Datasheet

UT8806E Benchtop Digital Multimeter

1. Characteristics

- 4.3" TFT-LCD, display resolution 480×272
- 6½ digital reading
- Measuring speed up to 10,000 rdgs/s
- TRMS AC voltage and current measurement
- Total capacity of 32Gb Nand Flash for saving a large number of setting and data files of the instrument.
- Built-in thermocouple cold-end compensator
- Supports SCPI remote control command, upper computer software and compatible with the latest mainstream multimeter command set.
- Supports dual display, simplified Chinese and English display, and built-in help system for accessing information easily.
- Configuration interface has USB Host,USB Device, LAN, RS-232C and GPIB(optional)
- Measured data and settings can be imported or exported by VXI-11, USBTMC and USB, so that users can easily modify, view and backup.

2. Product Introduction

The UT8806E 6½-digit dual-display digital multimeter with its outstanding reading rate and accuracy, which is designed to meet customers' requirements of high-precision and automatic measurement.

Basic Measurement Function

DC voltage measurement: 200mV, 2V, 20V, 200V, 1000V
DC current measurement: 2μA, 20μA, 200μA, 2mA, 20mA, 200mA, 2A, 10A
AC voltage measurement (RMS): 200mV, 2V, 20V, 200V, 750V
AC current measurement (RMS): 200μA, 2mA, 20mA, 200mA, 2A, 10A
Resistance measurement (2-wire, 4-wire): 20Ω, 200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ, 10MΩ, 100MΩ, 1GΩ
Capacitance measurement: 2nF, 20nF, 200nF, 2μF, 20μF, 200μF, 2mF, 20mF, 100mF
Connectivity test: fixed 2kΩ
Diode test: 0V to 5V
Frequency test: 20Hz to 1MHz
Period measurement: 1μs to 0.05s
Temperature measurement: supports thermocouple and thermal resistance sensor

Mathematical Operation

Maximum, minimum, average, standard deviation, relative measurement, bar chart, histogram, tendency chart, Pass/Fail

Humanized Design

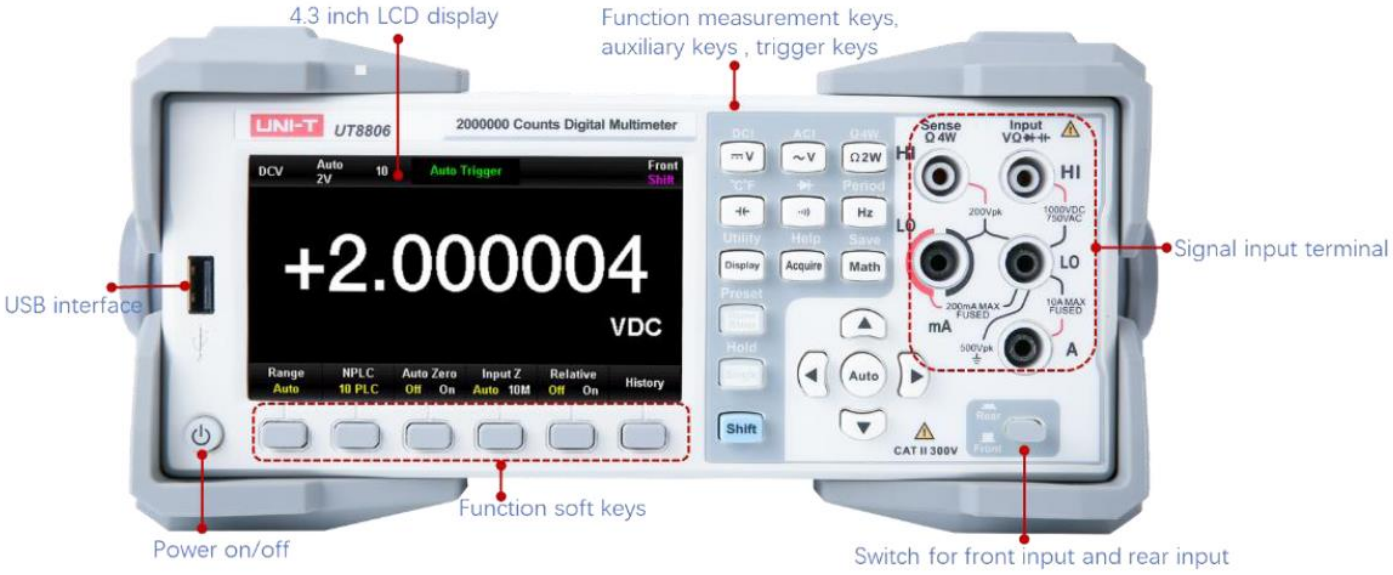
Graphical user interface, simple and convenient operation; more help system for accessing information easily; supports simplified Chinese and English menus; dual-window display function; supports USB and local storage for file management.

