SECTION FIVE
TROUBLESHOOTING

SYSTEM MESSAGES

System messages advise the user of a system condition that requires an action and/or a response in order to proceed with the current procedure.

Advisory Messages

Advisory messages (see Table 5-1) are informational messages that help guide the user or bring attention to the laser's condition.

- Advisory messages appear on the same blue-gray background that many labels and prompts appear on.
- Advisory messages can appear when the device is in Standby or Ready mode. They do not appear when the device is in Firing mode.
- Advisory messages will cause the system to switch from Ready to Standby mode.

Warning Messages

Warning messages (see Table 5-2) are precautionary messages displayed on a yellow background to inform the user of a possible safety or procedural problem that may occur in any mode. The following events take place:

- The laser is placed into Standby mode.
- The user is presented with one of two types of display, an Acknowledgement screen or an Operating screen, each of which asks for an action before the user continues with the procedure:

The Acknowledgement Screen presents the user with information that describes the problem. The user must select a response, using the Menu knob, stating that they have seen and acknowledged the message. This acknowledgement is recorded in the laser's system log. The display returns to the regular operating display in Standby mode. Attempting to go to Ready Mode without taking requested action results in the system continuing to display the Acknowledgement Screen.

The Operating display allows the user to perform operational tasks such as adjusting the laser parameters while a warning prompt appears at the top of the screen asking the user to perform an action. After the requested action is performed, the warning prompt is removed and the display returns to the regular operating display in Standby mode. If the user tries to go to Ready mode without performing the requested action, the prompt starts blinking in order to get the attention of the user. The laser will remain in Standby mode until the action is performed.

Error Messages

Errors are major faults in the system that cannot be resolved by either software, hardware, or user action. The following events take place:

- The laser is placed in a safe state (laser engine is turned off and shutter is closed).
- The user is told by an error message and voice confirmation that a fault has taken place.
- The front panel controls are not functional other than the emergency shut-off switch and the On/Off key. The footswitch controls are also not functional.

An error message is usually an indication that the system requires service in order to correct the problem. If restarting the system does not resolve the problem, contact your local Alcon representative to schedule a service call.

Figure 5-1 Error Message

Table 5-1. Advisory Messages		
Message Displayed	**Condition**	**Action**
“Unable to recognize probe type in Port XX. Please select probe type from options below.”	An unidentified fiber is connected to a laser port. The laser fiber may not include a RFID tag or the tag’s data may be corrupted.	User must select a probe type (slit lamp, LIO, or Endo) to clear the message.
“Please Insert Probe. Select the Main Menu button to view or alter settings.”	Unit completes boot-up and no probe has been inserted.	User must connect a fiber to a laser port or select the Main Menu button to clear the message.
“Maximum Power Available: 1.5W” *(any number under 2W will be displayed; in this case it is 1.5W)*	Power available from the laser drops below the maximum level (2 Watts).	User must acknowledge the screen prompt to clear the message.
“Requested Power Not Available”	The operator depresses the footswitch, but the laser is unable to deliver the power value requested.	User must acknowledge the screen prompt to clear the message. User should then reduce laser power.
“Service Engine Soon”	The laser has a significant drop in its maximum power or system detects other potential maintenance need.	User must acknowledge this prompt to clear the message. If the service has not been done, the message repeats with every boot-up.
"Footswitch side switches control power to laser."	Message is displayed at boot up to inform the user that the footswitch side switches are set to adjust power only.	User must acknowledge this prompt to clear the message.
"Footswitch side switches may be used to change from Standby to Ready and back."	Message is displayed at boot up to inform the user that the footswitch side switches have been set to switch between Standby and Ready.	User must acknowledge this prompt to clear the message.
"Footswitch side switches have been de-activated."	Message is displayed at boot up to inform the user that the footswitch side switches have been de-activated.	User must acknowledge this prompt to clear the message.

Table 5-2. Warning Messages		
Message Displayed	**Condition**	**Action**
"Footswitch Configuration 0 Power 0 Standby/Ready"	The first time after system initialization that a multi-function footswitch is connected and not in Disabled mode.	User must acknowledge the message to clear the screen and continue.
"Verify appropriate Dr. Filters are installed in all viewing devices." Acknowledgement Screen	The first time after system initialization that either a slit lamp or endo laser fiber is selected while at least one tethered doctor filter is connected.	User must acknowledge the message to clear the screen and continue.
Verify appropriate Dr. Filters are installed in all viewing devices." Acknowledgement Screen	Either a slit lamp or endo laser fiber is selected and no tethered doctor filter is connected.	User must acknowledge the message to clear the screen and continue.
"Please Engage Dr. Filter" Operating display	A tethered doctor filter is disengaged.	User must engage the doctor filter to clear the message.
"Please Connect Dr. Filter" Operating display	A tethered doctor filter is disconnected while the system is in Ready or Firing mode.	User must connect a tethered doctor filter to clear the message.
"Please Release Footswitch" Operating display	Operator initiates switching from Standby to Ready while the footswitch is depressed.	User must cease pressing footswitch to clear the message.
"Please Connect Footswitch" Operating display	The footswitch is disconnected in any mode.	Footswitch must be re-connected to clear the message.
"Please Close Remote Interlock" Operating display	The remote interlock circuit detects a door is opened or the remote interlock plug is disconnected from the back panel.	Door must be closed or plug re-connected to clear the message.
"Port 1 cannot be used. Please use Port 2." Acknowledgement Screen	A fault exists on one laser port, but the other port is still usable.	User must acknowledge the message and only use the functioning port.

SECTION SIX
ACCESSORIES AND PARTS

This section of the manual contains the various accessories that are available for use with the *PurePoint*™ Laser (see Table 6-1). If additional information is required for setup and use of the accessory, the Notes column of Table 6-1 provides references to that information.

