

Luminary failure through grid problems

Guidelines: A condition for safety and quality are regulations and test symbols within the lamp industry.

Despite adherence to valid regulations of the lamp industry by almost all manufacturers, substantial critical ballast failures are noted with many customers only after a sort while of use.

Many manufacturers replace hundreds of ballasts per customer on goodwill, because individual investigations into possible causes are uneconomical.



Protective module of Bajog electronic GmbH (clamp version)

Is it really uneconomical? Doesn't it pay off to uphold ones corporate image by emphasizing quality, competence and reliability? Is it indeed cheaper to replace ballasts up to 5 times each through all the years of valid warranty?

In 2006 alone, Bajog electronic was contracted by 62 affected companies to investigate the illuminant failures in their respective environments and to provide a solution to the problem. In all cases, the causes were quickly established and solved. Only in one case had it been a manufacturer-made problem.

Based on the insights and knowledge gained, Bajog electronic developed a protection module for electronic ballast. This module is simply connected between feeder and ballast.

Electronic ballasts with this protective module fulfil their lighting duties beyond the indicated warranty.

Luminary failure through grid problems

By now you may ask yourself what led to these problems.

Bajog electronic composed a detailed professional article, including the results of over 800 measurements conducted in Europe and Asia.

Should you be interested, we will gladly provide you with copy.



Protective module of Bajog electronic GmbH (litz wire version)

Generell Information:

In the lamp industry the illuminant regulation EN 60598 and 5 socket regulations guarantee safety and protection against electrical shocks and inflammability of lamps and other illuminants.

The regulation contains the general safety requirements in chapter 1 and specific requirements for specific luminaries (e.g. garden lamps, trouble lamps, stage projectors, ceiling lights, etc.) in part 2.

The 5 socket regulations concern Edison sockets (DIN EN 60238/VDE 0616T.1), bayonet sockets (DIN EN 61184/VDE 0616T.2), fluorescent lamps and starter sockets (DIN EN 60400/VDE 0616T.3), line lamp (DIN EN 60838-2/VDE 0616T.4) and special sockets (DIN EN 60838-1/VDE 0616T.5).

All these norms comply with the norms of the International Electrotechnical Commission (IEC).

Pointers as to how the respective norms can be fulfilled with special sockets are given.

Test symbols are awarded for complying with norms. The VDE and the ENEC symbol prove that the luminary or socket comply with VDE and ENEC regulations.

The VDE-ÜG symbol is awarded when the most important VDE requirements are met.

CE is only awarded if compliance with EMC-regulation is proven.

Luminary failure – a problem on the rise

Topic:

Lamp interference through supply grid influences.

Food, beverage and home improvement markets as well as exhibition halls, theatres and other event halls in Europe and Asia reported an increasing number of luminary and electronics ballast failures in the last three years.

Investigations in 21 central markets, two exhibition centres, several theatres and event halls all showed one and the same reason for the failures.

It was proven in all cases that the failures and destruction have been caused not by manufacturer neglect or product quality issues but by exterior interferences.

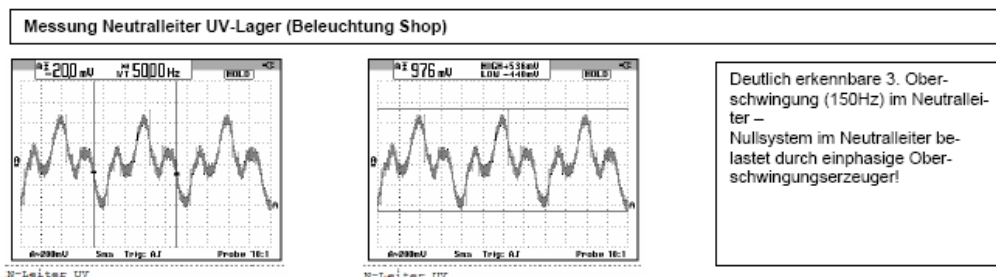
Bajog electronic has been identifying and naming the causes in many articles and lectures since 1996. Bajog electronic actively supports it's customers to solve these problems.

If interested, feel free to contact Bajog electronic GmbH (info@bajog.com) for further information, support and solution finding.

