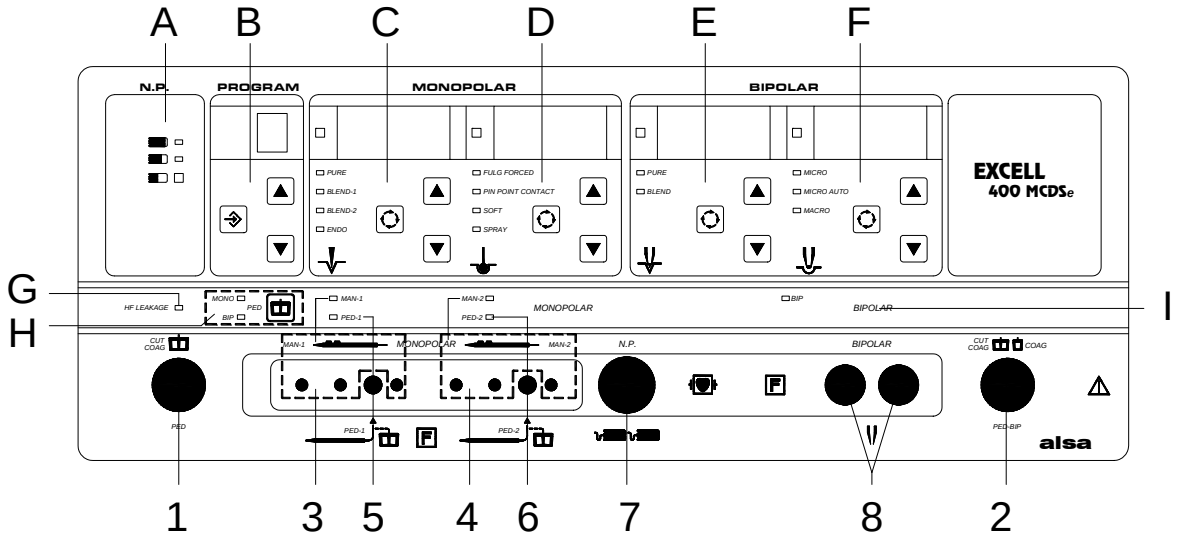
# USER MANUAL FOR EXCELL 400 MCDSe

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** Led for bipolar output

**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

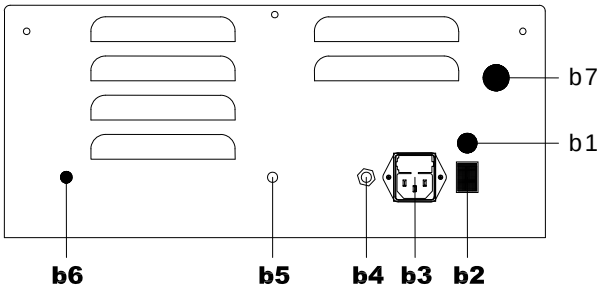
**4** Socket ***MAN-2*** for the connection of the monopolar hand-switch handles

**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

**8** Socket ***BIP*** 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

Earth 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 earth 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 400MCDSe 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 are not perfectly compliant with all the applicable technical or legislative Rules, and which are not suitable for the working voltages of the device (approx. 7600Vpp "4000Vp" for the monopolar currents with crest factors equal or higher than 2; 3600Vpp "1800Vp" for the monopolar currents with crest factors lower than 2; approx. 1100Vpp "550Vp for the bipolar currents with crest factors equal or lower than 2). Moreover, the accessories and instruments must not be old nor worn. 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. In addition, their unstable functioning can lead the operator to increase the output powers at dangerous levels;
   - In the user manual, for each current, the maximum output voltage "Vpp" and its variation (see the curves) according to the output power adjustment are specified. This allows the operators to choose the maximum output power that must not be overcome, in order to not exceed the rated HF insulation voltage, which is possible for each accessory;
   - The standard monopolar active electrodes for normal surgery have a stem with Ø 2.3mm (so, the standard electrode-holder handles are suitable for the electrodes having stems with this diameter).
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 earth, 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:
    - Bear in mind that, if the neutral electrodes "Split" type double section are not used, the neutral electrode safety circuit of the unit cannot control the contact between the electrode and the patient tissues (that is, it does not grant the safety of a good contact);
    - 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 with "weight body higher than 15 Kg": approx. 136cm$^2$; standard for children with "weight body from 5 to 15 Kg": 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 earth 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 earth 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 memory for the bipolar use (it does not require any neutral electrode) is selected (memory 9)**, 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*

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:

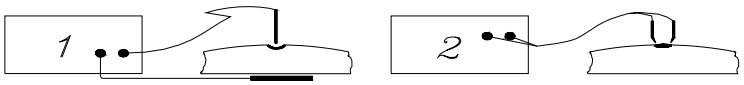
- *MONO* to activate the monopolar currents of cut/coagulating cut (**yellow** pedal), or coagulation (**blue** pedal);
- *BIP* to activate the bipolar currents of cut/coagulating cut (**yellow** pedal), or coagulation (**blue** pedal), except for the coagulation **Micro Auto** (which is not activated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

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 6, 7)

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");

**3.** 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 6 and 7 "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.

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

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

**Control devices to be used (area C):**

- With the selection key, select the current ***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;

**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", program nr. 8).

## 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.

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

**Control devices to be used (area C):**
- With the selection key, select the current ***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 ***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 ***ENDO***, for a cut-coagulation combination (alternated phases of cut and coagulation), and self regulation of the power (from 70-80W for papillotomy or polipectomy with polypus ∅ until 5mm, and from 90-100W 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", program nr. 8).

## 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.
**COMBINATED CUT (CUT ALTERNATED TO COAGULATION) ( *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), 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;
-

## CONNECTION and USE of the ACCESSORIES

The unit is equipped with one socket for the connection of the bipolar electrodes.

**1.** Socket 8-***BIP***: 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;

**der to facilitate the bipolar use, the unit is equipped with 1 pre-set program** (See Par. "PROGRAMS and MEMORIES", program nr.8) **which is 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*) – 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***, 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*) – Very soft coagulating effect**

This is a constant voltage current and it is controlled by a special automatic power self adjustment system (**ADC 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***, 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.

