HIOKI

POWER QUALITY ANALYZER 3197

Power Measuring Instruments

The Most Comprehensive Portable PQA on The Market

Catch Power Quality Problems on the Fly...

Monitor for:

- ✔ *Inrush Current*
- ✔ *Voltage Swells*
- ✔ *Voltage Dips*
- ✔ *Transient Overvoltage*
- ✔ *Interruptions*

Measure and Record:

- ✔ *Power and Power Factor*
- ✔ *Active/Reactive Energy*
- ✔ *Demand*
- ✔ *Load Changes (with graph display!)*
- ✔ *Voltage and Current*

...Before They Catch You!

CE

ISO14001
JQA-E-90091

ISO 9001
JMI-0216

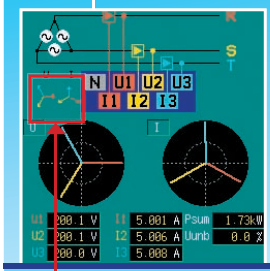
www.hioki.com

HIOKI company overview, new products, environmental considerations and other information are available on our website.

Measure Power and Power Quality on Single to Three-Phase Circuits Quickly and Effortlessly

PQA 3197

Feature 1: Vector Multimeter



Use the wiring map, vector map and data monitor to check for proper wiring before taking measurements – don't miss out on important power data just because of minor wiring mistakes!

A quick glance at the correct vector map will show you if your wiring is correct

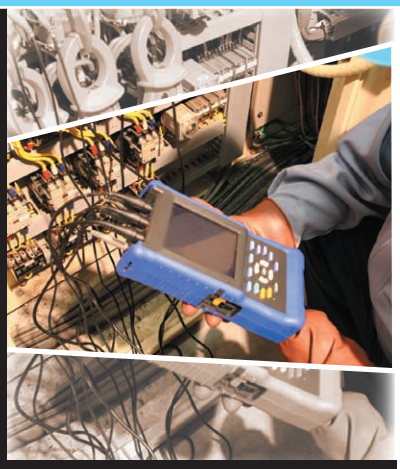
Feature 2: QuickSet

With QuickSet, all you have to do is just Set, Clamp and Measure!

Line frequency		:	Auto
Measurement Interval		:	Auto
Nominal Voltage		:	Auto
Event thresholds against nominal voltage	▶ **Swell**	:	110%
	▶ **Dip**	:	90%
	▶ **Interruption**	:	10%
	▶ **Transient**	:	ON

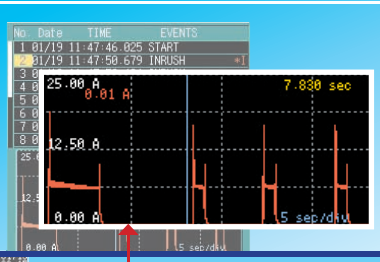
Let QuickSet help you take care of all the time-consuming setup procedures. All you need to do is select your circuit, clamp sensor and range, and then let QuickSet do the rest of the work for you.

Testing Parameters Automatically Defined by QuickSet
Redefine Thresholds Easily with Intuitive Key Panel



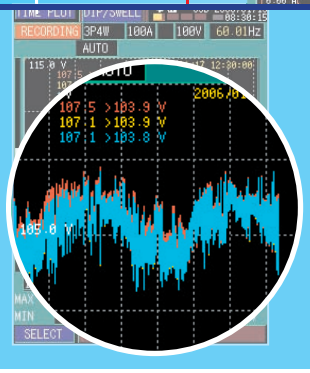
Feature 3: Power & Power Quality

Get a crystal clear picture of the voltage fluctuation on all channels



Measure all the necessary power parameters simultaneously

Check for sudden inrush during motor startup and diagnose breaker trips due to over current all on the same measurement interface. View RMS data for every half cycle over a 30 second period on a large graph display

