



## SURGE PROTECTION FOR POWER APPLICATIONS

Zone Defender Pro

MA4000 Series

MA30 Series

MA15 Series

MA3100 Series

MA05/10 Series

Zone Defender

Zone Sentinel

Zone Master

Zone Defender Plus L

Zone Defender<sup>2</sup>



# ZoneDefender PRO



The most compact, powerful, feature-rich AC surge protector available.

- **80kA to 240kA surge current rating per phase**
- **Includes high-performance EMI/RFI filtering**
- **LED status indication via solid state diagnostics plus remote indication contacts**
- **Built-in audible alarm**
- **Thermal and short circuit fusing**
- **Short circuit current rating: 100k AIC**
- **UL 1449 Listed**
- **10 year product warranty**



**The ZoneDefender PRO Series** is a versatile, high performance surge protector designed for use in a wide variety of industrial, institutional and commercial applications. The ZoneDefender PRO is the most compact, powerful, feature-rich surge protector on the market today. State-of-the-art circuitry protects equipment from high frequency noise as well as from damaging electrical transients and high-energy disturbances. In addition, the ZoneDefender PRO Series offers cost-effective high capacity protection along with application versatility; features which make the Series the ultimate surge protection solution.

**ZoneDefender PRO units** provide protection between Line to Neutral, Line to Ground, Line to Line and Neutral to Ground. Utilizing Metal Oxide Varistor (MOV) technology, the ZoneDefender PRO's protection circuits are highly reliable, dual-redundant varistor networks ensuring your site is never unprotected. Fully automatic in operation,

ZoneDefender PRO reacts immediately, clamping voltage surges without causing undue leakage losses under normal operation. No operator intervention is required, ZoneDefender PRO resets automatically and is maintenance free.

**Suitable for all AC power applications,** ZoneDefender PRO devices provide protection for AC power supplies with no restriction to the amount of load current.

**Thermal fusing** is incorporated into each ZoneDefender PRO as an additional safety feature. Short circuit protection with 100kA AIC rating, is also supplied, as standard, for added peace of mind.

**ZoneDefender PRO offers an LED status indication** allowing each varistor network to be continually monitored and indicated by LEDs on the front panel of the

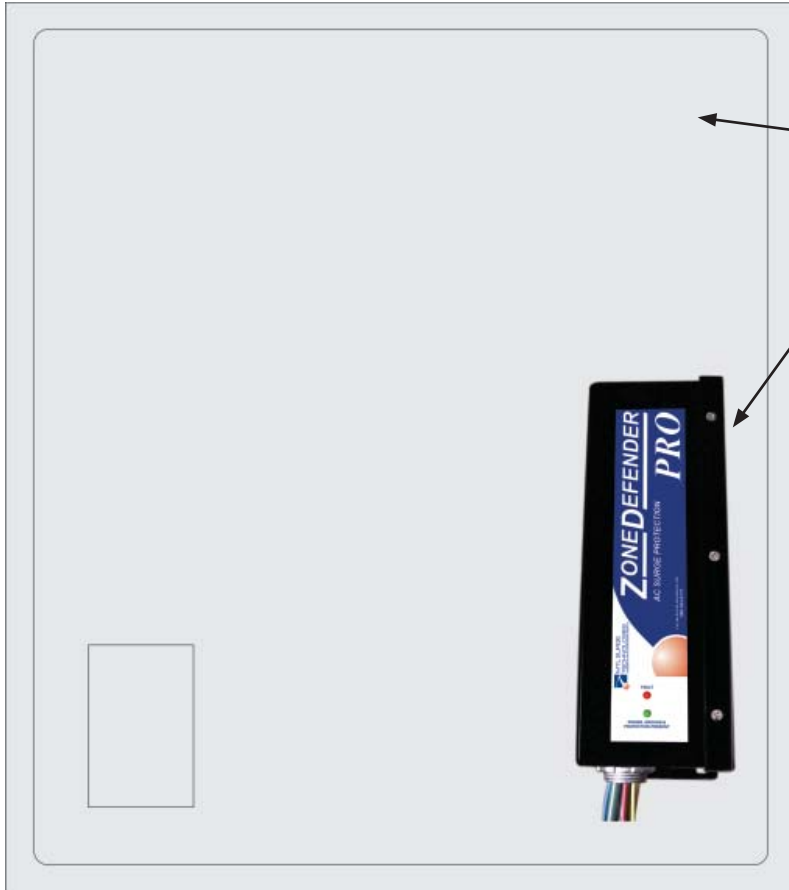
device. In addition, remote monitoring is enabled by the unit's remote indication contacts.

Installation is simple - the NEMA 4X enclosure of the ZoneDefender PRO devices can be easily surface or nipple mounted.

**The ZoneDefender PRO Series is UL 1449 Listed** and boasts an unrivaled 10 year 'no questions asked' manufacturers product warranty. ZoneDefender PRO devices also exceed the requirements of ANSI/IEEE C62.45 and ANSI/IEEE C62.41.

## AC Power Protection

# Smallest Footprint on the Market

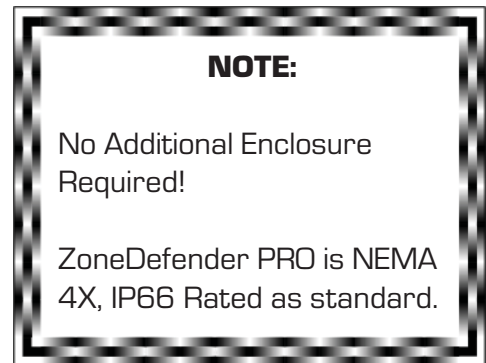


## Compare

Typical 200kA SPD (17.5" x 15.5").  
Footprint area required = 271 sq. inches

ZoneDefender PRO 200kA (9.3" x 3.0").  
Footprint area required = 27.8 sq. inches

ZoneDefender PRO requires 90% LESS footprint area!



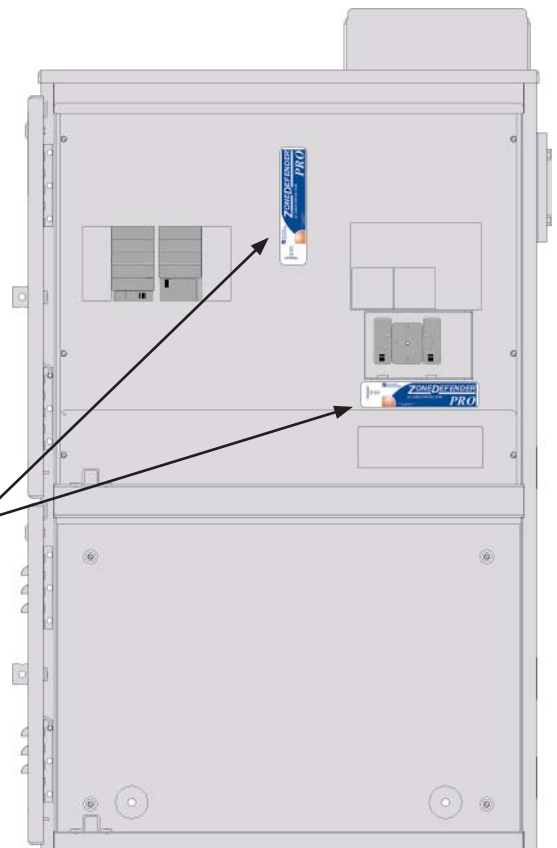
## Small size makes integration into custom equipment a breeze.

ZoneDefender PRO saves money by facilitating smaller AC power cabinets. Once the ZoneDefender Pro has been engineered in, there is no re-engineering needed to meet customers changing surge capacity requirements.

Great for:

- ◆ Telecom power distribution cabinets
- ◆ Industrial control panels
- ◆ Motor drive panels
- ◆ Automatic transfer switch
- ◆ Facility distribution panels

Can be custom designed into any available space.



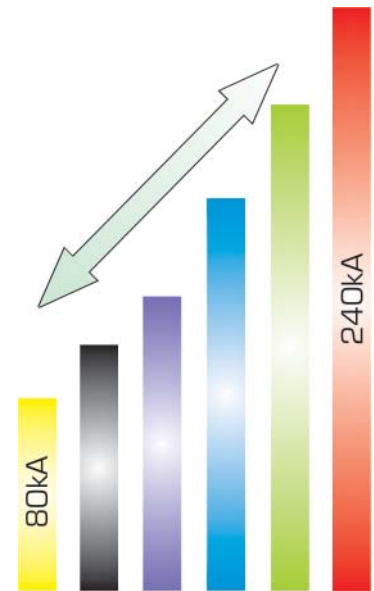
# Advanced indication and monitoring



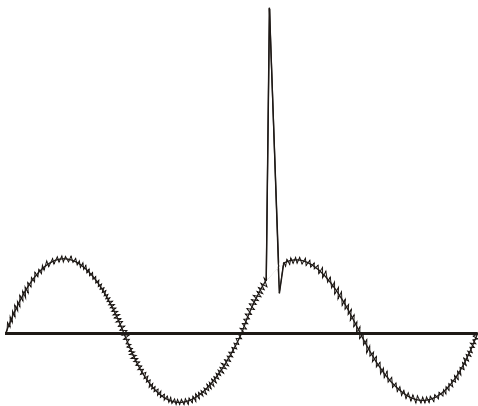
- Red LED = Fault warning  
Advanced circuitry monitors every suppression component in the ZoneDefender PRO.
- Green LED = Protection operational and ground present  
Assures user that full protection is present. Advanced circuitry continuously monitors the presence of a ground connection.
- 🔊 Any fault in the unit triggers an audible alarm. Great for units hidden from view.
- ⚡ Normally open, normally closed, voltage free contacts are a standard feature on all ZoneDefender PROs.

## Powerful surge protection

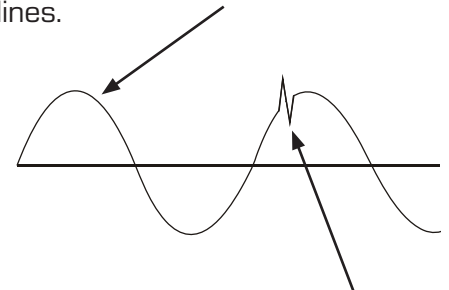
- ◆ Surge capacity options to cover every requirement **and budget**.
- ◆ An unmatched range of surge current capacities available in the same compact package.
- ◆ The same small footprint (9.3" x 3.0") for all six (6) surge capacity types.



## Precise power protection



High performance EMI/RFI Filter attenuates noise on AC power lines.



State-of-the-art surge protection reduces transient voltages to harmless levels.

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current (Imax)

80kA/100kA/120kA (8/20µs)  
160kA/200kA/240kA (8/20µs)

## Maximum continuous operating voltage

120/240 versions 140Vac  
120/208 versions 140Vac  
277/480 versions 320Vac  
220/380 versions 300Vac  
240/415 versions 300Vac

## Lines protected AC

LN, L-G, LL, NG

## Duty cycle performance (8/20ms)

Rated 1 impulse  
10,000A >6,500 Impulses  
100A infinite

## Long duration current pulse (10/1,000µs) capability

3,600A (tested)

## Ambient temperature limits

-40°F to +185°F - working  
-40°C to +85°C - working

## Humidity

95% RH (non-condensing)

## Enclosure

NEMA 1, 2, 3, 3R, 4, 4X, 12 and 13 (IP66)

## Terminals

#10 AWG (5mm<sup>2</sup>) & #8 AWG (8mm<sup>2</sup>)

## Mounting

Surface mount by 0.21" (5mm) diameter holes

## Remote contacts

Form C (NC, NO, C) 125Vac, 3A rated

## Indication

Green LED on } Power and ground present, full  
Red LED off } protection in all modes, all phases  
Green LED off } Loss of power or loss of ground  
Red LED off } (remote indication warning, via  
contacts)  
Green LED off } Protection fault (remote indication  
Red LED off } alarm via contacts & audible alarm)

## Audible Alarm

90dB

## EMI/RFI Attenuation

-75dB maximum 100kHz to 100MHz

## Weight

From 5.2 lbs (2.34Kg)

## Dimensions

9.30" x 3.00" x 4.93" (236mm x 76mm x 125mm)

## SCCR Rating

Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical Amperes, 480V maximum

## EMC compliance

BS EN 60950: 1992  
BS EN 61000-6-2: 1999

## Ratings in compliance with IEC 61643-1

I<sub>max</sub> = 80kA, 100kA, 120kA  
I<sub>imp</sub> = 6kA (10/350)\*  
I<sub>max</sub> = 160kA, 200kA, 240kA  
I<sub>imp</sub> = 10kA (10/350)\*  
\*All current results are per phase.

