# 511

## Features

- ☐ Heavy duty 140A 400VAC(for 511E), 100A 400VAC (for 511H) power type.
- ☐ SPDM contact configuration with large contact gap 3.0mm version.
- ☐ Conforms to European photovoltaic standard IEC 62109-1.
- ☐ Coil holding voltage can be reduced to 50~55% V of the nominal coil voltage for saving energy.
- ☐ High performance PCB power relay for photovoltaic power generation systems (solar inverter).
- ☐ Complies with RoHS-Directive 2011/65/EU.

## Type List

| Terminal style | Contact form | Designation (provided with) |
|---|---|---|
| | | Flux tight |
| PCB terminal | 1A (SPDM) | 511EP-1AH-F-C |
| | | 511HP1-1AH-F-C |

## Ordering Information

| 511 | E | P | - | 1A | H | - | F | - | C | ☐ |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | | 4 | 5 | | 6 | | 7 | 8 |

1. 511 -- Basic series designation
2. H -- High power type
   E -- Extreme type
3. P -- PCB terminal (only for 511E)
   P1 -- PCB terminal (only for 511H)
4. 1A -- Form A, single-pole, double-make (SPDM)
5. H -- Contact material Ag alloy
6. F -- Class F
7. C -- Flux tight
8. ☐ -- Coil voltage (please refer to the coil rating data for the availability)

## Contact Rating

◆ High power type

| | |
|---|---|
| Rated load (Resistive) | Making 40A, Carrying 100A, Breaking 40A / 240VAC, On 1s/Off 9s, at 85°C, 10K ops. |
| | Making 30A, Carrying 100A, Breaking 30A / 400VAC, On 1s/Off 9s, at 85°C, 10K ops. |
| Max. switching current | 100A |
| Max. switching voltage | 400VAC |

◆ Extreme type

| | |
|---|---|
| Rated load (Resistive) | Making 40A, Carrying 120A, Breaking 40A / 240VAC, On 1s/Off 9s, at 85°C, 10K ops |
| | Making 30A, Carrying 120A, Breaking 30A / 400VAC, On 1s/Off 9s, at 85°C, 10K ops. |
| Max. switching current | 140A |
| Max. switching voltage | 400VAC |

## Coil Rating (DC)

| Rated voltage (V) | Rated current ±10 % at 23°C (mA) | Coil resistance ±10 % at 23°C (Ω) | Pick up voltage (Max.) at 23°C (1) | Drop out voltage (Min.) at 23°C | Continuous voltage at 85°C (2) | Power consumption at rated / holding voltage |
|---|---|---|---|---|---|---|
| 12 | 266.7 | 45 | 75 % of rated voltage | 5 % of rated voltage | 50~55 % of rated voltage | approx. 3.2W / 0.8W (2) |
| 24 | 133.3 | 180 | | | | |

Notes : (1) To energize relay properly apply 100%~120% nominal coil voltage for 200ms.
(2) Coil holding voltage is 50~55% of nominal voltage after applying nominal voltage for 200ms.

## Specification

| | | |
|---|---|---|
| Contact material | Ag alloy | |
| Contact gap | 3.0 mm Min | |
| Contact resistance (1) | 100mΩ Max. (at 1A/6VDC by 4-wire resistance measurement)<br>6 mΩ Max. (By voltage drop 10A) | |
| Operate time (1) | 30ms Max. | |
| Release time (1) | 30ms Max. | |
| Vibration resistance | Operating extremes | 10~50Hz , amplitude 1.5 mm |
| | Damage limits | 10~50Hz , amplitude 1.5 mm |
| Shock resistance | Operating extremes | 10G |
| | Damage limits | 100G |
| Life expectancy | Mechanical | 1,000,000 ops.<br>(frequency 9,000 ops./hr) |
| Operating ambient temperature | -40~+85°C (no freezing) | |
| Weight | Approx.170 g | |

