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About this Manual

This manual includes information about the design of the WHITESTAR SIGNATURE PRO System for anterior segment (phacoemulsification) surgical procedures.

This manual includes information about optional system enhancements. Your Johnson & Johnson Surgical Vision, Inc. representative can confirm the availability of these features for your system configuration and availability in your area.

About Phacoemulsification

Over thirty years ago, Dr. Charles Kelman conceived and developed phacoemulsification (phaco), a method of cataract removal by use of ultrasonic emulsification with aspiration of the cataractous lens through a small incision. Phacoemulsification is advantageous for both patient and surgeon:

- Greater intraoperative control.
- The smaller incision requires fewer or no sutures, poses less risk of infection and induced astigmatism, and gives better long-term and short-term predictability of vision.
- Patients are able to resume normal activity much sooner and with fewer restrictions than with traditional cataract extraction surgeries.

AMO supports phacoemulsification with sophisticated instrumentation that optimizes the benefits of this surgical procedure.

Intended Use

The WHITESTAR SIGNATURE PRO System is a modular ophthalmic microsurgical system that facilitates anterior segment (cataract) surgery. The modular design allows the users to configure the system to meet their surgical requirements.

WHITESTAR SIGNATURE PRO System Description and Features

The WHITESTAR SIGNATURE PRO System is a multi-functional tool for use in anterior segment surgery procedures. The WHITESTAR SIGNATURE PRO System represents the latest generation of AMO phacoemulsification technology. Designed and manufactured into every WHITESTAR SIGNATURE PRO System are safety, ease-of-use, and reliability. The WHITESTAR SIGNATURE PRO System meets applicable United States and International safety requirements for this type of device.

The WHITESTAR SIGNATURE PRO System contains a number of features based on extensive research and clinical trials with highly trained and noted ophthalmologists with experience as phacoemulsification surgeons.

WHITESTAR Technology

The WHITESTAR Technology represents the many enhancements to the power modulation for the WHITESTAR SIGNATURE PRO System. The WHITESTAR Technology enhancement was the first to deliver finely modulated pulses of energy, interrupted by extremely brief cooling periods. This allows the system to achieve full ultrasound cutting efficiency and magnetic followability, while introducing less energy into the eye. Minimized ultrasonic time reduces the risk of thermal damage.
WHITESTAR ICE Technology

The WHITESTAR ICE Technology was the next advance in micropulse phacoemulsification technology. This technology combined modulated ultrasonic power (pulse shaping) with vacuum control through the use of the Chamber Stabilization Environment (CASE).

This pulse shaping technology modified the standard “square” wave pulse, by increasing the amplitude of the first millisecond of the on time “kick”. The technology then set the remaining part of the on time to the standard power setting. This process repeats for each on time pulse. This results in increased control and efficiency in phacoemulsification.

Occlusion Mode Phaco

The Occlusion mode phaco regulates the vacuum rise time following an occlusion of the phaco tip, without limiting the choice of aspiration rate through an unoccluded needle. To independently control the aspiration rate and the vacuum rise time, you can have a different aspiration rate when the needle occludes than when the needle is unoccluded.

The Occlusion mode phaco also regulates the ultrasound power modulation. You can program the power modulation of the phaco handpiece (continuous, pulse, burst) to automatically change when the phaco tip changes from an unoccluded condition to an occluded condition.

The FUSION mode allows the user to access the settings and variables for both CASE and Occlusion mode phaco. The CASE and Occlusion mode phaco can work together or independently.

FUSION Fluidics System

The system has both a flow-based peristaltic pump system and a vacuum-based Venturi pump system. The patented microprocessor-based system continuously monitors and controls intraocular conditions of the flow and vacuum in the eye.

Chamber Stabilization Environment (CASE)

CASE is an intelligent vacuum monitoring system that regulates the maximum allowable vacuum used following the occlusion of the phaco tip. When the phaco tip becomes occluded, the vacuum rises. Clearing of the occlusion while the vacuum is at a high-level can lead to a post occlusion surge. When CASE is on, the system monitors the actual vacuum levels. When the vacuum exceeds a specific threshold for a specified duration, the system automatically adjusts the maximum allowable vacuum setting to a lower predefined CASE maximum vacuum level. When the occlusion clears, the system automatically restores the settings to the original programmed maximum vacuum setting. This function makes it possible to have a different maximum vacuum setting when the needle occludes than when the needle is unoccluded.
Accessories

WHITESTAR Handpiece
The design of the phaco handpiece has a straight-through aspiration channel for more efficient removal of nuclear fragments, to minimize clogging and to facilitate cleaning. The handpiece is lightweight, slim, and well-balanced, making it comfortable to use and easy to control.

ELLIPS FX Handpiece
The ELLIPS FX phaco handpiece is available for use with the WHITESTAR SIGNATURE PRO System. The ELLIPS FX handpiece provides both longitudinal and transversal movement. You can use the handpiece with a straight tip or a curved tip.

Foot Pedal
The foot pedal controls the various operating modes of the instrument. You can program the foot pedal settings through the user interface. You can use either the Single Linear foot pedal, the Advanced Control Pedal or the Advanced Linear Pedal with the system.

The foot pedal design offers control through the use of increased linearity with the foot pedal movement. The design provides uniform pressure throughout the foot pedal movement, easing foot and leg fatigue. You can select the degrees of movement for each foot pedal position. You can save the settings for each surgeon/mode, pitch for the standard foot pedal and the Advanced Linear Pedal and pitch and yaw for the Advanced Control Pedal giving the pedal dual linear functionality. Programmable switches can activate reflux, giving an immediate response.

Wireless Remote Control
The surgery can be controlled from the wireless remote control keypad. You can access all surgical modes and adjust all surgical settings with the use of the wireless remote control. Back-lighting supports low light operating room conditions.
Operating room teams contributed significantly to the successful design of the system console. The solid wheel base and locking wheels make the console stable and smooth rolling. An adjustable height Mayo tray accommodates the handpieces and tubing. The remote control is wireless and recharges when attached to the AC Charging Adapter. The foot pedal has an open bin area for storage.

**WHITESTAR SIGNATURE PRO System Display (Graphic User Interface-GUI)**

The system graphic screen display is easy to read and easy to operate. You can see at a glance the status of the system. The screen gives you visual indication of operating modes, settings, and system status. Messages cue you through the procedure, and error messages indicate improper connections, or selections. Help information is available when resolving error messages.

**Prime/Tune**

Before the start of each surgical case, the system requires that you run prime, tune or prime/tune. The prime mode incorporates the function of clearing the tubing of air, then fills the tubing and completes the fluid aspiration check and the vacuum check. The tune mode incorporates an ultrasonic power calibration check and safety check for the attached phaco handpiece. The prime/tune mode allows the system to prime and tune the handpiece at the same time.

**Dual Pump**

The system provides a fluid aspiration system that uses either a peristaltic (flow-based) pump or a Venturi (vacuum-based) pump system. The surgeon can use both the peristaltic pump and the Venturi pump in the phaco, irrigation/aspiration (I/A), and vitrectomy surgical modes.

**Continuous Irrigation**

Continuous Irrigation is immediately available by way of the touch screen. Surgeon control of continuous irrigation with the foot pedal is also available. You can use continuous irrigation to fill cups prior to prime/tune. You can use the cup fill feature in place of continuous irrigation when you fill a cup. The cup fill feature is only available from the prime/tune screen. (See “Prime/Tune” on page 3-11 for detailed information.)

**Programmable Operating Parameters**

The system is programmable through the screens on the touch screen monitor. You can select your desired settings for each portion of the anterior surgical procedure. The instrument program memory stores up to 50 surgeon names with a maximum of 20 different setups, plus the AMO default settings program and the Post Laser Cataract program. This allows different users to preset their preferences, or an individual user to select setups for different procedures, including a personalized initial operating mode.
MMP – Multiple Mode Programming

Multiple submodes are available within the system operating modes. The multiple submodes allows you to preset your settings for specific techniques such as phaco chop or viscoelastic removal.

Programmable IV Pole

The system has a programmable IV pole. You can set the programmable IV pole height parameters independently for each of the phaco modes plus settings for I/A, and vitrectomy. During surgery, the programmable IV pole height changes to the preprogrammed height when you switch modes.

The automated and programmable IV pole allows adjustment of the bottle height to provide gravity infusion through each procedural phase. The up and down arrows on the touch screen or the wireless remote control raises and lowers the bottled balanced salt solution, while maintaining the sterility of the operating field. A separate up and down switch allows IV pole adjustment from the side of the system. The foot pedal can also be programmed to move the IV pole.

Note: The IV pole movement is calibrated in centimeters. When the IV pole height is set to inches, the height shown may not update immediately upon pressing the up arrow or down arrow.

WHITESTAR SIGNATURE PRO System Operating Modes

The design of the system provides all the operating modes and surgical capabilities that the anterior segment surgeon or the cataract surgeon requires. These capabilities include:

Phacoemulsification (Phaco)

You use the phacoemulsification mode to break up (emulsify) the nucleus of the lens. You then aspirate the nucleus of the lens from the eye through a small incision. The continuous autotuning circuitry maximizes the emulsification efficiency for each lens density, even varying densities within the same lens. The system displays phaco time in minutes and seconds. The convenient selection of linear or panel preset phaco power, in a variety of power delivery options (continuous, pulsed, burst), provides increased precision, and control.

The WHITESTAR Technology allows you to safely remove all lens types through small incisions with single-mode, single-instrument convenience.

The WHITESTAR Technology is a patented software program proven to change the characteristics of phacoemulsification using little or no ultrasound. The WHITESTAR Technology changes the thermal properties and improves control of the lens without reducing the cutting power or changing technique or efficiency.
Irrigation/Aspiration (I/A)
The irrigation and aspiration mode allows for controlled aspiration of cortical material from the eye, while maintaining intraocular stability, by replacing the aspirated material with a balanced salt solution. This mode gives you flexible control of each case with the independently adjustable vacuum level settings and flow rate settings. A peristaltic pump provides a predictable and stable aspiration rate. “Aspiration Rate” and “Vacuum” settings allows for complete control.
Irrigation is gravity-fed.
The vacuum units can be set to either mmHg or kPa. To set the vacuum units go to Configuration, Set Vacuum Units.
You can regulate the gravity-fed irrigation by adjusting the height of the balanced salt solution bottle (peristaltic). The Venturi pump can also be used to regulate irrigation.

Vitrectomy (VIT)
You use the Vitrectomy mode to remove vitreous from the eye during surgery. The system uses air pressure to drive the vitreous cutter. The wide range of user-controlled, programmable cut rates supports both anterior segment and posterior segment surgeries.

Diathermy (DIA)
Most surgeons use the diathermy mode to coagulate blood vessels during the procedure and by some surgeons to “coag” the conjunctiva at the end of the procedure. An isolated output frequency allows noncontact tissue coagulation, eliminating adhesion, and traction. Also, the depth of penetration of the energy field is less than that of lower frequency units, which minimizes tissue shrinkage or charring. The gentleness of the diathermy mode allows the surgeon to stop “bleeders” within the incision with only minimal scleral shrinkage.

CASE One Touch
The One Touch button simplifies the programming of the CASE function and allows you to easily define the basic CASE settings once. You can adjust the CASE function with the CASE One Touch settings on the surgical screens. When you use these controls, the CASE functionality changes to provide enhanced control or improved efficiency to suit any particular combination of cataract density, surgical technique or personal preferences. See “CASE One Touch” on page 5-27
Safety Precautions

Once you have set the system up and you have verified that all the functions are operating properly, you are almost ready to use your system. Read the following safety precautions and warnings carefully before you use the system in surgery.

1. Do not use extension cords with your system.
2. Do not overload your electrical receptacle (outlet).
3. If there is damage to the cord or the plug, do not use the instrument. A damaged cable can cause an electric shock to the user or a fire hazard to the system. Call AMO customer service to order a new cord.
4. The instrument has ventilation openings at the rear of the console to allow ambient air intake and the release of heat generated during operation. Do not block the openings; as heat build-up can cause system failures which can result in a fire hazard.
5. Do not try to move the system cart on deep pile carpets or over objects on the floor such as cables and power cords.
6. Take care not to trip over power and foot pedal cords.
7. Do not try to lift the system console.
8. Do not place the instrument on uneven or sloped surfaces.
9. Only use disposables, accessories, or other surgical instruments designed for this system. For optimum performance of the system and safety, use only parts recommended by AMO.
10. Do not operate the system in a condensing environment. Take care to protect the instrument from fluid sprays or fluid buildup.
11. To protect the patient from contaminated fluids or handpieces, use only:
   • sterile tubing packs
   • sterile irrigation fluid
   • sterile handpieces
12. Wrap the excess power cord neatly around the cord wrap on the back of the console.
13. Use caution when you use handpieces with sharp edges or pointed tips.
14. Always replace the tubing pack and the balanced salt solution bottle between cases.

Changing Irrigation Flow

Use extreme caution when you lower or raise the balanced salt solution bottle to decrease fluid flow or increase fluid flow, and fluid pressure. If you lower the bottle too much it can cause the anterior chamber to collapse or to become too shallow; care should be taken to avoid abrasion of tissues during phacoemulsification. If you raise the bottle too high it can cause the anterior chamber to deepen. To make sure that the bottle height does not go too high, you can set the maximum bottle height on the Configuration screen. See “Setting the Maximum IV Pole Height” on page 6-2.

Note: Use a new bottle of balanced salt solution at the start of each case.
Phacoemulsification without Adequate Irrigation

Operating phacoemulsification without an adequate irrigation flow can result in an elevated temperature of the tip and subsequent damage to the eye tissue or could cause the chamber to collapse. Confirm that there is irrigation flow before you initiate phacoemulsification. A tight wound or the angle of the needle next to the wound can also constrict the irrigation flow. Pinching the coaxial irrigation sleeve assembly on the needle of the phaco handpiece causes the constriction.

Power Failure during Surgery

If there is a loss of power during a procedure, you need to:

- Withdraw the handpiece from the eye
- Release the foot pedal to position 0

When power is restored:

- Disconnect at least one of the luers from the handpiece before you insert the pack.
- Insert the pack.
- Connect the tubing to the handpiece.
- Select Prime/Tune to reprime the fluids and tune the phaco handpiece. Use Bypass to reduce the length of prime time.
- Select the mode that was in use when the system lost power (Phaco, I/A, Vitrectomy, or Diathermy)

Connecting Handpieces

It is very important that the electrical connectors on the handpieces are completely dry before you attach the handpiece to the system receptacles.

Handling the Phaco Handpiece

The phaco handpiece is a very delicate instrument and you must handle the handpiece with EXTREME care. If you drop the handpiece or the handpiece receives any other significant impact, the handpiece will not work properly. The ultrasonic titanium phaco tip must never touch any solid material while in use. Always clear the handpiece of fluid immediately following surgery.

See cleaning instructions in Chapter 7, “Care and Cleaning”.

Handpieces can be extremely hot immediately after sterilization. Use care and caution when handling.
Phaco and Vitrectomy Operation

Do not activate the phaco handpiece and the vitrectomy cutter with the tips exposed to air, as this reduces the useful life of the handpiece and the cutter. When you introduce power to the phaco handpiece or the vitrectomy cutter, the tips must be in one of the following:

- a test chamber filled with balanced salt solution
- in a container of balanced salt solution
- in the patient's eye

Vitrectomy

Failure to properly attach the tubing to the vacuum source or pressure source can affect the vitrectomy cutter operation. Be sure to read the vitrectomy cutter package insert for the correct assembly procedures and connection procedures.

Diathermy

When you select the Diathermy mode, you hear an audible tone. Also, you will hear an audible tone when you apply diathermy power.

You must check the diathermy cable periodically for damage. If the cable shows signs of damage, replace the cable immediately with the same type of cable. Use of other types of cables can affect the diathermy performance.

During surgery, the diathermy output power must be as low as possible for the intended purpose. AMO recommends the 30% setting to start.

You must position the diathermy cable in such a way that the cable avoids contact with the patient or other leads. When you use diathermy, grounded or ungrounded metal parts must not come in contact with the patient.

For proper operation of the diathermy, replace the handpiece with the same type.

Programmable IV Pole

Do not exceed the maximum weight of two 500 ml balanced salt solution bottles on the IV pole bottle holder.

Foot Pedal

Never handle the foot pedal by its cable.

Do not place the foot pedal on a wet surface.
Regulatory Compliance Statements

Federal Communications Commission (FCC) Compliance Statement
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.
Any changes or modifications not expressly approved by AMO can void the user's authority to operate the equipment. (FCC Part 15.21)
Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

Industry Canada (IC) Notice of Compliance
This device complies with Industry Canada’s licence-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference, including interference that may cause undesired operation of the device
Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes:
(1) l’appareil ne doit pas produire de brouillage;
(2) l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

Warnings

WARNING: All personnel who might operate this equipment must read and understand the instructions in this manual before they use the system. Failure to do so might result in the improper operation of the system. Only a trained licensed physician can use this device.

WARNING: Do not modify the WHITESTAR SIGNATURE PRO System.

WARNING: The system comes equipped with a 3-prong power plug which you must plug into an outlet with a ground receptacle. If the plug does not fit the outlet, contact an electrician. DO NOT modify or remove the ground pin.
WARNING: When using peristaltic, make sure that the balanced salt solution bottle is at or above the eye level of the patient.

WARNING: The surgical staff must monitor the balanced salt solution bottle height and fluid level at all times. A low bottle or empty bottle affects the fluid balance and the intraocular pressure (IOP) while aspirating. Low bottle height or low or empty bottle fluid level can result in:
- Inadvertent chamber shallowing or collapse
- Aspiration or abrasion of the iris or other tissue
- An ultrasonic wound heating commonly called wound burn (extreme case)

WARNING: DO NOT attempt to use the system if the system fails to perform properly as stated in this manual.

WARNING: DO NOT use the system in the presence of any of the following as a fire can result:
- flammable anesthetics
- other flammable gases
- flammable fluids
- flammable objects
- oxidizing agents

WARNING: Make sure that the patient does not have a cardiac pacemaker as this unit might interfere with any cardiac pacemaker; therefore obtain qualified advice prior to such use.

WARNING: The patient must not come into contact with grounded metal parts or metal parts that have appreciable capacitance to ground. AMO recommends the use of an antistatic mat for this purpose.

WARNING: Use proper handling and disposal methods for biohazards when you dispose of the fluidics pack, Mayo tray drape, and monitor drape.

WARNING: Make sure that the fluidics pack drain bag does not over-fill. The maximum capacity of the bag is 750 cc.

WARNING: Use caution when you extend, retract, or swivel the Mayo tray articulating arm. Stay clear of the hinged hardware.
**WARNING:** Do not modify the pole height or manually force the pole height because this could cause incorrect indication of bottle height and patient injury.

**WARNING:** Place monitoring electrodes or other types of equipment as far from those of the **WHITESTAR SIGNATURE PRO** System as possible. AMO recommends high current limiting devices for the protection of such systems. Do not use needle monitoring electrodes.

**WARNING:** Keep the diathermy cord away from the patient and other handpieces or leads (for example, monitoring electrodes). Keep unused **ACTIVE ELECTRODES** away from the patient.

**WARNING:** The output power selected must be as low as possible for the intended purpose.

**WARNING:** This unit complies with all Electromagnetic Interference (EMI) standards and requirements. It is possible that interference provided by the operation of the **HIGH FREQUENCY (HF) SURGICAL EQUIPMENT** can adversely influence the operation of other electronic equipment.

**WARNING:** Do not have skin-to-skin contact on the patient. For example, between the arms and the torso. Insert dry gauze to avoid contact, as appropriate.

*Note:* The unit does not contain any neutral electrode.

*Note:* The diathermy output is bipolar.

*Note:* AMO recommends that you check the condition of all interconnecting and handpiece cables on a regular basis.

**WARNING:** Risk of burns and fire. Do not use the system near conductive materials such as metal bed parts, inner spring mattresses, or similar items. Replace electrode cables on evidence of deterioration.

**WARNING:** Hazardous electrical output. This equipment is for use only by qualified personnel.

**WARNING:** Disconnect the power before you service the equipment.

**WARNING:** Remove the power cord from the power outlet when the equipment is not in use.
**WARNING:** Do not obstruct the power outlet so you can readily remove the power cord.

**WARNING:** Not recommended for use in condensing environments. If exposed to a condensing environment, allow the system to equilibrate to typical operating room conditions prior to use.

**WARNING:** You do not need to use a NEUTRAL ELECTRODE with this HIGH FREQUENCY (HF) SURGICAL EQUIPMENT.

**WARNING:** Failure of the HIGH FREQUENCY (HF) SURGICAL EQUIPMENT could result in an unintended increase of output power.

**WARNING:** DO NOT try to replace the batteries for the Advanced Control Pedal. Call your AMO technical service representative to replace the batteries.

**WARNING:** DO NOT try to replace the wireless remote control batteries. Call your AMO technical service representative to replace the batteries.

**WARNING:** Sterility assurance is the responsibility of the user. You must sterilize all non-sterile accessories prior to use.

**WARNING:** Prior to using any invasive portions of the handpiece assembly, examine under the microscope for any obvious damage, oxidation, or the presence of foreign material. You must note any questionable characteristics; use a backup handpiece for surgery. Use of contaminated or damaged system accessories can cause patient injury.

**WARNING:** Do not have the handpiece tip in the eye of the patient when you prime and tune the handpiece.

**WARNING:** Do not use non-AMO approved products with the WHITESTAR SIGNATURE PRO System, as this can affect overall system performance. AMO cannot be responsible for system surgical performance if you use these products in surgery.

**WARNING:** Do not charge Foot Pedal or Remote Control in patient environment. Do not come in contact with patient when touching the device under charge.
**WARNING:** This equipment/system is intended for use by healthcare professionals only. This equipment/system may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the **WHITESTAR SIGNATURE PRO** System or shielding the location.

**WARNING:** **WHITESTAR SIGNATURE PRO** System needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this manual.

**WARNING:** Portable and mobile RF communications equipment can affect **WHITESTAR SIGNATURE PRO** System.

**WARNING:** The use of accessories, transducers and cables other than those specified by AMO, may result in increased EMISSIONS or decreased IMMUNITY of the **WHITESTAR SIGNATURE PRO** System.

**WARNING:** The **WHITESTAR SIGNATURE PRO** System should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the **WHITESTAR SIGNATURE PRO** System should be observed to verify normal operation in the configuration in which it will be used.

