

**BS**  
**CR4 AA**  
**CR6 AA**  
**CR6-PS AA**

**Including**

**Ergonomic Sealing Handle, MSH-III**  
**Manual Sealing Handle**  
**Bench Unit**

**User's Manual**  
**and**  
**Technical Reference**



**LJUNGBERG & KÖGEL AB**

Rev: 2021-02-05



## Important

This user's manual is written for the person responsible for the operation of a BS CR4 AA, CR6 AA or CR6-PS AA. The operational methods and routines are developed and tested to ensure a reliable, safe and effective operation. It is important that the user has studied and understood the contents of this manual before using the product.



- This instrument is a sealing equipment using radio frequency for welding and the electrical emission at the operating frequency 40.68 MHz is high. Make sure that other instruments and equipment near the sealing unit can withstand this emission.
- Never touch the electrodes with your fingers during the sealing process since this may cause burn damages.
- Ensure that the PVC tube is dry on the surface.

### **Electrical safety**

Only use the battery charger intended for your model of BS (or a charged of another manufacturer recommended by the manufacturer of the BS) and make sure it is marked with the correct mains voltage.

### **Battery**

The battery contains NiMh and is not considered to be dangerous for the environment but should be left to a recycling station for recycling.

### **Disposal**

The products contain electronic components and must be left to a recycling station when disposed. The BSs contain electronic components which are classified as dangerous for the environment and the equipment must be left to a recycling station when disposed.

### **Environmental effects**

The products contains none or insignificant parts of the forbidden hazardous substances in RoHS directive 2002/95/EG but should be left to a recycling station when disposed.

### **Contact details**

|                            |  |  |
|----------------------------|--|--|
| Manufacturing and service: | Abelko Innovation<br>Industrivägen 17<br>972 54 Luleå<br>Tel. +46920450600 | Abelko Innovation<br>Box 808<br>971 25 Luleå |
|----------------------------|--|--|

|            |  |
|------------|--|
| Marketing: | Ljungberg&Kögel AB<br>Box 1032<br>251 10 Helsingborg<br>Tel. +4642139860 |
|------------|--|

## **Feedback**

Abelko Innovation is committed to develop high-quality equipment and technical services to all our customers. We welcome any inputs on technical issues that are encountered so that they can be resolved quickly and in the most appropriate manner. Please submit your comments/feedbacks through your local distributors or alternatively email us directly at [info@abelko.se](mailto:info@abelko.se).

## **Warranty**

- (1) The manufacturer hereby guarantees the original buyer that the product is manufactured in a professional and quality manner, and will be free from all faults during a period of one year from the date of delivery from the manufacturer.
- (2) The warranty includes equipment or components that prove to have faults during the warranty period. The manufacturer will without cost for the customer, repair or replace the equipment that is faulty.
- (3) The warranty is not valid if the equipment has been repaired by anyone else than qualified personnel, approved by the manufacturer.
- (4) The warranty is not valid if the equipment has been changed in any way that according to the manufacturer's opinion, affects the reliability or stability of the instrument.
- (5) The warranty is not valid when the serial number has been changed, crossed over or been removed, or if the fault has been caused by misuse or abnormal use.
- (6) In these cases, the manufacturer or the manufacturer's representative will inform the customer about the decision, and if wished by the client will repair the equipment for normal rate. An estimated price can be given on request.

---

### Document history

2015-04-14: Cable length changed from 4.3 to 4.2m. Note about charger added  
2015-04-20: Cable length for MSH updated  
2017-11-06: Page 1: Revision added  
Page 3, 38: Updated addresses and telephone numbers.  
2018-09-28: Page 37: Weight of ergonomic handle updated  
2020-05-15: DoC update  
2021-02-05: Sealer name and DoC update

|     |   |    |
|-----|---|----|
| 1   | Description .....   | 7  |
| 1.1 | CR 4 AA .....   | 8  |
| 1.2 | CR6 AA .....  | 9  |
| 1.3 | CR6-PS AA.....  | 10 |
| 1.4 | Handle Unit, Ergonomic Sealing Handle (MSH-III).....        | 11 |
| 1.5 | Handle Unit, Manual Sealing Handle .....                    | 11 |
| 1.6 | Bench Unit .....  | 12 |
| 2   | How to use the products .....                               | 13 |
| 2.1 | Operation with the Ergonomic Sealing Handle (MSH-III).....  | 13 |
| 2.2 | Operation with the Handle Unit (Manual sealing handle)..... | 14 |
| 2.3 | Operation with the Bench Unit .....                         | 15 |
| 3   | Maintenance.....  | 16 |
| 3.1 | Cleaning the electrodes .....                               | 16 |
| 4   | Adjustments.....  | 18 |
| 4.1 | Manual setting of timer .....                               | 18 |
| 4.2 | Charging the batteries (does not apply to CR4 AA).....      | 19 |
| 4.3 | Change of batteries (does not apply to CR4 AA) .....        | 20 |
| 4.4 | RF-unit (High frequency generator) .....                    | 21 |
| 5   | Technical description.....                                  | 22 |
| 5.1 | CR4 AA .....  | 22 |
| 5.2 | CR6 AA and CR6-PS AA.....                                   | 22 |
| 5.3 | Sealing Function .....                                      | 22 |
| 6   | Trouble shooting.....                                       | 24 |
| 6.1 | Cable length .....  | 26 |
| 7   | Spare parts .....   | 27 |
| 7.1 | CR4 AA .....  | 27 |
| 7.2 | CR6 AA .....  | 28 |
| 7.3 | CR6-PS AA.....  | 29 |
| 7.4 | Manual sealing handle .....                                 | 30 |
| 7.5 | Bench Unit .....  | 31 |
| 7.6 | Ergonomic Sealing Handle, MSH-III .....                     | 32 |
| 8   | Technical data.....   | 33 |
| 8.1 | Power units .....   | 33 |
| 8.2 | Sealing units.....  | 34 |



# 1 Description

There are three different types of power units, CR4 AA, CR6 AA and CR6-PS AA. AA stands for Automatic Adjust which means that the sealing time is automatically adjusted depending on which tube that is being sealed.

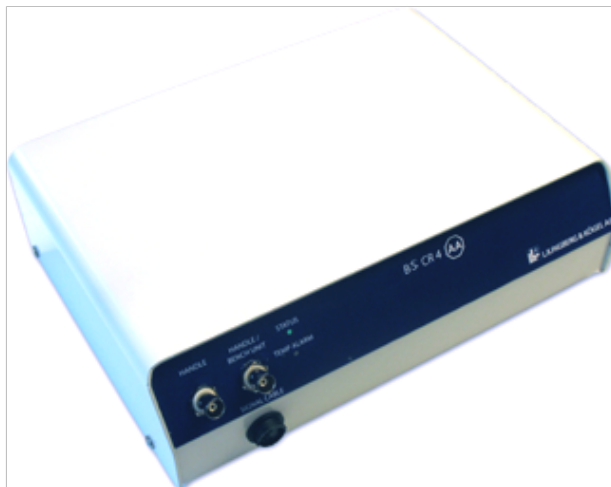
CR4 AA is powered from the mains network while CR6 AA and CR6-PS AA is battery powered.

There are two types of sealing handles, Manual Sealing Handle and Ergonomic Sealing Handle (or MSH-III) and a bench unit. The sealing handles are operated by hand and the bench unit will automatically seal when a tube is inserted.

The high frequency generator, HFG, together with the specially designed electrodes gives a wide and safe seal of about 3mm with a marking in the middle that makes it easier to pull the tubes apart. The electrodes is adjusted for tubes of 4-5 mm thickness but can on demand be adjusted for tubes of up to 6,5 mm.

The sealing gives easy separation and leakage check. Sealing is done in 1-2 sec depending on type of tube. Before sealing, the microprocessor controlled timer board checks that the tube is not moist, to avoid sparks and thereby leakage.

## 1.1 CR 4 AA



BS CR 4 AA is a model for continuous use, built for sealing PVC-tubes, PVC/EVA and EVA-tubes, especially blood bags tubes or sets for plasmapheresis. It has a powerful HF-unit (high frequency), which makes it suitable both for routine procedures at donation rooms and repeated operations at preparation rooms without overheating.

The CR 4 AA can either be connected to a Handle Unit and a Bench Unit or two Handle Units. The Bench Unit automatically seals when a tube is in position.

