

5000-200-EMOR

EXTENDED MOR TRANSMISSOMETER

Applications

- CAT III RVR SYSTEMS AT AIRPORTS

Features

- WHITE LIGHT LED FLASH UNIT
- WIDE RANGE 1-100%
- EXTENSIVE B.I.T.E
- DYNAMIC AUTOCALIBRATION
- CONTAMINATION COMPENSATION
- SPECTRALLY MATCHED TO EYE
- FULL RCMS FACILITIES
- SERIAL, LAN OR WAN COMMS
- CO-LOCATED FORWARD SCATTER

Description

The 5000-200-EMOR Extended MOR Transmissometer Sensor measures the atmospheric extinction co-efficient, which is the sum of the scattering co-efficient and the absorption coefficient resulting in highly accurate visibility measurement

Application

The 5000-200-EMOR is specified for assessment of RVR in CAT III and CAT-IIIb runways. The sensor incorporates a transmissometer and a co-located forward scatter sensor which extends the range out to 80,000 metres

CAT III Capability

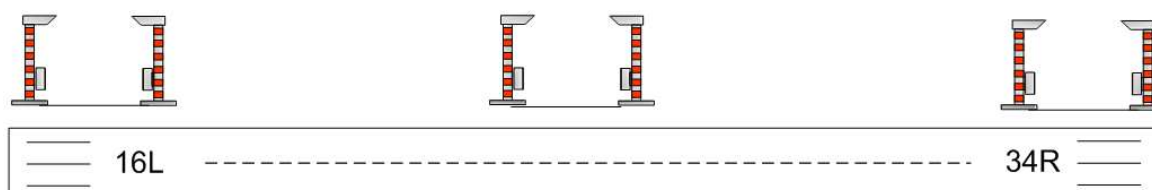
For up to CAT-IIIb operations Transmissometers are mounted in groups of 1, 2, 3 or 4 along the runway. Cat-III operations require accuracy down to very high values of extinction coefficient, The 20 bit analog to digital conversion extends dynamic range to eliminate this as a source of error, while the dynamic autocalibration system using the co-located forward scatter meter ensures reduced maintenance interval and high accuracy in the upper part of the range. Using a 30 metre baseline gives optimal performance at the low end of the range.



5000-200-EMOR Transmissometer source with high specification co-located visibility sensor as standard.

Frangible Mounting

The 5000-200-EMOR features an integrated frangible dual concentric pole, which is bolted to the foundation base-plate. The optical units mount at the top of the inner pole, with the main electronics box mounted on the side of the pole for easy access. The window conditioning fan unit attached to the outer pole provides a heated air curtain for the optical unit windows. This actively maintains the transmissometer window in a clean dry condition during fog, rain or snow.



CAT III RVR Layout

Light Source

The Transmissometer light source is an ultra high intensity LED light source with light output having broad spectral characteristics similar to white light. The scan is performed every second with reports every 10 seconds.

The LED MTBF is specified for 4 years under continuous low visibility conditions and longer where high visibility conditions prevail over long periods.

Pulsed Light Sensor

The optoelectronics assembly is mounted inside a weather proof sensor enclosure, with a glass front window and integral hood. The sensor is a high stability silicon photodiode. This has a linear response over 7 orders of magnitude of light level. The sensor characteristic is compensated by a correction filter, to ensure that the reading conforms closely to the CIE Photopic response centred on 555 Nm.

The sensor electronics has integral ambient light compensation. Potential external sources of error are minimised by advanced hum, noise and offset cancellation techniques.

Electronic Control Box

The control box, mounted on each pole,

The source acts as master sensor and manages the link to the server. Local operator controls are provided to facilitate ease of setup and maintenance. By the use of these controls four levels of access are available:

- Setup mode.
- Test mode.
- Communications status display
- Data display

Built In Test

All "Built in Test" functions are available at the server by means of the comprehensive Transmissometer Control Message Set. The monitored variables include: Enclosure Temperature, Sensor Temperatures, LED Voltage, Sensor Background level, Background Luminance, Power supply voltage and over 20 reported systems status conditions.

Lightning Protection

World's best practice lightning protection modules are used in the transmissometer. These LRU modules are mounted on DIN rails for easy removal or replacement.

Installation

The sensor package includes a complete foundation kit for siting the equipment. The foundation assemblies have been engineered to compliment the frangible design of the sensor pole and also allow ease of installation by qualified personnel. A special foundation kit is provided as an option for sites subject to frost or unstable soils

Alignment

In stable ground, alignment needs only to be made when the system is first installed. Alignment is automated through the sensor software. Replacement optical modules are keyed into the poles and tight manufacturing boresight alignment tolerances ensure that alignment need not be repeated when spare optical modules are installed.

Maintenance Requirements

The MTECH 5000-200 has several unique features that minimize the maintenance effort required for successful deployment of MTECH transmissometer sensors. A typical schedule for maintenance is an inspection every three months to ensure correct operating of the device. The 5000-200's air blower reduces overall maintenance requirements by keeping window condition dry and minimises dust build-up. All air flowing over the external optical elements is heated and highly filtered. All modules are LRU and keyed to allow "plug in" replacement for error free maintenance.

