

Biosealer CR6

User's manual
and
Technical reference

Ljungberg & Kögel AB

Important

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



- 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 period! This may cause burn damages!

Electrical safety

Only use battery chargers approved for CR6 and ensure that the chargers are marked with accurate AC-line voltage.

Batteries

The batteries used in CR6 contains lead and worn out batteries must be left to a recycling station.



Pb

Disposal of CR6

Biosealer CR6 contains electronic components which are classified as dangerous for the environment and the equipment must be left to a recycling station when disposed.

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

Rev history:

2007-01-11: Warranty is nor valid for batteries.

2009-05-13: Ergonomic sealing handle included

2009-11-03 TI: P16 coax cable new art-no

2010-08-13 TI: P 5: Sealing can be done with or without the charger connected to mains power.

2012-11-09 JA: Added Abelko Innovation commitment concerning technical feedback

2014-05-05 DC: Address in DoC updated

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Features

Biosealer CR6 is a battery operated sealing unit for PVC-tubes. With new and fully charged batteries it manages more than 750 seals (500 with automatic handle) on 4-5 mm PVC-tubes. The high capacity makes it suitable to use CR6 both in donation rooms and laboratories.

Biosealer CR6 is comprised of 3 units:

- Manual sealing handle type 1 or ergonomic sealing handle type MSH-II or automatic handle ASH.
- Power unit with batteries, RF generator and a control unit monitored by a microprocessor.
- Battery charger

Optional there is a carry bag for mobile use.



Function

Sealing is done in about 1 sec and the width of the seal is about 3 mm with a marking in the middle which makes it easier to pull the tubes apart. Before sealing, the microprocessor controlled timer board checks that the tube not is damp, to avoid sparks and thereby leakage. After each seal a multicoloured diode is lit. The diode indicates the remaining capacity of the batteries. This can also be checked before sealing with the push button at the front of the power unit.

Operation

1. Ensure that the power is off and thereafter connect the sealing handle.
2. Turn the power on and place the PVC-tube between the electrodes.
Manual handle: Press the handle. The sealing automatically starts and two indications are given. The yellow diode "sealing" on the power unit is lit and the orange lamp, indicating high frequency power, on the handle is lit. The intensity of the orange lamp is reduced during the sealing and is turned off when the seal is completed. Wait a short moment (0.5 sec) after the indication is turned off to let the seal cool down before releasing the tube. The yellow diode is also turned off when the seal is completed.
Automatic handle: Push the start button. The sealing automatically starts and two indications is given. The yellow LED "sealing" on the power unit is lit and the green LED, indicating high frequency power, on the handle is lit. The green and the yellow LED is turned off when the seal is completed.
3. Immediately after the sealing the multicoloured diode on the power unit is lit. It shows green when the remaining capacity of the battery is 70-100%, orange for 25-70% and red when the capacity is lower than 25%.
4. A new seal can be made immediately after the yellow LED "sealing" has been turned off.

Note:

- Never have a shorter distance than 5 cm between two seals. Otherwise the pressure in the tube may cause leakage.
- Never stretch the tube during sealing, since this may cause leakage.
- **Manual handle:** Continuous sealing with an interval of 1 seal/sec during several minutes can cause overheating of the power unit or the electrodes with a declined quality of the seals or cause "temp alarm" on the power unit. Always use the delivered standard coax cable 1.9 m . If a longer cable is needed , 4.2 m or 9.1m shall be used, see list of spare parts.
Note! Ergonomic sealing handle has a special coax cable not compatible with standard coax cable.
- **Automatic handle:** Continuous sealing with an interval of less then one minute or more then 10 seals a minute can cause overheating and weakening of the solenoid which may result that the tube is not squeezed together properly. Red LED on the handle indicates overheating. If overheating occurs stop sealing immediately. Wait 5 minutes after the red LED has switch off before start sealing.
- Sealing can be done with or without the charger connected to mains power.

Battery test

Battery test can be done at any time by pressing the button "batt test". The "batt status" 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%.

