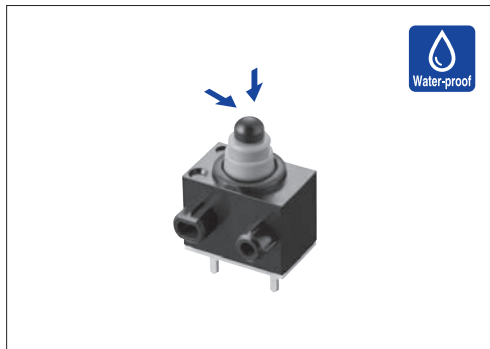


Industry's smallest size, with main unit dimensions of 8.3×5.3×7mm



### Typical Specifications



| Items                                                  |              | Specifications                                                                |
|--------------------------------------------------------|--------------|-------------------------------------------------------------------------------|
| Rating (max.)/(min.)<br>(Resistive load)               |              | 0.1A 12V DC / 50μA 5V DC                                                      |
| Contact resistance<br>(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                           | SPVQ810101    | SPVQ830101     | 1           |
|       |           |         | Angle                 | Boss-single side |                          |        |                             | SPVQ810301    | SPVQ830301     | 2           |
|       |           |         | For PC board          | Without boss     |                          |        |                             | SPVQ810401    | SPVQ830401     | 3           |
|       |           |         |                       | Boss-single side |                          |        |                             | SPVQ810501    | SPVQ830501     | 4           |
|       |           |         | For Lead              | Boss-both sides  |                          |        |                             | SPVQ810601    | SPVQ830601     | 5           |
|       |           |         |                       | Boss-single side |                          |        |                             | SPVQ810703    | SPVQ830701     | 6           |
|       |           |         |                       | Boss-both sides  |                          |        |                             | SPVQ810801    | SPVQ830801     | 7           |
|       |           |         | Press fit             | Boss-single side |                          |        |                             | SPVQ811004    | SPVQ831001     | 8           |
|       |           | N.C.    | For PC board          | Boss-both sides  | 1,755                    | 7,020  | A                           | SPVQ820101    | —              | 1           |
|       |           |         | Angle                 | Boss-single side |                          |        |                             | SPVQ820301    | —              | 9           |
|       |           |         | For PC board          | Without boss     |                          |        |                             | SPVQ820401    | —              | 3           |
|       |           |         |                       | Boss-single side |                          |        |                             | SPVQ820501    | —              | 4           |
|       |           |         | For Lead              | Boss-both sides  |                          |        |                             | SPVQ820601    | —              | 10          |
|       |           |         |                       | Boss-single side |                          |        |                             | SPVQ820704    | —              | 11          |
|       |           |         |                       | Boss-both sides  |                          |        |                             | SPVQ820801    | —              | 7           |
|       |           |         | Press fit             | Boss-single side |                          |        |                             | SPVQ821004    | —              | 12          |
|       |           | N.O.    | With wire (Downwards) | Boss-single side | 400                      | 1,600  | B                           | SPVQ850100*   | —              | 13          |
|       |           |         | With wire (Downwards) | Boss-both sides  |                          |        |                             | SPVQ850200*   | —              | 14          |
|       |           |         | With wire (Left side) | Boss-single side |                          |        |                             | SPVQ850300*   | —              | 15          |
|       |           |         | With wire (from side) | Boss-both sides  |                          |        |                             | SPVQ850500*   | —              | 16          |
|       |           | N.C.    | With wire (Downwards) | Boss-single side |                          |        |                             | SPVQ860100*   | —              | 17          |
|       |           |         | With wire (Downwards) | Boss-both sides  |                          |        |                             | SPVQ860200*   | —              | 14          |
|       |           |         | With wire (Left side) | Boss-single side |                          |        |                             | SPVQ860300*   | —              | 18          |
|       |           |         | With wire (from side) | Boss-both sides  |                          |        |                             | SPVQ860500*   | —              | 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.

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

■ Dimensions

Unit:mm

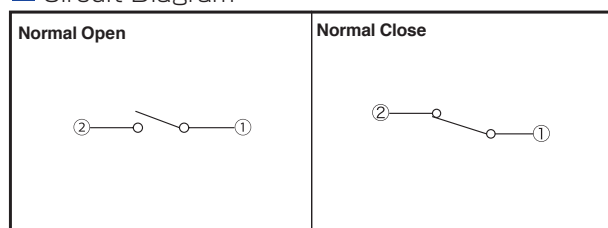
| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 9   |       | 12  |       |
| 10  |       | 13  |       |
| 11  |       | 14  |       |

