This manual and the equipment it describes are for use only by qualified medical professionals trained in the particular technique and surgical procedure to be performed. It is intended as a guide for using the Aaron 1250U Electrosurgical Generator only.

Additional technical information is available in the Aaron 1250U Electrosurgical Generator Service Manual.

**Equipment Covered in this Manual**
Aaron 1250U Electrosurgical Generator:
Model No.: A1250U

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**CONVENTIONS USED IN THIS GUIDE**

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**
Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

**NOTICE**
Indicates an operating tip, a maintenance suggestion, or a hazard that may result in product damage.
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INTRODUCING THE AARON 1250U
ELECTROSURGICAL GENERATOR

This section includes the following information:

Key Features

Components and Accessories

Safety

CAUTIONS
Read all warnings, cautions, and instructions provided with this generator before using.

Read the instructions, warnings, and cautions provided with electrosurgical accessories before using. Specific instructions are not included in this manual.
**KEY FEATURES**

The Aaron 1250U Electrosurgical Generator includes the latest technology. This unit offers unsurpassed performance, flexibility, reliability, and convenience.

It includes the following features:

- **Two levels of coagulation: Pinpoint Coagulation and Fulguration**
  Pinpoint Coagulation provides precise control of bleeding in localized areas.
  Fulguration provides greater control of bleeding in highly vascular tissue over broad surface areas.

- **Return electrode sensing and contact quality monitoring**
  The Aaron 1250U incorporates a return electrode contact quality monitoring system (Bovie NEM™). This system determines the type of patient return electrode: single or split plate. The system also continually monitors the contact quality between the patient and the split-plate return electrode. This feature is designed to eliminate patient burns at the return electrode site.

  **NOTICE**
  *The Bovie NEM™ system recommends that you use a split-plate patient return electrode.*

- **Memory**
  The unit automatically powers up to the last used modes and power settings.

- **Isolated RF output**
  This minimizes the potential of alternate site burns.

- **Standard connectors**
  These connectors accept the latest monopolar and bipolar instruments.

- **Self diagnostics**
  These diagnostics continually monitor the unit to ensure proper performance.

**COMPONENTS AND ACCESSORIES**

To avoid incompatibility and unsafe operation, we recommend using the following Bovie brand accessories supplied with your generator:

- Aaron 1250U Electrosurgical Generator
- Hospital-grade power cords - 09-039-001; 09-035-001
- User’s Guide
- One disposable pencil - ESP1-S
- Three electrodes - ES20 (ball); ES02 (needle); ES01 (blade)
- One reusable grounding cord - A1252C
- Five disposable split grounding pads - ESRE-1
- ESU Series I DVD

**ADDITIONAL ACCESSORIES**

To avoid incompatibility and unsafe operation, we recommend using the following Bovie accessories with the A1250U:

- BV-1253B - Footswitch for Monopolar and Bipolar procedures
SAFETY

The safe and effective use of electrosurgery depends to a large degree on factors solely under the control of the operator. There is no substitute for a properly trained and vigilant medical staff. It is important that they read, understand, and follow the operating instructions supplied with this electrosurgical equipment.

Physicians have used electrosurgical equipment safely in numerous procedures. Before starting any surgical procedure, the surgeon should be familiar with the medical literature, complications, and hazards of using electrosurgery in that procedure.

To promote the safe use of the Aaron 1250U Electrosurgical Generator, this section presents the warnings and cautions that appear throughout this user’s guide. So that you can operate this equipment with maximum safety, it is important that you read, understand, and follow the instructions in these warnings and cautions. It is also important that you read, understand, and follow the instructions for use in this user’s guide.
WARNINGS

Hazardous Electrical Output - This equipment is for use only by trained, licensed physicians.

Danger: Fire / Explosion Hazard - Do not use the Aaron 1250U electrosurgical generator in the presence of flammable anesthetics.

Fire / Explosion Hazard - The following substances will contribute to increased fire and explosion hazards in the operating room:
- Flammable substances (such as alcohol based skin prepping agents and tinctures)
- Naturally occurring flammable gases which may accumulate in body cavities such as the bowel
- Oxygen enriched atmospheres
- Oxidizing agents (such as nitrous oxide \([\text{N}_2\text{O}]\) atmospheres).

The sparking and heating associated with electrosurgery can provide an ignition source. Observe fire precautions at all times. When using electrosurgery in the same room with any of these substances or gases, prevent their accumulation or pooling under surgical drapes, or within the area where electrosurgery is performed.

Connect the power cord to a properly polarized and grounded power source with the frequency and voltage characteristics that match those listed on the back of the unit.

Electric Shock Hazard - Connect the generator power cord to a properly grounded receptacle. Do not use power plug adapters.

Electric Shock Hazard - Always turn off and unplug the generator before cleaning.

Fire Hazard - Do not use extension cords.

Patient Safety - Use the generator only if the self-test has been completed as described. Otherwise, inaccurate power outputs may result.

Failure of the high frequency electrosurgical equipment could result in an unintended increase of output power.

The instrument receptacles on this generator are designed to accept only one instrument at a time. Do not attempt to connect more than one instrument at a time into a given receptacle. Doing so will cause simultaneous activation of the instruments.

Use the lowest output setting necessary to achieve the desired surgical effect. Use the active electrode only for the minimum time necessary in order to lessen the possibility of unintended burn injury. Pediatric applications and/or procedures performed on small anatomic structures may require reduced power settings. The higher the current flow, and the longer the current is applied, the greater the possibility of unintended thermal damage to tissue, especially during use on small structures.

Use electrosurgery with caution in the presence of internal or external devices such as pacemakers or pulse generators. Interference produced by the use of electrosurgical devices can cause devices such as pacemakers to enter an asynchronous mode or can block the pacemaker effect entirely. Consult the device manufacturer or hospital Cardiology Department for further information when use of electrosurgical appliances is planned for patients with cardiac pacemakers or other implantable devices.

If the patient has an Implantable Cardioverter Defibrillator (ICD), contact the ICD manufacturer for instructions before performing an electrosurgical procedure. Electrosurgery may cause multiple activation of ICDs.

Do not use electrosurgical equipment unless properly trained to use it in the specific procedure being undertaken. Use by physicians without such training has resulted in serious, unintended patient injury, including bowel perforation and unintended, irreversible tissue necrosis.

For surgical procedures where the high frequency current could flow through parts of the body having a relatively small cross-sectional area, the use of bipolar techniques may be desirable to avoid unwanted coagulation.
In some circumstances, potential exists for alternate site burns at points of skin contact (e.g., between the arm and the side of the body). This occurs when electrosurgical current seeks a path to the patient return electrode that includes the skin-to-skin contact point. Current passing through small skin-to-skin contact points is concentrated and may cause a burn. This is true for grounded, ground referenced, and isolated output generators.

