



**Vante®**

**INSTRUCTION  
MANUAL**

**MODELS 3120/3807**

**Tube Sealing System**

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## **Vante®**

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## Preliminary Information

### Document Scope

This manual is a guide for the initial setup, adjustment, operation and routine maintenance of the Vante Model 3120 RF Generator (hereinafter referred to as “the Generator”) used with the Vante Model 3807 Large Sized Tube Sealer (hereinafter referred to as “the Sealer”). This information is based upon technical data that is believed to be adequate for the intended Sealer use.

### Intended Audience

This manual is for use by personnel with technical skills, a thorough knowledge of the procedures for using radio frequency (RF) power to seal, form and/or weld RF reactive thermoplastic materials and the understanding that this sealer is to be used at their own discretion and risk in a controlled environment. A controlled environment is a location where there is RF radiation that may be incurred by persons who are aware of the potential for exposure.

### Application

The Model 3120 RF Generator and Model 3807 Sealer create a system for making seals on tubing made of RF-reactive thermoplastic materials such as polyurethane, polyvinylchloride (PVC), Ethylene vinyl acetate (EVA), certain types of nylons and certain co-extrusions. Tubing may be filled with liquid; however, the outside of the tubing must be clean and dry.



### User Alerts

Throughout this document WARNINGS, CAUTIONS and NOTES are employed to notify the user of important and/or critical information.

**WARNING:** A Warning indicates a condition or procedure that could result in bodily harm. A Warning is enclosed with a **bold**-line box.

**CAUTION:** A Caution indicates a condition or procedure that could result in damage to the unit. A Caution is enclosed with a single-line box.

**NOTE:** A Note indicates important and/or useful information.

## Safety Symbols



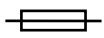
Caution, risk of electric shock



Caution (refer to accompanying documents)



Earth (ground) terminal



Fuse



On



Off



WEEE – Indicates electronic equipment requiring proper recycling (EU only)

## Exclusions and Limits of Liability

Vante makes no warranties, expressed or implied, and assumes no liability in connection with any use of this information. If the Tube Sealer System or its related procedures are used for purposes other than those stipulated herein, verification of the validity and applicability should be obtained, otherwise Vante assumes no liability or obligation nor guarantees system performance.

## Proprietary Information

All rights are reserved. Copying of the protected designs associated with the Model 3120 or the Model 3807 Sealer system is strictly prohibited without the prior written consent of Vante.

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# 1. Description

## 1.1 Tube Sealer System

- 1.1.1 The RF Forming/Welding Sealer System is a portable system which employs radio frequency (RF) to seal, form and/or weld RF reactive thermoplastic materials in a variety of tubing sizes. The Model 3120 RF Generator is the foundation of the system. It must be connected to the Model 3807 Large Sized Tube Sealer to complete the system and perform the required operation.
- 1.1.2 The system includes a cable assembly used to connect the Generator to the Sealer. This cable assembly consists of an 8 ft. RF Cable and airlines for connecting the Generator to the Sealer and air supply.

## 1.2 Theory of Operation

- 1.2.1 The physical properties of RF-reactive thermoplastic materials cause them to dielectrically heat at a molecular level in the presence of RF energy. This energy causes the plastic to soften due to the friction of the vibrating molecules. In this softened condition, the plastic becomes weldable because the molecules are free to intermingle under the application of external forces, such as compression. If allowed to cool while the forces are applied, the weld will be permanent.
- 1.2.2 The RF Generator is the instrument that produces, when actuated, a controlled amount of RF energy. The Sealer mechanically compresses the tubing across its diameter during the sealing and forming process. When the RF energy is removed and the tubing is allowed to cool under compression, a permanent seal is produced.
- 1.2.3 The RF Generator produces a variable nonlinear RF power output up to a maximum of 200 watts, the frequency of which is controlled by a solid-state oscillator/amplifier operating at 40.68 MHz. The RF power level, dwell time and clamp time can be adjusted by the operator, allowing various tubing sizes and materials to be accommodated.

