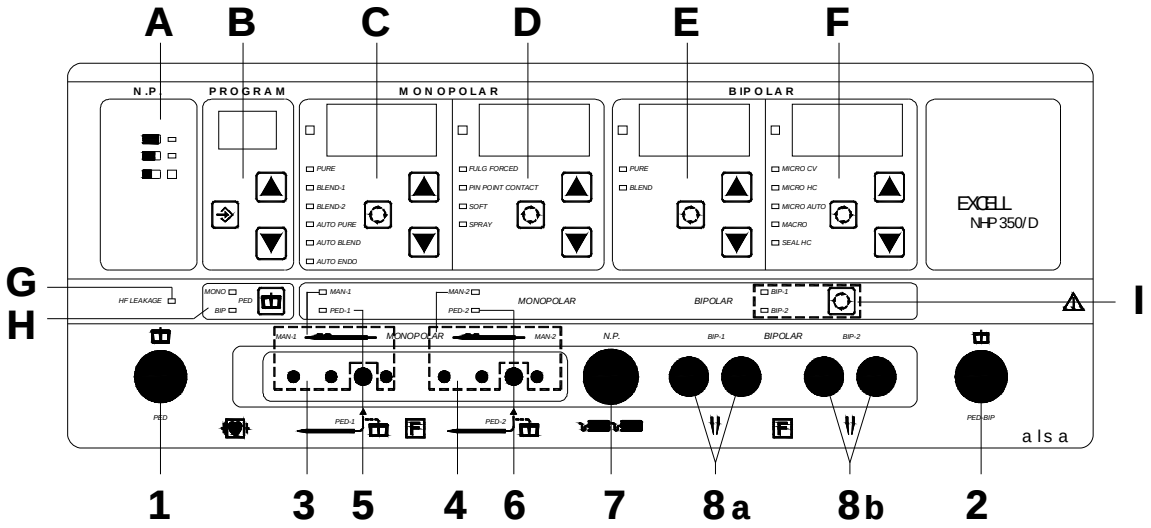
USER MANUAL FOR EXCELL NHP 350/D

CE 0051



Control devices, Connection sockets, and Symbols

A Alarm Led for the neutral plate safety circuit (red)

B Area for memories setting (storage key and selection/shifting keys ▲ ▼)

C Area of selection and regulation ▲ ▼ of the Monopolar Cut/Coagulating Cut

D Area of selection and regulation ▲ ▼ of the Monopolar Coagulation

E Area of selection and regulation ▲ ▼ of the Bipolar Cut/Coagulating Cut

F Area of selection and regulation ▲ ▼ of the Bipolar Coagulation

G Alarm Led for the HF leakage currents control circuit

H Setting of the standard twin foot-switch pedal functioning ***PED***

I Setting of the connection sockets for the bipolar electrodes (left socket **8a** / right socket **8b** / Both)

1 Socket ***PED*** for the twin foot-switch pedal connection (standard for the activation of the monopolar or bipolar currents)

2 Socket ***PED-BIP*** for the twin foot-switch pedal connection (non standard, and only for the activation of the bipolar currents)

3 Socket ***MAN-1*** for the connection of the monopolar hand-switch handles

4 Socket ***MAN-2*** for the connection of the monopolar hand-switch handles

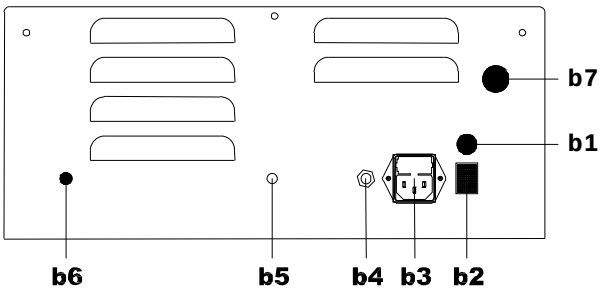
5 Socket ***PED-1*** for the connection of the monopolar electrodes cables with activation by foot-switch pedals

6 Socket ***PED-2*** for the connection of the monopolar electrodes cables with activation by foot-switch pedals

7 Socket ***N.P*** for the connection of the neutral electrode cable

8a Socket ***BIP-1*** for the connection of the bipolar electrodes cable

8b Socket ***BIP-2*** for the connection of the bipolar electrodes cable



b1- At disposal

b2- General mains switch (green-0/I)

b3- Socket for the mains cable with fuse block

b4- Plug for the equipotential connection

b5- Rotating regulator of the start delay of the bipolar *Micro Auto* coagulation (from instantaneous mode to 5sec max.)

b6- Rotating regulator of the acoustic signals intensity for the activation of the cut and coagulation

b7- Connector for interconnection to the Argon gas module

Hearth protection (inside) Alternating current Attention: read the user manual

F

Apparatus of Class I Type CF, protected against the defibrillator effects (a CF type unit guarantees the highest safety level against direct and indirect contacts, notably for the allowable leakage currents). The applied part type F (floating) is protected from the hearth at high and low frequencies. This kind of unit is especially indicated for direct heart application.

This unit is manufactured by ALSA Apparecchi Medicali s.r.l. – via C. Bonazzi, no.16 – 40013 Castel Maggiore (Bologna - Italy), which is responsible for its safety, reliability, and performances, but only if the additions, the recalibrations, the alterations or the repairs are carried out by its authorized personnel who uses original spare parts, and only if the unit is installed according to the given instructions in an area that meets the norms IEC/CEI.

On request, ALSA can provide the user with the electric diagrams and/or any further information which is necessary.

Keep this manual with the unit, read it carefully before using the equipment, and ask for it again in case of loss. If it is not exhaustive for the specific needs of the application field, get in touch with the Manufacturer, directly or through the local distributor, before using the apparatus.

According to the requirements of the European Directive for Medical Devices 93/42 CEE, and in compliance with the procedures of the Company Quality System for the after-sale control of the production, the users are kindly invited to inform ALSA about any problem, even the smallest one, related to the unit, in order to allow ALSA to intervene as soon as possible.

INTRODUCTION

In a biological tissue crossed by the electric current, three effects are usually generated: Thermal, Faradic, and Electrolytic.

By using high frequency electric current, higher than 300kHz, the faradic effect is almost completely eliminated, while the electrolytic one is kept, even if with no practical result. So, the most used is the thermal one. When an electric current having such characteristics crosses with sufficient density the cellular liquid of the tissues, it warms it and generates what follows:

1) a heating, which is so rapid that the vapour pressure into the cells breaks their membranes and provokes their division (*pure cut*);
2) a heating, which is slower, and which permits to the liquid to evaporate very slowly; in this way, the coagulating parts of the tissues can coagulate (*coagulation*);
3) a process which is in the middle between the two phenomena described above (*coagulating cut*).

The use of the HF current presents also some risks that must be known, because their possible reduction depends also on users' behaviour:

- undesired burns on the patient tissues (i.e. where the neutral electrode is placed because of non homogeneous / insufficient contact, or in any other zone because of anomalous contacts / use of water mattresses / contacts of patient with the metallic parts of the operating table)
- undesired burns on the operator tissues (i.e. into the hand, because of an insulation leakage into the coagulation monopolar forceps);
- interferences with the functioning of other equipments (i.e. video systems) or implanted devices (pace-makers);
- slight neuromuscular stimulations, notably with coagulation currents, both in the contact point of the active electrode and in the contact point of the neutral electrode. These stimulations are felt by patients as "electrical discharges".

DIRECTIONS FOR USE

In the field of normal electro-surgery, with only the High Frequency currents, the Excell NHP 350/D allow to perform all kinds of Monopolar Cut (Pure or Coagulating), Monopolar Coagulation (at low, medium, and high voltage), Bipolar Cut (Pure or Coagulating), Bipolar Coagulation (Micro, Macro, sealing of vessels, etc.), during major and medium surgery interventions into the operating theatre (open sky surgery, minimum invasive surgery, endoscopic surgery), or in any other similar place. The application medical fields of this model are the following ones:

GYNAECOLOGY, HEART SURGERY, ORTHOPAEDICS, NEUROSURGERY, OTORHINOLARYNGOLOGY, UROLOGY, MAXILLOFACIAL SURGERY, DERMATOLOGY, PLASTIC SURGERY, VASCULAR SURGERY, GENERAL and THORACIC SURGERY, PAEDIATRIC SURGERY, EMERGENCY SURGERY, GASTROENTEROLOGY, VETERINARY, and OTHER.

GENERAL PRECAUTIONS – *It is dangerous to ignore the following warnings!*

1 Every electro-surgical unit has its own characteristics and therefore, before using it, it is advisable to check its functioning, without taking into consideration the previous experiences with other devices only. Anyway, start always with very low powers, and then raise them until the required one is reached;

2 It is extremely dangerous to use the device if the electrical plant and the installations of the operating theatre do not comply with the current safety standards. Never use extensions for the mains cable and, if many devices are connected at the same time, ask for their compatibility to the Technical Service;

3 It is extremely dangerous to use accessories or instruments which have not been supplied by the Manufacturer, as it can happen that they are not suitable for the working voltages of the device, which are as follows: approx. 7600ppV for the monopolar currents, and approx. 1100ppV for the bipolar currents. It is also dangerous to use old and worn accessories or instruments. So, check always their status before the use, notably if for endoscopy. Bear in mind that:
   - All the old/worn active electrodes, accessories and cables do not work properly, and do not guarantee the perfect insulation. Moreover, their unstable functioning can convince the operator to increase the output powers at dangerous levels.

4. Do not activate the outputs before the active electrode is in contact with the tissues, as electrical arcs can be created. They burn the tissues superficially and prevent the good effect ;
5. Keep the active electrode always clean, because otherwise it can provoke sparks or superficial carbonizations on the tissues. A dirty active electrode, an electrode in bad conditions, or an electrode with connection defects causes a reduction of the output power, as it does not have any good contact with the tissues;
6. Remember that, even if compliant with all the current standards about the electromagnetic compatibility, the unit can have interferences with other electro-medical equipments;
7. Bear in mind that, when operating on patients with pace-makers or other implanted active devices, an interference with their functioning can occur (fibrillations, etc.), and they can even be damaged (in this case, it is advisable to ask for a specific qualified advice from the Cardiology Division);
8. Never use an electro-surgical unit in presence of flammable anaesthetic gases (i.e. oxygen and nitrogen protoxide, etc.), notably when operating in cavities like thorax, abdomen, trachea, head, etc. Do not use any cleaning substances, disinfectants or flammable solvents; if used, let them evaporate before the intervention. Always remove their remaining traces from the hollow parts of the body or the cavities (i.e. umbilicus, vagina, etc.), and from underneath the patient. Remember that during the use a spark may cause the explosion of endogenous gases (intestine), or the fire of oxygen saturated materials (cotton, gauze, etc.);

9. Take always all the metallic objects off the patient (rings, etc.), and be sure he is not in contact with any metallic part connected to the hearth, or which may conduct electricity (table, supports, etc.). Insulate with dry towels the strongly secreting parts of the body and the contacts skin-to-skin (i.e. between the arm and the body);
10. Place always all the monitoring electrodes, which are not specifically protected, as far away as possible from the electrodes of the electrosurgical unit. It is not advisable to use needle type or very small monitoring electrodes;
11. Use and place the neutral electrode as follows:
    - Make sure it is in perfect conditions (the worn/old neutral electrodes are extremely dangerous for the risk of the burns on the patients), and choose an area of the body as close as possible to the intervention point (the ideal would be a soft part without hairs, nor protuberant bones or superficial differences). Clean this area, shave it and massage it, in order to favour the circulation;
    - Fix it in a reliable way, without placing anything in-between, nor pressing too much, in order to avoid ischemic zones. Establish the best possible contact over the entire surface, and make sure it remains constant, especially if the patient is moved or when liquids are poured. As a matter of fact, a non homogeneous and/or insufficient contact of the neutral electrode generates both an increase of the current density in the contact points (which produces a higher temperature into the tissues, and creates burns), and a decrease of the output power into the application point (which leads the operator to raise it, dangerously);
    - Never exceed 1/3 of the max. output power for each monopolar current when using the paediatric neutral electrodes, or 1/5 when using the electrodes for babies;
    - Use the disposable neutral electrodes only once, by paying attention to the instructions on the packaging. Make sure they have the right dimensions (standard for adults: approx. 136cm^2, standard for children: approx. 84cm^2);
    - As the space between the neutral electrode and the operating area represents a sort of "path" for the HF current, be sure that it is not diagonal as regards the body, nor on the heart. Remember also that the metallic elements (prosthesis, catheters, etc.) on the path of the current may cause accumulations of current with consequent heating/burns of the surrounding tissue;
12. Position the cables of the electrodes in a way that they do not touch the patient or any other conducting part.
    During the operations, place the unused active electrodes on insulating materials, far away from the patient;
13. Always use the lowest possible power. Bear this warning in mind when intervening on patients (children or babies) for whom small neutral electrodes are used (see also point 11);
14. Choose the bipolar technique, when operating on small portions of tissue or in cavities;
15. Try to respect as much as possible the suggested working times, and avoid useless short-circuits between the active electrode and the neutral one;
16. Get in contact with the Technical Service for the use of the "disposable" electrodes;
17. When the device is switched on, check all the settings before using it on the patient, and remember that a failure can provoke an undesired increase of the power;
18. Remember that also the use of too low powers, if combined with some particular electrodes or accessories, can cause side effects: for example, when using the Argon gas, the risk of embolism raises if the power of the spray coagulation is not able to produce quickly a rapid and impermeable eschar on the target tissues;
19. The unit must not be used for final purposes other than those listed in this manual.

THE HF LEAKAGE CURRENTS CONTROL CIRCUIT

The unit is equipped with a leakage currents to hearth control circuit because these currents represent one possible source for undesired burns on the patient or the operators (i.e. a patient who gets in touch with a metallic part of the operating table or with wet/damp towels, a patient who is placed on a water mattress for surgical needs, an operator who gets in touch with instruments or endoscopes, etc. They all are possible causes of the increase of such currents).
When the leakage currents to hearth overcome 150mA (limit established by the rules), the circuit intervenes as follows:

- It automatically reduces the output power, so that the currents come back within the agreed limits;
- It gives an alarm signal to the operators (red Led **G-***HF LEAKAGE* on).

SAFETY CIRCUIT OF THE NEUTRAL ELECTRODE

The neutral electrode connection control circuit (area **A** with 3 Led) operates in the three following manners:

1) **With disposable/reusable electrodes with one single section (non split)**. The circuit controls if the neutral electrode is connected to the cable, and if the latter is integral and correctly connected to the unit (socket *N.P-**7***). If this is not the case, it stops the delivery of the power and gives a luminous alarm signal (all the Led are lit, Error Code "no Np") and a buzzer (loud, intermittent);
2) **With disposable/reusable electrodes with twin section (split)**. The circuit works as described above at point 1, but it also checks if the quality of the contact between the electrode and the patient tissues is good enough. It operates as follows:
    a) When the contact is optimum, the circuit does not intervene;
    b) When the contact is not optimum (approx. 70/80% of the surface of a standard electrode for adults is well attached), the circuit intervenes by giving a first indication to the operators (the first small Led lights up);
    c) When the contact decreases to approx. 50/60% of the surface of a standard electrode for adults well attached, the circuit intervenes by giving a second indication to the operators (the 2 first small Led light up);
    d) When the contact decreases to less than approx. 50% of the surface of a standard electrode for adults well attached, the circuit intervenes by giving a third indication to the operators (the 2 first small Led light up, and the third bigger red Led blinks), and by automatically reducing to max. 200W the output powers (if higher levels have been selected);
    e) When the contact further decreases, the circuit completely stops the delivery of the power, by giving a luminous alarm signal (all the Led light up, Error Code "no Np") and also a buzzer (loud, intermittent).
3) **When only the memories for the bipolar use (it does not require any neutral electrode) are selected (memories from 96 to 99)**, the circuit does not intervene (the 3 Led are lit, but only to show that the electrode is not connected).

INITIAL CHECKS

Initial checks

1. Make sure that the mains power supply corresponds to the technical data (see the data label on the backside of the unit), and connect the unit with the mains switch (**b2-green-** on the backside of the unit) off;
2. For a possible equipotential connection, use the plug (**b4** on the backside of the unit),

3. Adjust the functioning acoustic signals by the specific rotating control (**b6** on the backside of the unit) – the max. is clockwise **-** . The alarm signals cannot be regulated.

DATA STORING AT THE SWITCHING ON

When switched on, or after a temporary leak of current:
The unit always stores all the settings/regulations used when switched off (see also Par. "PROGRAMS and MEMORIES");
The unit does not keep the selection of the bipolar coagulation *Micro Auto*, and it automatically sets the coagulation *Micro CV*.
The operators must select the current *Micro Auto* every time the device is switched on, as **the safety rules for the electro-surgical units do not allow that, when switching on, a current with automatic start/stop system is applied without having been intentionally chosen by the users.**

CONNECTION and USE OF THE FOOT-SWITCH PEDALS

The unit is equipped with a standard twin foot-switch pedal (**DS/E**), which allows to activate the monopolar currents (cut/coagulating cut or coagulations) or the bipolar currents (cut/coagulating cut or coagulations).
On request, the unit can also be equipped with another foot-switch pedal (**DS/B =** twin foot switch pedal to activate cut/coagulating currents), which allows to activate the bipolar currents only, and therefore it can be very useful in the following cases:

- When surgeons want to continuously alternate the use of monopolar and bipolar currents by simply pressing on the different pedals at each time (notably in laparoscopic procedures);
- When surgeons want to use the bipolar currents through an independent pedal foot-switch, which is not the one used for the monopolar currents.

