

SURGE PROTECTIVE DEVICE



Surge Protective Device

| Type | Max. discharge current I _{max} /I _{imp} (kA) | | Number of poles (P) | R: with alarm auxiliary contact Blank: without alarm auxiliary contact | Max. continuous operating voltage U _c (V) | |
|------|--|-----------------|-----------------------|---|--|----------------------------|
| | | | | | Max. discharge current | Standard operation voltage |
| BHP | 20 | 20kA (8/20μs) | 1P: 1P | | 20kA | 320V |
| | 40 | 40kA (8/20μs) | 1P1: 1P+1 2P: 1P+N | | 40kA | 385V |
| | 80 | 80kA (8/20μs) | 3P: 3P 3P1: 3P+1 | | 80kA | 385V |
| | 100 | 100kA (8/20μs) | 4P: 3P+N | | 100kA | 385V |
| | 250 | 25kA (10/350μs) | | | 25kA | 440V |

In order to use surge protective device more effectively, the following information is necessary.

1. The grounding system types of the protected device and the maximum operating voltage of the power grid U_s. Max.
2. The impulse withstand voltage of the protected device.

| Max. continuous operating voltage U _c (V) | Protective mode | TT | TT | TN-S | TN-C | IT | IT |
|--|-----------------|------------|-----------|------|------|------------------------|----------------------------|
| | | Before RCD | After RCD | | | Neutral point earthing | Neutral point non-earthing |
| 320V | Common | — | — | 2P | 2P | — | 3P |
| | Differential | — | — | 1P+1 | 1P+1 | 1P+1 | — |
| 385V 440V | Common | 3P | 4P | 4P | 4P | — | 3P |
| | Differential | 3P+1 | — | — | — | 3P+1 | — |

- **Common mode protection:**
Protection of line to earth (Protection of line and neutral to earth)
- **Differential mode protection:**
Protection of line to earth and neutral(Protection of line to neutral and line to earth)

Operating Conditions

- **Frequency:** 48~60Hz.
- **Voltage:** The voltage continuously applied on between the wiring terminal of the surge protective device shall not exceed its maximum continuous operating voltage U_c.
- **Altitude:** Less than 2,000M.
- **Temperature:** - Normal range: -5°C ~ +40°C;
- Ultimate range: -40°C ~ +70°C;
- **Humidity- Relative humidity:** 30%~90%, non-condensing.

Combination Selection of Surge Protective Device and Circuit Breaker

The internal core of SPD is one zinc-oxide pressure-sensitive element and zinc oxide consists of grains. When the surge current with energy through the SPD far exceeds its specified value, ceramic breakdown will happen, and certain grain boundary layers in the ceramic will be damaged. Under extreme circumstances, excessive heat generated by over high continuous load will damage the grains, and even break the grains down under serious conditions, leading to the fusion of ZnO grains and thus causing short circuit. Since there is no time for the burst heat to transfer to the thermal cutoff mechanism, fuse or circuit breaker must be used for cutting off the power.

Even under the condition of precise parameter selection, the over high temperature rise and burst of the SPD due to overload are not eliminated.

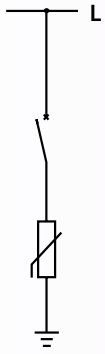
| SPD | | Circuit Breaker | | |
|---|--|-----------------|---------------------|--------------|
| Max. discharge current I_{max}/I_{imp} (kA) | | Rated current | Trip characteristic | Model |
| 20kA (8/20 μ s) | | 32A | C | BHA2XC32 |
| 40kA (8/20 μ s) | | 50A | C | BHA2XC50 |
| 80kA (8/20 μ s) | | 63A | C | BHA3XC63 |
| 100kA (8/20 μ s) | | 100A | 10In \pm 20% | BHA100XP100A |
| 25kA (10/350 μ s) | | 100A | 10In \pm 20% | BHA100XP100A |

