



Multifunctional Power Quality Analysis

There are quite a few reasons for measuring and analysing power quality nowadays. Our work mostly depends on computers and machines supplied by electrical power. Therefore, problems with electrical power directly impact our work.

What is a power quality problem? This is every deviation of the electricity applied to the equipment which results in damage or misoperation of electronic equipment or other electrical devices.

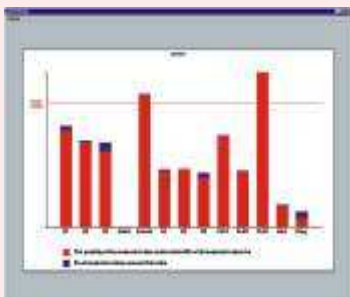
Some common symptoms of power quality problems in facilities are:

- Unexplained equipment trips or shutdowns.
- Occasional equipment damage or component failure.
- Erratic control of process performance.
- Random lockups and data errors.
- Power system component overheating.

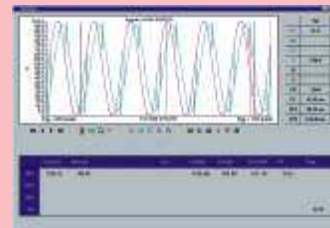
If we look at those technical problems from the economic point of view, this means that we have to deal with decreased production, time delays, additional expenses and company reputation. Therefore good power quality is a must for a normal business flow. **MobiPower** will help you find many problems on your site such as:

- Identification of sensitive electrical devices.
- Early detection of potential errors.
- Electrical network optimization or expansion on power quality measurements basis.

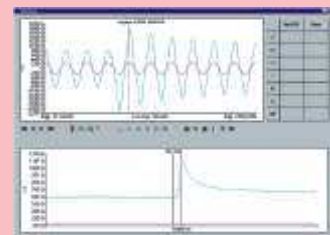
Typical applications of individual instruments



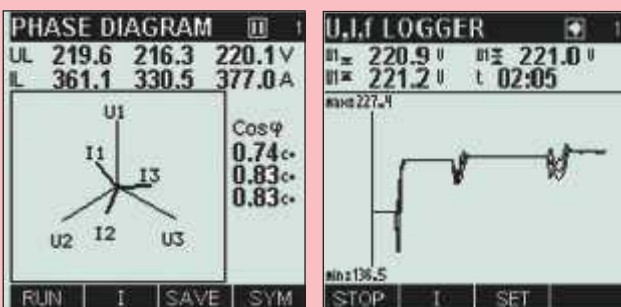
Power quality assessment according to EN 50160 and flicker measurement performed with **MI 2292 Power Quality Analyser Plus**.



Transients capturing with **MI 2292 Power Quality Analyser Plus**. Transients can appear due to atmosphere discharges, switching maneuvers or capacitor banks switching. Records can be effectively used for overvoltage protection selection.



Waveform analysis performed either with **MI 2292 Power Quality Analyser Plus**. Useful feature for determining harmonics direction, UPS performance evaluation or motor start-up analysis.



Different pre-set loggers within **MI 2392 PowerQ^{Plus}** allow quick on-site power quality assessment without the need to download recorded data on a PC. Examples show phase diagram which helps when connecting the instrument to power supply network U, I, f logger is a useful feature for measurement conditions evaluation.



Periodic measurement of basic power quality parameters (U, I, P, Q, S, PF, etc.) with harmonics analysis performed with **MI 2092 Power Harmonics Analyser**.

