

# MULTI-STAGE Surge Protection

## CLASS I+II+III

Innovated Multi-Stage Surge Protection  
Single & Three Phase Modular  
Installation - Hard Wire

Cascade bi-directional EMI-RFI filtering  
of phase (L), neutral (N) and  
ground (GND) wire

IEC61643-1 Class I+II+III; IEC60939-2

Mobile Base Station

Telecommunication

Broadcast

Computers

Sensitive Electronic

Medical Equipment

 **Surge**  
Protection



CLASS I+II+III



Military

Industrial

Residential

## Hard Wire Installation

### Nine (9) Stages Surge Protector

NEW INNOVATION APPROACH TO SURGE PROTECTION



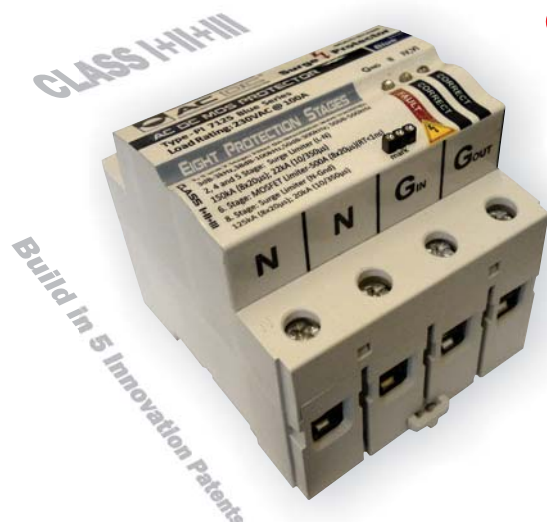
**... We Care for Safety of Your Electronic Devices**



## ACDC SURGE PROTECTOR

### NINE (9) STAGES SERIES PROTECTOR 1/1 & 3/3

#### HARD WIRE INSTALLATION - MODULAR SYSTEM



NEW!



### Type-PI (780; 7100; 7125; 7200) Red Series

Single Phase / Three Phase CLASS I+II+III

Voltage Rating: 120VAC / 230VAC / 400VAC

Current Rating: up to 100A per phase

Response Time: < 1ns



### ACDC Surge Protector Type- PI Series

is specifically designed to protect, upgrade and improve functioning of computers, telecommunication, medical, audio, video and all sensitive electronic equipment.

High current capability, up to 100A, makes these protectors ideal equally for low power sensitive electrical devices and for industrial application.

### EASIER SIMPLER BETTER

Implementation of ACDC Surge Protectors is simple and easy. Regarding multi-stage design of Class I+II+III in one unit with ACDC Surge Protectors is expel need of several surge protectors installed separately in each boundary protection zone (LPZ0a/LPZ0b-LPZ3 & C-A acc. IEC62305-4 & ANSI/IEEE C62.41.1-2)

With simple words, design and planning of surge protection is not any more reserved just for experts in this field. It become simple and applicable to wide branch of professions: electrician, const. builders, IT..

### ACDC Surge Protector Type - PI (780; 7100; 7125; 7200) Red Series

is advanced multi-stage surge protector consists of 9 (nine) & 100A protection stages that provides effective and reliable protection against surges and transients. The protection device have high grade cascade bi-directional EMI/RFI filtering of phase (L) and neutral (N) wire with option for ground (GND) filtering. It also has special diagnostic for ground condition.

**Application:** The scope of applications of ACDC Surge Protectors is quite wide and refers to the protection of electrical devices against impulse surge and high-frequency (electromagnetic) disturbance, oscillation, speaks in network power supply and atmospheric discharge. ACDC protectors have high-grade bidirectional filtering. They are tracking AC waveform eliminating so-called pollution in power AC supply.

These protectors have special design to protect and improve functioning of sophisticate equipment in Telecommunications, Broadcast, Medical equipment, Computers, Military, Solar Photovoltaic and Residential.

**Technical Specifications:** The basic module of type ACDC Surge Protector- Red Series is 9 (nine) stages Single Phase Protector with modular configuration for single or three phase applications for load currents of up to 100A (22kW) per phase.

**Investment:** Installation of ACDC Surge Protector type - PI is excellent choice for investment in the quality of your power network supply, extended equipment life and reduce their down time and errors.

