SUITA

Three-phase Power Meter

SPA3200

SPA3100

Highest Measurement Accuracy: ±(0.1% of reading + 0.05% of range)

Bandwidth: DC, 0.1Hz - 100kHz

Measurement Voltage up to 1000V(SPA3100), 1500V(SPA3200)

Measurement Current up to 5A(SPA3100), 50A(SPA3200)

3 Power Channel + 3 External Current Sensor Connection

Harmonic Analysis up to 50th Order

Instantaneous Power Measurement

Peak Hold, Save and Re-load Configuration, D/A Output, Comparator and Computation Function

5.6-inch Touch Screen

PM Viewer Software

Suita Electric Website

SUITA ELECTRIC Corporation, headquartered in Suita, Osaka, Japan, is a leading provider of high-end equipment with a focus on quality and innovation. Drawing from years of dedicated research and development, our company delivers top-notch products that span various industries, including electric power, energy resources, transportation, automobiles, and telecommunications. Our advanced, reliable, and comprehensive test and measurement solutions are sought after by R&D companies and manufacturers. Through systematic approaches, we address the intricate demands of our customers, actively contributing to the continuous development and updating of global industries.

Digital power meter is an instrument used to measure the power consumption of household appliances, office automation products, large power equipment and process control automation equipment. It is widely used in the power industry to test the power consumption of office or household appliances, batteries and other driving devices. The instrument also has functions such as real-time waveform, waveform data recording, and harmonic analysis. With the characteristics of small size, compact structure, convenient operation, cost-effectiveness, and accurate measurement, it is an ideal model suitable for power consumption testing stand and production line or testing workbench.

Functional Advantages and Features

Simultaneously Measuring All Parameters

All AC and DC parameters can be measured, and integral measurement and harmonic measurement can be performed simultaneously without changing the measurement mode.

Fast Display with Data Update Rate up to 50ms

With the fast display function and data update rate of up to 50ms, the time for users to test the program can be shortened.

Peak Hold Function

Display of relevant maximum values in the measurement process can be held in order to observe maximum values in the measurement process. Display of maximum values of the following measurement functions can be held: RMS/MEAN/DC/PEAK value of voltage and current, power peak value, active power, reactive power and apparent power.

Save and Re-load Configuration Parameters

The configuration file shall be saved, so that the configuration file saved can be loaded quickly when encountering similar measurement environment in the later period, and the time for users to set the parameters again can be reduced.

D/A Output for Measurement Recording

D/A output is used to output voltage, current, power and other measured data to the data recorder or other devices (±5V DC output).

Comparator Function

The measured value is compared with the set value, and the values of +50 and -5v are output based on the comparison result.

Current Sensor Input

When measuring large current, voltage output type current clamp or current sensor can be used for measurement to expand the measuring current range of the instrument.

Computation Function

The instrument supports multiple computation functions, which can set and display the value of efficiency, peak factor, arithmetic results and average active power.

Data Storage Function

The measured data can be stored, and the maximum available storage space inside the instrument is 4GB. The stored data cannot be read directly in the display frame of instrument, but can be analyzed by a computer or a connected application software through the communication function.

