

# MPQ1000 Handheld Power Quality Analyzer

# Megger<sup>®</sup>



- Automatic CT recognition
- Automatic connection verification
- On-board data analysis
- SD card and USB stick support
- 1000 V ac and 1500 V dc range
- Scope and DMM modes
- CATIV @ 600 V
- IEC61000-4-30 Class A compliant

## DESCRIPTION

The Megger MPQ1000 Power Quality Analyzer is an advanced handheld 3-phase analyzer. It is a highly intuitive analyzer that delivers unmatched capability in a smart ergonomic platform. View RMS data, waveforms, demand data, phase angles, harmonics, unbalance, flicker and more in real time with the MPQ1000 scope mode and DVM mode. When data needs to be recorded the MPQ1000 record verification will automatically identify the current clamps, recognize their range and verify the unit is connected properly. Simply connect it and push the record button. The MPQ1000 can record for extended periods of time because of its massive memory. It utilizes an SD card, which makes expanding the memory as easy as installing a new SD card. The recorded data can be viewed on the MPQ1000 color VGA display or the data can be transferred to the high power Megger PQ Power Quality Analysis software via USB cable, USB stick, Ethernet or directly from the SD card.

## MEASURED PARAMETERS

- RMS voltage / current
- DC voltage
- DC current (requires dc CT)
- Phase-to-phase voltage
- Power parameters (KW, KVAR, KVA, DPF, TPF)
- Voltage sag/dips and swells
- Phase angles
- Current sags/dips and swells
- Transient down to 1  $\mu$ sec
- IEC unbalance
- Frequency
- Event waveform capture
- Total harmonic distortion
- Total demand distortion
- Harmonics
- Inter-harmonics
- Energy parameters (KWH, KVARH, KVAH)
- Mains signaling
- Harmonic direction
- IEC flicker
- Rapid voltage change
- Phase angle deviation
- ANSI unbalance
- Timed waveform capture

## FEATURES AND BENEFITS

- Automatic CT recognition means never having the unit programmed for an incorrect range.
- CTs are powered by the unit so there is no need for additional connections or batteries.
- Connection verification ensures the unit is configured correctly and you get the data you need — no wasted recordings.
- On-board data analysis saves time by allowing an immediate examination of data before leaving the site.
- Multiple communication methods (USB, Ethernet, USB stick or SD card) allow for flexible and convenient operation.
- Removable SD card allows for large recording capabilities and simple memory expansion.
- The expanded 1000 V ac range allows for more application; no need for a second unit.
- 1000 V dc measurement allows testing and analysis of renewable applications dismissing the need for additional equipment.
- CATIV @ 600 V assures a safe unit for all applications.
- Full-featured Class A compliant (all parameters) ensures the recording of correct values.
- Smart configuration in the Megger PQ software for quick and easy setup.
- Phase angle stability measurement lets you easily find tricky phasing problems caused by multiple erratic sources.
- Timed waveform capture allows for the taking of PQ events and periodic waveforms at the same time.
- Easy intuitive menus allow for simple navigation and operation.
- Free software included means no license or dongle required.

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## APPLICATIONS

Using experience gained from supplying a multitude of analyzers to a large number of utilities, industries and service providers, Megger has designed the most versatile unit available today. Some of the applications include the following:

- Compliance testing to any PQ standard
- Power factor studies
- Load studies and load balancing
- Billing verification
- Substation monitoring
- Capacitor bank sizing
- Transformer analysis and de-rating
- Motor troubleshooting and inrush testing
- Switchgear and component failure
- Tripping breakers
- Equipment tripping offline
- Dimming/surging lighting
- Lamp flicker analysis
- Neutral overheating
- Solar (PV) analysis

## SPECIFICATIONS

### Input Power

120/240 V, 50/60 Hz

International power adapter supports US, UK, EU and Australian plugs

### Battery

NiMH battery pack (field replaceable)

Discharge time – up to 8 hours

Recharge time – 3 hours

### Data storage

External SD card (32GB max)

### Communication

USB communications

Ethernet communications: network communications.

Wireless communications with off-the-shelf bridge.

