MAINTENANCE PROTOCOL

HIT LIGHTING INSTALLATION WITH CONVENTIONAL BALLAST UNIT

In addition to cleaning the reflectors and protective glass and replacing lamps, a lighting installation needs to be checked from time to time for good operation. The lighting installation is part of the electrical installation of a company and must comply with the NEN 3140 and NEN 1010 standards. Just like a car, good maintenance ensures that the installation is safe and reliable. Good maintenance greatly reduces the risk of power failures and even fires.

This manual examines in depth the need for the timely replacement of lamps, testing of the installation, inspection of fittings and replacement of components.

Any modifications to the installation should always be carried out by a qualified professional!

POINTS TO NOTE DURING TESTING AND MAINTENANCE:

- - REPLACEMENT OF LAMPS

If a lamp turns itself on and off, then there may be a loose connection in the lighting device. In practice, a light tap on the fitting will often resolve this problem. However, the lamp often goes out again after a certain time. A loose connection can lead to high voltage peaks and this can cause the controller to fail. That is why this fault should be repaired as quickly as possible.

If a defective lamp is not replaced, the controller will continue to pulsate. The ignition voltage increases as the lamp gets older. At a certain point, the ignition will no longer supply the required voltage and the lamp will flicker. This will impair the lifespan of the controller and can also cause oxidation of the fitting (type G12 or Rx7S). See photos below. This will mean that starting problems may occur even after you have replaced the lamp. In this case, the fitting will have to be replaced.

When the lamp is approaching the end of its lifespan, it is not unusual for it to go out after a certain time and then to light up again once it has cooled. This is also known as 'cycling' or 'oscillation' of a lamp. It is a sign that the lamp should have been replaced. An HIT lamp has an average lifespan of 12,000 hours and an HIT-DE lamp has an average lifespan of 15,000 hours.

After this period, there will be variations in the lamp colour (we get green, blue or pink hues in the light and so poor colour reproduction). The lamp voltage increases over the lifespan of the lamp and at that time it is beyond the adjustment range of the ballast unit. This causes the temperature to increase which could lead to defects in the components and the device with the possible risk of fire.

The date of production of the lamp can be read using the diagram below:

Month and year date code

January	A	July	G
February	B	August	H
March	C	September	J
April	D	October	K
May	E	November	L
June	F	December	M

Note:

- The 'i' is not used to avoid misunderstanding
- Every 10 years, the order of the letter and number is reversed

Examples

January 2006 = A6	September 2006 = J6
April 1993 = 3D *BUT ALSO*	April 2013 = 3D
January 1998 = 8A	January 2008 = A8

Table 2 - lamp marking of the manufacturing date ©Philips

PLEASE NOTE
YOU SHOULD ONLY CHANGE LAMPS AFTER TURNING OFF THE POWER!!!

(*) Average lifespan of a lamp: the number of hours of use after which 50% of the lamps no longer work.

- - GROUP REPLACEMENT OF LAMPS

If lamps are replaced as a group, then it is sensible to first verify the measurements of some of the capacitors. As capacitors decrease in value, this causes the current to increase and the installation to become overloaded. You can also replace the lamps and the capacitors at the same time.

- - REPLACEMENT OF CAPACITORS

A capacitor is used to limit the current (the so-called reactive current compensation or cos phi compensation) in a fitting. These capacitors have a lifespan of 30,000 hours (NEN 6048/6049 standard). As a rule, we can say that capacitors should be replaced when you replace the lamp for the third time. However, measuring the capacitor value gives you much more certainty!

During the lifespan of the capacitor, the value will gradually reduce and this will be different for each type of capacitor. A capacitor has an initial capacitance of 6µF at 35W, 9µF at 70W and 20µF at 150W. This can be measured using a special multimeter. When this value decreases, the current in the device will increase. This leads to higher temperatures in the device and can even cause the capacitor to explode!

- - MEASUREMENT OF CAPACITORS

In order to get a representative picture, it is best to test a minimum number of capacitors (1% of the total number of fittings in each installation and a minimum of five fittings per installation). Where there is more than one capacitor in an fitting, the capacitance of each individual capacitor should be measured. You should not take an average value for the fitting or the cable section. The report will show the measured and original capacitance values for the capacitors. The capacitors in the entire installation should be replaced if the capacitance of capacitors in two or more fittings has decreased by more than 15% compared to the original value.

