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Data Sheet

UTE323 Series Digital Power Meter

REV.1

July 1st, 2025

Key Specifications

AC/DC Voltage Range

UTE323/UTE323G:15 V, 30 V, 60 V, 150 V, 300 V, 600 V

UTE333H/UTE333HG: 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1000 V

UTE333H-2K/UTE333HG-2K: 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1000 V, 2000 V

AC/DC Current Range

UTE323/UTE323G: 500 mA,1 A, 2 A, 5 A, 10 A, 20 A

UTE333H/UTE333HG/UTE333H-2K/UTE333HG-2K: 1 A, 2 A, 5 A, 10 A, 20 A, 50 A

AC/DC Power Range

UTE323/UTE323G: 7.5 W to 12000 W

UTE333H/UTE333HG/UTE333H-2K/UTE333HG-2K: 15 W to 50000 W

Frequency Measurement: 0.1 Hz to 300 kHz

Integration Time: 0 to 10000 hours

Four Arithmetic Operation: A+B, A-B, AxB, A/B, A/B^2, A^2/B

Harmonic Measurement: 1 to 50 times

Waveform Display: Voltage, current

External Sensor: Current

D/A Output: U, I, P, S, Q, PF, PHI, FU, FI, UPK, IPK, WH, WHP, WHM, AH, AHP, AHM, CFU, CFI, AVP, EFFi, MATH

Humanized Design

The 5-inch TFT LCD screen features a graphical user interface (GUI) with clear, intuitive data presentation and user-friendly operation. It supports multi-data display on a single screen and includes a built-in help system for quick information access.

USB data storage is available for easy file management, and the system can be upgraded directly via a USB drive, providing a convenient solution for product maintenance and updates.

Application Areas

- Scientific Research and Education
- Industrial Manufacturing and Automation
- Motor Monitoring and Control

  Measures actual power consumption, efficiency, and power factor of three-phase motors in equipment such as pumps, fans, compressors, conveyors, and machine tools. Supports operation optimization, predictive maintenance (e.g., detection of overload, underload, and imbalance), process control, and energy management.
- Production Line Energy Consumption Monitoring

  Provides sub-metering for entire production lines or critical process sections, enabling energy bottleneck analysis and the implementation of energy-saving measures.
- Inverter/Drive Applications

  Measures power on both input and output sides of inverters to evaluate efficiency and monitor grid impacts (e.g., harmonics).
- Key Equipment Energy Consumption Monitoring and Compliance Verification

  Continuously monitors real-time and cumulative energy consumption of critical equipment to verify that operational efficiency complies with national and industry energy-efficiency standards and regulatory requirements.
- Equipment Testing

  Used to test and verify the performance (e.g., efficiency, power factor) and energy consumption compliance of electrical equipment such as motors, transformers, UPS systems, power supplies, and household appliances.
- R&D

  Enables power measurement and analysis of prototypes during the research and development phase.

Key Features

- 5-inch TFT LCD screen with 800×480 resolution, providing a clear and intuitive user interface
- Supports measurement configurations: 1P2W (Single-Phase Two-Wire) ,1P3W (Single-Phase Three-Wire), 3P3W (Three-Phase Three-Wire), 3P4W (Three-Phase Four-Wire), and 3V3A (Three-Voltage Three-Current)

- Voltage and current measurement ranges

  UTE323/UTE323G: 75 mV to 600 V, 2.5 mA to 20 A

  UTE333H/UTE333HG: 75 mV to 1500 V, 5 mA to 50 A

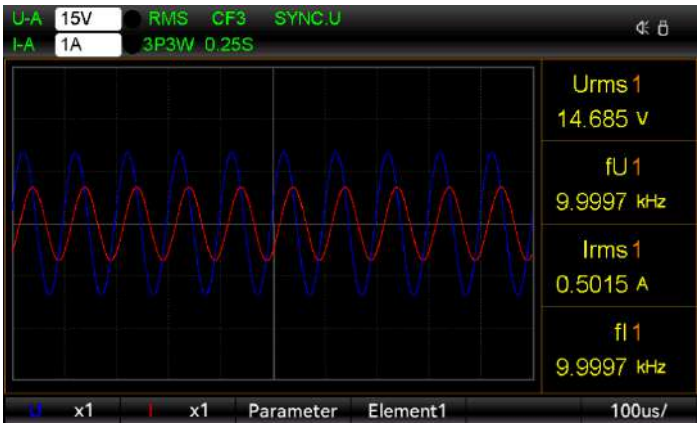
  UTE333H-2K/UTE333HG-2K: 75 mV to 2000 V, 5 mA to 50 A
- Maximum resolution: 1 mV (voltage), 10 μA (current)
- Basic accuracy (voltage, current, power): ±0.5%
- Measurement bandwidth: DC, 0.1 Hz to 300 kHz
- Sample rate: 300 kSa/s
- Multiple communication interfaces: USB, RS-232/GPIB, LAN
- Communication protocol: Modbus and SCPI
- Waveform Display: Voltage/current waveform display, harmonic analysis graph
- Measurement recording: 12-channel D/A output
- Comparator function
- Current sensor input
- USB data storage

