

Section 17

Binocular Indirect Ophthalmoscope

B. I. O. Model 12000

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Special Instructions for B.I.O. Service

Clean all returned items by wiping with a solution of 10% Clorox/90% water. Do not use alcohol or other chemicals to clean to B.I.O. Inspect the unit, especially alignment prior to disassembly. Duplicate (if possible) customer problem.

Important: Check alignment before and after service.

1. Put B.I.O. on head.
2. Look at object held in hand, arms length. If the image appears as a double image, then the unit is misaligned. The B.I.O. unit must be evaluated on laser alignment equipment at Welch Allyn. Return to Technical Service Dept. for evaluation and or repair. Therefore, proceed with repairs only on units with good alignment.

Disassembly of Model 12000 B.I.O.

Refer to Figure 120103 in Repair Parts Catalog

Abbreviations used in text and parts list:

- **CM** Central Mirror
- **EM** Eye Mirror
- **CMH** Central Mirror Holder
- **IM** Illumination Mirror
- **VS** Viewing System
- **IS** Illumination System
- **BIS** B.I.O. Sub-Assembly without headband

Caution!!! Lamp area will be hot after use.

1.1 Lamp

Remove lamp cover.
Loosen the adjustment knob and slide the BIO all the way up.
Remove the lamp from its well.
Replace with new Welch Allyn lamp.
Clean new lamp with alcohol.
Insert lamp pin with slot (pin down).
Slide lamp cover over lamp.
Verify operation of the new lamp.

1.2 VS Housing Assembly

Unscrew and remove bracket knob.
Support the *BIS* and remove bracket screw, bracket spacer with washer.
Remove *BIS* from headband.
Remove lamp as per Step 1.1 above.
Remove left and right outer insulators and left/right inner ear insulators respectively.
Remove top two screws.
Pull back cover off.
Remove cable connector assembly.
Loosen bottom two screws.
Pry off and discard +- button.
Remove two outer bottom screws.
Loosen two central screws 3 turns.
Do not remove them. This helps VS housing removal.
Remove the VS housing from the VS/IS assemblies.

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|-----|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.3 | Illumination System
(IS) Sub-Assembly | Place BIO in fixture T-12198 to ease further disassembly.
Remove the two central screws that were loosened in the previous step.
Seperate the illumination system sub-assembly from the visual assembly. |
| 1.4 | <i>IM</i> Yoke
<i>IM</i> Mirror | Remove hair spring with tweezers.
Remove <i>IM</i> yoke and IM mirror/mirror holder sub-assembly for illumination system bracket. |
| 1.5 | Illumination Lenses | When the two hex cap screws are removed from the illumination sub-assembly, it will come apart.
Hold the illumination sub-assembly on a foam mat in a horizontal position for complete disassembly.
Remove two hex cap screws from heat sink lamp holder. Use 3/32 hex key.
Pull Illumination system bracket away from optics carrier.
Remove compression spring and mirror tilt control.
Remove aperture spacer assembly which contains aperture and filter holders.
Remove heat sink lamp holder from contact holder.
Remove spring washer, wide band hot mirror disc lens, lens spacer and lens. |
| 1.6 | VS Assembly | Remove and discard rubber eye cups.
Remove and clean both eyepiece lenses. |

End of Disassembly

Reassembly of Model 12000
Refer to Figure 120103 in Repair Parts Catalog

Important: Check alignment prior to reassembly of whole unit.

