Directions for use

MACH LED 120F / 120

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Dear customer!

Congratulations for acquiring our new light **MACH LED 120F / LED 120**.

The new light generation with LED technology supports your professionalism by innovative technology and design.

The advantages of the LED technology: a life-span of minimum 50.000 hours and an almost nonexistent heat development in the surgeon's head area and in the wound field.

The advantages already provided by Dr. Mach's light technology with halogen and gas discharge lamps have been maintained: natural color reproduction, exact illumination of the wound field and easy positioning of the light head.

1. Safety instructions

Pay attention to the instructions for use when handling the lamp.

WARNING:

This device has not been designed for use in potentially explosive areas.
According to the Medical Device Regulation the light is classified under class I.

Store the light in its package for at least 24 hours in the respective room before mounting, in order to equal temperature differences.

Please read the instructions for use carefully to make the most of your lighting system and to avoid any damages to the device.

The lights may only be repaired and special assembly work may only be carried out on the reflector or sockets by ourselves or a company that has been expressly authorized by us.

The manufacturer can only be made responsible for the safety of the light if repairs and alterations are carried out by the manufacturer himself or a company that guarantees to observe the safety regulations.

 No modification of the lamp is allowed!

The manufacturer cannot be made liable for personal or material damages if the light is operated inexpediently or incorrectly or used for purposes other than those for which it is intended.

The light is to be dismantled from the spring arm in reverse order to its assembly. This may only be carried out after the spring arm has been secured, since the arm is under spring tension and can bounce up.

Make sure that the light is in perfect working order before every use.

Attention, external power supply!
The light works only with an external power supply 60VA.
The external power supply used with the OT-light must be tested and validated according to IEC 60601-1.

Attention!
A main control switch must be installed for turning the system power-off. The switch must meet the requirements of the standard IEC 61058-1 regarding rated voltage peaks of 4kV.

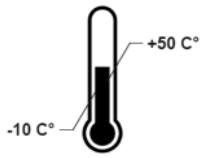
 During the mounting of the lights the entire system (incl. the ceiling attachment) must be disconnected from mains!
A later dismounting of the lights from the spring arms or dismounting the sliding contacts inside the arms is to be done ONLY AFTER DISCONNECTING THE ENTIRE SYSTEM FROM MAINS.
Otherwise the electronic board will be damaged!

Symbols and notes used in this user manual:

This symbol means possible hazard sources. Please observe also the safety remarks and the hazard specifications mentioned in the mounting instructions and user manuals from Ondal company.

This symbol means possible hazard caused by electric current. Please observe also the safety remarks and the hazard specifications mentioned in the mounting instructions and user manuals from Ondal company.

This symbol refers to important mounting indications, useful information and operation hints.



Temperature range for transport and storage

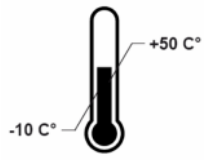
Indication for disposal

CE- conformity mark

Symbols and notes used on the device:

This symbol indicates to observe the user manual.

Indication on China RoHS / Pollution control Logo China



Temperature range for transport and storage

Indication for disposal

Serial number of the product

Article number of the product

Address of manufacturer / distributor of the product

Year of manufacture

CE- conformity mark

Quality control

Hazardous Substance Table & Technical Explanation Template

Mach LED 120F/120

产品中有毒有害物质或元素的名称及含量

Table of hazardous substances' name and concentration.

部件名称 Component Name	有毒有害物质或元素 Hazardous substances' name					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
Mach LED 120F/120	X	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求

- 此表所列数据为发布时所能获得的最佳信息
- 由于缺少经济上或技术上合理可行的替代物质或方案，此医疗设备运用以上一些有毒有害物质来实现设备的预期临床功能，或给人员或环境提供更好的保护效果。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

- Data listed in the table represents best information available at the time of publication
- Applications of hazardous substances in this medical device are required to achieve its intended clinical uses, and/or to provide better protection to human beings and/or to environment, due to lack of reasonably (economically or technically) available substitutes.

2. Brief description of the light MACH LED 120F / LED 120

Mach LED 120F/120 intended use:
The Mach LED 120F/120 lighting system is designed for illuminating an examination area at the hospital and doctor's practice.

Mach LED 120F/120 indications for use:
The surgical light MACH LED 120F/120 is intended to illuminate the surgical field and the patient's body with a high intensity, shadow-free and "cold" light.