Design Highlights

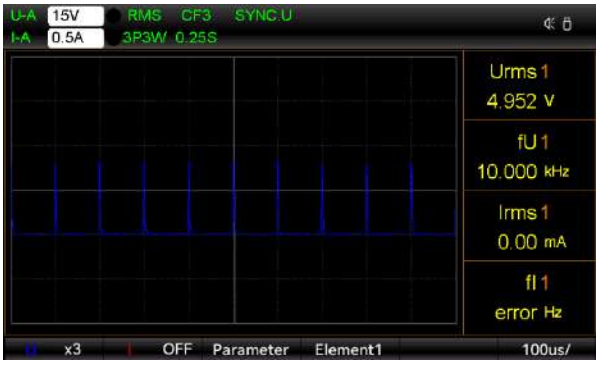
5-inch TFT LCD displays multiple parameters on a single screen.

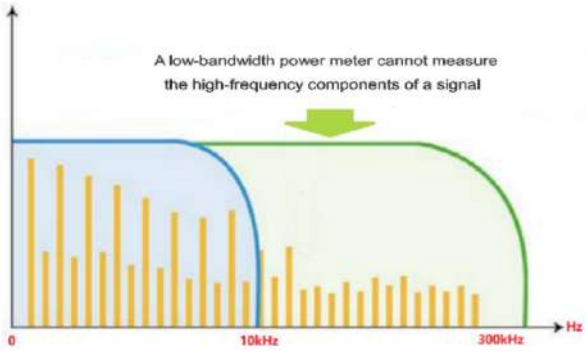


300 kHz analog bandwidth for capturing high-frequency signals.

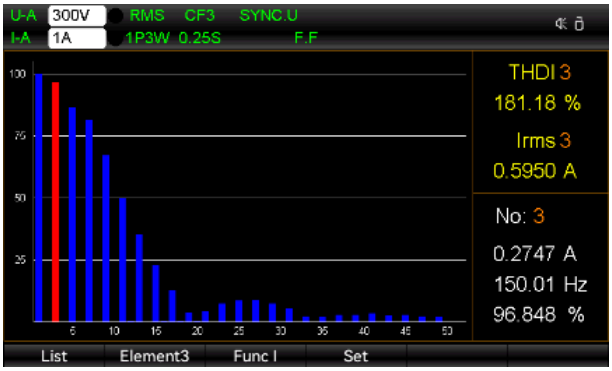


300 kSa/s sample rate for accurate instantaneous signal measurement.





Supports harmonic analysis up to the 50th order in compliance with IEC 61000-4-7.





Front and Rear Panels



Figure 6-1 UTE323 Front Panel



Figure 6-2 UTE323 Rear Panel

Technical Specifications

f: Frequency (in error calculation formulas, the unit is kHz)

Rate: Data update interval

CF: Crest factor (peak factor)

rdg.: Reading

F.S.: Measurement range (full scale)

λ/PF: Power factor

ø: Phase difference

Ext: External current sensor input

S: Apparent power

Q: Reactive power

<table>
<tr><th>Model</th><th colspan="2">UTE323, UTE323G</th><th colspan="2">UTE333H, UTE333HG
UTE333H-2K, UTE333HG-2K</th></tr>
<tr><td>Bandwidth</td><td colspan="2">DC, 0.1 Hz to 300 kHz</td><td colspan="2">DC, 0.1 Hz to 300 kHz</td></tr>
<tr><td>Sample Rate</td><td colspan="2">300 kSa/s</td><td colspan="2">300 kSa/s</td></tr>
<tr><td rowspan="10">Voltage Range</td><td>CF = 3</td><td>CF=6 or 6 A</td><td>CF = 3</td><td>CF=6 or 6 A</td></tr>
<tr><td>15 V</td><td>7.5 V</td><td>15 V</td><td>7.5 V</td></tr>
<tr><td>30 V</td><td>15 V</td><td>30 V</td><td>15 V</td></tr>
<tr><td>60 V</td><td>30 V</td><td>60 V</td><td>30 V</td></tr>
<tr><td>150 V</td><td>75 V</td><td>150 V</td><td>75 V</td></tr>
<tr><td>300 V</td><td>150 V</td><td>300 V</td><td>150 V</td></tr>
<tr><td>600 V</td><td>300 V</td><td>600 V</td><td>300 V</td></tr>
<tr><td>/</td><td>/</td><td>1000V</td><td>500V</td></tr>
<tr><td>/</td><td>/</td><td>2000V
(Applicable only to UTE333H-2K and UTE333HG-2K)</td><td>1000V
(Applicable only to UTE333H-2K and UTE333HG-2K)</td></tr>
<tr><td colspan="4">Note:
The rated range of voltage is: 1% - 130% (the maximum display is 140%. 1000V range and 500V range,the maximum is 100%)
The maximum AC input for the 1000V range is 1000Vrms, and the maximum DC input is 1500Vdc
The maximum AC input for the 2000V range is 1100Vrms, and the maximum DC input is 2050Vdc</td></tr>
</table>