**WARNINGS**

To reduce the potential for alternate site burns, do one or more of the following:

- Avoid skin-to-skin contact points, such as fingers touching leg, when positioning the patient.
- Place 5 to 8 cm (2 to 3 in.) of dry gauze between contact points to ensure that contact does not occur.
- Position the patient return electrode to provide a direct current route between the surgical site and the return electrode which avoids skin-to-skin contact areas.
- In addition, place patient return electrodes according to the manufacturer’s instructions. Potential for alternate site burns increases if the return electrode is compromised. Bovie Medical recommends the use of split patient return electrodes and Bovie Medical generators with a contact quality monitoring system.

Do not wrap the accessory cords or patient return electrode cords around metal objects. This may induce currents that could lead to shocks, fires, or injury to the patient or surgical team.

**CAUTIONS**

At no time should you touch the active electrode or bipolar forceps. A burn could result.

Do not stack equipment on top of the generator or place the generator on top of electrical equipment. These configurations are unstable and/or do not allow adequate cooling.

Provide as much distance as possible between the electrosurgical generator and other electronic equipment (such as monitors). An activated electrosurgical generator may cause interference with them.

Nonfunction of the generator may cause interruption of surgery. A backup generator should be available for use.

Do not turn the activation tone down to an inaudible level. The activation tone alerts the surgical team when an accessory is active.

When using a smoke evacuator in conjunction with the electrosurgical generator, place the smoke evacuator a distance from the generator and set the generator volume control at a level that ensures that the activation tones can be heard.

The use of high frequency current can interfere with the function of other electromagnetic equipment.

When high frequency surgical equipment and physiological monitoring equipment are used simultaneously on the same patient, place any monitoring electrodes as far as possible from the surgical electrodes.

Do not use needles as monitoring electrodes during electrosurgical procedures. Inadvertent electrosurgical burns may result.

To avoid the possibility of an electrosurgical burn to either the patient or the physicians, do not allow the patient to come in contact with a grounded metal object during activation. When activating the unit, do not allow direct skin contact between the patient and the physician.

Remove any loose fitting jewelry from the patient before activation.

Examine all accessories and connections to the electrosurgical generator before use. Ensure that the accessories function as intended. Improper connection may result in arcs, sparks, accessory malfunction, or unintended surgical effects.

When not using active accessories, place them in a holster or in a clean, dry, nonconductive, and highly visible area not in contact with the patient. Inadvertent contact with the patient may result in burns.
Studies have shown that smoke generated during electrosurgical procedures can be potentially harmful to patients and the surgical team. These studies recommend adequately ventilating the smoke by using a surgical smoke evacuator or other means.¹


NOTICES
If required by local codes, connect the generator to the hospital equalization connector with an equipotential cable.

Do not clean the generator with abrasive cleaning or disinfectant compounds, solvents, or other materials that could scratch the panels or damage the generator.
CONTROLS, INDICATORS, AND RECEPTACLES

This section describes:

The Front and Rear Panels

Controls, Indicators, Receptacles, the Fuse Drawer, and Ports
FRONT PANEL
Figure 2-1 Layout of controls, indicators, and receptacles on the front panel
SYMBOLS ON THE FRONT PANEL
Refer to the following table for descriptions of symbols found on the front panel of the Aaron 1250U.

<table>
<thead>
<tr>
<th>SYMBOLS</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td><strong>Cut Controls</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Cut Mode" /></td>
<td>Cut Mode</td>
</tr>
<tr>
<td><img src="image" alt="Blend Mode" /></td>
<td>Blend Mode</td>
</tr>
<tr>
<td><strong>Coag Controls</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Coagulation Mode" /></td>
<td>Coagulation Mode</td>
</tr>
<tr>
<td><img src="image" alt="Fulguration Mode" /></td>
<td>Fulguration Mode</td>
</tr>
<tr>
<td><strong>Bipolar Controls</strong></td>
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</tr>
<tr>
<td><img src="image" alt="Bipolar Mode" /></td>
<td>Bipolar Mode</td>
</tr>
<tr>
<td><strong>Indicators</strong></td>
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</tr>
<tr>
<td><img src="image" alt="Split Return Electrode" /></td>
<td>Split Return Electrode</td>
</tr>
<tr>
<td><img src="image" alt="Solid Return Electrode" /></td>
<td>Solid Return Electrode</td>
</tr>
<tr>
<td><strong>Regulatory Symbology</strong></td>
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<tr>
<td><img src="image" alt="Read instructions before use." /></td>
<td>Read instructions before use.</td>
</tr>
<tr>
<td><img src="image" alt="Defibrillator Proof Type BF Equipment" /></td>
<td>Defibrillator Proof Type BF Equipment</td>
</tr>
<tr>
<td><img src="image" alt="RF Isolated – patient connections are isolated from earth at high frequency." /></td>
<td>RF Isolated – patient connections are isolated from earth at high frequency.</td>
</tr>
<tr>
<td><strong>Power Switch and Handpiece Connectors</strong></td>
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<tr>
<td><img src="image" alt="Patient Return Electrode" /></td>
<td>Patient Return Electrode</td>
</tr>
<tr>
<td><img src="image" alt="Caution High Voltage" /></td>
<td>Caution High Voltage</td>
</tr>
<tr>
<td><img src="image" alt="Monopolar Output" /></td>
<td>Monopolar Output</td>
</tr>
<tr>
<td><img src="image" alt="Bipolar Output" /></td>
<td>Bipolar Output</td>
</tr>
</tbody>
</table>
**CUT AND BLEND CONTROLS**

Figure 2 – 2 Controls for the Cut and Blend Modes

**NOTICE:**
When selecting the Blend mode, the unit defaults to a setting of minimum blend (only the first bar is illuminated).
**COAG AND BIPOLAR CONTROLS**

Figure 2–3 Controls for the Coagulation, Fulguration, and Bipolar Modes

- **Coag and Bipolar Activation Indicator**
  - Illuminates when you activate Coagulation, Fulguration, or Bipolar Mode.

- **Coagulation Indicator**
  - Illuminates when Coagulation Mode is selected.

- **Fulguration Indicator**
  - Illuminates when Fulguration Mode is selected.

- **Bipolar Indicator**
  - Illuminates when Bipolar Mode is selected.

- **Coagulation Selector**
  - When pressed, selects the Coagulation Mode.

- **Fulguration Selector**
  - When pressed, selects the Fulguration Mode.

- **Bipolar Selector**
  - When pressed, selects the Bipolar Mode.

- **Coag and Bipolar Power Control Dial**
  - Increases or decreases the Coag or Bipolar power output in increments of 1 watt.

- **Coag and Bipolar Power Display (watts)**
  - Indicates the power set for any Coag or Bipolar Mode.
**INDICATORS**

Figure 2 – 4 Indicators for power, return electrodes, and footswitch control

- **Power Indicator**
  Illuminates when the unit is on.

- **Split-Plate Patient Return Electrode Indicator**
  Illuminates when the system detects a split plate.

- **Single Plate Patient Return Electrode Indicator**
  Illuminates when the system detects a single plate.

- **Monopolar Footswitch Control Indicator**
  Illuminates when monopolar footswitch control is selected.

- **Bipolar Footswitch Control Indicator**
  Illuminates when bipolar footswitch control is selected.

