



**3330**

**USER'S MANUAL**

**INNOVA®**

# Automotive Circuit Tester





**WELCOME TO THE INNOVA FAMILY!**

**i**

## **HELLO...**

On behalf of everyone at INNOVA®, we want to welcome you and thank you for purchasing the **INNOVA® 3330 Automotive Circuit Tester!** Every automotive diagnostic tool we make includes tons of pro-level features designed to help maximize and simplify your vehicle diagnostic routine.

Please reference this manual to learn about all the features and functions included with this product. Be sure to visit us at [INNOVA.com](http://INNOVA.com) to learn more about our comprehensive line of automotive diagnostic tools.

Enjoy using your INNOVA® diagnostic equipment!

Yours sincerely,

*The Innova® Technical Team*

**P.S.** See what's new! Connect with us on social...



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## **LEGAL INFORMATION**

### **TRADEMARKS**

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### **PATENTS**

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Innova® Electronics Corp. protects its intellectual property with numerous U.S. patents, which were used to research, design and manufacture this product. Please visit <https://www.innova.com/pages/patents> for additional information.

### **CALIFORNIA PRODUCT WARNING**

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#### **⚠ WARNING**

This product can expose you to chemicals including DINP, which is known to the State of California to cause cancer. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**INTRODUCTION****ABOUT THE TESTER**

This User's Manual includes safety information and warnings on how to operate the tester. DO NOT operate this tester before reading this manual in its entirety.



**WARNING:** DO NOT operate this tester before reading the "SAFETY PRECAUTIONS / WARNINGS" specified in this manual.

- Powered by batteries, the INNOVA® 3330 is a highly dependable and safe automotive circuit tester.
- The tester provides reliable performance with its highly accurate A/D converter and advanced micro-processors. It is a versatile vehicle diagnostic tester with full test range, overload protection and unique design.
- This high performance and versatile 3330 tester features smart automatic tests such as AC Voltage, DC Voltage, Resistance, and Continuity.

**Perform Test Functions For:**

- DC Voltage
- AC Voltage
- Resistance
- Continuity
- Capacity
- Duty Cycle
- Frequency
- Diode
- Tachometer (RPM)
- Dwell Angle Test
- Pulse Width (mS)

**Additional Features Include:**

- Data Hold
- Max. Value Hold
- Min. Value Hold
- Low Voltage Indication
- Automatic Power-off
- Flashlight
- Alarm Buzzer

**PACKAGE CONTENTS**

When opening the product packaging, please check to see that your tester kit includes all of the accessories listed below. If anything is missing, please contact our customer service center at **1-800-544-4124**.

ITEM	QUANTITY
3330 Automotive Circuit Tester	1 pc
Black Threaded Probe	1 pc
Black Threaded Alligator Clip	1 pc
Threaded Adapters to Back Probe	3 pcs
Storage Case	1 pc
Screwdriver	1 pc
User's Manual	1 pc

**NOTE:**

- Batteries are not included. Please install (2 ea.) AAA Alkaline batteries to operate tester.** [See Page 21]

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## **SAFETY PRECAUTIONS / WARNINGS**

*Safety First!*


### **SAFETY PRECAUTIONS / WARNINGS**

#### **SAFETY FIRST!**

This tester has been designed, manufactured and tested to comply with IEC61010-1, CAT III 600V and CA65 Rules. The LICENSEE and END USER shall be made aware that, if the tester is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

- Before using the tester and probe, please make sure the tester and the test lead are in good condition. DO NOT use the tester if you find any damage to the tester and/or the lead, including a broken tester housing, damaged insulation layer of the test lead, no display or a malfunctioning display screen. To avoid electric shock, DO NOT use the tester without proper installation of battery compartment cover.
- DO NOT use damaged test lead. Use a good test lead that meets the same electric standards.
- When using the tester, DO NOT touch the uninsulated electric wires, connectors, ends of the test probes and circuits.
- Measure with extreme care for AC voltage higher than 30V. To avoid electric shock, keep fingers behind the probe sheath.
- DO NOT apply more than the rated voltage, as marked on the tester, between the COM terminal and the input terminal.
- Make sure correct function is selected before starting any test. Before shifting to another test, make sure the test leads are disconnected from all circuits.
- To avoid damage to the tester, DO NOT shift functions during test.
- To avoid electrical shock and/or damage to the circuit tester, ensure the power is removed from the circuit before any resistance, diode or continuity testing procedure is conducted, and discharge all capacitors. Always test resistance, diodes and

continuity on deenergized (dead) circuits only, never on live circuits.

