WatchfulEyE

Surge Protective Device

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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/US120234.html

Model & Ordering Code

Model	Ordering Code	MCOV/Uc	Remote Contacts	UPC/EAN Code
WTH-50/B+C/R/1P-275	US120234	275VAC	YES	(0) 811914030423
WTH-50/B+C/1P-275	US120224		NO	(0) 811914030485
WTH-50/B+C/R/1P-320	US120235	320VAC	YES	(0) 811914030430
WTH-50/B+C/1P-320	US120225		NO	(0) 811914030492
WTH-50/B+C/R/1P-385	US120236	385VAC	YES	(0) 811914030447
WTH-50/B+C/1P-385	US120226		NO	(0) 811914030508
WTH-50/B+C/R/1P-420	US120237	420VAC	YES	(0) 811914030454
WTH-50/B+C/1P-420	US120227		NO	(0) 811914030515

Certificates of Products

LISTED E345944 CE RoHS IEC61643-11

More Package

Model with suffix	WTH-50/B+C/R/1P-275	x2pcs	x3pcs	x4pcs
Ordering Code	US120234	US120234x2	US120234x3	US120234x4

Model with suffix	WTH-50/B+C/1P-275	x2pcs	x3pcs	x4pcs
Ordering Code	US120224	US120224x2	US120224x3	US120224x4

Model with suffix	WTH-50/B+C/R/1P-320	x2pcs	x3pcs	x4pcs
Ordering Code	US120235	US120235x2	US120235x3	US120235x4

Model with suffix	WTH-50/B+C/1P-320	x2pcs	x3pcs	x4pcs
Ordering Code	US120225	US120225x2	US120225x3	US120225x4

Model with suffix	WTH-50/B+C/R/1P-385	x2pcs	x3pcs	x4pcs
Ordering Code	US120236	US120236x2	US120236x3	US120236x4

Model with suffix	WTH-50/B+C/1P-385	x2pcs	x3pcs	x4pcs
Ordering Code	US120226	US120226x2	US120226x3	US120226x4

Model with suffix	WTH-50/B+C/R/1P-420	x2pcs	x3pcs	x4pcs
Ordering Code	US120237	US120237x2	US120237x3	US120237x4

Model with suffix	WTH-50/B+C/1P-420	x2pcs	x3pcs	x4pcs
Ordering Code	US120227	US120227x2	US120227x3	US120227x4

Watchful EyE

Surge Protective Device

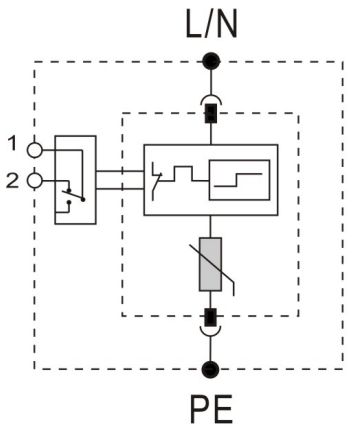
Description

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 Series Technical Data	
Requirement Class to IEC61643-11	Class I+II
IEEE Category Rating	C, B & A
Nominal Discharge Current (In)	25kA
Max. Discharge Current (Imax)	50kA
Pulsed Current (Iimp)	5kA
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	35mm² (solid) / 25mm² (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)

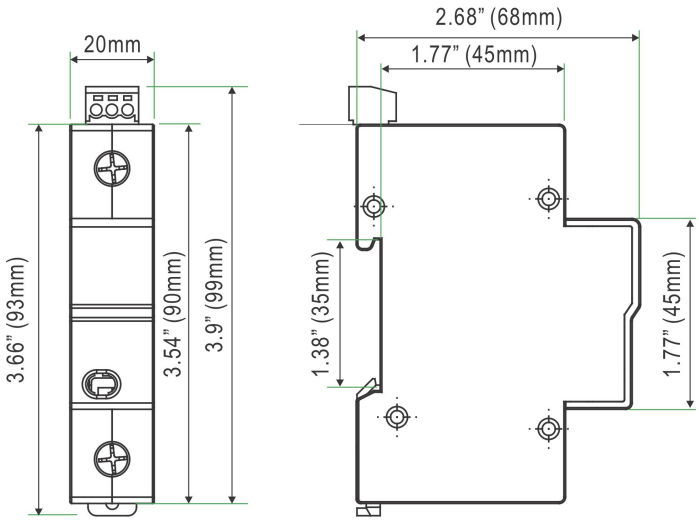
Surge Protective Device

Surge Protection Connection Diagram



Maximum Continuous Operating Voltage (MCOV/Uc)	275VAC	320VAC	385VAC	420VAC
Voltage Protection Level (Up)	1.6kV	1.8kV	1.9kV	2.0kV
Residual Voltage (Ures)	1.0kV	1.1kV	1.2kV	1.4kV

