



### Features

- Single baseline for the MOR measurement range 10 ... 10 000 m (33 ... 32 800 ft)
- State-of-the-art white light source
- Automatic alignment with quality control
- Automatic calibration
- Internal back-up battery
- Compatible with Vaisala Transmissometer MITRAS and SKOPOGRAPH II Flamingo
- Window contamination compensation
- Meets the ICAO and WMO requirements for RVR and visibility
- Based on decades of field experience
- Sophisticated self-diagnostics

Vaisala Transmissometer LT31 enables accurate and reliable single baseline measurement for CATIIIb category airports.

Accurate and reliable determination of runway visual range (RVR) reduces airport downtime and improves safety of operations. LT31 is the qualified observer of RVR providing correct visibility data without interruptions and with minimal maintenance.

### Measurement Range from 10 to 10 000 m (33 to 32 800 ft)

LT31 provides the most accurate and reliable solution for the automatic measurement of RVR.

The meteorological optical range (MOR)

measurement range is 10 ... 10 000 m (33 ... 32 808 ft), which covers the full required RVR range (CATI ... CATIIIb), as well as the range required for aeronautical visibility (the ICAO-defined visibility). LT31 accuracy meets the ICAO and WMO requirements.

This full measurement range is achieved with a single baseline system, which makes measuring easier and more economical.

### White LED Provides Wide Spectrum Light Source

LT31 incorporates a white LED as a light source. White light is needed for the best accuracy in transmittance measurement. The WMO recommends the use of a wide spectrum (white) light sources for transmissometers as narrow spectrum light source (for example, lasers or colored LEDs) will cause measurement error with some weather phenomena.

# Automatic Systems



## Automatic Calibration with Integrated Forward Scatter Sensor

Calibration of a transmissometer is traditionally based on human observations. A reliable and accurate calibration has required very high visibility, stable conditions, and skilled and well trained personnel.

The Vaisala-patented automatic calibration method for transmissometers is based on an integrated forward scatter sensor/present weather sensor. The system automatically detects drift

and adjusts the sensor settings accordingly. Weather conditions do not need to be as good as for manual calibration; LT31 automatically recognizes suitable conditions.

## Automatic Fine Alignment

One of the major error sources in transmittance measurement is alignment drift. Checking and adjusting the alignment has also required skilled and trained personnel.

To maintain the measurement accuracy, LT31 performs an automatic optimization of the alignment. The alignment quality is also continuously evaluated without any human intervention.

The automatic fine alignment also provides easy handling of LT31 during installation. The alignment quality during harsh weather conditions is ensured by a double mast construction. The outer tube works as wind and solar radiation shield. The inner support structure is separated from thermal and mechanical stress caused by solar radiation and wind load.