### 1.1.1 Connectors and indicators

|                          |  |
|--------------------------|--|
| <b>HANDLE</b>            | BNC contact for HF output to a Handle Unit   |
| <b>HANDLE/BENCH UNIT</b> | BNC contact for HF output to a Handle Unit or a Bench Unit   |
| <b>SIGNAL CABLE</b>      | Signal output for controlling the Bench Unit electromagnet   |
| <b>STATUS</b>            | BI-colour LED indicating power on (fixed green), sealing (blinking orange) or some error (blinking red)  |
| <b>TEMP ALARM</b>        | If the temperature of the high frequency generator exceeds alarm level, set to 75°C, this diode is lit. Sealing cannot be done before the RF-generator has cooled down and the diode is turned off |



## 1.2 CR6 AA



BS CR6 AA is battery operated sealing unit for PVC-tubes, PVC/EVA and EVA-tubes especially suitable for tubing from blood bags and tubing from sets for plasmapheresis.

The CR6 AA can either be connected to a Handle Unit or a Bench Unit. The Bench Unit automatically seals when a tube is in position.

With a new and fully charged battery it can make 1500 seals (1200 with the Bench Unit) on a 4-5 mm PVC tube. This high capacity makes it suitable to use CR6 AA either mobile or stationary in donation rooms and laboratories.

Optionally there is a carry bag for mobile use.

### 1.2.1 Connectors and indicators

|                     |   |
|---------------------|---|
| <b>power</b>        | Power switch used to turn the sealer on and off   |
| <b>status</b>       | When the power switch is turned on, both the lamp for status and battery will turn green. When the status lamp is green, a new sealing can be done. After a sealing is done, the lamp goes off and as soon as it starts to shine green it is ready to be used again |
| <b>temp alarm</b>   | If the temperature of the high frequency generator exceeds alarm level, set to 75°C, this diode is lit. Sealing cannot be done before the RF- generator has cooled down and the diode is turned off   |
| <b>battery</b>      | Check of battery capacity is done after each seal, and <b>battery</b> is green when it is 50-100% left, orange for 25-50% and red when there is less than 25% left. If the lamp is orange or red the battery must be recharged before operation                     |
| <b>RF-OUT</b>       | BNC contact for HF output to a Handle Unit  |
| <b>Signal cable</b> | Signal output for controlling the Bench Unit electromagnet  |
| <b>Charger</b>      | Inlet for battery charger   |

### 1.3 CR6-PS AA



BS CR6-PS AA is a battery operated sealing unit for PVC, PVC/EVA and EVA-tubes using environmentally approved cadmium-free NiMH batteries. With new and fully charged batteries it manages more than 500 seals on 4-5 mm PVC-tubes. This high capacity makes it suitable to use CR6-PS AA both in donation rooms and in laboratories.

The CR6-PS AA can be connected to a Manual Sealing Handle or an Ergonomic Sealing Handle, MSH-III.

#### 1.3.1 Connectors and indicators

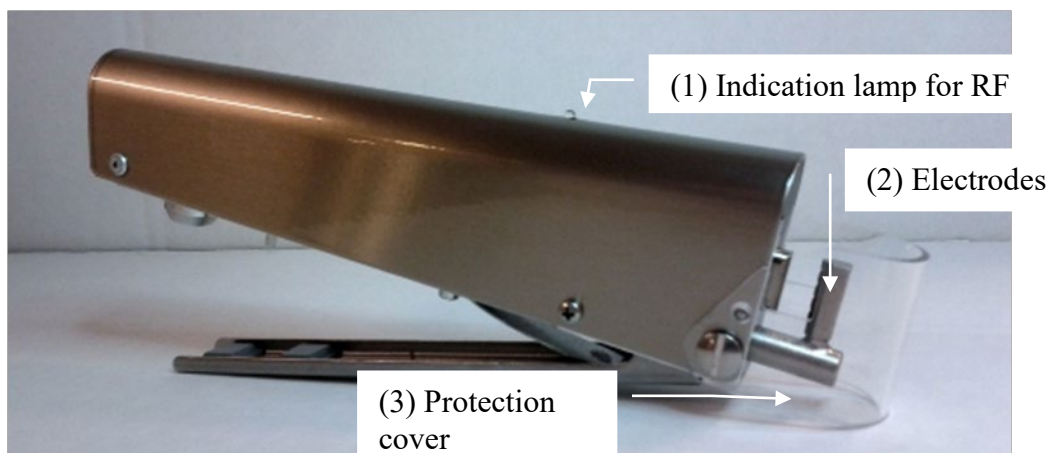
|                   |  |
|-------------------|--|
| <b>SEALING</b>    | When a sealing starts, this yellow diode is lit. A new seal can be made immediately after the diode has been turned off  |
| <b>TEMP ALARM</b> | If the temperature of the high frequency generator exceeds alarm level, set to 75 °C, this diode is lit. Sealing cannot be done before the RF- generator has cooled down and the diode is turned off   |
| <b>BATT COND</b>  | The battery can be tested any time by pressing this button. The <b>BATT COND</b> indicator will show the battery capacity in the same way as after each seal with green light for 70-100%, orange light for 25-70% and red light when capacity is less than 25%. If the lamp is orange or red the battery must be recharged before operation |
| <b>ON/OFF</b>     | Power switch used to turn the sealer on and off  |
| <b>RF-OUT</b>     | BNC contact for HF output to a Handle Unit   |

#### 1.4 Handle Unit, Ergonomic Sealing Handle (MSH-III)



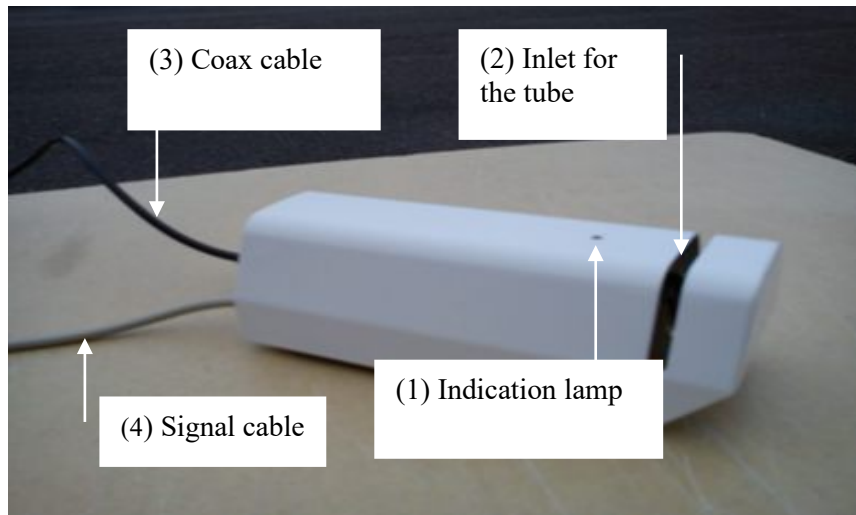
- (1) **Sealing indication.** Is blinking blue during sealing process and turns to green when ready.
- (2) **Electrodes.** Transfers the high frequency energy to the tube. The tube to be sealed is placed between the electrodes.
- (3) **Protection cover.** Protects electrodes from damage and also prevent unintentional finger contact with electrodes.
- (4) **Coaxial cable.** Transfers the RF-energy from the power unit to the handle unit.

#### 1.5 Handle Unit, Manual Sealing Handle



- (1) **Sealing indication.** This is a neon lamp that is lit by the RF-power. Is lit as long as the sealing is in progress.
- (2) **Electrodes.** Transfers the high frequency energy to the tube. The tube to be sealed is placed between the electrodes.
- (3) **Protection cover.** Protects electrodes from damage and also prevent unintentional finger contact with electrodes.
- (4) **Coaxial cable.** Transfers the RF-energy from the power unit to the handle unit (not in picture).

## 1.6 Bench Unit



- (1) **Sealing indication.** This is a neon lamp that is lit by the RF-power. Is lit as long as the sealing is in progress.
- (2) **Tube inlet.** A slot where the tube is inserted prior to a seal. The tube will be automatically sealed when the tube is inserted.
- (3) **Coaxial cable.** Transfers the RF-energy from the power unit to the handle unit.
- (4) **Signal cable.** Used by the power unit to start a seal when a tube is inserted.

## 2 How to use the products



- Always turn the power off before you connect or disconnect cables.
- Always use the coax cable that is delivered with the equipment. It is not allowed to extend the cable. If you need a longer cable, order one from Ljungberg & Kögel, see spare parts list.
- When sealing a tube on two or more places the distance between the seals must be more than 50 mm. Shorter distance may cause leakage.

