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DATA SHEET

U1270 Series Handheld Digital Multimeters

Be Ready for Harsh Environments and Sub-zero Temperatures

The U1273AX, the latest addition to the U1270 Series is capable of operating down to –40 °C in temperature. Even in extremely cold conditions, the U1273AX handheld DMM delivers immediate and accurate results — no warm-up time required.

All models are ergonomically built providing useful functions such as ZLOW, which eliminates stray voltages, and Smart Ohm that minimizes false readings from residual voltage induced by leakage current. All of this is designed into a case that fulfills the needs of today's industrial handheld users.



KEYSIGHT TECHNOLOGIES

Features

- OLED display with 2000:1 contrast ratio and 160 degrees viewing angle[3,4]
- 30,000-count resolution
- Measure up to 1000 V AC and DC
- Measure up to 10 A (20 A for 30 s)
- Resistance, diode test, temperature, capacitance
- Low Impedance mode[2,3,4] and Low Pass Filter
- Peak detection of up to 250 µs
- Continuity test with beeper and backlight[1,2]
- Seven readings/s measurement rate for voltage and current
- Smooth function for accurately stable readings
- Up to 10,000 points internal memory for data logging
- **Bluetooth** wireless connectivity with optional U1177A **Bluetooth**
- PC connectivity with optional U1173A IR-USB cable
- IP 54 certified – water and dust resistant
- CAT III 1000 V, CAT IV 600 V safety rating
- Up to 3000m operating altitude
- –40 to 55 °C operating temperature[4]

1. U1271A
2. U1272A
3. U1273A
4. U1273AX

Operational down to –40 °C temperature

The U1273AX OLED handheld digital multimeter, the latest addition to U1270 Series, is capable of operating in winter weather down to –40°C temperature. Even in frigid conditions, the U1273AX enables you to achieve immediate and accurate results without the need to warm up in advance.





Increase productivity with *Bluetooth*® wireless connectivity

For wireless connectivity to smartphones and tablets, the U1270 Series is compatible with the U1177A infrared-to-*Bluetooth* adapter for maximum efficiency and productivity in completing measurements tasks. Adding the optional U1177A to a U1270 Series you can easily perform remote monitoring and data logging via Android devices or Windows- based PC.

OLED for more display clarity

Designed with OLED display, you can experience crystal-clear measurement readings with its outstanding 2000:1 contrast ratio. The display also allows wider viewing angles up to 160 degrees ensuring you get the right readings at the first glance even in poorly lit environments.

Key Functions

Water and dust resistance (IP54)

The series' tightly sealed design helps protect against water, dust and damage. Each handheld DMM is certified with IP 54 ratings so that you can carry out tests and measurements with confidence, even in harsh working conditions.

Operational up to 3000 meters altitude

For high altitude applications such as wind farm maintenance, you can measure with confidence using the U1270 Series, capable of measuring up to 3000 meters above sea level.

High measurement rate at seven readings per second for Voltage and Current

You can detect even the slightest change in your sensitive signals (Voltage and Current) with its high measurement rate capability. By clicking the resettable smooth function button, you may customize the readings' sensitivity suitable for various tests.

Visual alert for continuity test (for U1271A and U1272A only)

Continuity detection in noisy and dark environments is made easy with U1270 Series' loud beeper and flashing backlight that indicates continuity and thus improves safety.

Up to 10,000 recording points for manual, auto and event logging

Record measurements on-the-go and transfer data to PC conveniently with the huge internal memory of up to 10,000 recording points. The GUI Data Logging software and optional U1173A IR-USB cable are required to transfer data or perform real time data logging on a PC.

Built-in Low Pass Filter

The U1270 Series offers a 1 kHz LPF or Low Pass Filter to provide accurate Variable Frequency Drive (VFD) output measurements. This function eliminates high frequency noise and harmonics, ensuring motor filter efficiency.



Figure 1. Comparison of voltage output from industrial motor VFD without and with Low Pass Filter functionality.

Key Functions

Low impedance mode

Stray voltages are usually found in non-energized electrical wiring adjacent to powered wires due to capacitive or inductive coupling between these wires. The low impedance mode serves to eliminate false readings by dissipating these stray voltages thus improves safety and measurement efficiency during voltage measurement.

Peak detect at 250 µs

The peak detect function allows you to capture the engine or motor startup transient as fast as 250 µs.



Figure 2. U1272A helps you identify the presence of stray voltage on a disconnected wire running parallel with the wire powering up the VFD to an industrial motor. The image on the right shows the U1272A in low impedance mode.

Front and Back Panel Description



30,000 counts resolution

Peak detect records transients as fast as 250 µs

Measure up to 1000V AC and DC

Low Pass Filter (LPF) removes unwanted high frequency signals

Z_{LOW} [1] provides both high and low impedance modes to eliminate stray voltages

OLED display with 2000:1 contrast ratio and 160 degree viewing angle

Smart Ω [1] removes residual voltage of up to 1000 mV

Auto diode [1] automatically determines diode polarity

Temperature measurement: J type thermocouple –210 to 1200 °C 1, K type thermocouple –200 to 1732 °C

Measure up to 10 A (20 A for 30 s)

1. U1272A, U1273A and U1273AX only

Front Panel



Figure 3. Once connected to any HH DMM via Bluetooth adapter you are able to log and view measurements graphically from smart phones and tablets.

