

HF SURGICAL UNITS

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Manufacturer of medical devices since 1932

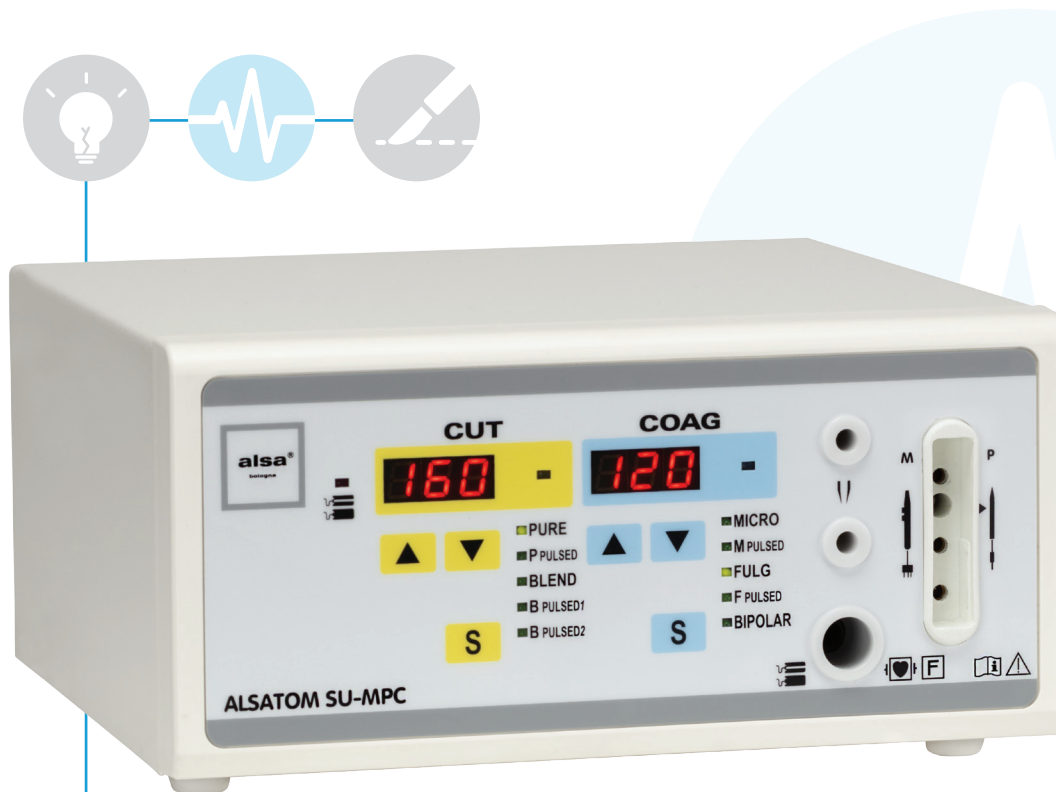


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ALSATOM SU-MPC

ALSATOM SU 140/D-MPC



Electrosurgical unit for monopolar and bipolar surgery with direct, pulsed and timed currents

ALSATOM SU-MPC are intuitive high-performing electrosurgical units. They have both traditional currents and currents with pulsed delivery, which minimises thermal effects in tissues and reduces the harmful smokes generated by the use of electrosurgical units. By selecting them, operators can make fine cuts similar to those obtained with radiofrequency devices, and delicate coagulations that would otherwise be difficult to achieve. They are also equipped with a current for Micro-Coagulation that allows the delivery of single pulses varying from 0.1 sec to 1 sec.

They are available in 5 models:

- **ALSATOM SU 50-MPC, ALSATOM SU 100-MPC, ALSATOM SU 140-MPC, ALSATOM SU 140/D-MPC** for Monopolar, Bipolar, Monopolar use under liquid with miniresectors and 5Fr needles
- **ALSATOM SU 140/BD-MPC** for Bipolar use only in cutting and coagulation, as well as cutting, coagulation, saline vaporisation with miniresectors, 5Fr needles and arthroscopy instruments

CURRENTS

ALSATOM SU 50-MPC, SU 100-MPC, SU 140-MPC, SU 140/D-MPC

MONOPOLAR CURRENTS

PURE	Pure Cut, suitable also for use in under liquid surgery in case of minor hysteroscopy procedures
P PULSED	Pure Pulsed Cut, suitable for very fine cuts, with minimum thermal effect (i.e. for conization of cervix or blepharoplasty) and to control surgical smoke
BLEND	Coagulating Cut
B PULSED 1	Coagulating Pulsed Cut. Similar to BLEND, but suitable to reduce the thermal effect and surgical smoke
B PULSED 2	Slow Coagulating Pulsed Cut. Similar to BLEND, but with slow pulses (i.e. for polypectomies)
MICRO	Delicate Coagulation, with low sparking effect
M PULSED	Delicate Micro-Coagulation, with single pulses, which are adjustable from 0.1 sec to 1 sec. It is indicated for all micro-coagulations
FULG	Macro-Coagulation "Fulguration" with strong sparks. It is indicated to coagulate all tissues, even in under liquid surgery, and to perform high-coagulating cuts
F PULSED	Macro-Coagulation "Fulguration", with fast pulses. Similar to FULG, but more delicate. It is indicated to reduce surgical smoke

BIPOLAR CURRENTS

BIPOLAR	Bipolar Coagulation, to be used with forceps, scissors, double-needle electrodes and laparoscopic instruments
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CURRENTS

ALSATOM SU 140/BD-MPC

PURE	Cut for use in Open Surgery or Laparoscopy
P PULSED	Pulsed Fast Cut, suitable to achieve detailed results, minimum thermal effect and reduction of surgical smoke
BLEND	Coagulating Cut, with greater thermal effect
MACRO	Coagulation, to be used with forceps, scissors, double-needle electrodes and laparoscopic instruments
M PULSED	Pulsed Coagulation. Similar to MACRO, but more delicate and useful to reduce surgical smoke
MICRO	Micro-Coagulation, to be used with forceps, scissors, double-needle electrodes and laparoscopic instruments



TECHNICAL FEATURES

HF generator compliant with	IEC 60601-1 and IEC 60601-2-2
CE Classification	I Ib
IEC 60601-1 classification and type	I CF
IEC 60601-2-2 output circuit	Floating - protected for the use of a defibrillator (HF dispersion <150 mA)
Monopolar and bipolar working frequency	450 kHz
Operation check	Complete self-diagnosis using microprocessor, and possible operation lock with alarm by means of specific Error Codes in the event of problems relating to: - general operation or activation errors (General Error Control) - output power (Output Error Control)
Power self-adjustment	By microprocessor with: ADC System - Constant power: self-adjusts power, controlling voltage and current, based on real-time feedback (7000 checks/sec) between device and patient's tissue
Outputs	1 Monopolar and 1 Bipolar (for ALSATOM SU 140/BD-MPC 1 Bipolar only)
Foot-operated controls	Single or double pneumatic control (for ALSATOM SU 140/D-MPC and ALSATOM SU 140/BD-MPC only)
Micro/macro power adjustment	0-30 W = 1 W, over 30 W = 2 W
Panel	Smooth, with digital displays and keys
Neutral electrode safety circuit NPCC System	Control of the connection of the neutral electrode - and of the quality of the contact using double section/split electrodes - with alarm signal and possible lock of delivered power
Power supply	230 or 115 V - 50/60 Hz
Power consumption at 230 V	370 VA
Cooling	Convection, without fan
Size (LxDxH) and weight	25x24x12 cm – 4.5 Kg

OUTPUT POWERS

Monopolar currents	ALSATOM SU 50-MPC	ALSATOM SU 100-MPC	ALSATOM SU 140-MPC	ALSATOM SU 140/D-MPC
PURE	80 W - 500 Ω 980 Vpp - CF 1.5 M: no - D: 100%	100 W - 500 Ω 1000 Vpp - CF 1.5 M: no - D: 100%	140 W - 500 Ω 1000 Vpp - CF 1.5 M: no - D: 100%	160 W - 500 Ω 990 Vpp - CF 1.5 M: no - D: 100%
P PULSED	40 W - 500 Ω 1350 Vpp - CF 3 M: 50% - D: 100%	50 W - 500 Ω 1360 Vpp - CF 3 M: 50% - D: 100%	70 W - 500 Ω 1380 Vpp - CF 3 M: 50% - D: 100%	80 W - 500 Ω 1380 Vpp - CF 3 M: 50% - D: 100%
BLEND	80 W - 500 Ω 1400 Vpp - CF 2.3 M: no - D: 80%	100 W - 500 Ω 1400 Vpp - CF 2.3 M: no - D: 80%	120 W - 500 Ω 1400 Vpp - CF 2.3 M: no - D: 80%	140 W - 500 Ω 1410 Vpp - CF 2.3 M: no - D: 80%
B PULSED 1	40 W - 500 Ω 1550 Vpp - CF 3.5 M: 50% - D: 80%	50 W - 500 Ω 1550 Vpp - CF 3.5 M: 50% - D: 80%	60 W - 500 Ω 1550 Vpp - CF 3.5 M: 50% - D: 80%	70 W - 500 Ω 1600 Vpp - CF 3.5 M: 50% - D: 80%
B PULSED 2	35 W - 500 Ω 1580 Vpp - CF 3.6 M: 50% - D: 80%	38 W - 500 Ω 1580 Vpp - CF 3.6 M: 50% - D: 80%	38 W - 500 Ω 1580 Vpp - CF 3.6 M: 50% - D: 80%	38 W - 500 Ω 1630 Vpp - CF 3.6 M: 50% - D: 80%
MICRO	80 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%	80 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%	80 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%	100 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%
M PULSED	80 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%	80 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%	80 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%	100 W - 500 Ω 1530 Vpp - CF 3.4 M: no - D: 50%
FULG	80 W - 750 Ω 2250 Vpp - CF 3.5 M: no - D: 50%	100 W - 750 Ω 2300 Vpp - CF 3.5 M: no - D: 50%	120 W - 750 Ω 2300 Vpp - CF 3.5 M: no - D: 50%	120 W - 750 Ω 2280 Vpp - CF 3.5 M: no - D: 50%
F PULSED	40 W - 750 Ω 2300 Vpp - CF 5 M: 50% - D: 50%	48 W - 750 Ω 2300 Vpp - CF 5 M: 50% - D: 50%	60 W - 750 Ω 2300 Vpp - CF 5 M: 50% - D: 50%	60 W - 750 Ω 2270 Vpp - CF 5 M: 50% - D: 50%
Bipolar currents	SU 50-MPC	SU 100-MPC	SU 140-MPC	SU 140/D-MPC
BIPOLAR	80 W - 100 Ω 500 Vpp - CF 2.8 M: no - D: 100%	100 W - 100 Ω 500 Vpp - CF 2.8 M: no - D: 100%	100 W - 100 Ω 500 Vpp - CF 2.8 M: no - D: 100%	100 W - 100 Ω 500 Vpp - CF 2.8 M: no - D: 100%

Bipolar currents	ALSATOM SU 140/BD MPC
PURE	120 W - 400 Ω 975 Vpp - CF 2.75 M: no - D: 100%
P PULSED	60 W - 400 Ω 990 Vpp - CF 3.98 M: 50% - D: 100%
BLEND	100 W - 400 Ω 975 Vpp - CF 2.8 M: no - D: 80%
MACRO	100 W - 100 Ω 640 Vpp - CF 3.6 M: no - D: 80%
M PULSED	50 W - 100 Ω 640 Vpp - CF 5 M: no - D: 50%
MICRO	100 W - 100 Ω 600 Vpp - CF 3.4 M: no - D: 50%

KEY

W: DELIVERED POWER

Ω: NOMINAL LOADS

Vpp: PEAK/NO-LOAD PEAK VOLTAGES

CF: CREST FACTORS

M: MODULATION

D: DUTY CYCLE

DEVICES AND STANDARD ACCESSORIES

ALSATOM SU 140-MPC, without accessories

ALSATOM SU 100-MPC, without accessories

ALSATOM SU 50-MPC, without accessories

B700/A STANDARD ACCESSORIES SERIES including:

1 STOP/PN Single pedal control, pneumatic, waterproof, explosion-proof

1 EIP/9 Stainless steel neutral electrode, 2.5 m cable

1 FFE Fixing belt for electrodes

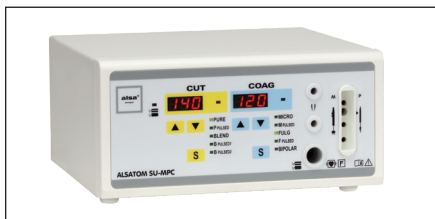
1 MPE/F Sterilisable electrode holder handle, 2.5 m cable

1 SEL/VI Series of 6 active electrodes (2 E1 - Straight blade electrode, 1 E5 - Thick needle electrode, 1 E7 - Fine needle electrode, 1 E12 - Straight ball electrode Ø 2.5 mm, 1 E14 - Straight ball electrode Ø 4 mm)

B700/B STANDARD ACCESSORIES SERIES identical to B700/A, but with NP/GP flexible conductive rubber neutral electrode

B700/D As above, but for dental use, without EIP/9 and SEL/VI replaced, respectively, by EIP/S

- Manual neutral electrode, 2.5 m cable and SEL/D - set of 8 dental electrode



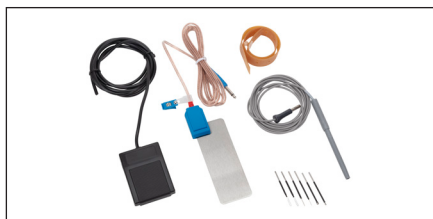
ALSATOM SU 140-MPC



ALSATOM SU 100-MPC



ALSATOM SU 50-MPC



B700/A



B700/B

ALSATOM SU 140/D-MPC, without accessories

B730/A STANDARD ACCESSORIES SERIES including:

1 D-STOP/P Double pedal control, pneumatic, waterproof, explosion-proof

1 EIP/9 Stainless steel neutral electrode, 2.5 m cable

1 FFE Fixing belt for electrodes

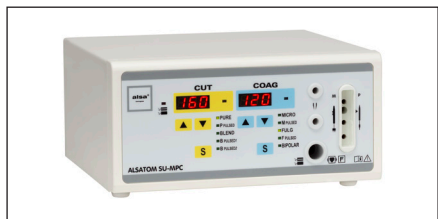
1 MPE/F Sterilisable electrode holder handle, 2.5 m cable

1 SEL/VI Series of 6 active electrodes (2 E1 - Straight blade electrode, 1 E5 - Thick needle electrode, 1 E7 - Fine needle electrode, 1 E12 - Straight ball electrode Ø 2.5 mm, 1 E14 - Straight ball electrode Ø 4 mm)

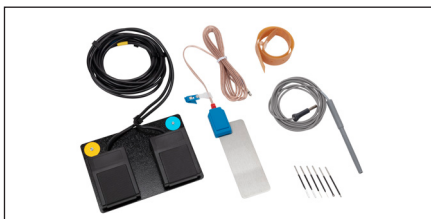
B730/B STANDARD ACCESSORIES SERIES identical to B730/A, but with NP/GP flexible conductive rubber neutral electrode

B730/D As above, but for dental use, without EIP/9 and SEL/VI replaced, respectively, by EIP/S

- Manual neutral electrode, 2.5 m cable and SEL/D - set of 8 dental electrodes



ALSATOM SU 140/D-MPC

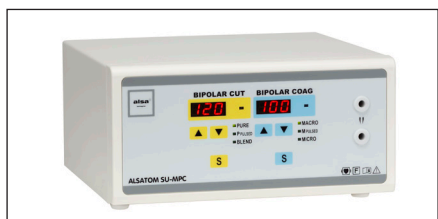


B730/A



B730/B

ALSATOM SU 140/BD-MPC, with D-STOP/P double pedal control



ALSATOM SU 140/BD-MPC

EXCELL MCDSe



Electrosurgical unit for monopolar and bipolar surgery

EXCELL MCDSe are electrosurgical units for advanced surgery, indicated for all monopolar, bipolar and monopolar techniques with Argon gas flow.

They are available in 5 models:

- **EXCELL 400 MCDSe, EXCELL 350 MCDSe, EXCELL 250 MCDSe, EXCELL 200 MCDSe** for electrosurgery
- **EXCELL 400/A MCDSe** both for electrosurgery and for electrosurgery with Argon gas, being equipped with an integrated Argon module

CURRENTS

MONOPOLAR CURRENTS

PURE	Pure cut without any coagulating effect
BLEND 1	Coagulating cut with medium haemostatic effect
BLEND 2	Coagulating cut with strong haemostatic effect, spray type
ENDO	Coagulating cut with cut phases alternated to coagulation phases, for flexible endoscopy

FULG FORCED	Coagulation with strong superficial and deep effect
PINPOINT CONTACT	Coagulation similar to the previous one, but softer
SOFT	Very delicate coagulation, with soft superficial effect and strong deep action
SPRAY	Coagulation without any contact and a very strong superficial effect

BIPOLAR CURRENTS

PURE	Pure cut with minimum coagulating effect
BLEND	Coagulating cut with strong coagulating effect

MICRO	Very delicate coagulation, Micro Precise type, with minimum sticking effect of tissue on the tips of the forceps
MICRO AUTO	Coagulation identical to Micro, but with Impedance Sensing automatic Auto Start/Auto Stop
MACRO	Coagulation Standard type, very rapid and efficacious, ideal for forceps with bigger section (for example, for laparoscopy)



TECHNICAL FEATURES

HF generator compliant with	IEC 60601-1 and IEC 60601-2-2
CE Classification	IIb
IEC 60601-1 classification and type	I CF
IEC 60601-2-2 output circuit	Floating - protected for the use of a defibrillator (HF dispersion <150 mA)
Monopolar and bipolar working frequency	440 kHz
Operation check	Complete self-diagnosis by means of a double microprocessor which performs: <ul style="list-style-type: none"> - Main Self-check when turned on - Standard Self-check during operation and, if any, operation lock (within 100 milliseconds), with alarm signalling to operators through specific Error Codes, in the event of problems concerning: <ul style="list-style-type: none"> - general operation or activation errors (General Error Control) - output power (Output Error Control) - HF Leakage Control: continuous verification, by means of a specific circuit, of any HF current dispersion to earth and possible automatic power reduction by means of an alarm signal - Storage of the last 32 Error Codes
Power self-adjustment	By microprocessor with: <ul style="list-style-type: none"> - ADC System - Constant power: self-adjusts power, controlling voltage and current, based on real-time feedback (7000 checks/sec) between device and patient's tissue
Operation memorisation	10 programs
Outputs	2 Monopolar and 1 Bipolar
Foot-operated controls	The EXCELL MCDSe can be equipped with: <ul style="list-style-type: none"> • A double pedal control selectable for monopolar or bipolar functions. • Two double pedal controls, one for monopolar and one for bipolar functions. The pedals are compliant with IEC 60601-2-2, waterproof (IP67), electric with 12 VDC low voltage power supply.
Micro/macro power adjustment	Monopolar: 0-30 W = 1 W, 30-100 W = 2 W, 100-200 W = 5 W, over 200 W = 10 W Bipolar: 0-10 W = 0.5 W, 10-30 W = 1 W, 30-100 W = 2 W, over 100 W = 5 W
Panel	Smooth, with digital displays and keys
Neutral electrode safety circuit NPCC System	Control of the connection of the neutral electrode - and of the quality of the contact using double section/split electrodes - with alarm signal and possible lock of delivered power.
Power supply	230 or 115 V - 50/60 Hz
Power consumption at 230 V	Max power 3.6 A = 828 VA, Stand-by 0.4 A = 92 VA
Cooling	Convection, without fan
Equipotential bonding	Standard DIN 42801 plug
Size (LxDxH) and weight	EXCELL 400/A MCDSe: 38x38x16 cm – 16 Kg EXCELL 400 MCDSe, EXCELL 350 MCDSe, EXCELL 250 MCDSe, EXCELL 200 MCDSe: 38x35x16 cm – 15 Kg
Argon gas section (only in the EXCELL 400/A MCDSe model)	
Supply	One 5 litre cylinder or with centralised system
Flow	Max 15 l/min
Pressure	Inlet 2.5 atm / Outlet 1 atm
Flow check with Constant flow System	From 1 to 15 l/min by means of an electronic sensor with adjustment buttons and visual control on the LED bar. Automatic self-compensation based on the type of electrode used. Alarm if gas is absent.
Pressure check in the Safety gas System circuit	Two-stage pressure reducer (on the cylinder and inside, with safety valve). Pressure sensor connected to the electronic control system, with Auto-Check when the gas section is switched on.
Protection of the supplied gas flow	Gas outlet equipped with antibacterial filter.

OUTPUT POWERS

Monopolar currents	EXCELL 400 MCDSe	EXCELL 350 MCDSe	EXCELL 250 MCDSe	EXCELL 200 MCDSe	EXCELL 400/A MCDSe
PURE	400 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	350 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	280 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	200 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	400 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no
BLEND 1	300 W – 350 Ω 3600 Vpp – CF: 2.3 M: 29 kHz – D: 65%	300 W – 350 Ω 3600 Vpp – CF: 2.3 M: 29 kHz – D: 65%	280 W – 350 Ω 3540 Vpp – CF: 2.3 M: 29 kHz – D: 65%	200 W – 350 Ω 3500 Vpp – CF: 2.3 M: 29 kHz – D: 65%	300 W – 350 Ω 3600 Vpp – CF: 2.3 M: 29 kHz – D: 65%
BLEND 2	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%
ENDO	250 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag	220 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag	220 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag	200 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag	250 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag
FULG FORCED	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%
PINPOINT CONTACT	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 56%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 56%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 56%	200 W – 250 Ω 3400 Vpp – CF: 2.6 M: 29 kHz – D: 56%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 56%
SOFT	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	200 W – 250 Ω 3020 Vpp – CF: 2,5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%
SPRAY	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%
Argon Coag					SPRAY + ARGON GAS
Bipolar currents	EXCELL 400 MCDSe	EXCELL 350 MCDSe	EXCELL 250 MCDSe	EXCELL 200 MCDSe	EXCELL 400/A MCDSe
PURE	140 W – 300 Ω 790 Vpp – CF: 1.5 M: no – D: no	140 W – 300 Ω 790 Vpp – CF: 1.5 M: no – D: no	140 W – 300 Ω 790 Vpp – CF: 1.5 M: no – D: no	140 W – 300 Ω 790 Vpp – CF: 1.5 M: no – D: no	140 W – 300 Ω 790 Vpp – CF: 1.5 M: no – D: no
BLEND	120 W – 300 Ω 980 Vpp – CF: 1.8 M: 29 kHz – D: 75%	120 W – 300 Ω 980 Vpp – CF: 1.8 M: 29 kHz – D: 75%	120 W – 300 Ω 980 Vpp – CF: 1.8 M: 29 kHz – D: 75%	120 W – 300 Ω 980 Vpp – CF: 1.8 M: 29 kHz – D: 75%	120 W – 300 Ω 980 Vpp – CF: 1.8 M: 29 kHz – D: 75%
MICRO	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no
MICRO AUTO	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no
MACRO	120 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	120 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no

KEY

W: DELIVERED POWER
Ω: NOMINAL LOADS
Vpp: PEAK/NO-LOAD PEAK VOLTAGES
CF: CREST FACTORS
M: MODULATION
D: DUTY CYCLE

DEVICES AND STANDARD ACCESSORIES

EXCELL 400 MCDSe, without accessories

EXCELL 350 MCDSe, without accessories

EXCELL 250 MCDSe, without accessories

EXCELL 200 MCDSe, without accessories

EXCELL 400/A MCDSe, without accessories

B610/A STANDARD ACCESSORIES SERIES including:

1 DS/E Double pedal control, electric, waterproof

1 NP/A Stainless steel neutral electrode, 2.5 m cable

1 FGE Fixing belt for electrodes

2 MPE/E Sterilisable electrode holder, 3.5 m cable

1 SEL/E Series of 8 active electrodes (2 E1 - Straight blade electrode, 2 E5 – Thick needle electrode, 1 E7 - Fine needle electrode, 1 E12 - Straight ball electrode Ø 2.5 mm, 2 E14 - Straight ball electrode Ø 4 mm)

B610/B STANDARD ACCESSORIES SERIES identical to B610/A, but with NP/GA flexible conductive rubber neutral electrode for adults

B610/P As above, with neutral paediatric electrode NP/GP



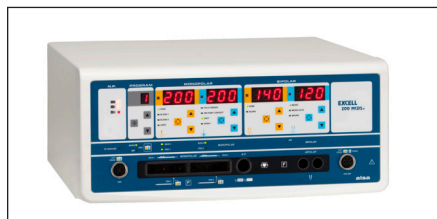
EXCELL 400 MCDSe



EXCELL 350 MCDSe



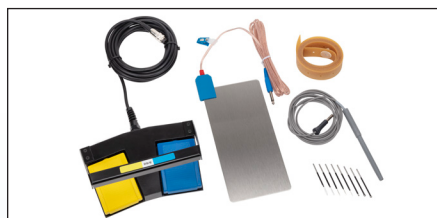
EXCELL 250 MCDSe



EXCELL 200 MCDSe



EXCELL 400/A MCDSe

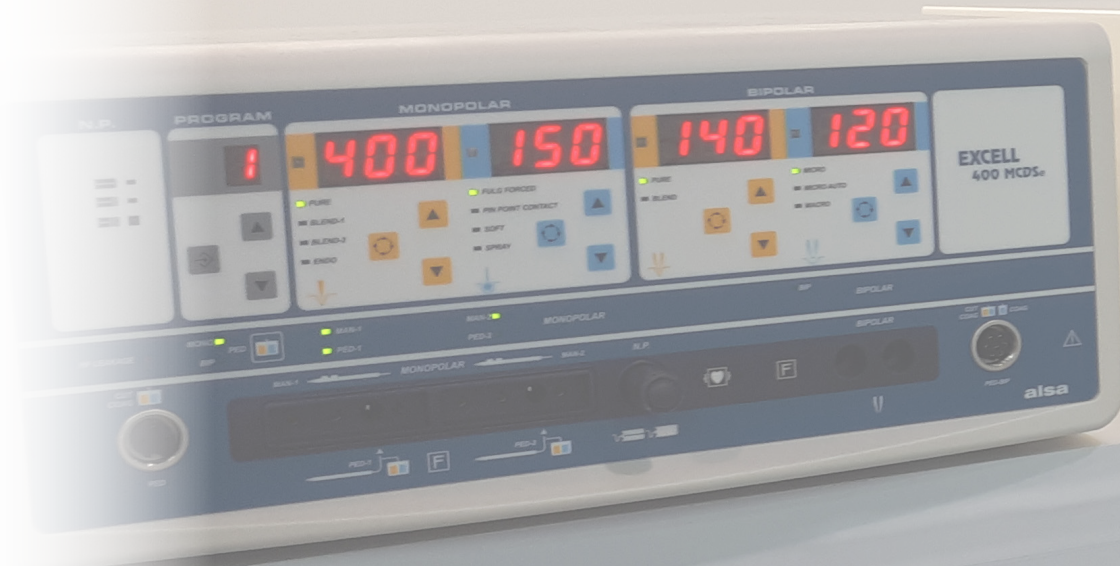


B610/A



B610/B

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EXCELL NHP



Electrosurgical unit for monopolar and bipolar surgery

EXCELL NHP are electrosurgical units for advanced surgery, indicated for all monopolar, bipolar and monopolar techniques with Argon gas flow.

They are available in 5 models:

- **EXCELL NHP 400/D, EXCELL NHP 350/D and EXCELL NHP 250/D** for electrosurgery
- **EXCELL NHP 400/DA and EXCELL NHP 250/DA** both for electrosurgery and for electrosurgery with Argon gas, being equipped with an integrated Argon module

CURRENTS

MONOPOLAR CURRENTS

PURE	Non-modulated sinusoidal current for cutting without any coagulating effect
BLEND 1	Modulated and pulsed sinusoidal current for cutting with moderate coagulating effect
BLEND 2	Modulated and pulsed current for cutting with strong coagulating effect, Spray type, for surgery or laparoscopy
AUTO PURE	Non-modulated sinusoidal current for cutting without any coagulating effect
AUTO BLEND	Modulated and pulsed sinusoidal current for cutting with moderate coagulating effect
AUTO ENDO	Current with alternating cut and coagulation phases for flexible endoscopy

FULG FORCED	Modulated high-voltage current with optimum superficial and deep efficacy, suitable both for direct use with an active small section electrode and indirect use through insulated coagulation forceps
PINPOINT CONTACT	Modulated medium-voltage current, very similar to the previous one, but with a more delicate effect
SOFT	Modulated low-voltage current with strong deep effect, and no superficial carbonisation. It is perfect for direct use with coagulation electrodes, or for indirect use through insulated coagulation forceps
SPRAY	Modulated and pulsed very-high voltage current, with a very strong superficial effect and low penetration in the tissue. It is perfect for direct use without any contact, with small section electrodes

BIPOLAR CURRENTS

PURE	Non-modulated sinusoidal pulsed current for cut
BLEND	Modulated and pulsed sinusoidal current for cut with coagulating effect
MICRO CV	Non-modulated low voltage current for very delicate coagulations with Soft / Micro Precise effect, minimum superficial carbonisation, and no sticking on tissue
MICRO HC	Current with Standard Forced effect in order to rapidly coagulate vascularised sites and bleeding during procedures with saline solution, or to use instruments with large tips
MICRO AUTO	Identical to Micro CV, but with Impedance Sensing Auto Start / Auto Stop and Start Delay adjustable from 0 to 5 sec. It is perfect for the use with manual activation, and no need of special forceps with switch device
MACRO	Modulated and pulsed current with stronger effect than the Micro HC current
SEAL HC	Pulsed current to coagulate and close big vessels with minimum superficial carbonization and no sticking of tissues. It can be activated through a pedal foot-switch, and thanks to the Auto Stop Impedance Sensing system it is very effective and easy to use, for laparoscopy procedures as well

TECHNICAL FEATURES

HF generator compliant with	IEC 60601-1 and IEC 60601-2-2
CE Classification	IIb
IEC 60601-1 classification and type	I CF
IEC 60601-2-2 output circuit	Floating - protected for the use of a defibrillator (HF dispersion <150 mA)
Monopolar and bipolar working frequency	440 kHz
Operation check	Complete self-diagnosis by means of a double microprocessor which performs: <ul style="list-style-type: none"> - Main Self-check when turned on - Standard Self-check during operation and, if any, operation lock (within 100 milliseconds), with alarm signalling to operators through specific Error Codes, in the event of problems concerning: <ul style="list-style-type: none"> - general operation or activation errors (General Error Control) - power supply (Output Error Control) - HF Leakage Control: continuous verification, by means of a specific circuit, of any HF current dispersion to earth and possible automatic power reduction by means of an alarm signal - Storage of the last 32 Error Codes
Power self-adjustment	By means of a microprocessor with two different systems: <ul style="list-style-type: none"> - ADC System - Constant power: self-adjusts the power, controlling voltage and current, based on real-time feedback (7000 checks/sec) between device and patient's tissue - APC System - Constant voltage: self-adjusts the power, keeping the voltage constant, based on a real-time feedback (7000 checks/sec) between device and patient's tissue
Operation memorisation	100 programs
Outputs	2 Monopolar and 2 Bipolar
Foot-operated controls	EXCELL NHP units can be fitted with: <ul style="list-style-type: none"> • A double pedal control selectable for monopolar or bipolar functions. • Two double pedal controls, one for monopolar and one for bipolar functions. The pedals are compliant with IEC 60601-2-2, waterproof (IP67), electric with 12 VDC low voltage power supply.
Micro/macro power adjustment	Monopolar: 0-30 W = 1 W, 30-100 W = 2 W, 100-200 W = 5 W, over 200 W = 10 W Bipolar: 0-10 W = 0.5 W, 10-30 W = 1 W, 30-100 W = 2 W, over 100 W = 5 W
Panel	Smooth, with digital displays and keys
Neutral electrode safety circuit NPCC System	Control of the connection of the neutral electrode - and of the quality of the contact using double section/split electrodes - with alarm signal and possible lock of delivered power.
Power supply	230 or 115 V - 50/60 Hz
Power consumption at 230 V	Max power 3.6 A = 828 VA, Stand-by 0.4 A = 92 VA
Cooling	Convection, without fan
Equipotential bonding	Standard DIN 42801 plug
Size (LxDxH) and weight	EXCELL NHP 400/DA and EXCELL NHP 250/DA: 38x38x16 cm – 16 Kg EXCELL NHP 400/D, EXCELL NHP 350/D and EXCELL NHP 250/D: 38x35x16 cm – 15 Kg
Argon gas section (only in EXCELL NHP 400/DA and EXCELL NHP 250/DA models)	
Supply	One 5 litre cylinder or with centralised system
Flow	Max 15 l/min
Pressure	Inlet 2.5 atm / Outlet 1 atm
Flow check with Constant flow System	From 1 to 15 l/min by means of an electronic sensor with adjustment buttons and visual control on the LED bar. Automatic self-compensation based on the type of electrode used. Alarm if gas is absent.
Pressure check in the Safety gas System circuit	Two-stage pressure reducer (on the cylinder and inside, with safety valve). Pressure sensor connected to the electronic control system, with Auto-Check when the gas section is switched on.
Protection of the supplied gas flow	Gas outlet equipped with antibacterial filter.

OUTPUT POWERS

Current self-adjustment

Monopolar currents	EXCELL NHP 400/D	EXCELL NHP 350/D	EXCELL NHP 250/D	EXCELL NHP 400/DA	EXCELL NHP 250/DA	ADC	APC
PURE	400 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	350 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	280 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	400 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	280 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	X	
BLEND 1	300 W – 350 Ω 3600 Vpp – CF: 2.3 M: 29 kHz – D: 65%	300 W – 350 Ω 3600 Vpp – CF: 2.3 M: 29 kHz – D: 65%	280 W – 350 Ω 3540 Vpp – CF: 2.3 M: 29 kHz – D: 65%	300 W – 350 Ω 3600 Vpp – CF: 2.3 M: 29 kHz – D: 65%	280 W – 350 Ω 3540 Vpp – CF: 2.3 M: 29 kHz – D: 65%	X	
BLEND 2	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	X	
AUTO PURE	400 W – 350 Ω 1470 Vpp – CF: 1.6 M: no – D: no	350 W – 350 Ω 1350 Vpp – CF: 1.6 M: no – D: no	280 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no	400 W – 350 Ω 1470 Vpp – CF: 1.6 M: no – D: no	280 W – 350 Ω 3450 Vpp – CF: 1.6 M: no – D: no		X
AUTO BLEND	300 W – 350 Ω 1930 Vpp – CF: 2.3 M: 29 kHz – D: 65%	300 W – 350 Ω 1930 Vpp – CF: 2.3 M: 29 kHz – D: 65%	280 W – 350 Ω 3540 Vpp – CF: 2.3 M: 29 kHz – D: 65%	300 W – 350 Ω 1930 Vpp – CF: 2.3 M: 29 kHz – D: 65%	280 W – 350 Ω 3540 Vpp – CF: 2.3 M: 29 kHz – D: 65%		X
AUTO ENDO	250 W – 350 Ω 1890 Vpp – CF: 2.2 50% Pure / 50% Coag	220 W – 350 Ω 1710 Vpp – CF: 2.2 50% Pure / 50% Coag	220 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag	250 W – 350 Ω 1890 Vpp – CF: 2.2 50% Pure / 50% Coag	220 W – 350 Ω 1880 Vpp – CF: 2.2 50% Pure / 50% Coag		X
FULG FORCED	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	150 W – 350 Ω 4700 Vpp – CF: 4.5 M: 78 kHz – D: 35%	X	
PINPOINT CONTACT	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 50%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 50%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 50%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 50%	250 W – 250 Ω 3460 Vpp – CF: 2.6 M: 29 kHz – D: 50%	X	
SOFT	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	280 W – 250 Ω 3440 Vpp – CF: 2.5 M: 29 kHz – D: 56%	X	
SPRAY	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	140 W – 600 Ω 7600 Vpp – CF: 8.1 M: 19 kHz – D: 9%	X	
Argon Coag				SPRAY + ARGON GAS	SPRAY + ARGON GAS	X	

Current self-adjustment

Bipolar currents	EXCELL NHP 400/D	EXCELL NHP 350/D	EXCELL NHP 250/D	EXCELL NHP 400/DA	EXCELL NHP 250/DA	ADC	APC
PURE	160 W – 300 Ω 850 Vpp – CF: 1.5 M: no – D: no	160 W – 300 Ω 850 Vpp – CF: 1.5 M: no – D: no	160 W – 300 Ω 850 Vpp – CF: 1.5 M: no – D: no	160 W – 300 Ω 850 Vpp – CF: 1.5 M: no – D: no	160 W – 300 Ω 850 Vpp – CF: 1.5 M: no – D: no	X	
BLEND	130 W – 300 Ω 1000 Vpp – CF: 1.8 M: 29 kHz – D: 75%	130 W – 300 Ω 1000 Vpp – CF: 1.8 M: 29 kHz – D: 75%	130 W – 300 Ω 1000 Vpp – CF: 1.8 M: 29 kHz – D: 75%	130 W – 300 Ω 1000 Vpp – CF: 1.8 M: 29 kHz – D: 75%	130 W – 300 Ω 1000 Vpp – CF: 1.8 M: 29 kHz – D: 75%	X	
MICRO CV	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no		X
MICRO HC	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	X	
MICRO AUTO	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 450 Vpp – CF: 1.7 M: no – D: no		X
MACRO	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 760 Vpp – CF: 1.7 M: no – D: no	X	
SEAL HC	130 W – 100 Ω 710 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 710 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 710 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 710 Vpp – CF: 1.7 M: no – D: no	130 W – 100 Ω 710 Vpp – CF: 1.7 M: no – D: no	X	

KEY

W: DELIVERED POWER

Ω: NOMINAL LOADS

Vpp: PEAK/NO-LOAD PEAK VOLTAGES

CF: CREST FACTORS

M: MODULATION

D: DUTY CYCLE

ADC: CONSTANT POWER

ADC: CONSTANT VOLTAGE

DEVICES AND STANDARD ACCESSORIES

EXCELL NHP 400/D, without accessories

EXCELL NHP 350/D, without accessories

EXCELL NHP 250/D, without accessories

EXCELL NHP 400/DA, without accessories

EXCELL NHP 250/DA, without accessories

B610/A STANDARD ACCESSORIES SERIES including:

1 DS/E Double pedal control, electric, waterproof

1 NP/A Stainless steel neutral electrode, 2.5 m cable

1 FGE Fixing belt for electrodes

2 MPE/E Sterilisable electrode holder, 3.5 m cable

1 SEL/E Series of 8 active electrodes (2 E1 - Straight blade electrode, 2 E5 - Thick needle electrode, 1 E7 - Fine needle electrode, 1 E12 - Straight ball electrode Ø 2.5 mm, 2 E14 - Straight ball electrode Ø 4 mm)

B610/B STANDARD ACCESSORIES SERIES identical to B610/A, but with NP/GA flexible conductive rubber neutral electrode for adults

B610/P As above, with neutral paediatric electrode NP/GP



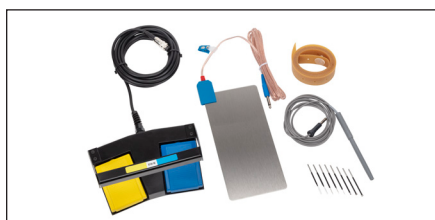
EXCELL NHP 400/D



EXCELL NHP 350/D



EXCELL NHP 250/D



B610/A



B610/B



EXCELL NHP ENDOMED



Electrosurgical unit for monopolar and bipolar surgery

EXCELL NHP ENDOMED is a complete technologically advanced electrosurgical unit suitable for any type of monopolar and bipolar technique. It is also equipped with a special

bipolar cutting current in liquid, particularly suitable for the new bipolar endoscopic procedures in urology and gynaecology in saline solution.

