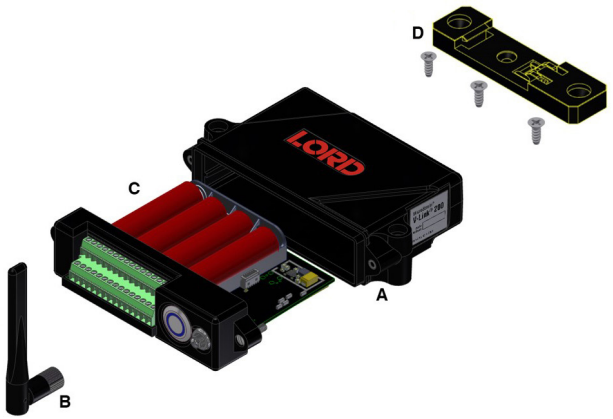
TC-LINK-200

Wireless 12 Channel Analog Input Sensor Node

The TC-Link-200 is a 12-channel wireless sensor used for the precise measurement of thermocouples. There is no calibration required, users need only select the desired thermocouple type and the node will output accurate, low-noise temperature or mV data.

In this document we explain how to deploy the TC-Link-200 for data collection. This includes electrical wiring, mounting of the device, and using SensorConnect software to configure the node, start sampling, and display data.



Item	Description	Quantity
A	TC-Link-200	1
B	Antenna with right angle adapter	1
C	AA Lithium batteries (3.6 V dc, 2.4 Ah)	4
D	DIN rail clip	1
	#6-32 x 3/8" Thread forming screws	3

Table 1 - TC-Link-200 Configuration Options

Cycle power to the TC-Link-200 using the "on/off" button. A quick push will power the device on or off. A longer push (approximately two seconds) will initiate sampling, indicated by the blue light illuminating. A very long push (approximately 10 seconds) will perform a hardware reset.

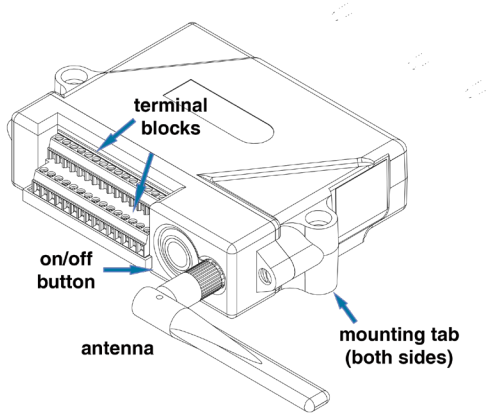


Figure 1 - Interface and Indicators

Indicator	Behavior	Node Status
Device status indicator	OFF	Node is OFF
	Rapid green flashing on start-up	Node is booting up
	1 (slow) green pulse per second	Node is idle and waiting for a command
	1 green blink every 2 seconds	Node is sampling
	Blue LED during sampling	Node is resynchronizing
	Red LED	Built-in test error

Table 2 - Indicator Behaviors

1. Pinout and Sensor Wiring

Pin #	Signal	Pin #	Signal
1	S1+	16	S7+
2	S1-	17	S7-
3	S2+	18	S8+
4	S2-	19	S8-
5	S3+	20	S9+
6	S3-	21	S9-
7	S4+	22	S10+
8	S4-	23	S10-
9	S5+	24	S11+
10	S5-	25	S11-
11	S6+	26	S12+
12	S6-	27	S12-
13	--	28	GND
14	--	29	VIN
15	--	30	GND

Signal	Description	Pin Type	Range
VIN	External supply voltage	Power input	4.0 V to 36 V
GND	Ground	Power return	GND
Sx+	Thermocouple positive input, with internally applied 1.4V bias	Analog input	0 to 2.5 V
Sx-	Thermocouple negative input	Analog input	0 to 2.5 V

Table 2 - TC-Link-200 Connections

TC-Link-200 default wiring uses a K type thermocouple. User-configuration is required for the following wiring options.

