



## Surge Protective Device

### Paperless Datasheet

Going green and protecting environment is manufacturers' responsibility. Each WatchfulEyE product has a link of downloading data sheet on its enclosure:  
<http://datasheet.watchfuleyesolutions.com/US120233.html>

### Model & Ordering Code

Model	Ordering Code	Remote Contacts	UPC/EAN Code	
WTH-50/B+C/R/1P-150	US120233	YES	(0) 811914030416	
WTH-50/B+C/R/1P-150	US120223	NO	(0) 811914030478	

Model with suffix	WTH-50/B+C/R/1P-150	x2pcs	x3pcs	x4pcs
Ordering Code	US120233	US120233x2	US120233x3	US120233x4

Model with suffix	WTH-50/B+C/R/1P-150	x2pcs	x3pcs	x4pcs
Ordering Code	US120223	US120223x2	US120223x3	US120223x4



### Certificates of Products



LISTED  
E345944



RoHS

IEC61643-11



## Surge Protective Device

### Description

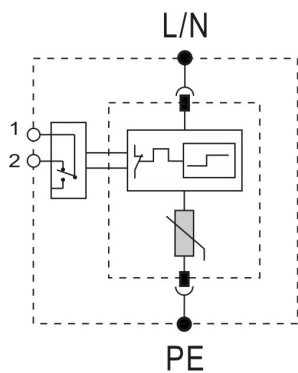
In accordance with: IEC 61643-11 - Class I+II and UL1449 Type 4 Location  
Location of use: main sub-distribution boards, branch sub-distribution boards  
One-piece compact design with minimized volume but maximized capability of Class I+II surge protection.  
Internal thermal disconnect devices help ensure safe or at end-of-life

### WTH-50/B+C/R/1P-150 Series Technical Data

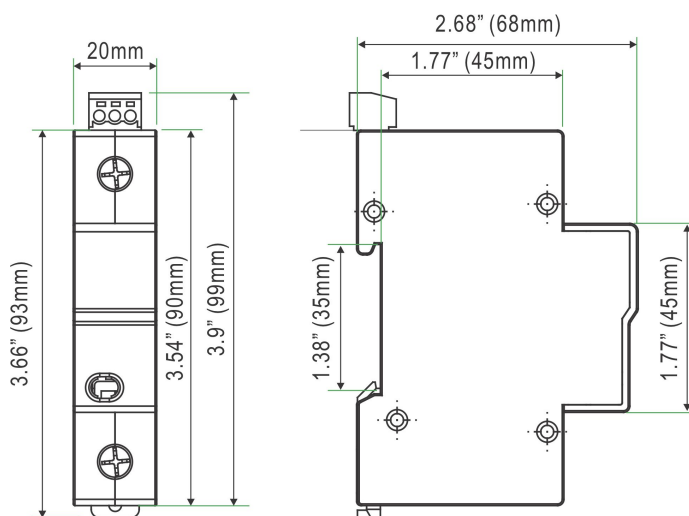
Requirement Class to IEC61643-11	Class I+II
IEEE Category Rating	C, B & A
Maximum Continuous Operating Voltage (Uc/MCOV)	150VAC 50/60Hz
Nominal Discharge Current (In)	25kA
Max. Discharge Current (Imax)	50kA
Pulsed Current (Iimp)	5kA
Voltage Protection Level (Up)	1.4kV
Residual Voltage (Ures)	0.8kV
Protection Modes	L-PE, N-PE
Protective Element	High Energy MOV
Follow Current (If)	NO
Response Time (tA)	<5ns
Leakage Current (at 75%U1mA)	<20μA
Thermal Protection	YES
Protection Rating (IP Code)	IP 20
Short Circuit Current Ratings (SCCR)	25kA rms
Max. Back-up Fuse (if mains >100A)	100A gL (circuit-breaker: <50A)
Surge Life at 3kA (8/20μs)	>5000 events
Temperature Range	- 40°F to 176°F (-40°C to 80°C)
Relative Humidity	0% to 95% noncondensing
Maximum Operating Altitude	10,000 feet (3000m)
Terminal Cross Section	35mm <sup>2</sup> (solid) / 25mm <sup>2</sup> (stranded)
Stripping Length Contacts	0.6inches (15mm)
Terminal Screw Torque	Max. 3.5Nm
DIN Rail EN60715	35mm top-hat rail
Dimensions DIN 43880	20mm
Housing Material	Thermoplastic (UL94 V-0)
Housing Design	Compact design
Net Weight Per Unit	0.3Lb (136g)

