

APC 300

Handbook Standard Version



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ERBE

ERBE APC 300

Handbook Standard Version

APC 300 No. 10132-010 Standard Version



Quality Management System according to: EN ISO 13485 EN ISO 9001

Manual part number: 80110-051

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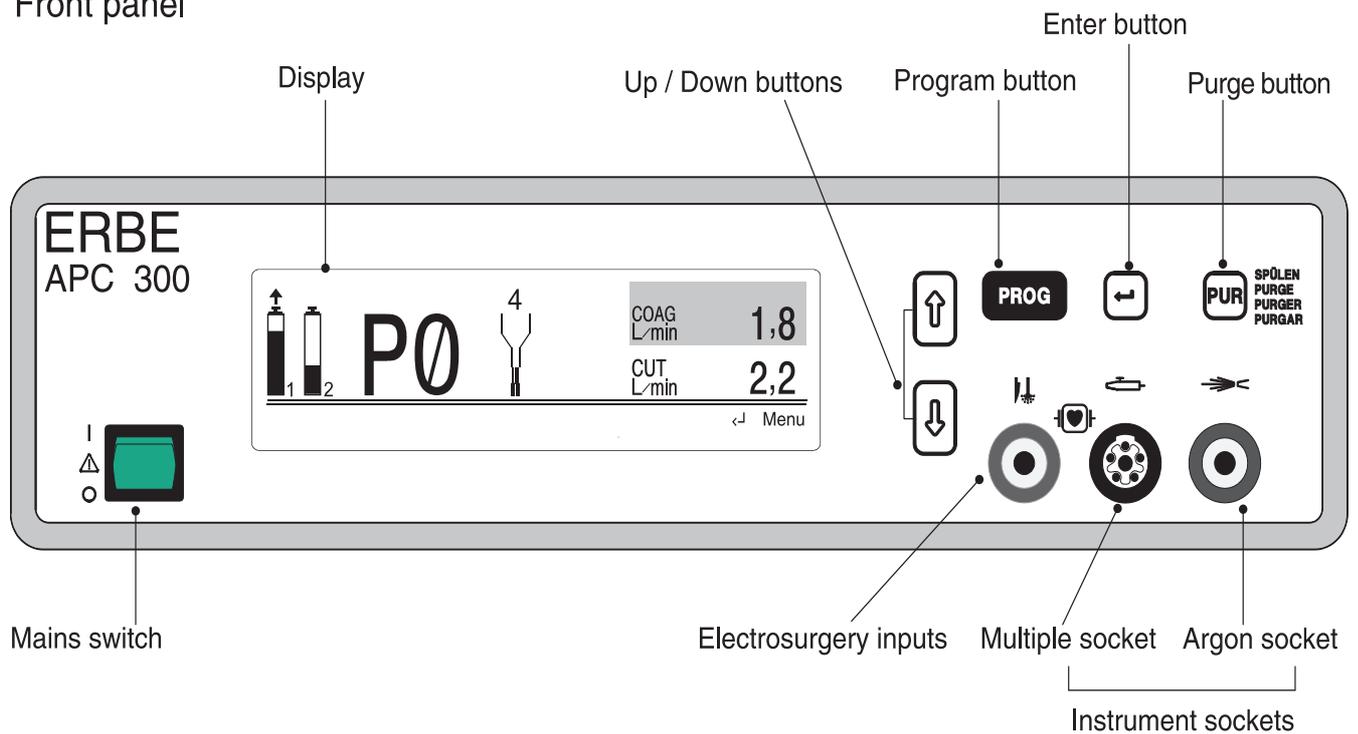
**Notes on using electrosurgical devices of other manufacturers in
combination with the APC 300**

Literature

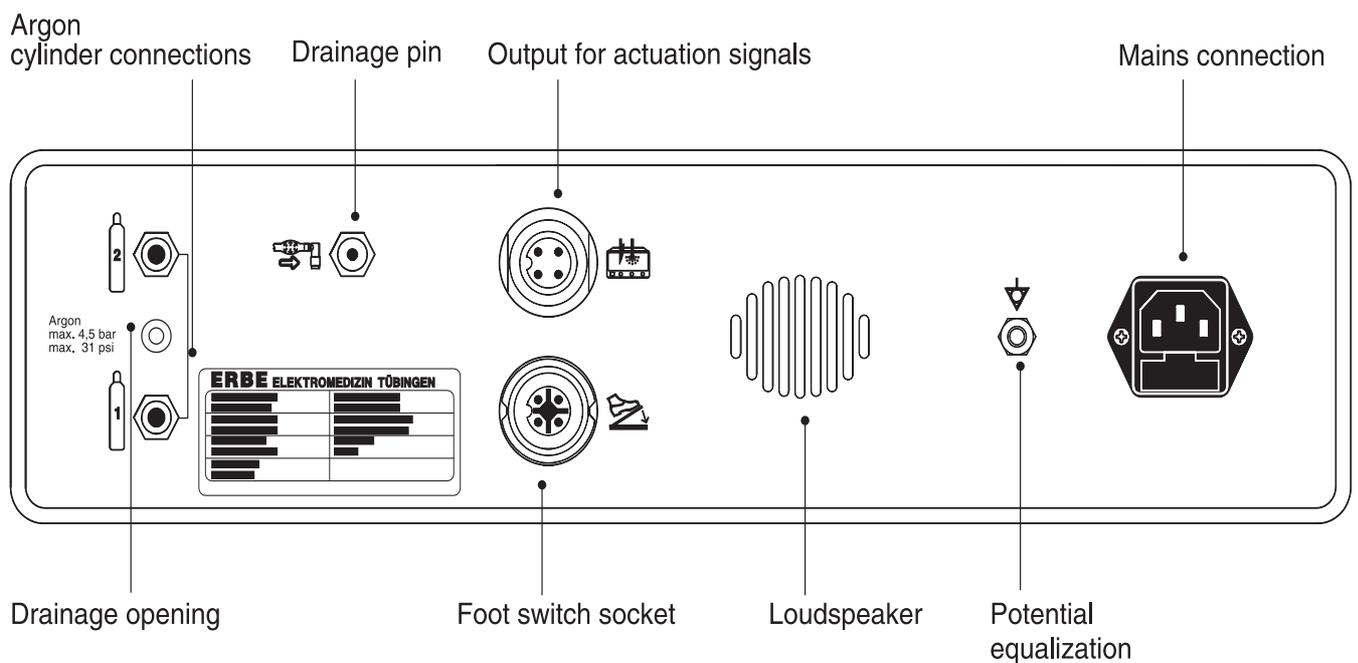
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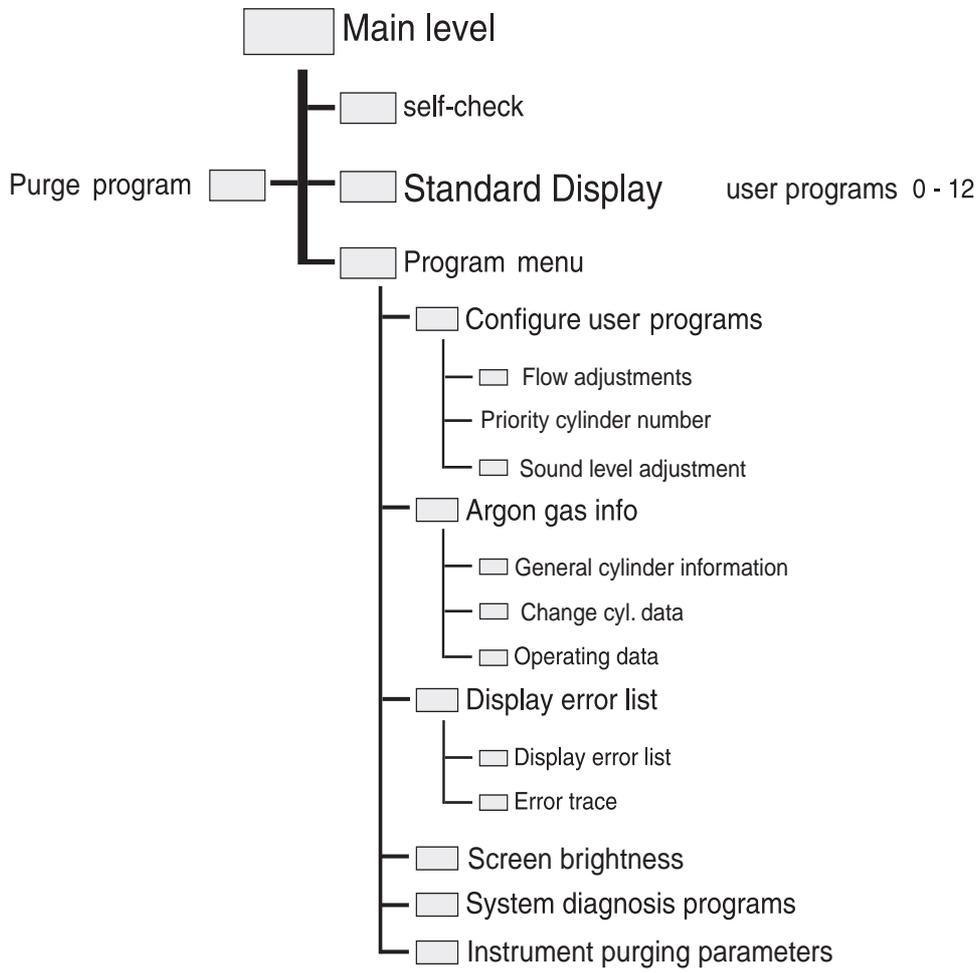
Front panel



Rear panel



Program structure APC 300



CHAPTER 1

How to Use these Operating Instructions. Intended Purpose of the APC 300

Do I have to read all of the Operating Instructions?

These operating instructions are very extensive. There are several reasons for this: the APC 300 can be used in many medical fields. The equipment can be combined with a number of electrosurgical devices and instruments. Lastly, the user can adapt the software of the equipment to his own requirements, although it is not always necessary to do this. So in order to work safely and effectively with the APC 300, it is not necessary to read every chapter of the operating instructions. Please proceed as follows:

Preparation

- Please first read the *Notes on safety* and *the Notes on safety in the medical specialties*: CHAPTER 2 and 3 →.
- If it has not already been done, carry out the electrical *Installation*: CHAPTER 4 →.
- Connect the argon gas cylinders: CHAPTER 5 →.
- Make yourself familiar with the operating elements: Foldout 1, CHAPTER 6 →.

Quick start

- If you wish to begin working with the APC 300 as soon as possible and not preoccupy yourself with the equipment's additional functions: First read *Quick start*: CHAPTER 7 →.
- Then select a suitable *Connection and actuation configuration*. Implement it step by step: CHAPTER 8 →.

Additional functions

- If you wish to adapt the equipment to your particular needs, perhaps to program and store your own COAG flow or CUT flow parameters for one of the application programs: Read the section entitled *Additional functions of the APC 300*: CHAPTER 7 →. Foldout 2 can help you.

Intended purpose of the APC 300

The APC 300 is an argon plasma coagulator. It is designed for argon plasma coagulation and argon-enhanced cutting in combination with ERBE HF surgical units, ERBE APC applicators, and APC probes. The APC 300 can be used in many medical disciplines. These include open surgery, flexible endoscopy, and bronchoscopy. The range of applications is constantly increasing.

CHAPTER 2

Notes on Safety

This chapter contains general notes on safety. For safety notes relating to special applications or special fields of application, please refer to CHAPTER 3 →.

Safety instructions marked with an exclamation mark (!) should always be read before using the APC 300.

WARNING! The safety instruction WARNING denotes a danger which can cause damage to persons.

CAUTION! The safety instruction CAUTION denotes a danger which can cause damage to property.

ATTENTION The safety instruction ATTENTION denotes a danger which can cause failure of the device.

Argon Plasma Coagulation, a safe and learnable technique

Safety of the method Argon Plasma Coagulation (APC) is a high frequency surgical method. When used according to instructions and safety notes, APC does not represent a danger either to users, patients or to the environment.

Safety role of medical personnel Working with high high frequency voltages and compressed argon always holds certain risks for medical personnel and patient. Design precautions alone do not suffice to completely rule out risks. The safety of the APC does not depend only on the equipment. Safety is dependent to a large extent on factors which are in the hands of the user. These factors are discussed in the safety notes and warnings of this chapter.

Safety of the equipment APC 300 and ERBE electrosurgical equipment meet all relevant generally recognized rules of technology as well as the applicable work safety and accident-avoidance regulations. The combination of the APC 300 and one of the electrosurgical units listed below together with an ERBE APC applicator is a well-thought-out system of interrelated elements. This is especially true of the level of electrical safety, the pneumatics, argon dosage, error monitoring, error messages, and protection against operating errors and confusion. These operating instructions represent an important component in the safety concept.

Only instruments and accessories authorized by ERBE Elektromedizin should be used. Otherwise ERBE Elektromedizin cannot be held in any way responsible.

The following electrosurgical units are suitable for use in conjunction with the APC 300:

ERBOTOM ACC 450
ERBOTOM ICC 200 ARGON COAG
ERBOTOM ICC 300
ERBOTOM ICC 350

Instructions, training of medical personnel

Who should read these operating instructions?

All those involved in preparing, setting, working with, stripping down, cleaning or disinfecting the equipment and instruments should read the operating instructions of the APC 300 and the notes on the use of the instruments. Please pay particular attention to the notes on safety and the warnings contained in each chapter.

Reading the operating instructions of the electrosurgical equipment

Operation of the electrosurgical equipment is not the subject of these operating instructions. Aside from the following notes on safety, all safety regulations concerning monopolar HF surgery apply to argon plasma coagulation. This is particularly the case for the correct handling of the neutral electrode. It is imperative that you refer to the notes on safety contained in the operating instructions of the electrosurgical equipment.

Training

The APC 300 may only be used by persons who have been given training in the correct use of the APC 300 or the combination of appliances (APC 300 - electrosurgical equipment, instrumentation) which has taken these operating instructions into consideration.

Training may only be conducted by persons whose knowledge and practical experience qualify them to do so.

ERBE Elektromedizin GmbH cannot be held responsible for damage caused by improper usage.

If anything is unclear or questions arise, please contact an ERBE employee or the ERBE office nearest to your location. We will be glad to help you and appreciate comments on these operating instructions.

Safety precautions against the threat of electric shocks

The APC 300 complies with the requirements of type CF (cardiac floating) according to EN 60-601-1 and it has a patient leakage current of less than 10 μ A. The APC 300 is protected against defibrillator voltages.

Mains lead, mains socket

WARNING! Only connect the APC 300 using the mains lead supplied by ERBE, or one of at least the same quality, to a faultlessly installed grounded socket. If you use an equipment trolley, this applies to the mains lead of the trolley. The mains lead must bear the national mark of conformity.

For safety reasons multiple sockets and extension leads should not be used. If their use is unavoidable, they, too, must be provided with faultless protective grounding.

Mains fuses	WARNING! The unit is protected by mains fuses. If one of these fuses blows, the unit must not be used on patients until it has been checked by an experienced technician. Only replacement fuses of the rating specified on the unit's name plate may be used.
Potential equalization	Connect the potential equalization pins of the electrosurgical unit and the APC 300 to the equipment trolley via potential equalization conductors. Connect the potential equalization of the equipment trolley to the potential equalization of the operating theatre.
Visual check of the electrical insulation	WARNING! A high frequency voltage of several thousand V is needed to ionize argon. Check that there is no visible damage to the electrical insulation of the applicators and all leads prior to every use.

Environment

Ambient temperature, humidity	ATTENTION: The APC 300 can be operated at a room temperature of between 10 and 40° C. The effective humidity can be between 30 and 75 %, non-condensing. If these tolerances are exceeded either way, the unit may break down. ATTENTION: If the APC 300 has been stored or transported at temperatures below +10° C, or especially below 0°, the equipment will require about 3 hours to acclimatize to room temperature.
Ventilation	ATTENTION: The APC 300 must be set up in a way that permits air to freely circulate around the case. The unit must not be set up in narrow niches or shelves.
Protection against moisture	CAUTION! The APC 300 is protected against penetration by liquids according to EN 60-601-2-2 . The case is not absolutely watertight. For this reason, do not set up the unit in the direct vicinity of tubes or vessels containing liquids. Do not place any liquids on the APC 300.
Portable and mobile communication equipment HF	Portable and mobile communication equipment HF can influence the device.

Caution when handling argon cylinders

No force of any kind	Argon is a non-flammable, non-toxic, physiologically inactive, odorless and colorless noble gas. WARNING! No force of any kind should be exerted on cylinders, cylinder connections or pressure reducers. Protect the argon cylinder by means of chains, straps, or safety belts from tipping over or falling during transport, storage and use.
Pressure reducer	WARNING! Argon cylinders may only be transported with valve protection (cylinder cap) in vertical position and secured in place.
Confusion	WARNING! Argon cylinders may only be connected to the APC 300 with the pressure reducers and hoses provided by ERBE.

WARNING! The APC 300 may only be operated with argon. A cylinder containing a dangerous gas could be connected to the cylinder connection of the unit. Check each cylinder to ensure that it really does contain argon: identification must not be damaged or missing.

**Danger of suffocation:
uncontrolled argon flow**

WARNING! Argon build-up in the air being breathed can cause suffocation. Symptoms are drowsiness, rising blood pressure and breathing difficulties. In an atmosphere of pure argon, sudden loss of consciousness and suffocation occur without prior warning.

When the APC is used in the manner intended the concentration of argon in a room reaches about 1% in a room measuring 6m x 6m x 3m in 100 min. this argon/air mixture is completely harmless.

A short hissing noise will be heard when the gas valves are opened due to the argon flowing in the hoses. If this hissing continues for longer than 2 sec. when a cylinder is opened, there is a leak and the argon cylinder must be closed again immediately. The unit may not be used until the leak has been rectified.

Make sure that the hoses are faultlessly (tightly) connected to the APC 300 and the gas cylinder. This also applies to the connection of the pressure reducer to the argon cylinder.

Precautionary measures

Close the safety valves of the argon cylinders after use.

Operating errors, confusion, disregarding error messages

Operating errors

WARNING! The APC 300 possesses an instrument identification facility which assigns to each instrument appropriate CUT flow and COAG flow values (l/min) for the application. The set values can naturally be altered within limits. If an insufficient flow rate is selected, the applicator can sustain damage. Read CHAPTER 7: *Description of the graphical interface of the APC 300* →.

**Confusing actuation switches
and actuation signals**

WARNING! A large number of different instruments can be connected to the APC 300 or to the electrosurgical unit, e.g. for cutting, bipolar cutting, coagulation, bipolar coagulation and for argon plasma coagulation. Depending on the actuation concept and setting, these can be activated via foot and/or finger switches. Do not confuse the actuation switches and actuation signals. Read CHAPTER 8: *Actuation concepts* →. Please comply at all costs with the settings and connections described. If in doubt, check which instrument is actuated by which key and which pedal! Never place instruments on the patient or in the immediate vicinity of the patient.

**Disregarding or falsely
interpreting error messages**

WARNING! The APC 300 is equipped with an error recognition and error reporting system. Take note of visual and audible error indications. Do not set the volume of the actuation signals for COAG, CUT and PURGE too low.

Do not use laser safety goggles

It is possible that the APC 300 display may no longer be visible with laser safety goggles.

Dangers associated with argon plasma coagulation

Argon Plasma Coagulation is a monopolar high frequency surgical method i.e., high frequency current flows through the patient's body to the neutral electrode, as is generally the case in monopolar electrosurgery.

Burns, damage to tissue

WARNING! All safety regulations concerning monopolar high frequency surgery are applicable. One must therefore particularly ensure in endoscopic applications that adjacent tissue structures are not inadvertently damaged thermally by uncontrolled high frequency currents.

The active electrode must not directly contact the tissue, as this could trigger the cutting effect and lead to uncontrolled coagulation of the contacted tissue.

Danger of explosion of endogenic gases, particularly in the colon

WARNING! When performing electrosurgery on the gastrointestinal tract, no flammable or potentially explosive endogenic gases must be present. Particular care is required during the resection or coagulation of tumors obstructing the colon using an HF loop or argon plasma coagulation. Flammable gases must be suspected behind every stenosis in the colon. Be certain to flush out at-risk sections of the intestine with CO₂ or argon before activating the electrosurgical unit or argon plasma coagulator.

Danger of fires in the tracheobronchial system

WARNING! Argon gas is non-combustible. It does not cause fire in burnable materials or help them to burn. The high temperature of **argon plasma**, on the other hand, can cause easily burning materials to ignite if oxygen or other burnable gases are nearby or are mixed with argon when applied to these materials (for example plastic insulation at the distal end of the bronchoscope or a tracheal tube). This is especially true of highly concentrated or pure oxygen. For this reason, please always observe the following rules:

1. Never permit oxygen or other combustible gases or fluids to enter the tracheobronchial system before or above all during APC in the tracheobronchial system.
2. When using APC in the tracheobronchial system for more than a few seconds, alternate oxygen ventilation of the patient with APC, that is, use them in turns.
3. Always keep the distal end of the APC applicator in view in the endoscope before and during activation of the argon plasma. Never activate argon plasma if you cannot see the distal end.

Please read the special notes on this topic in *CHAPTER 3: APC in flexible endoscopy, APC in bronchoscopy* →.

Gas embolisms, gas emphysema

WARNING! The use of Argon Plasma Coagulation units during laparoscopy has been associated with gas embolisms in a small number of cases. The use of argon should be limited to those situations where the advantages outweigh the risks.

To avoid gas embolisms, the argon flow rate should not be set so high that argon is blown into open vessels.

To avoid gas embolisms and emphysema, do not direct the distal end of APC applicators toward open vessels or press against tissue.

Pressure rise in body cavities **WARNING!** When applying APC in body cavities, it is imperative to ensure that the endoluminal gas pressure does not rise excessively.

Maintenance

The APC 300 should be safety-checked at least once a year. Alterations and repairs may only be performed by ERBE or by persons expressly authorized by ERBE.