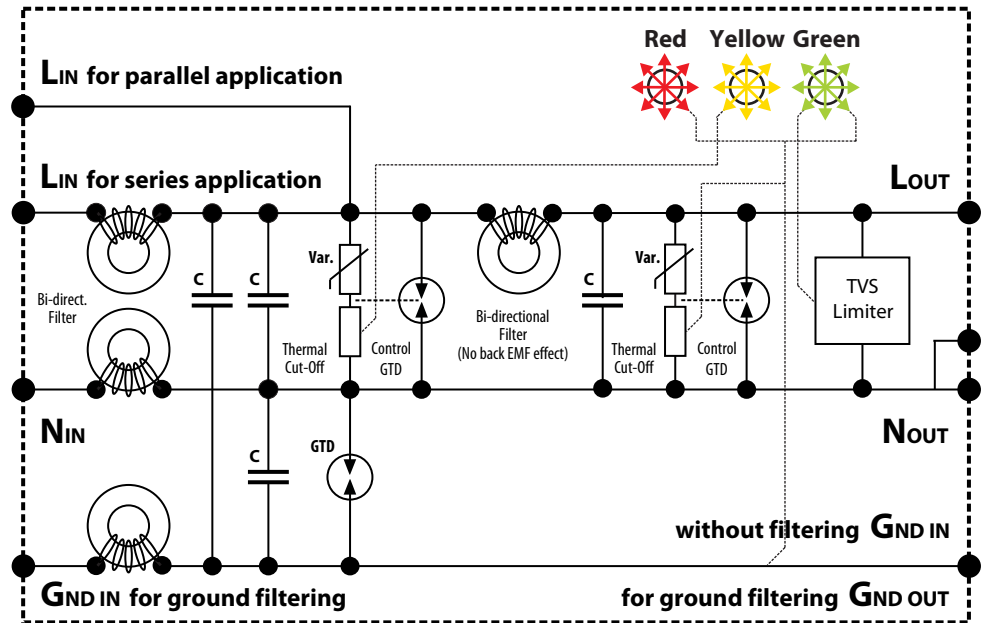
**Reliability:** If the stages 2,4 and 6 are out of function, the stages 1,3,7 and 8 are still provide a high grade cascade bi-directional filtering along with ultimate (5-th) protection stage.



## NINE PROTECTION STAGES:

Cascade bi-directional EMI-RFI filtering of phase (L) neutral (N) and (Gnd) wire

### Basic Circuit Diagram per Phase - Red Series:



### ACDC Surge Protector Type-PI Red Series

**Philosophy:** The ACDC Surge Protectors have coordinated approach to lightning protection, surge and transient protection as well as grounding, an approach that embraces all aspects of potential damage. No single technology can effectively protect electronic devices from the damaging effects of lightning and induced transients, which can severely damage or destroy electronic systems.

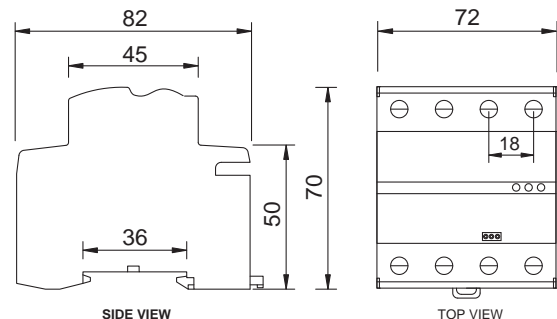
In order to provide the optimum level of protection, ACDC has developed integrate 9 (nine) stages Surge protector that provides effective and reliable protection against surges and transients.

**Approach:** ACDC Surge Protectors provides a systematic approach on two fronts: Surge protection and Bi-directional filtration. While there are companies and products that attempt one of these, ACDC Surge Protectors is the only product that seamlessly merges the two technologies. The unique multi-stage design provides the most advanced power filter protector.

**Technology:** ACDC Surge Protector Type-PI Red Series is protector of class I+II+III in one according to IEC61643. They also full fill standard requirements for electromagnetic (radio) interference IEC60939-2.

**Design:** The integrated modular design for single or three phase applications allow easy installation on place where surge protection are needed.

**Installation:** The ACDC Surge Protector - Red Series could be install in series or parallel configuration depending of total load ( $>100A <$ ). The place of installation could be Main Circuit Board (MCB) or Sub Distribution Board (SDB).



### Innovation Approach to Surge Protection

ACDC Multi-Stage Surge Protectors have built-in five (5) patents and use four (4) complementary different protection technologies, (Varistor, Gas Tube, Nanocrystalline Cores and TVS technology) in one unit. That result with reducing the surge current up to 99.9% at single point.

