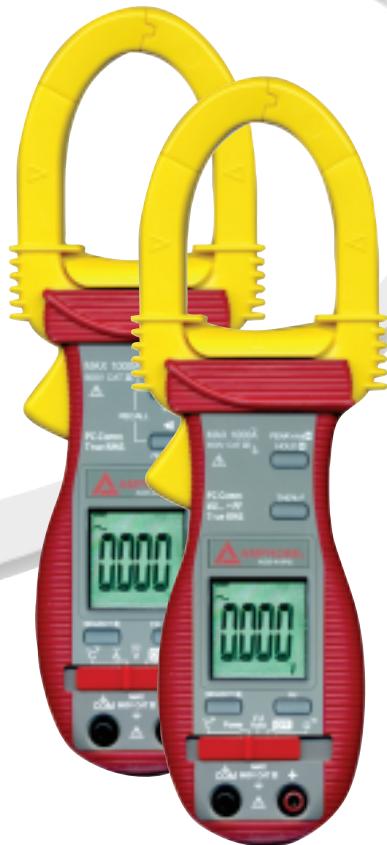




# AMPROBE®

## ACD-40PQ & ACD-41PQ

### 1000A Power Quality Clamp-on with THD Measurement



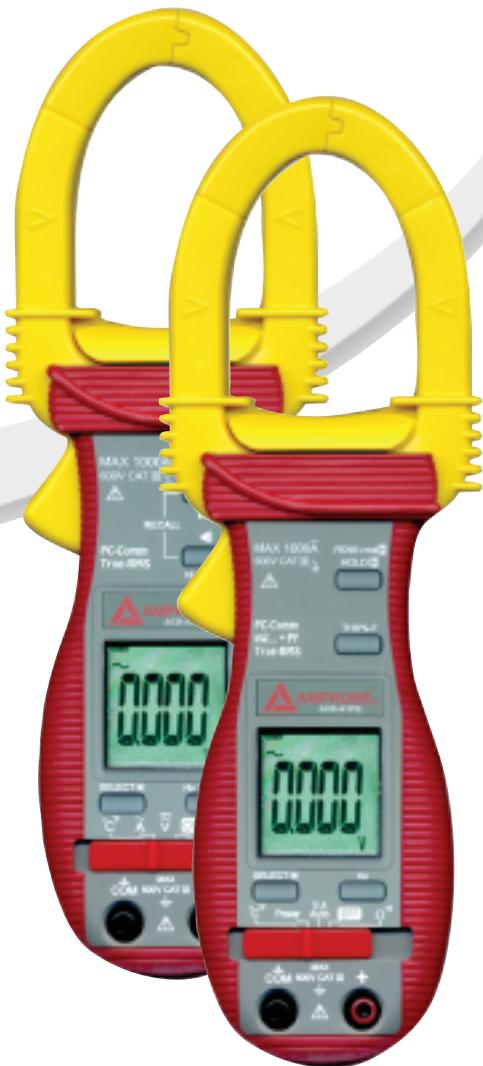
The ACD-40's provide a simple and effective way to verify if the electrical system is affected by harmonics. Add on troubleshooting capabilities with the ACD-40PQ data logging feature or get complete Power analysis with the ACD-41PQ. Increase measuring efficiency with an optional PC interface kit.

- TRMS sensing
- Measurements:
  - Total Harmonics Distortion THD, AC/DC Voltage up to 600V, AC Current up to 1000A, Resistance, Frequency, -Temperature
  - ACD-41PQ also measures Active (W), Reactive (VAR) and Apparent (VA) Power with dual-display Power Factor readout
  - AutoVA - Auto Selection of AC Volts, DC Volts or AC Amps (ACD-41PQ)
  - Data-logging 5400 points (ACD-40PQ)
  - Optional PC interface capability
  - Audible continuity
  - Auto power off
- Automatic polarity
- Low battery indication
- Peak hold (ACD-41PQ)
- Data hold
- Large, easy to read LCD display with backlight
- Accommodates conductors up to 1.77" (45mm) in diameter
- Carrying case, test leads, batteries (installed), thermocouple and manual included
- Voltage overload protection for all functions up to 600V AC/DC
- Safety CAT III 600V

