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L.E.D LIGHTING LINE SUPPRESSION SURGE FILTERS TYPE SLB

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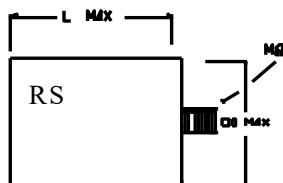
Due to the fact that most LED Drivers do not have surge suppression between earth ground and any of the input wires due to the effect these have during the hi-pot testing, it has been established that it is more practical to install these devices in the fixture or external to the LED Driver.

The Maximum surge rating required is 10Ka for the high exposure level. These devices are fitted with 4 10KA Varistors and connected so as to improve the differential mode surge capability. See AN2.pdf

LED DRIVER SURGE PROTECTOR WITH FILTER AND STATUS LIGHT SLB-A

These LED Driver Surge Protectors are additionally fitted with Emi filters containing X and Y capacitors and Specially wound Inductors to eliminate the flickering effect sometimes found when using LED Light dimmers caused by ripple relays as well as when using emergency generators during blackout periods. They provide additional Surge Protection for Long Term reliability to minimise failure of L.E.D Lighting Systems. In addition they suppress the noise generated causing interference to Electronic equipment and Entertainment systems.

10 Amp 45/003



DIMENSIONS

Rated Current Amps	Housing	Od mm	L mm	Stud mm	Wire Length	Stock Code
10	RS3	44	76	M8	185mm	45/003

Specifications Type SLB

Part No	Current Rating in Series (A)	Max Continuous operating Voltage Ac Rms (V)	Clamping Voltage (Max) Vc (V)	Maximum Peak Current (8/20us) Imax (kA)
45/003	10	275	710	30 (3x10)

INSTALLATION INSTRUCTIONS

Connect the Brown and Blue wires of the Units to the Mains Supply Live and neutral and the Green and Yellow Wire to the Mains Earth.
Connect the Red (Live) and Black (Neutral) wire to the Led Light Circuit Red to Brown and Black to Blue.



L.E.D LIGHTING LINE SUPPRESSION SURGE FILTERS TYPE SLB

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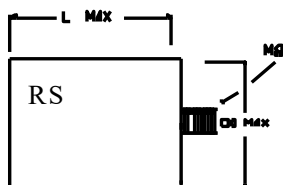
Due to the fact that most LED Drivers do not have surge suppression between earth ground and any of the input wires due to the effect these have during the hi-pot testing, it has been established that it is more practical to install these devices in the fixture or external to the LED Driver.

The Maximum surge rating required is 10Ka for the high exposure level. These devices are fitted with 4 10KA Varistors and connected so as to improve the differential mode surge capability. See AN2.pdf

LED DRIVER SURGE PROTECTOR WITH FILTER AND BUILT IN SWITCH SLB-B

These LED Driver Surge Protectors are additionally fitted with Emi filters containing X and Y capacitors and Specially wound Inductors to eliminate the flickering effect sometimes found when using LED Light dimmers caused by ripple relays as well as when using emergency generators during blackout periods. They provide additional Surge Protection for Long Term reliability to minimise failure of L.E.D Lighting Systems. In addition they suppress the noise generated causing interference to Electronic equipment and Entertainment systems. This Type has an additional built in Isolated normally closed Switch to remotely monitor the Protection Status when the unit is fitted in an inaccessible place. They are connected in Series with the LED Systems

10 Amp 45/070



DIMENSIONS

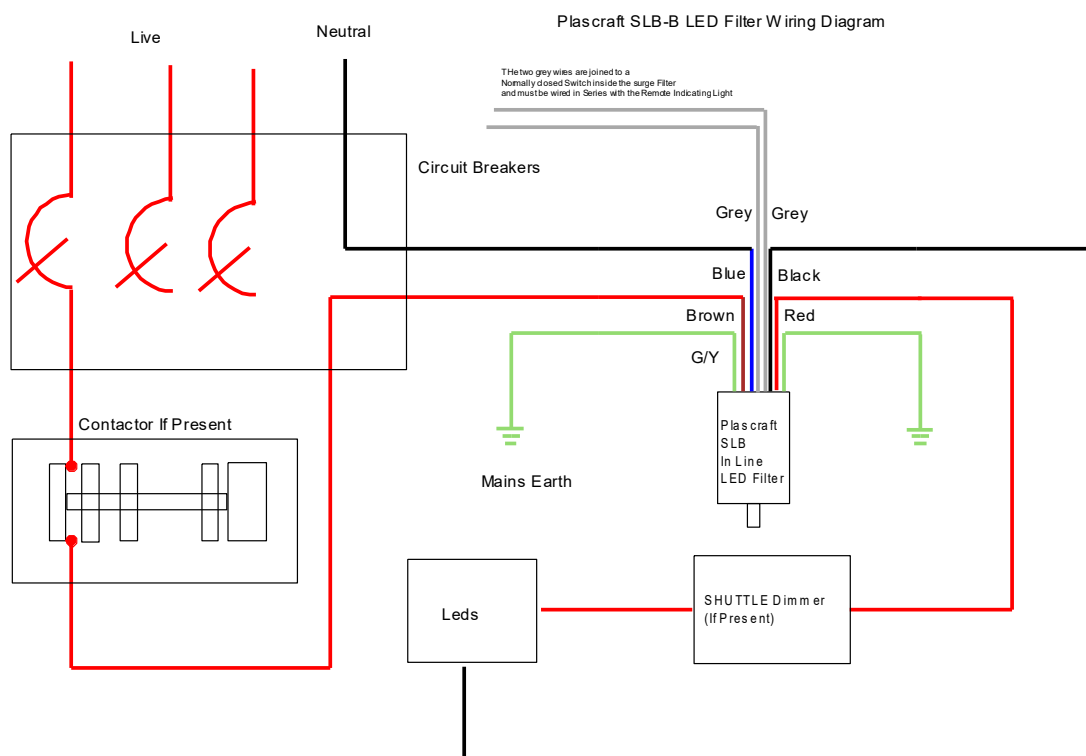
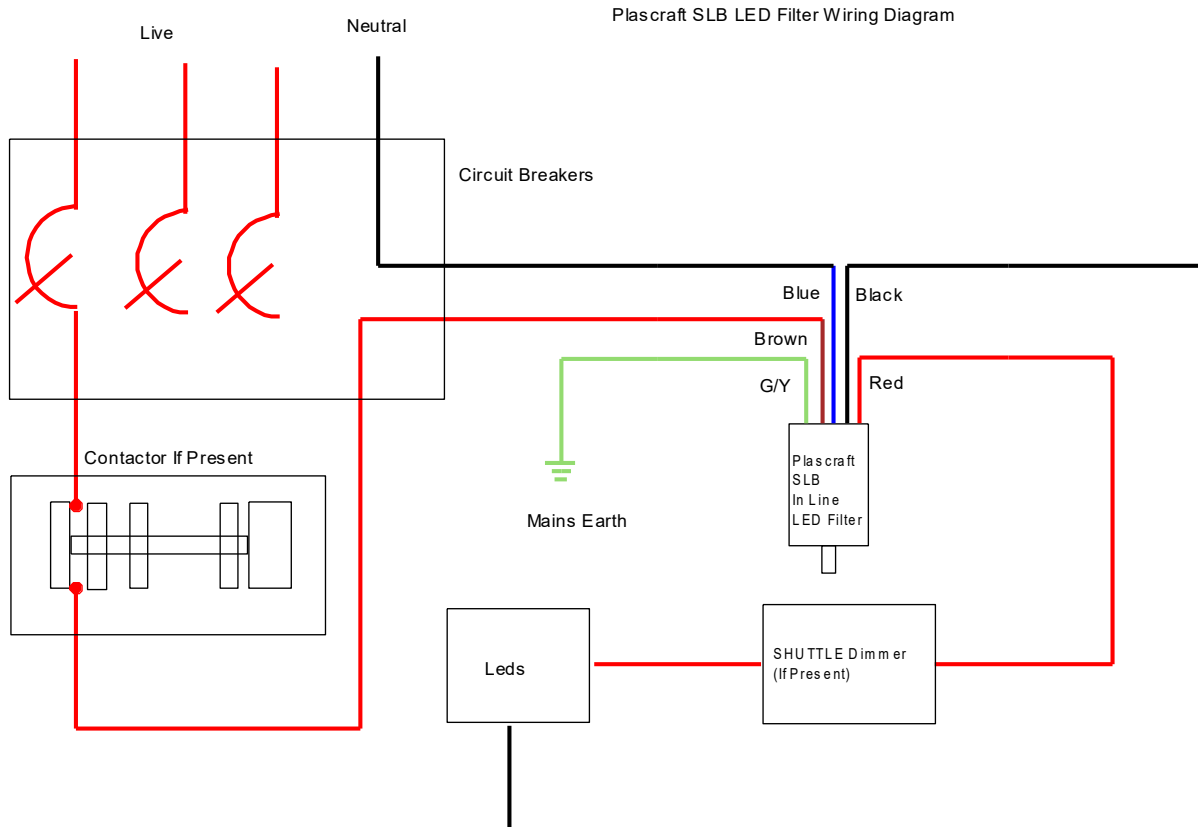
Rated Current Amps	Housing	Od mm	L mm	Stud mm	Wire Length	Stock Code
10	RS3	44	76	M8	185mm	45/070

