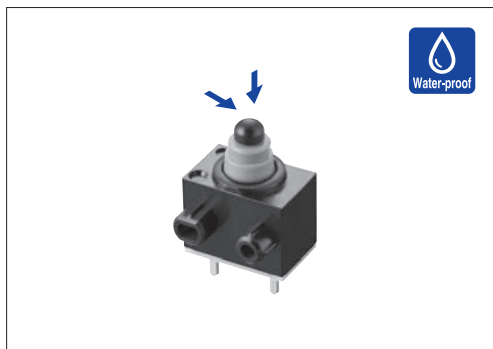


# SPVQ8 Water-proof Type

Industry's smallest size, with main unit dimensions of 8.3×5.3×7mm



## Typical Specifications



| Items                                               |              | Specifications                                                                |
|-----------------------------------------------------|--------------|-------------------------------------------------------------------------------|
| Rating (max.)/(min.) (Resistive load)               |              | 0.1A 12V DC / 50μA 5V DC                                                      |
| Contact resistance (Initial / After operating life) |              | 500mΩ max. / 1Ω max. (Standard type)<br>500mΩ max. / 3Ω max. (Long-life type) |
| Operating force                                     |              | 1±0.5N                                                                        |
| Operating life                                      | Without load | 300,000cycles (Standard type)<br>1,000,000cycles (Long-life type)             |
|                                                     | With load    | 300,000cycles (Standard type)<br>1,000,000cycles (Long-life type)             |

## Product Line

| Poles | Positions | Circuit   | Terminal type         | Main body form    | Minimum order unit (pcs) |        | Packing specifications type | Product No.       |                   | Drawing No. |   |
|-------|-----------|-----------|-----------------------|-------------------|--------------------------|--------|-----------------------------|-------------------|-------------------|-------------|---|
|       |           |           |                       |                   | Japan                    | Export |                             | Standard type     | Long-life type    |             |   |
| 1     | 1         | N.O.      | For PC board          | Boss-both sides   | 1,755                    | 7,020  | A                           | <b>SPVQ810101</b> | <b>SPVQ830101</b> | 1           |   |
|       |           |           | Angle                 | Boss-single side  |                          |        |                             | <b>SPVQ810301</b> | <b>SPVQ830301</b> | 2           |   |
|       |           |           |                       | Without boss      |                          |        |                             | <b>SPVQ810401</b> | <b>SPVQ830401</b> | 3           |   |
|       |           |           | For PC board          | Boss-single side  |                          |        |                             | <b>SPVQ810501</b> | <b>SPVQ830501</b> | 4           |   |
|       |           |           | For Lead              | Boss-both sides   |                          |        |                             | <b>SPVQ810601</b> | <b>SPVQ830601</b> | 5           |   |
|       |           |           |                       | Boss-single side  |                          |        |                             | <b>SPVQ810703</b> | <b>SPVQ830701</b> | 6           |   |
|       |           |           | Press fit             | Boss-both sides   |                          |        |                             | <b>SPVQ810801</b> | <b>SPVQ830801</b> | 7           |   |
|       |           |           | Press fit             | Boss-single side  |                          |        |                             | <b>SPVQ811004</b> | <b>SPVQ831001</b> | 8           |   |
|       |           |           | N.C.                  | For PC board      |                          |        |                             | Boss-both sides   | <b>SPVQ820101</b> | —           | 1 |
|       |           |           |                       | Angle             |                          |        |                             | Boss-single side  | <b>SPVQ820301</b> | —           | 9 |
|       |           |           |                       |                   |                          |        |                             | Without boss      | <b>SPVQ820401</b> | —           | 3 |
|       |           |           |                       | For PC board      |                          |        |                             | Boss-single side  | <b>SPVQ820501</b> | —           | 4 |
|       |           | For Lead  |                       | Boss-both sides   | <b>SPVQ820601</b>        | —      | 10                          |                   |                   |             |   |
|       |           |           |                       | Boss-single side  | <b>SPVQ820704</b>        | —      | 11                          |                   |                   |             |   |
|       |           | Press fit | Boss-both sides       | <b>SPVQ820801</b> | —                        | 7      |                             |                   |                   |             |   |
|       |           | Press fit | Boss-single side      | <b>SPVQ821004</b> | —                        | 12     |                             |                   |                   |             |   |
|       |           | N.O.      | With wire (Downwards) | Boss-single side  | <b>SPVQ850100*</b>       | —      | 13                          |                   |                   |             |   |
|       |           |           | With wire (Downwards) | Boss-both sides   | <b>SPVQ850200*</b>       | —      | 14                          |                   |                   |             |   |
|       |           |           | With wire (Left side) | Boss-single side  | <b>SPVQ850300*</b>       | —      | 15                          |                   |                   |             |   |
|       |           |           | With wire (from side) | Boss-both sides   | <b>SPVQ850500*</b>       | —      | 16                          |                   |                   |             |   |
|       |           | N.C.      | With wire (Downwards) | Boss-single side  | <b>SPVQ860100*</b>       | —      | 17                          |                   |                   |             |   |
|       |           |           | With wire (Downwards) | Boss-both sides   | <b>SPVQ860200*</b>       | —      | 14                          |                   |                   |             |   |
|       |           |           | With wire (Left side) | Boss-single side  | <b>SPVQ860300*</b>       | —      | 18                          |                   |                   |             |   |
|       |           |           | With wire (from side) | Boss-both sides   | <b>SPVQ860500*</b>       | —      | 16                          |                   |                   |             |   |

