technical datasheet

MA05/10 Series

Unique units combining filtering, surge 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 8/20µs 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 suppresss conducted RFI and voltage surges they enable associated equipment to comply with this aspect of the European 'CE' mark standards.

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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.

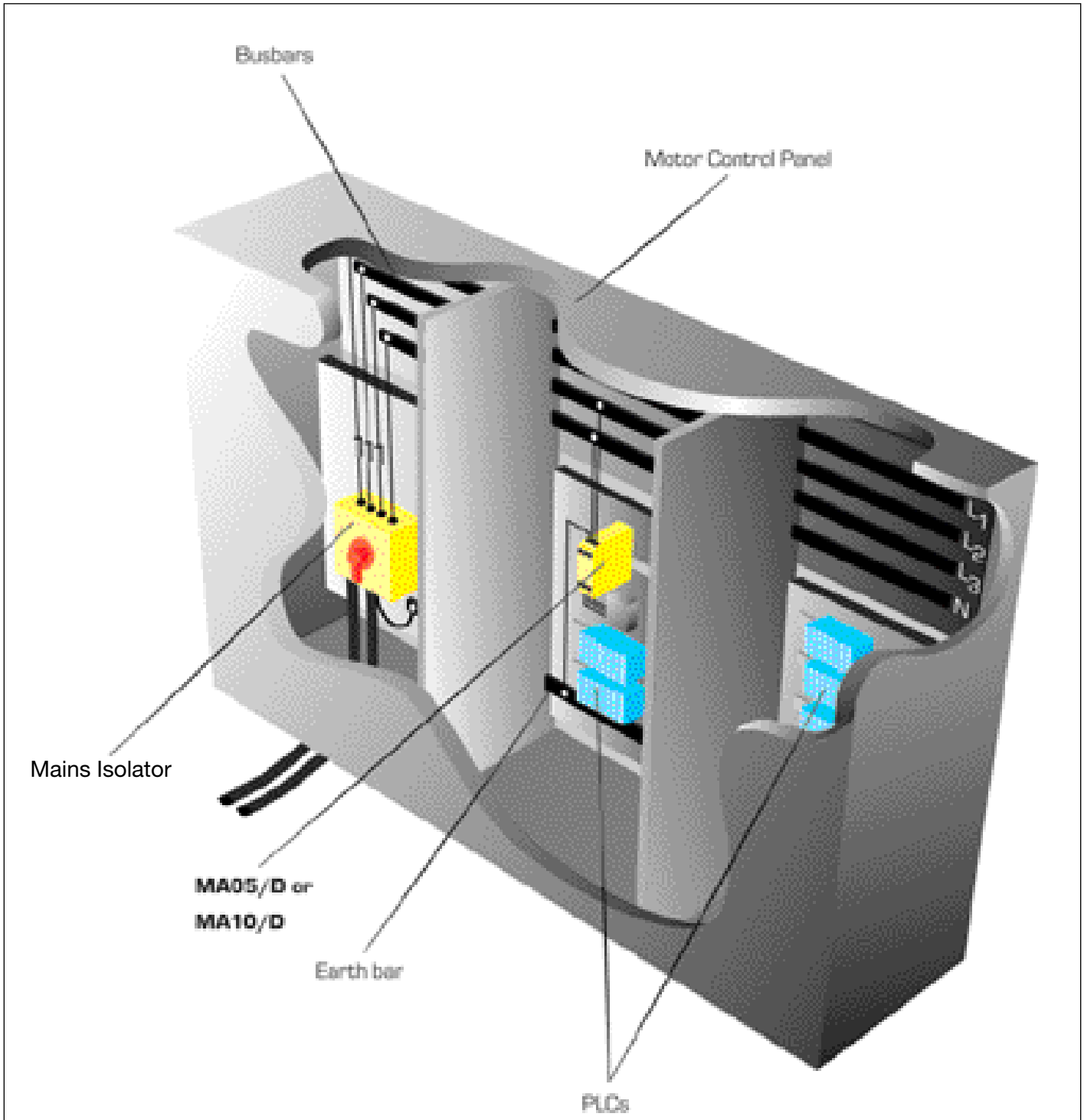

Figure 1 'Typical MA05/D or MA10/D installation for industrial control

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.

