Surge Protective Device

Paperless Datasheet

In support of environmental sustainability, WatchfulEye provides digital datasheets accessible via a QR code laser-marked on the product housing. Scan the QR code or visit the link below to download the latest datasheet:
http://datasheet.watchfuleyesolutions.com/US120516.html

Model & Ordering Code

Model	Ordering Code	Uc/MCOV	Up
WTH-300/G+/R/1P-275	US120514	275V	1.4kA
WTH-300/G+/R/1P-320	US120515	320V	1.5kA
WTH-300/G+/R/1P-385	US120516	385V	1.6kA
WTH-300/G+/R/1P-420	US120517	420V	1.7kA

Uc/MCOV: Maximum Continuous Operating Voltage Up: Residual Voltage (Ures @6kV/3kA)

WatchfulEyE

Surge Protective Device

Description

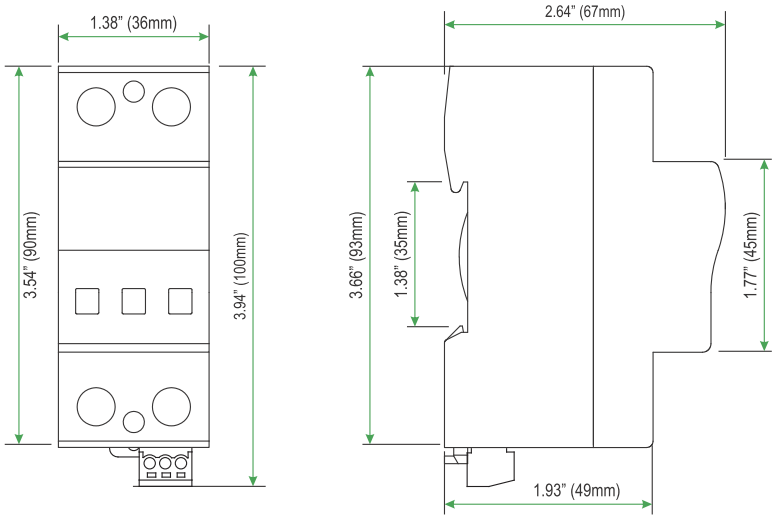
In accordance with: IEC/EN61643-11 - Class I and UL1449 Type 4 Location
Location of use: main sub-distribution boards
Built-in 7-layer High Energy GDT: Safely applied to L-PE mode to realize Class I surge protection.

WTH-300/G+/R/1P Series Technical Data	
Dc spark-over voltage at 100 V/s	>500V
Requirement Class to IEC/EN61643-11	Class I
IEEE Category Rating	C & B
Nominal Discharge Current (In)	100kA
Max. Discharge Current (Imax)	200kA
Pulsed Current (Iimp)	25kA
Protection Modes	L-PE, N-PE
Protective Element	7-layer High Energy GDT
Follow Current (If)	3kA rms (at 320V) / 5kA rms (at 255V)
Response Time (tA)	<100ns
Leakage Current (at 75%U1mA)	None
Fault Indication	None
Protection Rating (IP Code)	IP 20
Short Circuit Current Ratings (SCCR)	25kA rms
Max. Back-up Fuse (if mains >315A)	315A gL (circuit-breaker: <160A)
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	$35mm^2$ (solid) / $25mm^2$ (stranded)
Stripping Length Contacts	0.6inches (15mm)
Terminal Screw Torque	Max. 3.5Nm
DIN Rail EN60715	35mm top-hat rail
Dimensions DIN 43880	36mm (2TE)
Housing Material	Thermoplastic (UL94 V-0)
Housing Design	Compact design
Net Weight Per Unit	0.57Lb (259g)

Downloadable CAD-Compatible SVG Drawing

A scalable SVG drawing file is available for this product. The vector-based format preserves dimensional accuracy and can be imported into many CAD and engineering design applications. Customers can use the file for rack layout planning, cabinet integration, installation design, and project documentation.