## Notes

- ※ Products with a wire will be supplied as follows.
  - Unless specified, the length of the lead wire is 250mm. Color is either red or black. Please consult us for length modification.
  - Please specify circuits (N.O. or N.C.) for wired (side) types. Unless specified, the circuit will apply N.O.
  - Product with wire will be build-to-order.
- This unit cannot be used in water (IP67 rating, except for terminal).

## Packing Specifications

### Tray

| Packing specifications type | Number of packages (pcs.) |                        | Export package measurements (mm) |
|-----------------------------|---------------------------|------------------------|----------------------------------|
|                             | 1 case /Japan             | 1 case /export packing |                                  |
| <b>A</b>                    | 1,755                     | 7,020                  | 540×360×270                      |

### Bulk

| Packing specifications type | Number of packages (pcs.) |                        | Export package measurements (mm) |
|-----------------------------|---------------------------|------------------------|----------------------------------|
|                             | 1 case /Japan             | 1 case /export packing |                                  |
| <b>B</b>                    | 400                       | 1,600                  | 555×375×223                      |

Refer to P.73 for soldering conditions.

# SPVQ8 Water-proof Type

## Dimensions

Unit:mm

| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 1   |       | 5   |       |
| 2   |       | 6   |       |
| 3   |       | 7   |       |
| 4   |       | 8   |       |

Dimensions

Unit:mm

| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 9   |       | 12  |       |
| 10  |       | 13  |       |
| 11  |       | 14  |       |

Detector

Slide

Push

Rotary

Power

Dual-in-line  
Package Type

General-  
purpose Type

Water-proof  
Type

Fast Switching  
Type

# SPVQ8 Water-proof Type

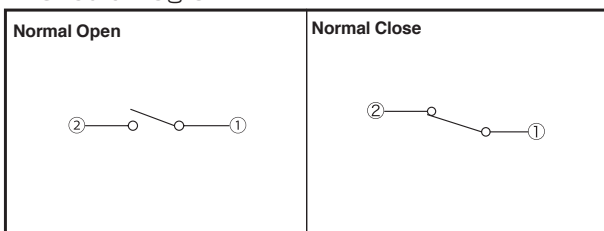
Detector  
Slide  
Push  
Rotary  
Power  
Dual-in-line Package Type  
General-purpose Type  
Waterproof Type  
Fast Switching Type

## Dimensions

Unit:mm

| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 15  |       | 17  |       |
| 16  |       | 18  |       |

## Circuit Diagram

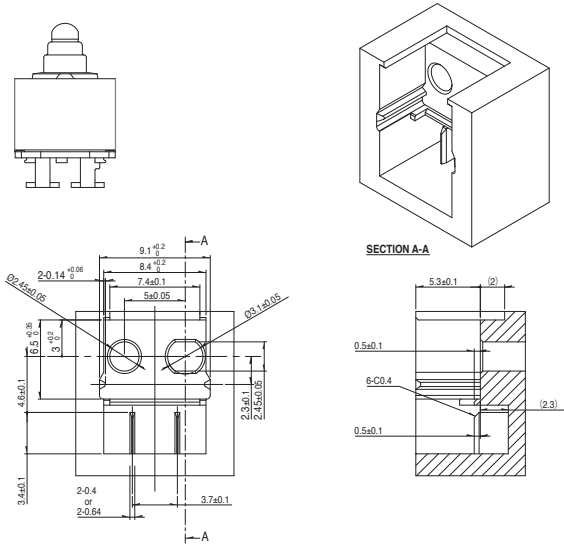


Recommended Unit Terminal Shape for Press-Fit Terminals (Normally Open)