- **Patient Return Electrode Alarm Indicator**
  Illuminates when the system detects a patient return electrode alarm condition.

- **Footswitch Control Selector**
  When pressed, toggles between monopolar and bipolar foot control.
POWER SWITCH AND RECEPTACLES

Figure 2 – 5 Location of the unit power switch and front panel receptacles

- **Power On/Off Switch**: Turns the unit on or off.
- **Monopolar Footswitching Receptacle**: Accepts cables or adapters equipped with standard (Bovie #12) active plugs. Connect footswitching accessories.
- **Monopolar Handswitching Receptacle**: Accepts standard three-pin handpieces. Connect handswitching accessories.
- **Patient Return Electrode Receptacle**: Accepts a standard patient return electrode plug.
- **Bipolar Receptacle**: Accepts standard cables for bipolar handpieces.
SYMBOLS ON THE REAR PANEL
Refer to the following table for descriptions of symbols found on the rear panel of the Aaron 1250U.

<table>
<thead>
<tr>
<th>SYMBOLS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Equipotential Ground Stud" /></td>
<td>Equipotential Ground Stud</td>
</tr>
<tr>
<td><img src="image" alt="Non-ionizing Radiation" /></td>
<td>Non-ionizing Radiation</td>
</tr>
<tr>
<td><img src="image" alt="Volume Control" /></td>
<td>Volume Control</td>
</tr>
<tr>
<td><img src="image" alt="Danger - Explosion Risk If Used With Flammable Anesthetics." /></td>
<td>Danger - Explosion Risk If Used With Flammable Anesthetics.</td>
</tr>
<tr>
<td><img src="image" alt="Fuse Enclosed" /></td>
<td>Fuse Enclosed</td>
</tr>
<tr>
<td><img src="image" alt="Do not dispose of this device in the unsorted municipal waste stream." /></td>
<td>Do not dispose of this device in the unsorted municipal waste stream.</td>
</tr>
<tr>
<td><img src="image" alt="Footswitch Input Jack" /></td>
<td>Footswitch Input Jack</td>
</tr>
<tr>
<td><img src="image" alt="Read Instructions Before Use" /></td>
<td>Read Instructions Before Use</td>
</tr>
</tbody>
</table>

**NOTICE:**
* Please note that infected medical devices must be disposed of as medical/biohazard waste and cannot be included in used electronic equipment disposal/recycling programs. In addition, certain electronic products must be returned directly to Bovie Medical. Contact your Bovie sales representative for return instructions.
GETTING STARTED

This section includes the following information:

- Initial Inspection
- Installation
- Function Checks
- Performance Checks
**INITIAL INSPECTION**
When you first unpack your Aaron 1250U, inspect it visually:

- Look for any signs of damage.
- Verify that the shipping package contains all items listed on the packing list.

If the unit or any accessories are damaged, notify Bovie Medical’s Customer Service immediately. Do not use any damaged equipment.

**INSTALLATION**
Place the Aaron 1250U on any flat surface with a tilt angle not more than 10°. The unit relies on natural convection cooling. Do not block its bottom or rear vents. Ensure that air flows freely on all sides of the unit.

**WARNING:**
Connect the power cord to a properly polarized and grounded power source with the frequency and voltage characteristics that match those listed on the back of the unit.

**FUNCTION CHECKS**
Upon initial installation of the unit, perform the tests listed below. Refer to the figures in the previous chapter for the location of connectors and controls.

**WARNING:**
At no time should you touch the active electrode or bipolar forceps. A burn could result.

**Setting Up the Unit**
1. Verify that the Power Switch is in the Off position and that no accessories are connected to the unit.
2. Connect a hospital grade power cable to the AC power cable receptacle on the back of the unit, then to a properly grounded wall outlet.
3. Connect a two-pedal footswitch to the appropriate receptacle on the back of the unit. Use only Bovie Medical footswitches. Although other types of footswitches may fit, they may not be compatible.
4. Do not connect a patient return electrode at this time.
5. Turn the unit on by switching the power switch to the On position.

**Checking the Return Electrode Alarm**
1. Adjust the power settings for each mode (Cut, Blend, Coagulation, Fulguration, and Bipolar) to one watt.
2. Press the Cut pedal of the footswitch. Verify that an alarm sounds for three seconds and the Patient Return Electrode Sensing Alarm Indicator light illuminates, indicating that no return electrode is connected to the unit.
3. Verify that adjusting the volume control on the back of the unit while the alarm is sounding does not change the alarm volume.
CONFIRMING MODES
Confirm that you can select each mode and adjust the power up and down.

Checking Bipolar Mode (with footswitch)
1. Select Bipolar mode by pressing the Bipolar Mode selector.
2. Select Bipolar footcontrol by pressing the Footcontrol selector.
3. Verify that the Bipolar mode indicator illuminates and that the system generates the Coag tone when you press the Coag pedal (Blue) on the footswitch.
4. While activating the Bipolar mode, rotate the volume control over the full range to verify that the sound is audible throughout the range.
5. Confirm that releasing the Coag pedal returns the unit to an idle state.

Checking Monopolar Mode (with footswitch)
1. Select monopolar footcontrol by pressing the Footswitch Control selector until the Monopolar Footswitch Control indicator illuminates.
2. Connect a single-plate return electrode to the return electrode receptacle. Verify that the green single-plate return electrode indicator illuminates.
3. Press the Cut pedal (yellow) on the footswitch. Verify that the Cut and Blend mode activation indicator illuminates and that the system generates the Cut activation tone.
4. While activating the Cut mode, rotate the volume control over the full range to verify that the sound is audible throughout the range.
5. Press the Coag pedal (blue) on the footswitch. Verify that the Coag, Fulguration, and Bipolar activation indicator illuminates and that the system generates the Coag activation tone.
6. While activating the Coag mode, rotate the volume control over the full range to verify that the sound is audible throughout the range.

Checking Monopolar Mode (with handswitch)
1. Connect a handswitching handpiece to the Monopolar handpiece receptacle.
2. Activate, one at a time, the Cut and Coag handswitching controls. Verify that each control causes the correct indicator and tone to sound.

PERFORMANCE CHECKS
After the unit has passed the preliminary functional test, it is ready for performance testing. A qualified biomedical engineer who is thoroughly familiar with electrosurgical devices should conduct this testing. The testing should include checking all modes of operation for proper function and power output.
USING THE AARON 1250U

This section contains the following procedures:

- Inspecting the Generator and Accessories
- Setup Safety
- Setting Up
- Preparing for Monopolar Surgery
- Preparing for Bipolar Surgery
- Activation Safety
- Activating the Unit

CAUTIONS:
Read all warnings, cautions, and instructions provided with this generator before use.

Read the instructions, warnings, and cautions provided with electrosurgical accessories before use. Specific instructions are not included in this manual.
**INSPECTING THE GENERATOR AND ACCESSORIES**

Before each use of the Aaron 1250U, verify that the unit and all accessories are in good working order:

- Inspect for damage to the Electrosurgical Generator and all its connections.
- Verify that the appropriate accessories and adapters are present.
- Inspect all cords and connectors for signs of wear, damage, and abrasion.
- Verify that no errors occur when you turn on the unit.

