 Thumbwheel Switch (e.g., A7PS-219)	As a voltage divider or digital variable resistor  Thumbwheel Switch

■ Terminology

Explanation of Common Terms

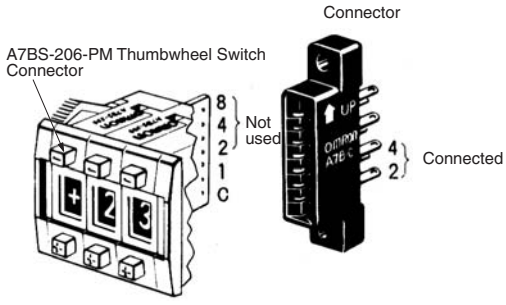
Output Codes

Term	Meaning
Binary Code	Combined 2-value (“0” and “1,” “OFF” and “ON,” etc.) sign.
Decimal Code	Uses the ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
Binary Coded Decimal Code	Each decimal number is represented by a binary code (see following table).
Binary Coded Hexadecimal Code	Each hexadecimal numeral is represented by a binary code. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F represent the sixteen possible values.
Parity Check	As a method of determining if a binary code is in error, a parity check signal is added to give odd (or even) uniformity to the number of binary 1’s in the code. This uniformity can be used to determine the validity of the code.
Real Code	In an electronic circuit, a voltage which is high compared to ground is termed “H” and represents binary code 1, while a voltage which is low compared to ground is “L” and represents binary code 0.
Complement Code	As opposed to real code, “H” represents a 0 and “L” represents a 1.

+/– Dial Display (“-PM” Models)

It is possible to produce 06-type models (binary coded decimal code) that display “+, –, +...–" instead of “1, 2, 3...9”.

The model numbers used for this type of Switch are A7□-206-PM and A7□-206-PM-1. Below is an example of the A7BS-206-PM. The Switch’s output terminal 1 and common terminal are used for binary output.



Example of A7BS-206-PM

Model	Switch Unit or Connector	Common terminal number	Terminals connected to common			
A7BS	Switch Unit	C	1	2	4	8
	Connector	2	4	5	6	7
Dial	+ (0)					
	– (1)		•			
	+ (2)			•		
	– (3)		•	•		
	+ (4)				•	
	– (5)		•		•	
	+ (6)			•	•	
	– (7)		•	•	•	
	+ (8)					•
	– (9)		•			•

Note: **1.** The solid dot • indicates that the internal switch is ON.
2. Numbers enclosed in parentheses are the dial displays for the A7BS-206.

Attaching Stoppers

Stoppers are mechanisms for preventing the wheels rotating outside set ranges. There are internal stoppers that are set at setup and external stoppers that can be set as required at any time. For example, a wheel that normally displays any number in the range 0 to 9 can be restricted to the range 0 to 5 using a stopper.

Add -S□□ to the suffix, specifying the range in the blanks.
Example: A7PS-203-S05

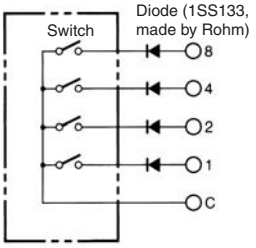
Units to which stoppers can be attached are the A7DP, A7D, A7BS, A7BL, A7PS, A7PH, and A7AS. Consult your OMRON representative for details on individual model numbers.

On the outside of the A7BS-□-S is a Stopper Pin with which the user can make any setting.

The A7CN-2, A7CN-1, A7CN-L2, A7MD, and A7MA cannot be equipped with stoppers.

Built-in Diodes

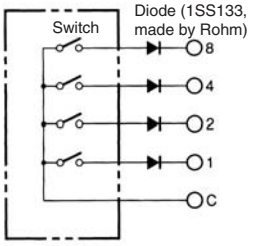
"-D" Models (Cathode Common)



Applicable Models:
- A7BS-207/-255
- A7MA-107
- A7BL-207
- A7PS-207/-225
- A7PH-207
- A7AS-207

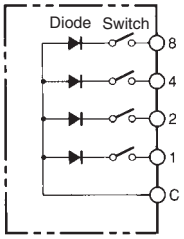
"-D1" Models (Anode Common)

(Special specification)



Applicable Models:
- A7MA-107/-207
- A7AS-207
- A7BS-207
- A7PS-207
- A7PH-207

Note: The A7MD has special specifications (anode common). Be sure to connect the terminals with the correct polarity. The configuration for the A7MD-106-P-D is shown below.

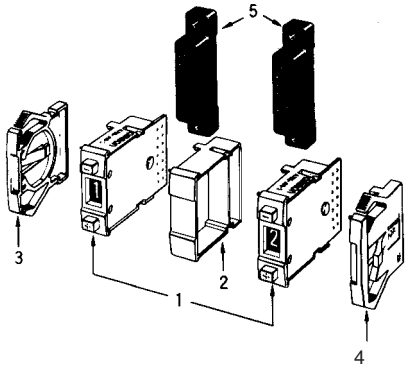


Note: The diode (DAP202K, made by Rohm) is installed inside the case.

■ Ordering Procedure

Configurations

The Thumbwheel Switch is generally used in the configuration shown below.



1. Switch Unit refers to the Switch itself. As each digit is independent of the others, a number of Switch Units are assembled to make up just the number of digits needed.
2. Spacers can be used in case the number of digits change due to a change in specifications. When units for time and length must be displayed, the necessary letters and symbols can be printed or stamped. The stamping shown in the following table can be produced. Inquire for details.

Stamping

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	•

3, 4. End Caps/Side Plates: These are used at both ends of the Switch Unit to insure a solid mount of each Switch Unit to a panel. Left and right plates make a set.

5. Connectors: Since the Switch Unit snaps right into a Connector, accomplishing both attachment and wiring in a single action, connections, maintenance and inspection are greatly simplified.

Ordering

Standard products, such as the Switch Units and End Caps, are not factory-assembled for shipment. Place orders as shown below, specifying the model and number of Switch Units.

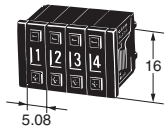
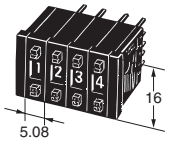
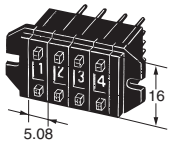
Ordering Example:

Figure	Product name	Model	Number of Units
1	Switch Unit	A7BS-206-1	2
2	Spacer	A7B-PA-1	1
3	End Caps	A7B-M-1	1 set
4			
5	Connector	A7B-CP	2

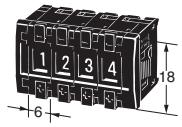
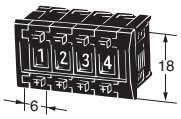
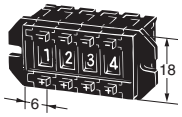
Special Characters and Symbols for Dial Displays

Dials can be ordered with special characters or symbols as well as with stoppers attached. Ask your OMRON sales representatives.

Selection Guide

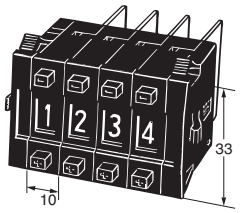
Actuator		Push-button					
Model		A7DP-2		A7D-2		A7D-1	
Appearance **(Height of displayed characters)**		Pen-push type  (3.2 mm)		 (3.2 mm)		 (3.2 mm)	
Features		For use in DC circuits (5 to 30 VDC). Optimizes space. Can be made with stoppers.					
Mounting		Snap-in (front mounting) 				Screw mounting (back mounting) 	
Terminals		PCB terminals 					
Dust-proofing		Provided (IP50)					
Color		Light gray	Black	Light gray	Black	Light gray	Black
Switch/ output code number	**03 (decimal code)**	---		---		---	
	06 (binary coded decimal) [with +, – display]	A7DP-206 [A7DP-206-PM]	A7DP-206-1 [A7DP-206-PM-1]	A7D-206 [A7D-206-PM]	A7D-206-1 [A7D-206-PM-1]	A7D-106 [A7D-106-PM]	A7D-106-1 [A7D-106-PM-1]
	07 (binary coded decimal, with component-adding provision)	---		---		---	
	19 (decimal code, with component-adding provision)	---		---		---	
	54 (binary coded hexadecimal)	---		---		---	
	55 (binary coded hexadecimal, with component-adding provision)	---		---		---	
End Caps		A7D-2M	A7D-2M-1	A7D-2M	A7D-2M-1	A7D-1M	A7D-1M-1
Spacers		A7D-2PA	A7D-2PA-1	A7D-2PA	A7D-2PA-1	A7D-1PA	A7D-1PA-1
Connectors	**Solder terminals**	---					
	PCB terminals	---					
Page		19 to 20					

Note: Inquire about models in parentheses.

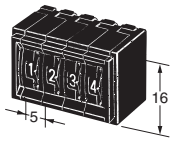
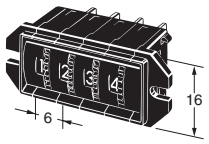
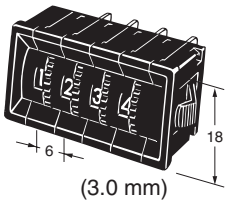
Actuator		Push-button				
Model		A7CN-L2		A7CN-2		A7CN-1
Appearance **(Height of displayed characters)**		 (3.4 mm)		 (3.4 mm)		 (3.4 mm)
Features		Up to 50 VAC or 28 VDC. For built-in use in small devices. Switching current of 1 mA to 0.1 A.				
Mounting		Snap-in (front mounting) 				Screw mounting (back mounting) 
Terminals		PCB terminals 				
Dust-proofing		Provided (IP50)				
Color		Light gray	Black	Light gray	Black	Black
Switch/ output code number	**03 (decimal code)**	---		---		---
	06 (binary coded decimal) [with +, − display]	A7CN-L206 [A7CN-L206-PM]	A7CN-L206-1 [A7CN-L206-PM-1]	A7CN-206 [A7CN-206-PM]	A7CN-206-1 [A7CN-206-PM-1]	A7CN-106-1 [A7CN-106-PM-1]
	07 (binary coded decimal, with component-adding provision)	---		---		---
	19 (decimal code, with component-adding provision)	---		---		---
	54 (binary coded hexadecimal)	---		---		---
	55 (binary coded hexadecimal, with component-adding provision)	---		---		---
End Caps		A7CN-2M	A7CN-2M-1	A7CN-2M	A7CN-2M-1	A7CN-1M-1
Spacers		A7CN-2PA	A7CN-2PA-1	A7CN-2PA	A7CN-2PA-1	A7CN-1PA-1
Connectors	**Solder terminals**	---		---		
	PCB terminals	---		---		
Page		24 to 25				

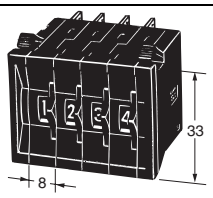
Actuator		Push-button					
Model		A7BL		A7BS		A7BS-20□-S	
Appearance		Locking type				With external stoppers	
(Height of displayed characters)		(4.8 mm)		(4.8 mm)		(4.8 mm)	
Features		For use in medium-sized devices.		For use in medium-sized devices. Available in hexadecimal.		For use in medium-sized devices.	
Mounting		Snap-in (front mounting)					
Terminals		Solder terminals					
Dust-proofing		Provided (IP50)					
Color		Light gray	Black	Light gray	Black	Light gray	Black
Switch/ output code number	**03 (decimal code)**	---		---		---	
	06 (binary coded decimal) [with +, − display]	A7BL-206 [A7BL-206-PM]	A7BL-206-1 [A7BL-206-PM-1]	A7BS-206 [A7BS-206-PM]	A7BS-206-1 [A7BS-206-PM-1]	A7BS-206-S	A7BS-206-S-1
	07 (binary coded decimal, with component-adding provision)	A7BL-207	A7BL-207-1	A7BS-207	A7BS-207-1	A7BS-207-S	A7BS-207-S-1
	19 (decimal code, with component adding provision)	---		A7BS-219	A7BS-219-1	---	
	54 (binary coded hexadecimal)	---		A7BS-254	A7BS-254-1	---	
	55 (binary coded hexadecimal, with component-adding provision)	---		A7BS-255	A7BS-255-1	---	
End Caps		A7B-M	A7B-M-1	A7B-M	A7B-M-1	A7B-M	A7B-M-1
Spacers		A7B-PA	A7B-PA-1	A7B-PA	A7B-PA-1	A7B-PA	A7B-PA-1
Connectors	**Solder terminals**	A7B-C (Cannot be used for A7BS-219/-219-1.)					
	PCB terminals	A7B-CP (Cannot be used for A7BS-219/-219-1.)					
Page		30 to 32					

Note: A7BS can be made with PCB terminals.

