UNI-T UT311A, UT312A Vibration Tester User Manual

Contents

UNI-T UT311A, UT312A Vibration Tester

Product Information

UT311A/UT312A Vibration Tester

- **Part number:** 110401111643X
- Handheld vibration tester
- Consists of an acceleration sensor and a digital display circuit
- Measures vibration acceleration, velocity, and displacement of mechanical equipment
- Wide measurement range
- Easy operation and convenient carrying
- 2.4 TFT color screen with automatic rotation
- Flashlight for measurements in low-light conditions
- Switchable high and low vibration frequency
- Rechargeable lithium battery
- High-sensitivity sensor for accurate measurement
- Equipped with a long and short probe for measurement in different places
- Simple design and compact structure

Product Usage Instructions

1. **Safety Instructions:** Read the Safety Instructions carefully before use. Pay attention to the Warning and

Caution instructions.

2. **Unpack and Inspect:** Check that all components are present and undamaged. Contact your dealer if any parts are missing or damaged.
3. **Charging the Battery:** Connect the USB-C charging cable to the charging interface on the vibration tester and plug it into a power source. The indicator light will turn on when charging and turn off when fully charged.
4. **Using the Vibration Tester:**
    - **Power On:** Press and hold the Power on/Measure button until the LCD screen turns on.
    - **Measurement:** Place the probe on the equipment to be tested and press the Power on/Measure button to start measurement. The LCD screen will display the measurement value and status.
    - **Switching Modes:** Press the Power on/Measure button to switch between acceleration, velocity, and displacement modes.
    - **Switching Vibration Frequency:** Press the Power off/Mode button to switch between high and low vibration frequency modes.
    - **Flashlight:** Press the Flashlight/Lock screen button to turn on the flashlight for measurements in low-light conditions.
    - **Lock Screen:** Press and hold the Flashlight/Lock screen button to lock the screen.
    - **Power Off:** Press and hold the Power off/Mode button until the LCD screen turns off.
5. **Maintenance:** Keep the vibration tester clean and dry. Do not expose it to extreme temperatures or humidity. Store it in a safe and dry place when not in use.
6. **Warranty:** Uni-Trend guarantees that the product is free from any defect in material and workmanship within one year from the purchase date. Contact your seller directly for warranty service within the warranty period.

PRODUCT PREFACE

- Thank you for purchasing the new UT311A/UT312A vibration tester. In order to use this product safely and correctly, please read this manual thoroughly, especially the Safety Instructions part.
- After reading this manual, it is recommended to keep the manual at an easily accessible place, preferably close to the device, for future reference.

PRODUCT LIMITED WARRANTY

LIMITED WARRANTY AND LIABILITY

Uni-Trend guarantees that the product is free from any defect in material and workmanship within one year from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination and improper handling. The dealer shall not be entitled to give any other warranty on behalf of Uni-Trend. If you need warranty service within the warranty period, please contact your seller directly. Uni-Trend will not be responsible for any special, indirect, incidental or subsequent damage or loss caused by any reason or speculation.

Introduction

UT311A/UT312A is a handheld vibration tester which consists of acceleration sensor and digital display circuit. It is mainly used to measure vibration acceleration, velocity and displacement of mechanical equipment. It has the advantages of wide range, easy operation and convenient carrying. It is an ideal inspection tool that can be used for patrol detection of equipment vibration in power , metallurgic and petrochemical industries.

Features

- 2.4″ TFT color screen, better display the measurement value and status
- Automatically rotatable screen, easy to view and operate
- Flashlight for measurements at night or in environments with undesirable lighting conditions
- It can measure acceleration, velocity, displacement
- Switchable high and low vibration frequency
- Rechargeable lithium battery
- High sensitivity sensor, accurate measurement
- Equipped with a long and short probe, suitable for measurement in different places
- Simple design, compact structure, easy to carry and use

Unpack and Inspect

- **Vibration tester**——————————1 PC
- **User manual**——————————1 PC
- **Safety instructions**——————————-1 PC
- **Long probe**——————————-1 PC
- **Short probe**——————————-1 PC (installed on the vibration tester)
- **USB-C charging cable**——————————1 PC
- **U-type magnetic sucker**——————————1 PC (UT312A only)