Front and Back Panel Description

Hang hole

Probe holder/storage



Slim, ergonomic design

for better grip



IR-USB connectivity with optional IR-USB cable



Easy fuse and battery access from battery cover beneath the stand



Back Panel

Choose Among These Four Models

	U1271A	U1272A	U1273A	U1273AX
Basic Features				
Display resolution	30,000 counts	30,000 counts	30,000 counts	30,000 counts
Display	LCD	LCD	OLED	OLED
Backlight	Yes	Yes	N/A	N/A
True RMS	AC	AC + DC	AC + DC	AC + DC
Measurements				
Voltage	Up to 1000 V AC, DC	Up to 1000 V AC, DC	Up to 1000 V AC, DC	Up to 1000 V AC, DC
Basic dcV accuracy	0.05% + 2 counts	0.05% + 2 counts	0.05% + 2 counts	0.05% + 2 counts
Current	Up to 10 A	Up to 10 A	Up to 10 A	Up to 10 A
	(20 A for 30 s)	(20 A for 30 s)	(20 A for 30 s)	(20 A for 30 s)
Resistance	Up to 100 MΩ	Up to 300 MΩ	Up to 300 MΩ	Up to 300 MΩ
Other measurements	Frequency, capacitance, temperature, continuity, diode test	Frequency, capacitance, temperature, continuity, diode test	Frequency, capacitance, temperature, continuity, diode test	Frequency, capacitance, temperature, continuity, diode test
AC bandwidth	20 kHz	100 kHz	100 kHz	100 kHz
Low pass filter	Yes	Yes	Yes	Yes
Low impedance mode	—	Yes	Yes	Yes
Smart Ohm	—	Yes	Yes	Yes
Safety and Regulatory				
Over-voltage safety protection	CAT III 1000 V, CAT IV 600 V	CAT III 1000 V, CAT IV 600 V	CAT III 1000 V, CAT IV 600 V	CAT III 1000 V, CAT IV 600 V
General				
Logging memory	200 points	10,000 points	10,000 points	10,000 points
Connectivity	Optional IR-USB and *Bluetooth*	Optional IR-USB and *Bluetooth*	Optional IR-USB and *Bluetooth*	Optional IR-USB and *Bluetooth*
Operating temperature	–20 to 55 °C	–20 to 55 °C	–20 to 55 °C	–40 to 55 °C
Altitude	3000 meters	3000 meters	3000 meters	3000 meters
Water and dust ingress protection	IP 54	IP 54	IP 54	IP 54
Battery life	Up to 300 hours 4X AAA Alkaline	Up to 300 hours 4X AAA Alkaline	Up to 60 hours 4X AAA Alkaline	Up to 100 hours 4X AAA Lithium

General Specifications (continued)

Display	U1271A and U1272A: Liquid crystal display (LCD) (with maximum reading of 33,000 counts) U1273A/U1273AX: Organic LED (OLED) display (with maximum reading of 33,000 counts) (Note: OLED is made of organic materials and it has its lifespan.)
Power consumption	U1271A/U1272A: 460 mVA maximum (with backlight enabled) U1273A/U1273AX: 180 mVA maximum (with maximum brightness)
Battery type	4 × 1.5 V Alkaline battery (ANSI/NEDA 24A or IEC LR03), or 4 × 1.5 V Zinc Chloride battery (ANSI/NEDA 24D or IEC R03) 4 × 1.5 V Lithium battery (ANSI/NEDA 24LF or IEC FR03)
Battery life	U1271A and U1272A: 300 hours typical (based on new Alkaline batteries for DC voltage measurement) U1273A/U1273AX: Based on new Alkaline batteries for DC voltage measurement: 30/45/60 hours typical at High/Medium/Low brightness, respectively Based on new Lithium batteries for DC voltage measurement: 50/100 hours typical at High/Low brightness, respectively Low battery indicator will flash when the battery voltage drops: For non-rechargeable batteries: 4.4 V (approximately) For rechargeable batteries: 4.5 V (approximately)
Fuse	10 × 35 mm 440 mA/1000 V 30 kA fast-acting fuse 10 × 38 mm 11 A/1000 V 30 kA fast-acting fuse
Input impedance at off mode	1.67 kΩ (protected by positive temperature coefficient resistor) (U1272A, U1273A and U1273AX only)
Operating environment	Operating temperature: U1271A/ U1272A/U1273A: –20 to 55 °C, 0% to 80% RH U1273AX: –40 to 55 °C, 0% to 80% RH (using Lithium batteries) Full accuracy up to 80% RH for temperatures up to 30 °C, decreasing linearly to 50% RH at 55 °C Altitude up to 3000 meters Pollution degree II
Safety compliance	–40 to 70 °C, 0 to 80% RH
Storage compliance	IEC 61010-1:2010 / EN 61010-1:2010, IEC 61010-2-033:2012 / EN 61010-2-033:2012 Canada: CAN/CSA-C22.2 No.61010-1-12, CAN/CSA-C22.2 No. 61010-2-033-12 USA: ANSI/UL Std. No. 61010-1 (3rd Edition), ANSI/UL Std. No. 61010-2-033 (1st Edition)
Measurement category	CAT III 1000 V/CAT IV 600 V

