

Vaisala Present Weather Sensor FS11P



The Vaisala Present Weather Sensor FS11P is intended for demanding weather applications such as runway visual range (RVR), aeronautical and synoptical visibility and present weather observation. The FS11P is a combined RVR, visibility and present weather sensor. It delivers valuable multi-parameter measurement, all in one. It transmits data on visibility up to 75km, present weather covering obscuration, precipitation type and intensity, and optionally background luminance.

Scientifically valid chain of calibration

Every Vaisala FS11P 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 FS11P is also traceable to FAA reference sensors.

Low maintenance need

The FS11P 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 visibility measurement fork, present weather detector, and optional background luminance meter 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 FS11P to ensure reliable operation in the harshest weather. The first is the window contamination compensation technique. The second is the “head-

Benefits

- Excellent value: RVR, visibility and present weather all-in-one
- The most widely proven forward scatter RVR sensor
- Visibility sensor selected and used by FAA
- Meets FAA and ICAO specifications
- Can be used for both aeronautical and synoptical applications
- Minimal maintenance needs
- Compatible with FD12P
- Meets ICAO frangibility standards

Features

- Unique window contamination correction
- Uses the same principles as the renowned FD12P weather sensor
- Accurate and traceable measurement
- Technical design and high-power heating according to FAA guidelines
- Composite fiber frangible mast

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 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.

Dependable Present Weather

For detection and identification of present weather, FS11P utilizes Vaisala's unique multi-variable technology of the widely-used and renowned Weather Sensor FD12P and Present Weather Detector PWD22. A combination of three independent sensing techniques with fine tuned algorithms provides robust observation for automated use or as an observer aid. The technology of the FD12P has been proven to be reliable and accurate in international intercomparison studies, for example by the WMO.

Technical data

Visibility (Meteorological Optical Range)

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

Optical

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

Present weather

Identifies	7 different types of precipitation (rain, freezing rain, drizzle, freezing drizzle, mixed rain/snow, snow, ice pellets) Fog, mist, haze (smoke, sand) or clear
Reports	WMO 4680 (SYNOP), 4678 (METAR) and NWS code tables 49 different codes supported in the WMO 4680 code table

Precipitation measurement

Measures	Precipitation intensity, accumulation and amount of new snow
Precipitation detection sensitivity	0.05 mm/h or less, within 10 minutes

Electrical

Mains supply	100/115/230 VAC ±10 %, 50-60 Hz
Power consumption	370 VA maximum (50 VA + 320 VA defrosting heaters)
Outputs	Serial line RS-232 or opto-isolated RS-485 (2-wire) or optional data modem Separate RS232 maintenance lines

Technical compatibility

In addition to the technological similarity, the FS11P is compatible with, and can be used to replace, the FD12P. They both provide the same mechanical, electrical and communication interfaces, and they transmit similar message formats widely used in aviation and meteorology.



Mechanical

Dimensions	2.8 m x 0.9 m x 1.0 m
Weight	52 kg incl. Frangible Mast FFSM250
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
Calibration set	PWA12
Maintenance cable	QMZ101

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