



The Optronics 6ES Patternless Edger System

User's Manual

Rev. 1.082

October 20, 2004

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, sharp edges, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware or software, nor to provide for every possible contingency in connection with installation, operation, or maintenance. National Optronics assumes no obligation of notice to holders of this document with respect to changes subsequently made.

Safety Reminders

- DO NOT operate this machine until you have read and understood this manual—if operating for the first time; ask your supervisor or a qualified operator for help.
- DO NOT attempt to bypass or circumvent the built-in safety features: the safety switches and the chip chute cover. They are in place for operator protection—any alteration, removal or damage can cause a serious safety hazard. Doing so will void your warranty.
- DO NOT attempt changing cutters or any machine maintenance or repair until you have turned the cutter motor switch to OFF.

ROTATING CUTTERS CAN CAUSE SERIOUS INJURY. USE EXTREME CAUTION WHEN WORKING NEAR THE CUTTERS.

- Plug unit into a grounded receptacle ONLY! Do not cut off the ground prong or use any cord or adapter without a ground prong.
- Always assume that the power and motor switch are ON—do not attempt any cutter change or maintenance until you have verified they are OFF.
- When changing inserts, always make sure that the insert clamp(s) are tight before starting the machine.
- Never turn the machine or the cutter motor on while someone is performing maintenance or repair.
- Always wear safety glasses with side shields when servicing the machinery.
- Never operate this machine while on medication which may affect sight or coordination.
- Under normal operation, the 6ES produces sound levels within the requirements of the Occupational Safety and Health Administration Regulations. However, the use of the 6ES with other noise producing equipment may raise sound levels to a degree where hearing protection should be worn by the user. Therefore, if the users' environmental circumstances cause a projected noise dose of 85% or more (appropriate testing is recommended), the use of hearing protection is highly recommended. Further, sensitivity to noise levels may depend on the individual user. While the 6ES operates within accepted noise standards, the use of hearing protection should be considered by the user should the user experience discomfort or abnormal hearing sensations during use.
- The 6ES should be lifted very carefully by two people. Before attempting to move or lift the edger, ensure that all connections (electrical, communications, and vacuum) have been disconnected from the edger. To lift the edger, each person should carefully lift the edger from the bottom of each edge, using both hands.

THINK SAFETY FIRST—ALWAYS PRACTICE SAFE WORK HABITS.

Content of This Manual

- Chapter 1. Prerequisites:** Includes National Optronics contact information, requirements for use such as electrical supply and operating conditions, and general specifications of the Optronics 6ES Patternless Edger System.
- Chapter 2. Getting Started:** Includes instructions on initial installation and daily maintenance.
- Chapter 3. Commonly Performed Tasks:** Includes instructions for changing the blade, verifying size and bevel placement, updating the software code, and changing the vacuum bag and paper filter.
- Chapter 4. Operating the 6ES (Standard Operation):** Includes tasks performed while using the 6ES in a standard operation, such as pulling down a job, edging (roughing and finishing), polishing, grooving, and safety beveling.
- Chapter 5. Calibrating the 6ES:** Includes instructions on all aspects of calibration.
- Chapter 6. Performing As Needed Maintenance:** Includes instructions for performing non-daily maintenance tasks. (For daily maintenance tasks, refer to Chapter 2.)
- Chapter 7. Advanced Configuration & Special Considerations:** Includes instructions on less commonly performed tasks with the 6ES Edger System such as changing display options on the *Job Screen*, creating alternate selections on the *Blank Materials* screen, reading and interpreting data collected in the *Log Screen*, and using less common calibration settings. These tasks are generally performed by a lab manager or a National Optronics technician and are password protected.
- Appendix A. Screen Field Definitions:** Includes reference information including definitions of the fields on the screens you will see on the 6ES's monitor.
- Appendix B. 6ES System Messages:** Describes and gives more detail about the messages you will see on the 6ES's monitor (warnings, information, etc.).
- Appendix C. Spindle Assembly:** Shows an exploded view of the spindle Assembly.
- Appendix D. Statement of Warranty:** Includes the Warranty Statement for the 6ES.

Changes from the Previous Edition

The 1.04 edition includes a change to the takeoff value when calibrating the Wheel 2 Size Bias. The suggested takeoff is now 0.30 since this is what we use in the dry-wet cycle.

The 1.05 edition includes two new fields on the *Advanced Setup Screen* and on the *Servo Screen*, neither of which should be adjusted without the advice of an Optronics technician.

The 1.06 edition includes a correction to the drawing in Appendix C.

The 1.07 edition includes a new drawing of the Accessory Kit, which now includes a one-ounce cup to be used when mixing Tri-Cool with distilled water prior to filling the water bottle—refer to Chapter 2 for more information.

The 1.08 edition includes a modified drawing of the Accessory Kit in Chapter 2 and new information about A/R coating for thin lenses—refer to Chapter 7 for more information. There are also three new materials shown on the *Blank Materials Screen*, field definitions supplied in Appendix A. In addition, this software version includes a new method for cleaning the Polishing Wheel—refer to Chapter 3 for details.

The 1.081 edition includes a small change to the *Blank Materials Screen* and the *Advanced Setup Screen*. Previously, there was a pressure field on the *Advanced Setup Screen*. This functionality has been moved to the *Blank Materials Screen* (field definitions supplied in Appendix A). This change simplifies and improves the calibration of the Polishing Wheel—refer to Chapter 5 for details.

The 1.082 edition includes a small change to the Accessory Kit drawing in Chapter 2 and additional reference material (part lists) in Appendix C.

This manual was released with Software Version 1.11. Future software upgrades do not necessarily affect the manual. Call technical support if you feel you need a newer manual.

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Chapter 1

Before You Begin

Before You Begin

General Description

The 6ES is a state-of-the-art 3-axis Patternless Edger manufactured by National Optronics, Inc. It will process Polycarbonate, Hi-index and CR-39 lenses with exceptional accuracy. Standard features include pin beveling, polishing, grooving, and automatic decentration. The clamping pressure applied by the 6ES's electric chuck is automatically adjusted by the selection of lens material, addressing A/R crazing issues.

In addition to its superior mechanics, the 6ES's unique software can accumulate statistical lens information that most operators now keep manually. Automatic prompts will remind operators to maintain their equipment.

For Further Assistance

If you should require any further assistance, National Optronics can be contacted directly between 8:30 AM and 5:00 PM ET Monday through Friday.

National Optronics
100 Avon Street
P.O. Box 1547
Charlottesville, Virginia 22902

Toll-free: (800) 247-9796

Tel: (434) 295-9126

Parts Order Fax: (888) 239-0778

General Fax: (434) 295-7799

To Order Parts:

Please call our Customer Service Department at 800-247-9796 ext. 317.

Please know your part number, serial number of the machine, and Customer Account Number.

If you do not know the part number of the part you need to order, you will need to talk with Technical Assistance. The following guidelines for Technical Assistance will apply in that circumstance.

If you need to return a part, the Customer Service Department will issue a Return Authorization Number to you and explain the procedure for returning parts.





For Technical Assistance:

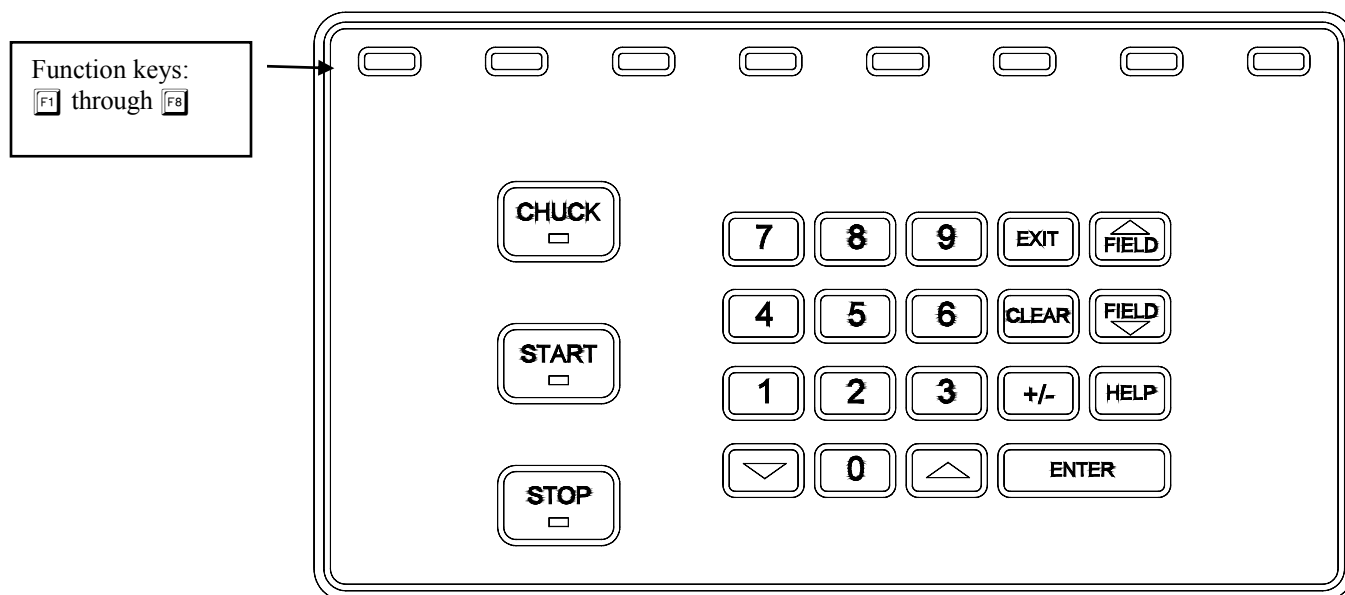
Please call our Technical Service Department at 800-247-9796 ext. 314 and know the serial number of your machine and Customer Account Number. If you purchased your equipment from National Optronics, there is no charge for telephone support. If, however, you purchased your Optronics equipment elsewhere, you will be charged for telephone support at the rate of \$47.50 per half hour.

If you would like to schedule an on-site Technical Service visit, please call Technical Support at 800-247-9796 ext. 314. Please know the serial number of your machine and Customer Account Number for requesting a Technical Service visit. There is no charge for warranty service visits. If your machine is out of warranty, there is a charge of \$55.00 per hour for travel to and from the equipment location and \$125.00 per hour (two-hour minimum) for the Technician's time at the location. Any additional travel expenses incurred, such as airline tickets, hotel rooms, etc., are billed to the customer.

The rates published above may be subject to change without notice.

Conventions Used in This Manual

Wherever possible, keys on the 6ES keypad are identified with a graphic representation of the key, such as, the  key. The function keys run along the top of the keypad and are associated with buttons on the screen. These buttons have different meanings depending on which screen you are viewing. Although they are not marked, these keys will be identified as  through , such as the *Job* function key .



Names of screens and fields within screens will be placed in *Italics*, for example, the *Setup Screen*. Values in a field will be in quotation marks, as in, The default for the *New Code Source* field is “Floppy.”

Requirements for Use

115 VAC 60 Hz 20A Electrical Supply

This is standard outlet power in the United States. The Optronics 6ES Patternless Edger System should be on a dedicated circuit (no other electrical loads connected to the same circuit) to ensure a uniform, consistent power supply. The maximum continuous power consumption of the edger, including the vacuum, is 14.3 amps. The 6ES must be properly grounded—do not use any adapter that will bypass the grounding plug.

Power fluctuations can adversely affect production and machine integrity. Please contact the factory if you have power glitches or questions about the power requirements.

Note

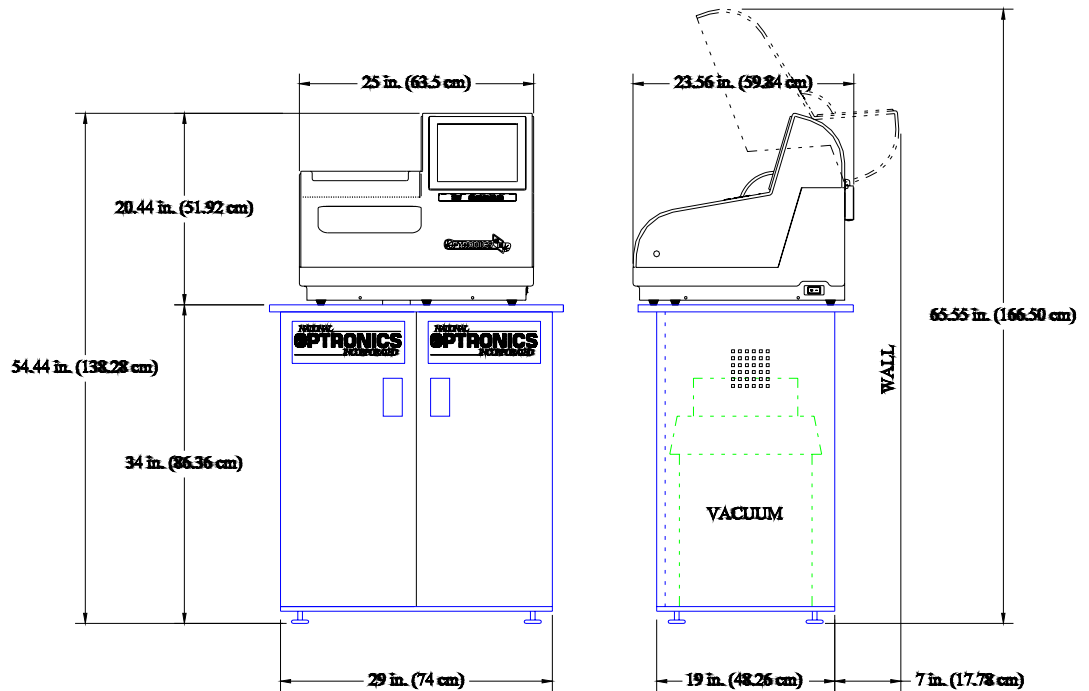
The 6ES is available for 230V 50 Hz installations. It is also recommended for 230V units to be installed on a dedicated circuit.

Operating Conditions

The 6ES edger is designed for indoor use only. The edger is designed to operate safely at a temperature range of 5° C to 40° C, at altitudes up to 2000 meters.

General Specifications

The following drawing illustrates the general specifications of the Optronics 6ES Patternless Edger System:



General Specifications

Cutters

Coated carbide.

Cutter Motor

Adjustable speed (up to 20,000 RPM) DC Brushless, ¾ Hp.

Bevel Placement

3-Axis Numerical Control; 8 bevel selections with independent point control.

Vacuum

2.5 HP, 109 CFM (9A).

Lens Materials

CR-39, Polycarbonate, All High Index, Trivex, NO GLASS.

Statement Against Misuse

The 6ES edger is designed to edge **plastic lenses only**. Any other use of the machine will compromise its safety protection features.

Caution

The 6ES will edge ONLY PLASTIC LENSES. Under no circumstances should any attempt be made to process a glass lens on this unit!

Chapter 2

Getting Started & Daily Maintenance

Section 1: Initial Installation

National Optronics can provide field technicians who will install your equipment and set up the Optronics 6ES Patternless Edger System to meet the needs of your specific operation. You can, however, perform these tasks yourself. Use the information in this chapter as a guide through the initial installation and daily cleaning. To learn about the procedures for changing the cutter blades, checking size and bevel position, and vacuum bag replacement, read Chapter 3, “Commonly Performed Tasks.” To learn about tasks performed while using the 6ES in a standard operation, such as pulling down a job, edging (roughing and finishing), polishing, and safety beveling, refer to Chapter 4, “Operating the 6ES (Standard Operation).” To learn about calibration instructions, refer to Chapter 5, “Calibrating the 6ES.”

There are four phases to setting up the 6ES:

1. Setting up the cabinet (skipped if you already have one)
2. Preparing the work bench
3. Setting up the vacuum unit
4. Setting up the 6ES Edger itself (physical setup)

Within the final phase, physically setting up the 6ES, there are four main steps:

1. Placing the 6ES on the cabinet and connecting the vacuum unit
2. Removing the shipping brackets
3. Connecting the 6ES to your electric outlet
4. Filling the coolant reservoir (the water bottle)

Note

These procedures should be followed in sequence: the completion of one step may depend on the one previous to it. Tools are provided in the accessory kit (see the drawing on page 2- 13) to aid in both the installation and subsequent operation. The 6ES can be shipped with a cabinet, which is custom designed for the application. The laboratory can either: (1) use the custom cabinet, or (2) mount the edger on a standard workbench.

Setting Up the Cabinet

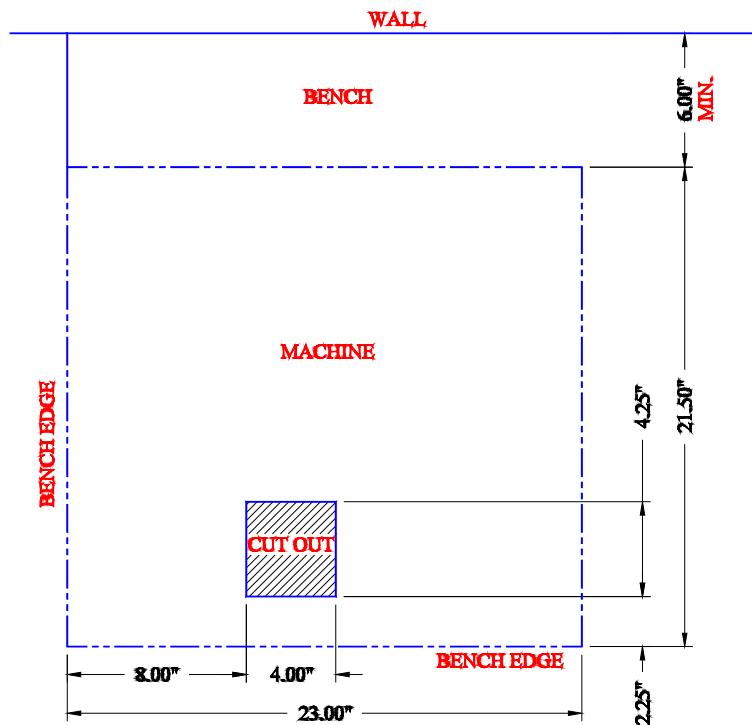
If the edger is being installed on a workbench already present in the lab, proceed to “Preparing the Workbench” below for making the necessary cutouts.

To set up the Optronics workbench, follow these steps:

1. Remove the cabinet and cabinet top from the box.
2. Place cabinet top, white side down, on floor.
3. Place cabinet upside down on cabinet top, with the doors on the same side as the cutout in the cabinet top.
4. Attach cabinet to cabinet top with screws provided.

Preparing the Workbench

Prepare the bench surface to be used by cutting an opening for the vacuum hose and vacuum power cord (if the opening does not already exist) as shown below:



Note

The Optronics cabinet has an additional hole in the back panel, approximately six inches from the floor, for the vacuum power cord. You may need to cut a hole in the cabinet or move the cabinet two inches out from the wall to supply power to

the 6ES itself. The power connection for the 6ES is located on the back of the unit.

Setting Up the Vacuum Unit

There are two parts to setting up the vacuum unit: assembling the vacuum and setting it up inside the cabinet.

Assembling the Vacuum

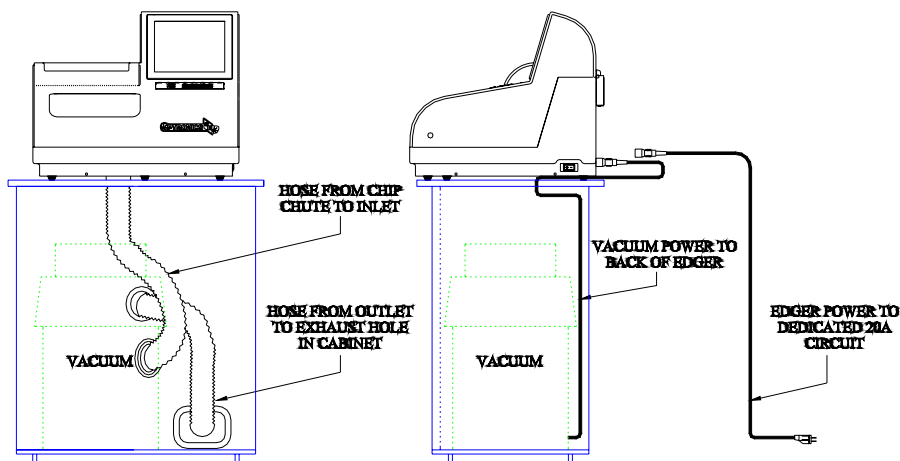
To assemble the vacuum, follow these steps:

1. Remove the vacuum from the box.
2. Open the vacuum and remove the accessories from inside the canister.
3. Install the small motor filter bag, and place the large dust collection bag around the inlet.
4. Replace the vacuum top, making sure the snaps are tight.
5. Turn the switch to the ON position—its cycling is controlled automatically.

Setting Up the Vacuum Inside the Cabinet

If you are using a different cabinet than the one Optronics provides, make sure that you have a hole in the top of the cabinet for the vacuum hose (refer to “Preparing the Workbench” on the previous page). To set up the vacuum correctly, follow these steps:

1. Place the vacuum unit under the workbench so that the short hose can reach from the vacuum inlet to the underside coupling of the edger chip chute (refer to the left portion of the drawing shown below).
2. Run the power cord through the vacuum/power cord hole in the top of the cabinet. After you have placed the 6ES on the workbench, plug the vacuum power cord into the back of the 6ES (refer to the right portion of the drawing shown below).



3. **Properly ground the vacuum:** A green, yellow-striped ground wire extends from the can of the vacuum with an eyelet attached to its end. There are three suggested methods to grounding the vacuum. In order of preference, these methods are: (1) Attach the eyelet directly to the ground frame inside the housing of an electrical outlet (preferred) or to the faceplate screw on the front of the electrical outlet. (2) Attach the eyelet to a grounded metal water pipe. Make sure the water pipe is grounded, using an ohmmeter to check the continuity between the pipe and earth ground (grounding rod). (3) Attach the eyelet to the front right bolt of the left spindle support, running the ground wire up through the chip chute hole.
4. **Properly ground the vacuum hose:** The green, yellow-striped ground wire, attached to the anti-static segment of the vacuum hose, has an eyelet attached to its end. Attach this eyelet to the same ground as the vacuum itself if the wire will reach. (The three suggested methods to grounding the vacuum are the same as listed above for the vacuum itself, in that order of preference.)

Setting Up the 6ES

There are four main steps to setting up the 6ES:

1. Placing the 6ES on the cabinet and connecting the vacuum unit
2. Removing the shipping brackets
3. Connecting the 6ES to your electric outlet
4. Filling the coolant reservoir (the water bottle)

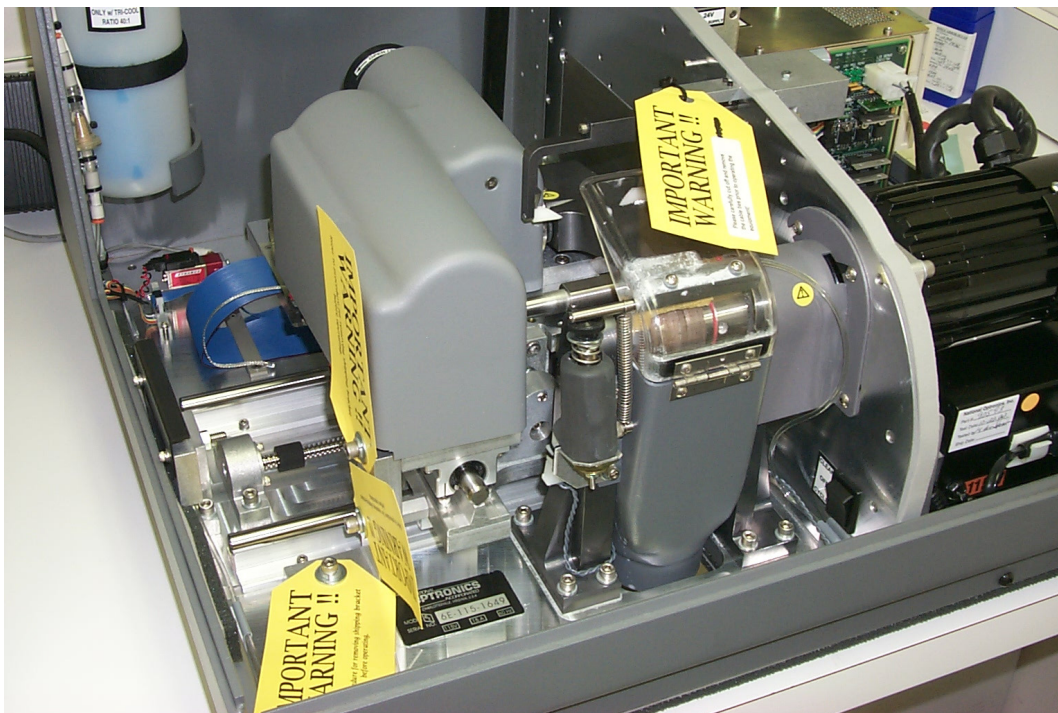
Placing the 6ES on the Cabinet

To place the 6ES on the cabinet and connect the vacuum correctly, follow these steps:

1. Remove the unit from its shipping foam and place it on the cabinet or table with all six feet on the bench top, and the cutout in the base plate roughly aligned with the cutout in the bench top.
2. Plug the vacuum power cord into the back of the edger.
3. Attach the vacuum hose from the bottom of the chip chute to the inlet (lower hole) of the vacuum.

Removing the Shipping Bracket

Remove the shipping brackets and the wire tie marked with the yellow tags (refer to the picture shown below). The brackets can be removed with a 3/16-inch hex wrench found in the hex key set. Each item to be removed is identified with a yellow tag.



Connecting the 6ES to an Electric Outlet

As with all electrical equipment, you must ensure proper power connection for proper functionality.

Note

The 6ES Edger must be connected to a dedicated 115V 20A circuit.

Connect the 6ES to power following these steps:

1. Before connecting power, make sure that the edger ON/OFF switch is “OFF.”
2. Plug the female end of the power cord into the back of the unit and the male end into the wall outlet, making sure that the connections are secure.

Filling the Coolant Reservoir (the Water Bottle)

The coolant reservoir feeds the coolant to the sponge used for keeping the polishing wheel from overheating. Ensure that there is always coolant (the mixture of distilled water and Trico's Tri-Cool coolant) in the reservoir. Failure to do so may damage the machinery.

To fill the coolant reservoir, follow these steps:

Using the one-ounce measuring cup from the 6ES Accessory Kit, mix one ounce of Trico's Tri-Cool coolant with one gallon of distilled water; then fill the reservoir from this mixture. This ratio of distilled water to Tri-Cool coolant is 128:1.




Note

If the coolant reservoir is totally empty, you may need to "prime the pump" before it will flow properly. The easiest way to do this is to follow these steps:

1. Go to the *Cleaning Screen* (from the *Setup Screen*, press the *Cleaning* function key **F2**).
2. Move the bevel carriage to the right (**F3** on the *Cleaning Screen*) to gain access to the solenoid.
3. Set the *Water Flow* field to **20**.
4. Down by the solenoid, disconnect the water line running from the pump (to the solenoid).
5. Remove the lid of the water bottle.
6. Hold the water line you just connected so that it will squirt water back in the water bottle.
7. Press the *Pump on* function key **F5** on the *Cleaning Screen*.
8. Watch the clear tubes to see if water is coming out—it should be shooting water into the bottle.
9. Ensure that the water is flowing properly, then press the *Pump off* key **F6**.
10. Reconnect the water line to the solenoid.
11. Turn the pump on again and wait for the air to be cleared from the hose leading to the sponge.
12. Turn the pump off once the air is cleared and the sponge is saturated.

Wetting the Sponge for Initial Use

For the first time you use the 6ES, follow these steps to wet the sponge:

1. Go to the *Cleaning Screen* (from the *Setup Screen* press the *Cleaning* function key ).
2. Press the *Pump on* function key  until the sponge is wet.
3. Press the *Pump off* function key  after the sponge is completely wet.



Note

Using a water bottle is an alternative way of wetting the sponge, but the method described above ensures that the water line is full in addition to wetting the sponge.

Powering Up and Calibrating the Probe

Each time you turn on the power switch for the 6ES, you will be prompted to calibrate the probe. Follow the steps discussed below:

To calibrate the probe:

1. Locate the black, 58-mm diameter, calibration disc and the Pattern Duplicator Adapter (PDA) in the accessory kit.
2. Turn on the power switch.
3. You will see a message box on the initial 6ES screen stating, “WARNING 101 PLEASE VERIFY THAT PROBE TIPS ARE PULLED TO THEIR FULL FRONT LIMIT. Mount probe calibration disk. Press Continue to calibrate probe.” When you see this prompt, chuck the probe disk (meaning insert the PDA and disk into the Chuck and press the  key to lock it into place). Also verify that the Probe tips are pointed straight down—see pictures displayed below.
4. Press the Continue key  and wait while the probe calibrates itself.
5. When 6ES is finished calibrating the probe, remove the PDA and disk.



Probe in Correct Position—If the probe tips are *NOT* straight down, manually pull them forward into position.



Probe in Incorrect Position—Note that the tips are slanted, not straight down.

Setting Up Communications for Job Information

Overview

The settings on the *Communications Screen* are shown in the screen sample below and discussed in the sections that follow.

The screenshot shows the 'Communications Screen' with a blue header bar. Below the header, it says 'EXIT returns to Advanced Setup Screen'. The screen is divided into two main sections: 'Comm Settings' on the left and 'Software' on the right. In the 'Comm Settings' section, there are several fields: 'Arcnet Connection' (set to 'None'), 'Com 1 Connection' (set to 'Host'), 'Com 1 Baud Rate' (set to '19200'), 'Protocol' (set to 'OMA'), 'Max TRCFMT' (set to '4'), 'OMA Init Level' (set to 'None'), and 'Com 2 Connection' (set to 'None'). In the 'Software' section, there are several buttons: 'Load Software', 'Backup System', 'Save Setup Nums', 'Restore Setup From Floppy', 'Restore Log From Floppy', and 'Start Modem Communications'. At the bottom of the screen, there is a status bar with the text '+/- or INC/DEC to Change' and a row of buttons: 'Job', 'Diagnostics', 'Arcnet', 'COM1', 'COM2', 'Load SW', and 'Backup Sys'.

Comm Settings

Arcnet Connection

(Optional Equipment) Specifies the type of Arcnet connection (Host, 4T, Saturn, or None).

Machine Node ID

(This field disappears when Arcnet Connection is set to “None.”) Specifies the Node ID of the Arcnet connection.

Protocol

(This field disappears when Arcnet Connection is set to “None.”) NOP is the protocol being used for each of the following job sources:

- A Saturn tracer
- A 4T tracer
- A host computer (“Host”)

Com1 and Com2 Connection

The choices for Com1 and Com2 vary depending on what you have selected in the Arcnet Connection field. If you have “Host,” “4T,” or “Saturn,” selected for the Arcnet Connection field, your choice for Com1 (or Com2) is “Barcode” or “None.” If you have “None” selected for the Arcnet Connection field, your choices include “4T,” “3B” and “Host,” as well as “Barcode” and “None.” You can only have one Barcode selection.

Baud Rate

(This field only appears when the Com 1 Connection has a Barcode, Host, 3B, or 4T configured.) This field shows the baud rate for the Com 1 or Com2 Connection. The default is 9600 (or 19,200 if the Protocol is GC). Normally, the 6ES software will supply the correct baud rate automatically. The edger will not be able to communicate if this parameter is different from the baud rate of the attached device.

Protocol

(This field only appears when Arcnet Connection is set to “None” and Com1 or Com2 has a 4T or Host configured.) The choices for Host are OMA or GC; the choice for 4T or 3B is OMA.

