Keysight Technologies
U1280 Series Handheld Digital Multimeters

Data Sheet



Trustworthy Measurements in the Palm of Your Hand!

KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

Introduction

Gain the confidence to achieve trustworthy measurements thanks to the precision, accuracy and repeatability of the Keysight Technologies, Inc. U1280 series handheld digital multimeters (DMMs). Why feel tied to the bench when it comes to the need of troubleshooting electronic circuits in the system? Now you can get accurate and reliable measurement with 60,000-count display resolution and 0.025% basic DCV accuracy for troubleshooting electronic circuits of the system.

Key Features

- 60,000-count dual display
- Up to 0.025% basic DCV accuracy
- Longer battery life up to 800 hours
- Certified to IP 67 for water and dust protection
- Tested to withstand a 3-meter (10-ft) drop
- CAT III 1000 V / CAT IV 600 V overvoltage protection
- Special features[1]
  - Vsense for non-contact voltage detection
  - Square wave output for generating pulse width modulation (PWM) signal
  - Frequency counter
  - Low pass filter
- For Keysight Remote Link solution, add on optional U1117A Infrared (IR)-to-*Bluetooth*® adapter to get instant wireless *Bluetooth* connection

1. U1282A only

Prolonged battery life and rugged

The last thing you want is for your tools to run out of juice when you need it the most. The U1280 series handheld DMMs lets you carry out test and measurements over a longer duration than ever before. With up to 800 hours of battery life, you have a handheld DMM which works for a long time minus the hassle of battery change, especially useful for frequent usage or prolong testing. Put your battery concerns behind and fully focus on your work at hand, as it should be for maximum productivity.

When operating in harsh conditions, you'd need tools which are strong enough to stand up to the task. The U1280 series are housed in robust over mold enclosures and certified to IP 67, providing superior protection to monitor against dust and water immersion. Better yet, it is also designed to absorb the impact of a 3-meter (10 ft) drop.

Vsense for non-contact voltage detection

Troubleshooting in most electrical environment is typically dangerous due to the high voltages involved. Now with the unique built in Vsense feature, you get a quick sense of AC voltage presence without the need to probe. When voltage presence is detected, it produces a unique combination of audible beeper alert and blinking LED light to alert users. This is especially useful to safeguard users from exposure to live wires, suspected AC voltage presence or simply an act of safety precaution before initiating a task. Work with a peace of mind knowing your safety comes first with Keysight's U1280 Series handheld DMM.



Figure 1. Large display and backlit keypad allow users to complete their jobs even in subdued lighting conditions.

Comprehensive data logging experience with Keysight Meter Logger software

When it comes to the need to observe measurements over a period of time, Keysight Meter Logger software provides a comprehensive data logging experience with Keysight U1280 Series as well as other Keysight U1200 Series handheld DMMs. The handheld DMM can be easily connected to the Meter Logger software that runs on a PC via Infrared (IR)-to-USB cable, or to do so wirelessly with the optional Keysight Remote Link solution. Keysight Meter Logger software provides users the flexibility and useful configuration to log their measurements, such as the flexibility to select sample interval, enable limit levels on the data log and email notification option for when the limit is exceeded. The data log measurements can be presented either by trend plot or table format for easy interpretation and further analysis – essential for troubleshooting and commissioning tasks. Once the measurements are recorded in the software, users can transfers the logged data into various types of report formats with just a click of the button.



Figure 2. U1282A data log trend plot with markers and limit levels.

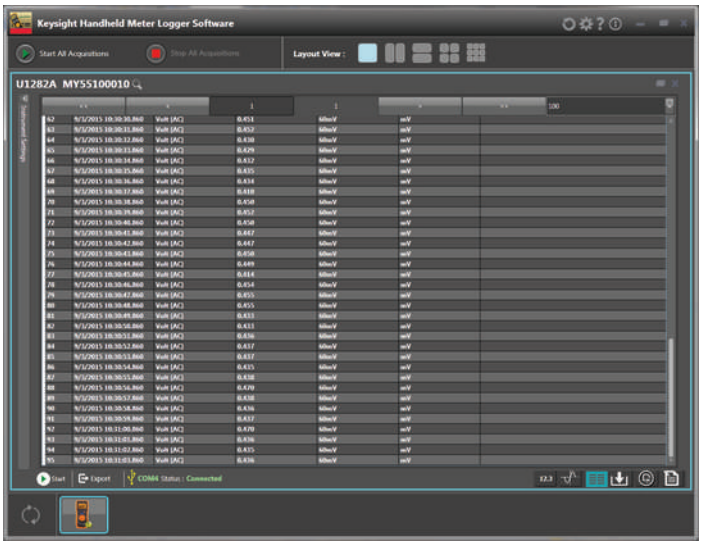


Figure 3. U1282A data log in table format.

