



Visibility and Present Weather Sensors

Visibility and weather detection at an economical price

Overview

The CS120A and CS125 are infrared forward scatter visibility and present weather sensors for stand alone use or with automatic weather stations. They use the well established forward scatter system for visibility measurement, utilising a 42° scatter angle which gives accurate estimates of Meteorological Observable Range (MOR) for fog and snow.¹ The CS125 identifies precipitation particles from their scattering properties and fall speeds, and combines this with a temperature measurement to identify the weather type. They have downward pointing optics that reduce the risk of contamination of the optics and blockage with snow.² This also means that direct sunlight will never shine directly into the optics. Interference to the sample volume from the sensor by flow distortion or heat is minimised by keeping it clear of the hood and electronics box.

The CS125 also provides reliable present weather information including information on the intensity of precipitation. Accumulation can also be reported.

Both sensors use continuous high speed sampling to reduce errors during mixed weather events and events that return intermittent signals such as rain and hail, while still providing reliable readings during more stable events such as fog and mist. They have high immunity to interference from the visible and infra-red warning lights used to mark obstructions such as wind turbines or obstacles near runways.

The sensors can be set to a lower sampling frequency to save power, if required.

They incorporate low power dew prevention heaters and higher power anti-icing heaters for the hoods as standard. These are automatically controlled to ensure operation in all weathers or can be disabled to save power.

Both continuously monitor their own status and will report faults and contamination of the sensor lenses. They also have two user configurable alarm outputs.

A CS215 temperature and relative humidity sensor can be fitted to the CS125. This gives better performance in identifying precipitation and allows relative humidity information to be transmitted.

The CS120A and CS125 comply with ICAO, UK, FAA and CAA guidance and meets or exceeds all recommendations and specifications (this includes ICAO 9837, ICAO Annex 3, CAP437, CAP670 and CAP746).

Certified by Deutscher Wetterdienst as suitable for use to control wind turbine obstruction light systems as specified by 506/04, General Administrative Rules for the Identification of Aircraft Obstructions.

¹U.S. Department of Transportation, FAA 1997 ref. DOT/FAA/AND-97/1

²ICA09328 8.2.6 b)

Applications

- › Road weather
- › Airport visibility and Runway Visual Range
- › Marine weather stations
- › Automatic weather stations
- › Wind farms
- › Solar farms

Benefits and Features

- › High performance visibility and present weather sensors at an economical price
- › Uses established 42° scatter angle for good MOR readings in all precipitation types
- › Incorporates both dew and hood heaters for all-weather operation
- › The CS125 gives present weather and precipitation accumulation
- › RS-232/RS-485 and logic level alarm outputs
- › Simple field calibration with optional calibration disk including dirty window zero offset correction
- › Low power - suitable for remote applications
- › Automatic fault/contamination detection
- › Sample volume clear of disturbance from the mounting and the electronics enclosure

Operational Specifications

- › Maximum reported visibility: 75 km (approx. 47 miles)
- › Minimum reported visibility: 5 metres (16 feet)
- › Accuracy:
 - <600 m $\pm 8\%$
 - 600-10,000 m $\pm 10\%$
 - 10,000-15,000 m $\pm 15\%$
 - 15,000-75,000 m $\pm 20\%$
- › Resolution: 1 metre
- › Operating temperature: -25 to +60°C
- › Extended operating temperature: -40 to +70°C option
- › Operating humidity: 0 . . . 100%
- › Wind speed: Up to 60 m/s
- › Sensor sealing: rated to IP66

CS125 only

- › Present and past weather: identifies as standard mist, fog, drizzle, freezing drizzle, drizzle and snow, rain, freezing rain, rain and drizzle, rain and snow and snow.
- › Outputs 56 SYNOP present weather codes according to WMO code table 4680, associated METAR codes to WMO code table 4678 and NWS codes.
- › Accumulation reported range: 0 - 999.9 mm
- › Accumulation accuracy: $\pm 15\%^{**}$
- › Accumulation resolution: 0.1 mm
- › Intensity reported range*: 0-999.9 mm/hr
- › Intensity accuracy: $\pm 15\%^{**}$
- › Intensity resolution: 0.01 mm/hr
- › Detection threshold for present weather: 0.02 mm/hr
- › Reports temperature and RH from optional CS215 T/RH sensor
- › Hail detection option available

*The maximum intensity reported is dependent on the mixture of precipitation falling.

**Against factory calibration standards in the laboratory, for liquid precipitation.

Mechanical Specifications

- › Sensor approximate weight: 3 kg (dependent upon mounting system)
- › Sensor dimensions (including mount): H540 mm x W640 mm x D246 mm
- › Supplied with 5 m long cables as standard. Other lengths are available
- › Manufactured from stainless steel and hard-anodised aluminium powder coated
- › Mountings: Stainless steel clip on V-bolt mounting to pole (diameter 32 mm to 52.5 mm)
- › An optical mounting pole is available to place the sample volume at 1.5 m as recommended by the WMO
- › Frangible masts are available to customer requirements to meet ICAO recommendations (typically placing the sample volume at 2.5 m)
- › Shipping weight: 6 kg
- › Shipping dimensions (mm) 800 x 650 x 240

Electrical Specifications

- › Electronics supply voltage: 7-30V DC (7-28V DC for CS125 with CS215 attached)
- › Hood heater supply voltage: 24V DC or AC
- › Hood heater power: 2 x 30 Watts, total of 60 Watts
- › Dew heater power: 2 x 0.6 Watt, total of 1.4 Watts
- › Total unit power: <3W while sampling continuously (including dew heaters)
- › Optional power supplies with battery back-up available
- › Connectors in place of flying leads are available to special order
- › A low voltage shutdown level can be set to prevent back-up batteries being damaged

NB: Lower power states can be achieved by less frequent sampling and remote control of heaters.

Interface Specifications

- › Serial interface: RS-232 or RS-485
- › Serial data rates: 1200-115,200 bps (38,400 bps default rate)
- › Alarm Outputs: 2 x 0-5V outputs, 32 mA (max)

Optical Specifications

- › Emitter frequency: 850 nm
- › Lens contamination circuitry monitors both the source and detector lenses for contamination/blockage at 1 sec intervals. The sensor can be configured to adjust calibration for low to moderate window contamination.
- › Light source stability control ensures stable operation through variations in temperature and with sensor ageing, corrected at 1 sec intervals.

Accessories

- › Temperature and RH probe type CS215 with RAD10 radiation shield for CS125
- › High grade CS120A/CS125 calibration device, wide temperature range
- › Power supplies
- › WMO compliant optical mast
- › ICAO compliant frangible masts for aviation use
- › Maintenance cables for serial or USB
- › Ethernet converters and modems are available

We reserve the right to alter specifications without notice

