S7
High Precision Power Analyzer

- Max Measuring Accuracy : ±（0.01% of reading + 0.02% of range）

- Bandwidth : DC,from 0.1Hz to 5MHz

- Up to 7channels for power measurement; double channels for motor input

- Multiple options of range and accuracy input for optimal configurations

- Simultaneously and independently analyzing 7-harmonics channel

- Measuring up to 500 harmonic orders

- Instantaneous power measurement

- X-Y Graph Display

- Data update rate up to 10ms

- 128G/512G SSD

SUITA ELECTRIC Corporation, founded in Suita, Osaka, Japan, is a company specializing in high-end equipment. Rooted in the technological achievements after years of research and development, the top-notch products of our company, with good quality, apply in many industries such as electric power, energy resource, transportation, automobile, telecommunication, and our advanced, reliable, and comprehensive solutions of test and measurement are provided to many R&D companies and manufacturers, systematic approaches meeting the deep demands of our customers to support the development and continuous update of the global industries.

This power analyzer is an instrument for measuring such parameters as voltage, current, power and efficiency of the transducer (frequency inverter), motor and converter. This product provides up to 7 power inputs and double motor inputs, characterized by various assembled modes of power board, diversity of options of measurement range and accuracy, widely applied in the areas such as electric vehicle, new energy technology, inverter, motor, battery, lighting, household appliance, and avionics. It has powerful features, including measuring by multi-channel input, sampling in high speed, displaying the measured results in rich display formats such as real-time numeric, waveform, trend, bar graph, and vector and so one. It is also a professional instrument used for effectively measuring and analyzing the systems via some special measurement functions such as harmonics analysis, motor evaluation, voltage fluctuation, flicker measurement, FFT, and so on.

Functions and Advantages

Various Types of Input Modules

Various modules with different voltage input ranges, current input ranges and accuracies are compatible with one power analyzer, up to 7 modules available to be installed. Users can select different modules with required technical specifications so as to meet the requirement of the instrument functions to be achieved. New modules are continuously developed.

Sensor Power Supply

This power analyzer is technically equipped with user-friendly Power supply connectors for sensor input, convenient for the users connect the power supply to the sensor directly, getting rid of the traditional connecting methods of power supply units.

User-friendly GUI

Equipped with high resolution large touch screen (12.1 inches) and with clear functional modules well-designed to suit the intuitive operations, this power analyzer is easily operated by the users. Besides, press-keys, rotary knobs, mouse, and extended keyboard are available. What make operations more convenient are the designs including one-button access to the parameters setup menu, various configured parameters displayed on one screen, and simultaneously viewing and setting the parameters.
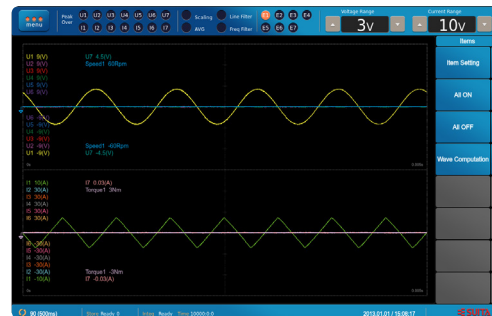
Powerful Display Function

Large amount of information can be displayed on one large screen of high definition in various formats, such as numeric, waveform, bar, trend and vector.
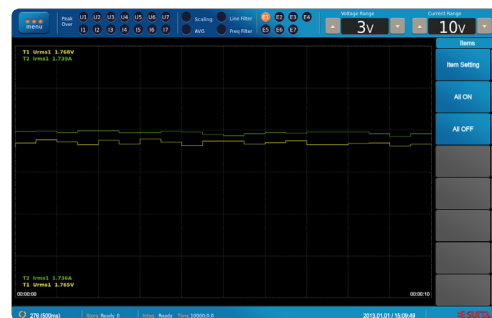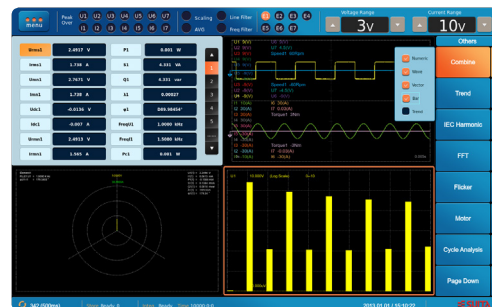
Numeric Display

Waveform Display

Trend Display

Combination Display (Multi-screen)

Auto Range Rapid Change

This instrument has the function of auto range, i.e. automatically changing the range according to the amplitudes of input signals. Traditionally, it costs too much time to change the range step by step, especially when the amplitude of signal changes largely, so that the data are lost without being measured.

When the amplitude of the input signal exceeds the previous one, the previous range can automatically increase to the maximum range and then adjust itself until the range matches with the measured data, shortening the period of switching ranges and reducing the chances of data lost.

Current Phase Calibration

This function is used for calibrating the measurement error caused by the phase difference in the measured circuit to ensure the accuracy of the measurement. The phase calibration function enabled during measurement is used to compensate the phase difference of the current sensor (with resolution of 0.01°), so that the power measurement is more accurate at high frequency or low power factor.

Automatic Update Rate (Up to 10ms)

With data update rate at a range between 10ms to 20ms, it is ensure that this power analyzer can perform high precision computation at a high speed. The technology of advanced independent digital filter ensures the stability of the measurement values. It will automatically adjust the data update rate along with the changes of the frequency signal which changes from 0.1Hz, to ensure rapidity and accuracy of the data measurement.

Cycle-by-cycle Measurement

This instrument can use the Cycle-by-cycle measurement method to calculate the voltage, current, power, and other parameters for each cycle of the AC input signal of the synchronization source signal. Up to 3000 cycles of measurement can be achieved. When the measurement of the specified frequency is complete, the results will be displayed in order of measurement cycle. The measured results can be stored in the internal memory.


Integration Function

The integration function, including integrated power, integrated current, is used to calculate the electrical energy (Wh) or charge (Ah). There are two integration methods: Bought and Sold (power integration method is used for energy statistics in the grid), and Charge and Discharge (instantaneous power integration method is used for charge statistics in the battery).

Besides, users can enable the function of automatic range before integration starts, so as to greatly reduce the measurement error caused by unstable input signal during long-time integration operating.