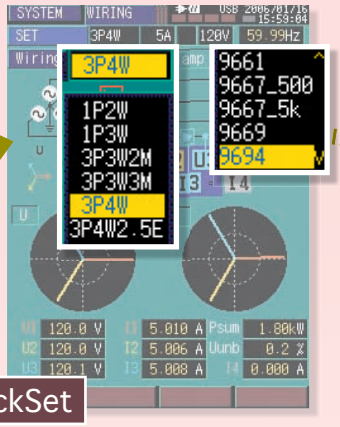


All items are recorded as events so that a quick understanding can be obtained just by viewing the waveform

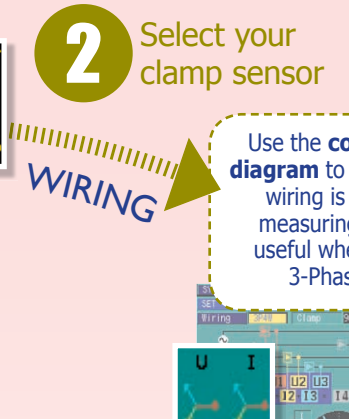
Power & Energy		Power Quality
✓ *Voltage*	✓ *Demand*	✓ *Inrush Current*
✓ *Current*	✓ *Load Changes*	✓ *Voltage Swells*
✓ *Frequency*	✓ *THD(voltage)*	✓ *Voltage Dips*
✓ *Power and Power Factor*	✓ *Active/Reactive Energy*	✓ *Transient Overvoltage*
✓ *Voltage Fluctuation (dips and swells)*		✓ *Interruptions*

Setting Up is as Easy as 1-2-3

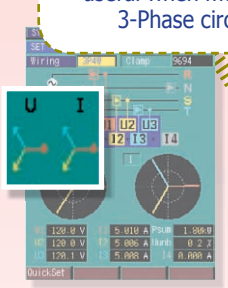
1 Select your wiring



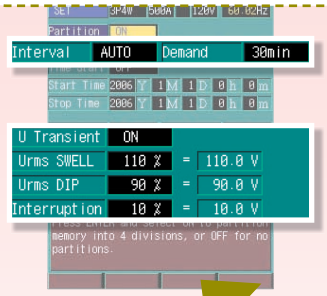
2 Select your clamp sensor



Use the **correct vector diagram** to check that your wiring is right before measuring, particularly useful when measuring 3-Phase circuits



Use **QuickSet** to automatically set the default values for line frequency, nominal voltage, interval, and power quality thresholds for event detection



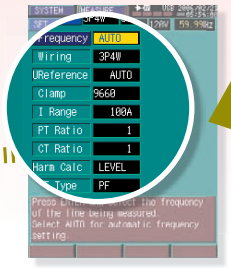
3 QuickSet

SYSTEM

Toggle between screens to customize your measurement settings

REC&EVENT

Make detailed settings on how and when to measure, and customize your level of event detection as desired.

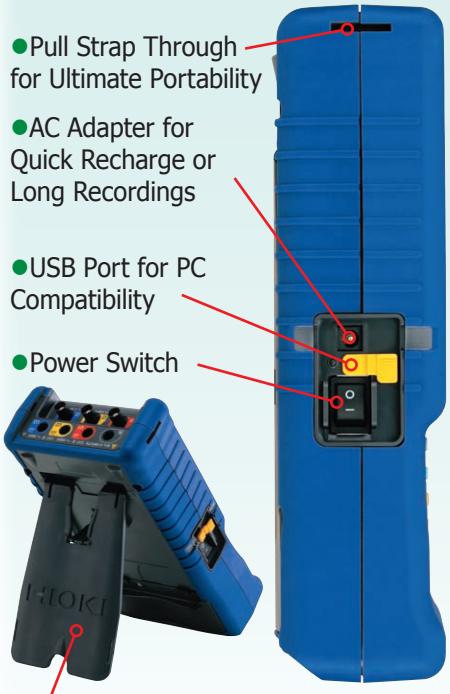


Obtain **real-time** moving data on voltage, current, power, and more!

