

SPVQ3 Water-proof Type

Long travel type applicable to oblique pressing without an actuator



Detector

Slide

Push

Rotary

Power

Dual-in-line Package Type

General-purpose Type

Water-proof Type

Fast Switching Type



Typical Specifications

| Items | | Specifications | |
|--|--------------|---|--|
| | | Normal type | Longlife type |
| Rating (max.)/(min.) (Resistive load) | | 0.1A 12V DC 50μA 5V DC | 0.3A 16V DC 1mA 5V DC |
| Contact resistance (Initial / After operating life) | | 500mΩ max. / 1Ω max. | |
| Operating force | | Push type 1±0.5N Actuator type 3N max. | |
| Operating life | Without load | 300,000cycles | 1,200,000cycles |
| | With load | 300,000cycles (0.1A 12V DC) | 1,200,000cycles (0.1A 16V DC) 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 |
| | | | With wire (Downwards) | — | — | — | — | SPVQ361000* | 400 | 1,600 | B | 5 |
| | | | | — | SPVQ361100* | SPVQ361200* | SPVQ361300* | — | | | | 6 |
| | 1 | Push | With wire (Right side) | — | — | — | — | SPVQ361400* | 400 | 1,600 | B | 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 |
| | | | With wire (Downwards) | — | — | — | — | SPVQ350100* | 180 | 720 | D | 5 |
| | | | | — | SPVQ350200* | SPVQ350300* | SPVQ350400* | — | | | | 6 |
| | 1 | Actuator A | 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 | A | 1 |
| For Lead | | | — | SPVQ371600 | SPVQ371500 | SPVQ371400 | — | 2 | | | | |
| Right angle | | | — | SPVQ371800 | — | — | — | 3 | | | | |
| Left angle | | | — | — | SPVQ371700 | — | — | 4 | | | | |
| With wire (Downwards) | | | — | — | — | — | SPVQ351200* | 180 | 720 | D | 5 | |
| | | | — | SPVQ351300* | SPVQ351400* | SPVQ351500* | — | | | | 6 | |
| 1 | Actuator B | 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 | | Actuator A | 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 B | 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 | Actuator B | 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 |
| For Lead | | | | — | SPVQ331600 | SPVQ331500 | SPVQ331400 | — | 2 | | | | | | | | | |
| Right angle | | | | — | SPVQ331800 | — | — | — | 3 | | | | | | | | | |
| Left angle | | | | — | — | SPVQ331700 | — | — | 4 | | | | | | | | | |
| 1 | Actuator B | 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 | |
| A | 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 | 400 | 1,600 | 555×375×223 |
| C | 168 | 672 | |
| D | 180 | 720 | 540×360×270 |

Detector

Slide

Push

Rotary

Power

Dual-in-line Package Type

General-purpose Type

Water-proof Type

Fast Switching Type

SPVQ3 Water-proof Type

Dimensions

Unit:mm

| No. | Style |
|-----|--|
| 1 | <p> Terminal No.③-① ON starting point Terminal No.③-② OFF starting point Free position Operating force measurement position Total travel position PC board mounting face Terminal No.① Terminal No.② Terminal No.③ 0.9 2.3 5 5 13 4 4.35 3.3 6.1 (6.4) 8.4 8.7 9.1 0.25 5.8 0.5 </p> <p> ※ Refer to page 54 "Actuator Configurations" for operating part shape. ※ Refer to page 54 "Main Body Configurations" for boss positions. </p> |
| 2 | <p> Terminal No.③-① ON starting point Terminal No.③-② OFF starting point Free position Operating force measurement position Total travel position Terminal No.① Terminal No.② Terminal No.③ 2.3 4.35 4.35 13 4 4.35 7.45 1.5 1.2 2.2 6.1 (6.4) 8.4 8.7 9.1 0.25 5.8 0.5 </p> <p> ※ Refer to page 54 "Actuator Configurations" for operating part shape. ※ Refer to page 54 "Main Body Configurations" for boss positions. </p> |
| 3 | <p> Terminal No.③-① ON starting point Terminal No.③-② OFF starting point Free position Operating force measurement position Total travel position PC board mounting face Terminal No.① Terminal No.② Terminal No.③ 0.9 2.3 5 5 13 4 4.15 6.1 (6.4) 8.4 8.7 9.1 0.25 5.8 6 0.15 (2.6) </p> <p> ※ Refer to page 54 "Actuator Configurations" for operating part shape. </p> |
| 4 | <p> Terminal No.③-① ON starting point Terminal No.③-② OFF starting point Free position Operating force measurement position Total travel position PC board mounting face Terminal No.① Terminal No.② Terminal No.③ 0.9 2.3 5 5 13 4 4.15 6.1 (6.4) 8.4 8.7 9.1 0.25 5.8 6 0.15 (2.6) </p> <p> ※ Refer to page 54 "Actuator Configurations" for operating part shape. </p> |