**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* 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.

## 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 10 memories (9 programmable memories and 1 for the storage of the data at the switching off), which allow to set 9 complete functioning programs, that can be selected by simply pressing the shifting keys UP/DOWN until the desired memory is chosen. 5 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 9 (1, 2, 3, 4, and so on) with the key UP, but also to shift them in the opposite direction, from 9 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 (nr 6 and 7) – 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 6, 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 7, 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 (nr.8) – 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 (nr. 9) – 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 reusable neutral electrodes with their cables 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 E²PROM (select "Cd" in CAL mode)*[1] |
|---|---|---|
| **Codes for Wrong Use or Activation Circuits Fault**<br>For all the "**U"** problems, the operators can act by eliminating the cause of the intervention of the self-diagnosis system.<br>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 S3 | 35 |
| Failure of an activation hand-switch at the switching on;<br>**U)** Activation hand-switch pressed at the switching on | Err Hnd | 82 |
| Failure of a pedal foot-switch at the switching on;<br>**U)** Pedal foot-switch pressed at the switching on | Err PEd | 83 |
| **U)** Contemporary activation not allowed of the two activation devices | USr Act | - |
| Failure of a key on the control panel;<br>**U)** Key on the control panel pressed at the switching on | Err 14 | 0E |

[1] Inside the E²PROM hexadecimal value corresponding to one of error codes reported on "Error code" column in the above table are stored.

| Error description | Error code | *Stored code in $E^2$PROM (select "Cd" in CAL mode)[1]* |
|---|---|---|
| **Codes for System Fault**<br>For this kind of problems, ask for the technical assistance, after having checked the signal by switching off and on the unit | | |
| *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* | | |
| +5VDC 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 slow sound repeatitions; after fast repeatitions | 3d |
| Failure regarding serial communication peripheral placed on power supply board alsa code 801471 | 3 slow sound repeatitions; after fast repeatitions | 3E |
| Failure regarding serial communication peripheral placed on double handswitch & nP control board alsa code 801462 | 4 slow sound repeatitions; after fast repeatitions | 3F |
| $E^2$PROM Communication error | 5 slow sound repeatitions; after fast repeatitions | 40 |
| $I^2$CBUS connection lost (during the use) | 6 slow sound repeatitions; after fast repeatitions | 43 |
| Master-Slave connection lost (during selftest phase) | 7 slow sound repeatitions; after fast repeatitions | 41 |
| Slave microcontroller failure | 8 slow sound repeatitions; after fast repeatitions | 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 selftest | Err 39 | 27 |
| Failure in HF output current measurement (lower than expected) | Err 51 | 33 |
| Failure in HF output current measurement (higher than expected) | Err 52 | 34 |
| Failure in bipolar output power( lower than expected) | Err 43 | 2b |
| Failure in bipolar output power( higher than expected) | Err 42 | 2A |
| Failure in monopolar circuit when PURE cut mode is used | Err 40 | 28 |
| Failure in monopolar circuit when SPRAY mode is used | Err 41 | 29 |
| Failed modulation signal for monopolar BLEND-1 mode | Err 44 | 2C |
| Failed modulation signal for monopolar FULG FORCED mode | Err 45 | 2d |
| Failed modulation signal for monopolar SPRAY mode | Err 46 | 2E |
| Output peak voltage reading failed (lower than expected) | Err 47 | 2F |
| Output peak voltage reading failed (higher than expected) | Err 48 | 30 |
| Output peak current reading failed (lower than expected) | Err 49 | 31 |
| Output peak current reading failed (higher than expected) | Err 50 | 32 |
| HF output power higher than expected | Err 98 | 62 |
| *Errors related to thermal protection* | | |
| 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 electrode 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 10 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** | 400 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 |
| Coagulating Cut : **Endo** | 250 W | 350 Ω | 1890 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 |

