Remote Monitoring Solution

Sensors Technical Datasheets:

PRO Temperature Probe

IPROBE-4000-0001

Probe Length & Diameter	Stainless probe: 25mm, Ø 4mm (1”, Ø 0.16”)
Cable Length	304cm (10ft)
Measurement Range	-30°C to +150°C (-22°F to +302°F)
Accuracy	±0.2°C (±0.4°F) at 25°C (77°F)
Response Time (to reach 90%)	In water, with stirring: <10sec
Display Resolution	0.1°C (0.1°F)

RTD - Ultra Low Temperature Probe

IPROBE-4101-0001

Probe Length & Diameter	Stainless probe: 25mm, Ø 4mm (1”, Ø 0.16”)
Cable Length	183cm (6ft)
Measurement Range	-200°C to +150°C (-328°F to +302°F)
Accuracy	±0.2°C (±0.4°F) at 25°C (77°F)
Response Time (to reach 90%)	In water, with stirring: <10sec
Display Resolution	0.1°C (0.1°F)
Optional DI (Digital Input)	dry contact available

Temperature and Relative Humidity Connector

IPROBE-4000-0004

Dimensions	28mmx10mmx10mm
Temperature Measurement Range	-40°C to +125°C (-40°F to +257°F)
Accuracy	±0.3°C (±0.5°F)
Relative Humidity Range	0 to +100% RH
Response Time (to reach 66%)	5 to 30sec for T; 8sec for RH
Display Resolution	0.1°C (0.1°F)

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RTD Temperature Probe with Dry Contact

IPROBE-4101-0004

Probe Length & Diameter	Stainless probe: 25mm, Ø 4mm (1", Ø 0.16")
Cable Length	183cm (6ft)
Measurement Range	-200°C to +150°C (-328°F to +302°F)
Accuracy	±0.2°C (±0.4°F) at 25°C (77°F)
Response Time (to reach 90%)	In water, with stirring: <10sec
Display Resolution	0.1°C (0.1°F)
Optional DI (Digital Input)	dry contact available

Door Contact

Circuit type	Open loop
Operation gap	½"(13mm)
Color	White
Terminals	Screw-type
Mounting Tabs	Yes
Case	High-impact ABS plastic
Contacts	Deactivated rhodium on gold under-plating
Contact rating	0.1A@100VDC (max), 1.0A@10VDC (max), 10W (max)
Temperature	-15°~160°F (-25°~70°C)
Switch cycles	50 Million (0.1mA@5VDC)
Switch Dimensions	21/2''x9/16''x1/2'' (63.5x14x13mm)
Magnet Dimensions	21/2''x1/2''x1/2'' (63.5x13x13mm)
Magnet Type	Ferrite

Large Range CO2 Probe (0-30%)

IPROBE-4400-0002

Probe Dimensions	7.6cm x 9.5cm x 3.8cm (3” x 3.75” x 1.5”)
Cable Length	100cm (~39”)
Operating Principle	Non-dispersive infrared (NDIR)
Measurement range CO2	0 to 30%vol(CO2)
Measurement RH	0 to 100% (non-condensing)
Measurement range °C	-40 to 60 °C
Accuracy	± 0,25vol ± 3% of reading
Operation temperature range	0 to 50 °C
Operation humidity range	0 to 95% RH (non-condensing)
Display Resolution	0.1°C (0.1°F)

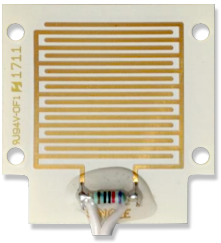
Ambient CO2 Probe

IPROBE-4400-0001

Probe Dimensions	7.6cm x 9.5cm x 3.8cm (3” x 3.75” x 1.5”)
Cable Length	100cm (~39”)
Operating Principle	Non-dispersive infrared (NDIR)
Measurement range CO2	0 to 5000 ppm (CO2)
Measurement RH	0 to 100% (non-condensing)
Measurement range °C	0 to 50 °C
Accuracy	± 30ppm ± 3% of reading
Operation temperature range	0 to 50 °C
Operation humidity range	0 to 80% RH (non-condensing)
Display Resolution	0.1°C (0.1°F)