Temperature-alarm

If the temperature of the high frequency generator exceeds predetermined alarm level, in factory set to 60 °C, the diode "Temp alarm" is lit. Sealing can not be done before the RF- generator has cooled and the diode is turned off.

Timer setting

If the RF is turned off before the seal is completed the timer must be increased. A thicker tube normally demands a longer seal-time. The time can be set between 0.5-5 seconds with the potentiometer under behind the lid to the right of LED "sealing". Avoid setting the timer too long since this will decrease battery capacity and heat up the electrodes.

Remove the lid

1. Adjust time with a small screw driver. Clockwise turn increase time.
2. Replace the lid when ready.

Maintenance and service

The maintenance that can be done by the operator is limited to cleaning. All other service must be done by an approved service personnel.

The power unit and the handle can be cleaned with a mild soap solution.



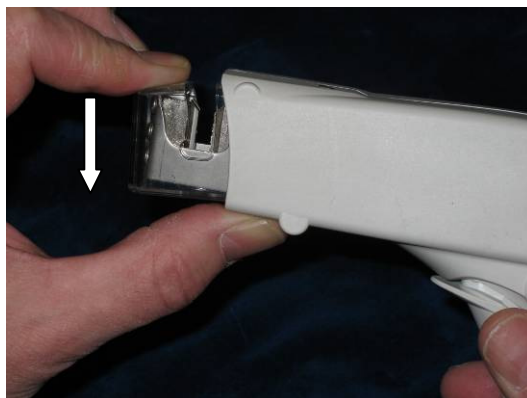
Always turn off the power unit and disconnect the battery charger from the AC-line before cleaning the equipment.

Cleaning the electrodes

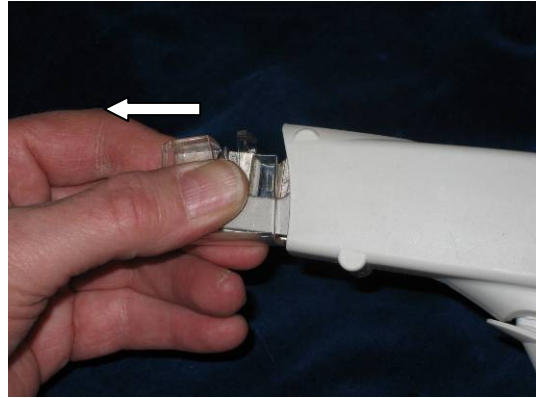
Manual handle type1 : Remove the coaxial cable. Unscrew the 2 screws to the plastic cover and remove it. Clean the electrodes with distilled water and dry with a soft cloth. Replace the coax cable.

Ergonomic Handle :

- (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.



- (3) Then pull the cover forwards.
- (4) Clean both electrodes with distilled water.
- (5) Dry up the electrodes carefully with a soft and lint-free cloth.
- (6) Replace the coax cable.



Automatic handle:

Remove cover and clean the electrodes with distilled water and dry with a soft cloth.

Charging batteries



Only battery chargers intended for charging of CR6 and approved by Ljungberg&Kögel are allowed to be used.

1. Check the type marking sign that the power of the charger corresponds to the local AC -line voltage.
2. Connect the charger to the AC-line and the low voltage connector to the input at the back side of the CR6 marked "Charger Inlet". (It is allowed to make the connections in the reverse order).
3. A battery which has a capacity of 25% is fully loaded within 8 hours.
4. Always have the charger connected to CR6 when it is not used mobile.
5. Sealing can be done when the charger is connected.
6. It lacks significance whether CR6 is turned on or off during charging.
7. Do not let the capacity of the batteries be reduced to more than 25%, since this will shorten the life length of the batteries.
8. The life length of the batteries depends mainly on the surrounding temperature and as a guideline the life length at 25 °C temperature is 3-5 years and at 35 °C temperature it is 1-2 years. Repeated discharging of the batteries below 25% reduces the life length.