- 1.7 Aperture Filter Assy's Clean the aperture and filter assemblies before installing in aperture spacers.
Place the aperture spacers side by side as in Figure 1.7. Top spacer is put on left. Bottom spacer is put on right. Place a spring washer in the right circle recess of each aperture spacer as shown in Figure 1.7. Place aperture assembly, with the black aperture mask facing up, into the left (top) aperture spacer, on top of the washer. Engage the detent with the aperture assembly. Carefully pick up left (top) aperture spacer and turn it over. Lay it on top of the other aperture spacer. Hold the aperture spacers together with one hand and operate the levers of the aperture and filter assemblies. Keep this orientation. After assembly, the filter lever must be on the right side.
- 1.8 Illumination System Bracket IS lenses Clean the objective lens and all parts of illumination system.
Place the objective lens (convex down) into the IS bracket. Place a lower aperture over the objective lens. Press objective lens retainer into the IS bracket (over the lower aperture). Use tool T-12169. Place IM yoke and mirror assembly together. Use new hair spring. Place yoke and mirror assembly onto the IS bracket. Place the VS subassembly into assembly nest T-12198. Attach the IS bracket assembly to the VS subassembly with two chassis screws. Place mirror tilt control in hole in IS bracket. Insert compression spring into hole in mirror tilt control. Place the aperture assembly built in Step 1.7 into assembly nest T-12196 (aperture side up)
- Note: If assembled correctly, the filter lever will be on the right side of the aperture assembly.
- Place a clean lens on top of aperture spacer (round side up).

Reassembly of Model 12000 cont'd

- 1.9 Optics Carrier
IS lenses and components
- Place optics carrier (ears up), over lens of aperture spacer assembly (lower lens.)
Place lens spacer into optics carrier, over lower lens.
Place upper lens (round side down) on top of lens spacer.
Place hot mirror disc on top of lens.
Place wide band hot mirror (coated side up), over hot mirror disc. See *Figure 1.10* for correct orientation of coated side of hot mirror.
Place spring washer over wide band hot mirror.
- 1.10 Heat Sink Lamp holder
- Place contact holder onto lamp socket of heat sink lamp holder.
Lower this assembly onto the optics carrier. All layers of this assembly must be held securely together.
Pick up this assembly and place it onto the IS bracket.
Insert two long hex head cap screws into heat sink lamp holder.
Tighten cap screws. Use 3/32" hex key.
Check illumination system for dirt.
- 1.11 Power Cord
- Place the contact/cord assembly through left slot of textured side of back cover.
Place the optics assembly into nest T-12100.
Insert the contacts into the slots of the lamp carrier assembly (white wire on left, black wire on right).
Press the wire into wire groove.
Place the back cover on to the optics assembly.
Attach the back cover to the optics assembly with screw between ear insulators.
Tighten screw.
Place lamp into lamp holder.
- 1.12 VS Housing
- Place the CM slider onto the bottom of VS chassis assembly.
Loosen the two center chassis screws holding IS to the VS.
Place the optics section into housing.
Retighten these two chassis screws.
Install one short and two long screws into assembly.

■ **Note:** Lower two screw heads must not interfere with slider motion.

1.12 VS Housing cont'd

- **Note:** Lower two screw heads must not interfere with slider motion.
 - Insert the tabs of new CMH button in CM slider at the bottom of the housing.
 - Attach inner and outer left insulator ears.
 - Clean both eyepiece lenses.
 - Insert eyepiece lenses.
 - Plano lenses: insert either way
 - +2 Diopter lenses: insert concave side out
 - Install new rubber eye cups.

- 1.13 Lamp Cover Inspect that lamp is all the way into heat sink lamp housing.
Slide the lamp cover down into the assembly.

- 1.14 Head band bracket Attach BIO to the headband browband.
Insert bracket screw through slotted holes so that it passes through spacer and washer. Washer will be on knob side of the bracket.
Attach knob and tighten finger tight.

- 1.15 Test BIO Put BIO on head.
Look at object held in hand, arms length. If the image appears as a double image, then the unit is misaligned. Some part of the visual system has become damaged and misaligned. The unit must be evaluated on laser alignment equipment at Welch Allyn. Return unit to Welch Allyn Technical Service Dept. for evaluation and or repair.

End Reassembly

Model 74201 Battery Pack

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|-----|---------------|--------------------------------------------------------------------------------------------------------------|
| 2.1 | Back Case | Unscrew and remove two screws from back of battery pack.
Carefully separate back of case from front case. |
| 2.2 | Battery | Unplug battery from circuit board. |
| 2.3 | Circuit Board | Pull knob off.
Unscrew potentiometer nut.
Gently pull board straight out of front case. |

