Power Quality Analyser Plus MI 2292

Top of range, 3-phase power quality analyser, with included EN 50160 and Flicker measurements

Power Quality Analyser Plus is a top of range, 3-phase, portable power analyser for use in industry, utilities and suits the most demanding power quality diagnostics.

- Three current and three voltage inputs combined with an internal memory modules allow recording up to 4 weeks
- 64 parameters can be monitored or recorded simultaneously
- Instrument can be programmed either directly or via PC
- MS Windows compatible PC SW PowerLink serves for downloading, management of recorded data and preparation of test reports
- Extensive selection of accessories makes the instrument suitable for a variety of different applications

Target applications

- General power quality assessment in distribution and industrial low and middle voltage electric systems
- Power quality analysis according to EN 50160
- Capturing and recording of power supply events (shut-down's, interruptions, sags, dips)
- Flicker measurement
- Power factor correction equipment measurements
- Harmonics measurements and filter selection
- Transients recording and over-voltage protection devices (MO varistors) performance testing
- Assessment of UPS performance
- Consumption profile recording
- Motor's inrush currents monitoring and recording

Main features

- High accuracy measurement and recording of power quality parameters (U,I,f, cos φ, PF, P,Q,S, current and voltage harmonics up to 63rd order, etc.)
- Power quality assessment according to EN 50160 including Flicker measurement and standardised printout report in graph and table form
- Transients measurements down to 20 µs with adjustable level triggers
- Waveform measurements with harmonics direction detection. Adjustable level and slope triggers on voltage and current
- Instrument or a group of them can be remotely controlled and programmed via GSM modem
- Windows compatible PowerLink PC Software supports downloading, programming, communication with the instrument and transfer of recorded data to other MS programmes (Excel, Word, etc.)

Standards:
Instrument is developed and manufactured in accordance with following standards:
Safety: IEC/EN 61010-1
EMC: IEC/EN 61326-1
Measurements: EN 50160 and EN 61000-4-30, Class B

General technical specifications

Display
Graphic Liquid Crystal Display with
LED backlight, 160 x 116 dots resolution
Non - volatile memory
2048 Kbytes SRAM, battery backed
Digital hardware specification
A/D con., 14 bit with 128 samples per channel per period (43 ÷ 68 Hz)
Outputs
Communication type: RS232 serial interface
Baud rate: 2400 ÷ 57600 bps
Connector: 9 pin, D-type
Communication cable: Standard type
Power supply
Operating range:
230 VAC +10 % ÷ 20 %, 45 ÷ 65 Hz, 8 VA
Optional: 115 VAC +10 % ÷ 20 %, 45 ÷ 65 Hz, 8 VA
DC power supply: Internal 4 x 1.2 V NiMh batteries
Charger: Internal battery charger
Working temperature range: -20 °C ÷ + 60 °C
Max. humidity: 85 % RH (0 ÷ 40 °C)
Pollution degree: 2
Protection classification: II, double insulation
Voltage inputs: CAT III/600 V; optional CAT IV/600 V
Overvoltage category: AC power supply CAT III/300 V
Protection degree: IP 64
Dimensions: 265 x 110 x 185 mm
Weight: 2 kg
Recorder
Adjustable integration period: 1 s ÷ 900 s
Selected signals: max. 64
Statistics values:
Each period divided in 200 parts (0.1 ms)
Voltage anomalies:
Based on half period, start, duration and extremes of measured voltage
EN 50160 Analysis mode:
Voltage dips, swells, sags and breaks
Resolution 10 ms, no gaps
Unsimetry
Voltage RMS
Frequency
Harmonics: up to 43rd
Flickers: Pst, Plt

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Technical specification

AC Voltages
Three-phase AC voltage input (3 differential inputs, L1 - N, L2 - N, L3 - N)

Input voltage range:	10 ÷ 550 $V_{RMS\ L\text{-}N}$, 900 $V_{RMS\ L\text{-}L}$ 600 $V_{RMS\ L\text{-}N}$ (overload 10 s)
Optional on request:	10 ÷ 750 $V_{RMS\ L\text{-}N}$, 1000 $V_{RMS\ L\text{-}L}$ 800 $V_{RMS\ L\text{-}N}$ (overload 10 s)
Resolution:	0.1 V
Accuracy:	± 0.5 % of reading ± 2 digits
Crest factor max.:	1 ÷1.4 @ 550 $V_{RMS\ L\text{-}N}$
Frequency range:	43 ÷ 68 Hz mains voltage

AC Currents
Three-phase AC input for connection to current transducers with voltage output

Input current (voltage otput):	0.02 ÷ 1 V_{RMS} (from 0.02 x In ÷ In)
Resolution:	0.3 mV (0.3 A with 1000 A / 1 V)
Accuracy:	(±0.5 % of reading ±6 dig.) + current transformer accuracy
Crest factor:	1 ÷ 2.5 @ 1 V_{RMS}
Maximum permissible overload:	150 % In (sinusoidal current)
Maximum input voltage:	1 V_{RMS}

Phase angle
Consider phase angle data of used current transformer.