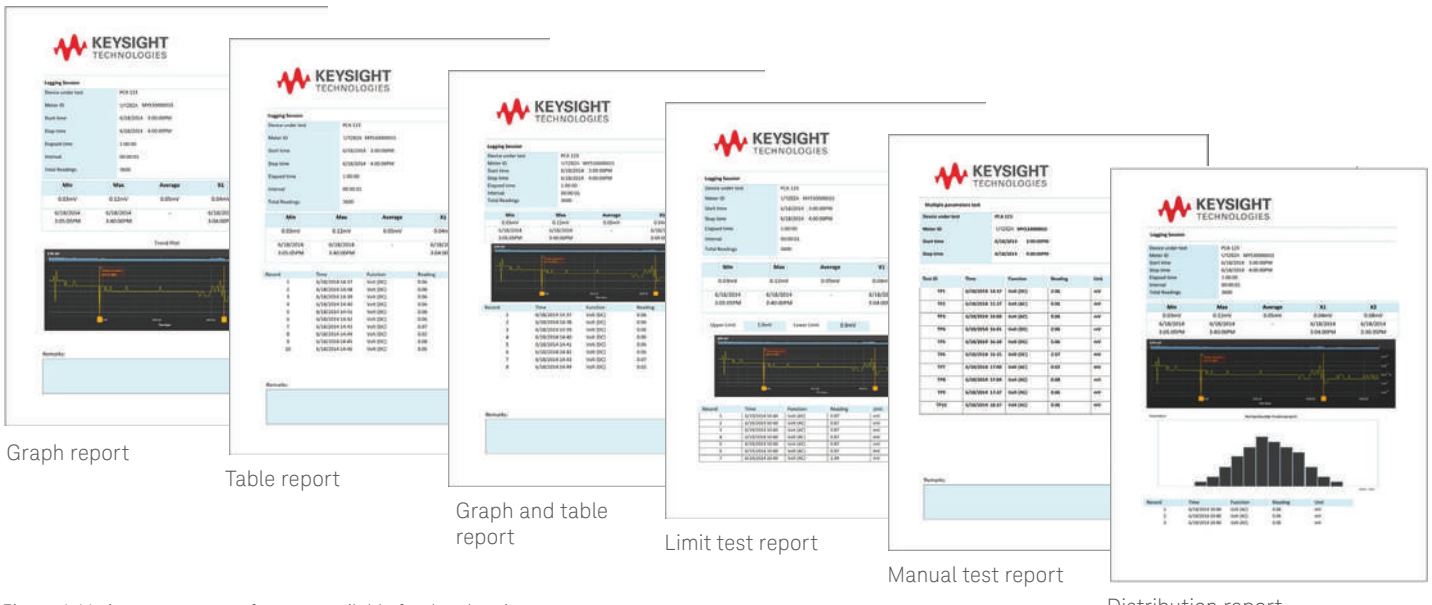


Figure 4. Various test reports formats available for data logging

Manual logging made easy with Hold & Export button

While data logging over a period of time is useful to capture measurements for further observations and analysis, manual data log is just as useful to conveniently record measurements and reduce human error occurrence from conventional manual data entering process. Better yet, users are able to store measurement readings into the handheld DMM's internal memory and at the same time export the measurements to the Keysight Meter Logger software or Keysight Remote Link solution via the DMM's infrared port – all of these by simply pressing the 'Hold & Export' button. When the situation requires users to concentrate on probing, the optional U5404A remote switch probe can be used to perform manual logging by emulating the 'Hold & Export' button of the U1280 Series handheld DMMs.



Figure 5. Hold & Export button—one press for three actions: Measure, save it into handheld DMM's memory and send the measurement out via infrared port. Optional U5404A remote switch probe emulates 'Hold & Export' button.

Built-in low pass filter

Today, three-phase AC electric motors are the most important workhorses in industry and commercial facilities. With the advent of solid state electronics, variable speed drives (VFD) are used to regulate the speed of three-phase AC motors to increase the efficiency of AC motors. However, the increased use of VFDs present challenges to technicians in getting accurate voltage, current and frequency measurements that match with readings shown on the VFD's control panel display. Many true RMS DMMs that have high AC bandwidth are measuring VFD signals up to 20% to 30% higher than the drive's controller display due to the reason that DMMs are measuring the carrier frequency/switching frequency generated by VFDs. Keysight U1280 Series comes with LPF (low pass filter) feature which blocks unwanted high frequency signal from VFDs' switching components. The net result is an accurate measurement of VFD's output signal which helps to expedite the maintenance or troubleshooting tasks of VFDs.

