

Vaisala Transmissometer
LT31



Measures Visibility with Maximum
Reliability and Minimum Maintenance.

Vaisala Transmissometer LT31 RVR with New Eyes



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

Accurate and reliable determination of the Runway Visual Range (RVR) reduces airport downtime and improves safety of operations. The Vaisala Transmissometer 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

The Vaisala Transmissometer LT31 provides the most accurate and reliable solution for the automatic measurement of the RVR. The Meteorological Optical Range (MOR) measurement range is from 10 to 10 000 meters, which covers the need of the entire RVR range (CATI...CATIIIb) as well as the range required for Aeronautical Visibility (the ICAO defined visibility). The accuracy of the LT31 meets ICAO and WMO requirements.

The whole measurement range can be achieved with a single baseline system,

which makes measuring easier and more economical.

White LED provides wide spectrum light source

The 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 source for transmissometers as narrow spectrum light sources (e.g. lasers or coloured LEDs) will cause measurement errors with some weather phenomena.

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.

Features/Benefits

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

Automatic calibration method for transmissometers patented by Vaisala is based on an integrated forward scatter sensor. The system will automatically detect a calibration drift and adjust the sensor settings accordingly. Weather conditions do not need to be as good as for a manual calibration; the LT31 transmissometer recognizes suitable conditions automatically.

Automatic fine alignment

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

To maintain the measurement accuracy, the Vaisala Transmissometer LT31 will perform an automatic optimization of the alignment. The alignment quality is also continuously evaluated without any human intervention. The automatic fine



The integrated forward scatter sensor.



True window contamination compensation based on V-shaped windows.

alignment also provides easy handling of the LT31 during installation.

The alignment quality during harsh weather conditions is ensured by a double mast construction. The outer tube behaves 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. The 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 specially designed not to disturb the measurement path and cause the measurement errors that have been a problem with traditional blower designs.

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

Extensive self-diagnostics

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

Internal back-up battery

The LT31 can be equipped with an internal back-up battery. This feature provides steady data availability during short power breaks, e.g. while back-up 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 whole 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.

Vaisala Background Luminescence 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 the runway lights or runway markings.

Technical Data

Performance

| | |
|-----------------------------------|---|
| Measurement range | |
| 30 m baseline length (optimal) | 10 ... 10 000 m (MOR) |
| 50 m baseline length | 25 ... 10 000 m (MOR) |
| 75 m baseline length | 37.5 ... 10 000 m (MOR) |
| Accuracy | according to ICAO and WMO specifications for RVR and Visibility |
| Light source | light emitting diode (LED), white |
| Window contamination compensation | automatic, direct window transmittance measurement |
| Calibration | automatic with integrated forward scatter sensor |
| Alignment | automatic fine alignment with servo mechanism |

Present Weather reporting (optional)

| | |
|------------|---|
| Identifies | 7 different types of precipitation (rain, freezing rain, drizzle, freezing drizzle, mixed rain/snow, snow, ice pellets) |
| Reports | 49 codes from WMO 4680 code table |

Electrical

| | |
|------------------------------|------------------------------------|
| Power | 100 / 115 / 230VAC, ±10%, 50-60 Hz |
| Power consumption | max. 800 W with all options |
| Interfaces | |
| Data | RS232 / RS485 / modem (optional) |
| Maintenance | RS232 |
| Back-up battery (optional) | typical back-up time 1 h @ +20 °C |
| Obstruction light (optional) | |

Data messages

| | |
|------------------------|------------------------------------|
| LT31 | standard incl. full status report |
| MITRAS | standard message (for replacement) |
| SKOPOGRAPH II Flamingo | standard message (for replacement) |

Mechanical

| | |
|--|----------------------------|
| Single baseline for full measurement range | |
| Baseline length | 30...75 m (30 recommended) |
| Measurement height | 2.5 m |
| Weight | |
| Transmitter Unit LTT111 | 85 kg |
| Receiver Unit LTR111 | 82 kg |
| Window blower | |

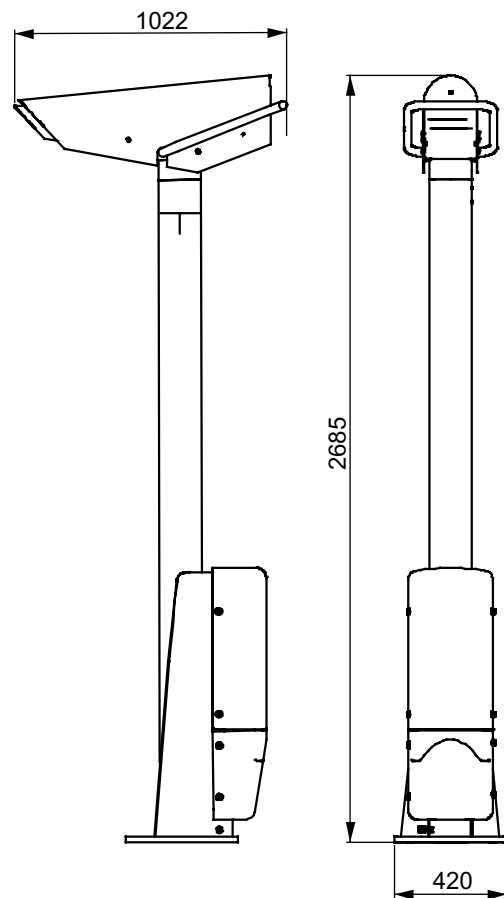
Environmental

| | |
|--|----------------|
| Temperature range | -40 ... +60 °C |
| Humidity | 0 ... 100 % RH |
| Wind | 60 m/s |
| EMC | IEC/EN 61326 |
| Electrical Safety | IEC/EN 61010 |
| Specifications subject to change without prior notice. | |
| © Vaisala Oyj | |



Dimensions

Dimensions in mm.



Easy installation

Installation of transmissometers has always been a time consuming task, even for trained personnel. The LT31 assists the installation personnel via the service terminal and offers acoustical support during set-up of the instrument heads. The final alignment is carried out automatically.

Vaisala Oyj, P.O. Box 26, FIN-00421 Helsinki, FINLAND
Tel: +358 9 894 91, Fax: +358 9 8949 2485
Email: metinstruments@vaisala.com

 **VAISALA**
www.vaisala.com