

# REF 7800 Battery Sternum Saw

## Instructions for Use



**MICROAIRE®**  
*For Surgery. For Life.™*

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**Model 7800 Battery Sternum Saw  
7800-002 Sternum Guard & Accessories  
Instruction Manual**

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- INTRODUCTION -

This manual has been written to help describe the procedures required to keep the MicroAire REF 7800 Battery Sternum Saw system operating properly. Throughout the manual, the following terms are used to identify tips and precautions that will help avoid accidental injury to patients or personnel, or prevent damage to the system.

- NOTE:** Used to point out the easiest means of carrying out techniques.
- WARNING:** Used to indicate that the safety of the patient and hospital personnel could be involved.
- CAUTION:** Used to point out special procedures or precautions that must be followed to avoid damaging the system/instrument.

- GENERAL WARNINGS -

**WARNING: Sternum Guard Attachment**

The REF 7800 Battery Sternum Saw must never be used without the REF 7800-002 sternum guard securely in place and properly oriented with the MicroAire REF ZR-032M or ZR-033M sternum saw blade.

**WARNING:** Risk of fire. Replace battery pack only with a MicroAire REF 6640-710, REF 7505-710, or REF 7500-620 battery.

**WARNING:** Explosion Hazard. Not suitable for use in the presence of flammable anesthetics or oxygen.

**WARNING:** Electric Shock. Do not remove cover, return to factory for servicing.

**WARNING:** Medical electrical equipment may be affected by electromagnetic interference. It should be installed and used in accordance with the electromagnetic compatibility information provided herein.

**WARNING:** Portable and mobile RF communications equipment can affect medical electrical equipment.

**WARNING:** Prior to use, system components should be inspected and operated to detect any damage or malfunction. Do not use if damage is apparent.

**WARNING:** Always point the handpiece away from the patient and surgical team vicinity when testing.

**WARNING:** Do not charge the battery in the vicinity of the patient.

**WARNING:** No modification of this equipment is allowed.

**WARNING:** Operating Duty cycle is 1 minute on, 2hours off.

**WARNING:** Irrigation must be applied to the cutting accessory when cutting bone in order to keep bone temperature within safe limits. Cutting without irrigation may cause unsafe temperatures leading to bone necrosis.

**CAUTION:** Do not run the handpiece without the saw blade.

**CAUTION:** Disconnect battery from handpiece before loading or unloading the saw blade.

**CAUTION:** Battery pack should not be left attached to the handpiece when not in use. This could result in accelerated battery drain.

**CAUTION:** Make sure the tip of the sternum saw blade is inside the foot of the sternum guard and does not strike any part of the sternum guard. Improper alignment of the sternum guard with the saw blade can cause damage to the sternum saw or saw blade.

**CAUTION:** If the handpiece will not hold the saw blade or sternum guard securely, discontinue use and return to the factory for service.

**CAUTION:** Check Safety Lock and Trigger before operating the handpiece. If the trigger should stick in the depressed "ON" position, do not use the handpiece. Immediately remove the battery. Return the instrument to the factory for service. Always use the Safety Lock when the instrument is not running.

**CAUTION:** Check that the battery is fully seated and locked.

**CAUTION:** Federal Law restricts this device to sale by or on the order of a physician (or properly licensed practitioner).

**NOTE:** Disconnect sternum guard, battery, and saw blade prior to sterilization. Batteries must be sterilized separately.

- MARKINGS -



Follow Instructions for Use. This icon is blue.



Consult Instructions for Use (IFU).



Type B Applied Part



**DO NOT** Lubricate



**DO NOT** Immerse



Lock



Unlock



**DO NOT** expose to stray magnetic fields



Temperature Limitation



Humidity Limitation



Atmospheric Pressure Limitation



Sternum guard alignment arrow



Waste Electrical and Electronic Equipment (WEEE) European Community Symbol. Regarding Electrical Equipment European Union end of life of product, indicating separate collection for electrical and electronic equipment. **ALWAYS** follow the current local recommendations and/or regulations governing environmental protection and the risks associated with recycling or disposing of the equipment at the end of its usual life.