**WARNING:** Do not replace the Advanced Linear Pedal (ALP) battery when the pedal is attached to a power source.

**WARNING:** **WHITESTAR SIGNATURE PRO** System may be interfered with by other equipment, even if that other equipment complies with CISPR emission requirements.
Symbol Definitions

The following symbols appear on the **WHITESTAR SIGNATURE PRO** System front and back panels and in the software:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Symbol on the power switch indicates power is on." /></td>
<td>Symbol on the power switch indicates power is on.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol on the power switch indicates power is off." /></td>
<td>Symbol on the power switch indicates power is off.</td>
</tr>
<tr>
<td><img src="image" alt="Indicates WARNING; a potentially hazardous situation which, if not avoided, could result in serious injury." /></td>
<td>Indicates WARNING; a potentially hazardous situation which, if not avoided, could result in serious injury.</td>
</tr>
<tr>
<td><img src="image" alt="Indicates that there are important operating and maintenance instructions included in the operator’s manual." /></td>
<td>Indicates that there are important operating and maintenance instructions included in the operator’s manual.</td>
</tr>
<tr>
<td><img src="image" alt="Indicates that there are important operating and maintenance instructions included in the operator’s manual." /></td>
<td>Indicates that there are important operating and maintenance instructions included in the operator’s manual.</td>
</tr>
<tr>
<td><img src="image" alt="Indicates the presence of uninsulated high voltage inside the instrument. Risk of electric shock. Do not remove the instrument cover." /></td>
<td>Indicates the presence of uninsulated high voltage inside the instrument. Risk of electric shock. Do not remove the instrument cover.</td>
</tr>
<tr>
<td><img src="image" alt="Brazilian National Institute of Metrology, Standardization and Industrial Quality (INMETRO)" /></td>
<td>Brazilian National Institute of Metrology, Standardization and Industrial Quality (INMETRO)</td>
</tr>
<tr>
<td><img src="image" alt="Indicates fuse." /></td>
<td>Indicates fuse.</td>
</tr>
<tr>
<td><img src="image" alt="Single phase alternating current." /></td>
<td>Single phase alternating current.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Definition</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td><img src="image1" alt="Symbol" /></td>
<td>Indicates isolation of the patient applied part from earth ground.</td>
</tr>
<tr>
<td><img src="image2" alt="Symbol" /></td>
<td>Foot pedal connection.</td>
</tr>
<tr>
<td><img src="image3" alt="Symbol" /></td>
<td>Communications port</td>
</tr>
<tr>
<td><img src="image4" alt="Symbol" /></td>
<td>Programmable IV pole</td>
</tr>
<tr>
<td><img src="image5" alt="Symbol" /></td>
<td>Diathermy receptacle</td>
</tr>
<tr>
<td><img src="image6" alt="Symbol" /></td>
<td>Phaco handpiece receptacle</td>
</tr>
<tr>
<td><img src="image7" alt="Symbol" /></td>
<td>Vitrectomy cutter receptacle</td>
</tr>
<tr>
<td><img src="image8" alt="Symbol" /></td>
<td>Potential equalizer used to identify the terminals which, when connected together, bring the various parts of an equipment or of a system to the same potential, not necessarily being the earth (ground) potential, e.g. for local bonding.</td>
</tr>
<tr>
<td><strong>IPX8</strong></td>
<td>IPX8 is the International Protection code that indicates that the device is protected against the effects of continuous immersion in water.</td>
</tr>
<tr>
<td><strong>IPX4</strong></td>
<td>IPX4 is the International Protection code that indicates that the device is protected against splashing water sprayed at all angles.</td>
</tr>
<tr>
<td><strong>IPX6</strong></td>
<td>IPX6 is the International Protection code that indicates that the device is protected against powerful water jets.</td>
</tr>
<tr>
<td><img src="image9" alt="Symbol" /></td>
<td>Indicates compliance with the Medical Device Directive.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Definition</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td><img src="image" alt="EC REP" /></td>
<td>Indicates the authorized European Union representative.</td>
</tr>
<tr>
<td><img src="image" alt="Separate disposal/collection required" /></td>
<td>Separate disposal/collection required</td>
</tr>
<tr>
<td><img src="image" alt="Indicates manufacturer of the WHITESTAR SIGNATURE PRO System." /></td>
<td>Indicates manufacturer of the WHITESTAR SIGNATURE PRO System.</td>
</tr>
<tr>
<td><img src="image" alt="Date of manufacture of the WHITESTAR SIGNATURE PRO System." /></td>
<td>Date of manufacture of the WHITESTAR SIGNATURE PRO System.</td>
</tr>
<tr>
<td><img src="image" alt="Environment friendly use period in years (RoHS)" /></td>
<td>Environment friendly use period in years (RoHS)</td>
</tr>
<tr>
<td><img src="image" alt="ETL Listed Mark issued to those products that have met the requirements of product safety standards for the United States and Canada. (ETL formerly Edison Testing Laboratory)" /></td>
<td>ETL Listed Mark issued to those products that have met the requirements of product safety standards for the United States and Canada. (ETL formerly Edison Testing Laboratory)</td>
</tr>
<tr>
<td><img src="image" alt="Universal Serial Bus (USB) port" /></td>
<td>Universal Serial Bus (USB) port</td>
</tr>
<tr>
<td><img src="image" alt="Federal Communications Commission (FCC)" /></td>
<td>Federal Communications Commission (FCC) The FCC regulates interstate and international communications by radio, television, wire, satellite, and cable under the FCC’s jurisdiction.</td>
</tr>
<tr>
<td><img src="image" alt="Mark on shipping crate indicating not to open the crate except by authorized personnel." /></td>
<td>Mark on shipping crate indicating not to open the crate except by authorized personnel.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Definition</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td><img src="image" alt="FUSION" /></td>
<td><strong>FUSION</strong> mode button used to open the CASE and the Occlusion mode settings screen.</td>
</tr>
<tr>
<td><img src="image" alt="Single Linear Foot Pedal" /></td>
<td>Single Linear Foot Pedal icon. Shows the current position of the foot pedal as you press the foot pedal. The number changes when the position of the foot pedal changes. When pressed, the Foot Pedal Configuration screen opens.</td>
</tr>
<tr>
<td><img src="image" alt="Advanced Control Pedal" /></td>
<td>Advanced Control Pedal (ACP) icon. Shows the current position of the foot pedal as you press the foot pedal. The number changes when the position of the foot pedal changes. The letters indicate the location of Aspiration (A), Irrigation (I), Phaco (P), Reflux (R), <strong>WHITESTAR</strong> increment/decrement (WS) and Switch (S). When pressed, the Foot Pedal Configuration screen opens.</td>
</tr>
<tr>
<td><img src="image" alt="Advanced Linear Pedal" /></td>
<td>Advanced Linear Pedal. Shows the current position of the foot pedal as you press the foot pedal and the activated foot switch. The number changes when the position of the foot pedal changes. When you press icon, the Foot Pedal Configuration screen opens.</td>
</tr>
<tr>
<td><img src="image" alt="Battery" /></td>
<td>Battery icon on the Advanced Linear Pedal Test screen. Indicates the battery charge left in the battery.</td>
</tr>
<tr>
<td><img src="image" alt="WHITESTAR" /></td>
<td><strong>WHITESTAR</strong> Technology is on.</td>
</tr>
<tr>
<td><img src="image" alt="WHITESTAR Technology" /></td>
<td><strong>WHITESTAR</strong> Technology is on and ICE pulse shaping is on.</td>
</tr>
<tr>
<td><img src="image" alt="ELLIPS FX" /></td>
<td><strong>ELLIPS FX</strong> handpiece is attached.</td>
</tr>
<tr>
<td><img src="image" alt="Reload" /></td>
<td>Reload - The reload button cycles through the surgeon’s programs.</td>
</tr>
<tr>
<td><img src="image" alt="Cont. Irr." /></td>
<td>Continuous Irrigation - Used to turn continuous irrigation on or off.</td>
</tr>
<tr>
<td><img src="image" alt="Volume control" /></td>
<td>Volume control - When pressed cycles through the volume settings.</td>
</tr>
<tr>
<td><img src="image" alt="Help" /></td>
<td>Help - Only active when there is an error. Select this icon to show possible solutions to clear the error.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Definition</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td>Clear Error - Only active when there is an error. Select this icon after resolving the error. The icon removes the error from the display.</td>
<td></td>
</tr>
<tr>
<td>Event Log - Select this button on the Configuration screen to view the Event Log.</td>
<td></td>
</tr>
<tr>
<td>Touch Screen Calibration - Select this button on the Configuration screen to calibrate the touch screen on the system.</td>
<td></td>
</tr>
<tr>
<td>Max IV Pole Height - Select this button on the Configuration screen to set the maximum height the IV pole can move.</td>
<td></td>
</tr>
<tr>
<td>Wireless Setup - Select this button on the Configuration screen to pair the wireless remote control or the wireless foot pedals.</td>
<td></td>
</tr>
<tr>
<td>View Software Versions - Select this button on the Configuration screen to view the version of the software installed on the system.</td>
<td></td>
</tr>
<tr>
<td>IV Pole Test - Select this button on the Configuration screen to test the movement of the IV pole.</td>
<td></td>
</tr>
<tr>
<td>Wireless Remote Test - Select this button on the Configuration screen to test the functionality of the remote control.</td>
<td></td>
</tr>
<tr>
<td>System Self Test - Select this button on the Configuration screen to run a test of the system.</td>
<td></td>
</tr>
<tr>
<td>Set Date/Time - Select this button on the Configuration screen to set the date and time.</td>
<td></td>
</tr>
<tr>
<td>Language - Select this button on the Configuration screen to select the language used for the user interface.</td>
<td></td>
</tr>
<tr>
<td>Set Vacuum Units - Select this button on the Configuration screen to set the vacuum units to either mmHg or kPa.</td>
<td></td>
</tr>
<tr>
<td>Symbol</td>
<td>Definition</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
</tr>
<tr>
<td><img src="image1" alt="Symbol" /></td>
<td>Surgical Media Center (SMC) - Select this button on the Configuration screen to format how the SMC starts to record surgery.</td>
</tr>
<tr>
<td><img src="image2" alt="Symbol" /></td>
<td>Service Interval - Select this button on the Configuration screen to view when the next time maintenance is due on the system.</td>
</tr>
<tr>
<td><img src="image3" alt="Symbol" /></td>
<td>Import/Export Database - Select this button on the Configuration screen to import or export a database to or from the system.</td>
</tr>
<tr>
<td><img src="image4" alt="Symbol" /></td>
<td>Restore Database - Select this button on the Configuration screen to restore a database if the current database is corrupted.</td>
</tr>
<tr>
<td><img src="image5" alt="Symbol" /></td>
<td>Backup All - Select this button on the Configuration screen to save data to a USB device.</td>
</tr>
<tr>
<td><img src="image6" alt="Symbol" /></td>
<td>Restore All - Select this button on the Configuration screen to restore data from a USB device.</td>
</tr>
<tr>
<td><img src="image7" alt="Symbol" /></td>
<td>Add Surgeon or Program - Select this icon to add a surgeon to the list of surgeons or a program to the list of programs.</td>
</tr>
<tr>
<td><img src="image8" alt="Symbol" /></td>
<td>Delete Surgeon or Program - Select this icon to delete a surgeon from the list of surgeons or a program from the list of programs.</td>
</tr>
<tr>
<td><img src="image9" alt="Symbol" /></td>
<td>Edit Surgeon - Select to edit the surgeon or program name.</td>
</tr>
<tr>
<td><img src="image10" alt="Symbol" /></td>
<td>Foot Pedal Settings - Select to set up or edit the foot pedal settings.</td>
</tr>
<tr>
<td><img src="image11" alt="Symbol" /></td>
<td>Sound Settings - Select to set the volume settings for the system.</td>
</tr>
<tr>
<td><img src="image12" alt="Symbol" /></td>
<td>Move Doctor Name Up - Select a surgeon name on the list of surgeons and use this icon to move the doctor’s name up the list. This can be used to alphabetize the list of surgeons.</td>
</tr>
</tbody>
</table>
### Symbol Definition

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Icon" /></td>
<td>Move Doctor Name Down - Select a surgeon name on the list of surgeons and use this icon to move the doctor’s name down the list. This can be used to alphabetize the list of surgeons.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Icon" /></td>
<td>Settings - Select to set the specific surgical program settings.</td>
</tr>
<tr>
<td><img src="image3.png" alt="Icon" /></td>
<td>More - Opens additional settings screens.</td>
</tr>
<tr>
<td><img src="image4.png" alt="Icon" /></td>
<td>Save - Used to save changes made to settings during surgery.</td>
</tr>
<tr>
<td><img src="image5.png" alt="Icon" /></td>
<td>Save As - Located on the Program Settings screen. Used to save the program with a new name.</td>
</tr>
<tr>
<td><img src="image6.png" alt="Icon" /></td>
<td>Restore Program - Located on the Program Settings screen. Used to change the settings back to the previous saved settings.</td>
</tr>
<tr>
<td><img src="image7.png" alt="Icon" /></td>
<td>Restore Submode - Located on the Program Settings screen. Used to change the submode settings to the previous saved settings.</td>
</tr>
<tr>
<td><img src="image8.png" alt="Icon" /></td>
<td>Lock Program - Select to lock the settings for the selected program. You cannot unlock a program once the program is locked.</td>
</tr>
<tr>
<td><img src="image9.png" alt="Icon" /></td>
<td>Copy Program - Select to copy an existing program and rename to a new program.</td>
</tr>
<tr>
<td><img src="image10.png" alt="Icon" /></td>
<td>Move Program Name Up - Select a program name on the list of programs and use this icon to move the program’s name up the list. This can be used to alphabetize the list of programs for the active surgeon. The name at the top of the list becomes that surgeon’s default program.</td>
</tr>
<tr>
<td><img src="image11.png" alt="Icon" /></td>
<td>Move Program Name Down - Select a program name on the list of programs and use this icon to move the program’s name down the list. This can be used to alphabetize the list of programs for the active surgeon.</td>
</tr>
</tbody>
</table>
System Disposal

**WEEE**

The electronic components of the **WHITESTAR SIGNATURE PRO** System are subject to the European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment. This directive applies to all electronic equipment in the European Union only.

The disposal to municipal waste is prohibited for electronic equipment subject to this directive; this equipment must be treated or recycled. Each component that is subject to this regulation is marked on the component itself with this symbol:

![WEEE symbol](image)

In some cases where the component’s size prohibits marking (such as handpieces) the marking can be found on the directions for use and the warranty. Treatment and/or recycling of the electronic equipment are provided at no cost to you. Please see the contact information below for disposition of unwanted AMO electronic equipment.

For disposal of your unit, contact your local AMO subsidiary or the AMO service center.

**RoHS (Restriction of Hazardous Substances)**

For Chinese regulation: *Administrative Measure on the Control of Pollution Caused by Electronic Information Products*.

<table>
<thead>
<tr>
<th>Names and Contents of Toxic/Hazardous Substances or Elements Contained in Products</th>
<th>Toxic/Hazardous Substances or Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assembly</strong></td>
<td><strong>Lead (Pb)</strong></td>
</tr>
<tr>
<td>Housing</td>
<td>X</td>
</tr>
<tr>
<td>Power Supply</td>
<td>X</td>
</tr>
<tr>
<td>Motherboard</td>
<td>X</td>
</tr>
<tr>
<td>Rear Panel Assembly</td>
<td>X</td>
</tr>
<tr>
<td>Pneumatics</td>
<td>X</td>
</tr>
<tr>
<td>Monitor</td>
<td>X</td>
</tr>
<tr>
<td>Base Unit</td>
<td>X</td>
</tr>
<tr>
<td>Fluidics</td>
<td>X</td>
</tr>
<tr>
<td>Remote Control</td>
<td>X</td>
</tr>
<tr>
<td>Single Linear Foot Pedal</td>
<td>X</td>
</tr>
<tr>
<td>Advanced Control Pedal (ACP)</td>
<td>X</td>
</tr>
<tr>
<td>Advanced Linear Pedal (ALP)</td>
<td>X</td>
</tr>
</tbody>
</table>
Format of this table is in compliance with SJ/T11364-2006

O: Indicates that this toxic/hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T26572.

X: Indicates that this toxic/hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T26572.

**Restriction of Hazardous Substances in Electrical and Electronic Equipment (EU RoHS)**

All homogeneous materials for the parts contained within the **WHITESTAR SIGNATURE PRO** System are below the limit requirement in Directive 2011/65/EU Annex II, or are addressed by an exemption noted in Annex III or IV.

For any Product Stewardship related questions, please contact ps_jjsv@its.jnj.com or a Johnson & Johnson Vision office.
SYSTEM COMPONENTS

Receipt and Inspection Instructions

WHITESTAR SIGNATURE PRO System Components
Receipt and Inspection Instructions

When you receive your WHITESTAR SIGNATURE PRO System inspect the exterior packaging for any signs of damage that might have occurred during shipping and record this damage on the shipping documents. If there are any signs of damage to the exterior packaging, have authorized personnel carefully unpack the WHITESTAR SIGNATURE PRO System and inspect the system for damage. If any damage to the package contents has occurred, you must immediately file a claim with the transporter. The transporters accept claims only from the recipient (you), not from the shipper (AMO).

Your AMO representative will contact you to schedule both the installation and the in-service training when you receive your new WHITESTAR SIGNATURE PRO System. We suggest that you leave the WHITESTAR SIGNATURE PRO System in the original packaging. Store the package in a cool, dry environment until the AMO installation personnel arrive to assemble, install, and test your equipment. Extreme heat, cold or moisture can damage any electronic equipment.

WHITESTAR SIGNATURE PRO System Components

Your WHITESTAR SIGNATURE PRO System consists of all or some of the following components:

• WHITESTAR SIGNATURE PRO System console with a Mayo tray on an adjustable arm, detachable power cord, and a programmable IV pole

• FUSION pack (disposable)

• Foot pedal and foot pedal cable (Single Linear Pedal (SLP), Advanced Control Pedal (ACP), or Advanced Linear Pedal (ALP)) (With AC Charger for the ACP and the ALP)

• Wireless remote control module (With AC Charger)

• Surgical Media Center (optional)

• WHITESTAR SIGNATURE PRO System Operator’s Manual
FUSION Packs

Each surgical procedure requires a disposable tubing pack for either the peristaltic pump or the Venturi pump. The FUSION Pack only works with the peristaltic pump used in anterior/cataract surgeries. The FUSION Dual Pump Pack works with both the peristaltic pump and the Venturi pump. With the FUSION Dual Pump Pack you can select either pump while you are in a surgical case.

The pack contains the following components:

- A pack with irrigation and aspiration tubing (administration set) with an attached, sealed drain bag
- Test chamber – to test and prime/tune the phaco handpiece
- Mayo tray drape – to cover the Mayo tray and arm
- Monitor drape – to cover the front of the touch screen
Use proper handling and disposal methods for biohazards when you dispose of the tubing pack, Mayo tray drape, and monitor drape.

The **FUSION** Pack (OPO70) allows an inter-connection of the irrigation line to the aspiration line, so that sterile balanced salt solution can enter the aspiration line and has no time restriction for reflux as there is no pump reversal.

The **FUSION** Dual Pump (DP) pack (OPO71) includes support for the vacuum tank used in the Venturi vacuum system but does not support inter-connecting the irrigation line to the aspiration line. Therefore, only previously aspirated fluid is being refluxed.
Foot Pedal

The foot pedal controls all of the system functions, therefore, it is essential that you understand the foot pedal operation.

The system software automatically detects if a foot pedal is present and what type of foot pedal is attached during start up.

The foot pedal settings and adjustments can be selected and preset for all of the foot pedals on the Foot Pedal Setup screen. Instructions for the foot pedal settings are given in “Foot Pedal Setup” on page 4-6. The foot pedal housing incorporates a handle, making the foot pedal easy to grip for repositioning and storage.

The foot pedal cable attaches to the foot pedal connector on the rear of the console. The Advanced Control Pedal and the Advanced Linear Pedal can also be set up with a wireless connection.

Four to six minutes after the system is shut down and power is turned off, both of the wireless foot pedals go into a power-save mode.

- To activate the Advanced Control Pedal after you start up the system, touch the wake-up button on the foot pedal.
- To wake-up the Advanced Linear Pedal after you start up the system, tap the pedal.

After two hours, when the system is on and the foot pedal switches and treadle are inactive, the foot pedal goes into a power-save mode:

Note: You must NEVER handle the foot pedal by the cable.

Figure 2.3 – Single Linear Foot Pedal
Figure 2.4 – Advanced Control Pedal

1. Left yaw
2. Wake-up button
3. Left heel switch

Figure 2.5 – Advanced Linear Pedal

1. Handle
2. Left and Right Top Switches
3. Left and Right Side Switches

5. Right heel switch
6. Lights

4. Heel rest
5. Pedal

8. Handle
7. Right yaw

9. Pedal
5. Right heel switch
6. Lights
Removing the Handle from the Advanced Linear Pedal

1. To remove the handle, press the clips on either side of the handle.

Figure 2.6 – Foot Pedal Handle Diagram

Removing the Foot Pedal Handle

2. Remove the cover of the handle.
3. Remove the screws and store the screws and handle in a safe place.
   Note: Do not lose the handle as it cannot be replaced.

Foot Pedal Operation

The foot pedal has three active “pitch” ranges, which are referred to as positions 1, 2 and 3 (FP1, FP2, FP3). Position 0 is the off position, and position 3 is the fully pressed position. The ranges are shown below. The Advanced Control Pedal has two Yaw switches.

Figure 2.7 – Advanced Control Pedal Pitch and Yaw Positions

Note: The foot pedal position determines the function that is delivered by the handpiece, which depends on the mode selected on the touch screen. When the foot pedal has been attached, place your foot on the pedal and press to the desired position. The foot pedal settings and programming are addressed in “Foot Pedal Setup” on page 4-6.
**Programmable IV Pole**

The programmable IV pole is controlled by the up and down arrows on the upper right of the touch screen, next to the bottle height indicator. The buttons on the remote control and the rocker switch on the side of the console can also be used to control the IV pole. The height is set on the **Programmable IV Pole** screen. The IV pole moves at a rate of approximately 7.62 cm per second.

The IV pole is adjustable from 0 to 106 centimeters, and can be set for either inches or centimeters. The height measurement is relative to the distance from the irrigation valve to the center of the drip chamber. The IV pole height for each fluidic mode or submode (phaco, I/A, vitrectomy) is saved in the system memory. A maximum IV pole height can be set from the Configuration screen.

When a surgery mode is selected, the IV pole automatically moves to the preset height. To manually adjust the IV pole height, use the up and down arrows on the touch screen. Manual adjustments to the IV pole can also be made by pressing the rocker switch located on the side of the console. If a maximum height has been set, the IV pole does not move above that height.

**Wireless Remote Control**

The wireless remote control keypad can be used to move between the surgical modes and submodes. Adjustments to the surgical mode and submode settings can be made with the remote control. The buttons on the remote keypad work the same as the controls on the system touch screen.

**Figure 2.8 – Remote Control Key Functions**

After you turn the system on, press the remote control back light button to activate the remote control.

**Note:** After four to six minutes of idle time, the remote control goes into a power-save mode. To turn the remote control on, press the back light button.
**WARNING:** DO NOT try to replace the wireless remote control batteries. Call your AMO technical service representative to replace the batteries.

**Figure 2.9 – Wireless Remote Control Module Storage**

![Wireless Remote Control Module Storage](image)

**Surgical Media Center (SMC) - Optional**

The Surgical Media Center (SMC) is used to record the surgery and the instrument settings to be viewed at a later date and time. The surgery is displayed on a monitor with the instrument settings. The SMC hardware is attached to your system through the communications port on the rear panel.
# SURGERY START UP

<table>
<thead>
<tr>
<th>WHITESTAR SIGNATURE PRO System Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front and Rear Panel Connections</td>
</tr>
<tr>
<td>IV Pole Setup</td>
</tr>
<tr>
<td>Handpiece Setup</td>
</tr>
<tr>
<td>Startup</td>
</tr>
<tr>
<td>Install the FUSION Pack</td>
</tr>
<tr>
<td>Cup Fill</td>
</tr>
<tr>
<td>Prime/Tune</td>
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<td>System Shutdown</td>
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<tr>
<td>End Case</td>
</tr>
</tbody>
</table>
WHITESTAR SIGNATURE PRO System

System Setup

This is a general overview of the steps to take to prepare the WHITESTAR SIGNATURE PRO System for surgery:

1. Attach the power cord to the rear of system. Plug the power cord into a grounded power outlet.
2. Attach the foot pedal to the rear panel receptacle.
3. Attach the compressed air line to the compressed air receptacle (optional).
4. Turn the system on at the back of the console.
5. Press the on/off button on the touch screen monitor.
6. After completion of the self test, select the surgeon and program.
7. Install the tubing pack.
8. Assemble and attach the required accessories (phaco, vitrectomy, or diathermy handpieces) and set up the tubing.
9. Prime and tune the handpieces. (See “Prime/Tune” on page 3-11.)
10. Perform the final test of the fluidics and the handpiece integrity with the foot pedal. (Refer to “Verify Irrigation/Aspiration Balance” on page 3-14.)

Front and Rear Panel Connections

This section shows the front and rear panel connections.

**Figure 3.1 – Front Panel Connections**

1. Vitrectomy handpiece
2. Diathermy handpiece
3. Phaco handpiece
IV Pole Setup

**IMPORTANT:** Before you insert the spike into the bottle, shake the irrigation drip chamber at the end of the irrigation tubing to confirm that the irrigation valve moves. If the valve does not rattle, the valve cannot operate properly and irrigation cannot flow.

The IV pole moves to the appropriate height automatically based on the settings of the selected surgical mode. Follow these steps to set up the IV pole.

1. Insert the drip chamber spike into a new balanced salt solution bottle.
2. Hang the bottle of balanced salt solution on the IV pole.
3. Squeeze the drip chamber to fill the drip chamber with fluid to the half-full level.
4. Raise or lower the pole if needed. Use the IV pole up and down arrows on the upper right of the touch screen. You can also use the rocker switch on the console.
5. Attach the I/A tubing to the handpiece.

   **Note:** To make sure that the bottle height does not change when you select I/A after Vitrectomy during surgery, check the box for **Bottle Height Hold** on the Vitrectomy Settings screen.

---

**Figure 3.2 – Rear Panel Connections**

1. USB port
2. Communication port
3. Foot pedal connector
4. Compressed air
5. Potential equalizer
6. Power switch
7. Fuse holder
8. Power cord connector
Handpiece Setup

This section presents information about setting up the handpieces.

• Phacoemulsification Handpiece Setup
• I/A Handpiece Setup
• Diathermy Handpiece Setup
• Vitrectomy Handpiece Setup

Phacoemulsification Handpiece Setup

**WARNING:** Sterility assurance is the responsibility of the user. You must sterilize all non-sterile accessories prior to use.

**WARNING:** Prior to using any invasive portions of the handpiece assembly, examine under the microscope for any obvious damage, oxidation, or the presence of foreign material. Use a backup handpiece for surgery if there are any questionable characteristics of the handpiece. Use of contaminated or damaged system accessories can cause patient injury.

1. Use caution to prevent burns when handling the handpiece directly from sterilization.
2. Remove the tubing pack and accessories from the packaging and place them in the sterile area.
3. Assemble the phaco handpiece as shown below. You need the handpiece, titanium phaco tip, the appropriate tip wrench, one of the irrigation sleeves, and the test chamber.

**CAUTION:** NEVER ATTEMPT TO STRAIGHTEN A BENT NEEDLE. THIS MIGHT PRODUCE A BROKEN TIP WHEN YOU APPLY ULTRASOUND.

**Figure 3.3 – Phaco Handpiece Assembly**

1. Test Chamber 3. Phaco Tip
2. Irrigation Sleeve 4. Handpiece

4. Attach the connector end of the handpiece to the phaco receptacle on the front of the **WHITESTAR SIGNATURE PRO** System. Make sure there is no moisture on the connectors prior to attaching. Moisture prevents the handpiece from operating properly.
5. Insert the male luer end of the irrigation tubing into the phaco handpiece.
6. Attach the female luer fitting end of the aspiration tubing to the phaco handpiece.