Harmonic Measurement Function

This instrument can simultaneously measure the voltage, basic harmonics, harmonic components and the total harmonic distortion (THD)in the mode of harmonic measurement and up to 500th harmonics can be measured. The Power spectrum and measured data of the harmonic of each order can be displayed on the screen. Harmonic measurement can be performed simultaneously on 7 power channels, and different PLL source can be selected, so that the efficiency of harmonic measurement can be improved in the areas such as invertor, robot, and lighting. Harmonic measurement up to 500th order can be performed on this this power analyzer.
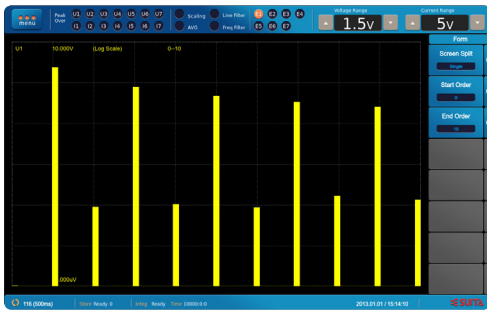
Double-Motor Evaluation

The analog or pulse input signal of the motor can be connected to this power analyzer for measuring the parameters such as the speed/direction, torque, synchronous speed, power, slip, and phase angle, and efficiency, which can be divided into two groups for measurement as well. Double-motor measurement mode is available, which is suitable for the application in electric vehicles.

Single-Motor Mode
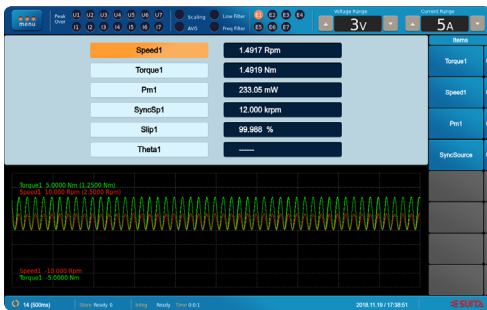
Dual-Motor Mode
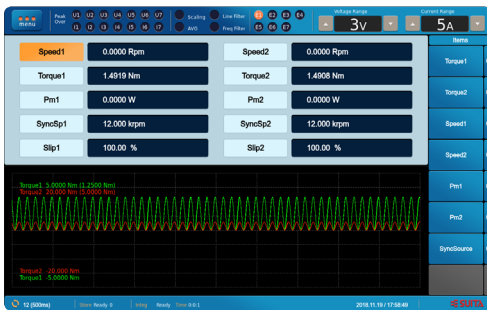
Instantaneous Power Measurement

This power analyzer has the function of computing the display waveform to display the waveform of the data after computation completed. For example, the instantaneous power waveform can be obtained and displayed after multiplication performed between the voltage and current of the input signals. The data can be measured as well.
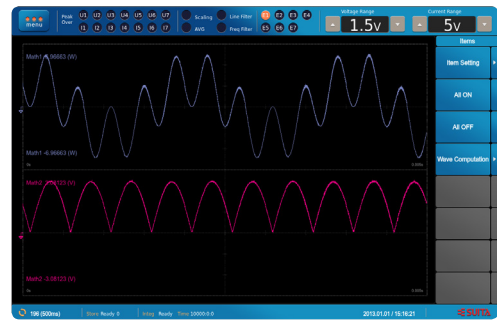
X-Y Graph Display Function

Users can view some measurement items from the X-Y Graph. For example, in waveform display, the custom 2-path inputs are respectively shown as X-axis and Y-axis, which can reflect the relative relationship between these 2 inputs, as basic for analyzing these 2 inputs.
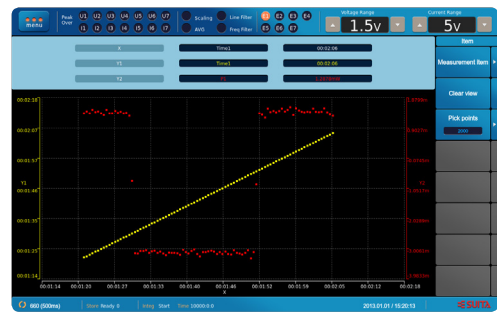
FFT Computation Function

Under FFT function, parameters such as sampling points and sampling ratio can be set, the frequency spectrum of input signal can be analyzed, so that those frequencies not able to be displayed can be viewed in harmonic measurement.

FFT Linear Display
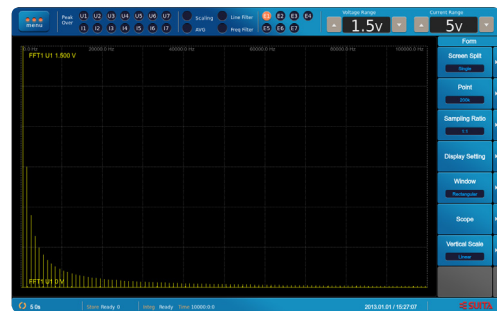
FFT Logarithm Display

IEC Harmonics and Voltage Flicker

IEC harmonic measurement accords with IEC61000-4-7 standard. The current harmonics containing the inter-harmonics can be measured and displayed. The voltage fluctuation and flicker can be measured, analyzed and judged as per the corresponding IEC standard.

Numeric Display in Flicker Measurement

Flicker ISF Graph Display

Super Storage Capacity and Printer

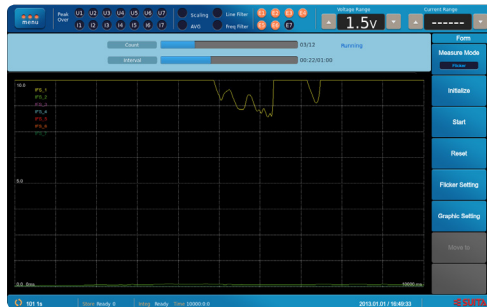This power analyzer stores the measured results and displayed formats (such as waveform) regarding voltage, current, power and others at real-time at a fast speed of 100 data packages per second, for further data analysis; with 96G or 480G free memory space inside, it really meet the storage requirements of high capacity and high efficiency.

Besides, the external printer can be connected to this power analyzer via USB or LAN interface, for printing conveniently in site.

SUITA PA Viewer Software

The SUITA PA Viewer is an software installed in PC available to remotely control the power analyzer connected via a communication interface (network port or USB port), and display the results analyzed by the power analyzer in the form of numeric, waveform, trend and vector.

