

 **Accuracy**Matters

 **sona**star®

Ultrasonic surgical aspiration system

- High performance tissue ablation
- Vessel sparing, soft and hard tissue removal
- Adaptive radio frequency coagulation capability
- Easy to set up and break down



MISONIX®
BETTER MATTERS™



Misonix, Inc. designs, develops, manufactures and markets therapeutic ultrasonic medical devices. Misonix's therapeutic ultrasonic platform is the basis for several innovative medical technologies. Addressing a combined market estimated to be in excess of \$3 billion annually, Misonix proprietary ultrasonic medical devices are used for wound debridement, cosmetic surgery, spine surgery, neurosurgery, laparoscopic surgery and other surgical and medical applications. Additional information is available on the company's web site at www.misonix.com. All of our products are designed, manufactured and serviced with strict adherence to U.S.A. cGMP and ISO 13485:2007 standards. Additionally, all products meet or exceed the regulations for all applicable safety requirements.



OsteoSculpt®
bone shavers (long)



SonaStar aspiration
tips



SonaStar specialty
aspiration tips



OsteoSculpt
bone shavers (short)

Intuitive Handling

The SonaStar® is an advanced ultrasonic system for precise soft tissue aspiration and powerful removal of osseous structures. It is engineered for maximum simplicity and intuitive use. All ultrasonic components are optimized for high efficiency and reliability, day after day, case after case.



Short Straight, High-Flow
23 kHz Handpiece (shown)

Simple Set-Up

- 1** Assemble Handpiece
- 2** Connect Handpiece and Tubing Set
- 3** Activate Footswitch
- 4** Automatic System Check

Advanced System Features

- Dynamic Tissue Response (DTR)
- Linear Modes and Preset Modes
- Progressive Footswitch Control

High Performance Design

- 23 kHz Single Frequency Technology
- Universal SonaStar Short Straight Handpiece and Curved Extended Handpiece
- Adaptive RF capability

Enhanced Ergonomics

- Compact, well-balanced handpieces
- Enhanced tip visibility
- Multifunctional, wireless footswitch

Intuitive Control



Progressive Wireless Footswitch Control



Dynamic Tissue Response System

Dynamic Tissue Response™ | DTR

1 SonaStar DTR

Tissue selectivity is managed seamlessly and intuitively with the SonaStar DTR. DTR enables the surgeon to command the desired balance between power and selectivity by setting a single parameter, the Vibration.

DTR automatically increases tissue selectivity at low vibration settings when delicate anatomy demands it most. Likewise, it decreases selectivity at high vibration settings to achieve high ablation rates. A dedicated electronic circuit is able to sense and adjust tip vibration within milliseconds.

Benefit: DTR helps to preserve nerves and blood vessels while enabling the removal of tough tissues.

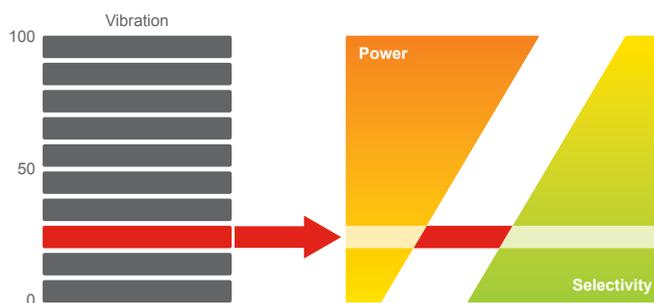
2 SonaStar Linear Mode

In addition to DTR, SonaStar has a progressive Linear function that allows the surgeon to control tip vibration directly and dynamically in response to changes in the anatomy and pathology by setting a pre-set vibration maximum.

Benefit: The Linear function provides the surgeon with greater control of Vibration during tissue ablation.

Tissue Selectivity Features (Combined)

By allowing surgeon control of vibration via the Linear mode, the surgeon is able to directly control tissue selectivity with DTR.



Indications

The SonaStar Ultrasonic Aspirator System is indicated for use in the fragmentation, emulsification and aspiration of both soft and hard (i.e., bone) tissue in the following surgical specialties:

- Gastrointestinal and Affiliated Organ Surgery
- General Surgery, e.g., liver
- Gynecological Surgery
- Laparoscopic Surgery
- Neurosurgery
- Orthopedic Surgery
- Plastic and Reconstructive Surgery
- Thoracic Surgery
- Thoracoscopic Surgery
- Urological Surgery

The SonaStar system may be combined with electro-surgery using optional RF surgery interface components.