- Special notes:**
1. The X in the breaker model indicates the pole number, for example, to design a breaker for BHP40, in combination with 4-pole 25A breaker, the model shall be BHA24C25.
 2. The breaking capacity of the breaker must be larger than the maximum short circuit current at this position.
 3. Protection shall be provided for each pole of the surge protective device.
 4. For PT secondary line protection, due to the restriction of the maximum load current of PT, full consideration shall be given to the following circumstances:
 - (1) The maximum short circuit current of PT, it is noted that, when discharge with excessive energy gets SPD breakdown and short-circuit, the secondary line shall not have high voltage paralysis. At this moment, the release current and quick response capacity of the breaker must be considered.
 - (2) Fuse may be considered, since standard fuse cannot be broken down by the pulse current, by contrast, the breaker can protect from the damages caused by the continuous surge with follow current or energy.

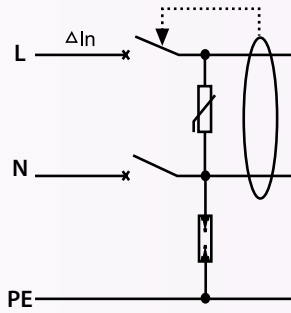
Parameter of Surge Protective Devices

| Type | Model | U_n (V) | U_c (V) | U_p (kV) | Impulse wave (μ s) | I_{max}/I_{imp} (kA) | I_n (kA) | Connection | |
|----------|--------|--------------|--------------|---------------|----------------------------|---------------------------|---------------|-----------------------|----------------------|
| | | | | | | | | L-N | PE |
| Cassette | BHP20 | 230/ 400 | 320 | ≤ 1.3 | 8/20 | 20 | 10 | $\geq 2.5\text{mm}^2$ | $\geq 6\text{mm}^2$ |
| | BHP40 | 230/ 400 | 385 | ≤ 1.8 | 8/20 | 40 | 20 | $\geq 4\text{mm}^2$ | $\geq 16\text{mm}^2$ |
| | BHP80 | 230/ 400 | 385 | ≤ 2.1 | 8/20 | 80 | 40 | $\geq 10\text{mm}^2$ | $\geq 25\text{mm}^2$ |
| Fixed | BHP100 | 230/ 400 | 385 | ≤ 2.3 | 8/20 | 100 | 60 | $\geq 16\text{mm}^2$ | $\geq 25\text{mm}^2$ |
| | BHP250 | 230/ 400 | 440 | ≤ 1.8 | 10/350 | 25 | 25 | $\geq 25\text{mm}^2$ | $\geq 35\text{mm}^2$ |

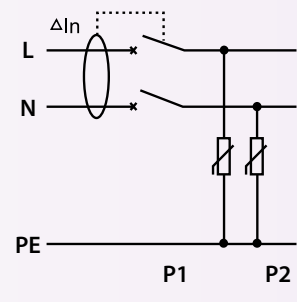
Wiring Diagrams



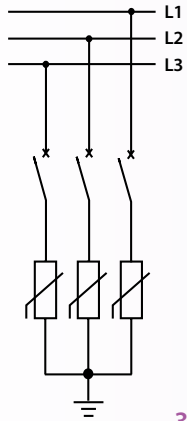
1P



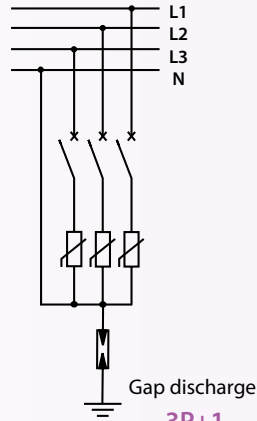
1P+1



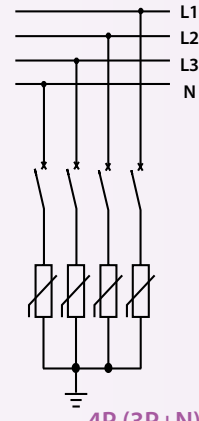
2P (1P+N)