Change of batteries



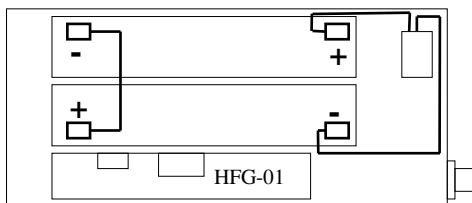
Change of batteries must be done by approved service personnel.

The battery charger and the handle shall be disconnected when the batteries are changed. The batteries used in CR6 contains lead and worn out batteries must be left to a recycling station.

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

1. Unscrew the 4 screws for the cover to the power unit and remove the cover.
2. Loosen the connections to the batteries and carefully note how they are placed.
3. Unscrew the 2 screws for the battery clamp and remove the batteries.
4. Replace the batteries with new batteries of same model, see technical data, and attach the battery clamp.
5. Connect the cables in the same way as they were before the changing of the batteries.
6. Attach the cover.

Batteries location and connection:



Wrong connection of the batteries may cause that the cables get over-heated and that the RF-generator or the control card is damaged.

Technical description

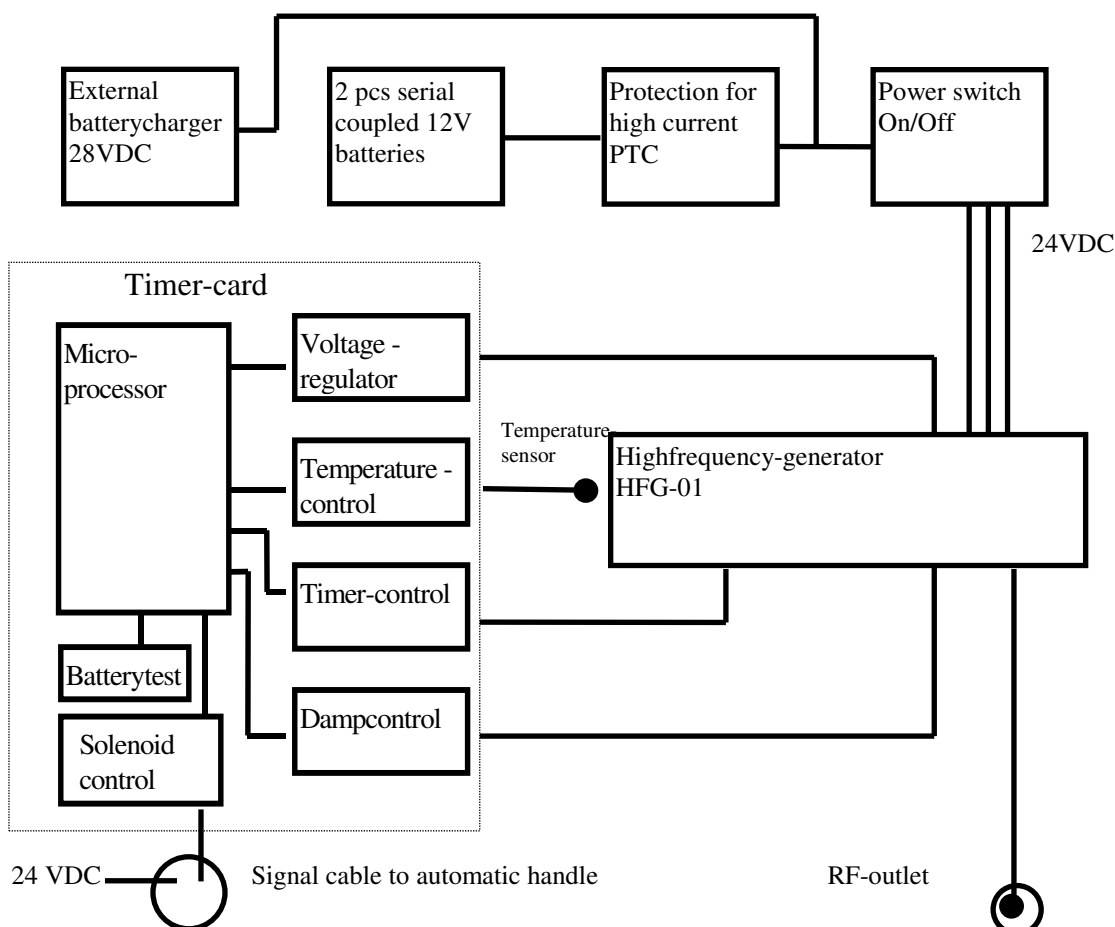
Biosealer CR6 consists of a radio frequency (RF) generator operating at 40,68 MHz with a maximum effect of 80W. RF-generator HFG-01 is a complete module mounted in the power unit. HFG-01 is provided with current (24 V) by batteries with serial coupling. The batteries do not need maintenance and are charged with 28 VDC from an external battery charger.

