

**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.



# 9

## WARRANTY AND MAINTENANCE

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Warranty Statement

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**Warranty Statement**

Abbott Medical Optics 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 Abbott Medical Optics 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-AMO-4-LIFE in USA 1-877-266-4543 or 1-800-511-0911 for outside the USA).



# 10

## SPECIFICATIONS

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Physical Specifications

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Vitrectomy Specifications

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Diathermy Specifications

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Diathermy Power versus Load Impedance

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Phaco Power Graphs

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Phaco Tip Velocity

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Bottle Height Pressure

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**Physical Specifications**

**Table 10.1 – System Physical Specifications**

		<b>English / U.S.</b>	<b>Metric:</b>
<b>WHITESTAR SIGNATURE PRO System Console</b>			
Console dimensions (with display)	Width	24 inches	61 cm
	Depth	24 inches	61 cm
	Height	59 inches	150 cm
Power cord length		20 feet	6 meters
Electrical enclosure current leakage		IEC 60601-1 compliance UL 60601-1	
Weight (including IV pole)		185 pounds	84 kg
<b>Foot Pedal</b>			
<b>Single Linear Foot Pedal</b>			
Dimensions	Width	12 inches	31 cm
	Length	10.5 inches	27 cm
	Height	5.5 inches	14 cm
Weight		10.0 pounds	4.5 kg
<b>Advanced Control Pedal</b>			
Dimensions	Width	10.5 inches	27 cm
	Length	14 inches	36 cm
	Height	5.5 inches	14 cm
Weight		15 pounds	7 kg
Cord Length		11.8 feet	36 cm
<b>Advance Linear Pedal</b>			
Dimensions	Width	9.82 inches	25 cm
	Length	15.57 inches	39.6 cm
	Height	4.88 inches	12.4 cm
Weight		13 pounds	5 kg
Cord Length		12 feet	366 cm
<b>Programmable IV Pole</b>			
Maximum travel		41 inches	106 cm
Velocity		2.4 inches/sec	6 cm/sec.
Maximum lift weight		2.43 pounds	1.1 kg

		<b>English / U.S.</b>	<b>Metric:</b>
<b>Wireless Remote Control</b>			
	Width	5 inches	13 cm
	Length	5 inches	13 cm
	Height	1.5 inches	4 cm
	Weight	2.0 pounds	.9 kg

**Environmental Specifications**

**Table 10.2 – Environmental Specifications**

<b>Environmental Specifications</b>	Operating Temperature	10 to 40°C
	Humidity	Up to 95% RH, non-condensing
	Ambient Pressure	See Vitrectomy Specifications for additional information.
<b>Storage/Transportation Conditions</b>	Storage Temperature	-20 to 60°C
	Humidity	Up to 95% RH, non-condensing

**Electrical Specifications**

**Table 10.3 – Electrical Specifications**

	<b>Voltage</b>	<b>Frequency</b>	<b>Rated Power</b>	<b>Fuse Rating</b>	<b>Enclosure Current Leakage</b>
<b>System</b>	100-240 Vac	50-60 Hz	750 VA	6.3A, 250V, Bussman GDA	<500 µA

**Phacoemulsification Specifications**

**Table 10.4 – Phacoemulsification Specifications**

	Phaco Power	1%-5% in 1% increments, 5-100%, in 5% increments
Peristaltic Pump	Vacuum Level	0–650 mmHg in 5 mmHg increments
	Pump Flow Rate	0-60 cc/minute
Venturi Pump	Vacuum Level	0-600 mmHg in 5 mmHg increments

**Irrigation and Aspiration Specifications**

**Table 10.5 – Irrigation and Aspiration Specifications**

Peristaltic Pump	Vacuum Level	0–650 mmHg in 5 mmHg increments
	Pump Flow	0-60 cc/minute
Venturi Pump	Vacuum Level	0-600 mmHg in 5 mmHg increments

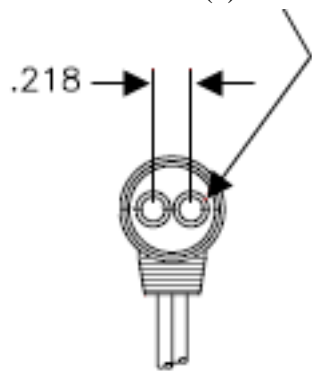
**Vitrectomy Specifications**

**Table 10.6 – Vitrectomy Specifications**

Peristaltic Pump	Vacuum Level	0–650 mmHg in 5 mmHg increments
	Pump Flow Rate	10-60 cc/minute, in 1 cc increments
Venturi Pump	Vacuum Level	0-600 mmHg in 5 mmHg increments
Atmospheric Pressure/Altitude	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 100cpm per 1,000ft (304.8 m) additional elevation up to a maximum of 10,000 ft above sea level.	
Indicated Cut Rate	Actual Cut Rate Upper Limit (cpm)	Actual Cut Rate Lower Limit (cpm)
2500	3000	2000