**SETUP SAFETY**

**WARNINGS:**

<table>
<thead>
<tr>
<th>Hazardous Electrical Output</th>
<th>This equipment is for use only by trained, licensed physicians.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Shock Hazard</td>
<td>Connect the generator power cord to a properly grounded receptacle. Do not use power plug adapters.</td>
</tr>
<tr>
<td></td>
<td>Connect the power cord to a properly polarized and grounded power source with the frequency and voltage characteristics that match those listed on the back of the unit.</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Do not use extension cords.</td>
</tr>
<tr>
<td>Patient Safety</td>
<td>Use the generator only if the self-test has been completed as described. Otherwise, inaccurate power outputs may result.</td>
</tr>
<tr>
<td></td>
<td>The instrument receptacles on this generator are designed to accept only one instrument at a time. Do not attempt to connect more than one instrument at a time into a given receptacle. Doing so will cause simultaneous activation of the instruments.</td>
</tr>
<tr>
<td></td>
<td>Failure of the high frequency electrosurgical equipment could result in an unintended increase of output power.</td>
</tr>
<tr>
<td></td>
<td>Do not use electrosurgical equipment unless properly trained to use it in the specific procedure being undertaken. Use by physicians without such training has resulted in serious, unintended patient injury, including bowel perforation and unintended, irreversible tissue necrosis.</td>
</tr>
<tr>
<td></td>
<td>For surgical procedures where the high frequency current could flow through parts of the body having a relatively small cross-sectional area, the use of bipolar techniques may be desirable to avoid unwanted coagulation.</td>
</tr>
<tr>
<td></td>
<td>If the patient has an implantable cardioverter defibrillator (ICD), contact the ICD manufacturer for instructions before performing an electrosurgical procedure. Electrosurgery may cause multiple activation of ICDs.</td>
</tr>
<tr>
<td></td>
<td>In some circumstances, potential exists for alternate site burns at points of skin contact (e.g., between the arm and the side of the body). This occurs when electrosurgical current seeks a path to the patient return electrode that includes the skin-to-skin contact point. Current passing through small skin-to-skin contact points is concentrated and may cause a burn. This is true for grounded, ground referenced, and isolated output generators.</td>
</tr>
<tr>
<td></td>
<td>To reduce the potential for alternate site burns, do one or more of the following:</td>
</tr>
<tr>
<td></td>
<td>• Avoid skin-to-skin contact points, such as fingers touching leg, when positioning the patient.</td>
</tr>
<tr>
<td></td>
<td>• Place 5 to 8 cm (2 to 3 in.) of dry gauze between contact points to ensure that contact does not occur.</td>
</tr>
<tr>
<td></td>
<td>• Position the return electrode to provide a direct current route between the surgical site and the return electrode which avoids skin-to-skin contact areas.</td>
</tr>
<tr>
<td></td>
<td>• In addition, place return electrodes according to the manufacturer’s instructions. Potential for alternate site burns increases if the return electrode is compromised. Bovie Medical recommends the use of split return electrodes and Bovie generators with a contact quality monitoring system.</td>
</tr>
</tbody>
</table>
CAUTIONS:
Do not stack equipment on top of the generator or place the generator on top of electrical equipment. These configurations are unstable and/or do not allow adequate cooling.

Provide as much distance as possible between the electrosurgical generator and other electronic equipment (such as monitors). An activated electrosurgical generator may cause interference with them.

Non-function of the generator may cause interruption of surgery. A backup generator should be available for use.

Do not turn the activation tone down to an inaudible level. The activation tone alerts the surgical team when an accessory is active.

When using a smoke evacuator in conjunction with the electrosurgical generator, place the smoke evacuator a distance from the generator and set the generator volume control at a level that ensures that the activation tones can be heard.

NOTICE:
If required by local codes, connect the generator to the hospital equalization connector with an equipotential cable.

Connect the power cord to a wall outlet having the correct voltage. Otherwise, product damage may result.

SETTING UP
1. Verify that the generator is Off by pressing the power switch Off (O).

2. Place the generator on a stable flat surface, such as a table, platform, or medical cart. Carts with conductive wheels are recommended. For details, refer to the procedures for your institution or to local codes. Provide at least 10 to 15 cm (4 to 6 in.) of space from the sides and top of the generator for cooling. Normally, the top, sides, and rear panel are warm when you use the generator continuously for extended periods of time.

3. Plug the generator power cord into the AC Power Cable Receptacle on the rear panel.

4. Plug the generator power cord into a grounded receptacle.

5. Turn on the generator by pressing the power switch On (|). Verify the following:
   • All visual indicators and displays on the front panel illuminate.
   • Activation tones sound to verify that the speaker is working properly.

6. If the self-test is successful, a tone sounds. Verify the following:
   • A Cut mode is selected; a Coag or Bipolar mode is selected.
   • Each display shows a power setting. The unit automatically powers up to the last used power settings.
   • The Patient Return Electrode Alarm Indicator illuminates red.

If the self-test is not successful, an alarm tone sounds. An error code will appear in the Cut and/or Coag display, in most cases, the generator is disabled. Note the error code and refer to Section 6, Troubleshooting.

Once the self-test is successful, connect the accessories and set the generator controls. Refer to Preparing for Monopolar Surgery or Preparing for Bipolar Surgery later in this section.
PREPARING FOR MONOPOLAR SURGERY
Monopolar surgery requires a return electrode.

Applying the Return Electrode
Bovie Medical recommends using return electrode contact quality monitoring system (Bovie NEM™) patient return electrodes to maximize patient safety. Using a patient return electrode without the Bovie NEM™ safety feature may result in a patient burn.

NOTICE:
The Bovie NEM™ system recommends that you use a split return electrode.

Refer to the manufacturer’s instructions for application site and placement procedures. When using metal plate return electrodes, use a conductive gel specifically designed for electrosurgery. Select a return electrode site with good blood flow. While a properly applied electrode results in minimal tissue heating beneath the electrode, a good blood flow helps carry heat away from the site.

Connect the cable to the Return Electrode receptacle on the front of the unit. The unit will automatically sense the presence of a split or solid return electrode and, if a split return electrode is used, will constantly monitor the resistance at the contact between the electrode and the patient.

Connecting Accessories
1. Connect a monopolar active electrode to the unit.

NOTICE:
The Bovie NEM™ system recommends that you use a split return electrode.

<table>
<thead>
<tr>
<th>If you are using...</th>
<th>Connect it to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard 3-pin handswitching pencil</td>
<td>Monopolar handswitching receptacle</td>
</tr>
<tr>
<td>Footswitching pencil</td>
<td>Monopolar footswitching receptacle</td>
</tr>
</tbody>
</table>

2. If using a footswitch activated device, connect an appropriate Bovie Medical footswitch to the footswitch connecting socket on the rear of the unit.