FEATURES	ACD-40PQ	ACD-41PQ	BASIC ACCURACY
TRMS Measurement	Yes		
AC Current	40.0 / 400.0 / 1000 A		+/- (1.0% Rdg + 5 LSD) @ 50 and 60Hz
DC Voltage	600.0V		+/- (0.5% Rdg + 5 LSD)
AC Voltage	600.0V		+/- (0.5% Rdg + 5 LSD) @ 50 / 60 Hz
Resistance	999.9 Ohms		+/- (1.0% Rdg + 6 LSD)
Frequency	5.00Hz to 500.0Hz		+/- (0.5% Rdg + 4 LSD)
Active Power (W)		0 to 600.0 kW	+/- (2.0% Rdg + 6 LSD) @ Harmonics Fund to 10th & PF > 0.7
Reactive Power (VAR)		0 to 600.0 kVAR	+/- (2.0% Rdg + 6 LSD) @ Harmonics Fund to 10th & PF > 0.7
Apparent Power (VA)		0 to 600.0 kVA	+/- (2.0% Rdg + 6 LSD) @ Harmonics Fund to 10th
Power Factor		0.10 to 0.99	+/- 3 LSD @ Harmonics Fund to 21th
THD-R *	0.0% to 99.9%		1.5% of Reading + 6d @ Fund Frequency
THD-F *	.	0.0% to 99.9%	1.5% of Reading + 6d @ Fund Frequency
Temperature	-58 F to 572 F (-50 C to 300 C)		+/- (2.0% Rdg + 6F) +/- (2.0 % Rdg + 3C)
Hi-Lo Logging	5400 Points		

\*THD-R is defined as: (Total Harmonic RMS / Total RMS) x 100%

THD-F is defined as: (Total Harmonic RMS / Fundamental RMS) x 100%



TRUE  
RMS



*The ACD-40's provide a simple and effective way to verify if the electrical system is affected by harmonics. Add on troubleshooting capabilities with the ACD-40PQ data logging feature or get complete Power analysis with the ACD-41PQ. Increase measuring efficiency with an optional PC interface kit.*

OPTIONAL ACCESSORIES	PART NUMBER
PC Interface kit (PC connection cable with software)	RS-232 KIT2
Line splitter (Energizer)	A47L
5000A Clamp-on Current Transformer (50 to 1)	CT50-1
3000A Clamp-on Current Transformer (50 to 1)	CT50-2
Dual input Thermocouple adapter with two thermocouples -50°F to 600°F	DKTA-620 and two of TPK-56
Alligator Clips (For test leads)	VRC-320

REPLACEMENT PARTS	PART NUMBER
<i>(supplied with product)</i>	
Test leads with set of alligator clips (alligator clips are not supplied with product)	MTL-90B
Thermocouple	TPK-59
Carrying case	SV-U
Instruction Manual	<a href="http://www.AMPROBE.com">www.AMPROBE.com</a>

#### GENERAL SPECIFICATIONS

**Display:** Voltage functions: 6000 counts LCD display(s)  
**Power, Ohm & Hz functions:** 9999 counts LCD display(s)  
**ACA clamp-on function:** 4000 counts LCD display(s)  
**Update Rate:** Power function: 1 per second nominal (ACD-41PQ only)  
**Voltage, ACA clamp-on, Ohm, Hz & Temperature functions:** 4 per second nominal ACD-40PQ Hz function: 2 per second nominal.  
**Polarity:** Automatic  
**Low Battery:** Below approx. 2.4V  
**Operating Temperature:** 0°C to 40°C  
**Relative Humidity:** Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C  
**Altitude:** Operating below 2000m  
**Storage Temperature:** -20°C to 60°C, < 80% R.H. (with battery removed)  
**Temperature Coefficient:** nominal 0.15 x (specified accuracy) °C @ (0°C -180°C or 28°C -40°C), or otherwise specified  
**Sensing:** True RMS sensing for all models  
**Safety:** Meets IEC61010-2-032 (1994),

EN61010-2-032(1995), UL3111-2-032(1999).