OMA Init Level






This field allows you to set the level of OMA initialization to Auto, Preset, or None. Auto is the best choice most of the time.

Max TRCFMT

This field allows the operator to set the highest trace format used by the 6ES for OMA communications. This field defaults to 4 for Packed Binary communications. A value of 1 should be used when communicating with 4Ts earlier than Version 1.23.

Changing Communications Settings

To change the current communications settings, follow these steps:

1. From the *Setup Screen*, press the *Advanced Setup* function key .
2. Press the *Communications* function key .
3. From the *Communications Screen*, use the *Field Down* key  to move to the field(s) you want to change and press the increment  or decrement  keys to change the selection. (Refer to the field definitions above and on the previous page.)
4. Enter the password if prompted.

Note









If you receive job numbers using a barcode reader or use a computer connected through a serial port, use the *Communications Screen* to set up the COM ports.

Section 2: Daily Cleaning & Other Daily Maintenance of the 6ES

Daily Cleaning of the 6ES

Keeping the 6ES clean is the largest single component in proper maintenance. Thorough daily cleanings are strongly recommended and will prevent many service problems and greatly extend the service life of the edger.

To clean the interior:

1. Go to the *Setup Screen*, and select the *Cleaning Screen* function key .
2. Remove the 1½-inch hose from the vacuum canister's inlet and install the 1½-inch hose fitted with the crevice tool.
3. Move the rocker switch on the front left side of the center wall to "CLEAN" position—see label next to the switch. This will turn on the vacuum, independent of the 6ES's operation.
4. Vacuum the debris from the inside of the 6ES with the crevice tool, being careful not to disturb the control wiring.
5. When ready to move on to the next stage of cleaning, press the *Size* function key  or make sure the cursor is on the *Move Size Carriage* option and press the  key to move the size carriage. Then vacuum the spots you could not reach before.
6. Then press the *Bevel* function key  or use the *Field Down* key  to move the cursor to the *Move Bevel Carriage* option and press the  key to move the bevel carriage. Then vacuum the spots you could not reach before.
7. Press the *Home* key  or move the cursor to the *Home Carriages* option and press the  key to move the carriages back to the home position.
8. Reverse steps 2 and 3 to return the vacuum to normal operation; that is, reconnect the hose and put the switch back to "CYCLE" position.
9. Pull the chip chute cover back and clean around the sponge, removing any debris.
10. The exterior may be cleaned with a mild, non-abrasive detergent.

Note

If you bump the probe during cleaning, you should perform the probe calibration procedure—refer to Chapter 5 for instructions on calibrating the probe.

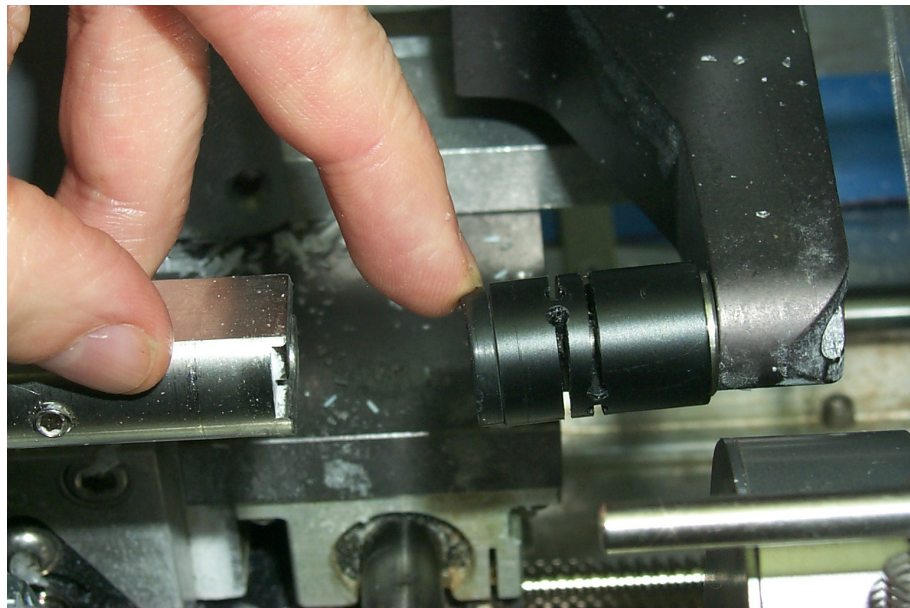
Other Daily Maintenance

Checking the Probe Tip for Wear

If excessive wear is present, replace the worn item. Run the probe calibration. Cut a test lens to verify calibration. For information about calibration, refer to Chapter 5, “Calibrating the 6ES.”

Checking the Clamp Pad

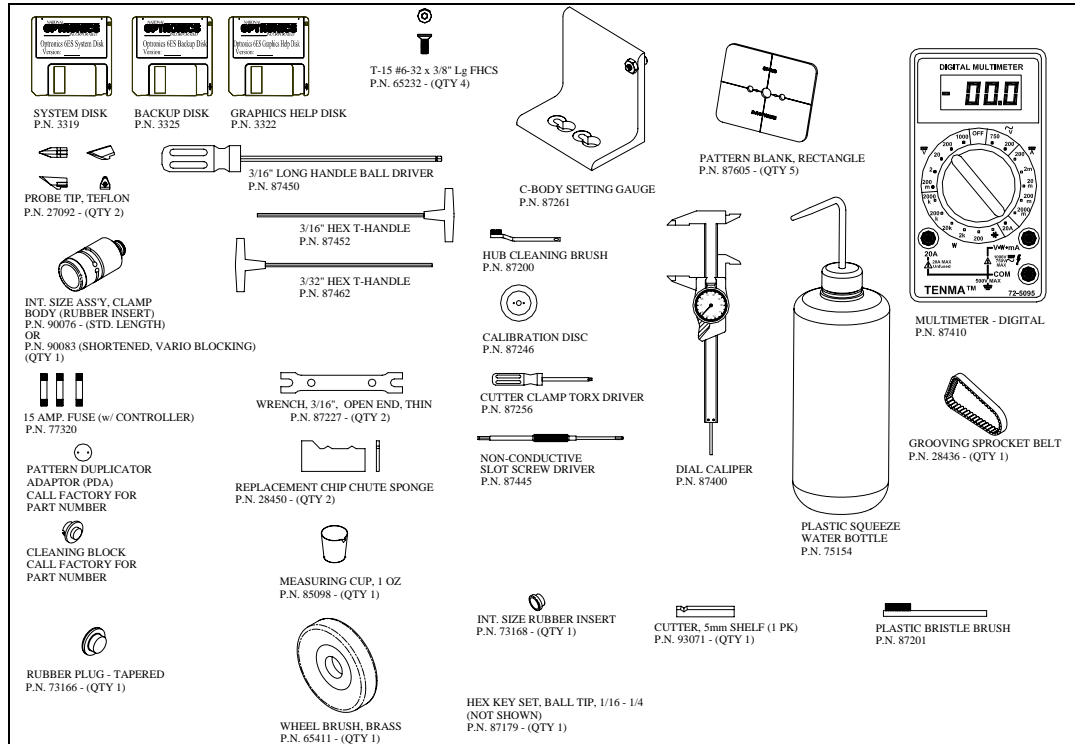
If the pad is torn or loose, replace with a fresh pad. Notice the clamp pad in the picture shown below:



To replace the pad, apply outward pressure to the edge of the pad and pull the old one out. Press the new one in its place.

The Accessory Kit

Use the accessories provided to perform setup and other tasks such as daily cleaning. The drawing shown below identifies the accessories that are usually shipped with the 6ES.



Chapter 3

Commonly Performed Tasks

To learn about the procedures for changing the cutter blades, checking size and bevel position, and vacuum bag replacement, read this chapter. For daily operation procedures, refer to Chapter 4.

Changing the Cutter Blade

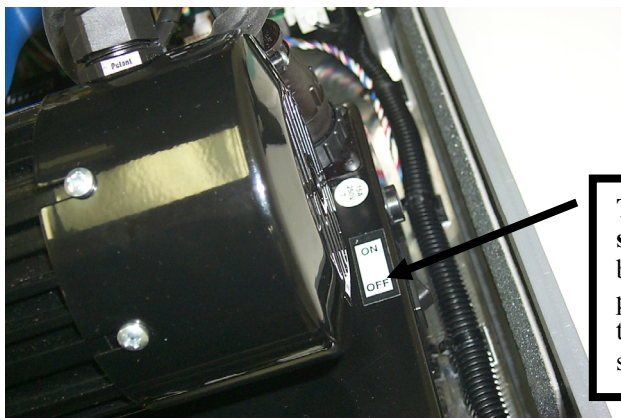
The blade needs to be changed approximately every 300 cycles for a carbide blade or every 3,000 cycles for a diamond-coated carbide blade. There is a *Status Indicator* in the lower right corner of the *Job Screen* (the Status area) that shows how many cycles since the last change. This *Status Indicator* turns yellow at 90% of the blade's life (according to the blade type and life specified on the *Setup Screen*), so that you can ensure that you have a replacement blade in stock (Coated Carbide Blade Part #: 93074, Carbide Blade Part #: 93071; 10-pack: 93072). When the indicator turns red, it is time to change the cutter blade.

Note

We *strongly* recommend using the National Optronics cutter blade specified above. Using alternative cutter blades may cause size, bevel, and finish problems.

To change the blade, follow these steps:

1. Press the case top release buttons and lift the case top.
2. Turn off the power switch on the cutter motor controller (far right side of the 6ES).

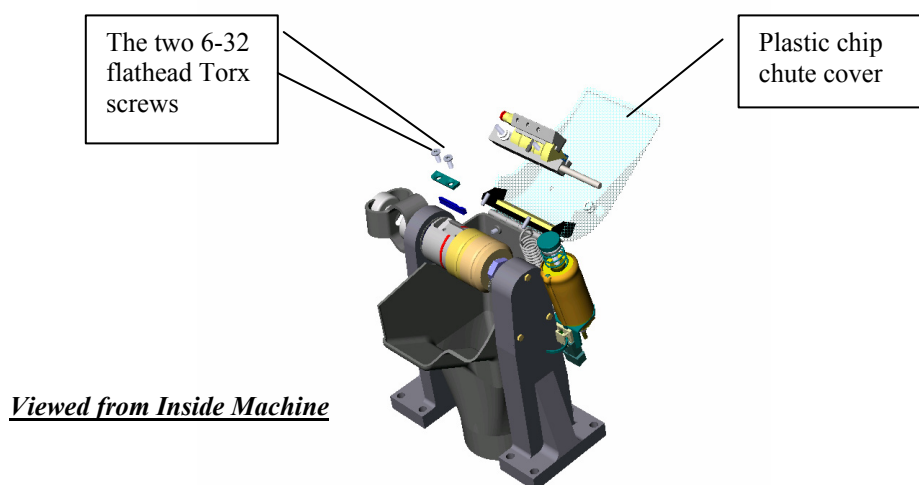


Turn this switch OFF before proceeding to the next step.

Warning

Turn switch to cutter motor OFF before pulling the chip chute cover back and touching the cutter blade.

3. Pull back the plastic chip chute cover.



4. Use the Optronics driver (labeled “Optronics” on the handle) that came in the 6ES accessory kit to remove the two 6-32 flathead Torx screws holding the clamp in place.

Note

Avoid dropping the two Torx screws down the chip chute into the vacuum bag. One method of avoiding that would be to stuff a paper towel or rag into the chip chute opening before removing the screws.

5. Remove the clamp. If you have trouble getting it to fall out, insert the end of the Torx wrench into the holes where the screws had been and lift the clamp out. Note that the rounded-off end is on the right side—you will place it back in the same way in Step 9 below.
6. Carefully lift the blade out—it may be advisable to wear tight-fitting gloves to avoid cutting your fingers. Note that the bevel is on the left. (You will need to place the new blade into place the same way the old one comes out.)
7. Blow the dust out of the blade and clamp area, then clean with alcohol.
8. Place the new blade in and slide it to the right (away from the hub) with the right edge of the blade touching the right edge of the pocket.
9. Replace the clamp with the rounded-off side on right.
10. Replace the screws while holding the blade in place.

Warning

A new blade is *very* sharp. Be extremely careful while holding the blade in place in Step 10 above to avoid cutting your finger on the blade.

11. Release spring loaded chip chute cover and make sure it springs back into its original position.
12. Turn on the motor controller power switch that you turned off in Step 3 above.
13. Close the case.

Note

If you bump the probe during this process, recalibrate the probe before cutting a lens—see Chapter 5 for instructions on calibrating the probe.

14. Go to the *Log Screen* (F6) from the *Advanced Setup Screen*).
15. Press the *Reset Blade* function key (F3) or use the *Field Down* key (FIELD) to move to the *Reset Blade* field and press (ENTER).
16. Type the password if prompted. The blade count resets to zero.
17. Edge a 58 mm circle using internal job 002 to ensure correct calibration. If the lens is not the correct size, recalibrate the size and bevel as discussed in Chapter 5.
18. Verify polish calibration.

Changing the Groover Wheel

The Groover wheel (Part Number 93410) needs to be changed when it becomes dull, approximately every 3000 cycles.

To change the Groover blade, follow these steps:

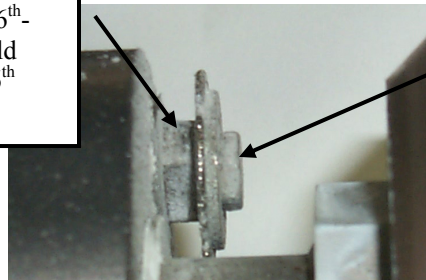
1. Turn off the motor—make sure the switch on the controller box is “OFF”—THIS IS A SAFETY ISSUE!

Warning

Ensure that the switch on the controller box is OFF any time you are touching the cutter blade or groover wheel. Failure to do so could lead to serious injury.

2. Place a cloth or plastic bag in the top of the chip chute. Make this a “screw catcher” so that if you should drop the screw or washer, etc., this cloth will catch the screw instead of it falling into the chip chute.
3. Take the two (2) supplied 3/16th-inch open end wrenches out of the accessory kit.
4. Place one 3/16th-inch open end wrench on the shaft flats (see picture below for location of the shaft) and place the other on the screw.

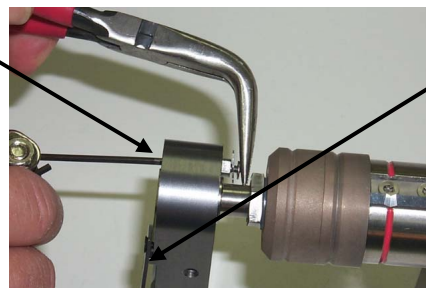
The shaft—use one of the 3/16th-inch open end wrenches to hold this while using the other 3/16th wrench to loosen the screw.



The screw to be loosened.

5. Loosen the screw until it is about to come loose.
6. Remove the two hex screws securing the plate on the left side of the housing so that you can access the hex screw within the housing as shown in the picture below. Note that you can remove two screws and swing it open—see picture below.
7. To avoid dropping the screw, hold the screw with a pair of needle-nosed pliers to hold the screw and turn the other end with a 3/32nd hex driver—one is available in the toolkit’s hex tool cluster.

At this point in the process, it is better to use a 3/32nd hex driver to loosen the screw the rest of the way until the screw with the washer and groover wheel disconnects from the assembly.







Notice that we have removed two of the hex screw holding this plate (Step 6) so that it can swing open.

8. Remove the washer and groover wheel from the screw and set the washer and screw aside. The old groover wheel should be marked as used or thrown away.
9. Clean debris from around the bearing and shaft before installing the new grooving wheel.
10. Take new groover wheel (P/N 93410) out of the shipping bag.
11. Assemble the screw placing the washer and groover wheel onto the screw in the same manner as they came off.
12. To avoid dropping the screw, hold the screw with a pair of needle-nosed pliers to hold the screw and turn the other end with a 3/32nd hex driver—this is the same as done in Step 7 on the previous page except that you are now tightening instead of loosening.
13. After you have the screw secured in place, you can finish tightening with the two 3/16th-inch open end wrenches.

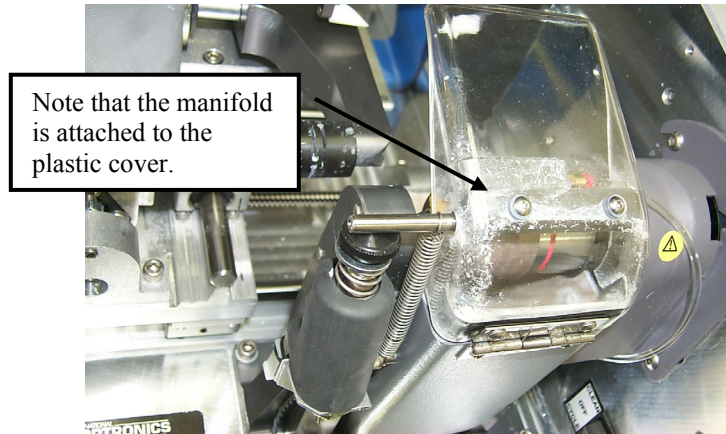
Note

There is a small rim on the inside of the shaft flat. Make sure you have the wheel resting on the small rim prior to final tightening. You will probably need to lift it slightly to place it on there.

14. Using the two 3/16th-inch open end wrenches, hand tighten the screw until it is very snug.
15. Remove the cloth you placed in the chip chute during Step 2.
16. Turn the motor back on.
17. Go to the *Log Screen* ( from the *Advanced Setup Screen*).
18. Press the *Reset GBlade* function key ( or use the *Field Down* key () to move to the *Reset Groover* field and press .
19. Type the password if prompted. The groover count resets to zero.
20. Recalibrate the groover—refer to Chapter 5 for directions.

Sponge Replacement

The sponge should be replaced when it wears thin or becomes non-functional (approximately every 300 cycles). This will vary from one machine to another depending on the amount of usage. Cleaning debris from the sponge may help extend the sponge life and ensure a consistent lens polish.



Before you begin, retrieve the water bottle from the 6ES Accessory Kit.

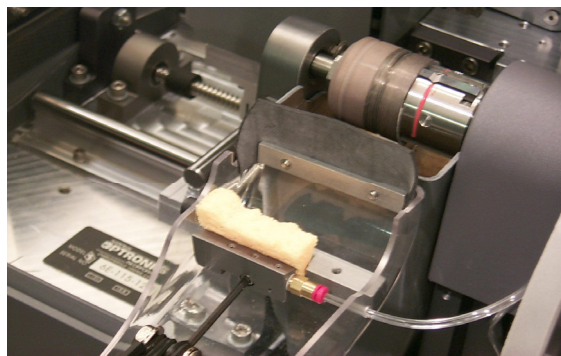
To replace the sponge, follow these steps:

1. Open cover of the 6ES.
2. Turn motor switch Off.

Warning

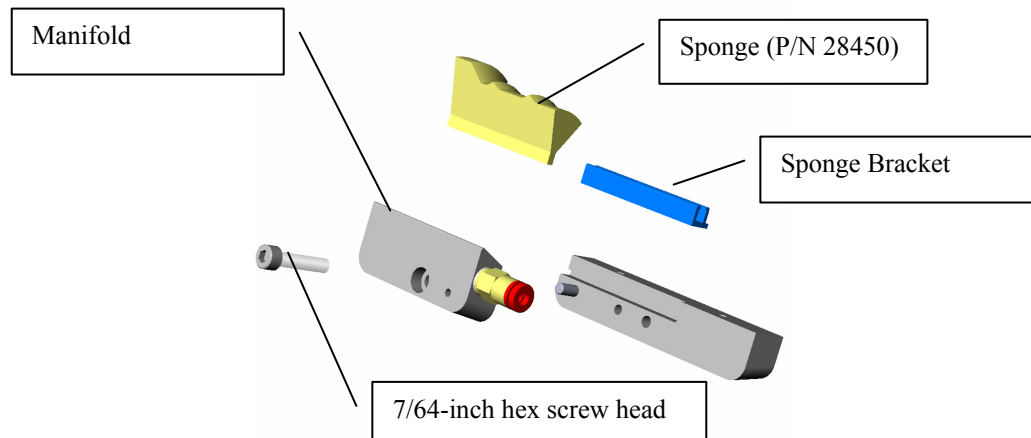
Make sure the switch to the cutter motor is turned OFF when handling the sponge, the hubs, and other parts of the spindle assembly.

3. Pull back chip chute cover and remove manifold screw using a 7/64-inch hex wrench as shown in the picture below:



The hex key set (part number 87178) comes in the accessory kit provided with the 6ES.

4. Remove the sponge and bracket from the assembly.






5. Slide or pull the old sponge out of the sponge bracket, noting where it is located so that you can place the new sponge into the same area of the bracket.
6. Clean debris from the area around the manifold and sponge bracket.
7. Take the new sponge out of its bag (Part number: 28450).
8. Place the dry sponge in the groove in the sponge bracket (where the old sponge came out).
9. Make sure that the right side of the sponge is aligned with the right side of the bracket. Doing so will align it with the grooves of the hubs.
10. Tighten the sponge manifold screw using a 7/64-inch hex wrench and wet a single corner of the sponge with the water bottle, as shown below. This will allow for any left-right adjustment in the next step.







11. Lower the chip chute and sponge assembly onto the polishing wheels. Make sure that the points of the sponge fit into the bevel grooves of the polish wheels. (If they do not fit, move the sponge until they do fit.)
12. Raise the chip chute cover and wet the sponge to ensure it is secure in the bracket.
13. Lower the chip chute cover and turn the cutter motor back on.
14. Close the lid of the 6ES.

Verifying Size and Bevel Placement

1. Go to the *Setup Screen* ( from the *Job Screen*).
2. Press the *Calibration* function key .
3. Press the *58mm Circle* function key .
4. Enter a password if prompted.

Note

Pressing the *Size Calibration* function key  causes the *Job Screen* to choose Job: 002—this is the automatic job setup for checking size and bevel placement.

5. Load a 6 base plano lens of at least 2 mm thickness by pressing the Chuck button  to lock the lens in place.
6. Press the Start button  on the 6ES.
7. When done, press the Chuck key  to release the lens; then remove the lens.
8. Using calipers, measure from the apex of the bevel to the other apex. The distance should be 58 mm. If it is not exactly 58 mm, adjust Size Offset.
9. Visually check to see if the apex of the bevel is in the center of the lens edge. If not, adjust Bevel Offset.





Changing the Vacuum Bag

The vacuum bag needs to be changed approximately every 300 cycles. There is a Status Indicator in the lower right corner of the *Job Screen* (the *Status* area—lower right of screen) that graphically shows how many cycles since the last change. This *Status Indicator* turns yellow at 90% of the vacuum bag life, so that you can ensure that you have a replacement bag and filter in stock (Bag and Filter 5-Pack Set Part # 87142). When it is red, it is time to change the vacuum bag and filter. This reminder feature can be disabled through the *Job Screen Layout* field on the *Setup Screen*. (Disabling this feature should only be done when using a central vacuum rather than one under the edger).

Caution

Wear an appropriate dust mask and eye protection when changing the vacuum bag, especially if you are sensitive to dust particles since the dust is small particles of plastic.

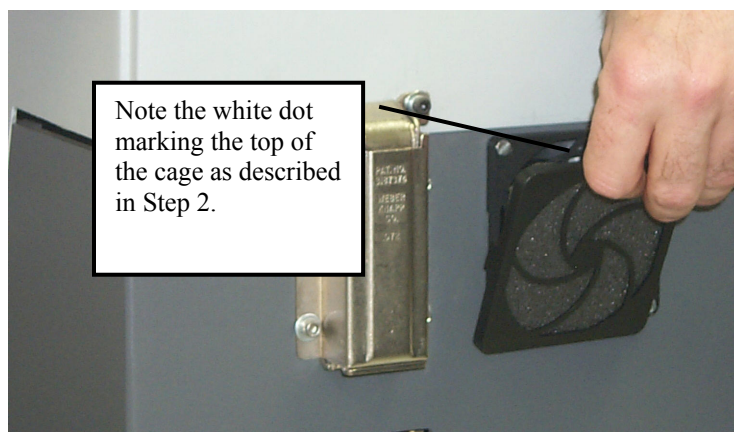
Change the vacuum bag when it gets full by following these steps:

1. Open the cabinet if applicable.
2. Make sure the vacuum is turned off.
3. Disconnect the vacuum hose from the back of the vacuum.
4. Undo the three clamps holding the top on the vacuum.
5. Lift the vacuum head out of the vacuum base and set it aside.
6. Pull the bag back from the inlet fitting.
7. Lift the large bag out and dispose of it.
8. Replace it with a new bag. (The bags and filters are often kept in the cabinet—Bag and Filter 5-Pack Set Part # 87142)
9. Change the paper filter.
 - A. Examine the top piece that you set aside in Step 5 above. There is a steel ring (some have a thick rubber band) holding the paper filter onto the foam filter. Squeeze the prongs on that ring and pull the paper filter off, leaving the foam filter in place.
 - B. Throw away the paper filter and put another one in its place (within the steel ring).
 - C. Squeeze hard on the ring's prongs and slide the filter back into place.
10. Reinstall the vacuum head on the can, aligning the inlet and exhaust holes. Then secure it with the three clamps.
11. Close the cabinet.
12. Go to the *Log Screen* ( from the *Advanced Setup Screen*).
13. Press the *Reset Vac* function key  or use the  key to move to the *Vacuum Bags* field and press the  key.
14. Type the password if prompted. The bag count resets to zero.

Air Intake Maintenance

For proper maintenance of your air filter, follow these steps:

1. Turn off the power switch on the side of the 6ES.
2. Mark the top of the air filter cage with either masking tape, Scotch[®] tape, Liquid Paper[®], or Wite-Out[®] (or some other method) so that you will know which side goes on top when you replace the air filter cage.
3. Remove the outer part of the air filter cage as shown below. (The cage will snap out.)



4. Remove the filter as shown below:



5. Clean the filter with soap and water or replace it with a new filter (Part #: 3069).
6. Place the new or cleaned filter back in the air filter cage and snap the outer part of the cage back in place. NOTE: When performing this step, use the mark you placed on the outer part of the cage to ensure that you replace the piece the same as it came out.
7. Turn the power switch back on.

Cleaning the Polishing Wheels

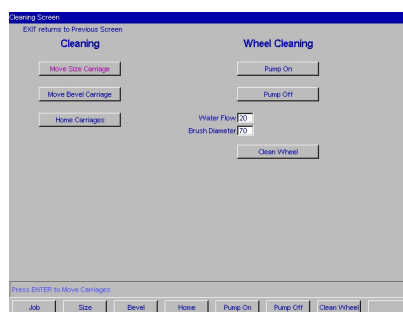
Clean the Polishing Wheels when experiencing poor polish quality and when there is visual evidence of lens material buildup.

To clean the Polishing Wheels, follow these steps:

1. Turn the cutter motor off.
2. Remove the cutter (but not the clamp).
3. Turn the cutter motor back on.
4. Remove the Wire Brush and Cleaning Block from the Accessory Kit.
5. Using calipers or a ruler, check the diameter of the Wire Brush.
6. Attach the Wire Brush to the Cleaning Block; then chuck the Wire Brush.



7. Go to the *Cleaning Screen* (F2 from the *Setup Screen*).
8. On the *Cleaning Screen*, confirm that the “Brush Diameter” field reflects the actual diameter of the Wire Brush. If not, type in the correct diameter or use the Up or Down Arrow keys to adjust the diameter setting.
9. Press F7, the *Clean Wheel* function, and follow the directions on the screen.



Note










The Wire Brush will make three sweeps across the Polishing Wheel. While it is making these sweeps, you can adjust the Brush Diameter by pressing the Up Arrow key to increase or Down Arrow key to decrease the Brush Diameter setting. When you decrease the Brush Diameter setting, the Size Carriage will move towards the wheel, which will clean more aggressively.

10. Turn the cutter motor off.
11. Reinstall the cutter.
12. Turn cutter motor back on.

Backing Up the System









National Optronics strongly recommends backing up your system before loading software or make sure that you have a working backup disk before loading new software. Try to keep that backup disk up-to-date with the software that is installed on your 6ES.

To backup the 6ES's software, do the following:

1. Go to the *Setup Screen*—from the *Job Screen*, press the *Setup* function key  to select the *Setup Screen*.
2. Press the *Advanced Setup Screen* function key  to go to the *Advanced Setup Screen*.
3. Press the *Comm* function key  or use the Field Down key  to move the cursor to the *Communications* field, then press the  key.
4. Press the *Backup Sys* function key  or use the Field Down key  to move the cursor to the *Backup System* button and press the  key.
5. Enter the password if prompted. Make sure a blank 3½-inch disk is in the disk drive.
6. Press the  key after placing the disk in the disk drive. Follow the screen instructions.

Saving Setup Numbers










National Optronics recommends that you save all calibration and setup numbers (all data saved across power cycles) to disk for future retrieval with the Restore Setup from Floppy feature prior to loading new software. It is also a good precaution to perform this task frequently whether or not you are loading new software. To perform this function, follow these steps:

1. Insert a 3 ½-inch disk into the 6ES's disk drive.
2. Go to the *Setup Screen*—from the *Job Screen*, press the *Setup* function key  to select the *Setup Screen*.
3. Press the *Advanced Setup Screen* function key  to go to the *Advanced Setup Screen*.
4. Press the *Comm* function key  or use the Field Down key  to move the cursor to the *Communications* field, then press the  key.
5. Use the Field Down key  to move the cursor to the *Save Setup Nums* button and press the  key.
6. Enter the password if prompted and make sure your 3 ½-inch disk is in the disk drive.
7. Press the  key. Follow the screen instructions.

Updating Software

Update to new software using a 3 ½-inch disk through the floppy drive inside the 6ES. National Optronics strongly recommends that you back up your system—refer to previous page—before loading software.

To update the 6ES's software, do the following:

1. Go to the *Setup Screen*—from the *Job Screen*, press the *Setup* function key  to select the *Setup Screen*.
2. Press the *Advanced Setup Screen* function key  to go to the *Advanced Setup Screen*.
3. Press the *Comm* function key  or use the Field Down key  to move the cursor to the *Communications* field, then press the  key.
4. Backup the System if needed.
5. Press the *Load SW* function key  or use the Field Down key  to move the cursor to the *Load Software* button and press the  key.
6. Enter the password if prompted. If loading from a diskette, make sure it is in the disk drive.
7. Press the  key after placing the update disk in the floppy drive. Follow the screen instructions.

Chapter 4

Operating the 6ES (Standard Operation)

This chapter includes directions for standard tasks performed while using the 6ES in a standard operation, such as pulling down a job, edging (roughing, finishing, and grooving), polishing, and safety beveling. For calibration instructions, refer to Chapter 5.

Pulling Down a Job

For standard operations, there are only two steps to this part of the process:

1. Go to the *Job Screen*, which is where the 6ES will go automatically if you just started it up.
2. Type in the number of the job to pull down from a Tracer, Blocker, or Host computer.