Actuator		Push-button			
Model		A7PS		A7PH	
Appearance (Height of displayed characters)		Long-life type  (6.8 mm)			
Features		Mechanical durability: 100,000 operations min. For use in medium or large devices. Up to 50 VAC or 28 VDC. Can be made with stoppers.		Mechanical durability: 2,000,000 operations min. For use in medium or large devices. Up to 125 VAC or 28 VDC. Can be made with stoppers.	
Mounting		Snap-in (front mounting) 			
Terminals		Solder terminals 			
Dust-proofing		Provided (IP50)			
Color		Light gray	Black	Light gray	Black
Switch/ output code number	**03 (decimal code)**	A7PS-203	A7PS-203-1	A7PH-203	A7PH-203-1
	06 (binary coded decimal) [with +, − display]	A7PS-206 [A7PS-206-PM]	A7PS-206-1 [A7PS-206-PM-1]	A7PH-206 [A7PH-206-PM]	A7PH-206-1 [A7PH-206-PM-1]
	07 (binary coded decimal, with component-adding provision)	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)	A7PS-255	A7PS-255-1	---	
End Caps		A7P-M	A7P-M-1	A7P-M	A7P-M-1
Spacers		A7P-PA	A7P-PA-1	A7P-PA	A7P-PA-1
Connectors	**Solder terminals**	NRT-C			
	PCB terminals	NRT-CP			
Page		38 to 40			

Note: A7PS and A7PH can be made with PCB terminals.

Actuator		Thumbwheel						
Model		A7MD	A7MA-1		A7MA-2			
Appearance								
(Height of displayed characters)		(2.8 mm)	(3.0 mm)		(3.0 mm)			
Features		Ideal for use in small-device PCBs. Available with built-in diode (saves space).	For built-in use in devices. For DC circuits (5 to 28 VDC). Switching capacity of 1 mA to 0.1 A.					
Mounting		Mounts via printed circuit board. 	Screw mounting (back mounting) 		Snap-in (front mounting) 			
Terminals		PCB terminals 	Solder terminals 	PCB terminals 	Solder terminals 		PCB terminals 	
Dust-proofing		Provided (simple dust-proofing)	Not provided					
Color		Black			Light gray	Black	Light gray	Black
Switch/ output code number	**03 (decimal code)**	---	---		---		---	
	06 (binary coded decimal) [with +, − display]	A7MD-106-P-09	A7MA-106 [A7MA-106-PM]	A7MA-106-P2 [A7MA-106-P2-PM]	A7MA-206 [A7MA-206-PM]	A7MA-206-1 [A7MA-206-PM-1]	A7MA-206-P2 [A7MA-206-P2-PM]	A7MA-207-P2-1 [A7MA-206-P2-PM-1]
	07 (binary coded decimal, with component-adding provision)	---	A7MA-107	A7MA-107-P2	A7MA-207	A7MA-207-1	A7MA-207-P2	A7MA-207-P2-1
	14 (06 with odd parity)	---	---		---		---	
	19 (decimal code, with component adding provision)	---	---		---		---	
	22 (06 with complementary code)	---	---		---		---	
End Caps		A7MD-1M	A7M-1M		A7M-2M	A7M-2M-1	A7M-2M	A7M-2M-1
Spacers		A7MD-PA	A7M-1PA		A7M-2PA	A7M-2PA-1	A7M-2PA	A7M-2PA-1
Connectors	**Solder terminals**	---	---		---		---	
	PCB terminals	---	---		---		---	
Page		45 to 46						

Actuator		Thumbwheel	
Model		A7AS	
Appearance **(Height of displayed characters)**		 (4.0 mm)	
Features		Mechanical durability: 1,000,000 operations min. Up to 50 VAC or 28 VDC. Switching current of 1 mA to 0.1 A. Can be made with stoppers.	
Mounting		Snap-in (front mounting) 	
Terminals		Solder terminals 	
Dust-proofing		Provided (IP50)	
Color		Light-gray	Black
Switch/ output code number	**03 (decimal code)**	A7AS-203	A7AS-203-1
	06 (binary coded decimal) [with +, − display]	A7AS-206 [A7AS-206-PM]	A7AS-206-1 [A7AS-206-PM-1]
	07 (binary coded decimal, with component-adding provision)	A7AS-207	A7AS-207-1
	14 (06 with odd parity)	A7AS-214	A7AS-214-1
	19 (decimal code, with component-adding provision)	A7AS-219	A7AS-219-1
	22 (06 with complementary code)	A7AS-222	A7AS-222-1
End Caps		A7AS-M	A7AS-M-1
Spacers		NRT-PA	NRT-PA-1
Connectors	**Solder terminals**	NRT-C	
	PCB terminals	NRT-CP	
Page		51 to 52	

Note: A7AS is also available with PCB terminals.

CONTENTS

A7D/A7DP **19**

A7CN/A7CN-L **24**

A7BS/A7BL **30**

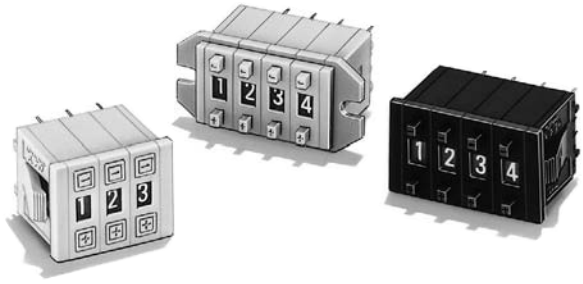
A7PS/A7PH **38**

A7MD/A7MA **45**

A7AS **51**

Thumbwheel Switch
A7D/A7DP

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



Ultra-small, Low-cost, Push-operated Switches

- All-in-one design means fewer parts are required. This product delivers high reliability at a low cost.
- Uses long-lasting resin springs to achieve a long mechanical durability expectancy of 30,000 operations.
- Models with stoppers for restricting the setting range are available.
- The series includes a complete range of pen-push models that prevent accidental operation.

Model Number Structure

■ Model Number Legend

A7D□-□□□-□
1 2 3 4

1. Operation Method
None: Push type
P: Pen-push type

2. Mounting Method
1: Screw mounting (back mounting)
Note: Screw mounting is not available with A7DP models.
2: Snap-in (front mounting)

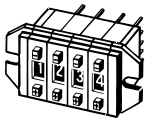
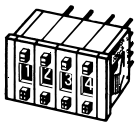
3. Output Code Number
06: Binary coded decimal output

4. Unit Color
None: Light gray
1: Black

Ordering Information

■ List of Models

Push-operated Switches

Model		A7D				A7DP	
Classification (See note 1.)		Screw mounting (back mounting) 		Snap-in (front mounting) 		Snap-in (front mounting) 	
Output code number	Terminals	PCB terminals					
	Color	Light gray	Black	Light gray	Black	Light gray	Black
06 (binary coded decimal)		A7D-106	A7D-106-1	A7D-206	A7D-206-1	A7DP-206	A7DP-206-1

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 "106" or "206" 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., A7D-106-S06-1).
4. Models with +, – displays are also available. Add "-PM" after the "106" or "206" in the model number (e.g., A7D-106-PM or A7D-106-PM-1).

Accessories (Order Separately)

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

Classification / Accessory / Color	Screw mounting (back mounting)		Snap-in (front mounting)	
	Light gray	Black	Light gray	Black
End Caps (1 pair)	A7D-1M	A7D-1M-1	A7D-2M	A7D-2M-1
Spacer	A7D-1P□ (See note.)	A7D-1P□-1 (See note.)	A7D-2P□ (See note.)	A7D-2P□-1 (See note.)

Note: 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.)

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

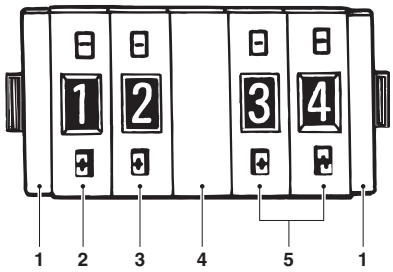
Spacers are used for creating extra space or gaps between the Switch Units and have the same dimensions as the Switch Units themselves.

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. A7D-2M (End Caps): 1 pair
2. A7D-206-S□□ (Switch Unit with stopper): 1 piece
3. A7D-206 (Switch Unit): 1 piece
4. A7D-2P□ (Spacer): 1 piece
5. A7D-206 (Switch Unit): 2 pieces

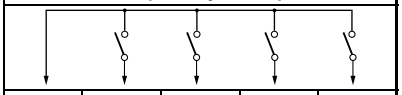
Note: Standard products, such as the Switch Units and End Caps, are not factory-assembled for shipment. Contact your OMRON representative for details on ordering factory-assembled sets.

Specifications

■ Characteristics

Item		A7D/A7DP
Switching capacity (resistive load)		5 to 30 VDC 1 mA to 0.1 A
Continuous carry current		100 mA
Contact resistance		200 mΩ max.
Insulation resistance	**Between non-connected terminals**	10 MΩ min. (at 250 VDC)
	Between terminal and non-current carrying part	100 MΩ min. (at 500 VDC)
Dielectric strength	**Between non-connected terminals**	250 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
Shock resistance		500 m/s^2 min.
Durability	**Mechanical**	30,000 operations min.
	Electrical	20,000 operations min.
Ambient temperature		Operating: –10°C to 70°C (with no icing) Storage: –20°C to 80°C
Ambient humidity		Operating: 45% to 85%
Max. operating force		3.43 N max.

