HIOKI

2002

3286 [ø 55 mm(2.16") max.]
CLAMP ON POWER HiTESTER

Power measuring instruments

"All Powerful"
TRMS Clamp-On Power Meter!

W
VA var
600.0kW max.(1ø)

COS φ
±1.000 (±90.0°)

Harmonics
Up to 20th

CAT III 600V

CE

ISO14001
JQA-E-90091

INTERNET HIOKI Website
http://www.hioki.co.jp/

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

Line voltage
AC RMS V
600 Vrms max.

Load current
AC RMS A
1000 Arms max.

Power
W VA var
600.0kW max.(1ø)

Phase detection
RST
Normal/ Reverse/ Missing

Power factor
COS ϕ
±1.000 (±90.0°)

Peak
Peak value
1700 A peak max.

Frequency
Hz
1000 Hz max.

Harmonics
Harmonics
Up to 20th

Battery operation for use in every field location.

Helpful battery capacity check

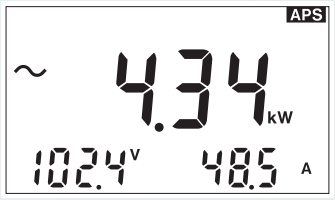
Whenever the unit is powered on, and while the record function is operating, the battery capacity can be checked to avoid battery exhaustion during measurement.

Applications

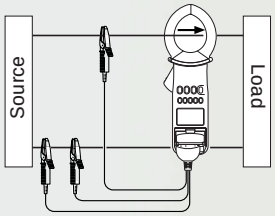
❑ Use as a single-phase power meter

1ø Power meter mode

Effective power/ voltage/ current



PT/CT conversion ratio settings are not possible.



This displays the result of vector calculations on single-phase power.

Apparent/ reactive power

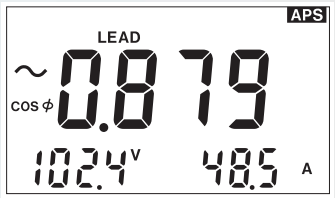
Power factor (effective value power factor)

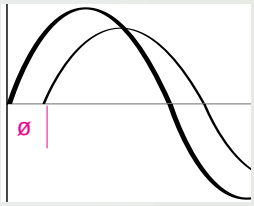
❑ Measure phase on a single-phase line

1ø Power Factor meter mode

The phase angle between the voltage waveform and the current waveform is found, and the power factor (cos ø) and reactivity (sin ø) are calculated and displayed.

Power factor (cos ø)





Reactivity (sin ø)

Phase angle (ø)

The 3286 provides the following 2 types of power factor measurement. If the waveform includes harmonic distortion, there will be a difference between the two measurement values, and the method must be selected accordingly.

●Power factor derived by phase discrimination (cos ø):
1ø Power Factor meter and 3ø Power Factor meter mode
From the phase information for the fundamental frequency component, cos ø is calculated. This is suitable for assessing the quality of a power supply.

●Power factor (effective value power factor) derived from effective power ÷ apparent power: 1ø Power meter mode
This is calculated from the power value including harmonic components (effective power ÷ apparent power). This is suitable for evaluating the performance of standalone load equipment and similar cases.

* It is not possible to calculate the effective power factor of a three-phase line.

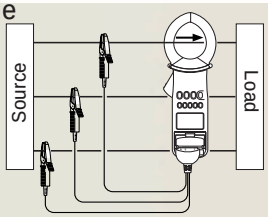
Power & Harmonics CAT Ⅲ 600V

Functionality and Safety Packed into a Handheld Unit

❑ Simple checking of three-phase lines

3ø Power Factor meter mode

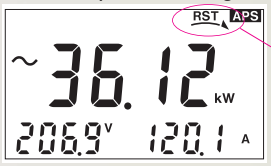
Power factor (cos ø)



Phase angle (ø) Reactivity (sin ø)

Balanced three-phase power can also be displayed

Effective power/ voltage/ current



Phase detection check

Apparent/ reactive power

The 3286's three-phase power measurement calculates and displays the power values for a sine wave input at 50/60 Hz, assuming it is balanced and there is no distortion. Accurate measurement is not possible on a three-phase line if it is not balanced, for example when controlled by an inverter or thyristor.

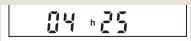
Since there is no integration function, it is not possible to measure total energy consumed (Wh).

❑ Check power supply fluctuations

Max. and min. value displays

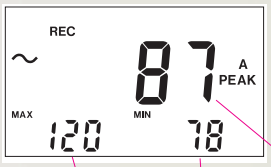
Using the record function, it is possible to check the amplitude of fluctuations.

Record elapsed time
Example: 4 h 25 m



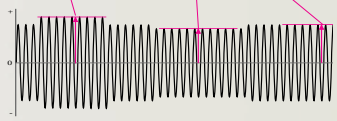
Waveform display is not available
Care must be taken with regard to battery life

Record peak value fluctuations



Easily check peak value fluctuations.

