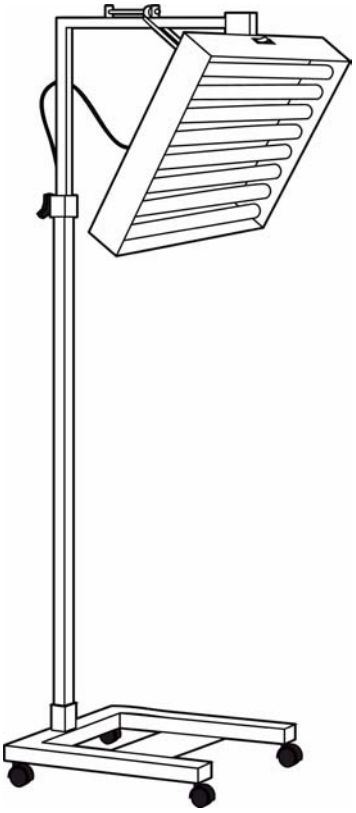
OLYMPIC MEDICAL



Instruction Manual

OLYMPIC BILI-LITE™

Model 33/34

⚠ CAUTION	Read and be familiar with this manual before installing, operating, or servicing this device. To ensure operator, technician, and patient safety, use only as specified in this manual.

51433-IMA-EN0103Q

OLYMPIC MEDICAL
5900 First Ave S
Seattle, WA 98108 USA

Toll-free: 1-800-426-0353 (US/Canada)
Phone: 206-767-3500 (worldwide)
Fax: 206-762-4200
Web: www.OlympicMedical.com

Contents

Section

1

Overview

This manual provides the necessary information to install, maintain, and service the Olympic Bili-Lite™ Model 33/34. The operating instructions in this manual are intended for use under the direct supervision of a licensed medical practitioner. The installation and service instructions in this manual are intended for use by qualified service technicians.

Conventions

The following conventions are used in this manual.

Table 1.1 Conventions

Convention	Description
NOTE	Notes provide additional information to clarify a point in the text.
CAUTION	Cautions indicate situations that, if not avoided, could result in minor to moderate injury to the patient or operator, or damage to the equipment.
WARNING	Warnings indicate situations that, if not avoided, could result in serious injury or death to the patient or operator.
BUTTON	This character style represents buttons and controls that the user can touch or press.

Symbols

The following symbols are located on the Olympic Bili-Lite and its packaging.

Table 1.2 Symbols on the Bili-Lite

Symbol	Definition
	Alternating current (ac) voltage
	Atmospheric pressure
	Caution, hot surfaces
	Caution, read instructions
	Electrical shock hazard
	Eye protection to be worn by infants
	Fuse
	Protective earth (ground)
	Humidity, condensing

Symbol	Definition
L	Line (hot conductor)
	Mains power OFF
I	Mains power ON
N	Neutral (neutral conductor)
	Nonionizing electromagnetic radiation
	Shipping
	Storage
	Temperature
	Type B equipment

Intended Use

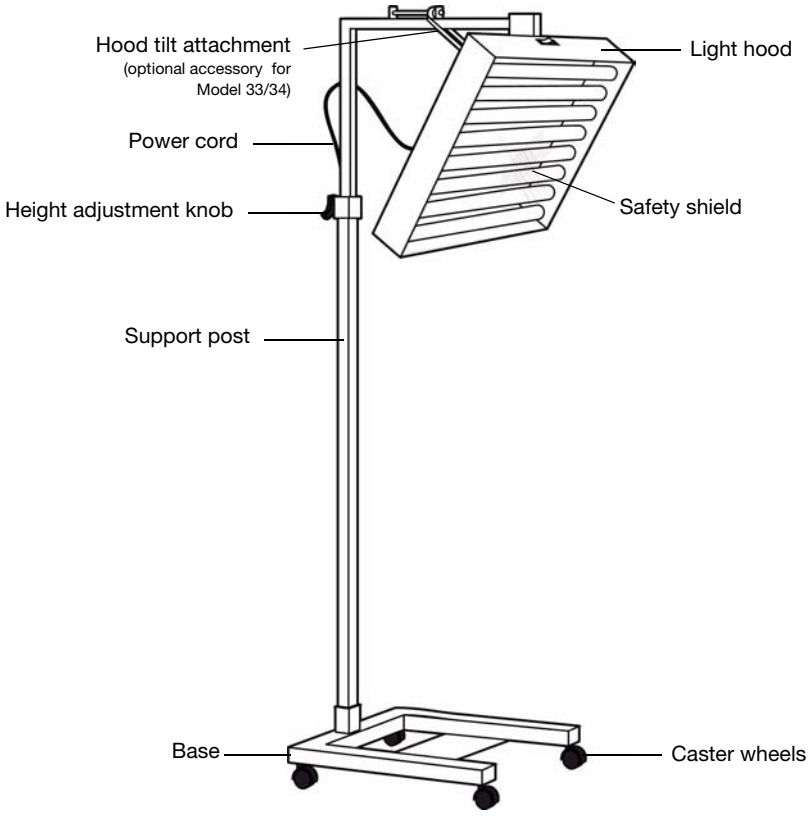
The Olympic Bili-Lite™ Model 33/34 is a floorstand phototherapy light intended to provide therapeutic irradiance to treat neonatal hyperbilirubinemia.

Description

The Olympic Bili-Lite Model 33/34 is a floorstand phototherapy light (see Figure 1.1). Its light hood is height adjustable from 43 to 59 in. (110 to 151 cm) above the floor. The Bili-Lite Model 34 includes an Olympic Bili-Timer™.

The Bili-Lite is equipped standard with eight Olympic Blue (Type OB) fluorescent bulbs. Other types of fluorescent bulbs are available (see *Parts and Accessories* on page 7-1).

Figure 1.1 Bili-Lite Model 33/34



Accessories

Olympic Medical offers the following items that are compatible for use with the Bili-Lite Model 33/34:

- Olympic Bili-Timer, which precisely times the phototherapy treatment session.
- Olympic Bili-Meter™, which measures the irradiance output of phototherapy.
- Olympic Bili-Mask™, which protects the patient's eyes during phototherapy treatment.

To order these items, see page 7-1.

Figure 1.2 Bili-Timer

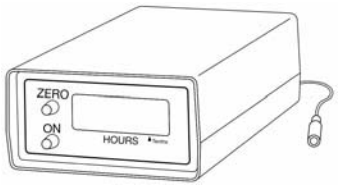


Figure 1.3 Bili-Meter with Type B22 sensor

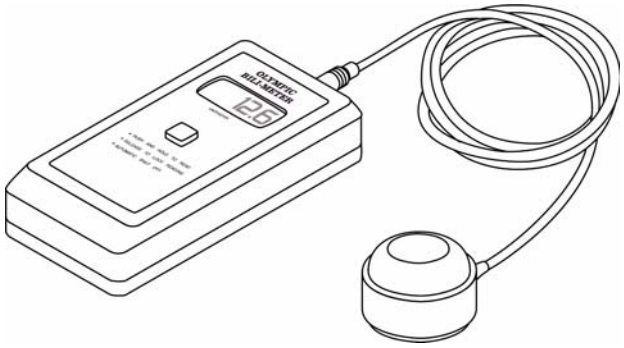


Figure 1.4 Bili-Mask styles

"Quick-Stick" "Standard" "Easy-On"

Irradiance

The therapeutic irradiance of phototherapy lights is measured with radiometers, instruments with optical filters that pass only selected portions of the blue-green action spectrum of bilirubin. Irradiance (radiant power) is expressed in units of microwatts per square centimeter per nanometer ($\mu W/cm^2/nm$).

