

# Ultra-Cold Wireless Transceiver Node Specifications

## Ultra-Cold Wireless Sensor Node

Data Sheet Leap Sensors® Ultra-Cold Transceiver Node Specifications

### Applications

- Vaccine storage monitoring
- Hospital sample freezers
- Lab ultra-cold storage monitoring
- General temperature monitoring

### Special Features

- Probe is calibrated and verified at -60C, -40C, and +5C.
- Probe can operate below -80C.
- Optional door-open sensor available on the same node.
- Transmission range of 1500 ft (500 m) in open air. 500 ft (150 m) in a typical industrial environment. Range extenders increase the sensor to gateway distance.
- Typical battery life of 5+ years when transmitting every 15 minutes.
- Battery powered or option for external 5VDC input.
- Sample and transmit intervals can be configured over the air, via the Leap software, to meet specific application requirements.
- Preconfigured, prior to shipping, to pair with new or existing gateway for simple installation – up and running in 5 minutes.
- LED indicators for power, network connection, gateway connection, and database connection status.

### Description & Product Highlights

The Leap Sensors® wireless sensor system greatly reduces installation costs and the complexity pulling wire to connect sensors with monitoring software. In addition, edge computing creates easily transmissible, small, actionable data to trigger alerts.

Use the Leap Sensor Manager software to monitor freezers and send alerts. Or, pass data to existing plant monitoring software with the Modbus, DNP3, or standard web-API interfaces.

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



### Transceiver Node

#### Modularity and Customizability

Each Multi-Sensor Transceiver Node has the capability to support and interface simultaneously with up to four analog voltage sensors, two thermocouples, a mV/V output sensor (strain bridge, load cell, potentiometer, RTD), a digital switching input, and digital busses (I2C CAN, Modbus RTUS RS485). This makes the Multi-Sensor Transceiver Node ideal for all remote sensing applications and semi-custom applications. Interfacing multiple sensors to one transceiver node provides a substantially lower price compared to individual sensing devices.

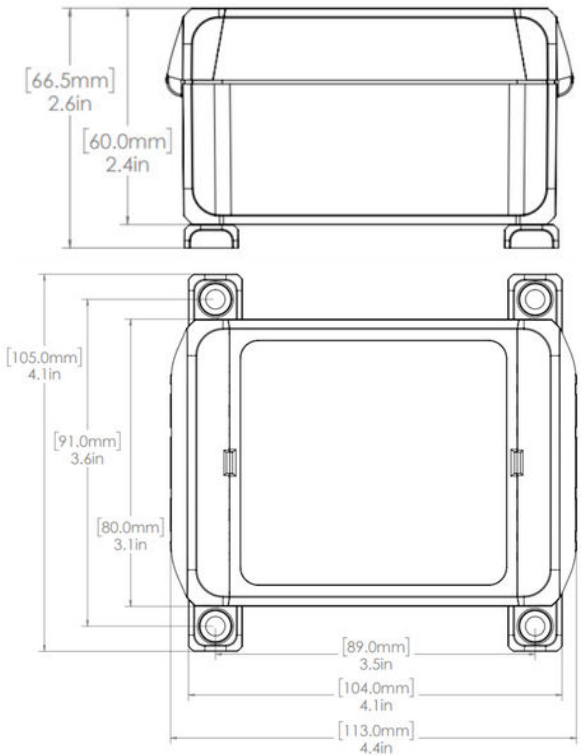
#### Ease of Implementation

All Leap Sensors transceiver nodes come preconfigured and securely paired with selected Leap Sensors gateways for quick and simple integration into an existing Leap Sensors system. Custom firmware loaded on new sensor nodes automatically configures the Leap software to accept new types of sensor data.