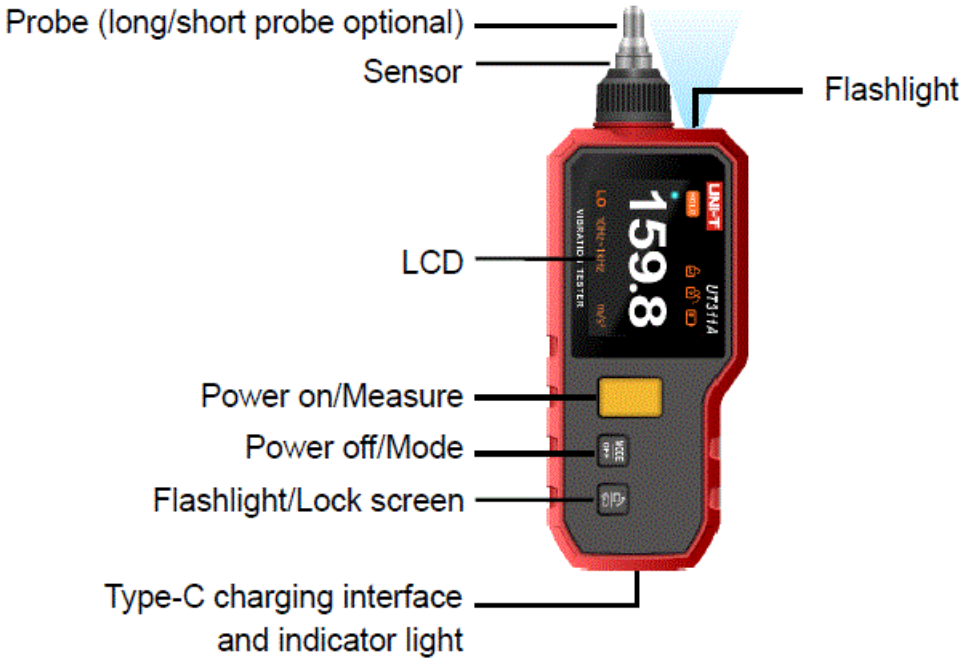
If any parts are missing or damaged, please contact your dealer.

Safety Instructions

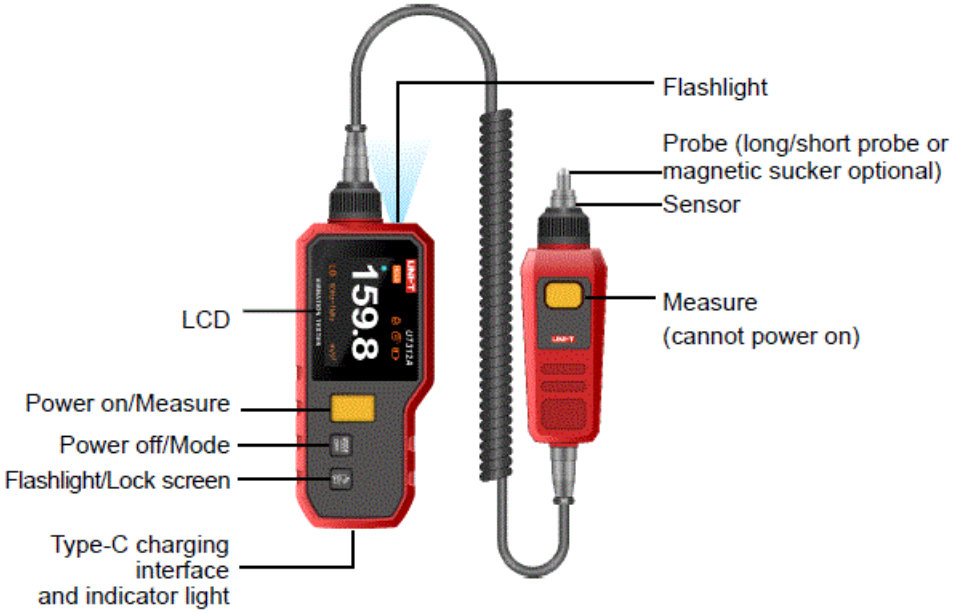
- Please read the Safety Instructions carefully before use.
- A “Warning” identifies conditions and procedures that are dangerous to users. A “Caution” identifies conditions and procedures that can cause damage to the product or the equipment under test.
- Read and follow the user manual before measuring.
- Check the meter and accessories before use, and beware of any damage or abnormal phenomenon. If the meter housing is obviously damaged, the LCD fails to display or the meter cannot operate properly, please do not use the meter.
- Please do not disassemble the meter or change the internal wiring to avoid damage to the meter.
- When  is displayed on the LCD, charge the meter in time to ensure its normal use and to get accurate test results.
- Please use a standard DC 5V adapter to charge the meter. Do not use a power supply or adapter of other voltages to avoid meter damage.
- Do not store or use the meter in high temperature, high humidity, flammable, explosive and strong electromagnetic field environment.
- Please use soft cloth and neutral detergent to clean the meter housing. Do not use abrasive and solvent, in case the housing is corroded.
- When measuring exposed rotating parts or drivetrain parts of the machine, please be careful to avoid being mangled in the machine.