Scope

Display options:	Waveform of pairs (L1: U1 and I1, L2: U2 and I2, L3: U3 and I3), $U_{1,2,3}$, and $I_{1,2,3}$
Ranging:	Auto / manual

METER – Power measurement
Phase values for selected measuring parameters:

Measured:	voltage (U), current (I), cos φ
Calculated:	active power (P), apparent power (S), reactive power (Q), power factor (PF) with its characteristics (C, L, none), interphase voltage

3-phase values:

Calculated:	active power (Pt), apparent power (St), reactive power (Qt), power factor (PFt), neutral current (In);
Basic accuracy for P, Q, S,:	± 1 % of reading
Resolution for P, Q, S,:	0.01 of displayed value

SPECTRUM – Harmonics measurement
The instrument computes harmonics on signals sampled with an A/D converter.

Recording interval:	160 ms (8 cycles)
Spectrum calculation range:	DC – 63rd
Spectrum display range:	DC – 25th

Displayed items for selected harmonic: Order, relative and absolute value

Energy
Displayed results:
- cumulative values (TOTAL)
- partliol cumulative value (SUBTOTAL)
- values for last integration period (LAST IP)

Quantities Active energy (EP), capacitive energy (EQC), inductive energy (EQI)

Basic accuracy:	± 1 % of reading
Resolution:	0.1 of displayed value

Flicker measurement
The instrument computes flickers according to IEC 61000-4-15

Waveforms

Sampling rate:	128 scans / period
Trigger:	level, manual, timer
Buffer:	min. 10 periods of pre / post size, up to 7812 periods can be recorded
Channels:	Single or multi chanel mode
Harmonics / direction:	magnitudes generated by load, generated by utility

Fast logging

Sampling rate:	128 scans / period, (min, max, avg recorded each half period)
Trigger:	level, manual, timer
Buffer:	pre / post size, up to 166 minutes of recording
Channels:	3 x U, 3 X I, Single or multi channel mode

Transients

Capturing:	>20 µs transient detectability
Trigger:	Level, slope, manual
Buffer:	min. 10 periods of pre / post size, up to 1000 periods can be recorded
Channels:	3 x U, 3 x I, single or multi channel mode

Ordering information:

Standard set **Part No. MI 2292**

- Instrument Power Quality Analyser Plus
- Current clamp 1000 A/1 V, 3 pcs
- Test tips, 3 pcs
- Alligator clips, 4 pcs
- Voltage measurement cables, 4 pcs
- Mains cable
- PowerLink PC SW package with RS232 cable
- Power supply adapter
- Rechargeable batteries, 4 pcs
- Soft carrying bag
- Small soft carrying bag for current clamps
- User manual
- Handbook "Modern Power Quality Measurement Techniques" on CD
- Product verification data

Standard set **Part No. MI 2292F**

Similar content as MI 2292:
Current clamp 1000 A/1 V, 3 pcs replaced by
3-phase flexible current clamps 3000/300/30 A, 1 pcs

Optional accessories:

Photo	Order No.	Acc. decription
	A 1033	Current clamp 1000 A/1 V
	A 1037	Current transformer 5 A/1 V
	A 1039	Clamp adapter (for A 1069 and A 1122)
	A 1069	Mini clamp 100 A/1 V to be used with (A 1039)
	A 1122	Mini clamp 5 A/1 V to be used with (A 1039)
	A 1100	Modem ST
	A 1101	Modem GSM
	A 1171	USB/RS232 converter with 1 m fixed cable
	A 1179	3-phase flexible current clamps 2000/200/20 A
	A 1257	3-phase flexible current clamps 3000/300/30 A
	A 1287	1-phase flexible current clamps 3000/300/30 A
	S 2014	Safety fuse adapter
	S 2015	Safety flat clamps

Note! Photographs in this catalogue may slightly differ from the instruments at the time of delivery.
Subject to technical change without notice.

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