VETROSON® V-10 BIPOLAR ELECTROSURGICAL UNIT
OPERATING INSTRUCTIONS
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OPERATING INSTRUCTIONS

Front Panel

**VETROSON® V-10 generates radio frequency electrical energy which may interfere with other equipment adversely affecting that equipment.**

1. Power ON/OFF (I=ON, O=OFF)
2. AC power “on” indicator (lights green when AC power is on)
3. “Stabilizing” indicator comes on automatically upon power switching on to allow unit to stabilize. After about 25 seconds indicator will go off and unit is ready. *The unit will not activate while indicator is on!*
4. RF active indicator lights yellow when energy is present at the selected jacks
5. Electrosurgical current quality select (“mode” a.k.a. “waveform”)
6. RF Power control (electrosurgical current quantity)
7. Monopolar active jack (monopolar handpiece black plug goes here)
8. Monopolar/bipolar switch (only one pair of jacks may be activated at a time)
9. Bipolar jacks (bipolar cord plugs in here *(no polarity)* NEVER plug a bipolar lead into a monopolar jack!)
10. Monopolar dispersive jack (current return from the electrode) *V-10 is an isolated unit and will not work in monopolar without the ground pad plugged in and properly placed!*

Symbol for type BF Applied Part. Indicates isolated from ground at high frequency and a high degree of electrical shock protection.

Symbol for floating. Isolated from ground at high frequency and a high degree of electrical shock protection.
Hospital grade power cord goes here (polarized, only goes in one way) *push in firmly*

Foot pedal cable plug goes here (keyed, only goes in one way) *goes in easily, do not force*

Active audible tone Normal/Soft setting (up = normal, down = soft)

How ground dispersive pad connects to dispersive cable
Monopolar and Bipolar

Monopolar electrosurgical current is used for incision, excision, and coagulation.

Monopolar electrosurgical current enters the body at the surgical site where a very highly concentrated current density induces heat endogenously within the individual cells making up tissue.

The electrosurgical current returns to the generator via the dispersive pad (a.k.a. ”indifferent pad” or NE “neutral electrode”) over a very large area with low current density and no heat development.

Bipolar electrosurgical current is used for coagulation.

Bipolar electrosurgical current remains constrained to the immediate volume of tissue grasped between the tips of the two insulated forceps blades. as shown here for electrocoagulation of a vessel.

In bipolar operation electrosurgical current does not traverse the body in order to return to the generator as in monopolar operation.

Bipolar electrosurgical current may also be applied superficially on tissue by holding the forceps tips apart. The electrosurgical current may be applied in “hard” or “forced” manner or “soft” manner.

Using the back side of curved forceps held apart, electrosurgical may be applied over large areas by brushing the area with the forceps. A thin coagulum develops in that method, similar to fulguration but without eschar.

Electrosurgical Current Quality (a.k.a. “mode” or “waveform”)

The FINE (Filtered) current has the lowest degree of collateral tissue denaturing but also the lowest degree of concurrent hemostasis. It is used where collateral heat and cicatrix formation are clinical concerns, i.e., dermatological indications, cosmetic indications, biopsy, graft donor tissue harvesting, oculo-plastic indications, and dental indications.

Crest factor is a measure of coagulation ability (the higher the number the more effective the coagulation ability) and CUT has a crest factor of 1.4.
The **NORMAL (Fully Rectified)** combines elements of cutting current and coagulation current so as to provide significant and effective concurrent hemostasis during incision and excision. “NORMAL” is the “general purpose” electrosurgical current and is most often used.

NORMAL has a crest factor of 1.9 which is a proven effective balance between concurrent hemostasis and fast healing due to minimal collateral tissue denaturing.

The **COAG** electrosurgical current is used to control bleeding. It may be applied in monopolar using the ball electrode in “hard” (a.k.a “forced”) application or else in “soft” application.

Crest factor in COAG is 2.7 which is relatively mild yet effective allowing good control over the effects and minimal cicatrix formation.

Bipolar mode selection automatically selects this electrosurgical current.

The electrical characteristics of the CUT, BLEND, and COAG on an oscilloscope are illustrated below:

**RF POWER SETTING**

*Electrosurgery is unique among surgical technologies having characteristics which must be taken into account when applying it clinically in order to achieve positive clinical outcomes.*

1. Electrosurgery is NOT CAUTERIZATION! In cauterization heat is produced outside tissue and then brought into contact with tissue causing significant collateral tissue damage.

Electrosurgery develops heat endogenously within tissue cells and the electrode DOES NOT get hot outside tissue.

Because electrosurgical current reacts with tissue cell contents, it will NOT REACT with inorganics or electrical insulators such as wood, plastic, or paper.