Product Overview

1 ESC Key
2 Navigation Keys
3 Rotary Knob (Range)
4 Sensor Key
5 Display Selection Keys
6 Function Execution Keys
7 Power Switch
8 Type A USB Port
9 Menu Off Key
10 Menu Key
11 Condition Selection Keys
12 Touch Screen
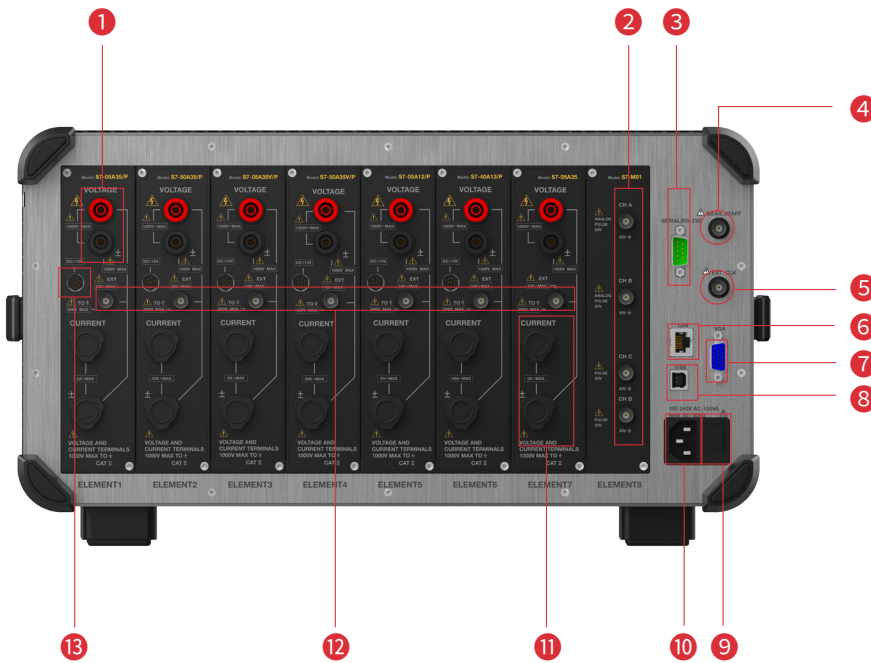
1 Voltage Input Terminal
2 (Motor) Torque and Speed
   Signal Input Connector
3 RS232 Connector
4 Terminal of Master/slave
   Synchronized Measurement
5 EXT Clock Input Connector
6 Ethernet Port
7 VGA Connector
8 Type B USB Port
9 Power Switch
10 Power Cord Connector
11 Current Input Terminal
12 EXT Current Sensor Input
   Terminal
13 Power Connector of Sensors

Applications

Power Efficiency Assessment:

Hybrid Electric Vehicle, Transducer, Variable Frequency Motor

Equipped with 7 measurement channels and double-motor channels, this power analyzer S7 can measure and evaluate the voltage, current, power, efficiency of the inverter of the electric vehicle, charger, battery, motor, and so on. Double-motor channels meet the requirement of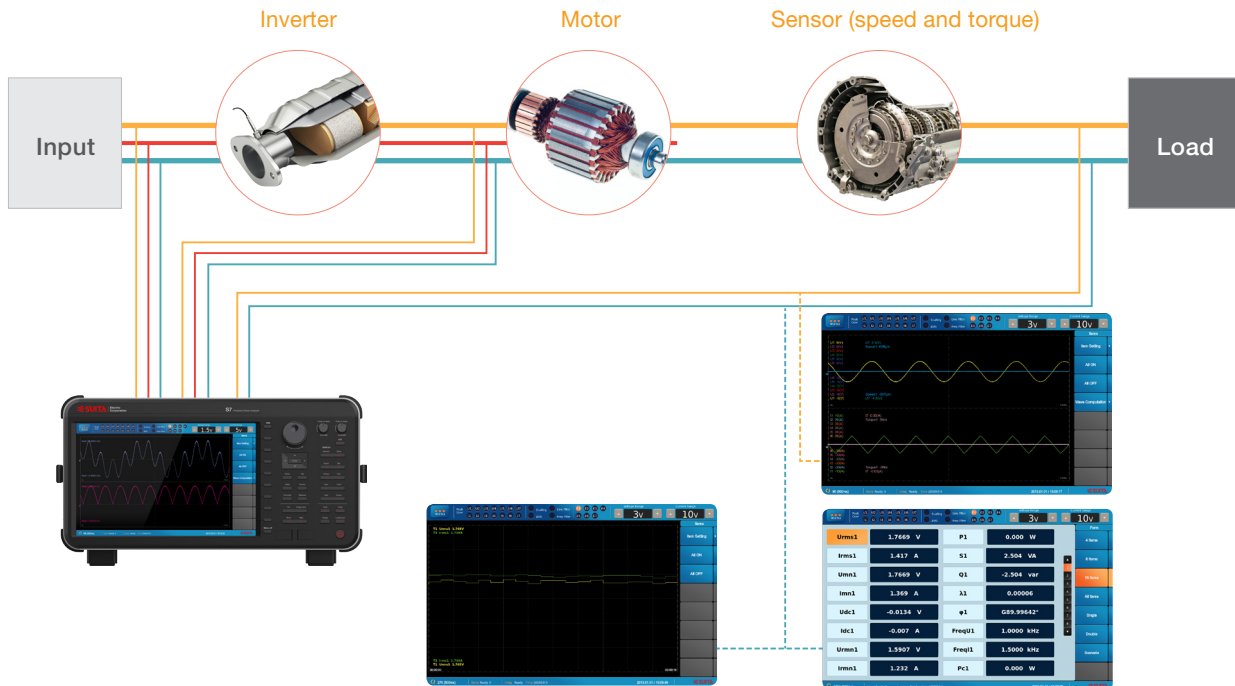 simultaneously measuring the power and efficiency of the drive motor and dynamotor. Besides, the integration function is available for evaluating the battery charging.

Power Efficiency Assessment: New Energy System

With the progress of new energy used, the power quality is becoming increasingly prominent. This product can be used to effectively monitor and evaluate the power energy problem arising from harmonic or low voltage.

This power analyzer provides 7 elements of power measurement continent for measurement and analysis to the voltage, current, efficiency, harmonics of each node. It also has integration function available for evaluating and analyzing the conditions of Bought/Sold, Charge/Discharge for the system.
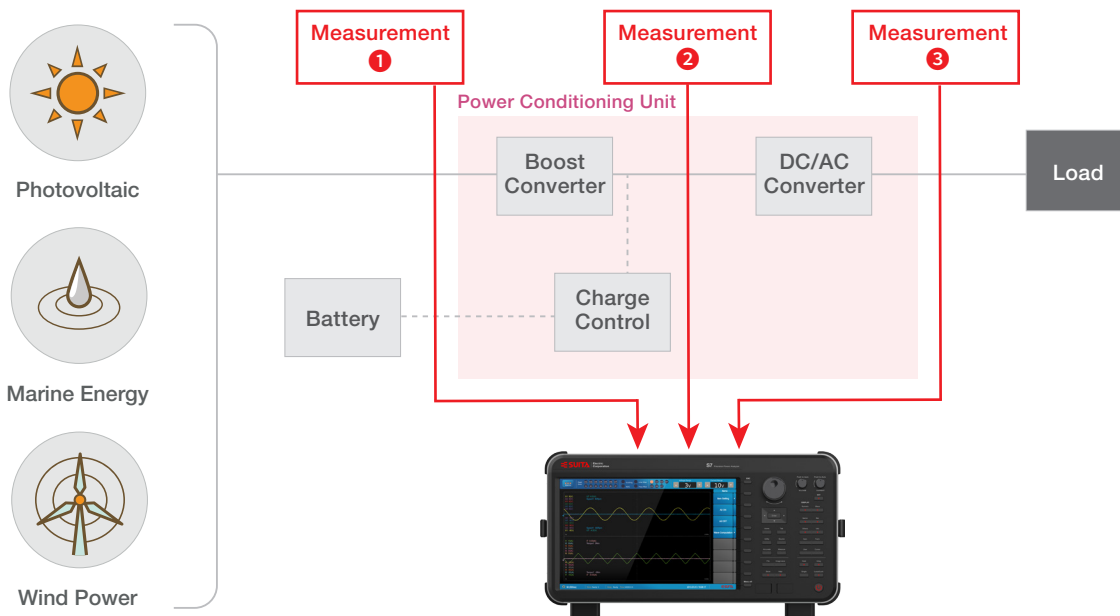
Functional Test to Home Appliances

This power analyzer of S7 series can simultaneously test up to 7 pieces of appliances (home appliance of single phase) for measuring the voltage, current, power, frequency, power factor and harmonics. Besides, the IEC harmonics and Flicker measurement functions are available for measuring and evaluating the power quality as per IEC standard.