## Contamination Reduction

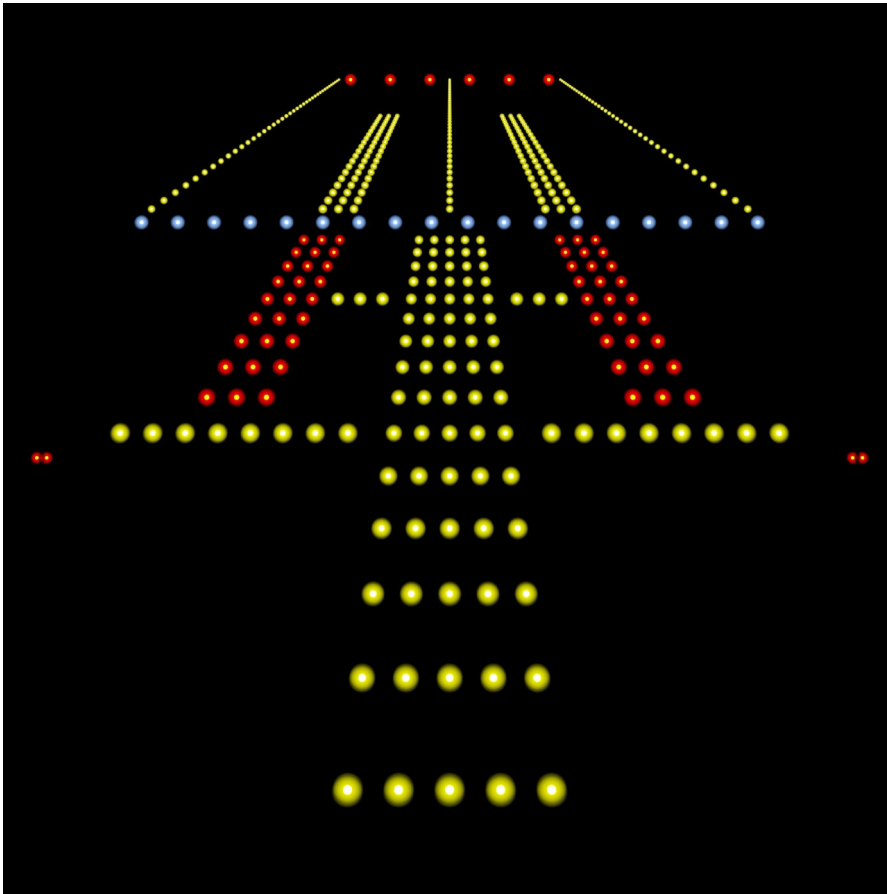
In general, precipitation leads to an increased amount of window contamination. LT31 has long and narrow weather protection hoods that reduce the amount of window contamination caused by precipitation.

For wind-driven precipitation or dust, the instrument is equipped with a powerful blower. The blower creates an air curtain in front of the instrument window. The air curtain is specifically designed not to disturb the measurement path and cause the measurement errors that have been a problem with conventional blower designs.



The integrated forward scatter sensor

# Up-to-date Data



Airport runway lights at night



True window contamination compensation based on V-shaped windows

## Automatic Window Contamination Compensation

Window contamination is a significant source of error in transmissometers. Maintaining high accuracy has required frequent cleaning. However, the effects of contamination can be automatically compensated if the window transmittance can be measured accurately.

In LT31, window contamination is also compensated for by the most accurate method: by measuring the transmittance directly through the window glass.

## Extensive Self-diagnostics

LT31 has a sophisticated self-diagnostics that provides detailed status information for all functional units. In addition, this feature helps to locate possible technical failures. It records a history of significant operational situations, warnings, and alarms from the instrument.

## Internal Backup Battery

LT31 can be equipped with an internal backup battery. It provides steady data availability during short power breaks, for example while backup generators are started.

## Present Weather Reporting

The optional present weather reporting from RVR sites gives a full picture of the prevailing weather conditions within the entire airport area. The arrival of weather fronts and the presence of local showers can easily be monitored due to the multiple present weather observation points. The integrated present weather sensor provides the type and intensity of precipitation for METAR and local weather reporting purposes.

## Background Luminance Sensor LM21

The optional LM21 sensor offers the means for measuring the ambient light level or background luminance in RVR applications. The background luminance sensor is used for measuring the background against which the runway lights or runway markings are seen.

# Technical Data

## Measurement Performance

Transmittance measurement resolution	20 bit
<b>Recommended Baseline Lengths</b>	
30 m (98 ft) baseline length (optimal)	MOR: 10 ... 10 000 m (33 ... 32 808 ft) Transmittance range: < 0.01 % ... 100 %
50 m (164 ft) baseline length	MOR: 25 ... 10 000 m (82 ... 32 808 ft) Transmittance range: < 0.02 % ... 100 %
75 m (246 ft) baseline length	MOR: 37.5 ... 10 000 m (123 ... 32 808 ft) Transmittance range: < 0.02 % ... 100 %
<b>Purchased Option</b>	
25 m (82 ft) baseline length	1/3 × baseline length to 10 000 m (32 808 ft)
Accuracy (RVR range)	Exceeds the ICAO (Annex 3) recommendations
Output data	Automatic or polled data messages Standard message including MOR, LT31 status and BGL data (option) Message including present weather data (option) MITRAS transmissometer compatible message SKOPOGRAPH II Flamingo transmissometer compatible message FD12 Visibility Meter compatible message
Present weather reporting option	Identifies 7 different types of precipitation (rain, freezing rain, drizzle, freezing drizzle, mixed rain/snow, snow, ice pellets)
Reports	49 different codes from WMO 4680 code table

