



Instruction Manual

SERIES 5000

**MICROAIRE**<sup>®</sup>  
*For Surgery. For Life.™*

## Instrument Manual Translation Information

This printed instrument manual for the REF 5000 Series Modular Motors and Instrument Modules is provided in English only. To obtain translations of this manual please visit the website addresses below:

### **Dansk (Danish)**

Dansk oversættelse af denne brugsanvisning er tilgængelig online på [www.microaire.com/resources/instructions-for-use](http://www.microaire.com/resources/instructions-for-use)

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**-APPLICABLE INSTRUMENT PART NUMBERS -**

<b>REF Number</b>	<b>Description</b>
5000-100	MicroAire Pneumatic Motor Module with Throttle - MicroAire Hose Connector
5000-200	MicroAire Pneumatic Motor Module with Throttle - Hall-Style Hose Connector
5000ET	MicroAire Electric Motor Module with Throttle
5000E	MicroAire Electric Motor Module without Throttle
5922	MicroAire Sagittal Saw Head Module
5930	MicroAire 30K Drill Head Module
5945	MicroAire Reciprocating Saw Module
5950	MicroAire Hall Style Keyless Sagittal Saw Module
5955	MicroAire Hall Style Keyed Sagittal Saw Module
5970	MicroAire Oscillating Saw Module
5972	MicroAire Keyed Oscillating Saw Module
5976	MicroAire Keyless Oscillating Saw Module
5980	MicroAire Jacobs-Style Drill Module
5990	MicroAire AO Synthes Style Drill Module

- STANDARDS -

The REF 5000 Series System meets the following standards:

UL 60601-1 AND CAN/CSA C22.2 No. 601.1-M90

EN 60601-1/IEC 601-1

EN 60601-1-2, DIN EN 60601-1-2

- ENVIRONMENTAL PARAMETERS -

**OPERATING CONDITIONS**

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

		
Temperature	Humidity	Atmospheric

**SHIPPING & STORAGE CONDITIONS**

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

		
Temperature	Humidity	Atmospheric

**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.

## - INTRODUCTION -

This manual has been written to help describe the procedures required to keep the MicroAire Series 5000 Modular Instruments 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.

**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.

**NOTE:** Used to point out the easiest means of carrying out techniques.

## - GENERAL WARNINGS -

**WARNING:** Use care to ensure that there is no electromagnetic interference between these devices and other devices in use.

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

**CAUTION:** It is essential to dry and filter compressed air, as the air lines frequently contain oil vapor, moisture, and bacteria.

**CAUTION:** If the REF 5000-XXX are run with excessive pressure, the rate of wear and the probability of instrument failure increases significantly.

**NOTE:** All personnel should become familiar with the power equipment before it is set-up for use in any procedure. Personnel that are in-serviced should include, but not be limited to, central processing personnel, members of the surgical team, and the bioengineering department.

**NOTE:** If using the REF 5000-XXX pneumatic motor module, use the MicroAire 9500-000 or similar pressure regulator. The main tank pressure gauge should indicate a minimum of 500 p.s.i. (35kg/cm<sup>2</sup>). Set the output pressure gauge to indicate 100 p.s.i. (7kg/cm<sup>2</sup>). If you have a wall or ceiling mounted air system and the air hose is longer than 10 ft. (3 m), the air pressure must be increased by 10 p.s.i. (0.7kg/cm<sup>2</sup>), for each additional 10 ft. (3 m) of hose length.

## - DUTY CYCLE -

Continuous operation with intermittent loading. (20 seconds ON then 1 minute OFF for 3 consecutive cycles.)

## - SYMBOL DEFINITIONS -



**Attention, See instructions for use**



European Conformity Mark with MicroAire Notified Body Number



**DO NOT** Lubricate



**DO NOT** Immerse



**DO NOT** Expose To Stray Magnetic Fields



Handpiece throttle set to **“SAFE”**  
and/or  
Drill Collet **“LOCK”**



Handpiece throttle set to **“RUN”**  
and/or  
Drill Collet **“UNLOCK”**



Date of Manufacture - YYYY-MM



Product Catalog Number



Product Serial Number



Temperature Limitations



Humidity Limitations



Atmospheric Pressure Limitations



Authorized European Representative

- SYMBOL DEFINITIONS -



Manufacturer



Must be collected separately from household waste. Dispose of as per WEEE Directive 2002/96-EE

## - PNEUMATIC SYSTEM SETUP -

MicroAire pneumatic instruments are powered by compressed nitrogen. Compressed air is also acceptable, provided the air is dried and filtered to 3 micrometers (3 microns).