SonaStar Handpieces | 23 kHz

SonaStar handpieces, with their piezoelectric drivers, are core system components. They deliver uncompromised performance in wide ranging scenarios. RF coagulation is seamlessly integrated and all materials are carefully selected to minimize magnetic susceptibility.

Most important, they feature a straight and streamlined aspiration channel to yield maximum aspiration efficiency and minimize any risk of clogging. This results in handpieces that are compact, extremely well balanced, reliable and intuitive to set up.

Nr. 1.1.1. **SonaStar Short Straight**

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The SonaStar Short Straight is an advanced 23 kHz handpiece that combines high performance with maximum flexibility. It delivers ultrasonic power in a compact design engineered for effective tissue removal. It accepts the entire tip portfolio for hard and soft tissue ablation and can be configured for a variety of surgical approaches. The Short Straight handpiece delivers **up to 230 microns** of amplitude.



Shown with standard long curved plus tip (MXA-D218)

Short Straight 23 kHz Universal Handpiece



Shown with short aspiration tip (MXA-D212)

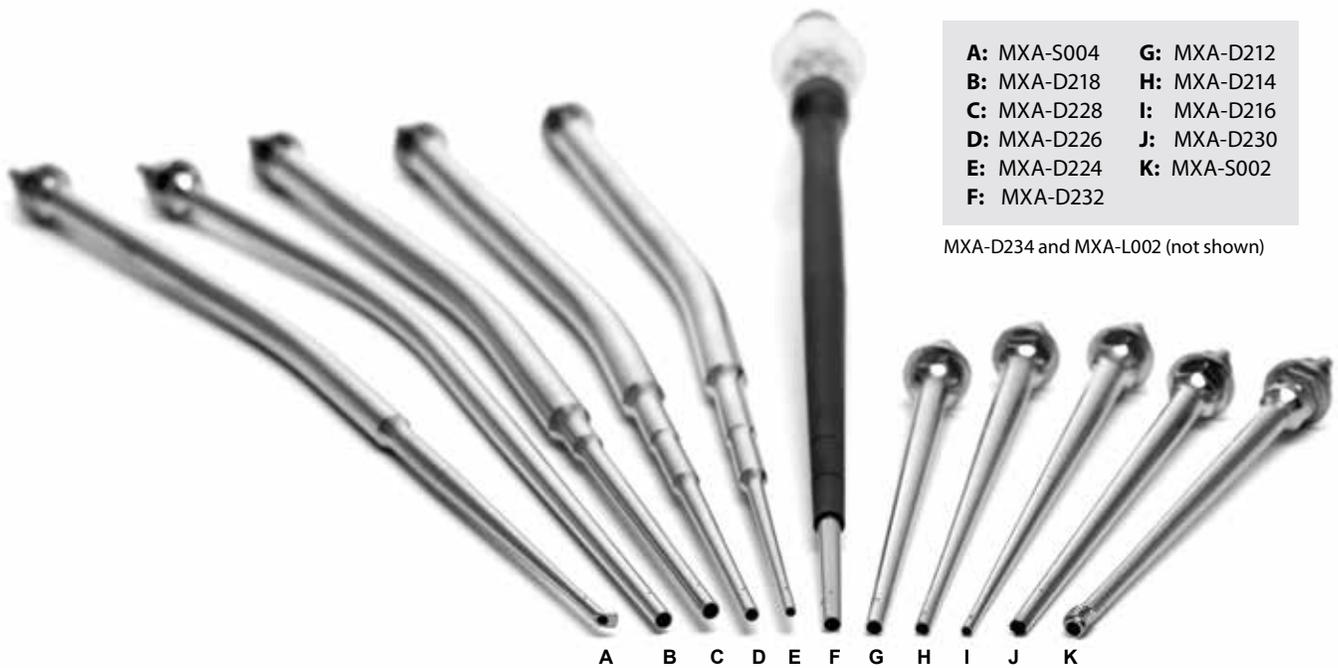
SonaStar Curved, Extended

The SonaStar Curved, Extended handpiece is designed to provide clearance for use with a microscope. Additionally, the handpiece is well balanced, and its curved shape improves ergonomics by reducing hand fatigue over extended periods of use. It provides an amplified tip stroke for more efficient removal of fibrous or calcified structures. The Curved, Extended handpiece delivers **over 300 microns** of amplitude.