Components and Buttons

UT311A Components



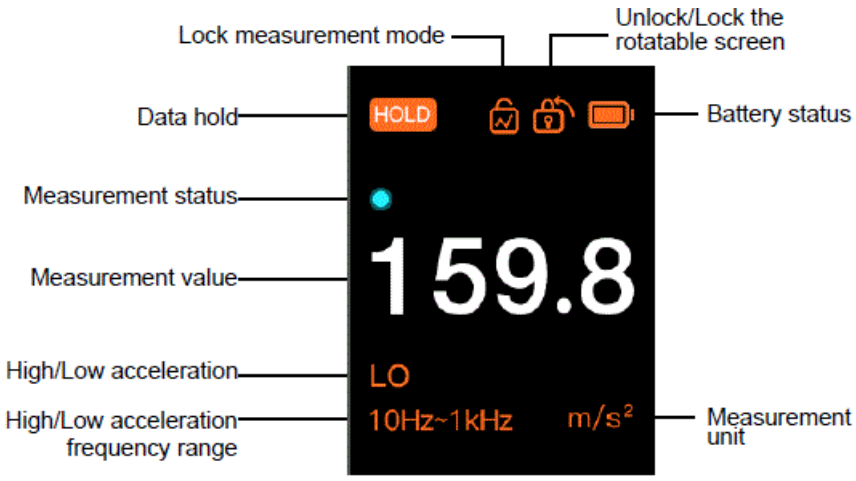
UT311A Components



Buttons

Button	Long press	Short press
Power on/Measure	Long press to power on. When the meter is turned on, long press to st art measuring, release to stop mea suring.	When the meter is turned on, short press twice to start measuring, short press again to stop measuring.
Power off/Mode	Long press to power off.	Switch between high/low frequency acceleration, velo city and displacement modes.
Flashlight/ Lock s creen	Long press to turn on/off the flashli ght.	Unlock/lock the rotatable screen.

LCD Indicators/Icons

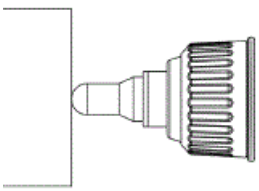


Operation

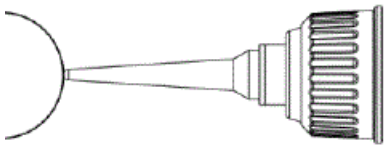
Select the Probe

The test probe is divided into the following types. Please choose according to the actual situation (Turn the probe counterclockwise to remove it. Do not turn the sensor.):

1. Measure with the short (S) probe: The probe is installed on the meter when it leaves the factory. It is suitable for measuring a wide range of vibration and can obtain good response values. In general, please use this short probe to measure, as shown below:

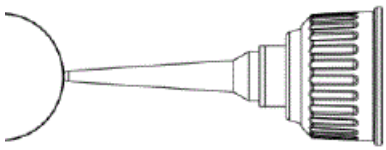


2. Measure with the long (L) probe: The probe is an accessory in the packing box. It is suitable for measuring narrow spaces or special objects, as shown below:

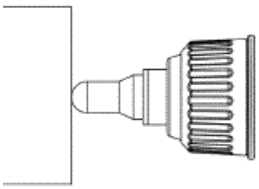


- **Note:** The long probe can only be used for low frequency measurements. When measuring high frequency acceleration above 1kHz, replace with the short probe.