## 1.3 User Safety

- 1.3.1 The Sealer is intended for use by personnel trained by their organization for using RF equipment to seal or weld plastic tubing or parts in a controlled environment.
- 1.3.2 Vante RF Sealers meet or exceed appropriate electrical safety standards and pose no electrical shock hazard when used with properly fused and grounded outlets.

Reference the Radio Frequency System Safety Considerations section included at the end of this manual.

- 1.3.3 The Model 3120 Generator has a thermal protection circuit which will cause the unit to shut down if internal temperatures exceed 55°C. After a short period of time (when internal temperatures are below 55° C) the Generator will reset and operation can resume.

## 1.4 Sealer Interface

- 1.4.1 The BNC Connector is located on the right side of the front panel of the Generator. The three port quick release air lines connector is located to the left of the BNC. The 15 pin D-sub connector is not used with the Sealer.

## 1.5 Specifications

### Mechanical:

	<b>Generator</b>	<b>Model 3807 Sealer*</b>
<b>Size (L x W x H)</b>	17 x 12 x 4 in (43 x 30.5 x 10 cm)	8.5 x 2 x 7.25 in (21.6 x 5 x 18.4 cm)
<b>Operating Weight</b>	27 lbs (12.5 kg)	2.5 lbs (1.1 kg)
<b>Shipping Weight</b>	30.5 lbs (13.8 kg)	5.5 lbs (2.49 kg)

### Electrical (Generator only):

Power Input 100 to 230 Vac 6.3A 50/60 Hz (Model 3120)  
 RF Power Variable  
 200 W minimum, at maximum output setting  
 Main AC Power Fuses 2 x 250 VAC, 5 x 20mm T6.3A  
 Booster/Driver Fuses PCBA F1, F2 and F3  
 3 x 250 VAC 2 AG/3A  
 NOT USER REPLACEABLE

### Operating temperature and humidity (Generator only):

4°-38°C at 90% maximum relative humidity, non-condensing.

## 1.6 Component Identification

- 1.6.1 Figure 1.1 and Figure 1.2 indicate component parts of the RF Generator and the Sealer.

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\* Sealer dimensions and weight are approximations.