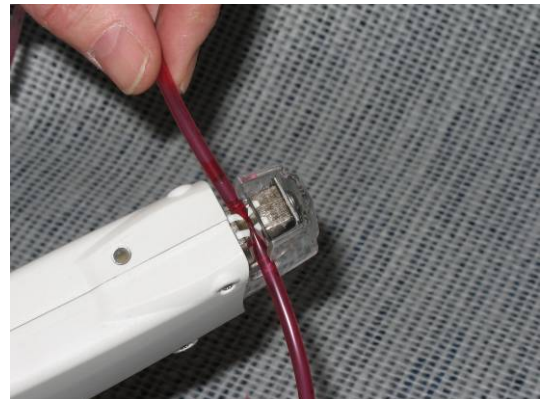
### 2.1 Operation with the Ergonomic Sealing Handle (MSH-III)

#### 2.1.1 Connection of Ergonomic Sealing Handle

- 1) Connect the Handle Unit to the HF-contact on the Power Unit with the coax cable.

#### 2.1.2 Sealing with Ergonomic Sealing Handle

- 1) Place the tube in the slot of the Handle Unit.
- 2) Press the Handle Unit. The sealing indication on the Handle Unit is blinking blue during the seal process and turns to green when ready after about 1-2 sec.

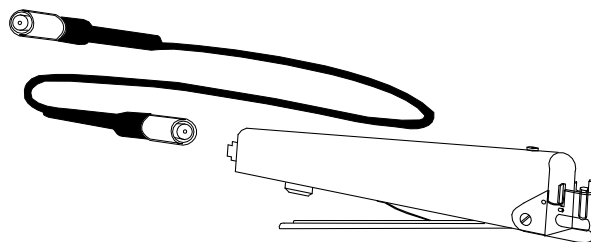


- Do not release the handle while sealing is in progress since this may cause leakage.
- Continuous sealing with an interval of 1 seal/sec during several minutes may cause overheating of the Power Unit or the electrodes with a declined quality of the seals or cause a temperature alarm on the Power Unit. Let the sealing unit cool down.

## 2.2 Operation with the Handle Unit (Manual sealing handle)

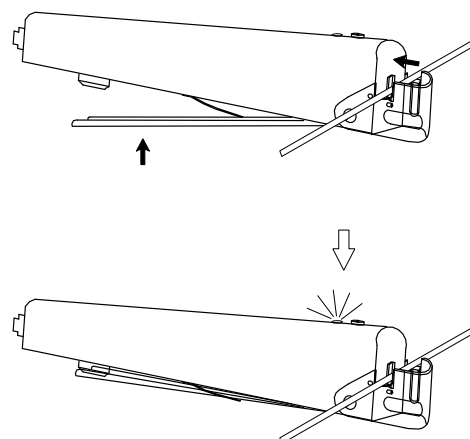
### 2.2.1 Connection of Handle Unit

- 1) Connect the Handle Unit to the RF-contact on the Power Unit with the coaxial cable.



### 2.2.2 Sealing with Handle Unit

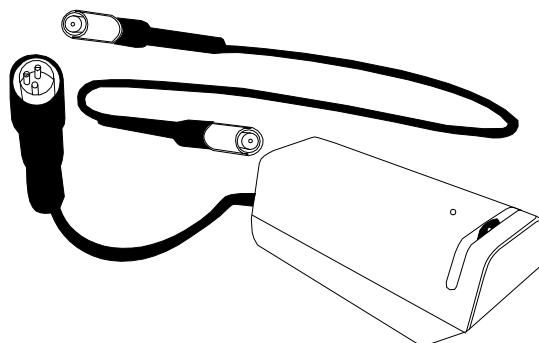
- 1) Place the tube in the slot of the Handle Unit.
- 2) Press the Handle Unit. The sealing indication on both the Power Unit and the Handle Unit is lit.
- 3) The tube is sealed in approx. 1 sec. Wait a short moment (0.5 sec) after the indication is turned off to let the seal cool down before releasing the tube.



## 2.3 Operation with the Bench Unit

### 2.3.1 Connection of Bench Unit

- 1) Connect the Bench Unit to the HF-contact on the Power Unit with the coax cable.
- 2) Connect the signal cable from the Bench Unit to the signal contact on the Power Unit.

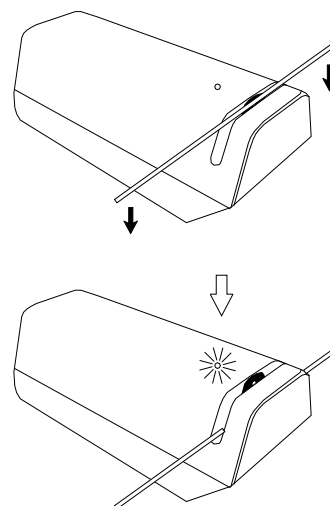


### 2.3.2 Sealing with Bench Unit

- 1) Place the PVC-tube in the slot of the Bench Unit.
- 2) The sealing automatically starts, and the indication diodes are lit on the Power Unit and the Bench Unit.

**Note!** Do not pull the PVC-tube when sealing.

- 3) The PVC-tube is sealed in approx. 1-2 sec. The electrodes automatically release the tube and the indication is switched off.



### 3 Maintenance

Maintenance to be done by the operator is limited to cleaning. All other service must be done by an approved service personnel.

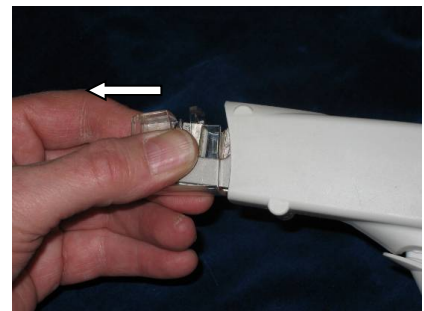
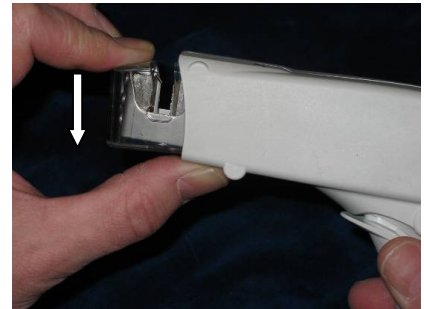


- Always turn the power off before cleaning the electrodes

#### 3.1 Cleaning the electrodes

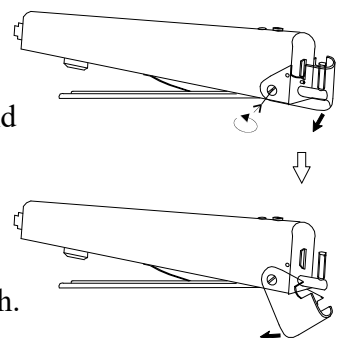
##### 3.1.1 Ergonomic Sealing Handle, MSH-III

- 1) Remove the coaxial cable from the handle unit.
- 2) Remove the protective cover by first pressing the front down as shown in the figure and then pulling it forwards.
- 3) Clean both electrodes with distilled water.
- 4) Dry up the electrodes carefully with a soft and lint-free cloth.
- 5) Reconnect the coax cable.



##### 3.1.2 Manual Sealing Handle

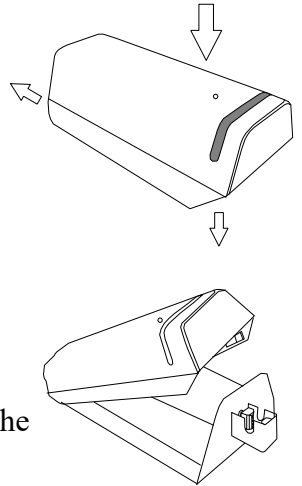
- 1) Remove the coax-cable from the handle unit.
- 2) Loosen the two screws holding the protection cover a bit and tilt it down.
- 3) Clean both electrodes with distilled water.
- 4) Dry up the electrodes carefully with a soft and lint-free cloth.
- 5) Tilt up the protection cover and fasten it with the two screws.
- 6) Reconnect the coax cable.





### 3.1.3 Bench Unit

- 1) Remove the coax-cable from the Bench Unit.
- 2) Press gently on top of the cover and pull the lever for the locking device on the backside. This will release the cover locking.
- 3) Lift the cover.
- 4) Clean both electrodes with distilled water or alcohol.
- 5) Dry up the electrodes carefully with a soft and lint-free cloth.
- 6) Put the cover back in position by pressing the cover while pushing the locking device.
- 7) Reconnect the coax cable.