End Disassembly of 74201 Battery Pack

Reassembly

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| 2.4 | Circuit Board | Insert replacement circuit board into front case.
Place hex nut on potentiometer and tighten.
Position knob on end of shaft with flat of shaft aligned with spring clip of knob. |
| 2.5 | Battery | Plug a fully charged battery into circuit board connector.
Place battery into case with wire exiting battery on lower left side.
Place connector in space on knob side of case. |
| 2.6 | Back Case | Engage back case to front case at bottom.
Gently push on circuit board at side opposite knob so that cases will come together.
Gently press cases together at top.
Secure with two phillips head screws. |

End of Reassembly of 74201 Battery Pack

Model 74241 Wall Bracket Disassembly

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|-----|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3.1 | Back Cover | Remove two screws at back of wall bracket.
Pull back cover off at the screw end. It will hinge at the tabs on opposite end. |
| 3.2 | Wiring Harness | Remove knob by pulling straight off.
Unscrew hex nut from potentiometer.
Reach inside and pull indicator lamp from hole in case.
Pull spade connectors from micro-switch. |
| 3.3 | Microswitch Actuator | Unscrew two nuts from studs.
Remove star washers.
Pull micro-switch from two studs.
Pull actuator from case. |

End Disassembly 74241 Wall Bracket

Model 74241 Wall Bracket Reassembly

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| 3.4 | Microswitch Actuator | Position micro switch with actuator towards screw holes in back cover.
Secure with two star washers and nuts.
Position actuator into slot in case.
Press it up and down to assure it operated freely. |
| 3.5 | Wiring Harness | Insert shaft of potentiometer through hole in heat sink plate.
Position potentiometer shaft through hole in the case.
Make sure that the alignment tab of the potentiometer is inserted into the hole next to potentiometer shaft hole.
Tighten potentiometer shaft nut.
Insert pilot light hole in case over split tang molded onto case.
Put "power in" jack in other slot closest to rear of case. (Two wires go to this jack).
Put "power out" jack in other slot closest to front of case. (3 wires go to this jack).
Attach spade connectors from harness to micro switch. |

Model 74241 Wall Bracket Reassembly cont'd

3.6 Back Cover

Engage tabs and back cover into slots of case.

Close back cover onto case.

Operate black actuator to assure that it is operating micro switch.

Insert and tighten two screws.

End Reassembly of 74241 Wall Bracket

Required Tools for BIO

General purpose tools:

3/32" hex key
Peer #7 tweezers
#2 phillips screwdriver (Cresent #2501)
Long nose pliers (Xcelite 91 cg)

Welch Allyn Tools and Fixtures:

T-12169	Lens retainer push tool
T-12196	Optics system assembly nest
T-12291	Electrical contact assembly nest
T-12198	Final Illumination assembly