Dimensions

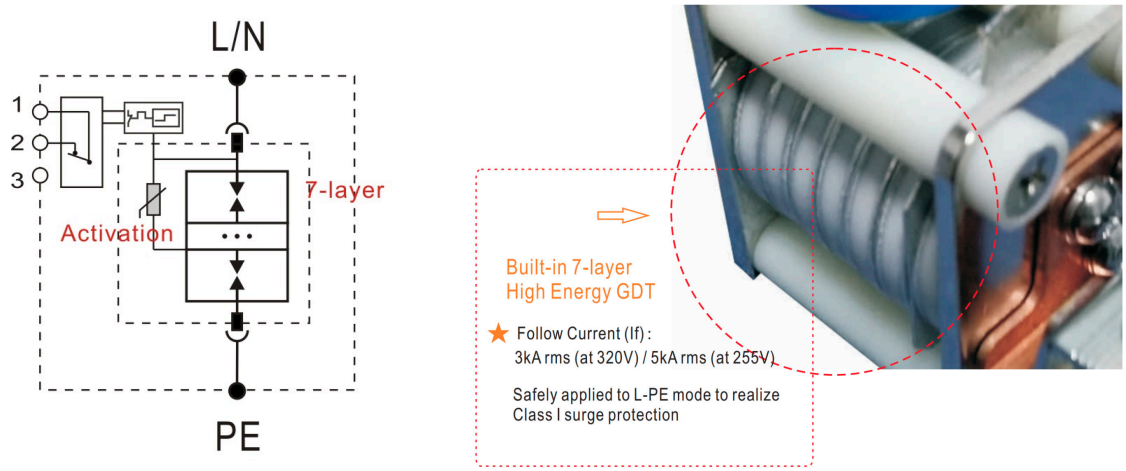


3D file download

http://www.watchfuleyesolutions.com/wth_rar/3D/WTH-165.STEP.zip

Surge Protection Connection Diagram

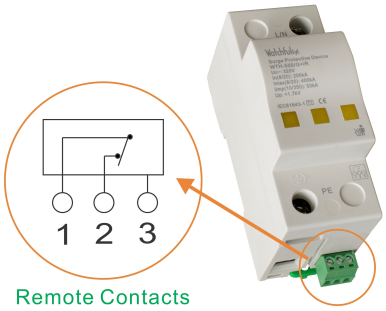
The 7-layer discharge structure distributes surge energy across multiple discharge gaps, reducing arc energy and thermal stress on each stage. After the surge event, the discharge path recovers to its insulating state more rapidly, minimizing the risk of follow current while improving arc extinction performance, surge endurance, and long-term reliability.

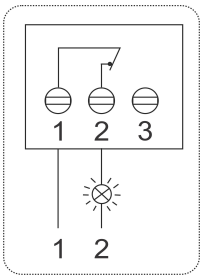


Activation: improve the sensitivity of anti surge, activate surge protection under lower voltage

Remote Contacts (Dry Contacts)

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





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

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)

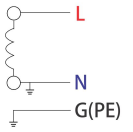
How to choose a suitable Uc(MCOV) value

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, 120/208V, 127/220V	150V
220/380V	275V, 320V, 385V
230/400V	275V, 320V, 385V, 420V
240/415V	320V, 385V, 420V
266/460V, 277/480V	385V, 420V
347/600V	550V, 690V
Wind Power System	690V (Grid side), 885V (Gen side)

AC Network Connection Diagram (1/2)

1



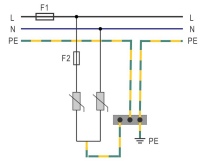
Single Phase
2 Wire + Ground

AC System Voltage

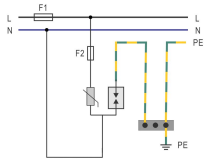
L-N:

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

2P Combination



1P+NPE Combination



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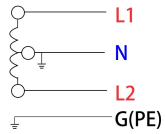


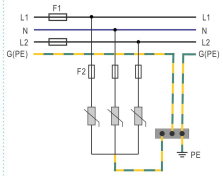
Split Phase
3 Wire + Ground

AC System Voltage

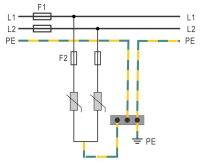
L-N/L-L:

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

3P Combination



2P Combination



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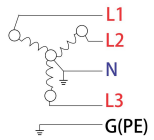


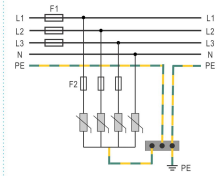
3 Phase Wye
4 Wire + Ground

AC System Voltage

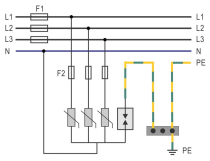
L-N/L-L:

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

4P Combination



3P+NPE Combination



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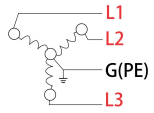


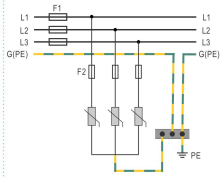
3 Phase Wye
3 Wire + Ground

AC System Voltage

L-L:

480V

3P Combination



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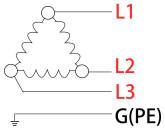