2. The amount of electrosurgical current (power setting) necessary to perform a surgical procedure is a function of electrode surface area (size and shape). There is a threshold below which it will not work, that is to say, a minimum setting. It is NOT like a stove with “simmer”, “medium” and “high” and cannot be dialed below the minimum threshold setting and still cut or coagulate.
Surgical technique is a very significant factor in clinical efficacy when using electrosurgery. Practice on test media before using the VETROSON® V-10 in clinical use on patients!

Adjusting RF power setting (titrating the dose)

- Way too low, no cutting just coagulation burn
- Too low, dragging, tissue adhering to electrode
- Just right: pressureless smooth clean cutting
- Too high, sparking, protein deposits on electrode
- Way too high, sparking, charring, carbon deposits on electrode

<table>
<thead>
<tr>
<th>indication</th>
<th>electrode</th>
<th>RF power</th>
<th>waveform</th>
</tr>
</thead>
<tbody>
<tr>
<td>incision &lt;2mm</td>
<td>M-1, M-10, M-F11</td>
<td>3 to 3.5</td>
<td>Fine (Filtered), Normal (Fully Rectified)</td>
</tr>
<tr>
<td>incision &gt;3mm</td>
<td>M-1, M-10, M-11</td>
<td>4 to 4.5</td>
<td>Fine (Filtered), Normal (Fully Rectified)</td>
</tr>
<tr>
<td>ablation</td>
<td>M-1, M-10, M-11</td>
<td>2 to 2 1/2</td>
<td>Fine (Filtered)</td>
</tr>
<tr>
<td>ablation</td>
<td>M-61</td>
<td>2 to 2 1/2</td>
<td>Fine (Filtered)</td>
</tr>
<tr>
<td>ablation</td>
<td>M-51</td>
<td>3 1/2 to 4</td>
<td>Fine (Filtered)</td>
</tr>
<tr>
<td>planning</td>
<td>M-33</td>
<td>5</td>
<td>Fine (Filtered), Normal (Fully Rectified)</td>
</tr>
<tr>
<td>planning</td>
<td>M-34</td>
<td>6</td>
<td>Fine (Filtered), Normal (Fully Rectified)</td>
</tr>
<tr>
<td>coagulation hard</td>
<td>M-51</td>
<td>6 to 7</td>
<td>coag</td>
</tr>
<tr>
<td>coagulation soft</td>
<td>M-51</td>
<td>7</td>
<td>coag</td>
</tr>
<tr>
<td>incision</td>
<td>M-71, M-72</td>
<td>6 to 8</td>
<td>Fine (Filtered), Normal (Fully Rectified)</td>
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NOTE: the flat side of R71 and R72 lancet may be used effectively for coagulation

**RF Power Initial Settings bipolar** (subject to subsequent adjustment)

<table>
<thead>
<tr>
<th></th>
<th>bipolar forceps</th>
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<tbody>
<tr>
<td>coagulation</td>
<td></td>
<td>4 ½ to 5</td>
<td>coag</td>
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Electrodes

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1</td>
<td>Fine wire incision; adjustable depth; angled shaft</td>
</tr>
<tr>
<td>M-11</td>
<td>Fine wire incision; angled shaft</td>
</tr>
<tr>
<td>M-33</td>
<td>5mm loop</td>
</tr>
<tr>
<td>M-34</td>
<td>10mm loop</td>
</tr>
<tr>
<td>M-51</td>
<td>1.5mm coagulation ball</td>
</tr>
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</table>

Optional Electrodes

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-10</td>
<td>Fine wire incision; straight shaft</td>
</tr>
<tr>
<td>M-61</td>
<td>Fine needle; incision, ablation, fulguration</td>
</tr>
<tr>
<td>M-62</td>
<td>Pointed tip fulguration</td>
</tr>
<tr>
<td>M-71, M-72</td>
<td>lancet</td>
</tr>
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</table>
Electrode Holder Block

The 2 ½” x 2 ½” plastic electrode block holds up to 25 electrodes and may be used during surgery as a holder.

Electrode and Handpiece sterilization

Steam autoclave at 270°F (132°C) for 15 minutes. The nose cap should be removed during autoclave. Coil the cord loosely when placing in an autoclave bag. Allow 15 minutes cooling time. FDA does not recognize chemical sterilization as adequate for electrosurgery.

Electrode hygiene

The active metal portions of electrodes (both the tissue contact areas and the part held in the handpiece) must be clean and free of oxides and protein deposits in order to electrically conduct electrosurgical current. These areas may be pre-cleaned prior to autoclave with a quaternary disinfectant and scrubbed with a suitable media such as Scotchbrite® “maroon” pads. The electrodes pre-cleaned with disinfectant should be rinsed after words prior to autoclave. Do not soak!