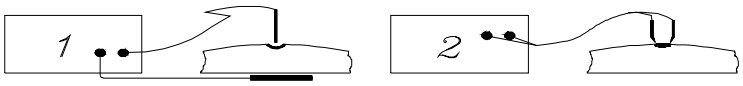
Use of the standard twin pedal foot-switch (DS/E)
Connect the pedal to the socket *PED* **(1)** and, by pressing on the key of the area *PED*- **H,** select the functioning mode:

- *MONO* to activate the monopolar currents of cut/coagulating cut (**yellow** pedal), or coagulation (**blue** pedal);
- *BIP* to activate the bipolar currents of cut/coagulating cut (**yellow** pedal), or coagulation (**blue** pedal), except for the coagulation **Micro Auto** (which is not activated by any pedal foot-switch).

Use of two twin pedal foot-switches (DS/E and DS/B)
Connect the pedal **DS/E** to the socket *PED* **(1)** and the pedal **DS/B** to the socket *PED BIP* **(2)**. When the pedal DS/B is connected, the Led of the area *PED* – **H** automatically sets itself on *MONO* mode, and the unit works as follows:

- The pedal **DS/E** activates the monopolar currents of cut/coagulating cut (**yellow** pedal), or coagulation (**blue** pedal);
- The pedal **DS/B** activates the bipolar currents of cut/coagulating cut (**yellow** pedal), or coagulation (**blue** pedal), except for the coagulation **Micro Auto** (which is not activated by any foot-switch pedal).

FUNCTIONING, NUMBER OF USABLE ELECTRODES, and ACTIVATION MODES



1. Monopolar functioning

The monopolar functioning requires the use of two electrodes (an active one, and a neutral one). The current flows from the active electrode towards the neutral electrode, so that the process concerns all the tissues around the specific point where the active electrode operates.

For the open sky surgery or the laparoscopy, the unit can be used:

- With 1 or 2 electrodes-holder handle/s (they can be both hand-switch type with twin key **cut/coag**, or just one can be hand-switch type with twin key **cut/coag**, while the other is normal type for use by twin pedal foot-switch **cut/coag**).
  It can be used with two electrodes-holder handles (as above described) at the same time by two different operators. In order to use the unit in this way, it must be selected a coagulation mode without contact (**Fulg – Forced** or **Spray**), as stated by the International Safety Rules for the HF electro-surgical equipments (IEC 60601-2-2, par. 46.103).

When the unit is on, the bipolar modes are always possible, as specified here below at point 2).

For the flexible endoscopic surgery, the unit can be used:

- With 1 flexible electrode (i.e. loop for polipectomy) by twin pedal foot-switch **cut/coag**;

When the unit is on, the bipolar modes are always possible, as specified here below at point 2).

For the endoscopic surgery under liquid in urology or gynaecology (TUR), the unit can be used:

- With the monopolar resectoscope by twin pedal foot-switch **cut/coag**;

When the unit is on, the bipolar modes are always possible, as specified here below at point 2).

2. Bipolar functioning

The bipolar functioning does not require the use of the neutral electrode, as the current flows between the tips of the bipolar electrode, and it only affects the tissues of this specific area.
The unit always allows this kind of use as follows:

- With 1 bipolar electrode (for cut/coagulating cut and/or coagulation) by twin pedal foot-switch **cut/coag**;
- With 1 bipolar electrode (for coagulation) with automatic start/stop system (*impedance sensing*), by selecting the coagulation **Micro Auto**;
- With 1 bipolar electrode (for coagulation/sealing of big vessels) with foot-switch activation but automatic stop system (*impedance sensing*), by selecting the coagulation **Seal HC**;
- With 2 bipolar electrodes (one for the cut/coagulating cut and one for the coagulation) with twin pedal foot-switch **cut/coag**.

When 2 electrodes are used, by pressing on the pedal **cut** the first electrode is activated and the cut currents are delivered, while by pressing on the pedal **coag** the second electrode is activated and the coagulation currents are delivered.
Even in this case, the coagulation electrode can be used with the automatic start/stop system (*impedance sensing*), by selecting the coagulation **Micro Auto**, or with foot-switch activation but automatic stop system (*impedance sensing*), by selecting the coagulation **Seal HC**.

All the electrodes mentioned above can be used at the same time and independently, but not simultaneously, except for the two monopolar electrodes-holder handles, as specified at point 1). In this case, the first activation stops the other ones avoiding all possible errors and giving the right signal to the users (See Par. "SELF-DIAGNOSIS and SELF-TEST" – Self-diagnosis system = Error Code **uSr Act** and block of the unit).

MONOPOLAR MODE FOR ELECTROSURGERY

CONNECTION and USE of the ACCESSORIES

1. Socket (**3-***MAN-1*): **hand-switch** handle (forceps for coagulation **with hand-switch for coag only**)

**** in alternative ****

Socket (5- ***PED-1)****:* handle (forceps for coagulation, laparoscopy instrument) for the use **by pedal foot-switches**
(See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES")
Use only this socket to connect the instruments specified here above. If other sockets are used, a failure into the unit could occur.
Just in case of a cable with a different plug from Alsa standard type, ask for:
- **ALSA cables**, by specifying the model and the instrument connector type
- **Adaptor** (RD/5, for the cables with non insulated plugs ∅ from 2 to 8mm, or with insulated plug ∅ 4mm);

2. Socket (4-***MAN-2***): second **hand-switch** handle (forceps for coagulation **with hand-switch for coag only**)

**** in alternative **** (by selecting the pre-set programs 89, 90)

Socket (6- ***PED-2****,* lit Led)*:* second handle (forceps for coagulation) for the use **by pedal foot-switches**
(See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES");

4. Socket (7- ***N.P.***): neutral electrode.

According to the connection possibilities specified here above, the operator can use:

A **Obviously, one single active electrode** (handle, forceps, instrument, etc.) **by hand-switches or pedal foot-switches** (press the mode **cut** for the pure cut/coagulating cut currents, or the mode **coag** for the coagulation currents);

B **Alternatively, two active electrodes** (two handles, or one handle and one forceps for coagulation, or other), **both of them by hand-switches, or just one of them by hand-switches and the other by pedal foot-switches** (press the mode **cut** for the pure cut/coagulating cut currents, or the mode **coag** for the coagulation currents);

C **At the same time, two active electrodes by two operators, both of them by hand-switches, or just one of them by hand-switches and the other by pedal foot-switches**, (This possibility is allowed only selecting the coagulation modes without contact "**Fulg-Forced** and **Spray**", as stated by the International Safety Rules for the HF electro-surgical equipments -IEC 60601-2-2, par. 46.103);

D **Alternatively, two active electrodes** (two handles, or one handle and one forceps for coagulation, or other), **both of them by pedal foot-switches** (This mode is possible by selecting the pre-set programs 89 and 90 "See Par. "PROGRAMS and MEMORIES");

E. **!!! BIPOLAR FUNCTIONING !!!**
The unit can always be used for the bipolar functioning. See Par. "BIPOLAR MODE".

MONOPOLAR CURRENTS, ELECTRODES, ADJUSTMENT of the POWERS, ADVICE

CURRENTS for CUT and COAGULATING CUT

PURE CUT (*PURE*) – Cut without coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***PURE***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal, or the **yellow** key of the hand-switch handle.

Instructions for use, adjustments and electrodes

Use cutting electrodes (blade, needle, loop, hook type, or the external part of the dissector, in laparoscopy) from 30-40W.

COAGULATING CUT (*BLEND-1*) – Cut with soft coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***BLEND-1***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the foot-switch pedal, or the **yellow** key of the hand-switch handle.

Instructions for use, adjustments and electrodes

Use cutting electrodes (blade, needle, loop, hook type, or the external part of the dissector, in laparoscopy) from 30-40W.

COAGULATING CUT (*BLEND-2*) – Cut with a very strong spray coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***BLEND-2***, then adjust the power with the regulation keys;

- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the foot-switch pedal, or the **yellow** key of the hand-switch handle.

Instructions for use, adjustments and electrodes

Use cutting electrodes (blade, needle, hook type, or the external part of the dissector, in laparoscopy) from 30-40W.

PURE CUT (*AUTO PURE*) – Cut without coagulating effect

This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues.

Control devices to be used (area C):

- With the selection key, select the current ***AUTO PURE***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the foot-switch pedal, or the **yellow** key of the hand-switch handle.

Instructions for use, adjustments and electrodes

Use cutting electrodes (blade, needle, hook type, or the external part of the dissector, in laparoscopy) from approx. 80W.

COAGULATING CUT (*AUTO BLEND*) – Cut with soft coagulating effect

This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues.

Control devices to be used (area C):

- With the selection key, select the current ***AUTO BLEND***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the foot-switch pedal, or the **yellow** key of the hand-switch handle.

Instructions for use, adjustments and electrodes

Use cutting electrodes (blade, needle, hook type, or the external part of the dissector, in laparoscopy) from 80W.

COMBINATED CUT (CUT ALTERNATED TO COAGULATION) (*AUTO ENDO*) – For flexible endoscopy with cutting phases alternated to coagulation phases

This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues.

Control devices to be used (area C):

- With the selection key, select the current ***AUTO ENDO***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the foot-switch pedal, or the **yellow** key of the hand-switch handle.

Instructions for use, adjustments and electrodes

Ideal only for flexible endoscopic surgery (i.e. polipectomy or papillotomy).

CURRENTS for COAGULATION

"FULGURATION" COAGULATION (*FULG FORCED*) – Strong superficial sparkling effect, and optimum deep coagulating effect

This current guarantees a strong coagulating effect, both deep and superficial, and therefore it is suitable both for coagulations performed with forceps/surgical instrument, and for coagulations performed by grazing the tissues with the active electrode.

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):

- With the selection key, select the current ***FULG FORCED***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal, or the **blue** key of the hand-switch electrodes-holder handle. It is also possible to deliver the current by simply closing the coagulation forceps, just in case a hand-switch forceps is used (PMI/P or PMI/B).

Instructions for use, adjustments and electrodes

It can be used with all types of electrodes (ball, blade, or needle type, insulated coagulation forceps, loop electrodes in conization, hook electrodes, dissectors, and forceps in laparoscopy) from 40-50W.

"PIN POINT CONTACT" COAGULATION (*PIN POINT CONTACT*) – Medium-Low superficial sparkling effect, and optimum deep coagulating effect

This current guarantees a strong deep coagulating effect and a normal superficial coagulating effect. It is suitable both for coagulations performed with forceps/surgical instrument and for coagulations performed directly with the active electrode, just in case the operators prefer a superficial effect which is less strong than the one of the FULG FORCED coagulation.

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):

- With the selection key, select the current ***PIN POINT CONTACT***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal, or the **blue** key of the hand-switch electrodes-holder handle. It is also possible to deliver the current by simply closing the coagulation forceps, just in case a hand-switch forceps is used (PMI/P or PMI/B).

Instructions for use, adjustments and electrodes

It can be used with all types of electrodes (ball, blade, or needle type, insulated coagulation forceps, loop electrodes in conization, hook electrodes, dissectors, and forceps in laparoscopy) from 40-50W.

"SOFT" COAGULATION (*SOFT*) – Low superficial sparkling effect, and good deep coagulating effect

This current guarantees a good deep coagulating effect, and a very low superficial coagulating effect. It is suitable above all for the coagulations performed with forceps/surgical instrument, and for coagulations performed by touching the tissues with an active ball electrode of at least 4-5mm.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):

- With the selection key, select the current ***SOFT***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal, or the **blue** key of the hand-switch electrodes-holder handle. It is also possible to deliver the current by simply closing the coagulation forceps, just in case a hand-switch forceps is used (PMI/P or PMI/B).

Instructions for use, adjustments and electrodes

Use coagulation electrodes (ball type, coagulation insulated forceps in laparoscopy) from 50-60W.

"SPRAY" COAGULATION (*SPRAY*) – Very strong superficial sparkling effect, and good deep coagulating effect

This current guarantees a good deep coagulating effect, and a very strong superficial coagulating effect. It is suitable both for the coagulations performed with forceps/surgical instrument, and for coagulations performed directly with the active electrode, even far away from the tissues.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):

- With the selection key, select the current ***SPRAY***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal, or the **blue** key of the hand-switch electrodes-holder handle. It is also possible to deliver the current by simply closing the coagulation forceps, just in case a hand-switch forceps is used (PMI/P or PMI/B).

Instructions for use, adjustments and electrodes

Use cutting and coagulation electrodes (blade, needle, ball type, and coagulation insulated forceps, in laparoscopy, conization electrodes in gynaecology) from 40-50W.

ADVICE

OPEN SKY SURGERY

For the Cut, use as follows:

Current ***PURE***, from 40-50W, for a cut without the coagulating effect (it is not very common in surgery, where the coagulating cut is preferred);
Current ***BLEND-1***, from 40-50W, for a cut with a medium coagulating effect;
Current ***BLEND-2***, from 40-50W, for a cut with a very strong superficial coagulating effect, *spray* type;
Current ***AUTO BLEND*** from 80-100W, for a cut with a soft coagulating effect at constant voltage, which is less efficacious than the previous ones, but it reduces the superficial carbonization at maximum.

For the Coagulation, use as follows:

Current ***FULG FORCED,*** from 40-50W, for superficial coagulations or deep coagulations with the active electrode or the forceps. It is the most suitable coagulation mode when a forceps or an electrode is used;
Current ***PIN POINT CONTACT***, from 40-50W, for superficial coagulations or deep coagulations with the active electrode or the forceps, if a softer superficial effect is desired, compared to the ***FULG FORCED*** coagulation;
Current ***SOFT,*** from 40-50W, for superficial or deep coagulations, which are softer than those of the ***PIN POINT CONTACT*** coagulation, which is not suitable at all for the use with small electrodes with which it tends to cut;
Current ***SPRAY***, from 40-50W, for a very strong superficial coagulation with the active electrode (without any contact with the tissues), and a good deep coagulation with the forceps (it is the ideal coagulation mode for the operators who prefer the active electrode to coagulate).

LAPAROSCOPIC SURGERY

For the Cut, use as follows:

See above "OPEN SKY SURGERY" ***PURE, BLEND-1, BLEND-2***. The current ***BLEND-2*** is very efficacious when using the hooks or the external part of the forceps/dissectors to cut with a strong coagulating effect.

For the Coagulation, use as follows:

See above "OPEN SKY SURGERY" ***FULG FORCED, PIN POINT CONTACT, SPRAY.*** The current ***SPRAY*** is very efficacious when using the hooks or the external part of the forceps/dissectors to coagulate.

FUNCTIONING for the FLEXIBLE ENDOSCOPIC SURGERY

(See Par. "PROGRAMS and MEMORIES", programs from 91 to 95).

CONNECTION and USE of the ACCESSORIES

1. Socket (5-***PED-1***): flexible electrode **with pedal foot-switch** (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES").
   Use only this socket to connect the above mentioned instruments. The use of different sockets provokes a damage to the unit.
   Just in case, ask for:
   ALSA cables for the flexible electrodes:
   - CEP3, 3mt long or CEP3/5, 5mt long, for the disposable instruments with male connector ∅ 3mm;
   - CEP4, 3mt long or CEP4/5, 5mt long, for the reusable instruments with female connector ∅ 4mm.

   The adaptors for the cables with different plug:
   - RD/5, for cables with non insulated plugs ∅ from 2 to 8mm, or with insulated plug ∅ 4mm;
2. Socket (7- ***N.P.***): neutral electrode.

According to the connection possibilities listed above, the unit allows to:

A. Use the flexible electrode by foot-switch activation (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES").
Just press on the **yellow** pedal for the pure/coagulating cut currents, and on the **blue** pedal for the coagulation currents.

B. !!! BIPOLAR FUNCTIONING!!!
The bipolar functioning is always possible. See Par. "BIPOLAR MODE".

MONOPOLAR CURRENTS, ELECTRODES, ADJUSTMENT of the POWERS, ADVICE

CURRENTS for CUT

PURE CUT (*PURE*) – Cut without coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***PURE***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal

Instructions for use, adjustments and electrodes
Use the flexible electrodes of the endoscopes, from 20-30W for the papillotomy, from 20-30W for the polipectomy with polypus ∅ 5mm, and from 40-50W approx. for polypus ∅ 6mm or more.

COAGULATING CUT (*BLEND-1*) – Cut with soft coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***BLEND-1***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal .

Instructions for use, adjustments and electrodes
Use the flexible electrodes of the endoscopes, from 20-30W for the papillotomy, from 20-30W for the polipectomy with polypus ∅ 5mm, and from 40-50W approx. for polypus ∅ 6mm or more.

COAGULATING CUT (*BLEND-2*) – Not suitable at all.

PURE CUT (*AUTO PURE*) – Cut without coagulating effect
This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***AUTO PURE***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal .

Instructions for use, adjustments and electrodes
Use the flexible electrodes of the endoscopes, from 70-80W for the papillotomy, from 70-80W for the polipectomy with polypus ∅ 5mm, and from 90-100W approx. for polypus ∅ 6mm or more.

COAGULATING CUT (*AUTO BLEND*) – Cut with soft coagulating effect
This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***AUTO BLEND***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal .

Instructions for use, adjustments and electrodes
Use the flexible electrodes of the endoscopes, from 70-80W for the papillotomy, from 70-80W for the polipectomy with polypus ∅ 5mm, and from 90-100W approx. for polypus ∅ 6mm or more.