Model	UTE323, UTE323G		UTE333H, UTE333HG UTE333H-2K, UTE333HG-2K	
Voltage Resolution	0.001 V, 0.01 V	0.0001 V, 0.001 V, 0.01 V	0.001 V, 0.01 V, 0.1 V	0.0001 V, 0.001 V, 0.01 V
Voltage Accuracy	DC, 0.1 Hz to 45 Hz: ±(0.1% rdg.+ 0.2% F.S.)		DC, 0.1 Hz to 45 Hz: ±(0.1% rdg.+ 0.2% F.S.)	
	45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)		45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)	
	66 Hz to 1 kHz: ±(0.1% rdg.+ 0.2% F.S.)		66 Hz to 1 kHz: ±(0.1% rdg.+ 0.2% F.S.)	
	1 kHz to 10 kHz: ±[(0.07 * f)% rdg.+ 0.3% F.S.]		1 kHz to 10 kHz: ±[(0.07 * f)% rdg.+ 0.3% F.S.]	
	10 kHz to 100 kHz: ±(0.5% rdg.+ 0.5% F.S.)±{0.04*(f-10)}% rdg.		10 kHz to 100 kHz: ±(0.5% rdg.+ 0.5% F.S.)±{0.04*(f-10)}% rdg.	
	Note: For input levels between 110% and 130% of the rated range, add 50% of the specified reading error to the above accuracy.			
Current Range	CF = 3	CF=6 or 6 A	CF = 3	CF=6 or 6 A
	500 mA	250 mA		
	1 A	0.5 A	1 A	0.5 A
	2 A	1 A	2 A	1 A
	5 A	2.5 A	5 A	2.5 A
	10 A	5 A	10 A	5 A
	20 A	10 A	20 A	10 A
			50 A	25 A
	The rated range of the current is: 1% to 130% (the maximum display range is 140%, and for the 50A range, it is 100%)			
Current Resolution	0.01 mA, 0.1 mA, 1 mA		0.1 mA, 1 mA	0.01 mA, 0.1 mA, 1 mA
Direct Input Current Accuracy	DC: ±(0.1% rdg.+ 0.2% F.S.)		DC: ±(0.2% rdg.+ 0.2% F.S.)	
	0.1 Hz to 45 Hz: ±(0.1% rdg.+ 0.2% F.S.)		0.1 Hz to 45 Hz: ±(0.1% rdg.+ 0.2% F.S.)	
	45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)		45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)	
	66 Hz to 1 kHz: ±(0.1% rdg.+ 0.2% F.S.)		66 Hz to 1 kHz: ±(0.1% rdg.+ 0.2% F.S.)	
	1 kHz to 10 kHz: ±[(0.07 * f)% rdg.+ 0.3% F.S.]		1 kHz to 10 kHz: ±[(0.07 * f)% rdg.+ 0.3% F.S.]	
	10 kHz to 100 kHz: ±(0.5% rdg.+ 0.5% F.S.)±{0.04*(f-10)}% rdg.		10 kHz to 100 kHz: ±(0.5% rdg.+ 0.5% F.S.)±{0.04*(f-10)}% rdg.	
	Note: For input levels between 110% and 130% of the rated range, add 50% of the specified reading error to the above accuracy.			
External Current Sensor Input	CF = 3	CF=6 or 6 A	CF = 3	CF=6 or 6 A
	2.5 V	1.25 V	2.5 V	1.25 V
	5 V	2.5 V	5 V	2.5 V