Select from 5 Types of Color-coded Input Terminal Labels to Suit Your Application Region

Type	N	U1	U2	U3	Region
1	Black	Red	Yellow	Blue	Japan, U.K.
2	Blue	Orange	Black	Gray	EU (new)
3	Black	Yellow	Green	Red	China
4	Blue	Black	Red	White	EU (former)
5	White	Black	Red	Blue	N. America

- Pull Strap Through for Ultimate Portability
- AC Adapter for Quick Recharge or Long Recordings
- USB Port for PC Compatibility
- Power Switch



- Convenient Stand for Hands-free Viewing

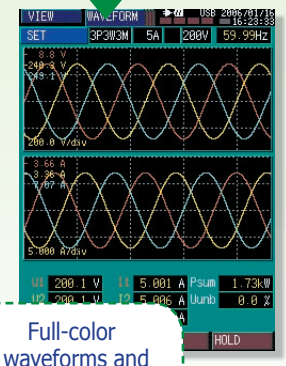
- Rugged and Durable Casing to withstand even the toughest environments and uses

Monitor Trends while Recording

WAVEFORM

Toggle between screens using VIEW key for instantaneous power data

VIEW

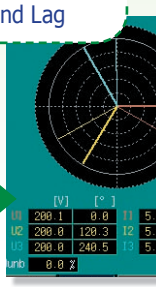


One-touch switching between graph and numerical data

RMS, Phase Angle and Lead and Lag

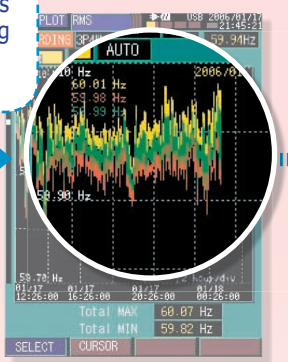
Full-color waveforms and RMS readings

VECTOR



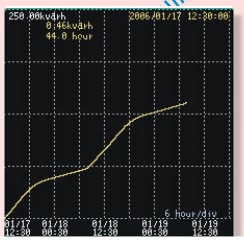
Record and Inspect
(even while measuring)

Find the max, min and average values for any point using the **cursor function**



Auto-Data Compression Lets You Record for up to 125 Days

RMS



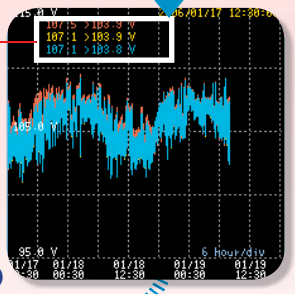
TIME PLOT

Toggle between the trend graphs for a complete analysis of the power situation

- ✓ Consumed & Regenerated **Active Power**
- ✓ Lag and Lead of **Reactive Power**

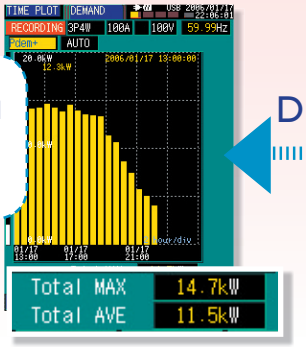
DIP/SWELL

Get a detailed picture during voltage anomalies - fluctuation range for **all 3 channels** are displayed



ENERGY

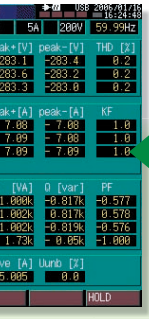
Demand Graph and maximum and average values displayed in **one window**