Water (Leak) detection Probe

IPROBE-4200-0001



Impedance range	0Ω to 2MΩ (Lower limit theoretical)
Accuracy	1.8V
Maximum Current	<0.18mA
Response Time (to reach 66%)	10ms

Differential Pressure, +/- 125 Pa

XTEMP-4000-0020

Output	I2C
Pneumatic Connection	Manifold or Tube
Pressure range (bidirectional)	125 Pa 0.5” H2O
Accuracy of measured value	3%
Lowest detectable pressure	< 0.01 Pa
Measurement speed	0.5 ms
Calibrated for	Air, N2
Gas compatibility	Air, inert gas
Dimensions	29mmx18mmx25.4mm

Differential Pressure, , +/- 500 Pa

XTEMP-4000-0021

Output	I2C
Pneumatic Connection	Manifold or Tube
Pressure range (bidirectional)	500 Pa 2” H2O
Accuracy of measured value	3%
Lowest detectable pressure	< 0.02 Pa
Measurement speed	0.5 ms
Calibrated for	Air, N2
Gas compatibility	Air, inert gasses
Dimensions	29mmx18mmx25.4mm

Miscellaneous

Recommended Buffer Solutions
Glycol, Glass Beads, IceClear PGX. Specify buffer solution on order.

NIST or **NIST-ILAC** Certification available

IceClear PGX for -30C to +90C
Wax beads for < -30C

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Oxygen Sensor

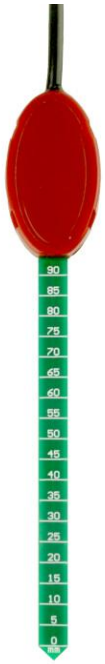
IPROBE-4400-0003

Output	I2C
Detected Gas	O2
Measurement range	0-25% Vol
Maximum Measurement limit	30% Vol
Response time	≤15 s
Repeatability (precision)	<2% of reading
Resolution	0.15% Vol
Stability (per month)	<2%
Zero drift (-20°C to 40°C)	≤0.1% Vol
Storage Temperature	-20°C to 50°C
Storage Humidity	0 to 100% Relative Humidity
Pressure range	Standard atmospheric pressure ± 10%
Anticipating using life	2 years
Dimension (L x W x H)	37 x 27 x 24.5 mm
Weight	~37g

Soil Moisture Sensor

IPROBE-4200-0002

Supply Voltage	3.5 to 20V
Output	0 to 3V
Power consumption	< 13mA
Measurement range	0-100% Volumetric Water Content (VWC)
Response time	400 ms
Accuracy at 25°C	2%
Operational Temperature	-40°C to 85°C
Operational Humidity	0 to 100% (Waterproof)
Dimension (L x W x H)	See drawing
Weight	~65g



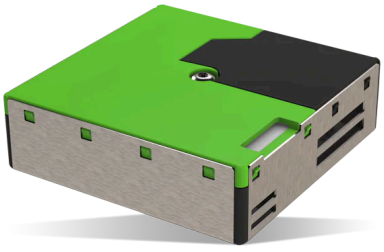
Water Level Sensor

IPROBE-4200-0003

Supply Voltage	3.5 to 20V
Output	0 to 3V
Power consumption	1.2mA
Measurement range	0-100% relative to calibration length
Resolution	0.1% of the calibrated length
Response time	400 ms
Accuracy at 25°C	2%
Operational Temperature	-40°C to 85°C
Operational Humidity	0 to 100% (Waterproof)
Dimension (L x W x H)	See drawing
Weight	~65g

PM Sensor

XPM-1000-0001



Dimension	41 x 41 x 12mm
Weight	28gm
Measurement Method	Laser Scattering (600nm Wavelength)
Particle Sizes	PM0.5, PM1, PM2.5, PM4, PM10
Number Concentration	0-3000/cm3
Mass Concentration	0-1000microgram/m3

Coming soon **VOC** (volatile organic compound) and **NOx** sensors.