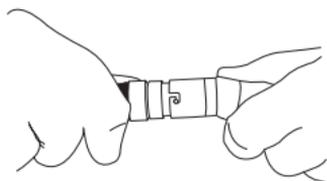
1. Inspect the instruments, foot control, and hoses for damage, corrosion, or excessive wear. If any of the components look damaged or show signs of excessive wear, they should not be used.

**WARNING:** If any corrosion or debris is detected in/on the instrument, it must be considered contaminated. Either replace the instrument immediately or remove it from the sterile field and reprocess.

2. Check all surgical accessories. Make sure that they are not dull or bent.

3. Attach the air hose to a compressed air/nitrogen source.

4. Make sure handpiece throttle is set to the  position, and if using the foot control, take care to ensure the foot control is not activated accidentally.



5. Attach the air hose to the pneumatic motor module, making sure the hose end is properly seated in the module hose connector.

6. Attach a MicroAire Series 5000 head module (see page 4 for full listing) to the pneumatic motor module.

7. Insert a surgical accessory into the handpiece. For detailed instructions for a specific handpiece, please refer to the corresponding section as shown in the table of contents inside the front cover of this manual.

8. Confirm the handpiece throttle is functional.

- a. Make sure that when the throttle safety lock is set to  it prevents activation of the motor by the hand throttle.
- b. Make sure that when the throttle safety lock is set to  it allows activation of the motor by the hand throttle.

**WARNING:** When using the pneumatic handpiece with the foot control, the motor will activate if the foot control pedal is depressed even if the instrument safety lock is set to .

- c. Make sure that the throttle does not stick in the fully depressed position. If it has any tendency to stick, reclean and resterilize the handpiece. If the handpiece still does not meet the above requirements, return the handpiece to MicroAire or an Authorized MicroAire Repair Facility for service.

9. With the surgical accessory inserted, test run the instrument in the sterile field for five (5) seconds, checking for any indication of irregular noise, excessive heat, or vibration. Irregular grinding noises may indicate impending failure or overheating of the handpiece. If any irregular grinding noises are present, return the handpiece to MicroAire or an Authorized MicroAire Repair Facility for service.

**WARNING:** Excessive heat is the most likely cause of patient injury. Periodically monitor the temperature of the nose section. The temperature should not rise above 115°F (46°C). If the instrument temperature exceeds 115°F (46°C) please return the handpiece to MicroAire or an Authorized MicroAire Repair Facility for service.

10. Move handpiece throttle to the  position.

11. System is ready for use.



Pneumatic Motor Module with throttle set to "SAFE" position



Pneumatic Motor Module with throttle set to "RUN" position

**WARNING:** Place throttle into safe  position when not in use.

## - PNEUMATIC SYSTEM TROUBLESHOOTING -

### 1. Air Hose is difficult to insert into motor module.

- Make sure that the type of air hose matches the connector type on the motor module. The number following the “-” designates the hose connector type.

REF Number Suffix	Air-Hose Type Needed	MicroAire® 10 ft (3m) Hose REF #
-100	MicroAire® Style Air Hose	9000-000
-200	Hall® Style Air Hose	9013-000

Please refer to MicroAire catalog LIT-POWERCATALOG for a full list of pneumatic hoses and accessories.

- Steam sterilization may cause the O-ring inside the hose connector to become overly dry. Apply a small amount of sterile lubricant and/or sterile water around the distal end of the hose connector, and attempt to re-insert hose into motor module.
- The connector on either the motor module or hose could be damaged. Attempt to use a different hose or handpiece with a similar hose connector to isolate the problem.

### 2. Motor module will not start.

- Make sure the throttle is in the  position.
- Be sure the air pressure from the source is actually reaching the handpiece. Disconnect and reconnect the air hose to the motor module. Listen for the air pressure “pop” sound.
- Make sure the regulator pressure is set between 80-100 p.s.i. (5.5-7 kg/cm<sup>2</sup>), and that the main tank has at least 500 p.s.i. (35 kg/cm<sup>2</sup>).
- Make sure the air hose is fully inserted and locked into the regulator. Disconnect and reconnect the air hose to the regulator.
- Insert a different head module into the motor module, and attempt a different motor module (if available) with the same head module to isolate the problem to the head module, motor module, or air supply.

### 3. Instrument runs slowly and/or lacks power.

**CAUTION:** If the handpiece runs slowly or irregularly, be alert for the possibility of instrument overheating or other malfunctions.

