

MA3100 Series

Cost effective surge protection designed to cope with high magnitude 10/350µs current waveforms as described in IEC 61312

- **Space saving design, DIN rail mounting**
- **IEC Class I, II and III products available**
- **Single pole Ipeak of 60kA (10/350µs) for Class I devices**
- **Multiple pole Ipeak of >100kA (10/350µs) for Class I devices**
- **Full range of AC mains power applications**
- **Coordinated surge protection to IEC 61312; rated according to IEC 61643**



The MA3100 Series offers cost effective surge protection for applications described by IEC 61312 where the surge protector could carry a partial share of the lightning surge current. The MA3100 Series fulfills IEC's cascade protection philosophy. Class I devices rated for 60kA (10/350µs) are deployed at the service entrance, followed by the Class II rated devices at key power panels. Sensitive systems can then be locally protected by a Class III device.

All modules are DIN rail mounted for ease of installation and have very small footprints therefore minimising the space required. Even the powerful 60kA (10/350µs) single pole module is only 18mm wide. Each device is simply connected in parallel with the power system via a fused spur.

The Class I lightning current arrester offers a very high performance specifica-

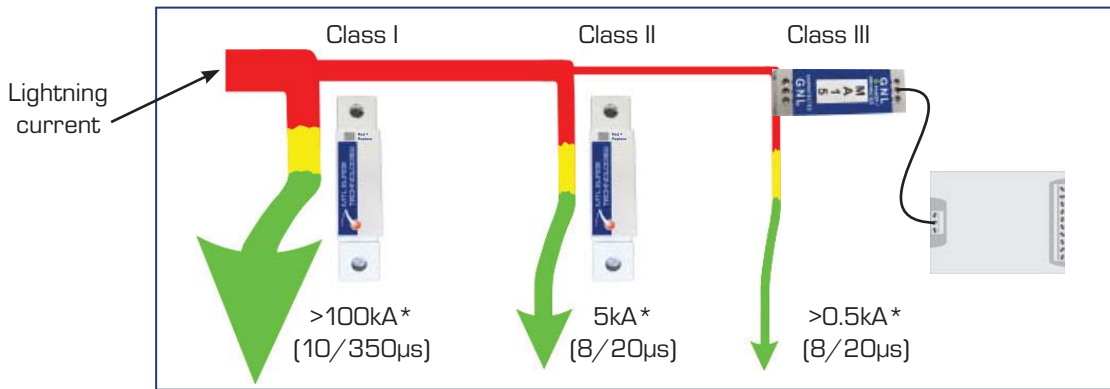
tion. The unit withstands the impact of a 60,000A impulse with a lightning wave-shape of 10/350µs with a specific energy of 1,000kJ/Ω. These levels are significantly higher than called for in IEC 61643 for a Class I device.

The Class II surge current arrester is designed to work as both a standalone device and in cascade coordination with MTL's Class I lightning arrester. A single width module withstands surge currents up to 45,000A with an 8/20µs waveform. Class II arresters are available in single width modules for maximum user flexibility, double width modules for all-mode protection on single phase systems and quad width modules for all-mode protection on three phase systems. Many Class II modules have remote monitoring capabilities as a standard feature. Voltage free, normally open, normally

closed contacts can be used for a variety of monitoring tasks.

The Class III surge protector is designed to protect individual pieces of equipment. A typical example of a Class III device is the MA15 which offers RFI/EMI filtering in addition to excellent levels of surge protection.