General Specifications (continued)

Electromagnetic compatibility (EMC)	Commercial limits compliance with EN61326-1 Influence of radiated immunity; in RF electromagnetic fields of 3 V/m DC voltage measurement typical accuracy All ranges; ± 0.03% of range DC current measurement typical accuracy 300 uA, 3000 uA, 30 mA, 300 mA & 3 A range; ± 0.22% of range 10 A range; ± 0.66% of range Note: – The measurement accuracy is applied only when DC Low Pass Filter (LPF) is ON (factory default). – The use of LPF is recommended to improve the accuracy of measurements in the presence of RF fields. – If used in close proximity to an RF transmitter or when subjected to continuously present electromagnetic phenomena, some recoverable degradation of performance may occur.
Ingress protection rating	IP-54
Temperature coefficient	U1271A/U1272A/U1273A: 0.05 × (specified accuracy)/°C (from –20 to 18 °C, or 28 to 55 °C) U1273AX: 0.05 x (specified accuracy/ °C (from –40 to 18 °C, or 28 to 55 °C)
Common Mode Rejection Ratio (CMRR)	> 120 dB at DC, 50/60 Hz ± 0.1% (1 kΩ unbalanced)
Normal Mode Rejection Ration (NMRR)	> 60 dB at 50/60 Hz ± 0.1%
Dimensions (W x H x D)	92 × 207 × 59 mm
Weight	U1271A: 518 grams (with batteries) U1272A: 520 grams (with batteries) U1273A: 500 grams (with batteries) U1273AX: 500 grams (with batteries)
Calibration cycle	One year

Specification Assumptions

- Accuracy is given as ± (% of reading + counts of least significant digit) at 23 °C ± 5 °C, with relative humidity less than 80% RH.
- AC V and AC µA/mA/A specifications are AC coupled, true RMS and are valid from 5% of range to 100% of range.
- Crest factor ≤ 3 at full-scale and decrease reciprocally for overange as 3 x Full Scale / Input; except for the 1000 V range, where this range has a crest factor ≤ 1.5 at full scale and decrease reciprocally for overange as
  1.5 x Full Scale / Input.
- For non-sinusoidal waveforms, add (2% of reading + 2% of full scale) typical.
- After Z_{LOW} voltage measurements, wait at least 20 minutes for thermal impact to cool before proceeding with any other measurement.

Electrical Specifications

DC specifications for U1271A, U1272A, U1273A and U1273AX

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)			Test current / Burden voltage
			U1271A	U1272A	U1273A / U1273AX	
Voltage[1]	30 mV	0.001 mV	—	0.05 + 20	0.05 + 20	—
	300 mV	0.01 mV	0.05 + 5	0.05 + 5	0.05 + 5	—
	3 V	0.0001 V	0.05 + 5	0.05 + 5	0.05 + 5	—
	30 V	0.001 V	0.05 + 2	0.05 + 2	0.05 + 2	—
	300 V	0.01 V	0.05 + 2	0.05 + 2	0.05 + 2	—
	1000 V	0.1 V	0.05 + 2	0.05 + 2	0.05 + 2	—
	Z_{LOW} (low impedance) enabled, applicable for 1000 V range and resolution only	0.1 V	—	1 + 20	1 + 20	—
Resistance[2]	30 Ω	0.001 Ω	—	0.2 + 10	0.2 + 10	0.65 mA
	300 Ω	0.01 Ω	0.2 + 5	0.2 + 5	0.2 + 5	0.65 mA
	3 kΩ	0.0001 kΩ	0.2 + 5	0.2 + 5	0.2 + 5	65 µA
	30 kΩ	0.001 kΩ	0.2 + 5	0.2 + 5	0.2 + 5	6.5 µA
	300 kΩ	0.01 kΩ	0.2 + 5	0.2 + 5	0.2 + 5	0.65 µA
	3 MΩ	0.0001 MΩ	0.6 + 5	0.6 + 5	0.6 + 5	93 nA/10 MΩ
	30 MΩ	0.001 MΩ	1.2 + 5	1.2 + 5	1.2 + 5	93 nA/10 MΩ
	100 MΩ	0.01 MΩ	2.0 +10	—	—	93 nA/10 MΩ
	300 MΩ	0.01 MΩ	—	2.0 + 10 @ < 100 MΩ 8.0 + 10 @ > 100 MΩ	2.0 + 10 @ < 100 MΩ 8.0 + 10 @ > 100 MΩ	93 nA/10 MΩ
	300 nS	0.01 nS	1 + 10	1 + 10	1 + 10	93 nA/10 MΩ
Current[3]	300 µA	0.01 µA	0.2 + 5	0.2 + 5	0.2 + 5	< 0.04 V/100Ω
	3000 µA	0.1 µA	0.2 + 5	0.2 + 5	0.2 + 5	< 0.4 V/100 Ω
	30 mA	0.001 mA	0.2 + 5	0.2 + 5	0.2 + 5	< 0.08 V/1 Ω
	300 mA	0.01 mA	0.2 + 5	0.2 + 5	0.2 + 5	< 1.00 V/1 Ω
	3 A	0.0001 A	0.3 + 10	0.3 + 10	0.3 + 10	< 0.1 V/0.01 Ω
	10 A	0.001 A	0.3 + 10	0.3 + 10	0.3 + 10	< 0.3 V/0.01 Ω
Diode Test[4]	3 V	0.0001 V	0.5 + 5	0.5 + 5	0.5 + 5	Approximately 1 to 2 mA
	Auto	0.0001 V	—	0.5 + 5	0.5 + 5	Approximately 1 to 2 mA

