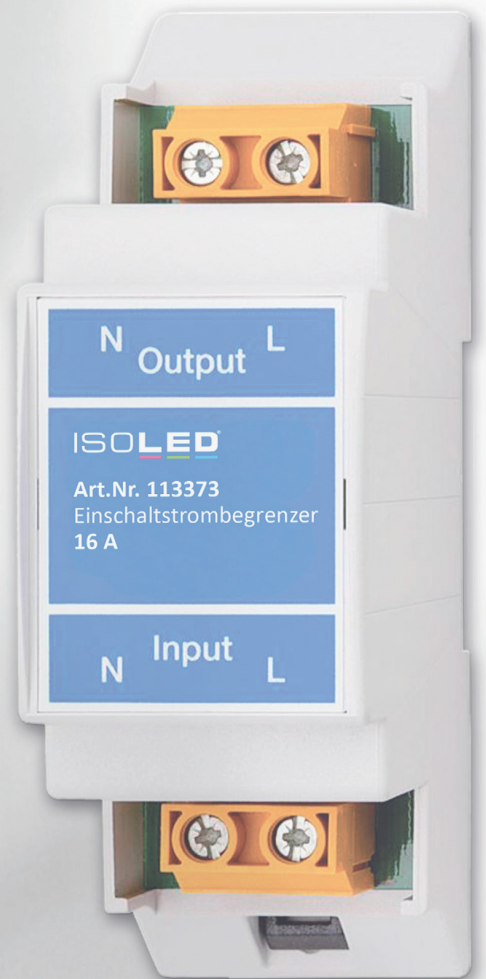




ISOLED KNOWLEDGE

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INRUSH  
CURRENT  
LIMITER



**ISOLED**<sup>®</sup>

CUSTOMISED LIGHT SOLUTIONS



# INRUSH CURRENT LIMITER

## DESIGNED FOR LED LIGHTING SOLUTIONS

### Inrush current limiter (ESB) for capacitive loads

#### Why inrush current limiter?

When switched on, LED power supplies draw a high starting current for a period of up to 300 milliseconds compared to traditional lighting systems- this can be many times the rated current (e.g. 24 V/150 W transformer: rated current 6 A, in-rush peak/start-up current 20 A). This means that only a few simultaneously switched-on loads are sufficient to trigger the circuit breaker to trip.

Frequently installed B16 miniature circuit breakers are triggered from 5 times the 16 A rated current (i.e. 80 A). If you change to a C16 miniature circuit breaker which only trips from 10 times the 16 A rated current, this means a tolerable starting current of up to 160 A.

Here, however, there is a risk that, depending on the loop impedance, the circuit breaker may not trip in the event of a short circuit, provided the maximum length of the spur lines is not limited and their cross-section is not increased. (With D automatic circuit breakers the danger is considerably greater!)

#### Alternatives

Often attempts are made to use a simple inrush current limiter instead of a miniature circuit breaker with a different tripping characteristic. However, these ESBs usually only limit for too short a period.

Even a soft start is not the best solution for limiting the inrush current, as it is not compatible with current LED technology.

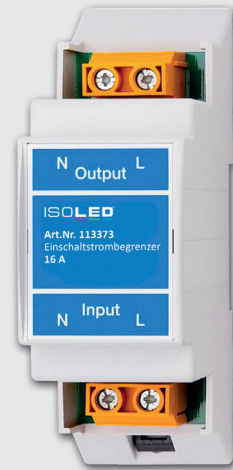
#### The ISOLED® ESB - the perfect solution!

The perfect solution for this well-known problem when converting to LED or for a new installation is the use of the ISOLED® inrush current limiter with a significantly longer limiting time. It is designed for the optimum design of typical LED lighting networks and is highly effective in preventing fuses from blowing (also to the benefit of fuse life).

The ESB is installed between the circuit breaker and the consumer and limits the inrush current for 300 ms.

Up to 70 Reduction of the Installation- /Costs of materials

**RETROFITTING IN EXISTING LIGHTING SOLUTIONS POSSIBLE WITHOUT PROBLEMS!**



## MOST IMPORTANT DATA

- Effective/peak current limiting of capacitive loads | ESB cuts current peaks from 48 A (33.9 A effective)
- Rated power 16 Ampere
- Nominal voltage 184- 265 Vac
- Integrated resistor 6,000 µF
- Max. 3 switch-on operations per minute
- Ambient temperature:-40° to +70° C
- Integrated bypass relay
- Temperature monitoring against overload and for fire protection
- Protection class IP20
- Smallest recommended circuit breaker B13A at 30
- Ambient temperature
- For mounting on top hat rail (35 mm)
- Service life 384,000 h
- Spring cage terminals 0.5- 6 mm<sup>2</sup>
- NO EXTERNAL POWER SUPPLY NECESSARY!