COMBINATED CUT (CUT ALTERNATED TO COAGULATION) (*AUTO ENDO*) – For flexible endoscopy with cutting phases alternated to coagulation phases
This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues.

Control devices to be used (area C):
- With the selection key, select the current ***AUTO ENDO***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal .

Instructions for use, adjustments and electrodes

Use the flexible electrodes of the endoscopes, from 70-80W for the papillotomy, from 70-80W for the polipectomy with polypus ∅ 5mm, and from 90-100W approx. for polypus ∅ 6mm or more.

CURRENTS for COAGULATION

"FULGURATION" COAGULATION AT HIGH VOLTAGE (*FULG FORCED*) - Strong superficial sparkling effect, and optimum deep coagulating effect

This current guarantees a strong coagulating effect, both deep and superficial, and therefore it is suitable both for coagulations performed with forceps/surgical instrument, and for coagulations performed by grazing the tissues with the active electrode.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):
- With the selection key, select the current ***FULG FORCED***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal.

Instructions for use, adjustments and electrodes

Use the flexible electrodes of the endoscopes, from 20-30W.

"PIN POINT CONTACT" COAGULATION AT MEDIUM VOLTAGE (*PIN POINT CONTACT*) – Medium-Low superficial sparkling effect, and optimum deep coagulating effect

This current guarantees a strong deep coagulating effect, and a normal superficial coagulating effect. It is suitable both for coagulations performed with forceps/surgical instrument, and for coagulations performed by grazing the tissues with the active electrode, just in case the operators prefer a superficial effect which is less strong than the one of the FULG FORCED coagulation.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):
- With the selection key, select the current ***PIN POINT CONTACT***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal.

Instructions for use, adjustments and electrodes

Use the flexible electrodes of the endoscopes, from 20-30W.

"SOFT" COAGULATION AT LOW VOLTAGE (*SOFT*) – Low superficial sparkling effect, and good deep coagulating effect

This current guarantees a good deep coagulating effect, and a very low superficial coagulating effect. Is suitable above all for coagulations performed with forceps/surgical instrument, and for coagulations performed by touching the tissues with an active ball electrode of 4-5mm at least.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):
- With the selection key, select the current ***SOFT***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal**.**

Instructions for use, adjustments and electrodes

Use the flexible electrodes of the endoscopes, from 30-40W.

"SPRAY" COAGULATION AT VERY HIGH VOLTAGE (*SPRAY*) – Very strong superficial sparkling effect, and good deep coagulating effect

This current guarantees a good deep coagulating effect, and a very strong superficial coagulating effect. It is suitable both for the coagulations performed with forceps/surgical instrument, and for coagulations performed directly with the active electrode, even far away from the tissues.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):
- With the selection key, select the current ***SPRAY***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal.

Instructions for use, adjustments and electrodes

Use the flexible electrodes of the endoscopes, from 20-30W.

ADVICE

For the Cut, use as follows:

Current ***PURE***, for a cut without coagulating effect and constant delivery of the power (from 20-30W for papillotomy or polipectomy with polypus ∅ until 5mm, and from 30-40W with polypus ∅ 6mm or more);
Current ***AUTO PURE***, for a cut without coagulating effect, nor self regulation of the power (from 40-50W for papillotomy or polipectomy with polypus ∅ until 5mm, and from 70-80W with polypus ∅ 6mm or more);
Current ***BLEND-1***, for a cut with a soft coagulating effect and constant delivery of the power (from 20-30W for papillotomy or polipectomy with polypus ∅ until 5mm, and from 30-40W with polypus ∅ 6mm or more);
Current ***AUTO ENDO***, for a cut-coagulation combination (alternated phases of cut and coagulation), and self regulation of the power (from 40-50W for papillotomy or polipectomy with polypus ∅ until 5mm, and from 70-80W with polypus ∅ 6mm or more).

For the Coagulation, use as follows:

Current ***FULG FORCED,*** from 30-40W;

Current ***PIN POINT CONTACT***, from 40-50W, for a superficial effect which is softer than the one of the ***FULG FORCED*** coagulation.

FUNCTIONING for the UNDER LIQUID ENDOSCOPIC SURGERY (TUR, TURP, TURV, etc.)

(See Par. "PROGRAMS and MEMORIES", programs from 91 to 95).

CONNECTION and USE of the ACCESSORIES

1. Socket (5-***PED-1***): electrode of the monopolar resectoscope for the use **by foot-switch pedal** (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES").
   Use only this socket to connect the above mentioned instrument. The use of different sockets provokes a damage to the unit.
   Just in case of a cable with a plug which is different from ALSA standard type, ask for:
   - **Adaptor** (RD/5, for cables with non insulated plugs ∅ from 2 to 8mm, or with insulated plug ∅ 4mm).
2. Socket (7- ***N.P.***): neutral electrode.

According to the connection possibilities listed above, the unit allows to:

A. Use the resectoscope by foot-switch activation (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES").
Just press on the **yellow** pedal for the pure/coagulating cut currents, and on the **blue** pedal for the coagulation currents.

C. !!! BIPOLAR FUNCTIONING!!!
The bipolar functioning is always possible. See Par. "BIPOLAR MODE".

MONOLAR CURRENTS, ELECTRODES, ADJUSTMENT of the POWERS

CURRENTS for CUT

PURE CUT (*PURE*) – Cut without coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***PURE***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal.

Instructions for use, adjustments, and electrodes
Use the specific electrodes for the resectoscope from:
70-80W with wire loop electrodes, for soft tissues (i.e. into the bladder);
90-100W with wire loop electrodes, for strong tissues (i.e. TUR);
90-100W with ribbon loop (cutting/vaporization) electrodes, for soft tissues (i.e. into the bladder);
100-110W with ribbon loop (cutting/vaporization) electrodes, for strong tissues (i.e. TUR);
100-120W with vaporisation electrodes of small dimensions;
150-170W with vaporisation electrodes of big dimensions.

COAGULATING CUT (*BLEND-1*) – Cut with soft coagulating effect
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area C):
- With the selection key, select the current ***BLEND-1***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal

Instructions for use, adjustments, and electrodes
As per the current ***PURE***.

COAGULATING CUT (*BLEND-2*) – Not suitable at all.
PURE CUT (*AUTO PURE*) – Not suitable at all.
COAGULATING CUT (*AUTO BLEND*) – Not suitable at all.
COMBINATED CUT (CUT ALTERNATED TO COAGULATION) (*AUTO ENDO*) – Not suitable at all.

CURRENTS for COAGULATION

"FULGURATION" COAGULATION AT HIGH VOLTAGE (*FULG FORCED*) - Strong superficial sparkling effect, and optimum deep coagulating effect
This current guarantees a strong coagulating effect, both deep and superficial. It is suitable both for coagulations performed with forceps/surgical instrument, and for coagulations performed by grazing the tissues with the active electrode.
This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.
Control devices to be used (area D):
- With the selection key, select the current ***FULG FORCED***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal.

Instructions for use, adjustments, and electrodes
Use the specific electrodes for the resectoscope from 60-70W.

"PIN POINT CONTACT" COAGULATION AT MEDIUM VOLTAGE (*PIN POINT CONTACT*) – Medium-Low superficial sparkling effect, and optimum deep coagulating effect

This current guarantees a strong deep coagulating effect and a normal superficial coagulating effect. It is suitable both for coagulations performed with forceps/surgical instrument, and for coagulations performed by grazing the tissues with the active electrode, just in case the operators prefer a superficial effect which is less strong than the one of the FULG FORCED coagulation.

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):

- With the selection key, select the current ***PIN POINT CONTACT***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal.

Instructions for use, adjustments, and electrodes

Use the specific electrodes for the resectoscope from 60-70W.

"SOFT" COAGULATION AT LOW VOLTAGE (*SOFT*) – Not suitable.

"SPRAY" COAGULATION AT VERY HIGH COLTAGE (*SPRAY*) – Very strong superficial sparkling effect, and good deep coagulating effect

This current guarantees a good deep coagulating effect, and a very strong superficial coagulating effect. It is suitable both for the coagulations performed with forceps/surgical instrument, and for coagulations performed directly with the active electrode, even far away from the tissues.

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area D):

- With the selection key, select the current ***SPRAY***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal.

Instructions for use, adjustments, and electrodes

Use the specific electrodes for resectoscope from 60-70W.

ADVICE

For the Cut with wire loop electrodes, use as follows:

Current ***PURE,*** from 70-80W into the bladder or on soft tissues, for a cut without coagulating effect;
Current ***BLEND-1***, from 70-80W into the bladder or on soft tissues, for a cut with soft coagulating effect;
Current ***PURE,*** from 90-100W on the prostate, for a cut without coagulating effect;
Current ***BLEND-1***, from 90-100W on the prostate, for a cut with soft coagulating effect.

For the Cut with ribbon loop electrodes, use as follows:

Current ***PURE,*** from 90-100W into the bladder or on soft tissues, for a coagulating cut;
Current ***BLEND-1***, from 90-100W into the bladder or on soft tissues, for a cut with stronger coagulating effect;
Current ***PURE,*** from 100-110W on the prostate, for a coagulating cut;
Current ***BLEND-1***, from 100-110W on the prostate, for a cut with stronger coagulating effect.

NB: In order to optimize the functioning and obtain the perfect cut without any "sticking" of the tissues on the electrode, the above mentioned powers maybe have to be changed through small variations of 10-15W each time.

For the Vaporisation with rolls, use as follows:

Current ***PURE,*** from 100-120W with small rolls, and from 150-170W with bigger rolls.

For the Coagulation, use as follows:

Current ***SPRAY*** from 40-50W. Optimum to coagulate both with cutting electrodes (loop, blade type) and coagulation electrodes, even without any contact with the tissues;
Current ***FULG FORCED,*** from 60-70W, for a coagulation both with cutting and coagulation electrodes;.
Current ***PIN POINT CONTACT***, from 60-70W, for a coagulation with the contact between the electrode and the tissues.

BIPOLAR MODE

INTRODUCTION

As far as the bipolar functions, please note as follows:

- They are always available, as alternative to all the other monopolar functioning modes;
- They can be used alone, without connecting the neutral electrode. See the pre-set programs in next paragraph;
- Besides the standard twin pedal foot-switch (**DS/E**, for the monopolar or bipolar use), the unit can also be equipped or with another pedal (**DS/B**= twin pedal for bipolar cutting/coagulating functions or **SS/B**= single pedal for coagulating currents only), on request. (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES");
- The unit is equipped with a coagulating current ***Micro Auto*** (*impedance sensing* type) with automatic start/stop system (switching on with adjustable delay from 0.5 to 5sec, by the control device **b5** which is placed on the backside of the unit, when the tips of the forceps get in touch with the non coagulated tissues – switching off when the tissues are coagulated). This system does not require any pedal foot-switch;
- The unit is equipped with a coagulating current ***Seal HC*** for the sealing of the big vessels, which is activated by the foot-switch pedal, but it switches off automatically once the vessel is coagulated.

CONNECTION and USE of the ACCESSORIES

The unit is equipped with two sockets for the connection of the bipolar electrodes, which can be selected with the selection key (area **I**). By pressing the key, it is possible to select first the socket 8a-***BIP-1***, then the socket 8b-***BIP-2***, and finally both of them at the same time (normally, when the unit is switched on, the socket 8a-***BIP-1*** is already selected).

- When one single socket is selected, all the currents of cut/coagulating cut or coagulation, selected and activated by the control devices, are delivered on the electrode connected to the socket itself;
- When the two sockets are selected at the same time, the currents of cut/coagulating cut are delivered on the electrode connected to the socket 8a- ***BIP-1***, while the currents of coagulation are delivered on the electrode connected to the socket 8b- ***BIP-2***.

1. Socket 8a-***BIP-1***: first bipolar electrode (connected cable without any particular polarity) for use **by foot-switch pedal** for cutting and/or coagulation. The foot-switch pedal for the **Micro auto** coagulation with automatic start/stop system is not used;

2. Socket 8b-***BIP-2***: second bipolar electrode (connected cable without any particular polarity) for use **by foot-switche pedal** for coagulation only. In this case too, the pedal foot-switch for the **Micro auto** coagulation is not used.

In order to facilitate the bipolar use, the unit is equipped with 4 pre-set programs (See Par. "PROGRAMS and MEMORIES", programs from 96 to 99) **which are characterised by what follows:**

- Disconnection of the neutral electrode safety circuit, which is not required for the bipolar use only (as a matter of fact, through the 3 lit alarm Led, the circuit just informs the operators that the neutral electrode is not connected);
- Impossibility to use the monopolar currents (the displays for the monopolar currents powers are switched off).

Just in case of cables with connection plugs which are different from ALSA standard type, ask for:

- **ALSA cables**, by specifying the model and the instrument connector type;
- **Adaptor**, by specifying the type of the cable plug (i.e. coaxial *MARTIN* type).

BIPOLAR CURRENTS, ELECTRODES, ADJUSTMENT of the POWERS

CURRENTS for CUT

PURE CUT (*PURE*) – Cut with minimum coagulating effect

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area L):

- With the selection key, select the current ***PURE***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal.

Instructions for use, adjustments, and electrodes

Use the specific electrodes, from:
40-50W, with cutting electrodes, needle type;
90-100W, with the bipolar loop electrodes of the bipolar resectoscope, for soft tissues (i.e. into the bladder);
100-110W, with the bipolar loop electrodes of the bipolar resectoscope (i.e. for TUR).

COAGULATING CUT (*BLEND-1*) – Cut with coagulating effect

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues.

Control devices to be used (area L):

- With the selection key, select the current ***BLEND-1***, then adjust the power with the regulation keys;
- For the delivery (**loud** acoustic signal, and **yellow** Led), press on the **yellow** pedal of the twin foot-switch pedal.

Instructions for use, adjustments, and electrodes

As per the current *PURE*

CURRENTS for COAGULATION

"MICRO" COAGULATION (*MICRO CV*) – Very soft coagulating effect

This is a constant voltage current and it is controlled by an automatic power self adjustment system (**APC System**) according to the characteristics of the tissues. It is the most suitable current when operating on extremely delicate tissues.

Control devices to be used (area F):

- With the selection key, select the current ***MICRO CV***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal or the single foot switch pedal.

Instructions for use, adjustments, and electrodes

Use coagulation forceps with tips of: 0.5mm (from 0.5-1W), 1mm (from 1-2W), and 2mm (from 2-4W);

Use coagulation forceps for laparoscopy, from 20-30W.

"MICRO" COAGULATION (*MICRO HC*) – Soft coagulating effect

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues. It is the most suitable current for various applications, and it is slightly stronger than the *MICRO CV* current.

Control devices to be used (area F):

- With the selection key, select the current ***MICRO CV***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal or the single foot switch pedal.

Instructions for use, adjustments, and electrodes

Use coagulation forceps with tips of: 0.5mm (from 0.5-1W), 1mm (from 1-2W), and 2mm (from 2-4W);
Use coagulation forceps for laparoscopy, from 10-20W;
Use the bipolar electrodes of the bipolar resectoscope, from 50-60W.

"MICRO AUTO" COAGULATION (*MICRO AUTO*) – Very soft coagulating effect and automatic start/stop system (*impedance sensing* type)

This current is the same as the *MICRO CV* current, as far as the performances and the indications are concerned.

Control devices to be used (area F):

- With the selection key, select the current ***MICRO AUTO***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), touch the tissues with the forceps tips after having regulated the starting delay (from 0.5 to 5sec) by turning the control device **b5** on the backside of the unit (0.5sec on the left, 5sec on the right);
- For the switching off, it is possible either to disconnect the forceps from the tissues, or wait until the current disconnects automatically, once the tissues are coagulated

For safety reasons, the unit is also provided with an automatic stop control, which is activated after approximately 6 seconds of functioning (if the forceps remains on the tissues, it starts again after a stop interval which is exactly the same as the delay set for the start).

Instructions for use, adjustments, and electrodes

Use coagulation forceps with tips of: 0.5mm (from 0.5-1W), 1mm (from 1-2W), and 2mm (from 2-4W);
Not suitable for the use in laparoscopy.

"MACRO" COAGULATION (*MACRO*) – Strong coagulating effect

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues. It is the most suitable current for a strong coagulating effect on big dimensions electrodes, and therefore it is ideal both for the operators who desire a bipolar coagulation with an effect which is "similar" to the monopolar coagulation, and for those who want to coagulate in laparoscopy or on big tissues areas.

Control devices to be used (area F):

- With the selection key, select the current ***MACRO***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal or the single foot switch pedal.

Instructions for use, adjustments, and electrodes

Use coagulation forceps with tips of: 1mm (from 5-10W), 2mm (from 7-15W);
Use coagulation forceps for laparoscopy, from 10-20W;
Use the bipolar electrodes of the bipolar resectoscope, from 50-60W.

COAGULATION for the SEALING of BIG VESSELS (*SEAL HC*) – Strong coagulating effect and sealing of big vessels

This current is controlled by an automatic system (**ADC System**) for the self regulation of the functioning, which guarantees that the power selected by the operators remains constant according to the characteristics of the tissues. It is the most suitable current for a strong coagulating effect with sealing of big vessels through big dimensions forceps with strong mechanic pressure.

Control devices to be used (area F):

- With the selection key, select the current ***SEAL HC***, then adjust the power with the regulation keys;
- For the delivery (**acute** acoustic signal, and **blue** Led), press on the **blue** pedal of the twin foot-switch pedal or the single foot switch pedal.
  The delivery disconnects automatically once the vessel is coagulated/closed.