3. Measure without a probe: It is used for measuring flat surfaces to obtain stable data, as shown below:



4. Measure with the U-type magnetic sucker (UT312A only): It is used to measure flat or curved objects. It is suitable for taking measurements in crowded or inaccessible places where hand-held measurement is dif ficult and cannot apply pressure.

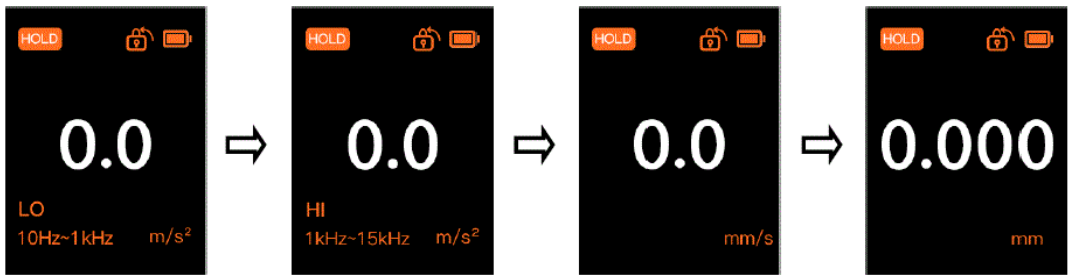


Power On and Check the Battery Status

1. **Power on:** Long press the Power On button  , and the vibration tester is turned on after the power-on logo is displayed.
2. **Power off:** When the meter is turned on, long press the Power Off button  to turn it off.
3. Auto power off:
    - When the battery is low, the icon  flashes and the meter will automatically shut down after 1 minute.
    - The screen will become dark if no button press occurs for 1 minute. The meter will automatically shut down if no button press occurs for 5 minutes. Short press any button to restore the screen brightness.
    - When the meter is taking measurements, it will not automatically shut down if no button press occurs for 5 minutes.
4. **Charging:** When the battery icon  shows low power, please charge the meter in time. The indicator light is red when charging and turns green when fully charged.

Select the Measurement Mode

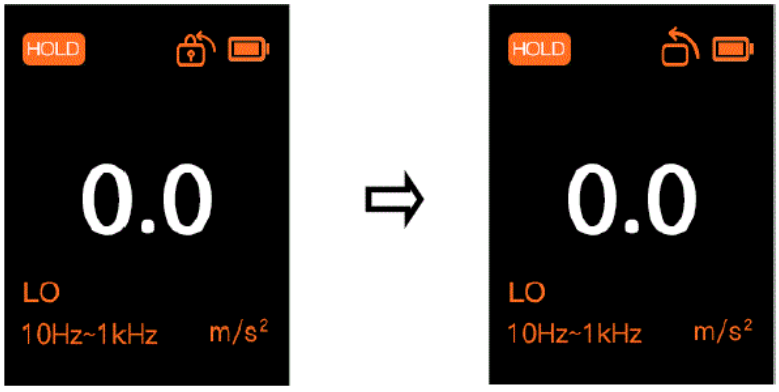
When the meter is turned on, short press the Mode button  to step through the following modes and units. Please select parameters according to measurement requirements:



Low frequency acceleration (LO) | High frequency acceleration (HI) | Velocity | Displacement

- Low frequency acceleration (LO) 10Hz~1kHz m/s²→ High frequency acceleration (HI) 1kHz~15kHz m/s² → Velocity mm/s → Displacement mm.

