ELECTRO-SON

ELECTROSURGERY UNIT

Instruction Manual

Engler Engineering Corporation
1099 East 47th Street, Hialeah, Florida 33013
800-445-8581 – 305-688-8581 – FAX 305-685-7671
Web site: www.englerusa.com Support site: www.engler411.com

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COMPANY PROFILE

Engler Engineering Corporation has been in business since 1964 and occupies an 8000 square foot facility in Hialeah, Florida (USA). We manufacture ultrasonic dental scalers, polishers and combination units including electrosurgery equipment and ultrasonic instruments for the veterinary market as well as a microprocessor controlled anesthesia delivery system and a respiratory monitor for veterinary use only.

Engler Engineering Corp. acquired the exclusive manufacturing and marketing rights of **Dynax** products, including stretchers, animal restraint devices, comfort cots, heating pads, and other products. We also acquired the Alpha-Sonic, Ora-Sonic, and Pro-Sonic line of piezo scalers.

Engler Engineering Corporation's brand name veterinary products proudly include:

Excelsior, high speed dental air unit with vacuum / electro-surge / ultrasonic scaler / low speed / high speed / air / water syringe,
Son - Mate II, ultrasonic scaler / polisher,
Sonus II, ultrasonic dental scaler,
Poli - X, micromotor variable speed polisher,
Drill – Aire, high speed dental air unit, high speed, air / water syringe,
Drill – Aire Plus, high speed dental air unit, high speed, low speed, air / water syringe,
Scale - Aire Mini, high speed dental air unit with ultrasonic scaler / high speed / low speed / air / water syringe,
Scale - Aire, high speed dental air unit with ultrasonic scaler / high speed / low speed / air / water syringe and compressor,
Tri - Mate, ultrasonic scaler / micromotor polisher / electro-surge,
A.D.S. 2000, microprocessor controlled anesthesia delivery system / ventilator, **Sentinel V.R.M**., respiratory monitor.

We manufacture all of the inserts and tips used in the Engler products as well as many others on the market today in the 18K and 25K frequency range.

Our repair department has the technical knowledge to repair and maintain most dental devices manufactured by other companies including Shorline.

Engler Engineering Corporation's foreign sales are handled through a large and growing network of veterinary distributors. At the present time we are represented throughout Europe, South and Central America, Canada, Asia, New Zealand, Australia, the Middle East, and most other countries.

If you have any questions or comments, please contact:

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INTRODUCTION

Thank you for selecting the Electro-Son. We believe you have selected the best product available for performing basic and advanced electrosurgery for your veterinary patients.

PLEASE READ VERY CAREFULLY

Engler Engineering Corporation makes every effort to verify that all parts for the device along with any optional accessories ordered were shipped from our facility in Hialeah, Florida and are included in this shipment. It is imperative that the shipment be inspected immediately upon arrival. Should any parts be missing or damaged, Engler Engineering must be notified immediately. All claims submitted after fifteen days of receipt will not be valid.

All devices manufactured and sold by Engler Engineering Corporation are built and tested to approved standards. Any modification to the device, cables or hoses, initiated by others nullifies all warranty statements. Engler Engineering Corporation will not be held liable for any loss, damage, injury or death due to non-authorized service and / or improper installation and / or improper use of the device.

Under no condition will Engler Engineering Corporation's liability exceed the purchase price.

This manual is not intended to teach electrosurgery. The information contained herein is intended only as a guide. Individuals not properly trained in electrosurgery should not use this equipment. It is intended for professional use only.

All images are for reference only and may change without notice.

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TABLE OF CONTENTS

PRINCIPLES OF ELECTROSURGERY

ELECTROSURGERY ELECTRONICS

The Electro-Son uses solid-state technology. The unit accepts electrical power from a standard outlet and converts it's low frequency 50 or 60 Hz cycle to a high frequency radio wave of 1.2 MHz. This rapid reversal of current means ion positions across cellular membranes do not change. As a result, neuromuscular membranes do not depolarize and there is no danger of cardiac defibrillator at these high frequencies. Neuromuscular stimulation occurs at alternating current frequencies of less than 100,000 hertz.

The frequency used in this device is above the range of neuromuscular stimulation and there is no danger of electrical shock to the patient or operator. However, this high frequency waveform produces heat rapidly and is capable of producing burns to tissue.

These high frequency radio waves are transmitted from the insulated handpiece to the patient's tissue by the metallic surgical tip electrode. For safety, this device is a capacitive coupled device.

MONOPOLAR MODE

The current from the surgical monopolar electrode is transmitted to the target tissue and then dissipated through the indifferent plate, thus forming a complete circuit. The use of the isolated capacitive coupled circuit is an attempt to reduce the incidence of an alternate site burn inflicted to the patient by incorrect placement of a return pad. Still care must be taken because a chance exists of alternate site burns related to current taking the pathway of least resistance to ground. **When operating, always use plastic suction tips, mouth mirror, etc.**

INDIFFERENT GROUND (FOR MONOPOLAR USE ONLY)

A complete circuit is necessary for the flow of current. That is, electrons must leave an electrode and return to mother earth to complete the circuit. In a monopolar circuit, current flows between two electrodes held widely apart. These two electrodes are the active electrode, which is small, thereby providing a high power and current density, and the return or indifferent electrode, which is large, thereby providing a low current density. It is important to remember that the indifferent electrode is just as capable of producing injury as the active electrode. The key element in avoiding injury at the indifferent electrode is to have a large surface area of contact. In this manner, the current is dispersed over a large area, thereby reducing the current density. Consequently, the indifferent electrode must be placed over an area that will allow uniform contact with the body. If contact is only partial, current density at the indifferent electrode will be greater and injury can result. The return or indifferent electrode is often referred to as the grounding pad. This however is incorrect. The indifferent electrode carries current back to the generator, not to ground.

