

# Direct-to-Cellular Wireless Transceiver Node

## Customizable Analog & Digital Sensor Transmitter

Phase IV Data Sheet Leap Sensors® Direct to Cellular Transceiver Node

### Applications

- Wireless transmission of any analog (0-5 V, 0-10 V, 0-12.5 V, 4-20 mA, amplified mV/V or Digital (I2C, CAN, Switch) sensor signals. Two thermocouple inputs.
- Configurable into semi-custom monitoring systems (Including the Leap Sensors® Motor Monitor, the Leap Sensors® Vibration Monitor, and Leap Sensors® Dual-Input Thermocouple & Analog Nodes)
- Ideal for in-process monitoring, predictive maintenance, equipment monitoring, general plant health monitoring, and multi-sensor interfacing

### Special Features

- Transmission direct to software via cellular signal – no gateway
- Configurable to provide power to any industrial sensor and transmit any sensor signal listed below
- Edge computing gives small, actionable data
- Configurable sample and transmit intervals to fit many application requirements, high speed sampling available
- Simple integration into existing Leap Sensors system
- Preconfigured 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 statuses

### Description & Product Highlights

Phase IV's Leap Sensors Direct to Cellular Transceiver Node is ideal for remote locations or when no internet connection is available and only a few transceiver nodes are needed. The combination of multiple simultaneous inputs and sensor powering makes this transceiver node ideal for multi-sensor monitoring applications, or rapidly deployable semi custom systems.

The Leap Sensors wireless sensor system greatly reduces the cost and complexity of laying cables between sensors and data acquisition units. In addition, edge computing creates easily transmissible, small, actionable data to trigger alerts.

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



### Direct-to-Cellular Transceiver Node Model

#### 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, an mV/V output sensor (bridge, potentiometer, RTD), a digital switching input, and two digital busses (I2C and CAN). 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 substantial ROI compared to individual sensing devices.

#### Ease of implementation

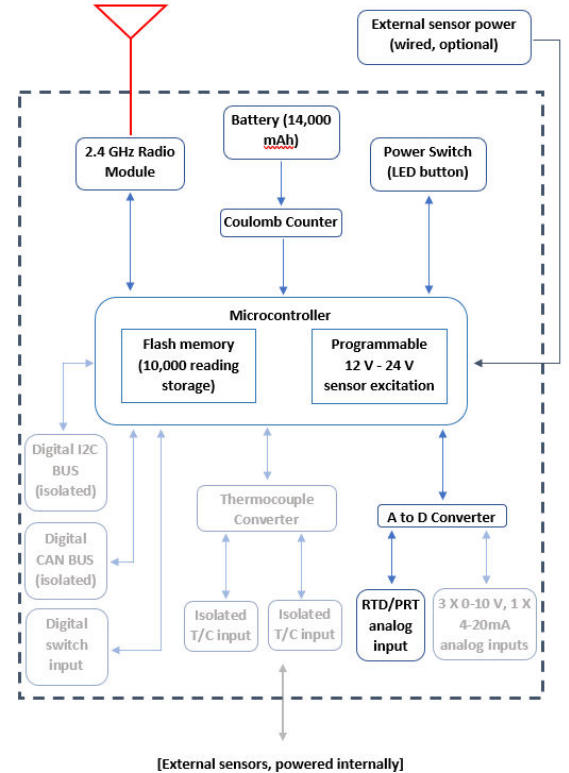
All Leap Sensors transceiver nodes come pre-configured and ready to connect to the Leap cloud software via a cellular connection. Custom firmware loaded on the device can configure the data viewing software to accept any and all new device types.

#### Real-time data viewing and alters

All Leap Sensors transceiver nodes stream data to Leap Sensors gateways 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® Direct-to-Cellular Multi Node Specifications		
<b>General Sensor Specifications</b>		
<b>Analog Input Signals</b>	<b>Isolated 24-Bit ADC:</b> 2 x 0-10 V 1 x 0-12.5 V 1 x 4-20mA Amplified mV/V (strain, load cell)	<b>Thermocouple:</b> 2 x Isolated Thermocouple
<b>Digital Input Signals</b>	1 x Isolated I2C BUS 1 x Isolated CAN BUS	1 x Digital Input (3.3V to 24V)
<b>Programmable Sensor Excitation</b>	12 V @ 80 mA max, 24 V @ 25 mA max – turn accuracy ed-on only immediately prior to reading sensor	
<b>Sensor Interface</b>	Pre-configured IP67 2-6 pin M8, 8 pin M12, cable gland, female thermocouple connector*	
<b>Output units</b>	User and factory configurable through Leap Sensor Manager software.	
<b>Integrated and Isolated Thermocouple Sensing (Cold Junction Compensation)</b>		
<b>Specifications</b>	+/-0.0625 °C resolution, open and short circuit detection	
<b>Compatible Thermocouple Types</b>	K, J, T, N, S, E, B, R	
<b>Circuit Accuracy</b>	+/- 0.5 °C (typical) Thermocouple will reduce accuracy.	
<b>Power Specifications</b>		
<b>Battery Power</b>	Two 3.6 V, 14,000 mAh D-cell, Lithium Thionyl Chloride	
<b>Battery Life</b>	8-10 years at 1 hour transmit & sample intervals. On-board battery passivation prevention circuit assures long life.	
<b>Power / Current Consumption</b>	Low sleep current assures long life Typical Operating Current: 6mA - 30mA (depending on sensors)	
<b>Wireless Specifications</b>		
<b>RF Transmission Power</b>	User configurable 0-20 dBm, factory configured to 20 dBm***	
<b>RF Communication Protocol</b>	Internet Protocol based thread, IPV6LoWPAN	
<b>RF Frequency and Modulation</b>	Over cellular network LTE	
<b>Data Security</b>	AES 128-bit encryption with secure join and key exchange (J-PAKE)	
<b>Other Features</b>		
<b>Operating Temp.</b>	- 40 °C to 60 °C	
<b>Gateway Compatibility</b>	Compatible with all Leap Sensors® wireless gateways	
<b>Firmware</b>	Over-the-air upgradeable via web interface	
<b>Certifications</b>	FCC (USA)	
<b>Gateway Communication</b>	Send and receive (data, acknowledgements, updates, and device configuration). Data stored in 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>	110,000 time-stamped device readings stored on transceiver node if gateway does not acknowledge writing data to database.	
<b>Enclosure &amp; Hardware Specifications</b>		
<b>Dimensions</b>	151 mm x 80 mm x 60 mm****	
<b>Material</b>	Polycarbonate (UL-94 and 120C rated)	

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



<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 (optional). External antenna (typical)

*\* Panel connections are customizable, consult factory for complete options.*

*\*\*Transmission ranges vary with environmental conditions.*

*\*\*\* Transmission power requirements are governed regionally.*

*\*\*\*\*Enclosure dimensions and weights vary, see specific sensor system datasheets for dimensions.*