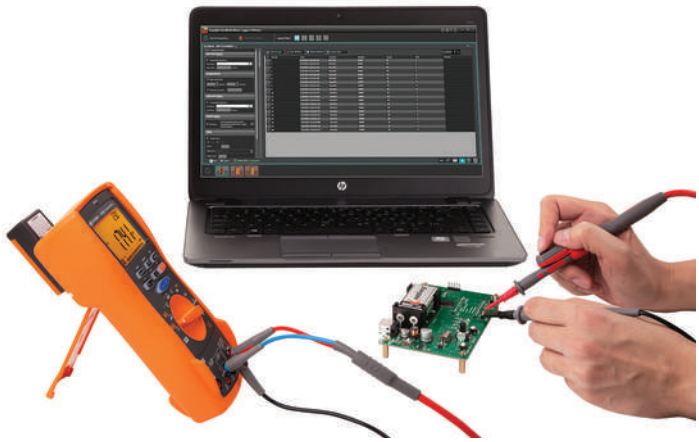


Figure 6. Data logging experience with Keysight Meter Logger software

Programmable

Keysight U1280 Series comes with programmability capability that allows avid programmer to create computer programs to control the handheld DMM. The programmability of Keysight U1280 Series allows users to automate Keysight U1280 Series or even integrate into bigger test systems.



Figure 7. Pair up the U1280 series with Keysight Remote Link solution for wireless measurement option

Front panel

60,000-count dual display

Data logging:
- Manual data logging up to 100 readings, or,
- Auto/event data logging up to 10,000 readings

Low pass filter (LPF)* to reduce unwanted noise when measuring AC voltage



Vsense* red LED indicator for non-contact voltage detection

Frequency counter for low voltage application

Broad range of measurement functions: voltage, current, frequency, capacitance, resistance, continuity, diode test and temperature

Square wave output* for generating pulse width modulation (PWM) output

CAT IV 600 V CAT III 1000 V overvoltage protection

Remote switch probe terminal

Back panel



Probe holder/storage





IR-USB connectivity

* U1282A only

U1280 series comparison

		U1281A	U1282A
Basic features			
Display resolution		60,000	60,000
Auto/manual ranging		Yes	Yes
Analog bar graph		Yes	Yes
Backlight		Yes	Yes
AC bandwidth		30 kHz	100 kHz
True RMS		AC + DC	AC + DC
Measurements			
Voltage DC	Range	60 mV to 1000 V	60 mV to 1000 V
	Accuracy	0.025 % + 5 cnts	0.025 % + 5 cnts
Voltage AC	Range	60 mV to 1000 V	60 mV to 1000 V
	Accuracy	0.3 % + 25 cnts	0.3 % + 25 cnts
Current DC	Range	600 µA to 10 A	600 µA to 10 A
	Accuracy	0.05 % + 5 cnts	0.05 % + 5 cnts
Current AC	Range	600 µA to 10 A	600 µA to 10 A
	Accuracy	0.6 % + 25 cnts	0.6 % + 25 cnts
Resistance	Range	600 Ω to 60 MΩ	60 Ω to 600 MΩ
	Accuracy	0.05 % + 2 cnts	0.05 % + 2 cnts
Frequency	Range	99.999 Hz to 9.9999 MHz	99.999 Hz to 9.9999 MHz
	Accuracy	0.005 % + 3 cnts	0.005 % + 3 cnts
Capacitance	Range	10 nF to 100 mF	10 nF to 100 mF
	Accuracy	1 % + 5 cnts	1 % + 5 cnts
Temperature (K-type thermocouple)	Range	–200 °C to 1372 °C	–200 °C to 1372 °C
	Accuracy	1 % + 1 °C	1 % + 1 °C
Continuity with beeper		Yes	Yes
Diode test		Yes	Yes
Data management			
Min/max recording		Yes	Yes
Display hold		Yes	Yes
Auto hold		Yes	Yes
Null		Yes	Yes
PC-Connectivity		Infrared (IR)-USB; *IR-Bluetooth (optional with U1117A)*	Infrared (IR)-USB; *IR-Bluetooth (optional with U1117A)*
Special features			
Square wave output			Yes
Vsense: non-contact voltage detect			Yes
Frequency counter			Yes
Low pass filter			Yes
Safety and regulatory			
Over-voltage safety protection		CAT III 1000 V / CAT IV 600 V	CAT III 1000 V / CAT IV 600 V
EN/IEC 61010-2-030: 2010 compliance		Yes	Yes
EN/IEC 61010-1: 2010 compliance		Yes	Yes
General			
Operating temperature		–20 °C to 55 °C 0 % to 80 % R.H.	–20 °C to 55 °C 0 % to 80 % R.H.
Battery (included)		4 x 1.5 V AA	4 x 1.5 V AA
Battery life		800 hours	800 hours
Warranty		3-year	3-year
Calibration		One year, or; Two years (with 1.5 times of one year specification)	One year, or; Two years (with 1.5 times of one year specification)
Dimensions (H x W x D)		218 x 96 x 59 mm	218 x 96 x 59 mm