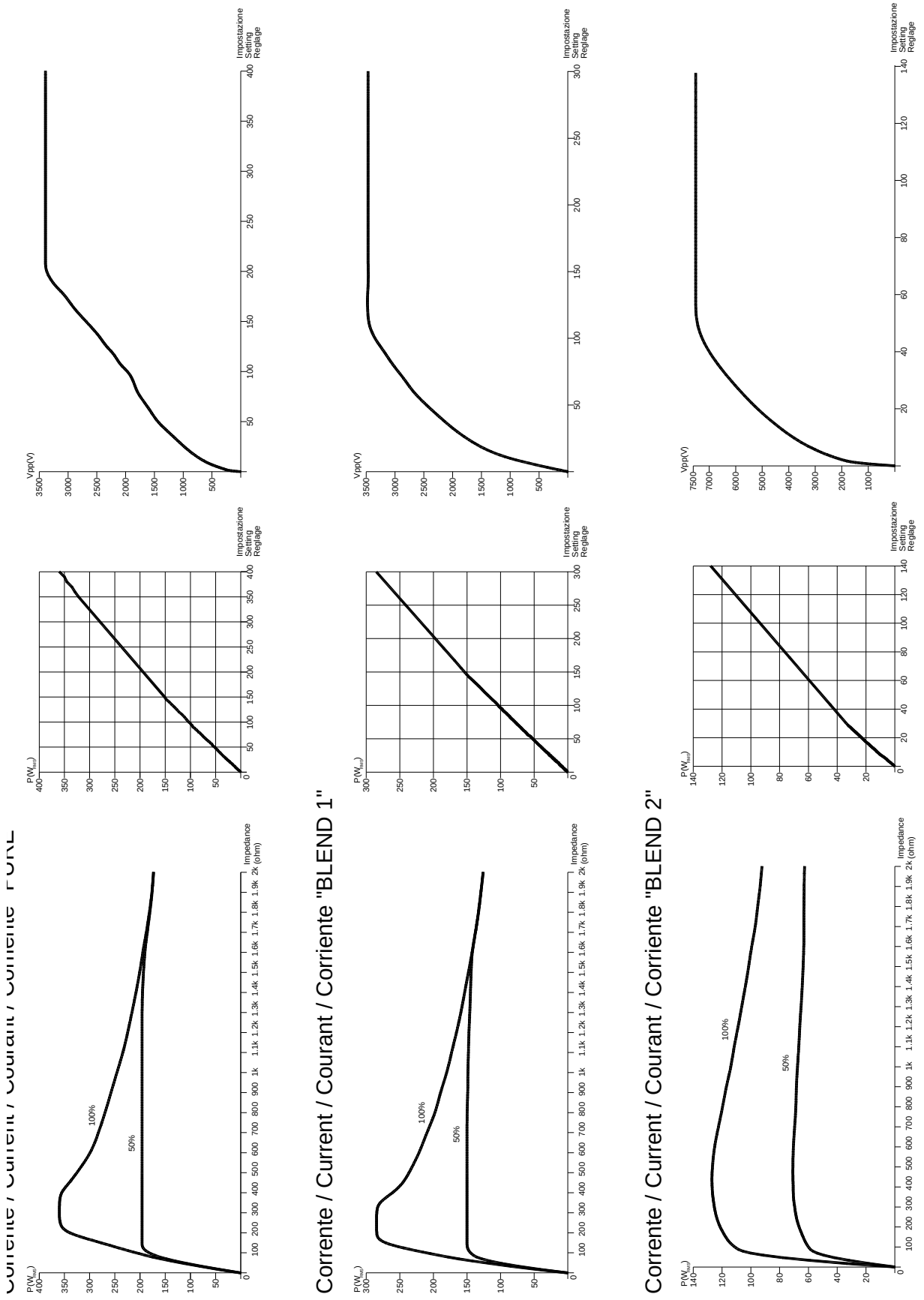
***Bipolar Currents Characteristics***

| Function | Maximum Power | Load | Vp/p | Frequency (F) - Crest Factor (CF) – Modulation (M) - Duty Cycle (DT) | Acoustic and Luminous Signals |
|---|---|---|---|---|---|
| Pure Cut: **Pure** | 140 W | 300 Ω | 850 V | F: 440 kHz- CF: 1.5 – M: No – DT: no | Loud tone, Yellow light |
| Coagulating Cut : **Blend** | 120 W | 300 Ω | 1000 V | F: 440 kHz- CF: 1.8 – M: 29 kHz – DT: 75 % | Loud tone, Yellow light |
| Micro Coagulation : **Micro** | 120 W | 100 Ω | 450 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** | 120 W | 100 Ω | 760 V | F: 440 kHz- CF: 1.7 – M: No – DT: no | High tone, Blue light |

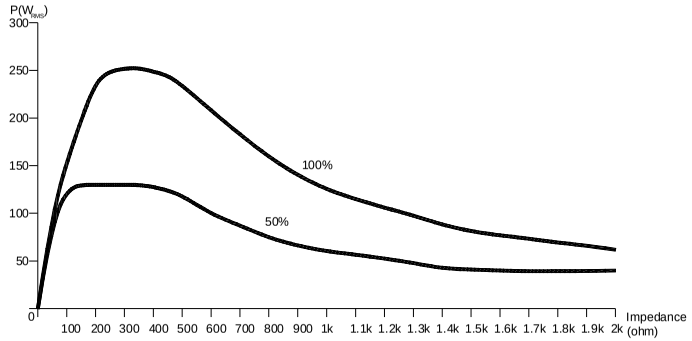
| **Conformity EMC/Directive 89/336/CEE: Category A<br>Suggested distances to keep from not vital devices** | | |
|---|---|---|
| **Source of the Current RF** | **Typical Power (W)** | **Distance (m)** |
| Microcellular telephones CT1,CT2,CT3 | 0.01 | 0.4 |
| Mobile telephones DECT, Wireless devices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

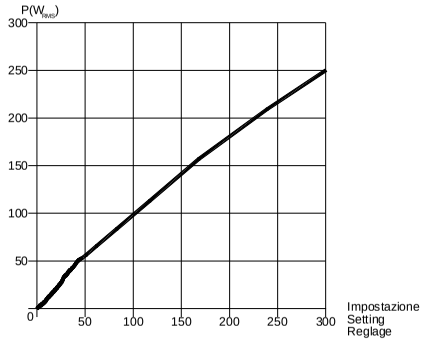
# MONOPOLAR CURRENTS

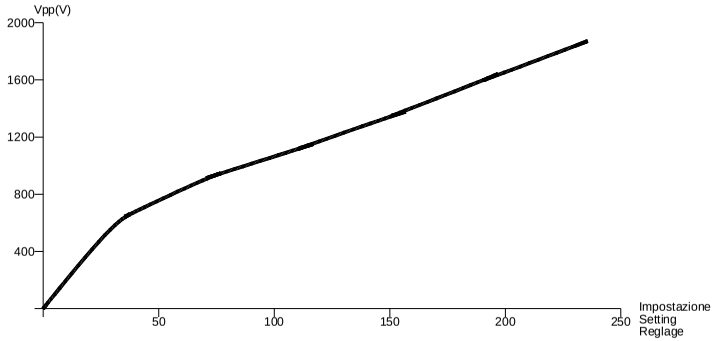
(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)
(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltageaccording to the power adjustment).



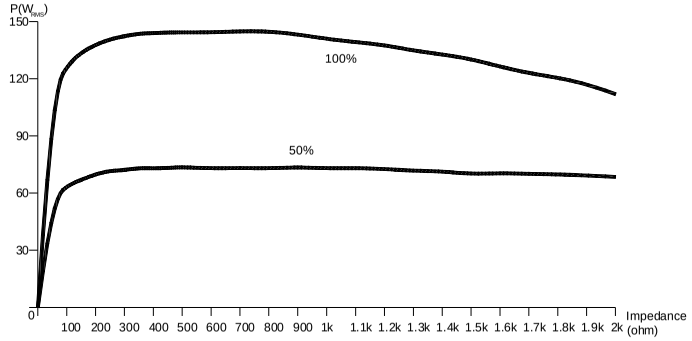
## Corrente / Current / Courant / Corriente "ENDO"

