



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/US220353.html>

3D file download

http://www.watchfuleyesolutions.com/wth_rar/3D/24WTH40-3P-62.stp.zip

Model & Ordering Code

Model	Ordering Code	MCOV/Uc	Remote Contacts	UPC/EAN Code
WTH-40/C/R/3P-150	US220353	150VAC	YES	(0) 811914030171
WTH-40/C/3P-150	US220343		NO	(0) 811914031703



Certificates of Products



CE RoHS IEC61643-11



Surge Protective Device

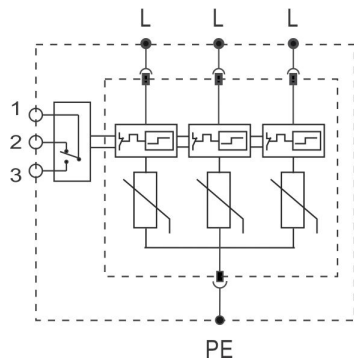
Description

In accordance with: IEC/EN61643-11 - Class II and UL1449 Type 4 Location
Location of use: branch sub-distribution boards
Plug-in module and separate base design enables convenient maintenance.
Internal thermal disconnect devices help ensure safe or at end-of-life

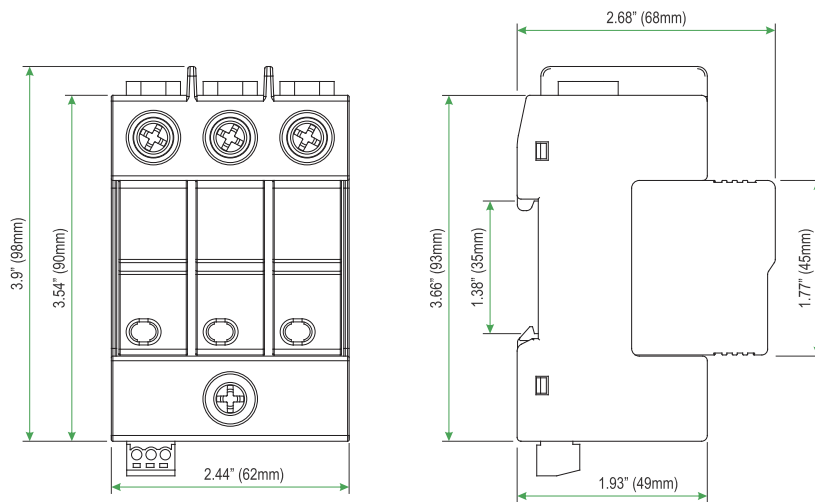
WTH-40/C/R/3P-150 Series Technical Data

Requirement Class to IEC/EN61643-11	Class II
IEEE Category Rating	B & A
Maximum Continuous Operating Voltage (Uc/MCOV)	150VAC 50/60Hz
Nominal Discharge Current (In)	20kA
Max. Discharge Current (Imax)	40kA
Voltage Protection Level (Up)	1.3kV
Residual Voltage (Ures)	0.8kV
Protection Modes	L-PE, N-PE
Protective Element	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 >80A)	80A gL (circuit-breaker: <40A)
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	62mm (3.5TE)
Housing Material	Thermoplastic (UL94 V-0)
Housing Design	Modular design
Net Weight Per Unit	0.73Lb (330g)