Essential Performance:
The surgical light MACH LED 120F/120 is intended to provide the illumination.

General product description:

- The Mach LED 120F/120 lighting system is an examination light according to EN 60601-2-41, which is not fail-safe when used as a single light.
- The Mach LED 120F/120 lighting system is designed to support therapy and diagnosys.
- The light is used in medical rooms (groups 0, 1 and 2 according to DIN VDE 0100-710 respectively HD 60364-7-710).
- This light system can be added to the ceiling mounted suspension system supporting the horizontal arms and spring arms, as well as a wall light or mobile light.
- The maintenance of the light must be done every two years.
- The electrical connection for the ceiling and wall lights is done by a fixed connection.

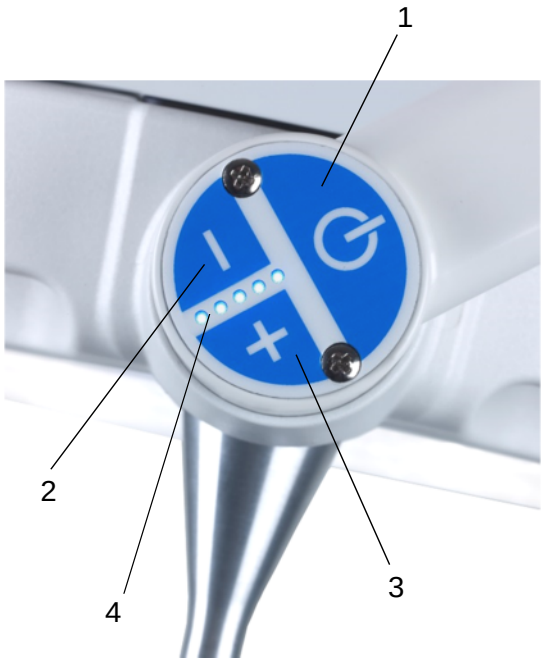
The examination light Mach LED 120F/120 is available in following versions:
- Mach LED 120F with light intensity control and focusing function.
- Mach LED 120 with light intensity control and fixed-focus.
- Mach LED 120F with light intensity control, focusing function and sterilizable handle.
- Mach LED 120 with light intensity control, fixed-focus and sterilizable handle.

Accessory

The accessories for the Mach LED 120F/120 lighting systems are as follows:

Camera module
Remote control for camera module
Single monitor yoke for flat panel monitors
Double monitor yoke for flat panel monitors
Instrument trays
24V DC battery backup support
Sterile handle sleeves

3. Operating the light MACH LED 120F / LED 120



3.1 ON/OFF switch

The push button **1** on the control panel turns the light **MACH LED 120F / LED 120** ON and OFF.

3.2 Light intensity control

The lights Mach LED 120F / LED 120 offer the facility of light intensity control.
The adjustment range of the light intensity is from 50 % to 100 %.
The light intensity can be adjusted according to the requirements of the surgeon / physician.

The light intensity can be decreased by pressing push button **2**.
The light intensity can be increased by pressing push button **3**.

The set light intensity is shown by the display **4**.

3.3 Focusing

The lamp-models Mach LED 120F have a focusing function. That means, you can either enlarge the diameter of the light field or bundle the light to a smaller area, depending on the circumstances.

To activate the function of focusing turn the handle **5** (see figure).

3.4 Positioning

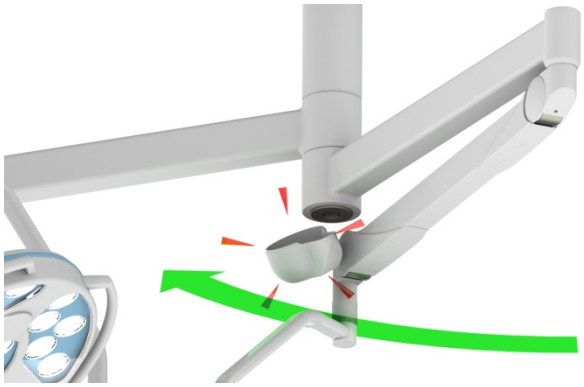
Use the handle **5/6** or the handle rail **7** to position the lamp.