## To order specify -

Model number as per specification table

Optional Flush Mount Bracket (see figure 2)  
Order #16000

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

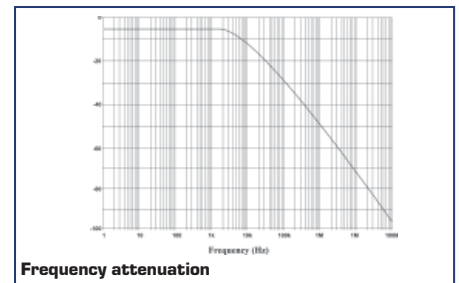
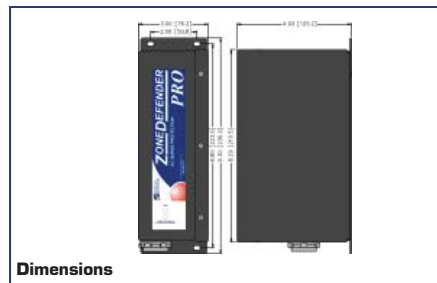
For more information please contact your local MTL sales office:

**The Americas:** +1 800 835 7075  
**UK:** +44 (0)1582 723633  
**Singapore:** +65 6 487 7887  
**The Netherlands:** +31 (0)481 450250  
**Italy:** +39 (0)2 6180 2011  
**Australia:** +61 (0)8 9455 2994  
**India:** +91 (0)44 450 1660

Local sales office information is also available on our web site at:  
[www.mtlsurge.com/support/distribution/index.htm](http://www.mtlsurge.com/support/distribution/index.htm)

Model	Working voltage (V)	UL1449 Listing (V)	Let-through voltage @ 3kA= @ 10kA= In (V)		Up (kV)	Ringwave @ 200A (V)	Phase types
<b>80kA versions</b>							
16100	120/240	400	470	780	0.8	60	Split phase 3 wire
16101	120/208	400	470	780	0.8	60	Three phase 4 wire WYE
16104	277/480	800	890	1200	1.2	75	Three phase 4 wire WYE
16107	220/380	800	890	1200	1.2	75	Three phase 4 wire WYE
16108	240/415	800	890	1200	1.2	75	Three phase 4 wire WYE
<b>100kA versions</b>							
16200	120/240	400	470	780	0.8	60	Split phase 3 wire
16201	120/208	400	470	780	0.8	60	Three phase 4 wire WYE
16202	120/240	400/800	470/890	780/1200	0.8/1.2	60/75	Three phase 4 wire Delta
16204	277/480	800	890	1200	1.2	75	Three phase 4 wire WYE
16207	220/380	800	890	1200	1.2	75	Three phase 4 wire WYE
16208	240/415	800	890	1200	1.2	75	Three phase 4 wire WYE
<b>120kA versions</b>							
16300	120/240	400	470	780	0.8	60	Split phase 3 wire
16301	120/208	400	470	780	0.8	60	Three phase 4 wire WYE
16302	120/240	400/800	470/890	780/1200	0.8/1.2	60/75	Three phase 4 wire Delta
16304	277/480	800	890	1200	1.2	75	Three phase 4 wire WYE
16307	220/380	800	890	1200	1.2	75	Three phase 4 wire WYE
16308	240/415	800	890	1200	1.2	75	Three phase 4 wire WYE
<b>160kA versions</b>							
16400	120/240	400	430	650	0.7	50	Split phase 3-wire
16401	120/208	400	430	650	0.7	50	Three phase 4-wire WYE
16402	120/240	400/800	430/770	650/1180	0.7/1.2	50/68	Three phase 4 wire Delta
16404	277/480	800	770	1180	1.2	68	Three phase 4-wire WYE
16407	220/380	800	770	1180	1.2	68	Three phase 4-wire WYE
16408	240/415	800	770	1180	1.2	68	Three phase 4-wire WYE
<b>200kA versions</b>							
16500	120/240	400	430	650	0.7	50	Split phase 3-wire
16501	120/208	400	430	650	0.7	50	Three phase 4-wire WYE
16502	120/240	400/800	430/770	650/1180	0.7/1.2	50/68	Three phase 4 wire Delta
16504	277/480	800	770	1180	1.2	68	Three phase 4-wire WYE
16507	220/380	800	770	1180	1.2	68	Three phase 4-wire WYE
16508	240/415	800	770	1180	1.2	68	Three phase 4-wire WYE
<b>240kA versions</b>							
16600	120/240	400	430	650	0.7	50	Split phase 3-wire
16601	120/208	400	430	650	0.7	50	Three phase 4-wire WYE
16602	120/240	400/800	430/770	650/1180	0.7/1.2	50/68	Three phase 4 wire Delta
16604	277/480	800	770	1180	1.2	68	Three phase 4-wire WYE
16607	220/380	800	770	1180	1.2	68	Three phase 4-wire WYE
16608	240/415	800	770	1180	1.2	68	Three phase 4-wire WYE

\* 8/20µs waveform - Tested as per ANSI/IEEE C62.45 and ANSI/IEEE C62.41



## AC split phase connection AC three phase connection

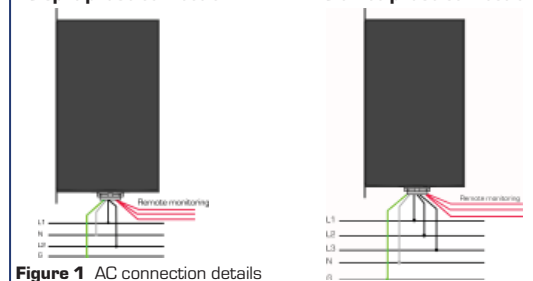
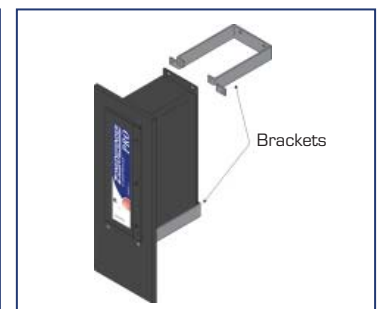


Figure 1 AC connection details



## Approvals

Country	Standard/Authority	Approved for	Product
Europe	EN60950 EN61000-6-2	AC power product	ZoneDefender PRO
Global	IEC 61643-1	Class II	ZoneDefender PRO
United States	UL 1449 2nd Edition Listed	AC power product	ZoneDefender PRO
Canada	[C-UL US Listed]		



# MA4000 Series

Surge protection for AC and DC power supplies in harsh environments.

- AC or DC application
- Straightforward and simple installation - wall mounting
- Remote monitoring plus dual redundancy
- ATEX Category 3G certified
- 10 year product warranty



**MA4000 Series surge protection devices** prevent surges and transient overvoltages conducted through power circuits from damaging electronic systems such as control panels, distributed I/O, motor and pump controls and many other remotely mounted pieces of equipment.

The MA4000 Series is available in a range of voltage options (24Vdc, 48Vdc, 110Vac and 230Vac) making it universally suitable for protecting power supplies in hostile environments. These 20kA rated, single phase devices provide protection for ac or dc power supplies with no restriction to the amount of load current.

**Fully automatic in operation**, MA4000 devices react immediately, clamping voltage surges without causing undue leakage losses under normal conditions. No operator intervention is required, MA4000 devices reset automatically and are maintenance

free. The MA4000 is designed to protect and survive the level of transient associated with the industrial environment, extending the life of equipment which could otherwise be stressed or damaged if not properly protected.

**Connected in parallel via flying leads**, MA4000 devices are easily connected to the power supply. The robust, IP54 (NEMA 13) rated enclosure is simply 'wall mounted' via the four fixing points provided.

**Remote monitoring** is provided, as standard, which can be utilised to provide indication of the status of an MA4000 unit. These wires have a normally closed contact which will open to indicate that reduced protection is present. However, continuity of protection is ensured via the redundancy capability of the MA4000

range. Additionally, thermal fusing, incorporated into each MA4000 unit, ensures a high level of safety.

The MA4000 Series is self-certified to ATEX 94/9/EC for mounting into Zone 2, Category 3G hazardous areas, especially useful for protecting the next generation of Hazardous Area mounted control systems. Also, the MA4000's aluminium case is silica filled, a requirement of Ex q certification. The MA4000 has a 10 year product warranty, like all MTL Surge Technologies and Atlantic Scientific lightning and surge protection devices.

**AC & DC Power  
Protection**

# Specification

All figures typical at 25°C (77°F) unless otherwise stated

## Maximum surge current

20kA

## Leakage current

0.3mA

## Lines protected AC

L-N, L-E, N-E

## Lines protected DC

V+, V-

## Ambient temperature limits

-30°C to +60°C (working)

-22°F to +140°F (working)

## Humidity

95% RH (non-condensing)

## Enclosure

IP54 (NEMA 13)

## Connections

AC Live, Neutral, Earth  
remote monitor1 & 2

DC +ve, -ve, Earth  
remote monitor1 & 2

Wire size: 5 x 2.5mm<sup>2</sup> (12 AWG)

Lead length: 450mm (1.5 ft)

## Mounting

Surface mount with 4 x 6mm  
(0.24") slots

## Remote contacts

NC 250Vac, 2A rated

## Weight

1Kg (2.2lb)

## Dimensions

See figure 1

## ATEX compliance

BS EN 50014 : 1998

BS EN 50021 : 1999

IEC 60079-0 : 1998

IEC 60079-15 : 2001

## EMC compliance

BS EN 61643-1

BS EN 61000-6-2 : 2001,

referencing particularly -

IEC 61000-4-2 : 2000

IEC 61000-4-4 : 2001

IEC 61000-4-5 : 2000

## Installation

MA4000 Series devices can be easily mounted using the four fixing points provided on the enclosure. Flying leads are provided for easy connection to the power supply cable (see figure 2 for further information).

The MA4000 device should be mounted close to the equipment it is protecting and should be bonded directly to the equipment with as short a length of cable as possible.

## To order specify -

### AC versions

MA4020-F-110-1-D-R (110Vac version)

MA4020-F-230-1-D-R (230Vac version)

### DC versions

MA4020-F-024-1-D-R (24Vdc version)

MA4020-F-048-1-D-R (48Vdc version)

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

Model	Working voltage (V)	Limiting voltage* (6kV/3kA) (V)	Maximum continuous operating voltage (V)	Line frequency	Phase types
<b>AC versions</b>					
MA4020-110	110Vac	470	130	dc to 60Hz	Single phase 2 wire
MA4020-230	230Vac	790	265	dc to 60Hz	Single phase 2 wire
<b>DC versions</b>					
MA4020-024	24Vdc	210	38	dc	2 wire
MA4020-048	48Vdc	240	65	dc	2 wire

\* 8/20µs waveform (cable length 150mm)

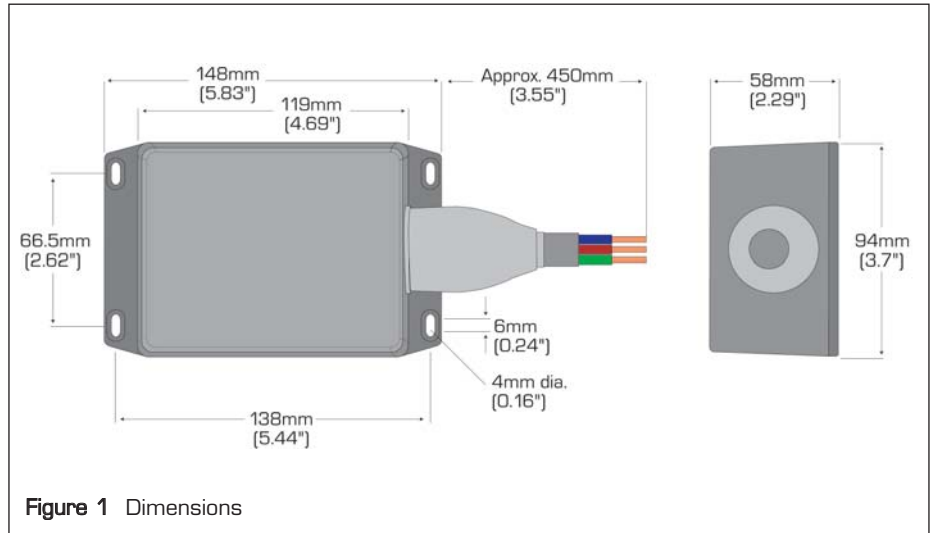


Figure 1 Dimensions

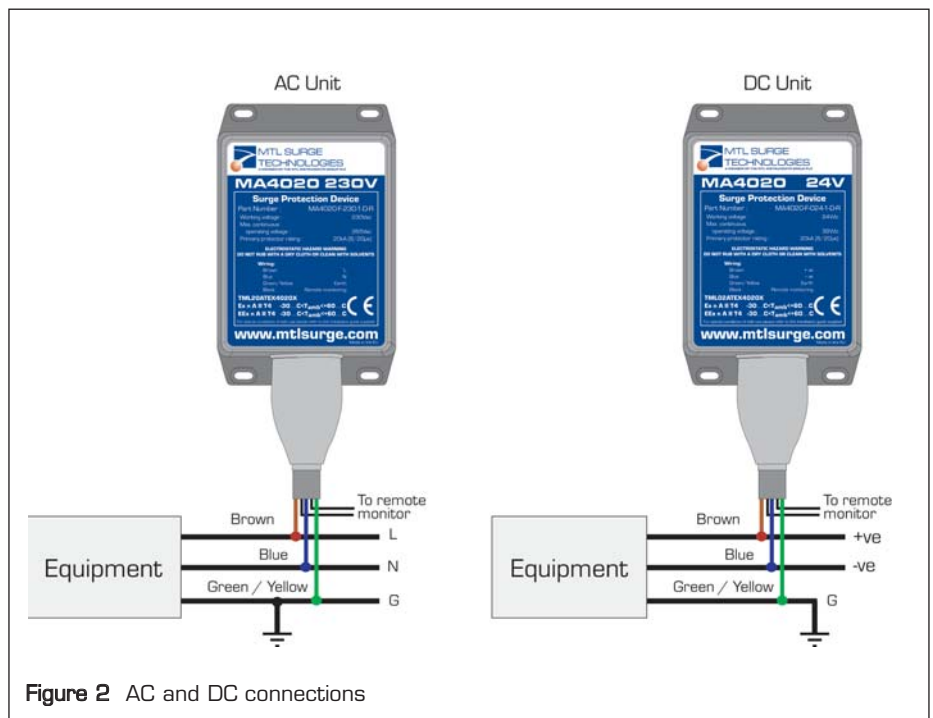


Figure 2 AC and DC connections

## Approvals

Standard/Authority	Certificate/File No.	Approved for	Product
ATEX Directive 94/9/EC for Zone 2 Category 3G	TML02ATEX4020X	Ex n A II T4 (-30°C<T <sub>amb</sub> <+60°C) EEx n A II T4 (-30°C<T <sub>amb</sub> <+60°C)	MA4020-024 MA4020-048 MA4020-110 MA4020-230

## MTL Surge Technologies

Power Court, Luton, Bedfordshire, England LU1 3JJ  
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283  
E-mail: enquiry@mtlsurge.com WWW: www.mtlsurge.com

A member of the MTL Instruments Group plc



# MA30 Series

AC and DC mains power surge protector and filter

- **18kA surge protection and RFI filtering**
- **Protects panel loads up to 30 Amps in series, unlimited Amps in parallel**
- **Suitable for AC or DC application**
- **Thermal and short circuit protection**
- **LED status indication feature and remote alarm and power fail capability with Form C contacts**
- **10 year product warranty**



**The MA30 Series of surge protection devices** protects electronic equipment power supplies and computer networks against the effects of 'noise pollution' induced in AC power supplies. MA30 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.

**Industrial control systems** and dc power supplies utilizing programmable logic controllers (plc) and industrial computers are particularly vulnerable due to the aggressive electrical environments for which they are intended, such as process plants, factories and water treatment sites. Although industrial computers and plcs are designed to be rugged, the extra protection provided by the DIN rail mounting MA30 units is critical. Ideally suited for protecting panel mounted equipment and typically used in the controls section of a motor control center (MCC), the MA30 range provides surge and RFI protected power.

**With a unique 'three-stage' combination of protection elements**, these units suppress conducted RFI and voltage surges. The circuit 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.

**Suitable for AC or DC application**, MA30 units reduce both electromagnetic emissions and the susceptibility of the associated equipment to emissions from other sources. MA30 devices also offer ultimate installation flexibility. To protect circuits rated 30A or less, MA30 devices should be installed in series. To protect higher current circuits, simply install the MA30 in parallel.