- DO NOT keep or use the tester in a high temperature, high humidity, inflammable, explosive, or within a strong electromagnetic field environment.
- To avoid damage to the tester and prevent personal injury, DO NOT rebuild this tester.
- To avoid false readings that could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator  displays. Never ground yourself when taking electrical measurements. Isolate yourself from ground by using dry rubber insulating mats to cover all exposed/grounded metal. Stand on rubber mats and wear dry clothing.
- Turn the tester OFF every time a test is completed. To avoid damage to the tester caused by battery leakage, remove the batteries and store them properly.

**If working on a vehicle, take the following added precautions:**

- Always wear safety eye protection.
- Only work on vehicles in a well-ventilated area.
- Avoid moving fan blades or any potentially moving parts.
- Avoid hot engine parts.
- Put transmission in "Park" (Automatic Transmission vehicles) or "Neutral" (Manual Transmission vehicles). Set the parking brake.
- Turn the ignition OFF before connecting or disconnecting any testing equipment.
- Put blocks on drive wheels.
- To avoid damage to the tester and/or vehicle battery, and personal injury, DO NOT put the tester on a vehicle's battery.
- DO NOT smoke around the vehicle while testing.
- DO NOT drive the vehicle while testing.
- Avoid wearing loose clothing or jewelry when



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## SAFETY PRECAUTIONS / WARNINGS

*Safety First!*

working on a vehicle.

- Read your vehicle's service manual and follow its safety procedures.



**WARNING:** When testing airbag parts and wirings, please pay special attention to vehicle's service manual and follow its safety procedures; otherwise, the airbags may deploy and cause personal injury.

**Note:** After the ignition is turned OFF (even after the vehicle battery is disconnected), the airbags may deploy within a few minutes, as airbag deployment is powered by a special power supply.



**WARNING: Risk of Explosion.** This equipment has internal arcing and sparking parts, which should not be exposed to flammable vapors. This equipment is only suitable for working in an environment with sufficient air circulation to avoid a hazardous situation.












**WARNING:** Ignition coils produce a very high voltage. To reduce the risks of electric shock when conducting RPM tests, DO NOT touch the uninsulated ends of the test probes, the ignition coil, or the coil terminals when the engine is running.

**Disclaimer:** All information, specifications and illustrations in this manual are based on the latest information available at the time of printing. INNOVA® reserves the right to make changes at any time without notice. While information of this manual has been carefully checked for accuracy, no guarantee is given for the completeness and correctness of the contents, including but not limited to the product specifications, functions, and illustrations. INNOVA® is not liable for any direct, special, incidental, or indirect damages, or for any economic consequential damages (including the loss of profits) as a result of using this product.

**TESTER FEATURES & FUNCTIONS**

**ICON LEGEND**

Symbol / Icon	Description
	High Voltage Warning
	AC (AC Voltage)
	DC (DC Voltage)
	Fuse
	Low Battery
	Double Insulation
	Ground
	Warning
	Continuity Test

**SPECIFICATIONS**

Function / Feature	Specification
Operating Altitude	Max. 650 ft. (200 meters)
Display	Color LCD
Auto Range	Yes
Count	4000
Overload Protection	250 V
COM Terminal and Input Terminal	Max voltage AC/DC 600 V
Sampling Rate	3 times/s
Polarity Display	AUTO
Over Range Display	OL or -OL
Automatic Power-off	15 minutes

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## TESTER FEATURES & FUNCTIONS

### Controls

Function / Feature	Specification
Flashlight	Powers off automatically in 5 minutes
Low Battery	LCD shows "🔋" symbol
Low Battery Indicator	≤2.4 V/±0.2 V
Working Temperature	32°F–104°F (0°C–40°C)
Storage Temperature	14°F–122°F (-10°C–50°C)
Humidity	32°F–86°F (0°C–30°C) ≤75%HR
	86°F–104°F (30°C–40°C) ≤50%HR
Power Supply	1.5 V / AAA×2
Dimensions	6.4" x 1.2" x 1" (162 x 29.5 x 25.6 mm)
Weight (without batteries)	2 oz. (57 g)