Surge Protection Connection Diagram

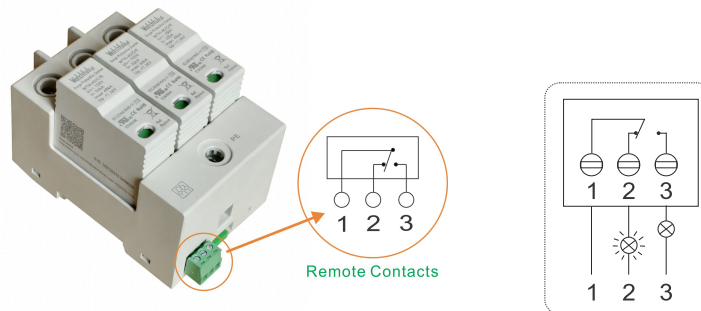


Dimensions



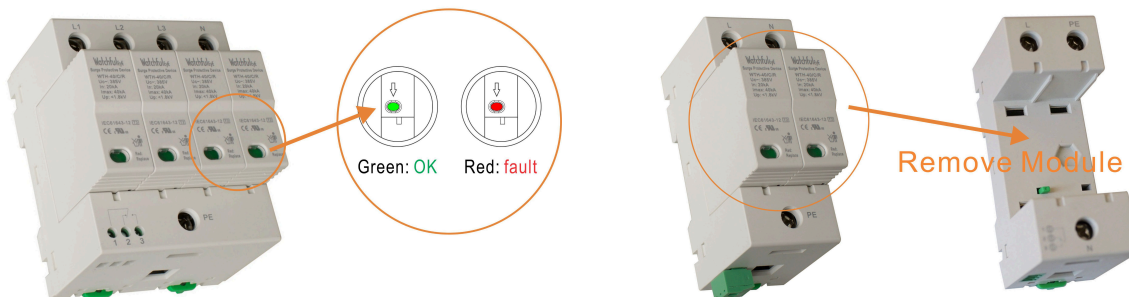
Remote Contacts (Dry Contacts)

- 1: COM (Common)
- 2: NC (Normally Close)
- 3: NO (Normally Open)



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

Fault Indication (same indication in 1P/2P/3P/4P/1P+NPE/3P+NPE models)



Two features of 3P mode strengthening protection

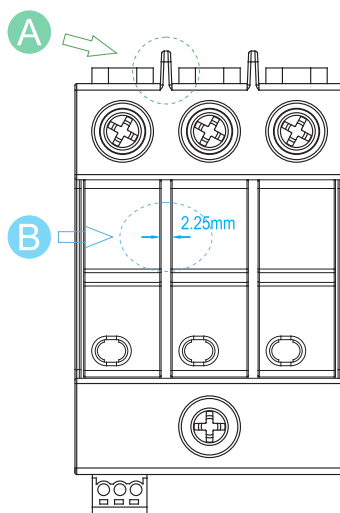
A: The isolated barrier between two modules

B: 2.25mm-wide gap between two modules

1. Increase creepage distance

2. Increase the capacity of insulation isolation and make the connection more secure

3. More important for the application with MCOV (Uc) higher than 550Vac



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.

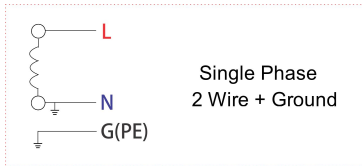
If you choose larger U_c , and the value of U_p is accordingly large, the surge protective efficiency will not be so fine.

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

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

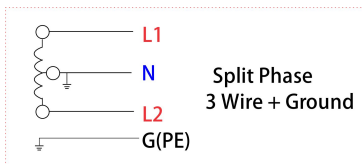
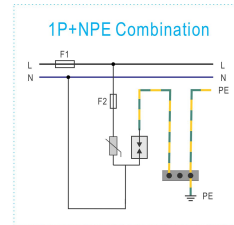
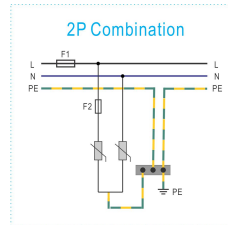
AC Network (U_n)	MCOV(U_c), L/N-PE Protection Mode
110V, 120/208V, 127/220V	150V
220/380V	275V, 320V, 385V
230/400V	275V, 320V, 385V, 420V
240/415V	320V, 385V, 420V
266/460V, 277/480V	385V, 420V
347/600V	550V, 690V
Wind Power System	690V (Grid side), 885V (Gen side)