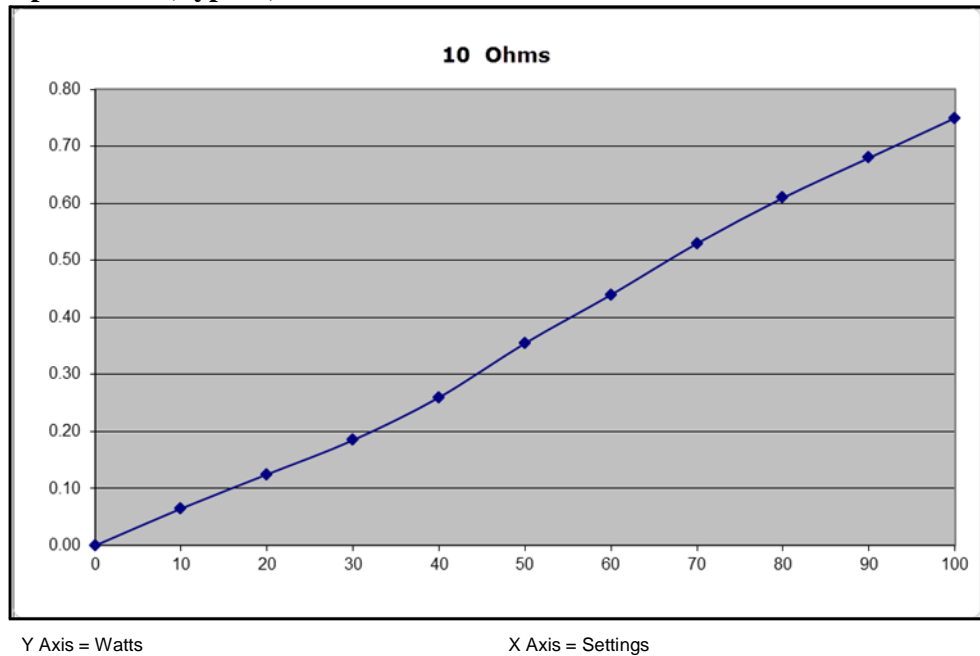
**Diathermy Specifications**

**Table 10.7 – Diathermy Specifications**

Power Adjustment	5% to 100%, in 5% increments
Diathermy Power (maximum power into rated load)	8.5 Watts into 350 Ohms 386 kHz
Diathermy Type	Bipolar
Rated Peak Voltage	160 Volts
Connector of diathermy forcep/ probe	<p>Ø.072 RECEPTACLE (2)</p>  <p>All measurements are in inches.</p>