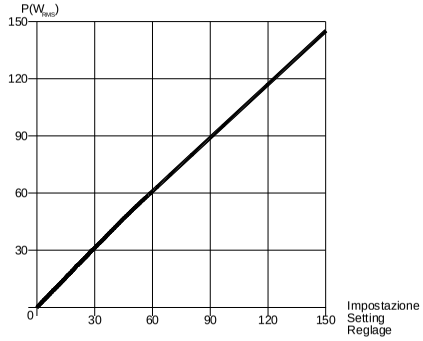


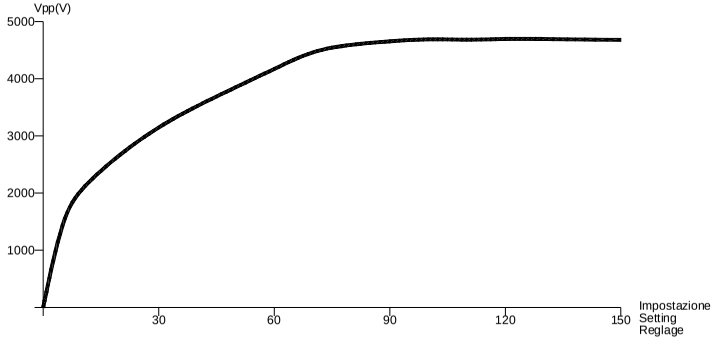



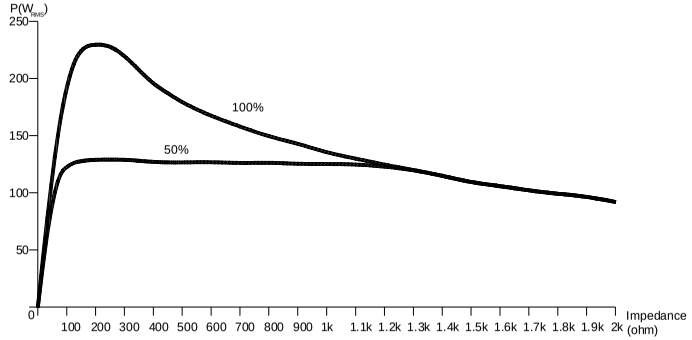

## Corrente / Current / Courant / Corriente "FULG"

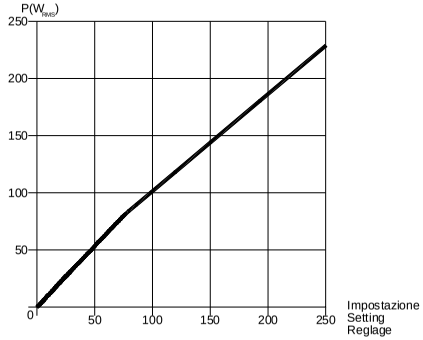


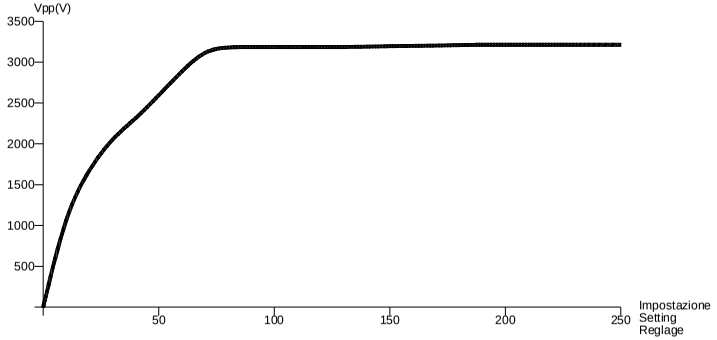



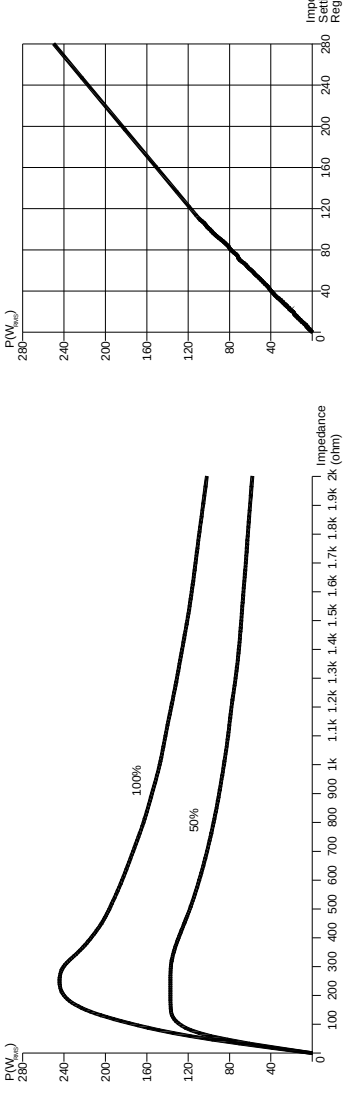

## Corrente / Current / Courant / Corriente "PINPOINT"

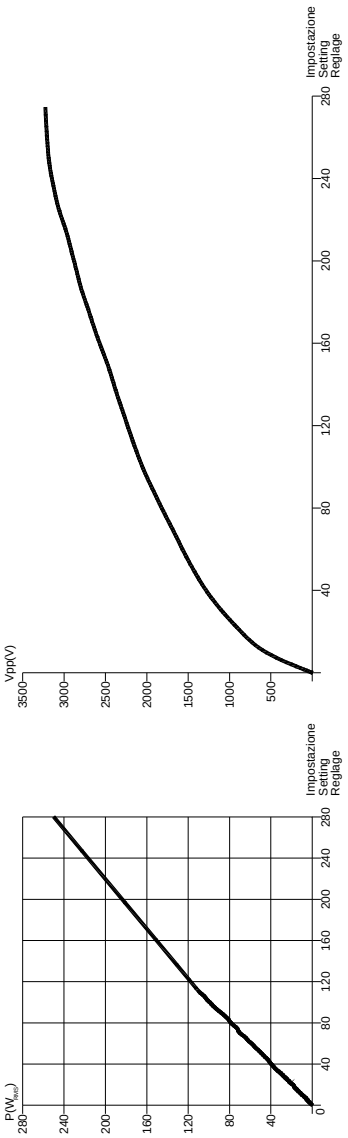