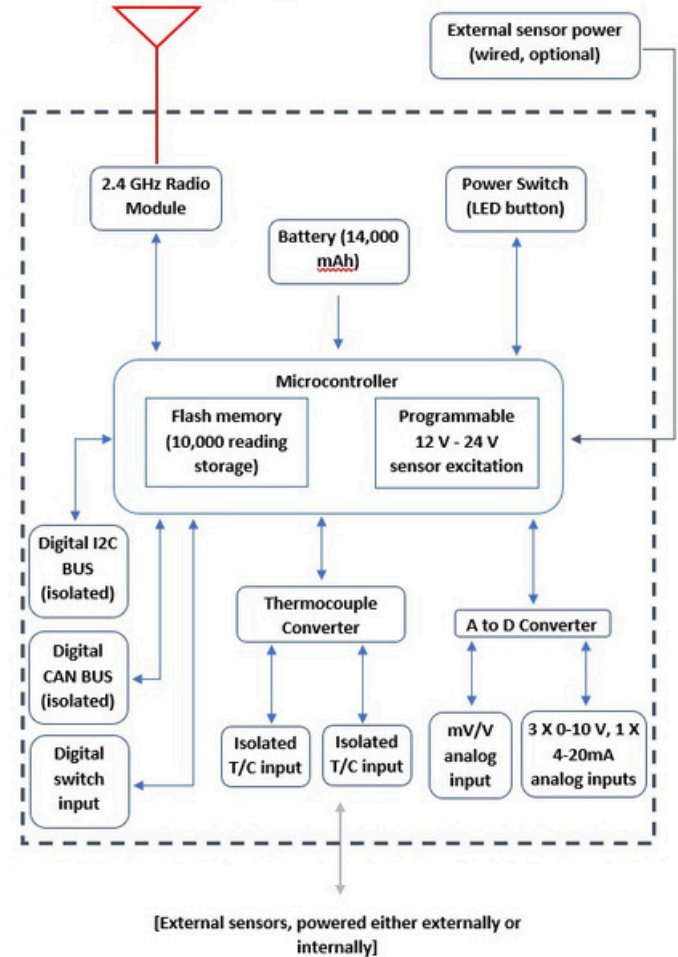
#### Real-time Data Viewing and Alerts

All Leap Sensors transceiver nodes stream data to gateways at configurable intervals. This data is accessible and viewable in real time. In addition to real-time viewing and graphing of sensor data, 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® Ultra-Cold Node Specifications	
General Sensor Specifications	
<b>Temperature Probe Sensing Specifications</b>	<p>Sensing temperature down to -80C, but lowest calibration point is -60C.</p> <p>High accuracy sensing in the calibrated range from -60C to 5C. +/- 1C.</p> <p><b>Calibration target temperatures are -60C, -40C, and +5C.</b></p>
<b>Probe and Cable</b>	<p>Probe can read from -196C to +450C (but the standard product is calibrated and verified for accuracy only in the -60C to +5C range).</p> <p>PFA cable is rated to a narrower range of -200C to +250C. Cable should not be bent when it is below -50C.</p> <p>Cable and probe connect to the enclosure with a cable gland. The temperature cable/probe assembly is not detachable to assure the calibrated probe stays with the node that it was calibrated with.</p> <p>Temperature Sensing Probe Tip:            Temperature sensing element is a RTD 100 ohm Class A PT100 sensor.            Temperature sensor is wired using 3-wire configuration to factor-out changes in cable resistance to assure an accurate temperature reading is taken at the probe tip.            Metal probe tip size: 3/16 inch diameter, 1.3 inches long.</p>
<b>Optional Door Open Sensor</b>	<p>Reports when door is open. Includes a door open timer. Alerts may be set on door-open or the door open timer.</p>
<b>Output units</b>	<p>User and factory configurable through Leap Sensor Manager software.</p>
<b>Thermocouple Connection</b>	<p>Pigtail cable with standard female miniature flat pin connectors. The enclosure IP67 rating may be reduced if the thermocouple "pigtail" cable has a braided jacket</p>
Power Specifications	
<b>Battery Power</b>	<p>3.6 V, 14,000 mAh D-cell, Lithium Thionyl Chloride</p>
<b>Battery Life</b>	<p>Typically 5+ years at 10 minute transmit &amp; sample intervals. On-board patented battery passivation prevention circuit assures long life. Battery life estimations on specific nodes and applications are available upon request.</p>
<b>Power / Current Consumption</b>	<p>Low sleep current assures long life</p>
Wireless Specifications	
<b>Wireless Transmission Range</b>	<p>Industrial Environments**</p>
	<p>Open-Air**</p>
	<p>500 ft</p>
	<p>1500 ft</p>
<b>Range Extenders</b>	<p>Range extenders available to extend transmission distance</p>
<b>RF Transmission Power</b>	<p>User configurable 0-20 dBm, factory configured to 20 dBm***</p>
<b>RF Communication Protocol</b>	<p>1) Internet Protocol based Thread, IPV6LoWPAN, 802.15.4            2) Direct-to-cellular network (Verizon standard) LTE-M/NB-IoT</p>
<b>RF Frequency and Modulation</b>	<p>1) 2.4 GHz (16 Channels), DSSS provides higher noise and interference resistance            2) Direct-to-cellular network (Verizon standard) LTE-M/NB-IoT</p>
<b>Data Interfaces to Other Software</b>	<p>Modbus, DNP3, standard web API</p>
<b>Data Security</b>	<p>AES 128-bit encryption with secure join and key exchange (J-PAKE)</p>



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



Other Features	
<b>Node Operating Temperature</b>	-40 to 60C standard -40 to 80C available - special order
<b>Gateway Compatibility</b>	Compatible with all Leap Sensors® wireless gateways
<b>Firmware</b>	Over-the-air upgradeable via software interface
<b>Certifications</b>	FCC (USA), IC (Canada)
<b>Gateway Communication</b>	Send and receive (data, acknowledgements, updates, and device configuration). Data stored in sensor node and gateway until confirmed write to database.
<b>LED Power Switch</b>	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.
<b>Node Internal Memory</b>	Time-stamped device readings stored on transceiver node if gateway does not acknowledge writing data to database.
Enclosure & Hardware Specifications	
<b>Dimensions</b>	113 mm x 80 mm x 60 mm
<b>Weight</b>	355g typical for complete transceiver node
<b>Material</b>	Polycarbonate (UL-94)
<b>Mounting Options</b>	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.
<b>Ingress Protection</b>	IP68 enclosure. IP67 glands, cables, switch
<b>Node Antenna</b>	Internal antenna (typical). External antenna (optional).

\* 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.