Note: To protect the patient from contamination, use only:
- sterile tubing sets
- sterile balanced salt solution
- sterile handpieces

Figure 3.4 – ELLIPS FX Handpiece

Figure 3.5 – Phaco Handpiece Connections
Irrigation/Aspiration Handpiece Setup

Assemble the SOLO Irrigation/Aspiration (I/A) handpiece by attaching the irrigation sleeve.

Note: The test chamber is provided in the FUSION Pack. The LAMINAR Flow 20 gauge irrigation sleeves can also be used and are available with the OPOS20L or any 20 gauge LAMINAR phaco tip.

Figure 3.6 – I/A Handpiece Assembly

Diathermy Handpiece Setup

1. Attach the diathermy cord to the diathermy forceps or pencil.
2. Attach the diathermy cord to the diathermy receptacle on the front panel.

Figure 3.7 – Diathermy Forceps

Figure 3.8 – Diathermy Pencil

Note: Other diathermy accessories are regionally available. Contact your AMO representative.
Vitrectomy Cutter Setup

If you need to use vitrectomy during surgery:

1. Attach the vitrectomy cutter as shown below. Vitrectomy requires the following components:
   - I/A Tubing (from FUSION Pack)
   - Vitrectomy cutter
   - Vitrectomy irrigation sleeve, or a 23 Gauge Limbal Infusion Needle, if desired.

2. Use the instructions provided with the vitrectomy cutter to assemble the handpiece.

Figure 3.9 – Vitrectomy Cutter

3. Attach the connector to the vitrectomy receptacle on the front panel.
**Startup**

After you have turned on the system, the system performs a series of self tests. After start up, the screen shows the available surgeons and programs.

**Figure 3.10 – Select Surgeon and Program Screen**

From the main menu you can:

- Select a **Surgeon/Program** and begin surgery based on the values of that program
- Access the **Settings** screen, where you can edit programs and setup operating parameters
- Access the **Configuration** screen to set system parameters
- Access the **End Case** screen (See “End Case” on page 3-21.).
Install the FUSION Pack

1. After you select a surgeon, you must select a program from the surgeon's available programs.
   Note: The program at the top of the list is the default program for that surgeon.

2. Select the **Prime/Tune** button.
   Note: If a pack is needed the Install Pack Screen is shown.

**Figure 3.11 – Install Pack Screen**

3. Install a pack as shown on the screen.
**Cup Fill**

To collect the balanced salt solution:

1. Use the test chamber, a medicine cup, or similar container.
2. Press the **Prime/Tune** button.

**Figure 3.12 – Prime/Tune Screen with Cup Fill Controls Highlighted**

3. Use the **up** arrow to cycle through the three available amounts of solution to be dispensed. You can choose from:
   - 30 cc
   - 60 cc
   - 90 cc

   **Note:** The fill rate and time is based on using the irrigation tubing with no handpiece attached and that there is fluid in the tubing. If you use an attached handpiece to fill the cup, the fluid amount dispensed is less during the time allowed.

   **Note:** Make sure that you have filled the tubing with fluid using the Continuous Irrigation feature. If the tubing does not have fluid, the amount dispensed during Cup Fill may not be the amount selected.

4. Press **Start** to turn on Cup Fill.
5. Use **Stop** to turn off Cup Fill. This stops the process before the system dispenses the requested amount of fluid.
6. Perform a phaco prime/tune. The **Prime/Tune** screen indicates the progress of the prime/tune process.
Prime/Tune

You must prime/tune:

- before each procedure
- anytime you reattach the phaco handpiece
- after you have inserted or replaced a tubing pack

**WARNING:** Do not have the handpiece tip in the eye of the patient when you prime and tune the handpiece.

The prime/tune process fills the I/A tubing with fluid, performs a vacuum check, and tests and characterizes the phaco handpiece.

You can select **Continuous Irrigation** to allow fluid to free flow from the bottle to collect fluid.

The design of I/A Prime allows for a procedure that does not require a phaco handpiece. The design of tune allows for a quick tune of the phaco handpiece with an I/A tubing set. You can use tune if you replace a phaco tip during a procedure.

You can shorten the overall prime sequence by selecting **Bypass** prime. You also reduce the time to prime the system. You can use **Bypass** if you used **Continuous Irrigation** or primed the I/A tubing.

If you do not properly prime the I/A tubing, errors can occur.

To access the prime/tune routines, press the **Prime/Tune** button. The console shows the Prime/Tune screen with all the prime and tune options.

Note: Prime/Tune is a combination of tune followed by an I/A prime.
The system tracks the successful completion of the prime and tune cycles independently. If the system needs to be tuned again (new tip, failed tune), you only need to select and run the tune.

**CAUTION:** DO NOT ACTIVATE THE PHACO HANDPIECE AND VITRECTOMY CUTTER WITH THE TIP IN THE AIR. EXPOSURE OF THE TIP TO AIR DRastically REDuces THE USEFUL LIFE OF THE HANDPIECE. IF YOU INTRODUCE POWER TO THE PHACO HANDPIECE OR VITRECTOMY CUTTER, THE TIP MUST BE IN A TEST CHAMBER FILLED WITH BALANCED SALT SOLUTION, IN A CONTAINER OF BALANCED SALT SOLUTION, OR IN THE PATIENT’S EYE.
Suggestions for Priming the Handpieces

Do not lay the handpiece and the empty test chamber down and have the system fill the test chamber. When you lay down the handpiece, this allows air to collect in the test chamber and can produce an error. Point the tip of the handpiece up to reduce the amount of bubbles.

1. Use **Continuous Irrigation** to fill the tubing with fluid. Remember to hold the ends of the tubing over a container to catch any fluid.
2. Use the **Cup Fill** feature to fill the test chamber with fluid and to eliminate all air. Remember to remove the test chamber from the handpiece, if needed, before you start the cup fill process.
3. Place the test chamber over the handpiece tip and the sleeve hub.
4. Attach the tubing to the handpiece.
5. Press the **Prime/Tune** button, this starts the prime and tune sequences.
   - To perform a prime only, press the **Prime** button.
   - To perform a tune only, press the **Tune** button.
6. Make sure that low ceilings, light fixtures, or equipment do not block the movement of the IV pole.
7. Watch the fluid fill the drip chamber. The fluid moves toward the handpiece and fills the test chamber.
8. The display screen indicates the progress of the prime and tune process.
9. As the tubing lines fill, the system software performs functional checks. The checks include:
   - Monitoring for the presence of irrigation flow (bottle height)
   - Leaks (via vacuum rise checks)
10. When you attach the phaco handpiece and you select **Prime/Tune** or **Tune**, the system automatically includes a handpiece tuning test concurrently with the prime cycle.
    - At the end of the priming sequence, the system makes an audible sound to indicate that Prime process is complete.
    - At the end of the phaco tuning test, the system makes an audible alert sound to indicate that Tune process is complete.
11. To discontinue prime or tune during the process, select **Cancel**.
12. When prime and tune are complete, the system automatically proceeds to the preprogrammed submode or Phaco 1 operating mode. It is important that you verify the Irrigation and Aspiration balance prior to operating.
Verify Irrigation/Aspiration Balance

We strongly recommend you verify that you balanced Irrigation/Aspiration properly for your settings used in surgery.

Figure 3.14 – Irrigation/Aspiration Balance Procedure

To verify irrigation/aspiration balance:

1. In Phaco 1 mode, hold the handpiece at the approximate patient eye level.
   Note: The numbers in the drawing Figure 3.14 correspond to the steps listed.

2. Occlude the aspiration line just below the handpiece, while you press and hold the foot pedal in position 2. Make sure the you attach the foot pedal. (See “Foot Pedal Setup” on page 4-6.)

3. The actual vacuum level should rise to the preset level.

4. Release the aspiration line and then watch the test chamber to make sure that the test chamber does not collapse. A slight shallowing of the test chamber is normal.

5. If the test chamber collapses, raise the IV bottle height or lower the vacuum setting.

6. Pinch the irrigation tubing at the handpiece and watch for the test chamber to collapse.

7. Release the irrigation line and the test chamber should fill.

8. Press Reset in the upper left corner of the screen to open the Reset Timers dialog box. Press Yes to reset the timers. You are now ready to begin surgery.
**Priming for Vitrectomy**

Before you perform vitrectomy, we recommend you prime the handpiece to reduce the chance of errors. Each time you select vitrectomy mode, a dialog box asks you to prime the vitrectomy handpiece. If you do not need to prime, press **Bypass**.

To prime the handpiece:

1. Attach the irrigation tubing and the aspiration tubing of the pack together.
2. Press **Prime** on the **Prime/Tune** screen.
3. Press the **VIT** button to access **VIT** mode.
4. Follow the instructions on the screen.
5. Press **Start Vit Prime**. The screen closes automatically after the system primes the handpiece.

Note: If you must perform vitrectomy in the middle of phaco surgery, perform steps 3 through 5.

**Figure 3.15 – Vitrectomy Prime Procedure**

---

**Before you perform a vitrectomy, you must prime the vitrectomy cutter.**

Note: Use Bypass if the vitrectomy cutter is already primed.
1. Connect the tubing to the vitrectomy cutter.
2. Immerse the cutter tip into a container filled with a balanced salt solution.
3. Press Start Vit Prime.
Selecting and Changing Mode Parameters

The design of the system's graphical user interface (GUI) and touch screen is for ease-of-use, consistent look, and maximum informational display during all operating modes.

Your interface with the system requires only three basic steps, which apply to all the selections, settings, and operations. Once you understand this basic organization, you can move quickly and easily through all the system functions and system operations.

Panels organize the text on the display screen. The top panel shows current status, configuration options, the bottle height, and the foot pedal icon. The left-side column lists the operating modes and submodes. The main panel that dominates the screen shows current operating levels for aspiration, vacuum and power.

Figure 3.16 – Phaco Mode Screen

- To switch operating modes or submodes, press a button in the left panel. The control panels in the main panel show the operating levels for that mode.
- To make basic changes to the settings, press the up and down arrows to increase or decrease a value.
- To change other control panel settings, such as Panel or Linear power and nonzero start, press the Settings button on that control panel. A Settings screen opens, and you can make your selections.
System Check-out

The purpose of the check-out procedure is to verify that installation of the system is complete and the system is operating properly. You must perform the check-out procedure prior to the first case of the day, as outlined in the following steps. You test the I/A mode and handpiece, then the phaco mode and handpiece, so that the phaco handpiece (used first) is ready for surgery.

If any of the check-out steps fail, you must repeat the steps. If the instrument still does not work correctly, refer to Chapter 8, “Error Messages Troubleshooting and Diagnostics”.

Figure 3.17 – Phaco Submode Settings Screen
Phacoemulsification
Follow these steps to check the system out for phacoemulsification.

1. Attach the tubing to the phaco handpiece.
2. Screw the phaco needle onto the handpiece, use your fingers to engage the screw thread, and then use the tip wrench to tighten the needle.
3. Screw the irrigation sleeve over the needle.
4. Place the test chamber over the irrigation sleeve.
5. Prime and Tune the system.
6. Select the phaco mode.
7. Press and hold the foot pedal in position 1.
8. Observe the irrigation flow.
9. Hold the handpiece approximately at the patient’s eye level, and fill the test chamber with irrigation fluid.
10. Occlude the aspiration tubing just below the phaco handpiece.
11. Press and hold the foot pedal in position 2. The actual vacuum level should rise to the preset level.
12. Release the occlusion and watch the test chamber to make sure that the test chamber does not collapse. A dent or dimple in the test chamber is normal.
13. To test irrigation, pinch the irrigation tubing just below the phaco handpiece and watch for the test chamber to collapse. Release the irrigation tubing and the test chamber should fill.
14. Press Reset in the upper left corner of the screen to open the Reset Timers dialog box. Press Yes to reset the timers.
15. Phacoemulsification check-out is complete.

Irrigation and Aspiration
Follow these steps to check the system out for irrigation and aspiration.

1. Attach the tubing to the I/A handpiece.
2. Select I/A mode.
3. Hold the test chamber near the handpiece tip, press and hold the foot pedal in position 1
4. Observe the irrigation flow.
Diathermy

Follow these steps to check the system out for diathermy.

1. Attach the diathermy forceps to the cable and the cable to the front panel of the console.
2. Select the Diathermy mode.
3. Press the foot pedal. You should hear a tone when you press the foot pedal.

**CAUTION:** IF YOU DO NOT HEAR A TONE WHEN YOU PRESS THE FOOT PEDAL AND VOLUME ADJUSTMENT IS UNSUCCESSFUL, THE MODE IS NOT FUNCTIONING PROPERLY. REFER TO Chapter 8, “Error Messages Troubleshooting and Diagnostics”.

Vitrectomy

Follow these steps to check the system out for vitrectomy.

1. Attach the irrigation tubing and aspiration tubing of the pack together.
2. Press **Prime** on the Prime/Tune screen.
3. Press the **VIT** button to access the VIT mode.
4. Follow the instructions on the screen.
5. Press **Start Vit Prime**. The screen closes automatically after the handpiece primes.
6. Observe that:
   - irrigation fluid flows
   - the aspiration tubing is full and clear of air
   - the vitrectomy cutter motor activates (slight sense of motion of the handpiece)
   - the cutter blade operates
7. Vitrectomy check-out is complete.
Pre-operative Sterilization

Prior to each surgical case, sterilize the system instruments with the recommended sterilization techniques, times and temperatures given in Chapter 7, “Care and Cleaning”. AMO recommends that you follow the sterilization guidelines to maximize the life of your system instruments.

System Shutdown

The following is a general overview of the steps to be taken to shut the system down after surgery:

1. Select **End Case**.
2. Select **Shutdown**. At the prompt, select **Yes**.
3. Wait for shutdown sequence to complete.
4. Turn the system off at the back of the console.
5. Remove the power cord from the power outlet.
6. Wrap the excess power cord neatly around the cord wrap on the back of the console.
7. Use the AC Charging Adapter to charge the ACP or ALP foot pedal.
8. Use the AC Charging Adapter to charge the remote control.
9. Refer to Chapter 7, “Care and Cleaning” for additional information.
**End Case**

*End Case* is available in the top panel from any programming or surgical mode. *End Case* allows you to terminate the programming session or surgical case.

**Figure 3.18 – End Case Screen**

![End Case Screen](image)

Note: For ease of viewing, the EPT, EFX, UST, and DT times are in a large font size on the *End Case* screen. The EFX shows only when you attach an ELLIPS FX handpiece.

**End Case**

The timers on the upper left side of the screen indicate:

- **Effective Phaco Time (EPT).** Effective Phaco Time is ultrasound time as a weighted total that takes into account the amount of power being used:
  - at 100% power: 1 sec. U/S Time = 1 sec. EPT
  - at 50% power: 1 sec. U/S Time = 0.5 sec. EPT
  - Average phaco power (AVG) = EPT/UST

- Ultrasonic (U/S) time (UST) in foot pedal position 3
- **EFX** when you attach an ELLIPS FX handpiece
- **DT** - Diathermy Time

**Next Case** – Select **Next Case** to install a new pack.

Note: Use a new bottle of balanced salt solution at the start of each case.
Continue Case – Select Continue Case to return to the current case, after you selected Review Case.

Purge – Select Purge to remove the fluid from the irrigation and aspiration tubing before you remove the pack.

Shutdown – Select the Shutdown button to turn the system off. At the prompt, press Yes to complete the process.

Next Case

If any changes were made to the settings, you are prompted to confirm and save the changes.

Figure 3.19 – Save Changes Confirmation Screen

Note: You can also select on the main surgical screen to save changes. When you save changes a confirmation screen is displayed to review the settings. If all of the settings are correct, select Save for the current program. Use Save As to save to a new program name.

Save - Saves any changes to the current program.

Save As – Saves the program changes (made to an existing program) to a new program name when you enter a program name.
Review Case

Figure 3.20 – Review Case Screen

Review Case – shows the graphical history of the surgery. (Refer to Figure 3.20 – Review Case Screen.)

1. Select a shorter time interval to adjust the time line duration and to see greater case details. For example, 10 Sec shows more detail than 15 Min.
2. Select a longer time interval for an overview of the surgery or sessions, such as 1 hour or 2 hours. This view provides less detail, but gives you a better indication of the trends over time. Use the << or >> buttons to shift the section being displayed.
3. Press the Select Case to select and view a specific surgical case.
4. Press Export to name and save the record to a USB device. Enter a name for the Case History.
5. Use the Print to File to save the data to a file format.
6. Use the Delete Record button to remove a case from the Record database.
7. Select Finished to close the screen.
## SURGEON SETTINGS

<table>
<thead>
<tr>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Surgeon</td>
</tr>
<tr>
<td>Add a New Surgeon</td>
</tr>
<tr>
<td>Delete Surgeon</td>
</tr>
<tr>
<td>Edit a Surgeon</td>
</tr>
<tr>
<td>Foot Pedal Setup</td>
</tr>
<tr>
<td>Set Sound Levels</td>
</tr>
<tr>
<td>Surgeon – Assign Order</td>
</tr>
</tbody>
</table>
When you use the system for the first time, Standard Surgeon is the only surgeon on the system.

Select Surgeon  

Figure 4.1 – Surgeons and Programs Screen
**Add a New Surgeon**

To create a new surgeon:

1. Press **+** on Select Surgeon.
2. The keyboard screen opens.
3. Enter the name of the surgeon.
4. Press **Enter** to save the new surgeon and then exit the keyboard screen. The new surgeon is now on the list of available surgeons.

**Figure 4.2 – Keyboard Screen**

**Delete Surgeon**

To remove a surgeon name from the list:

1. Select the name of the surgeon.
2. Press **-** on Select Surgeon.
3. At the confirmation dialog box, select **Yes**.
Edit a Surgeon

1. Select a surgeon from the list.

Figure 4.3 – Select Surgeon

2. Press on Select Surgeon.
3. The keyboard screen appears.
4. Edit the name.
5. Press **Enter**.
Foot Pedal Setup

This section presents the setup, calibration, and testing process for your foot pedal, divided into three sections:

- Single Linear Foot Pedal
- Advanced Control Pedal
- Advanced Linear Pedal

Single Linear Foot Pedal Setup

This section presents the following topics for setting up a standard foot pedal.

- Single Linear Foot Pedal Connections
- Single Linear Foot Pedal Switch Assignment
- Single Linear Foot Pedal Threshold Configuration
- Single Linear Foot Pedal Calibration and Testing

Figure 4.5 – Single Linear Foot Pedal
Table 4.1 – Single Linear Foot Pedal Default Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Available Settings</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitch regions</td>
<td>1–100%</td>
<td>P1=5% P2=30% P3=60%</td>
</tr>
<tr>
<td>Switch position</td>
<td>Switch1= * Switch2= *</td>
<td>Switch1=Off Switch2=Off</td>
</tr>
<tr>
<td>Feedback</td>
<td>On, Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

*Table 4.3 – Single Linear Foot Pedal Switch Assignments

Vitrectomy Foot Pedal Modes

Table 4.2 – Vitrectomy Single Linear Foot Pedal Modes

<table>
<thead>
<tr>
<th>Foot Pedal Positions</th>
<th>Vitrectomy Foot Pedal Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ICA</td>
</tr>
<tr>
<td>1</td>
<td>Irrigation</td>
</tr>
<tr>
<td>2</td>
<td>Irrigation/Cut</td>
</tr>
<tr>
<td>3</td>
<td>Irrigation/Cut/A</td>
</tr>
</tbody>
</table>
Single Linear Foot Pedal Connections
Attach the foot pedal cable to the connector on the left side of the foot pedal and attach the other end of the cable to the foot pedal connector on the rear panel of the system.

Figure 4.6 – Rear Panel Connections

1. USB port  
2. Communication port  
3. Foot pedal connector  
4. Compressed air  
5. Potential equalizer  
6. Power switch  
7. Fuse holder  
8. Power cord connector  
9. Pedal
Single Linear Foot Pedal Switch Assignment

The standard foot pedal has four switches that you can assign specific functions for each surgeon. For Phaco and Vitrectomy foot pedal settings the switches are set per submode. Follow these steps to assign functions to the foot pedal switches.

Note: In addition to the procedure below, you can access the Single Linear Foot Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, select a surgeon.
2. Press
3. The system displays the Summary information on the foot pedal screen. Each surgical mode has individual settings for the foot pedal switches. The Single Linear foot pedal screen displays the settings for the pedal linear motion (Pitch) and each of the four switches. For purposes of this example, we will discuss configuring the switches for phaco.

Figure 4.7 – Single Linear Foot Pedal Phaco Summary Screen

4. Press the Summary button.
5. Press the **Switches** button to change the settings for the switches. The system displays the standard foot pedal switch assignment screen. The Single Linear foot pedal Switches screen allows you to assign or change the action for each of the four switches.

6. Select the major mode and then the applicable submode.

7. Press the buttons under each switch name to assign or change the action for that switch. The system displays a switch assignment dialog box with the text of the current switch assignment shown in green.

Note: If you select Next Major Mode, Previous Major Mode, Next Active Mode or Previous Active Mode as a foot pedal switch setting, the Vitrectomy mode cannot be selected as you cycle through the different modes and submodes.
8. Press the button that represents your choice of switch setting.

### Table 4.3 – Single Linear Foot Pedal Switch Assignments

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Off</strong></td>
<td>This switch has no switch assignment.</td>
</tr>
<tr>
<td><strong>Surgeon Program Up</strong></td>
<td>Selects the surgeon program above the current program in the list.</td>
</tr>
<tr>
<td><strong>Surgeon Program Down</strong></td>
<td>Selects the surgeon program below the current program in the list.</td>
</tr>
<tr>
<td><strong>Previous Major Mode</strong></td>
<td>Changes to the previous surgical mode.</td>
</tr>
<tr>
<td><strong>Next Major Mode</strong></td>
<td>Changes to the next surgical mode.</td>
</tr>
<tr>
<td><strong>Previous Active Mode</strong></td>
<td>Changes to the previous active mode.</td>
</tr>
<tr>
<td><strong>Next Active Mode</strong></td>
<td>Changes to the next active mode.</td>
</tr>
</tbody>
</table>
Press the \texttt{Finished} button to:
\begin{itemize}
  \item accept your choice of switch assignment
  \item close the Switch Assignment dialog box
  \item return to the edit screen
\end{itemize}
Repeat the process for all switches.

10. Press \texttt{Save} to retain the settings.
11. Press the \texttt{Exit} tab to close the Foot Pedal Set Up screen.

\textbf{Single Linear Foot Pedal Threshold Configuration}
Follow these steps to configure the thresholds for the foot pedal.

1. On the Surgeons and Programs screen, press \texttt{.}
2. Select the \texttt{Thresholds} button.
3. Use the arrow buttons to set the threshold for position 1, 2, or 3. The system announces the current value.
4. Select the Feedback box to enable foot pedal feedback. Feedback is a physical and audible click as you move the foot pedal to the next or previous position.

5. Press Save to retain the settings.
Single Linear Foot Pedal Calibration and Testing
Follow these steps to calibrate and test your foot pedal.

1. On the Surgeons and Programs screen, press 👇.
2. Select the Calibration button.
   
   Note: The Calibration feature is not available during surgery.

### Figure 4.11 – Single Linear Foot Pedal Calibration Screen

3. With your foot off the foot pedal, press the Phase 1 button.
4. Put your foot on the foot pedal, press and hold the foot pedal all the way down and press the Phase 2 button.
5. The system automatically displays the Foot Pedal Test screen.
6. Press the foot pedal down fully to position 3. As the foot pedal travels through positions 1 and 2 to position 3, the progress bar shows its current state. When the pedal reaches the bottom of position 3, the progress bar should be solid green.
7. Press each of the four switches. When you press a switch, the On button for that switch turns green and its Off button turns white. When you release the switch, the On button for that switch turns white and its Off button turns green.
8. Press the Finished button when you have completed testing the foot switches.
9. To test the foot pedal before calibration, press the **Test** button. The **Test** button is not available during surgery.
Advanced Control Pedal Setup

This section presents the following topics for setting up an Advanced Control Pedal (ACP):

- Advanced Control Pedal Connections
- Advanced Control Pedal Switch Assignment
- Advanced Control Pedal Threshold Configuration
- Advanced Control Pedal Calibration and Testing

**Figure 4.13 – Advanced Control Pedal**

![Advanced Control Pedal Diagram]

1. Left yaw  
2. Wake-up button  
3. Left heel switch  
4. Heel rest  
5. Right heel switch  
6. Lights  
7. Right yaw  
8. Handle  
9. Pedal

Note: See “Charging Options for Wireless Devices” on page 8-5.

**Table 4.4 – Advanced Control Pedal Default Settings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Available Settings</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right/Left Yaw</td>
<td>*</td>
<td>Right Yaw=Reflux</td>
</tr>
</tbody>
</table>
| Pitch Region         | 1-100%             | P1=5%  
                       |                     | P2=30%  
                       |                     | P3=60%               |
| Yaw Position         | 5-100%             | Left=90%  
                       |                     | Right=90%            |

*Table 4.6 – Advanced Control Pedal Switch Assignments
Vitrectomy Foot Pedal Modes

Table 4.5 – Vitrectomy Advanced Control Pedal Modes

<table>
<thead>
<tr>
<th>Foot Pedal Positions</th>
<th>Vitrectomy Foot Pedal Modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICA</td>
<td>IAC</td>
</tr>
<tr>
<td>Side VIT</td>
<td></td>
</tr>
<tr>
<td>1 Irrigation</td>
<td>Irrigation</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2 Irrigation/Cut</td>
<td>Irrigation/Aspiration</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>3 Aspiration</td>
<td>Cut</td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Advanced Control Pedal Connections
You can attach the Advanced Control Pedal to the system either with a cable or with a wireless BLUETOOTH connection.