**An LED status indication facility** is standard with the MA30 units. This displays both 'power on' and that protection is present. Thermal fusing is also incorporated into each 18kA rated device as an additional safety feature. MA30 units also

offer short circuit protection. An optional remote monitoring unit is also available with audio and visual indication status, along with features such as a test switch for checking the monitoring circuitry and an audio alarm silence switch.

**MA30 devices exceed the requirements of IEC 61000-4-5.** Since MA30 units suppress conducted RFI and voltage surges they enable associated equipment to comply with this aspect of 'CE' mark standards.

## AC & DC Power Protection

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current

18kA (8/20µs) per mode

## Maximum leakage current

<0.3mA

## Maximum continuous operating current

30A series connection  
Unlimited Amps in parallel

## Working voltage

	AC	DC
MA30/D/1/SI	120V	140V
MA30/D/2/SI	240V	280V
MA30/D/3/SI	240V	280V

## Maximum continuous operating voltage

25% above nominal

## Limiting voltage

### @ 500A ring

120V/140V versions	295V
240V/280V versions	404V

### @ 500A 8/20µs

120V/140V versions	320V
240V/280V versions	628V

### @ 3kA 8/20µs

120V/140V versions	396V
240V/280V versions	820V

### @ 10kA 8/20µs

120V/140V versions	585V
240V/280V versions	1020V

## Maximum attenuation (typical)

-55dB @ 100MHz

## Lines protected

MA30/D/1/SI	L, N, G (E)
MA30/D/2/SI	L, N, G (E)
MA30/D/3/SI	L <sub>1</sub> , L <sub>2</sub> , G (E)

## Ambient temperature limits

-40°F to +185°F (working)  
-40°C to +85°C (working)

## Humidity

95% RH (non-condensing)

## Casing

ABS with DIN-rail mounting foot

## Connectors

Screw terminal

## Terminals

#10 AWG (5.3mm<sup>2</sup>)

## Mounting

1.4 inch (35mm) DIN rail

## Indication

Green LED on	Protection present
Green LED off	Internal failure

## Weight

3.53oz (100g)

## Dimensions

See figure 1

## EMC compliance

BS EN 60950 : 1992  
BS EN 61000-6-2 : 1999

Model	500A Ring (V)	500A 8/20µs (V)	3kA 8/20µs (V)	10kA 8/20µs (V)
MA30/D/1/SI	295	320	396	585
MA30/D/2/SI	404	628	820	1020
MA30/D/3/SI	404	628	820	1020

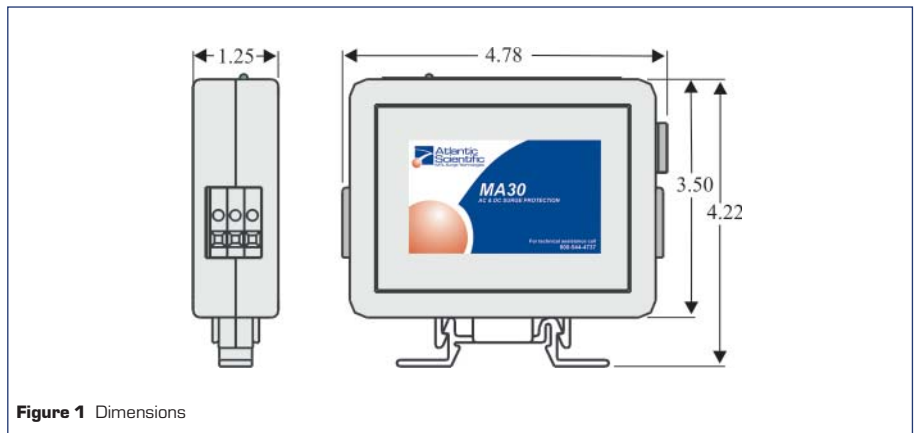


Figure 1 Dimensions

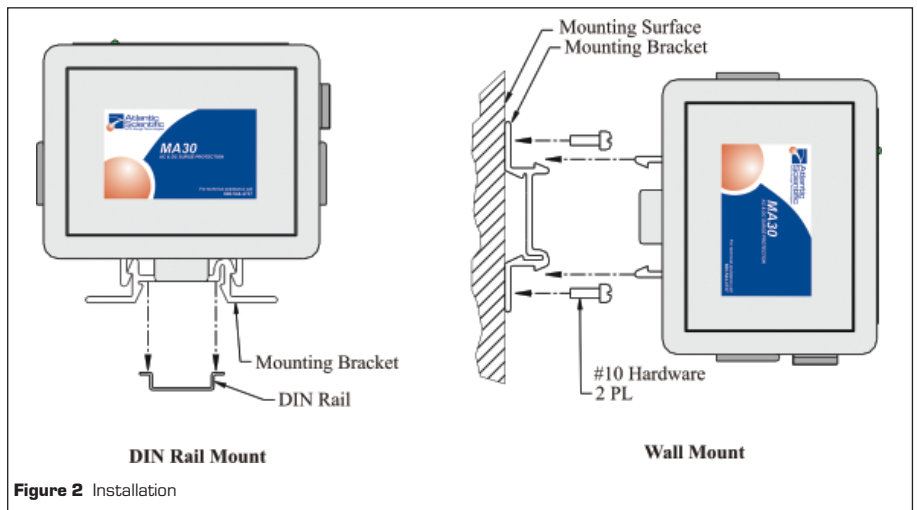


Figure 2 Installation

## Installation

The grounding (earthing) of the surge protector and the protected equipment is very important and, if possible, should be accomplished as illustrated. The unit is marked Protected and Unprotected and it is important that the unit is installed with the Unprotected side connected to the incoming AC power and the Protected side connected to the equipment to be protected. For parallel application however, the Unprotected side is connected to the incoming AC power and the Protected side left unconnected.

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

For more information please contact your local MTL sales office:

<b>The Americas:</b>	+1 800 835 7075
<b>UK:</b>	+44 (0)1582 723633
<b>Singapore:</b>	+65 6 487 7887
<b>The Netherlands:</b>	+31 (0)481 450250
<b>Italy:</b>	+39 (0)2 6180 2011
<b>Australia:</b>	+61 (0)8 9455 2994
<b>India:</b>	+91 (0)44 450 1660

Local sales office information is also available on our web site at:  
[www.mtlsurge.com/support/distribution/index.htm](http://www.mtlsurge.com/support/distribution/index.htm)

## To order specify -

As per table above

## Remote Monitoring Unit

(Model number 11101)

### Indication

Green LED on	Protection present
Red LED on	Fault indication
Audible alarm	Fault indication

### Connectors

Screw terminal

### Terminals

14 AWG (2mm<sup>2</sup>)

### Weight

1 lb (450g)

### Dimensions

5.5" x 4" x 1.5" (135mm x 100mm x 40mm)

# MA15 Series

AC and DC power surge suppressor and filter



- **18kA surge protection and RFI filtering**
- **Protects panel loads up to 15 Amps in series, unlimited Amps in parallel**
- **Suitable for AC or DC application**
- **Thermal and short circuit protection**
- **LED status indication feature**
- **10 year product warranty**



**The MA15 Series of surge protection devices** protects electronic equipment and computer networks against the effects of 'noise pollution' induced in power supplies. MA15 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.

**Industrial control systems** utilizing programmable logic controllers (plc) and industrial computers are particularly vulnerable due to the aggressive electrical environments for which they are intended, such as process plants, factories and water treatment sites. Although industrial computers and plcs are designed to be rugged, the extra protection provided by the DIN rail mounting MA15 units is critical. Ideally suited for protecting panel mounted equipment and typically used in the controls section of a motor control centre (MCC), the MA15 range provides surge and RFI protected power.

**With a unique 'three-stage' combination of protection elements**, these units suppress conducted RFI and voltage surges. The circuit 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.

**Suitable for AC or DC application**, MA15 units reduce both electromagnetic emissions and the susceptibility of the associated equipment to emissions from other sources. MA15 devices also offer ultimate installation flexibility. To protect circuits rated 15A or less, MA15 devices should be installed in series. To protect higher current circuits, simply install the MA15 in parallel.

**An LED status indication facility** is standard with the MA15 units. This displays both 'power on' and that protection is present. Thermal fusing is also incorporated into each 18kA rated device as an additional safety feature. MA15 units also offer short circuit protection for added peace of mind.

**MA15 devices are UL 1449 Recognized Components** (certified by UL for both US and Canadian requirements) and exceed the requirements of IEC 61000-4-5. As MA15 units suppress conducted RFI and voltage surges they enable associated equipment to comply with this aspect of European 'CE' mark standards.

## AC & DC Power Protection

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current

18kA (8/20µs) per mode

## Maximum leakage current

<0.3mA

## Maximum continuous operating current

15A series connection  
Unlimited Amps in parallel

## Working voltage

	AC	DC
MA15/D/1/SI	120V	140V
MA15/D/2/SI	240V	280V

## Maximum continuous operating voltage

25% above nominal

## Limiting voltage

### @ 500A ring

120V/140V versions	295V
240V/280V versions	356V

### @ 500A 8/20µs

120V/140V versions	320V
240V/280V versions	800V

### @ 3kA 8/20µs

120V/140V versions	396V
240V/280V versions	975V

### @ 10kA 8/20µs

120V/140V versions	585V
240V/280V versions	1210V

## Maximum attenuation (typical)

-55dB @ 100MHz

## Lines protected

L, N, G

## Ambient temperature limits

-40°F to +185°F (working)  
-40°C to +85°C (working)

## Humidity

95% RH (non-condensing)

## Casing

Polymide-PA, with G- or T-section  
(Top-hat) DIN-rail mounting foot

## Connectors

Screw terminal

## Terminals

0.1 inch<sup>2</sup> (2.5mm<sup>2</sup>) 12 AWG

## Mounting

G- or T-section ('Top-hat') or 1.4 inch (35mm) DIN rail

## Weight

3.53oz (100g)

## Dimensions

See figure 1

## EMC compliance

BS EN 60950 : 1992  
BS EN 61000-6-2 : 1999

## LED Indication

Green LED on	Protection present
Green LED off	Internal failure

## Installation

Typical wiring connections for MA15 Series devices are indicated in figure 2. The grounding of the surge protector and the protected equipment is very important and, if possible, should be accomplished as illustrated.

Please note that the unit is marked Line and Load and it is important that the unit is installed with the Line side connected to the incoming power and the Load connected to the equipment to be protected. For parallel application however, the Line side is connected to the incoming power and the Load left unconnected.

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

For more information please contact your local MTL sales office:

<b>The Americas:</b>	+1 800 835 7075
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<b>Singapore:</b>	+65 6 487 7887
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[www.mtl surge.com/support/distribution/index.htm](http://www.mtl surge.com/support/distribution/index.htm)

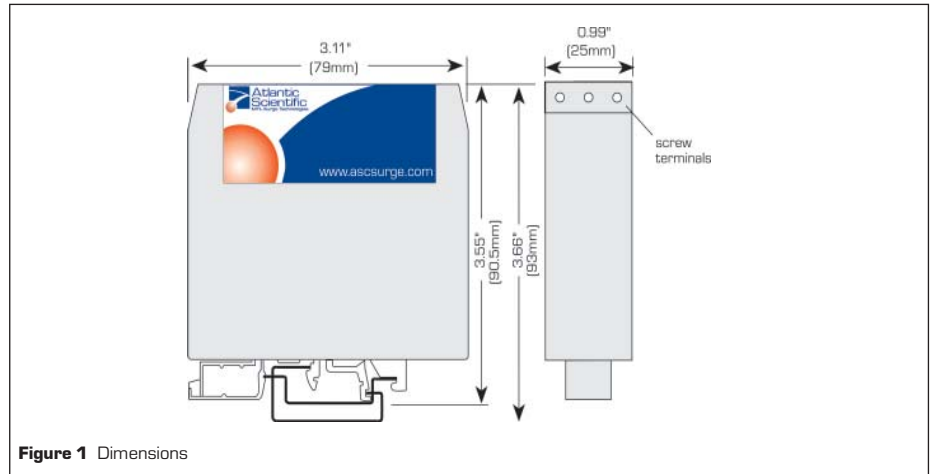


Figure 1 Dimensions

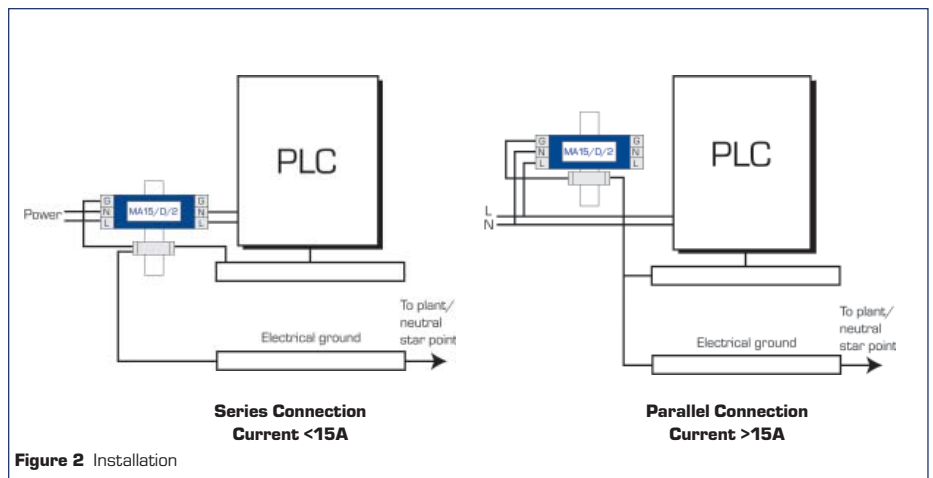


Figure 2 Installation

## Approvals

Country	Standard/Authority	Approved for	Product
United States Canada	UL 1449 Recognized Component	AC Power Product	MA15/D/1/SI, MA15/D/2/SI
United States Canada	UL 1449 Recognized Component UL1604	Hazardous Locations Class I, Division 2 Groups A, B, C and D	MA15/D/1/SI, MA15/D/2/SI
India	Petroleum & Explosives Safety Organisation (PESO)	EEx ia	MA15/D/1/SI MA15/D/2/SI



# 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-

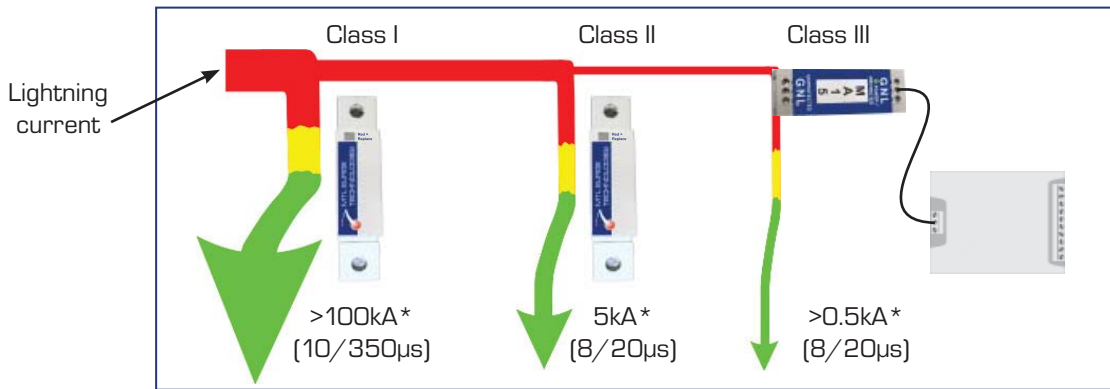
tion. The unit withstands the impact of a 60,000A impulse with a lightning wave-shape of 10/350µs with a specific energy of 1,000kJ/Ω. These levels are significantly higher than called for in IEC 61643 for a Class I device.