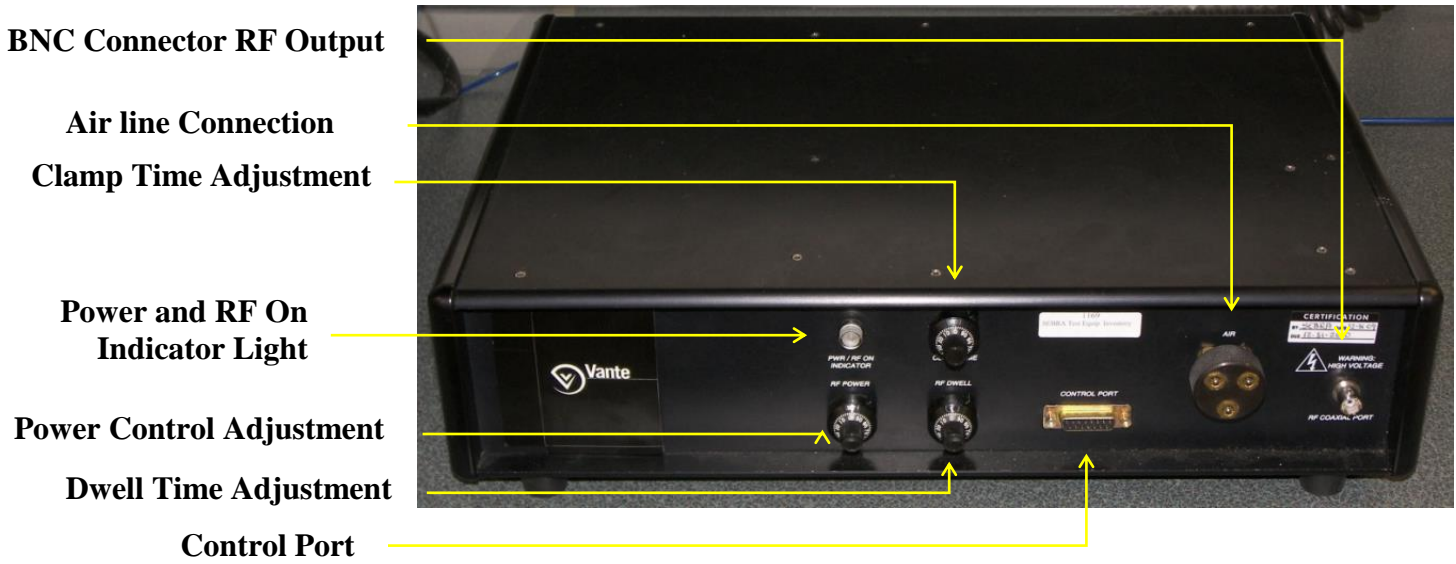


Figure 1.1 Model 3120 RF Generator

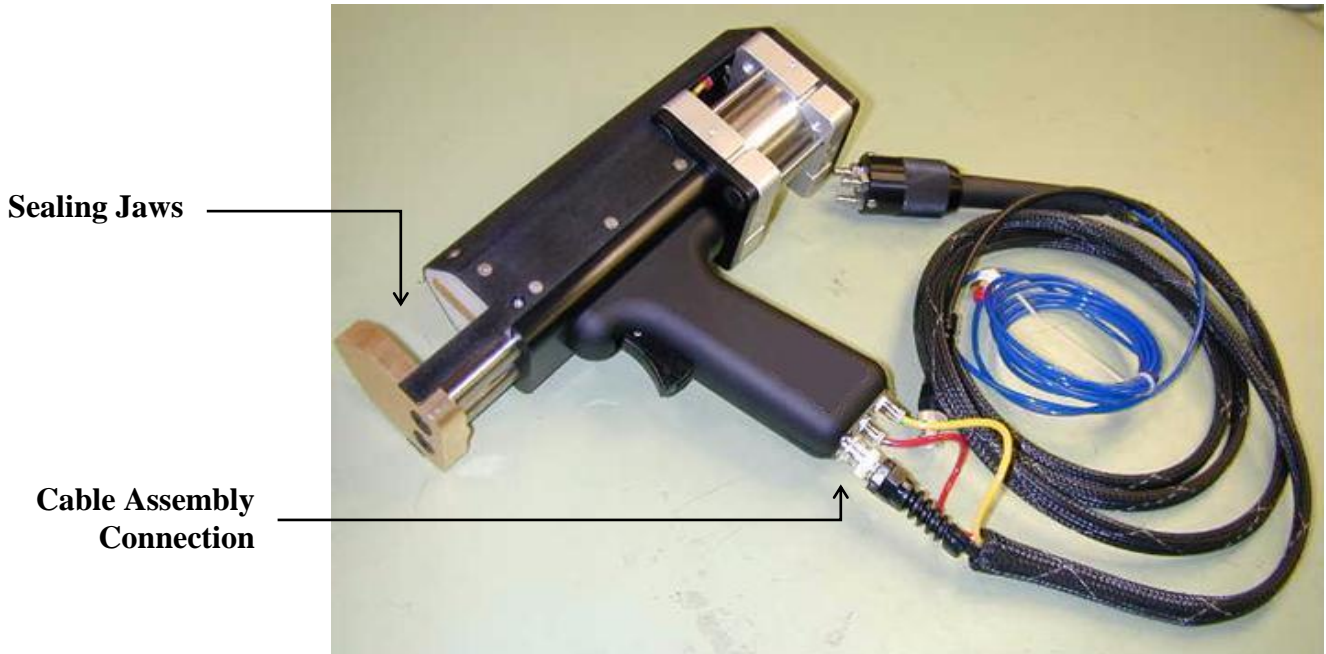
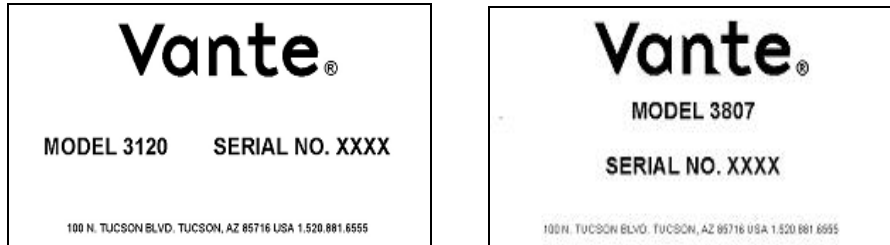
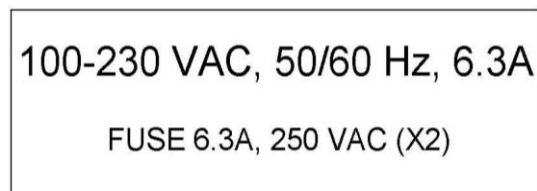