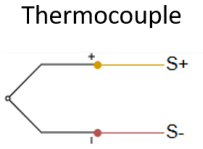


Figure 3 - Additional Wiring Options

2. Mounting Recommendations

There are 4 mounting holes on the TC-Link-200 for 2-56 UNC screws.

The node can be mounted in any orientation, but it is recommended that it is mounted in a way that optimizes wireless communications.

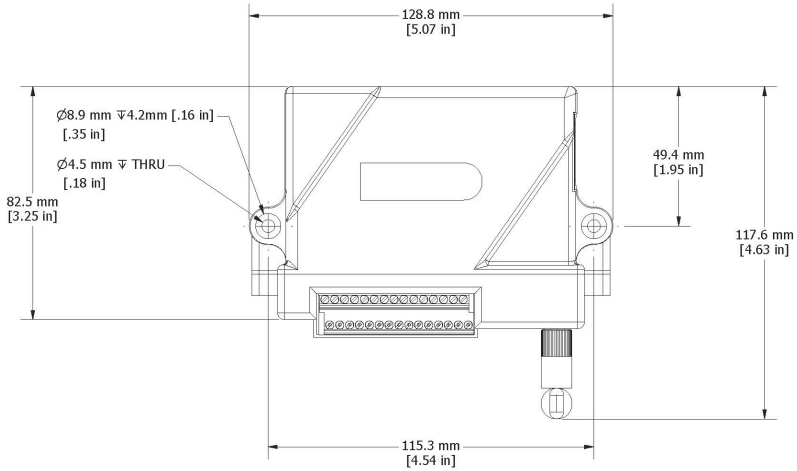


Figure 4 - Mounting the Node

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3. Node Operational Modes

Sensor nodes have three operational modes: active, sleep, and idle. When the node is sampling, it is in active mode. When sampling stops, the node is switched into idle mode, which is used for configuring node settings, and allows toggling between sampling and sleeping modes. The node will automatically go into the ultra low- power sleep mode after a user- determined period of inactivity. The node will not go into sleep mode while sampling.

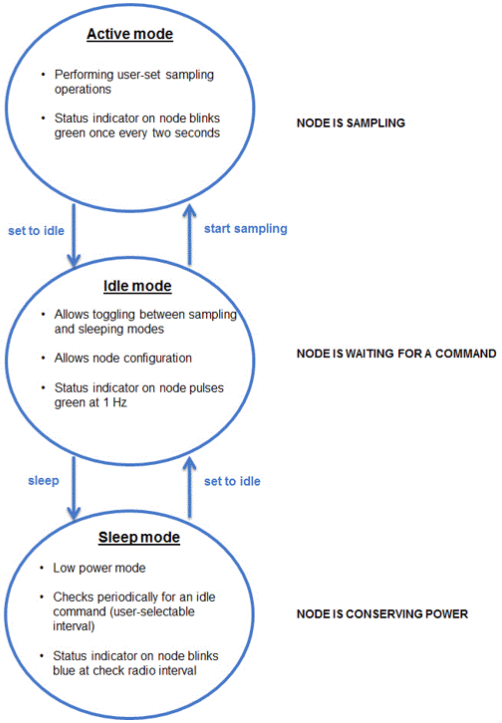

Figure 5 - Node Operational Modes

4. Install Software 6. Connect to Nodes

Install the SensorConnect software on the host computer before connecting any hardware. Access the free software download on the LORD Sensing website at:

SensorConnect™

http://www.microstrain.com/software

5. Establish Gateway Communication

Drivers for the USB gateways are included the SensorConnect software installation. With the software installed, the USB gateway will be detected automatically whenever the gateway is plugged in.

1. Power is applied to the gateway through the USB connection. Verify the gateway status indicator is illuminated, showing the gateway is connected and powered on.
2. Open the SensorConnect™ software.
3. The gateway should appear in the Controller window automatically with a communication port assignment. If the gateway is not automatically discovered, verify the port is active on the host computer, and then remove and re-insert the USB connector.