Instructions for use, adjustments, and electrodes

Use coagulation forceps with strong mechanic pressure, from 40-50W.

ADVICE

For the Cut:

In order to optimize the functioning of the bipolar cut under liquid (TUR), and obtain the perfect cut without any "sticking" of the tissues on the electrode, the above mentioned powers maybe have to be changed through small variations of 10/15W each time.

For the Coagulation:

When bipolar forceps are used, it is advisable to keep their tips damp, for example with physiologic solution, in order to reduce the omnipresent phenomenon of the "sticking" of the tissues. It is also possible to use forceps with "anti-sticking" tips, or better with irrigation system.

PROGRAMS and MEMORIES

The unit is provided with 100 memories (99 programmable memories and 1 for the storage of the data at the switching off), which allow to set 99 complete functioning programs, that can be selected by simply pressing the shifting keys UP/DOWN until the desired memory is chosen. 88 memories are totally free, and can be set by the operators, while the remaining ones are pre-set in order to facilitate the use of the unit:

How setting a free memory

1. Select the desired memory with the selection keys UP/DOWN of the area **B**. As a matter of fact, it is possible to shift the complete range of memories from 1 to 99 (1, 2, 3, 4, and so on) with the key UP, but also to shift them in the opposite direction, from 99 to 1, with the key DOWN;
2. Make all the adjustments related to the desired functioning modes (i.e. the selection of the functioning for the twin pedal foot-switch), except for the selection of the current for the *Micro Auto* bipolar coagulation;
3. Choose the desired currents and the adjustment of their powers.
   For example: as the unit is equipped with 4 different monopolar coagulation currents, it is possible to set a memory, through the keys of the area **D**, with one single current and its power, or with the four currents and their different powers, which can be then applied/changed during the use, by simply pressing the selection key.
   In the first case, the selection key only allows to choose the desired current, while with the adjustment keys it is possible to set its power.
   In the second case, the selection key allows to select all the available currents, by setting the power for each of them;
4. After having set all the parameters, the program has to be confirmed by pressing the storage key of the area **B**.

Is it possible to modify during the use the adjustments of the powers already set in a memory?

Yes, it is always possible, through the adjustment keys of the power of the used current, and this variation is shown by the number of the memory which blinks. This number stops blinking if:

- The storage key of the area **B** is pressed, in order to confirm the variation done;
- One of the two selection keys UP/DOWN of the area **B** is pressed, in order to come back to the powers and/or the functioning mode which was set before the variation.

Is it possible to modify the adjustments of the power/s and/or the selected settings of a memory before the use?

Yes, it is always possible, through the different adjustment/selection keys, and this variation is shown by the number of the memory which blinks. This number stops blinking if:

- The storage key of the area **B** is pressed, in order to confirm the variation done;
- One of the two selection keys UP/DOWN of the area **B** is pressed, in order to come back to the powers and/or the functioning mode which was set before the variation.

Is it possible to come back to the power and/or functioning adjustments, if changed but not confirmed (while the number of the memory is blinking)?

Yes, it is. One of the two selection keys UP/DOWN of the area **B** must be pressed (the number of the memory stops blinking, and the original data are set again).

Is it possible to use the unit without setting any memory?

Yes, it is, but it is less practical, as each type of intervention may require different parameters.

Bear in mind that, if during the switching off the number of the memory is blinking, at the moment of the switching on the unit starts with the same memory number which is still blinking.

PRE-SET MEMORIES (89 and 90) – Use in open sky surgery with two handles (or one handle and one forceps with connecting cable to the unit), both of them with twin foot-switch pedal.

The pre-setting does not concern the current types that have to be used, nor their powers, which have to be set according to the operators' needs, and therefore memorised as shown at points 3 and 4 of the previous paragraph (for this kind of use, it is advisable to select and set the same currents and the same powers in both memories).

The pre-setting of these memories allows to use the unit as follows:

A. **With memory 89, the electrodes-holder handle** (connected to the socket **5**) **can be used by the foot-switch pedal**. (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES") – press on the **cut** mode for the pure/coagulating cut currents, or on the **coag** mode for the coagulation currents;

B. **With memory 90, the coagulation forceps** (connected to the socket **6**) **can be used by the foot-switch pedal**. (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES") – press on the **cut** mode for the pure/coagulating cut currents, or on the **coag** mode for the coagulation currents.

PRE-SET MEMORIES (from 91 to 95) – Use in flexible endoscopic surgery or in endoscopic surgery under liquid.

The pre-setting does not concern the current types that have to be used, nor their powers, which have to be set according to the operators' needs, and therefore memorised as shown at points 3 and 4 of the previous paragraph.

The pre-setting of these memories allows to use the unit as follows:

A. **With the flexible electrode for flexible endoscopic surgery, or the resectoscope for endoscopic surgery under liquid** (connected to the socket **5**) **by pedal foot-switches** (See Par. "CONNECTION and USE of the PEDAL FOOT-SWITCHES") – press on the **yellow** pedal for the pure/coagulating cut currents, or on the **blue** pedal for the coagulation currents;

B. **!!! BIPOLAR FUNCTIONING !!!**
The bipolar functioning is always available. See Par. "BIPOLAR MODE".

PRE-SET MEMORIES (from 96 to 99) – Use in bipolar mode only.

The pre-setting does not concern the current types that have to be used, nor their powers, which have to be set according to the operators' needs, and therefore memorised as shown at points 3 and 4 of the previous paragraph.

The pre-setting of these memories allows to use the unit as follows:

A. With one or two bipolar electrodes, connected and activated as specified in Par. "BIPOLAR MODE";

B. Without connecting the neutral electrode, as it is not required (as a matter of fact, through the 3 lit alarm Led, the safety circuit just informs the operators that the neutral electrode is not connected);

C. Without using the monopolar currents (the displays for their powers are switched off).

CLEANING AND STERILIZATION

1. Clean the unit with a neutral soap solution, **by taking care that no liquid goes inside**, and then wipe it by a dry cloth. Clean the pedal foot-switches in the same way, or with a cold disinfectant solution (i.e. "*Amuchina*");
2. **Attention: at the moment of the sale the accessories are not sterile.**
   The following accessories can be sterilized in autoclave (*gloves cycle* at 121°C for 20min / 134°C for 10min), or with cold solutions (i.e. "*Amuchina*"):
   -The electrodes-holder handles (MPE/E, MPE/CMS) and all the active electrodes;
   -The cables and the forceps for bi-coagulation, the cables and the forceps (scissors, cannulae) for monopolar coagulation;
   -The cables and the monopolar/bipolar electrodes for laparoscopy.
   The neutral electrodes (NP/A with its cable CMS/E, NP/GP, NP/GA) can be sterilized only with cold solutions (i.e. "*Amuchina"*).
   During the sterilisation, do not bend too much the connection cables, and wipe perfectly all the parts of the accessories before using them, in order to eliminate all traces of humidity. The best thing to do is to centrifuge them.

ENVIRONMENTAL and ATMOSPHERIC CONDITIONS for USE, TRANSPORT and STORAGE

The environmental use and preservation conditions are the following ones:
Temperature (°C): +10 ÷ +40 – Humidity: 30% ÷ 75% - Pressure (hPa): 700 ÷ 1060.
The unit must not be used at less than 30cm from the wall or other objects that can obstruct the ventilation areas, and it must be placed on a trolley or a support (there are two screwed points under the basis for the fixing).
When the unit is not used, it must be kept in a dry place, not dusty. Be aware that no liquid is poured on it.
The environmental transport and storage conditions are the following ones:
Temperature (°C): -40 ÷ +70 - Humidity: 10% ÷ 95% - Pressure (hPa): 500 ÷ 1060.
For the shipment of the unit, we suggest to use the original packaging, or at least a new one that can guarantee the same reliability.

MAINTENANCE and DISPOSAL

The unit must be regularly checked (once per year) by qualified personnel, even better if by the Manufacturer himself. Check always the perfect condition of the accessories, because otherwise their use can be dangerous.
Its disposal must be done according to the different National Rules, by bearing in mind that the accessories (notably the active and neutral ones) get in contact with the patients tissues, and therefore require a special attention.

SELF-DIAGNOSIS and SELF TEST SYSTEM, CONTROL of the ERROR CODES

The unit is equipped with a self-diagnosis system, which automatically intervenes in case of functioning problems, included the delivery of powers that are higher than the set ones. It stops the device and informs the operators through specific alarm signals (*Error Codes*), which can be either acoustic (loud and intermittent sound) or also visual (see the Tables *Codes for Wrong Use or Activation Circuit Fault – Codes for System Fault*).
When the device is turned on, this control system carries out a complete self-test cycle over the hardware and the software (all the Led and displays light up, and the loudspeaker is activated). If everything works properly, this phase ends by a short acoustic signal.
If the system detects any problem, the faults are indicated as described above, and the operator must either try to eliminate all the possible causes, or switch the equipment off and ask for a technical assistance.
When the device is running, this control system checks the functioning of the unit, included the output powers (2000 times per second), by repeating the complete test on the functioning every 20 minutes (in an activation interval).
Even in this case, the problems are indicated as described above ("*When the device is turned on*").
Control of the Error Codes
The unit stores the last 32 Error Codes that have been detected, in order to help the operators in finding a solution for the problems/faults. The procedure to follow for this control is detailed into the Service Manual.

ERROR CODES TABLE

Error description	**Error code**	***Stored code in E^2PROM (select "Od" In CAL mode)***
Codes for Wrong Use or Activation Circuits Fault For all the **"U"** problems, the operators can act by eliminating the cause of the intervention of the self-diagnosis system. In all the other cases, ask for the technical assistance, after having checked the signal by switching off and on the unit		
U) Problem into the neutral electrode (broken cable, non connected cable to the unit or to the neutral electrode, neutral electrode "split" type not attached to the tissues	no nP	-
Failure into the neutral electrode control circuit (internal fault)	Err nPC	81
Failure into the control circuit of the contact between the neutral electrode/the patient (internal fault)	Err 53	35
Failure of an activation hand-switch at the switching on **U)** Activation hand-switch pressed at the switching on	Err Hnd	82
Failure of a pedal foot-switch at the switching on **U)** Pedal foot-switch pressed at the switching on	Err PEd	83
U) Contemporary activation not allowed of the two activation devices	USr Act	-
U) Key on the control panel pressed at the switching on Failure of a key on the control panel	Err 14	0E
Codes for System Fault For this kind of problems, ask for the technical assistance, after having checked the signal by switching off and on the unit		

Error description	**Error code**	***Stored code in E²PROM (select "0d" In CAL mode)***
Errors related to Master microcontroller		
RAM Memory	Err 32	20
FLASH Memory	Err 34	22
System complemented variables	Err 35	23
Watchdog Timer	Err 33	21
Errors related to power supply section		
+5V DC Failure	Err 36	24
HF power supply failure with lower setting value	Err 37	25
HF power supply failure with higher setting value	Err 38	26
HF power supply higher than setting value during activation	Err 97	61
Errors related to serial communication		
Failure regarding serial communication peripheral placed on mother board alsa code 801463	2 audio slow repetitions, then quick intermittence	3d
Failure regarding serial communication peripheral placed on power supply board alsa code 801471	3 audio slow repetitions, then quick intermittence	3E
Failure regarding serial communication peripheral placed on double hand switch & NP control board alsa code 801462	4 audio slow repetitions, then quick intermittence	3F
E^2PROM communication error	5 audio slow repetitions, then quick intermittence	40
I^2CBUS connection lost (during the use)	6 audio slow repetitions, then quick intermittence	43
Master-Slave connection lost (during self test phase)	7 audio slow repetitions, then quick intermittence	41
Slave microcontroller failure	8 audio slow repetitions, then quick intermittence	44
Errors related to slave microcontroller		
Failure in a Slave microcontroller internal peripheral	Err 60	3c
Slave microcontroller connection failed	Err 68	44
Errors related to HF power section		
Failure in internal dummy load used for self test	Err 39	
Failure in HF output current measurement (lower than expected)	Err 51	
Failure in HF output current measurement (higher than expected)	Err 52	
Failure in bipolar output power (lower than expected)	Err 43	
Failure in bipolar output power (higher than expected)	Err 42	
Failure in monopolar circuit when PURE mode is used	Err 40	
Failure in monopolar circuit when SPRAY COAG mode is used	Err 41	
Failed modulation signal for monopolar BLEND-1 mode	Err 44	
Failed modulation signal for monopolar FULG FORCED mode	Err 45	
Failed modulation signal for monopolar SPRAY mode	Err 46	
Output peak voltage reading failed (lower than expected)	Err 47	
Output peak voltage reading failed (higher than expected)	Err 48	
Output peak current reading failed (lower than expected)	Err 49	
Output peak current reading failed (higher than expected)	Err 50	
HF Output power higher than expected	Err 98	
Errors into the thermal protections		
Power supply thermal protection	Err 27	1b
HF power section thermal protection,	Err 28	1c

TECHNICAL FEATURES

- Electronic generator according to the Standards CEI EN 60601-2-2 (IEC 601-2-2 ed. 1991);
- General mains switch;
- Monopolar and Bipolar working frequency: 440kHz +- 10%;
- Classification CEI/IEC: Class I - Type CF,
- Classification 93/42 CEI/EEC: IIB;
- Output circuit: "floating", insulated from ground at high and low frequencies, and protected against the use of the defibrillator;
- Mains and Absorption: 230 V ~ 50 Hz - 828 VA, Mains Fuses: T 5 A;
- Monopolar mode with the possibility to connect 1 or 2 electrodes-holder handles (both of them with hand-switches, or just one with hand-switches and the other one with pedal foot-switches);
- Bipolar mode with the possibility to connect 1 or 2 electrodes with pedal foot-switches;
- Bipolar mode in coagulation by pedal foot-switch or (with a particular selection) by automatic start/stop system, according to the conditions of the tissue (*impedance sensing*); adjustable activation delay from 0.5sec to 5sec;
  Typical working values: 0-30Ω = non activated system; less than 900Ω = start; from 1000 to 1700Ω = stop;
- Functioning memorisation system with 100 memories;
- Setting: by keys buttons for the functioning and the powers (indicated on the display in centesimal scale);
- Functioning control circuit: by twin microprocessor;
- Self-control and self-diagnosis circuit with delivery stop system, acoustic signal, visualization of the fault code;
- Neutral electrode safety circuit with acoustic signal (loud and intermittent), luminous signal (red), and visualization of the code;
- Protection against liquids: standard, non protected enclosure;
- Cooling system: by convection, without fan – Discontinuous functioning: max. 1 hour (10s ON/30s OFF);
- Shelf-life: 5 years;
- Dimensions and weight: (LxDxH) 38x35x17cm – 15Kg;
- Mains cable: 3m long, section 3x1mm^2.

Monopolar Currents Characteristics

Function	Maximum Power	Load	Vp/p	Frequency (F) - Crest Factor (CF) - Modulation (M) - Duty Cycle (DT)	Acoustic and Luminous Signals
Standard Pure Cut: **Pure**	350 W	350 Ω	3450 V	**F:** 440 kHz- **CF:** 1.6 – **M:** No – **DT:** no	Loud tone, Yellow light
Coagulating Cut 1: **Blend I**	300 W	350 Ω	3600 V	**F:** 440 kHz- **CF:** 2.3 – **M:** 29 kHz – **DT:** 65 %	Loud tone, Yellow light
Coagulating Cut 2: **Blend II**	140 W	600 Ω	7600 V	**F:** 440 kHz- **CF:** 8.1 – **M:** 19 kHz – **DT:** 9 %	Loud tone, Yellow light
Pure Cut CV: **Auto Pure**	400 W	350 Ω	1350 V	**F:** 440 kHz- **CF:** 1.6 – **M:** No – **DT:** no	Loud tone, Yellow light
Coagulating Cut 1 CV: **Auto Blend**	350 W	350 Ω	1930 V	**F:** 440 kHz- **CF:** 2.3 – **M:** 29 kHz – **DT:** 65 %	Loud tone, Yellow light
Coagulating Cut 2 CV: **Auto Endo**	250 W	350 Ω	1710 V	Alternation 50% of **Pure** and **Blend1** - **CF**:2.2	Loud tone, Yellow light
Fulguration Coagulation: **Fulg Forced**	150 W	350 Ω	4700 V	**F:** 440 kHz- **CF:** 4.5 – **M:** 78 kHz – **DT:** 3.5%	High tone, Blue light
Contact Coagulation: **Pin Point Contact**	250 W	250 Ω	3460 V	**F:** 440 kHz- **CF:** 2.6 – **M:** 29 kHz – **DT:** 50 %	High tone, Blue light
Soft Coagulation: **Soft**	280 W	250 Ω	3440 V	**F:** 440 kHz- **CF:** 2.5 – **M:** 29 kHz – **DT:** 56 %	High tone, Blue light
Spray Coagulation: **Spray**	140 W	600 Ω	7600 V	**F:** 440 kHz- **CF:** 8.1 – **M:** 19 kHz – **DT:** 9 %	High tone, Blue light

