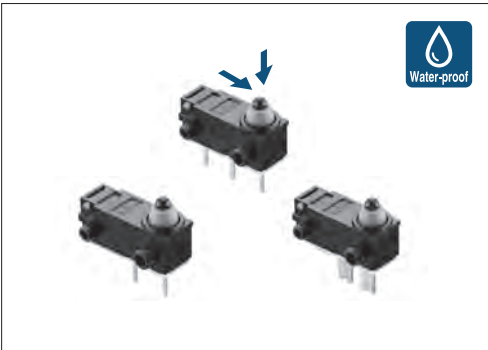


# SPVQ7 Water-proof Type

Slim type with body height of 6.7mm



## 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.        |
| Operating force                                      |              | 1 ± 0.5N                    |
| Operating life                                       | Without load | 300,000cycles               |
|  | With load    | 300,000cycles (0.1A 12V DC) |

## Product Line

| Poles | Positions | Change over timing | Operating part shape | Terminal type | Main body form    | Minimum order unit (pcs) |        | Product No.       | Drawing No.       |                   |   |
|-------|-----------|--------------------|----------------------|---------------|-------------------|--------------------------|--------|-------------------|-------------------|-------------------|---|
|       |           |                    |                      |               |                   | Japan                    | Export |                   |                   |                   |   |
| 1     | 2         | Non shorting       | Push                 | For PC board  | Boss - left side  | 1,350                    | 5,400  | <b>SPVQ710103</b> | 1                 |                   |   |
|       |           |                    |                      |               | Boss - right side |                          |        | <b>SPVQ710203</b> | 2                 |                   |   |
|       |           |                    |                      |               | Boss - left side  |                          |        | <b>SPVQ710304</b> | 3                 |                   |   |
|       |           |                    |                      |               | Boss - right side |                          |        | <b>SPVQ710404</b> | 4                 |                   |   |
|       | 1         |                    |                      |               | 2                 |                          |        | For Lead          | Boss - left side  | <b>SPVQ740303</b> | 5 |
|       |           |                    |                      |               |                   |                          |        |                   | Boss - right side | <b>SPVQ740403</b> | 6 |
|       |           |                    |                      |               |                   |                          |        |                   | Boss - left side  | <b>SPVQ740103</b> | 7 |
|       |           |                    |                      |               |                   |                          |        |                   | Boss - right side | <b>SPVQ740203</b> | 8 |

## Note

This unit cannot be used in water (IP67 rating, except for terminal).

## Packing Specifications

Tray

| Number of packages (pcs.) |                        | Export package measurements<br>(mm) |
|---------------------------|------------------------|-------------------------------------|
| 1 case /Japan             | 1 case /export packing |                                     |
| 1,350                     | 5,400                  | 540×360×270                         |

## Dimensions

Unit:mm

| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 1   |       | 2   |       |

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

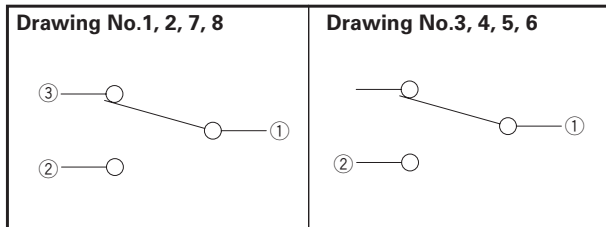
# SPVQ7 Water-proof Type

## Dimensions

Unit:mm

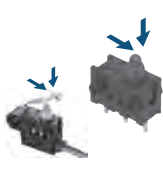
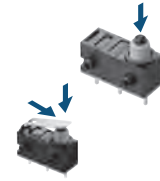
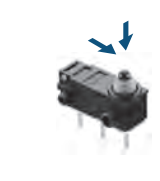
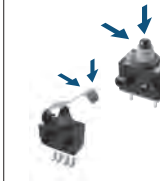






| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 3   |       | 6   |       |
| 4   |       | 7   |       |
| 5   |       | 8   |       |