Portable and mobile communication equipment HF

ATTENTION: Portable and mobile communication equipment HF can influence the device.

CHAPTER 3

Notes on Safety in the Medical Specialties

Argon Plasma Coagulation in Flexible Endoscopy

Electric insulation of the endoscope

WARNING! For Argon Plasma Coagulation (APC) use only endoscopes whose electric insulation is absolutely reliable both exteriorly and in the instrument channel. Defective or inadequate insulation can cause patient burns.

Training

The APC 300 may only be used by persons who have been given training in the correct use of the equipment or the combination of appliances (APC 300-electrosurgical equipment) which has taken these operating instructions into consideration.

1. Installation, connection and actuation configuration

Please read the operating instructions for the electrosurgical equipment and CHAPTERS 4 and 8 of this handbook →.

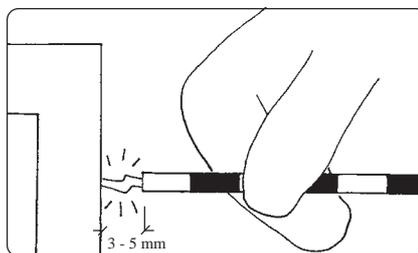
2. Preoperative Test of APC probe function

Check the function of the APC probe as follows before inserting it into the working channel of an endoscope:

1. Hold the tip of the APC probe approx. 3-5 mm from a non-insulated, bare metal object. This must not have any electrically conductive contact with the patient, other people or electrical appliances.
2. Activate the APC unit.
3. Note whether argon plasma develops between the probe tip and the metal object.

WARNING! Do not touch the tip with bare fingers when it is activated!

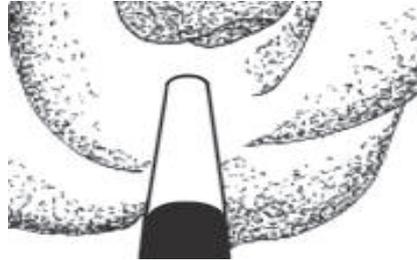
Figure 1: Test of APC Probe Function



3. Insert APC probe into the endoscope

Insert the APC probe into the working channel of the endoscope until the distal end emerges at least 10 mm from the distal end of the endoscope. This is indicated when the first black ring on the distal end of the probe is seen to emerge from the endoscope.

Figure 2: The distal end of the endoscope with the first black ring



4. Select power limitation

Power should be set as low as possible:

	Power limit [W]	Single shot duration [sec]
Normal setting for work in the esophagus, duodenum, small intestine and rectum	60	1 - 3
Stomach	60 - 80	1 - 3
Stent ingrowth Stent overgrowth	60	3 - 5
Conditioning of fistulas	40 - 60	0.3 - 1
Tracheobronchial system		
• thin probe 1.5 mm	40	1 - 5
• normal probe 2.3 mm	50 - 60	1 - 5
Large tumors diameter > 15 mm	99	3 - 10
Medium-sized tumors diameter = 5 - 15 mm	80	3 - 5
Small tumors	60	1 - 5
Right colon	40	0.5 - 1
Remaining colon	40 - 50	1 - 3

The recommended dosages as noted above apply for ERBE electro-surgical units ICC 200, 300, 350. Of course the physician takes the final responsibility in each case.

5. Application of the APC probe

- **WARNING!** When performing electrosurgery on the gastrointestinal tract, no flammable or potentially explosive endogenous gases must be present. Particular care is required during the resection or coagulation of tumors obstructing the colon using an HF loop or argon plasma coagulation. Flammable gases must be suspected behind every stenosis in the colon. Be certain to flush out at-risk sections of the intestine with CO₂ or argon before activating the electro-surgical unit or argon plasma coagulator.
- The distal end of the APC probe should be not less than 3 mm and no more than 5 mm from tissue to ensure safe ignition and application of the argon plasma.

- **Never** activate the APC probe while it is in contact with tissue.
- **Never** press the distal tip of the APC probe against an organ wall before or during activation.

6. Prevention of excessive argon insufflation within the GIT or TBS

During APC, distention of the organ being treated can cause discomfort to the patient. To avoid this:

- Set the argon flow rate as low as possible.
- Apply repeated suction if using a single-channel endoscope.
- Apply continuous or interrupted suction through the second channel if using a double-channel therapeutic endoscope.
- Insert a deflation tube (3 - 5 mm \varnothing) parallel to the endoscope, e.g. when using APC in the rectum.
- Always monitor the patient's abdominal wall tension.

7. Intraoperative cleaning of the APC probe's distal tip

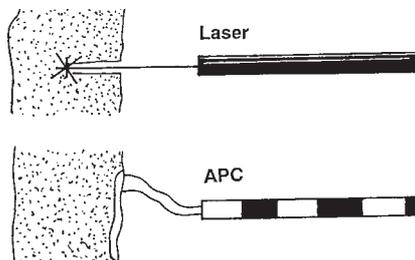
Coarse crusts of debris or tissue on the tip of the APC probe may inhibit argon flow through the probe. In such a case, remove the APC probe and clean its tip with a wet swab. Before reinserting the APC probe into the endoscope, recheck its function as described under No. 2 above.

8. Postoperative cleaning, disinfection and sterilization of reusable APC probe

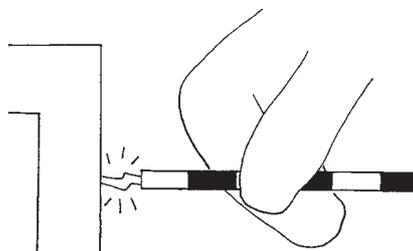
Thoroughly rinse the APC probe from proximal to distal as soon as possible after use with a suitable rinsing or disinfection solution. Also clean its exterior. The APC probes can be resterilized in autoclaves to 134 °C. (Where applicable)

The 10 Commandments of APC in Flexible Endoscopy

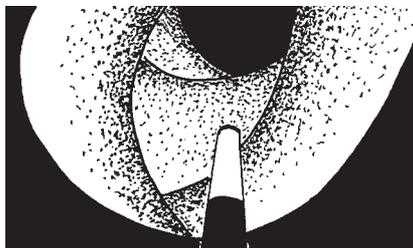
1. You shall not confuse Argon Plasma Coagulation with Argon Laser. The two are completely different.



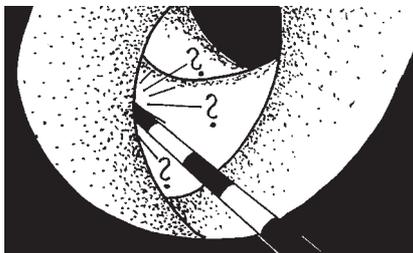
2. You shall always test Argon Plasma ignition and the electric arc outside the endoscope before inserting the APC probe into the working channel.



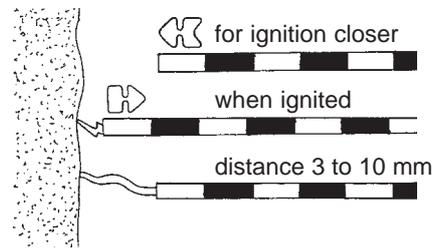
3. You shall insert the APC probe at least far enough into the endoscope's working channel that the first distal black ring becomes visible.



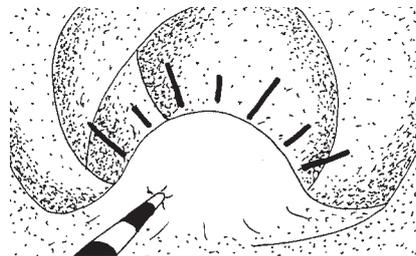
4. You shall always carry out Argon Plasma Coagulation (as long as you are not expert in its use) under visual control.



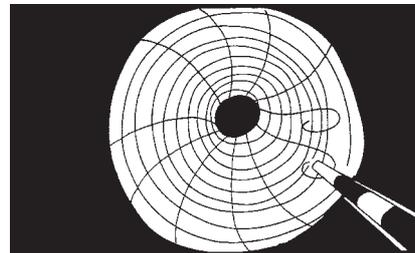
5. You shall take care that the APC probe does not touch the organ wall during activation; however, your application shall be near enough to ensure Argon Plasma ignition.



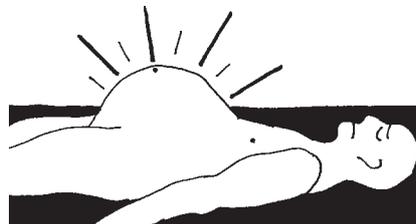
6. You shall never press the activated probe into tissue or against the organ wall, since this can lead emphysema / wall damage.



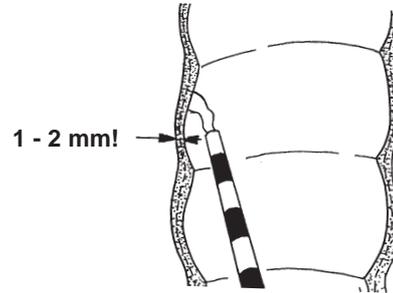
7. You shall not touch metal stents directly with the APC probe; here too, you shall, maintain an adequate distance.



8. You shall avoid distentions caused by inflowing argon and shall therefore check and vacuum repeatedly and lay a decompression catheter if necessary.



9. You shall set the power limit of the electro-surgical unit and the activation duration adequately according to wall thickness in the affected organ (e.g. an upper limit of max. 40 W in the right colon, but higher power for a large tumor, see Recommended Dosages).



10. You shall prefer many short-duration activations to few long-duration activations (as long as you are not an expert).

APC in bronchoscopy

Emphysemas WARNING! Argon plasma coagulation in a non contact procedure. Do not hold the distal end of the activated applicator against or insert it into tissue. Emphysemas can result.

Intraluminal gaspressure WARNING! When using argon plasma coagulation, argon flows into the lumen of the organ. The intraluminal gas pressure increases if the argon cannot simultaneously escape from the lumen or is not extracted. Monitor the intraluminal gas pressure regularly.

Danger of burns The high temperature of argon plasma can cause flammable materials to ignite if oxygen or other flammable gases are nearby or are mixed with argon when applied to these materials (for example plastic insulation at the distal end of the bronchoscope or a tracheal tube). This is especially true of highly concentrated or pure oxygen. for this reason, please observe the following rules:

-
- WARNING!**
- Never permit oxygen, other combustibel gases or fluids to enter the tracheobronchial system before or above all during APC.
 - When using APC for more than a few seconds, alternate oxygen ventilation of the patient with APC, that is, use them in turns.
 - Always keep the distal end of the APC applicator in view in the endoscope before and during activation of the argon plasma. Never activate APC if you cannot see the distal end.
-

Video interference ATTENTION: Due to the relatively high-frequency voltages required for APC, interference can occur in video systems. Digital video systems are normally less sensitive to this interference than analog systems.

Cardiac pacemakers WARNING! APC is a monopolar high-frequency surgical procedure in which high-frequency electrical current flows through the body of the patient to the neutral electrode (grounding pad). In case of doubt, when operating on a patient with cardiac pacemaker, consult the patient's cardiologist concerning the risk involved using APC. This applies in particular to APC application in the thoracic region.

CHAPTER 4

Installation

First-time operation

The APC 300 has been checked for proper and safe operation prior to shipment. In order to guarantee that the unit functions safely after transport and installation by the operator, it may only be put in operation after:

1. It has been subjected to a functional check in conjunction with the HF-surgical unit at the location of operation, and
2. those responsible for operating this combination of equipment have been instructed by the manufacturer or supplier on the proper use of this combination of equipment with reference to the operating instructions.

Mains fuses

The unit is protected by mains fuses. If one of these fuses blows, the unit must not be used on patients until it has been checked by an experienced technician. Only use replacement fuses of the rating specified on the unit's name plate.

Installation on the equipment trolley

APC 300 The APC 300 is normally installed on an ERBE-equipment trolley. It also carries the argon gas cylinder(s) and the high-frequency surgical unit required for operation. For installing on a Cart, see ERBE's Cart User Manual.

electrosurgical units The electrosurgical units ERBOTOM ACC 450 and ICC 350 are equipped with a high-frequency leakage current monitor which samples for high-frequency leakage current in the grounding and potential equalization conductors in these units. For this reason the units must be installed on the APC 300 in such a way that their cases are not in electrical conducting contact with the APC 300 casing: i.e. the aforementioned electrosurgical units must be electrically insulated and installed on the surface provided on the APC 300.

Location of equipment trolley in the operating theatre If the electrosurgical unit and the APC 300 are installed together on an equipment trolley, this must be kept outside the zone of the operating theatre subject to danger of explosion. Read the operating instructions of the electrosurgical units under *Explosion protection* →.

Electrical Installation on the equipment trolley

Mains lead Only connect the APC 300 using the mains lead supplied by ERBE, or one of at least the same quality, to the equipment trolley's mains connection. The mains lead must bear the national mark of conformity. The mains lead is connected to a faultlessly installed ground-referenced socket.

Apart from the APC 300 and the electrosurgical unit, no other appliances must be connected to the mains sockets of the equipment trolley.

For safety reasons multiple sockets and extension leads should not be used. If their use is unavoidable, they, too, must be provided with faultless protective earthing.

Potential equalization To avoid high frequency disturbance and to protect the patient connect the potential equalization pins of the electrosurgical unit and the APC 300 to the equipment trolley via potential equalization conductors. Connect the potential equalization of the equipment trolley to the potential equalization of the operating theatre.

Environmental conditions

Temperature, humidity The APC 300 can be operated at a room temperature of between 10 and 40° C. The effective humidity can be between 30 and 75 %, non-condensing. If these tolerances are exceeded in either ways, the unit may break down.

Ventilation The APC 300 must be set up in a way that permits air to freely circulate around the case. The unit must not be set up in narrow niches or shelves.

Protection from moisture The APC 300 is protected against penetration by liquids according to EN 60-601-2-2 . The case is not absolutely watertight. For this reason, do not set up the unit in the direct vicinity of tubes or vessels containing liquids. Do not place any liquids on the APC 300.

CHAPTER 5

Changing Cylinders**WARNING!****Dangers associated with handling argon gas cylinders**

- Valve protection** Argon cylinders may only be transported with a valve protection (cylinder cap).
- Warming** Protect the argon cylinders from being warmed by heaters or open fires.
- Pressure reducer** Argon cylinders may only be connected to the APC 300 with the pressure reducer and hoses provided by ERBE.
- Do not use force** No force of any kind should be exerted on cylinders, cylinder connections or the pressure reducer. Protect the argon cylinder during transport, storage and use from tipping over or falling down by means of chains, straps or safety belts. Always use the safety belt on the mobile equipment trolley.
- Input pressure** The input pressure at cylinder connections 1 and 2 of the APC 300 may not exceed 4.5 bar (65.25 psi). If the unit is connected to a central argon supply, the input pressure may not exceed 2.5 bar (36.25 psi).
- Cylinders** Damaged cylinders may not be used. Mark them. Inform your gas supplier immediately. Only use argon cylinders conforming to your national safety standards.
- Only use argon** The APC 300 may only be operated with argon. A cylinder containing a dangerous gas could be connected to the cylinder connection of the unit. Check each cylinder to ensure that it really does contain argon. Identification of the cylinder must not be damaged or missing.
- Uncontrolled flows of argon** Argon is heavier than air. If it builds up in the air being breathed, it can displace the oxygen so that there is a danger of suffocation. Symptoms of oxygen deprivation are drowsiness, rising blood pressure and breathing difficulties. In an atmosphere of pure argon, sudden and unexpected loss of consciousness and suffocation occur.
- A short hissing noise will be heard when the gas valves are opened due to the argon flowing in the hoses. If this hissing continues for longer than 2 sec. when a cylinder is opened, there is a leak and the argon cylinder must be closed again immediately. The unit may not be used until the leak has been rectified. Make sure that the hoses are faultlessly (tightly) connected to the APC 300 and the gas cylinder. Close the safety valve of the argon cylinders after use.

Central gas supply

The maximum permissible input pressure is 2.5 bar (36.25 psi). The APC 300 must be modified by a technician if a central argon supply is used.

Connecting argon cylinders

The input pressure at cylinder connections 1 and 2 of the APC 300 may not exceed 4.5 bar (65.25 psi).



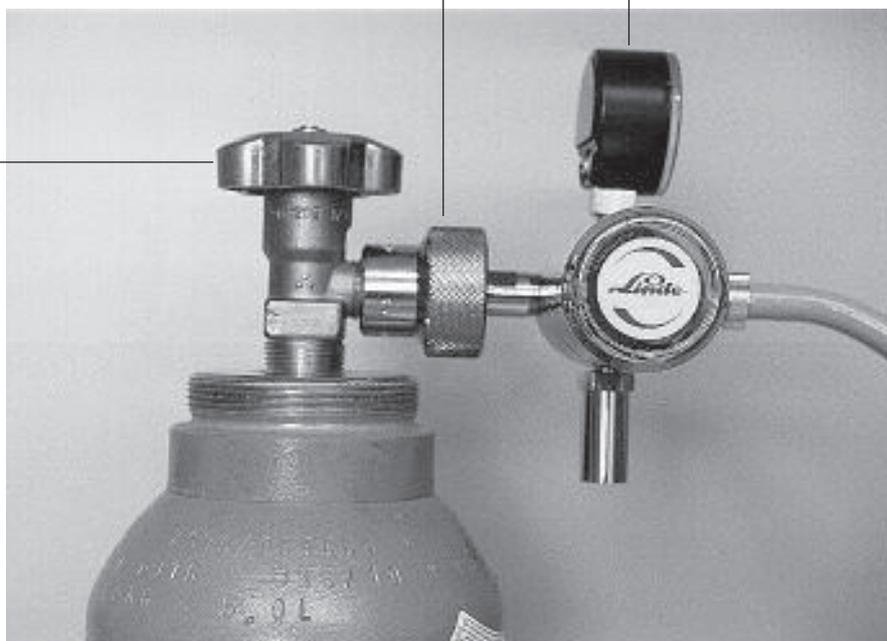
ERBE advises working with two argon cylinders with a volume of 5 liters and a pressure of 200 bar (2900 psi). The APC 300 has been programmed by ERBE to operate with this type of cylinder. If you wish to use other types of cylinders, you must reprogram the cylinder data in the menu *Argon gas information* under menu point *Changing cylinder data*.

Connecting pressure reducer
to cylinder

Cylinder valve

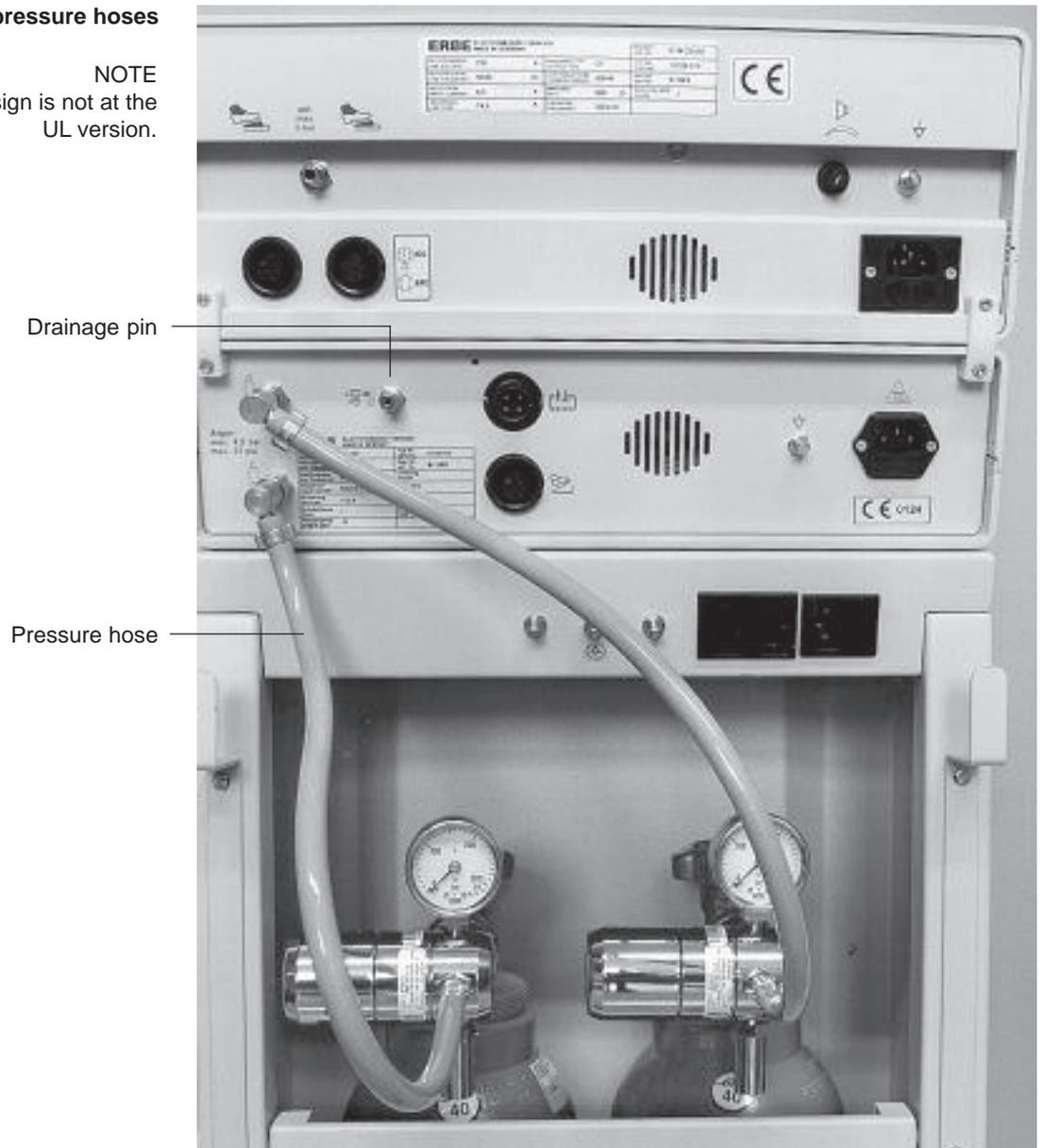
Screw-cap

Manometer



Connecting pressure hoses

NOTE
The CE 0124 sign is not at the UL version.