- If using a nitrogen tank, the tank may be almost empty. The main pressure gauge on the tank should show at least 500 p.s.i. (5.5-7 kg/cm<sup>2</sup>). Open the main valve several turns to ensure the air flow is not restricted.
- Check the regulator pressure with the instrument running. The gauge should indicate 80-100 p.s.i. (5.5-7 kg/cm<sup>2</sup>) when using a 10 foot (3 meter) air hose. The regulator pressure must be increased by 10 p.s.i. (0.7 kg/cm<sup>2</sup>) for each additional 10 ft. (3 m) of hose length.



## - ELECTRIC SYSTEM SETUP -

1. Inspect the handpiece, console, foot control, and cables for damage, corrosion, or excessive wear. If any of the components look damaged or show signs of excessive wear, they should not be used.

**WARNING:** If any corrosion or debris is detected in/on the instrument, it must be considered contaminated. Either replace the instrument immediately or remove it from the sterile field and reprocess.

2. Check all surgical accessories. Make sure that blades and rasps are not dull or bent.
3. Place the console on a sturdy, flat surface near a hospital-grade outlet. Install the power cord plug into the power receptacle on the console. Install the other end of the power cord into a hospital grade wall outlet. Wait for the console to initialize, then press and hold the blinking standby button to turn the console on. Refer to your REF 5025/5020 console manual for more information.
4. Insert handpiece cable into handpiece cable receptacle on front of console. If using a foot control, plug the REF 5401 foot control cable into the REF 5025/5020 console port marked with a FOOT PEDAL symbol. Align the marks and gently push the connectors together. Only one foot control may be connected to the console at a time, but can be selected to operate either of the foot control compatible instruments.
5. Make sure handpiece throttle is set to the  position, and if using the REF 5401 foot control, take care to ensure the foot control is not activated accidentally.
6. Insert handpiece cable into receptacle on rear of handpiece, aligning the dots on both cable end and receptacle to ensure proper fit.
7. Attach a MicroAire Series 5000 module (see page 4 for full listing) to the REF 5000E or REF 5000ET electric motor module.

8. Insert a surgical accessory into the handpiece. For detailed instructions for a specific handpiece, please refer to the corresponding section as shown in the table of contents in this manual.



9. Confirm the handpiece throttle is functional.

- a. Make sure that when the throttle safety lock is set to  it prevents activation of the motor by the hand throttle or foot control.



- b. Make sure that when the throttle safety lock is set to  it allows activation of the motor by the hand throttle or foot control.

- c. Make sure that the throttle does not stick in the fully depressed position. If it has any tendency to stick, reclean and re-sterilize the handpiece. If the handpiece still does not meet the above requirements, return the handpiece to MicroAire or an Authorized MicroAire Repair Facility for service.

10. With the surgical accessory inserted, test run the instrument in the sterile field for five (5) seconds, checking for any indication of irregular noise, excessive heat, or vibration. Irregular grinding noises may indicate impending failure or overheating of the handpiece. If any irregular grinding noises are

present, return the handpiece to MicroAire or an Authorized MicroAire Repair Facility for service.

**WARNING:** Excessive heat is the most likely cause of patient injury. Periodically monitor the temperature of the nose section. The temperature should not rise above 115°F (46°C). If the instrument temperature exceeds 115°F (46°C) please return the handpiece, module and cable to MicroAire or an Authorized MicroAire Repair Facility for service.

**NOTE:** The speed value will default to 100% when the instrument is first plugged into the REF 5025/5020 console.

11. To set the throttle maximum speed at other than 100%:

- Move handpiece throttle to the  position.
- Fully depress the throttle of the instrument.
- Use the REF 5025/5020 Console touch screen to set the desired speed.
- Desired maximum speed is now set for the desired instrument.
- Move handpiece throttle back to the  position.

12. Move handpiece throttle to the  position.

13. **Pre-use check:** Run instrument for 3 seconds to ensure that the instrument functions properly prior to use.

14. System is ready for use.

**WARNING:** Place throttle into safe  position when not in use.

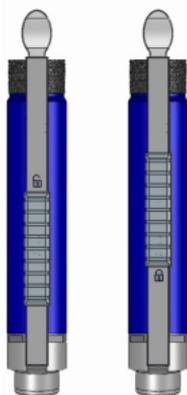
## - ELECTRIC SYSTEM TROUBLESHOOTING -

1. Handpiece cable is difficult to insert into the handpiece or the console.

- Align connectors and receptacles carefully. Make sure the pins on the cable are aligned with the matching holes in the console or handpiece receptacle. This connection is a tight fit to keep particles from getting inside the handpiece.
- Make sure the plug is pressed fully into the handpiece and that the “snap lock” is fully engaged.