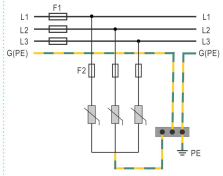
3 Phase Delta
3 Wire + Ground

AC System Voltage

L-L:

240V
480V
600V

3P Combination



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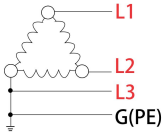
Surge Protective Device

AC Network Connection Diagram (2/2)

6



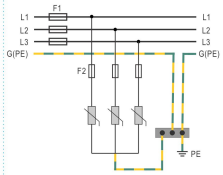
3 Phase Delta
3 Wire + Ground

AC System Voltage

L-L:

240V
480V
600V

3P Combination



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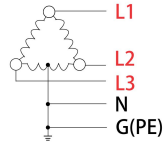


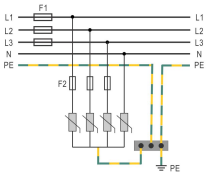
3 Phase Delta
4 Wire + Ground

AC System Voltage

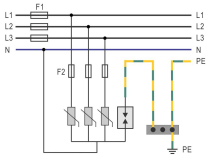
L-N/L-L:

120/240V
240/480V

4P Combination

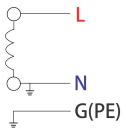


3P+NPE Combination



Difference mode & Common mode Connection Diagram

8



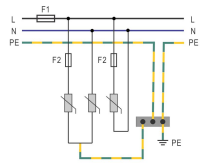
Single Phase
2 Wire + Ground

AC System Voltage

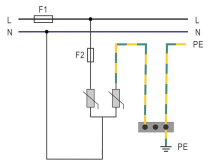
L-N:

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

3P Full Protection

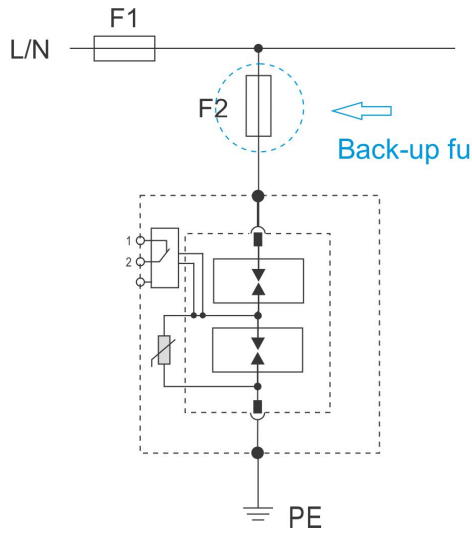


2P, L-N, N-PE Mode



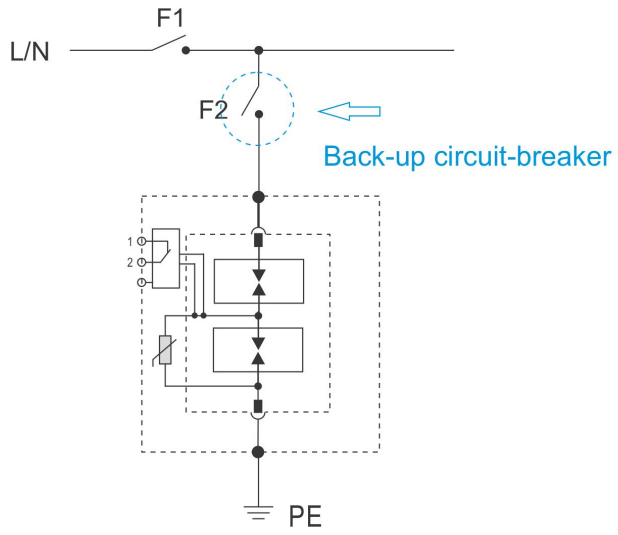
Common mode: L-PE, N-PE surge protection
Difference mode: L-N surge protection

