SN2430R420

802.15.4 RTD/4-20 mA Sensor Node

- *Wireless Sensor Node for RTD, 4-20 mA and Contact Inputs*
- *Supports 2, 3 or 4-wire 100 ohm Platinum RTDs*
- *100 mW IEEE 802.15.4 Radio*
- *Internal Antenna or External 2 dBi Antenna Options*
- *Optional 128-Bit AES Encryption*
- *Compatible with LG2430E and LG2430C Gateways*
- *Configuration Through Serial Port*
- *Up to 10 Years Battery Life*

The SN2430R420 is a battery-powered wireless sensor node providing support for one 100 ohm Platinum RTD input, one 4-20 mA input and one contact closure input. Wireless connectivity is provided through a 100 mW 802.15.4 wireless connection, making use of the companion LG2430E Ethernet gateway or LG2430C cellular gateway. The unique low-power 802.15.4 radio and signal conditioning circuitry used in the SN2430R420 provide years of battery operation. Sensor data plus battery status is automatically transmitted based on user-configurable conditions, simplifying application software design. The wireless sensor node is configured through its serial port.

SN2430R420 Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Sensor Inputs			2, 3 or 4-wire 100 ohm Platinum RTD 4-20 mA Contact Closure			
RTD Type			100 ohm Platinum, 0.00385 Alpha			
RTD Temperature Range			-200		+158	^{o}C
RTD Resolution				0.0625		^{o}C
RTD Accuracy				±0.3		^{o}C
RTD Measurement Data Format			16-bit Signed Value			
4-20 mA Measurement Resolution				12		bits
4-20 mA Measurement Data Format			12-bit Unsigned Value			
Open Contact Voltage				3.3		V
Closed Contact Current				33		µA
Contact Status Data Format			8-bit Unsigned Value			
Internal Battery Voltage Range			3.0		3.6	V
Internal Battery Voltage Accuracy					±2	%
Internal Battery Voltage Data Format			12-bit Unsigned Value			

SN2430R420 Specifications

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Serial Interface			RS232C, 38.4 kbps, 8N1, no flow control			
Radio			RFM LPR2430ERA IEEE 802.15.4 module			
Operating Frequency Range			2405		2475	MHz
RF Data Rate			250			kbps
Number of RF Channels				15		
RF Transmit Power, EIRP				18		dBm
Receiver Sensitivity, 10E-5 BER:				-95		dBm
Internal Antenna			SMD Chip Antenna			
Optional External Antenna			2 dBi RPSMA Dipole Antenna			
Supplied Battery			Lithium Thionyl Chloride (LTC) C Cell, 8.5 A-hr			
Operating LTC Battery Life, -40 to +85 ^{o}C:						
1 Minute Report Interval				10*		years
15 Minute Reprt Interval				10*		years
1 Hour Report Interval				10*		years
Optional Battery			3 Alkaline AA Cells, 2.5 A-hr			
Operating Alkaline Battery Life, -20 to +50 ^{o}C:						
1 Minute Report Interval				3.2		years
15 Minute Reprt Interval				4.9		years
1 Hour Report Interval				5.0		years
Sensor Sampling Rate					2000	Hz
Report Triggers:						
Timer			100 ms to > 1 year			
Measurement Value			High and Low Measurement Thresholds			
Switch Closure			Upon Closure			
Operating Temperature Range			-40		+85	^{o}C
Operating Humidity Range, Non-condensing			5		95	%RH
Nominal Dimensions			5.5 x 2.5 x 1.3 inches 140 x 64 x 33 mm			
Mounting			Left and Right Flanges, Two Pre-drilled Holes Plus Slot in Each Flange			