PREPARING FOR BIPOLAR SURGERY
1. Select the Bipolar Mode by pressing the Bipolar Mode selector. The Bipolar Mode indicator will illuminate.
2. Select Bipolar Foot Control by pressing the Foot Control selector.
3. Connect a Bipolar cable to the Bipolar receptacle.
4. Connect the appropriate Bovie Medical footswitch to the Footswitch receptacle on the rear of the unit.
5. Connect a forceps instrument to the Bipolar cable.
**ACTIVATION SAFETY**

**WARNINGS:**

Do not wrap the accessory cords or patient return electrode cords around metal objects. This may induce currents that could lead to shocks, fires, or injury to the patient or surgical team.

**Danger: Fire / Explosion Hazard** - Do not use the Aaron 1250U in the presence of flammable anesthetics.

**Fire / Explosion Hazard** - The following substances will contribute to increased fire and explosion hazards in the operating room:

- Flammable substances (such as alcohol based skin prepping agents and tinctures)
- Naturally occurring flammable gases that may accumulate in body cavities such as the bowel
- Oxygen enriched atmospheres
- Oxidizing agents (such as nitrous oxide [N₂O] atmospheres).

The sparking and heating associated with electrosurgery can provide an ignition source. Observe fire precautions at all times. When using electrosurgery in the same room with any of these substances or gases, prevent their accumulation or pooling under surgical drapes, or within the area where electrosurgery is performed.

Use the lowest output setting necessary to achieve the desired surgical effect. Use the active electrode only for the minimum time necessary in order to lessen the possibility of unintended burn injury. Pediatric applications and/or procedures performed on small anatomic structures may require reduced power settings. The higher the current flow, and the longer the current is applied, the greater the possibility of unintended thermal damage to tissue, especially during use on small structures.

Use electrosurgery with caution in the presence of internal or external devices such as pacemakers or pulse generators. Interference produced by the use of electrosurgical devices can cause devices such as pacemakers to enter an asynchronous mode or can block the pacemaker effect entirely. Consult the device manufacturer or hospital Cardiology Department for further information when use of electrosurgical appliances is planned for patients with cardiac pacemakers or other implantable devices.

**CAUTIONS:**

The use of high frequency current can interfere with the function of other electromagnetic equipment.

When high frequency surgical equipment and physiological monitoring equipment are used simultaneously on the same patient, place any monitoring electrodes as far as possible from the surgical electrodes.

Do not use needles as monitoring electrodes during electrosurgical procedures. Inadvertent electrosurgical burns may result.

To avoid the possibility of an electrosurgical burn to either the patient or the physicians, do not allow the patient to come in contact with a grounded metal object during activation. When activating the unit, do not allow direct skin contact between the patient and the physician.

Remove any jewelry from the patient before activation.

Studies have shown that smoke generated during electrosurgical procedures can be potentially harmful to patients and the surgical team. These studies recommend adequately ventilating the smoke by using a surgical smoke evacuator or other means.¹

Examine all accessories and connections to the electrosurgical generator before use. Ensure that the accessories function as intended. Improper connection may result in arcing, sparks, accessory malfunction, or unintended surgical effects.

When not using active accessories, place them in a holster or in a clean, dry, non-conductive, and highly visible area not in contact with the patient. Inadvertent contact with the patient may result in burns.

ACTIVATING THE UNIT

When you turn on your unit, remember this feature:

• Aaron 1250U Electrosurgical Generator will power up to the last used modes and last used settings. For example, if you set Pure Cut mode at 50 watts when you turned the unit off, it will automatically return to Pure Cut mode at 50 watts when you turn it on again. Similarly, if you set Coagulation mode at 40 watts before you turned the unit off, it will return to Coagulation mode at 40 watts when you turn it on again.

1. Monopolar Cut - Select the mode of operation for cut: Cut or Blend, then Select the desired Cut power settings by rotating the Cut and Blend Power Control Dial.

2. Monopolar Coag - Select the mode of operation for coagulation: Coagulation or Fulguration, then Select the coagulation power settings by rotating the Coagulation, Fulguration, and Bipolar Power Control Dial.

3. Bipolar - Select the mode of operation for Bipolar, then select the Bipolar power settings by rotating the Coagulation, Fulguration, and Bipolar Power Control Dial.

4. Activate the generator by pressing the appropriate button:

<table>
<thead>
<tr>
<th>To Activate...</th>
<th>Press This...</th>
<th>On This Device...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopolar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut or Blend Modes</td>
<td>Yellow Button</td>
<td>Handswitching Pencil</td>
</tr>
<tr>
<td></td>
<td>Yellow Pedal</td>
<td>Footswitch</td>
</tr>
<tr>
<td>Coagulation or Fulguration Modes</td>
<td>Blue Button</td>
<td>Handswitching Pencil</td>
</tr>
<tr>
<td></td>
<td>Blue Pedal</td>
<td>Footswitch</td>
</tr>
<tr>
<td>Bipolar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any Bipolar</td>
<td>Yellow (Cut) or Blue (Coag) Pedal</td>
<td>Footswitch</td>
</tr>
</tbody>
</table>

NOTICES

One footswitch activates either monopolar or bipolar footswitching accessories.

If the unit is in the Bipolar Mode and the Bipolar Foot Control is selected, Monopolar Modes can be activated via the 2 button handpiece. If the Cut Button is depressed, the unit will activate whichever Cut Mode is displayed, either Cut or Blend. If the Coag Button is depressed, the unit will switch to the Coagulation Mode and activate with the last used Coagulation Power Setting. To return to the Bipolar Mode the user must press the Bipolar Selector.
MAINTAINING THE AARON 1250U

This section covers the following topics:

- Cleaning
- Periodic Inspection
- Fuse Replacement
Bovie Medical recommends that you complete periodic inspection and performance testing. Perform inspections and performance testing every six months. A qualified biomedical technician should conduct this testing to ensure that the unit is operating effectively and safely.

**CLEANING**

After each use, clean the unit.

**WARNING:**

*Electric Shock Hazard - Always turn off and unplug the generator before cleaning.*

**NOTICE:**

*Do not clean the generator with abrasive cleaning or disinfectant compounds, solvents, or other materials that could scratch the panels or damage the generator.*

1. Turn off the generator, and unplug the power cord from the wall outlet.

2. Thoroughly wipe all surfaces of the generator and power cord with a mild cleaning solution or disinfectant and a damp cloth. Follow the procedures approved by your institution or use a validated infection control procedure. Do not allow fluids to enter the chassis. Do not sterilize the generator.

**PERIODIC INSPECTION**

Every six months, visually inspect the Aaron 1250U for signs of wear or damage. In particular, look for any of the following problems:

- Damage to the power cord
- Damage to the power cable receptacle
- Obvious damage to the unit
- Damage to any receptacle
- Accumulation of lint or debris in or around the unit.

**FUSE REPLACEMENT**

Fuses for the unit reside directly below the Power Cable Receptacle on the rear of the unit.