Model	UTE323, UTE323G		UTE333H, UTE333HG UTE333H-2K, UTE333HG-2K	
(Ext1)	10 V	5 V	10 V	5 V
External Current Sensor Input (Ext2)	50 mV	25 mV	50 mV	25 mV
	100 mV	50 mV	100 mV	50 mV
	200 mV	100 mV	200 mV	100 mV
	500 mV	250 mV	500 mV	250 mV
	1 V	0.5 V	1 V	0.5 V
	2 V	1 V	2 V	1 V
External Current Sensor Input Accuracy	DC, 0.1 Hz to 45 Hz: ±(0.1% rdg.+ 0.2% F.S.)		DC, 0.1 Hz to 45 Hz: ±(0.1% rdg.+ 0.2% F.S.)	
	45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)		45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)	
	66 Hz to 1 kHz: ±(0.1% rdg.+ 0.2% F.S.)		66 Hz to 1 kHz: ±(0.1% rdg.+ 0.2% F.S.)	
	1 kHz to 10 kHz: ±[(0.07 * f)% rdg.+ 0.3% F.S.]		1 kHz to 10 kHz: ±[(0.07 * f)% rdg.+ 0.3% F.S.]	
	10 kHz to 100 kHz: ±(0.5% rdg.+ 0.5% F.S.)±{0.04*(f-10)}% rdg.		10 kHz to 100 kHz: ±(0.5% rdg.+ 0.5% F.S.)±{0.04*(f-10)}% rdg.	
Line Filter (ON)	f < 45Hz: The voltage and current errors increase the reading by 1%. 45Hz ≤ f < 66Hz： The voltage and current errors increase the reading by 0.3%.			
Frequency Measuring Range	Data Update Interval	Measurement Range	Data Update Interval	Measurement Range
	0.1 s	20 Hz ≤ f ≤ 300 kHz	0.1 s	20 Hz ≤ f ≤ 300 kHz
	0.25 s	10 Hz ≤ f ≤ 300 kHz	0.25 s	10 Hz ≤ f ≤ 300 kHz
	0.5 s	5.0 Hz ≤ f ≤ 300 kHz	0.5 s	5.0 Hz ≤ f ≤ 300 kHz
	1 s	2.0 Hz ≤ f ≤ 300 kHz	1 s	2.0 Hz ≤ f ≤ 300 kHz
	2 s	1.0 Hz ≤ f ≤ 300 kHz	2 s	1.0 Hz ≤ f ≤ 300 kHz
	5 s	0.5 Hz ≤ f ≤ 300 kHz	5 s	0.5 Hz ≤ f ≤ 300 kHz
	10 s	0.2 H z≤ f ≤ 300 kHz	10 s	0.2 H z≤ f ≤ 300 kHz
	20 s	0.1 Hz ≤ f ≤ 300 kHz	20 s	0.1 Hz ≤ f ≤ 300 kHz
	Auto	0.1 Hz ≤ f ≤ 300 kHz	Auto	0.1 Hz ≤ f ≤ 300 kHz
Frequency accuracy	Accuracy: ±(0.06% of the reading) Note: When the crest factor is 3, the input signal level must be greater than or equal to 30% of the measurement range (for crest factors of 6 or 6A, it must be greater than or equal to 60%); furthermore, when the frequency of the measured voltage or current is less than or equal to 200Hz, the frequency filter must be turned on.			
Active Power Accuracy (Direct Input Current, PF =	DC: ±(0.1% rdg.+ 0.2% F.S.)		DC: ±(0.3% rdg.+ 0.2% F.S.)	
	0.1 Hz to 45 Hz: ±(0.3% rdg.+ 0.2% F.S.)		0.1 Hz to 45 Hz: ±(0.3% rdg.+ 0.2% F.S.)	
	45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)		45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)	
	66 Hz to 1 kHz: ±(0.2% rdg.+ 0.2% F.S.)		66 Hz to 1 kHz: ±(0.2% rdg.+ 0.2% F.S.)	

<table>
<tr><th>Model</th><th colspan="2">UTE323, UTE323G</th><th colspan="2">UTE333H, UTE333HG
UTE333H-2K, UTE333HG-2K</th></tr>
<tr><td rowspan="2">1)</td><td colspan="2">1 kHz to 10 kHz:
±(0.1% rdg.+ 0.3% F.S.)±{0.067*(f-1)}% rdg.</td><td colspan="2">1 kHz to 10 kHz:
±(0.1% rdg.+ 0.3% F.S.)±{0.067*(f-1)}% rdg.</td></tr>
<tr><td colspan="2">10 kHz to 100 kHz:
±(0.5% rdg.+ 0.5% F.S.)±{0.07*(f-10)}% rdg.</td><td colspan="2">10 kHz to 100 kHz:
±(0.5% rdg.+ 0.5% F.S.)±{0.07*(f-10)}% rdg.</td></tr>
<tr><td rowspan="6">Active Power Accuracy (External Current Sensor Input, PF = 1)</td><td colspan="2">DC: ±(0.1% rdg.+ 0.2% F.S.)</td><td colspan="2">DC: ±(0.1% rdg.+ 0.2% F.S.)</td></tr>
<tr><td colspan="2">0.1 Hz to 45 Hz: ±(0.3% rdg.+ 0.2% F.S.)</td><td colspan="2">0.1 Hz to 45 Hz: ±(0.3% rdg.+ 0.2% F.S.)</td></tr>
<tr><td colspan="2">45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)</td><td colspan="2">45 Hz to 66 Hz: ±(0.1% rdg.+ 0.05% F.S.)</td></tr>
<tr><td colspan="2">66 Hz to 1 kHz: ±(0.2% rdg.+ 0.2% F.S.)</td><td colspan="2">66 Hz to 1 kHz: ±(0.2% rdg.+ 0.2% F.S.)</td></tr>
<tr><td colspan="2">1 kHz to 10 kHz:
±(0.1% rdg.+ 0.3% F.S.)±{0.067*(f-1)}% rdg.</td><td colspan="2">1 kHz to 10 kHz:
±(0.1% rdg.+ 0.3% F.S.)±{0.067*(f-1)}% rdg.</td></tr>
<tr><td colspan="2">10 kHz to 100 kHz:
±(0.5% rdg.+ 0.5% F.S.)±{0.07*(f-10)}% rdg.</td><td colspan="2">10 kHz to 100 kHz:
±(0.5% rdg.+ 0.5% F.S.)±{0.07*(f-10)}% rdg.</td></tr>
<tr><td>Power Range</td><td colspan="2">750 mW to 12000 W</td><td colspan="2">15 W to 50 kW</td></tr>
<tr><td>Influence of Power Factor</td><td colspan="4">When λ=0:
45 Hz ≤ f ≤ 66 Hz: 0.2% of ± S
When f up to 100 kHz: ± {(0.2+0.2 x f) % of S}, as reference value, the unit of f is kHz.
When 0＜λ＜1:
(Power reading) x [(Power reading error%) + (Power range error%) x ($\frac{\text{Power range}}{\text{Indicated apparent power value}}$)
+ {tanø x (Influence of power factor when λ=0)%}]</td></tr>
<tr><td>Apparent Power (S) Accuracy</td><td colspan="4">Voltage accuracy + Current accuracy</td></tr>
<tr><td>Reactive Power (Q) Accuracy</td><td colspan="4">Apparent power accuracy + ($\sqrt{(1.0004-\lambda^2)}$ $-\sqrt{(1-\lambda^2)}$) x 100% of range</td></tr>
<tr><td>Power Factor (λ) Accuracy</td><td colspan="4">$\pm$ [$\left(\lambda-\frac{\lambda}{1.0002}\right)$ + | cosø-cos{ø+ $sin^{-1}(Influence\ of\ power\ factor\ when\ \lambda=0)$ %/100}|] ± 1 digit
At rated voltage and current, ø represents the phase difference between voltage and current.</td></tr>
<tr><td>Phase Difference (ø) Accuracy</td><td colspan="4">± [|ø-$cos^{-1}\left(\frac{\lambda}{1.0002}\right)$| + sin^{-1}{(Influence of power factor when λ=0) %/100}]</td></tr>
<tr><td rowspan="2">Harmonic accuracy (when the line</td><td>Frequency</td><td>Voltage</td><td>Current</td><td>Power</td></tr>
<tr><td>10Hz≤f < 45Hz</td><td>±(0.15% rdg.+0.35% F.S.)</td><td>±(0.15% rdg.+0.35% F.S.)</td><td>±(0.15% rdg.+0.50% F.S.)</td></tr>
</table>