The path of least resistance is always taken to the indifferent electrode in a monopolar circuit. As a result, consideration should be given to what the operative procedure will be when the indifferent electrode is applied to the patient.

The indifferent electrode should always be as close to the operative site as possible to minimize the volume the current will need to travel. For example, the indifferent electrode is better applied to the right flank during gallbladder surgery than to a thigh. The reason is that the distance between the operative site and the indifferent electrode is diminished when applied in the right flank, thereby providing a closer and more direct pathway for the circuit to be completed. This should reduce the likelihood of injury at a site other than that intended because current flow through the body is less.

BIPOLAR MODE

The bipolar electrosurgical mode is produced by placing the two electrodes necessary to complete the circuit with in a few millimeters of each other. As a result current does not need to travel throughout the patients body to reach the indifferent electrode. Since the area between the two electrodes is 2 - 3 mm, the current is concentrated in a bipolar circuit. Furthermore, since both electrodes are capable of producing injury at the same time, and since both are small and similar in size, current concentration is achieved. Whereas the current density of a monopolar circuit is based on the second power of the radius of contact, the current density of a bipolar circuit is based on the fourth power of the radius of contact. Clinically, this means less electrical energy or power is need to produce a similar effect with bipolar electrosurgery when compared to monopolar electrosurgery. Furthermore, tissue damage should be reduced with bipolar electrosurgery since less energy passes through the tissue.

The area of tissue damage produced by bipolar electrosurgery is two times less than that observed with bipolar electrosurgery. Furthermore, the conduction of heat is considerably less and over a much shorter distance in a bipolar circuit when compared to a monopolar one.

Not only is overall tissue injury reduced with bipolar electrosurgery, so is the depth of penetration when compared to a monopolar circuit. Clearly, the depth of penetration cannot be much greater than the depth of tissue present between the blades. In contrast, in a monopolar circuit the current disperses over a much larger area as it travels throughout the body. The reduced depth of penetration for bipolar electrosurgery is not without drawbacks. Monopolar electrosurgery is more effective at deeper hemostatic coagulation but also has greater risk of perforation from delayed necrosis. Because coagulation is not as deep, less smoke is generated with bipolar electrosurgery and the risk of perforation is less. On the other hand, hemostasis is not as good.

The obvious advantage of bipolar electrosurgery over monopolar electrosurgery is the absence of a return electrode on the patient. This eliminates the possibility of ground pad and alternate site burns. However, other important differences that should reduce inadvertent injury are present. Capacitive coupling should be eliminated by the bipolar circuit because the flow of current in each electrode is so close that any leakage current is canceled out. That is, change in the insulator caused by one electrode is balanced by changes from the other electrode so that there is no net current flow. Furthermore, both electrodes within the bipolar device are insulated making capacitance less likely. This also significantly reduces if not completely eliminates the risk of insulation failure. Finally, direct coupling can occur only if metal is grasped or placed between the electrodes in a bipolar circuit or extremely close to the electrodes themselves. This should not however, be implied to mean bipolar electrosurgery is safe to use between metal clips. Heat is conducted from the site of application and can lead to necrosis beneath the clips.

The typical power output for bipolar circuits is rated for 50 to 150 ohm resistance. This is considerably less than the power output for monopolar circuits in which loads of 30 to 500 ohms are used. This relates to the considerably smaller volume of tissue affected in the bipolar circuit. Overall, the power provided to a monopolar circuit is 10 % that of a monopolar circuit. In this regard, it is imperative that bipolar devices be connected only to the bipolar side of the