The Olympic Bili-Meter[1]—the radiometer widely used in nurseries—measures irradiance from 425 to 475 nanometers (nm). Standard 60601-2-50 of the International Electrotechnical Commission (IEC) also requires that irradiance from 400 to 550 nm be measured. The following tables show this data.

NOTE The differences between the Olympic Bili-Meter and the IEC measurements do not represent a difference in the ***total*** irradiance output of the same bulbs. The difference results from ***averaging*** the irradiance of the same bulbs over wavelength bands of different widths. The Olympic Bili-Meter measures from 425 to 475 nm — nearly all of the irradiance of blue bulbs occur in this 50-nm band. The IEC measures irradiance from 400 to 550 nm — a 150-nm band; therefore, the ***average irradiance per nanometer*** of the IEC measurement will differ from the Bili-Meter measurement.

The irradiance data for the Olympic Bili-Lite Model 33/34, below, is shown for Olympic Blue (Type OB) and Super Blue (Special, Type BB) blue fluorescent bulbs at varying distances. Average irradiance is measured over an effective surface area of 12 x 24 in. (30 x 60 cm). Maximum irradiance is measured at the center of the area.

Table 1.3 Average irradiance using the Olympic Bili-Meter (425–475 nm)

	Distance—bulb shield to top of light sensor		
	20 in. (51 cm)	**25 in. (64 cm)**	**30 in. (76 cm)**
(8) Olympic Blue (Type OB) bulbs	11.9	8.5	6.0
(8) Super Blue (Type BB) bulbs	22.4	16.3	12.3

Table 1.4 Maximum irradiance using the Olympic Bili-Meter (425–475 nm)

	Distance—bulb shield to top of light sensor		
	20 in. (51 cm)	**25 in. (64 cm)**	**30 in. (76 cm)**
(8) Olympic Blue (Type OB) bulbs	13.8	9.5	6.4
(8) Super Blue (Type BB) bulbs	26.0	18.2	13.3

1. Each Olympic Bili-Meter is certified to be calibrated traceable to the United States National Institute of Standards and Technology (NIST).

Table 1.5 Average irradiance using the IEC Standard (400–550 nm)

	Distance—bulb shield to top of light sensor		
	20 in. (51 cm)	**25 in. (64 cm)**	**30 in. (76 cm)**
(8) Olympic Blue (Type OB) bulbs	6.0	4.5	3.5
(8) Super Blue (Type BB) bulbs	8.3	6.1	4.6

Table 1.6 Maximum irradiance using the IEC Standard (400–550 nm)

	Distance—bulb shield to top of light sensor		
	20 in. (51 cm)	**25 in. (64 cm)**	**30 in. (76 cm)**
(8) Olympic Blue (Type OB) bulbs	7.0	5.0	3.8
(8) Super Blue (Type BB) bulbs	9.6	6.8	5.0