Waste Electrical and Electronic Equipment (WEEE) European Community Symbol. Batteries contain materials that must be recycled or disposed of properly. Do not dispose of as unsorted municipal waste. **ALWAYS** follow the current local recommendations and/or regulations governing environmental protection and the risks associated with recycling or disposing of the equipment at the end of its usual life. **ALWAYS** decontaminate a battery pack exposed to infectious material before sending it to a waste treatment facility.



0086

European Conformity Mark with MicroAire's Notified Body Number



MEDICAL-GENERAL MEDICAL EQUIPMENT AS TO ELECTRIC SHOCK, FIRE, AND MECHANICAL HAZARDS ONLY. IN ACCORDANCE WITH ANSI/AAMI ES 60601-1 (2005) + A1 (2012) + CAN/CSA C22.2 No. 60601-1 (2014) + | Control Number: E494242



YYYY-MM

Date of manufacture. Y=year, M=month.



Manufacturer



Product catalog number



Serial number



Non-Ionizing Electromagnetic Radiation

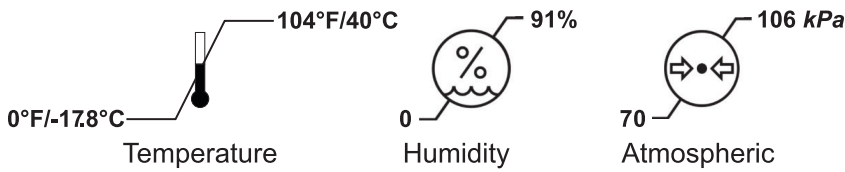


Prescription

- ENVIRONMENTAL PARAMETERS -

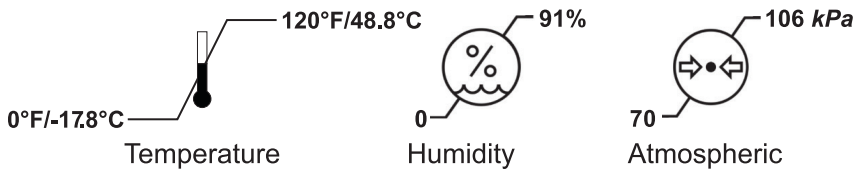
OPERATING CONDITIONS

This device has been tested and proven to operate within the following conditions:



SHIPPING & STORAGE CONDITIONS

This device has been tested and proven to operate after repeated exposure to the following conditions:



Shipping: The materials and components used in the construction of this device were selected to ensure that the device could be shipped by any standard commercial method without special handling conditions.

- LIST OF TYPE B APPLIED PARTS -

Part Number	Description
7800-002	Sternum Saw Guard
ZR-032M	Sternum Saw Blade
ZR-033M	Aggressive Saw Blade

**WARNING:** Use of other accessories may negatively affect Electromagnetic Performance.

- TECHNICAL DATA - SPECIFICATIONS -

Operating Speed:	12,000 CPM (nominal)
Cutting Stroke:	0.117 in. (3.0 mm)
REF 7800 Handpiece Weight (without battery pack):	2.65 lb. (1211 g)
REF 6640-710 Battery Weight:	0.95 lb. (431 g)
Battery Voltage:	14.4 volts
Duty Cycle:	1 minute on, 2 hours off.
Rating:	14.4 VDC 225W

- HANDPIECE SAFETY MECHANISMS -



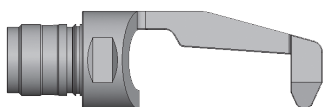
Trigger in Upright - "ON" Position




Trigger in Turned - "OFF" Position  
(Trigger can be turned in either direction to be turned "OFF")

- REF 7800-002 STERNUM GUARD -



The REF 7800 Battery Sternum Saw requires the use of the included REF 7800-002. The guard can be attached to the handpiece in either a superior or inferior position, depending on the position at which the blade was loaded.



