

# WatchfulEye

Watchful Eye Solutions, Inc.

**WTH-120, WTH-165/... Class I Series  
Lightning & Surge Protection** ...





WTH-120/B... Series

WTH-165/B... Series

WTH-165/G/1P-255

## WTH-165/G/1P-255 (N-PE Only)

### Technical Data

|                  |        |
|------------------|--------|
| Uc               | 255VAC |
| In               | 80kA   |
| I <sub>max</sub> | 165kA  |
| I <sub>imp</sub> | 17.5kA |
| Up               | 1.5kV  |
| Ures             | 1.0kV  |

### Technical Data

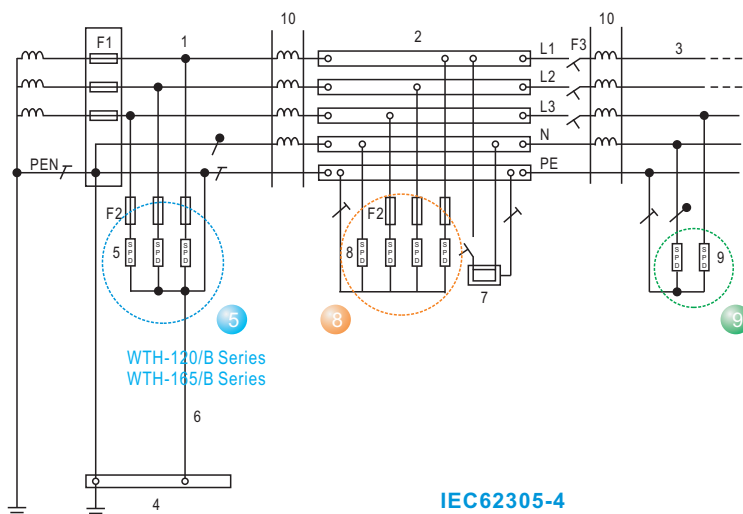
#### WTH-120

#### WTH-165

|   |  |
|---|--|
| Requirement Class to IEC61643-1                   | Class I  |
| IEEE Category Rating                              | C & B  |
| Protection Modes                                  | L-N, L-PE, N-PE  |
| Nominal Discharge Current (In @8/20μs)            | 60kA   |
| Max. Discharge Current (I <sub>max</sub> @8/20μs) | 120kA  |
| Pulsed Current (I <sub>imp</sub> @10/350μs)       | 15kA   |
| Follow Current (If)                               | NO   |
| Short Circuit Current Ratings (SCCR)              | 20kA rms   |
| Response Time (tA)                                | < 25ns   |
| Leakage Current (at 75%U1mA)                      | <20μA  |
| Thermal Protection                                | YES  |
| Back-up Fuse (if mains > 160A)                    | 160A gL  |
| Temperature Range                                 | -40° to 176°F (-40° 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   |
| Protection Rating (IP Code)                       | IP 20  |
| Surge Life at 3kA (8/20μs)                        | >5000 events   |
| Din Rail EN60715                                  | 35mm top-hat rail  |
| Housing Material                                  | Thermoplastic; extinguishing degree UL 94 V-0            |

### Surge Protective Device for Low Voltage Power Supply System

- Different types for your choosing according to different voltages (110V, 120/208V, 220/380V, 277/480V, 347/600)
- In accordance with: IEC 61643-1 - Class I and UL1449 Type 4 Location
- Location of use: main sub-distribution boards
- One-piece design
- Internal thermal disconnect devices help ensure safe or at end-of-life
- Combinations: 1P, 1P+NPE, 2P, 3P, 3P+NPE, 4P
- Remote Contact: optional



### 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 III tested
  10. Decoupling element or line length
- F1, F2, F3 overcurrent protective disconnectors  
NOTE Refer to IEC 61643-12 for further information.

## Technical Data

| Type:                   | Uc (MCOV) | Up    | Ures  |
|-------------------------|-----------|-------|-------|
| WTH-120/B/...75 Series  | 75VAC     | 1.5kV | 0.6kV |
| WTH-120/B/...115 Series | 115VAC    | 1.7kV | 0.7kV |
| WTH-120/B/...150 Series | 150VAC    | 1.8kV | 0.8kV |
| WTH-120/B/...275 Series | 275VAC    | 2.1kV | 1.0kV |
| WTH-120/B/...320 Series | 320VAC    | 2.2kV | 1.1kV |
| WTH-120/B/...385 Series | 385VAC    | 2.4kV | 1.2kV |
| WTH-120/B/...420 Series | 420VAC    | 2.5kV | 1.4kV |
| WTH-120/B/...550 Series | 550VAC    | 2.9kV | 1.8kV |
| WTH-120/B/...690 Series | 690VAC    | 3.2kV | 2.1kV |

|                         |        |       |       |
|-------------------------|--------|-------|-------|
| WTH-165/B/...75 Series  | 75VAC  | 1.6kV | 0.6kV |
| WTH-165/B/...115 Series | 115VAC | 1.8kV | 0.7kV |
| WTH-165/B/...150 Series | 150VAC | 2.0kV | 0.8kV |
| WTH-165/B/...275 Series | 275VAC | 2.3kV | 1.0kV |
| WTH-165/B/...320 Series | 320VAC | 2.4kV | 1.1kV |
| WTH-165/B/...385 Series | 385VAC | 2.5kV | 1.2kV |
| WTH-165/B/...420 Series | 420VAC | 2.7kV | 1.4kV |
| WTH-165/B/...550 Series | 550VAC | 3.0kV | 1.8kV |
| WTH-165/B/...690 Series | 690VAC | 3.3kV | 2.1kV |

| Power Supply System | Uc(MCOV), L-PE Mode, Uc>1.15Un |
|---------------------|--------------------------------|
| 110V, 120/208       | 150VAC                         |
| 220/380             | 275VAC, 320VAC, 385VAC         |
| 230/400V            | 275VAC, 320VAC, 385VAC, 420VAC |
| 240/415V            | 320VAC, 385VAC, 420VAC         |
| 277/480V            | 320VAC, 385VAC, 420VAC         |
| 347/600V            | 550VAC, 690VAC                 |