Figure 1.5 Response, Olympic Bili-Meter

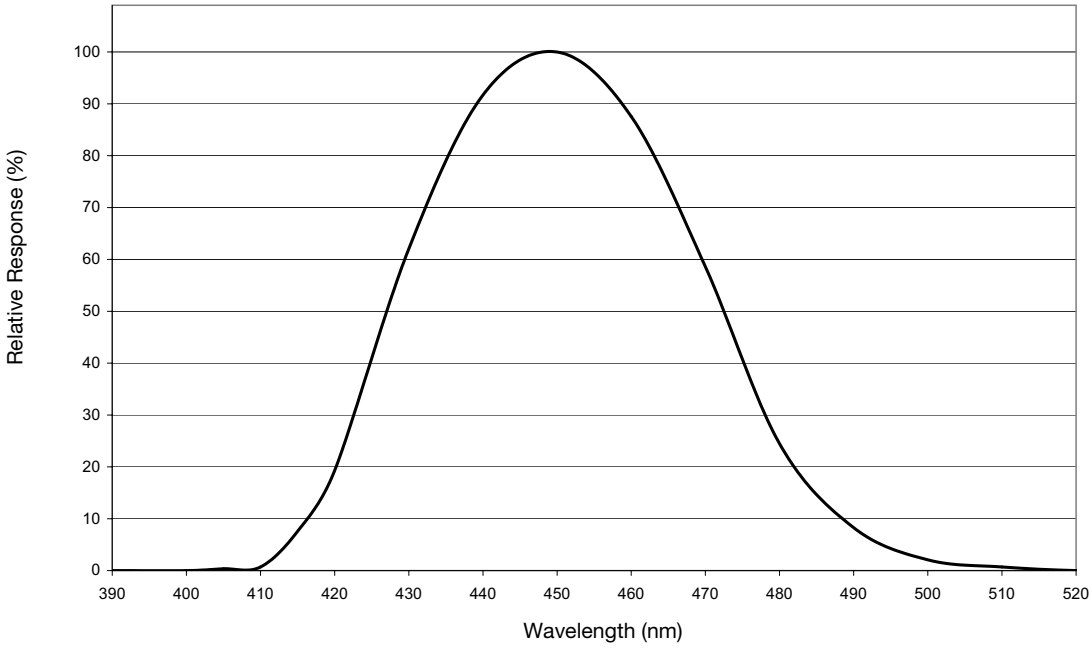


Figure 1.6 Spectral energy distribution, Olympic Blue (Type OB) bulb

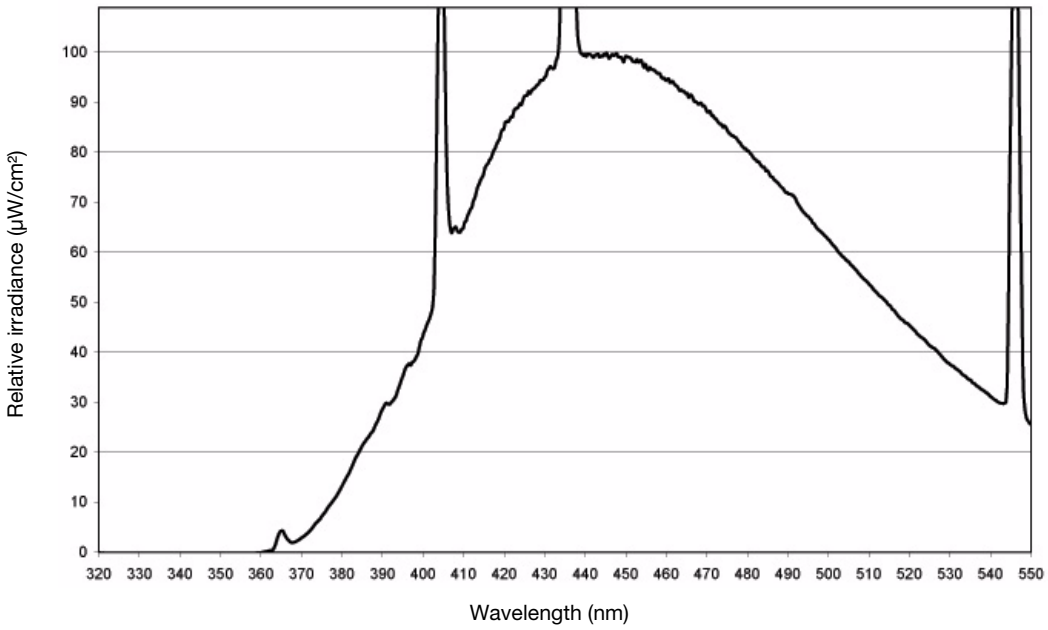


Figure 1.7 Spectral energy distribution, Super Blue (Type BB) bulb

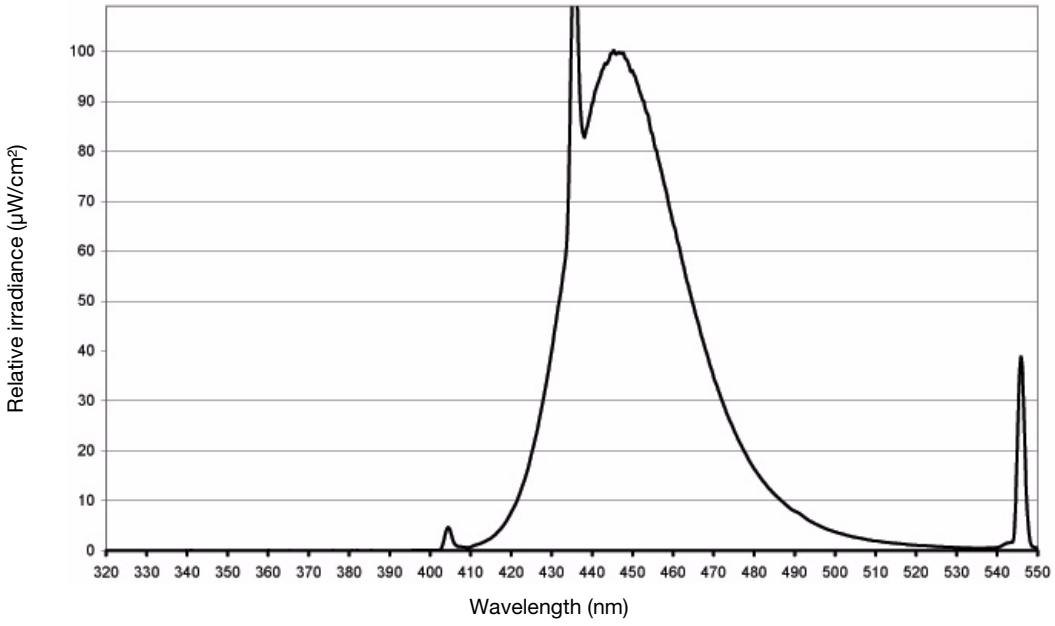
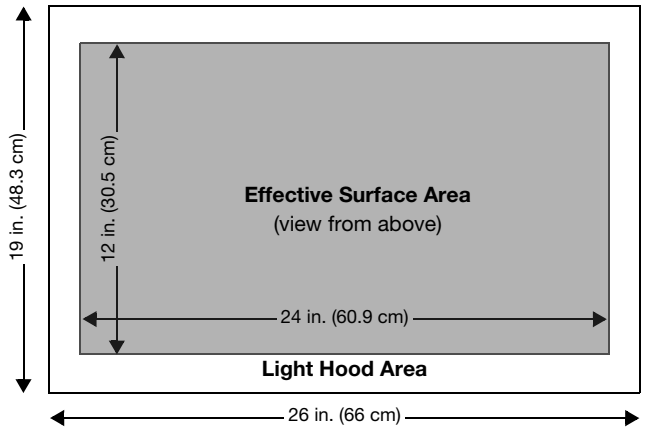


Figure 1.8 Effective surface area, Olympic Bili-Lite Model 33/34



Section

2

Assembly

> **CAUTION**
> - Only qualified technicians should assemble this device.
> - Read and be familiar with this instruction manual before assembling this device.

Assembling the Bili-Lite

The Bili-Lite Model 33 is shipped with the following items. The Model 34 also includes an Olympic Bili-Timer™ (for installation, see page 2-7).

- Light hood with safety shield
- Support post with arm and power cord
- Base assembly
- Caster wheels
- Hardware packet with 3/8-in. grade-8 mounting bolt and two spare starters
- Bulbs (eight Type OB)

Required Items:

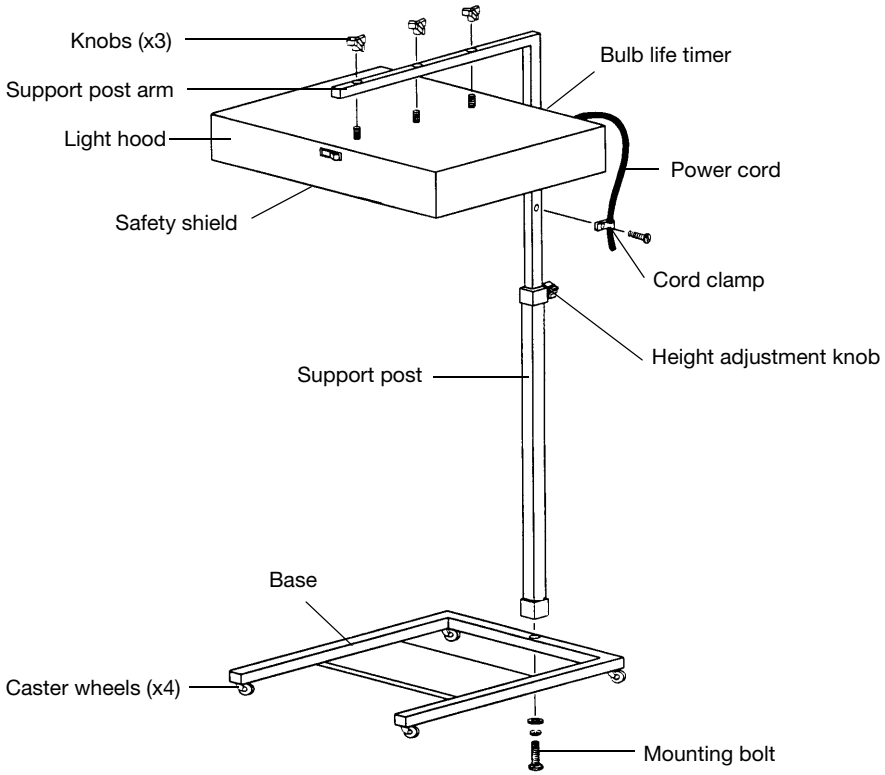
- Major assemblies, as listed above
- Medium-size adjustable wrench
- Phillips-head screwdriver
- Scissors or utility knife

To assemble the Bili-Lite:

1. Install the caster wheels:
   a. Place the base with the bottom facing up.
   b. Screw the casters into the base, then tighten.
2. Set the base on a level floor, then mount the support post on the base (see Figure 2.1 on page 2-2).
3. Insert and securely tighten the mounting bolt from underneath the base (see Figure 2.1), to secure the support post.

> **CAUTION**
> Firmly tighten the mounting bolt to preserve the stability of the Bili-Lite.

Figure 2.1 Bili-Lite assembly, without tilt assembly



WARNING **The spring inside the support post is compressed; releasing the height adjustment knob will permit the support post to extend suddenly and forcefully to a distance of 16 in. (40.6 cm). Fully tighten the height adjustment knob before cutting the string. While securely holding the support post, carefully release the knob.**

4 Fully tighten the height adjustment knob, then cut the safety string.

5 Slowly and carefully release the height adjustment knob until the support post is at its full extension, then tighten the knob again.

CAUTION The light hood is heavy and awkward. A second person should help support the light hood while installing or removing it.

