

PowerQ ^{Plus} MI 2392



Advanced,
handheld, easy to
use, 3-phase
power quality
analyser



PowerQ ^{Plus} is a genuine, portable 3-phase power quality analyser which favorably competes with higher priced instruments and can be easily implemented in a variety of different situations.

PowerQ ^{Plus} is due to its small dimensions and ease of use ideally suited for routine or complex power quality assesment in heavy duty industrial environments.

Pre-set logging screens allow on-site evaluation of all major power quality parameters (U, I, P, PF, cos ϕ , THD, individual harmonic components, phase shift, etc.).

Windows compatible **PowerQ Link** PC Software expands a versatility of the instrument.

Target applications

- Power quality assessment and troubleshooting in low and middle voltage electrical systems
- Balancing phase loads in 3-phase systems
- Checking power correction equipment performance
- Harmonics spectrum analysis for selection of harmonic filters
- Capturing inrush currents e.g. motor s start up currents
- Voltage fluctuation recording
- Consumption recording

Main features

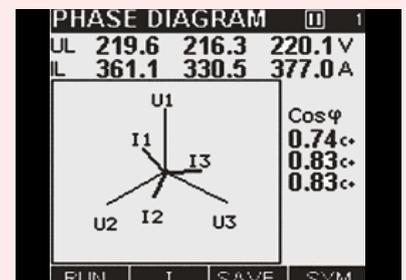
- Simultaneous measurement and recording of basic power quality parameters (U, I, P, Q, S, PF)
- Harmonics analysis up to 50th component
- Phase diagram
- Voltage unbalance calculation for 3-phase systems
- On-line scope function
- Windows compatible software package PowerQ Link
- EN 50160 power quality assessment
- Recording of anomalies and inrush currents via adjustable triggers
- Lightweight design

Standards:

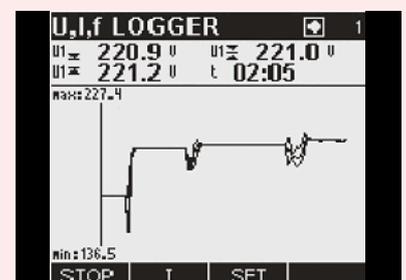
Safety: IEC/EN 61010-1

EMC: IEC/EN 61326-1

Measurements: EN 50160 and EN 61000-4-30, Class B



Phase diagram helps at connecting the instrument on the power network and is effectively used at individual phase conditions assesment.



PowerQ ^{Plus} enables on-screen evaluation of various pre-set loggers. This is an example of logger for U, I, f.

Technical specification

Voltage

Three phase AC/DC voltage input
(3 differential inputs, L_{1-N}, L_{2-N}, L_{3-N})
Input voltage range: $3 \div 550 V_{RMS\ L-N}$
 $3 \div 550 V_{RMS\ L-L}$
Resolution: 0.1 V
Crest factor: ≤ 1.4
Frequency range: $45 \div 66\ Hz$

Current

Three phase AC/DC input for connection of current transducers with voltage output.
Range 1: $0.004 V_{RMS} \div 0.1 V_{RMS}$ (4 A \div 100 A)
Resolution: 0.1 A
Crest factor: ≤ 2.3
Range 2: $0.04 V_{RMS} \div 1 V_{RMS}$ (40 A \div 1000 A)
Resolution: 0.1 A
Crest factor: ≤ 2.3

Power

Measured parameters:
Active power (P)
Reactive power (Q)
Apparent power (S)
Power factor
Cos ϕ
Energy (Wh, Vah, Varh)
Accuracy:
Power $\pm(3\% + 3\ dig)$
Power factor:
Range 1: $0.00 \div 0.39$; Accuracy ± 0.06
Range 2: $0.40 \div 1.00$; Accuracy ± 0.03
All measurements are performed in four quadrants: load or generator with capacitive or inductive character.

Voltage harmonics

Measuring range: $U_M > 3\% U_N$
Resolution: 0.1 %
Accuracy: $5\% U_M$ (3% for DC)
Measuring range: $U_M > 3\% U_N$
Resolution: 0.1 %
Accuracy: $0.15\% U_N$
 U_N : nominal voltage (TRMS)
 U_M : measured harmonic voltage $h_M = 1^{st} \div 50^{th}$

Accuracy

Voltage

Measuring range	Resolution	Accuracy	Crest factor
Range 1: $3.0 V_{RMS} \div 70.0 V_{RMS}$	0.1 V	$\pm(1\% + 0.5\ V)$	≤ 1.4
Range 2: $5.0 V_{RMS} \div 130.0 V_{RMS}$		$\pm(1\% + 0.8\ V)$	
Range 3: $10.0 V_{RMS} \div 300.0 V_{RMS}$		$\pm(1\% + 1.5\ V)$	
Range 4: $20.0 V_{RMS} \div 550.0 V_{RMS}$		$\pm(1\% + 2.5\ V)$	