- A more complete cleaning may be done by opening the cover. Unplug the coax cable and pull the locking clamp backwards.

## 4 Adjustments



- The voltage that occurs during sealing may cause burn damages if someone touches the electrodes during the sealing process. Therefore it is absolutely necessary to turn off the power before cleaning or service any of the units.

### 4.1 Manual setting of timer



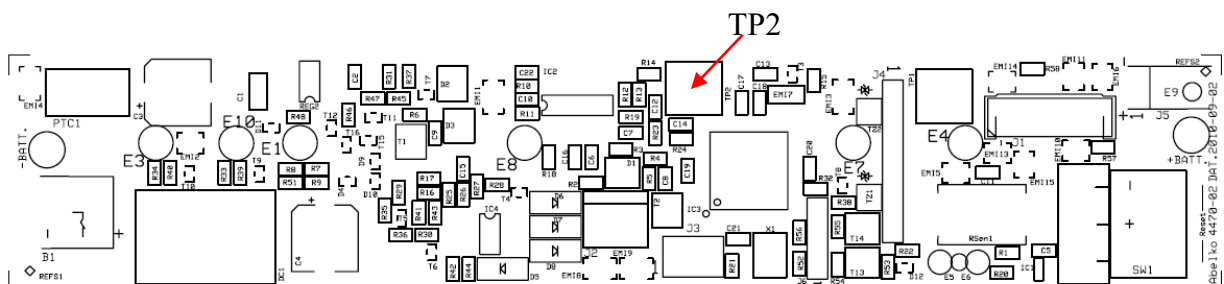
- This is an operation that must be done by an authorized technician. We recommend not using manual timer since this may cause overheated RF generator or solenoid in the Bench Unit. It should only be used for very special tubes.
- Manual setting of timer will shut off the automatic timer function. It is not recommended except in special cases.
- Please contact Ljungberg & Kögel if in doubt.

When sealing thick or stiff PVC or EVA tubes, it may be necessary to increase the seal time more than what you get with the autotimer.

In CR4 AA and CR6 AA you will need to locate TP2 to make the adjustment. Lift the cover off by unscrewing the 4 screws on the side.

In CR6-PS AA the timer can be manually set with the potentiometer TIMER ADJ with a small screwdriver on the front of the power unit.

Turning the potentiometer to more than 20% turns on the manual timer and the timer will be set from 2 to 10 sec. (potentiometer 20-100%).



## 4.2 Charging the batteries (does not apply to CR4 AA)

The "Battery charger for CR6 AA" and the "Battery charger for CR6-PS" is specially designed for charging the NiMH batteries powering CR6 AA and CR6-PS AA. It is medical approved according to EN 60601-1 and UL recognized for US and Canada.

It has a controlled charging procedure which is vital to avoid overcharge of batteries since this will shorten the working life. The controller is using both DeltaV sensing and timeout limits. DeltaV sensing is a method to recognize when battery is fully charged since at this point the voltage starts to decrease instead of increase depending on temperature rise in battery.



- Only use the battery charger specific for your model of sealer. Only charger from Ljungberg & Kögel may be used.

1. Check that the local mains supply corresponds to the charger type sign.
2. Connect the power supply cord to the charger and then to the AC-line and the low voltage connector to the input at the back side of the sealer marked **BATTERY CHARGER INLET**. It is ok to connect the charger to the sealer first and then to the mains power.



- Check that the charging led on the charger will be orange or red when the charging is started. If it is green directly after start the mains cable must be unplugged and reconnected once again.

1. A battery with a capacity of 25% (red light) is fully loaded within 6-8 hours for CR6 AA and 1-2 hours for CR6-PS AA.
2. Since this is a NiMH battery pack it should never be overcharged. The recommendation for longest working life is to use the sealer unconnected to mains until the **BATTERY** turns orange and then recharge it.
3. Sealing can be done when the charger is connected.
4. Sealing can be done with the needle in the arm with or without connected charger.
5. It lacks significance whether the sealer is turned on or off during charging.
6. Avoid to completely unloading the battery since this will shorten the life of the battery.
7. The working life of the battery depends on the amount of charging cycles and the surrounding temperature included the temperature rise that occurs when batteries are overcharged. Typical expected working life is 3 years with a charging frequency of 200 cycles/year in a surrounding temperature of 25°C. Deep discharging and overcharging shortens working life.

8. If the sealer is not used for a while, the battery needs maintenance recharging every 3 months.
9. If the battery has been completely discharged during some time it may need repeatedly charging and discharging to obtain full capacity.

### **4.3 Change of batteries (does not apply to CR4 AA)**

When the battery capacity begins to be insufficient for one day sealing, the batteries has to be changed.



- Change of batteries must be done by approved service personnel.
- The battery charger and the handle must be disconnected when the batteries are changed.
- The BS must be turned OFF.
- Always use battery packs from Ljungberg & Kögel.

#### **4.3.1 CR6 AA**

1. Unscrew the 4 screws holding the cover and remove it.
2. Loosen the battery cables (red and black).
3. Unscrew the 2 screws to the battery holder, now the battery pack can be removed.
4. Change battery pack and reassemble in reversed order.



- The battery used in CR6 AA contains NiMh and is not considered to be dangerous for the environment but should be left to a recycling station for recycling.

#### **4.3.2 CR6-PS AA**

1. Unscrew the 4 screws holding the back plate and remove it.
2. Lift carefully out the battery pack and loosen the connections to the battery.
3. Replace with a new one of the same model and connect the cables, red to red and black to black, and put the cables back as they were before.
4. Put the back plate back and fasten it with the 4 screws.

#### 4.4 RF-unit (*High frequency generator*)



- Due to regulations of maximum emission (radiation) at other frequencies than 40,68 MHz, the HFG-01 module is soldered up and shall be regarded as a component. It cannot and it is not allowed to be adjusted or repaired by anyone else than the manufacturer. In the event of malfunction of HFG-01 or HFG-02 it must be sent to the manufacturer for repair.

## 5 Technical description

### 5.1 CR4 AA

CR4 AA consists of a High Frequency Generator (HFG) module operating at 40,68 MHz with a maximum output power of 100W. The HFG is a complete module mounted on the backside of CR 4 AA to achieve the best possible cooling. The HFG is provided with power, 24 V, from a 200W medical approved power supply.

### 5.2 CR6 AA and CR6-PS AA

BS CR6 AA and CR6-PS AA consists of a High Frequency Generator (HFG), operating at 40,68 MHz with a maximum power of 100W. The HFG is a complete module mounted in the Power Unit. The HFG is provided with power (24 V) by a NiMH battery pack. The batteries do not need maintenance and are charged with a special NiMH charger.

### 5.3 Sealing Function

The sealing function is controlled by the timer board mounted on the HFG. The timer board consists of a microprocessor which governs all functions. When the Handle Unit is pressed, or when a tube is placed in the Bench Unit, the connection from the central conductor in the coax cable to ground is released and a DC-voltage of 5 V is supplied from the timer board.

This voltage is recognized by the microprocessor on the timer board. The processor first checks if there is any leakage of current between the electrodes, if so, this indicates moist on the tube. The limit is set to 6 $\mu$ A. If the value exceeds this limit, the seal is cancelled and an indication is given by the diode **STATUS** which is flashing red indicating "Moist on tube". There will also be an audible warning signal. This means that the tube is damp and that there is a risk for sparking and leakage. Let the tube dry and try again.