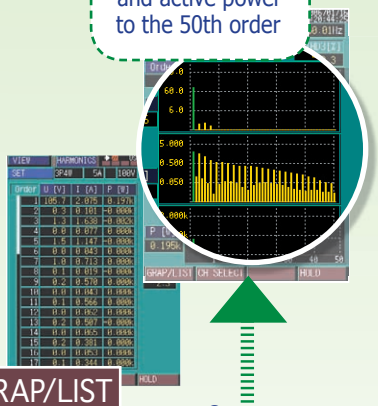
DEMAND

Identify Power Quality Problems

DMM



Harmonic waveforms of voltage, current and active power to the 50th order

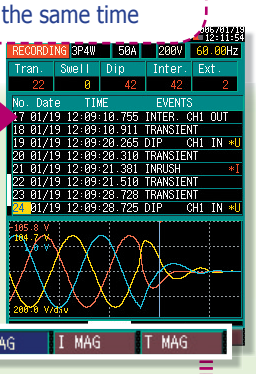


GRAP/LIST

HARMONICS

WAVEFORM

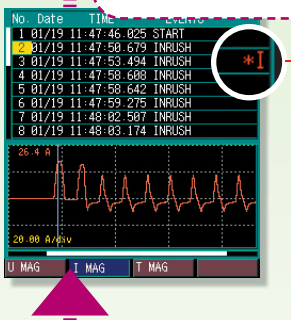
Display events AND their waveforms at the same time



Switch between voltage and current graphs, and zoom in on the time axis at the touch of a button

DETAIL

Inrush current fluctuations are captured in RMS at a fast 10ms sampling rate and displayed across a 30-second window



"I" marks an Inrush Event

Toggle between events for a complete picture of the power anomaly

EVENT

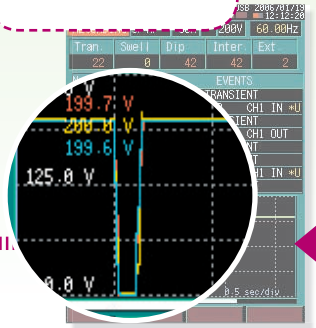
Store up to 50 Events

RMS voltage fluctuations such as swells and dips are clearly displayed at event detection

Scroll down and select to display the finer details of any event

INRUSH

Record up to 20 graphs in internal memory



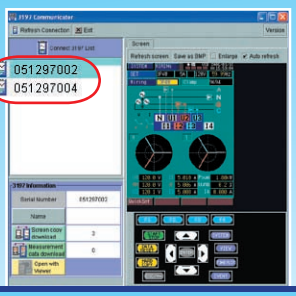
RMS

Mobility, Portability Plus Convenient Data Transfer Right to Your PC

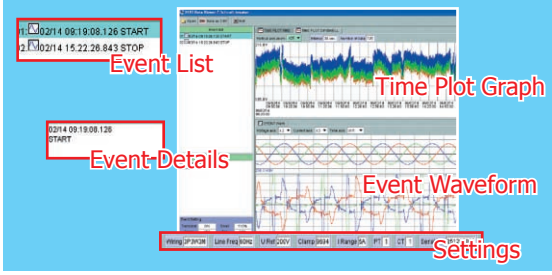
Feature 4: Bundled PC Application Software

Two Integrated Programs for Data Download and Viewing

Standard USB connection lets you download data at a snap, and immediately view your measurements with the DataViewer



Open downloaded recordings with DataViewer to manage and process your captured power data on your PC.



Feature 5: Compact Design Makes for Long Battery Life

6 Hours of Continuous Use on a Single Recharge

Non-volatile Ni-MH rechargeable battery pack keeps important measurement data in memory even after power is turned off.

A PQA that TRULY fits in the palm of your hand.

Standard 3197 Package Fulfills All the Requirements for Checking Voltage Anomalies

To measure current and power, please select one or more of our HIOKI Clamp On Sensors detailed on the back of this catalog.