Note!

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

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

Block diagram



Sealing function

The sealing function is controlled by the timer board mounted in the front of the power unit. The timer board consists of a microprocessor which governs all functions. When the sealing handle is pressed, the connection from the central conductor in the coax cable to ground is released and a DC-voltage of 12 V is supplied from the timer board.

This voltage is recognized by the microprocessor (input PB0) on the timer card. The processor first checks if there is any leakage of current between the electrodes, if so this indicates damp on the tube. The limit is set to 5 μ A, which corresponds to 2,5 V at input PB1 on the processor. If the value exceeds this limit, the seal is cancelled and an indication is given by the yellow diode "sealing" which is flashing. This means that the tube is damp and that there is a risk for sparking and leakage.

If no damp is found, the transistor T4 turns on to activate the solenoid of automatic handle if connected. This signal is on for about 150 ms to get the tube squeezed together properly before the RF is turned on. The RF generator is turned on by transistor T3 and keeps it on during the period determined by the timer potentiometer P1. Thereafter the RF is turned off by T3 and 250 ms later the solenoid is turned off by T4.

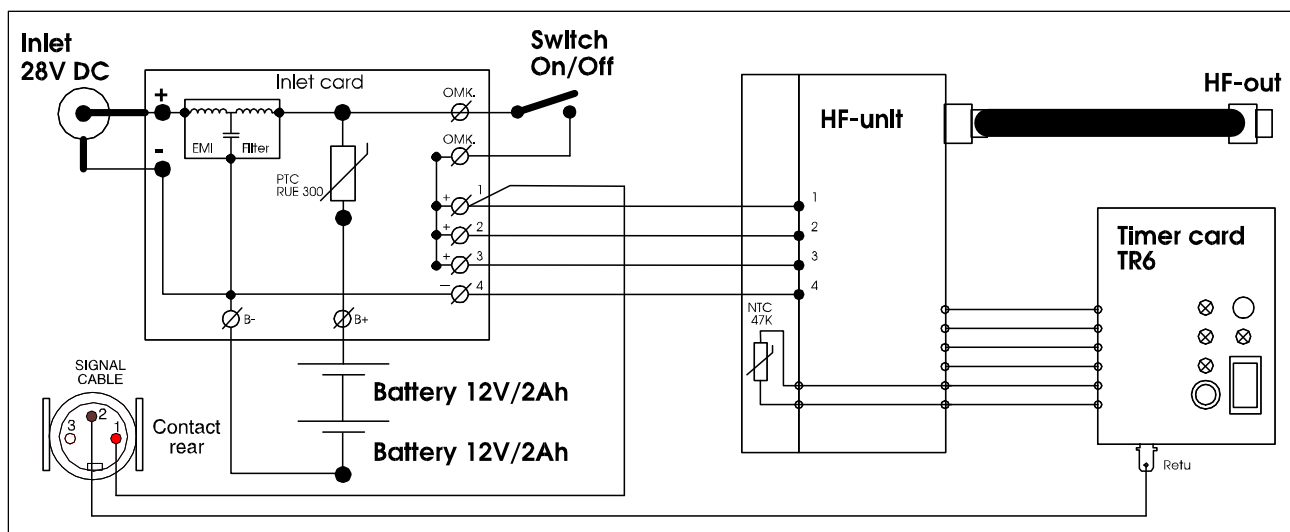
About 100 msec before the RF is turned off, the battery capacity is measured with the input PB2 on the microprocessor. After completed sealing the diode for the battery is lit and during 3 sec the capacity is shown. Green light for 70-100% left, green/ red light for 25-70% and red light if the capacity is below 25%.