Dimensions



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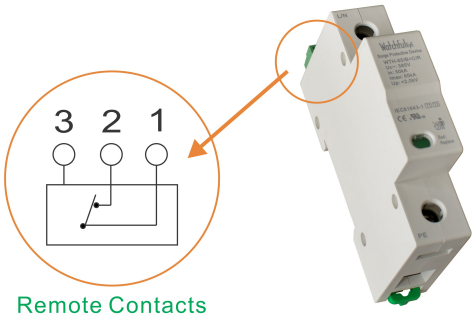
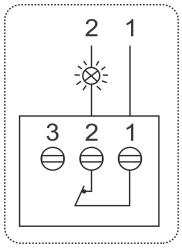
Remote Contacts (Dry Contacts)

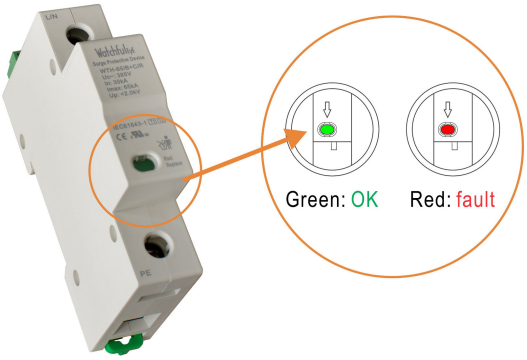
1: COM (Common)
2: NC (Normally Close)





Contact Ratings	125VAC/3A, 250VAC/1.5A
Terminal Cross Section	Max. 1.5mm²
Stripping Length Contacts	0.25 inches (6-7mm)
Remote Terminal Torque	0.25Nm

Fault Indication



Common Terms and Definitions

1. Normal operating voltage rating (Un)
2. Maximum Continuous Operating Voltage (Uc/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 (In):
crest value of the current through the surge protective device having a current waveshape of 8/20μs.
4. Maximum Discharge Current (Imax):
Crest value of a current through the surge protective device having an 8/20μs waveshape and magnitude according to the manufacturers specification. Imax is equal to or greater than In.
5. Voltage Protection Level (Up):
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 (Ures):
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)

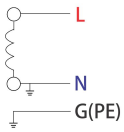
How to choose a suitable Uc(MCOV) value

Note: Uc >1.15Un
The relationship between two parameters Uc and Up of a surge protective device is proportional.
If Uc is small, the value of Up is also small; surge protective devices with smaller Up can provide better surge protection.
Whether to choose smaller Uc depends on the voltage stability of the grid.
If you choose surge protective devices with smaller Uc 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 Uc, and the value of Up 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(Uc) using the following formula: $\sqrt{2}$ Un < Uc < $\sqrt{3}$ Un

AC Network (Un)	MCOV(Uc), 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 (1/2)

1



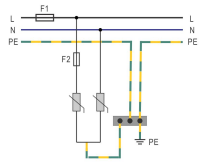
Single Phase
2 Wire + Ground

AC System Voltage

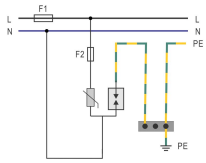
L-N:

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

2P Combination



1P+NPE Combination



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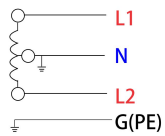


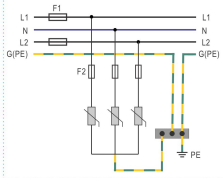
Split Phase
3 Wire + Ground

AC System Voltage

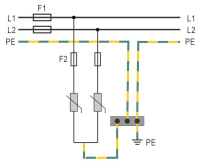
L-N/L-L:

120/240V
127/254V
240/480V
277/480V

3P Combination



2P Combination



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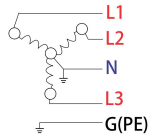


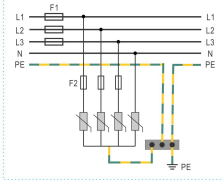
3 Phase Wye
4 Wire + Ground

AC System Voltage

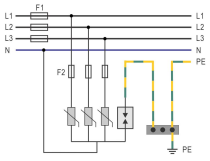
L-N/L-L:

120V/208Y
127V/220Y
220V/380Y
230V/400Y
240V/415Y
277V/480Y
347V/600Y

4P Combination



3P+NPE Combination



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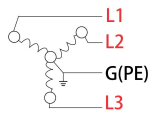