■Measurement Specifications (Guaranteed Accuracy Period: 1 Year)

RMS Voltage and Current	True RMS (200 ms calculation)
Voltage Accuracy	±0.3% rdg. ±0.2%f.s
Current Accuracy	±0.3% rdg. ±0.2%f.s. + Clamp sensor accuracy
Voltage (1/2) RMS Measurement	True RMS (one cycle calculation refreshed every half cycle)
Accuracy	±0.3% rdg. ±0.2%f.s.
Current (1/2) RMS Measurement	True RMS (half-cycle calculation, half-cycle voltage synchronized)
Accuracy	±0.3% rdg. ±0.2%f.s. + Clamp sensor accuracy
Frequency	Effective Measurement range: 45.00 to 66.00 Hz
Accuracy	±0.01 Hz ±1 dgt. (when input is at least 10% of range)
Active Power Accuracy (for consumption and regeneration)	±0.3% rdg. ±0.2% f.s. + clamp-on sensor accuracy (P.F.=1)
Reactive Power Accuracy (for lags and leads)	±1 dgt. of calculation from each measurement value
Effect of Power Factor	±1.0% rdg. (50 /60Hz, P.F.=0.5)
Apparent Power Accuracy	±1 dgt. of calculation from each measurement value
Power Factor and Displacement Power Factor Accuracy (leading phase indicated)	±1 dgt. of calculation from each measurement value (DPF calculated from phase difference between fundamental voltage and current waveforms)
Active or Reactive Energy Consumption	Selectable between consumption, regeneration, lag and lead
Accuracy	±1 dgt. applied to active and reactive power measurement accuracy
Demand	Selectable between active or reactive power
Accuracy	±1 dgt. applied to active and reactive power measurement accuracy
Harmonic Analysis Orders	Up to 50th (2048 points/window, rectangular)
Harmonic Voltage, Current and Power Accuracy (accuracy is not defined for harmonic power)	1st to 15th order ±0.5% rdg. ±0.2% f.s. 16th to 25th order ±1.0% rdg. ±0.3% f.s. 26th to 35th order ±2.0% rdg. ±0.3% f.s. 36th to 45th order ±3.0% rdg. ±0.3% f.s. 46th to 50th order ±4.0% rdg. ±0.3% f.s. (add accuracy of clamp sensor to harmonic current accuracy)
Other Measurement Items	Peak Voltage and Current, K Factor, Voltage Unbalance Factor, Max/Min/Ave of Time Series

■Event Detection

Voltage Swells (Rise), Voltage Dips (Drop), Interruptions	RMS value detected using voltage (1/2) measured every half cycle
Inrush Current	RMS value detected using current (1/2) every half cycle
Transient Overvoltage	Detection Range: 50 Vrms (±70.7 Vpeak equiv.) or more, 10 to 100 kHz
Timer Detection	Detect events at preset intervals selectable from OFF, 1, 5, 15 or 30 minutes; 1, 2 or 12 hours; or 1 day
Manual Detection	Detect events when keys are pressed
Thresholds	Set to OFF or to specified value, except for detection of transient overvoltages. (Waveform recording not available for transients.)
Event Recording Lengths	
Waveform	20ms before detection + 200ms upon detection + 30ms after detection
Event voltage fluctuation graph	0.5s before + 2.5s after detection
Inrush current graph	0.5s before + 29.5s after detection
Maximum Number of Recordable Events	50 event waveforms, 20 event voltage fluctuation graphs, 1 inrush current graph, 1000 event counts

■Input Specifications

Wiring Configurations	Single-phase 2-wire (1P2W), single-phase 3-wire (1P3W), three-phase 3-wire (3P3W2M and 3P3W3M), three-phase four-wire (3P4W and 3P4W2.5E)
Measurement Line frequency	Auto-select (50/60 Hz)
Maximum Allowable Input Voltage	Voltage input terminal: 780 V AC (1103 Vpeak) Current input terminal: 1.7 V AC (2.4 Vpeak)
Maximum Rated Voltage to Ground	Voltage input terminal: CATIII 600 V AC, CATIV 300 V AC (50/60 Hz) Current input terminal: per clamp-on sensors used
Measurement Method	Simultaneous digital sampling of voltage and current (sampling frequency: 10.24 kHz per channel)
Voltage Measurement Range	600.0V (Crest factor 2 or less)

