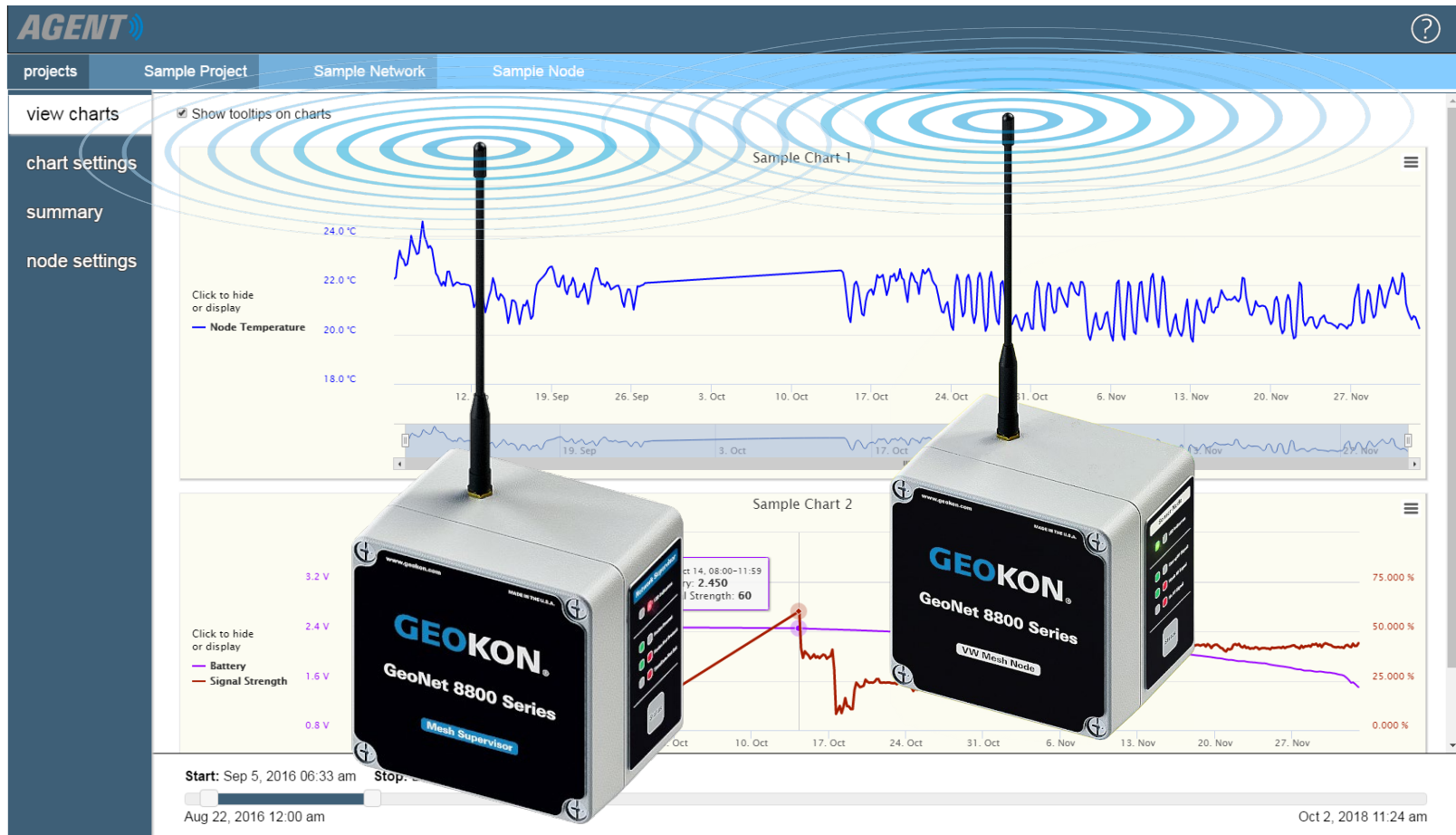





Product Tutorial

Troubleshooting GeoNet Networks & Agent Software



Before Continuing

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

Please read the [GeoNet Installation](#) and [Agent Software](#) tutorials and review the [product manuals](#) prior to attempting to troubleshoot a Network