■ Output Codes

Output code number	06 (Binary Code)				
Internal circuit					
Dial display / Terminal	C	1	2	4	8
0					
1		•			
2			•		
3		•	•		
4				•	
5		•		•	
6			•	•	
7		•	•	•	
8					•
9		•			•

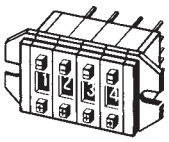
Note: The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

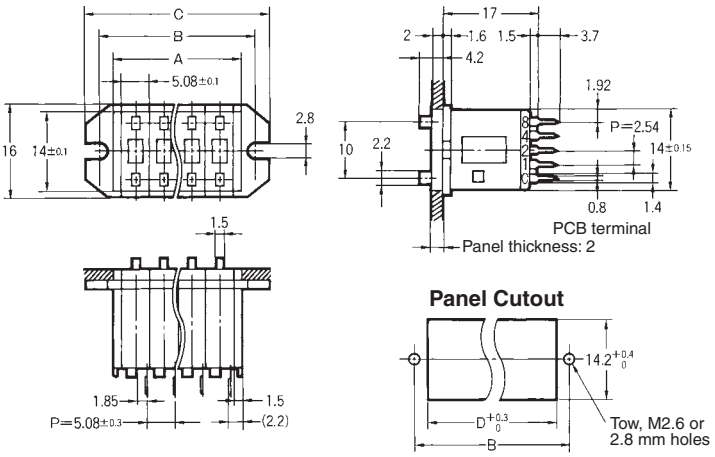
Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Push-operated Switches

A7D-106(-1) PCB Terminals



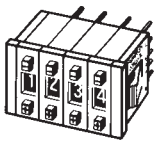


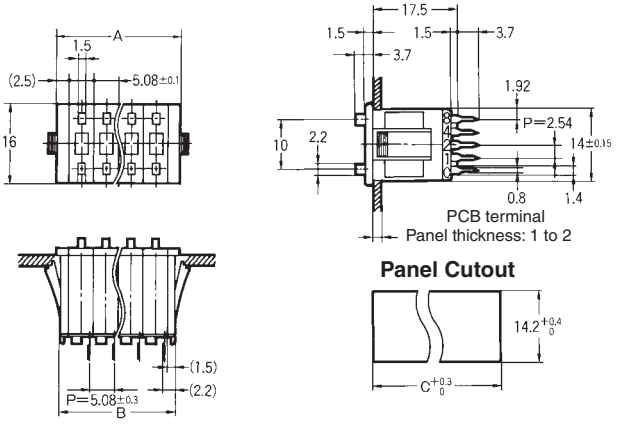
Number of Switches (n)	A (n x 5.1 + 3)	B (n x 5.1 + 8.3)	C (n x 5.1 + 13.3)	D
1	8.1 mm	13.4 mm	18.4 mm	8.4 mm
2	13.2 mm	18.5 mm	23.5 mm	13.5 mm
3	18.3 mm	23.6 mm	28.6 mm	18.6 mm
4	23.4 mm	28.7 mm	33.7 mm	23.7 mm
5	28.5 mm	33.8 mm	38.8 mm	28.8 mm
6	33.5 mm	38.9 mm	43.9 mm	33.9 mm
7	38.6 mm	44.0 mm	49.0 mm	39.0 mm
8	43.7 mm	49.1 mm	54.1 mm	44.1 mm
9	48.8 mm	54.2 mm	59.2 mm	49.2 mm
10	53.9 mm	59.3 mm	64.3 mm	54.3 mm

Note: 1. The dimensions above include both End Caps, and will increase 5.08 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: Common terminal C is at the bottom when the Switch Unit is viewed from the front.

A7D-206(-1) PCB Terminals



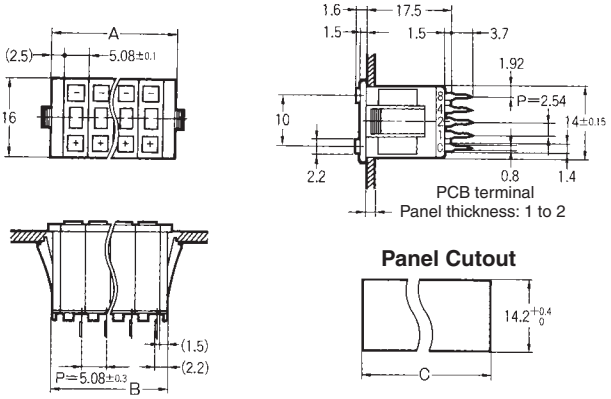


Number of Switches (n)	A (n x 5.1 + 5)	B (n x 5.1 + 3)	C (n x 5.1 + 3.9)
1	10.1 mm	8.1 mm	9 mm
2	15.2 mm	13.2 mm	14.1 mm
3	20.3 mm	18.3 mm	19.2 mm
4	25.4 mm	23.4 mm	24.3 mm
5	30.5 mm	28.5 mm	29.4 mm
6	35.5 mm	33.5 mm	34.5 mm
7	40.6 mm	38.6 mm	39.6 mm
8	45.7 mm	43.7 mm	44.7 mm
9	50.8 mm	48.8 mm	49.8 mm
10	55.9 mm	53.9 mm	54.9 mm

Note: 1. The dimensions above include both End Caps, and will increase 5.08 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: Common terminal C is at the bottom when the Switch Unit is viewed from the front.

A7DP-206(-1) PCB Terminals, Pen-push Model



Number of Switches (n)	A (n x 5.1 + 5)	B (n x 5.1 + 3)	C (n x 5.1 + 3.9)
1	10.1 mm	8.1 mm	9 mm
2	15.2 mm	13.2 mm	14.1 mm
3	20.3 mm	18.3 mm	19.2 mm
4	25.4 mm	23.4 mm	24.3 mm
5	30.5 mm	28.5 mm	29.4 mm
6	35.5 mm	33.5 mm	34.5 mm
7	40.6 mm	38.6 mm	39.6 mm
8	45.7 mm	43.7 mm	44.7 mm
9	50.8 mm	48.8 mm	49.8 mm
10	55.9 mm	53.9 mm	54.9 mm

Note: 1. The dimensions above include both End Caps, and will increase 5.08 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.

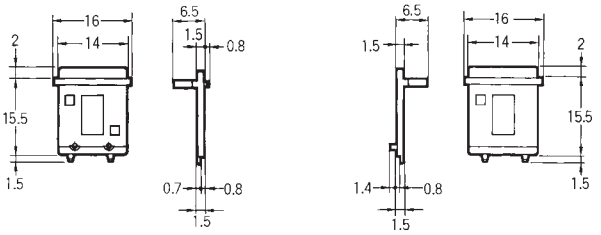
Note: Common terminal C is at the bottom when the Switch Unit is viewed from the front.

■ Accessories (Order Separately)

End Caps for Push-operated Switches

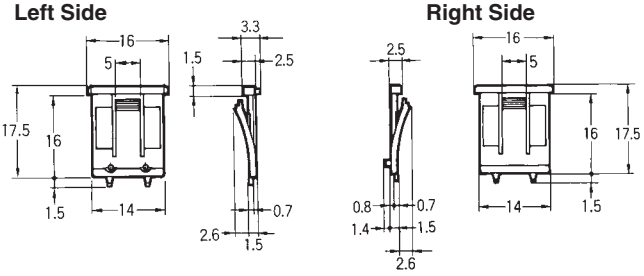
A7D-1M(-1) Screw Mounting (Back Mounting)

Left Side **Right Side**



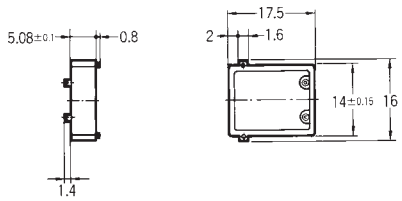
A7D-2M(-1) Snap-in Mounting (Front Mounting)

Left Side **Right Side**

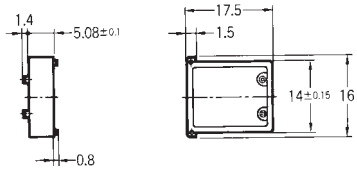


Spacers for Push-operated Switches

A7D-1P□(-1) Screw Mounting (Back Mounting)



A7D-2P□(-1) Snap-in Mounting (Front 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 20.)

Safety Precautions

■ Precautions for Correct Use

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

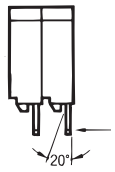
Refer to *Precautions for Correct Use* on page 4 for information common to all models.

Handling

The molded components of the Switch use polyacetal resin and PBT 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.

Terminals can withstand a force of 4.9 N for 10 seconds or more (the mating strength of the case and seal), and survive bending of 20° without breaking after returning to original position. Do not use excessive force or apply repetitive external force, however, when handling terminals. In particular, take care to avoid dropping them as the terminals might bend or break.



The setting buttons can withstand 19.6 N for 1 minute, but do not push the (+) and (–) buttons at the same time.

Models with PCB Terminals

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

Screw-mounting Models

Tighten mounting screws to a torque between 0.2 to 0.24 N·m, using M2.6 screws. Use plain washers or spring washers together with the screws.

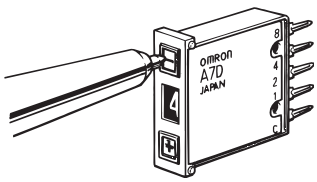
Soldering

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

Setting Numbers

Pen-push Type

Press the setting switch with the tip of a ball-point pen. Do not use pencil point or mechanical pencil point to press the setting switch, otherwise the lead of the pencil or mechanical pencil may be broken and A7DP malfunctions may result due to fragments of the broken lead.



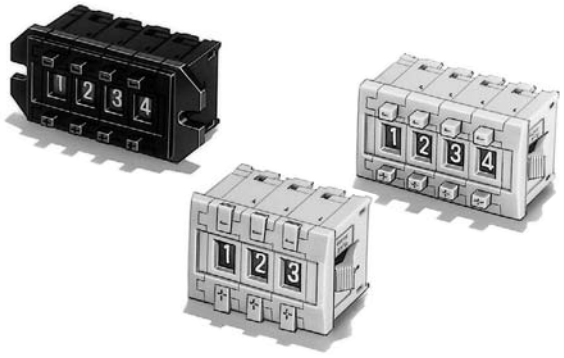
ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

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

Cat. No. A151-E1-01A In the interest of product improvement, specifications are subject to change without notice.

Thumbwheel Switch
A7CN/A7CN-L

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



A Brand New Lineup of A7C Series Compact Thumbwheel Switches

- Setting is performed with push-buttons that employ an easy-to-operate snap operation.
- The series includes a complete range of locking-type models that prevent accidental operation.

Model Number Structure

■ Model Number Legend

A7CN-□□□□-□
1 2 3 4

1. Operation Method
None: Push type
L: Set-locking type

2. Mounting Method
1: Screw mounting (back mounting)
2: Snap-in (front mounting)

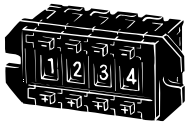
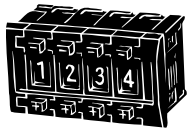
3. Output Code Number
06: Binary coded decimal output

4. Unit Color
None: Light gray
Note: Screw mounting is not available with A7CN-1 models.
1: Black

Ordering Information

■ List of Models

Push-operated Switches

Model	A7CN			
Classification (See note 1.)	Screw mounting (back mounting) 		Snap-in (front mounting) 	
Output code number / Terminals	PCB terminals			
Output code number / Color	Light gray	Black	Light gray	Black
06 (binary coded decimal)	---	A7CN-106-1	A7CN-206	A7CN-206-1

Model	A7CN-L	
Classification (See note 1.)	Snap-in (front mounting)  Locking type	
Output code number / Terminals	PCB terminals	
Color	Light gray	Black
06 (binary coded decimal)	A7CN-L206	A7CN-L206-1

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 Switch Units.
3. Models with +, – displays can also be produced. Add "-PM" after the "206" in the model number (e.g., A7CN-206-PM or A7CN-206-PM-1).

Accessories (Order Separately)

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

Classification	Screw mounting (back mounting)	Snap-in (front mounting)	
Accessory / Color	Black	Light gray	Black
End Caps (1 pair)	A7CN-1M-1	A7CN-2M	A7CN-2M-1
Spacer	A7CN-1P□-1 (See note.)	A7CN-2P□ (See note.)	A7CN-2P□-1 (See note.)

Note: 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.)

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

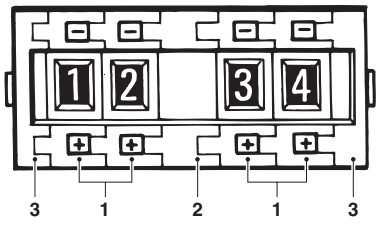
Spacers are used for creating extra space or gaps between the Switch Units and have the same dimensions as the Switch Units themselves.

