

MPQ2000 Portable Power Quality Analyzer



- IEC61000-4-30 Class A compliance
- Powered off of phase A voltage ac/dc
- 1000 Vac and 1500 Vdc range
- Real time scope and DVM
- Connection verification
- On-board data analysis

DESCRIPTION

The Megger MPQ2000 Power Quality Analyzer is a highly intuitive, advanced portable 3-phase analyzer, delivering unmatched capability, in a rugged IP54 weatherproof enclosure. View RMS data, waveforms, demand data, phase angles, harmonics, unbalance, flicker and more in real time with the MPQ2000 scope mode and DVM mode. When data needs to be recorded, the MPQ2000 record verification automatically identifies the current clamps, recognizes their range and verifies the unit is connected properly. Simply connect it and push the record button.

The MPQ2000 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 unit's color VGA display. 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.

The free software, which requires no license, optimizes the MPQ2000 to locate the power quality phenomenon such as lighting issues, computer problems, tripping breakers, and much more. It offers advanced charting, advanced waveform and advanced harmonic analysis.

MEASURED PARAMETERS

- | | |
|---|---|
| ■ RMS voltage / current | ■ Total harmonic distortion |
| ■ DC voltage | ■ Total demand distortion |
| ■ DC current (requires DC CT) | ■ Harmonics |
| ■ Phase-to-phase voltage | ■ Inter-harmonics |
| ■ Power parameters
(KW, KVAR, KVA, DPF, TPF) | ■ Energy parameters
(KWH, KVARH, KVAH) |
| ■ Voltage sags/dips and swells | ■ Power harmonics |
| ■ Phase angles | ■ Harmonic direction |
| ■ Current sags/dips and swells | ■ IEC flicker |
| ■ Transient down to 1 μ sec | ■ Rapid voltage change |
| ■ IEC unbalance and ANSI unbalance | ■ Phase angle deviation |
| ■ Frequency | |

FEATURES AND BENEFITS

- Powering off phase A makes the unit versatile, allowing its use in any location.
- IP54 weatherproof enclosure is designed for outdoor operation. The unit is robust enough to remain recording outdoors.
- Automated configuration in the Megger PQ software for quick and easy setup.
- Easy intuitive menus allow for simple navigation and operation.
- Record verification ensures the unit is configured correctly and you get the data you need — no wasted recordings.
- Automatic CT recognition means never having the unit programmed for a wrong range.
- CTs are powered by the unit so there's no need for additional connections or batteries.
- Full-featured Class A compliant (all parameters).
- On-board data analysis saves time by allowing an immediate examination of the data while still in the field.
- The expanded 1000 Vac range allows for more applications; no need for a second unit.
- 1000 DC measurement allows testing and analysis of renewable applications dismissing the need for additional equipment.
- Phase angle stability measurement lets you easily find tricky phasing problems caused by multiple erratic sources.
- CAT IV at 600 V ensures a safe unit for all applications.
- Multiple communication methods (USB, Ethernet, USB stick or SD card) allow flexible and convenient operation
- Removable SD card allows for large recording capabilities and simple memory expansion.
- Included PC software: data analysis, configuration wizard, analyze waveforms through 128th order.

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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

SPECIFICATIONS

Input Power

Phase A 90-600V 50Hz/60Hz or 105-600V DC
or

Aux Input Power - 120/240 V, 50/60 Hz

Water-tight cord to operate off standard US, UK and EU plugs
Supports live connect/disconnect

Battery

NiMH battery pack (field replaceable)

Discharge time – 8 hours

Recharge time – 3 hours

Data storage

External SD card (up to 32 GB)

Communication

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 - 4000 m: 600 V CAT III / 300 V CAT IV

Altitude 4000 m - 5000 m: 300 V CAT III / 150 V CAT IV

Case

Ruggedized enclosure IP54 when closed

Lockable by means of padlock

Display

Backlit 11.5 cm x 8.5cm color VGA

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.

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

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Compliance

IEC61000-4-7	IEC61326
IEC61000-4-30 Ed. 3 (Class A)	IEC60529
IEC61000-4-15	MIL-STD-810 G
IEC61000-4-27	IEEE 1453
IEC61010-1	IEEE 1459
RoHS2 Directive 2011/65/EU	CAN/CSA-C22 No. 1010.1-92

Dimensions

305 mm x 266 mm x 143 mm (12.01 in. x 10.47 in. x 6.38 in.)