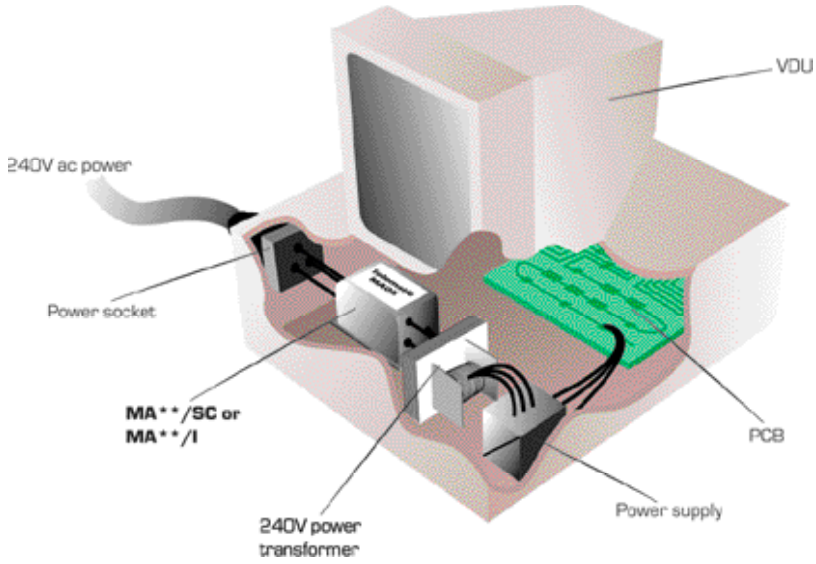

Figure 2 'Typical' MA**/SC or MA**/I installation in OEM equipment

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

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

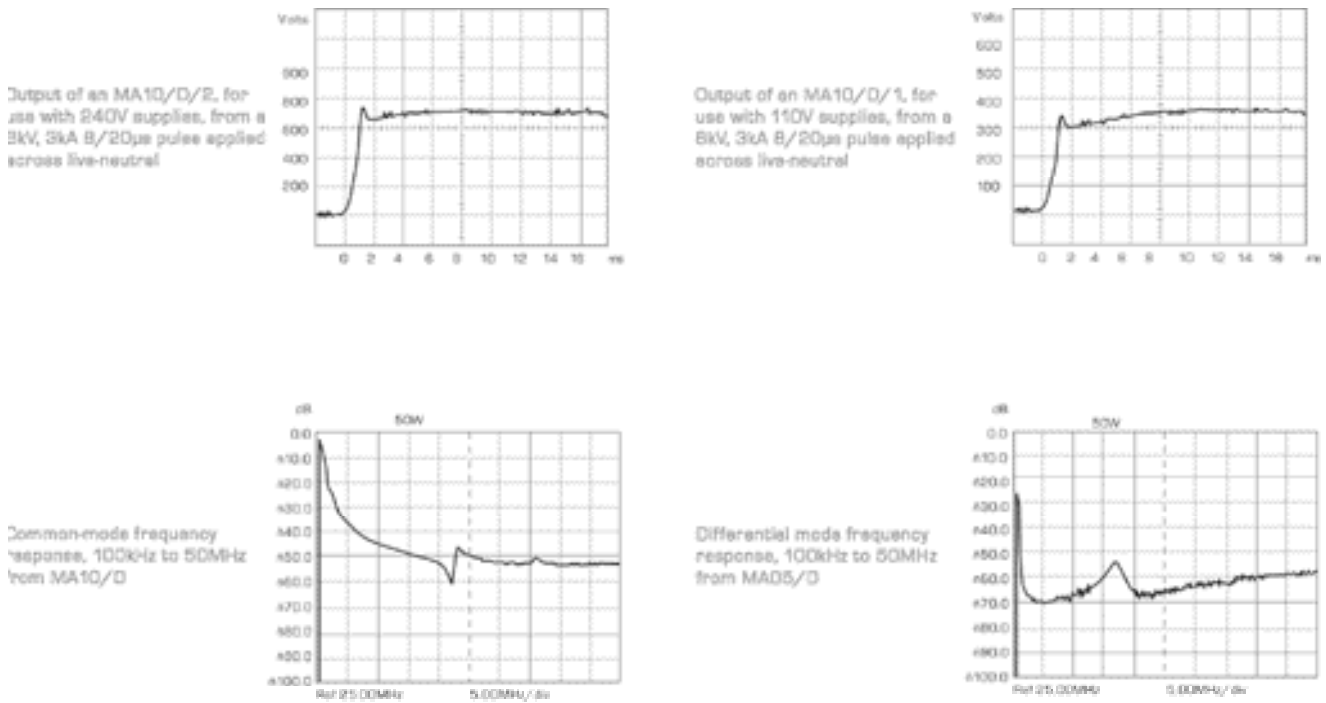

Figure 3 Typical output response of an MA10/D

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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 UL94-V0
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^2) —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

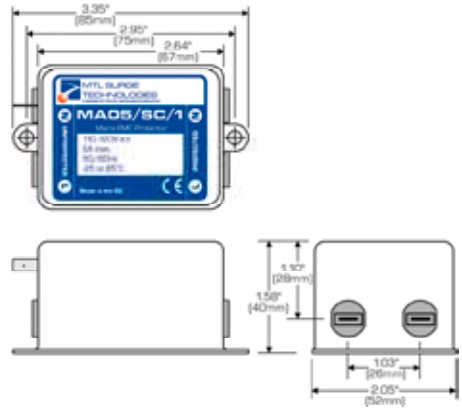

Figure 4 Dimensions and mounting — MA05/SC and MA10/SC

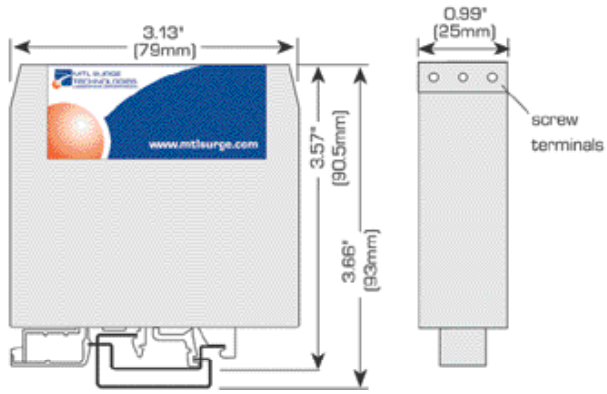

Figure 5 Dimensions and mounting — MA05/D and MA10/D