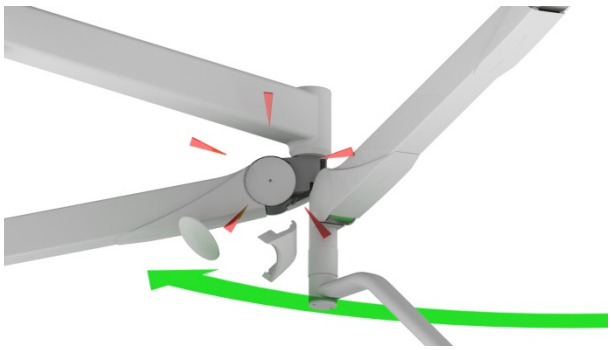
Use the handle rail to position the lights before the operation.

Use the handle for positioning the light during the operation.

There are two handle-types available:

- Standard handle **5**
- Sterilisable handle **6** (against surcharge)
  The sterilisable handle can be removed for sterilisation.

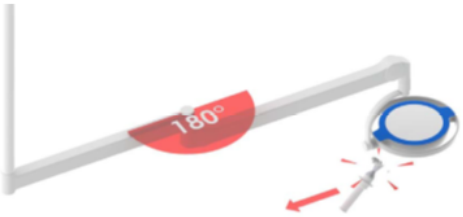


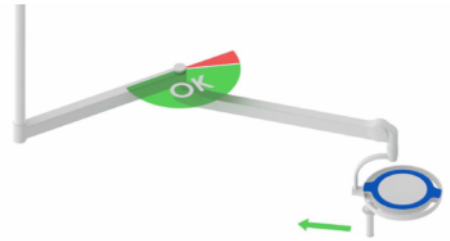


3.5 Danger of collision while positioning the lights

During positioning, eventual collisions between the lights, spring arms and other devices must be avoided.

Cover parts can get loose and fall down.





3.6 Addition to positioning the lamp

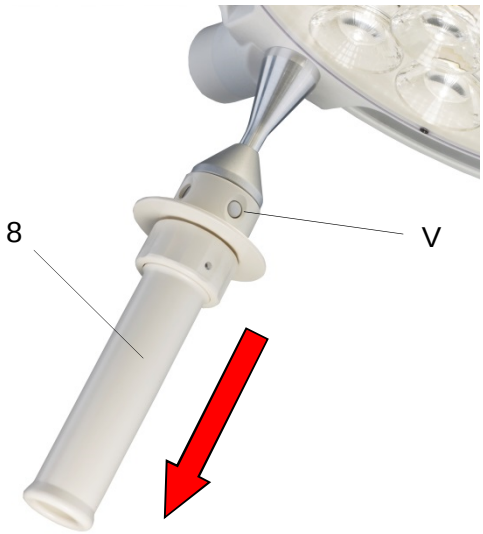
When the spring arm and extension arm are in a 180° position, the lamp head cannot be moved in the direction of the suspension axis.

A repeated force of > 25 N (according to EN 60601-2-41) at this angle can lead to damage.

This applies for all ceiling and wall mounted lamps (example in picture).

In order to be able to move the lamp in the direction of its suspension axis, the angle between the extension arm and spring arm must be < 180°.

4. Cleaning



4.1 Sterilisable handle

The light can be equipped against surcharge with the **sterilisable handle 8**. The handle sleeve is removable and sterilisable. Before using the first time and before every use the handle sleeve must be cleaned, disinfected and sterilised.

The handle sleeve must be removed for sterilisation:

- To remove press the lock **V** and pull off the sterilisable handle sleeve **8** while keeping the lock pressed.
- To attach, push on and slightly twist the handle until the lock **V** engages securely.

Handles often become unsterile during an operation. Therefore always keep additional handles available for exchange.

Cleaning / disinfection and sterilisation

Basics
Efficient cleaning / disinfection is an essential requirement for effective sterilisation of the handle.
Within the scope of responsibility for the sterility of the products it should be noted that only sufficiently validated equipment and product specific processes are used for cleaning / disinfection and that the validated parameters are complied with in every cycle.
In addition, the hospital / clinic hygiene regulations must be observed.

Remark:
The requirements of the national commitees (standards and directives) for hygienics and disinfection must be observed.