General specifications

Display	5-digit liquid crystal display (LCD) with maximum reading of 66,000-count Automatic polarity indication.
Power consumption	250 mVA / 330 mVA with backlight
Battery type	4x 1.5 V AA alkaline battery (ANSI/NEDA 15A or IEC LR6), or; 4x 1.5 V AA zinc chloride battery (ANSI/NEDA 15D or IEC R6), or; 4x 1.5 V AA Lithium battery (ANSI/NEDA 15-LF or IEC FR6)
Battery life	800 hours typical based on new alkaline batteries for DC voltage measurement
Connectivity	Infrared (IR) port, connect with: – IR-USB cable, or; – U1117A IR-to-*Bluetooth* adapter (*Bluetooth* Class 1), or; – U1177A IR-to-*Bluetooth* adapter (*Bluetooth* Class 2)
Fuse	10 x 35 mm, 440 mA / 1000 V, 10 kA minimum fast-acting fuse 10 x 38 mm, 11 A / 1000 V, 20 kA minimum fast-acting fuse
Operating environment	Full accuracy from –20 °C to 55 °C; and up to 80 % R.H. for temperature up to 30 °C decreasing linearly to 50 % R.H. at 55 °C Pollution Degree II Altitude up to 3000 meters
Storage compliance	–40 °C to 70 °C, 0 to 80 % R. H. (with battery removed)
Safety compliance	EN/IEC 61010-2-030: 2010 EN/IEC 61010-1: 2010
Measurement category	CAT III 1000 V / CAT IV 600 V
Electromagnetic compatibility (EMC)	Susceptibility and Emissions: commercial limits per EN/IEC 61326-1
Ingression protection rating	IP-67, protected against dust and the effect of immersion between 15 cm and 1 m
Temperature coefficient	0.05 x (specified accuracy) / °C (from –20 °C to 18 °C or 28 °C to 55 °C)
Common mode rejection ratio (CMRR)	> 120 dB at DC, 50/60 Hz ± 0.1 % (1 kΩ unbalanced)
Normal mode rejection ratio (NMRR)	> 60 dB at 50/60 Hz ± 0.1 %
Dimensions (H x W x D)	218 x 96 x 59 mm
Weight	701 grams (with batteries)
Warranty	Three years for main unit Three months for standard shipped accessories
Calibration cycle	One year, or; Two years (with 1.5 times of one year specification)

Specification assumptions

- Accuracy is given as ± (% of reading + counts of least significant digit) at 23 °C ± 5 °C, with relative humidity less than 80 % R.H.
- Accuracy is specified for 1-year after calibration, at operating temperature of room temperature. Multiply 1.5 times of the accuracy for 2-year after calibration. Example ± (1.5 X % of reading + 1.5 X counts of least significant digit).
- AC and AC µA / mA / A specifications are AC coupled.
- True RMS measurement is valid from 5 % of range to 100 % of range.
- For non-sinusoidal waveforms, add (0.1 % of reading + 0.3 % of full scale) typically
- The maximum circuit limitation of peak signal is 300 % typically for voltage and current except 250 % and 150 % typically for range 600 V and 1000 V respectively.
- The crest factor is according to the maximum circuit limitation of peak signal
- Specification is based on 5 times/second of data refresh rate
- CMRR and NMRR are based on 5 times/second of data refresh rate

DC specification for U1281A/U1282A

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)	Test current / burden voltage
Voltage[3,4]	60 mV	0.001 mV	0.05 % + 10[1]	–
	600 mV	0.01 mV	0.025 % + 5[1]	–
	6 V	0.0001 V	0.025 % + 5[2]	–
	60 V	0.001 V	0.025 % + 5	–
	600 V	0.01 V	0.025 % + 5	–
	1000 V	0.1 V	0.025 % + 5	–
Current[3,4,5]	600 µA	0.01 µA	0.12 % + 10	0.0301 V (50 Ω)
	6 mA	0.0001 mA	0.05 % + 5	0.312 V (50 Ω)
	60 mA	0.001 mA	0.10 % + 20[1]	0.115 V (0.5 Ω)
	600 mA	0.01 mA	0.15 % + 5[1]	0.896 V (0.5 Ω)
	6 A	0.0001 A	0.3 % + 10	0.240 V (0.01 Ω)
	10 A[2]	0.001 A	0.3 % + 5	0.4 V (0.01 Ω)
Diode test[1,2,3]	–	0.0001 V	0.5 % + 10	< 1.7 mA
Function	**Range**	**Resolution**	**Accuracy ± (% of reading + counts of least significant digit)**	**Continuity threshold**
Resistance/ audible continuity[1,2]	60 Ω[5]	0.001 Ω	0.15 % + 20[3]	5 ± 3 Ω
	600 Ω	0.01 Ω	0.05 % + 10[3]	25 ± 11 Ω
	6 kΩ	0.0001 kΩ	0.05 % + 2	0.123 ± 0.052 kΩ
	60 kΩ	0.001 kΩ	0.05 % + 2	1.12 ± 0.5 kΩ
	600 kΩ	0.01 kΩ	0.05 % + 2	12.1 ± 5.2 kΩ
	6 MΩ	0.0001 MΩ	0.15 % + 2	0.109 ± 0.05 MΩ
	60 MΩ[4]	0.001 MΩ	1.5 % + 3	0.109 ± 0.05 MΩ
	600 MΩ[4,5,6]	0.01 MΩ	3.0 % + 3 (< 100 MΩ) 8.0 % + 3 (< 600 MΩ)	0.109 ± 0.05 MΩ
	600 nS	0.01 nS	1 % + 20	None