**Measurement Category:** III 600 Volts ac & dc  
**Transient protection:** 6.5kV (1.2/50µs surge) for all models

**Pollution degree:** 2

**E.M.C.:** Meets EN61326(1997, 1998/A1), EN61000-4-2(1995), and EN61000-4-3(1996)

**In an RF field of 3V/m:**

Total Accuracy = Specified Accuracy + 45 digits  
 Performance above 3V/m is not specified

**Overload Protections:**

**ACA Clamp-on jaws:** AC 1000A RMS continuous + & COM terminals (all functions): 600VDC/VAC RMS

**Power Supply:** standard 1.5V AAA Size (NEDA 24A or IEC LR03) battery X 2

**Power Consumption:** Voltage, ACA, Hz & Power functions: 10mA typical (ACD-41PQ)

**Voltage & ACA functions:** 3.5mA typical (ACD-40PQ)

**Ohm & Temperature functions:** 4mA typical

**APO Timing:** Idle for 16 to 17 minutes

**APO Consumption:** 10µA typical

**Dimension:** L224mm X W78mm X H40mm

**Weight:** 224 gm approx

**Jaw opening & Conductor diameter:** 45mm max

**Special features (ACD-41PQ):** Backlight display; AutoVATM (Auto Selection on ACV, DCV or ACA functions); Power measurement of selectable W, VAR & VA with dual-display Total Power Factor features; Total harmonic distortion THD%-F; PEAK-RMS HOLD;

**Special features (ACD40PQ):** Backlight display; THD%-R Total harmonic distortion-RMS; On screen stand-alone Hi-Lo logging (5400 minutes) at sampling speed of faster than: 20 per second for Voltage & ACA functions 4 per second for Ohm & Temperature functions 2 per second for Hz function

#### ELECTRICAL SPECIFICATIONS

Accuracy is  $\pm$ (% reading digits + number of digits) or otherwise specified, at 23 °C  $\pm$  5 °C & less than 75% R.H. True RMS (all models) ACV & ACA clamp-on accuracies are specified from 0% to 100% of range or otherwise specified. Maximum Crest Factor is as specified below, and with frequency spectrums, besides fundamentals, fall within the meter specified AC bandwidth for non-sinusoidal waveforms. Fundamentals are specified at 50Hz and 60Hz.

AC Voltage	
RANGE	Accuracy
<b>50Hz / 60Hz</b>	
600.0V	1.0% + 5d (ACD-40PQ) 0.5% + 5d (ACD-41PQ)
<b>45Hz ~ 500Hz</b>	
600.0V	1.5% + 5d
<b>500Hz ~ 3.1kHz 9 (ACD-16 TRMS only)</b>	
600.0V	2.5% + 5d
<b>CMRR: &gt;60dB @ DC to 60Hz, Rs=1kΩ</b>	
<b>Input Impedance: 2MΩ, 30pF nominal</b>	
<b>Crest Factor: &lt; 2.3 : 1 at full scale &amp; &lt; 4.6: 1 at half scale</b>	
<b>ACV AutoVA™ Threshold: 30VAC (40Hz ~ 500Hz only)</b>	
<b>nominal (ACD-41PQ)</b>	