Weight

Standard unit: 2.27 kg (5 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: ± 20 ppm

Trended Parameters

Voltage

4 voltage channels (isolated)

AC voltage range: 0 to 1000 V AC RMS

DC voltage range: ± 1500 Vdc

Note: CATIII rating applicable up to 1000 Vdc

Measures AC & DC simultaneously (NO common neutral required)

AC voltage accuracy: 0.1% per IEC61000-4-30

DC voltage accuracy: $\pm 0.2\%$ of full scale ± 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

Impedance: 20.01 M Ω to gnd nominal

Voltage lead set: 4 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

5 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:	± 0.02 + CT error
True power factor range:	0.0 to +1.0
True power factor accuracy:	± 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,
Ithd	$\pm 5\%$ 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

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Measurement Parameters

RMS voltage
RMS current
Sags / dips / swells
Transients (1 μ sec) (± 2697 V)
Sub-cycle events 64 μ sec (notching, noise)
Rapid voltage change
Phase angle stability
IEC Unbalance
ANSI 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 (XP, Win 7, 8, 10)
See MPQ Analysis Software datasheet for details

OPTIONAL ACCESSORIES

Power Quality Simulator (MPQ-SIM-01)

An ideal training tool. Creates a three-phase source, 50/60 Hz and loads off of single-phase dc adapter.

- Create dips and swells on voltage and current channels
- Create transients
- Create phase shifts between voltage channels
- Create phase shifts between voltage channels and current channels
- Create harmonics
- Create flicker
- Create power reversals



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OPTIONAL ACCESSORIES CONTINUED

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-5CE-ID5	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 MPQ2000 Analyzer and come in three different diameters (18 cm, 27 cm and 37 cm).

Ranges includes 60 A, 600 A, 3000 A and 6000 A.

C/N 2007-216 Voltage Lead Set

Kit of 4 differential voltage leads.

Includes 4 voltage leads, 3 jumper leads and 1 ground lead.

Range = 0 to 1000 Vac / Vdc.

Voltage leads come with a kit of multi-color clip on bands. Configure the voltage leads to match the color code configuration.

CAT IV @ 600 V.

C/N 1008-645 Voltage Lead Fuse Adapters

Optional fuse adapter kit. This adapter connects to the MPQ2000 standard leads.

Includes 4 adapters with multiple color straps.

Fuses come with a kit of multi-color clip on bands. Configure the fuse adapters to match the color code of your voltage lead.



CP-5CE-ID, CP-20CE-ID, CP-100CE-ID



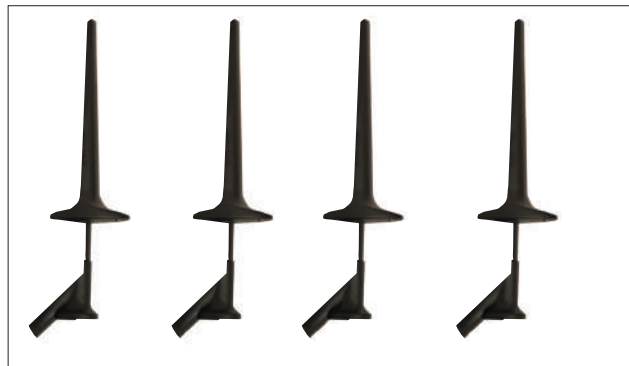
CP-1000WCE-ID



MCCV6000-18
MCCV6000-27
MCCV6000-37



CP-600DC-ID



Optional Plunger Clips
(1008-756)



Voltage Lead Set
(2007-216)



Optional Fuse Adapter Kit
(1008-645)

MPQ2000 Portable Power Quality Analyzer

ACCESSORY KITS



MPQ2000 Basic Kit
C/N MPQ2000-BASIC

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag plus fused adapters. Does **not** include current clamps.