### How to name our products

#### Example:

**WTH - 165 / B / R / 1P - 385**

Watchfuleye    I<sub>max</sub>    Remote contacts    U<sub>c</sub>: 385V

Class 1 / Type 1    Combination

**Un:** Normal operating voltage rating

**Uc (MCOV - UL):** Max. continuous operating voltage

**Up:** Voltage protection level (at I<sub>n</sub>)

**Ures:** Residual voltage at 6kV 1.2/50μs & 3kA 8/20μs

**Frequency:** 50Hz to 60Hz

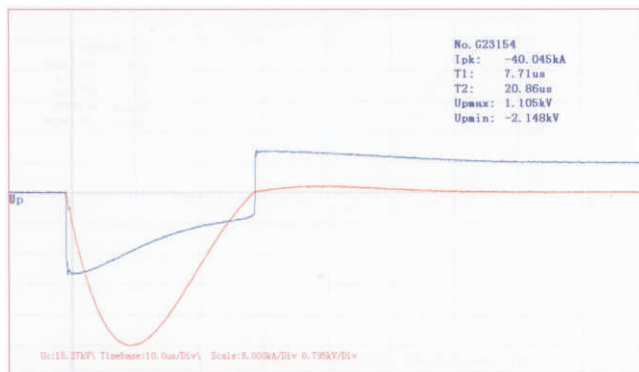
#### Note: Uc>1.15Un

The relationship between two parameters Uc and Up of a SPD is proportional. If Uc is small, the value of Up is also small; SPDs with smaller Up can provide better surge protection.

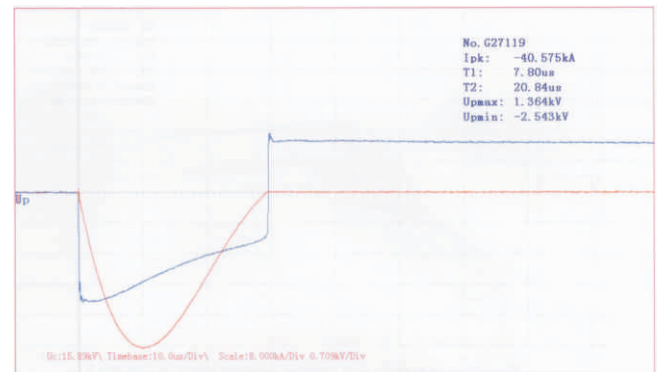
Whether to choose smaller Uc depends on the voltage stability of the grid. If you choose SPDs with smaller Uc for the grid with instable voltage, the SPDs will frequently work while the grid voltage fluctuates, resulting in shortening SPD's product life.

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 Uc using the following formula:  $\sqrt{2}Un < Uc < \sqrt{3}Un$



The impulse current and residual voltage curve in Ures=-40kA (WTH-165/B/1P-420(L-PE))



The impulse current and residual voltage curve in Ures=-40kA (WTH-165/B/1P-690(L-PE))

## Application

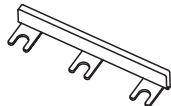
- Customized and designed by professional and experienced engineers according to your systems
- Different specifications for your choices (plastic shell and metal shell box; single-phase, three-phase power supply system)
- Suitable for 110V, 120/208V, 220/380V, 277/480V, 347/600V AC voltage systems
- Able to assemble fuses, circuit breakers, lightning counter and monitoring, etc. in accordance with the requirements of your surge protection systems
- Realize remote intelligent monitoring through wireless, wired network or cloud service



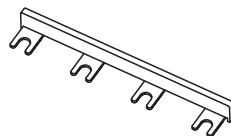
## Bus Bar



WTH-2P/165  
(1P+NPE, 2P Mode)

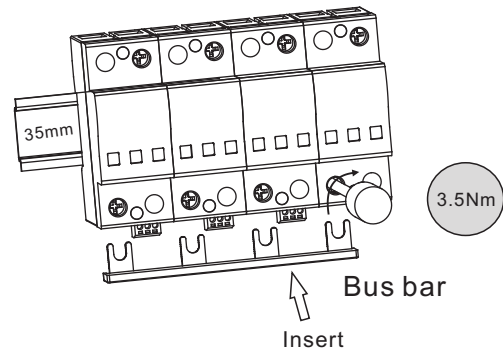


WTH-3P/165  
(2P+NPE, 3P Mode)



WTH-4P/165  
(3P+NPE, 4P Mode)

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

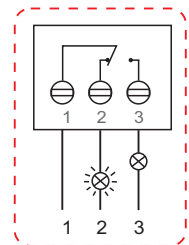
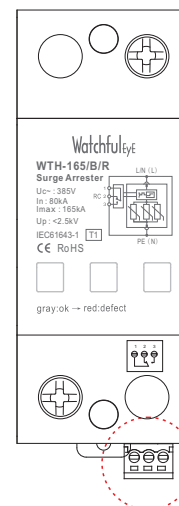