**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.

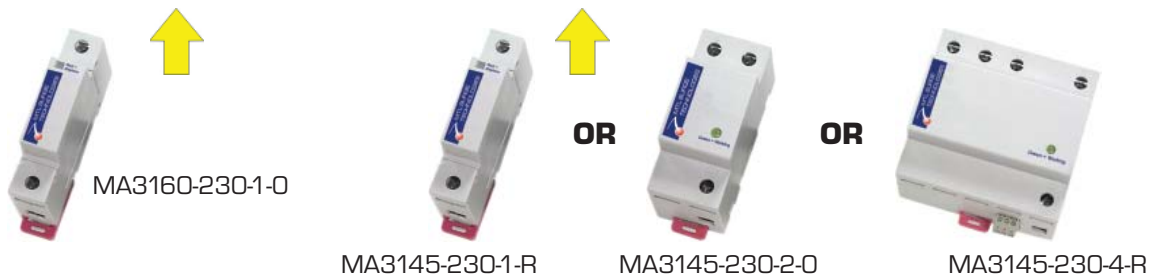
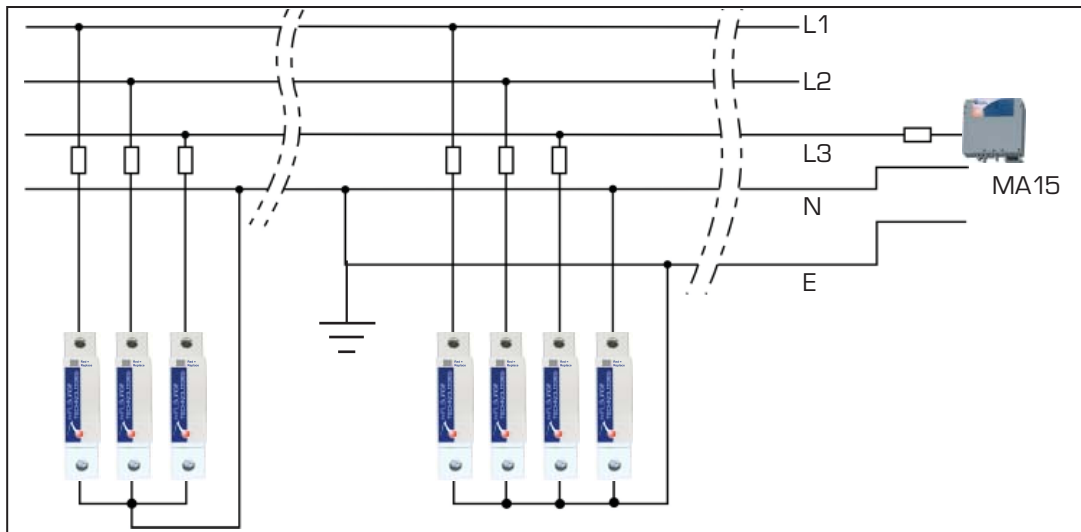
## Coordinated IEC 61643 Class I, Class II and Class III surge protection



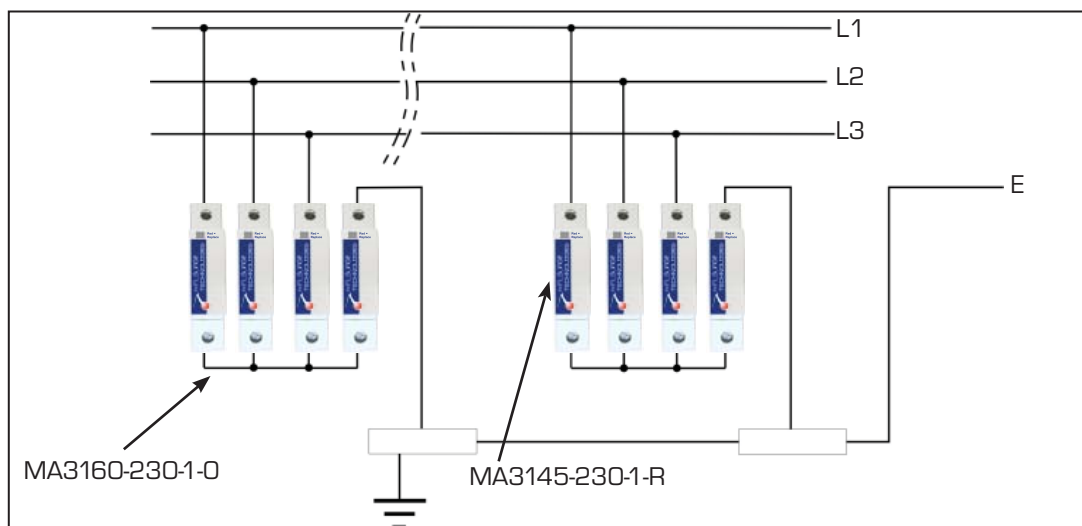
\*Total over a 3 phase system.

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 (10/350µs). Class II surge protectors are characterized by their ability to protect against 8/20µs 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.

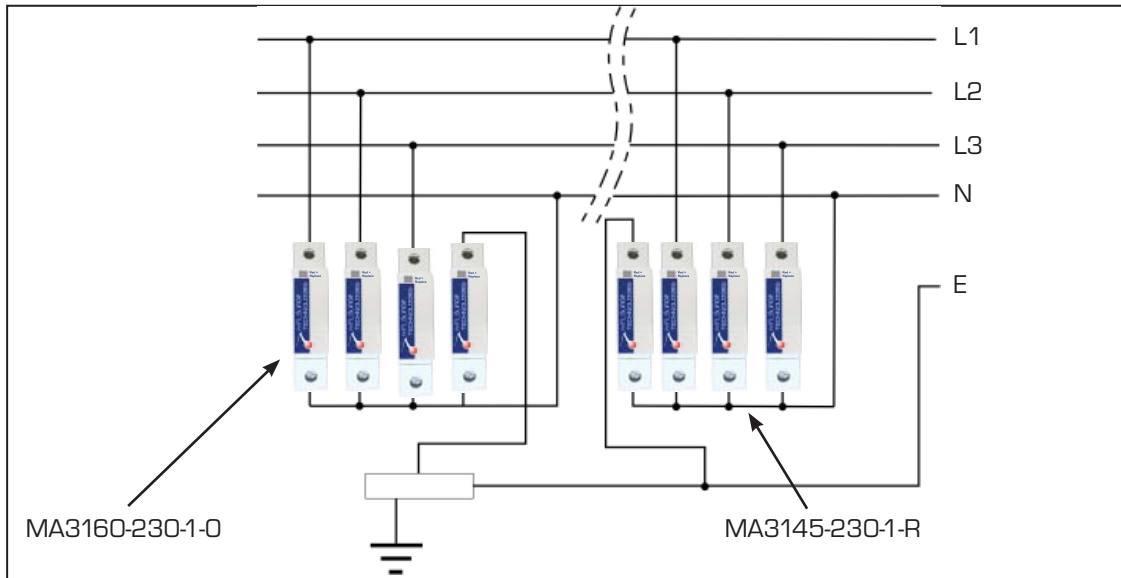
## TN-C-S System



## Variations for IT



## Variations for TT



## Class I Surge Protection Device

Technical data	MA3160	230-1-0
<b>Dimensions (see Fig. 1 for A, B and C)</b>		<b>A</b>
IEC category/VDE requirement class:		I/B
Max. continuous operating voltage $U_C$ :		250V 50/60Hz
Leakage current:		<1 $\mu$ A
Lightning test current $I_{imp}$ (10/350 $\mu$ s)	peak value/charge: 2 & multi-pole specific energy:	60kA/30As >100kA/>50As 1000kJ/ $\Omega$
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 <sup>2</sup>
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	

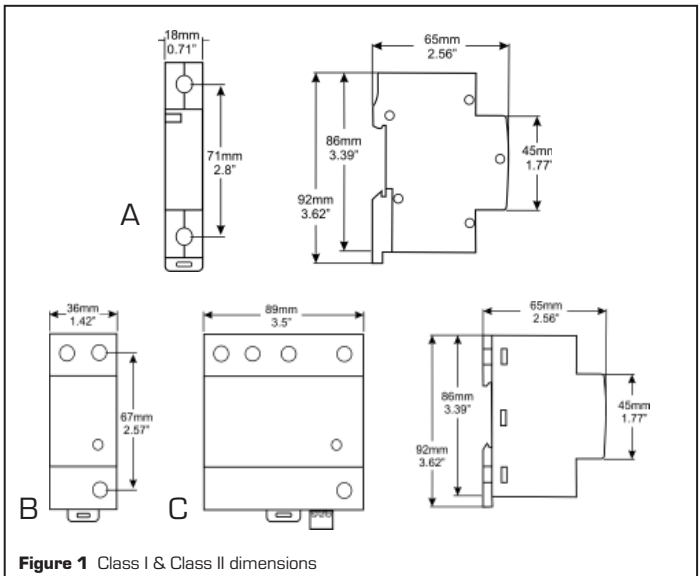


Figure 1 Class I & Class II dimensions

## Class II Surge Protection Device

Technical data	MA3145	230-1-R	230-1-R	120-2-0	230-2-0	120-4-R	230-4-R
<b>Dimensions (see Fig. 1 for A, B and C)</b>		<b>A (1 pole)</b>	<b>A (1 pole)</b>	<b>B (2 pole)</b>	<b>B (2 pole)</b>	<b>C (4 pole)</b>	<b>C (4 pole)</b>
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 $\mu$ 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 $\mu$ s):		10kA	10kA	10kA	10kA	10kA	10kA
Max. discharge surge current $I_{max}$ (8/20 $\mu$ 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

O = Remote contacts not present  
R = Remote contacts present

1 = 1 module width  
2 = 2 module widths  
4 = 4 module widths

120 = operating voltage  
230 = operating voltage

45 = 45kA surge rating


MA31 = (Product range name)

## 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 $I_L/40^\circ\text{C}$ :	15A	15A
Leakage current to PE at $U_n$ :	<0.3mA	<0.3mA
Nominal discharge surge current $I_n$ (8/20 $\mu\text{s}$ ):	sym/asym 3kA/6kA	3kA/6kA
Maximum discharge surge current $I_{max}$ (8/20 $\mu\text{s}$ ):	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 $\Omega$ ):	-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	

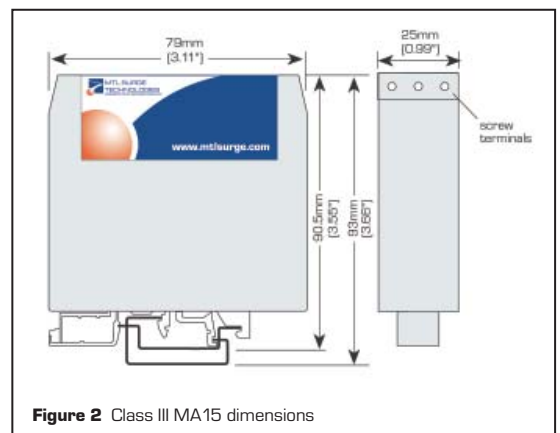


Figure 2 Class III MA15 dimensions

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](http://www.mtlsurge.com) for more information.

For more information please contact your local MTL sales office:

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**UK:** +44 (0)1582 723633  
**Singapore:** +65 6 487 7887  
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[www.mtlsurge.com/support/distribution/index.htm](http://www.mtlsurge.com/support/distribution/index.htm)



# MA05/10 Series

Unique units combining filtering, surge protection and ring suppression for protection against the effects of electrical disturbances on ac power cabling

- **Combines high quality filtering with 'ring' suppression**
- **Three different packages available, Wall/floor mounted (I) DIN-rail mounted (D) Standard filter case (SC)**
- **Added thermal fuse protection**
- **Unique design for EMC compliance – exceeding IEC61000-4-5, level 4**



**The MA05 and MA10 Series** protects electronic equipment and computer networks against the effects of 'noise pollution' induced in mains power supplies. A unique combination of circuit elements 'cleans up' the effects of industrial noise and surges caused by lightning, switching devices, thyristor controls, transmission system overloads and power-factor correction circuits.

**The units are available in alternative versions** – 'SC' suffixed models housed in standard filter 'cans with connections via safety-shrouded spade terminations'; 'Standard' I units for wall or floor mounting in a plastic enclosure with screw terminals inside; or 'D' suffixed units for G- or Top-hat section DIN-rail mounting. The 'SC' and 'I' units are useful for OEM incorporation into packaged systems as a superior alternative to conventional filters and also for retro-fitting to existing systems. The 'D' type units are ideally suited to protecting panel-mounted equipment.

**With a unique 'three-stage' combination of protection elements**, these units suppress conducted RFI and voltage surges. The circuit 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 'Transient response' graph printed overleaf illustrates the typical output response of an MA10/D when a 6kV, 3kA standard 8/20 $\mu$ s surge is applied to the input.

**The MA05 and MA10 devices operate in both signal directions** and therefore reduce both electro-magnetic emissions and the susceptibility of the associated equipment to emissions

from other sources. Thermal fusing is also incorporated into each device as an additional safety feature.

**Manufactured in accordance with ISO9001**, the performance of all units is tested before despatch and exceeds the requirements of IEC 61000-4-5, level 4. Since MA05/10 devices suppress conducted RFI and voltage surges they enable associated equipment to comply with this aspect of the European 'CE' mark standards.

