

Power Analyzer

Multiple Channel Power analyzer AN87500(F)



Main features

- ★ **Multiple channel:** 1~6 channel measuring element configuration, flexibly configured as multi-channel single-phase, 3P3W×2, 3P4W×2, 4-phase (DC + 3P3W) and other models for measuring of various loads (air conditioners, inverters, frequency converters, motors);
- ★ **High precision:** high-speed DSP processors, high-speed high-precision 16-bit AD converter, basic accuracy up to 0.1%, up to 100ms display update cycle;
- ★ **Wide power:** A single-channel can measure current up to 50A (optional 20A, 10A, 5A, 2A, 1A and other specification, and support their combination), minimum power resolution of 0.1mW, meet the requirements for standby power measurements and rated power measurement;
- ★ **Wide bandwidth:** AC/DC signals, power measurement bandwidth DC, 0.5Hz~100kHz, suitable for measurement of various standard and non-standard sine load power;
- ★ **Multi harmonics:** 6-channel harmonics analysis simultaneously, measurement of up to 50th harmonics, distortion analysis, visual display of individual harmonic content and total contents;
- ★ **Multi frequency:** 6-channel frequency measurement simultaneously;
- ★ **Line filter:** 500Hz, 5.5kHz low-pass filter, measure the fundamental value of PWM waveform, filter out high frequency interference;
- ★ **Sensor:** scaling function, support conventional I-I/V-V type voltage/current transformer; BNC interface I-V current sensor, maximum input voltage of 10V, optional large-current sensor;
- ★ **Efficiency calculation:** simultaneously measuring of I/O energy consumption, and calculate the efficiency;
- ★ **Cumulative energy:** forward, reverse and integrated electric energy can be accumulated separately for energy trading measurement;
- ★ **Threshold alarms:** independently setting of 10 groups of voltage, current, power, power factor and other thresholds for each channel, automatically determining of upper/lower limits and alarm;
- ★ **Chinese/English interface:** Chinese/English interface and time/date display.

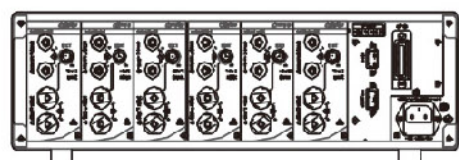
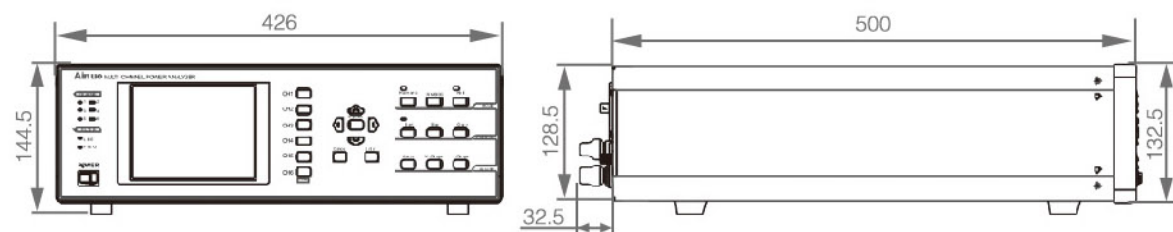
Typical Application

- ★ Single-phase/3-phase home/commercial appliances standby power consumption and power analysis
- ★ PV inverter power/efficiency/harmonic analysis
- ★ Electric vehicles, charging pile electrical properties measuring
- ★ Power electronics, transformers, generator power/harmonic analysis
- ★ Inverter, inverter motor power/harmonic analysis
- ★ Switching power supply power/harmonics/surge current analysis
- ★ Lighting, LED power analysis