3P



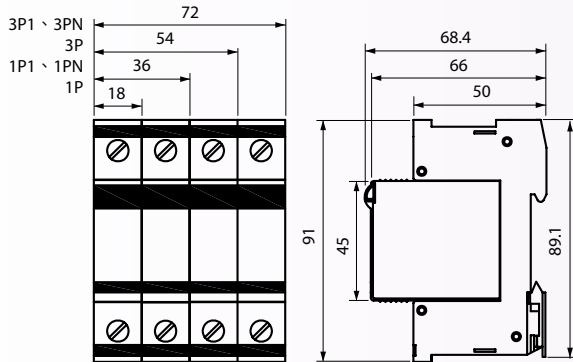
3P+1



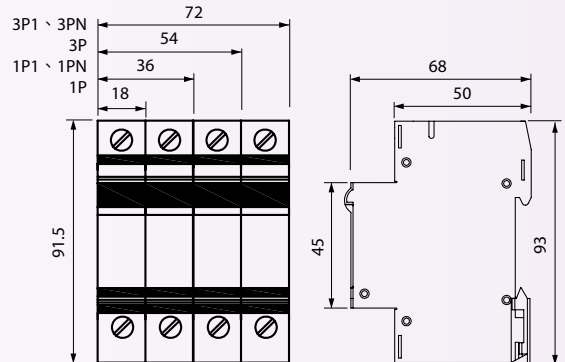
4P (3P+N)

Dimensions (mm)

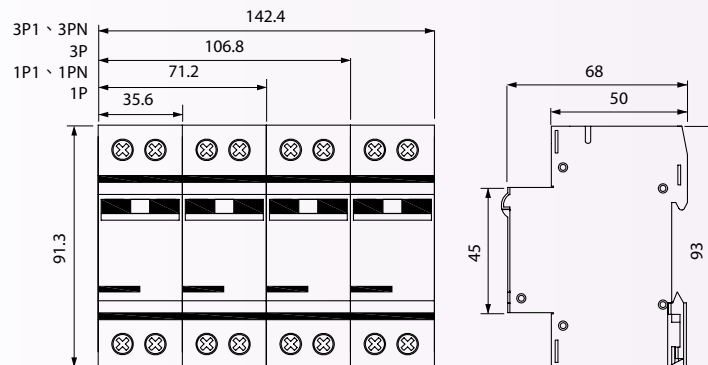
BHP20/40



BHP80/100

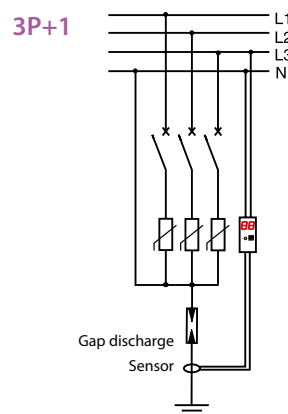
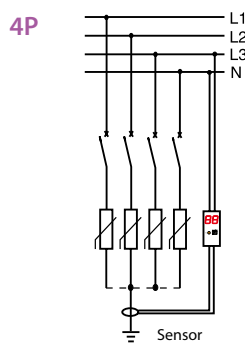
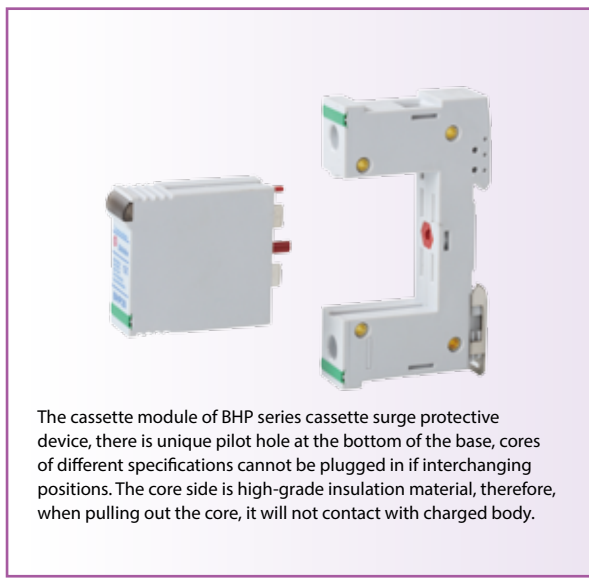
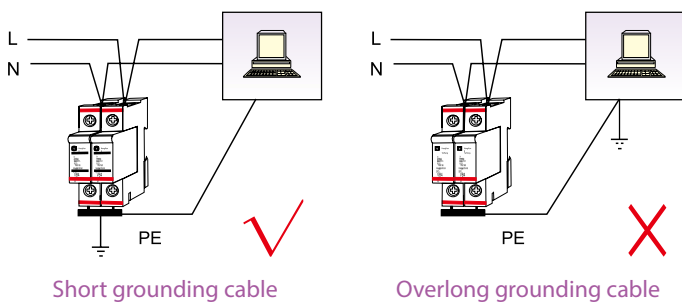