Specifications Type SLB

Part No	Current Rating in Series (A)	Max Continuous operating Voltage	Clamping Voltage (Max)	Maximum Peak Current (8/20us)
		Ac Rms (V)	Vc (V)	Imax (kA)
45/070	10	275	710	30 (3x10)

INSTALLATION INSTRUCTIONS

Connect the Brown and Blue wires of the Units to the Mains Supply Live and neutral and the Green and Yellow Wire to the Mains Earth.
Connect the Red (Live) and Black (Neutral) wire to the Led Light Circuit Red to Brown and Black to Blue. And the other Green and Yellow to the LED lighting Circuit
The two grey wires are joined to an internal isolated switch rated at 8 amps to connect to an external remote indication system





L.E.D LIGHTING BYPASS MODULE FOR CONTROL OF L.E.D. FLICKER TYPE SFL

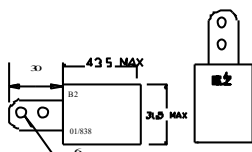
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LED bulbs are very different to the conventional bulbs they're replacing. Conventional bulbs are based on a simple 'filament' wire that glows white hot as the electrical current passes through it. If you vary the voltage and current applied to the bulb you can directly change its brightness. LED bulbs are more complex, they include electronic circuitry to control them and enable them to work in domestic mains (230V) electrical systems. It's this complexity that allows them to achieve such great power saving efficiency but also what makes them more difficult to use with dimmers of any type. Many dimmers cannot be used to control LEDs (even if the LEDs are dimmable), so you need to choose a Dimmer suitable for dimming L.E.D Lamps and even then sometimes there is a flicker due to the interaction of the dimmer and the LED Driver. This is when one needs to use a flicker control module.

LED Flicker Bypass Module Type SFL

These LED modules are fully encapsulated in a cylindrical housing and have two wires coming out which are connected in Parallel with the LED Drivers. See Application note [AN02](#) for a full explanation of how to choose and fit these items

44/050



DIMENSIONS

Bypass Watts	Housing	Od mm	L mm	Wire Length	Stock Code
10	I2	23	35	100	44/791

Specifications Type SFL

Stock Code	Max Continuous operating Voltage	Rating
	Ac Rms (V)	Watts
44/791	275	10

INSTALLATION INSTRUCTIONS

See Application Note [AN02](#) for correct connection and Installation



LED Lighting and Flicker

LED bulbs are very different to the conventional bulbs they're replacing. Conventional bulbs are based on a simple 'filament' wire that glows white hot as the electrical current passes through it. If you vary the voltage and current applied to the bulb you can directly change its brightness.

LED bulbs are more complex, they include electronic circuitry to control them and enable them to work in domestic mains (230V) electrical systems. It's this complexity that allows them to achieve such great power saving efficiency but also what makes them more difficult to use with dimmers of any type.

Many dimmers cannot be used to control LEDs (even if the LEDs are dimmable), so you need to choose a dimmer that is designed to work with a variety of lighting sources including LEDs.

Using Dimmers with LEDs

Even when using Dimmers designed to work with LEDs, there are three important points to observe; the dimmer's minimum load, its maximum load and its configuration to work with LEDs

Minimum Load

The Dimmer will have a minimum load rated in Watts This means that your lighting circuit connected to the dimmer must be more than the minimum load. This is easy to calculate by adding-up the power (W) of all the bulbs you have on the circuit, if it's more than dimmers minimum you should have no problem. If it's less than the minimum then we recommend installing a Bypass module or a Specially designed Surge Filter

The Dimmer Bypass acts as a 'dummy' load in the lighting circuit and will help prevent the LEDs flickering at startup, low dim settings or when they should be Off. The dimmer bypass should be installed in one of the light fittings or in the wiring going to the light fitting (Figure 1), it must be connected between the light's Live and Neutral wires. You only need one Dimmer Bypass for each circuit (not for each light bulb).