2. Handpiece will not start.

- Check to make sure that the console is “ON”
- Replace the handpiece cable.
- Make sure the REF 5000ET motor throttle is in the  position.
- Make sure the maximum speed display indicates a maximum speed, and the light around the cable receptacle is illuminated.
- Remove the handpiece and plug a different handpiece into the console and cable. If this handpiece runs properly, then return the faulty handpiece and cable to MicroAire or an authorized MicroAire Repair Facility for service.
- If the handpiece does not run properly, return the system (console, handpieces and cables) to MicroAire or an Authorized MicroAire Repair Facility for service.



### 3. Handpiece runs slowly.

- a. Check that the throttle safety lock is all the way in the  position.
- b. Replace the handpiece cable.
- c. Remove the handpiece and plug a different handpiece into the console. If this handpiece runs at the proper speed, return the faulty handpiece and cable to MicroAire or an Authorized MicroAire Repair Facility for service.
- d. If the second handpiece does not run properly, return the system (console, handpieces and cables) to MicroAire or an Authorized MicroAire Repair Facility for service.

### 4. Maximum speed set does not function properly.

- a. Make sure the lever was depressed in the proper sequence.
- b. Try another handpiece in place of the one not adjusting properly.
- c. If the second handpiece runs properly, then return the faulty handpiece to MicroAire or an Authorized MicroAire Repair Facility for service.
- d. If the second handpiece does not run properly, return the system (console, handpieces and cables) to MicroAire or an Authorized MicroAire Repair Facility for service.

## REF 5922 MICRO SAGITTAL SAW MODULE INSTRUCTIONS

The REF 5922 Sagittal Saw Module offers good control, power, and maneuverability for cutting transverse or wedge osteotomies.

This Sagittal Saw Module can be used with a variety of ultra-thin, 0.3mm (0.010" ), straight, angled, bent, or offset blades, such as MicroAire's 1200 Series blades. Please see MicroAire catalog for a full listing of these blades.

To insert a blade into the REF 5922 Sagittal Saw Module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using the handpiece with the foot control, take care to ensure that the foot control is not activated accidentally while inserting the blade.

2. Open the blade locking lever to release the floating jaw.



3. Insert the blade between the floating jaw and the indexing pin, making sure to fit the hole in the blade over the indexing pin.



**CAUTION:** The blade hole must be seated over the indexing pin. If it is not, the head will be damaged when the locking lever is closed. **DO NOT** force the locking lever if excessive resistance is felt.

4. Release the locking lever.
5. Attempt to pull the blade out of the handpiece to confirm it is secure. If the blade can be removed by hand, open the blade locking lever and attempt to insert the blade into the handpiece again.



## REF 5930 30K MICRO DRILL MODULE INSTRUCTIONS INSTRUCTIONS

The REF 5930 30K Micro Drill handpieces are the workhorses of small bone surgery. They are used for bone sculpting, drilling, wire passing, and reaming the intramedullary canals of small bones. These medium speed, high torque instruments come standard with a built-in, medium-length bur guard.

These drills will accept the MicroAire ZB-100, -200, and -300 Series burs. Please see MicroAire catalog for a full listing of these accessories. If other burs are used, make certain that they are designed for use in orthopedic or oral surgery. The bur shaft diameter must be within the range of .0919" (2.3mm) to .0928" (2.4mm).

**WARNING:** If burs of insufficient diameter are used, they may slip under load, resulting in rapid overheating, or they may eject at great velocity, potentially causing harm to patients or personnel.

**WARNING:** When using long or extra long burs, use the corresponding long (REF 1100-005) or extra-long (REF 1100-006) bur guard to prevent whipping or shattering of burs.

To insert a bur into a REF 5930 30K Micro Drill module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the safety lock to . If using the handpiece with the foot control, take care to ensure that the foot control is not activated accidentally while inserting the bur.
2. Remove the silicone cap (if present).
3. If using long or extra long burs, use the long (REF 1100-005) or extra long (REF 1100-006) bur guard.