### CONTROLS

See Figure 1 for the locations of items 1 through 9 below:

1. Red Probe, Input Jack
2. Display
3. Function Keys
4. Battery Compartment Cover
5. COM Jack
6. Flashlight
7. Black Test Probe
8. Threaded Adapters
9. Alligator Clip Adapter

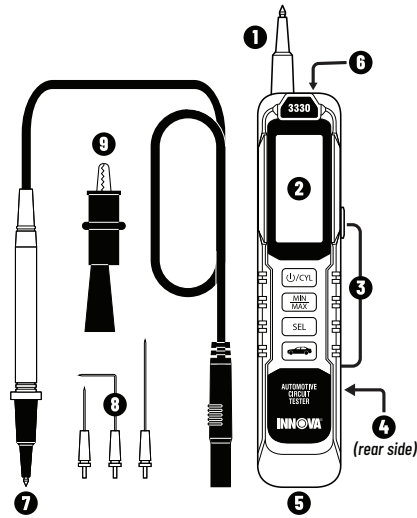
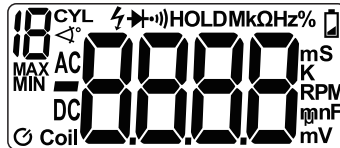


Figure 1. Controls

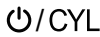



**LCD DISPLAY**



Symbol	Description
	Low Battery
%	Duty Cycle
HZ	Frequency
$\Omega$ , K $\Omega$ , M $\Omega$	Resistance
HOLD	Data Hold
	Continuity Test
	Diode
	High Voltage Warning
CYL	# of Cylinders Selection
	Dwell Angle
MAX	Max Value
MIN	Min Value
	Automatic Power-off
—	Negative Pole
AC	Alternating Current
DC	Direct Current
mS	Pulse Width
k	Kilo
RPM	Tachometer
nF, uF, mF	Capacity
mV, V	Voltage

## KEYPAD

**Keypad Operation Note:** For normal function, press key <2 s. For hold function, press key ≥2 s.



Keypad	Description
 /CYL	Hold button for a few seconds to power ON/OFF the tester.
	Power ON the tester, press the  key to enter automotive test functions and then press the <b>CYL</b> key to select the number of cylinders.
<b>MIN</b> <b>MAX</b>	Press <b>MIN/MAX</b> to hold the minimum/maximum value of automotive tests.
<b>SEL</b>	Press <b>SEL</b> to select test function: Diode, Duty Cycle, Frequency and Capacity.
	Hold <b>SEL</b> for a few seconds to start the smart measurement of AC/DC Voltage, Resistance, Diode and Continuity tests.
	Press to start automotive tests, like Tachometer, Dwell Angle and Pulse Width.
	Hold it for a few seconds to start smart tests.
 <b>HOLD</b>	Press to hold or release the test value.
	Hold it a few seconds to power ON/OFF the flashlight.

**PERFORMING TEST MEASUREMENTS**

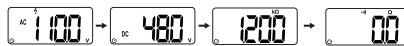



**WARNING:** Pay close attention to WARNINGS of the input jack and probe. For your safety, DO NOT measure more than the rated voltage of AC/DC 600V.

**AC/DC VOLTAGE, RESISTANCE AND CONTINUITY MEASUREMENT**




1. Plug the **black test lead** to the COM jack.
2. Hold  to power ON the tester until the screen shows the "AUTO" smart measurement message. 
3. Connect the **black lead** and **red probe** to the circuit.




- The tester starts measuring AC/DC voltage, resistance and continuity automatically. At this time, the instrument screen displays the recognized measurement data.




- The resistance starts measuring from 1 Ω and the screen displays the following when below 1 Ω. 

**NOTE:**


- Before using the instrument, test it with an energized conductor to make sure it's in good working condition.
- When the voltage (AC/DC) is over 30 V, the display shows the High Voltage Warning symbol  with the measured voltage. 
  - If the voltage is over 600 V, the alarm buzzer sounds.
  - If the voltage is >620 V, the display shows the following  and the alarm buzzer sounds, warning you of high voltage.

