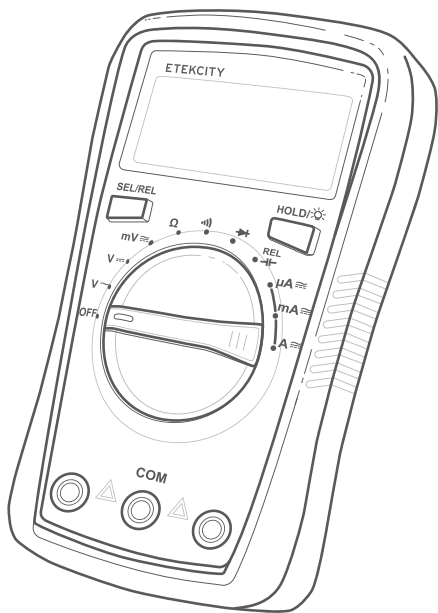




Digital Multimeter

Model No.: MSR-A600



Questions or Concerns? support@etekcity.com • (855) 686-3835

Thank You!

Thank you for purchasing the **MSR-A600 Digital Multimeter** by Etekcity. We are dedicated to providing our customers with quality products for building on better living. Should you have any questions or concerns about using your new product, feel free to reach out to our helpful Customer Support team at **support@etekcity.com**. We hope you enjoy your new product!

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Package Contents


1 x MSR-A600 Digital Multimeter
2 x Test Leads
2 x 1.5V AAA Batteries (Pre-installed)
1 x User Manual

Safety Information

This multimeter complies with the standards IEC61010: in pollution degree 2, overvoltage category (CAT. II 600V), and double insulation.

Use the multimeter only as instructed in this operating manual, or the device may be damaged, and you may be seriously injured.

In this manual:

 **WARNING** : Identifies conditions and actions that are hazardous to the user or may damage the multimeter and test leads while operating.







NOTE: Identifies the information that the user should pay attention to.

WARNING

- Please read and follow all of the instructions and warnings in this manual before using the product. Failure to comply with the instructions may result in serious injury, fire, and/or electrical shock. The person responsible for this equipment must ensure that all users understand and follow the instructions.
- TO AVOID THE RISK OF ELECTRIC SHOCK OR DAMAGE TO THE MULTIMETER OR OTHER EQUIPMENT, **DO NOT** CONNECT LEADS TO POWER SOURCES THAT MAY EXCEED 600V.
- Expired or damaged batteries can cause burns upon contact with skin. ALWAYS wear proper hand protection when handling expired or damaged batteries.
- **DO NOT** alter the internal circuitry of the multimeter. Doing so may damage the device and will void your warranty.

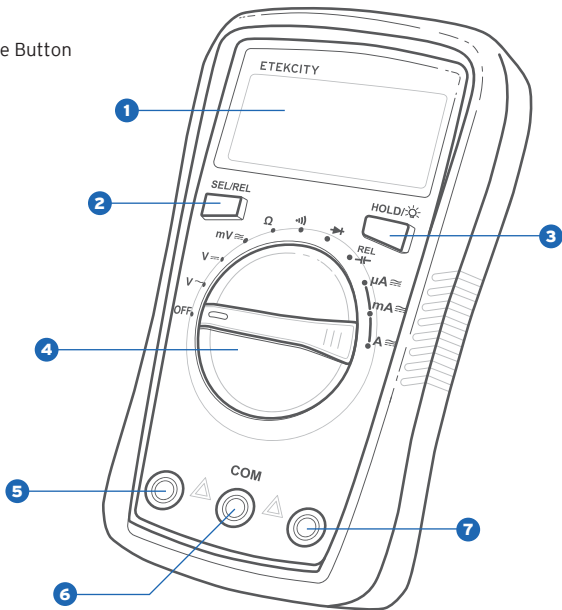
- **DO NOT** use the multimeter if it is damaged or if any part of the case is removed. Always inspect all parts of the multimeter, the case, and the test leads before each use.
- **DO NOT** use or store the multimeter in wet or humid environments, in high-temperature areas, around explosive or flammable substances, or in areas with strong magnetic fields.
- **DO NOT** allow children to use or play with this device.
- **DO NOT** measure voltages when the multimeter is set to measure resistance (Ω) or current (A).
- Take special care to avoid electric shock when the multimeter is working at an effective voltage over 60V DC or 30V rms AC.
- **DO NOT** change the settings on the rotary switch while the test leads are connected to a power source.
- **DO NOT** operate the multimeter with the battery cover removed or without the case.
- **DO NOT** remove the case or open the battery cover while the multimeter is connected to a power source.

