

# SPVQ1 Water-proof Type

Water-proof structure with 3mm long travel



Detector

Slide

Push

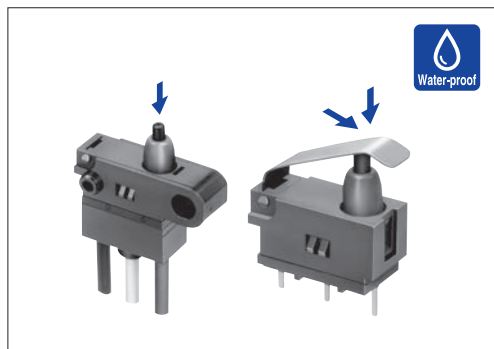
Rotary

Power

Dual-In-line  
Package Type

General-  
purpose Type

Water-proof  
Type



## Typical Specifications

| Items                                                  |              | Specifications                       |               |
|--------------------------------------------------------|--------------|--------------------------------------|---------------|
| Rating (max.)/(min.)<br>(Resistive load)               |              | 0.1A 12V DC / 50 $\mu$ A 3V DC       |               |
| Contact resistance<br>(Initial / After operating life) |              | 500m $\Omega$ max. / 1 $\Omega$ max. |               |
| Operating force                                        |              | Push type                            | Actuator type |
|                                                        |              | 2N max.                              | 5.9N max.     |
| Operating life                                         | Without load | 300,000cycles                        |               |
|                                                        | With load    | 300,000cycles (0.1A 12V DC)          |               |

## Product Line

| Poles | Positions | Changeover 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  | Normal            | 600                      | 2,400  | SPVQ140100  | 1           |   |
|       |           |                   |                      |               | Boss - right side |                          |        | SPVQ140200  | 5           |   |
|       |           |                   |                      |               | Boss - left side  |                          |        | SPVQ140300  | 6           |   |
|       |           |                   |                      |               | Boss - both sides |                          |        | SPVQ140400  | 7           |   |
|       |           |                   | Actuator A           |               | Normal            |                          |        | SPVQ130200  | 1           |   |
|       |           |                   |                      |               | Boss - right side |                          |        | SPVQ130400  | 5           |   |
|       |           |                   |                      |               | Boss - left side  |                          |        | SPVQ130500  | 6           |   |
|       |           |                   |                      |               | Boss - both sides |                          |        | SPVQ130600  | 7           |   |
|       |           |                   | Actuator B           |               | Normal            |                          |        | SPVQ130300  | 1           |   |
|       |           |                   |                      |               | Boss - right side |                          |        | SPVQ130700  | 5           |   |
|       |           |                   |                      |               | Boss - left side  |                          |        | SPVQ130800  | 6           |   |
|       |           |                   |                      |               | Boss - both sides |                          |        | SPVQ130900  | 7           |   |
|       |           |                   | Push                 | With wire     | With a screw hole | 180                      | 720    | SPVQ120500※ | 2           |   |
|       |           |                   |                      |               | Boss - right side | 100                      | 400    | SPVQ120600※ | 8           |   |
|       |           |                   |                      |               | Boss - left side  |                          |        | SPVQ120700※ | 9           |   |
|       |           |                   |                      |               | Boss - both sides |                          |        | SPVQ120800※ | 10          |   |
|       |           |                   |                      |               | Actuator A        | With a screw hole        | 180    | 720         | SPVQ111200※ | 3 |
|       |           |                   |                      |               | Actuator B        |                          |        |             | SPVQ111700※ | 4 |

## Notes

- ※ Products with a wire will be supplied as follows.
  - The length of lead wire is 250mm. For length modification, please contact us.
  - Product with wire will be build-to-order.
- This unit cannot be used in water (IP67 rating, except for terminal).

## Packing Specifications

Tray

| Product No.                                                                                                                                    | Number of packages (pcs.) |                        | Export package measurements (mm) |
|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------|----------------------------------|
|                                                                                                                                                | 1 case /Japan             | 1 case /export packing |                                  |
| SPVQ130200, SPVQ130300, SPVQ130400, SPVQ130500, SPVQ130600, SPVQ130700, SPVQ130800, SPVQ130900, SPVQ140100, SPVQ140200, SPVQ140300, SPVQ140400 | 600                       | 2,400                  | 540×360×230                      |

Bulk

| Product No.                        | Number of packages (pcs.) |                        | Export package measurements (mm) |
|------------------------------------|---------------------------|------------------------|----------------------------------|
|                                    | 1 case /Japan             | 1 case /export packing |                                  |
| SPVQ111200, SPVQ111700, SPVQ120500 | 180                       | 720                    | 555×375×223                      |
| SPVQ120600, SPVQ120700, SPVQ120800 | 100                       | 400                    | 540×360×230                      |

Refer to P.71 for soldering conditions.

■ Dimensions

Unit:mm

| No. | Style | Actuator configuration                                               |
|-----|-------|----------------------------------------------------------------------|
| 1   |       | <p><b>Push</b></p> <p><b>Actuator A</b></p> <p><b>Actuator B</b></p> |
| 2   |       |                                                                      |
| 3   |       |                                                                      |

Detector

Slide

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Rotary

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Dual-In-line  
Package Type

General-  
purpose Type

Water-proof  
Type

## Dimensions

Unit:mm

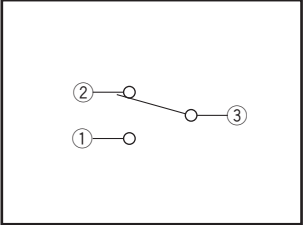
| No. | Style |                                                  |
|-----|-------|--------------------------------------------------|
| 4   |       |                                                  |
| 5   |       | <p>Actuator configuration</p> <p><b>Push</b></p> |
| 6   |       | <p><b>Actuator A</b></p>                         |
| 7   |       | <p><b>Actuator B</b></p>                         |