Please note that waveforms with amplitudes at or less than 250ms cannot be detected accurately

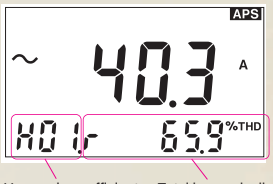


Waveform display is not available

❑ For harmonic suppression

Harmonic measurement function

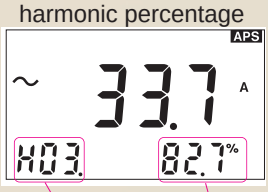
Harmonics effective value/ total harmonic distortion



Harmonic coefficients
Ex. Fundamental component is 40.3 A

Total harmonic distortion
Ex. THD-R is 65.9%

Harmonics effective value/ harmonic percentage



Harmonic coefficients
Ex. 3rd order is 33.7 A

Harmonic percentage
Ratio to case in which fundamental component is 100%

The analysis values for coefficients for each of the harmonics from 1 to 20 of voltage or current can be displayed.

❑ External output of data

Output to PC

(Optional 9636-01 required)

Cord length: approx 2m

Data output connector RS-232C interface by optical insulating coupler

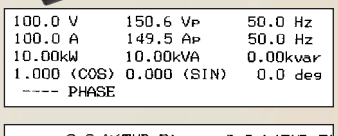
- OS:Windows 95, 98, NT4.0, 2000, Me*1
- Connector: D-sub 9 pin
- Fetch interval: 6s/30s/1m/5m/10m.
- Buffer size: 32,700 max.

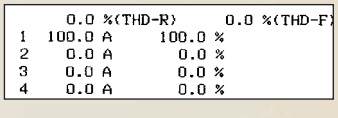
Care must be taken with regard to battery life

*1. Windows is a registered trademark of Microsoft Corporation.

Printer output to 9442 (optional)

The output is sent to the printer each time the 3286 HOLD key is pressed. (For about 1 sec.)





●Printing method: Thermal serial dot matrix ●Paper width: 112 mm ●Printing speed: 52.5cps ●Power supply: 9443 AC ADAPTER or supplied nickel-hydride battery (capable of printing about 3000 lines on full charge from 9443) ●Dimensions and mass: 160W × 66.5H × 170D mm; 580 g

9636
RS-232C CABLE

Cord length approx 1.3m

9443-02
AC ADAPTER
(For the EU)

9443-03
(For the UL)

Not for use with Model 3286

■Basic specifications

Measurement items : Voltage, current, voltage/current peak, effective/ reactive / apparent power(Single-phase or 3-phase), power factor, reactivity, phase angle, frequency, phase detection(3-phase), voltage/current harmonic levels(up to 20th)
Measurable conductor diameter : ø55mm (2.16") max.
Display : LCD, digital (6000 counts)
Rectification method : RMS (true root mean square value)
Display update rate : NORMAL approx. 1 time/ sec, SLOW 1 time/ 3-sec at HARM meas. approx. 1 time/ 2-sec
Analog response time : 4 seconds or less (when input is changed from 0% to 90% of range.)

[Voltage/ Current/ Power measurement]

Range Table			AC Current	
			200.0 A	1000 A
AC Voltage	150.0 V	Single-phase	30.00 kW	150.0 kW
		*3-phase (balanced load)	60.00 kW	300.0 kW
	300.0 V	Single phase	60.00 kW	300.0 kW
		*3-phase (balanced load)	60.00/120.0 kW	600.0 kW
	600 V	Single phase	120.0 kW	600.0 kW
		*3-phase (balanced load)	240.0 kW	600.0/1200 kW

*3-phase power is calculated and displayed on the basis of a balanced, 50/60 Hz, sine wave input. For apparent power and reactive power, the unit of watts in the above table is replaced by VA and var respectively.

Effective value P.F. : 0.000 (lead) to 1.000 to 0.000 (lag); 1ø only
Max. allowable current : 1000 Arms cont.
Max. usable circuit voltage : 600 Vrms (insulated conductor)
Effective input range : Voltage: 10 V to 600 V, Current: 10 A to 1000A, Power: 80 V to 600 V and 10 A to 1000 A
Min. Display value : Voltage: 0.6 Vrms, Current: 0.6 Arms
Display indication range (RMS value) : 5 or less are zero-suppressed, and the upper limit is to 125% of the range setting (to 100% for the 1000 A range)
Circuit dynamic : 2.5 or less (1000 A and 600 V range is 1.7 or less)

[Power factor/ Phase angle/ Reactivity measurement]

Detection method : Phase discrimination by phase detection (zero crossing)
Power factor (cos ø) : 0.000 (lead) to 1.000 to 0.000 (lag)
Phase angle : 90.0˚(lead) to 0.0˚to 90.0˚(lag)
Reactivity (sin ø) : 0.000 (lead) to 1.000 to 0.000 (lag)