Current Measurement Range: *Manual ranging according to clamp sensor (Crest factor 3 or less)*

Clamp Sensor	Range	Clamp Sensor	Range
9657-10, 9675	500.0 mA/5.000 A	9661, 9667 (500A)	50.00 A/500.0 A
9694, 9695-02	5.000 A/50.000 A	9669	100.0 A/1.000 kA
9660, 9695-03	10.00 A/100.0 A	9667 (5000A)	500.0 A/5.000 kA

Power Measurement Range: *Depends on combination of current range and measurement line*

500mA	300.0W/600.0W/900.0W	***100A***	60.00kW/120.0kW/180.0kW
5A	3.000kW/6.000kW/9.000kW	***500A***	300.0kW/600.0kW/900.0kW
10A	6.000kW/12.00kW/18.00kW	***1kA***	600.0kW/1.200MW/1.800MW
50A	30.00kW/60.00kW/90.00kW	***5kA***	3.000MW/6.000MW/9.000MW

■BASIC SPECIFICATIONS

Display	4.7-inch color STN LCD
Display languages	English, Japanese or Chinese (Simplified)
Display refresh rate	Approx. once per second
Clock functions	Auto calendar, auto leap year, 24-hour format
Real-Time Clock accuracy	Within 13 seconds/month
Internal Memory Capacity	4MB
Maximum recording time	125 Days
Interval Settings	AUTO, 1, 5, 15 and 30 min., and 1 hour (AUTO sequentially selects 1, 2, 10, 30 seconds, 1, 5, 15 and 30 min., and 1 hour automatically)
Demand period	15 min., 30 min. and 1 hour
Recordable Items	All parameters (incl. max/min/average values)

■INTERFACE SPECIFICATIONS

Interface	USB 2.0 (Full Speed)
Connection destination	Computer operating on Windows 2000/XP

■ENVIRONMENTAL AND SAFETY-RELATED SPECIFICATIONS

Operating environment	Indoors, up to 2000 m (6562-ft.) ASL	
Temperature and humidity	Storage	-10 to 50°C (14 to 122°F), 80% RH or less (non-condensating)
	Operation	0 to 40°C (32 to 104°F), 80% RH or less (non-condensating)
Applicable standards	Safety	EN61010, Pollution degree 2, Measurement Categories III (600 V) and IV (300 V) (anticipated transient overvoltage 6000 V)
	EMC	EN61326 Class A EN61000-3-2, EN61000-3-3
Power source	AC Adapter 9418-15 or Battery Pack 9459 (Maximum rated power: 23 VA (with AC adapter)	
Continuous operating time with battery pack	Approx. 6 hours (after full charge, with 5 min. auto-off LCD backlight)	
Dimensions and mass	128 W × 246 H × 63 D mm (5.04"W × 9.69"H × 2.48"D) (including stand) Approx. 1.2 kg (42.3 oz.) (with battery pack)	