**USB stick - transfer data file to USB. Transfer setup configurations to and from USB stick. Perform firmware upgrades using USB stick.**

**SD card: automatically writes data to SD card; no manual transfer required. Transfer setup configurations to and**

**from SD card. No tool needed to access the SD card.**

### Environmental

Operating: -20° C to 50° C (-4° F to 122° F)

Storage: -30° C to 60° C (-22° F to +140° F)

Relative humidity: 0-95% non-condensing

Altitude <2000 m: 1000V CAT III / 600 V CAT IV

Altitude 2000 m - 5000 m: 600 V CAT III / 300 V CAT IV

### Case

IP54 enclosure

Kensington lock

### Display

Backlit 11.5 cm x 8.5 cm color VGA

Resolution 5.56 pixels per mm (640 x 480 pixels, 115.2 x 86.4 mm)

Refresh rate: 1-3 sec

### PQ Events

Dips / sags: Triggers off of voltage and current. IEC61000-4-30 compliant.

Swells: Triggers off of voltage and current. IEC61000-4-30 Compliant

Sub-cycle distortions: Triggers off of voltage and current. IEC61000-4-30 compliant.

Transient detection: 1 µsecond. Triggers off of first 3 voltage channels. IEC61000-4-30 compliant.

THD: Triggers off of voltage and current. IEC61000-4-30 Compliant

Rapid Voltage Change (RVC): Triggers off of first 3 voltage channels. IEC61000-4-30 compliant.

Phase shifts: Trigger event when a phase shift occurs between the voltage channels. Record date and time, duration and waveforms of all enabled channels. Phase shift user selectable down to 1 degree.

Waveform capture of events: Capture waveforms on all enabled channels when an out of limits event occurs. Waveforms programmable with up to 9 pre-trigger cycles and 3600 post-trigger cycles.

Timed waveform capture: Captures waveforms periodically on all enabled channels. Waveform capture interval programmable down to 1 cycle. Programmable number of cycles to be captured up to 200 cycles.

### **Event triggered waveforms and timed triggered waveforms simultaneously.**

Mains signaling events: Two selectable frequencies and amplitudes. Selectable time interval. Measured per IEC61000-4-30.

Captures waveforms on all enabled channels when a mains signaling event occurs. Waveform programmable with up to 9 pre-trigger cycles and 99 post-trigger cycles.

Event Flagging: Measured per IEC61000-4-30.

### Motor Inrush

Can record RMS, Power, Energy and PF every 1 cycle simultaneously continuously.

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Can capture up to 1 minute of raw waveform data on every motor start up on all channels simultaneously.  
Can monitor a motor for weeks of months continuously.  
Support both three-phase and single-phase motors.

## Real Time Data

- Scope Mode:
- View waveforms in scope mode
  - Freeze, zoom and pan
  - View Vector scope
  - View ANSI unbalance
  - View IEC unbalance
  - View harmonic in real time
  - View inter-harmonics in real time
  - View RMS voltage and current in real time
- DMM Mode:
- View IEC unbalance
  - View Harmonic in real time
  - View RMS voltage and current in real time
  - View THD in real time
  - View active power in real time
  - View reactive power in real time
  - View apparent power in real time
  - View DPF in real time
  - View TPF in real time
  - View flicker in real time

## Compliance

IEC61000-4-7	IEC61000-4-30 (Class A)
IEC61000-4-15	IEC61000-4-27
IEC61010-1	IEC61326
IEC60529	MIL-STD-810-G
IEEE1453	CAN/CSA-C22.2 No. 1010.1-92
RoHS2 Directive 2011/65/EU	IEEE1459

## Dimensions

269 mm x 178.4 mm x 70.7 mm (10.6 in. x 7.0 in. x 2.8 in.)

