Remote Road Surface State Sensor DSC111

DSC111 has proven its capabilities during intensive field testing in collaboration with Vaisala customers. The sensor is operational at hundreds of sites throughout the world.

The unique DSC111 eliminates the service disruption, which was previously associated with the installation of a road weather station. Remote installation means that there is no requirement to slot cut the surface or close the road. The sensor can be installed in a remote location on a pole adjacent to the road, or as an addition to Vaisala ROSA Road Weather Station.

The spectroscopic measuring principle enables accurate measurement of the amounts of water, ice, and snow. Water and ice are measured independently, enabling DSC111 to accurately report the surface state.

DSC111 provides an accurate measure of the presence of ice crystals well before they make the road slippery. The winter service engineer can therefore carefully monitor all of the weather elements which create a hazardous driving surface in order to take the appropriate remedial action. As an additional feature of DSC111, the visibility measurement offers a useful, compact, and extremely cost-effective way to measure the meteorological optical range (MOR). It extends the capabilities of DSC111 to detect low-visibility conditions - without any external hardware.

Additional sensors can be directly connected to DSC111 to form a versatile stand-alone weather station.

Measurements include:

- Surface and air temperature
- Surface depth temperature
- Relative humidity
- Present weather
- Visibility
- Wind speed and direction
- Atmospheric pressure

Features

- Remote surface state sensing
- Spectroscopic measuring principle individually identifies the presence of:
  - Water
  - Ice
  - Slush
  - Snow or Frost
- Unique measurement of grip
- Cost-effective visibility measurement
- Accurate measurement even with intense traffic
- Eye-safe laser technology
- Easy installation and service
- Low maintenance costs
- Weather-proof, durable design
- Easy integration with Vaisala ROSA Road Weather Station, or can operate as a stand-alone solution with solar/GSM options

Technical Data

Measurement Performance

Measuring distance with visibility observation disabled	2 ... 15 m (6 ft 7 in ... 49 ft 3 in)
Measuring distance with visibility observation enabled	8 ... 15 m (26 ft 3 in ... 49 ft 3 in)
Installation angle from the horizontal line	30 ... 80° (35 ... 65° recommended)
Diameter of measuring area at 10 m (33 ft)	20 cm (7.87 in)
Layer Thickness	
Water layer observation range	0.00 ... 2 mm (0.00 ... 0.06 in)
Ice layer observation range	0.00 ... 2 mm (0.00 ... 0.06 in)
Snow coverage observation range	0.00 ... 10 mm (0.00 ... 0.40 in)
Resolution	0.01 mm (0.0004 in)
Level of Grip	
Measurement range	0.01 ... 1.00
Resolution	0.01 units
Reported Surface States	
Vaisala classes	Dry, Moist, Wet, Frost [1], Snow, Ice, Slush
Visibility (Optional)	
Observation range (MOR) [2]	10 ... 2000 m (33 ... 6572 ft)
Resolution	1 m (3 ft 3 in)
Accuracy (fog and snowfall)	±20 % (average)
Response time	60 s

1) Frost is only reported when dew point and road temperature information is available.
2) Meteorological optical range

Operating Environment

Operating temperature	−40 ... +60 °C (−40 ... +140 °F)
Operating humidity	0 ... 100 %RH
EMC compliance (industrial environment)	EN/IEC 61326-1
Eye safety	EN/IEC 60825-1, Laser Class 1
Vibration	IEC 60068-2-6, level 2 g

Mechanical Specifications

Dimensions (H × W × D)	210 × 133 × 448 mm (8.27 × 5.24 × 17.64 in)
Weight	3.7 kg (8.16 lb)
Mounting	Fits on a sensor support arm with cross-section of 40 × 40 mm (1.57 × 1.57 in)
Cables	3 ... 150 m (9 ft 10 in ... 492 ft) One end without connector 0.6 m (1 ft 12 in) extension cable to DST111

Inputs and Outputs

Connectors	3 × M12 (5 pins) RS-232, male RS-485 and power out for DST111, female RS-485 and power in, male
Communication interface	RS-485 isolated, RS-232
Sensor support	DST111, PWD10/12/20/22, WXT530, HMP155
Input voltage	9 ... 30 VDC
Average Power Consumption	
Above −10 °C (+14 °F)	1.2 W
Below −10 °C (+14 °F)	Max. 1.9 W
With lens heating on	0 ... 4 W, user-adjustable

DST111 Remote Road Surface Temperature presented with DSC111 Remote Road Surface State Sensor.

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Published by Vaisala | B210470EN-C © Vaisala 2017