Figure 1.7

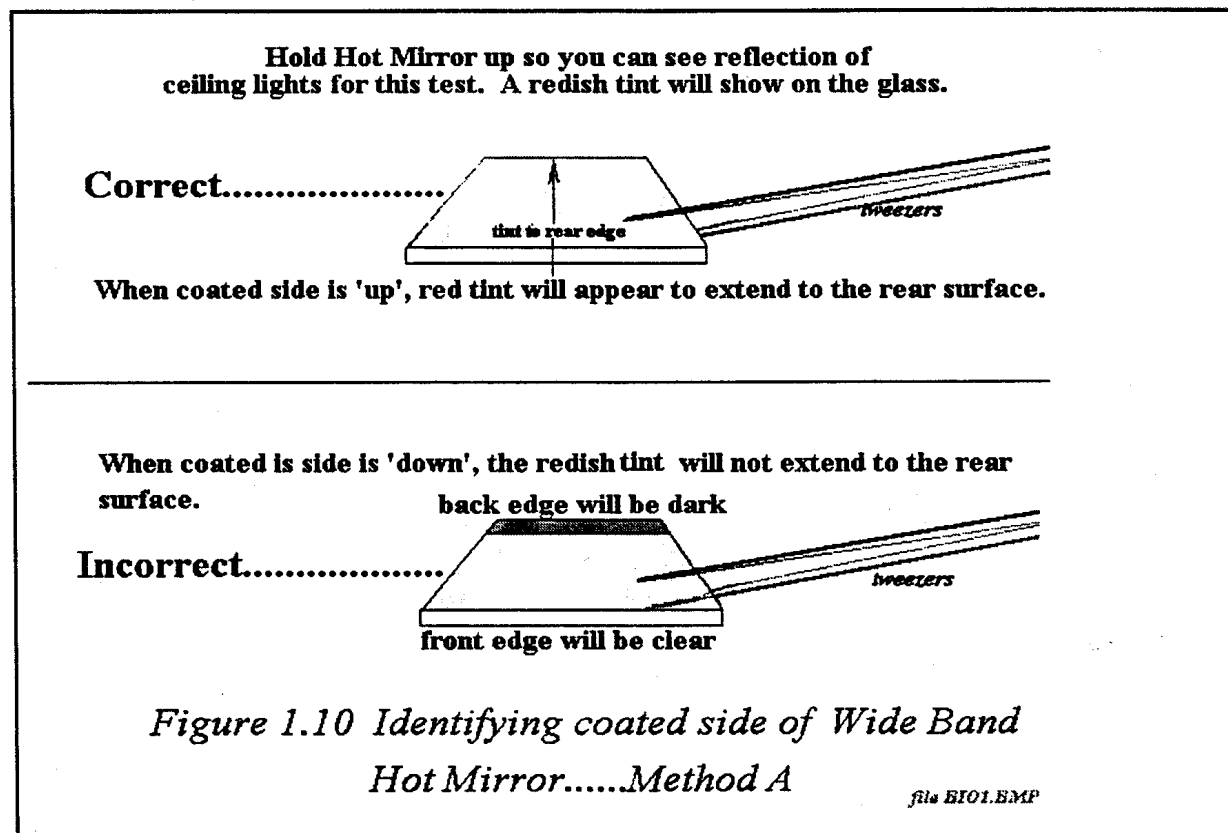
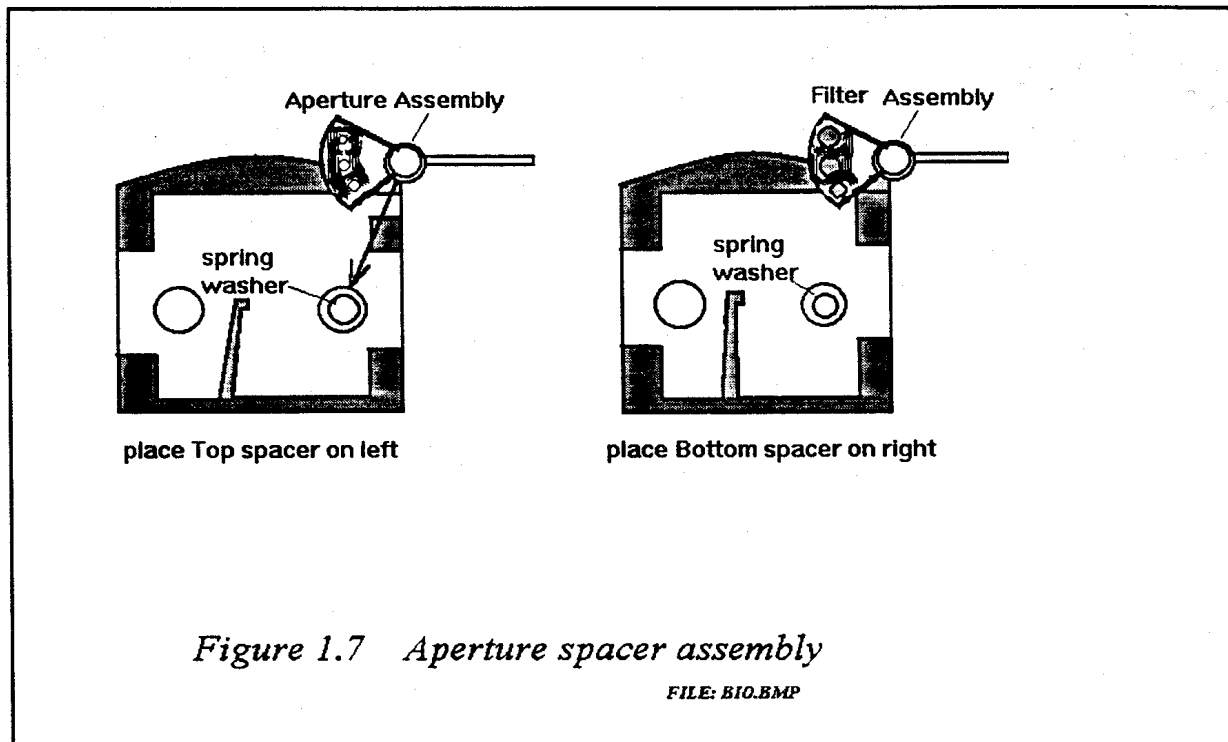