## Weight

Standard unit: 1.82 kg (4 lbs)

## Sampling

- Resolution: 16 bit analog to digital converter on 8 channels
- Max sampling speed: 1 MHz max
- Max RMS sampling: 17,664 per channel max
- PLL synchronization: 42.5 Hz to 69 Hz

## Real Time Clock

Accuracy  $\pm 20$  ppm

## Trended Parameters

### Voltage

- 4 voltage channels
- AC voltage range: 0 to 1000 V AC RMS
- DC voltage range:  $\pm 1500$  Vdc
- Note: CATIII rating applicable up to 1000 Vdc*
- Measures AC & DC simultaneously (common neutral required)*
- AC voltage accuracy: 0.1% per IEC61000-4-30
- DC voltage accuracy:  $\pm 0.2\%$  of full scale  $\pm 2$  Vdc
- Voltage ratios: Adjustable voltage ratios for measuring secondaries. (.0001 through 9999)
- Resolution: 16 bit
- Crest factor: 1.5
- Max pk voltage: 1628 V / 2500 V
- Voltage lead set: 5 voltage leads, 6 ft (2 m) in length. Safety banana leads. Removable alligator clips. Optional plunger clips. Set of color bands for customizing color codes. Safety green/yellow ground lead included.
- Fused adapter: In line with voltage leads to provide fuse protection (optional).

## Current Channels

- 4 current channels
- Current range: 0 to 6000 A (CT dependent)
- Current ratios: Adjustable current ratios for measuring secondaries (000.1 through 9999)
- AC current accuracy:  $\pm 0.5\%$  of reading  $\pm 0.05\%$  of full scale
- DC current accuracy:  $\pm 1.0\%$  of full scale
- Resolution: 16 bit
- Crest factor: 4.0

## Power and Energy

- Active power (KW): Per IEEE1459
- Reactive power (KVAR): Per IEEE1459
- Apparent power (KVA): Per IEEE1459
- Energy parameters (KWH, KVARH, KVAH): Per IEEE1459
- Displacement power factor range: -1.0 to +1.0
- Displacement power factor accuracy: =  $\pm 0.02$  + CT error

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True power factor range:	0.0 to +1.0
True power factor accuracy:	= $\pm 0.02$ + CT error
Power configurations:	11
Aggregation window:	1 cycle to 1 hour - fixed and sliding windows
Unbalance:	ANSI & IEC methodology per IEC61000-4-27
Total Harmonic Distortion (THD):	Per IEC61000-4-30 & IEC 61000-4-7
Distortion	200ms, 3 sec, 10 min windows
Vthd	0-100%, +/- 5% for $V \geq 1\%$
Vnom,	
lthd	$\pm 5\%$ reading @ $\geq 3\%$ Inom,
$\pm 0.15\%$	full scale @ $< 3\%$ Inom
Harmonics:	0 through 50th continuous
Inter-harmonics:	0 through 50th continuous
Total Demand Distortion (TDD):	Per IEEE519
Frequency:	Per IEC61000-4-30
Flicker:	Per IEC61000-4-15
Pst	10 minutes : 0.2-10, +/- 0.05 @ Pst=1 (50/60Hz only)
Plt	2 hours : 0.2-10, +/- 0.05 @
Pst=1	(50/60Hz only)

## Functions

Auto identify CT and CT range setting

Configuration verification - Display if unit is connected incorrectly.

On board analysis - Perform data analysis on unit. Compare recorded values against customizable templates.

Waveform analysis through the 128th order.

Clock hour orientation - Time sync recording to nearest interval.

Scheduled run - Select start and stop time of recording. Instrument then automatically begins recording.

On board configuration - Ability to configure recording parameters from front panel of instrument.

Auto Setup - Ability to have instrument automatically configure itself.

On board naming of data and setup files - Ability to name data and setup files from the front panel of the instrument.

Supported languages: English, Spanish, French, German & Czech

On Board Instrument Preference Settings:

Selectable Traces Colors

Selectable Short Cut Buttons

Selectable Time Out Period

Chart Grid ON / OFF

## Measurement Parameters

RMS voltage

RMS current

Sags / dips / swells

Transients (1  $\mu$ sec) ( $\pm 2697$  V)

Sub-cycle events 64  $\mu$ sec (notching, noise)

Rapid voltage change

Phase angle stability

IEC Unbalance

ANSII Unbalance

Power (KW, KVAR, KVA, DPF & TPF)

Energy (KWH, KVARH & KVAH)

Power Factor (1 to 0 to -1)

Phase Angle

THD/TDD

Harmonics

Inter-Harmonics

Power Harmonics

Harmonic Direction

Flicker

Waveform Capture

Frequency

## Software

Windows compliant (Win 7, Win 8 and Win 10)

See MPQ Analysis Software datasheet for details

# MPQ1000 Handheld Power Quality Analyzer



## OPTIONAL ACCESSORIES



### Instrument strap (P/N 2009-205)

Two-piece strap for hanging instrument from both metallic and nonmetallic structures. One piece is attached to the instrument; the other piece wraps around any structure, then they clip together.