Contact us for specialty sensors:

Pipe sensor (measures pipe surface temperature), **Capture display reading** (using a camera and converting to digital reading), **Water Turbidity**, **Dissolved oxygen** and **Corrosion.**

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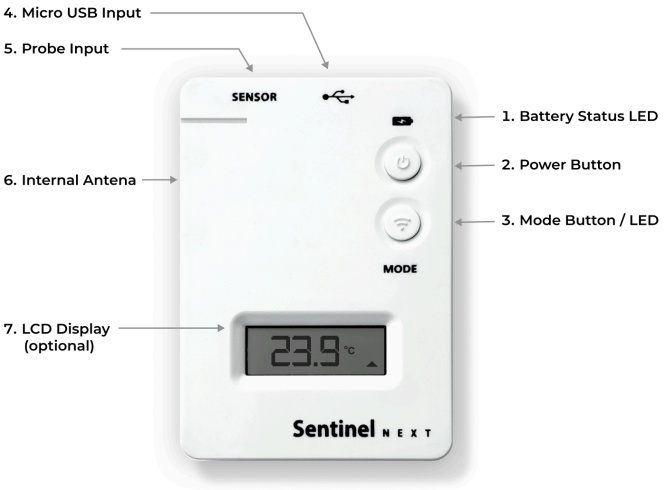
Sentinel NEXT 1S

Monitor environment - Use low power **Wi-Fi**

Product Number: **XTEMP-3101-0000**

Specifications

Dimensions (HxWxD)	89mm x 60mm x 20mm (3.50” x 2.36” x 0.78”)
Weight	102g (3.60 Oz)
Connectors	10-pin Sensor Connector; micro USB for Charging
Battery	Integrated 1000mAh Rechargeable Li-Ion Battery
Wi-Fi Protocols	IEEE 802.11b/g/n
Wi-Fi Models Supported	Wi-Fi Direct, Infrastructure, Remote
Wi-Fi Encryption	WEP, WPA/WPA2 Personal, PEAPv0, PEAPv1, EAP-TLS
On Board Data Storage	>2 months with a Once/Minute Sampling Rate
Operating Temperature	0°C to 40°C on Charger -20°C to 60°C on Battery only
Non-operating Temperature	-30°C to 70°C
Relative Humidity	10% to 90%
Certifications	FCC, CE



Software to View Data

Cloud, Enterprise or App based solution available

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Sentinel NEXT 1S LTE

Monitor environment - **LTE (cell)**

Product Number: **XTEMP-3201-0000**

Specifications

Dimensions (HxWxD)	89mm x 60mm x 25mm (3.50” x 2.36” x 0.98”)
Weight	102g (3.60 Oz)
Connectors	10-pin Sensor Connector; micro USB for Charging
Battery	Integrated 1000mAh Rechargeable Li-Ion Battery
LTE radio technology	LTE Cat M1
LTE Band	12 (also supported: 1, 2, 3, 4, 5, 8, 13, 18, 19, 20, 25, 26, 28)
Internal Flexible Antenna	Wideband 698-3000MHz
Operator	T-Mobile
Wi-Fi Protocols	IEEE 802.11b/g/n
Wi-Fi Models Supported	Wi-Fi Direct, Infrastructure, Remote
Wi-Fi Encryption	WEP, WPA/WPA2 Personal, PEAPv0, PEAPv1, EAP-TLS
On Board Data Storage	>2 months with a Once/Minute Sampling Rate
Operating Temperature	0°C to 40°C on Charger -20°C to 60°C on Battery only
Non-operating Temperature	-30°C to 70°C
Relative Humidity	10% to 90%
Certifications	FCC, CE

Software to View Data

Cloud, Enterprise or App based solution available.

