

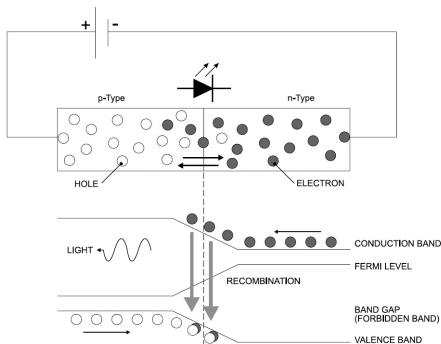


### Ergonomics and design

The dental lamp POLARIS is characterized by an advanced design and by simple and soft lines. The design has been particularly studied in order to realize a dental lamp not only with a high performance but also aesthetically appealing: a perfect union of functionality and aesthetics. Soft lines and smooth surfaces, the possibility to easily extract the handles for sterilization allow an optimal cleaning and hygiene.

POLARIS is characterized by shells entirely made from Aluminium, which guarantee a high robustness. The Aluminium shells are powder coated which assure considerably longer colour durability (in comparison with a lamp produced with plastic materials), a higher hardness and scratch resistance (in comparison with liquid paintings). In addition powder coatings do not contain solvents and paint thinners and therefore are environmentally saver.

- ✓ **Low heat production, low energy consumption, higher lifetime!**
- ✓ **Noiseless operation, because no fan cooler is required!**
- ✓ **Adjustable light intensity from 8'000 LUX - 35'000 LUX and colour temperature 4'000 K - 6'000 K!**
- ✓ **Illumination without shadows (scialitic effect) due to a special geometry of ten reflectors on the LED-sources!**
- ✓ **Without dangerous UV-rays!**
- ✓ **Removable handles for easy cleaning!**



### LED technology

POLARIS is made of 10 LED (Light Emitting Diode) sources. LED technology is based on optic properties of semiconductor materials to produce photons through phenomena of electron-hole couples' recombination. The emission wavelength, and so the colour of emitted light, depends on the gap between energy levels of electrons and holes and it is typically equal to the forbidden band of semiconductor.

LED technology allows to obtain several advantages:

- low energy consumption
- low heat production
- high lifetime

### Low energy consumption

LED technology realizes very high performances with low energy consumption (< 20 W). A reduction on energy consumption introduces a long term advantage, thinking about the number of hours in which lamp will be used.

### Low heat production

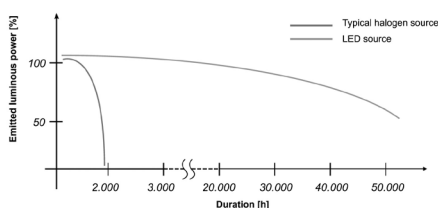
The low values of current and voltage, required to supply the light source, minimize the heat production, making the fan cooler not necessary.

### Noise absence

The fan cooler absence implies the noise absence and the improvement of working condition. The exposure to long period of noise produces a discomfort sensation in the operator, at who a great strain is required to realize a mental concentration to do his work.

### High lifetime

LED lifetimes are high in comparison with halogen light. Minimum LED lifetime is about 50.000 hours.



Estimated light power vs time for an halogen source and a LED source.

## POLARIS

The eye is the external organ of the vision. The eye is a part of visual apparatus and it is very complex and of fundamental importance: it is the main knowledge mean of external world.

A correct illumination influences not only a correct visualization, but also biological processes.

The quality of a light source emission is a very important point to be considered.

In the vision, light reflected from the objects is focused from the outer part of the eye to the retina.

In the retina, the luminous signal is translated in electric signal and sent to the brain.

The luminous signal is responsible of two effects:

- visual effect:  
in the visual brain cortex, imagine is created through complex interactions and processing.
- non visual effect:  
in specific brain nuclei, luminous signal influences biological rhythms regulation, endocrine secretion, emotion management, alertness level control and muscular tension.