To change cylinders, the APC 300 must be switched on.

Unmounting cylinder

1. Shut the cylinder valve. The cylinder valve may be a little stiff.
2. Remove the pressure hose of the argon cylinder at the rear of the APC 300.
3. Place the hose opening on the drainage pin at the rear of the APC 300 and press. The hose contains a residue of argon which escapes with a loud hissing noise.
4. The union nut of the pressure reducer should only be unscrewed to the left and removed by hand.

Mounting cylinder

1. The pressure reducer should only be screwed onto the new cylinder to the right by hand.
2. Open the cylinder valve.
3. Put the pressure hose onto the cylinder connection of the APC 300.

The system will now automatically be rinsed with argon by the APC 300. If the pressure hose and pressure reducer are fitted tightly, no further hissing noises should be audible!

Changing cylinder data

1. Call up the menu point *Changing cylinder data*.
2. Using the enter button, move the cursor onto the data to be changed. Modify the data using the up / down buttons.
3. Press the enter button repeatedly to leave the menu.

Changing cylinder parameters		
Cylinder data	P [bar]	V [L]
Cylinder 1	200	5,0
Cylinder 2	200	5,0
		↵ Continue

First mark and program the pressure.
Then mark and program the volume.

200 bar = 2900 psi

CHAPTER 6

Description of the Front and Back Panels

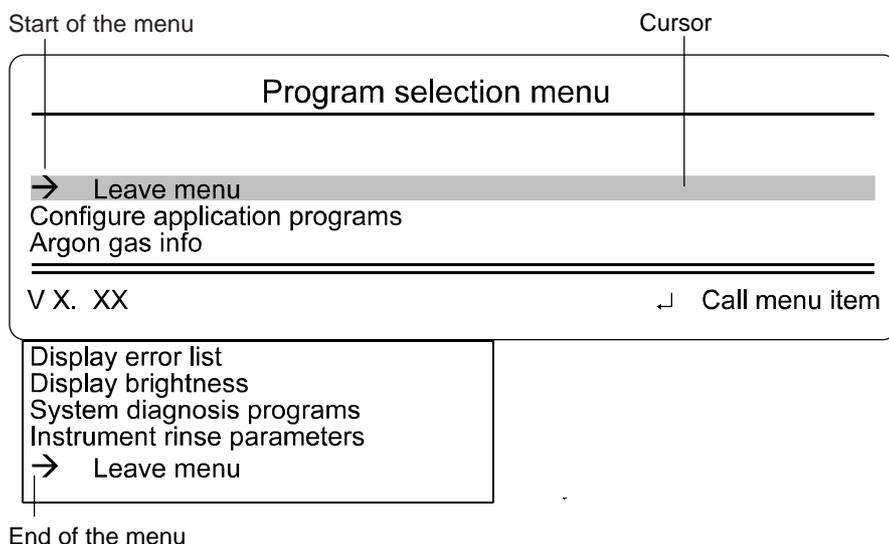
Diagrams on folding leaf 1 clockwise

Operating elements on the front panel

Display On the display, the graphical interface (shell) of the APC 300 is shown. The shell is the interface between the operator and the unit's software. Using the shell, the instrument's COAG flow and CUT flow, as well as all the functions of the APC 300, can be controlled and the unit modified to suit your requirements. See CHAPTER 7 *Description of the graphical interface of the APC 300* →.

UP / DOWN buttons The UP / DOWN keys are used to set the flow parameters. For instance, up: increases COAG flow, down: decreases COAG flow.

In addition, the UP / DOWN keys are used for marking menu items in selection menus. All the APC 300's menus have the same structure. There is a cursor in the second line. If you press the up or down keys, the cursor runs up and down the menu items.



PROGRAM button The APC 300 possesses 13 application programs. Using these, you can, among other things, program and store COAG flow and CUT flow settings for a particular instrument.

Using the program key, the selected application program is started.

ENTER button The enter key is used to alternate between the standard display and the program selection menu and for calling the menu item marked. Its current function is always shown on the bottom, at the right of the display.

PURGE button Using the purge key, the purge program is called. Before an instrument is actuated for the first time it must be purged with argon.

Instrument sockets **Argon socket**
Argon output. Insert the instrument's argon gas connection into this socket.

Multiple socket
Input of finger switch signals, instrument recognition, output of high-frequency current. Insert the instrument's multiple plug into this socket.

Meaning of the symbol



The unit has been built in compliance with Type CF (cardiac floating) and it has a patient leakage current of less than 10 μA . The APC 300 is protected against defibrillator voltages.

High-frequency inputs The high-frequency current of the electrosurgical unit is conducted to the APC 300 via this socket. Insert the high-frequency lead into the socket. Connect it to the CUT / COAG socket of an ERBE electrosurgical unit. The ICC 300 and 350 possess two CUT / COAG sockets. Please refer to the CHAPTER 8 entitled *Actuation concepts* → to discover which socket is used for which concept.

Mains switch Before the unit is switched on, the APC 300 should be installed and configured as described in CHAPTERS 4 and 8 →.

Switch on the APC 300 about 5 minutes before starting an application. The unit requires this amount of time to reach its thermal equilibrium and to conduct self checks and functional tests.

Self checks

After being switched on, the unit conducts a self check in which the pressure sensors are tested. If an error is identified, the message *Selfcheck Error* appears on the standard display. The unit of flow [*L/min*] is not shown. Despite this error, the COAG flow and CUT flow can still be set and the unit utilized.

WARNING!

If a self check error occurs, the APC 300 should only be used in an emergency when no reserve unit is available as an argon overdose could occur. This is, however, less of a threat than the non-availability of the APC 300 in an emergency.

Functional test

The unit conducts a functional test in which the keys on the front panel, the foot and the finger switches are checked. In addition, the APC 300 identifies whether a supply of argon gas is available. The supply level in the gas cylinders may also be identified. Errors are displayed in plain language and signalled by an audible signal.

Meaning of the symbol



Only use the APC 300 if you are familiar with its operation and properties.

Operating elements on the rear panel

Argon cylinder connections Only argon gas cylinders or a central argon supply may be connected to these cylinder connections.

Cylinders with a capacity of 5 liters or other volumes can be connected. The pressure reducer supplied by ERBE must be installed on the argon cylinders. The cylinders may only be connected using the pressure hoses supplied by ERBE. The input pressure for the gas cylinders is maximally 4.5 bar (65.25 psi).

If the APC 300 is connected to a central argon supply, the maximum input pressure is 2.5 bar (36.25 psi).

WARNING!

The APC 300 may only be operated with argon. A cylinder containing a dangerous gas could be connected to the cylinder connection of the unit. Check each cylinder to ensure that it really does contain argon. Identification must not be damaged or missing.

Argon cylinders may only be connected to the APC 300 with the pressure reducer and hoses provided by ERBE.

Please read CHAPTER 5 *Changing cylinders* →. Please read sections *Danger of pressure explosions* and *Dangers associated with handling of argon* in CHAPTER 2 *Notes on safety* →.

Drainage pin

There is a residual amount of argon in the pressure hoses of empty argon cylinders. In order to empty the hose when changing the cylinder, the hose should be pressed onto the drainage pin.

Output for actuation signals

The actuation signals (foot or finger switch of the instrument) are conducted to the electrosurgical unit via this socket. Insert the connection lead 20189-022 or 20132-063 into this socket and connect it to one of the foot switch sockets at the rear of the electrosurgical unit. Please refer to CHAPTER 8 *Actuation configurations* → to discover which socket and which lead is used for which configuration.

Mains connection

WARNING!

Only connect the APC 300 using the mains lead supplied by ERBE, or one of equal quality, to a faultlessly installed ground contact socket. The mains lead must bear the national mark of conformity. If you use the equipment trolley provided by ERBE, the mains lead of the APC 300 is connected to the socket of the trolley.

For safety reasons multiple sockets and extension leads should not be used. If their use is unavoidable, they, too, must be provided with faultless protective grounding.

Please read the section *Electrical installation on the equipment trolley* in CHAPTER 4 entitled *Installation* →.

- Potential equalization connections** To avoid high-frequency disturbance and to protect the patient connect the potential equalization pin of the APC 300 to the equipment trolley via potential equalization conductors.
- Loudspeaker** Over the loudspeaker of the APC 300, actuation and warning signals are emitted. Always place the APC 300 / the equipment trolley in a position where the audible signals can be heard clearly.
- Foot switch socket** A single- or two-pedal foot switch can be connected to this socket. Please refer to CHAPTER 8 entitled *Actuation configurations* → to discover which socket is used for which concept.
- Drainage opening** During the self check, argon is expelled through this opening.

CHAPTER 7

Description of the graphical interface of the APC 300

Controlling argon flow, controlling all functions, programming the flow parameters of the instruments

Introduction

Programs The APC 300 is a machine with software support. A graphical interface known as a shell serves as an interface between the user and the software. By means of the shell the standard display can be accessed. With its help, the COAG flow and CUT flow of the instrument can be controlled as well as all functions of the APC 300. In addition, the shell provides access to the programs. Using the programs, the APC 300 can be adapted to your requirements and to the environment. For instance, the program *Display brightness* can be used to adapt the brightness of the display to lighting conditions in the room.

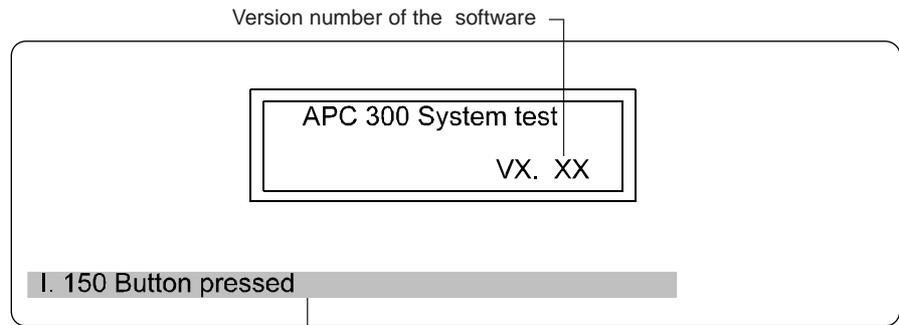
Program structure The program structure of the APC 300 is nested. However, it only consists of 3 levels. Folding leaf 2 shows the nesting and helps to orient the user. Under the heading *Finding your way around in the program structure*, this chapter provides examples to clearly illustrate how to reach any particular menu in the program structure.

Operating in an intuitive manner The shell allows the unit to be operated in an intuitive manner. However, please bear in mind that the APC 300 operates in a range of several thousand volts. It is not a word processor with which you can experiment all you want. In order to work safely and effectively, you should be familiar with all symbols, the function of the keys, the program structure and also the meaning of the error messages before beginning operation.

System test

Before the unit is switched on, the APC 300 should be installed as described in CHAPTER 4 →.

Switch on the APC 300 about 5 minutes before starting an application. The unit requires this time to reach its thermal equilibrium and to conduct self checks and functional tests.



The information line of the system test display shows any errors encountered during the test.

Self check After being switched on, the unit conducts a self check in which the pressure sensors are tested. If an error is identified, the message *Selfcheck error* appears on the standard display. The unit of flow [l/min] is not shown. Despite the error the COAG flow and CUT flow can still be set and the unit utilized.

WARNING! If a self check error occurs the APC 300 should only be used in an emergency when no reserve unit is available, as an argon overdose could occur. This is, however, less of a threat than the non-availability of the APC 300 in an emergency.

Functional test The unit conducts a functional test in which the keys on the front panel, the foot and the finger switches are checked. In addition, the APC 300 identifies whether a supply of argon gas is available. The supply level in the gas cylinders is also identified. Errors are displayed in plain language and signalled by an audible alarm.

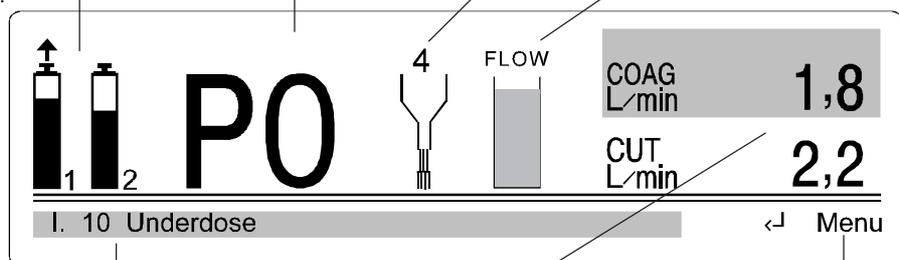
Standard display

Control of argon supply. The fill level shows the approximate contents of the argon cylinders. The arrow points to the active cylinder.

Number of the active program

Instrument number of the identified instrument

Actuation display



Information line: Warnings and error messages

Display of COAG flow / CUT flow

Function of ENTER key in display / menu

After the system test has been completed the standard display of the APC 300 appears.

WARNING!

If you leave the standard display of the APC 300 using the enter key the unit **cannot be activated**. In order to do this, it is necessary first to return to the standard display.

Quick start

You can now begin working with the APC 300. You can examine the additional functions of the unit, but you do not have to.

Connect instruments and begin working

The APC 300 possesses an instrument identification facility. For each instrument a COAG flow and CUT flow are automatically set. These are shown in the display. Before the instrument is actuated for the first time, it must be purged with argon. Purge time and Purge flow are also set automatically.

Purge instrument with argon

Press the purge key and purge the instrument with argon.

Accept or alter CUT flow / COAG flow

Anything displayed on a green background can be altered. The CUT flow / COAG flow can be altered before and during actuation.

If you wish to alter settings before actuation, switch between COAG flow and CUT flow displays by lightly touching the respective foot or finger switch.

The CUT flow / COAG flow are set using the up / down keys. They are set in defined steps:

Between 0.1 and 1 l each step is 0.1 l

Between 1 and 4 l each step is 0.2 l

Between 5 and 9 l each step is 0.5 l

A hidden value for maximum COAG flow / CUT flow exists for each instrument. The maximum parameters cannot be exceeded by the user and, for safety reasons, cannot be altered either.

The APC 300 will not store alterations to CUT flow / COAG flow.

Central argon supply

A full cylinder is displayed. This merely signifies that there is an input pressure of 2.5 bar (36.25 psi) as required. If the input pressure falls under 2.5 bar (36.25 psi), an empty cylinder is displayed. The unit will not assume more control function over the argon supply.

Argon cylinders

If one or two argon cylinders are connected to the APC 300, this is shown in the display by numbers 1 and 2. The active cylinder is indicated by an arrow.

Function of the cylinder symbols

The cylinder symbols are more or less filled in to reflect the approximate contents of the cylinders. If two cylinders are connected and one is empty, the APC 300 automatically switches to the second cylinder. Empty cylinders flash on and off.

Warning of argon deficiency If the following argon-deficiency situations arise the APC 300 emits an audible signal. In addition, a warning in plain language appears in the information line:
Both cylinders are empty.
One cylinder is empty, the other nearly empty.
Both cylinders are nearly empty.

WARNING! **Only use argon**
The APC 300 may only be operated with argon. It cannot differentiate between gases. A cylinder containing a dangerous gas could be connected to the cylinder connection of the unit. Check each cylinder to ensure that it really does contain argon. Identification must not be damaged or missing.

Information line In the information line, warnings and error messages in plain language appear. The letter I for information, and a number, e.g. 262, precede the text. Refer to the error list to see what are the possible causes of the error and what action should be taken.

Actuation display When you actuate the APC 300, a COAG or CUT signal is emitted. The fill level in the cylinder depicts the approximate flow. If the cylinder is completely filled, the APC 300 flow is as specified by the setting. If the cylinder is only partially filled, delivery is too low. This condition is also indicated by an error message.

Additional functions of the APC 300

Automatic setting of COAG flow / CUT flow and purging parameters using the Instrument numbers

The APC 300 automatically sets COAG flow and CUT flow, purge time and purge flow for each instrument. This is achieved by means of an instrument identification facility. Each ERBE instrument has a certain number. In the *Flow setup* of the application programs and in the *Instrument purging parameters*, COAG flow, CUT flow, purge time and purge flow are stored under this number. There are 11 Instrument numbers. Since, however, instruments which use identical COAG flow / CUT flow and purging parameters are given identical numbers, the APC 300 can automatically adapt itself to more than 11 instruments. Alterations to the COAG flow or CUT flow defaults in the application programs and the instrument purging parameters programmed by ERBE can be made and stored.

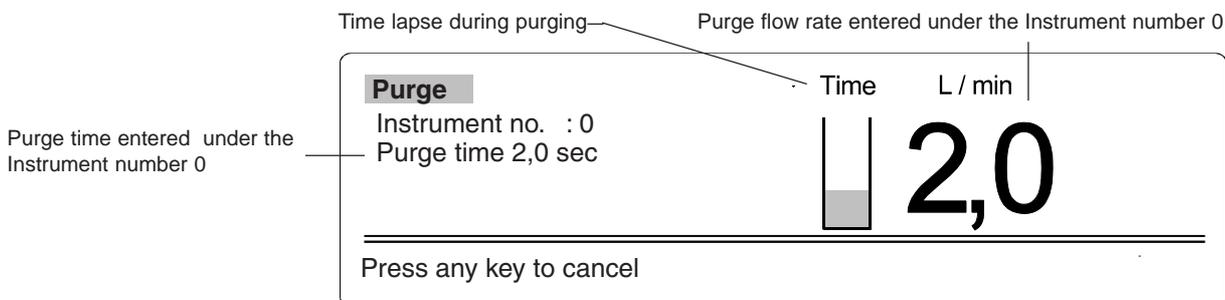
Joker function of Instrument number 0

If the APC 300 cannot identify an instrument, it displays Instrument number 0. There are flow and purging parameters stored at Instrument number 0 as well. Please make quite certain, however, that these parameters are suitable for your application.

Purging parameters

In the program *Instrument purging parameters*, *purge flow* and *purge time* are stored under each Instrument number. When these operating instructions went to press in the autumn of 1995, there were instrument purging parameters set by ERBE for Instrument numbers 0 to 6. At that time there were 6 instruments with varying purging parameters. Alterations to the purging parameters set by ERBE can be made and stored.

If the purge key is pressed, the instrument is purged with argon. The purging process takes place according to the purging parameters stored under the respective Instrument number.



COAG flow / CUT flow and application programs

The APC 300 possesses 13 application programs. Each ERBE instrument has a certain number. In the *Flow setup* of each application program the same COAG flow / CUT flow values are stored under this number. After the APC 300 is switched on, the last program to be active when the unit was last switched off is called up. The instrument which is connected is identified and its Instrument number called, e.g. in application program 0. In that program, for example, a COAG flow of 1.8 l/min and a CUT flow of 3.6 l/min are stored for the instrument with the number 4. This flow is shown in the standard display.

When these operating instructions went to press in the autumn of 1995 there were flow parameters set by ERBE for Instrument numbers 0 to 6. At that time there were 6 instruments with varying flow parameters. The flow parameters belonging to an Instrument number are always set in all 13 application programs at once.

Configure (program) user programs

The APC 300 has 13 user programs: 0-9, bipolar, Endo, miC. If you work with the same settings over and over again in your operations, you can store these in any of the 13 application programs. Before the operation call this program.

You can store the following settings in each program:

- Preferred argon cylinder,
- Volume of the auditory signals,
- The COAG flow / CUT flow for each instrument,
- The display brightness,
- A purge flow and a purge time for each instrument.

The terms bipolar, Endo, miC do not express functions of the APC 300. For instance, there is no bipolar APC. The names and numbers of the programs are simply to assist visual assignment to the programs of the ICC 350.

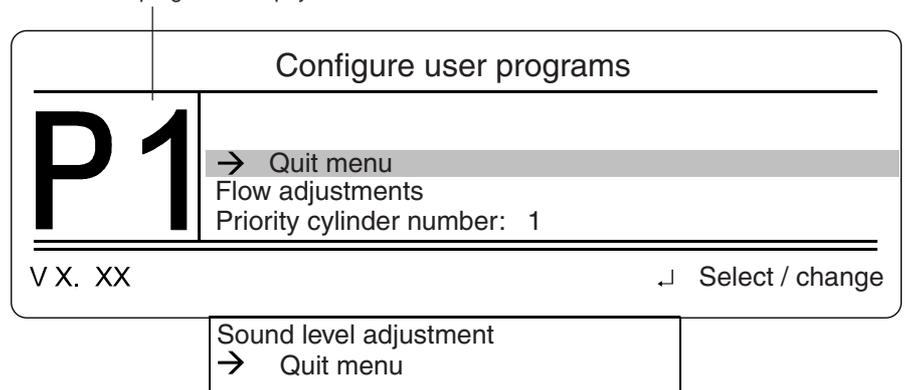
For example:

For a certain operation you have stored a front panel setting in program 5 of the ICC 350. In this operation you also use the APC. In program 5 of the APC 300 you store the desired APC settings. Before the operation you then call program 5 on the ICC 350 and on the APC 300.

Select a program

1. Call the *Program menu*.
2. Call the menu item *Configure user programs*. When you are in the menu *Configure user programs*, press the PROGRAM key and select a program 0 - 13.

The selected program is displayed here.



Change the preferred cylinder number

You can select a preferred cylinder for each program. Thus, operator A can work with programs 1 to 3 and cylinder 1, operator B with programs 4 to 7 and cylinder 2. On delivery of the APC 300, cylinder 1 is the preferred cylinder in all programs.

1. Select the program you require.
2. Mark menu item *Priority cylinder number*. Press the ENTER key.
3. Press keys UP / DOWN and select cylinder number.
4. Press the ENTER key.