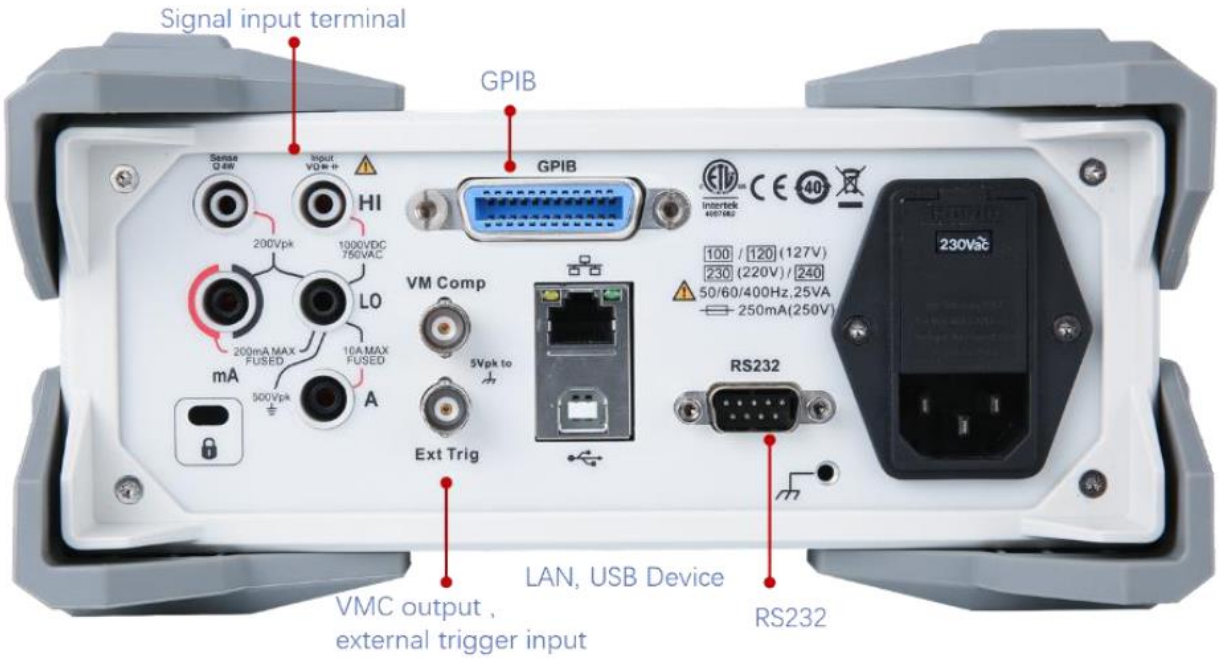
Application Fields

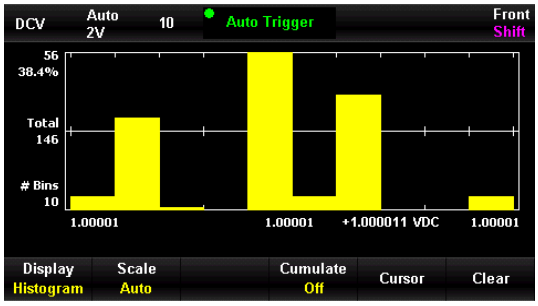
Scientific research and education
Research and development
Inspection and maintenance

3. Design Highlights

Clear and simple key front, 4.3 inch TFT-LCD, graphical user interface, simple and convenient operation; more help system for accessing information easily; supports simplified Chinese and English menus; dual-window display function; supports USB and local storage for file management.