Recent studies have been shown that non visual effects of light are influenced by light intensity and colour temperature.

### Light intensity

The possibility to adjust light intensity allows to:

- reduce eyestrain.
- increase mental concentration.

### Eyestrain reduction

An incorrect illumination level forces eye to work hard and determines, consequently, a faster eyestrain. The possibility of light intensity adjustment makes the light adaptable to the level required by the specific application, reducing eyestrain.

### Mental concentration increase

The melatonin secretion is reduced by the increase of light intensity. Reducing melatonin, alertness enhances and so the operator concentration, with a decrease in errors' possibility.

## Colour temperature

Recent studies have shown that maintaining the same light intensity, light with elevate colour temperature (> 5000 K) influences biological rhythms and tends to increase alertness level. The combination of high light intensity with high colour temperature is able to increase considerably the concentration status during the realization of complex mental tasks and to reduce mental fatigue.

### Colour temperature: 4'200 K – 6'000 K

Colour temperature is defined as the absolute temperature at which a purely emitter surface must be brought to reproduce a specific colour. POLARIS, through a regulation system (patent) allows to adjust the colour temperature in order to improve the contrast on soft tissues, increasing the visibility and the resolution.

### Illuminance: 28'000-35'000 LUX

High illuminance values of POLARIS allows to improve visual acuity and so the details perception, reducing fatigue and the probability of errors.

It is possible to adjust illuminance as a function of the specific application and to improve the tissues visualization after a visual adaptation due to long time exposure at the same light.

### Colour Rendering Index (CRI): > 85

The Colour Rendering Index (CRI) is a quantitative measure of the ability of a light source to reproduce the colors of various objects faithfully in comparison with an ideal or natural light source. High CRI value of POLARIS assures a faithful colour reproduction.

### Cold light

POLARIS' LED emission is without infrared wavelengths. This radiation is responsible of tissues heating. The use of cold light avoids:

- The heating of treatment zone with discomfort for patient.
- The possibility of dehydration of biological tissues exposed to the luminous flux (in fact water is the main element which interacts with the infrared radiation).
- The operator heating with consequent annoyance, sweating and concentration's reduction.

## UV absence

POLARIS emission spectrum is without UV radiation. UV rays are responsible of skin ageing and are dangerous for eyes.

### Scialitic effect

The studied geometry of reflectors, in combination with each LED source is, allows to realize a luminous flux which is homogeneous, clean and without shadows. The scialitic effect is the result of the superimposition of 100 individual light fields (10 light fields for each reflector) which produce a negligible dimming effect in case of a partial lamp covering.

### Light field

The particular light focusing geometry allows to obtain a rectangular light field (7 x 14 cm size at 70 cm from the source) and with well defined contours, in order to avoid risk of patient dazzling. Moreover, in case of one or more LEDs damage, the light field is not completely darkened and so the operator can terminate the treatment in safety.

## Technical Data

Power supply voltage (VAC) .....	17-24
Power consumption (W) .....	20
Dimensions light pattern (mm) .....	70 x 140
Light intensity (LUX) .....	8'000-35'000
Colour temperature (°K) .....	4'200-6'000
CRI .....	>85

In accordance with the directives:  
93/42 CEE class 1

Applicable normes:  
UNI EN ISO9680, CEI-EN 60825-1,  
CEI EN 60601-1, CEI EN 60601-1-2,  
UNI CEI EN ISO 14971

Technical features with a tolerance range of  
+/- 10%

### Order number for unit

320.6696.01 OP-lamp LED Mikrona

### Adaption (from Vision to POLARIS)<sup>1)</sup>

320.7185.01 Lamp head to OP-lamp  
LED POLARIS  
320.6832.01 Adaption kit transformer 18V

<sup>1)</sup> The transformer adaption and the adjustment of the spring mounted arm may only be realised by a service technician.

## MIKRONA TECHNOLOGIE AG

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