**T**his characteristic can not offer competitive surge products and present a fundamental improvement in Surge Protection technology. Implementation of ACDC Surge Protectors are simple and applicable for professions such as planners, construction engineers, designers, electricians and others.



## Technical Specification per Phase ACDC Surge Protector - Red Series

| Type                    | Type PI 780 - RS   | Type PI 7100 - RS                               | Type PI 7125 - RS                               | Type PI 7200 - RS                               |
|-------------------------|--|---|---|---|
| Order Code              | 800.135  | 800.136   | 800.137   | 800.138   |
| Total Surge Current     | Surge Cur. 105kA (8/20µs)<br>or 15kA (10/350µs)  | Surge Cur. 125kA (8/20µs)<br>or 18kA (10/350µs) | Surge Cur. 150kA (8/20µs)<br>or 22kA (10/350µs) | Surge Cur. 225kA (8/20µs)<br>or 32kA (10/350µs) |
| Product Standard        | IEC61643-1 Class I+II+III (B+C+D); IEC60939-2  |   |   |   |
| <b>1. Stage</b>         | <b>First Protection Stage</b>  |   |   |   |
| Function                | Bi-directional filtering EMI/RFI (L-N); Front signal edge reduction;   |   |   |   |
| Technical Specification | L=0.7mH; I <sub>max</sub> =up to 100A  |   |   |   |
| Technology              | Nano Crystalline Core (L-C configuration)  |   |   |   |
| <b>2. Stage</b>         | <b>Second Protection Stage</b>   |   |   |   |
| Function                | Suppression signal shape (L-N), 8/20µs or 10/350µs   |   |   |   |
| Technical Specification | Surge Cur. 80kA (8/20µs)<br>or 12,5kA (10/350µs)   | Surge Cur. 100kA (8/20µs)<br>or 15kA (10/350µs) | Surge Cur. 125kA (8/20µs)<br>or 20kA (10/350µs) | Surge Cur. 200kA (8/20µs)<br>or 30kA (10/350µs) |
| Technology              | Varistor with thermal cut-off; Control Gas Tube Discharge  |   |   |   |
| <b>3. Stage</b>         | <b>Third Protection Stage</b>  |   |   |   |
| Function                | Bi-directional filtering EMI/RFI (L-N); Front signal edge reduction;   |   |   |   |
| Technical Specification | L=0.7mH; I <sub>max</sub> =up to 100A  |   |   |   |
| Technology              | Nano Crystalline Core (L-C configuration)  |   |   |   |
| <b>4. Stage</b>         | <b>Fourth Protection Stage</b>   |   |   |   |
| Function                | Suppression signal shape (L-N), 8/20µs   |   |   |   |
| Technical Specification | Surge Cur. 25kA (8/20µs)   |   |   |   |
| Technology              | Varistor with thermal cut-off  |   |   |   |
| <b>5. Stage</b>         | <b>Fifth Protection Stage</b>  |   |   |   |
| Function                | Long term signal suppression from 1µs to 2 sec.  |   |   |   |
| Technical Specification | This stage is the last ultimate protection level. He switch-off the circuits breaker install upstream, if the pick voltage > 300DC for (120 VAC) or 520VDC for (230 VDC) appears on the output. Circuits breaker should be < 250A gI/gG. |   |   |   |
| Technology              | Controlled Gas Tube Discharge  |   |   |   |
| <b>6. Stage</b>         | <b>Sixth Protection Stage</b>  |   |   |   |
| Function                | High speed efficiency signal suppression   |   |   |   |
| Technical Specification | TVS Limiter 500A (8/20µs); Typical response < 1nsec (nanosecond)   |   |   |   |
| Technology              | Transient Voltage Suppressor   |   |   |   |
| <b>7. Stage</b>         | <b>Seventh Protection Stage</b>  |   |   |   |
| Function                | Bi-directional filtering EMI/RFI (N-L); Front signal edge reduction;   |   |   |   |
| Technical Specification | L=0,7mH; I <sub>max</sub> =up to 100A  |   |   |   |
| Technology              | Nano Crystalline Core (L-C configuration)  |   |   |   |
| <b>8. Stage</b>         | <b>Eight Protection Stage</b>  |   |   |   |
| Function                | Ground filtering   |   |   |   |
| Technical Specification | L=0,7mH  |   |   |   |
| Technology              | Nano Crystalline Core (L-C configuration)  |   |   |   |
| <b>9. Stage</b>         | <b>Ninth Protection Stage</b>  |   |   |   |
| Function                | Suppression signal shape (N-Gnd), 8/20µs or 10/350µs   |   |   |   |
| Technical Specification | Surge Cur. 80kA (8/20µs)<br>or 12,5kA (10/350µs)   | Surge Cur. 100kA (8/20µs)<br>or 15kA (10/350µs) | Surge Cur. 125kA (8/20µs)<br>or 20kA (10/350µs) | Surge Cur. 200kA (8/20µs)<br>or 30kA (10/350µs) |
| Technology              | Controlled Gas Tube Discharge  |   |   |   |