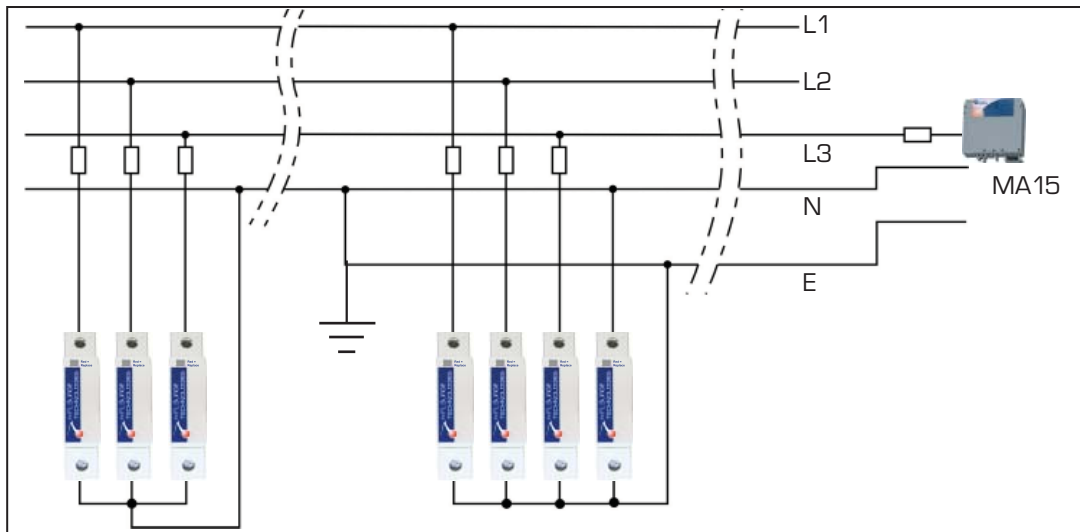
Coordinated IEC 61643 Class I, Class II and Class III surge protection



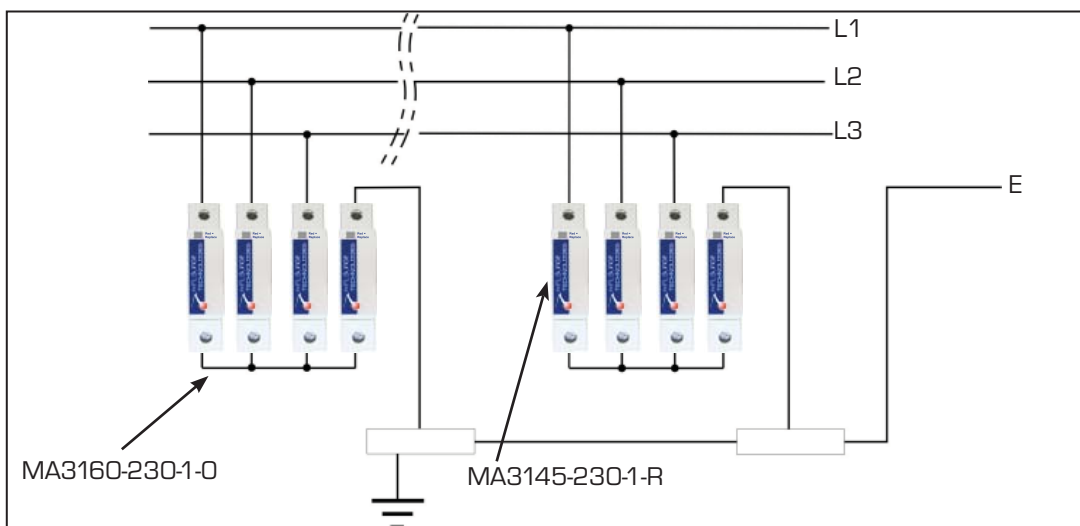
*Total over a 3 phase system.

The MA3100 range offers cost effective surge protection for applications described by IEC 61312, where the AC mains supply can carry a partial share of the lightning surge current. Class I surge protectors (rated according to IEC 61643) are designed to carry up to 60kA (10/350 μs). Class II surge protectors are characterized by their ability to protect against 8/20 μs impulses up to 45kA, possibly resulting from the operation of a class I device. Finally Class III devices are used to protect individual pieces of equipment. An excellent example of a class III device is the MA15.