### Diathermy Power Graphs

**Figure 10.1 – Diathermy Output Power (Typical) 10 Ohm**



**Figure 10.2 – Diathermy Output Power (Typical) 50 Ohm**

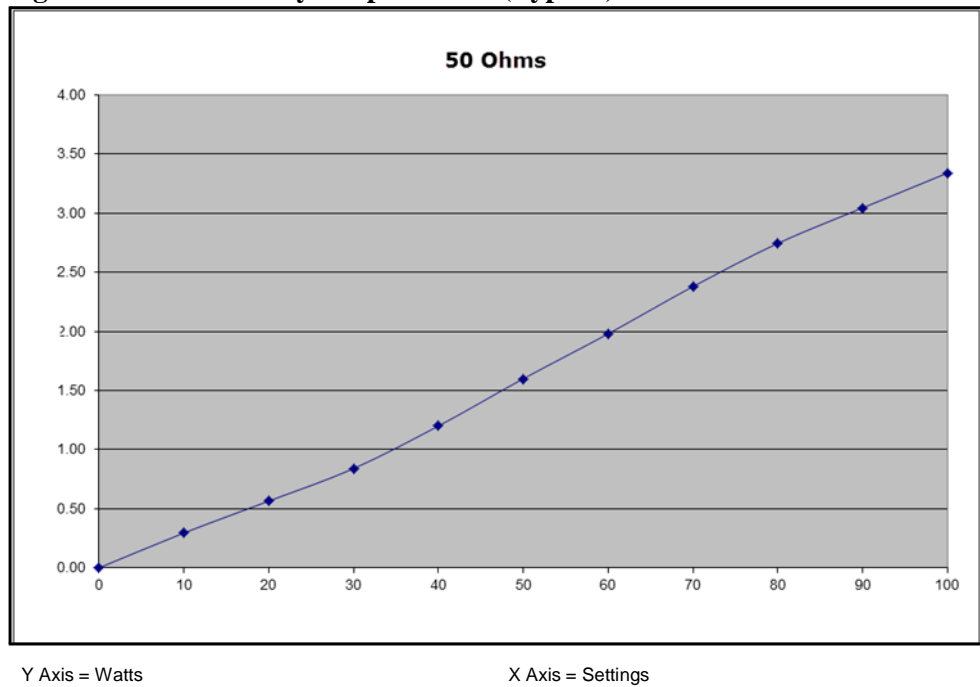


Figure 10.3 – Diathermy Output Power (Typical) 200 Ohm

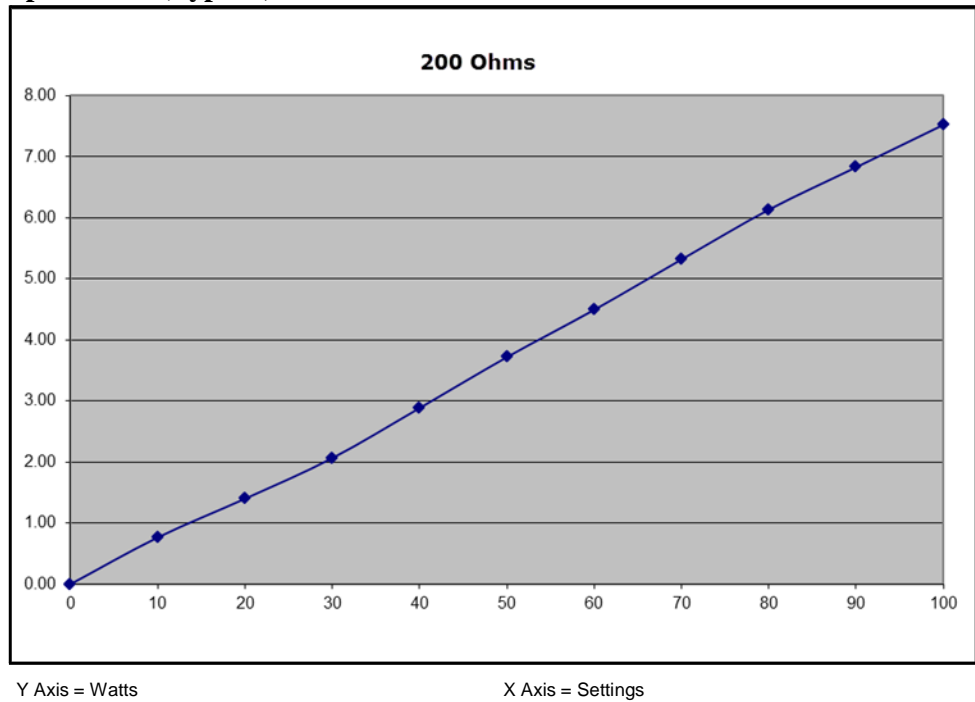
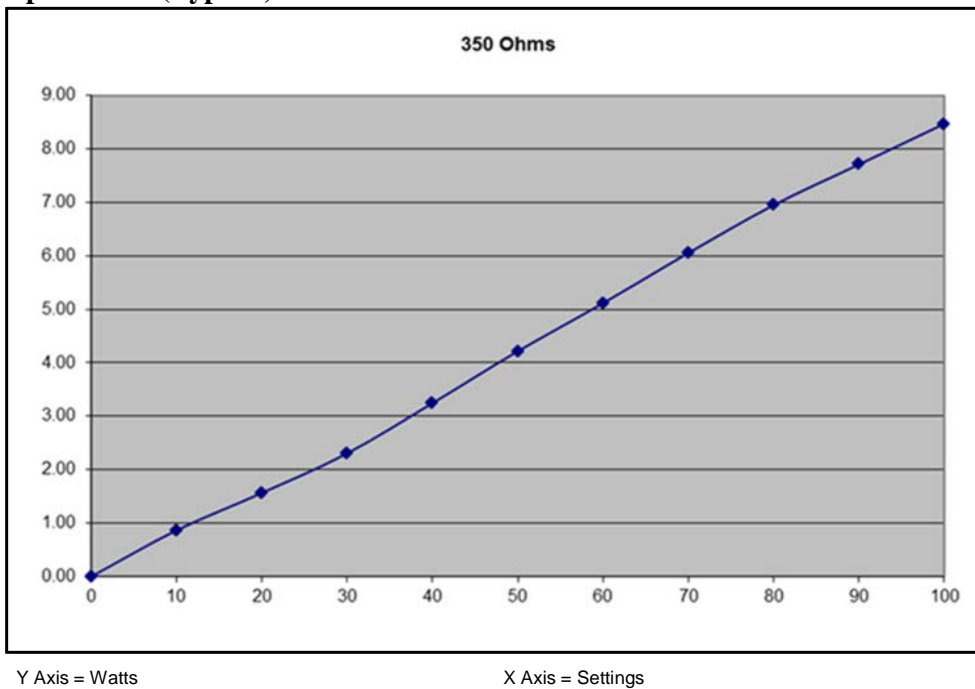
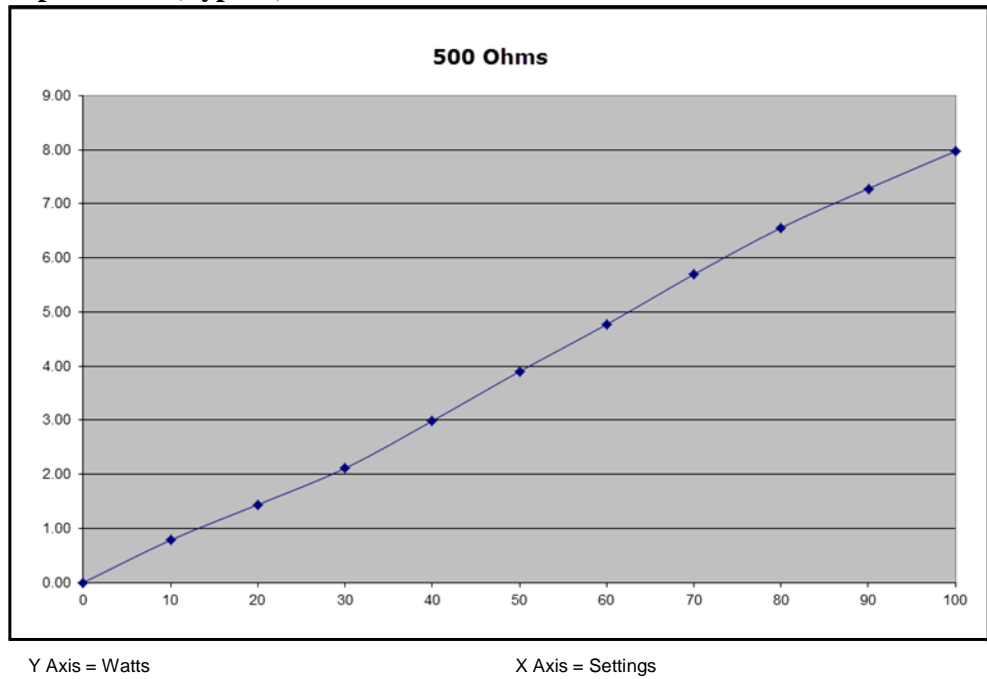