generator. Otherwise considerable greater and potentially dangerous voltages may be provided. Furthermore, the device may act as a monopolar electrode when it is touched to the patient if an indifferent electrode is on their body.
The fact that both electrodes in a bipolar circuit are active and producing tissue damage leads to a unique feature of bipolar coagulation, namely, the tissue is cooked form the outside in. However, as the outer layers of tissue desiccates, the resistance to current flow increases. Coagulation may cease before it is complete. That is, a blood vessel may be cut before it is completely coagulated and therefore bleeds.
Clearly, this problem arises out of a lack of correlation between the visual endpoint (blanching, charring etc) that is external and what is occurring internally. As a result, it is recommended that bipolar electrosurgery be used in conjunction with an ammeter. Coagulation should continue by activation of the bipolar device as long as the ammeter registers current.
The maximum coagulation with the least lateral thermal spread is achieved with bipolar electrosurgery when low voltages of 20 to 30 watts are used. Higher wattage leads to rapid coagulation of the outer layers with concomitant increases in electrical resistance that may prevent complete coagulation. In this regard, the cutting waveform should almost always be used to avoid the high peak voltages associated with the coagulation waveform. The reason high voltages should be avoided is to prevent current bridging around the tissue when the tissue resistance increases. This could lead to injury to structures adjacent to the electrodes that are in this alternate pathway.
Activation of the electrode of the tissue should not be constant. More uniform coagulation is achieved if the tissue is heated with a brief period of activation, allowed to cool for a few seconds and then heated again by activation of the electrode, etc, until current flow thorough the ammeter ceases. This is achieved by tapping the foot switch for a few seconds at a time.
A significant problem with bipolar electrodes is tissue sticking. This can be reduced or eliminated by irrigation of the bipolar electrodes at the time of activation. This concept has the added and potentially significant advantage that it reduces lateral thermal damage. In essence, the irrigant not only cools the electrodes but also the tissue, thereby minimizing conducted thermal injury. Although any solution, including saline, can be used, non-electrolytic solutions such as glycine or weakly electrolytic solutions work best. This ability to irrigate particularly with water or saline while activating differentiates bipolar from monopolar surgery as well. The reason it is possible is that the tissue to be coagulated is between the jaws of the device and does not interfere with current flow. In contrast, saline does not allow for electrosurgical effect in a monopolar circuit because it disperses the current before it reaches the tissue.
The principle tissue effect achieved with bipolar electrosurgery is tissue coagulation through the process of desiccation. Clearly, contact of the tissue with the electrodes is necessary by squeezing tissue between the pads of the device, but not with excessive pressure.

REFERENCE:
Thermal Energy in Minimally Invasive Surgery - Science and Safety
Joseph F. Amaral, MD

Every Engler Electro-Son comes equipped with one monopolar autoclavable handpiece, one monopolar disposable handpiece and Electrosurge tips.

Autoclavable Handpiece, cord, and connector;

Disposable Handpiece (Not autoclavable);

An assortment of Autoclavable Electrosurge tips;

(Representative sample, actual tips and handpieces may vary)

See Electrosurge handpiece / tip autoclave instructions on page 19

Contact Engler Engineering at 800-445-8581 for replacement handpieces and tips.

Please Note:

The unit can use a constant waveform, which produces heat very rapidly to enable the operator to vaporize or cut tissue. As tissue conducts heat, always allow 10 to 15 seconds for the tissue to cool before operating on the same area. The only variable that determines whether the unit vaporizes tissue or produces a coagulum is the rate at which heat is produced. High heat that is produced rapidly will cause vaporization while low heat creates a coagulum.
In order to limit migration current into adjacent issue, the surgical intervention must be performed in a dry field. Do not use adjacent to metallic restorations due to uncontrollable and unpredictable migration along this alternate path or near bone due to current spread and the danger of osseous necrosis.

Tissue types:
Different tissue types have different electrical characteristics. The electrode drags when moving through high impedance (fibrous) tissue, requiring more power. When low impedance (muscle) tissue is encountered a lower power setting should be used.

PLEASE NOTE: Excessive tissue damage can occur if the power setting is in excess of what is required to accomplish the task.

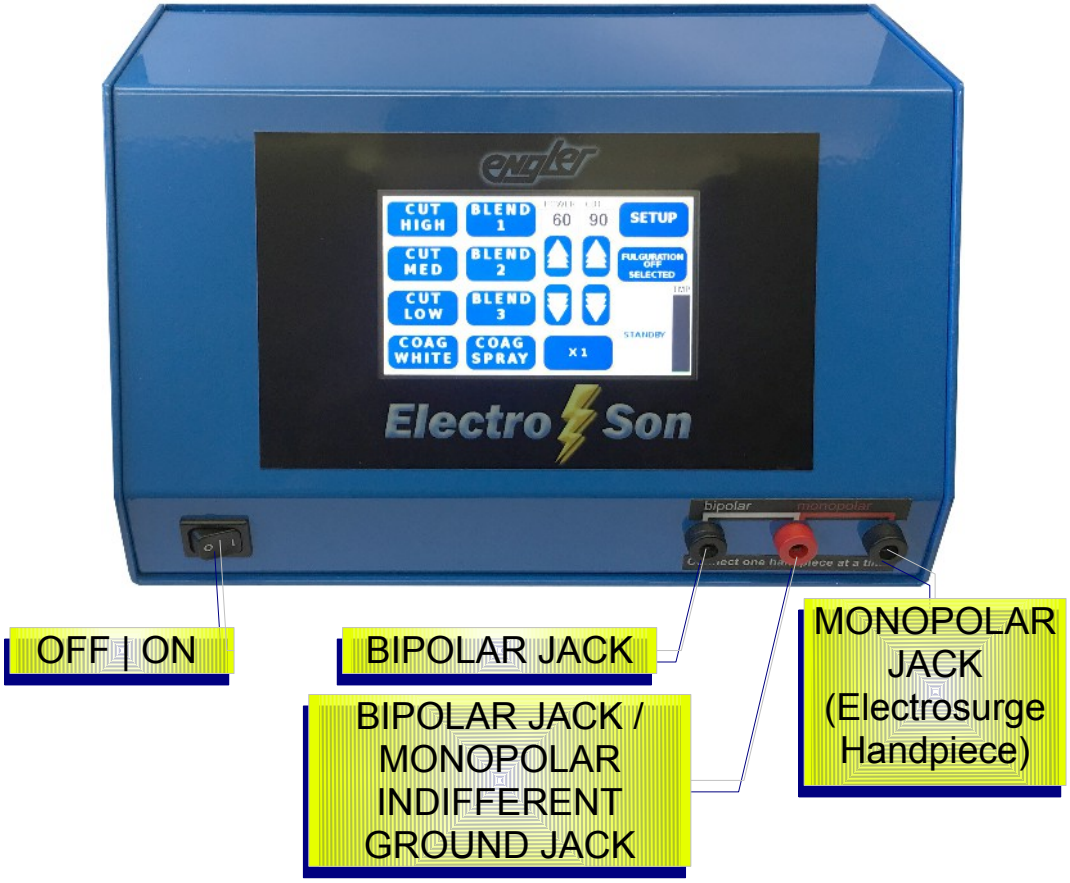
PURE CUT MODE
This operating mode is the most popular for incising or excising tissue when the objective is to produce the least amount of tissue necrosis on either side of the incision wall or to obtain a vital sample for biopsy. The amount of remaining necrosis will depend upon the speed or deliberate motion through the tissue. The current mode is referred to as PURE CUT due to the fact it is pure unmodulated carrier frequency - fully rectified and filtered.