Unit:mm

| Style |
|-------|
|-------|

SPVQ811004, SPVQ831001

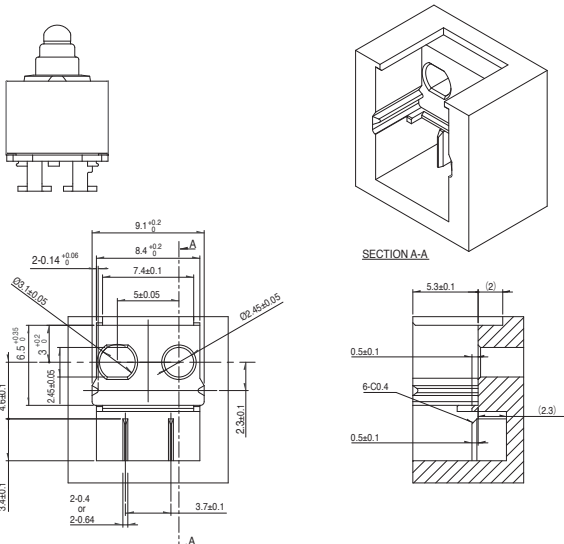


Recommended Unit Terminal Shape for Press-Fit Terminals (Normally Closed)

Unit:mm

| Style |
|-------|
|-------|

SPVQ821004



Detector

Slide

Push

Rotary

Power

Dual-in-line  
Package Type

General-  
purpose Type

Water-proof  
Type

Fast Switching  
Type

| Series                         |                                                         | Water-proof Type                                                            |                          |                          | Fast Switching Type         |                        |                                                                                  |
|--------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------|--------------------------|-----------------------------|------------------------|----------------------------------------------------------------------------------|
|                                |                                                         | SPVQ8                                                                       | SPVQA                    | SSCN                     | SPVQ9                       | SPVQC                  | SPVQE                                                                            |
| Photo                          |                                                         |                                                                             |                          |                          |                             |                        |                                                                                  |
| Operation type                 |                                                         | Two-way                                                                     |                          |                          |                             |                        |                                                                                  |
| Dimensions (mm)                | W                                                       | 8.3                                                                         | 15.2                     | 13                       | 15.4                        | 15.4                   | 17.2                                                                             |
|                                | D                                                       | 5.3                                                                         | 6.4                      | 5                        | 8.4                         | 7.4                    | 12                                                                               |
|                                | H                                                       | 6.5                                                                         | 7.95                     | 15                       | 7.5                         | 7.5                    | 7.5                                                                              |
| Operating temperature range    |                                                         | -40°C to +85°C                                                              |                          |                          |                             |                        |                                                                                  |
| Automotive use                 |                                                         | ●                                                                           | ●                        | ●                        | ●                           | ●                      | ●                                                                                |
| Life cycle (availability)      |                                                         |                                                                             |                          |                          |                             |                        |                                                                                  |
| Poles / Positions              |                                                         | 1/1                                                                         | 1/1<br>1/2               | 1/2                      | 2/2                         | 2/2                    | 3/2                                                                              |
| Rating (max.) (Resistive load) |                                                         | 0.1A 12V DC                                                                 |                          |                          | 50mA 26V DC                 | 50mA 18V DC            |                                                                                  |
| Rating (min.) (Resistive load) |                                                         | 50µA 5V DC                                                                  |                          | 100µA 5V DC              | 50µA 5V DC                  |                        |                                                                                  |
| Durability                     | Operating life without load                             | 300,000cycles<br>1Ω max. or<br>1,000,000cycles<br>3Ω max.                   | 300,000cycles<br>1Ω max. | 100,000cycles<br>1Ω max. | 300,000cycles<br>200mΩ max. |                        | 300,000 cycles<br>CIRCUIT ①-②-③ and ④-⑤-⑥<br>200mΩ max.<br>CIRCUIT ⑦-⑧-⑨ 1Ω max. |
|                                | Operating life with load Rating (max.) (Resistive load) | 300,000cycles<br>1Ω max. or<br>1,000,000cycles<br>3Ω max.                   | 300,000cycles<br>1Ω max. | 100,000cycles<br>1Ω max. | 300,000cycles<br>200mΩ max. |                        | 300,000 cycles<br>CIRCUIT ①-②-③ and ④-⑤-⑥<br>200mΩ max.<br>CIRCUIT ⑦-⑧-⑨ 1Ω max. |
| Electrical performance         | Initial contact resistance                              | 500mΩ max.                                                                  |                          |                          | 75mΩ max.                   |                        | CIRCUIT ①-②-③ and ④-⑤-⑥<br>75mΩ max.<br>CIRCUIT ⑦-⑧-⑨ 250mΩ max.                 |
|                                | Insulation resistance                                   | 100MΩ min. 500V DC                                                          |                          |                          |                             | 100MΩ min.<br>250V DC  | 100MΩ min.<br>100V DC                                                            |
|                                | Voltage proof                                           | 500V AC for 1minute                                                         |                          |                          |                             | 250V AC<br>for 1minute | 100V AC<br>for 1minute                                                           |
| Mechanical performance         | Terminal strength                                       | 3N for 1minute (with terminal)<br>Wire strength 30N for 1minute (with wire) | 3N for 1minute           |                          |                             |                        |                                                                                  |
|                                | Actuator strength                                       | 20N                                                                         |                          | 10N                      | 20N                         |                        |                                                                                  |
| Environmental performance      | Cold                                                    | -40°C 500h                                                                  |                          |                          |                             |                        |                                                                                  |
|                                | Dry heat                                                | 85°C 500h                                                                   |                          |                          |                             |                        |                                                                                  |
|                                | Damp heat                                               | 60°C, 90 to 95% RH 500h                                                     |                          |                          |                             |                        |                                                                                  |
| Operation force                |                                                         | 1±0.5N                                                                      |                          | 2N max.                  | 1±0.5N                      |                        |                                                                                  |
| Page                           |                                                         | 61                                                                          | 66                       | 69                       | 70                          | 71                     | 72                                                                               |