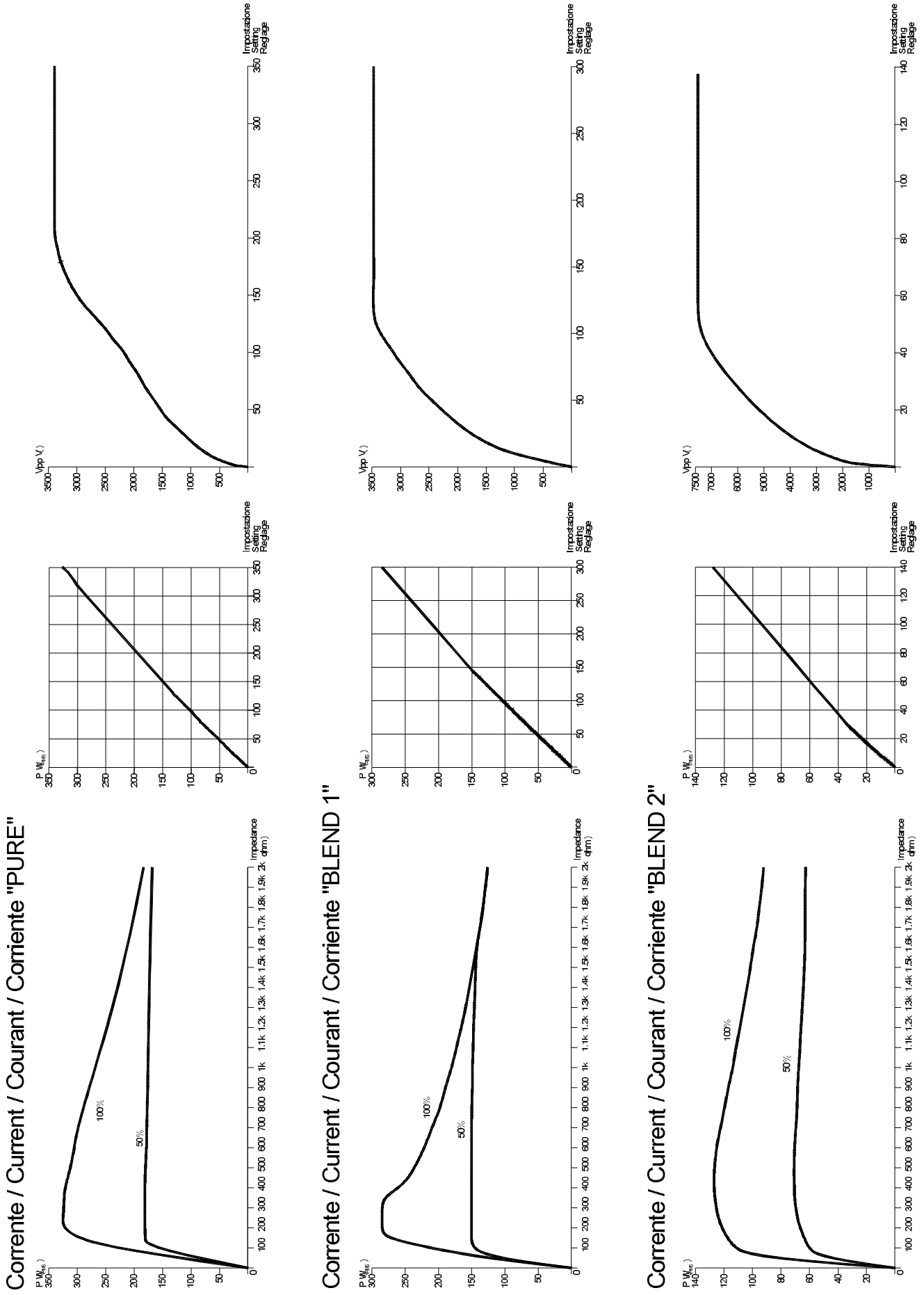
Bipolar Currents Characteristics

Function	Maximum Power	Load	Vp/p	Frequency (F) - Crest Factor (CF) – Modulation (M) - Duty Cycle (DT)	Acoustic and Luminous Signals
Pure Cut: **Pure**	160 W	300 Ω	850 V	**F:** 440 kHz- **CF:** 1.5 – **M:** No – **DT:** no	Loud tone, Yellow light
Coagulating Cut : **Blend**	130 W	300 Ω	1000 V	**F:** 440 kHz- **CF:** 1.8 – **M:** 29 kHz – **DT:** 75 %	Loud tone, Yellow light
Micro Coagulation CV: **Micro CV**	130 W	100 Ω	450 V	**F:** 440 kHz- **CF:** 1.7 – **M:** No – **DT:** no	High tone, Blue light
Micro Coagulation HC: **Micro HC**	130 W	100 Ω	760 V	**F:** 440 kHz- **CF:** 1.7 – **M:** No – **DT:** no	High tone, Blue light
Micro Coagulation Automatic Start/Stop : **Micro Auto**	See *Micro CV*				
Macro Coagulation: **Macro**	130 W	100 Ω	760 V	**F:** 440 kHz- **CF:** 1.7 – **M:** No – **DT:** no	High tone, Blue light
Macro Coagulation HC: **Seal HC**	130W	100Ω	710V	**F:** 440 KHz-**CF:** 1.7 **– M:** No **– DT: no**	High tone, Blue light

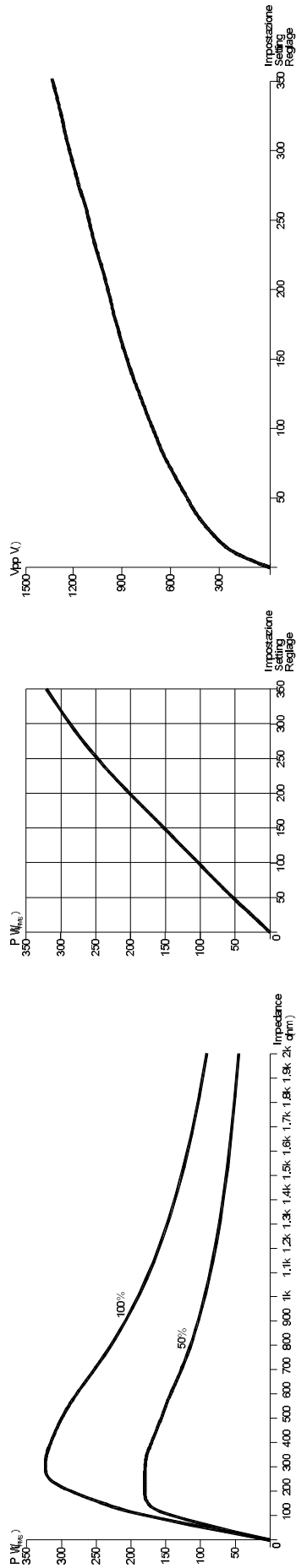
Conformity EMC/Directive 89/336/CEE: Category A Suggested distances to keep from not vital devices		
Source of the Current RF	**Typical Power (W)**	**Distance (m)**
Microcellular telephones CT1,CT2,CT3	0.01	0.4
Mobile telephones DECT, Wireless devices (modems, LANs)	0.25	2
Mobile telephones (USA)	0.6	3
Hand mobile telephones (GSM, NMT, Europe) (DECS 1800)	2 8	6 11
Walkie-talkie (police, firemen , protection, maintenance)	5	9
Bag mobile telephones	16	16
Mobile radio (police, firemen, protection)	100	40
For broadcasting stations which use frequencies less than 800MHz, the distance can be established by using the equation: A: $d = 4\sqrt{P}$ For broadcasting stations which use frequencies between 800MHz and 2.5GHz, the distance can be established by using the equation: B : $d = 2.3\sqrt{P}$ P = Nominal power of the transmitter in watt (W), established by the manufacturer.		

MONOPOLAR CURRENTS

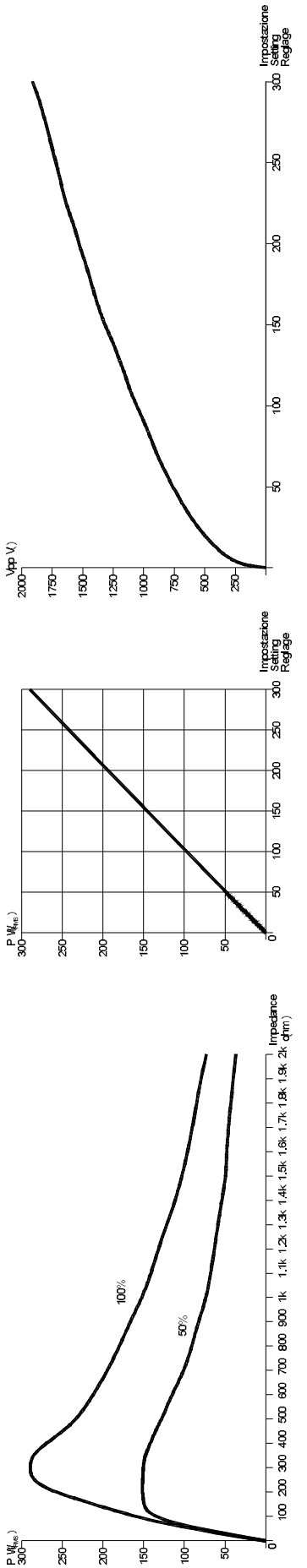
(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)
(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltageaccording to the power adjustment).



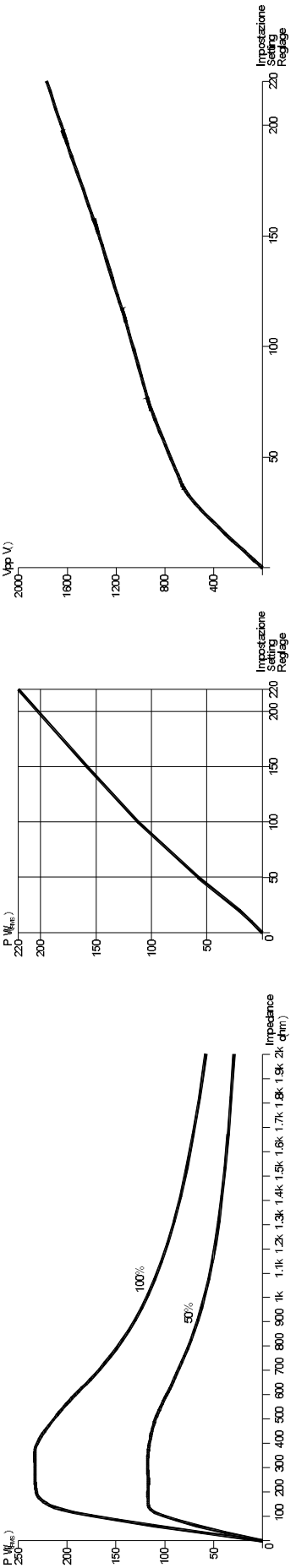
Corrente / Current / Courant / Corriente "AUTOPURE"



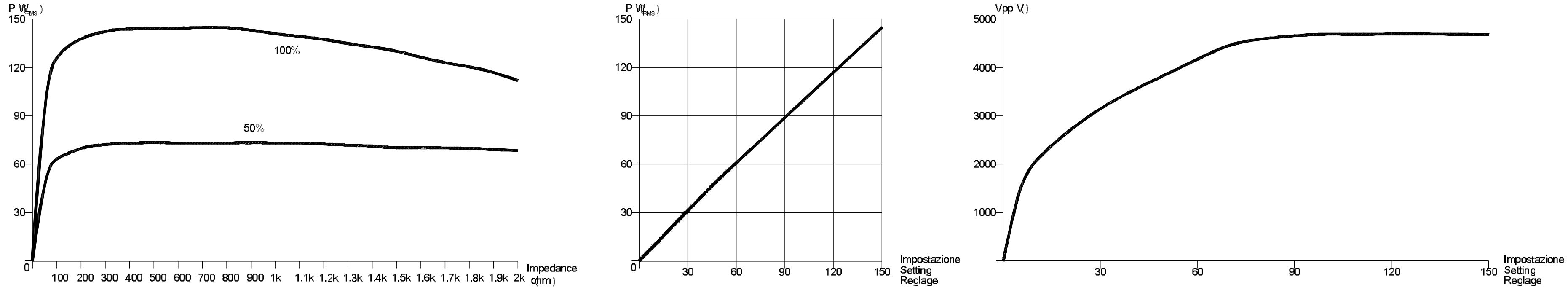
Corrente / Current / Courant / Corriente "AUTOBLEND"



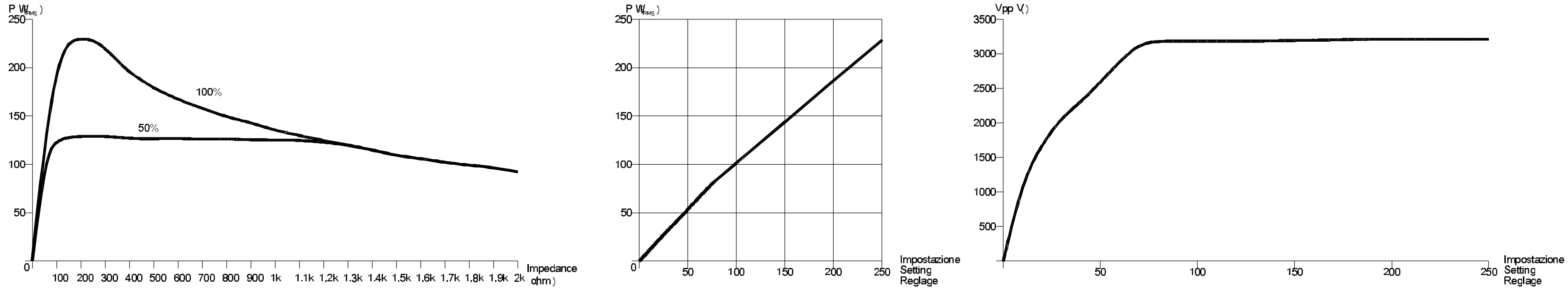
Corrente / Current / Courant / Corriente "AUTOENDO"



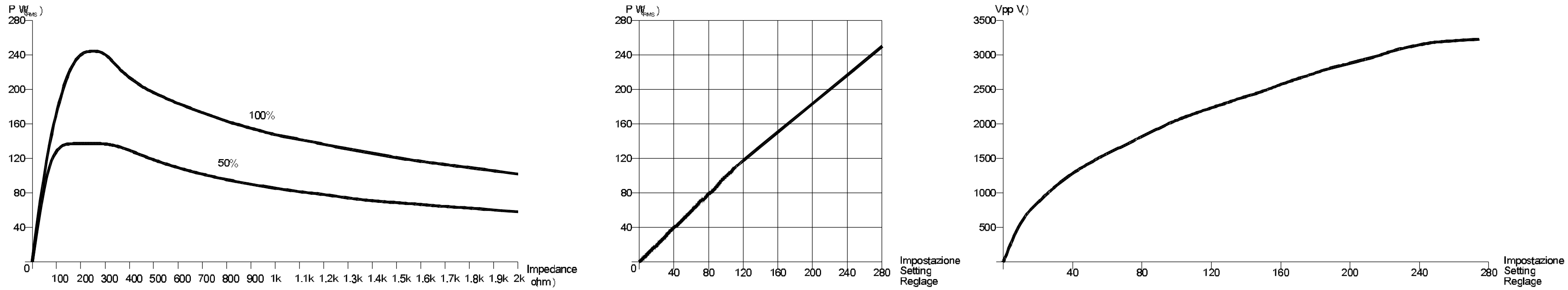
Corrente / Current / Courant / Corriente "FULG FORCED"



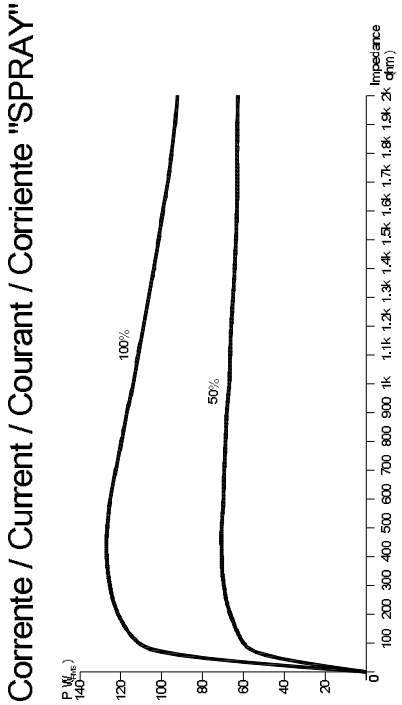
Corrente / Current / Courant / Corriente "PIN POINT"

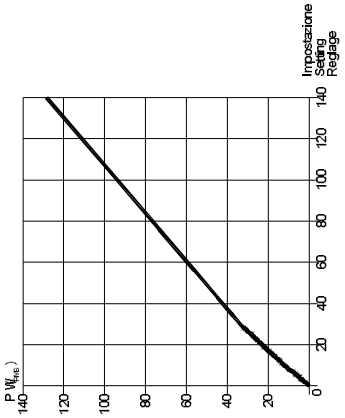


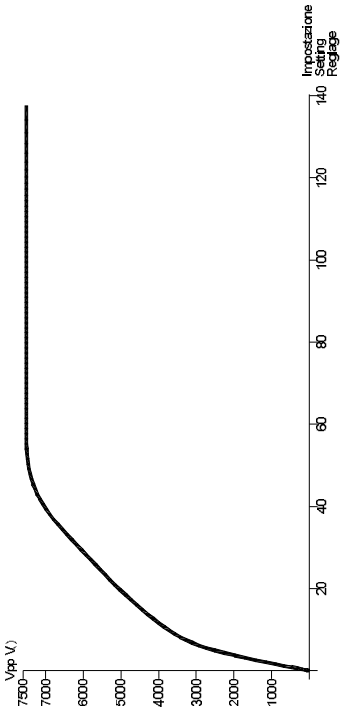
Corrente / Current / Courant / Corriente "SOFT"