To use the “Wired” connect the foot pedal cable to the connector on the top left side of the foot pedal and attach the other end of the cable to the foot pedal connector on the rear panel of the system. To use the foot pedal wireless refer to Figure 6.7 – Advanced Control Pedal Pairing Screen.

Advanced Control Pedal Switch Assignment
The Advanced Control Pedal has four switches that you can assign specific functions to. Follow these steps to assign functions to the foot pedal switches.

Note: In addition to the procedure below, you can access the Advanced Control Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, press .
2. The system displays the Summary screen.

Note: Both phaco and vitrectomy submodes have individual settings for the foot pedal switches. For purposes of this example, we will discuss configuring the switches for phaco.
3. Press the **Switches** button to change the settings for the switches. The system displays the Advanced Control Pedal edit screen. The Advanced Control Pedal edit screen allows you to assign or change the action for each of the four switches.
4. Select the major mode and then the applicable submode.
5. Press the button under each switch name to assign or change the action for that switch. The system displays a switch assignment dialog box with the text of the current switch assignment shown in green.

Note: If you select Next Major Mode, Previous Major Mode, Next Active Mode or Previous Active Mode as a foot pedal switch setting, the Vitrectomy mode cannot be selected as you cycle through the different modes and submodes.
6. Press the button that represents your choice of switch setting.

Table 4.6 – Advanced Control Pedal Switch Assignments

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>This switch has no switch assignment.</td>
</tr>
<tr>
<td>Surgeon Program Up</td>
<td>Selects the surgeon program above the current program in the list.</td>
</tr>
<tr>
<td>Surgeon Program Down</td>
<td>Selects the surgeon program below the current program in the list.</td>
</tr>
<tr>
<td>Previous Major Mode</td>
<td>Changes to the previous surgical mode.</td>
</tr>
<tr>
<td>Next Major Mode</td>
<td>Changes to the next surgical mode.</td>
</tr>
<tr>
<td>Previous Active Mode</td>
<td>Changes to the previous active mode.</td>
</tr>
<tr>
<td>Next Active Mode</td>
<td>Changes to the next active mode.</td>
</tr>
<tr>
<td>Previous Sub Mode</td>
<td>Changes to the previous submode.</td>
</tr>
<tr>
<td>Next Sub Mode</td>
<td>Changes to the next submode.</td>
</tr>
<tr>
<td>Toggle SMC Record</td>
<td>Activates or deactivates the surgical media center (SMC) recording function.</td>
</tr>
</tbody>
</table>

Figure 4.16 – Advanced Control Pedal Switch Assignment Dialog Box
<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottle Up</td>
<td>Raises the IV pole while the switch is held down.</td>
</tr>
<tr>
<td>Bottle Down</td>
<td>Lowers the IV pole while the switch is held down.</td>
</tr>
<tr>
<td>Reflux</td>
<td>Activates or deactivates reflux.</td>
</tr>
<tr>
<td>Continuous Irrigation</td>
<td>Activates or deactivates continuous irrigation.</td>
</tr>
<tr>
<td>1-Touch Up</td>
<td>Increments CASE mode 1-Touch. (Phaco only)</td>
</tr>
<tr>
<td>1-Touch Down</td>
<td>Decrements CASE mode 1-Touch. (Phaco only)</td>
</tr>
<tr>
<td>Toggle CASE</td>
<td>Activates or deactivates CASE MODE (Phaco only)</td>
</tr>
<tr>
<td>WhiteStar Increment</td>
<td>Increment the WHITESTAR setting</td>
</tr>
<tr>
<td>WhiteStar Decrement</td>
<td>Decrement the WHITESTAR setting</td>
</tr>
<tr>
<td>Vacuum Boost</td>
<td>Activates or deactivates vacuum boost.</td>
</tr>
<tr>
<td>Power Boost</td>
<td>Activates or deactivates power boost</td>
</tr>
<tr>
<td>ASP + VAC</td>
<td>Activates or deactivates aspiration plus vacuum.</td>
</tr>
<tr>
<td>Phaco</td>
<td>Activates phaco surgical mode.</td>
</tr>
</tbody>
</table>

Note: The items in italics in Table 4.6 – Advanced Control Pedal Switch Assignments are only displayed when you assign functions to the left and right yaw switches.

7. Press the Finished button to:
   - accept your choice of switch assignment
   - close the Switch Assignment dialog box
   - return to the edit screen
   Repeat the process for all switches.

8. Press the Save button to retain the switch assignments.

9. Press Exit to close the Foot Pedal Set Up screen.
Advanced Control Pedal Threshold Configuration
Follow these steps to configure the thresholds for the foot pedal.

Note: In addition to the procedure below, you can access the Advanced Control Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, press .
2. Press the Thresholds button under Foot Pedal. The system displays the foot pedal thresholds screen.

**Figure 4.17 – Advanced Control Pedal Thresholds**

3. Use the right and left arrows to set the threshold for position 1, 2, or 3. The system announces the current value.
4. Use the up and down arrows to set the threshold for the left and right yaw controls. The threshold determines how far the user needs to move the pedal before the switch is activated.
5. Select Feedback to enable foot pedal feedback. Feedback is a physical and audible click as you move the foot pedal to the next or previous position. The foot pedal is now ready for calibration.
6. Press Save to retain the settings.
Advanced Control Pedal Calibration and Testing
Follow these steps to calibrate and test your foot pedal.

Note: In addition to the procedure below, you can access the Advanced Control Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, press .
2. Press the Calibration button.

Figure 4.18 – Advanced Control Pedal Calibration

3. With your foot off the foot pedal, press the Phase 1 button.
4. Put your foot on the foot pedal, press and hold the foot pedal all the way down and press the Phase 2 button.
5. Move the pedal to the far left and hold that position while you press the Phase 3 button.
6. Move the pedal to the far right and hold that position while you press the Phase 4 button.
7. Press the foot pedal down fully to position 3. As the foot pedal travels through positions 1 and 2 to position 3, the progress bar shows its current state. When the pedal reaches the bottom of position 3, the progress bar should be solid green.

8. Press each of the four switches. When a switch is pressed, the On button for that switch turns green and its Off button turns white. When you release the switch, the On button for that switch turns white and its Off button turns green.

9. Press the Finished button when you complete the testing of your foot switch.

10. Press Exit to close the Foot Pedal Set Up screen.

11. To test the foot pedal without performing a calibration, press Test and follow the instructions on the screen.
Advanced Linear Pedal Setup

Note: Only use the Johnson & Johnson Surgical Vision, Inc. specified replacement battery in the Advanced Linear Pedal to ensure correct system performance. See “Charging Options for Wireless Devices” on page 8-5.

The Advanced Linear Pedal does not need to be calibrated.

Figure 4.20 – Advanced Linear Pedal

Advanced Linear Pedal Connections

You can attach the Advanced Linear Pedal to the system either with a cable or with a wireless BLUETOOTH connection.

Note: The blue light on the pedal indicates that the foot pedal is active. The amber light indicates that the battery needs to be charged.

To use the “Wired” connect the foot pedal cable to the connector on the top left side of the foot pedal and attach the other end of the cable to the foot pedal connector on the rear panel of the system. To use the foot pedal wireless refer to Figure 6.8 – Advanced Linear Pedal Pairing Screen.
Advanced Linear Pedal Switch Assignment

The Advanced Linear Pedal has four switches that you can assign specific functions to. Follow these steps to assign functions to the foot pedal switches.

Note: In addition to the procedure below, you can access the Advanced Linear Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, press .

Note: Both phaco and vitrectomy modes have individual settings per submode for the foot pedal switches. For purposes of this example, we will discuss configuring the switches for phaco.

Figure 4.21 – Advanced Linear Pedal Summary Screen

2. Press the **Switches** button to change the settings for the switches. The system displays the Advanced Linear Pedal edit screen. The Advanced Linear Pedal edit screen allows you to assign or change the action for each of the four switches.
3. Select the major mode and then the applicable submode.
4. Press the button under each switch to assign or change the action for that switch. The system displays a switch assignment dialog box with the text of the current switch assignment shown in green.

Note: If you select Next Major Mode, Previous Major Mode, Next Active Mode or Previous Active Mode as a foot pedal switch setting, the Vitrectomy mode cannot be selected as you cycle through the different modes and submodes.
5. Press the button that represents your choice of switch setting.

Table 4.7 – Advanced Linear Pedal Switch Assignments

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>This switch has no switch assignment.</td>
</tr>
<tr>
<td>Surgeon Program Up</td>
<td>Selects the surgeon program above the current program in the list.</td>
</tr>
<tr>
<td>Surgeon Program Down</td>
<td>Selects the surgeon program below the current program in the list.</td>
</tr>
<tr>
<td>Previous Major Mode</td>
<td>Changes to the previous surgical mode.</td>
</tr>
<tr>
<td>Next Major Mode</td>
<td>Changes to the next surgical mode.</td>
</tr>
<tr>
<td>Previous Active Mode</td>
<td>Changes to the previous active mode.</td>
</tr>
<tr>
<td>Next Active Mode</td>
<td>Changes to the next active mode.</td>
</tr>
<tr>
<td>Previous Sub Mode</td>
<td>Changes to the previous submode.</td>
</tr>
<tr>
<td>Next Sub Mode</td>
<td>Changes to the next submode.</td>
</tr>
<tr>
<td>Toggle SMC Record</td>
<td>Activates or deactivates the surgical media center (SMC) recording function.</td>
</tr>
</tbody>
</table>
### Switch Setting Description

<table>
<thead>
<tr>
<th>Switch Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottle Up</td>
<td>Raises the IV pole while the switch is held down.</td>
</tr>
<tr>
<td>Bottle Down</td>
<td>Lowers the IV pole while the switch is held down.</td>
</tr>
<tr>
<td>Reflux</td>
<td>Activates or deactivates reflux.</td>
</tr>
<tr>
<td>Continuous Irrigation</td>
<td>Activates or deactivates continuous irrigation.</td>
</tr>
<tr>
<td>1-Touch Up</td>
<td>Increments CASE mode 1-Touch (phaco only).</td>
</tr>
<tr>
<td>1-Touch Down</td>
<td>Decrements CASE mode 1-Touch (phaco only).</td>
</tr>
<tr>
<td>Toggle CASE</td>
<td>Activates or deactivates CASE mode, (phaco only)</td>
</tr>
</tbody>
</table>

6. Press the **Finished** button to:
   - accept your choice of switch assignment
   - close the Switch Assignment dialog box
   - return to the edit screen
   Repeat the process for all switches.

7. Press the **Save** button to retain the switch settings.

8. Press **Exit** to close the Foot Pedal Set Up screen.
Advanced Linear Threshold Configuration

Figure 4.24 – Advanced Linear Pedal Threshold Screen
Follow these steps to set the foot pedal thresholds.

Note: In addition to the procedure below, you can access the Advanced Linear Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, press \[input_icon\].
2. Press the **Thresholds** button under Foot Pedal. The system displays the foot pedal thresholds screen.
3. Use the up and down arrows to change the threshold for each of the foot pedal pitch zones. P1 is the first zone, P2 is the second, and P3 is the final zone.
4. Select **Feedback** to enable foot pedal feedback. Feedback is a physical and audible click as you move the foot pedal to the next or previous position. The foot pedal is now ready for calibration.
5. Press **Save** to retain the settings.
6. Press **Exit** to close the Foot Pedal Set Up screen.
Advanced Linear Pedal Test

Figure 4.25 – Advanced Linear Pedal Test Screen

Note: In addition to the procedure below, you can access the Advanced Linear Pedal Summary screen by pressing the foot pedal symbol near the top of the screen.

1. On the Surgeons and Programs screen, press .
2. Press the Test button.
3. Press the foot pedal down fully to position 3. As the foot pedal travels through positions 1 and 2 to position 3, the progress bar shows its current state. When the pedal reaches position 3, the progress bar should be solid green.
4. Press each of the four switches. When a switch is pressed, the On button for that switch turns green and its Off button turns white. When you release the switch, the On button for that switch turns white and its Off button turns green.
5. Press the Finished button when you complete the testing of your foot switch.
6. Press Exit to close the Foot Pedal Set Up screen.
Set Sound Levels

Table 4.8 – WHITESTAR SIGNATURE PRO System Default Sound Settings

<table>
<thead>
<tr>
<th>Sounds</th>
<th>Available Settings</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phaco Tone Volume</td>
<td>5–10</td>
<td>Off</td>
</tr>
<tr>
<td>Tone Volume Level (All Other Functions)</td>
<td>5–10</td>
<td>6</td>
</tr>
<tr>
<td>Voice Volume Level (For All Functions)</td>
<td>5–10</td>
<td>6</td>
</tr>
<tr>
<td>Irrigation Tone</td>
<td>On, Off</td>
<td>On</td>
</tr>
<tr>
<td>High Vacuum</td>
<td>On, Off</td>
<td>On</td>
</tr>
<tr>
<td>Mode Change</td>
<td>Off, Tone, Voice</td>
<td>Voice On</td>
</tr>
<tr>
<td>Submode Change</td>
<td>Off, Tone, Voice</td>
<td>Voice On</td>
</tr>
<tr>
<td>Value Change</td>
<td>On, Off</td>
<td>Voice On</td>
</tr>
<tr>
<td>Activity Confirmation</td>
<td>On, Off</td>
<td>Voice On</td>
</tr>
<tr>
<td>Continuous Irrigation (When no modes selected)</td>
<td>On, Off</td>
<td>Off</td>
</tr>
<tr>
<td>Vacuum Tone</td>
<td>Off-10</td>
<td>6</td>
</tr>
<tr>
<td>Diathermy Tone</td>
<td>5–10</td>
<td>6</td>
</tr>
<tr>
<td>Error Tone</td>
<td>5–10</td>
<td>6</td>
</tr>
<tr>
<td>Irrigation Tone</td>
<td>Off-10</td>
<td>3</td>
</tr>
<tr>
<td>Key Press Tone</td>
<td>Off–10</td>
<td>6</td>
</tr>
<tr>
<td>Speech Tone</td>
<td>Off–10</td>
<td>6</td>
</tr>
<tr>
<td>CASE Activation Tone</td>
<td>0–10</td>
<td>5</td>
</tr>
<tr>
<td>Master Volume</td>
<td>0–10</td>
<td>5</td>
</tr>
<tr>
<td>High Vacuum Sound</td>
<td>On, Off</td>
<td>On</td>
</tr>
<tr>
<td>Mode change</td>
<td>Voice</td>
<td></td>
</tr>
<tr>
<td>Submode Change</td>
<td>Voice</td>
<td></td>
</tr>
<tr>
<td>Change Value</td>
<td>Voice</td>
<td></td>
</tr>
<tr>
<td>Activity Confirmation</td>
<td>On, Off</td>
<td>On</td>
</tr>
<tr>
<td>CASE Activation Volume</td>
<td>0-10</td>
<td>5</td>
</tr>
</tbody>
</table>
Follow these steps to set the system sound levels.

1. On the Surgeons and Programs screen, select the surgeon.

2. Press 🔊.

**Figure 4.26 – Sound Settings Screen**

3. Use the sliders to adjust the volume for:
   - Instrument
   - Confirmation

4. Use the buttons on the right side to turn sounds on or off for the different system functions.

5. Use the **up** and **down** arrows to set the volume for:
   - CASE Activation
   - Master Volume

   **Note:** You can also change the volume from the main surgical screen with the button at the top of the screen.

6. Press **Save** to retain any changes you made.

7. Press **Exit**.
Surgeon – Assign Order

1. Select a surgeon.

2. Use or to move the surgeon names up or down on the Surgeons and Programs screen.

Figure 4.27 – Surgeons and Programs Screen

3. Repeat steps until the order is to your satisfaction.
5

PROGRAM SETTINGS

<table>
<thead>
<tr>
<th>Create a New Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete a Program</td>
</tr>
<tr>
<td>Edit a Program Name</td>
</tr>
<tr>
<td>Program Settings</td>
</tr>
<tr>
<td>Phaco</td>
</tr>
<tr>
<td>Irrigation and Aspiration</td>
</tr>
<tr>
<td>Vitrectomy</td>
</tr>
<tr>
<td>Diathermy</td>
</tr>
<tr>
<td>Default Settings</td>
</tr>
<tr>
<td>Phaco Power Settings</td>
</tr>
<tr>
<td>WHITESTAR Technology</td>
</tr>
<tr>
<td>FUSION Fluidics Phaco</td>
</tr>
<tr>
<td>Occlusion Mode Settings</td>
</tr>
<tr>
<td>CASE Mode</td>
</tr>
<tr>
<td>Passive Reflux</td>
</tr>
<tr>
<td>Lock a Program</td>
</tr>
<tr>
<td>Copy a Surgeon Program</td>
</tr>
<tr>
<td>Program – Assign Order</td>
</tr>
</tbody>
</table>
Create a New Program

When you create a new surgeon, the system automatically assigns the Default Anterior Program and the Post Laser Cataract to that surgeon. You can customize a program for that surgeon name with your preferred settings. You can also create new programs for existing surgeons.

Figure 5.1 – Surgeons and Programs Screen

1. On Select Program, press .
2. Enter a program name or select a name from the Standard Names list.
4. Select a program name from the list.
5. Press Enter.

Delete a Program

Use Delete Program to remove a surgeon program from the Select Program screen. You cannot delete the current program or a program selected on the Settings screen. You cannot delete the Default Anterior Program or the Post Laser Cataract program.

1. Select a program name on the list.
2. Press .
Edit a Program Name

1. Select a program name on the list.
2. Press "Edit Program Name".
3. Enter a different program name or select a new name from the Standard Names list.
5. Select a program from the list.
6. Press Enter.

Program Settings

Program settings are used to define your specific settings on the WHITESTAR SIGNATURE PRO system. There are four major surgical modes (Phaco, I/A, Vitrectomy (VIT), and Diathermy (DIA)).

For each major mode there are multiple submodes available that you can customize for each step in your procedure. You can program all or some of the submodes within each of the major modes. You can use the submode names that come with the system (Standard Names) or create a specific name.

The primary settings in the submodes are:

• Aspiration
• Vacuum
• Power
• Cut Rate (Vitrectomy)
• Bottle Height
• Pump Type (Peristaltic or Venturi)
• Delivery Mode (Panel or Linear)
  • Linear - Provides a gradual increase based on the foot pedal position.
  • Panel - Provides a full and immediate increase when the is pressed.

3. Press Yes.
Phaco

1. Press 🔄 to open the Settings screen.

**Figure 5.3 – Phaco Settings Screen**

2. Select a submode or customize the submode name.
3. Select the pump type (peristaltic or Venturi).
4. Use the up and down arrows to set the Aspiration Rate (10 to 60).
5. Use the up and down arrows to set the Vacuum. (0 to 650) If you are using Venturi, the range is 0 to 600.
6. Use the up and down arrows to set the Power (0% to 100%).
7. Select the delivery mode (Linear or Panel).
8. Set the bottle height

9. Press **Save**.

For additional information:

See “FUSION Fluidics Phaco” on page 5-20.

See “Occlusion Mode Settings” on page 5-21.
Irrigation and Aspiration

Figure 5.4 – Irrigation/Aspiration Settings

1. Select a submode or customize the submode name.
2. Select the pump type (peristaltic or Venturi).
3. Use the **up** and **down** arrows to set the Aspiration Rate (0 to 60).
4. Use the **up** and **down** arrows to set the Vacuum. (0 to 650) If you are using Venturi, the range is 0 to 600.
5. Select the delivery mode (Linear or Panel).
6. Set the bottle height

7. Press **Save**.
Vitrectomy

Figure 5.5 – Vitrectomy Settings Screen

1. Select a submode or customize the submode name.
2. Select the pump type (peristaltic or Venturi).
3. Use the up and down arrows to set the Aspiration Rate (0 to 60).
4. Use the up and down arrows to set the Vacuum. (0 to 650) If you are using Venturi, the range is 0 to 600.
5. Use the up and down arrows to set the Cut Rate (50 to 2500).
   Note: You must make a foot pedal selection for ICA, IAC, or Side Vitrectomy (VIT), which determines how the vitrectomy cutter activates as you press the foot pedal from Positions 1 through 3. only. See “Vitrectomy Foot Pedal Modes” on page 4-7.
6. Select the delivery mode (Linear or Panel).
7. Set the bottle height
8. Press Save
Diathermy

Figure 5.6 – Diathermy Power Submode

1. Select a submode or customize the submode name.
2. Use the **up** and **down** arrows to set the Power (5% to 100%).
3. Select the delivery mode (Linear, Panel, or Burst).
4. Press **Save**.
## Default Settings