SENSOR
PRODUCT LIST

Ref ID	Name	Probe ID	Range	Notes
SNT-X/RTD-X	**Sentinel Next 1S base unit**	XTEMP-3101-0000	No Probes	Base WiFi communication unit
SNT-X/RTD-X	**Sentinel Next 1S LTE base unit**	XTEMP-3201-0000	No Probes	LTE communication unit
Probe-SNT-X-1	**PRO Temperature Probe System, single**	IPROBE-4000-0001	-30°C to +150°C	Single temperature adaptor + 1m probe
Probe-SNT-X-2	**PRO Temperature Probe System, dual**	IPROBE-4000-0010	-30°C to +150°C	Dual temperature adaptor + 1m probe
Probe-RTD-X-1	**RTD, Single Adaptor + 6ft Probe**	IPROBE-4101-0001	-198°C to +150°C	Single Ultra Low Temp system
Probe-RTD-X-2	**RTD, Dual Adaptor + 6ft Probe**	IPROBE-4102-0001	-198°C to +150°C	Dual Ultra low Temp System
Probe-RTD-X-1-A	**RTD, Single Adaptor Only**	IPROBE-4101-0001-A	No Probes	Standard Audio Jack on Adaptor for Probe
Probe-RTD-X-2-A	**RTD, Dual Adaptor Only**	IPROBE-4102-0001-A	No Probes	Standard Audio Jack on Adaptor for Probe
Probe-RTD-X-1-DC-A	**RTD, Single Adaptor + Dry Contact**	IPROBE-4101-0002-A	No Probes	Standard Audio Jack on Adaptor for Probe
Probe-RTD-X-2-DC-A	**RTD, Dual Adaptor + Dry Contact**	IPROBE-4102-0002-A	No Probes	Standard Audio Jack on Adaptor for Probe
Probe-RTD-X-6-P	**RTD Probe only, 6ft**	IPROBE-4100-000-6-P	-198°C to +150°C	Probe length 6ft
Probe-RTD-X-10-P	**RTD Probe only, 10ft**	IPROBE-4100-000-10-P	-198°C to +150°C	Probe length 10ft
Probe-RTD-X-1-DC	**RTD Probe only with, single Dry Contact**	IPROBE-4101-0002	-198°C to +150°C with dry contact	Specify Dry Contact when ordering
Probe-RTD-X-2-DC	**RTD Probe only with, dual Dry Contact**	IPROBE-4102-0002	-198°C to +150°C with dry contact	Specify Dry Contact when ordering
Probe-DC-X-1	**Single Dry Contact only**	IPROBE-4300-0001	No Probes	Specify Dry Contact when ordering
Probe-DC-X-2	**Dual Dry Contact only**	IPROBE-4300-0002	No Probes	Specify Dry Contact when ordering
Probe-SHT	**T/RH Connector: Temp & RH**	IPROBE-4000-0004-1	0°C to +40°C 0 to +100% RH	RH is relative Humidity
Probe-SHT+	**T/RH Probe: Temp & RH**	IPROBE-4000-0004-2	-40°C to +125°C 0 to +100% RH	Recommended for use: 10C to 30C
Probe-SNT-X-2-SHT	**"PRO Temperature probe, dual with T/RH connector"**	IPROBE-4000-0011	T probes: -30°C to +150°C T/RH connector: 0°C to +40°C"	2 Temp Probes with T/RH connector; RH is 0 to +100%
Probe-SNT-X-CO2-PLUS	**Large Range CO2 Probe with T/RH**	IPROBE-4400-0002	0-30% CO2; 0 to 100% RH 0°C to 50°C"	
Probe-SNT-X-CO2-Amb	**Ambient CO2 Probe with T/RH**	IPROBE-4400-0001	0 to 5000 ppm (CO2) 0 to 100% RH; 0°C to 50°C	
Probe-SNT-X-WET	**Water (Leak) detection Probe**	IPROBE-4200-0001	0Ω to 2MΩ	
Probe-DPS-X-125	**Differential Pressure, +/- 125 Pa**	IPROBE-4000-0020	125 Pa (0.5 in. H2O)	Manifold or Tube; Calibrated for Air, N2
Probe-DPS-X-500	**Differential Pressure, , +/- 500 Pa**	IPROBE-4000-0021	500 Pa (2 in. H2O)	Manifold or Tube; Calibrated for Air, N2

