Present Weather Sensor FS11P

Vaisala Present Weather Sensor FS11P is intended for the most demanding weather applications such as runway visual range (RVR), aeronautical and synoptical visibility, and present weather observation. It provides the optimal combination of the best accuracy, the highest reliability, broad measurement range, and low maintenance need.

**Features**
- Unique window contamination correction
- Uses the same principles as the renowned FD12P weather sensor
- Accurate and traceable forward scattering measurement
- Technical design and high-power heating according to FAA guidelines
- Frangible composite fiber mast

**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

**Scientifically Valid Chain of Calibration**
FS11P is calibrated through a scientifically valid chain of reference. The scattering response of the calibration device can be clearly traced to a reference FS11P visibility sensor, which is in continuous operation at Vaisala outdoor test field along with reference transmissometers and other instrumentation. The visibility measurement of FS11P is also traceable to FAA reference sensors.

**Low Maintenance Need**
FS11P incorporates a technique that measures and compensates for window contamination. It ensures unparalleled measurement accuracy between window cleanings. It also enables much longer window cleaning intervals than compared to conventional 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.

**Reliable Operation in the Harshest Weather**
Four main design features are combined in FS11P 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 heater has 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.

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

- **Measurement range of MOR**
  - 5 ... 75 000 m (16 ft ... 46.6 mi) with 1, 3, and 10 min averaging

- **Accuracy**
  - ±10 % range 5 ... 10 000 m (16 ft ... 6.2 mi)
  - ±20 % range 10 000 ... 75 000 m (6.2 ... 46.6 mi)

- **Scatter measurement accuracy** ±3 %

**Optical Specifications**

- **Operating principle** Forward scatter measurement
- **Scattering angle** 42°
- **Light source** Near-infrared LED

**Weather Measurement Performance**

- **Weather type identification**
  - 7 different types of precipitation (rain, freezing rain, drizzle, freezing drizzle, mixed rain/snow, snow, ice pellets)
  - Precipitation (unknown type)
  - Fog (mist), haze (smoke, sand) or clear

- **Weather type reporting** WMO 4680 (SYNOP), 4678 (METAR), and NWS code tables; 49 different codes supported from the WMO 4680 code table

- **Precipitation detection sensitivity** 0.05 mm/h (0.0020 in/h) or less, within 10 minutes

- **Precipitation intensity measurement**
  - 0.00 ... 999.99 mm/h (0.00 ... 39.37 in/h)

- **Precipitation amount measurement**
  - 0.00 ... 99.99 mm (0.00 ... 3.94 in)

- **Amount of new snow**
  - 0.00 ... 999 mm (0.00 ... 39.33 in)

**Operating Environment**

- **Operating temperature**
  - -40 ... +65 °C (-40 ... +149 °F)
  - -55 ... +65 °C (-67 ... +149 °F) (optional)

- **Operating humidity**
  - 0 ... 100 %

- **Wind speed**
  - Up to 60 m/s (134 mph)

**Inputs and Outputs**

- **AC (mains) power supply**
  - 100/115/230 VAC ±10 %, 50 ... 60 Hz

- **Power consumption**
  - Max. 370 VA (50 VA + 320 VA defrosting heaters) with options

- **Battery backup option**
  - Battery 2 Ah, typical backup time 30 min at 23 °C (77 °F) and 5 min at -40 °C (-40 °F)

- **Outputs**
  - Serial data line RS-232 or opto-isolated RS-485 (2-wire) or optional data modem
  - Separate maintenance line RS-232 +12 VDC max. 0.8 A output for option powering

**Spare Parts and Accessories**

- **Calibration set** FSA11
- **Background luminance sensor** LM21
- **Battery backup** FSB101
- **Modem for long distance communication (> 1 km / 0.6 mi)** DMX501
- **Obstruction light** FS10BS
- **Calibration set** PWA12
- **Maintenance cable** QMZ101

**Mechanical Specifications**

- **Dimensions (H × W × D)** 2.8 × 0.9 × 1.0 m (9.19 × 2.95 × 3.28 ft)

- **Weight without mast** 37 kg (81.57 lb)
- **Weight, including Frangible Mast FSFM250** 52 kg (115 lb)

- **IP rating** IP66
- **Mast** Frangible and hinged glass fiber mast

- **Compliance**
  - **EMC Compliance**
    - 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 AC (mains) grid IEC 61000-3-2

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