BHP250



Installation Method of SPD

1. The cable for connecting SPD shall be as short as possible, since the impedance of the wire can weaken the protection function of SPD.
2. To realize effective protection, it is suggested to install one lead-in device to locally diversify the current at the inlet of the device.
3. When one switch device and one SPD are mounted in a serial manner, the wire shall be as short as possible.



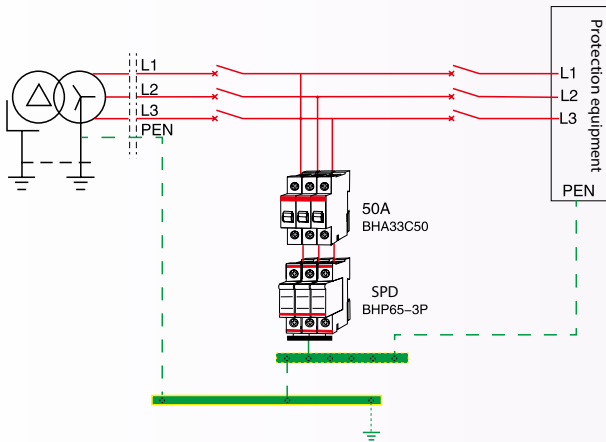
Counter

| Type | TAD-04-99 |
|---|---|
| Rated operation voltage | 85~250V |
| Counter pulse threshold | $\geq 1\text{kA}$ |
| Maximum count | 99 |
| Counting method | Pulse |
| Counter display method | 2 digits LED red |
| Minimum interval between counter pulses | $\geq 200\text{ms}$ |
| Digital memory method | Pulse falling edge, flash accumulation record |
| Dimension | 91 × 68 × 18 (mm) |

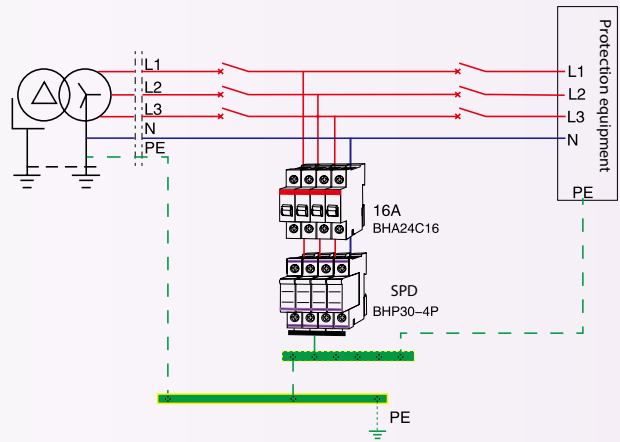
Note: Lightning strike pulse counter can count the discharge pulses and store them to the single-chip FLASH, and features intuitive display and small volume.