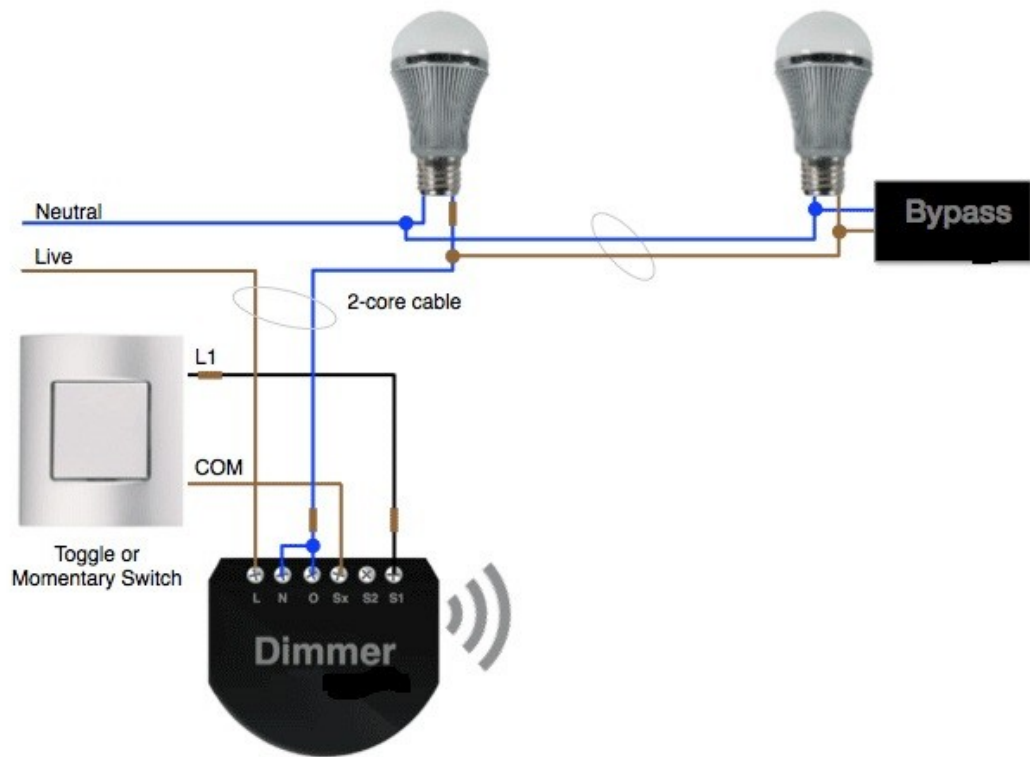
Maximum Load

The way in which LEDs work can result in very high in-rush currents when they are controlled by a leading-edge dimmer . It is common practise to de-rate the maximum power rating of the dimmer when using LEDs by a factor of 5x - 10x.

LED bulbs from different vendors have different characteristics. These variations mean that they can misbehave when used with a dimmer - usually this means they flash at start-up or will not completely turn off.

Installing a Bypass Module

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In some cases when the bypass does not work it has been found that the Filters Type SLB work well. See next page for details



L.E.D LIGHTING INTERFERENCE SUPPRESSION FILTERS TYPE SEM

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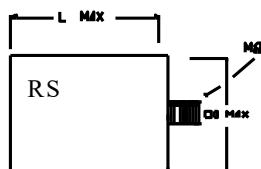
These LED Lighting EMI filters have been designed to eliminate the noise generated by LED Drivers causing interference to Electronic equipment and Entertainment systems.

They are connected in Series with the LED Systems. See Application Note [AN03](#) for a detailed description of the causes , Remedies , Selection and Installation instructions

LED LIGHTING EMI FILTER PLASTIC HOUSING TYPES

These units consist of Inductors , Capacitors and Resistors fully encapsulated in Plastic housings and are suitable for low to medium levels of interference

10, Amp versions



DIMENSIONS

Rated Current Amps	Housing	Od mm	L mm	Stud mm	Wire Length	Stock Code
10	RS	44	76	M8	185mm	41/201

INSTALLATION INSTRUCTIONS

Connect the Brown and Blue wires of the Units to the Mains Supply Live and neutral and the Green and Yellow Wire to the Mains Earth.

Connect the Red (Live) and Black (Neutral) wire to the Led Light Circuit Red to Brown and Black to Blue.

See Application Note AN2 for detailed Installation Instructions.



SURGE ARRESTORS FOR LED TUBES TYPE SLA-B

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Due to the fact that a number of Led Drivers built in to Led tubes installed in Luminaires do not have the minimum requirement of 6Ka surge protection built in to them there are an increasing number of premature Led tube failures in South Africa .

These Surge protectors have a combined total of 18Ka protection in a compact package for fitting into the Luminaire either when it is installed or when tubes have failed.

They are connected between the live, Neutral and earth to give extra protection as even when the tube includes the minimum 6Ka protection it is only between Live and Neutral

SLA –B Parallel Connection

Surge Current	Voltage	Series	Parallel	Rated Current Amps	Stock Code	Photo/ Housing
6KA	275		X	10	45/032	Fig 1 I2

Fig 1 I2



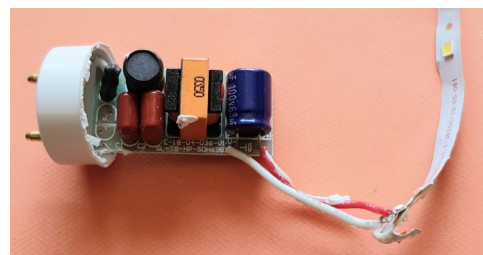
Dimensions I2

OD 23mm

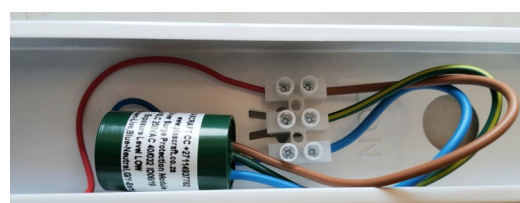
Height 35mm



Typical Tube LED Driver without adequate Surge Protection



Installation and Connection of SLA-B Surge Protection





SURGE ARRESTORS PM L/N/E CLASS II TYPE SLA

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These Led Driver surge protectors are typically used in Indoor, Outdoor and commercial LED Lighting, including traffic lighting, Service entrance lighting, flood lighting , tunnel lighting , parking garage lighting, street lighting , roadway lighting, and digital signage.