6 Remove the three knobs from the bolts on top of the light hood (see Figure 2.1).

7 Lift the light hood, then insert the bolts on top of the light hood through the holes in the horizontal arm of the support post (see Figure 2.1).

8 Reinstall the knobs on the bolts and tighten.

9 Remove the plastic cord clamp from the support post (see Figure 2.1).

10 If you are adding a tilt assembly, perform the hood tilt assembly steps now (see page 2-4). Once the hood tilt attachment is installed, continue to step 11.

11 Slip the power cord into the clamp and reinstall it on the support post. Leave approximately 28 in. (71 cm) of slack in the cord above the clamp to allow for adjustment.

12 Remove the safety shield by removing the retaining screws and washers. Then gently slide the shield out (see Figure 2.3).

13 Remove the protective covering from the safety shield.

14 Install the bulbs: For each new bulb insert the prongs into the socket, then carefully rotate the bulb into place.

15 Insert the safety shield, place the washers, then tighten the retaining screws.

CAUTION The safety shield must always be in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

16 Test for proper operation (see page 2-8).

Attaching the Tilt Hood Assembly

A tilt assembly can also be added to a Model 33/34. To order a tilt assembly, see *Ordering Information* on page 7-1.

Required Items:

- Tilt hood assembly, which includes adhesive

NOTE The adjustment screw assembly and the pivot assembly are shipped with their mounting fasteners loosely assembled. They may be disassembled as required to attach them during the following steps.

- Medium-size adjustable wrench
- Phillips-head screwdriver
- Nutdriver, slim-profile preferred

NOTE If you do not have a slim-profile nutdriver or socket, you might not be able to reach inside the square tubing to install the lock nuts. You may instead install these brackets with the mounting screws placed inside the support post arm and the lock nut on top of the bar. After assembly is complete the five extra fastener caps supplied with this kit may be affixed over the lock nuts using the small tube of Loctite® 401 supplied with this kit

To attach the tilt hood assembly:

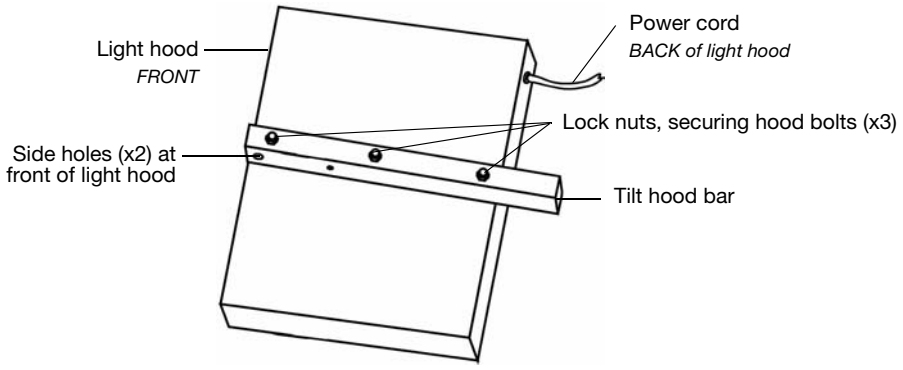
1 **If adding a tilt assembly while assembling your new Model 33/34,** perform steps 2–6 starting on page 2-1, then perform the hood tilt assembly steps below.

–or–

If adding the tilt hood assembly to your assembled Model 33/34, press the power switch to the Off (O) position, unplug the power cord, perform the steps 6–9 starting on page 2-1, then perform the hood tilt assembly steps below.

2 Place the tilt hood bar, with the large holes facing down and the side holes toward the front of the light hood, on top of the light hood (see Figure 2.2).

Figure 2.2 Placing the tilt hood bar



3 Insert the three hood bolts up, through the light hood, through the bar and secure with lock nuts (see Figure 2.3). Affix fastener caps over the lock nuts using the small tube of Loctite® 401 supplied in this kit.

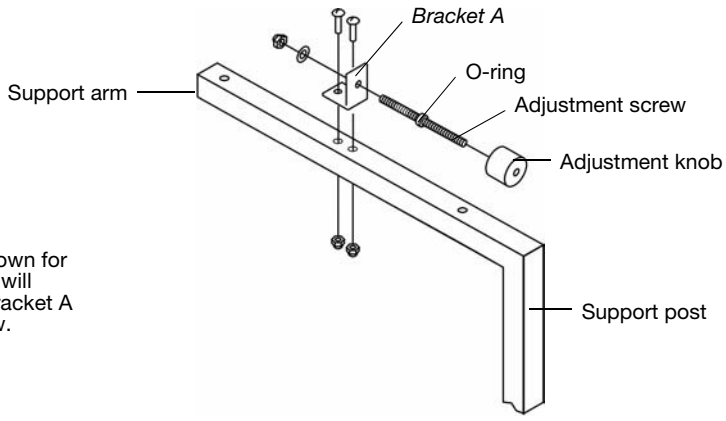
4 Place *Bracket A* on the support post arm. *Bracket A* is the bracket facing the O-ring side of the adjustment knob. There is an acorn nut and lock washer permanently secured to the adjustment screw through this bracket.

5 Slide the adjustment screw into the *Bracket A*.

6 Place the rubber O-ring on the front end of the adjustment screw (see Figure 2.3).

7 Screw adjustment knob all the way onto the screw, to the O-ring.

Figure 2.3 Mounting *Bracket A* and the adjustment screw



NOTE: Exploded view shown for information only. The nut will already be attached to Bracket A and the adjustment screw.

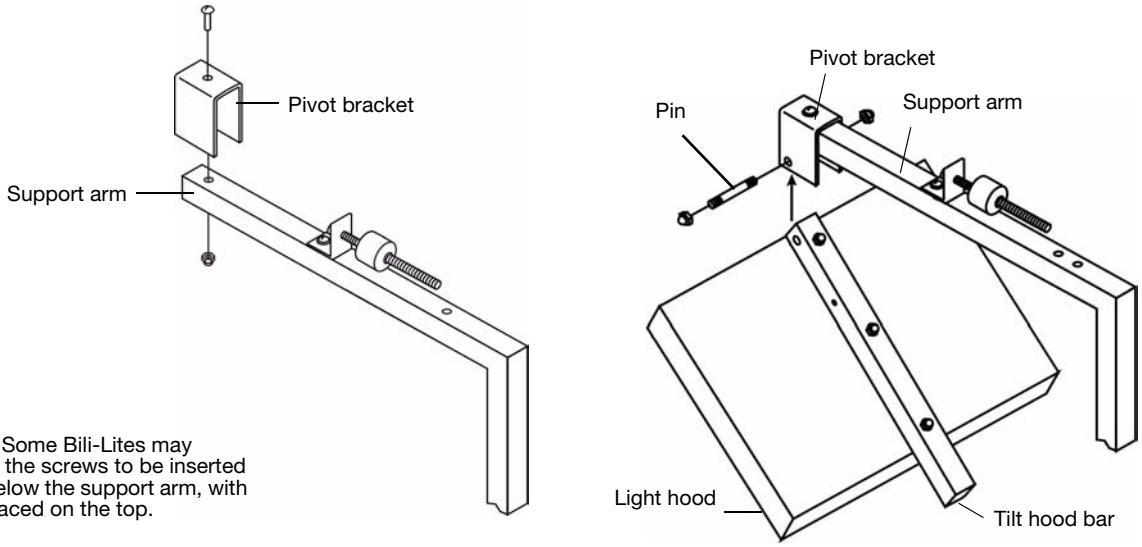
CAUTION The light hood is heavy and awkward. A second person should help support the light hood while installing or removing it.