■CLAMP ON SENSOR SPECIFICATIONS

MODEL		9694	9660	9661	9669	9667	9695-02	9695-03
								
Measurable conductor diameter		ϕ15mm		ϕ46mm	ϕ55mm, 80×20mm	ϕ254mm	ϕ15mm	
Primary current rating		AC 5A	AC 100A	AC 500A	AC 1000A	AC 500A/5000A	AC 50A	AC 100A
Output voltage		AC 10mV/A	AC 1mV/A	AC 1mV/A	AC 0.5mV/A	AC 500mVf.s.	AC 10mV/A	AC 1mV/A
Accuracy	Amplitude (45 to 66 Hz)	±0.3%rdg.±0.02%f.s.	±0.3%rdg.±0.02%f.s.	±0.3%rdg.±0.01%f.s.	±1.0%rdg.±0.01%f.s.	±2.0%rdg.±1.5mV	±0.3%rdg.±0.02%f.s.	±0.3%rdg.±0.02%f.s.
	Phase (5Hz to 5kHz)	within ±2°	within ±1°	within ±0.5°	within ±1°	within ±1° (minimum 10% input)	within ±2°	within ±1°
Frequency characteristic (accuracy deviation)		within ±1.0% at 40Hz to 5kHz (9669: within ±2.0%)				±3dB at 10Hz to 20kHz	within ±1.0% at 40Hz to 5kHz	
Max. rated voltage to earth(insulated conductor)		300Vrms	300Vrms	600Vrms	600Vrms	1000Vrms	300Vrms	
Maximum allowable input (45 to 66 Hz)		50A continuous	130A continuous	550A continuous	1000A continuous	10000A continuous	60A continuous	130A continuous
Dimensions and weight		46W×135H×21Dmm, 230g	46W×135H×21Dmm, 230g	77W×151H×42Dmm, 360g	100W×188H×42Dmm, 590g	Sensor length 910mm, 140g	51W×58H×19Dmm, 50g	
Requirements						9445-02/03 AC Adapter (Option)	9219 Connection Cord (3m; Option)	

■COMPLETE LIST OF OPTIONS

CLAMP ON SENSOR (100A)	9660
CLAMP ON SENSOR (500A)	9661
FLEXIBLE CLAMP ON SENSOR (5000A)	9667
CLAMP ON SENSOR (1000A)	9669
CLAMP ON SENSOR (5A)	9694
CLAMP ON SENSOR (50A)	9695-02
CLAMP ON SENSOR (100A)	9695-03
CONNECTION CORD (for the 9695-02/9695-03)	9219
CLAMP ON LEAK SENSOR (10A)	9657-10
CLAMP ON LEAK SENSOR (10A)	9675
VOLTAGE CORD (bundled with the standard 3197)	9438-05
AC ADAPTER (bundled with the standard 3197)	9418-15
BATTERY PACK (bundled with the standard 3197)	9459
PQA-HiVIEW Pro *PC Application Software*	9624-50

MODEL	9675	9657-10
		
Measurable conductor diameter	ϕ30mm	ϕ40mm
Primary current rating	AC 10A	AC 10A
Output voltage	AC 100mV/A	AC 100mV/A
Amplitude Accuracy (45 to 66 Hz)	±1.0%rdg.±0.005%f.s.	±1.0%rdg.±0.05%f.s.
Phase Accuracy (50/60Hz)	within ±5°	within ±3°
Residual Current	1mA (10A on forward and return)	5mA (100A on forward and return)
Frequency characteristic (accuracy deviation)	within ±5% at 40Hz to 5kHz	within ±3% at 40Hz to 5kHz
Max. rated voltage to earth	300Vrms (insulated conductor)	
Maximum allowable input	10A continuous	30A continuous
Dimensions and weight	60W×113H×24Dmm, 160g	74W×145H×42Dmm, 380g
Notes	Not compatible with power measurements	

■3197 STANDARD BUNDLE CONFIGURATION

Includes all the equipment you need to measure voltage.
For current or power measurements, please select from our wide assortment of clamp on sensors.

VOLTAGE CORD 9438-05 (3m cord length), BATTERY PACK 9459, AC ADAPTER 9418-15 , USB Cable, Input Terminal Labels, Input Cord Labels, 3197 Applications PC Program (CD-ROM), strap, carrying case, measurement guide, instruction manual

■SUGGESTED OPTIONS for POWER MEASUREMENTS

3P4W Circuit testing of motors and breakers:
3197 Standard Package + 9661 (500A Sensor)×3
3P4W Circuit testing of external CTs:
3197 Standard Package + 9694 (5A Sensor)×3
3P Leakage testing:
3197 Standard Package + 9675 (10A Sensor)×3

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