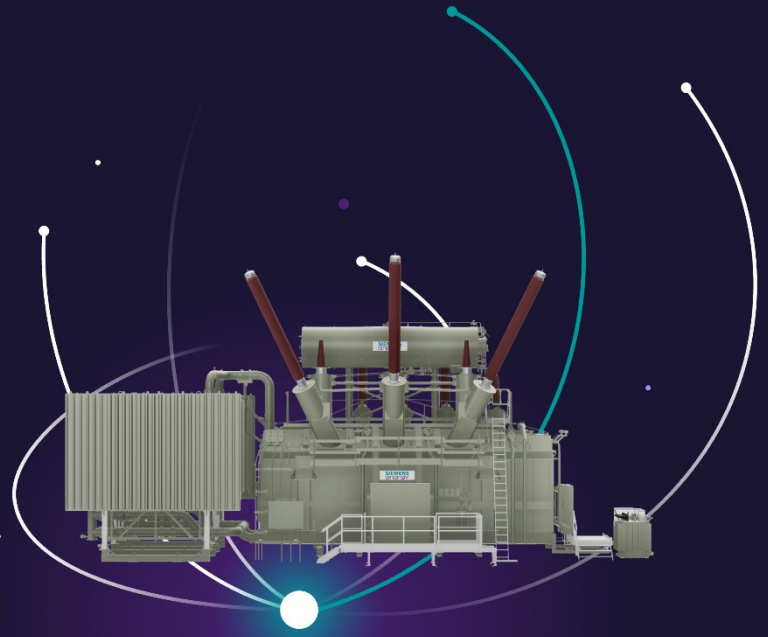


Direct Current Detector

Detecting DC bias in transformer

siemens-energy.com/gt-service



Introduction

Understanding the impact of DC bias on transformers

DC bias significantly increases noise and loss levels in transformers. This DC can originate from power electronics in the grid, HVDC interconnections, renewable power generation, or small direct currents caused by geomagnetic effects. Due to the magnetic properties of transformer cores, even a small DC bias can lead to substantial consequences, including increased reactive power current requirements and greater losses.

For example, a mere few hundred milliamperes of DC can result in a notable increase in noise and no-load losses. A DC level of 500 mA may cause an increase of 13 dB(A) compared to reference noise levels in a test field without DC. The human ear perceives a 10 dB increase as a doubling of the noise level. Additionally, DC loading can lead to an increase of up to 50 percent in no-load losses.

Therefore, it is essential for transformer owners, operators, and service personnel to detect DC bias in their transformers. The Direct Current Detector (DCD) app provides an initial indication of whether a transformer is affected by DC bias.

In case a transformer consistently shows DC bias, we strongly recommend contacting our Siemens Energy Transmission Service experts for a comprehensive diagnosis and tailored service recommendations. ([Link to contact form.](#))

Features

The Direct Current Detector (DCC) is designed to empower transformer owners and operators with essential tools for

early detection of DC bias. By providing a quick and easy initial assessment, the DCC enables users to identify potential issues before they escalate, ensuring the reliability and efficiency of transformer operations.

- Easy to use for any person at site
- Giving a first actual indication of DC in the asset
- Freely available for Android and IOS smartphones

How to perform a DCD measurement

The easy-to-use app transforms any smartphone into a DC detection device and can be used by any person at the site, either with or without internet connection. Below are the steps for performing a DCD measurement, presented with accompanying screenshots for clarity.

1. Install the DCD app

To begin the DCD measurement, access the Direct Current Detector (DCD) app by opening the [link](#) (see also QR-code) in your smartphone browser. Once the app is open in your

browser, tap  or  button and the "Add to Home Screen" button  (the exact wording may vary depending on your browser). This will save the DCD app to your home screen for easy access, allowing you to launch it directly from your mobile device.



DC Detector

2. Read and confirm the license agreement

Before proceeding, please review the "End User License Agreement for Free of Charge Mobile Applications" and the "Additional Conditions for Free of Charge Apps." These documents outline the terms and conditions associated with the use of the DCD app. Kindly confirm that you have read and understood the agreement before continuing.

3. Read the safety manual before DCD measurement

To ensure safe operation during the DCD measurement, please click on the Hamburger menu (≡) and select "Safety."

Please read the Safety Disclaimer carefully before approaching a transformer for DC measurement. Understanding these safety guidelines is crucial for conducting the measurement safely and effectively.

4. Start DCD measurement

To begin your DCD measurement, click on "Start Your First Measurement." You will be prompted to select or enter the following details: substation name, serial number, and transformer name/label.

Next, select the microphone option, and initiate the sound measurement by tapping on the microphone icon.

