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Gridphase: Revolutionising Phase Identification in Power Distribution Networks

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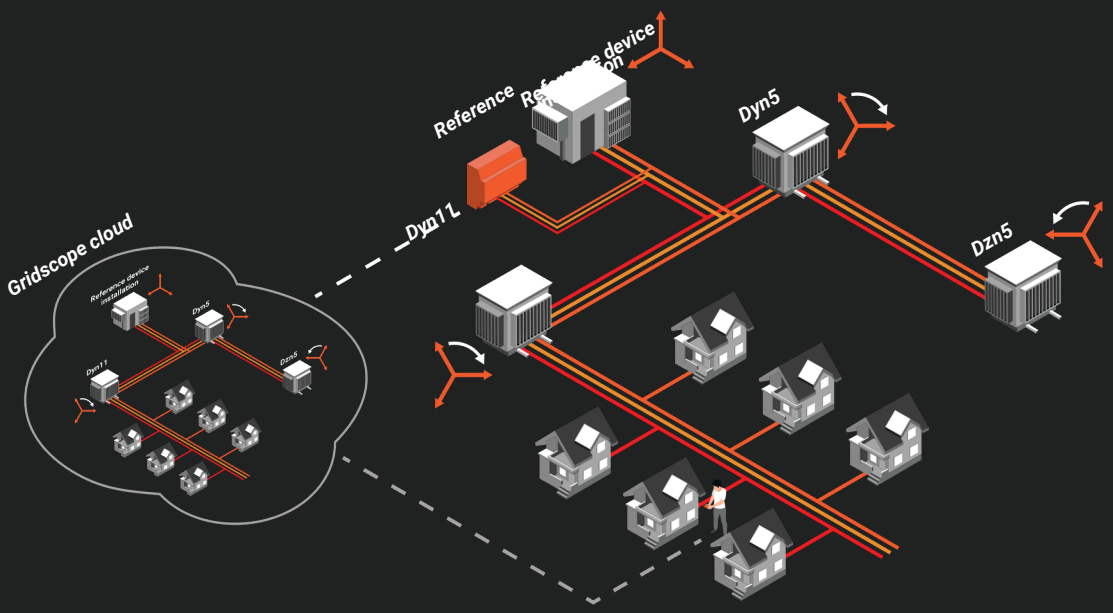
Dewesoft d.o.o.
Gabrsko 11a, 1420 Trbovlje
Email: sales@dewesoft.com
Website: dewesoft.com

As the demand for energy is increasing and power distribution networks are becoming more complex, accurate phase identification has emerged as a crucial aspect of network management. **Gridphase**, our innovative solution, pioneers a path for robust and reliable phase identification across your whole power distribution network.

Gridphase employs synchronised measurements of base harmonic voltage for phase identification, a method that ensures the accuracy and reliability of the operation. The system employs both reference devices and handheld instruments to measure synchronised voltage signals.

This synchronisation is facilitated by a Global Positioning Systems (GPS) clock signal, ensuring precision across all measurements. To exchange these timestamped measurements, the handheld instrument uses a mobile connection, while the reference device uses an ethernet connection.

The exchange of measurements is done through a backend server application. Through this exchange of timestamped synchronised measurements, users can compare the phases measured at the reference point with those at the measurement point, facilitating the identification of matching phases.



However, the described approach is limited in scenarios where phase shifting devices, such as transformers, are situated between the reference device and the measurement point. These devices can introduce phase shifts that complicate the phase identification process. To overcome this challenge, **Gridphase** incorporates a patented methodology designed to automatically compensate for the phase shifts introduced by different phase shifting devices. This innovation ensures seamless and accurate phase identification, irrespective of the complexity or the configuration of the power distribution network.

Applications

Load imbalance

One significant application of Gridphase within low-voltage networks is in the mitigation of load imbalance. Given that most loads in these networks are single-phase and are not systematically ordered, this can lead to load asymmetry and subsequently, voltage asymmetry.

Imbalance becomes a serious concern when it affects capacity, specifically when voltages or currents near thermal or voltage regulatory limits. Our experience has shown that load imbalance typically peaks when feeder loading is at its maximum, and these patterns are generally repeatable.

This means the same phase, or occasionally the same two phases, are subjected to a higher load than the other phases. This presents an opportunity - by merely reconnecting a few consumers, the impact of load asymmetry can be substantially mitigated.

Furthermore, load asymmetry induces a neutral current, contributing to the total voltage drop and thus reducing the voltage on the load. Gridphase offers you the means to correct such scenarios, thereby improving the overall utilization of the low-voltage grid.

Meter installations and replacements

New meter installations and meter replacements in low-voltage networks represent another significant use-case for Gridphase. Conventionally, meter phasing is conducted through timeseries analysis of collected voltage and power consumption measurements, or through inbuilt PLC functionality in cases where PLC communication is utilised. However, collecting sufficient data with newly installed meters can be time-consuming, and some older meters only report energy consumption. In such instances, phasing the meters during the installation or replacement process is a feasible solution.

Gridphase's mobile application supports a module that records the measured phase upon connection and instantly feeds this data into a database. This real-time phase information can be readily utilised in Advanced Distribution Management Systems (ADMS) and data analytics applications. This immediate phase identification introduces no overhead and empowers the installation crew to influence the phase selection for connection. Consequently, they can systematically balance the consumers within a particular building or on a low-voltage feeder, thereby improving load balance.