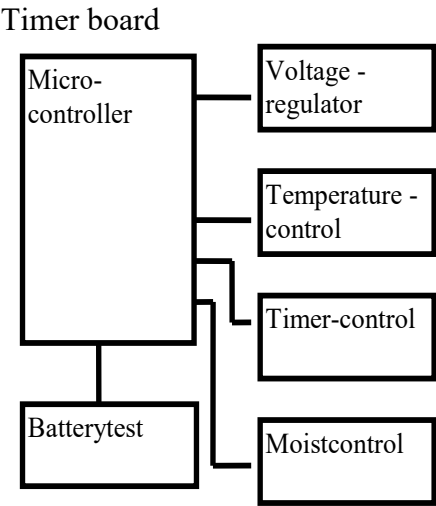
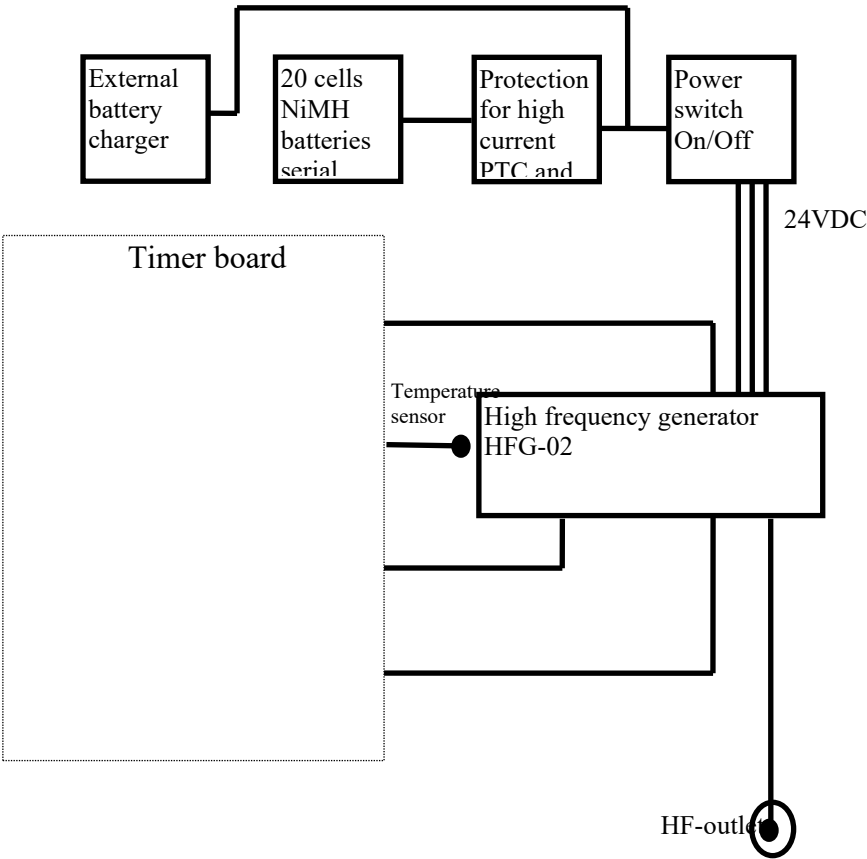
If no moist is found the HF generator is turned on. The microprocessor has an automatic sensing algorithm which turns off the HFG when the seal is finished. After this, there is a cooling period of 500ms to let the seal cool down, and then the seal is completed. The Status diode and the lamp on the handle are turned green and the indication on the Bench Unit is turned off and the electromagnet releases the tube.

On CR6 AA and CR6-PS AA, the battery capacity is measured once a minute with a load of 100 Ohm, and after each seal the diode for the battery is lit and during 3 sec the capacity is shown. Green light for 70-100% left, orange light for 25-70% and red light if the capacity is below 25%. The capacity of the batteries can also be tested before sealing, by pushing the **BATT TEST** button at the front of the Power Unit.

The temperature of the HFG is measured with a thermistor mounted on the rear part, and if the temperature exceeds an alarm set level of 75 °C, the start of sealing is cancelled and the red diode "Temp Alarm" is blinking.

If the electrodes are shortened during sealing the HFG is immediately being stopped.

5.3.1 Block diagram



## 6 Trouble shooting



- Do not adjust the electrodes by yourself. They can be damaged by non professional adjustments.



- More detailed troubleshooting, training of technician and service instructions can be obtained by Ljungberg & Kögel on demand.

| Model            | Problem  | Solution  |
|------------------|--|---|
| CR4 AA<br>CR6 AA | Sealing does not start and the diode <b>STATUS</b> is not blinking when the handle is pressed. | <ul style="list-style-type: none"> <li>• Test another handle</li> <li>• Change the coax cable</li> </ul>  |
| CR6-PS AA        | The diode <b>SEALING</b> is lit but not the lamp on the handle.                                | <ul style="list-style-type: none"> <li>• Test another handle</li> <li>• Change the coax cable</li> <li>• Change the RF-generator (only for service personnel).</li> </ul>                                   |
| CR4 AA<br>CR6 AA | The diode <b>STATUS</b> is blinking orange but not the lamp on the handle or the Bench Unit.   | <ul style="list-style-type: none"> <li>• Test another handle</li> <li>• Test another Bench Unit</li> <li>• Change the coax cable</li> <li>• Change the HF-generator (only for service personnel)</li> </ul> |
| All              | The diode <b>TEMP ALARM</b> is lit and sealing does not start.                                 | <ul style="list-style-type: none"> <li>• The RF-generator is overheated. Let it cool down until the alarm is turned off</li> </ul>  |
| CR4 AA<br>CR6 AA | The diode <b>STATUS</b> flashes red and sealing does not start.                                | <ul style="list-style-type: none"> <li>• There is moist on the tube, dry it</li> </ul>  |
| CR6-PS AA        | The diode <b>SEALING</b> flashes and sealing does not start.                                   | <ul style="list-style-type: none"> <li>• There is moist on the tube, dry it</li> </ul>  |



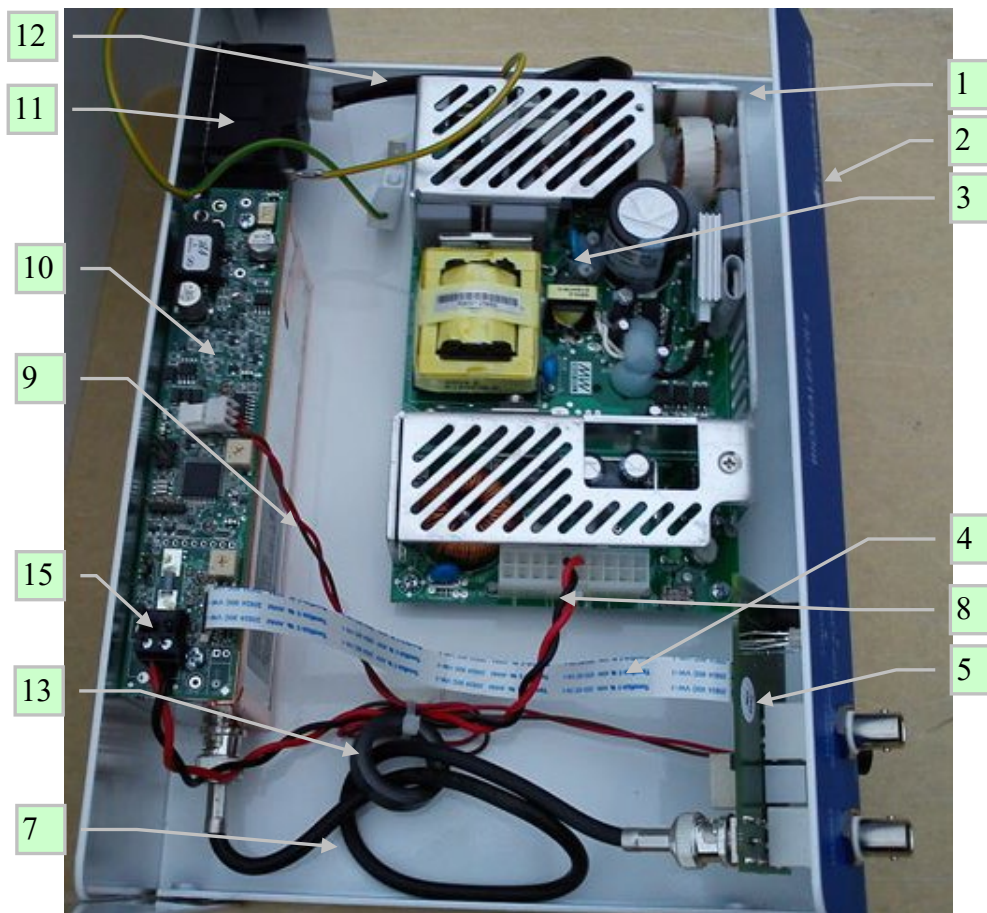
|     |  |  |
|-----|--|--|
| All | Sparks appear by the electrodes during sealing.  | <ul style="list-style-type: none"> <li>• This can happen if the electrodes are overheated due to too many seals in a short time. Let the electrodes cool down</li> <li>• If there has been a leakage and flashes have created carbon particles on the electrodes, these particles must be removed completely before sealing can continue</li> <li>• It can indicate that the electrodes are not parallel. Contact service personnel</li> </ul> |
| All | The seal is done but with bad quality, leakage may appear.   | <ul style="list-style-type: none"> <li>• Check that the coax cable is the right type. Please refer to section 6.1</li> <li>• <i>Note! The cables must not be shortened or lengthened</i></li> </ul>  |
| All | Short-circuit is shown on display or <b>Status</b> is blinking red during a seal, blue lamp is turned off. | <ul style="list-style-type: none"> <li>• The electrodes are getting hot and the tubes melts easier which may cause the electrodes to shorten during sealing. Let the electrodes cool down by pausing for 10-15 minutes</li> </ul>  |
| All | The blue lamp on the handle stops blinking but the green lamp is not lightened.                            | <ul style="list-style-type: none"> <li>• This may occur if the welding makes the plastic melts until the electrodes makes contact. This is no error, the seal will be satisfactory</li> </ul>  |