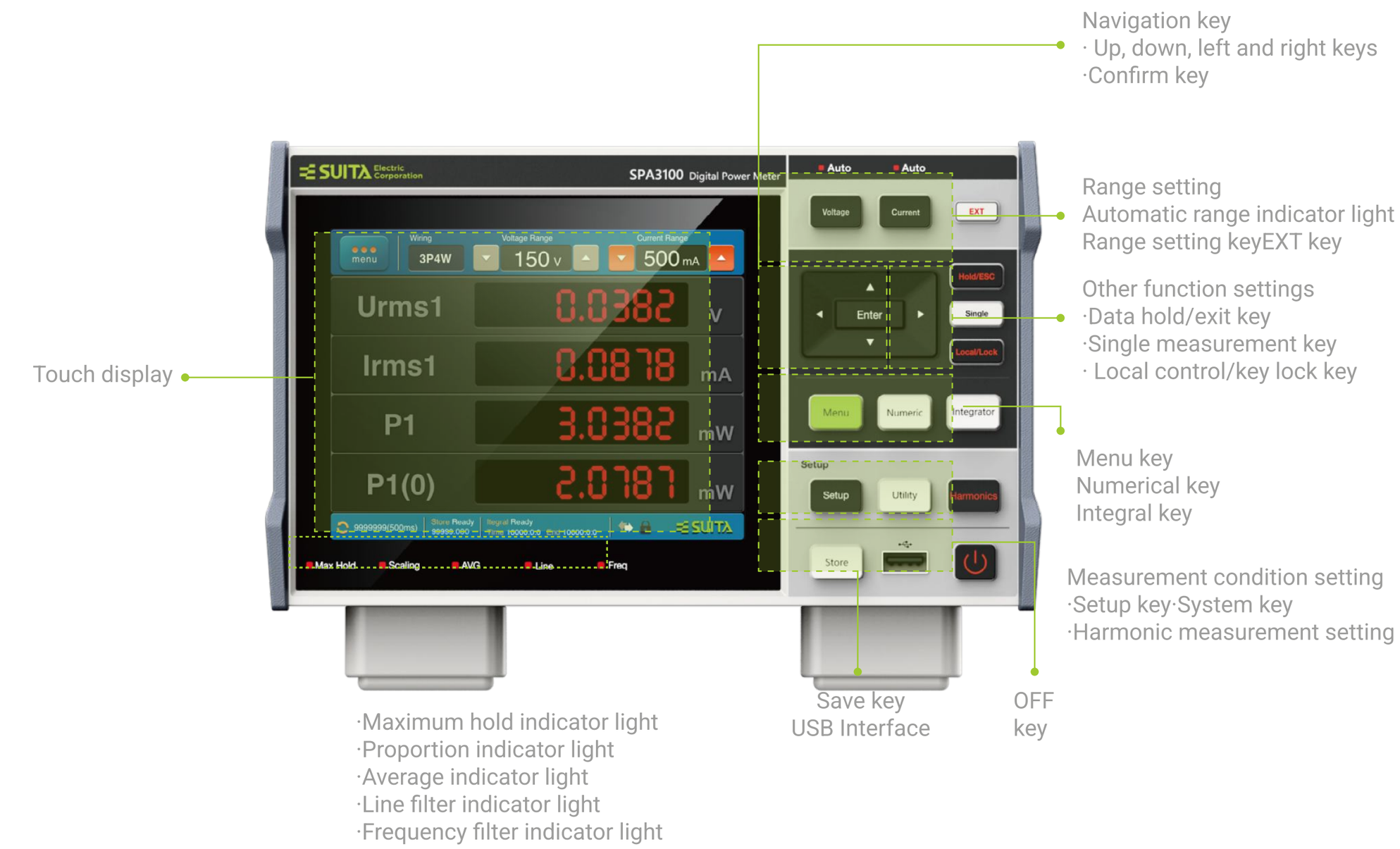
SUITA PM Viewer Software

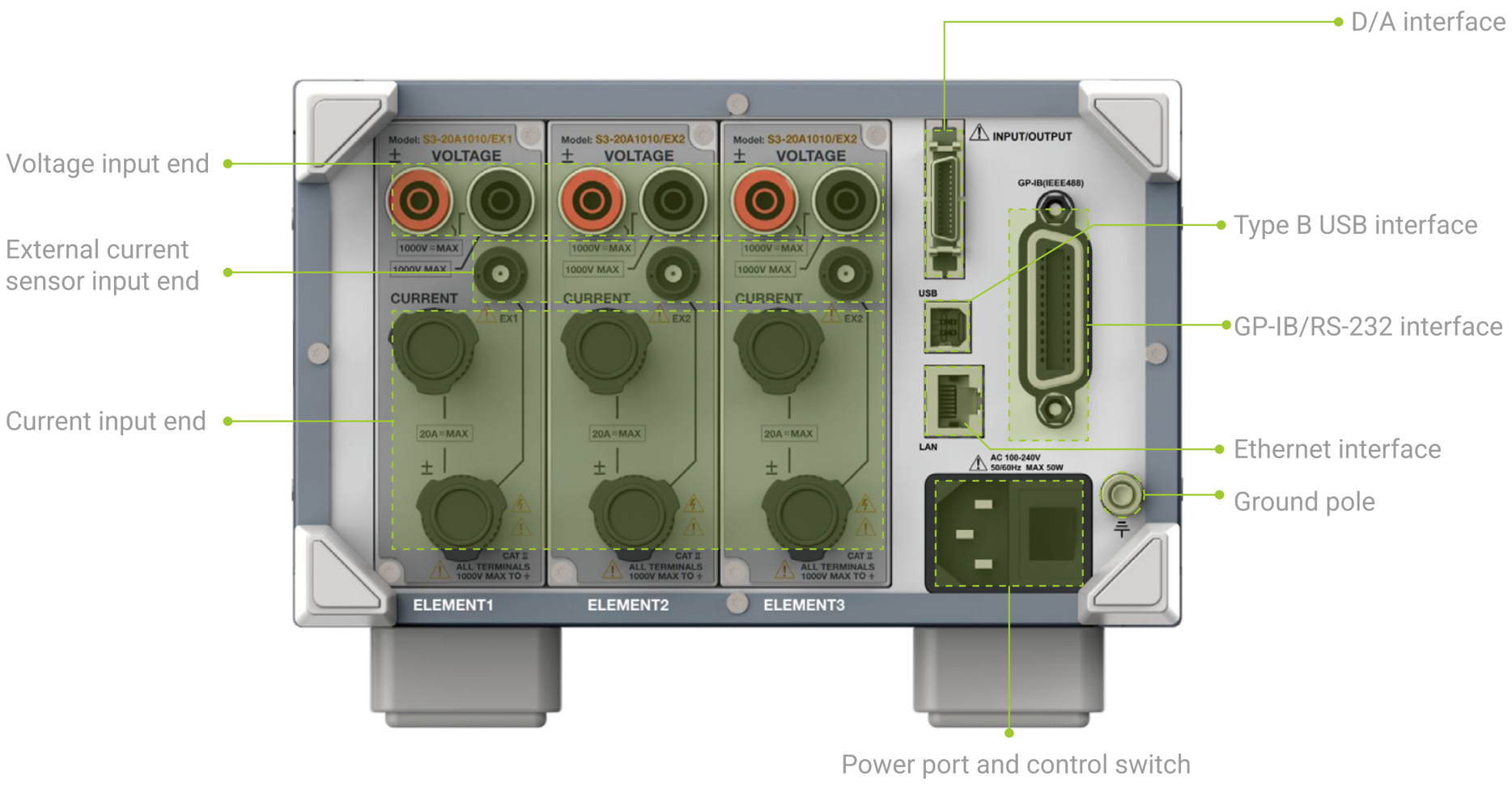
SUITA PM Viewer software is a PC application software that allows users to remotely control the instrument from PC and display the measured value, waveform, trend, bar chart, etc. on the PC display screen more intuitively. Users can connect the instrument to the computer through network interface.

User-friendly GUI