Especially in the above mentioned area of illuminates, the identified causes apart from substantial resonance problems were:

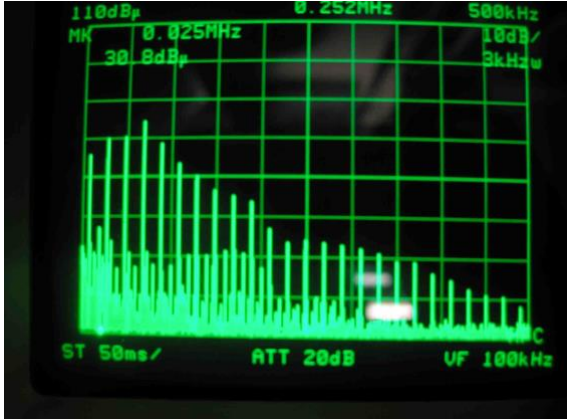
Sinus wave distortion and resonance cave-in:

Aufgrund des hohen Einsatzes von einphasig Schaltgeräten (EVG's) werden 3. und 5. harmonische Oberschwingungen stark erzeugt.

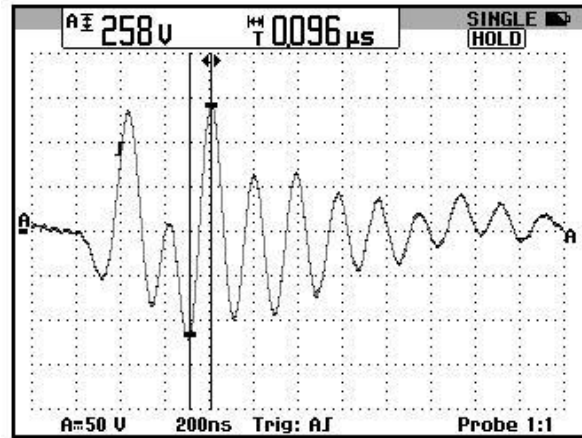


Die 5. Oberschwingung – welche im untersuchten Netz auch auftritt (siehe auch Ihre zur Verfügung gestellten Messungen) – hat eine Frequenz von 250Hz. Diese Oberschwingung wird von dem Schwingkreis der Leuchte (errechnete Resonanzfrequenz bei geschädigten Kondensatoren 238Hz) aufgrund der vorgeschädigten Kondensatoren abgesaugt, wodurch diese in weiterer Folge durch dauernde Überlastung und Überhitzung defekt werden!

$$f_{res} = \frac{1}{2 \cdot \pi \cdot \sqrt{12,43 \cdot 10^{-3} H \cdot 36 \cdot 10^{-6} F}} = 237,9 Hz$$



impulse rise times of 5KV/µs destroy loads connected to the grid

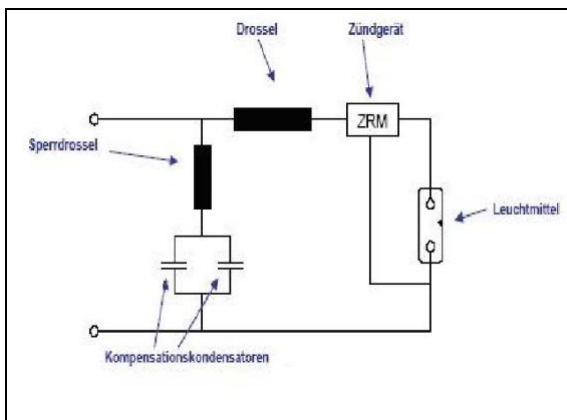


I2 - 50Hz ausgek. Wischer E-Filter
dU/dt- impulse of >2,7 kV/µs in 230V-grid

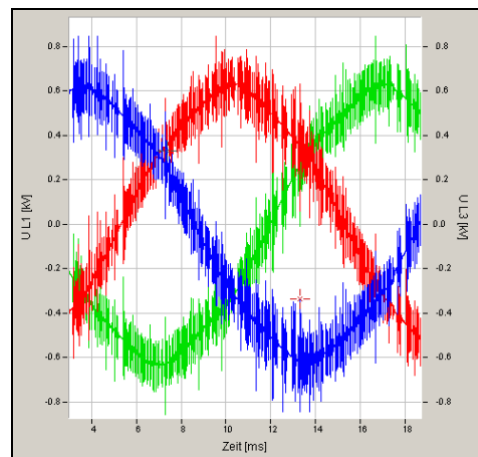
Due to high pulse stress, connection contacts in the sockets are overheating (electric arc) and burning clean....