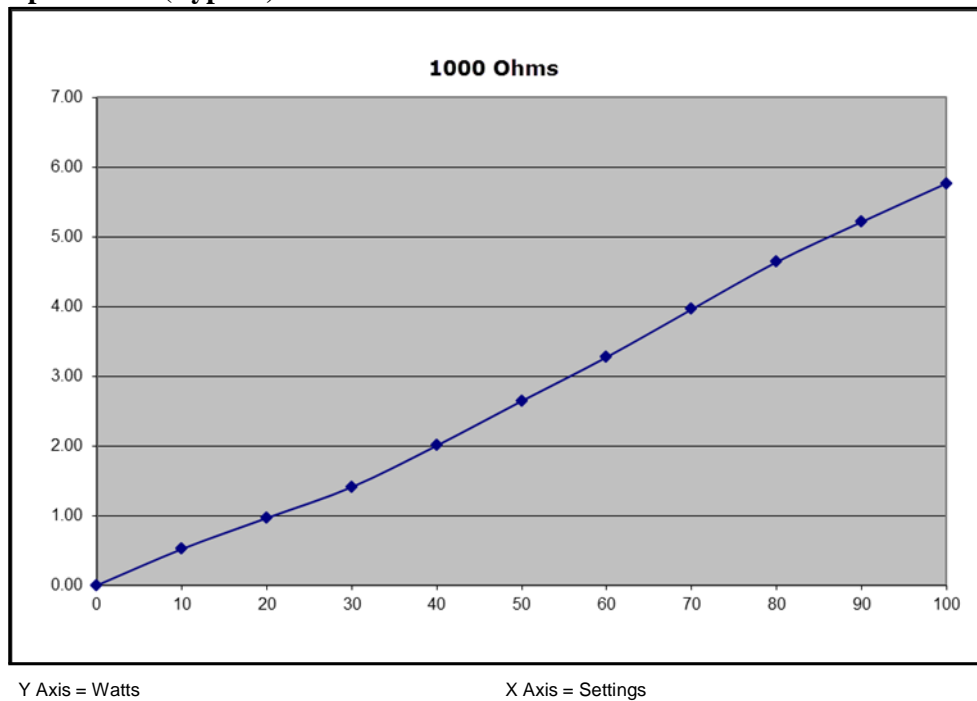
Figure 10.4 – Diathermy Output Power (Typical) 350 Ohm