CURRENTS

MONOPOLAR CURRENTS

PURE	Non-modulated sinusoidal current for pure cut without coagulating effect
BLEND 1	Sinusoidal modulated current for coagulating cut
BLEND 2	Modulated current for cut with strong coagulating effect, Spray type, for surgery and laparoscopy
AUTO PURE	Non-modulated sinusoidal current for cut without coagulating effect
AUTO BLEND	Sinusoidal modulated current for coagulating cut
AUTO ENDO	Current with alternating cut and coagulation phases for flexible endoscopy
FULG FORCED	Modulated high voltage current with strong coagulating superficial and deep effect
PINPOINT	Modulated medium voltage current with medium coagulating superficial and deep effect
SOFT	Modulated low voltage current with delicate coagulating effect without superficial carbonisation
SPRAY	Modulated very high voltage current for very strong superficial coagulation with a low tissue penetration, even without any contact of the active electrode

BIPOLAR CURRENTS

STANDARD	Pulsed current for cut
SALINE	Pulsed current for endoscopic cut in saline solution
MICRO	Pulsed current for coagulation Soft / Micro Precise type and for coagulation in saline solution
MACRO	Pulsed current for coagulation Standard / Forced type in laparoscopy
SEAL	Pulsed current with automatic stop for sealing of big vessels up to 7 mm diameter



TECHNICAL FEATURES

HF generator compliant with	IEC 60601-1 and IEC 60601-2-2
CE Classification	IIb
IEC 60601-1 classification and type	I CF
IEC 60601-2-2 output circuit	Floating - protected for the use of a defibrillator (HF dispersion <150 mA)
Monopolar and bipolar working frequency	440 kHz
Operation check	Complete self-diagnosis by means of a double microprocessor which performs: <ul style="list-style-type: none"> - Main Self-check when turned on - Standard Self-check during operation and, if any, operation lock (within 100 milliseconds), with alarm signalling to operators through specific Error Codes, in the event of problems concerning: <ul style="list-style-type: none"> - general operation or activation errors (General Error Control) - output power (Output Error Control) - HF Leakage Control: continuous verification, by means of a specific circuit, of any HF current dispersion to earth and possible automatic power reduction by means of an alarm signal - Storage of the last 32 Error Codes
Power self-adjustment	By means of a microprocessor with two different systems: <ul style="list-style-type: none"> - ADC System - Constant power: self-adjusts the power, controlling voltage and current, based on real-time feedback (7000 checks/sec) between device and patient's tissue - APC System - Constant voltage: self-adjusts the power, keeping the voltage constant, based on a real-time feedback (7000 checks/sec) between device and patient's tissue
Operation memorisation	100 programs
Outputs	2 Monopolar and 1 Bipolar
Foot-operated control	EXCELL NHP ENDOMED can be equipped with a double pedal control that can be selected for monopolar or bipolar functions. The pedal is compliant with IEC 60601-2-2, waterproof (IP67), electric with 12 VDC low voltage power supply.
Micro/macro power adjustment	Monopolar: 0-30 W = 1 W, 30-100 W = 2 W, 100-200 W = 5 W, over 200 W = 10 W Bipolar: 0-10 W = 0.5 W, 10-30 W = 1 W, 30-100 W = 2 W, over 100 W = 5 W
Panel	Smooth, with digital displays and keys
Neutral electrode safety circuit NPCC System	Control of the connection of the neutral electrode - and of the quality of the contact using double section/split electrodes - with alarm signal and possible lock of delivered power.
Power supply	230 or 115 V - 50/60 Hz
Power consumption at 230 V	Max power 3.6 A = 828 VA, Stand-by 0.4 A = 92 VA
Cooling	Convection, without fan
Equipotential bonding	Standard DIN 42801 plug
Size (LxDxH) and weight	38x35x16 cm – 15 Kg

OUTPUT POWERS

Monopolar currents	EXCELL NHP ENDOMED
PURE	350 W - 350 Ω 3450 Vpp - CF: 1.6 M: no - D: no
BLEND 1	300 W - 350 Ω 3600 Vpp - CF: 2.3 M: 29 kHz - D: 65%
BLEND 2	140 W - 600 Ω 7600 Vpp - CF: 8.1 M: 19 kHz - D: 9%
AUTO PURE	350 W - 350 Ω 1350 Vpp - CF: 1.6 M: no - D: no
AUTO BLEND	300 W - 350 Ω 1930 Vpp - CF: 2.3 M: 29 kHz - D: 65%
AUTO ENDO	220 W - 350 Ω 1710 Vpp - CF: 2.2 50% Pure 50% Blend I
FULG FORCED	150 W - 350 Ω 4700 Vpp - CF: 4.5 M: 78 kHz - D: 3,5%
PINPOINT	250 W - 250 Ω 3460 Vpp - CF: 2.6 M: 29 kHz - D: 50%
SOFT	280 W - 250 Ω 3440 Vpp - CF: 2.5 M: 29 kHz - D: 56%
SPRAY	140 W - 600 Ω 7600 Vpp - CF: 8.1 M: 19 kHz - D: 9%

Current self-adjustment

ADC	APC
X	
X	
X	
	X
	X
	X
X	
X	
X	
X	



Bipolar currents	EXCELL NHP ENDOMED
STANDARD	180 W - 350 Ω 1200 Vpp - CF: 1.5 M: no - D: no
SALINE	320 W - 50 Ω 1200 Vpp - CF: 1.5 M: no - D: no
MICRO	130 W - 100 Ω 420 Vpp - CF: 1.7 M: no - D: no
MACRO	130 W - 200 Ω 1050 Vpp - CF: 1.7 M: no - D: no
SEAL	130 W (200 W) - 100 Ω 420 Vpp - CF: 1.7 M: no - D: no

Current self-adjustment

ADC	APC
X	
X	
	X
X	
	X

KEY

W: DELIVERED POWER
(W): STARTING IMPULSE
 Ω : NOMINAL LOADS
Vpp: PEAK/NO-LOAD PEAK VOLTAGES
CF: CREST FACTORS
M: MODULATION
D: DUTY CYCLE
ADC: CONSTANT POWER
ADC: CONSTANT VOLTAGE



DEVICE AND STANDARD ACCESSORIES

EXCELL NHP ENDOMED, without accessories

B610/A STANDARD ACCESSORIES SERIES including:

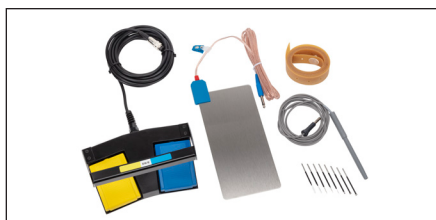
- 1 DS/E Double pedal control, electric, waterproof
- 1 NP/A Stainless steel neutral electrode, 2.5 m cable
- 1 FGE Fixing belt for electrodes
- 2 MPE/E Sterilisable electrode holder, 3.5 m cable
- 1 SEL/E Series of 8 active electrodes (2 E1 - Straight blade electrode, 2 E5 - Thick needle electrode, 1 E7 - Fine needle electrode, 1 E12 - Straight ball electrode Ø 2.5 mm, 2 E14 - Straight ball electrode Ø 4 mm)

B610/B STANDARD ACCESSORIES SERIES identical to B610/A, but with NP/GA flexible neutral conductive rubber electrode for adults

B610/P As above, with neutral paediatric electrode NP/GP



EXCELL NHP ENDOMED



B610/A



B610/B



EXCELL NHP/T



EXCELL NHP/TA-400

Electrosurgical unit for monopolar and bipolar surgery with 7" touch screen display

EXCELL NHP/T are electrosurgical units for advanced surgery, indicated for all monopolar, bipolar and monopolar techniques with Argon gas flow.

They are available in 4 models:

- **EXCELL NHP/T-400** and **EXCELL NHP/T-200** for electrosurgery
- **EXCELL NHP/TA-400** and **EXCELL NHP/TA-200** both for electrosurgery and for electrosurgery with Argon gas, being equipped with the integrated Argon module

CURRENTS

MONOPOLAR CURRENTS

PURE CUT	Pure cut without coagulating effect. For open or laparoscopic surgery and for under liquid endoscopy (TURP and TURV procedures)
BLEND CUT 1	Blended cut with medium coagulating effect. For open or laparoscopic surgery and for under liquid endoscopy (TURP and TURV procedures)
BLEND CUT 2	Blended cut with very high coagulating effect. For open or laparoscopic surgery
PURE CUT PULSED	Pure pulsed cut without coagulating effect. For open or laparoscopic surgery (suitable to reduce surgical smoke)
BLEND CUT PULSED	Blended pulsed cut with medium coagulating effect. For open or laparoscopic surgery (suitable to reduce surgical smoke)
AUTO PURE CUT MICRO	"Constant voltage", delicate, pure cut without coagulating effect. For open or laparoscopic surgery and for under liquid endoscopy (TURP and TURV procedures)
AUTO BLEND CUT MICRO	"Constant voltage", delicate cut blended with a medium coagulating effect. For open or laparoscopic surgery and for under liquid endoscopy (TURP and TURV procedures)
AUTO PAPILO PURE CUT	"Constant voltage" pure cut, without coagulating effect, for flexible endoscopy. With four modes of delivery: continuous and pulsed (slow, medium, fast)
AUTO POLIPO BLEND CUT	"Constant voltage" cut, blended with a medium coagulating effect, for flexible endoscopy. With four modes of delivery: continuous and pulsed (slow, medium, fast)
AUTO ENDOCUT	"Constant voltage" cut with alternating phases of BLEND and CUT, for flexible endoscopy. With four modes of delivery: 90% BLEND and 10% CUT, 80% BLEND and 20% CUT, 60% BLEND and 40% CUT, 50% BLEND and 50% CUT

FULG FORCED COAG	High-voltage, contact free coagulation. For open or laparoscopic surgery, under liquid endoscopy (TURP and TURV procedures), and for flexible endoscopy
SPRAY COAG	Very high voltage, contact-free coagulation. For open or laparoscopic surgery, under liquid endoscopy (TURP and TURV procedures), and for flexible endoscopy
PULSED SPRAY COAG	Identical to the SPRAY COAG current, but pulsed and more delicate
PINPOINT CONTACT COAG	Medium voltage, contact coagulation. For open or laparoscopic surgery, under liquid endoscopy (TURP and TURV procedures), and for flexible endoscopy
SOFT MICRO COAG	Delicate, low voltage coagulation. For open or laparoscopic surgery

BIPOLAR CURRENTS

STANDARD BICUT	Cut for open or laparoscopic surgery
BLEND BICUT	Blended cut with very high coagulating effect (Coagulation 95%) for open or laparoscopic surgery
SALINE URO-GYN CUT	Cut in saline with two modes of delivery: continuous and pulsed. For under liquid endoscopy (TURPis and TURVis procedures). The continuous delivery is suitable for vaporization
SALINE ARTHRO CUT	Cut in saline with two modes of delivery: continuous and pulsed. For arthroscopy. The continuous delivery is suitable for vaporization

SOFT MICRO BICOAG	Very precise and delicate coagulation. For open or laparoscopic surgery, under liquid endoscopy (TURPis and TURVis procedures) and flexible endoscopy
FORCED MACRO BICOAG	Fast coagulation. For open or laparoscopic surgery
AUTO SOFT MICRO BICOAG	Identical to SOFT MICRO BICOAG, but with Impedance Sensing automatic activation/deactivation. It is not suitable for endoscopy in saline. Activation with delay adjustable from 0 to 5 seconds and deactivation with two-tone, grave, acoustic signal
SEALING	Current to coagulate/seal vessels up to 7 mm in open and laparoscopic surgery. Activation with pedal and automatic Impedance Sensing deactivation with two-tone, acute, acoustic signal
AUTO SEALING	Identical to SEALING, but with Impedance Sensing automatic activation/deactivation. It is not suitable for endoscopy in saline. Activation with delay adjustable from 0 to 5 seconds and deactivation with two-tone, grave, acoustic signal

TECHNICAL FEATURES

HF generator compliant with	IEC 60601-1 and IEC 60601-2-2
CE Classification	IIB
IEC 60601-1 classification and type	I CF
IEC 60601-2-2 output circuit	Floating - protected for the use of a defibrillator (HF dispersion <150 mA)
Monopolar and bipolar working frequency	440 kHz
Operation check	Complete self-diagnosis by means of a double microprocessor which performs: <ul style="list-style-type: none"> - Main Self-check when turned on - Standard Self-check during operation and, if any, operation lock (within 100 milliseconds), with alarm signalling to operators through specific Error Codes, in the event of problems concerning: <ul style="list-style-type: none"> - general operation or activation errors (General Error Control) - output power (Output Error Control) - HF Leakage Control: continuous verification, by means of a specific circuit, of any HF current dispersion to earth and possible automatic power reduction by means of an alarm signal - Storage of the last 32 Error Codes
Power self-adjustment	By means of a microprocessor with two different systems: <ul style="list-style-type: none"> - ADC System - Constant power: self-adjusts the power, controlling voltage and current, based on real-time feedback (7000 checks/sec) between device and patient's tissue. The powers are equipped with Micro and Macro progressive regulation with steps from 0.1 W to 10 W. Monopolar (from 1 W to 10 W), Bipolar (from 0.1 W to 5 W). - APC System - Constant voltage: self-adjusts the power, keeping the voltage constant, based on a real-time feedback (7000 checks/sec) between device and patient's tissue. The powers are equipped with regulation with 10 effects (for each one the maximum power delivered in W is indicated).
Operation memorisation	100 programs
Outputs	2 Monopolar and 2 Bipolar
Foot-operated controls	EXCELL NHP/T can be fitted with: <ul style="list-style-type: none"> • A double pedal control with push button selector for monopolar or bipolar functions. • Two double pedal controls, one for monopolar and one for bipolar functions. The pedals are compliant with IEC 60601-2-2, waterproof (IP67), electric with 12 VDC low voltage power supply.
Panel	7" touch screen LCD display
Neutral electrode safety circuit NPCC System	Control of the connection of the neutral electrode - and of the quality of the contact using double section/split electrodes - with alarm signal and possible lock of delivered power. It can be used in two different ways: Large electrodes for adults, Small electrodes for paediatric patients/newborns. It allows using cables with both European "Ø 6.35 mm" and US "2 pins" connectors.
Power supply	100-230 V - 50/60 Hz – Automatic switching supply.
Power consumption at 230V	Max power 3.6 A = 828 VA, Stand-by 0.4 A = 92 VA
Cooling	Convection, without fan
Equipotential bonding	Standard DIN 42801 plug
Software upgrade, calibration	Upgrade via serial port connected to a PC, on-site calibration.
Size (LxDxH) and weight	EXCELL NHP/T-400 and EXCELL NHP/T-200: 38x38x20 cm – 10 Kg EXCELL NHP/TA-400 and EXCELL NHP/TA-200: 38x38x20 cm – 10.5 Kg
Argon gas section (only in EXCELL NHP/TA-400 and EXCELL NHP/TA-200 models)	
Supply	One 5 litre cylinder or with centralised system
Flow	Max 15 l/min
Pressure	Inlet 2.5 atm / Outlet 1 atm
Flow check with Constant flow System	From 1 to 15 l/min by electronic sensor with adjustment buttons and numerical control on the display. Automatic self-compensation based on the type of electrode used. Alarm if gas is absent.
Pressure check in the Safety gas System circuit	Two-stage pressure reducer (on the cylinder and inside, with safety valve). Pressure sensor connected to the electronic control system, with Auto-Check when the gas section is switched on.
Protection of the supplied gas flow	Gas outlet equipped with antibacterial filter.

OUTPUT POWERS

Monopolar currents	EXCELL NHP/T-400	EXCELL NHP/T-200	EXCELL NHP/TA-400	EXCELL NHP/TA-200
PURE CUT	400 W - 400 Ω 2550 Vpp - CF: 1.46 M: no - D: 100%	200 W - 400 Ω 2550 Vpp - CF: 1.46 M: no - D: 100%	400 W - 400 Ω 2550 Vpp - CF: 1.46 M: no - D: 100%	200 W - 400 Ω 2550 Vpp - CF: 1.46 M: no - D: 100%
BLEND CUT 1	300 W - 400 Ω 3390 Vpp - CF: 1.94 M: 17 kHz - D: 95%	200 W - 400 Ω 3390 Vpp - CF: 1.94 M: 17 kHz - D: 95%	300 W - 400 Ω 3390 Vpp - CF: 1.94 M: 17 kHz - D: 95%	200 W - 400 Ω 3390 Vpp - CF: 1.94 M: 17 kHz - D: 95%
BLEND CUT 2	250 W - 400 Ω 3330 Vpp - CF: 2.29 M: 17 kHz - D: 65%	200 W - 400 Ω 3330 Vpp - CF: 2.29 M: 17 kHz - D: 65%	250 W - 400 Ω 3330 Vpp - CF: 2.29 M: 17 kHz - D: 65%	200 W - 400 Ω 3330 Vpp - CF: 2.29 M: 17 kHz - D: 65%
PURE CUT PULSED	200 W - 400 Ω 2640 Vpp - CF: 2 M: 3 Hz - D: 50%	100 W - 400 Ω 2640 Vpp - CF: 2 M: 3 Hz - D: 50%	200 W - 400 Ω 2640 Vpp - CF: 2 M: 3 Hz - D: 50%	100 W - 400 Ω 2640 Vpp - CF: 2 M: 3 Hz - D: 50%
BLEND CUT PULSED	150 W - 400 Ω 3330 Vpp - CF: 3.2 M: 50 Hz - D: 50%	100 W - 400 Ω 3330 Vpp - CF: 3.2 M: 50 Hz - D: 50%	150 W - 400 Ω 3330 Vpp - CF: 3.2 M: 50 Hz - D: 50%	100 W - 400 Ω 3330 Vpp - CF: 3.2 M: 50 Hz - D: 50%
AUTO PURE CUT MICRO	300 W - 300 Ω 1137 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1137 Vpp - CF: 1.5 M: no - D: 100%	300 W - 300 Ω 1137 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1137 Vpp - CF: 1.5 M: no - D: 100%
AUTO BLEND CUT MICRO	300 W - 300 Ω 1500 Vpp - CF: 1.98 M: 17 kHz - D: 90%	200 W - 300 Ω 1500 Vpp - CF: 1.98 M: 17 kHz - D: 90%	300 W - 300 Ω 1500 Vpp - CF: 1.98 M: 17 kHz - D: 90%	200 W - 300 Ω 1500 Vpp - CF: 1.98 M: 17 kHz - D: 90%
AUTO PAPILO PURE CUT	300 W - 300 Ω 1140 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1140 Vpp - CF: 1.5 M: no - D: 100%	300 W - 300 Ω 1140 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1140 Vpp - CF: 1.5 M: no - D: 100%
AUTO POLIPO BLEND CUT	300 W - 300 Ω 1490 Vpp - CF: 1.98 M: 17 kHz - D: 95%	200 W - 300 Ω 1490 Vpp - CF: 1.98 M: 17 kHz - D: 95%	300 W - 300 Ω 1490 Vpp - CF: 1.98 M: 17 kHz - D: 95%	200 W - 300 Ω 1490 Vpp - CF: 1.98 M: 17 kHz - D: 95%
AUTO ENDOCUT	300 W - 300 Ω 1670 Vpp - CF: 2.20	200 W - 300 Ω 1670 Vpp - CF: 2.20	300 W - 300 Ω 1670 Vpp - CF: 2.20	200 W - 300 Ω 1670 Vpp - CF: 2.20
FULG FORCED COAG	150 W - 300 Ω 4500 Vpp - CF: 6.45 M: 60 kHz - D: 18%	150 W - 300 Ω 4500 Vpp - CF: 6.45 M: 60 kHz - D: 18%	150 W - 300 Ω 4500 Vpp - CF: 6.45 M: 60 kHz - D: 18%	150 W - 300 Ω 4500 Vpp - CF: 6.45 M: 60 kHz - D: 18%
SPRAY COAG	200 W - 700 Ω 7750 Vpp - CF: 7.75 M: 30 kHz - D: 7%	200 W - 700 Ω 7750 Vpp - CF: 7.75 M: 30 kHz - D: 7%	200 W - 700 Ω 7750 Vpp - CF: 7.75 M: 30 kHz - D: 7%	200 W - 700 Ω 7750 Vpp - CF: 7.75 M: 30 kHz - D: 7%
PULSED SPRAY COAG	100 W - 700 Ω 7850 Vpp - CF: 11.54 M: 3 Hz - D: 50%	100 W - 700 Ω 7850 Vpp - CF: 11.54 M: 3 Hz - D: 50%	100 W - 700 Ω 7850 Vpp - CF: 11.54 M: 3 Hz - D: 50%	100 W - 700 Ω 7850 Vpp - CF: 11.54 M: 3 Hz - D: 50%
PINPOINT CONTACT COAG	300 W - 400 Ω 3700 Vpp - CF: 2.2 M: 17 kHz - D: 85%	200 W - 400 Ω 3700 Vpp - CF: 2.2 M: 17 kHz - D: 85%	300 W - 400 Ω 3700 Vpp - CF: 2.2 M: 17 kHz - D: 85%	200 W - 400 Ω 3700 Vpp - CF: 2.2 M: 17 kHz - D: 85%
SOFT MICRO COAG	280 W - 300 Ω 3300 Vpp - CF: 2.16 M: 17 kHz - D: 75%	200 W - 300 Ω 2875 Vpp - CF: 2.1 M: 17 kHz - D: 75%	280 W - 300 Ω 3300 Vpp - CF: 2.16 M: 17 kHz - D: 75%	200 W - 300 Ω 2875 Vpp - CF: 2.1 M: 17 kHz - D: 75%
SPRAY COAG + GAS ARGON	-	-	200 W - 700 Ω 7750 Vpp - CF: 7.75 M: 30 kHz - D: 7%	200 W - 700 Ω 7750 Vpp - CF: 7.75 M: 30 kHz - D: 7%
PULSED SPRAY COAG + GAS ARGON	-	-	100 W - 700 Ω 7850 Vpp - CF: 11.54 M: 3 Hz - D: 50%	100 W - 700 Ω 7850 Vpp - CF: 11.54 M: 3 Hz - D: 50%

Current self-adjustment

ADC	APC
X	
X	
X	
X	
	X
	X
	X
	X
	X
X	
X	
X	
X	
X	
X	
X	

Bipolar currents	EXCELL NHP/T-400	EXCELL NHP/T-200	EXCELL NHP/TA-400	EXCELL NHP/TA-200
STANDARD BICUT	200 W - 300 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	200 W - 300 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%
BLEND BICUT	160 W - 200 Ω 740 Vpp - CF: 1.57 M: 17 kHz - D: 95%	160 W - 200 Ω 740 Vpp - CF: 1.57 M: 17 kHz - D: 95%	160 W - 200 Ω 740 Vpp - CF: 1.57 M: 17 kHz - D: 95%	160 W - 200 Ω 740 Vpp - CF: 1.57 M: 17 kHz - D: 95%
SALINE URO-GYN CUT	300 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	300 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	300 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	300 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%
SALINE ARTHRO CUT	230 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	230 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	230 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%	230 W - 350 Ω 1070 Vpp - CF: 1.5 M: no - D: 100%
SOFT MICRO BICOAG	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%
FORCED MACRO BICOAG	200 W - 100 Ω 550 Vpp - CF: 1.6 M: no - D: 100%	200 W - 100 Ω 550 Vpp - CF: 1.6 M: no - D: 100%	200 W - 100 Ω 550 Vpp - CF: 1.6 M: no - D: 100%	200 W - 100 Ω 550 Vpp - CF: 1.6 M: no - D: 100%
AUTO SOFT MICRO BICOAG	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%	140 W - 100 Ω 460 Vpp - CF: 1.56 M: no - D: 100%
SEALING	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%
AUTO SEALING	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%	320 W - 50 Ω 780 Vpp - CF: 2.47 M: no - D: 100%

Current self-adjustment

ADC	APC
X	
X	
X	
X	
	X
X	
	X
	X
	X

KEY

W: DELIVERED POWER
Ω: NOMINAL LOADS
Vpp: PEAK/NO-LOAD PEAK VOLTAGES
CF: CREST FACTORS
M: MODULATION
D: DUTY CYCLE
ADC: CONSTANT POWER
ADC: CONSTANT VOLTAGE

DEVICES AND STANDARD ACCESSORIES

EXCELL NHP/T-400, without accessories

EXCELL NHP/T-200, without accessories

EXCELL NHP/TA-400, without accessories

EXCELL NHP/TA-200, without accessories

B610/Asw STANDARD ACCESSORIES SERIES including:

1 DS/Esw Double pedal control, electric, waterproof

1 NP/A Stainless steel neutral electrode, 2.5 m cable

1 FGE Fixing belt for electrodes

2 MPE/E Sterilisable electrode holder, 3.5 m cable

1 SEL/E Series of 8 active electrodes (2 E1 - Straight blade electrode, 2 E5 - Thick needle electrode, 1 E7 - Fine needle electrode, 1 E12 - Straight ball electrode Ø 2.5 mm, 2 E14 - Straight ball electrode Ø 4 mm)

B610/Bsw STANDARD ACCESSORIES SERIES identical to B610/Asw, but with flexible conductive rubber neutral electrode NP/GA for adults

B610/Psw As above, with neutral paediatric electrode NP/GP



EXCELL NHP/T-400



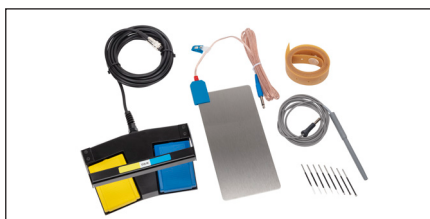
EXCELL NHP/T-200



EXCELL NHP/TA-400



EXCELL NHP/TA-200



B610/Asw



B610/Bsw

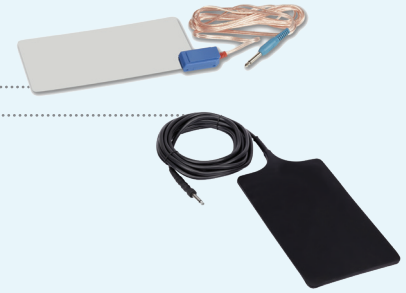
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GENERAL LIST OF ACCESSORIES

REUSABLE NEUTRAL ELECTRODES

- EIP/9** Stainless steel electrode (16x6 cm), 3 m cable
- NP/A** Stainless steel electrode (25x12 cm), 3 m cable
- NP/GA** Conductive flexible rubber electrode (25x15 cm), 4.5 m cable
- NP/GP** Conductive flexible rubber electrode (15x8 cm), 4.5 m cable
- EIP/S** Manual neutral electrode, 2 m cable
- FFE** Elastic belt for fixing electrodes, with double button, L. 50 cm (*)
- FGE** Elastic belt for fixing electrodes, with double button, L. 150 cm (*)



DISPOSABLE ADHESIVE NEUTRAL ELECTRODES

- CMS/E** Reusable connection cable, 3 m
- CMS/E5** As above, 5 m
- EIP/DA** Single section non Split adhesive electrode for adults (25-pc pack) (*)
- EIP/SA** As above, Split type with double section (25-pc pack) (*)
- EIP/DP** Single section non Split paediatric adhesive electrode (25-pc pack) (*)
- EIP/SP** As above, Split type with double section (25-pc pack) (*)

HANDLES FOR USE WITH FOOT CONTROLS

- MPE/F** Autoclavable handle, 2.5 m cable
- MPE/E** Sterilisable electrode holder handle, 3.5 m cable
- MPE/E5** As above, 5 m cable
- MLD/F** Needle holder microsurgery handpiece, autoclavable, 2 m cable

HANDLES WITH DOUBLE BUTTON MANUAL CONTROLS

- MPE/CMS** Electrode holder handle with blade electrode, 3 m cable (100 times sterilisable)
- MPE/CMS5** As above, 5 m cable

ACTIVE ELECTRODES stainless steel, insulated stem \varnothing 2.3 ÷ 2.4 mm, sterilisable

- SHORT TYPE, L. 70 mm**
- E1** Blade electrode, straight
- E1/I** Blade electrode, straight, all insulated except the last 5 mm
- E3** Blade electrode, angled
- E1/L** Lancet electrode, straight
- E3/L** As above, angled
- E5** Thick needle electrode, straight
- E6** As above, angled
- E7** Thin needle electrode, straight
- E7/I** Thin needle electrode, straight, all insulated except the last 5 mm
- E8** Thin needle electrode, angled
- E10** Ultra-thin needle electrode, 0.40 mm diam.
- E12** Ball electrode, straight, \varnothing 2.5 mm
- E13** As above, angled
- E14** Ball electrode, straight, \varnothing 4 mm
- E15** As above, angled
- E16** Ball electrode, straight, \varnothing 6 mm
- E17** As above, angled
- E18** Loop electrode (diamond-shaped 5x10 mm)
- E19** As above, diamond-shaped 10x10 mm
- E21** Loop electrode (wire, round \varnothing 5 mm)
- E23** As above, \varnothing 10 mm
- E25** As above, \varnothing 15 mm
- E23/N** Loop electrode (ribbon, round \varnothing 10 mm)
- E25/N** As above, \varnothing 15 mm
- E26** Plate electrode
- EXT/15** Extension l. 15 cm for all electrodes with stem \varnothing 2.3 ÷ 2.4 mm
- LONG TYPE, L. 130 mm**
- E40** Blade electrode, straight
- E40/I** Blade electrode, straight, all insulated except the last 5 mm
- E41** Thick needle electrode, straight
- E42** Thin needle electrode, straight
- E42/I** Thin needle electrode, straight, all insulated except the last 5 mm
- E43** Loop electrode, straight (wire, round \varnothing 5 mm)
- E44** As above, \varnothing 10 mm
- E45** As above, \varnothing 15 mm
- E46** Ball electrode, straight, \varnothing 2.5 mm
- E47** As above, \varnothing 4 mm
- E47/6** As above, \varnothing 6 mm



■ ELECTRODES FOR GYNECOLOGY L. 130 mm

- E48 Round loop electrode, 20x15 mm
- E49 As above, 10x7 mm
- E50 As above, 10x10 mm
- E51 As above, 15x12 mm
- E52 As above, 15x10 mm
- E53 As above, 20x8 mm
- E54 As above, 20x10 mm
- E55 As above, 20x20 mm
- E56 Square loop electrode, 10x5 mm
- E57 As above, 10x8 mm
- E58 As above, 10x10 mm
- E59 As above, 5x5 mm

■ ELECTRODES FOR MICROSURGERY, STERILISABLE

- MID Needle reducer (for all electrode handles)
- SAD Series of 10 needles, Ø 0.10 mm
- SAD/1 As above, Ø 0.15 mm
- SAD/2 As above, Ø 0.20 mm
- SAD/3 As above, Ø 0.40 mm

■ INSULATED MONOPOLAR FORCEPS FOR COAGULATION, WITHOUT CONNECTION CABLES TO THE EQUIPMENT, STERILISABLE

- PIC/1 Straight forceps (Cushing/Potts-Smith) ("grasping" tips 1 mm - L. 18 cm)
- PIC/1-25 As above, L. 25 cm
- PIC/2 Straight forceps (Cushing/Potts-Smith) ("grasping" tips 2 mm - L. 25 cm)

■ INSULATED MONOPOLAR FORCEPS FOR COAGULATION, WITH CONNECTION CABLES TO THE EQUIPMENT, STERILISABLE

- CPI Connection cable for PMI, L. 3.5 m
- CPI/5 As above, L. 5 m
- PMI/1 Straight forceps (Cushing/Potts-Smith) ("grasping" tips 1 mm - L. 18 cm)
- PMI/1-20 As above, L. 20 cm
- PMI/1-25 As above, L. 25 cm
- PMI/2 Straight forceps (Cushing/Potts-Smith) ("grasping" tips 2 mm - L. 25 cm)
- PMI/B Bayonet forceps (Jansen/Yasargil) ("grasping" tips 2 mm - L. cm. 20 cm)

■ MONOPOLAR ACCESSORIES FOR LAPAROSCOPY, request specific details.

■ CONNECTION CABLES FOR MONOPOLAR INSTRUMENTS FOR LAPAROSCOPY

- CPE Connection cable for instruments with male or female connector Ø 4 mm, L. 3.5 m
- CPE/5 As above, L. 5 m

■ CABLES FOR FLEXIBLE ENDOSCOPY, request specific details.

■ CONNECTION CABLES FOR BIPOLAR FORCEPS OR ELECTRODES AND FOR HOOKS, FORCEPS AND BIPOLAR SCISSORS FOR LAPAROSCOPY, STERILISABLE

- CPB/E Connection cable, 3 m
- CPB/E5 As above, L. 5 m

■ RIGID BIPOLAR INSULATED CLAMPS AND ELECTRODES, STERILISABLE

Standard forceps for bipolar coagulation

- PMC/JR Straight forceps (Jeweler) (straight tips 0.5 mm - L. 11.5/12 cm)
- PMC/JC As above, angled tips
- PMC/RS Straight forceps (Cushing/Potts-Smith) (straight tips 0.7 mm - L. 15.5 / 16 cm)
- PMC/CS As above, angled tips
- PMC/R Straight forceps (Cushing/Potts-Smith) (straight tips 1 mm - L. 20 cm)
- PMC/C As above, angled tips
- PBC/R Straight forceps (Cushing/Potts-Smith) (straight tips 2 mm - L. 20 cm)
- PBC/C As above, angled tips
- PMC/R25 Straight forceps (Cushing/Potts-Smith) (straight tips 1 mm - L. 25 cm)
- PMC/C25 As above, angled tips
- PBC/R25 Straight forceps (Cushing/Potts-Smith) (straight tips 2 mm - L. 25 cm)
- PBC/C25 As above, angled tips
- PMC/RSB Bayonet forceps (Jensen/Yasargil) (straight tips 0.7 mm - L. 16.5 / 17 cm)
- PMC/B Bayonet forceps (Jensen/Yasargil) (straight tips 1 mm - L. 20 cm)
- PMC/BCD As above, angled tips pointing down
- PMC/BCU As above, angled tips pointing up
- PBC/B Bayonet forceps (Jensen/Yasargil) (straight tips 2 mm - L. 20 cm)
- PBC/BCD As above, angled tips pointing down
- PBC/BCU As above, angled tips pointing up



PMC/B25 Bayonet forceps (Jensen/Yasargil) (straight tips 1 mm - L. 25 cm)
PBC/B25 Bayonet forceps (Jensen/Yasargil) (straight tips 2 mm - L. 25 cm)

- **FORCEPS WITH IRRIGATION FOR BIPOLAR COAGULATION**, request specific details.
- **FORCEPS WITH NON-STICK TIPS FOR BIPOLAR COAGULATION**, request specific details.
- **RIGID ELECTRODES FOR BIPOLAR COAGULATION OF TURBINATES OR LARYNX**, request specific details.
- **HOOKS, FORCEPS AND BIPOLAR SCISSORS FOR LAPAROSCOPY**, request specific details.
- **BIPOLAR FORCEPS FOR COAGULATION/SEALING OF LARGE VESSELS FOR SURGERY AND LAPAROSCOPY WITH RELATIVE CABLES**, request specific details.

■ **ADAPTERS FOR USE OF NON-STANDARD ALSA CABLES**

RD/5 For monopolar cables with plugs with Ø from 2 to 8 mm, or Martin standard.
RD/BF For bipolar cables with double plug Ø 4 mm (International standard) or with Valleylab/Conmed standard plug.
RD/BF1 For bipolar cables with coaxial plug Ø 12.5 mm (Erbe/Storz standard)
RD/BF2 For bipolar cables with coaxial plug Ø 8 mm (Martin/Bertchold standard)

■ **TROLLEYS**

H23/SE Trolley with 3 shelves. Size: 50x50x80 cm, antistatic wheels, 2 with brakes
H26 Trolley with 2 shelves and seat for Argon cylinder. Size: 52x55x90 cm, antistatic wheels, 2 with brakes

■ **FOOT CONTROLS**

STOP/PN Foot control, pneumatic, waterproof, explosion-proof (single) (ALSATOM SU 50-MPC, ALSATOM SU 100-MPC, ALSATOM SU 140-MPC)
D-STOP/P Foot control, pneumatic, waterproof, explosion-proof (double) (ALSATOM SU 140/D-MPC, ALSATOM SU 140/BD-MPC)
DS/E Double pedal electric control, waterproof (IP67) (EXCELL MCDS_e, EXCELL NHP)
DS/Esw Double pedal electric control, waterproof (IP67) (EXCELL NHP/T)
DS/B Double pedal electric control, waterproof (IP67), for bipolar operation only (EXCELL MCDS_e, EXCELL NHP, EXCELL NHP/T)

■ **ACCESSORIES HOLDER BOXES**

BOX/TE Stainless steel round box for electrodes
BOX/RA-2 Stainless steel rectangular box for accessories, 30x20x6 cm

ACCESSORIES FOR SURGERY WITH ARGON GAS

(with EXCELL 400/A MCDS_e, EXCELL NHP 250/DA, EXCELL NHP 400/DA, EXCELL NHP/TA-200, EXCELL NHP/TA-400)

■ **HANDLE WITH MANUAL CONTROLS AND ELECTRODES FOR SURGERY/LAPAROSCOPY**

AC/HANDLE Double button handle, sterilisable, 3.5 m cable
AC/E25-C Rigid electrode for coagulation, l. 25 mm, sterilisable
AC/E100-C As above, l. 100 mm
AC/E320-C As above, l. 320 mm (for laparoscopy only)
AC/E320-H Rigid hook L-shaped electrode, l. 320 mm, sterilisable (for laparoscopy only)
AC/E40-A Rigid needle electrode, l. 40 mm, sterilisable
AC/E100-A As above, l. 100 mm
AC/E40-L Rigid blade electrode, l. 40 mm, sterilisable
AC/E100-L As above, l. 100 mm


■ **CABLE AND ELECTRODES/PROBES FOR FLEXIBLE ENDOSCOPY**

AC/CABLE+ Connection cable for electrodes/probes, sterilisable, l. 3.5 m
AC/FP1+ Flexible electrode for endoscopy d. 1.5 mm, l. 1.5 m
AC/FP2+ As above, d. 2.3 mm, l. 1.0 m
AC/FP3+ As above, d. 2.3 mm, l. 2.2 m
AC/FP4+ As above, d. 3.2 mm, l. 2.2 m
AC/FP3+s As above, d. 2.3 mm, l. 2.2 m, with side opening

■ **TROLLEY, CYLINDERS, PRESSURE REDUCER, ANTIBACTERIAL FILTER**

H26 Trolley with 2 shelves and seat for Argon cylinder.
 Size: 52x55x90 cm, antistatic wheels, 2 with brakes
B5 5 l argon gas cylinder
RD/P Pressure reducer for B5 cylinder
ESU/TG Gas supply pipe with quick connector (for B5)
ESU/F Antibacterial filter for argon gas outlet
ESU/FC Metal connector for filter

(*) items not CE0051 certified



Notes

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alsa[®]

bologna

PRODUCTS DESIGNED AND MANUFACTURED BY:
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IT - 1231



ISO 13485
9124.ALS2



USER MANUAL**CE0051****EXCELL 400 MCDSe, 350MCDSe, 250MCDSe, 200MCDSe**

This unit is manufactured by ALSA Apparecchi Medicali s.r.l. – Castel Maggiore (Bologna - Italy) – Phone +39.051.700.101, which is responsible for its functioning, liability and safety only if the device is used, according to these instructions, in an area that meets IEC Standards and only if installation, calibrations or repairs are performed by authorized personnel who use original spare parts. On request, ALSA will provide the user with the related electric diagrams and/or any further technical or practical information. This manual has to be kept where the unit is used and it must be replaced in case of loss. The users must read it carefully before use and, if it is not clear for the specific need, they must contact the company before starting any procedure (To replace this manual / to have more information, either directly or through the local distributor, contact the company)

In compliance with the requirements of 93/42 + 2007/47 European MDD the users are kindly invited to inform the company, in order to intervene as soon as possible, about any problem of these units.

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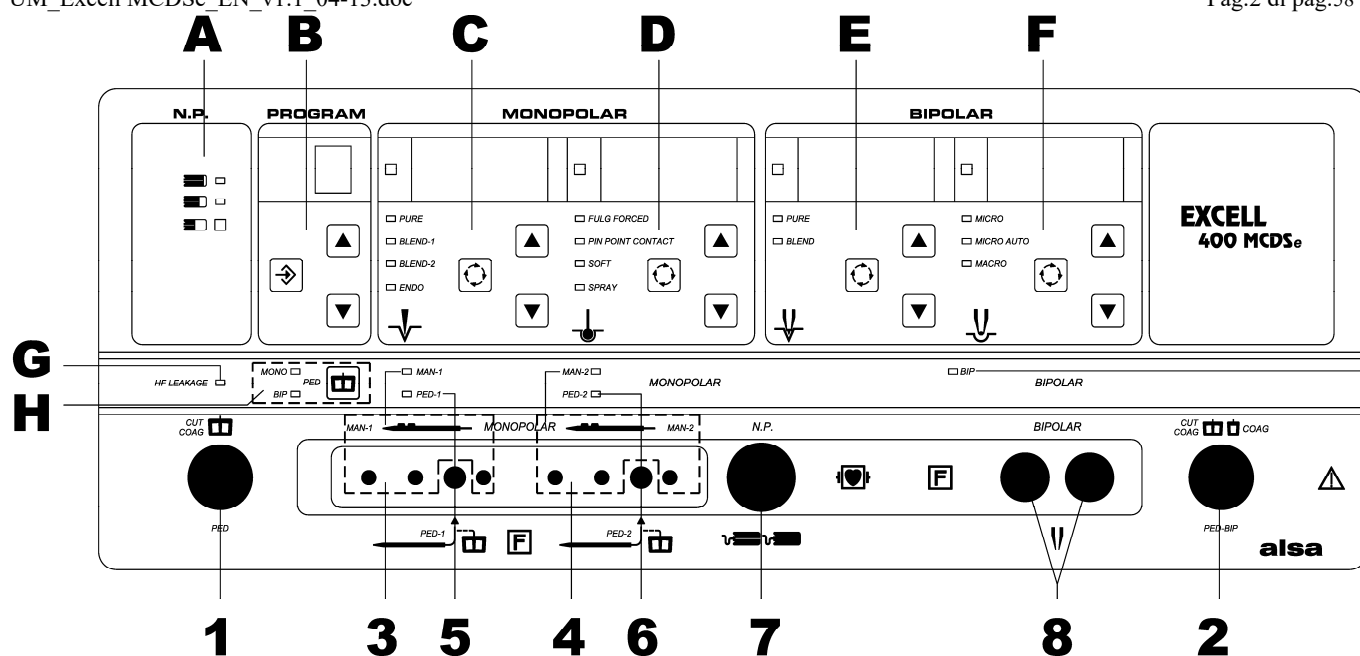
All the Excell MCDSe units have the same front panel and identical technical features, they have different output powers only.

Because of this reason in this manual the front panel of the 400 MCDSe model is used

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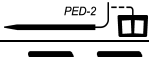
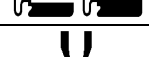






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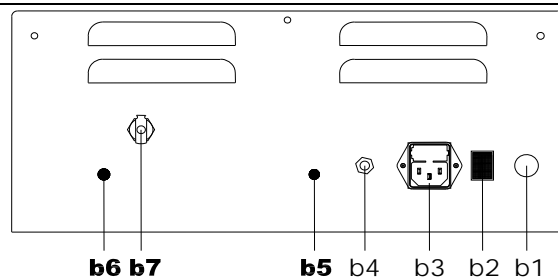
A area (N.P) - CONTROL CIRCUIT OF THE NEUTRAL ELECTRODE	
	Alarm light of the control circuit.
B area (PROGRAM) - PROGRAMMING AND USE OF THE MEMORIES - STANDBY	
	STORE key – It is used either to confirm settings or to exit from the Standby mode.
	UP/DOWN keys – They are used either to select a memory or to cancel a change of settings.
C area (MONOPOLAR - Yellow) - SETTING AND USE OF THE MONOPOLAR CURRENTS FOR CUTTING	
	SEL key – It is used to select the monopolar currents for cutting or coagulating cutting. The currents are selected by pushing the key (the current is signalled by the related light ON).
	UP/DOWN keys – They are used to set the power of the monopolar currents for cutting or coagulating cutting.
D area MONOPOLAR - Blue) - SETTING AND USE OF THE MONOPOLAR CURRENTS FOR COAGULATION	
	SEL key – It is used to select the monopolar currents for coagulation. The currents are selected by pushing the key (the current is signalled by the related light ON).
	UP/DOWN keys – They are used to set the power of the monopolar currents for coagulation.
E area (BIPOLAR - Yellow) - SETTING AND USE OF THE BIPOLAR CURRENTS FOR CUTTING	
	SEL key – It is used to select the bipolar currents for cutting. The currents are selected by pushing the key (the current is signalled by the related light ON).
	UP/DOWN keys – They are used to set the power of the bipolar currents for cutting.
F area (BIPOLAR - blue) - SETTING AND USE OF THE BIPOLAR CURRENTS FOR COAGULATION	
	SEL key – It is used to select the bipolar currents for coagulation. The currents are selected by pushing the key (the current is signalled by the related light ON).
	UP/DOWN keys – They are used to set the power of the bipolar currents for coagulation.
G area- CONTROL OF THE HIGH FREQUENCY LEAKAGE CURRENTS	
	Alarm red light of the control circuit.
H area - USE OF DS/E FOOT-SWITCH PEDAL	
	PED key – It is used to change the functioning of DS/E foot-switch. MONO light ON = The foot-switch activates the monopolar currents / BIP light ON = The foot-switch activates the bipolar currents..