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



1. Switch Unit (snap-in mounting, black)
A7CN-206-1: 4 pieces
2. Spacer (snap-in mounting, no designation, black)
A7CN-2PA-1: 1 piece
3. End Caps (snap-in mounting, black)
A7CN-2M-1: 1 pair

Specifications

■ Characteristics

Item		A7CN/A7CN-L
Switching capacity (resistive load)		5 to 28 VDC 1 mA to 0.1 A
Continuous carry current		1 A
Contact resistance		200 mΩ max.
Insulation resistance	**Between non-connected terminals**	10 MΩ min. (at 250 VDC)
	Between terminal and non-current carrying part	100 MΩ min. (at 500 VDC)
Dielectric strength	**Between non-connected terminals**	200 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
Shock resistance		490 m/s^2 min.
Durability	**Mechanical**	30,000 operations min.
	Electrical	20,000 operations min.
Ambient temperature		Operating: –10°C to 65°C (with no icing) Storage: –20°C to 80°C
Ambient humidity		Operating: 35% to 85%
Max. operating force		4.41 N max.

■ Output Codes

06 (Binary Code)

Dial	Terminals connected to common			
	1	2	3	8
0				
1	•			
2		•		
3	•	•		
4			•	
5	•		•	
6		•	•	
7	•	•	•	
8				•
9	•			•

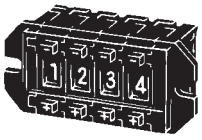
Note: The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

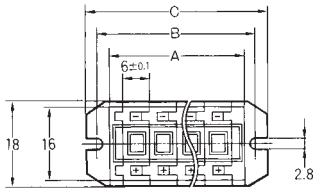
Dimensions

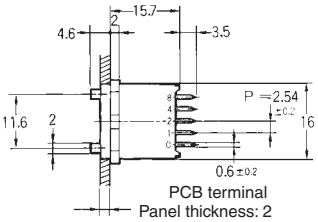
Note: All units are in millimeters unless otherwise indicated.

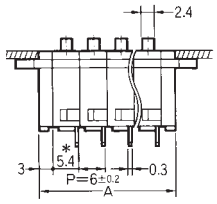
■ Push-operated Switches

A7CN-106-1
PCB Terminals



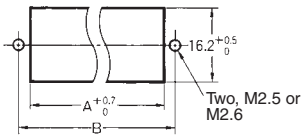






✻ : Terminal position dimensions

Panel Cutout



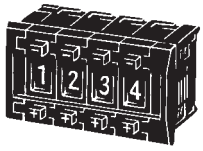
Number of Switches (n)	A (n x 6 + 6)	B (n x 6 + 11)	C (n x 6 + 16)
1	12 mm	17 mm	22 mm
2	18 mm	23 mm	28 mm
3	24 mm	29 mm	34 mm
4	30 mm	35 mm	40 mm
5	36 mm	41 mm	46 mm
6	42 mm	47 mm	52 mm
7	48 mm	53 mm	58 mm
8	54 mm	59 mm	64 mm
9	60 mm	65 mm	70 mm
10	66 mm	71 mm	76 mm

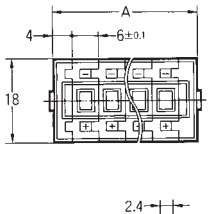
Note: 1. The dimensions above include both End Caps, and will increase 6 mm for each Spacer inserted.

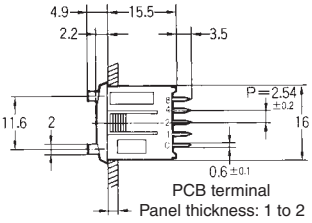
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
The tolerance for multiple connection is ±(number of units x 0.4) mm.

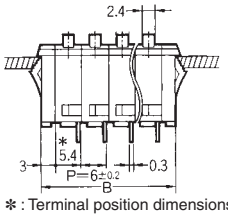
Note: Common terminal C is at the bottom when the Switch Unit is viewed from the front.

A7CN-206(-1)
PCB Terminals



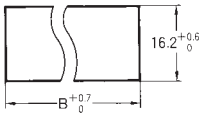






✻ : Terminal position dimensions

Panel Cutout



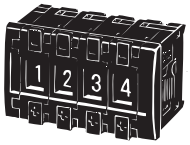
Number of Switches (n)	A (n x 6 + 8)	B (n x 6 + 6)
1	14 mm	12 mm
2	20 mm	18 mm
3	26 mm	24 mm
4	32 mm	30 mm
5	38 mm	36 mm
6	44 mm	42 mm
7	50 mm	48 mm
8	56 mm	54 mm
9	62 mm	60 mm
10	68 mm	66 mm

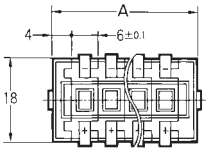
Note: 1. The dimensions above include both End Caps, and will increase 6 mm for each Spacer inserted.

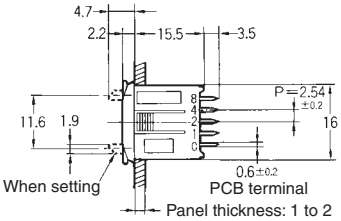
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
The tolerance for multiple connection is ±(number of units x 0.4) mm.

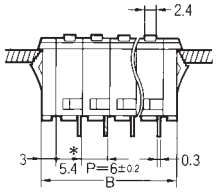
Note: Common terminal C is at the bottom when the Switch Unit is viewed from the front.

A7CN-L206(-1)
PCB Terminals
Locking Model



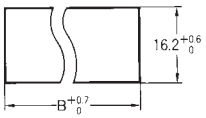






✻ : Terminal position dimensions

Panel Cutout



Note: Common terminal C is at the bottom when the Switch Unit is viewed from the front.

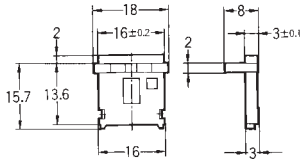
Number of Switches (n)	A (n x 6 + 8)	B (n x 6 + 6)
1	14 mm	12 mm
2	20 mm	18 mm
3	26 mm	24 mm
4	32 mm	30 mm
5	38 mm	36 mm
6	44 mm	42 mm
7	50 mm	48 mm
8	56 mm	54 mm
9	62 mm	60 mm
10	68 mm	66 mm

Note: 1. The dimensions above include both End Caps, and will increase 6 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.

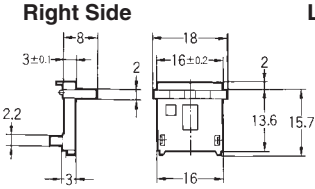
■ Accessories (Order Separately)

End Caps for Push-operated Switches

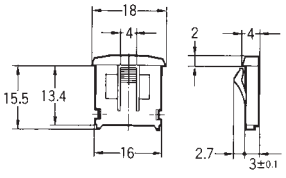
A7CN-1M-1 Screw Mounting
Left Side



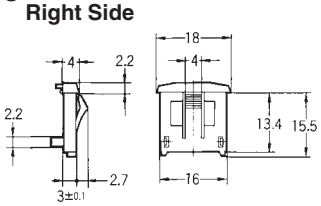
Right Side



A7CN-2M(-1) Snap-in Mounting
Left Side

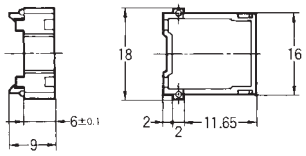


Right Side

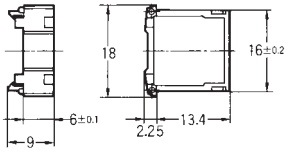


Spacers for Push-operated Switches

A7CN-1P□-1
Screw Panel Mounting Model



A7CN-2P□(-1)
Snap-in Mounting Model



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 25.)

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 A7CN cannot be connected to the A7C.

The molded components of the Switch use polyacetal resin and polycarbonate 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.

Models with PCB Terminals

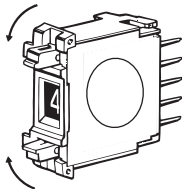
Refer to *Precautions for Correct Use* on page 4.

Screw-mounting Models

Tighten mounting screws to a torque between 0.2 to 0.24 N·m, using M2.6 screws. Use plain washers or spring washers together with the screws.

Setting Numbers

Locking Type



Set with the setting button by raising it.

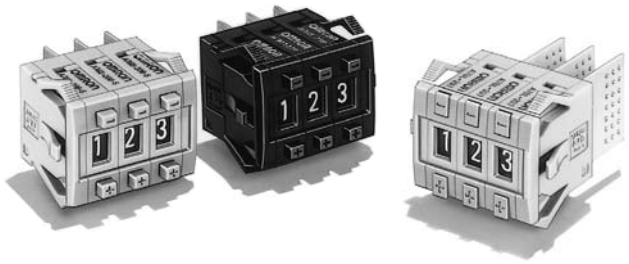
Return the button to its original position after setting. It is then locked to prevent rotation, and the set numbers will not change accidentally.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A152-E1-01A In the interest of product improvement, specifications are subject to change without notice.

Thumbwheel Switch
A7BS/A7BL

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



Wide Range of Locking-type Models Available

- Character height of 4.8 mm makes for easy-to-view display.
- Installation is easy with snap-in mounting.
- The series includes a complete range of locking-type models that prevent accidental operation.

Model Number Structure

■ Model Number Legend

A7B□-2□□-□□□-□
1 2 3 4 5

1. Operation Method
- S: Push type
- L: Set-locking type

2. Mounting Method
- 2: Front mounting

3. Output Code Number
- 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 (See note 1.)
- 55: 54 with component-adding provision (See note 1.)

4. External Stoppers
- None: Without external stoppers
- S□□: Internal stoppers (-S(1)(5) indicates the switch display limited to 1 to 5).
- S: With external stoppers (See note 2.)

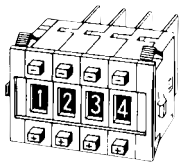
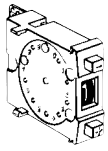
5. Unit Color
- None: Light gray
- 1: Black

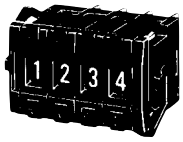
Note: 1. Output code number 54 and 55 can be used for A7BS without external stoppers only.
2. External stoppers are not available for Locking type.

Ordering Information

■ List of Models

Push-operated Switches

Model	A7BS		A7BS-20□-S	
Classification (See note 1.)	Screw mounting (front mounting) 		Snap-in (front mounting)  With external stoppers	
Terminals	Solder terminals (See note 4.)			
Color	Light gray	Black	Light gray	Black
Output code number	Model		Model	
06 (binary coded decimal)	A7BS-206 (See note 5.)	A7BS-206-1 (See note 5.)	A7BS-206-S	A7BS-206-S-1
07 (binary coded decimal, with component adding provision) (See note 6.)	A7BS-207 (See note 5.)	A7BS-207-1 (See note 5.)	A7BS-207-S	A7BS-207-S-1
19 (decimal code, with component-adding provision)	A7BS-219	A7BS-219-1	---	---
54 (binary coded hexadecimal)	A7BS-254	A7BS-254-1	---	---
55 (binary coded hexadecimal, with component-adding provision) (See note 6.)	A7BS-255	A7BS-255-1	---	---

Model	A7BL	
Classification (See note 1.)	Snap-in (front mounting)  Locking type	
Terminals	Solder terminals (See note 4.)	
Color	Light gray	Black
Output code number	Model	
06 (binary coded decimal)	A7BL-206 (See note 5.)	A7BL-206-1 (See note 5.)
07 (binary coded decimal, with component-adding provision) (See note 6.)	A7BL-207 (See note 5.)	A7BL-207-1 (See note 5.)