## Surge Protective Device

### Surge Protection Connection Diagram



### Dimensions



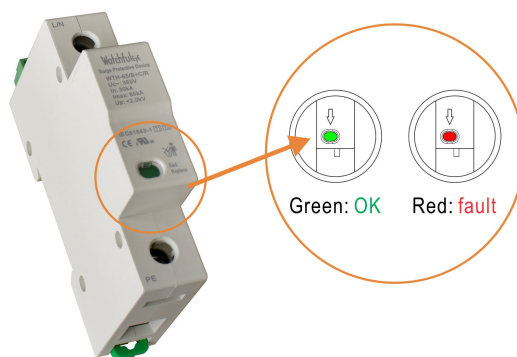
### Remote Contacts

- 1: COM (Common)
- 2: NC (Normally Close)



Contact Ratings	125VAC/3A, 250VAC/1.5A
Terminal Cross Section	Max. 1.5mm <sup>2</sup>
Stripping Length Contacts	0.25 inches (6-7mm)
Remote Terminal Torque	0.25Nm

### Fault Indication





## Surge Protective Device

### Common Terms and Definitions

1. Normal operating voltage rating ( $U_n$ )

2. Maximum Continuous Operating Voltage ( $U_c$ /MCOV):

Maximum r.m.s. voltage, which may be continuously applied to the surge protective device's mode of protection.

3. Nominal Discharge Current for Class II Test ( $I_n$ ):

crest value of the current through the surge protective device having a current waveshape of 8/20 $\mu$ s.

4. Maximum Discharge Current ( $I_{max}$ ):

Crest value of a current through the surge protective device having an 8/20 $\mu$ s waveshape and magnitude according to the manufacturers specification.  $I_{max}$  is equal to or greater than  $I_n$ .

5. Voltage Protection Level ( $U_p$ ):

Maximum voltage to be expected at the surge protective device terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape.

6. Residual Voltage ( $U_{res}$ ):

Crest value of voltage that appears between the terminals of an surge protective device due to the passage of discharge current.

7. IEEE 62.41

CATEGORY C: outdoor overhead lines, service entrance (most severe)

CATEGORY B: major feeder, short branch circuits, service panel (indoor)

CATEGORY A: long branch circuits, receptacles (indoor) (least severe)

### How to choose a suitable $U_c$ (MCOV) value

Note:  $U_c > 1.15U_n$

The relationship between two parameters  $U_c$  and  $U_p$  of a surge protective device is proportional.

If  $U_c$  is small, the value of  $U_p$  is also small; surge protective devices with smaller  $U_p$  can provide better surge protection. Whether to choose smaller  $U_c$  depends on the voltage stability of the grid.

If you choose surge protective devices with smaller  $U_c$  for the grid with instable voltage, the surge protective devices will frequently work while the grid voltage fluctuates, resulting in shortening surge protective device's product life.

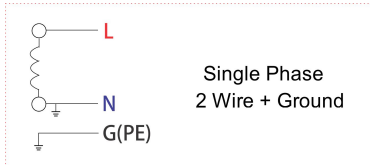
If you choose larger  $U_c$ , and the value of  $U_p$  is accordingly large, the surge protective efficiency will not be so fine.

If you are unsure of the voltage stability of the grid,

it is suggested to calculate MCOV( $U_c$ ) using the following formula:  $\sqrt{2} U_n < U_c < \sqrt{3} U_n$

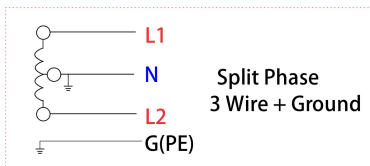
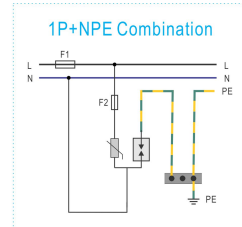
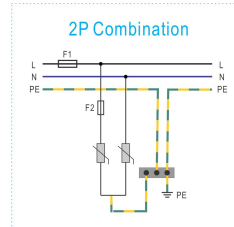
AC Network ( $U_n$ )	MCOV( $U_c$ ), L/N-PE Protection Mode
110V	150V
120/208V	150V
127/220V	150V
220/380V	275V, 320V, 385V
230/400V	275V, 320V, 385V, 420V
240/415V	320V, 385V, 420V
277/480V	320V, 385V, 420V
347/600V	550V, 690V

### AC Network Connection Diagram



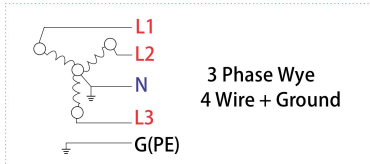
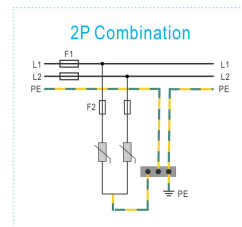
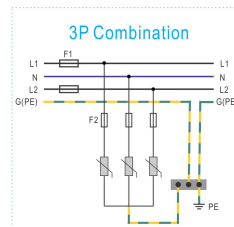
#### AC System Voltage