Corrente / Current / Courant / Corriente "SPRAY"

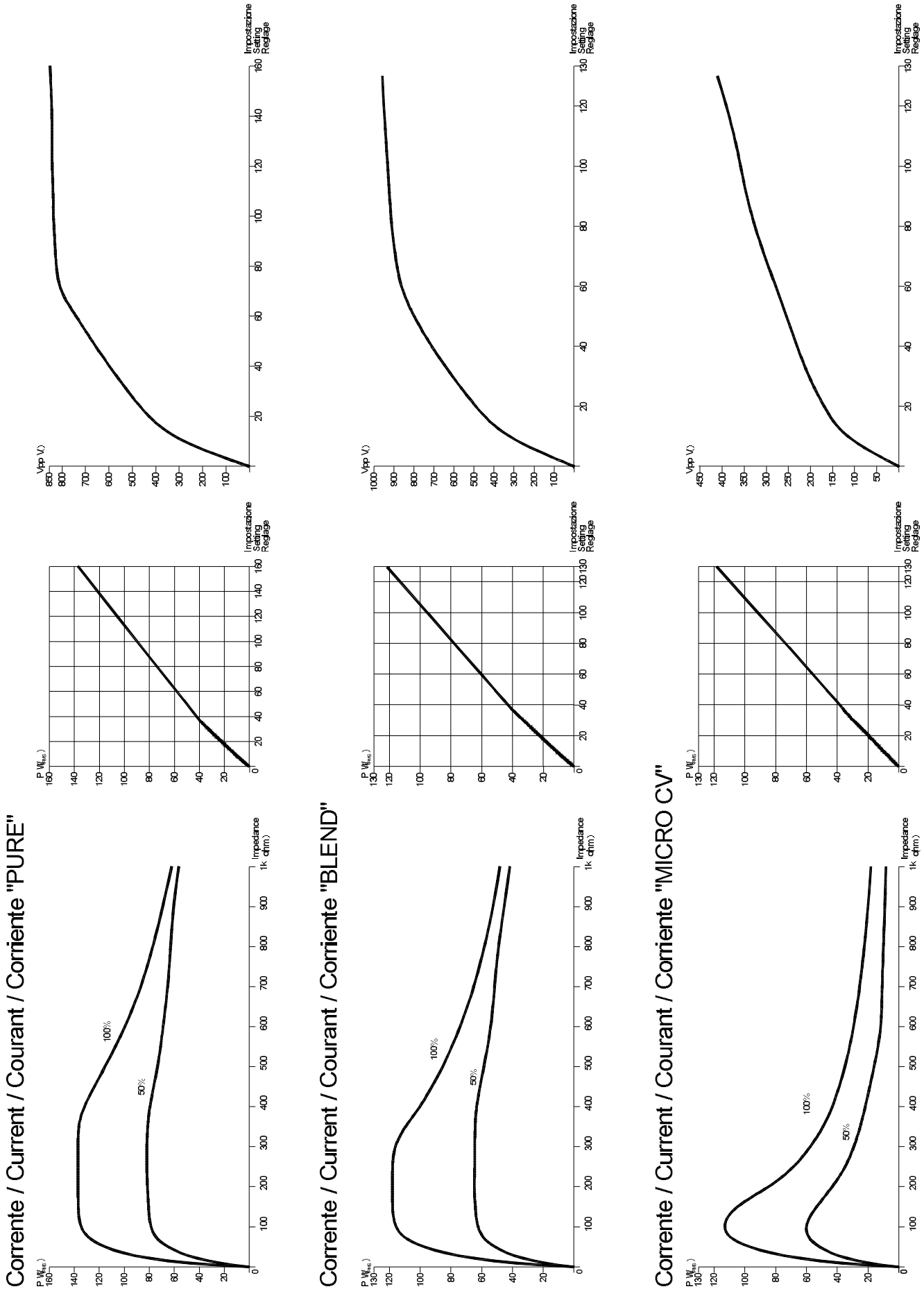


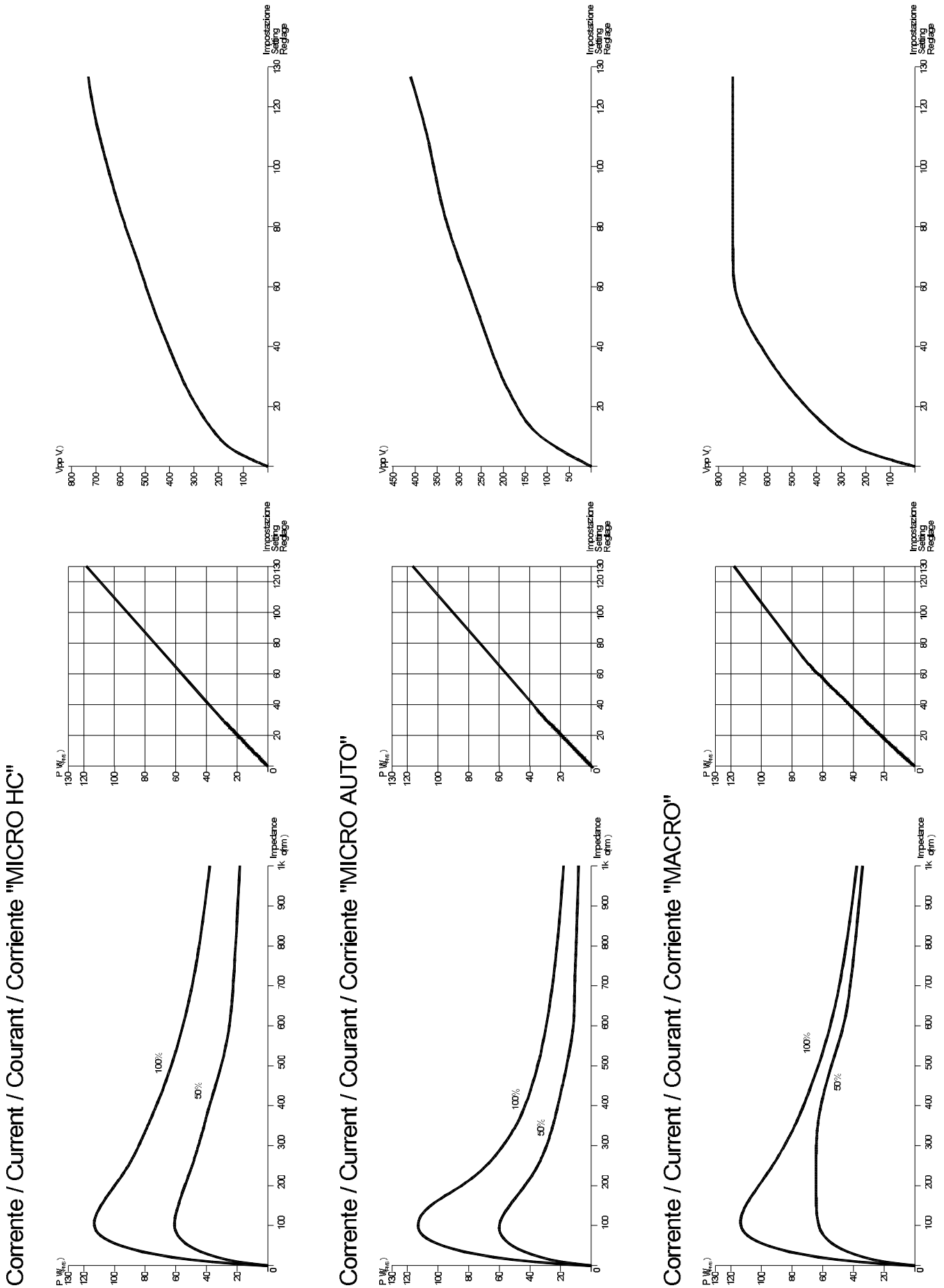




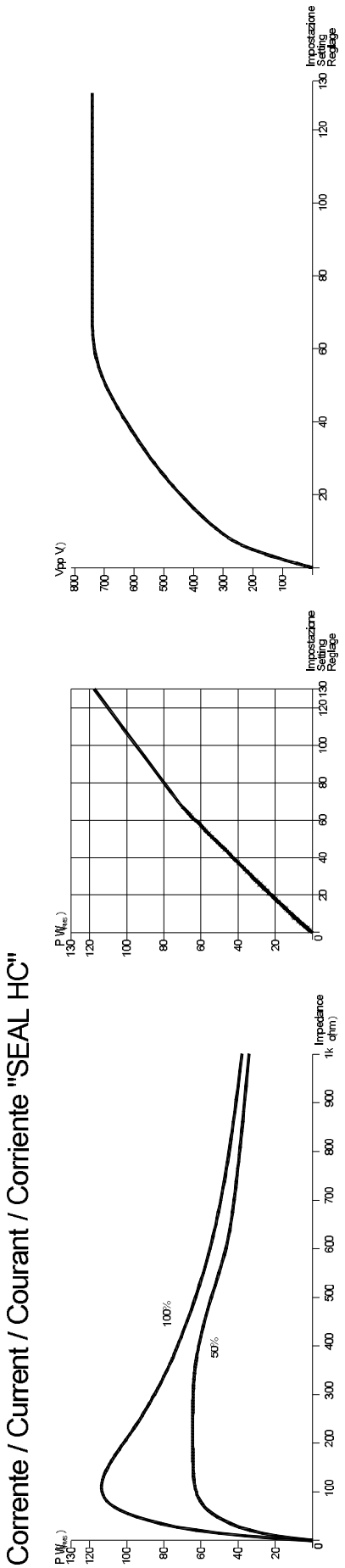
BIPOLAR CURRENTS

(Variation of the output power from 10 to 1000Ω by selecting 100% and 50% of maximum power)
(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltage according to the power adjustment).




Corrente / Current / Courant / Corriente "MICRO HC"
Corrente / Current / Courant / Corriente "MICRO AUTO"
Corrente / Current / Courant / Corriente "MACRO"
P W
Vpp V
Impostazione
Setting
Réglage
Impedance
ohm
100%
50%

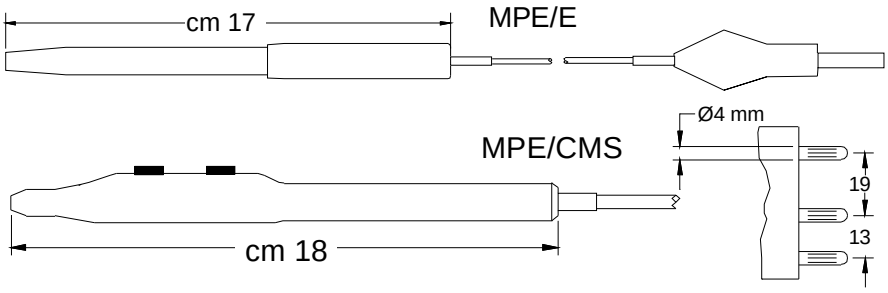
Corrente / Current / Courant / Corriente "SEAL HC"



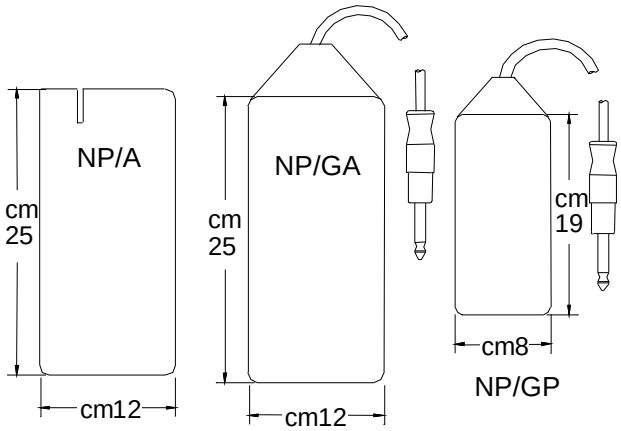
ACCESSORIES

ELECTRODES-HOLDER HANDLES

MPE/E - Electrodes-holder handle with cable 3.5m long;
MPE/CMS - Electrodes-holder handle with hand-switches, reusable 100 times.



NEUTRAL ELECTRODES



NP/A: Stainless steel neutral electrode for adults, cable 2.5m long;
NP/GA: Flexible rubber neutral electrode for adults, cable 2.5m long;
NP/GP: Flexible rubber neutral electrode for children, cable 2.5m long.

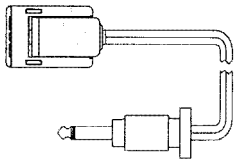
PEDAL FOOT-SWITCHES

DS/E: Twin pedal foot-switch;
DS/B: Twin pedal foot-switch for bipolar mode only.

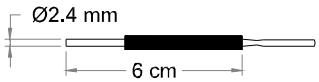
DISPOSABLE NEUTRAL ELECTRODES

CMS/E: Connection cable 2.5m long;
EIP/DA: Neutral electrode “non split” type for adults, 134 cm^2;
EIP/DP: Neutral electrode “non split” type for children, 72 cm^2;
EIP/SA: Neutral electrode “split” type for adults, 128 cm^2;
EIP/SP: Neutral electrode “split” type for children, 71 cm^2.

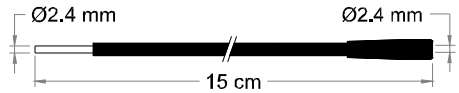
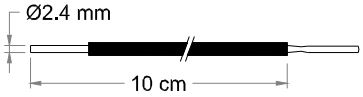
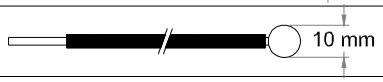
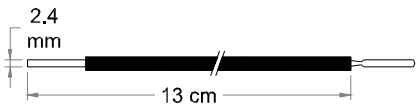
CMS/E



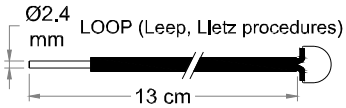
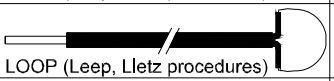
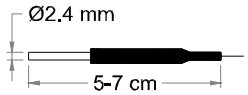
ELETTRODI MONOPOLARI
MONOPOLAR ELECTRODES
ELECTRODES MONOPOLAIRES
ELECTRODOS MONOPOLARES

ELETTRODO ELECTRODE ELECTRODE ELECTRODO	DESCRIZIONE DESCRIPTION DESCRIPTION DESCRIPCIÓN	NON STERILE NON-STERILE NON STÉRILE NO ESTÉRIL 134° C / Autoclave
	A lama dritta • Straight knife À lame drolte • De cuchllo recto	E1
	A lama (spatola) dritta isolata • Insulated straight knife (spatula) À lame (spatule) droite isolé • De cuchillo (espátula) recto aislado	E1/I
	A lama angolata • Bent knife (spatula) À lame courbée • De cuchillo con angulo	E3
	A lancetta retta • Straight lancet Lancette droite • Lanceta recta	E1/L
	A lancetta angolata • Bent lancet Lancette courbée • Lanceta con angulo	E3/L
	Ad ago grosso, retto • Straight needle, thick type À aiguille grosse, droite • De aguja grueso, recto	E5
	Ad ago grosso, angolato • Thick needle, bent type À aiguille grosse, courbée • De aguja grueso, con angulo	E6
	Ad ago sottile, retto • Straight needle, thin type À aiguille fine, droite • De aguja fino, recto	E7
	Ad ago sottile isolato • Insulated thin needle À aiguille fine, insulé • De aguja fino, aislado	E7/I
	Ad ago sottile, angolato • Thin needle, bent type À aiguille fine, courbée • De aguja fino, con angulo	E8
	Ad ago finissimo • Very thin needle À aiguille très fine • De aguja super fino	E10
	Ad ago finissimo angolato • Very thin needle, bent type À aiguille très fine, courbée • De aguja super fino, con angulo	E11
	A sfera Ø 2,5 mm, retto • Ball Ø 2.5 mm, straight type À bille Ø 2,5 mm, droite • De bola Ø 2,5 mm, recto	E12
	A sfera Ø 2,5 mm, angolata • Ball Ø 2.5 mm, bent type À bille Ø 2,5 mm, courbée • De bola Ø 2,5 mm, con angulo	E13
	A sfera Ø 4 mm, retto • Ball Ø 4 mm, straight type À bille Ø 4 mm, droite • De bola Ø 4 mm, recto	E14
	A sfera Ø 4 mm, angolata • Ball Ø 4 mm, bent type À bille Ø 4 mm, courbée • De bola Ø 4 mm, con angulo	E15
	A sfera Ø 6 mm, retto • Ball Ø 6 mm, straight type À bille Ø 6 mm, droite • De bola Ø 6 mm, recto	E16
	A sfera Ø 6 mm, angolata • Ball Ø 6 mm, bent type À bille Ø 6 mm, courbée • De bola Ø 6 mm, con angulo	E17
	Diamante 5x10 mm • Diamond 5x10 Diamant 5x10 mm • Diamante 5x10	E18 (ex EL14)
	Diamante 10x10 mm • Diamond 10x10 mm Diamant 10x10 mm • Diamante 10x10 mm	E19 (ex EL15)
	Ansa a filo Ø 5 mm • Wire loop Ø 5 mm Anse à fil Ø 5 mm • Asa de alambre Ø 5 mm	E21
	Ansa a filo Ø 10 mm • Wire loop Ø 10 mm Anse à fil Ø 10 mm • Asa de alambre Ø 10 mm	E23
	Ansa a filo Ø 15 mm • Wire loop Ø 15 mm Anse à fil Ø 15 mm • Asa de alambre Ø 15 mm	E25
	Ansa a nastro Ø 10 mm • Ribbon loop Ø 10 mm Anse à bande Ø 10 mm • Asa de cinta Ø 10 mm	E23/N
	Ansa a nastro Ø 15 mm • Ribbon loop Ø 15 mm Anse à bande Ø 15 mm • Asa de cinta Ø 15 mm	E25/N
	A paletta 8x12 mm • Plate electrode 8x12 mm À palette 8x12 mm • De placa 8x12 mm	E26