## 6.1 Cable length

| Sealing unit                      | Cable   | Suits for:       | Note                                 |
|-----------------------------------|---|------------------|--------------------------------------|
| Manual sealing handle             | 9-32416-19<br>Coaxial BNC-BNC<br>1,9m         | CR4 AA<br>CR6 AA |                                      |
| Manual sealing handle             | 9-32416-23<br>Coaxial BNC-BNC<br>2,30m        | CR6-PS AA        |                                      |
| Ergonomic sealing handle, MSH-III | 9-35419-17<br>Coiled coaxial BNC-SMA<br>1,75m | CR4 AA<br>CR6 AA |                                      |
| Ergonomic sealing handle, MSH-III | 9-35419-21<br>Coiled coaxial BNC-SMA<br>2,15m | CR6-PS AA        |                                      |
| Bench Unit                        | 9-33410-19<br>Coaxial BNC-BNC<br>1,9m         | CR4 AA<br>CR6 AA | 9-33410-19 is the same as 9-32416-19 |

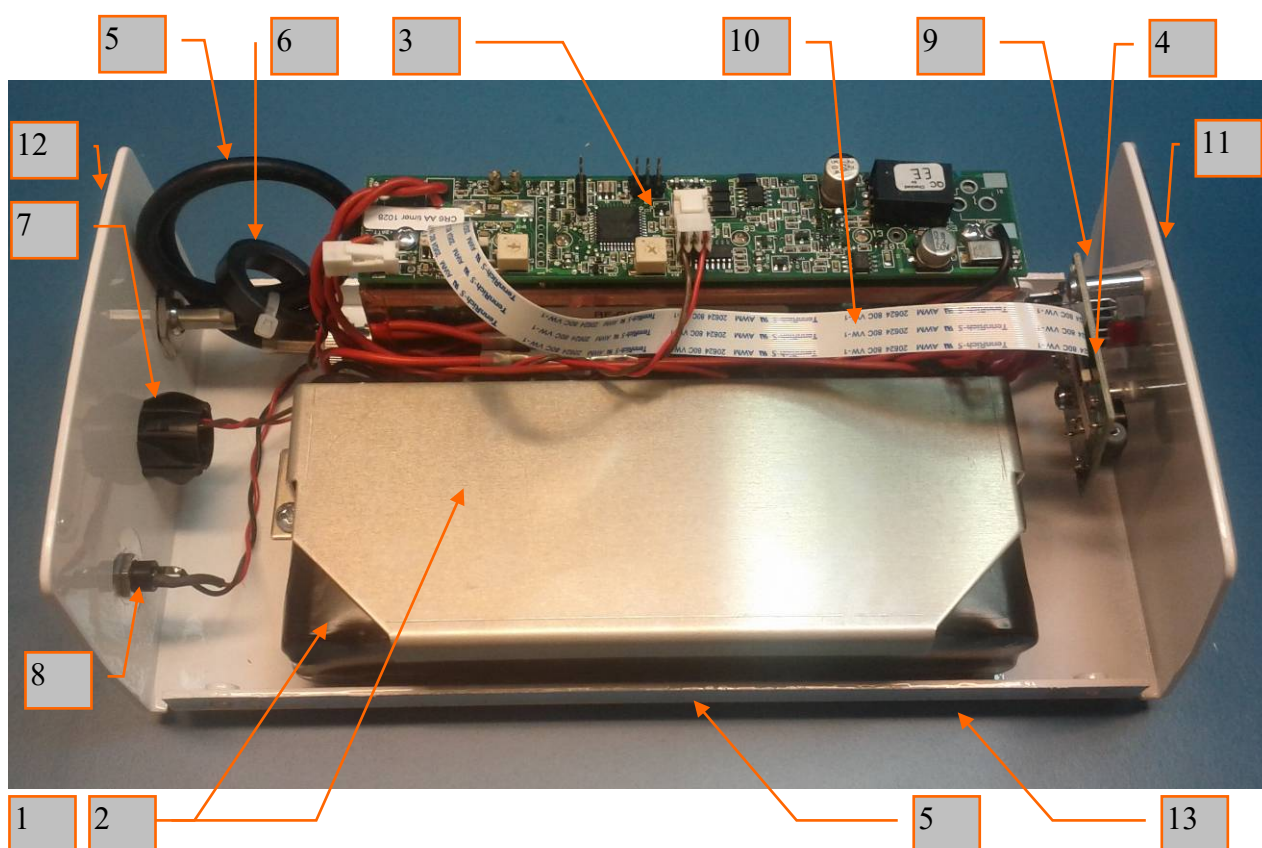
## 7 Spare parts

### 7.1 CR4 AA



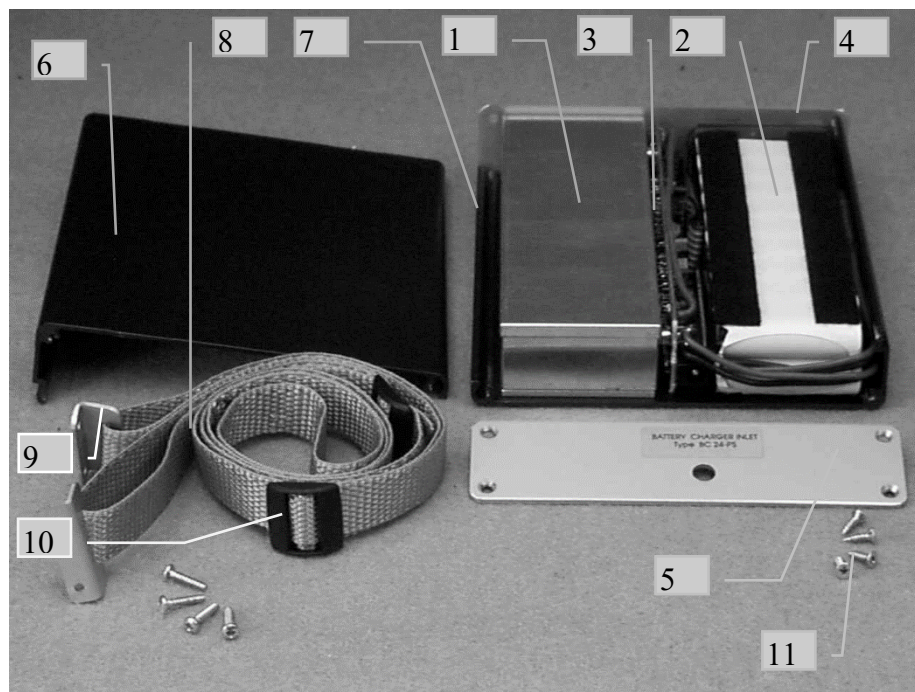
|            |                                  |            |                                  |
|------------|----------------------------------|------------|----------------------------------|
| 9-50401-00 | Bottom plate (chassis)           | 9-50408-00 | 24V power contact incl cable     |
| 9-50402-00 | Rubber feet x 4 (Not in picture) | 9-50409-00 | Bench unit internal signal cable |
| 9-50403-00 | Power supply 200W                | 9-50410-00 | HF generator incl. timer board   |
| 9-50404-00 | 20-pole FFC cable                | 9-50411-00 | Mains inlet                      |
| 9-50405-00 | Front board CR5                  | 9-50412-00 | Mains internal cable             |
| 9-50406-00 | Signal contact bench unit        | 9-50413-00 | Ferrite core $\varnothing$ 29mm  |
| 9-50407-00 | Internal coax cable              | 9-50414-00 | Cover (Not in picture)           |
|            |                                  | 9-50415-00 | 2-pole input power contact       |