TABLE 6-1. *PUREPOINT*™ LASER ACCESSORIES

Description	Catalog Number	Notes
Endo Ocular Laser Probe, Straight, 20 Gauge	8065678610	
Endo Ocular Laser Probe, Curved, 20 Gauge	8065010203	
Endo Ocular Laser Probe, Straight, 20 Gauge	8065010219	
Endo Ocular Laser Probe, Straight, 23 Gauge	8065750803	
Endo Ocular Laser Probe, Straight, 25 Gauge	8065750133	
Endo Ocular Laser Probe, Curved, 20 Gauge, W/RFID	8065750989	
Endo Ocular Laser Probe, Straight, 20 Gauge, W/RFID	8065750990	
Endo Ocular Laser Probe, Straight, 25 Gauge, W/RFID	8065750978	
Endo Ocular Laser Probe, Straight, 23 Gauge, W/RFID	8065750991	
Chang Aspirating Laser Probe, Curved, 20 Gauge	8065010703	
Chang Aspirating Laser Probe, Straight, 20 Gauge	8065010719	
Chang Aspirating Laser Probe, Soft Tip, 20 Gauge	8065010739	
Chang Aspirating Laser Probe, Curved, 20 Gauge, W/RFID	8065750979	
Chang Aspirating Laser Probe, Straight, 20 Gauge, W/RFID	8065750980	
Chang Aspirating Laser Probe, Soft Tip, 20 Gauge, W/RFID	8065750981	
Illuminated Endo Ocular Laser Probe, Curved, 20 Gauge	8065010403	
Illuminated Endo Ocular Laser Probe, Curved, 20 Gauge	8065010404	
Illuminated Endo Ocular Laser Probe, Straight, 20 Gauge	8065010419	
Illuminated Endo Ocular Laser Probe, Straight, 20 Gauge	8065010420	
Illuminated Endo Ocular Laser Probe, Curved, 20 Gauge, W/RFID	8065750982	
Illuminated Endo Ocular Laser Probe, Straight, 20 Gauge, W/RFID	8065750983	
Slit Lamp Front Actuating Doctor Protection Filter	8065750260	
Microscope Front Actuating Doctor Protection Filter	8065750448	
PurePoint™ Passive Dr. Filter	8065751051	
Slit Lamp: Alcon® SL 1000 (CSO Table) Adaptation Fiber Strain Relief	8065740982 8065741019 8065750256	See pages 6-2 & 6-5
Slit Lamp: Zeiss 30SL (Topcon Table) Adaptation Fiber Strain Relief	 8065-5010-01 8065750256	See pages 6-2 & 6-5
Slit Lamp: Haag-Streit 900 BM (Haag-Streit Table) Adaptation Fiber Strain Relief	 8065-5011-01 8065750256	See page 6-3
Laser Indirect Ophthalmoscope	8065751050	See page 6-10

SLIT LAMPS WITH DOCTOR PROTECTION FILTERS AND ADAPTATIONS

A slit lamp assembly is typically used to deliver the *PurePoint*™ laser treatment beam to the patient's eye. An adaptation, mounted on the slit lamp, is required to interface the slit lamp to the *PurePoint*™ laser.

The adaptation consists of a zoom assembly with micromanipulator and a Doctor Protection Filter. The Doctor Protection Filter provides eye protection for the physician. The parfocal zoom assembly is used to set the spot size of the aiming and treatment beams, and a micromanipulator is provided for fine adjustment of the beam position.

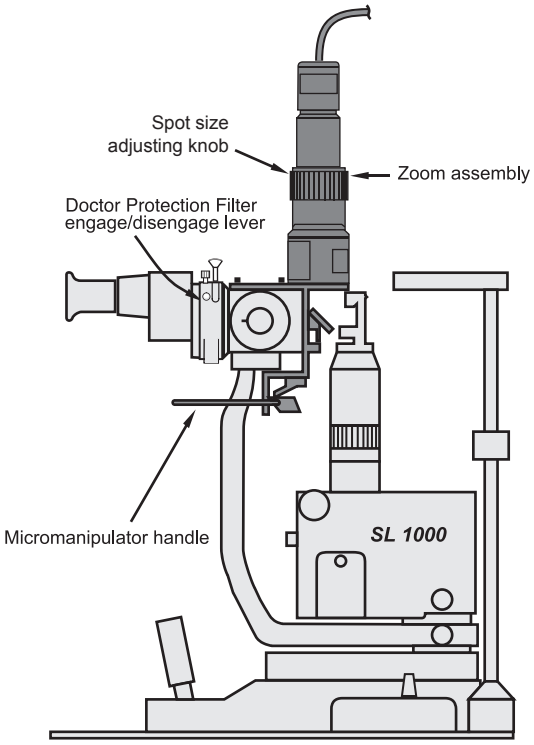


Figure 6-1 Alcon SL1000 Slit Lamp

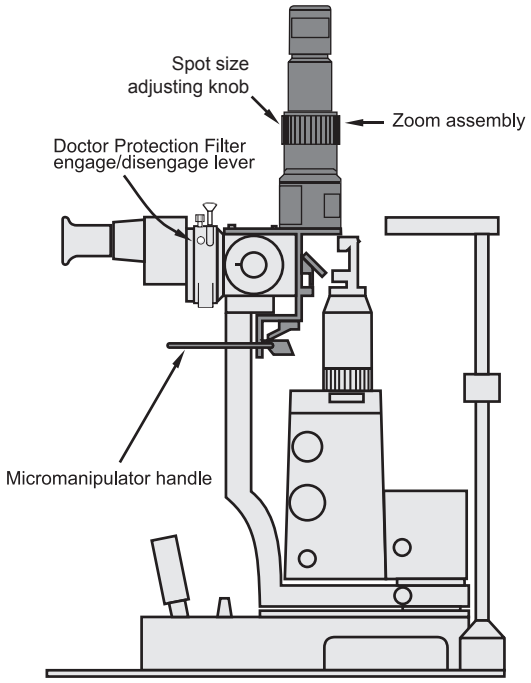


Figure 6-2 Zeiss 30SL

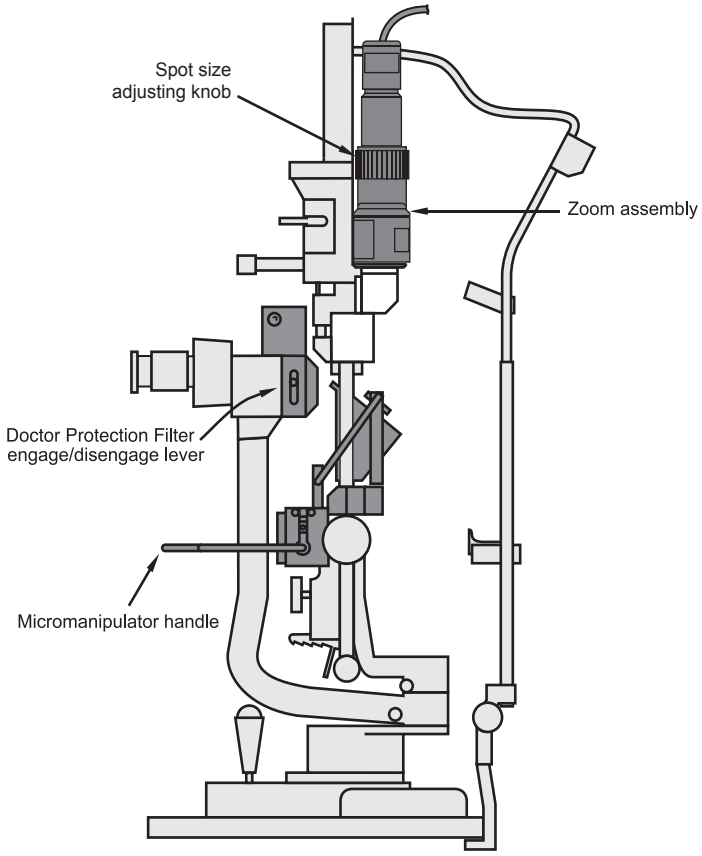


Figure 6-3 Haag-Streit 900 BM

POSITIONING THE DOCTOR PROTECTION FILTER

The Doctor Protection Filter is used to protect the surgeon from harmful laser radiation that could damage his eyes. The Doctor Protection Filter is inserted between the binoculars and the slit lamp or microscope.

WARNINGS!

It is the operator's responsibility to properly install the Doctor Protection Filter and verify operation. Using the instrument with a Doctor Protection Filter that is improperly installed could result in operator injury. Alcon shall not be held liable for problems caused by improper installation of the Doctor Protection Filter. Defeat of the Doctor Protection Filter interlock switches and/or incorrect installation of the Doctor Protection Filter to the microscope could result in ocular hazards to the surgeon.