Testing to Aircraft Electrical Power System

The frequency of the aviation AC power supply system generally are 400Hz or 800Hz, but it is very difficult for a common power analyzer to satisfy the requirement of measuring such frequency, especially measuring the harmonics. With 2Ms/s of sampling rate, this power analyzer can measure the harmonics of order up to 500th to meet the requirement, especially when at a frequency of 400Hz (fundamental harmonics).

LED Lighting

The LED, characterized by high efficiency and conservative energy, is rapidly replacing the traditional lightening facilities. However, control unit is necessary for supporting the LED lighting, up to 200 kHz of frequency and even 1MHz of frequency for the harmonics. So it is necessary to measure the harmonics of the voltage and current besides voltage, current and efficiency in LED measurement. The small current range provided by this power analyzer can support the LED working power and stand-by power; besides, 2MS/s sampling rate helps fully evaluating LED lighting system.
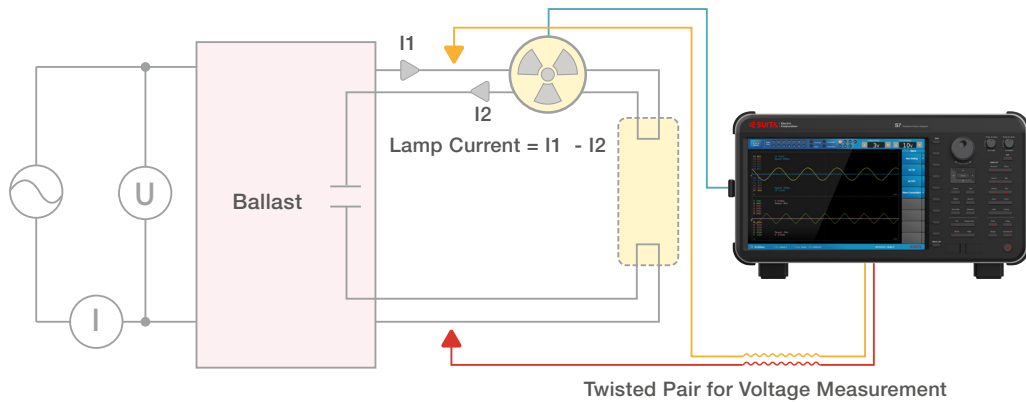
Wiring diagram for fluorescent lamp
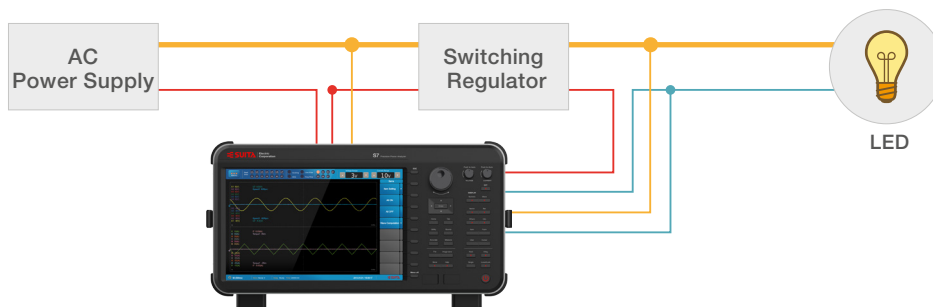
Technical Specifications

Inputs

Items	Specifications		
Input terminal type	**Voltage(U):** Plug-in terminal (Safety terminal) **Current(A):** binding post **External current sensor input:** Insulated BNC connector		
Input type	**Voltage:** Floating input, resistive potential method **Current:** Floating input, Shunt input method		
Measurement range (Voltage)	S7-05A12/ S7-40A13	**CF3:** 15V,30V,60V,100V,150V,300V,600V,1000V **CF6/6A:** 7.5V,15V,30V,50V,75V,150V,300V,500V	
	S7-05A35/ S7-50A35	**CF3:** 1.5V,3V,6V,10V,15V,30V,60V,100V,150V,300V,600V,1000V **CF6/6A:** 750mV,1.5V,3V,5V,7.5V,15V,30V,50V,70V,150V,300V,500V	
	S7-05A35V/ S7-50A35V	**CF3:** 3V,6V,10V,15V,30V,60V,100V,150V,300V,600V,1000V,1500V **CF6/6A:** 1.5V,3V,5V,7.5V,15V,30V,50V,75V,150V,300V,500V,750V	
Measurement range (Current)	S7-05A12	**CF3:** 2mA, 5mA, 10mA, 20mA, 50mA, 100mA, 200mA, 500mA, 1A, 2A, 5A **CF6/6A:** 1mA, 2.5mA, 5mA,10mA, 25mA, 50mA, 100mA, 250mA, 0.5A, 1A, 2.5A	
	S7-40A13	**CF3:** 100mA, 200mA,500mA, 1A, 2A, 5A, 10A, 20A, 40A **CF6/6A:** 50mA, 100mA, 250mA,500mA, 1A, 2.5A, 5A, 10A, 20A	
	S7-50A35/ S7-50A35V	**CF3:** 1A,2A,5A,10A,20A,50 A **CF6/6A:** 500mA,1A,2.5A,5A,10A,25A	
	S7-05A35/ S7-05A35V	**CF3:** 10mA,20mA,50mA,100mA,200mA,500mA,1A,2A,5A **CF6/6A:** 5mA,10mA,25mA,50mA,100mA,250mA,500mA,1A,2.5A	
	EXT current sensor input	**CF3:** 50mV,100mV,200mV,500mV,1V,2V,5V,10V **CF6/6A:** 25mV,50mV,100mV,250mV,500mV,1V,2.5V,5V	
Input resistance	Voltage	**S7-05A35/S7-05A35V:** Input resistance: approximately 4MΩ, Input capacitance: approximately 10pF; **S7-50A35/S7-05A35:** Input resistance: approximately 2MΩ, Input capacitance: approximately 10pF; **S7-50A35V/S7-05A35V:** Input resistance: approximately 3MΩ, Input capacitance: approximately 10pF	
Input resistance	Current	Direct Input	**S7-05A12:** When 2mA-10mA, Input resistance: approximately 10Ω, Input inductance: approximately 0.1µH; When 20mA-500mA, Input resistance: approximately 1Ω, Input inductance: approximately 0.1µH; When 1A-5A, Input resistance: approximately 50mΩ, Input inductance: approximately 0.1µH; **S7-40A13:** When 100mA-500mA, Input resistance: approximately 200mΩ, Input inductance: approximately 0.1µH; When 1A-10A, Input resistance: approximately 20mΩ, Input inductance: approximately 0.1µH; When 20A-40A, Input resistance: approximately 1mΩ, Input inductance: approximately 0.1µH; **S7-50A35/S7-50A35V:** Input resistance: approximately 1mΩ, **S7-05A35/S7-05A35V:** Input resistance: approximately 100mΩ
	External current sensor		**S7-05A12/S7-40A13:** Input resistance: approximately 100kΩ; **S7-50A35/S7-50A35V/S7-05A35/S7-05A35V:** Input resistance: approximately 1 MΩ
Continuous maximum allowable input	Voltage	1000 V	Peak value of 2kV or RMS value of 1.1kV,whichever is less;
		1500 V	Peak value of 3kV or RMS value of 1.65kV,whichever is less;
	Current	Direct Input	**S7-05A12:** When 2mA-10mA, Peak value of 0.2A or RMS value of 0.1A,whichever is less; When 20mA-500mA, Peak value of 04A or RMS value of 2.5A,whichever is less; When 1A-5A, Peak value of 20A or RMS value of 12A,whichever is less; **S7-40A13:** When 100mA-500mA, Peak value of 2A or RMS value of 1A,whichever is less; When 1A-10A, Peak value of 80A or RMS value of 40A,whichever is less;