8 Mount the pivot bracket on the support post arm (see Figure 2.4).

9 Fasten the light hood to the pivot bracket with the pin (see Figure 2.4), then place the washers and secure the lock nuts.

10 Affix fastener caps over the lock nuts using the small tube of Loctite 401 supplied with this kit.

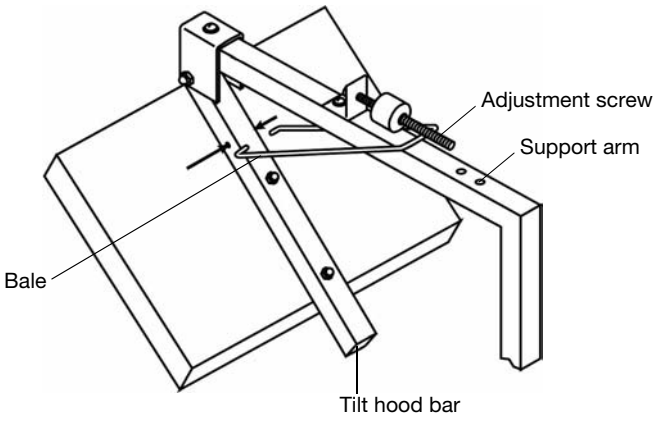
Figure 2.4 Mounting the pivot bracket



NOTE: Some Bili-Lites may require the screws to be inserted from below the support arm, with nuts placed on the top.

11 Hold the light hood in position under the support post arm, then slide the bale under the adjustment screw (see Figure 2.5) and hook the ends into the side holes of the tilt hood bar.

Figure 2.5 Placing the bale



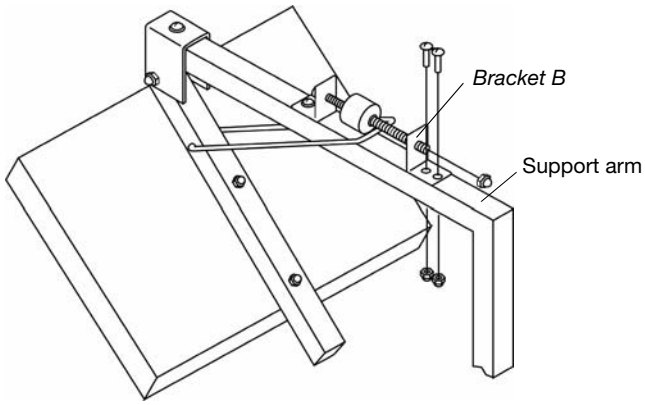
12 To secure the light hood to the support post arm, attach *Bracket B* (see Figure 2.6). The end of the adjustment screw fits through the opening in the vertical face of *Bracket B*. Fasten with the screws and lock nuts provided. Secure the adjustment screw with the lock nut provided.

13 Confirm that all nuts are securely tightened.

14 The tilt assembly is installed with the hood in its lowest position, with the adjustment knob should be in the full-forward position (see Figure 2.6).

15 To continue assembly, proceed to step 11 on page 2-3.

Figure 2.6 Mounting *Bracket B*



NOTE: Some Bili-Lites may require the screws to be inserted from below the support arm, with nuts placed on the top.

Installing the Bili-Timer on the Bili-Lite

The Model 34 includes an Olympic Bili-Timer. The Bili-Timer is a portable, battery-operated digital timer that automatically measures total phototherapy exposure time.

Required Items:

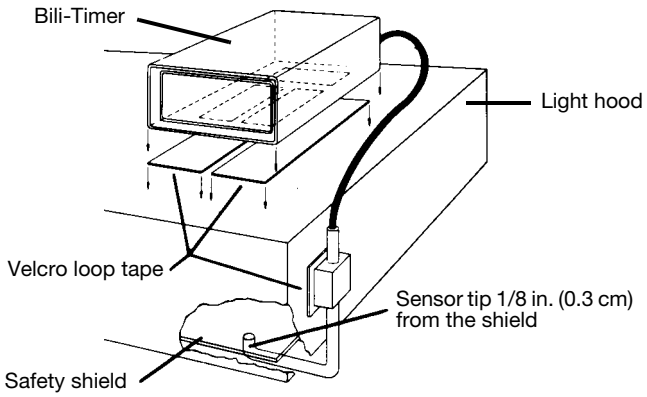
- Bili-Timer mounting kit, which includes three strips of Velcro® hook-and-loop tape:
  - Two 5-in. (12.7-cm) strips for mounting the readout
  - One 1.5-in. (3.8-cm) strip for mounting the sensor

To install the Bili-Timer:

NOTE Make sure the readout and sensor locations do not interfere with the operation or movement of the phototherapy light.

1. Place the two 5-in. strips of loop material (soft side) onto the Velcro hook material (rough side) on the back of the Bili-Timer.
2. Peel the backing off of the hook material to expose the adhesive, then position the Bili-Timer on the phototherapy light, and press into place (see Figure 2.7).

Figure 2.7 Mounting the Bili-Timer



3. Place the 1.5 in. (3.8 cm) strip of loop material (soft side) onto the hook material (rough side) on the back of the sensor.
4. Peel the backing off of the hook material to expose the adhesive, then position the sensor 1/8 in. (0.3 cm) from the safety shield on the inside the light, and press into place (see Figure 2.7).

NOTE
- The tip of the sensor should be 1/8 in. (0.3 cm) below the protective shield on the underside of the light.
- The Bili-Timer can be removed and replaced as necessary.
- To operate the timer, refer to the *Olympic Bili-Timer Model 20 Instruction Manual*.

Testing the Bili-Lite

Perform the test procedure to ensure the Bili-Lite is working properly after performing assembly and service procedures.

Test the Bili-Lite:

1. Plug in the power cord, then press the power switch to the **ON** (|) position.
2. Confirm that the bulbs illuminate.
3. Check the bulb life timer.
4. If equipped with the optional tilt attachment, move the light hood to several positions; verify that it remains at each set position.
5. Turn the power switch to the **OFF** (O) position.


NOTE If the device does not operate as expected, see *Troubleshooting* on page 4-1.

Section

3

Operation

WARNING **Explosion hazard. Do not use this device in the presence of flammables (e.g., oxygen, nitrous oxide, anesthetics).**

CAUTION

- Read and be familiar with this instruction manual before using this device.
- Only use this device under the direct supervision of a licensed medical practitioner.
- Connect this device directly to a properly grounded hospital-grade outlet.
- Do not place objects on the light hood as they may cause the hood to change position or items may fall onto the patient. Do not attach objects, other than a properly installed Olympic Bili-Timer, that add weight to the device as this will degrade stability.
- Always lock the wheel casters to maintain the correct light position over the patient.
- During phototherapy treatment, cover the patient's eyes with an opaque mask, such as an Olympic Bili-Mask (see Figure 1.4 on page 1-4).
- Keep the safety shield in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.
- Place the bottom of the Bili-Lite light hood at least 20 in. (51 cm) from the patient to avoid overheating the patient and to avoid ultraviolet and infrared exposure.
- Place the bottom of the Bili-Lite light hood at least 3 in. (7.6 cm) from the top of the incubator to avoid overheating the patient.
- Do not place the Bili-Lite directly under the canopy of the radiant warmer, if used.
- Never position the phototherapy light so that the Olympic Bili-Timer is under a radiant warmer or heat lamp.
- Observe the patient frequently for adverse reactions during phototherapy.
- Monitor the patient's water balance during treatment as it may be affected by phototherapy.
- Monitor the patient's temperature during treatment because phototherapy may affect patient body temperature.
- Do not use reflective foils because they may cause hazardous body temperatures.
- Patients adjacent to the phototherapy equipment may require eye protection or shielding from phototherapy radiation.
- Phototherapy devices may affect the heat supply of thermotherapy devices (e.g., incubators, radiant warmers, heated mattresses). During phototherapy treatment, it is recommended that thermotherapy devices be operated in skin-control mode or that air temperature setting or heat output of thermotherapy devices be reduced as appropriate.
- Measure the bilirubin level at regular intervals during treatment.
- Photo isomers of bilirubin may cause toxic effects.
- Operators may experience some adverse effects from exposure to phototherapy irradiation.
- Do not store drugs and infusion liquids in the phototherapy radiation area.