International Electrical Symbols

	AC or DC
	Double Insulated
	Warning
	Grounding
	Low Battery
	Conforms to European Union Standards

Function Diagram

1. LCD Screen
2. Selection/Relative Mode Button
3. Hold/Backlight Button
4. Rotary Switch
5. **10A** Terminal
6. **COM** Terminal
7. **VΩmAμA** Terminal



Rotary Switch




The table below briefly describes each of the rotary positions (see the **Operation** section for further details, pages 10-15).

OFF	Multimeter is Off
V ~	AC Voltage Measurement
V =	DC Voltage Measurement
mV =	AC & DC Voltage Measurement
Ω	Resistance Measurement
•)	Continuity Test
▶ 	Diode Test
REL ⎓	Capacitance Test
μA =	DC and AC Current Measurement (microAmps)
mA =	DC and AC Current Measurement (milliAmps)
A =	≤ 10A DC and AC Current Measurement

Button Functions


SEL/REL	mV = / Current Measurement: Press once to switch to the alternate function.
	Capacitance Test ^{REL} ⎓ : Press once to switch to the Relative Mode, which removes the capacitance of the test leads when measuring low capacitance values.
HOLD/ BACKLIGHT	Data Hold: Press once to hold the displayed measurement on the LCD screen.
	Backlight On/Off: Press and hold for 2 seconds to turn the screen backlight on or off. NOTE: <ul style="list-style-type: none"> The backlight will automatically turn off after 30 seconds. Use the backlight while operating the multimeter in poorly lit areas to prevent faulty readings.

LCD Screen Symbols

Symbol	Description
AUTO	Auto range mode. The multimeter will automatically select the range with the best resolution.
APO	Auto power-off
H	Data hold is active
-	Indicates a negative reading
AC	AC measurement indicator
DC	DC measurement indicator
	Low battery indicator
OL	Input value is too large for the selected range
	Diode test
	Continuity test
Ω	Ohm: the unit of resistance
kΩ	Kilohm: 1×10^3 or 1,000 ohms

Symbol	Description
MΩ	Megaohm: 1×10^6 or 1,000,000 ohms.
V	Volts: the unit of voltage
mV	Millivolt: 1×10^{-3} or 0.001 volts
A	Amperes (amps): the unit of current
mA	Milliamp: 1×10^{-3} or 0.001 amperes
μA	Microamp: 1×10^{-6} or 0.000001 amperes
mF	Millifarad: the unit of capacitance
μF	Microfarad: 1×10^{-6} or 0.000001 farads
nF	Nanofarad: 1×10^{-9} or 0.000000001 farads

Before First Use

- When setting up the multimeter, connect the **black test lead** before connecting the **red test lead**. To disconnect, take out the **red test lead** before removing the **black test lead**.
- Inspect the test leads for damaged insulation or exposed metal parts. Check the leads for continuity (see page 12). Replace damaged test leads if necessary.
- Keep your fingers behind the finger guards at all times when handling the test probes.
- ALWAYS remove the test leads from the item being measured before changing the settings.
- Check the fuses in the multimeter before measuring current. Always make sure power to the circuit has been shut off before connecting the multimeter to the circuit. Once you have properly connected the multimeter, power on the circuit.
- Remember to replace the batteries as soon as the low battery indicator “” appears (see **Replacing the Batteries**, page 16). The multimeter may produce incorrect readings if it is operated with a low battery, which can result in electric shock or injury.
- Whenever you finish measuring an object with the multimeter, disconnect the test leads from the object.

