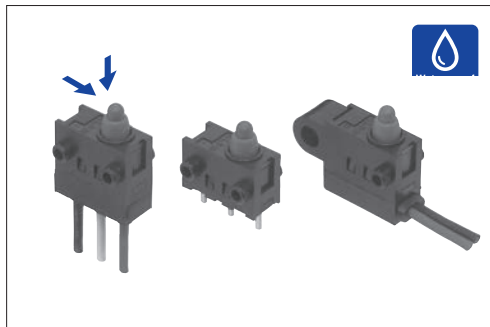


Long travel type applicable to oblique pressing  
without an actuator



#### Typical Specifications



| Items                                                  |              | Specifications                              |                                                              |
|--------------------------------------------------------|--------------|---------------------------------------------|--------------------------------------------------------------|
|                                                        |              | Normal type                                 | Longlife type                                                |
| Rating (max.)/(min.)<br>(Resistive load)               |              | 0.1A 12V DC<br>50μA 5V DC                   | 0.3A 16V DC<br>1mA 5V DC                                     |
| Contact resistance<br>(Initial / After operating life) |              | 500mΩ max. / 1 Ω max.                       |                                                              |
| Operating force                                        |              | Push type 1 ± 0.5N<br>Actuator type 3N max. |                                                              |
| Operating life                                         | Without load | 300,000cycles                               | 1,200,000cycles                                              |
|                                                        | With load    | 300,000cycles<br>(0.1A 12V DC)              | 1,200,000cycles (0.1A 16V DC)<br>300,000cycles (0.3A 16V DC) |
| Poles                                                  |              | 1                                           |                                                              |
| Changeover timing                                      |              | Non shorting                                |                                                              |

#### Product Line

| Operating life | Positions   | Operating part shape   | Terminal type          | Product No. (Main body form) |                   |                  |                   |                   | Minimum order unit (pcs) |        | Packing specification type | Drawing No. |     |       |       |
|----------------|-------------|------------------------|------------------------|------------------------------|-------------------|------------------|-------------------|-------------------|--------------------------|--------|----------------------------|-------------|-----|-------|-------|
|                |             |                        |                        | Normal                       | Boss - right side | Boss - left side | Boss - both sides | With a screw hole | Japan                    | Export |                            |             |     |       |       |
| 300,000 cycles | 2           | Push                   | For PC board           | SPVQ380400                   | SPVQ380300        | SPVQ380201       | SPVQ380100        | —                 | 1,300                    | 5,200  | A                          | 1           |     |       |       |
|                |             |                        | For Lead               | —                            | SPVQ380700        | SPVQ380600       | SPVQ380500        | —                 |                          |        |                            | 2           |     |       |       |
|                |             |                        | Right angle            | —                            | SPVQ380900        | —                | —                 | —                 |                          |        |                            | 3           |     |       |       |
|                |             |                        | Left angle             | —                            | —                 | SPVQ380800       | —                 | —                 |                          |        |                            | 4           |     |       |       |
|                | 1           |                        | With wire (Downwards)  | —                            | —                 | —                | —                 | SPVQ361000※       | 400                      | 1,600  | B                          | 5           |     |       |       |
|                |             |                        |                        |                              | SPVQ361100※       | SPVQ361200※      | SPVQ361300※       | —                 |                          |        |                            | 6           |     |       |       |
|                |             |                        | With wire (Right side) | —                            | —                 | —                | —                 | SPVQ361400※       |                          |        |                            | 7           |     |       |       |
|                |             |                        |                        |                              | SPVQ361500※       | SPVQ361600※      | SPVQ361700※       | —                 |                          |        |                            | 8           |     |       |       |