5.6-inch touch screen is adopted to support touch operation. The graphic function module design is convenient for users to operate intuitively. Compared with the traditional power meter with digital tube display, its operation and configuration are more convenient.

Product Overview





Applications

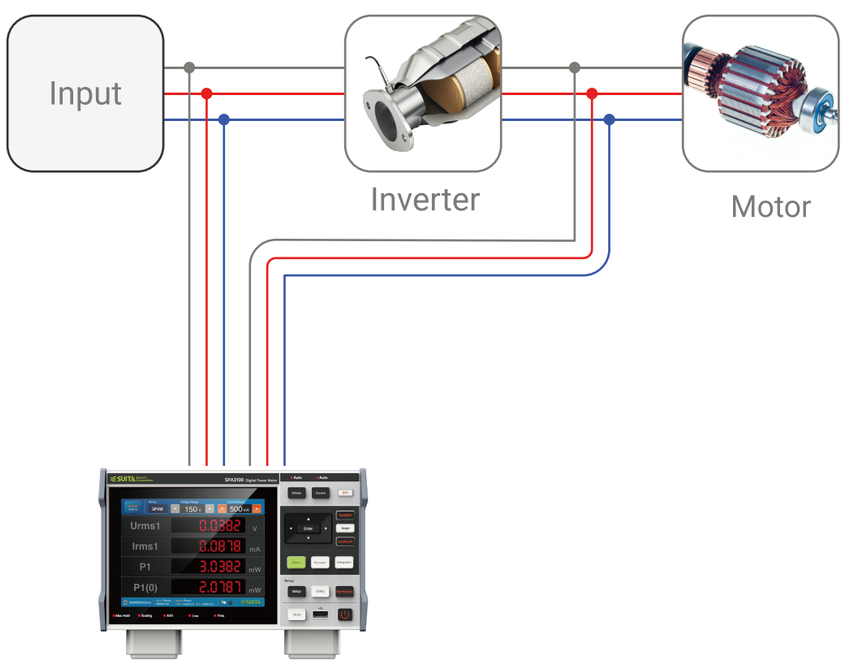
Digital power meter is easy to use, cost-effective and accurate in measurement, and can meet a wide range of application needs in production, testing, evaluation, and R&D fields.