## 7.2 CR6 AA



|            |                                   |
|------------|-----------------------------------|
| 9-31601-00 | Battery pack                      |
| 9-31602-00 | Battery holder                    |
| 9-31603-00 | HFG incl. timer board             |
| 9-31604-00 | Front board                       |
| 9-31605-00 | Internal coaxial cable            |
| 9-31606-00 | Ferrite ring                      |
| 9-31607-00 | C91 contact, (signal to BU)       |
| 9-31608-00 | Inlet for charger including cable |
| 9-31609-00 | On/Off switch                     |
| 9-31610-00 | 20-pole FFC cable                 |
| 9-31611-00 | Overlay front                     |
| 9-31612-00 | Overlay back                      |
| 9-31613-00 | Rubber feet x 4, not in picture   |
| 9-31614-00 | Chassis                           |
| 9-31615-00 | Cover, not in picture             |

### 7.3 CR6-PS AA

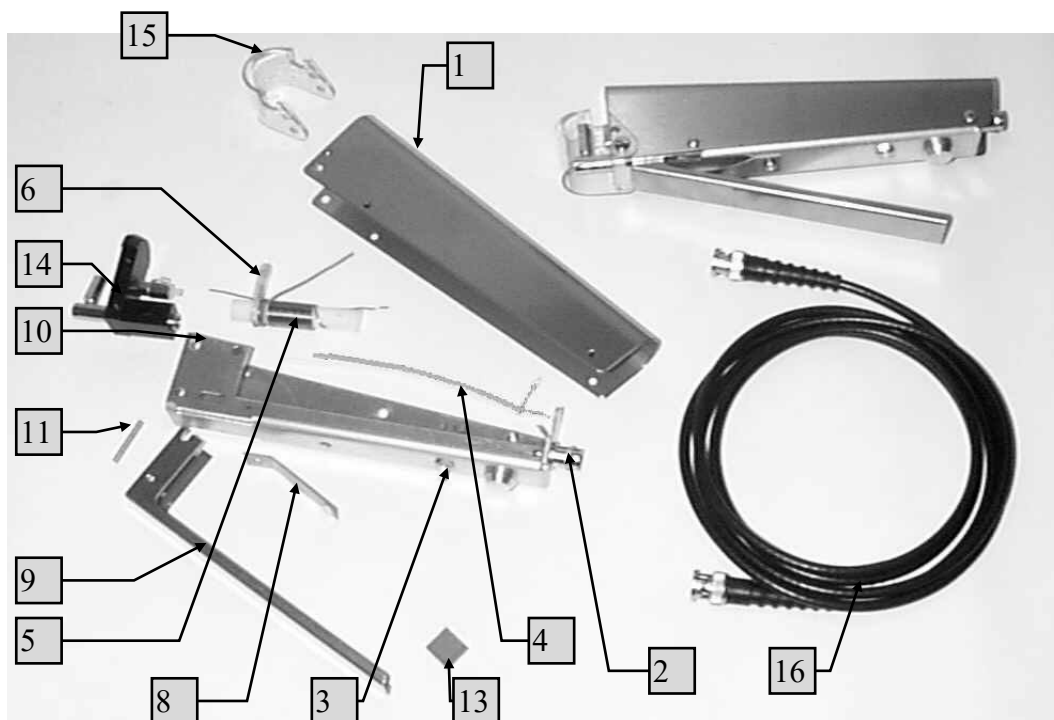


|            |   |
|------------|---|
| 9-81601-00 | HFG-02 RF-generator                                     |
| 9-81602-00 | Battery pack NiMH 24V/1100mA incl. wires and connectors |
| 9-81603-01 | Timer PC-board  |
| 9-81604-01 | Front plate   |
| 9-81605-00 | Back plate  |
| 9-81606-00 | Cover upper half  |
| 9-81607-00 | Cover bottom half                                       |
| 9-81608-00 | Strap   |
| 9-81609-00 | Strap holder incl. 2 screws                             |
| 9-81610-00 | ITW Fixlock ETG20                                       |
| 9-81611-00 | Front and back plate countersunk screws x 4             |
| 9-81612-00 | Rubber feet x 4 (Not in picture)                        |
| 9-81613-00 | On/off -switch (Not in picture)                         |
| 9-81614-00 | Battery. test button (Not in picture)                   |
| 9-81615-00 | Charger inlet (Not in picture)                          |

#### 7.3.1 Power cord sets for battery charger

|            |                         |
|------------|-------------------------|
| 9-81601-51 | Power cord set (EUR)    |
| 9-81601-52 | Power cord set (UK)     |
| 9-81601-53 | Power cord set (US/JPN) |
| 9-81601-54 | Power cord set (AUS)    |

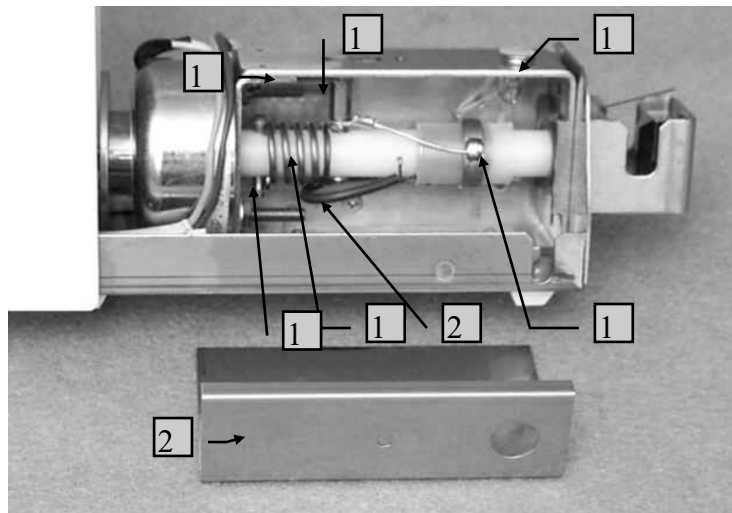
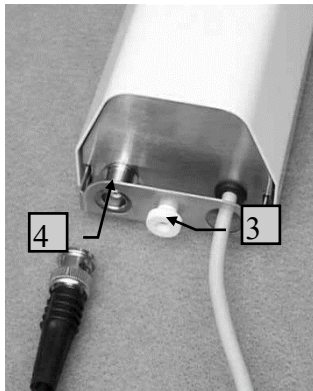
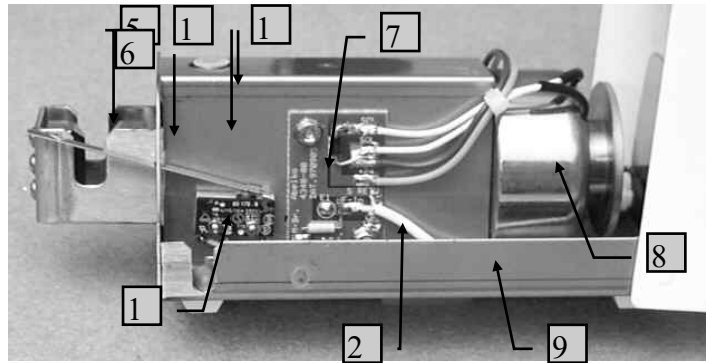
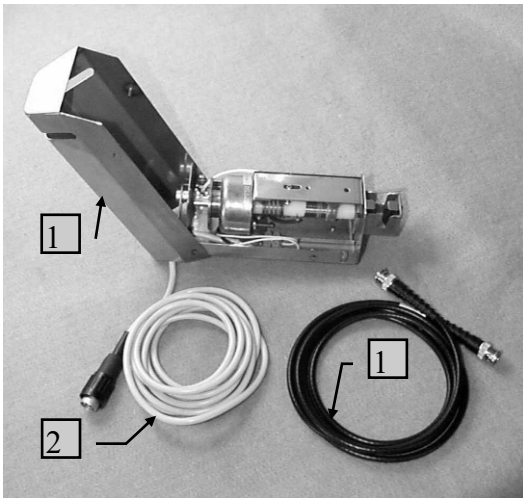
## 7.4 Manual sealing handle



|            |  |
|------------|--|
| 9-32401-00 | Cover                                    |
| 9-32402-00 | BNC chassis female contact               |
| 9-32403-00 | Switch mom close                         |
| 9-32404-00 | Internal coax cable                      |
| 9-32405-00 | Coil incl. delrin core and dim neon lamp |
| 9-32406-00 | Dim neon lamp                            |
| 9-32408-00 | Plate spring                             |
| 9-32409-00 | Handle                                   |
| 9-32410-00 | Chassis                                  |
| 9-32411-00 | Pin                                      |
| 9-32413-00 | Rubber tile                              |
| 9-32414-00 | Electrode house complete                 |
| 9-32415-00 | Electrode cover                          |
| 9-32416-19 | Coax cable 1.9m                          |
| 9-32416-42 | Coax cable 4.2m                          |
| 9-32416-91 | Coax cable 9.1m                          |



