# Technical specification
# Mobile Power-Quality Analyser for Low, Medium and High Voltage networks

| Pos. | Specification |
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| Pos. 1 | - The mobile Power-Quality Analyser must be made for measuring 4 voltages and 4 currents in low voltage range and for measurements in medium and high voltage range via instrument transformers.<br>- The device must be compliant to IECIEC61000-4-30 Ed.3 (2015) and fulfil the requirements for “Class A”.<br>- A fault record can be triggered via external trigger input (AC/DC signals from 0 V to 250 V).<br>- For the measurement of 0-1000 mV signals, an AUX input is required. Units and scaling must be freely configurable. (E.g. simultaneous measurement of temperature and 4x voltage, current)<br>- The accuracy limit of voltage- and current inputs must be < 0,1 %.<br>- Voltage and current inputs must be able to measure AC and DC values.<br>- Voltage range should be P-P: 0-830V for AC and 1000V for DC measurements, appropriate for measurements in LV systems and at instrument transformers in MV/HV systems.<br>- Measurement range current: up to 3000 A with flexible current clamps, optional up to 6000 A and mini current clamps for 1A/5A instrument transformers. The analyser must detect the connected clamps by coding and the settings must be set automatically.<br>- The voltage measuring channels must have a sampling rate of 1 MHz. Current measuring channels must have a sampling rate of 40 kHz. The channels must have a resolution of 24 bit.<br>- The online measurement data (voltage, current, power, power consumption, THD, information about the number of PQ-events and fault records) can be viewed at a colour display.<br>- The analyser must be equipped with a memory of min. 4 GB. The memory card must be easily replaceable by the user.<br>- The device provides the following interfaces: TCP/IP; USB; WLAN and Wifi. All interfaces provide full functionality.<br>- The system must provide the monitoring of the threshold values of the following standards: EN50160; IEC61000-2-2; IEC61000-2-4 (class 1, 2, 3); NRS048; IEEE519<br>- The device must measure the angle of current- and voltage-harmonics in relation to the fundamental voltage oscillation according to IEC61000-3-12 standard.<br>- The flicker measurement must be class F1 according to IEC61000-4-15 standard.<br>- Settings like nominal voltage, transformer ratio, measurement range are able to be set via display control (no pc required)<br>- The measuring interval must be freely programmable in range of 1 sec to 30 min.<br>- The following measuring intervals must be recordable without restriction to the number of values: 200 ms; 3 sec; 1 sec to 30 min (variable); 2 h.<br>- The evaluation of standards with 10 min data must be recordable up to 1 year without any loss of data.<br>- No pre-selection of measurement values has to be made. The device must be able to compute and record all 3800 parameters for voltage quality and load analyses simultaneously<br>- The FFT calculation and visualisation of harmonics and interharmonics must provide the spectrum from DC to 170.000 Hz.<br>- The device must be able to calculate and permanently record voltages and current with frequencies of 2 kHz to 9 kHz as 200 Hz bands according to IEC61000-4-7 standard. In addition, frequencies of 8 kHz to 170 kHz are measured. FFT calculation must be made as gapless 200 Hz sectors. The aggregation of the frequency sectors is adjustable to 200 Hz or 2 kHz.<br>- Long term data and all triggered events must be measured and recorded simultaneously as phase-to-ground and phase-to-phase values. |

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| | - Event type, measurement channel, onset, duration and extreme values must be recorded for each type of event. Events are triggered by limit-value violations of EN50160 standard or various trigger options.<br>- The trigger thresholds must be fully configurable by the user and independent of the EN50160 settings.<br>- For each trigger event, oscilloscope data and 10 ms RMS data must be recorded.<br><br>The following trigger types must be provided:<br>a.) Under- or overshoot of a predefined RMS value (voltage or current)<br>b.) Frequency trigger (frequency hopping, under- or overshoot)<br>c.) Envelope curve trigger<br>d.) Effective value hopping (voltage or current)<br>e.) Phase jump (°)<br>f.) Automatic trigger (trigger values are automatically adjusted by the device)<br><br>- Trigger events must be recorded as RMS and oscilloscope values. Duration and prehistory can be fully parameterised by the user.<br>- ½ period sampling – recording duration min. 600 sec.<br>- 40 kHz sampling – recording duration min. 4.000 msec.<br>- In case of supply disruption, an intern UPS (uninterruptable power supply) must supply the device for up to 3,5 hours.<br>- The possibility of an external time synchronisation via DCF77 and GPS is necessary.<br>- The display and all interfaces must be protectable against unauthorized access by a password.<br>- The device must provide theft protection via Kensington lock.<br>- The evaluation software must be suitable for Windows 7; 8; 10 and enable graphical representation and prints of continuous measurement data and trigger events.<br>- The software should be provided as 64-bit version.<br><br>The following measurement variables must be representable as continuous values:<br>- Effective values as minimal, mean and maximum value of 10 min interval<br>- Short- and long-time flicker<br>- Recorded trigger events must be represented as table or graphic<br>- Triggered events should be evaluable as effective value and/or as oscilloscope curve depending on previous parameterisations.<br><br>In the graphic view, zoom and cursor functions must be available. Reports according to EN50160; IEC61000-2-2, IEC61000-2-4 and NRS048 should be generated automatically.<br><br>- Effective values, spectral display of harmonics, signal level diagrams and oscilloscope data may be analysed online.<br>- Harmonics and supraharmonics up to 170 kHz can be visualized as area charts.<br>- Data export format should be Comtrade; CSV and XML.<br>- A description in English must be attached to the hard- and software. The user interface of the analysing and operating software must be in English.<br>- The software and all updates have to be provided for free and without licenses or dongle.<br>- The device has a three-year warranty. |
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