Model	UTE323, UTE323G		UTE333H, UTE333HG UTE333H-2K, UTE333HG-2K	
filter is turned off)	45Hz≤f≤440Hz	±(0.15% rdg.+0.35% F.S.)	±(0.15% rdg.+0.35% F.S.)	±(0.25% rdg.+0.50% F.S.)
	440Hz < f≤1kHz	±(0.20% rdg.+0.35% F.S.)	±(0.20% rdg.+0.35% F.S.)	±(0.40% rdg.+0.50% F.S.)
	1kHz < f≤2.5kHz	±(0.80% rdg.+0.45% F.S.)	±(0.80% rdg.+0.45% F.S.)	±(1.56% rdg.+0.60% F.S.)
	2.5kHz < f≤5kHz	±(3.05% rdg.+0.45% F.S.)	±(3.05% rdg.+0.45% F.S.)	±(5.77% rdg.+0.60% F.S.)
	Note: The above accuracy is applicable when CF = 3 and PF = 1. The power above 1.2 kHz is the reference value.			
Temperature coefficient	Add ±0.03% of reading/°C within the range 5 to 18°C or 28 to 40°C			
Waveform Display	Voltage and current waveforms			
Line Filter	Standard			
Frequency Filter	Standard			
Efficiency Measurement	Support			
Math Operation	Standard			
Harmonic Measurement	Maximum 50th order			
Integration Function	Average active power integral, current integral			
D/A Output	12CH for digital-to-analog conversion			
Communication Interface	LAN, USB, RS-232 (Option: GPIB, When selecting GPIB, the models are UTE323G, UTE333HG or UTE333HG-2K.)			

Notes:

- The accuracy values for voltage, current, and power in the table are specified at CF = 3.
- For CF = 6 or 6 A, the range error is twice that at CF = 3.
- When measuring frequency, the RMS value of voltage or current must be greater than 30% of the measurement range.

Influence of temperature variation after zero-level compensation or range change

DC Voltage: Add 0.02% of range/°C to the DC voltage accuracy.

DC Current: Add the following value to the DC current accuracy.

- UTE323/UTE323G: 500 μA/°C
- UTE333H/UTE333HG/UTE333H-2K/UTE333HG-2K (direct current input): 1.25 mA/°C
- EXT1: 1 mV/°C
- EXT2: 50 μV/°C

DC Power: Add the influence of voltage and current to the DC voltage accuracy.

Accuracy of the Upk, Ipk and waveform display data

Add the following value to the above accuracy (reference value). The effective input range is within ±300% of range (within ±600% for CF= 6 or 6 A).