## Remote Contacts

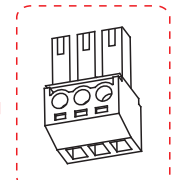
Type: WTH-165/B/ **R** /1P-385

Remote contacts

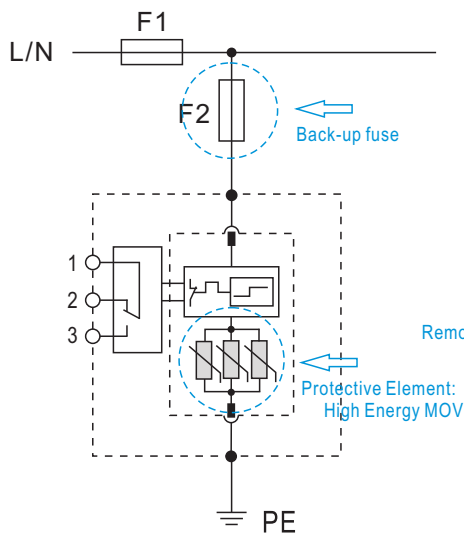
|                           |                         |
|---------------------------|-------------------------|
| Remote Contacts           |                         |
| Contact Ratings           | AC:125V/1A              |
| Terminal Cross Section    | Max. 1.5mm <sup>2</sup> |
| Stripping Length Contacts | 0.25inches (6-7mm)      |
| Remote Terminal Torque    | 0.25Nm                  |



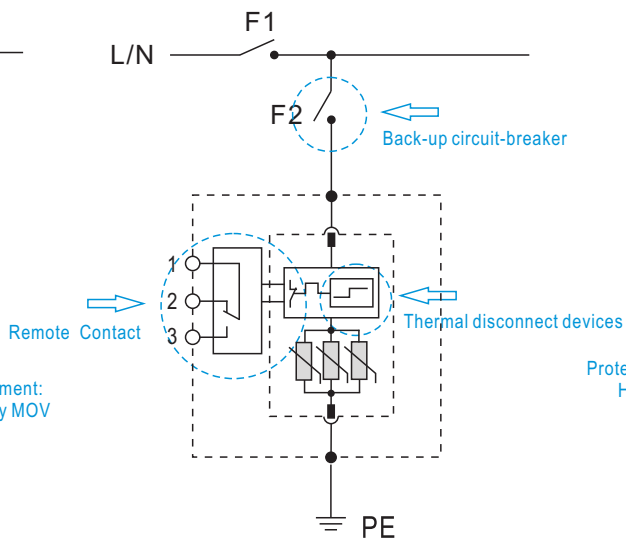
1: COM(Common)  
2: NC(Normally Close)  
3: NO(Normally Open)



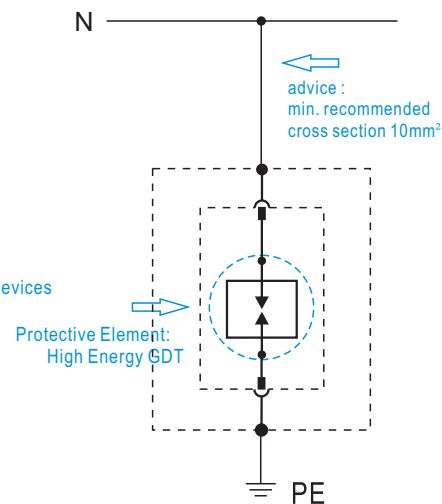




WTH-120, WTH-165 Series



WTH-120, WTH-165 Series



WTH-165/G/1P-255

### Selection of back-up fuse

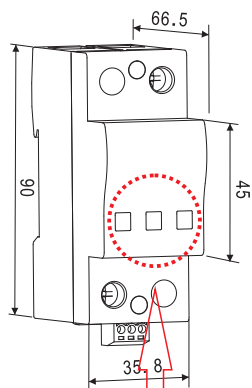
$F1 > 160A gL \Rightarrow F2 = 160A gL$   
 $F1 \leq 160A gL \Rightarrow \text{No}$

### Selection of back-up circuit-breaker

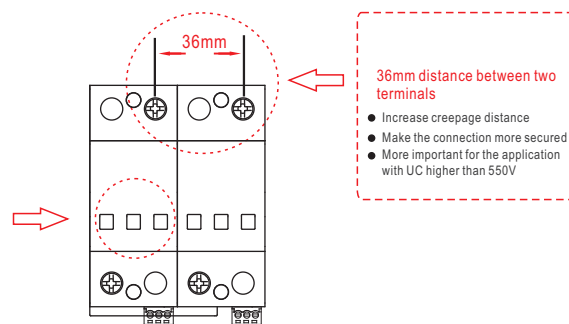
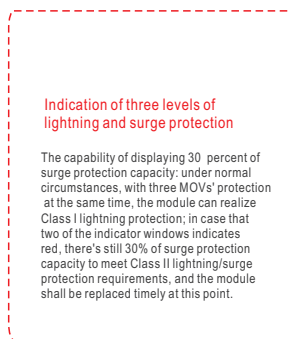
$F1 > 100A \Rightarrow F2 = 100A$   
 $F1 \leq 100A \Rightarrow \text{No}$

### N-PE Only

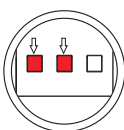
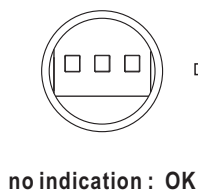
### Dimensions



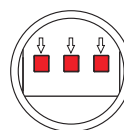
### Two details strengthening the protection