This streamlined process underscores Gridphase's commitment to optimising field operations and enhancing the overall efficiency of low-voltage network management.

Key Features

Synchronization buffer

Synchronization buffer enables you to execute measurement without GPS signal present, once the device has been synchronized to the GPS signal. Buffer holds the synchronization up to 3 hours.

Phase/Neutral detection

Gridphase contains a special circuit that automatically detects if you accidentally reversed the connection of live and neutral conductors.

Distribution network model support

Support for the grid network model, hosted on the backend server application, is a patented pivotal component of our phase identification system. It houses network connectivity and transformer information, thus ensuring a consistent reference frame throughout the entire network. This means that Line 1 in the substation aligns with Line 1 on the low-voltage network, thereby maintaining uniformity across the network infrastructure.

No cellular signal required

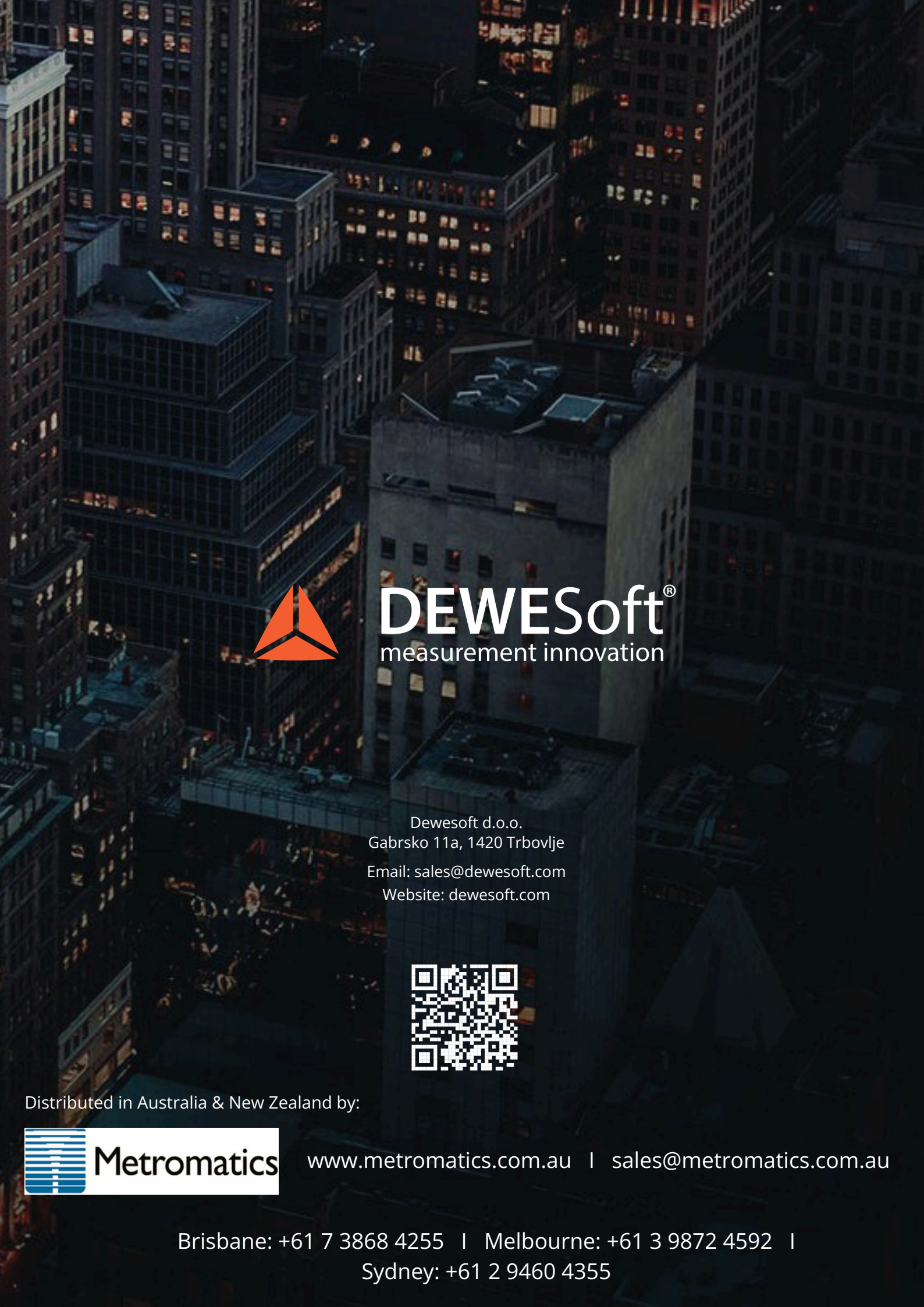
If cellular signal is not present on the connected mobile phone. The measurements can be saved and paired with the reference device after internet connection is once again available.

Virtual reference node concept

Virtual reference node allows user to save a measurement on a particular bus in the network as if a reference device was connected to that bus. All subsequent measurements can then be referenced to the saved measurement as long as they are done in the same power synchronous zone.

Contactless detection

Gridphase features a built-in capacitive sensor that enables contactless detection of phase on low / medium and high voltage lines.



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www.metromatics.com.au I sales@metromatics.com.au

Brisbane: +61 7 3868 4255 I Melbourne: +61 3 9872 4592 I
Sydney: +61 2 9460 4355