SPD Wiring Example

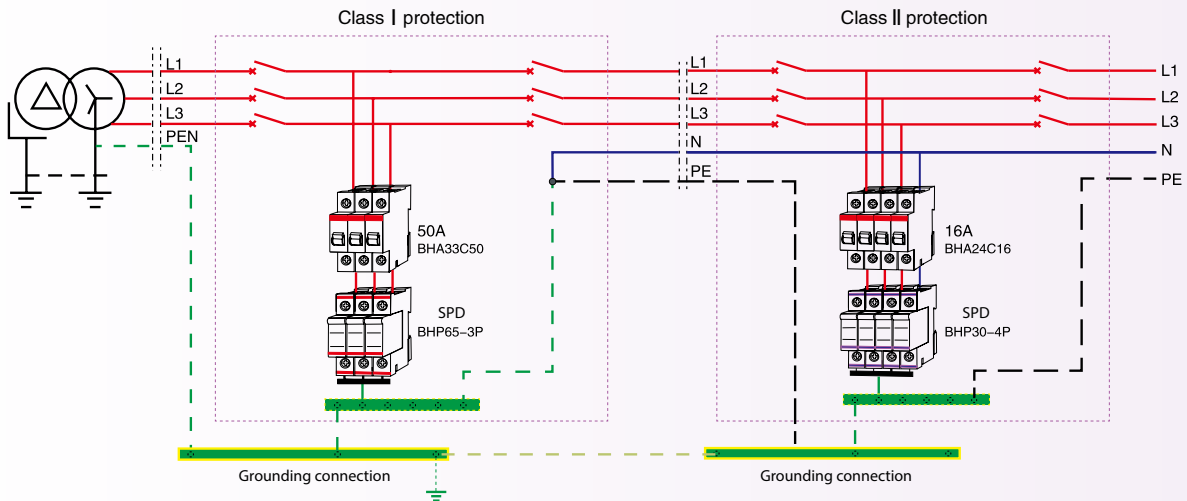
TN-C system three phase



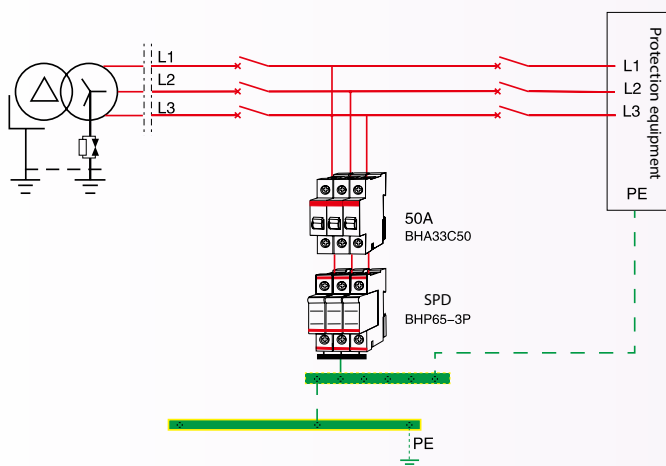
TN-S system three phase



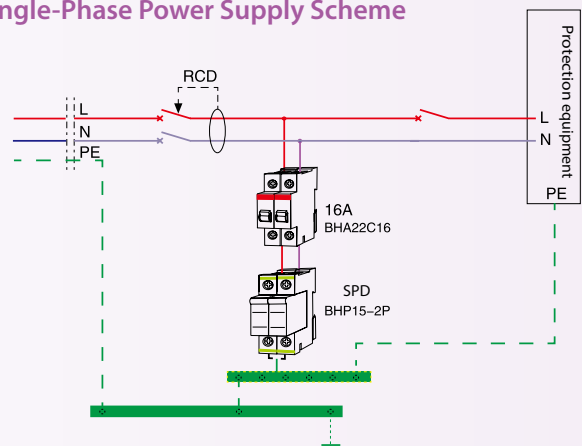
TN-C-S system three phase



IT system three phase



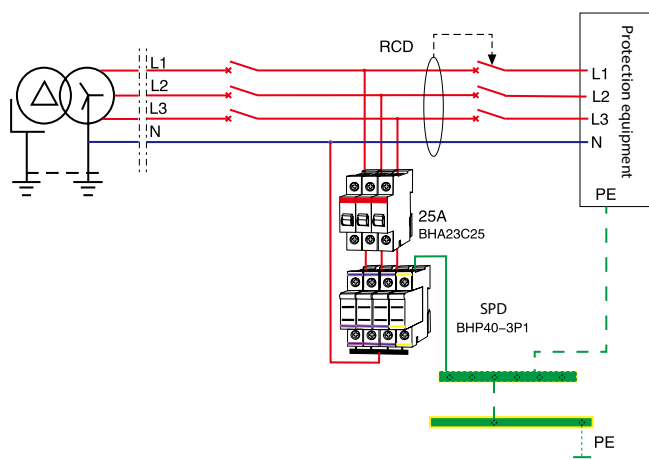
Single-Phase Power Supply Scheme



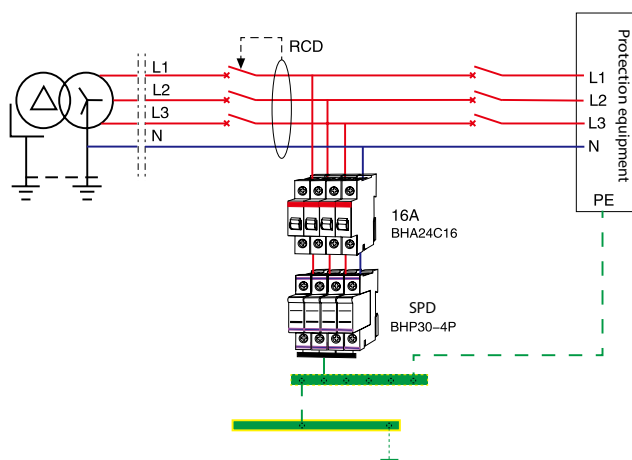
Special notes:

Time-delay leakage protector shall be selected for the RCD in the power supply system; leakage protector insensitive to atmospheric