Network Tips



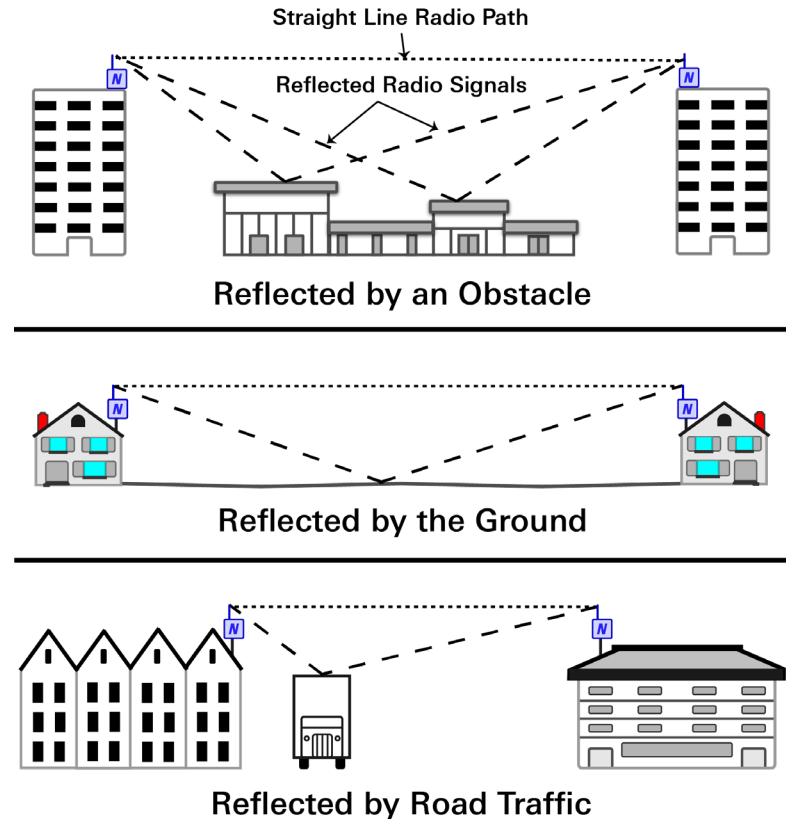
Device Mounting

- Mount Nodes and Supervisors as high off the ground as possible
- Devices should be mounted vertically, with the antenna pointing up



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)



Device Mounting (Continued)

- The photos to the right are examples of improper device mounting; in each installation there are obstructions blocking the radio path