## 7.5 Bench Unit



|            |                               |            |  |
|------------|-------------------------------|------------|--|
| 9-33401-00 | Cover                         | 9-33411-00 | Micro switch                                 |
| 9-33402-00 | Signal cable                  | 9-33412-00 | Welding house chassis complete               |
| 9-33403-00 | Locking device                | 9-33413-00 | Pull back spring                             |
| 9-33404-00 | Chassis BNC contact           | 9-33414-00 | Steering pin complete                        |
| 9-33405-00 | Hot moving electrode          | 9-33415-00 | Pin compl. with cases and locking nut        |
| 9-33406-00 | Fixed electrode               | 9-33416-00 | Clamp spring                                 |
| 9-33407-00 | Circuit board for connections | 9-33417-00 | Piston complete incl. coil and dim neon lamp |
| 9-33408-00 | Solenoid                      | 9-33418-00 | Dim neon lamp                                |
| 9-33409-00 | Chassis                       | 9-33419-00 | Welding house cover, micro switch side       |
| 9-33410-19 | Coax cable 1.9m               | 9-33420-00 | Welding house cover                          |
| 9-33410-42 | Coax cable 4.2m               | 9-33421-00 | Coax cable internal                          |
| 9-33410-91 | Coax cable 9.1m               | 9-33422-00 | HF-cable flexible                            |

## 7.6 Ergonomic Sealing Handle, MSH-III



|            |                                      |            |  |
|------------|--------------------------------------|------------|--|
| 9-35401-00 | Right cover                          | 9-35411-00 | Pushing spring   |
| 9-35402-00 | Left cover                           | 9-35412-00 | Piston complete incl. coil   |
| 9-35403-00 | Handle                               | 9-35413-00 | Moving electrode   |
| 9-35404-00 | Protection cover                     | 9-35414-00 | Fixed electrode  |
| 9-35405-00 | Internal coax cable with SMA contact | 9-34515-00 | PC board complete incl. micro switch (Not in picture)  |
| 9-35405-01 | Washer for SMA contact               |            |  |
| 9-35406-00 | Indicator lens                       | 9-34516-00 | 3 Socket head cap screw for screen plates  |
| 9-35407-00 | Screen plate bottom                  | 9-35417-00 | Screw Torx T25x8   |
| 9-35408-00 | Screen plate top                     | 9-35418-00 | Screw Torx T30x8   |
| 9-35409-00 | Pushing knob                         | 9-35419-16 | (CR4 AA, CR6 AA)<br>Coax cable coiled 1.2m, max 1.6m drawn out, total 1.75m (Not in picture) |
| 9-35410-00 | Pull back spring                     | 9-35419-17 | (CR6-PS AA)<br>Coax cable coiled 1.2m, max 1.7m drawn out, total 2.15m (Not in picture)      |



## 8 Technical data


This equipment complies with the demands in medical directive MDD 93/42 EEC



### 8.1 Power units


#### 8.1.1 CR 4 AA

|                           |  |
|---------------------------|--|
| <b>Voltage demands:</b>   | 90-250 VAC 50/60 Hz  |
| <b>Power consumption:</b> | 200 VA   |
| <b>Net fuses:</b>         | 2x T 3,15A L 250V  |
| <b>Internal fuses:</b>    | Protection for high current, type PTC  |
| <b>Dimensions:</b>        | 290x205x85 mm (LxWxH)  |
| <b>Weight:</b>            | 2.1 Kg   |
| <b>Operation:</b>         | Recommended max 1 seal each 3rd sec during continuous use or max 150 seals in sequence and after that 15 minutes rest. |

**Protective classification:** Protection against electrical shock: Class I type B. 


#### 8.1.2 CR6 AA

|                       |   |
|-----------------------|---|
| <b>Battery:</b>       | NiMh battery pack 24V/ 3,8Ah, 170x34x68 (LxWxH) mm.   |
| <b>Internal fuse:</b> | Overload protection type PTC, self-recovery, and thermo fuse.   |
| <b>Dimensions:</b>    | 266x119x88 mm (LxWxH) incl. HF contact.   |
| <b>Weight:</b>        | 2,15 Kg incl. battery.  |
| <b>Operation:</b>     | Recommended max 1 seal each 3rd sec during continuous use or max 50 seals in sequence and after that 15 minutes rest. |

**Protective classification:** Protection against electrical chock: Class II type B. 

#### 8.1.3 CR6-PS AA

|                            |   |
|----------------------------|---|
| <b>Batteries:</b>          | NiMH,battery pack 24V/1,1Ah                                   |
| <b>Battery safety:</b>     | Overload protection type PTC, self-recovery, and thermo fuse. |
| <b>Effect consumption:</b> | 120W maximum effect   |
| <b>Dimensions:</b>         | 167x141x35 mm (LxWxH) incl. RF-outlet                         |
| <b>Weight:</b>             | 1.3 Kg incl. batteries  |
| <b>Operation:</b>          | Recommended max 1 seal each 3:rd sec during continuous use.   |

**Protective classification:** Protection against electrical chock: Class II type B. 

#### **8.1.4 All units**

|   |  |
|---|--|
| <b>Frequency:</b>                                 | 40,68 MHz crystal controlled   |
| <b>Output HF power:</b>                           | 100W/50Ω maximum power   |
| <b>Seal time:</b>                                 | Automatic or manually adjustable 2-10 sec  |
| <b>Rel. Humidity incl. storage and transport:</b> | 10-95% not condensing  |
| <b>Working temperature:</b>                       | 10-40 °C. (The working life of the batteries is shortened at high temperatures). |
| <b>Storage- and transportation temperature:</b>   | -40- +70 °C  |

### **8.2 Sealing units**

#### **8.2.1 Bench Unit**

|                         |   |
|-------------------------|---|
| <b>Dimensions:</b>      | 150 (L) x 60 (W) x 73(H) mm                 |
| <b>Weight:</b>          | 0.9 Kg                                      |
| <b>Length of cable:</b> | 1.9 m (4.2 or 9.1 m is available as option) |

#### **8.2.2 Handle Unit**

|                         |   |
|-------------------------|---|
| <b>Dimensions:</b>      | 206 (L) x 27 (W) x 35 (H) mm                      |
| <b>Weight:</b>          | 0.3 kg  |
| <b>Length of cable:</b> | 1.9 m (4.2 or 9.1 m cable is available as option) |

#### **8.2.3 Ergonomic Handle Unit**

|                         |  |
|-------------------------|--|
| <b>Dimensions:</b>      | 180 (L) x 35 (W) x 145 (H) mm          |
| <b>Weight:</b>          | 0.24 kg                                |
| <b>Length of cable:</b> | Coiled cable 1.2m (Total length 1.75m) |

# DECLARATION OF CONFORMITY

according to the  
***Medical Devices Directive 93/42/EEC***  
and  
***LVFS2003:11***  
and

***RoHS directive, 2011/65/EU***

STANDARDS TO WHICH CONFORMITY IS DECLARED:

***EN 60 601-1:2005***

***EN 60 601-1-2:2012***

***EN 50581:2012***

***Including: EN 61000-3-2, EN 61000-3-3;***

***EN 55011 (CR4 AA: Kl B, CR6, CR6-PS AA: Kl A),***

***EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5,***

***EN 61000-4-6, EN 61000-4-8. EN 61000-4-11***

*Manufacturer:* Abelko Innovation  
*Address:* Industrivägen 17, 972 54 Luleå  
*Telephone:* +46 920-450600

*Marketing:* Ljungberg&Kögel AB  
*Address:* Box 1032, 251 10 Helsingborg  
*Telephone:* +46 042-139860  
*Telefax:* +46 042-132181

*Type of Equipment:* Blood donor bag tube sealer  
*Model:* CR4 AA, CR6 AA, CR6-PS AA  
*Product class:* Class 1



I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.

*Date of issue: 5 February 2021*

A handwritten signature in blue ink, appearing to read 'Caroline Nordin'.

*/ Caroline Nordin*

*Position/title: President*



**LJUNGBERG & KÖGEL AB**