

Refrigerator & Freezer Monitoring Transceiver Node

Wireless Temperature,
Power, Open Door –
Refrigerator & Freezer

Phase IV Data Sheet Leap Sensors® Refrigerator & Freezer Transceiver Node

Applications

- **Pharmaceutical & Laboratory Industries:** medicine or other critical asset low temperature storage monitoring
- **Food and Beverage Industry:** product monitoring in refrigerators and freezers
- **Grocery Industries:** monitoring of refrigerated food shelf items
- **Hospital Cooler Monitoring:** track refrigerator / freezer opening frequency and medicine temperatures

Special Features

- Transmission range of 1,500 ft. in open air
- 1 or 2 temperature sensors
- 0 to 2 door open sensors
- Wall power option also monitors power outages
- Replaceable calibrated probe tip (optional)
- Edge computing for small, actionable data
- Configurable sample and transmit intervals to fit many application requirements
- Preconfigured to pair with new or existing gateway for simple integration – up and running in 5 minutes
- LED indicators for power, network connection, gateway connection, and database connection status

Description & Product Highlights

Phase IV's Leap Sensors Refrigerator & Freezer Monitor Node is the perfect tool for asset monitoring inside of a refrigerator or freezer. The system includes a digital temperature sensor, a door open sensor and timer, and an optional wall outlet power sensor to monitor outages. These sensors together offer a full monitoring system to protect critical and temperature sensitive products and give the ability to diagnose reasons for failure to prevent them from recurring.

Additional accessories enhance the effectiveness of this monitoring system. The flat ribbon cable adaptor allows the temperature sensor to be minimally invasive to the sealing gasket of the refrigerator or freezer, and the FDA recommended thermal buffer greatly reduces false alert messages when the door is briefly opened.

The open door sensor also forces a timer start condition when it is opened, giving the internal door timer millisecond accuracy.

The Leap Sensors system is intended primarily for the purpose of performing industrial sensor measurements.



Refrigerator & Freezer Transceiver Node Model

Modularity and customizability

Each refrigerator monitoring device can be custom configured to include a door open switch and timer, a replaceable calibrated probe tip, and a wall power sensor. This ensures that this device can meet any and all refrigerator and freezer monitoring applications. Interfacing multiple sensors to one transceiver node provides a substantial ROI compared to individual sensing devices.

Ease of implementation

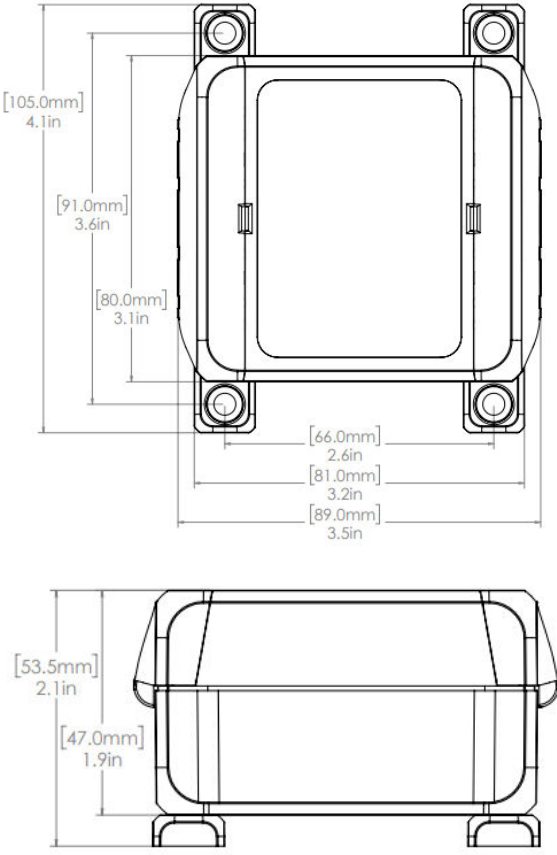
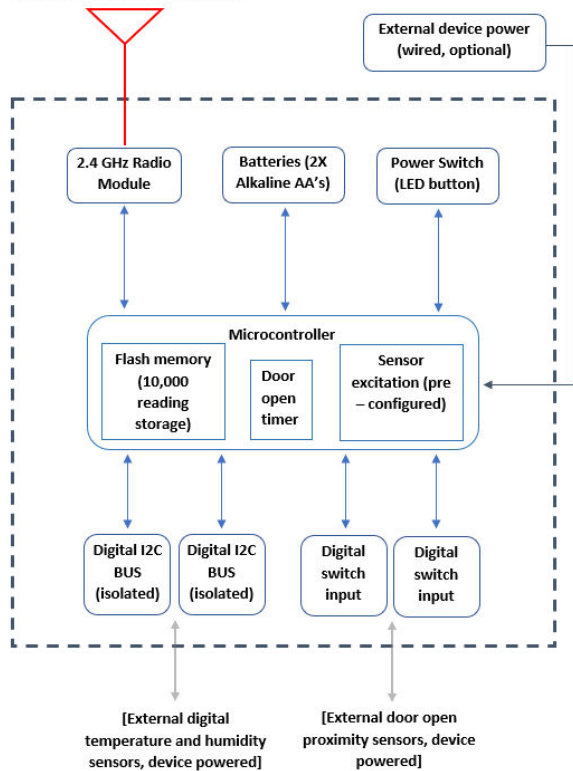
All Leap Sensors device nodes come pre-configured and paired with selected Leap Sensor gateways for quick and simple integration into an existing Leap Sensor system, or to function as a new stand-alone system. The Refrigerator & Freezer monitoring system comes with an optional replaceable calibrated probe tip, simplifying calibration procedures, ensuring traceability, and drastically reducing lead times.