	Typical application areas	Possible corrective solutions	Suitable Metrel Power Quality Analyser
General Power Quality Testing	<ul style="list-style-type: none"> - General power quality assessment - Power factor correction - Harmonics filtering - Power peak reduction - Power breaks capturing 	<ul style="list-style-type: none"> - PF correction equipment - Filters - UPS - Power conditioners 	<ul style="list-style-type: none"> - Power Harmonics Analyser MI 2092 - Power Quality Analyser Plus MI 2292 - PowerQ^{Plus} MI 2392 - PowerQ MI 2492
EN 50160 Voltage Quality Evaluation	<ul style="list-style-type: none"> - Assessment of supply voltage quality at end users - Assessment of voltage quality at end users - Assessment of voltage quality in electrical generation systems 	<ul style="list-style-type: none"> - Dealing with customer complaints - UPS - Ferro-resonant transformers - Backup generators - Power conditioners 	<ul style="list-style-type: none"> - Voltscanner MI 2130 (1-phase only) - Power Quality Analyser Plus MI 2292 - PowerQ^{Plus} MI 2392
Waveforms Recording	<ul style="list-style-type: none"> - Analysis of influences of motor start-ups - Analysis of load variations - Analysis of non-linear loads 	<ul style="list-style-type: none"> - Voltage regulators - Power conditioners - UPS - Ferro-resonant transformers - Filters 	<ul style="list-style-type: none"> - Power Quality Analyser Plus MI 2292 - PowerQ^{Plus} MI 2392 - PowerQ MI 2492
Transients Capturing	<ul style="list-style-type: none"> - Analysis of oscillatory transients caused by lightning - Analysis of electrostatic discharges - Analysis of switching manouvres 	<ul style="list-style-type: none"> - UPS - Overvoltage protection devices - Analysis of switching manouvres 	<ul style="list-style-type: none"> - Power Quality Analyser Plus MI 2292
Fast Logging Recording	<ul style="list-style-type: none"> - Analysis of influences of motor start-ups - Analysis of load variations 	<ul style="list-style-type: none"> - Voltage regulators - Power conditioners - UPS 	<ul style="list-style-type: none"> - Power Quality Analyser Plus MI 2292 - PowerQ^{Plus} MI 2392

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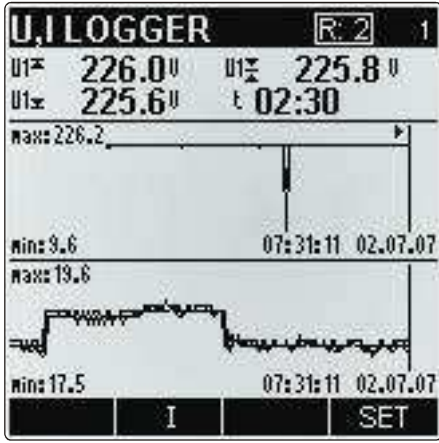


What we do

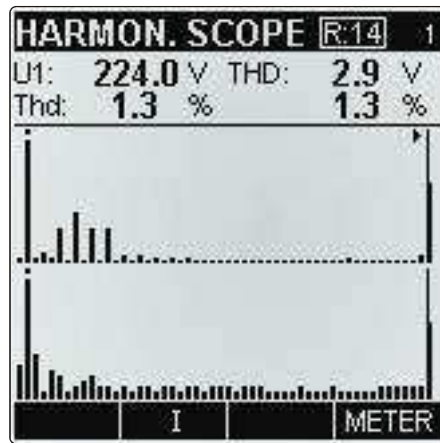
- Power quality assessment and troubleshooting in low and middle voltage electrical systems.
- Checking power correction equipment performance.
- Harmonics spectrum analysis for selection of harmonic filters.
- UPS, voltage generators and regulators checking and troubleshooting.
- Voltage, current, power monitoring and recording.
- Energy consumption monitoring and recording.
- Network power quality evaluation according to EN 50160. (only MI 2392)

Main features

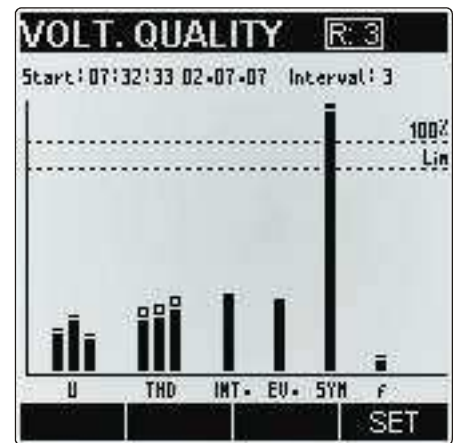
- Simultaneous analysis of basic power quality parameters (U, I, P, Q, S, PF).
- Harmonics analysis up to 50th component.
- Phase diagram and unbalance calculation for 3-phase systems.
- Voltage and current on-line scope function.
- Instrument is ready for incoming A 1179 flex clamps.
- Voltage events (dip, swells and interrupts) evaluations.
- Recording and reporting according to EN 50160. (only MI 2392)



