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Installation Guide

IOT Network with Customer Provided Wi-Fi

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Content

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NS002 Wi-Fi Requirements

Connectivity Requirements

The NS002 sensor should have following minimum connectivity to assure proper data upload.

	NS002	**Smartphone**
RSSI	> -75 dBm	> -68 dBm
Upload Speed	> 300 kbps	> 3 Mbps

Wi-Fi & Security

Sensors support only 2.4GHz Wi-Fi network bandwidth. NS002 can determine what type of security is required, be it WEP, WPA, or WPA2. It supports all of these security mechanisms.

NS002 Wi-Fi Requirements

Enterprise Wi-Fi

NS002 IS NOT compatible with enterprise-level Wi-Fi authentication, 802.1x, which requires logging in with a username and password.

Firewalls

NS002 uses the following ports which should be open for outgoing connection.

Port	TCP	UDP	Usage
31314	✓		Initial device-server connection
9933	✓		Fallback device-server connection #1
443	✓		Fallback device-server connection #2
80	✓		Fetch device firmware
53		✓	Allow DNS look-ups — imps with non-default DNS settings

Wi-Fi Connectivity Check for NS002 using Installed Sensor

Enterprise Wi-Fi

A start-up sequence is built into our standard sensor firmware to prompt the sensor to upload additional data during the first hour after it's turned on for the first time. This allows us to verify the connection quality on the dashboard and ensure a stable connection is established. If the sensor is turned off and back on again, this sequence will repeat. Based on this information, necessary adjustments can be made to the sensor, modem, or repeater locations to improve performance.

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Wi-Fi Connectivity Check for NS002 using Installed Sensor

Sensor Start-up Process

- Remove the sensor cap and locate the On/Off switch.
- Power on the sensor.
  - Within 1 to 2 minutes, the sensor will attempt to establish a connection to the cloud.
  - The status LED will begin blinking in a pattern of red and amber:
    - Connected: If the sensor successfully connects, the LED will blink green at least 2 times.
    - Unsuccessful connection: The LED will only blink red or amber periodically for 1 to 2 minutes. This means the sensor failed to connect.
- Initial upload (first 10 minutes):
  - If connected, the sensor will send a small set of data.
  - A dark green light will remain on during this first upload phase.
  - The upload will repeat every 10 minutes for a total of 6 times.
  - These uploads are visible on the dashboard as they are received.
- First hour data upload:
  - At the end of the first hour, the sensor will upload a larger data set, including statistical summaries of the initial period.
  - This helps verify if any data loss occurred.
  - The total number of expected sets in the first hour is 8 sets (2 small + 6 full sets).
- Post-upload behavior:
  - After the first hour, the sensor switches to its normal measurement sequence and time.
  - All uploads during commissioning and the first hour are available on the dashboard.
- Connection Quality Indicator: If the upload rate (i.e., number of samples successfully received vs. expected) is ≥ 80%, the connection is considered satisfactory.

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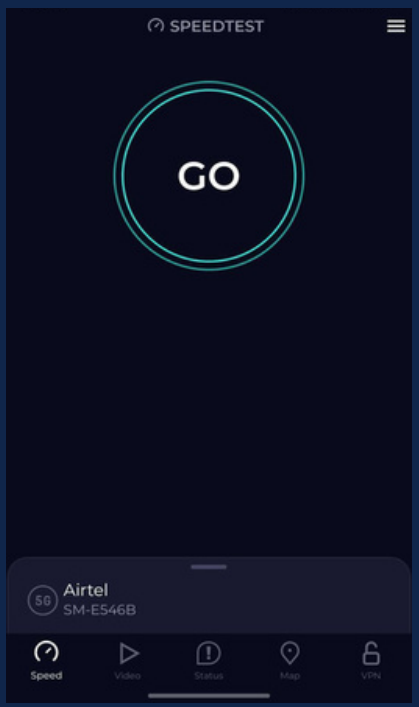
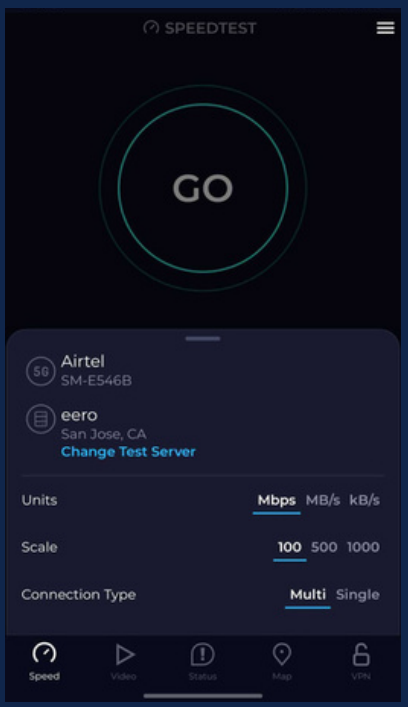
Wi-Fi Connectivity Check for NS002 using Smartphone

Speed Test

- Connect your smartphone to the field Wi-Fi. Make sure you get connected to the network successfully and NOT use data provided by your mobile network. Please switch off your mobile data to avoid any confusion with this.
- Here is a link for how to turn off the mobile data on the Android phone: https://www.youtube.com/watch?v=rbNCyFF_mZI
- Here is a link for how to turn off the mobile data for Apple iPhone: https://www.youtube.com/watch?v=2auwdwrPZ3Q
- Do a connection speed test by going to www.speedtest.net , or by downloading Speed Test by 'Ookla', available on both iOS app store and Android store.