NOTE The hospital/facility is responsible for ensuring that all personnel who operate or maintain this device are trained in its operation and safe use, and for maintaining training records of attendance and evidence of understanding.

Operating the Bili-Lite

To operate the Bili-Lite:

1 Plug in the power cord, then press the power switch to the **ON** (|) position.

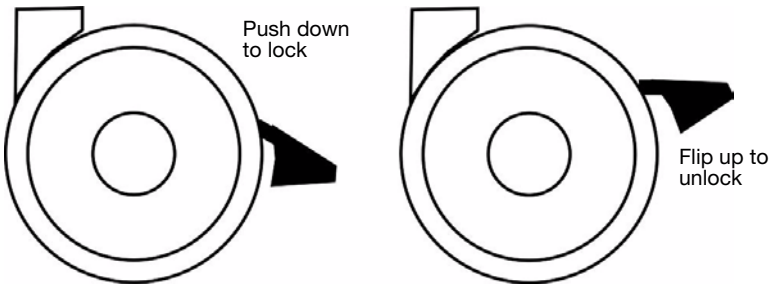
2 Position the Bili-Lite so that maximum light (irradiance) is delivered to the patient's exposed skin area:

- Reposition the lamp position via its caster wheels
- Raise and lower the light hood
- Tilt the light hood

CAUTION
- Place the bottom of the Bili-Lite light hood at least 20 in. (51 cm) from the patient to avoid overheating the patient and to avoid ultraviolet and infrared exposure.
- Place the bottom of the Bili-Lite light hood at least 3 in. (7.6 cm) from the top of the incubator to avoid overheating the patient.

3 Lock the casters to maintain the correct position over the patient.

Figure 3.1 Locking the caster wheels



Positioning the Light Hood

To raise or lower the light hood:

- Turn the height adjustment knob counterclockwise (see Figure 2.1 on page 2-2). Move the light hood to the desired height, then tighten the knob.

To tilt the light hood:

NOTE For the light hood to tilt, your Bili-Lite must have the tilt assembly mechanism installed. To order a tilt assembly for your Model 33/34, see *Ordering Information* on page 7-1.

1 Support the light hood with one hand (see Figure 2.1 on page 2-2).

2 Rotate the adjustment knob on top of the light hood to the desired position.

3 Gently release the light hood and check the position.

Measuring Irradiance

Irradiance can only be determined by measuring with a radiometer such as the Olympic Bili-Meter (see page 1-4 and refer to the *Olympic Bili-Meter Model 22 Instruction Manual*).

Measuring Treatment Time

Use the Olympic Bili-Timer to measure the duration of treatment (see page 1-4 and refer to the *Olympic Bili-Timer Model 20 Instruction Manual*).

Section

4

Troubleshooting

Should you experience difficulty when operating your Bili-Lite, consult the following table. For problems not listed in the table, contact Olympic Medical (see page 4-2).

Table 4.1 Troubleshooting chart

Problem	Probable Cause	Solution
■ Power on ■ Bulbs not lit ■ Fan doesn't run	No power	Plug the power cord into a functioning hospital-grade electrical outlet.
		Check the external circuit breakers.
	Blown fuse	Replace the fuse (see page 6-2).
	Damaged power switch	Check the power switch; replace the switch if necessary (see page 6-3).
	Loose connection or break in wiring	Check the wiring (see page 6-6).
■ Power on ■ Bulb not lit ■ Fan runs	Damaged starter	Replace the starter (see page 6-11).
	Burned out bulb	Replace the bulbs (see page 5-2).
	Damaged bulb holder	Replace the bulb holder (see page 6-8).
	Loose connection or break in wiring	Check the wiring (see page 6-6).
	Damaged ballast	Replace the ballast (see page 6-12).
■ Power on ■ Bulbs light ■ Fan doesn't run	Blocked or jammed fan	Inspect the blades and verify the fan turns freely.
	Damaged fan motor	Replace the fan (see page 6-12).
	Loose connection or break in wiring	Check the wiring (see page 6-6).
■ Power on ■ Fan runs ■ Bulb lights but is dim or makes humming sound	Reduced irradiance	Replace the bulbs (see page 5-2).
	Worn out ballast	Replace the ballast (see page 6-12).

Technical Support

For technical support, contact Olympic Medical at:

Toll-free: 1-800-426-0353 (US/Canada)
Phone: 206-767-3500 (worldwide)
Fax: 206-762-4200

Section

5

Maintenance

WARNING

- **Electrical shock hazard when the enclosure is open. Unplug the power cord from the electrical outlet before cleaning this device.**
- **Do not clean this device with flammables (e.g., antiseptics, cleaning agents).**

CAUTION

- Only qualified technicians should perform maintenance procedures.
- Do not allow liquid to enter the light hood as liquids may cause a shock hazard or damage the internal wiring.
- Never use alcohol to clean the safety shield as alcohol will damage the plastic.
- Keep the safety shield in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

Cleaning the Bili-Lite

Required Items:

- Cleaning cloths
- Mild cleaning detergent (e.g., Virex™ Tb, Virustat®, Coverage®)
- Mild soap-and-water solution
- Phillips-head screwdriver

To clean the Bili-Lite:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Allow the light to cool to touch before cleaning.
3. Dampen the cleaning cloth with either the mild soap-and-water solution or the liquid disinfectant, then wipe down all exterior surfaces of the Bili-Lite. Use the second cloth to dry all exterior surfaces of the Bili-Lite.

To clean the safety shield:

1. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
2. Dampen the cleaning cloth with the mild soap-and-water solution, then wipe the surfaces of the safety shield. Use the second cloth to dry all exterior surfaces of the Bili-Lite.
3. Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.

Replacing the Bulbs

Replace the Bili-Lite bulbs at 3,000 hours to maintain greater than 75% of initial irradiance (irradiance measured at 100 hours).

Bulb Timer

The bulb timer operates whenever the bulbs illuminate. View the elapsed time shown to track bulb life and determine when to replace the treatment bulbs.

NOTE

- The ***elapsed time*** bulb timer cannot be reset by the user.
- The bulb timer may be labeled as ***Lamp Timer***.
- Change all treatment bulbs at the same time.
- Record the bulb change in the *Medical Device History*.

CAUTION

Use only bulbs specified by Olympic Medical. Use of other bulbs may affect the safety and efficacy of treatment.

Required Items:

- Replacement bulbs (see *Parts and Accessories* on page 7-1)
- Phillips-head screwdriver

To replace the bulbs:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the two retaining screws and washers on one end of the safety shield, and then slide the safety shield out of the light hood.
3. Rotate each individual bulb out of its socket.
4. Install the bulbs: For each new bulb, insert the prongs into the socket, then carefully rotate the bulb into place. Place the white bulbs on the outside and the blue bulbs in the center.
5. Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.
6. Test for proper operation (see page 2-8).