This range is available for Series as well as Parallel connection, for Low and High Exposure situations Low exposure situations could include inside the home and small offices.

High exposure situations would include outdoors and inside larger buildings .

Where LED Lighting Dimmers are included in LED Lighting system the SLB range should be considered. See AN1.pdf for detailed instructions of application, selection and installation for these types.

SLA-A Protection Mode L/N/E Series Connection

Surge Current	Voltage	Rated Current Amps	Stock Code	Photo/Housing	Dimensions mm
6KA	275	10	45/033	Fig 1 I2	OD 23, Length 35
10KA	275	10	45/009	Fig 2 B2	OD 30, Length 43

SLA-B Protection Mode L/N/E Parallel

Surge Current	Voltage	Rated Current Amps	Stock Code	Photo/Housing	Dimensions
6KA	275		45/032	Fig 3 I2	OD 23, Length 35
10KA	275		45/008	Fig 4 B2	OD 30, Length 43
25KA	480		45/536	Fig 5 RS3	OD 44,Length 72, Stud M8

Fig 1



Fig 2 45/009



Fig 3

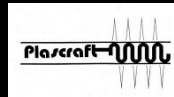


Fig 4



Fig 5



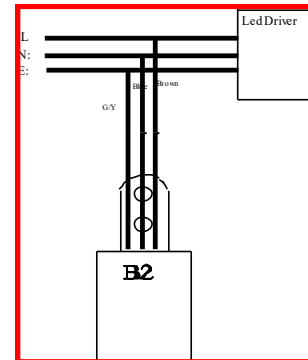


CONNECTIONS TYPE SLA

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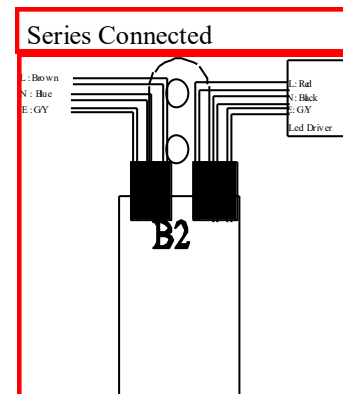
Parallel Connection. SLA-B

The brown, blue and Green and Yellow wires are to be connected to the mains Live , Neutral and Earth respectively as close as possible to the Led lights or LED light drivers



Series Connection . SLA-A

The brown, blue and Green and Yellow wires are to be connected to the mains Live , Neutral and Earth respectively and the Red , Black and Green and yellow are to be connected to the Led Lights or LED driver Live , Neutral and Earth respectively





L.E.D DRIVER SURGE PROTECTION MODULES CLASS II TYPE SLC

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These Led Driver surge protectors are typically used in Outdoor and commercial LED Lighting, including traffic lighting, Service entrance lighting, flood lighting, tunnel lighting, parking garage lighting, street lighting, roadway lighting, and digital signage.

This range is available for Series as well as Parallel connection. and include Thermal disconnect with built in indicators to monitor protection status. See AN1.pdf for detailed instructions of application, selection and installation for these types.

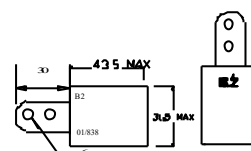
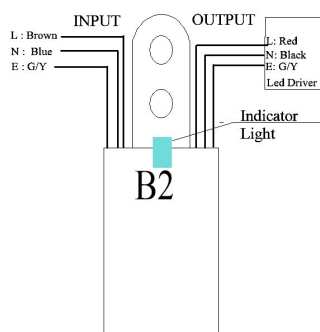
LED DRIVER SURGE PROTECTOR SLC Series Connected with built in Indicator SLC-A

In this arrangement in the event of failure of the surge protection, the monitoring led will go out and the and the Luminaire will be disconnected

Connection.

The brown, blue and Green and Yellow wires are to be connected to the mains Live, Neutral and Earth respectively and the Red, Black and Green and yellow are to be connected to the Led Lights or LED driver Live, Neutral and Earth respectively

Series Connected Connection



45/034 For Low Exposure Level



45/016 For High Exposure Level



Specifications Series Connected with built in Indicator

Rated Current Amps	Surge Current	Housing	OD mm	Length mm	Stock Code	Exposure Level
10	10KA	B2	31.5	43.5	45/016	High
10	6Ka	I3	27.5	40.5	45/034	Low



L.E.D DRIVER SURGE PROTECTION MODULES CLASS II TYPE SLC

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These Led Driver surge protectors are typically used in Outdoor and commercial LED Lighting, including traffic lighting, Service entrance lighting, flood lighting , tunnel lighting , parking garage lighting, street lighting , roadway lighting, and digital signage.

This range is available for Series as well as Parallel connection. and include Thermal disconnect with provision for monitoring protection status.

See AN1.pdf for detailed instructions of application, selection and installation for these types.

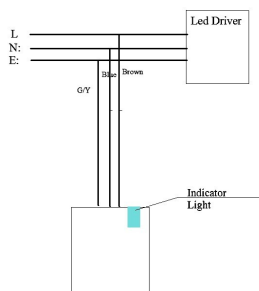
LED DRIVER SURGE PROTECTOR SLC Parallel Connected with built in Indicator SLC-B

In this arrangement in the event of failure of the surge protection, the monitoring led will go out and the surge protection will be disconnected . The Luminaire will continue to operate without protection



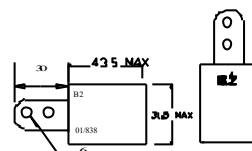
Connection.

The brown, blue and Green and Yellow wires are to be connected to the mains Live , Neutral and Earth respectively They should be situated where the LED is visible so as to allow replacement as soon as possible



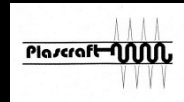
45/017 For High exposure Level

45/035 For Low exposure Level



Specifications Parallel Connection with built in Indicator

Surge Current	Housing	OD mm	Length mm	Stock Code	Exposure Level
10KA	B2	315	43.5	45/017	High
6Ka	I3	27.5	40.5	45/035	Low



L.E.D DRIVER SURGE PROTECTION MODULES CLASS II TYPE SLC

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LED DRIVER SURGE PROTECTOR SLC Series Connected with built in switch for Remote Monitoring SLC-C

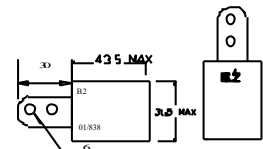
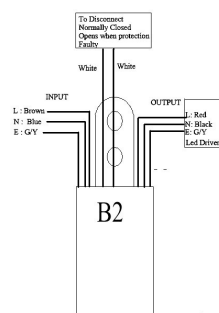
In this arrangement in the event of failure of the surge protection, the monitoring switch will be opened and the status can be monitored remotely by connecting the switch to a panel or other control device. See AN1.pdf for detailed instructions of application, selection and installation for these types.