## Corrente / Current / Courant / Corriente "SOFT"

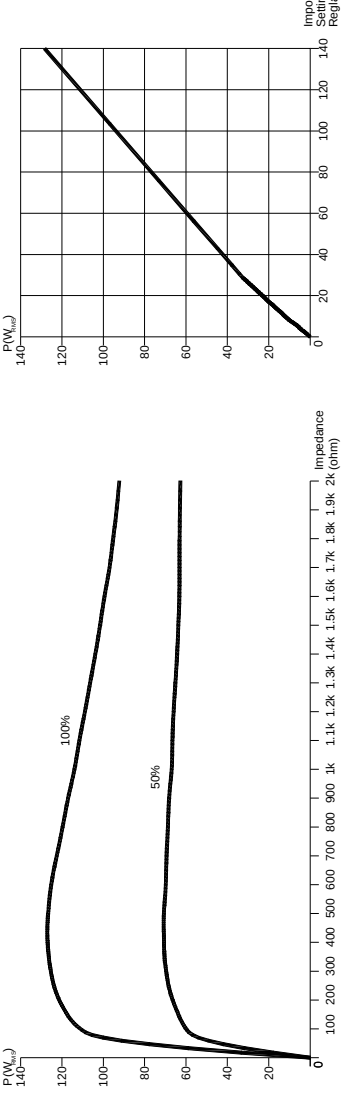


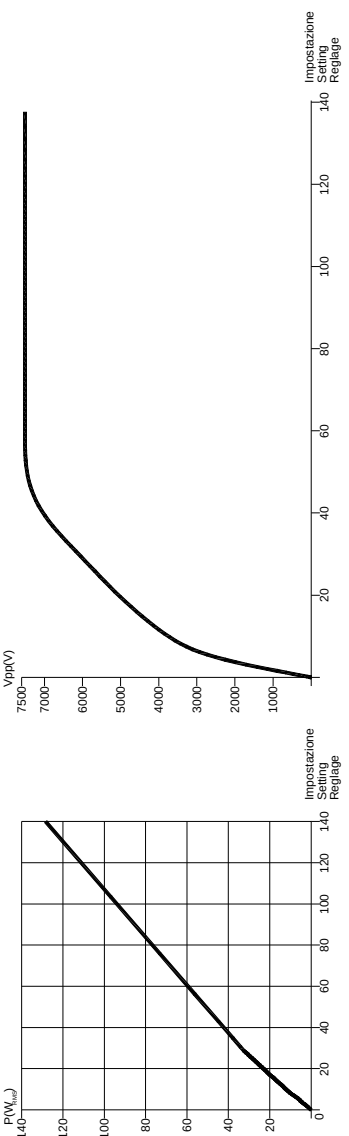







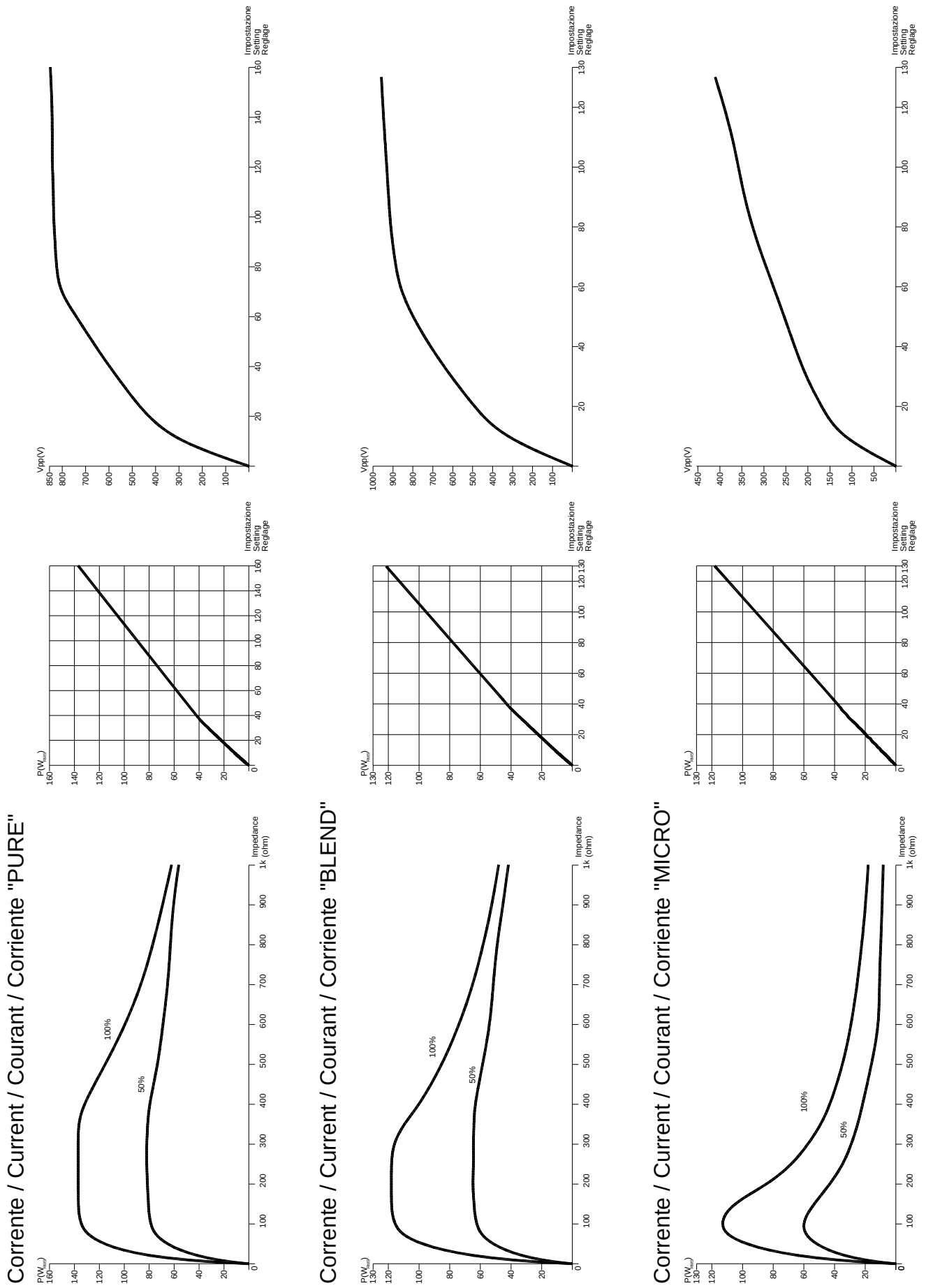
## Corrente / Current / Courant / Corriente "SPRAY"



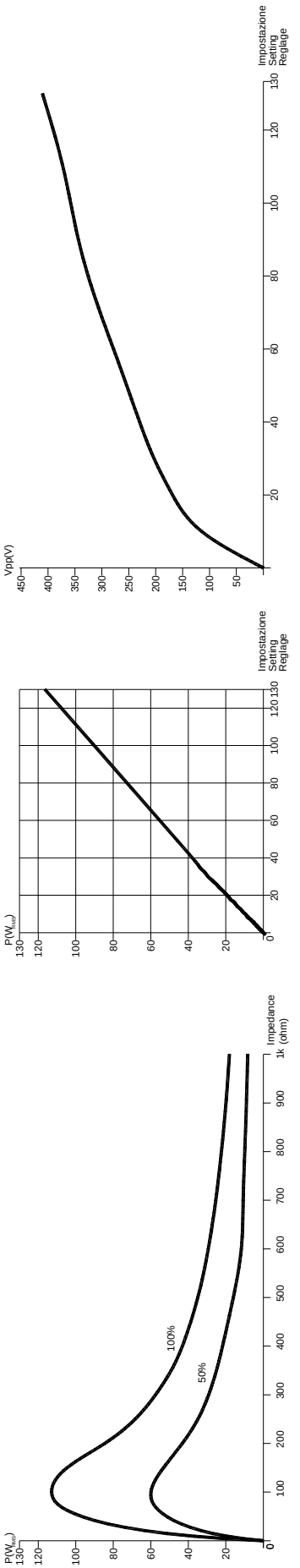



## BIPOLAR CURRENTS

(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 AUTO"