Alter the volume of audible signals

To alter the volume of the audible signal for COAG, CUT and PURGE:

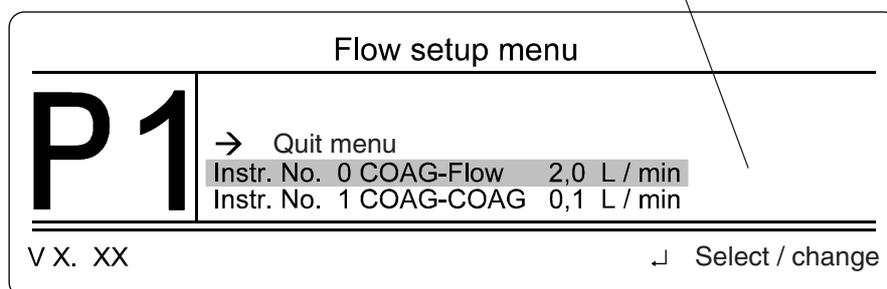
1. Select the program you require.
2. Mark menu item *Sound level adjustment*. Press the ENTER key.
3. Using the program key, select the TONE desired. (COAG, CUT or PURGE).
4. Press UP / DOWN keys and select volume.
5. Store volume control setting using the PUR key.
6. Leave the menu by pressing the ENTER key.

Alter COAG flow / CUT flow settings

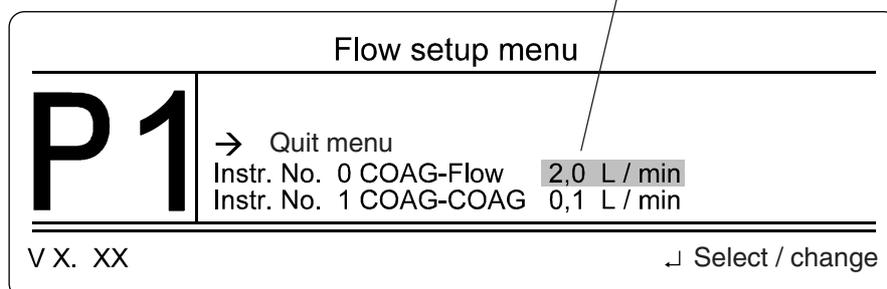
In the *Flow setup* you can alter the COAG flow / CUT flow settings for Instrument numbers 0 to 10 in each application program. A number of parameters exist which for safety reasons cannot be altered by the user. These include maximum COAG flow / CUT flow, CUT function, on or off.

1. Select the program you require.
2. Mark menu item *Flow adjustments*. Press the ENTER key.
3. Using the UP / DOWN keys mark the Instrument number (COAG flow or CUT flow). Press the ENTER key.
4. Press UP / DOWN keys to select the desired flow. Press the ENTER key.
6. Repeat the procedure for other Instrument numbers or leave the *Flow setup* menu.

Instrument number 0 COAG flow is marked.



After pressing the enter key, the cursor is only marking a section of the display. You can now alter the flow with the UP / DOWN keys.

**Display brightness**

1. Select the menu item *Screen brightness* from the *Program menu*.
2. With the UP / DOWN keys, select the required brightness.
3. Store the setting using the ENTER key. You are now back in the *Program menu*.

Instrument purging parameters In this menu you can set a purge flow and a purge time for each Instrument number.

1. Select the menu item *Instrument purging parameters* from the *Program menu*.
2. Mark an number using the UP / DOWN keys. Press the ENTER key.
3. Select *purge time* or *purge flow* using the UP / DOWN keys. Press the ENTER key.
4. Repeat the procedure for other Instrument numbers or leave the *Instrument purging parameters* menu.

Argon-Gas Info

General cylinder information Select the *argon gas information* from the *Program menu*. Here you can choose between menu items *General cylinder information* and *Change cylinder data*.

If you need to know how much argon there is left in the cylinders, call the menu item *General cylinder information*. The remaining contents is shown in liters, the remaining pressure in bar / psi and the familiar cylinder symbols are displayed.

In addition, cylinder data is shown in this display.

Change cylinder data In this menu you can program the pressure [bar / psi] and volume [l] of the cylinders connected. The APC 300 requires this data to calculate the cylinder contents.

Refer to the chapter *Changing cylinders* to see how cylinder data can be changed.

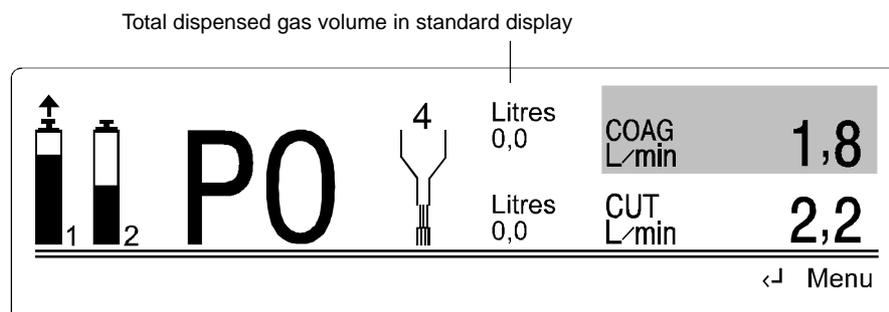
If the unit is connected to a central gas supply, you do not need to program anything in this menu.

Displaying operating data

Displaying short-term operating data When you invoke the *Display operating data* menu, the submenu *Display short-term operating data* appears first. You see accumulators for the dispensed gas volume, the activation duration and the number of activations. These are reset to 0 when the APC 300 is switched on.

Short-term operating data	
Gas volume	Activation duration
COAG: 0,0 L	0 h 0 min 0,0 s
CUT : 0,0 L	0 h 0 min 0,0 s
Counter COAG: 0	CUT: 0
<hr/>	
<PUR> Display shown	↵ Continue

You can display the total gas volume in the standard display. The PUR key shows or hides this data.



Displaying operating data

On pressing the ENTER key, the submenu *Display operating data* is presented. You see the same accumulators as for the *short-term operating data display*. These are not cleared when the unit is switched on. Whether you turn the unit on or off, the gas volume, the activation duration and the number of activations continue to be accumulated. To reset these totals, press the PUR key.

By pressing the ENTER key a second time, the submenu *Display long-term operating data* is shown. The totals shown here are not reset when the unit is switched on, and they cannot be cleared by the APC 300 user.

Menu items display error list, system diagnosis programs

Displaying long-term operating data

These are for the use of the service technician.

CHAPTER 8

Connection and Actuation Configurations for ERBE Electrosurgical Equipment in Conjunction with the APC 300

This chapter gives a step by step guide to the preparation of the electrosurgical equipment, the APC 300 and instruments. In particular, it explains how to

- connect the electrosurgical equipment to the APC 300.
- connect the foot switches.
- connect the APC applicator, neutral electrode and the instruments.
- set up the electrosurgical equipment.
- actuate APC, ARGON CUT, CUT, BIPOLAR CUT, COAG and BIPO-LAR COAG.

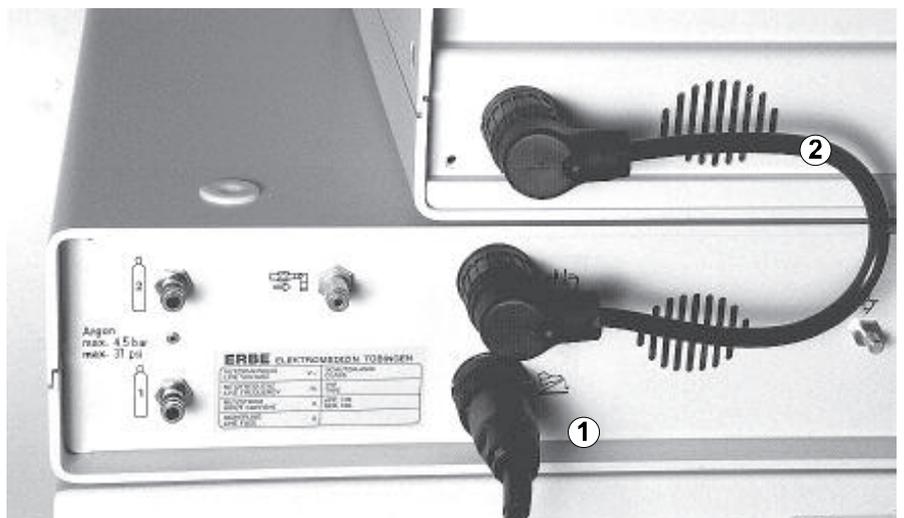
Connection cables required:

- *Connection cable* no. 20189-022 with two 4-pin plugs.
- *Connection cable* no. 20132-063 with one 4-pin and one 7-pin plug. For actuation configurations 3 and 4 ICC 350 only.
- *HF cable* no. 20192-082 or 20192-126.

Actuation Configuration 1 for ICC 200

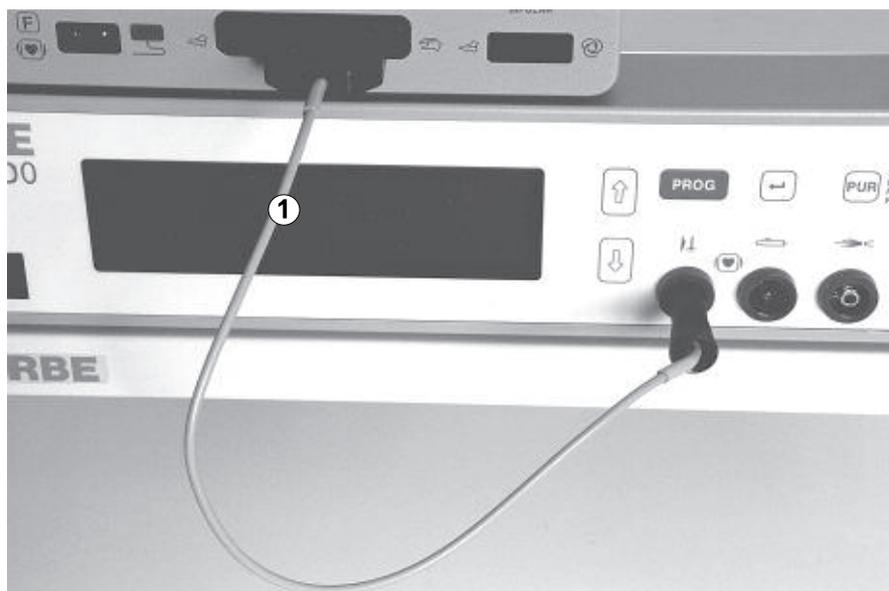
APC probe for flexible endoscopes

1. Connect two-pedal foot switch to the APC 300's foot switch socket ①.



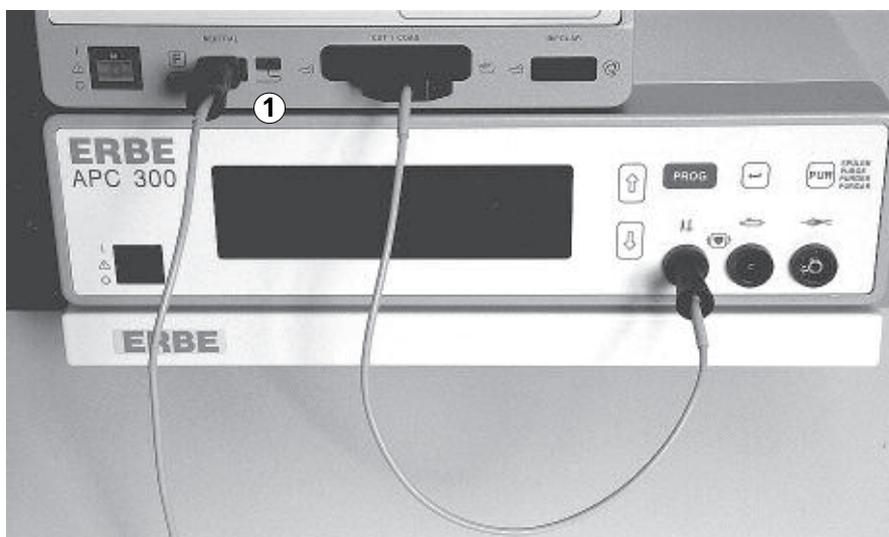
1. Connect foot switch, connection cable with two 4-pin plugs

2. Plug connection cable 20189-022 ② into the APC 300's actuation signal output and into the ICC's foot switch socket.



- 2. Connect HF cable** Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the CUT / COAG socket of the ICC.

WARNING! If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



- 3. Connect neutral electrode** Position the neutral electrode on the patient. Connect neutral electrode ① to the ICC.

- 4. Plug in mains plug** of equipment trolley.

- 5. Switch on** ICC and APC 300.

- 6. Open cylinder valves** 1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.

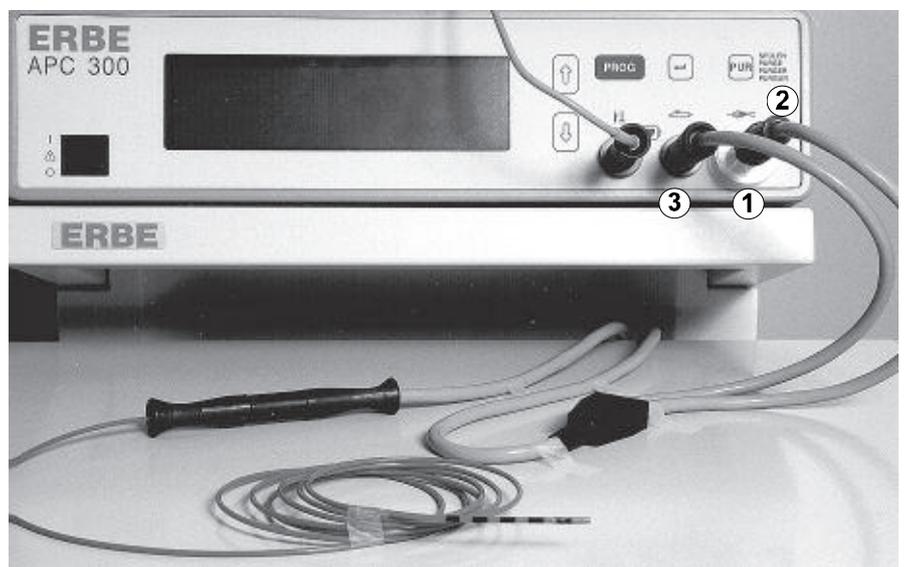
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder ready.

7. Set ICC for APC

1. Set AUTO COAG field to FORCED.
2. Press selection key again. Displayed: *A.60* (APC mode, power limit 60 W)
3. Select the desired power limit.

WARNING!

If an instrument is connected to the BIPOLAR socket and you select BIPO-LAR mode by mistake, you can actuate the instrument using the foot switch.



8. Connect APC probe

APC probe for flexible endoscopes, consisting of: cable and probe

1. Screw the bacteriological filter ① to the argon socket.
2. Screw the cable's argon connection ② to the filter.
3. Plug the cable's multiple plug ③ into the multiple socket.
4. Connect the cable to the APC probe.

9. Check flow

Is the automatic setting of the COAG flow suitable for the application?

10. Rinse probe

Press PUR key and rinse the probe with argon.

11. Functional test

Carry out functional test as described in CHAPTER 3 →.

12. Actuate APC

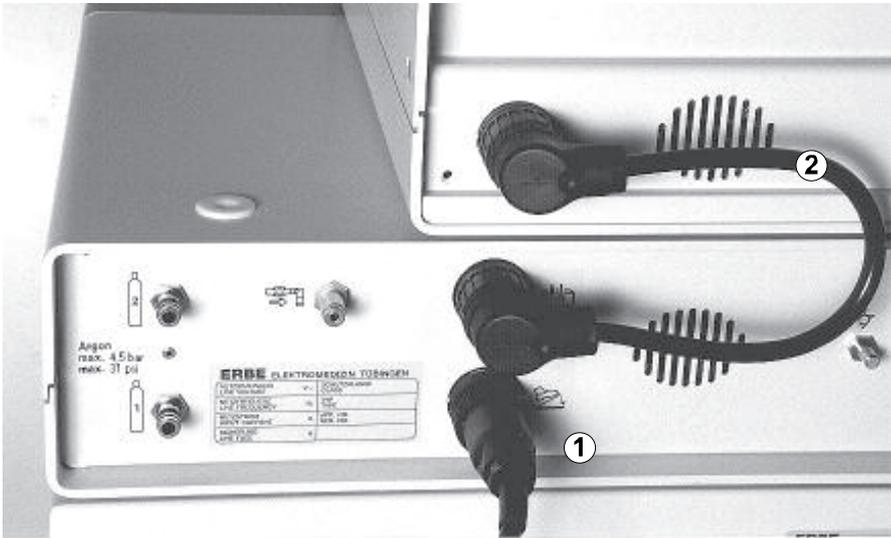
Press the blue pedal.

13. Introduce probe into the endoscope

Introduce the sterile APC probe into the work channel of the endoscope.

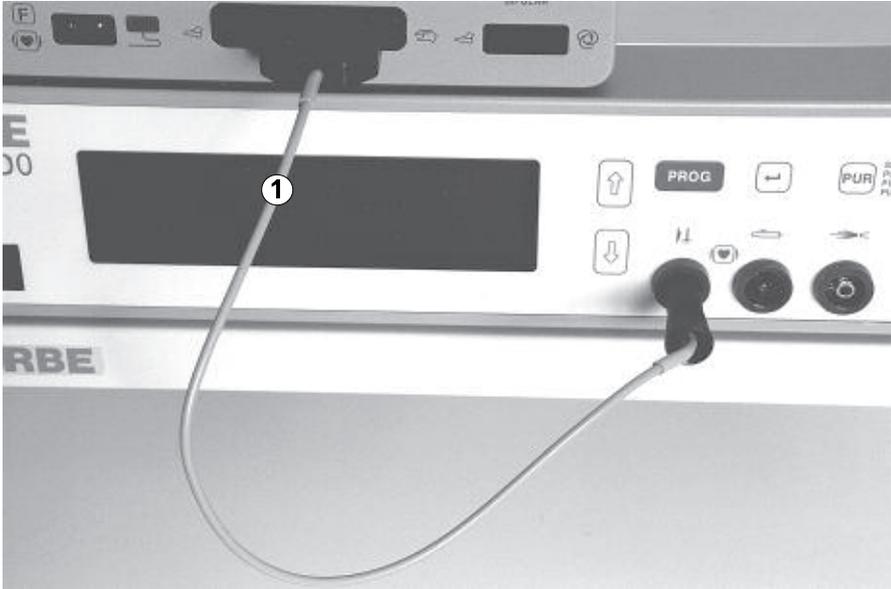
Actuation Configuration 2 for ICC 200

APC handle for APC and ARGON CUT



1. Connect foot switch, connection cable with two 4-pin plugs

- 1. Connect two-pedal foot switch to the foot switch socket ① of the APC 300.
- 2. Plug the connection cable 20189-022 ② into the actuation signals output of the APC 300 and into the ICC's foot switch socket.

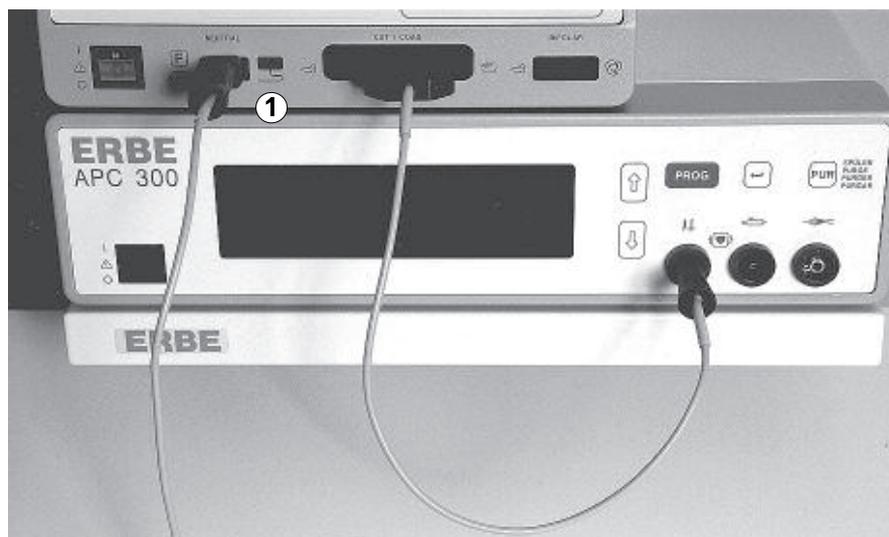


2. Connect HF cable

Plug the HF cable 20192-082 or 20192-126 ① into the APC 300's HF input and into the ICC's CUT / COAG socket.

WARNING!

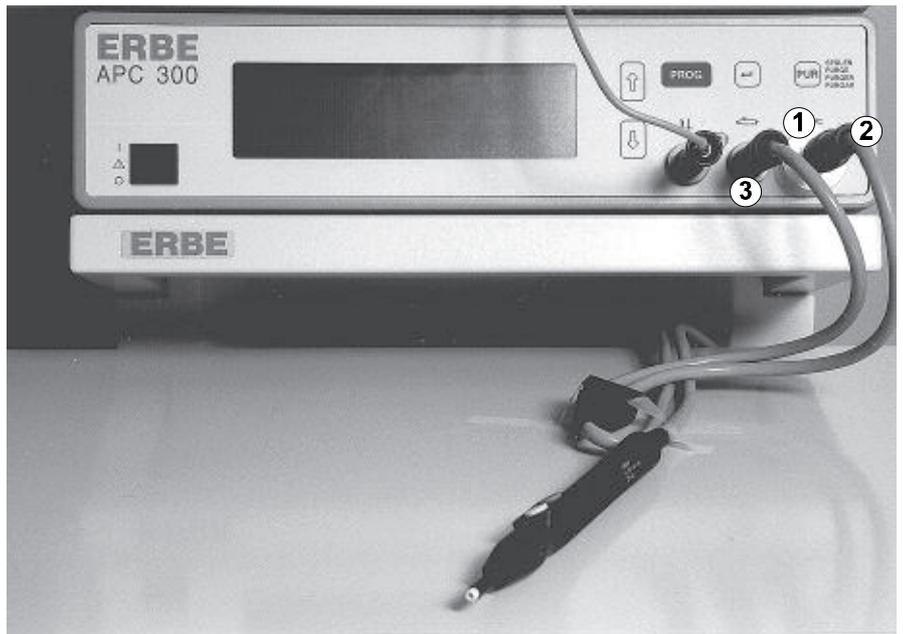
If an instrument rather than the HF cable is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



- 3. Connect neutral electrode** Position neutral electrode on the patient. Connect the neutral electrode ① to the ICC.
- 4. Plug in mains plug** of equipment trolley.
- 5. Switch on** ICC and APC 300.
- 6. Open cylinder valves**
1. Open cylinder valves of the argon gas cylinders in a clockwise direction until they stop.
 2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder ready.
- 7. Set ICC for APC**
1. Set AUTO COAG field to FORCED.
 2. Press selection key again. Displayed: A.60 (APC mode, power limit 60 W).
 3. Select the desired power limit.