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 Switch Units.

3. Models with +, – displays can also be produced. Add "-PM" (+/– alternating display) or "-MP" (–/+ alternating display) after the "206" or "207" in the model number (e.g., A7BS-206-PM, A7BS-207-PM-1, or A7BS-206-MP). There is no "-MP" type available, however, for A7BS-20□-S models.

4. For models with PCB terminals, add "-P2" to the model number (e.g., A7BS-207-P2-1).

5. Models with internal stoppers are also available. Add "-S□□" after the "206" or "207" 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., A7BS-206-S06-1).

6. Models with diodes are available. Add "-D" to the model number (e.g., A7BS-207-D or A7BS-207-D-1).

Accessories (Order Separately)

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

Accessory / Color		Light gray	Black
End Caps (1 pair)		A7B-M (See note 2.)	A7B-M-1 (See note 2.)
Spacer		A7B-P□ (See note 1.)	A7B-P□-1 (See note 1.)
Connectors	**Solder terminals**	A7B-C	
	PCB terminals	A7B-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

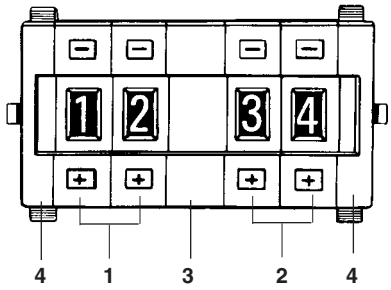
Spacers are used for creating extra space or gaps between the Switch Units and have the same dimensions as the Switch Units themselves.

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



1. A7BS-206 (Switch Unit): 2 pieces
2. A7BS-207 (Switch Unit): 2 pieces
3. A7B-PA (Spacer): 1 piece
4. A7B-M (End Caps): 1 pair

Specifications

■ Characteristics

Item		A7BS/A7BL
Switching capacity (resistive load)		5 to 28 VDC or 50 VAC 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	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
Shock resistance		490 m/s^2 min.
Durability	**Mechanical**	100,000 operations min.
	Electrical	50,000 operations min.
Ambient temperature		Operating: –10°C to 65°C (with no icing) Storage: –20°C to 80°C
Ambient humidity		Operating: 45% to 85%
Max. operating force		5.39 N max.

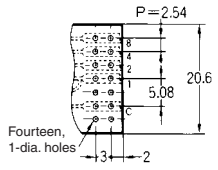
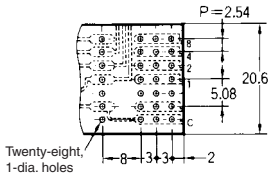
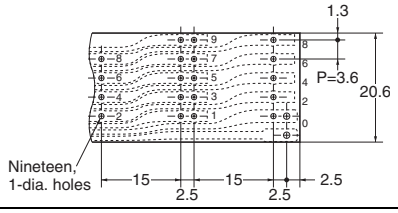
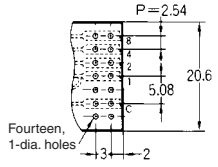
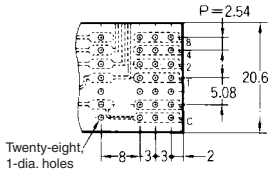
■ Output Codes/Terminals

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 2, and terminals 1 and 2 become connector terminals 4 and 5 respectively.

Output code number	Terminals
06	
07	 Component-adding provision
19	
54	
55	 Component-adding provision

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	2	4	5	6	7
07	Connector	1	4	5	6	7
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 Code 19

Dial	Terminal connected to common									
	0	1	2	3	4	5	6	7	8	9
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 54 and 55

Model	Switch Unit or Connector	Common terminal number	Terminals connected to common			
	Switch Unit	C	1	2	4	8
54	Connector	2	4	5	6	7
55	Connector	1, 2 (See note 2.)	4	5	6	7
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).

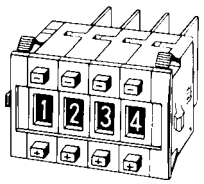
2. Terminal 2 is the common terminal for the component-adding provision.

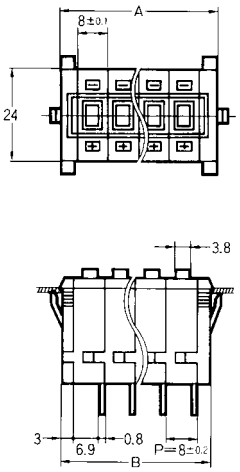
Dimensions

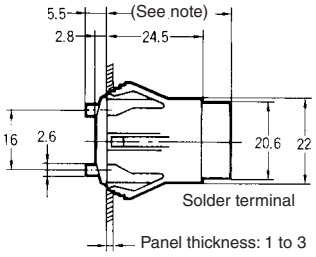
Note: All units are in millimeters unless otherwise indicated.

■ Push-operated Switches

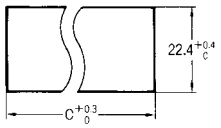
A7BS-2□□(-1)
Solder Terminals







Panel Cutout



Number of Switches (n)	A (n x 8 + 8)	B (n x 8 + 6)	C
1	16 mm	14 mm	14.4 mm
2	24 mm	22 mm	22.4 mm
3	32 mm	30 mm	30.4 mm
4	40 mm	38 mm	38.4 mm
5	48 mm	46 mm	46.8 mm
6	56 mm	54 mm	54.8 mm
7	64 mm	62 mm	62.8 mm
8	72 mm	70 mm	70.8 mm
9	80 mm	78 mm	78.8 mm
10	88 mm	86 mm	86.8 mm

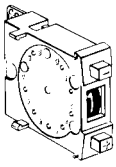
Note: **1.** The dimensions above include both End Caps, and will increase 8 mm for each Spacer inserted.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions. The tolerance for multiple connection is ±(number of units x 0.4) mm.

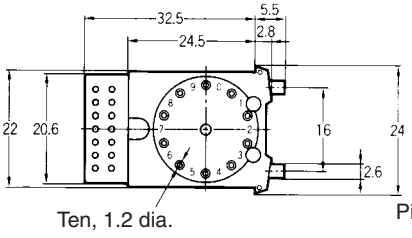
Note: If the output code is 06 or 54, the dimension is 32.5; if the output code is 07 or 55, the dimension is 43.5.

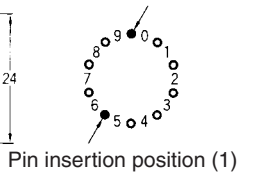
Thumbwheel Switches with External Stoppers: A7BS-20□-S(-1)

- Use A7BS-S Stopper Pins to make dial display restrictions for these Switches.
- Insert the Stopper Pins in the positions required to give the desired display range. For example, for a display range of 0 to 5, insert a Stopper Pin at position 1 (see following diagram) to stop the display from going above 5 when the (+) button is pressed, and insert a Stopper Pin at position 2 to stop the display from going below 0 when the (–) button is pressed.

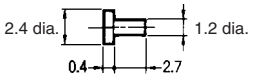
Refer to page 37 for details.





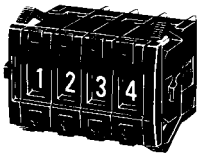


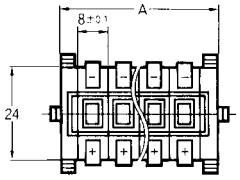
Stopper Pins

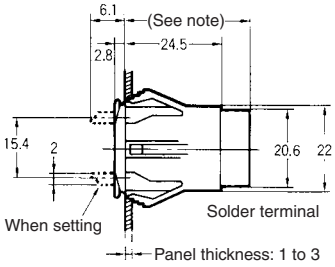


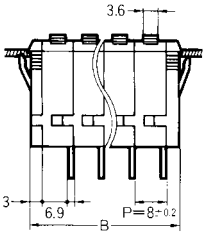
Note: 1. Two pins constitute one set.
2. The first shipment is free and is attached to the Switch.

A7BL-206(-1)
A7BL-207(-1)
Solder Terminals, Locking Models

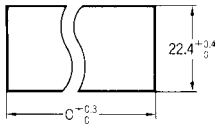








Panel Cutout



Number of Switches (n)	A (n x 8 + 8)	B (n x 8 + 6)	C
1	16 mm	14 mm	14.4 mm
2	24 mm	22 mm	22.4 mm
3	32 mm	30 mm	30.4 mm
4	40 mm	38 mm	38.4 mm
5	48 mm	46 mm	46.8 mm
6	56 mm	54 mm	54.8 mm
7	64 mm	62 mm	62.8 mm
8	72 mm	70 mm	70.8 mm
9	80 mm	78 mm	78.8 mm
10	88 mm	86 mm	86.8 mm

Note: 1. The dimensions above include both End Caps, and will increase 8 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.

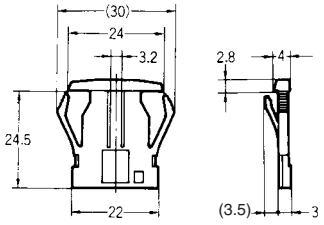
Note: If the output code is 06, the dimension is 32.5; if the output code is 07, the dimension is 43.5.

■ Accessories (Order Separately)

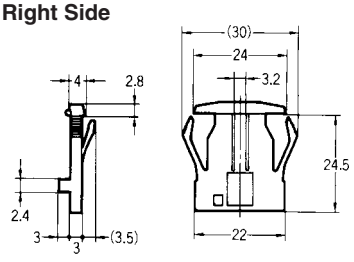
End Caps for Push-operated Switches

A7B-M(-1) Snap-in Panel Mounting

Left Side

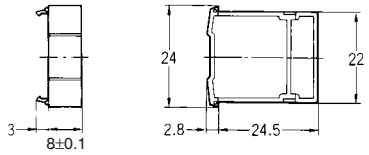


Right Side



Spacers for Push-operated Switches

A7B-P□(-1) Snap-in Panel Mounting

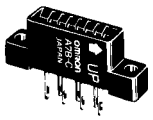


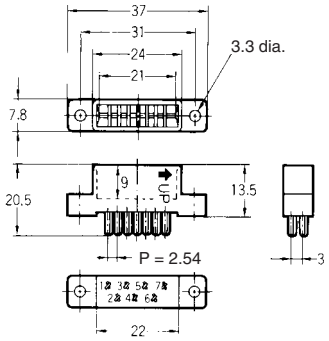
Note: The □ in the Spacer model number stands for a letter in the range A to U. (Refer to the table under the explanation about Spacers on page 32.)

Connectors

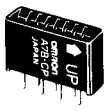
These devices allow Switches to be quickly removed for maintenance and inspection of connectivity, and quickly re-installed.

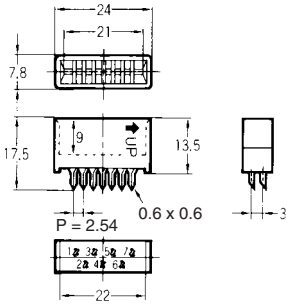
A7B-C
Solder Terminals



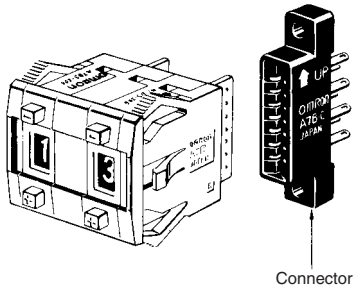


A7B-CP
PCB Terminals





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



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.

