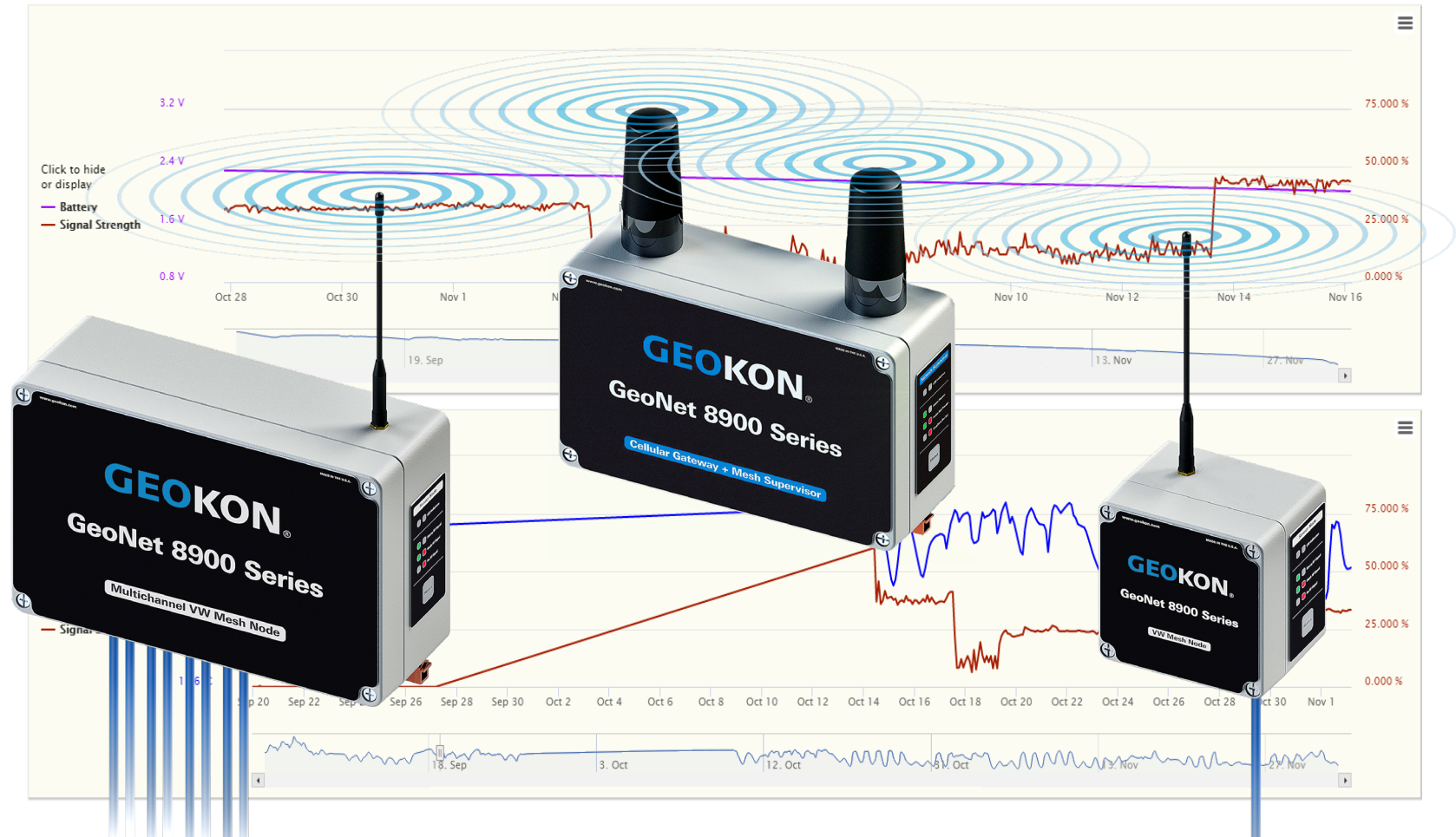# Product Tutorial

Troubleshooting GeoNet Wireless Data Hosting Systems

Before Continuing

⚠️ Many hardware and software issues can be prevented or resolved with a better understanding of the product

