SELF-CLEANING AIR IONIZATION SYSTEM FOR RESIDENTIAL AIR CONDITIONING SYSTEMS

- Patented self-cleaning design ensures ongoing peak performance
- Needlepoint ionization actively treats air in the living space
- For duct systems up to 6 tons (2400 CFM)
- iWave is validated to meet UL 867 ozone requirements
- No maintenance for the life of the iWave
- Easily installs in minutes in A/C system
- Patented multi-voltage input – 24VAC to 240VAC!
- Universal mounting with magnets
- Flexible design with no replacement parts
- Reduces certain bacteria and viruses*
- Reduces odors, smoke and other airborne particles
- Keeps coil cleaner
- Programmable cleaning cycle
- Alarm contact option for secondary notification
- UL and cUL recognized
- Three-year limited warranty

Indoor Air Quality

iWave®-R

Residential Air Ionization System

Description

With technology installed in over 200,000 applications, iWave-R is a self-cleaning, no maintenance needlepoint bi-polar ionization generator designed specifically for treating air in residential duct A/C systems. As the air flows past the iWave-R, positive and negative ions actively treat the supply air, reducing certain bacteria and viruses* in the coil and living space. The ionization process also reduces smoke, odors (cooking, pet, VOCs), as well as other particles (no more sunbeams) in the air. iWave is validated to meet UL 867 ozone requirements.

Application

iWave-R treats the air in any brand of residential duct air conditioning systems up to 6 tons (2400 CFM) in size with no maintenance and no replacement parts. Designed for universal mounting, the iWave-R can be installed inside or outside of duct, or attached magnetically near the indoor fan in the air handler. Simply connect to power using its patented voltage input capability. The iWave-R should always be installed after the return filter. The unit can be installed pre or post coil, but in areas with high humidity it is always recommend being installed on the supply side of the coil. iWave-R always works at peak performance, producing over 160 million ions/cc per polarity (320 million total ions/cc), more than any other ionizer product on the market. Its patented self-cleaning design includes a programmable cleaning cycle that can clean the emitter brushes every 1, 3, 5 or 10 days. The iWave-R is factory set to clean every third day which is adequate for a typical installation. iWave-R does not create “black walls” as negative-only ionizer products will do.

Packaging

1 each	**4900-20**

Specifications

Input Voltage:	24VAC to 240VAC
Power (VA):	10 VA
Frequency:	50/60 HZ
System Size:	6 tons (2400 CFM)
Ion Output:	160 million ions/cc per polarity (320 million total ions/cc)
Dimensions:	6” L x 4.8” W x 2” D
Weight:	1 lb.
Electrical Approvals:	UL and cUL recognized
Service Temp. Range:	-40°F to 160°F

iWave-R Installation Instructions

1. Disconnect air handler power before installing.
2. Mount the iWave-R after the return filter. The iWave-R can be mounted before the coil if the primary concern is treating the coil. If the primary concern is treating the occupied space, then the iWave-R should be installed on the supply side of the coil. In regions with high humidity, it is always recommend being installed on the supply side of the coil.
3. The iWave-R is designed with universal mounting- either attach with screws or affix to the system with integral magnets. Mount near the fan inlet (shaft side) on a metal surface in the air handler, internal wall duct or external wall duct depending on what is best for the installation. For external duct mount, a three inch diameter hole will need to be cut/drilled out of the duct. **IMPORTANT:** If mounting on the fan housing, ensure the iWave-R is secured from fan vibration - use short length self-tapping screws so as not to impair operation of fan.

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Nu-Calgon Application Bulletin 4-100

Needlepoint Bi-Polar Ionization

Nu-Calgon introduces iWave, a new advanced air ionization technology to the HVACR market. This patented and OEM approved technology called needlepoint bi-polar ionization uses carbon fiber brushes to produce a refined electrical charge to proactively clean the air in residential and commercial buildings. The iWave approach produces equal amounts of positive and negative ions that reduce certain viruses and bacteria*, particles, smoke, odors and VOCs in the air, creating a cleaner environment. iWave is validated to meet UL 867 ozone requirements.