Notes : (1) Initial value. Operate and release time excluding contact bounce.
(2) Unless otherwise specified, all tests are under room temperature and humidity.
(3) Consider the heat of PCB is necessary, please check the actual condition of PCB.
(4) Applying no diode to this relay. The life expectancy will be lower when a diode is used. To use a varistor (ZNR) could absorb the coil surge of relay that is recommended.
(5) Do not use the relay exceeding the coil rating, contact rating and life expectancy, or this may cause the risk of overheating.
(6) To assure optimum performance, avoid the relay from dropping, hitting, or other unnecessary shocks.
(7) Do not switch the contacts without any load as the contact resistance may become increased rapidly.
(8) Please contact Song Chuan for the detailed information.

## Insulation Data

| | | |
|---|---|---|
| Insulation resistance (1) | 1000MΩ Min. (DC 500V) | |
| Dielectric strength (1) | Between open contact | : AC 2000V, 50/60Hz 1 min. |
| | Between contact and coil | : AC 4000V, 50/60Hz 1 min. |
| Insulation of IEC 61810-1 | | |
| Clearance / creepage distances | Between coil to contact | : Double /Reinforce,<br>≥3.0mm / ≥5.0 mm (for 250VAC)<br>≥3.0mm / ≥8.0 mm (for 400VAC) |
| | Between open contact | : Basic,<br>≥1.5 mm/ ≥2.5 mm (for 250VAC)<br>≥3.0 mm/ ≥4.0 mm (for 400VAC) |
| Rated insulation voltage | 250 / 400V | |
| Rated impulse withstand voltage | 2500V | |
| Pollution degree | 2 | |

| | |
|---|---|
| Rated voltage | 230 / 400V |
| Overvoltage category | II |
| Compliant with European photovoltaic standard | |
| Contact gap | 3.0mm (IEC 62109-1 and VDE 0126) |

Notes : (1) Initial value.

## Safety Approval

| Certified | UL / CUL | TUV |
|---|---|---|
| File No. | E88991 | R50267102 |

## Safety Approval Rating

◆ 511H type

| UL / CUL | TUV |
|---|---|
| 60A 277VAC, Resistive, Carrying current 100A<br>30A 400VAC, Resistive, Carrying current 100A | Making 60A, Carrying 100A, Breaking 60A /250VAC (1)<br>Making 30A, Carrying 100A, Breaking 30A /400VAC (1) |

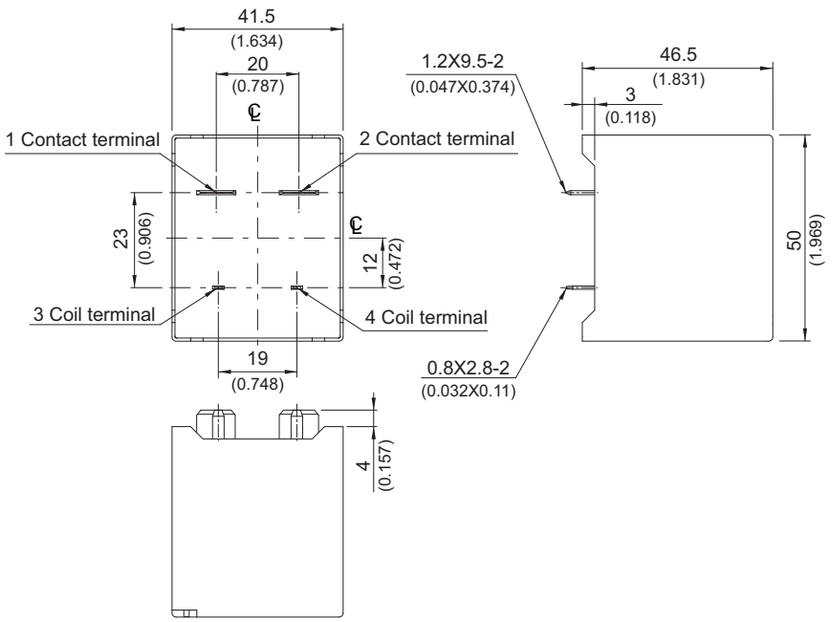
◆ 511E type

| UL / CUL | TUV |
|---|---|
| 60A 277VAC, Resistive, Carrying current 140A<br>60A 400VAC, Resistive, Carrying current 140A | Making 60A, Carrying 120A, Breaking 60A /250VAC (1)<br>Making 60A, Carrying 120A, Breaking 60A /400VAC (1) |