Please read the Installing GeoNet Wireless Data Hosting Systems and Using Agent Software with GeoNet Wireless Data Hosting Systems tutorials and review the product manuals prior to attempting to troubleshoot a Network

Network Tips
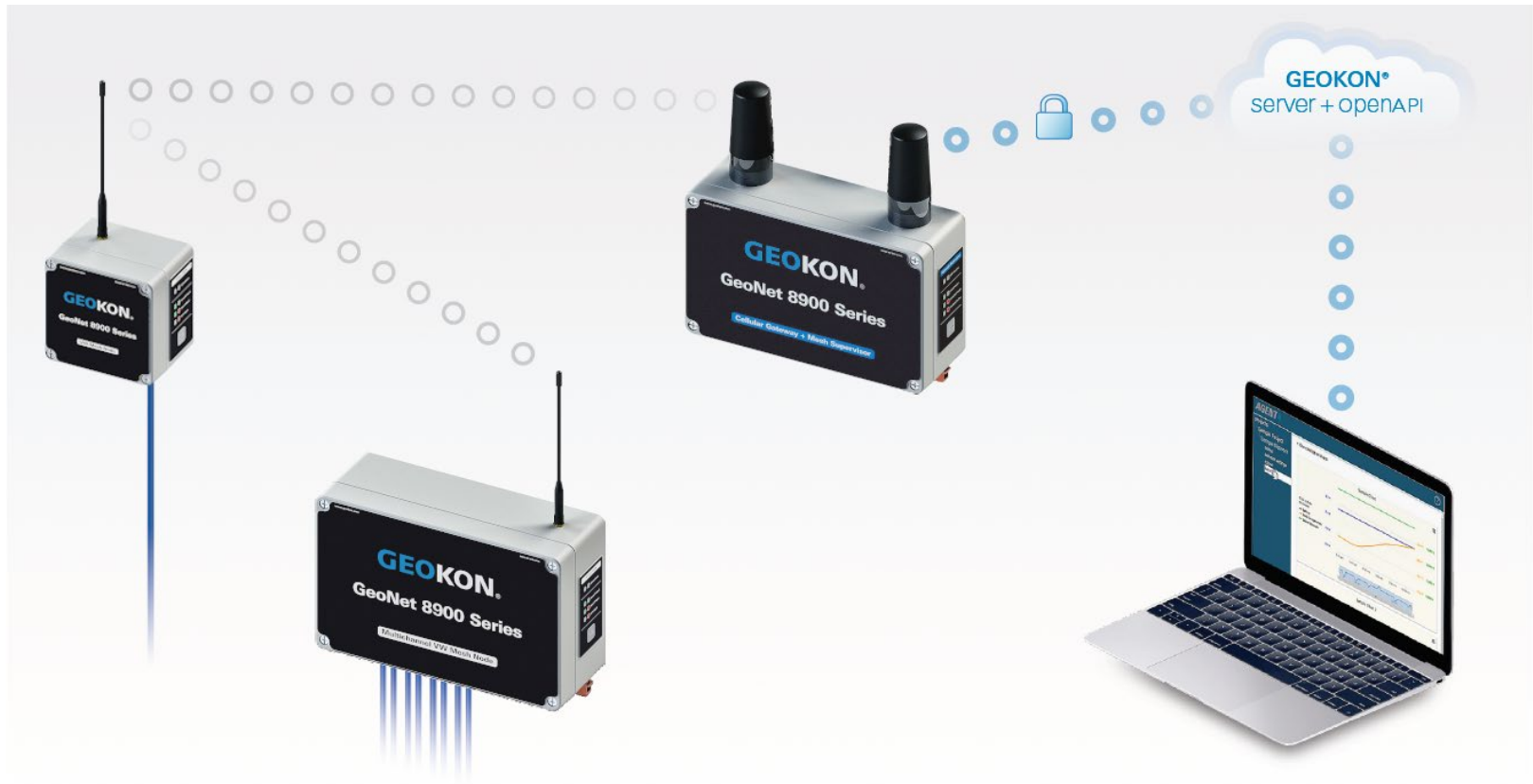
Device Mounting

- Always mount GeoNet devices vertically, with the antenna pointing up

- The space around the antenna should be free of obstructions

- A minimum mounting height of two meters (six-feet) is recommended

Device Mounting (Continued)