How Bi-Polar Ionization Works

Air Flow Direction

iWave devices are bi-polar, meaning they use two emitters to create equal amounts of positive and negative ions. When these ions are injected into the air stream they reduce passing pollutants, gases and odors. When the ions are emitted into the airstream, they will reduce certain viruses and bacteria*. Contact with ions has microbicidal effects on certain viruses and bacteria, which ultimately disrupt their surface proteins and render them inactive. The ions also attach to dust and other particles, causing them to band together until they are large enough to be caught by filters. iWave's technology generates the same ions that nature creates with lightning, waterfalls, ocean waves, etc. Nature uses ion energy to break apart molecules, naturally cleaning the air. iWave is validated to meet UL 867 ozone requirements.

How iWave Ionization Differs from PCO Technology

Unlike iWave's bi-polar ionization method, Photo Catalytic Oxidation (PCO) technology uses UV light, commonly with titanium dioxide (TiO2) and often with other alloys, to create ionization. The Centers for Disease Control (CDC) has warned of cancerous risks involved with TiO2[1] – not something you want in a building's air quality!

ASHRAE issued a position document in January 2015 on Filtration and Air Cleaning where they cautioned UV lamps used in many PCO devices can emit significant ozone – known to be harmful for human health. They also observed and reported on page 9 of the document "…potential of an incomplete oxidizing process, which produces by-products of reaction that can be more toxic or harmful than the original constituents (i.e. formaldehyde). The catalysts can be contaminated (poisoned) by airborne reagents and/or products of oxidation, which results in reduced or total efficiency failure of the process." Lastly, the PCO approach requires the replacement of the UV cell every year or two. Bi-polar ionization requires no replacement parts, and on the self-cleaning models, they are maintenance free for the life of the unit.

1 - CDC Current Intelligence Bulletin 63
*Visit www.iwaveair.com for performance data.

2611 Schuetz Rd. • St. Louis, MO 63043 • 800-554-5499 • www.nucalgon.com

Nu-Calgon Instruction Bulletin

4-415

Specifications:

Approvals	OEM, UL 867
Universal Voltage Input:	24VAC to 240VAC
Power (VA):	Less than 10 VA
Frequency:	50/60 HZ
Air Flow Capacity:	2400 CFM (up to 6 tons)
Dimensions:	6" L x 4.8" W x 2" D
Weight:	1 lb.
Service Temp. Range:	-40ºF to 160ºF
Electrical Approvals:	UL and cUL recognized
Plasma Output:	160 million ions/cc per polarity (320 million total ions/cc)
Indication:	Green LED "Power On" LED "Off" = No Power or Fault
Alarm:	Includes Optional Alarm Contact
Self-Cleaning:	Factory set to clean every third day. Can be reprogrammed in the field to clean every day
Mounting:	Duct, Internal AHU Wall or Fan Inlet
Orientation:	Mount unit so air flows across brushes like a football through a field goal post

Packaging:

1 each **4900-20**

Mounting Options

Fan Inlet Mount

- Internal magnets holding unit to fan inlet (shaft side).
- Use self-tapping screws to secure device, especially for high velocity applications or excessive vibration when using magnets.

Inside Wall/Cabinet Mount

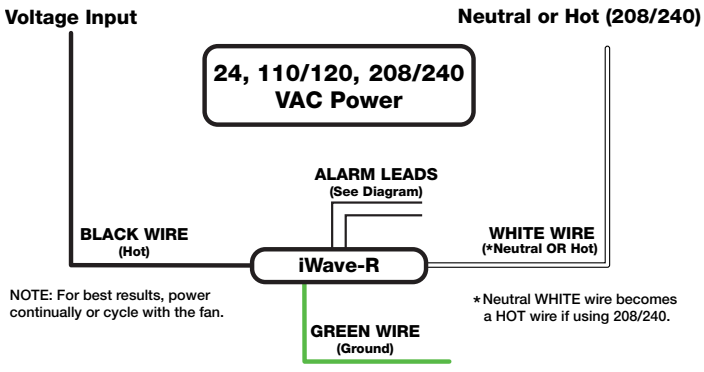
- Internal magnets holding unit to wall duct or air handler metal panel.

External Duct Mount

- Cut/drill a 3 inch hole in duct to install and use two self-tapping screws to hold unit to duct.

IMPORTANT!

Install the iWave-R in the airflow after the return filter. For external duct mount, make sure sheet metal sits against gasket surface; the high voltage emitter ends (fiber brushes) must be a minimum of 2 inches away from other metal and other wiring to prevent grounding/premature failure.