### Table 5.1 – Phaco – Anterior Default Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Available Settings</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Phaco 1</td>
<td>Phaco 2</td>
</tr>
<tr>
<td>Submode name</td>
<td>Phaco 1</td>
<td>Phaco 2</td>
</tr>
<tr>
<td>Pump selection</td>
<td>Venturi</td>
<td>Peristaltic</td>
</tr>
<tr>
<td>IV Pole Height</td>
<td>0–106cm 0–42 inches</td>
<td>66 cm 26 inches</td>
</tr>
<tr>
<td>Vacuum control (Occlusion Mode/CASE)</td>
<td>On, Off</td>
<td>Occlusion Mode off</td>
</tr>
<tr>
<td>Min vacuum (Peristaltic and Venturi pump)</td>
<td>Unoccluded (mmHg)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Occluded</td>
<td>0 or 5 less than occlusion threshold setting</td>
</tr>
<tr>
<td>Max vacuum (peristaltic and Venturi)</td>
<td>Unoccluded (mmHg)</td>
<td>75 mmHg (120 when CASE on)</td>
</tr>
<tr>
<td></td>
<td>Occlusion threshold</td>
<td>25 mmHg</td>
</tr>
<tr>
<td>CASE Parameters</td>
<td>CASE Upper threshold (mmHg)</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>CASE up time (ms)</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>CASE vacuum (mmHg)</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>CASE lower threshold (mmHg)</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>CASE one-touch</td>
<td>STD</td>
</tr>
<tr>
<td>Peristaltic pump ramp threshold (%)</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Venturi pump</td>
<td>On, Off</td>
</tr>
<tr>
<td>Min flow/aspiration rate (peristaltic and Venturi)</td>
<td>Unoccluded (cc/min)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Occluded</td>
<td>10</td>
</tr>
<tr>
<td>Max flow/aspiration rate (peristaltic)</td>
<td>Unoccluded (cc/mm)</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Occluded</td>
<td>18</td>
</tr>
<tr>
<td>Fluidics mode type, aspiration</td>
<td>Panel, Linear</td>
<td>Panel</td>
</tr>
<tr>
<td>Fluidics mode type, vacuum</td>
<td>Panel, Linear</td>
<td>Linear</td>
</tr>
<tr>
<td>Min power</td>
<td>Unoccluded (%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Occluded</td>
<td>N/A</td>
</tr>
<tr>
<td>Parameter</td>
<td>Available Settings</td>
<td>Default Settings</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Max power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unoccluded (%)</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Power delivery</td>
<td>Continuous</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td>Continuous</td>
<td>Continuous</td>
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<tr>
<td></td>
<td>Continuous</td>
<td>Continuous</td>
</tr>
<tr>
<td>WHITESTAR setting (duty cycle)</td>
<td>On 6/12 (33%)</td>
<td>On 6/12 (33%)</td>
</tr>
<tr>
<td></td>
<td>On 6/12 (33%)</td>
<td>On 6/12 (33%)</td>
</tr>
<tr>
<td></td>
<td>On 6/12 (33%)</td>
<td>On 6/12 (33%)</td>
</tr>
<tr>
<td>Occluded mode (%)</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>40</td>
</tr>
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<td>Power delivery</td>
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<td></td>
<td>Continuous</td>
<td>Continuous</td>
</tr>
<tr>
<td>WHITESTAR setting (duty cycle)</td>
<td>On 6/12 (33%)</td>
<td>On 6/12 (33%)</td>
</tr>
<tr>
<td></td>
<td>On 6/12 (33%)</td>
<td>On 6/12 (33%)</td>
</tr>
<tr>
<td></td>
<td>On 6/12 (33%)</td>
<td>On 6/12 (33%)</td>
</tr>
<tr>
<td>Power type, occluded and unoccluded</td>
<td>Linear</td>
<td>Linear</td>
</tr>
<tr>
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<td>Linear</td>
</tr>
<tr>
<td></td>
<td>Linear</td>
<td>Linear</td>
</tr>
<tr>
<td>Short pulse rate, occluded and unoccluded</td>
<td>1–14 pps</td>
<td>6 pps</td>
</tr>
<tr>
<td></td>
<td>6 pps</td>
<td>6 pps</td>
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<td></td>
<td>6 pps</td>
<td>6 pps</td>
</tr>
<tr>
<td>Long pulse rate, occluded and unoccluded</td>
<td>1–6 pps</td>
<td>4 pps</td>
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<td></td>
<td>4 pps</td>
<td>4 pps</td>
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<td></td>
<td>4 pps</td>
<td>4 pps</td>
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<td>Pulse Shape Setting (WHITESTAR ICE)</td>
<td>On, OFF</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>OFF</td>
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<td></td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Pulse Shape Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Kick Low</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>% Kick High</td>
<td>5</td>
<td>5</td>
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<td>Low Power Limit</td>
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<td>High Power Limit</td>
<td>80</td>
<td>80</td>
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<td>80</td>
<td>80</td>
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<tr>
<td>Foot Pedal Feedback</td>
<td>On, OFF</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Initial Mode</td>
<td>On, OFF</td>
<td>On, OFF</td>
</tr>
<tr>
<td></td>
<td>Phaco (first enabled submode)</td>
<td></td>
</tr>
<tr>
<td>Passive Reflex</td>
<td>On, OFF</td>
<td>On</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td></td>
<td>On</td>
<td>On</td>
</tr>
<tr>
<td>Cup Fill</td>
<td>30, 60, 90 cc</td>
<td>30 cc</td>
</tr>
<tr>
<td></td>
<td>30 cc</td>
<td></td>
</tr>
<tr>
<td>Surgical Mode/ Submode</td>
<td>Aspiration Rate cc/mm (Min/Max)</td>
<td>Vacuum mmHg (Min/Max)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Phaco 1 Pre Segment</td>
<td>10 / 28 Linear</td>
<td>50 / 150 Panel</td>
</tr>
<tr>
<td>Phaco 2 Normal Segment</td>
<td>N/A (Venturi Mode)</td>
<td>0 / 275 Linear</td>
</tr>
<tr>
<td>Phaco 3 Dense Segment</td>
<td>N/A (Venturi Mode)</td>
<td>0 / 300 Linear</td>
</tr>
<tr>
<td>Phaco 4 Last Segment</td>
<td>25 / 40 Linear</td>
<td>200 / 400 Linear</td>
</tr>
<tr>
<td>I/A 1 Cortex</td>
<td>N/A (Venturi Mode)</td>
<td>0 / 450 Linear</td>
</tr>
<tr>
<td>I/A 2 Polish</td>
<td>0 / 8 Linear</td>
<td>0 / 20 Linear</td>
</tr>
<tr>
<td>I/A 3 Visco</td>
<td>0 / 50 Linear</td>
<td>0 / 550 Panel</td>
</tr>
<tr>
<td>DIA 1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>DIA 2</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>VIT 1 ICA</td>
<td>0 / 18 Panel</td>
<td>0 / 250 Linear</td>
</tr>
<tr>
<td>VIT 2 IAC</td>
<td>10 / 18 Linear</td>
<td>0 / 300 Panel</td>
</tr>
</tbody>
</table>
### Table 5.3 – I/A – Anterior Default Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Available Settings</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submode Active</td>
<td>On, Off</td>
<td>I/A1</td>
</tr>
<tr>
<td>IV Pole Height</td>
<td>0–104 cm 0–42 inches</td>
<td>76 cm</td>
</tr>
<tr>
<td>Max Vacuum (Peristaltic and Venturi pump)</td>
<td>0–650 mmHg</td>
<td>500 mmHg</td>
</tr>
<tr>
<td>Min Vacuum (Peristaltic and Venturi pump)</td>
<td>0 mmHg</td>
<td>0 mmHg</td>
</tr>
<tr>
<td>Max Aspiration/ (cc/min) (Peristaltic Pump)</td>
<td>0–60 cc/min</td>
<td>26 cc/min</td>
</tr>
<tr>
<td>Fluidic Mode Type, Aspiration</td>
<td>Panel, Linear</td>
<td>Panel</td>
</tr>
<tr>
<td>Fluidic Mode Type, Vacuum</td>
<td>Panel, Linear</td>
<td>Linear</td>
</tr>
<tr>
<td>Venturi Pump</td>
<td>On, Off</td>
<td>Off</td>
</tr>
<tr>
<td>Peristaltic Pump Threshold %</td>
<td>10–100%</td>
<td>80%</td>
</tr>
</tbody>
</table>
### Table 5.4 – Vitrectomy – Anterior Default Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Available Settings</th>
<th>IAC</th>
<th>ICA</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV Pole Height (cm)</td>
<td>0–104 cm</td>
<td>30 cm</td>
<td>30 cm</td>
</tr>
<tr>
<td>Minimum Cut Rate (Cuts per minute)</td>
<td>50 cpm</td>
<td>50 cpm</td>
<td></td>
</tr>
<tr>
<td>Maximum Cut Rate (Cuts per minute)</td>
<td>2500 cpm</td>
<td>2500 cpm</td>
<td></td>
</tr>
<tr>
<td>Min vacuum (mmHg) (Peristaltic and Venturi)</td>
<td>0–650 mmHg</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Max vacuum (mmHg) (Peristaltic and Venturi)</td>
<td>0–650 mmHg</td>
<td>225 mmHg</td>
<td>225 mmHg</td>
</tr>
<tr>
<td>Min aspiration (cc/min) (peristaltic pump)</td>
<td>0–60 cc/min</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Max aspiration (cc/min) (Peristaltic pump)</td>
<td>0–60 cc/min</td>
<td>18 cc/min</td>
<td>12 cc/min</td>
</tr>
<tr>
<td>Fluidic mode type, Aspiration</td>
<td>Panel, Linear</td>
<td>Panel</td>
<td>Panel</td>
</tr>
<tr>
<td>Fluidic mode type, Vacuum</td>
<td>Panel, Linear</td>
<td>Panel</td>
<td>Panel</td>
</tr>
<tr>
<td>Venturi pump</td>
<td>On, Off</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Cut Rate (Cuts per Minute)</td>
<td>250</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>Cut Mode</td>
<td>ICA, IAC</td>
<td>ICA</td>
<td>IAC</td>
</tr>
<tr>
<td>Pump Ramp Threshold (%)</td>
<td>10 - 100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 5.5 – Diathermy – Anterior Default Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Available Settings</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DIA 1</td>
</tr>
<tr>
<td>Max Power</td>
<td>5–100%</td>
<td>30%</td>
</tr>
<tr>
<td>Power Delivery Type</td>
<td>Linear, Burst, Panel</td>
<td>Linear</td>
</tr>
</tbody>
</table>
**Phaco Power Settings**

- Continuous
- Pulse Mode
- Short Pulse
- Long Pulse
- Low Power Pulse
- High Power Pulse
- Single Burst (panel only)
- Multiple Burst (panel only)
- Continuous Burst

From the **Phaco Settings** screen press 📩 to show the **Phaco Power** selection.

**Figure 5.7 – Phaco Power Settings**

In addition to the nine phaco power modes, you can also select the **WHITESTAR** mode. Additional **WHITESTAR** Technology information is later in this section.
Continuous Phaco Power
Continuous phaco power delivers continuous, uninterrupted phaco power to the handpiece and requires no pulse rate setting.

Pulse Mode
Pulse Mode delivers phaco in pulses of 1 to 100 ms when the foot pedal is in position 3. You can set this in a range of 1 to 100 pulses per second (pps). The default setting is 20 pps.

To set the Pulse Mode range:

1. Press the Pulse Mode button.
2. Press on the pulse setting number. A Settings dialog box opens.
3. Press the up or down arrows to increase or decrease the pps from 1 to 100.
4. Press Finished to close the screen.

Short Pulse Phaco Power
Short pulse delivers phaco in pulses of 50 ms when the foot pedal is in position 3. You can set this in a range of 1 to 14 pulses per second (pps). The actual number of pps is on the button to the right of the Short Pulse button.

To set the Short Pulse range:

1. Press the Short Pulse button.
2. Press on the pulse setting number. A Settings dialog box opens.
3. Press the up or down arrows to increase or decrease the pps from 1 to 14.
4. Press Finished to close the screen.

Long Pulse Phaco Power
Long Pulse delivers Phaco in pulses of 150 ms when the foot pedal is in position 3. You can set this in a range of 1 to 6 pulses per second (pps). The actual number of pps is on the button to the right of the Long Pulse button.

To set the Long Pulse range:

1. Press the Long Pulse button.
2. Press on the pulse setting number. A Settings dialog box opens.
3. Press the up or down arrows to increase or decrease the pps from 1 to 6.
4. Press Finished to close the screen.

Low Power Pulse Phaco Power
Low Power Pulse generates short pulses of ultrasonic power in foot pedal position 3. When you press the foot pedal, the pulses become longer and eventually blend together to become continuous phaco power.

High Power Pulse Phaco Power
High Power Pulse generates continuous Phaco Power in foot pedal position 3. When you press the foot pedal, the continuous pulse changes into long pulses and then gradually changes to short pulses.
Single Burst Phaco Power (Panel Only)

Single Burst delivers a single burst of ultrasonic power of 110 ms duration when you press the foot pedal to position 3. You must return to foot pedal position 2, pause for approximately one-half (0.5) second, and then press the foot pedal to position 3 to obtain an additional burst of energy.

Multiple Burst Phaco Power (Panel Only)

Multiple Burst generates a burst of ultrasonic power of 110 ms duration, with additional bursts deployed beginning at approximately 1 burst per second when you press the foot pedal to position 3.

The frequency of burst increases as you press the foot pedal. At the maximum level of foot pedal position 3, the delivered rate of the bursts are 4 bursts per second.

Continuous Burst Phaco Power

Continuous Burst can deliver an ultrasonic burst duration from 50 to 150 ms. As you press the foot pedal through position 3, the bursts get closer together. At the maximum level of foot pedal position 3, the bursts blend together, and the power becomes continuous (at the preset power level). The default setting is 100 ms.

To set the Continuous Burst range:
1. Press the Continuous Burst button.
3. Press the up or down arrows to increase or decrease the burst rate from 50 to 150.
4. Press Finished to close the screen.

WHITESTAR Technology

WHITESTAR Technology can be applied in any phaco power delivery mode. This advanced phacoemulsification power technology delivers finely modulated pulses of energy interrupted by extremely brief cooling periods. This technology is available in linear or panel mode. When the WHITESTAR delivery mode is turned on, either 🟢 or 🟣 appears on the touch screen.

WHITESTAR duty cycles are expressed as pulse time on/pulse time off, to achieve a desired duty cycle. For example, the duty cycle setting 6/12 means that the pulse time on is 6 ms, and the pulse time off is 12 ms, that results in a 33% duty cycle.
When the variable **WHITESTAR** Technology is used, different duty cycles are applied as the foot pedal moves through the power delivery zone. The zone is divided into four equal size quadrants, and a different duty cycle can be applied in each quadrant (Variable WS). You can also use the sliding adjustments to create custom duty cycles for Variable WS.
Figure 5.9 – Variable WHITESTAR Technology Foot Pedal Positions and Duty Cycles

1. Foot pedal position 3
2. WHITESTAR duty cycle

Figure 5.10 – Duty Cycles for Variable WS

<table>
<thead>
<tr>
<th>WS</th>
<th>Converted WS</th>
<th>Pulse Shaping</th>
<th>Off</th>
<th>On</th>
<th>Edit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duty Cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow Quadrant: 1</td>
<td>6/24 20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow Quadrant: 2</td>
<td>6/12 33%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Slow Quadrant: 3</td>
<td>6/8 43%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slow Quadrant: 4</td>
<td>8/4 67%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Finished
**WHITESTAR ICE Technology (Pulse Shaping)**

The WHITESTAR ICE Technology was the next micro-pulse advance in phacoemulsification technology, which combined modulated ultrasonic power (pulse shaping) with vacuum control through the application of the Chamber Stabilization Environment (CASE).

This pulse shaping technology modifies the standard square wave pulse, by increasing the amplitude of the first millisecond of the on time “kick”, and then setting the remaining part of the on time to the standard power setting. This is repeated for each on time period, resulting in increased control and efficiency in phacoemulsification.

Figure 5.11 – WHITESTAR ICE Technology Pulse Shaping

1. **Kick Amplitude**
2. **1 Millisecond Kick**
3. **Burst Width**
4. **Phaco Power Level**

To access the WHITESTAR ICE Technology settings:

1. Press **Settings** on the **Settings** screen.
2. Press the WHITESTAR mode button.
3. Press **On** for pulse shaping.
4. Press **Edit** to access the pulse shaping parameter settings.
5. Press **Finished** to close the screen. Continue to press **Finished** to return to the main screen.
There are four settings for WHITESTAR ICE Pulse Shaping:

- Low Power Limit
- High Power Limit
- Percent Kick Low End of Range
- Percent Kick High End of Range

The **Low Power Limit** and **High Power Limit** settings define the range of the applied pulse shaping. When the applied phaco power is outside these limits, there is no pulse shaping.

The **Percent Kick** settings determine the amplitude, or amount of the applied phaco power “kick” in the first millisecond of phaco power, either in the low end or the high end of the power range. As the phaco power increases from the **Low Power Limit** to the **High Power Limit**, the percentage of kick interpolates for the power ranges in between the two limits.

As an example, if you establish a small kick setting for the low end of the range and establish a large kick setting for the high end of the range, the kick percentage gradually increases as the phaco power increases. When the percent kick at the low end is the same as the high end, then the kick remains constant throughout the low to high range.
**FUSION Fluidics Phaco**

FUSION Fluidics Phaco is an intelligent vacuum monitoring system that regulates the maximum allowable vacuum that follows an occlusion of the phaco tip. When the phaco tip becomes occluded, the vacuum rises. Clearing of the occlusion while the vacuum is at a high-level can cause a post-occlusion surge. With CASE enabled, the system monitors the actual vacuum levels and when the vacuum exceeds a specific threshold for a specified duration, the system automatically adjusts the maximum allowable vacuum setting to a lower predefined CASE vacuum level. When the occlusion clears, the system automatically restores to the original programmed maximum vacuum setting. It is possible to have a different maximum vacuum setting when the needle occludes than when the needle is unoccluded.

You can program the power modulation of the phaco handpiece to automatically change when the phaco tip changes from an unoccluded condition to an occluded condition.

Use the FUSION Fluidics screen to adjust the settings. When Occlusion mode is on, the main Phaco operating screen provides alternative aspiration, vacuum, and power settings used when the system detects an occlusion.

**Figure 5.13 – FUSION Fluidics Phaco**

1. CASE Vacuum
2. Upper Threshold
3. Lower Threshold
4. Vacuum Level crosses Upper Threshold
5. Phaco activated
6. Up Time
7. Vacuum Level
8. Vacuum
9. Time
10. Max Vac
Occlusion Mode Settings

With Occlusion Mode, you can set different aspiration rates for occluded aspiration as opposed to unoccluded aspiration.

You can set a different vacuum rise time for when the phaco tip occludes without changing the aspiration rate through an unoccluded needle.

To set the occluded aspiration rate thresholds:

1. Press **Phaco**.
2. Press **Settings**.
3. Select the **Occlusion** box to enable Occlusion Mode.
4. Use the **up** and **down** arrows to adjust the pump ramp.
5. Press the **FUSION** button (%).
6. On the **FUSION** screen, Use the **up** and **down** arrows to adjust the threshold and the Actual Max Vac.
7. Press **Finished** to close the screen.
8. Press **Save** to retain the settings.
9. Press **Exit** to close the screen.
Occlusion Vacuum Threshold
In Occlusion mode phaco, you can set an occlusion threshold value for vacuum. When in Occlusion mode phaco, there is an additional control panel for vacuum. The vacuum threshold setting lets you choose the vacuum level at which occluded settings take effect.

To adjust the occluded vacuum threshold, press the up or down arrows. When you decrease the threshold, the occlusion settings take effect sooner.

Occlusion Aspiration Rate
In Occlusion mode phaco, you can set a different maximum flow value for aspiration. There is an additional control panel for aspiration below the standard aspiration control panel.

Figure 5.17 – Occlusion Aspiration Rate

To adjust the occluded aspiration rate in occlusion mode phaco, press the up or down arrows to increase or decrease the occluded aspiration rate.

Or

1. Press . The Settings screen opens.
2. Press the up or down arrows to increase or decrease the occluded aspiration rate.
3. Press Exit to close the screen.
### Occlusion Mode Power Settings
You can set different power levels when the phaco tip occludes.
When you are in Occlusion mode phaco, there is an additional control panel for power.

**Figure 5.18 – Phaco Surgical Screen with Occlusion Mode Power Settings**

To adjust the occluded power delivery:

**Note:** Nonzero start parameters are the same for unoccluded and occluded settings. When the current value reaches the occlusion threshold then the system uses the occlusion settings. You cannot set the nonzero start value higher than the occlusion threshold.

1. In Occlusion Mode phaco, press the **up** or **down** arrows to increase or decrease the occluded power level.
2. Press the **Settings** button.
3. Press **Configuration** to change other power settings. A **Power Settings** screen opens.
4. Press the buttons on the left of the **Power Settings** screen to select a power type.
5. Press the **On** button to engage WHITESTAR Technology.
6. Press **Finished** to close the screen.
**Venting an Occlusion**

When there is a blockage or an occlusion to the aspiration port by some tissue or other material, the vacuum pressure builds up. The aspiration flow system vents to the bottle when you release the foot pedal. Another choice is that you can release the foot pedal to position 1 and that causes the aspiration system fluid to vent using pump rotation. This is used with the OPO70 FUSION Pack. The OPO71 FUSION Dual Pump Pack uses a pump mechanism.

These methods release the material at the aspiration port and gives you full control if the tip accidentally grabs the capsule or iris. The internal fluidic system maintains the desired vacuum level when you hold the foot pedal at a constant position. The two adjustments associated with aspiration flow are **Max Vac** and **Max Flow**.

**CASE Mode**

CASE maintains a stable chamber by detecting an impending occlusion break, and reducing the vacuum before occlusion surge can occur. When the system detects the occlusion, the system waits long enough to allow you to grasp the particle firmly, and then reduces the vacuum to a lower level that allows the occlusion to clear safely. When you clear the occlusion, the vacuum returns to the previous vacuum level.

To access CASE settings:

1. Press the **Settings** button.
2. On the **Settings** screen, press the **FUSION** button ( ).

**Figure 5.19 – FUSION Settings Screen**
3. On the FUSION screen, press the On button to turn CASE mode on.
   Note: If the Venturi pump option is on, you cannot access the FUSION Fluidics screen. There is no Occlusion mode phaco or CASE mode with Venturi.

4. The FUSION screen shows the CASE settings as a graph. Use the up and down arrows at the bottom of the screen to adjust the:
   - **Upper Threshold (Up)** – This is the maximum threshold vacuum setting. You define the amount for the upper threshold by the up time threshold setting.
   - **CASE Vacuum (CASE)** – This is the optimum occlusion vacuum setting
   - **Lower Threshold (Down)** – After the occlusion clears, the vacuum level drops to the lower vacuum threshold setting to allow the occlusion to safely clear, and then gradually returns to the previous levels.

   Note: You cannot set the nonzero start value higher than the CASE up threshold or the CASE vacuum setting. You cannot set the nonzero start value higher than the CASE down threshold. When the current vacuum level reaches the CASE threshold, the system uses the CASE settings. When the current vacuum level goes below the CASE down threshold, the system uses the nonzero start settings as long as the system is also out of CASE mode.

   - **Up Time** – Use the up and down arrows to change the up time threshold. The up time threshold is the maximum time that the system maintains the maximum threshold vacuum.

5. Press Finished to close the screen

**CASE One Touch**

To simplify the programming of the CASE function, you only need to define the basic CASE parameters once. You can adjust the CASE function quickly and easily from the CASE One Touch settings on the surgical screen. Use these controls to change the CASE functionality for greater efficiency (up arrow) or more control (down arrow) to suit any particular combination of cataract density, surgical technique, or personal preference.

When CASE is On, use the One Touch buttons to adjust the CASE parameters.

**Figure 5.20 – CASE One Touch**
Table 5.7 – CASE One Touch Parameter Settings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CASE -2</th>
<th>CASE -1</th>
<th>CASE STD</th>
<th>CASE +1</th>
<th>CASE +2</th>
</tr>
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<tr>
<td>Pump Ramp Setting</td>
<td>Program default</td>
<td>Program default</td>
<td>Program default</td>
<td>CASE STD +10%</td>
<td>CASE STD +20%</td>
</tr>
<tr>
<td>CASE Occlusion Delay</td>
<td>CASE STD -200 ms</td>
<td>CASE STD -100 ms</td>
<td>Program default</td>
<td>CASE STD +100 ms</td>
<td>CASE STD +200 ms</td>
</tr>
<tr>
<td>CASE Upper Threshold</td>
<td>CASE STD -5%</td>
<td>Program default</td>
<td>Program default</td>
<td>Program default</td>
<td>CASE STD +5%</td>
</tr>
</tbody>
</table>

Passive Reflux

Moving the foot pedal to position one or zero vents any excess vacuum. You can select how venting works by setting the Passive Reflux feature. Enabling Passive Reflux provides a small amount of positive pressure to gently push the particle away from the tip. Disabling Passive Reflux gently releases the particle while keeping the particle at or near the tip. The system default is enabled.

1. Select Surgeons and Programs.
2. Select the surgeon and program.
3. Press the Settings button.
4. Select the applicable operating mode and submode.
5. Select the Passive Reflux box to enable or disable.

Reflux

Reflux is the controlled back flow of fluid through the aspiration port of the handpiece. Reflux is used to gently release or dislodge unwanted material from the handpiece tip. Reflux can also be used to “tent” the incision site to allow easier tip insertion. Reflux pressure depends on bottle head pressure (IV pole height and gravity) for the FUSION Pack (OPO70), and as such, is not intended to clear a clogged handpiece. However, reflux can be used to identify a blockage.

The reflux action can be programmed on any available foot pedal switch. This causes fluid to be expelled from the aspiration line into or towards the eye.

The reflux is active until the foot pedal switch is released.

Lock a Program

Press the to lock the program.

Note: Once you lock a program you cannot unlock the program. You cannot edit a locked program.
Copy a Surgeon Program

You can copy the settings of one surgeon program for use by another surgeon. To copy a surgeon program:

1. Select a program name on the list.
2. Press .
3. Select a surgeon and program from the Copy Program list.
4. Press Enter.
5. Press if you need to edit the name of the program.

Program – Assign Order

1. Select a program.
2. Use or to move the program names up or down on the Surgeons and Programs screen.
   Note: Assign Program Order is also used to select your preferred program. By moving a program to the top of the list, that program becomes your default or preferred program.
Figure 5.22 – Surgeons and Programs Screen
<table>
<thead>
<tr>
<th>Setting the Maximum IV Pole Height</th>
</tr>
</thead>
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<td>Testing the IV Pole</td>
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<td>Event Log</td>
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<td>Wireless Setup - Foot Pedal and Remote Control</td>
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<td>System Self Test</td>
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<td>Language Selection</td>
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<td>Surgical Media Center (SMC) (Optional)</td>
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<tr>
<td>Set the System Date and Time</td>
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<tr>
<td>Set Units of Measure for Vacuum</td>
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<tr>
<td>Service Interval</td>
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<tr>
<td>Import/Export Database</td>
</tr>
<tr>
<td>Backup All</td>
</tr>
<tr>
<td>Restore Database</td>
</tr>
<tr>
<td>Restore All</td>
</tr>
</tbody>
</table>
Setting the Maximum IV Pole Height

Follow these steps to set the maximum IV pole height.

Note: The Configuration screen is only available when you are not in a case. If you need to access the Configuration screens you must select End Case, select Next Case, then press the Configuration button.

1. Press Configuration.
2. Press the Max IV Pole Height button.

Figure 6.1 – Max IV Pole Height Dialog Box

3. Use the up or down arrow to adjust the maximum IV pole height. You can set the maximum IV pole height in the range 75 cm to 106 cm. You can also press the numeric value shown to open a numeric keypad screen to enter the exact value to use.
4. Press the Finished button to return to the Configuration screen.
5. Press Exit to close the Configuration screen.
Testing the IV Pole

Follow these steps to test the IV pole.

1. Press Configuration.
2. Press the IV Pole Test button.

**Figure 6.2 – IV Pole Test**

3. Press the Start button under Send to Top to move the IV pole to maximum height.
4. Press the Start button under Send to 30 cm to move the IV pole to a height of 30 cm.
5. Press the Start button under Send to Bottom to move the IV pole to minimum height.
6. Press Finished to close the IV Pole Test dialog box and return to the Configuration screen.
7. Press Exit to close the Configuration screen.
Event Log

1. Press Configuration.
2. Press the Event Log button.

Figure 6.3 – Event Log Screen

3. Press the Previous button to move to the prior page of the log.
4. Press the Next to move to the next page of the log.
5. Press the Export Log button to save the log file to an external USB device.
6. Press Finished to close the Event Log dialog box and return to the Configuration screen.
7. Press Exit to close the Configuration screen.
Wireless Setup - Foot Pedal and Remote Control

Pairing

Note: If you have problems pairing the Advanced Control Pedal (ACP) and the remote control, remove any other BLUETOOTH devices from the area. Multiple BLUETOOTH devices can affect the pairing process.

Foot Pedal - Advanced Control Pedal

Follow these steps to pair the Advanced Control Pedal to the system with a wireless BLUETOOTH connection.

Wireless Pairing

1. On the main screen, press Configuration.

Figure 6.4 – Wireless Setup Screen

4. On the **Foot Pedal Pairing** screen, press the **Wireless Pairing** button.
5. Remove the cable from the foot pedal and select **OK**.
6. Follow the instructions on the screen.

**Figure 6.6 – Wireless Pairing Instructions**

7. The system communicates the appropriate data to the foot pedal. The system shows a progress screen during the pairing process.
8. When pairing completes, the progress screen closes and the system displays the message **The foot pedal is now paired with the system.**
   - If the blue light is on, the wireless foot pedal is paired.
   - If the blue light is blinking the wireless foot pedal is not paired.
   - If the green light is on, the batteries in the foot pedal are charged.
   - If the green light is blinking, the batteries in the wireless foot pedal need to be charged. See “Charging Options for Wireless Devices” on page 8-5.