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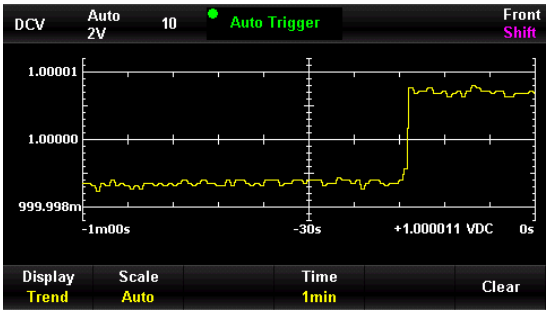
Auto
2V
10
Auto Trigger
Front
Shift
56
38.4%
Total
146
Bins
10
1.00001
1.00001
+1.000011 VDC
1.00001
Display
Histogram
Scale
Auto
Cumulate
Off
Cursor
Clear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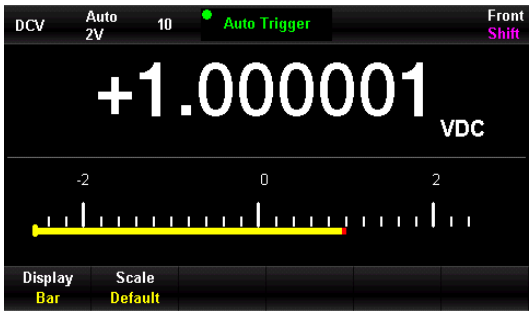
Auto
2V
10
Auto Trigger
Front
Shift
1.00001
1.00000
999.998m
-1m00s
-30s
+1.000011 VDC
0s
Display
Trend
Scale
Auto
Time
1min
Clear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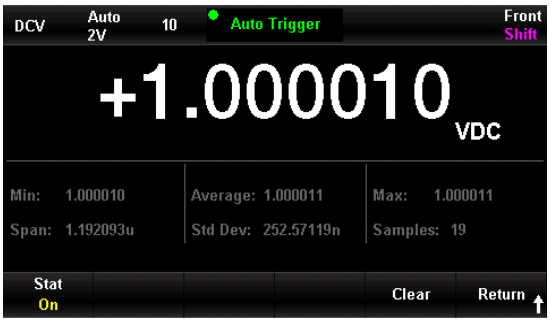
Auto
2V
10
Auto Trigger
Front
Shift
+1.000001
VDC
-2
0
2
Display
Bar
Scale
Default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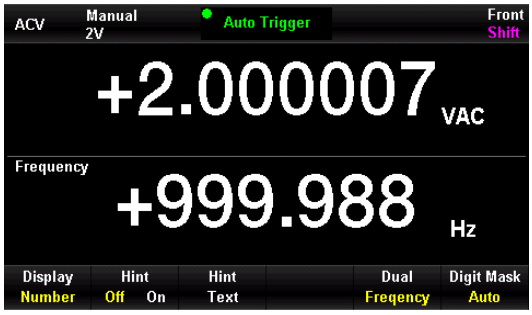
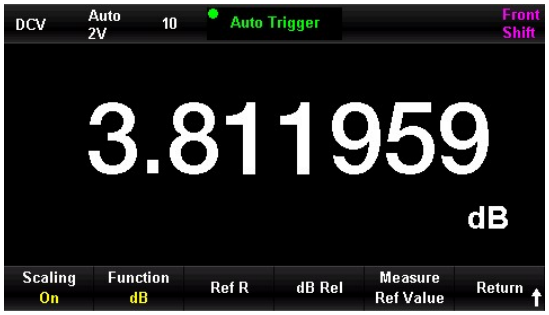
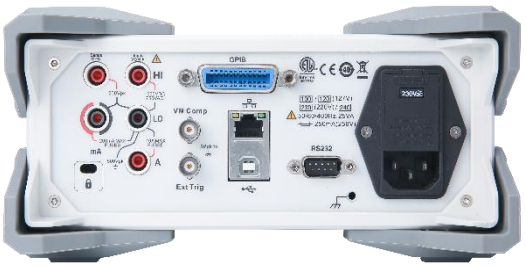
Auto
2V
10
Auto Trigger
Front
Shift
+1.000010
VDC
Min: 1.000010
Average: 1.000011
Max: 1.000011
Span: 1.192093u
Std Dev: 252.57119n
Samples: 19
Stat
On
Clear
Return