**Figure 10.5 – Diathermy Output Power (Typical) 500 Ohm**

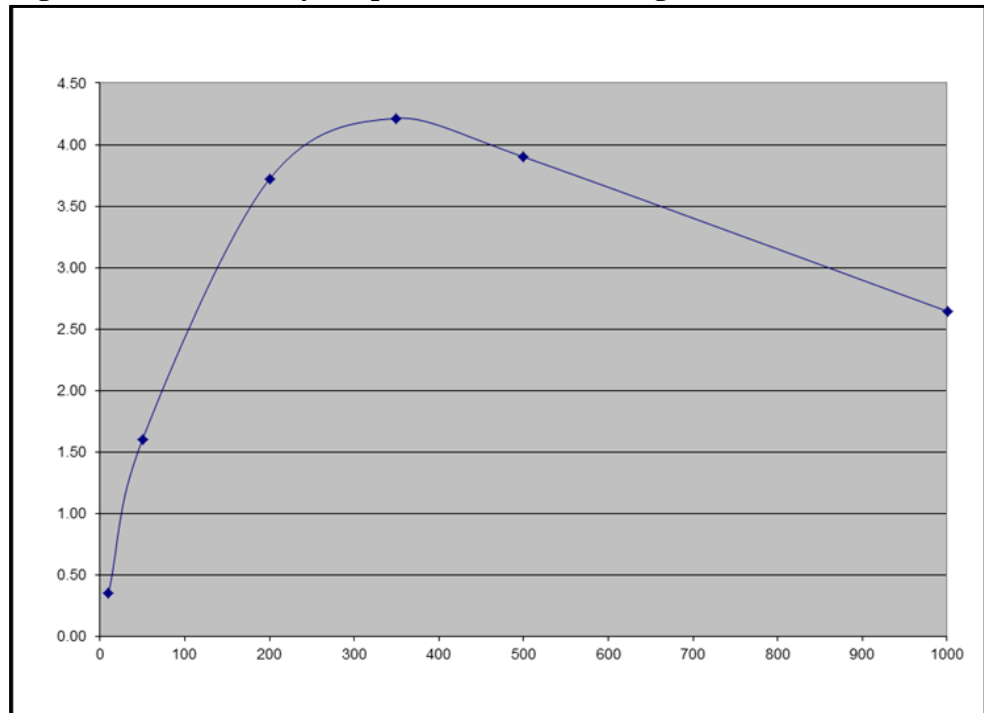


**Figure 10.6 – Diathermy Output Power (Typical) 1000 Ohm**



**Diathermy Power  
versus Load  
Impedance**

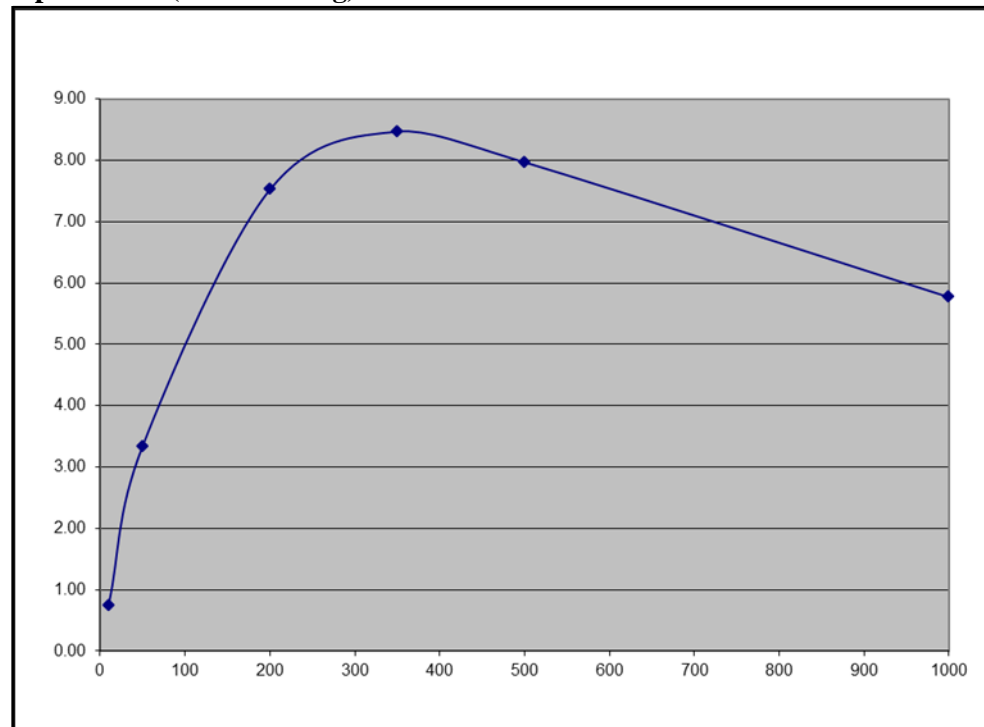
**Figure 10.7 – Diathermy Output Power (50% Setting)**



Y Axis = Watts

X Axis = Impedance (Ohms)