Connection.

The brown, blue and Green and Yellow wires are to be connected to the mains Live , Neutral and Earth respectively and the Red , Black and Green and yellow are to be connected to the Led Lights or LED driver Live , Neutral and Earth respectively.

The 2 Grey or White wires in the centre are isolated from the mains and can be connected as a normally closed switch to control 6 amps for switching or illumination of a fault condition

Series Connected



Specifications Series Connected with built in switch for remote Monitoring

Rated Current Amps	Surge Current	Housing	OD mm	Length mm	Height	Leads	Stock Code	Exposure Level
10	10KA	B2	31.5	43.5			45/038	High
10	6ka	I3	27.5	40.5			45/036	Low

45/038 For High exposure Levels



45/036 For low exposure levels





L.E.D DRIVER SURGE PROTECTION MODULES CLASS II TYPE SLC

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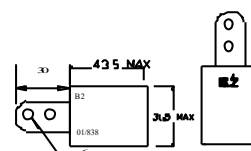
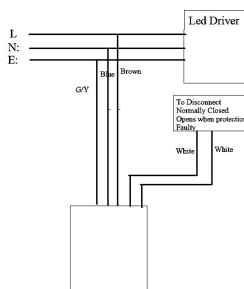
LED DRIVER SURGE PROTECTOR SLC Parallel Connected with built in switch for Remote Monitoring SLC-D

In this arrangement in the event of failure of the surge protection, the monitoring switch will be opened and the status can be monitored remotely by connecting the switch to a panel or other control device. See AN1.pdf for detailed instructions of application, selection and installation for these types.

Connection.

The brown, blue and Green and Yellow wires are to be connected to the mains Live, Neutral and Earth respectively

The 2 Grey or White wires in the centre are isolated from the mains and can be connected as a normally closed switch to control 6 amps for switching or illumination of a fault condition



45/039 For High exposure Level

45/037 For low exposure Level

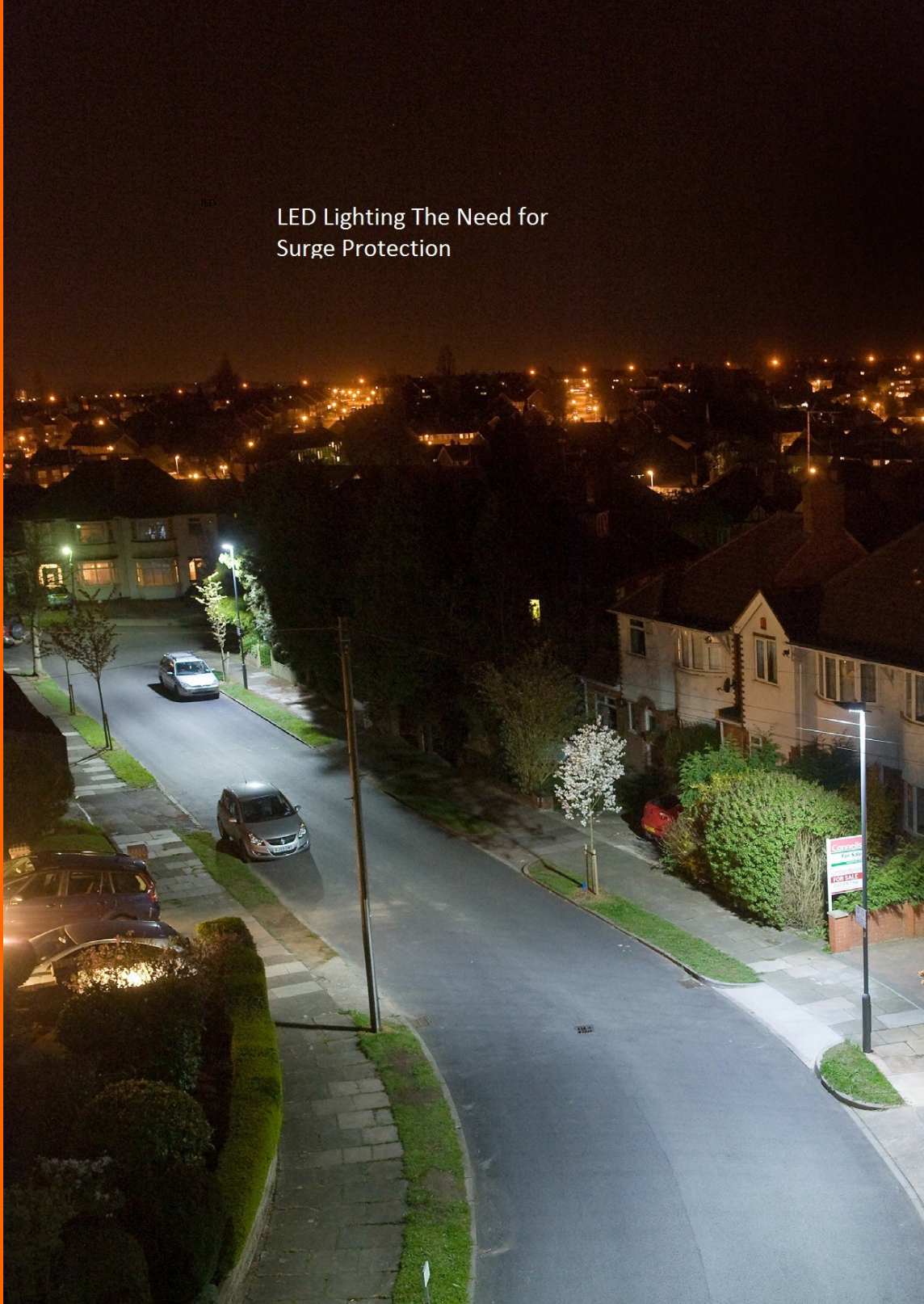


Specifications Parallel Connection with built in switch for Remote Monitoring

Surge Current	Housing	OD mm	Length mm	Stock Code	Exposure Level
10KA	B2	315	43.5	45/039	High
6KA	I3	27.5	40.5	45/037	Low



LED Lighting The Need for
Surge Protection



The need for protection

Voltage surges have a huge destructive impact upon public lighting systems. They wear out LED drivers and distribution panels prematurely, and increase service interruptions to street lighting. Beyond material damage to the luminaires, voltage surges caused by lightning, for example, can trigger or break protective devices in the circuit boards of street lighting distribution panels. So as well as the cost of replacing hardware, the public is left without lighting — a critical safety issue in the case of pedestrian and traffic tunnels, road signs and other public lighting. The vulnerability of electronic lighting systems to overvoltages is widely recognized in technical literature, and different European regulations and standards specify the need for lighting protection. This white paper explains the causes of lighting overvoltages and how they affect public lighting installations. It also covers the legal and regulatory framework governing protection, and proposes a solution to maximize protection performance and continuity of service.