- INSTRUMENT COMPONENTS -

	<p><b>Features &amp; Descriptions</b></p> <ol style="list-style-type: none"> <li><b>1. Blade Locking Collet</b> Insert the REF ZR-032M or ZR-033M Sternum Saw Blade into the blade locking collet by turning the collet in the direction indicated by the arrow, and then inserting the blade.</li> <li><b>2. Sternum Guard Lock / Release Button</b> Depress this button to lock or release the REF 7800-002 Sternum Guard from the handpiece.</li> <li><b>3. Trigger / Safety Lock</b> The REF 7800 Battery Sternum Saw operates at variable speeds and is controlled by depressing the trigger. The instrument is in the OFF position when the trigger is not depressed. As the trigger is depressed fully the speed increases from 0% - 100%. The trigger also serves as the safety lock for the handpiece (see previous page). After loading the saw blade and attaching the sternum guard and battery, fully depress the trigger and release one time before use.</li> <li><b>4. Battery Release Button</b> Depress this button to remove a battery/power pack from the handpiece. This button does not need to be depressed to load a battery/power pack.</li> </ol>
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- ACCESSORY ATTACHMENT -

	<p><b>Battery Attachment</b></p> <p>The REF 7800 Battery Sternum Saw must have a fully charged MicroAire REF 6640-710 battery installed before each use. The MicroAire REF 7505-710 and REF 7500-620 batteries may also be used with the REF 7800 Battery Sternum Saw. To attach the battery to the handpiece, place the battery under the base of the instrument with the longer side facing the rear of the instrument. Firmly push the battery into the base of the handpiece until the battery latch clicks into place.</p>
	<p><b>Sternum Guard Attachment</b></p> <p><b>WARNING:</b> The REF 7800 Battery Sternum Saw must never be used without the REF 7800-002 sternum guard securely in place and properly oriented with the MicroAire REF ZR-032M or ZR-033M sternum saw blade.</p>

- INSTRUMENT SETUP -

**CAUTION:** Disconnect battery from handpiece before loading or unloading the saw blade.

**CAUTION:** Battery pack should not be left attached to the handpiece when not in use. This could result in accelerated battery drain.

**To insert the REF ZR-032M or ZR-033M saw blade into the sternum saw handpiece:**

1. Make sure the handpiece trigger is set to the "OFF" position and the safety is "ON" by turning the trigger to one side.
2. If installed, remove the sternum guard from the handpiece by depressing the release button located on the underside of the sternum guard collet.
3. Twist the blade locking collet into the open position by rotating in the direction of the arrows.
4. While holding the blade locking collet in the open position, insert a MicroAire REF ZR-032M or ZR-033M saw blade until it is fully seated. The blade may be inserted in the inferior or superior position.
5. Release the blade locking collet; it should automatically spring back into the lock position.

**To install the REF 7800-002 Sternum Guard on the sternum saw:**

1. Make sure the handpiece trigger is set to the "OFF" position and the safety is "ON" by turning the trigger to one side.
2. Make sure that the MicroAire REF ZR-032M or ZR-033M sternum saw blade is securely installed.
3. Push the sternum guard into the blade/guard collet, over the installed saw blade. The sternum guard may be inserted easier by depressing the sternum guard lock button as the sternum guard is installed on the handpiece. Make sure that the sternum guard is aligned with the saw blade teeth facing away from the sternum guard. The sternum guard must be completely locked into place prior to use. Use the alignment arrows to make sure the sternum guard is properly aligned with the handpiece.

**CAUTION:** Make sure the tip of the sternum saw blade is inside the foot of the sternum guard and does not strike any part of the sternum guard. Improper alignment of the sternum guard with the saw blade can cause damage to the sternum saw or saw blade.

Test run the assembled handpiece for a few seconds to make sure that the blade and sternum guard are properly aligned and secure.

1. Move the safety lock to the "OFF" position by turning the trigger back into the vertical position.
2. Run the handpiece by fully depressing the trigger.

**WARNING:** Always point the handpiece away from the patient and surgical team vicinity when testing.

**WARNING:** If the handpiece will not securely hold the saw blade or sternum guard, discontinue use and return to the factory for service.

**WARNING:** Check Safety Lock and Trigger before operating the handpiece. If the trigger should stick in the depressed "ON" position, do not use the handpiece. Immediately remove the battery. Return the instrument to the factory for service. Always use the Safety Lock when the instrument is not running.

**WARNING:** Check that the battery is fully seated and locked.

**WARNING:** Disconnect battery in the event of continuous running.

- BATTERY CHARGING -

See the separate operating instructions provided with the MicroAire REF 7500-700 charger.