|                |             |                        | With wire (Left side)  | —                            | SPVQ361800※       | SPVQ361900※      | SPVQ362000※       | —                 |                          |        |                            | 9           |     |       |       |
|                | 2           | Actuator A             | For PC board           | SPVQ370400                   | SPVQ370300        | SPVQ370200       | SPVQ370100        | —                 | 1,300                    | 5,200  | A                          | 1           |     |       |       |
|                |             |                        | For Lead               | —                            | SPVQ370700        | SPVQ370600       | SPVQ370500        | —                 |                          |        |                            | 2           |     |       |       |
|                |             |                        | Right angle            | —                            | SPVQ370900        | —                | —                 | —                 |                          |        |                            | 3           |     |       |       |
|                |             |                        | Left angle             | —                            | —                 | SPVQ370800       | —                 | —                 |                          |        |                            | 4           |     |       |       |
|                | 1           |                        | With wire (Downwards)  | —                            | —                 | —                | —                 | SPVQ350100※       | 180                      | 720    | D                          | 5           |     |       |       |
|                |             |                        |                        |                              | SPVQ350200※       | SPVQ350300※      | SPVQ350400※       | —                 |                          |        |                            | 6           |     |       |       |
|                |             |                        | With wire (Right side) | —                            | SPVQ350600※       | SPVQ350700※      | SPVQ350800※       | —                 |                          |        |                            | 168         | 672 | C     | 8     |
|                |             |                        | With wire (Left side)  | —                            | SPVQ350900※       | SPVQ351000※      | SPVQ351100※       | —                 |                          |        |                            |             |     |       | 9     |
|                |             |                        | 2                      | Actuator B                   | For PC board      | SPVQ371300       | SPVQ371200        | SPVQ371100        |                          |        |                            | SPVQ371000  | —   | 1,300 | 5,200 |
|                | For Lead    | —                      |                        |                              | SPVQ371600        | SPVQ371500       | SPVQ371400        | —                 | 2                        |        |                            |             |     |       |       |
|                | Right angle | —                      |                        |                              | SPVQ371800        | —                | —                 | —                 | 3                        |        |                            |             |     |       |       |
|                | Left angle  | —                      |                        |                              | —                 | SPVQ371700       | —                 | —                 | 4                        |        |                            |             |     |       |       |
|                | 1           | With wire (Downwards)  | —                      |                              | —                 | —                | —                 | SPVQ351200※       | 180                      | 720    | D                          | 5           |     |       |       |
|                |             |                        |                        |                              | SPVQ351300※       | SPVQ351400※      | SPVQ351500※       | —                 |                          |        |                            | 6           |     |       |       |
|                |             | With wire (Right side) | —                      |                              | SPVQ351700※       | SPVQ351800※      | SPVQ351900※       | —                 |                          |        |                            | 168         | 672 | C     | 8     |
|                |             | With wire (Left side)  | —                      |                              | SPVQ352000※       | SPVQ352100※      | SPVQ352200※       | —                 |                          |        |                            |             |     |       | 9     |