Public lighting installations are exposed to the environment. Located where continuity of service is essential, it is crucial that these installations are protected against lightning and overvoltages.

Investing a small amount in protection can extend luminaire lifetime, improve public services and greatly reduce overall operating and infrastructure costs.



Building-in protection

What are transient or surge overvoltages?

When analyzing the phenomenon of overvoltages, we consider surge overvoltages and power-frequency overvoltages separately. Although they both represent an increase in voltage above an acceptable limit, their root causes, magnitude, duration and method of protection are radically different.

Surge overvoltages are spikes that can reach tens of kilovolts but last for only a few microseconds. Despite their short duration, their high energy content may cause serious problems to equipment connected to the electricity network — from premature aging to destruction — resulting in service disruptions and costly repairs.

Fig.1 Transient “surge” overvoltage



Voltage surges have several causes. For example, lightning discharges that directly strike the distribution line of a building, or its lightning rod, can induce electromagnetic fields that generate voltage spikes in nearby lighting installations. And very long outdoor distribution power lines are highly susceptible to the direct effects of lightning strikes, with large currents from the lightning being conducted in the power lines. It's also common for non-weather phenomena to cause voltage spikes in adjacent lines — for instance, switching inside transformer cabinets, or the disconnection of motors and other inductive loads.

Surge overvoltages are voltage spikes of several kilovolts that last for just a few microseconds

Surge overvoltages have two modes of circulation: common and differential. Common-mode overvoltages appear between the live conductors and earth: for example, line-to-earth or neutral-to-earth. Differential-mode overvoltages circulate between live conductors: line-to-line or line-to-neutral. A well-protected luminaire should integrate protection for both modes.

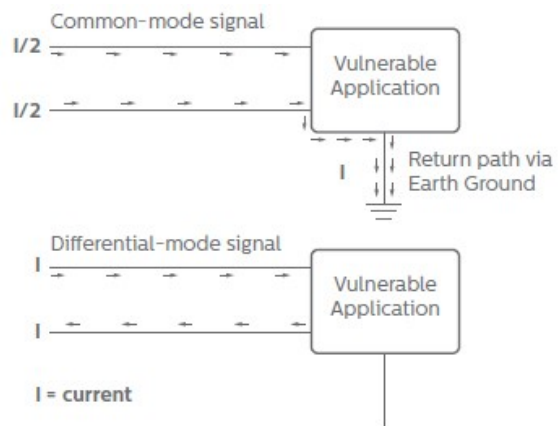


Fig.2 Definition of common and differential-mode currents

Surge overvoltage protection is provided by installing a protective device (surge arrester) on the vulnerable line, and connecting it in parallel or in series.

When connected in series, the protection device acts as a fuse. But when it's connected in parallel, the luminaire continues to function even after the Surge Protection Device (SPD) is damaged. The SPD will get damaged after weathering a number of spikes above a certain voltage level. In the event of a surge overvoltage, the protective device will divert excess energy to earth, thus limiting the peak voltage to a tolerable level for the electrical equipment connected downstream.

Protecting against the effects of surge overvoltages in public lighting

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An SPD acts as a voltage-controlled switch. When the network voltage is lower than the activation voltage, the component is passive. On the other hand, when the network voltage exceeds the activation voltage, the SPD diverts the surge energy and prevents it from destroying the equipment. When choosing an SPD, you need to consider the equipment's exposure to the effects of lightning, along with the maximum impulse voltage that the equipment needs to withstand.

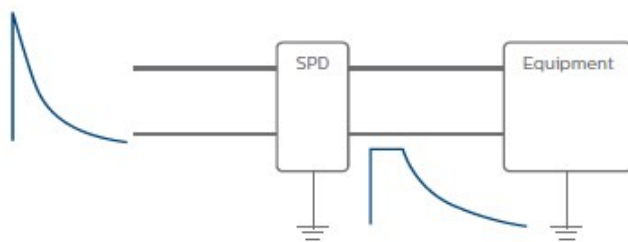


Fig.3 Working principle of a surge protection device (SPD)

In general, the most effective approach to protect large installations of lighting equipment against surge overvoltages is by cascading multiple protective stages. Each stage combines the necessary balance between discharge capacity and voltage protection level. This way, a first stage (typically a 'Type 1' or 'Type 2' SPD) provides robustness, thus diverting most of a spike's energy, while a second stage (typically a 'Type 2' or 'Type 3' SPD) provides 'fine' protection. Thus the peak voltage reaching the equipment always stays below the critical level. Of the causes of surges mentioned in international protection standards, the ones most likely to affect a public lighting system are:

- direct lightning strikes on distribution lines (conducted through the power lines), and
- lightning strikes near to a building/structure (creating induced surges).

European standards EN 60364-5-534 and EN 62305-1 require that protection against these types of electrical disturbance are to be provided by a Type 2 SPD. The protection solution is installed downstream of the main circuit breaker in the distribution panel circuit board, in parallel to the main system. So it diverts the energy of the surge to earth, limiting the voltage peak to a tolerable level for equipment connected downstream.

To guarantee proper protection of a luminaire, the distance between it and its protector circuit must be as short as possible. If the distance between a protected distribution panel and several luminaires is more than 20 meters, using a second protection stage (of Type 2 or 3) is recommended, even if the protection level of the first stage seems to be sufficient (see Fig.4).