ELETTRODI MONOPOLARI
MONOPOLAR ELECTRODES
ELECTRODES MONOPOLAIRES
ELECTRODOS MONOPOLARES

ELETTRODO ELECTRODE ELECTRODE ELECTRODO	DESCRIZIONE DESCRIPTION DESCRIPTION DESCRIPCIÓN	NON STERILE NON-STERILE NON STÉRILE NO ESTÉRIL 134° C / Autoclave
	Prolunga • Extension Rallonge • Alargamiento	EXT/15
	A lama • Knife À lame • De cuchillo	E27
	Ad ago • Needle À aiguille • De aguja	E29
	Ad ago sottile • Thin needle À aiguille fine • De aguja fino	E30
	Ansa a filo • Wire loop Anse à fil • Asa de alambre	E31
	Ansa a filo • Wire loop Anse à fil • Asa de alambre	E33
	A sfera Ø 2,5 mm • Ball, 2.5 mm Ø À bille Ø 2,5 mm • De bola Ø 2,5 mm	E35
	A sfera Ø 4 mm • Ball, 4 mm Ø À bille Ø 4 mm • De bola Ø 4 mm	E37
	A sfera Ø 6 mm • Ball, 6 mm Ø À bille Ø 6 mm • De bola Ø 6 mm	E39
	A lama • Knife À lame • De cuchillo	E40 (ex EL18)
	A lama (spatola) isolata • Insulated knife (spatula) À lame (spatule) isolé • De cuchillo (espátula) aislado	E40/I
	Ad ago grosso • Thick needle À aiguille grosse • De aguja grueso	E41 (ex EL19)
	Ad ago sottile • Thin needle À aiguille fine • De aguja fino	E42 (ex EL20)
	Ad ago sottile isolato • Insulated thin needle À aiguille fine isolé • De aguja fino aislado	E42/I
	Ansa a filo Ø 5 • Wire loop Ø 5 mm Anse à fil Ø 5 • Asa de alambre Ø 5	E43 (ex EL21)
	Ansa a filo Ø 10 • Wire loop Ø 10 mm Anse à fil Ø 10 • Asa de alambre Ø 10	E44 (ex EL24)
	Ansa a filo Ø 15 • Wire loop Ø 15 mm Anse à fil Ø 15 • Asa de alambre Ø 15	E45 (ex EL25)
	A sfera Ø 2,5 mm • Ball Ø 2.5 mm À bille Ø 2,5 mm • De bola Ø 2,5 mm	E46 (ex EL27)
	A sfera Ø 4 mm • Ball Ø 4 mm À bille Ø 4 mm • De bola Ø 4 mm	E47 (ex EL30)

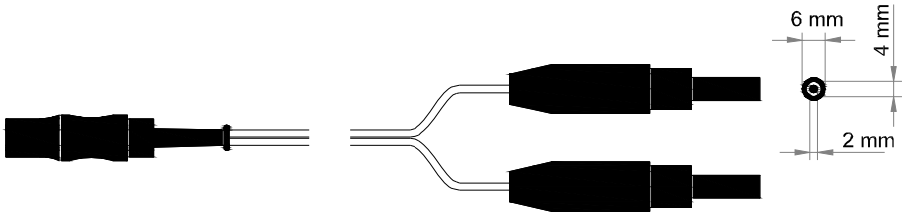
ELETTRODI MONOPOLARI
MONOPOLAR ELECTRODES
ELECTRODES MONOPOLAIRES
ELECTRODOS MONOPOLARES

ELETTRODO ELECTRODE ELECTRODE ELECTRODO	DESCRIZIONE DESCRIPTION DESCRIPTION DESCRIPCIÓN	NON STERILE NON-STERILE NON STÉRILE NO ESTÉRIL 134° C / Autoclave
	Ansa a filo 10x10 mm • Wire loop 10x10 mm Anse à fil 10x10 mm • Asa de alambre 10x10 mm	E50 (ex EL41)
	Ansa a filo 15x10 mm • Wire loop 15x10 mm Anse à fil 15x10 mm • Asa de alambre 15x10 mm	E52 (ex EL46)
	Ansa a filo 20x8 mm • Wire loop 20x8 mm Anse à fil 20x8 mm • Asa de alambre 20x8 mm	E53 (ex EL48)
	Ansa a filo 20x10 mm • Wire loop 20x10 mm Anse à fil 20x10 mm • Asa de alambre 20x10 mm	E54 (ex EL49)
	Ansa a filo 20x20 mm • Wire loop 20x20 mm Anse à fil 20x20 mm • Asa de alambre 20x20 mm	E55 (ex EL51)
	Ansa a filo 10x5 mm • Wire loop 10x5 mm Anse à fil 10x5 mm • Asa de alambre 10x5 mm	E56 (ex EL60)
	Ansa a filo 10x8 mm • Wire loop 10x8 mm Anse à fil 10x8 mm • Asa de alambre 10x8 mm	E57 (ex EL61)
	Ansa a filo 10x10 mm • Wire loop 10x10 mm Anse à fil 10x10 mm • Asa de alambre 10x10 mm	E58 (ex EL62)
Elettrodi per microchirurgia • Microsurgical electrodes • Electrodes pour microchirurgie • Electrodos para microcirugía		
	Ad ago sottile retto • Stralght thln needle À aiguille fine droite • De aguja fina recta	E101
	Ad ago sottile angolato • Thin bent needle À aiguille fine courbée • De aguja fina acodada	E102
	Ad ago sottile angolato • Thin bent needle À algulle fine coudée • De aguja fina acodada	E103
	Ad ago grosso • Thick needle À algulle grosse • De aguja gruesa	E105
	Ad ago grosso angolato • Thick angled needle À aiguille grosse courbée • De aguja gruesa acodada	E106
	Ansa a filo Ø 5 mm • Wire loop Ø 5 mm Anse à fil Ø 5 mm • Asa de alambre Ø 5 mm	E110
	Ansa Ø 5 mm angolata • Angled loop Ø 5 mm Anse coudée Ø 5 mm • Asa acodada Ø 5 mm	E109
	Laccio allungato Ø 5 mm • Long wire loop Ø 5 mm Anse à fil long Ø 5 mm • Asa de alambre Ø 5 mm	E111
	Laccio allungato Ø 5 mm • Long wire loop Ø 5 mm Anse à fil long Ø 5 mm • Asa de alambre Ø 5 mm	E112
	A sfera Ø 2,5 mm • Ball Ø 2.5 mm À bille Ø 2,5 mm • De bola Ø 2,5 mm	E120
	A sfera Ø 2,5 mm • Ball Ø 2.5 mm À bille Ø 2,5 mm • De bola Ø 2,5 mm	E121

ACCESSORI PER BICOAGULAZIONE
ACCESSORIES FOR BICOAGULATION
ACCESSOIRES POUR LA BICOAGULATION
ACCESORIOS DE BICOAGULACIÓN

134° C
Autoclave

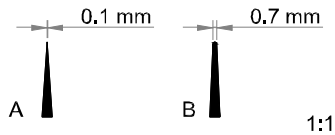
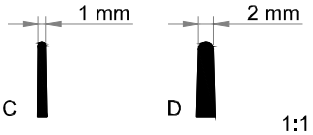
Cavo / Cable / Câble / Cable



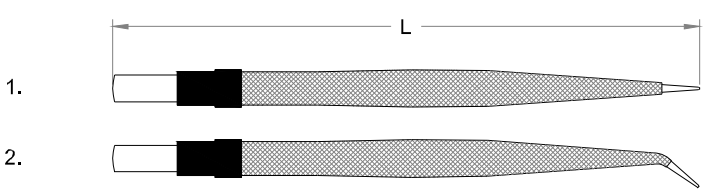
ALSA
CPB/E
(3 m)

CPB/E5
(5 m)

Pinze di lunghezza diversa sono fornibili a richiesta (specificare tipo e lunghezza, es. PBC/R14 = PBC/R lunga 14 cm
Forceps of different lenght are available on request (please, specify lenght and type, i.e. PBC/R14 = PBC/R 14 cm long)
Pinces avec différente longueure peuvent etrê fournis sur demande (veuillez spécifier longueur et modèle, par example PBC/R14 = PBC/R longue 14 cm)
Pinzas de longitud distinta se pueden suministrar bajo pedido (detallar por favor longitud y modelo, por ejemplo PBC/R14 = PBC/R con 14 cm de longitud)

Punte / Tips / Pointes / Puntas			Spina / Plug / Fiche / Enchufe
A punta / Pointed / Pointu / Con la punta	Smussate / Blunted / Arrondies / Redondeadas		Tipo platto europeo / European flat type / Type plate européenne / Tipo plano europeo
			

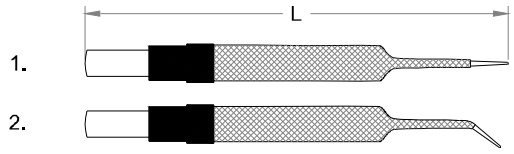
Pinza isolata (Cushing / Potts-Smith) Insulated forceps (Cushing / Potts-Smith) Pince isolée (Cushing / Potts-Smith) Pinza recubierta (Cushing / Potts-Smith)		L (cm)	ALSA standard	ALSA con irrigazione / with irrigation avec Irrigation / con Irrigación
1. Retta / Straight type / Droite / Recta	B	16	PMC/RS	PMC/RSL
	C	18	PMC/R18	
	C	20	PMC/R	PMC/RL
	C	25	PMC/R25	PMC/R25L
	D	18	PBC/R18	
	D	20	PBC/R	PBC/RL
	D	25	PBC/R25	PBC/R25L
2. Curva / Bent type / Courbée / Curva	B	16	PMC/CS	PMC/CSL
	C	18	PMC/C18	
	C	20	PMC/C	PMC/CL
	C	25	PMC/C25	PMC/C25L
	D	18	PBC/C18	
	D	20	PBC/C	PBC/CL
	D	25	PBC/C25	PBC/C25L



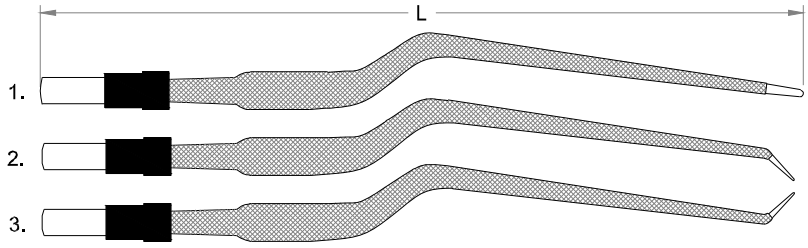
ACCESSORI PER BICOAGULAZIONE
ACCESSORIES FOR BICOAGULATION
ACCESSOIRES POUR LA BICOAGULATION
ACCESORIOS DE BICOAGULACIÓN

134° C
Autoclave

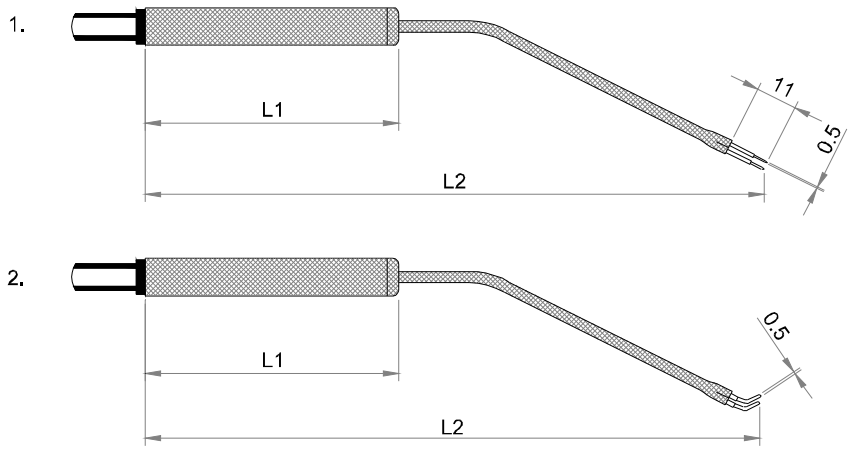
Pinza isolata (Jeweler) Insulated forceps (Jeweler) Pince isolée (Jeweler) Pinza recubierta (Jeweler)		L (cm)	ALSA standard	ALSA con irrigazione / with irrigation avec irrigation / con irrigación
1. Retta / Staight type / Droite / Recta	B	12	PMC/JR	
2. Curva / Bent type / Courbée / Curva	B	12	PMC/JC	



Plnza Isolata (a balonetta / Jansen / Ysargll) Insulated forceps (bayonet type / Jansen / Ysargil) Pince isolée (à bayonette / Jansen / Ysargil) Pinza recubierta (de baioneta / Jansen / Ysargil)		L (cm)	ALSA standard	ALSA con irrigazione / with irrigation avec irrigation / con irrigación
1. Retta / Straight type / Droite / Recta	B	16	PMC/RSB	
	C	17	PMC/B17	
	C	20	PMC/B	PMC/BL
	C	25	PMC/B25	
	D	17	PBC/B17	
	D	20	PBC/B	PBC/BL
	D	25	PBC/B25	
2. Curva / Bent type / Courbée / Curva	C	20	PMC/BCD	
	D	20	PBC/BCD	
3. Curva / Bent type / Courbée / Curva	C	20	PMC/BCU	
	D	20	PBC/BCU	

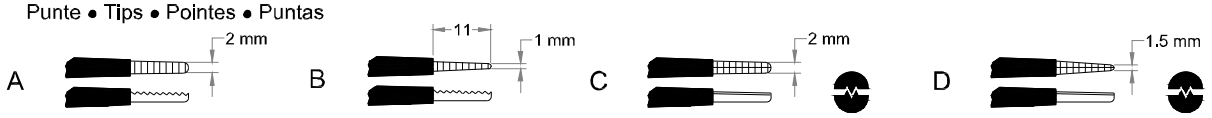


Elettrodo bipolare Bipolar electrode Electrode bipolaire Electrodo bipolar	L1(mm)	L 2(mm)	ALSA
1. Ad ago per turbinati (Binner) / Needle type for turbinals (Binner) À aiguille pour cornets (Binner) / De aguja para cornetes (Binner)	68	170	EBT
2. Per laringe / For larynx / Pour larynx / Para laringe	68	310	EBL

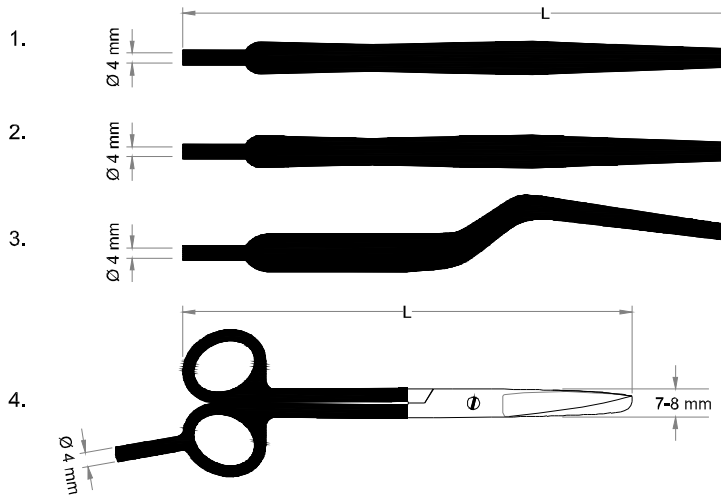


PINZE, FORBICI E CANNULE D'ASPIRAZIONE ISOLATE MONOPOLARI
MONOPOLAR INSULATED FORCEPS, SCISSORS AND SUCTING CANNULAE
PINCES, CISEAUX ET CANULES POUR ASPIRATION MONOPOLAIRE ISOLEES
PINZAS, TIJERAS Y CANULAS PARA ASPIRACION MONOPOLARES RECUBIERTAS

Punte • Tips • Pointes • Puntas



Pinze e forbici monopolari • Monopolar forceps and scissors • Pinces et ciseaux monopolaires • Pinzas y tijeras monopolares		L (cm)	ALSA
1. (Potts-Smith) - Retta • Straight • Droite • Recta	A	25	PMI/2
	B	18	PMI/1
	B	20	PMI/1-20
	B	25	PMI/1-25
2. Curva • Bent type • Courbée • Curva	B	25	PMI/1C25
(DeBakey - AT/Atraumatic) - Retta • Straight • Droite • Recta	C	20	PMI/DB2-20
	C	25	PMI/DB2-25
	D	20	PMI/DB1-20
	D	25	PMI/DB1-25
3. Baionetta • Bayonet • Bayonette • Baioneta	A	20	PMI/B
	B	18	PMI/B1-18
4. Retta • Straight • Droite • Recta		18	FI/18
		24	FI/24