## Single and Three phase Models - ACDC Surge Protectors - Red Series

### Guideline for ordering of ACDC Surge Protectors of Red Series

|                   |  |
|-------------------|--|
| Technology:       | Multi-Stage Surge Protection; Nine (9) Stages Series Protector                           |
| Specification:    | Cascade bi-directional EMI-RFI filtering of phase (L), neutral (N) and ground (GND) wire |
| Load:             | Up to 100A per phase; 12kW per phase for 120VAC; 22kW per phase for 230VAC               |
| Options:          | Ground filtering, indication for bed grounding, remote alarm                             |
| Installation:     | Hard wire installation - Modular System  |
| Product Standard: | IEC61643-1 Class I+II+III; IEC60939-2  |

### Single Phase

For upgrade the distribution panel



| Type                  | Order Code  | Total Surge Cur.                  | Dimension (WxDxHmm) | Weight (kg) |
|-----------------------|-------------|-----------------------------------|---------------------|-------------|
| Type-PI 780 1/1-RS    | 800.135-1/1 | 105kA(8/20µs) or 15kA(10/350µs)   | 82x72x70            | 0,47        |
| Type-PI 7100 1/1-RS   | 800.136-1/1 | 125kA (8/20µs) or 18kA (10/350µs) | 82x72x70            | 0,47        |
| Type - PI 7125 1/1-RS | 800.137-1/1 | 150kA (8/20µs) or 22kA (10/350µs) | 82x72x70            | 0,47        |
| Type - PI 7200 1/1-RS | 800.138-1/1 | 225kA (8/20µs) or 32kA (10/350µs) | 82x72x70            | 0,47        |

### Three Phase

For upgrade the distribution panel

Three single phase surge protectors connected for three phase application



| Type                      | Order Code      | Total Surge Cur.                  | Dimension (WxDxHmm) | Weight (kg) |
|---------------------------|-----------------|-----------------------------------|---------------------|-------------|
| Type-PI 780 1/1-RS x 3    | 800.135-1/1 x 3 | 315kA(8/20µs) or 45kA(10/350µs)   | 82x216x70           | 1,41        |
| Type-PI 7100 1/1-RS x 3   | 800.136-1/1 x 3 | 375kA (8/20µs) or 54kA (10/350µs) | 82x216x70           | 1,41        |
| Type - PI 7125 1/1-RS x 3 | 800.137-1/1 x 3 | 450kA (8/20µs) or 66kA (10/350µs) | 82x216x70           | 1,41        |
| Type - PI 7200 1/1-RS x 3 | 800.138-1/1 x 3 | 675kA (8/20µs) or 96kA (10/350µs) | 82x216x70           | 1,41        |

### Three Phase

The Surge Protectors are installed in Metal Distribution board with degree of protection IP54



| Type                    | Order Code    | Total Surge Cur.                  | Dimension (WxDxHmm) | Weight (kg) |
|-------------------------|---------------|-----------------------------------|---------------------|-------------|
| Type-PI 780 3/3-M-RS    | 800.135-3/3-M | 315kA(8/20µs) or 45kA(10/350µs)   | 250x250x150         | 5,1         |
| Type-PI 7100 3/3-M-RS   | 800.136-3/3-M | 375kA (8/20µs) or 54kA (10/350µs) | 250x250x150         | 5,1         |
| Type - PI 7125 3/3-M-RS | 800.137-3/3-M | 450kA (8/20µs) or 66kA (10/350µs) | 250x250x150         | 5,1         |
| Type - PI 7200 3/3-M-RS | 800.138-3/3-M | 675kA (8/20µs) or 96kA (10/350µs) | 250x250x150         | 5,1         |