Electrical Specifications (continued)

Notes for DC specifications (previous page)

1. Notes for voltage specifications:
   - The accuracy of the 30 to 300 mV range is specified after the Null function is used to subtract the thermal effect (by shorting the test leads).
   - Z_{Low} impedance: 2 kOhm (nominal). For Z_{Low} measurements, autoranging is disabled and the multimeter's range is set to 1000 volts in the manual ranging mode.

2. Notes for resistance specifications:
   - Overload protection: 1000 Vrms for short circuits with < 0.3 A current.
   - Maximum open voltage is < +3.3 V.
   - Built-in buzzer beeps when the resistance measured is less than 25 Ω ± 10 Ω. The multimeter can capture intermittent measurements longer than 1 ms.
   - U1272A/73A/73AX only: The accuracy of the 30 Ω to 3 kΩ range is specified after the Null function is used to subtract the test lead resistance and thermal effect (by shorting the test leads).
   - U1271A only: The accuracy of the 300 Ω to 3 kΩ range is specified after the Null function is used to subtract the test lead resistance and thermal effect (by shorting the test leads).
   - U1273AX only: The accuracy for all resistance ranges is specified after the Null function is used when measuring at temperatures below –20 °C. The Null function is used to subtract the test lead resistance and thermal effect (by shorting the test leads).
   - For the ranges of 30 MΩ and 100 MΩ, the RH is specified for < 60%.
   - The accuracy for ranges < 50 nS is specified after the Null function is used on an open test lead.
   - The temperature coefficient of the 100 MΩ and 300 MΩ range is 0.1 × (specified accuracy)/°C (from –40 to 18 °C or 28 to 55 °C).

3. Notes for current specifications:
   - Overload protection for 300 µA to 300 mA range: 0.44 A/1000 V; 10 × 35 mm 30 kA fast-acting fuse.
   - Overload protection for 3 A to 10 A range: 11 A/1000 V; 10 × 38 mm 30 kA fast-acting fuse.
   - Specification for 300 mA range: 440 mA continuous.
   - Specification for 10 A range: 10 A continuous. Add 0.3% to the specified accuracy when measuring signals > 10 to 20 A for 30 seconds maximum. After measuring currents > 10 A, cool down the multimeter for twice the duration of the measured time before proceeding with low current measurements.

4. Notes for diode specifications:
   - Overload protection: 1000 Vrms for short circuits with < 0.3 A current.
   - Built-in buzzer beeps continuously when the voltage measured is less than 50 mV and beeps once for forward-biased diode or semiconductor junctions measured between 0.3 V and 0.8 V (0.3 V ≤reading ≤ 0.8 V).
   - Open voltage for diode: < +3.3 V DC.
   - Open voltage for Auto diode: < +2.5 V DC and > –1.0 V DC.

Electrical Specifications (continued)

AC specifications for U1271A

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit) 45 Hz to 65 Hz	30 Hz to 1 kHz	1 kHz to 5 kHz	5 kHz to 20 kHz
True RMS AC Voltage[1]	300 mV	0.01 mV	0.7 + 20	1.0 + 25	2.0 + 25	2.0 + 40
	3 V	0.0001 V	0.7 + 20	1.0 + 25	2.0 + 25	2.0 + 40
	30 V	0.001 V	0.7 + 20	1.0 + 25	2.0 + 25	2.0 + 40
	300 V	0.01 V	0.7 + 20	1.0 + 25	2.0 + 25	—
	1000 V	0.1 V	0.7 + 20	1.0 + 25	—	—
	LPF (low pass filter) enabled, applicable for all voltage ranges and resolution0.1 V		0.7 + 20	1.0 + 25@<200 Hz 5.0 + 25@<440 Hz	—	—

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit) 45 Hz to 2 kHz	Burden voltage/Shunt
True RMS AC Current[2]	300 µA	0.01 µA	0.9 + 25	< 0.04 V/100 Ω
	3000 µA	0.1 µA	0.9 + 25	< 0.4 V/100 Ω
	30 mA	0.001 mA	0.9 + 25	< 0.08 V/1 Ω
	300 mA	0.01 mA	0.9 + 25	< 1.00 V/1 Ω
	3 A	0.0001 A	1.0 + 25	< 0.1 V/0.01 Ω
	10 A	0.001 A	1.0 + 25	< 0.3 V/0.01 Ω

1. Notes for voltage specifications:
   - Overload protection: 1000 Vrms. For millivolt measurements, 1000 Vrms for short circuits with < 0.3 A current.
   - Input impedance: 10 MΩ (nominal) in parallel with < 100 pF.
2. Notes for current specifications:
   - Overload protection for 300 µA to 300 mA range: 0.44 A/1000 V; 10 × 35 mm 30 kA fast-acting fuse.
   - Overload protection for 3 A to 10 A range: 11 A/1000 V; 10 × 38 mm 30 kA fast-acting fuse.
   - Specification for 300 mA range: 440 mA continuous.
   - Specification for 10 A range: 10 A continuous. Add 0.3% to the specified accuracy when measuring signals > 10 to 20 A for 30 seconds maximum. After measuring currents > 10 A, cool down the multimeter for twice the duration of the measured time before proceeding with low current measurements.