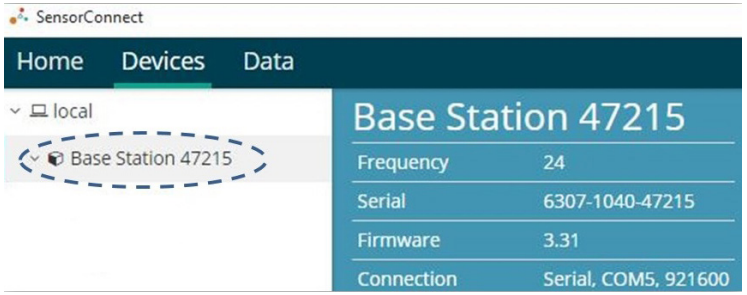

Figure 6 - USB Gateway Communication

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Several methods can be used in SensorConnect to establish communication with the nodes: the automatic node discovery on the same frequency, automatic node discovery on a different frequency, and add node manually.

A. Automatic Node Discovery on Same Frequency

If the base and node are on the same operating frequency, the node will populate below the Base Station listing when powering on the TC-Link-200.

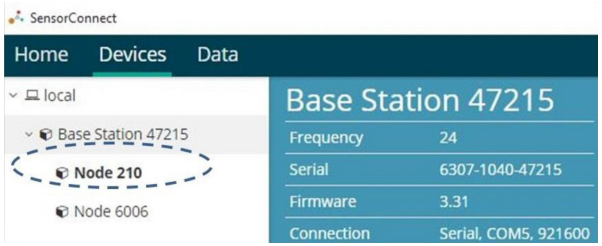

Figure 7 - Node Discovered On Same Frequency

B. Automatic Node Discovery on Different Frequency

If a red circle with a number appears next to the Base Station, the node may be operating on a separate radio channel. Select the Base Station and then select the Nodes on Other Frequencies tile.

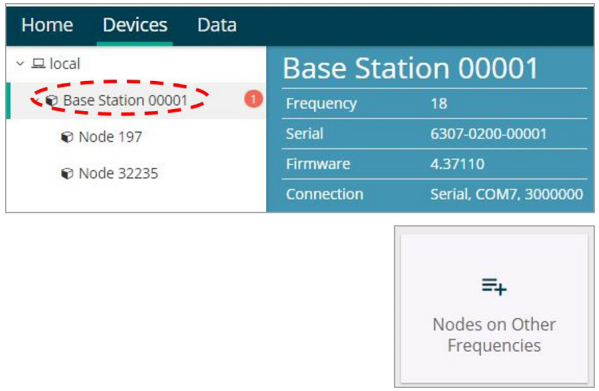

Figure 8 - Node On Other Frequency

Highlight the new node being added and select Move Node to Frequency (#).

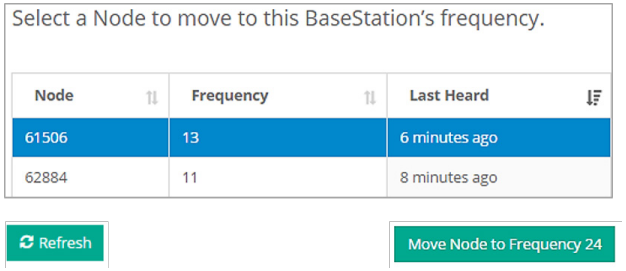

Figure 9 - Move Node

C. Manually Add Node

Adding a node manually requires entering the node address and its current frequency setting.

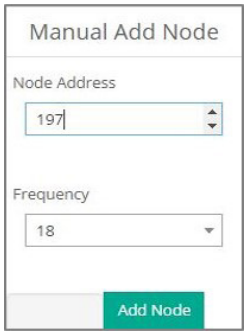

Figure 10 - Add Node By Address

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If the node was successfully added, two confirmation messages will appear and it will be listed under the Base Station.