- TROUBLESHOOTING -

1. Blade will not load into collet.
  - a. Make sure that the blade is the MicroAire REF ZR-032M or REF ZR-033M.
  - b. Make sure the blade locking collet is fully turned in the direction indicated by the arrow on the collet.
  - c. Attempt to load a different REF ZR-032M or REF ZR-033M blade into the collet. If the 2nd blade cannot be loaded into the collet, return the handpiece for service.
2. Sternum Guard will not lock into handpiece.
  - a. Make sure that the sternum guard is the MicroAire REF 7800-002.
  - b. Make sure the arrows on the handpiece and guard are aligned properly, and the Guard Lock/Release Button is depressed when attempting to insert the sternum guard.
  - c. Attempt to load a different REF 7800-002 sternum guard into the collet. If the 2nd guard cannot be loaded into the collet, return the handpiece for service.
3. Trigger cannot be depressed.
  - a. Make sure the trigger is turned to the upright "ON" position (refer to page 2).
  - b. Make sure the instrument was properly cleaned and sterilized.
  - c. If trigger cannot be depressed, return to factory for service.
  - d. DO NOT OIL the handpiece or trigger, as this could damage the instrument.
4. Handpiece does not run when trigger is depressed.
  - a. Make sure you have a fully charged MicroAire Battery Pack properly seated in the handpiece base.
  - b. Try a different, fully charged battery pack in the handpiece. If the handpiece still does not operate when the trigger is depressed, return the handpiece for service.
5. Battery does not seat properly in handpiece.
  - a. Make sure you are using an approved MicroAire battery/power pack (part numbers listed on page 1).
  - b. Make sure the longer side of the battery pack is facing the rear of the instrument as shown on page 6.
  - c. Attempt to insert another battery pack. If 2nd battery pack will seat properly, return the 1st battery for inspection. If the 2nd battery pack does not seat properly, return the handpiece and batteries for inspection and/or service.
  - d. Make sure the connector pins in the handpiece battery receptacle are not bent. If the pins are bent, return the handpiece for service. **DO NOT** attempt to bend the pins back into place.
6. Handpiece runs slowly.
  - a. Make sure you have a fully charged MicroAire Battery Pack properly seated in the handpiece base.
  - b. Try a different, fully charged battery pack in the handpiece. If the handpiece still runs slowly when the trigger is depressed, return the handpiece for service.

**NOTE:** Refer to page 13 for detailed instructions on returning MicroAire products for service.



- ROUTINE CLEANING/DECONTAMINATION -

- 7800 INSTRUMENT CLEANING INSTRUCTIONS -

1. Remove the battery, sternum guard, and sternum saw blade from the handpiece.
2. Scrub the handpiece, sternum guard, and batteries using warm water, a soft brush, and mild detergent. Scrub the handpiece with the brush, paying close attention to the instrument crevices. Take care to keep the instrument as upright as possible to restrict water from flowing into the battery cavity and contacts of the battery.
3. Rinse all items thoroughly under running water, again paying close attention to the battery cavity by keeping the instrument as upright as possible. Dry the instrument and accessories with a lint free towel.

- INSTRUMENT STERILIZATION INSTRUCTIONS -

[see separate Battery Sterilization Instructions on page 17]

MicroAire surgical instruments are normally sterilized using steam autoclaves by either gravity discharge, or pre-vacuum sterilization. The following sterilization processes have been validated based on AAMI Protocols. The exposure times and temperatures are the minimum validated requirements to ensure sterility.

**CAUTION:** Disconnect sternum guard, battery, and saw blade prior to sterilization. Batteries must be sterilized separate from the handpiece and sternum guard.

HANDPIECE AND STERNUM GUARD – WRAPPED OR UNWRAPPED

**1. Steam Sterilization**

*Steam sterilize using one of the following cycles:*

Sterilization Cycle	Instrument	Minimum Time & Temp	Min Heated Dry time
Dynamic Air Removal (Pre-vacuum)	Single Instrument	3 minute full cycle @ 134 – 137°C (273 – 279°F)	8 minutes
		4 minute full cycle @ 132 – 135°C (270 – 275°F)	8 minutes
	Sterilization Tray	3 minute full cycle @ 134 – 137°C (273 – 279°F)	10 minutes
		4 minute full cycle @ 132 – 135°C (270 – 275°F)	10 minutes
Gravity Displacement	Single Instrument	30 minute full cycle @ 132 – 135°C (270 – 275°F)	8 minutes
	Sterilization Tray	45 minute full cycle @ 132 – 135°C (270 – 275°F)	20 minutes

**CAUTION:** DO NOT run instruments while warm. Cool by exposure to room temperature.

**CAUTION:** DO NOT immerse in liquid to cool.

**2. Flash sterilization**

Please contact MicroAire for the most up-to-date information on this sterilization method.