Order information and extended functions

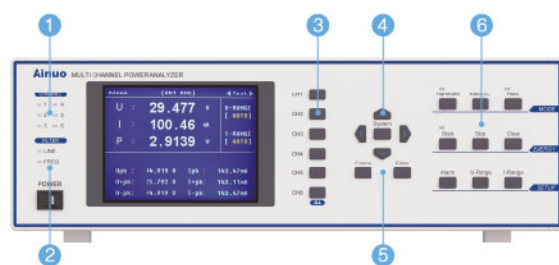
- ★ Up to 6 channels
- ★ AN87500-6-50A multi-channel power analyzer (Max 50A, 6CH), optional Max 20A/10A/5A/2A/1A
- ★ AN87500-5-50A multi-channel power analyzer (Max 50A, 5CH), optional Max 20A/10A/5A/2A/1A
- ★ AN87500-4-50A multi-channel power analyzer (Max 50A, 4CH), optional Max 20A/10A/5A/2A/1A
- ★ AN87500-3-50A multi-channel power analyzer (Max 50A, 3CH), optional Max 20A/10A/5A/2A/1A
- ★ AN87500-2-50A multi-channel power analyzer (Max 50A, 2CH), optional Max 20A/10A/5A/2A/1A
- ★ AN87500-1-50A multi-channel power analyzer (Max 50A, 1CH), optional Max 20A/10A/5A/2A/1A

Dimension



Unit: mm

Panel instruction



- 1 Measurement display
- 2 Filter indication
- 3 Channel selection
- 4 Cursor direction
(Selection/Increase/Decrease)
- 5 Exit/Save
- 6 Function keys
Harmonics/Wiring/Hold
Start/Stop/Clear
Set/Voltage/Current range



- 7 Voltage input
- 8 Current input
- 9 Sensor input (BNC) (Option)
- 10 Switch I/O interface
- 11 RS232 (Optional RS485)
- 12 GPIB (Optional)
- 13 Power (Fuse), Earth terminal

Configuration of Channels

The multi-channel power analyzer supports various wiring, including 1P2W, 1P3W, 3P3W, 3V3A, 3P4W etc. The user can configure multi channel mode as required, to measure the voltage, current, power, efficiency and other parameters for specific load.

Wiring	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6
1P2W single-phase 2-wire	1P2W	1P2W	1P2W	1P2W	1P2W	1P2W
1P3W single-phase 3-wire		1P3W			1P3W	
3P3W 3-phase 3-wire		3P3W			3P3W	
3V3A 3-phase 3-wire		3V3A			3V3A	
3P4W 3-phase/4-phase		3P4W			3P4W	

Test fixture

- ★ Voltage test clamp
- ★ Communication wire
- ★ Powe core
- ★ Software

Main function

★ Single channel power measurement

[CH1]	TEST	00:00:00
U	220.50 V	U-AUTO [300V]
I	100.10 mA	I-AUTO [500mA]
P	19.887 W	
λ	0.9007	S : 22.177 VA
ctU	1.4152	Q : 9.6310 Var
ctI	1.5020	fU : 49.999 Hz
Φ	25.7°	fI : ----- Hz

★ 3 channels power measurement

[CH123]	[3P4W]	00:00:00
U	0.000 V	0.000 V
I	0.000 mA	0.000 mA
P	0.000 W	0.000 W
S	0.0000 VA	0.0000 VA
Q	0.0000 Var	1.0000 Var
λ	-----	-----
fU	0.0000 Hz	0.0000 Hz
ΣU	0.000 V	ΣS 0.000 VA
ΣI	0.000 mA	ΣQ 0.000 Var
ΣP	0.000 W	Σλ 0.0000

★ Single channel peak measurement

[CH1]	TEST	00:00:00
U	220.50 V	U-AUTO [300V]
I	100.10 mA	I-AUTO [500mA]
P	19.887 W	
Upk	312.12 V	Ipk : 150.10 mA
U+pk	312.12 V	I+pk : 150.10 mA
U-pk	-312.09 V	I-pk : -147.48 mA
Udc	0.02 V	Ide : 0.76 mA

★ 6 channels power measurement

	U(V)	I(A)	P(W)	λ
1	220.50	100.10m	19.887	0.9010
2	0.0000	0.00m	0.000	0.0000
3	0.0000	0.00m	0.000	0.0000
4	0.0000	0.00m	0.000	0.0000
5	0.0000	0.00m	0.000	0.0000
6	0.0000	0.00m	0.000	0.0000

★ Single channel harmonic measurement

[CH1]	[HARM]	00:00:00
U	220.50 V	U-AUTO [300V]
I	100.10 mA	I-AUTO [500mA]
P	19.887 W	
▲01	Voltage	Current
hdf%	100.00 %	100.00 %
hdf	220.45 V	99.04 mA
thd%	0.06 %	0.40 %