SOCKETS FOR CONNECTION AND SYMBOLS

1	Symbol		PED socket - Connection of DS/E twin foot-switch (standard accessory) which activates either the monopolar currents or the bipolar currents.
2	Symbol		PED-BIP socket - Connection of DS/B twin foot-switch (not standard, on request) which activates the bipolar currents only.
3	Symbol		MAN-1 socket – Connection of a hand-switch monopolar pencil or instrument.
4	Symbol		MAN-2 socket - Connection of a hand-switch monopolar pencil or instrument.
5	Symbol		PED-1 socket - Connection of a foot-switch monopolar pencil or instrument.
6	Symbol		PED-2 socket – Connection of a foot-switch monopolar pencil or instrument.
7	Symbol		N.P socket – Connection of the neutral electrode.
8	Symbol		BIP socket - Connection of a bipolar instrument.
	Symbol		Earth protection (inside the unit)
	Symbol		Alternating current (on the data label)
	Symbol		Be careful; Read the user manual before using the unit.
	Symbol	 	Unit of Class I Type CF, protected against the defibrillator effects (This type guarantees the highest level of safety against direct and indirect contacts, notably for the leakage currents). The F type applied part (floating out) is protected from the earth at high and low frequencies. This kind of unit is especially suitable for direct heart application.

ON THE BACK OF THE UNIT.

- b1** At disposal
- b2** Main switch (green 0/I);
- b3** Socket for supply cord with fuse block
- b4** Plug for the equipotential connection 
- b5** Adjusting of the start delay of the **MICRO AUTO** bipolar coagulation (clockwise from 0,1 to 5 seconds)
- b6** Adjusting of the functioning acoustic signals of the currents for cutting or coagulation
- b7** At disposal



INTRODUCTION AND DIRECTIONS FOR USE

When an electrical current is applied on a biological tissue and flows across it, through the contact of two ends which are called *ELECTRODES*, a triple effect is produced, according to the features of the current: *ELECTROLYTIC EFFECT*, *FARADIC EFFECT* and *THERMAL EFFECT*

By applying a direct current, the **Electrolytic effect** prevails (The ions with positive charge move to the negative pole “anions” and those with negative charge move to the positive pole “cations”).

By applying an alternating current, with a frequency up to 20.000Hz (20kHz), the **Faradic effect** occurs which stimulates nerves and muscle cells, so provoking twitches.

By applying an alternating current, with frequency higher than 300kHz (The International Standards establish that, for the surgical use, only currents with frequencies higher than 300 kHz can be used), the electrolytic / faradic phenomena disappear or are very limited and the **Thermal effect** remains. Such effect is based on the electric principle that, while a current is crossing a resistance, it develops a heat proportional to both the current density and the resistance. 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 so rapid that the vapour pressure into the cells breaks their membranes and provokes their division (pure cut);*
- 2) *A heating, slower, 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 surgical use of the high frequency currents is possible, by using HF units, in 3 different ways:



MONOPOLAR MODE (fig 1):

By *Monopolar mode* people indicate the use of a HF current which is applied through two electrodes of different dimensions:

The active one that **brings to** the tissues the current generated by the HF unit and the neutral one that **brings back** the current to the HF unit. The neutral electrode is placed and fixed on parts of the patient's body, normally far from the point where the active electrode is used. This electrode is wide, to reduce the density of the current which flows through its area of contact, so minimizing the thermal effect that could cause unexpected and dangerous burns. In order to reduce this risk, not only the dimensions of this electrode are important, but also its correct and homogenous contact. The positioning of the neutral electrode depends on the kind of operation and its dimension depends on the power delivered by HF generator, it means a wide electrode if the powers are high and a smaller one if the powers are lower (i.e. a dental HF unit delivers very low powers and so a small neutral electrode is enough for its safe use).

The current produces the maximum thermal effect where the desired surgical effect is required, then the current flows through the tissues to reach the neutral electrode. The thermal effect, by decreasing along the entire path of the current, affects also the neighbouring tissues.

BIPOLAR MODE (fig 2):

By *Bipolar mode* people indicate the use of a HF current which is applied by an instrument including both the electrodes;

The active one that **brings to** the tissues the current generated by the HF unit and the neutral one that **brings back** the current to the HF unit. The current produces the thermal effect where the electrodes are applied and it affects only the tissues included between the electrodes.

MONOPOLAR MODE, ENHANCED BY A FLOW OF ARGON GAS

(This part is applicable only if the models are provided with this mode):

Argon is an inert gas that does not combine with other chemical elements, and its flow, duly controlled, can be delivered, by using specific accessories including both the channel for the gas and the electrode for the HF current, at the same time as the HF monopolar currents into the application point (Argon gas isn't used with all the bipolar currents).

Argon gas can be used with all the monopolar currents for cutting, coagulating cutting or low / medium voltage coagulation. In this case the effects of the currents don't change, but the gas flow, by removing the oxygen from the point where the currents are applied, reduces and eliminates bad smells or smoke caused by the thermal effect which the HF currents produce on the biological tissues.

Argon gas gives the special ARGON COAGULATION when is used with the monopolar current SPRAY for coagulation. As a matter of fact, the use of Argon gas changes and enhances the effect of the SPRAY coagulation because, when this current and the gas are delivered, the current ionizes the Argon and this “combined” flow produces, a very quick and constant superficial coagulation of the tissues, with a maximum depth of 3mm. This coagulation is obtained without touching the tissues; in fact the electrode is normally used 6/8 mm far from the tissues even if, only to ignite the gas, it must sometimes graze the tissues. Moreover, since this haemostatic effect is high in the non coagulated tissues and completely absent in the tissues already coagulated, ARGON COAGULATION reduces the superficial carbonization effect and is very efficient and useful when the coagulating effect has to be very fast or when the surface of the tissues mustn't be damaged.

UNDESIRE SIDE EFFECTS OF THE HF CURRENTS

The use of the HF current, mainly when the monopolar mode is used, presents also some risks that must be known, because the only solution to reduce them is how the operators use the unit.

- *Undesired burns on the patient's tissues provoked by many different causes (i.e. bad contact where the neutral electrode is placed, use of warm mattresses, anomalous contacts with metallic parts of the operating table, etc ,etc).*
- *Undesired burns on the surgeon's tissues (i.e. on hands, because of damages of the insulation of the active electrodes/instruments);*
- *Electromagnetic Interferences with the functioning of other equipment (i.e. video systems, ECG) used in the OT*
- *Slight neuromuscular stimulation, notably while applying currents for coagulation, where the active electrode and neutral one are used or positioned. This stimulation can be felt by patients or surgeons like “an electrical discharge”.*
- *Explosion and fire of flammable substances or gases. In fact the sparks generated during the delivery of power can ignite them.*
- *Burns on the patient's tissues caused by flammable disinfectants (the sparks generated during the delivery of power can ignite them).*
- *The bad functioning of devices (i.e. pace-makers) provoked by the EMC interferences emitted during the delivery of the HF currents;*
- *The damage of the patient's tissues caused by a delivery of an output power different from that expected because of a fault of the device.*
- *The use of argon gas can cause specific side effects: for example, the risk of embolism rises if the power of the spray coagulation is not able to produce a rapid and impermeable eschar on the target tissues*

DIRECTIONS FOR USE

During operations of major or medium surgery in O.T. (Open-sky Surgery, Laparoscopic Surgery / MIS, Endoscopic Surgery), by using High Frequency currents, these units allow the surgeons to obtain all the kinds of Monopolar Cutting (Pure or Coagulating), Monopolar Coagulation (low, medium and high voltage), Bipolar Cutting, Bipolar Coagulation (Micro, Macro, sealing of vessels and so on). These units are intended to be used for:

Gynaecology, Orthopaedics, ORL, Urology, Maxillofacial Surgery, Dermatology, Plastic Surgery, Vascular Surgery, General or Thoracic Surgery, Paediatric Surgery, Emergency Surgery, Gastroenterology, Veterinary and other.

GENERAL WARNINGS

Preparation of the patient – Safety during use.

To obtain the best functioning and to reduce all the undesired side effects the following is essential:

The observance of all the warnings which are detailed in this paragraph.

The careful preparation of patients and their proper positioning on the operating table.

The greatest care, when the operating field is arranged or during the operation.

The careful check of the accessories.

The cleaning of all the monopolar active electrodes or instruments.

The cleaning of the tips of all the bipolar instruments

The cleaning of the joints of the tips of the bipolar instruments for laparoscopy

Remember that the units are provided with electronic self-check systems able to detect all the failures which can provoke

Problems of functioning, Absence or decrease of power, Power higher than that intended and expected.

The systems perform an auto-check at the switching on and they go on checking the functioning during use.

If the systems detect problems during the auto-check, it doesn't finish and the system stops the functioning.

If the systems detect problems during use, they stop the functioning.

In case of problem or failure, the systems inform the users by acoustic or visual alarm signals.

Because of this reason:

If the power is absent or very low or, by using the normal powers, the effect appears less efficacious, but the unit has properly passed the auto-check at the switching on and the systems do not signal problems Users must not think that the problem depends on the unit or they must not increase the power too much.

Users must check:

The good contact between neutral electrode and the patient's tissues (while using monopolar currents).

The conditions of cables and connectors, by bending and pulling them (They mainly break close to the instrument).

The internal connections of the monopolar or bipolar instruments for endoscopy or laparoscopy.

The insulation of the blades of the bipolar scissors for open or laparoscopic surgery. In fact the continuous sliding of the blades damages the insulation and so a short circuit happens which does not allow the good functioning.

Users must clean:

The monopolar active electrodes or instruments and the tips of all the bipolar instruments

If they are dirty, the current does not reach the patient's tissues

The joints of the tips of the bipolar instruments for laparoscopy

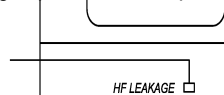
If they are dirty, a short circuit happens and the current does not reach the patient's tissues.

HF leakage currents to earth and related control circuit

When delivering HF currents, an electrosurgical unit also generates High Frequency leakage currents to earth. These currents cannot be totally eliminated (IEC International Safety standards for the electrosurgical devices establish that they must be lower than 150mA) and they can cause burns for patient or operators on the points where a path for these currents is possible.

The absolute insulation of the patient from earth is the only way to avoid this risk and the users, to try to obtain this result, must follow all the warnings specified in the point "Preparation of the patient and use of the neutral electrode", but the unit is also

- G** provided with a specific circuit which intervenes if the currents go over 150 mA:
- It automatically reduces the output power (The leakage currents depend on the power);
 - It informs the users by an alarm signal (The red alarm light G-HF LEAKAGE is ON).



General instruction

- The unit must be used, only for the purposes which are listed in this manual, by qualified operators who are experienced in electro-surgery and all the related problems or undesired side effects.
- Never use the unit 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 cord and, if many devices are connected at the same time, ask the Technical Service about their compatibility;
- Try to follow the suggested working times, and avoid useless short-circuits between the active electrode and the neutral one;
- The smoke produced during the use of ESU is biologically noxious. In USA, ENGLAND, CANADA the Technical or Governmental Bodies, who safeguard the operator's and the patient's health, recommend the use of Smoke evacuators when such smoke is produced.
- Place the patient properly for a long operation. The risks of burn or decubitus lesion rise according to the length of operation.

Flammable substances or explosive gases

- Never use an electro-surgical unit in presence of flammable anesthetic gases (i.e. oxygen and nitrogen protoxide, etc.). Never use flammable cleaning substances, disinfectants or solvents. Remember that, during use, a spark may cause the explosion of these gases or the fire of materials (cotton, gauze, sheets or other) which are oxygen saturated or soaked with flammable substances. Remember that, during use, a spark may also cause the explosion of endogenous gases (intestine);

EMC Interferences

- The electrosurgical units comply with all the applicable EMC standards and they have been specifically tested, but they can, mainly when delivering monopolar currents, affect or damage the functioning of:
 - **Other medical equipment used in O.T. (i.e. monitoring device, video-camera and so on)**
 - **Pace-makers or other implanted devices (i.e. they can provoke fibrillations and so on).**

When operating on patients with these devices, to ask for specific qualified advice from the Cardiology Division;
The bipolar mode is the best solution to operate on a patient having a pace-maker or another similar device.

Preparation of the patient and use of the neutral electrode

The surgical use of the HF currents is based on the related thermal effect. When using an ESU, between the points where active and neutral electrodes are in contact with the patient's tissues, there is a path for the currents which are needed to obtain this effect. The thermal effect has to be very high where the active electrode is used, but it has to be absent or, at least, very low on the other tissues which the currents cross, not to produce undesired burns.

The path of the currents is more dangerous when using monopolar currents because it is long (the electrodes are used on different points of the patient's body) and the powers are quite high (the thermal effect depends on the level of power).

The path of the currents is less dangerous when using bipolar currents because it is very short (the electrodes are included in the same instrument and they are applied on the same point of the patient's body) and the powers are low.

Because of these reasons, all the causes which can increase the density of current on an area of the tissues or which allow the current to pass through anomalous and small areas of contact, have to be avoided because they provoke two dangers:

Burns of the patient's tissues crossed by too high density of current.

I.E. A metallic part or an implanted prosthesis increase the passage of the current with consequent heating/burns of the surrounding tissue

Burns of the patient's tissues crossed by too high density of current which is provoked by an anomalous or not proper contact.

I.E. A damp or wet sheet can concentrate the current,

I.E. During a laparoscopic procedure a metallic trocar cannula can cause an electrical coupling which produces a passage of current.

Generally, to reduce these risks, users must do the following:

- Take all the metallic objects off the patient (rings, etc.), remember also that the metallic elements (prosthesis, catheters, etc.) on the path of the current may cause increases of density of current;
- When performing a laparoscopic procedure, check insulation of trocar cannula and instruments;
- With dry sheets or suitable materials insulate the patient from any metallic part connected to earth or which may conduct electricity (table, supports). In the same way insulate both the patient from the heating mattress and the strongly secreting parts of the body or the contacts skin-to-skin (i.e. between arm and body). Remember that also sweat can affect the insulation;
- During the operation, mainly if the patient is moved or liquids are poured, verify if the intended insulation remains good;
- When preparing the operating field, take care that the disinfectants do not wet the sheets which are positioned under or around the patient. Also dry the traces of disinfectant on the skin;
- Place all the not specifically protected monitoring electrodes as far away as possible from the electrodes of the electrosurgical unit. Avoid, if possible, the use of needle type or very small monitoring electrodes;

When using monopolar currents, the non-homogeneous (areas with different quality of contact) and/or insufficient contact of the neutral electrode can generate 2 specific risks:

Burns on the area of the patient's body where the electrode is placed. In fact the current flows through the points which have better contact and, if these points have not sufficient surface, the current density increases and produces a high temperature which can create burns.

Bad functioning of the unit (The power decreases where the active electrode is used). This problem leads the operator to raise the power, dangerously. In fact, by raising the power, the risk of burns increases;

In order to obtain the best and homogeneous contact between tissues and neutral electrode, use and place it as follows:

- Check the electrode, if it is a reusable type (worn/old neutral electrodes are extremely dangerous);
- Place the electrode on an area of the body as close as possible to the intervention point (the ideal is a soft part without hairs, protuberant bones or superficial differences), but which not get wet when preparing or disinfecting the operating field. Normally, the better points are calf and thigh, but obviously if the operation does not affect these areas.
- Clean this area, shave it and massage it, in order to improve the circulation;
- Fix the electrode properly with the best possible contact, without placing anything in between, but do not press it too much, in order to avoid ischemic zones. Avoid anomalous contacts (i.e. When positioning the patient's arm on the operating table, insulate the hand/ the fingers from the neutral electrode). Make sure that the contact remains constant during the operation;
- As the space between the neutral electrode and the operating area represents a sort of "path" for the HF current, be sure that it does not cross diagonally the body or it crosses the heart.
- When disinfecting the operating field, avoid wetting the electrode or the related area.
- During the operation, mainly if the patient is moved or liquids are poured, verify if the intended contact remains constant;
- Contact the Technical Service for the use (choice) of the "disposable" neutral electrodes;
- Use the disposable neutral electrodes only once and follow their instructions. The right dimensions are approx. 136cm² for patients with body weight higher than 15 Kg; approx. 84cm² for children with body weight from 5 to 15 Kg;
- When using adhesive neutral electrodes, do not rely on their characteristics only. The use of a supplementary fixing guarantees a more reliable contact (i.e. an elastic bandage, able to cover the entire electrode, but without pressing it too much).
- Remember that, mainly when high powers are used, if the "Split" electrodes are not used, the circuit of the unit is not able to control the good contact between the electrode and the patient's tissues (that is, it does not guarantee the intended safety);
- When using "Split" electrodes, place them in order to obtain the same distance between both the parts of the electrode and the operation area.(i.e. when intervening on the abdominal area, if the electrode is on the thigh, place it lengthwise on the leg;

Use of currents and powers

If, when using the standard settings, the units has an anomalous functioning or it gives practical results unsatisfactory or different from the normal ones, do not increase the powers too much because these units are provided with systems able to detect and signal the problems which can badly affect the delivered powers.

*See the paragraph: **PREPARATION OF THE PATIENT - SAFETY DURING USE.***

- When start using a new electro-surgical unit, check its functioning without considering the previous experiences with similar devices. Anyway, always start with very low powers and then raise them until the required result is reached;
- Always use the lowest possible power. Do not exceed 1/4 of the maximum power for each monopolar current when using neutral electrodes for pediatrics, or 1/6 when using electrodes for new-born;
- Use the bipolar mode when operating on delicate tissues, on much innervated tissues, on small portions of tissue and cavities, when operating on patients with pace-makers or similar implanted devices, when the use of the neutral electrode is difficult.

Use of all the active accessories (electrodes, pencils, instruments, cables, connectors)

The standard monopolar pencils are suitable for active monopolar electrodes having stems with diameter 2, 3 mm.

- **Never use accessories (active electrodes, pencils, instruments, cables, connectors):**
 - Not compliant with all the applicable technical / legislative Rules
 - Not suitable for the working voltages of the device:
 - *Approx. 7600 Vpp. "4000 Vp" for the monopolar currents with crest factor equal or higher than 2.*
 - *Approx. 3600 Vpp "1800 Vp" for the monopolar currents with crest factor lower than 2.*
 - *Approx. 1100 Vpp "550 Vp" for the bipolar currents with crest factor equal or lower than 2.*
- *The manual, for each current, includes the diagram of the increase of voltage with regard to the increase of power. It helps users to establish the power which can be used without exceeding the insulation voltage of the accessories. (According to the safety standards, this voltage must be detailed on the label or in the user manual of each accessory).*
- Old/worn/damaged because they do not work properly (they do not guarantee the intended insulation and their unstable functioning can lead the operator to increase the output powers at dangerous levels) and provoke useless superficial sparks.
- When positioning the cables of the electrodes, avoid their contact either with the patient or with other cables / conductive parts. During use, place the unused active electrodes or instruments on insulating materials.
- When starting the operation, check status and insulation of the accessories, notably if they are for laparoscopy or endoscopy.
- If the carbonization of the tissues is not required, do not activate the currents if the electrode does not touch the tissues.

Use of monopolar currents enhanced by argon gas (Only for the models provided with this mode)

- Remember that the use of powers which are too low can cause undesired side effects / risks (i.e. when using the Argon gas coagulation, the risk of embolism rises if the power level is not sufficient to produce a rapid and impermeable eschar on the target tissues);
- When performing laparoscopic procedures, mainly if the cavity is small (i.e. during pediatric operation), the argon gas coagulation (It needs a gas flow of 5/6 lt/min with a pressure of 1 atm) can increase the intended pressure that is obtained by insufflating CO² gas (CO² insufflators informs the users by the alarm signal "**OVER-PRESSURE**"). In order to reduce this risk, lower when using an ALSA smoke evacuator for laparoscopy, the operators must open for an instant the Luer-Lock tap of any trocar cannula, , while the argon coagulation is being used.
- The functioning of the accessories for ARGON GAS SURGERY can be affected by the following reasons:
 - The electrical wire of the Handle / Electrodes / Connecting cables / Probes for Flexible Endoscopy, is broken
The SPRAY current does not reach the end of the electrode / probe and it is not able to ignite the gas.
 - Either the gas pipe of the Handle / Connecting cables or the plastic pipe of the probes for flexible Endoscopy are broken
The SPRAY current reaches the end of the electrode, but the gas flow is absent or too low.
 - The liquids used to clean or sterilize the probes for flexible Endoscopy, obstruct them
The gas flow is absent or intermittent.

See the specific advice which is detailed in the section of this manual "USE FOR FLEXIBLE ENDOSCOPY".

THE STICKING OF TISSUE ON THE TIPS OF BIPOLAR INSTRUMENTS

The sticking of tissue on the tips of the bipolar instruments is not a totally avoidable problem which happens when using all kinds of instrument (this means forceps for Open surgery, forceps for MIS or clamps for vessel sealing) and which depends on the heat which the passage of currents produces on the tips. To solve or, at least, to reduce this problem do the following:

- When using forceps for open surgery, irrigate, if possible, the tissue with physiological solution.
- When using forceps for open surgery, deliver the power intermittently and do not press the tips too much.
- When using all kinds of instruments (for coagulation or vessel sealing), dampen or, even better, wet the tips / the jaws. The tips or the jaws can be:
 - *Immersed in a bowl with physiological solution and they can be wetted again during use (i.e. after 3/4 coagulations).*
 - *Dampened by a gauze soaked with physiological solution and they can be dampened again during use (i.e. after 3/4 coagulations).*

MONOPOLAR CURRENTS

All the currents are automatically controlled, according to the features of the tissues, by microprocessor with two different systems
ADC System – Self adjusting with constant power / APC System - Self adjusting with constant voltage

MONOPOLAR CURRENTS FOR CUTTING OR COAGULATING CUTTING

PURE – Cutting without coagulating effect. (Auto control by ADC System with constant power).

It is suitable to cut, quickly and with minimum coagulating effect, all kinds of tissue in all the dry, damp or wet operating fields.

It is suitable for under liquid endoscopy (In Urology or Gynaecology) and for flexible endoscopy (for papillotomy).

BLEND-1 - Cutting with soft coagulating effect (Auto control by ADC System with constant power).

It is suitable to cut, with soft coagulating effect, all kinds of tissue in all the dry, damp or wet operating fields.

It is suitable for under liquid endoscopy (In Urology or Gynaecology) and for flexible endoscopy (for papillotomy or polypectomy).

BLEND-2 - Cutting with strong SPRAY coagulating effect (Auto control by ADC System with constant power).

It is suitable to cut, with strong superficial coagulating effect, the dry or damp tissues in Open-sky by grazing the tissue with the active electrode, in Laparoscopic Surgery by grazing the tissue with a hook electrode or the side of dissectors / scissors.

ENDO – Current including phases of cutting and phases of coagulation (Auto control by APC System with constant voltage).

It is suitable for flexible endoscopy only (for polypectomy).

MONOPOLAR CURRENTS FOR COAGULATION

FULG FORCED – No-contact Coagulation with strong superficial sparking (Auto control by ADC System with constant power).

It is also defined **FULGURATION** and it is suitable to coagulate, with strong superficial and deep effect, all kinds of tissue (with medium or heavy bleeding) by grazing the tissues with the active electrode or by using surgical forceps or instruments.

It is also suitable to cut with strong superficial coagulation (in Open or Laparoscopic Surgery, by grazing the tissues with the active electrodes) (in Flexible Endoscopy, by using the electrodes for polypectomy or coagulation).

PIN POINT CONTACT - Coagulation with medium superficial sparking (Auto control by ADC System with constant power).

It is suitable for the same use of **FULG FORCED** current, but it has a slightly lower sparking / superficial effect.

SOFT - Coagulation with low superficial sparking (Auto control by ADC System with constant power).

It is suitable to coagulate the tissues, with minimum superficial effect and mainly by using surgical forceps.

It is suitable to perform micro coagulations, by using thin active electrodes or micro needles,

It is not suitable to coagulate tissues with heavy bleeding and it is not intended to be used to cut.

SPRAY – No-contact Coagulation with very strong superficial sparking. (Auto control by ADC System with constant power).

It is suitable to coagulate, with very strong superficial effect, all kinds of tissue (with medium or heavy bleeding) by grazing the tissues with the active electrode or by using surgical forceps or instruments.

It is also suitable, in Open or Laparoscopic Surgery, to cut with strong coagulating effect (by grazing the tissues with the active electrodes)

For ARGON COAGULATION, the SPRAY coagulation is needed

THE CHOICE OF THE COAGULATION CURRENTS.

The currents for coagulation must be able to give the following 2 different effects:

“Superficial spark” and “Deep haemostatic effect”.

The spark is essential for the following:

To coagulate the bleeding tissues when, by using all the following thin active electrodes, the operator grazes them:

The knife, needle or thin electrodes for open surgery,

The wire loop electrodes for open surgery or other needs (i.e. the loop electrodes for the conization in gynaecology),

The wire and ribbon loop electrodes or the L-knife electrodes for under liquid endoscopy, the loop electrodes for flexible endoscopy,

The hook electrodes or the thin side of a dissector for laparoscopic surgery.

If the surgical result, by using all kinds of thin or large electrode, requires the superficial carbonization of the tissues.

The deep haemostatic effect is essential for the following:

To coagulate the bleeding tissues when, by using the following larger active electrodes, the surgeon touches or clamps them:

The forceps for coagulation for open or laparoscopic surgery.

The ball electrodes for open surgery.

The ball or roll electrodes for under liquid endoscopy.

To coagulate not bleeding tissues when, by using thin or large active electrodes, the surgeon touches or clamps them:

The ball electrodes for open surgery

All the currents for coagulation include both the effects, but with different percentages. It means that they can give lower sparking and higher deep effect or higher sparking and lower deep effect.

Because of this reasons the users must select, according to personal preferences, the currents as follows

The Fulg Forced, with high sparking and good deep effect, can be considered the current most suitable for all uses.

It is fit to coagulate either by grazing the tissues with the active electrode or by using a surgical forceps / a ball electrode.

It is fit to perform the coagulating cutting.

The Pin Point, with medium sparking and good deep effect, is similar to the FULG FORCED, but it has a slightly softer superficial effect.

It is fit for the uses of the FULG FORCED current when users like a slightly delicate effect.

The SPRAY, with very high sparking and lower deep effect, is the current which gives the highest superficial effect.

It is fit for the uses of the FULG FORCED current, if users like a very strong superficial effect, also without touching the tissues.

The SOFT is a current different from the previous ones because it has a good deep effect but a very low sparking.

It is not fit to perform the coagulating cutting. It is mainly suitable to use surgical forceps or when performing micro coagulations without superficial carbonization. It is usable to perform the coagulation when using thin electrodes, but only if the required result must be very delicate.

BIPOLAR CURRENTS

All the currents are automatically controlled, according to the features of the tissues, by microprocessor with two different systems
ADC System – Self adjusting with constant power / APC System - Self adjusting with constant voltage

BIPOLAR CURRENTS FOR CUTTING.

PURE - Cutting (Auto control by ADC System with constant power) for open or laparoscopic surgery, for use in saline solution.

BLEND - Cutting with soft coagulating effect (Auto control by ADC System with constant power) for open or laparoscopic surgery.

BIPOLAR CURRENTS FOR COAGULATION/VESSEL SEALING.

MICRO - Fine coagulation (Auto control by APC System with constant voltage) for open / laparoscopic surgery, for use in saline.

It is suitable for all uses (Very fine coagulation by using forceps with thin tips, stronger coagulation by using forceps with larger tips or forceps for laparoscopy, fast coagulation in endoscopy in saline solution by using loop or ball/roll bipolar electrodes).

MICRO AUTO – Coagulation identical to the MICRO, but with “impedance sensing” automatic start/stop system.

The delivery automatically starts (the starting delay is adjustable from 0.1 sec to 5 sec) when the tips of the instruments come in contact with damp or bleeding tissues..

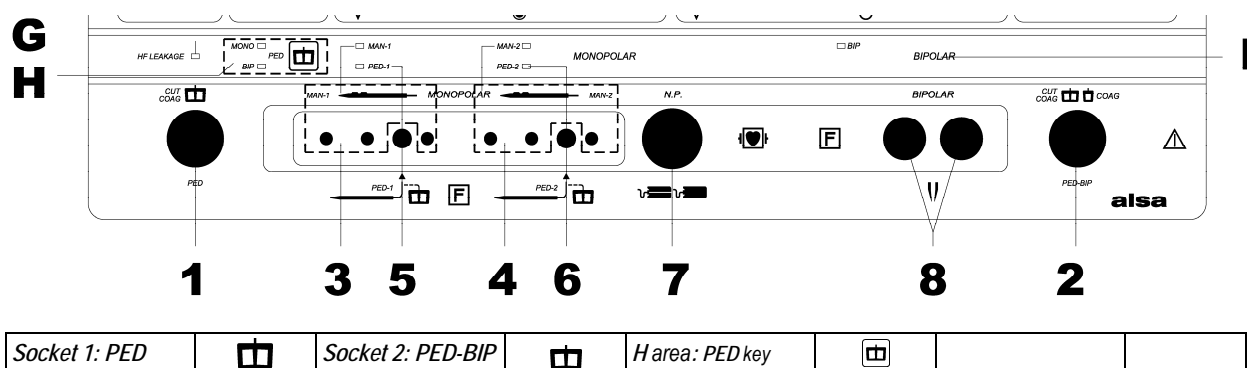
The delivery automatically stops when the tissues are coagulated or if the operators open the tips of the instruments.

MACRO – Fast and strong coagulation (Auto control by ADC System with constant power) for open or laparoscopic surgery.

INITIALS CHECKS

- Verify that the mains power supply corresponds to the technical data (see the data label on the back) and connect the unit with the mains switch (**b2-green** - on the back) off;
- If an equipotential connection is required, use the specific plug (**b4** on the back).

CONNECTION AND USE OF THE FOOT SWITCHES



The unit is provided with a standard twin foot-switch (DS/E code)

When using the DS/E only it, according to a setting on the panel, activates either the monopolar currents or the bipolar currents.

The unit can also be equipped with a second twin foot-switch (DS/B code) which activates the bipolar currents only.

If both the foot-switches are connected, the DS/E activates the monopolar currents and the DS/B activates the bipolar currents.

The foot-switch is not required to use the MICRO AUTO bipolar current for coagulation which is automatically activated / deactivated according to the impedance of the tissues.

It starts, with a delay adjustable from 0,1 to 5 seconds, when the tips of the forceps come in contact with bleeding tissues.

It stops when tissues are coagulated or if the surgeon opens the tips of the instrument.

The use of both the pedals is very useful, for example for laparoscopic surgery, to activate the delivery of all the monopolar or bipolar currents without intervening on the control panel.

*The foot-switches have different connectors (The DS/E has a 3 pins connector; the DS/B has a 7 pins connector).
 Do not force a wrong connection to the sockets.*

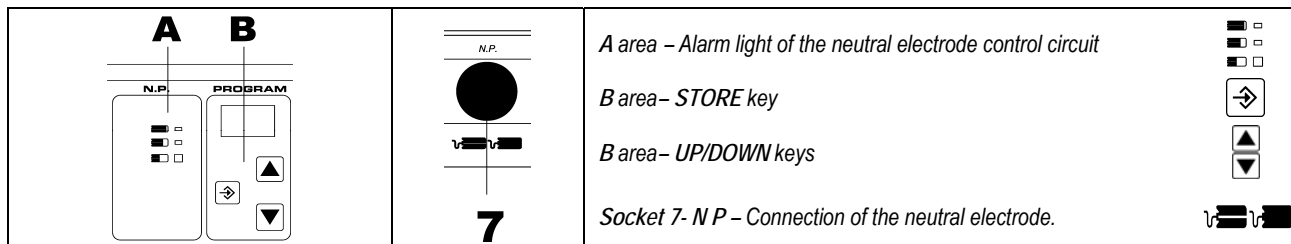
Use of DS/E twin foot-switch only (the connector has 3 pins)

- Connect the DS/E to the **Socket 1 (PED)** and push the **PED** key (**H** area) to set its functioning (**MONO** or **BIP**):
MONO light **ON**: The DS/E activates the monopolar currents for cutting (**yellow** left pedal) or coagulation (**blue** right pedal).
BIP light **ON**: The DS/E activates the bipolar currents for cutting (**yellow** left pedal) or coagulation (**blue** right pedal).

Use of both the twin foot-switches, DS/E (the connector has 3 pins) and DS/B (the connector has 7 pins)

- Connect the DS/E to the **Socket 1 (PED)** and the DS/B to the **Socket 2 (PED BIP)**.
- As soon as the DS/B is connected, the **MONO** light is **ON** (**H** area) and the unit operates as follows:
 - The DS/E activates the monopolar currents for cutting (**yellow**, left pedal) or coagulation (**blue** right pedal).
 - The DS/B activates the bipolar currents for cutting (**yellow**, left pedal) or coagulation (**blue** right pedal).

ALARM CIRCUIT OF THE NEUTRAL ELECTRODE



The monopolar mode requires the positioning, on the patient's body, of the neutral electrode.

*The neutral electrode must be used according to all the warnings detailed in the paragraph: **GENERAL WARNINGS**.*

- **Connect to the socket (7) N.P** the cable of the neutral electrode (*The connector is Ø 6,35 mm – European standard*)
Use, to connect neutral electrode cables with USA "VALLEYLAB" connector: **Adaptor RD/EN**.

The unit is provided with an alarm circuit to control the connection of the neutral electrode.

The circuit operates in different ways according to the kind of electrode ("NON SPLIT" single section, "SPLIT" twin section)

The circuit does not intervene when the memory 9, specifically available for the bipolar use only, is selected.

On the A area, the alarm is ON, but it only shows that the neutral electrode, not needed in this case, is not connected.

1. *When using single section electrodes, the circuit stops the current delivery and informs the users by the related alarm signals if the electrode is not connected to its cable, if the cable is broken or if the cable is not connected to the unit. The circuit progressively operates as follows:*

I PHASE for 10 seconds = The circuit intervenes and stops the monopolar functioning.

*All the alarm lights (A area) are ON, the unit gives the specific acoustic alarm (loud, intermittent and not adjustable), on the displays (C-D areas) the code **no nP** appears.*

II PHASE (Pre Phase of STANDBY) for 1/2 seconds = The monopolar functioning is stopped.

*All the alarm lights (A area) are ON, the acoustic alarm is stopped, on the displays (C-D areas) the code **ESU OFF** appears.*

III PHASE (COMPLETE STANDBY) with no time limit = The monopolar functioning is stopped.

*All the alarm lights (A area) are ON, the acoustic alarm is stopped, on the display (B area) the code **St** blinks, on the displays (C-D areas) the monopolar powers, used when the circuit has started intervening, appear again.*

2. *When using twin section electrodes, the circuit operates as detailed on point 1, but it also checks the contact between electrode and tissues. Because of this reason, before stopping the monopolar functioning, the circuit progressively operates, without preventing the users from the normal use the unit.*

When the contact is good, the circuit does not intervene.

If the contact is not perfect (approx. 70/80% of the surface of an electrode for adults is well attached), the circuit gives a first visual indication to the users (The first small light, A area, is ON).

If the contact decreases (approx. 50/60% of the surface of an electrode for adults is well attached), the circuit gives a second visual indication to the users (The two small lights, A area, are ON).

If the contact further decreases (approx. less than 50% of the surface of a standard electrode for adults is well attached), the circuit:

- *Gives a third visual indication to the users (On the A area, the small lights are ON and the red bigger light blinks)*
- *It automatically reduces the output powers to max. 200W (if higher levels have been selected).*

When the contact is not enough, the circuit completely operates as above detailed.

When using small neutral electrodes for pediatrics / new-born, the circuit could signal an imperfect contact and the alarm small lights can be ON, but this situation is not harmful because the powers are very lower than those which are needed to operate on adults. Anyway, by massaging the area, the contact can be improved.

3. ***Exit from STANDBY condition (Return to the normal operation)***

- Check the connections of the neutral electrode (If the electrode is "SPLIT" type, verify also its good contact with the tissues)

- Push the STORE key (B area). On the displays (C-D areas) the code **ESU On** appears.

The unit can be used in the same way as at the moment of the intervention of the circuit (functioning, currents, powers);

If the cause of the intervention of the circuit has not been solved, the unit stops again and goes back to **II** and **III** phases.

STANDBY OF THE UNIT

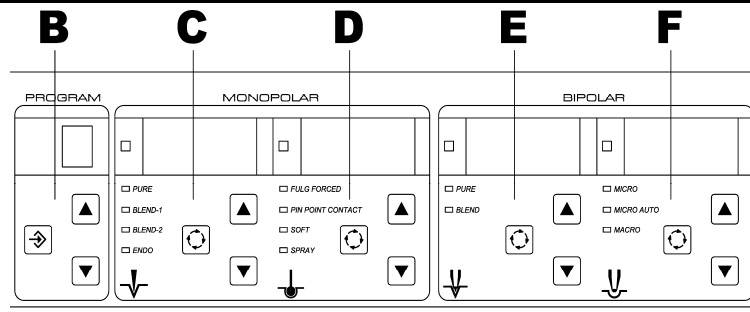
During the pauses between two operations, the electrode can be disconnected without the acoustic alarm signal.

- Disconnect either the neutral electrode from the patient or the related cable from the unit.
- The control circuit intervenes as above detailed and the unit reaches the phases I, II and III (Complete STANDBY).
The users can, without switching off the unit and without the disturbing acoustic signal, perform all the needed activities.
- Before starting the new operation, position and connect the neutral electrode.
- Push the STORE key (B area). On the displays (C-D areas) the code **ESU On** appears.

The unit can be used in the same way as at the moment of the intervention of the circuit (functioning, currents, powers);

MEMORIZATION OF PROGRAMS

The unit is usable either by performing the settings which are needed for the specific operation each time or by the previous memorization of programs including the settings which are suitable for the different needs.



The B-PROGRAM area of the panel includes all the controls needed to memorize and use a program. The display of the B-PROGRAM area shows the number of memory which the users select..

STORE key: It is used to memorize settings or changes of settings.



UP/DOWN keys are used to:

Select the memories: With the UP key = memory 1, 2, 3 and so on / With the DOWN key = memory 1, 99, 98, and so on.

Cancel changes of memorized settings: By pushing any UP/DOWN key.



The first time that the unit is switched on: Memory 1 is automatically selected.

The first time that a memory is selected: The minimum power level is selected for all the currents.

When users set the currents, the related powers or the Argon gas flow (if the unit is provided with this mode), in a memory:

The memory number starts blinking.

The memory number stops blinking when users memorize the settings.

The Currents are set by using the SEL key of the C, D, E, F areas.



The powers of the currents or the gas flow are set by using the UP/DOWN keys of the C, D, E, F, L areas.

By pushing the UP key the powers or the gas flow increase, by pushing the DOWN key the powers or the gas flow decrease.



When users change the previously memorized settings (currents, powers or the argon flow if the unit is provided with this mode) in a memory:

The memory number starts blinking.

The memory number stops blinking when users memorize or cancel the changes of setting.

Use of the unit without previously memorizing a specific program.

Before starting each operation, users have to perform all the needed settings.

As soon as the users start setting the unit, the memory number starts blinking, but the unit is normally usable.

When the unit goes OFF and ON again (intentionally or because of a loss of the mains supply):

The memory number blinks again and the unit keeps the same settings.

The unit never keeps the selection of MICRO AUTO current for bipolar coagulation; it selects MICRO bipolar coagulation.

IEC Safety standards require, when switching on a unit, the intended selection of a current with automatic activation/deactivation.

The unit, when provided with ARGON mode, never keeps the switching ON of the ARGON section.

When necessary, users must select it.

The previous memorization of programs is the best way to use the unit.

The memorization allows the users:

- To memorize programs with the starting settings which they prefer for the different surgical procedure.
 - To select the program with the intended settings, before starting the operation.
 - To change the starting settings previously memorized, during the operation,.
- To cancel or memorize the changes of the starting settings previously memorized, whenever they like

The unit is provided with 10 memories which allow the memorization of 9 working programs

7 MEMORIES are free and can be preset and used for all monopolar or bipolar needs.

MEMORY 8 is preset for the following:

Under liquid Monopolar Urological or Gynaecological Endoscopy Flexible Endoscopy,

but the same settings can be memorized in the free memories.

MEMORY 9 is preset for the bipolar use only, without connecting the neutral electrode, and their use is compulsory for this purpose. These memories can be used for the following:

Open or Laparoscopic surgery, Bipolar Endoscopy or Arthroscopy in saline solution or other bipolar uses only.

FIRST MEMORIZATION OF THE PROGRAMS.

To memorize a program for Monopolar use or Monopolar and Bipolar use:

Connect the neutral electrode to the patient and to the unit, when performing the memorization before the operation.

In case of previous memorization, arrange the neutral electrode as follows:

If the electrode is disconnectable and single section type, connect it to its cable.

If the electrode is disconnectable, but double section type, connect it to its cable, but also short-circuit the two parts of the electrode.

Place the electrode where you like, but insulate it properly (i.e. place over the unit, but insulate it by a sheet).

- Connect the neutral electrode to the Socket 7 – N.P
- Switch the unit ON. It performs the initial self-test (*On the displays, C-D areas, the ~~SUF EST~~ code is ON*) which ends with a short acoustic signal (*On the displays, C-D areas, the ~~SUF EST~~ code is OFF and the power settings appear*).
- Push the UP/DOWN (B area) and select the first memory that must be programmed.