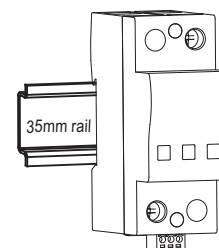
### Fault Indication



or

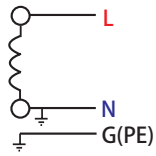


replace

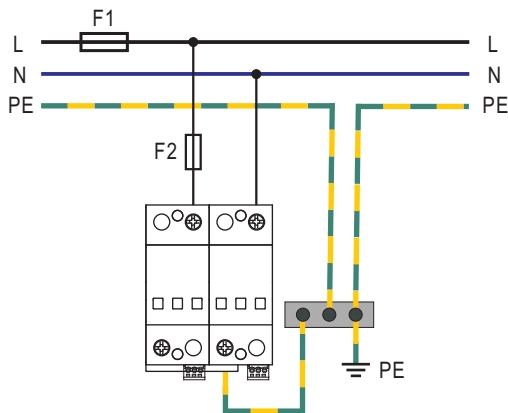


## Lightning and Surge Protection for 2 Wire + Ground System

1

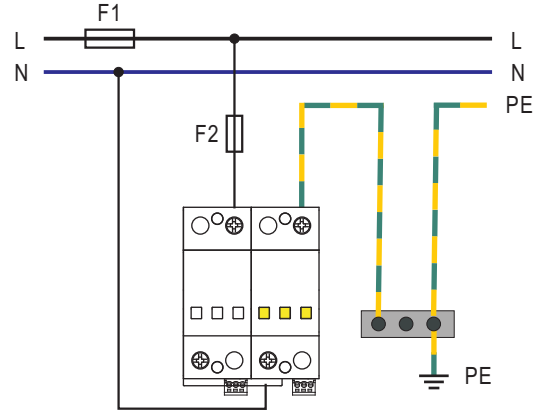


A



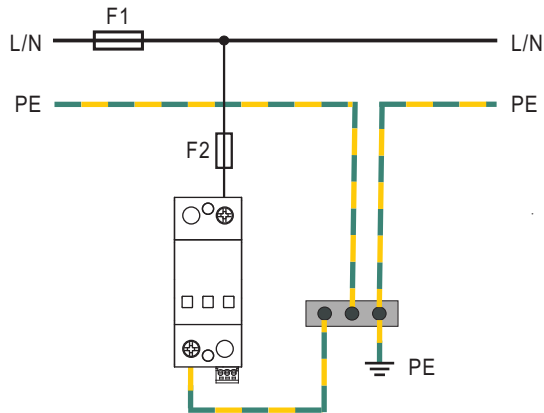
WTH-120/B/...2P, WTH-165/B/...2P Combination