Electrical Specifications (continued)

AC specifications for U1272A/U1273A and U1273AX

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit) 45 Hz to 65 Hz	20 Hz to 1 kHz	1 kHz to 5 kHz	5 kHz to 20 kHz	20 kHz to 100 kHz
True RMS AC Voltage[1]	30 mV	0.001 mV	0.6 + 20	0.7 + 25	1.0 + 25	1.0 + 40	3.5 + 40
	300 V	0.01 mV	0.6 + 20	0.7 + 25	1.0 + 25	1.0 + 40	3.5 + 40
	3 V	0.0001 V	0.6 + 20	1.0 + 25	1.5 + 25	2.0 + 40	3.5 + 40
	30 V	0.001 V	0.6 + 20	1.0 + 25	1.5 + 25	2.0 + 40	3.5 + 40
	300 V	0.01 V	0.6 + 20	1.0 + 25	1.5 + 25	2.0 + 40	—
	1000 V	0.1 V	0.6 + 20	1.0 + 25	1.5 + 25	—	—
	LPF (low pass filter) enabled, applicable for all voltage ranges and resolution		0.6 + 20	1.0 + 25 @ < 200 Hz 5.0 + 25 @ < 440 Hz	—	—	—
	Z_{LOW} 1000 V		2.0 + 40	2 + 40 @ < 440 Hz	—	—	—

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit) 45 Hz to 65 Hz	20 Hz to 2 kHz	Burden voltage/Shunt
True RMS AC Current[2]	300 µA	0.01 µA	0.6 + 25	0.9 + 25	< 0.04 V/100 Ω
	3000 µA	0.1 µA	0.6 + 25	0.9 + 25	< 0.4 V/100 Ω
	30 mA	0.001 mA	0.6 + 25	0.9 + 25	< 0.08 V/1 Ω
	300 mA	0.01 mA	0.6 + 25	0.9 + 25	< 1.00 V/1 Ω
	3 A	0.0001 A	0.8 + 25	1.0 + 25	< 0.1 V/0.01 Ω
	10 A	0.001 A	0.8 + 25	1.0 + 25	< 0.3 V/0.01 Ω

1. Notes for voltage specifications:
   - Overload protection: 1000 Vrms. For millivolt measurements, 1000 Vrms for short circuits with < 0.3 A current.
   - Input impedance: 10 MΩ (nominal) in parallel with < 100 pF.
   - ZLOW impedance: 2 kΩ (nominal).
   - The input signal is lower than the product of 20,000,000 V×Hz.
   - For 20 to 100 kHz accuracy: Three counts of the LSD per kHz of additional error is to be added for frequencies > 20 kHz and signal inputs < 10% of range.
   - U1273AX only: For all AC voltage ranges, the accuracy is specified at 2.5% + 25 counts when measuring below –20 °C for 20 to 45 Hz AC signals.
2. Notes for current specifications:
   - Overload protection for 300 µA to 300 mA range: 0.44 A/1000 V; 10 × 35 mm 30 kA fast-acting fuse.
   - Overload protection for 3 A to 10 A range: 11 A/1000 V; 10 × 38 mm 30 kA fast-acting fuse.
   - Specification for 300 mA range: 440 mA continuous.

Electrical Specifications (continued)

- Specification for 10 A range: 10 A continuous. Add 0.3% to the specified accuracy when measuring signals > 10 to 20 A for 30 seconds maximum. After measuring currents > 10 A, cool down the multimeter for twice the duration of the measured time before proceeding with low current measurements.
- U1273AX only: The accuracy for the 300 µA range, 3000 µA range, and 30 mA is specified after the Null function is used when measuring at temperatures below –20 °C. The Null function is used to subtract the test lead resistance and thermal effect (by shorting the test leads).
- U1273AX only: For all AC current ranges, the accuracy is specified at 2.5% + 25 counts when measuring below –20 °C for 20 to 45 Hz AC signals.

Electrical Specifications (continued)

AC + DC specifications for U1272A/U1273A and U1273AX

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)				
			45 Hz to 65 Hz	20 Hz to 1 kHz	1 kHz to 5 kHz	5 kHz to 20 kHz	20 kHz to 100 kHz
True RMS AC + DC Voltage[1]	30 mV	0.001 mV	0.7 + 40	0.8 + 45	1.1 + 45	1.1 + 60	3.6 + 60
	300 mV	0.01 mV	0.7 + 25	0.8 + 30	1.1 + 30	1.1 + 45	3.6 + 45
	3 V	0.0001 V	0.7 + 25	1.1 + 30	1.6 + 30	2.1 + 45	3.6 + 45
	30 V	0.001 V	0.7 + 25	1.1 + 30	1.6 + 30	2.1 + 45	3.6 + 45
	300 V	0.01 V	0.7 + 25	1.1 + 30	1.6 + 30	2.1 + 45	—
	1000 V	0.1 V	0.7 + 25	1.1 + 30	1.6 + 30	—	—

