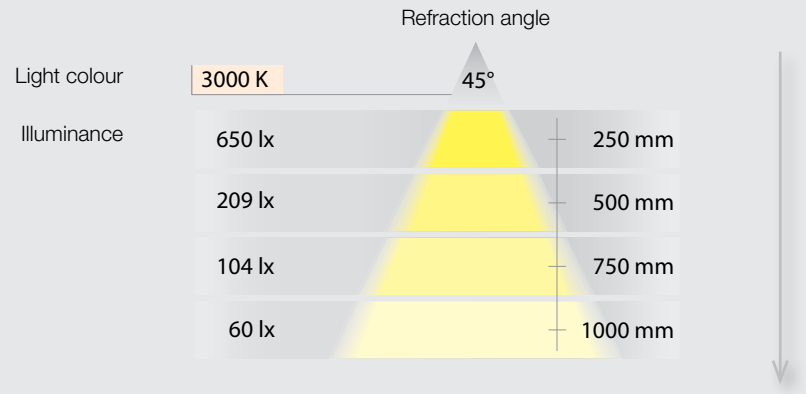
TECHNICAL INFORMATION

LIGHTING EFFECTS AND LIGHTING TECHNOLOGY

Cone of light

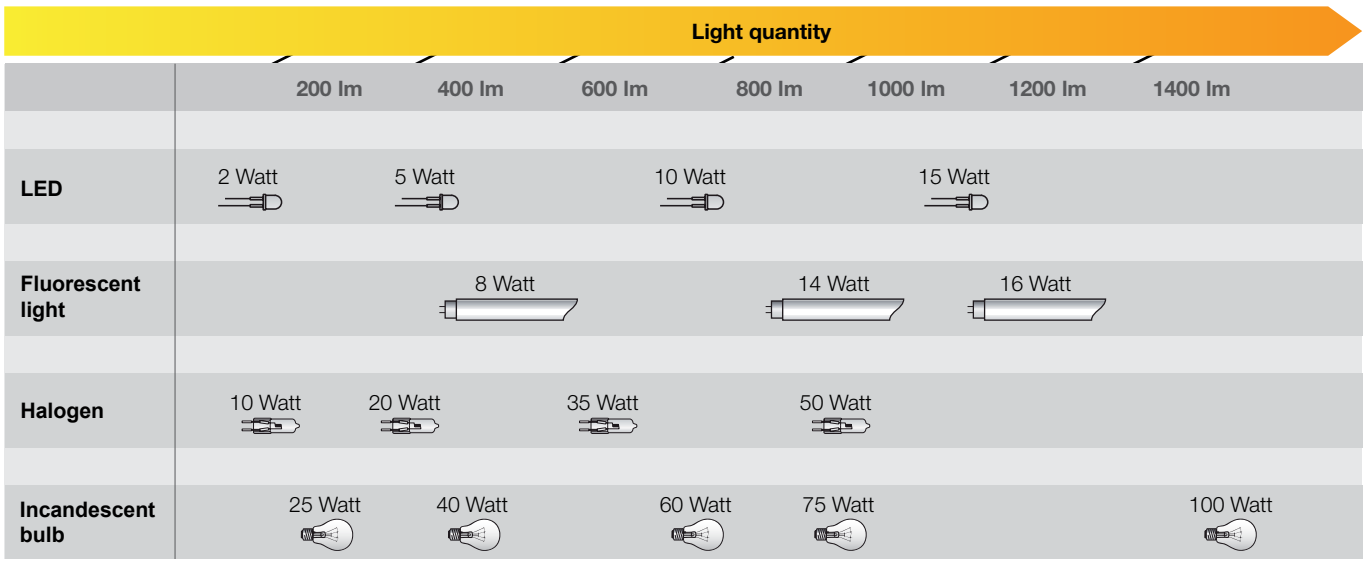


Light source comparison



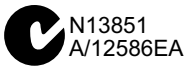
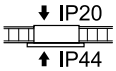
	LED	Halogen	Fluorescent lights
Colour temperature	2700–6500 K	3000 K	2700–6500 K
Power consumption	0.5–6 Watt	5–50 Watt	7–58 Watt
Efficacy	30–100 Lm/W	14–18 Lm/W	65–100 Lm/W
Service life	up to 50,000 h	approx. 2,000 h	approx. 20,000 h
Heat generation	approx. 50 °C	approx. 90 °C	approx. 70 °C
Colour rendering index (CRI)	70–95	60–95	50–90