Section

6

Service

WARNING **Electrical shock hazard when the enclosure is open. Unplug the power cord from the electrical outlet before servicing this device.**

CAUTION

- Only qualified technicians should perform service procedures.
- Reattach all ground wires after servicing to ensure proper grounding.
- Note the location of the lock washers when disassembling the device. To ensure ground integrity, reseat all washers when reassembling the device.
- Do not allow liquids to enter the bulb enclosure as this may result in a shock hazard or damage internal wiring.
- Firmly tighten the height adjustment knob before attempting to remove the light hood.

Repair Policy

Do not use malfunctioning equipment. To promote product reliability, a qualified technician may perform the replacement and service procedures described in this section. Before servicing your equipment, check your equipment warranty status, check the normal repair procedures for your facility, and determine the appropriate repair procedure to perform.

To ensure performance to factory specifications, it is recommended that all replacement parts be those either manufactured or sold by Olympic Medical. After all repair actions and tests are complete, perform the pre-operative test procedure in this manual (see page 2-8) to ensure proper operation and compliance with published specifications.

Repair Procedures

Consult the troubleshooting chart (see page 4-1) to identify probable causes and solutions before performing repair procedures.

WARNING **Electrical shock hazard when the enclosure is open. Unplug the power cord from the electrical outlet before servicing this device.**

CAUTION

- Reattach all ground wires after servicing to ensure proper grounding.
- Note the location of the lock washers when disassembling the device. To ensure ground integrity, reseat all washers when reassembling the device.
- Do not allow liquids to enter the bulb enclosure as this may result in a shock hazard or damage internal wiring.
- Firmly tighten the height adjustment knob before attempting to remove the light hood.

Replacing the Fuse

If the device does not function when the power cord is plugged in and the power is turned on, a fuse may be blown.

Required Items:

- Replacement fuse (part no. 200021)
- Flat-head screwdriver

To replace the fuse:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the old fuse:
   a. Locate the fuse box on the back of the light hood, to the right of the bulb timer.
   b. Pry open the door to the fuse box.
   c. Remove the fuse holder, then remove the fuse from the fuse holder.

CAUTION For protection against a fire hazard, replace only with the correct type and rating of fuse.

3. Install the new fuse: Insert the new fuse in the holder, insert the holder back in to the light hood, and push the door closed.
4. Perform the test procedure (see page 2-8).

Replacing the Power Switch

If the power switch malfunctions, it may need to be replaced.

Required Items:

- Replacement power switch (part no. 200001)
- Medium-size flat-blade screwdriver
- Medium-size Phillips-head screwdriver
- 5/16-in. nut driver
- 3/8-in. nut driver

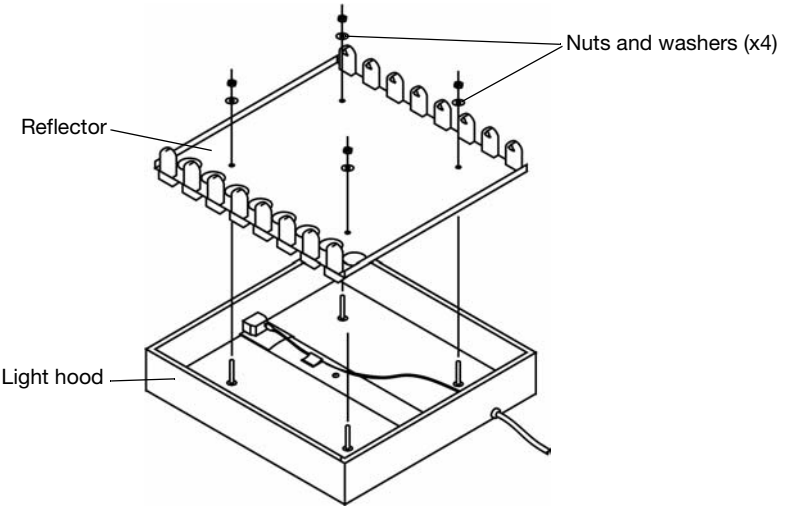
To remove the power switch:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
3. Rotate each bulb out of its socket; set the bulbs aside in a secure place.

> **CAUTION**
> - The light hood is heavy. Installing or removing the light hood requires two people.
> - Tighten the support post height adjustment knob firmly before attempting to remove the light hood.

4. Remove the light hood from the support post (see page 6-5).
5. Remove the fan shroud: Loosen and remove the three Phillips-head screws and washers.
6. Remove the safety shield bracket: Loosen and remove the two acorn nuts and two Phillips-head screws and washers.
7. Remove the reflector:
   a. Remove the four nuts and washers securing the reflector to the light hood (see Figure 6.1).

Figure 6.1 Removing the reflector



NOTE: Not pictured:
Safety shield bracket with acorn nuts (x2), Phillips-head screws (x2) washers (x4
Fan shield with screws (x3) and washers (x3)

b Starting at one corner, carefully pull the reflector away from the hood. Pull the sides of the hood slightly outward to allow the reflector to clear the shield tab.

c Once the reflector is clear of the hood, unplug wires 5 and 22 from the power switch, then unclip wires 5 and 22 from the clip centered on the inside the hood (see Figure 6.4). It may be possible to lay the reflector down next to the hood to work on the bulb holder. (In older models, cut the wires or otherwise detach them.)

To install the new power switch:

1 Place wires 5 and 22 into the clip centered on the inside the hood.

2 Insert the reflector into the hood.

3 Place the washers, then tighten the nuts that secure the reflector to the light hood.

4 Attach the fan shroud: Tighten the three Phillips-head screws and washers.

5 Attach the safety shield bracket: Tighten the two acorn nuts and two Phillips-head screws and washers.

6 Reattach the light hood (page 6-5).

7 Install the bulbs (for placement, see page 5-2).

8 Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.

> **CAUTION** The safety shield must always be in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

9 Perform the test procedure (see page 2-8).

Removing the Light Hood

The light hood must be removed before accessing the wiring.

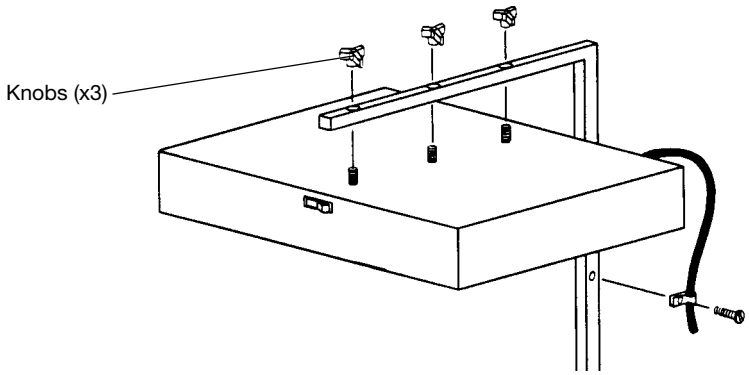
CAUTION

- The light hood is heavy. Installing or removing the light hood requires two people.
- Tighten the support post height adjustment knob firmly before attempting to remove the light hood.

To remove the light hood:

1. Turn the **POWER** switch to the **OFF (O)** position, and then unplug the power cord from the electrical outlet.
2. Remove the power cord from the clamp.
3. Loosen and remove the three black knobs on the support arm (see Figure 6.2). (If you have a tilt assembly installed, remove the three acorn nuts.)