To replace the fuses, follow this procedure:

1. Unplug the power cord from the wall outlet.
2. Remove the power cord from the Power Cable Receptacle on the rear panel.
3. To release the fuse drawer, insert a small flathead screwdriver into the slot on the drawer below the power cord receptacle. Then, slide the drawer out.
4. Remove the two fuses and replace them with new fuses with the same values.
5. Insert the fuse holder into the Power Cable Receptacle.

**NOTICE:**

*If the unit does not display an error and does not power on, check fuses.*
TROUBLESHOOTING

This section includes Error Code Descriptions and actions to take to resolve them.
The Aaron 1250U includes automatic self-diagnostics. If the diagnostics detect an error, the system displays an error code, sounds an audible tone, and deactivates the unit output power.

Most error codes result from faults in accessories attached to the unit. The following table lists the error codes, describes the errors, and recommends actions to take to resolve the errors.

If the unit displays any other error code, it requires service.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Recommended Action</th>
</tr>
</thead>
</table>
| F1 (on the Cut / Blend display) | Handswitch or monopolar footswitch cut pedal may be stuck. | 1. Turn off, then turn on the generator. Do not press buttons or activate accessory devices during the self-test.  
2. If the error code reappears, disconnect all accessories. Turn off, then turn on the generator again.  
3. If the problem persists, replace the handpiece or footswitch and repeat the restart.  
4. If the error code reappears, record the number and call Bovie customer service. |
| F1 (on the Coagulation / Fulguration Bipolar display) | Handswitch or monopolar footswitch coag pedal may be stuck. | |
| F2 | Cut and Coag buttons activated simultaneously (pencil or footswitch) | The unit does not allow simultaneous activation of the cut and coagulation modes. Release either the cut or coag button on the handpiece, or the cut or coag pedal on the footswitch. |
| F3 | Footswitch Cut or Coag pedal pressed while in Bipolar Foot Control and the unit is not in Bipolar Mode. | The unit will not allow the footswitch to activate the unit if Bipolar footcontrol is selected, but the Bipolar Mode is not selected. |
| F4 | Line voltage error (Line voltage too high) | 1. Turn the unit off.  
2. Verify that the unit is connected to the line voltage.  
3. If the error code reappears, record the number and contact Bovie customer service. |
| E7 | Internal temperature of a section of the unit exceeded the limit. | 1. Turn the unit off.  
2. Allow the unit to cool for 20 minutes.  
3. Turn the unit on.  
4. If the error code reappears, record the number and contact Bovie customer service. |

**NOTICE:**

If the unit does not power on to display an error, check fuses as described in Section 5 of this guide.
REPAIR POLICY AND PROCEDURES

Refer to this section for information on:

- Responsibility of the Manufacturer
- Returning the Generator for Service
RESPONSIBILITY OF THE MANUFACTURER

Bovie Medical is responsible for the safety, reliability, and performance of the generator only under the following circumstances:

- The user has followed the Installation and Setup Procedures in this User’s Guide.
- Persons authorized by Bovie Medical performed assembly operation, readjustments, modifications, or repairs.
- The electrical installation of the relevant room complies with local codes and regulatory requirements.
- Equipment use is in accordance with the Bovie Medical instructions for use.

For warranty information, refer to Appendix B - Warranty.

RETURNING THE GENERATOR FOR SERVICE

Before you return the generator, call your Bovie Medical representative for assistance. If instructed to send the generator to Bovie Medical, first obtain a Returned Goods Authorization Number. Then, clean the Generator and package securely to ensure proper protection of the unit. So as to aid in the processing of the unit, please be sure to include a reference to the Return Goods Authorization Number on the outside of the box and ship directly to Bovie Medical.

**Step 1 – Obtain a Returned Goods Authorization Number**

Call the Bovie Medical Customer Service Center to obtain a Returned Goods Authorization Number. Have the following information ready when you call:

- Hospital / clinic name / customer number
- Telephone number/fax number
- Department / address, city, state, and zip code
- Model number
- Description of the problem
- Type of repair to be done
- P.O. number

**Step 2 – Clean the Generator**

**WARNING:**

Electric Shock Hazard - Always turn off and unplug the generator before cleaning.

**NOTICE:**

Do not clean the generator with abrasive cleaning or disinfectant compounds, solvents, or other materials that could scratch the panels or damage the generator.

A. Turn off the generator, and unplug the power cord from the wall outlet.

B. Thoroughly wipe all surfaces of the generator and power cord with a mild cleaning solution or disinfectant and a damp cloth. Follow the procedures approved by your institution or use a validated infection control procedure. Do not allow fluids to enter the chassis. You cannot sterilize the generator.

**Step 3 – Ship the Generator**

A. Attach a tag to the generator that includes the Returned Goods Authorization Number and the information (hospital, phone number, etc.) listed in Step 1 – Obtain a Returned Goods Authorization Number.

B. Be sure the generator is completely dry before you pack it for shipment. Although the preference is to have the Generator repackaged using its original packaging, Bovie understands that this may not always be possible. If necessary, contact Customer Service for the proper packaging to ship the unit. Please be sure to include a reference of the Bovie Return Goods Authorization Number on the outside of the box/container.

C. Ship the generator, prepaid, to the address given to you by the Bovie Medical Service Center.
TECHNICAL SPECIFICATIONS

All specifications are nominal and subject to change without notice. A specification referred to as “typical” is within ± 20% of a stated value at room temperature (25° C / 77° F) and a nominal input power voltage.
**PERFORMANCE CHARACTERISTICS**

**Input Power**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>100 – 240 VAC</strong></td>
<td></td>
</tr>
<tr>
<td>Mains line frequency range (nominal): 50 – 60 Hz</td>
<td></td>
</tr>
<tr>
<td>Power consumption: 540 VA</td>
<td></td>
</tr>
<tr>
<td>Fuses (two): 3.15A (Slow Blow)</td>
<td></td>
</tr>
</tbody>
</table>

**Duty Cycle**

Under maximum power settings and rated load conditions (Pure Cut, 120 watt @ 500 ohm load), the generator is suitable for activation times of 10 seconds on, 30 seconds off for one hour.

The internal temperature of the unit is continuously monitored. If the temperature rises above 85°C, the alarm will sound and output power will be deactivated.

**Dimensions and Weight**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Measure (Unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>26 cm (10.25 in.)</td>
</tr>
<tr>
<td>Height</td>
<td>15.2 cm (6 in.)</td>
</tr>
<tr>
<td>Depth</td>
<td>30.5 cm (12 in.)</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt; 4 kg (&lt; 9 lbs)</td>
</tr>
</tbody>
</table>

**Operating Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature range</td>
<td>10°C to 40°C (50°F to 104°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>30% to 75%, non-condensing</td>
</tr>
<tr>
<td>Atmospheric pressure</td>
<td>700 hPa to 1060 hPa</td>
</tr>
<tr>
<td>Warm-up time</td>
<td>If transported or stored at temperatures outside the operating temperature range, allow one hour for the generator to reach room temperature before use.</td>
</tr>
</tbody>
</table>

**Transport and Storage**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature range</td>
<td>-34°C to 65°C (-29°F to 149°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>0% to 75%, condensing during transport, non-condensing during storage</td>
</tr>
<tr>
<td>Atmospheric pressure</td>
<td>500 hPa to 1060 hPa</td>
</tr>
</tbody>
</table>
Audio Volume
The audio levels stated below are for activation tones (bipolar, cut and coag) and alarm tones (return electrode and system alarms) at a distance of one meter. Alarm tones meet the requirements for IEC 60601-2-2.