Cleaning / disinfection
Cleaning and disinfection must be carried out immediately after use.
A mechanised process (disinfector) should be used for cleaning / disinfection. The efficiency of the process used must be recognised and validated in principle (e.g. listed under disinfectants and disinfection procedures tested and recognised by Robert-Koch-Institute / DGHM).
When using other procedures (e.g. a manual procedure), proof and process efficiency in principle must be provided within the scope of validation.
Proof in principle of the suitability of the handles for efficient cleaning / disinfection was provided using a cyclic cleaning system (Netsch-Bellmed T-600-IUDT/AN, programme 2 for small parts; code B).

It is not allowed to use agents / disinfectants, which contain the following substances, as these may cause changes in the material:

- High-concentration organic and inorganic acids
- Chlorinated hydrocarbons
- 2-ethoxyethanol

When cleaning / disinfecting, the following procedures must be followed:

	Process	**Time (sec.)**
Zone 1	Pre-rinse, external, cold, 10 – 15°C Washing, acidic, external 35°C Draining time Re-rinse, external approx. 80°C Draining time Re-rinse, external approx. 80°C Draining time	45 120 10 *10 *15 *15 15
Zone 2	Washing, alkaline, external, 93°C Draining time Re-rinse, external, acidic, 90°C Draining time Re-rinse, external 90°C Draining time	135 10 10 15 15 15
Zone 3	Drying, external 100 – 120°C	200
Zone 4	Drying, external 100 – 120°C	200
	Door open / close & transport (sluice discharge)	60
	Cycle time overall ca.	290 ≈ 5 minutes

* When occupying the disinfection zone (washing zone 2), the re-rinse and draining times will depend on the respective objects being washed therein!

Sterilization

Only previously cleaned and disinfected handles may be sterilised.
The handles are placed in a suitable sterilisation pack (one-way sterilisation pack, e.g. foil / paper sterilisation bags, single or double pack) in accordance with DIN EN 868 / ISO 11607 for steam sterilisation and then sterilised.
Use only the sterilisation procedure listed below for sterilisation. Other sterilisation procedures (e.g. ethylene oxide, formaldehyde and low-temperature plasma sterilisation) are not permissible.

Steam sterilisation procedure
Validated in accordance with DIN EN 554/ISO 11134
Maximum sterilisation temperature 134°C

Proof in principle of the handles' suitability for effective sterilisation was provided using a fractional vacuum process (Euroselectomat 666 by MMM Münchner Medizin Mechanik GmbH, sterilising temperature 134°C, holding time 7 min.)
When applying other sterilization procedures, the suitability and effectiveness of the process must be validated.

Inspection / durability

Sterilisable handle:
The sterilisable handle sleeve must be disposed after 1000 sterilisation cycles or at the latest after 2 years and replaced with a new one.

The year of manufacture can be determined with the help of a stamping on the inner side of the handle sleeve (like shown in the photo). The stamping in the photo shows the number 12, which stands for the year 2012.

Standard handle:
We recommend replacing the standard handle with a new one every 2 years.
Thereby a continuing, safe and stable operation with the standard handle is provided and also an effected cleansing/disinfection.

4.2 Lamp housing, protective lens and support system

The Dr. Mach light system has a high-quality surface, which can be cleaned with conventional cleaning agents.

The lens system **9** is made of a high-quality plastic. Pay attention to the following during cleaning:

- Never wipe over the lens system **9** with a dry cloth (always clean with a wet cloth).
- Wipe the protective disk **9** after cleaning with an antistatic, non-fluffy cloth.

5. Initial operation and Maintenance

Preventive maintenance of the light should be done every two years. This includes a technical and mechanical check-up.
Please observe also the mounting instructions and instructions for the carrying systems. These instructions can contain statements for different maintenance intervals.

Basis of the examination of the lighting and load-bearing systems forms the DGUV-V3 (formerly BGV-A3) in connection with the EN 62353.

Attention:
Set the height adjustment, if applicable, of the spring arm to horizontal position before dismounting the lamp. Please observe also the mounting instructions and instructions for the carrying systems.

 **Attention: During all maintenance work the light must be disconnected from mains and secured against resetting.**

5.1 Activity at initial operation and maintenance work

The following maintenance work / tests has / have to be done:

- check on defects in paint work;
- check on fissures at plastic parts;
- check on deformation of the suspension;
- check on loosened parts;
- check the connection between light and carrying systems;
- check and grease the securing segment;
- check the faultless function of the light;
- perform the electrical safety tests;

 For adjustments at the ceiling attachment please observe also the mounting instructions "**Ceiling attachment with heavy central axis**" or "**Ceiling attachment – wall attachment**" from Dr. Mach.