Light output comparison



SYMBOLS AND TERMS

TEST SYMBOLS AND DEFINITION OF TECHNICAL TERMS

	Technical Control Board		European Safety Standard
	Underwriters Laboratories (CAN/USA)	IP20	Only for use in dry locations
	Australian Communications Authority	IP44	Protected against solid foreign objects Ø 1 mm and larger and splash water
	Product Safety Electrical Appliance and Material Safety Law (Japan)		IP44 after installation
	China Quality Certification		Lights to be used indoors only. Not to be used outdoors!
	Electrical Testing Labs (CAN/USA)		Do not use components that impede thermal radiation
	TISI – Thai Industrial Standards Institute		Kelvin
	BSMI (Taiwan)		Watt
	Korea Certification Mark		Switch
SELV	Protective extra-low voltage		Multi-white
	Furniture installation symbol		Dimmable
	Suitable for directly fixing to standard inflammable surfaces		Motion detector
	Protection class II		RGB light
	Protection class III		

Technical terms	
Light colour / colour temperature	The light colour is a specification of the colour appearance of a light source and is measured in Kelvin (K). The lower the Kelvin value, the warmer the light; the higher the value, the cooler the light. Light sources of 3400 K and above are considered “warm”, while light sources between 3400 and 5700 K are considered “cold”. Light sources above 5700 K are referred to as “daylight white” sources.
Luminous efficacy	The luminous efficacy is the indication of the illuminance in relation to a surface and its distance. It is indicated in Lux (lx).
Luminous intensity / light output	The luminous intensity indicates the light output, i.e. the quantity of light a lamp emits. It is indicated in Lumen (Lm).
Colour Rendering Index	The colour rendering index is a parameter that can be used to compare the colour rendering quality of light sources at the same colour temperature.
Binning	LEDs are sorted according to colour temperature. LED colour deviations are dependent on the grade of binning. LOOX LED lights have a deviation of ±200 Kelvin.

LED LIGHTING TECHNOLOGY

LEDs (Light Emitting Diodes) can vary the properties of the light that is generated, and generate almost the entire colour spectrum. Unlike normal light bulbs and halogen lamps, LEDs generate little heat. They use less energy and have a long service life.

ADVANTAGES:

Long lasting
LED lights have an extremely long service life of up to 25 years or more than 40,000 to 50,000 hours.

Insensitive
LEDs have an extremely small and robust design. This makes handling easier during furniture construction and transport.

Low heat generation
Because of their extremely low power consumption, LED lights generate hardly any heat. This means that LED lighting systems are particularly suitable for displays.

Energy-saving
LED lights use an impressive 90 percent less power than conventional light bulbs! This means that they can be used to implement modern lighting scenarios in furniture, and still be in line with the energy saving trend.

Powerful
Modern LED lights are bright and have a saturated light colour. They achieve full brightness as soon as they are switched on. LED furniture lighting therefore has a lasting effect at the push of a button.

Rich in variants
LED lights are available in different colours, and can also be designed as colour changing lights.
This allows the light colour to be coordinated with furniture contents, such as exhibits, in the best possible way.

THE LOOX LIGHTING TECHNOLOGY:

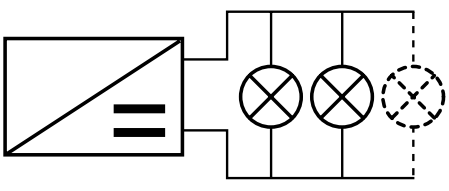
The LOOX LED technology incorporates different power systems. A system is decided on by choosing the driver or by choosing a particular light. The choice of system is an important decision, because the driver that is selected can only be combined with lights from the same system.