MPQ2000 Silver Kit
C/N MPQ2000-S-KIT

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag, plus fused adapters and 3 MCCV6000-18 (four range flex 18 cm ID) CTs



MPQ2000 Silver Plus Kit
C/N MPQ2000-S-KIT-PLUS

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag, plus fused adapters and 4 MCCV6000-18 (four range flex 18 cm ID) CTs



MPQ2000 Gold Kit
C/N MPQ2000-G-KIT

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag, plus fused adapters and 3 MCCV6000-27 (four range flex 27 cm ID) CTs



MPQ2000 Gold Plus Kit
C/N MPQ2000-G-KIT-PLUS

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag, plus fused adapters and 4 MCCV6000-27 (four range flex 27 cm ID) CTs



MPQ2000 Platinum Kit
C/N MPQ2000-P-KIT

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag, plus fused adapters and 3 MCCV6000-37 (four range flex 37 cm ID) CTs

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MPQ2000 Platinum Plus Kit
C/N MPQ2000-P-KIT-PLUS

Includes MPQ2000 analyzer, voltage leads, SD card, USB cable, ethernet cable, universal power cords, soft-sided carry bag, plus fused adapters 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 in. (1.82 m) cord.



Kit of 4 split core self ID 100A PQ CT
C/N CP-100CE-ID-KIT

Split core current clamp for the MPQ and PA9 series. Self-identifying on MPQ. Supports 100A range. 6 in. (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 in. (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 in. (1.82 m) cord.



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

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

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ORDERING INFORMATION

Item (Qty)	Cat. No.
MPQ2000 9 channel 3-phase portable power quality analyzer	MPQ2000
*MPQ2000 basic kit	MPQ2000-BASIC
*MPQ2000 silver kit	MPQ2000-S-KIT
*MPQ2000 silver plus kit	MPQ2000-S-KIT-PLUS
*MPQ2000 gold kit	MPQ2000-G-KIT
*MPQ2000 gold plus kit	MPQ2000-G-KIT-PLUS
*MPQ2000 platinum kit	MPQ2000-P-KIT
*See description of Kit contents on previous pages	
Included Accessories	
Unfused differential voltage lead kit	2007-216
32 GB SD card	90023-619
USB communications cable	CA-USB
USB memory stick contains user guide, Megger PQ PC software and Megger PQ PC software user guide	1006-532
Ethernet communications cable	36798
Soft sided case	2007-626
Power cord and adapter - US	1007-980
Power cord and adapter - UK	1007-981
Power cord and adapter - EU	1007-982
Battery pack	2008-369

Item (Qty)	Cat. No.
Optional Accessories	
PQ simulator	MPQ-SIM-01
Green ground lead and clip	2008-101
White jumper lead	CA-PA9-JMP-KIT
Fused adapter kit (3 adapters and 3 fuses)	1008-645
Kit of 4 plunger clips	1008-756
Lid modification to include external Ethernet port	MPQ2000EE
Current Clamps	
Four range 6000 A AC rain tight, self-identifying, flexible rope current clamps (18 cm ID)	MCCV6000-18
Four range 6000 A AC rain tight, self-identifying, flexible rope current clamps (27 cm ID)	MCCV6000-27
Four range 6000 A AC rain tight, self-identifying, flexible rope current clamps (37 cm ID)	MCCV6000-37
1000 A AC split core current, self-identifying current clamps (50 mm ID)	CP-1000WCE-ID
100 A AC split core current, self-identifying current clamps (20 mm ID)	CP-100CE-ID
20 A AC split core current, self-identifying current clamps (20 mm ID)	CP-20CE-ID
5 A AC split core current self-identifying current clamps (20 mm ID)	CP-5CE-ID
AC/DC 600 A split core current self-identifying current clamps (50 mm ID)	CP-600DC-ID
**Kit of 4 split core self ID 1000A PQ CT	CP-1000WCE-ID-KIT
**Kit of 4 split core self ID 100A PQ CT	CP-100CE-ID-KIT
**Kit of 4 split core self ID 20A PQ CT	CP-20CE-ID-KIT
**Kit of 4 split core self ID 5A PQ CT	CP-5CE-ID-KIT
**Kit of 3 split core self ID 600A (AC/DC) PQ CT	CP-600DC-ID-KIT
**See description of Kit contents on previous pages	