- Obstructions between, around, or near GeoNet devices can cause reflections of the radio signal

- Reflected radio signals can cause GeoNet devices to malfunction

- For optimum performance, create as much space as possible between the straight-line radio path and any obstructions (especially metallic objects)

Straight Line Radio Path

Reflected Radio Signals

Reflected by an Obstacle

Reflected by the Ground

Reflected by Road Traffic
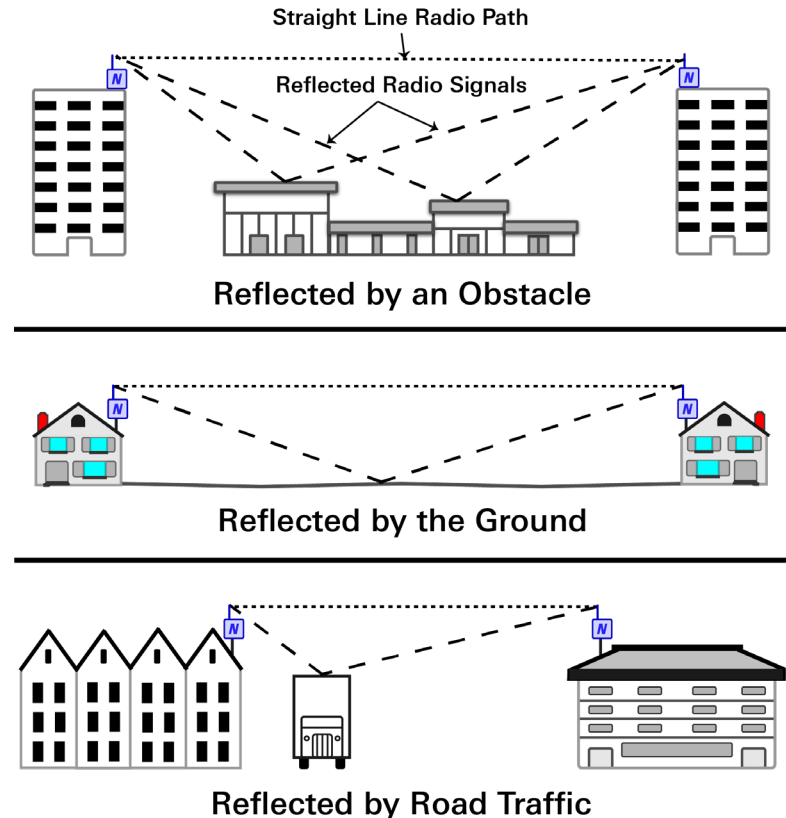
Device Mounting (Continued)

- Common mounting mistakes include:
  - ▸ Not enough clear space around the antenna
  - ▸ Mounting devices horizontally
  - ▸ Metallic objects nearby
- The photos to the right show examples of improper device mounting

Setting Channels

- All GeoNet devices are set to operate on the same channel at the factory

⚠️ *Channels only need to be set if multiple networks will be operating within radio range of one another*
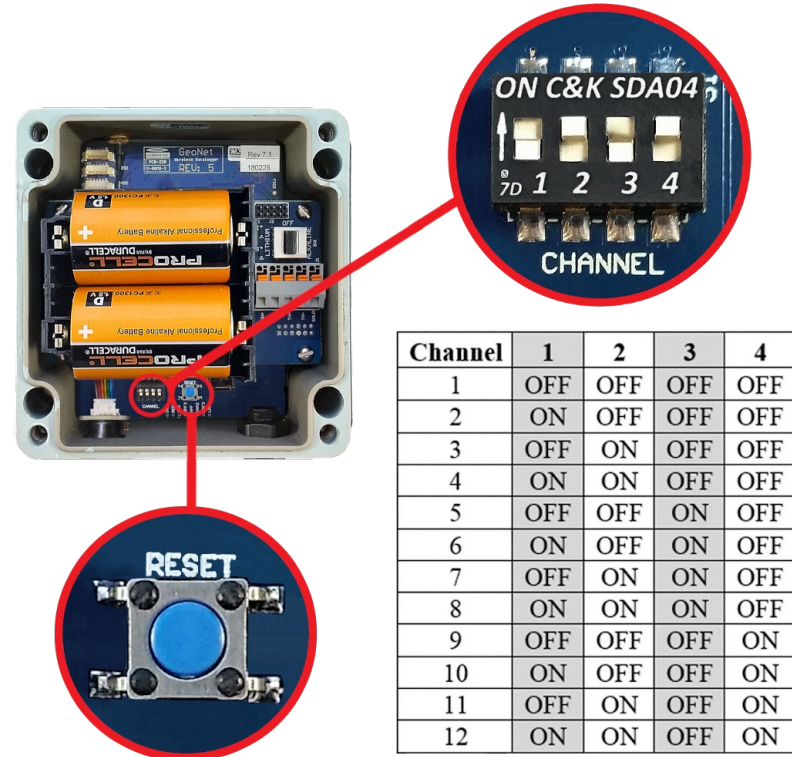
- Networks within radio range of one another *must not* be set to the same channel