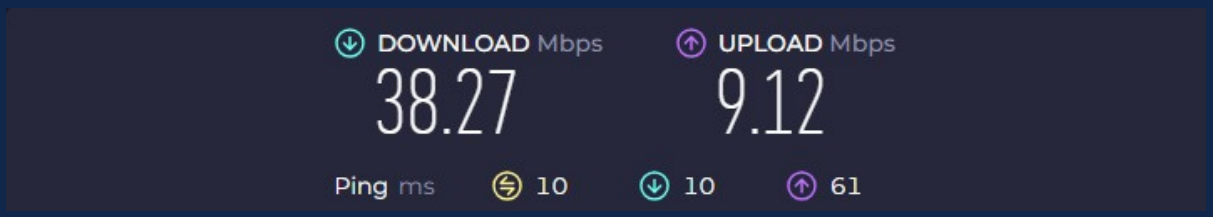
Wi-Fi Connectivity Check for NS002 using Smartphone

Speed Test

- Swipe up the below tab as shown in picture 1. Click on Change Test Server and
- choose one of the servers in the San Jose, CA area. Tap on the main screen and then click on GO to start the speed test. The speed test might take 1 to 2 mins to
- finish.
-

[The speed test should be done near each installed sensor and using the same Wi-Fi network that the sensor is connected to].

Please record the download speed, upload speed, and ping time for each test.



Wi-Fi Connectivity Check for NS002 using Test Sensor

- A NS002 sensor can be configured as a connectivity test sensor, by deploying a special firmware, which can continuously present the connection status on the sensor agent page. Important: This firmware will deplete the battery within 24h (since it uploads every 5 seconds) and therefor should never be deployed on a sensor that will be used in production. Ideally a separate test sensor is used during installation only to perform the connectivity testing, or a new battery is installed after reverting to normal firmware.

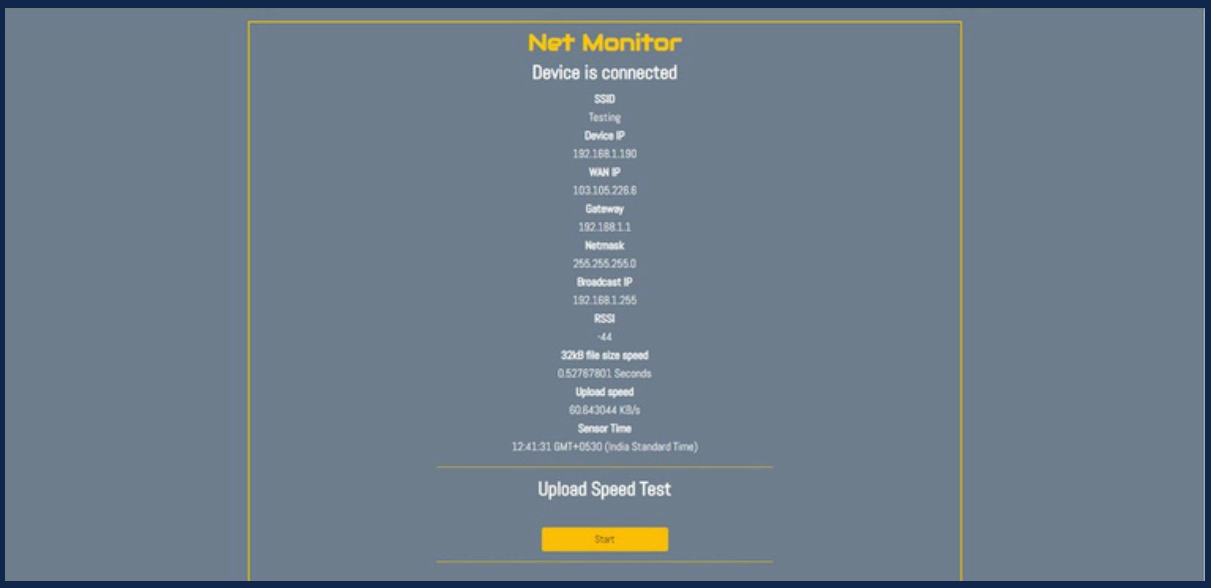
- Step 0: Provide the SensorTagId of test sensor to Nanoprecise so the special firmware can be loaded and a link to the agent interface provided (this link will expire after 48h or when reblinking sensor, contact Nanoprecise timely to get updated link)

- Step 1: GO to the link that was provided for your test sensor, either on your mobile phone or on the laptop.

- Step 2: Blink the test sensor to the appropriate Wi-Fi to which all the sensors need to be connected. Ensure the firewall requirements are met, refer to section on Firewalls above.

- Step 3: Please take the test sensor to every potential sensor location with the sensor switched off.

This is updated every 5 sec.



- While the device is connected, you will notice the RSSI, and upload speed of the sensor is updated every 5 seconds.
- If the sensor is not able to connect to the internet, the “Device is Disconnected” will prompt.
- Repeat the test for each location you want to install a sensor and note down the RSSI and upload speed at each location.
- If needed the router or repeater can be moved or more routers or repeaters added to assure proper RSSI and upload speed at all planned sensor locations.
- See the video here for demo on how NS002 can be used as connectivity test sensor:
  - Cellular Blinkup: https://www.youtube.com/watch?v=g53EoEF9pVU
  - WiFi Blinkup: https://www.youtube.com/watch?v=p95vcONB8vg
  - Wifi Blinkup with incorrect credentials: https://www.youtube.com/watch?v=r2yS4HVOB9Y

Need more information or assistance? Reach out to us at customer-success@nanoprecise.io or click the (?) button in your dashboard for setup guidance or troubleshooting tips.