12V System Spoiled for choice in the 12V system
The LED lights are voltage-controlled and connected in parallel in the 12V system.
The slots on the driver can be freely allocated.
12V lights are the most widespread at present.

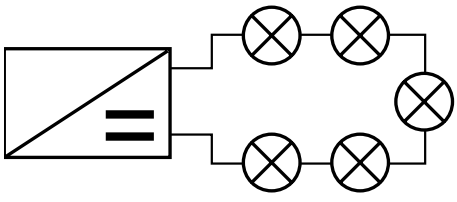
24V System Powerful 24V system
Technically speaking, the 24V system is identical to the 12V system, but has a considerably higher power level. 24V lights can therefore be used when extremely bright lights are required.

350mA System Spotlights in the 350mA system
The LED lights in the 350mA system are current-controlled and connected in series.
This means that each slot has to be either occupied or must have a bridge. 350mA lights provide extremely great light output and are particularly suitable for spotlighting.

SWITCHING



Parallel connection for 12V and 24V systems



Series connection for 350mA system

FAQ

QUESTIONS AND ANSWERS

Glossary

LED

A light-emitting diode (LED) is a semi-conductor element that emits light when electricity passes through it. This semi-conductor element consists of a crystal that is attached to a metal holder, and are both encapsulated in protective plastic. LEDs are mostly based on inorganic, i.e. non-carbonic materials.

OLED

Organic light-emitting diodes (OLEDs) are based upon organic (carbonic) materials. OLEDs are manufactured in thin layers and therefore provide a diffuse light source. The OLED technology is becoming more frequently used in display applications (e.g. mobile phones and PDA screens).

Service life of an LED

Up to 50,000 hours.

Infrared radiation from LEDs

LEDs do not emit infrared radiation, like incandescent bulbs do.

Heat generation of LEDs

All light sources produce heat, even LEDs. However, they do not become very hot, especially if the LEDs and lights are fitted with “heat sinks”, which help to lead away heat from the light

Test of service life in accordance with the LM-80 standard?

Häfele tests LOOX LED flexible strip lights in accordance with the LM-80 standard. LM-80 is a standardised testing method, which allows products to bear the EPA's (Environmental Protection Agency) Energy Star. The test is a manufacturer-independent comparison of LEDs. During the test the luminous flux (Lumen maintenance) and the service life of an LED are tested at three different temperatures (55, 85, and 105 °C) for 6,000 hours.

LEDs and foodstuffs

As LEDs do not emit UV radiation, they are the better option for supermarkets, restaurants and kitchen lighting. UV radiation reduces the nutrient content in foodstuffs, and all other light sources – including natural and artificial – emit UV radiation. It must also be taken into consideration that LEDs emit less heat and keep foodstuffs fresher for longer.

Lead in LOOX products

LOOX Products by Häfele are lead-free and adhere to the RoHS guidelines.

Technical questions about LOOX

Can the 12V/24V lights be dimmed at the primary side? (Phase section - phase dimmer)

No, this is not possible. With LEDs, dimming takes place at the secondary side.

What has a major effect on the service life of drivers and LEDs?

An ambient temperature and / or voltage that is too high.

How long should the lead of an LED light / LED flexible strip light be?

6 metres, as with a longer lead the resistance drops and the specified light intensity can no longer be guaranteed.

What is the service life of the drivers?

Approx. 30,000 hours at an ambient temperature of 45 °C.

Can an LED flexible strip light be used behind acrylic glass?

Yes, however the acrylic glass increases the light colour variations (binning) up to four times and minimal colour deviations are therefore more visible.

Can the multi switch box, the multi driver box and the 3-way distributor with switching function be connected in series multiple times?

No, because the signals can no longer be transmitted properly.

With what output tolerance should drivers and LED lights be calculated?

±10 percent

What binning (colour deviation) do LOOX LED lights have?

±200 Kelvin

Can 12V and 350mA lights be used together?

Yes, please use the LOOX converter (refer to page 88).

Which ambient variables can lead to problems when using the door sensor switch?

High-gloss front panels and sliding doors. Solution: Please use motion detector.

Is it possible to control multiple colour mixers with a single remote control?