ACV
Manual
2V
Auto Trigger
Front
Shift
+2.000007
VAC
Frequency
+999.988
Hz
Display
Number
Hint
Off On
Hint
Text
Dual
Freqency
Digit Mask
Auto


DCV
Auto
2V
10
Probe Hold
Front
Shift
1.000006
VDC
Live: 1.000005 VDC
First Meas: 1
Last Meas: 4
1: 1.000006 V
2: 1.000007 V
3: 1.000007 V
4: 1.000006 V
Probe Hold
On
Beeper
On
Remove
Last
Clear
List


DCV
Auto
2V
10
Auto Trigger
Front
Shift
3.811959
dB
Scaling
On
Function
dB
Ref R
dB Rel
Measure
Ref Value
Return


GPIB
HI
LO
A
RS232
Ext Trig

4. Technical Index

Accuracy Index ±(% Reading＋% Range)[1]

Range[2]/ frequency		24 Hours[3] TCAL±1℃	90 Days TCAL±5℃	1 Year TCAL±5℃	Temperature Coefficient /℃[4]
DC Voltage	Input Resistance				
200mV	10MΩ or > 10GΩ	0.0020+0.0015	0.0030+0.0020	0.0040+0.0023	0.0005+0.0003
2V	10MΩ or > 10GΩ	0.0015+0.0004	0.0020+0.0004	0.0035+0.0006	0.0005+0.0001
20V	10MΩ or > 10GΩ	0.0020+0.0003	0.0030+0.0004	0.0040+0.0004	0.0005+0.0001
200V	10MΩ	0.0020+0.0005	0.0040+0.0004	0.0050+0.0005	0.0005+0.0001
1000V	10MΩ	0.0020+0.0005	0.0040+0.0008	0.0055+0.0008	0.0005+0.0001
TRMS AC Voltage[2,5,6] 200mV、2V、20V、200V and 750V range					
3Hz - 5Hz		1.00+0.02	1.00+0.03	1.00+0.03	0.10+0.003
5Hz - 10Hz		0.35+0.02	0.35+0.03	0.35+0.03	0.035+0.005
10Hz - 20kHz		0.04+0.02	0.05+0.03	0.06+0.03	0.005+0.003
20kHz - 50kHz		0.10+0.04	0.11+0.05	0.12+0.05	0.011+0.005
50kHz - 100kHz		0.55+0.08	0.60+0.08	0.60+0.08	0.060+0.008
100kHz - 300kHz		4.00+0.50	4.00+0.50	4.00+0.50	0.20+0.02
Resistance[7]	Testing Current				
20Ω	About 10 mA	0.008+0.006	0.010+0.006	0.015+0.005	0.0006+0.0008
200Ω	About 10mA	0.0030+0.0031	0.008+0.005	0.010+0.004	0.0006+0.0006
2kΩ	About 1 mA	0.0020+0.0005	0.008+0.001	0.010+0.001	0.0006+0.0002
20kΩ	About 100μA	0.0020+0.0005	0.008+0.001	0.010+0.001	0.0006+0.0001
200kΩ	About 10μA	0.0020+0.0005	0.008+0.001	0.010+0.001	0.0006+0.0001
2MΩ	About 1μA	0.002+0.001	0.010+0.001	0.012+0.001	0.0010+0.0002
10MΩ	About 1μA	0.015+0.001	0.030+0.001	0.040+0.001	0.0030+0.0005
100MΩ	1μA ‖ 10MΩ	0.1+0.001	0.2+0.001	0.3+0.001	0.1+0.0001
1000MΩ	1μA ‖ 10MΩ	2+0.001	2+0.001	3+0.001	1+0.0001
DC Current	Burden Voltage				
2μA	< 5mV	0.009+0.010	0.040+0.007	0.050+0.007	0.0025+0.0030
20μA	< 5mV	0.009+0.002	0.040+0.005	0.050+0.005	0.0025+0.0005
200μA	< 30mV	0.009+0.010	0.040+0.005	0.050+0.005	0.0020+0.0026
2mA	< 0.3V	0.007+0.001	0.030+0.001	0.050+0.002	0.0020+0.0001
20mA	< 30mV	0.006+0.008	0.030+0.005	0.050+0.005	0.0020+0.0015
200mA	< 0.3V	0.009+0.001	0.030+0.001	0.050+0.002	0.0020+0.0001
2A	< 0.1V	0.045+0.015	0.080+0.005	0.100+0.012	0.0050+0.0008
10A[8]	< 0.3V	0.090+0.002	0.120+0.005	0.150+0.005	0.0050+0.0018