- Up to 12 Networks can operate in the same area by utilizing a different channel for each Network

Setting Channels (Continued)

- To set the channels on a device:

1. Activate Deployment mode

2. Move the channel switches to one of the 12 valid settings

3. Press the reset button

⚠ GeoNet Devices can only communicate when set to the same channel, therefore, _ALL DEVICES_ in a network must be set to the same channel

Channel	1	2	3	4
1	OFF	OFF	OFF	OFF
2	ON	OFF	OFF	OFF
3	OFF	ON	OFF	OFF
4	ON	ON	OFF	OFF
5	OFF	OFF	ON	OFF
6	ON	OFF	ON	OFF
7	OFF	ON	ON	OFF
8	ON	ON	ON	OFF
9	OFF	OFF	OFF	ON
10	ON	OFF	OFF	ON
11	OFF	ON	OFF	ON
12	ON	ON	OFF	ON

Deployment Mode

- Must be used when making changes to a network
  (adding Nodes, changing batteries, resetting a device, etc.)

- Indicated by the LEDs on the Supervisor flashing every 10-15 seconds

- Automatically activated when Supervisor is powered

- Active for 60 minutes by default
  (Can be changed using Agent software)

- Can be reactivated/reset by pressing the status button on the Supervisor
  (May take up to 6 minutes to take effect)

Supervisors Control the Network

- Avoid powering down or removing the Supervisor from a working Network

- If the Supervisor must be powered down or removed, activate deployment mode prior to doing so

- When downloading data via a direct PC connection, bring the PC to the Supervisor rather than removing the Supervisor from the Network

Battery Replacement

- The Network must be put into deployment mode prior to replacing the batteries in the Supervisor
(Also best practice when replacing batteries in Nodes)

- Replace D cell batteries when voltage drops below 2.0 VDC

- Replace 12-volt external batteries when voltage is below 11 volts

- All data is stored in nonvolatile flash memory, and will be retained even if the batteries are absent for an extended period

- After replacing the batteries in a Node, make sure it rejoins the Network, then set the Network time using Agent Software (Setting time not required when using a Cellular Gateway Supervisor)

Software Tips

- Changes to "deploy period" will take effect the next time Deployment mode is activated on the Supervisor