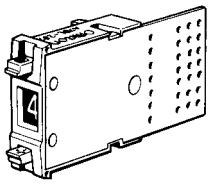
Do not push the (+) and (–) operating push-buttons at the same time.

Soldering

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

Setting Numbers

Locking Type

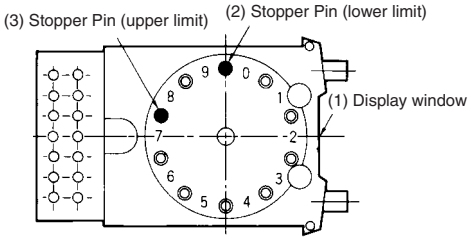


Set with the setting button by raising it.

Return the button to its original position after setting. It is then locked to prevent rotation, and the set numbers will not change accidentally.

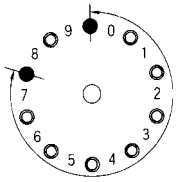
Models with External Stoppers (A7BS-20□-S)

With the A7BS-20□-S, any range can be set externally using the Stopper Pin. Insert the Stopper Pin using the following procedure:



Example: To Display the Range 0 to 7

1. Any number within the range of (0 to 7) can be chosen to limit the numbers displayed in the display window. (In this example, 8 and 9 are outside of this range.)
2. First, insert the Stopper Pin in the hole in front of the lower limit (“0”) for the number to be defined.
3. Next, inset the Stopper Pin in the hole past the upper limit (“7”) for the number to be defined. (The Stopper Pins then surround the exact range to be defined.)



4. Confirm that the (+) push-button can no longer be pushed after reaching the upper limit of (“7”).
5. Confirm that the (–) push-button can no longer be pushed after reaching the lower limit of (“0”). This completes the setting.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

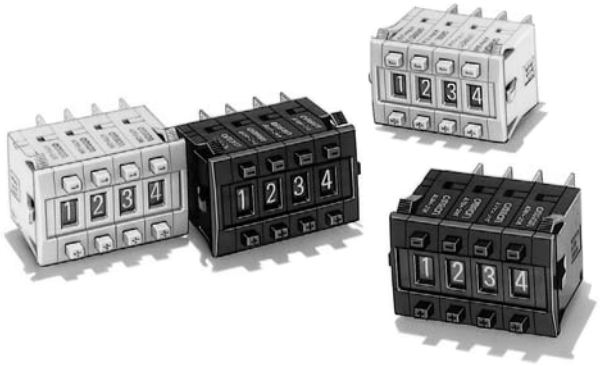
Cat. No. A153-E1-01A In the interest of product improvement, specifications are subject to change without notice.

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.)

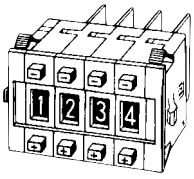
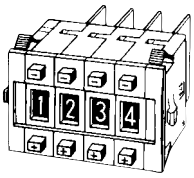
3. Unit Color
- None: Light gray
- 1: Black

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

Ordering Information

■ List of Models

Push-Operated Switches

Model	A7PS		A7PH	
Classification (See note 1.)	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

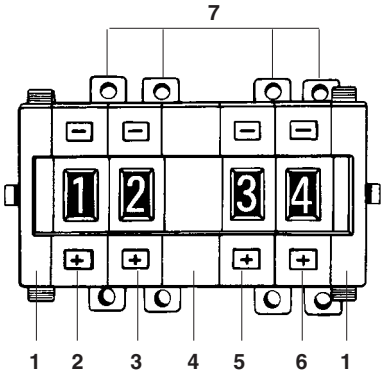
Spacers are used for creating extra space or gaps between the Switch Units and have the same dimensions as the Switch Units themselves.

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 1 mA to 0.1 A	125 VAC or 5 to 28 VDC 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.	

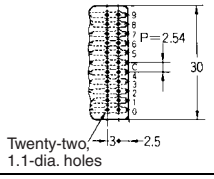
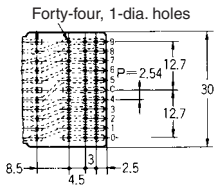
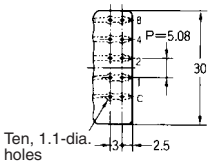
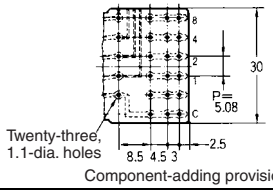
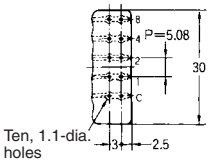
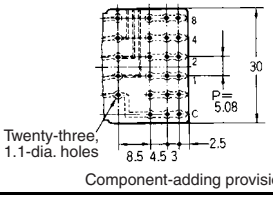
■ Output Codes/Terminals

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	
19	
06	
07	
54	
55	

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		•	•	•	•

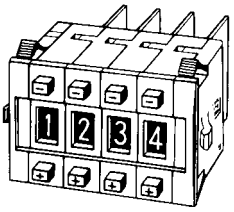
Note: 1. The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).
2. Terminal 3 is the common terminal for the component-adding provision.

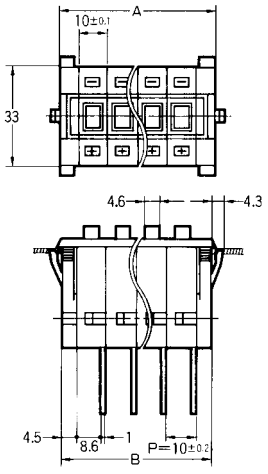
Dimensions

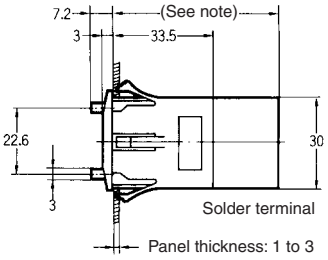
Note: All units are in millimeters unless otherwise indicated.

■ Push-operated Switches

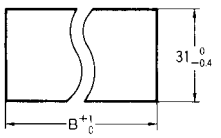
A7PS-2□□(-1)
A7PH-2□□(-1)
Solder Terminals







Panel Cutout



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.

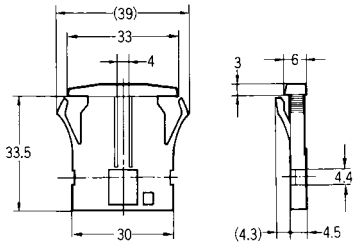
Note: If the output code is 03, 06 or 54, the dimension is 43; if the output code is 07, 19 or 55, the dimension is 55.

■ Accessories (Order Separately)

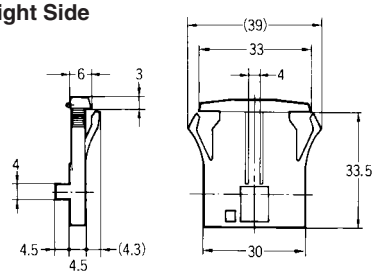
End Caps for Push-operated Switches

A7P-M(-1) Snap-in Panel Mounting

Left Side

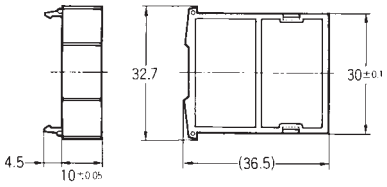


Right Side



Spacers for Push-operated Switches

A7P-P□(-1) Snap-in Panel Mounting

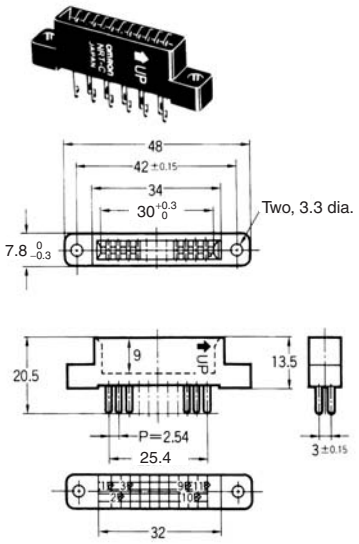


Note: The □ in the Spacer model number stands for a letter in the range A to U. (Refer to the table under the explanation about Spacers on page 39.)

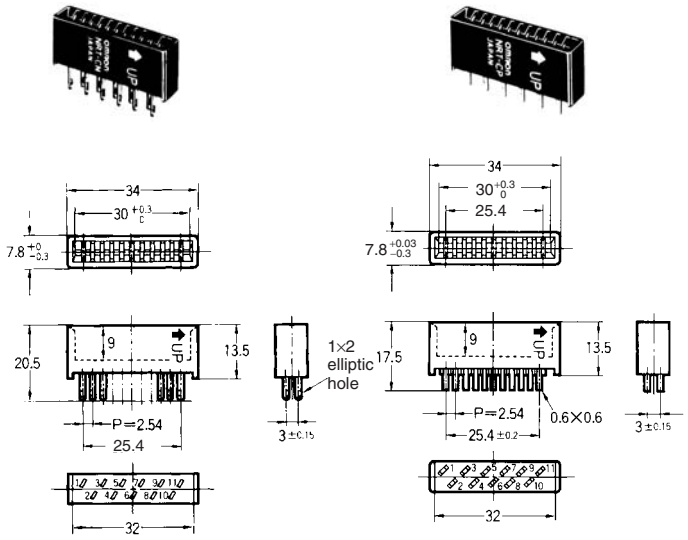
Connectors

These devices allow Switches to be quickly removed for maintenance and inspection of connectivity, and quickly re-installed.

NRT-C
Solder Terminals

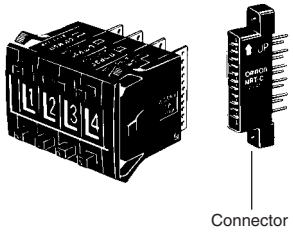


NRT-CN
Solder Terminals



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.

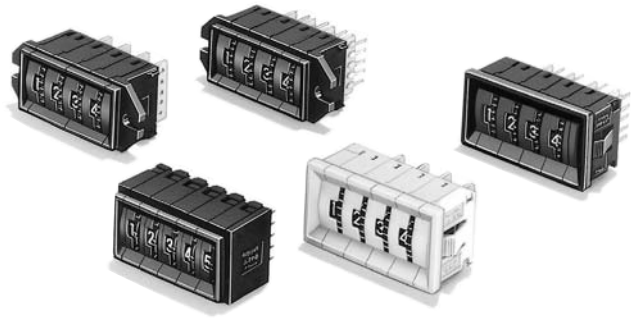
Cat. No. A154-E1-01A In the interest of product improvement, specifications are subject to change without notice.

Thumbwheel Switch
A7MD/A7MA

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

Ultra-small Thumbwheel-operated Switches

- High reliability achieved with gold contacts.
- Select from screw mounting or snap-in mounting as the mounting method and models with solder terminals or PCB terminals are available.