To memorize a program for Bipolar use only.

- Switch the unit ON without arranging the neutral electrode. It performs the self test as above detailed, as soon as it ends, push the UP/DOWN keys (B area) and select the memory that must be programmed (9).

Memorization of the first program:

- Perform all the settings for the specific use according to the instructions detailed in the following sections of this manual:
MONOPOLAR AND BIPOLAR USE for Open or Laparoscopic surgery.
MONOPOLAR AND BIPOLAR USE for Flexible Endoscopy.
MONOPOLAR USE for under liquid Endoscopic Urology and Gynaecology.
BIPOLAR USE ONLY for Open or Laparoscopic surgery.
BIPOLAR USE ONLY for both Endoscopic Urology or Gynaecology in saline solution and Arthroscopy in saline solution.
- At the end of the settings, push the STORE key (B area) to memorize the first program.

Memorization of the second program:

- Push the UP/ DOWN keys (B area) to select the second memory number.
- As it has been detailed on the previous point, perform all the settings for the specific use.
- At the end of the settings, push the STORE key (B area) to memorize the second program.

Memorization of other programs:

- Follow the same method to memorize all the required programs.

Final selection of the first program that the users need to use.

- Push the UP/DOWN keys (B area) until select the intended memory number.

CHANGES OF THE MEMORIZED SETTINGS.

Whenever they like, when the currents are not activated, users can change the settings of the used program / of other programs. They can change the currents and/or the related powers.

- To change the settings of a program different from the used one, push the UP/DOWN keys (B area) to select the intended memory.
The memory number can be seen on the display (B area).
- To change the currents, push the SEL key of the area which includes the current.
The new current is signaled by the related light ON. On the display of the area the previously set power of the new current appears.
- To change the power of a current, push the UP/DOWN keys of the area which includes the current.
The display of the area shows the change of power.

As soon as the users start changing the currents, the powers or the argon gas flow (NOTE 1), the memory number starts blinking, but the unit goes on working normally. In fact the blinking is only for information of the users.

The memory number does not blink when users change the functioning of DS/E pedal.

The memory number does not blink when users switch the argon gas section ON/OFF (NOTE 1).

NOTE 1) Only for the models that are provided with ARGON GAS MODE.

CANCELLATION OR MEMORIZATION OF CHANGED SETTINGS.

Whenever they like, users can cancel all the changes of setting of a program.

- Push either of the two UP/DOWN keys (B area).
The unit re-sets the settings memorized before the change and the memory number stops blinking.
Whenever they like, users can permanently memorize the changes of setting of a program.
- Push the STORE key (B area)
The unit memorizes the new settings and the memory number stops blinking.

DATA STORING AT THE SWITCHING ON

At the switching on (intentional or unintentional because of a temporary loss of the supply), the unit re-sets all the settings used at the switching off. If the memory number was blinking at the switching off, it blinks again and the unit keeps the same settings.

The unit never keeps the selection of MICRO AUTO current for bipolar coagulation, it automatically selects MICRO coagulation.

The unit never keeps the switching ON of the ARGON gas section (Only for the models provided with this mode).

SELECTION OF A PROGRAM BEFORE USE

If the unit is OFF:

- To select a memory for monopolar or monopolar/bipolar use (from 1 to 8) connect the neutral electrode, previously placed on the patient, to the Socket 7 – **N.P.**
- To select a program for bipolar use only, without neutral electrode (9), do not connect it.
- Switch the unit ON. It performs the initial self test (*On the displays, C-D areas, the **SLF tSt** code is ON*) which ends with a short acoustic signal (*On the displays, C-D areas, the **SLF tSt** code is OFF and the power settings appear*).
- When the self test ends, push the UP/DOWN keys (**B** area) and select the desired memory.

If the unit is ON:

- To select a memory for monopolar or monopolar/bipolar use (from 1 to 8) connect the neutral electrode, previously placed on the patient, to the Socket 7 – **N.P.**
- To select a program for bipolar use only, without neutral electrode (9), do not connect it.
- Push the UP/DOWN keys (**B** area) and select the desired memory

If the unit is ON and in STANDBY mode (On the display of B area, the **St code is OFF)**

- To select a memory for monopolar or monopolar/bipolar use (from 1 to 8) connect the neutral electrode, previously placed on the patient, to the Socket 7 – **N.P.**
- To select a program for bipolar use only, without neutral electrode (9), do not connect it.
- Push the **STORE** key of **B** area (*On the displays of C-D areas the **ESU On** code is ON for a short moment, then the power settings appear*).
- Push the UP/DOWN keys (**B** area) and select the desired memory.

THE PRESET MEMORIES

The memory 8 is preset for flexible endoscopy, with or without argon gas.

In this memory the use of the argon gas allows the obtaining of the ARGON coagulation.

In this memory the following is preset:

- The sockets to connect the accessories and the functioning of DS/E pedal (it must activate either the monopolar or the bipolar currents).
- For the complete setting which is needed for this use, see the SECTION 2, paragraph SETTING OF THE CURRENTS.**

The memory 8 is preset for Urological or Gynaecological monopolar endoscopy.

In this memory the following is preset:

- The socket to connect the resectoscope and the functioning of DS/E pedal (it must activate the monopolar currents only)
- For the complete setting which is needed for this use, see the SECTION 3, paragraph SETTING OF THE CURRENTS.**

The memory 9 is preset for the bipolar use only in open or laparoscopic surgery.

In this memory the following is preset:

- The sockets to connect the accessories and the block of all monopolar currents.
- The block of the control circuit of the neutral electrode. The alarm light (**A** area) is ON, but it is for information only)
- The functioning of DS/E pedal which activates the bipolar currents only.

For the complete setting which is needed for this use, see the SECTION 4, paragraph SETTING OF THE CURRENTS.

The memory 9 is preset for both Urological or Gynaecological bipolar endoscopy in saline and for bipolar Arthroscopy in saline

In this memory the following is preset:

- The sockets to connect the accessories and the block of all monopolar currents.
- The block of the control circuit of the neutral electrode. The alarm light (**A** area) is ON, but it is for information only)
- The functioning of DS/E pedal which activates the bipolar currents only.

For the complete setting which is needed for this use, see the SECTION 5, paragraph SETTING OF THE CURRENTS.

SECTION 1

MONOPOLAR AND BIPOLAR USE

For Open or Laparoscopic Surgery

For this use the unit is provided with 7 programmable memories.

For the monopolar use all the memories from 1 to 7 allow the following:

- The use with 1 hand-switch pencil/instrument or 1 handle/instrument usable by foot switch.
 - The, not simultaneous, use of 2 hand-switch pencil/instruments.
- The not simultaneous use of both 1 hand-switch pencil/instrument and 1 pencil/instrument usable by foot switch.
- The simultaneous use of 2 hand-switch pencils/instruments, when delivering either the **SPRAY** or the **FULF FORCED** coagulation (The second one is suitable to obtain the coagulating cutting).

For the bipolar use all the memories from 1 to 7 allow the following:

- The use, by foot-switch, of 1 instrument

The foot-switch is not required to use the **MICRO AUTO** current for coagulation which is automatically activated / deactivated according to the impedance of the tissues.

- The delivery automatically starts when the tips of the instrument come in contact with a damp/wet tissue (bleeding vessel).
- The delivery automatically stops either when the vessels are coagulated or the surgeon opens the tips of the instrument.

MEMORIZATION OF PROGRAMS

The memorization system, detailed in the paragraph **MEMORIZATION OF PROGRAMS**, allows the following.

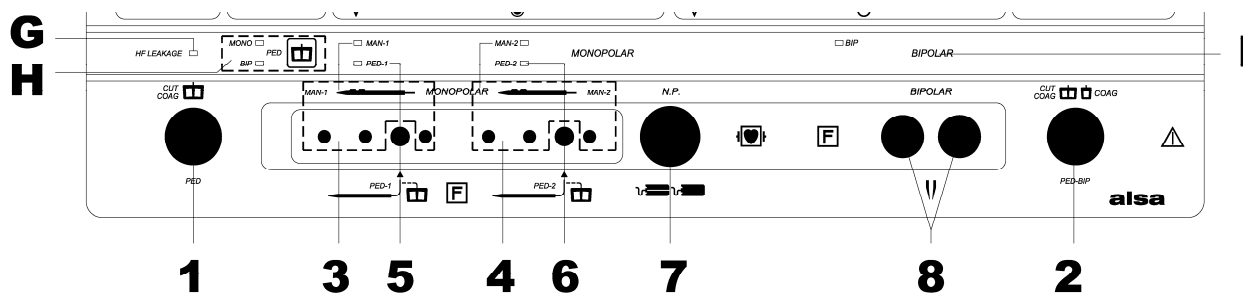
The memorization of programs, the selection of a program before use, the change of memorized settings,

The cancellation of the changed settings, the memorization of the changed settings, the data storing at the switching on.

PREPARATION AND POSITIONING OF THE PATIENT FOR THE OPERATION.

Prepare and position the patient according to all the warnings detailed in the paragraphs: **GENERAL WARNINGS, PREPARATION OF THE PATIENT – SAFETY DURING USE, CONTROL OF THE HF LEAKAGE CURRENTS.**

CONNECTION AND USE OF THE FOOT-SWITCHES



Socket 1: PED		Socket 2: PED-BIP		H area: PED key			
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The unit is provided with a twin foot-switch (DS/E code) which activates either the monopolar currents or the bipolar currents.

The unit can also be equipped with a second twin foot-switch (DS/B code) which activates the bipolar currents only.

The foot-switch is not required to use the **MICRO AUTO** current for bipolar coagulation which is automatically activated / deactivated according to the impedance of the tissues.

It starts, with a delay adjustable from 0,1 to 5 seconds, when the tips of the forceps come in contact with bleeding tissues.

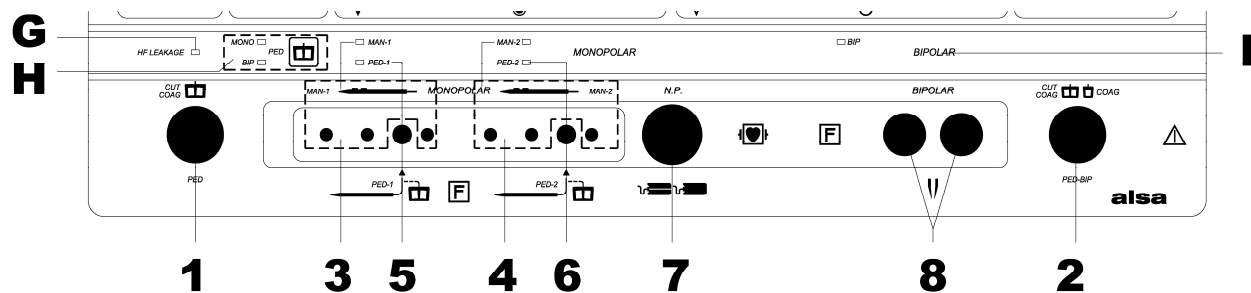
It stops when tissues are coagulated or if the surgeon opens the tips of the instrument.

Use of the DS/E (The connector has 3 contacts)

- Connect the **DS/E** to the **Socket 1 (PED)** and, by pushing **PED** key (**H-PED** area), set its functioning:
MONO light **ON**: It activates the monopolar currents for cutting (**yellow** left pedal) or coagulation (**blue** right pedal).
BIP light **ON**: It activates the bipolar currents for cutting (**yellow** left pedal) or coagulation (**blue** right pedal).

Use of the DS/E (The connector has 3 contacts) and of the DS/B (The connector has 7 contacts)

- Connect the **DS/E** to the **Socket 1 (PED)** and the **DS/B** to the **Socket 2 (PED BIP)**.
- As soon as the **DS/B** is connected, the **MONO** light is **ON (H-PED area)** and the unit operates as follows:
 - The **DS/E** activates the monopolar currents for cutting (**yellow**, left pedal) or coagulation (**blue** right pedal).
 - The **DS/B** foot-switch activates the bipolar currents for cutting (**yellow**, left pedal) or coagulation (**blue** right pedal).



Socket 1: PED		Socket 3: MAN-1		Socket 5: PED-1		Socket 7: N.P.	
Socket 2: PED-BIP		Socket 4: MAN-2		Socket 6: PED-2		Socket 8: BIP	
H area: PED key							

CONNECTION AND USE OF THE NEUTRAL ELECTRODE

- **Connect to the Socket (7) N.P:** The neutral electrode cable (The connector is Ø 6,35 mm – European Standard)
To connect a neutral electrode cable “VALLEYLAB or USA” type, use the **RD/EN** adaptor.
The monopolar mode requires the positioning, on the patient's body, of the neutral electrode.
The neutral electrode must be used according to all the warnings detailed in the paragraph: **GENERAL WARNINGS**.
The unit is provided with an alarm circuit to control the connection of the neutral electrode.
The circuit operates in different ways according to the kind of electrode (“NON SPLIT” single section, “SPLIT” twin section)
The circuit does not intervene when using the memory for the bipolar use only. On the **A** area, the alarm is **ON**, but it is for information only
For the complete functioning of the control circuit see the paragraph: **ALARM CIRCUIT OF THE NEUTRAL ELECTRODE**.
STANDBY. The neutral electrode, during the pause in use, can be disconnected without the acoustic alarm.
To select the **STANDBY** mode, see the paragraph: **STANDBY OF THE UNIT**.

CONNECTION OF THE MONOPOLAR PENCILS / INSTRUMENTS FOR SURGERY

- Users can connect 1 hand-switch pencil/instrument and/or 1 pencil/instrument usable by foot-switch.
- Users can connect 2 hand-switch pencils/instruments.

The sockets to connect the accessories are signalled by the switching **ON** of the related lights.

Two pencils/instruments are simultaneously usable when selecting and delivering either the **FULG FORCED** or the **SPRAY** current for coagulation. (The first one is suitable to obtain the coagulating cutting).

Connection of 1 hand-switch and/or 1, usable by foot-switch, pencil (instrument).

- **Connect to the Socket (3) MAN-1** (The **MAN-1** light **ON** signals that the socket is available):
The cable of a hand-switch pencil / instrument (The connector of the cable is a 3 pins type - International Standard)
- **Connect to the Socket (5) PED-1** (The **PED-1** light **ON** signals that the socket is available):
The cable of a foot-switch pencil / instrument (The connector of the cable is a female plug Ø 6mm)
Be careful!! Use only this socket to connect the accessories usable by foot-switch, if a hole of the MAN-1 socket is used to connect them, an internal breakage of the unit is caused!!
To connect accessories with cables having a different connector to the unit, use:
 - **RD/5 universal adaptor** (It allows the connection of all kinds of plugs)
 - **ALSA cables** (Model and connector of the instrument must be specified).

To use the **RD/5** adaptor see the paragraph **ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR**

Connection of 2 hand-switch pencils (instruments).

- **Connect to the Socket (3) MAN-1 and (4) MAN-2** (The lights **MAN-1** and **MAN-2** **ON** signal that the sockets are available)
The cables of 2 hand-switch pencils / instruments (The connector of the cables is a 3 pins type - International Standard)

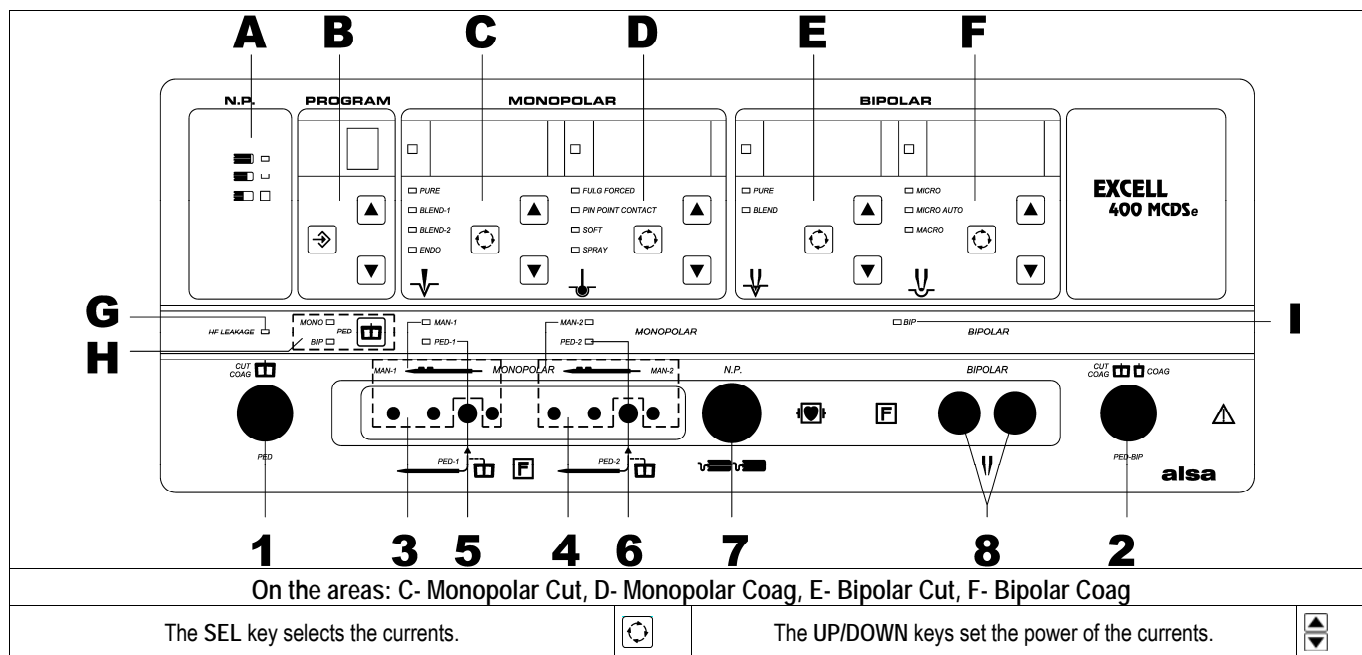
CONNECTION OF THE BIPOLAR INSTRUMENT.

The socket to connect the instrument is signalled by the switching **ON** of the related light which switches **ON** only if:

- When using the **DS/E** foot-switch, users select the **BIP** mode (the **BIP** light is **ON**) by pressing **PED** key (**H** area) •
- Users connect the **DS/B** foot-switch • Users select the **MICRO AUTO** current for coagulation •

The instrument is usable by foot-switch, but the pedal is not required to use the **MICRO AUTO** current for coagulation which is automatically activated / deactivated according to the impedance of the tissues.

- **Connect to the socket (8) BIP** (**BIP** light **ON**) the instrument
(The connector, without polarity of connection, is a 2 plugs Ø 6mm type).
To connect accessories with cables having a different connector to the unit, use:
 - **ALSA cables** (Model and connector of the instrument must be specified).
 - **Specific adaptors** which allow the use of all kinds of connectors.
 To choose the right adaptor, see the paragraph **ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR**



SELECTION, SETTING AND MEMORIZATION OF THE CURRENTS

The features and the settings (starting settings) of the currents are detailed in this section, paragraph: **CURRENTS**.

To set, on the C, D, E, F areas, all the monopolar or bipolar currents, the users must do the following:

- Use the **SEL** key of an area to set the **FIRST CURRENT** (The related light ON signals the selected current).
- Use the **UP/DOWN** keys of the same area to set the power of the **FIRST CURRENT** (The power appears on the display)
- Repeat the same method until all the intended currents have been set.

When setting the currents, the users can set 1 current, more currents or all the currents.

I.E. The unit has 4 currents for monopolar cutting: PURE, BLEND-1, BLEND-2, ENDO and 4 currents for monopolar coagulation: FULG FORCED, PIN POINT, SOFT, SPRAY.

To set 1 current for cutting (i.e. PURE with 40W):

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 40W (They appear on the display)

To set more currents for cutting which can be changed during use (i.e. PURE with 60W, BLEND-1 with 80W):

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 60W (They appear on the display)

Push the **SEL** key (C area) and select the **BLEND-1** current. With the **UP/DOWN** keys of the same area, set 80W (They appear on the display)

To set 1 current for coagulation (i.e. FULG FORCED with 50W):

Push the **SEL** key (D area) and select the **FULG FORCED** current. With the **UP/DOWN** keys of the same area, set 50W (They appear on the display)

To set more currents for coagulation which can be changed during use (i.e. SPRAY with 60W, FULG FORCED with 80W):

Push the **SEL** key (D area) and select the **SPRAY** current. With the **UP/DOWN** keys of the same area, set 60W (They appear on the display)

Push the **SEL** key (D area) and select the **FULG FORCED** current. With the **UP/DOWN** keys of the same area, set 80W (They appear on the display)

When setting more currents, the users must select the first current that they intend to use.

Push the **SEL** key (C area) and select the first current for cutting to be used (i.e. **PURE** current. On the display 60W appears).

Push the **SEL** key (D area) and select the first current for coagulation to be used (i.e. **FULG FORCED** current. On the display 60W appears).

At the end of the settings.

- | | |
|--|---------------------------------------|
| • The users can memorize the settings | Push the STORE key (B area) |
| • The users can select different memories. | Push the UP/DOWN keys (B area) |

During use, while the users are not activating the current delivery.

- | | |
|--|--|
| • Whenever they like, the users can change the memorized settings. | The memory number starts blinking.
It does not blink when changing the use of the DS/E foot-switch.
It does not blink when switching the ARGON section ON/OFF. |
| • Whenever they like, the users can cancel the changes of the settings. | Push the UP/DOWN keys (B area).
The memory number stops blinking. |
| • Whenever they like, the users can memorize the changes of the settings. | Push the STORE key (B area)
The memory number stops blinking. |
| • The users can, if the memory number does not blink, select other memories. | Push the UP/DOWN keys (B area) |

At the switching on (intentional or unintentional because of a temporary loss of the supply), the unit re-sets all the settings used at the switching off. If the memory number is blinking at the switching off, it blinks at the switching on and the unit keeps the same settings.

The unit never keeps the selection of the MICRO AUTO bipolar coagulation, it selects the MICRO bipolar coagulation.

For the complete use of the memorization system see the paragraph: **MEMORIZATION OF PROGRAMS**.

DELIVERY OF THE MONOPOLAR CURRENTS

According to the instructions which are detailed in this section, the users must connect the accessories as follows:

- The monopolar hand-switch pencils/instruments to either the **MAN-1(3)** or the **MAN-1(4)** socket.
- The monopolar foot-switch pencil/instrument to the **PED-1(5)** socket.

Delivery of currents for monopolar cutting or coagulating cutting.

- When using hand-switch pencils, push the **yellow** button,
- To use pencils / instruments by the **DS/E** foot-switch, set the **MONO** mode (**PED** key - **H** area) and press the **yellow** pedal.
An acoustic signal (low, adjustable by B6 on the back) and the yellow light ON (C- MONOPOLAR yellow area) signal the delivery.

Delivery of currents for monopolar coagulation.

- When using hand-switch pencils, push the **blue** button,
- To use pencils / instruments by the **DS/E** foot-switch, set the **MONO** mode (**PED** key - **H** area) and press the **blue** pedal.
An acoustic signal (acute, adjustable by B6 on the back) and the blue light ON (D- MONOPOLAR blue area) signal the delivery.

DELIVERY OF THE BIPOLAR CURRENT

According to the instructions detailed in this section, the bipolar instrument must be connected to the **BIP (8)** socket (**BIP** light **ON**).

Delivery of currents for bipolar cutting.

- When using the **DS/E** foot-switch, set the **BIP** mode (**PED** key - **H** area) and push its **yellow** pedal.
- When using the **DS/B** foot-switch, push its **yellow** pedal.
An acoustic signal (low, adjustable by B6 on the back) and the yellow light ON (E- BIPOLAR yellow area) signal the delivery.

Delivery of currents for bipolar coagulation.

To reduce the sticking of the tissues on the tips, normal and well known problem when using the bipolar forceps, apply the advice detailed in the paragraph: THE STICKING OF THE TISSUES ON THE TIPS OF BIPOLAR INSTRUMENTS.

To check, when starting the operation, the functioning of the bipolar forceps/scissors, do the following:

With physiological solution, wet a gauze and place it on an insulated surface or hold it without touching the wet part.

Set a coagulation current (20/30W), tighten the gauze between the tips/blades and activate the delivery. The smoke produced on the gauze signals the good functioning. Otherwise, check the cable, the connections and the insulation between the tips/blades (i.e. the damage of the insulation of the blades of the scissors, caused by the continuous sliding, causes a short-circuit which does not allow the intended use)

When using bipolar scissors, do not use a cutting current! The scissors must be used to cut the tissue mechanically while coagulating it by delivering the MICRO current.

- When using the **DS/E** foot-switch, set the **BIP** mode (**PED** key - **H** area) and push its **blue** pedal.
- When using the **DS/B** foot-switch, push its **blue** pedal.
An acoustic signal (acute, adjustable by B6 on the back) and the blue light ON (F- BIPOLAR blue area) signal the delivery.

The delivery of the **MICRO AUTO** for coagulation automatically starts/stops by an impedance sensing system.

It starts, with a delay adjustable from 0, 1 to 5 seconds, when the tips of the forceps come in contact with bleeding tissues.

It stops when tissues are coagulated or if the surgeon opens the tips of the instrument.

The units are provided with electronic self-check systems able to detect all the failures which can provoke PROBLEMS OF FUNCTIONING, ABSENCE OR DECREASE OF POWER, POWER HIGHER THAN THAT INTENDED.

The systems perform a main auto-check at the switching on and they go on checking the functioning during use.

- *If the systems detect problems during the auto-check, it doesn't finish and the systems stop the functioning.*
 - *If the systems detect problems during use, they stop the functioning.*
- *In both the cases the systems inform the users by acoustic or visual alarm signals (ERROR CODES).*

Because of this reason, if the unit has properly passed the auto-check at the switching on and the systems do not signal problems:

- *If the power is absent or very low*
- *If the practical effect, by using the standard powers, appears less efficacious than the normal one.*

Users must not think that the problem depends on the unit and they must not increase the power too much. Users must:

Check the good contact between neutral electrode and the patient's tissues (while using monopolar currents).

Check the conditions of cables and connectors, by bending and pulling them (They mainly break close to the instrument).

Check the internal connections of the instruments.

Clean the tips of all the monopolar or bipolar active electrodes or instruments. (If dirty, the current does not reach the patient's tissues)

Clean the joints of the bipolar instruments (If dirty, a short circuit happens and the current does not reach the patient's tissues).

Alarm signal for the users of the Self-diagnosis system

During use the unit can break, immediately solvable problems can happen or the users can make mistakes of use.

In these cases the system stops the unit and informs the users by acoustic alarms and ERROR CODES (on the displays of C, D areas).

The main alarm signals, related to the mistakes of use or to the immediately solvable problems, are here under detailed.

For the other alarm signals (The technical assistance is needed) see the paragraph: SELF DIAGNOSIS SYSTEM

no nP ERROR CODE + Acoustic alarm	Intervention of the control circuit of the neutral electrode
ourAct ERROR CODE + Acoustic alarm	It is for information only (The currents have been delivered for a time longer than 40/50 seconds). Stop the delivery for an instant and then re-start.
US- Act ERROR CODE + Acoustic Alarm	Two activation switches are simultaneously pressed or a switch is used against the selected mode. Two hand-switch pencils can be simultaneously used, when using the SPRAY / FULG FORCED currents only.
HF Leakage light ON (G area)	Intervention of the control circuit of the High Frequency leakage currents to earth. See the paragraph GENERAL WARNINGS, point: HF leakage currents to earth and related control circuit

CURRENTS

THE MONOPOLAR CURRENTS FOR CUTTING AND COAGULATING CUTTING.

PURE – Cutting without coagulating effect. It is suitable for the following:

To cut, without coagulating effect, all kinds of tissue in all the damp or wet operating fields when using (starting from 40/50W) either the needle or knife electrodes for Open surgery or the hook / the side of a dissector for Laparoscopy.

To reduce the smoke in Laparoscopy, the intermittent and fast activation, while grazing the tissues with the electrode, is advisable.

BLEND-1 - Cutting with soft coagulating effect. It is suitable for the following:

To cut, with soft coagulating effect, all kinds of tissue in all the dry or damp operating fields when using (starting from 40/50W) either the needle or knife electrodes for Open surgery or the hook / the side of a dissector for Laparoscopy.

To reduce the smoke in Laparoscopy, the intermittent and fast activation, while grazing the tissues with the electrode, is advisable.

BLEND-2 - Cutting with strong SPRAY coagulating effect. It is suitable for the following:

To cut with strong superficial coagulating effect all kinds of tissue in all the dry or damp operating fields when using (starting from 40/50W) either the needle or knife electrodes for Open surgery or the hook / the side of a dissector for Laparoscopy.

To reduce the smoke in Laparoscopy, the intermittent and fast activation, while grazing the tissues with the electrode, is advisable.

ENDO – Current including phases of cutting and phases of coagulation. It is not suitable for this use.

THE MONOPOLAR CURRENTS FOR COAGULATION.

FULG FORCED – (Fulguration) No contact Coagulation with strong superficial sparking. It is suitable for the following:

To coagulate (starting from 40/50W), with strong superficial and deep effect, all the damp or wet (medium or heavy bleeding) tissues, either by grazing the tissues with the active electrode or by touching the tissues with surgical forceps / instruments.

To cut (starting from 60/70W), with strong superficial coagulation all the dry or damp tissues, while grazing them with the active electrode.

PIN POINT CONTACT - Coagulation with medium superficial sparking. It is suitable for the following:

The same use of the **FULG FORCED** current (starting from 40/50W), but with a slightly lower sparking / superficial effect.

SOFT - Coagulation with low superficial sparking. It is suitable for the following:

To perform delicate coagulations (starting from 40/50W) when using surgical forceps

To perform micro coagulations (starting from 10/20W) when using thin active electrodes or micro needles.

It is not suitable to coagulate tissues with heavy bleeding and to cut the tissues with coagulating effect.

SPRAY – No-contact Coagulation with very strong superficial sparking. It is suitable for the following:

To coagulate (starting from 40/50W), with very strong superficial effect, all the damp or wet (medium or heavy bleeding) tissues either by grazing the tissues with the active electrode or by touching the tissues with surgical forceps / instruments.

To cut (starting from 60/70W), with strong superficial coagulation all the dry or damp tissues, while grazing them with the active electrode.

For ARGON COAGULATION, the SPRAY coagulation is needed

THE BIPOLAR CURRENTS FOR CUTTING.

PURE – Cutting with very low coagulating effect. It is suitable for the following:

To dissect (starting from 50/60W) the tissues in Open surgery, by performing fast nips of the tissue with forceps with thin tips.

To dissect (starting from 80/90W) the tissues in Laparoscopic surgery, by using bipolar hook or bipolar rigid needle electrodes.

BLEND - Cutting with slightly coagulating effect. It is suitable for the following:

The same use (starting from the same settings) of the PURE current

THE BIPOLAR CURRENTS FOR COAGULATION.

MICRO – Very fine coagulation (The best one for all the uses in Open / Laparoscopic surgery) and it is suitable for the following:

To use the forceps for Open surgery (starting from 1/5W if they have tips of 0,5/1 mm, from 10/20W if they have tips of 1,5 or 2mm)

To use (starting from 30/40W) scissors or rigid needle electrodes (i.e. for turbinates or tonsillectomy)

To use (starting from 20/40W according to the dimensions of the tips) forceps or scissors for laparoscopy.

MICRO AUTO – Coagulation identical to the MICRO current, but provided with “impedance sensing” automatic start/stop system.

MACRO – Fast and strong coagulation for Open or Laparoscopic Surgery. It is suitable for the following:

The same use (starting from 30/40W) of the **MICRO** current, but with a stronger effect.

SECTION 2

MONOPOLAR AND BIPOLAR USE

For Flexible Endoscopy

For this use the unit is provided with 7 programmable memories and with 1 preset memory.

For the monopolar use all the memories from 1 to 7 and the preset memory 8 allow the following:

- The use, by foot-switch, of a monopolar flexible electrode for cutting, coagulating cutting and coagulation.

For the bipolar use all the memories from 1 to 7 and the preset memory 8 allow the following:

- The use, by foot-switch, of a bipolar flexible electrode for coagulation.

All the previous accessories can be simultaneously connected to the unit and then they can be used according to the needs

The memory 8 is preset for flexible endoscopy.

In this memory the following is preset:

- The sockets to connect the accessories and the functioning of DS/E pedal (it must activate either the monopolar or the bipolar currents).
To perform the complete setting of the unit for this use see this section.

MEMORIZATION OF PROGRAMS

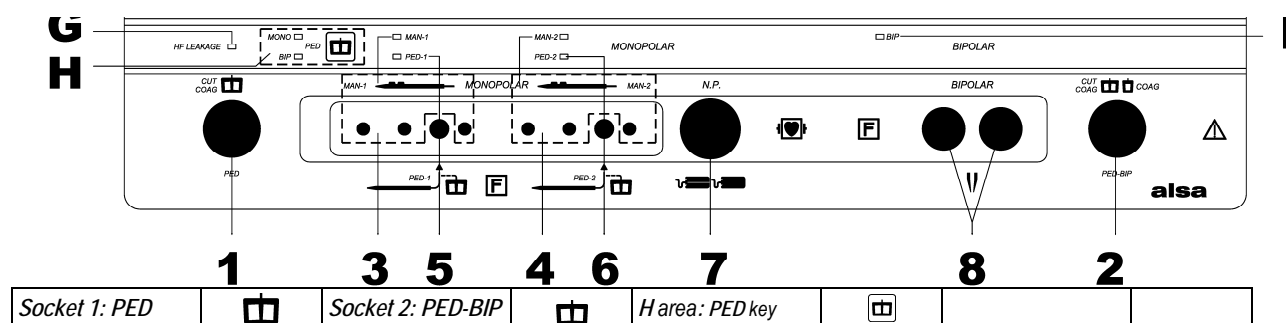
The memorization system, detailed in the paragraph MEMORIZATION OF PROGRAMS, allows the following.

The memorization of programs, The selection of a program before use, The change of memorized settings, The cancellation of the changed settings, The memorization of the changed settings, The data storing at the switching on.

PREPARATION AND POSITIONING OF THE PATIENT FOR THE OPERATION.

Prepare and position the patient according to all the warnings detailed in the paragraphs: GENERAL WARNINGS, PREPARATION OF THE PATIENT – SAFETY DURING USE, CONTROL OF THE HF LEAKAGE CURRENTS.

CONNECTION AND USE OF THE FOOT-SWITCHES



The unit is provided with a twin foot-switch (DS/E code) which activates either the monopolar currents or the bipolar currents.

The unit can also be equipped with a second twin foot-switch (DS/B code) which activates the bipolar currents only.

The foot-switch is not required to use the MICRO AUTO current for bipolar coagulation which is not used for flexible endoscopy.

- **Connect to the Socket 1 (PED):** the DS/E twin foot-switch.

To use the electrode for monopolar cutting or coagulation

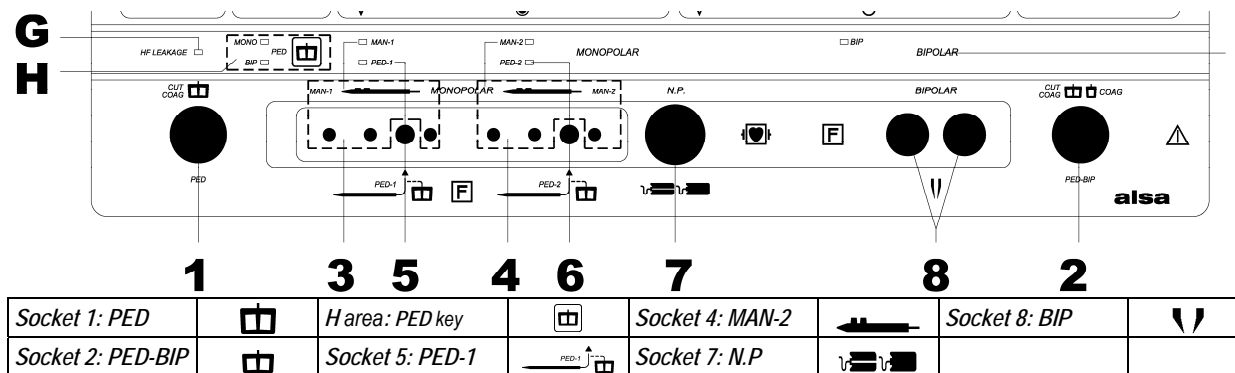
- Push the **PED** key (H area) and set the **MONO** functioning (**MONO** light ON)

The foot-switch activates the monopolar currents for cutting (yellow left pedal) or coagulation (blue right pedal).

To use the electrode for bipolar coagulation with MICRO current

- Push the **PED** key (H area) and set the **BIP** functioning (**BIP** light ON)

The foot-switch is used to activate the bipolar currents for coagulation (blue right pedal).



CONNECTION AND USE OF THE NEUTRAL ELECTRODE

- **Connect to the Socket (7) N.P:** The neutral electrode cable (The connector is Ø 6,35 mm – European Standard) To connect a neutral electrode cable “VALLEYLAB or USA” type, use the **RD/EN** adaptor.

The unit is provided with an alarm circuit to control the connection of the neutral electrode.

The circuit operates in different ways according to the kind of electrode (“NON SPLIT” single section, “SPLIT” twin section)

The circuit does not intervene when using the memory for the bipolar use only. On the A area, the alarm is ON, but it is for information only

*For the complete functioning of the control circuit see the paragraph: **ALARM CIRCUIT OF THE NEUTRAL ELECTRODE.***

***STANDBY.** The neutral electrode, during the pause in use, can be disconnected without the acoustic alarm.*

*To select the STANDBY mode, see the paragraph: **STANDBY OF THE UNIT.***

CONNECTION OF THE MONOPOLAR ELECTRODE.

The electrode is usable by foot-switch and the socket to connect it is signalled by the switching ON of the related light.

- **Connect to the Socket (5) PED-1** (The **PED-1** light ON signals that the socket is available):

The cable of the instrument (The connector of the cable is a female plug Ø 6mm)

Be careful!! Use only this socket to connect the accessories usable by foot-switch, if a hole of the MAN-1 socket is used to connect them, an internal breakage of the unit is caused!!

To connect accessories with cables having a different connector to the unit, use:

- **RD/5 universal adaptor** (It allows the connection of all kinds of plugs)
- **ALSA cables** (Model and connector of the instrument must be specified).

***CEP/3:** For instruments provided with 3mm. male connection, cable 3mt long - **CEP/3- 5:** Ditto, cable 5mt long -*

***CEP/4:** For instruments provided with 4mm. female connection, cable 3mt long - **CEP/4- 5:** Ditto, cable 5mt long -*

*To use the RD/5 adaptor see the paragraph **ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR***

CONNECTION OF THE ELECTRODE FOR BIPOLAR COAGULATION.

The electrode is usable by foot-switch, but the pedal is not required to use the MICRO AUTO current for coagulation which is not used for flexible endoscopy.

The socket to connect the electrode is signalled by the switching ON of the related light which switches ON only if:

- When using the DS/E foot-switch, users select the BIP mode (the BIP light is ON) by pressing PED key (H area) •
- Users connect the DS/B foot-switch • Users select the MICRO AUTO current for coagulation (not suitable for this use) •

The users must select the MICRO current. (The other currents are not suitable for this use).

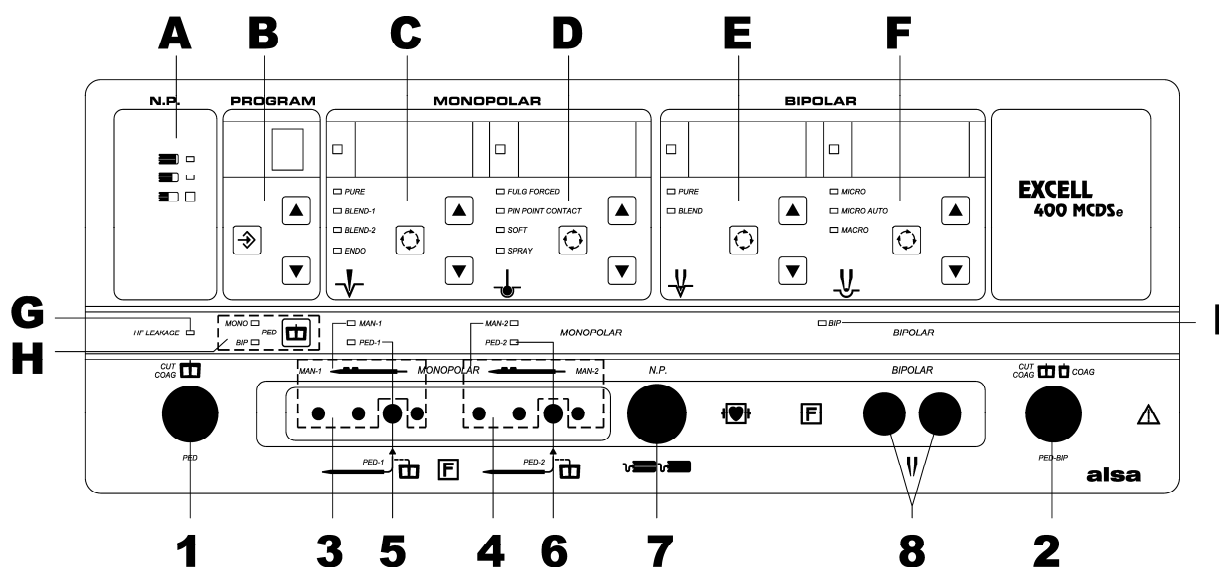
- **Connect to the socket (8) BIP** (BIP light ON) the cable of the instrument.

(The connector, without polarity of connection, is a 2 plugs Ø 6mm type).

To connect accessories with cables having a different connector to the unit, use:

- **ALSA cables** (Model and connector of the instrument must be specified).
- **Specific adaptors** which allow the use of all kinds of connectors.

*To choose the right adaptor, see the paragraph **ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR***



On the areas: C- Monopolar Cut, D- Monopolar Coag, F- Bipolar Coag

The SEL key selects the currents.



The UP/DOWN keys set the power of the currents.



SELECTION, SETTING AND MEMORIZATION OF THE CURRENTS

The features and the settings (starting settings) of the currents are detailed in this section, paragraph: **CURRENTS**.