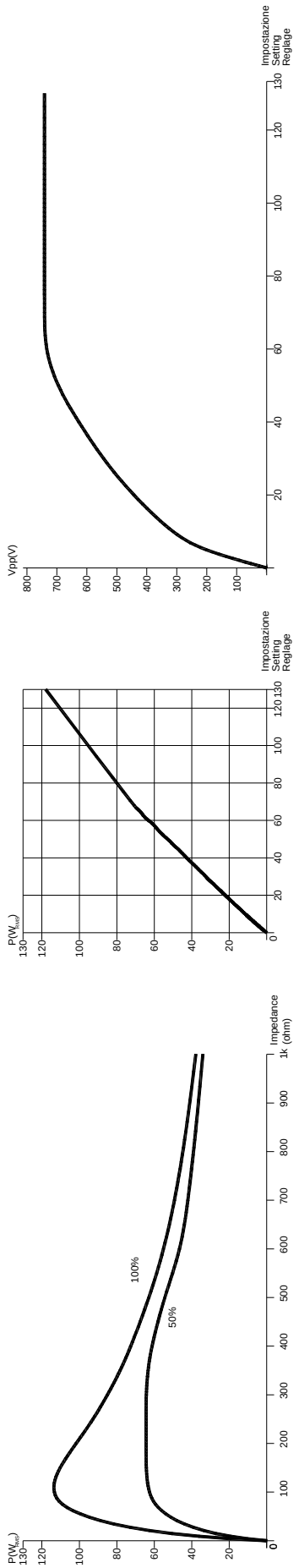






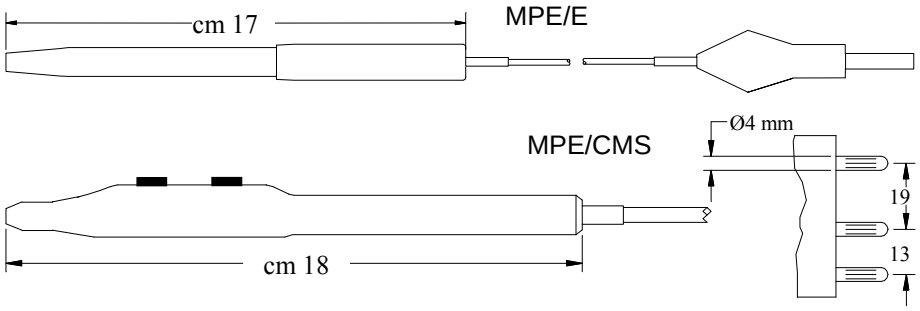



## Corrente / Current / Courant / Corriente "MACRO"



# ACCESSORIES

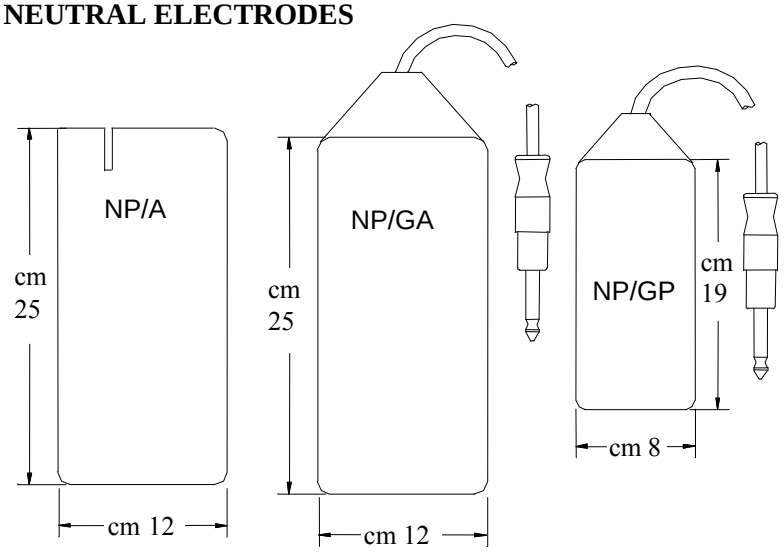
**ELECTRODES-HOLDER HANDLES** (nominal voltage: 4000 V)
MPE/E - Electrodes-holder handle (electrodes with stem Ø 2,3/2,4 mm) with cable 3.5m long;
MPE/CMS - Electrodes-holder handle (electrodes with stem Ø 2,3/2,4 mm) with hand-switches, reusable 100 times.




**ACTIVE ELECTRODES STANDARD SERIES (*SEL/E)*** (see next page for details)
(Nominal voltage: 4000 V)

E 1 - Straight knife electrode
E 5 - Straight needle electrode, thick type (2 pcs.)
E 7 - Straight needle electrode, thin type
E12 - Straight ball electrode Ø 2.5 mm
E14 - Straight ball electrode Ø 4 mm (2 pcs.)

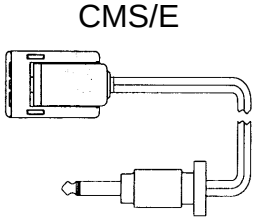
**NEUTRAL ELECTRODES**



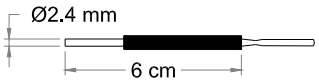

NP/A: Stainless steel neutral electrode for adults (bodies with weight higher than 15 Kg), cable 2.5m long;
NP/GA: Flexible rubber neutral electrode for adults (bodies with weight higher than 15 Kg), cable 2.5m long;
NP/GP: Flexible rubber neutral electrode for children (bodies with weight from 5 to 15 Kg), cable 2.5m long.