Dispersive ground pad hygiene

The ground pad may be cleaned with a suitable quaternary disinfectant. Do not soak the ground pad! The ground pad may be steam autoclaved at 270°F (132°C) for 15 minutes with a 15 minute drying time. If autoclaving, the pad should be loosely wound up with a layer of gauze to allow steam to reach the entire surface of the coiled pad.

Dispersive ground cable, bipolar cable and bipolar forceps

These are also autoclaveable. Like the handpiece should be coiled loosely in the autoclave bag. Steam sterilize at 270°F (132°C) for 15 minutes with a 15-minute drying time. Like electrodes and dispersive pad, these items may be pre-cleaned with a quaternary disinfectant and rinsed prior to autoclave. Do not soak!

Gas sterilization has not been investigated for the above products hence no recommendation can be made.

Dry heat will damage electrodes, cables, and ground pad.
Dispersive ground pad placement

This aspect of electrosurgery is essential for successful clinical use.

The dispersive ground pad is a capacitive type and does not require any direct electrical contact with bare skin and will work through fur. No adhesives or gels are needed or used.

General rules are

- Insure that the entire area of the dispersive ground pad is covered by the patient
- Place over a large well vascularized muscle mass
- Place as near to the surgical site as practical

The least furry areas of the patient’s anatomy are better; for example, inside the thigh on large dogs, on the haunches for equine and bovine. The patient indifferent plate may be held in place with loosely wrapped gauze. The patient indifferent plate is flexible to conform to body contours for maximum coverage.

Precautions

Electrosurgery uses high radio frequency electrical current which is inherently dangerous unless handled properly. Please follow the recommendations for safe, effective use and positive clinical outcomes.

Fire and explosion hazard:

- DO NOT use with flammable anesthetics!
- Allow alcohol-based astringents to completely dry and evaporate before using electrosurgery.
- Do not use with oxygen or nitrous oxide! Discontinue $O_2$ or N2O during electrosurgery! Re-establish afterwards.
- Do not allow $O_2$ or N2O to pool under a surgical drape!
- Remove cotton or gauze from cavities where $O_2$ or N2O are present before electrosurgery! Replace afterwards.

Pacemakers and other implanted electrical medical devices:

- Always consult the implanting/referring physician before using electrosurgery (patient, operator, or staff personnel). Generally speaking, pacemakers are RF shielded and safe for use with electrosurgery. Caution: the only way to know is to ask the implanting physician. Some other implanted devices may not be shielded or safe; always ask!

Smoke: electrosurgical smoke is vaporized tissue cell contents. FDA and CDC regard it as a mild carcinogen if inhaled sufficiently over extensive time, therefore, the use of a suitable smoke evacuator is very strongly advised. Virus may be present in electrosurgical smoke. If a patient is known to have active viral infection, take additional measures for surgeon and staff respiratory protection.
If the electrosurgical generator appears to lose power:

DO Not turn up RF power to a dangerous level! First do this:

- Check the dispersive pad for position and firm connection to the generator
- Be sure the wrong current quality is not selected (i.e., COAG instead of FINE (Filtered))
- Be sure the proper power setting is set (see initial settings)
- Be sure that the electrode is clean and not compromised by protein deposit or carbon
- Be sure that cables are intact and functional (substitute a spare to verify)

**Metallic instruments or objects** (includes implants and amalgams, jaw wiring, orthopedic braces)

Electrode contact with a metal instrument or object will make the object an extension of the electrode and electrosurgical current will enter tissue wherever the object is in contact resulting in burns.

- Avoid contact with metal objects in the surgical field!
- DO NOT allow electrosurgical cables to coil around metal objects! (magnetic induction will cause electrosurgical current to be generated in the object)

**NOTE:** “buzzing the hemostat” is the obvious exception to the above

**Electrode heat**

Intense intracellular tissue heat will heat the electrode which will remain hot after electrosurgery.

- Withdraw the electrode from the surgical site cautiously to avoid tissue contact.
- Allow adequate cooling time before handling the electrode.

**Inadvertent activation**

- Never leave a handpiece or bipolar forceps resting on a patient! Always stow in proper holder.
- Be sure that foot pedal is in sight and yellow RF indicator is off when changing electrodes or bipolar forceps.

**Bone**

- NEVER contact exposed bone with monopolar electrosurgery
  - Contact with monopolar electrosurgical current WILL necrotize the bone nutrient foramen and subsequent injury will be a matter of degree
  - Use bipolar coagulation near or on exposed bone
  - Do not coagulate on the dental palate with monopolar electrosurgery (see above)

**General hints and advice**

Anesthesia is necessary for electrosurgery.