## Dimensions

Unit:mm

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

### Circuit Diagram

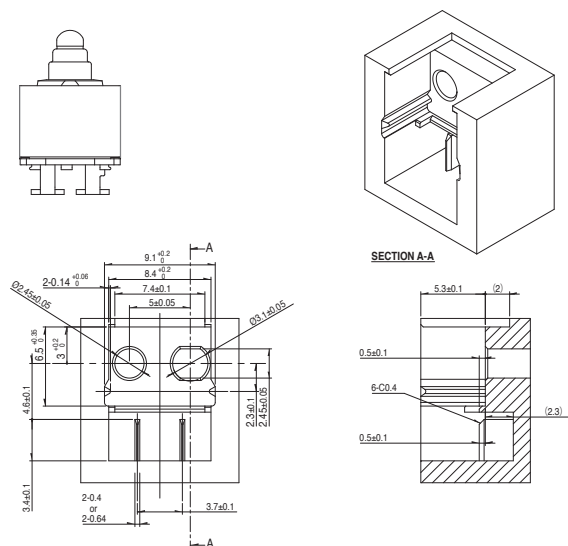


■ Recommended Unit Terminal Shape for Press-Fit Terminals (Normally Open)

Unit:mm

## Style

**SPVQ811004, SPVQ831001**

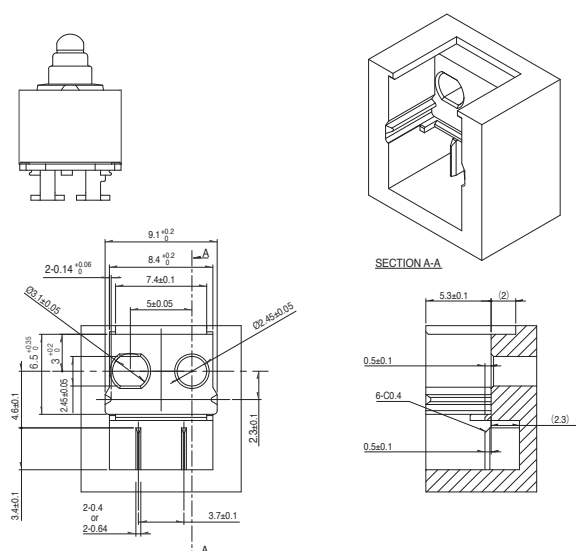


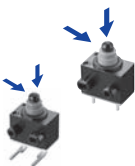
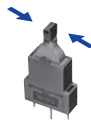
■ Recommended Unit Terminal Shape for Press-Fit Terminals (Normally Closed)

Unit:mm

## Style

SPVQ821004



| 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℃ to +85℃                                                                      |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Automotive use                    |                                                               |  |  |  |  |  |  |
| Life cycle (availability)         |                                                               |  |  |  |  |  |  |
| Poles / Positions                 |                                                               | 1/1                                                                               | 1/1<br>1/2                                                                        | 1/2                                                                               | 2/2                                                                                | 2/2                                                                                 | 3/2                                                                                 |
| Rating (max.)<br>(Resistive load) |                                                               | 0.1A 12V DC                                                                       |                                                                                   |                                                                                   | 50mA 26V DC                                                                        | 50mA 18V DC                                                                         |                                                                                     |
| Rating (min.)<br>(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 ⑤-⑥-⑦<br>200mΩ max.<br>CIRCUIT ④-⑧-⑨-⑩ 1Ω max.  |
|                                   | Operating life with load<br>Rating (max.)<br>(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 ⑤-⑥-⑦<br>200mΩ max.<br>CIRCUIT ④-⑧-⑨-⑩ 1Ω max.  |
| Electrical performance            | Initial contact resistance                                    | 500mΩ max.                                                                        |                                                                                   |                                                                                   | 75mΩ max.                                                                          |                                                                                     | CIRCUIT ①-②-③ and ⑤-⑥-⑦<br>75mΩ max.<br>CIRCUIT ④-⑧-⑨-⑩ 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℃ 500h                                                                         |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|                                   | Dry heat                                                      | 85℃ 500h                                                                          |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|                                   | Damp heat                                                     | 60℃, 90 to 95% RH 500h                                                            |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| Operation force                   |                                                               | 1±0.5N                                                                            |                                                                                   | 2N max.                                                                           | 1±0.5N                                                                             |                                                                                     |                                                                                     |
| Page                              |                                                               | 61                                                                                | 66                                                                                | 69                                                                                | 70                                                                                 | 71                                                                                  | 72                                                                                  |

|                                        |    |
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| 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) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| SPPB                 | 250            | 230    | 40    | 180    | 150    | 120   |
| SPPW8                |                |        | 35    |        |        |       |
| SPVE                 | 260            |        | 40    |        |        |       |
| SPVL                 |                |        |       |        |        |       |
| SPVM                 |                |        |       |        |        |       |
| SPVN                 |                |        |       |        |        |       |
| SPVR                 |                |        |       |        |        |       |
| SPVS                 |                |        |       |        |        |       |
| SPVT                 |                |        |       |        |        |       |
| SSCM                 |                |        |       |        |        |       |
| SSCQ                 |                |        |       |        |        |       |
| SPVQC, SPVQE         | 250            |        |       |        |        |       |

## 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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