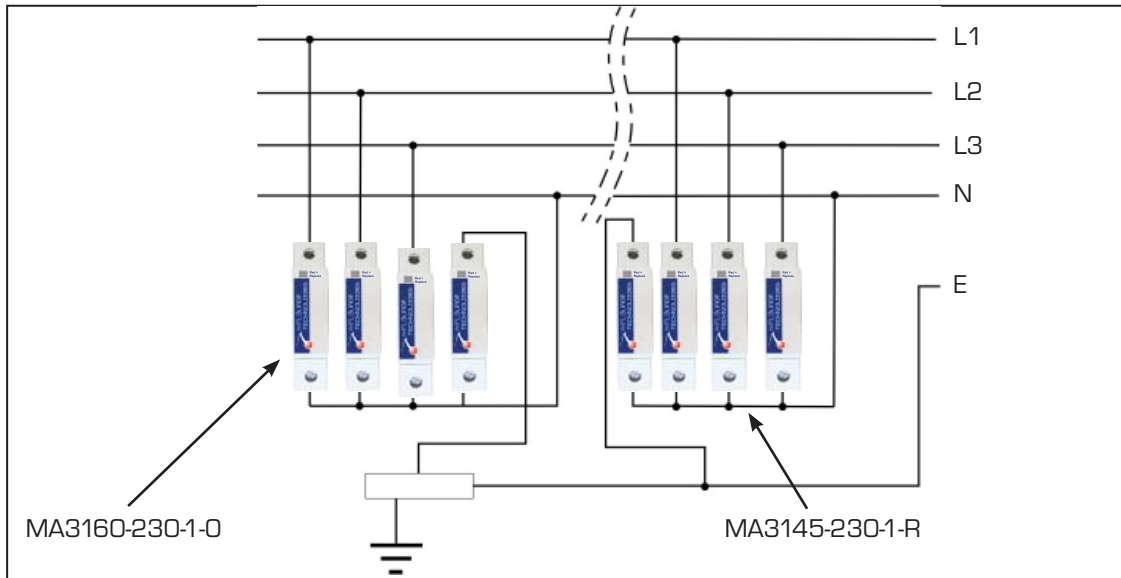
TN-C-S System



Variations for IT



Variations for TT



Class I Surge Protection Device

| Technical data | MA3160 | 230-1-0 |
|---|---|---|
| Dimensions (see Fig. 1 for A, B and C) | | A |
| IEC category/VDE requirement class: | | I/B |
| Max. continuous operating voltage U_C : | | 250V 50/60Hz |
| Leakage current: | | <1 μ A |
| Lightning test current I_{imp} (10/350 μ s) | peak value/charge: 2 & multi-pole specific energy: | 60kA/30As >100kA/>50As 1000kJ/ Ω |
| Protection level U_p : | | \leq 4kV |
| Response time t_a : | | \leq 100ns |
| Quenching short circuit current I_f : | | 1.5kA/250V |
| Max. required backup fuse: | | 125A gL |
| Climate category: | | -40°C to +80°C |
| Perm. relative air humidity: | | \leq 95% |
| Protection type acc. to IEC 60 529/EN 60 529: | | IP20 |
| Maximum wire size: | | 25mm ² |
| Torque: | | 4.5Nm |
| Inflammability class in acc. with UL94: | | VO |
| Test standards: | IEC 61643-1:1998-02 E DIN VDE 0675 PART 6:1989-11/A2:1196-10 | |