Operation

Voltage Measurement

WARNING

DO NOT measure voltages higher than 600V. Doing so may result in electric shock, damage to the multimeter, or injury to the user. Always take extra care to avoid electric shock when measuring high voltages.

i. AC or DC Voltage

1. Insert the **black test lead** into the **COM** terminal, and the **red test lead** into the **V Ω mA μ A** terminal.
2. Turn the rotary dial to **V \sim** or **V ---** .
3. Connect the test leads to the object being measured. Hold them in place until the readings on the display stabilize.
4. When the measurement is complete, disconnect the test leads from the object, then remove the test leads from the multimeter.

ii. AC or DC mV Measurement

1. Insert the **black test lead** into the **COM** terminal, and the **red test lead** into the **V Ω mA μ A** terminal.
2. Turn the rotary dial to **mV ---** .

Note: The default function is DC. Press **SEL/REL** to switch between AC and DC measurement.

3. Connect the test leads to the object being measured. Hold them in place until the readings on the display stabilize.
4. When the measurement is complete, disconnect the test leads from the object, then remove the test leads from the multimeter.

Note: In each range, the multimeter has an input impedance of 10M Ω . This loading effect can cause measurement errors in high impedance circuits. If the circuit impedance is less than or equal to 10M Ω , the error is negligible (0.1% or less).

Resistance Testing

WARNING

To avoid damaging the multimeter or the object being measured, ALWAYS disconnect the circuit power and discharge all high-voltage capacitors before measuring resistance.

1. Insert the **black lead** into the **COM** terminal, and the **red test lead** in to the **V Ω mA μ A** terminal. [Figure 1.1]
2. Turn the rotary dial to **Ω** .
3. Connect the test leads to the object being measured. Hold them in place until the readings on the display stabilize.

Note:

- The LCD will read “**OL**” if there is an open-circuit for the tested resistor or if the resistor value is higher than the maximum range of the multimeter.
- When testing high-resistance objects, it is normal to wait for several seconds before receiving a stable reading ($>1\text{M}\Omega$). To obtain a stable reading, use the test leads for the shortest time possible.

- If the resistance reading with the connected test leads is not $\leq 0.5\Omega$, check if the leads are loose or damaged.
- The maximum resistance rating for the multimeter is $200\text{M}\Omega$.

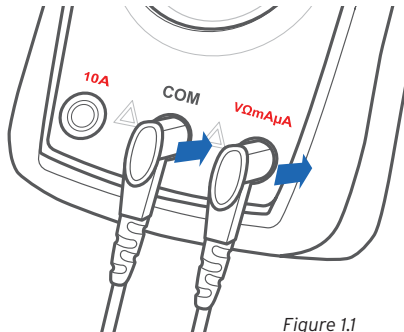


Figure 1.1

Continuity Testing

⚠ WARNING

To avoid damaging the multimeter or the object being measured, ALWAYS disconnect the circuit power and discharge all high-voltage capacitors before testing for continuity.

1. Insert the **black test lead** into the **COM** terminal, and the **red test lead** in to the **VΩmAμA** terminal.
2. Turn the rotary dial to **•|•**.
3. Test the test leads before measurement by connecting the metal ends of the leads together. The multimeter will beep to indicate that the test leads are working properly. [Figure 2.1]
4. Connect the test leads to the object being measured. Hold them in place until the multimeter beeps.

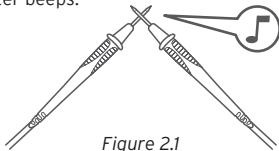


Figure 2.1

Diode Testing

⚠ WARNING

To avoid damaging the multimeter or the object being measured, ALWAYS disconnect the circuit power and discharge all high-voltage capacitors before testing diodes.

This test sends a current of 2.1V through a diode or a semiconductor junction, then measures the voltage drop across the junction.