## Circuit Diagram



# Detector Switches

## List of Varieties

| Series                         |   | Water-proof Type  |   |   |   |   |
|--------------------------------|---|---|---|---|---|---|
|                                |   | SPVQ3   | SPVQ6   | SPVQ7   | SPVQ8   | SPVQ8H  |
| Photo                          |   |  |  |  |  |  |
| Operation type                 |   | Two-way   | One-way<br>Two-way  | Two-way   |   |   |
| Dimensions (mm)                | W   | 13  | 13.3  | 14.7  | 8.3   | 14.8<br>17.95   |
|                                | D   | 5.8   | 5.3   | 5.4   | 5.3   | 6.45  |
|                                | H   | 8.35  | 7   | 6.7   | 6.5   | 14.5  |
| Operating temperature range    |   | -40°C to +85°C  |   |   |   |   |
| Automotive use                 |   | ●   | ●   | ●   | ●   | ●   |
| Life cycle (availability)      |   |  |  |  |  |  |
| Poles / Positions              |   | 1/1<br>1/2  | 1/2   | 1/1<br>1/2  | 1/1   |   |
| Rating (max.) (Resistive load) |   | 0.1A 12V DC   |   |   |   |   |
| Rating (min.) (Resistive load) |   | 50μA 5V DC  |   |   |   |   |
| Durability                     | Operating life without load                             | 300,000cycles 1Ω max.   |   |   | 300,000cycles 1Ω max. or 1,000,000cycles 3Ω max.                                    | 100,000cycles 1Ω max.   |
|                                | Operating life with load Rating (max.) (Resistive load) | 300,000cycles 1Ω max.   |   |   | 300,000cycles 1Ω max. or 1,000,000cycles 3Ω max.                                    | 100,000cycles 1Ω max.   |
| Electrical performance         | Initial contact resistance                              | 500mΩ max.  |   |   |   |   |
|                                | Insulation resistance                                   | 100MΩ min. 500V DC  |   |   |   |   |
|                                | Voltage proof   | 500V AC for 1minute   |   |   |   |   |
| Mechanical performance         | Terminal strength                                       | 3N for 1minute (with terminal)<br>Wire strength 30N for 1minute (with wire)       | 3N for 1minute  |   | 3N for 1minute (with terminal)<br>Wire strength 30N for 1minute (with wire)         | Wire strength 110N for 1minute  |
|                                | Actuator strength                                       | 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 3N max.  |   | 1±0.5N  | 1±0.5N 3N max.  | 4.7N max.   |
| Page                           |   | 43  | 48  | 51  | 53  | 61  |

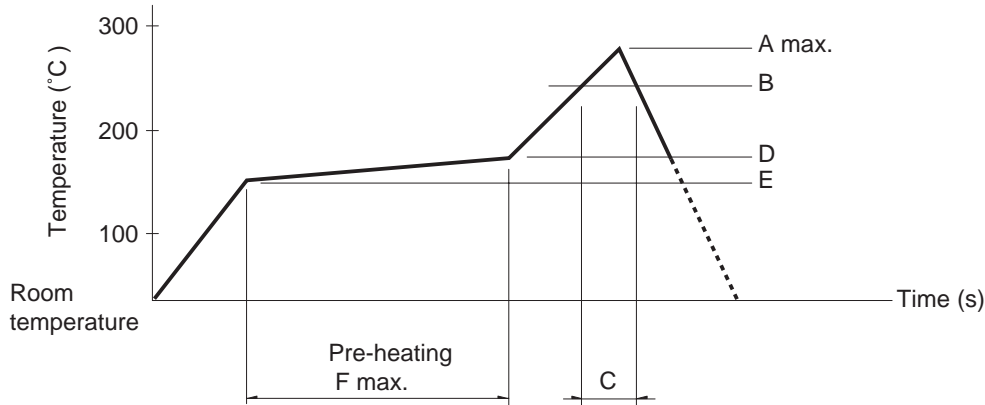
|  |    |
|--|----|
| Detector Switches Soldering Conditions | 68 |
| Detector Switches Cautions             | 69 |

### Note

● Indicates applicability to all products in the series.

## 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>SPVE</b>          |                |        |       |        |        |       |
| <b>SPVL</b>          |                |        |       |        |        |       |
| <b>SPVM</b>          |                |        |       |        |        |       |
| <b>SPVN</b>          |                |        |       |        |        |       |
| <b>SPVR</b>          | 260            | 230    | 40    | 180    | 150    | 120   |
| <b>SPVS</b>          |                |        |       |        |        |       |
| <b>SPVT</b>          |                |        |       |        |        |       |
| <b>SSCM</b>          |                |        |       |        |        |       |
| <b>SSCQ</b>          | 250            |        |       |        |        |       |
| <b>SPVQC</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, SSCQ, SSCM, SPVL, SSCT, SPVQC</b> | 350±5°C               | 3s max.        |
| <b>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, 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                  |