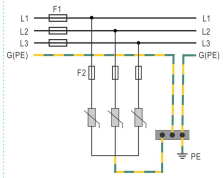
3 Phase Wye
3 Wire + Ground

AC System Voltage

L-L:

480V

3P Combination



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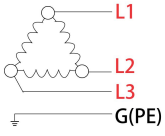


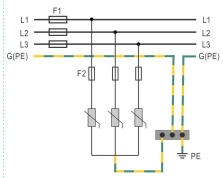
3 Phase Delta
3 Wire + Ground

AC System Voltage

L-L:

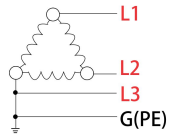
240V
480V
600V

3P Combination



AC Network Connection Diagram (2/2)

6

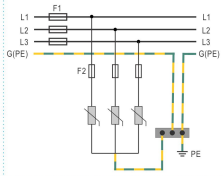


3 Phase Delta
3 Wire + Ground

AC System Voltage

L-L:
240V
480V
600V

3P Combination



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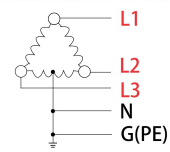
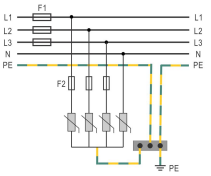


3 Phase Delta
4 Wire + Ground

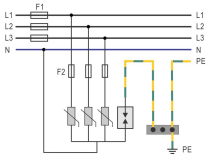
AC System Voltage

L-N/L-L:
120/240V
240/480V

4P Combination

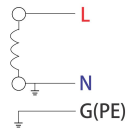


3P+NPE Combination



Difference mode & Common mode Connection Diagram

8

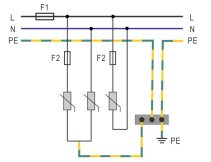


Single Phase
2 Wire + Ground

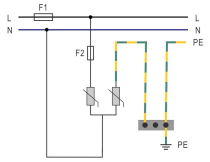
AC System Voltage

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

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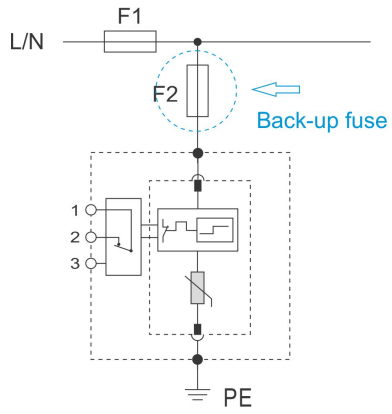
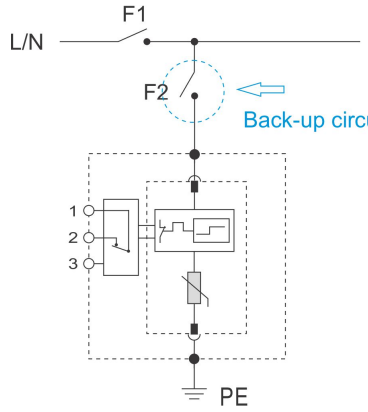
Selection of back-up fuse