**Figure 10.8 – Diathermy Output Power (100% Setting)**



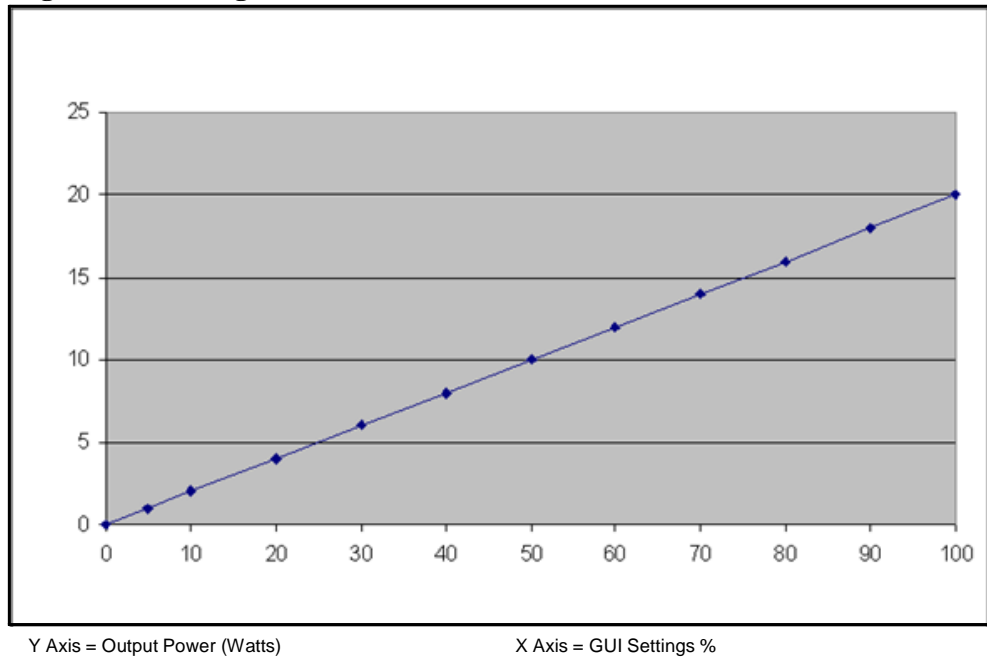
Y Axis = Watts

X Axis = Impedance (Ohms)