Voltage Input: $1.5 \times \left(\sqrt{\frac{15}{\text{Range}}\% \text{ of range}}\right)$

Direct Current Input Range: UTE323/UTE323G: $3 \times \left(\sqrt{\frac{0.5}{\text{Range}}\% \text{ of range}}\right)$

UTE333H/UTE333HG/UTE333H-2K/UTE333HG-2K (direct current input): $3 \times \left(\sqrt{\frac{1}{\text{Range}}\% \text{ of range}}\right)$

External Current Sensor Input Range:

EXT1: $3 \times \left(\sqrt{\frac{2.5}{\text{Range}}\% \text{ of range}}\right)$

Ext2: $3 \times \left(\sqrt{\frac{2.5}{\text{Range}}\% \text{ of range}}\right)$

Influence of self-generated heat caused by voltage input

AC Voltage Accuracy: Add 0.0000001 × U^2% of reading to the AC voltage accuracy.

DC Voltage Accuracy: Add 0.0000001 × U^2% of reading + 0.0000001 × U^2% of range to the DC voltage accuracy.

AC Power Accuracy: Add 0.0000001 × U^2% of reading to the AC power accuracy.

DC Power Accuracy: Add 0.0000001 × U^2% of reading + 0.0000001 × U^2% of range to the DC power accuracy.

Note: U is the voltage reading (V). The influence of self-generated heat persists until the shunt resistor cools down, even after the applied voltage decreases.

Influence of self-generated heat caused by current input

UTE323/UTE323G:

AC Current Accuracy: Add 0.00013 × I^2% of reading to the AC current accuracy.

DC Current Accuracy: Add 0.00013 × I^2% of reading + 0.004 × I^2 mA (0.5 A/1 A/2 A/5 A/10 A/20 A range) to the DC current accuracy.

AC Power Accuracy: Add 0.00013 × I^2% of reading to the AC power accuracy.

DC Power Accuracy: Add 0.00013 × I^2% of reading + 0.004 × I^2 Ma (0.5 A/1 A/2 A/5 A/10 A/20 A range) to the DC power accuracy.

UTE333H/UTE333HG/UTE333H-2K/UTE333HG-2K:

AC Current Accuracy: Add 0.00006 × I^2% of reading to the AC current accuracy.

DC Current Accuracy: Add 0.00006 × I^2% of reading + 0.001 × I^2 mA to the DC current accuracy.

AC Power Accuracy: Add 0.00006 × I^2% of reading to the AC power accuracy.

DC Power Accuracy: Add 0.00006 × I^2% of reading + 0.001 × I^2 mA to the AC power accuracy.

Note: I is the current reading (A). The influence of self-generated heat persists until the shunt resistor cools down, even after the applied current decreases.

Accuracy changes caused by data update interval

When the data update interval is 0.1 s, add 0.05% of reading to the specified accuracy in the frequency range of 0.5 Hz to 1 kHz.

Guaranteed accuracy ranges for frequency, voltage and current (direct input)

All accuracy figures in the range of 0.1 Hz to 10 Hz are reference values.

For DC, 10 Hz to 45 Hz, and 400 Hz to 30 kHz, when the input current exceeds 20 A, the accuracy figures are reference values.

For frequencies above 30 kHz to 100 kHz, the maximum current input is limited to 6 A (applicable only to UTE323 and UTE323G).

Functions and Parameters

Settings	Description
Crest Factor	3, 6 or 6 A
Wiring Method	1P3W (Single-Phase Three-Wire), 3P3W (Three-Phase Three-Wire), 3P4W (Three-Phase Four-Wire), and 3V3A (Three-Voltage Three-Current)
Range	Manual, Auto
Auto Range	Range Up The measurement range is automatically increased when any of the following conditions are met: 1. Crest Factor 3 • Urms or Irms exceeds 130% of the currently set measurement range. • Upk or Ipk of the input signal exceeds 300% of the currently set measurement range. 2. Crest Factor 6 • Urms or Irms exceeds 130% of the currently set measurement range. • Upk or Ipk of the input signal exceeds 600% of the currently set measurement range. 3. Crest Factor 6 A • Urms or Irms exceeds 260% of the currently set measurement range. • Upk or Ipk of the input signal exceeds 600% of the currently set measurement range. Range Down The measurement range is automatically decreased when any of the following conditions are met: 1. Crest Factor 3 • Urms or Irms is less than or equal to 30% of the measurement range. • Urms or Irms is less than or equal to 125% of the measurement range. • Upk or Ipk of the input signal is less than 300% of the currently set measurement range. 2. Crest Factor 6 • Urms or Irms is less than or equal to 30% of the measurement range. • Urms or Irms is less than or equal to 125% of the measurement range. • Upk or Ipk of the input signal is less than 300% of the currently set measurement range.