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

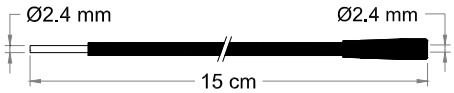
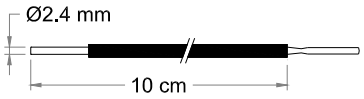
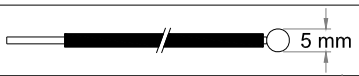
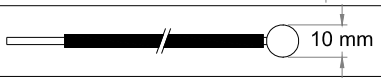
**DISPOSABLE NEUTRAL ELECTRODES**
CMS/E: Connection cable 2.5m long;
EIP/DA: Neutral electrode "non split" type for adults
(bodies with weight higher than 15 Kg), 136 $cm^2$;
EIP/DP: Neutral electrode "non split" type for children, 72 $cm^2$;
(bodies with weight from 5 to 15 Kg), 136 $cm^2$;
EIP/SA: Neutral electrode "split" type for adults,
(bodies with weight higher than 15 Kg), 128 $cm^2$;
EIP/SP: Neutral electrode "split" type for children, 71 $cm^2$.
(bodies with weight from 5 to 15 Kg), 136 $cm^2$;



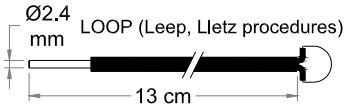
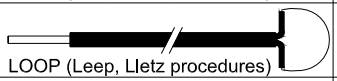
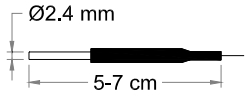
# ELETTRODI MONOPOLARI
# MONOPOLAR ELECTRODES
# ELECTRODES MONOPOLAIRES
# ELECTRODOS MONOPOLARES

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

# ELETTRODI MONOPOLARI
# MONOPOLAR ELECTRODES
# ELECTRODES MONOPOLAIRES
# ELECTRODOS MONOPOLARES

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

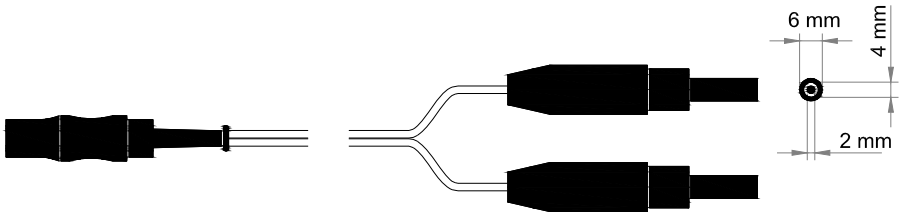
# ELETTRODI MONOPOLARI
# MONOPOLAR ELECTRODES
# ELECTRODES MONOPOLAIRES
# ELECTRODOS MONOPOLARES

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



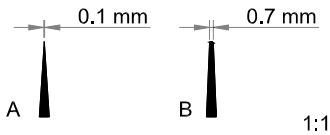

ALSA
CPB/E
(3 m)

CPB/E5
(5 m)

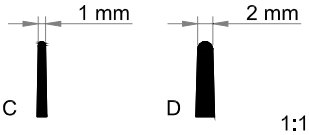
**Pinze di lunghezza diversa sono fornibili a richiesta (specificare tipo e lunghezza, es. PBC/R14 = PBC/R lunga 14 cm**
**Forceps of different lenght are available on request (please, specify lenght and type, i.e. PBC/R14 = PBC/R 14 cm long)**
**Pinces avec différente longueure peuvent etrê fournis sur demande (veullez 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

A punta / Pointed / Pointu / Con la punta



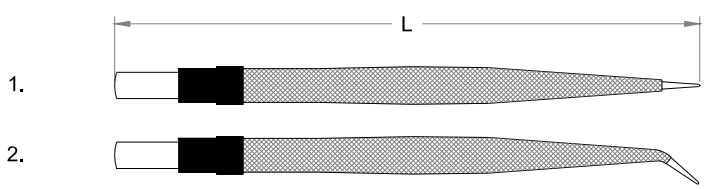

Smussate / Blunted / Arrondies / Redondeadas




Spina / Plug / Fiche / Enchufe

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

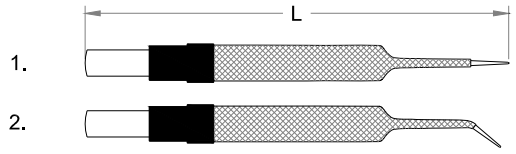

| Pinza isolata (Cushing / Potts-Smith)<br>Insulated forceps (Cushing / Potts-Smith)<br>Pince isolée (Cushing / Potts-Smith)<br>Pinza recubierta (Cushing / Potts-Smith) |  | L (cm) | ALSA<br>standard | ALSA<br>con irrigazione / with irrigation<br>avec irrigation / con irrigación |
|---|---|---|---|---|
| 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 |
| | | | | |



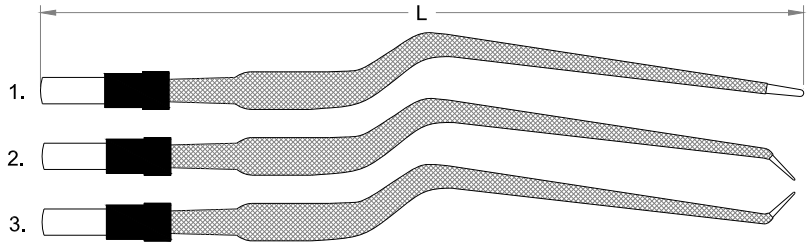
# ACCESSORI PER BICOAGULAZIONE
# ACCESSORIES FOR BICOAGULATION
# ACCESSOIRES POUR LA BICOAGULATION
# ACCESORIOS DE BICOAGULACIÓN

134° C
Autoclave

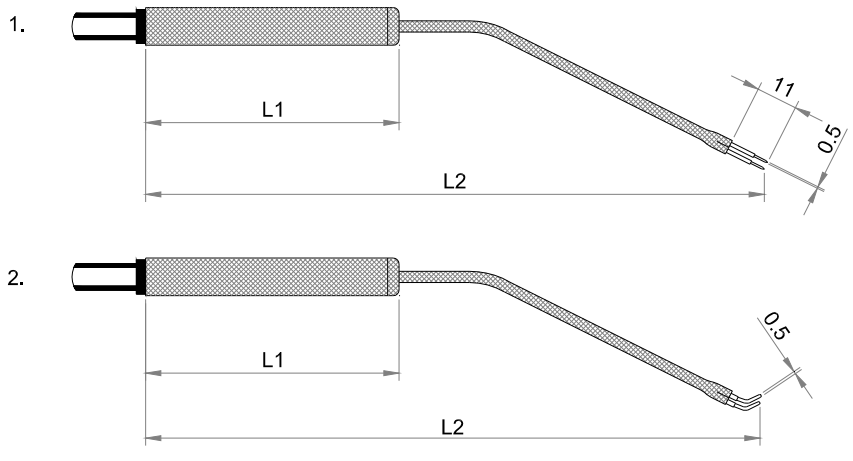
| Pinza isolata (Jeweler)<br>Insulated forceps (Jeweler)<br>Pince isolée (Jeweler)<br>Pinza recubierta (Jeweler) | | L (cm) | ALSA<br>standard | ALSA<br>con irrigazione / with irrigation<br>avec irrigation / con irrigación |
|---|---|---|---|---|
| 1. Retta / Staight type / Droite / Recta | B | 12 |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




| Pinza isolata (a baionetta / Jansen / Ysargil)<br>Insulated forceps (bayonet type / Jansen / Ysargil)<br>Pince isolée (à bayonette / Jansen / Ysargil)<br>Pinza recubierta (de baioneta / Jansen / Ysargil) | | L (cm) | ALSA<br>standard | ALSA<br>con irrigazione / with irrigation<br>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 | |