Activation Tone

<table>
<thead>
<tr>
<th>Volume (adjustable)</th>
<th>40 to &gt; 65 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>Cut: 610 Hz</td>
<td></td>
</tr>
<tr>
<td>Blend: 610 Hz</td>
<td></td>
</tr>
<tr>
<td>Pinpoint: 910 Hz</td>
<td></td>
</tr>
<tr>
<td>Spray: 910 Hz</td>
<td></td>
</tr>
<tr>
<td>Bipolar: 910 Hz</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>Continuous while the generator is activated</td>
</tr>
</tbody>
</table>

Alarm Tone

<table>
<thead>
<tr>
<th>Volume (not adjustable)</th>
<th>70 dB ± 5 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2 kHz ½ seconds / 1 kHz ½ seconds</td>
</tr>
<tr>
<td>Duration</td>
<td>2 s</td>
</tr>
</tbody>
</table>

Return Electrode Sensing

<table>
<thead>
<tr>
<th>Single Plate</th>
<th>Trip resistance: 0 Ω to 5 Ω ± 3 Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Continuous measurement:</td>
</tr>
<tr>
<td></td>
<td>Once the system establishes the single-plate electrode resistance, an increase of 20 Ω ± 5 Ω in resistance will cause an alarm. When the alarm condition exists, the system deactivates output power.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Split Plate</th>
<th>Trip resistance: 10 Ω ± 5 Ω to 135 Ω ± 10 Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Continuous measurement:</td>
</tr>
<tr>
<td></td>
<td>Once the system establishes the split-plate electrode resistance, an increase of 40% in resistance will cause an alarm. When the alarm condition exists, the system deactivates output power.</td>
</tr>
</tbody>
</table>

The system presents audible and visible alarms when it senses no return electrode.

Low Frequency (50-60 Hz) Leakage Current

<table>
<thead>
<tr>
<th>Enclosure source current, ground open</th>
<th>&lt; 300 µA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source current, patient leads, all outputs</td>
<td>Normal polarity, intact ground: &lt; 10 µA</td>
</tr>
<tr>
<td></td>
<td>Normal polarity, ground open: &lt; 50 µA</td>
</tr>
<tr>
<td></td>
<td>Reverse polarity, ground open: &lt; 50 µA</td>
</tr>
<tr>
<td>Sink current at high line, all inputs</td>
<td>&lt; 20 µA</td>
</tr>
</tbody>
</table>
**Standards and IEC Classifications**

**Class I Equipment (IEC 60601-1)**
Accessible conductive parts cannot become live in the event of a basic insulation failure because of the way in which they are connected to the protective earth conductor.

**Type BF Equipment (IEC 60601-1) / Defibrillator Proof**
The Aaron 1250U Electrosurgical Generator provides a high degree of protection against electric shock, particularly regarding allowable leakage currents. It is type BF equipment. Patient connections are isolated from earth and resist the effects of defibrillator discharge.

**Drip Proof (IEC 60601-2-2)**
The generator enclosure is constructed so that liquid spillage in normal use does not wet electrical insulation or other components which, when wet, are likely to affect adversely the safety of the generator.

**Electromagnetic Interference**
When other equipment is placed on or beneath an activated Aaron 1250U Electrosurgical Generator, the unit can be activated without interference. The generator minimizes electromagnetic interference to video equipment used in the operating room.

**Electromagnetic Compatibility (IEC 60601-1-2 and IEC 60601-2-2)**
The Aaron 1250U Electrosurgical Generator complies with the appropriate IEC 60601-1-2 and IEC 60601-2-2 specifications regarding electromagnetic compatibility.

**Voltage Transients (Emergency Generator Mains Transfer)**
The Aaron 1250U Electrosurgical Generator operates in a safe manner when the transfer is made between line AC and an emergency generator voltage source.

**EMC Compliance**
Special precautions should be taken regarding the 1250U. Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.

Understand that only the Accessories supplied with or ordered from Bovie Medical should be used with your device. The use of Accessories, transducers, and cables other than those specified, may result in increased Emissions or decreased Immunity of the 1250U. The 1250U and its accessories are not suitable for interconnection with other equipment.

Portable and mobile RF communications equipment can affect Medical Electrical Equipment. The 1250U should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the 1250U should be observed to verify normal operation in the configuration in which it will be used.

**High Frequency (RF) Leakage Current**

<table>
<thead>
<tr>
<th>Description</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bipolar RF leakage current</td>
<td>&lt; 39 mA rms</td>
</tr>
<tr>
<td>Monopolar RF leakage current (additional tolerance)</td>
<td>&lt; 150 mA rms</td>
</tr>
</tbody>
</table>

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A-4 Bovie Medical
The 1250U is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the 1250U can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the 1250U as recommended below, according to the maximum output power of the communications equipment.

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter W</th>
<th>separation distance according to frequency of transmitter in metres (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150 kHz to 80 MHz</td>
</tr>
<tr>
<td></td>
<td>80 MHz to 800 MHz</td>
</tr>
<tr>
<td></td>
<td>800 MHz to 2.5 GHz</td>
</tr>
<tr>
<td>0.01</td>
<td>[d = \frac{0.5}{\sqrt{P}}]</td>
</tr>
<tr>
<td>0.1</td>
<td>[d = \frac{0.38}{\sqrt{P}}]</td>
</tr>
<tr>
<td>1</td>
<td>[d = \frac{0.38}{\sqrt{P}}]</td>
</tr>
<tr>
<td>10</td>
<td>[d = \frac{3.8}{\sqrt{P}}]</td>
</tr>
<tr>
<td>100</td>
<td>[d = \frac{7}{\sqrt{P}}]</td>
</tr>
</tbody>
</table>

For transmitters rated at a maximum output power not listed above, the recommended separation distance \(d\) in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where \(P\) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Guidance and manufacturer’s declaration – electromagnetic emissions

The 1250U is intended for use in the electromagnetic environment listed below. The customer or the user of the 1250U should assure that is is used in such an environment.

<table>
<thead>
<tr>
<th>Emissions test</th>
<th>Compliance</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Emissions CISPR 11</td>
<td>Group 2</td>
<td>The 1250U must emit electromagnetic energy in order to perform its intended function. Nearby electronic equipment may be affected.</td>
</tr>
<tr>
<td>RF Emissions CISPR 11</td>
<td>Class A</td>
<td>The 1250U is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used in domestic purposes.</td>
</tr>
<tr>
<td>Harmonic emissions</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>IEC 61000-3-2</td>
<td>Complies</td>
<td></td>
</tr>
</tbody>
</table>
The 1250U is intended for use in the electromagnetic environment listed below. The customer or the user of the 1250U should assure that is is used in such an environment.