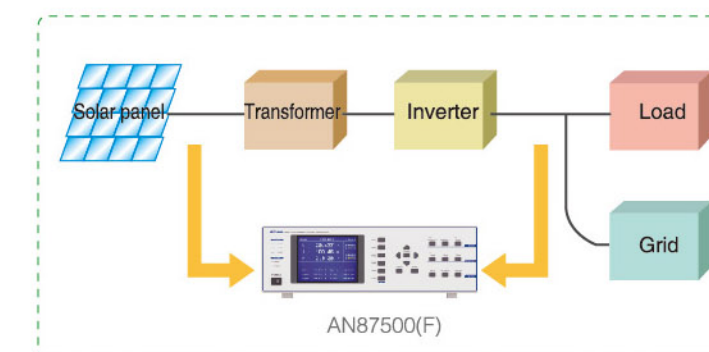
★ Single channel 50 harmonic measurement

[CH1]	[HARM]	00:00:00			
U	0	1	2	3	4
0	---- %	0.00	0.00	0.00	0.00
1	100.00	0.00	0.00	0.00	0.00
2	0.04	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
Uthd%	0.06 %	U(1)	220.45 V		

Application

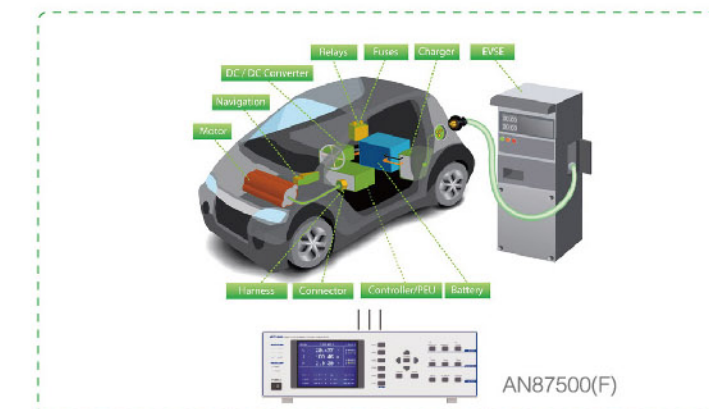
PV inverter power measurement

- ★ Comply with CGC/CF 004-2011, CNCA/CTS 0004-2009A standard
- ★ Voltage range: 0 ~ 1000V
- ★ Current range: 0 ~ 50A / larger by current sensor
- ★ Input /output (single-phase, three-phase), power and power factor measurement
- ★ Automatic efficiency calculation
- ★ 50 times harmonics/distortion analysis
- ★ Bidirectional energy measurement of solar power system



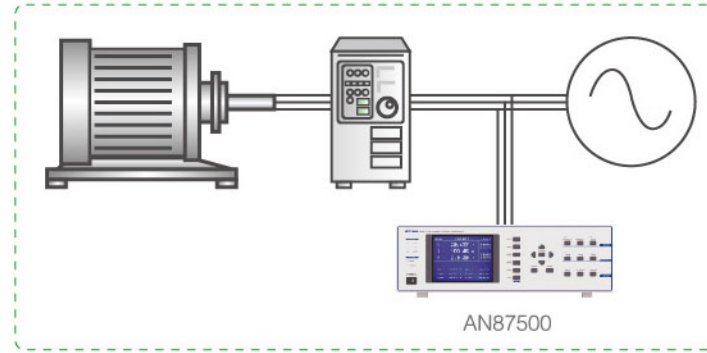
Electric vehicle power measurement

- ★ Multi-channel, multi-parameter measurement: charging station performance, battery charge and discharge performance, power conversion performance, motor performance etc.
- ★ AC/DC current measurement range up to 50A, more scalable current sensor
- ★ High accuracy up to 0.1%, minimum power resolution is 0.1mW
- ★ AC and DC signal instantaneous RMS, AVG, Peak, and electric energy measurement