Current

Measuring range	Resolution	Accuracy	Crest factor
Range 1: $0.004 V_{RMS} \div 0.1 V_{RMS}$	0.1 A	$\pm(2\% + 0.3\ V)$	≤ 2.3
Range 2: $0.04 V_{RMS} \div 1 V_{RMS}$		$\pm(2\% + 3\ V)$	

Voltage events

Signals: selectable U1, U2, U3
Swell limit: $(1\% \div 35\%) U_N$
Dip limit: $(-35\% \div -1\%) U_N$
Interruption limit: $(1\% \div 20\%) U_N$
Logging limit: manual stop; (1, 2, 5, 10, 30) minutes or (1, 2, 5, 10, 30, 50, 75) hours
Hysteresis: 1 % U_N

Measuring range

Measuring range	Resolution	Accuracy	Crest factor
Range 1: $5.0 V_{RMS} \div 70.0 V_{RMS}$	0.1 V	$\pm(5\% + 1\ V)$	≤ 1.4
Range 2: $10.0 V_{RMS} \div 130.0 V_{RMS}$		$\pm(5\% + 1.5\ V)$	
Range 3: $20.0 V_{RMS} \div 300.0 V_{RMS}$		$\pm(5\% + 3\ V)$	
Range 4: $30.0 V_{RMS} \div 550.0 V_{RMS}$		$\pm(5\% + 5\ V)$	

Possible recording time depends on selected interval. Maximum recording time is displayed automatically.

Current harmonics

Measuring range: $I_M > 3\% I_N$
Resolution: 0.1 %
Accuracy: $5\% I_M$ (3% for DC)
Measuring range: $I_M < 3\% I_N$
Resolution: 0.1 %
Accuracy: $0.15\% I_N$
 U_N : nominal voltage (TRMS)
 U_M : measured harmonic voltage $h_M = 1^{st} \div 50^{th}$

Loggers

Voltage and current logger

Signals: selectable U1, U2, U3, I1, I2, I3
Integration period: selectable (1, 2, 5, 10, 15, 30) seconds
or (1, 2, 5, 10, 15, 30) minutes
Displayed data: min., average and max. value of the IP

Power logger

Signals: selectable L1, L2, L3, TOT
Interval: selectable (1, 2, 5, 10, 15, 30) seconds or (1, 2, 5, 10, 15, 30) minutes
Displayed data: min., average and max. value of the interval

Inrushes

Signals: selectable U1, U2, U3, I1, I2, I3
Interval: selectable (10, 20, 100, 200) ms
Trigger channels: I1, I2, I3
Trigger level: selectable, 2 % \div 100 % of current range (in step of 0.1 % of current range)
Displayed data: min., average and max. value of the interval

General technical specification

Working temperature range: $-10\ ^\circ C \div +55\ ^\circ C$
Storage temperature range: $-20\ ^\circ C \div +70\ ^\circ C$
Max. humidity: 95 % RH ($0\ ^\circ C \div 40\ ^\circ C$), non-condensing
Pollution degree: 2
Protection classification: double insulation
Over voltage category: CAT III/600 V
Protection degree: IP 42
Display: graphic LCD with backlight, 160x160 dots
External DC supply: 12 V, 400 mA min.
Maximum power consumption: 360 mA
Communication: RS232, USB
Connector: 9 pin D-type
Dimensions (mm): 220 x 115 x 90
Weight (without accessories): 650 g

Ordering information:

Standard set

Part No. MI 2392



- Instrument PowerQ ^{Plus}
- Current clamp 1000 A/1 V, 3 pcs
- Test tips, 3 pcs
- Alligator clips, 4 pcs
- Voltage measurement cables, 4 pcs
- PowerQ Link PC SW package with RS232 and USB cable
- Power supply adapter
- Rechargeable batteries, 6 pcs
- Soft carrying bag
- User manual
- Handbook "Modern Power Quality Measurement Techniques" on CD
- Product verification data

Standard set

Part No. MI 2392F



Similar content as MI 2392:
Current clamp 1000 A/1 V, 3 pcs replaced by
1-phase flexible current clamps 3000/300/30 A, 3 pcs

Option accessories:

Photo	Order No.	Acc. description
	A 1020	Small soft carrying bag
	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 1171	USB/RS232 converter with 1 m fixed cable
	A 1179	3-phase flexible current clamps 2000/200/20 A
	A 1227	1-phase flexible current clamp 3000/300/30 A
	A 1257	3-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.



Measuring and Regulation Equipment Manufacturer

METREL d.d.
Ljubljanska 77
SI-1354 Horjul
Tel: + 386 (0)1 75 58 200
Fax: + 386 (0)1 75 49 226
E-mail: metrel@metrel.si
http://www.metrel.si