Display Mode	RMS: True RMS value of voltage and current) VMean : 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.
Measurement Sync Source	Voltage, current, or the entire period of the data update interval of the signal can be used as measurement sync source.
Peak Measurement	Measures the peak (max, min) value of voltage, current or power from the sampled instantaneous voltage, instantaneous current, or instantaneous power.
Zero-Level Compensation	Removes the internal offset.
Leading Phase and Lagging Phase Detection	The leading and lagging of the voltage and current inputs can be detected correctly under the following conditions: • Sine wave • When the measured value is 50% or more (100% or more when the crest factor is 6 or 6 A) of the measurement range • Frequency: 20 Hz to 2 kHz • Phase difference: ±(5° to 175°)
Transformation Ratio	When inputting the output of a current sensor, VT, or CT, the current sensor transformation ratio, VT ratio, CT ratio, and power factor should be set. • Significant digit: Automatically selected according to the significant digits of the voltage and current ranges. • Setting range: 0.001 to 9999
Averaging	• Exponential averaging method • Moving averaging method: Select the attenuation constant for exponential averaging; select the number of samples from 8, 16, 32, or 64 for the moving averaging method.
Crest Factor	Calculates the crest factor of voltage and current (Peak value/RMS value).
Four Arithmetic Operation	Six types of operations: A+B, A-B, A×B, A/B, A^2/B, A/ B^2
Average Active Power During Integration	Calculates the average active power within the integrated period.

Integration

Settings	Description
Mode	Manual, standard, repetitive integration Note: If the data update interval is set to Auto, the integration function is unavailable.
Timer	Automatically stops integration by using a timer. Setting range: 0 hours 00 minutes 00 seconds to 10000 hours 00 minutes 00 seconds.

	Note: If set to 0 hours 00 minutes 00 seconds, the instrument automatically switches to Manual Integration mode.
Counter Overflow	WP: 999999 MWh/-99999 MWh q: 999999 MAh/-99999 MAh Holds the integration time and integration value and stops integration when either the elapsed time reaches the maximum of 10,000 hours or the integrated value reaches the maximum or minimum displayable value (999,999 M or–999,999 M).
Accuracy	± (Power accuracy (or Current accuracy) + 0.1% of reading) (Fixed range) Note: In the case of auto range: Measurements are not performed during a range change. The first measurement data after the range change is added to the period in which measurement was not performed.
Range Setting	Auto, fixed For details on range switching, see *Voltage, Current, and Active Power Measurements* section.
Effective Frequency Range	Active power: DC to 45 kHz Current: • RMS mode: DC, lower limit frequency determined by the data update interval to 45 kHz. • Vmean mode: DC, lower limit frequency determined by the data update interval to 45 kHz. • DC mode: DC to 45 kHz
Timer Accuracy	±0.02%
Remote Control	Start, stop, and reset operations can be performed via an external remote signal.

Harmonic Measurement

Settings	Description
Measurement Method	PLL synchronization method
Frequency Range	Fundamental frequency of PLL source: 10 Hz to 1.2 kHz
PLL Source	Select the voltage or current of each input unit. Input level: • 50% or more of the rated measurement range when the crest factor is 3. • 100% or more of the rated measurement range when the crest factor is 6 or 6A. Note: The frequency filter must be enabled when the fundamental frequency is less than or equal to 200 Hz.
FFT Data Length	1024/512
Window Function	Rectangular

Conventional Harmonic Measurement Mode

Performs FFT calculation using a fixed 1024-point sequence.

Fundamental Frequency	Sample Rate
10 Hz ≤ f < 75Hz	f×1024
75 Hz ≤ f < 150 Hz	f×512
150 Hz ≤ f < 300 Hz	f×256
300 Hz ≤ f < 600 Hz	f×128
600 Hz ≤ f ≤ 1200 Hz	f×64
In the formula, f indicates the carrier frequency of the input signal. * The upper limit of analysis orders can be decreased.	

IEC Harmonic Measurement Mode (in accordance with IEC 61000-4-7:2002):

FFT calculation is performed using a 200 ms time window, and total harmonic distortion (THD) is calculated up to the 40th order.

Signal	Sample Rate
50 Hz	f×512
60 Hz	f×512

Power Meter Accuracy (Line Filter OFF)

±(% of reading + % of range)

Frequency	Voltage
10 Hz ≤ f < 45 Hz	0.15% + 0.35%
45 Hz ≤ f ≤ 440 Hz	0.15% + 0.35%
440 Hz < f ≤ 1 kHz	0.20% + 0.35%
1 kHz < f ≤ 2.5 kHz	0.80% + 0.45%
2.5 kHz < f ≤ 5 kHz	3.05% + 0.45%

The following conditions apply to all tables:

- When the crest factor is set to 3.
- When the λ (crest factor) is 1.
- Power values above 1.2 kHz are reference values.
- For the direct current range: Add 10 μA to the current accuracy, and add (10 μA / direct current range) × 100% of range to the power accuracy.
- For the external current sensor range: Add 100 μV to the current accuracy, and add (100 μV / external current sensor rated range) × 100% of range to the power accuracy.
- For an nth harmonic component input: Add ({n / (m+1)} / 50)% of the nth harmonic reading to the (n+m)th

and (n−m)th harmonics of voltage and current.

Add ({n / (m+1)} / 25)% of the nth harmonic reading to the (n+m)th and (n−m)th harmonics of power.

Add (n / 500)% of reading to the nth harmonic component of voltage and current, and add (n / 250)% of reading to the nth harmonic component of power.