L-N:  
110V, 120V, 127V



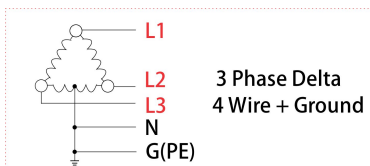
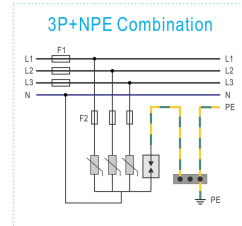
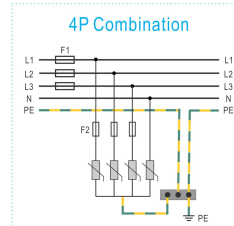
#### AC System Voltage

L-N/L-L:  
120/240V  
127/254V



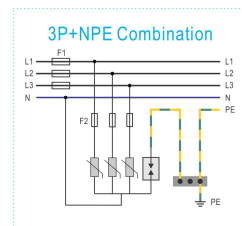
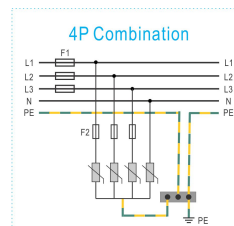
#### AC System Voltage

L-N/L-L:  
120V/208Y  
127V/220Y



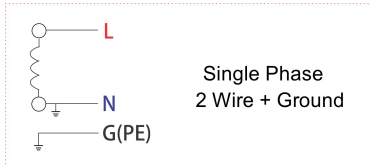
#### AC System Voltage

L-N/L-L:  
120/240V



## Surge Protective Device

### Difference mode & Common mode Connection Diagram

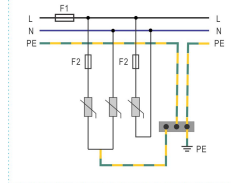


#### AC System Voltage

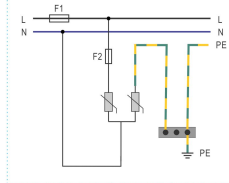
L-N:

110V, 120V, 127V  
220V, 230V, 240V  
277V, 480V

#### 3P Full Protection



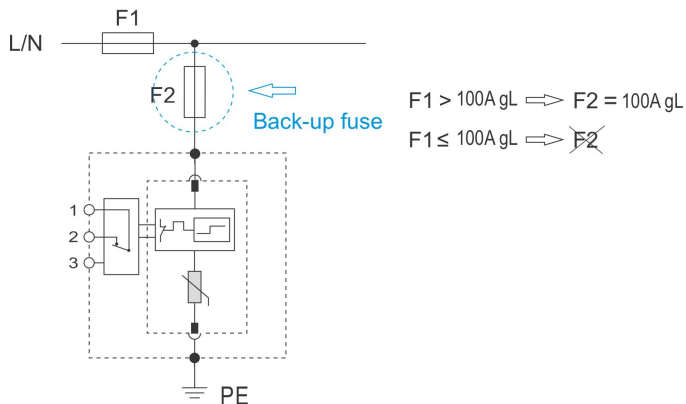
#### 2P, L-N, N-PE Mode



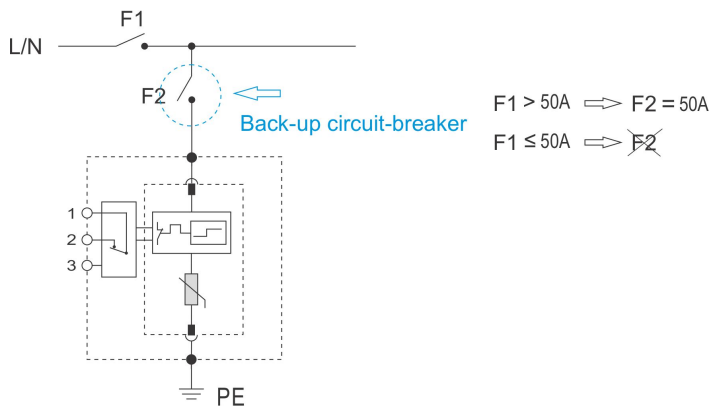
**Common mode:** L-PE, N-PE surge protection

