Mach LED 2

Dr. Mach GmbH & Co. KG

Flossmannstraße 28 · D-85560 Ebersberg
Phone: +49 (0) 8092 / 2093-0 · Fax: +49 (0) 8092 / 2093-50
www.dr-mach.com · e-mail: info@dr-mach.de

Subject to change without notice due to technical modification · 59000300 A01 · Version: 11/2010

Dr. Mach
Medical lighting
+Technology

# Mach LED 2

Small OT-light with LED technology

LED OT-LIGHTS

# **Dr. Mach** LED technology

Dr. Mach provides two different LED technologies for its OT-lights:

## 1. MC models

are equipped with **Multi-Colour-chips**. The use of different-coloured LED-chips allows the surgeon to change the colour temperature of the OT-light depending on the preference for a more cold-white light (colour temperatures ≥ 4500 K) or for a warm-white OT-light (colour temperatures ≤ 4250 K). The surgeon can set the colour temperature according to the tissue structure, the surgical application and individual colour sensitivity. This way we avoid tiredness during work: for instance, dazzling effects can be avoided after longer interventions by using a warmer light. On the other hand it is possible to increase the contrast by using higher colour temperatures, which supports the surgeon's power of concentration.

## 2. SC models

are equipped with **Single-Colour-chips**. Changing the colour temperature is not possible in this case. Of course all the other advantages of the LED technology are also implemented here, or they can be ordered for surcharge (integrated laser pointer).

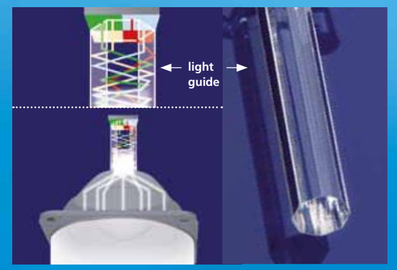
## Lighting technology - special features of the **MC models**

### Colour composition inside the light head

Dr. Mach already merges the different coloured LED's by a computer-calculated optical system with light guide and facetted lenses.

This means: The composed light leaves the optical system as white light and is dispersed over the wound field homogeneously.

Colour shadows in the light beam of the OR light caused by the surgeon's head, shoulder or hands are avoided by the colour composition in the optical system.



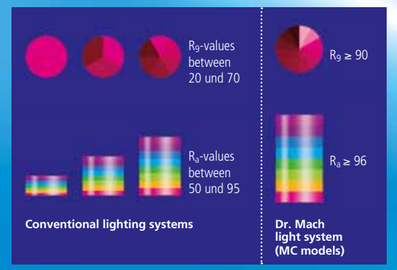

### Changing the light colour

The use of different coloured LED's makes it possible for the first time in surgery to change the light colours depending on the application.

The surgeon has the possibility to choose the optimum OR light according to the tissue type and the wound field texture.

Five different colour temperature values can be set: 3750, 4000, 4250, 4500 and 4750 Kelvin.* The setting can be done either at the key pad on the lamp housing or by a turn of the ring at the sterilisable handle.

* The LED-OT-lights can be equipped optionally with different colour temperature ranges, e.g. from 3500 K to 5000 K.



## Common characteristics of the **MC models** and **SC models**

### Facetted multi-lens system

A multitude of computer-calculated facetted lenses guarantees homogeneity and lowest shadiness in the light field.

Separately arranged optical systems, each with four LED modules (Multi-Colour models) or each with one LED module (Single-Colour models), generate their own light field, which increases the contrast effect of the OR light. Light intensities of 100.000 Lux can be attained without difficulty.

### Superiour colour rendition

With colour rendering indexes $R_a$ above 96 and $R_9$ (red) above 90 the surgeon recognizes clearly the tiniest nuances of colour in tissue. The colour rendering index for SC models is $R_a = 95$. For recognizing the exact colour spectrum of the wound the exact rendition of the red colour range is essential.

$R_9$(red) ≥ 90 means for the surgeon a visibly better recognition of details. The colour spectrum of the wound is rendered naturally with rich contrast. The OT-light clearly provides welcome relief for your eyes.

### Illumination in depth

You have the possibility to increase the light intensity of the central segment of the OT-light. This enables an optimum illumination of the wound field according to its texture and the shadowing effects.

A high and adequate light intensity is very important especially in cases of narrow and deep wound channels.

# **Dr. Mach** LED technology

## Integrated OT-laser pointer (optional)

The built-in laser pointer always indicates the middle of the light field and helps the surgeon to find the optimal position of the OT-light to the wound field.

The laser pointer can be activated either at the key pad on the lamp housing or by a turn of the ring at the sterilisable handle.

After a short time the laser pointer turns off automatically.

## Key pad on the lamp housing

Several light functions can be adjusted electronically, such as:
- Switching ON and OFF
- Illumination in depth
- Laser pointer
- Electronic light intensity control
- Endo-Light
- Changing the colour temperature: 3750, 4000, 4250, 4500, 4750 K

## Flow properties

During development high attention was paid to the performance of the new LED OR lights in laminar-flow ceiling systems. The flow-enhancing ring form of all light heads and the minimal surface avoid any heat increase in the surgeon's head area and create a perfect laminar flow performance, being a basic hygienic requirement in surgery.