SNAP
CALIBRATION PARTS

Ref ID	**Name**	Probe ID	Range	Notes
Probe-RTD-X-1-A-M	**RTD Single Adaptor with 1m Cable and Premium connector**	IPROBE-4101-0003-A	No Probes	Probe tip with connector order separately
Probe-RTD-X-1-DC-A-M	**RTD Single Adaptor + Dry contact with 1m Cable and Premium connector**	IPROBE-4101-0002-M	No Probes	Probe tip with connector order separately
Probe-RTD-X-1-A-H	**RTD Single Adaptor with 1m Cable and Standard connector**	IPROBE-4101-0003-H	No Probes	Probe tip with connector order separately
Probe-RTD-X-1-DC-A-H	**RTD Single Adaptor + Dry contact with 1m Cable and Standard connector**	IPROBE-4101-0004-H	No Probes	Probe tip with connector order separately
Probe-RTD-P-M	**RTD Probe tip only with 1m Cable and Premium connector**	IPROBE-4101-0002-P	-198°C to +150°C	Use with IPROBE-4101-0003-A or IPROBE-4101-0002-M
Probe-RTD-P-H	**RTD Probe tip only with 1m Cable and Standard connector**	IPROBE-4101-0003-HP	-198°C to +150°C	Use with IPROBE-4101-0003-H or IPROBE-4101-0004-H
Probe-SNT-X-1-A-M	**PRO Single Adaptor with 1m Cable and Premium connector**	IPROBE-4000-0001-C	No Probes	Probe tip with connector order separately
Probe-SNT-X-1-DC-A-M	**PRO Dual Adaptor with 1m Cable and Premium connector**	IPROBE-4000-0010-D	No Probes	Probe tip with connector order separately
Probe-SNT-X-1-A-K	**PRO Single Adaptor with 1m Cable and Standard connector**	IPROBE-4000-0001-K	No Probes	Probe tip with connector order separately
Probe-SNT-X-1-DC-A-K	**PRO Dual Adaptor with 1m Cable and Standard connector**	IPROBE-4000-0010-KD	No Probes	Probe tip with connector order separately
Probe-SNT-P-1-M	**PRO Single Probe tip with 1"" Cable and Premium connector**	IPROBE-4000-0001-P	-30°C to +150°C	Use with IPROBE-4000-0001-C or IPROBE-4000-0010-D
Probe-SNT-P-4-M	**PRO Single Probe tip with 4"" Cable and Premium connector**	IPROBE-4000-0001-P2-0	-30°C to +150°C	Use with IPROBE-4000-0001-C or IPROBE-4000-0010-D
Probe-SNT-P-1-K	**PRO Single Probe tip with 1"" Cable and Standard connector**	IPROBE-4000-0001-KP	-30°C to +150°C	Use with IPROBE-4000-0001-K or IPROBE-4000-0010-KD
Probe-SNT-P-4-K	**PRO Single Probe tip with 4"" Cable and Standard connector**	IPROBE-4000-0001-P2-K	-30°C to +150°C	Use with IPROBE-4000-0001-K or IPROBE-4000-0010-KD