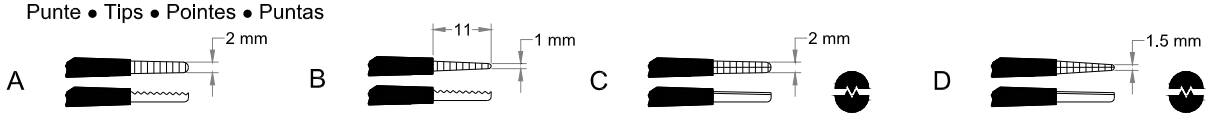



| Elettrodo bipolare<br>Bipolar electrode<br>Electrode bipolaire<br>Electrodo bipolar | L1(mm) | L 2(mm) | ALSA |
|---|---|---|---|
| 1. Ad ago per turbinati (Binner) / Needle type for turbinals (Binner)<br>À aiguille pour cornets (Binner) / De aguja para cornetes (Binner) | 68 | 170 | EBT |
| 2. Per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

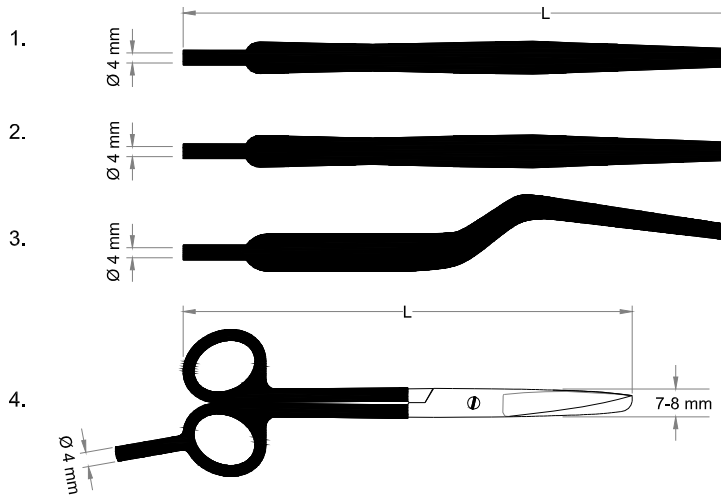


# PINZE, FORBICI E CANNULE D'ASPIRAZIONE ISOLATE MONOPOLARI
# MONOPOLAR INSULATED FORCEPS, SCISSORS AND SUCTING CANNULAE
# PINCES, CISEAUX ET CANULES POUR ASPIRATION MONOPOLAIRE ISOLEES
# PINZAS, TIJERAS Y CANULAS PARA ASPIRACION MONOPOLARES RECUBIERTAS

Punte • Tips • Pointes • Puntas

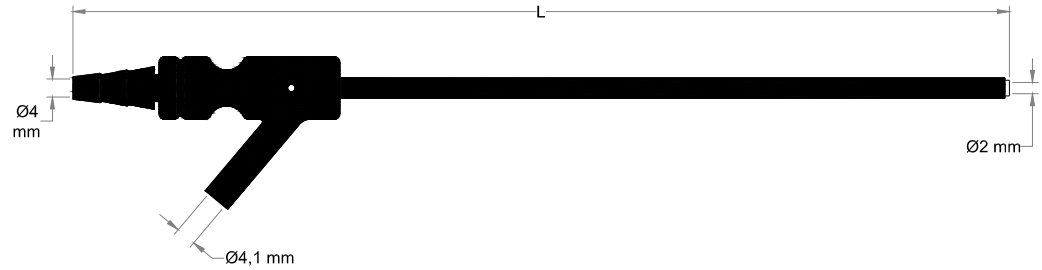



| Pinze e forbici monopolari • Monopolar forceps and scissors • Pinces et ciseaux monopolaires • Pinzas y tijeras monopolares | | L (cm) | ALSA |
|---|---|---|---|
| 1. (Potts-Smith) - Retta • Straight • Droite • Recta | A | 25 | PMI/2 |
| | B | 18 | PMI/1 |
| | B | 20 | PMI/1-20 |
| | B | 25 | PMI/1-25 |
| 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

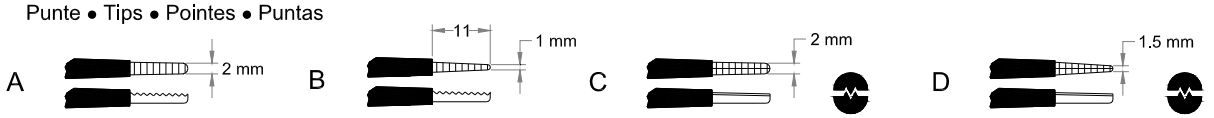
Cavo / Cable / Câble / Cable


ALSA
CPI
(m 3.5)

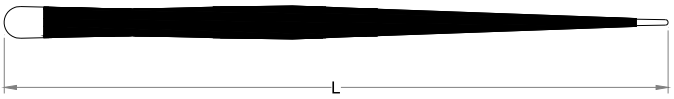
134° C
Autoclave

# 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<br>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 |

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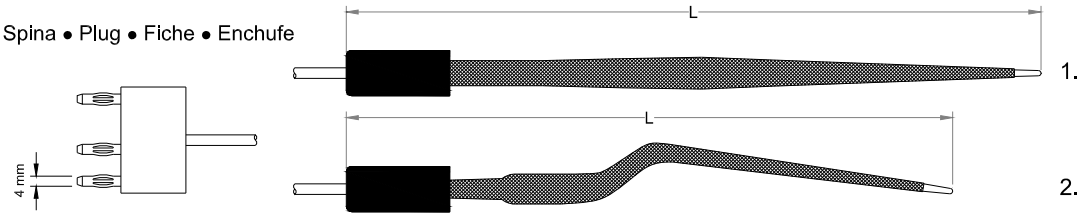
| Pinze con comando manuale • Hand-controlled forceps<br>Pinces avec commande manuelle • Pinzas con mando manuale | | L (cm) | ALSA |
|---|---|---|---|
| 1. (Potts-Smith) - Retta • Straight • Droite • Recta | A | 21 | PMI/PJ20 |
| " " " " | A | 24 | PMI/PJ25 |
| | | | |
| 2. (Jansen / Yasargil) - A baionetta • 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

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