**AC Power/EMC  
Protection**

# MA05/10 EMC/Surge Protection Devices

## Guide to applications and selection

### Industrial Control Systems

Industrial control systems utilising programmable logic controllers (plc) and industrial computers are particularly vulnerable due to the aggressive electrical environments for which they are intended, such as process plants, factories and water treatment sites. Although industrial computers and plcs are designed to be rugged, protection against the extreme voltage surges caused by lightning activity and the switching of large electrical motors demands the extra protection provided by the DIN rail mounting MA05/D and MA10/D units. Typically used in the controls section of a motor control cubicle (MCC), this range provides voltage surge and RFI protected power.

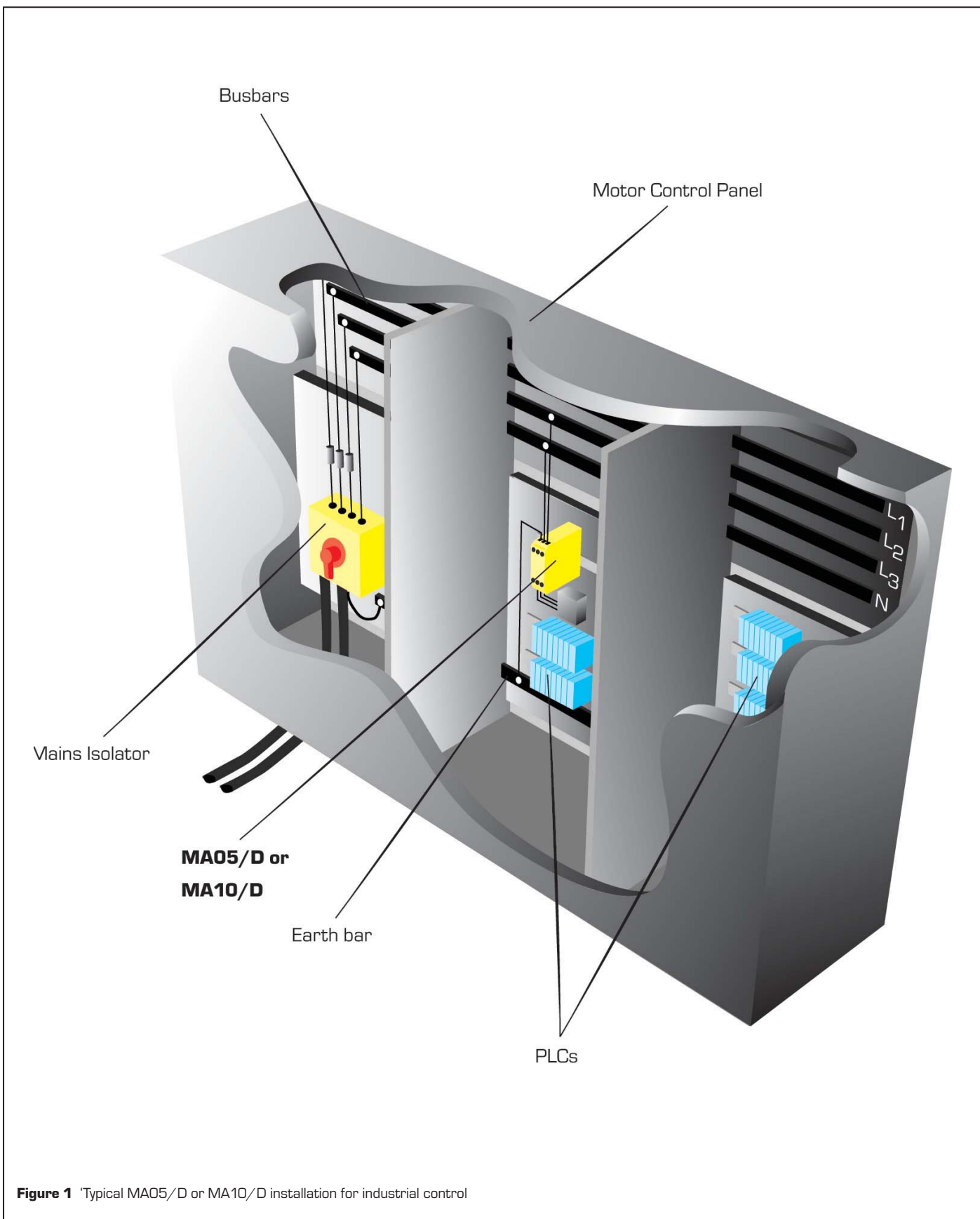
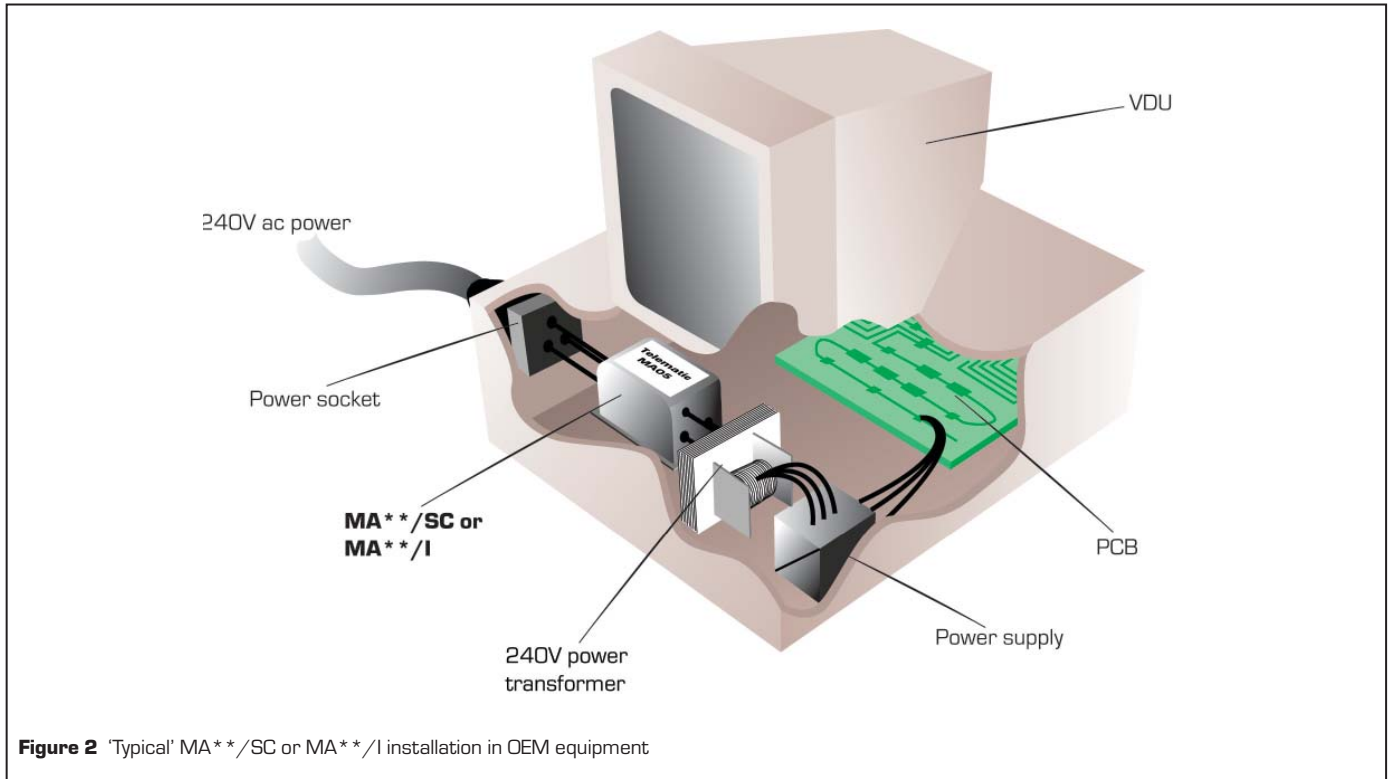


Figure 1 Typical MA05/D or MA10/D installation for industrial control

# Computer/OEM Equipment

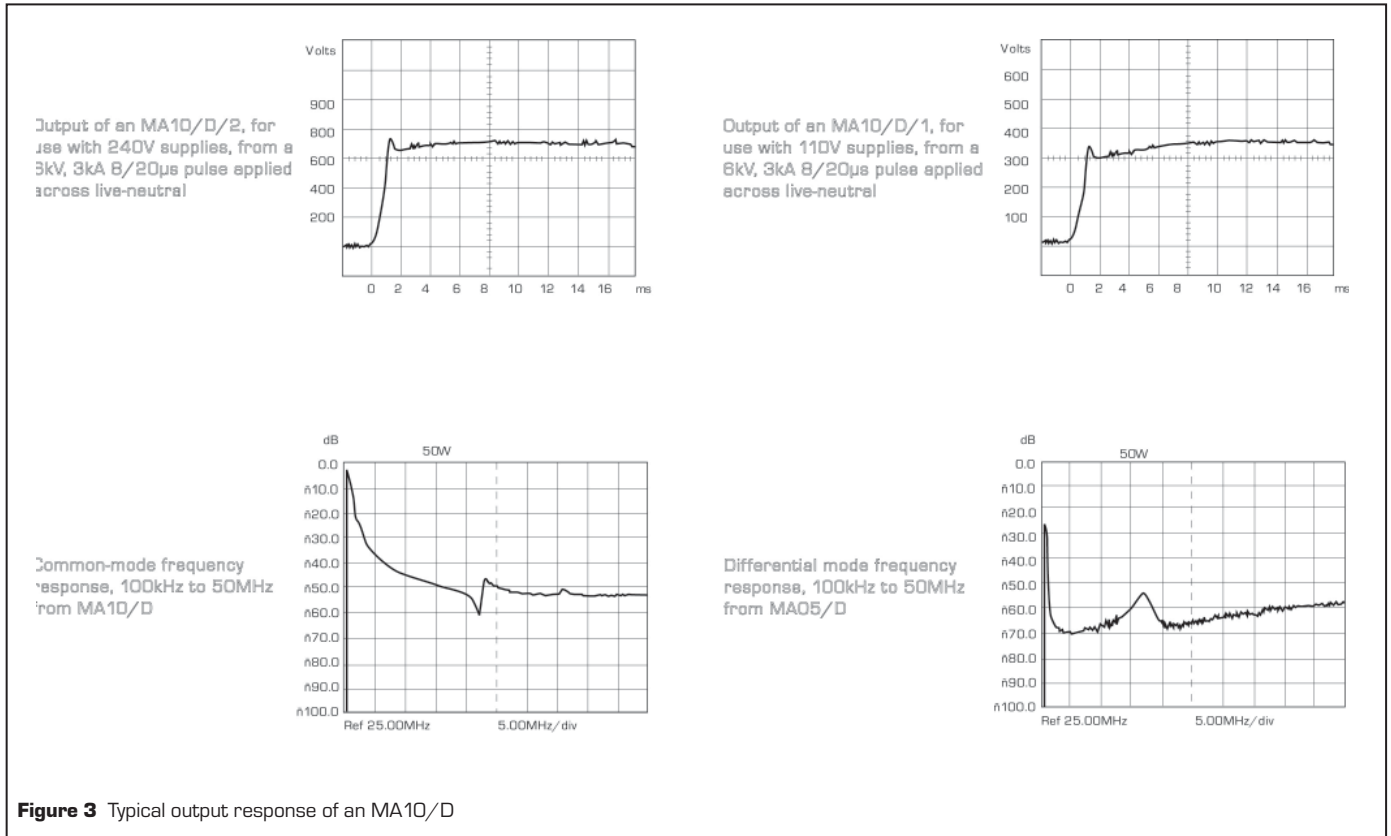


Increased reliance on computers in industry and the workplace, coupled with an increasingly 'noisy' electrical supply and a higher incidence of lightning activity has led to a higher risk of costly system downtime and disruption. In turn, this has led to the need to manufacture equipment that is resistant to voltage surges and radio frequency interference (RFI), as laid down in the EMC directives. The MA05/SC, MA10/SC, MA05/I and MA10/I units are designed to be easily incorporated into OEM equipment such as industrial computers, mobile telephone base stations, closed circuit tv (cctv) systems and can help with EMC compliance and 'CE' marking.



## Typical RFI and surge protection performance MA05/D and MA10/D units

The following graphs are prepared from test results made on typical units.



# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current

6.5kA (8/20µs)

## Maximum leakage current

<0.3mA at working voltage

## Maximum continuous operating current

Rated

MA05 devices 5A at 30°C

MA10 devices 10A at 30°C

Derated

MA05 devices 1A/ 10°C above 35°C

MA10 devices 2A/ 10°C above 45°C

## Working voltage

MA\*\*/\*/\*/1 110V

MA\*\*/\*/\*/2 240V

## Maximum continuous operating voltage

110V versions 132V

240V versions 253V

## Limiting voltage

110V versions <400V

240V versions <800V

## Maximum attenuation (typical)

73dB (series mode); 70dB (common mode)

Bandwidth 50/60Hz

## Impulse energy absorption

110V versions 210J

240V versions 420J

## Ambient temperature limits

-13°F — +185°F (-25°C to +85°C)

## Humidity

5 to 95% RH (non-condensing)

## Casing

### SC models

Cold-rolled steel casing, tin-plated

### D models

Polyamide-PA, with G- or T-section

DIN-rail mounting foot

### I models

Plastic ABS - VO IP50 rated

## Connectors

### SC models

Low-profile safety spade terminators, or 'Faston' connectors

### D and I models

Screw-clamp

## Terminals

### D and I models

0.4" (2.5mm<sup>2</sup>) — 12 AWG

## Weight

5.3 oz (150g) — SC models

3.5 oz (100g) — D models

5.6 oz (160g) — I models

## Dimensions

See figures 4, 5 and 6

## Warning

These units must be protected by an external fuse

## Maximum fuse rating

MA05 5A

MA10 10A

Fuse rating may need to be reduced depending on power supply capability or equipment fitted downstream of SPD

For more information please contact your local MTL sales office:

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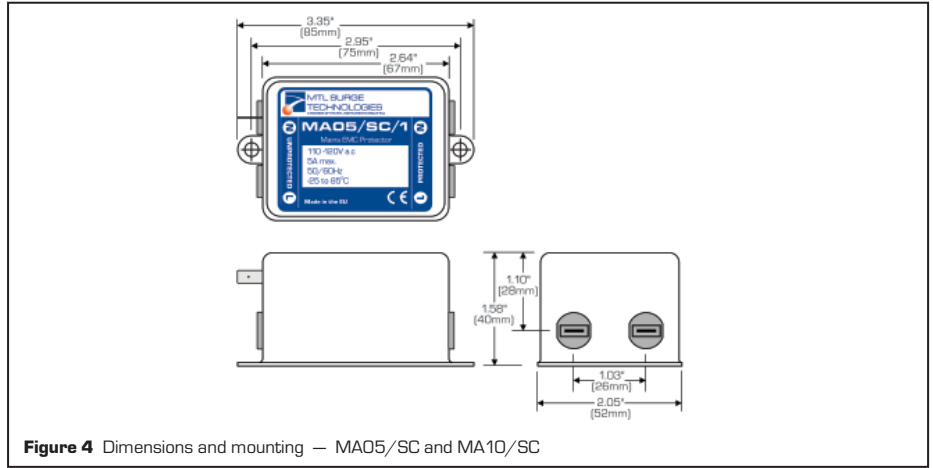


Figure 4 Dimensions and mounting — MA05/SC and MA10/SC

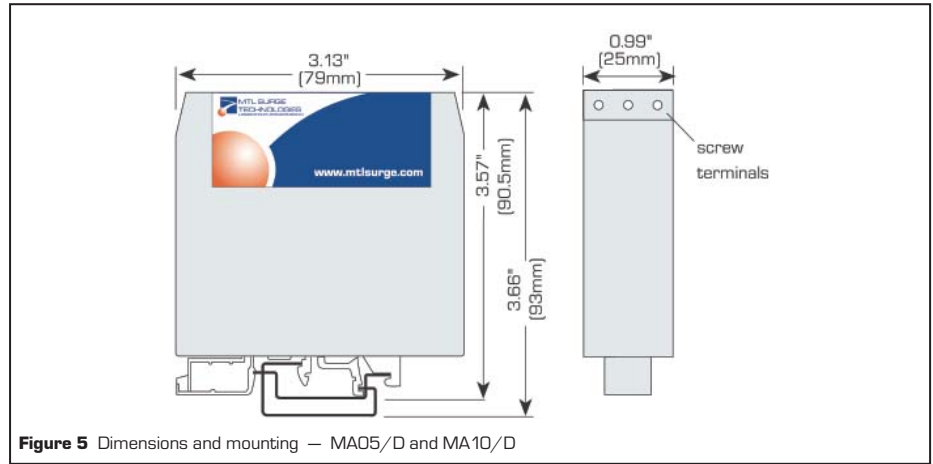


Figure 5 Dimensions and mounting — MA05/D and MA10/D

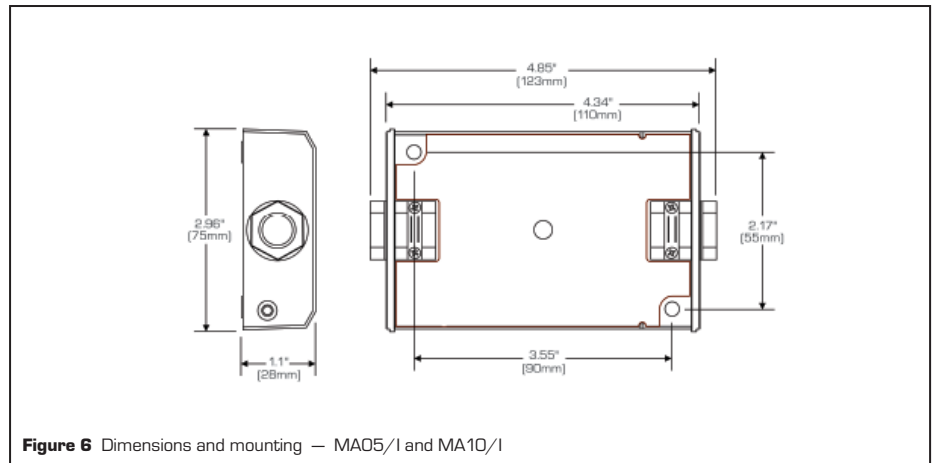


Figure 6 Dimensions and mounting — MA05/I and MA10/I

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice

## To order specify -

<b>MA05/SC/1</b>	'filter-can' version, 110V, 5Amp	<b>MA05/D/2</b>	'DIN-rail' version, 240V, 5Amp
<b>MA10/SC/1</b>	'filter-can' version, 110V, 10Amp	<b>MA10/D/2</b>	'DIN-rail' version, 240V, 10Amp
<b>MA05/SC/2</b>	'filter-can' version, 240V, 5Amp	<b>MA05/I/1</b>	Wall/floor mounting version, 110V, 5Amp
<b>MA10/SC/2</b>	'filter-can' version, 240V, 10Amp	<b>MA10/I/1</b>	Wall/floor mounting version, 110V, 10Amp
<b>MA05/D/1</b>	'DIN-rail' version, 110V, 5Amp	<b>MA05/I/2</b>	Wall/floor mounting version, 240V, 5Amp
<b>MA10/D/1</b>	'DIN-rail' version, 110V, 10Amp	<b>MA10/I/2</b>	Wall/floor mounting version, 240V, 10Amp



# ZoneDefender

80kA power surge protection for small distribution panels, tower lights, equipment cabinets and confined spaces



- **Straightforward and simple installation — wall or flush mounting**
- **LED status indication via solid state diagnostics plus remote indication contacts**
- **Thermal and short circuit fusing**
- **UL1449 Listed**
- **10 year product warranty**



**The ZoneDefender Series** of power surge protection devices has been specifically designed for interior lighting and small distribution panels. These compact and durable devices offer cost effective, high capacity protection along with application versatility, features which make the Series the ultimate surge protection solution.

**ZoneDefender units, with a 80kA surge handling capability** per phase, provide protection between Line to Neutral, Line to Ground/Earth, Line to Line and Neutral to Ground/Earth. Utilizing Metal Oxide Varistor (MOV) technology, the ZoneDefender's protection circuits are highly reliable, dual-redundant varistor networks ensuring your site is never unprotected. ZoneDefender devices provide protection for power supplies with no restriction to the amount of load current. Fully automatic in operation, ZoneDefender reacts immediately, clamping voltage surges without causing undue leakage losses under

normal operation. No operator intervention is required, ZoneDefender resets automatically and is maintenance free.

**Thermal fusing is incorporated** into each ZoneDefender as an additional safety feature. Short circuit protection is also supplied, as standard, for added peace of mind.

**ZoneDefender offers an LED Status indication facility** allowing each varistor network to be continually monitored and indicated by LEDs on the front panel of the device. In addition, remote monitoring is enabled by the units' remote indication contacts.

**Installation is simple** - the enclosure of the ZoneDefender devices can be easily 'wall mounted'. Alternatively, ZoneDefender units may be flush mounted by way of an optional mounting plate which should be specified at time of order placement.

**The ZoneDefender Series is UL1449 Listed** and boasts an unrivalled 10 year 'no questions asked' manufacturers product warranty. Zone-Defender devices also exceed the requirements of ANSI/IEEE C62.45 and ANSI/IEEE C62.41.

## AC Power Protection

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current

80kA (8/20µs)\*

## Lines protected AC

LN, L-G/E, LL, N-G/E

## Duty cycle performance (8/20µs)

80,000A 1 impulse  
10,000A >4000 impulses  
100A infinite

## Long duration current pulse (10/1,000µs) capability

3,600A (tested)

## Ambient temperature limits

-40°F to +185°F (-40°C to +85°C) — working

## Humidity

95% RH (non-condensing)

## Enclosure

NEMA 1, 2, 3, 3R, 4, 4X, 12 and 13 (IP66)

## Terminals

12 AWG (3mm<sup>2</sup>)

## Mounting

Surface mount by 0.16" (4mm) diameter holes or flush mount via mounting plate (Optional at time of order)

## Remote contacts

NC 250Vac, 5A rated

## Indication

Green LED on Protection present  
Green LED off Internal failure

## Weight

3.6 lbs (1.64Kg)

## Dimensions

5.3" x 5.3" x 2.3"  
(134.5mm x 134.5mm x 58.4mm)

## AIC Rating

Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical Amperes, 480V maximum

## EMC compliance

BS EN 60950: 1992  
BS EN 61000-6-2: 1999

Model	Working voltage (V)	Let-through voltage		Max. continuous operating voltage (Vac)	Phase types
		@ 3kA*	@ 10kA*		
ZD14106	480	1600	2100	550	Three phase 3 wire Delta

\* 8/20µs waveform - Tested as per ANSI/IEEE C62.45, ANSI/IEEE C62.41 and BS 6651 Appendix C

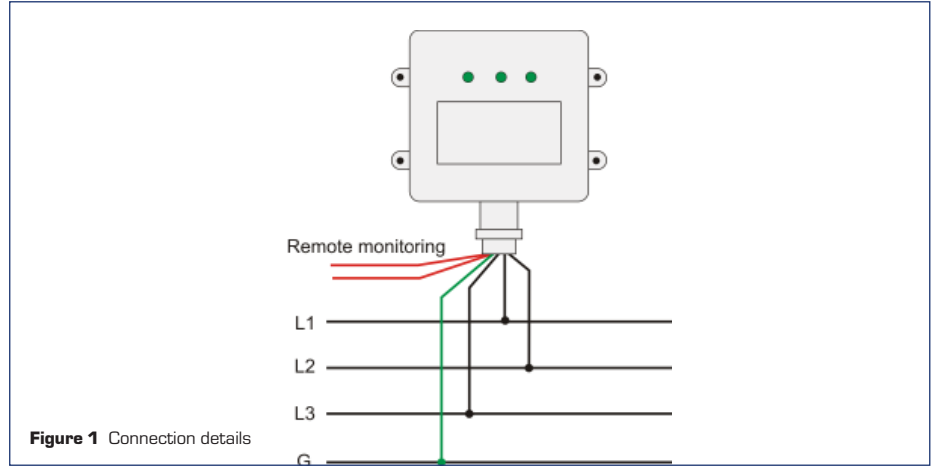


Figure 1 Connection details

## To order specify -

Model number as per specification table

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

## Approvals

Country	Standard/Authority	Approved for	Product
United States Canada	UL 1449 Listed (C-UL US Listed)	AC power product	ZD14106

For more information please contact your local MTL sales office:

**The Americas:** +1 800 835 7075  
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# ZoneSentinel

90kA surge capacity for distribution boards and small service entrance locations

- **Thermal and short circuit fusing mechanism**
- **Low let-through voltage**
- **LED status indication and optional remote monitoring unit with audio and visual indication**
- **Small footprint**
- **Optional high performance power filter**
- **Patented technology, UL 1449 Listed**
- **10 year product warranty**



**The ZoneSentinel Series** is engineered specifically for application at distribution boards and small service entrance locations. ZoneSentinel devices provide cost effective, high capacity power surge protection and, when used at a local panel in combination with a ZoneMaster at the service entrance, provide the lowest suppression voltages available today.

**ZoneSentinel units offer a 90kA surge handling capability** with protection between Line to Neutral, Line to Ground, Line to Line and Neutral to Ground and no restriction to the amount of load current. Patented thermal and short circuit fusing mechanisms are also included as an additional safety feature.

**ZoneSentinel is modular in construction** with individual modules bolted to a large surge return plate to minimize transient impedance. These modules, with a UL 94-5 rated plastic casing, are supplied mounted within a durable, corrosion resistant, NEMA

4X rated enclosure which can easily be drilled for cable access. ZoneSentinel units are easy to wall mount and flush mounting is also an option, should this be required. Individual modules are available upon request.

**LED status indication** is supplied with ZoneSentinel units as standard - normally open/normally closed contacts change state to indicate a fault. These contacts can be employed in a variety of applications from turning on lights remote from the surge protector, to interfacing with intelligent building management systems.

**An optional remote monitoring unit** is available for the ZoneSentinel range, capable of monitoring the status of all panel mounted surge protectors in the facility. This unit provides audio and visual indication of protector status in one compact wall mounting case. Other features of the remote monitoring

unit include a test switch which checks the monitoring circuitry and an audio alarm silence switch.

**The optional power filter**, for the ZoneSentinel range, which is tested to ANSI/IEEE C62.41 and is UL 1283 listed, has a noise attenuation of just 75dB at 100KHz to 100MHz. The filter module will attenuate 6kV transients down to a mere 200V without the support of other surge components.

**ZoneSentinel units are UL 1449 Listed.**

**AC Power  
Protection**

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current (Imax)

90kA (8/20µs)

## Maximum leakage current

<0.3mA

## Maximum continuous operating voltage

25% above nominal

## Lines protected

L-N, L-L, L-E, N-E 45kA (8/20µs)

## Duty cycle performance (8/20µs)

45,000A >4 impulses  
10,000A >6,000 Impulses  
100A infinite

## Long duration current pulse (10/1,000µs) capability

3,600A (tested)

## Ambient temperature limits

-40°F to +185°F (working) -40°C to +85°C (working)

## Humidity

95% RH (non-condensing)

## Enclosure

IP66 (NEMA 1, 2, 3, 3S, 4, 4X, 12 and 13)

## Terminals

32mm² (2 AWG)

## Mounting

Surface mount by 0.31" (8mm) diameter holes

## Indication

Green LED on Protection present\*  
Mechanical flag Fault warning  
Red LED on High voltage neutral to ground (earth)

**Note:** mechanical flag is fuse link operated

\*Excluding 3 wire delta models

## Remote contacts

NO/NC 125Vac, 2A rated

## Weight

4 lbs (1.8Kg)

## Dimensions

Enclosure — see figure 1  
Modules — 1.25" x 5.3" x 2.5"  
(32mm x 135mm x 64mm)

## EMC compliance

BS EN 60950: 1992  
BS EN 61000-6-2: 1999

## Mains power filter

### Maximum continuous operating voltage

400Vac rated (L-N)

### Limiting voltage

200V (@ 3kA 8/20µs)

### Maximum attenuation (typical)

-75dB (100kHz to 100MHz)

## Remote monitoring unit

Model number: ZM11101 — Battery powered  
ZM11102 — AC power

## Indication

Protection present; flashing green LED

## Fault indication

Flashing red LED & audible alarm

## Connectors

Accepts wires from #26 - #14 AWG

## Weight

Approximately 0.35 lbs (9mm) including batteries

## Dimensions

5.4" x 2.6 x 1.3" (137mm x 66mm x 33mm)