Notes for DC specifications

A. Notes for voltage specification.

1. The accuracy is specified after NULL function is used to zero out thermal effect (by shorting test leads).
2. The temperature coefficient for 6 V range is 0.075 x (specified accuracy) / °C (from –20 °C to 18 °C or 28 °C to 55 °C).
3. The accuracy is specified for 10 MΩ (nominal) input impedance.
4. Overload protection for 60 mV and 600 mV ranges: 1000 Vrms for circuits < 0.3 A short circuit current. Overload protection for other ranges: 1000 Vrms.

B. Notes for current specification

1. Current can be measured up to 440 mA continuously. Maximum of 20 hours for measuring current more than 440 mA. 60 mA and 600 mA ranges have thermal effect of 0.35 µA/mA to be offset after current applied to these ranges. Cool down the meter for at least 6 seconds if 100 mA was applied, and at least 3 minutes if 600 mA was applied; or alternatively use the NULL function to zero-out thermal effect with open test lead before measuring the signal.
2. Current can be measured up to 10 A continuously. Maximum of 30 seconds for measuring current more than 10 A to 20 A, add 0.3 % to specified accuracy. The multimeter needs to be cool down after measuring current that is more than 10 A. Cool down the meter for twice the duration of the measured time and use NULL function to zero-out thermal effect before proceeding with lower current measurement.
3. 600 µA to 60 mA ranges (connection with mA terminal) overload protection by 10 x 35 mm, 440 mA/1000 V, 10 kA minimum fast-acting fuse.
4. 6 A and 10 A ranges (connection with A terminal) overload protection by 10 x 38 mm, 11 A / 1000 V, 20 kA minimum fast-acting fuse.
5. Ensure good ventilation and no heat element close to the meter.

C. Notes for diode test specification

1. Overload protection: 1000 Vrms for circuits < 0.3 A short circuit current.
2. Built-in buzzer sounds when reading is below 0.05 V approximately, and single tone for normal forward-biased diode or semiconductor junction as 0.3 V ≤ reading ≤ 0.8 V.
3. The maximum threshold voltage display is less than +3.1 V.

D. Notes for resistance/audible Continuity specification

1. Maximum open voltage: < +2.7 V
2. Built-in buzzer sounds as transient when resistance less than 25 ± 11 Ω. It may capture the intermittent for longer than 1 ms.
3. The accuracy is specified after Math Null, which is used to subtract the test lead resistance and the thermal effect. Ensure good ventilation and no heat element close to the meter.
4. For 60 MΩ and 600 MΩ ranges, the R.H. is specified for < 60 % at 30 °C.
5. Only available in U1282A
6. For 600 MΩ range: temperature coefficient is 0.1 x (specified accuracy) / °C (from –20 °C to 18 °C or 28 °C to 55 °C).

AC and AC + DC voltage specification for U1281A / U1282A[1,2]

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)				
			20 Hz to 45 Hz	45 Hz to 1 kHz	1 kHz to 10 kHz	10 kHz to 20 kHz	20 kHz to 100 kHz[5]
AC voltage True RMS	60 mV	0.001 mV	1.0 % + 60	0.3 % + 25	0.7 % + 25	1.5 % + 60	3.5 % + 60
	600 mV[3]	0.01 mV	1.0 % + 60	0.3 % + 25	0.7 % + 25	1.5 % + 60	3.5 % + 60
	6 V	0.0001 V	1.0 % + 60	0.3 % + 25	0.7 % + 25	1.5 % + 60	3.5 % + 60
	60 V	0.001 V	1.0 % + 60	0.3 % + 25	0.7 % + 25	1.5 % + 60	3.5 % + 60
	600 V	0.01 V	1.0 % + 60	0.3 % + 25	0.7 % + 25	1.5 % + 60[4]	3.5 % + 60[4]
	1000 V	0.1 V	1.0 % + 60	0.3 % + 25	0.7 % + 25	1.5 % + 60[4]	N/A
	LPF (Low Pass Filter) enabled, applicable for all voltage ranges and resolutions	2.0 % + 60	2.0 % + 25 for < 200 Hz 6.0 % + 60 for < 440 Hz	N/A	N/A	N/A	N/A
AC + DC voltage True RMS	60 mV	0.001 mV	1.05 % + 70	0.35 % + 35	0.75 % + 35	1.55 % + 70	3.55 % + 70
	600 mV[3]	0.01 mV	1.05 % + 65	0.35 % + 30	0.75 % + 30	1.55 % + 65	3.55 % + 65
	6 V	0.0001 V	1.05 % + 65	0.35 % + 30	0.75 % + 30	1.55 % + 65	3.55 % + 65
	60 V	0.001 V	1.05 % + 65	0.35 % + 30	0.75 % + 30	1.55 % + 65	3.55 % + 65
	600 V	0.01 V	1.05 % + 65	0.35 % + 30	0.75 % + 30	1.55 % + 65[4]	3.55 % + 65[4]
	1000 V	0.1 V	1.05 % + 65	0.35 % + 30	0.75 % + 30	1.55 % + 65[4]	N/A