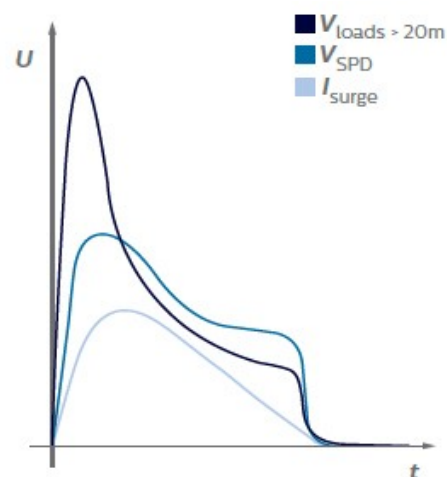
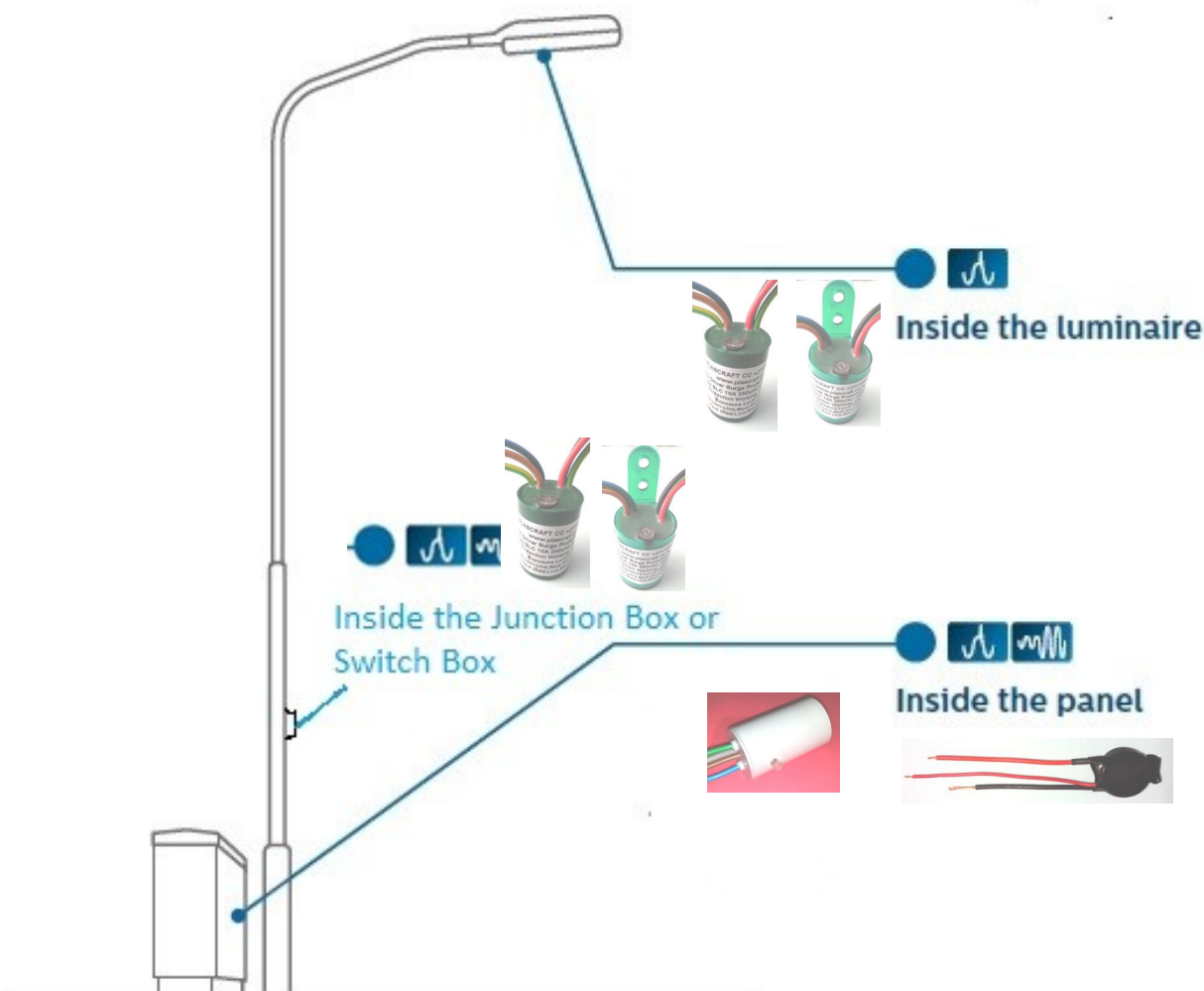


Fig.4 Effect of cable distance on the voltage protection level

Practical approach

Fig.5 Circuit protection solutions for luminaires Switch boxes/Junction Boxes and street-lighting distribution panels.
This may be applied to Warehouse Lighting, Field Lighting, Office Lighting and Residential lighting where there is a Distribution panel , Junction or Switch box and a LED Light or Luminaire



Stage 1: Standard protection at luminaire level

IEC61547 states that all luminaires should be protected from overvoltages up to 1 kV in differential mode and 2 kV in common mode. However, in practice many units installed in South Africa do not have the necessary protection built in whilst some of the better units have additional protection up to 10KV

Stage 2: Additional protection of luminaires

When designing installations, the area should be assessed for its vulnerability to lightning strikes. If the vulnerability is high, 10 kV protection is recommended. In these cases, it is recommended to use an SPD, in addition to the standard protection at luminaire level to ensure a higher level of protection (10 kV).

Stage 3: Junction Box or switch Box protection

In the most vulnerable environments, the Plas-craft Types are suitable as they protect for surge overvoltages up to max surge current of 25 kA.

Stage 4: Distribution panel board protection

See next section for suitable Types up to 5KA

Practical approach

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Selection of Surge Protection Products for each Stage.

Stage 1 : Standard protection at Luminaire or LED Light Level.

If possible establish what protection the LED Driver has and note this. Should this not be possible assume a 2KV to 4KV level .

Stage 2: Additional protection of Luminaire or LED Driver of double reinforced insulation.

First establish whether the Luminaire is with Double re-inforced insulation (previously class II) . Current standards require that an SPD may not be connected to the protective conductor or the metal Luminaire enclosure in the LED Light.

In this case only the path Live to Neutral can be protected.

2 Wire Surge Protection Devices without Thermal Disconnect for Parallel Connection

Live to Neutral	Rating	Voltage AC	Type	Stock Code	Connec- tion	Image
2 Wire	6KA	275				
2 Wire	10KA	275				
2 Wire	20KA	275	SAA	45/023	C5	
2 Wire	25KA	460	SAA	45/604	C5	
2 Wire	30 KA	275	SAA	45/024	C5	

Stage 2: Additional protection of Luminaire or LED Driver with 3 wire Live,Neutral,Earth

3 Wire Surge Protection Devices without Thermal Disconnect for Parallel Connection

Live to Neutral	Rating	Voltage AC	Type	Stock Code	Connection	Image
3 Wire	6KA	275	SLA	45/032	C3	
3 Wire	10KA	275	SLA	45/008	C3	
3 Wire	25KA	460	SAD	45/536	C3	

3 Wire Surge Protection Devices with Thermal Disconnect for Parallel Connection with built in Status Indicator

Live to Neutral	Rating	Voltage AC	Type	Stock Code	Connection	Image
3 Wire	6KA	275	SLC	45/035	C3	
3 Wire	10KA	275	SLC	45/017	C3	
3 Wire	25KA	460	SAB	45/026	C3	

Practical approach

Selection of Surge Protection Products for each Stage.