Figure 1.2 Model 3807 Large Sized Tube Sealer.

- 1.6.2 Figure 1.3 depicts the serial plates which specify the power input requirements for the models. Each unit's serial plate indicates the model number and serial number of the unit.



**Figure 1.3 Serial Plates**



**Figure 1.4 Fuse Label**

- 1.6.3 Refer to the serial number when contacting Vante or one of its authorized service centers.

## **1.7 Operating Environment**

- 1.7.1 The Sealer will perform effectively when used in a controlled environment. Actual performance may be affected by variation in environmental conditions of the facility and/or the level of contamination and/or moisture on the ground jaw electrode and/or tubing exterior.

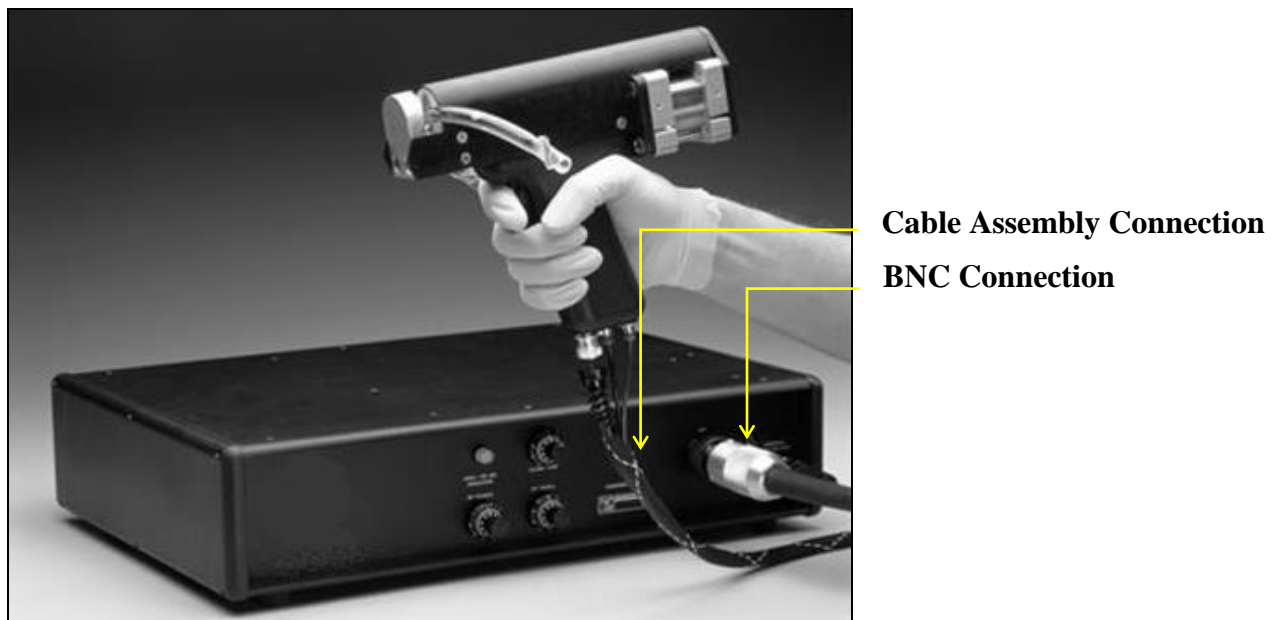
## 2. System Setup

### 2.1 Installation

- 2.1.1 Remove the RF Generator and the Sealer from their respective shipping cartons and visually inspect them for obvious damage. Contact Vante if any damage is found.

**NOTE:** If possible, retain shipping containers and packing materials for future use.

- 2.1.2 Check to see that the power cord plug matches the power receptacle for the country in which the system is being used. If it does not, contact Vante. *Do not connect the power cord to AC mains at this time.*
- 2.1.3 Connect the Sealer to the RF Generator using the supplied cable assembly. Connect the cable assembly to a dry compressed air supply (60 PSI (2.8 kg/cm<sup>2</sup>) minimum, 120 PSI (8.44 kg/cm<sup>2</sup>) maximum, 80-100 PSI (4.2 kg/cm<sup>2</sup>) recommended). See Figure 2.1 for connection illustrations.



**Figure 2.1 Interface Connections**

**NOTE:** The cable assembly does not include a quick-release air chuck for connecting the air line to the air supply.

2.1.4 Verify that all connections are correct before proceeding.

## 2.2 Adjustment and Operation

2.2.1 Check to see that the AC power switch is on the “O”(off) position and connect the AC power cord to a 100 to 230 VAC power source. Route the AC power cord to prevent interference with other equipment or activities.

2.2.2 Both the RF Generator and the Sealer are portable and operate in any position.

2.2.3 The jaws on the Sealer should be open. If they are not open, unplug supply air line and reverse air lines on the bottom of the Sealer handle.

2.2.4 Set the compressed air supply to the appropriate value (80-100 psi recommended; 60 psi min/120 psi max).

2.2.5 Turn the Generator on by toggling the rocker switch located on the back of the unit to the “|” (on) position. The power-on light will illuminate green, indicating that power is on. The power-on light is amber when RF is energized. The fan in the back of the Generator will begin operation. The Generator requires no warm-up period due to transistorized electronics design.

2.2.6 Set the power control adjustment located on the front of the Generator to the maximum setting (10). This setting is recommended for all tube sealing applications.

2.2.7 Set the RF Dwell time Adjustment located on the front of the Generator to a low setting, e.g., “1” for a small tube, “3” for a larger tube. One complete revolution of the knob is about 2.6 seconds. If you have any questions, contact Vante for a recommended setting.

2.2.8 Set Clamp Time Adjustment to allow weld to cool prior to jaw release. Premature opening of jaws before seal has set could cause weld to fail.

2.2.9 Be sure that the exterior of the tubing to be sealed is clean and dry.

2.2.10 Place the tubing on the cradle between the sealing jaws. Practice on dry non-filled tubing may be necessary to achieve the desired result.

**NOTE:** Seal quality and speed may change depending on jaw heating. RF Dwell time may need to be reduced when jaws are hot. Clamp Time may need to be increased when jaws are hot.

**WARNING:** Do NOT place fingers or any other objects near or between the electrodes in the Tube Sealer when the Generator RF power is on. Severe burns can occur!

**WARNING:** Keep the outside of the tubing and equipment clean and dry!

**NOTE:** Releasing the trigger will immediately turn off RF power; however, the jaws will remain clamped dependant on front clamp time.