Continuous maximum allowable input	Current	Direct Input	When 20A-40A, Peak value of 100A or RMS value of 50A,whichever is less; **S7-50A35/S7-50A35V:** Peak value of 150A or RMS value of 55A,whichever is less; **S7-05A35/S7-05A35V:** Peak value of 10A or RMS value of 7A,whichever is less
	External current sensor		Peak value less than or equal to 5 times of the rated range.
Power supply for sensor (output)	Connector type		Mini DIN 8Pin
	Output voltage		±15V DC
	Max outputpower		15W
Continuous maximum common mode voltage (50/60Hz)	**Voltage input terminals:** 1000Vrms **Current input terminals:** 1000Vrms **External current sensor input connector:** 600Vrms		
Rated voltage to ground	**Voltage input terminals:** 1000V **Current input terminals:** 1000V **External current sensor input connector:** 600V		
A/D converter	Simultaneous voltage and current input conversion **Resolution:** 16-bit **Conversion speed (sampling period):** Approximately 0.5us (2MS/s).		
Auto range function	Range up (When one of the following conditionis met)		• Urms or Irms exceeds 110% of the range selected 110%.(When in crest factor 6A, greater than 220%.) • When in crest factor 3: Upk or Ipk of the input signal exceeds 330% of the range selected. • When in crest factor 6 or 6A: Upk or Ipk of the input signal exceeds 660% of the range selected.
	Range down (When all the following conditionis met)		• Urms or Irms is less or equal to 30% of the measurement range. • When in crest factor 3: Upk and Ipk of the input signal are less than 300% of the next lower measurement range. • When in crest factor 6 or 6A: Upk and Ipk of the input signal are less than 600% of the next lower measurement range.

Technical Specifications of Input Elements

Input element	Range	Bandwidth	Sample rate	Power accuracy ±(% of reading +% of range)
S7-05A12	Voltage: 15~1000V Current: 2m~5A	DC, 0.1Hz~3.5MHz	2MHz	0.01+0.02
S7-40A13	Voltage: 15~1000V Current: 100m~40A	DC, 0.1Hz~1MHz	2MHz	0.01+0.03

S7-05A35	Voltage: 1.5~1000V Current: 10m~5A	DC, 0.1Hz~5MHz	2MHz	0.03+0.05
S7-50A35	Voltage: 1.5~1000V Current: 1~50A	DC, 0.1Hz~5MHz	2MHz	0.03+0.05
S7-05A35V	Voltage: 3~1500V Current: 10m~5A	DC, 0.1Hz~5MHz	2MHz	0.03+0.05
S7-50A35V	Voltage: 3~1500V Current: 1~50A	DC, 0.1Hz~5MHz	2MHz	0.03+0.05

Measurement Accuracy

Conditions: Temperature at 23±5℃; Humidity at the range from 30%RH to 75%RH; Inputting sinusoidal wave; When the Power factor(λ) is set as 1, with common mode voltage 0V, crest factor CF3, line filter OFF, frequency filter ON, 1kHz or less; after 30 minutes preheating; Zero setting before wiring; Frequency f with unit kHz; within half a year after calibrated.

S7-05A12 Accuracy ±(…% of reading+ …% of range)

Frequency of input signal	Voltage	Current (5A)	Active Power
DC	0.01+0.02	0.01+0.02	0.01+0.02
0.1Hz≤f<30Hz	0.02+0.05	0.02+0.05	0.06+0.1
30Hz≤f<45Hz	0.02+0.05	0.02+0.05	0.05+0.05
45Hz≤f<66Hz	0.01+0.02	0.01+0.02	0.01+0.02
66Hz≤f<1kHz	0.02+0.05	0.02+0.05	0.04+0.05
1kHz≤f<10kHz	0.08+0.05	0.08+0.05	0.12+0.1
10kHz≤f<50kHz	0.25+0.1	0.25+0.1	0.3+0.15
50kHz≤f<100kHz	0.01*f+0.2	0.01*f+0.2	0.012*f+0.3
100kHz≤f<500kHz	0.002*f+0.5	0.002*f+0.5	0.01*f+1
500kHz≤f≤1MHz	0.007*f+1	0.007*f+1	0.012*f+2

S7-40A13 Accuracy ±(…% of reading+ …% of range)

Frequency of input signal	Voltage	Current (50A/5A)	Active Power
DC	0.01+0.03	0.01+0.03	0.01+0.03
0.1Hz≤f<30Hz	0.03+0.05	0.03+0.05	0.08+0.1
30Hz≤f<45Hz	0.03+0.05	0.03+0.05	0.05+0.05
45Hz≤f<66Hz	0.01+0.03	0.01+0.03	0.01+0.03
66Hz≤f<1kHz	0.03+0.05	0.03+0.05	0.05+0.05
1kHz≤f<10kHz	0.1+0.05	0.1+0.05	0.14+0.1
10kHz≤f<50kHz	0.3+0.1	0.3+0.1	0.4+0.15
50kHz≤f<100kHz	0.012*f+0.2	0.012*f+0.2	0.014*f+0.3