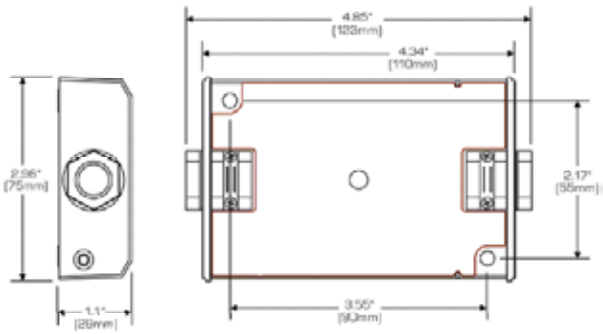

Figure 6 Dimensions and mounting — MA05/I and MA10/I

To order specify -

MA05/SC/1	'filter-can' 110V, 5Amp
MA10/SC/1	'filter-can' 110V, 10Amp
MA05/SC/2	'filter-can' 240V, 5Amp
MA10/SC/2	'filter-can' 240V, 10Amp
MA05/D/1	'DIN-rail' 110V, 5Amp
MA10/D/1	'DIN-rail' 110V, 10Amp

MA05/D/2	'DIN-rail' 240V, 5Amp
MA10/D/2	'DIN-rail' 240V, 10Amp
MA05/I/1	Wall/floor mounting 110V, 5Amp
MA10/I/1	Wall/floor mounting 110V, 10Amp
MA05/I/2	Wall/floor mounting 240V, 5Amp
MA10/I/2	Wall/floor mounting 240V, 10Amp

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technical datasheet

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
- UL1449 3rd Edition

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.