Indoor Air Quality

iWave®-R

Residential Air Ionization System

Installation Instructions

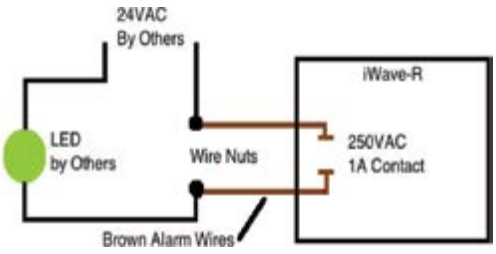
1. Disconnect air handler power before installing.
2. Mount the iWave-R after the return filter. The iWave-R can be mounted before the coil if the primary concern is treating the coil. If the primary concern is treating the occupied space, then the iWave-R should be installed on the supply side of the coil. * In regions with high humidity, it is always recommend being installed on the supply side of the coil.
3. The iWave-R is designed with universal mounting- either attach with screws or affix to the system with integral magnets. Mount near the fan inlet (shaft side) on a metal surface in the air handler, internal wall duct or external wall duct depending on what is best for the installation. For external duct mount, a three inch diameter hole will need to be cut/drilled out of the duct. **IMPORTANT:** If mounting on the fan housing, ensure the iWave-R is secured from fan vibration - use short length self-tapping screws so as not to impair operation of fan. **CRITICAL:** The iWave-R is designed for flush, external duct mount installations as an optional install. Ensure in all installations that other metal surfaces/wires are kept a minimum of two inches away from the tip ends of the high voltage emitters to prevent grounding, leading to premature failure.

Air Flow Direction

CRITICAL: Make sure air flows across both brushes at the same time, like a football through a field goal post.

ALARM RELAY WIRING EXAMPLE

Remote mounted LED will illuminate when the iWave-R is powered and there are no faults. All remote mount wiring, LED, wire nuts and voltage source are provided, mounted and wired by others.



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Installation Instructions Continued

4. The iWave-R has universal voltage capability, connect 24VAC to 240VAC voltage input, whatever is most convenient for quick installation. Although the device only pulls 10 watts, sometimes a dedicated 24VAC power supply may be necessary depending on the current load on the transformer for other system accessories.
5. Unit may be powered 24/7 or may be interlocked with indoor fan – unit only purifies when air is flowing. If unit is wired with the fan, the quickest air purification to address an air concern is to let the fan/iWave-R run continually for 72 hours. Leaving the fan continually in the 'on' position will provide the best ongoing air purification in the house.
6. **Wiring:** The iWave-R has a patent-pending universal voltage 24VAC to 240VAC input capability. The black wire (marked 'AC' on label) is for 24VAC to 240VAC voltage input. The white wire (marked 'N' on the label) is the neutral leg for 24VAC or 120VAC; or the other hot leg for 208/240VAC. The green striped wire is ground, marked 'G' on the label. The brown wires (marked 'A' on the label) are leads to a normally closed alarm contact – see step 7.
7. The iWave-R is equipped with an alarm contact option to provide a visual indicator outside of the air conditioning system to let the homeowner know that it is in normal operation or if there is a fault. The alarm contact, a normally closed contact, rated at 240 VAC/1A, will require a power source and visual indicator, such as a LED. In normal mode, the LED will stay illuminated. If the device goes into default mode, the LED will not light. If a homeowner wants a remote indication of iWave-R status, it is recommend that the 24VAC light (bought separately) be powered through the alarm contacts and sent to a remote wall.
8. When powered up, a green LED on the iWave-R will illuminate; the ionizer is working and the stepper motor for the cleaning feature is in the home position. If the light is not illuminated, check voltage to the iWave-R.
9. **Self-Cleaning/Program Feature:** The patent-pending iWave-R has a self-cleaning feature to ensure it is always operating at peak performance over its design life. The functions for the button include:
   a. While in normal operation mode, press the button once, the LED light will flash and the stepper motor starts an on-demand cleaning cycle.
   b. While in cleaning cycle (after step 'a' above), press the button and hold for 3 seconds, it goes into the mode of setting the cleaning cycle intervals. The iWave-R is designed to be programmed for 1, 3, 5, or 10 day cleaning cycle intervals. **The iWave-R is factory preset for cleaning the emitters every third day; this is adequate for most applications and will not need to be reprogrammed in the field.**

   While in the cleaning mode (with LED flashing and cleaning feature working):

   a. Press the button and hold for 3 seconds, the LED will flash once every second and the motor works once every day.
   b. Press the button twice (the first press hold for three seconds), the LED will flash twice every second and the motor works once every 3 days. This is the factory preset program.
   c. Press the button three times (the first press hold for three seconds), the LED will flash five times every second and the motor works once every 5 days.
   d. Press the button four times (the first press hold for three seconds), the LED will flash ten times every second and the motor works once every 10 days.