Notes
1. Overload protection: 1000 Vrms. Overload protection for mV range: 1000 Vrms for short circuits with < 0.3 A current.
2. Input impedance: 10 MΩ in parallel with < 100 pF (nominal). The accuracy is specified for 10 MΩ (nominal) input impedance.
3. Add additional 2 % error as crest factor > 2
4. For voltage that is lower than 300 Vrms, and frequency lower than 30 kHz.
5. Additional error when frequency is more than 30 kHz: 0.1 of least significant digit x square of frequency. The bandwidth of U1281A is up to 30 kHz only.

Frequency	Counts of least significant digit	Formula	Additional error
30 kHz	0.1	0.1 x 30 x 30	90
50 kHz	0.1	0.1 x 50 x 50	250
100 kHz	0.1	0.1 x 100 x 100	1000

The bandwidth for U1281A is up to30 kHz only.

AC and AC + DC current specification for U1281A / U1282A[8,9]

Function	Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)			
			20 Hz to 45 Hz	45 Hz to 1 kHz	1 kHz to 20 kHz[5]	20 kHz to 100 kHz[5,6,7]
AC current True RMS	600 µA[1]	0.01 µA	1.0 % + 40	0.6 % + 25	1.0 % + 30	5 % + 40
	6 mA	0.0001 mA	1.0 % + 40	0.6 % + 25	1.0 % + 30	5 % + 40
	60 mA	0.001 mA	1.0 % + 40	0.6 % + 25	1.0 % + 30	5 % + 40
	600 mA[2]	0.01 mA	1.0 % + 40	0.6 % + 25	1.5 % + 30	5 % + 40
	6 A	0.0001 A	1.0 % + 40[4]	0.6 % + 25	1.5% + 30[6]	N/A
	10 A[3]	0.001 A	1.0 % + 40[4]	0.6 % + 25	1.5% + 30[6]	N/A
AC + DC current True RMS	600 µA[1]	0.01 µA	1.12 % + 50	0.72 % + 35	1.12 % + 40	5.12 % + 50
	6 mA	0.0001 mA	1.05 % + 45	0.65 % + 30	1.05 % + 35	5.05 % + 45
	60 mA	0.001 mA	1.10 % + 60	0.70 % + 45	1.05 % + 50	5.10 % + 60
	600 mA[2]	0.01 mA	1.15 % + 45	0.75 % + 30	1.65 % + 35	5.15 % + 45
	6 A	0.0001 A	1.15 % + 50[4]	0.95 % + 35	1.65 % + 40[6]	N/A
	10 A[3]	0.001 A	1.15 % + 45[4]	0.95 % + 30	1.65 % + 40[6]	N/A

Notes
1. Typical performance for current ≤ 30 µArms.
2. Current can be measured up to 440 mA continuously. Maximum of 20 hours for measuring current more than 440 mA.
3. Current can be measured up to 10 A continuously. Maximum of 30 seconds for measuring current more than 10 A to 20 A, add 0.3 % to specified accuracy. The multimeter needs to be cool down after measuring current that is more than 10 A. Cool down the meter for twice the duration of the measured time and use NULL function to zero-out thermal effect before proceeding with lower current measurement.
4. Input current < 3 Arms.
5. These specifications are for typical performance.
6. For current < 3 Arms and < 5 kHz.
7. Additional error when Frequency is more than 30 kHz: 0.1 of least significant digit x square of frequency. The bandwidth of U1281A is up to 30 kHz only.

Frequency	Counts of least significant digit	Formula	Additional error
30 kHz	0.1	0.1 x 30 x 30	90
50 kHz	0.1	0.1 x 50 x 50	250
100 kHz	0.1	0.1 x 100 x 100	1000

8. 6 A and 10 A ranges (connection with A terminal) overload protection by 10 x 38 mm, 11 A / 1000 V, 20 kA minimum fast-acting fuse. 600 µA to 600 mA ranges (connection wth µ.mA terminal) overload protection by 10 x 35 mm, 440 mA / 1000 V, 10 kA minimum fast-acting fuse.
9. Ensure good ventilation and no heat element close to the meter.