Unlock/Lock the Rotatable Screen



Lock the screen direction Unlock the rotatable screen

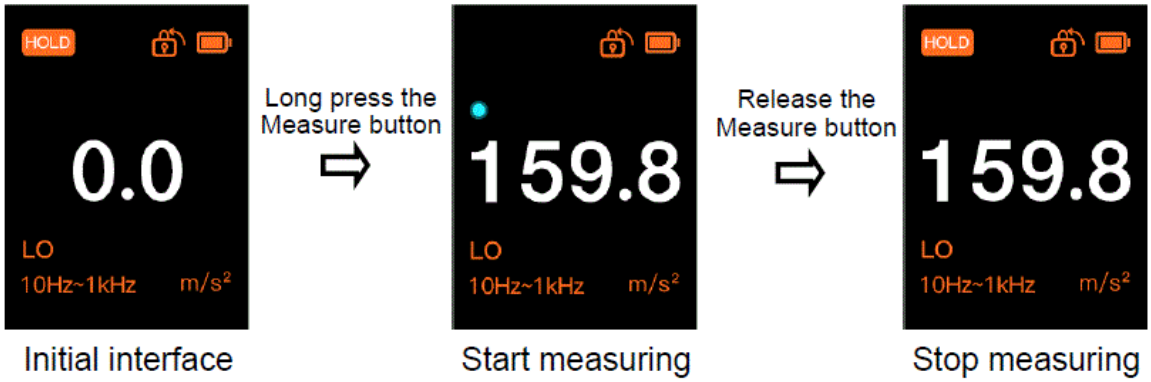
Short press the Lock Screen button  to lock/unlock the automatically rotatable screen:

- **Lock:** The icon  shows on the LCD. The screen is locked.
- **Unlock:** The icon  shows on the LCD. The screen rotates in the direction of gravity.

Select the Measurement Method

There are two measurement methods:

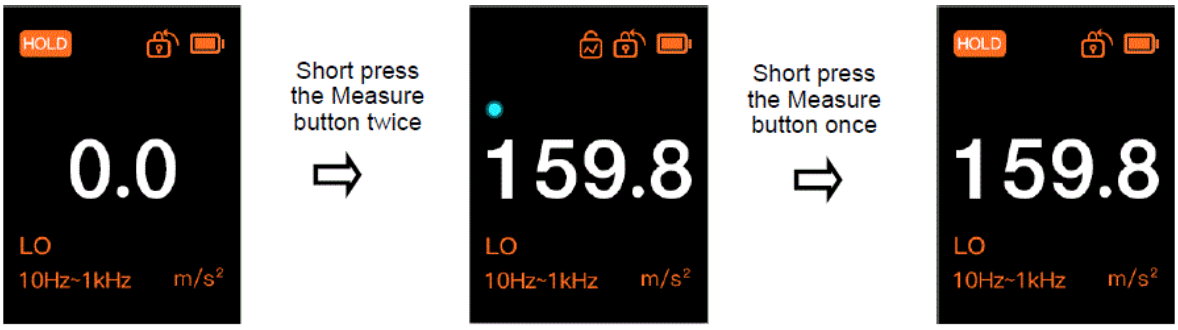
- Long press measurement



Initial interface | Start measuring | Stop measuring

- **Start measuring:** The default measurement method is long press measurement after the meter is turned on. Long press the Measure button, the Data Hold icon HOLD on the screen disappears and the Measurement Status icon flashes. The meter starts measuring.
- **Stop measuring:** Release the Measure button, the Data Hold icon HOLD shows on the screen, and the meter stops measuring.

- Lock measurement



- **Start measuring:** Short press the Measure button twice, the Lock Measurement icon shows on the screen, and the Measurement Status icon flashes. The meter starts measuring.
- **Stop measuring:** Short press the Measure button again to exit the lock measurement mode. The Data Hold HOLD icon shows on the screen and the meter stops measuring.

After selecting a measurement method, hold the vibration tester and press the probe vertically on the object to be measured, with the force of about 500g~1kg. Follow the method described above and the measured vibration value will be displayed on the screen.

Remarks: Users can turn on the flashlight at night or in environments with undesirable lighting conditions. Long press the Flashlight button to turn on the flashlight, long press again to turn it off.