WARNING! If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!

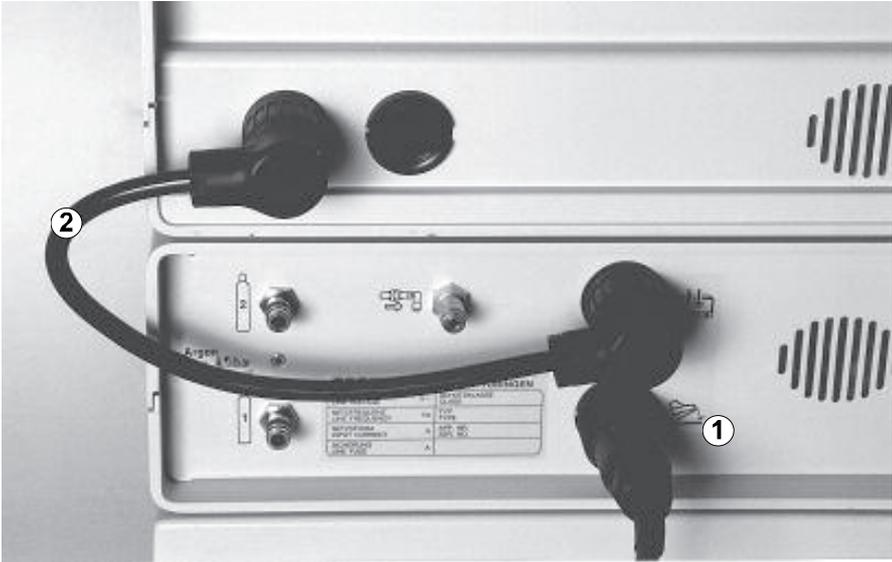
- 8. Set ICC for ARGON CUT** Select effect and power limit in the AUTO CUT field.



- 9. Connect the APC handle**
1. Screw the bacteriological filter ① to the argon socket.
 2. Screw the argon connection ② to the filter.
 3. Plug in the cable's multiple plug ③ to the APC 300's multiple socket.
- 10. Check flow** Is the automatic setting of the COAG flow / CUT flow suitable for the application?
- 11. Rinse applicator** Press PUR key and rinse the applicator with argon.
- 12. Actuate the APC** Press the blue pedal or the blue finger switch.
- 13. Actuate ARGON CUT** Press the yellow pedal or the yellow finger switch.

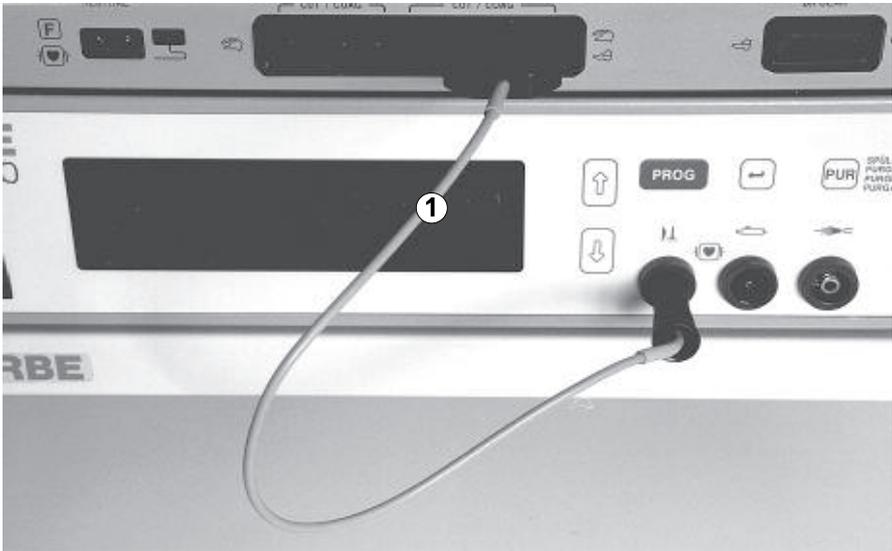
Actuation Configuration 1 for ICC 300

APC probe for flexible endoscopes



1. Connect foot switch, connection cable with two 4-pin plugs

- 1. Connect two-pedal foot switch to the APC 300's foot switch socket ①.
- 2. Plug connection cable 20189-022 ② into the APC 300's actuation signals output and into the ICC's 4-pin foot switch socket.

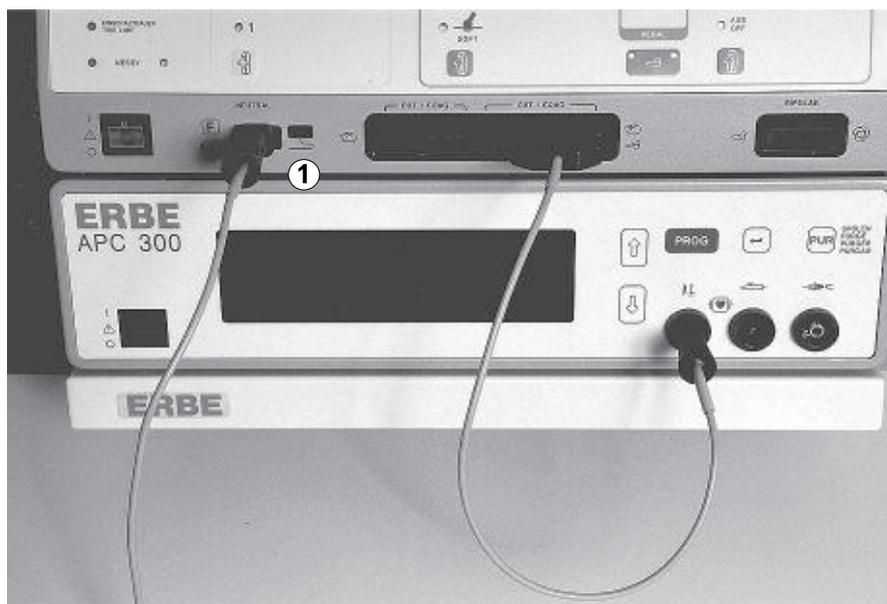


2. Connect HF cable

Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the CUT / COAG socket of the ICC for foot and finger switches.

WARNING!

If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



3. Connect neutral electrode Position neutral electrode on the patient. Connect the neutral electrode ① to the ICC 300.

4. Plug in mains plug of equipment trolley.

5. Switch on ICC 300 and APC 300.

6. Open cylinder valves

1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.

7. Set ICC for APC

1. Set AUTO COAG field to SPRAY. Displayed: 60 (power limit 60 W)
2. Select the desired power limit.

WARNING! 3. Position PEDAL key to AUTO COAG field. **Imperative!**



- 8. Connect APC probe** APC probe for flexible endoscopes, consisting of: cable and probe
1. Screw the bacteriological filter ① to the argon socket .
 2. Screw the cable's argon connection ② to the filter.
 3. Plug the cable's multiple plug ③ into the multiple socket .
 4. Connect the cable to the APC probe.
- 9. Check flow** Is the automatic setting of the COAG flow suitable for the application?
- 10. Rinse probe** Press PUR key and rinse the probe with argon.
- 11. Functional test** Carry out functional test as described in CHAPTER 3 →.
- 12. Actuate APC** Press the blue pedal.
- 13. Introduce probe into the endoscope** Introduce the sterile APC probe into the work channel of the endoscope.

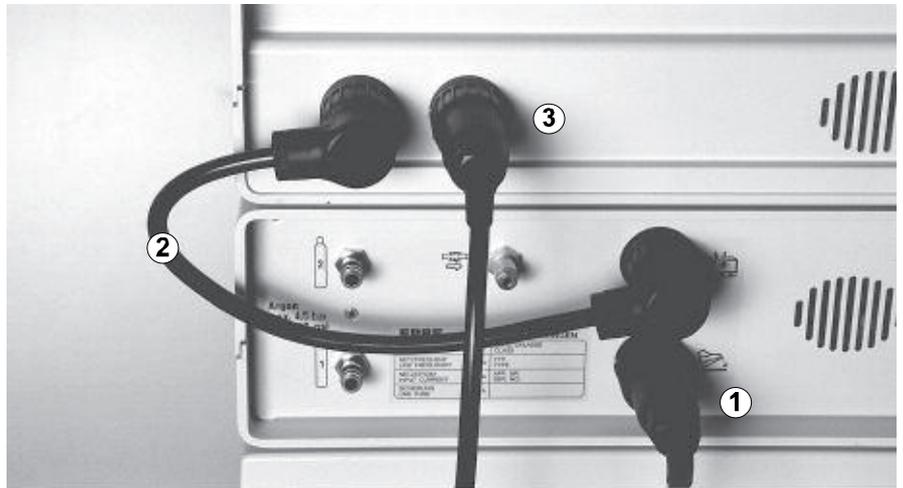
Actuation Configuration 2 for ICC 300

APC handle for APC and ARGON CUT, electrode handle for CUT and COAG with two buttons, instrument for BIPOLAR COAG



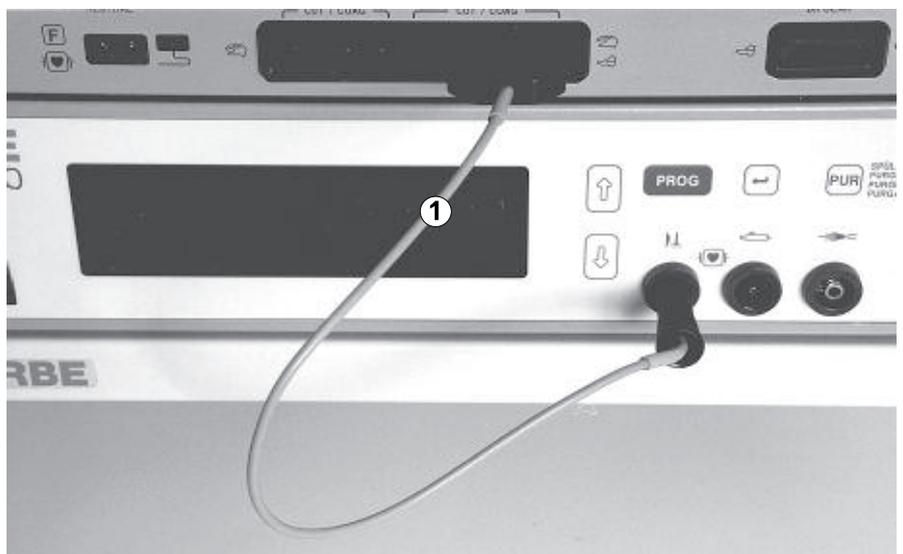
In this configuration, CUT and COAG of the electrode handle can only be actuated with finger switches.

APC can be actuated with foot and finger switches. ARGON CUT can be actuated with foot and finger switches.



1. Connect foot switch, connection cable with two 4-pin plugs

1. Connect two-pedal foot switch to the APC 300's foot switch socket ①.
2. Plug connection cable 20189-022 ② into the APC 300's actuation signals output and into the ICC's 4-pin foot switch socket.
3. Connect single-pedal foot switch to the ICC's 7-pin foot switch socket ③.

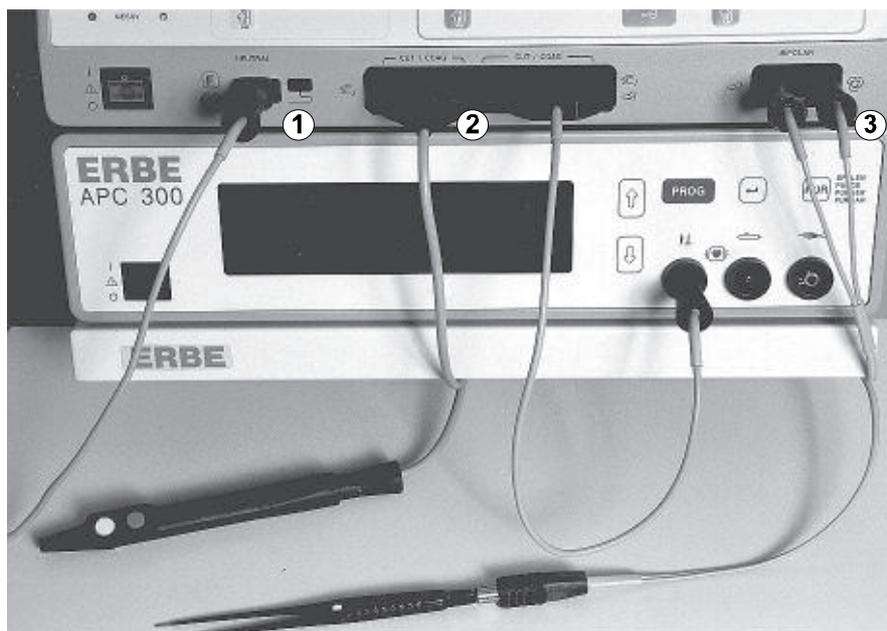


2. Connect HF cable

Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the CUT / COAG socket of the ICC for foot and finger switches.

WARNING!

If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



3. Connect instruments, neutral electrode to ICC

1. Position the neutral electrode on the patient. Connect neutral electrode ① to the ICC 300.
2. Plug HF plug of the electrode handle ② into the CUT / COAG socket for finger switches.
3. Connect bipolar instrument ③ to BIPOLAR socket.

4. Plug in mains plug

of the equipment trolley.

5. Switch on

ICC 300 and APC 300.

6. Open cylinder valves

1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.

7. Set ICC for APC

1. Set AUTO COAG field to SPRAY. Displayed: 60 (power limit 60 W)
2. Select the desired power limit.

8. Set ICC for ARGON CUT

Select effect and power limit in the AUTO CUT field.

WARNING!

9. PEDAL key

Position PEDAL key to AUTO COAG field. **Imperative!**

10. Set ICC for bipolar coagulation

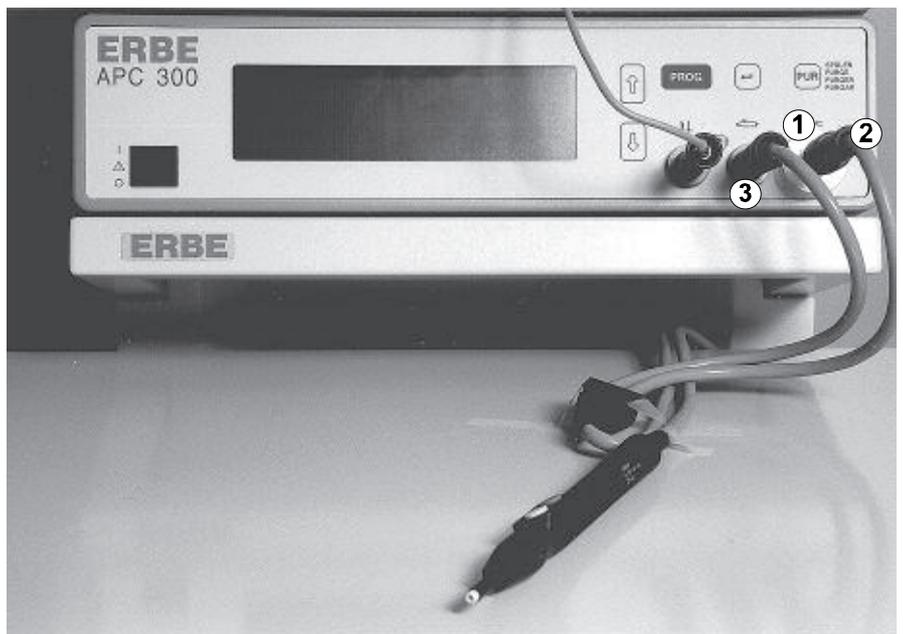
Select a power limit in the AUTO BIPOLAR field. Select an AUTO START mode, or actuate via the white single-pedal foot switch.

- 11. Set ICC for CUT and COAG** **CUT:** Select effect and power limit in the AUTO CUT field for the electrode handle at the CUT / COAG socket for finger switches. The ICC can be set either for ARGON CUT or for CUT. The APC handle's and the electrode handle's cutting modes both reference the AUTO CUT field.

WARNING! Every time you switch between ARGON CUT and CUT, the AUTO CUT field must be reset, unless you want to use the same parameters.

COAG: Select coagulation mode and power limit in the AUTO COAG field for the electrode handle at the CUT / COAG socket for finger switches. The ICC can be set either for APC or for COAG. The coagulation mode of the APC handle and the electrode handle both reference the AUTO COAG field.

WARNING! Every time you switch between APC and COAG, the AUTO COAG field must be reset, unless you want to use the same parameters.



- 12. Connect APC handle**
1. Screw the bacteriological filter ① to the argon socket .
 2. Screw the argon connection ② to the filter.
 3. Plug the multiple plug into the multiple socket ③ of the APC 300.
- 13. Check flow** Is the automatic setting of the COAG flow / CUT flow suitable for the application?
- 14. Rinse applicator** Press PUR key and rinse the applicator with argon.
- 15. Actuate APC** Press the blue pedal or the blue finger switch.

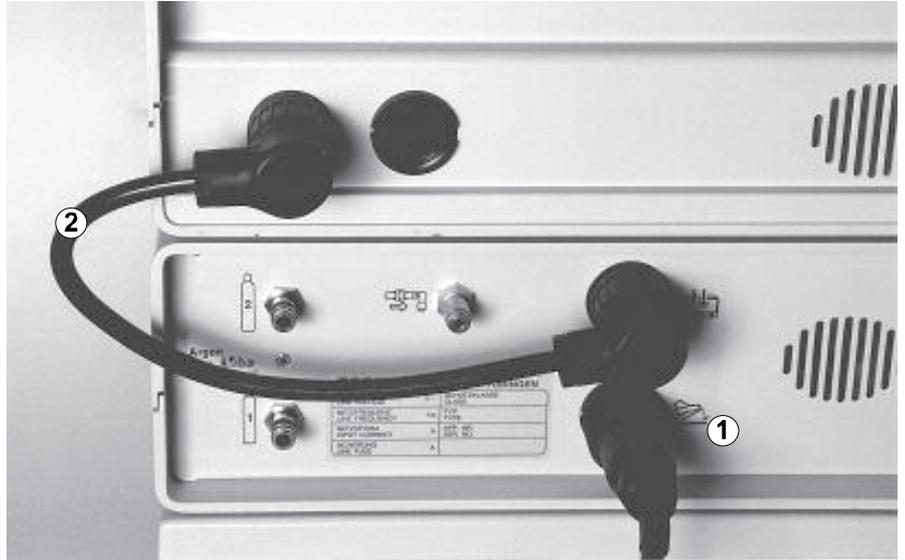
16. Actuate ARGON CUT Press the yellow pedal or the yellow finger switch.

17. Actuate BIPOLAR COAG AUTO START on contact or with the white single-pedal foot switch.

18. Actuate CUT or COAG Yellow finger switch or blue finger switch.

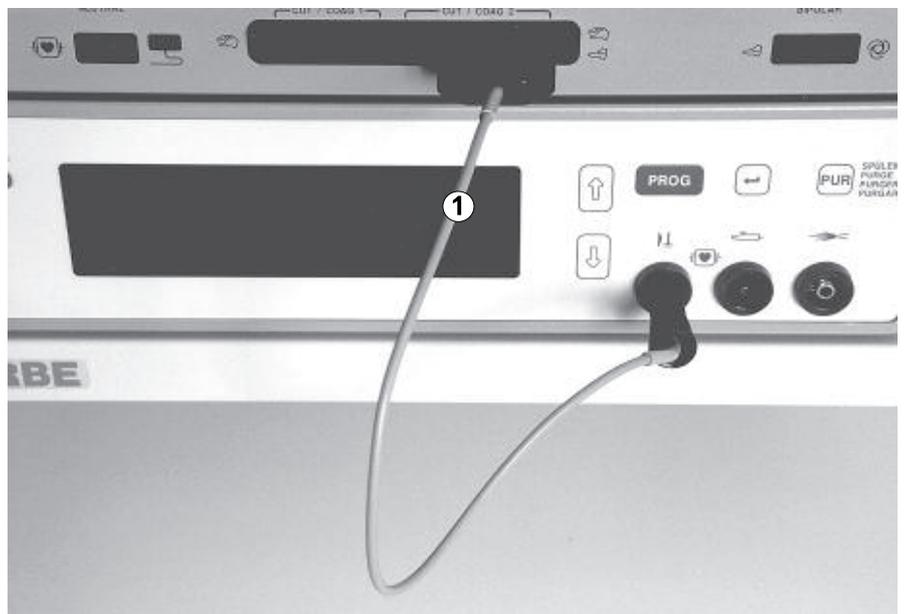
Actuation Configuration 1 for ICC 350 ICC Software V. 1.06 and V. 1.07

APC probe for flexible endoscopes



1. Connect foot switch, connection cable with two 4-pin plugs

1. Connect two-pedal foot switch to the APC 300's foot switch socket ①.
2. Plug connection cable 20189-022 ② into the APC 300's actuation signals output and into the 4-pin foot switch socket of the ICC 350.