100kHz≤f <500kHz	0.004*f+0.5	0.004*f+0.5	0.012*f+1
500kHz≤f ≤1MHz	0.008*f+1	0.008*f+1	0.014*f+2

S7-05A35/S7-50A35/S7-05A35V/S7-50A35V

Accuracy ±(…% of reading+ …% of range)

Frequency of input signal	Voltage	Current (50A/5A)	Active Power
DC	0.03+0.05	0.03+0.05	0.03+0.05
0.1Hz≤f<45Hz	0.05+0.05	0.05+0.05	0.08+0.1
45Hz≤f<66Hz	0.03+0.05	0.03+0.05	0.03+0.05
66Hz≤f<1kHz	0.05+0.05	0.05+0.05	0.1+0.05
1kHz≤f<50kHz	0.1+0.08	0.1+0.08	0.2+0.1
10kHz≤f<50kHz	0.3+0.2	0.3+0.2	0.4+0.3
50kHz≤f<100kHz	0.014*f+0.3	0.014*f+0.3	0.016*f+0.4
100kHz≤f <500kHz	0.006*f+1	0.006*f+1	0.012*f+1.5
500kHz≤f≤1MHz	0.01*f+1.2	0.01*f+1.2	0.02*f+2

Measurement Conditions

Items	Specifications
Crest factor	3 or 6 or 6A
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.) During harmonic measurement, the measurement period starts from the data point where update interval starts to the acquired data points of 1024 or 10240.
Synchronizaiton source	U1~U7,I1~I7,EXT CLK,None
Wiring	1P2W (single-phase, two-wire), 1P3W (single-phase, 3-wire), 3P3W (3-phase, 3-wire), 3P4W (3-phase, 4-wire), 3P3W (3V3A) (3-phase, 3-wire, 3-volt/3-amp measurement). However, the number of available wiring systems varies depending on the number of installed input elements.
Line filter	OFF,0.1kHz-100kHz(increment: 0.1kHz),300kHz,1Mhz
Frequency filter	OFF,100Hz,1kHz
Scaling	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 0.0001 to 99999.9999.
Accuracy compensation function	**Efficiency compensation:** Compensate for the loss caused by the measurement instrument during efficiency computation. **Wiring compensation:** Compensate for the loss caused by the wiring. **Two wattmeter method compensation:** Compensate for the power loss due to leakage current.
Averaging	**Exponential average:** Select an attenuation constant from the values of 2, 4, 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.

Items	Specifications
Data update interval	Select 10ms, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, or AUTO.
Hold	Holds the data display, without data update
Single	Executes a single measurement and displays once data update during measurement hold.
Null	**Purpose:** The null function allows eliminating DC component of the input signals Target: • Voltage and current of each input element (from U1 to U7, I1 to I7) • Rotation speed and torque **Compensation range:** ±10% of range
Zero Level compensation	**Purpose:** to make instrument measurement more accurate **Method:** Manual, Auto This device automatically performs zero level compensation after manual change of the range, device start-up, and initialization.

The Function of Display

Items	Specifications
Display	12.1-inch TFT color LCD display
Pixels	1280(horizontal)×800(vertical)dots
Display types	Numeric, Waveform, Vector, Bar, Trend, Combination(Multi-panel), X-Y Graph
Touch screen	available

Numerical Display

Items	Specifications
Resolution	6-digit, 5-digit
Display format	Select 4-,8-, 16-, all, harmonic single list, harmonic dual list, scenario(Custom)
Display item	Items that this instrument can measure

Waveform Display

Items	Specifications
Display format	Single, Dual, Triad, Quad, Penta (Fifth), Hexa (Sixth)
Time axis	From 0.05ms to 2s/div; up to 1/10 of the data update interval
Interpolation	**ON:** Data points are connected with straight lines **OFF:** Only the data points are displayed
Vertical scaling	Ratio: within the range from 0.1 to 100.0
Vertical position	From 0.00 to ±100.00
Display Items	Voltage and current of each input element(from U1 to U7, from I1 to I7) Speed and torque of the motor(speed1, torque1) Waveform computation(math1, math2)

Vector Display

Items	Specifications
Display modes	Single, dual screen split
Range of U/I scale	From 0.1 to 100
Display items	Display element 1…7, wiring systems (ΣA,ΣB,ΣC), the relationships of phase difference and amplitude (RMS) of the voltage and current fundamental harmonic for each input element in the wiring system

Bar Display

Items	Specifications
Display modes	Single, Dual, Triad
Display Items	U, I, P, S, Q, λ, Φ, ΦU, ΦI, Z, Rs, Xs, Rp, Xp; Each harmonic order

Trend Display

Items	Specification
Display modes	Single, Dual, Trisection, Quartered
Time axis	Values from 1s to 1day
Number of display channels	Up to 16
Display items	All the functions that this instrument can measure

Frequency Measurement Function

Items	Specifications	
Measured source	The frequencies of voltages and currents for all input elements can be measured simultaneously.	
Measurement method	Reciprocal method	
Frequency measuring range	Data update rate	Measuring range
	10ms	0.25kHz ≤ f ≤ 1MHz
	50 ms	45 Hz ≤ f ≤ 1 MHz
	100 ms	25 Hz ≤ f ≤ 1 MHz
	200 ms	12.5Hz ≤ f ≤ 500kHz
	500 ms	5 Hz ≤ f ≤ 200 kHz
	1s	2.5Hz ≤ f ≤ 100kHz
	2s	1.25Hz ≤ f ≤ 50kHz
	5s	0.5Hz ≤ f ≤ 20kHz
	10 s	0.25Hz ≤ f ≤ 10kHz
	20 s	0.1Hz ≤ f ≤ 5 kHz
	AUTO	0.1Hz ≤ f ≤ 500kHz
	* The frequency measurement range is subject to the settings of Timeout and synchronization source at auto update interval.	
Accuracy	±0.05% of reading	
Minimum frequency resolution	0.0001Hz	

Integration Function

Items	Specifications
Mode	The modes that can be selected include Normal, Continuous, Real Time Normal, and Real Time Continuous.
Integration timer	Rang from 00: 00: 01 to 10000: 59: 59
Count over (Conditions of integration stopping)	• If the integration time reaches the maximum integration time, • If the integration value reaches maximum/ minimum display integration value
Accuracy	±(power or current accuracy+ timer accuracy)
Timer accuracy	±0.02% of reading

Harmonic Measurement Function

Items	Specifications
Measured souce	All installed elements
Method	PLL synchronization method
PLL source	U1~U7,I1~I7,EXT CLK
Frequency range	Fundamental frequency of the PLL source is in the range of 0.1 Hz to 2.6 kHz.

FFT: 1024 points(Data update interval 50ms, 100ms, or 200ms)

Fundamental frequency	Sampling rate	Window width	Upper limit of measured order	
			U, I, P, φ, φU(*), φI(*)	Other measured values
15 Hz – 600 Hz	f*1024	1	500 order	100 order
600 Hz – 1.2 KHz	f*512	2	255 order	100 order
1.2 KHz – 2.6 KHz	f*256	4	100 order	100 order

* The maximum measured order is 100 at a data update rate of 50 ms.