The capacity of the batteries also can be tested before sealing, by pushing the "batt test" button at the front of the power unit. The microprocessor then discharge the batteries with approximately 0,5 A during 0,5 sec with transistor T7 and resistor R19, and measures the voltage at input PB5 and indication is given in the same way as described above.

The temperature of the RF-module is measured with a termistor mounted on the rear part above the RF-module. If the temperature exceeds predetermined value set to 60 °C at factory the start of sealing is cancelled and the red diode "Temp alarm" is lit.

If the electrodes are shortened during sealing the RF-generator immediately is stopped.

Circuit diagram CR6

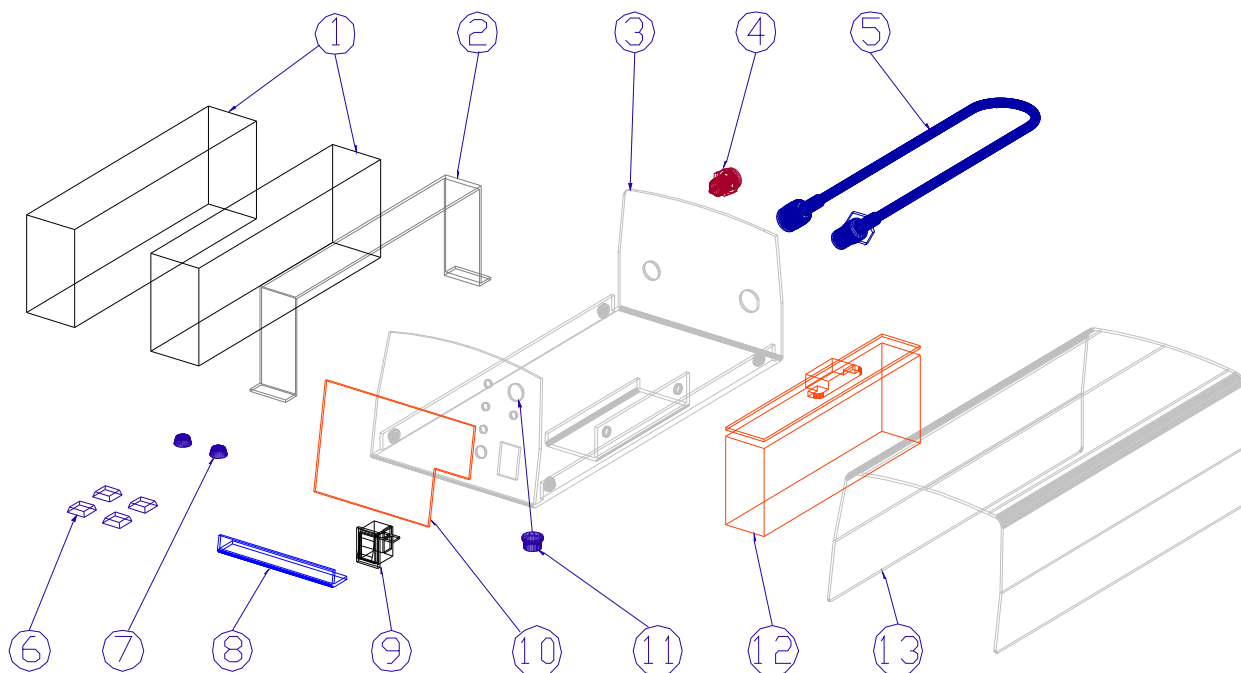


Trouble shooting

Sealing does not start and the diode "Sealing" is not lit when the handle is pressed.	<ul style="list-style-type: none"> • Test another handle. • Change the coax cable • Change the timer board