### Three Phase

The Surge Protectors are installed in Metal Distribution board with degree of protection IP54  
Circuit breakers MCB 100A are installed in the front of protectors for each phase















| Type                      | Order Code      | Total Surge Cur.                  | Dimension (WxDxHmm) | Weight (kg) |
|---------------------------|-----------------|-----------------------------------|---------------------|-------------|
| Type-PI 780 3/3-MCB-RS    | 800.135-3/3-MCB | 315kA(8/20µs) or 45kA(10/350µs)   | 300x250x150         | 7,1         |
| Type-PI 7100 3/3-MCB-RS   | 800.136-3/3-MCB | 375kA (8/20µs) or 54kA (10/350µs) | 300x250x150         | 7,1         |
| Type - PI 7125 3/3-MCB-RS | 800.137-3/3-MCB | 450kA (8/20µs) or 66kA (10/350µs) | 300x250x150         | 7,1         |
| Type - PI 7200 3/3-MCB-RS | 800.138-3/3-MCB | 675kA (8/20µs) or 96kA (10/350µs) | 300x250x150         | 7,1         |

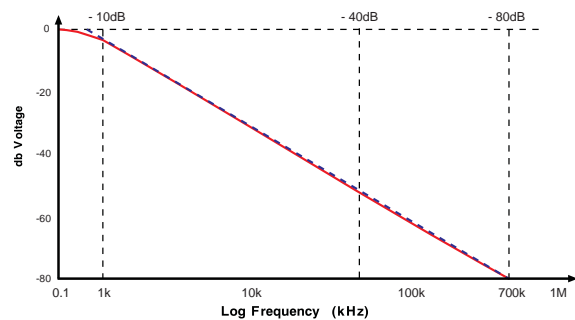
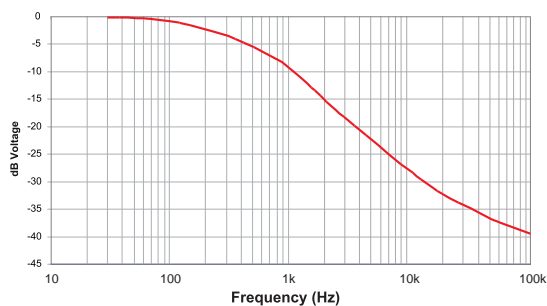
\* The Surge Protectors from series Type-PI 3/3-MCB-RS are delivered with phase, neutral and ground filtering as model basic option. By customer request the model could be delivered for installation without ground filtering or for parallel installation with additional mark WGF or P

[www.acdc-dcac.eu](http://www.acdc-dcac.eu)

