



Surge Protective Device

ENGINEERED FOR RENEWABLE ENERGY BUILT FOR RELIABLE SURGE PROTECTION

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/US220385.html>

Model & Ordering Code (1P Mode)

Model	Ordering Code	MCOV/Uc	Up	Ures	UPC/EAN Code
WTH-40/C/1P-PV100	US220339	100Vdcpv	1.3kV	0.8kV	(0) 811914032151
WTH-40/C/1P-PV200	US220338	200Vdcpv	1.5kV	1.0kV	(0) 811914032175
WTH-40/C/1P-PV300	US220403	300Vdcpv	1.7kV	1.2kV	(0) 811914032199
WTH-40/C/1P-PV400	US220404	400Vdcpv	1.9kV	1.4kV	(0) 811914032212
WTH-40/C/1P-PV500	US220386	500Vdcpv	2.2kV	1.6 kV	(0) 811914032236
WTH-40/C/1P-PV600	US220336	600Vdcpv	2.4kV	1.8kV	(0) 811914032250
WTH-40/C/1P-PV800	US220402	800Vdcpv	2.8kV	2.2kV	(0) 811914032274
WTH-40/C/1P-PV1000	US220401	1000Vpvc	3.4kV	2.8kV	(0) 811914032298





Surge Protective Device

Model & Ordering Code (2P Mode)

Model	Ordering Code	MCOV/Uc	Up	Ures	UPC/EAN Code
WTH-40/C/2P-PV100	US220333	100Vdcpv	1.3kV	0.8kV	(0) 811914032168
WTH-40/C/2P-PV200	US220337	200Vdcpv	1.5kV	1.0kV	(0) 811914032182
WTH-40/C/2P-PV300	US220393	300Vdcpv	1.7kV	1.2kV	(0) 811914032205
WTH-40/C/2P-PV400	US220394	400Vdcpv	1.9kV	1.4kV	(0) 811914032229
WTH-40/C/2P-PV500	US220385	500Vdcpv	2.2kV	1.6 kV	(0) 811914032243
WTH-40/C/2P-PV600	US220332	600Vdcpv	2.4kV	1.8kV	(0) 811914032267
WTH-40/C/2P-PV800	US220392	800Vdcpv	2.8kV	2.2kV	(0) 811914032281
WTH-40/C/2P-PV1000	US220391	1000Vpvc	3.4kV	2.8kV	(0) 811914032304





Surge Protective Device

Description

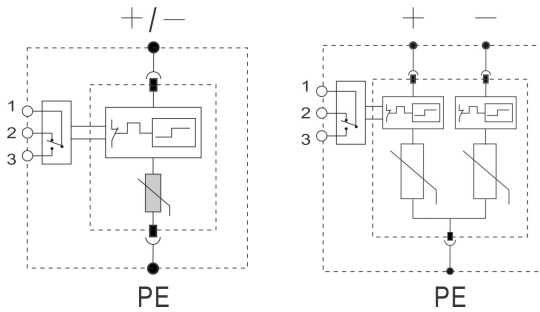
In accordance with: IEC/EN61643-11 - Class II and UL1449 Type 4 Location
Battery Management System, Suitable for off-grid PV system or grid-connected system
Location of use: Battery Energy Storage System (BESS), DC System, DCpv System, Photovoltaic Combiner Box, Photovoltaic Power Supply Box
Plug-in module and separate base design enables convenient maintenance.
Internal thermal disconnect devices help ensure safe or at end-of-life

