HIOKI

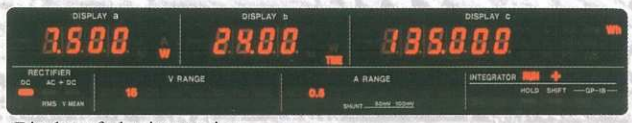
Power Meter 1997

3187

AC/DC POWER HiTESTER

Basic ±0.35% accuracy from DC to 20kHz

Single-phase power meter with simultaneous positive and negative integration



Display of plus integration

Display of total integration

Display of minus integration

The 3187 POWER HiTESTER, the definitive high cost-performance unit for singlephase power consumption measurement of domestic and office equipment.
With a basic accuracy of ±0.35%, this unit covers a wide frequency range, including DC and from 10 Hz to 20 kHz. The unit not only measures reactive power, power factor, phase angle and frequency, but also provides a polarity determination for DC measurement. The optional GP-IB interface, it is possible to output all data simultaneously to a printer with a listen-only interface (manual print, time interval print, and help print functions). This makes upgrading to more highly automated systems easy.

Features

● Basic accuracy ±0.35% ● Covers DC to 20 kHz ● Integration function for current and power (separate integration for each polarity) ● Wide range from 7.5 W to 12 kW ● 50/100 mV shunt input ● Voltage, current and power analog outputs (levels), and voltage and current waveform monitor output ● DC measurement functions (voltage and current, with polarity discrimination) ● Frequency measurement up to 50 kHz ● Lead/lag discrimination for reactive power and power factor ● Isolated voltage and current terminals ● Assured simultanelty of all data

■Basic specification

Line measured:	Single phase, two conductor (1 ϕ 2W)
Values measured:	Voltage, current, active power, apparent power, reactive power, power factor, phase angle, frequency, current integral and power integral.
Measurement ranges:	Voltage, current and active power: see separate table of ranges. Shunt input 50/100 mV Frequency: 500 Hz/50 kHz
Rectification methods:	DC rectification measurement AC + DC rms measurement (V and A true effective values displayed) AC + DC mean measurement (V: mean value rectified current effective value displayed; A: true effective values displayed)
Range selection:	Auto or manual
Sampling rate:	5 times/s
Input resistances:	Voltage - approx. 1 MΩ Current - direct input approx. 10 mΩ. Shunt input approx 100 Ω
Maximum sustainable inputs:	Voltage 650 V rms, 920 V peak Current - direct input 30 A rms, 45 A peak shunt input 1 V rms, 1.5 V peak
Maximum common mode voltage:	Voltage and current shunt input terminals: 600 V rms (DC and 50/60 Hz)
Analog outputs:	Simultaneous voltage, current and effective power outputs, 2 V DC f.s., response time 1.6 seconds approx.
Monitor outputs:	Simultaneous voltage and current outputs, 2 V f.s.
Backup function:	Internal settings held in memory
Crest factor:	3 or less
Input method:	Voltage: resistance divider Current: shunt resistor
Effective input range:	10% to 110% of the set range
Temperature coefficient:	Less than ±0.05% f.s./°C
Power factor influence:	±0.4% rdg (at 45 to 66 Hz and a power factor of 0.5)
External magnetic field influence:	±1.5% f.s. or less (in a magnetic field of 400 A/m AC, 50/60 Hz)
Influence of common mode voltage:	Less than ±0.2% f.s. (with voltage, current and shunt input terminals short-circuited, and 600 V rms, 50/60 Hz, applied between the voltage, current, shunt input terminals and the frame)
Scaling factors:	Voltage: PT ratio (1.000 to 9999) Current: CT ratio (0.01 to 9999)
Averaging function:	Displays computed moving average (off, 8, 16, 32 and 64)
[Integration functions]	
Integration range:	0 to ±999999 MAh/MWh (max. integration time 1000h)
Accuracy:	Measurement accuracy ±1 dgt.
Integration time:	1 m to 1000 h (settable in 1-minute steps) ±100 ppm ±1 s (at 0 to 40 °C)
Functions:	Separate integration (displays positive and negative components and total value) Integration start, stop and reset operations by key press or external trigger signal Timer-triggered integration stop Integration elapsed time display (1 m to 1000 h) Continued integration with repeated start and stop operations Backup of integration values and elapsed integration time in the event of a power failure Integration restart on power restoration after a power failure
[D/A output functions]	
Configuration:	1 D/A conversion output channel (16-bit: polarity bit+15 bits)
Accuracy (23°C ± 3°C):	Measurement accuracy ±0.2% f.s.
Temperature coefficient:	less than ±0.05% f.s./°C
Sampling rate:	5 times/s
Output voltage:	2 V DC f.s.
Output values:	Apparent power, reactive power, power factor, phase angle, frequency, current integral and power integral.
[GP-IB interface]	
(Conformance to IEEE 488.1-1987; with reference to IEEE 488.2-1987)	
[Frequency measurement functions]	
Measurement range:	0.8% to 100% of set range (4 Hz to 50 kHz)
Range settings:	500 Hz, 50 kHz
Accuracy:	±0.1% rdg. ±1 dgt at 0 to 40 °C (with sine wave input)
Measurement cycle:	2 to 5 times/s (depending on measured frequency; display updated 5 times/s)