Performance testing of household appliances or office equipment

As more and more attention is paid to energy efficiency, reducing the functional loss of ordinary household appliances (e.g. air conditioners, washing machines, induction cookers, water heaters, etc.) has also become a major breakthrough point in improving domestic energy efficiency. Digital power meter supports the electric energy test of household appliances. In order to perform high-efficiency measurement, one digital power meter can undertake the measurement work of three instruments simultaneously, measuring parameters such as voltage, current, power, frequency, power factor and harmonic distortion.

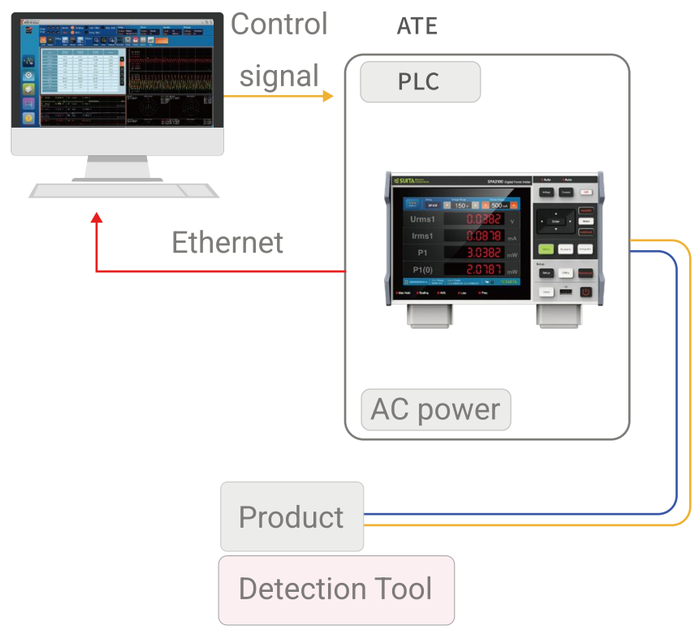
Industrial equipment and transportation use

Efficiency evaluation system for automotive batteries and drive devices
It can directly measure current up to 50A. Without using any external sensors, it can test the DC drive system for cars, providing affordable and accurate solutions.