Standardization

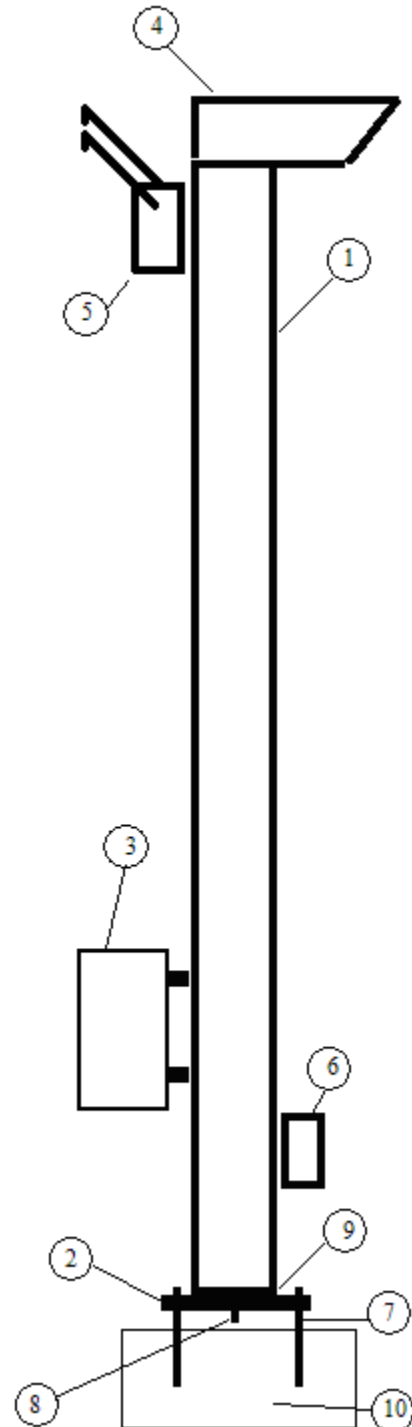
The 5000-200 conforms to all relevant ICAO and WMO guidelines in relation to the operation of RVR systems including: ICAO DOC: 9328 AN/908: MANUAL OF RUNWAY VISUAL RANGE OBSERVING AND REPORTING PRACTICE.

Construction

The transmissometer is fabricated from high quality aluminium and stainless steel. This ensures long lasting performance in even the toughest of marine environments.

Model Number and Options

The standard Model is the 5000-200-EMOR which is fitted with a forward scatter visibility Sensor. Optionally the device can be fitted with a combination visibility and present weather sensor.



Key to diagram of Source [Receiver is similar]

- 1 Dual Concentric Transmissometer Pole
- 2 Baseplate [27mm thick plated Steel]
- 3 Dual Skinned Control Box
- 4 Hood [Aluminium] and Optics
- 5 Co-located Forward Scatter Sensor
- 6 Junction Box [as required]
- 7 Foundation Bolts [M16]
- 8 Frangible Bolt [M16]
- 9 Pole Base Plate [25mm thick plated Steel]
- 10 Concrete Foundation [1000 x 1000 x 300 mm]



View of the 5000-200-EMOR Extended MOR Transmissometer with co-located 80km range forward scatter visibility sensor.



Example cross section showing dual frangible mast allowing for minimization of wind effects on central sensor shaft (shown in red).

Specifications – 5000-200-EMOR

Performance	
Measurement range; 30 m baseline	10 ... 80,000 m (MOR)
Accuracy:	Meets all ICAO and WMO guidelines for RVR & Visibility.
Light source Options:	High Intensity White Light White Light Emitting Diode
MTBF	33,000 Hours
Flash Pulse Duration:	10 milliseconds
LED Lamp Life :	>10E8 flashes, or typically 6 years of operation
Receiver Field of View:	4 degrees.
Spectral Response:	Centre Wavelength 555nm, Bandpass +/-100 nm
Transmissometer Accuracy:	+/-1% of reading for 95% of readings
Forward Scatter Sensor Accuracy:	+/-10% for 95% of readings
Digital Converter	24 Bits
Calibration	Automatic
Window contamination compensation:	Automatic
Alignment:	Automatic or Manual fine alignment.

Electrical	
Power Supply:	100 / 115 / 230VAC 50-60HZ +/-10%. 350Watts
Power consumption	Max. 800 W with all options
Data and Maintenance Interface	Fibre / RS232 / RS485 / TCP/IP / Modem
Local Maintenance Interface	RS232

Data messages	
5000-200 Transmissometer	Standard Message including full status report

Mechanical	
Single baseline for full measurement range	
Baseline length	30
Measurement height	2.5 m
Mounting	Bolts to concrete foundation block. Mounting kit supplied.
Color	White, Aviation Red/White or custom
Weight of single 5000-200 Pole	18 kg

Environmental	
Temperature range	-40 ... +60 °C
Humidity	0 ... 100 % RH
Wind (Max)	60 m/s
EMC	IEC/EN 61326
Electrical Safety	IEC/EN 61010

Options	
Standard	Forward Scatter Visibility Sensor
Option	Combination Visibility and Present Weather Sensor
Back-up battery	Backup battery to ensure continuation of operation during loss of power.

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