Remark:
Wiring diagrams, complete spare parts lists and maintenance manuals can be provided on request.
It is not allowed to exchange spare parts and make repair work while the light is in operation.
It is not allowed to touch parts below the housing cover and to touch the patient at the same time.

6. Data

6.1 Technical data

	Mach LED 120F	Mach LED 120
Central light intensity at a distance of 1 meter	50.000 Lux	40.000 Lux
Light field diameter d_{10}	122 mm	132 mm
Light field diameter d_{50}	62 mm	66 mm
Light intensity with one shadower	0 %	0 %
Light intensity with two shadowers	60 %	61 %
Light intensity on the ground of a normed tube	100 %	100 %
Light intensity on the ground of a normed tube with one shadower	0 %	0 %
Light intensity on the ground of a normed tube with two shadowers	60 %	61 %
Illumination depth 20 %	1750 mm	1750 mm
Illumination depth 60 %	890 mm	840 mm
Colour rendering index R_a	95	95
Colour rendering index R_9	94	94
Max. radiation in field in a distance of 1 meter	162 W/m²	126 W/m²
Max. radiation in field in a distance of 0,80 meters	201 W/m²	148 W/m²
Focusable light field size	14-20 cm	17 cm (fixed focus)
Colour temperature (Kelvin)	4300 K	4300 K
Temperature increase in head area	0,5 °C	0,5 °C
Electronic light intensity control at the light head (standard)	50-100 %	50-100 %
Number of LED's	12	12
Life span of LED's	50.000 h	50.000 h
Working distance	70-140 cm	70-140 cm
Diameter of the light head	29 cm	29 cm
Height adjustment	121 cm	121 cm

Remark:
The technical data are subject to fluctuations. Due to manufacturing reasons the real values can slightly differ from the data mentioned above.
The values for R_a and R_9 can differ with approx ± 5%.
The values for the colour temperature can differ with approx ± 200K.

6.2 Electrical Data

	Mach LED 120F / 120
Power consumption	18 W
Operating voltage DC	24 V DC
Current	0,75 A

6.3 Information regarding the electrical installation

When turned ON, the light MACH LED 120F/120 is exposed to a current peak.
The light MACH LED 120F/120 is delivered with a Dr. Mach power supply.
It is an electronic power supply with a wide-range input, input voltage 100 – 240V AC, 50 – 60Hz, output voltage 24V DC.
In case there is a switch-over relay needed for an emergency power supply on site, this switch over relay must be ordered separately at Dr. Mach.
In case of a power supply provided by the customer, the following points must be observed:

- The examination light works with 24V DC (direct voltage).
- The direct voltage provided by the hospital must have a maximum undulation of 5%.

Warning!
The light is class I. equipment. In order to avoid the risk of an electric shock, the equipment must be connected to a mains supply with protective earth.

6.4 Weights

Light	Weight
Mach LED 120F	1,9 kg
Mach LED 120	1,9 kg

6.5 Environmental conditions

Operation

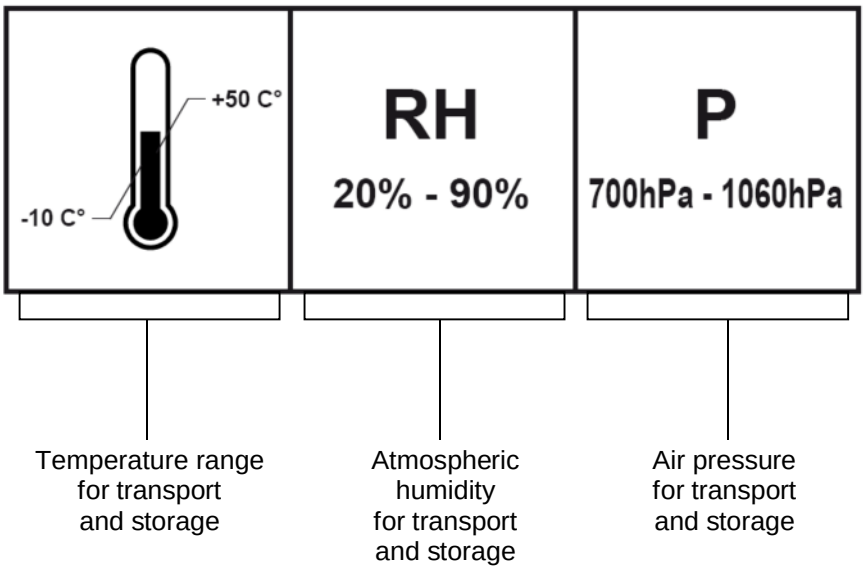
	Min.	Max.
Temperature	+10°C	+30°C*
Relative atmospheric humidity	30 %	75 %
Air pressure	700 hPa	1060 hPa