Dimensions

Unit:mm

| No. | Style |
|-----|--|
| 5 |  <p>Terminal No.③-① ON starting point Terminal No.③-② OFF starting point Hole (for M3) Terminal No.③ Terminal No.② Terminal No.① Free position Operating force measurement position Total travel position</p> <p>※ Refer to page 54 "Actuator Configurations" for operating part shape.</p> |
| 6 |  <p>Terminal No.③-① ON starting point Terminal No.③-② OFF starting point Free position Operating force measurement position Total travel position Terminal No.③ Terminal No.② Terminal No.①</p> <p>※ Refer to page 54 "Actuator Configurations" for operating part shape. ※ Refer to page 54 "Main Body Configurations" for boss positions.</p> |
| 7 |  <p>Wire Terminal No.③ Terminal No.① or ② Terminal No.③-① ON starting point Free position Operating force measurement position Total travel position Hole (for M3)</p> <p>※ Refer to page 54 "Actuator Configurations" for operating part shape.</p> |
| 8 |  <p>Wire Terminal No.③ Terminal No.① or ② Terminal No.③-① ON starting point Free position Operating force measurement position Total travel position</p> <p>※ Refer to page 54 "Actuator Configurations" for operating part shape. ※ Refer to page 54 "Main Body Configurations" for boss positions.</p> |

Detector

Slide

Push

Rotary

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Dual-in-line
Package Type

General-
purpose Type

Water-proof
Type

Fast Switching
Type

SPVQ3 Water-proof Type

Detector

Slide

Push

Rotary

Power

Dual-in-line Package Type

General-purpose Type

Water-proof Type

Fast Switching Type

Dimensions

Unit:mm

| No. | Style |
|-----|--|
| 9 | <p>※ Refer to below "Actuator Configurations" for operating part shape. ※ 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 Two-way | Two-way | | One-way Two-way | Two-way |
| Dimensions (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°C to +85°C | | | | |
| Automotive use | | ● | ● | ● | ● | ● |
| Life cycle (availability) | |  |  |  |  |  |
| Poles / Positions | | 1/2 | 1/1 1/2 | | 1/2 | 1/1 1/2 |
| Rating (max.) (Resistive load) | | 0.1A 12V DC | 0.1A 12V DC or 0.3A 16V DC | 0.1A 12V DC | | |
| Rating (min.) (Resistive load) | | 50μA 3V DC | 50μA 5V DC or 1mA 5V DC | 1mA 5V DC | 50μA 5V DC | |
| Durability | Operating life without load | 300,000cycles 1Ω max. | 300,000cycles or 1,200,000cycles 1Ω max. | 300,000cycles 1Ω max. | | |
| | Operating life with load Rating (max.) (Resistive load) | 300,000cycles 1Ω max. | 300,000cycles or 1,200,000cycles 1Ω max. | 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 (with terminal) Wire strength 30N for 1minute (with wire) | | Wire strength 30N for 1 minute | 3N 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 | | 2N max. 5.9N max. | 1±0.5N 3N max. | 3N max. | 1±0.5N 3N max. | 1±0.5N |
| Page | | 46 | 50 | 55 | 56 | 59 |

| | |
|--|----|
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| Detector Switches Cautions | 74 |

Note
● Indicates applicability to all products in the series.

Detector Switches Soldering Conditions

Example of Reflow Soldering Condition

1. Heating method: Double heating method with infrared heater.
2. Temperature measurement: Thermocouple $\phi 0.1$ to 0.2 CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.
3. Temperature profile



| Series (Reflow type) | A (°C) 3s max. | B (°C) | C (s) | D (°C) | E (°C) | F (s) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| SPPB | 250 | 230 | 40 | 180 | 150 | 120 |
| SPPW8 | | | 35 | | | |
| SPVE | 260 | | 40 | | | |
| SPVL | | | | | | |
| SPVM | | | | | | |
| SPVN | | | | | | |
| SPVR | | | | | | |
| SPVS | | | | | | |
| SPVT | | | | | | |
| SSCM | | | | | | |
| SSCQ | | | | | | |
| SPVQC, SPVQE | 250 | | | | | |

Notes

1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, surface depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface temperatures.
2. Soldering conditions differ depending on reflow soldering machines. Prior verification of soldering condition is highly recommended.

Reference for Hand Soldering

| Series | Soldering temperature | Soldering time |
|--|-----------------------|----------------|
| SPVS, SPVN, SPVT, SPVM, SPVR, SPVE, SPPW8, SSCQ, SSCM, SPVL, SSCT, SPVQC, SPVQE | 350±5°C | 3s max. |
| SPVQ1, SPVQ3, SPVQ6, SPVQ7, SPVQ8, SPVQ9, SSCN, SPVQA | 300±10°C | 3 + 1 / 0s |
| SPPB (Reflow) | 300±5°C | 5s max. |
| SSCF, SPPB (For Lead, Dip) | 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 |
| SSCT, SPVQ1, SPVQ3, SPVQ6, SPVQ7, SPVQ8, SPVQ9, SPVQA | 100±10°C | 60s max. | 260±5°C | 5±1s |
| SPPW8, SPPB | 100 °C max. | 60s max. | 255±5°C | 5±1s |
| SSCF | — | | 260±5°C | 5±1s |

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