   The iWave-R remembers the programmed cleaning cycle days. After the power source is removed and applied again, the iWave-R will automatically operate and go back to the previous days.

   Note: The iWave-R is designed to be a long term IAQ investment, not requiring ongoing maintenance of replacing expensive parts every year or two like other market approaches. The ion emitters (fiber brushes) used in the iWave-R are designed to where they could easily be replaced after many years in service; in the unlikely event they ever needed to be replaced. Replacement requires a Phillips screwdriver and a few minutes; contact Nu-Calgon for further questions.

WARNING

10. The health aspects associated with the use of this product and its ability to aid in disinfection of environmental air have not been investigated by UL LLC.
11. This product shall not be installed behind a suspended floor/ceiling or a structural wall, ceiling, or floor.
12. This product is suitable for mounting to duct of metallic Construction only. Installation must be such that the structural integrity of the ducting is not compromised.
13. RISK OF ELECTRIC SHOCK. CAN CAUSE INJURY OR DEATH: DISCONNECT All ELECTRIC POWER SUPPLIES BEFORE SERVICING

Limited Warranty:

The iWave-R offers a limited warranty for three years that covers any defects in material or workmanship under normal use. If you make a claim during the warranty period, you must provide proof of purchase and proof of proper installation by a licensed contractor for the warranty to be valid. The iWave warranty does not cover labor, return shipping charges, damage from improper installation or improper voltage usage. The iWave warranty begins on the date that the unit was purchased. Installation of your iWave by any person other than a licensed contractor will void the warranty. Contact your local Nu-Calgon account manager or info@nucalgon.com with further questions.

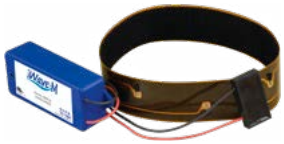
Products:

iWave®-R

4900-20

With technology installed in over 200,000 applications worldwide, iWave-R is a self-cleaning, bi-polar ionization system specially designed for residential duct air conditioning systems up to 6 tons (2400 CFM) in size. Needlepoint ionization actively treats air in the living space with no replacement parts, no maintenance for the life of the iWave and patented multi-voltage (24-240VAC). It can mount easily inside or outside of duct, or it can attach magnetically near indoor fan. iWave-R always works at peak performance, producing over 160 million ions/cc per polarity (320 million total ions/cc), more than any interior air quality product on the market. Patented self-cleaning design includes programmable cleaning cycle with alarm contact option. UL and cUL recognized. Three-year limited warranty.

iWave®-M



4900-35

iWave-M is a flexible ion-generating bar that can treat IAQ in nearly any HVAC application. Its revolutionary circuit bar with special ion-generating needles suitable for any HVAC cooling coil up to 1,600 CFM. Plus, it can be shortened in the field to any size! Perfect for ducted package or ductless HVAC systems in living centers, hotels, commercial buildings, residential (including mini-splits), and even transport cooling coils – applications where certain bacteria is an issue. Provides the highest level of ionization energy in the most compact size available on the market. UL and cUL recognized with patented multi-voltage (110-240VAC). Virtually maintenance free with no replacement parts. Produces over 35 million ions/cc per foot per foot of flexible ribbon. Three-year limited warranty.

iWave®-V

4900-40

With technology currently installed in over 200,000 applications worldwide, iWave-V is a versatile, low-maintenance bi-polar ionization generator for treating air in residential duct air conditioning systems up to 6 tons (2400 CFM) in size. Needlepoint ionization actively treats air in the living space with low maintenance and no replacement parts. Produces over 160 million ions/cc per polarity (320 million total ions/cc), more than any other interior air quality product on the market. Installs inside or outside of duct, or attaches magnetically near indoor fan. UL and cUL recognized. Three-year limited warranty.

iWave®-C

4900-10

Although it can be used for residential applications, the original iWave-C is especially suitable for light commercial systems up to 12 tons (4800 CFM). iWave-C is a self-cleaning, bi-polar ionization generator for treating a building's air quality that does not require replacement parts in a year or two like competing technologies. iWave-C always works at peak performance, producing over 200 million ions/cc per polarity (400 million total ions/cc), making it superior to other market approaches. Special features include a programmable cleaning cycle, waterproof housing, digital display and integral alarm contact. Duct mount to air handler inside or outside of building. For systems larger than 12 tons, multiple iWave-C units can be applied. UL and cUL certified with patented multi-voltage input (24-240VAC). Three-year limited warranty.