## ■ Product Line

| Operating life   | Positions   | Operating part shape | Terminal type          | Product No. (Main body form) |                   |                  |                   |                   | Minimum order unit (pcs) |        | Packing specification type | Drawing No. |       |       |   |   |
|------------------|-------------|----------------------|------------------------|------------------------------|-------------------|------------------|-------------------|-------------------|--------------------------|--------|----------------------------|-------------|-------|-------|---|---|
|                  |             |                      |                        | Normal                       | Boss - right side | Boss - left side | Boss - both sides | With a screw hole | Japan                    | Export |                            |             |       |       |   |   |
| 1,200,000 cycles | 2           | Push                 | For PC board           | SPVQ340400                   | SPVQ340300        | SPVQ340200       | SPVQ340100        | —                 | 1,300                    | 5,200  | A                          | 1           |       |       |   |   |
|                  |             |                      | For Lead               | —                            | SPVQ340700        | SPVQ340600       | SPVQ340500        | —                 |                          |        |                            | 2           |       |       |   |   |
|                  |             |                      | Right angle            | —                            | SPVQ340900        | —                | —                 | —                 |                          |        |                            | 3           |       |       |   |   |
|                  |             |                      | Left angle             | —                            | —                 | SPVQ340800       | —                 | —                 |                          |        |                            | 4           |       |       |   |   |
|                  | 1           |                      | With wire (Downwards)  | —                            | —                 | —                | —                 | SPVQ320100※       | 400                      | 1,600  | B                          | 5           |       |       |   |   |
|                  |             |                      |                        | SPVQ320200※                  | SPVQ320300※       | SPVQ320400※      | —                 | 6                 |                          |        |                            |             |       |       |   |   |
|                  |             |                      | With wire (Right side) | —                            | —                 | —                | —                 | SPVQ320500※       |                          |        |                            | 7           |       |       |   |   |
|                  |             |                      |                        | SPVQ320600※                  | SPVQ320700※       | SPVQ320800※      | —                 | 8                 |                          |        |                            |             |       |       |   |   |
|                  |             |                      | With wire (Left side)  | —                            | SPVQ320900※       | SPVQ321000※      | SPVQ321100※       | —                 |                          |        |                            | 9           |       |       |   |   |
|                  |             | 2                    | Actuator A             | For PC board                 | SPVQ330400        | SPVQ330300       | SPVQ330200        | SPVQ330100        |                          |        |                            | —           | 1,300 | 5,200 | A | 1 |
|                  |             |                      |                        | For Lead                     | —                 | SPVQ330700       | SPVQ330600        | SPVQ330500        |                          |        |                            | —           |       |       |   | 2 |
|                  | Right angle |                      |                        | —                            | SPVQ330900        | —                | —                 | —                 | 3                        |        |                            |             |       |       |   |   |
|                  | Left angle  |                      |                        | —                            | —                 | SPVQ330800       | —                 | —                 | 4                        |        |                            |             |       |       |   |   |
|                  | 1           |                      |                        | With wire (Downwards)        | —                 | —                | —                 | —                 | SPVQ310100※              | 180    | 720                        | D           | 5     |       |   |   |
|                  |             |                      |                        |                              | SPVQ310200※       | SPVQ310300※      | SPVQ310400※       | —                 | 6                        |        |                            |             |       |       |   |   |
|                  |             |                      |                        | With wire (Right side)       | —                 | SPVQ310600※      | SPVQ310700※       | SPVQ310800※       | —                        |        |                            |             | 168   | 672   | C | 8 |
|                  |             |                      |                        | With wire (Left side)        | —                 | SPVQ310900※      | SPVQ311000※       | SPVQ311100※       | —                        |        |                            |             |       |       |   | 9 |
|                  | 2           | Actuator B           | For PC board           | SPVQ331300                   | SPVQ331200        | SPVQ331100       | SPVQ331000        | —                 | 1,300                    | 5,200  | A                          | 1           |       |       |   |   |
|                  |             |                      | For Lead               | —                            | SPVQ331600        | SPVQ331500       | SPVQ331400        | —                 |                          |        |                            | 2           |       |       |   |   |
|                  |             |                      | Right angle            | —                            | SPVQ331800        | —                | —                 | —                 |                          |        |                            | 3           |       |       |   |   |
|                  |             |                      | Left angle             | —                            | —                 | SPVQ331700       | —                 | —                 |                          |        |                            | 4           |       |       |   |   |
|                  |             |                      | 1                      | With wire (Downwards)        | —                 | —                | —                 | —                 | SPVQ311200※              | 180    | 720                        | D           | 5     |       |   |   |
|                  |             |                      |                        |                              | SPVQ311300※       | SPVQ311400※      | SPVQ311500※       | —                 | 6                        |        |                            |             |       |       |   |   |
|                  |             |                      |                        | With wire (Right side)       | —                 | SPVQ311700※      | SPVQ311800※       | SPVQ311900※       | —                        |        |                            |             | 168   | 672   | C | 8 |
|                  |             |                      |                        | With wire (Left side)        | —                 | SPVQ312000※      | SPVQ312100※       | SPVQ312200※       | —                        |        |                            |             |       |       |   | 9 |

## ■ Notes

- ※ Products with a wire will be supplied as follows.
  - Unless specified, the length of the lead wire is 250mm. Color is either red, black or yellow. Please consult us for length modification.
  - Unless circuit is specified, wired (downward) types will apply three wires.
  - 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

| Product No. | Number of packages (pcs.) |                         | Export package measurements (mm) |
|-------------|---------------------------|-------------------------|----------------------------------|
|             | 1 case / Japan            | 1 case / export packing |                                  |
| <b>A</b>    | 1,300                     | 5,200                   | 540×360×290                      |

## Bulk

| Product No. | Number of packages (pcs.) |                         | Export package measurements (mm) |
|-------------|---------------------------|-------------------------|----------------------------------|
|             | 1 case / Japan            | 1 case / export packing |                                  |
| <b>B</b>    | 400                       | 1,600                   | 555×375×223                      |
| <b>C</b>    | 168                       | 672                     |                                  |
| <b>D</b>    | 180                       | 720                     | 540×360×270                      |

