

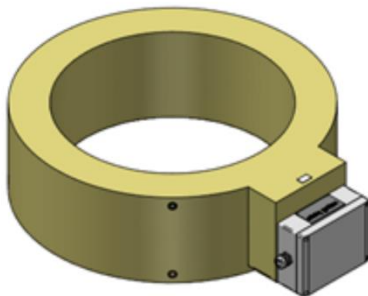
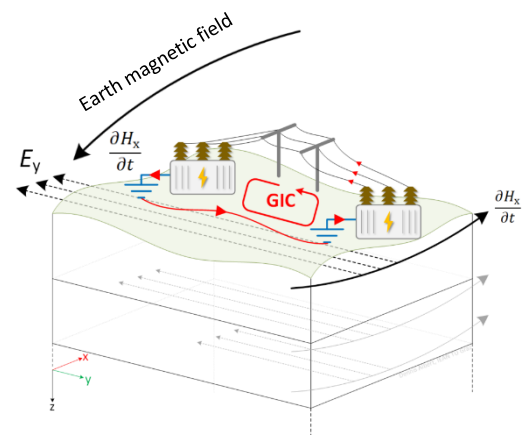
Power Quality Measurements in High Voltage Grids – Everything in Control

Experts predict that electricity consumption will increase significantly in many European countries over the next few years. In Germany alone, consumption is expected to rise by around 19 percent by 2030. Electric cars, heat pumps and the generation of green hydrogen are cited as the main drivers. Already today, many resources in the grid infrastructure are operated at the load limit in order to continue to comply with the legal requirements for the energy transition. Non-linear loads and feed-in plants in the low-voltage grid generate a large proportion of harmonics as well as a DC component, which is already regulated in many technical guidelines. However, network operators do not usually carry out any checks. Transformers in local substations are therefore exposed to non-defined operating conditions. For example, control operation for transformers is defined according to IEEE C57-110 with a THDI $\leq 5\%$. If this value is exceeded, a so-called "derating" is advised.

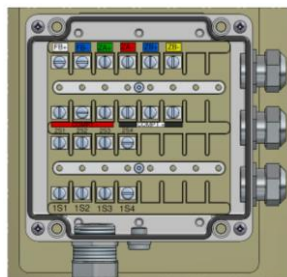
In medium- and high-voltage networks, DC currents from neighboring DC equipment can enter the grounded neutral point of transformers. Geomagnetically induced currents can also generate non-negligible DC components in high-voltage networks. The transformers enter half-wave saturation and become large consumers of reactive power.

In addition, harmonic currents up to 9 kHz are already measured in many high-voltage networks. But harmonics above 9 kHz are also increasingly of interest.

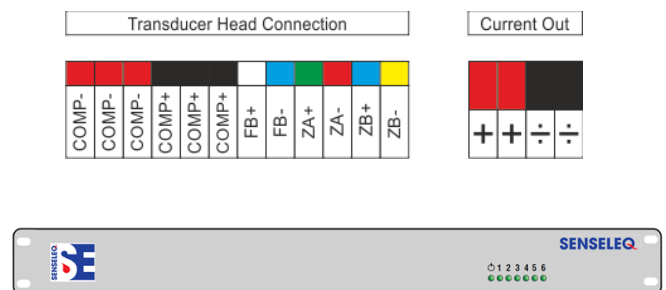
The companies Senseleq and Neo Messtechnik are working in pilot projects on highly accurate measurement concepts to meet current and future requirements. Zero-flux transducers in cast-resin design are mounted on transformer bushings to record the current with high precision in the range from DC to approx. 60 kHz.



Transducer head



Terminal box



Electronic box

The electronics box mounted in control cabinets can provide current or voltage output signals that can be processed by the PQ analyzer.

The measuring instruments from Neo Messtechnik measure with similar precision as power analyzers and can detect relatively small DC components. At the same time, harmonics up to 60 kHz can be analyzed.

PQM200 Power Quality Monitoring

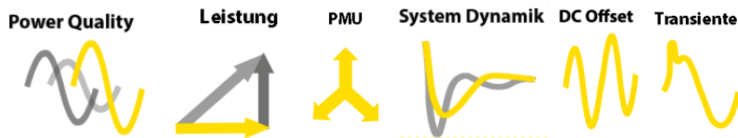
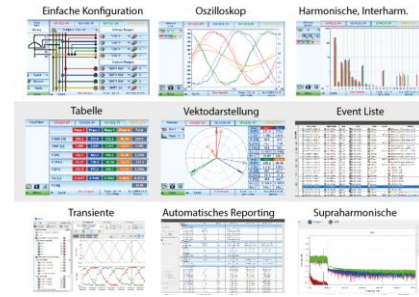


Power Quality Klasse A+

klassifiziert nach IEC61000-4-30 Ed. 3 (Ed. 4 ready)

Schnittstellen

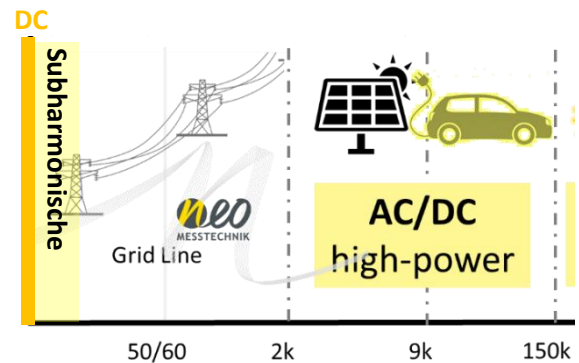
GPS / LTE / LAN / WLAN / CAN / RS485 / DIO



DC to 60 kHz for Current and Voltage

- High precision DC measurement with 0.05% accuracy and 24 bit
- Subharmonics
- Harmonics / Interharmonics / THD / TDD
- Supraharmonics 2-9 kHz (IEC61000-4-7)
- Supraharmonics 8-60 kHz (IEC61000-4-30) with full FFT
- High dynamic range (0.5 mA to 120 kA)

0.05% accuracy / 24 bit resolution / SNR >100dB



Nothing now stands in the way of future-proof retro-fit measures in the high-voltage network.

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