

# Vaisala Background Luminance Sensor LM21



*Vaisala Background Luminance Sensor LM21 is an intelligent, stand-alone precision photometer.*

## Features/Benefits

- Intelligent, stand-alone sensor
- Extensive self-diagnostics
- Window contamination measurement and compensation
- Optical path blockage detection
- High power heaters to prevent snow accumulation
- Calibration traceable to measurement standards
- Field calibration device available

The Vaisala Background Luminance Sensor LM21 is a part of Vaisala's airport RVR assessment equipment. The background luminance has an effect on the distinctiveness of the runway lights as seen by a pilot.

### Resembles human eye

The LM21 is a precision photometer with a spectral response similar the human eye. The LM21 measures the total amount of light coming in from an angle of 6 degrees, and converts the measured data to  $\text{cd}/\text{m}^2$ . The LM21 sends the measurement data to the interface unit of a Vaisala transmissometer or forward scatter visibility sensor. The interface unit combines both the visibility and background luminance data into the same message and sends it to the main RVR computer.

The LM21 can be connected to the Vaisala Transmissometers LT31 and MITRAS, as well as to the Vaisala Forward Scatter Sensors FS11 and FD12. The LT31 and FS11 are connected using a RS-485 serial line. For the MITRAS and FD12 connection, the measurement result is converted to a frequency that corresponds linearly to  $\text{cd}/\text{m}^2$  divided by 10.

### Comprehensive self-diagnostics

The LM21 is an intelligent, stand-alone sensor. To ensure reliable and uninterrupted operation, the LM21 has extensive self monitoring functions with high power heating features. The LM21 measures and compensates for the attenuation effect of window contamination. It ensures that measurement accuracy is maintained between window cleaning, and also extends the cleaning interval. The optical path clearance monitoring circuitry verifies that measurement is not affected by obstructions. Traditionally, background luminance sensors have either incorporated rudimentary self-monitoring features or none at all.

### Easy to calibrate

The calibration of the LM21 is traceable to the measurement standards. The Vaisala Field Calibrator LMA21 is a unique field calibration device that is available for quick field calibration. It provides a stabilized and diffused white light beam for the LM21 calibration. The calibration coefficients for light intensity have been defined during factory calibration, and stored in the LMA21 memory. The calibration is done

automatically when the LMA21 is connected to the Vaisala Background Luminance Sensor LM21. The LM21 reads the calibration coefficients from the LMA21 memory and performs the calibration. The status and result of the calibration is displayed with 5 LED indicators on the cover of the LMA21.



*The Vaisala Background Luminance Sensor LM21 measures the ambient light level or background luminance in RVR applications. In the picture, the LM21 is installed to the Vaisala Transmissometer LT31.*

# Technical Data

## Operational

Measuring range	2 ... 40 000 cd/m <sup>2</sup>
Measurement accuracy	10 %

## Optical

Spectral response	400 ... 700 nm, resembles the spectral response of the human eye
Peak wavelength	550 nm
Field of view	6°
Effective diameter of reception lens	24 mm

## Electrical

Connection	power/signal cable provided
Power supply	10 VDC to 38 VDC, or alternatively 8 VAC to 28 VAC, 6 W
Heater power supply	28 VAC, 50 W
Output signal	RS-485 (RS-232), frequency output
Output signal frequency (LM21FD and LM21MITRAS)	1.4 ... 3000 Hz (corresponds to 4 ... 30 000 cd/m <sup>2</sup> )
Frequency signal amplitude	12 V
Frequency signal max.current	10 mA
Overvoltage protection	power supply lines and output lines are protected by current limiters and transient suppressors

## Environmental

Operating temperature	-40 ... +65 °C
Operating humidity	0 ... 100 %RH

## Mechanical

Weight	1.1 kg
Cable length	2.3 m
Cable length of LM21FD and LM21MITRAS	4 m
Color	white
Housing	aluminum, weatherproof
Mounting	with a mounting clamp onto the LM21 Support Arm of LT31 or Option Support Arm of FS11 with Sensor Fastener Assembly on top of MITRAS Light Transmitter or FD12P

## Electromagnetic compatibility

The LM21 sensor is CE-compliant. This compliance has been verified according to the following EMC directives:	
Radiated emissions	EN55022
Radiated susceptibility	IEC 1000-4-3, 10 V/m
Conducted emissions	EN55022
Conducted susceptibility	IEC 1000-4-6
EFT immunity	IEC 1000-4-4
ESD immunity	IEC 1000-4-2

## Dimensions

Dimensions in mm.