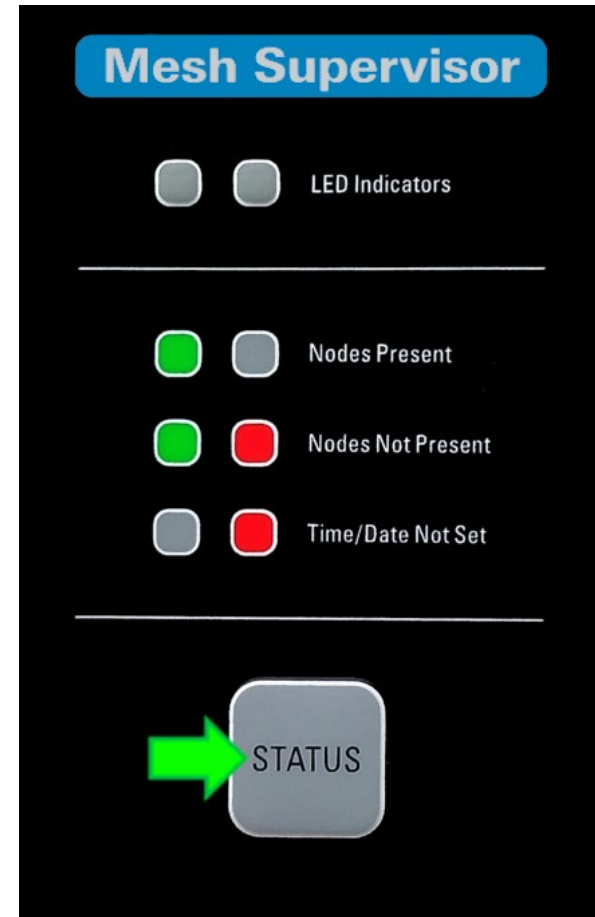
Deployment Mode

- Deployment mode allows Nodes to be added to a Network
- Indicated by an LED flash on the Supervisor every 10 seconds
- The default deploy period (amount of time the Network stays in deployment mode) is 60 minutes
- Adding a Node to the Network resets the deploy period timer
- The deploy period can be changed using Agent software



Deployment Mode (Continued)

- Supervisors enter deployment mode automatically on power up
- To reactivate deployment mode, press the status button on the Supervisor
(Firmware versions prior to 190125 require that the status button be pressed until the green LED illuminates)
- Deployment mode will reactivate on the next radio cycle
(May take several minutes, depending on Network size)



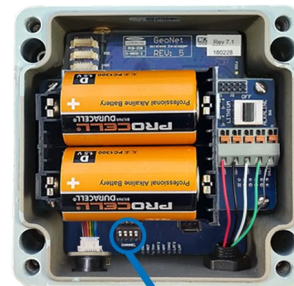
Network Supervisor

- Avoid powering down or removing the Supervisor from a working Network (When downloading data, bring the computer to the Supervisor, not the other way around)
- If the Supervisor must be powered down or removed from the Network, put the Network in deployment mode prior to doing so