You do not have to replace all of the capacitors when only one capacitor varies by more than 15% during testing, if the following conditions are met:

- The capacitors are less than four years old.
- Even after further measurement of at least 2% of the number of fittings with a minimum of 10 per installation, there should still only be 1 capacitor that varies by 15% from its original value.
- The other capacitors measured should not vary by more than 10% from their original values.

- - TESTING THE MAINS VOLTAGE

Harmonic distortion (THD = Total Harmonic Distortion) is an indication of the quality of the mains voltage and is expressed in %. The higher the value of the harmonic distortion, the poorer the quality of the mains voltage. The following are often used as a guideline for the threshold values:

- 230V installation: max. THD current 6%, max. THD current 25%
- 400V installation: max. THD current 6%, max. THD current 10%

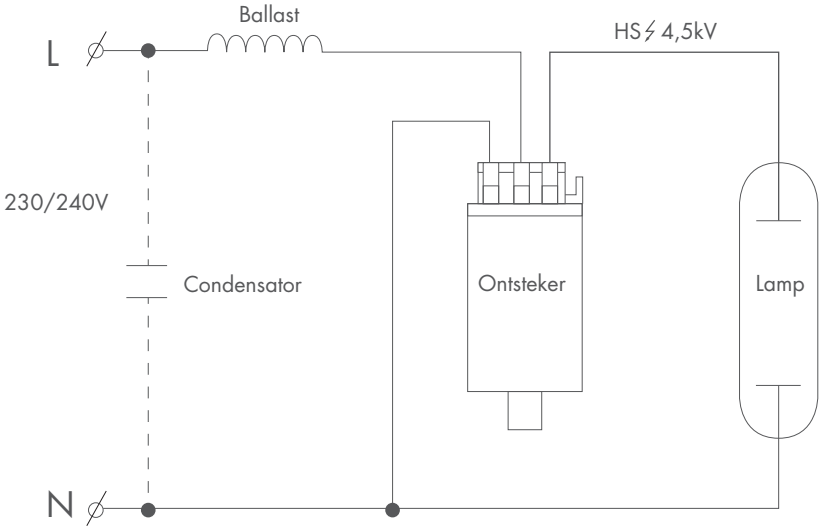
Harmonic distortion in the mains voltage causes the capacitors to have a visibly shorter lifespan and also leads to voltage surges and/or an excessive temperature. When the harmonic distortion is too high, this will also cause additional heating in the cables, connections and components in the fitting and distributor system(s). The increase in temperature caused by harmonic distortion raises the risk of fires, but this is also caused by the ageing (for instance, corrosion) of the installation(s). If the temperature in the distributor systems gets too high, this also causes accelerated ageing of the components in the cabinets.

- - VOLTAGE DIPS AND WARM RESTART

When there is a voltage dip of 0.1µsec, the lamp will enter a warm-up phase. The ignition will continuously provide ignition and energy to the lamp which will not allow it to cool sufficiently. This means that the lamp will not restart for 5 to 10 minutes. The lamp will eventually restart, but this phenomenon can last for up to 2 hours. Switching off the 230V/50Hz mains power for 10 minutes so that the lamp can cool down can avoid heating (and defects) in the electrical components.

Repeatedly restarting a lamp that is still warm will reduce the lifespan of the lamp.

- - WIRING DIAGRAM



- - SUMMARY

- Check the fitting every time a lamp is replaced.
- After exceeding the technical lifespan of the lamp
  - Lamp replacement
  - Measure capacitors (1% of the installation with at least 5 capacitors)
- When there are variations in the colour temperature
  - Replace lamps with correctly working lamps and check the colour variation. The lamp should be replaced where necessary
- In the event of abnormal ageing of the capacitors
  - See "Testing the mains voltage"
- All components should be replaced with the power switched off.

CONSULT A QUALIFIED PROFESSIONAL!

This maintenance protocol can also be found on the website
www.lunoo.eu

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