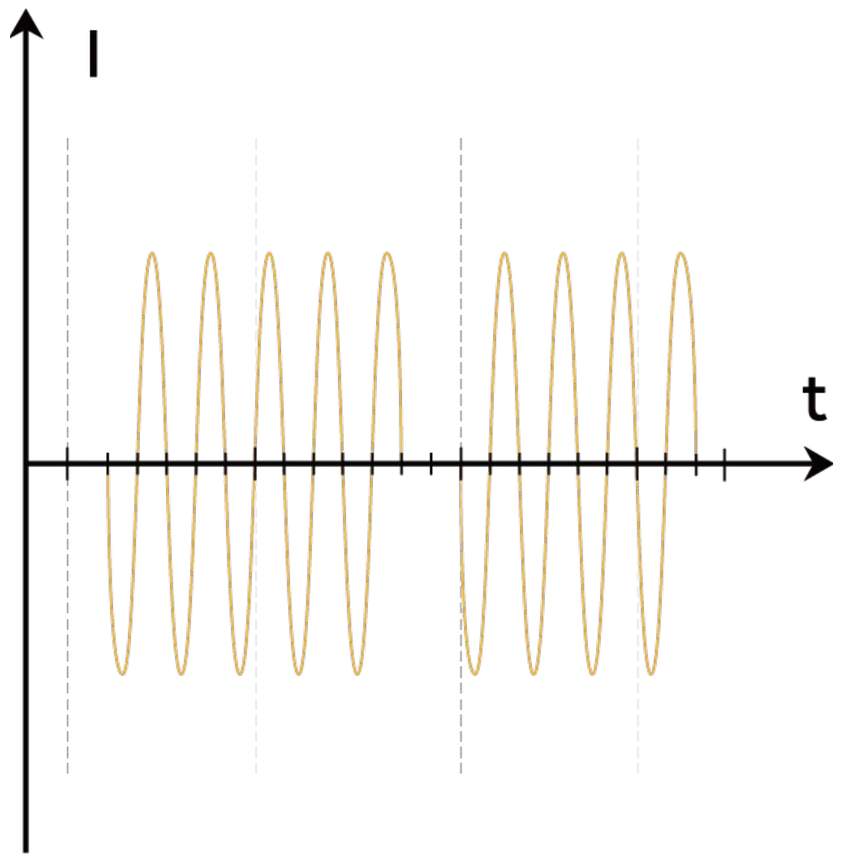
Production line test

SPA3100/SPA3200 has a compact structure, and the width of half rack can be easily installed on the test rack of the production line. With a favorable price, it is suitable for users to build a cost-effective test platform. It can measure parameters such as voltage, current, frequency, power, power factor and harmonics simultaneously, so as to effectively improve testing efficiency and shorten testing man-hours.

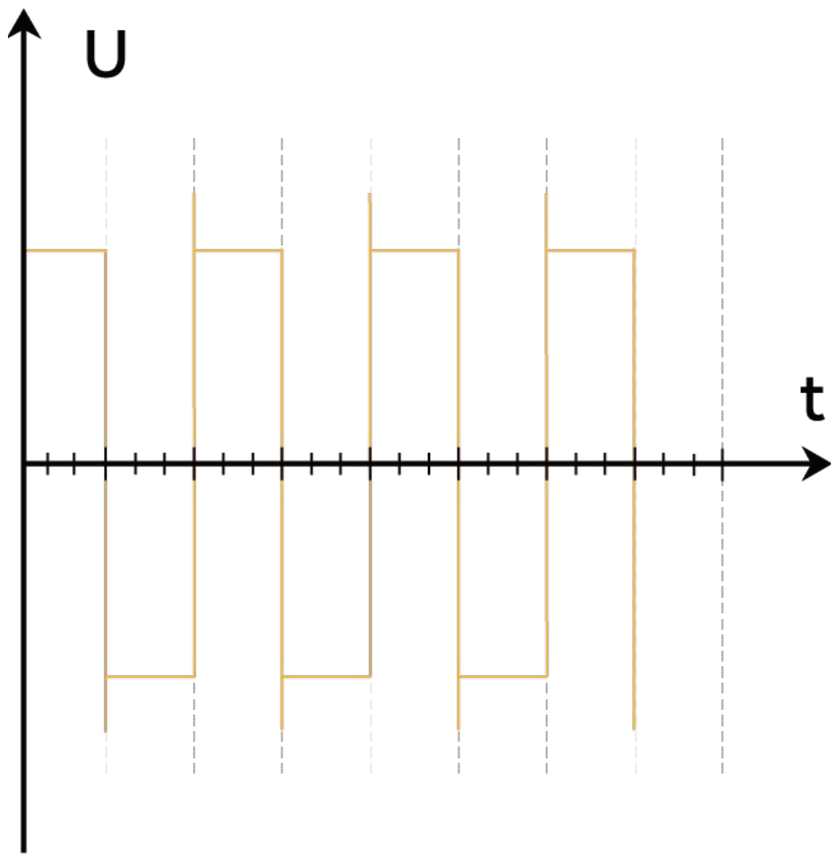


Evaluation testing of special waveform driving device and distorted waveform containing DC component

With a frequency range of DC, 0.1Hz~100kHz, the digital power meter can be used to measure the RMS value of distorted waveforms such as square wave or special waveform driving device. Through the average active power measurement function, it can provide accurate power consumption data for impulse wave control devices and other fluctuating power devices. Therefore, the distorted waveform can be accurately measured without any special mode setting.