Specifications

Parameter	Range	Frequency	Resolution	Accuracy
Acceleration (PEAK)	0.1-199.9m/s²	LO:10Hz-1kHz	0.1m/s²	±(5%+2dgts)
		HI:1kHz-15kHz		
Velocity (RMS)	0.1-199.9mm/s	10Hz-1.5kHz	0.1mm/s	
Displacement (P-P)	0.001-1.999mm	10Hz-1kHz	0.001mm	±(10%+2dgts)

Automatically rotatable screen	√
High/Low-frequency acceleration	√
Data hold	√
Flashlight	√
Battery indication	√
LCD type	2.4″ TFT color screen
LCD backlight	Become dark if no button press occurs for 1 minute
Auto power off	Automatically shut down if no button press occurs for 5 minutes
Probes	Long and short probes (optional), magnetic sucker (UT312A only)
Battery type	1350mAh/3.7V lithium battery
Charging interface	Type-C
Charging voltage	DC 5V
Charging time	About 3h
Battery duration	About 12h
Operating temperature and h umidity	-10℃~50℃; humidity 90%RH, non-condensing
Storage temperature	-20℃~60℃
Product size	UT311A: 180×28×64mm (including the short probe); UT312A: 168×28×64mm

Product weight	UT311A: About 191g (including the short probe); UT312A: About 364g (including the short probe)

EMC standard: EN IEC 61326-1:2021.

Maintenance

1. **Operating environment:** The vibration tester is a precision instrument, so it should strictly avoid collision, percussion, damp, strong electricity, magnetic field, oil and dust.
2. **Clean the housing:** Alcohol and diluent will corrode the meter housing, especially the LCD. So when cleaning the housing, gently wipe with a small amount of water.

Appendix

- Table of machine vibration levels (ISO2372)

Note

1. Class I: small machines (electrical motors of up to 15kW); Class II: medium size machines (electrical motors with 15 to 75kW output); Class III: large prime machines (rigid and heavy foundations); Class IV: large prime machines (soft foundations).

Vibration severity			**Vibration velocity**			
Examples of quality judgment for separate cla sses of machines			I	II	III	IV
			A	A	A	A
	0.28					
	0.45		B			
	0.71			B		
	1.12					
	1.8		C		B	
	2.8			C		B
	4.5				C	
	7.1		D			C
	11.2			D		
	18				D	
	28					D
	45					

1. A, B, C and D are vibration levels. A means Good, B means Satisfactory, C means Not Satisfactory, D means Not Allowed. The measurement velocity RMS value should be in the three orthogonal directions of the bearing housing.

- Maximum allowable vibration of motors greater than 1HP (NEMA MG1-12.05)

Rev (rpm)	**Peak-peak shifting amplitude (μm)**
3000~4000	25.4
1500~2999	38.1
1000~1499	50.8
≤ 999	63.6

- **Note:** For AC motors, use the highest synchronous Rev. For DC motors, use the maximum power Rev. For series and multipurpose motors, use the operating Rev.

- Maximum allowable vibration of large induction motors (NEMA MG1-20.52)

Rev (rpm)	**Peak-peak shifting amplitude (μm)**
≥ 3000	25.4
1500~2999	50.8
1000~1499	63.6
≤ 999	76.2

  - The two standards are set by the National Electrical Manufacturers Association (NEMA).

- Formed winding squirrel-cage induction motors

Synchronous Rev (rpm)	**Peak-peak shifting amplitude (μm)**	
	Elastic support	Rigid support
720~1499	50.8	63.6
1500~2999	38.1	50.8
≥ 3000	25.4	25.4

  - The standard is set by the American Petroleum Institute (API).

- ISO/IS2373 Motor Quality Standard According as Vibration Velocity

Quality rank	**Rev**	**H: High of shaft (mm), maximum vibration velocity RMS (mm/s)**		
		80<H<132	132<H<225	225<H<400
Normal	600~3600	1.8	2.8	4.5
Good	600~1800	0.71	1.12	1.8
	1800~3600	1.12	1.8	2.8
Excellent	600~1800	0.45	0.71	1.12
	1800~3600	0.71	1.12	1.8

  - Limit of rank “N” is suitable for the common motor.

- Due to different batches, the materials and details of actual products may be slightly different from the graphic information. Please refer to the goods received. The experimental data in the manual are theoretical values and all from Uni-Trend’s internal laboratories, for reference only. Customers cannot use them as bases for

placing orders. If users have any questions, please contact customer service.

- This user manual is subject to change without prior notice.

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Documents / Resources

	UNI-T UT311A, UT312A Vibration Tester [pdf] User Manual UT311A, UT312A, UT311A UT312A Vibration Tester, UT311A Vibration Tester, UT312A Vibration Tester, Vibration Tester, Tester