VARIABLE BLEND MODES
This operating mode is typically used when the subject tissue is fibrous or when an increased amount of lateral wall necrosis, shrinkage, or dehydration is desired. This is achieved by varying the duty cycle. The best example of this current is displayed in the output waveforms below, along with its effect on tissue. The user can actually feel an increase in CUT vibration as the settings are selected from BLEND 1 to BLEND 2 and to BLEND 3. BLEND 1 contains the most cutting power.

CUT SETTING
The cut setting determines the wave duty cycle or CUT to COAG (coagulation) ratio of the output.
The cut setting is effective from 20% to 100%. 100% cut setting is a pure cut. 20% is mostly COAG.

POWER SETTING
Determines the output amplitude. 100% is maximum amplitude (power).

GETTING TO KNOW THE CONTROLS



ON / OFF

Setting the power switch to | will turn device ON.
When the power switch is activated the power ON sequence will start and a all menu items will show when completed.

BIPOLAR JACK

Connect BIPOLAR FORCEPS here when doing bipolar surgery.

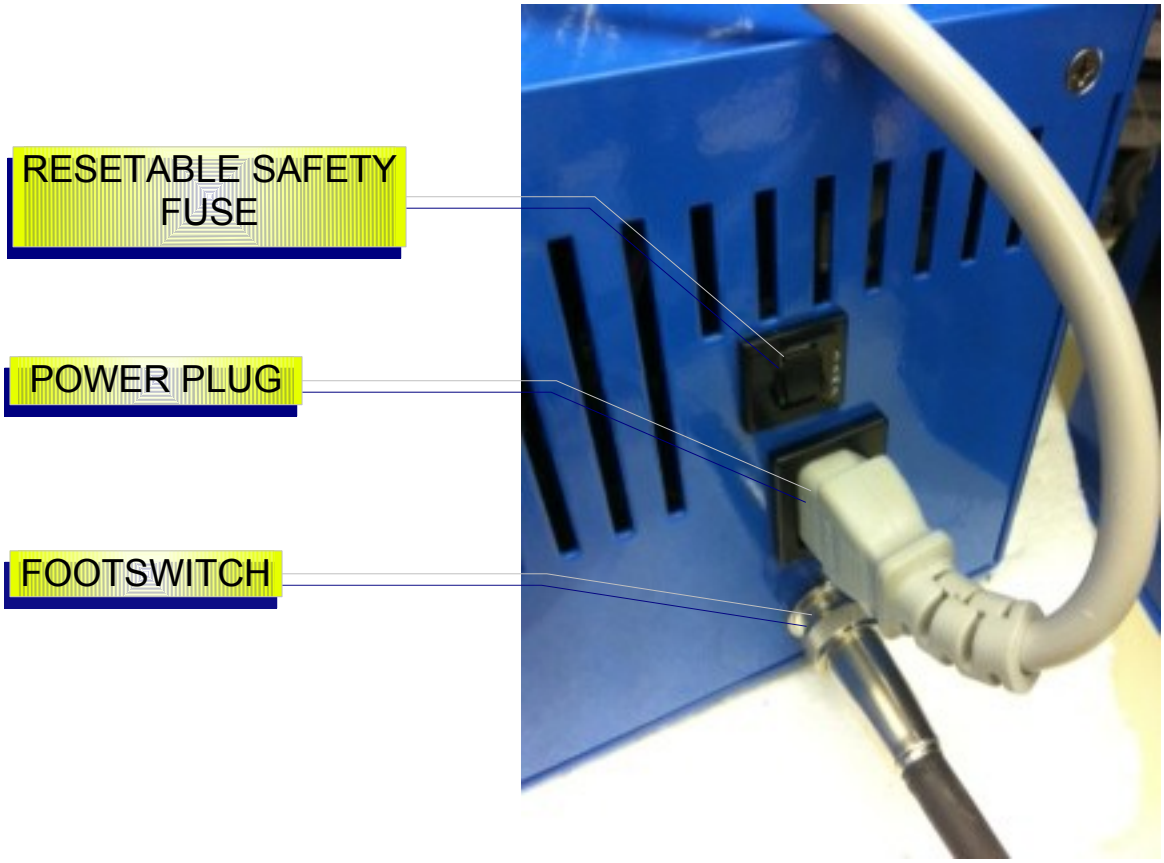
BIPOLAR JACK / MONOPOLAR INDIFFERENT GROUND JACK

Connect BIPOLAR FORCEPS here when doing bipolar surgery.
Connect INDIFFERENT GROUND when doing monopolar surgery.

MONOPOLAR JACK

Connect MONOPOLAR AUTOCLAVEABLE ELECTROSUGE HANDPIECE CONNECTOR when doing monopolar surgery. (Far right black jack)

Warning: Do not connect INDIFFERENT GROUND plate when doing bipolar surgery.



RESETABLE SAFETY FUSE

This is a safety fuse, no user action is required.

POWER PLUG

Connect the power cord here.

FOOT SWITCH