Real-time data viewing and alerts

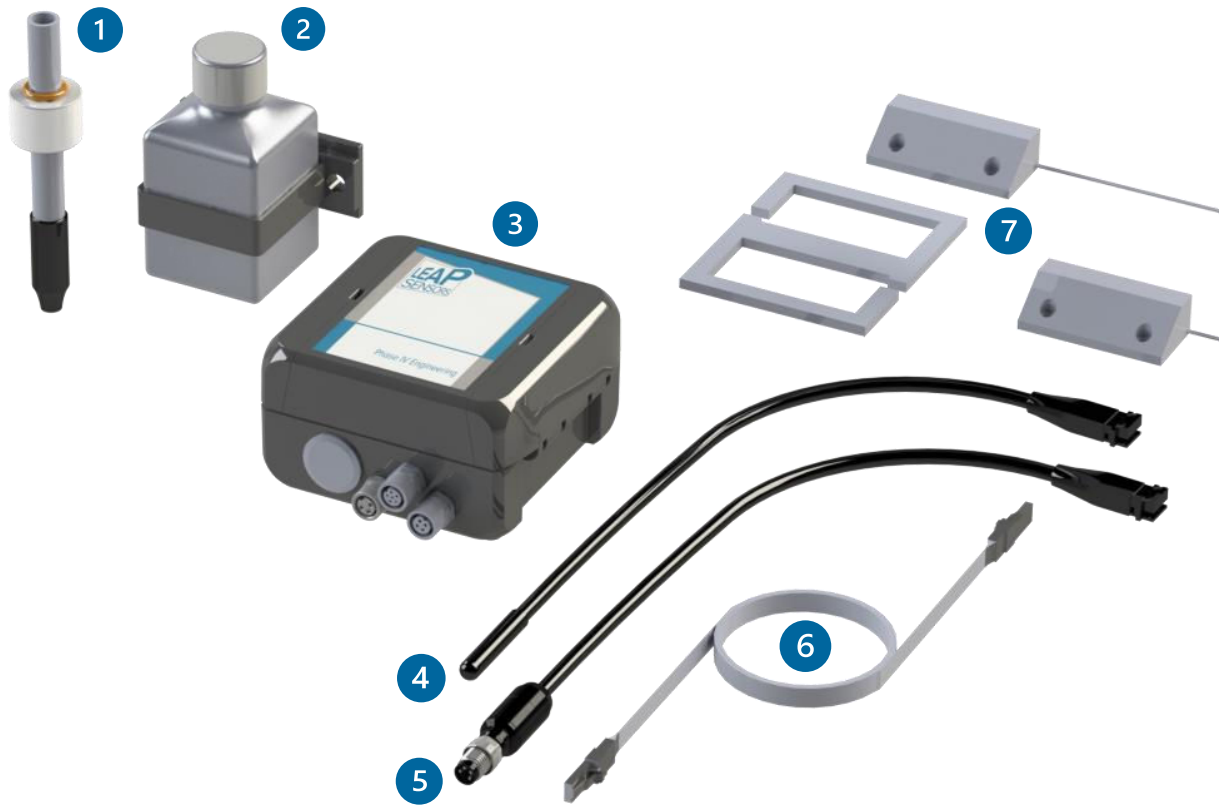
All Leap Sensors nodes stream data to Leap Sensors gateway devices at configurable intervals. This data is accessible and viewable in real time. In addition to real-time viewing and graphing of sensor parameters, alerts based on any sensor condition are configurable, and can be sent via phone call, email, or text for instant communication of a sensor reaching an alert condition.

