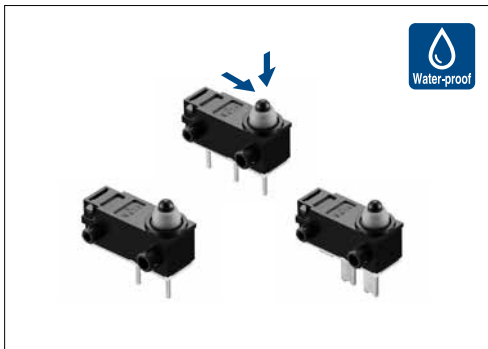


Slim type with body height of 6.7mm



## ■ 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  | SPVQ710103  | 1           |
|       |           |                    |                      |                      | Boss - right side |                          |        | SPVQ710203  | 2           |
|       | 1         |                    |                      |                      | Boss - left side  |                          |        | SPVQ710304  | 3           |
|       |           |                    |                      |                      | Boss - right side |                          |        | SPVQ710404  | 4           |
|       |           |                    |                      | For Lead             | Boss - left side  |                          |        | SPVQ740303  | 5           |
|       |           |                    |                      |                      | Boss - right side |                          |        | SPVQ740403  | 6           |
|       | 2         |                    |                      |                      | Boss - left side  |                          |        | SPVQ740103  | 7           |
|       |           |                    |                      |                      | Boss - right side |                          |        | SPVQ740203  | 8           |
|       |           |                    |                      | For Lead (hole type) | Boss - left side  |                          |        | SPVQ740502  | 9           |
|       |           |                    |                      |                      | Boss - right side |                          |        | SPVQ740602  | 10          |

## 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

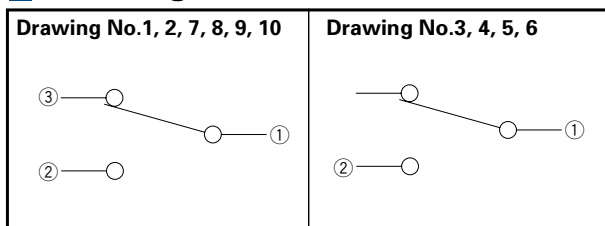
| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 1   |       | 2   |       |

## Dimensions

Unit:mm

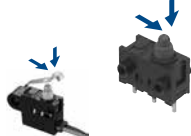
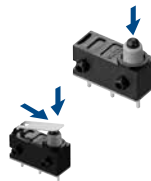
| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 3   |       | 7   |       |
| 4   |       | 8   |       |
| 5   |       | 9   |       |
| 6   |       | 10  |       |

## Circuit Diagram



# Detector Switches

## List of Varieties

| Series                            |                                                               | Water-proof Type                                                                  |                                                                                   |                                                                                     |                                                                                     |
|-----------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |                                                               | SPVQ1                                                                             | SPVQ3                                                                             | SPVQ6                                                                               | SPVQ7                                                                               |
| Photo                             |                                                               |  |  |   |  |
| Operation type                    |                                                               | One-way<br>Two-way                                                                | Two-way                                                                           | One-way<br>Two-way                                                                  | Two-way                                                                             |
| Dimensions (mm)                   | W                                                             | 13.3                                                                              | 13                                                                                | 13.3                                                                                | 14.7                                                                                |
|                                   | D                                                             | 5.8                                                                               |                                                                                   | 5.3                                                                                 | 5.4                                                                                 |
|                                   | H                                                             | 8                                                                                 | 8.35                                                                              | 7                                                                                   | 6.7                                                                                 |
| Operating temperature range       |                                                               | -40℃ to +85℃                                                                      |                                                                                   |                                                                                     |                                                                                     |
| Automotive use                    |                                                               |  |  |  |  |
| Life cycle (availability)         |                                                               |  |  |  |  |
| Poles / Positions                 |                                                               | 1/2                                                                               | 1/1<br>1/2                                                                        | 1/2                                                                                 | 1/1<br>1/2                                                                          |
| Rating (max.)<br>(Resistive load) |                                                               | 0.1A 12V DC                                                                       |                                                                                   |                                                                                     |                                                                                     |
| Rating (min.)<br>(Resistive load) |                                                               | 50μA 3V DC                                                                        |                                                                                   | 50μA 5V DC                                                                          |                                                                                     |
| Durability                        | Operating life without load                                   | 300,000cycles 1Ω max.                                                             |                                                                                   |                                                                                     |                                                                                     |
|                                   | Operating life with load<br>Rating (max.)<br>(Resistive load) | 300,000cycles 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                                                                    | 3N for 1minute (with terminal)<br>Wire strength 30N for 1minute (with wire)       | 3N for 1minute                                                                      |                                                                                     |
|                                   | Actuator strength                                             | 20N                                                                               |                                                                                   |                                                                                     |                                                                                     |
| Environmental performance         | Cold                                                          | -40℃ 500h                                                                         |                                                                                   |                                                                                     |                                                                                     |
|                                   | Dry heat                                                      | 85℃ 500h                                                                          |                                                                                   |                                                                                     |                                                                                     |
|                                   | Damp heat                                                     | 60℃, 90 to 95% RH 500h                                                            |                                                                                   |                                                                                     |                                                                                     |
| Operation force                   |                                                               | 2N max. 5.9N max.                                                                 | 1±0.5N 3N max.                                                                    |                                                                                     | 1±0.5N                                                                              |
| Page                              |                                                               | 43                                                                                | 45                                                                                | 50                                                                                  | 53                                                                                  |

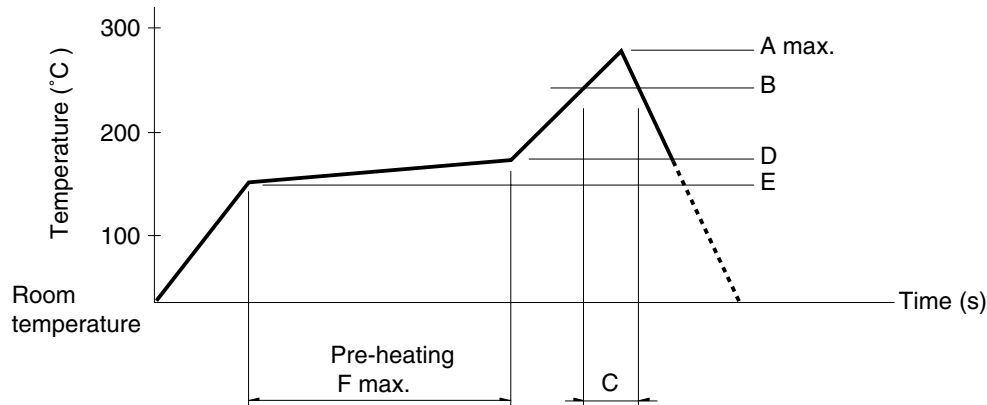
|                                        |    |
|----------------------------------------|----|
| Detector Switches Soldering Conditions | 66 |
| Detector Switches Cautions             | 67 |

### 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) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| SPPB                 | 250            | 230    | 40    | 180    | 150    | 120   |
| SPVE                 | 260            |        | 40    |        |        |       |
| SPVL                 |                |        |       |        |        |       |
| SPVM                 |                |        |       |        |        |       |
| SPVN                 |                |        |       |        |        |       |
| SPVR                 |                |        |       |        |        |       |
| SPVS                 |                |        |       |        |        |       |
| SPVT                 |                |        |       |        |        |       |
| SSCM                 |                |        |       |        |        |       |
| SSCQ                 |                |        |       |        |        |       |
| SPVQC                | 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, SSCQ, SSCM, SPVL, SSCT, SPVQC</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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