Inter-harmonic shock wave



Square wave

Technical Specifications

Signal Input

Item	Specifications
Input Terminal Type	**Voltage:** Plug-in terminal (safety terminal) **Current:** Outside the binding post **Current sensor:** Insulated BNC interface
Input Format	**Voltage:** Floating input, resistor voltage division mode **Current:** Floating input, shunt input mode
Measurement Range	**Voltage** 15V, 30V, 60V, 150V, 300V, 600V, 1000V (peak factor 3), 1500V (peak factor 2) 7.5V, 15V, 30V, 75V, 50V, 300V, 500V (peak factor 6), 750V (peak factor 6) **Current** **• Direct input** **SPA3100-5A:** 100mA, 200mA, 500mA, 1A, 2A, 5A (peak factor 3) 50mA, 100mA, 250mA, 500mA, 1A, 2.5A (peak factor 6) **SPA3200-50A:** 1A ,2A, 5A, 10A, 20A, 50A (peak factor 3) 500mA, 1A, 2.5A, 5A, 10A, 25A (peak factor 6) **External current sensor** 50mV, 100mV, 200mV, 500mV, 1V, 2V, 2.5V, 5V, 10V (peak factor 3) 25mV, 50mv, 100mV, 250mV, 500mv, 1V, 1.25V, 2.5V, 5V (peak factor 6)
Input Impedance	**Voltage** Input resistance is about 2MΩ, and input capacitance is about 13pF (in parallel with the resistor) **Current** **• Direct input** **SPA3100-5A:** In case of 0.1A~5A, Approximately 20mΩ; Approximately 0.1μH (resistance in series) **SPA3200-50A:** In case of 1A~50A, Approximately 5mΩ; Approximately 0.1μH(resistance in series) **• External current sensor** Input resistance is about 20kΩ (50mV~10V)
Instantaneous Continuous Maximum Allowable Input Value	**Voltage** Take the smaller value between the peak value of 3kV and the voltage effective value of 1.5kV **• Direct input** **SPA3100-5A:** Take the minimum value between the peak value of 45A and the current effective value of 15A **SPA3200-50A:** Take the minimum value between the peak value of 100A and the current effective value of 55A **• External current sensor** The peak value shall not exceed 5 times the rated range
A/D Converter	**Voltage and current input are converted simultaneously** **Resolution:** 16-bit **Conversion rate (sampling rate):** 10μs

Measurement Accuracy

Frequency range	Voltage	Current	Power
DC	0.1+0.05	0.1+0.05	0.1+0.05
0.5Hz≤f<45Hz	0.1+0.15	0.1+0.15	0.25+0.2
45Hz≤f≤66Hz	0.1+0.05	0.1+0.05	0.1+0.05
66Hz＜f≤1kHz	0.1+0.15	0.1+0.15	0.1+0.15
1kHz<f≤10kHz	0.06*f+0.3	0.06*f+0.3	0.08*f +0.25
10kHz<f≤100kHz	0.04*f +0.5	0.04*f +0.5	0.07*f +0.5

Measurement Conditions

Item	Specification
Crest Factor	3 or 6
Measurement Period	Interval for determining the measurement function and performing calculations The measurement period is set by the zero crossing of the reference signal (When synchronization source is set to be None, measurement period becomes data update interval)
Sync Source	Voltage, Current, None
Measurement Mode	Select RMS(the true RMS value of voltage and current), MEAN (The rectified mean value calibrated to the RMS value of the voltage and the true RMS value of the current), DC (simple average of voltage and current)
Wiring System	1P2W, 1P3W, 3P3W, 3V3A, 3P4W However, the number of available wiring systems varies depending on the number of installed input elements
Scaling Factor	When inputting output from external current sensors, VT, or CT, set the current sensor conversion ratio, VT ratio, CT ratio, and power coefficient in the range from 0.001 to 9999
Line Filter	Select OFF or ON(cutoff frequency of 500Hz)
Frequency Filter	Select OFF or ON(cutoff frequency of 500Hz)
Average Function Operation	Exponential average: Select an attenuation constant from the values of 8, 16, 32, and 64 Linear average: Select the number of averages from the values of 8, 16, 32, and 64 Harmonic measurement: Only exponential averaging is available
Data Update Rate	50ms, 100ms, 250ms, 500ms, 1s,c 2s, 5s, Auto
Peak Measurement	Measure the peak (max/min) value of voltage, current or power from the instantaneous voltage, instantaneous current or instantaneous power that is sampled
Zero Setting	Remove the internal offset