Stage 2: Additional protection of Luminaire or LED Driver with 3 wire Live,Neutral,Earth Continued

3 Wire Surge Protection Devices with Thermal Disconnect for Series Connection with built in Status Indicator						
Live to Neutral	Rating	Voltage AC	Type	Stock Code	Connection	Image
3 Wire	6KA	275	SLC	45/034	C4	
3 Wire	10KA	275	SLC	45/016	C4	
3 Wire	25KA					

3 Wire Surge Protection Devices with Thermal Disconnect for Series Connection with built in switch for remote monitoring						
Live to Neutral	Rating	Voltage AC	Type	Stock Code	Connection	Image
3 Wire	6KA	275	SLC	45/036	C2	
3 Wire	10KA	275	SLC	45/038	C2	
3 Wire	25KA					

Stage 3 : Junction Box or Switch Box Protection

All of the protection devices outlined for Stage 2 Protection may be used in Stage 3. Depending on the space available ,the protection level required and Connection requirement items should be selected from Stage 2

Practical approach

Selection of Surge Protection Products for each Stage.

Stage 3 : Junction Box or Switch Box Protection

All of the protection devices outlined for Stage 2 Protection may be used in Stage 3. Depending on the space available ,the protection level required and Connection requirement items should be selected from Stage 2

Stage 4: Distribution Panel Board Protection.

Distribution Panel Board Protection					
	Rating	Voltage AC	Type	Stock Code	Connection
2 Wire	25KA	460	SMB	45/604	C5
2 Wire with Thermal Disconnect	25KA	460	SAF	45/New	C5
2 Wire with Status Indicator	25KA	460	SAF	45/New	C5
2 Wire With Load Disconnect	25KA	460	SAF	45/TR	C8
2 Wire	30KA	275	SAA	45/024	C3
3 Wire	25KA	460	SAD	45/536	C3
3 Wire with Status Monitor	25KA	460	SAB	45/026	C3
3 Wire with Load Disconnect	25KA	460	SAB	45/004	C6
3 Phase 4 Wire	3x10KA	460	SAC	45/458	
3 Phase with Thermal disconnect and Status Monitor	25KA	460	SAE	45/025	
3 Phase 5 Wire	7 x 10KA		SAC	45/577	

Connection

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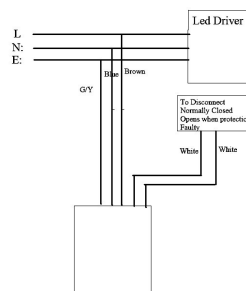
Connection Diagrams

Connection is made as per diagrams

Connection. Fig C1

3 wire parallel with switch

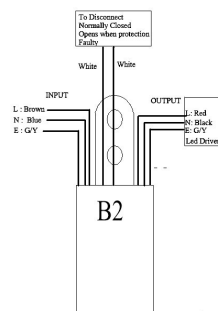
The brown, blue and Green and Yellow wires are to be connected to the mains Live, Neutral and Earth respectively. The 2 Grey or White wires in the centre are isolated from the mains and can be connected as a normally closed switch to control 6 amps for switching or illumination of a fault condition.



Connection. Fig C2

3 wire series with switch

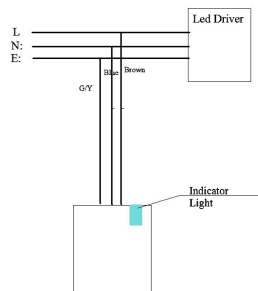
The brown, blue and Green and Yellow wires are to be connected to the mains Live, Neutral and Earth respectively, and the Red, Black and Green and yellow are to be connected to the Led Lights or LED driver Live, Neutral and Earth respectively. The 2 Grey or White wires in the centre are isolated from the mains and can be connected as a normally closed switch to control 6 amps for switching or illumination of a fault condition.



Connection. Fig C3

3 wire parallel

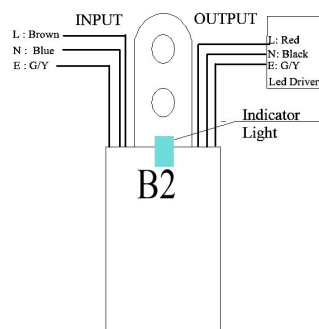
The brown, blue and Green and Yellow wires are to be connected to the mains Live, Neutral and Earth respectively. They should be situated where the LED is visible so as to allow replacement as soon as possible.



Connection. Fig C4

3 wire series

The brown, blue and Green and Yellow wires are to be connected to the mains Live, Neutral and Earth respectively, and the Red, Black and Green and yellow are to be connected to the Led Lights or LED driver Live, Neutral and Earth.

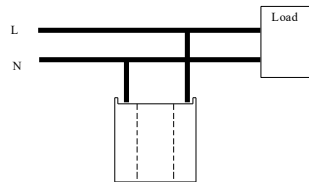


Connection

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Connection Diagrams

Connection. Fig C5



Connection. Fig C6

3 Wire Parallel with Load Disconnect

Brown Live In , Blue Neutral, G/Y
Earth, Grey Live Out

Connection. Fig C7

4 Wire 3 Phase

Connection. Fig C8

2 Wire with Load
Disconnect



PACKAGING

PAC

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Polybag Packaging.



Polystyrene Packaging



Display Packaging.
Product can be individually packed
In Polybags with a label for display



Carton 1 Size 23x15x15cm ,5175cu cm ,193 cartons cu. metre
Carton 2 Size 25x15x25,9375cu. Cm , Max weight 18Kgs
Carton 3 Size 30x21x28, 17640cu.cm. Max weight 18Kgs

Carton Identification.

Plascraft

Customer Name and Address

(If Contents are 1 Item)

Product Type

Stock Code

Product Description .

Quantity.

(If Contents contain more than 1 Item)

Plascraft

Customer Name and Address

Bag Identification

Plascraft. 011-4937782

Product Type

Stock Code

Product Description

Capacitors: Capacitor Type, Value,
Voltage, Tolerance, Lead Spacing

Inductors: Inductance, Current Rating,
Voltage