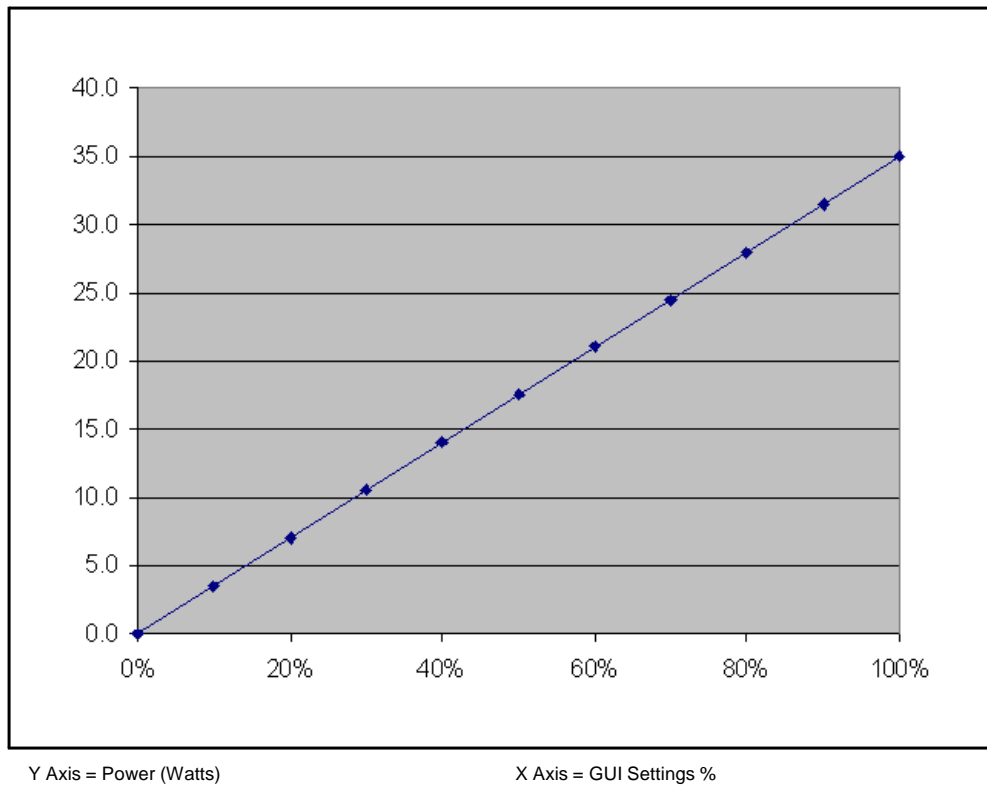


**Phaco Power  
Graphs**

**Figure 10.9 – Longitudinal Phaco Power**



**Figure 10.10 – ELLIPS FX Phaco Power Linear Mode**



**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.

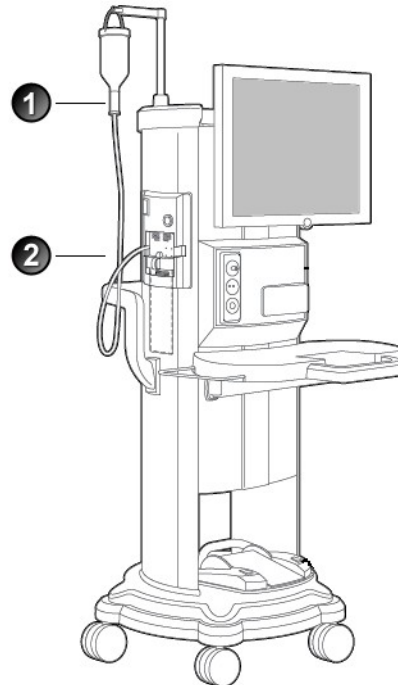
Handpiece	Nominal Longitudinal Velocity (m/s)
<b>ELLIPS FX</b> (690880 (A))	8.85
<b>WHITESTAR</b> (690697 (A))	11.13

**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 10.8 – Expected Pressure as a function of Bottle Height**

<b>Bottle Height cm</b>	<b>Theoretical Pressure mmHg</b>	<b>Corrected Pressure At Patient Eye Level mmHg</b>
0	0.00	14.80
20	14.80	29.60
40	29.60	44.40
60	44.40	59.20
80	59.20	74.00
100	74.00	88.80
105	77.70	92.50

# 11

## ACCESSORIES AND PARTS REORDERING

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Accessories and Parts List

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**Table 11.1 – WHITESTAR SIGNATURE PRO System Part Number**

Name	Description	Part number
<b>WHITESTAR SIGNATURE PRO</b> Console	An ophthalmic microsurgical system.	NGP680301

**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**

System Accessories	Part Number	Description
<b>Phaco Handpiece</b>	690697	<b>WHITESTAR</b> Phaco Handpiece, Coaxial
	690880	<b>ELLIPS FX</b> Phaco Handpiece
	OPOR0019L	19 Gauge <b>LAMINAR</b> Flow Phaco Tip, 0° Round Tip
	OPOR1519L	19 Gauge <b>LAMINAR</b> Flow Phaco Tip, 15° Round Tip
	OPOR3019L	19 Gauge <b>LAMINAR</b> Flow Phaco Tip, 30° Round Tip
	OPOR4519L	19 Gauge <b>LAMINAR</b> Flow Phaco Tip, 45° Round Tip
	OPOR0020L	20 Gauge <b>LAMINAR</b> Flow Phaco Tip, 0° Round Tip
	OPOR1520L	20 Gauge <b>LAMINAR</b> Flow Phaco Tip, 15° Round Tip
	OPOR3020L	20 Gauge <b>LAMINAR</b> Flow Phaco Tip, 30° Round Tip
	OPOR4520L	20 Gauge <b>LAMINAR</b> Flow Phaco Tip, 45° Round Tip
	OPOCR3019L	Disposable <b>LAMINAR</b> Flow Phaco Tip, 19 Gauge, 30° Curved
	OPOCR3020L	Disposable <b>LAMINAR</b> Flow Phaco Tip, 20 Gauge, 30° Curved
	OPOS19L	19 Gauge <b>LAMINAR</b> Flow Irrigation Sleeve and Test Chamber
	OPOS20L	20 Gauge <b>LAMINAR</b> Flow Infusion Sleeve and Test Chamber
	OPOMTTL	<b>LAMINAR</b> Flow Tip Wrench
<b>I/A Handpiece</b>	OPOIA20CRV	SOLO I/A Handpiece, 20 Ga., Curved Silicone Sleeve Tip
	OPOIA2045D	SOLO I/A Handpiece, 20 Ga., 45° Silicone Sleeve Tip
	OPOIA20STR	SOLO I/A Handpiece, 20 Ga., Straight Silicone Sleeve Tip
	OPOIA20KIT	SOLO I/A Handpiece Kit
	OM055002	<b>PHACOFIT</b> Titanium Handle
	OM05510110	<b>PHACOFIT</b> I/A Tip Curved 0.5 mm Port