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

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Model	Working voltage (V)	UL1449 Listing (V)	Limiting voltage		Phase types
			@ 3kA (V)	@ 10kA (In)† (V)	
ZS12100	120/240 split*	330	395	533	Split phase 3 wire
ZS12101	120/208	330	395	533	Three phase 4 wire WYE
ZS12102	120/240	330/700	395	533	Three phase 4 wire Delta
ZS12103	240	700	740	1000	Three phase 3 wire Delta
ZS12104	277/480	700	875	1030	Three phase 4 wire WYE
ZS12106	480	1500	1600	1880	Three phase 3 wire Delta
ZS12107	220/380	700	875	1030	Three phase 4 wire WYE
ZS12108	240/415	700	875	1030	Three phase 4 wire WYE
ZS12110	240	700	875	1030	Single phase 2 wire
ZS12111	120/208	330	395	533	Three phase 3 wire Delta
ZS12112	277/480	700	875	1030	Three phase 3 wire Delta

†8/20µs waveform — Tested as per ANSI/IEEE C62.45; IEC 61643-1 U<sub>oc</sub> = 6kV

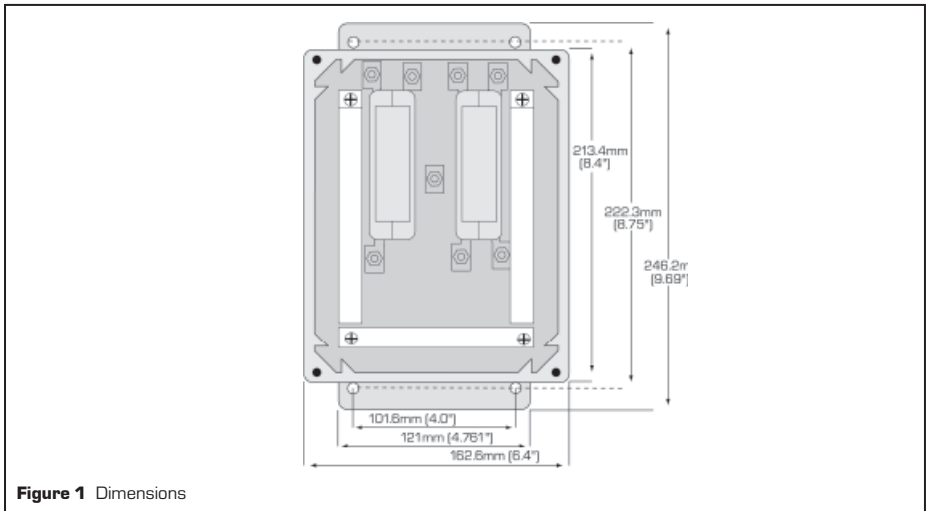


Figure 1 Dimensions

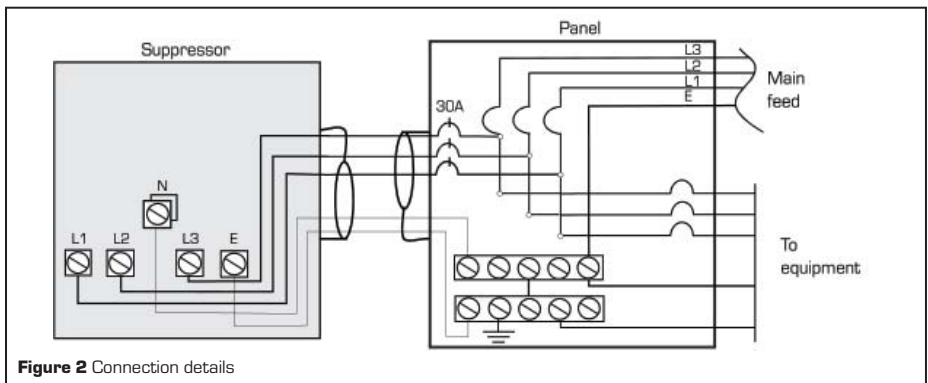


Figure 2 Connection details

## To order specify -

Model number as per specification table above  
Add suffix 'F' for flush mount option  
Add suffix 'X' for power filter option

### Optional Remote Monitoring Unit

ZM11101 — Battery powered  
ZM11102 — AC powered

## Approvals

Country	Standard/Authority	Approved for	Product
United States Canada	UL 1449 Listed	Mains power product	ZS12100, ZS12101, ZS12102, ZS12103, ZS12104, ZS12106, ZS12107, ZS12108



Up to 300kA mains power surge protection for total facility protection

- **Full protection redundancy plus thermal and short circuit fusing**
- **Status indication and optional remote monitoring unit with audio and visual indication**
- **Optional high performance mains power filter and optional fuse disconnect**
- **Patented technology, UL 1449 Listed - tested per ANSI/IEEE C62.45, IEC 61643-1**
- **10 year product warranty**



**The ZoneMaster Series** of surge protection devices combines unparalleled power handling capability, application versatility, proven circuitry along with simple installation, features which make ZoneMaster units the ultimate mains power protection solution. With 300kA, 250kA or 150kA versions available (ZoneMaster 300, ZoneMaster 250 and ZoneMaster 150 respectively), and with configurations suitable for all International supply voltages, ZoneMaster is truly a versatile and flexible protection range.

**ZoneMaster devices are modular in construction**, individual modules are bolted to a large surge return plate to minimise transient impedance. These colour coded, replaceable modules, with a UL 94-5V rated plastic casing are supplied mounted within a durable IP66 rated enclosure. ZoneMaster units are easy to install via simple wall mounting, although flush mounting is also

an option for ZoneMaster 150 models (11200-11208).

**Large block, 3 terminal Metal Oxide Varistor (MOV) protection technology** is utilised within the ZoneMaster range. ZoneMaster 300 and 250 versions include four totally redundant independent stages of protection per phase while the dual protection circuits of ZoneMaster 150 devices provide full redundancy ensuring the site is never unprotected. All ZoneMaster units also include thermal and short circuit fusing for additional safety while an integral fused disconnect feature is an optional extra.

**Status indication** is supplied as standard, normally open/ normally closed contacts change state to indicate a fault. An optional remote monitoring unit is also

available providing audio and visual indication of protector status, along with features such as a test switch for checking the monitoring circuitry and an audio alarm silence switch.

**The optional mains power filter** has a noise attenuation of 75dB at 100KHz-100MHz and will attenuate 6kV transients down to just 200V. This mains power filter is UL 1283 Listed (with MOV ZoneMaster versions), and all ZoneMaster devices have UL 1449 Listing for added peace of mind.

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Impulse current for class I (Imax)

ZoneMaster 300 & 250	15kA
ZoneMaster 150	10kA

## Maximum continuous operating voltage

25% above nominal

## Lines protected

ZoneMaster 150 — L-N	150kA, L-L	150kA, N-E	75kA
ZoneMaster 250 — L-N	250kA, L-L	250kA, N-E	75kA
ZoneMaster 300 — L-N	300kA, L-L	300kA, N-E	75kA

## Duty cycle performance (8/20ms)

	ZoneMaster 250	ZoneMaster 300
Impulses	Impulses	Impulses
200,000A	>2	>4
10,000A	>11,000	>12,000
200A	infinite	infinite

	ZoneMaster 150
100,000A	>4 impulses
10,000A	>8,000 impulses
150A	infinite

## Long duration current pulse (10/1,000µs) capability

ZoneMaster 300	5,500A (tested)
ZoneMaster 250	5,000A (tested)
ZoneMaster 150	3,600A (tested)

## Ambient temperature limits

-40°F to +185°F (-40°C to +85°C) - working

## Humidity

95% RH (non-condensing)

## Enclosure

IP66 (NEMA 1, 2, 3, 3S, 4, 4X, 12 and 13)

## Terminals

32mm<sup>2</sup> (2 AWG)

## Mounting

Surface mount by 0.31" (8mm) diameter holes

## Indication

Green LED on	Protection present*
Mechanical flag	Fault warning
Red LED on	High voltage neutral to ground (earth)

**Note:** mechanical flag is fuse link operated

\*Excluding 3 wire delta models

## Remote contacts

NO/NC 125Vac, 2A rated

## Weight

ZoneMaster 300 & 250	— 12 lbs (5.5Kg)
ZoneMaster 150	— 7 lbs (3.2Kg)

## Dimensions

Enclosure	— See figure 1
Modules	— 1.25" x 5.3" x 2.5"
	(32mm x 135mm x 64mm)

## EMC compliance

BS EN 60950: 1992
BS EN 61000-6-2: 1999

## Mains power filter

### Maximum continuous operating voltage

400Vac rated (L-N)

### Limiting voltage

200V (@ 3kA 8/20µs)

### Maximum attenuation (typical)

-75dB (100kHz to 100MHz)

## To order specify -

Model number as per specification table above

**Add suffix X for mains power filter**

**Add suffix F for flush mount options**

(models ZM11200 - ZM11208)

**Add suffix D for fuse disconnect**

(models ZM11200, ZM11201, ZM11202, ZM11204, ZM11207 and ZM11208)

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

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Model	Maximum surge current I <sub>max</sub> (kA)	Working voltage (V)	Limiting voltage @ 3kA† @ 10kA (I <sub>n</sub> )†		Phase types
			(V)	(V)	
<b>ZoneMaster 300</b>					
17100	300	120/240 split	333	406	Split phase 3 wire
17101	300	120/208	333	406	Three phase 4 wire WYE
17102	300	120/240	333	406	Three phase 4 wire Delta
17103	300	240	726	826	Three phase 3 wire Delta
17104	300	277/480	726	826	Three phase 4 wire WYE
17106	300	480	1480	1680	Three phase 3 wire Delta
17107	300	220/380	726	826	Three phase 4 wire WYE
17108	300	240/415	726	826	Three phase 4 wire WYE
<b>ZoneMaster 250</b>					
17000	250	120/240 split	333	406	Split phase 3 wire
17001	250	120/208	333	406	Three phase 4 wire WYE
17002	250	120/240	333	406	Three phase 4 wire Delta
17003	250	240	726	826	Three phase 3 wire Delta
17004	250	277/480	726	826	Three phase 4 wire WYE
17006	250	480	1480	1680	Three phase 3 wire Delta
17007	250	220/380	726	826	Three phase 4 wire WYE
17008	250	240/415	726	826	Three phase 4 wire WYE
<b>ZoneMaster 150</b>					
11200	150	120/240 split	350	446	Split phase 3 wire
11201	150	120/208	350	446	Three phase 4 wire WYE
11202	150	120/240	350	446	Three phase 4 wire Delta
11203	150	240	760	886	Three phase 3 wire Delta
11204	150	277/480	760	886	Three phase 4 wire WYE
11206	150	480	1480	1680	Three phase 3 wire Delta
11207	150	220/380	760	886	Three phase 4 wire WYE
11208	150	240/415	760	886	Three phase 4 wire WYE

†8/20µs waveform — Tested as per ANSI/IEEE C62.45; IEC 61643-1 U<sub>oc</sub> = 6kV

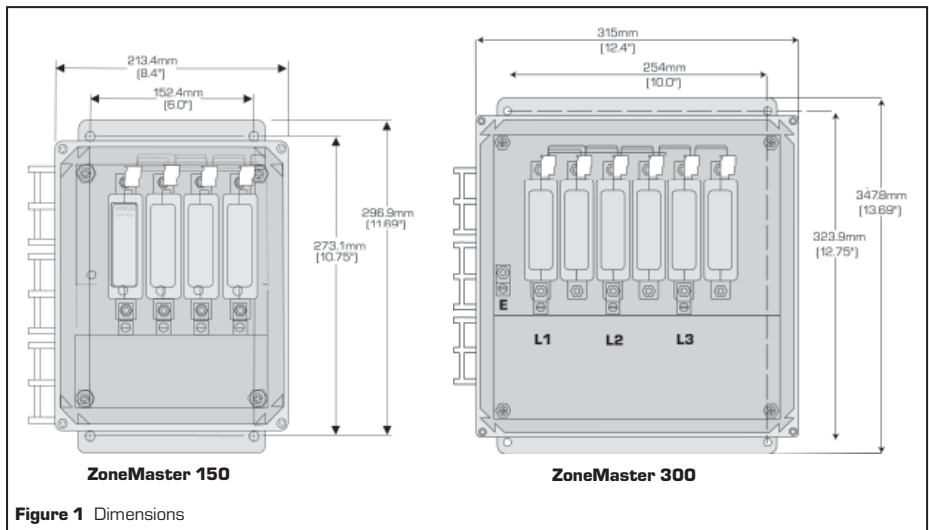


Figure 1 Dimensions

## Approvals

Country	Standard/Authority	Approved for	Product
United States Canada	UL 1449 Listed	AC power product	ZoneMaster 300 units ZoneMaster 250 units ZoneMaster 150 units



# ZoneDefender PLUS L Series

Non-modular surge protection for distribution panels, equipment cabinets and confined spaces

- **MOV technology**
- **Includes EMI/RFI filtering**
- **LED status indication via solid state diagnostics**
- **Remote indication contacts**
- **Thermal and short circuit fusing**
- **UL 1449 Listed**
- **10 year product warranty**



The **ZoneDefender PLUS L Series** of surge protection devices have been specifically designed for small distribution panels, equipment cabinets and confined spaces. These versatile, cost effective units provide years of surge protection in a compact, efficient package.

**ZoneDefender PLUS L units**, with a 260kA surge capacity, provide protection between Line to Neutral, Line to Line, Line to Ground, and Neutral to Ground. The ZoneDefender PLUS L utilizes Metal Oxide Varistor (MOV) technology for high reliability ensuring that your equipment is never unprotected. The ZoneDefender PLUS L Series resets automatically and is maintenance free. All ZoneDefender PLUS L units include EMI/RFI filtering.

**Thermal fusing is incorporated into each ZoneDefender PLUS L** as an additional safety feature. Short circuit pro-

tection is also supplied, as standard, for added peace of mind.

**ZoneDefender PLUS L offers an LED status indication** showing each varistor network to be continually monitored and indicated by LEDs on the front panel of the device. In addition, remote monitoring is enabled by the units' remote indication contacts.

**The ZoneDefender PLUS L Series is UL1449 Listed** and boasts an unrivaled 10 year "no questions asked" manufacturers product warranty. ZoneDefender PLUS L devices also exceed the requirements of ANSI/IEEE C62.45 and ANSI/IEEE C62.41.