CP-1000WCE-ID	1000 A split core CT
CP-100CE-ID	100 A split core CT
CP-20CE-ID	20 A split core CT
CP-5CD-ID	5 A split core CT
CP-600DC-ID	600 A split core AC/DC current clamp

### MCCV Rain Tight Flexible Current Clamps

These flexible rain tight CTs have four current ranges that are all self-identifying.

The current clamps are powered from the MPQ1000 Analyzer and come in three different diameters (18 cm, 27 cm, and 37 cm). Ranges include 60 A, 600 A, 3000 A and 6000 A.

### MPQ1000 Voltage Lead Set

Standard set of voltage leads included with MPQ1000.

Includes: 5 voltage leads and 1 ground lead.

Range = 0 to 1000 V ac/dc

Multiple color straps. Configure your voltage leads for the required color code.

CAT IV @ 600 V

### 1008-645 Optional Fuse Adapter Kit

This adapter connects to the MPQ1000 standard leads.

Includes 4 adapters with multiple color straps.



Optional Fuse Adapter Kit  
(1008-645)



Optional Plunger Clips  
(1008-756)

### Split Core Current Clamp 1000 A

(CP-1000WCE-ID)



### Split Core Current Clamp

Available options:  
100 A (CP-100CE-ID)  
20 A (CP-20CE-ID)  
5 A (CP-5CE-ID)



### Hall Effect Current Clamp 600 A dc and 400 A ac

(CP-600DC-ID)



### MCCV Rain Tight Flexible Current Clamps

Available diameters:  
18 cm (MCCV6000-18)  
27 cm (MCCV6000-27)  
37 cm (MCCV6000-37)



### MPQ1000 Voltage Lead Set

(2007-259)

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## ACCESSORY KITS



**MPQ1000 Basic Kit**  
C/N MPQ1000-BASIC

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag plus fuse adapters and hanging strap. Does **not** include current clamps.



**MPQ1000 Gold Kit**  
C/N MPQ1000-G-KIT

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag, plus hanging strap, voltage lead plunger clips, and 3 MCCV6000-27 (four range flex 27 cm ID) CTs



**MPQ1000 Silver Kit**  
C/N MPQ1000-S-KIT

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag, plus hanging strap, voltage lead plunger clips, and 3 MCCV6000-18 (four range flex 18 cm ID) CTs



**MPQ1000 Gold Plus Kit**  
C/N MPQ1000-G-KIT-PLUS

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag, plus hanging strap, voltage lead plunger clips, and 4 MCCV6000-27 (four range flex 27 cm ID) CTs



**MPQ1000 Silver Plus Kit**  
C/N MPQ1000-S-KIT-PLUS

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag, plus hanging strap, voltage lead plunger clips, and 4 MCCV6000-18 (four range flex 18 cm ID) CTs

# MPQ1000 Handheld Power Quality Analyzer



## MPQ1000 Platinum Kit C/N MPQ1000-P-KIT

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag, plus hanging strap, voltage lead plunger clips, and 3 MCCV6000-37 (four range flex 37 cm ID) CTs



## MPQ1000 Platinum Plus Kit C/N MPQ1000-P-KIT-PLUS

Includes MPQ1000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power adapter, soft-sided carry bag, plus hanging strap, voltage lead plunger clips, and 4 MCCV6000-37 (four range flex 37 cm ID) CTs

## SPLIT CORE CURRENT CLAMP KITS

### Kit of 4 split core self ID 1000A PQ CT C/N CP-1000WCE-ID-KIT



Split core current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 1000A range. 6 ft. (1.82 m) cord.