<b>System Accessories</b>	<b>Part Number</b>	<b>Description</b>
	OM05510112	<b>PHACOFIT</b> O-Ring's I/A Tip (5PK)
	OM05510113	<b>PHACOFIT</b> Titanium, Multi-Tip Set
	OM05510114	<b>PHACOFIT</b> Cleaning/Flushing Kit
	OM05510115	<b>PHACOFIT</b> Tip, Luer Adapter (Aspiration)
	OM05510116	<b>PHACOFIT</b> Tip, 45 Degree Silicone (No Sleeve)
	OM0551011	<b>PHACOFIT</b> I/A Tip Straight 0.3 MM Port
	OM0551012	<b>PHACOFIT</b> I/A Tip Curved 0.3 mm Port
	OM0551013	<b>PHACOFIT</b> I/A Tip 45 Degree 0.3 mm Port
	OM0551014	<b>PHACOFIT</b> I/A Tip 90 Degree 0.3 mm Port
	OM0551015	<b>PHACOFIT</b> I/A Tip Binkhorst 0.3 mm Port
	OM0551016	<b>PHACOFIT</b> I/A Tip Straight SI 0.3 mm Port
	OM0551017	<b>PHACOFIT</b> I/A Luer Adapter, F/F
	OM0551018	<b>PHACOFIT</b> I/A Tip Curved, SI, 0.3 mm Port
	OM0551019	<b>PHACOFIT</b> I/A Tip Straight 0.5 MM Port
	OM0551020J	<b>PHACOFIT</b> Athlete I/A Tip Straight Type
	OM0551021J	<b>PHACOFIT</b> Athlete I/A Tip 45 Degree Type
	DUA02020	DUET STARTER KIT, 20GA
	DU02100	DUET ASPIRATION HANDLE
	DU02200	DUET IRRIGATION HANDLE
	DU02301	DUET 20G CURVED IRRIGATOR CLOSED END
	DU02302	DUET 20G CURVED ASPIRATION 0.3MM PORT CAP POL
	DU02303	DUET 19G FINE IRRIGATING CHOPPER
	DU02305	DUET 20G OLSON II IRRIGATING CHOPPER
	DU02325	DUET MST Aguirre Duet Tip
	DU02335	DUET MST Fine/Nagahara Tip
<b>Diathermy Handpiece</b>	SCP680600	Diathermy Power Cable
	K121085	Bipolar Forceps, Curved Iris 0.5 mm Tip
	K147000	18 Gauge Straight Diathermy Pencil, reusable
<b>Vitreotomy Cutter</b>	NGP0020	20 gauge Vitreous Cutter
	NGP0023	23 gauge Vitreous Cutter
	NGP0025	25 gauge Vitreous Cutter

<b>System Accessories</b>	<b>Part Number</b>	<b>Description</b>
<b>FUSION Pack</b>	OPO70	<b>FUSION</b> Pack (disposable, sterile)
	OPO71	<b>FUSION</b> Dual Pump Pack (disposable, sterile)
<b>Wireless Remote Control</b>	NGP680137	<b>WHITESTAR SIGNATURE PRO</b> System Remote Control
	0100-1834	AC Charger, <b>SIGNATURE</b> Wireless Remote
<b>Foot Pedal</b>	NGP680701	<b>WHITESTAR SIGNATURE</b> System Single Linear Foot Pedal
	NGP680702	<b>WHITESTAR SIGNATURE</b> System Advanced Control Pedal
	NGP680703	<b>WHITESTAR SIGNATURE PRO</b> System Advanced Linear Foot Pedal
	0100-1835	AC Charger, <b>SIGNATURE</b> Wireless Foot Pedal
	0100-0055	CABLE ASSY, <b>WHITESTAR SERIES FOOT PEDAL</b> (Single Linear Foot Pedal and Advanced Control Pedal)
	0100-6303	Cable Assy, Advanced Linear Foot Pedal to Console, Signature
	0100-1836	LI-BATTERY, <b>SIGNATURE PRO</b> Advanced Linear Pedal
<b>Miscellaneous</b>	2410-0049-L	Power cord, hospital grade, 20 ft., 6.1 meters
	OM05510114	I/A Cleaning Kit
	0100-0750	<b>WHITESTAR SIGNATURE</b> System Dust Cover
	MSR309	Sterilization Tray
<b>Operator's Manual</b>	NGP Z370494	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Bulgarian)
	NGP Z370495	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Chinese)
	NGP Z370496	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Czech)
	NGP Z370497	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Croatian)
	NGP Z370498	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Danish)
	NGP Z370499	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Dutch)
	NGP Z370500	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (English)
	NGP Z370501	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Estonian)
	NGP Z370502	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Finnish)
NGP Z370503	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (French)	

<b>System Accessories</b>	<b>Part Number</b>	<b>Description</b>
	NGP Z370504	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (German)
	NGP Z370505	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Greek)
	NGP Z370506	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Hungarian)
	NGP Z370507	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Italian)
	NGP Z370508	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Japanese)
	NGP Z370509	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Korean)
	NGP Z370510	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Latvian)
	NGP Z370511	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Lithuanian)
	NGP Z370512	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Norwegian)
	NGP Z370513	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Polish)
	NGP Z370514	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Portuguese)
	NGP Z370515	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Portuguese-Brazilian)
	NGP Z370516	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Romanian)
	NGP Z370517	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Russian)
	NGP Z370518	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Serbian)
	NGP Z370519	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Slovakian)
	NGP Z370520	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Slovenian)
	NGP Z370521	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Spanish)
	NGP Z370522	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Swedish)
	NGP Z370523	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Turkish)



System Accessories	Part Number	Description
	NGP Z370526	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual (Traditional Chinese)
	NGP Z370524	<b>WHITESTAR SIGNATURE PRO</b> System Operator's Manual CD, Multilingual

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