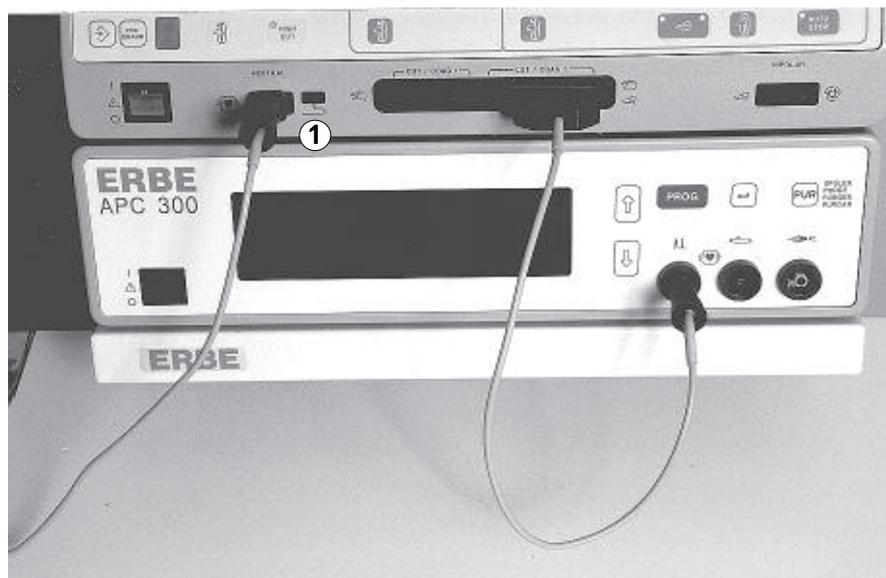


2. Connect HF cable

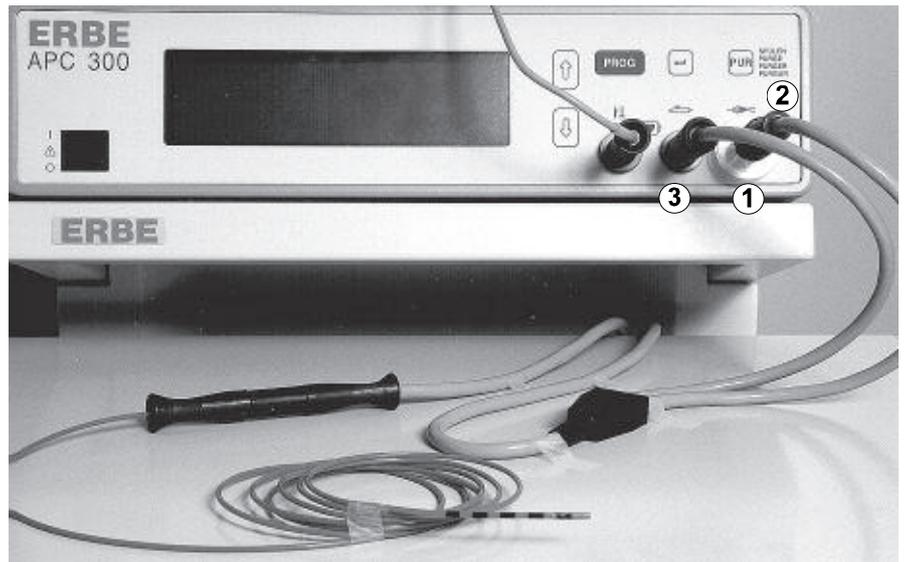
Plug HF cable 20192-082 or 20192-126 ① into the HF input of the APC 300 and into the CUT / COAG 2 socket of the ICC.

WARNING!

If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



- 3. Connect neutral electrode** Position the neutral electrode on the patient. Connect neutral electrode ① to the ICC 350.
- 4. Plug in mains plug** of equipment trolley.
- 5. Switch on** ICC 350 and APC 300.
- 6. Open cylinder valves**
1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
 2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder ready.
- 7. Set ICC 350 for APC**
1. Set AUTO COAG 2 to SPRAY. Displayed: 60 (power limit 60 W)
 2. Select the desired power limit.
- WARNING!** **8. PEDAL key** Position PEDAL key to AUTO COAG 2 field. **Imperative!**



- 9. Connect APC probe** APC probe for flexible endoscopes, consisting of: cable and probe
1. Screw the bacteriological filter ① to the argon socket.
 2. Screw the cable's argon connection ② to the filter.
 3. Plug the cable's multiple plug ③ into the multiple socket.
 4. Connect the cable to the APC probe.
- 10. Check flow** Is the automatic setting of the COAG flow suitable for the application?
- 11. Rinse probe** Press PUR key and rinse the probe with argon.
- 12. Functional test** Carry out functional test as described in CHAPTER 3 →.
- 13. Actuate APC** Press the blue pedal.
- 14. Introduce probe into the endoscope** Introduce the sterile APC probe into the work channel of the endoscope.

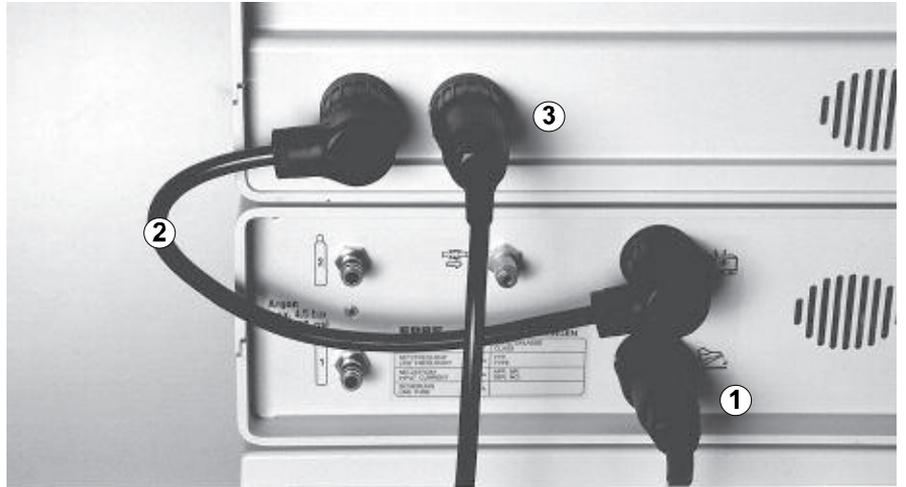
Actuation Configuration 2 for ICC 350 ICC Software V. 1.06 and V. 1.07

APC handle for APC and ARGON CUT, electrode handle for CUT and COAG with two buttons, instrument for BIPOLAR COAG



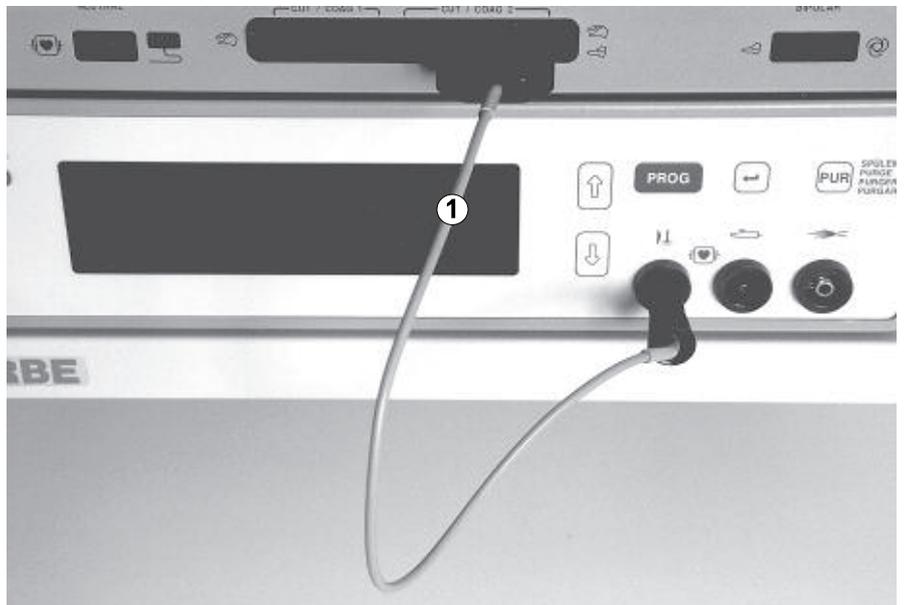
In this configuration, CUT and COAG of the electrode handle can only be actuated with finger switches.

APC can be actuated with foot and finger switches. ARGON CUT can be actuated with foot and finger switches.



1. Connect foot switch, connection cable with two 4-pin plugs

1. Connect two-pedal foot switch to the APC 300's foot switch socket ① .
2. Plug connection cable 20189-022 ② into the APC 300's actuation signals output and into the 4-pin foot switch socket of the ICC 350.
3. Connect single-pedal foot switch to the ICC's 7-pin foot switch socket ③ .

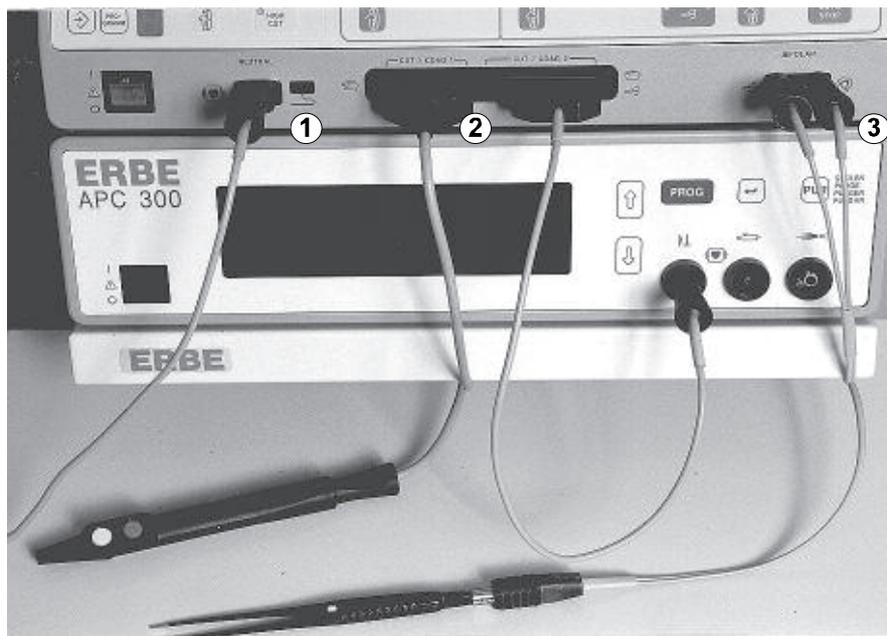


2. Connect HF cable

Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the CUT / COAG 2 socket of the ICC 350.

WARNING!

If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



3. Connect instruments, neutral electrode to ICC 350

1. Position neutral electrode on the patient. Connect the neutral electrode ① to the ICC 350.
2. Plug HF plug of the electrode handle ② into the CUT / COAG 1 socket.
3. Connect bipolar instrument ③ to the BIPOLAR socket of the ICC 350.

4. Plug in mains plug of the equipment trolley.

5. Switch on ICC 350 and APC 300.

6. Open cylinder valves

1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.

7. Set ICC 350 for APC

1. Set AUTO COAG 2 to SPRAY. Displayed: 60 (power limit 60 W).
2. Select the desired power limit.

8. Set ICC 350 for ARGON CUT

Select effect and power limit in AUTO CUT field.

WARNING!

9. PEDAL key

Position PEDAL key to AUTO COAG 2 field. **Imperative!**

10. Set ICC for BIPOLAR COAG

Select a power limit in the AUTO BIPOLAR field. Select an AUTO START mode, or actuate using the white single-pedal foot switch.

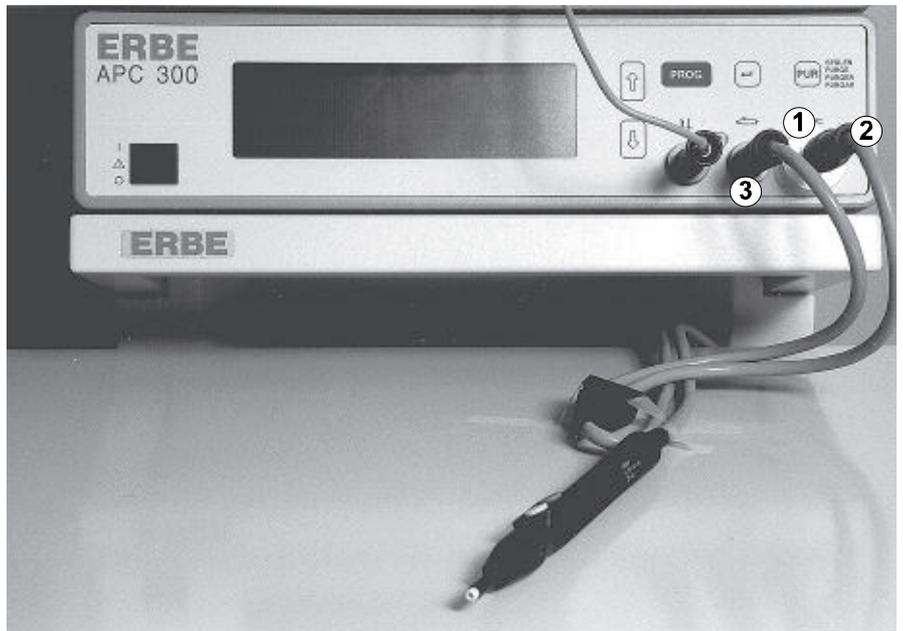
11. Set ICC 350 for ARGON CUT and COAG

CUT: Select effect and power limit in the AUTO CUT field for the electrode handle at the CUT / COAG 1 socket. The ICC 350 can be set either for ARGON CUT or for CUT. The APC handle's and the electrode handle's cutting modes both reference the AUTO CUT field.

WARNING!

Every time you switch between ARGON CUT and CUT, the AUTO CUT field must be reset, unless you want to use the same parameters.

COAG: Select coagulation mode and power limit in the AUTO COAG 1 field for the electrode handle at the CUT / COAG 1 socket. AUTO COAG 1 applies exclusively to the electrode handle's coagulation mode.

**12. Connect APC handle**

1. Screw the bacteriological filter ① to the argon socket.
2. Screw the argon connection ② to the filter.
3. Plug the multiple plug ③ into the multiple socket of the APC 300.

13. Check flow

Is the automatic setting of the COAG flow / CUT flow suitable for the application?

14. Rinse applicator

Press PUR key.

15. Actuate APC

Press the blue pedal or the blue finger switch.

16. Actuate ARGON CUT

Press the yellow pedal or the yellow finger switch.

17. Actuate BIPOLAR COAG

AUTO START on contact or with the white single-pedal foot switch.

18. Actuate CUT or COAG

Yellow finger switch or blue finger switch.



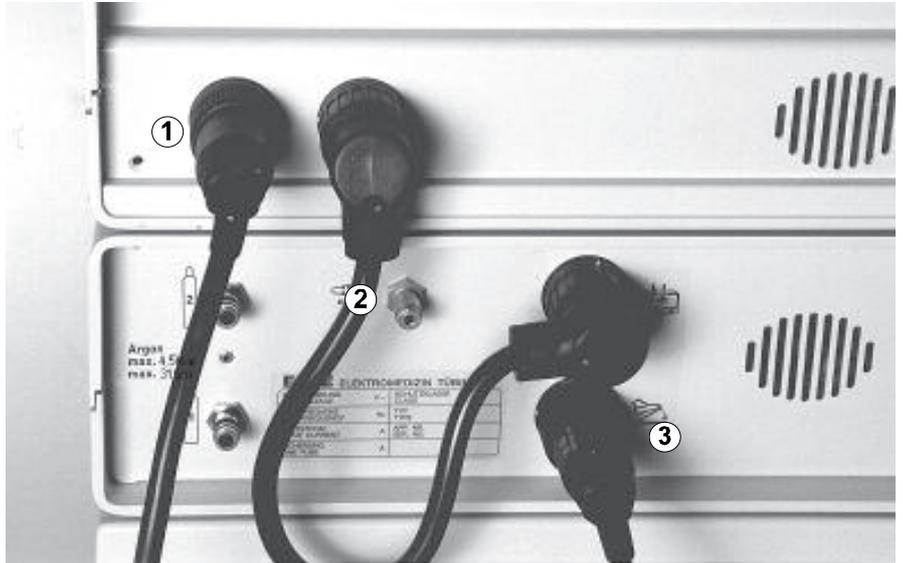
In this configuration, CUT and COAG of the electrode handle can be actuated with foot and finger switches.

APC can be actuated with foot and finger switches. ARGON CUT can only be actuated with finger switch.

Actuation Configuration 3 for ICC 350

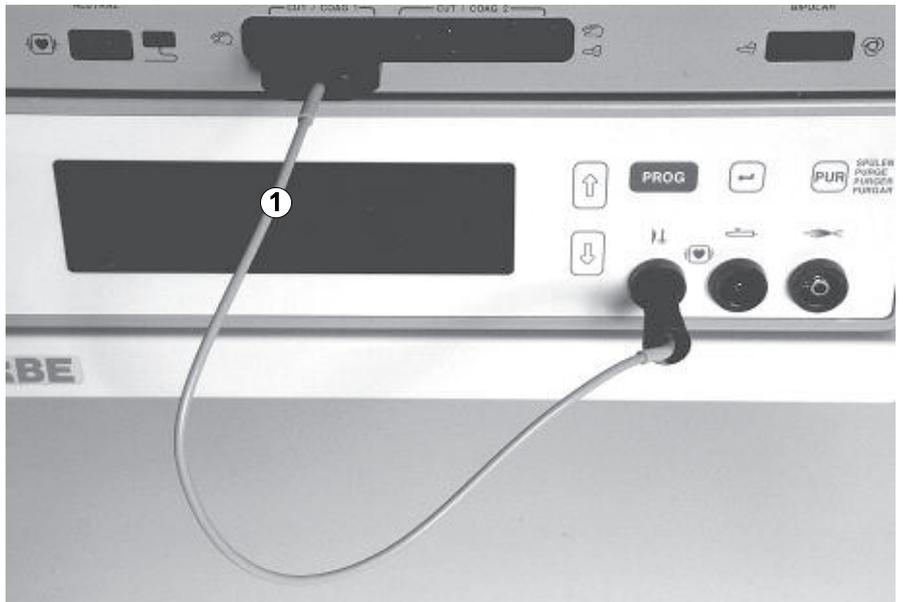
ICC Software V. 1.07 only

APC handle for APC and ARGON CUT, electrode handle for CUT and COAG with two buttons, instrument for BIPOLAR COAG



1. Connect foot switch, connection cable with 4- and 7-pin plugs

1. Connect two-pedal foot switch to the ICC 350 4-pin foot switch socket ①
2. Plug connection cable 20132-063 ② into the APC 300's actuation signals output and into the ICC's 7-pin foot switch socket.
3. Connect single-pedal foot switch to the APC 300's foot switch socket ③.

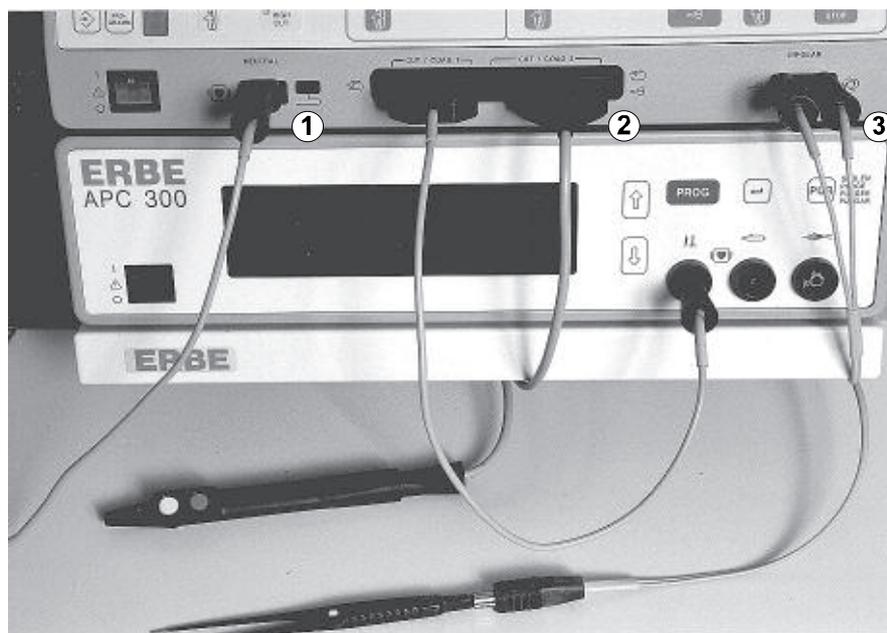


2. Connect HF cable

- Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the CUT / COAG 1 socket of the ICC.

WARNING!

If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



3. Connect instruments, neutral electrode to ICC 350

1. Position the neutral electrode on the patient. Connect neutral electrode ① to the ICC 350.
2. Plug HF plug of the electrode handle ② into the CUT / COAG 2 socket.
3. Connect bipolar instrument ③ to BIPOLAR socket of the ICC 350.

4. Plug in mains plug

of the equipment trolley.

5. Switch on

ICC 350 and APC 300.

6. Open cylinder valves

1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.

7. Set ICC 350 for APC

1. Set AUTO COAG 1 to SPRAY. Displayed: 60 (power limit 60 W)
2. Select the desired power limit.

8. Set ICC 350 for ARGON CUT

Select effect and power limit in the AUTO CUT field.

WARNING!

9. PEDAL key

The PEDAL key associates the blue foot switch with the coagulation mode of the electrode handle or with the bipolar instrument.

10. Set ICC 350 for bipolar coagulation

Select a power limit in the AUTO BIPOLAR field. Select an AUTO START mode, or actuate via the blue foot switch if the PEDAL key is positioned to the AUTO BIPOLAR field.