Inverter motor/inverter power measurement

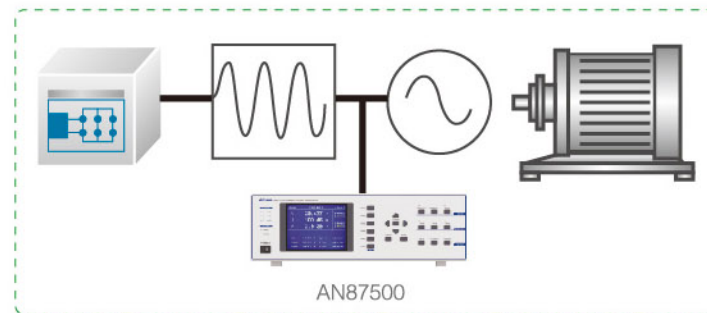
- ★ Comply with GB12668 standard
- ★ Power bandwidth: DC, 0.5Hz ~ 100kHz
- ★ Current range: 0 ~ 50A/larger by current sensor
- ★ Input/output power measurement
- ★ 50 times harmonics/distortion analysis



AN87500

Power supply/UPS measurement

- ★ Current range: 0 ~ 1A/2A/5A/10A/20A/50A
- ★ Power bandwidth: DC, 0.5Hz ~ 100kHz
- ★ Input/output (single-phase, three-phase) power, monitor the battery measurement



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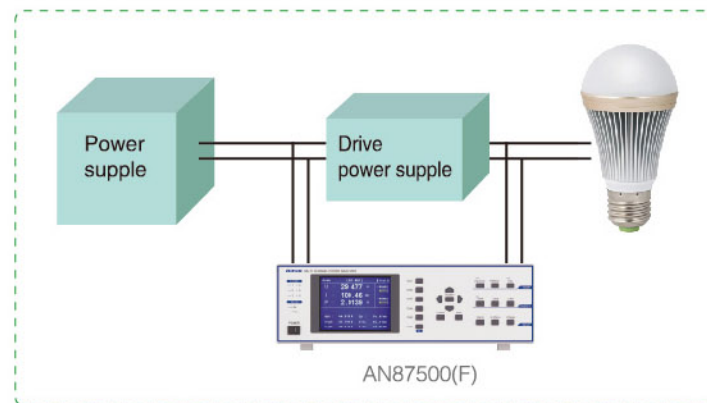
Appliance performance evaluation, standby power consumption measurement

- ★ Comply with IEC 62301-2011 standard
- ★ Current range: 0 ~ 1A / 2A / 5A / 10A / 20A / 50A, rated power and standby power measurement
- ★ Minimum power resolution: 0.1mW
- ★ Automatic identification of appliances Run/Stop/ Standby state, optional accumulated electric energy
- ★ 50 times harmonics/distortion analysis



Lighting, LED power measurement

- ★ Current range: 0 ~ 1A / 2A / 5A / 10A
- ★ Minimum power resolution: 0.1mW
- ★ Drive power input/output power, power factor, efficiency measurement
- ★ 50 times harmonics/distortion analysis



AN87500(F)

Optional

- ★ GPIB communication card

Model	Type	Spec.	Picture
870-021	Com card	IEEE-488.2	

- ★ BNC current sensor interface
- ★ AC current sensor

Model	Type	Bandwidth	Spec.	Dimension and picture
CT117	AC	10kHz	AC: 1mA~1200A Turns ratio: 1A/1mV	
Fluke i2000	AC	20kHz	AC: 20A/200A/2000A Turns ratio: 1A/100mV 1A/10mV 1A/1mV	

- ★ AC/DC current sensor

Model	Type	Bandwidth	Spec.	Dimension and picture
PAC22	AC/DC	DC 10kHz	AC: 0.2~100A DC: 0.4~150A Turns ratio: 1A/10mV AC: 0.5~1000A DC: 0.5~1400A Turns ratio: 1A/1mV	

Spec.

Model	AN87500-x(F)
Channel -x	1~6
Wiring	1P2W (single-phase 2-wire), 1P3W (single-phase 3-wire), 3P3W (3-phase 3-wire, 2 voltage 2 current), 3P3W (3V3A) (3-phase 3-wire, 3 voltage 3 current), 3P4W (3-phase 4-wire)
Measurement parameter	Voltage U, current I, active power P, reactive power Q, apparent power S, power factor λ, voltage frequency fU, current frequency fI, phase angle Φ, efficiency η, total electric energy Wh, positive electric energy Wh+, reverse electric energy Wh-, current integration Ah, 50th harmonics analysis HDF, voltage and current distortion THD, surge current Ir, peak voltage Vpk, peak current Ipk, peak voltage factor CfU, peak current factor CfI
Input impedance	Voltage: Approx. 2MΩ Direct current input: Approx. 2.5mΩ (50A) Current sensor input: Approx. 100kΩ
Full range crest factor	3 * The exceptions are as followed

Spec.