Hint: For a high-quality initial assessment of DC effects, we recommend conducting three measurements of 60 seconds each. During the 60-second recording phase, walk around the transformer while keeping your smartphone at a distance of 30 to 100 cm from the transformer.

To ensure accurate results, avoid ambient noise during the recording, as it can negatively impact the DC assessment. The app will indicate recording quality using a traffic light system, and if necessary, it will provide further recommendations for improving sound quality.

5. Review measurement results

While the recording is in progress, the app will display the following information:

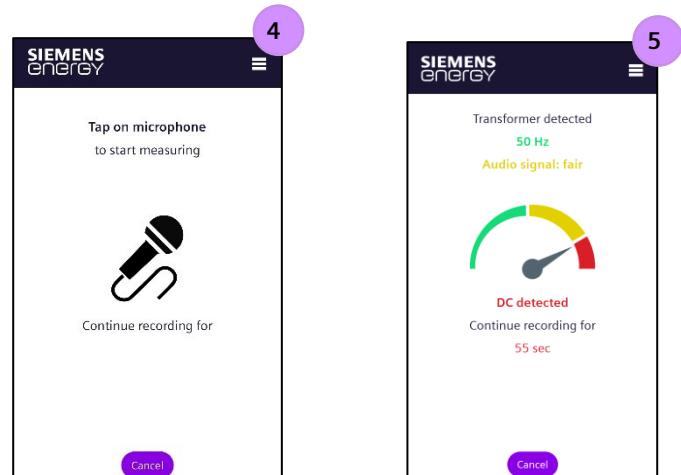
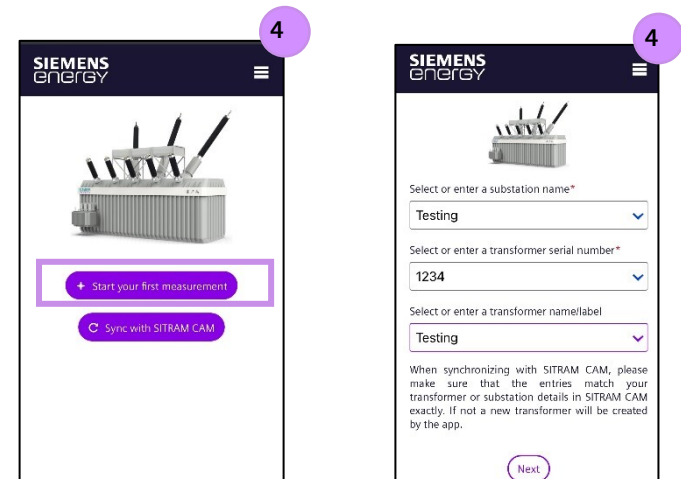
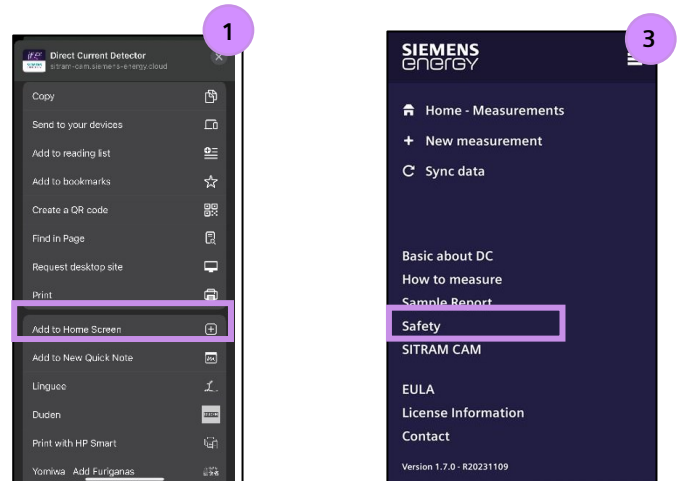
- **Hz:** This indicates the sound frequency detected during the recording, representing the Hertz of the transmission grid.
- **Audio Signal:** This provides an indication of sound quality, categorized as "Poor," "Fair," or "Good."
- **DC Detected/Not Detected:** This shows the result of the DC assessment, indicating whether Direct Current has been detected.

Once the recording is complete, the app will process the audio file. A clear color signal will indicate the status of DC bias detection:

- **Green:** Everything is okay; no DC bias detected.
- **Yellow:** An uncertain signal; further investigation may be needed.
- **Red:** DC bias is detected; immediate attention is required.

6. Follow up if necessary

If the app indicates the presence of DC bias, we recommend contacting Siemens Energy Transmission Service experts for a thorough diagnosis and actionable service recommendations. ([Link to contact form.](#))



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