- Turn off automatic download before changing the "scan rate"
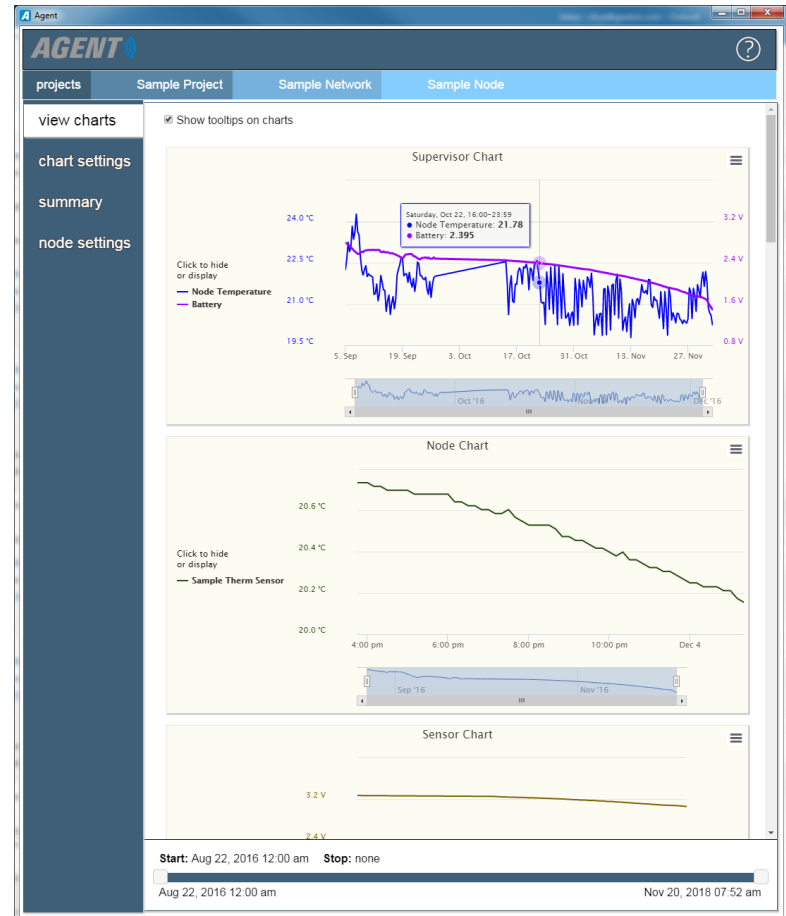
Troubleshooting

Node will not Join the Network:
Flashing Red LED

- Make sure the Network is in deployment mode (one or both of the LEDs on the Supervisor flashing **every 10-15 seconds**)

- Verify that _all four_ channel dipswitches inside the Node are set to the same position as the switches inside the Supervisor **Devices will only communicate when set to the same channel**

- Power the Node while it is in close proximity to the Supervisor
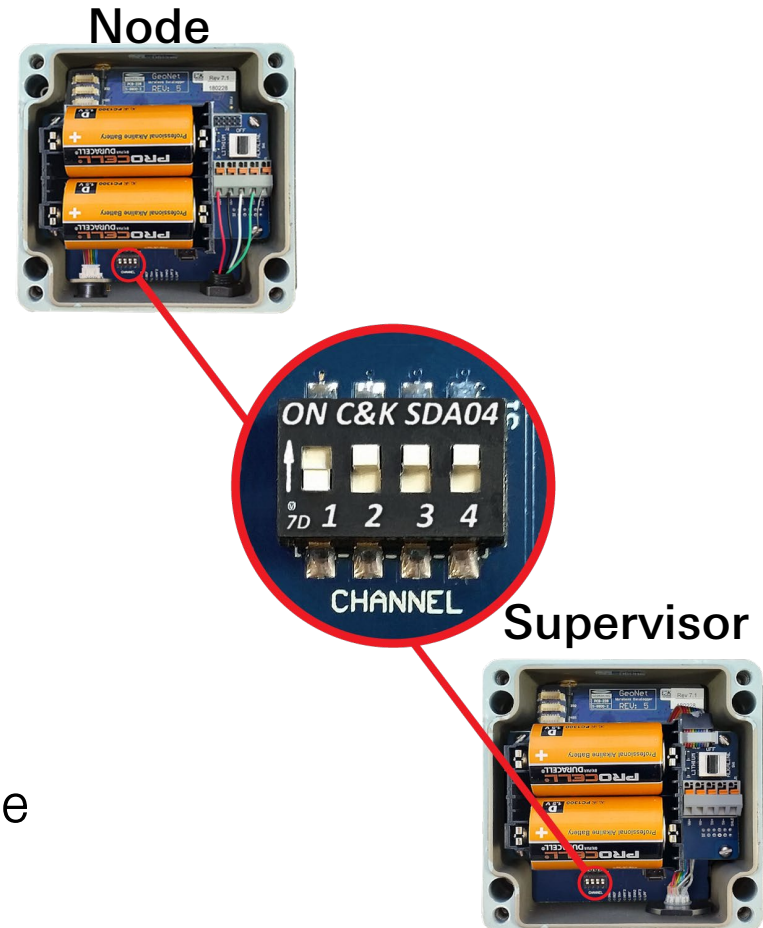
Node