Rated voltage range (Direct input)	15/30/60/100/150/300/600/1000*[V] *Full range crest factor for 1000V: 1.5
Rated current range (Direct input)	50A specification: 500m/1/2/5/10/20/40/50*[A] Optional: 20A specification: 100m/200m/500m/1/2/5/10/20*[A] 10A specification: 50m/100m/200m/500m/1/2/5/10*[A] 5A specification: 20m/50m/100m/200m/500m/1/2/5*[A] 2A specification: 10m/20m/50m/100m/200m/500m/1/2*[A] 1A specification: 5m/10m/20m/50m/100m/200m/500m/1*[A] * Full range crest factor for maximum range for above specifications: 1.5
Rated current range (Sensor input)	50m/100m/200m/500m/1/2/5/10[V]
Accuracy range of voltage/current	(1%~110%)*range * Accuracy range for 1000V voltage range and 50A current range: (1%~100%)*range
Power factor range	± (0.001~1.000)
Voltage accuracy	DC ±(0.1%×reading+0.1%×range) 0.5Hz≤f<45Hz ±(0.1%×reading+0.2%×range) 45Hz≤f≤66Hz ±(0.1%×reading+0.1%×range) 66Hz<f≤1kHz ±(0.1%×reading+0.2%×range) 1kHz<f≤10kHz ±({0.1+0.05×(f-1)})%×reading+0.2%×range) 10kHz<f≤100kHz ±({0.5+0.04×(f-10)})%×reading+0.3%×range)
Current accuracy	DC ±(0.1%×reading+0.1%×range) 0.5Hz≤f<45Hz ±(0.1%×reading+0.2%×range) 45Hz≤f≤66Hz ±(0.1%×reading+0.1%×range) 66Hz<f≤1kHz ±(0.1%×reading+0.2%×range) 1kHz<f≤10kHz ±((0.1×f)%reading+0.2%×range) 10kHz<f≤100kHz ±({1+0.08×(f-10)})%×reading+0.3%×range)
Active power accuracy	DC ±(0.1%×reading+0.1%×range) 0.5Hz≤f<45Hz ±(0.3%×reading+0.2%×range) 45Hz≤f≤66Hz ±(0.1%×reading+0.1%×range) 66Hz<f≤1kHz ±(0.2%×reading+0.2%×range) 1kHz<f≤10kHz ±({0.2+0.1×(f-1)})%×reading+0.2%×range) 10kHz<f≤50kHz ±({0.2+0.1×(f-1)})%×reading+0.3%×range) 50kHz<f≤100kHz ±({5.1+0.18×(f-50)})%×reading+0.3%×range)
Active power range	50A specification: 11mW~11kW@220V, PF=0.01~1 Optional: 20A specification: 2.2mW~4.4kW@220V, PF=0.01~1 10A specification: 1.1mW~2.2kW@220V, PF=0.01~1 5A specification: 0.4mW~1.1kW@220V, PF=0.01~1 2A specification: 0.2mW~440W@220V, PF=0.01~1 1A specification: 0.1mW~220W@220V, PF=0.01~1
Active power resolution	0.1mW
Frequency range	DC, 0.5Hz~100kHz
Frequency accuracy	±0.1%×reading
Harmonics	10Hz~600Hz, 1~50th harmonic content, total distortion
Energy range	0~999999MWh (Resolution: 1mWh/0.01mAh)
Energy accuracy	±0.5%×reading
Filter	500Hz, 5.5kHz voltage lines, current line and frequency filter
Ratio	1 ~ 50000
Data update	100m/250m/500m/5[s]
Alarm	Setting of 10 groups of voltage, current, power, power factor; upper limit, lower limit, threshold
Interface	Standard: RS-232, digital interface; Optional: RS-485, GPIB
Display	5.7-inch color LCD
Dimension	426(W)×132.5(H)×500(D) mm
Foot height	17.5 mm
Weight(without packaging)	About 10 kg