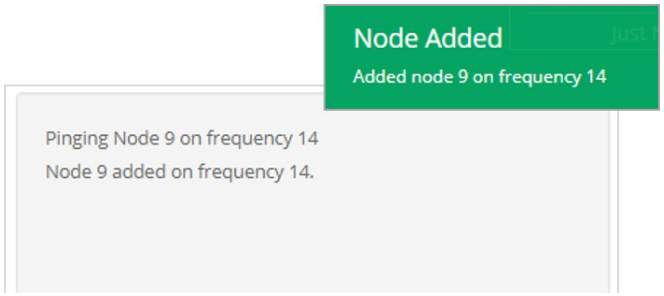

Figure 11 - Add Node Confirmation

If the node failed to be added, a failure message will appear. This means the node did not respond to the base station which could indicate the node is not in idle mode or it may be on another frequency. If "Add Node Anyway" is selected, it will associate that node with the channel entered but it is likely there will be a communication error. If the node was not in idle, move the base station to the frequency of the node and issue a "Set to Idle" command.

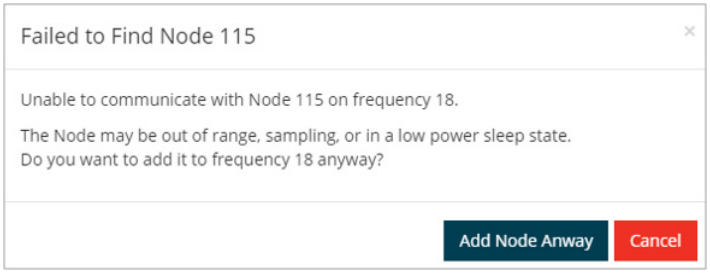

Figure 12 - Failure to Add Node

7. Configure Node

Node settings are stored to non-volatile memory and may be configured using SensorConnect. To access the node configuration menu, under Devices select the node and then the Configure tile.

The configuration menus show the channels and configuration options available for the type of node being used.

This example uses a K type thermocouple.

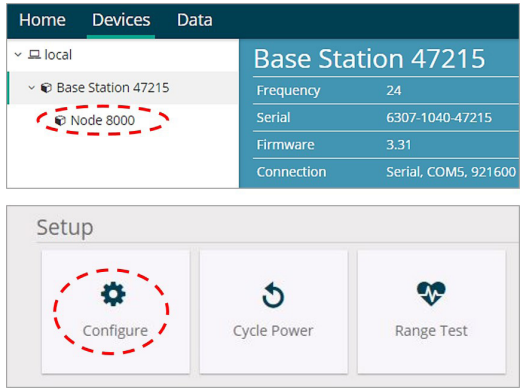

Figure 13 - Node Configuration Menu

1. From the Wireless Node Configuration Menu > Transducer Type, select Thermocouple > Sensor Type, select K type.

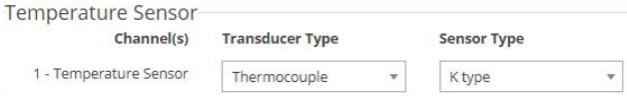

Figure 14 - Temperature Sensor Configuration

2. Under Low Pass Filter, select 12.66 Hz

Figure 15 - Low Pass Filter Configuration

3. Select Apply Configuration to write to node memory.

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8. Configure Sampling Setting and Start Data Acquisition

1. Left click on the Base Station > Sampling, and indicate the nodes to be sampled by checking the box to the left of each node.
2. Under Sampling, select Sample Rate from the drop down menu, select Continuously to sample indefinitely.

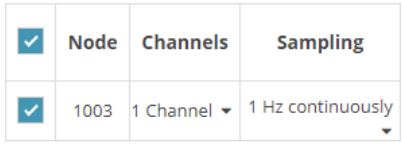

Figure 16 - Sampling Setting

3. Select Apply and Start Network.
4. Select Create Quick View Dashboard in the pop up window immediately to create a dashboard of the new data.