The foot switch included with this unit is an ON / OFF foot switch. Pressing the foot switch will activate the handpiece and an operating alarm.

Configuring the Electro-Son Presets

Plug in the Electro-Son and switch the power on.

This is the start screen:

On the start menu, press Set Up,

This is the Set Up page,

The Settings Menu button allows for adjusting the Tone Volume and Screen Brightness,

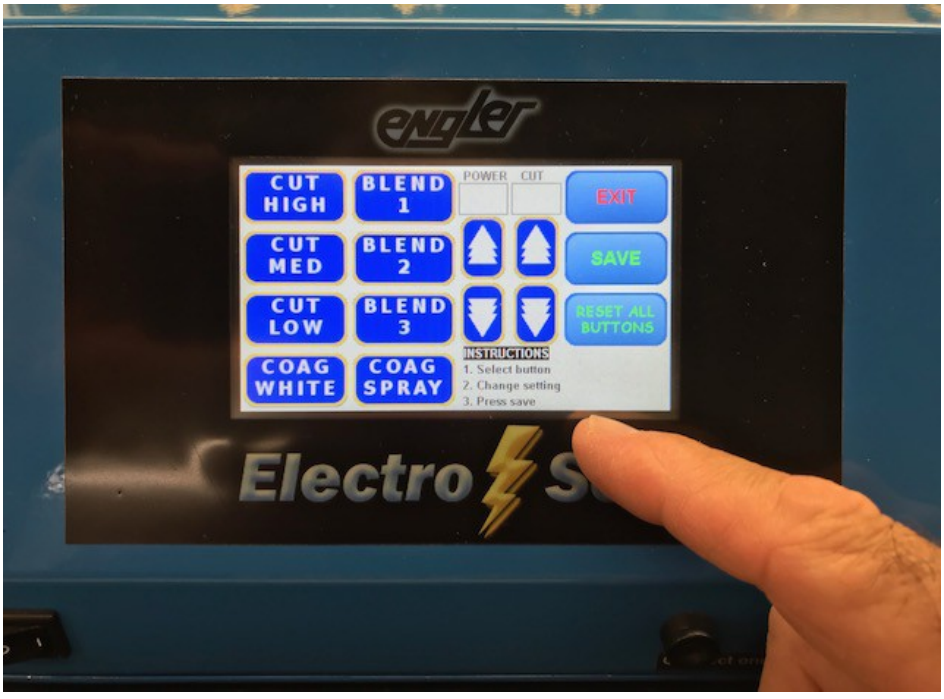
The Help Menu button describes the various cuts obtainable with the Electro-Son,

The Calibration Menu button allows for calibrating the screen,

The Configure Buttons setting allows for presetting and saving the various cuts used for different procedures.

Select Configure Buttons,

Follow the on-screen instructions



Power and **Cut** Min / Max Values;

Cut @100 (Value not adjustable) Only adjust power

Cut High, Min / Max Power 75 - 100

Cut Medium, Min / Max Power 50 – 74

Cut Low, Min / Max Power 20 – 49

Blend Power Values;

Blend 1, Min / Max Power 20 – 100

Min / Max Cut 80 – 95

Blend 2, Min / Max Power 20 – 100

Min / Max Cut 61 – 79

Blend 3, Min / Max Power 20 – 100

Min / Max Cut 40 – 60

Coag Values;

White Coag, Min / Max Power 10 – 20

Cut 100 (not adjustable)

Coag Spray, Min / Max Power 20 – 100

Min / Max Cut 15 – 40

These settings will save automatically. The Electro-Son can be turned off, the settings will not be affected.

The settings can be adjusted at any time by returning to this set-up menu.

Press Reset All Buttons to restore all Power and Cut button values ONLY, to factory settings. No other set-up screens will be restored.