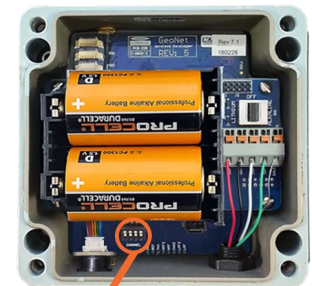


Multiple Networks

- Up to 12 Networks can operate in the same area by utilizing a different channel for each Network
- Channels are selected by changing the position of the dipswitches inside each device
- All devices in a Network must be set to the same channel (i.e., the dipswitches must be in the same configuration)
- Refer to the [GeoNet manual](#) for more information on channels



Network A



Network B

Battery Replacement

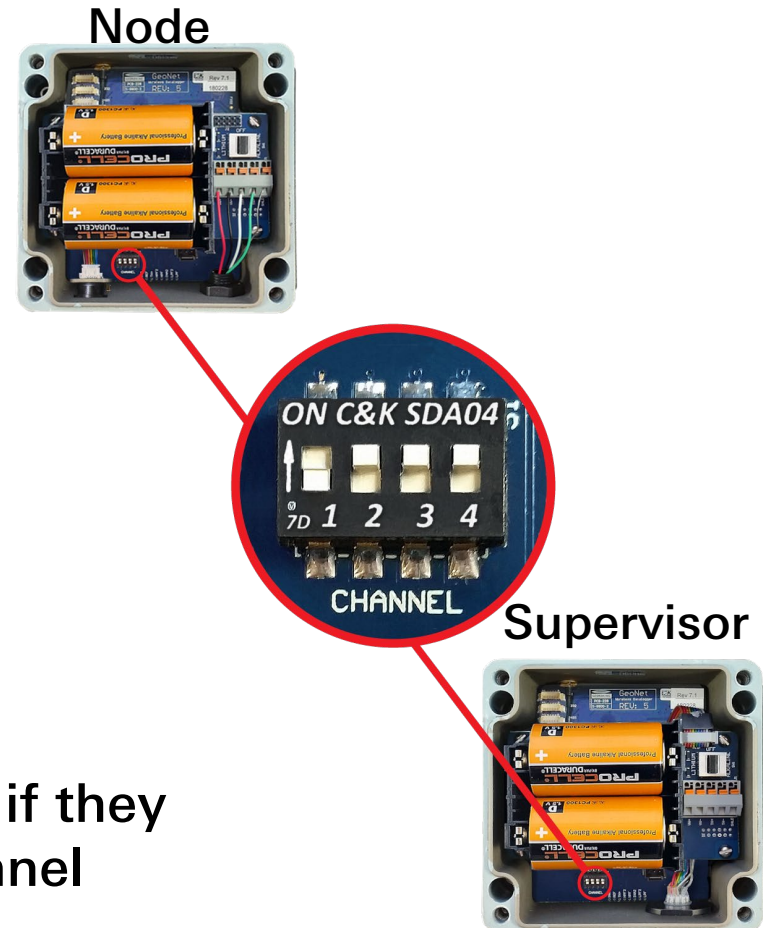
- The Network must be put into deployment mode prior to replacing the batteries in the Supervisor (This is also best practice when replacing batteries in Nodes)
- D cell batteries should be replaced when the measured voltage drops below 2.0 VDC (Note that several GeoNet models require lithium batteries; please refer to the [product manual](#))
- 12 volt external batteries should be replaced when the measured voltage drops 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, it will need to rejoin the Network, and then the Network time must be set in Agent