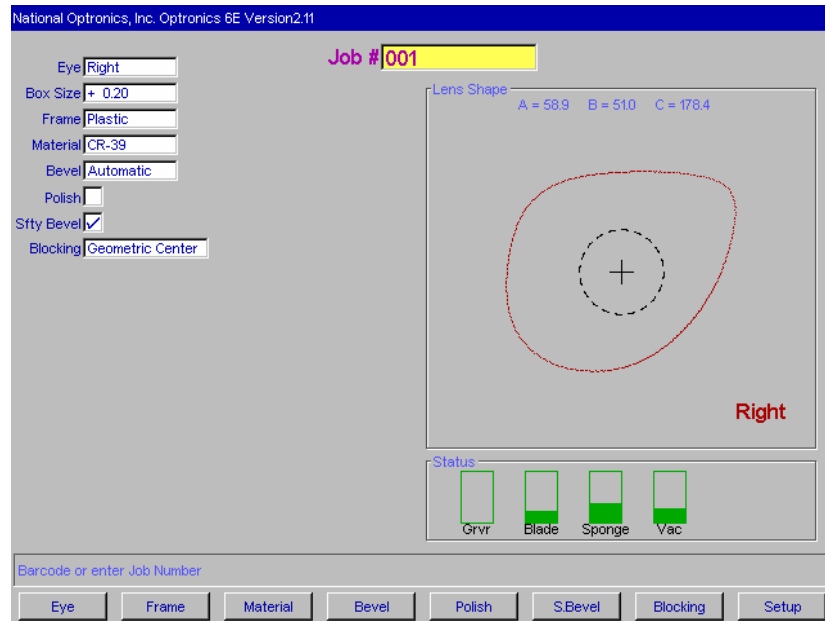
Note

Another way of pulling down a job is to scan the job tray with the bar code reader. (Bar code readers are optional accessories—call National Optronics technical support if you want information about this.)

The *Job Screen* parameters can be tailored to meet the specific needs of the user.

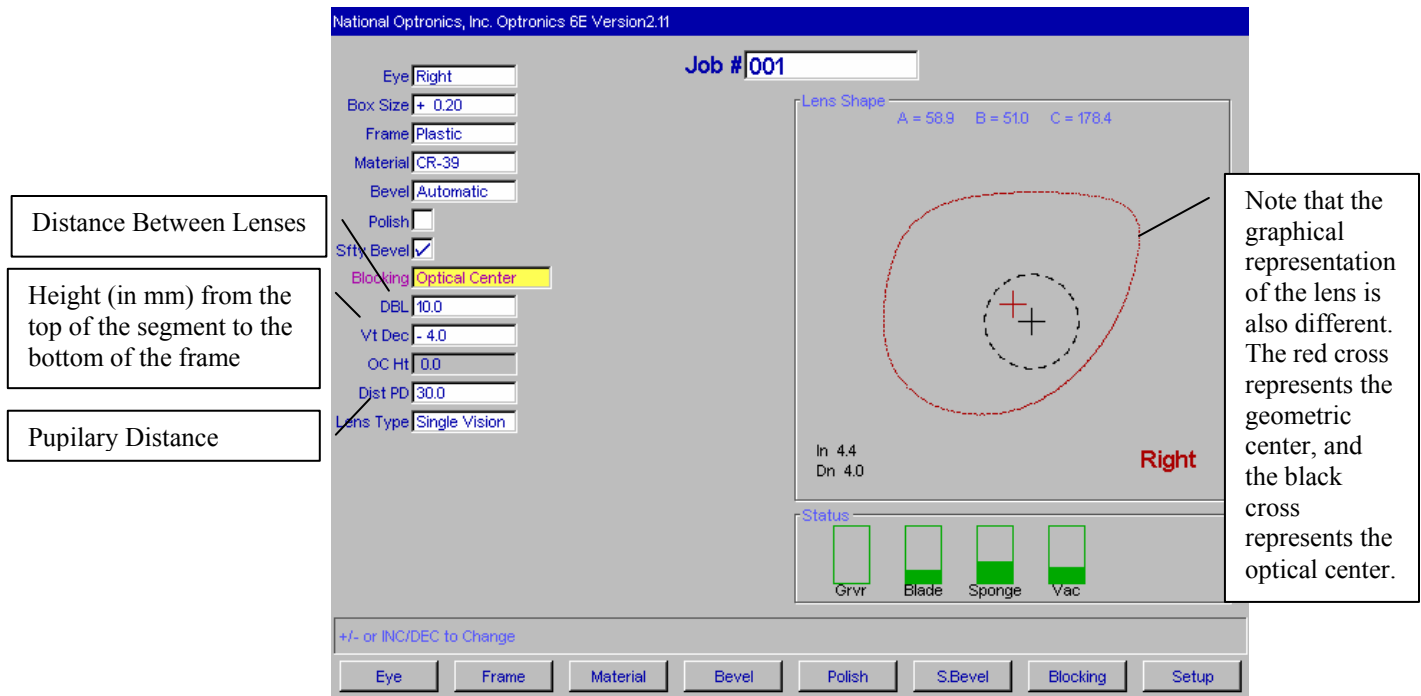
Job Screen Display Variations

The three screens displayed in this section show the default parameters based on the blocking mode and protocol.



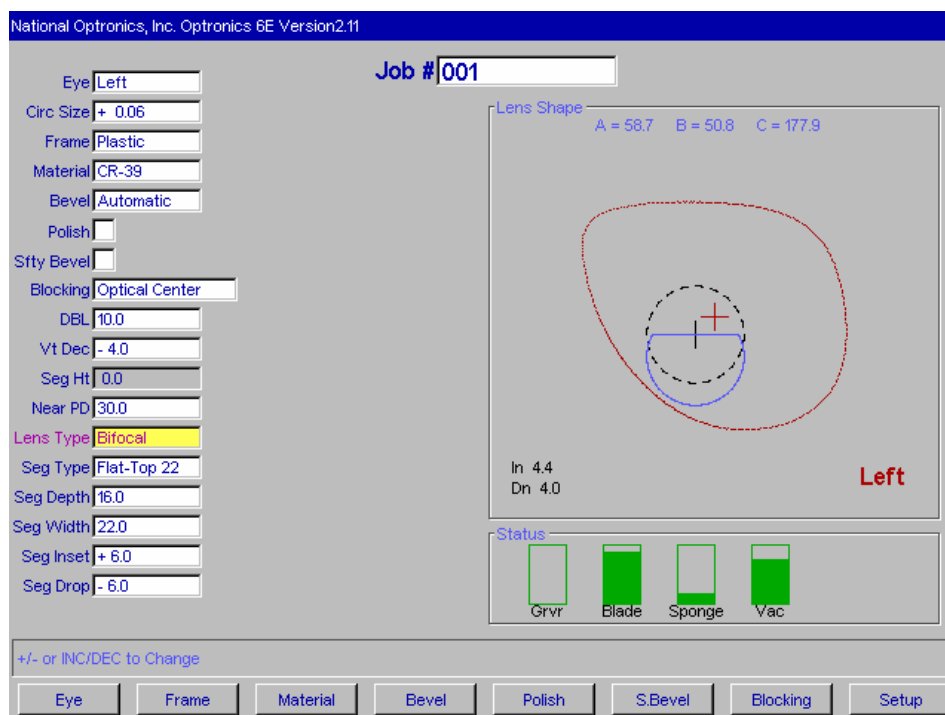
The *Job Screen* for Single Vision Lens with Geometric Center Selected (OMA or NOP Protocol)

The *Job Screen* looks different when you select “Optical Center” for *Blocking Mode*.



The *Job Screen* with Optical Center Selected (NOP Protocol)

Additional lens blank information is displayed when you use OMA protocol instead of NOP as shown in the screen shown directly below.





The Job Screen Display with Optical Center Selected (OMA Protocol)

Note


The Job Screen changes based on lens type as well as protocol.


Edging, Polishing, Grooving and Safety Beveling


The basic steps involved in edging, polishing and safety beveling:


1. After pulling down a job, put the lens in and press the Chuck button  to lock it in place.
2. Press the Start button  to begin the process.
3. Wait until the process finishes and remove the lens.

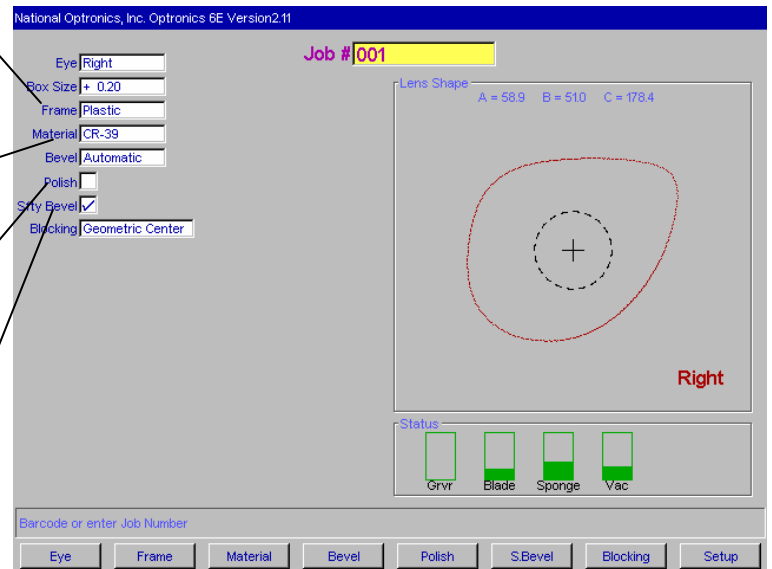
Depending on the materials and the job, there might be a few adjustments. The picture shown below illustrates the fields you would be most likely to modify:

Modify the *Frame* field (press the Frame function key ) if changing frame. To perform grooving, choose “St. Groove” or “W. Groove.”

Modify the *Material* field (press the Material function key ) if changing material.

Check this field to polish the lens or uncheck it to skip the polishing—use the Polish function key  to check or uncheck.

Check this field to create a safety bevel or uncheck it to skip the safety bevel—use the SBevel function key  to check or uncheck.



Note

If the *Frame* type is “St. Groove” or “W. Groove” and you have the Grooving spindle arrangement, then the cycle will include grooving of the lens.

In addition, if you place an exclamation point (!) within the name of the frame, the 6ES will include standard grooving for the job (for example, “metal!”). If you place a # sign within the name (for example, “plastic#”), the 6ES will include wide grooving for the job.

Chapter 5

Calibrating the 6ES

The 6ES arrives from the factory already tuned and calibrated and ready to go into production immediately. You should check the calibration occasionally, and adjust it if necessary. The table shown below indicates times when calibration should be checked.

Calibrate:

<u>Change:</u>	Probe	Axis	Bevel	Size	Rimless Size	Polish	Safety Bevel	Groove Depth & Placement
Cutter Insert			*	*	*			
Cutter Assembly			*	*	*	*	*	*
Probe Tips	*		*				*	
Probe Assembly	*		*				*	
Axis Home Switch		*						
Bevel Home Switch	*		*				*	*
Size Home Switch	*			*				*
Grooving Blade								*




The following procedures should be followed in order to properly calibrate the 6ES. It is very important to proceed in order, as one step may require previous steps to be completed properly. **Also, note that Probe Calibration is part of the power-up process; for more information, refer to the steps detailed on the following page.**

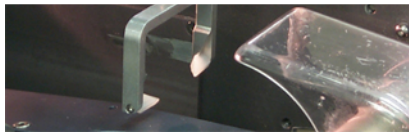
Calibrating the Probe

Each time you turn on the power switch for the 6ES, you will be prompted to calibrate the probe. Follow the prompts.

If you wish to calibrate the probe after bootup, before performing other calibration, follow the following steps.

To calibrate the probe:

1. Locate the black, 58-mm diameter, calibration disk and the Pattern Duplicator Adapter (PDA) in the accessory kit.
2. Go to the *Calibration Screen*.
3. Press the *Probe* button  on the *Calibration Screen*.
4. You will see a message box on the initial 6ES screen stating, “WARNING 101 PLEASE VERIFY THAT PROBE TIPS ARE PULLED TO THEIR FULL FRONT LIMIT. Mount probe calibration disk. Press Continue to calibrate probe.” When you see this prompt, chuck the probe disk (meaning insert the disk and PDA into the Chuck and press the  button to lock it into place). Also, verify that the Probe tips are in the correct position—see pictures shown below.
5. Press the  key and wait while the probe calibrates itself.
6. When the 6ES is finished calibrating the probe, remove the PDA and disk.



Probe in Correct Position—Note that the tips are straight down, not slanted as shown below.



Probe in Incorrect Position—Note that the tips are slanted, not straight down.

Calibration: Overview

There are several ways of calibrating the 6ES: cutting an SBA (Size/Bevel/Axis) shape, cutting a circle, cutting an aviator, and cutting a grooved circle. Each has its own advantages and disadvantages:


- Use the SBA shape (with pattern) to calibrate everything needed for edging calibration, specifically size (both bevel and rimless), axis, and bevel placement.
- It is ***strongly recommended*** to use the circle for polish and groover calibration. It can also be used for size and bevel calibration (but not axis).
- Use the aviator shape to calibrate the safety bevel.
- Use the grooved circle to calibrate groove placement and depth.

Read this chapter to learn the steps involved in each of the types of calibration.

Calibrating Axis, Size, and Bevel

As stated earlier, use the SBA shape for axis, size, rimless size, and bevel calibration.


To calibrate using the SBA shape:

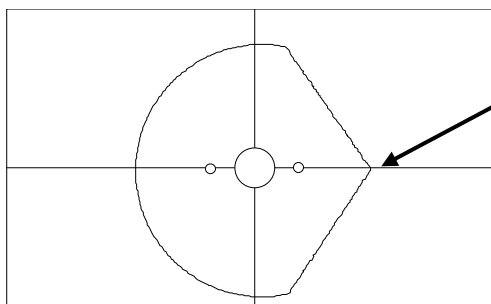
1. Get a pattern out and ready to use.
2. Go to the *Calibration Screen*.
3. Press the *SBA* function key  which takes you to the *Job Screen* (set up for an SBA calibration).

Note

Make sure the *Material* field says, “CR39,” even though you will be using a pattern.

ALSO:

- If you are calibrating the size, set the *Frame* field to “Metal.”
 - If you are calibrating a rimless, set the *Frame* field to “Rimless.”
4. Chuck the pattern (meaning insert the pattern into the Chuck and press the  button to lock it into place).
 5. Press the *Start* button, then wait until the cycle ends.
 6. Remove the pattern and physically examine it:
 - A. **Check the axis.** The point should be on the 180° line (see drawing shown below).



Check the point to make sure it lines up with the 180° line.

If the point does not line up with the 180° line, adjust the *Axis Offset* and recut. If the point is above the line, make a negative adjustment to the *Axis Offset* (a positive adjustment if the point is below the line) and then recut. Repeat the process until the point lines up with the 180° line.

Note

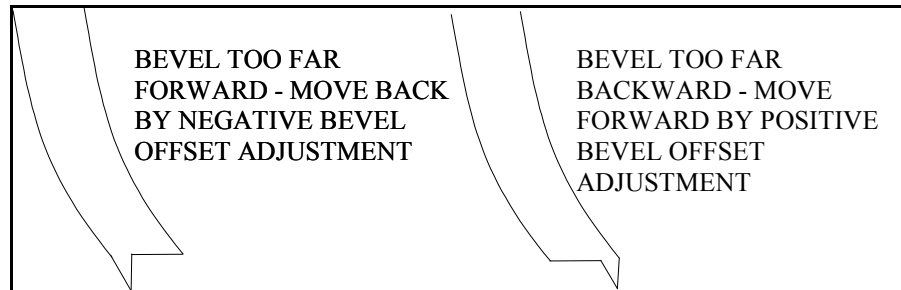
If you prefer to think of moving the line relative to the point of the SBA, you can adjust the *Axis Offset* positive to move the line clockwise, negative to move the line counter-clockwise.

- B. **Check the size.** Using calipers, measure the size across the B dimension (on round sides, not the point). The diameter should be 58 mm.

If the calipers do not read 58 mm and the lens was cut with a bevel, adjust the *Size Offset* and recut. (A positive adjustment will increase the size; a negative adjustment will decrease it.) Repeat until the size is 58 mm.

If the calipers do not read 58 mm and the lens was cut as a rimless, adjust the *Rimless Size Offset* and recut. (A positive adjustment will increase the size; a negative adjustment will decrease it.) Repeat until the size is 58 mm.

- C. **Check the bevel.** It should be centered (see drawing).



Calibrate Trace Size Adjustment

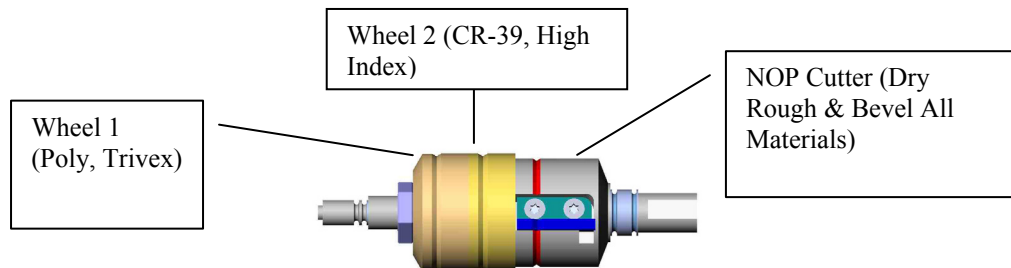
Perform the following steps if you receive jobs from a tracer.

1. Trace a medium weight metal frame on a tracer.
2. Transfer the trace data to a 6E.
3. Edge a lens. If the lens fits precisely, no adjustments are needed. If not, perform these steps:
 - A. Measure the circumference of the lens and calculate the approximate difference between the lens and the size it should be.
 - B. Go to the *Advanced Setup Screen*.
 - C. Enter a number in the *Trace Size* field (or change the existing number) that would be approximately the radius difference; for example, if the circumference difference is 3 mm, enter 1 or change the existing number by 1.
 - If the lens is too large, decrease the number in the *Trace Size* field.
 - If the lens is too small, increase the number in the *Trace Size* field.
 - D. Repeat this process until the 6E edges accurately with the trace data received.

Calibrating the Polishing Wheels

The following pages provide a step-by-step process for calibrating the polish wheels. When you are more familiar with the 6ES screens and terminology, you may wish to refer to the “6ES Polish Calibration Quick Reference Guide” section on Page 5-24.

During the process of calibrating the polishing wheels, it is very important that the following steps be performed in order, and that each step is completed before moving on to the next step.



Note

CR-39 and High Index are polished wet on Wheel 2 only. The best finish for Poly and Trivex requires polishing dry first, then wet on Wheel 1. The directions provided on the following pages assume that you are calibrating both wheels and that you begin with Wheel 1.

Calibrating Wheel 1

Calibrating Wheel 1 Bevel

1. Ensure that the “dry blade” size is calibrated correctly before proceeding with the polish calibration—refer to the “Calibrating Axis, Size, and Bevel” on Page 5-4, or edge the internal 58 mm shape (Job # 002) using a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
2. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *Poly* function key **[F3]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 1W* is selected. This will cause the polish cycle to be wet on Wheel 1.

Key Parameter:

Poly Wheel=1W

3. Press the *Material2* function key **[F6]** to access the *Blank Materials 2 Screen*.
4. Use the following settings for the material *Poly*:

Key Parameters:

Poly Takeoff=0.00 and Revs=2

5. Go to the *Calibration Screen* (**[F3]** from the *Setup Screen*).
6. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **[ENTER]** key (or press the *58 mm Circle* function key **[F2]**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
7. Use the following settings on the *58 mm Circle Calibration Screen*:

National Optonics, Inc. Optronics 6ES Version 108

EXIT returns to Previous Screen

Job #002

Eye Right

Box Size 0.00

Frame Metal

Material CR-39

Bevel Center

Polish ☒

Stty Bevel ☐

Calibration Offsets

	Edging	Wheel1	Wheel2
Size Offset	0.00	0.00	0.00
Rimless Size Offset	0.00	0.00	0.00
Bevel Offset	0.00	0.00	0.00

Lens Shape A = 58.0 B = 58.0 C = 182.2

Right

Status

Grvr Blade Sponge Vac

Barcode or enter Job Number

Eye Frame Material Bevel Polish S.Bevel Advanced

Key Parameter:


Material=Poly

8. Set the *Wheel 1 Bevel Offset* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens. The polishing wheel should lightly touch both the front and the back of the bevel.
 - If just the back is polished, enter a negative *Wheel 1 Bevel Offset*.
 - If just the front is polished, enter a positive *Wheel 1 Bevel Offset*.
 - If the lens is not polished, enter a negative *Wheel 1 Size Offset*.
 - If the lens is completely polished, enter a positive *Wheel 1 Size Offset*.
 - Repeat as necessary until both sides of bevel are lightly touched. Try adjusting in 0.05 mm increments.

Note

To conserve lenses, the test cuts can initially be oversized, and then decreased by 3 mm per iteration. For example, by setting the Box Size to +6.00 for the first cut, it can then be edged at +3 mm, then +0.00, -3.00, and finally -6.00 mm, resulting in 5 test cuts per lens. Once adjustments are close enough that the lens touches the Polishing Wheel, **do not use re-cut mode**—this will result in inaccurate bevel placement.

If you use Circ Size, instead of Box Size, you can accomplish the same thing by downsizing the Circ Size by -10.00 mm each time.

In addition, please note that setting the *Offset* is a quick and easy way of adjusting the bias. When you enter an *Offset*, the 6ES automatically adjusts the bias numbers on the *Advanced Setup Screen*. If this is changed on the *Calibration Screen*, when you return to this screen later, you will see that the *Offset* is zero (0) rather than the number you have entered. That shows that it has made the adjustment on the bias numbers—the bias numbers will change by the amount (positive or negative) that you enter in the *Offset*. If you change this on the *Job Screen* (the special one set up for 58 mm circle calibration), the *Offset* will change to zero when you press the *Start* button. Alternatively, you can press the *Advanced Setup* function key  and modify the Bias numbers directly.

Calibrating Wheel 1 Size

9. Go to the *Blank Material Screen* (press the *Materials* function key **F4** from the *Setup Screen*) and press the *Poly* function key **F3** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 1D* is selected. This will cause the polish cycle to be dry on Wheel 1.

Key Parameters:

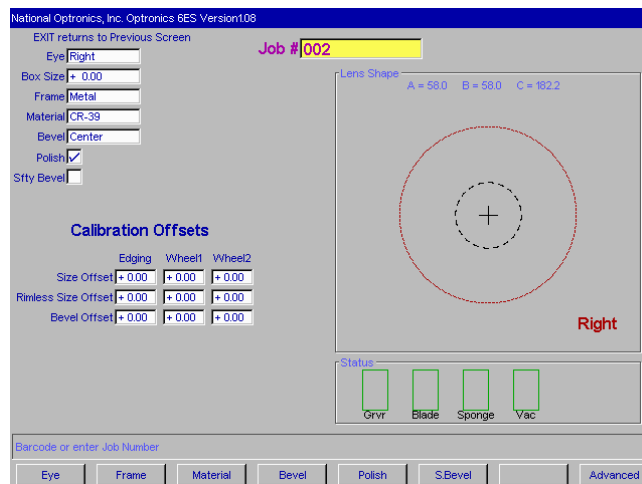
Poly Wheel=1D

10. Press the *Material2* function key **F8** to access the *Blank Materials 2 Screen*.
11. Use the following settings for the material *Poly*:

Key Parameters:

Poly Takeoff=0.30 and Revs=2

12. Go to the *Calibration Screen* (**F3** from the *Setup Screen*).
13. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **ENTER** key (or press the *58 mm Circle* function key **F2**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
14. Use the following setting on the *58 mm Circle Calibration Screen*:



Key Parameter:

Material=Poly

15. Set the *Wheel 1 Size Offset* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens. The polishing wheel should remove material around the lens completely.
 - If the lens is small, enter a positive *Wheel 1 Size Offset*.
 - If the lens is large, enter a negative *Wheel 1 Size Offset*.

Calibrating Wheel 2

Calibrating Wheel 2 Bevel

1. Ensure that the “dry blade” size is calibrated correctly before proceeding with the polish calibration—refer to the “Calibrating Axis, Size, and Bevel” on Page 5-4, or edge the internal 58 mm shape (Job # 002) using a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
2. Go to the *Blank Material Screen* (press the *Materials* function key **F4** from the *Setup Screen*) and press the *Poly* function key **F2** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 2W* is selected. This will cause the polish cycle to be wet on Wheel 2.

Key Parameters:

Poly Wheel=2W

3. Press the *Material2* function key **F8** to access the *Blank Materials 2 Screen*.
4. Use the following settings for the material *Poly*:

Key Parameters:

Poly Takeoff=0.00 and Revs=2

5. Go to the *Calibration Screen* (**F3** from the *Setup Screen*).
6. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **ENTER** key (or press the *58 mm Circle* function key **F2**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).

7. Use the following settings on the 58 mm Circle Calibration Screen:

When calibrating Wheel 2 Bevel, use “Poly” as the material with the values shown in this sample screen.

Key Parameters:

Material=Poly

8. Set the *Wheel 2 Bevel Offset* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens. The polishing wheel should lightly touch both the front and the back of the bevel.
- If just the back is polished, enter a negative *Wheel 2 Bevel Offset*.
 - If just the front is polished, enter a positive *Wheel 2 Bevel Offset*.
 - If the lens is not polished, enter a negative *Wheel 2 Size Offset*.
 - If the lens is completely polished, enter a positive *Wheel 2 Size Offset*.
 - Repeat as necessary until both sides of bevel are lightly touched. Try adjusting in 0.05 mm increments.

Note

To conserve lenses, the test cuts can initially be oversized, and then decreased by 3 mm per iteration. For example, by setting the Box Size to +6.00 for the first cut, it can then be edged at +3 mm, then +0.00, –3.00, and finally –6.00 mm, resulting in 5 test cuts per lens. Once adjustments are close enough that the lens touches the Polishing Wheel, **do not use re-cut mode**—this will result in inaccurate bevel placement.

If you use Circ Size, instead of Box Size, you can accomplish the same thing by downsizing the Circ Size by –10.00 mm each time.

Calibrating Wheel 2 Size

9. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *Poly* function key **[F2]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 2D* is selected. This will cause the cycle to be dry on Wheel 2.

Key Parameter:

Poly Wheel=2D

10. Press the *Material2* function key **[F8]** to access the *Blank Materials 2 Screen*.
11. Use the following settings for the material *Poly*:

Key Parameters:

Poly Takeoff=0.30 and Revs=2

12. Go to the *Calibration Screen* (**[F3]** from the *Setup Screen*).
13. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **[ENTER]** key (or press the *58 mm Circle* function key **[F2]**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
14. Use the following settings on the *58 mm Circle Calibration Screen*:

When calibrating Wheel 2 Size, use “Poly” as the material with the values shown in this sample screen.

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EXIT returns to Previous Screen

Job # 002

Eye Right

Box Size + 0.00

Frame Metal

Material Poly

Bevel Automatic

Polish ☒

Sfty Bevel ☐

Calibration Offsets

	Edging	Wheel1	Wheel2
Size Offset	+ 0.00	+ 0.00	+ 0.00
Rimless Size Offset	+ 0.00	+ 0.00	+ 0.00
Bevel Offset	+ 0.00	+ 0.00	+ 0.00

Lens Shape A = 58.0 B = 58.0 C = 182.2

Right

Status

Grvr Blade Sponge Vac

Barcode or enter Job Number

Eye Frame Material Bevel Polish S.Bevel Advanced

Key Parameters:

Material=Poly

15. Set the *Wheel 2 Size Offset* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens. The polishing wheel should remove material around the lens completely.
 - If the lens is small, enter a positive *Wheel 2 Size Offset*.
 - If the lens is large, enter a negative *Wheel 2 Size Offset*.

Calibrating Poly Bevel Polish

1. Go to the *Blank Material Screen* (press the *Materials* function key **F4** from the *Setup Screen*) and press the *Poly* function key **F9** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 1D-1W* is selected. This will invoke a polish cycle on Wheel 1 that is first dry and then wet.

Key Parameter:

Poly Wheel=1D-1W

2. Press the *Material2* function key **F8** to access the *Blank Materials 2 Screen*.
3. Use the following settings for the material *Poly*:

Key Parameters:

The Dry Cycle key parameters are:

Takeoff=0.30, Revs=2, Lens rpm=10, Motor RPM=7

The Wet Cycle parameters are:

Takeoff=0.02, Revs=4, Lens rpm=10, Motor RPM=10, and

Bev Edge Pres.= 0.10 mm

4. Go to the *Calibration Screen* (**F3** from the *Setup Screen*).
5. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **ENTER** key (or press the *58 mm Circle* function key **F2**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
6. Use the following settings on the *58 mm Circle Calibration Screen*:

When calibrating Poly Bevel Polish, use the values shown in this sample screen.

National Optonics, Inc. Optonics 6ES Version108

EXIT returns to Previous Screen

Job #002

Eye Right

Box Size + 0.00

Frame Metal

Material Poly

Bevel Automatic

Polish ☒

Stty Bevel

Calibration Offsets

	Edging	Wheel1	Wheel2
Size Offset	+ 0.00	+ 0.00	+ 0.00
Rimless Size Offset	+ 0.00	+ 0.00	+ 0.00
Bevel Offset	+ 0.00	+ 0.00	+ 0.00

Lens Shape A = 58.0 B = 58.0 C = 182.2

Right

Status

Crvr Blade Sponge Vac

Barcode or enter Job Number

Eye Frame Material Bevel Polish S.Bevel Advanced

Key Parameter:

Material=Poly

-
7. Set the *Poly Edge Bev Pres.* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
 - If there are striations on the lens, return to the *Materials 2 Screen* and increase the *Poly Edge Bev Pres.*
 - If the lens material “balls up,” return to the *Materials 2 Screen* and decrease the *Poly Edge Bev Pres.*
 8. No further calibration should be required. From the *Job Screen*, pull down Job 002 (58 mm) or internal Job 001 (Aviator) and edge a Poly lens to verify edge polish. If problems are encountered, refer back to individual wheel calibration.

Calibrating Bevel Polish for CR-39

1. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *CR-39* function key **[F2]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 2W* is selected. This will cause the polish cycle to be wet on Wheel 2.

Key Parameter:

CR-39 Wheel=2W

2. Press the *Material2* function key **[F8]** to access the *Blank Materials 2 Screen*.
3. Use the following settings for the material *CR-39*:

Key Parameters:

**CR-39 Takeoff=0.10, Rev=4, Lens rpm=7, Motor rpm=6, and
Bev Edge Pres.= 0.10 mm**

4. Go to the *Job Screen* and call down the internal 002 circle shape.
5. Use the following setting on the *Job Screen*:

Key Parameter:

Material=CR-39

6. Set the *CR-39 Edge Bev Pres.* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
 - If there are striations on the lens, return to the *Materials 2 Screen* and increase the *CR-39 Edge Bev Pres.*
 - If the lens material “balls up,” return to the *Materials 2 Screen* and decrease the *CR-39 Edge Bev Pres.*
7. Set the *CR-39 Wet Polish Takeoff* (on the *Material2 Screen*) by cutting a medium thickness, 6.0 base, 75-mm diameter or less, CR-39 lens.
 - If the lens is large, decrease the *CR-39 Wet Polish Takeoff*.
 - If the lens is small, increase the *CR-39 Wet Polish Takeoff*.

Note

Steps 6 and 7 are intended to maximize the polish quality while maintaining size. These parameters are interrelated and may work best in an iterative application; that is, after completing Step 7, you may need to repeat Step 6.

8. No further calibration should be required. From the *Job Screen*, pull down Job 002 (58 mm) or internal Job 001 (Aviator) and edge a CR-39 lens to verify edge polish. If problems are encountered, refer back to individual wheel calibration.

Rimless Lens Calibration

Calibrating Wheel 1 Rimless Size

1. Ensure that the “dry blade” size is calibrated correctly before proceeding with the polish calibration—refer to the “Calibrating Axis, Size, and Bevel” on Page 5-4, or edge the internal 58 mm shape (Job # 002) using a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
2. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *Poly* function key **[F3]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 1D* is selected. This will cause the polish cycle to be dry on Wheel 1.