Capacitance [15]				
2.000 nF	1.8+2.4	1.8+2.4	2+2.4	0.05+0.06
20.00 nF	0.9+0.1	0.9+0.1	1+0.1	0.05+0.01
200.0 nF	0.9+0.1	0.9+0.1	1+0.1	0.01+0.01
2..000 μF	0.9+0.1	0.9+0.1	1+0.1	0.01+0.01
20..00 μF	0.9+0.1	0.9+0.1	1+0.1	0.01+0.01
200.0 μF	0.9+0.1	0.9+0.1	1+0.1	0.01+0.01
2.000 mF	0.9+0.1	0.9+0.1	1+0.1	0.01+0.01
20.00 mF	0.9+0.2	0.9+0.2	1+0.2	0.01+0.01
100.0 mF	2.8+0.1	2.8+0.1	3+0.1	0.05+0.02

Range [2]/ Frequency		24 Hours [3] TCAL±1℃	90 Days TCAL±5℃	1 Year TCAL±5℃	Temperature Coefficient /℃ [4]
TRMS AC Current [2,6,9]	Burden Voltage				
200μA、2mA	< 30mV, < 0.3V				
20mA and 200mA range	< 30mV, < 0.3V				
3Hz-10Hz		1.0+0.04	1.0+0.04	1.0+0.04	0.02+0.006
10Hz-10kHz		0.1+0.04	0.1+0.04	0.1+0.04	0.03+0.006
2A、10A[8] Range	< 0.1V、< 0.3V				
3Hz-10Hz		1.0+0.04	1.0+0.04	1.0+0.04	0.02+0.006
10Hz-10kHz		0.15+0.04	0.15+0.04	0.15+0.04	0.03+0.006

Connectivity					
	Testing Current				
2kΩ	About 1mA	0.002+0.010	0.008+0.020	0.010+0.020	0.0010+0.0020

Diode Test [10]					
	Testing Current				
5V	About 1mA	0.002+0.010	0.008+0.020	0.010+0.020	0.0010+0.0020

Temperature [11]	
RTD(R0 span 49Ω ~ 2.1kΩ)	Probe accuracy +0.16℃
Thermocouple (E、J、K、N、R、T)	Probe accuracy +0.5℃
Thermocouple (S)	Probe accuracy +0.6℃
Thermocouple (B)	Probe accuracy +0.76℃

Frequency(±% Reading)[12, 13] 200mV、2V、20V、200V and 750V range[14]				
3 Hz-5 Hz	0.07	0.07	0.07	0.005
5 Hz-10 Hz	0.04	0.04	0.04	0.005

10 Hz-40 Hz	0.02	0.02	0.02	0.001
40 Hz-300 kHz	0.005	0.006	0.007	0.001
300 kHz-1 MHz	0.005	0.006	0.007	0.001
square wave [15]	0.004	0.005	0.006	0.001

Additional low frequency error (% Reading)[13]				
Gate Time (Resolution/range)	1s (0.1ppm)	0.1s (1ppm)	0.01s (10ppm)	0.001s (100ppm)
3 Hz-5 Hz	0	0.12	0.12	0.12
5 Hz-10 Hz	0	0.17	0.17	0.17
10 Hz-40 Hz	0	0.2	0.2	0.2
40 Hz-100 Hz	0	0.06	0.21	0.21
100 Hz-300 kHz	0	0.03	0.21	0.21
300 kHz-1 MHz	0	0.01	0.07	0.07

1. For DC： The specifications are valid after 60 minutes of warm-up, with the integration time set to 10 or 100 NPLC and auto-zeroing is enabled. For AC: The specifications are valid after a 60-minute warm-up period, with slow AC filtering and sine wave.