*In case of higher temperatures please contact us

Transport / storage

	Min.	Max.
Temperature	-10°C	+50°C
Relative atmospheric humidity	20 %	90 %
Air pressure	700 hPa	1060 hPa

References on the package



6.6 Important remarks

When using more than one light at the same time (light combinations), due to the overlapping of the light fields of different lights, the total radiation intensity can exceed the value of 1000 W/m^2.
This means a risk of higher heat development in the wound field.

When using more than one light at the same time (light combinations), due to the light fields overlapping of different lights the maximum permissible values for UV-radiation (< 400 nm) of 10 W/m² can be exceeded.

The test certificate for the electrical safety test can be requested when needed. Please provide the serial number of the respective light.

In case of a collective wiring of further lights or devices at installation, chapter 16 of the European standard EN 60601-1:2013 must be applied and eventually it has to be checked if the requirements are met.

The light must be tested according to EN 62353 at commissioning.

The polarity is very important for the installation of the light. In case the light does not function after installation, the polarity must be checked at the secondary side of the power supply for troubleshooting.

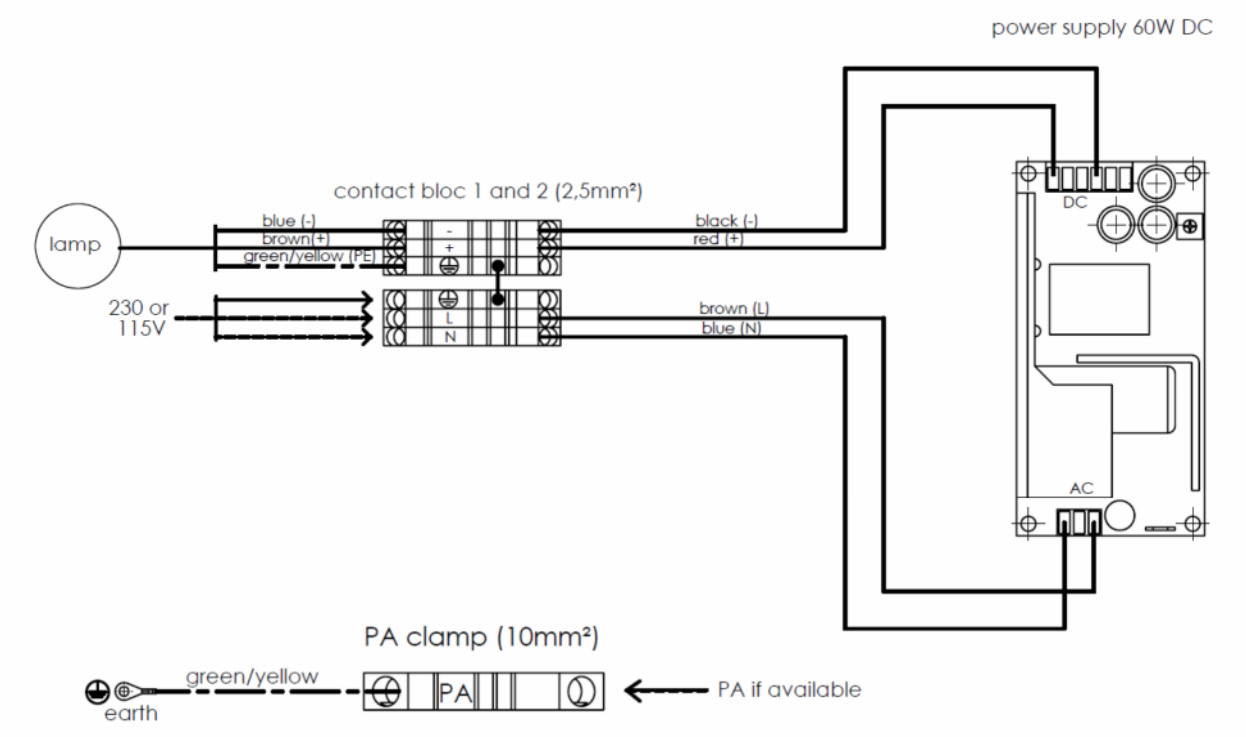
7. CE-mark

The products Mach LED 120F/120 comply with the standards 93/42/EEC for medical products of the European Community's Council. Dr. Mach applies the standard EN 60601-2-41.
Dr. Mach GmbH is certified according to EN ISO 13485:2012 + AC:2012.