4. Twist the collet to the  position.

5. Insert the bur.

6. Twist the nose collet to the  position.

**WARNING:** Collet must be in full  position to prevent overheating of the instrument.

7. Pull on the bur to make sure it is secure.

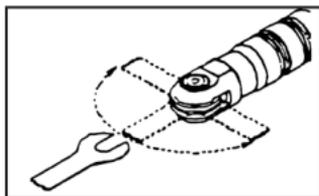
**WARNING:** **DO NOT** run the instrument without a bur or drill, or the instrument will overheat.



## REF 5955 HALL® STYLE KEYED SAGITTAL SAW MODULE INSTRUCTIONS

The REF 5955 Hall® Style Keyed Sagittal Saw module is a heavy duty design saw which permits use of the longer ZS series sagittal saw blades for performing transverse or wedge osteotomies. Please refer to MicroAire catalog for a full listing of these blades.

**NOTE:** The head module can be rotated to any position for the best blade angle, and the blade can be locked into the saw at any angle on an 180° arc.



To insert a blade into the REF 5955 Hall® Style Keyed Sagittal Saw module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using the handpiece with the foot control, take care to ensure that the foot control is not activated accidentally while inserting the blade.
2. Insert the hex driver (2250-001) and turn it counter-clockwise until a slight resistance is felt.
3. Insert the blade in the space between the two jaws making sure that the blade is fully seated.



4. Turn the hex driver clockwise to lock the blade.  
**DO NOT** over-tighten.



## REF 5945 RECIPROCATING SAW MODULE INSTRUCTIONS

The REF 5945 Reciprocating Saw module can be used with a variety of surgical accessories from the MicroAire 1400 and small ZR series of micro-reciprocating blades and rasps. Please see MicroAire catalog for a full listing of these accessories.

**NOTE:** MicroAire Large Reciprocating ZR Series of blades (ZR-032, -032M, -058, -059, -060, -061, -073, -079, -160,) cannot be used with the REF 5945 module.

To insert a surgical accessory into the REF 5945 Reciprocating Saw module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using the handpiece with the foot control, take care to ensure that the foot control is not activated accidentally while inserting the surgical accessory.
2. Loosen the locking collar by turning it approximately four (4) times in a counter-clockwise direction.
3. Insert the surgical accessory, making sure it is fully seated in the locking collar.
4. Tighten the locking collar by turning it in a clockwise direction. Turn the locking collar until tight.
5. Run the instrument for 3-5 seconds, then attempt to pull the surgical accessory out of the handpiece to confirm it is secure. If accessory can be removed by hand, re-insert and properly tighten locking collar.

**NOTE:** If a surgical accessory becomes loose when the handpiece is running, the accessory was not seated properly in the locking mechanism. Move the accessory from side to side several times, then retighten the locking collar.

**WARNING:** When operating this saw, be careful to retract or protect the patient's tissue near the locking collar. Pinching the tissue between the collar and the body of the instrument may cause injury.

## REF 5950 HALL® STYLE KEYLESS SAGITTAL SAW MODULE INSTRUCTIONS

The REF 5950 Hall® Style Sagittal Saw, Keyless handpiece is a powerful, heavy-duty saw for transverse or wedge osteotomies. This saw accepts MicroAire ZS series of Keyless Sagittal Blades. Please see MicroAire catalog for a full listing of these blades. This saw will not accept MicroAire ZS-0XX series of Sagittal Blades.

To insert a blade into the REF 5950 Hall® Style Sagittal Saw, Keyless module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using the handpiece with the foot control, take care to ensure that the foot control is not activated accidentally while inserting the blade.
2. Depress push button and insert the blade between the two jaws, making sure that the blade is fully seated over the indexing pins.



3. Release push button.



## REF 5970 MICRO OSCILLATING SAW MODULE INSTRUCTIONS

The REF 5970 Micro-Oscillating Saw module is useful for precise curved and straight osteotomies. This saw has an extended head for procedures where extra length provides better visibility. The REF 5970 Micro-Oscillating Saw module accepts MicroAire 1700 Series saw blades, please refer to MicroAire catalog for a complete listing of these blades.

To insert a blade into the REF 5970 Micro-Oscillating Saw module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using a motor module with a foot control, take care to ensure that the foot control is not activated accidentally while inserting the blade.
2. Open the blade locking lever to release the floating jaw.
3. Insert the blade between the floating jaw and the indexing pin.



4. Fit the hole in the blade over the indexing pin.

**CAUTION:** The blade hole must be seated over the indexing pin. If it is not, the head will be damaged when the locking lever is closed. **DO NOT** force the locking lever if excessive resistance is felt.