Curved Extended 23 kHz Handpiece

SonaStar® Aspiration Tips



The soft tissue aspiration and OsteoSculpt® bone sculpting ultrasonic tips are engineered as distinct surgical instruments and individually tuned to the 23 kHz system frequency.

Soft Tissue Aspiration Tips



2.6 mm
Macro

1.9 mm
Standard

1.6 mm
Micro

1.1 mm
Precision

SonaStar aspiration tips cover the spectrum from delicate skeletonizing to powerful debulking. They come in a variety of tip diameters and styles to address both open surgical procedures and minimally invasive surgery.

Specialty Tips

Deep Access Probe (MXA-D232)

The Deep Access Probe is designed for use in tight areas for ablation of soft tissue in neurosurgery. It is a 1.9 mm standard, long straight tip protected by a sheath made of rigid plastic to mitigate any potential for collateral damage to the surrounding tissue, e.g., thermal necrosis.

Laparoscopic Probe (MXA-L002)¹

The Laparoscopic Probe consists of a 30 cm long straight aspiration tip with 2.0 mm standard I.D. housed in a rigid plastic sheath with a silicone tip assembled at its distal end. Previous surgeries include resection of liver hepatocellular carcinomas, liver metastases from colorectal cancer and carcinomas of the gall bladder. The probe can also be reprocessed up to 6 times. ¹Not available in all markets. Check on availability.

Notched Aspiration Tip (MXA-D230)

The Notched Aspiration Tip combines our signature SonaStar ultrasound technology with mechanical cutting to remove stubborn tissue. Reported uses of this tip include the removal of fibrous meningiomas. It features beveled edges of the distal shaft orifice, and four V-shaped notches opposite one another for enhanced cutting power. This enables the surgeon to perform dissections of stubborn tissue. Since the Notched Aspiration Tip helps address a wider range of tissue types it can potentially save surgeons valuable time in the O.R.



OsteoSculpt Bone Shavers*



MXA-S004 MXA-S002

OsteoSculpt bone shavers are designed to remove hard tissue efficiently with minimal impact to adjacent anatomy. Different styles are offered to target various applications.

*Bone shaving surface area for MXA-S004 is 1.8 x 1.3 mm, for MXA-S002 it is 3.6 mm x 160°



*If you would like further information or would like to evaluate the
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For further information on SonaStar® please consult with your local Misonix sales representative.

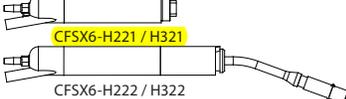
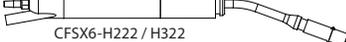
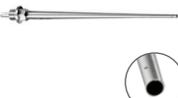
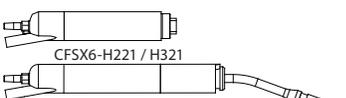
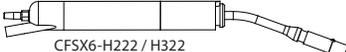
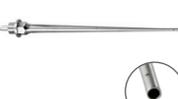
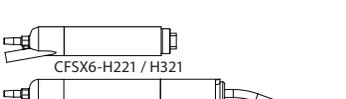
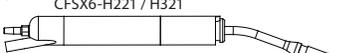
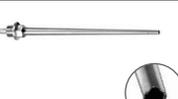
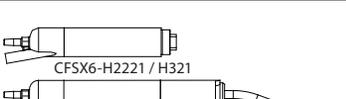
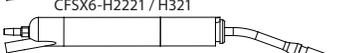
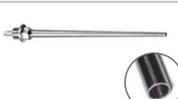
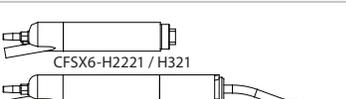
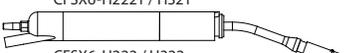
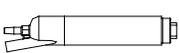
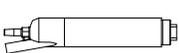
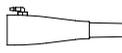
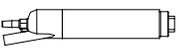
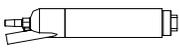
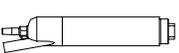
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References available upon request and on file at the corporate offices.