Display Function

Item	Specifications
Display	12.1-Inch TFT color touchscreen
Display item	Display 4 items simultaneously
Unit Symbol	m, k, M, V, A, W, VA, var, °, Hz, h±, Tl ME, %
Response Time	The maximum is twice the data update cycle (The time required for the displayed value to reach the final accuracy state when the rated value of the range changes from 0 to 100% or from 100% to 0)
Hold	Hold the displayed value
Single update	When data is held, the displayed value is updated every time the Single key is pressed

Frequency Measurement Function

Item	Specifications	
Measuring Object	Measure the frequency of voltage or current of all input units simultaneously	
Measurement Method	Reciprocal method	
Frequency Measurement Range	Data update rate	Frequency measuring range
	0.1s	25Hz≤f≤100kHz
	0.25s	10Hz≤f≤100kHz
	0.5s	5Hz≤f≤100kHz
	1s	2.5Hz≤f≤100kHz
	2s	1.5Hz≤f≤100kHz
	5s	0.5Hz≤f≤100kHz
Frequency Accuracy	When the peak factor is 3, the input signal level is greater than or equal to 30% of the measuring range (when the peak factor is 6, it is greater than or equal to 60%). When the measured voltage or current is less than or equal to 200Hz, open the frequency filter accuracy: ± (0.06% of reading)	
Minimum Resolution	0.0001 Hz	

Integration Function

Item	Specifications
Mode	Standard integral mode or repeated integral mode is optional
Timer	Automatically stop integral by setting a timer Setting range: 00:00:00 ~ 10000:0:0
Integral Stop	Integral time reaches the set value The integral value reaches the maximum or minimum displayable value
Accuracy	In case of fixed range: ± (power accuracy (or current accuracy) + 0.1% of reading); in case of automatic range: when the range changes, no measurement will be performed. The first measured value after range change and the non-measurement period will be added
Timer Accuracy	± 0.02% of reading

D/A Interface

Item	Specification
Output Voltage	±5V full scale(approximately ±7.5V maximum) against each rated values
Number of Output Channels	12 outputs
Output Items	Set for each channel U, I, P, S, Q, λ, Ø, Fu, fI, Upk, Ipk, WP, WP±, q, q±, MATH
Accuracy	±(accuracy of each measurement item+0.2% of full scale)(FS=5V)
Minimum load	100kΩ
Update Interval	Same as the data update interval
Temperature coefficient	± 0.05%/°C at full scale
D/A Conversion Resolution	16-bit

Harmonic Measurement Function

Item	Specifications
Measuring Object	All installed units
Frequency Range	Fundamental frequency range of PLL source is 8Hz~1.5kHz PLL source: Voltage and current of each input unit
Sample Rate, Window Width, and Upper Limit of the Measured Order	1024 points, when the data update rate is 100ms or 250ms Fundamental frequency / Window width / Window width 20Hz~40Hz / 1 / 50 40Hz~440 Hz / 2 / 50 440Hz~1KHz / 10 / 50 1KHz~1.5KHz / 16 / 40 1024 points, when the data update rate is 100ms or 250ms Fundamental frequency / Window width / Window width 8Hz~40 Hz / 1 / 50 40Hz~440 Hz / 2 / 50 20Hz~40Hz / 10 / 50 20Hz~40Hz / 16 / 40
Accuracy of Harmonic Measurement (Indicator: ±% of reading + % of range)	1024 points, when the data update rate is 100ms or 250ms Fundamental frequency / Window width / Window width / Window width 8Hz≤f≤45Hz / 1 / 50 / 50 45Hz≤f≤440Hz / 2 / 50 / 50 440Hz≤f≤1KHz / 10 / 50 / 50 1KHz≤f≤1.5KHz / 16 / 40 / 40