11. Set ICC 350 for CUT and COAG

CUT: Select effect and power limit in the AUTO CUT field for the electrode handle at the CUT / COAG 2 socket. The ICC 350 can be set either for ARGON CUT or for CUT. The APC handle's and the electrode handle's cutting modes both reference the AUTO CUT field.

WARNING!

Every time you switch between ARGON CUT and CUT, the AUTO CUT field must be reset, unless you want to use the same parameters.

COAG: Select coagulation mode and power limit in the AUTO COAG 2 field for the electrode handle at the CUT / COAG 2 socket. AUTO COAG 2 applies exclusively to the electrode handle's coagulation mode.

**12. Connect APC handle**

1. Screw the bacteriological filter ① to the argon socket.
2. Screw the argon connection ② to the filter.
3. Plug the multiple plug ③ into the multiple socket of the APC 300.

13. Check flow

Is the automatic setting of the COAG flow / CUT flow suitable for the application?

14. Rinse applicator

Press PUR key and rinse the applicator with argon.

15. Actuate APC

Press the white pedal or the blue finger switch.

16. Actuate ARGON CUT

Press the yellow finger switch only.

17. Actuate BIPOLAR COAG

AUTO START on contact, or with the blue foot switch if the PEDAL key is positioned to the AUTO BIPOLAR field.

18. Actuate CUT

Yellow finger switch or yellow pedal.

19. Actuate COAG

Blue finger switch, or blue pedal if the PEDAL key is positioned to the AUTO COAG 2 field.

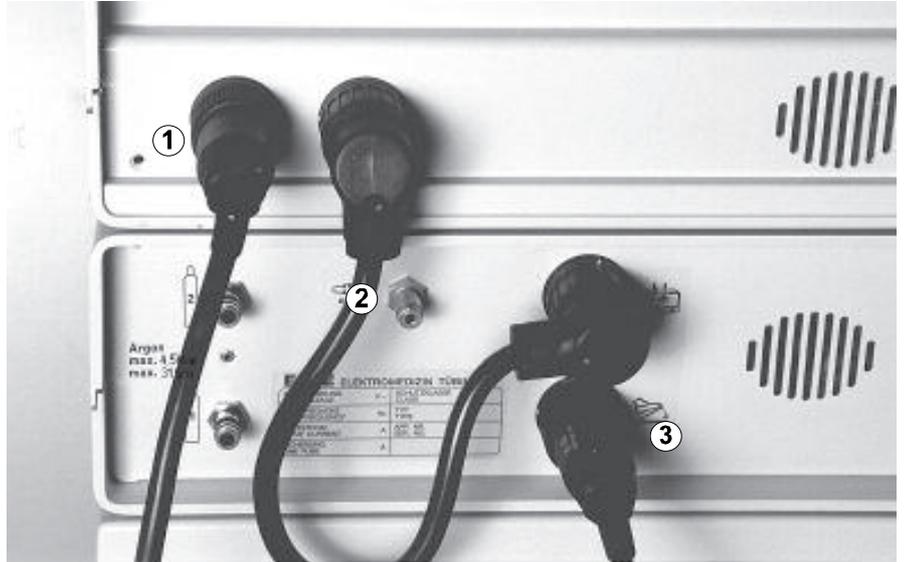


In this configuration, BIPOLAR CUT can be actuated using the foot switch. BIPOLAR COAG can be actuated with the foot switch and AUTO START.

APC can be actuated with foot and finger switches. ARGON CUT can only be actuated with finger switch.

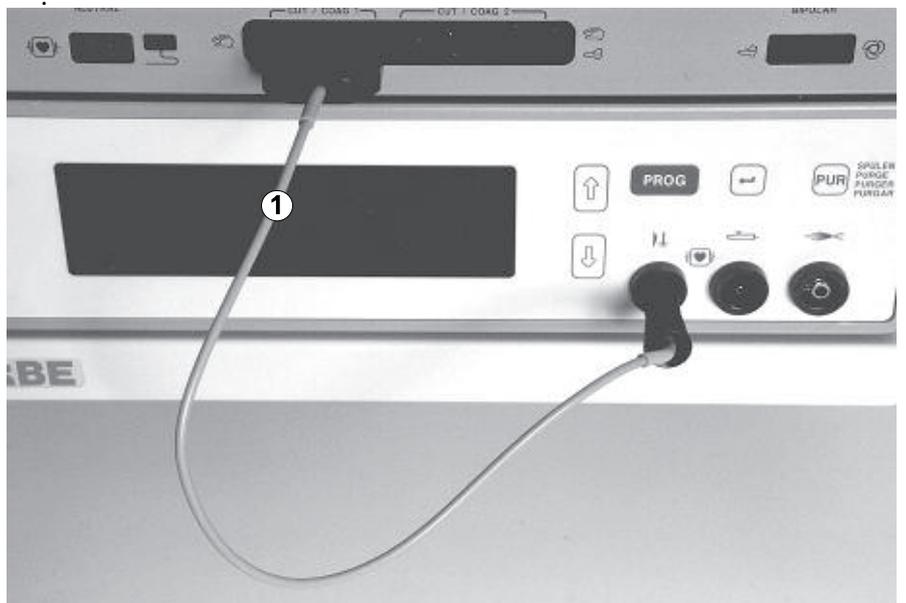
Actuation Configuration 4 for ICC 350 ICC Software V. 1.07 only

APC handle for APC and ARGON CUT, instrument for BIPOLAR COAG and BIPOLAR CUT



1. Connect foot switch, connection cable with 4- and 7-pin plugs

1. Connect two-pedal foot switch to the ICC 350 4-pin foot switch socket ①.
2. Plug connection cable 20132-063 into the APC 300's actuation signals output and into the ICC's 7-pin foot switch socket ②.
3. Connect single-pedal foot switch to the APC 300's foot switch socket ③.

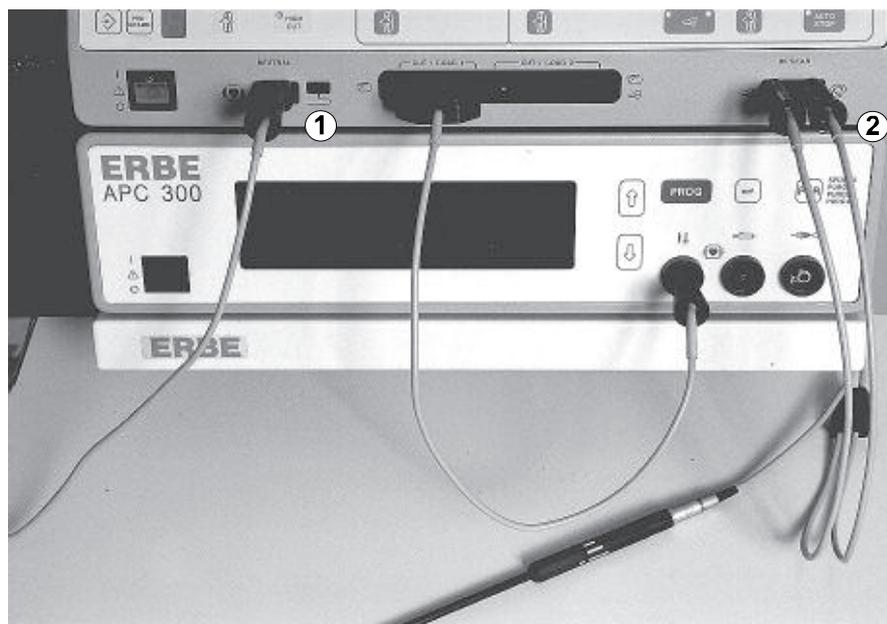


2. Connect HF cable

Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the CUT / COAG 1 socket of the ICC.

WARNING!

If an instrument, rather than the HF cable, is connected to the CUT / COAG socket, you can actuate this instrument using the foot switch!



3. Connect instrument, neutral electrode to ICC 350

1. Position the neutral electrode on the patient. Connect neutral electrode ① to the ICC 350.
2. Connect bipolar instrument ② to the BIPOLAR socket of the ICC 350.

4. Plug in mains plug

of the equipment trolley.

5. Switch on

ICC 350 and APC 300.

6. Open cylinder valves

1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.

7. Invoke BIPOLAR CUT

Using the PROGRAM key on the ICC 350, call up program «b».

8. Set ICC 350 for APC

1. Set AUTO COAG 1 to SPRAY. Displayed: 60 (power limit 60 W)
2. Select the desired power limit.

9. Set ICC 350 for ARGON CUT

Select effect and power limit in the AUTO CUT field.

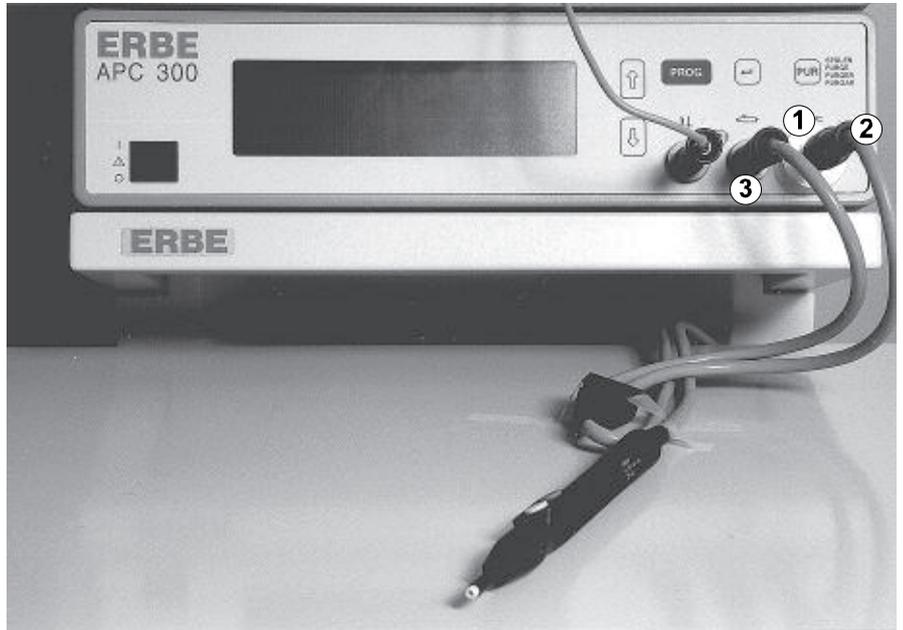
10. Set ICC 350 for BIPOLAR COAG

Select a power limit in the AUTO BIPOLAR field. Select an AUTO START mode or actuate via the blue foot switch.

11. Set ICC 350 for BIPOLAR CUT

BIPOLAR CUT: Select effect and power limit in the AUTO CUT field for the bipolar instrument at the bipolar socket. The ICC can be set either for ARGON CUT or for BIPOLAR CUT. The APC handle's and the bipolar instruments's cutting modes both reference the AUTO CUT field.

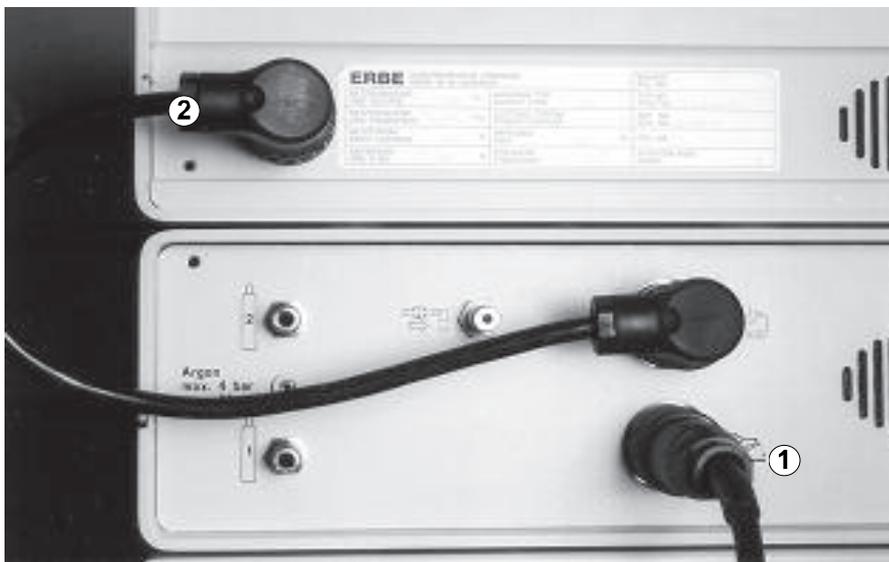
WARNING! Every time you switch between ARGON CUT and BIPOLAR CUT, the AUTO CUT field must be reset, unless you want to use the same parameters.



- 12. Connect APC handle** 1. Screw the bacteriological filter ① to the argon socket .
 2. Screw the argon connection ② to the filter.
 3. Plug the multiple plug ③ into the multiple socket of the APC 300.
- 13. Check flow** Is the automatic setting of the COAG flow / CUT flow suitable for the application?
- 14. Rinse applicator** Press PUR key.
- 15. Actuate APC** Press the white pedal or the blue finger switch.
- 16. Actuate ARGON CUT** Press yellow finger switch **only!**
- 17. Actuate BIPOLAR COAG** AUTO START on contact, or blue foot switch.
- 18. Actuate BIPOLAR CUT** Yellow pedal.

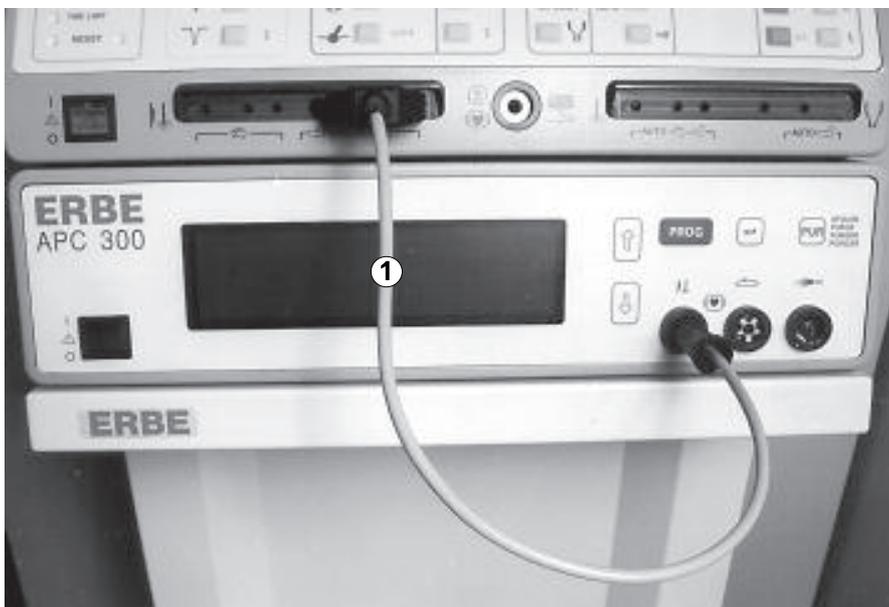
Actuation Configuration 1 for ACC 450

APC probe for flexible endoscopes



1. Connect foot switch, connection cable with two 4-pin plugs

1. Connect two-pedal foot switch to the APC 300's foot switch socket ①.
2. Plug connection cable 20189-022 ② into the APC 300's actuation signals output and into the ACC's 4-pin foot switch socket.

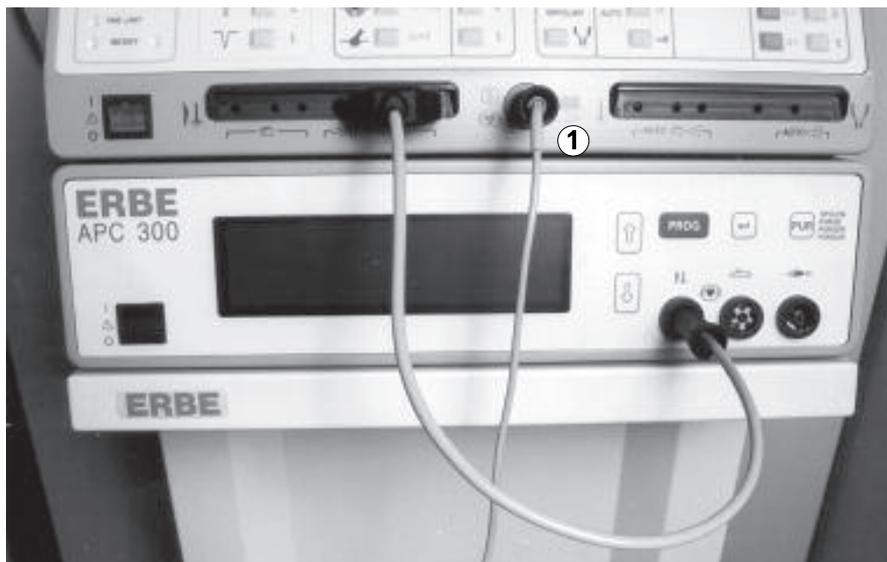


2. Connect HF cable

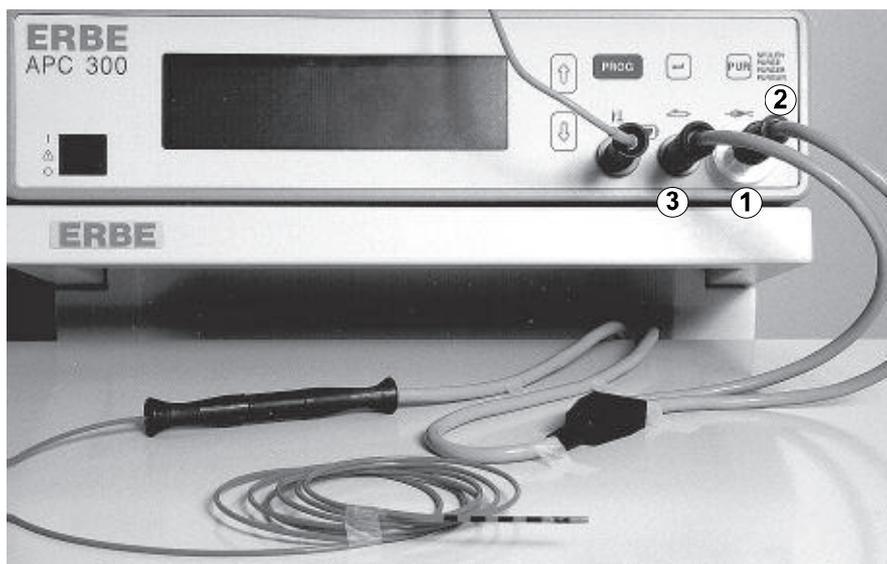
Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the Cut and Coagulation socket of the ACC for foot and finger switches.

WARNING!

If an instrument, rather than the HF cable, is connected to the Cut and Coagulation socket, you can actuate this instrument using the foot switch!



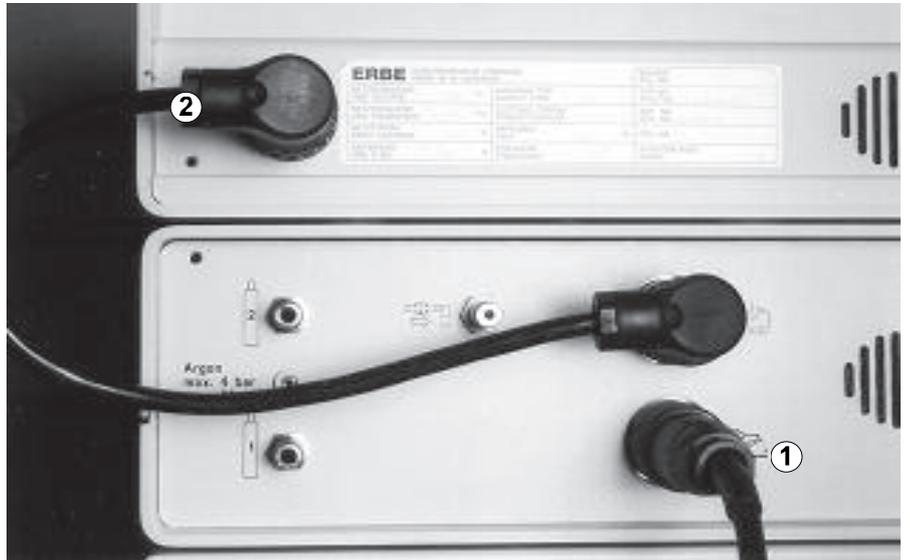
- 3. Connect neutral electrode** Position neutral electrode on the patient. Connect the neutral electrode ① to the ACC 450.
- 4. Plug in mains plug** of equipment trolley.
- 5. Switch on** ACC 450 and APC 300.
- 6. Open cylinder valves**
1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
 2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.
- 7. Set ACC for APC**
1. Set Coagulation field to SPRAY 2.
 2. Select the desired intensity.
- WARNING!**
3. Do not activate PEDAL key in Autocoagulation field. **Imperative!**



- 8. Connect APC probe** APC probe for flexible endoscopes, consisting of: cable and probe
1. Screw the bacteriological filter ① to the argon socket.
 2. Screw the cable's argon connection ② to the filter.
 3. Plug the cable's multiple plug ③ into the multiple socket .
 4. Connect the cable to the APC probe.
- 9. Check flow** Is the automatic setting of the Coag flow suitable for the application?
- 10. Rinse probe** Press PUR key and rinse the probe with argon.
- 11. Functional test** Carry out functional test as described in CHAPTER 3 →.
- 12. Actuate APC** Press the blue pedal.
- 13. Introduce probe into the endoscope** Introduce the sterile APC probe into the work channel of the endoscope.