## Dimensions

Unit:mm

| No. | Style                                                                                                                                                        |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | <p>※ Refer to page 54 "Actuator Configurations" for operating part shape.<br/>         ※ Refer to page 54 "Main Body Configurations" for boss positions.</p> |
| 2   | <p>※ Refer to page 54 "Actuator Configurations" for operating part shape.<br/>         ※ Refer to page 54 "Main Body Configurations" for boss positions.</p> |
| 3   | <p>※ Refer to page 54 "Actuator Configurations" for operating part shape.</p>                                                                                |
| 4   | <p>※ Refer to page 54 "Actuator Configurations" for operating part shape.</p>                                                                                |

■ Dimensions

Unit:mm

| No. | Style                                                                                                                                                          |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5   | <div><p>※ Refer to page 54 "Actuator Configurations" for operating part shape.</p></div>                                                                       |
| 6   | <div><p>※ Refer to page 54 "Actuator Configurations" for operating part shape.<br/>※ Refer to page 54 "Main Body Configurations" for boss positions.</p></div> |
| 7   | <div><p>※ Refer to page 54 "Actuator Configurations" for operating part shape.</p></div>                                                                       |
| 8   | <div><p>※ Refer to page 54 "Actuator Configurations" for operating part shape.<br/>※ Refer to page 54 "Main Body Configurations" for boss positions.</p></div> |

## Dimensions

Unit:mm

| No. | Style                                                                                                                                           |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 9   | <p>※ Refer to below "Actuator Configurations" for operating part shape.<br/>※ Refer to below "Main Body Configurations" for boss positions.</p> |

## Actuator Configurations

Unit:mm

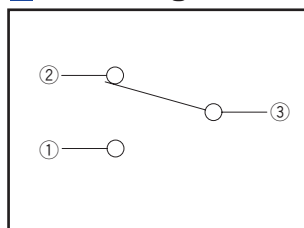
| Push | Actuator A | Actuator B |
|------|------------|------------|
|      |            |            |

## Main Body Configurations

Unit:mm

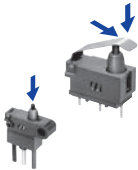
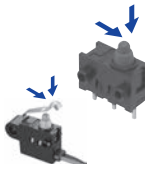
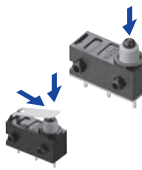
| Normal | Boss - right side | Boss - left side | Boss - both sides |
|--------|-------------------|------------------|-------------------|
|        |                   |                  |                   |

## Circuit Diagram



# 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                                                                                  | 59                                                                                  |

|                                        |    |
|----------------------------------------|----|
| Detector Switches Soldering Conditions | 73 |
| Detector Switches Cautions             | 74 |

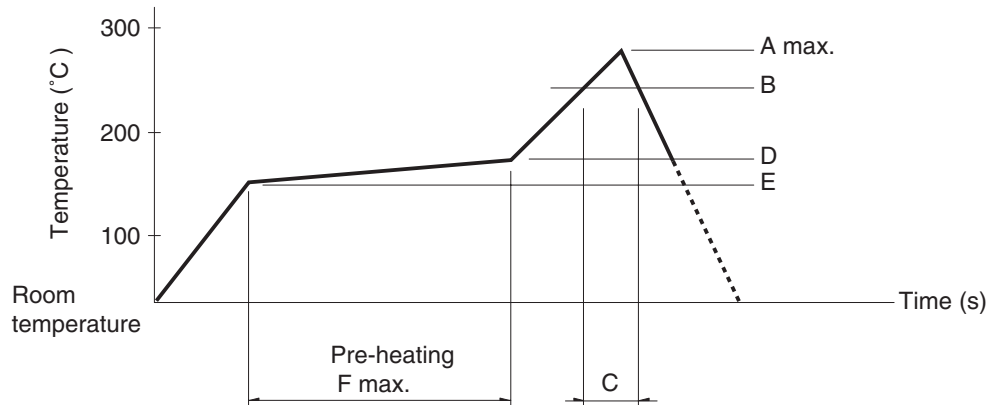
### Note

● 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) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| 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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