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 **once every 10 seconds**)
- Reactivate deployment mode if necessary
- Verify that all four channel dipswitches inside the Node are set to the same positions as the switches inside the Supervisor.
Devices will only communicate if they have been set to the same channel



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. This can occur when the Network is not put into deployment mode before the Supervisor is powered down or removed from the Network
- The Node will join the Network eventually if given enough time, however, the connection can be expedited by resetting the Node
- To reset a Node, cycle the power, or hold down the status button for 10 seconds, until red and green LEDs turn on, then release the button

Node will not Join the Network at its intended location

- 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
(Use the LEDs to monitor the strength of the radio signal as it is being moved)
- If the Network connection is lost during transport, try to improve the radio signal, as explained on the next slide

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

- Improve the radio signal by:
 1. Mounting the Node as high as possible
 2. Making sure there is plenty of clear space around the antenna
 3. Removing obstructions from the radio path
 4. Activating more Nodes to provide alternate data paths
 5. Moving the Node to a better location

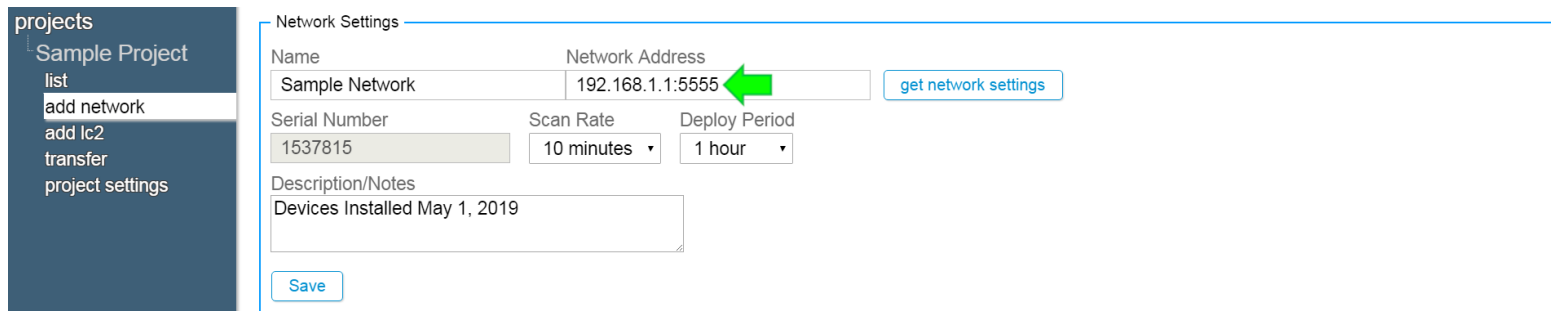


Additional LED Light Codes

- **Green LED alternating on and off in one second intervals:**
Channel switches inside the Node are incorrectly set. Remove the batteries from the unit, set the channel switches to a valid setting, and then reinsert the batteries
- **Green LED flashing quickly (twice per second):**
Update the Network firmware to version 160816 or later (Refer to the [GeoNet manual](#) for information on how to perform a firmware update)
- **Alternating green & red LEDs:**
Device malfunction, please contact GEOKON

Agent Can't Connect to Supervisor: Wireless Connections

- Verify that the URL or IP address entered as the "Network Address" in the Network Settings is correct (IP addresses must be followed by a colon and then the port number)



The screenshot displays a web interface for managing projects. On the left is a dark sidebar with the following menu items: "projects", "Sample Project", "list", "add network", "add lc2", "transfer", and "project settings". The "add network" item is highlighted. The main content area is titled "Network Settings" and contains the following fields:

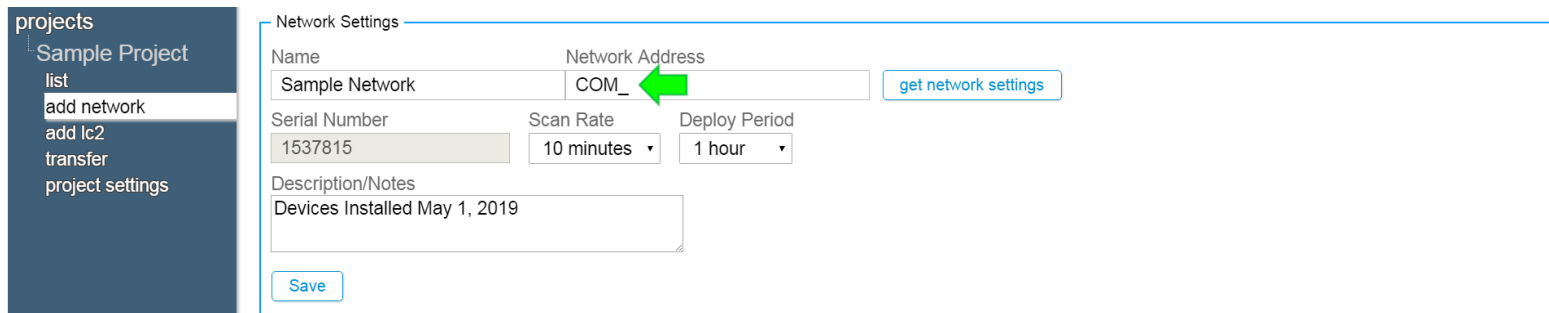
- Name:** A text input field containing "Sample Network".
- Network Address:** A text input field containing "192.168.1.1:5555". A green arrow points to this field.
- Serial Number:** A text input field containing "1537815".
- Scan Rate:** A dropdown menu set to "10 minutes".
- Deploy Period:** A dropdown menu set to "1 hour".
- Description/Notes:** A text area containing "Devices Installed May 1, 2019".

There are two buttons: "get network settings" (light blue) next to the Network Address field, and "Save" (light blue) at the bottom left of the form.

- Use an alternate web program to verify correct modem operation
- Make sure the D cell batteries in the Supervisor are installed correctly, and are not depleted. Replace the batteries if needed