More on Functions:

CUT HI: pure cut maximum power.
CUT MED: pure cutting medium power.
CUT LOW: pure cutting low power

BLEND 1: least coagulation / most cutting
BLEND 2: more coagulation / more cutting
BLEND 3: most coagulation / least cutting

COAG WHITE: White coagulation, desiccation (very low power, low crest factor, 100% duty cycle)

COAG SPRAY: Maximum homeostasis (high crest factor, maximum power, minimum duty cycle)

FULGURATION ON (BLEND 1, BLEND 2, BLEND 3, COAG SPRAY): Highly damped waveform. The current is spread over the tissue area larger than the tip of electrode.

AMPLITUDE: 10% to 100%. CUT (BLEND RATIO): 10% to 100%.

10%= MINIMUM CUTTING POWER, MAXIMUM CUAGUALATION.

100%= PURE CUT.

Bipolar mode: On bipolar mode power is supplied in a shape load response. The amplitude sharply drops as impedance is increased. Less power is desired as resistance increases as tissue desiccates.

PURE CUT waveform is continuous, unmodulated, and undamped.

COAG SPRAY Coagulation waveform is interrupted, modulated, and can be damped current.

Blend waveform is a modification of the cutting waveform and is used when hemostasis is needed while cutting. This waveform type consists of a combination of both cutting and coagulation waveforms. A lower blend value setting translates into more time between bursts of current and greater coagulation.

TOUCH SCREEN

This unit is designed with presets that will automatically control the output to give the desired function. This gives the operator the ability to expedite operation consistently. Manual controls allow for finer adjustments.
The touch screen provides 8 preset functions and two manual options.
The system remembers last settings used, even after power has been turned OFF.

The following is a list of each automatic preset button:

CUT HIGH: Maximum power, pure cut wave.	BLEND 1: High duty cycle waveform. Maximum power.
CUT MEDIUM: Medium power, pure cut wave.	BLEND 2: Medium duty cycle waveform. Medium power.
CUT LOW: Low power, pure cut wave.	BLEND 3: Low duty cycle waveform. Low power.
COAG WHITE: Minimum power, pure cut wave. Enough power to desiccate tissue but not enough to cut.	COAG SPRAY: Minimum duty cycle. Maximum power.

STANDBY / OPERATING: This is an indicator. STANDBY indicates that the unit is not active and that the settings can be changed. OPERATING indicates the unit is active, the foot switch is activated, settings cannot be changed.

TMP: This is the internal temperature indicator. The device monitors the temperature of the internal components and **if the maximum safe operating temperate is reached the bar will turn red and the output will become inactive**. When the circuit cools down, the unit will continue to work normally, thus ensuring reliable operation.

POWER: This voltage amplitude (power) indicator. This window indicates the percentage of voltage output. 100% is maximum power.

CUT: This is the waveform duty cycle indicator. The cut window indicates the blend between cut and coagulation. 100% cut is pure cut (100% duty cycle).

X1 / X10 SETTING: This manual control setting allows you to increase cut and power in multiples of one or ten.

/\ POWER UP button: This manual control setting increases output power by a factor of the X1 / X10 SETTING.

\/ POWER DOWN button: This manual control setting decreases output power by a factor of the X1 / X10 SETTING.

/\ CUT UP button: This manual control setting increases cutting and decreases coagulation by a factor of X1 / X10 SETTING.

\/ CUT DOWN button: This manual control setting decreases cutting and increases coagulation by a factor of X1 / X10 SETTING.

FULGURATION MODE:
This setting activates the highly damped waveform.
It can be activated at any time and it affects the blended and coag spray modes.
The current is spread over the tissue area larger than the tip of electrode.

MANUAL MODE:
The touch screen has also a manual mode menu that allows fine tuning of each mode and / or selecting the power for cutting and the blend amount of cut / blend. 100% cut is pure cut. The manual mode consist of the cut and power up / down buttons. The preset button is deselected if manual buttons are used.

SETUP:
The setup menu can be used to customize the touch screen.
Three menus are available inside the setup menu.

SETTINGS MENU:
The operator can customize the buzzer volume and tone, and the screen brightness.

Warning: Setting the volume too low will affect your touch screen feedback and may affect the alarms.

HELP MENU: Gives a few simple descriptions.