B

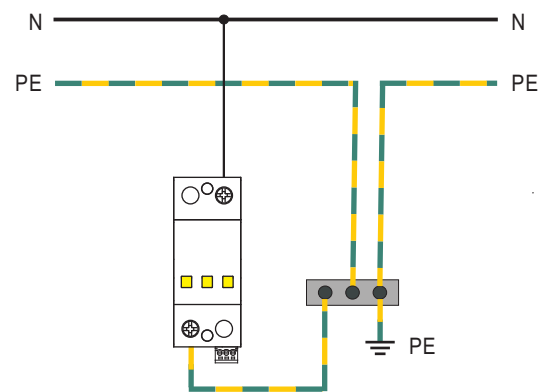


WTH-120/B/...1P+NPE, WTH-165/B/1P+NPE... Combination

C



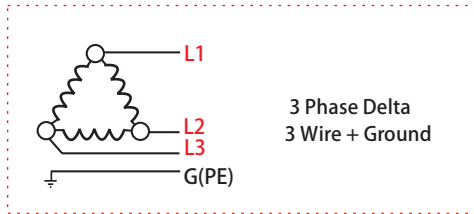
WTH-120/B/...1P, WTH-165/B/...1P Series



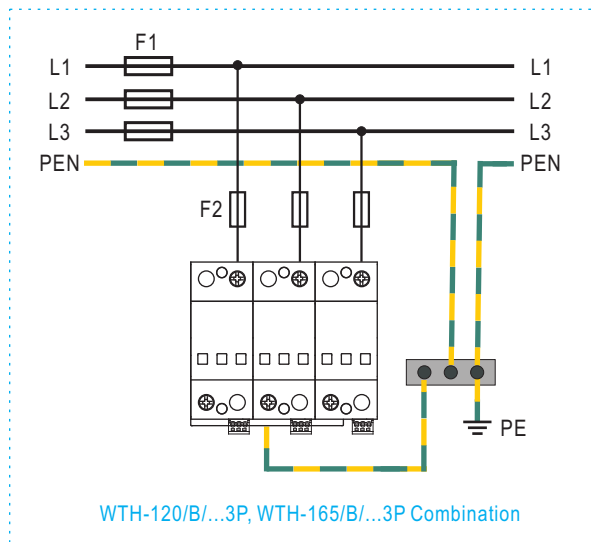
WTH-165/G/1P-255

# Lightning and Surge Protection for 3 Wire + Ground System

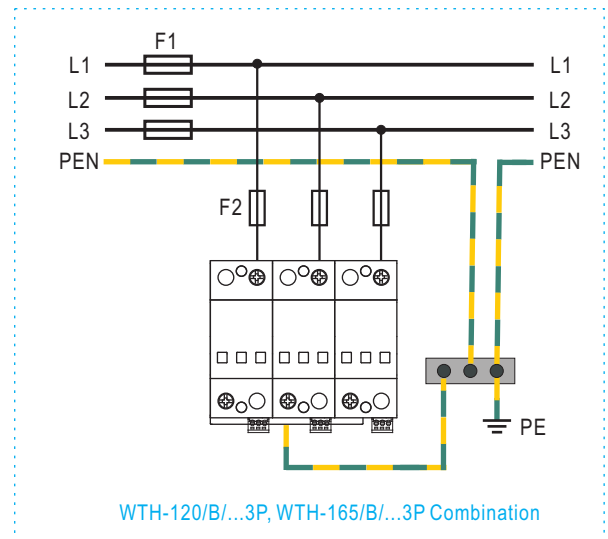
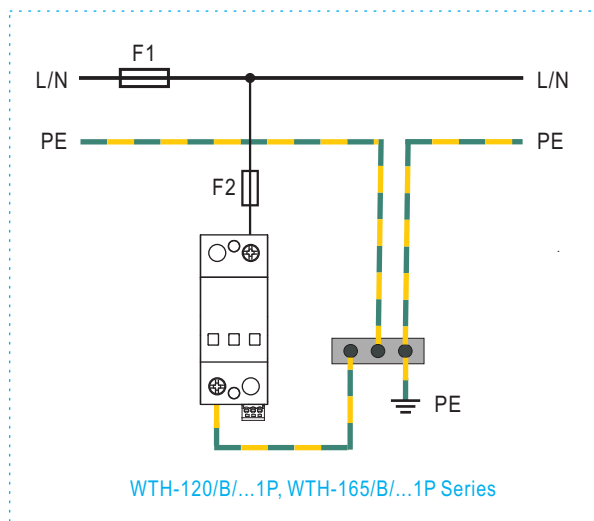
2



D

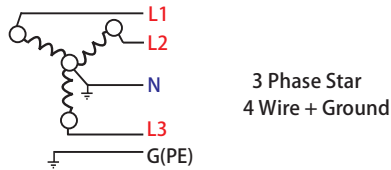


E

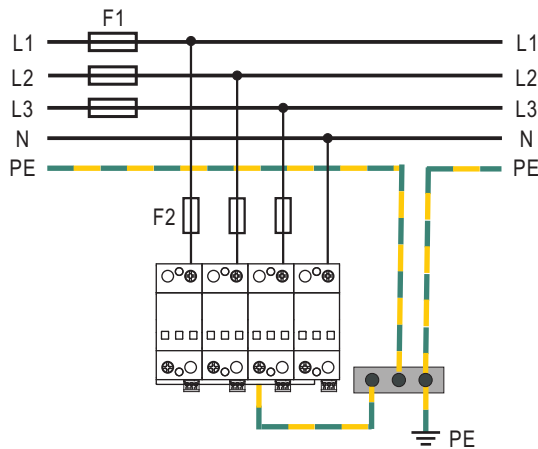


## Lightning and Surge Protection for 4 Wire + Ground System

3

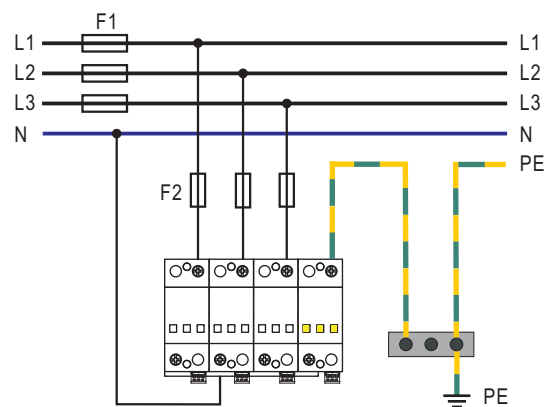


F



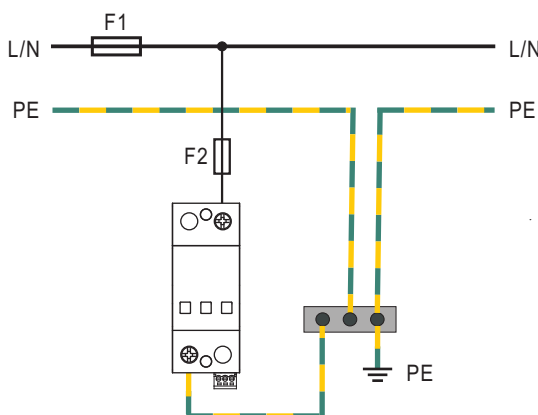
WTH-120/B/...4P, WTH-165/B/...4P Combination

G

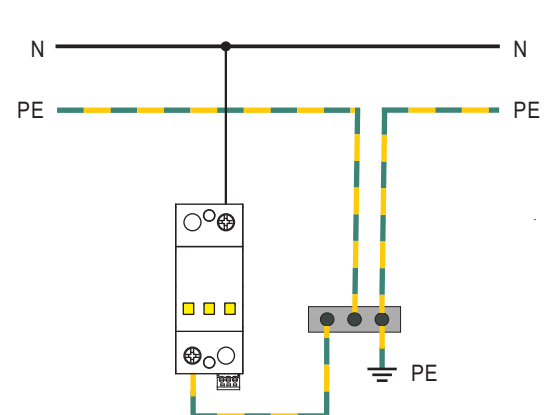


WTH-120/B/...3P+NPE, WTH-165/B/...3P+NPE Combination

H



WTH-120/B/...1P, WTH-165/B/...1P Series

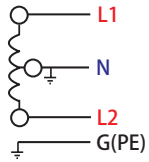


WTH-165/G/1P-255



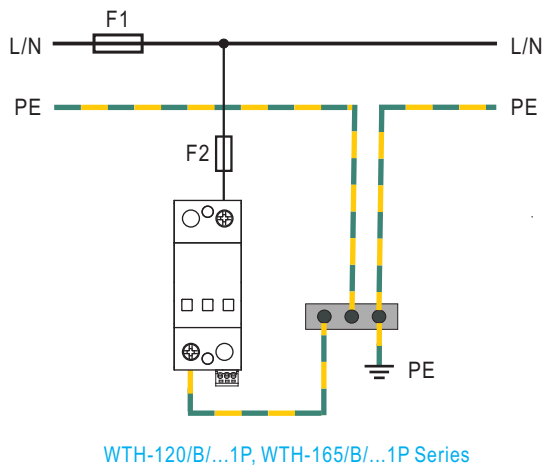
# Lightning and Surge Protection for 3 Wire + Ground System