134° C
Autoclave

Cannule d'aspirazione (Frazier) • Sucting cannulae (Frazier) • Canules pour aspiration (Frazier) • Canulas para aspiracion (Frazier)	L (cm)	ALSA
1.	14	CFI/1
2.	20	CFI/2
3.	40	CFI/3

134° C
Autoclave

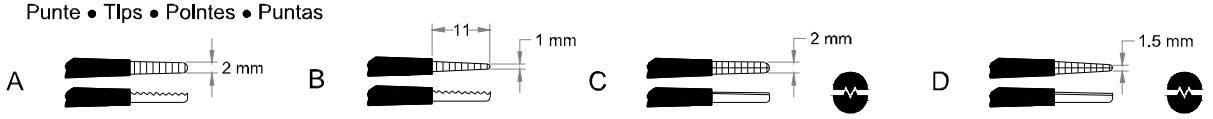
Cavo / Cable / Câble / Cable

ALSA
CPI
(m 3.5)

134° C
Autoclave

PINZE, FORBICI E CANNULE D'ASPIRAZIONE ISOLATE MONOPOLARI
MONOPOLAR INSULATED FORCEPS, SCISSORS AND SUCTING CANNULAE
PINCES, CISEAUX ET CANULES POUR ASPIRATION MONOPOLAIRE ISOLEES
PINZAS, TIJERAS Y CANULAS PARA ASPIRACION MONOPOLARES RECUBIERTAS

Punte • Tips • Pointes • Puntas

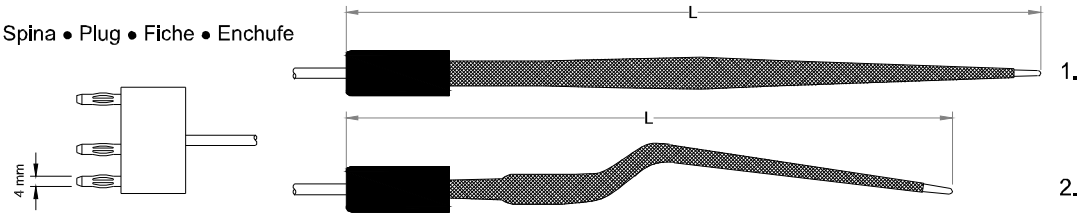


Pinze senza cavo di collegamento • Forceps without connecting cable Pinces sans câble de raccordement • Pinzas sin cable de conexión		L (cm)	ALSA
(Potts-Smith) - Retta • Straight • Droite • Recta	A	25	PIC/2
	B	18	PIC/1
	B	25	PIC/1-25
	D	20	PIC/DB1-20
(DeBakey - AT/Atraumatic) - Retta • Straight • Droite • Recta	C	20	PIC/DB2-20
	C	25	PIC/DB2-25
	D	25	PIC/DB1-25

134° C
Autoclave

Pinze con comando manuale • Hand-controlled forceps Pinces avec commande manuelle • Pinzas con mando manuale		L (cm)	ALSA
1. (Potts-Smith) - Retta • Straight • Droite • Recta	A	21	PMI/PJ20
" " " "	A	24	PMI/PJ25
2. (Jansen / Yasargil) - A baionetta • Bayonet type • À bayonette • De bayoneta	A	21	PMI/B

Spina • Plug • Fiche • Enchufe

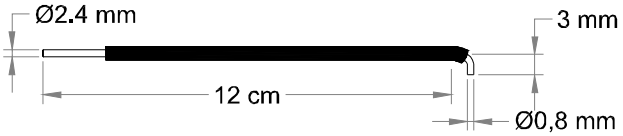
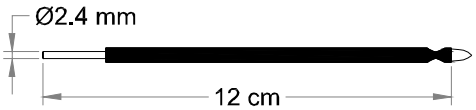
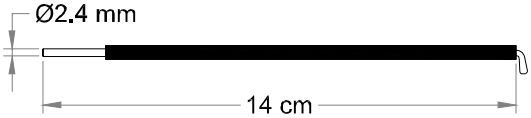
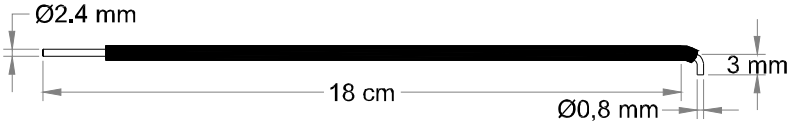
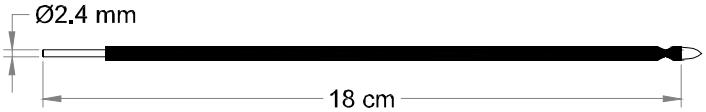
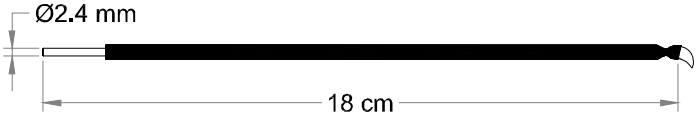
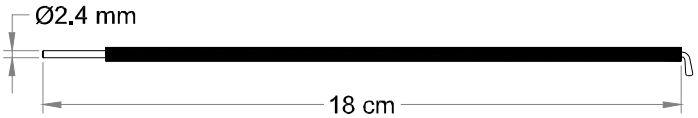
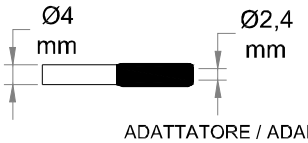


Cavo: 3 m • Cable: m 3 • Câble: 3 m • Cable: 3 m

134° C
Autoclave

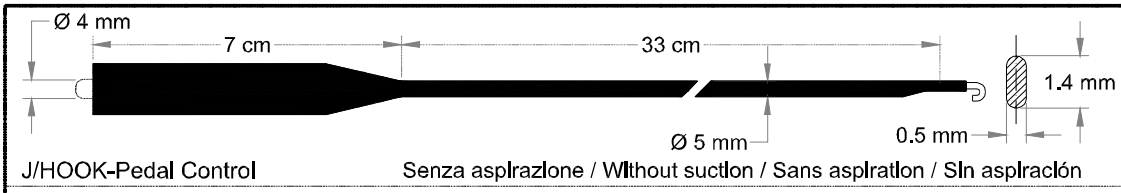
ACCESSORI ARTROSCOPICI
ARTHROSCOPIC ACCESSORIES
ACCESSOIRES ARTHROSCOPIQUES
ACCESORIOS DE ARTROSCOPI

134° C
Autoclave

 STERILIZZABILE MAX 80-100 VOLTE / STERILIZABLE MAX 80-100 TIMES STERILISABLE MAX 80-100 FOIS - ESTERILIZABLE MAX 80-100 VECES	MPE/E
	MPE/CMSL
 ANGLED NEEDLE	E/ND12
 DAGGER	E/DR12
 HOOK	E/HK12
 HOCKEY	E/HY14
 ANGLED NEEDLE	E/ND18
 DAGGER	E/DR18
 HOOK	E/HK18
 HOCKEY	E/HY18
 ADATTATORE / ADAPTOR / ADAPTATEUR / ADAPTADOR	RD/424

ACCESSORI MONOPOLARI PER LAPAROSCOPIA
MONOPOLAR ACCESSORIES FOR LAPAROSCOPIC SURGERY
ACCESSOIRES MONOPOLAIRES DE LAPAROSCOPIE
ACCESORIOS MONOPOLARES DE LAPAROSCOPIA

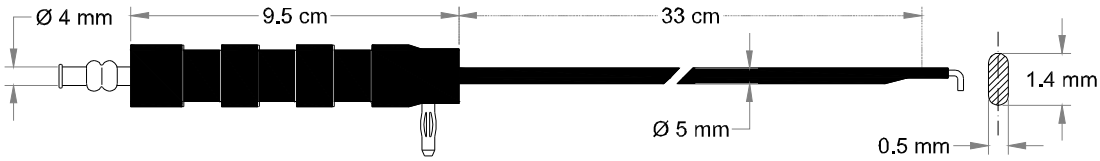
134° C
Autoclave



J/HOOK-Pedal Control — Senza aspirazione / Without suction / Sans aspiration / Sin aspiración — EL/ML-J

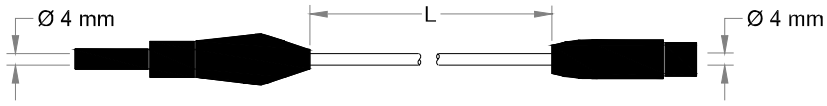
L/HOOK-Pedal Control — Senza aspirazione / Without suction / Sans aspiration / Sin aspiración — EL/ML-L

J/HOOK-Pedal Control — Con aspirazione / With suction / Avec aspiration / Con aspiración — EL/ML-JS

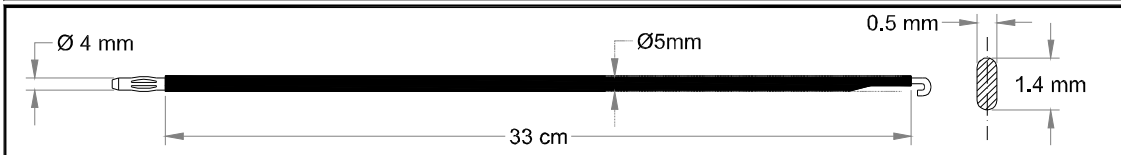


L/HOOK-Pedal Control — Con aspirazione / With suction / Avec aspiration / Con aspiración — EL/ML-LS

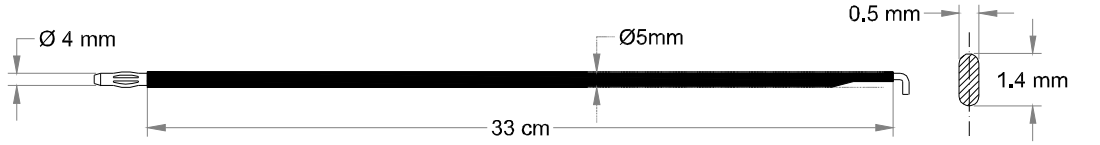
Cavo dl collegamento per elettrodl EL/ML / Connectlng cable for EL/ML electrodes
Câble de connection pour electrodes EL/ML / Cable de conexión para electrodos EL/ML



CPE (L = 3.5 m)
CPE/5 (L = 5 m)

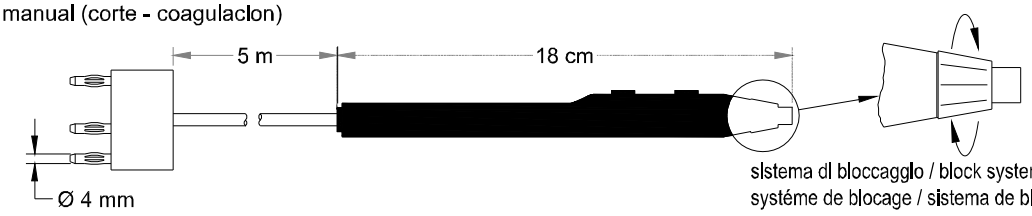


J/HOOK-Hand Control — Senza aspirazione / With no suction / Sans aspiration / Sin aspiración — EL/MLH-J



L/HOOK-Hand Control — Senza aspirazione / With no suction / Sans aspiration / Sin aspiración — EL/MLH-L

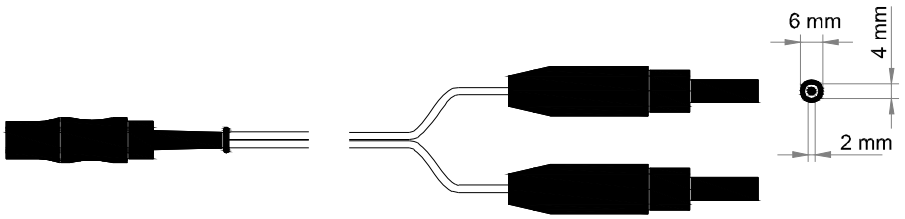
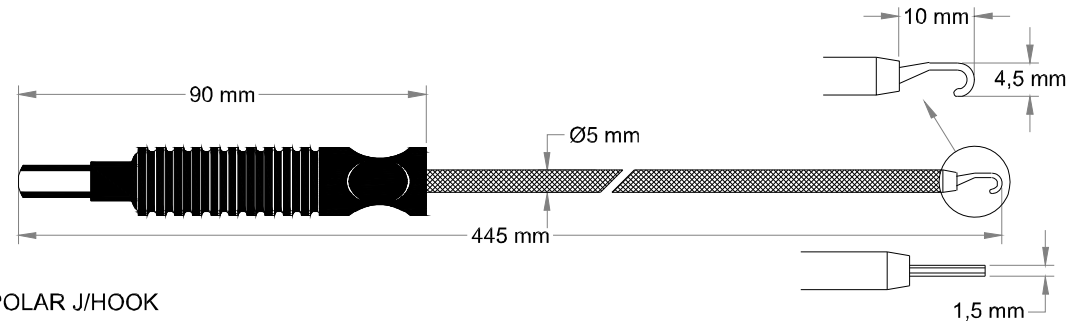
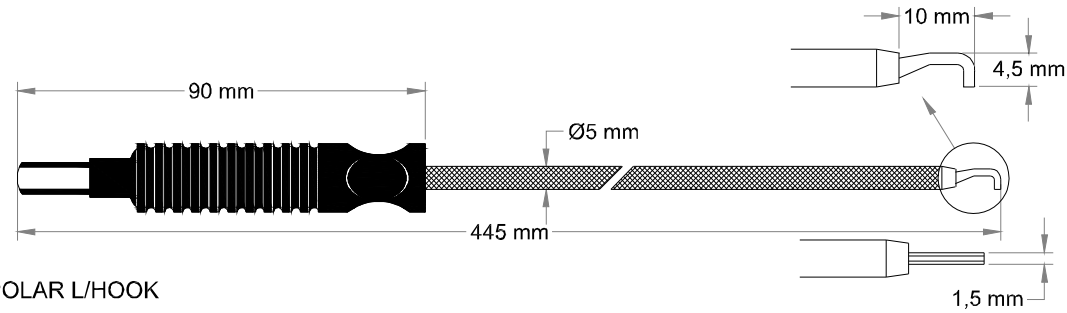
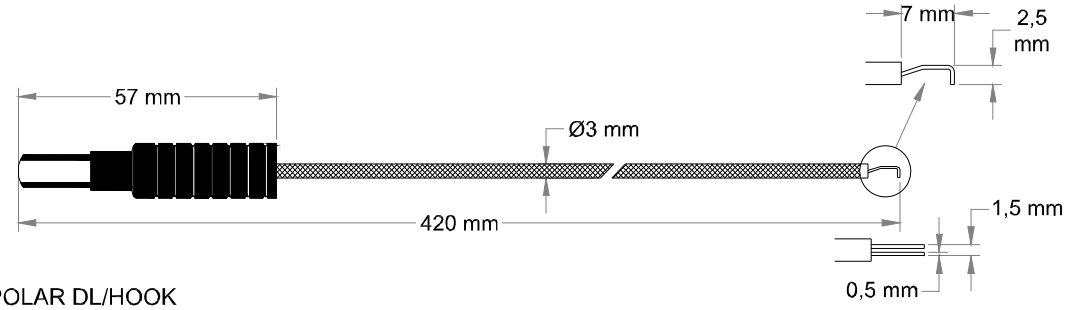
Manipolo con controllo manuale (taglio - coagulazione) / Pencil with hand control (cut - coag)
Polgneé porte-electrodes avec commande manuelle (coupe - coagulatlon) / Mango porta electrodos para mando manual (corte - coagulaclon) — MPE/CMS-300/4



Elettrodo a lama per manico MPE/CMS 300-4 / Knife electrode for MPE/CMS 300-4 handle
Electrode à lame droite pour poigneé MPE/CMS 300-4 / Electrodo de cuchillo para mango MPE/CMS 300-4 — EL/1-4

ACCESSORI BIPOLARI PER LAPAROSCOPIA
BIPOLAR ACCESSORIES FOR LAPAROSCOPIC SURGERY
ACCESSOIRES BIPOLAIRES POUR LAPAROSCOPIE
ACCESORIOS BIPOLARES PARA LAPAROSCOPIA

134° C
Autoclave

	ALSA
Cavo / Cable / Câble / Cable 	CPB/E (3 m) CPB/E5 (5 m)
BIPOLAR J/HOOK 	EL/BL-J
BIPOLAR L/HOOK 	EL/BL-L
BIPOLAR DL/HOOK 	EL/BL-DL

Spina / Plug / Fiche / Enchufe

Tipo piatto europeo / European flat type / Type plate européenne / Tipo plano europeo

1:1

ACCESSORI BIPOLARI PER LAPAROSCOPIA
BIPOLAR ACCESSORIES FOR LAPAROSCOPIC SURGERY
ACCESSOIRES BIPOLAIRES POUR LAPAROSCOPIE
ACCESORIOS BIPOLARES PARA LAPAROSCOPIA

134° C
Autoclave

	Pinza completa / Forceps complete Pince complet / Pinza completa	Solo elettrodo / Electrode only Seul electrode / Solo electrodo
	tk 707-100 ZDR	tk 707-100 E
	tk 707-101 ZDR	tk 707-101 E
	tk 707-103 ZDR	tk 707-103 E
	tk 707-105 ZDR	tk 707-105 E
 Carburo di tungsteno / Tungsten carbide Carbure de tungstène / Carburo de tungsteno	tk 707-106 ZDR	tk 707-106 E
	tk 707-108 ZDR	tk 707-108 E
	tk 707-109 ZDR	tk 707-109 E