over-voltage shall be selected for the RCD installed in residences and office buildings.

TT System Scheme 1



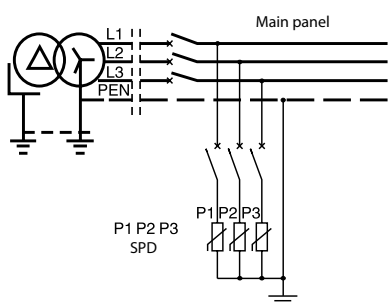
TT System Scheme 2



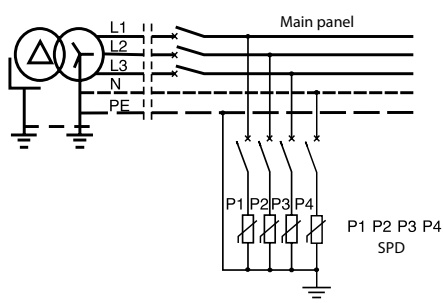
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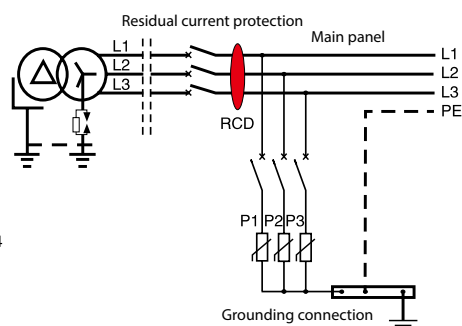
TN-C



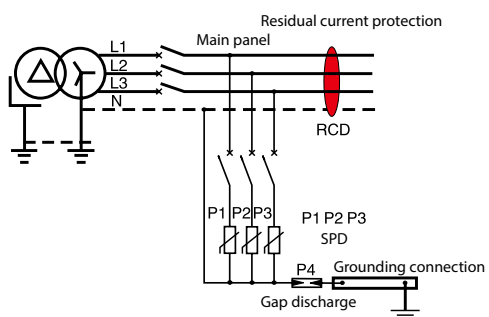
TN-S



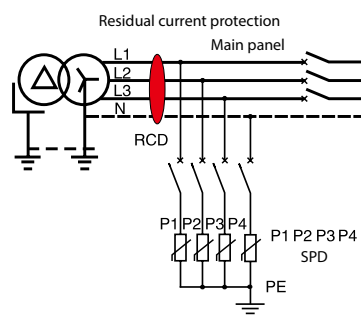
IT



TT System Scheme 1



TT System Scheme 2



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