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current

### 260kA (8/20µs)

L-N	88,000A (8/20µs)
L-L	88,000A (8/20µs)
L-G	88,000A (8/20µs)
N-G	88,000A (8/20µs)

### 160kA (8/20µs)

L-N	40,000A (8/20µs)
L-L	40,000A (8/20µs)
L-G	40,000A (8/20µs)
N-G	40,000A (8/20µs)

### 120kA (8/20µs)

L-N	30,000A (8/20µs)
L-L	30,000A (8/20µs)
L-G	30,000A (8/20µs)
N-G	30,000A (8/20µs)

## Lines protected

LN, L-G/E, LL, N-G/E

## Duty cycle performance (8/20µs)

150,000A	1 impulse
10,000A	>6,500 impulses
100A	infinite

## Long duration current pulse (10/1,000µs) capability

3,600A (tested)

## EMI/RFI attenuation

-55dB typical 100kHz - 100mHz

## Ambient temperature limits

-40°F to +185°F - working  
-40°C to +85°C - working

## Humidity

95% RH (non-condensing)

## Enclosure

NEMA 1, 2, 3, 3R, 4, 4X, 12 and 13 (IP66)

## Terminals

10 AWG (5mm<sup>2</sup>)

## Mounting

Surface mount by 0.21" (5mm) diameter holes

## Remote contacts

NO, C, NC 125Vac, 2A rated

## Indication

Green LED on  
Red LED off  
Green LED off  
Red LED on

## Weight

8.8 lbs (4.0Kg)

## Dimensions

6.25" x 6.25" x 4.00"  
(159mm x 159mm x 102mm)

## SCCR Rating

Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical Amperes, 480V maximum without external fusing.

## EMC compliance

BS EN 60950: 1992  
BS EN 61000-6-2: 1999

## To order specify -

Model number as per specification table

Model	Working voltage (V)	UL 1449 Listing (V)	Limiting voltage @ 3kA† @ 10kA (In)† (V)		Max. continuous operating voltage (Vac)	Phase types
<b>260kA models</b>						
ZD14601	120/240	330	416	628	140	Split phase 3-wire
ZD14602	120/208	330	416	628	140	Three phase 4-wire WYE
ZD14604	277/480	800	820	1180	320	Three phase 4-wire WYE
<b>160kA models</b>						
ZD14631	120/240	330	416	628	140	Split phase 3-wire
ZD14632	120/208	330	416	628	140	Three phase 4-wire WYE
ZD14634	277/480	800	820	1180	320	Three phase 4-wire WYE
<b>120kA models</b>						
ZD14641	120/240	330	416	628	140	Split phase 3-wire
ZD14642	120/208	330	416	628	140	Three phase 4-wire WYE
ZD14644	277/480	800	820	1180	320	Three phase 4-wire WYE

\* 8/20µs waveform - Tested as per ANSI/IEEE C62.45 and ANSI/IEEE C62.41

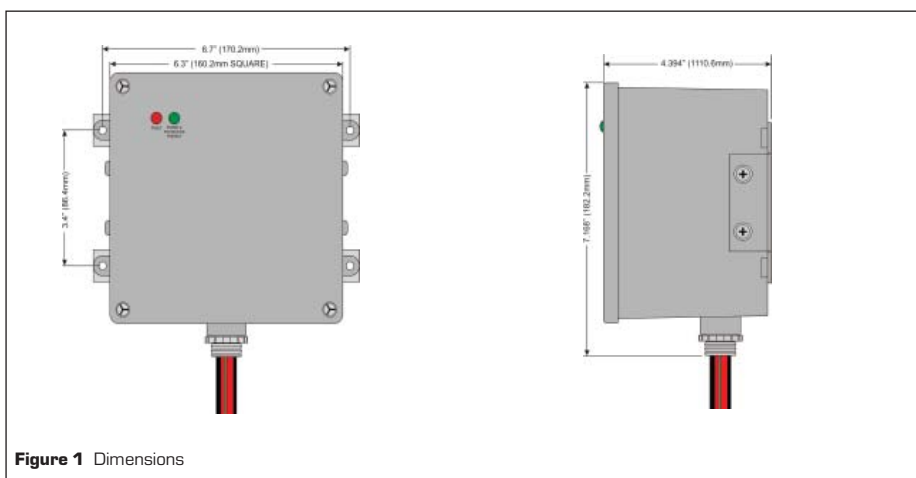


Figure 1 Dimensions

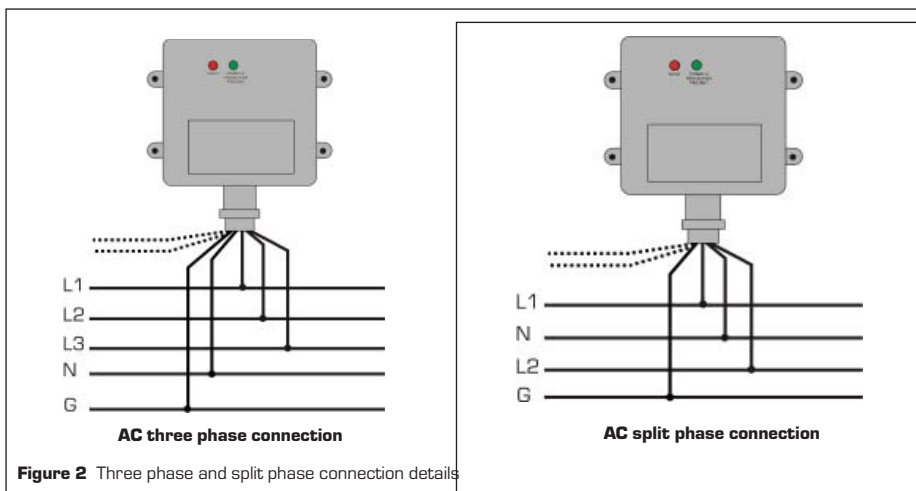


Figure 2 Three phase and split phase connection details

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

## Approvals

Country	Standard/Authority	Approved for	Product
United States Canada	UL 1449 Listed C-UL US Listed	AC power product	ZoneDefender PLUS L Series

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[www.mtlurge.com/support/distribution/index.htm](http://www.mtlurge.com/support/distribution/index.htm)



# ZoneDefender<sup>2</sup>

80kA power surge protection for small distribution panels, tower lights, equipment cabinets and confined spaces



- **AC or DC application**
- **Straightforward and simple installation – wall or flush mounting**
- **LED status indication via solid state diagnostics plus remote indication contacts**
- **Thermal and short circuit fusing**
- **UL 1449 Listed**
- **10 year product warranty**



The ZoneDefender<sup>2</sup> Series of power surge protection devices has been specifically designed for small distribution panels. These compact and durable devices offer cost effective, high capacity protection along with application versatility, features which make the Series the ultimate surge protection solution.

**ZoneDefender<sup>2</sup> units, with a 80kA surge handling capability** per phase, provide protection between Line to Neutral, Line to Ground/Earth, Line to Line and Neutral to Ground/Earth. Utilizing Metal Oxide Varistor (MOV) technology, the ZoneDefender's protection circuits are highly reliable, dual-redundant varistor networks ensuring your site is never unprotected. Fully automatic in operation, ZoneDefender<sup>2</sup> reacts immediately, clamping voltage surges without causing undue leakage losses under normal operation. No operator intervention is required, ZoneDefender<sup>2</sup> resets automatically and is maintenance free.

**Suitable for AC or DC applications**, ZoneDefender<sup>2</sup> devices provide protection for AC or DC power supplies with no restriction to the amount of load current. ZoneDefender<sup>2</sup> DC versions are available utilizing SAD (Silicon Avalanche Diode) technology in addition to the standard MOVs. DC versions are also available with EMI filtering, should this be required.

**Thermal fusing is incorporated** into each ZoneDefender<sup>2</sup> as an additional safety feature. Short circuit protection is also supplied, as standard, for added peace of mind.

**ZoneDefender<sup>2</sup> offers an LED Status indication facility** allowing each varistor network to be continually monitored and indicated by LEDs on the front panel of the device. In addition, remote monitoring is enabled by the units' remote indication contacts.

**Installation is simple** - the enclosure of ZoneDefender<sup>2</sup> devices can be easily 'wall mounted'.

**The ZoneDefender<sup>2</sup> Series is UL 1449 Listed** and boasts an unrivalled 10 year 'no questions asked' manufacturers product warranty. ZoneDefender<sup>2</sup> devices also exceed the requirements of ANSI/IEEE C62.45 and ANSI/IEEE C62.41.

## AC & DC Power Protection

# Specification

All figures typical at 77°F (25°C) unless otherwise stated

## Maximum surge current

80kA (8/20 $\mu$ s)\*  
 \*except ZoneDefender<sup>®</sup> DC versions.  
 See specifications table for details.

## Lines protected AC

L-N, L-G/E, L-L, N-G/E

## Lines protected DC

V+, V-

## Duty cycle performance (8/20 $\mu$ s)

80,000A 1 impulse  
 10,000A >4,000 impulses  
 100A infinite

## Long duration current pulse (10/1,000 $\mu$ s) capability

3,600A (tested)

## Response time

<5ns

## Ambient temperature limits

-40°F to +185°F (-40°C to +85°C) — working

## Humidity

95% RH (non-condensing)

## Enclosure

NEMA 1, 2, 3, 3R, 4, 4X, 12 and 13 (IP66)

## Terminals

12 AWG (3mm<sup>2</sup>)

## Mounting

Surface mount by four 0.17" (4mm) diameter holes

## Remote contacts

C, NO, NC 250Vac, 2A rated

## Indication

Green LED on Protection present  
 Green LED off Internal failure or no power  
 Red LED on Internal failure

## Weight

2.1 lbs (0.94Kg)

## Dimensions

4.0" x 4.0" x 2.4"  
 (102mm x 102mm x 61mm)

## AIC Rating

Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical Amperes, 240V maximum

## EMC compliance

BS EN 60950: 1992  
 BS EN 61000-6-2: 1999

## To order specify -

As per table above.

Note: In accordance with our policy of continuous improvement, we reserve the right to change the product's specification without notice.

Model	Working voltage (V)	UL 1449 Listing (V)	Limiting voltage		Max. continuous operating voltage (Vac)	Phase types
			@ 3kA† (V)	@ 10kA (In)† (V)		
<b>AC versions</b>						
ZD16800*	120	400	430	690	140	Single phase 2-wire US
ZD16801*	120/240	400	430	690	140	Split phase 3-wire US
ZD16809‡	240	800	925	1200	320	Single phase 2-wire EU
ZD16820	120	400/800	430/925	690/1200	140/320	Single phase 2-wire TT
ZD16821	120/240	400/800	430/925	690/1200	140/320	Single phase 3-wire TT
<b>DC versions</b>						
ZD14612	12V DC	N/A	120	292	5kA	—
ZD14624	24V DC	N/A	140	340	36kA	—
ZD14648	48V DC	N/A	280	504	53kA	—
ZD14712	12V DC	N/A	120	292	15kA	EMI filter
ZD14724	24V DC	N/A	140	340	36kA	EMI filter
ZD14748	48V DC	N/A	280	504	53kA	EMI filter

\* Suitable for U.S. use only † 8/20 $\mu$ s waveform — Tested as per ANSI/IEEE C 62.45 and ANSI/IEEE C62.41

‡ Not UL Listed

**NOTE:** ZD14712, ZD14724 & ZD14748 have > -30dB attenuation @ 100kHz

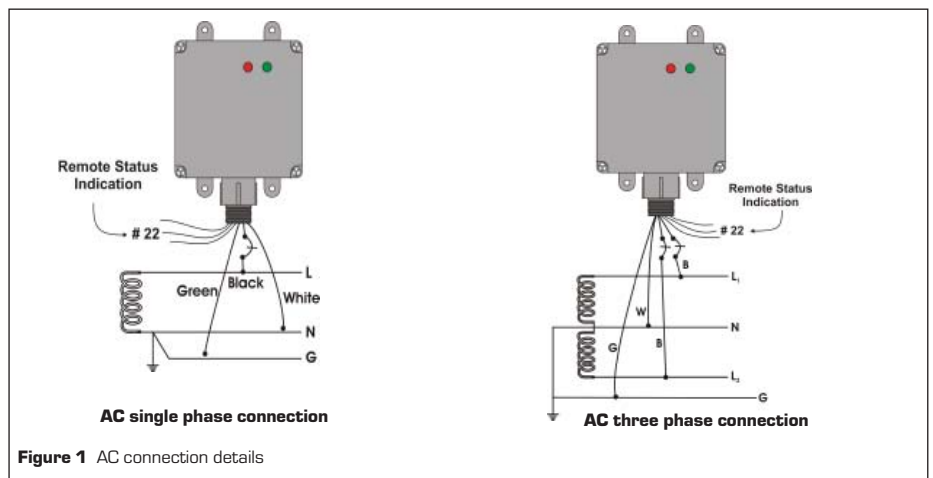


Figure 1 AC connection details

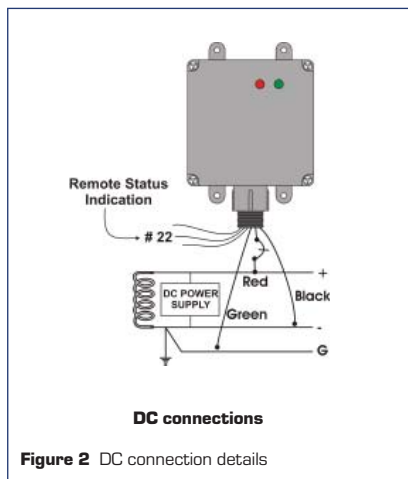


Figure 2 DC connection details

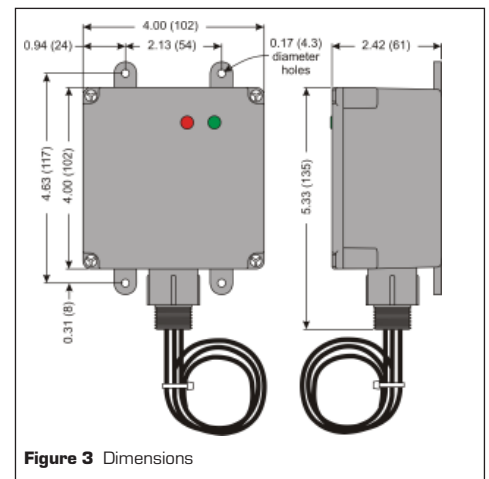


Figure 3 Dimensions

## Approvals

Country	Standard/Authority	Approved for	Product
United States Canada	UL 1449 Listed (C-UL US Listed)	AC power product	ZD16800, ZD16801, ZD16820, ZD16821

For more information please contact your local MTL sales office:

**The Americas:** +1 800 835 7075  
**UK:** +44 (0)1582 723633  
**Singapore:** +65 6 487 7887  
**The Netherlands:** +31 (0)481 450250  
**Italy:** +39 (0)2 6180 2011  
**Australia:** +61 (0)8 9455 2994  
**India:** +91 (0)44 450 1660

Local sales office information is also available on our web site at:  
[www.mtl surge.com/support/distribution/index.htm](http://www.mtl surge.com/support/distribution/index.htm)