Temperature specification for U1281A / U1282A[2,3,4,5,6,7]

Thermal type	Range	Resolution	Accuracy ± (% of reading + as specified below)
K	–200 °C to 1372 °C	0.1 °C	1 % + 1 °C
	–328 °F to 2502 °F	0.1 °F	1 % + 1.8 °F
J[1]	–210 °C to 1200 °C	0.1 °C	1 % + 1 °C
	–346 °F to 2192 °F	0.1 °F	1 % + 1.8 °F

Notes
1. Only for U1282A
2. The specification above is specified after 60 minutes of warm-up time.
3. The accuracy does not include the tolerance of the thermocouple probe.
4. Do not allow the temperature sensor to contact a surface that is energized about 30 Vrms or 60 V DC. Such voltages pose a shock hazard.
5. Ensure the stable (within ± 1 °C) ambient temperature,and that the Null function is used to reduce the test lead's thermal effect and temperature offset. Before using Null function, set the multimeter to measure temperature without ambient compensation (°C) and keep the thermocouple probe as close to the multimeter as possible (avoid contact with any surface that has a different temperature from the ambient temperature).
6. When measuring temperature with respect to any temperature calibrator, try to set both the calibrator and multimeter with an external reference (without internal ambient compensation). If both the calibrator and multimeter are set with internal reference (with internal ambient compensation), some deviations may show between the readings of the calibrator and multimeter, due to differences in ambient compensation between the calibrator and multimeter. Keeping the multimeter close to the output terminal of calibrator will help reduce the deviation.
7. The temperature calculation is specified according to the safety standards of EN/IEC-60548-1 and NIST 175.

Capacitance specification for U1281A / U1282A[1,2,3]

Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)
10 nF	0.001 nF	1.0 % + 5
100 nF	0.01 nF	1.0 % + 5
1 µF	0.0001 µF	1.0 % + 5
10 µF	0.001 µF	1.0 % + 5
100 µF	0.01 µF	1.0 % + 5
1 mF	0.0001 mF	1.0 % + 5
10 mF	0.001 mF	1.0 % + 5
100 mF	0.01 mF	2.5 % + 10

Notes
1. Overload protection: 1000 Vrms for short circuits with < 0.3 A current.
2. 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 shorting the test leads).
3. The maximum display is 1200 counts / 12000 counts selectable

Frequency specification for U1281A / U1282A

Range	Resolution	Accuracy ± (% of reading + counts of least significant digit)	Minimum input frequency
99.999 Hz	0.001 Hz	0.02 % + 3[1]	0.5 Hz
999.99 Hz	0.01 Hz	0.005 % + 3	
9.9999 kHz	0.0001 kHz	0.005 % + 3	
99.999 kHz	0.001 kHz	0.005 % + 3	
999.99 kHz	0.01 kHz	0.005 % + 3	
9.9999 MHz	0.0001 MHz	0.005 % + 3, < 1 MHz	

Notes
1. 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. For U1282A only, turning on LPF (low pass filter) may help to filter out the noise and achieve a stable reading.

U1281A / U1282A sensitivity[1] for voltage measurement

Input range	Minimum sensitivity (RMS sine wave)		Trigger level for DC coupling	
Maximum input[2] for specified accuracy	15 Hz to 100 kHz	Typical bandwidth at full scale	15 Hz to 100 kHz	Typical bandwidth at full scale
60 mV	2.5 mV	1 MHz	4.5 mV	1 MHz
600 mV	12 mV	1 MHz	15 mV	1 MHz
6 V	0.25 V	900 kHz	0.45 V	900 kHz
60 V	2.5 V	600 kHz	4.5 V	600 kHz
600 V	25 V	100 kHz	45 V	100 kHz
1000 V	33 V	100 kHz	50 V	100 kHz

U1281A / U1282A sensitivity[1] for current measurement

Input range	Minimum sensitivity (RMS sine wave)	
Maximum input[2] for specified accuracy	15 Hz to 30 kHz	Typical bandwidth at full scale
60 µA	38 µA	100 kHz
6 mV	0.38 mA	100 kHz
60 mV	3.8 mA	100 kHz
600 mV	38 mA	100 kHz
6 A	0.38 A	100 kHz
10 A	1 A	100 kHz

Notes
1. The sensitivity is typical performance.
2. Refer to 'AC Specifications' for specified accuracy of maximum input.

Duty cycle and pulse width for U1281A / U1282A[1,2,3]

Duty cycle mode	Range	Accuracy at full scale
DC coupling	99.999%	0.3 % per kHz + 0.3 %
AC coupling	99.999%	0.3 % per kHz + 0.3 %
Pulse width range	**Resolution**	**Accuracy**
99.999 ms	0.001 ms	Duty cycle accuracy / frequency + 1
999.99 ms	0.01 ms	Duty cycle accuracy / frequency + 1
2000.0 ms	0.1 ms	Duty cycle accuracy / frequency + 1

Notes
1. The accuracy for duty cycle and pulse width is based a square wave of full scale input to the 6 V range. For AC coupling, the duty cycle range can be measured within 5 % to 95 % for signal frequency more than 15 Hz.
2. The pulse width (positive or negative) must be more than 10 µs. The range of the pulse width is determined by the frequency of the signal.
3. The range of the duty cycle is determined by the frequency of the signal: {10 µs x frequency x 100 %} to {[1 –(10 µs x frequency)] x 100 %}

Peak hold for U1281A / U1282A

Signal width	Accuracy for DC mV / voltage / current
Single event > 1 ms	2 % + 400 for all ranges
Repetitive > 250 µs	2 % + 1000 for all ranges

dB specification for U1281A / U1282A

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

Notes
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.
2. Auto-ranging mode is used
3. The bandwidth is according to voltage measurement.