- When testing a resistor, the screen shows a resistance value as illustrated. 
  - If the resistor is open loop or the resistance is  $>40 \text{ M}\Omega$ , the screen displays "AUTO" indicating that the resistor was not able to be measured. 
- When testing a circuit, if the resistance at the two ends measures  $<50 \Omega$ , the tester will recognize it as a continuity test, the buzzer alarm sounds, and the screen displays its resistance value. 
  - If the resistance of the two ends of the circuit measures  $>50 \Omega$ , the tester will recognize it as a resistance test and the alarm will not sound.
- When tests are completed, disconnect the test lead from the circuit.


### CAPACITY MEASUREMENT


1. Press the **SEL** key select the *Capacity* test – the screen displays (nF) as illustrated. 
2. Plug the **black test lead** to the COM jack.
3. Connect the **black lead** and the **red probe** to the capacitor.
4. The screen displays its capacity value.

#### NOTE:



- Deenergize the capacitor before testing to avoid damage to the tester and/or personal injury.
- If the capacitor is open loop or the capacity is over range, the screen displays: 
- When tests are completed, disconnect the test lead from the capacitor.

### DUTY CYCLE MEASUREMENT

1. Press the **SEL** key to select the *Duty Cycle* test – the screen shows (%) as illustrated. 
2. Plug the **black test lead** to the COM jack.

3. Connect the **black lead** and **red probe** to the desired circuit.
4. The tester shows the duty cycle value. 



**FREQUENCY MEASUREMENT**

1. Press the **SEL** key to select *Frequency* test – the screen displays (Hz) start screen: 
2. Plug the **black test lead** to the COM jack.
3. Connect the **black lead** and **red probe** to the desired circuit.
4. The tester shows the frequency value: 


**NOTE:**

- When the test is completed, disconnect the test lead from the circuit.

**DIODE MEASUREMENT**

1. Press the **SEL** key to select *Diode* test – the screen displays: 
2. Plug the **black test lead** to the COM jack.
3. Connect both probes in parallel as follows:
  - The polarity of **black test lead** is negative – connect it to the negative “-” pole of the diode.
  - The polarity of **red probe** is positive – connect it to the positive “+” pole of the diode.
4. The screen shows the voltage of positive PN junction of the diode. 

**NOTE:**

- If the diode under test is open loop, or the polarity is incorrectly connected, the screen displays: 
- Before testing a diode, disconnect all power from the circuit and deenergize all capacitors.
- The open loop voltage of diode is about 4 V.
- When the test is completed, disconnect the test lead from the circuit.




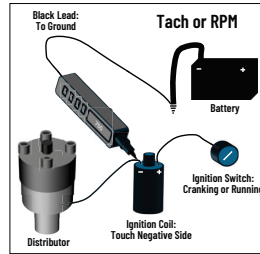
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## PERFORMING TEST MEASUREMENTS

### Tachometer (RPM) Measurement

#### TACHOMETER (RPM) MEASUREMENT

1. Press the  key to select the *Tachometer* test.
2. Press the **CYL** key to select # of cylinders to test RPM.
3. Plug the **black test lead** to the COM jack to display



4. If the engine has a Distributorless Ignition System (DIS), connect the **red probe** to the vehicle's TACH signal cable. (*Please refer to vehicle's service manual for the location of the signal cable.*)
5. If the engine has a Distributor Ignition System, connect the **red probe** to the negative pole of the primary ignition coil. (*Please refer to vehicle's service manual for details.*)
6. Connect the **black test lead** to ground.
7. Run the engine to display the vehicle's engine RPM.

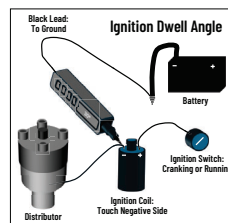



#### NOTE:

- The RPM should be between 300–9999.
- When the test is completed, disconnect the test lead from the circuit.

#### DWELL ANGLE MEASUREMENT

It is important to test the dwell angle of circuit breaker of an ignition system in older vehicles. In addition, dwell angle measurement can be taken for the hybrid control solenoid (i.e., feedback vaporizer of GM vehicles).




1. Press the  key to select the *Dwell Angle* test.
2. Press **CYL** to select proper # of cylinders.
3. Plug the **black test lead** to the COM jack.