Operator will have a colored view through the Doctor Protection Filter due to blocking of the 532nm wavelength (green).**

Operator must be careful to avoid potential secondary reflections; therefore, the room used to treat the patient should be approved by a qualified laser safety officer.

1. Loosen thumbscrew on slit lamp assembly (or microscope) and remove binoculars (see Figure below).

2. Place Doctor Protection Filter into position on the slit lamp assembly and secure with thumbscrew.

3. Place binoculars into position on the Doctor Protection Filter and secure with thumbscrew.

4. Connect electrical cable connector to the Doctor Protection Filter port on the *PurePoint*™ rear panel.

5. Perform the System Power Up instructions for the *PurePoint*™ Laser in Section Three of this manual. Move the Doctor Protection Filter lever to disengage the filter and verify proper function; the message "Engage Dr. Filter" should appear. **If the message does not appear, do not use the instrument; call Alcon Technical Services.**

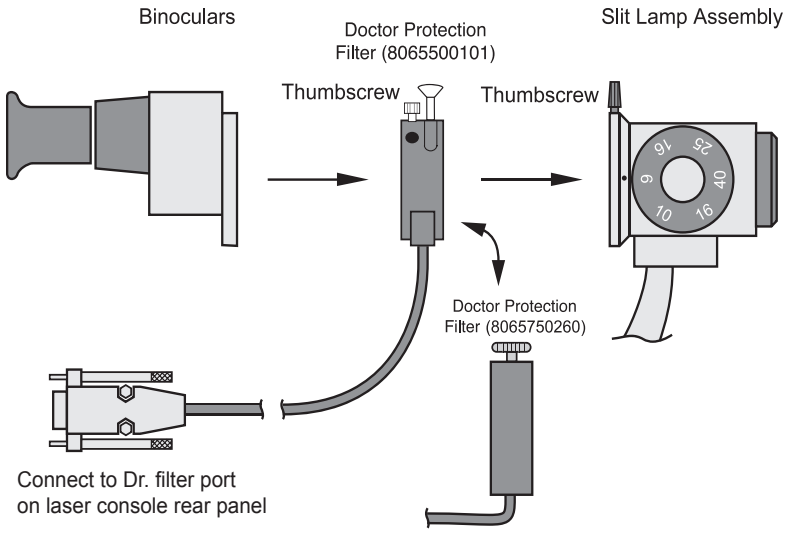


Figure 6-4
Doctor Protection Filter Mounted Between Binoculars and Slit Lamp Assembly

** Newer Doctor Protection Filters will have less tint than older ones.

ALCON SL 1000 AND *ZEISS* 30SL ADAPTATION

Introduction

The Doctor Protection Filter, fiber optic cable, mechanical micromanipulator with zoom, and beam splitter/accessories in combination with the Alcon SL 1000 Slit Lamp (or *Zeiss* 30SL) are designed exclusively for use with the *PurePoint*™ laser system. This instrument combination represents a complete ophthalmic unit. Please refer to the Alcon SL 1000 (or *Zeiss* 30SL) Operator's Manual for information not included in this manual.

The micromanipulator with zoom provides interface between the *PurePoint*™ laser system and the patient. The laser spot is focused and traversed in the X and Y direction by means of the slit lamp joystick. The micromanipulator control lever provides additional positioning of the laser spot. The micromanipulator with integral zoom is used to adjust the laser spot size.

The mandatory Doctor Protection Filter provides protection from the 532nm laser radiation for the attending physician. The safety circuit of the *PurePoint*™ laser is designed to insure the safety filters are engaged (moved into place) prior to the treatment laser being operational.

WARNINGS!

Ensure that the terminal selection on the *PurePoint*™ front panel is SLIT LAMP. Verify that the selection is correctly confirmed. It is the responsibility of the operator to connect and confirm the selected terminal.

Operator will have a colored view through the Doctor Protection Filter due to blocking of the 532nm (green) wavelength.**

To avoid potential secondary reflections, the room used to treat the patient must be approved by a qualified laser safety officer.

All personnel in the treatment room must wear protective eyewear (OD 4 or above at 532nm) when the system is in Standby or Ready modes.

Installation of the complete instrument system or retrofitting an existing SL 1000 slit lamp with a micromanipulator with zoom, a beam splitter/accessories, a fiber optic cable, and a Doctor Protection Filter should only be done by Alcon Service Personnel or persons authorized by Alcon.

A qualified technician must perform a visual inspection of the following components every twelve months: warning labels, power cords, fuses. In case of a deficiency, do not use the system; contact Alcon Technical Services.

Before each use, ensure the Doctor Protection Filter assembly, the micromanipulator with zoom, and the fiber optic cable are firmly attached to the slit lamp. The user must also check the Doctor Protection Filter elements for scratches, breaks, or alterations. If scratched, damaged, or loosely attached, discontinue use of device immediately and contact Alcon Technical Services.

When using beam splitter accessories, the binoculars must first be attached to the beam splitter (the beam splitter accessories are attached to the beam splitter on the protected side of the Doctor Protection Filter assembly); the beam splitter is then attached to the permanently installed Doctor Protection Filter. Improper installation could cause injury to the operator and/or the patient.

** Newer Doctor Protection Filters will have less tint than older ones.

WARNINGS!

Verify that the label marking the laser exit aperture is in place. Refer to the figure below for the location of labels on the Alcon SL 1000.

Never treat a patient when the *PurePoint™* Laser is connected to a service computer.

Defeat of the Doctor Protection Filter switches and/or incorrect installation of the Doctor Protection Filter assembly could result in ocular hazards to the surgeon.

Please refer to the *PurePoint*™ Operating Instructions in section three for further warnings.