4

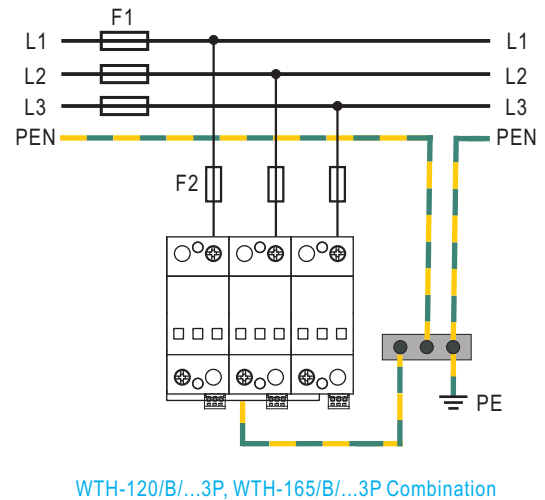


Split Phase  
3 Wire + Ground

I



WTH-120/B/...1P, WTH-165/B/...1P Series



WTH-120/B/...3P, WTH-165/B/...3P Combination

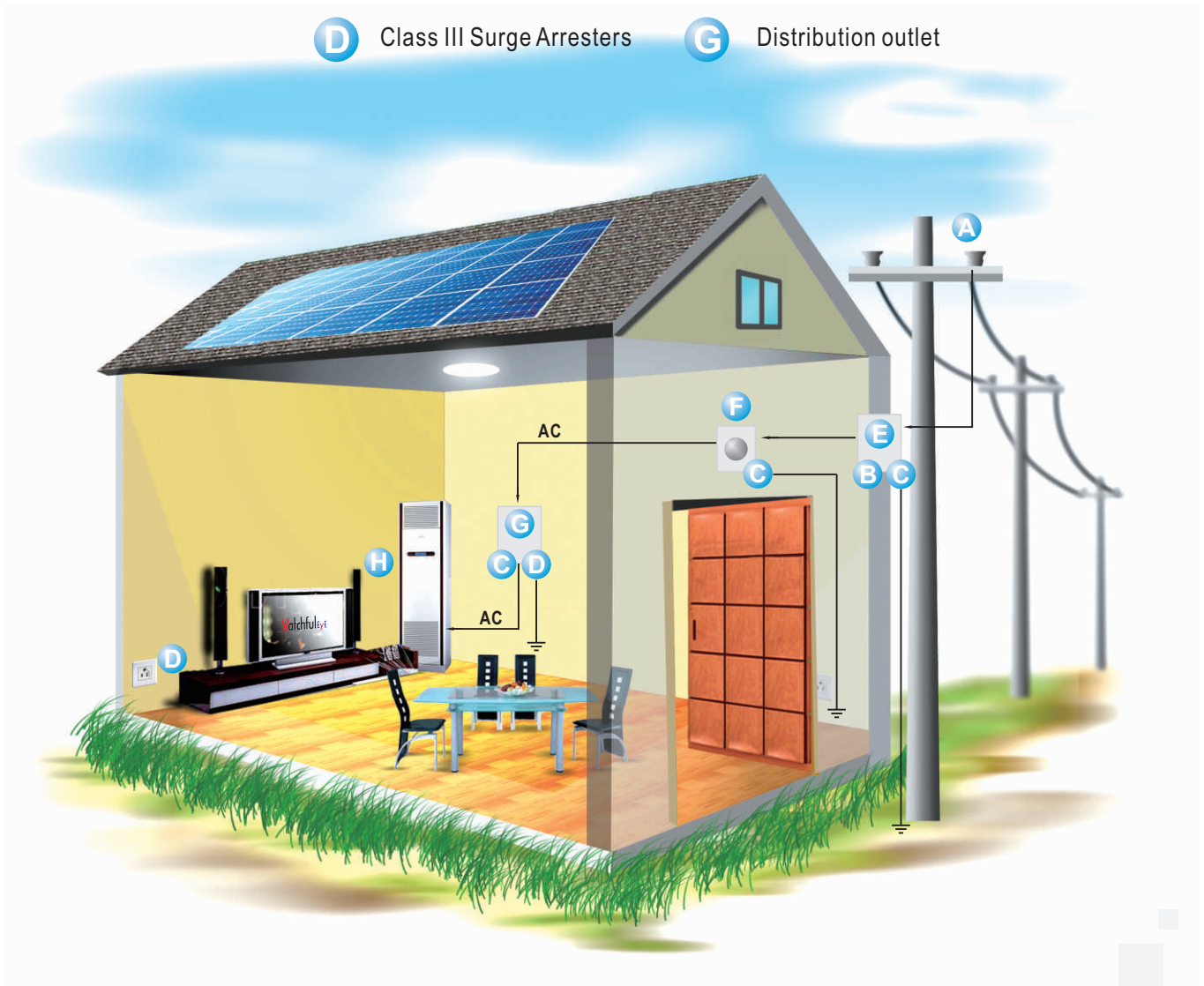
Watchful Eye offers complete and reliable technical solutions for AC power supply systems, protecting the electrical facilities throughout buildings against lightning and surge, providing a guarantee for the security of your systems and avoid unnecessary losses.