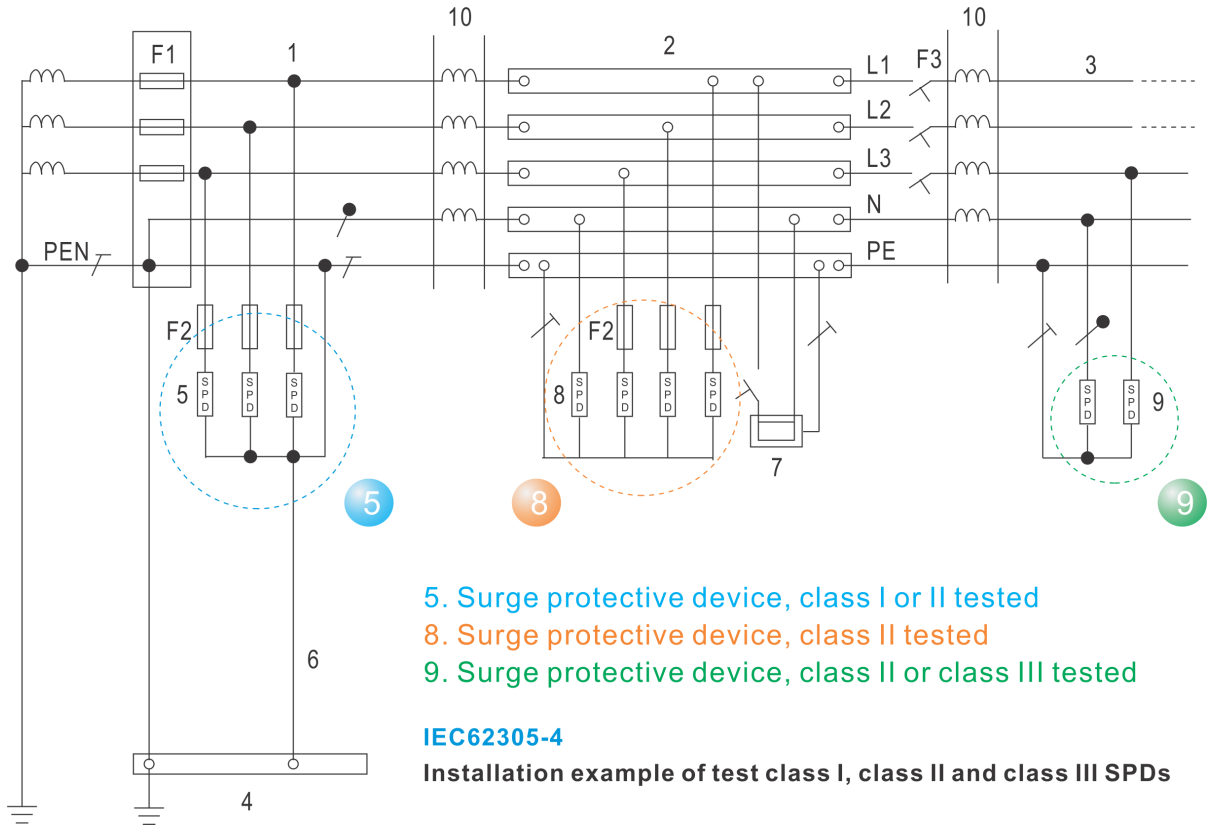
F1 > 100A gL ⇨ F2 = 100A gL
F1 ≤ 100A gL ⇨ ~~F2~~

Selection of back-up circuit-breaker



F1 > 50A ⇨ F2 = 50A
F1 ≤ 50A ⇨ ~~F2~~

Application



5. Surge protective device, class I or II tested
8. Surge protective device, class II tested
9. Surge protective device, class II or class III tested

IEC62305-4

Installation example of test class I, class II and class III SPDs

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.

N-PE Module

WTH-65/G+ module integrates High-Energy GDT, no leakage current. It pairs WTH-50/B+C/R series surge protector, combined into N-PE protection mode, the two modules are the same in dimension and shape, and are connected with a dedicated bus-bar to achieve a perfect combination.

WTH-65/G+ Technical Data	
Max. continuous operating voltage (Uc)	255V
Nominal Discharge Current (In)	40kA
Max. Discharge Current (Imax)	65kA
Pulsed Current (Iimp)	22.5kA
Voltage protection level (Up)	1.1kV
Protection Modes	N-PE only
Protective Element	High Energy GDT
Follow Current (If)	100A rms
Response Time (tA)	<100ns
Net Weight Per Unit	0.24Lb (109g)

3P + NPE Combintion Package

Model with suffix	Ordering Code		Model with suffix	Ordering Code
WTH-50/B+C/R/1P-275 x3pcs +NPE	US120234x3N		WTH-50/B+C/1P-275 x3pcs +NPE	US120224x3N
WTH-50/B+C/R/1P-320 x3pcs +NPE	US120235x3N		WTH-50/B+C/1P-320 x3pcs +NPE	US120225x3N
WTH-50/B+C/R/1P-385 x3pcs +NPE	US120236x3N		WTH-50/B+C/1P-385 x3pcs +NPE	US120226x3N
WTH-50/B+C/R/1P-420 x3pcs +NPE	US120237x3N		WTH-50/B+C/1P-420 x3pcs +NPE	US120227x3N

1P + NPE Combintion Package

Model with suffix	Ordering Code		Model with suffix	Ordering Code
WTH-50/B+C/R/1P-275 +NPE	US120234x1N		WTH-50/B+C/1P-275 +NPE	US120224x1N
WTH-50/B+C/R/1P-320 +NPE	US120235x1N		WTH-50/B+C/1P-320 +NPE	US120225x1N
WTH-50/B+C/R/1P-385 +NPE	US120236x1N		WTH-50/B+C/1P-385 +NPE	US120226x1N
WTH-50/B+C/R/1P-420 +NPE	US120237x1N		WTH-50/B+C/1P-420 +NPE	US120227x1N

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.

Download WatchfulEyE Official App

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After-sale Services

Watchful Eye provides a 5-year quality warranty globally.

I have a question