5. Close the locking lever.



## REF 5972 KEYED FOOT SURGERY OSCILLATING SAW MODULE INSTRUCTIONS

The REF 5972 Oscillating Saw module was specially designed for foot surgery. A wide selection of straight, bent, and crescentic saw blades (MicroAire's ZO Series small oscillating blades) are available for this special purpose module. Please refer to MicroAire catalog for a complete listing of these blades.

To insert a blade into the REF 5972 Oscillating Saw module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using a motor module with a foot control, take care to ensure that the foot control is not activated accidentally while inserting the blade.
2. Loosen the head nut with the REF 1745-001 Oscillating Saw locking tool.
3. Insert the blade behind the washer (the washer goes next to the head nut) in any desired position.



**CAUTION:** Blade must be placed behind the washer or instrument will be damaged.

4. Tighten the nut using the MicroAire REF 1745-001 Oscillating Saw Locking Tool, and then pull on the blade to make sure it is secure.



5. Run the instrument for 3-5 seconds, then retighten nut.

## REF 5976 KEYLESS FOOT SURGERY OSCILLATING SAW MODULE INSTRUCTIONS

The REF 5976 Keyless Oscillating Saw module was specially designed for foot surgery. A wide selection of straight, bent, and crescentic saw blades (MicroAire's ZS-36x and ZS-37x Series blades) are available for this special purpose module. Please refer to MicroAire catalog for a complete listing of these blades.

To insert a blade into the REF 5976 Keyless Oscillating Saw module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using a motor module with a foot control, take care to ensure that the foot control is not activated accidentally while inserting the blade.

2. Pull the locking collar down and insert the oscillating blade between the two jaws, making sure the blade hub is fully seated over the indexing pins.



3. Once the blade is seated, release the locking collar to lock the blade in place.



4. Run the saw for 3-5 seconds to ensure blade is secure.

## REF 5980 JACOBS® STYLE DRILL MODULE INSTRUCTIONS

The REF 5980 Jacobs® Style Drill module is a low-speed, high-torque drill.

The Jacobs® Style Drill Head handpiece accepts MicroAire 8051 and 8054 Series Jacobs® Style twist drills with diameters between 1.0mm (.039") and 4.0mm (.15"), up to 127mm (5") in length. Please refer to MicroAire catalog for a full listing of these drill bits.

To insert a twist drill into the REF 5980 Jacobs® Style Drill module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source to the electric console.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using a motor module with a foot control, take care to ensure that the foot control is not activated accidentally while inserting the drill bit.
2. Using a 5/32" Jacobs® Style chuck key (REF 1645-004), open the chuck to the desired size.



3. Insert the twist drill, making sure that it seats properly.



4. Tighten the Jacobs® style chuck using the same Jacobs chuck key (1645-004).



5. Being careful of sharp drill flutes, pull on the drill bit to make sure it is secure.

## REF 5990 SYNTHES® STYLE DRILL MODULE INSTRUCTIONS

The REF 5990 Synthes® Style Drill module is a low speed, high torque drill that allows the use of Synthes® Style quick-connect twist drills.

The REF 5990 Synthes® Style Drill handpiece accepts any MicroAire 8053 Series quick-connect twist drills with diameters between 1.1mm (.05") and 3.5mm (.14"), up to 127mm (5") in length. Please refer to MicroAire catalog for a full listing of these drill bits.

To insert a twist drill into the REF 5990 Synthes® Style Drill module:

**NOTE:** At this point, the head module should be attached to the motor module, and the motor module should be connected to its corresponding power source. The pneumatic or electric power source should be set to "OFF". Please see System Setup for instructions on connecting the motor module to its corresponding power source.

1. If using the throttle-lever handpiece, move the throttle safety lock to . If using a motor module with a foot control, take care to ensure that the foot control is not activated accidentally while inserting the drill bit.
2. Retract the collar at the front of the handpiece.
3. Insert a quick connect Synthes® type twist drill.
4. Make sure the drill is fully inserted and seated.
5. Release the collar to lock the drill in place.
6. Being careful of sharp drill flutes, pull on the drill bit to make sure it is secure.



# INSTRUMENT CLEANING AND STERILIZATION INSTRUCTIONS

## PER ISO 17664:2003 & AAMI ST 81:2004

### INSTRUCTIONS

**Point of Use:** Remove excess body fluids and tissue with a disposable, non-shedding wipe and cover with a cloth dampened with purified water. Body fluids and tissue should not be allowed to dry on instruments prior to cleaning (MAXIMUM 30 minutes).