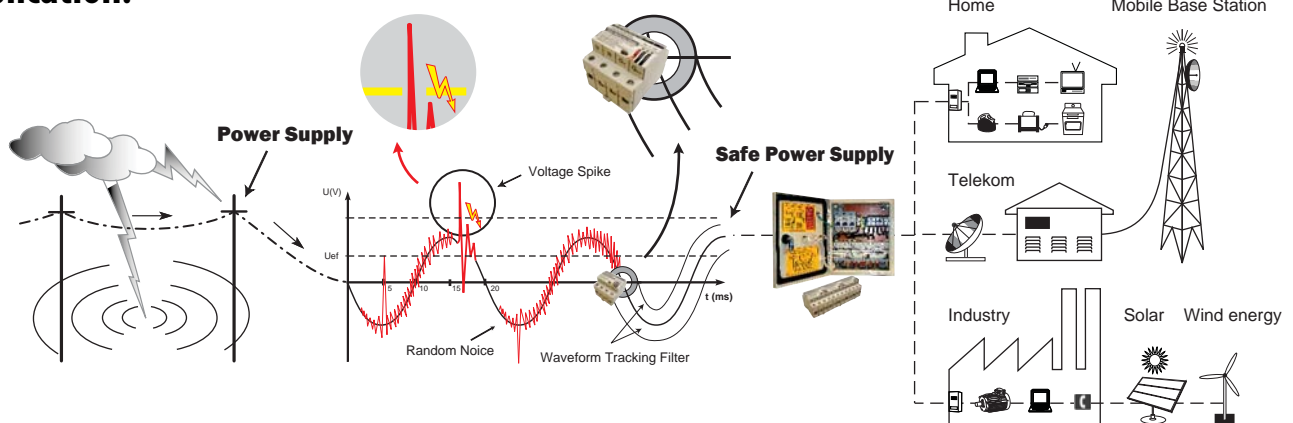
## Operation Diagnostic System

| Normal:                     | Red   | Yellow  | Green   |   |
|-----------------------------|---|---|---|---|
| Continuous yellow and green |  |  |  | Led Indication for correct stage no. 2,4 and 6. The stages no. 1,3,7 and 8 (high garde bi-directional filtering) are always in function along with ultimate (5-th) protection stage.    |
| Fault:                      |   |   |   |   |
| Continuous green            |  |  |  | Led Indication for correct stage no. 4,6 and un correct no 2. The stages no. 1,3,7 and 8 (bi-directional filtering) are always in function along with ultimate (5-th) protection stage. |
| Fault:                      |   |   |   |   |
| Blinking red                |  |  |  | Led Indication for bed grounding (Low impedance equipotential ground is not provided)   |
| Fault:                      |   |   |   |   |
| Continuous red              |  |  |  | Only stages 1,3,7 and 8 are still in function along with ultimate (5-th) protection stage.  |

## Frequency attenuation:



## Application:



### Applications:

Telecommunication  
Computers  
Medical equipment  
Sensitive electronic  
Solars  
Industrial grade  
Military

### Features:

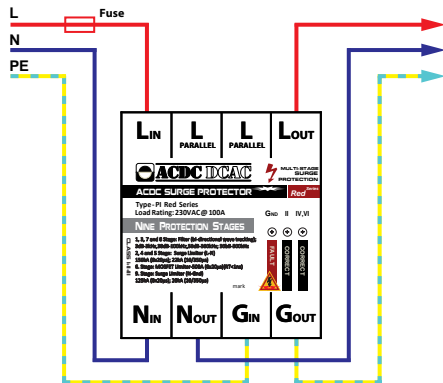
Multi - Stage Surge Protection  
Nine (9) Protection Stages  
Bi-directional Filtering  
Ground Filtering  
Thermal Circuit Protection  
High Reliability  
Excellent Response Time < 1ns

Certificate of Quality    ISO 9001:2008  
Varistors Standard        IEC 61643-1; UL 1449  
Elect. Magn. Interfer.    IEC 60939-2  
Protec. Standard acc.    IEC 61643-1 Class I+II +III

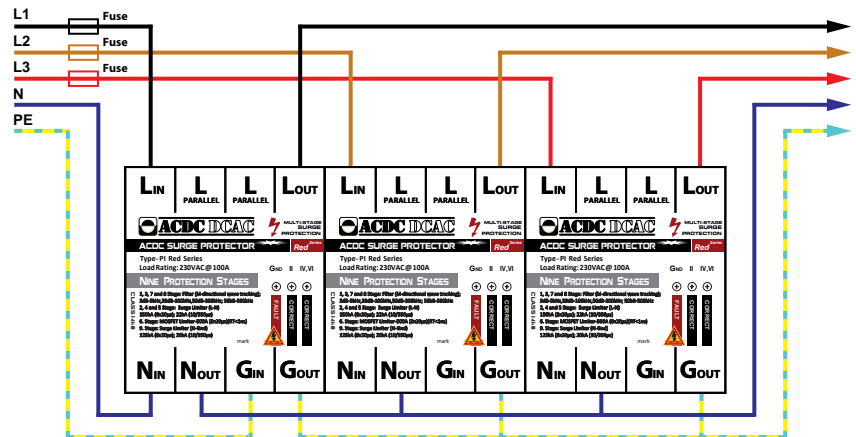


## Installation Instruction for TN-C-S, TN-S and TT distribution system

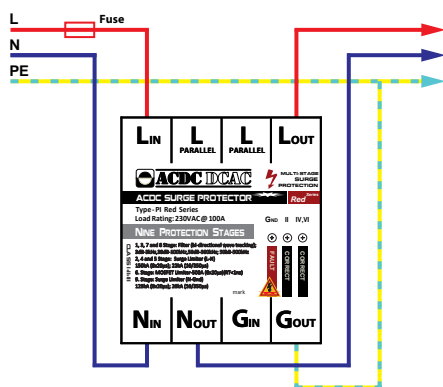
### SERIES - Single Phase Installation with phase (L), neutral (N) and ground (GND) filtering