**3. Ethylene Oxide Sterilization.**

Ethylene is NOT recommended for powered surgical instruments because lengthy aeration time is needed to assure that no ethylene oxide is left in the internal mechanisms or on the surface of the instrument.

**4. Peracetic Acid**

**DO NOT** process powered surgical instruments in equipment that uses peracetic acid as a liquid sterilant.

## - WARRANTY, SERVICE AND REPAIR -

Periodic inspection and service is essential to keep precision MicroAire instruments running properly. If repairs are required, they can be accomplished quickly with a minimum of disruption to the hospital's schedule.

### - IN HOSPITAL SERVICE -

All MicroAire equipment should be inspected and tested periodically in accordance with the facility's bioengineering policy. Such service should be documented within the bioengineering department.

**CAUTION:** Repairs or alterations to MicroAire products made by anyone other than MicroAire or an Authorized MicroAire Repair Facility will void that product's warranty, and the customer will be responsible for any costs related to returning the product to working condition

### - MICROAIRE REPAIR SERVICE -

Responsive service comes with every MicroAire product. If a problem with your equipment should arise, contact our Customer Service Department at:

	Telephone:	Fax:	Email:
USA:	800-722-0822	800-438-6309	inquiry@microaire.com
Outside USA:	434-975-8000	434-975-4134	intlsvc@microaire.com

**NOTE:** Mailing address information located on back cover.

We may be able to help solve the problem quickly without returning the item for service. **DO NOT** disassemble or attempt to service the equipment. It can only be serviced by MicroAire or an Authorized MicroAire Repair Facility. Unauthorized service will void the warranty.

To return an item for service, follow this procedure:

1. Contact Customer Service for a Return Material Authorization (RMA) number.

**NOTE:** **DO NOT** return equipment without an RMA number. This could cause delays in service, and/or problems tracking your return.

2. Clean and disinfect equipment before sending for repair.

3. Along with the items sent for repair, enclose a detailed description of the problem encountered, the type of use, the place of use, a contact name, and a telephone number. This information is helpful to our repair technicians.

4. If the instrument is out of warranty, enclose a purchase order number with the instrument. If the instrument is under warranty, include the purchase date.

5. In the United States, ship the merchandise by Express Mail, Federal Express, or UPS Blue Label to prevent shipping delays. From outside the United States, return goods by Federal Express or Air Freight.

6. Return the merchandise prepaid.

7. If an estimate of repair costs is needed before the repair technicians start work, include the name and telephone number of the person to contact.

8. We will repair and reship the item by 2nd Day Air within the United States and by Federal Express or Air Freight outside the U.S. unless specified otherwise.

- PERIODIC INSPECTION -

Because of the stressful nature of surgical use, decontamination, and sterilization, we recommend that all instruments be returned for routine inspection and service at least once a year. There is no charge for service during the warranty period.

- MICROAIRE PRODUCT LIFESPAN -

The REF 7800 Battery Sternum Saw should provide years of reliable service. This life-expectancy is based on the proper handling and care of the instrument, including annual maintenance at a MicroAire authorized service center. Any abuse, misuse, or use in other than recommended operating parameters may affect the life of the equipment.

- 7800 BATTERY STERNUM SAW & ACCESSORY WARRANTY -

MicroAire Surgical Instruments LLC warrants its REF 7800 Battery Sternum Saw and the REF 7800-002 Sternum Guard to be free from defects in material and workmanship in their manufacture for a period of 1 year from the original purchase date by the end customer. The warranty is limited to the repair or replacement of the product without charge.

This warranty is void in the event of abuse, misuse, or use in other than normal surgical environment, or in the event disassembly, alteration, or repair of the product not authorized by the manufacturer, or in the event that the product has not been used in a reasonable manner and in compliance with the written instructions furnished by the Manufacturer.