## Hygiene

The disk sealings of the light outlets and the circumferential sealing cord avoid infiltrations of dust, dirt and liquids inside the lamp head.

## Wall panel

The OT-light can be operated at the wall panel (optional equipment against surcharge). The light functions can be adjusted on the wall panel as well as on the key pad of the light.

Several light functions can be adjusted electronically, such as:
- Switching ON and OFF
- Illumination in depth
- Laser pointer
- Electronic light intensity control
- Endo-Light
- Changing the colour temperature (MC models only)

## Handle

Merging of light fields is done by turning the sterilisable handle.
The ring at the top of the handle allows the surgeon to set the most important light functions in the sterile area.

The light functions mentioned below can be set at the ring of sterilisable handle:
- Depth light
- Laser pointer
- Light intensity control
- Colour temperature (MC-models only)

## Cool light

The LED technology is much more effective than conventional light sources such as halogen bulbs. The heat radiation is reduced to a minimum without using any expensive filter technique. The temperature increase in the surgeon's head area is almost nonexistent.

## Long life-span/low power consumption

The life-span of more than 40.000 operating hours reduces the costs for exchanging and replacing the illuminants considerably, compared with the conventional halogen technology used with former OT-lights. By implementation of the LED technology the power consumption could be reduced partially with more than 50%.

# Mach LED 2

## OT-light

**Ceiling model**

for low room height ≤ 2,80m

**Mach LED 2 with**

**Mobile light**

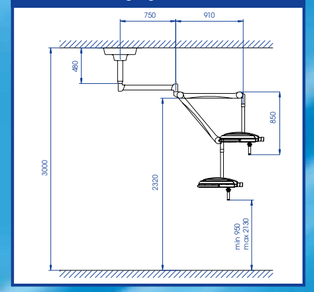
with integrated power supply

**Mach LED 2**
**100.000 Lux**

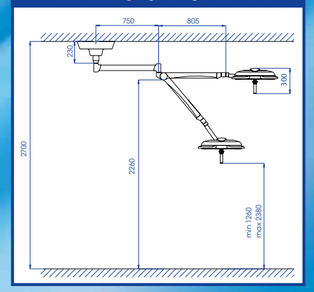
The light beams of the three outer clusters can be merged by turning the sterilisable handle.

## Mach LED 2 Skizzen

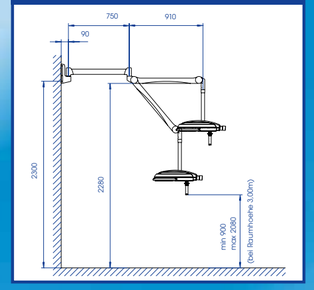
Deckenbefestigung normale Raumhöhe



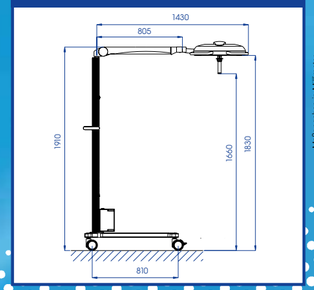

Deckenbefestigung niedrige Raumhöhe




Wandbefestigung




Vierfuß-Stativ




Maßangaben in Millimeter

# Mach LED 2

## OT-light

**Mach LED 2**
**100.000 Lux**

The light beams of the three outer clusters can be merged by turning the sterilisable handle.

**Mach LED 2 ceiling models**

**Ceiling model**
for low room height ≤ 2,80m

**Mach LED 2 with wall fixation**

**Ceiling model**
for standard room height > 2,80m

**Mobile light**
with integrated power supply

**Mobile light**
with integrated emergency power unit
operating time 3 hours

| Technical data<br>Mach LED 2 light system | Mach LED 2MC | Mach LED 2SC |
|---|---|---|
| Light intensity Lux at 1 meter distance | 100.000 | 100.000 |
| Colour rendering index $R_a$[1] at 4500 Kelvin | ≥ 96 | 95 |
| Focussable size of the light field (in cm) | 17 - 28 | 17 - 28 |
| Colour temperature (Kelvin) | 3750, 4000, 4250, 4500, 4750 | 4500 |
| Electronic light intensity control at the lamp head | 5 - 100% | 5 - 100% |
| Temperature increase in head area | 0,5 °C | 0,5 °C |
| Voltage | 24V-30V DC | 24V-30V DC |
| Total power consumption | 70 W | 30 W |
| Number of LEDs | 84 | 21 |
| Life-span of the LEDs | ≥ 40.000 h | ≥ 40.000 h |
| Working distance (in cm) | 60 - 150 | 60 - 150 |
| Diameter of the lamp head (in cm) | 49 | 49 |
| Height adjustment (in cm) | 118 | 118 |

(1) $R_a$ is an average of $R_1$ = burnt pink, $R_2$ = mustard yellow, $R_3$ = yellow green, $R_4$ = light green, $R_5$ = turquoise blue, $R_6$ = skyviolet, $R_7$ = violet, $R_8$ = lilac. Maximum value = 100.