SonaStar Tip Selection Guide

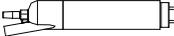


Nr. 1.1.2.

| Short Aspiration Tips for Short Straight and Curved Extended Handpieces | | | | |
|---|---|--|---|---|
| Tip | | Handpiece | Front Housing | Uses |
|  | MXA-D212 1.9 mm Standard, short Working length* = 3 in. |  CFSX6-H221 / H321  CFSX6-H222 / H322 |  CFSM6-H185  CFSM6-H175 | General soft or calcified tissue removal; (large tissue volume) |
|  | MXA-D214 1.6 mm Micro, short Working length* = 3 1/2 in. |  CFSX6-H221 / H321  CFSX6-H222 / H322 |  CFSM6-H185  CFSM6-H175 | Smaller bore for more precise tissue removal (soft or calcified tissue) |
|  | MXA-D216 1.1 mm, Precision, short Working length* = 3 3/8 in. |  CFSX6-H221 / H321  CFSX6-H222 / H322 |  CFSM6-H185  CFSM6-H175 | Smallest bore for most precise tissue removal (near critical structures) |
|  | MXA-D230 1.9 mm, Notched, standard, short Working length* = 3 in. |  CFSX6-H221 / H321  CFSX6-H222 / H322 |  CFSM6-H185  CFSM6-H175 | General soft or calcified tissue removal; esp. dense or fibrous tissue |
|  | MXA-D234 2.6 mm, Macro, short Working length* = 3 in. |  CFSX6-H221 / H321  CFSX6-H222 / H322 |  CFSM6-H185  CFSM6-H175 | General soft or calcified tissue removal; (greater tissue volume/general surgery) |
| Long Aspiration Tips for Short Straight Handpiece | | | | |
| Tip | | Handpiece | Front Housing | Uses |
|  | MXA-D218 1.9 mm Standard, long curved PLUS Working length* = 7 1/4 in. |  CFSX6-H221 / H321 |  CFSM6-H185 | General soft or calcified tissue removal; (large tissue volume/general surgery) |
|  | MXA-D224 1.1 mm Precision, long curved Working length* = 6 3/4 in. |  CFSX6-H221 / H321 |  CFSM6-H183 | Curved, smallest bore for the most precise tissue removal near critical structures |
|  | MXA-D226 1.6 mm Micro, long curved Working length* = 7 in. |  CFSX6-H221 / H321 |  CFSM6-H183 | Curved, small bore for precise tissue removal (soft or calcified tissue) |
|  | MXA-D228 1.9 mm Standard, long curved Working length* = 7 1/4 in. |  CFSX6-H221 / H321 |  CFSM6-H183 | Curved, general soft or calcified tissue removal (large tissue volume/general surgery) |
|  | MXA-D232 <i>Deep Access Probe</i> 1.9 mm Standard, long with Rigid Sleeve Working length* = 5.43 in. |  CFSX6-H221 / H321 |  CFSM6-H185 | General soft calcified tissue removal from limited-access surgical site |
|  | MXA-L002 <i>Laparoscopic Probe</i> ¹ 2.0 mm Standard long, reusable with (6) replacement sheath tips Working length* = 11.80 in. |  CFSX6-H221 / H321 |  CFSM6-H190 | General soft or calcified tissue removal in laparoscopic surgery |

*Approximate distance from typical index finger placement to end of probe using a Short Straight Handpiece (CFSX6-H221 / H321).

¹Not available in all markets. Check on availability.

| OsteoSculpt® Bone Shavers for Short Straight Handpiece | | | | |
|---|---|--|--|--|
| Tip | | Handpiece | Front Housing | Uses |
|   | MXA-5002 3.6 mm x 160° Standard, short Working length* = 3 in. |  CFSX6-H221 / H321 |  CFSM6-H185 | For bone sculpting or dissection |
|   | MXA-5004 1.8 mm x 1.3 mm Micro, long curved Working length* = 6 3/4 in. |  CFSX6-H221 / H321 |  CFSM6-H183 | For bone sculpting or dissection (minimally invasive or keyhole approaches) |

*Approximate distance from typical index finger placement to end of probe using a Short Straight Handpiece (CFSX6-H221 / H321).



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