Model Number Structure

■ Model Number Legend

A7M□-□□□-□-□
1 2 3 4 5

1. Basic Model
- D: Mounts via printed circuit board
- A: Screw mounting (back mounting) or snap-in (front mounting)

2. Mounting Method
- 1: Screw mounting (back mounting)
- 2: Snap-in (front mounting)

3. Output Code Number
- 06: Binary coded decimal output
- 07: 06 with component-adding provision

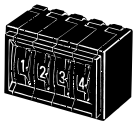
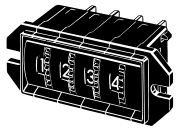
4. Terminal Specifications
- None: Solder terminals
- P2: PCB terminals

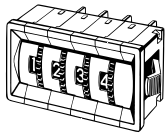
5. Unit Color
- None: Light gray
- 1: Black

Ordering Information

■ List of Models

Push-operated Switches

Model	A7MD/A7MD-□-D	A7MA–1	
Classification (See note 1.)	Mounts via printed circuit board 	Screw mounting (back mounting) 	
Output code number / Terminals	PCB terminals	Solder terminals	PCB terminals
Color	Black	Black	Black
06 (binary coded decimal)	A7MD-106-P-09	A7MA-106	A7MA-106-P2
	A7MD-106-P-09-D (See note 4.)		
07 (binary coded decimal, with component-adding provision) (See note 5.)	---	A7MA-107	A7MA-107-P2

Model	A7MA–2			
Classification (See note 1.)	Snap-in (front mounting) 			
Output code number / Terminals	Solder terminals		PCB terminals	
Color	Light gray	Black	Light gray	Black
06 (binary coded decimal)	A7MA-206	A7MA-206-1	A7MA-206-P2	A7MA-206-P2-1
07 (binary coded decimal, with component-adding provision) (See note 5.)	A7MA-207	A7MA-207-1	A7MA-207-P2	A7MA-207-P2-1

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 +, – displays can also be produced. Add "-PM" after the "106" or "206" in the model number (e.g., A7MA-106-PM or A7MA-106-PM-1).
4. Equipped with built-in diode.
5. Models with diodes are available. Add "-D" to the model number (e.g., A7MA-207-D or A7MA-207-D-1).

Accessories (Order Separately)

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

Classification	A7MD/A7MD-□-D	A7MA-1	A7MA-2	
Accessory / Color	Black	Black	Light gray	Black
End Caps	A7MD-1M	A7M-1M	A7M-2M	A7M-2M-1
Spacer	A7MD-P□	A7M-1P□	A7M-2P□	A7M-2P□-1

Note: 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.)

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

When ordering, be sure to specify the End Space model number (A7M-1M, -2M).

Standard products, such as the Switch Units and End Caps, are not factory-assembled for shipment.

Specifications

■ Characteristics

Item		A7MD/A7MD-□-D (See note 1.)	A7MA-1/A7MA-2
Switching capacity (resistive load)		5 to 28 VDC 1 mA to 0.1 A	
Continuous carry current		1 A max.	
Contact resistance		200 mΩ max., 10 Ω max. (See note 2.)	200 mΩ max.
Insulation resistance (See note 1.)	Between non-connected terminals	10 MΩ min. (at 500 VDC)	
	Between terminal and non-current carrying part	1,000 MΩ min. (at 500 VDC)	
Dielectric strength (See note 2.)	Between non-connected terminals	200 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 for 2 hours min.	
Shock resistance	Malfunction	490 m/s² min.	196 m/s² min.
Durability	Mechanical	30,000 operations min.	
	Electrical	20,000 operations min.	
Ambient temperature (with no icing)		Operating: –10°C to 65°C Storage: –20°C to 80°C	
Ambient humidity		Operating: 45% to 85%	
Max. operating force		2.94 N max.	

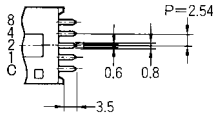
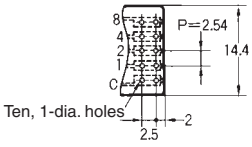
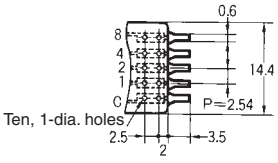
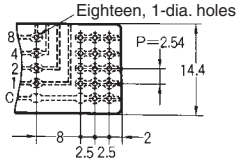
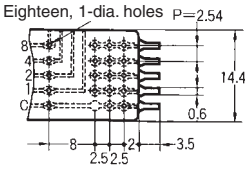
Note: 1. For A7MD(-D) with diode, the dielectric strength was measured at display of "0."

2. Contact resistance for A7MD-□-D with diode was evaluated at 6 to 8 VDC, 0.1 A. Reverse-direction voltage was 35 V (min.).

■ 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.

Terminals

Output code number	A7MD (PCB terminals)	A7MA-□ (solder terminals)	A7MA-□-P2 (PCB terminals)
06			
07	---	 Component-adding provision	 Component-adding provision

Output Codes 06 and 07

Dial	Terminal connected to common C			
	1	2	4	8
0				
1	•			
2		•		
3	•	•		
4			•	
5	•		•	
6		•	•	
7	•	•	•	
8				•
9	•			•

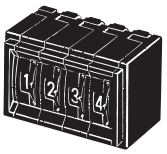
Note: The solid dot • indicates that the internal switch is ON.

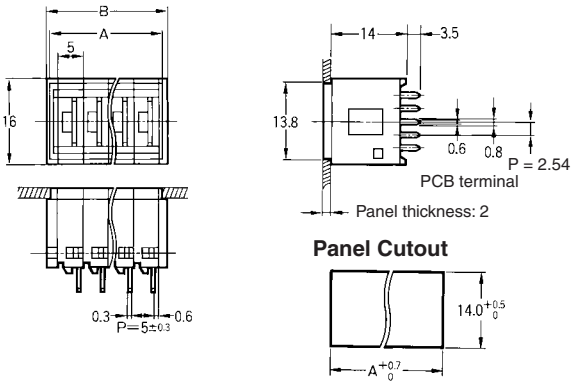
Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Push-operated Switches

A7MD-106-P-09
A7MD-106-P-09-D
PCB Terminals

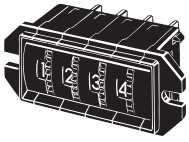


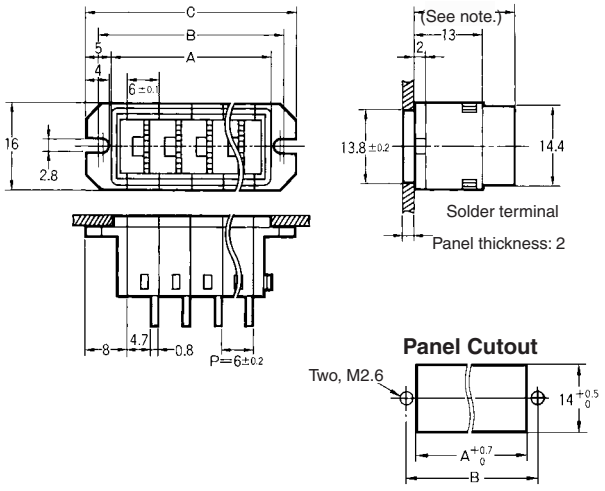


Number of Switches (n)	A (5n + 3)	B (5n + 5)
1	8 mm	10 mm
2	13 mm	15 mm
3	18 mm	20 mm
4	23 mm	25 mm
5	28 mm	30 mm
6	33 mm	35 mm
7	38 mm	40 mm
8	43 mm	45 mm
9	48 mm	50 mm
10	53 mm	55 mm

Note: 1. The dimensions above include both End Caps, and will increase 6 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.

A7MA-1□□
Solder Terminals



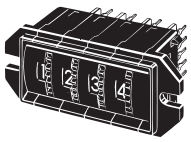


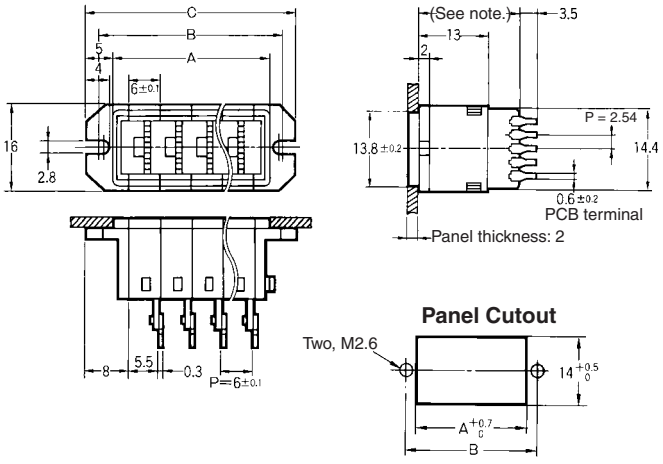
Number of Switches (n)	A (6n + 6)	B (6n + 11)	C (6n + 16)
1	12 mm	17 mm	22 mm
2	18 mm	23 mm	28 mm
3	24 mm	29 mm	34 mm
4	30 mm	35 mm	40 mm
5	36 mm	41 mm	46 mm
6	42 mm	47 mm	52 mm
7	48 mm	53 mm	58 mm
8	54 mm	59 mm	64 mm
9	60 mm	65 mm	70 mm
10	66 mm	71 mm	76 mm

Note: 1. The dimensions above include both End Caps, and will increase 6 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 06, the dimension is 19; if the output code is 07, the dimension is 31.

A7MA-1□□-P2
PCB Terminals



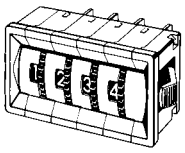


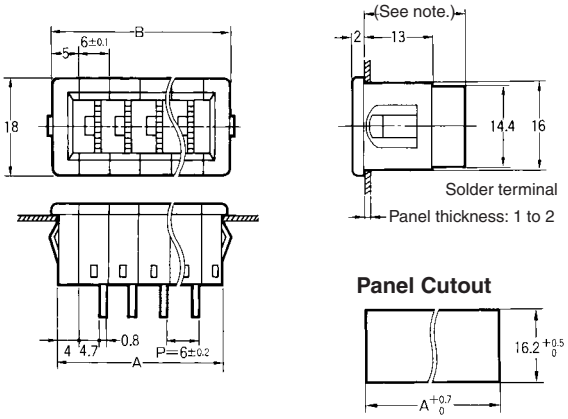
Number of Switches (n)	A (6n + 6)	B (6n + 11)	C (6n + 16)
1	12 mm	17 mm	22 mm
2	18 mm	23 mm	28 mm
3	24 mm	29 mm	34 mm
4	30 mm	35 mm	40 mm
5	36 mm	41 mm	46 mm
6	42 mm	47 mm	52 mm
7	48 mm	53 mm	58 mm
8	54 mm	59 mm	64 mm
9	60 mm	65 mm	70 mm
10	66 mm	71 mm	76 mm

Note: 1. The dimensions above include both End Caps, and will increase 6 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 06, the dimension is 19; if the output code is 07, the dimension is 31.

A7MA-2□□(-1)
Solder Terminals



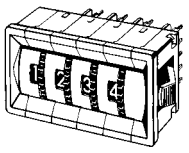


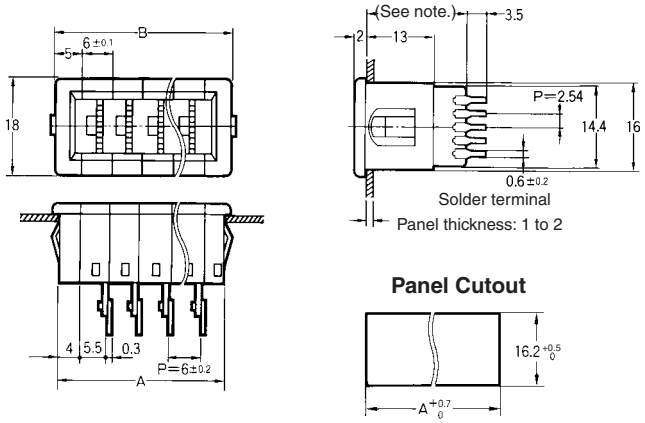
Note: If the output code is 06, the dimension is 19; if the output code is 07, the dimension is 31.

Number of Switches (n)	A (6n + 8)	B (6n + 10)
1	14 mm	16 mm
2	20 mm	22 mm
3	26 mm	28 mm
4	32 mm	34 mm
5	38 mm	40 mm
6	44 mm	46 mm
7	50 mm	52 mm
8	56 mm	58 mm
9	62 mm	64 mm
10	68 mm	70 mm

Note: **1.** The dimensions above include both End Caps, and will increase 6 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.