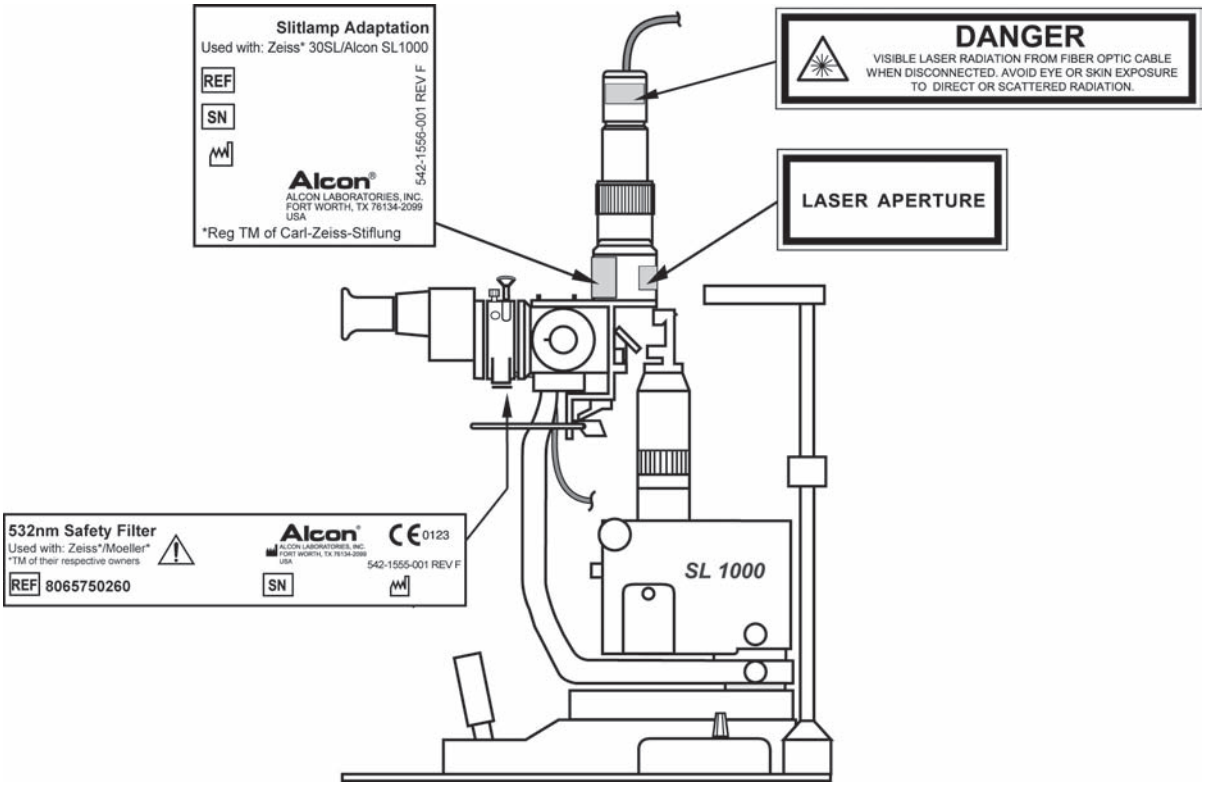


Figure 6-5
Label Location Diagram on Adaptation - Alcon SL 1000 shown

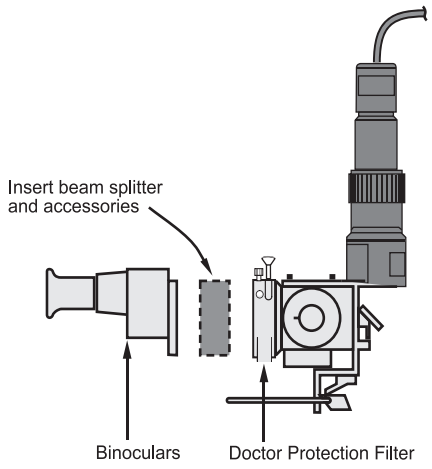


Figure 6-6
To avoid injury, the beam splitter/accessories must be placed between the binoculars and Doctor Protection Filter (Alcon SL 1000 shown)

Adaptation Controls

Laser Spot Size Indicator - Indicates diameter of laser spot in the microscope focal plane.

Laser Spot Size Adjustment Lever - Used to adjust the laser spot size.

Micromanipulator Control Lever - Used to position the laser spot around the microscope center field of view.

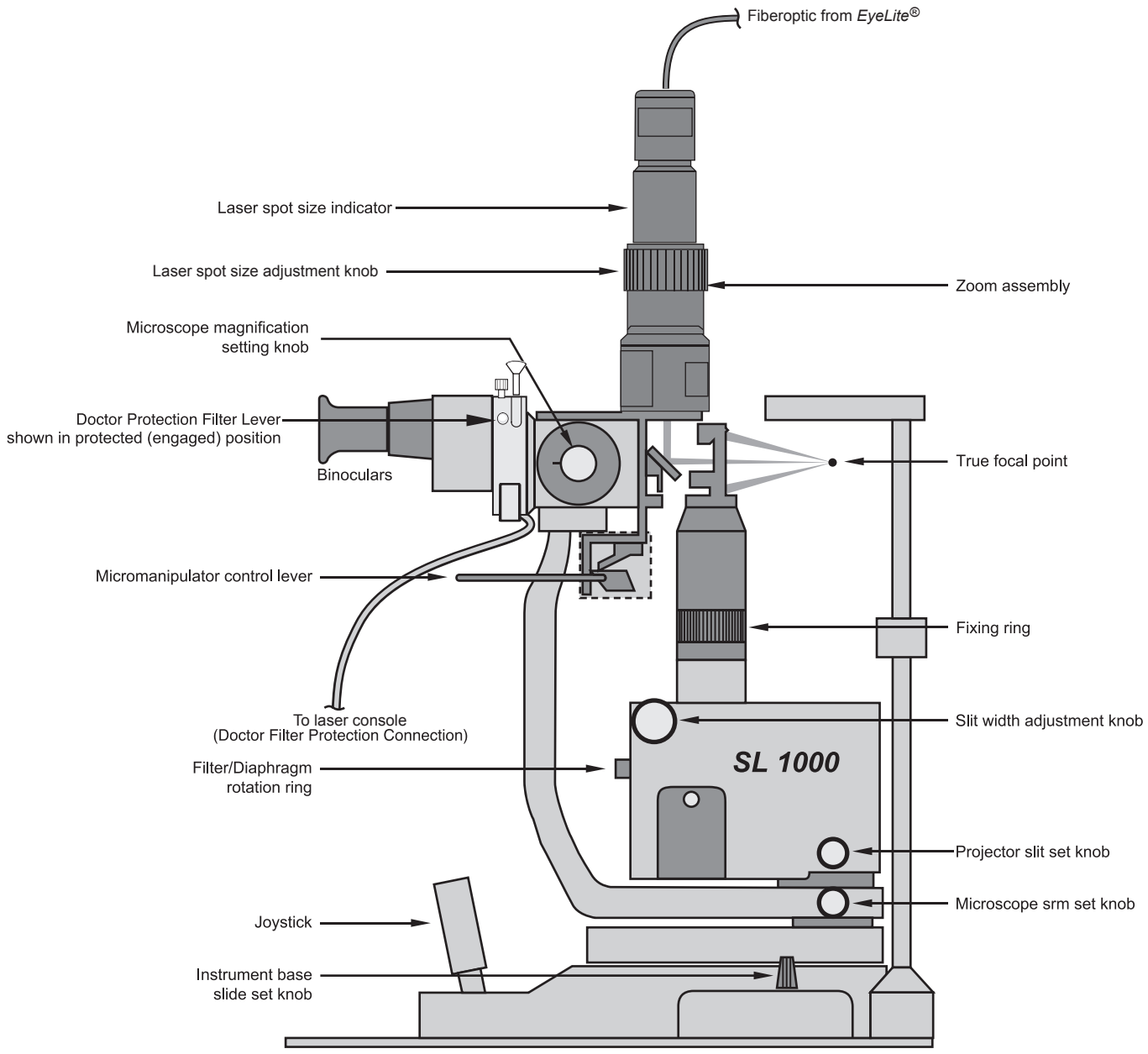


Figure 6-7
Controls on Alcon SL 1000 Slit Lamp with Doctor Protection Filter and Adaptation Installed

Operation

Operation of the Doctor Protection Filter

- Before operating the slit lamp, the Doctor Protection Filter cable must be plugged in and firmly attached to the rear panel of the *PurePoint*™ laser system.

