SNOdar Snow Depth Sensor

Overview

SNOdar is an insfrared based sensor for accurately and robustly monitoring snow depth and new snowfall in remote sensing applications, even during winter storm events.

Accuracy + Low Power + Low Cost!

SNOdar measures seasonal snow depth and snowfall. Simultaneously, it can relay data over a serial RS-232 or SDI-12 bus to commercially available telemetry, i.e. Satcom, data logger, or cell modem. Moreover, it can record an entire season of data on its internal, nonvolatile data logger so there is no need to pair every sensor with a separate data logger; therefore, resulting in large cost savings upon deployment.

Applications
SNOTEL Snow Depth Monitoring
Stormboard Snowfall Measurement
Avalanche Monitoring and Forecasting
DOT Road Conditions Monitoring
Ski Resort Snow Monitoring
Cornice Growth
General Snow Management

The sensor is small and lightweight, yet durable enough to monitor snow depth all season long at -40 degC and colder. The unit is typically powered from +12 VDC battery source and consumes less than 0.5 Watt on average. A small battery and solar panel (e.g. 50Ah + 10W) is all that is needed for seasonal deployment, depending on lattitude. The unit can be set up to operate as a distance sensor, stormboard snowfall sensor, or a seasonal snow depth sensor.

A powerful mobile App allows the user to quickly configure and deploy the unit as well as monitor real-time data when within Bluetooth range. As a stormboard sensor, view or download the latest storm snow total, wipe the board, and re-calibrate for the next snowfall event. Furthermore, within minutes of deployment set up the unit as a standalone depth/snowfall sensor and data logger. Return periodically with an App-enable mobile device to download the latest data and instantly upload the data to a cloud platform, of your choice, for viewing, management, or analysis.

Features

- Real-time, accurate snow depth information during storms and heavy snowfall
- Bluetooth Low Energy (BLE) enabled configuration, installation, and live display
- Seasonal internal data logger
- Seasonal snowfall totals, snow depth and new snowfall, even during heavy snowfall
- Model-based Snow Water Equivalent (SWE)
- SDI-12 data logger connectivity
- RS-232 Satcom connectivity
- Sensor orientation monitoring
- Normal or oblique angle mounting (up to 30 degrees) - mounting on inclines or stormboards
- Low power deployment, ≤ 500 mW average consumption

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Specifications

Parameter	Description	Min	Max	Units
Input Voltage	Input voltage range (VDC)	6	24	volts
Operating Temperature	Outside, ambient operating temperature range	-40	60	deg C
Storage Temperature	Inside, ambient storage temperature range	-40	85	deg C
Mechanical Vibration	Mil-STD-883D, Method 2007.2, 20 to 2000 Hz		20	g
Mechanical Shock	Mil-STD-883D, Method 2002.3, 1 msec, 1/2 sine, mounted		500	g
Ingress Protection	Dust tight. Immersion, up to 1 meter depth	IP67		
Corrosion Resistance	MIL-A-8625, Hard-anodizing process (6061 T6)	Type II		
Accuracy	Typical deviation from absolute depth	+-1	+-2	cm
Resolution	Minimum detectable depth change	0.3	1	cm
Range	Distance from snow target	0.09	9	meters
Measurement Interval	1 minute granularity	1	60	minutes
Current Consumption	@ 12 VDC, with Heater ON	0.250	0.260	amps
Current Consumption	@ 12 VDC, with Heater OFF (Idle, Active)	0.035	0.045	amps
Power Consumption	Max measured with heater ON	0.42	3.2	watts
Average Power	Typical average seasonal power usage	0.5		watts
Weight	Without and with mounting clamp, respectively	265	375	grams
Size	6.3 x 6.3 x 9.5 (W x L x H)			cm
Obliqueness	From vertical, angle slant relative to measuring surface	-30	30	degrees

Electrical Interfaces

Wired

The communication standards accessible on the cable allow for rapid deployment with COTS telemetry devices.

- 1 RS-232 port (common among commercial Satcom / LTE modems)
- 1 SDI-12 port (common among remote sensors and commerical data loggers)

Wireless

Bluetooth Low Energy (BLE) 5.x

- 2 Mbps PHY capable, up to 50 meters Line-of-Sight (LOS)
- Long Range 125 Kbps PHY, up to 250 meters LOS
- The wireless connection allows for quick setup and calibration, data monitoring and sharing.

Regulatory Compliance & Certifications

Full Compliance

EMC

- FCC 15B and ISES-003 Issue 7
- CISPR 32:2015 / CENELEC EN 55032:2015
- CISPR 35:2016 / CENELEC EN 55035:2017
- ETSI EN 301 489-1 v2.2.3:2019
- ETSI EN 301 489-17 v3.1.1:2020

RoHS

IP67

- IEC 60529 Section 13.4, 13.6
- IEC 60529 Section 14.2.7

Safety

- IEC 61010-1:2010
- IEC 61010-1:2010/AMD1:2016

CE

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