Temperature	
RANGE	Accuracy <sup>1)</sup>
-50°C ~ 300°C	2.0% + 3°C
-58°F ~ 572°F	2.0% + 6°F
<sup>1)</sup> Add 3°C (or 6°F) to specified accuracy @ -20°C ~ -50°C (or @ -4°F ~ -58°F) Type-K thermocouple range & accuracy not included	
Frequency	
RANGE	Accuracy
5.00Hz ~ 500.0Hz	0.5%+4d
<b>Sensitivity (Sine RMS)</b>	
40A range: > 4A	
400A range: > 40A	
1000A range: > 400A	
600V range: > 30V	

THD%-F <sup>1)</sup> (ACD-41PQ only)		
RANGE	Harmonic Order	Accuracy <sup>3)</sup>
0.0% ~99.9%	Fundamental	1.5% of Reading + 6d
	2nd ~ 3rd	5.0% of Reading + 6d
	4th ~ 10th	2.5% of Reading + 6d
	17th ~ 46th	3.0% of Reading + 6d
	47th ~ 51st	4.5% of Reading + 6d

<sup>1)</sup> THD-F is defined as: (Total Harmonic RMS / Fundamental RMS) x 100%

<sup>2)</sup> Range for Dual Display mode: 0% ~ 99%

<sup>3)</sup> Specified accuracy @ ACA fundamental > 5A ; ACV fundamental > 50V

DC Voltage	
RANGE	Accuracy
600.0V	0.5% + 5d
<b>NMRR: &gt;50dB @ 50/60Hz</b>	
<b>CMRR: &gt;120dB @ DC, 50/60Hz, Rs=1kΩ</b>	
<b>Input Impedance: 2MΩ, 30pF nominal</b>	
<b>DCV AutoVA™ Threshold: 2.4VDC nominal (ACD-41PQ)</b>	
<b>ACA &amp; ACV PEAK-rms HOLD (ACD-41PQ only)</b>	
<b>Response: 65ms to 90%</b>	

THD%-R <sup>1)</sup> (ACD-40PQ only)		
RANGE	Harmonic Order	Accuracy <sup>2)</sup>
0.0%	Fundamental	1.5% of Reading + 6d
~99.9%	2nd ~ 3rd	5.0% of Reading + 6d
	4th ~ 10th	2.5% of Reading + 6d
	11th ~ 51st	2.0% of Reading + 6d

<sup>1)</sup> THD-R is defined as: (Total Harmonic RMS / Total RMS) x 100%

<sup>2)</sup> Specified accuracy @ ACA fundamental > 5A ; ACV fundamental > 50V

Total Power Factor (PF)		
RANGE	Accuracy	
0.10 ~ 0.99	F ~ 21st	22nd ~ 51st
	3d	5d

<sup>1)</sup> Specified accuracy @ ACA fundamental > 2A ; ACV fundamental > 50V

Ohms	
RANGE	Accuracy
999.9Ω	1.0% + 6d
<b>Open Circuit Voltage: 0.4VDC typical</b>	
<b>Audible Continuity Tester</b>	
<b>Audible threshold: between 10Ω and 300Ω.</b>	
<b>Response time: 250μs</b>	

Power	
RANGE	Accuracy <sup>1,2)</sup>
0 ~ 600.0kVA	F ~ 10th
@ PF = 0.99 ~ 0.1	2.0%+6d
<b>RANGE</b>	
0 ~ 600.0kW / kVAR	F ~ 10th
@ PF = 0.99 ~ 0.70	2.0%+6d
@ PF = 0.70 ~ 0.50	3.0%+6d
@ PF = 0.50 ~ 0.30	4.5%+6d
@ PF = 0.30 ~ 0.20	10%+6d
<b>Accuracy <sup>1,3)</sup></b>	
11th ~ 25th	26th ~ 46th
47th ~ 51st	