Leap Sensors® Refrigerator & Freezer Monitor Node Specifications		
Digital Temperature Sensor Specifications		
Sensor Head Dimensions	0.25" Diameter, 1.25" Length	
Sensing Range	-40 °C to 85 °C, -40C to 120C available – special order	
Accuracy	+/- 0.2 °C verified at -20C, 5C, & 25C (NIST traceable probe)	
Connector Interface	Industrial IP67 4 pin M8 connector option	
Door-Open Sensor Specifications		
Sensor Head Dimensions	1.875" x .9375" x .5625" (Mounting footprint: 1.875" x .9375")	
Mounting	3M adhesive and spacing bracket (optional)	
Response Time	~50 ms	
Connector Interface	Industrial IP67 6 pin M8 connector option	
Power Specifications		
Battery Power	2 X AA alkaline batteries, 5700 mAh	
Battery Life	4-5 years at 10-minute sample and transmit intervals	
Power / Current Consumption	Low sleep current assures long life Typical Operating Current: 6mA - 30mA (depending on sensors) Typical Transmit Current: 9mA @ 0dBm and 80mA @ 20 dBm RX Current: 11 mA	
Optional Wall Power Specifications		
Power Adaptor	5 VDC, 1500 mW max	
Barrel Jack	2.5 mm ID barrel connector (5 VDC - 3A AC/DC converter included)	
Wireless Specifications		
Wireless Transmission Range	Industrial Environments**	Open-Air**
	500 ft	1,500 ft
Range Extenders	Range extenders available to extend transmission distance.	
RF Transmission Power	User configurable 0-20 dBm, factory configured to 20 dBm***	
RF Communication Protocol	Internet protocol-based thread, IPV6LoWPAN, IEEE 802.15.4	
RF Frequency and Modulation	2.4 GHz (16 Channels), DSSS provides higher noise and interference resistance	
Data Security	AES 128-bit encryption with secure join and key exchange (J-PAKE)	
Other Features		
Operating Temp.	- 40 °C to 60 °C, -40°C to 120°C available – special order	
Gateway Compatibility	Compatible with all Leap Sensors wireless gateways	
Firmware	Over-the-air upgradeable via web interface	
Certifications	FCC (USA), IC (Canada)	
Gateway Communication	Send and receive (data, acknowledgements, updates, and device configuration). Data stored in gateway until confirmed write to database.	
LED Power Switch	Recessed in the enclosure to prevent accidental power cycling. On-switch is recessed. Off-switch flush with surface. Immediately resets transceiver node when turned off. Integrated green and red LED indicate wireless connection status at power-up.	
Internal Memory	110,000 time-stamped device readings stored on transceiver node if gateway does not acknowledge writing data to database.	
Enclosure & Hardware Specifications		
Dimensions	89 mm x 80 mm x 47 mm	
Weight	355g typical for complete transceiver node	
Material	Polycarbonate (UL 94 rated and 120C rated)	
Mounting Options	Optional feet (shown in drawing) can be mounted horizontally or vertically. Screws can also be passed through the enclosure (when the lid is open) for mounting without feet.	
Ingress Protection	IP68 enclosure. IP67 glands, cables, switch (Note: with AC power backup option, IP67 rating is not maintained.)	
Node Antenna	Internal antenna (typical). External antenna (optional)	

[Outbound sensor data, inbound device configurations, firmware updates, and transmission acknowledgements]



* Panel connections are customizable, consult factory for complete options.
 ** Transmission ranges vary with environmental conditions. Reported values are test averages.
 *** Transmission power requirements are governed regionally.



Refrigerator & Freezer Monitor System Legend	
1	Calibrated thermal buffer probe tip protector
2	Thermal buffer solution and bottle
3	Leap Sensors Refrigerator & Freezer Monitor Device node (with 3 X M8 connectors)
4	Field-replaceable & calibrated digital temperature probe
5	M8 to flat ribbon connector adaptor cable
6	Flat ribbon cable
7	Door open switch & mounting bracket