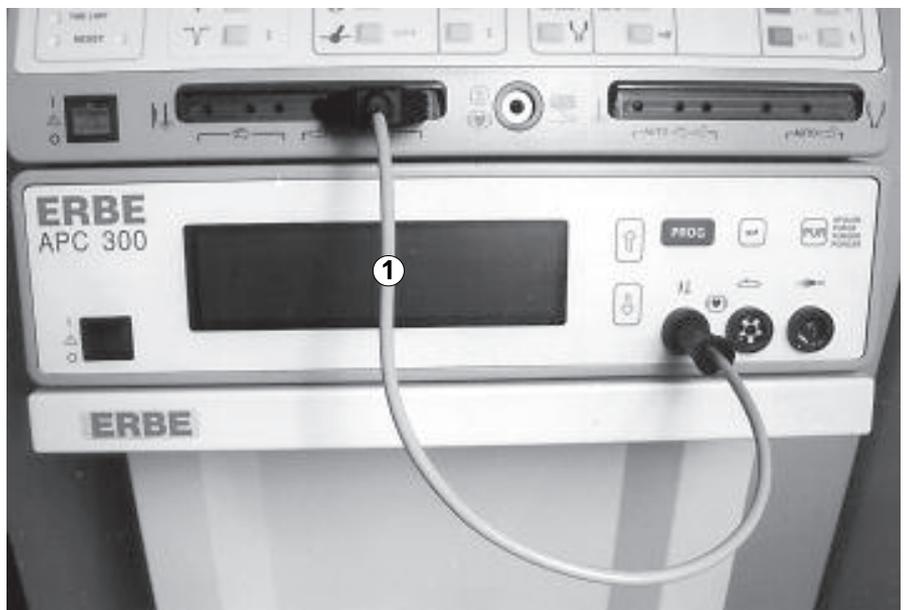
Actuation Configuration 2 for ACC 450

APC handle for APC and ARGON CUT, electrode handle for CUT and COAG with two buttons, instrument for BIPOLAR COAG



1. Connect foot switch, connection cable with two 4-pin plugs

1. Connect two-pedal foot switch to the APC 300's foot switch socket ①.
2. Plug connection cable 20189-022 ② into the APC 300's actuation signals output and into the ACC's 4-pin foot switch socket.

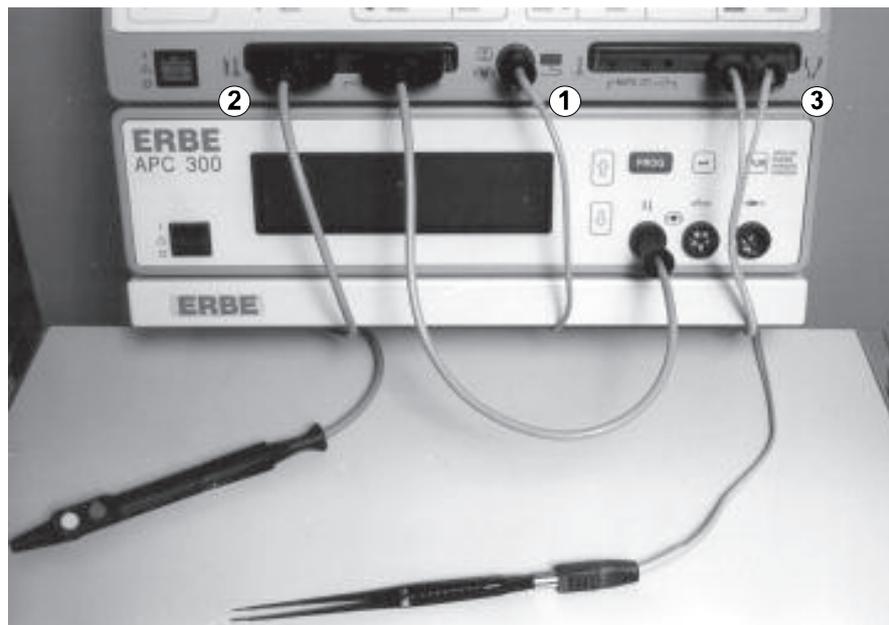


2. Connect HF cable

Plug HF cable 20192-082 or 20192-126 ① into HF input of the APC 300 and into the Cut and Coagulation socket of the ACC for foot and finger switches.

WARNING!

If an instrument, rather than the HF cable, is connected to the Cut and Coagulation socket, you can actuate this instrument using the foot switch!



3. Connect instruments, neutral electrode to ACC

1. Position the neutral electrode on the patient. Connect neutral electrode ① to the ACC 450.
2. Plug HF plug of the electrode handle ② into the Cut and Coagulation socket for finger switches.
3. Connect bipolar instrument ③ to Bipolar socket.

4. Plug in mains plug

of the equipment trolley.

5. Switch on

ACC 450 and APC 300.

6. Open cylinder valves

1. Open the cylinder valves on the argon gas cylinders in a clockwise direction until they stop.
2. Check fill level of the argon cylinders (fill level of the argon cylinders is in the information line of the standard display). Always keep a full replacement cylinder at the ready.

7. Set ACC for APC

1. Set Coagulation field to SPRAY 2.
2. Select the desired intensity.

8. Set ACC for ARGON CUT

Select intensity in the Cut field.

WARNING!

9. PEDAL key

Do not activate PEDAL key in Autocoagulation field. **Imperative!**

10. Set ACC for Bipolar Coagulation

Select Bipolar Coagulation mode. Select AUTO START mode. If desired select AUTO STOP mode. Select intensity in the Autocoagulation field.

- 11. Set ACC for Coagulation** Select a monopolar Koagulation Mode for the electrode handle at the Coagulation socket. Select AUTO START mode. If desired select AUTO STOP mode. Select intensity in the Autocoagulation field.

WARNING! Every time you switch between monopolar and bipolar Coagulation Mode, the Autocoagulation field must be reset, unless you want to use the same parameters.



- 12. Connect APC handle**
1. Screw the bacteriological filter ① to the argon socket .
 2. Screw the argon connection ② to the filter.
 3. Plug the multiple plug into the multiple socket ③ of the APC 300.

13. Check flow Is the automatic setting of the Coag flow / Cut flow suitable for the application?

14. Rinse applicator Press PUR key and rinse the applicator with argon.

15. Actuate APC Press the blue pedal or the blue finger switch.

16. Actuate ARGON CUT Press the yellow pedal or the yellow finger switch.

17. Actuate BIPOLAR COAG AUTO START on contact

18. Actuate CUT or COAG AUTO START on contact or blue finger switch.

CHAPTER 9

Troubleshooting

Error message	Possible cause	What to do ?
I 10 Underdose	1. Blocked hose 2. Cylinder empty 3. System error	1. Remove tissue from instrument 2. Change cylinder 3. Technical service
I 11 Overdose	1. Input pressure too high 2. System error	1. Replace pressure reducer 2. Technical service
I 12 Overdose	1. Input pressure too high 2. System error	1. Replace pressure reducer 2. Technical service
I. 13 Input pressure	1. No cylinder connected 2. System error	1. Connect cylinder 2. Technical service
I 150 Button pressed	1. When switching on, a button on front panel was pressed 2. Button on front panel faulty	1. Do not press any button on the front panel 2. Technical service
I 160 CUT-foot switch pressed	1. When switching on, CUT-foot switch pressed 2. Foot switch faulty	1. Do not press any foot switch when switching on 2. Technical service
I 161 COAG-foot switch pressed	1. When switching on, COAG-foot switch pressed 2. Foot switch faulty	1. Do not press any foot switch when switching on 2. Technical service
165 CUT-finger switch pressed	1. When switching on, CUT-finger switch pressed 2. Finger switch faulty	1. Do no press any finger switch, when switching on 2. Technical service
I 166 COAG-finger switch pressed	1. When switching on, COAG-finger switch pressed 2. Finger switch faulty	1. Do no press any finger switch, when switching on 2. Technical service
I 200 Programming error system page	Error reported after a page was programmed	Technical service
I 201 System page not initialized	System parameters incomplete	Technical service
I 250 Blocked hose	Tissue in instrument	Remove tissue from instrument
I 251 Pressure limitation		
I 262 Cylinders 1 and 2 are empty		Replace cylinders
I 263 Cylinder 1 is empty, 2 is nearly empty		Replace cylinder 1
I 264 Cylinder 2 is empty, 1 is nearly empty		Replace cylinder 2
I 265 Cylinders 1 and 2 are nearly empty		Use up one cylinder and then replace

CHAPTER 10

Cleaning, Disinfecting and Sterilizing

Case of the APC 300 unit

Clean and disinfect the case of the unit using a spray or wipe disinfectant. Follow to the instructions of the disinfectant manufacturer

WARNING! Do not use any flammable or explosive substances. If this cannot be avoided, they must have evaporated completely before the APC 300 and the electrosurgical unit are switched on.

Make sure that no moisture penetrates the APC 300 during cleaning and disinfection.

Pressure hoses and pressure reducers

Pressure hoses and pressure reducers must not be sterilized. A spray or wipe disinfectant may be used.

WARNING! Do not use any flammable or explosive substances. If this cannot be avoided, they must have evaporated completely before the APC 300 and the HF surgical unit are switched on.

Foot switches

Please read the respective instructions on their use.

APC applicators and probes

These accessories are continually being redesigned and developed. Please read the respective instructions on their use.

CHAPTER 11

Maintenance

Maintenance of the appliance and re-usable accessories

Maintenance of the appliance and the reusable accessories comprises preventive and corrective measures. The safety checks represent preventive measures. Alterations and repairs are corrective measures.

Regular maintenance of the appliance and accessories is intended to guarantee safety and functionality at least until the next maintenance appointment. All maintenance must be recorded in the appliance log.

Safety checks

The APC 300 should be checked for safety at least once a year. It is recommended that safety checks of the APC 300 and of the electrosurgical unit be carried out together.

The following safety checks should be carried out on the APC 300:

- Function check of the cylinder valve
- Function check of the pressure reducer
- Check of the gas hoses
- Check on the leak-tightness of all connections
- Safety check on the protective conductor connections
- Safety check on the leakage current
- Function check of all optical signals
- Function check of foot switches and finger switches

System diagnosis programs

- Tone generator test
- Display test
- Checking keyboard
- Testing actuation signals
- Display of output pressure
- Flow measurement region 1
- Flow measurement regions 2 and 3
- Display of pressure in cylinder 1
- Display of pressure in cylinder 2

- Instrument identification
- Actuation identification
- Supply voltage - 12V
- Reference voltage + 10V
- Proportional valve test
- Relay and valve test

Alterations and Repairs

Alterations and/or repairs to the unit and/or accessories must not result in a loss of safety to the patient, the operator or the environment.

For this reason alterations and repairs to the unit and/or accessories may only be carried out by the manufacturer or persons expressly authorized to do so.

If unauthorized persons perform inappropriate alterations and repairs, the manufacturer cannot be held responsible. In addition, the guarantee will become invalid.

CHAPTER 12

Service and Warranty**Service**

In order to prevent accidental injuries due to faults occurring in, or to failures of the equipment or of any of its accessories, the equipment and all of its accessories should be regularly checked for proper and safe operation. These checks should be performed exclusively by personnel whose knowledge, training and practical experience qualifies them to perform such checks. A maintenance contract with ERBE is thus advisable after the warranty period.

Warranty

Transport damage The unit and accessories must be inspected immediately on receipt for deficiencies and transport damage. Claims for compensation can only be enforced when the seller or carrier are notified without delay. A damage report must be compiled.

Equipment warranty For warranty conditions ask your local dealer.

Claims under warranty are valid only when the warranty certificate has been properly completed. The warranty covers free repair of the unit provided that the deficiency has been caused by material or manufacturing faults. Other claims, particularly claims for compensation are excluded.

Repairs may only be performed by the equipment's manufacturer or by authorised service agents. Claims under warranty are invalidated if improper modifications or repairs have been undertaken.

Repair work performed under warranty neither extends nor renews the warranty.

CHAPTER 13

Technical Data, Standard Parameters Programmed by ERBE

Technical Data

APC 300 Typ No. 10132-010 Standard version

Supply voltage	100-230 V 50 / 60 Hz
Current input	0.3 A
Mains fuse	T 1 A
Power consumption in Standby mode	20 watts
Power consumption at max. HF power	28 watts
Operating mode	Intermittent operation ON time 25 % (e.g. activated for 10 sec. / deactivated for 30 sec.)
Protective Class according to EN 60 601-1	I, CF
Classification according to EC Directive 93/42/EEC	Class IIb
Potential equalization	Yes
Cylinder connections	2 connections, 2 cylinders 5 l recommended
Input pressure of cylinder connections when gas cylinders are connected	Minimum 2.5 bar (36.25 psi), maximum 4.5 bar (65.25 psi)
Maximum input pressure of cylinder connections when central gas supply is connected	2.5 bar (36.25 psi)
Maximum cylinder pressure	200 bar (2900 psi)
Minimum purity of argon	99.998 %
Maximum gas flow rate	from 0.1 l/min to 9 l/min regulated argon flow with pressure limitation
Modes of actuation	Foot switch or finger switch
Automatic instrument identification	Yes
Automatic flow setting	Yes
Plain language error messages	Yes
Size of APC 300	W x H x D 410 x 105 x 380 mm, W x H x D 16.1 x 4.1 x 14.9 inches
Weight of APC 300	6.8 kg
Size of equipment trolley	410 x 820 x 445 mm, 16.1 x 35.2 x 17.5 inches
Environmental conditions for shipping and storage of the unit	Temperature -40°C to + 70°C Air humidity, relative 10% to 95%
Environmental conditions for operation of the unit	Temperature +10°C to + 40°C Air humidity, relative 30% to 75%, noncondensing

Standard Parameters programmed by ERBE APC 300 Standard Version

Instrument no.	COAG flow [l / min]	CUT flow [l / min]	Purge flow [l / min]	Purge Time [sec]
0	2.0	3.6	2.0	2.0
1	0.1	0.0	0.1	2.0
2	0.3	0.0	0.5	2
3	2.0	0.0	0.5	2.0
4	1.8	3,6	0.5	2.0
5	1.8	0.0	0.5	2.0
6	3.0	0.0	0.5	2.0
7	1.4	1.4	0.5	2.0
8	1.4	0.0	0.5	2.0
9	not yet in use	not yet in use	not yet in use	not yet in use
10	not yet in use	not yet in use	not yet in use	not yet in use

CHAPTER 14

Information on Electromagnetic Compatibility (EMC)

Where EMC is concerned, medical electrical equipment is subject to special safety measures and must be installed and commissioned according to the EMC instructions stated herein.

Guidelines for avoiding, recognizing and rectifying unwanted electromagnetic effects on other equipment or systems that are the result of operating the APC 300.

When the APC 300 is activated with an electrosurgical unit connected, disturbance of other equipment or systems in the immediate vicinity can occur. This can be recognized as, for example, image artifacts in imaging devices or unusual fluctuations in measured value displays.

Such disturbances from an activated electrosurgical unit can be reduced by placing it further away and/or carrying out suitable shielding measures on the equipment or system experiencing disturbance.

When the APC 300 is in the nonactivated state with an electrosurgical unit connected, interference with other equipment in the immediate vicinity does not occur.

ATTENTION

The use of internal cables other than those specified in the Service Manual may result in increased emissions or decreased immunity of the equipment.

ATTENTION

The equipment should not be used adjacent to or stacked with equipment, other than with that which is intended for this purpose. If adjacent or stacked use is necessary, the entire system should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration - electromagnetic emissions

The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
HF emissions CISPR 11	Group 1	In the stand-by state the equipment uses HF energy only for its internal function. Therefore its HF emissions are very low in the stand-by state and are not likely to cause any interference in nearby electronic equipment.
HF emissions CISPR 11	Class A	The device is suited for use in environments other than domestic areas and in ones directly connected to a public power supply system that also supplies buildings being used for domestic purposes
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity

The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with non-conductive synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 s	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the equipment requires continued operation during power mains interruptions, it is recommended that the equipment be powered from an uninterruptible power supply or a battery.
Power frequency (50/ 60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: U_T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity

The equipment is intended for use in the electromagnetic environment specified below. The customer or the user of the equipment should ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile HF communications equipment should be used no closer to any part of the equipment, including cables, than the recommended separation distance. The separation distance is calculated from various equations depending on the frequency of the portable and mobile HF communications equipment:
			Recommended separation distance
Conducted HF IEC 61000-4-6	3 V _{rms} 150 kHz to 80 MHz	3 V _{rms}	Equation 1) $d=1.2 P^{1/2}$
Radiated HF IEC 61000-4-3	3 V/m 80 MHz to 800 MHz	3 V/m	Equation 2) $d=1.2 P^{1/2}$
	3 V/m 800 MHz to 2.5 GHz	3 V/m	Equation 3) $d=2.3 P^{1/2}$
			<p>P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer. d is the recommended separation distance in metres (m). Field strengths from fixed transmitters, as determined by an electromagnetic site survey) should be less than the compliance level in each frequency rangeb). Interference may occur in the vicinity of equipment marked with the following symbol:</p> 

Guidance and manufacturer's declaration - electromagnetic immunity

Note 1: At 80 MHz equation 2) applies At 800 MHz equation 3) applies

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a) Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed HF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the equipment is used exceeds the applicable compliance level above, the equipment should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the equipment.

b) Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m. Über den Frequenzbereich von 150 kHz bis 80 MHz ist die Feldstärke kleiner als 3 V/m.

Recommended separation distances between portable and mobile HF communications equipment and the equipment

The equipment is intended for use in an electromagnetic environment in which radiated HF disturbances are controlled. The customer or the user of the equipment can help prevent electromagnetic interference. This can be achieved by maintaining the minimum distance recommended below between the communications equipment (transmitters) and the equipment. The minimum distance depends on the maximum output power and the frequency of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d=1.2 P^{1/2}$	80 kHz to 800 MHz $d=1.2 P^{1/2}$	800 MHz to 2.5 GHz $d=2.3 P^{1/2}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance can be determined using the equation applicable to the frequency of the transmitter. P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: An additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in the frequency bands between 80 MHz and 2.5 GHz to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Notes on Using Electrosurgical Devices of other Manufacturers in Combination with the APC 300

Connect the APC 300 HF input with the monopolar HF output for footswitches (monopolar active receptacle for footswitch).

Connect the APC 300 output for actuation signals with the monopolar footswitch receptacle.

The connection and actuation of the instruments largely corresponds to the APC 300 - ICC 300 connection and actuation configurations. You will find these in chapter 8.

WARNING!

Read the operating instructions of the electrosurgical unit and the APC 300. After connecting up the instruments it is imperative (!) that you are clear about which instrument is actuated with which button and which footswitch. If in doubt ask an ERBE employee to explain the connection and actuation configurations.

When you use ERBE instruments and accessories, ERBE Elektromedizin accepts liability. Instruments and accessory parts not manufactured by ERBE must be approved by an authorized testing agency.

A series of electrosurgical units of other manufacturers can be used in combination with the APC 300. Please ask your ERBE branch which these are. You will find the address at the back of this manual.

Glossary

Application programs

Programs in which the user can store, at a series of addresses, COAG flow, CUT flow settings and in addition, a preferred cylinder number, for instance.

Argon plasma

Plasma state of argon. A plasma is a gaseous mixture of electrically charged ions, electrons, and, if present, electrically neutral atoms or molecules.

Argon plasma coagulation

Coagulation method in which HF-current is conducted to tissue via ionized argon (argon plasma).

COAG flow, CUT flow defaults

Values programmed by ERBE at the Instrument numbers.

COAG flow, CUT flow

Amount of argon, in units of l/min, which is to flow from the applicator when CUT or COAG is actuated.

COAG flow, CUT flow maximum parameters

Maximum flow which the user can set for a particular instrument.

Connection cable with two 4-pin plugs no. 20189-022, connection cable with 4- and 7-pin plugs no. 20132-063

Connection cables for transmitting the actuation signals from the APC 300 to the ICC generator.

Default settings for rinse duration and rinse flow

Values set by ERBE at the Instrument Numbers.

Dosage

Argon in l/min.

HF-cable no. 20192-082 or 20192-126

Cable for conducting the high frequency current from the ICC generator to the APC 300.

Information line

A line in the standard display. Here, plain language error messages and warnings are shown.

Instrument identification facility

For assigning an instrument to a particular Instrument number by means of a coding. With the aid of the instrument identification facility, the APC 300 automatically sets the COAG flow, CUT flow, rinse flow and rinse duration for each instrument.

Instrument Number

Memory location e.g. 1, where COAG flow, CUT flow, rinse flow and rinse duration of an instrument are stored.

Instrument rinse parameters

Rinse duration and rinse flow rate.

Ionization

Removal or addition of an electron from or to an atom or molecule. The electrically charged atoms or molecules thus formed are known as ions. Ions can, like electrons, conduct electrical charges.

Menu

For example a list of programs from among which the user can make a selection.

Overdose

The actual COAG flow, CUT flow rate is greater than the flow rate that was set.

Plasma channel

Ionized path within the argon cloud, through which the HF-current flows between the active electrode and the surface of the tissue.

Pressure pipe

Connection between argon cylinder and cylinder connections.

Pressure reducer

This is screwed onto the argon cylinders. It is necessary in order to achieve the APC 300's input pressure.

Programm selection menu

Main menu for selecting programs. The menu reached on leaving the standard display.

Programs

Aids used to modify the APC 300 to suit the user's individual needs and environmental conditions.

Program structure

Nesting of the APC 300's programs.

Purge time

If you call the rinse program, the applicator is rinsed with a certain amount of argon (purge flow rate) during a certain period (purge time).

Purge flow

Amount of argon, in units of l/min, which is to flow into the applicator when the purge program is actuated. The applicator must be rinsed with argon before it is actuated for the first time.

Settings for COAG flow, CUT flow

e.g. 2 l/min

Settings for purge time and purge flow

2 sec, 2 l/min, for instance.

Shell

Graphical interface of the APC 300. Interface for communication between the user and the software.

Standard display

Display for controlling CUT flow, COAG flows and for controlling all functions during operation of the APC 300. The APC can only be activated via this display.

System test

Self check and functional test.

Self check = Testing of pressure sensors.

Functional test = Testing the keys on the front panel, foot switches, finger switches, gas supply.

Self check error = an error was discovered during self check.

Functional test error = an error was discovered during functional test.

Underdose

The actual COAG flow, CUT flow rate is smaller than the flow rate that was set.

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