

Wireless Modbus RTU Transceiver Node Customizable for Reading 10 Modbus Registers

Phase IV Data Sheet Leap Sensors® Wireless Modbus RTU Transceiver Node

Applications

- Wireless transmission of up to 10 Modbus sensor values over a single-ended RS485 digital interface. Read-only.
- Configure the node to read up to 10 Modbus registers. The configuration interface scales the data and adds units of measure to make the data useable and actionable.
- Ideal for in-process monitoring data from a variable frequency drives (VFD) and other industrial equipment with a Modbus RS485 Modbus RTU interface. Note: many types of digitally controlled industrial equipment offer an option to add a Modbus RTU interface card.
- Read data such as temperature, RPM, electric current draw...

Special Features

- Read (and scale) up to 10 Modbus RTU sensor readings. RTU registers. Each of the 10 readings will read as many registers as needed to fit the selected data type in the configuration
- Transmission range of 1500 ft. in open air with external antenna.
- Option to power the node externally.
- Edge computing gives small, actionable data.
- Configurable sample and transmit intervals to fit many application requirements.
- 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 status.
- The node is read-only and cannot write data to Modbus registers.

Description & Product Highlights

Phase IV's Leap Sensors® Modbus RTU Transceiver Node allows a way to quickly and easily tap into valuable process and predictive maintenance data in digitally controlled industrial equipment - without needing to connect to the secure process control network. One node digitally-connects to 10 valuable sensor readings. The node can be configured to read any of the Modbus registers in equipment that has a Modbus RTU interface.

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.



Transceiver Node

Modularity and Customizability

Each Modbus RTU Transceiver Node has the capability to read 10 Modbus registers over a single cable - using a standard RS485 single-ended interface

Ease of Implementation

All Leap Sensors transceiver nodes come pre-configured and paired with selected Leap Sensors gateways for quick and simple integration into an existing Leap Sensors system, or to function as a new stand-alone system. Custom firmware loaded on the device can configure the data viewing software to accept and all new device types.

Real-time Data Viewing and Alerts

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 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® Modbus RTU Node Specifications

General Sensor Specifications

Configuration Parameters	Baud Rate Slave Address Number of sensor reading values (max 10) Each of the 10 sensor readings will read as many registers as needed to fit the selected data type in the configuration.									
Modbus Register Configuration Parameters	<ul style="list-style-type: none"> Starting address #1 Number of registers wide (2 bytes / register) Endianness of data (Big/Little) Word order (most significant first/last) Datatype (int16, uint16, int32, uint32, int64, uint64, float, double) Modbus value Units - what the measured object is reporting Units (from list of our standard ISO) Scaling Offset 									
Data Interface	<p>Single RS485 cable - a shielded and twisted pair cable equivalent to Belden 3105A. Connects to node with pre-configured IP67 M8 or a cable gland. Spring-loaded terminal blocks inside the node can facilitate terminating the cable inside the node.</p> <p>Node will act only as a “client” or “master” and will not have the functionality to write data to the equipment it is connected to.</p>									
Output units	Set in the Modbus configuration parameters (see above)									
Power Specifications										
Battery Power	3.6 V, 14,000 mAh D-cell, Lithium Thionyl Chloride									
Battery Life	TBD - need to analyze									
External Power	Optional 5V external power can be supplied to a 5V input connector on the node by a 120V wall transformer or other 5VDC source.									
Power / Current Consumption	Need to analyze - TBD									
Wireless Specifications										
Wireless Transmission Distance**	<table border="1"> <thead> <tr> <th></th> <th><u>Open Air*</u></th> <th><u>Industrial Plant*</u></th> </tr> </thead> <tbody> <tr> <td>External Antenna</td> <td>1500 ft</td> <td>500 ft</td> </tr> <tr> <td>Internal Antenna</td> <td>500 ft</td> <td>300 ft</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Transmission distances vary by environment. Distances above are typical. 		<u>Open Air*</u>	<u>Industrial Plant*</u>	External Antenna	1500 ft	500 ft	Internal Antenna	500 ft	300 ft
	<u>Open Air*</u>	<u>Industrial Plant*</u>								
External Antenna	1500 ft	500 ft								
Internal Antenna	500 ft	300 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 standard -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 sensor node and 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									
Node Internal Memory	110,000 time-stamped device readings stored on transceiver node if gateway does not acknowledge writing data to database.									

Leap Sensors® Multi-Sensor Node Specifications Leap Sensors® Multi-Sensor Node Specifications	
Enclosure & Hardware Specifications	
Dimensions	113 mm x 80 mm x 60 mm****
Weight	355g typical for complete transceiver node
Material	Polycarbonate (UL-94 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
Node Antenna	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.

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