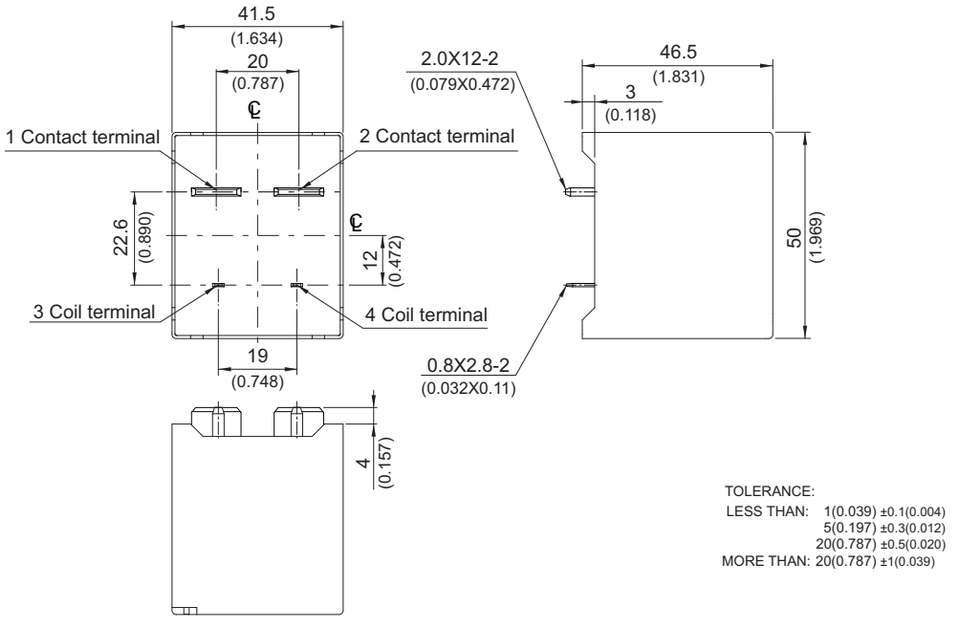
Notes : (1) With 50%~55% modulation of nominal coil voltage.

## Outline Dimensions

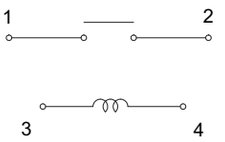
◆ 511HP1



◆ 511EP

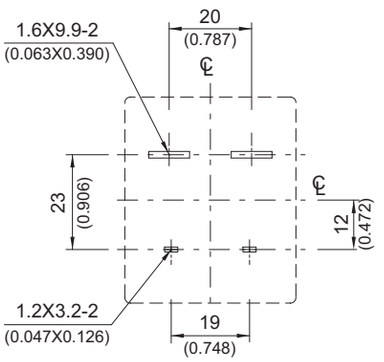



## Wiring Diagram (Bottom view)

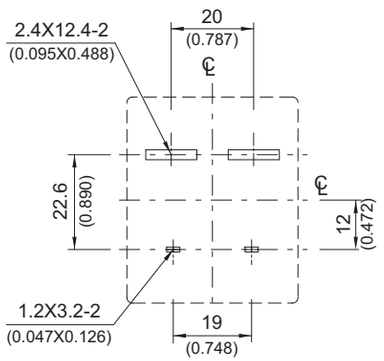



## PC Board Layout (Bottom view)

◆ 511HP1




◆ 511EP



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511HP1-1AH-F-C-24VDC 511HP1-1AH-F-C-12VDC