Key Parameter:

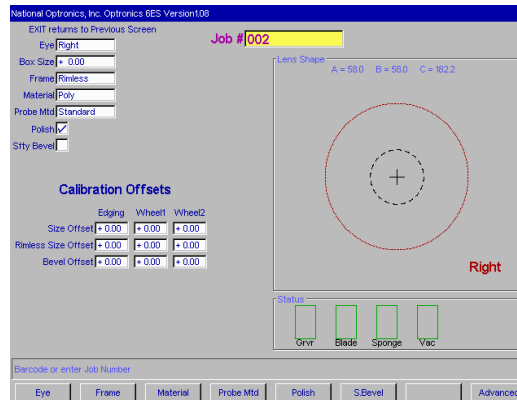
Poly Wheel=1D

3. Press the *Material2* function key **[F8]** to access the *Blank Materials 2 Screen*.
4. Use the following settings for the material *Poly*:

Key Parameters:

Poly Takeoff=0.30 and Revs=2

5. Go to the *Calibration Screen* (**[F3]** from the *Setup Screen*).
6. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **[ENTER]** key (or press the *58 mm Circle* function key **[F2]**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
7. Use the following settings on the *58 mm Circle Calibration Screen*:



Key Parameters:

Frame=Rimless

Material=Poly

8. Set the *Wheel 1 Rimless Size Offset* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens. The polishing wheel should remove material around the lens completely.
 - If the lens is small, enter a positive *Wheel 1 Rimless Size Offset*.
 - If the lens is large, enter a negative *Wheel 1 Rimless Size Offset*.

Calibrating Wheel 2 Rimless Size

1. Ensure that the “dry blade” size is calibrated correctly before proceeding with the polish calibration—refer to the “Calibrating Axis, Size, and Bevel” on Page 5-4, or edge the internal 58 mm shape (Job # 002) using a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
2. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *Poly* function key **[F2]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 2D* is selected. This will cause the polish cycle to be dry on Wheel 2.

Key Parameter:

Poly Wheel=2D

3. Press the *Material2* function key **[F8]** to access the *Blank Materials 2 Screen*.
4. Use the following settings for the material *Poly*:

Key Parameters:

Poly Takeoff=0.10 and Revs=2

5. Go to the *Calibration Screen* (**[F3]** from the *Setup Screen*).
6. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **[ENTER]** key (or press the *58 mm Circle* function key **[F2]**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
7. Use the following setting on the *58 mm Circle Calibration Screen*:

When calibrating Wheel 2 Rimless Size, use “Poly” as the material with the values shown in this sample screen.

Key Parameters:

Frame=Rimless

Material=Poly

8. Set the *Wheel 2 Rimless Size Offset* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens. The polishing wheel should remove material around the lens completely.
 - If the lens is small, enter a positive *Wheel 2 Rimless Size Offset*.
 - If the lens is large, enter a negative *Wheel 2 Rimless Size Offset*.

Calibrating Poly Rimless Polish

1. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *Poly* function key **[F5]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 1D-1W* is selected. This will invoke a polish cycle on Wheel 1 that is first dry and then wet.

Key Parameter:

Poly Wheel=1D-1W

2. Press the *Material2* function key **[F6]** to access the *Blank Materials 2 Screen*.
3. Use the following settings for the material *Poly*:

Key Parameters:

Dry Polishing: TO = 0.30, revs = 2, Lens rpm = 10, Motor rpm = 7

**Wet Polishing: TO = 0.02, revs = 4, Lens rpm = 10, Motor rpm = 10, and
Rmls Bev Edge Pres.= 0.10 mm**

4. Go to the *Calibration Screen* (**[F3]** from the *Setup Screen*).
5. From the *Calibration Screen*, move the cursor to *58 mm Circle* and press the **[ENTER]** key (or press the *58 mm Circle* function key **[F2]**). This will take you to a modified *Job Screen* (one set up for 58 mm circle calibration).
6. Use the following setting on the *58 mm Circle Calibration Screen*:

Key Parameters:

Frame=Rimless

Material=Poly

7. Set the *Rmls Bev Edge Pres.* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, Poly lens.
 - If there are striations on the lens, increase *Wheel 2 Rmls Bev Edge Pres.*
 - If the lens material “balls up,” decrease *Wheel 2 Rmls Bev Edge Pres.*

8. No further calibration should be required. From the *Job Screen*, pull down Job 002 (58 mm) or internal Job 001 (Aviator) and edge a Poly lens to verify edge polish. If problems are encountered, refer back to individual wheel calibration.

Calibrating CR-39 Rimless Polish

1. Ensure that Wheel 1 and Wheel 2 have been calibrated according to the previous steps.
2. Go to the *Blank Material Screen* (press the *Materials* function key **[F4]** from the *Setup Screen*) and press the *CR-39* function key **[F2]** on the *Blank Material Screen*. Ensure that *Polish* has a check mark and that *Wheel 2W* is selected. This will cause the polish cycle to be wet on Wheel 2.

Key Parameter:

CR-39 Wheel=2W

3. Press the *Material2* function key **[F8]** to access the *Blank Materials 2 Screen*.
4. Use the following settings for the material *CR-39*:

Key Parameters:

CR-39 Takeoff=0.10, Revs=4, Lens rpm=7, Motor rpm=6, and Rmls Bev Edge Pres.=0.10 mm

5. Go to the *Job Screen* and call down the internal 002 circle shape.
6. Use the following setting on the *Job Screen*:

Key Parameter:

Material=CR-39
7. Set the *Rmls Bev Edge Pres.* by cutting a medium thickness, 6.0 base, 75-mm diameter or less, CR-39 lens.
 - If there are striations on the lens, increase *Wheel 2 Rmls Bev Edge Pres.*
 - If the lens material “balls up,” decrease *Wheel 2 Rmls Bev Edge Pres.*
8. Set the *CR-39 Wet Polish Takeoff* (on the *Material2 Screen*) by cutting a medium thickness, 6.0 base, 75-mm diameter or less, CR-39 lens.
 - If the lens is large, decrease the *CR-39 Wet Polish Takeoff*.
 - If the lens is small, increase the *CR-39 Wet Polish Takeoff*.

Note

Steps 7 and 8 are intended to maximize the polish quality while maintaining size. These parameters are interrelated and may work best in an iterative application; that is, after completing Step 7, you may need to repeat Step 6.

9. No further calibration should be required. From the *Job Screen*, pull down Job 002 (58 mm) or internal Job 001 (Aviator) and edge a Poly lens to verify edge polish. If problems are encountered, refer back to individual wheel calibration.

Calibrating the Safety Bevel

Calibrating the Safety Bevel is generally the last step in calibrating the 6ES polish; that is, you would generally perform this calibration after you have performed all the other polish calibrations. The suggested steps for the process are as follows:

1. Prepare a blank lens for cutting. Use a lens that has a thick enough edge to leave a 4-5mm edge on a Rimless Lens.
2. Go to the *Calibration Screen* (F3 from the *Setup Screen*).
3. Press the *Aviator* function key (F4), which takes you to the *Job Screen*.
4. On the *Job Screen*, make sure the *Safety Bevel* field has a check mark (✓) in it.
5. On the *Job Screen*, use the following values for the initial Safety Bevel cut:

Safety Bevel Depth: +1.00

Safety Bevel Margin: 0.0

Note

These settings will apply for the material selected and are the same parameters found on the *Material Screen*.

6. Cut a Rimless Lens and examine the safety bevel. You should not adjust the margin at this point.

Adjust the *Safety Bevel Depth* according to the following guidelines (and afterwards cut another lens and re-examine it):

- **To increase the depth of the safety bevel, increase the number in the *Safety Bevel Depth* field.**
- **To decrease the depth of the safety bevel, decrease the number in the *Safety Bevel Depth* field.**

7. When you have the Safety Bevel correct for a thick Rimless Lens, cut a thin Beveled Lens to calibrate the safety bevel margin:

- A. Chuck a thin Beveled Lens.
- B. Using the *Aviator* selection as discussed above, cut a lens that will have an edge thinner than the bevel (approximately 3mm). The safety bevel should lightly touch the back of the frame bevel.

Adjust the *Safety Bevel Margin* according to the following guidelines:


- **If the safety bevel cuts too deeply into the frame bevel, increase the number in the *Safety Bevel Margin* field.**
- **If the safety bevel is too light, decrease the number in the *Safety Bevel Margin* field.**

8. Repeat process for each material used.

You can use the *Copy to All Materials* button to copy the Safety Bevel Depth and Margin currently displayed to all materials defined on the *Materials Screen*.

Adjusting the Water Flow

If you have cut a couple of lenses and the water flow does not seem correct (too much flow or not enough), you can adjust the water flow by following these steps:

1. Go to the *Blank Materials Screen* (from the *Setup Screen* press the *Material* function key ).
2. Move the cursor to the material you are using; then move the cursor to the *Water Flow* field.
3. Increase the value in this field to increase the water flow; decrease it to decrease the water flow. Enter a password if prompted.
4. Test the water flow by running another cycle. If the water flow is still not adjusted correctly, readjust the flow. See Note below for an alternative way of testing.

Note

You can also test the water flow on the *Cleaning Screen*. The numbers on the *Water Flow* field there directly correspond to the numbers on the *Blank Materials Screen*.

Calibrating the Groover

The process of calibrating the Groover is almost identical to calibrating the Polishing Wheels. It is very important that the following steps be performed in order, and that each step is completed before moving on to the next step.

1. Go to the *Blank Material Screen* (press the *Materials* function key from the *Setup Screen*) and press the *CR-39* function key **[F2]** on the *Blank Material Screen* and ensure that the CR-39 grooving settings are the same as shown below:

When calibrating the groover, use CR-39 as the material with the values shown in this sample screen.

Blank Material Screen (Page 1)
EXIT returns to Setup Screen

Name	Defaults				Roughing			Finishing			Grooving		
	Chuck	Polish	Safety Bevel	Wheel	Feed	Lens rpm	Motor rpm	Feed	Lens rpm	Motor rpm	Feed	Lens rpm	Motor rpm
CR-39	8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2W	20	15	14	4	12	15	0.2	10	10
Poly	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	20	15	16	4	12	12	0.2	10	10
Hi-Idx	9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2W	20	15	16	4	12	12	0.2	10	10
Trivex	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	20	15	16	4	12	12	0.2	10	10
Thk Poly	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	12	12	16	4	12	12	0.2	10	10
AR Resin	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2W	8	8	16	4	10	12	0.2	10	10
AR Poly	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	8	8	16	4	10	12	0.2	10	10
	8	<input type="checkbox"/>	<input type="checkbox"/>	2W	8	8	16	4	10	12	0.2	10	10
	8	<input type="checkbox"/>	<input type="checkbox"/>	2W	8	8	16	4	10	12	0.2	10	10
Pattern	15				20	15	16	15	12	12			

Press CLEAR to edit name

Job CR-39 Poly Hi-Idx Trivex Thk Poly AR Resin Material2

Key Parameters:

CR-39 Grooving Feed=0.02, Lens RPM=10, Motor RPM=10

2. Go to the *Calibration Screen* (**[F3]** from the *Setup Screen*).
3. From the *Calibration Screen*, move the cursor to *Groove* and press the **[ENTER]** key (or press the *Groove* function key **[F5]**). This will take you to a modified *Job Screen*.

4. Use the following setting on the *Groove Calibration Screen*:

Key Parameters:

Size=0, Frame=St. Groove, Material=CR-39, Bevel=Center, Polish=No, and Safety Bevel=No

5. Set the *Standard Groove Placement* by cutting a 3-5 mm finished edge thickness CR-39 lens. The groove should be centered on the lens.
- If the groove is too far forward, use a negative number to adjust the Standard Placement.
 - If the groove is too far backward, use a positive number to adjust the Standard Placement

Note

To conserve lenses, the test cuts can initially be oversized, and then decreased by 3 mm per iteration. For example, by setting the size to +6.00 for the first cut, it can then be edged at +3 mm, then +0.00, -3.00, and finally -6.00 mm, resulting in 5 test cuts per lens. **Do not use re-cut mode**—this will result in inaccurate bevel placement.

If you use Circ Size, instead of Box Size, you can accomplish the same thing by downsizing the Circ Size by -10.00 mm each time.

6. Set the *Standard Groove Depth* using the following procedure:
- If the groove is too deep, use a negative number to adjust the Standard Depth.
 - If the groove is too shallow, use a positive number to adjust the Standard Depth.
7. Set the *Wide Groove Placement* and *Depth* in the same manner as Steps 6 and 7.
8. Set the *Wide Groove Width* using the following procedure:
- If the groove is too wide, enter a smaller number to adjust the Wide Groove Width.
 - If the groove is too narrow, enter a larger number to adjust Wide Groove Width.
9. If you made any adjustments, re-cut a lens to test the calibration.

6ES Polish Calibration Quick Reference Guide

After you have performed calibration several times and are fully familiar with the process, you can use this Quick Reference Guide to perform calibration. If you forget a step in the process, refer back to the detailed steps in the previous 23 pages.

Beveled Lens Calibration

Calibrate Wheel 1 Bevel

- Material = Poly; Wheel = 1W; TO = 0.00; rev = 2
- Align bevel using Wheel 1 Bevel Bias, and Wheel 1 Size Bias (just touch).
 - W1 Bevel Bias _____

Calibrate Wheel 1 Size

- Material = Poly; Wheel = 1D; TO = 0.30; rev = 2
- Set Wheel 1 Size Bias so that 58mm circle is on-size.
 - W1 Size Bias _____

Calibrate Wheel 2 Bevel

- Material = Poly; Wheel = 2W; TO = 0.00; rev = 2
- Align bevel using Wheel 2 Bevel Bias, and Wheel 2 Size Bias (just touch).
 - W2 Bevel Bias _____

Calibrate Wheel 2 Size

- Material = Poly; Wheel = 2D; TO = 0.30; rev = 2
- Set Wheel 2 Size Bias so that 58mm circle is on-size.
 - W2 Size Bias _____

Calibrate Poly Bevel Polish

- Material = Poly; Wheel = 1D-1W;
- Dry Cycle: TO = 0.30; revs = 2; Lens rpm = 10; Motor rpm = 7
- Wet Cycle: TO = 0.02; revs = 4; Lens rpm = 10; Motor rpm = 10
- Poly Bev Edge Pres. = 0.10mm. This will “force” the wet cycle by that amount.
- Increase or decrease Poly Bev Edge Pres. until 58mm is polished well.
 - Poly Bev Edge Pres. _____

Calibrate CR-39 Bevel Polish

- Material = CR-39; Wheel = 2W; TO = 0.10mm; rev = 4; Lens rpm = 7; Motor rpm = 6
- Increase or decrease CR-39 Bev Edge Pres. until 58mm is polished well.
- Increase or decrease CR-39 TO if necessary to maintain until 58mm size.
 - CR-39 Bev Edge Pres. ____
 - CR-39 TO _____

Rimless Lens Calibration

Calibrate Wheel 1 Rimless Size

- Material = Poly; Wheel = 1D; TO = 0.30; rev = 2
- Set Wheel 1 Rimless Size Bias so that 58mm circle is on-size.
 - W1 Rimless Size _____

Calibrate Wheel 2 Rimless Size

- Material = Poly; Wheel = 2D; TO = 0.10; rev = 2
- Set Wheel 2 Rimless Size Bias so that 58mm circle is on-size.
 - W2 Rimless Size _____

Calibrate Poly Rimless Polish

- Material = Poly; Wheel = 1D-1W
- Dry Cycle: TO = 0.30; revs = 2; Lens rpm = 10; Motor rpm = 7
- Wet Cycle: TO = 0.02; revs = 4; Lens rpm = 10; Motor rpm = 10
- Poly Rmls Edge Pres. = 0.10mm. This will “force” the wet cycle by that amount.
- Increase or decrease Poly Rmls Edge Pres. until 58mm is polished well.
 - Poly Rmls Edge Pres.- _____

Calibrate CR-39 Rimless Polish

- Material = CR-39; Wheel = 2W; TO = 0.10mm; rev = 4; Lens rpm = 7; Motor rpm = 6
- Increase, or decrease CR-39 Rmls Edge Pres. until 58mm is polished well.
 - CR-39 Rmls Edge Pres. _____

Safety Bevel Calibration

- Material=CR-39; Frame=Rimless; Safety Bevel Depth: 1.00; Safety Bevel Margin=0.0
- Increase or decrease the Safety Bevel Depth to obtain the desired safety bevel
- Material=CR-39, Frame=Bevel
- Increase or decrease the Safety Bevel Margin so that the safety bevel just touches the back edge of the frame bevel on a thin lens.

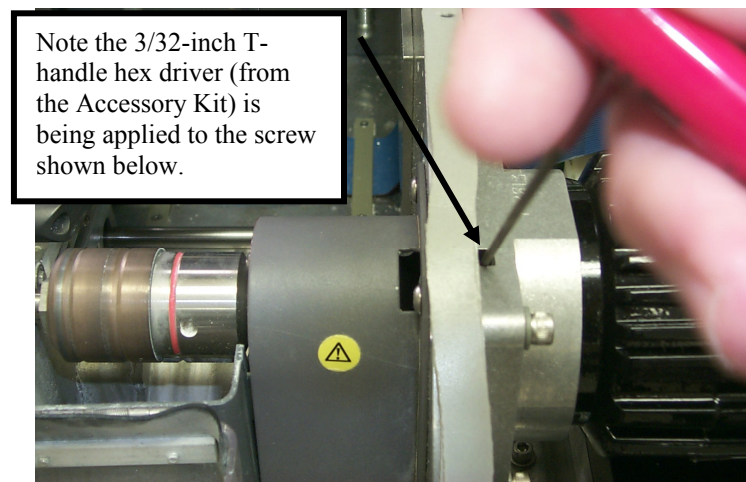
Chapter 6

Performing As Needed Maintenance

Cutter Motor Replacement

The life of an electric motor is long but finite. Motor bearings are the primary limitation on the motor's life, and increasingly loud operation is the most common sign for replacement. The motor should be replaced following these steps:

1. Turn the cutter motor and the edger OFF. Unplug the motor from its connection to the controller unit.
2. Loosen the screw connecting the coupler to the motor shaft (see picture below). You can see down into the hole where the hex driver is being used in the picture below; before placing the hex driver into the hole, manually turn the polishing wheel to make the screw align with the hole.



Caution

Avoid stripping the hexagonal screw on the coupler in Step 2 above. Make sure that the 3/32-inch hexagonal driver (Allen wrench) you use for the removal of the coupler is not badly worn. A new 3/32-inch T-handle hex driver is provided in the Accessory Kit.

3. With the 3/16-inch wrench from the accessory kit, unscrew the four bolts on the adapter plate that holds the plate to the wall.
4. Remove the adapter plate and motor.
5. Remove the four screws that secure the motor to the adapter plate.
6. Install the new motor on the adapter plate. Make sure that the circular boss on the motor fits into the circular recess in the plate, and that the power cord coming out of the motor is at 45° to the right of vertical, when viewed from the right hand side of the edger.
7. Install the motor/adapter plate assembly by re-tightening the bolts, going in an “X” pattern around the four bolts, to ensure even tightening.
8. Re-tighten the screw holding the coupler in place (loosened in Step 2 above).
9. Connect the new motor to the controller unit, and secure the wire so it will not interfere with other nearby wires. Turn the motor “ON.”
10. Go to the *Log Screen* (F5) from the *Advanced Setup Screen*).
11. Press the *Reset Motor* function key (F8) or use the FIELD key to move to the *Reset Motor* field and press the ENTER key.

Probe Tip Replacement

Replace the probe tips when bevel placement seems erratic and probe calibration does not fully correct the problem. Probe tips should have a fairly distinct point. Well-worn or rounded tips are a sign for replacement.

Remove the old tips by following these steps:

1. Hold the tip tightly with one hand while performing Step 2.
2. Remove the #4-40 screw with a 3/32-inch hexagonal wrench (that is, an Allen wrench).

When reinstalling the new tips, adhere to the following conditions:

- Make sure the tips line up.
- Make sure the tips are pointed at the operator and slightly down from horizontal.

Note

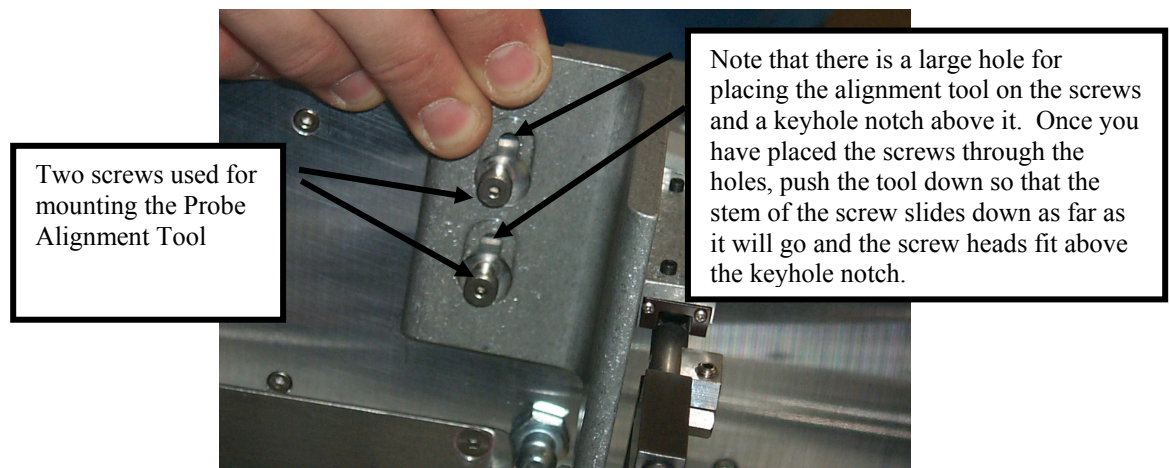
It will be necessary to recalibrate the probe and bevel placement after changing tips—refer to Chapter 5 for calibration instructions.

Probe Vertical Alignment

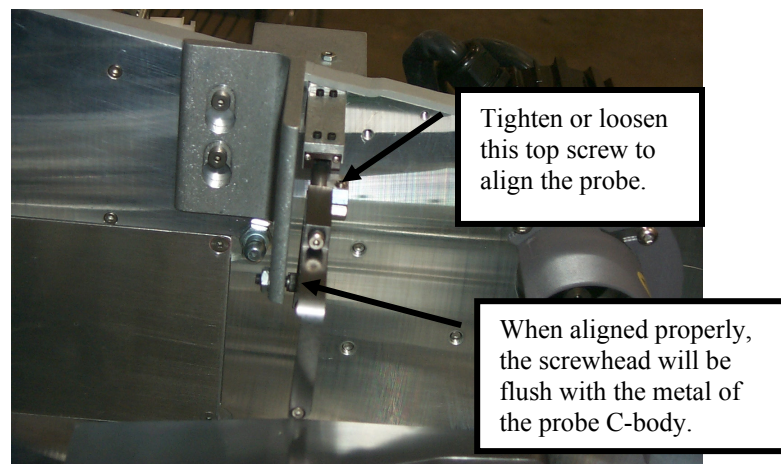
Align the probe if you suspect bad bevel placement or if you have replaced the probe or probe C-body (but not when you replace the probe tips).

Align the probe by following these steps:

1. Get the probe alignment tool out of the 6ES toolkit and place it on the two screws as shown below:



2. With the probe alignment tool in place, tighten or loosen the probe alignment adjustment screw using the 5/64-inch hex driver from the hex key set. The lower screwhead of the alignment tool will be flush against the metal of the probe C-body when it is perfectly aligned—**do not over tighten this screw—as soon as metal touches metal, stop tightening it.** (If you tighten too far, the probe will spring outward when you remove the probe alignment tool.)



Note

Turning the screw clockwise forces the probe tips toward the back of the 6ES; turning them counter-clockwise brings the tips in toward the front of the 6ES.

3. Pull the probe to the left and ensure it slides to the right past the alignment tool. If it doesn't, refer back to Step 2.
4. Remove the probe alignment tool and place it and the hex key set back into the tool kit.

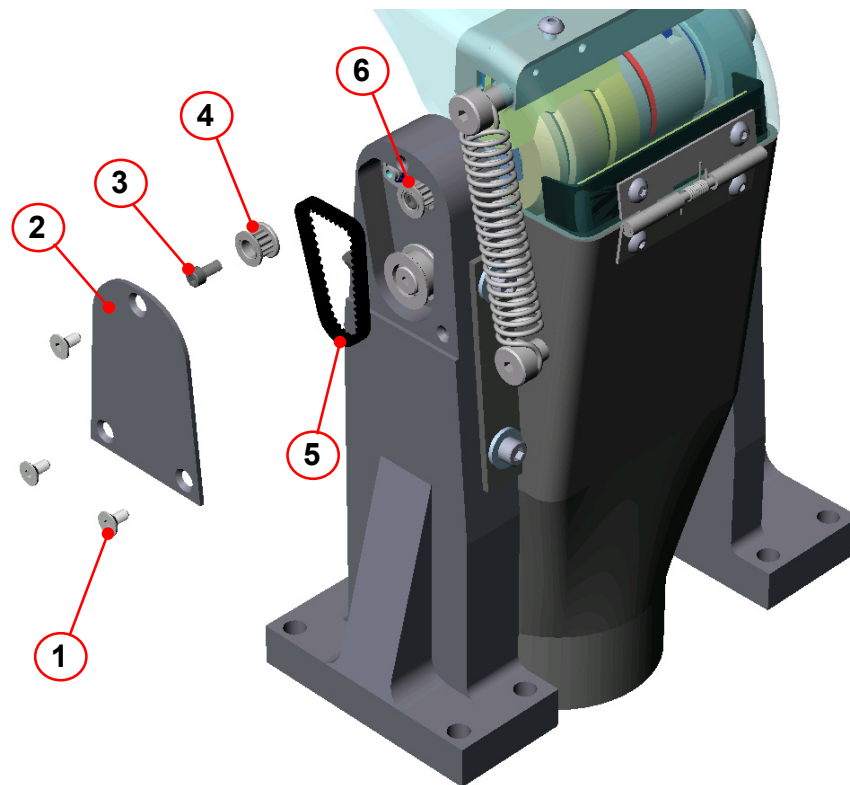
Replacing the Groover Drive Belt or Pulley

If the Groover Drive Belt breaks, the wheel will not turn.

Replacing the Groover Drive Belt

To replace the Groover Drive Belt, follow these steps:

1. Use the switch on the controller box to turn the motor OFF—**this is an important safety step. Always make sure the controller box switch is OFF before placing your hands near the cutter.**
2. Remove the three screws (Item 1 in the drawing shown below).

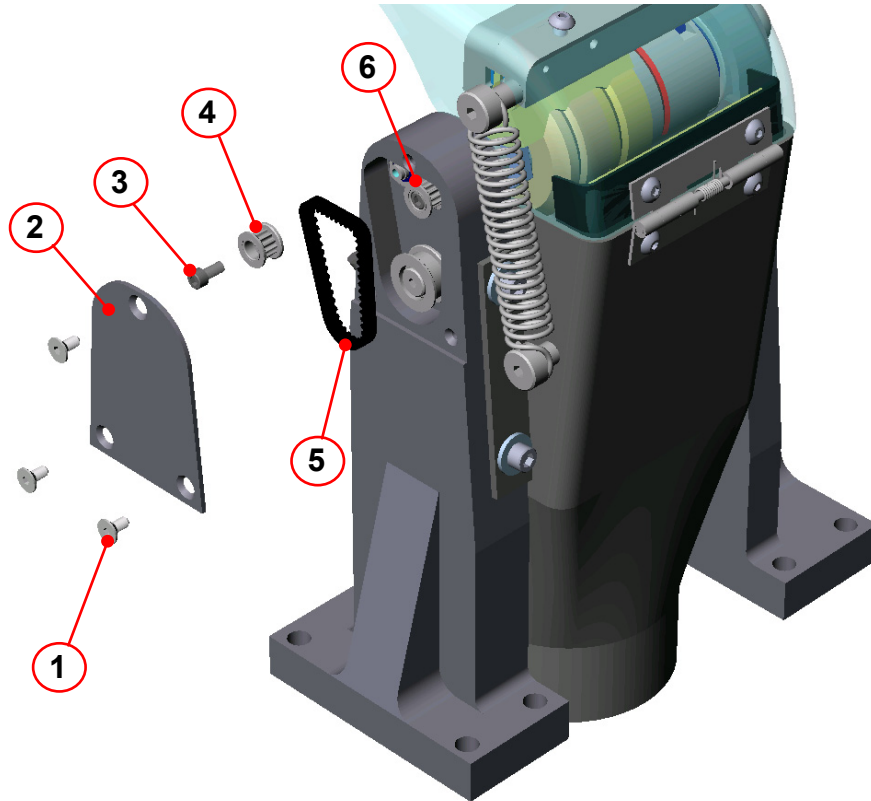


3. Remove cap plate to expose the drive mechanism (Item 2).
4. Remove the #4-40 socket head cap screw (Item 3) to release the pulley from the threaded shaft.
5. Remove the groover drive pulley (Item 4—also called a “sprocket”).
6. Clean out any debris or build-up before replacing the drive belt.
7. Remove the old drive belt (if broken, remove all parts of it) and place a new drive belt in its proper place (Item 5).
8. Reverse Steps 2 through 5 to re-install the screws and cap plate.
9. Turn the motor back ON.

Replacing the Groover Drive Pulley(s)

To replace the Groover Drive Pulleys:

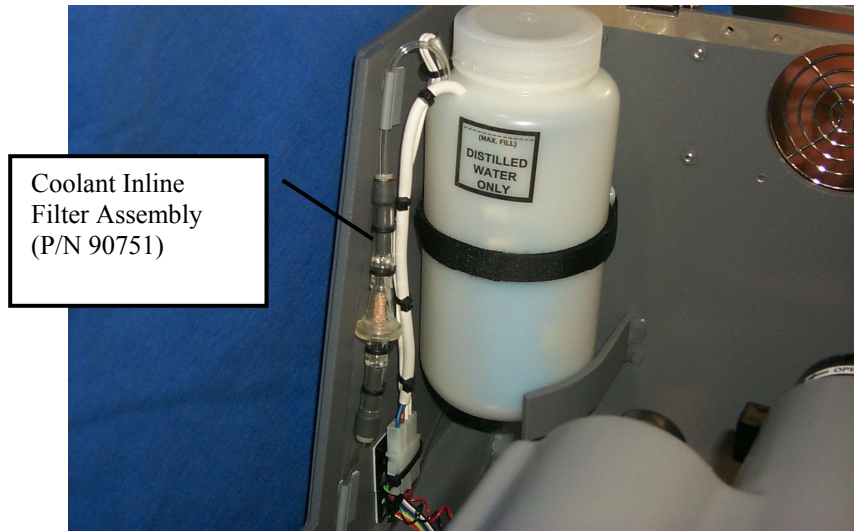
1. Use the switch on the controller box to turn the motor OFF—**this is an important safety step. Always make sure the controller box switch is OFF before placing your hands near the cutter.**
2. Remove the three screws (Item 1 in the drawing shown below).



3. Remove cap plate to expose the drive mechanism (Item 2).
4. Clean out any debris or build-up before replacing the pulley(s).
5. Remove the #4-40 socket head cap screw (Item 3) to release the pulley from the threaded shaft.
6. Replace the sprocket/pulley (or both pulleys) with the new one(s) you have received from Optronics.
7. Reverse Steps 2 through 5 to re-install the screws and cap plate.
8. Turn the motor back on.