To set, on the C, D, F areas, all the monopolar currents and the bipolar current for coagulation, the users must do the following:

- Use the **SEL** key of an area to set the **FIRST CURRENT** (The related light ON signals the selected current).
- Use the **UP/DOWN** keys of the same area to set the power of the **FIRST CURRENT** (The power appears on the display)
- Repeat the same method until all the intended currents have been set.

When setting the currents, the users can set 1 current, more currents or all the currents.

I.E. The unit has 4 currents for monopolar cutting: PURE, BLEND-1, BLEND-2, ENDO and

4 currents for monopolar coagulation: FULG FORCED, PIN POINT, SOFT, SPRAY.

To set 1 current for cutting (i.e. PURE with 40W):

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 40W (They appear on the display)

To set more currents for cutting which can be changed during use (i.e. PURE with 60W, BLEND-1 with 80W):

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 60W (They appear on the display)

Push the **SEL** key (C area) and select the **BLEND-1** current. With the **UP/DOWN** keys of the same area, set 80W (They appear on the display)

To set 1 current for coagulation (i.e. FULG FORCED with 50W):

Push the **SEL** key (D area) and select the **FULG FORCED** current. With the **UP/DOWN** keys of the same area, set 50W (They appear on the display)

To set more currents for coagulation which can be changed during use (i.e. SPRAY with 60W, FULG FORCED with 80W):

Push the **SEL** key (D area) and select the **SPRAY** current. With the **UP/DOWN** keys of the same area, set 60W (They appear on the display)

Push the **SEL** key (D area) and select the **FULG FORCED** current. With the **UP/DOWN** keys of the same area, set 80W (They appear on the display)

When setting more currents, the users must select the first current that they intend to use.

Push the **SEL** key (C area) and select the first current for cutting to be used (i.e. **PURE** current. On the display 60W appears).

Push the **SEL** key (D area) and select the first current for coagulation to be used (i.e. **FULG FORCED** current. On the display 60W appears).

At the end of the setting.

- The users can memorize the settings
- The users can select different memories.

Push the **STORE** key (B area)

Push the **UP/DOWN** keys (B area)

During use, while the users are not activating the current delivery.

- Whenever they like, the users can change the memorized settings.
- Whenever they like, the users can cancel the changes of the settings.
- Whenever they like, the users can memorize the changes of the settings.
- The users can, if the number memory does not blink, select other memories.

The memory number starts blinking.

It does not blink when changing the use of the DS/E foot-switch.
It does not blink when switching the ARGON section ON/OFF.

Push the **UP/DOWN** keys (B area).
The memory number stops blinking.

Push the **STORE** key (B area)
The memory number stops blinking.

Push the **UP/DOWN** keys (B area)

At the switching on (intentional or unintentional because of a temporary loss of the supply), the unit re-sets all the settings used at the switching off. If the memory number is blinking at the switching off, it blinks at the switching on and the unit keeps the same settings.

The unit never keeps the selection of the MICRO AUTO bipolar coagulation, it selects the MICRO bipolar coagulation.

For the complete use of the memorization system see the paragraph: **MEMORIZATION OF PROGRAMS**.

DELIVERY OF THE MONOPOLAR CURRENTS

According to the instructions detailed in this section, the monopolar foot-switch flexible electrode must be connected to the **PED-1(5)** socket.

Delivery of currents for monopolar cutting or coagulating cutting.

- With the **PED** key set the **MONO** mode (**H** area) and push the **yellow** pedal of the **DS/E** foot-switch.
An acoustic signal (low, adjustable by **B6** on the back) and the yellow light **ON** (**C- MONOPOLAR** yellow area) signal the delivery.

Delivery of currents for monopolar coagulation.

- With the **PED** key set the **MONO** mode (**H** area) and push the **blue** pedal of the **DS/E** foot-switch.
An acoustic signal (acute, adjustable by **B6** on the back) and the blue light **ON** (**D- MONOPOLAR** blue area) signal the delivery.

DELIVERY OF THE BIPOLAR CURRENTS

According to the instructions detailed in this section, the bipolar flexible electrode must be connected to the **BIP (8)** socket (**BIP** light **ON**).

Delivery of currents for bipolar cutting (they are not used in this case).

Delivery of currents for bipolar coagulation (The MICRO current only is suitable for this use).

- With the **PED** key set the **BIP** mode (**H** area) and push the **blue** pedal of the **DS/E** foot-switch.
An acoustic signal (acute, adjustable by **B6** on the back) and the blue light **ON** (**F- BIPOLAR** blue area) signal the delivery.

The units are provided with electronic self-check systems able to detect all the failures which can provoke PROBLEMS OF FUNCTIONING, ABSENCE OR DECREASE OF POWER, POWER HIGHER THAN THAT INTENDED.

The systems perform a main auto-check at the switching on and they go on checking the functioning during use.

- If the systems detect problems during the auto-check, it doesn't finish and the systems stop the functioning.*
 - If the systems detect problems during use, they stop the functioning.*
- In both the cases the systems inform the users by acoustic or visual alarm signals (ERROR CODES).*

Because of this reason, if the unit has properly passed the auto-check at the switching on and the systems do not signal problems:

- If the power is absent or very low*
- If the practical effect, by using the standard powers, appears less efficacious than the normal one.*

Users must not think that the problem depends on the unit and they must not increase the power too much. Users must:

Check the good contact between neutral electrode and the patient's tissues (while using monopolar currents).

Check the conditions of cables and connectors, by bending and pulling them (They mainly break close to the instrument).

Check the internal connections of the instruments.

Clean the tips of all the monopolar or bipolar active electrodes or instruments. (If dirty, the current does not reach the patient's tissues)

Clean the joints of the bipolar instruments (If dirty, a short circuit happens and the current does not reach the patient's tissues).

Alarm signal for the users of the Self-diagnosis system

During use the unit can break, immediately solvable problems can happen or the users can make mistakes of use.

*In these cases the system stops the unit and informs the users by acoustic alarms and ERROR CODES (on the displays of **C**, **D** areas).*

The main alarm signals, related to the mistakes of use and to the immediately solvable problems, are here under detailed.

*For the other alarm signals (The technical assistance is needed) see the paragraph: **SELF DIAGNOSIS SYSTEM**.*

no nP ERROR CODE + Acoustic alarm	Intervention of the control circuit of the neutral electrode
our Act ERROR CODE + Acoustic alarm	It is for information only (The currents have been delivered for a time longer than 40/50 seconds). Stop the delivery for an instant and then re-start.
US- Act ERROR CODE + Acoustic Alarm	Two activation switches are simultaneously pressed or a switch is used against the selected mode. Two hand-switch pencils can be simultaneously used, when using the SPRAY / FULG FORCED currents only.
HF Leakage light ON (G area)	Intervention of the control circuit of the High Frequency leakage currents to earth. See the paragraph GENERAL WARNINGS , point: HF leakage currents to earth and related control circuit

CURRENTS

THE MONOPOLAR CURRENTS FOR CUTTING AND COAGULATING CUTTING.

PURE – Cutting without coagulating effect. It is suitable for the following:

To perform the papillotomy (starting from 20/30W) or to all the other needs which require a cut, without coagulating effect.

BLEND-1- Cutting with soft coagulating effect. It is suitable for the following:

To perform either the papillotomy (starting from 20/30W) or the other needs which require a cut, with soft coagulating effect.

BLEND-2- Cutting with strong SPRAY coagulating effect. It is suitable for this following:

To perform the either polypectomy (starting from 20/30W) or the other needs which require a cut, with strong coagulating effect.

ENDO – Current including phases of cutting and phases of coagulation . It is suitable for this use.

To perform the polypectomy (starting from 50W for polyps with Ø up to 5mm, starting from 80W FOR polyps with Ø wider than 5mm)

The currents **FULG FORCED** or **PIN POINT CONTACT** for coagulation allow the obtaining, when performing a polypectomy, of a very good coagulating cutting.

THE MONOPOLAR CURRENTS FOR COAGULATION.

FULG FORCED – (Fulguration) No contact Coagulation with strong superficial sparking. It is suitable for the following:

To coagulate (starting from 20/30W), with strong and fast effect, all kinds of tissue (with medium or heavy bleeding).

To cut when performing a polypectomy (starting from 20/30W) because it coagulates very well the wall under the polyp. For this use the intermittent activation (by fast and short pressures on the foot-switch), is advisable.

PIN POINT CONTACT - Coagulation with medium superficial sparking. It is suitable for the following:

The same use of the **FULG FORCED** current (starting from the same power settings, but with a slightly lower sparking / superficial effect.

SOFT and SPRAY currents are not suitable for this use

For the **ARGON COAGULATION** the **SPRAY** current (starting from 70/80W) is needed.

THE BIPOLAR CURRENTS FOR CUTTING.

The bipolar currents for cutting are not used

THE BIPOLAR CURRENTS FOR COAGULATION

MICRO is the current suitable in case of use of a bipolar flexible loop (starting setting of 20/30W).

STARTING SETTINGS (The settings can be changed according to the personal preferences)								
Papillotomy or other procedures which need pure cut or a slightly coagulating cut								
CUTTING		COAGULATION		BIP COAG		ARGON GAS COAGULATION		
PURE	20/30W	FULG FORCED	20/30W	MICRO	20/40W	If the unit is provided with this mode		
		PIN POINT	20/30W			SPRAY	70/80W	Argon 6/7 lt/min
If doctor prefers a cut with a slightly coagulating effect.								
BLEND 1	20/30W							
Polypectomy or other procedures which need strong coagulating cut								
ENDO (Note 1)	40/50W	FULG FORCED	20/30W					
		PIN POINT	20/30W					
FULG FORCED (Note 3)	20/40W							
PIN POINT (Note 3)	20/40W							

Note 1) The difference between a normal current and an AUTO current is that the first one delivers a constant power and the second one delivers a constant voltage. The superficial effect (i.e. the superficial carbonization which is a side effect of all the currents) of a constant voltage current is lower than that of a constant power current, but the related power is more affected by the resistance of the tissues, so the related power setting must be higher

(Because of the previous reasons, by using a constant voltage current, the required power setting is more affected by the dimensions of the polyp: 40/50W if the polyps have a diameter up to 5mm, 60/80W if the polyps are larger than 5 mm.

Note 3) Since the perfect coagulation of the tissues under the polyp is needed, the currents for coagulation are very efficacious to obtain a cut with this effect. The delivery of the current must be intermittent (by short pressures of the foot-switch)

SECTION 3

MONOPOLAR USE

For endoscopic Urology and Gynaecology under liquid

For this use the unit is provided with 7 programmable memories (from 1 to 7) and with 1 preset memory (8) which allow the use, by foot-switch, of a monopolar resector / instrument.

For the endoscopic Urology and Gynaecology under liquid in the memory 8 the following is preset:

The socket to connect the resector and the functioning of DS/E pedal (it must activate the monopolar currents only)

To perform the complete setting of the unit for this use see this section.

MEMORIZATION OF PROGRAMS

The memorization system, detailed in the paragraph MEMORIZATION OF PROGRAMS, allows the following.

The memorization of programs, The selection of a program before use, The change of memorized settings,

The cancellation of the changed settings, The memorization of the changed settings, The data storing at the switching on.

PREPARATION AND POSITIONING OF THE PATIENT FOR THE OPERATION.

Prepare and position the patient according to all the warnings detailed in the paragraphs: *GENERAL WARNINGS, PREPARATION OF THE PATIENT – SAFETY DURING USE, CONTROL OF THE HF LEAKAGE CURRENTS.*

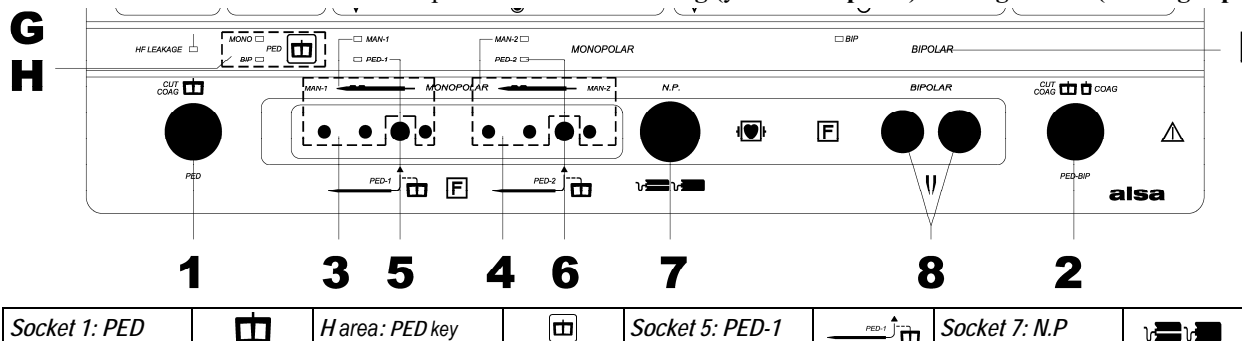
CONNECTION AND USE OF THE FOOT-SWITCHES

The unit is provided with a twin foot-switch (DS/E code) which activates either the monopolar currents or the bipolar currents.

The unit can also be also equipped with a second twin foot-switch (DS/B code) which activates the bipolar currents only.

For this use, the bipolar currents are not required and the DS/E pedal only is used (The connector has 3 contacts)

- Connect the DS/E to the **Socket 1 (PED)** and, by pushing PED key (**H** area), set the **MONO** functioning (**MONO** light ON)
- The foot-switch activates the monopolar currents for **cutting** (yellow left pedal) or **coagulation** (blue right pedal).



CONNECTION AND USE OF THE NEUTRAL ELECTRODE

- Connect to the Socket (7) N.P.:** The neutral electrode cable (The connector is Ø 6,35 mm – European Standard)

To connect a neutral electrode cable “VALLEYLAB or USA” type use the **RD/EN** adaptor.

The monopolar mode requires the positioning, on the patient's body, of the neutral electrode.

The neutral electrode must be used according to all the warnings detailed in the paragraph: *GENERAL WARNINGS.*

The unit is provided with an alarm circuit to control the connection of the neutral electrode.

The circuit operates in different ways according to the kind of electrode (“NON SPLIT” single section, “SPLIT” twin section)

The circuit does not intervene when using the memory for the bipolar use only. On the **A** area, the alarm is **ON**, but it is for information only

For the complete functioning of the control circuit see the paragraph: *ALARM CIRCUIT OF THE NEUTRAL ELECTRODE.*

STANDBY. The neutral electrode, during the pause in use, can be disconnected without the acoustic alarm.

To select the **STANDBY** mode, see the paragraph: *STANDBY OF THE UNIT.*

CONNECTION OF THE MONOPOLAR RESECTOR / INSTRUMENT

The socket to connect the resector / instrument is signalled by the switching ON of the related light.

- Connect to the Socket (5) PED-1** (The **PED-1** light **ON** signals that the socket is available):

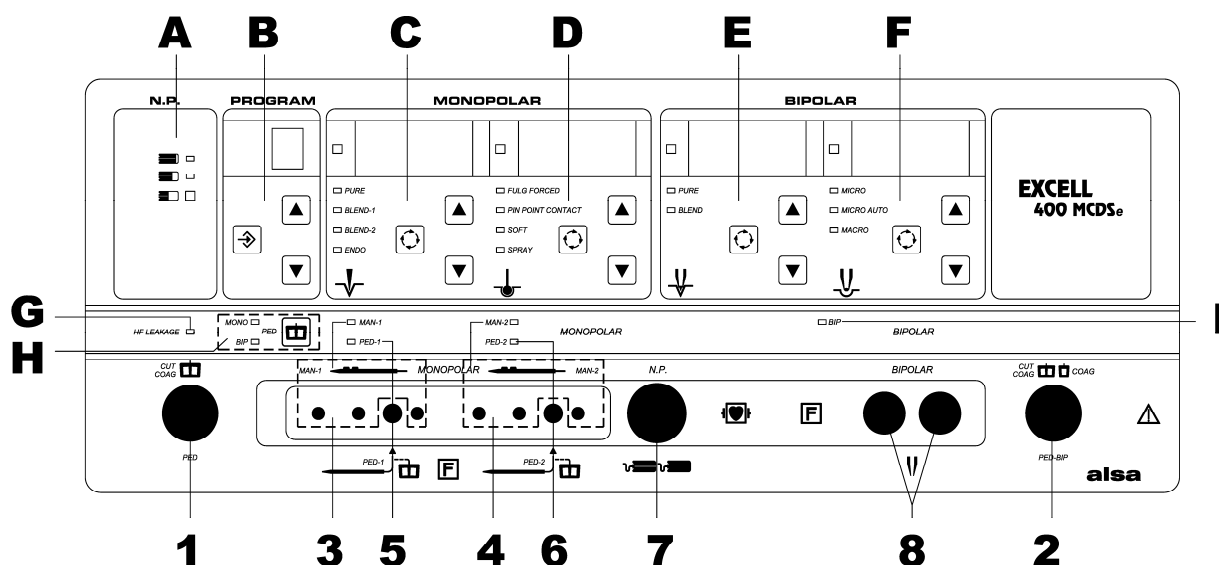
The cable of the resector/instrument (The connector of the cable is a female plug Ø 6mm)

Be careful!! Use only this socket to connect the accessories usable by foot-switch, if a hole of the MAN-1 socket is used to connect them, an internal breakage of the unit is caused!!

To connect accessories with cables having a different connector to the unit, use:

- RD/5 universal adaptor** (It allows the connection of all kinds of plugs)
- ALSA cables** (Model and connector of the instrument must be specified).

To use the **RD/5** adaptor see the paragraph **ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR**



On the areas: C- Monopolar Cut, D- Monopolar Coag

The SEL key selects the currents.



The UP/DOWN keys set the power of the currents.



SELECTION, SETTING AND MEMORIZATION OF THE CURRENTS

The features and the settings (starting settings) of the currents are detailed in this section, paragraph: **CURRENTS**.

To set, on the C, D areas, all the monopolar currents, the users must do the following:

- Use the **SEL** key of an area to set the **FIRST CURRENT** (The related light ON signals the selected current).
- Use the **UP/DOWN** keys of the same area to set the power of the **FIRST CURRENT** (The power appears on the display)
- Repeat the same method until all the intended currents have been set.

When setting the currents, the users can set 1 current, more currents or all the currents.

I.E. The unit has 4 currents for monopolar cutting: **PURE**, **BLEND-1**, **BLEND-2**, **ENDO** and
4 currents for monopolar coagulation: **FULG FORCED**, **PIN POINT**, **SOFT**, **SPRAY**.

To set 1 current for cutting (i.e. **PURE with 40W):**

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 40W (They appear on the display)

To set more currents for cutting which can be changed during use (i.e. **PURE with 60W, **BLEND-1** with 80W):**

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 60W (They appear on the display)

Push the **SEL** key (C area) and select the **BLEND-1** current. With the **UP/DOWN** keys of the same area, set 80W (They appear on the display)

To set 1 current for coagulation (i.e. **FULG FORCED with 50W):**

Push the **SEL** key (D area) and select the **FULG FORCED** current. With the **UP/DOWN** keys of the same area, set 50W (They appear on the display)

To set more currents for coagulation which can be changed during use (i.e. **SPRAY with 60W, **FULG FORCED** with 80W):**

Push the **SEL** key (D area) and select the **SPRAY** current. With the **UP/DOWN** keys of the same area, set 60W (They appear on the display)

Push the **SEL** key (D area) and select the **FULG FORCED** current. With the **UP/DOWN** keys of the same area, set 80W (They appear on the display)

When setting more currents, the users must select the first current that they intend to use.

Push the **SEL** key (C area) and select the first current for cutting to be used (i.e. **PURE** current. On the display 60W appears).

Push the **SEL** key (D area) and select the first current for coagulation to be used (i.e. **FULG FORCED** current. On the display 60W appears).

At the end of the settings.

- The users can memorize the settings

Push the **STORE** key (B area)

- The users can select different memories.

Push the **UP/DOWN** keys (B area)

During use, while the users are not activating the current delivery.

- Whenever they like, the users can change the memorized settings.

The memory number starts blinking.
It does not blink when changing the use of the DS/E foot-switch.
It does not blink when switching the ARGON section ON/OFF.

- Whenever they like, the users can cancel the changes of the settings.

Push the **UP/DOWN** keys (B area).
The memory number stops blinking.

- Whenever they like, the users can memorize the changes of the settings.

Push the **STORE** key (B area)
The memory number stops blinking.

- The users can, if the memory number does not blink, select other memories.

Push the **UP/DOWN** keys (B area)

At the switching on (intentional or unintentional because of a temporary loss of the supply), the unit re-sets all the settings used at the switching off. If the memory number is blinking at the switching off, it blinks at the switching on and the unit keeps the same settings.

The unit never keeps the selection of the **MICRO AUTO** bipolar coagulation, it selects the **MICRO** bipolar coagulation.

The unit, when provided with **ARGON** mode, never keeps the switching ON of the **ARGON** gas section.

For the complete use of the memorization system see the paragraph: **MEMORIZATION OF PROGRAMS**.

DELIVERY OF THE MONOPOLAR CURRENTS

According to the instructions which are detailed in this section, the users must connect the resector to the **PED-1 (5)** socket.

- Push the **PED** key and set the **MONO** mode (**H** area)

Delivery of currents for monopolar cutting or coagulating cutting.

To obtain a very fast and efficacious cutting, but with minimum superficial carbonization of the tissues, the power of the cutting currents must be perfectly set, by small changes of 5/15W.

The result can be seen, according to the colour of the tissues, on the screen of the video-camera.

- Push the **yellow** pedal of **DS/E** foot-switch.

An acoustic signal (low, adjustable by B6 on the back) and the yellow light ON (C- MONOPOLAR yellow area) signal the delivery.

Delivery of currents for monopolar coagulation.

- Push the **blue** pedal of **DS/E** foot-switch.

An acoustic signal (acute, adjustable by B6 on the back) and the blue light ON (D- MONOPOLAR blue area) signal the delivery.

The units are provided with electronic self-check systems able to detect all the failures which can provoke PROBLEMS OF FUNCTIONING, ABSENCE OR DECREASE OF POWER, POWER HIGHER THAN THAT INTENDED.

The systems perform a main auto-check at the switching on and they go on checking the functioning during use.

- *If the systems detect problems during the auto-check, it doesn't finish and the systems stop the functioning.*
 - *If the systems detect problems during use, they stop the functioning.*
- *In both the cases the systems inform the users by acoustic or visual alarm signals (ERROR CODES).*

Because of this reason, if the unit has properly passed the auto-check at the switching on and the systems do not signal problems:

- *If the power is absent or very low*
- *If the practical effect, by using the standard powers, appears less efficacious than the normal one.*

Users must not think that the problem depends on the unit and they must not increase the power too much. Users must:

Check the good contact between neutral electrode and the patient's tissues (while using monopolar currents).

Check the conditions of cables and connectors, by bending and pulling them (They mainly break close to the instrument).

Check the internal connections of the instruments.

Clean the tips of all the monopolar or bipolar active electrodes or instruments. (If dirty, the current does not reach the patient's tissues)

Clean the joints of the bipolar instruments (If dirty, a short circuit happens and the current does not reach the patient's tissues).

Alarm signal for the users of the Self-diagnosis system

During use the unit can break, immediately solvable problems can happen or the users can make mistakes of use.

In these cases the system stops the unit and informs the users by acoustic alarms and ERROR CODES (on the displays of C, D areas).

The main alarm signals, related to the mistakes of use and to the immediately solvable problems, are here under detailed.

*For the other alarm signals (The technical assistance is needed) see the paragraph: **SELF DIAGNOSIS SYSTEM**.*

no nP ERROR CODE + Acoustic alarm	<i>Intervention of the control circuit of the neutral electrode</i>
our Act ERROR CODE + Acoustic alarm	<i>It is for information only (The currents have been delivered for a time longer than 40/50 seconds). Stop the delivery for an instant and then re-start.</i>
US- Act ERROR CODE + Acoustic Alarm	<i>Two activation switches are simultaneously pressed or a switch is used against the selected mode. Two hand-switch pencils can be simultaneously used, when using the SPRAY / FULG FORCED currents only.</i>
HF Leakage light ON (G area)	<i>Intervention of the control circuit of the High Frequency leakage currents to earth. See the paragraph GENERAL WARNINGS, point: HF leakage currents to earth and related control circuit</i>

CURRENTS

THE MONOPOLAR CURRENTS FOR CUTTING AND COAGULATING CUTTING.

PURE – Cutting without coagulating effect. It is suitable for the following:

To perform either the TURV or the cutting in Gynaecology (Starting from 90-100W), when using the wire loops.

To perform the TURP (Starting from 100-120W), when using the wire loops.

To perform either the TURV or the cutting in Gynaecology (Starting from 140-150W), when using the ribbon loops for cutting or vaporization.

To perform the TURP (Starting from 150-160W), when using the ribbon loops for cutting or vaporization.

To perform a cutting (Starting from 60-70W), when using the L –knife electrodes.

To perform the vaporization (Starting from 100-120W), when using the small roll electrodes.

To perform the vaporization (Starting from 150-200W), when using the big roll electrodes.

BLEND-1 - Cutting with soft coagulating effect. It is suitable for the following:

The same use of the **PURE** current (identical starting power), but with a soft coagulating effect.

It is not suitable to perform the vaporization, when using the roll electrodes.

BLEND-2 and AUTO ENDO currents are not suitable for this use

THE MONOPOLAR CURRENTS FOR COAGULATION.

FULG FORCED – (Fulguration) No contact Coagulation with strong superficial sparking. It is suitable for the following:

To coagulate with strong and fast effect, all kinds of tissue (Starting from 60-70W, when using the wire loops / the ribbon loops)

To coagulate with strong and fast effect, all kinds of tissue (Starting from 70-80W, when using the ball / roll electrodes)

PIN POINT CONTACT - Coagulation with medium superficial sparking. It is suitable for the following:

The same use of the **FULG FORCED** current (starting from the same power settings), but with a slightly lower sparking / superficial effect.

SOFT current is not suitable for this use

SPRAY – No-contact Coagulation with very strong superficial sparking. It is suitable for the following:

To coagulate with strong superficial effect and without touching the tissue (Starting from 40-50W, when using the wire or ribbon loops).

To coagulate with strong superficial effect and without touching the tissue (Starting from 60-70W, when using the ball electrodes).

THE BIPOLAR CURRENTS FOR CUTTING OR COAGULATION.

The bipolar currents are not used

TABLE SETTINGS (The settings can be changed according to the personal preferences)		
TURP	ELECTRODE	CURRENTS AND START SETTING
CUTTING	With wire loops	PURE: 110/120W
COAGULATING CUTTING	ditto	BLEND-1: 110/120W
COAGULATION	ditto	FULG FORCED: 70/80W or SPRAY: 60/70W
CUTTING	With ribbon loops	PURE: 110/120W
COAGULATING CUTTING	ditto	BLEND-1: 110/120W
COAGULATION	ditto	FULG FORCED: 70/80W or SPRAY: 60/70W
COAGULATION	With ball electrode	FULG FORCED: 80/90W or SPRAY: 80/90W
TURV or GYNAECOLOGY		
CUTTING	With wire loops	PURE: 90/100W
COAGULATING CUTTING	ditto	BLEND-1: 90/100W
CUTTING	With ribbon loops	BLEND-1: 110/120W
COAGULATING CUTTING	ditto	BLEND-1: 110/120W
COAGULATION	ditto	FULG FORCED: 70/80W or SPRAY: 60/70W
COAGULATION	With ball electrode	FULG FORCED: 80/90W or SPRAY: 80/90W
VAPORIZATION	With ball or roll electrode (3mm)	PURE: 140/150W
VAPORIZATION	With ball or roll electrode (5mm)	PURE: 190/200W
PURE CUT	With knife electrode	PURE: 60/70W
COAGULATING CUT	With knife electrode	BLEND-1: 60/70W
PURE CUT	With knife electrode	PURE: 40/50W

SECTION 4

BIPOLAR USE ONLY, WITHOUT CONNECTING THE NEUTRAL ELECTRODE ***For open or laparoscopic surgery***

The monopolar currents are blocked and the unit is usable without connecting the neutral electrode.

The alarm light of the control circuit of the neutral electrode is ON, but it is for information only.

For this use the unit is provided with the preset memory 9 which allows the following:

- *The use, by foot-switch, of 1 instrument*

The foot-switch is not required to use the MICRO AUTO current for bipolar coagulation which is automatically activated / deactivated according to the impedance of the tissues.

- *The delivery starts, with a delay from 0,1 to 5 sec, when the tips of the instrument come in contact with a damp/wet tissue (bleeding vessel).*
- *The delivery stops either when the vessels are coagulated or the surgeon opens the tips of the instrument.*

For this use the memory 9, where the following is preset, must be used:

- The sockets to connect the accessories and the block of all the monopolar currents.
- The block of the control circuit of the neutral electrode. The alarm light (A area) is ON, but it is for information only.
- The functioning of DS/E pedal which activates the bipolar currents only.

To perform the complete setting of the unit for this use see this section.

MEMORIZATION OF PROGRAMS

The memorization system, detailed in the paragraph MEMORIZATION OF PROGRAMS, allows the following.

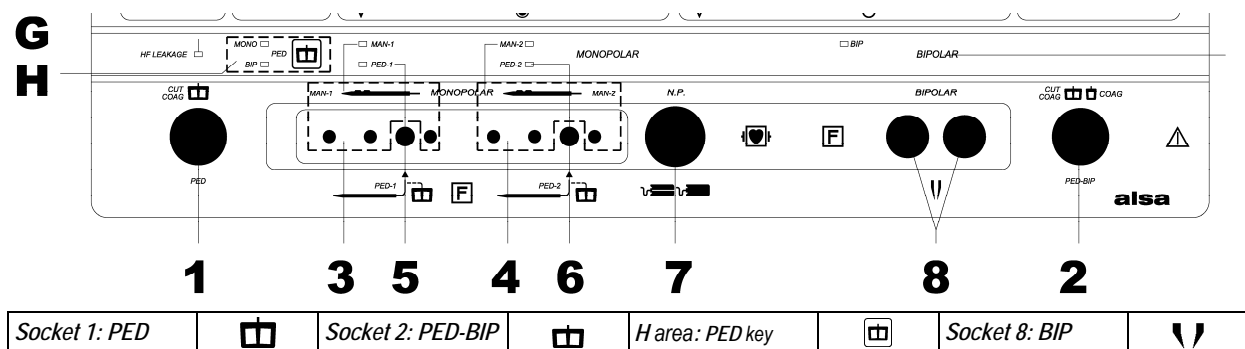
The memorization of programs, The selection of a program before use, The change of memorized settings,

The cancellation of the changed settings, The memorization of the changed settings, The data storing at the switching on.

PREPARATION AND POSITIONING OF THE PATIENT FOR THE OPERATION.

Prepare and position the patient according to all the warnings detailed in the paragraphs: GENERAL WARNINGS, PREPARATION OF THE PATIENT – SAFETY DURING USE, CONTROL OF THE HF LEAKAGE CURRENTS.

CONNECTION AND USE OF THE FOOT-SWITCHES



The unit is provided with a twin foot-switch (DS/E code) which activates either the monopolar currents or the bipolar currents.

The unit can also be equipped with a second twin foot-switch (DS/B code) which activates the bipolar currents only.

The foot-switch is not required to use the MICRO AUTO current for bipolar coagulation which is automatically activated / deactivated according to the impedance of the tissues.

It starts, with a delay adjustable from 0,1 to 5 seconds, when the tips of the forceps come in contact with bleeding tissues.

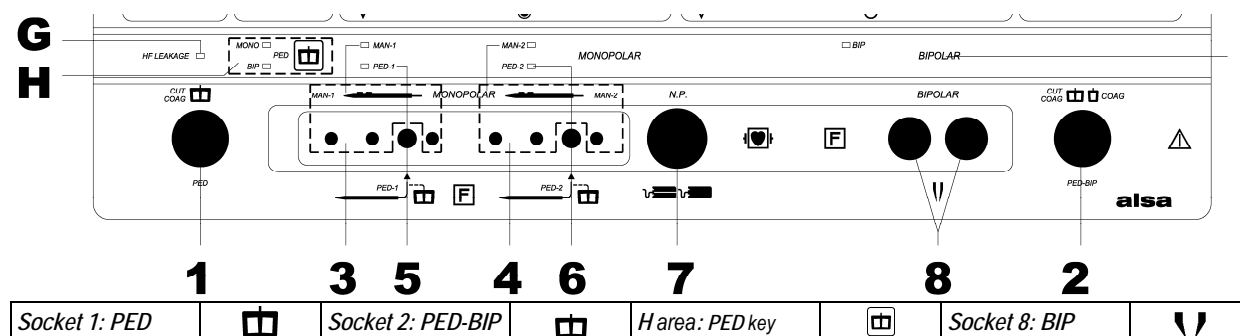
It stops when tissues are coagulated or if the surgeon opens the tips of the instrument.

Use of the DS/E (The connector has 3 contacts)

- Connect the DS/E to the **Socket 1 (PED)** and, by pushing PED key (**H-PED** area), set its functioning:
MONO light **ON**: It activates the monopolar currents for cutting (**yellow** left pedal) or coagulation (**blue** right pedal).
BIP light **ON**: It activates the bipolar currents for cutting (**yellow** left pedal) or coagulation (**blue** right pedal).

Use of the DS/E (The connector has 3 contacts) and of the DS/B (The connector has 7 contacts)

- Connect the DS/E to the **Socket 1 (PED)** and the DS/B to the **Socket 2 (PED BIP)**.
- As soon as the DS/B is connected, the **MONO** light is **ON** (**H-PED** area) and the unit operates as follows:
 - The DS/E activates the monopolar currents for cutting (**yellow**, left pedal) or coagulation (**blue** right pedal).
 - The DS/B foot-switch activates the bipolar currents for cutting (**yellow**, left pedal) or coagulation (**blue** right pedal).



CONNECTION AND USE OF THE NEUTRAL ELECTRODE

The neutral electrode is not required when using the bipolar mode only.

The related control circuit is blocked. The red alarm light (A area) is ON, but it is for information only.

CONNECTION OF THE BIPOLAR INSTRUMENT.

The socket to connect the instrument is signalled by the switching ON of the related light which switches ON only if:

- When using the DS/E foot-switch, users select the BIP mode (the BIP light is ON) by pressing PED key (H area) •
- Users connect the DS/B foot-switch • Users select the MICRO AUTO current for coagulation •

The instrument is usable by foot-switch, but the pedal is not required to use the MICRO AUTO current for coagulation which is automatically activated / deactivated according to the impedance of the tissues.

- **Connect to the socket (8) BIP (BIP light ON) the instrument**
(The connector, without polarity of connection, is a 2 plugs Ø 6mm type).

To connect accessories with cables having a different connector to the unit, use:

- **ALSA cables** (Model and connector of the instrument must be specified).
- **Specific adaptors** which allow the use of all kinds of connectors.

To choose the right adaptor, see the paragraph ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR

CURRENTS

THE BIPOLAR CURRENTS FOR CUTTING.

PURE – Cutting with very low coagulating effect. It is suitable for the following:

To dissect (starting from 50/60W) the tissues in Open surgery, by performing fast nips of the tissue with forceps with thin tips.

To dissect (starting from 80/90W) the tissues in Laparoscopic surgery, by using bipolar hook or bipolar rigid needle electrodes.

BLEND - Cutting with slightly coagulating effect. It is suitable for the following:

The same use (starting from the same settings) of the PURE current

THE BIPOLAR CURRENTS FOR COAGULATION.

MICRO – Very fine coagulation (The best one for all the uses in Open / Laparoscopic surgery) and it is suitable for the following:

To use the forceps for Open surgery (starting from 1/5W if they have tips of 0,5/1 mm, from 10/20W if they have tips of 1,5 or 2mm)

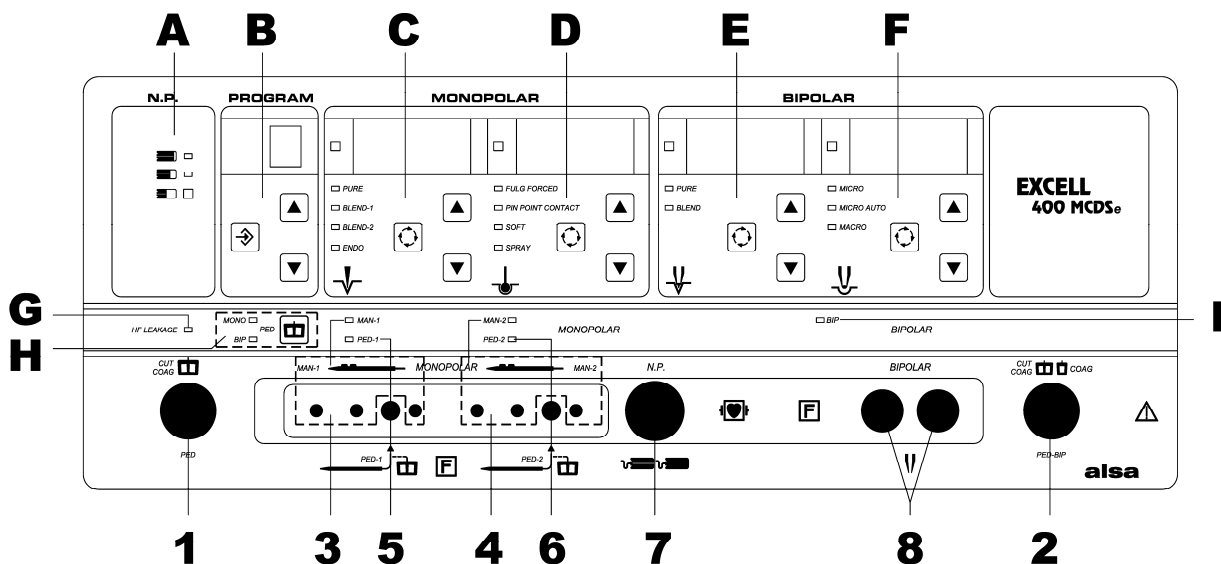
To use (starting from 30/40W) scissors or rigid needle electrodes (i.e. for turbinals or tonsillectomy)

To use (starting from 20/40W according to the dimensions of the tips) forceps or scissors for laparoscopy.

MICRO AUTO – Coagulation identical to the MICRO current, but provided with “impedance sensing” automatic start/stop system.

MACRO – Fast and strong coagulation for Open or Laparoscopic Surgery. It is suitable for the following:

The same use (starting from 30/40W) of the MICRO current, but with a stronger effect.



On the areas: E- Bipolar Cut, F- Bipolar Coag

The SEL key selects the currents.



The UP/DOWN keys set the power of the currents.



SELECTION, SETTING AND MEMORIZATION OF THE CURRENTS

The features and the settings (starting settings) of the currents are detailed in this section, paragraph: **CURRENTS**.

To set, on the E, F areas, the bipolar currents, the users must do the following:

- Use the **SEL** key of an area to set the **FIRST CURRENT** (The related light ON signals the selected current).
- Use the **UP/DOWN** keys of the same area to set the power of the **FIRST CURRENT** (The power appears on the display)
- Repeat the same method until all the intended currents have been set.

When setting the currents, the users can set 1 current, more currents or all currents.

I.E. The unit has 2 currents for bipolar cutting: PURE, BLEND and 3 currents for bipolar coagulation: MICRO, MICRO AUTO, MACRO.

To set 1 current for cutting (i.e. PURE with 70W):

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 70W (They appear on the display)

To set more currents for cutting which can be changed during use (i.e. PURE with 120W, BLEND with 130W):

Push the **SEL** key (C area) and select the **PURE** current. With the **UP/DOWN** keys of the same area, set 120W (They appear on the display)

Push the **SEL** key (C area) and select the **BLEND** current. With the **UP/DOWN** keys of the same area, set 130W (They appear on the display)

To set 1 current for coagulation (i.e. MICRO with 30W):

Push the **SEL** key (D area) and select the **MICRO** current. With the **UP/DOWN** keys of the same area, set 30W (They appear on the display)

To set more currents for coagulation which can be changed during use (i.e. MICRO with 40W, MACRO with 90W):

Push the **SEL** key (D area) and select the **MICRO** current. With the **UP/DOWN** keys of the same area, set 40W (They appear on the display)

Push the **SEL** key (D area) and select the **MACRO** current. With the **UP/DOWN** keys of the same area, set 90W (They appear on the display)

When setting more currents, the users must select the first current that they intend to use.

Push the **SEL** key (C area) and select the first current for cutting to be used (i.e. **PURE** current. On the display 120W appears).

Push the **SEL** key (D area) and select the first current for coagulation to be used (i.e. **MICRO** current. On the display 40W appears).

At the end of the setting.

- The users can memorize the settings

Push the **STORE** key (B area)

- The users can select different memories.

Push the **UP/DOWN** keys (B area)

During use, while the users are not activating the current delivery.

- Whenever they like, the users can change the memorized settings.

The memory number starts blinking.

It does not blink when changing the use of the DS/E foot-switch.

- Whenever they like, the users can cancel the changes of the settings.

Push the **UP/DOWN** keys (B area).

The memory number stops blinking.

- Whenever they like, the users can memorize the changes of the settings.

Push the **STORE** key (B area)

The memory number stops blinking.

- The users can, if the number memory does not blink, select other memories.

Push the **UP/DOWN** keys (B area)

At the switching on (intentional or unintentional because of a temporary loss of the supply), the unit re-sets all the settings used at the switching off. If the memory number is blinking at the switching off, it blinks at the switching on and the unit keeps the same settings.

The unit never keeps the selection of the **MICRO AUTO** bipolar coagulation It selects the **MICRO** bipolar coagulation.

For the complete use of the memorization system see the paragraph: **MEMORIZATION OF PROGRAMS**.

DELIVERY OF THE BIPOLAR CURRENTS

According to the instructions detailed in this section, the bipolar instrument must be connected to the **BIP (8)** socket (**BIP** light **ON**).

All the monopolar currents are blocked (the related displays are OFF)

Delivery of currents for bipolar cutting.

- When using the **DS/E** foot-switch, set the **BIP** mode (**PED** key - **H** area) and push its **yellow** pedal.
- When using the **DS/B** foot-switch, push its **yellow** pedal.

An acoustic signal (low, adjustable by B6 on the back) and the yellow light ON (E- BIPOLAR yellow area) signal the delivery.

Delivery of currents for bipolar coagulation.