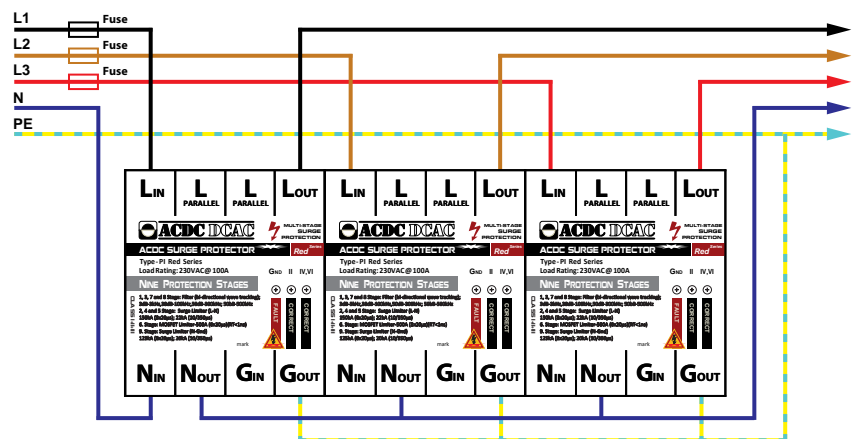
### SERIES - Three Phase Installation with phase (L), neutral (N) and ground (GND) filtering



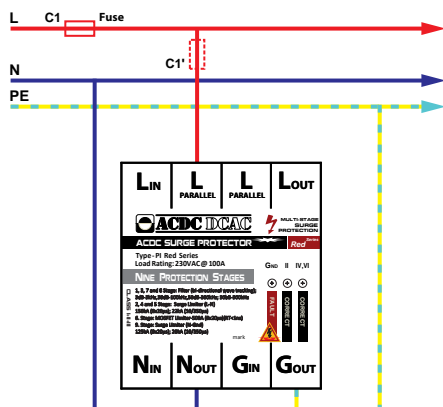
### SERIES - Single Phase Installation with phase (L) and neutral (N) and without ground (GND) filtering



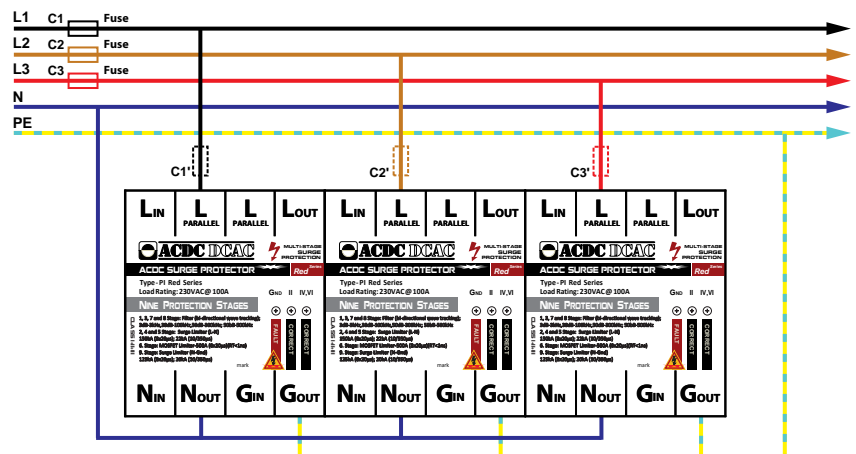
### SERIES - Three Phase Installation with phase (L) and neutral (N) and without ground (GND) filtering



### PARALLEL - Single Phase Installation (for current > 100A per phase)



### PARALLEL - Three Phase Installation (for current > 100A per phase)



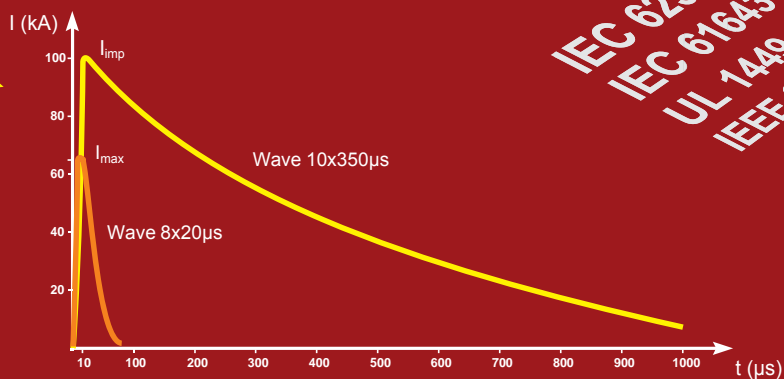
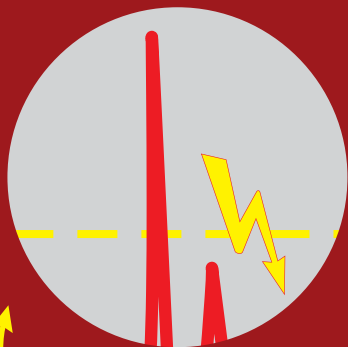