Figure 1.10 a

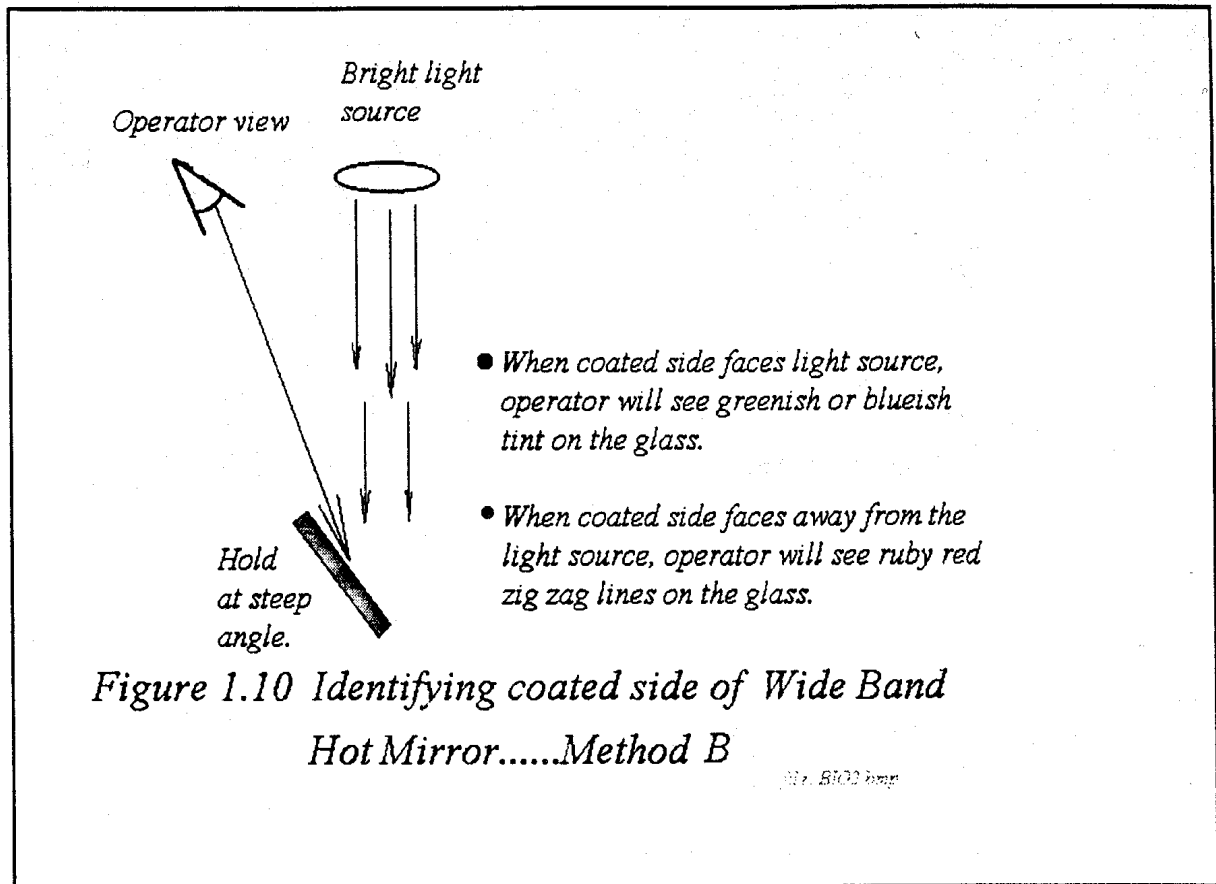


Figure 1.10 b