To reduce the sticking of the tissues on the tips, normal and well known problem when using the bipolar forceps, apply the advice detailed in the paragraph: THE STICKING OF THE TISSUES ON THE TIPS OF BIPOLAR INSTRUMENTS.

To check, when starting the operation, the functioning of the bipolar forceps/scissors, do the following:

With physiological solution, wet a gauze and place it on an insulated surface or hold it without touching the wet part.

Set a coagulation current (20/30W), tighten the gauze between the tips/blades and activate the delivery. The smoke produced on the gauze signals the good functioning. Otherwise, check the cable, the connections and the insulation between the tips/blades (i.e. the damage of the insulation of the blades of the scissors, caused by the continuous sliding, causes a short-circuit which does not allow the intended use)

When using bipolar scissors, do not use a cutting current! The scissors must be used to cut the tissue mechanically while coagulating it by delivering the MICRO current.

- When using the **DS/E** foot-switch, set the **BIP** mode (**PED** key - **H** area) and push its **blue** pedal.
- When using the **DS/B** foot-switch, push its **blue** pedal.

An acoustic signal (acute, adjustable by B6 on the back) and the blue light ON (F- BIPOLAR blue area) signal the delivery.

The delivery of the MICRO AUTO for coagulation automatically starts/stops by an impedance sensing system.

It starts, with a delay adjustable from 0,1 to 5 seconds, when the tips of the forceps come in contact with bleeding tissues.

It stops when tissues are coagulated or if the surgeon opens the tips of the instrument.

The units are provided with electronic self-check systems able to detect all the failures which can provoke PROBLEMS OF FUNCTIONING, ABSENCE OR DECREASE OF POWER, POWER HIGHER THAN THAT INTENDED.

The systems perform a main auto-check at the switching on and they go on checking the functioning during use.

- *If the systems detect problems during the auto-check, it doesn't finish and the systems stop the functioning.*
 - *If the systems detect problems during use, they stop the functioning.*
- *In both the cases the systems inform the users by acoustic or visual alarm signals (ERROR CODES).*

Because of this reason, if the unit has properly passed the auto-check at the switching on and the systems do not signal problems:

- *If the power is absent or very low*
- *If the practical effect, by using the standard powers, appears less efficacious than the normal one.*

Users must not think that the problem depends on the unit and they must not increase the power too much. Users must:

Check the good contact between neutral electrode and the patient's tissues (while using monopolar currents).

Check the conditions of cables and connectors, by bending and pulling them (They mainly break close to the instrument).

Check the internal connections of the instruments.

Clean the tips of all the monopolar or bipolar active electrodes or instruments. (If dirty, the current does not reach the patient's tissues)

Clean the joints of the bipolar instruments (If dirty, a short circuit happens and the current does not reach the patient's tissues).

Alarm signal for the users of the Self-diagnosis system

During use the unit can break, immediately solvable problems can happen or the users can make mistakes of use.

In these cases the system stops the unit and informs the users by acoustic alarms and ERROR CODES (on the displays of C, D areas).

The main alarm signals, related to the mistakes of use and to the immediately solvable problems, are here under detailed.

For the other alarm signals (The technical assistance is needed) see the paragraph: SELF DIAGNOSIS SYSTEM

ourAct ERROR CODE + Acoustic alarm	<i>It is for information only (The currents have been delivered for a time longer than 40/50 seconds). Stop the delivery for an instant and then re-start.</i>
US-Act ERROR CODE + Acoustic Alarm	<i>Two activation switches are simultaneously pressed or a switch is used against the selected mode. Two hand-switch pencils can be simultaneously used, when using the SPRAY / FULG FORCED currents only.</i>
HF Leakage light ON (G area)	<i>Intervention of the control circuit of the High Frequency leakage currents to earth. See the paragraph: CONTROL CIRCUIT OF THE HF LEAKAGE CURRENTS TO EARTH..</i>

SECTION 5

BIPOLAR USE ONLY WITHOUT CONNECTING THE NEUTRAL ELECTRODE For endoscopic Urology and Gynaecology in saline - For Arthroscopy in saline

The monopolar currents are blocked and the unit is usable without connecting the neutral electrode.

The alarm light of the control circuit of the neutral electrode is ON, but it is for information only.

For this use the unit is provided with the preset memory 9 which allows the following:

- *The use, by foot switch, of 1 bipolar resector / 1 bipolar needle or instrument / 1 bipolar instrument for arthroscopy..*

For this use the memory 9, where the following is preset, must be used:

- The sockets to connect the accessories and the block of all the monopolar currents.
- The block of the control circuit of the neutral electrode. The alarm light (A area) is ON, but it is for information only.
- The functioning of DS/E pedal which activates the bipolar currents only.

To perform the complete setting of the unit for this use see this section.

MEMORIZATION OF PROGRAMS

The memorization system, detailed in the paragraph MEMORIZATION OF PROGRAMS, allows the following.

The memorization of programs, The selection of a program before use, The change of memorized settings,

The cancellation of the changed settings, The memorization of the changed settings, The data storing at the switching on.

PREPARATION AND POSITIONING OF THE PATIENT FOR THE OPERATION.

Prepare and position the patient according to all the warnings detailed in the paragraphs: GENERAL WARNINGS, PREPARATION OF THE PATIENT – SAFETY DURING USE, CONTROL OF THE HF LEAKAGE CURRENTS.

CONNECTION AND USE OF THE NEUTRAL ELECTRODE

The neutral electrode is not required when using the bipolar mode only.

The related control circuit is blocked. The red alarm light (A area) is ON, but it is for information only.

CONNECTION AND USE OF THE FOOT-SWITCHES

The unit is provided with a twin foot-switch (DS/E code) which activates either the monopolar currents or the bipolar currents.

The unit can also be equipped with a second twin foot-switch (DS/B code) which activates the bipolar currents only.

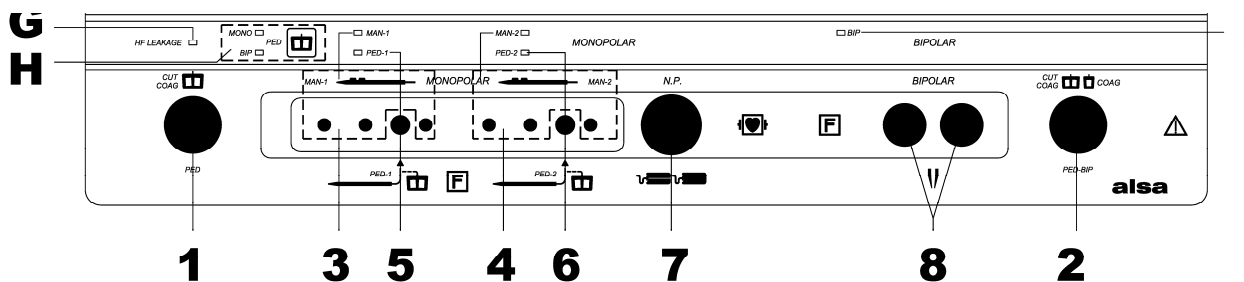
The foot-switch is not required to use the MICRO AUTO current for bipolar coagulation, not used for these procedures.

Use of the DS/E pedal (The connector has 3 contacts)

- Connect the DS/E to the **Socket 1 (PED)** and, by pushing PED key (**H** area), set the **BIP** functioning (**BIP** light ON)
The foot-switch activates the bipolar currents for cutting (yellow left pedal) or coagulation (blue right pedal).

Use of the DS/B pedal (The connector has 7 contacts)

- Connect the DS/B to the **Socket 2 (PED BIP)**.
The foot-switch activates the bipolar currents for cutting (yellow, left pedal) or coagulation (blue right pedal).



Socket 1: PED		Socket 2: PED-BIP		H area: PED key		Socket 8: BIP	
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CONNECTION OF THE BIPOLAR RESECTOR / INSTRUMENT.

The socket to connect the instrument is signalled by the switching ON of the related light which switches ON only if:

- When using the DS/E foot-switch, users select the **BIP** mode (the **BIP** light is ON) by pressing PED key (**H** area) •
- Users connect the DS/B foot-switch • Users select the **MICRO AUTO** current for coagulation (not suitable for this use) •

The instrument is usable by foot-switch. The MICRO AUTO current for coagulation, automatically activated / deactivated according to the impedance of the tissues, is not suitable for this use.

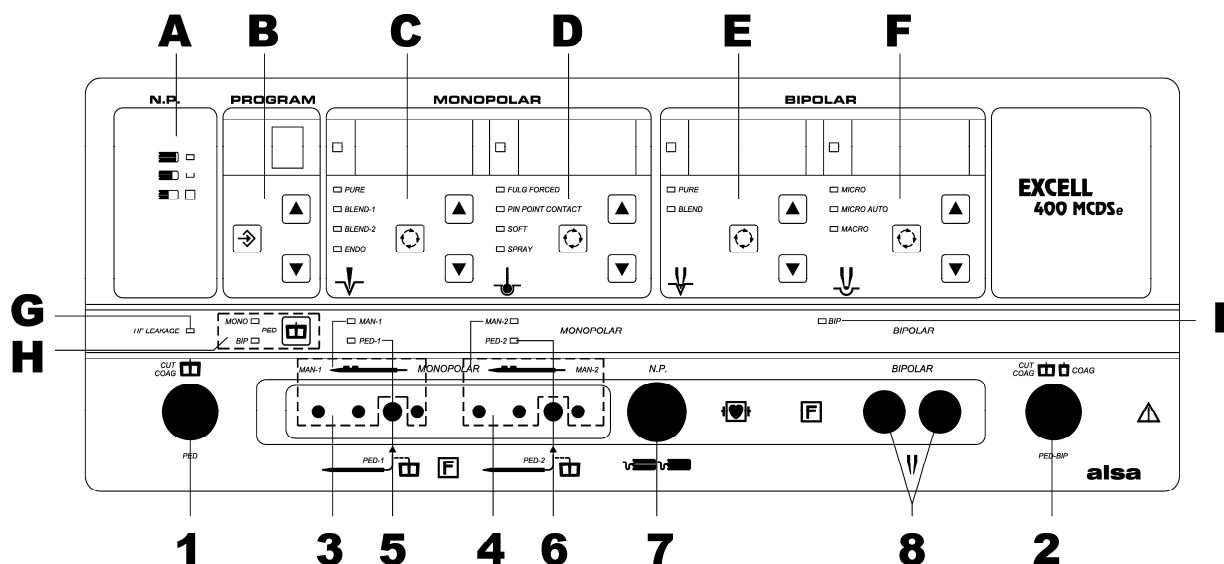
The users must select the currents: PURE to cut and MICRO to coagulate

- **Connect to the (8) BIP socket (BIP light ON)** The cable of the instrument.
(The connector, without polarity of connection, is a 2 plugs Ø 6mm type).

To connect accessories with cables having a different connector to the unit, use:

- **ALSA cables** (Model and connector of the instrument must be specified).
- **Specific adaptors** which allow the use of all kinds of connectors.

To choose the right adaptor, see the paragraph ADAPTORS FOR CONNECTION AND USE OF RD/5 ADAPTOR



On the areas: E- Bipolar Cut, F- Bipolar Coag

The SEL key selects the currents.



The UP/DOWN keys set the power of the currents.



SECTION, SETTING AND MEMORIZATION OF THE CURRENTS

For endoscopy or arthroscopy in saline, two currents only must be used, the PURE current for cutting and the MICRO current for coagulation.

The starting power settings are here under detailed.

To set the PURE current for cutting (i.e. with a power of 140W), the following do:

Push the SEL key (E area) and selected the PURE current (The related light is ON).

Push the UP/DOWN keys of the same area and set 140W (they appear on the display)

To set the MICRO current for coagulation (i.e. with a power of 110W), the following do:

Push the SEL key (F area) and selected the MICRO current (The related light is ON).

Push the UP/DOWN keys of the same area and set 110W (they appear on the display)

PURE current - Starting settings for cutting or vaporization

When using wire loops, either for the cutting during a TURPis or when intervening on similar hard tissues, start from 120/140W.

When using wire loops, either for the cutting during a TURVis or when intervening on similar soft tissues, start from 100/120W.

When using ribbon loops, for the cutting on all the kinds of tissue, start from 130/140W.

When using L knife electrodes on all the kinds of tissue, start from 60/70W.

When using needle electrodes on all the kinds of tissue, start from 40/50W.

When using ball or roll electrodes, for the vaporization start from 130/140W

When using cone or half ball electrodes, for the vaporization start from 140/150W

When using L knife electrodes to cut in Arthroscopy start from 40/50W,

To perform a vaporization in Arthroscopy start from 70/80W (according to the dimensions of the electrode).

MICRO current - Starting settings for coagulation.

When using wire loops, start from 90/110W. When using ball or roll electrodes, start from 100/120W.

When using knife, start from 80/100W.

When using needle for gynaecology, start from 50W

To perform a coagulation in Arthroscopy start from 70/80W (according to the dimensions of the electrode).

At the end of the setting.

• The users can memorize the settings

Push the STORE key (B area)

• The users can select different memories.

Push the UP/DOWN keys (B area)

During use, while the users are not activating the current delivery.

• Whenever they like, the users can change the memorized settings.

The memory number starts blinking.

It does not blink when changing the use of the DS/E foot-switch.

• Whenever they like, the users can cancel the changes of the settings.

Push the UP/DOWN keys (B area).

The memory number stops blinking.

• Whenever they like, the users can memorize the changes of the settings.

Push the STORE key (B area)

The memory number stops blinking.

• The users can, if the number memory does not blink, select other memories.

Push the UP/DOWN keys (B area)

At the switching on (intentional or unintentional because of a temporary loss of the supply), the unit re-sets all the settings used at the switching off. If the memory number is blinking at the switching off, it blinks at the switching on and the unit keeps the same settings.

The unit never keeps the selection of the MICRO AUTO bipolar coagulation It selects the MICRO bipolar coagulation.

The unit, when provided with ARGON mode, never keeps the switching ON of the ARGON section (it is not used in this case).

For the complete use of the memorization system see the paragraph: MEMORIZATION OF PROGRAMS.

DELIVERY OF THE BIPOLAR CURRENTS

All the monopolar currents are blocked (the related displays are OFF)

According to the instructions detailed in this section, the bipolar instrument must be connected to the **BIP (8)** socket (**BIP** light **ON**).

To check, before use, the resector or the bipolar instrument, do the following:

Either assemble the resector and connect it to the unit or connect the bipolar instrument to the unit.

By using saline physiological solution wet a gauze and place it on an insulating surface (i.e. a dry sheet).

Select the bipolar **PURE** current (set 60/70W when checking the resector) (set 30/40W when checking the instrument)

While touching the gauze with both the poles, activate the current delivery.

The sparking on the point where the active pole touches the gauze signals the good functioning..

To obtain the best result, when performing the endoscopic procedure, do the following:

Do not use the saline solution when cold, but slightly warm (warm it by the heating device for the bags or for their flow).

When performing the cutting, push the pedal until the slice is completely cut.

To increase the coagulating effect of the cutting current, move the electrode slowly.

To coagulate the vessels, touch them until the coagulating effect reaches the surrounding tissues

Delivery of currents for bipolar cutting (The **PURE** current only is suitable for this use).

- When using the **DS/E** foot-switch, set the **BIP** mode (**PED** key - **H** area) and push its **yellow** pedal.
- When using the **DS/B** foot-switch, push its **yellow** pedal.

An acoustic signal (low, adjustable by **B6** on the back) and the yellow light **ON** (**E- BIPOLAR** yellow area) signal the delivery.

Delivery of currents for bipolar coagulation (The **MICRO** current only is suitable for this use).

- When using the **DS/E** foot-switch, set the **BIP** mode (**PED** key - **H** area) and push its **blue** pedal.
- When using the **DS/B** foot-switch, push its **blue** pedal.

An acoustic signal (acute, adjustable by **B6** on the back) and the blue light **ON** (**F- BIPOLAR** blue area) signal the delivery.

The units are provided with electronic self-check systems able to detect all the failures which can provoke PROBLEMS OF FUNCTIONING, ABSENCE OR DECREASE OF POWER, POWER HIGHER THAN THAT INTENDED.

The systems perform a main auto-check at the switching on and they go on checking the functioning during use.

- If the systems detect problems during the auto-check, it doesn't finish and the systems stop the functioning.
 - If the systems detect problems during use, they stop the functioning.
- In both the cases the systems inform the users by acoustic or visual alarm signals (**ERROR CODES**).

Because of this reason, if the unit has properly passed the auto-check at the switching on and the systems do not signal problems:

- If the power is absent or very low
- If the practical effect, by using the standard powers, appears less efficacious than the normal one.

Users must not think that the problem depends on the unit and they must not increase the power too much. Users must:

Check the good contact between neutral electrode and the patient's tissues (while using monopolar currents).

Check the conditions of cables and connectors, by bending and pulling them (They mainly break close to the instrument).

Check the internal connections of the instruments.

Clean the tips of all the monopolar or bipolar active electrodes or instruments. (If dirty, the current does not reach the patient's tissues)

Clean the joints of the bipolar instruments (If dirty, a short circuit happens and the current does not reach the patient's tissues).

Alarm signal for the users of the Self-diagnosis system

During use the unit can break, immediately solvable problems can happen or the users can make mistakes of use.

In these cases the system stops the unit and informs the users by acoustic alarms and **ERROR CODES** (on the displays of **C, D** areas).

The main alarm signals, related to the mistakes of use and to the immediately solvable problems, are here under detailed.

For the other alarm signals (The technical assistance is needed) see the paragraph: **SELF DIAGNOSIS SYSTEM**

our Act ERROR CODE + Acoustic alarm	<i>It is for information only (The currents have been delivered for a time longer than 40/50 seconds). Stop the delivery for an instant and then re-start.</i>
US- Act ERROR CODE + Acoustic Alarm	<i>Two activation switches are simultaneously pressed or a switch is used against the selected mode. Two hand-switch pencils can be simultaneously used, when using the SPRAY / FULG FORCED currents only.</i>
HF Leakage light ON (G area)	<i>Intervention of the control circuit of the High Frequency leakage currents to earth. See the paragraph: CONTROL CIRCUIT OF THE HF LEAKAGE CURRENTS TO EARTH..</i>

AUTO-CHECK SYSTEM

The unit is provided with a self-diagnosis system which is able to check all the hardware/ software functioning. It operates as follows:

- **At the switching on**, it performs an auto-check that, if the functioning is the intended one, ends with a short acoustic signal.
- **During use**, it continuously checks both the functioning and the delivered powers (It repeats, every 20 minutes, the main auto-check).

In both the cases, if the self-diagnosis system detects either mistakes of use or problems of functioning / delivering of power, it stops the unit and informs the users by specific acoustic and visual alarms (The ERROR CODES which are detailed in the following tables).

For some problems (i.e. the mistakes of use or the immediately solvable problems) the users can intervene and eliminate the related causes.

For the other hardware or software failures the users must switch the unit OFF/ON to verify the alarm. If it is confirmed they must ask for the technical assistance.

The storing of the last 32 detected error codes: The unit stores the last 32 detected Error Codes in order to help the Technicians in finding a solution for the problems/faults. The procedure to perform the related control is detailed in the Service Manual.

ERROR CODES TABLE		The "U – Mistakes of use" codes depend on mistakes or bad use by the operators, so they can eliminate the related causes The other problems are caused by FAULTS OF THE HARDWARE/SOFTWARE SYSTEM . The users, by switching the unit OFF and ON, must verify the alarms. If they are confirmed, Technical Assistance is needed	
ERROR DESCRIPTION		ERROR CODE	Corresponding code in E ² PROM (select "0d" in CAL mode)
U - Mistake of use) Alarm of the control circuit of the neutral electrode		no nP	-
Failure of the neutral electrode control circuit.		Err nPC	81
Failure of the circuit which controls the contact between neutral electrode and patient.		Err 53	35
Failure of an activation hand-switch at the switching on		Err Hnd	82
U – Mistake of use) An activation hand-switch is pressed at the switching on			
Failure of a foot-switch at the switching on		Err PEd	83
U – Mistake of use) A foot-switch is pressed at the switching on			
U– Mistake of use) Not allowed contemporary activation of two activation devices		USr Act	-
Failure of a key of the control panel		Err 14	0E
U – Mistake of use) A key of the control panel is pressed at the switching on			
ERRORS RELATED TO THE MASTER CONTROLLER			
RAM Memory		Err 32	20
FLASH Memory		Err 34	22
Variables of the system		Err 35	23
Watchdog Timer		Err 33	21
Errors related to the POWER SUPPLY SECTION			
+5VDC failure		Err 36	24
Failure of the HF power supply (lower setting value)		Err 37	25
Failure of the HF power supply (higher setting value)		Err 38	26
Failure of the HF power supply during the activation (value higher than the setting).		Err 97	61
Intervention of the thermal protection of the Supply section.		Err 27	1b
Errors related to the SERIAL COMMUNICATION			
Failure regarding the serial communication (board Alsa code 801463)		2 slow sounds; then fast repetitions	3d
Failure regarding the serial communication (board Alsa code 801471)		3 slow sounds; then fast repetitions	3e
Failure regarding the serial communication (Alsa code 801462)		4 slow sounds; then fast repetitions	3f
(E ² PROM) Error of communication.		5 slow sounds; then fast repetitions	40
(I ² CBUS) The connection is being lost during the use.		6 slow sounds; then fast repetitions	43
(Master-Slave) The connection is lost during the self-test phase.		7 slow sounds; then fast repetitions	41
(Slave) Failure regarding the communications of this microcontroller.		8 slow sounds; then fast repetitions	44
Errors related to the SLAVE MICROCONTROLLER			
(Slave) Failure regarding the internal peripheral of this microcontroller.		Err 60	3c
(Slave) The communication of this microcontroller fails.		Err 68	44
Errors related to the HF POWER SECTION			
Failure (internal dummy load used for self-test)		Err 39	27
Failure (the HF output current measurement is lower than the expected one)		Err 51	33
Failure (the HF output current measurement is higher than the expected one)		Err 52	34
Failure (the bipolar output power is lower than the expected one)		Err 43	2b
Failure (the bipolar output power is higher than the expected one)		Err 42	2a
Failure of the monopolar circuit when the PURE CUT mode is used		Err 40	28
Failure of the monopolar circuit when the SPRAY COAG mode is used		Err 41	29
The modulation signal for the monopolar BLEND-1 mode fails.		Err 44	2c
The modulation signal for the monopolar FULG FORCED mode fails.		Err 45	2d
The modulation signal for monopolar SPRAY mode fails		Err 46	2e
The reading of the Output peak voltage fails (it is lower than the expected one)		Err 47	2f
The reading of the Output peak voltage fails (it is higher than the expected one)		Err 48	30
The reading of the Output peak current fails (it is lower than the expected one)		Err 49	31
The reading of the Output peak current fails (it is higher than the expected one)		Err 50	32
The HF output power is higher than the expected value		Err 98	62
Intervention of the thermal protection of the HF power section.		Err 28	1c
Inside the E ² PROM hexadecimal values corresponding to one of error codes reported on "Error code" column in the above table are stored.			

CLEANING AND STERILIZATION

- Clean the unit with a simple soap solution, **by taking care that no liquid goes inside** and then wipe it with a dry cloth.
Clean the foot-switches in the same way or by using a cold disinfecting solution.
- **Be careful; at the moment of the sale the accessories are not sterile. The packaging of all the accessories includes a label with the instructions for use and the sterilization mode.**

The following accessories are sterilizable by autoclave (121°C for 20 minutes or 134°C for 10 minutes) or by cold solutions:

- The monopolar pencil (MPE/E, MPE/CMS) and all the monopolar active electrodes or instruments.
- The cables and all the bipolar accessories. The cables and all the monopolar instruments.
- The neutral electrodes (NP/A with its CMS/E cable, NP/GP, NP/GA) are sterilizable by cold solutions.

During the sterilization, do not bend the connection cables too much and wipe, before use, all the parts of the accessories very well in order to eliminate all the traces of humidity. The best thing to do is to centrifuge them.

MAINTENANCE, DISPOSAL

- The unit does not include consumables or materials with limited service life.
- The unit must be regularly checked (once per year according to the Safety Standards for the medical devices) by qualified personnel, even better if by the Manufacturer.

According to the requirements of the International Standards for all the medical devices the following must be carried out:

- The checks of electrical safety (Low Frequency Leakage currents, Resistance of the protective earth conductor and so on).
- The check of the general functioning, of the mains fuses, of the supply cord and so on.

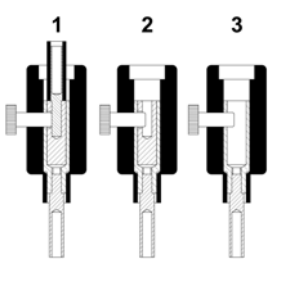
According to the requirements of the International Standards for the High Frequency surgical units, the following must be carried out:

- The checks of electrical safety (High Frequency Leakage currents and so on).
- The check of the functioning of the control circuit of the neutral electrode..
- The check of the delivered powers, according to the values which are specified in this manual (for the powers higher than 10% of the maximum power of each current, the tolerance is 20%).

- Always check the accessories (They are dangerous if old, worn, damaged or broken).
- The final disposal must be performed according to the specific National Laws, but it must be remembered the following:
 - The unit does not include dangerous substances or materials.
 - The accessories, mainly the active and neutral electrodes, come in contact with the patient's tissues and they must be sterilized before disposal.

ADAPTORS FOR CONNECTION AND USE OF THE RD/5 ADAPTOR

To connect cables provided with connectors different from the standard ones, many adaptors for monopolar or bipolar cable are available

	<p>RD/5 universal adaptor for monopolar cables. The adaptor allows the connection of all kinds of plugs:</p> <p>Image 1: All the MARTIN or similar cables with plug Ø 4 mm, spring type, can be connected.</p> <p>Image 2: The cables with plug Ø 4 mm, spring type, can be connected. (Take away the first metallic external part, by unscrewing the black knob) All the cables with plug having a diameter lower than 4mm can be connected. (Unscrew the knob, insert the plug and block it by screwing the knob)</p> <p>Image 3: The cables with spring / no spring plug having diameter from 4,5 to 8 mm can be connected. (i.e. ERBE, STORZ or similar ones and VALLEYLAB, CONMED or similar ones) (Unscrew the knob, take away the internal part, insert the plug and block it by screwing the knob)</p>
<p>Adaptors for bipolar cables</p> <ul style="list-style-type: none"> • Adaptor RD/BF, to connect cables with connector Valleylab type or 2 x Ø 4 mm, flying plugs. • Adaptor RD/BF1, to connect cables with coaxial connector Erbe, Storz type. • Adaptor RD/BF, to connect cables with coaxial connector Martin, Bertchold type. <p>Adaptors for bipolar cables of bipolar resectors for use in saline</p> <ul style="list-style-type: none"> • Adaptor RD/BFO, to connect cables for Olympus resectors with single connector including 2 x Ø 5 mm plugs. • Adaptor RD/BFG, to connect cables for single use electrodes of GYRUS resectors. 	

GENERAL FEATURES OF ALL THE MODELS

Electronic generator: <i>It complies with IEC 601-2-2 Standards.</i> Classification IEC 601-1: <i>Class I - Type CF.</i>	Bipolar activation: <i>by foot-switch or by automatic "Impedance sensing" system (0-30Ω = non activated system; 30-900Ω = start; from 1000 to 1700Ω = stop).</i>
Classification 93/42 + 2007/47 MDD: <i>IIB.</i>	MICRO AUTO current: <i>start delay adjustable from 0,1 (indicated 0,5) to 5 sec.</i>
Monopolar and Bipolar working frequency: <i>440kHz +/- 10%.</i>	Selection and setting of the functioning, of the currents or the related powers: <i>by keys (The power settings are signaled by displays in centesimal scale).</i>
Output circuit: <i>"floating out" (insulated from earth at the high and low frequencies, protected against the use of the defibrillator).</i>	Functioning control circuit: <i>by twin microprocessor.</i>
Mains and Absorption: <i>230 V ~ 50 Hz - 828 VA. Mains Fuses: T 5 A.</i> General mains switch: <i>green (0/I).</i>	Self- diagnosis system: <i>by microprocessor with auto-check at the switching on and continuous control during the functioning.</i>
Protection against liquids: <i>standard, non protected enclosure.</i>	Neutral electrode control: <i>by specific circuit with acoustic signal (loud and intermittent), luminous alarm signal and visualization of the ERROR CODE.</i>
Cooling system: <i>by convection, without fan.</i>	Discontinuous functioning: <i>max. 1 hour (10s ON/30s OFF).</i>
Monopolar use: <i>with 1 or 2 pencils / instruments</i>	Dimensions and weight: <i>(LxDxH) 38x35x17cm – 15Kg.</i>
Bipolar use: <i>with 1 instrument;</i>	Mains cable: <i>3 meters long, section 3x1mm².</i>

ENVIRONMENTAL AND ATMOSPHERIC CONDITIONS FOR USE, TRANSPORT AND STORAGE

The environmental use and preservation conditions are the following ones: <i>Temp (°C): +10 ÷ +40. Humidity: 30% ÷ 75%. Pressure (hPa): 700 ÷ 1060.</i>	The environmental transport and storage conditions are the following ones: <i>Temp (°C): -40 ÷ +70. Humidity: 10% ÷ 95%. Pressure (hPa): 500 ÷ 1060.</i>
<i>The unit must not be used at less than 30cm from the wall or other objects that can obstruct the ventilation areas. It must be placed on a trolley or a support</i>	
<i>When the unit is not used, it must be kept in a dry place, not dusty. Be careful that no liquid is poured on it.</i>	

CONFORMITY EMC/DIRECTIVE 89/336/CEE: CATEGORY A (SUGGESTED DISTANCES TO BE KEPT 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)	2	6
(DECS 1800)	8	11
Walkie-talkie (police, firemen, protection, maintenance)	5	9
Bag mobile telephones	16	16
Mobile radio (police, firemen, protection)	100	40

For broadcasting stations which use frequencies less than 800MHz, the distance can be established by using the equation: $A: d = 4\sqrt{P}$

For broadcasting stations which use frequencies between 800MHz and 2.5GHz, the distance can be established by using the equation: $B: d = 2.3\sqrt{P}$

P = Nominal power of the transmitter in watt (W), established by the manufacturer.

INFORMATION TO THE USERS



According to the article no. 13 of the Legislative Decree no. 151 dated 25th July 2005 "Fulfillment of the Directives 2002/95/CE, 2002/96/CE and 2003/108/CE, for the reduction in the use of dangerous substances in electric and electronic devices, as well as for the waste disposal":

The symbol on the left is present either on the unit or on its packaging and it indicates that the product must be separately disposed of. The separate waste collection of this kind of unit is arranged and managed by the manufacturer. Therefore the user, to dispose of an old unit, must contact the producer and follow the procedure which it established. The correct separate collection for the recycling process, for the treatment and the eco-friendly disposal of the old unit, contributes to avoid any possible negative effects on the environment or on human health and it helps the recycling of the materials that compose the unit. The illegal disposal of the product by the user implies the imposition of the fines established in the Legislative Decree no. 22/1997 (art. 50 and following).

CHARACTERISTICS OF THE MONOPOLAR CURRENTS (400 MCDSe)

Function	Maximum Power	Rated 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	Deep 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 %	Deep 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 %	Deep tone, Yellow light
Coagulating Cut: Endo	250 W	350 Ω	1710 V	Alternanza 50% di Pure e Blend1 - CF: 1,7	Deep 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

CHARACTERISTICS OF THE MONOPOLAR CURRENTS (350 MCDSe)

Function	Maximum Power	Rated Load	Vp/p	Frequency (F) - Crest Factor (CF) Modulation (M) - Duty Cycle (DT)	Acoustic and Luminous Signals
Standard Pure Cut: Pure	350 W	350 Ω	3450 V	F: 440 kHz- CF: 1.6 – M: No – DT: no	Deep 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 %	Deep 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 %	Deep tone, Yellow light
Coagulating Cut: Endo	220 W	350 Ω	1710 V	Alternanza 50% di Pure e Blend1 - CF: 1,7	Deep 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

CHARACTERISTICS OF THE MONOPOLAR CURRENTS (250 MCDSe)

Function	Maximum Power	Rated Load	Vp/p	Frequency (F) - Crest Factor (CF) Modulation (M) - Duty Cycle (DT)	Acoustic and Luminous Signals
Standard Pure Cut: Pure	280 W	350 Ω	3450 V	F: 440 kHz- CF: 1.6 – M: No – DT: no	Deep tone, Yellow light
Coagulating Cut 1: Blend I	280 W	350 Ω	3540 V	F: 440 kHz- CF: 2.3 – M: 29 kHz – DT: 65 %	Deep 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 %	Deep tone, Yellow light
Coagulating Cut: Endo	220 W	350 Ω	1710 V	Alternanza 50% di Pure e Blend1 - CF: 1,7	Deep 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

CHARACTERISTICS OF THE MONOPOLAR CURRENTS (200 MCDSe)

Function	Maximum Power	Rated Load	Vp/p	Frequency (F) - Crest Factor (CF) Modulation (M) - Duty Cycle (DT)	Acoustic and Luminous Signals
Standard Pure Cut: Pure	200 W	350 Ω	3450 V	F: 440 kHz- CF: 1.6 – M: No – DT: no	Deep tone, Yellow light
Coagulating Cut 1: Blend I	200 W	350 Ω	3540 V	F: 440 kHz- CF: 2.3 – M: 29 kHz – DT: 65 %	Deep 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 %	Deep tone, Yellow light
Coagulating Cut: Endo	200 W	350 Ω	1710 V	Alternanza 50% di Pure e Blend1 - CF: 1,7	Deep 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	200 W	250 Ω	3460 V	F: 440 kHz- CF: 2.6 – M: 29 kHz – DT: 50 %	High tone, Blue light
Soft Coagulation: Soft	200 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

CHARACTERISTICS OF THE BIPOLAR CURRENTS (ALL MODELS)

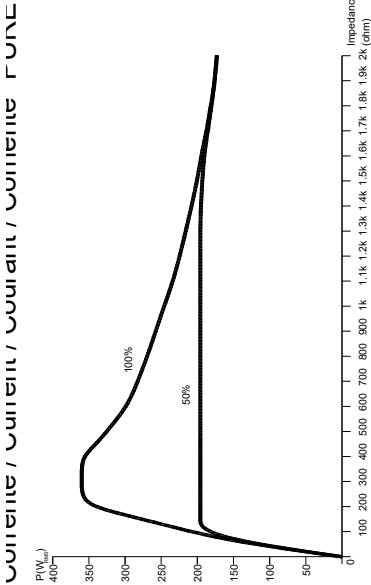
Function	Maximum Power	Rated Load	Vp/p	Frequency (F) - Crest Factor (CF) Modulation (M) - Duty Cycle (DT)	Acoustic and Luminous Signals
Pure Cut: Pure	140 W	300 Ω	850 V	F: 440 kHz- CF: 1.5 – M: No – DT: no	Deep tone, Yellow light
Coagulating Cut: Blend	120 W	300 Ω	1000 V	F: 440 kHz- CF: 1.8 – M: 29 kHz – DT: 75 %	Deep 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
Automatic coagulation: Micro Auto	Identical to the Micro, but provided with automatic “impedance sensing” activation/deactivation				
Macro Coagulation: Macro	120 W	100 Ω	760 V	F: 440 kHz- CF: 1.7 – M: No – DT: no	High tone, Blue light

MONOPOLAR CURRENTS (400 MCDSe)

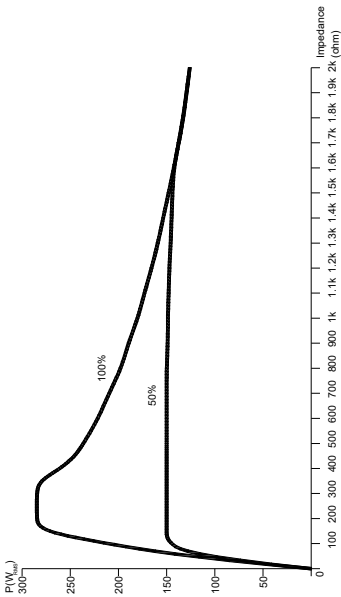
Measurement performed according to IEC 60601-2-2 (values detected within 1 second, excluding shorter transients)

(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)

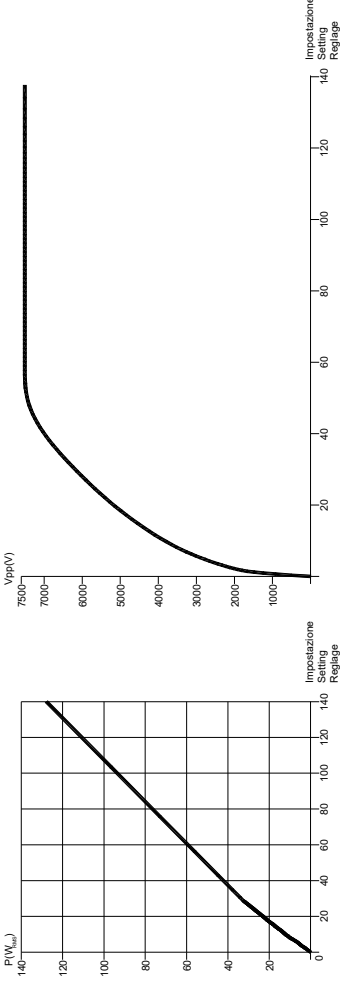
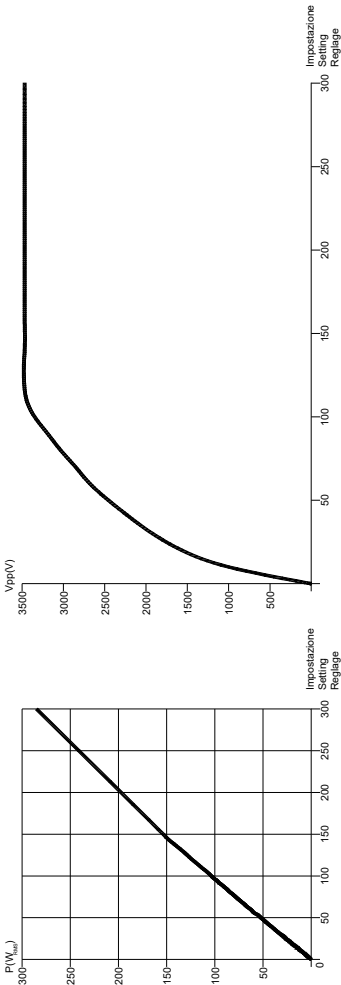
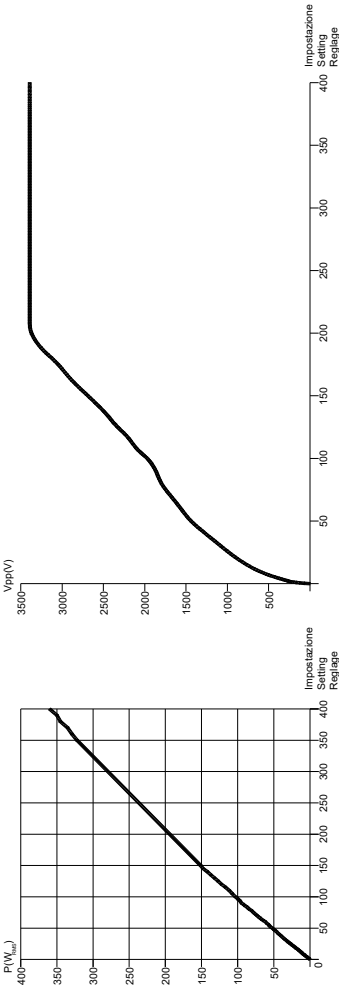
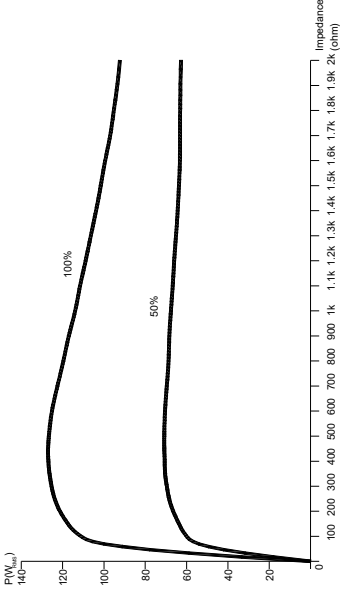
(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltage according to the power adjustment).