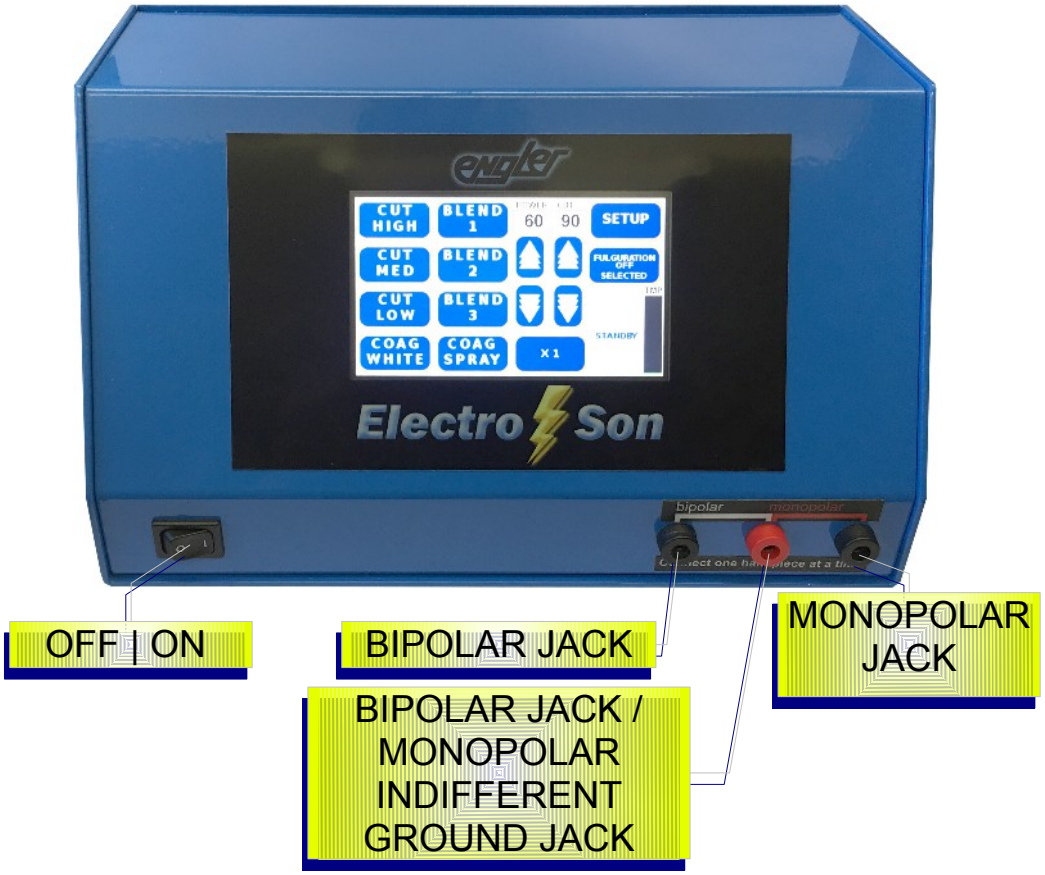
CALIBRATION MENU: For troubleshooting purposes. Do not activate this setting without Engler technical support instructions.

Warning: The calibrate screen menu button is intended to calibrate the touch screen, if this procedure is not done properly, the touch screen may not work as intended.
The touch screen is factory calibrated, do not activate this mode unless instructed by an Engler technical support specialist.

Warning:
Lowering the volume too low will affect your touch screen feedback and may affect the alarms.

SET UP

1. Unpack unit and confirm all items checked on your packing list.

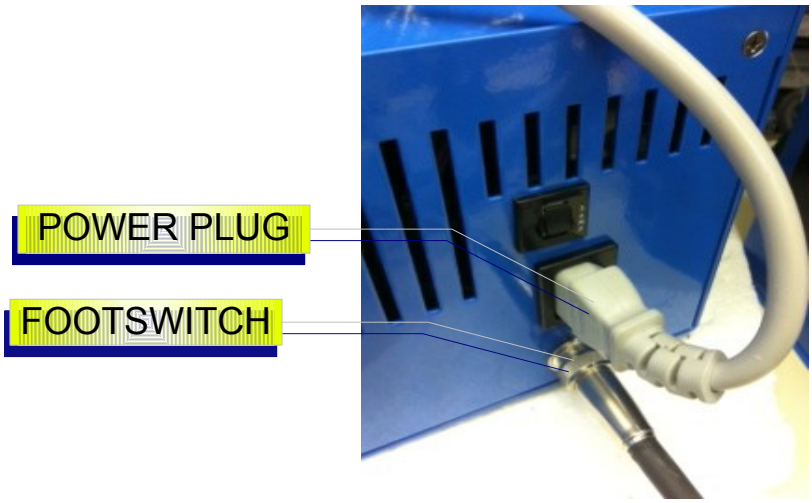


2. When performing monopolar surgery:
   a) Install handpiece plug on the monopolar handpiece jack.
   b) Install indifferent plate plug on the red jack.

3. When performing bipolar surgery:
   c) Install one handpiece plug on the bipolar handpiece jack.
   d) Install the other handpiece plug on the other red bipolar handpiece jack.
   e) In the bipolar mode, the order of the plugs is not important, as long as the bipolar jacks are used.

It is of utmost importance that each handpiece is plugged into its designated jack otherwise undesired operation and / or injury may occur.

Engler Engineering Corporation will not be held liable for any loss, damage, injury or death due to non-authorized service and / or improper installation and / or improper use of the device or accessories.



6. Connect foot switch quick disconnect on the back of the unit and tighten safety nut.
7. Connect power cord to the power plug socket at the back of the unit and connect power cord to outlet.
8. Switching the power switch to | will turn will turn device ON.
9. Verify that unit is functional.

Warning: This unit is equipped with non-discrete outputs. When an accessory is activated any and all accessories connected to the unit are also activated. Only connect one accessory at a time.

IMPORTANT ITEMS TO REMEMBER

A few words about operation duty cycle

Operation duty cycle is a term that refers to the length of time an electrosurgery unit should be allowed to run. Generally speaking, an electrosurgery device uses high energy, which generates a lot of heat at the operative site AND inside the electrosurgery device. It is generally recommended that the unit be used for no more than 30 seconds on, then at least 30 seconds off. This allows sufficient time for the unit and the operative site to cool.