- The Doctor Protection Filter is operated by moving the lever from the unprotected position to the filter protected (engaged) position. The 532nm laser treatment beam is not operational until the filter lever is in the engaged position.

- When using beam splitter accessories, the binoculars must first be attached to the beam splitter (the beam splitter accessories are attached to the beam splitter on the protected side of the Doctor Protection Filter assembly); the beam splitter is then attached to the permanently installed Doctor Protection Filter (see Figure 6-9).

Positioning and Focusing the Laser Beam

1. Move the joystick left and right to horizontally position the laser spot and illumination slits.

2. Rotate the joystick to vertically position the laser spot.

3. Move the joystick forward and backward to focus the laser spot.

Adjusting the Laser Position and Spot Size

1. Following customary methods, position patient and place the contact lens on patient's eye.

2. Using the joystick control on instrument base, bring the selected area of treatment into position/focus. If desired, lock instrument base in position with instrument base slide set knob.

3. To position the laser spot, choose one or a combination of the following methods:

    3.1 Using the joystick control, position the laser spot on the selected treatment area.

    3.2 Using the micromanipulator, position the laser spot around the microscope center field of view.

    3.3 Tilt the contact lens.

4. Use the laser spot size adjustment lever to set the laser spot size.

Laser Treatment of the Eye

1. The Doctor Protection Filter must be connected and in working order. To protect the user's eyes, the filter must be in the engaged position prior to firing the treatment laser.

2. For laser spot sizes ranging from 50 µm to 500 µm, the focus is parfocal; i.e., the focus of the laser spot lies in the focal plane of the microscope (see Figure 6-11). For laser spots greater than 500 µm, the laser spot sizes are set by defocusing the laser; i.e., the laser focus will not lie in the focal plane of the microscope).

3. If the diopter adjustment(s) of the microscope eyepieces are not accurate, the object and the laser focal point will not be in the same plane (for values between 50 µm and 500 µm). Consequently, the laser spot size on the fundus will be larger than the values set on the zoom.

4. To position the laser spot, use the procedures outlined in the previous section.

5. Activate the treatment laser only if the target area has been clearly localized and irradiation by a treatment laser is warranted. Follow the operating instructions for the *PurePoint*™ laser to operate the laser control console and activate the laser treatment beam.

WARNING!

If the red aiming beam is not operating, do not use the system; contact Alcon Technical Services.

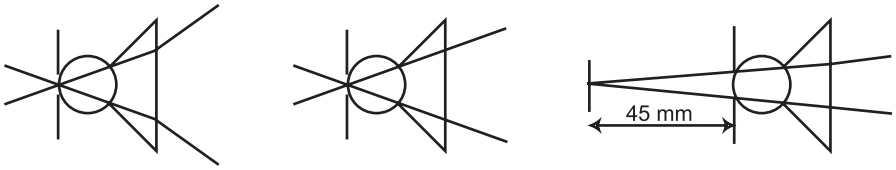


Figure 6-8 Laser Spot Focus

Troubleshooting

The table below is provided as an aid in troubleshooting. Normal care should be used during the troubleshooting process to prevent the introduction of additional problems.

Table 6-2 Adaptation Troubleshooting

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No Aiming Beam (red)	Laser not switched on.	Turn on Laser.
	Aiming beam set too low.	Turn up intensity.
	Fiber optic cable not connected.	Connect fiber.
	Aiming beam inoperative.	Contact Technical Services.
No Treatment Beam (532nm - green)	Laser not switched on.	Turn on Laser .
	Doctor Protection Filter not properly connected to Laser.	Connect filter cable to back panel of Laser.
	Filters not engaged.	Properly engage filters.
	Fiber optic cable not connected.	Connect fiber.
Laser spot cannot be positioned	Zero position lock knob in locked position.	Release zero position lock knob.

Introduction

The Alcon Laser Indirect Ophthalmoscope - Advanced Technology (LIO-AT) is an accessory for use exclusively with the *PurePoint*™ Laser. The Alcon LIO-AT is composed of a *Heine* diagnostic headset with integral laser delivery adaptation and an illumination power supply. The treatment laser beam and the aiming beam are both provided by the *PurePoint*™ Laser.

The LIO-AT is connected to the *PurePoint*™ Laser via a fiber optic cable. The LIO-AT headset illuminator is powered by a standard desktop power supply. Prior to connecting the primary power supply, ensure the voltage indicated on the power supply label is the same as the main power outlet. The illumination light is adjustable from approximately 0 to 1000 lux using the illumination control knob on the power supply.

A permanent Doctor Protection Filter protects the surgeon against incidental laser beam reflections. The operator will have a colored** view through the Doctor Protection Filter due to blocking of the 532 nm wavelength (green).

Figure 6-9 The Alcon Laser Indirect Ophthalmoscope-Advanced Technology

WARNINGS!

The head-worn Laser Indirect Ophthalmoscope (LIO-AT) is designed solely for examination and treatment of the eye, particularly the retina.

Use only the illumination power supply provided with LIO-AT. It is specially designed for medical applications.

Insure that the selection on the *PurePoint™* front panel is LIO. It is the responsibility of the operator to verify that the selection is correctly confirmed.

The operator will have a colored (pink) view through the Doctor Protection Filter due to blocking of the 532 nm wavelength (green).**

The operator must be careful to avoid potential secondary reflections; therefore the room used to treat the patient should be approved by a qualified laser safety officer.

All personnel in the treatment room must wear protective eyewear (OD 4 or above at 532 nm) when the system is in "Standby" or "Ready" modes.

The laser delivery system is an integral part of the Alcon LIO-AT and is not designed to be used with an observer. Never use a teaching or observation system in conjunction with the LIO-AT. There is no eye protection provided for the observer.

Never treat a patient when the *PurePoint™* Laser is connected to a service computer.

Before each use of the headset, the operator must check the permanent Doctor Protection Filter for scratches, breaks, or alterations. If there is any doubt, please call Alcon Technical Services, and discontinue use of device.

There are potential hazards when inserting, steeply bending, or improperly handling of the fiber optic cable. Not following the recommendations of the manufacturer may lead to damage to the fiber or delivery system and/or harm to the patient or user.

Since the aiming beam passes down the same delivery system as the treatment beam, it provides a good method of checking the integrity of the delivery system. If the aiming beam spot is not present at the distal end of the delivery system, or its intensity is reduced or it looks diffused, this a possible indication of a damaged or not properly working delivery system. If there is any doubt, contact Alcon Technical Services.

The use of flammable anesthetics or oxydizing gases such as nitrous oxide (N_2O) and oxygen should be avoided. Some materials - for example cotton wool when saturated with oxygen - may be ignited by the high temperatures produced in normal use of the laser equipment. The solvents of adhesives and flammable solutions used for cleaning and disinfecting should be allowed to evaporate before the laser equipment is used. There is also danger of ignition of endogenous gases.

A qualified technician must perform a visual inspection of the following components every twelve months: warning labels, power cords, and fuses. In case of a deficiency, do not use the system; call Alcon Technical Services.