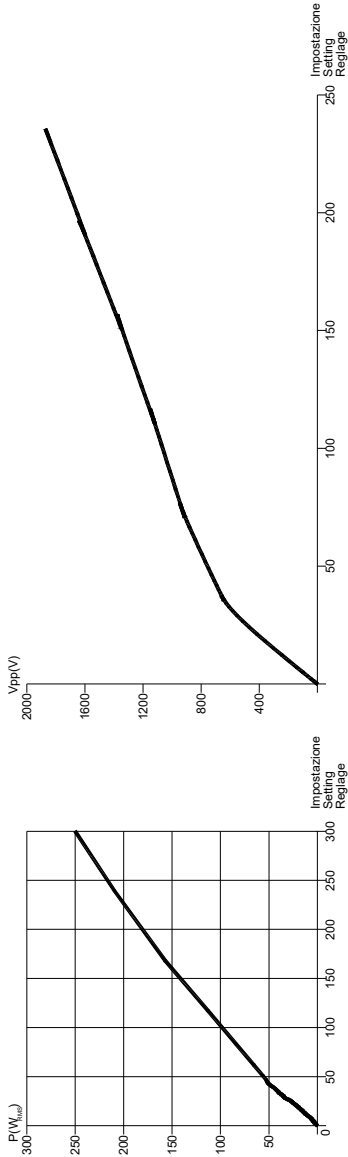
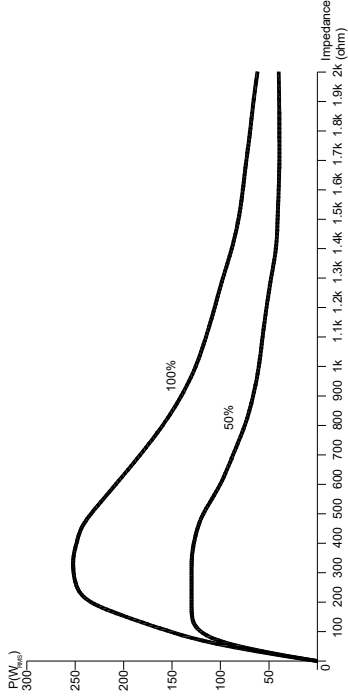
Corrente / Current / Courant / Corriente "BLEND 1"



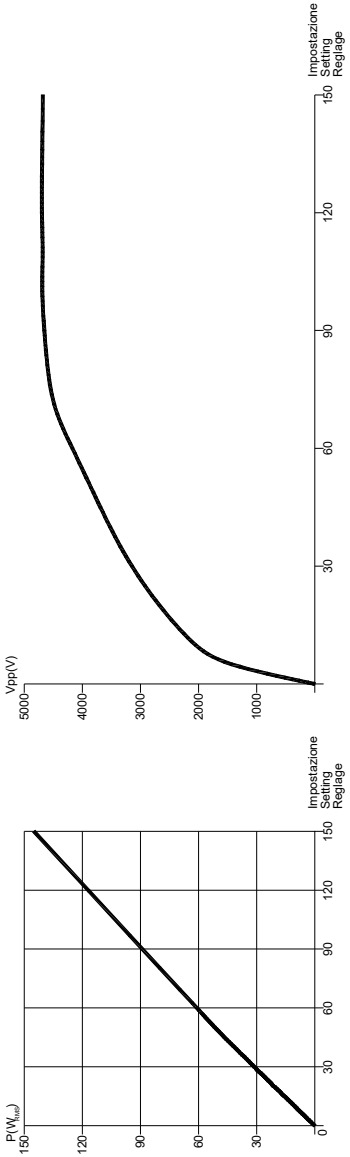
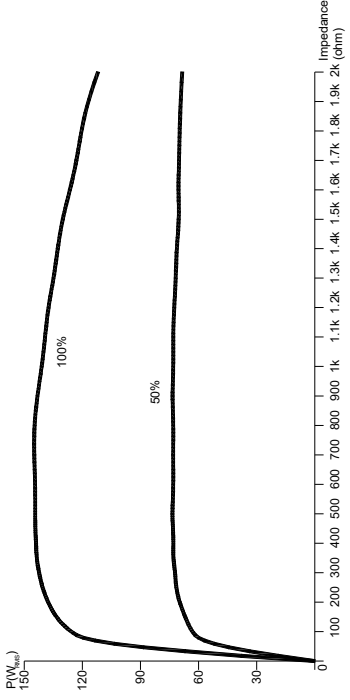
Corrente / Current / Courant / Corriente "BLEND 2"



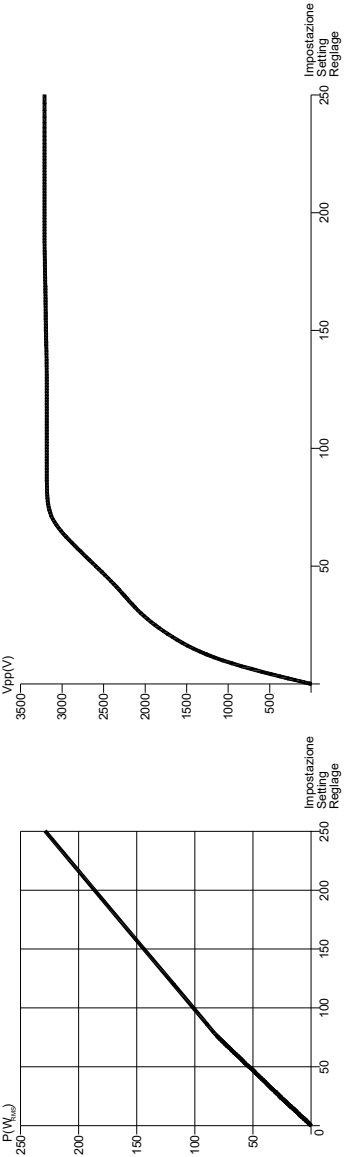
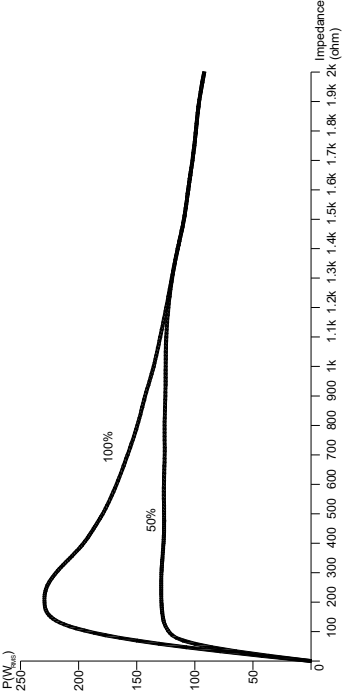
Corrente / Current / Courant / Corrente "ENDO"



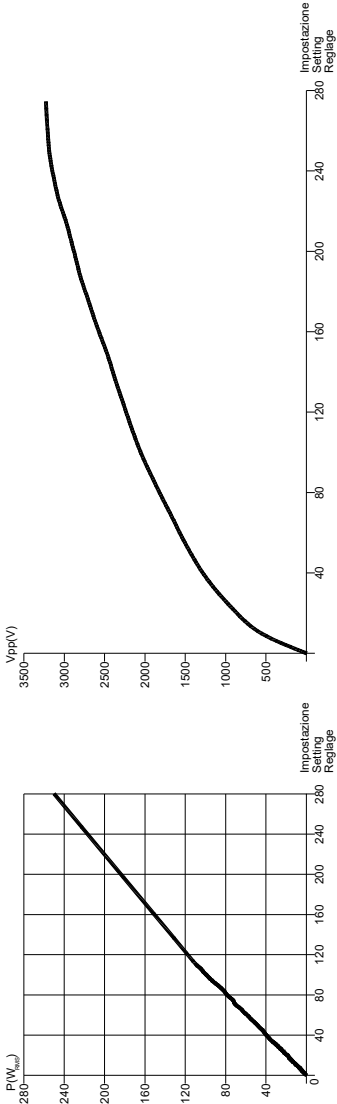
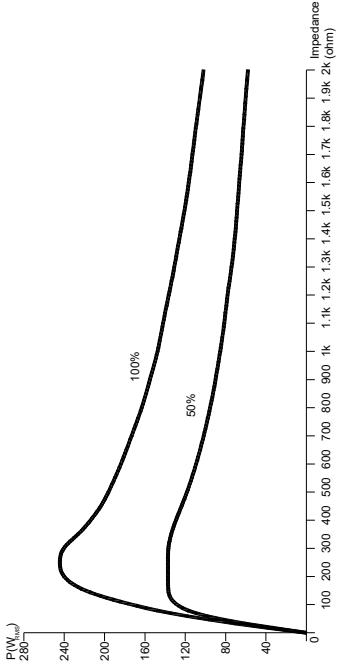
Corrente / Current / Courant / Corrente "FULG"



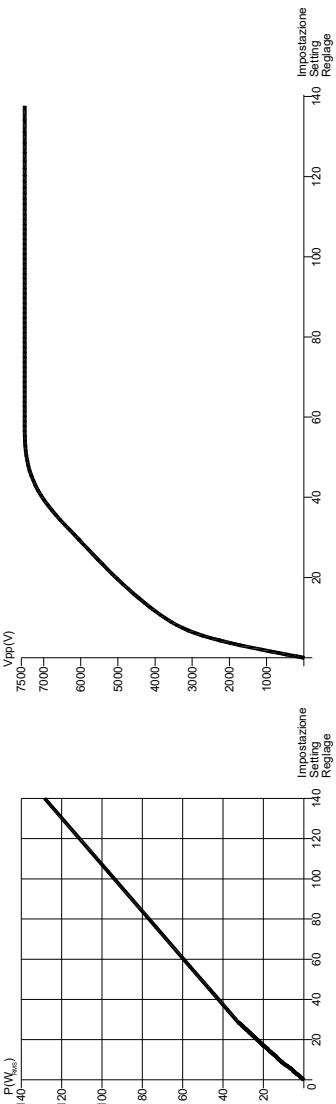
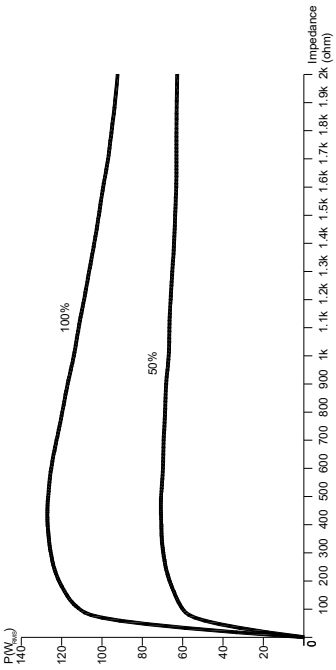
Corrente / Current / Courant / Corrente "PINPOINT"



Corrente / Current / Courant / Corrente "SOFT"



Corrente / Current / Courant / Corrente "SPRAY"

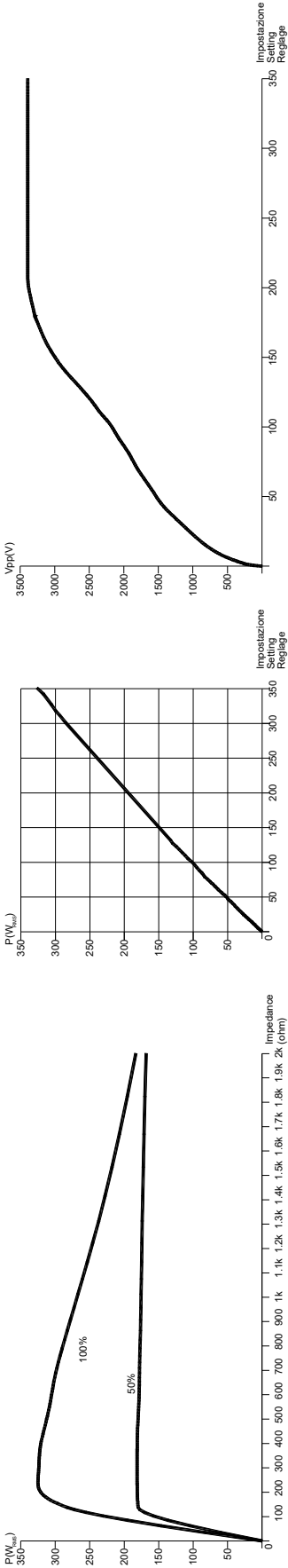


MONOPOLAR CURRENTS (350 MCDse)

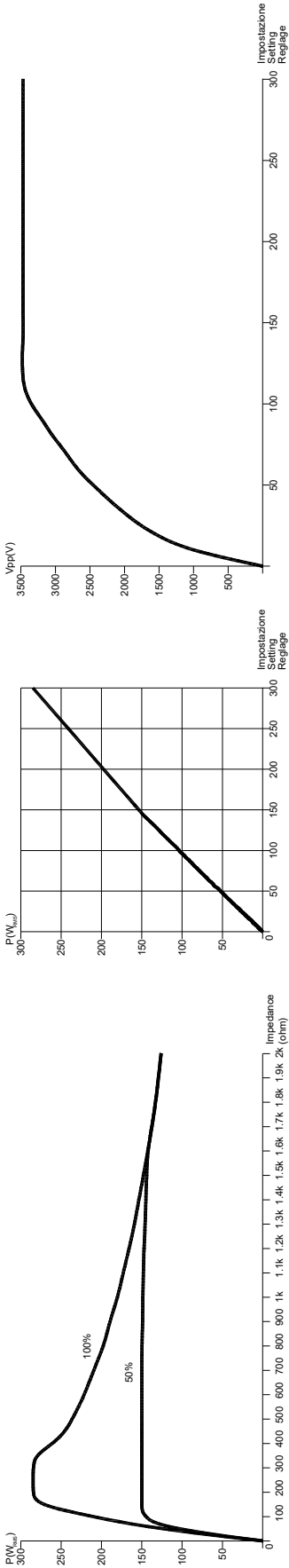
Measurement performed according to IEC 60601-2-2 (values detected within 1 second, excluding shorter transients)
(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)

(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltage according to the power adjustment).

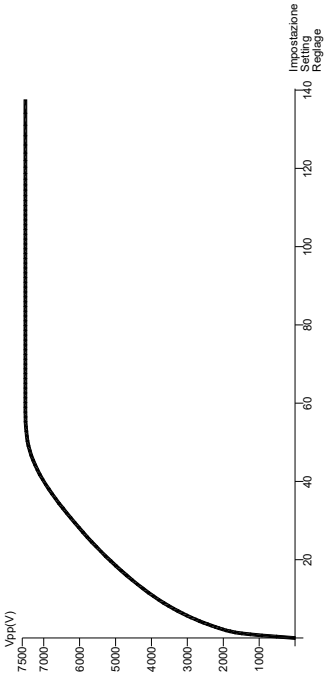
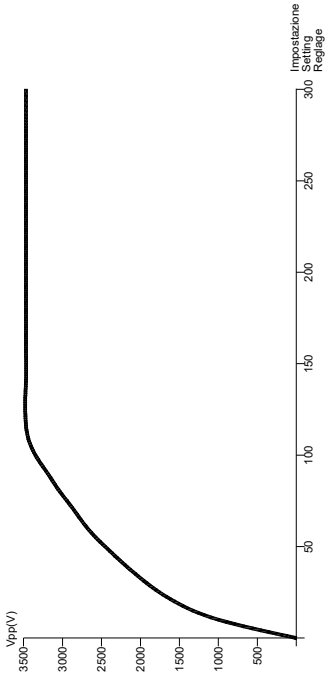
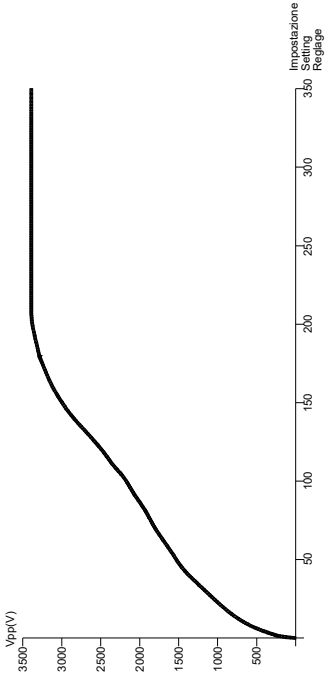
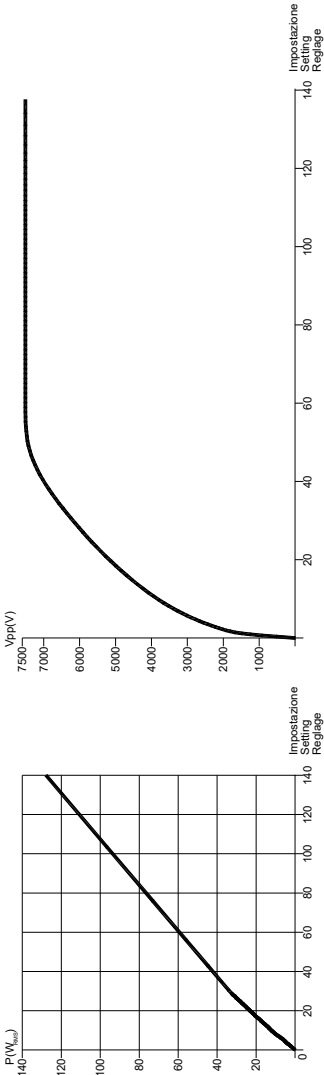
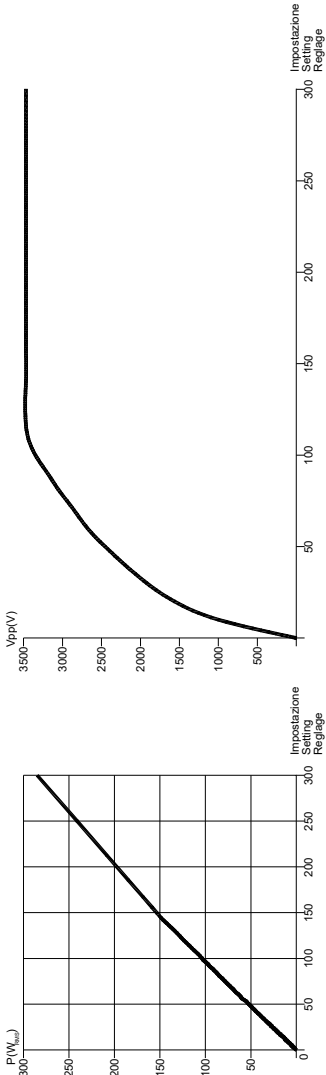
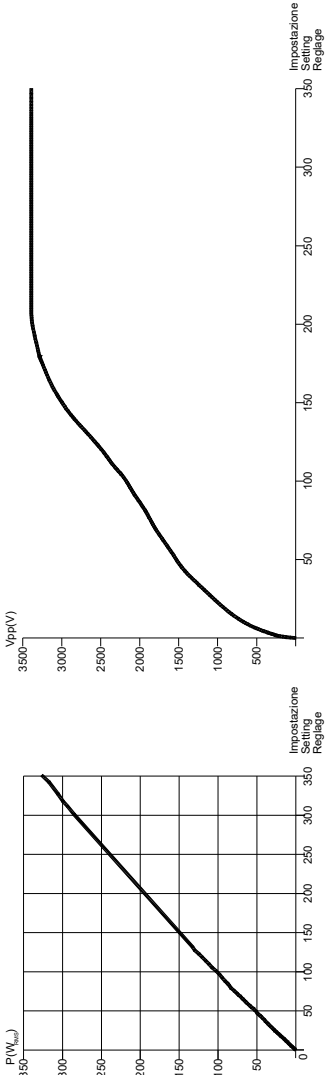
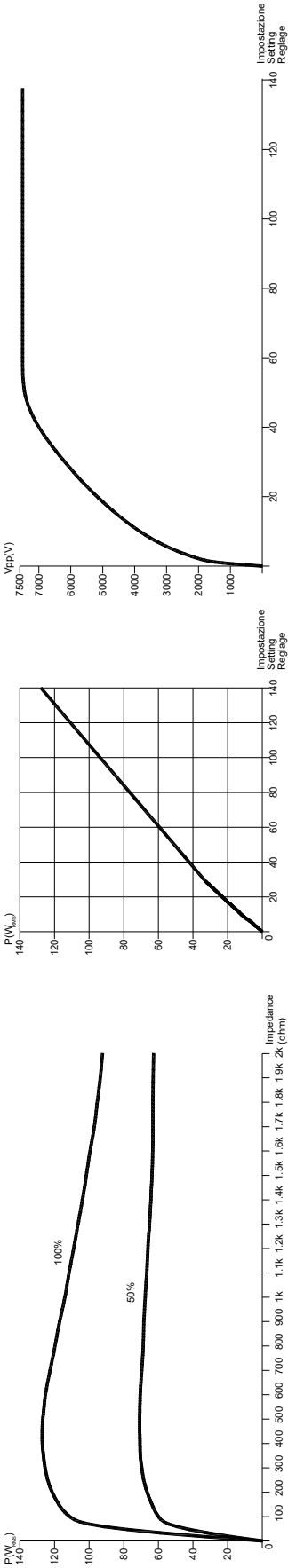
Corrente / Current / Courant / Corriente "PURE"



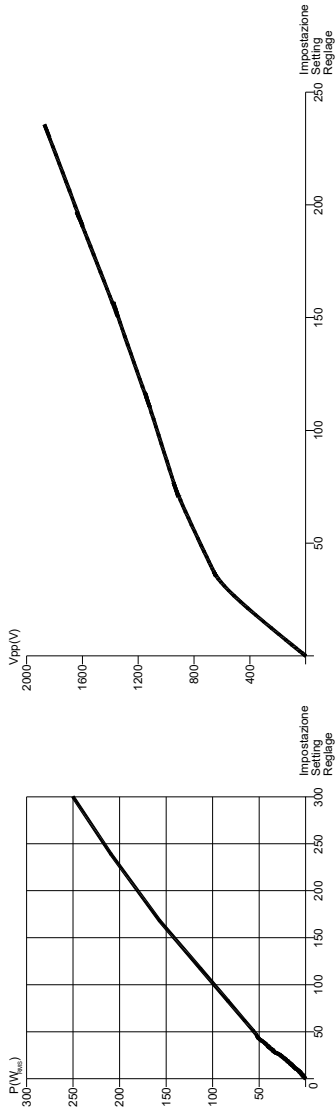
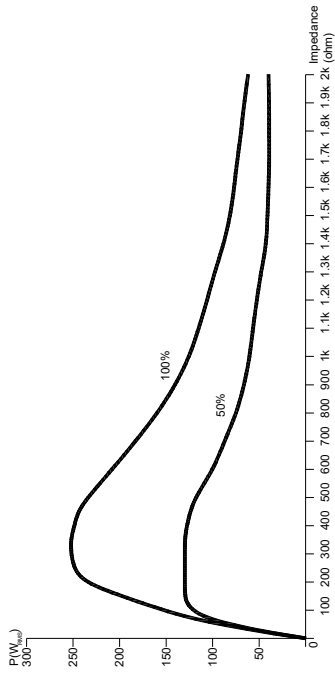
Corrente / Current / Courant / Corriente "BLEND 1"



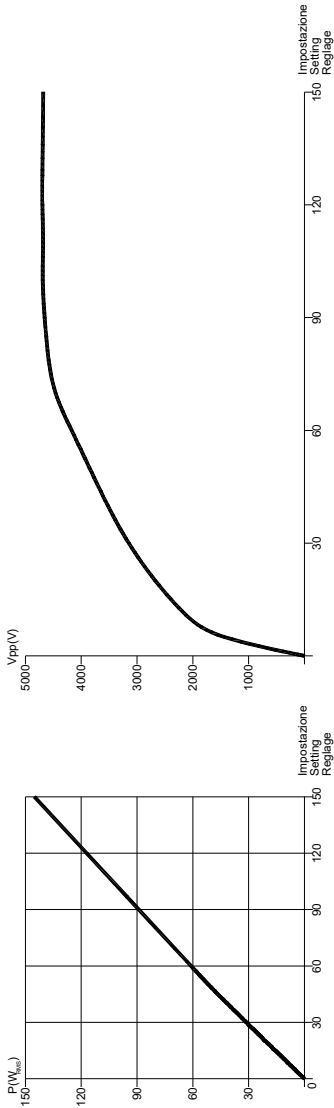
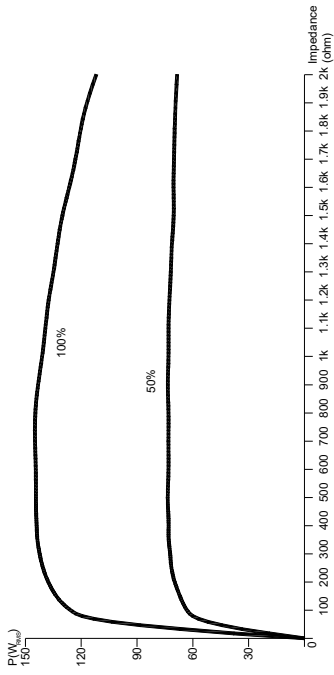
Corrente / Current / Courant / Corriente "BLEND 2"



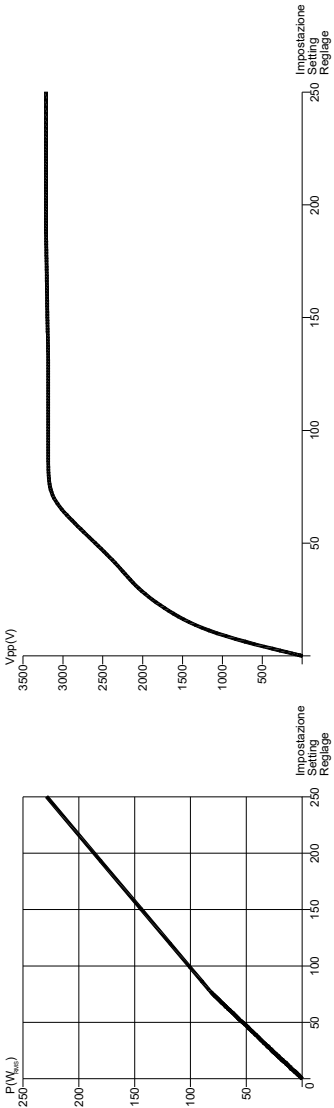
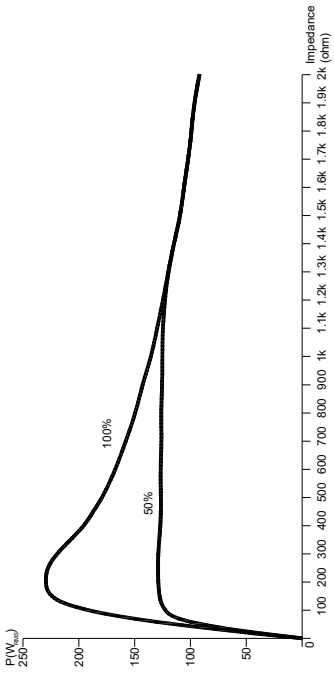
Corrente / Current / Courant / Corrente "ENDO"

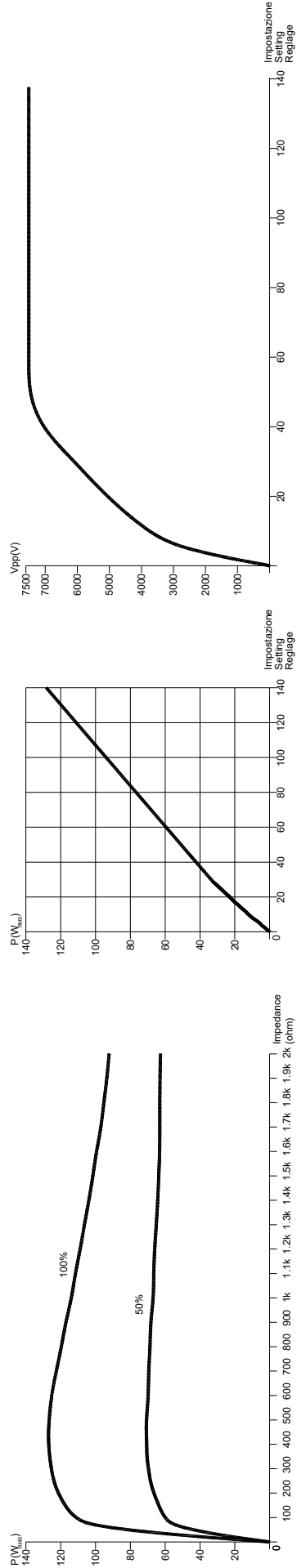
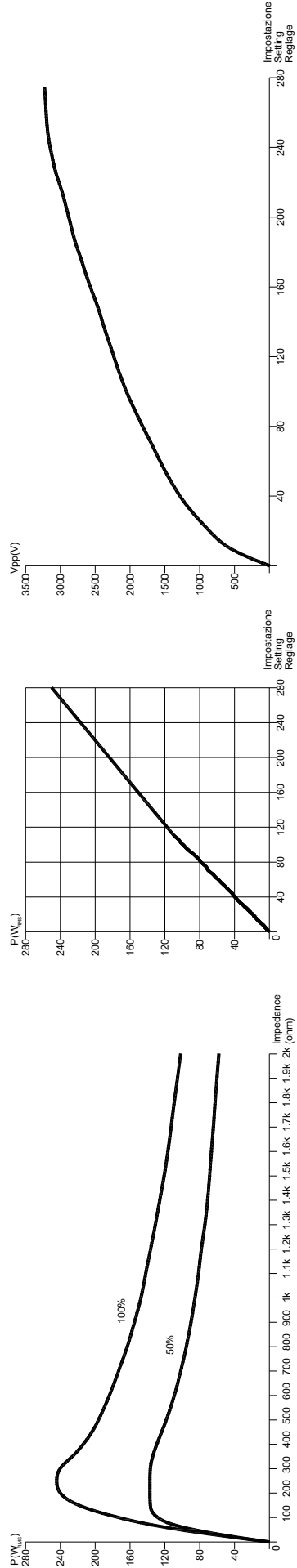


Corrente / Current / Courant / Corrente "FULG"



Corrente / Current / Courant / Corrente "PINPOINT"





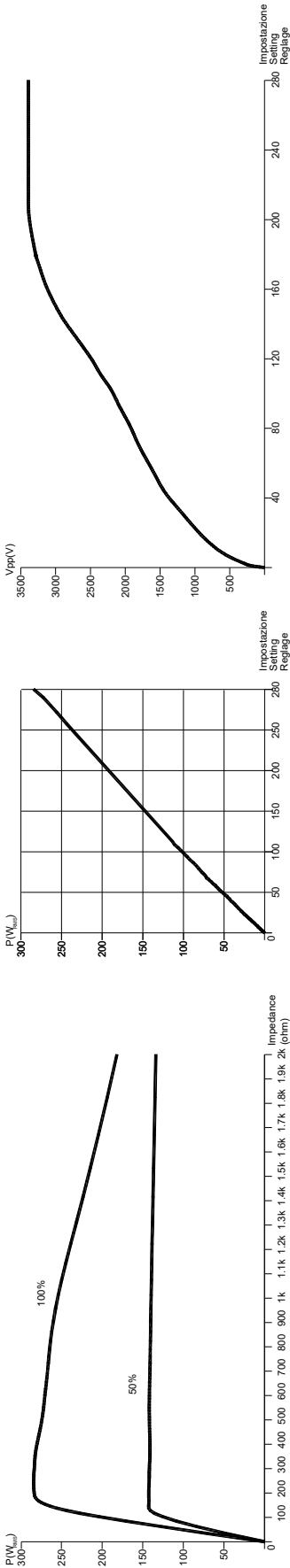
Corrente / Current / Courant / Corrente "SPRAY"

MONOPOLAR CURRENTS (250 MCDse)

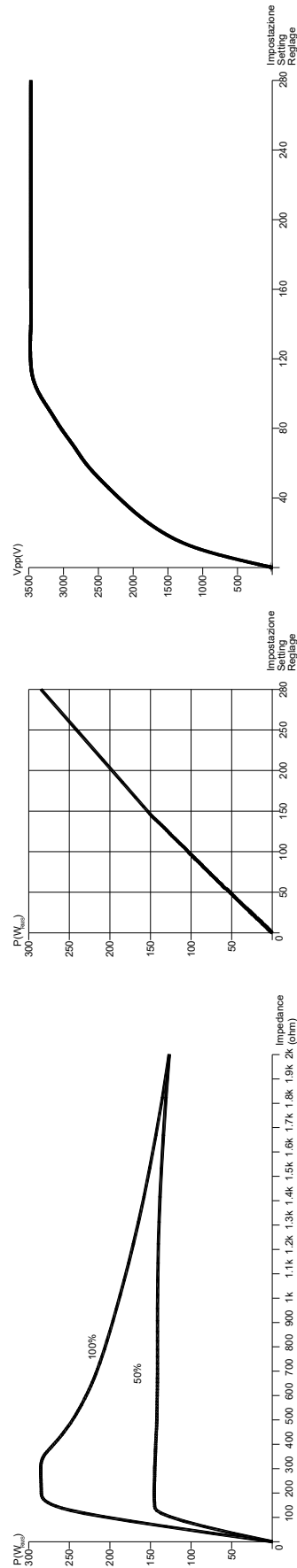
Measurement performed according to IEC 60601-2-2 (values detected within 1 second, excluding shorter transients)
(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)

(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltage according to the power adjustment).

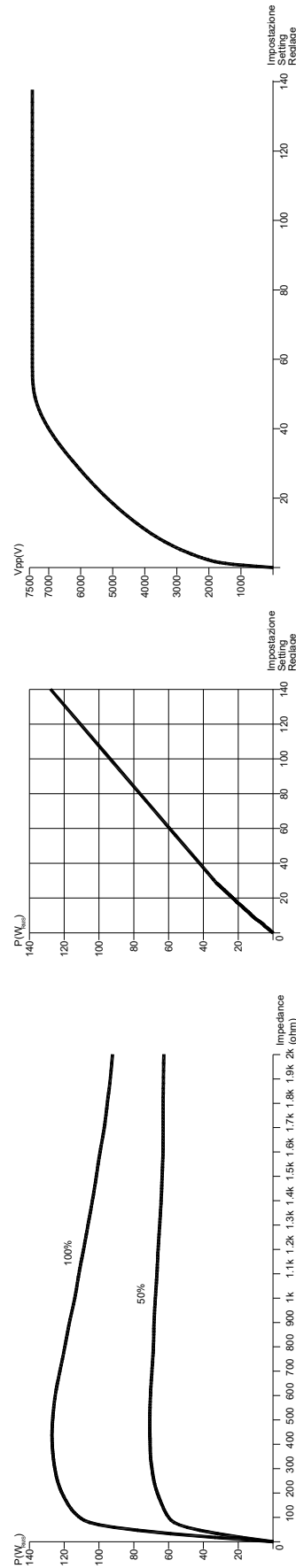
Corrente / Current / Courant / Corrente "PURE"



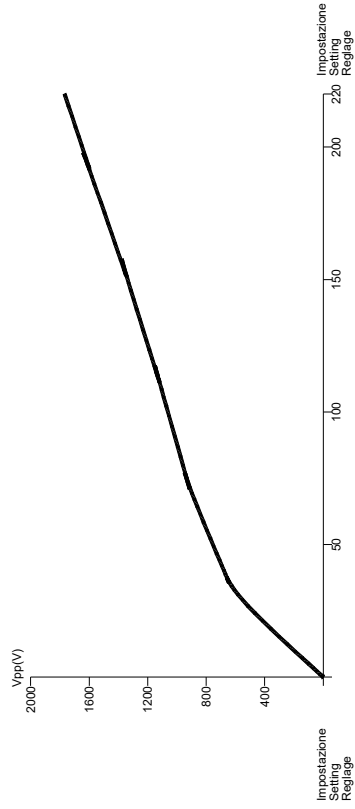
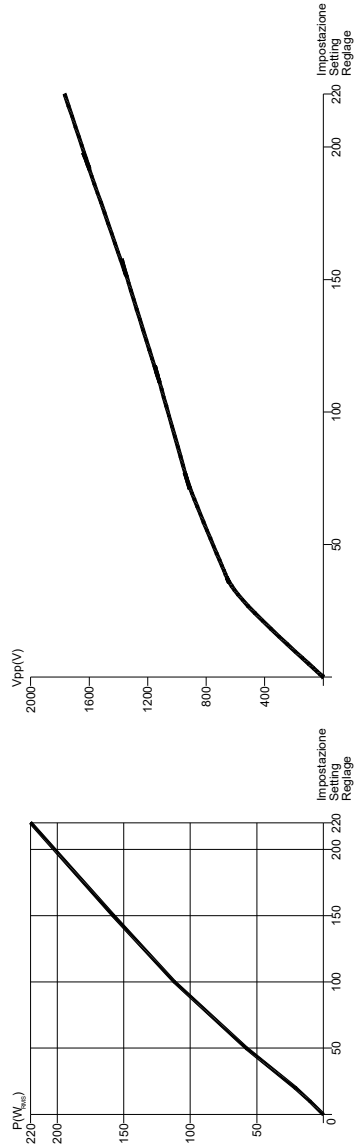
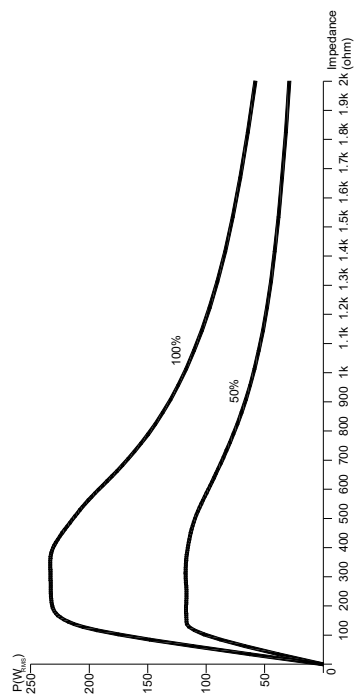
Corrente / Current / Courant / Corrente "BLEND 1"



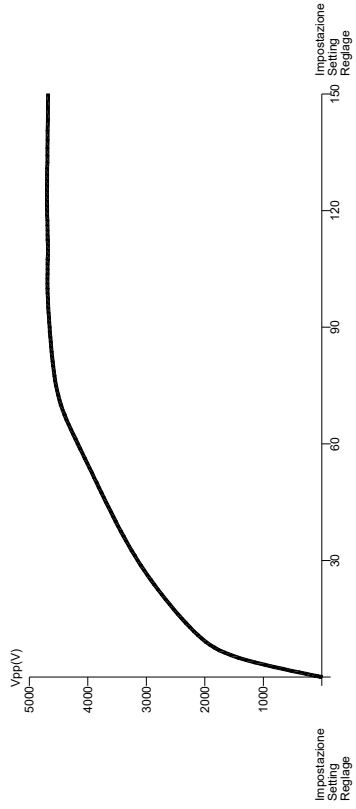
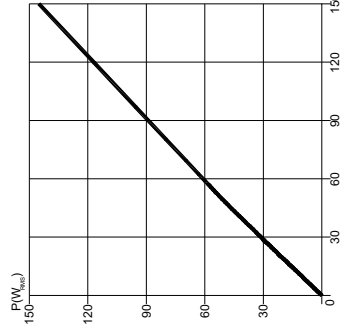
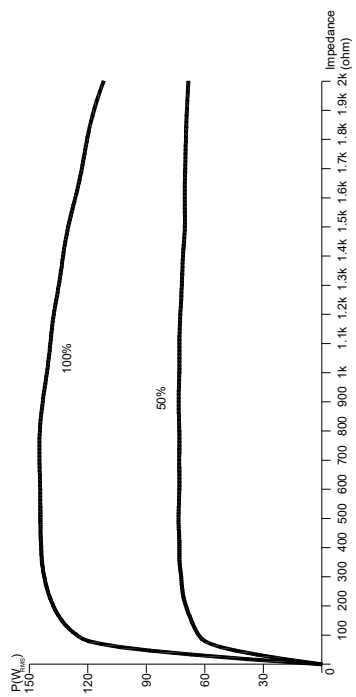
Corrente / Current / Courant / Corrente "BLEND 2"



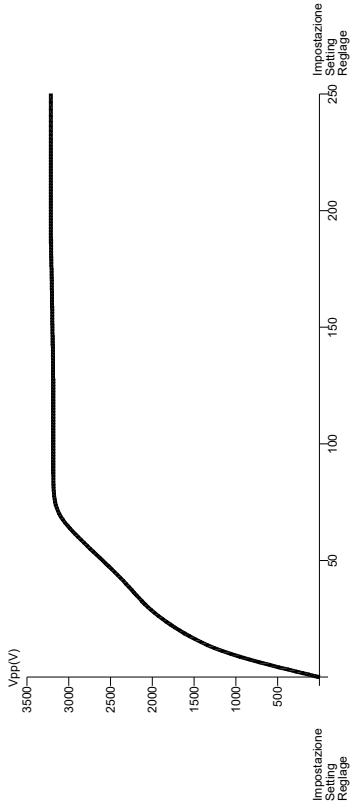
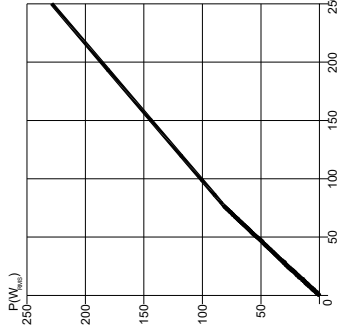
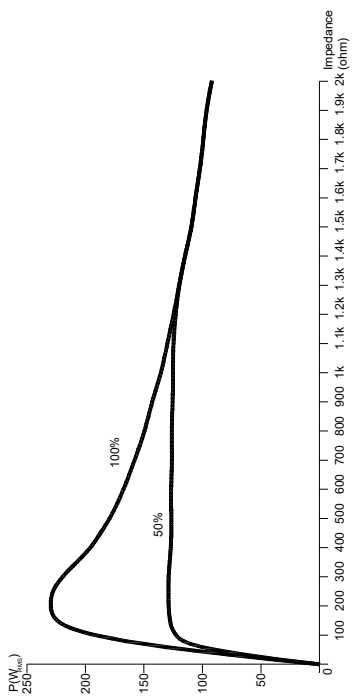
Corrente / Current / Courant / Corrente "ENDO"



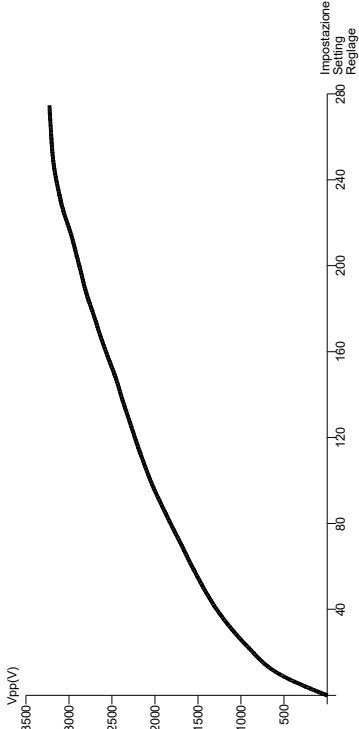
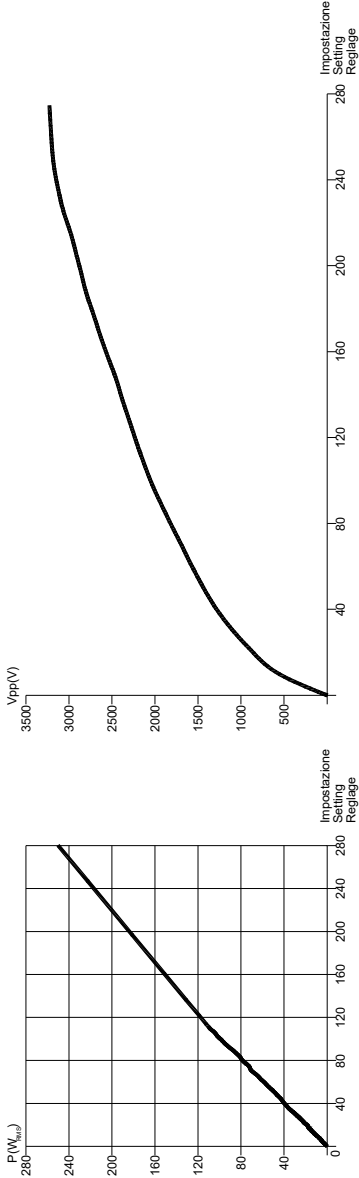
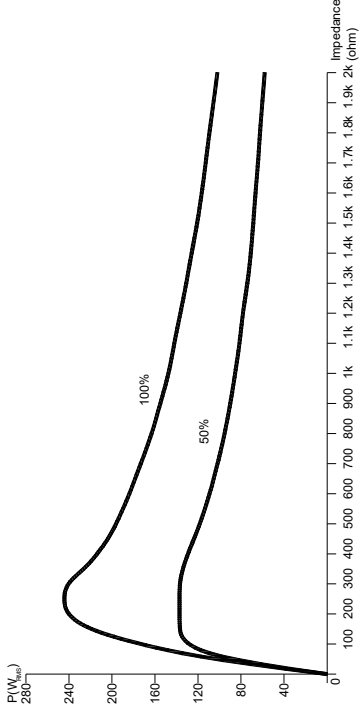
Corrente / Current / Courant / Corrente "FULG FORCED"