Replacing the Coolant Filter Assembly (P/N 90751)



Approximately every six months or as needed, replace the water filter shown below:

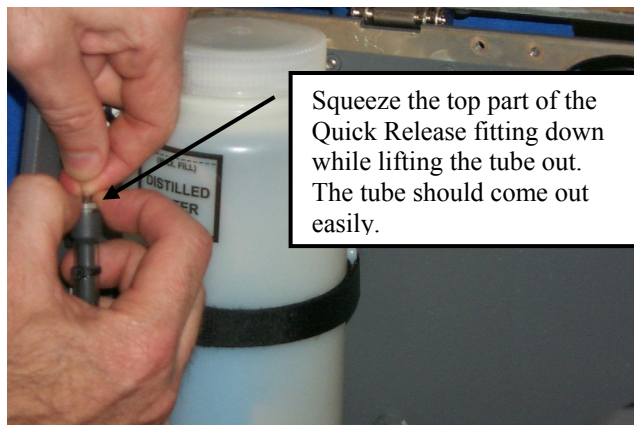


Note

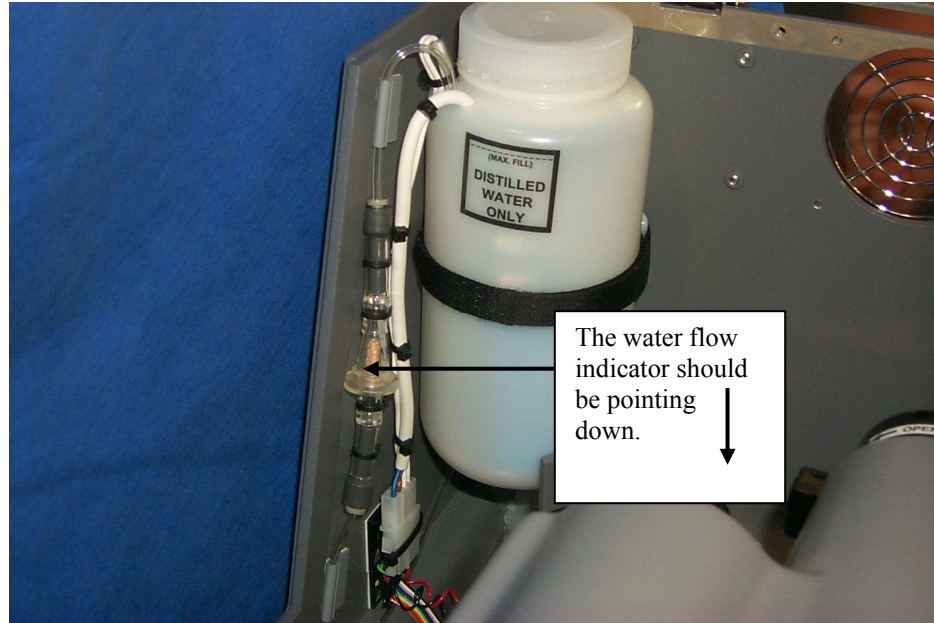
Small amounts of debris can get into the coolant reservoir during normal use. You may need to change the filter more often than every six months if you see a significant accumulation of debris in the filter or notice restricted water flow.

To change the filter, follow these steps:

1. Remove lens from the 6ES chuck if you have not already done so.
2. Close the chuck by pressing the Chuck button .
3. Move the bevel carriage over to the right by going to the *Diagnostic Screen* and pressing the Bevel Right function key  (the *Diagnostics Screen* is an option from the *Advanced Setup Screen*).
4. Turn off the 6ES's power switch.
5. Press and hold the top part of the top Quick Release fitting and pull the hose away from the filter. Repeat with the bottom Quick Release fitting.



6. Discard the used filter.
7. Using the Quick Release fittings on the new filter, install the new filter into the place where the one was removed. **NOTE:** There is a water flow indicator arrow on the filter. The water flow indicator should be pointing down.



8. Turn the power back on and check for leaks by going to the *Cleaning Screen* and turning on the pump. If there are any leaks, push the tube farther into the Quick Release fittings.

Chapter 7

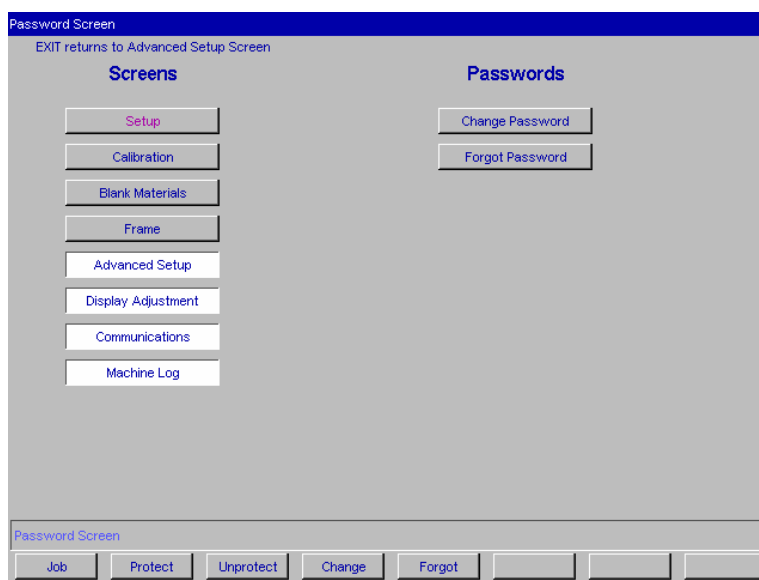
Advanced Configuration & Special Considerations

Customizing the 6ES to Meet Your Needs

There are several ways you can customize the 6ES software to meet the needs of your organization. Customizing tasks tend to be performed by lab managers or supervisors.




Password Protection

Certain screens are password protected by default, meaning that a user cannot change the settings on a given screen without typing in the password. The screen capture below shows the default settings (white background indicates password protected screens).



You can change the default settings by following these steps:

1. Go to the *Advanced Setup Screen* (F7 from the *Setup Screen*).
2. Go to the *Password Screen* (F7 from the *Advanced Setup Screen*).

3. Move the cursor to the button of the screen you want to password protect or unlock and press the *Protect*  or *Unprotect*  function key.
4. Enter the password if prompted.
5. Press the *Job* key  to go to the *Job Screen* and save the changes.

Changing Password

To change your password, press the *Change Password* button and follow the prompts. The password must be 6 digits in length.

What Happens If I Forget My Password

If you forget the current password, follow these steps:

1. Press the *Forgot Password* button; then call National Optronics Technical Service.
2. Provide them with the password code displayed in the message box.
3. They will provide you with a special (one-time use) password that can be used in place of the current password.

Note

This special password is only valid for use this one time. A new special password will be required each time you forget your password.

Special Note

The special password is based on the password code, and the password code changes on a regular basis, so do not exit this screen before receiving and using the special password.

4. Press the *Change Password* button.
5. Enter the special one-time use password that you received from National Optronics.
6. Follow the prompts that appear. You will be required to enter a new password and confirm it.

The 6ES will display a “Password has been changed” message box.

Defining Customized Materials

The *Blank Materials Screen* includes all the standard materials used for lenses (except glass, which the 6ES is not designed to use). You may want to create a new “Material” that has special settings for special need jobs. Below is a *Blank Materials Screen* with the default materials plus a custom material “QPOLY.”

Blank Material Screen (Page 1)
EXIT returns to Setup Screen

Name	Defaults			Roughing			Finishing			Grooving		
	Chuck	Polish	Safety Bevel Wheel	Feed	Lens rpm	Motor rpm	Feed	Lens rpm	Motor rpm	Feed	Lens rpm	Motor rpm
CR-39	8	<input type="checkbox"/>	<input checked="" type="checkbox"/> 2W	20	15	14	4	12	15	0.2	10	10
Poly	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2D-2W	20	15	16	4	12	12	0.2	10	10
Hi-idx	9	<input type="checkbox"/>	<input checked="" type="checkbox"/> 2W	20	15	16	4	12	12	0.2	10	10
Trivex	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2D-2W	20	15	16	4	12	12	0.2	10	10
Thk Poly	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2D-2W	12	12	16	4	12	12	0.2	10	10
AR Resin	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2D-2W	8	8	16	4	10	12	0.2	10	10
AR Poly	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2D-2W	8	8	16	4	10	12	0.2	10	10
QPOLY	8	<input type="checkbox"/>	<input type="checkbox"/> 2D-2W	8	8	16	4	10	12	0.2	10	10
	8	<input type="checkbox"/>	<input type="checkbox"/> 2D-2W	8	8	16	4	10	12	0.2	10	10
Pattern	15			20	15	16	15	12	12			

(INC) Up (DEC) Down (ENTER) Next Letter

Job CR-39 Poly Hi-idx Trivex Thk Poly AR Resin Material2

To add a new Material onto this screen, follow these steps:

1. Move the cursor to the first blank space in the *Name* field.
2. Press the **CLEAR** button.
3. Enter the password if prompted.
4. Use the **▲** key to advance through the alphabet so that you can add a letter. Notice that the *Increment* and *Decrement* keys (**▲** and **▼**) move forward or backward through the alphabet. Press the **ENTER** key to accept the letter that is displaying and proceed to the next space to the right. The next space to the right will begin with the letter you just entered; that is, if you are entering the word “SPECIAL,” after entering the *S*, the letter next to it will begin with the letter *S* and you will need to use the **▼** key to go to the letter *P*. (If you want to use lower case letters, keep pressing the **▲** key and lower case letters will display.)
5. Press the **FIELD** or **FIELD** key to complete the name and leave the field.
6. After you have entered the name of the Blank Material, you can add the edging and polishing settings. Then press the **Job** key **F1** to go to the *Job Screen* and save the changes.

Special Characters

If there is an asterisk (*) anywhere within the name of the material, the 6ES will rough first, then probe to ensure proper bevel placement for very thin lenses that might flex due to clamping. For example, if you create a custom material called CR39*, this technique will be invoked each time you select that material.

Working with the Frame Adjustment Fields

You may need to set up unique frame types to accommodate different sizing needs. These sizing offsets will automatically be applied to the sizing field on the job screen for the various frame types.

The default frame types and settings are shown below:

Frame Screen
EXIT returns to Setup Screen

Name	Size Adj	Default Bevel
Plastic	+ 0.20	Automatic
Metal	+ 0.00	Automatic
Rimless	+ 0.00	Standard
St Groove	+ 0.00	Automatic
VV Groove	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic

Press CLEAR to edit name

Job Plastic Metal Rimless

To add a new frame type, add a new Name in the Name field by following these steps:

1. Move the cursor to the first blank space in the *Name* field.
2. Press the **CLEAR** button.
3. Enter a password if prompted.
4. Use the **▲** key to advance through the alphabet so that you can add a letter. Notice that the *Increment* and *Decrement* keys (**▲** and **▼**) move forward or backward through the alphabet. Press the **ENTER** key to accept the letter that is displaying and proceed to the next space to the right. The next space to the right will begin with the letter you just entered; that is, if you are entering the word "SPECIAL," after entering the *S*, the letter next to it will begin with the letter *S* and you will need to use the **▼** key to go to the letter *P*. (If you want to use lower case letters, keep pressing the **▲** key and lower case letters will display.)
5. Press the **FIELD** or **FIELD** key to complete the name and leave the field.

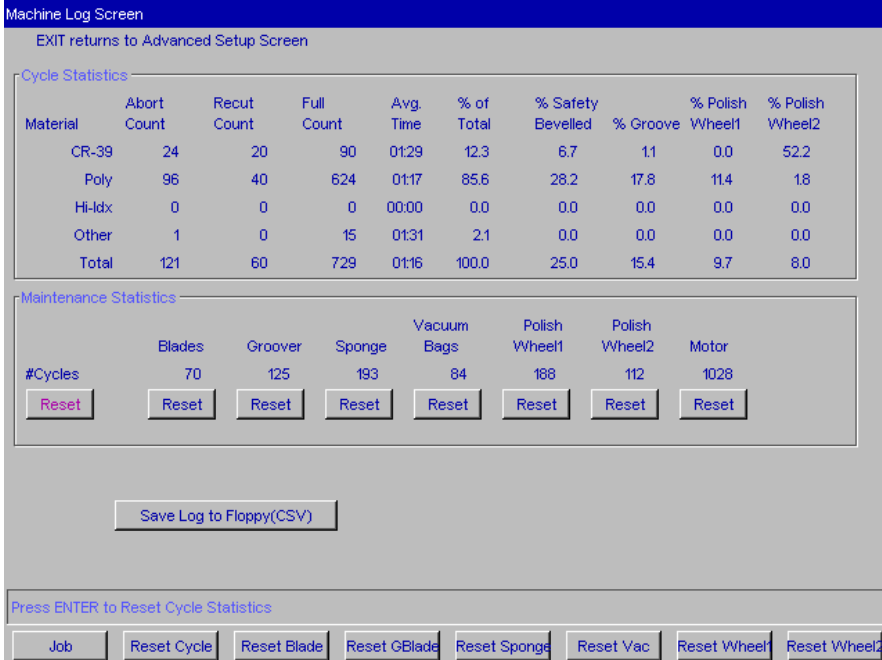
6. After you have entered the name of the Frame, you can add the size adjustments settings. Then press the *Job* key  to go to the *Job Screen* and save the changes.

Note

In addition, if you place an exclamation point (!) within the name of the frame, the 6ES will include standard grooving for the job (for example, “metal!”). If you place a # sign within the name (for example, “plastic#”), the 6ES will include wide grooving for the job.

Collecting and Resetting Statistics

You can use the *Machine Log Screen* to collect statistics about the 6ES, including number of cycles since the last maintenance, etc. You will also use this screen immediately after replacing the vacuum bag, the cutter blade, etc. (Refer to Chapter 3, “Commonly Performed Tasks,” for instructions on vacuum bag and cutter blade replacement; refer to Chapter 6, “Performing Periodic Maintenance,” for instructions on motor replacement. For all other replacements, call National Optronics.)










Machine Log Screen
EXIT returns to Advanced Setup Screen


Cycle Statistics

Material	Abort Count	Recut Count	Full Count	Avg. Time	% of Total	% Safety Bevelled	% Groove	% Polish Wheel1	% Polish Wheel2
CR-39	24	20	90	01:29	12.3	6.7	1.1	0.0	52.2
Poly	96	40	624	01:17	85.6	28.2	17.8	11.4	1.8
Hi-Idx	0	0	0	00:00	0.0	0.0	0.0	0.0	0.0
Other	1	0	15	01:31	2.1	0.0	0.0	0.0	0.0
Total	121	60	729	01:16	100.0	25.0	15.4	9.7	8.0









Maintenance Statistics

#Cycles	Blades	Groover	Sponge	Vacuum Bags	Polish Wheel1	Polish Wheel2	Motor
70	125	193	84	188	112	1028	

Buttons:       



Press ENTER to Reset Cycle Statistics

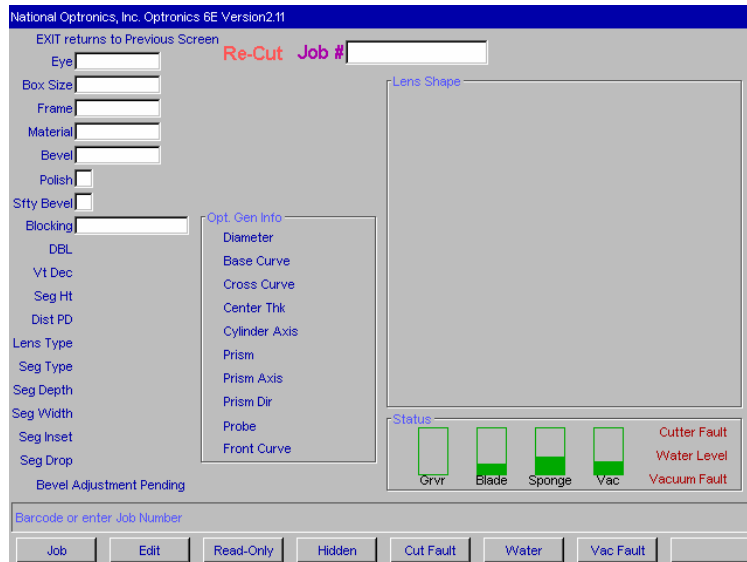
Buttons:        

Note

National Optronics Service Technicians use the Cycle Statistics for data analysis and troubleshooting, and for that reason, we recommend that resetting Cycle Statistics be performed or authorized by a manager or other authorized personnel.

Customizing the Look of Your Job Screen

You can control many of the fields that display on the *Job Screen*, as well as the warnings for Vacuum fault, etc., through the *Job Screen Layout Screen* (shown below).



Each field can have one of three settings: (1) displaying and editable, (2) displaying but read-only, or (3) hidden—does not display on the *Job Screen*.

To modify the settings of fields on this screen, follow these steps:

1. Move the cursor to the field whose display or edit characteristics you want to modify.
2. Press the *Edit* button **[F2]** if you want to make a field editable and displaying on the *Job Screen*. Press the *Read-Only* button **[F3]** if you want to make a field non-editable (read-only) but displaying on the *Job Screen*. Press the *Hidden* button **[F4]** if you want to make a field hidden (not displaying) on the *Job Screen*.
3. Then press the *Job* key **[F1]** to go to the *Job Screen* and save the changes.

One of the common uses of this screen is to disable warnings such as disabling the vacuum fault warning if a central vacuum is in use. To modify the Vacuum fault warning, follow these steps:

1. Press the Vac Fault function key **[F7]** to turn it off; press the Vac Fault function key **[F7]** again to turn it back on. When off, the words *Vacuum Fault* display in black typeface, and the bar is gray. When on, the words *Vacuum Fault* display in red typeface, and the Vac bar is colored.
2. Press the *Job* key **[F1]** to go to the *Job Screen* and save the changes.

If you are not using the 6ES's polishing feature, you may want to disable the *Water Level* warning to keep the warning from appearing on the screen. If you want to disable the *Water Level* warning, use the same type of procedure to enable or disable the Water Level warnings: Press the *Water* function key **[F6]** to turn it off; press the *Water* function key **[F6]** again to turn it back on. When off, the words *Water Level* display in black typeface, and the Sponge bar will turn gray. When on, the words *Water Level* display in red typeface, and the Sponge bar is colored.

Using Pause Mode and Profile Mode for Bevel Placement

When to Use Pause Mode and Profile Mode

Both Pause Mode and Profile Mode allow you to place the bevel manually rather than using the automated (Auto, Front, Back, Center, Base, Fixed, and Percent) 6ES bevel placement features.

Note: These two methods also work with the groove cycle, that is, placement of the groove.

Use Pause Mode if you want to place the bevel by visually examining at the orange bevel mark on the cutter blade and the lens. Pause Mode is also very similar to the method of adjusting the bevel on a Horizon III. Pause Mode provides front-to-back adjustment to the entire bevel.

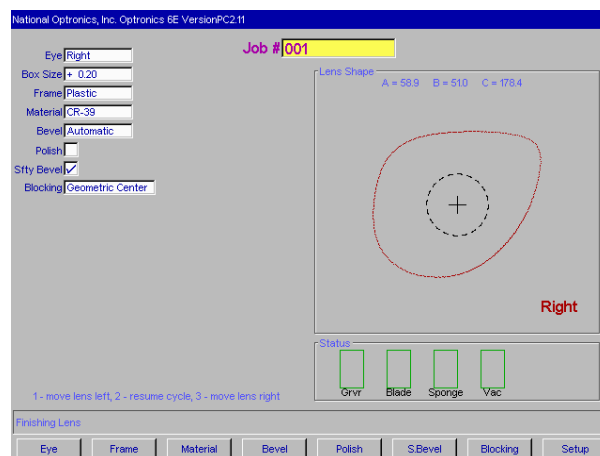
Use Profile Mode if you want precise bevel placement control where you can place the bevel on an image of the lens. This also gives you the ability to place the bevel at different positions (more towards the front or back) at different places along the lens's edge, perhaps more useful when you have a lens that is thicker on one side than the other. Profile Mode provides point-by-point adjustments.

Using Pause Mode

Follow these steps to use Pause Mode:

1. Make sure that the field *Use Profile Mode* on the *Setup* screen is unchecked.
2. Go to the job screen and set up a job, as you would normally do.
3. Press the start key—then press it again within five (5) seconds. (When you press the START button the first time, you will see the message, “Press START again to adjust bevel”; you will have to press the START button within five seconds or the 6ES will proceed in its normal mode.) Note: Pressing START more than once has no effect on Rimless lenses in Pause Mode.

After several seconds, the message on the screen will change to the words, “Bevel Adjustment Pending.” Before the finishing cycle, the lens will move in front of the bevel part of the blade. The words, “1-move lens left, 2-resume cycle, 3-move lens right,” will then appear on the screen, as shown below:



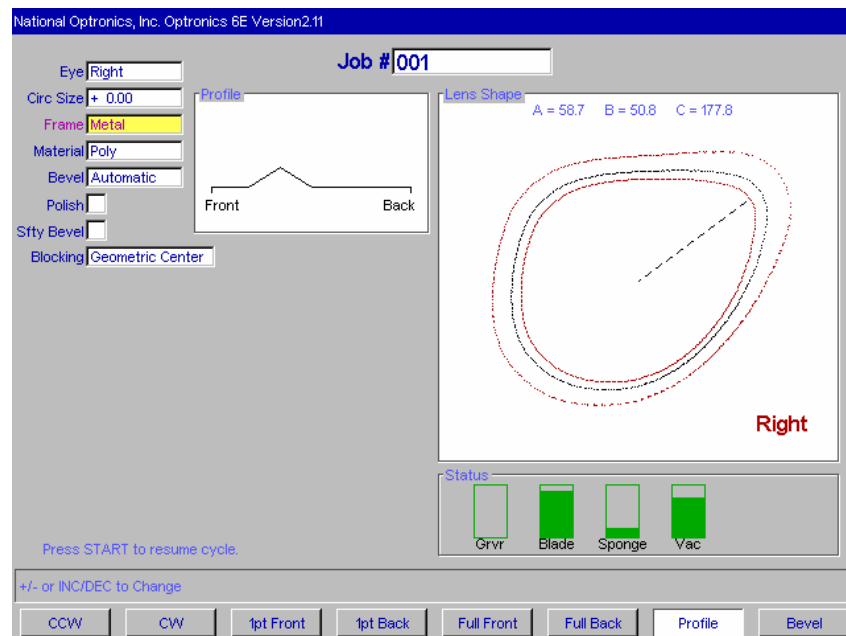
4. Visually examine the location of the bevel by looking at the orange bevel mark on the cutter blade to determine where the bevel will be on the lens. If you want to move it to your left or right, use the 6ES keypad numbers 1 or 3 to move the bevel placement. When it is in the exact location you want, press **[2]** to finish the cycle.

Using Profile Mode

Follow these steps to use Profile Mode:

1. Make sure that the field *Use Profile Mode* on the *Setup* screen is checked.
2. Go to the job screen and set up a job as you would normally do.
3. Press the start key—then press it again within five (5) seconds. (When you press the START button the first time, you will see the message, “Press START again to adjust bevel”; you will have to press the START button within five seconds or the 6ES will proceed in its normal mode.)

After several seconds, the message on the screen will change to the words, “Bevel Adjustment Pending.” After the probing cycle, the screen will display an image representing the lens and bevel, looking similar to this:



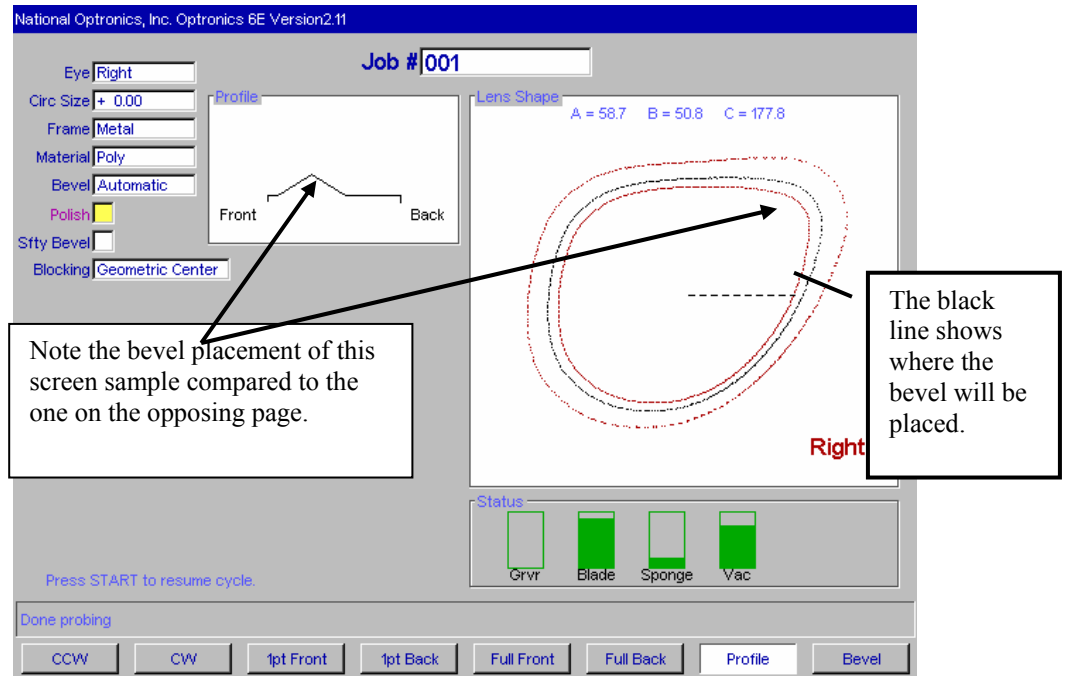
The first two function keys, from left to right, are *CCW*=move the pointer counter clockwise and *CW*=move the pointer clockwise. This controls where the pointer is located, to be used with the next two function keys.

The third and fourth function keys are *1pt Front*=move the bevel in towards the front 1 point at the location where the pointer is located and *1pt Back*, which moves the bevel back one point. This will position the bevel in the manner shown in the next screen capture.

The next two function keys, *Full Front* and *Full Back*, lets you move the bevel in a uniform manner, around all of the lens, not focused at the point where the pointer is located.

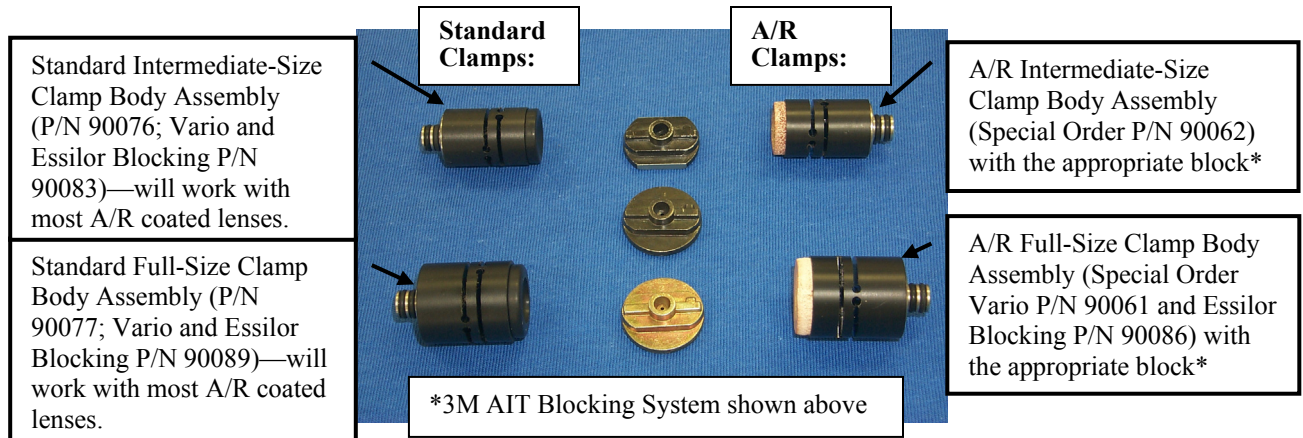
The final two function keys are *Profile*, showing the mode selected (this is a toggle that will take you out of Profile Mode), and *Bevel*, which you would press to change the *Bevel* selection, shown here as “Automatic”; for example, you could change it to “Front,” which would position the bevel towards the front.

4. Make adjustments to the bevel placement using the function keys defined above. In the following sample screen, we positioned the pointer, using CCW (the first function key) to a thick part of the lens and then placed the bevel using the fourth function key (*1pt Back*) to the position we believe would be optimal.



5. When you have positioned the bevel exactly where you want it, press the START button to finish the cycle.

Special Clamps for Thin Lenses with AR Coating



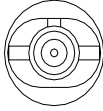
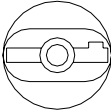
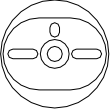
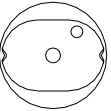
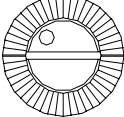
To edge AR-coated thin lenses, follow these steps:

1. Ensure that your cutter blade is in good condition.
2. Select the correct A/R clamp assembly, depending on the size of the lens being edged.
 - If the shape of the lens has a 23 “B” or higher, use the full-size A/R clamp.
 - If the shape of the lens has a “B” size lower than 23, use the intermediate A/R clamp.
3. **For 3M blocking**, select the correct block, depending on the clamp selection:
 - When using the full-size clamp body, use only eight-base blocks—regardless of lens curvature.
 - When using the intermediate-size clamp body, use only two-base blocks—regardless of lens curvature.
 - If a half-eye block is needed and you are using the 3M blocking system, use National Optronics-modified half-eye 3M blocks (see table on the following page for part numbers).
 - Do **not** use a six-base block for any A/R work!

For Vario blocking, use a solid block, and match the block curve with the lens curve.
4. Use 3M Blue Chip (or equivalent) protective tape on both sides of the lens.
5. On the *Job Screen*, set the material to “AR Resin” if the lens material is High Index or CR39; use “AR Poly” if the lens material is Poly or Trivex.
6. Check the *Blank Materials Screen* to ensure that you are using standard, default feedrates and speeds appropriate for the material. These settings are listed below:

	Roughing				Finishing		
	Chuck Pressure	Feed	Lens Rpm	Motor rpm	Feed	Lens rpm	Motor rpm
AR Resin	6	8	8	16	4	10	12
AR Poly	6	8	8	16	4	10	12

Use NOP Kit Number when ordering these parts and follow these guidelines for choosing the correct half-eye blocks when using the A/R clamp assembly:

Blocking System	Kit Number	Leap Block Intermediate Lowbase	Leap Block Full Size Lowbase	Leap Block Full Size Highbase
Semi-Tech 	90068	47	46	42
AIT 	90069	37	36	32
Coburn 	90071	27	26	22
Shuron 	90072	17	16	12
Vario 	90073	65	60	62

Standard Flow of Work on the 6ES

The graphical representation on the following pages shows the screens and common patterns of screen usage. Although work flow may vary from the graphic, these patterns account for the more common tasks.

Please unfold the next pages: We printed them on oversized paper to increase readability of the screen captures. These two pages show:

- Screen flow for standard usage
- Screen flow for advanced setup usage (usually performed by a lab manager)

Field Definitions

Job Screen

Job Screen with Geometric Center Selected

The *Job Screen* for a single vision lens with “Geometric Center” selected displays the fields shown below:

National Optronics, Inc. Optronics 6E Version 2.11

Job # 001

Eye: Right

Box Size: + 0.20

Frame: Plastic

Material: CR-39

Bevel: Automatic

Polish: ☐

Sfty Bevel: ☒

Blocking: Geometric Center

Lens Shape: A = 58.9 B = 51.0 C = 178.4

Right

Status: Grvr Blade Sponge Vac

Barcode or enter Job Number

Eye Frame Material Bevel Polish S.Bevel Blocking Setup

Job #: Job number may be entered with the keypad or with a barcode wand. Barcode requires 8 Bits, 1 Stop Bit and No Parity—also, CR or LF must be sent after the code when configuring for a bar-code reader. (Baud rate can be set on the *Communications Screen*.)