FFT: 10240 points(data update interval 500ms, 1 s, 2 s, 5 s, 10 s, 20 s)

Fundamental frequency	Sampling rate	Window width	Upper limit of measured order	
			U, I, P, φ, φU(*), φI(*)	Other measured value
0.1 Hz – 1.5 Hz	f*10240	1	500 order	100 order
1.5 Hz – 5Hz	f*5120	2	500 order	100 order
5 Hz – 10 Hz	f*2560	4	500 order	100 order
10 Hz – 600 Hz	f*1280	8	255 order	100 order
600 Hz – 1.2 kHz	f*640	16	255 order	100 order
1.2 kHz – 2.6 kHz	f* 320	32	100 order	100 order

Add the following accuracy to the accuracy at normal measurement.

When the line filter is off:

S7-05A35/S7-50A35/S7-05A35V/S7-50A35V:

	Frequency	Voltage/Current	Active Power
Accuracy: ±(…% of reading+ …% of range)	0.1 Hz ≤ f < 30 Hz	0.1+0.2	0.15+0.3
	30 Hz ≤ f < 66 Hz	0.05+0.15	0.1+0.15
	66 Hz <f ≤ 440 Hz	0.05+0.15	0.1+0.15
	440 Hz <f ≤ 1 kHz	0.1+0.15	0.2+0.2
	1 kHz <f ≤ 2.6 kHz	0.2+0.15	0.25+0.2

S7-40A13/ S7-05A12:

Frequency	Voltage/Current	Active Power
0.1 Hz ≤ f < 30 Hz	0.05+0.2	0.05+0.3
30 Hz ≤ f < 66 Hz	0.03+0.15	0.06+0.15
66 Hz <f ≤ 440 Hz	0.03+0.15	0.06+0.15
440 Hz <f ≤ 1 kHz	0.03+0.15	0.1+0.2
1 kHz <f ≤ 2.6 kHz	0.1+0.15	0.2+0.2

Motor Evaluation Function

Items	Specifications	
Input terminal	**Single-motor:** torque, speed (Phase A, Phase B, Phase Z) **Double-moto:** torque 1/2, speed 1/2	
Input resistance	Approximately 1MΩ	
Input connector type	Insulated BNC	
Analog Input	Fixed Range	1 V, 2 V, 5 V, 10 V, 20 V
	Auto range	ON, OFF
	Input range	±110% of measuring range
	Cutoff frequency	OFF, 100Hz, 1 kHz
	Smapling rate	Approximately 200 kS/s
	Resolution	16-bit
	Synchronous source	U1~U7,I1~I7,EXT CLK,None
	Accuracy	±(0.03% of ready + 0.05% of range)
	Temperature coeficient	±0.03% of range /°C
Pulse Input	Input range	±12 Vpeak
	Frequency measurement range	2Hz-200KHz
	Maximum common mode voltage	±42 Vpeak
	Accuracy	± [(0.05+f/500)% of reading±1mHz]

	Detection level	H level: Approximately 2Vor more L level: Approximately 0.8Vor less
	Pulse width	500ns or more

Waveform Computation Function

Items	Specifications
User-defined expressions	Math1,Math2
Computed waveform	U1…U7, I1…I7, speed, torque
Operators	Four arithmetic operations:(+),(-),(*),(/) Absolute value(ABS) Square(SQR) Square root(SQRT) Natural logarithm(LOG) Common logarithm(LOG10) Exponent(EXP) Negative (NEG) Average(AVG2, AVG 4, AVG 8, AVG 16, AVG 32, AVG 64)
Constants	K1, K2, K3, K4, K5, K6, K7,K8

The Function of Cycle-by-Cycle Measurement

Items	Specification
Measurement Items	**Power** Urms,Irms(True rms voltage, True rms current) Urmn,Irmn(Rectified mean voltage or current) Umn,Imn(Rectified mean voltage or current calibrated to the rms value) Udc,Idc(Simple voltage or current average) Uac,Iac(AC current or voltage component) U+Peak,U-Peak,I+Peak,I-Peak(Peak value) CfU,CfI(Crest factor) P(Active power) Q(Reactive power) S(Apparent power) Phi(Phase difference) λ(Power factor) Pc(Corrected power) **Motor** Speed 1(Rotational speed 1) Torque 1(Torque 1) Pm 1(Mechanical power 1) **Synchronous source**
Synchronous source	U1~U7,I1~I7,EXT CLK
Frequency range of the synchronous source	0.1Hz~1kHz(EXT CLK) 1Hz~1KHz(U1~U7,I1~I7)
Cycle counts	From 10 to 3000
Time out	From 0 to 3600s(when"0"is selected,it defaults to be time-out after 24 hours.)

Save Function

Items	Specifications
Naming files	By date, serial number, or user-defined
Format of file save	CSV, Binary format
Media of file storage	Internal SSD drive or external USB
Properties of internal disk	SSD,128/512G
File conversion	Manual or Auto (save as CSV file)

Types of file storage	Numeric, Waveform, Numeric + Waveform
Number of storages	Within the range from 1 to 9999999
Storage interval	0 second-10000 hour 59 minute 59 second When it is set to be 0: 0: 0, same as Data Update Interval
Max storage duration	It depends on the number of storages and the media.

Image Save Function

Items	Specifications
Naming file	File named by serial number, date, or custom
Format of image save	PNG,BMP,JPG

The Function of Raw Data Save

Items	Specifications
Raw data storage	Sample the raw data at high speed
Storage interval	Update rate at 10ms: storage interval is 100ms Update rate > 10ms: storage interval is 1s
Data storage capacity	Available storage space up to 96G/480G
File format	MAT file
Sampling rate	2MS/s

Printer Function

Items	Specifications
Printer mode	Manual, Auto
Auto printer mode	Real-time, Synchronous integration, Trigger event
Connections to printer	LAN,USB

Cursor Function

Items	Specifications
Cursor type	Cursor C1+, cursor C2x
Cursor application	Applied on the waveforms, trends, bars or FFT graphs
Display items for cursor measurement	**Waveform display:** Y+,Yx,ΔY,X+,Xx,ΔX **Trend display:** Y+,Yx,ΔY,X+,Xx,ΔX,D+,Dx **Bar display:** Y1+,Y1x,ΔY1,X+Order,Xx Order **FFT function display:** Y+,Yx,ΔY,X+,Xx,ΔX

External Hardware Interfaces

| Items	Specifications
External Clock Input	Specifications BNC connector; TTL level; Square waveform with a duty ratio of 50%.
Master-slave Synchronization Port	BNC connector; TTL level
Type A USB Interface	Conforms to USB Rev.2.0; 5 V; 500 mA (Power supply)