A7MA-2□□-P2(-1)
PCB Terminals





Note: If the output code is 06, the dimension is 19; if the output code is 07, the dimension is 31.

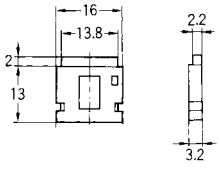
Number of Switches (n)	A (6n + 8)	B (6n + 10)
1	14 mm	16 mm
2	20 mm	22 mm
3	26 mm	28 mm
4	32 mm	34 mm
5	38 mm	40 mm
6	44 mm	46 mm
7	50 mm	52 mm
8	56 mm	58 mm
9	62 mm	64 mm
10	68 mm	70 mm

Note: **1.** The dimensions above include both End Caps, and will increase 6 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.

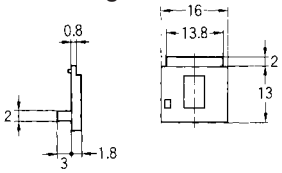
■ Accessories (Order Separately)

End Caps for Push-operated Switches

A7MD-1M PCB Mounting (Side Plate)
Left Side

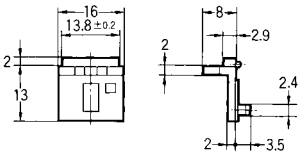


Right Side

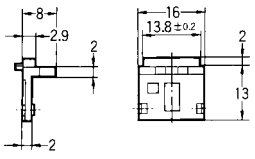


Note: The A7MD cannot be mounted by a screw panel or snap-in panel. Fasten the PC board after mounting the A7MD to the PC board.

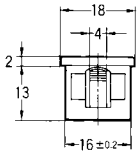
A7M-1M Screw Panel Mounting
Left Side

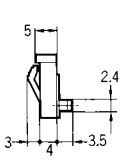


Right Side

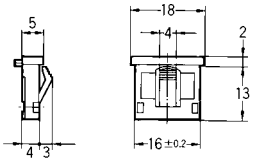


A7M-2M(-1) Snap-in Panel Mounting
Left Side



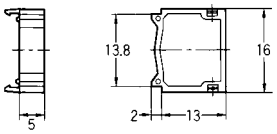


Right Side

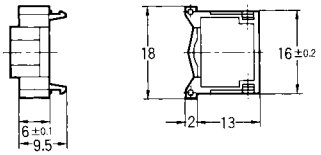


Spacers for Thumbwheel Switches

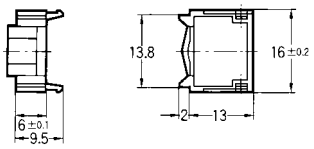
A7MD-P□
PCB Mounting



A7M-2P□(-1)
Snap-in Panel Mounting



A7M-1P□
Screw 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 46.)

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 A7MD Switches are mounted on PCBs. When projecting the operating face from the back of a panel, refer to the recommended panel cutout dimensions. The A7MD Switches, however, cannot be mounted to panels individually.

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.

Models with PCB Terminals

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

Screw-mounting Models

Tighten mounting screws to a torque between 0.2 to 0.24 N·m, using M2.6 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.

Cat. No. A155-E1-01A
In the interest of product improvement, specifications are subject to change without notice.

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)

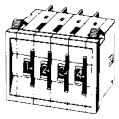
2. Output Code Number
03: Decimal code output
06: Binary coded decimal output
07: 06 with component-adding provision
19: 03 with component-adding provision

3. Unit Color
None: Light gray
1: Black (See note 2.)

Ordering Information

■ List of Models

Push-operated Switches

Model	A7AS	
Classification (See note 1.)	Snap-in 	
Terminals	Solder terminals	
Output code number / Color	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: 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 "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).

4. Models with +, – displays can also be produced. Add "-PM" after the "106" or "206" in the model number.

5. 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

Classification	A7AS	
Accessory / Color	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

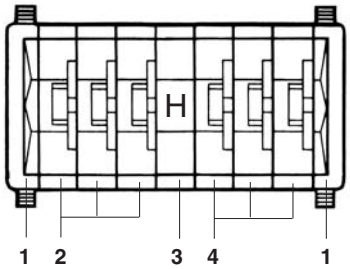
Model / Type	A7AS
Solder terminals	NRT-C
PCB terminals	NRT-CP

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.



1. A7AS-M (End Caps): 1 pair

2. A7AS-203 (Switch Unit): 3

3. NRT-PD (Spacer): 1

4. A7AS-206 (Switch Unit): 3

Specifications

■ Characteristics

Item		A7AS
Switching capacity (resistive load)		50 VAC or 28 VDC 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^2 min.
Durability	**Mechanical**	1,000,000 operations min.
	Electrical	50,000 operations min.
Ambient temperature (with no icing)		Operating: –40°C to 85°C 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									
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			
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			
A7AS	Switch Unit	C	1	2	4	8
	Connector	1, 3 (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.

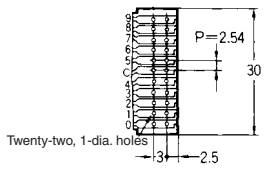
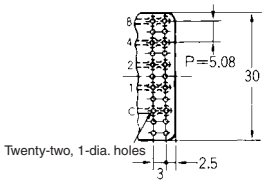
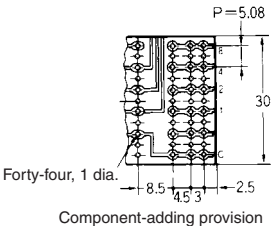
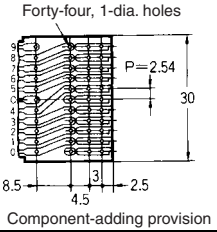
3. The solid dot • indicates that the internal switch is ON (i.e., connected to the common terminal).

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

Model	Switch Unit or Connector	Common terminal number	Terminals connected to common									
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
A7AS (solder terminals)				

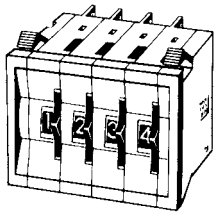
Note: 1. Switches with output code 13 are double-sided PCB models equivalent to models with output code 06.
2. Switches with output code 36 are double-sided PCB models equivalent to models with output code 07.

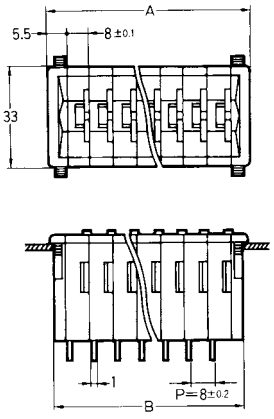
Dimensions

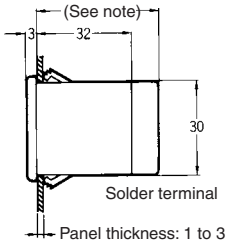
Note: All units are in millimeters unless otherwise indicated.

■ Push-operated Switches

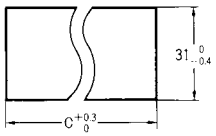
A7AS-2□□(-1)
Solder terminals







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.

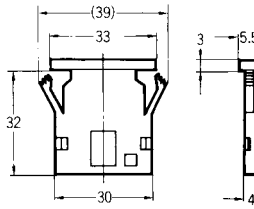
Number of Switches (n)	A (8n + 11)	B (8n + 8)	C (B + 1)
1	19 mm	16 mm	17 mm
2	27 mm	24 mm	25 mm
3	35 mm	32 mm	33 mm
4	43 mm	40 mm	41 mm
5	51 mm	48 mm	49 mm
6	59 mm	56 mm	57 mm
7	67 mm	64 mm	65 mm
8	75 mm	72 mm	73 mm
9	83 mm	80 mm	81 mm
10	91 mm	88 mm	89 mm

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 ±0.4 mm applies to all dimensions. The tolerance for multiple connection is ±(number of units x 0.4) mm.

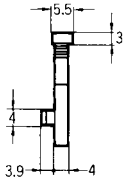
End Caps for Push-operated Switches

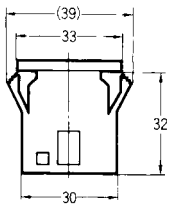
A7AS-M(-1) Snap-in Panel Mounting

Left Side



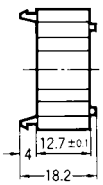
Right Side

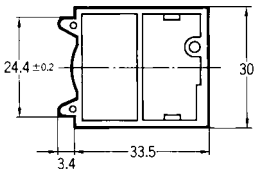




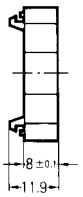
Spacers for Thumbwheel Switches

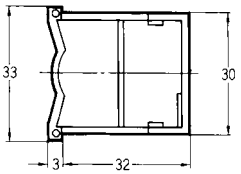
SRT-P□ Screw Panel Mounting





NRT-P□ Snap-in Panel Mounting



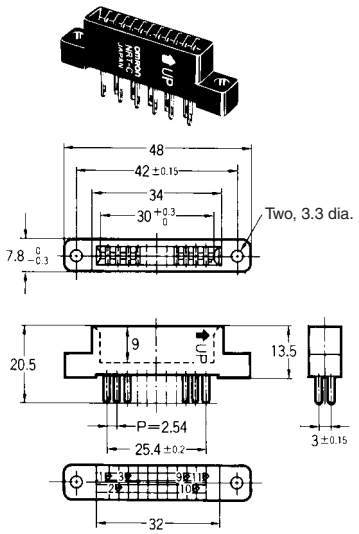
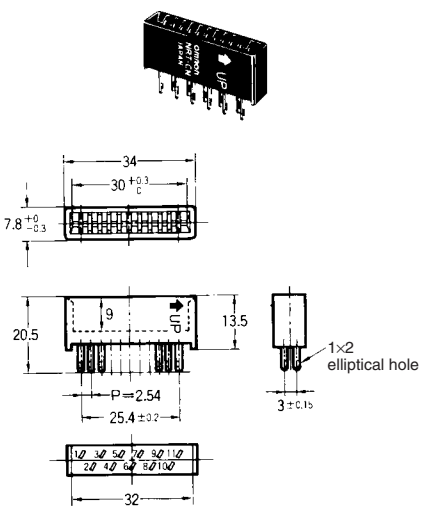
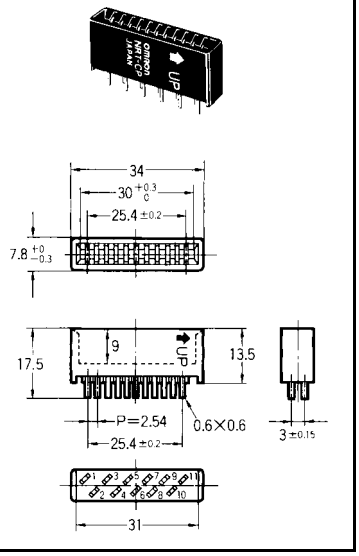


Note: The □ in the Spacer model number stands for a letter in the range A to U. (Refer to the table under the explanation about Spacers on page 52.)

■ Accessories (Order Separately)

Connectors

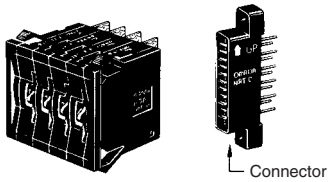
The Switch Units can be installed using snap-in mounting, allowing easy maintenance and inspections after wiring is completed.

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 ±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.

Cat. No. A156-E1-01A In the interest of product improvement, specifications are subject to change without notice.