

MR-compatible long-range LED illumination “MR-LED-ARRAY-18X”

User Manual



1. Intended Use

The long-range LED illumination has been designed to work as a stand-alone device or in combination with our MR-compatible video cameras for various illumination purposes such as face monitoring or eye-tracking from a distance of at least 50 cm. It emits diffuse light with a power of up to 1080 mW and can illuminate a scene with infrared light from a distance of up to 1.5 to 2 metres.

The LED illumination can be used around the tube of a magnetic resonance tomograph (MR) without any relevant artefacts in the images during MR imaging or fMRI. 18 light-emitting diodes (LEDs) are used, which are placed in a compact titanium case.

The illumination has no alarm system in case of failure. Therefore, it should not be used to monitor vital functions.

2. Description

The long-range LED illumination consists of 18 LEDs mounted in a compact case with a connection cable (see figure 1) and a control and filter box (see figure 2). The wavelength is 850 nm.



Figure 1: Long-range LED illumination.

Power is supplied via a filter box. The LED illumination is connected to it via a shielded cable. The cable contains the power and the signal lines.

3. Installation of the filter box

The filter box should be attached to the filter panel of the MR room. It must be located outside the MR room. The cable to the LED illumination must be routed into the MR room through a hole.

For permanent installation, the filter box with the connector should be screwed firmly to the filter panel.

- A 12 mm through hole is required in the filter panel.

- The LED connector is led through this hole.
- The LED connector also provides the ground connection to the MR room shield.

For short-term use, the LED cable can also be led into the MR room in another way, e.g. through a service through hole ("waveguide"). In this case, an additional grounding cable should be used to ground the LED connection to the MR room shielding.

4. Operation

The light intensity can be adjusted via two potentiometers on the filter box. Each potentiometer controls one half of the array.



Figure 2:

Control and filter box. The two potentiometers for intensity adjustment can be seen at the left side.

On the front is the connection for the power supply and a signal LED. It lights up when the LED illumination is switched on.

The connection for connecting the LED cable is located at the rear. This connection should be used to attach the box to the filter panel.

5. Technical data

Wavelength	850 nm
Optical intensity	up to 1080 mW
Recommended working distance	50 – 300 cm
Emission angle	10°
Electrical power	200 mA / 18 V
Standard cable length (other lengths on request)	10 m
Dimensions and weight of illumination head	55x41x10.6 mm ³ / 130 g
Dimensions and weight of filter box	46x65x110 mm ³ / 350 g, thread: 35 mm

6. Safety and operation instructions



- Each LED of the long-range illumination can achieve an intensity of 800mW/sr when the maximum intensity is set. Therefore, in order to prevent a damage to the eye, a working distance of at least 50 cm from the front to the subject's or user's eye is required.
- When metal objects are used in magnetic resonance tomographs, the residual risk of a flashover of voltage from the inserted object to the human body remains. Therefore, it is strongly recommended that the rear side of the LED illumination must not be positioned closer than 10 cm to the user or a subject.
- Even in the case of provisional use of the LED illumination, where the connection cable is led through a waveguide, care must be taken to ensure that
 - (1) the filter box is grounded to the MR shield. The ground connection cable must be well contacted.
 - (2) the connection cable does not protrude from the MR cage / waveguide. Otherwise the cable may cause interference.
- Light-emitting diodes (LEDs) are subject to an ageing process that progresses faster at high intensities. In order to increase the service life, we recommend not to operate the LED illumination with the maximum brightness and to disconnect it from the power supply when not in use.
- The LED illumination is not specially protected against splashing water or other intruding liquids. Please use it only in dry environments. If moisture intrudes into the case, a short circuit may occur, which can damage the electronics.
- Only the delivered medical power supply should be used.

7. Labelling



Power Input: maximum 300 mA / Supply: FW8000M/18, 18VDC/660mA

8. Contact

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