WTH-40/C DC & PV Series Technical Data

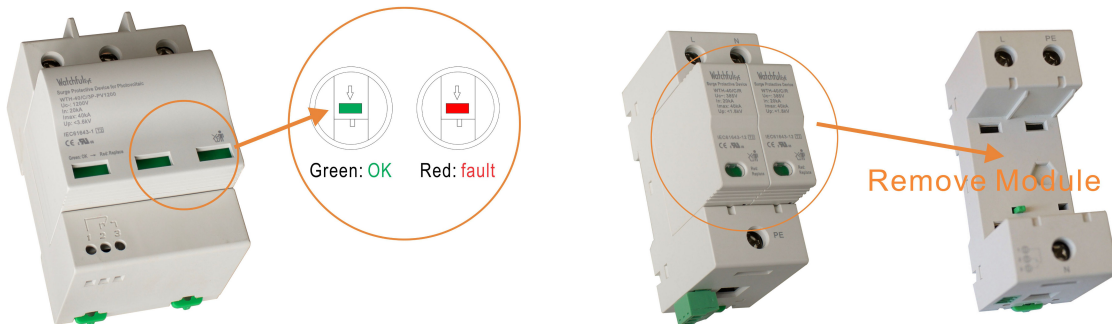
Requirement Class to IEC/EN61643-11	Class II
IEEE Category Rating	B & A
Nominal Discharge Current (In)	20kA
Max. Discharge Current (Imax)	40kA
Protection Modes	DC+/PE, DC-/PE, DC+/DC-
Protective Element	MOV
Follow Current (If)	NO
Response Time (tA)	<5ns
Leakage Current (at 75%U1mA)	<20μA
Thermal Protection	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
Housing Material	Thermoplastic (UL94 V-0)
Housing Design	Modular design

Surge Protective Device

Surge Protection Connection Diagram



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

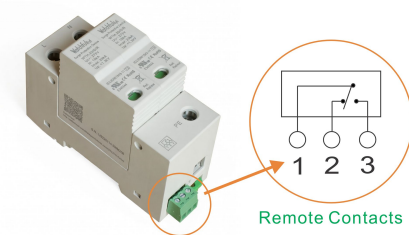
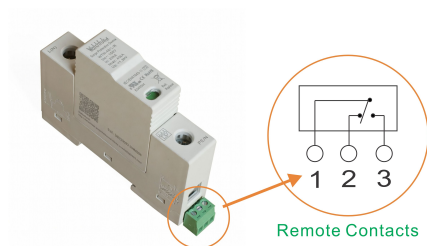
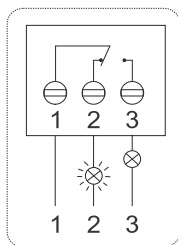


Surge Protective Device

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

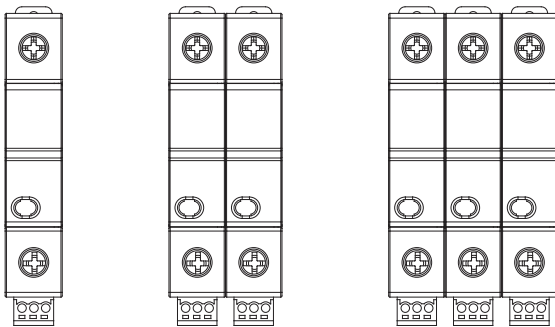




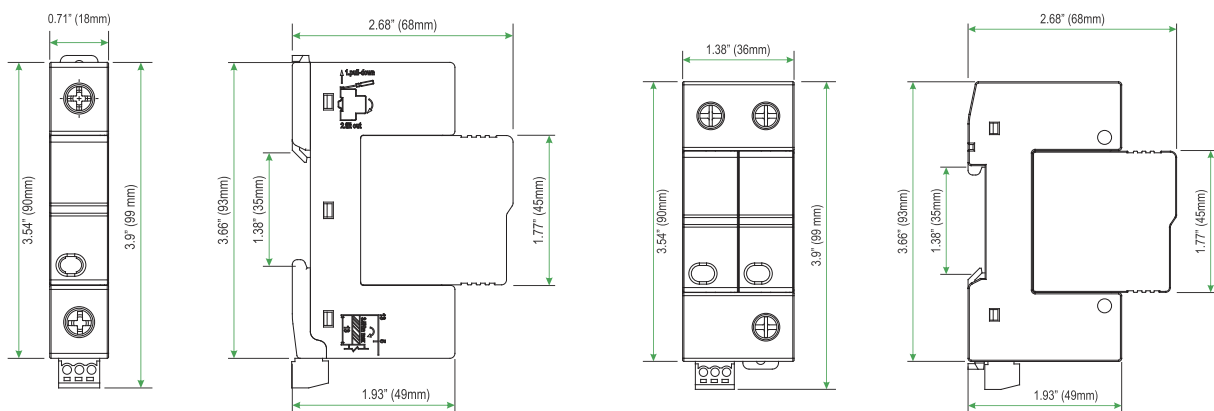
Surge Protective Device

1P mode

Single modules can be combined with a bus bar in multiple combination methods.