8. Disposal

The light doesn't contain any dangerous goods.
The components of the OT-lamp should be properly disposed at the end of its shelf-life.
Make sure, that the materials are carefully separated.
The electrical conducting boards should be submitted to an appropriate recycling proceeding.
The rest of the components should be disposed according to the contained materials.

9. Wiring diagram for single attachments



10. Electromagnetic compatibility

The Dr. Mach OT- and examination lights are subject to special preventive measures regarding the electromagnetic compatibility and must be installed according to the EMC-instructions mentioned in the accompanying documents.
The function of the OT- and examination lights can be affected by portable and mobile HF-communication devices.

The use of other equipment than the equipment mentioned in chapter 2. leads to an increased emission or to a reduced interference resistance of the device.

For the intended use of the OT-light MACH LED 120F/120 it is required that the light MACH LED 120F/120 is not mounted immediate and near to other devices or mounted together with other devices. If operating the light is obligatory near other devices or together with other devices, the functions of the light MACH LED 120F/120 must be observed.

Table 1 – Guidance and manufacturer´s declaration – electromagnetic emission

Guidance and manufacturer´s declaration – electromagnetic emission		
The MACH LED 120/120F is intended for use in the electromagnetic environment specified below. The customer or the user of the MACH LED 120/120F should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment - guidance
Harmonic emissions IEC 61000-3-2	Class A	The MACH LED 120/120F is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	
RF emissions CISPR 15	Complies	The MACH LED 120/120F is not suitable for interconnection with other equipment.

Table 2 – Guidance and manufacturer's declaration – electromagnetic immunity

Guidance and manufacturer´s declaration – electromagnetic immunity			
The MACH LED 120F/120 is intended for use in the electromagnetic environment specified below. The customer or the user of the MACH LED 120F/120 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient / burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (>95 % dip in U_T) for 5 sec	< 5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles < 5 % U_T (>95 % dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the MACH LED 120F/120 requires continued operation during power mains interruptions, it is recommended that the MACH LED 120F/120 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_T is the a. c. mains voltage prior to application of the test level.			

Table 4 – Guidance and manufacturer´s declaration – electromagnetic immunity – for EQUIPMENT and SYSTEM that are not LIFE-SUPPORTING

Guidance and manufacturer´s declaration – electromagnetic immunity			
The MACH LED 120F/120 is intended for use in the electromagnetic environment specified below. The customer or the user of the MACH LED 120F/120 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Conducted RF IEC 61000-4-6	3 V 150 kHz to 80 MHz	3 V	Portable and mobile RF communications equipment should be used no closer to any part of the MACH LED 120F/120 including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = 1{,}17\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	$d = 1{,}17\sqrt{P}$ 80 MHz to 800 MHz $d = 2{,}34\sqrt{P}$ 800 MHz to 2,5 GHz where *p* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in metres (m).[b] Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the MACH LED 120/120F is used exceeds the applicable RF compliance level above, the MACH LED 120/120F should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the MACH LED 120/120F.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Table 6 – Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM - for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and the MACH LED 120F/120			
The MACH LED 120F/120 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the MACH LED 120F/120 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the MACH LED 120/120F as recommended below, according to the maximum output power of the communications equipment			
	Separation distance according to frequency of transmitter m		
Rated maximum output of transmitter W	150 kHz to 80 MHz $d = 1{,}17\sqrt{P}$	80 MHz to 800 MHz $d = 1{,}17\sqrt{P}$	800 MHz to 2,5 GHz $d = 2{,}34\sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,37	0,37	0,74
1	1,17	1,17	2,33
10	3,69	3,69	7,38
100	11,67	11,67	23,33
For transmitters rated at a maximum output power not listed above the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies. NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			