Eye: Denotes the eye for which the lens will be cut (Right or Left).

Note

If you check (place a checkmark “✓” in) the *Eye Toggle* field on the *Advanced Setup Screen* (under *Settings*), once you finish edging the lens for the right eye, it will automatically switch to the left eye.

Box or Circ Size: This field will appear as Box or Circ Size (circumference size) based on the *Size Dimension* field on the *Setup Screen*. For either Box or Circ Size, this field specifies a size correction if the size of the frame to be used is different from the size used when performing the trace, or a size adjustment to the downloaded shape for any other reason. A setting of 0.00 (mm) means that the frame to be used is the exact same size as the one that was traced to create the specific job (that is, no increase or decrease needed).

For Box Size, if the *Box Size* is less than 65 mm, the size offset will affect the “A” dimension (diameter). If the *Box Size* is greater than 65 mm, the lens will be edged to that circumference. If this number is 0.00, the edger will cut the shape exactly size-on-size with the trace. The operator may use this feature to manually oversize the first cut or do a light skim cut in the “Re-cut” mode. A *Size* value of -0.10 during a re-cut will give a 0.1 mm skim cut. Downsizing a re-cut by more than 3 mm from the previous size will require re-probing for correct bevel placement.

For Circ Size, if the *Circ Size* is less than 65 mm, the size offset will affect the circumference. If *Circ Size* is greater than 65 mm, the lens will be edged to that circumference. If this number is 0.00, the edger will cut the shape exactly size-on-size with the trace. The operator may use this feature to manually oversize the first cut or do a light skim cut in the “Re-cut” mode. Downsizing a re-cut by more than 9 mm from the previous size will require re-probing for correct bevel placement.

Note

Size adjustments are relative to the original size, not the previous cut.

Frame:	Specifies whether the frame is metal, plastic, rimless, or a frame that requires a standard groove or a wide groove.
Metal	For metal frames; default size offset is 0.00.
Plastic	For plastic frames; automatically defaults to +0.20, but this default oversize may be adjusted on the <i>Frame Screen</i> (refer to the <i>Frame Screen</i> field definitions on page A-30).
Rimless	Cuts a rimless lens; roughs the lens out and finishes with a slow finish cut. Size overset is done automatically. When “Rimless” is selected, the <i>Bevel</i> field changes to <i>Probe Mtd</i> (Probe Method)—see definition on the following page.
St. Groove	Cuts a groove 0.5 millimeters wide—this is the standard for most grooved lenses.
W. Groove	Cuts a groove with a width that is user-defined on the <i>Advanced Setup Screen</i> .

Note

If the *Frame* type is “St. Groove” or “W. Groove” and you have the Grooving spindle arrangement, then the cycle will include grooving of the lens.

In addition, if you place an exclamation point (!) within the name of the frame, the 6ES will include standard grooving for the job (for example, “metal!”). If you place a # sign within the name (for example, “plastic#”), the 6ES will include wide grooving for the job.

Material: Specifies the material of the lens to be cut so that the edger can cut it at a specified rate set in the *Blank Material Screen* (refer to the *Blank Material Screen* field definitions on page A-10). The factory settings are as follows:

CR-39	Fast roughing cut, moderately slow finish cut.
Poly	Moderately slow roughing cut, slow finish cut.
HI-IDX	For high index materials; moderate roughing and finish cuts.
Trivex	Fast roughing cut, moderately slow finishing cut.
Thk Poly	(Thick Poly) Same as Poly except for a slower Feed and Lens RPM.
AR Resin	Use when edging very thin AR-coated CR39 or High Index material using the special A/R clamps—refer to Chapter 7 for more information.
AR Poly	Use when edging very thin AR-coated Poly or Trivex material using the special A/R clamps—refer to Chapter 7 for more information.
Pattern	A very fast cycle for cutting a pattern blank to match the job trace. When selected, the Frame field becomes “Rimless” because you wouldn’t have a bevel or a groove on a pattern. Also, when the material is “Pattern,” the <i>Bevel</i> , <i>Polish</i> , and <i>Safety Bevel</i> fields disappear.

Note

You can add “materials” to the selections provided. This allows you to specify different settings even if the actual material is the same. In addition, please note that cutting speeds, water flow, chuck pressure, polishing settings, and polish/safety bevel defaults are controlled with this selection.



Bevel: You can choose from the following options when selecting bevel placement:



Front	Places the bevel along the front surface of the lens.
Automatic	Places the apex of the bevel 1/3 - 2/3 along the periphery and will automatically center the bevel on those portions of the lens where the edge is thinner than the full bevel. This option is recommended for most jobs.
Center	Centers the bevel on all points on the lens edge.
Back	Places the bevel along the back surface of the lens.
Executive	Centers the apex of the bevel along the periphery and will smooth the bevel over an executive shelf. Also uses a special probing technique.
Base	This option allows the operator to place a pre-selected base curve bevel around the edge for easy fit into frames. If selected curve cannot fit, the 6ES calculates a range of legal values and prompts you to choose from those values after probing.
Fixed	This option specifies the default distance in millimeters that the apex of a fixed bevel will be from lens front.
Percent	This option specifies the location of the bevel apex from front of lens as a percentage of edge thickness.


Note

Automatic, Center, Back, Base, Fixed and Percent placements may be affected by National Optronics cutter geometry; specifically, the maximum front shelf is 4 mm. The front shelf is 3 mm for a polished lens.

Probe Mtd: Appears when “Rimless” is the frame type. There are two selections available: “Executive” and “Standard.” Use Executive for executive lenses.

Polish: This value toggles between a checkmark “✓” and no checkmark (that is, blank) and determines if the lens to be edged should also be automatically polished. To change this value, press the *Polish* function key  key or move the cursor to the field and change its value by pressing the  key.

Sfty Bevel: This value will toggle between a checkmark “✓” and no checkmark (that is, blank) and tells the edger if it should place a safety bevel on the lens. To change this value, press the *S.Bevel* function key  key or move the cursor to the field and change its value by pressing the  key.

Blocking: The Blocking function key  allows you to change from Optical Center to Geometric Center from the *Job Screen*.

Lens Shape: Graphically represents the shape the lens will be cut—displays A, B, C. These change appropriately as the size setting is changed. In Optical Center mode, the decentration will appear in the lower left corner.

Status Area: Status Indicators and Fault Indicators display here. The warnings appear only if there is a Status or Fault warning. The following warnings may appear:

Status Indicators	The bar graphs (“Groover,” “Blade,” “Sponge,” and “Vac” on the <i>Job Screen</i> represents the number of cycles since the last groover, blade, sponge, or vacuum bag replacement. This graphic turns yellow at 90% of the life expectancy of each and red when it is time for replacement—refer to Chapter 3, “Commonly Performed Tasks” for step-by-step instructions.
Cutter Fault	These words appear when the cutter motor fails to start up at the beginning of the cycle or stops running at any time during the cycle.
Water Level	These words appear when the sensing device on the coolant receptacle indicates that the water level is very low. A cycle requiring polishing cannot be started when the <i>Water Level</i> warning is visible.
Vacuum Fault	These words appear when the vacuum fails to start up at the beginning of a cycle or stops running at any time during the cycle.

Job Screen with Optical Center Selected Using NOP Protocol

If you specify “Optical Center” for *Lens Blocking* on the *Advanced Setup Screen*, the *Job Screen* will have additional fields displaying as shown below:

National Optronics, Inc. Optronics 6E Version 2.11

Job # 001

Eye: Right

Box Size: + 0.20

Frame: Plastic

Material: CR-39

Bevel: Automatic

Polish: ☐

Sfty Bevel: ☒

Blocking: Optical Center

DBL: 10.0

Vt Dec: - 4.0

OC Ht: 0.0

Dist PD: 30.0

Lens Type: Single Vision

Lens Shape: A = 58.9 B = 51.0 C = 178.4

In 4.4
Dn 4.0

Right

Status: Grvr, Blade, Sponge, Vac

+/- or INC/DEC to Change

Eye, Frame, Material, Bevel, Polish, S.Bevel, Blocking, Setup

- DBL:** Distance Between Lenses value for the frame of the current job
- Vert Dec:** Specifies the vertical decentration of the optical center of the lens, not typically used for multifocal lens types.
- OC Ht or Seg Ht:** Segment Height (or Optical Center Height) of the lens in mm. This changes to OC Ht for single vision and progressive lenses.
- Dist PD or Near PD:** Patient Pupillary Distance in mm. This changes to Dist PD (Pupillary Distance established when looking in the distance) for single vision and progressive lenses.

Note

The PD is considered binocular pupillary distance if the amount is greater than 40 mm. If the amount is less than or equal to 40, the 6ES interprets that number as monocular pupillary distance. This is a near measurement for all multifocal lenses except Executive segments and a distance measurement for all other lens and segment types.

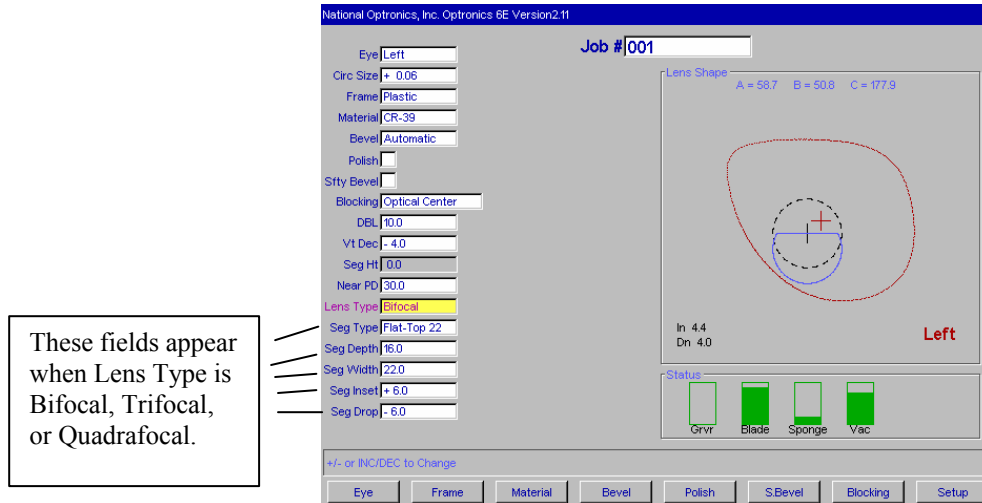
- Lens Type:** Specifies the type of lens being edged. The choices are Single Vision, Bifocal, Trifocal, Quadrafacal, and Progressive. If you select Bifocal, Trifocal, or Quadrafacal, several additional fields appear as shown on the following page.

Note

For all five of the fields defined above, the information (DBL, Vert Dec, Seg Ht, PD, and Lens Type) will be downloaded to the edger if it is available at the third-party computer.

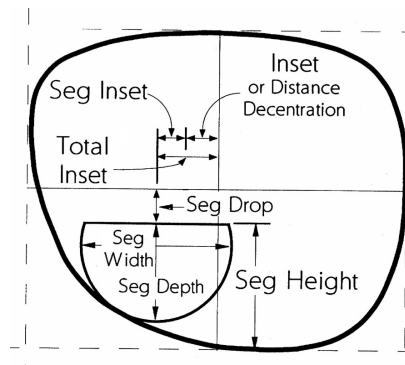
Job Screen with Optical Center Using OMA Protocol

The fields defined below can only be downloaded using OMA protocol and are used to graphically represent the lens block.



- Seg Type:** Type of segment (Flat-top, Round, Curve Top, Executive)—choosing a preset Seg Type will automatically fill in the rest of the fields (Seg Depth, Width, etc.).
- Seg Depth:** Segment Depth (see drawing below)
- Seg Width:** Segment Width (see drawing below)
- Seg Inset:** Segment Inset (see drawing below)
- Seg Drop:** Segment Drop (see drawing below)

The following drawing illustrates the concepts of Segment (Seg) Depth, Width, Inset and Drop—corresponding to fields on the *Job Screen*.






Setup Screen

If you are calibrating the machine, changing default material or frame settings, or cleaning the machine, the *Setup Screen* is often the starting point for your work, as suggested by the screen flow graphic on page A-2 (the fold-out page).

Screens (Left Side of the Setup Screen)


Cleaning:	Takes you to the <i>Cleaning Screen</i> to begin cleaning procedures—refer to Section 2 of Chapter 2, “Getting Started & Daily Maintenance,” for step-by-step instructions.
Calibration:	Takes you to the <i>Calibration Screen</i> to begin calibration procedures—refer to Chapter 5, “Calibrating the 6ES,” for step-by-step instructions.
Blank Materials:	Takes you to the <i>Blank Material Screen</i> for setting up a unique set of speeds etc. to be used on certain lenses; that is, custom materials can be set up for your specific needs.
Frame:	Takes you to the <i>Frame Screen</i> for modifying size offset for a specific frame type.
Servo Burnin:	Takes you to the <i>Servo Burnin Screen</i> to warm up the servo motors and check burn-in range and other information.
Advanced Setup:	Takes you to the <i>Advanced Setup Screen</i> , which allows a lab manager to perform more advanced tasks such as changing the <i>Job Screen</i> layout, configuring communications, or trouble-shooting problems.

Help

- Help Graphics:** When performing maintenance or trouble-shooting, you may work with different pieces of the internal equipment. To assist you in these tasks, Optronics provides 3D drawings of several parts. To scroll through the names of each drawing, move the cursor to the *Help Graphics* field and press the Increment  or Decrement  keys. Press the  key to display. Press any key to return to the *Setup Screen*.
- Error Text:** Enter error number in this field, and the 6ES will display the text of the message for that error number.

Preferences

- Rough First:** If checked, lens will be probed after roughing for better bevel placement. The default is checked.
- Eye Toggle:** Determines whether the job screen will automatically toggle to the Left Eye after the Right has been cut. If set to “✓” (checkmark), then it will automatically toggle to the Left Eye after the Right has been cut. If it is blank (no checkmark), the screen will go to *Re-Cut* mode after Edging the Right Lens and the *EYE* field must be toggled to *LEFT*.
- Rimless SB Override:** Overrides the material safety bevel default (see *Material Screen*) for rimless lenses if checked. You may still safety bevel a rimless lens by checking the Safety Bevel box on the *Job Screen*.
- Grooved SB Override:** Overrides the material safety bevel default (see *Material Screen*) if checked. You may still safety bevel a grooved lens by checking the Safety Bevel box on the *Job Screen*.
- Probe Front:** If unchecked, the 6ES will not probe the front of lenses when lens is beveled using Back bevel. This will also disable profile mode.
- Probe Back:** If unchecked, the 6ES will not probe the back of lenses with no Safety Bevel when lens is rimless or beveled using Front or Fixed bevel. This will also disable profile mode and the option to turn on safety beveling in recut mode.
- Rough Recut:** If checked, recuts will always start at roughing stage. This is useful for cutting multiple lenses of the same type without the need to probe each one.
- Initial Burnin:** If checked, the 6ES servos will burn in for 10 minutes on power up.
- Use Profile Window:** If checked, bevel adjustment is done using profile window. If unchecked, the lens will rotate in front of blade during finishing or grooving and the user can adjust bevel placement there.
- Strip Leading Zeros:** If checked, leading zeros will be stripped from entered job numbers. If not checked, the leading zeros will be left to match the HIII.
- Home Servos:** If checked, the 6ES will home the servos with each cycle. The default is unchecked, which saves time in the cycle.
- Thin Groove Edge:** Controls the point at which you receive a warning when grooving a thin lens. The range is 1.5 mm to 3 mm with 2 mm as the default.
- Fixed Bevel Distance:** Specifies the default distance in millimeters that the apex of a fixed bevel will be from lens front

Bevel Percent:	Specifies the location of the bevel apex from front of lens as a percentage of edge thickness.
Screen Saver Timeout:	Specifies the number of minutes (1-60) of inactivity that will elapse before the screen saver activates. A setting of zero (0) deactivates the screen saver.
Blade Life:	Specifies the number of cycles before the 6ES will display a warning that the blade needs to be changed. Optronics recommends leaving this number at 300 for carbide cutters, 3,000 for diamond coated cutters, and 10,000 for diamond cutters. Increasing this number from the default may lead to decreased edge quality and axis slippage.
Groover Life:	Specifies the number of cycles before the 6ES will display a warning that the groover needs to be changed. Optronics recommends leaving this number at 3,000. Increasing this number from the default may lead to decreased edge quality and axis slippage.
Sponge Life:	Specifies the number of cycles the 6ES will run before showing a warning to change the sponge. National Optronics recommends 300.
Vacuum Bag Life:	Specifies the number of cycles the 6ES will run before showing a warning to change the vacuum bag. National Optronics recommends 300.
Right Side Clamp:	Options are Standard and Half-Eye. Set to "Half-Eye" if you do not want to see the "Half-eye warning" appear and a half-eye clamp is installed.
Right Recut Cursor:	Controls where the cursor goes when doing recuts on the right eye lens. Your choices are "Job" or "Size," referring to going to the <i>Job</i> field or going to the <i>Size</i> field.
Left Recut Cursor:	Controls where the cursor goes when doing recuts on the left eye lens. Your choices are "Job" or "Size," referring to going to the <i>Job</i> field or going to the <i>Size</i> field.
Cycle Order:	On jobs requiring both grooving and polishing, use this field to control which is done first, the grooving or the polishing.
Size Dimension:	Specifies whether the <i>Job Screen</i> will include the field "Box Size" or Circ Size (Circumference Size), used for manually adjusting the size offset.
Default Lens Material:	Specifies the material (from the list on the <i>Material Screen</i>) to use if the Lens Material is not provided by the 4T or host computer.
Softkey Use:	Specifies whether the  key on the <i>Job Screen</i> toggles Blocking or Probe Order. If you choose for it to toggle Probe Order, then the softkey label on the <i>Job Screen</i> will toggle between Rough First and Probe First.

- Default Lens Blocking:** Determines the type of blocking that the 6ES edger will use: “Geometric Center,” “Traced Center,” or “Optical Center.” “Traced Center” is an option to accept the centering of a third-party software program.
- You can choose one of the following options for how a lens is blocked for edging:
- Optical Center:** The block is placed on the optical center of the lens. If this option is chosen, the operator must also specify bifocal blocking options.
- Traced Center:** The block is placed on the traced center of the lens shape.
- Geometric Center:** The block is placed at the geometric center of the frame.
- NOTE:** If “Geometric Center” or “Optical Center” is chosen, the options for *Multifocal Blocking* and *Progressive Blocking* (below) will be available. Optical Center blocking is the *only* type that supports full graphical display of the blank and segment.
- Multifocal Blocking:** Sets the type of optical center decentration to use for multifocal lenses. The first option for this field is “Segment center,” which will place the block on the center of the top of the seg (MRP). The second option is “5 mm down, 5 mm in” which will place the segment center 5 mm down, 5 mm in (refer to the drawing on page A-8 for a graphical presentation of these concepts). When a single vision lens is blocked, it will always be blocked on optical center, regardless of the setting in this field.
- Progressive Blocking:** Sets the type of optical center decentration to use for progressive lenses. When a progressive lens is blocked using the optical center blocking method, the operator can choose to place the block at the fitting cross or to move the fitting cross 5 above the center of the block. The two options are as follows in the field: (1) “cross”—this places the block on the fitting cross; (2) “5 mm up”—this places the fitting cross 5 mm up from the center of the block.

Advanced Setup Screen

The *Advanced Setup Screen* is often the starting point for a variety of tasks usually performed by a lab manager. These tasks include changing the *Job Screen* layout, configuring communications or trouble-shooting problems.

Advanced Setup Screen

The Screens Section

- Communications:** Takes you to the *Communications Screen* for setting up or changing the 6ES's communication options—refer to Section 2 of Chapter 2, “Getting Started & Daily Maintenance,” for step-by-step instructions.
- Display Adjustment:** Takes you to the *Display Adjustment Screen* for changing the system colors (the colors used in text boxes, etc.)
- Job Screen Layout:** Takes you to the *Job Screen Layout Screen* for changing the fields to be shown on the *Job Screen* and making other adjustments to the way the *Job Screen* will appear by default.

Note

Any change to the protocol setting or the *Default Lens Blocking* field will reset the *Job Screen* layout.

- Diagnostics:** Takes you to the *Diagnostics Screen* for checking servo encoders, communications, the keypad, and the home, door and water level switches.
- Servo:** National Optronics use only.
- Machine Log:** Takes you to the *Machine Log Screen* to check the log of various regularly performed maintenance tasks and job statistics.

Passwords: Takes you to the *Passwords Screen* to set password requirements for different screens.

The Bias Numbers Section

Size Bias: Sets the size of the offset for each lens. A 58 mm test lens should be cut using *58 mm Circle*. This lens should be measured, and this value should be changed by the difference between the measured amount and 58 mm. If the cut lens is larger than 58 mm, the difference should be subtracted from this value. Decrementing or incrementing this field may be confusing if there are negative numbers. For example, if the setting is -4.00 mm., an increase by 0.50 would be -3.5 mm.

Rimless Size Bias: An adjustment for correctly sizing rimless lenses. A round, 58 mm rimless test lens should be cut to help in adjusting this value. Adjustment is the same as that for the *Size Bias* setting.

Bevel Bias: Adjusts the ‘front-to-back’ position of the bevel on the lens. The proper setting places the center bevel (see the *Bevel* field on the *Job Screen*, described on page A-5) in the center of a pattern or lens. Increasing this number will move the bevel towards the front of the lens. Decrementing or incrementing this field may be confusing if there are negative numbers. For example, if the setting is -4.00 mm, an increase by 0.50 would be -3.5 mm.

Blade Radius: Defines the cutting radius of the blade or polishing wheel in millimeters (mm), which will change with blade type. These are factory set and should not be altered. This value may change with Blade Type.

Axis Bias: Sets the relative angular position of the rotating chuck. During calibration, this value is used to set the axis of the edger. Once set at the factory, this number normally should not change, except when installing a new axis home switch. To adjust, when the cut pattern is viewed from the PDA side, increasing this value will move the line clockwise. Decrementing or incrementing this field may be confusing if there are negative numbers. For example, if the setting is -4.00 deg, an increase by 0.50 would be -3.5 deg.

The Groove Section

(Groove) Width: Defines the width of the groove in millimeters for the standard or wide groove.

(Groove) Depth: Defines the depth of the groove in millimeters for the standard or wide groove.

(Groove) Placement: Adjusts the front-to-back position of the groove on the lens. Increasing this number will move the groove toward the front of the lens. Decrementing or incrementing this field may be confusing if there are negative numbers. For example, if the setting is -4.00 mm, an increase by 0.50 would be -3.5 mm.

(Groove) Blade Radius: Defines the cutting radius of the grooving blade in millimeters. This is factory set and should not be altered.

The Settings Section

Chuck Type:	Sets the type of chuck used to hold block. Since the size varies from brand to brand, it is important to specify the type that you are using. When changing chuck types, follow these steps: <ol style="list-style-type: none"> 1. Update this field. 2. Reset the Front Size Stop. 3. Find the servo limits. 4. Recalibrate the probe. 5. Check size and bevel calibration.
Blade Type:	Specifies the type of blade you are using.
Blade Material:	Specifies that you are using a carbide blade, coated carbide, or diamond. This affects the number of jobs required for the blade status indicator on the <i>Job Screen</i> .
Spindle Arrangement:	Specifies the type of spindle (Speed or Groove). Set by factory—do not change.
Probe Speed:	Specifies how fast the lens turns during probing. Set by factory—do not change.
Calib Disk Thk:	Thickness of the calibration disk in millimeters. Note: You will have to recalibrate your probe if you change this number, and both bevel bias and safety beveling may be affected.
Trace Size Adjustment:	Adjust this parameter for frame fit after size verification of the internal 58 mm circle (job number 002). If the lens for frame fits large, decrease this number. If the lens is small, increase this number.
Rough Offset:	Distance in millimeters added to the start position for roughing. This is usually set to zero, but may be increased to around 5 to help prevent axis slippage.
Blade Offset:	Measured offset in mm between (or difference between) the polishing wheel and the blade radius. Set by factory—do not change.
Right Probe Height:	The height of the right probe tip above the center of the cutter. Automatically set during Probe Calibration—do not change.
Left Probe Height:	The height of the left probe tip above the center of the cutter. Automatically set during Probe Calibration—do not change.

Blank Material Screen

When you specify the material on the *Job Screen*, the 6ES edges following the speeds and other data listed on the *Blank Material Screen*.

Blank Material Screen (Page 1)
EXIT returns to Setup Screen

Name	Defaults				Roughing			Finishing			Grooving		
	Chuck	Polish	Safety Bevel	Wheel	Feed	Lens rpm	Motor rpm	Feed	Lens rpm	Motor rpm	Feed	Lens rpm	Motor rpm
CR-39	8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2W	20	15	14	4	12	15	0.2	10	10
Poly	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	20	15	16	4	12	12	0.2	10	10
Hi-idx	9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2W	20	15	16	4	12	12	0.2	10	10
Trivex	8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	20	15	16	4	12	12	0.2	10	10
Thk Poly	15	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	12	12	16	4	12	12	0.2	10	10
AR Resin	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2W	8	8	16	4	10	12	0.2	10	10
AR Poly	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1D-1W	8	8	16	4	10	12	0.2	10	10
	8	<input type="checkbox"/>	<input type="checkbox"/>	2W	8	8	16	4	10	12	0.2	10	10
	8	<input type="checkbox"/>	<input type="checkbox"/>	2W	8	8	16	4	10	12	0.2	10	10
Pattern	15				20	15	16	15	12	12			

Press CLEAR to edit name

Job CR-39 Poly Hi-idx Trivex Thk Poly AR Resin Material2

Defaults Portion of the Blank Material Screen

- Name:** The lines of the *Name* column, *CR-39*, *POLY*, and *Pattern* cannot be altered except to put a suffix at the end. All other lines can be any combination of letters and symbol. The main requirement is that they make sense to the operator. Each material will appear in sequence on the *Job Screen* when scrolling through the material selections. Refer to Chapter 7, “Advanced Configuration” for step-by-step instructions for adding a new material to the list.
- Putting an asterisk (*) anywhere in the name of a material forces rough first, particularly useful when dealing with thin lenses—see Chapter 7, “Advanced Configuration & Special Considerations.”
- Chuck:** The force the machine exerts in clamping the lens. For lenses with Anti-reflective Coatings (AR), the pressure can be reduced to prevent cracking or crazing of the lens.
- Polish:** This value toggles between a checkmark “✓” and no checkmark (that is, blank) and determines if polishing should occur by default. If this value is set to “✓” polishing will default to “✓” on the *Job Screen*. If the majority of the lenses of a certain material are to be polished, this setting should be set to “✓.”
- Safety Bevel:** This value toggles between a checkmark “✓” and no checkmark (that is, blank) and sets the default value for the *Safety Bevel* on the *Job Screen*. If the majority of the lenses of a certain material are to be safety beveled, this setting should be set to “✓.”
- Wheel:** Tells the edger which wheel to use for a specific material—refer to the drawing of the wheel in the “Calibrating the Polishing Wheel” section in

Chapter 5 for a graphical representation of the wheels. The choices are 1D, 1W, 1D-1W, 2D, 2W, or 2D-2W (refer to Chapter 5, “Calibration,” for instructions on how to set the 6ES up for using both wheels).

Roughing Portion of the Blank Material Screen

Feed:	The speed at which the size carriage moves forward during roughing, measured in millimeters per lens revolution.
Lens rpm:	The speed at which the lens rotates during the roughing portion of the cycle, measured in revolutions per minute.
Motor rpm:	Controls the speed of rotation of the cutter motor during the roughing cycle measured in thousands of revolutions per minute.

Finishing Portion of the Blank Material Screen

Feed:	Maximum amount of material to remove per revolution of the lens. This value is expressed in millimeters.
Lens RPM:	The speed at which the lens rotates during the finishing portion of the cycle, measured in revolutions per minute.
Motor rpm:	Controls the speed of rotation of the cutter motor during the finishing cycle measured in thousands of revolutions per minute.

Grooving Portion of the Blank Material Screen

Feed:	The speed at which the size carriage moves forward during grooving, measured in millimeters per lens revolution.
Lens rpm:	The speed at which the lens rotates during the grooving process, measured in revolutions per minute.
Motor rpm:	Controls the speed of rotation of the cutter motor during the grooving cycle measured in thousands of revolutions per minute.

Blank Material Screen—Second Part (Blank Material 2)

When you press the Material2 function key **[F8]** on the *Blank Materials Screen*, you will see a screen that looks like the one shown below:

Blank Material Screen (Page 2)

EXIT returns to Setup Screen

Name	Dry Polishing				Wet Polishing							Safety Beveling			
	Take	Lens	Motor		Bev	Rmls									
	Off	Revs	rpm	rpm	Take	Edge	Edge	Revs	rpm	rpm	Water	Lens	Motor	Depth	Water
					Off	Pres.	Pres.				Flow	rpm	rpm		Margin Flow
CR-39					0.10	+0.00	+0.00	4	7	6	20	7	7	+0.00	+0.00 20
Poly	0.30	2	10	7	0.02	+0.00	+0.00	4	10	10	20	7	7	+0.00	+0.00 15
Hi-Idx					0.10	+0.00	+0.00	4	7	6	20	7	7	+0.00	+0.00 20
Trivex	0.30	2	10	7	0.02	+0.00	+0.00	4	10	10	20	7	7	+0.00	+0.00 15
Thk Poly	0.30	2	10	7	0.02	+0.00	+0.00	4	10	10	20	7	7	+0.00	+0.00 15
AR Resin					0.10	+0.00	+0.00	4	7	6	20	7	7	+0.00	+0.00 20
AR Poly	0.30	2	10	7	0.02	+0.00	+0.00	4	10	10	20	7	7	+0.00	+0.00 15
					0.10	+0.00	+0.00	4	7	6	20	7	7	+0.00	+0.00 20
					0.10	+0.00	+0.00	4	7	6	20	7	7	+0.00	+0.00 20

Press CLEAR to edit name

Job

CR-39

Poly

Hi-Idx

Trivex

Thk Poly

AR Resin

Material

Polishing Portion of the Blank Material 2 Screen (Dry and Wet)

		Takeoff:	Tells the edger how large to oversize the lens during the ‘dry-cut’ cycle. During polishing, this remaining material will be removed by the polishing wheel in millimeters.
Wet Polish Only	{	Bev Edge Pres.:	The amount of edge pressure applied when polishing a beveled lens wet (+ increases pressure/- decreases pressure) in millimeters.
		Rmls Edge Pres.:	The amount of edge pressure applied when polishing a rimless lens wet (+ increases pressure/- decreases pressure) in millimeters.
		Revs:	Tells the edger how many revolutions the lens should make during the polishing process. This number should be minimized, since the greater the number of revolutions, the longer the resulting cycle time.
		Revs:	Tells the edger how many revolutions the lens should make during the polishing process. This number should be minimized, since the greater the number of revolutions, the longer the resulting cycle time.
		Lens rpm:	The speed at which the lens rotates during the polishing portion of the cycle, measured in revolutions per minute.
Wet Polish Only	{	Motor rpm:	Controls the speed of rotation of the cutter motor during the polishing cycle measured in thousands of revolutions per minute.
		Water Flow:	Adjusts the flow of water from the pump onto the sponge. Increase the number to increase the flow; decrease the number to decrease the flow. Water flow for Wheel 1 is also used during safety beveling. (Also, see note on the following page.)