A qualified technician must verify the LIO-AT performance by performing an LIO-AT calibration, power output, and energy matrix test every twelve months to ensure the LIO-AT is operating within specifications. See Section Four of this operator's manual for instructions. If the LIO-AT is not operating within specifications, do not use the system; call Alcon Technical Services.

A qualified technician must check and record ground continuity and both polarities for leakage current every twelve months to ensure they are within the applicable standards (for example: EN60601-1/IEC601-1). If they are above the applicable standards, or 50% above initial measurement, do not use the system; call Alcon Technical Services.

Alcon LIO-AT Icons and Labels

The labels and icons shown in Figure 6-10 are found on the Alcon LIO-AT and are defined as indicated.

Refer to Operator's Manual

Laser Radiation

Laser Aperture

Use appropriate take-back system (See Environmental Considerations in this manual)

No Continuous Use of LIO-AT; 10 Minutes ON/20 Minutes OFF.

Manufacture Date

Fragile - Handle Laser Fiber With Care

CE Identification Label

cUL-UL Identification Label

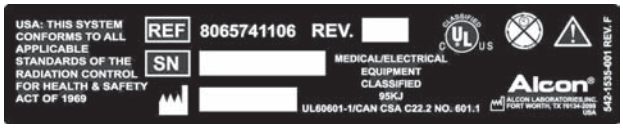


Figure 6-10 Alcon LIO-AT Labeling

Table 6-3 Alcon LIO-AT Technical Specifications

CATEGORY	SPECIFICATION
Dimensions	Width: 22.0 cm (8.7 inches) Length: 24.2 cm (9.5 inches) Height: 20.0 cm (7.9 inches)
Headset Weight	571 g (1.26 lbs.)
Electrical characteristics	See Heine power supply documentation.
Environmental Limitations	Operating: Temperature: 15° C≤ T° ≤ 35° C Relative Humidity: 10% to 90% with no condensation Storage: Temperature: -40° C≤ T° ≤ 70° C Relative Humidity: 10% to 90% with no condensation
Miscellaneous	*EyeLite®* Laser complies with CE MDD requirements (CE 0123). Not suitable for use in the presence of flammable anesthetic, oxygen, or nitrous oxide. System not protected against the ingress of water. Class IIb, IEC 601-1

Alcon LIO-AT Safety Features

- Labels on the instrument warn the operator about laser dangers.
- An On/Off (I/O) switch with indicator light controls the illumination power supply. When the indicator light is ON, the illumination power supply is ON.
- A protective housing covers the laser source completely and the beam will only exit through the LIO-AT exit window.
- A permanent Doctor Protection Filter on the LIO-AT headset protects the operator from incidental reflections of the laser beam. Prior to using the laser system, ensure that the filter is in good condition and that it has not been damaged, displaced, or moved.
- An emergency switch located on the *PurePoint*™ console can be used to shut off power to the laser. After using the emergency switch, pull it back to its initial position to restore power and start the instrument.

General System Precautions

All personnel operating laser systems shall follow each of the general safety precautions listed below.

- Never look into the laser beam.
- Restrict laser room access to people whose presence is required and who are familiar with the laser precautions.
- The laser room should be clearly identified with proper warning signs.
- Never direct the laser beam towards an opening.
- Never place any reflecting object in the path of the laser beam, or direct the laser beam toward objects that may reflect light (such as surgical instruments).
- Turn the *PurePoint*™ Laser OFF when not in use.
- Turn the LIO-AT illumination power supply OFF when not in use.
- Only authorized personnel thoroughly familiar with the recommendations contained in this manual may operate the LIO-AT. Any use of this laser system beyond the design intentions may result in dangerous exposure to laser radiation.
- Familiarity and understanding the use and application of the Indirect Ophthalmoscope is a prerequisite to using the LIO-AT.

Power Supply

For information on the desktop power supply (*Heine* EN 20-1) refer to the documentation provided with the power supply.

Connecting the Alcon LIO-AT to the *PurePoint*™ Laser

1. Connect the fiber from the LIO-AT termination to the Laser Aperture connector on the *PurePoint*™ front panel.
2. Attach the power cord from the LIO-AT to the power supply (see *Heine* EN 20-1 documentation) and switch on illumination.

CAUTION

Do not use the *Heine* standard desktop power supply EXTENSION cable (PN X-00.99.207) on the LIO-AT.

Using the Optics Overband

The pivoting overband allows the laser optics to be pushed up out of the operator's field of view (see Figure 6-11). It is locked in the end position and can only be released by pressing the Overband Adjustment Knob.

To pivot the overband, press the Overband Adjustment Knob with the right hand and pivot the overband into the desired position (up for the “rest” position and down for the “working” position). When the unit is properly adjusted, the overband can be lowered into the same pre-selected working position. Once set, changing the adjustments is required only if another examiner uses the instrument.

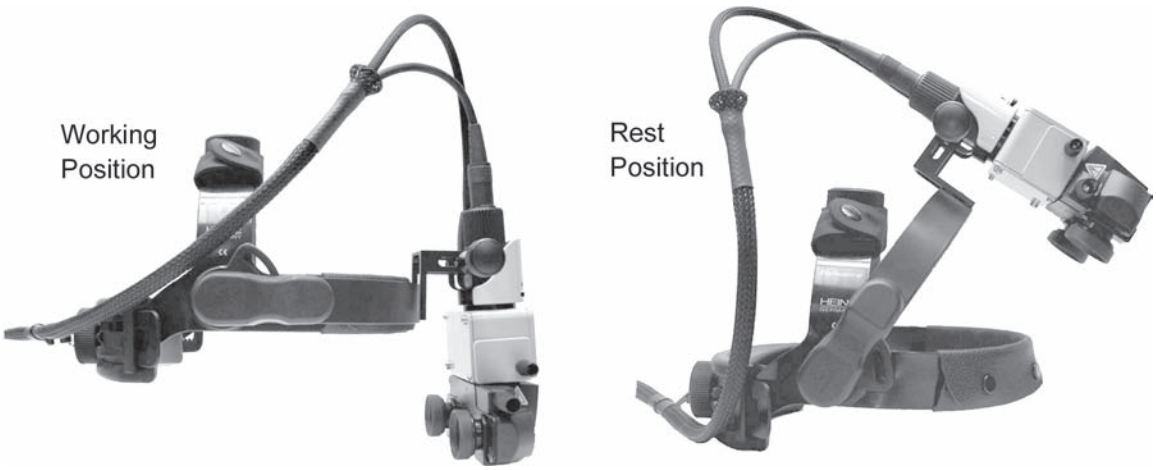


Figure 6-11 Adjusting the LIO-AT Overband

Observation Optics Adjustment

1. Loosen the Observation Optics Adjustment Knob (see Figure 6-36) so that the observation optics are free to move. The Observation Optics Adjustment Knob can be unscrewed and reversed to the other side for left-handed operators. Remove dust cover protecting delivery window.

2. Place the LIO-AT on your head and adjust the circumference and height using the Circumference and Height Adjustment Knobs so that the headband is firmly positioned but comfortable.

3. For convenience, use clothing clip to attach the fiber/cable assembly to clothing.

4. Move the eyepieces as close as possible to your eyes and look at the light spot at a distance of 30 cm. A small object (such as a pencil) held in front of the eyepieces at 30 cm must be clearly focused.