The diode "Sealing" is lit but not the lamp on the handle.	<ul style="list-style-type: none"> • Test another handle. • Change the coax cable • Control the cables to the RF-generator. • Change the RF-generator.
The diode "Temp Alarm" is lit and sealing does not start.	<ul style="list-style-type: none"> • The RF-generator is overheated. Let it cool down until the alarm is turned off. • Control set alarm level on the timer board, see table in the circuit description above.
The diode "Sealing" flashes and sealing does not start.	<ul style="list-style-type: none"> • The tube is damp, dry it.
Sparks appear by the electrodes during sealing.	<ul style="list-style-type: none"> • The electrodes are not parallel. Contact service personnel.
The seal is done but with bad quality, leakage may appear.	<ul style="list-style-type: none"> • Check that the coax cable is the right type, the length must be 1.9m for bench unit and sealing handle typ1. Ergonomic sealing handle has a special type coax cable.

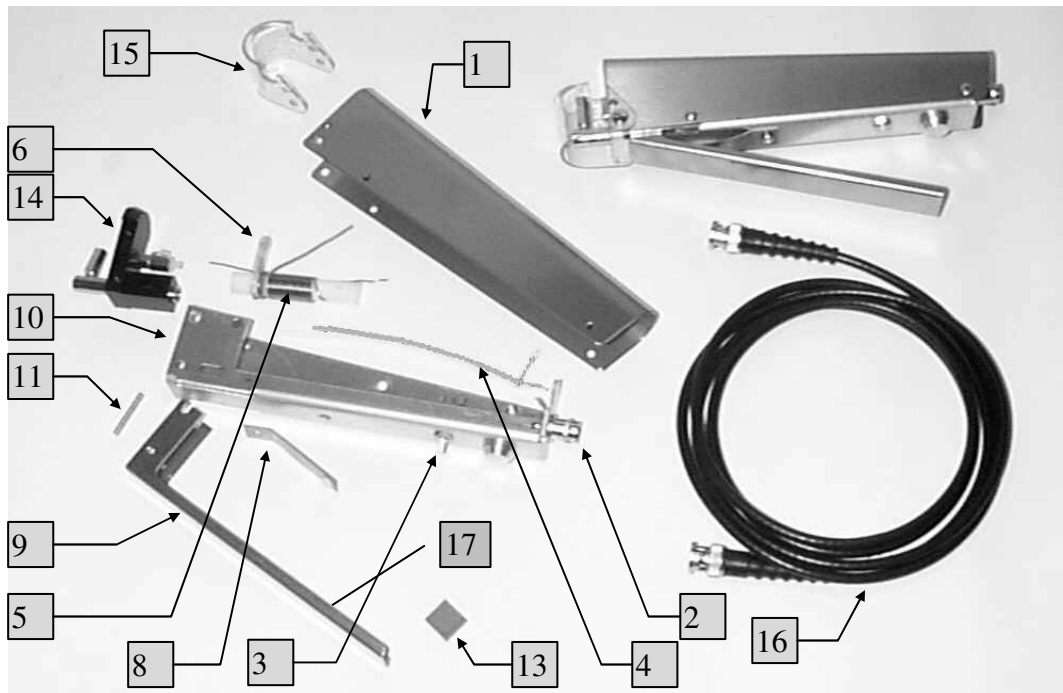
Note: Ljungberg & Kögel AB will supply more detailed service-instructions with component lists and trouble-shooting guides on request.