9. Test the foot pedal or press **Finished** to close the test screen.
10. Press **Exit** to close the **Configuration** screen.

**Wired Pairing**

1. On the main screen, press **Configuration**.
2. Press **Wireless Setup**.
3. On the **Wireless Setup** dialog box, press the **Advanced Control Pedal** button.

**Figure 6.7 – Advanced Control Pedal Pairing Screen**

4. On the **Foot Pedal Pairing** screen, press the **Wired Pairing** button. The system displays the message **Make sure that the cable is attached to the foot pedal.**
5. Press the **OK** button.
6. The system communicates the appropriate data to the foot pedal. When the system receives the appropriate data back from the foot pedal the system displays the message **Remove the cable from the foot pedal.** The system shows a progress screen during the pairing process.
7. When pairing completes, the progress screen closes and the system displays the message **The foot pedal is now paired with the system.**
8. Test the foot pedal or press **Finished** to close the test screen.
9. Press **Exit** to close the **Configuration** screen.

**Foot Pedal - Advanced Linear Pedal**

**Figure 6.8 – Advanced Linear Pedal Pairing Screen**

1. On the main screen, press **Configuration**.
2. Press **Wireless Setup**.
3. Press the **Advanced Linear Pedal** button.
4. Follow the instructions on the screen.
5. Press **Pair**.
   - If the blue light is on, the wireless foot pedal is paired.
   - If the blue light is blinking (fast) the wireless foot pedal is searching for a connection.
   - If the blue light is blinking (slow) the wireless foot pedal is not paired.
   - If the green light is on, the batteries in the foot pedal are charged.
   - If the green light is blinking, the batteries in the wireless foot pedal are charging.
   - If the amber light is on, the batteries in the foot pedal need charging. See “Charging Options for Wireless Devices” on page 8-5.
6. When pairing completes, the progress screen closes and the system displays the message **The foot pedal is now paired with the system.**
7. Test the foot pedal or press **Finished** to close the test screen.
8. Press **Exit** to close the **Configuration** screen.
Remote Control Pairing
Note: Make sure that the back light feature for the wireless remote control is off before you start the wireless setup process.

1. On the main screen, press Configuration.  

Figure 6.9 – Wireless Remote Pair Screen

4. Follow the instructions shown on the screen.  
5. Press the corresponding buttons on the wireless remote control as prompted.  
6. Verify for each button that the corresponding button on the screen lights. If the button does not light on the screen, the test fails. If the test fails contact AMO for technical service. If remote pairing fails, follow the instructions on the screen.  
7. Press Exit to close the screen.  
8. Press Exit to close the Configuration screen.

Wireless Remote Test
1. On the main screen, press Configuration.  
3. Follow the instructions on the screen.  
4. Press Finished to close the dialog box.  
5. Press Exit to close the Configuration screen.
Touch Screen Calibration

You must calibrate the system touch screen as part of the system setup. Follow these steps to calibrate the touch screen.

1. On the main screen, press **Configuration**.
2. Press **Touch Screen Calibration**.

**Figure 6.10 – Touch Screen Target Circle**

3. Press the arrow on the screen. When released, the arrow moves to the next calibration point.
4. Repeat for all the calibration points.
5. Press **Confirm** at the completion of the calibration process.
1. On the main screen, press **Configuration**.
2. Press **View Software Versions**.

**Figure 6.11 – View Software Versions Screen**

3. Press **Finished** to close the **View Software Versions** dialog box.
4. Press **Exit** to close the **Configuration** screen.
System Self Test

1. On the main screen, press **Configuration**.
2. Press **Self Test**.

**Figure 6.12 – Self Test Screen**

3. The **Self Test** closes automatically.
4. Press **Exit** to close the **Configuration** screen.
Language Selection

The system features a 31-language user interface. Before you proceed, select one of the languages for your display screen. (English is the default language).

1. On the main screen, press Configuration.
2. Press Language.

Figure 6.13 – Language Screen

3. Select the desired language from the listing (for additional languages, press the Next List button).
4. Press Yes at the confirmation pop-up. The screen automatically changes to the selected language.
5. Press Exit to close the Language screen.
6. Press Exit to close the Configuration screen.

Note: If you press the screen under the letter A in the WHITESTAR SIGNATURE PRO logo 20 times, the system changes to the default language (English).
Surgical Media Center (SMC) (Optional)

The Surgical Media Center (SMC) is used to integrate and record the video image from the surgical microscope and the surgical operating data to be viewed at a later date and time. The surgery displays on a separate monitor with the instrument settings. The SMC hardware is attached to the communications port on the rear panel. (Figure 4.6 – Rear Panel Connections.)

Follow these steps to configure the Surgical Media Center.

1. Press Configuration.
2. Press SMC.

Figure 6.14 – Surgical Media Center (SMC) Dialog Box

3. The system displays an SMC dialog box. Press the appropriate button to choose one of the three options. You can choose from:

   **Off** - The surgical media center function is disabled.

   **On** - The surgical media center function records continuously, even between cases

   **Automatic** - The SMC function records only during cases, not between them

   Note: A foot pedal switch can be set up to activate the surgical media center record function.

4. Press Finished to accept the change and close the SMC dialog box.
5. Press Exit to close the Configuration screen.
**Set the System Date and Time**

Follow these steps to set the system date and time.

1. Press **Configuration**.
2. Press the **Set Date/Time** button.

**Figure 6.15 – Set Date/Time Dialog Box**

3. On the **Set Date/Time** screen, press the up and down arrows to set the day, month, year, hour, and minute.
4. You can change the way the date is displayed.

   Press the **Day/Month/Year** button to display the date in that format; for example, the date December 21, 2011 would be displayed as 21.12.2011.

   Press the **Month/Day/Year** button to display the date in that format; for example, the date December 21, 2011 would be displayed as 12.21.2011.

5. You can change the way the time of day is displayed.

   Press the **24Hr. Display** button to display the time of day in 24-hour format; for example, 2:45:43 PM would be displayed as 14:45:43.

   Press the **12Hr. Display** button to display the time of day in 12-hour format; for example, 2:45:43 PM would be displayed as 2:45:43 PM.

6. Press **Enter** to return to the Configuration screen.
7. Press **Exit** to close the Configuration screen.
Set Units of Measure for Vacuum

Follow these steps to set the units of measure for vacuum.

1. Press Configuration.
2. Press the Set Vacuum Units button.

Figure 6.16 – Set Vacuum Units Dialog Box

3. On the Set Vacuum Units dialog box, the current selection is highlighted in green. Press the button for the units of measure you want to use for the display of vacuum settings.
4. Press Finished to return to the Configuration screen
5. Press Exit to close the Configuration screen.
Service Interval

1. On the main screen, press Configuration.
2. Press Service Interval.

Figure 6.17 – Service Interval Screen

3. Press Finished to close the dialog box.
4. Press Exit to close the Configuration screen.
Export

1. From Configuration, press Import/Export Database.
   Note: Make sure that you place the USB device into the USB port on the back of the system.

Figure 6.18 – Export Database Screen

2. Press the Export button.
3. Select a file to export from the list or use the Select All to export all of the files listed.
4. Press the Copy Programs button.
5. Press OK to close the screen.
6. Press Exit to close the Configuration screen.
Import

1. From Configuration, press Import/Export Database.
   
   Note: Make sure that you place the USB device into the USB port on the back of the system.

2. Press the Import button.
3. Select a file to import from the list or use the Select All to import all of the files listed.
4. Press the Copy Programs button.
5. Press OK to close the screen.
6. Press Exit to close the Configuration screen.

**Backup All**

1. From Configuration, press **Backup All**.
   
   Note: Make sure that you place the USB device into the USB port on the back of the system.

2. Enter a name for the file.
3. Press **Enter**.
4. Press **OK** to complete the backup.
5. Press Exit to close the Configuration screen.

Print to File

1. From Configuration, press Print to File.
2. Press OK to close the confirmation dialog box.

Figure 6.24 – Print to File Dialog Box
Restore Database

Note: When you save a new surgeon or save changes to an existing program the system updates this list. The database names are a date and time stamp.

1. From Configuration, press Restore Database.
2. Select a database from the list.

Figure 6.25 – Database Restore Screen


Figure 6.26 – Restore Selection Dialog Box

4. Press Yes at the confirmation.
5. Press OK or wait for the dialog box to close.
6. Press **Finished** to close the screen.
7. Press **Exit** to close the **Configuration** screen.

**Restore All**

1. From **Configuration**, press **Restore All**.
   
   **Note:** Make sure that you place the USB device into the USB port on the back of the system.

**Figure 6.28 – Database Restore Screen**

2. Select the database to restore from the list.
3. Press **Restore Selection**.
4. Press **OK** at the confirmation screen.
5. Press **Finished** to close the screen.
6. Press **Exit** to close the **Configuration** screen.

### Delete a Backup Database

You can delete a database from your portable USB device. Contact your AMO service representative to delete the database from your system's hard drive.

1. Insert the USB device into the port on the back of the system.
2. From **Configuration**, press **Restore All**.
3. Select the database to delete from the list.
4. Press **Delete Selection**.
5. Press **Yes** at the confirmation screen.

#### Figure 6.30 – Deletion of Backup Database Confirmation Dialog Box

6. Press **Finished** to close the screen.
7. Press **Exit** to close the **Configuration** screen.
# CARE AND CLEANING

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<td>Diathermy Handpiece</td>
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<tr>
<td>Vitrectomy Cutter</td>
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<td>Touch Screen Cleaning</td>
</tr>
<tr>
<td>General Cleaning (Console, Foot Pedal, Remote)</td>
</tr>
</tbody>
</table>
Cleaning and Sterilization Procedures

Handle all previously used reusable items according to the Directions for Use for the particular product. Dispose of all single-use items or items which have completed their recommended useful life in accordance with:

- accepted hospital practices and hospital procedures
- local governing ordinance and recycling plans

The items for disposal can include the following:

- waste materials
- waste collection bags
- tubing
- phaco tip
- irrigation sleeves
- test chambers

Note: Inspect the Diathermy, Vitrectomy and Phaco handpiece cables for possible damage on a daily basis.

Phaco Handpiece

Refer to the phaco handpiece product Directions for Use for cleaning, handling, and sterilization instructions.

Irrigation/Aspiration Handpiece

Refer to the irrigation/aspiration handpiece product Directions for Use for cleaning, handling, and sterilization instructions.

Diathermy Handpiece

Refer to the diathermy handpiece product Directions for Use for cleaning, handling, and sterilization instructions.

Vitrectomy Cutter

The vitrectomy cutter is a disposable, single-use instrument.

Touch Screen Cleaning

Use a soft cloth dampened with either:

- alcohol
- ethanol
- neutral detergent

Note: Never use organic solvents on the touch screen. Use only those items listed above.

General Cleaning (Console, Foot Pedal, Remote)

Use a soft cloth or wipes dampened with disinfectant cleaners such as:

- hydrogen peroxide based cleaners
- bleach sodium hypochlorite based cleaners

Note: Avoid disinfectants containing alcohol for general cleaning.
## ERROR MESSAGES

### TROUBLESHOOTING AND DIAGNOSTICS

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<th>Errors</th>
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<tr>
<td>Status, Warning and Error Messages</td>
</tr>
<tr>
<td>Error Messages</td>
</tr>
</tbody>
</table>
Errors

During the operation of the WHITESTAR SIGNATURE PRO System, various errors may be displayed to indicate a fault that can affect the system. When errors are detected, the following occurs:

- A tone is generated.
- A message is displayed indicating the error.
- The system goes into a safe state without user intervention:
  - Phaco, I/A, Vitrectomy, and Diathermy functions are disabled.
  - Irrigation valve is automatically opened to the balanced salt solution and the aspiration path is vented ensuring that there is no residual vacuum and chamber pressure is maintained in the eye during the error state.
  - In this state, all the surgical modes become inoperative.

To resolve the errors, refer to Chapter 8 Error Messages Troubleshooting and Diagnostics and follow the described corrective actions.

Most Common User-Correctable Problems

Use the information in this section if you are not successful with the system check-out. Consult this section to resolve the problem before you call AMO for technical service:

- Make sure that you plugged the system in to a power receptacle.
- Make sure that there is electrical power to the receptacle.
- If there is no phacoemulsification, make sure that the phaco needle is tight on the handpiece.
- If there is no phacoemulsification, make sure that the phaco needle is compatible with the handpiece (for example, non-AMO phaco needle on an AMO handpiece).
- If there is no phacoemulsification, confirm there is no damage to the phaco needle/handpiece by dropping or misuse.
- If no irrigation occurs, shake the drip chamber to confirm that the ball or the valve moves freely. If there is no rattle sound, replace the drip chamber with another disposable pack.

Fuse Replacement Procedure

If the system does not turn on when you press the power switch, you have confirmed that you attached the power cord properly, and you plugged the cord in, check to see if the fuse is bad.

Note: To prevent the risk of fire or damage to the instrument, replace the fuses with the exact type and rating as indicated below (check the voltage sticker on the back panel of the system to confirm your system voltage):

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Quantity</th>
<th>Fuse Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>100/120/240</td>
<td>2</td>
<td>6.3A, 250V, Bussman GDA</td>
</tr>
</tbody>
</table>
To replace the console fuses:

1. Unplug the system electrical power.
2. Unplug the power cord from the back panel.
3. Locate the fuse holder on the back panel of the system.

**Figure 8.1 – Rear Panel Connections**

4. Use a small screwdriver to gently pry open the cover and expose the fuse holder.
5. Gently pry out the fuse holder.
6. Remove the bad fuse and replace the fuse with a new fuse (See value and size in Table 8.1 – Fuse Specifications).
7. Replace the fuse holder. Make sure that the arrows point to the right side of the back panel. Tilt the fuse holder slightly to the right and push in.
8. Push the fuse holder cover up and in until the cover snaps closed.
9. Reattach the power cord to the back panel.
10. Plug the system into an electrical receptacle.
Advanced Linear Pedal Battery Replacement

To replace the battery in the Advanced Linear Pedal:

Note: Remove the battery when shipping or transporting the foot pedal.

**Figure 8.2 – Bottom View Advanced Linear Pedal**

1. Use a flat-head screwdriver to remove the battery cover.
   Note: The screws cannot be separated from the cover.

2. Remove the battery.
   Note: Dispose of the used battery in the proper manner.

3. Insert a new battery.
   Note: Make sure to align the positive and negative ends of the battery.

4. Replace the cover and tighten the screws.
Charging Options for Wireless Devices

Figure 8.3 – AC Charger for the Foot Pedal

1. Disconnect the foot pedal cable from the console.
2. Attach the AC charger cable to the foot pedal cable.
3. Plug the AC charger into a power receptacle.
   Note: When the green light is no longer blinking, the foot pedal batteries are charged.

Figure 8.4 – AC Charger for the Remote Control

1. Attached the AC charger cable to the remote control.
2. Plug the AC charger into a power receptacle.
### Table 8.2 – Charging Options

<table>
<thead>
<tr>
<th>The System Is:</th>
<th>Advanced Linear Pedal (ALP)</th>
<th>Advanced Control Pedal (ACP)</th>
<th>Remote Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not attached to a power source and the system is off</td>
<td>AC Charger</td>
<td>AC Charger</td>
<td>AC Charger</td>
</tr>
<tr>
<td>Attached to a power source and the system is off</td>
<td>AC Charger</td>
<td>AC Charger</td>
<td>AC Charger</td>
</tr>
<tr>
<td>Attached to a power source and the system is on</td>
<td>AC Charger or Wired Mode</td>
<td>AC Charger or Wired Mode</td>
<td>AC Charger</td>
</tr>
<tr>
<td>Attached to a power source and the system is on and in-use</td>
<td>** Wired Mode</td>
<td>** Wired Mode</td>
<td>AC Charger</td>
</tr>
</tbody>
</table>

** The AC Charger cannot be used for charging while the system is operating with an ALP or an ACP in surgical modes.
Troubleshooting

**General**

**The system does not come on when you turn the power switch to on**

1. Turn the power switch off.
2. Confirm that you attached the power cord to the console back panel.
3. Confirm that you plugged the power cord into the electrical receptacle or another power source.
4. Confirm that there is electrical power to the wall receptacle or to the power source.
5. Turn the system on.
6. If the system still does not come on, turn the power off. Check for bad fuses and replace the fuse if necessary.
7. Contact AMO for technical service.

**The wireless remote control does not pair**

1. Make sure that you are pairing only one remote. If you try to pair more than one remote at the same time, the pairing fails.
2. Only pair the remote with one console at a time. Do not press the pairing key-sequence on multiple remote controls as this causes the pairing to fail.

Note: **DO NOT** have any other BLUETOOTH devices in the same area as the remote and the console (other remote controls, foot pedals, cell phones, or headsets, for example) as the pairing operation will fail. The software can detect a maximum of nine (9) devices.

3. Check to see if the remote control is in “sleep” mode. If the remote is in “sleep” mode, press the back-light button on the remote. Complete the up, down, right, left, reload key-sequence to pair the remote.

   Note: Always press the back-light button before you pair the remote.

4. Only pair the remote control with one console at a time. Make sure that you did not pair the remote with another console. You must:
   - Unpair the remote from the console.
   - Shut down the console.
   - Pair the remote with the new console. Make sure this console is at least 40 meters away from the first console.

5. Once you pair a remote, you cannot pair that remote with another console. (You cannot pair one remote with two (2) consoles.)
   - Unpair the remote from the console.
• Move the first remote out of range from the console.
• Wait for the first remote to go into “sleep” mode.
• Pair the new remote.

6. Make sure that you fully charge the batteries before you pair the remote with the console. Low batteries can cause pairing failures.

7. Charge the batteries if pairing has failed after several attempts.

8. When the batteries are charging:
   • The BLUETOOTH is off.
   • You cannot use the remote.
   • You cannot pair the remote.

The foot pedal is not operating properly

1. Go to the Configuration screen and perform a Foot Pedal Test.

2. Confirm that you attached the foot pedal cable at the back of the console.

3. Perform a Foot Pedal Calibration, for either the Advanced Control Pedal or the Single Linear foot pedal.

The IV Pole does not respond

1. The IV pole might have reached the maximum or the minimum height.

2. Attempt a programmable IV pole height adjustment with the touch screen, remote, or the rocker switch on the side of the system.

The Touch Screen Does Not Respond

Perform the Touch Screen Calibration procedure as described in “Touch Screen Calibration” on page 6-11.

Priming Errors

1. Check the pack loading, including reloading the pack.

2. Verify that there are no kinks, clogs, or loose fittings.

3. Replace the handpiece and the tip and prime.

4. Replace the pack.

5. Check the test chamber for proper installation and any leaks.

6. Contact AMO Technical Service to check the vacuum.
**Irrigation**

**No Irrigation Flow**
1. Make sure you selected the appropriate mode on the screen.
2. Check for kinks in the irrigation tubing.
3. Check the tubing connection to the handpiece.
4. Tap the drip chamber to make sure the valve operates properly.
5. Check the bottle height.
6. Press the foot pedal to position 1 and check for flow.
7. Listen for the irrigation pinch valve in the tubing manifold area when you press the foot pedal to confirm that the valve operates.
8. If there is still no flow, replace the pack.

**Reduced/insufficient irrigation flow**
1. Check for kinks in the tubing or leaks in the tubing or the handpiece.
2. Check the bottle height.
3. Check the tubing connections.
4. Check for a pinched irrigation sleeve at the incision.

**Irrigation flow continues even when foot pedal is off (position 0)**
1. Check that there is no obstruction to the foot pedal or that the foot pedal is stuck in position 1.
2. Check the foot pedal operation.
3. Verify that Continuous Irrigation is not active.

**Anterior chamber is too shallow or too deep**
1. Check the bottle height.
2. Too shallow, check for a pinched irrigation sleeve at the incision.
3. Check the pump speed (flow rate).
4. Check for obstructions to the irrigation tubing.
5. Make sure that you balanced irrigation and aspiration.
Using large amounts of fluid

1. Check the incision size.
2. Check the bottle height.
3. Check the flow rate (pump speed too high).
4. Check that no fluid enters the collection bag when you do not use irrigation.
5. Reseat or replace the tubing.

Aspiration

No aspiration

1. Make sure you have the appropriate mode selected on the screen.
2. Check for kinks or clogs in the tubing.
3. Check the tubing connection to the handpiece.
4. Make sure there are no obstructions in the handpiece.
5. Press the foot pedal to position 2 and check the pump function.

Poor Aspiration

1. Check the flow rate.
2. Check the foot pedal operation.
3. Check for kinks or clogs in the tubing.
4. Make sure there are no obstructions in the handpiece.
5. Check the tubing connection to the handpiece.
6. Check the I/A handpiece o-rings for excessive wear. Replace the o-rings, if needed.
Not building vacuum or pump does not turn

1. Check the programming. If the surgeon is in “linear vacuum” as opposed to “linear aspiration”, you must press the foot pedal through position 2 for the vacuum to reach the preset maximum.

2. Make sure you are pressing the foot pedal.

3. Check the tubing connection to the handpiece.

4. Check for air in the irrigation and aspiration tubing.

5. Check the system vacuum settings.

6. Replace the pack.

7. Run I/A prime.

8. Check the flow rate.

Chamber shallowing or partially collapses

1. Check the bottle height and the handpieces for correct position.

2. Check the flow rate setting.

3. Check the tubing fittings to the handpiece.

4. Check for kinks in the tubing.

5. Remove the handpiece and perform the test chamber test to make sure you have balanced the handpiece.

6. Make sure you balanced irrigation and aspiration.
**Phacoemulsification**  

**No phacoemulsification**

1. Make sure that you selected the phaco mode on the touch screen.

2. Make sure that the system is primed and tuned.

3. Check the foot pedal operation.

4. Make sure that you properly connected the phaco handpiece cord to the phaco receptacle on the front of the system.

5. Check the phaco power setting.

6. Make sure that the phaco tip is tight on the handpiece.

7. Check for damage to the phaco tip.

8. If there is damage to the tip, replace the tip with a new tip and retune.

**Poor or intermittent phacoemulsification**

1. Check all the corrective steps above for “**No phacoemulsification**”.

2. Remove the phaco tip and then replace the tip. Make sure the tip is tight on the handpiece.

3. Check the phaco power delivery setting for both unoccluded and occluded (if applicable) settings.

4. Tune the phaco handpiece.
Diathermy

No diathermy or poor diathermy

1. Make sure that you selected the diathermy mode on the touch screen.
2. Check the foot pedal operation.
3. Check the diathermy power setting.
4. Check the diathermy cord for a secure connection to the forceps and to the diathermy receptacles on the system.
5. Make sure that the diathermy cord connections are dry.
6. Try to use diathermy starting at a low power setting and gradually increase the power.
7. Replace the diathermy cord.
8. Replace the diathermy handpiece.

No sound when using diathermy

1. Make sure the volume setting is at a level of 6 or greater on Sounds screen.
2. Check for sounds when you push any touch screen or remote buttons.
3. Check for an audible confirmation upon completion of system start-up test (at power up).

Vitrectomy

No vitrectomy cutting or poor cutting

1. Make sure that you selected the vitrectomy mode on the touch screen.
2. Verify that the surgeon is in foot pedal position 3, if using IAC step vitrectomy. If using ICA, verify the foot pedal is in position 2.
3. Check the foot pedal operation.
4. Check the tubing connections to the vitrectomy cutter.
5. Check the vitrectomy tubing connection to the front panel receptacle on the system.
6. Check the vitrectomy rate (cpm) setting on the touch screen. Lower the cpm, if necessary.
7. Check that irrigation and aspiration are working correctly.
8. Verify that the cutter blade moves.
9. Replace the vitrectomy cutter and try again.
Status, Warning and Error Messages
The system shows status, warning, and error messages on the monitor. Alerts (Gray) show at the top of the screen. You do not need to clear an alert as with an error message. An alert, for example, can be: **Not Primed/Not Tuned**.

Error messages show at the top of the screen. Press the button to open the corrective action for that error. After you correct the error, press to clear the error message from the screen.

The message can show possible solutions to the error or recommendations to clear the error. The messages can indicate the available options if a component or subsystem fails.

The list of messages in the following pages have corrective actions that you can take to clear the error.