Communication Interface

Items	Specifications
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 (Alternative)	9-pin, D-Sub (plug); Conforms to EIA-574, standard of 9-pin EIA-232(RS-232)
GP-IB Interface (Alternative)	Conforms to IEEE 488-1978 (JIS C 1901-1987), and IEEE St'd 488.2-1992

General Specifications

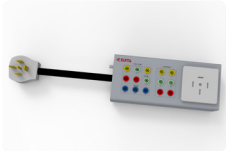| Items	Specifications
Dimensions	482.2mm*454.4mm*249.0mm
Rated power supply voltage	From 100 to 240V AC
Allowable power supply voltage fluctuation range	From 85 to 264V AC
Rated power supply frequency	50/60Hz
Allowable power supply frequency fluctuation range	From 48 to 63Hz
Maximum power consumption	300VA(When using 7 ×15W Current Sensor Power rating)
Warm-up time	Approximately 30 minutes
Operation environment	**Temperature:** 5°C ~ 40°C **Humidity:** from 20% to 80%RH(no condensation)
Operating altitude	2000m or less
Applicable environment	Indoors
Storage environment	**Temperature:** -25°C ~ 60°C **Humidity:** from 20% to 80%RH(no condensation)
Weight	About 16.3kg
Internal RTC battery	Internal RTC batteries support Built-in clock operation

Dimensions of the Instrument

454.4mm

441.3mm

249.0mm

482.2mm

456.1mm

222.0mm
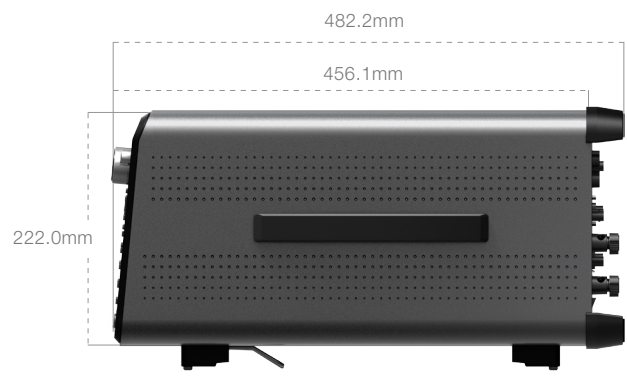
Accessories

Current Sensor of SHT Series

Item \ Model	SHT60	SHT200	SHT600	SHT1000
DC	0-60A	0-200A	0-600A	0-1000A
AC	60Apeak	200Apeak	600Apeak	1000Apeak
Accuracy	±(0.05% of rdg + 15µA)	±(0.05% of rdg + 15µA)	±(0.05% of rdg + 15µA)	±(0.05% of rdg + 15µA)
Measuring bandwidth	DC-500KHz	DC-300KHz	DC-200KHz	DC-150KHz
Ratio K_N	1: 600	1: 1000	1: 1500	1: 2000
Resistance Rm	0--25Ω	0--25Ω	0--12Ω	0 -- 4Ω
Aperture	Ø28mm	Ø28mm	Ø30.9mm	Ø30.9mm
Connector	DB9	DB9	DB9	DB9
Supply	±12V~±15V	±12V~±15V	±15V~±24V	±15V~±24V

Current Sensor of SXT Series

Item \ Model	SXT60	SXT200	SXT600	SXT1000
DC	0-60A	0-200A	0-600A	0-1000A
AC	60Apeak	200Apeak	600Apeak	1000Apeak
Accuracy	±(0.01% of rdg + 10µA)	±(0.008% of rdg +10µA)	±(0.008% of rdg + 10µA)	±(0.008% of rdg + 10µA)
Measuring bandwidth	DC-800KHz	DC-500KHz	DC-300KHz	DC-300KHz
Ratio K_N	1: 600	1: 1000	1: 1500	1: 2000
Resistance Rm	0--25Ω	0--25Ω	0--12Ω	0 -- 4Ω
Aperture	Ø28mm	Ø28mm	Ø30.9mm	Ø30.9mm
Connector	DB9	DB9	DB9	DB9
Supply	±12V~±15V	±12V~±15V	±15V~±24V	±15V~±24V

Boxes

Name	Single-phase Junction Box	Three-phase Junction Box	Accessories for EXT Sensor Connection
Model	PG01A	PG02A	PG03A
Sample			
Usage	It is used for single phase circuit connection to measure power parameters conveniently via power analyzer	It is used for three- phase circuit connection to measure power parameters conveniently via power analyzer	It is used for connecting with external current sensor (/P option necessary)

Connectors and Cables

Name	Model	Sample	Specification
Fork terminal adapter	PAC-1001		Used when attaching banana plug to binding post. **Specification:** 1000V, 20A **Color:** red, black
BNC Conversion adapter	PAC-1002		**Connector:** Conversion between safety BNC and banana plug **Specification:** Ø4mm , 1000V, 1A
Safety adapter	PAC-1003		**Connector:** Safety adapter; Screw can be used for tightening the test cables. **Specification:** Ø4mm ,1000V, 20A **Color:** red, black
Safety adapter	PAC-1004		**Connector:** safety adapter, spring-hold type **Specification:** Ø4mm, 600V,10A **Color:** red, black
Safety clamp	PAC-1005		**Connector:** hook shape **Specification:** 1000V **Color:** red, black
Large alligator adapter	PAC-1006		**Connector:** safety adapter **Specification:** Ø4mm , 1000V **Color:** red, black
Small alligator adapter	PAC-1007		**Connector:** safety adapter **Specification:** Ø4mm ,300V **Color:** red, black
Measurement lead	PAL-1001		**Connector:** safety connector **Specification:** Ø4mm , 1m, 600V, 32A **Color:** red, black
Safety BNC cable	PAL-1002		**Connector:** BNC plug **Specification:** 1m **Color:** black
External sensor Cable	PAL-1003		**Connector:** one BNC safety plug **Specification:** 50cm **Color:** black

Case

Sample	Model	Size
	PY02A	617.4mm*718.4mm*352.0mm

Models and Codes

Name	Model	Descriptions
Instrument	S7	Power analyzer
Input Modules	S7-05A12	5A, 1000V, 0.01％+0.02％
	S7-40A13	40A, 1000V, 0.01％+0.03％
	S7-05A35	5A, 1000V, 0.03％+0.05％
	S7-50A35	50A, 1000V, 0.03％+0.05％
	S7-05A35V	5A, 1500V, 0.03％+0.05％
	S7-50A35V	50A, 1500V, 0.03％+0.05％
Function Modules (option)	/HF	IEC harmonic,flicker
	/MA	Motor evaluation function
	/WA	Waveform computation; X-Y graph display
SSD (option)	/HD	512G SSD
Input Module(option)	/P	Power supply for Current sensor (PG03A included)
Accessory mounted on the support	PAA1001	Used when the instrument mounted on the support

* Product specifications and models are subject to change without notice.

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