Yes, different colour mixers can be taught on a single remote control.

Is the dimmer setting saved if the power fails?

The dimmer setting is saved for RGB / multi-white mixers.
No, the dimmer setting is not saved for the LOOX dimmer.

FAQ

QUESTIONS AND ANSWERS

Technical questions about LOOX

For how many Amperes are the normal commercial LED plug systems and AWG-22 leads suitable?

2.5 Amperes

What is the maximum Wattage that I can connect to an AWG-22 lead and plug?

With 12V systems this is 12V x 2.5A = 30W.
With 24V systems this is 24V x 2.5A = 60W.

What is AWG 22?

AWG stands for American Wire Gauge.
It is the coding for wire diameters in electrical leads that are mainly used in North America. This identifies the cross-section of wires in electrical leads that consist of strands and wire.

Can your lights be operated using multiple switches?

Yes, please use the multi switch box to do this. Up to three switches can be connected to the multi switch box. The dimmer does not work with the multi switch box (see page 86).

What is the difference between the different LED flexible strip lights?

LOOX 3011, 3017 flexible strip lights are sheathed in silicone, which means that no profiles are required for installation. These flexible strip lights can be directly installed in a groove or attached to a surface.
LOOX 2013, 2015, 3013, 3015 flexible strip lights do not have silicone and it is advisable to use aluminium profiles for installation and heat management.

What influence does the type of glass edge have on the lighting effect that is generated?

The lighting effect varies depending on the type of glass shelf.
> Glass edge with satin finish = even light line
> Clear glass edge = point / dot light

Can I simply cut LED flexible strip lights to length?

Yes, LED flexible strip lights can be shortened at the mark with the scissor symbol.

Please note the following differences when doing this:
> LOOX 3011, 3017 flexible strip lights can be shortened but not re-attached.
> LOOX 2013, 2015, 3013, 3015 flexible strip lights can be shortened or extended as much as required, since the connection between the strips and the connection to the driver is made using clip connectors.

Example of LOOX 2013, 2015, 3013, 3015 flexible strip lights: Cut off, fit clip connector and press on – finished.

Can be shortened

Installation: Self-adhesive

Lead with clip connector

Why do the lights have to be plugged in first before connecting the main plug?

If the driver is connected to the power first, electrical power is output at the secondary side, which leads to overvoltage and therefore damage to the lights if they are connected.

Can LOOX lights be used in vehicles, for example?

Yes, but an upstream voltage stabiliser must always be installed, since voltage fluctuations occur in on-board power supplies and voltage peaks (even slight overvoltage) can reduce the service life of the lights considerably or cause damage.

How can I compare the output of an LED light with a halogen light?

Use the cone of light and compare the values at 500 mm. A 20W halogen light features approx. 600 lx at 500 mm.

Troubleshooting

Why does the light flash at regular intervals when it is switched off?

This is caused by leakage current in the electrical installation which is charging the capacitor in the driver until it briefly gives off the power at regular intervals to discharge itself and the light therefore briefly flashes.
Solution: Check the entire installation.

Why does my LED light flash?

Flashing is a sign of under or overloading.
Use a driver with higher power or reduce the number of lights.

What may be the cause if an RGB LED flexible strip light is only displaying individual colours?

The clip connector has been connected the wrong way round

Why is the door sensor switch not operating correctly?

When sliding doors are being used, the door sensor switch cannot record the rapid movement and the movement of the door properly.
Dark surfaces (e.g. jet black) have poor reflection. The optical sensor may therefore fail to detect the door panel.
Solution: Use motion detectors

What are the differences between the output of the different LOOX LED flexible strip lights?

	LOOX 2011	LOOX 2013	LOOX 2015	LOOX 3011	LOOX 3013	LOOX 3015
Wattage W/m	2.5	4.8	7.1	2.8	16	15
Number of LED/m	36	60	30	36	30	120
Lumen per Watt*	47	60	67	50	94	80
Lux 500 mm*	30	70	140	136	545	523
max. length [m] per lead	6	6	4.25	6	3.75	4

* Comparison with warm white light colour 3000–3200 K