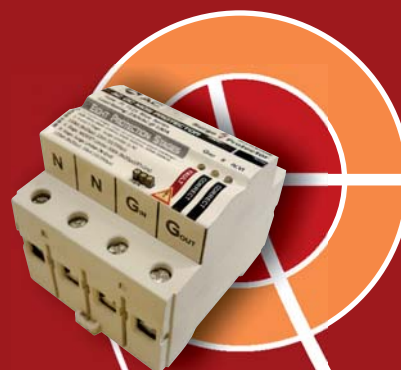
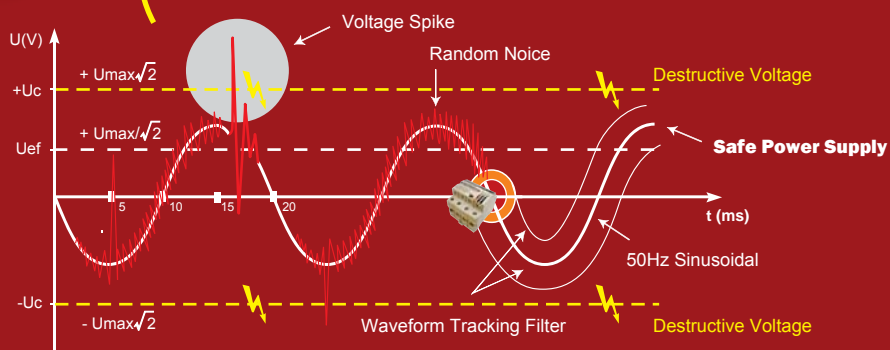
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# Surge



IEC 62305-4  
IEC 61643-1  
UL 1449 3th  
IEEE C62.41.1



## ACDC Surge Protector

|                      |  | Green Series | Blue Series | Red Series | Orange Series | Pink Series | Yellow Series |
|----------------------|--|--------------|-------------|------------|---------------|-------------|---------------|
| Application          | Single Phase                             | ✓            | ✓           | ✓          | ✓             | ✓           |               |
|                      | Three Phase                              | ✓            | ✓           | ✓          |               |             |               |
|                      | Signal Line                              |              |             |            |               |             | ✓             |
| Installation         | Rail Din                                 | ✓            | ✓           | ✓          |               |             |               |
|                      | Plug In                                  |              |             |            | ✓             | ✓           | ✓             |
| Connection           | Series Connection                        | ✓            | ✓           | ✓          | ✓             | ✓           | ✓             |
|                      | Parallel Connection (Optional)           | ✓            | ✓           | ✓          |               |             |               |
| Grounding            | Signal. for Ground Condition             | ✓            | ✓           | ✓          | ✓             |             |               |
|                      | Option for ground Filtering              |              | ✓           | ✓          |               |             |               |
|                      | No Ground Contamination                  | ✓            | ✓           | ✓          | ✓             | ✓           | ✓             |
| Degree of Protection | Eight (8) Stages Surge Protector         | ✓            | ✓           | ✓*         | ✓             |             |               |
|                      | Three (3) Stages Surge Protector         |              |             |            |               | ✓           | ✓             |
| Signalization        | Three Stages Signalization               | ✓            | ✓           | ✓          | ✓             |             |               |
|                      | AC Signalization                         |              |             |            |               | ✓           |               |
|                      | Signal Line Signalization                |              |             |            |               |             | ✓             |
| Options              | Modularity                               | ✓            | ✓           | ✓          |               |             |               |
|                      | Free Contact Alarm                       | ✓            | ✓           | ✓          |               |             |               |
|                      | Degree of Enclosures IP54, IP65          | ✓            | ✓           | ✓          |               |             |               |
| Standards            | IEC61643-1 Class I+II+III;<br>IEC60939-2 | ✓            | ✓           | ✓          | ✓             | ✓*          |               |
|                      | IEC61643-21                              |              |             |            |               |             | ✓             |

Products Manufacture by  
ACDC DCAC  
Multi-Stage Surge Protection

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