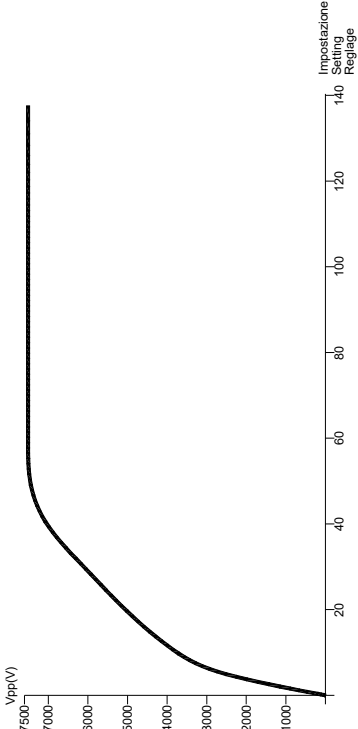
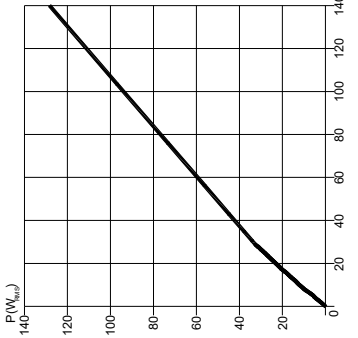
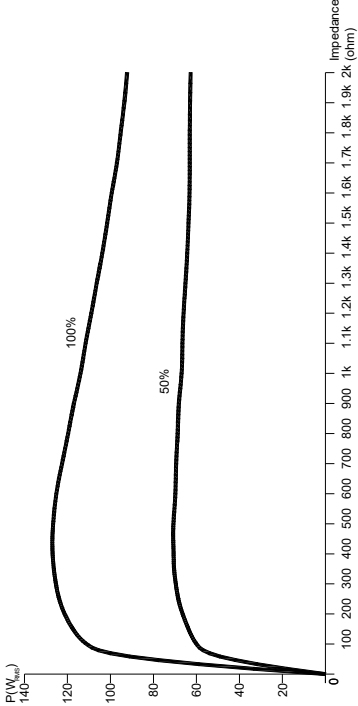
Corrente / Current / Courant / Corrente "PIN POINT"



Corrente / Current / Courant / Corrente "SOFT"



Corrente / Current / Courant / Corrente "SPRAY"



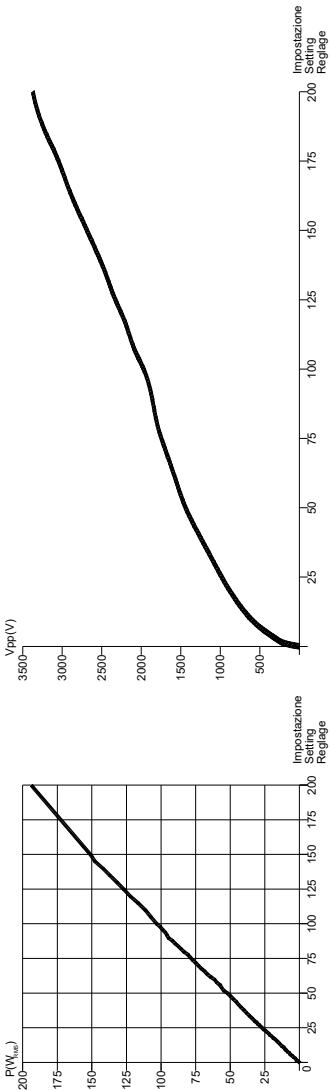
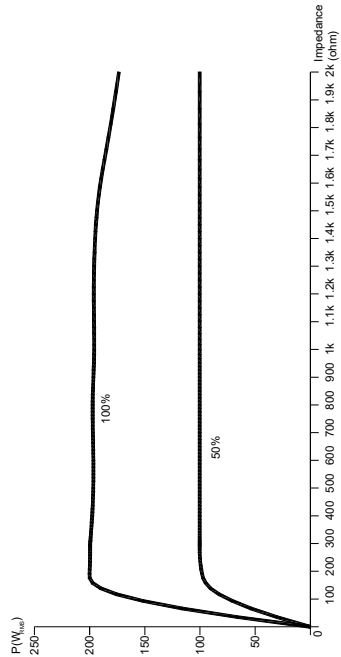
MONOPOLAR CURRENTS (200 MCDse)

Measurement performed according to IEC 60601-2-2 (values detected within 1 second, excluding shorter transients)

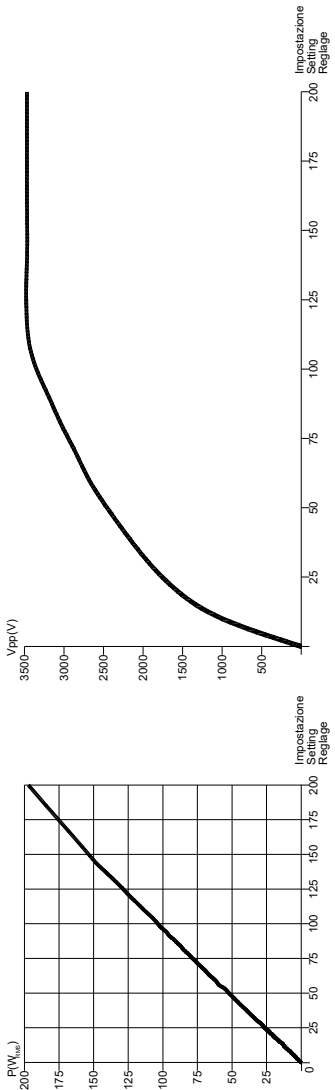
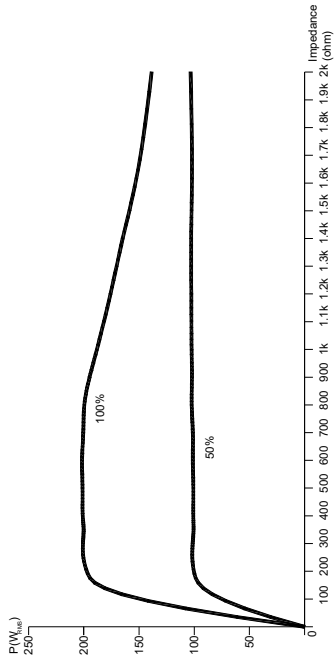
(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)

(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltage according to the power adjustment).

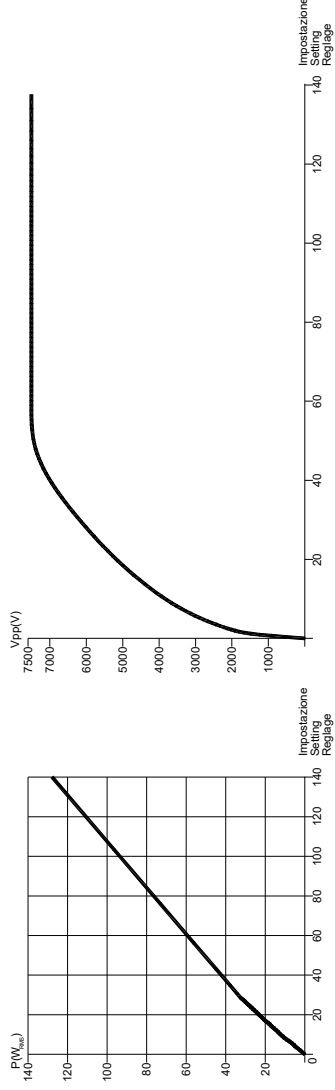
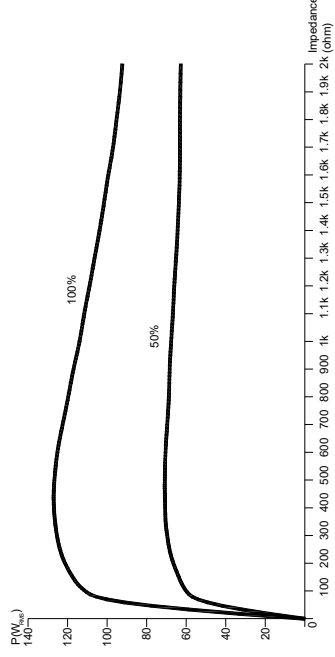
Corrente / Current / Courant / Corrente "PURE"



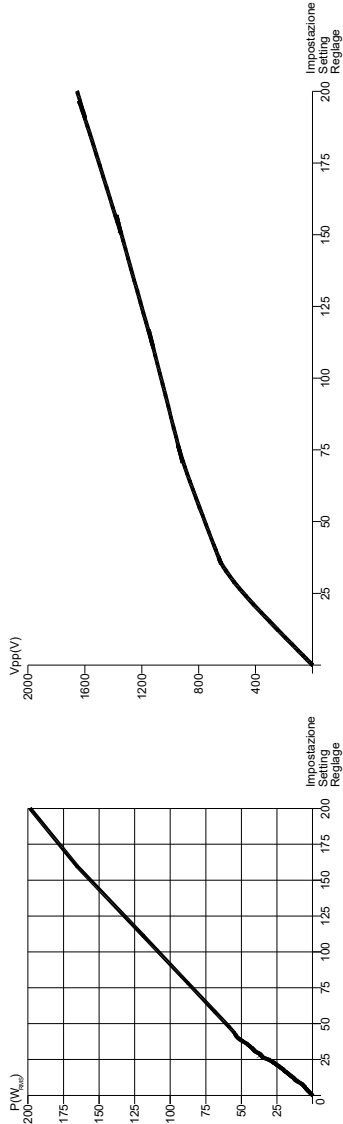
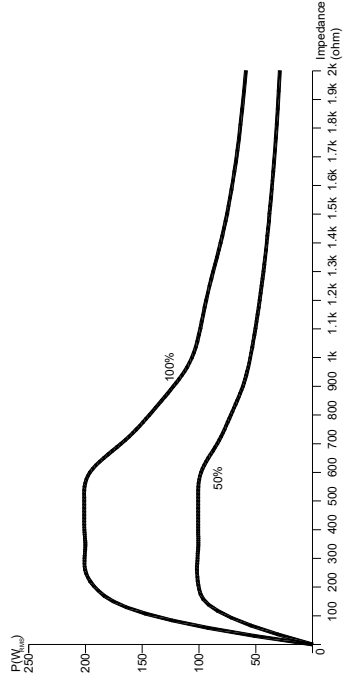
Corrente / Current / Courant / Corrente "BLEND 1"



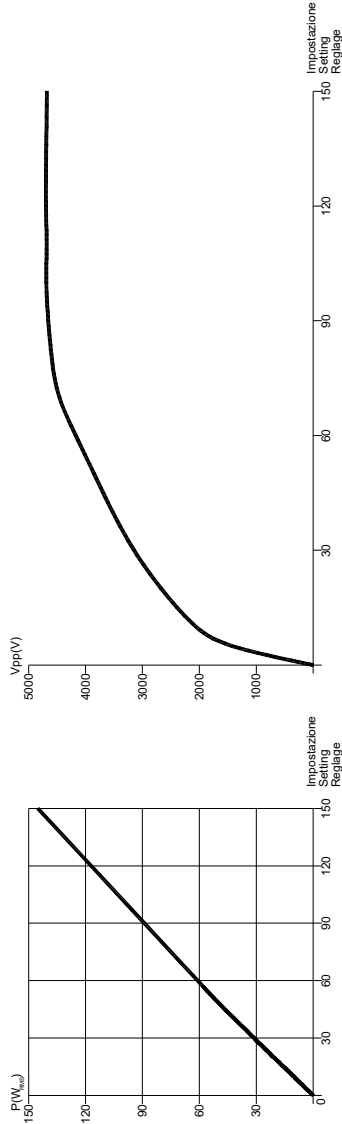
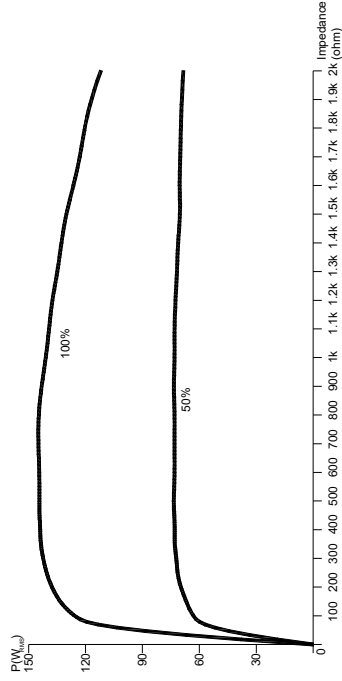
Corrente / Current / Courant / Corrente "BLEND 2"



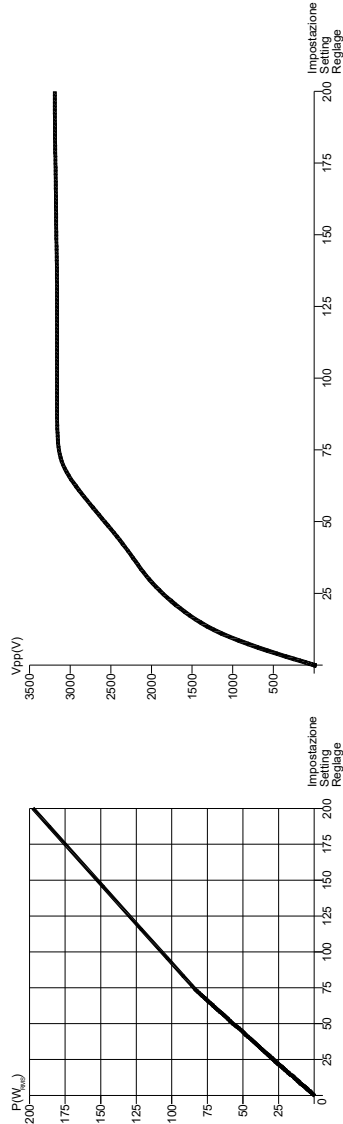
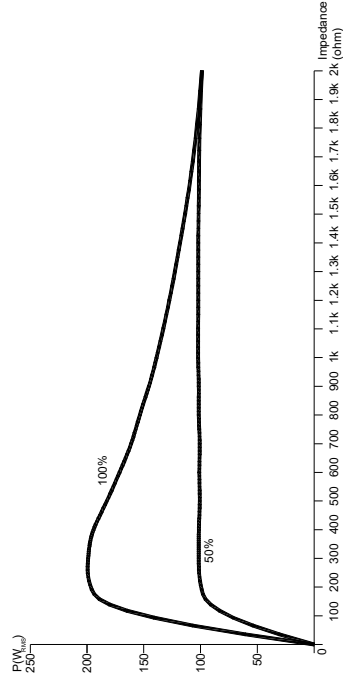
Corrente / Current / Courant / Corrente "ENDO"



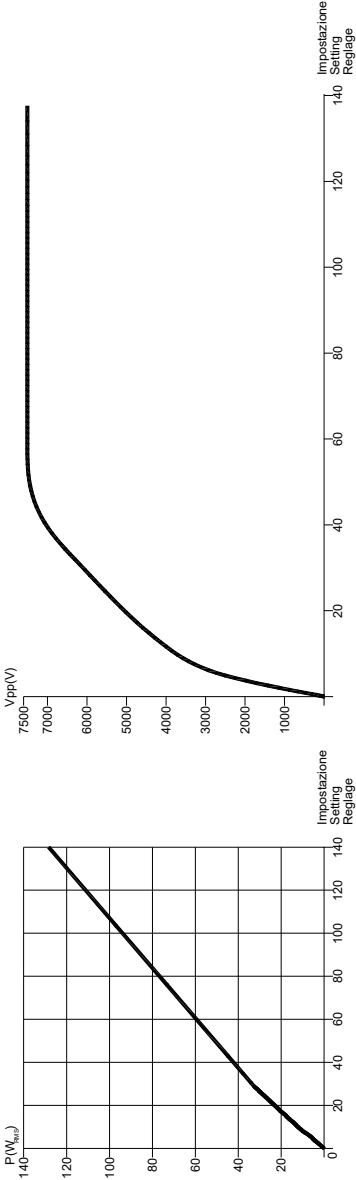
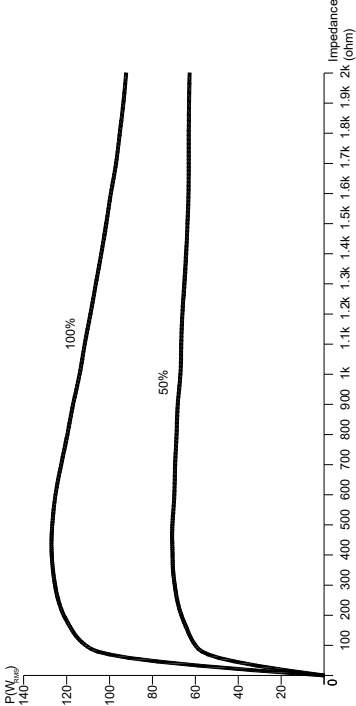
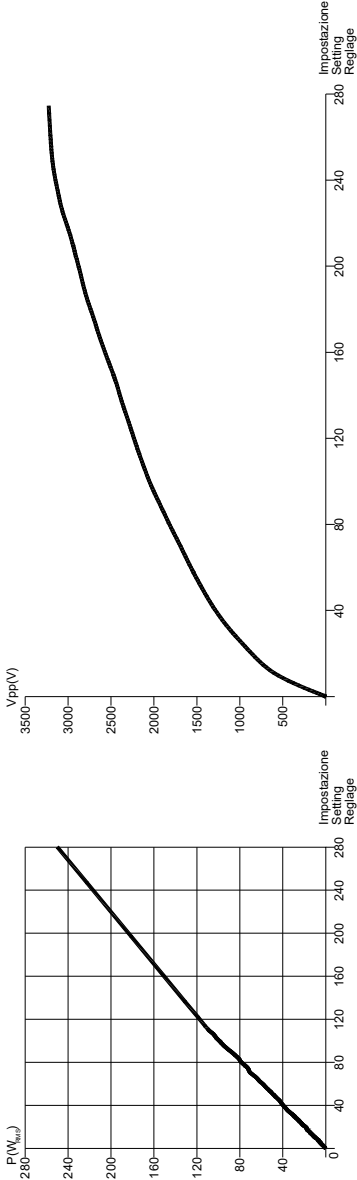
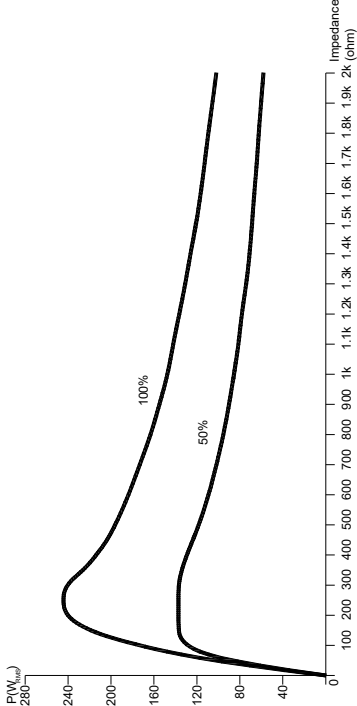
Corrente / Current / Courant / Corrente "FULG"



Corrente / Current / Courant / Corrente "PINPOINT"



Corrente / Current / Courant / Corrente "SOFT"



Corrente / Current / Courant / Corrente "SPRAY"

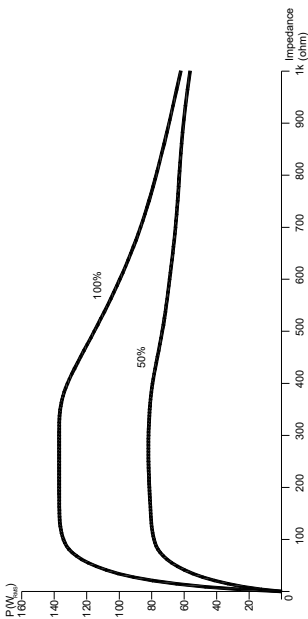
BIPOLAR CURRENTS (ALL MODELS)

Measurement performed according to IEC 60601-2-2 (values detected within1 second, excluding shorter transients)

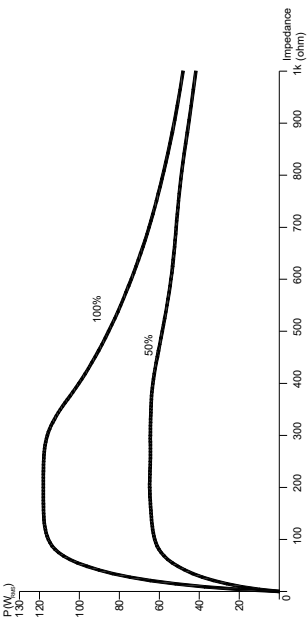
(Variation of the output power from 50 to 2000Ω by selecting 100% and 50% of maximum power)

(Increase in the output power with nominal load according to the power adjustment) (Increase of the Voltage according to the power adjustment).

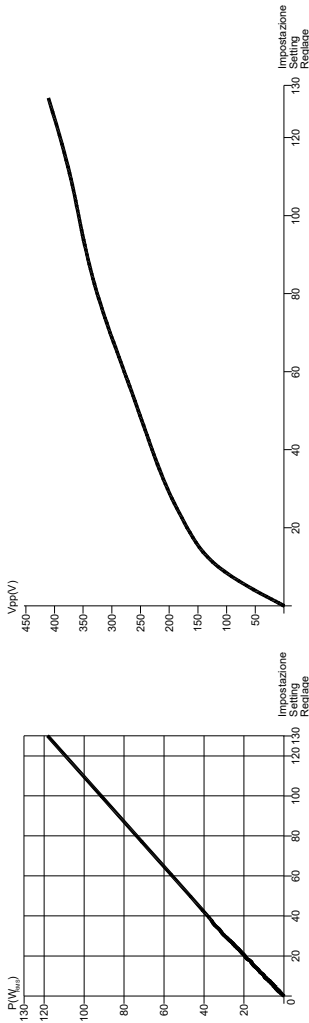
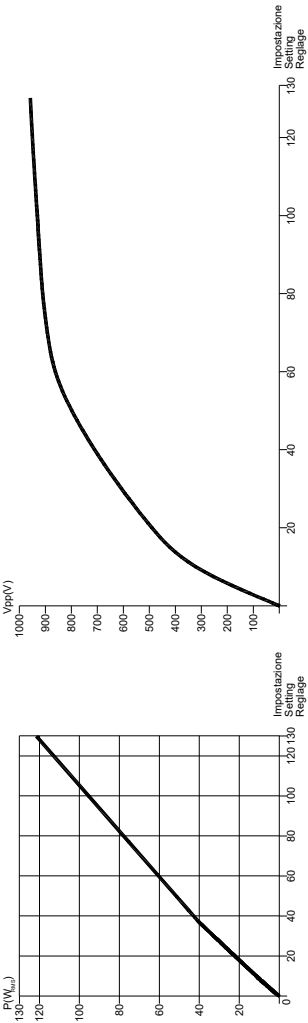
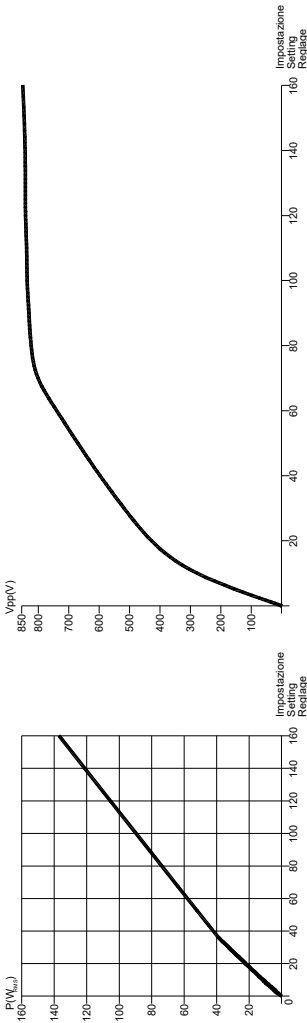
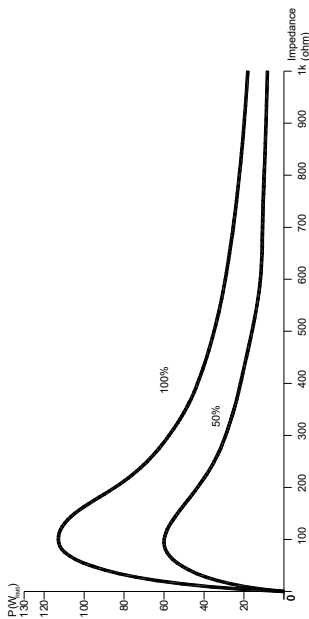
Corrente / Current / Courant / Corriente "PURE"



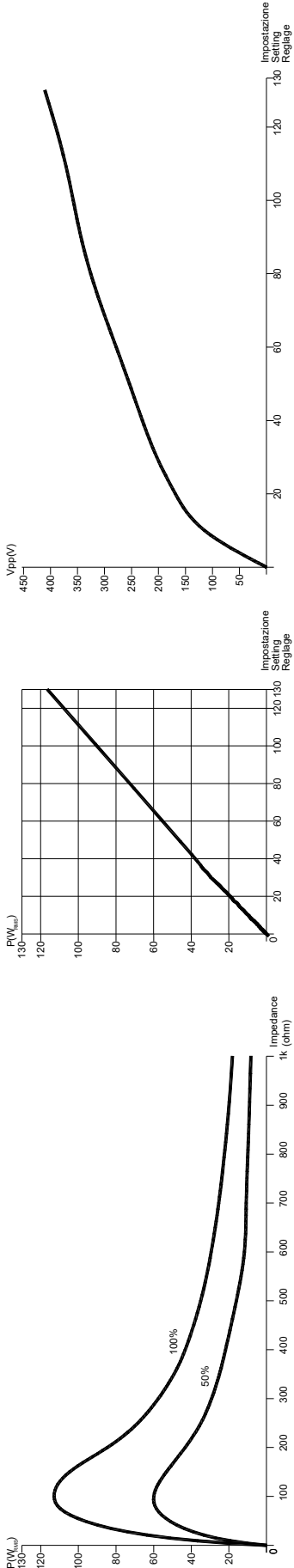
Corrente / Current / Courant / Corriente "BLEND"



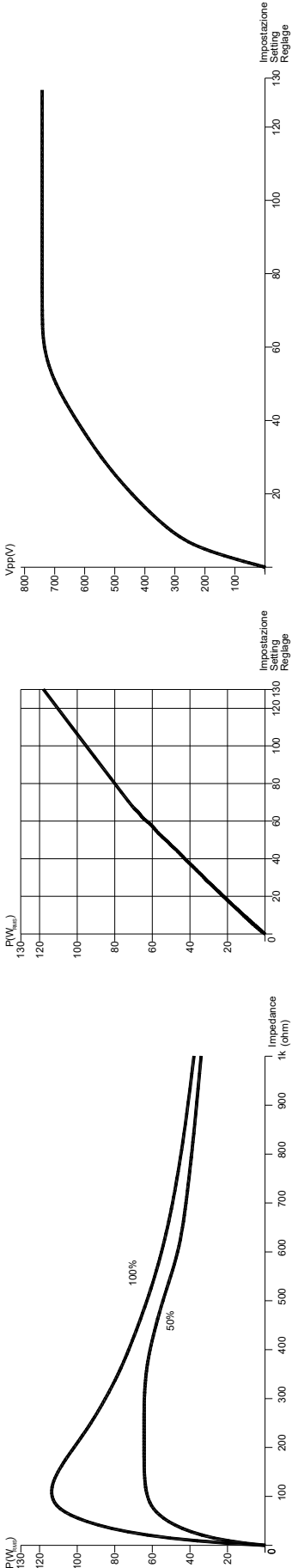
Corrente / Current / Courant / Corriente "MICRO"



Corrente / Current / Courant / Corrente "MICRO AUTO"



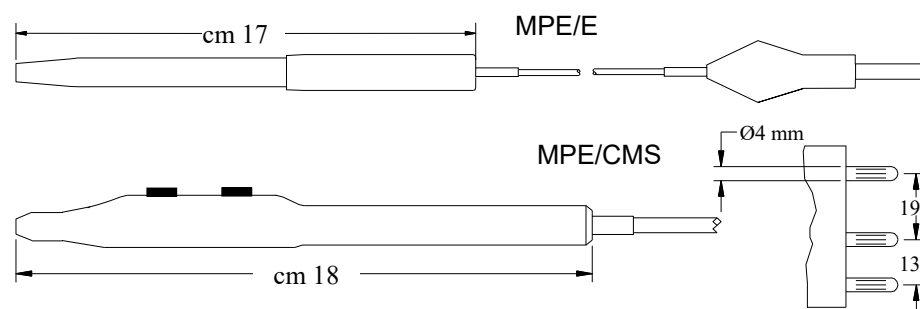
Corrente / Current / Courant / Corrente "MACRO"



ACCESSORIES

ELECTRODES-HOLDER HANDLES (rated voltage: 4000 V)

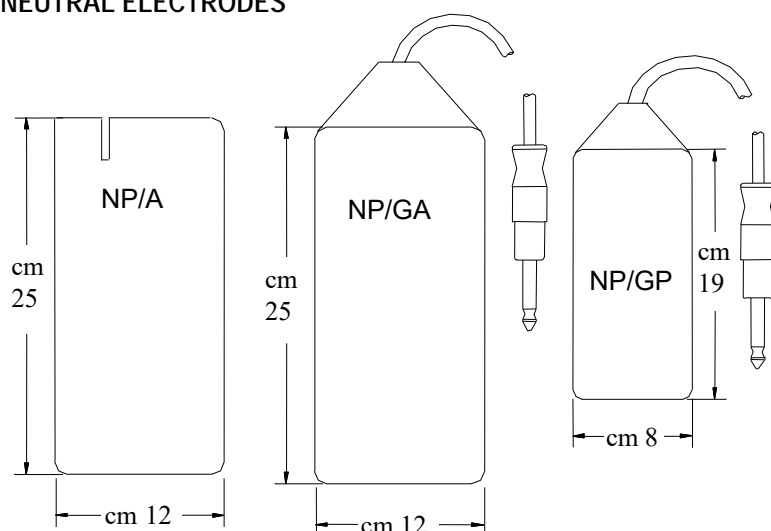
- MPE/E - Electrodes-holder handle (electrodes with stem \varnothing 2,3 / 2,4 mm) with cable 3.5m long;
 MPE/CMS - Electrodes-holder handle (electrodes with stem \varnothing 2,3 / 2,4 mm) with hand-switches, reusable 100 times.



ACTIVE ELECTRODES STANDARD SERIES (*SEL/E*) (see next page for details) (rated 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 \varnothing 2.5 mm
 E14 - Straight ball electrode \varnothing 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;

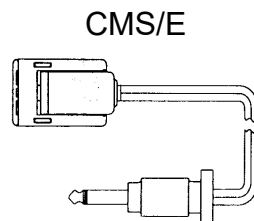
DS/B: Twin pedal foot-switch for bipolar mode only.

DISPOSABLE NEUTRAL ELECTRODES

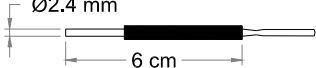












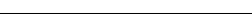












CMS/E: Connection cable 2.5m long;

EIP/DA: Neutral electrode "non split" type for adults (bodies with weight higher than 15 Kg), 136 cm²;


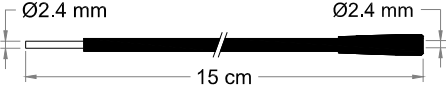
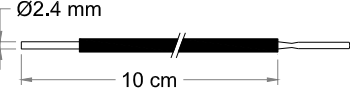







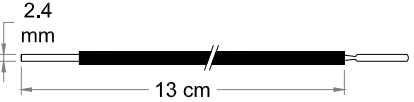









EIP/DP: Neutral electrode "non split" type for children, 72 cm²;
 (bodies with weight from 5 to 15 Kg), 136 cm²;



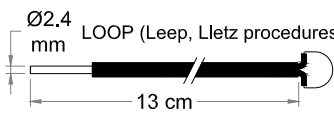
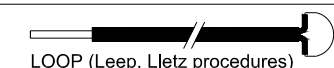

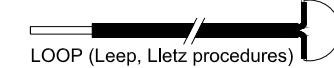
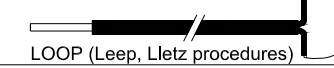



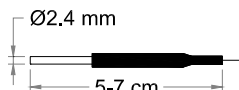










ELETTRODI MONOPOLARI
MONOPOLAR ELECTRODES
ELECTRODES MONOPOLAIRES
ELECTRODOS MONOPOLARES

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

ELETTRODI MONOPOLARI
MONOPOLAR ELECTRODES
ELECTRODES MONOPOLAIRES
ELECTRODOS MONOPOLARES

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

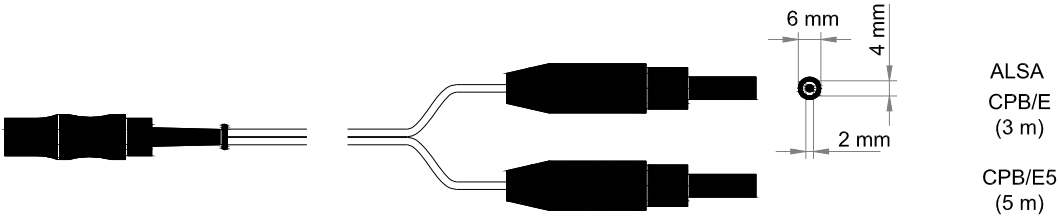
ELETTRODI MONOPOLARI
MONOPOLAR ELECTRODES
ELECTRODES MONOPOLAIRES
ELECTRODOS MONOPOLARES

ELETTRODO ELECTRODE ELECTRODE ELECTRODO	DESCRIZIONE DESCRIPTION DESCRIPTION DESCRIPCIÓN	NON STERILE NON-STERILE NON STÉRILE NO ESTÉRIL 134° C Autoclave
 Ø2.4 mm LOOP (Leep, Lletz procedures) 13 cm	Ansa a filo 10x10 mm • Wire loop 10x10 mm Anse à fil 10x10 mm • Asa de alambre 10x10 mm	E50 (ex EL41)
 LOOP (Leep, Lletz procedures)	Ansa a filo 15x10 mm • Wire loop 15x10 mm Anse à fil 15x10 mm • Asa de alambre 15x10 mm	E52 (ex EL46)
 LOOP (Leep, Lletz procedures)	Ansa a filo 20x8 mm • Wire loop 20x8 mm Anse à fil 20x8 mm • Asa de alambre 20x8 mm	E53 (ex EL48)
 LOOP (Leep, Lletz procedures)	Ansa a filo 20x10 mm • Wire loop 20x10 mm Anse à fil 20x10 mm • Asa de alambre 20x10 mm	E54 (ex EL49)
 LOOP (Leep, Lletz procedures)	Ansa a filo 20x20 mm • Wire loop 20x20 mm Anse à fil 20x20 mm • Asa de alambre 20x20 mm	E55 (ex EL51)
 SQUARE LOOP	Ansa a filo 10x5 mm • Wire loop 10x5 mm Anse à fil 10x5 mm • Asa de alambre 10x5 mm	E56 (ex EL60)
 SQUARE LOOP	Ansa a filo 10x8 mm • Wire loop 10x8 mm Anse à fil 10x8 mm • Asa de alambre 10x8 mm	E57 (ex EL61)
 SQUARE LOOP	Ansa a filo 10x10 mm • Wire loop 10x10 mm Anse à fil 10x10 mm • Asa de alambre 10x10 mm	E58 (ex EL62)
Elettrodi per microchirurgia • Microsurgical electrodes • Electrodes pour microchirurgie • Electrodos para microcirugía		
 Ø2.4 mm 5-7 cm	Ad ago sottile retto • Straight thin needle À aiguille fine droite • De aguja fina recta	E101
	Ad ago sottile angolato • Thin bent needle À aiguille fine courbée • De aguja fina acodada	E102
	Ad ago sottile angolato • Thin bent needle À aiguille fine coudée • De aguja fina acodada	E103
	Ad ago grosso • Thick needle À aiguille grosse • De aguja gruesa	E105
	Ad ago grosso angolato • Thick angled needle À aiguille grosse courbée • De aguja gruesa acodada	E106
	Ansa a filo Ø 5 mm • Wire loop Ø 5 mm Anse à fil Ø 5 mm • Asa de alambre Ø 5 mm	E110
	Ansa Ø 5 mm angolata • Angled loop Ø 5 mm Anse coudée Ø 5 mm • Asa acodada Ø 5 mm	E109
	Laccio allungato Ø 5 mm • Long wire loop Ø 5 mm Anse à fil long Ø 5 mm • Asa de alambre Ø 5 mm	E111
	Laccio allungato Ø 5 mm • Long wire loop Ø 5 mm Anse à fil long Ø 5 mm • Asa de alambre Ø 5 mm	E112
	A sfera Ø 2,5 mm • Ball Ø 2.5 mm À bille Ø 2,5 mm • De bola Ø 2,5 mm	E120
	A sfera Ø 2,5 mm • Ball Ø 2.5 mm À bille Ø 2,5 mm • De bola Ø 2,5 mm	E121

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



Cavo / Cable / Câble / Cable


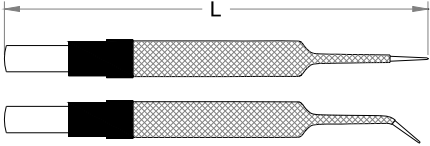

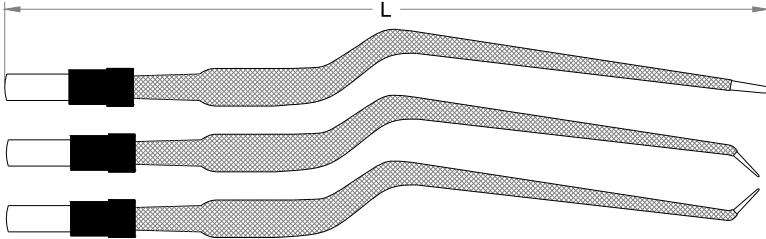


Pinze di lunghezza diversa sono fornibili a richiesta (specificare tipo e lunghezza, es. PBC/R14 = PBC/R lunga 14 cm
Forceps of different lenght are available on request (please, specify lenght and type, i.e. PBC/R14 = PBC/R 14 cm long)
Pinces avec différente longueur peuvent etrê fournis sur demande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

Punte / Tips / Pointes / Puntas		Spina / Plug / Fiche / Enchufe			
A punta / Pointed / Pointu / Con la punta	Smussate / Blunted / Arrondies / Redondeadas	Tipo piatto europeo / European flat type / Type plate européenne / Tipo plano europeo			
 A	 B	 C	 D	 6/7 mm	 4 mm
Pinza isolata (Cushing / Potts-Smith) Insulated forceps (Cushing / Potts-Smith) Pince isolée (Cushing / Potts-Smith) Pinza recubierta (Cushing / Potts-Smith)		 1:1	L (cm)	ALSA standard	ALSA con irrigazione / with irrigation avec irrigation / con irrigación
1. Retta / Straight type / Droite / Recta		B	16	PMC/RS	PMC/RSL
		C	18	PMC/R18	
		C	20	PMC/R	PMC/RL
		C	25	PMC/R25	PMC/R25L
		D	18	PBC/R18	
		D	20	PBC/R	PBC/RL
		D	25	PBC/R25	PBC/R25L
2. Curva / Bent type / Courbée / Curva		B	16	PMC/CS	PMC/CSL
		C	18	PMC/C18	
		C	20	PMC/C	PMC/CL
		C	25	PMC/C25	PMC/C25L
		D	18	PBC/C18	
		D	20	PBC/C	PBC/CL
		D	25	PBC/C25	PBC/C25L
 1. 2.					

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



Pinza isolata (Jeweler) Insulated forceps (Jeweler) Pince isolée (Jeweler) Pinza recubierta (Jeweler)		L (cm)	ALSA standard	ALSA con irrigazione / with irrigation avec irrigation / con irrigación
1. Retta / Stalght type / Drolte / Recta	B	12	PMC/JR	
2. Curva / Bent type / Courbée / Curva	B	12	PMC/JC	
				
Pinza isolata (a baionetta / Jansen / Ysargil) Insulated forceps (bayonet type / Jansen / Ysargil) Pince isolée (à bayonette / Jansen / Ysargil) Pinza recubierta (de baioneta / Jansen / Ysargil)		L (cm)	ALSA standard	ALSA con irrigazione / with irrigation avec irrigation / con irrigación
1. Retta / Straight type / Droite / Recta	B	16	PMC/RSB	
	C	17	PMC/B17	
	C	20	PMC/B	PMC/BL
	C	25	PMC/B25	
	D	17	PBC/B17	
	D	20	PBC/B	PBC/BL
2. Curva / Bent type / Courbée / Curva	D	25	PBC/B25	
	C	20	PMC/BCD	
3. Curva / Bent type / Courbée / Curva	D	20	PBC/BCD	
	C	20	PMC/BCU	
D	20	PBC/BCU		
				
Elettrodo bipolare Bipolar electrode Electrode bipolaire Electrodo bipolar		L1(mm)	L 2(mm)	ALSA
1. Ad ago per turbinati (Binner) / Needle type for turbinals (Binner) À aiguille pour cornets (Binner) / De aguja para cornetes (Binner)		68	170	EBT
2. Per laringe / For larynx / Pour larynx / Para laringe		68	310	EBL