*LTC battery life specified by manufacturer is 10 years. Operation at the report intervals listed above do not consume the rated battery capacity during 10 years of operation.
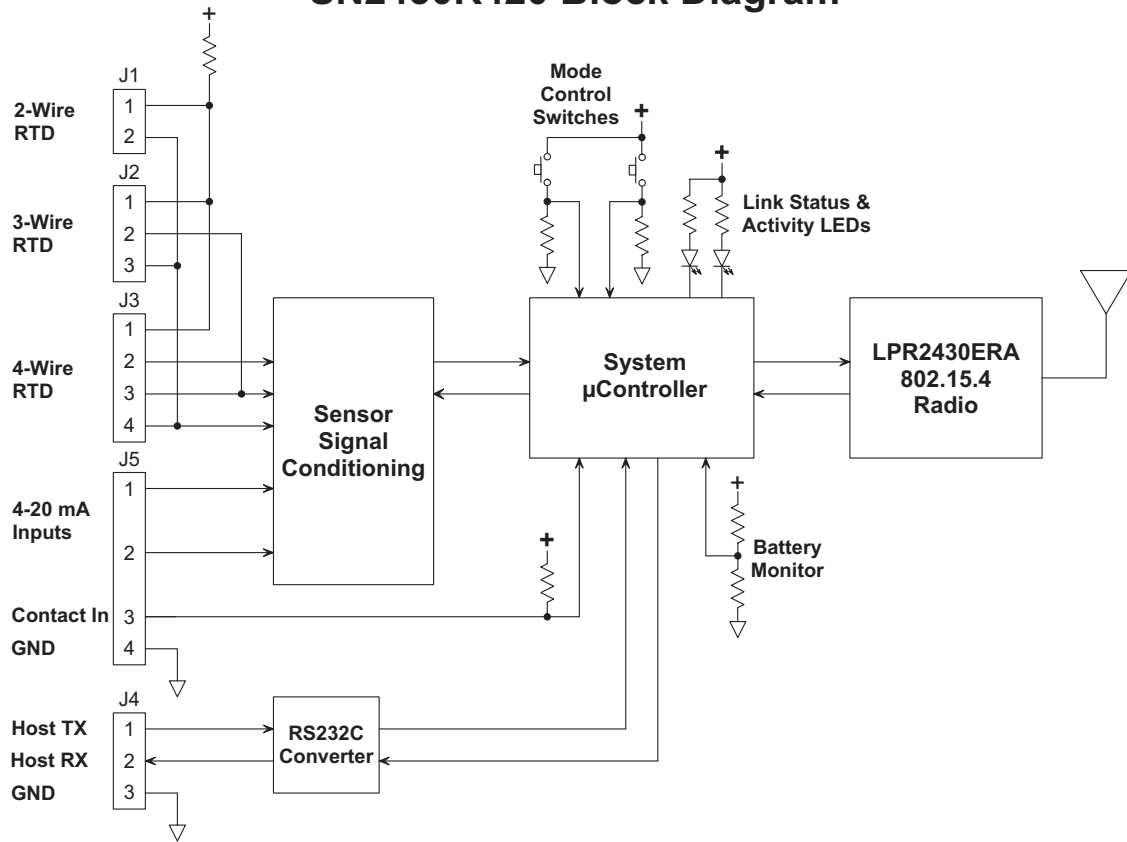
SN2430R420 Block Diagram

Figure 1

SN2430R420 Operation

The SN2430R420 is an IEEE 802.15.4-based wireless sensor node. The SN2430R420 supports 100 ohm platinum RTD, 4-20 mA and switch closure inputs. The SN2430R420's very low average power consumption provides up to 10 years of operation from a 8.5 A-hr C cell LTC battery. Alternately, the SN2430R420 can be powered from three inexpensive AA batteries in limited temperature range applications where shorter battery operating life is acceptable.

The SN2430R420 sensor node is available with either an internal antenna or external 2 dBi dipole antenna.

The SN2430R420 includes two LED indicators and two buttons to facilitate installation, activation, configuration and testing.

J1, J2 and J3 provide connection points for 2, 3 or 4-wire RTDs respectively, with a 4-wire RTD preferred for best accuracy. J4 provides connection points for 3-wire RS232 communication with a host computer, and J5 provides connection points for the 4-20 mA and contact status inputs.

The SN2430R420 automatically reports the sensor input readings on user defined intervals and conditions, eliminating the need for application polling. The SN2430R420 achieves low power consumption by maintaining association with its companion LG2430E or LG2430C gateway while sleeping. When the SN2430R420 sends data, it only has to wake up and send data; it does not have to reestablish a link with its gateway. The internal battery voltage is included in each sensor report, providing continual information on the battery status.

The SN2430R420 is configured through its serial port using a standard 3-wire RS-232 connection.

Connector J1 Description

Pin	Name	I/O	Description
1	RTD+	I	2-wire RTD positive (red) input. This input is connected to the RTD current source.
2	RTD-	I	2-wire RTD negative (black) input. This input is connected to the RTD ground return.

Connector J2 Description

Pin	Name	I/O	Description
1	RTD+	I	3-wire RTD positive (red) input. This input is connected to the RTD current source.
2	RTD-	I	First 3-wire RTD negative (black) input. This input is connected to the ADC negative differential input.
3	RTD-	I	Second 3-wire RTD negative (black) input. This input is connected to the RTD ground return.