ACA Current (Clamp-on)	
RANGE	Accuracy <sup>1,2)</sup>
<b>50Hz / 60Hz</b>	
40.00A, 400.0A, 1000A	1.0% + 5d
<b>45Hz ~ 500Hz</b>	
40.00A, 400.0A	2.0% + 5d
1000A	2.5% + 5d
<b>500Hz ~ 3.1kHz</b>	
40.00A, 400.0A	2.5% + 5d
1000A	3.0% + 5d
<b>ACA AutoVA™ Threshold: 1A AC (40Hz ~ 500Hz only)</b>	
<b>nominal</b>	
<b>Crest Factor:</b>	
< 2.5:1 at full scale & < 5.0:1 at half scale for 40.00A & 400.0A ranges	
< 1.4:1 at full scale & < 2.8:1 at half scale for 1000A range	
<sup>1)</sup> Induced error from adjacent current-carrying conductor: < 0.06A/A	
<sup>2)</sup> Specified accuracy is from 1% to 100% of range and for measurements made at the jaw center. When the conductor is not positioned at the jaw center, position errors introduced are: Add 1% to specified accuracy for measurements made WITHIN jaw marking lines (away from jaw opening) Add 4% to specified accuracy for measurements made BEYOND jaw marking lines toward jaws opening)	

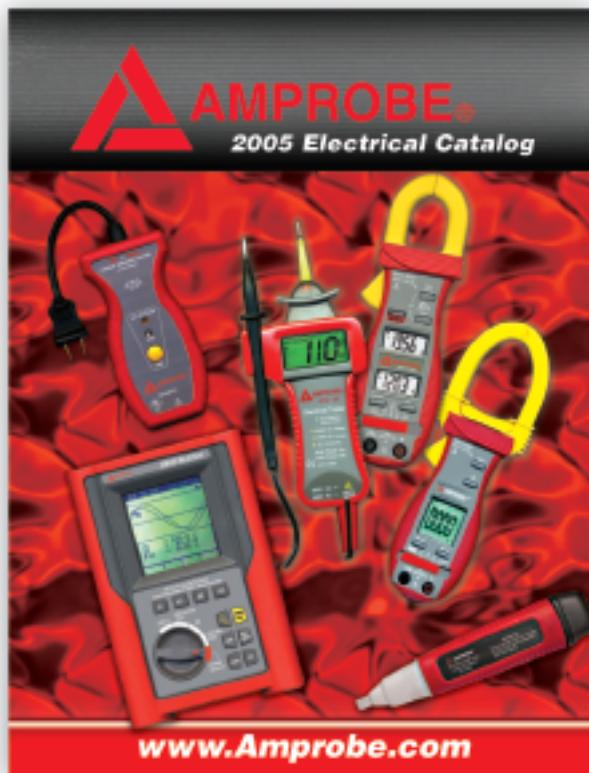
<sup>1)</sup> Specified accuracy is for ACA clamp measurement at the center of jaws. When the conductor is not positioned at the jaw center, position errors introduced are: Add 1% to specified accuracy for ACA measurements made WITHIN jaw marking lines (away from jaw opening) Accuracy is not specified for ACA measurement made BEYOND jaw marking lines (toward jaws opening)
<sup>2)</sup> Add 1% to specified accuracy @ ACA fundamental < 5A or ACV fundamental < 90V. Accuracy is not specified @ ACA fundamental < 1A or ACV fundamental < 30V
<sup>3)</sup> Add 1% to specified accuracy @ ACA fundamental < 5A or ACV fundamental < 90V. Accuracy is not specified @ ACA fundamental < 2A or ACV fundamental < 50V
<b>A-lags <sup>1)</sup> Indication:</b> “A-lags” LCD annunciator turns on to indicate an inductive circuit, or Current A lags Voltage V (i.e., phase-shift angle $\angle C$ is “+”).
<sup>1)</sup> A-lags Indication is specified at 50/60Hz fundamental without harmonics, and at ACV > 90V, ACA > 9A, & PF < 0.95



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Miramar, FL 33025 • Toll Free: 800-327-5060 • Phone: 954-499-5400 • Fax: 866-287-7222 • [www.Amprobe.com](http://www.Amprobe.com)

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Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd  
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com