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)		
			45 Hz to 65 Hz	20 Hz to 2 kHz	Burden voltage/Shunt
True RMS AC + DC Current[2]	300 µA	0.01 µA	0.8 + 30	1.1 + 30	< 0.04 V/100 Ω
	3000 µA	0.1 µA	0.8 + 30	1.1 + 30	< 0.4 V/100 Ω
	30 mA	0.001 mA	0.8 + 30	1.1 + 30	< 0.08 V/1 Ω
	300 mA	0.01 mA	0.8 + 30	1.1 + 30	< 1.00 V/1 Ω
	3 A	0.0001 A	0.9 + 35	1.3 + 35	< 0.1 V/0.01 Ω
	10 A	0.001 A	0.9 + 35	1.3 + 35	< 0.3 V/0.01 Ω

1. Notes for voltage specifications:
   - Overload protection: 1000 Vrms. For millivolt measurements, 1000 Vrms for short circuits with < 0.3 A current.
   - Input impedance: 10 MΩ (nominal) in parallel with < 100 pF.
   - The input signal is lower than the product of 20,000,000 V×Hz.
   - For 20 to 100 kHz accuracy: Three counts of the LSD per kHz of additional error is to be added for frequencies > 20 kHz and signal inputs < 10% of range.
   - U1273AX only: For all AC voltage ranges, the accuracy is specified at 2.5% + 25 counts when measuring below –20 °C for 20 to 45 Hz AC signals.
2. Notes for current specifications:
   - Overload protection for 300 µA to 300 mA range: 0.44 A/1000 V; 10 × 35 mm 30 kA fast-acting fuse.
   - Overload protection for 3 A to 10 A range: 11 A/1000 V; 10 × 38 mm 30 kA fast-acting fuse.
   - Specification for 300 mA range: 440 mA continuous.
   - Specification for 10 A range: 10 A continuous. Add 0.3% to the specified accuracy when measuring signals > 10 to 20 A for 30 seconds maximum. After measuring currents > 10 A, cool down the multimeter for twice the duration of the measured time before proceeding with low current measurements.
   - U1273AX only: The accuracy for the 300 µA range, 3000 µA range, and 30 mA is specified after the Null function is used when measuring at temperatures below –20 °C. The Null function is used to subtract the test lead resistance and thermal effect (by shorting the test leads).
   - U1273AX only: For all AC current ranges, the accuracy is specified at 2.5% + 25 counts when measuring below –20 °C for 20 to 45 Hz AC signals.

Electrical Specifications (continued)

Temperature specifications[1 - 4]

Thermocouple type	Range	Resolution	Accuracy ± (% of reading + as specified below)		
			U1271A	U1272A	U1273A/U1273AX
K	–200 to 1372 °C	0.1 °C	1% reading + 1 °C	1% reading + 1 °C	1% reading + 1 °C
	–328 to 2502 °F	0.1 °F	1% reading + 1.8 °F	1% reading + 1.8 °F	1% reading + 1.8 °F
J	–210 to 1200 °C	0.1 °C	—	1% reading + 1 °C	1% reading + 1 °C
	–346 to 2192 °F	0.1 °F	—	1% reading + 1.8 °F	1% reading + 1.8 °F

1. The specifications above is specified after 60 minutes of warm-up time.
2. The accuracy does not include the tolerance of the thermocouple probe.
3. Do not allow the temperature sensor to contact a surface that is energized above 30 Vrms or 60 V DC. Such voltages pose a shock hazard.
4. The temperature calculation is specified according to the safety standards of EN/IEC-60548-1 and NIST175.

Capacitance specifications[5, 6]

Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)		
		U1271A	U1272A	U1273A/U1273AX
10 nF	0.001 nF	1 + 5	1 + 5	1 + 5
100 nF	0.01 nF	1 + 2	1 + 2	1 + 2
1000 nF	0.1 nF	1 + 2	1 + 2	1 + 2
10 µF	0.001 µF	1 + 2	1 + 2	1 + 2
100 µF	0.01 µF	1 + 2	1 + 2	1 + 2
1000 µF	0.1 µF	1 + 2	1 + 2	1 + 2
10 mF	0.001 mF	1 + 2	1 + 2	1 + 2

5. Overload protection: 1000 Vrms for short circuits with < 0.3 A current.
6. The accuracy for all ranges is specified based on a film capacitor or better, and after the Null function is used to subtract the test lead resistance and thermal effect (by opening the test leads).

Electrical Specifications (continued)

Frequency specifications[1, 2]

Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)	Maximum input frequency
99.999 Hz	0.001 Hz	0.02 + 5	0.5 Hz
999.99 Hz	0.01 Hz	0.005 + 5	
9.9999 Hz	0.1 Hz	0.005 + 5	
99.999 kHz	1 Hz	0.005 + 5	
999.99 kHz	0.01 Hz	0.005 + 5	
> 1 MHz	0.1 Hz	0.005 + 5 @< 1 MHz	

1. Overload protection: 1000 V; input signal is < 20,000,000 V × Hz (product of voltage and frequency).
2. The frequency measurement is susceptible to error when measuring low-voltage, low-frequency signals. Shielding inputs from external noise pickup is critical for minimizing measurement errors. Turning on the low pass filter may help you to filter out the noise and achieve a stable reading.