Ranges

V \ A	500.0 mA	1.000 A	2.000 A	5.000 A	10.00 A	20.00 A
15.00V	7.500 W	15.00 W	30.00 W	75.00 W	150.0 W	300.0 W
30.00V	15.00 W	30.00 W	60.00 W	150.0 W	300.0 W	600.0 W
60.00V	30.00 W	60.00 W	120.0 W	300.0 W	600.0 W	1.200 kW
150.0V	75.00 W	150.0 W	300.0 W	750.0 W	1.500 kW	3.000 kW
300.0V	150.0 W	300.0 W	600.0 W	1.500 kW	3.000 kW	6.000 kW
600.0V	300.0 V	600.0 W	1.200 kW	3.000 kW	6.000 kW	12.00 kW

* The apparent power and reactive power ranges are the same as the effective power range, with VA and var in place of W.

Computation formulas

Apparent power (VA)	Reactive power (var)	Power factor (PF)	Phase angle (deg)
$VA = V \times A$	$var = s\sqrt{VA^2 - W^2}$	$PF = s\left\|\frac{W}{VA}\right\|$	$deg. = s\cos^{-1}\left\|\frac{W}{VA}\right\|$

Accuracy

(at 23°C±3°C, power factor 1, warm-up time at least 60 minutes, in 150 V and 5 A ranges)

Frequency	Accuracy
DC	Basic accuracy ±0.2% f.s.
10Hz - 20Hz	±1.5% f.s.
20Hz - 45Hz	±0.4% rdg. ±0.4% f.s.
45Hz - 66Hz	±0.25% rdg. ±0.1% f.s. (Basic accuracy)*
66Hz - 4kHz	±0.4% rdg. ±0.4% f.s.
4kHz - 10kHz	±1.4% f.s.
10kHz - 20kHz	±3.0% f.s.

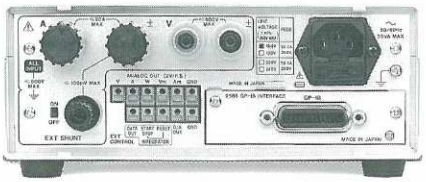
* Basic accuracy is ±0.4% rdg. ±0.1% f.s. in 15 V, 30 V, 60 V, 300 V and 600 V ranges and 500 mA, 1 A, 2 A, 10 A and 20 A ranges.

Notes

1. V is the measured voltage value, A the measured current value, and W the measured power value. (In this case the measured values do not include the ±1 dgt. error induced for display purposes.)
2. s is the sign, -1 if the current leads the voltage, and +1 if the current lags behind the voltage.
3. The computation accuracy is ±1 dgt. for computed values from the measurement values on the display.

■General specification

Operating temp. and humidity:	0°C to 40°C, 80%R.H. max. (no condensation)
Insulation resistance:	More than 100MΩ at 500V DC Input terminals – Frame, output terminals, external control terminals, and power supply Voltage input terminals – Current and shunt input terminals Power supply – Frame, output terminals, external control terminals
Withstand voltage:	2.2 kV AC, 1 minute Input terminals – Frame, output terminals, external control terminals, and power supply Voltage input terminals – Current and shunt input terminals 1.5 kV AC, 1 minute Power supply – Frame, output terminals, external control terminals
Power supply:	100/120/220/240 VAC ±10%, 50/60 Hz (specify at order)
External dimensions:	approx 215 W × 80 H × 280 D mm • 3.3 kg
Accessories:	power cord, plug adaptor



Rear panel

■Optional accessories

9588 GP-IB interface

HIOKI

HIOKI E. E. CORPORATION

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