**Difference mode:** L-N surge protection

### Selection of back-up fuse

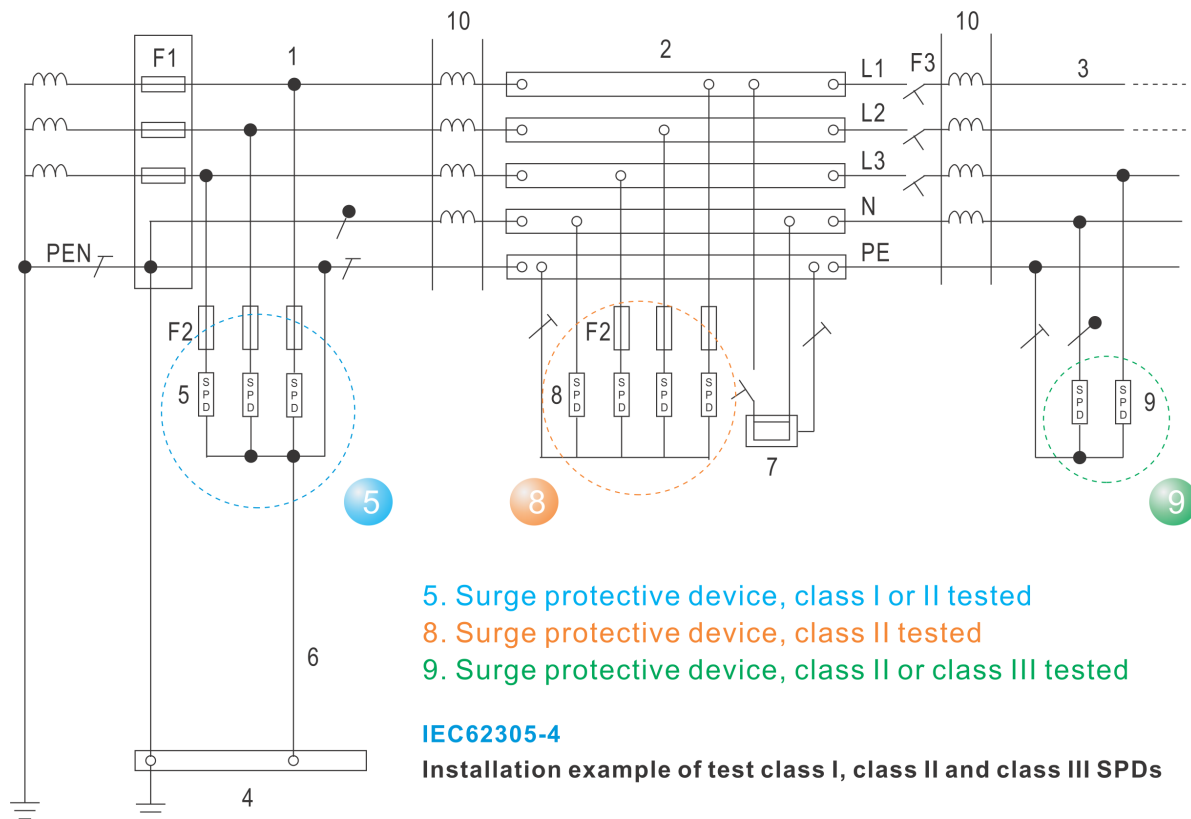


### Selection of back-up circuit-breaker



## Surge Protective Device

### Application



### Key

1. Origin of the installation
  2. Distribution board
  3. Distribution outlet
  4. Main earthing terminal or bar
  5. Surge protective device, class I or II tested
  6. Earthing connection (earthing conductor) of the surge protective device
  7. Fixed equipment to be protected
  8. Surge protective device, class II tested
  9. Surge protective device, class II or class III tested
  10. Decoupling element or line length
- F1, F2, F3 overcurrent protective disconnectors
- NOTE Refer to IEC 61643-12 for further information.



## Surge Protective Device

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### FAQ & Help

1. What should I do if I can't find the paper manual in the product packaging?

Watchful Eye products is committed to going green with paperless data sheets. On the side of each product enclosure is an engraved link with URL for downloading paperless data sheet and QR code of the website. If you need the paper data sheet, you can open the link and print the data sheet by yourself.

2. The advantages of fault indication windows?

If surge protection fails, the fault indication windows will turn red, thus it can be seen intuitively, and the surge protective device can be replaced in time to avoid damage to the equipment caused by a second surge.

3. What instruments can be used to test whether its surge protection function is normal or not?

Test with a Watchful Eye surge protector tester

4. Can you list more applications?

Power supply panel, whole house

5. What is the feature of Class I+II?

It provides high capability of Class I surge protection, and capability of Class II (equivalent to the parameters of WTH-40 ) fine protection with low residual voltage as well, applying to Class I and Class II surge protection in multiple areas. If you are not sure which module to choose for protecting your area, Class I + II is the best solution.



## Surge Protective Device

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### Download WatchfulEye Official App

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### After-sale Services

Watchful Eye provides a 5-year quality warranty globally.

[I have a question](#)