## PERFORMING TEST MEASUREMENTS

Pulse Width Measurement (mS)

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- To measure a circuit breaker, connect the **red probe** to the negative pole of the primary ignition coil. *(Please refer to the vehicle's service manual for details.)*
- To measure the feedback vaporizer of GM vehicles, connect the **red probe** to the Ground terminal of the solenoid, or to the driver of the solenoid. *(Please refer to the vehicle's service manual for details.)*
- To measure dwell angle of any ON/OFF device, connect the **red probe** to the end of the ON/OFF switch.
- Connect the **black test lead** to ground.
- Run the engine and view the test results on the screen. 

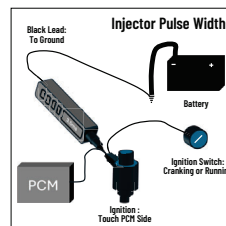
### NOTE:

- When the test is completed, disconnect the test lead from the circuit.
- The dwell angle is different from than the ignition angle.
- The ignition angle refers to the angle at which the engine crankshaft rotates from the start of ignition until the piston rises to the top dead center.
- The dwell angle of a traditional ignition system is the period of time of energizing and deenergizing the primary ignition coil. (The pulse width of the ignition control pulse is the dwell angle).

## PULSE WIDTH MEASUREMENT (mS)

Measures the length of time (in milliseconds) that a solenoid or actuator is energized (the "ON" time) during a one-cycle time period. One range = 1 to 999 ms illustrates the pulse width of fuel injection system.

- Press the  key to select the *Pulse Width* test. 
- Plug the **black test lead** to the




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## PERFORMING TEST MEASUREMENTS

### *Pulse Width Measurement (mS)*

COM jack.

3. Connect the **black test lead** to ground.
4. Connect the **red probe** to the control signal wire of the injector.
5. Run the engine and view the test results. 

#### **NOTE:**

- When the test is completed, disconnect the test lead from the circuit.

**TECHNICAL SPECIFICATIONS**

**Temperature for accurate measurement:** 64°F–82°F (18°C–28°C), ±1°F/C

When the temperature is <64°F (18°C) or >82°F (28°C), the additional temperature coefficient error is: 0.1 × (*Specify Accuracy*) / °F or °C

**DC VOLTAGE**

Range	Resolution	Accuracy
4 V	0.001 V	± (0.5% reading + 5 digits)
40 V	0.01 V	± (0.8% reading + 8 digits)
400 V	0.1 V	
600 V	1 V	

**Input resistance =** 10 Ω, Max. Input voltage: 600 V

**AC VOLTAGE**

Range	Resolution	Accuracy
4 V	0.001 V	± (1.0% reading + 5 digits)
40 V	0.01 V	± (1.2% reading + 8 digits)
400 V	0.1 V	
600 V	1 V	


**Input resistance =** 10 Ω, Max. input voltage: 600 V / Frequency response: 40 Hz–1 kHz

**RESISTANCE**

Range	Resolution	Accuracy
400 Ω	0.1 Ω	±(0.8% reading + 3 digits)
4 kΩ	0.001 KΩ	
40 kΩ	0.01 KΩ	
400 kΩ	0.1 KΩ	
4 MΩ	0.001 MΩ	±(1.2% reading + 8 digits)
40 MΩ	0.01 MΩ	

**Overload protection:** 250 V

## CONTINUITY MEASUREMENT

Function	Range	Resolution	Remark
	400 $\Omega$	0.1 $\Omega$	When the resistance is <math><50 \Omega</math>, the alarm buzzer sounds.

Overload protection: 250 V

## CAPACITOR

Range	Resolution	Accuracy
40 nF	0.01 nF	$\pm(4\% \text{ reading} + 10 \text{ digits})$
400 nF	0.1 nF	
40 $\mu$ F	0.01 $\mu$ F	
400 $\mu$ F	0.1 $\mu$ F	
4 mF	0.001 mF	$\pm(5\% \text{ reading} + 10 \text{ digits})$
40 mF	0.01 mF	

Overload protection: 250 V

## DUTY CYCLE

Range	Resolution	Accuracy
5% ~ 95%	0.1%	$\pm(2.6\% \text{ reading} + 7 \text{ digits})$

Overload protection: 250 V

## FREQUENCY

Range	Resolution	Accuracy
40 HZ	0.01 HZ	$\pm(0.1\% \text{ reading} + 5 \text{ digits})$
400 HZ	0.1 HZ	
4 KHZ	0.001 KHZ	
40 KHZ	0.01 KHZ	
400 KHZ	0.1 KHZ	
1 MHZ	0.001 MHZ	