- When the crest factor is 6 or 6 A, accuracy is equivalent to that with crest factor 3, but with the measurement range doubled.
- The guaranteed accuracy ranges for frequency, voltage, and current are the same as those for standard measurements. If the amplitude of high-frequency components is large, an influence of approximately 1% may appear in certain harmonics. Since this influence depends on the level of the frequency component, it is negligible when the component is small relative to the rated range.

External Current Sensor Input

Crest Factor	Measuring Range
3	Ext1: 2 .5 V, 5 V, 10 V Ext2: 5 0 mV,100 mV, 200 mV, 500 mV, 1 V, 2 V
6 or 6 A	Ext1: 1.25 V, 2.5 V, 5 V Ext2: 25 mV, 50 mV, 100 mV, 250 mV, 0.5 V, 1 V

D/A Output

Setting	Description
Output Voltage	±5 V F.S. (approx. ±7.5 V maximum) against each rated value
Output Parameters	Set for each channel: U, I, P, S, Q, PF, PHI, FU, FI, UPK, IPK, WH, WHP, WHM, AH, AHP, AHM, MATH
Accuracy	± (Accuracy of each measurement item + 0.2% of F.S.)(F.S.=5 V)
D/A Conversion Resolution	16 bits
Minimum Load	100 kΩ
Update Interval	Same as the data update interval In the case of Auto Update Rate, the update interval equals the signal interval and is greater than 100 ms.
Temperature Coefficient	±0.05%/°C of F.S.

Waveform Display

Setting	Description
Numbers of Display Grid	300
Display Format	p-p (packed data)
Sample Rate	Approx.300 kSa/s

Setting	Description
Time Axis	100 μs/div, 200 μs/div, 500 μs/div, 1 ms/div, 2 ms/div, 5 ms/div, 10 ms/div, 20 ms/div, 50 ms/div, 100 ms/div, 200 ms/div, 500 ms/div, 1 s/div, 2 s/div
Vertical Axis	Voltage waveform display: (Voltage range /3 /2 /1) /div Current waveform display: (Current range /3 /2 /1) /div
Waveform Display (ON/OFF)	Turn on/off the display of each voltage or current waveform

Serial Interface (RS-232)

Setting	Description
Connector Type	D-Sub 9-pin (plug)
Electrical and Mechanical Specifications	EIA-574 (EIA-232 (RS-232) standard for 9-pin connectors
Baud Rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 11520 (Default 115200)

USB Interface

Setting	Description
Number of Ports	1
Connector Type	Type B connector (socket)
Electrical and Mechanical Specifications	USB Rev. 2.0
Transmission Rate	Full speed;12 Mbps
Communication Protocol	User-defined
PC System	A PC with a USB port, running the English or Simplified Chinese version of Windows 7 (32-bit/64-bit), Windows Vista (32-bit/64-bit), or Windows XP (32-bit, SP2 or later)

Ethernet Interface

Number of Ports	1
Connector Type	RJ-45 connector
Electrical and Mechanical Specifications	IEEE802.3
Transmission System	Ethernet (100BASE-TX, 10BASE-T)
Transmission Rate	Max.100 Mbps
Communication Protocol	TCP/IP
Supported Services	DHCP, remote control (Modbus/TCP)

General Specifications

Rated Supply Voltage	110 VAC/220 VAC
Warm-up Time	≥ 30 mins
Operating Temperature	Full accuracy: 5°C to 40°C, 20% RH to 80% RH (non-condensing)
Storage Temperature	-15°C to 50°C, 20% RH to 80% RH (non-condensing)
Altitude	≤ 2000 meters
Calibration Interval	1 year
Rated Supply Frequency	50/60 Hz
Supply Frequency Range	48 Hz to 63 Hz
Maximum Power Consumption	30 VA
Weight	Approx.14kg
Safety Standard	IEC61010-1-2012, EN61010-2-030, EN61326-1 Class A, EN61000-3-2, EN61000-3-3 Measurement Category: CAT II Pollution Degree: Class 2

Packing List

No.	Item	Quanti ty	Remarks
1	Nation standard 3-prong power cord	1	
2	Double Bannan test leads	3 pairs	UT-L0110-BB (Stacking plug) /10A/1m
3	Bannan-U type test leads	3 pairs	UT-L0110-BU(Stacking plug U type)/ 10A/1m
4	Fork-shaped pre-insulated cold-press wiring terminal	6 pairs	Six red terminals and six black terminals (for user-defined connections)

Note: After checking that all packaging contents are complete and in good condition, store the packaging and related items properly. When returning the instrument for service, the packaging must meet the specified requirements.

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.

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https://instruments.uni-trend.com/ContactForm/

Headquarter

UNI-TREND TECHNOLOGY (CHINA) CO., Ltd.

Address: No.6, Industrial North 1st Road, Songshan Lake Park, Dongguan City, Guangdong Province, China

Europe

UNI-TREND TECHNOLOGY EU GmbH

Address: Steinerne Furt 62, 86167 Augsburg, Germany

Tel: +49 (0)821 8879980

North America

UNI-TREND TECHNOLOGY US INC.

Address: 2692 Gravel Drive, Building 5, Fort Worth, Texas 76118

Tel: +1-888-668-8648