■ Dimensions

Unit:mm

| No. | Style | Actuator configuration |
|-----|-------|------------------------|
| 00  |       | <b>Push</b><br>        |
| 01  |       |                        |
| 10  |       |                        |

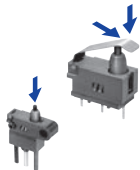
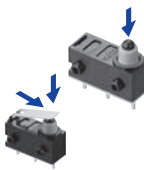
■ Circuit Diagram



| Detector                  |
|---------------------------|
| Slide                     |
| Push                      |
| Rotary                    |
| Power                     |
| Dual-In-line Package Type |
| General-purpose Type      |
| Water-proof Type          |

# Detector Switches

## List of Varieties

| Series                            |                                                                  | Water-proof Type                                                                  |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|-----------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |                                                                  | SPVQ1                                                                             | SPVQ3                                                                             | SPVQ4H                                                                            | SPVQ6                                                                               | SPVQ7                                                                               |
| Photo                             |                                                                  |  |  |  |  |  |
| Operation type                    |                                                                  | One-way<br>Two-way                                                                | Two-way                                                                           |                                                                                   | One-way<br>Two-way                                                                  | Two-way                                                                             |
| Dimensions<br>(mm)                | W                                                                | 13.3                                                                              | 13                                                                                | 19                                                                                | 13.3                                                                                | 14.7                                                                                |
|                                   | D                                                                | 5.8                                                                               |                                                                                   | 6                                                                                 | 5.3                                                                                 | 5.4                                                                                 |
|                                   | H                                                                | 8                                                                                 | 8.35                                                                              | 11.9                                                                              | 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                                                                       | 0.1A 12V DC or<br>0.3A 16V DC                                                     | 0.1A 12V DC                                                                       |                                                                                     |                                                                                     |
| Rating (min.)<br>(Resistive load) |                                                                  | 50μA 3V DC                                                                        | 50μA 5V DC or<br>1mA 5V DC                                                        | 1mA 5V DC                                                                         | 50μA 5V DC                                                                          |                                                                                     |
| Durability                        | Operating life<br>without load                                   | 300,000cycles<br>1Ω max.                                                          | 300,000cycles or<br>1,200,000cycles<br>1Ω max.                                    | 300,000cycles<br>1Ω max.                                                          |                                                                                     |                                                                                     |
|                                   | Operating life<br>with load<br>Rating (max.)<br>(Resistive load) | 300,000cycles<br>1Ω max.                                                          | 300,000cycles<br>or 1,200,000cycles<br>1Ω max.                                    | 300,000cycles<br>1Ω max.                                                          |                                                                                     |                                                                                     |
| Electrical<br>performance         | Initial contact<br>resistance                                    | 500mΩ max.                                                                        |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|                                   | Insulation<br>resistance                                         | 100MΩ min. 500V DC                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|                                   | Voltage proof                                                    | 500V AC for 1minute                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Mechanical<br>performance         | Terminal<br>strength                                             | 3N for 1minute (with terminal)<br>Wire strength 30N for 1minute (with wire)       |                                                                                   | Wire strenght<br>30N for1 minute                                                  | 3N for 1minute                                                                      |                                                                                     |
|                                   | Actuator<br>strength                                             | 20N                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Environmental<br>performance      | Cold                                                             | -40℃ 500h                                                                         |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|                                   | Dry heat                                                         | 85℃ 500h                                                                          |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|                                   | Damp heat                                                        | 60℃, 90 to 95% RH 500h                                                            |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Operation force                   |                                                                  | 2N max.<br>5.9N max.                                                              | 1±0.5N<br>3N max.                                                                 | 3N max.                                                                           | 1±0.5N<br>3N max.                                                                   | 1±0.5N                                                                              |
| Page                              |                                                                  | 46                                                                                | 50                                                                                | 55                                                                                | 56                                                                                  | 58                                                                                  |

|                                        |    |
|----------------------------------------|----|
| Detector Switches Soldering Conditions | 71 |
| Detector Switches Cautions             | 72 |

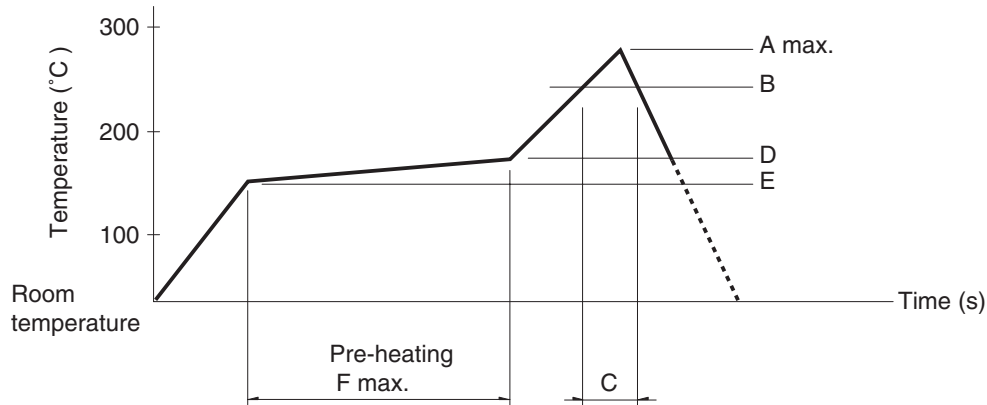
### Note

- 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                | 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</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                  |