.... And ballasts are getting destroyed:

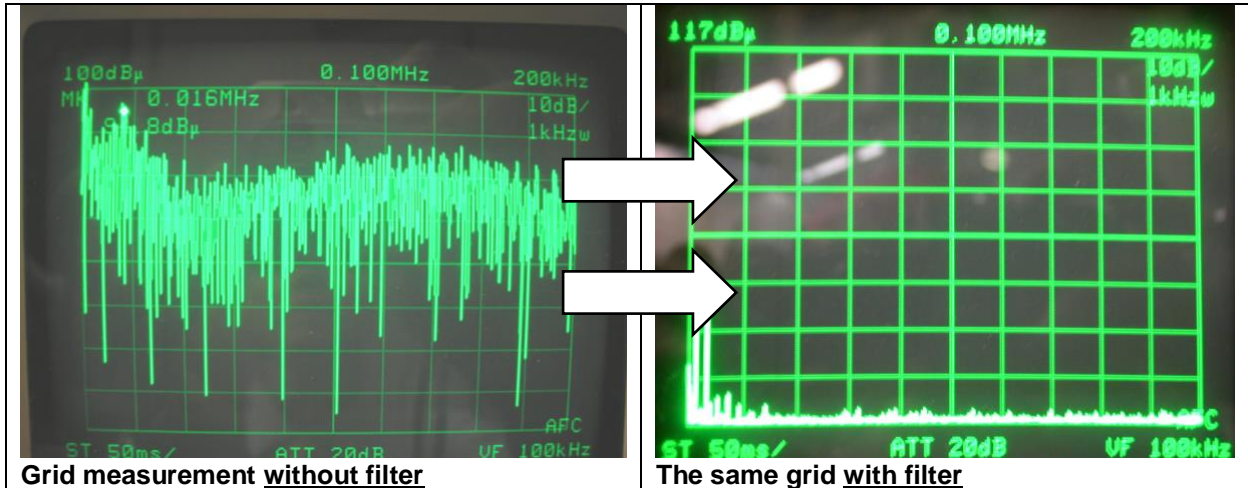


General circuit of ballast (starting device)



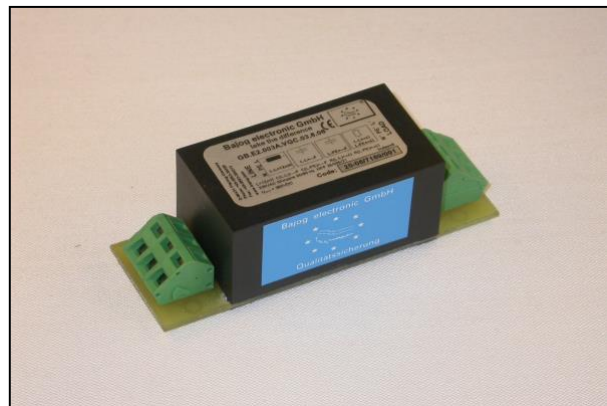
Measured interferences in a 690V grid, two frequency converters with 660 kW. Interfering amplitudes reach 650V_{peak-peak} with a du/dt of approx. 300V/µs.

Accomplished Solutions:



The most important thing for Bajog electronic is to provide a good and economic solution to its customers.

For this, Bajog electronic developed the protective module for single ballasts... →



...and safety module solutions for lines up to 16 Ampere and top-hat/ DIN-rail mounting in fuse and distribution boxes. With this solution it is important that apart from the voltage supply, the protective conductor is considered as well.

If it can be ruled out that the ballasts connected to the grid are not influencing each other through their pulsing, the protective module will provide absolute protection and guarantees interference free luminary operation.