Supervisor

Resetting a Node

- If a Node still will not join the Network after the previous suggestions have been tried, it may be out of synch with the Supervisor

- The Node will join the Network if given enough time, however, the connection can be expedited by resetting the Node

- To reset a Node, press the reset button inside the enclosure, or, hold down the status button until the red and green LEDs turn on, then release the button

No Signal at Installation Site

- Complete the following:

1. Make sure the Network is in deployment mode

2. Power down the Node

3. Position the Node so that it is in close proximity to the Supervisor (or a Node that has successfully joined the Network)

4. Power up the Node and wait for it to join the Network

5. Move the Node to its intended location

- If the Network connection is lost when the Node is in its original location, try to improve the radio signal by completing the steps in the next slide

Node has a Weak Radio Signal:
Red & Green LEDs Flashing Together

- Improve the radio signal by:
  ▶ Mounting the Node as high as possible
  ▶ Making sure there is plenty of clear space around the antenna
  ▶ Removing obstructions from the radio path
  ▶ Activating more Nodes to provide alternate data paths
  ▶ Moving the Node to a better location
  ▶ High gain directional antenna may be required (Contact Geokon)

Additional LED Light Codes

- **Green LED flashing slowly (once per second):**
  Channel switches inside the Node incorrectly set; move to a valid setting then press the reset button

- **Green LED flashing quickly (twice per second):**
  Update the Network firmware to version 160816 or later (Refer to GeoNet manual for firmware update instructions)

- **Five green flashes then one long red flash (repeating):**
  Update the Network firmware
  (Refer to GeoNet manual for firmware update instructions)

- **Alternating green & red LEDs:**
  Device malfunction, please contact GEOKON

Agent Can't Connect to Supervisor: Cellular Gateway

- Ensure that the external power source is connected and functioning properly

- Verify the Supervisor is connected to the cellular network by pressing the status button and observing a green, or green and red flash on the LED indicators

- Make sure the token has been copied into the Network address correctly, and that "token:" has been entered as a prefix

Agent Can't Connect to Supervisor: Direct Cable Connection

- Check the cable connection between the computer and the Supervisor

- Verify that the COM port entered as the "Network Address" in the Network Settings is correct

- Make sure the D cell batteries in the Supervisor are installed correctly and are not depleted

No Data from a Node

- Make sure the Node is powered on, and that it has successfully joined the Network

- Click "set network time" in the Network settings screen

- Make sure the D cell batteries are installed correctly and are not depleted

No Data from a Node (Continued)

- Take a test reading by pressing the status button on the Supervisor
  (Reading will be available for download within the next
  6 minutes, depending on radio cycles and Supervisor type)

- If necessary, data can be retrieved directly from a Node:

1. Connect a PC to the USB port

2. Create a new network in Agent

3. Enter the COM port the Node is connected to as the Network Address

4. Download the data

Vibrating Wire Sensor Reading is Missing, Incorrect, or Unstable

- Verify that the gauge leads are wired correctly inside the Node (Refer to the GeoNet manual for wiring information)

- Multi-channel and addressable Nodes stop trying to read empty channels after two attempts; additional attempts occur at the top of every hour (Reset the Node to initiate an immediate retry)

- Move any sources of electrical noise away from the transducer cable (generators, motors, arc welding equipment, etc.)

- Check sensor operation with a readout (GK-404, GK-406, etc.) or by measuring the resistance between the gauge leads with an ohmmeter

  ▶ Very high or infinite resistance may indicate cable damage

  ▶ Very low resistance may indicate a short between conductors

Thermistor Reads –273.15 °C

- Indicates an open circuit to thermistor leads

- Verify the thermistor leads are wired correctly inside the Node (Refer to the [GeoNet manual](#) for wiring information)

- Measure the resistance between the thermistor leads with an ohmmeter

  ▸ Resistance should be between 10K Ω and 2.4K Ω when the ambient temperature is between 0 and +30 °C

  ▸ Very high or infinite resistance may indicate cable damage

  ▸ Very low resistance may indicate a short between conductors

For more information…

- Consult the GeoNet and Agent instruction manuals.

- Instruction manuals are available for download at: www.geokon.com/Manuals

- Please visit https://www.geokon.com/Tutorials for more tutorials

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