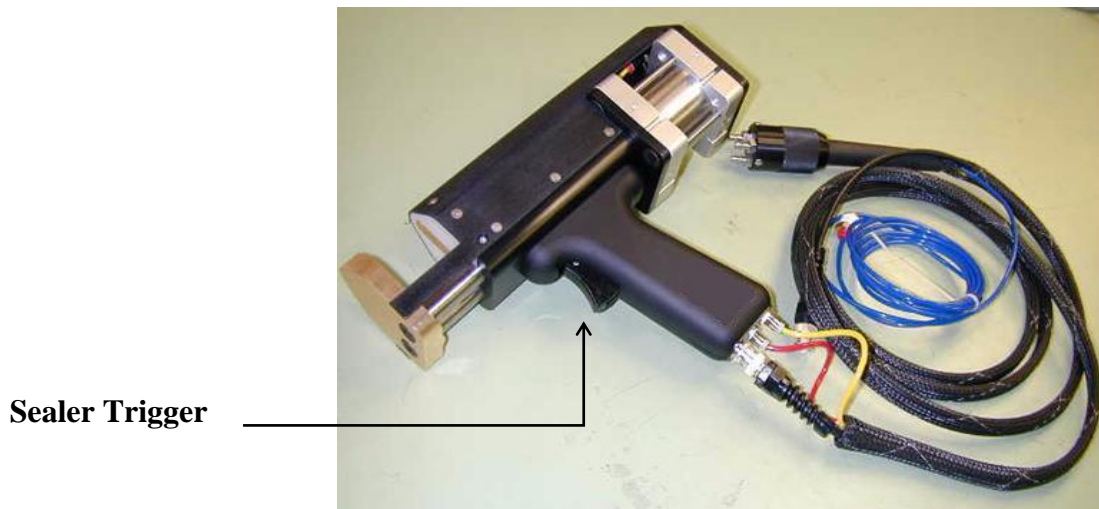
**NOTE:** Polyurethane, PVC, EVA and certain types of nylons are the only materials that can be sealed.

2.2.11 Squeeze and **hold** the trigger switch on until the RF power light is extinguished and the power-on light on the front panel of the Generator is green.

**CAUTION:** Never squeeze the trigger without tubing between the jaws. Damage to the sealing jaws and poor Sealer operation may result.

2.2.12 The jaws will clamp and the RF will energize the electrode according to the RF Dwell time and Power settings. The indicator light on the Sealer will illuminate and the power light on the Generator will turn amber when the RF is active. *Continue to squeeze the trigger until after the sealing indicator light is completely extinguished.* Premature trigger release may cause incomplete sealing and/or ruptured tubing.

2.2.13 After the tube melts and seals, the jaws will remain clamped to allow the tube to cool. Clamp time is adjustable via front panel control.



**Figure 2.2 Hand Held Sealer**

2.2.14 RF dwell time should be kept as close to the minimum amount required to accomplish the desired seal quality. This will minimize residual heating of the RF electrode and ground jaw and reflected RF energy into the Generator, which can cause overheating of Generator components.

2.2.15 The jaws will retract automatically.

2.2.16 Evaluate the result and adjust the RF Dwell time, clamp time and/or air supply settings as needed to obtain the desired seal quality. Only slight adjustments should be required. Power should only be adjusted in cases of very small tubing, and should be verified with an external watt meter (not included).

2.2.17 Once the desired result is obtained, continue to perform the sealing as needed.

**NOTE:** Seal quality and speed may change depending on jaw heating. RF Dwell time may need to be reduced when jaws are hot. Clamp Time may need to be increased when jaws are hot.

2.2.18 Multiple seals in close proximity *are not recommended*. If multiple seals must be used, they should be spaced apart at least 10 times the outside diameter of the tubing. Multiple seals spaced less than recommended distance may cause a rupture of a sealed segment due to excessive pressure build-up.

