

SNOdar Snow Depth Sensor

Overview

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

Accuracy + Low Power + Low Cost!

SNOdar measures seasonal snow depth and snowfall. Additionally, it relays data over a serial RS-232 or SDI-12 bus to commercially available telemetry, i.e. Satcom, data logger, or cell modem. Or, it can be paired via Bluetooth (BT) with our LTE-M Gateway for cloud backhaul and storage. Moreover, it can record an entire season of data on its internal, nonvolatile data logger so no external data logger is necessary, 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, lightweight, and low power, yet durable enough to monitor snow depth all season long at -40°C and colder. The unit is typically powered from a +12 VDC battery source, and on average consumes less than 0.5W. A small battery and solar panel (e.g. 50Ah + 10W) is all that is needed for seasonal deployment, depending on latitude and sky view.

The unit operates in 3 distinct modes: distance, stormboard, or snow depth.



A powerful mobile App allows the user to quickly configure and deploy the unit, as well as monitor real-time data in BT range. As a stormboard sensor, view or download the latest storm snow total, wipe the board, and re-calibrate for the next snow-fall event. Furthermore, within minutes of deployment set up the unit as a standalone depth/snowfall sensor and data logger. Return periodically to download the latest data in a standardized format and upload the data to a cloud platform of your choice for viewing, management, or analysis. Alternatively, use the Chairlift LTE-M Gateway Modem to automatically pair and upload your snow data as a set-and-forget option. Use our dashboard or developer API to access your secure data in real-time.



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Features

- Real-time, accurate snow depth information during storms and heavy snowfall (NO post-processing necessary)
- Bluetooth Low Energy (BLE) enabled configuration, installation, and live display
- Seasonal internal data logger
- Seasonal snow depth and new snowfall, even during heavy snowfall and storm events
- Seasonal snowfall totals
- Model-based Snow Water Equivalent (SWE) (*upgrade, coming soon!)
- SDI-12 data logger connectivity with commercially available devices (e.g. CSI CR6)
- RS-232 Satcom connectivity with commercially available devices (e.g. Rockblock Iridium)
- Sensor orientation monitoring (e.g. high snow load, high wind, tower shifting)
- Normal or oblique angle mounting (up to 30 degrees) for flexible mounting locations on inclines or stormboards
- Low power deployment, ≤ 500 mW average consumption

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 commercial data loggers)

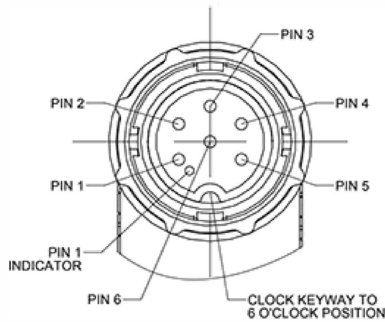
Wireless

Bluetooth Low Energy (BLE) 5.x

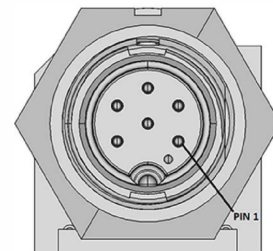
- 2 Mbps PHY capable, up to 50 meters Line-of-Sight (LOS)
- Long Range 125 Kbps PHY, up to 250 meters LOS
- The wireless connection allows for quick setup and calibration, data monitoring and sharing.

Pin Configuration

SNOdar Pin Name	SNOdar Pin NO.	Cable Pin NO.	Cable Color
GND	1	1	BLACK
PWR + 12V	2	2	WHITE
GND	3	3	GREEN
SDI-12	4	4	RED
TX: RS-232	5	5	BLUE
RX: RS-232	6	6	VIOLET



Mating Cable Pinout



Sensor Pinout

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

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

RoHS