All other expressed or implied warranties of fitness and merchantability are excluded here from, and manufacturer shall have no liability of any kind for incidental or consequential damages.

- EXTENDED WARRANTY / SERVICE AGREEMENT -

Extended warranties and service agreements are available on MicroAire power equipment. Extended warranties may be purchased while the equipment is covered by the original warranty. If the equipment is out of warranty, it must first be restored, if necessary, to full serviceable condition before being eligible for a service agreement.

- REFERENCES -

**Association for the Advancement of Medical Instrumentation (AAMI)**

AAMI Good Hospital Practice: Flash Sterilization-Steam Sterilization of Patient-Care Items for Immediate Use. 1995 Edition. pp. 61-79

AAMI Good Hospital Practices: Steam Sterilization and Sterility Assurance. 1995 Edition. pp. 1-60.

AAMI Good Hospital Practice: handling and Biological Decontamination of Reusable Medical Devices, 1995 Edition. pp. 393-414.

**Association of Operating Room Nurses (AORN)**

Association of Operating Room Nurses. "Recommended practices for care of instruments, scopes, and powered surgical instruments." In Standards & Recommended Practices Denver, CO: AORN, 1995. pp. 197-204.

Association of Operating Room Nurses. "Recommended practices for care sterilization in the practice setting." In: Standards & Recommended Practices. Denver, CO: AORN, 1995. pp. 267-278.

## U.S. Centers for Disease Control and Prevention (CDC)

Centers for Disease Control. "Recommendations for prevention of HIV transmission in health-care settings." In: Morbidity and Mortality Weekly Report 36 (August 21, 1987): 1S-12S.

Garner, Julia S., and Martin S. Favero. Guideline for Handwashing and Hospital Environmental Control, 1985. Atlanta: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, 1985.

## U.S Occupational Safety and Health Administration (OSHA)

Occupational Safety and Health Administration. "Occupational exposure to bloodborne pathogens, final rule." Federal Register 56 (December 6, 1991): 64004-64182.

### - BATTERY INSTRUCTIONS -

#### **Battery Installation**

The REF 7800 Battery Sternum Saw Handpiece must have a fully charged MicroAire battery (REF 6640-710, REF 7505-710 or REF 7500-620) installed before each use. To attach the battery to the handpiece, place the battery under the base of the instrument with the longer side facing the rear of the instrument. Firmly push the battery into the base of the handpiece until the battery latch clicks into place.

#### **Battery Charging**

See the separate operating instructions provided with the MicroAire U.L. Classified Battery Charger (REF 7500-700).

#### **Battery Conditioning**

In order to ensure the optimal performance of your battery pack, allow the battery to charge for 24 hours prior to first use. This will condition the battery so that it operates at its maximum capacity.

#### **Aseptic Battery**

The MicroAire Series 7000 battery instruments have been designed to operate using the MicroAire REF 7500-615, REF 7500-620 Aseptic Battery. The aseptic battery uses a non-sterile battery pack that is placed in a sterilized housing with locking door and removes the need to steam sterilize battery packs. The aseptic battery system has been designed for use with all MicroAire battery operated instruments and uses smaller battery cells than the conventional REF 7505-710 Large Power Battery Pack. The aseptic battery provides comparable power, but will have reduced run times. See separate instructions provided with the REF 7500-6XX Aseptic Battery System.

**CAUTION:** Leaving a battery pack attached to a handpiece when not in use may accelerate battery drain.

### -BATTERY STERILIZATION INSTRUCTIONS -

MicroAire NiMH Battery Packs are normally sterilized by steam, using either a gravity displacement or Dynamic Air Removal (Pre vacuum).

#### **1. Steam Sterilization**

Sterilizers vary in design and performance parameters, verify cycle parameters against the written instructions of the sterilizer and container manufacturers. Prevacuum sterilization is the preferred method of sterilization for powered surgical instruments because it allows for rapid sterilization of the internal components.

- a. Dynamic Air Removal (Pre vacuum) (wrapped or unwrapped):  
4 minutes at 270°F (132°C) - No drying time.
- b. Gravity displacement steam sterilization (unwrapped):  
3 minutes at 270°F (132°C)- No drying time.