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD) IEC 61000-4-2</td>
<td>±6 kV contact ±8 kV air</td>
<td>±6 kV contact ±8 kV air</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.</td>
</tr>
<tr>
<td>Electrical fast transient/burst IEC 61000-4-4</td>
<td>±2 kV for power supply lines ±1 kV for input/output lines</td>
<td>±2 kV for power supply lines ±1 kV for input/output lines</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Surge IEC 61000-4-5</td>
<td>±1 kV differential mode ±2 kV common mode</td>
<td>±1 kV differential mode ±2 kV common</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11</td>
<td>&lt;5 % $U_t$ (&gt;95 % dip in $U_t$) for 0.5 cycle 40 % $U_t$ (60 % dip in $U_t$) for 5 cycles 70 % $U_t$ (30 % dip in $U_t$) for 25 cycles &lt;5 % $U_t$ (&gt;95 % dip in $U_t$) for 5 sec</td>
<td>&lt;5 % $U_t$ (&gt;95 % dip in $U_t$) for 0.5 cycle 40 % $U_t$ (60 % dip in $U_t$) for 5 cycles 70 % $U_t$ (30 % dip in $U_t$) for 25 cycles &lt;5 % $U_t$ (&gt;95 % dip in $U_t$) for 5 sec</td>
<td>Mains power quality should be that of a typical commercial or hospital environment. If the user of the 1250U requires continued operation during power mains interruptions, it is recommended that the 1250U be powered from an uninterruptible power supply or a battery.</td>
</tr>
<tr>
<td>Power frequency (50/60 Hz) magnetic field IEC 61000-4-8</td>
<td>3 A/m</td>
<td>3 A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.</td>
</tr>
</tbody>
</table>

NOTE: $U_t$ is the a.c. mains voltage prior to application of the test level.
### Guidance and manufacturer’s declaration – electromagnetic immunity continued...

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF</td>
<td>IEC 61000-4-6</td>
<td>3 Vrms (V&lt;sub&gt;i&lt;/sub&gt;)</td>
<td>Portable and mobile RF communications equipment should be used no closer to any part of the 1250U, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: ( d = \left[ \frac{3.5}{3} \right] \sqrt{P} )</td>
</tr>
<tr>
<td>Radiated RF</td>
<td>IEC 61000-4-3</td>
<td>3 V/m (E&lt;sub&gt;i&lt;/sub&gt;)</td>
<td>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol.</td>
</tr>
</tbody>
</table>

#### NOTE 1
At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

#### NOTE 2
These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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\( a \) Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicated theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location which the 1250U is used exceeds the applicable RF compliance level above, the 1250U should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the 1250U.

\( b \) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than \([V_{i}]\) V/m.
OUTPUT CHARACTERISTICS

Maximum Output for Monopolar and Bipolar Modes

Power readouts agree with actual power into rated load to within 20% or 5 watts, whichever is greater.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Output Power</th>
<th>Output Frequency</th>
<th>Repetition Rate</th>
<th>Vp-p max</th>
<th>Crest Factor* (Rated Load)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cut</td>
<td>120 W @ 500 Ω</td>
<td>357 kHz ± 50 kHz</td>
<td>N / A</td>
<td>2.5 KV</td>
<td>2.9 ± 20%</td>
</tr>
<tr>
<td>Blend</td>
<td>90 W @ 800 Ω</td>
<td>357 kHz ± 50 kHz</td>
<td>30 kHz ± 5 kHz</td>
<td>3.5 KV</td>
<td>3.3 ± 20%</td>
</tr>
<tr>
<td>Coagulation</td>
<td>80 W @ 1000 Ω</td>
<td>475 kHz ± 19 kHz</td>
<td>57 kHz ± 5 kHz</td>
<td>4.5 KV</td>
<td>5.5 ± 20%</td>
</tr>
<tr>
<td>Fulguration</td>
<td>40 W @ 1000 Ω</td>
<td>410 kHz ± 50 kHz</td>
<td>25 kHz ± 5 kHz</td>
<td>6.5 KV</td>
<td>7.7 ± 20%</td>
</tr>
<tr>
<td>Bipolar</td>
<td>30 W @ 200 Ω</td>
<td>520 kHz ± 29 kHz</td>
<td>32 kHz ± 5 kHz</td>
<td>2.0 KV</td>
<td>6.9 ± 20%</td>
</tr>
</tbody>
</table>

* an indication of a waveform's ability to coagulate bleeders without a cutting effect
OUTPUT POWER CURVES
The curves that follow depict the changes for each mode at specific power settings.

Figure A – 1  Output power vs impedance for Cut mode

Figure A – 2  Output power vs impedance for Blend mode
Figure A – 3  Output power versus impedance for Coagulation modes

Coagulation Mode

![Coagulation Mode Graph]

Figure A – 4  Output power versus impedance for Fulguration mode

A1250 FULGURATION

![A1250 Fulguration Graph]
Figure A – 5  Output power vs impedance for Bipolar mode
WARRANTY

Bovie Medical, warrants each product manufactured by it to be free from defects in material and workmanship under normal use and service for the period(s) set forth below.

Bovie Medical’s obligation under this warranty is limited to the repair or replacement, at its sole option, of any product, or part thereof, which has been returned to it or its Distributor within the applicable time period shown below after delivery of the product to the original purchaser, and which examination discloses, to Bovie Medical’s satisfaction, that the product is indeed, defective.

This warranty does not apply to any product, or part thereof, which has been repaired or altered outside Bovie Medical’s factory in a way so as, in Bovie Medical’s judgment, to affect its stability or reliability, or which has been subjected to misuse, neglect, or accident.

The warranty periods for Bovie Medical products are as follows:

• Electrosurgical Generators: Two years from date of shipment
• Mounting Fixtures (all models): Two years from date of shipment
• Footswitches (all models): Ninety days from date of shipment
• Patient Return Electrodes: Shelf life only as stated on packaging
• Sterile Single Use Accessories: Only as stated on packaging
This warranty is in lieu of all other warranties, express or implied, including without limitation, the warranties of
merchantability and fitness for a particular purpose, and of all other obligations or liabilities on the part of Bovie
Medical.

Bovie Medical neither assumes nor authorizes any other person to assume for it any other liability in connection with
the sale or use of any of Bovie Medical’s products.

Notwithstanding any other provision herein or in any other document or communication, Bovie Medical’s liability
with respect to this agreement and products sold hereunder shall be limited to the aggregate purchase price for the
goods sold by Bovie Medical to the customer.

Bovie Medical disclaims any liability hereunder or elsewhere in connection with the sale of this product, for indirect
or consequential damages.

This warranty and the rights and obligations hereunder shall be construed under and governed by the laws of the
State of Florida, USA.

The sole forum for resolving disputes arising under or relating in any way to this warranty is the District Court of the
County of Pinellas, State of Florida, USA.

Bovie Medical, its dealers, and representatives reserve the right to make changes in equipment built and/or sold by
them at any time without incurring any obligation to make the same or similar changes on equipment previously built
and/or sold by them.