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DATASHEET

DSC211

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Remote Road State Sensor DSC211



DSC211 is the latest member of the DSC family with more sensitive measurement of the amount of water, ice, or snow on the road. Also, the improved autocalibration provides long-term stability by better adapting to the wear and tear of the road surface.

Features

- Measures the amount of water, ice, or snow on the road or runway surface
- Provides road state and grip based on the amount of water, ice, or snow
- Accurate and reliable measurements even with intense traffic
- Easy and low-cost installation and maintenance since there is no need for traffic control
- Can operate standalone, as a standalone solution with DST111, or as a sensor in a road weather station

Compared to its predecessor DSC111, DSC211 offers the following:

- Improved accuracy and sensitivity of the measurement of the amount of water, ice, or snow
- Enhanced autocalibration

No traffic disruption for installation or maintenance

The remote sensor DSC211 eliminates the traffic disruption caused by installation and maintenance. Remote installation means that there is no need to cut the road surface or to close the road. The sensor can be installed in a remote location to a pole adjacent to the road, or as an addition to Vaisala Road Weather Station RWS200.

Improved sensitivity for earlier warnings

The spectroscopic measuring principle enables accurate measurement of the amount of water, ice, or snow on the road surface. In addition, DSC211 provides road state and grip, which is a calculated estimate of friction.

DSC211 has a clearly improved sensitivity and accuracy compared to DSC111. It provides an accurate measurement of the presence of ice crystals well before they make the road slippery. The earlier warnings enable the winter maintenance engineer to react before the road becomes hazardous for drivers.

Frost detection and enhanced autocalibration

DSC211 requires air temperature, relative humidity, and road temperature observations from another sensor or system for frost detection and enhanced autocalibration. DSC211 can be connected to Vaisala Remote Road Temperature Sensor DST111, which provides these observations to DSC211.

For the most accurate and reliable observations, Vaisala recommends using DSC211 as a sensor in the Vaisala RWS200 or RWCC road weather station. RWS200 and RWCC automatically reports observation values from the most reliable sensor in the system, for example, air temperature and relative humidity from Vaisala HUMICAP® Humidity and Temperature Probe HMP155.

With certain limitations, DSC211 can be connected to Vaisala legacy road weather stations LX-RPU and ROSA.

Optional visibility measurement

The optional visibility measurement offers a useful, compact, and extremely cost-effective way to measure the meteorological optical range (MOR). The visibility measurement extends the capabilities of DSC211 to detect low visibility conditions – without any external hardware.

Upgrade from DSC111 to DSC211

Because DSC111 and DSC211 share the same hardware, you can usually upgrade your DSC111 to DSC211 just by purchasing the software. To make sure that your system configuration is compatible with DSC211, contact Vaisala.

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)
Surface layer thickness	
Water	0.00–2 mm (0.00–0.06 in)
Ice	0.00–2 mm (0.00–0.06 in)
Snow	0.00–10 mm (0.00–0.40 in)
Snow (water equivalent)	0.00–1 mm (0.00–0.04 in)
Accuracy, water and ice	±0.1 mm in the range of 0–1 mm (0–0.04 in)
Grip	
Reported level of grip	0.09–0.82
Reported surface states	
Vaisala classes	Dry, moist, wet, frosty [1], snowy, icy, slushy
EN 15518-3 classes	Dry, moist, wet, streaming water, slippery
Visibility (optional)	
Observation range (meteorological optical range, MOR)	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.

Inputs and outputs

Connectors	3 × M12 (5 pins): • RS-485 and power out for DST111, female • RS-485 and power in, male • RS-232, male
Communication interface	RS-485 isolated, RS-232
Sensor support	DST111
Input voltage	9–30 V DC
Maximum input current	0.25 A at 24 V
Date and time	Real-time clock with battery backup
Settling time before dry calibration	5 min
Typical power consumption at 24 V	
At above −10 °C (+14 °F)	1.13 W
At below −10 °C (+14 °F)	1.90 W
With lens heating on	5.25 W

Operating environment

Operating temperature	−40 … +60 °C (−40 … +140 °F)
Storage temperature	−55 … +60 °C (−67 … +140 °F)
Operating humidity	0–100 %RH
IP rating	IP65

Mechanical specifications

Dimensions (H × W × D)	210 × 133 × 448 mm (8.27 × 5.24 × 17.64 in)
Weight	Sensor: 3.0 kg (6.61 lb) Mounting bracket: 0.71 kg (1.57 lb)
Mounting	Fits on a support arm with cross-section of 40 × 40 mm (1.57 × 1.57 in)
Cables	3–150 m (10–492 ft) [1] One end without connector 0.6 m (1 ft 12 in) extension cable to DST111
Materials	
Weather shield	ABS plastic
Transmitter body	POM plastic
Fixture plate of the weather shield, bolts, screws, and washers	Stainless steel
Lenses and windows	Glass
Other parts	Aluminum

1) Cables longer than 50 m (164 ft) require a minimum of 24 V input.

Optics and radiation

Optical specification	
Light source	Near-infrared laser diodes
Detection of window contamination	Contamination level of the receiver window is measured
Wavelength	Laser 1: 1050–1400 nm Lasers 2 and 3: 1400–4000 nm
Radiation properties	
Beam divergence	±12 mrad
Pulse duration	0.55 ms
Pulse repetition rate	1 kHz
Maximum output	0.0077 W

Compliance

EU directives and regulations	Low Voltage Directive (2014/35/EU) EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) as amended by 2015/863
EMC immunity	EN 61326-1, industrial environment FCC part 15 B, Class B ICES-3 / NMB-3 (Class B)
EMC emissions	CISPR 32 / EN 55032, Class B
Vibration	IEC 60068-2-6
Eye safety	Class 1 laser product, IEC 60825-1:2014 (Edition 3.0) and EN 60825-1:2014 + A11:2021 Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019. CLASS 1 LASER PRODUCT
Application standards	EN 15518-3:2023, Winter maintenance equipment - Road weather information systems - Part 3: Requirements on measured values of stationary equipment

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