1. Never use the electrosurgery unit if you are fitted with any electrical implant device. All persons in the immediate area of the surgery should be advised of the potential hazards if they have any implant, which may be affected.
2. Never use the electrosurgery unit on a patient fitted with an electrical device or in the immediate area of any metallic implant.
3. When operating the unit, always use non-conductive (plastic) implements on the patient. This includes suction cups, mirrors, probes, etc.
4. For the electrode to work efficiently during surgery, it must be kept clean.
5. The cut should be performed without drag on the tissue. Electrodes held in place for over 2 seconds will cause tissue to burn. When working on one area of tissue, always remember to allow sufficient time for the heated tissue to cool.
6. If the tissue turns brown, it's an indication that the tissue is burning, the setting is too high or the instrument is moving too slowly. If the electrode is buried into the tissue when the unit is not activated, nothing will happen. As coagulating tissue correctly is quite difficult, it is suggested to practice on a cadaver or piece of steak.
7. Because the electrodes are delicate, they are not covered under warranty except for manufacturer defects. When used correctly, they will last a considerable length of time.
8. Sparking can occur at the point of the electrode. DO NOT use the Unit in the presence of flammable gases or metallic items.

Note: The operation duty cycle refers to the the time doing a procedure and it is not to be confused with the waveform duty cycle.

For further information or assistance, please call
Engler Engineering Corp. – 1-800-445-8581

FINAL PROCEDURES AT THE END OF EACH DAY

1. Turn the unit off.
2. Detach indifferent plate.
3. Detach and clean / sterilize the tips and handpieces.
   Please note: The disposable electrosurgical handpiece is NOT autoclavable*
4. Clean and disinfect all surfaces. See page 23 for further instructions.

Chassis:

The chassis of your unit should be cleaned at the end of every operating day with a touch screen compatible chemical sterilization solution. This procedure could be done by spraying a fine mist of sterilization solution on the unit, allowing it to remain on the chassis for the length of time recommended by the sterilization solution manufacturer. The surface should be wiped with a clean damp cloth or as suggested by the Chemiclave manufacturer. Dry completely.

Warning: Do not allow liquids into the unit.
Warning: Do not use any abrasive means of cleaning the touchscreen as it will cause damage and void the warranty. Use only touch screen compatible solutions.

Electro-Son Electrode / Handpiece Autoclave instructions

The Electro–son is available with disposable and / or autoclavable handpieces. Disposable handpieces should be discarded after one use. Disposable handpieces cannot be sterilized using steam as outlined below.

The following are general infection control guidelines;

Standard personal protection is always recommended when performing medical or dental procedures. Gloves, face shields / masks, eye protection, and gowns are all strongly suggested.

DO NOT sterilize using dry heat, low temperature plasma, gas, radiation, or ethylene oxide, etc.

Always sterilize electrodes and handpiece after each patient

Electrodes

Read the manufacturers recommendations for safe handling of used electrodes. Save all packaging / manufacturers instructions for future reference.

Prevent the spread of germs, bacteria, disease, and cross contamination. Disposable electrodes should be discarded after each use.

To sterilize autoclavable electrodes, using a mild detergent, rinse / wipe debris, blood, and saliva from the electrode, dry thoroughly.
Following manufacturers recommendation, place electrode(s) in a bag and steam autoclave at 275F / 135C for three minutes. Allow to dry before use

Handpiece, cord, and connector

Remove electrode from the handpiece, follow above recommendations.
Wipe handpiece with disinfectant or antiseptic soap and water, dry thoroughly.
Follow autoclave manufacturers recommendation, place handpiece in bag, steam autoclave at 275F / 135C for 3 minutes. Allow to dry before use.

Use only steam autoclave for electrodes and handpiece.

Always follow manufacturers recommendation when using chemical disinfectants. Do not allow chemicals to remain on surfaces as damage may result

Do not allow handpiece / cable to become submerged in either water or disinfectant as damage may result.

TECHNICAL DATA

ELECTROSURGERY:

Operating Power: ~ 140 watts nominal

Duty Cycle: 30 seconds on / 30 seconds off

Crest factor: 1.37 – 10 depending on function

Operating frequency (Hz): 720,000 - 1,400,000 auto - tuned

Monopolar voltage Vpk - pk: 300 - 2200

Bipolar voltage Vpk - pk: 150 - 1300

Touch screen LED backlit color display: 4.3" TFT,

DIMENSIONS:

CHASSIS:		
Length:	**10 in.**	**(25.4 cm)**
Depth:	**6 in.**	**(15.24 cm)**
Height:	**6 in.**	**(15.24 cm)**

ACCESSORIES:

Handpiece Cable:	**96 in. (244 cm)**
Foot switch Cable:	**96 in. (244 cm)**
Power Cord:	**72 in. (183 cm)**

NET WEIGHT: 10 Lbs. (4.5 Kg.)
SHIPPING WEIGHT: 12 Lbs. (5.5 Kg.)

Web: www.englerusa.com / Email: info@englerusa.com
www.dynaxusa.com / www.ez-stretcher.com
www.englerO2.com / www.25KSeries.com
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