OTHER
ACCESSORIES

Door contact	**Door-Alarm**	HW-DOOR-CONTACT		Use with Dry contact
Probe-SHT+	**T/RH Probe: Temp & RH**	IPROBE-4000-0004-2	-40°C to +125°C 0 to +100% RH	Recommended for use: 10C to 30C
Glycol bottle	**Gly-bot**	XACCES-1000-0001		IceClear PGX for temperatures > -30C; Wax beads for temperatures < -30C

Remote Monitoring Solution

Communication	Sensors	Software
Wi-Fi	Temperature	Push notification alarms
LTE (cell)	Relative Humidity	Sensor signing
Bluetooth	Differential Pressure	Graphs/Data
	and many more...	Sensor Health

Aginova **Remote Monitoring Solution** is designed for the scientific, business and technology needs of the Pharmaceutical, Blood Bank, Biotech, Hospitals, Pharmacy and Life Sciences industries.
The solution is **21 CFR Part 11 compliant**.

Remote Monitoring with **WiFi**
Sentinel Next 1S

Uses your existing WiFi network to monitor across all your facilities. Automates monitoring of temperature, humidity, differential pressure, CO2 and more to meet compliance standards with 24/7 real-time continuous monitoring. Alerting system uses emails, text messages and APPs for notifications. The system meets 21 CFR 11 requirements, are ideal for monitoring of refrigerators, freezers and ultra low freezers

Remote Monitoring with **LTE**
Sentinel Next 1S LTE (cell)

Uses the cell phone network to monitor across all your facilities thereby eliminating IT security concerns, network performance issues and support commitment from IT. Automates monitoring of temperature, humidity, differential pressure, CO2 and more to meet compliance standards with 24/7 real-time continuous monitoring. Alerting system uses emails, text messages and APPs for notifications. The system meets 21 CFR 11 requirements, are ideal for monitoring of refrigerators, freezers and ultra low freezers.

Datalogging with **Bluetooth**
Sentinel Trace, IPM and Inspector

Datalogging thermometer that meets 21 CFR 11 requirements, are ideal for monitoring temperatures in refrigerators, freezers, water baths, heating blocks, and incubators.

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Remote Monitoring Solution

+ COMUNICATION

1. Network

The sensor communicates using WiFi Protocols (IEEE 802.11b/g/n) OR the LTE cell phone network. A key feature of our WiFi communication is that it supports a myriad of encryption including WEP, WPA/WPA2, PEAP, EAPTLS.

Therefore, our sensors can easily operate in any corporate or enterprise network. On board data storage with the store-and -forward feature prevents any data loss in case of network problems. Use of WiFi or LTE network eliminates the need for any gateway device. The sensors can communicate directly to the Cloud.

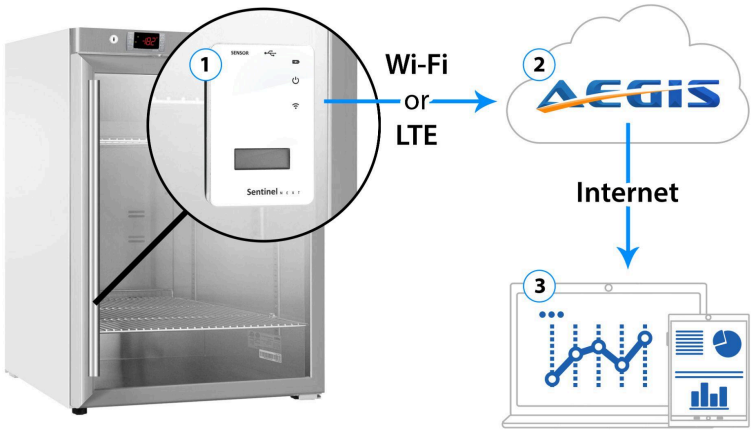


TABLE 1: The comparator below will help you choose which wireless network meets your technical and business needs

	WiFi	LTE (Cell Phone)
Customer IT Support	Required	Not Needed
Connectivity	Depends on WiFi Network	Depends on Cell Signal
Security	Corporate Policy	Same across the Country
Power failure on-site	Sensor will be offline	Sensor will be still online
Cost	No Cost	Small Monthly Cost

2. Cloud

The IoT cloud platform is unique because it has an ingestion engine that supports virtually unlimited number of sensors across a distributed network over many locations. An additional benefit of this platform is the possibility for users to develop prediction models for a particular use case using the AI and machine learning modules.