# Ordering Code

| Type:            | Ordering code | Type:              | Ordering code |
|------------------|---------------|--------------------|---------------|
| WTH-120/B/1P-75  | US 120 291    | WTH-120/B/R/1P-75  | US 120 301    |
| WTH-120/B/1P-115 | US 120 292    | WTH-120/B/R/1P-115 | US 120 302    |
| WTH-120/B/1P-150 | US 120 293    | WTH-120/B/R/1P-150 | US 120 303    |
| WTH-120/B/1P-275 | US 120 294    | WTH-120/B/R/1P-275 | US 120 304    |
| WTH-120/B/1P-320 | US 120 295    | WTH-120/B/R/1P-320 | US 120 305    |
| WTH-120/B/1P-385 | US 120 296    | WTH-120/B/R/1P-385 | US 120 306    |
| WTH-120/B/1P-420 | US 120 297    | WTH-120/B/R/1P-420 | US 120 307    |
| WTH-120/B/1P-550 | US 120 298    | WTH-120/B/R/1P-550 | US 120 308    |
| WTH-120/B/1P-690 | US 120 299    | WTH-120/B/R/1P-690 | US 120 309    |
|                  |               |                    |               |
| WTH-165/B/1P-75  | US 120 311    | WTH-165/B/R/1P-75  | US 120 321    |
| WTH-165/B/1P-115 | US 120 312    | WTH-165/B/R/1P-115 | US 120 322    |
| WTH-165/B/1P-150 | US 120 313    | WTH-165/B/R/1P-150 | US 120 323    |
| WTH-165/B/1P-275 | US 120 314    | WTH-165/B/R/1P-275 | US 120 324    |
| WTH-165/B/1P-320 | US 120 315    | WTH-165/B/R/1P-320 | US 120 325    |
| WTH-165/B/1P-385 | US 120 316    | WTH-165/B/R/1P-385 | US 120 326    |
| WTH-165/B/1P-420 | US 120 317    | WTH-165/B/R/1P-420 | US 120 327    |
| WTH-165/B/1P-550 | US 120 318    | WTH-165/B/R/1P-550 | US 120 328    |
| WTH-165/B/1P-690 | US 120 319    | WTH-165/B/R/1P-690 | US 120 329    |
|                  |               |                    |               |
| WTH-165/G/1P-255 | US 120 290    |                    |               |
|                  |               |                    |               |
| WTH-2P/165       | US 129 011    |                    |               |
| WTH-3P/165       | US 129 012    |                    |               |
| WTH-4P/165       | US 129 013    |                    |               |

# Lightning and Surge Protection for AC Power Supply System

- A** Utility Service
- B** Class I Surge Arresters
- E** Origin of the installation
- H** Electric Equipment
- C** Class II Surge Arresters
- F** Distribution board
- D** Class III Surge Arresters
- G** Distribution outlet



## 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)

## UL Listed (http://www.ul.com/database)

<http://www.ul.com/database>

UL Online

http://www.ul.com/database

**UL ONLINE CERTIFICATIONS DIRECTORY**

**BEGIN A BASIC SEARCH**

To begin a search, please enter one or more search criteria in the parameters below.

**Company Name (options)**

**City**

**US State**

**US Zip Code**

**Country**

**Region**

**Postal Code (non-US)**

**UL Category Code (opt)**

**UL File Number (help)**

**Keyword**

### Search results

You may choose to **Refine Your Search**.

| Company Name               | Category Name    |
|----------------------------|------------------|
| WATCHFUL EYE SOLUTIONS INC | Surge-protective |
| WATCHFUL EYE SOLUTIONS INC | Surge-protective |

Model number information is not published for all product number, please contact [Customer Service](#) for further assistance.

### UL ONLINE CERTIFICATIONS DIRECTORY

#### VZCA2.E345944 Surge-protective Devices - Component

[Page Bottom](#)

#### Surge-protective Devices - Component

[See General Information for Surge-protective Devices - Component](#)