AC Network Connection Diagram



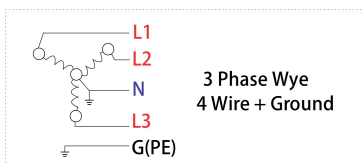
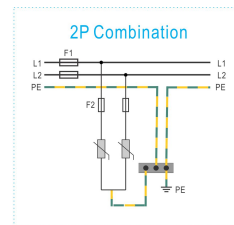
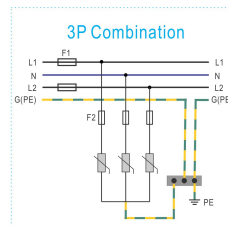
AC System Voltage

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



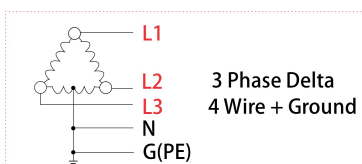
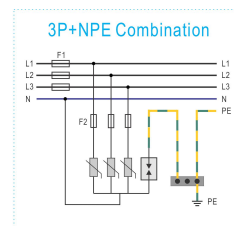
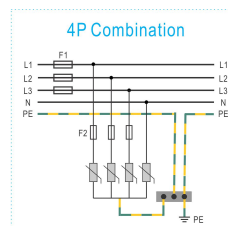
AC System Voltage

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



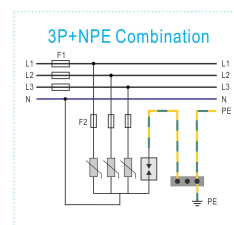
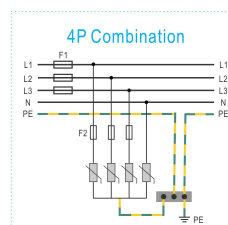
AC System Voltage