3. Dashboard

From the cloud the sensor data is moved to a dashboard for data visualization, alerting and reporting. Alerting engine includes emails,text messages and phone call with escalations. Custom reporting features, for any particular domain, can be created on the dashboard. Another unique feature of the dashboard is to track annual sensor certifications and validation procedures. In addition the ability to visualize assets and its maintenance procedures is very useful. Custom workflows can be implemented.

Remote Monitoring Solution

+ SENSORS

The sensors are modular in design with a digital interface for different types of sensor probes such as T, RH, CO2, Differential pressure and more.

The sensor platform is modular which makes easy addition of sensors, including any off-the-shelf sensor with customization. Several diagnostic tools have been developed to measure the sensor health remotely allowing the solution to be implemented on a large scale.

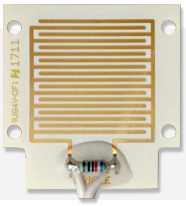
Temperature
Sensors

Relative humidity
Sensors

Differential Pressure
Sensors

Oxygen
Sensors

CO2
Sensors



Leak
Sensors

Moisture
Sensors

and more
+custom solutions

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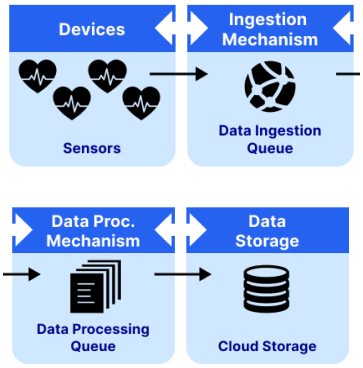
Remote Monitoring Solution

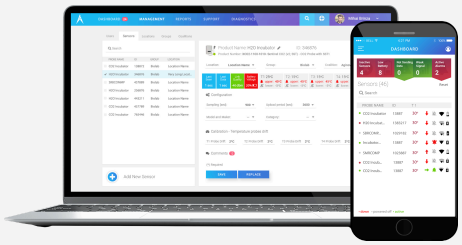
+ SOFTWARE

The software **complies with 21 CFR Part 11**.
It meets GMP standards and is used by Hospitals, Clinics, Pharma and Research Institutions.

Cloud Services	Dashboard	APPs
MQTT communication	Visualize sensor	iOS and Android
IoT Ingestion Engine	Group/Location/Asset	Sensor Configuration Wizard
Data Storage	Alarming and Alerting	Quickview Sensor Status
No limits to number of sensors	Individual & Aggregate Report	Alarm Notifications



Sensors communicate to the cloud using MQTT via either using WiFi or LTE cell network. No data is lost. All sensor communications can be seen in the cloud for updating firmware, debugging and diagnostics purposes. The system can be scaled to 100,000+ sensors instantly by allocating more resources on the server. The diagram shows the data flow from the sensor to the cloud.



The dashboard sits on top of the Data storage system. It is designed to help the user set sensor parameters, visualize data through graphs and tables, aggregate reports for managers and manage alarms.

Features include:

- User management
- Sensor management
- Alarm management
- Graphs / Data (exporting)
- Sensor Diagnostics
- Admin reports
- Sensor Health
- Sensor Signing
- Manage NIST Certificates
- Alarm Statistics
- Custom Reports and Workflows

Sensor configuration Wizard is an APP to test your network to cloud connectivity, configure sensors in the field and perform advanced diagnostics in case of communication malfunction

Sentinel Next APP provides a quick view of the sensor reading, graph, health and status of the alarms. The alarms can also be acknowledged from the APP. In addition, it can be used to validate sensors in the field.

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