External Hardware Interface

Item	Specification
D/A Terminal	±5V ; approximately ±7.5V(maximum) ; TTL level

Communication Interface

Item	Specification
Type B USB Interface	Conforms to the USB Rev.2.0; USBTMC-USB488(USB Test and Measurement Class Ver.1.0)
Ethernet Interface	RJ-45 connector; Conforms to IEEE802.3; Ethernet 100BASE-T, 100BASE-TX, 10BASE-T
RS-232 Interface	9-pin, D-Sub (plug); Conforms to EIA-574, standard of 9-pin EIA-232(RS-232)
GP-IB Interface	Confirms to IEEE Standard 488-1978 (JIS C 1901-1987); Confirms to the IEEE Standard 488.2-1992

General Specifications

Item	Specifications
Dimensions	220.02mm*402.87mm*153.22mm
Rated Supply Voltage	From 100 to 240V AC
Allowable Supply Voltage	From 85 to 264V AC
Rated Supply Frequency	50/60Hz
Allowable Supply Frequency Range	From 48 to 63Hz
Maximum Power Consumption	50VA
Preheating Time	Approximately 30 minutes
Operating Environment	**Temperature:** 5°C ~ 40°C **Humidity:** from 20% to 80%RH(no condensation)
Operating Altitude	2,000m or below
Applicable Environment	Indoors
Storage Environment	**Temperature:** -25°C ~ 60°C **Humidity:** from 20% to 80%RH(no condensation)
Weight	About 6kg
Battery Backup	Standby battery for clock

Accessories

Current Sensor of SCTH Series

	DC	AC	Accuracy	Measuring bandwidth	Transformation ratio KN	Measuring resistance Rm	Hole diameter	Interface	Power supply
SCTH60	0-60A	60Apeak	±(0.05% of rdg + 15μA)	DC-800kHz	1: 600	0-25Ω	Ø28mm	D-Sub 9 pin	±12V~±15V
SCTH200	0-200A	200Apeak	±(0.05% of rdg + 15μA)	DC-500kHz	1: 1000	0-25Ω	Ø28mm	D-Sub 9 pin	±12V~±15V
SCTH600	0-600A	600Apeak	±(0.05% of rdg + 15μA)	DC-300kHz	1: 1500	0-25Ω	Ø30.9mm	D-Sub 9 pin	±15V~±24V
SCTH1000	0-1000A	1000Apeak	±(0.05% of rdg + 15μA)	DC-300kHz	1: 2000	0-25Ω	Ø30.9mm	D-Sub 9 pin	±15V~±24V

Boxes

Model	Name	Sample	Usage
PTB01	Single-phase Junction Box		It is used for single phase circuit connection to measure power parameters conveniently via power analysis wavecorder
PTB03	Three-phase Junction Box		It is used for three- phase circuit connection to measure power parameters conveniently via power analysis wavecorder (The length of the line is about 2m)

Connectors and Cables

Model	Name	Sample	Usage
PAC-1001	Fork terminal adapter		Used when attaching banana plug to binding post. Specification: 1000V, CAT II, 20A Color: red, black
PAC-1002	BNC Conversion adapter		Connector: Conversion between safety BNC and banana jack Specification: 600V, CAT III
PAC-1003	Safety adapter		Connector: Safety connector; Solder can be used for tightening the test cables. Specification: 600V, CAT II, 20A Color: red, black
PAC-1004	Safety adapter		Connector: safety connector, spring-hold type Specification: 600V, CAT II, 10A Color: red, black
PAC-1005	Safety clamp		Connector: hook shape connector Specification: 1000V, CAT III, 4A Color: red, black
PAC-1006	Large alligator adapter		Connector: safety connector Specification: 600V, CAT , 19A Color: red, black
PAC-1007	Small alligator adapter		Connector: safety connector Specification: 300V, CAT II, 15A Color: red, black
PAL-1001	Measurement lead		Connector: safety connector Specification: 1000V, CAT II, 32A , 600V, CAT III Color: red, black
PAL-1002	Safety BNC cable		Connector: BNC connector Specification: 1000V, CAT II, 600V, CATIII Color: black
PAL-1003	External sensor Cable		Connector: one BNC safety connector Specification: 300V, CAT II, 2A Color: black

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