5. Using the Delivery Mirror Control Knob, adjust the optics so that the light spot is centered vertically in your field of view, then tighten the Observation Optics Adjustment Knob.

6. If the light spot is not centered horizontally, adjust the headband left or right accordingly.

7. Adjust the pupil distance setting by viewing the light spot alternately with the left eye then the right eye, and sliding the eyepieces so that the spot is centered within your field of view.

8. Remove the LIO-AT and look at the scale on the eyepieces to insure that the pupil distance is symmetrical. If not, center the headset and readjust the eyepieces. Correct adjustment of the optics is particularly important when examining small pupils.

Once set, changing the adjustments is required only if another examiner uses the instrument.

Controls for Observation and Illumination

The Aperture Lever (see Figure 6-12) allows you to choose between two different-sized illumination fields. The choice of illumination field size depends mainly on the size of the patient's pupil (the small illumination field is the recommended setting). The positions of the Aperture Lever for large and small illumination fields are marked with large and small black dots, respectively.

The Convergence Control Knob provides synchronized adjustment of both examination and illumination beams to suit the patient's pupil size. Wide convergence and parallax selection allows for maximum stereopsis with large pupils. Narrow convergence and parallax selection allows stereoscopic examination for small pupils. **NOTE: Use the small pupil setting and narrowest convergence angle at the small illumination field size setting; otherwise, clipping (shadow) of the illumination field will occur. The Convergence Control Knob adjustment range is limited in the LIO-AT to 50% of the original *Heine* range to accommodate for the laser beam delivery requirements.**

The Delivery Mirror Control Knob can be rotated to move both the illumination beam and the laser beam in the vertical plane.

CAUTION

Do not use the LIO-AT with the illumination power supply set at maximum intensity for more than 10 continuous minutes. The LIO-AT must be allowed to cool down at least 20 minutes between uses. Use as little observation/illumination light as possible and always switch power supply OFF after use.

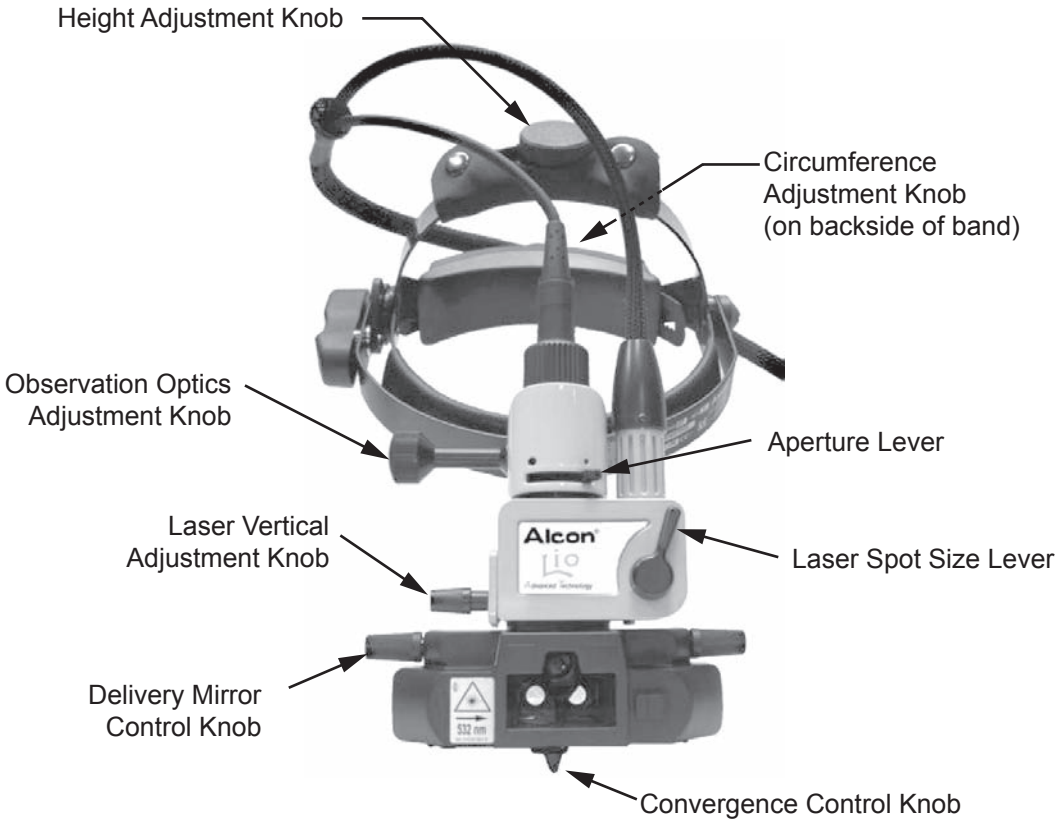


Figure 6-12 LIO-AT Controls and Adjustments

Using the Alcon LIO-AT for Observation

If the LIO-AT is used for illumination purposes only, the laser fiber does not need to be connected to the *PurePoint*™ Laser. **Note: Put dust cover on fiber termination to protect fiber when not connected to *PurePoint*™ Laser.**

1. Turn the illumination power supply on.

2. Adjust the light intensity with the power supply illumination control knob.

Using the Alcon LIO-AT for Laser Treatment

Using the system in this mode enables photocoagulation with the LIO-AT.

WARNING!

All the personnel in the room during the operation must wear protective safety eyewear with a minimum optical density OD 4 to filter 532nm radiation.

Before each use of the headset, the operator must examine the permanent Doctor Protection Filter for scratches, breaks, or alterations by looking through the ocular lens. If there is any doubt, discontinue use of device and please call Alcon Technical Service.

NOTE: The LIO-AT is shipped with +2 diopter ocular lenses installed. These may be changed with 0 (zero) diopter lenses.

1. If desired, change the ocular lenses by unscrewing the eyecup retainer in the counterclockwise direction, change each lens, and replace the eyecup retainers. Ensure that the new lenses are clean, i.e. no fingerprints or debris. Refer to the LIO-AT maintenance section for cleaning instructions.

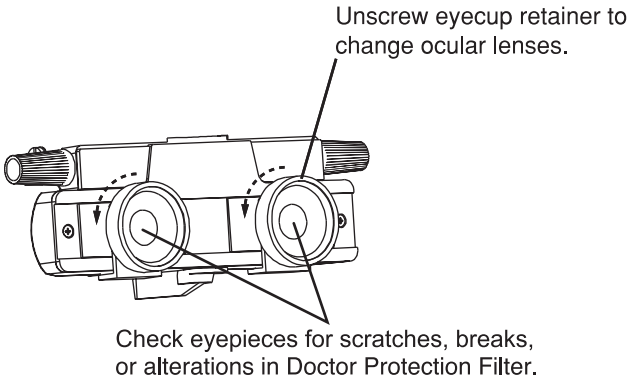


Figure 6-13
Eyecup Retainers and Ocular Lens on the Alcon LIO-AT

2. Turn the *PurePoint*™ console power ON and make the appropriate selections as specified in Operator's Manual.

3. Turn the LIO-AT Illumination power supply ON.

4. Select the appropriate illumination field size by toggling the illumination aperture lever to the desired setting.

5. Adjust the illumination intensity using the power supply illumination control knob.

6. Set the power below the nominal titration level by turning the Power Adjust knob on the *PurePoint*™ console counterclockwise. If the power parameter is not set below the nominal titration level, the message "Set Power < xxxx mW" will appear on the display.