**Item no. 113373**



## Advantages of inrush current limiters



Precise and repeatable inrush current limitation



Reliable prevention of the falling of circuit breakers



Significantly more LED power supply units/consumers per upstream circuit breaker possible



Use of faster circuit breakers



Extending the life of the circuit breakers



Effective cross-section reduction for spur lines - enormous copper savings



Sustainable reduction of installation and material costs (up to 70% cost savings compared to conventional installations)



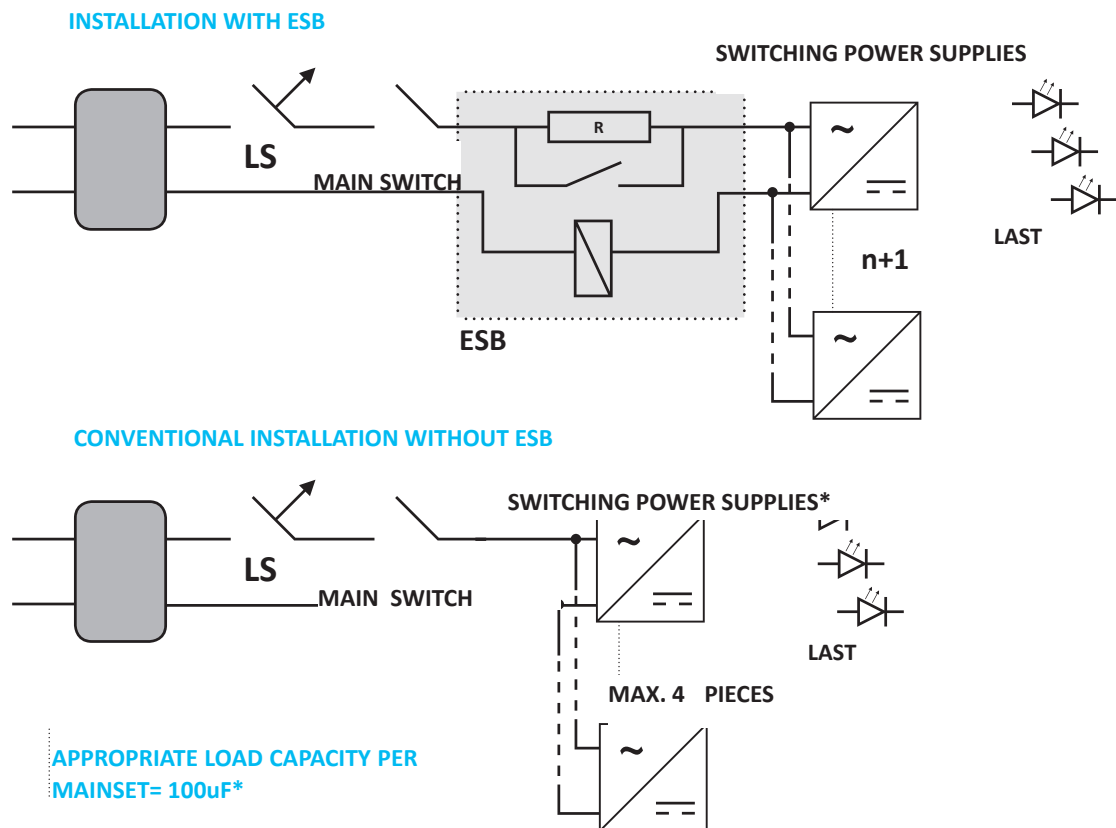
Suitable for retrofitting in existing LED lighting solutions without problems



Fewer circuit breakers



High quality and yet inexpensive device





### For the duration of 300 ms limitation of current peaks

This ESB is approved for capacitive loads and designed for networks with 230 Vac 16 A (mains frequency 16 1/3- 440 Hz). It is self-supplying- therefore no additional power supply unit is required- and is installed between the back-up fuse and the consumer. The current limiting duration (tone = 300 ms) is set so that the limitation remains active for the same period of time until the input capacitors of the connected ballasts/consumers are charged and the back-up fuse no longer trips.

### Time delay for short power failures

In the event of an intended mains switch-off or an unexpected mains failure, the elapsed time (Toff) is measured in the internal measuring circuit of the ESB. Only after this defined time Toff (= 500 ms) has elapsed is the bypass of the limiting circuit cancelled.

When the mains supply is restored, the ESB again limits the starting current.

## IMPORTANT



The consumer is connected to the power supply system in such a way that the line protection switch as well as a residual current circuit breaker can always be tripped within the legal standard - even during the period of current limitation.

### Dimensioning of the ESB

This ESB operates within a tolerance range of +/- 6 % of the nominal value.

It is not the peak current but the effective current that must be taken into account when designing the upstream miniature circuit breakers. Since a thermal tripping point is never reached even with extremely fast miniature circuit breakers, the magnetic tripping current is decisive for the calculation of the dimensioning.

For a simple consideration of the effective current, the following rule of thumb suffices:

### Berechnung Auslösestrom

$$I_{(top)} \times 0,707_{(Calculation\ factor)} = I_{(effective)}$$

### Functionality using an example with B16 automatic circuit breakers

For the ESB of ISOLED® Item no. 113373 we recommend a B13A as the smallest automatic circuit breaker. In the illustration shown here you can see how the inrush current limiter works in conjunction with a B16 automatic circuit breaker.

A B16 automatic circuit breaker trips from 3 to 5 times the 16 A rated current.

This means that it starts at 48 A at the latest. The effective value responsible for the magnetic tripping current of a miniature circuit breaker is 0.707 times lower than the peak current.

The intermediate inrush current limiter limits the starting current to 48 A (33.9 RMS) for 300 ms (tone), thus preventing the B16 circuit breaker from falling.