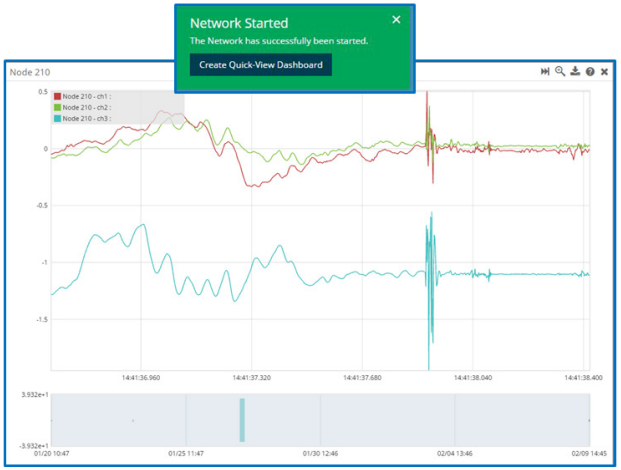

Figure 17 - Quick View Dashboard

9. Replacing Batteries

1. Remove the screws on both sides of the face plate to open the TC-Link-200.
2. It is important to replace all four of the batteries at the same time, observing the correct polarity orientation. The positive polarities are indicated on the batteries and the node by a “+” symbol.
3. Reassemble.

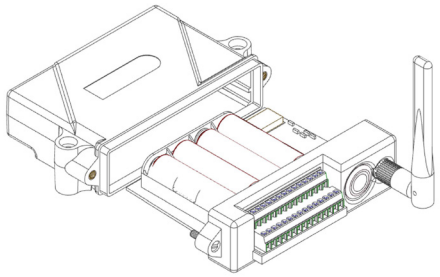

Figure 18 - Replace Batteries

10. Battery Hazards

⚠WARNING **⚠CAUTION** ***NOTICE***

The TC-Link-200 contains internal, non-rechargeable lithium batteries. Lithium batteries are a fire and explosion hazard. Do not store or operate the node at temperatures above 212°F (100°C). Do not disassemble, short circuit, crush, puncture, or otherwise misuse the battery.

Lithium batteries contain toxic chemicals that are harmful to humans and the environment. Disposal is subject to federal and local laws. Do not discard the battery or the node in the trash. Follow proper battery disposal protocol, or contact LORD Sensing Technical Support for information on extracting the battery or returning the product for proper recycling and disposal.

11. Power Supply

⚠WARNING **⚠CAUTION** ***NOTICE***

Apply only the input voltage range specified for the TC-Link-200. Connect to a power source that is near the device, is accessible, and adheres to all national wiring standards. Compliance with wiring standards is assumed in the installation of the power source and includes protection against excessive currents, short circuits, and ground faults. Failure to do so could result in personal injury and permanent damage to the device.

12 Radio Specifications

The TC-Link-200 employs a 2.4GHz IEEE 802.15.4- compliant radio transceiver for wireless communication. The radio is a direct-sequence spread spectrum radio and can be configured to operate on 16 separate frequencies ranging from 2.405 GHz to 2.480 GHz. Following the 802.15.4 standard, these frequencies are aliased as channels 11 through 26. For all newly manufactured nodes, the default setting is 2.425 GHz (channel 15).

TC-Link-200

FCC ID: XJQMSLINK0012

IC ID: 8505A-MSLINK0012

This device complies with Part 15 of the United States FCC Rules, and Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions: 1) This device may not cause interference, and

2) This device must accept any interference, including interference that may cause undesired operation of the device. Changes or modifications, including antenna changes not expressly approved by LORD Corporation could void the user's authority to operate the equipment.

Cet appareil est conforme à la Partie 15 des Règles de la FCC des États-Unis et aux RSSS exempts de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes: 1) Cet appareil ne doit pas causer d'interférences et 2) Cet appareil doit accepter toute interférence, y compris les interférences pouvant entraîner un fonctionnement indésirable de l'appareil. Les changements ou modifications, y compris les changements d'antenne non expressément approuvés par LORD Corporation, pourraient annuler l'autorisation de l'utilisateur d'utiliser l'équipement.

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