#### WATCHFUL EYE SOLUTIONS INC

24E Hudson View Dr  
Beacon, NY 12508 USA

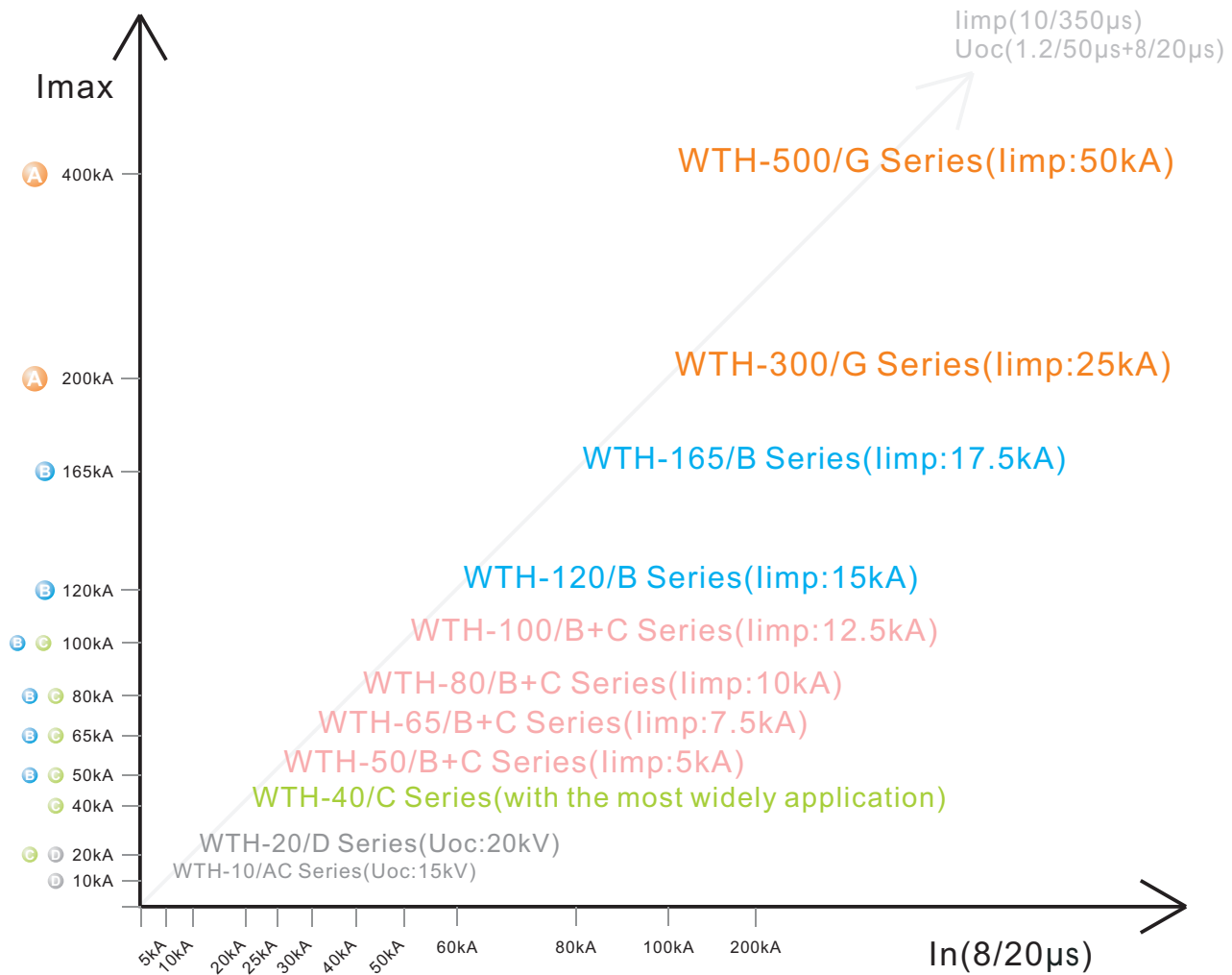
E345944

Effective May 3, 2010

| Cat No.                                | SPD Type | Volts (V) | AC/ DC/ DC PV | PH | AMPS (A) | AMB (°C) | MODE  | VPR (Vpk) | MLV (Vpk) | MCOV (V) | Vn (Vdc) | In (kA) | SCCR (kA) | NOTES |
|--|----------|-----------|---------------|----|----------|----------|-------|-----------|-----------|----------|----------|---------|-----------|-------|
| WTH-50/ B+ C/ 1P-385                   | 4CA      | 277       | AC            | 1  | n/a      | 65       | Ld-Ld | -         | 1830      | 385      | n/a      | 20      | n/a       | 1     |
| WTH-50/ B+ C/ R/ 1P-385                | 4CA      | 277       | AC            | 1  | n/a      | 65       | Ld-Ld | -         | 1830      | 385      | n/a      | 20      | n/a       | 1     |
| WTH-65/ B+ C/ 1P-385                   | 4CA      | 277       | AC            | 1  | n/a      | 65       | Ld-Ld | -         | 1830      | 385      | n/a      | 20      | n/a       | 1     |
| WTH-65/ B+ C/ R/ 1P-385                | 4CA      | 277       | AC            | 1  | n/a      | 65       | Ld-Ld | -         | 1830      | 385      | n/a      | 20      | n/a       | 1     |
| <b>Din Rail Moudle, Series WTH-385</b> |          |           |               |    |          |          |       |           |           |          |          |         |           |       |
| WTH-100/ B+ C/ 1P-385                  | 4CA      | 277       | AC            | 1  | n/a      | 65       | Ld-Ld | -         | 1620      | 385      | n/a      | 20      | n/a       | 1     |

# Lightning and Surge Protection for AC Power Supply System

- A Class I Surge Arresters (voltage switching type)
- C Class II Surge Arresters
- B Class I Surge Arresters (voltage limiting type)
- D Class III Surge Arresters



## IEC61643-1

- 5 Standard ratings
- 5.1 Preferred values of impulse current for class I tests  $I_{imp}$
- 5.2 Preferred values of nominal discharge current for class II tests  $I_n$
- 5.3 Preferred values of open-circuit voltage for class III tests  $U_{oc}$



Watchfuleye is specialized in a complete range of lightning and surge protective devices, with wide applications in low voltage DC & AC power supply system, data and control system, intelligent monitoring system and new energy industry like solar and wind power system, etc. Our company also offers reliable custom technical solutions in lightning & surge protection for global customers.

Headquartered in New York, watchful Eye has a network of sales to serve our customers world wide. with high quality products and optimal service, Watchful Eye can meet your strict technical standards and unique requirements.

# **Watchful Eye**

## **The Guardian that Protects Your System against Surge and Lightning**

 **Watchful Eye Solutions, Inc.**



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