Agent Can't Connect to Supervisor: Cable Connections


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

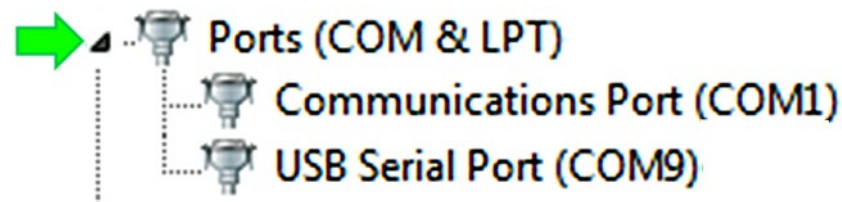


The screenshot displays a web interface for configuring network settings. On the left is a sidebar with a 'projects' header and a list of options: 'Sample Project', 'list', 'add network', 'add lc2', 'transfer', and 'project settings'. The 'add network' option is highlighted. The main area is titled 'Network Settings' and contains the following fields: 'Name' (set to 'Sample Network'), 'Network Address' (set to 'COM_' with a green arrow pointing to it), 'Serial Number' (set to '1537815'), 'Scan Rate' (set to '10 minutes'), 'Deploy Period' (set to '1 hour'), and 'Description/Notes' (containing the text 'Devices Installed May 1, 2019'). There are two buttons: 'get network settings' and 'Save'.

- Check the cable connection between the computer and the Supervisor
- Make sure the D cell batteries in the Supervisor are installed correctly, and are not depleted. Replace the batteries if needed

Agent Can't Connect to Supervisor: Cable Connections (Continued)

- Unsure of which COM port the Supervisor is connected to?
 - ▶ RS-232 connections will normally use COM1, but may use COM2 or COM3 if the computer has multiple serial ports
 - ▶ To determine the correct port for a USB connection, click Start , type "device" in the start search box, then click "device manager" in the control panel list. Next, click the triangle next to "Ports (COM & LPT)" to expand the list



Disconnect and then reconnect the USB cable to the computer—the COM port the Supervisor is using will disappear and then reappear on the list

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

The screenshot displays the 'Network Settings' interface. On the left is a sidebar with a tree view containing 'projects', 'Sample Project', 'Sample Network', 'nodes', 'network settings' (highlighted), 'export', and 'live'. The main content area is titled 'Network Settings' and contains several input fields: 'Name' (Sample Network), 'Network Address' (COM9), 'Serial Number' (1537815), 'Scan Rate' (10 minutes), 'Deploy Period' (1 hour), and 'Description/Notes' (Devices Installed on May 1 2019). Below these is a 'Network Time Zone' dropdown menu set to '(UTC-05:00) Eastern Standard Time (uses daylight savings)'. A 'Save' button is at the bottom left of this section. Below the main settings is a 'Network Time' section with the text 'To get network time use the "get network settings" button'. It shows the 'Current Network Time' as 'Thu Sep 27 2018 13:13:40 GMT-0400' and a 'set network time' button, which is highlighted with a green arrow. To the right of this is a 'Set Project' section with a 'Project' dropdown menu set to 'Sample Project' and a 'Save' button.

- If a Node cannot join the Network for some reason, data can be retrieved directly from the Node. Contact GEOKON for assistance

Vibrating Wire Sensor Reading is Missing, Incorrect, or Unstable

- Verify that the gauge leads are wired correctly inside the Node (Refer to the [sensor manual](#) for wiring information)
- Move any sources of electrical noise away from the transducer cable, such as, generators, motors, arc welding equipment, high voltage lines, etc.
- Check the sensor for proper operation with an independent readout, such as a GK-404 or GK-405
(Sensor operation can also be checked by using an ohmmeter to measure the resistance between the vibrating wire gauge leads. Very high or infinite resistance may indicate cable damage, very low resistance may indicate a short between conductors)

Thermistor Reads $-273.15\text{ }^{\circ}\text{C}$

- Indicates an open circuit to thermistor leads
- Verify that the thermistor leads are properly connected inside the Node
(Refer to the [sensor manual](#) for wiring information)
- Check the thermistor for proper operation by using an ohmmeter to measure the resistance between the thermistor leads. Resistance should be between $10\text{K } \Omega$ and $2.4\text{K } \Omega$ when the ambient temperature is between 0 and $+30\text{ }^{\circ}\text{C}$. 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 www.geokon.com/Tutorials for more tutorials