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

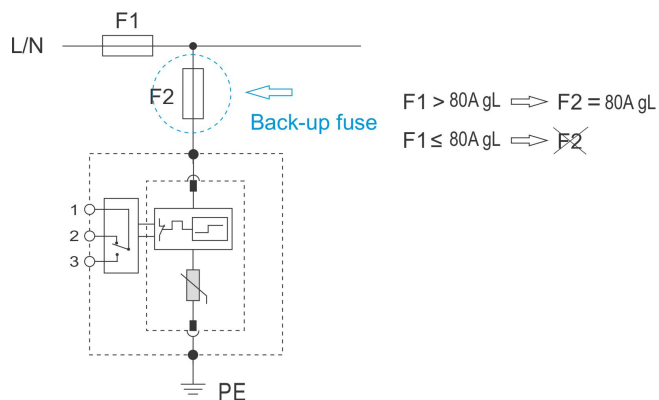


AC System Voltage

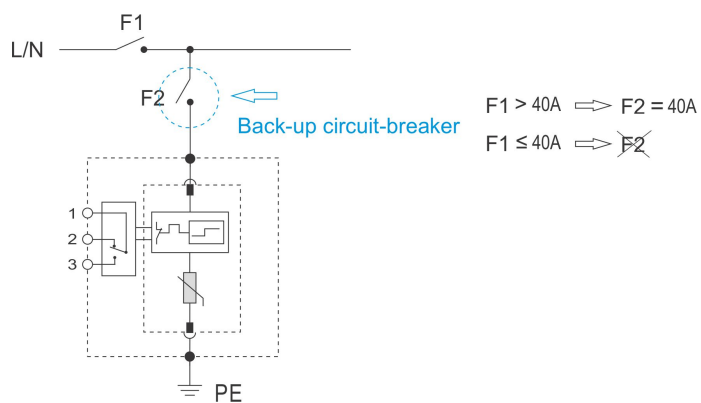
L-N/L-L:
120/240V



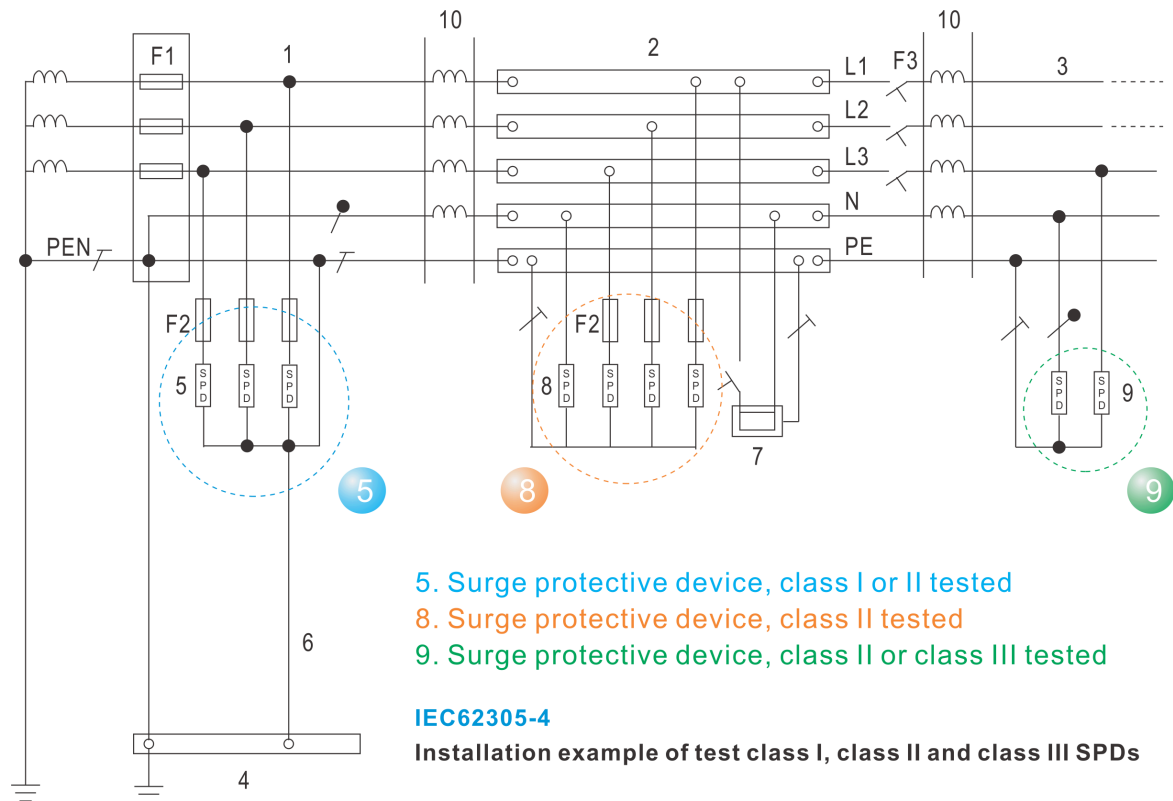
Selection of back-up fuse



Selection of back-up circuit-breaker



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

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. 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

5. Can you list more applications?

Power supply panel, whole house

6. What are the key benefits of the V22.1 upgrade?

The V22.1 series features an optimized mechanical design with the module-to-base plug-in travel increased by 3 mm. This enhancement improves module retention and helps prevent accidental movement caused by handling, vibration, or unintended contact. As a result, the possibility of false remote signaling alarms is significantly reduced, improving overall system monitoring reliability.

The remote signaling interface has also been upgraded to a pluggable terminal, allowing faster installation and easier maintenance. Field wiring can remain in place while the terminal is disconnected, simplifying module replacement and reducing downtime.



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Version Update

V22.1:

V22.1 replaces V12.1. Ordering code prefix updated from US12 to US22. Module-to-base plug-in travel increased by 3 mm to improve insertion and removal handling. The remote signaling terminal on the base has been upgraded to a pluggable connector.

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After-sale Services

Watchful Eye provides a 5-year quality warranty globally.

[I have a question](#)