**Preparation for decontamination:**

- 1) Remove all inserted surgical cutting accessories (blades, burs, rasps, drill bits, etc.) from the handpiece. Disposable surgical accessories should be discarded after use, handling them as any contaminated sharp accessory is handled. Reuse of surgical cutting accessories is not recommended.
- 2) Disassemble instruments and accessories.
- 3) For Automated Cleaning install the electric cable for the instrument.
- 4) For Manual Cleaning install the electric cable for the instrument.

**Preparation of Cleaning Agent:** Prepare mild pH enzyme and cleaning agents at the use-dilution and temperature recommended by the manufacturer. Determination of cleaning agents shall be by local or country regulations.

**Cleaning - Automated:**

- 1) Load the medical devices into the Washer Disinfector
  - a) Avoid contact between devices (movement during washing could cause damage and washing action could be obstructed). DO NOT overload the trays.
  - b) Arrange medical devices so that cannulations are not horizontal and any openings are oriented downwards (to assist drainage).
- 2) The minimum recommended Washer/Disinfectant cycle is below:

#	Title	Detergent	Minutes	Temp
1	Pre-Wash	Mild pH Enzymatic*	4	< = 50°C (122° F)
2	Rinse	None	1**	< = 50°C (122° F)
3	Wash	Mild pH	4	> = 60°C (140°F)
4	Drain for 1 Minute Minimum			
5	Rinse	None	2**	> = 60°C (140°F)
6	Drain for 1 Minute Minimum			
7	Thermal Disinfect	None	10	> = 93°C (200°F)
8	Drain for 1 Minute Minimum			

\* Detergent can be omitted at the pre-wash stage if the equipment does not have this ability.

\*\* If not using mild pH detergent, extend rinse time if possible to reduce possible degradation.

**Note:** Washer/Disinfectors should comply with the requirements of ISO 15883 (in preparation). They should be properly installed and be regularly tested in accordance with ISO 15883.

- Cleaning - Manual:**
- 1) Clean the handpiece and couplers thoroughly with warm (< = 50°C / 122° F) water, mild pH enzymatic detergent, and soft brush. Scrub the handpiece with the brush, paying close attention to instrument crevices.
  - 2) Rinse handpieces, couplers and electric cables thoroughly under running (< = 50°C / 122° F) water for a minimum of 2 minutes.
  - 3) Clean the handpieces and couplers thoroughly with warm (> = 60°C / 140°F) water, mild pH enzymatic detergent, and soft brush. Scrub the handpiece with the brush, paying close attention to instrument crevices.
  - 4) Flush the lumens of instruments and the nose of drills and wire drivers with a Water-Pik or similar device. Flushing removes blood, debris and saline deposits.
  - 5) Rinse handpieces, couplers and electric cables thoroughly under running (> = 60°C / 140°F) water for a minimum of 2 minutes. If possible, use distilled water for the final rinse.
  - 6) After rinsing all electric cables, it is required that the cables be drained of all residual cleaning fluids.

**Disinfection:** Disinfection is only acceptable as an adjunct to full terminal sterilization for reusable surgical instruments. See sterilization section below.

**Drying:** Wipe off any water from the handpiece with a soft lint free towel. An airgun can also be used to dry the handpiece.

- Maintenance, Inspection and Function Testing:**
- 1) Remove the electric cable from the hand piece.
  - 2) Carefully inspect each device to ensure all visible blood and soil has been removed.
  - 3) Visually inspect for damage and/or wear.
  - 4) Check the action of moving parts to ensure smooth operation throughout the intended range of motion.
  - 5) Where instruments form part of a larger assembly, check that the devices assemble with their mating components.

**NOTE:** If concerns are noted that may compromise the function of the device, please contact your MicroAire representative.

- Packaging:**
- 1) Single Instruments - A standard medical grade steam sterilization wrap may be used. Ensure that the wrap is large enough to contain the instrument without stressing the packaging. (ANSI/AAMI ST46-1993)
  - 2) Sets of Instruments - Sets of instruments may be loaded into dedicated instrument trays or general purpose sterilization trays for sterilization. If applicable, use standard medical grade steam sterilization wrap following the AAMI double wrap method. (ANSI/AAMI ST46-1993)