Safety Beveling Portion of the Blank Material 2 Screen

Lens rpm:	The speed at which the lens rotates during the safety beveling portion of the cycle, measured in revolutions per minute.
Motor rpm:	Controls the speed of rotation of the cutter motor during the safety beveling cycle measured in thousands of revolutions per minute.
Depth:	Determines how much material (in millimeters) to remove when cutting the safety bevel. The larger the number, the deeper the lens will come into the hub during safety beveling, and hence, the safety bevel will be larger.
Margin:	Influences the relationship between the safety bevel and the back of the lens bevel. This number (in millimeters) should be adjusted so that the safety bevel does not cut into the bevel of a thin lens. Increasing this number will increase the 'margin' between the bevel and the safety bevel.
Water Flow:	Adjusts the flow of water from the pump onto the sponge. Increase the number to increase the flow; decrease the number to decrease the flow. Water flow for Wheel 1 is also used during safety beveling.

Note

You can test the water flow numbers by adjusting them on the *Cleaning Screen*. Refer to page A-36 for information about the *Water Flow* field in the *Cleaning Screen*.

Calibration Screen

Use this screen to perform size, bevel, axis, probe and polish calibration (refer to Chapter 5, “Calibrating the 6ES” for step-by-step instructions).

Calibration Screen
EXIT returns to Setup Screen

Calibration

58mm Circle
Size/Bevel/Axis
Aviator
Groove
Probe

Calibration Offsets

	Edging	Wheel1	Wheel2
Size Offset	+ 0.00	+ 0.00	+ 0.00
Rimless Size Offset	+ 0.00	+ 0.00	+ 0.00
Bevel Offset	+ 0.00	+ 0.00	+ 0.00
Axis Offset	+ 0.00		

Size offset in mm (+ to increase, - to decrease)

Job 58mm Circle SBA Aviator Groove Probe

The Calibration Section

- 58 mm Circle:** A round, 58 mm diameter shape will be cut, so that the *Size Offsets* and *Bevel Offsets* can be adjusted, and set as required. The *Job Screen* will display with Job # 002—this is the internal job setup for checking size and bevel placement. Refer to Chapter 5 for step-by-step instructions.
- Size/Bevel/Axis:** Cuts an internal shape that allows the user to calibrate all of the edging offsets. Refer to Chapter 5 for step-by-step instructions.
- Aviator:** Cuts an internal shape for calibrating the safety bevel.
- Groove:** Activates the procedure for calibrating the groover. Refer to the “Calibrating the Groover” section of Chapter 5 for step-by-step instructions.
- Probe:** Activates the procedure for calibrating the probe. The 6ES edger will automatically measure the 58 mm calibration pattern to determine the relative locations of the probe tip, and the bevel and size carriages. The diameter of the 58 mm calibration pattern will be measured using both the right and the left probes. This information will be used by the 6ES to determine size and bevel location. Refer to the “Calibrating the Probe” section of Chapter 5 for step-by-step instructions.

The Calibration Offsets Section of the Calibration Screen

This section is used to add offsets to the current calibration numbers, which are stored as bias numbers on the *Advanced Setup Screen*. These are intended to be a way of quickly making slight adjustments to your calibration without having to worry about absolute calibration numbers. For example, if your unpolished size is too large by 0.1 mm, you would set your *Size Offset* for *Edging* to -0.10. (Use the minus sign to decrement the size.)

Note

After editing these values and leaving the screen, the numbers will be zero (0) when you come back to this screen; however, the bias numbers on the *Advanced Setup Screen* will be adjusted correctly.

- Size Offset:** Adjusts the 6ES for size differences between cutting surfaces. To increase the size, increase this number (units in mm).
- Rimless Size Offset:** Adjusts the 6ES for size differences for rimless and grooved lenses. To increase the offset, increase this number (units in mm).
- Bevel Offset:** Adjusts the ‘front-to-back’ position of the bevel on the lens. The proper setting places the “center” bevel (see the *Bevel* field on the *Job Screen*, described on page A-5) in the center of the edge of the lens. Using a positive number will move the bevel towards the front of the lens; a negative number will move it towards the back.
- Axis Offset:** Sets the relative angular position of the rotating chuck. During calibration, this value is used to set the axis of the edger. Once set at the factory, this number normally should not change, except when installing a new axis home switch. Increasing this value will move the point clockwise when the cut pattern is viewed from the PDA side.

Communications Screen

Use the *Communications Screen* for the following tasks:

- To set up communications to the edger and to change communications options (refer to the “Initial Installation” section of Chapter 2 for step-by-step instructions).
- To load new software (refer to Chapter 3, “Commonly Performed Tasks,” for instructions on updating the software).
- To back up setup numbers and restore them if necessary.

A sample *Communications Screen* is provided below:

The screenshot shows the 'Communications Screen' with a blue title bar. Below the title bar, it says 'EXIT returns to Advanced Setup Screen'. The screen is divided into two main sections: 'Comm Settings' on the left and 'Software' on the right. In the 'Comm Settings' section, there are several fields: 'Arcnet Connection' (set to 'None'), 'Com 1 Connection' (set to 'Host'), 'Com 1 Baud Rate' (set to '19200'), 'Protocol' (set to 'OMA'), 'Max TRCFMT' (set to '4'), 'OMA Init Level' (set to 'None'), and 'Com 2 Connection' (set to 'None'). In the 'Software' section, there are several buttons: 'Load Software', 'Backup System', 'Save Setup Nums', 'Restore Setup From Floppy', 'Restore Log From Floppy', and 'Start Modern Communications'. At the bottom of the screen, there is a status bar with the text '+/- or INC/DEC to Change' and a row of buttons: 'Job', 'Diagnostics', 'Arcnet', 'COM1', 'COM2', 'Load SW', 'Backup Sys', and an empty button.

NOTE: The first three fields (Arcnet Connection, Machine Node ID, and Protocol) may display as read-only (gray background) if no Arcnet card is present—an Arcnet card is optional equipment.

Arcnet Connection: Specifies the type of Arcnet connection (Host, 4T, Saturn, or None).

Machine Node ID: (This field disappears when Arcnet Connection is set to **None**.) Specifies the Node ID of the Arcnet connection. The value can be 1-249.

Protocol: (This field disappears when Arcnet Connection is set to **None**.) NOP is the protocol being used for each of the following Arcnet connections:

- A Saturn tracer
- A 4T tracer
- A host computer (“Host”)

Com 1 Connection: The choices for Com 1 vary depending on what you have selected in the Arcnet Connection field. If you have “Host,” “4T,” or “Saturn,” selected for the Arcnet Connection field, your choice for Com1 is “Bar Code” or “None.” If you have “None” selected for the Arcnet Connection field, your choices

	include “4T,” “3B” and “Host,” as well as “Bar Code” and “None.” You can only have one Bar Code selection.
Baud Rate:	(This field only appears when the Com 1 Connection has a Barcode, Host, 3B or 4T configured.) This field shows the baud rate for the Com 1 Connection. The default is 9600. Normally, the 6ES software will supply the correct baud rate automatically. The edger will not be able to communicate if this parameter is different from the baud rate of the attached device.
Protocol:	(This field only appears when Arcnet Connection is set to “None” and Com1 or Com2 has a 4T, 3B or Host configured.) The choices for Host are OMA or GC; the choice for 4T or 3B is OMA.
Max TRCFMT:	OMA Trace Format preference—4 is Packed Binary; 1 is ASCII.
OMA Init Level:	Specifies the Initialization Level—the communication information available upon initializing communication to another device. The default setting is “Auto,” which allows the attached device to specify which data items will be downloaded. The other options are “Preset,” which sends the defaults for that type of device, or “None,” which means that no data items will be assumed before each time the 6ES communicates with another device. “None” is a slower method of communication but may be necessary depending on the host.
Com 2 Connection:	The choices for Com 2 vary depending on what you have selected in the Arcnet Connection field. If you have “Host,” “4T,” or “Saturn,” selected for the Arcnet Connection field, your choice for Com 2 is “Barcode” or “None.” If you have “None” selected for the Arcnet Connection field, your choices include “4T,” “3B” and “Host,” as well as “Barcode” and “None.” You can only have one Bar Code selection.
Baud Rate:	This field only appears when the Com 2 Connection has a Barcode, Host, 3B or 4T configured. This field shows the baud rate for the Com 2 device. Normally, the 6ES software will supply the correct baud rate automatically.
Protocol:	This field only appears when Arcnet Connection is set to “None” and the Com 2 Connection has a Host, 3B, or 4T configured. If the Com 2 Connection is Host, then the protocol choices are OMA and GC. If the Com 2 Connection is 4T or 3B; then the protocol choices are NOP or OMA.
Max TRCFMT:	OMA Trace Format preference—4 is Packed Binary; 1 is ASCII.
OMA Init Level:	Specifies the Initialization Level—the communication information available upon initializing communication to another device. The default setting is “Auto,” which allows the attached device to specify which data items will be downloaded. The other options are “Preset,” which sends the defaults for that type of device, or “None,” which means that no data items will be assumed before each time the 6ES communicates with another device. “None” is a slower method of communication but may be necessary depending on the host.

Buttons:

Load Software	Allows you to load software code using a floppy disk.
Save Setup Nums	Saves all calibration, log, and setup numbers (all data saved across power cycles) to disk for future retrieval with the <i>Restore Setup from Floppy</i> feature.
Backup System	Backs up your complete system—recommended before loading software.
Restore Setup from Floppy	Restores from floppy the calibration and setup numbers saved to floppy with the <i>Save Setup Nums</i> feature.
Restore Log from Floppy	Restores Log saved to from floppy with the <i>Save Setup Nums</i> feature.

Diagnostics Screen

Use the *Diagnostics Screen* for checking servo encoders, communications, keypad, and the home, door and water level switches.

The screenshot shows the 'Diagnostics Screen' with a blue header bar. Below the header, a pink text line reads 'EXIT returns to Previous Screen'. The screen is divided into three main sections: 'Servo Diagnostics', 'Communications Diagnostics', and 'Switch Diagnostics'. The 'Servo Diagnostics' section contains a table with columns for 'Position', 'At Home', 'Left Size', 'Right Size', and 'Probe Deadband'. The 'Communications Diagnostics' section shows status for 'Keypad', 'Serial Com 1', 'Serial Com 2', and 'Arcnet Connected'. The 'Switch Diagnostics' section shows status for 'Water Level' and 'Door'. At the bottom, there is a row of buttons: 'Job', 'Bevel Left', 'Bevel Right', 'Axis CCW', 'Axis CW', 'Size Front', 'Size Back', and 'Solenoid'.

	Position	At Home	Left Size	Right Size	Probe Deadband
Probe	-4		68.36	68.66	0
Axis	-3	<input type="checkbox"/>	Chuck Base	9	
Size	-60	<input type="checkbox"/>	MCL HW Ver	D502	
Bevel	1	<input type="checkbox"/>	MCL FW Ver	0109	

Keypad	?
Serial Com 1	s
Serial Com 2	s
Arcnet Connected	<input checked="" type="checkbox"/>

Water Level	Not Empty
Door	Closed

Buttons: Job, Bevel Left, Bevel Right, Axis CCW, Axis CW, Size Front, Size Back, Solenoid

Servo Diagnostics Section of the Screen

Left Size:	The position of the left probe tip in mm, from the Size home switch.
Right Size:	The position of the right probe tip in mm, from the Size home switch.
Probe Deadband:	Indication of probe movement ability. This field should be showing a number less than 50. A value greater than 50 here may indicate a probe that is sticking, and could result in probe inaccuracies or probe error messages.
Probe:	The "Position" number represents the encoder count for the probe. Used to detect probe movement.
Axis:	The "Position" number represents the encoder count for the axis servo motor. Each full rotation of the lens should change the count by 240,000. The "At Home" checkmark or blank indicates whether the axis is (✓) or is not (blank) in the home position.
Size:	The "Position" number represents the encoder count for the size servo motor. Each full rotation of the servo coupler should change the count by 8,000. The "At Home" box indicates whether the axis is in home switch (✓) or is not (blank) in home switch.
Chuck Base:	For Optronics use only
MCL HW Ver:	Motion Control Library hardware version.
MCL FW Ver:	Motion Control Library firmware version.

Bevel: The “Position” number represents the encoder count for the bevel servo motor. Each full rotation of the servo coupler should change the count by 8,000. The “At Home” checkmark or blank indicates whether the axis is (✓) or is not (blank) in home switch.

Communications Diagnostics Section of the Screen

Keypad: Allows you to test the keypad to determine if each key is working. This field indicates the last key (or button) pressed.

Serial Com 1: If you assigned a device to COM1, the continually changing series of letters, numbers, and symbols indicates what is being sent out of the serial port. The serial port can be tested by placing a jumper across pins 2 & 3 of COM1 on the back of the 6E. If the serial port is working properly, the display should change from a single character to the same character being printed twice. For example, the display should change from {A, B, C, ...} to {AA, BB, CC, ...} if the serial port is working properly. (There will not be a continually changing series of numbers if you do not assign a device to COM1.)

Serial Com 2: Same as above for Loopback 1 but uses COM2.

Arcnet Connected: Indicates whether the 6ES is (✓) or is not (blank) properly connected to a network. If there is no checkmark, but the edger is physically connected to a network, it indicates a problem with the network. Possible causes are a bad co-axial (coax) cable, or a duplicate LAN ID.

Switch Diagnostics Section of the Screen

Water Level: Reports the water level in the coolant reservoir.

Door: Tells you if either the Plexiglas door or the lid is open or ajar.

Buttons Along the Bottom of the Diagnostics Screen:

Job: Takes you to the *Job Screen*.

Bevel Left: Moves the bevel one inch to the left. The encoder should decrease by 64,000.

Bevel Right: Moves the bevel one inch to the right. The encoder should increase by 64,000.

Axis CCW: Moves the axis counter-clockwise approximately 90° from the keypad-side view. The encoder should decrease by approximately 60,000.

Axis CW: Moves the axis clockwise approximately 90°. The encoder should increase by approximately 60,000.

Size Front: Moves the size one inch to the front. The encoder should decrease by 64,000.

Size Back: Moves the size to the back. The encoder should increase by 64,000.

Solenoid: Activates the solenoid on the chip chute, which will lower the sponge onto the wheels.

Servo Screen

Use the *Servo Screen* to view gain numbers and set carriage limits.

The screenshot shows the 'Servo Screen' interface with the following sections:

- Chuck:** Initial Burst (2), Initial Close (15), Chuck Open (12). Buttons: Calibrate Chuck.
- Limits:** Min, Max, Ctr columns for Bevel (0, 296533, 0) and Size (-27894, 170450, 0). Buttons: Find Carriage Limits, Reset Carriage Limits.
- Servo Gain:**

Axis		Bevel		Size	
Motor	Portescap	Motor	Portescap	Motor	Portescap
Cts/Rev 240	Cts/Rev 8000	Cts/Rev 8000			
Max Vel 18	Max Vel 25	Max Vel 20			
Max Acc 120	Max Acc 100	Max Acc 100			
Kp 100	Kp 110	Kp 110	Kp 125		
Ki 0	Ki 60	Ki 100	Ki 1125		
Kd 250	Kd 180	Kd 150	Kd 800		
Il 0	Il 400	Il 200	Il 2200		
Vff 0	Vff 0	Vff 0	Vff 0		
- Buttons:** Size Decrease (20), Size Increase (15), Job, Find Limits, Reset Limits, Axis Motor, Bevel Motor, Size Motor.

Sections

Chuck:

- Initial Burst:** Amount of time to start the chuck motor moving.
- Initial Close:** Initial closing force of the chuck.
- Chuck Open:** The force the machine exerts in opening the clamp.

Limits:

- The travel limits for the bevel and size carriages in encoder counts from the Home position.
- Axis Pos Error:** The amount of position error (in encoder counts) that triggers an error on the Axis.
- Linear Pos Error:** The amount of position error that triggers error on SIZE or BEVEL.
- Repeatability:** The amount of position error (in encoder counts) that triggers an error in the linear carriage homing routines. This is normally disabled with a value of zero, but it may be set to 250 if size or bevel problems appear.

Servo Gain:

National Optronics use only.

Size Decrease:

Slows down the Axis when the Size goes above this speed in mm/second. **Do not change unless instructed to do so by an Optronics technician.**

Size Increase:

Speeds up the Axis when the Size goes below this speed in mm/second. **Do not change unless instructed to do so by an Optronics technician.**

Buttons Along the Side

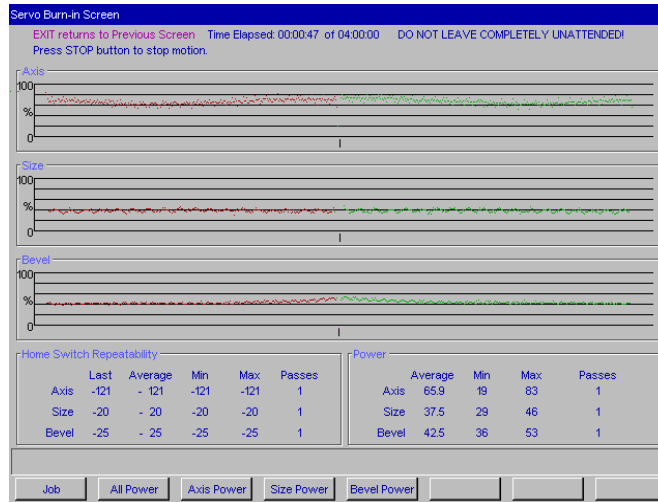
Calibrate Chuck:	For National Optronics Use Only.
Find Carriage Limits:	Moves carriages to find their limits.
Reset Carriage Limits:	Sets the carriages' range of motion to zero (used primarily by National Optronics). This will force the machine to find limits on the next boot-up.

Buttons Along the Bottom

Job:	Takes you to the <i>Job Screen</i> .
Find Limits:	Moves carriages to find their limits.
Reset Limits:	Sets the carriages' range of motion to zero (used primarily by National Optronics). This will force the machine to find limits on the next boot-up.
Axis Motor:	Moves the cursor to the top of the Axis column.
Bevel Motor:	Moves the cursor to the top of the Bevel column.
Size Motor:	Moves the cursor to the top of the Size column.

Servo Burn-In Screen

Use the *Servo Burn-In Screen* to burn in the servo motors, or to view the power graphs for each servo motor, and to monitor the Home switch repeatability. It can also be used to warm up the servo motors after a period of shut-down, for example, after a weekend of non-use. This type of warm-up is not required, but some operations consider it a good practice.



Servo Test Screen Fields

Graphs: The graphs show the power required for each of the servo motors (Bevel, Axis, and Size). A number above 50% for linear axes (bevel and size) or above 70% for axis may indicate some carriage binding or other mechanical problem. The red dots represent the first direction of movement—usually away from home; the green dots represent the movement back toward home position. (On the bevel, the red dots represent the power graph for a movement to the right; the green is to the left. For the axis, the green dots represent the power graph for a clockwise movement—when viewing from the back of the lens—and the red is counterclockwise. On the size, the red dots represent the power graph for backward movement; the green represents forward movement.)

Home Switch Repeatability: This section of the screen displays the repeatability of the home switch. A small number is desirable. If the average is higher than 50 for the Size or Bevel or higher than 100 for the Axis, then you may need to contact National Optonics.

Power: Shows the average, minimum and maximum power for each carriage.

Servo Test Screen Buttons

Job: Takes you to the *Job Screen*.

All Power: Runs all three motors, one at a time

Bevel Power: Runs the bevel motor only.

Axis Power: Runs the axis motor only.

Size Power: Runs the size motor only.

Frame Screen





Use the *Frame Screen* to set defaults for size adjustment for each of the frame types listed below or for frame types you name (the blank area below *Groove* in the screen capture shown below).

Name	Size Adj	Default Bevel
Plastic	+ 0.20	Automatic
Metal	+ 0.00	Automatic
Rimless	+ 0.00	Automatic
St Groove	+ 0.00	Center
W Groove	+ 0.00	Center
	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic
	+ 0.00	Automatic

Press CLEAR to edit name

Job Plastic Metal Rimless


Frame Screen Fields

- Name:** Type of material or other designation for size adjustment purposes.
- Size Adjustment:** Amount (in millimeters) to increase or decrease based on the selection. For example, in operations that use Zyl frames, set this value for slightly larger. For operations that use “cold-snap frames,” the tolerance is much tighter; therefore, this value should be set to zero or a very small value.
- Default Bevel:** Shows the default bevel position for each of the frame types listed. You can adjust these default settings by moving to the field with the  or , then using the  or  keys to change the selection.

Frame Screen Buttons

- Job:** Takes you to the *Job Screen*.
- Metal:** Moves the cursor to the *Metal* field.
- Plastic:** Moves the cursor to the *Plastic* field.
- Rimless:** Moves the cursor to the *Rimless* field.

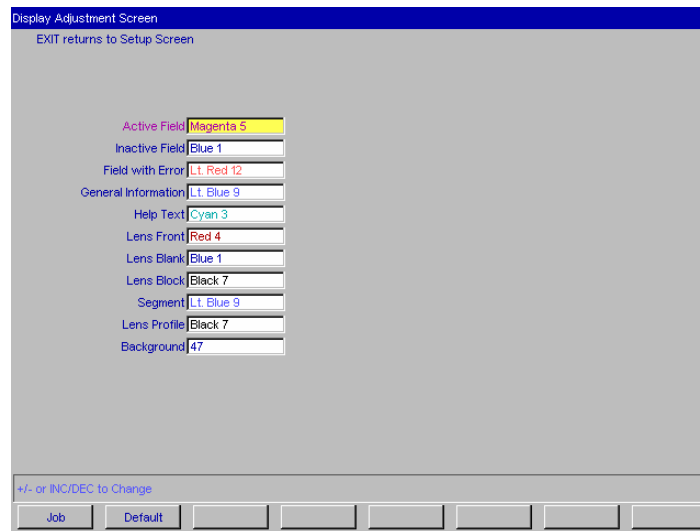
Note

To start the process of adding a name, move the cursor to a blank spot and press the Clear button . For step-by-step instructions on this procedure, refer to Chapter 7, “Advanced Configuration.”

In addition, if you place an exclamation point (!) within the name of the frame, the 6ES will include standard grooving for the job (for example, “metal!”). If you place a # sign within the name (for example, “plastic#”), the 6ES will include wide grooving for the job.

Display Adjustment Screen

Use the *Display Adjustment Screen* to change the default colors for fields and displays within the 6ES software.



Display Screen Fields

Active Field:	Controls the colors used in the field where the cursor is located; that is, the active field.
Inactive Field:	Controls the colors used in fields where the cursor is not located; that is, the inactive fields.
Field with Error:	Controls the colors used to accentuate an error.
General Information:	Controls the colors used for information boxes.
Help Text:	Controls the colors used for help text.
Lens Front:	Controls the color used on the <i>Job Screen</i> to represent the front of the lens.
Lens Blank:	Controls the color used on the <i>Job Screen</i> to represent the lens blank.
Lens Block:	Controls the color used on the <i>Job Screen</i> to represent the block of the lens.
Segment:	(For representing multi-focal lens) Controls the colors used to represent the segment.
Lens Profile:	Controls the color used on the <i>Job Screen</i> to represent the bevel of the lens when the <i>Profile</i> button is pressed.
Background:	Controls the background colors for all screens. The default gray is number 47. If you want to change that color, type in a different number.

Display Screen Buttons

Job:	Takes you to the <i>Job Screen</i> .
Default:	Reverts to default colors.

Job Screen Layout Screen

Use the *Job Screen Layout Screen* to modify the display and edit status of each field on the screen. Each field can have one of three settings: (1) displaying and editable, (2) displaying but read-only, or (3) hidden—does not display on the *Job Screen*. One of the common uses of this screen is to disable warnings such as disabling the vacuum fault warning if a central vacuum is in use—see “The Status Area” below.

Job Screen Layout Screen Fields and Buttons

You can modify each field (except the *Status* area) in the following ways:

- Use the *Job* button to store changes and go to the *Job Screen*.
- Use the *Edit* button to make the field one that is visible and can be edited by the user.
- Use the *Read Only* button to make the field one that is visible but cannot be edited by the user (that is, to make it a read-only field). Read-only fields will display with a gray background.
- Use the *Hidden* button to make the field disappear from the *Job Screen*.

The Status Area

The following buttons are used only for the display in the *Status* area of the *Job Screen*.

Cut Fault: Used to turn off or turn on the cutter motor fault during a cycle. In the default setting (on), if the cutter motor does not come on when you try to cut a lens, the cycle aborts and a cutter motor fault is displayed.

Caution

Turning off the *Cut Fault* is used primarily for diagnostics purposes by National Optronics service technicians. Without this warning, you might have a situation where you could damage the equipment.

Water: Used to turn off or turn on the refill-water reminder feature. Operations that never use the Polish or Safety Bevel feature of the 6ES may want to turn this feature off. Press the *Water* function key **[F6]** to turn it off; press the *Water* function key **[F6]** again to turn it back on. When off, the words *Water Level* display in black typeface, and the Sponge bar is grayed out. When on, the words *Water Level* display in red typeface and the Sponge bar is visible.

Vac Fault: Used to turn off or turn on the vacuum-bag-replacement reminder feature, as well as the fault indicator if the vacuum does not start during the cycle. Customers using a central vacuum system instead of the National Optronics standard vacuum should turn this feature off. Press the Vac Fault function key **[F5]** to turn it off; press the Vac Fault function key **[F5]** again to turn it back on. When off, the words *Vacuum Fault* display in black typeface and the Vacuum bar is grayed out. When on, the words *Vacuum Fault* display in red typeface, and the Vacuum bar is visible.

Machine Log Screen

Use the *Machine Log Screen* to check maintenance statistics, to view statistics on materials edged, and to reset statistics when needed, and save the log to a CSV file on a floppy disk.

Machine Log Screen
EXIT returns to Advanced Setup Screen

Cycle Statistics

Material	Abort Count	Recut Count	Full Count	Avg. Time	% of Total	% Safety Bevelled	% Groove	% Polish Wheel1	% Polish Wheel2
CR-39	24	20	90	01:29	12.3	6.7	1.1	0.0	52.2
Poly	96	40	624	01:17	85.6	28.2	17.8	11.4	1.8
Hi-Idx	0	0	0	00:00	0.0	0.0	0.0	0.0	0.0
Other	1	0	15	01:31	2.1	0.0	0.0	0.0	0.0
Total	121	60	729	01:16	100.0	25.0	15.4	9.7	8.0

Maintenance Statistics

	Blades	Groover	Sponge	Vacuum Bags	Polish Wheel1	Polish Wheel2	Motor
#Cycles	70	125	193	84	188	112	1028
Reset	Reset	Reset	Reset	Reset	Reset	Reset	Reset

Save Log to Floppy(CSV)

Press ENTER to Reset Cycle Statistics

Job Reset Cycle Reset Blade Reset GBlade Reset Sponge Reset Vac Reset Wheel1 Reset Wheel2

The Cycle Statistics Area

The statistics in this area show how many types of cuts have been performed, divided up by material. The *Reset Cycle* function button **[F2]** (labeled “#Cycles” on the screen) zeroes out all the *Cycle Statistics* values. Normally, this should only be done at the instruction of a National Optronics service technician. These cycles are usually used to record statistics for the life cycle of the 6ES; however, a lab manager may use them for other accounting analyses.

The Maintenance Statistics Area

This area shows how many cycles of cuts have been performed, divided up by material. The first button, however, pertains to the *Cycle Statistics* area. Use the *Reset Cycle* function button **[F2]** (labeled “#Cycles” on the screen), as discussed above.

Reset Buttons

Use the maintenance cycle buttons to reset (zero out) the number of cycles for each of the items listed, for example, when you have just changed a blade, vacuum bag, etc.

- Blades:** Shows the number of cycles the cutter motor has run since this field was reset (after a blade change). You will need to reset *Blades* after every cutter change—refer to the “Changing the Cutter Blade” section of Chapter 3, “Commonly Performed Tasks” for detailed instructions on changing the cutter blade.
- Groover:** Shows the number of times the grooving wheel was used since last reset.
- Sponge:** Shows the number of cycles since the sponge was last reset. You will need to reset these cycles after replacing the sponge. Refer to the “Replacing the Sponge”

section of Chapter 3, “Commonly Performed Tasks” for detailed instructions on changing the sponge.

- Vacuum Bags:** Shows the number of times the vacuum started since last reset. You will need to reset these cycles after every vacuum bag change—refer to the “Changing the Vacuum Bag” section of Chapter 3, “Commonly Performed Tasks” for detailed instructions on changing the vacuum bag.
- Polish Wheel 1:** Shows the number of times the polish cycle started when using Wheel 1 since last reset. You will need to reset these cycles after changing Polishing Wheel 1.
- Polish Wheel 2:** Shows the number of times the polish cycle started when using Wheel 2 (typically Wheel 2, as defined in the Blank Material screen) since last reset. You will need to reset these cycles after changing Polishing Wheel 2.
- Motor:** Shows the number of times the motor started since last reset. You will need to reset these cycles after every cutter motor change—refer to the “Cutter Motor Replacement” section of Chapter 6, “Performing Periodic Maintenance” for detailed instructions on changing the motor.

Save Log to Floppy (CSV): Saves the log to disk (in Comma Separated Variable format).

In addition, note that the ***Job*** function key stores the changes made on this screen and takes you to the ***Job Screen***.

Cleaning Screen

Use the *Cleaning Screen* for daily cleaning and cleaning the polishing wheel on the 6ES—refer to the “Daily Cleaning and Other Daily Maintenance of the 6ES” section in Chapter 2 and the “Cleaning the Polishing Wheel” section in Chapter 3.

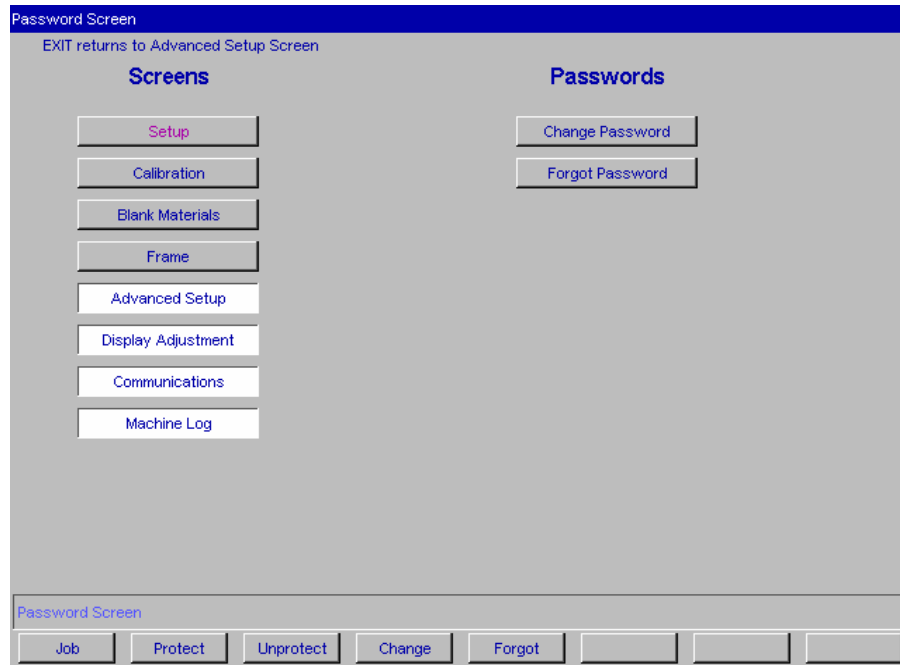
- Job:** Returns you to the *Job Screen*.
- Move Size Carriage:** Moves the Size carriage so that you can clean underneath it.
- Move Bevel Carriage:** Moves the Bevel carriage so that you can clean underneath it.
- Home Carriages:** Returns carriages to Home position after cleaning.
- Pump On:** Turns the pump on to wet the sponge and the Polishing Wheel for cleaning purposes.
- Pump Off:** Turns the pump off.
- Water Flow:** There is a *Water Flow* field on the *Blank Materials* screen that specifies the amount of water flow to the sponge needed for the polishing stage for each of the materials (CR39, Poly, etc.). Use this field to test the amount of flow. The valid range is from 5 to 20 with larger numbers increasing the amount of flow.
- Brush Diameter:** To be used with the Wire Brush from the Accessory Kit when cleaning the polishing wheel—see “Clean Wheel” below.
- Clean Wheel:** Use this function with the Wire Brush from the Accessory Kit when experiencing poor polish quality and when there is visual evidence of lens material buildup on the polishing wheels. Refer to the “Cleaning the Polishing Wheel” section in Chapter 3 for step-by-step instructions.