Spare parts list Power Unit



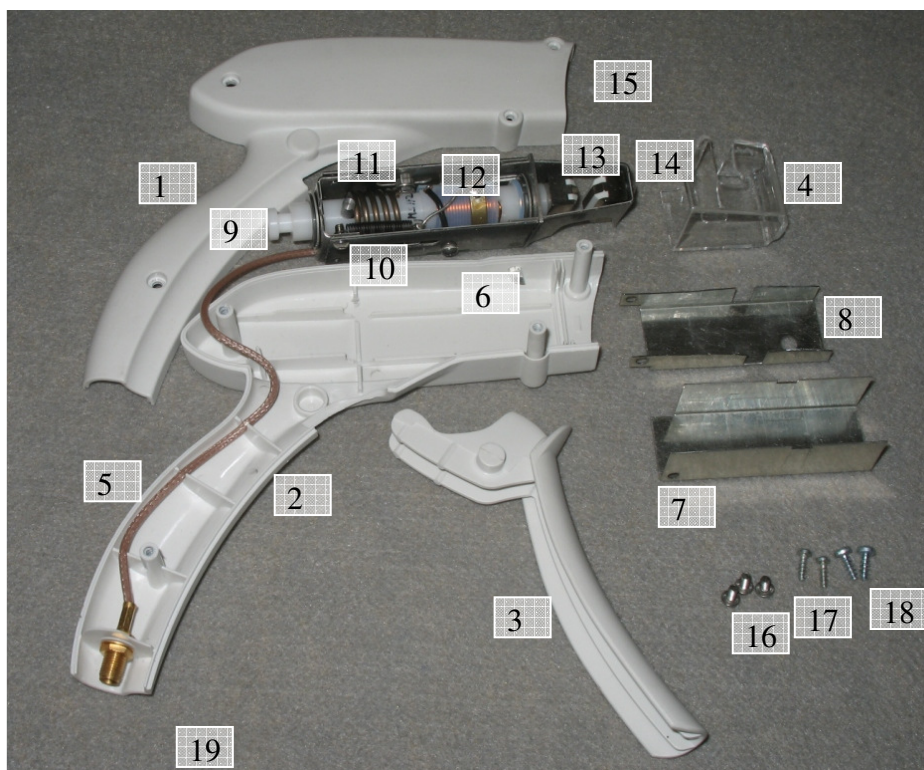
9-30601-00	BATTERY x 2
9-30602-00	BATTERY CLAMP
9-30603-00	BOTTOM PLATE POWER UNIT
9-30604-00	BATTERY CHARGER INLET
9-30605-00	CABLE COAX. STANDARD FOR HF UNIT
9-30606-00	RUBBER FEET x 4
9-30607-00	RUBBER FEET FOR BATTERY POSITIONING x 2
9-30608-00	HOLDER FOR PC-BOARD
9-30609-00	POWER PANEL SWITCH
9-30610-00	TIMER/LOGIC PC-BOARD
9-30611-00	COWER LID FOR TIME ADJUST
9-30612-00	RF-UNIT
9-30613-00	COVER POWER UNIT
9-30614-00	INTERNAL POWER SUPPLY CABLE (NOT IN PICTURE)
9-30615-0	INTERNAL SIGNAL CABLE WITH SOLENOID CONTACT (NOT IN PICTURE)