Detector Switches Soldering Conditions . . . . . 73  
 Detector Switches Cautions . . . . . 74

**Note**  
 ● Indicates applicability to all products in the series.

# Detector Switches Soldering Conditions

## Example of Reflow Soldering Condition

1. Heating method: Double heating method with infrared heater.
2. Temperature measurement: Thermocouple  $\phi 0.1$  to  $0.2$  CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.
3. Temperature profile



| Series (Reflow type) | A (°C) 3s max. | B (°C) | C (s) | D (°C) | E (°C) | F (s) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| <b>SPPB</b>          | 250            | 230    | 40    | 180    | 150    | 120   |
| <b>SPPW8</b>         |                |        | 35    |        |        |       |
| <b>SPVE</b>          | 260            |        | 40    |        |        |       |
| <b>SPVL</b>          |                |        |       |        |        |       |
| <b>SPVM</b>          |                |        |       |        |        |       |
| <b>SPVN</b>          |                |        |       |        |        |       |
| <b>SPVR</b>          |                |        |       |        |        |       |
| <b>SPVS</b>          |                |        |       |        |        |       |
| <b>SPVT</b>          |                |        |       |        |        |       |
| <b>SSCM</b>          |                |        |       |        |        |       |
| <b>SSCQ</b>          | 250            |        |       |        |        |       |
| <b>SPVQC, SPVQE</b>  |                |        |       |        |        |       |

### Notes

1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, surface depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface temperatures.
2. Soldering conditions differ depending on reflow soldering machines. Prior verification of soldering condition is highly recommended.

### Reference for Hand Soldering

| Series                                                                                 | Soldering temperature | Soldering time |
|----------------------------------------------------------------------------------------|-----------------------|----------------|
| <b>SPVS, SPVN, SPVT, SPVM, SPVR, SPVE, SPPW8, SSCQ, SSCM, SPVL, SSCT, SPVQC, SPVQE</b> | 350±5°C               | 3s max.        |
| <b>SPVQ1, SPVQ3, SPVQ6, SPVQ7, SPVQ8, SPVQ9, SSCN, SPVQA</b>                           | 300±10°C              | 3 + 1 / 0s     |
| <b>SPPB (Reflow)</b>                                                                   | 300±5°C               | 5s max.        |
| <b>SSCF, SPPB (For Lead, Dip)</b>                                                      | 350±10°C              | 3 + 1 / 0s     |

### Reference for Dip Soldering

(For PC board terminal types)

| Series                                                       | Items                  |                 | Dip soldering         |                       |
|--------------------------------------------------------------|------------------------|-----------------|-----------------------|-----------------------|
|                                                              | Preheating temperature | Preheating time | Soldering temperature | Duration of immersion |
| <b>SSCT, SPVQ1, SPVQ3, SPVQ6, SPVQ7, SPVQ8, SPVQ9, SPVQA</b> | 100±10°C               | 60s max.        | 260±5°C               | 5±1s                  |
| <b>SPPW8, SPPB</b>                                           | 100 °C max.            | 60s max.        | 255±5°C               | 5±1s                  |
| <b>SSCF</b>                                                  | —                      |                 | 260±5°C               | 5±1s                  |

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