## Transmitter Optical Specifications

Light source	White light-emitting diode (LED) - Certified class I product according to EN 60 825-1
Optical monitoring	Light source stability control Window contamination measurement and compensation circuitry

## Operating Environment

Operating temperature	-40 ... +60 °C (-40 ... +140 °F) standard -55 ... +60 °C (-67 ... +140 °F) hood heater option
Operating humidity	0 ... 100 %RH
Wind speed	Up to 60 m/s (134 mph)
Electrical safety	IEC 60950-22 / EN 60950-22/A11 / IEC 60950-1 / EN 60950-1 / UL 60950-1

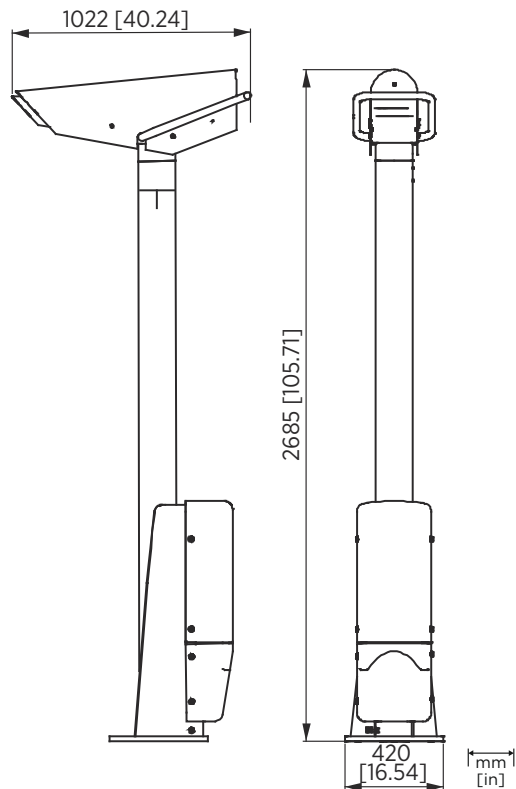


## Inputs and Outputs

AC supply	100/115/230 VAC + 10 %, 50 ... 60 Hz
Power consumption	Max. 800 VA (for complete LT31 system) with all options
Battery backup option	Battery 2 Ah, backup time 60 min at +20 °C (+68 °F) when a proper and fully charged battery is used
Obstruction light	Optional
Outputs	Serial data line RS-232 or opto-isolated RS-485 (2-wire) or optional data modem Separate maintenance line RS-232

## Mechanical Specifications

Dimensions (H × W × D)	2685 × 420 × 1022 mm (105.71 × 16.54 × 40.24 in)
<b>Weight</b>	
Transmitter Unit LTT111	85 kg (187.39 lb)
Receiver Unit LTR111	82 kg (180.78 lb)
IP rating	IP66



## Compliance

Radiated emissions	CISPR 22 / EN 55022
Conducted emissions AC	CISPR 22 / EN 55022
Harmonics current emissions	IEC 61000-3-2 / EN 61000-3-2
Electrostatic discharge	IEC 61000-4-2 / EN 61000-4-2
RF field immunity	IEC 61000-4-3 / EN 61000-4-311 V/m (80 MHz-1 GHz) 4 V/m (1 GHz-4 GHz)
Electric fast transient	IEC 61000-4-4 / EN 61000-4-4
Surge	IEC 61000-4-5 / EN 61000-4-5
Conducted RF immunity	IEC 61000-4-6 / EN 61000-4-6

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