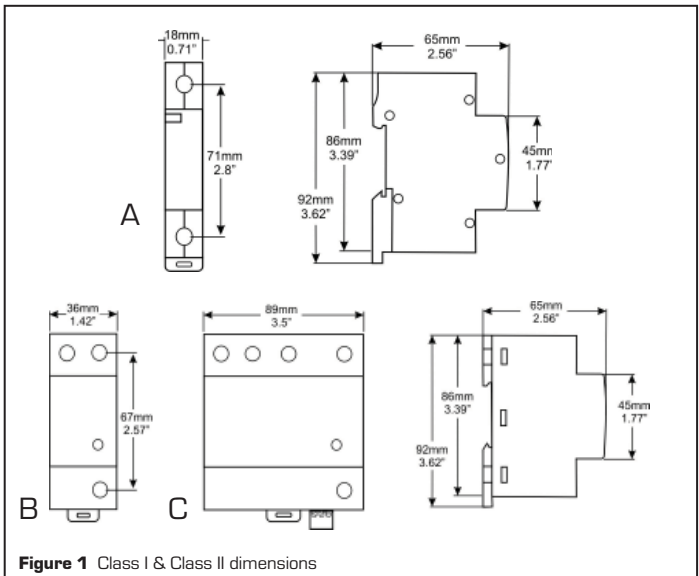


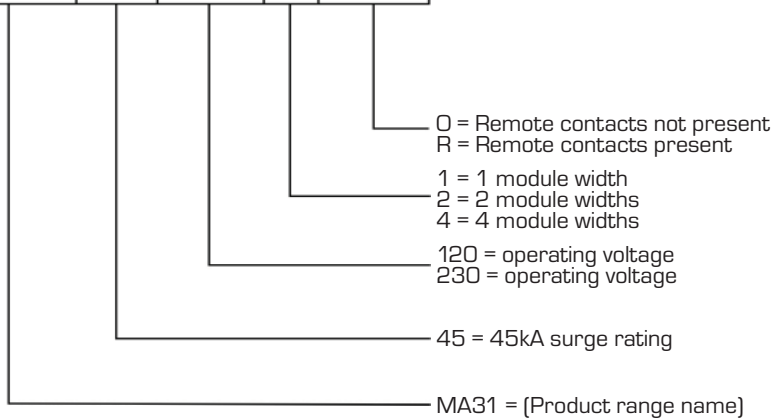
Figure 1 Class I & Class II dimensions

Class II Surge Protection Device

| Technical data | MA3145 | 120-1-R | 230-1-R | 120-2-0 | 230-2-0 | 120-4-R | 230-4-R |
|---|-----------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Dimensions (see Fig. 1 for A, B and C) | | A (1 pole) | A (1 pole) | B (2 pole) | B (2 pole) | C (4 pole) | C (4 pole) |
| IEC category/VDE requirement class: | | II/C | II/C | II/C | II/C | II/C | II/C |
| Nominal voltage U_n : | | 120V AC | 230V AC | 120V AC | 230V AC | 120/208V AC | 230/400V AC |
| Max. continuous operating voltage U_C : | | 150V AC | 270V AC | 150V AC | 270V AC | 150V AC | 270V AC |
| Lightning test current I_{imp} (10/350 μ s) | | — | — | — | — | — | — |
| peak value/charge: specific energy: | | — | — | — | — | — | — |
| Leakage current to PE at U_n : | | \leq 0.3mA | \leq 0.3mA | \leq 0.3mA | \leq 0.3mA | \leq 0.3mA | \leq 0.3mA |
| Nominal discharge surge current I_n (8/20 μ s): | | 10kA | 10kA | 10kA | 10kA | 10kA | 10kA |
| Max. discharge surge current I_{max} (8/20 μ s): | | 45kA | 45kA | 45kA | 45kA | 45kA | 45kA |
| Protection level U_p : | | <690V | <1.3kV | <690V | <1.3kV | <690V | <1.3kV |
| Residual voltage at 5kA: | | 490V | 900V | 490V | 900V | 490V | 900V |
| Response time t_a : | | \leq 25ns | \leq 25ns | \leq 25ns | \leq 25ns | \leq 25ns | \leq 25ns |
| Max. required backup fuse: | | 125A gL | 125A gL | 125A gL | 125A gL | 125A gL | 125A gL |
| Remote indication contact: | | | | | | | |
| max. perm. operating voltage U_{max} | | 20V AC/20V DC | 20V AC/20V DC | none | none | 125V AC/110V DC | 125V AC/110V DC |
| max. perm. operating current I_{max}^{AC} | | 20mA | 20mA | — | — | 0.3A | 0.3A |
| max. perm. operating current I_{max}^{DC} | | 20mA | 20mA | — | — | 0.3A | 0.3A |
| Temperature range: | | -40°C to +80°C | -40°C to +80°C | -40°C to +80°C | -40°C to +80°C | -40°C to +80°C | -40°C to +80°C |
| Protection type acc. to IEC 60 529/EN 60 529: | | IP20 | IP20 | IP20 | IP20 | IP20 | IP20 |
| Inflammability class according to UL94: | | VO | VO | VO | VO | VO | VO |
| Stripping lgth: Biconnect term. blks./remote indicator contact: | | 14.5/7mm | 14.5/7mm | 14.5/7mm | 14.5/7mm | 14.5/7mm | 14.5/7mm |
| Torque: Biconnect term. blks./remote indicator contact: | | 4.5Nm/0.25Nm | 4.5Nm/0.25Nm | 4.5Nm/0.25Nm | 4.5Nm/0.25Nm | 4.5Nm/0.25Nm | 4.5Nm/0.25Nm |
| Approvals: | | | | | | | |
| Test standards: | UL1449; IEC 61643-1:1998-02 | | | | | | |