Note

For step-by-step instructions for the cleaning functions mentioned above, refer to Section 2, “Daily Cleaning and Other Daily Maintenance of the 6ES,” in Chapter 2 of this manual.

Passwords Screen

The *Passwords Screen* allows the lab manager to determine which screens require passwords to change settings and values. The sample *Passwords Screen* shown below has the default settings. Notice that the bottom four buttons appear different; for example, they are white buttons and look pressed in, indicating that they are “Protected”—see button definitions of “Protect” and “Unprotect” below.



- Job:** Saves the changes and takes you to the *Job Screen*.
- Protect:** When you “Protect” a screen, for example, the *Communications Screen* as shown above, the 6ES requires a password to change any value on that screen.
- Unprotect:** To “Unprotect” a screen means that the 6ES no longer requires a password to change values.
- Change:** To change the password, press this *Change* button and follow the prompts.
- Forgot:** If you forget the password, follow the directions shown below:

What Happens If I Forget My Password

If you forget the current password, follow these steps:

1. Press the *Forgot Password* button; then call National Optronics Technical Service.
2. Provide them with the password code displayed in the message box.
3. They will provide you with a special (one-time use) password that can be used in place of the current password.

Note

This special password is only valid for use this one time. A new special password will be required each time you forget your password.

Special Note

The special password is based on the password code, and the password code changes on a regular basis, so do not exit this screen before receiving and using the special password.

4. Press the *Change Password* button.
 5. Enter the special one-time use password that you received from National Optronics.
 6. Follow the prompts that appear. You will be required to enter a new password and confirm it.
- The 6ES will display a “Password has been changed” message box.

Appendix B

6ES System Messages

Explanation of Numbered Messages, Warnings and Errors

There is a number attached to most system messages and all errors. These numbers are significant and can be useful in trouble-shooting. The text in this appendix describes each message and its meaning.

[51-99 Messages]

Message 51

Please call National Optronics with this code.
A service technician will give you a temporary password which
can be used to change the password to a password of your choice.

Message 52

Data has been saved.
Please remove diskette from floppy drive.

Message 53

Data has been restored.
Please remove diskette from floppy drive.

Message 54

Log has been saved.
Please remove diskette from floppy drive.

Message 55

New 6ES executable loaded.
REMOVE FLOPPY DISKETTE!!

[100-199 General Warnings]

Warning 101

PLEASE VERIFY THAT PROBE TIPS ARE
PULLED TO THEIR FULL FRONT LIMIT.

Mount probe calibration disk.

Press Continue to calibrate probe.

Warning 102

You should only turn this fault off if
you are using a central vacuum system.
Are you sure you want to do this?

Warning 103

Turning off this fault is primarily done by Optronics
service technicians. Without this warning, you might
have a situation where you could damage the equipment.
Are you sure you want to do this?

Warning 104

Resetting cycle data will erase the entire machine history.
Are you sure you want to do this?

Warning 109

Optronics recommends leaving this number at 300 for
Carbide cutters and 10,000 for Diamond cutters. Increasing this
number may lead to decreased edge quality and axis slippage.
Are you sure you want to do this?

Warning 110

Optronics does not recommend changing the vacuum bag
life from the default of 300. Increasing this number
may lead to decreased machine performance or life.
Are you sure you want to do this?

Warning 111

Has the machine been cleaned?

Warning 112

Insert diskette into floppy drive.

Warning 113

Check that floppy is inserted in drive.

Warning 114

Insert System Diskette, or other diskette with new software.

CAUTION

File transfers may require several minutes.

DO NOT insert or remove floppy diskette unless prompted.

DO NOT turn off system power unless prompted.

If system shows NO activity for 3 minutes...

... remove diskette

... turn off power

... restart system again.

Warning 115

Cycle will pause during finishing to allow for bevel adjustment.

Warning 116

Cycle will pause during grooving to allow for groove adjustment.

Warning 117

Optronics does not recommend changing the groover life from the default of 3000. Increasing this number may lead to decreased machine performance or life. Are you sure you want to do this?

Warning 118

Optronics does not recommend changing the sponge life from the default of 300. Increasing this number may

lead to decreased machine performance or life.

Are you sure you want to do this?

Warning 120

Power off cutter motor, remove blade, and power motor on.

Mount wire cleaning brush.

Make sure sponge is damp before cleaning hub.

Make sure that the lid is closed.

Press Continue to clean polishing hub.

[200-299 Physical Machine Limitations]

Warning 201

Probe tip fell off lens during probing.

Lens may be too small to cut out.

Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.
REPROBED LENS CANNOT BE SAFETY BEVELLED.

NOTE: If you receive this error message, you will go into Pause Mode—refer to the “Using Pause Mode” section of Chapter 7 (beginning in Step 3).

Warning 202

Probe tip fell off lens during probing.

Lens may be too small to cut out.

Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

Warning 203

Groove can not be placed as far back on lens as specified.

Warning 204

Lens edge may be too thin to groove.

Warning 205

Bevel is too far back to be polished.
Continuing will move bevel forward on lens.

Warning 206

Lens is too thick to be polished.
Continuing will turn polish off.

Warning 207

Lens is too thick to safety bevel.
Continuing will turn safety bevel off.

Warning 208

Half-eye clamp and block must be installed
to safety bevel this shape.
Do you want to continue?

Warning 209

Half-eye clamp and block must be installed to cut this shape.
Do you want to continue?

Warning 210

Lens edge too thin for base curve bevel.
If you continue, bevel placement will be
changed to automatic.
Do you want to continue?

Warning 211

Half-eye clamp and block must be installed to cut this shape.
Automatic safety bevel not allowed on lens this small.
Do you want to continue?

Warning 213

Probe data is irregular.
Lens may be too small to cut out.
Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

REPROBED LENS CANNOT BE SAFETY BEVELLED.

Warning 214

Probe data is irregular.
Lens may be too small to cut out.
Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

Warning 215

Probe appears to be stuck. Probe data may be incorrect.

Warning 216

Bevel carriage hit software limit before probe reached target.
Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.
REPROBED LENS CANNOT BE SAFETY BEVELLED.

Warning 217

Bevel carriage hit software limit before probe reached target.
Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

Warning 218

Lens shape may be affected by SIZE carriage minimum limit.

Warning 219

Bevel placement may be affected by BEVEL carriage maximum limit.

[300-399 Operator Error]

Warning 301

No lens detected!
Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.
REPROBED LENS CANNOT BE SAFETY BEVELLED.

Warning 302

No lens detected!
Reprobe lens 2mm smaller?

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

[400-499 Communication Error]

Error 400

No Arcnet Error

Error 401

LAN Hardware Failure

Make sure the DIP switches on the Arcnet
card are all in the same direction.

Error 402

Duplicate LAN ID

This Arcnet ID is already in use by
another device. Try another ID.

Error 403

LAN Receive Error

Code mismatch in packet series.

Error 404

LAN Receive Error

Packet numbers received out of order.

Error 405

LAN Receive Error

HOST ID is not 255.

Error 406

LAN Transmit Timeout

No Arcnet connection detected.

Error 407

LAN Receive Timeout

Host received request but did not respond in time.

Error 419

Arcnet Not Connected

Tried to call host, but no Arcnet connection was found.

Error 420

Call Host Timeout

No response from Host to Gateway

Error 421

Job Not Found

Check that job number was entered correctly and that job exists at host.

Error 422

Unknown Error

Network detected with no host.

Error 423

Edger Data NOT Found!

Error 424

Serial Receive Timeout

Check that serial cables are connected from 4T to 6ES and that the communications parameters on both machines are set correctly.

Error 425

No communication device configured or unsupported protocol.
Please configure a device and/or a supported protocol on the Communications Screen.

Error 426

Bad trace received!

[500-599 Hardware Error]**Error 501**

Calibration disk not detected.

PLEASE VERIFY THAT PROBE TIPS ARE PULLED TO THEIR
FULL FRONT LIMIT AND RECALIBRATE PROBE.

Error 503

Possible failure of BEVEL axis home switch detected.
Check switch and wiring.

Error 504

Possible failure of SIZE axis home switch detected.
Check switch and wiring.

Error 505

BEVEL motor or encoder not responding.
Make sure motor wiring is intact and
carriage rails are clear of debris.

Error 506

SIZE motor or encoder not responding.
Make sure motor wiring is intact and
carriage rails are clear of debris.

Error 507

AXIS motor or encoder not responding.
Make sure motor wiring is intact and
carriage rails are clear of debris.

Error 508

Unable to detect AXIS home position.
Check AXIS home switch function and wiring.

Error 509

False HOME position reading on BEVEL axis.
Check BEVEL home switch and wiring.

Error 510

Probe could not detect calibration disk size.
Probe is probably sticking in left position.

Error 511

Probe could not detect calibration disk size.
Probe is probably sticking in right position.

Error 512

Bevel home switch repeatability error.
Bevel placement and size may be affected.
Please call National Optronics Technical Service
for help with this error.

Error 513

Size home switch repeatability error.
Bevel placement and size may be affected.
Please call National Optronics Technical Service
for help with this error.

Error 514

Size limit exceeds probe tip location. This may
indicate missing rear size limit stops or a probe
that is too far forward. Please call National
Optronics Technical Service for help with this error.

Error 515

False HOME position reading on SIZE axis.

Check BEVEL home switch and wiring.

[600-699 Cycle Errors]**Error 601**

Lens must be chucked to start cycle.

Error 602

Door must be closed to start cycle.

Error 603

Probe not calibrated!!

Please remove lens and calibrate probe before continuing.

Error 604

You are missing information needed for cycle.

Please fix and try again.

Error 605

Water level too low to polish or safety bevel.

Error 606

Block too close to or outside of edge of lens.

Error 607

Lens too small to probe!

Error 608

No lens detected!

Error 609

Cutter Motor Fault!

Error 610

Vacuum Fault!

Error 611

Lens hit probe arm! You may be in re-cut mode using a full blank.

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

Error 614

Door opened before cycle complete!

Error 615

Lens too large or too decentered to cut. Try moving block and Multifocal blocking (on Setup Screen) to 5mm down, 5mm in or changing to Geometric Blocking.

Error 617

Memory error 2!

Error 618

Memory error 3!

Error 619

Memory error 4!

Error 620

Memory error 5!

Error 623

Toolpath alignment error!

Error 626

Cannot align data.

Error 627

Probe data is irregular.
Lens may be too small to cut out.

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

Error 628

Not enough information for profile mode.
Profile cannot be used with back bevel or if back is not probed.

Error 629

Bevel carriage hit software limit before probe reached target.

CAUTION

PROBE TIPS MAY HAVE BEEN PUSHED BACK. PLEASE
VERIFY THAT THEY ARE PULLED TO THEIR FULL FRONT LIMIT.

Error 630

Blocking is invalid. Please check blocking parameters.

Error 631

Axis servo could not maintain correct position during cycle.

This could be due to one of the following:

- a servo motor, encoder or wiring problem
- a driver chip problem
- too high a feed rate for the material being cut
- too high a lens rpm for the material being cut
- cutter motor never turned on and lens hit arbor

Please check your material settings and try again.

Error 632

Bevel servo could not maintain correct position during cycle.

This could be due to one of the following:

- a servo motor, encoder or wiring problem
- a driver chip problem
- too high a feed rate for the material being cut
- too high a lens rpm for the material being cut
- lens debris blocking carriage

Please check your material settings and try again.

Error 633

Size servo could not maintain correct position during cycle.

This could be due to one of the following:

- a servo motor, encoder or wiring problem
- a driver chip problem
- too high a feed rate for the material being cut
- too high a lens rpm for the material being cut
- lens debris blocking carriage

Please check your material settings and try again.

Error 634

Lens is too small to cut. Please check size and try again.

Error 635

Got a Position Error

Error 636

Lens is too large to cut. Please check size and try again

[700-799 Operator Error]

Error 703

Must recall job to go back to traced center

Error 713

Cannot start calibration from left eye.

Error 714

Need to download job for cycle to be valid.

Error 715

is invalid.

Please fix it at host or make it editable.

Error 716

Cannot load job while calibrating.

Error 717

Cannot change layout while in recut mode

Error 718

Unable to save setup numbers to floppy

Please remove diskette from floppy drive.

Error 719

Unable to restore setup numbers from floppy

Please remove diskette from floppy drive.

Error 720

Chuck pressure is too low to be calibrated.

Error 721

Chuck pressure is too high to be calibrated.

Error 722

Please remove lens from chuck

Error 723

- Out of Range value

Valid range is from

Error 724

Illegal value!!

Check Value of

Error 726

Calibration disk must be chucked to start calibration.

Error 727

Grooving Spindle Arrangement must be installed
before Groove can be calibrated.

Error 728

Unable to save log to floppy

Please remove diskette from floppy drive.

Error 729

Load aborted. Unable to access diskette file.

Restoring previous main program...

Please remove diskette from floppy drive.

Error 730

Unable to do download.

No SETUP program exists.

Please remove diskette from floppy drive.

Error 731

Download aborted. Unable to copy SETUP program.

Please remove diskette from floppy drive.

Error 732

Unable to restore statistics log from floppy

Please remove diskette from floppy drive.

Error 733

Hit maximum software limit on BEVEL carriage

Error 734

Hit minimum software limit on BEVEL carriage

Error 735

Hit maximum software limit on SIZE carriage

Error 736

Hit minimum software limit on SIZE carriage

Error 737

Chuck must be closed to find limits

Error 738

Wire brush must be chucked to start hub cleaning.

[Floating Point Errors 800-899]**Error 801**

INTO executed with OF flag set

Error 802

Integer Divide by Zero

Error 803

Invalid Operation

Error 804

Division by Zero

Error 805

Numeric Overflow

Error 806

Numeric Underflow

Error 807

Precision

Error 808

Program Generated Exception

Error 809

Stack Overflow

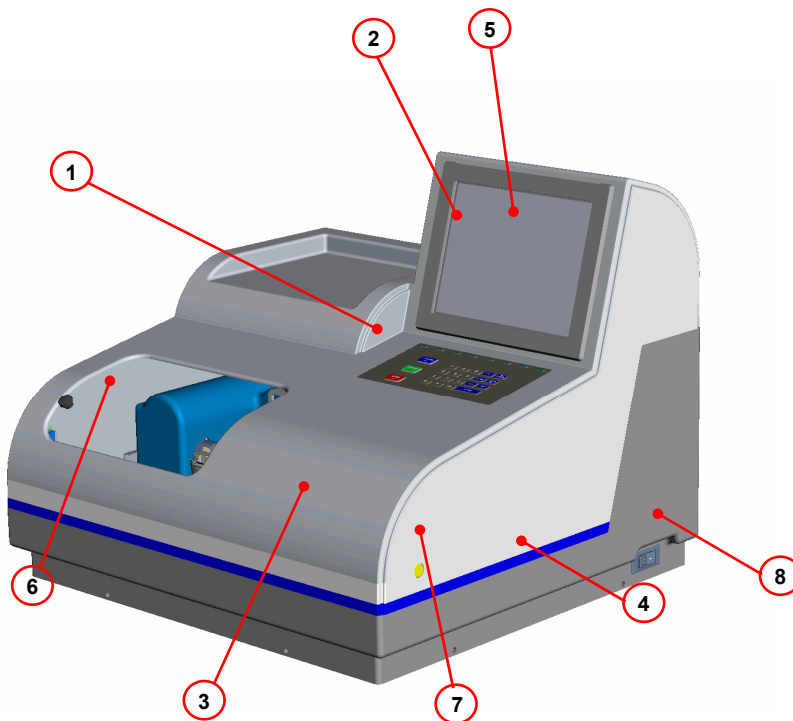
Error 810

Unknown Error

Appendix Reference

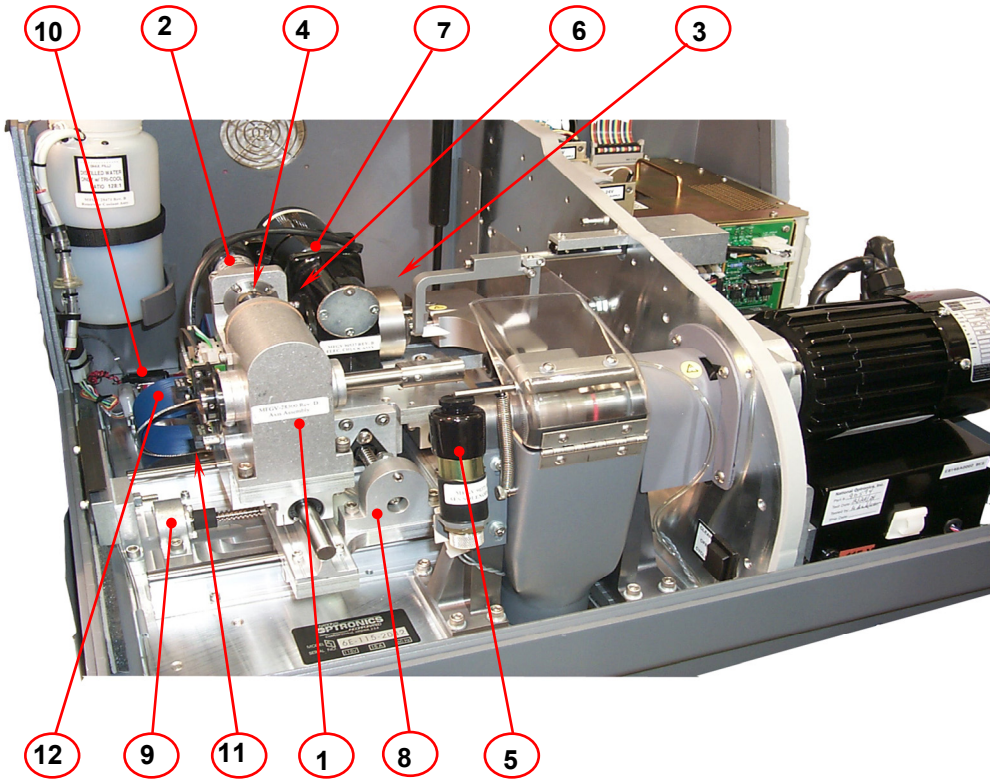
C

6ES External Parts



PARTS LIST		
ITEM	PART NUMBER	DESCRIPTION
1	94506	Key Pad Assembly
2	90786	Monitor Assembly
3	28601	Case Top
4	28602	Case Bottom
5	28608	Display Shield (10.4")
6	28644	Door
7	90535	Case Top Latch Assembly
8	77205	Power Switch

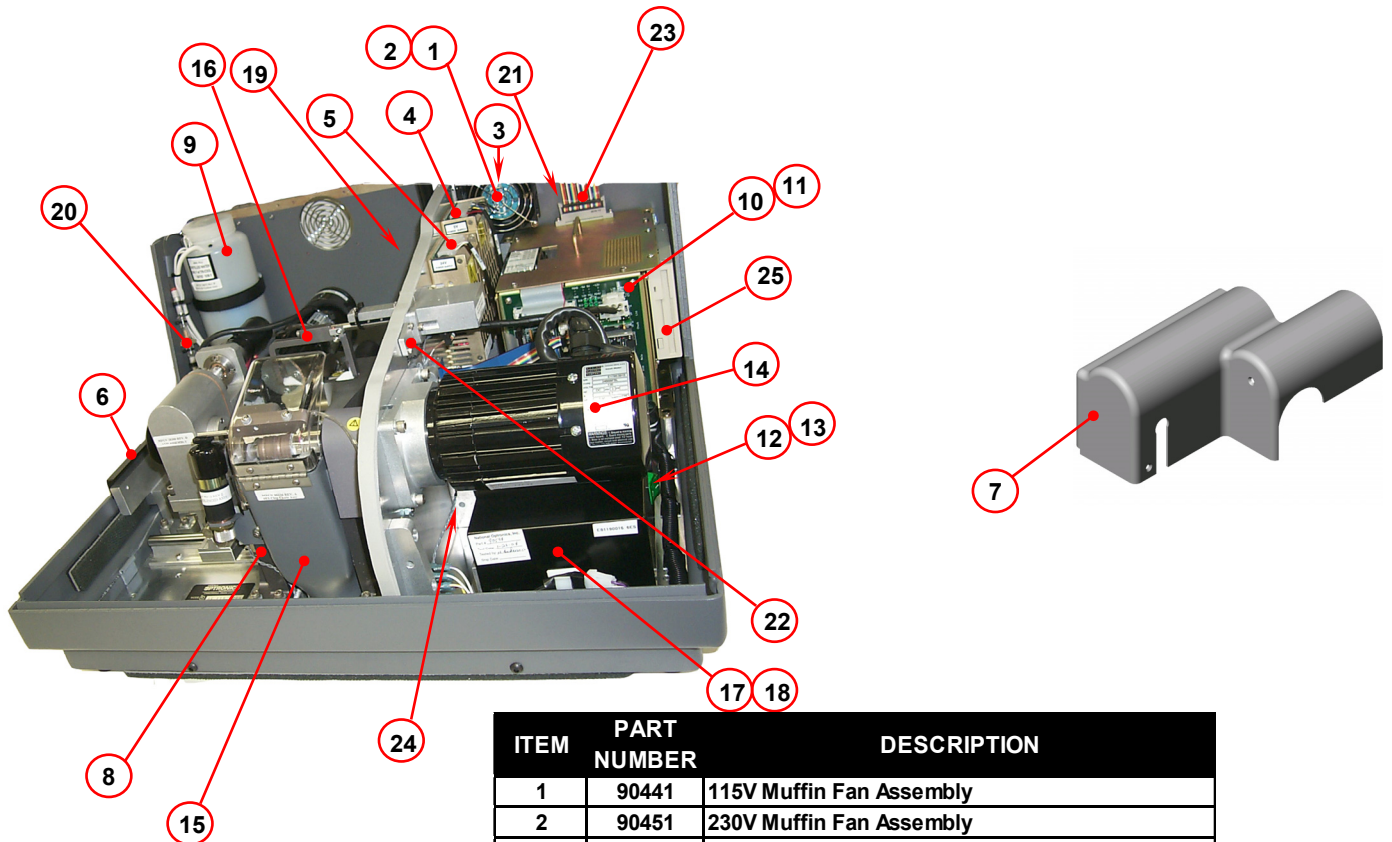
6ES Internal Parts—Left Side View



**View with Axis Gear Box & Electric Chuck
Cover Removed**

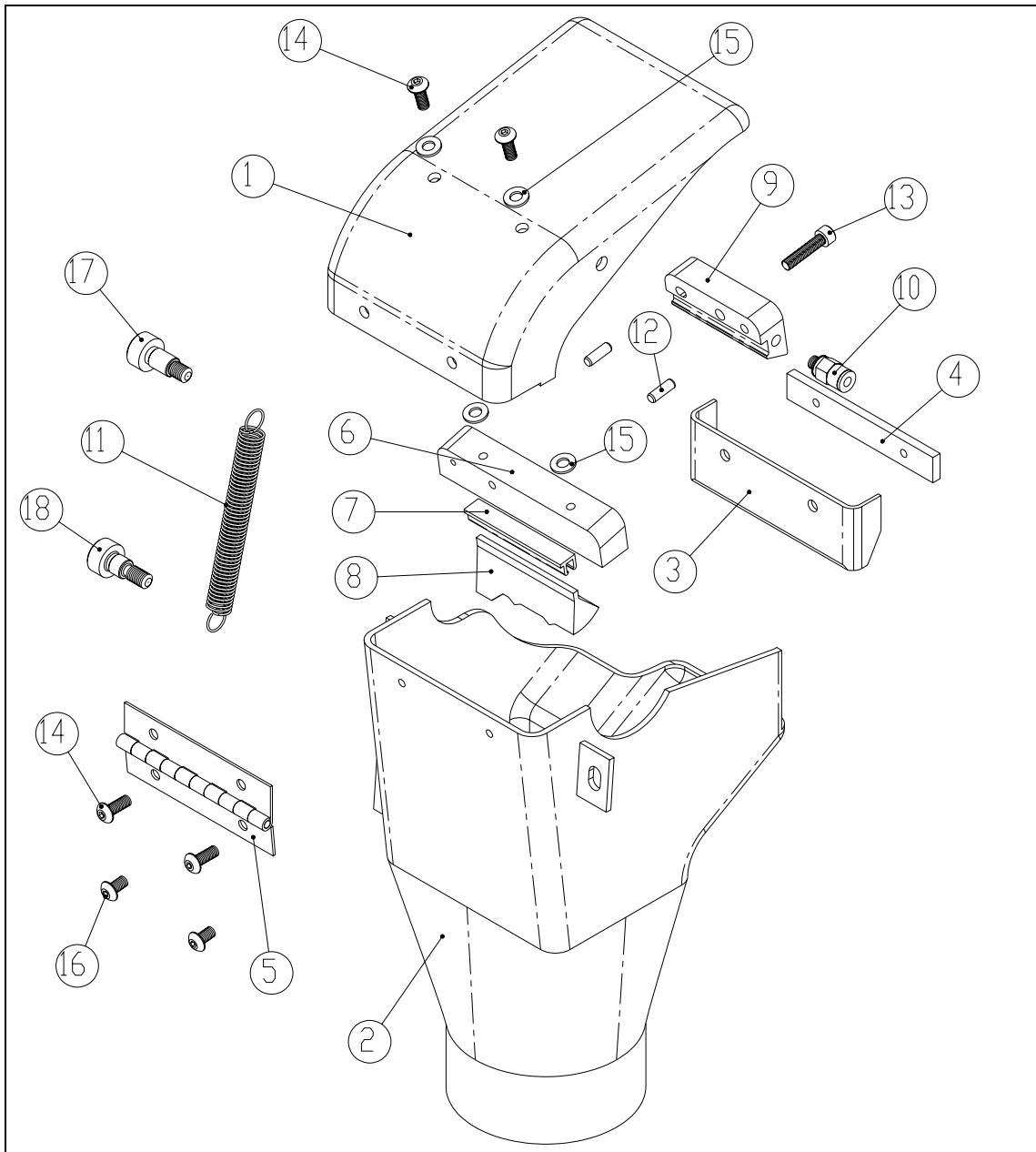
PARTS LIST		
ITEM	PART NUMBER	DESCRIPTION
1	28316	Adjustable Axis Assembly (28300 non-adjustable shown in picture)
2	55322	Axis Servo Motor
3	55322	Size Servo Motor
4	65520	Coupler (1/4 x 1/4, Helical Split (3X))
5	90373	6ES Solenoid Assembly
6	90536	Electric Chuck Leadscrew Assembly (5.08)
7	90537	Stabilizer -- Electric Chuck Ass'y, (Ver.2)
8	90543	Size Leadscrew Assembly with Blocks
9	90548	Bevel Leadscrew Assembly with Blocks
10	90767	Reservoir Solenoid Valve Assembly
11	90780	Home Switch Assembly (Ver. 2, 3X)
12	94515	Main Ribbon Cable

6ES Internal Parts—Right Side View



ITEM	PART NUMBER	DESCRIPTION
1	90441	115V Muffin Fan Assembly
2	90451	230V Muffin Fan Assembly
3	3068	Plastic Fan Grille (2.81) (on back of machine)
4	3406	5V Power Supply Assembly
5	3409	24V Power Supply Assembly
6	28111	Home Switch (X-Y Carriage) Vane
7	28320	Axis and EC Motor Cover
8	90872	6ES Small "B" Spindle Assembly
9	28471	Coolant Reservoir Assembly
10	28560	115V 6ES Card Cage Serial
11	48561	230v 6ES Card Cage Serial
12	77287	12V Lighted Bodine Controller Switch
13	77288	230V Lighted Bodine Controller Switch
14	80725	Y6 Cutter Motor
15	90236	6ES Chip Chute Assembly
16	90370	6E Slide Probe Assembly
17	90594	115V Motor Controller Assembly
18	90599	230V Motor Controller Assembly
19	90748	Mercury Relay Assembly
20	90751	Coolant Inline Filter Assembly
21	94499	Display/Inverter Cable
22	94510	Proximity Door Switch Wiring Harness
23	94517	Keypad Wiring Harness
24	55322	Bevel Servo Motor
25	3180	3 1/2" Floppy Disk Drive

Chip Chute Exploded View



ITEM	P/N	QTY	DESCRIPTION
1	28452	1	Chip Chute Top
2	28440	1	Chip Chute
3	28447	1	Chip Chute Splash Guard
4	28451	1	Splash Guard Nut Plate
5	28441	1	Hinge
6	28444	1	Chip Chute Bottom Manifold
7	28449	1	Sponge Bracket
8	28450	1	Sponge
9	28453	1	Chip Chute Top Manifold
10	74355	1	Straight Fitting (#10-32 x .125)
11	73061	1	Chip Chute Cover Spring
12	HDWR	2	Stainless Steel Dowel Pin (1/8" x 3/8")
13	HDWR	1	Stainless Steel Socket Head Cap Screw (#6-32 x 5/8")
14	HDWR	4	#6-32 x 3/8" SS BHCS
15	HDWR	4	#6 NYLON WASHER
16	HDWR	2	#6-32 x 1/4" SS BHCS
17	HDWR	1	250 x .375 SS SHOULDER SCREW (#10-24)

Spindle Assembly—Exploded View

Fold open the following page to view a drawing of the 6ES spindle assembly and its components.

Statement of Warranty

National Optronics warrants the 6ES Patternless Edger to be in good and serviceable condition upon shipment from the plant in Charlottesville, VA. The customer's sole remedy is to have defective parts replaced or repaired according to the following General Warranty:

For a 1-year period from the date of shipment, National Optronics will replace or repair all defective parts. Replacement parts supplied under this Warranty will be covered for the remainder of the initial warranty period.

Exempted from this General Warranty are perishable tools and wear parts, specifically covering, but not limited to, cutting flutes, and clamps. These tools are warranted to meet normal operating specifications when shipped; they will be replaced or a credit issued if found to be defective upon return to the plant.

These warranties set forth are made in lieu of all other warranties, including merchantability, expressed or implied.

The liability of National Optronics to the customer is limited to the exclusive remedies set forth. National Optronics will not be held responsible for loss of use or any indirect or consequential damage.

As a general condition to recover in the General Warranty, the customer must establish that:

1. He is the original purchaser of the machine or part;
2. The unit was maintained in accordance with the instructions in the Manual provided with the unit;
3. The unit was operated under normal conditions; and,
4. National Optronics was notified of the defect within two weeks of the date of discovery.

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