Application	iWave-R	iWave-V	iWave-C	iWave-M
Residential - Mini-Split A/C Systems				X
Commercial - VRF A/C Systems				X
PTAC Systems				X
Residential Duct HVAC Systems	X	X	X	X
Light Commercial Duct HVAC Systems			X	X
Transport HVAC Systems				X
Industrial HVAC Systems				X

Features	iWave-R	iWave-V	iWave-C	iWave-M
OEM Approved	X	X	X	X
Patented Self-Cleaning Technology	X		X	
No Replacement Parts	X	X	X	X
No Maintenance for life of iWave	X		X	
Reduces Certain Bacteria and Viruses*	X	X	X	X
Controls Odor (Cooking, Pet, VOCs)	X	X	X	X
Reduces Odors Caused by Dirty Sock Syndrome	X	X	X	X
Reduces Particles in Air	X	X	X	X
Reduces Smoke	X	X	X	X
Reduces Static Electricity	X	X	X	X
Multi-Voltage Input (24-240VAC)	X	24VAC	X	110-240VAC
Universal Mounting	X	X	Duct Mounted	X
Customizable Length				X
Digital Display/Weatherproof Housing			X	
Alarm Contact Option for Notification	X		X	
Replaceable Emitters	X		X	
Service Temperature Range	-40ºF to 160ºF	-40ºF to 160ºF	-40ºF to 160ºF	-40ºF to 140ºF
Limited Three Year Warranty	X	X	X	X

The iWave-M, and iWave-V require low maintenance. The emitters may require a wipe with damp cloth from time to time to ensure ionizer tips are clear of particles. After power is turned off, the carbon bristles on the iWave-V should be looked at periodically (every time the air filter is replaced) to ensure they are clean for optimum performance.
**Visit www.iwaveair.com for performance data.*

Frequently Asked Questions:

What makes iWave products unique?

- iWave products are patented ion-generating devices that produce the highest available ion outputs and are validated to meet UL 867 ozone requirements. Not only that, there are self-cleaning options that require no maintenance (for the life of the unit), no replacement parts, multi-voltage and universal mounting, making these highly versatile devices game-changers in the IAQ market. The devices offer a superior three-year warranty – other products require light/cell replacement in a year or two.

How long will iWave products last?

- iWave products are designed to last for a very long time, up to the design life of the air conditioning equipment. This is typically 10-15 years in standard applications.

What should be covered when installing an iWave-V or iWave-R in a residential A/C system?

- Install between the air filter and the indoor coil.
- The air current must flow through the “goal posts” (two emitters) so total ionization output is achieved.
- Attach IN or ON duct or indoor fan with air current flowing through “goal posts.” If installing on fan housing (shaft side), make sure self-tapping screws are used to secure device to housing, since the magnets alone may not be adequate if there is excessive vibration.
- Keep emitter brushes at least two inches from any metal surface. Electrical wires from the ionizer (or any wire in the equipment) must be kept away from emitter brushes.
- The products are only performing if there is air flow across the device.
- The devices pull low power (10VA), which allows maximum flexibility for installation.

Any electrical hook-up guidelines for residential A/C systems?

- The iWave-C and iWave-R have multi-voltage capability between 24-240VAC for maximum versatility on electrical service options that are available for duct A/C systems. The iWave-M will handle between 110-240VAC voltage outputs typical for its intended application. The iWave-V requires 24 volts VAC.
- For residential duct A/C systems where 24/7 operation is desired, connect the device wires with “R” and “C” terminals/auxiliary board hook-ups, commonly available for 24VAC or 120VAC, but 240VAC is also an option.
- For the iWave-V running 24/7, the brushes may need to be cleaned a little more often, which is not an issue with the iWave-C/iWave-R because of the self-cleaning feature. Without air flow, the air is not being cleaned. With the device continuously on, the ions are quickly neutralized and there is no ion build-up in the home, smell at start-up or health concerns.
- Note: If the device is wired to be cycled with fan, for best results to quickly address IAQ in home, turn indoor fan to “On” position (continuously run) for 24-48 hours, then cycle with thermostat.
- For residential duct A/C systems where it is desirable to cycle the ionizer with the internal fan, connect the device wires with “R” and “G” terminals/auxiliary board hook-ups. Another easy option is to add a 24VAC or 120VAC current relay to the wire of the blower so it energies the ionizer every time the blower is energized.
- Note: Depending on circumstances and what is being powered by a commonly used 40VA transformer, another 40VA foot-mounted transformer may be needed to power the ionizer.