7. If necessary press the Reset key to reset the shot counter to 0.

You can now adjust exposure time, aiming beam power, and treatment beam power.

8. Select exposure time by pressing the Exposure Time Adjustment arrow keys. If Continuous Wave mode is selected, "Mode: Continuous" is displayed.

WARNING!

Verify that all personnel are wearing protective eyewear (OD 4 or above at 532 nm) as soon as the system is in Standby/Ready mode, as well as during treatment.

NOTE: It is not recommended to use exposure times longer than 2 seconds in CW (Continuous Wave) mode. Depending on the thermal load, the system may shut down prior to the footswitch being released. A message will appear on the display indicating this condition.

9. Select the aiming beam intensity by turning the Aiming Beam Intensity knob.

WARNING!

Do not attempt treatment if aiming beam is not present. Patient injury may occur.

10. Turn the Power Adjust knob to set the desired treatment power.

11. Select the laser spot size using the Laser Spot Size Lever (see Figure 6-12). The positions of the Laser Spot Size lever for large (approximately 1mm) and small (approximately 0.5mm) laser spot sizes are marked with large and small black dots on the right side of the box, respectively. The change of laser spot size from large to small results in approximately four times increase in irradiance within the treatment area, provided that laser power was not adjusted.

    It is recommended to adjust laser power each time the Laser Spot Size Control setting is changed. Start with a low power, short duration pulse then increase until the desired coagulation result is achieved.

WARNING!

If unsure which settings are required, select a low power, short duration, and large laser spot size. Failure to properly adjust delivered energy may lead to patient injury.

12. Press the Standby/Ready key on the front panel. The green Standby LED turns OFF, and the red Ready LED illuminates.

NOTE: The footswitch must be released to proceed to Ready mode. If the footswitch is depressed during power-up or while in Standby mode, "Release footswitch" is displayed. Release footswitch and proceed.

13. Use the Laser Vertical Adjustment Knob (see Figure 6-12) on the laser delivery adaptation to aim the laser at the desired location within the illumination field.

14. Press the footswitch when ready to fire. The system will emit a 4 millisecond beep each time the laser fires. If the footswitch is not pressed within 2 or 10 minutes starting from entry into "Ready" mode, the system emits one beep and switches to "Standby" mode.

NOTE: The aiming beam is off during treatment beam exposure, except in repeat mode.

15. Repeat the firing procedure as often as necessary, making adjustments to power output and duration as appropriate to complete the treatment session.

16. When the treatment is completed, release the footswitch and press the Standby/Ready key. The green Standby LED illuminates and the system is placed in "Standby" mode.

NOTE: You can disable both treatment and aiming lasers by pressing the Laser ON/OFF switch. When turning the switch ON again, the system will default to the last terminal selection used before shutdown with the exception that LIO will default to Endo. Parameters shall be restored to the selected terminal.

Turn Off Sequence

1. Turn the Power Adjust knob to the minimum position.

2. Turn the key to the OFF (O) position and, for safety reasons, remove the key.

NOTE: The emergency switch on the front panel must only be used in case of emergency. After using the emergency switch, pull it back to its initial position to restore power and start the instrument.

3. Place the power switch on the rear of the system in the OFF (O) position.

NOTE: Between patients you can use the LASER ON/OFF switch to disable the treatment and aiming beams. The cooling system remains active in this mode.

4. Place the illumination power switch to the OFF (O) position.

ALCON LIO-AT MAINTENANCE

This section contains information for basic care and maintenance of the instrument. If a problem occurs on the instrument, call the Alcon Technical Services department and give details of the breakdown circumstances and effects. From these elements, a technician will evaluate the problem and determine the maintenance requirements.

WARNING!

Maintenance on any part of the laser system must be performed with the laser off and the main power plug disconnected.

Checking System Appearance

The condition of the system hardware components must be checked periodically to identify any fault which might cause incorrect operation of the system.

- Chassis appearance.
- Operation of controls and indicators.
- State of the fibers and connecting cables.
- Check permanent Doctor Protection Filter for damage; i.e., scratches and cracks.

Any damaged hardware must be replaced. Contact your Alcon Technical Service representative.

CAUTION

Care and cleaning operations must be performed with the instrument turned off and power disconnected.

Headset Care and Maintenance

- The eyepieces and the glass in front of the binocular assembly can be cleaned with a soft cloth (dipped in alcohol if necessary).
- The cushions for forehead and nape can be removed for wiping with soapy water.
- The rest of the instrument can be cleaned with a soft cloth dipped in alcohol. Under no circumstances should cleaning fluids be used.

Storage

The LIO-AT should be stored either on the Headset Stand or in the Storage Case when not in use to prevent inadvertent damage to the headset or cables.

Changing The Illumination Bulb

1. Ensure that power switches on the *PurePoint*™ Laser and illuminator power supply are in the OFF (O) position.

2. Disconnect power cord from power source.

3. Pull the cord socket away from the bulb connector (see Figure 6-14).

4. Unscrew and remove the bulb connector, then pull the bulb out of the socket.

WARNING!
The bulb and bulb connector may be hot, and can burn your fingers.

CAUTION
Do not touch the glass part of the new bulb directly with your fingers. Oil from fingers can dramatically reduce bulb life.

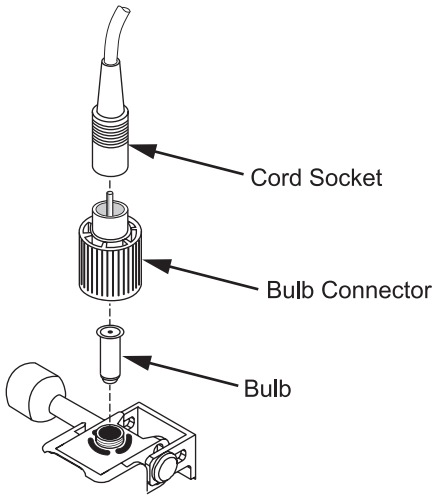
5. Clean the new bulb with a soft, clean cloth.

6. Insert the new bulb so its locating pin engages in the housing slit.

7. Rest the bulb connector on the base of the bulb and firmly screw it in.

8. Re-connect the cord socket.

Figure 6-14
Alcon LIO-AT Bulb Replacement



Calibration
Alcon Surgical recommends that the Laser Indirect Ophthalmoscope be calibrated on an annual basis as an integral part of the laser system with which it is used. Refer to Section Four for calibration information.

ALCON LIO-AT SPARE PARTS AND ACCESSORIES

Bulb 6V	P/N 542-1119-001
Laser Protective Eyewear	P/N 8065750107
28 D Lens	P/N 8065750158
20 D Lens	P/N 8065-6879-01
+2 D Ocular Lens	P/N 301-361
0 D Ocular Lens	P/N 301-362
Headset Stand	P/N 8065750891

SECTION SEVEN
INDEX

TO BE DETERMINED...

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