### Kit of 4 split core self ID 20A PQ CT C/N CP-20CE-ID-KIT



Split core current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 20A range. 6 ft. (1.82 m) cord.

### Kit of 4 split core self ID 5A PQ CT C/N CP-5CE-ID-KIT



Split core current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 5A range. 6 ft. (1.82 m) cord.

### Kit of 4 split core self ID 1-100A Mini CT's



Split core current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 1 to 100A range. 6 ft. (1.82 m) cord. Dimensions 5.47x2.0x1.18" (139x51x30mm) Inner ID = 0.94"

### Kit of 3 split core self ID 600A (AC/DC) PQ CT C/N CP-600DC-ID-KIT



Wide band hall effect current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 600A dc and 400A ac range. 6 ft. (1.82 m) cord.

### Kit of 4 self ID 100/1000A (DC) PQ CT



Hall effect current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 100A dc and 1000A dc range. 6 ft. (1.82 m) cord.

# MPQ1000

## Handheld Power Quality Analyzer

### ORDERING INFORMATION

Item (Qty)	Cat. No.	Item (Qty)	Cat. No.
MPQ1000 8 channel 3-phase power quality analyzer	MPQ1000	<b>Optional Accessories</b>	
*MPQ1000 basic kit	MPQ1000-BASIC	Fused adapter kit (3 adapters and fuses)	1008-645
*MPQ1000 silver kit	MPQ1000-S-KIT	Kit of 4 plunger clips	1008-756
*MPQ1000 silver plus kit	MPQ1000-S-KIT-PLUS	Instrument strap	2009-205
*MPQ1000 gold kit	MPQ1000-G-KIT	<b>Current Clamps</b>	
*MPQ1000 gold plus kit	MPQ1000-G-KIT-PLUS	Four range 6000 A AC rain tight, self-identifying, flexible rope current clamps (18 cm ID)	MCCV6000-18
*MPQ1000 platinum kit	MPQ1000-P-KIT	Four range 6000 A AC rain tight, self-identifying, flexible rope current clamps (27 cm ID)	MCCV6000-27
*MPQ1000 platinum plus kit	MPQ1000-P-KIT-PLUS	Four range 6000 A AC rain tight, self-identifying, flexible rope current clamps (37 cm ID)	MCCV6000-37
*See description of Kit contents on previous pages		1000 A AC split core current, self-identifying current clamps (50 mm ID)	CP-1000WCE-ID
<b>Included Accessories</b>		1-100 A AC split core current, self-identifying mini current clamps (20 mm ID)	MCP-100CE-ID
Unfused voltage lead kit	2007-259	20 A AC split core current, self-identifying current clamps (20 mm ID)	CP-20CE-ID
32 GB SD card	90023-619	5 A AC split core current self-identifying current clamps (20 mm ID)	CP-5CE-ID
USB memory stick: contains MPQ user guide, Megger PQ PC software and Megger PQ PC software user guide	1009-697	AC/DC 600 A hall effect current self-identifying wide band current clamps (50 mm ID)	CP-600DC-ID
USB communications cable	CA-USB	**Kit of 4 split core self ID 1000A PQ CT	CP-1000WCE-ID-KIT
Ethernet communications cable	36798	**Kit of 4 split core self ID 20A PQ CT	CP-20CE-ID-KIT
Carry Back Pack	2012-180	**Kit of 4 split core self ID 5A PQ CT	CP-5CE-ID-KIT
MPQ1000 Pouch (Used with 2012-180 carry back pack)	2012-545	**Kit of 4 split core self ID 1-100A Mini CT's	MCP-100CE-ID-KIT
Universal 24 Vdc power adapter	90011-992	**Kit of 3 split core self ID 600A (AC/DC)PQ CT	CP-600DC-ID-KIT
Battery pack	2008-369	**Kit of 4 hall effect self ID 100 / 1000A (DC) PQ CT	MCP-1000DC-ID-KIT
		DC 100A / 1000 A hall effect current self-identifying current clamps (50 mm ID) No batteries required.	MCP-1000DC-ID
		**See description of Kit contents on previous pages	

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**MPQ1000\_DS\_EN\_V010**  
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 ISO 9001  
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