Duty Cycle[3]

Mode	Range	Accuracy at full scale
DC coupling	99.99%	0.3 % per kHz + 0.3 %
AC coupling	99.99%	0.3 % per kHz + 0.3 %

3. Notes for duty cycle specifications:
   - The accuracy for duty cycle and pulse width measurements is based on a 3 V square wave input to the DC 3 V range. For AC couplings, the duty cycle range can be measured within the range of 10% to 90% for signal frequencies > 20 Hz.
   - The range of the duty cycle is determined by the frequency of the signal: {10 µs × frequency × 100%} to {[1 – (10 µs × frequency)] × 100%}.
   - The pulse width (positive or negative) must be > 10 µs. The range of the pulse width is determined by the frequency of the signal.

Pulse Width[4]

Range	Resolution	Accuracy at full scale
999.99 ms	0.01 ms	(duty cycle accuracy/frequency) + 0.01 ms
2000.0 ms	0.1 ms	(duty cycle accuracy/frequency) + 0.1 ms

4. Notes for pulse width specifications:
   - The accuracy for duty cycle and pulse width measurements is based on a 3 V square wave input to the DC 3 V range.
   - The pulse width (positive or negative) must be > 10 µs. The range of the pulse width is determined by the frequency of the signal.

Electrical Specifications (continued)

U1271A and U1272A frequency sensitivity for voltage measurements [1, 2, 3]

Input range	Minimum sensitivity (RMS sine wave)			Trigger level for DC coupling 0.5 Hz to 200 kHz	
	15 Hz to 100 kHz	0.5 Hz to 200 kHz	Up to 1 MHz	U1271A	U1272A
30 mV	3 mV	3 mV	—	—	5 mV
300 mV	6 mV	8 mV	40 mV	10 mV	15 mV
3 V	0.12 V	0.2 V	0.4 V	0.15 V	0.15 V
30 V	0.6 V	0.8 V	2.6 V	1.5 V	1.5 V
300 V	6 V	8 V @ < 100 kHz	—	9 V @ < 100 kHz	9 V @ < 100 kHz
1000 V	50 V	50V @ < 100 kHz	—	90 V @ < 100 kHz	90 V @ < 100 kHz

1. Maximum input for specified accuracy, refer to “AC specifications” on page 12.
2. 30 mV range applicable for U1272A only.
3. 200 kHz to 1 MHz range applicable for U1272A only.

U1273A/U1273AX sensitivity for voltage measurements[4]

Input range	Frequency sensitivity and trigger level			
	Minimum sensitivity (RMS sine wave)			Trigger level for DC coupling
Maximum input for specified accuracy, refer to AC voltage	15 Hz to 100 kHz	0.5 Hz to 200 kHz	Up to 1 MHz	0.5 Hz to 200 kHz
30 mV	3 mV	3 mV	—	5 mV
300 mV	7 mV	8 mV	38 mV	15 mV
3 V	0.12 V	0.2 V	0.48 V	0.15 V
30 V	0.8 V	0.8 V	3.5 V	1.5 V
300 V	6.7 V	8 V < 100 kHz	—	11 V < 100 kHz
1000 V	67 V	67 V < 100 kHz	—	110 V < 100 kHz

4. Maximum input for specified accuracy, refer to “AC specifications” on page 13.

Frequency sensitivity for current measurements[5]

Input range	Minimum sensitivity (RMS sine wave) 2 Hz to 30 kHz	
	U1271A/U1272A	U1273A/U1273AX
300 µA	100 µA	70 µA
3000 µA	70 µA	120 µA
30 mA	1.2 mA	1.2 mA
300 mA	12 mA	12 mA
3 A	0.12 A	0.12 A
10 A	1.2 A	1.2 A

5. Maximum input for specified accuracy, refer to “AC specifications” on page 12 and 13.

Electrical Specifications (continued)

Peak hold

Signal width	Accuracy for DC Voltage and Current
Single event >1 ms	Specified accuracy + 400
Repetitive >250 µs	Specified accuracy + 1000

Decibel (dB) for U1272A and U1273A[1, 2, 3]

dB	Reference	Default reference
1 mW (dBm)	1 to 9999 Ω	50 Ω
1 V (dBV)	1 V	1 V

1. The reading of dBm is indicated in decibels of power above or below 1 mW, or decibels of voltage above or below 1 V. The formula is calculated according to the voltage measurement and specified reference impedance. Its accuracy is depended on the accuracy of the voltage measurement. See Decibel (dBV) accuracy table below.
2. Auto-ranging mode is used.
3. The bandwidth is according to voltage measurement.