2. All scales have 20% overrange except 1,000V DCV, 750V ACV, 10 A DC, 10 A AC, and diode tests.

3. Relative to calibration standards.

4. . Increase by a factor for every 1 degree (°C) when exceed the TCAL ±5°C range.

5. The specifications are valid for sine wave when inputs >0.3% of range and >1 mVrms. The 750 ACV range is limited to 8×10^7 V–Hz.

6. Low Frequency Performance: Three filter settings are available: 3 Hz, 20 Hz, and 200 Hz. The frequency in excess of the filter setting is specified so that no additional error occurs.

7. The specifications is apply to resistance measurements with 4-wire or 2-wire measurements (operation bias to zeroed). When 2-wire resistance measurements without "relative" operation, it adds ±0.2 Ω of additional error.

8. For continuous currents > DV 7A or ACrms 7A, it requires 30 seconds of on-time and 30 seconds of off-time.

9. The specifications is valid when sine wave inputs >1% of range and >10μA AC.

10. The specifications is apply to voltage measured at the input port. The measurement current of 1 mA is typical value. The voltage drop across the diode junction will change with the change of current source.

11. The selected probe limits the actual measurement range and detection error. The probe accuracy includes all measurement and ITS-90 temperature conversion errors. PT100 Ro can be set to 100Ω ±5Ω to eliminate raw probe error.

12. Unless otherwise noted, specifications are valid after a 60-minute warm-up period and with a sine wave input. The specification is apply to a select time of 1s (7 bits).

13. For sine and square wave inputs ≥ 100 mV. For 10 mV to 100 mV inputs, multiply % reading error by 10.

14. Amplitude range is 10% to 120% below 750 ACV.

15. Square wave inputs are specified from 10 Hz - 1 MHz.

Measurement and Other Features	
DC voltage	
Input Resistance	200 mV , 2V and 20 V scale，10MΩ or > 10GΩ
	200 V and 1000 V scale，10MΩ ±2%
Input Bias Current	Testing < 30 pA，25℃
Input Protection	DC 1000V or AC 750V，full scale
Common-mode Rejection Ratio	120dB (For the 1 kΩ unbalanced resistance of the LO lead, the maximum is ±500 VDC.)
Resistance	
Measurement Mode	4-wire resistance or 2-wire resistance
Open-circuit Voltage	The maximum about 10V
The maximum Lead Resistance (4-wire)	200Ω, 2kΩ scale of each lead is 10% scale, and all other ranges are 1kΩ per lead.
Input Protection	DC 1000V or AC 750V，full scale
DC current	
Current Divider	2 μA, 20 μA is adopted transresistance test
	200 μA, 2 mA scale sampling the resistance 100 Ω
	20 mA , 200 mA scale sampling the resistance 1 Ω
	2 A, 10 A scale sampling the resistance 8 mΩ
Input Protection	Internal 250m A, 250V fast-acting fuse and10A，250V fast-acting fuse
Continuity/Diode Test	
Measurement Mode	Use the constant current of 1 mA±5% to measure the resistance or voltage
Response Time	300 sampling/second
Beeper	√
Continuity Threshold	Adjustable
Input Protection	DC 1000V or AC 750V
TRMS AC Voltage	
Measurement Mode	AC coupling TRMS measurement，the maximum DC bias is 400 V in arbitrary ranges
Crest Factor	Full scale, crest factor ≤5
Input Resistance	1MΩ±2% in parallel < 150 pF in full scale
Input Protection	Full scale 700Vrms
AC Filter Bandwidth	3Hz~300 kHz; 20Hz~300 kHz; 200Hz~300 kHz
Common-mode Rejection Ratio	70 dB (For the 1 kΩ unbalanced resistance and < 60 Hz of the LO lead, the maximum is ±500 VDC.)
TRMS AC Current	
Measurement Mode	DC coupling to the resistance divider，AC coupling to TRMS measurement (AC component of measurement input)
Crest Factor	Full scale, crest factor ≤3