Error Messages

**101 Fluidics communication error.**

**Probable cause:** Invalid data or communication error.

**Corrective action:**

1. Select **End Case**.
2. Select **Next Case**.
3. If the error does not clear select **End Case**.
4. Select **Shutdown**.
5. Select **Yes** and wait for the system to power off.
6. Start up the system.
7. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

**102 Fluidics write error.**

**Probable cause:** The Microcontroller, SPI, SPI Bus, EEPROM, or ADC is bad.

**Corrective action:**

1. Select **End Case**.
2. Select **Shutdown**.
3. Select **Yes** and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
103 Fluidics read error.
Probable cause: The Microcontroller, SPI, SPI Bus, EEPROM, or ADC is bad.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

110 Fluidics RAM error.
Probable cause: Bad Microcontroller.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

111 Fluidics ROM error.
Probable cause: Bad Microcontroller.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
112 Fluidics Master communication error
Probable cause: There is no communication between the Fluidics Controller and the Instrument Host.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

114 Fluidics DAC fault.
Probable cause: Circuit failure of the I2C bus, DAC, or micro.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

118 Fluidics irrigation valve error.
Probable cause: The valve or drive circuit has failed.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
119 Fluidics pinch valve error.
Probable cause: Valve or drive circuit failure.
Corrective action:
1. Select **End Case**.
2. Select **Shutdown**.
3. Select **Yes** and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

123 Fluidics Venturi valve fault.
Probable cause: Valve or drive circuit failure.
Corrective action:
1. Disconnect the external air supply.
2. Prime the system again.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

124 Fluidics rotary vane fault.
Probable cause: Pump or drive circuit failure.
Corrective action:
1. Connect the external air supply.
2. Prime the system again.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
125 Fluidics pack valve error.
Probable cause: Valve or drive circuit failure.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. Eject the FUSION Fluidics pack.
6. Insert the FUSION Fluidics pack.
7. Insert a new FUSION Fluidics pack.
8. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

126 Fluidics motor vent error.
Probable cause: Vacuum chamber is blocked.
Corrective action:
1. Select End Case.
2. Select Next Case.
3. Replace the FUSION Fluidics pack.
4. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

129 Fluidics proportional valve fault.
Probable cause: Valve or drive circuit failure.
Corrective action:
1. Disconnect the external air supply.
2. Prime the system again.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
130 Fluidics encoder error.

Probable cause:
- There is a tubing pack loading problem.
- Encoder, decoder or stepper driver circuit failed.

Corrective action:
1. Select **End Case**.
2. Select **New Case**.
3. If the error does not clear select **End Case**.
4. Select **Shutdown**.
5. Select **Yes** and wait for the system to power off.
6. Start up the system.
7. Remove the tubing pack.
8. Reinstall the tubing pack.
10. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

131 Fluidics mode error

Probable cause:
- Instrument Host malfunction
- Bad SSC Board
- Bad Foot pedal

Corrective action:
1. Select **End Case**.
2. Select **Shutdown**.
3. Select **Yes** and wait for the system to power off.
4. Start up the system.
5. Disconnect the foot pedal from the system.
6. Connect the foot pedal to the system.
7. Press and release the foot pedal at least three times.
8. Run the **Self Test**.
9. Replace the foot pedal.
10. If the error is not corrected or if the error continues to occur, document the error message and contact AMO for technical service.
134 Fluidics drain pump rotational error.

Probable cause:
- There is a pack loading problem.
- There is an encoder, decoder circuit, or stepper driver circuit failure.

Corrective action:
1. Insert a new Dual Pump FUSION Fluidics pack.
2. Select Next Case and prime the system.
3. Replace the Dual Pump FUSION Fluidics pack with a FUSION pack.
4. Select Next Case and prime the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

135 Low external air pressure.

Probable cause:
- There is a leak in the external air line.
- The pressure regulator is set too low.
- The pressure sensor failed.

Corrective action:
1. Remove the tubing pack.
2. Check the o-ring for wear or damage.
3. Reinstall the tubing pack.
4. Reprime the system.
5. Disconnect external air supply.
6. Replace the Dual Pump FUSION Fluidics pack with a FUSION pack.
7. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
137 Foot pedal error.

Probable cause:
- The foot pedal has failed.
- The user pressed the foot pedal.

Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. Disconnect the foot pedal from the system.
6. Connect the foot pedal to the system.
7. Press and release the foot pedal at least three times.
8. Run the Self Test.
9. Replace the foot pedal.
10. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

148 Fluidics pack pressure error.

Probable cause: There is a leak.

Corrective action:
1. Reinsert the pack.
2. Prime the system.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

149 Fluidics strain gauge error.

Probable cause:
- The pack is not properly mounted.
- Bad strain gauge.

Corrective action:
1. Reinsert the pack.
2. Prime the system.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
151 Peristaltic pump stall.

**Probable Cause:** Encoder, Decoder, or Stepper driver is faulty.

**Corrective Action:**

1. Reinsert the pack.
2. Prime the system.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

201 Phaco communication error.

**Probable cause:** Bad data sent from the host or communication error.

**Corrective action:**

1. Check the handpiece connections.
2. Retune the handpiece.
3. If the error does not clear, select **End Case**.
4. Select **Shutdown**.
5. Select **Yes** and wait for the system to power off.
6. Start up the system.
7. Retune the handpiece.
8. If the error still does not clear, replace the handpiece with a new handpiece and tune the handpiece.
9. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
202 Phaco power error.
Probable cause: Hardware failure.
Corrective action:
1. Check the handpiece connections.
2. Retune the handpiece.
3. If the error does not clear, select End Case.
4. Select Shutdown.
5. Select Yes and wait for the system to power off.
6. Start up the system.
7. Retune the handpiece.
8. If the error still does not clear, replace the handpiece with a new handpiece and tune the handpiece.
9. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

203 Phaco handpiece error.
Probable cause: The handpiece is bad.
Corrective action:
1. Check the handpiece connections.
2. Retune the handpiece.
3. If the error does not clear, select End Case.
4. Select Shutdown.
5. Select Yes and wait for the system to power off.
6. Start up the system.
7. Retune the handpiece.
8. If the error still does not clear, replace the handpiece with a new handpiece and tune the handpiece.
9. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
204 Phaco handpiece error.
Probable cause: A wire in the handpiece is broken.
Corrective action:
1. Check the handpiece connections.
2. Retune the handpiece.
3. If the error does not clear, select End Case.
4. Select Shutdown.
5. Select Yes and wait for the system to power off.
6. Start up the system.
7. Retune the handpiece.
8. If the error still does not clear, replace the handpiece with a new handpiece and tune the handpiece.
9. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

206 Phaco controller ADC error.
Probable cause: Phaco controller ADC problem.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

207 Handpiece not supported.
Probable cause:
• Incompatible handpiece.
Corrective action:
1. Change to a different handpiece.
2. Tune the handpiece and continue surgery.
3. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
208 Handpiece error.

Probable cause:
• Hardware failure.
• The handpiece is shorting out.

Corrective action:
1. Check the handpiece connections
2. Retune the handpiece.
3. If the error does not clear, select End Case.
4. Select Shutdown.
5. Select Yes and wait for the system to power off.
6. Start up the system.
7. Retune the handpiece.
8. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
9. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

210 Phaco RAM error.

Probable cause: Bad Microcontroller.

Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
211 Phaco ROM error.
Probable cause: Bad Microcontroller.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

212 Phaco controller timeout.
Probable cause: Instrument Host failure or bad Microcontroller.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

213 SPI error.
Probable cause: SPI Microcontroller failure.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
214 SPI error.
Probable cause: SPI Microcontroller failure.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

281 Phaco communication error.
Probable cause: Software or hardware failure.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

283 Phaco error.
Probable cause: Phaco Drive failure.
Corrective action:
1. Check the handpiece connections.
2. Check the handpiece. Replace the tip if needed.
3. Retune the handpiece.
4. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
5. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
284 Phaco power supply error.
Probable cause: The power supply is bad.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

285 Loose tip error.
Probable cause: The tip is loose on the handpiece.
Corrective action:
1. Tighten the phaco tip and then retune the handpiece.
2. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
3. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

286 Phaco handpiece impedance error.
Probable cause: The handpiece is bad.
Corrective action:
1. Check the handpiece connections.
2. Select End Case.
3. Select Shutdown.
4. Select Yes and wait for the system to power off.
5. Start up the system.
6. Retune the handpiece.
7. Check the handpiece. Replace the tip if needed.
8. Retune the handpiece.
9. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
10. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
287 Diathermy error.

**Probable cause:** Diathermy Driver failure.

**Corrective action:**
1. Check the diathermy cord connections.
2. Select **End Case**.
3. Select **Shutdown**.
4. Select **Yes** and wait for the system to power off.
5. Start up the system.
6. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

290 Foot pedal error.

**Probable cause:**
- The foot pedal has failed.
- The user pressed the foot pedal.

**Corrective action:**
1. Check the foot pedal. Make sure the foot pedal is connected.
2. Select **End Case**.
3. Select **Shutdown**.
4. Select **Yes** and wait for the system to power off.
5. Start up the system.
6. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

291 Phaco Diathermy power supply error.

**Probable cause:** Diathermy regulator or driver failure.

**Corrective action:**
1. Select **End Case**.
2. Select **Shutdown**.
3. Select **Yes** and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
308 External air pressure high/low.
Probable Cause: There is a valve or drive circuit failure.
Corrective action:
1. Check air hose connections.
2. Select End Case.
3. Select Next Case.
4. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

309 Piston pump pressure high/low.
Probable cause: The pump or the drive circuit failed.
Corrective action:
1. Select End Case.
2. Select Next Case.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

311 Dump valve pressure high/low.
Probable cause:
• Piston pump not working.
• The VIT dump valve not closing.
Corrective action:
1. Select End Case.
2. Select Next Case.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
322 Pneumatics system pressure too low.

Probable cause:

- The system pressure is too low.
- The external air valve does not work.
- The piston pump does not work.
- There is a system air leak.
- The vitrectomy cut valve is on.

Corrective action:

1. Select End Case.
2. Select Next Case.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

327 Pneumatics system pressure too low.

Probable cause:

- The system pressure is too low.
- The external air valve does not work.
- The piston pump does not work.
- There is a system air leak.
- The selector valve does not work.
- The vitrectomy cut valve is on.

Corrective action:

1. Select End Case.
2. Select Next Case.
3. Check air hose connections.
4. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
328 Pneumatics system pressure too high.

Probable cause:

• The system pressure is too high.
• The external air valve does not work.
• The piston pump does not work.
• The selector valve does not work.

Corrective action:

1. Select End Case.
2. Select Next Case.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

352 IH Failure.

Probable cause: Hardware not functioning correctly.

Corrective action:

1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

353 IH to GUI communication error.

Probable cause: Software or hardware error.

Corrective action:

1. Select End Case.
2. Select Next Case.
3. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
360 IH Fluidics - read error.
Probable cause: Communication error.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

361 IH Fluidics - write error.
Probable cause: Communication error.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

362 IH Fluidics communication error.
Probable cause: Communication error.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
370 IH Phaco read error.
Probable cause: Communication error.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

371 IH Phaco write error.
Probable cause: Communication error.
Corrective action:
1. Select End Case.
2. Select Shutdown.
3. Select Yes and wait for the system to power off.
4. Start up the system.
5. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

374 Handpiece removed after being tuned.
Probable cause: Phaco handpiece removed.
Corrective action:
1. Attach the handpiece.
2. Tune the handpiece and continue surgery.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
**416 Foot pedal error.**

**Probable cause:**
- Foot pedal communication error.
- Could not open port.
- Too many wireless devices.
- Foot pedal battery too low.

**Corrective action:**
1. Check the wired or wireless connection to the system.
2. Wired Connection.
   - Disconnect and reconnect the foot pedal cable.
3. Wireless Connection
   - Wake up the foot pedal and allow the wireless to connect to the system.
   - If the foot pedal does not connect, pair the foot pedal to the system.
4. If the error does not clear, replace the cable or the foot pedal, and repeat steps 2 or 3.
5. If the error continues, select **End Case**, then **Shutdown**. Start up the system.
6. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

**419 Foot pedal communication error.**

**Probable cause:** Communication Error.

**Corrective action:**
1. Select **End Case**.
2. Select **Shutdown**.
3. Select **Yes** and wait for the system to power off.
4. Start up the system.
5. Check the foot pedal connection to the connector on the back of the system.
6. Make sure the wireless foot pedal is paired and has power.
7. Run the Foot Pedal Test.
8. Replace the foot pedal cable with a new foot pedal cable.
9. Replace the foot pedal with a new foot pedal.
10. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
420 Foot pedal battery too low.
**Probable cause:** Foot pedal battery too low to operate wireless.

**Corrective action:**

1. Connect the foot pedal to the system with the foot pedal cable to clear the error.
2. Continue with the current case once the error is cleared.

501 Prime excessive vacuum error.
**Probable cause:**
- The system does not prime.
- There is too much vacuum.

**Corrective action:**

1. Prime the system.
2. Reinstall the tubing pack and prime.
3. Check the handpiece. Replace the tip if needed.
4. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
5. If the error does not clear, replace the tubing pack with a new tubing pack and prime the system.
6. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

502 Prime low bottle height error.
**Probable cause:** The bottle is not at the proper height.

**Corrective action:**

1. Increase the bottle height.
2. Prime the system.
3. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
503 Prime low vacuum error.
Probable cause: Hardware failure.
Corrective action:
1. Remove the tubing pack.
2. Reinstall the tubing pack and reprime.
3. If the error does not clear, replace the tubing pack with a new tubing pack and prime the system.
4. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

506 Pack detect failure.
Probable cause: A pack switch failure.
Corrective action:
1. Remove the tubing pack.
2. Reinstall the tubing pack and reprime.
3. If the error does not clear, replace the tubing pack with a new tubing pack and prime the system.
4. If the error does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

512 IV Pole communications error.
Probable cause: Communication error.
Corrective action:
1. Prime the system.
2. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
513 IV Pole communications error.
Probable cause: Communication error.
Corrective action:
1. Prime the system.
2. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

514 IV Pole error.
Probable cause: Communication error.
Corrective action:
1. Prime the system.
2. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

515 IV Pole calibration error.
Probable cause: Communication error.
Corrective action:
1. Run Self Test.
2. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

516 IV Pole communication error.
Probable cause: Communication error.
Corrective action:
1. Prime the system.
2. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
517 IV Pole is jammed.

Probable cause:
• IV Pole motor failure.
• There is an obstruction that does not allow the IV pole to move.

Corrective action:
1. Check the IV pole for obstructions.
2. Prime the system.
3. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

601 Tune excessive vacuum error.

Probable cause: There is too much vacuum.

Corrective action:
1. Check tubing connections.
2. Check the handpiece. Replace the tip if needed.
3. Retune the handpiece.
4. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
5. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.

605 Tune no handpiece error.

Probable cause: Hardware failure.

Corrective action:
1. Attach handpiece to the system.
2. Retune the handpiece.
3. If the error still does not clear, replace the handpiece with a new handpiece, and tune the handpiece.
4. If the error still does not clear or if the error continues to occur, document the error message and contact AMO for technical service.
WARRANTY AND MAINTENANCE

Warranty Statement
Warranty Statement

Johnson & Johnson Surgical Vision, Inc. warrants for a period of one year (12 months) from the date of installation of the WHITESTAR SIGNATURE PRO System console, foot pedal, wireless remote control, the programmable power pole, and the phaco handpiece to be free from defects in materials and workmanship when properly installed, maintained, and used for the intended purpose. In no event shall the date of installation be deemed to occur later than six months from the date of delivery of the WHITESTAR SIGNATURE PRO System by Johnson & Johnson Surgical Vision, Inc. to the common carrier.

You are required to provide AMO with prompt written notice of any defect or defects and permit AMO to have access to the WHITESTAR SIGNATURE PRO System within a reasonable time after notification of any defect. In the event that you do not provide AMO with prompt notification of a defect or permit access to the WHITESTAR SIGNATURE PRO System within a reasonable time after notification, AMO is hereby released from all liability with reference to such defect and subsequent damage, if any, resulting from the inability of AMO to correct such defect.

MISUSE AND MISHANDLING ARE NOT COVERED UNDER WARRANTY. AMO’s sole obligation is to repair or replace, at AMO’s option, the defective part(s), which shall be returned freight prepaid to AMO by you and then returned to you freight collect once repaired or replaced.

The irrigation/aspiration handpiece set, diathermy forceps and diathermy cord are warranted for ninety (90) days.

This warranty applies only to the original purchaser/user of the device and may not be transferred. This warrant will be void if and only so long as the equipment is used in any country other than the country to which it was originally shipped by AMO.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL AMO BE LIABLE TO THE PURCHASER/USER FOR CONSEQUENTIAL, SPECIAL, INCIDENTAL, OR PUNITIVE DAMAGES, LOSS OF PROFITS OR LOSS OF USE. The liability of AMO for breach of this warranty shall, in any case, be limited to the total amount paid by you for the WHITESTAR SIGNATURE PRO System furnished by AMO and any work performed by AMO in connection therewith.

Extended Warranty

Extended warranty contracts (excluding the phaco handpiece) are available. Contact AMO for information on the availability of an extended warranty contract.

Note: If outside the United States, contact your local AMO office or representative for warranty information.
Maintenance

User maintenance of the WHITESTAR SIGNATURE PRO System is only for those adjustments and corrective actions in the Error Messages and Troubleshooting, and Diagnostics sections of this manual. There are no user serviceable components within the console and you must not attempt to access the internal components. Any attempt to do so will void the warranty.

AMO recommends, at least annually, routine or periodic maintenance of the WHITESTAR SIGNATURE PRO System by an AMO representative. AMO recommends the measurement of PE resistance and leakage current according to IEC 601-1 every two years.

If a problem continues following setup, check-out and troubleshoot as per the procedures in this manual, then contact AMO for corrective action (1-877-266-4543 in USA 1-877-266-4543 or 1-800-511-0911 for outside the USA).
## SPECIFICATIONS

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<td>Diathermy Specifications</td>
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<td>Diathermy Power Graphs</td>
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<td>Diathermy Power versus Load Impedance</td>
</tr>
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<td>Phaco Power Graphs</td>
</tr>
<tr>
<td>Phaco Tip Velocity</td>
</tr>
<tr>
<td>Bottle Height Pressure</td>
</tr>
</tbody>
</table>
### Physical Specifications

#### Table 10.1 – System Physical Specifications

<table>
<thead>
<tr>
<th></th>
<th>English / U.S.</th>
<th>Metric:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHITESTAR SIGNATURE PRO System Console</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Console dimensions (with display)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>24 inches</td>
<td>61 cm</td>
</tr>
<tr>
<td>Depth</td>
<td>24 inches</td>
<td>61 cm</td>
</tr>
<tr>
<td>Height</td>
<td>59 inches</td>
<td>150 cm</td>
</tr>
<tr>
<td>Electrical enclosure current leakage</td>
<td></td>
<td>IEC 60601-1 compliance</td>
</tr>
<tr>
<td>Weight (including IV pole)</td>
<td>185 pounds</td>
<td>84 kg</td>
</tr>
</tbody>
</table>

**Foot Pedal**

**Single Linear Foot Pedal**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Width</th>
<th>12 inches</th>
<th>31 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>10.5 inches</td>
<td>27 cm</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>5.5 inches</td>
<td>14 cm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>10.0 pounds</td>
<td>4.5 kg</td>
<td></td>
</tr>
</tbody>
</table>

**Advanced Control Pedal**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Width</th>
<th>10.5 inches</th>
<th>27 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>14 inches</td>
<td>36 cm</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>5.5 inches</td>
<td>14 cm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>15 pounds</td>
<td>7 kg</td>
<td></td>
</tr>
</tbody>
</table>

**Advance Linear Pedal**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Width</th>
<th>9.82 inches</th>
<th>25 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>15.57 inches</td>
<td>39.6 cm</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>4.88 inches</td>
<td>12.4 cm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>13 pounds</td>
<td>5 kg</td>
<td></td>
</tr>
</tbody>
</table>

**Programmable IV Pole**

<table>
<thead>
<tr>
<th>Maximum travel</th>
<th>41 inches</th>
<th>106 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity</td>
<td>2.4 inches/sec</td>
<td>6 cm/sec.</td>
</tr>
<tr>
<td>Maximum lift weight</td>
<td>2.43 pounds</td>
<td>1.1 kg</td>
</tr>
</tbody>
</table>

**Wireless Remote Control**

<table>
<thead>
<tr>
<th>Width</th>
<th>5 inches</th>
<th>13 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>5 inches</td>
<td>13 cm</td>
</tr>
<tr>
<td>Height</td>
<td>1.5 inches</td>
<td>4 cm</td>
</tr>
<tr>
<td>Weight</td>
<td>2.0 pounds</td>
<td>.9 kg</td>
</tr>
</tbody>
</table>
Table 10.2 – System Cables

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Manufacturer Part Number</th>
<th>Description</th>
<th>Maximum Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMO</td>
<td>2410-0049-L</td>
<td>Power cord, hospital grade, 20 ft., 6.1 meters</td>
<td>6.1 meter</td>
</tr>
<tr>
<td>AMO</td>
<td>0100-0055</td>
<td>Cable Assy, <strong>WHITESTAR</strong> Series Foot Pedal</td>
<td>3.7 meter</td>
</tr>
<tr>
<td>AMO</td>
<td>0100-6303</td>
<td>Cable Assy, Advanced Linear Foot Pedal to Console, Signature</td>
<td>3.7 meter</td>
</tr>
<tr>
<td>AMO</td>
<td>690697</td>
<td><strong>WHITESTAR</strong> Phaco Handpiece, Coaxial</td>
<td>2.2 meter</td>
</tr>
<tr>
<td>AMO</td>
<td>690880</td>
<td><strong>ELLIPS FX</strong> Phaco Handpiece</td>
<td>2.2 meter</td>
</tr>
<tr>
<td>AMO</td>
<td>SCP680600</td>
<td>Diathermy Cord</td>
<td>3.6 meter</td>
</tr>
</tbody>
</table>

Table 10.3 – Environmental Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Operating Temperature</th>
<th>Humidity</th>
<th>Ambient Pressure</th>
<th>Storage Temperature</th>
<th>Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Specifications</td>
<td>10 to 40°C</td>
<td>Up to 95% RH, non-condensing</td>
<td>See Vitrectomy Specifications for additional information.</td>
<td>-20 to 60°C</td>
<td>Up to 95% RH, non-condensing</td>
</tr>
</tbody>
</table>

Table 10.4 – Electrical Specifications

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Frequency</th>
<th>Rated Power</th>
<th>Fuse Rating</th>
<th>Enclosure Current Leakage</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>100-240 Vac</td>
<td>50-60 Hz</td>
<td>750 VA</td>
<td>6.3A, 250V, Bussman GDA</td>
</tr>
</tbody>
</table>
Guidance and manufacturer's declaration - electromagnetic emissions

The WHITESTAR SIGNATURE PRO System is intended for use in the electromagnetic environment specified below. The customer or the user of the WHITESTAR SIGNATURE PRO System should assure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Emissions Test</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF emissions CISPR 11</td>
<td>Group 1</td>
</tr>
<tr>
<td>RF emissions CISPR 11</td>
<td>Class A</td>
</tr>
<tr>
<td>Harmonic emissions IEC 61000-3-2</td>
<td>Class A</td>
</tr>
<tr>
<td>Voltage Fluctuations/ Flicker emissions</td>
<td>Complies</td>
</tr>
</tbody>
</table>

The WHITESTAR SIGNATURE PRO System 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.
**Table 10.6 – Electromagnetic Immunity**

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD)</td>
<td>±6 kV contact ±8 kV air</td>
<td>±2 kV contact ±8 kV air (*)</td>
<td>Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.</td>
</tr>
<tr>
<td>Electrical fast transient/burst</td>
<td>±2 kV for power supply lines ±1 kV for input/output lines</td>
<td>±2 kV for power supply lines ±1 kV for input/output lines</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>ElectroSurge</td>
<td>±1 kV differential mode ±2 kV common mode</td>
<td>±1 kV differential mode ±2 kV common mode</td>
<td>Mains power quality should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Voltage dips, short interruptions, and voltage variations on power supply input lines</td>
<td>&lt;5% UT (&gt;95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles &lt;5% UT (&gt;95% dip in UT) for 5 sec</td>
<td>&lt;5% UT (&gt;95% dip in UT) for 0.5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles &lt;5% UT (&gt;95% dip in UT) for 5 sec</td>
<td>Mains power quality should be that of a typical commercial or hospital environment. If the user of the WHITESTAR SIGNATURE PRO System requires continued operation during power mains interruptions, it is recommended that the WHITESTAR SIGNATURE PRO System be powered from an uninterruptible power supply or a battery.</td>
</tr>
<tr>
<td>(50/60 Hz) magnetic field</td>
<td>3 A/m</td>
<td>3 A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.</td>
</tr>
</tbody>
</table>

Note: UT is the a.c. mains voltage prior to application of the test level.

(*) When ±2 kV, ±4 kV & 6 kV contact discharge were applied to all metal parts of the ACP & ALP Foot Pedal, performance interruption occurred. ACP Foot Pedal loses communication to the system. It requires user intervention to recover all its function without losing stored data. Per client declaration it is an acceptable performance criteria. Below is client justification for the observed EUT performance. Foot pedals (wireless & wired mode): If the wireless connection is lost during surgery, the console will be placed into a safe state, causing the surgical procedure to halt. Upon reconnection of the foot pedal cable, the error is removed and the procedure can recommence.
Table 10.7 – Electromagnetic Immunity

<table>
<thead>
<tr>
<th>Immunity test</th>
<th>IEC 60601 test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment - guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducted RF</td>
<td>IEC 61000-4-6</td>
<td>3 Vrms</td>
<td>3 Vrms</td>
</tr>
<tr>
<td></td>
<td>150 kHz to 80 MHz</td>
<td></td>
<td>Recommended separation distance:</td>
</tr>
<tr>
<td>Radiated RF</td>
<td>IEC 61000-4-3</td>
<td>3 V/m</td>
<td>3 V/m</td>
</tr>
<tr>
<td></td>
<td>80 MHz to 2.5 GHz</td>
<td></td>
<td>where $P$ is the maximum output power</td>
</tr>
</tbody>
</table>

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

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

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 WHITESTAR SIGNATURE PRO System is used exceeds the applicable RF compliance level above, the WHITESTAR SIGNATURE PRO System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the WHITESTAR SIGNATURE PRO System.