Decibel (dBV) accuracy

dBV range			Accuracy				
Range	Minimum	Maximum	45 Hz to 65 Hz	20 Hz to 1 kHz	1 Hz to 5 kHz	5 kHz 20 kHz	20 kHz to 100 kHz
30 mV	–56.48	–30.46	0.06	0.07	0.09	0.1	0.32
300 mV	–36.48	–10.46	0.06	0.07	0.09	0.1	0.32
3 V	–16.48	+9.54	0.06	0.09	0.14	0.19	0.32
30 V	+3.52	+29.54	0.06	0.09	0.14	0.19	0.32
300 V	+23.52	+49.54	0.06	0.09	0.14	0.19	—
1000 V	+33.98	+60	0.06	0.09	0.14	—	—

Measurement rate (approximate)

Function	Times / second	
	U1271A	U1272A/U1273A/U1273AX
ACV	7	7
DCV	7	7
Ω	14	14
Ω with offset compensation	—	3
Diode	14	14
Auto diode	—	3
Capacitance	4 (< 100 µF)	4 (< 100 µF)
DCA	7	7
ACA	7	7
Temperature	7	7
Frequency	2 (> 10 Hz)	2 (> 10 Hz)
Duty cycle	1 (> 10 Hz)	1 (> 10 Hz)
Pulse width	1 (> 10 Hz)	1 (> 10 Hz)

Ordering Information

Standard shipped accessories

Standard test leads, test probes with 4-mm tips, K-type thermocouple and adapter, 4x AAA alkaline batteries (4x AAA lithium batteries for U1273AX only), Certificate of Calibration, UK 6 (test report), Quick Start Guide


U1271A


U1272A


U1273A

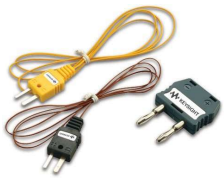

U1273AX

Optional accessories

Measuring accessories (non-temperature)		
U1161A Extended test lead kit		Includes two test leads (red and black), two test probes, medium-sized alligator clips and 4-mm banana plugs. – Test leads: CAT III 1000 V, CAT IV 600 V, 15 A – Test probes (4-mm tips): CAT III 1000 V, CAT IV 600 V, 15 A – Medium-sized alligator clips: CAT III 1000 V/CAT IV 600 V, 15 A – 4-mm banana plugs: CAT II 600 V, 10 A
U1162A Alligator clips		– One pair of insulated alligator clips (red and black). Recommended for use with Keysight standard test leads. – CAT III 1000 V, CAT IV 600 V, 15 A
U1163A SMT grabbers		– One pair of SMT grabbers (red and black). Recommended for use with Keysight standard test leads. – Rated CAT II 300 V, 3 A
U1164A Fine-tip test probes		– One pair of fine-tip test probes (red and black). Recommended for use with Keysight standard test leads. – Rated CAT II 300 V, 3 A
U1168A Standard test lead kit		Includes two test leads (red and black), 4-mm test probes, alligator clips, fine-tip test probes, SMT grabbers and mini grabber (black). – Test leads: CAT III 1000 V, CAT IV 600 V, 15 A – Test probe (19-mm tips): CAT II 1000 V, 15 A – Test probe (4-mm tips): CAT III 1000 V, CAT IV 600 V, 15 A (highly recommended for CAT IV environment) – Alligator clips: CAT III 1000 V, CAT IV 600 V, 15 A – Fine-tip test probes: CAT II 300 V, 3 A – SMT grabber: CAT II 300 V, 3 A – Mini grabber: CAT II 300 V, 3 A
U1583B AC current clamp		– Dual range: 40 A and 400 A – Rated CAT III 600 V – BNC-to-banana-plug adapter provided for use with DMMs – -40 to 55 °C operating temperature

Ordering Information (continued)

Optional accessories (continued)

Measuring accessories (non-temperature)		
U1180A Thermocouple adapter + lead kit, J and K types		Includes thermocouple adapter, thermocouple bead J-type and thermocouple bead K-type. – T/C adapter J/K-type – T/C bead J-type: –20 to 200 °C – T/C bead K-type: –20 to 200 °C
U1181A Immersion temperature probe		– Type-K T/C for use in oil and other liquids – Measurement range: –50 to 700 ºC – Includes adapter U1184A for connection to DMM
U1182A Industrial surface temperature probe		– Type-K T/C for use on still surfaces – Measurement range: –50 to 400 ºC – Includes adapter U1184A for connection to DMM
U1183A Air temperature probe		– Type-K T/C for use in air and non-caustic gas – Measurement range: –50 to 800 ºC – Includes adapter U1184A for connection to DMM
U1184A Temperature probe adapter		– Mini-connector-to-banana-plug adapter for use with DMM
U1185A J-type thermocouple and adapter		– T/C adapter J/K-type – T/C bead J-type: –20 to 200 °C
U1186A K-type thermocouple and adapter		– T/C adapter J/K-type – T/C bead J-type: –20 to 200 °C

Ordering Information (continued)

Optional accessories (continued)

U1171A Magnetic hanging kit		For fastening the DMM to a steel surface so both hands are free
U1173A IR-to-USB cable		– For remote control and data logging to PC – Maximum baud rate: 19,200 bits per second
U1174A Soft carrying case		The convenient way to carry your DMM and essential accessories – Dimension: 9 inches (H) x 5 inches (W) x 3 inches (D)
U1177A Bluetooth Adapter		– Enables Bluetooth connection to Keysight handheld digital multimeters – Support the U1230, U1240, U1250 and U1270 Series handheld multimeters – Remote monitoring and data logging capabilities via Android devices or Windows-based PC – Recommended to use Lithium battery in lower than -20°C in temperature for long hours of operation

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