1. Insert the **black test lead** into the **COM** terminal, and the **red test lead** in to the **VΩmAμA** terminal.
2. Turn the rotary dial to **▶|+**.
3. Connect the test leads to the object being measured. Hold the leads in place until the readings on the display stabilize.

Note:


- The LCD will read “**OL**” if the test leads are incorrectly connected or if the diode is open.
- The average value for a PN silicon junction is 500~800mV (0.5~0.8V).

Capacitance Testing

WARNING

A capacitor stores an electrical charge and may still be energized after being removed. ALWAYS turn off all power to the circuit before removing the capacitor. Make sure to wear proper protective equipment.

This test sends a current of 2.1V through a diode or a semiconductor junction, then measures the voltage drop across the junction.

1. Insert the **black test lead** into the **COM** terminal, and the **red test lead** into the **VΩmAμA** terminal.
2. Turn off all power to the circuit, then remove the capacitor from the circuit.
3. Safely discharge the capacitor by touching both ends of the capacitor to a resistor or a piece of metal. [Figure 3.1]
4. Set the rotary switch to **V** to test the capacitor to ensure it is completely discharged (see **Voltage Measurement**, page 10).
5. Turn the rotary dial to **REL** .

6. Connect the test leads to the capacitor. The negative end is often marked on the side of the capacitor. Hold the test leads until the reading on the display stabilizes.

Note:

- When measuring low capacitance values, the Relative Mode can be used to remove the capacitance of the test leads. Press **SEL/REL** while on the capacitance testing range to switch to the Relative Mode.
- It will take longer for the reading on the LCD to stabilize when testing a large-capacity capacitor.
- The LCD will read “**OL**” to indicate whether the capacitor has shorted out or if it has exceeded the maximum range.

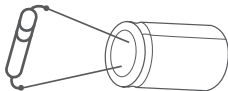


Figure 3.1

DC and AC Current Measurement

⚠ WARNING

- Before measuring current, ALWAYS make sure the power supply for the circuit has been switched off. Check if the leads are connected to the correct input terminals and that the rotary switch has been turned to the correct measurement range.
- ALWAYS connect the test leads in series. **DO NOT** connect the test leads in parallel with any circuit while taking measurements. Doing so may result in damage to the multimeter or injury to the user. [Figure 4.1]
- If the current being tested is greater than 10A, measure the current for less than 10 seconds, then wait at least 15 minutes before taking the next measurement.

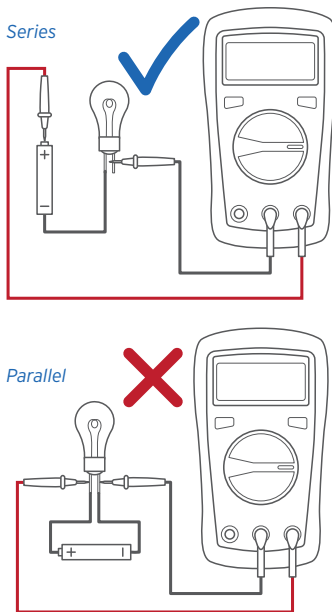


Figure 4.1

1. Turn off power to the circuit and discharge all high-voltage capacitors.
2. Insert the **black test lead** into the **COM** terminal. If you are measuring microamps (μA) or milliamps (mA), insert the **red test lead** into the **V Ω mA μ A** terminal. If you are measuring Amps (A), insert the **red test lead** into the **10A** terminal.
3. Set the rotary dial to the correct current measurement range.

Note: If you are unsure of the range of the current you are measuring, select the highest range (A) first (inserting the **red test lead** into the **10A** terminal), then use the lower ranges to find an accurate measurement.

4. (*Optional*) To switch to AC current measurement, press **SEL/REL** once.
5. Carefully break the current path to be tested.
6. Connect the **red test lead** to the positive side of the break, and the **black test lead** to the negative side of the break.
7. Turn on the circuit power. The measured value will show on the LCD.