To order Class II surge protection devices, specify -

MA31 45 230 1 O/R



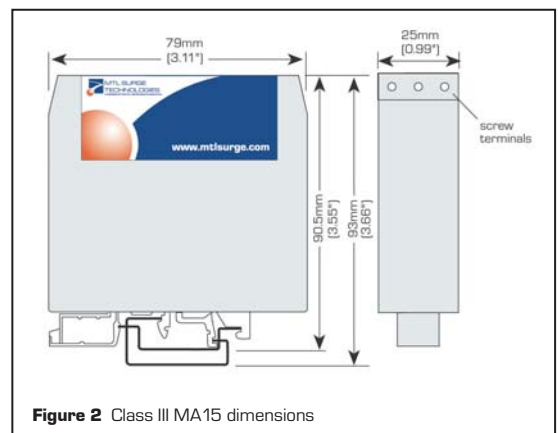
Class III Surge Protection Device

The MA15 Series of surge protection devices has a unique 'three stage' combination of protection elements, that suppress conducted RFI and voltage surges. The current elements are first, surge clipping components to absorb transient surges that may otherwise damage equipment, second a filter to suppress noise in the system and third, 'ring' suppression. The third of these prevents surges causing the filter to 'ring' (oscillate) under low load conditions – an effect that actually accentuates interference in most commercially available filters.

The MA15 Series protects electronic equipment and computer networks against the effects of 'noise pollution' induced in power supplies. MA 15 units 'clean up' the effects of industrial noise and surges caused by lightning, switching devices, thyristor controls, transmission system overloads and power-factor correction circuits.

MA15 Series

| MA15 technical data | MA15D1 | MA15D2 |
|--|---|----------------|
| IEC category/VDE requirement class: | III | III |
| Nominal voltage U_N : | 120V AC | 230V AC |
| Max. continuous operating voltage U_C : | 150V | 275V |
| Max. load current $I_N/40^\circ\text{C}$: | 15A | 15A |
| Leakage current to PE at U_N : | <0.3mA | <0.3mA |
| Nominal discharge surge current I_n (8/20 μs): | sym/asym 3kA/6kA | 3kA/6kA |
| Maximum discharge surge current I_{max} (8/20 μs): | sym/asym 18kA/36kA | 18kA/36kA |
| Protection level U_P : | sym/asym 400V/400V | 1,000V/1,000V |
| Response time t_a : | sym/asym <1ns/<5ns | <1ns/<5ns |
| RFI attenuation (50 Ω): | -55dB @ 100MHz | -55dB @ 100MHz |
| Maximum required backup fuse: | 15A | 15A |
| Temperature range: | -40°C to +85°C | -40°C to +85°C |
| Protection type accordance to IEC 60 529/EN 60 529: | IP20 | IP20 |
| Inflammability class in accordance with UL94: | V2 | V2 |
| Stripping length: | 8mm | 8mm |
| Thread/Torque: | M3/0.8Nm | M3/0.8Nm |
| Approvals: | Hazardous locations Class I Div 2 Groups A, B, C and D | |



MTL Surge Technologies offers a very wide range of surge protection devices for AC power systems. Product series such as the ZoneMaster, ZoneSentinel and ZoneDefender offer extremely high levels of protection and are ideally suited for the most critical industrial applications. Please visit www.mtlsurge.com for more information.

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