**NOTE:** The Model 3120 RF Generator is equipped with a thermal protection circuit which will cause the unit to shut down if unusually high levels of usage occur. In such case, the power-on switch on the front of the panel will remain illuminated, the fan will continue to run, but there will be no RF power output. Wait several minutes for the unit to cool and proceed with sealing operations at a rate that will not cause Generator shutdown.



### 3. Maintenance and Repair

#### 3.1 System Maintenance

**CAUTION:** Do NOT, under any circumstances, submerge the Sealer in any kind of liquid. This will damage the sealing jaws and void the warranty.

3.1.1 The only maintenance required for the Model 3120 RF Generator is ensuring the fan intake and air exhaust ports are free of accumulated dust to ensure proper airflow.

**WARNING:** Turn off the Generator and disconnect the sealer by removing the cable assembly prior to cleaning. Failure to do so may result in an RF burn to the operator during the cleaning process.

3.1.2 To maintain the Sealer, keep the electrodes in the sealing jaw and all thermoplastic materials being sealed clean and dry. Occasionally use isopropyl alcohol on a cotton swab to clean the electrodes. Ensure electrodes are completely dry before operating sealer.

3.1.3 If tubing frequently adheres to the brass electrodes, or if they become corroded, shine with a mild abrasive cleaner such as Soft Scrub® and a cotton swab. Follow the procedure by swabbing the area with isopropyl alcohol. Do not use Scotch Brite, steel wool or other abrasive pads to clean electrodes.

**NOTE:** Do NOT use abrasive cleaner on any part of the machines other than the electrode and sealing jaw.

#### 3.2 Repair

3.2.1 There are no user-serviceable parts in the Model 3807 Hand Held Sealer. It, and all other system components purchased from Vante, should be returned to an authorized Vante service center for repair.

**NOTE:** Units returned to Vante for repair are subject to biohazard charges if any Sealer component is contaminated with media or other potentially bio-hazardous materials.

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## **4. Radio Frequency System Safety Considerations**

### **4.1 General Information**

- 4.1.1 Vante manufactures a variety of instruments which incorporate the use of radio frequency (RF) for sealing, welding, or forming thermoplastics. Typical uses include biopharmaceutical tube sealing, thermoplastic welding and thermoplastic forming processes. When in operation, these RF instruments emit radio frequency energy to people, other instruments, and equipment located in close proximity. Current Vante RF instruments operate at a frequency authorized by the Federal Communications Commission (FCC) and the International Telecommunications Union (ITU) for, scientific, and medical (ISM) use. The following is an advisory regarding RF instrument use and associated safety considerations.

### **4.2 RF Effects On Human Tissue**

- 4.2.1 Vante RF instruments are in compliance with (IEEE) C95.1-1991, standards for safe exposure levels to RF energy. However, misuse or direct contact between tissue and RF electrode(s) can result in severe RF burns.

### **4.3 RF Effects On Pacemakers**

- 4.3.1 There is no evidence that Vante RF instruments interfere with the function of modern cardiac pacemakers.

### **4.4 Electrical Safety**

- 4.4.1 Vante RF devices meet or exceed appropriate electrical safety standards, and pose no electrical shock hazard when used with properly fused and grounded outlets.

### **4.5 RF Effects On Electronic Equipment**

- 4.5.1 Vante instruments produce RF power, and during operation emit some RF energy from the electrodes. While most modern electronic equipment and instruments provide shielding from RF energy, improperly shielded electronic devices operating in close proximity to an RF instrument may be affected. If interference is suspected, appropriate electronic shielding, moving equipment further away from the RF instrument, or operating from a different electrical circuit may be necessary.

## 4.6 RF Effects In Potentially Explosive Atmospheres

- 4.6.1 Do not operate Vante RF instruments in any area with a potentially explosive atmosphere. It is possible for the RF electrodes to arc, initiating an explosion or fire.

**WARNING:** Vante recommends strict adherence to the procedures specified in the instrument Instruction Manual. Misuse or modification of an instrument may result in unsafe or hazardous situations.