Spare parts list Manual handle



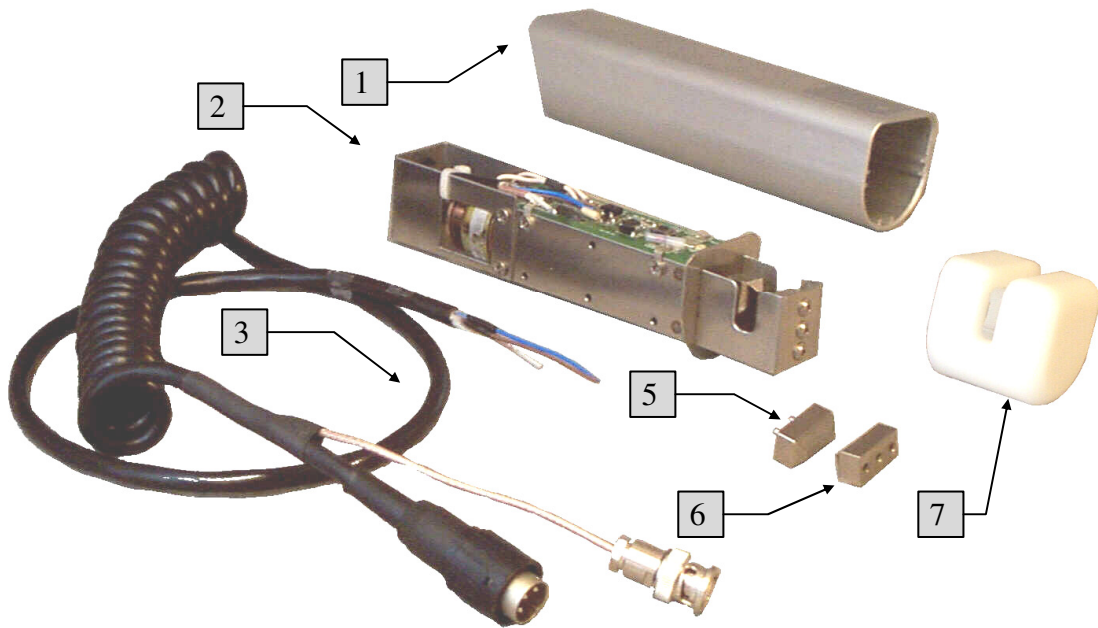
9-32401-00	Cover
9-32402-00	BNC chassis female contact
9-32403-00	Switch mom close
9-32404-00	Internal coax cable
9-32405-00	Coil incl. delrin core and dim glowing lamp
9-32406-00	Dim glowing lamp
9-32408-00	Plate spring
9-32409-00	Handle
9-32410-00	Chassis
9-32411-00	Pin
9-32413-00	Rubber tile
9-32414-00	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
9-32417-00	Rubber tile switch

Spare parts Ergonomic Sealing Handle MSH-II




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)
9-35406-00	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	Coax cable coiled 120cm, max 160 cm drawn out (Not in picture)
9-35410-00	Pull back spring		

Spare parts list Automatic handle



9-34401-00	Cover with start button
9-34402-00	Chassis complete
9-34403-00	Coaxial/Signal cable
9-34404-00	Rear cover (not in picture)
9-34405-00	Moving electrode
9-32406-00	Fixed electrode
9-32407-00	Electrode cover

Technical data

Batteries:	2x12V 2Ah Lead acid
Internal fuse:	Overload protection type PTC, self recovery.
Effect consumption:	170W maximum effect
Sealing time:	Adjustable 0,5-5 sec
Frequency:	40,68 MHz crystal controlled
Output effect:	90W/50Ω maximum effect
Dimensions:	266x119x88 mm (LxWxH) incl. rf-outlet
Weight:	3.1 Kg incl. batteries
Rel. Humidity incl. storage and transport:	10-95% not condensing
Working temperature:	10-40 °C
Storage- and transport- tation temperature:	-40- +50 °C. (The life length of the batteries is shortened at high temperatures).
Operation:	Manual handle: Recommended max 1 seal each 3:rd sec during continuous use. Automatic handle: Recommended max 1 seal each minute during continuous use or max 10 seals during 1 minute and then rest for 5 minutes.
Symbol:	 Protection against electrical chock : class II type B.

Warranty

LJUNGBERG & KÖGEL AB , (L&K), hereby guarantees the original buyer that Biosealer CR 6 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 L&K. The warranty includes equipment and components that proves to have faults during the warranty period. L&K will without cost for the customer, repair or replace the equipment that is faulty. The warranty is not valid for the batteries since they are considered to be expendable supplies. The warranty is not valid if the equipment has been repaired by anyone else than qualified personnel, that is approved by L&K. The warranty is not valid if the equipment has been changed in any way that according to L&K:s opinion, affects the reliability or stability of the instrument. 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. In these cases L&K or L&K: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.

DECLARATION OF CONFORMITY

according to the
Medical Devices Directive 93/42/EEC

STANDARDS TO WHICH CONFORMITY IS DECLARED:

EN 60 601-1 (SEMKO certificate 9701013)

EN 60 601-1-2 (Enator test report TR 976027)

Including: EN 55011 Kl B, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5

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Telephone: +46 042-139860
Telefax: +46 042-132181

Type of Equipment: Tube-sealer
Model: CR6
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 May 2014



/Thommy Lundström

Position/title: President

Ljungberg & Kögel AB