Maximum Input	Including RMS current of DC component < 10 A	
Resistance Divider	0.008 Ω in 2 A and 10 A scale，1Ω in 20 mA and 200 mA scale, 100Ω in 200 μA and 2 mA scale	
Input Protection	Internal 250m A，250V fast-acting fuse and10A，250V fast-acting fuse	
Frequency and Period		
Measurement Mode	Testing the frequency when timing the low frequency, counting the high frequency at the high frequency, AC coupling input, use AC voltage or AC current function	
Notes	All frequency counter introduces the error at low voltage and low frequency signal	
Capacitance Measurement		
Measurement Mode	Use the fixed current to charge the capacitance and measure the average rate of voltage rising	
Connecting Mode	2-wire	
Input Protection	Full scale, DC 1000V or AC 750V	
Arbitrary Sensor Measurement		
Measurement Mode	Thermocouple, DCV, DCI, Ω(2-wire/4-wire), frequency output type sensor，built-in thermocouple cold-end compensation	
Output Polarity	Positive/Negative	
Other	Preset ITS-90 transformer of B, E, J, K, N, R, S, T thermocouple and Pt100, Pt385 resistance temperature sensor convertor	
Frequency Response		
TRMS Measurement	AC voltage measurement，300kHz	
Sampling and Trigger		
Maximum Testing Rate	10,000 rdgs/s	
Trigger Delay	Can set to 6 ms~10000 ms	
External Trigger Input	Input Level	TTL compatibility
	Trigger Condition	Rising edge/falling edge
	Input Resistance	> 20kΩ // 400pF (DC coupling)
	Minimum Pulse Width	50μs
VMC Output	Level	TTL compatibility (input ≥1kΩ load)
	Output Polarity	Positive/Negative
	Output Resistance	200Ω (typical)
	Pulse Width	About 1μ
Record Function		
Volatile Memory	History data record of 10k reading	
Nonvolatile memory	Total capacity of 32Gb Nand Flash for saving a large number of setting and data files of the instrument	
	Preset setting of 6 groups	
	Supports USB	
Mathematical Function		

Mathematical Function	Pass/Fail, relative, minimum/maximum/average, standard deviation, dBm, dB, Hold, histogram, tendency chart and bar chart
Interface	
Interface type	USB Host, USB Device, LAN, RS-232C, GPIB (option)

5. General Features

Power

AC 90V～110V, 45～440Hz
AC 110V～132V, 45～440Hz
AC 200V～240V, 45～66Hz
AC 216V～264V, 45～66Hz
Power consumption: MAX 20W

Machine Features

Size: 215mm*88mm*390.2mm (width x height x depth)
Weight: 3.39kg
Color: grey-white and grey

Other Features

Full precision working environment: 0 ℃ ~28 ℃ <90%; 28 ℃ ~40 ℃ <75%; 40 ℃ ~55 ℃ <50% (non-condensation)
Storage temperature: -20℃~70℃, <95%; Continuously powered on for at least 7 days before use when save the instrument in high humidity environment
Altitude: ≤2000 meters
Shock and shake: MIL-T-28800E, CAT III, 5 class (only for sine wave)
Electromagnetic compatibility: Low voltage directive 2004/108/EC, EN61326-1:2013
Security: Low voltage directive 2006/95/EC, EN61010—1:2010
Remote interface: 10/100Mbit LAN, USB Device, USB Host, RS-232C, GPIB (option)
Programming language: SCPI and the latest mainstream multimeter command set
Pre-heat time: 30 minutes

6. Accessories

Article	Quantity	Remarks
UT8806E	1 piece	
Three-core power cable	1 piece	
Probe	1 pair	
USB connecting line	1 piece	
RS232 connecting line	1 piece	
Upper computer software	1 set	

7. Contact Us

UNI-T Technical Support Hotline: 400-876-7822

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