U,I logger screen

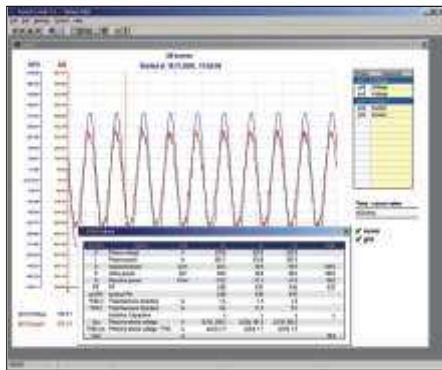


Harmonics screen

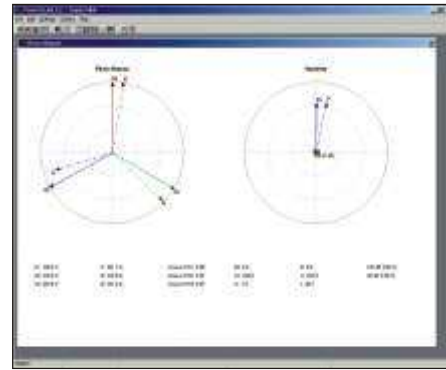


EN 50160 screen

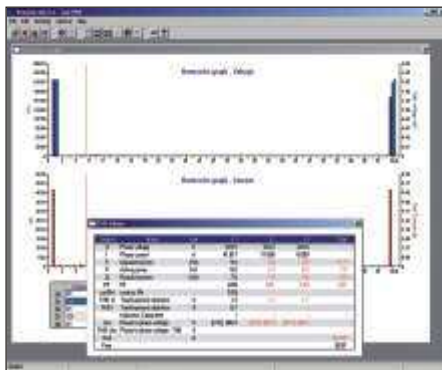
PowerQ Link Displays



UIf scope screen



Phase diagram



Harmonics screen



Voltage quality

Short Glossary

Harmonics are voltages or currents with a frequency that is an integral multiple of the fundamental supply frequency.

Interharmonics are voltages or currents with a frequency that is a non-integral multiple of the fundamental supply frequency. Interharmonics, always present in the power system, have recently become of more importance since the widespread use of power electronic systems results in an increase of their magnitude.

Voltage Dips is a short-term reduction in, or complete loss of, RMS voltage. It is specified in terms of duration and retained voltage, usually expressed as the percentage of nominal RMS voltage remaining at the lowest point during the voltage dip. A voltage dip means that the required energy is not being delivered to the load and this can have serious consequences depending on the type of load involved.

Voltage swell is a temporary increase of the voltage at a point in the electrical system above a threshold.

Flicker is the impression of unsteadiness of visual sensation induced by a light stimulus, the luminance or spectral distribution of which fluctuates with time. Usually it applies to cyclic variation of light intensity of lamps caused by fluctuation of the supply voltage.

Periodics is the base for power quality measurements. In fact the EN50160 measurement is a periodic measurement with the recording parameters set to EN50160 standard requirements. Measuring period is the time period between the beginning and end of the measurement.

Waveform is defined as a steady-state deviation from an ideal sine wave of power frequency principally characterized by the spectral content of the deviation.

Fast logging is a measurement similar to a waveform recording but instead of storing 64 points in a wave half-period, only the RMS value of a particular half-period is saved.

Transients are sudden changes of steady state voltage, current or load. These sudden changes are mostly found as the result of the operation of switching devices. Transients can cause oscillatory ringing. Filters are used to prevent these ringing oscillations from affecting delicate equipment.

EN 50160 was approved by the European Committee for Electrotechnical Standardization (CENELEC) in 1994. EN 50160 specifies voltage characteristics at the customer's supply terminals or in public LV and MV electricity distribution systems under normal operating conditions.



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