Interference may occur in the vicinity of equipment marked with the following symbol:

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

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

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 WHITESTAR SIGNATURE PRO System is used exceeds the applicable RF compliance level above, the WHITESTAR SIGNATURE PRO System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the WHITESTAR SIGNATURE PRO System.

Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V/m.
Table 10.8 – Separation Distances

Recommended separation distances between portable and mobile RF communications equipment and the WHITESTAR SIGNATURE PRO System

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

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter W</th>
<th>Separation distance according to frequency of transmitter m</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 kHz to 80 MHz</td>
<td>80 MHz to 800 MHz</td>
</tr>
<tr>
<td>0.01</td>
<td>0.12</td>
</tr>
<tr>
<td>0.1</td>
<td>0.37</td>
</tr>
<tr>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>10</td>
<td>3.7</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
</tr>
</tbody>
</table>

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 power rating of the transmitter in watts (W) according to the transmitter manufacturer.

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

These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.
### RF Wireless Technology

**Table 10.9 – RF Wireless Technology Used on the WHITESTAR SIGNATURE PRO System**

<table>
<thead>
<tr>
<th>Devices</th>
<th>RF Wireless Technology</th>
<th>Part Number</th>
<th>Operating Frequencies</th>
<th>Operating Distances</th>
<th>Industry Standard</th>
<th>Device System Wireless Functions, Capabilities, and Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGP680703 WHITESTAR SIGNATURE PRO Advanced Linear Pedal (ALP)*</td>
<td>BLUETOOTH Low Energy (two individual chips)</td>
<td>Texas Instruments CC2541F256RHAT</td>
<td>2.402 to 2.480 GHz, Adaptive Frequency Hopping GFSK (Gaussian Frequency-Shift Keying) over 37 Channels 2 MHz apart, 3 advertising Channels</td>
<td>Class 2 - 3 meters</td>
<td>BLUETOOTH Specification version 4.0 FCC CFR47, Part 15, sections 15.205, 15.209, 15.247 and 15.249</td>
<td>ALP Wireless Technology: Wirelessly and uniquely connects the ALP to the console to facilitate full functional control of the WHITESTAR SIGNATURE PRO System the same as if connected by cord. Function is limited to a 3 meter range. The ALP is a BLUETOOTH 4.0 (BLUETOOTH Low Energy) device that utilizes two TI CC2541 chips that communicates with the console through a transceiver that also utilizes two CC2541 chips. <strong>Functional ability:</strong> Consists of four programmable switches and a treadle that allows the operator to activate different functionalities at its corresponding pitch zone. <strong>Limitations during device operation:</strong> The device must be used within the specified operating range.</td>
</tr>
<tr>
<td>Devices</td>
<td>RF Wireless Technology</td>
<td>Part Number</td>
<td>Operating Frequencies</td>
<td>Operating Distances</td>
<td>Industry Standard</td>
<td>Device System Wireless Functions, Capabilities, and Limitations</td>
</tr>
<tr>
<td>---------</td>
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<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>NGP680701 \nWHITESTAR SIGNATURE ACP*</td>
<td>BLUETOOTH 2.0 (three individual chips, two for foot pedal, one for remote)</td>
<td>Texas Instruments LMX9830SMM/ NOPB</td>
<td>2.402 to 2.480 GHz, Adaptive Frequency Hopping over 79 Channels, 1 MHz Apart</td>
<td>Class 2 - 3 meters</td>
<td>BLUETOOTH Specification version 2.0 + EDR</td>
<td>ACP Wireless Technology: Wirelessly and uniquely connects the ACP to the console to facilitate full functional control of the WHITESTAR SIGNATURE PRO System the same as if connected by cord. Function is limited to a 3 meter range. The ACP is a BLUETOOTH 2.0 device that utilizes two TI LMX9838 BLUETOOTH modules, which communicate with the console through a wireless transceiver that utilizes two TI LMX9830 BLUETOOTH modules. Functional ability: The ACP consists of several linear controls and digital switches to activate different functionalities at its corresponding pitch zone. Limitations during device operation: The device must be used within the specified operating range.</td>
</tr>
<tr>
<td>and \nNGP680137 \nWHITESTAR SIGNATURE PRO Remote Control*</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Remote Control Wireless Technology:** Wirelessly and uniquely connects the Remote Control to the console to navigate the GUI display. Function is limited to a 3 meter range.
The remote control is powered with an internal rechargeable NiMH battery, and has a BLUETOOTH 2.0 device that utilizes a TI LMX9830 BLUETOOTH module for its RF communication. It communicates with the system via a BLUETOOTH dongle residing in the system, which also utilizes a LMX9830 BLUETOOTH module.

The remote control is an accessory that provides an alternative method for the operator to navigate through the different surgical modes, set various parameters, and perform IV pole height adjustment.

**Functional ability:** The Remote Control consists of 12 buttons with their functionality described below:
- IV Pole Up/Down: IV pole height adjustment.
- Mode: for operator to select preprogrammed surgeon mode.
- Navigator Up, Down, Left, Right, and Enter: navigate to access different functional icons on the screen within the surgical mode.
- Up, Down, Enter: for operator to navigate to desired surgical mode.
- Back-light: for operator to turn on Remote control back-light.

**Limitations during device operation:** The device must be used within the specified operating range.

<table>
<thead>
<tr>
<th>Devices</th>
<th>RF Wireless Technology</th>
<th>Part Number</th>
<th>Operating Frequencies</th>
<th>Operating Distances</th>
<th>Industry Standard</th>
<th>Device System Wireless Functions, Capabilities, and Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Devices</td>
<td>RF Wireless Technology</td>
<td>Part Number</td>
<td>Operating Frequencies</td>
<td>Operating Distances</td>
<td>Industry Standard</td>
<td>Device System Wireless Functions, Capabilities, and Limitations</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------------------------</td>
<td>---------------------</td>
<td>-----------------------</td>
<td>---------------------</td>
<td>------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>NGP680301</td>
<td>Wireless PCIe-M Card 802.11b/g/n</td>
<td>Advantech EWM-W142H01E</td>
<td>2.4 to 2.483 GHz, DSSS and OFDM modulation over 16 Channels 5MHz apart</td>
<td>Up to 3 meters</td>
<td>IEEE 802.11N-2009</td>
<td>Console Wireless Technology: The WHITESTAR SIGNATURE PRO Phacoemulsification System console downloads surgery case data via Wi-Fi to iPad for formatting/ printing/ presentation. The system has a Wi-Fi adapter that allows the surgical data to be downloaded to an iPad with our proprietary application, using IEEE 802.11 b/g/n standard. Functional ability: it provides the operator with an ability to download data from the system to an iPad. Please note that the console does not store any patient information. The iPad connection to the system is password-protected and data flow is unidirectional from the console to the iPad. Limitations during device operation: The device must be used within the specified operating range.</td>
</tr>
</tbody>
</table>

* All devices are on the 2.4 GHz ISM band.
## Table 10.10 – Wireless Technologies Used for Each of the Wireless Devices

<table>
<thead>
<tr>
<th>Devices</th>
<th>RF Wireless Technology</th>
<th>Operating Distances</th>
<th>Quality of Service and Security</th>
<th>Device System Wireless Function, Capabilities, and Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGP680703 WHITESTAR SIGNATURE PRO Advanced Linear Pedal (ALP)*</td>
<td>BLUETOOTH Low Energy (two individual chips)</td>
<td>Class 2 - 3 meters</td>
<td>In addition to the inherent data integrity by using the BLUETOOTH technology, the system design also incorporated redundant BLUETOOTH channels (2 channels) to further improve the quality of service for this wireless device, and reduce the chance of losing wireless connection between the foot pedal and the console. The wireless communication is secured by BLUETOOTH encrypted data technology.</td>
<td>ALP Wireless Technology: Wirelessly and uniquely connects the ALP to the console to facilitate full functional control of the WHITESTAR SIGNATURE PRO System the same as if connected by cord. Function is limited to a 3 meter range. The ALP is a BLUETOOTH 4.0 (BLUETOOTH Low Energy) device that utilizes two TI CC2541 chips that communicates with the console through a transceiver that also utilizes two CC2541 chips. Functional ability: Consists of four programmable switches and a treadle that allows the operator to activate different functionalities at its corresponding pitch zone. Limitations during device operation: The device must be used within the specified operating range.</td>
</tr>
<tr>
<td>NGP680701 WHITESTAR SIGNATURE Advanced Control Pedal (ACP)*</td>
<td>BLUETOOTH 2.0 (two individual chips)</td>
<td>Class 2 - 3 meters</td>
<td>In addition to the inherent data integrity by using the BLUETOOTH technology, the system design also incorporated redundant BLUETOOTH channels (2 channels) to further improve the quality of service for this wireless device, and reduce the chance of losing wireless connection between the foot pedal and the console. The wireless communication is secured by BLUETOOTH encrypted data technology.</td>
<td>ACP Wireless Technology: Wirelessly and uniquely connects the ACP to the console to facilitate full functional control of the WHITESTAR SIGNATURE PRO System the same as if connected by cord. Function is limited to a 3 meter range. The ACP is a BLUETOOTH 2.0 device that utilizes two TI LMX9838 BLUETOOTH modules, which communicate with the console through a wireless transceiver that utilizes two TI LMX9830 BLUETOOTH modules. Functional ability: The ACP consists of several linear control and digital switches to activate different functionalities at its corresponding pitch zone. Limitations during device operation: The device must be used within the specified operating range.</td>
</tr>
<tr>
<td>Devices</td>
<td>RF Wireless Technology</td>
<td>Operating Distances</td>
<td>Quality of Service and Security</td>
<td>Device System Wireless Function, Capabilities, and Limitations</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------</td>
<td>---------------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>NGP680137 WHITESTAR SIGNATURE PRO Remote Control*</td>
<td>BLUETOOTH 2.0 (one chip)</td>
<td>Class 2 - 3 meters</td>
<td>The quality of service is ensured by the BLUETOOTH technology. The WHITESTAR SIGNATURE PRO System uses the touchscreen as the primary user interface device. In the rare event of losing communication between the remote control and the console, the user can continue to operate all system functions by using the touchscreen. The wireless communication is secured by BLUETOOTH encrypted data technology.</td>
<td>Remote Control Wireless Technology: Wirelessly and uniquely connects the Remote Control to the console to navigate the GUI display. Function is limited to a 3 meter range. The remote control is powered with an internal rechargeable NiMH battery, and has a BLUETOOTH 2.0 device that utilizes a TI LMX9830 BLUETOOTH module for its RF communication. It communicates with the system via a BLUETOOTH dongle residing in the system, which also utilizes a LMX9830 BLUETOOTH module. The remote control is an accessory that provides an alternative method for the operator to navigate through the different surgical modes, set various parameters, and perform IV pole height adjustment. Functional ability: The Remote Control consists of 12 buttons with their functionality described below: • IV Pole Up/Down: IV pole height adjustment. • Mode: for operator to select preprogrammed surgeon mode. • Navigator Up, Down, Left, Right, and Enter: navigate to access different functional icons on the screen within the surgical mode. • Up, Down, Enter: for operator to navigate to desired surgical mode. • Back-light: for operator to turn on Remote control back-light. Limitations during device operation: The device must be used within the specified operating range.</td>
</tr>
</tbody>
</table>
**WHITESTAR SIGNATURE PRO System**

### Device System Wireless Function, Capabilities, and Limitations

<table>
<thead>
<tr>
<th>Devices</th>
<th>RF Wireless Technology</th>
<th>Operating Distances</th>
<th>Quality of Service and Security</th>
<th>Device System Wireless Function, Capabilities, and Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGP680301 WHITESTAR SIGNATURE PRO Console*</td>
<td>Wireless PCIe-M Card 802.11b/g/n</td>
<td>Up to 3 meters</td>
<td>The quality of service is ensured by the Wi-Fi technology. Downloading data from the WHITESTAR SIGNATURE PRO System to the iPad application does not interfere with system surgical functions. In the rare event of losing communication between the iPad and the console while downloading data, the application will notify the user to retry. The wireless communication is secured by Wi-Fi connection password.</td>
<td>Console Wireless Technology: The WHITESTAR SIGNATURE PRO Phacoemulsification System console downloads surgery case data via Wi-Fi to iPad for formatting/printing/presentation. The system has a Wi-Fi adapter that allows the surgical data to be downloaded to an iPad with our proprietary application, using IEEE 802.11 b/g/n standard Functional ability: The Wi-Fi adapter provides the operator with an ability to download data from the system to an iPad. Please note that the console does not store any patient information. The iPad connection to the system is password-protected and data flow is unidirectional from the console to the iPad. Limitations during device operation: The device must be used within the specified operating range.</td>
</tr>
</tbody>
</table>

* All devices are on the 2.4 GHz ISM band.

### Phacoemulsification Specifications

<table>
<thead>
<tr>
<th></th>
<th>table 10.11 – Phacoemulsification Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phaco Power</td>
<td>1%-5% in 1% increments, 5-100%, in 5% increments</td>
</tr>
<tr>
<td>Peristaltic Pump Vacuum Level</td>
<td>0–650 mmHg in 5 mmHg increments</td>
</tr>
<tr>
<td>Peristaltic Pump Pump Flow Rate</td>
<td>10-60 cc/minute</td>
</tr>
<tr>
<td>Venturi Pump Vacuum Level</td>
<td>0-600 mmHg in 5 mmHg increments</td>
</tr>
</tbody>
</table>

### Irrigation and Aspiration Specifications

<table>
<thead>
<tr>
<th></th>
<th>Table 10.12 – Irrigation and Aspiration Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peristaltic Pump Vacuum Level</td>
<td>0–650 mmHg in 5 mmHg increments</td>
</tr>
<tr>
<td>Pump Flow</td>
<td>0-60 cc/minute</td>
</tr>
<tr>
<td>Venturi Pump Vacuum Level</td>
<td>0-600 mmHg in 5 mmHg increments</td>
</tr>
</tbody>
</table>

### Vitrectomy Specifications

<table>
<thead>
<tr>
<th></th>
<th>Table 10.13 – Vitrectomy Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peristaltic Pump Vacuum Level</td>
<td>0–650 mmHg in 5 mmHg increments</td>
</tr>
</tbody>
</table>
### Diathermy Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Flow Rate</td>
<td>0-60 cc/minute, in 1 cc increments</td>
</tr>
<tr>
<td>Venturi Pump</td>
<td>Vacuum Level: 0-600 mmHg in 5 mmHg increments</td>
</tr>
<tr>
<td>ATMOSPHERIC PRESSURE/ALTITUDE</td>
<td>Density Altitude (DA) conditions are 2,500 cpm from sea level to 3,000 feet (914.4 m) elevation and shall be de-rated by 100 cpm per 1,000 ft (304.8 m) additional elevation up to a maximum of 10,000 ft above sea level.</td>
</tr>
<tr>
<td>Indicated Cut Rate Actual Cut Rate</td>
<td>Actual Cut Rate Upper Limit (cpm) 3000  Actual Cut Rate Lower Limit (cpm) 2000</td>
</tr>
<tr>
<td>Power Adjustment</td>
<td>5% to 100%, in 5% increments</td>
</tr>
<tr>
<td>Diathermy Power (maximum power into rated load)</td>
<td>8.5 Watts into 350 Ohms 386 kHz</td>
</tr>
<tr>
<td>Diathermy Type</td>
<td>Bipolar</td>
</tr>
<tr>
<td>Rated Peak Voltage</td>
<td>160 Volts</td>
</tr>
<tr>
<td>Connector of diathermy forcep/probe</td>
<td>Ø.072 RECEPTACLE (2)</td>
</tr>
</tbody>
</table>

All measurements are in inches.
Diathermy Power

Graphs

Figure 10.1 – Diathermy Output Power (Typical) 10 Ohm

![Graph 10 Ohms](image1)

Y Axis = Watts  
X Axis = Settings

Figure 10.2 – Diathermy Output Power (Typical) 50 Ohm

![Graph 50 Ohms](image2)

Y Axis = Watts  
X Axis = Settings
Figure 10.3 – Diathermy Output Power (Typical) 200 Ohm

Figure 10.4 – Diathermy Output Power (Typical) 350 Ohm
Figure 10.5 – Diathermy Output Power (Typical) 500 Ohm

![Graph showing diathermy output power at 500 Ohms.](image1)

Y Axis = Watts
X Axis = Settings

Figure 10.6 – Diathermy Output Power (Typical) 1000 Ohm

![Graph showing diathermy output power at 1000 Ohms.](image2)

Y Axis = Watts
X Axis = Settings
Diathermy Power versus Load Impedance

Figure 10.7 – Diathermy Output Power (50% Setting)

![Graph showing diathermy output power at 50% setting]

Y Axis = Watts  X Axis = Impedance (Ohms)

Figure 10.8 – Diathermy Output Power (100% Setting)

![Graph showing diathermy output power at 100% setting]

Y Axis = Watts  X Axis = Impedance (Ohms)
Phaco Power Graphs

Figure 10.9 – Longitudinal Phaco Power

Y Axis = Output Power (Watts)  
X Axis = GUI Settings %

Figure 10.10 – ELLIPS FX Phaco Power Linear Mode

Y Axis = Power (Watts)  
X Axis = GUI Settings %
**Phaco Tip Velocity**  
Nominal Velocity for the ELLIPS FX handpiece and the WHITESTAR handpiece at 100% power, continuous, with the OPOR3020L phaco tip is shown in the following table.

<table>
<thead>
<tr>
<th>Handpiece</th>
<th>Nominal Longitudinal Velocity (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELLIPS FX (690880 (A))</td>
<td>8.85</td>
</tr>
<tr>
<td>WHITESTAR (690697 (A))</td>
<td>11.13</td>
</tr>
</tbody>
</table>

**Bottle Height Pressure**  
The WHITESTAR SIGNATURE PRO System has a built in IV pole to generate positive pressure using balanced salt solution to provide positive irrigation fluid.  
Measurement points:
- All measurements are taken with a pressure meter at the same height as the pressure sensor in the WHITESTAR SIGNATURE PRO System.
- This position is defined as 41 inches or 101.6 cm from the floor.

1. Center of Drip Chamber  
2. Center of pressure sensor is 41 inches or 104.2 cm from the floor
An IV bottle height reported as 0 cm includes an offset of 7.9 inches or 20 cm to make sure that a positive pressure is always provided.

Table 10.15 – Expected Pressure as a function of Bottle Height

<table>
<thead>
<tr>
<th>Bottle Height cm</th>
<th>Theoretical Pressure mmHg</th>
<th>Corrected Pressure At Patient Eye Level mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00</td>
<td>14.80</td>
</tr>
<tr>
<td>20</td>
<td>14.80</td>
<td>29.60</td>
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<tr>
<td>40</td>
<td>29.60</td>
<td>44.40</td>
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<tr>
<td>60</td>
<td>44.40</td>
<td>59.20</td>
</tr>
<tr>
<td>80</td>
<td>59.20</td>
<td>74.00</td>
</tr>
<tr>
<td>100</td>
<td>74.00</td>
<td>88.80</td>
</tr>
<tr>
<td>105</td>
<td>77.70</td>
<td>92.50</td>
</tr>
</tbody>
</table>
ACCESSORIES AND PARTS REORDERING

Accessories and Parts List
List of Accessories with Part Numbers

The following table is a list of accessories that you can use to reorder parts for your WHITESTAR SIGNATURE PRO System. Your AMO representative can advise you of recommended inventory levels based your facility's volume of phacoemulsification procedures. You can order any of the items listed below through your AMO representative or directly through AMO customer service. Your AMO representative can confirm the availability of these items in your area.

Table 11.2 – Accessories and Parts List

<table>
<thead>
<tr>
<th>System Accessories</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phaco Handpiece</td>
<td>690697</td>
<td>WHITESTAR Phaco Handpiece, Coaxial</td>
</tr>
<tr>
<td></td>
<td>690880</td>
<td>ELLIPS FX Phaco Handpiece</td>
</tr>
<tr>
<td></td>
<td>OPOR0019L</td>
<td>19 Gauge LAMINAR Flow Phaco Tip, 0° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOR1519L</td>
<td>19 Gauge LAMINAR Flow Phaco Tip, 15° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOR3019L</td>
<td>19 Gauge LAMINAR Flow Phaco Tip, 30° Round Tip</td>
</tr>
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<td></td>
<td>OPOR4519L</td>
<td>19 Gauge LAMINAR Flow Phaco Tip, 45° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOR0020L</td>
<td>20 Gauge LAMINAR Flow Phaco Tip, 0° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOR1520L</td>
<td>20 Gauge LAMINAR Flow Phaco Tip, 15° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOR3020L</td>
<td>20 Gauge LAMINAR Flow Phaco Tip, 30° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOR4520L</td>
<td>20 Gauge LAMINAR Flow Phaco Tip, 45° Round Tip</td>
</tr>
<tr>
<td></td>
<td>OPOCR3019L</td>
<td>Disposable LAMINAR Flow Phaco Tip, 19 Gauge, 30° Curved</td>
</tr>
<tr>
<td></td>
<td>OPOCR3020L</td>
<td>Disposable LAMINAR Flow Phaco Tip, 20 Gauge, 30° Curved</td>
</tr>
<tr>
<td></td>
<td>OPOS19L</td>
<td>19 Gauge LAMINAR Flow Irrigation Sleeve and Test Chamber</td>
</tr>
<tr>
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<td>OPOS20L</td>
<td>20 Gauge LAMINAR Flow Infusion Sleeve and Test Chamber</td>
</tr>
<tr>
<td></td>
<td>OPOMTWL</td>
<td>LAMINAR Flow Tip Wrench</td>
</tr>
<tr>
<td>I/A Handpiece</td>
<td>OPOIA20CRV</td>
<td>SOLO I/A Handpiece, 20 Ga., Curved Silicone Sleeve Tip</td>
</tr>
<tr>
<td></td>
<td>OPOIA2045D</td>
<td>SOLO I/A Handpiece, 20 Ga., 45° Silicone Sleeve Tip</td>
</tr>
<tr>
<td></td>
<td>OPOIA20STR</td>
<td>SOLO I/A Handpiece, 20 Ga., Straight Silicone Sleeve Tip</td>
</tr>
<tr>
<td></td>
<td>OPOIA20KIT</td>
<td>SOLO I/A Handpiece Kit</td>
</tr>
<tr>
<td></td>
<td>OM055002</td>
<td>PHACOFIT Titanium Handle</td>
</tr>
<tr>
<td></td>
<td>OM05510110</td>
<td>PHACOFIT I/A Tip Curved 0.5 mm Port</td>
</tr>
<tr>
<td>System Accessories</td>
<td>Part Number</td>
<td>Description</td>
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<td>-------------------</td>
<td>-------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>OM05510112</td>
<td>PHACOFIT O-Ring's I/A Tip (5PK)</td>
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<tr>
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<td>OM05510113</td>
<td>PHACOFIT Titanium, Multi-Tip Set</td>
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<td>OM05510114</td>
<td>PHACOFIT Cleaning/Flushing Kit</td>
</tr>
<tr>
<td></td>
<td>OM05510115</td>
<td>PHACOFIT Tip, Luer Adapter (Aspiration)</td>
</tr>
<tr>
<td></td>
<td>OM05510116</td>
<td>PHACOFIT Tip, 45 Degree Silicone (No Sleeve)</td>
</tr>
<tr>
<td></td>
<td>OM05510117</td>
<td>PHACOFIT I/A Tip Straight 0.3 MM Port</td>
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<td>OM05510118</td>
<td>PHACOFIT I/A Tip Curved 0.3 mm Port</td>
</tr>
<tr>
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<td>OM05510119</td>
<td>PHACOFIT I/A Tip 45 Degree 0.3 mm Port</td>
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<td>OM05510120</td>
<td>PHACOFIT I/A Tip 90 Degree 0.3 mm Port</td>
</tr>
<tr>
<td></td>
<td>OM05510121</td>
<td>PHACOFIT I/A Tip Binkhorst 0.3 mm Port</td>
</tr>
<tr>
<td></td>
<td>OM05510122</td>
<td>PHACOFIT I/A Tip Straight SI 0.3 mm Port</td>
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<tr>
<td></td>
<td>OM05510123</td>
<td>PHACOFIT I/A Luer Adapter, F/F</td>
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<td>OM05510124</td>
<td>PHACOFIT I/A Tip Curved, SI, 0.3 mm Port</td>
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<td>PHACOFIT I/A Tip Straight 0.5 MM Port</td>
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<td>PHACOFIT Athlete I/A Tip Straight Type</td>
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<td>PHACOFIT Athlete I/A Tip 45 Degree Type</td>
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<td>DU02020</td>
<td>DUET STARTER KIT, 20GA</td>
</tr>
<tr>
<td></td>
<td>DU02100</td>
<td>DUET ASPIRATION HANDLE</td>
</tr>
<tr>
<td></td>
<td>DU02200</td>
<td>DUET IRRIGATION HANDLE</td>
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<td>DUET 19G FINE IRRIGATING CHOPPER</td>
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<td>SCP680600</td>
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<td>Bipolar Forceps, Curved Iris 0.5 mm Tip</td>
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<td>K147000</td>
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<td>18 Gauge Straight Diathermy Pencil, reusable</td>
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<td><strong>FUSION Pack</strong></td>
<td>OPO70</td>
<td>FUSION Pack (disposable, sterile)</td>
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<td>OPO71</td>
<td>FUSION Dual Pump Pack (disposable, sterile)</td>
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<td>NGP680702</td>
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