[Frequency measurement] Effective in the voltage and current functions

Measurement range : 30.0 Hz to 100 Hz (at 100.0Hz range)
100 Hz to 1000Hz (at 1000Hz range)
Min. input level : Voltage 10 Vrms-sine wave, Current 10 Arms-sine wave

[Wave peak measurement] Effective in the voltage and current functions

Measurement range : 150 (375 peak)/ 300 (750 peak) / 600 (1020 peak) V
200 (500 peak) / 1000 (1700 peak) A
Effective Input Range : Effective value of sine wave is within effective input permisible in the range and within circuit dynamic

[Harmonic measurement] Effective in the voltage and current functions

Measurement items : Level of each order, percentage of each order and total harmonic distortion (THD-F and THD-R)
Measurement range : Fundamental frequency 45 Hz to 65 Hz
Window width : 1 cycle (45 Hz to 65 Hz), Data points: 256 points
Window type : Rectangular
Orders analyzed : Up to 20th

[Other functions]

Phase detection : Normal/ reverse/ missing (at 3-phase balanced load)
Record : MAX. value and MIN. value (Effective in the voltage, current and effective / apparent power functions)
Battery capacity : Displayed in % when the unit is powered on
Data hold : Holds display
Auto power off : Approx. 10 minutes, buzzer sounds just before power is turned off, can be extended or cancelled
Data output : RS-232C interface by optical insulating coupler

■Measurement accuracy (23 ˚C±5 ˚C (73˚F ±9˚F), Less than 80%rh., sine wave input, power factor = 1)

[Voltage/ Current/ Power measurement]

	30 Hz to 45 Hz	45 Hz to 66 Hz	66 Hz to 1 kHz
Voltage	±1.5 %rdg.±5 dgt.	±1.0 %rdg.±3 dgt.	±1.5%rdg.±5 dgt.
Current	±2.0%rdg.±5 dgt.	±1.3 %rdg.±3 dgt.	±2.0 %rdg.±5 dgt.
Power	Accuracy guaranteed only for 50/60 Hz (COS ø=1) Single-phase: ±2.3 %rdg.±5 dgt. 3-phase: ±3.0 %rdg.±10 dgt.(at balanced load)		

Phase angle : ±3˚
Power factor (cos ø) : ±3˚±2 dgt

Frequency : ±0.3 % rdg.±1 dgt. (at 100.0Hz range)
±1.0 % rdg.±1 dgt. (at 1000Hz range)
Wave peak : ±3.0 %rdg.±5 dgt. (30 Hz to 1 kHz)
Thermal coefficient : Voltage and current: within ±0.1×Accuracy/ ˚C (0 to 40˚C)
Phase: within ±2˚ (0 to 40˚C)
Conductor position : Within ±0.7 % in any direction from the center of sensor
External magnetic field : 400A/m corresponds to 2 A max.
Power factor influence : ±10.0 % f.s. (cos ø=0.5)

Harmonics :

Order	Accuracy	Order	Accuracy
1	±3.0 %rdg.±10 dgt.	9, 10	±5.0 %rdg.±10 dgt.
2 to 6	±3.5 %rdg.±10 dgt.	11 to 15	±7.0 %rdg.±10 dgt.
7, 8	±4.5 %rdg.±10 dgt.	16 to 20	±10.0 %rdg.±10 dgt.

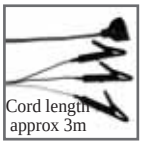
■General Specifications

Applicable standards : Safety
EN61010-1:1992+A2:1995 CAT Ⅲ 600V
EN61010-2-031:1996, EN61010-2-032:1995
EN60529:1991 IP40
: EMC
EN55011:1991+A7:1997+A2:1996, EN61326-1:1997+A1:1998
Withstand voltage (50/60 Hz, 1 minute) : 5.55 kV AC between clamp and frame, between clamp and circuitry

Measurement method : Digital sampling method
Operating temperature : 0ºC to 40ºC, 80%rh or less, no condensation
Storage temperature : -10ºC to 50ºC, no condensation
Power supply (9V battery) : 6LR61 alkaline battery×1 (continuous operation max. 25 hours)
6F22 manganese battery×1 (continuous operation max. 10 hours)
Dimensions, mass : Approx 62 W ×260 H × 39 D mm, Approx 550g (Approx 2.45″(W)10.24″ (H)1.54″ (D), Approx 19.4 oz.)

3286 CLAMP ON POWER HiTESTER

(Includes 9635 VOLTAGE CORD, 9355 CARRYING CASE, HAND STRAP)



Options

9636-01	**RS-232C PACKAGE**
9442	**PRINTER**
9636	RS-232C CABLE (For 9442 printer)
9443-02	AC ADAPTER (For 9442 printer, EU)
9443-03	AC ADAPTER (For 9442 printer, America)
1196	RECORDING PAPER (For printer, 10 rolls)

When ordering the 9442 PRINTER, also order the 9636 RS-232C CABLE required for connection to the 3286, and 9443 AC ADAPTER.

DISTRIBUTED BY

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