**Sterilization:** Steam sterilize using one of the following cycles.

<b>Sterilization Cycle</b>	<b>Instrument</b>	<b>Minimum Time &amp; Temp</b>	<b>Minimum Heated Dry Time</b>
<b>Pre-Vacuum Steam</b>	Single Instrument	3 minute Full Cycle @ 134-137°C (273 - 279°F)	8 Minutes
	In Sterilization Tray	4 minute Full Cycle @ 132-135°C (270 - 275°F)	8 Minutes
<b>Gravity Displacement</b>	Single Instrument	30 minute Full Cycle @ 132-135°C (270 - 275°F)	8 Minutes
	In Sterilization Tray	35 minute Full Cycle @ 132-135°C (270 - 275°F)	8 Minutes

**NOTE:** Where there is a concern about TSE/vCJD contamination, the World Health Organization recommends processing through a pre-vacuum steam sterilization cycle for 18 minutes at 134°C (273°F). (WHO/CDS/CSR/2000.3, "WHO Infection Control Guidelines for TSE," March 1999).

**Storage:** Sterile, packaged instruments should be stored in a designated, limited access area that is well ventilated and provides protection from dust, moisture, insects, vermin, temperature and humidity extremes

**Additional Information:**

- 1) Sterile instrument packages should be examined closely prior to opening to ensure that there has been no loss of package integrity.
- 2) Do not use instruments when they are still warm. They need to cool down to room temperature.
- 3) Do not soak instruments to cool them down or wrap cold towels around them.

**Manufacturer Contact:** **MicroAire Surgical Instruments**  
3590 Grand Forks Boulevard  
Charlottesville, VA 22911 U.S.A.

Inside the USA Dial: 1-800-722-0822  
Outside the USA, dial the local international access code followed by +1-434-975-8000

## WARRANTY, SERVICE AND REPAIR

MicroAire Surgical Instruments warrants the 5000 Series modular instruments to be free from defects in material and workmanship in their manufacture for a period of 1 (one) year from the original purchase date by the end customer. This warranty is limited to the repair or replacement of the product without charge.

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

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

**NOTE:** 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.

### Extended Warranty

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 the full serviceable condition before being eligible for a service agreement.

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

### Service and Repair

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

	Telephone:	Fax:	E-Mail:
USA	800-722-0822	800-648-4309	<a href="mailto:inquiry@microaire.com">inquiry@microaire.com</a>
Outside USA	434-975-8000	434-975-4134	<a href="mailto:intlsvc@microaire.com">intlsvc@microaire.com</a>

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

MicroAire may be able to solve the problem quickly without requiring return of 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 these guidelines listed below.

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, UPS, or Air Freight.

6. Return the merchandise prepaid.
7. If an estimate of repair costs is needed before the repair technicians begin work, include the name and telephone number of the person to contact.
8. MicroAire will repair and re-ship 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 WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY USE OF THIS PRODUCT.**

By using this handpiece and its accessories, you acknowledge and agree that you have read, understood and agree to be bound by these terms and conditions.

### Disposal - (2002/96/EC Directive on Waste Electrical and Electronic Equipment

In accordance with the 2002/96/EC Directive on Waste Electrical and Electronic Equipment (the WEEE Directive) and the current national provisions, the organization of the transfer of these wastes for devices sold by MANUFACTURER shall be undertaken by DISTRIBUTOR. For this reason, DISTRIBUTOR shall organize a system for the collection, storage and arrange transfer of any and all WEEE components to Manufacturer's approved WEEE collection facility in Europe. Distributor shall provide on request to the manufacturer, the proof of compliance with the European and national provisions regarding the WEEE Directive. Please refer to [www.microaire.com/weee-directive](http://www.microaire.com/weee-directive) for WEEE Compliance Instructions.

### Power Output, Noise and Vibration Information:

Part Number	Unit of Measure	5000E Electric Motor Module	5000ET Electric Motor Module	5000-XXX Pneumatic Motor Module
<b>Power Output</b>	kW - KiloWatts	0.05	0.05	-
<b>Vibration Exposure</b>	ahv(m/s <sup>2</sup> ) Uncertainty k (m/s <sup>2</sup> )	1.68 1.5	1.68 1.5	1.68 1.5
<b>Noise Emission Value</b>	LPA (db(A)) LC, Peak (db(C)) LWA (dbA)	74 - -	74 - -	84 - -
<b>Mass</b>	Weight (kg)	0.22	0.25	0.18



*Hall® is a registered trademark, and Mini-Driver™ is a trademark of Linvatec Corporation, a subsidiary of ConMed Corporation.  
Stryker® is a registered trademark of Stryker Corporation.  
Synthes® is a registered trademark of Synthes, Inc..  
These companies are not affiliated with MicroAire Surgical Instruments LLC.*



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