iWave-R Installation Instructions Continued

CRITICAL: The iWave-R is designed for flush, external duct mount installations as an optional install. Ensure in all installations that other metal surfaces/wires are kept a minimum of two inches away from the tip ends of the high voltage emitters to prevent grounding, leading to premature failure.

4. The iWave-R has multi-voltage capability, connect 24VAC to 240VAC voltage input, whatever is most convenient for quick installation. Although the device only pulls 10 watts, sometimes a dedicated 24VAC power supply may be necessary depending on the current load on the transformer for other system accessories.
5. Unit may be powered 24/7 or may be interlocked with indoor fan – unit only purifies when air is flowing. If unit is wired with the fan, the quickest air purification to address an air concern is to let the fan/iWave-R run continually for 72 hours. Leaving the fan continually in the 'on' position will provide the best ongoing air purification in the house.
6. **Wiring:** The iWave-R has a patented multi-voltage 24VAC to 240VAC input capability. The black wire (marked 'AC' on label) is for 24VAC to 240VAC voltage input. The white wire (marked 'N' on the label) is the neutral leg for 24VAC or 120VAC; or the other hot leg for 208/240VAC. The green striped wire is ground, marked 'G' on the label. The brown wires (marked 'A' on the label) are leads to a normally closed alarm contact – see step 7.
7. The iWave-R is equipped with an alarm contact option to provide a visual indicator outside of the air conditioning system to let the homeowner know that it is in normal operation or if there is a fault. The alarm contact, a normally closed contact, rated at 240 VAC/1A, will require a power source and visual indicator, such as a LED. In normal mode, the LED will stay illuminated. If the device goes into default mode, the LED will not light. If a homeowner wants a remote indication of iWave-R status, it is recommend that the 24VAC light (bought separately) be powered through the alarm contacts and sent to a remote wall.
8. When powered up, a green LED on the iWave-R will illuminate; the ionizer is working and the stepper motor for the cleaning feature is in the home position. If the light is not illuminated, check voltage to the iWave-R.
9. **Self-Cleaning/Program Feature:** The patented iWave-R has a self-cleaning feature to ensure it is always operating at peak performance over its design life. The functions for the button include:

   a. While in normal operation mode, press the button once, the LED light will flash and the stepper motor starts an on-demand cleaning cycle.

   b. While in cleaning cycle (after step 'a' above), press the button and hold for 3 seconds, it goes into the mode of setting the cleaning cycle intervals. The iWave-R is designed to be programmed for 1, 3, 5, or 10 day cleaning cycle intervals. **The iWave-R is factory preset for cleaning the emitters every third day; this is adequate for most applications and will not need to be reprogrammed in the field.**

   While in the cleaning mode (with LED flashing and cleaning feature working):

   a. Press the button and hold for 3 seconds, the LED will flash once every second and the motor works once every day.

   b. Press the button twice (the first press hold for three seconds), the LED will flash twice every second and the motor works once every 3 days. This is the factory preset program.

   c. Press the button three times (the first press hold for three seconds), the LED will flash five times every second and the motor works once every 5 days.

   d. Press the button four times (the first press hold for three seconds), the LED will flash ten times every second and the motor works once every 10 days.

Three-Year Limited Warranty - The iWave-R offers a limited warranty for three years that covers any defects in material or workmanship under normal use. If you make a claim during the warranty period, you must provide proof of purchase and proof of proper installation by a licensed contractor for the warranty to be valid. The iWave warranty does not cover labor, return shipping charges, damage from improper installation or improper voltage usage. The iWave warranty begins on the date that the unit was purchased. Installation of your iWave by any person other than a licensed contractor will void the warranty. Contact your local Nu-Calgon account manager or info@nucalgon.com with further questions.
*Visit iwaveair.com for performance data.