Note: If the display only reads “**0.0**” when measuring current using the **V Ω mA μ A** Terminal, it means that the 200mA fuse must be replaced.


Maintenance

General Maintenance

- Regularly use a dry cloth to dust the protective case and multimeter interface.
- **DO NOT** use cleaning detergents or abrasive cleaners on the protective case or on the multimeter.
- If you are experiencing any issues with the multimeter, contact our Customer Support Team (page 25).

Replacing the Batteries

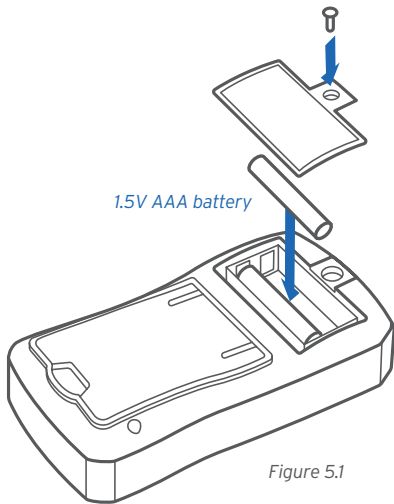
WARNING

To avoid false readings, replace the batteries as soon as “” appears on the LCD screen.

1. Disconnect the test leads from the input terminals on the multimeter.
2. Turn off the multimeter by turning the rotary dial to **OFF**.
3. Carefully remove the multimeter from its protective case.
4. Using a small screwdriver, remove the screw securing the battery compartment cover on the back of the multimeter. *[Figure 5.1 on next page]*
5. Remove the old batteries and properly dispose of them.
6. Install new 1.5V AAA batteries into the compartment under the correct polarity.
7. Replace and secure the battery compartment.

Note:

- **ONLY** use 1.5V AAA batteries when replacing the batteries in the multimeter. Be sure to install the batteries in the multimeter under the correct polarity.
- **DO NOT** dispose of old batteries in normal trash or in fires. Always follow your local environmental waste regulations.
- If the multimeter is not going to be used for an extended period of time, remove the batteries before storage.



Properly dispose of the old batteries.

Checking the Fuses

10A Fuse

Always check the 10A fuse before each use, especially before measuring current. If the internal fuse is overloaded, you must immediately replace it.

1. Plug the **red test lead** into the **VΩmAμA** terminal.
2. Turn the rotary dial to **10A**.
3. Insert the metal end of the **red test lead** into the **10A** terminal. If the multimeter beeps, then the internal fuses are still ready. If the multimeter does not beep, then the internal fuses have been overloaded and the LCD will read "**OL**".

200mA Fuse

If the display only reads "**0.0**" when measuring current using the **VΩmAμA** Terminal, it means that the 200mA fuse must be replaced.

Note:

- **10A** Terminal Fuse: 10A/600V Φ 5x20mm
- **VΩmAμA** Terminal Fuse: 200mA/600V Φ 5x20mm

Replacing the Fuses

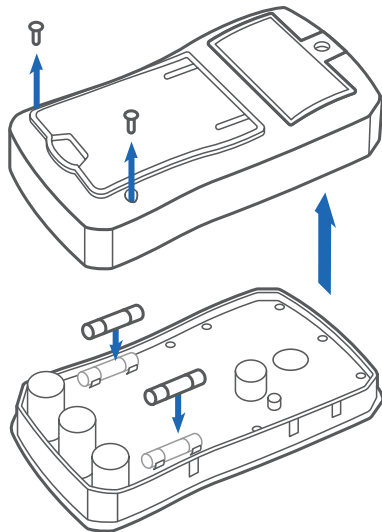
WARNING

To avoid electrical shock, arc blasts, arc flashes, personal injury, or damage to the multimeter, use the specified fuses ONLY in accordance with the following procedure.

1. Disconnect the test leads from the multimeter and turn the rotary switch to **OFF**.
2. Carefully remove the rubber case from the multimeter.
3. Use a small screwdriver to remove the screws at the bottom of the multimeter. Once the screws are removed, carefully separate the front and rear panels.
4. Replace the fuse(s) that need to be changed. [Figure 6.1]

Note: Make sure the fuses are placed in the correct ports.