Connector J3 Description

Ref	Name	I/O	Description
1	RTD+	I	First 4-wire RTD positive (red) input. This input is connected to the RTD current source.
2	RTD+	I	Second 4-wire RTD positive (red) input. This input is connected to the ADC positive differential input. If a 2-wire RTD is being used on J1 or a 3-wire RTD is being used on 2, jumper this input to J3 terminal 1.
3	RTD-	I	First 4-wire RTD negative (black) input. This input is connected to the ADC negative differential input. If a 2-wire RTD is being used on J1, jumper this input to J3 terminal 4.
4	RTD-	I	Second 4-wire RTD negative (black) input. This input is connected to the RTD ground return.

Connector J4 Description

Ref	Name	I/O	Description
1	HOST TX	I	Input terminal for host RS232 TX.
2	HOST RX	O	Output terminal for host RS232 RX.
3	GND	-	RS232 ground terminal.

Connector J5 Description

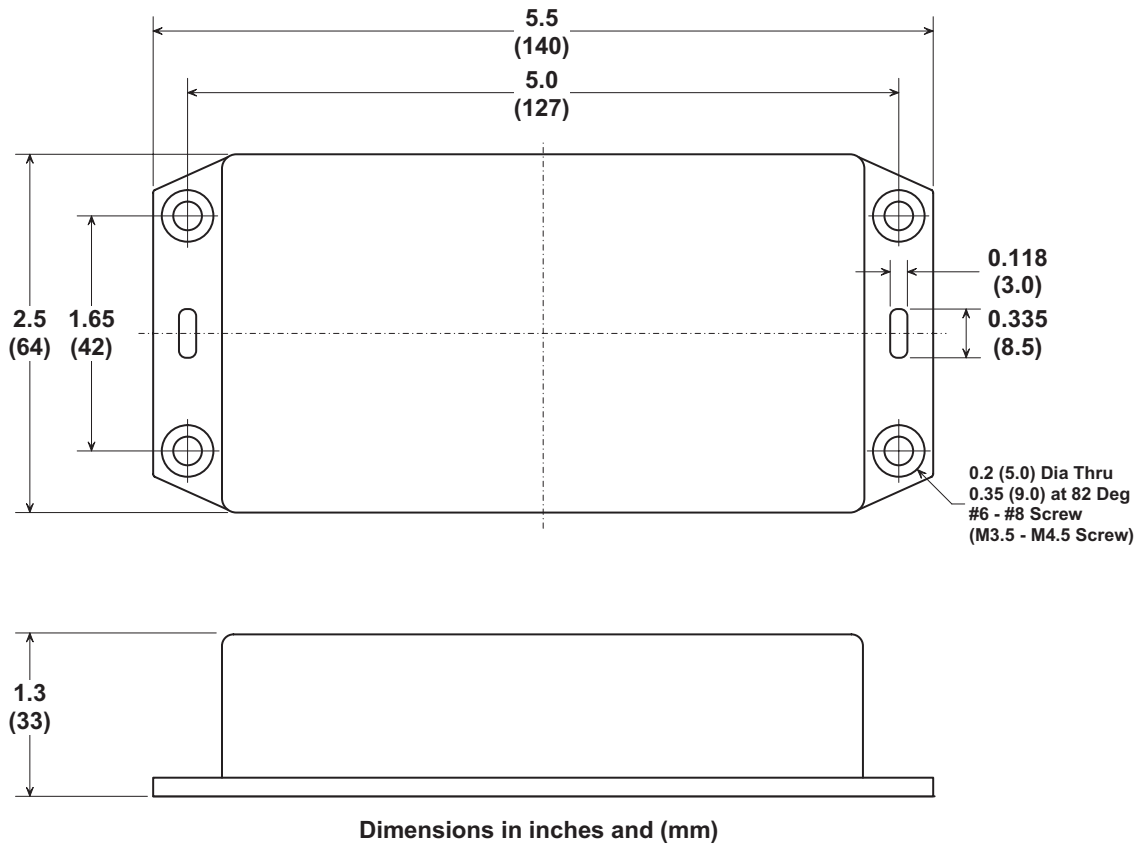| Ref	Name	I/O	Description
1	4-20+	I	Positive 4-20 mA input.
2	4-20-	I	Negative 4-20 mA input.
3	CONTACT	I	Contact input. This terminal is connected to +3.3 V through a 100 K resistor.
4	GND	-	Contact ground terminal.

SN2430R420 Case Dimensions

5.5
(140)

5.0
(127)

2.5
(64)

1.65
(42)

0.118
(3.0)

0.335
(8.5)

0.2 (5.0) Dia Thru
0.35 (9.0) at 82 Deg
#6 - #8 Screw
(M3.5 - M4.5 Screw)

1.3
(33)

Dimensions in inches and (mm)

Figure 2

Note: Specifications subject to change without notice.