## 2. Sterrad® 100 Sterilization

- a. 44 Minutes total exposure time

## 3. Sterrad® NX

- a. 28 minute full cycle

**CAUTION:** Exceeding recommended steam sterilization exposure times or temperatures for the battery may reduce battery life and/or performance.

### - MICROAIRE BATTERY WARRANTY -

MicroAire Surgical Instruments warrants the REF 7505-710 Large Battery Pack and REF 6640-710 Small Battery Pack to be free from defects in material and workmanship in their manufacture for a period of one (1) year from the original purchase date by the end customer. MicroAire warrants the REF 7500-620 Aesptic Battery to be free from defects and workmanship in their manufacture for a period of ninety (90) days from the original purchase date by the end customer. The warranty is limited to the repair or replacement of the product without charge.

This warranty is void in the event of abuse, misuse, or use in other than normal surgical environment, or in the event disassembly, alteration, or repair of the product not authorized by the manufacturer, or in the event that the product has not been used in a reasonable manner and in compliance with the written instructions furnished by the Manufacturer.

All other expressed or implied warranties of fitness and merchantability are excluded here from, and manufacturer shall have no liability of any kind for incidental or consequential damages.

Extended warranties and/or service agreements are not available on MicroAire batteries.

<b>Part Number</b>		<b>7800 - Sternum Saw Battery\Electric</b>
<b>Power Output</b>	kW- KiloWatts	0.13
<b>Vibration Exposure</b>	$a_{HV}(m/s^2)$	4.1
	Uncertainty K ( $m/s^2$ )	1.5
<b>Noise Emission Value</b>	$L_{PA}$ (db(A))	84
	$L_{C,peak}$ (db(C))	-
	$L_{WA}$ (dbA))	100
<b>Mass</b>	Weight (kg)	1.18

Guidance and manufacturer's declaration – electromagnetic emissions		
The Sternum Saw Handpiece (REF 7800) is intended for use in the electromagnetic environment specified below. The customer or the user of the REF 7800 should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment – guidance
Radio frequency (RF) emissions CISPR 11	Group 1	The REF 7800 Sternum Saw Handpiece uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The REF 7800 Sternum Saw Handpiece is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not Applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not Applicable	

**NOTE:** The REF 7800 Sternum Saw has no essential performance.

Guidance and manufacturer's declaration – electromagnetic immunity


The REF 7800 Sternum Saw Handpiece is intended for use in the electromagnetic environment specified below. The customer or the user of the REF 7800 Sternum Saw Handpiece should assure 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 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	Not Applicable	Not Applicable
Surge IEC 61000-4-5	±1 kV line to line ±2 kV line to earth	Not Applicable	Not Applicable
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 0.1 sec 70% $U_T$ (30% dip in $U_T$ ) for 0.5 sec <5% $U_T$ (>95% dip in $U_T$ ) for 5 sec	Not Applicable	Not Applicable
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 the application of the test level.

Guidance and manufacturer's declaration – electromagnetic immunity

The REF 7800 Sternum Saw Handpiece is intended for use in the electromagnetic environment specified below. The customer or the user of the REF 7800 battery system should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	Not Applicable	<p>Portable and mobile RF communications equipment should be used no closer to any part of the REF 7800, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance:  <math>d = 1.2 \sqrt{P}</math> 80 MHz to 800 MHz  <math>d = 2.3 \sqrt{P}</math> 800 MHz to 2.3 GHz</p> <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey<sup>a</sup>, should be less than the compliance level in each frequency range<sup>b</sup>.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

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

<sup>a</sup>: 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 RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the REF 7800 Sternum Saw Handpiece is used exceeds the applicable RF compliance level above, the REF 7800 Sternum Saw Handpiece should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the REF 7800 Sternum Saw Handpiece.

<sup>b</sup>: Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.



Recommended separation distances between portable and mobile RF communications equipment and the REF 7800 Sternum Saw Handpiece.

The REF 7800 Sternum Saw Handpiece is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the REF 7800 Sternum Saw Handpiece can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the REF 7800 Sternum Saw Handpiece as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \sqrt{P}$
0.01	Not Applicable	0.12	0.23
0.1	Not Applicable	0.37	0.74
1	Not Applicable	1.2	2.3
10	Not Applicable	3.7	7.4
100	Not Applicable	12	23

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

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

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







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