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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
120V @ 15A 240V @ 10A series connection
Unlimited Amps in parallel
Working voltage

	AC	DC
MA15/D/1/SI	120V, 47-63Hz	140V
MA15/D/1TT/SI	120V, 47-63Hz	140V
MA15/D/2/SI	240V, 47-63Hz	280V
MA15/D/2TT/L	240V, 47-63Hz	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
Modes protected
L-N, L-E, N-E
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
UL94-V0
Connectors
Screw terminal
Terminals
0.1 inch^2 (2.5mm^2) 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.

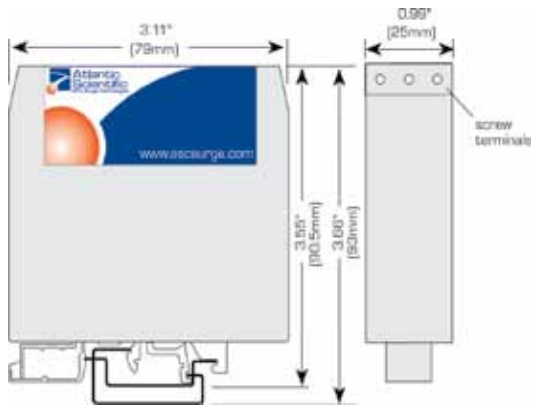
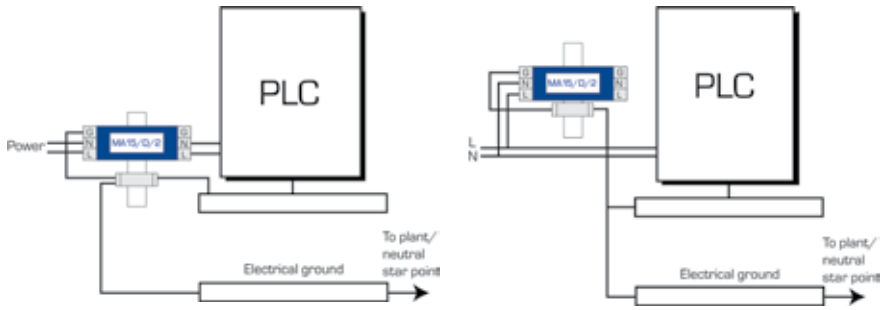


Figure 1 Dimensions



Series Connection Current <15A

Parallel Connection Current >15A

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

NOTE: The above approvals do not apply to the MA15/D/2TT/L and DC applications.

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technical datasheet

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 applications
- 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.

901-117 Rev I 170210

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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, 47-63Hz	140V
MA30/D/1TT	120V, 47-63Hz	140V
MA30/D/2/SI	240V, 47-63Hz	280V
MA30/D/2TT	240V, 47-63Hz	280V
MA30/D/3/SI	240V, 47-63Hz	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
Modes protected
Single phase: L-N, L-E, N-E
Split phase: L-E, L-L
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^2)
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

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.

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

Figure 1 Dimensions

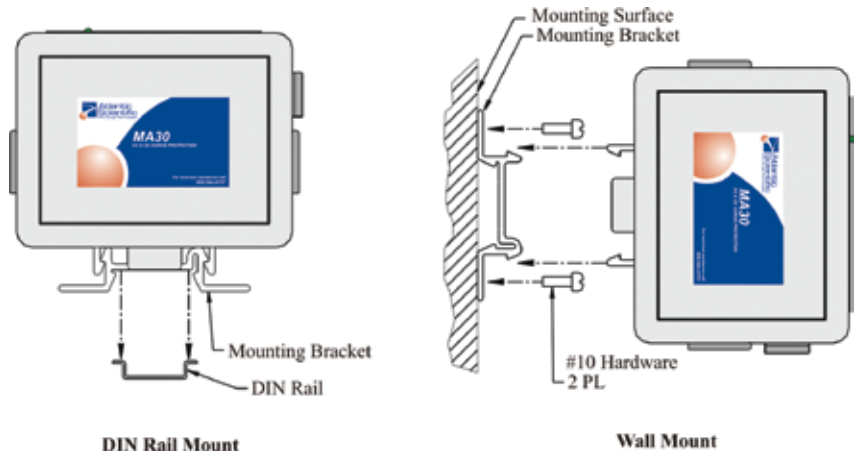

Figure 2 Installation

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^2)
Weight
1 lb (450g)
Dimensions
5.5” x 4” x 1.5” (135mm x 100mm x 40mm)

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