**Frequency:** 5 Hz–1 MHz, **Range:** 2.5 Vpp–10 Vpp

**Overload protection:** 250 V

**DIODE**

Function	Range	Resolution	Test Conditions
Diode Measurement	0.1 V–3 V	0.001 V	<b>Positive DC current:</b> about 2 mA <b>Open loop voltage:</b> about 3 V

**Overload protection:** 250 V

**TACHOMETER (RPM)**

Range	Resolution	Accuracy
2STR	0.001 RPM	±(3% reading + 5 digits)

**Input signal:** Duty Cycle 5%–95%, **Range:** 2.5 Vpp–10 Vpp

**Overload protection:** 250 V

**DWELL ANGLE**

Range	Resolution	Accuracy
1CYL	0.1°	±(3% reading + 5 digits)
2CYL		
3CYL		
4CYL		
5CYL		
6CYL		
8CYL		
10CYL		
12CYL		

**Negative duty cycle:** 5%–95%, **Range:** 2.5 Vpp–10 Vpp

**Frequency:** 5 Hz–166.6 Hz (RPM: 0.300–9.999 KPM)

**Overload protection:** 250 V

**PULSE WIDTH (MS)**

Range	Resolution	Accuracy
999.9 mS	0.001 RPM	$\pm(1.5\% \text{ reading} + 10 \text{ digits})$

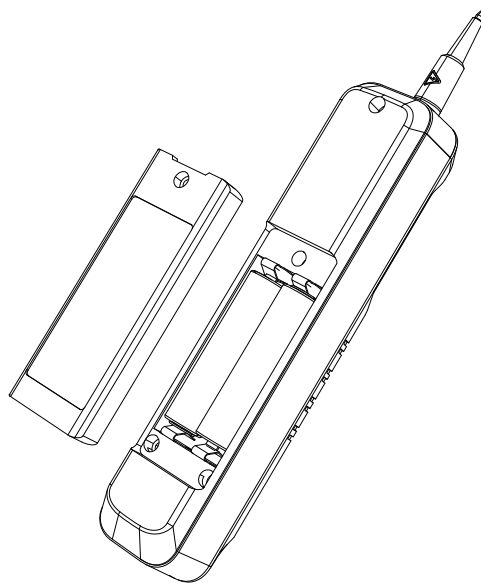
**Input signal/pulse frequency:** 5 HZ–<1 KHZ, **Pulse width**  $\geq 0.5$  mS, **Range:** 2.5 Vpp–10 Vpp

**Overload protection:** 250 V

## **BATTERY REPLACEMENT**

### **INSTALLING NEW BATTERIES**

1. Hold the **Power** key for a few seconds to power off the tester and unplug the **black test lead** from the COM jack.
2. Using the included Phillips screwdriver, unscrew the battery compartment cover.
3. Remove the old batteries and install new **2 x AAA Alkaline** batteries correctly according to their polarity.
4. Re-install the battery compartment cover.





**22****WARRANTY + CUSTOMER SERVICE***Limited Warranty***WARRANTY + CUSTOMER SERVICE****LIMITED WARRANTY**

The Manufacturer warrants to the original purchaser that this unit is free of defects in materials and workmanship under normal use and maintenance for a period of one (1) year from the date of original purchase.

If the unit fails within the one (1) year period, it will be repaired or replaced, at the Manufacturer's option, at no charge, when returned prepaid to the Service Center with Proof of Purchase. The sales receipt may be used for this purpose. Installation labor is not covered under this warranty. All replacement parts, whether new or remanufactured, assume as their warranty period only the remaining time of this warranty.

This warranty does not apply to damage caused by improper use, accident, abuse, improper voltage, service, fire, flood, lightning, or other acts of God, or if the product was altered or repaired by anyone other than the Manufacturer's Service Center.

The Manufacturer, under no circumstances shall be liable for any consequential damages for breach of any written warranty of this unit. This warranty gives you specific legal rights, and you may also have rights, which vary from state to state. This manual is copyrighted with all rights reserved. No portion of this document may be copied or reproduced by any means without the express written permission of the Manufacturer. **THIS WARRANTY IS NOT TRANSFERABLE.** For service, send via U.P.S. (if possible) prepaid to Manufacturer. Allow 3-4 weeks for service/repair.

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