

Vaisala Visibility Sensor FS11 for demanding applications



Visibility Sensor FS11 is the choice for demanding applications where an optimal combination of the best accuracy, the highest reliability, broad measurement range and a low maintenance need is required. The main applications are Runway Visual Range, synoptical and Aeronautical Visibility. FS11 is also well suited for other demanding applications, such as visibility measurement at ports and harbors.

Scientifically valid chain of calibration

Every Vaisala FS11 is calibrated through a scientifically valid chain of reference. The scattering

response of the calibration device can be clearly traced to a reference FS11 visibility sensor, which is in continuous operation at Vaisala outdoor test field along with reference transmissometers and other instrumentation. The visibility measurement of the FS11 is also traceable to FAA reference sensors.

Low maintenance need

The FS11 incorporates a new technique that measures and compensates for window contamination. It ensures unparalleled measurement accuracy throughout the interval between window cleanings. It also enables much longer window cleaning intervals than the former RVR visibility sensors. The unique system works by monitoring the total reflectance of the window surface. It automatically compensates for visibility measurement errors caused by window contamination.

The sophisticated self-diagnostics and modular design allow for very short service times. The measurement fork and optional background luminance meter (LM21) are independent instruments that can be replaced quickly as pre-calibrated spare parts.

Reliable operation in the harshest weather

Four main design features are combined in the FS11 to ensure reliable operation in the harshest weather. The first is the window contamination compensation technique. The second is the "head-down" design of the optical heads, which protects them against virtually all windblown particles (even those flying horizontally).

High-power heaters are the third feature, each with its own temperature monitoring and control

Benefits

- The most widely proven forward scatter RVR sensor
- Visibility sensor selected and used by FAA
- Meets FAA and ICAO specifications
- Accurate and traceable measurement
- Can be used for both aeronautical and synoptical applications
- Minimal maintenance needs
- Meets ICAO frangibility standards

Features

- Unique window contamination correction
- Accurate and traceable measurement
- Technical design and high-power heating according to FAA guidelines
- Composite fiber frangible mast
- Can be upgraded for sensing Present Weather



mechanism to prevent snow accumulation during the heaviest snowstorm.

As a final measure, there is an optical path clearance monitoring circuitry to verify that measurement is not affected by obstructions.

Technical data

Operational

Measurement range (MOR)	5 m ...75,000 m; 1,3 and 10 min averaging
Accuracy	$\pm 10\%$ range 5 m ... 10,000 m $\pm 20\%$ range 10,000 m ... 75,000 m
Scatter measurement accuracy	$\pm 3\%$

Optical

Operating principle	Forward scatter measurement
Scattering angle	42°
Light source	Near infrared Light Emitting Diode

Electrical

Mains supply	100/115/230 VAC $\pm 10\%$, 50-60 Hz
Power consumption	300 VA maximum (60 VA + 240 VA defrosting heaters)
Outputs	Serial line RS-232 or opto-isolated RS-485 (2-wire) or optional data modem Separate RS-232 maintenance line

Mechanical

Dimensions	2.8 m x 0.9 m x 0.5 m
Weight	37 kg
Mast	Frangible and hinged composite-fiber mast

Environmental

Operating temperature	-40 ...+65 °C, optional -55 ...+65 °C
Operating humidity	0 ... 100 %
Wind speed	Up to 60 m/s

Electromagnetic compatibility

CE compliant

Compliance has been verified according to the following

	EMC directives:
VERIFICATION SUBJECT	STANDARD
Radiated emissions	EN55022
Radiated susceptibility	IEC 61000-4-3, 10 V/m
Conducted emissions	EN55022
Conducted susceptibility	IEC 61000-4-6
EFT immunity	IEC 61000-4-4
ESD immunity	IEC 61000-4-2
Surge	IEC 61000-4-5
Harmonics to the mains network	IEC 61000-3-2

Accessories/Options

Calibration set	FSA11
Background luminance sensor	LM21
Battery backup	FSB101
	typical backup time 30 min at 25 °C
Modem for long distance (> 1km) communication	DMX501
Obstruction light	FS11OBS



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