5. Reconnect the front and back panels, then replace the screws to secure the panels together. Place the protective case back onto the multimeter.



Figures 6.1

Specifications

General Specifications

Maximum Voltage	600V
Maximum Overload Protection	600V rms (AC or DC)
Measurement Speed	2~3 times/second
Fused Protection	VΩmAµA Terminal: 200mA
	10A Terminal: 10A
Temperature	Operating: 32° - ±104°F (0°C - ±40°C)
	Storage: 14° - ±122°F (-10° - ±50°C)
Relative Humidity	≤ 75% @ 0°~30°C
	≤ 50% @ 30-40°C
Maximum Display Value	1999
Overload Display	OL
Battery Type	2 x 1.5V AAA Batteries (Pre-installed)
Dimensions	5.5 x 3 x 1.9 in. (140 x 77 x 48 mm)
Weight	7.1 oz (204 g)

Accuracy Specifications

Note:

- The following specifications are based on testing the multimeter in an environmental temperature range of 64.4°-82.4°F (18°-28°C). If the temperature is out of this range, it is required to multiply the measurement by a temperature coefficient.
- Temperature coefficient:
0.1 x (specified accuracy)/°C (<18°C or >28°C)

i. DC Voltage

Range	Resolution	Accuracy
200.0mV	0.1mV	± (0.7%+3)
2000mV	1mV	± (0.5%+2)
20.00mV	0.01V	± (0.7%+3)
200.0V	0.1V	
600V	1V	

- Input impedance is about 10MΩ.
- There may be unstable readings when using the **mV** range while the leads are not connected. This is a normal. The reading will become stable once the leads are connected.
- The max input voltage: ± 600V. When the voltage is more than 610V, the LCD will read "OL".

ii. AC Voltage

Range	Resolution	Accuracy
200.0mV	0.1mV	$\pm (1.0\%+2)$
2.000V	0.001V	$\pm (0.7\%+3)$
20.00V	0.01V	$\pm (1.0\%+3)$
200.0V	0.1V	$\pm (1.2\%+3)$
600V	1V	

- Input impedance is about 10M Ω .
- **Frequency response:** 40Hz ~ 400Hz, sine wave RMS (average response).
- **Max input voltage:** $\pm 600V$
- When the voltage is more than 610V, the LCD will read "OL".



iii. Resistance

Range	Resolution	Accuracy
200.0 Ω	0.1 Ω	$\pm (1.0\%+2)$
2000 Ω	1 Ω	$\pm (0.8\%+2)$
20.00K Ω	0.01K Ω	
200.0K Ω	0.1K Ω	$\pm (1.2\%+5)$
20.00M Ω	0.01M Ω	
200.0M Ω	0.1M Ω	$\pm (5.0\%+5)$

- **Measurement result =**
initial reading - reading after leads have been tested

Accuracy Specifications (cont.)

iv. Continuity & Diode

Range	Resolution	Accuracy
	0.1 Ω	If the measured resistance is greater than 50 Ω , the multimeter will read the circuit as open, and the buzzer will not sound off.
		If the measured circuit can support a flow of electricity, the reading will be less than 10 Ω and the buzzer will sound off.
	0.001V	Open circuit voltage: 2.1V. Test current is about 1mA. Silicon PN junction voltage is about 0.5-0.8V.

v. Capacitance

Range	Resolution	Accuracy
2.000nF	0.001nF	Under REL mode \pm (4%+10)
20.00nF	0.01nF	\pm (3%+10)
200.0nF	0.1nF	
2000 μ F	0.001F	\pm (3%+5)
20.00 μ F	0.01 μ F	
200.0 μ F	0.1 μ F	\pm (3%+10)
2.000mF	0.001mF	

- Use the Relative Mode when measuring capacitance that is less than 200nF.