Selection of back-up fuse



F1 > 315A gL ⇨ F2 = 315A gL
F1 ≤ 315A gL ⇨ ~~F2~~

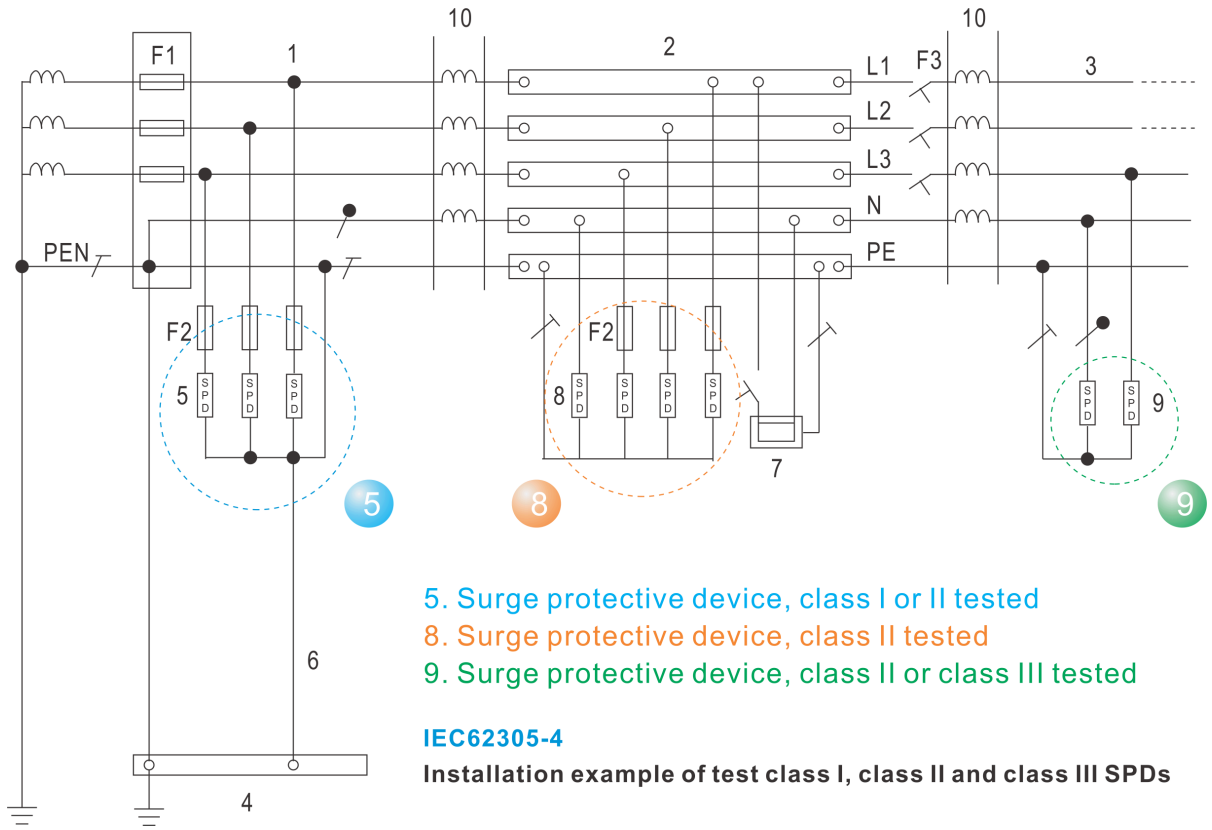
Selection of back-up circuit-breaker



F1 > 160A ⇨ F2 = 160A
F1 ≤ 160A ⇨ ~~F2~~

Surge Protective Device

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.

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. What instruments can be used to test whether its surge protection function is normal or not?
Test with a Watchful Eye surge protector tester

3. Can you list more applications?
Power supply panel, whole house

4. How to connections of the SPD?
Please refer to the standard IEC 60364-5-53
Connecting conductors of SPDs:
Conductors between the SPD and the main earthing terminal or the protective conductor shall have a cross-sectional area not less than: - 6 mm² copper or equivalent for class II tested SPDs installed at or near the origin of the installation;
- 16 mm² copper or equivalent for class I tested SPDs installed at or near the origin of the installation.
a) L/N to surge protector copper recommended diameter: 7AWG (10mm²), minimum: 6mm²
b) surge protector to PE copper recommended diameter: 5AWG (16mm²), minimum: 10mm²
(a+b) ≤ 0.5m

Certificates of Products

CE RoHS IEC61643-11

WatchfulEyE

Surge Protective Device

Version Update

V22.1: Updated document layout and visual design. Standardized CSS formatting and revised color scheme.
V22.0: Added product description details and enhanced document formatting.

Download WatchfulEyE Official App

Scan the QR code to access the WatchfulEye official website for product information and updates.

After-sale Services

WatchfulEye offers a global 5-year quality warranty.

Activate Your 10-Year Warranty

Register this product within 90 days of purchase to receive:
• 5-year standard warranty
• Additional 5-year free extended warranty

Customers are responsible for shipping, labor, and any incidental costs.
This warranty does not cover damage caused by misuse, improper installation, or unauthorized modifications.

Contact us | Register Extended Warranty