Dimensions



3D file download

http://www.watchfuleyesolutions.com/wth_rar/3D/24WTH40-1P-18.stp.zip
http://www.watchfuleyesolutions.com/wth_rar/3D/24WTH40-2P-36.stp.zip



Surge Protective Device

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: $U_c > 1.15U_n$

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.

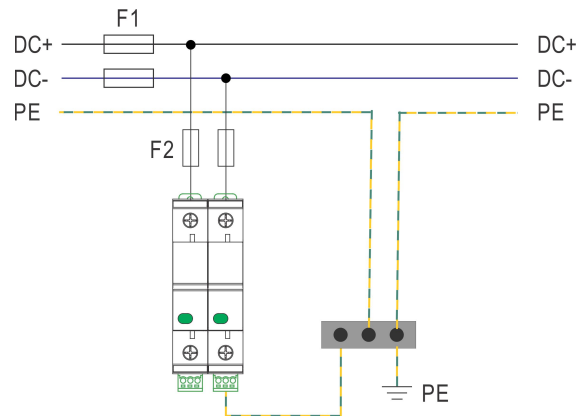
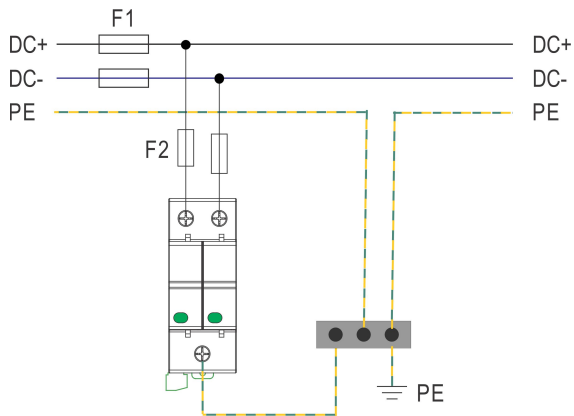
If you are unsure of the voltage stability of the grid,

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

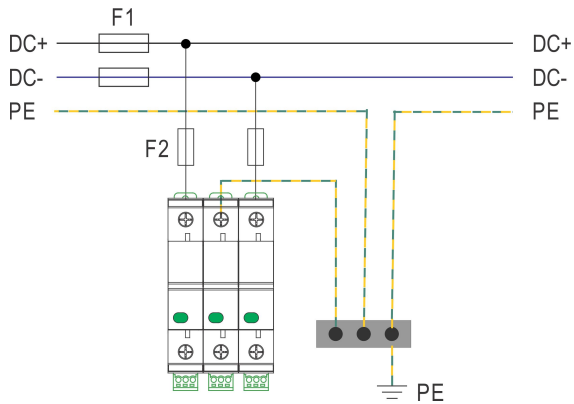
DC System (Un)	MCOV(Uc), DC+/DC-	DC System (Un)	MCOV(Uc), DC+/DC-
70Vdc	100Vdc	560Vdc	800Vdc
140Vdc	200Vdc	700Vdc	1000Vdc
210Vdc	300Vdc	840Vdc	1200Vdc
280Vdc	400Vdc	1120Vdc	1600Vdc
350Vdc	500Vdc	1400Vdc	2000Vdc
420Vdc	600Vdc		