- Turn on the V-10 and allow stabilization to complete then activate the V-10 briefly to verify it is operational before administering anesthesia.
Avoid overstressing the V-10.

- Observe 10 seconds of operation followed by 20 seconds de-active cooling time
- Do not operate the mode switch with the unit active

Electrically safe set up

- Use only with hospital grade NEMA 15 or NEMA 20 outlets
- Do not defeat the ground pin on the medical grade power cord
- Do not use extension cords

Easier clean up

- Place ground pad in a clean disposable plastic bag
- Use handpiece protector sheaths (NOT a substitute for autoclaving!)

Avoid failures during surgery (pro-active prevention)

- Handpieces, dispersive cable, and bipolar cable have a finite service life.
  - Routinely replace the above on a bi-annual schedule
- Always have a spare autoclaved handpiece, dispersive cable, and bipolar cable on hand

Inspect handpieces, cables, and forceps for visible flaws before autoclave

- Routinely inspect for bare metal showing where it should not be
- Replace faulty items! Do not attempt repair.

Hand rest for delicate procedures

- For delicate procedures establish a hand rest on the patient
- Do a couple of “practice strokes” without activating the unit before proceeding

Oculoplastic

- ALWAYS use corneal shields!

Dental

- Although intended for general veterinary surgery the V-10 is very well suited for dental

Coagulation hints and advice

- Monopolar “hard” coagulation is when the ball is placed in contact with tissue then the unit activated
  - Used for deep penetration of heavy bleeds
  - Used for desiccation or ablation of lesions
  - Will have significant collateral tissue denaturing, leaves cicatrix
• Monopolar “soft” coagulation is when the unit is activated first then the ball brought into contact with tissue
  o Used for superficial coagulation
  o Relatively shallow tissue penetration, minimal collateral tissue denaturing, cicatrix

• Monopolar coagulation is ineffective in wet or bloody fields
  o Use sponges as required to clear the field before monopolar coagulation

• Ball electrode size
  o The 1.5 mm ball takes the least RF power to operate
  o If power is set too high the 1.5 mm ball can ablate tissue instead of coagulate
  o The 3 mm ball is “general purpose”
  o The 5 mm ball takes a very high RF power setting and is best suited to “soft” coagulation

• Bipolar coagulation
  o Takes less RF power than monopolar coagulation
  o Effective in wet or bloody fields
  o May be used like a monopolar ball by holding the tips apart
    ▪ Blunt tips work best for this
    ▪ May be used as “soft” or “hard” in this manner
    ▪ See page 5 for large area coagulation

Resolving operational difficulties

UNIT

Unit fails to turn on.

• Verify that the electrical outlet is functional by plugging in another appliance known good.
• Verify that power cord is firmly seated in the appliance entry.

Unit turns on OK, timing indicator goes out OK, but unit will not activate when pedal is pressed.

• Verify that the foot pedal connector is attached and seated properly.
• Verify that the foot pedal cord is not damaged.
• Check foot pedal for obvious faults: does it “click” when pressed?

Sometimes depressing the foot pedal activates the unit, sometimes not.

• If the foot pedal is depressed on the very extreme corner it may not “click”. Be sure to step on it as fully as practical to avoid this annoyance.

NO OPERATION

The yellow “active” indicator comes on OK, but I get no cutting.

• Verify that the “Flexi-plate” dispersive plate is plugged in at the chair and at the unit.
• Verify that the electrode is fully seated and insulation is not caught in the chuck.
• Verify that the dispersive cable is undamaged and functional.
• Verify that the hand piece cable is undamaged and functional.
• Electrodes must be clean

POOR OPERATION

• Verify that proper initial power setting for the electrode selected is established.
• Verify that COAG has not been inadvertently selected for an incision or excision.
• Verify that heavy, thick fur is not adversely affecting dispersive efficiency
• Verify dispersive plate positioning

Warranty is for 5 years from date of sale for the unit.
Electrodes, cables, ground pad, and bipolar forceps for two years from date of sale.

Repairs

Call Summit Hill Laboratories for a Return Authorization number (RA number) BEFORE sending in a unit for service so as to assure proper handling and prompt response.

Have your unit serial number ready when you call and describe your problem. Hand written descriptions may be packed with the unit.

To avoid shipping damage the unit should be returned in its original packaging. If the original package has been discarded, please request one from Summit Hill for returning your unit for service when calling for RA number.

CAUTION: for your safety! The VETROSON® V-10 device contains no user serviceable parts.

• Never open the unit yourself.
• Never attempt modification of the device or any accessory.
• Use only Summit Hill laboratories spares and accessories
  o Do not use generic substitutes

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Visit www.summithilllaboratories.com for replacement items also for available electrodes and bipolar forceps

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