Frequency counter specification for U1282A[3]

Division	Range	Resolution	Accuracy	Sensitivity[1]	Minimum input frequency
1	99.999 Hz	0.001 Hz	0.02 % + 5[2]	30 mV	0.5 Hz
	999.99 Hz	0.01 Hz	0.002 % + 5	30 mV	
	9.9999 kHz	0.0001 kHz	0.002 % + 5	30 mV	
	99.999 kHz	0.001 kHz	0.002 % + 5	30 mV	
	999.99 kHz	0.01 kHz	0.002 % + 5	200 mV	
	9.9999 MHz	0.0001 MHz	0.002 % + 5, < 1 MHz	200 mV	
100	9.9999 MHz	0.0001 MHz	0.002 % + 5, < 20 MHz	330 mV	1 MHz
	99.999 MHz	0.001 MHz			

Notes
1. The sensitivity is specified as input with a load of 50 Ω.
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. For non-square wave signal, add additional 5 counts.
3. The maximum measurement level is ± 1.8 Vp.

Square wave output specification[1] for U1282A[2,3]

Output	Range	Resolution	Accuracy
	0.5, 1, 2, 5, 6, 10,15, 20, 25, 30, 40, 50, 60, 75, 80 Hz	0.01 Hz	0.005 % + 2
	100, 120, 150, 200, 240, 300, 400, 480, 600, 800 Hz	0.1 Hz	
	1200, 1600, 2400, 4800 Hz	1 Hz	
Duty cycle[1]	0.390 % to 99.609 %	0.390625 %	0.4 % at full scale
Pulse width[1]	1 / frequency	Range / 256	Range / 256 + 2 µs
Amplitude	Fixed + 2.2 V	0.1 V	0.2 V

Notes:
1. The specification is typical performance.
2. The positive or negative pulse width must be greater than 2 µs for adjustment of the duty cycle or pulse width under different frequencies. Otherwise, the accuracy and range will be different from the specification defined.
3. Output impedance: 600 Ω (nominal)

Multimeter data refresh rate

Function	Slow (times/second)	Fast (times/second)
ACV (V or mV)	5	40
DCV (V or mV)	5	40
Ω	5	40
Diode	5	40
Capacitance	1 (< 100 µF)	–
DC µA, mA or A	5	40
AC µA, mA or A	5	40
Temperature	5	40
Frequency	1 (> 10 Hz)	–
Duty cycle	1 (> 10 Hz)	–
Pulse width	1 (> 10 Hz)	–

Ordering Information


U1281C


U1282C

Standard shipped accessories

4 ½-digit handheld digital multimeter, test leads (red and black), infrared (IR)-to-USB cable, AA batteries (4x), Quick Start Guide, Certificate of Calibration

Optional accessories

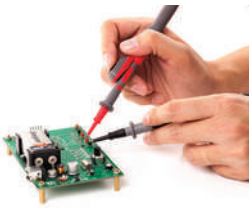
U1117A infrared(IR)-to-*Bluetooth* adapter
- Enable *Bluetooth* connection to Keysight handheld digital multimeters
- Up to 100-meter operating rage



U1115A remote logging display
- Displays up to 4 Keysight handheld digital multimeters measurements
- 60,000 points interval logging
- Extended measurement distance of up to 100-meter



U5404A remote switch probe for U1280 Series
- Measure and save measurement with a single touch of button



U1594A hard carrying case
Hard carrying case with two compartments for U1280 Series handheld digital multimeters.



U1595A rugged carrying case
- High quality, water and dust proof carrying case designed to store up to two handheld and accessories



U1583B AC current clamp
- Dual range 40 A and 400 A
- BNC-to-banana plug adapter provided for use with handheld digital multimeters



Optional accessories

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 probe (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



U1168B 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 p[robes: CAT II 300 V, 3 A
- SMT grabber: CAT II 300 V, 3 A
- Mini grabber: CAT II 300 V, 3 A



U1180A temperature sensors and probes
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 °C
- 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 °C
- 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 °C
- Includes adapter U1184A for connection to DMM



U1184A temperature probe adapter
- Mini-connector-to-banana-plug adapter for use with DMM



U1185A thermocouple (J-type) and temperature probe adapter
- T/C adapter J/K type
- T/C bead J-type: –20 to 200 °C



U1186A thermocouple (K-type) and temperature probe adapter
- T/C adapter J/K type
- T/C bead J-type: –20 to 200 °C



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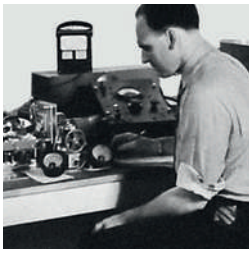



1939 THE FUTURE

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