Surge Protective Device

2P Mode Connection Diagram



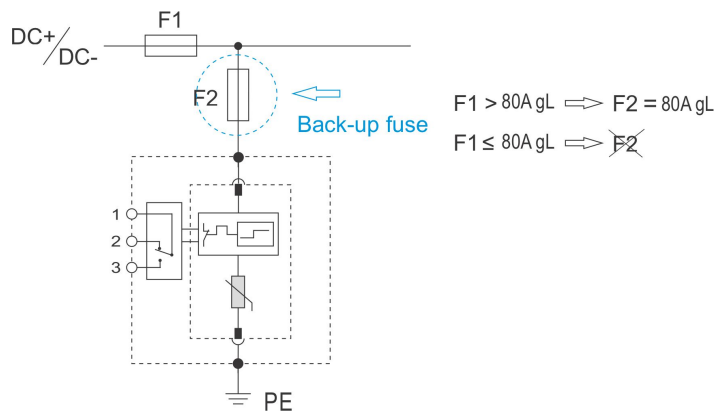
3P Mode Difference mode & Common mode Connection Diagram



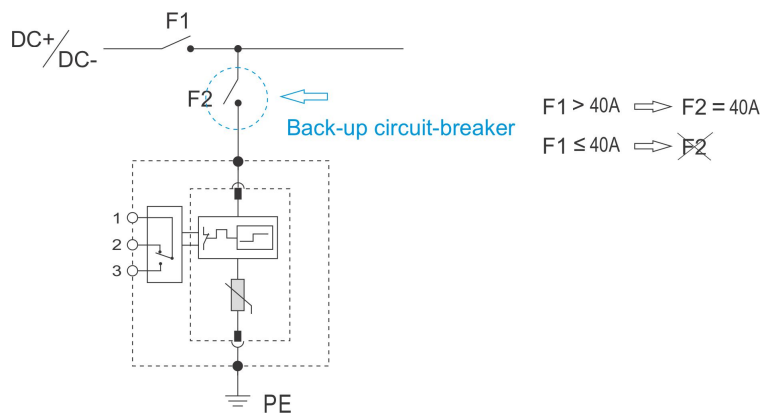
Common mode: DC+ to PE, DC- to PE surge protection
Difference mode: DC+ to DC- surge protection

Surge Protective Device

Selection of back-up fuse

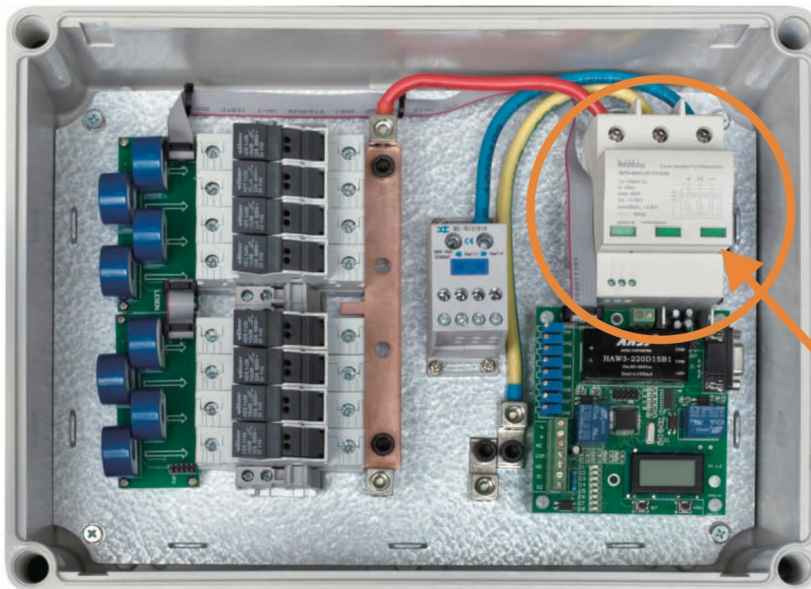


Selection of back-up circuit-breaker



Surge Protective Device

Application



Surge Protector



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?

DC System, DCpv System, Photovoltaic Combiner Box, Photovoltaic Power Supply Box



Surge Protective Device

Certificates of Products



LISTED
E345944



RoHS

IEC61643-11



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.

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