vi. DC Current

Range	Resolution	Accuracy
200.0μA	0.1μA	± (1.0%+2)
2000μA	1μA	
20.00mA	0.01mA	
200.0mA	0.1mA	
2.000A	0.001A	± (1.2%+5)
10.000A	0.01A	

- If the current being tested is more than 10.10A, the LCD will read “ **OL** ” and the buzzer will sound.
- **Overload protection:**
 - **μA mA** range:
Fuse 200mA/600V Φ5 x 20mm
 - 10A range:
Fuse 10A/600V Φ5 x 20mm

vii. AC Current

Range	Resolution	Accuracy
200.0μA	0.1μA	± (1.2%+3)
2000μA	1μA	
20.00mA	0.01mA	
200.0mA	0.1mA	
2.000A	0.001A	± (1.5%+5)
10.000A	0.01A	

- **Frequency response:** 40 to 400 Hz.
- **Accuracy guarantee range:** 5 to 100% range, short circuit allows less than 2 word residual reading.
- If the current being tested is more than 10.10A, the LCD will read “ **OL** ” and the buzzer will sound.
- **Overload protection:**
 - **μA mA** range:
Fuse 200mA/600V Φ5 x 20mm
 - 10A range:
Fuse 10A/600V Φ5 x 20mm

Warranty Information

Product Name	Digital Multimeter
Model Number	MSR-A600
Default Warranty Period	1 year
<i>For your own reference, we strongly recommend that you record your order number and date of purchase.</i>	
Order Number:	
Date of Purchase:	

TERMS & POLICY

Etekcity warrants all products to be of the highest quality in material, craftsmanship, and service effective from the date of purchase to the end of the warranty period.

Etekcity will replace any product found to be defective due to manufacturer flaws based on eligibility. Refunds are available within the first 30 days of purchase. Refunds are only available to the original purchaser of the product. This warranty extends only to personal use and does not extend to any product that has been used for commercial, rental, or any other use in which the product is

not intended for. There are no warranties other than the warranties expressly set forth with each product.

This warranty is non-transferrable. Etekcity is not responsible in any way for any damages, losses, or inconveniences caused by equipment failure by user negligence, abuse, or use noncompliant with the user manual or any additional safety, use, or warnings included in the product packaging and manual.

This warranty does not apply to the following:

- Damage due to abuse, accident, alteration, misuse, tampering, or vandalism.
- Improper or inadequate maintenance.
- Damage in return transit.
- Unsupervised use by children under 18 years of age.

Etekcity and its subsidiaries assume no liability for damage caused by the use of the product other than for its intended use or as instructed in the user manual. Some states do not allow this exclusion or limitation of incidental or consequential losses so the foregoing disclaimer may not apply to you. This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

ALL EXPRESSED AND IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE PERIOD OF THE LIMITED WARRANTY.

Additional 1-Year Warranty

You can extend your 1-year warranty by an additional year. Log onto

www.etekcity.com/warranty and enter your order number (e.g., from Amazon or Houzz) within the first 14 days of your purchase to register your new product for the extended warranty.

If you are unable to provide the order number for your product, please type a short note in the order number field along with the date you received your product.

Defective Products & Returns

Should your product prove defective within the specified warranty period, please contact Customer Support via **support@etekcity.com** with your invoice and order number. **DO NOT** dispose of your product before contacting us. Once our Customer Support Team has approved your request, please return the unit with a copy of your invoice and order number.

Customer Support

Should you encounter any issues or have any questions regarding your new product, feel free to contact our helpful Customer Support Team. Your satisfaction is our goal!

CUSTOMER SUPPORT

Etekcity Corporation

1202 N. Miller St., Ste. A
Anaheim, CA 92806

SUPPORT HOURS

Monday - Friday:

9:00 am - 5:00 pm PST

Email: support@etekcity.com

Local: (657) 500-1872

Toll Free: (855) 686-3835

* Please have your order invoice and order number ready before contacting Customer Support.

Connect with us @Etekcity





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