Figure 6.2 Loosen the knobs on top of the light hood



4. Gently lower the light hood from the support arm.

To reattach the light hood:

1. Hold the light hood up to the support arm with the holes aligned.
2. Insert and secure the three knobs on the support arm.
3. Insert the power cord into the clamp.
4. Perform the test procedure (see page 2-8).

Checking the Wiring

If a new bulb does not light or the fan does not run, access the wiring to check for loose or broken connections.

Required Items:

- 5/16-in. nutdriver
- 3/8-in. nutdriver
- Medium-size Phillips-head screwdriver

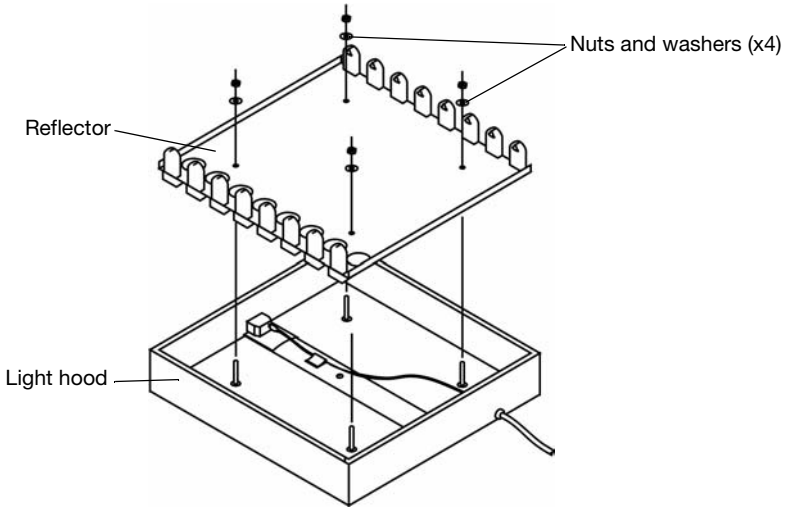
To access the wiring:

1. Turn the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
3. Rotate each bulb out of its socket; set the bulbs aside in a secure place.

> **CAUTION**
> - The light hood is heavy. Installing or removing the light hood requires two people.
> - Tighten the support post height adjustment knob firmly before attempting to remove the light hood.

4. Remove the light hood from the support post (see page 6-5).
5. Remove the fan shroud: Loosen and remove the three Phillips-head screws and washers.
6. Remove the safety shield bracket: Loosen and remove the two acorn nuts and two Phillips-head screws and washers.
7. Remove the reflector:
   a. Remove the four nuts and washers securing the reflector to the light hood (see Figure 6.3).

Figure 6.3 Hood and reflector

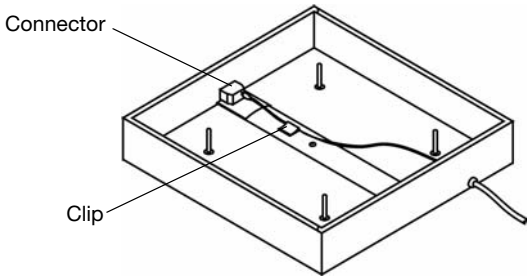


NOTE: Not pictured:
Safety shield bracket with acorn nuts (x2), Phillips-head screws (x2) washers (x4).
Fan shield with screws (x3) and washers (x3).

b Starting at one corner, carefully pull the reflector away from the hood. Pull the sides of the hood outward slightly to allow the reflector to clear the shield tab.

c Once the reflector is clear of the hood, unplug wires 5 and 22 from the power switch, then unclip wires 5 and 22 from the clip centered on the inside the hood (see Figure 6.4). It may be possible to lay the reflector down next to the hood to work on the bulb holder. (In older models, cut the wires or otherwise detach them.)

Figure 6.4 Inside of hood with reflector removed



To re-attach the wiring:

1 Place wires 5 and 22 into the clip centered on the inside the hood.

2 Insert the reflector into the hood.

3 Place the washers, then tighten the nuts that secure the reflector to the light hood.

4 Attach the fan shroud: Tighten the three Phillips-head screws and washers.

5 Attach the safety shield bracket: Tighten the two acorn nuts and two Phillips-head screws and washers.

6 Reattach the light hood (page 6-5).

7 Install the bulbs (for placement, see page 5-2).

8 Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.

CAUTION The safety shield must always be in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

9 Perform the test procedure (see page 2-8).

Replacing the Bulb Holder

If the power is on and the fan runs but a bulb does not light, replace the bulb holder.

Required Items:

- Bulb holder assembly replacement kit (part no. 200018)
- 3/8-in. nutdriver
- 5/16-in nutdriver
- Medium-size Phillips-head screwdriver
- Metal snippers
- Loctite®222 (red)

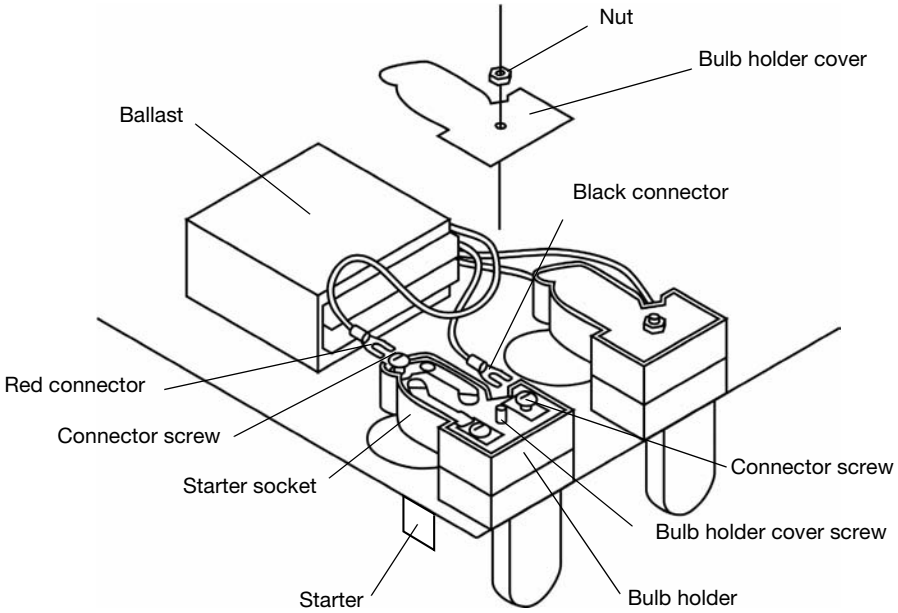
To replace the bulb holder:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
3. Rotate each bulb out of its socket; set the bulbs aside in a secure place.

> **CAUTION**
> - The light hood is heavy. Installing or removing the light hood requires two people.
> - Tighten the support post height adjustment knob firmly before attempting to remove the light hood.

4. Remove the light hood from the support post (see page 6-5).
5. Remove the fan shroud: Loosen and remove the three Phillips-head screws and washers.
6. Remove the safety shield bracket: Loosen and remove the two acorn nuts and two Phillips-head screws and washers.
7. Remove the reflector:
   a. Remove the four nuts and washers securing the reflector to the light hood (see Figure 6.3 on page 6-6).
   b. Starting at one corner, carefully pull the reflector away from the hood. Pull the sides of the hood outward slightly to allow the reflector to clear the shield tab.
   c. Once the reflector is clear of the hood, unplug wires 5 and 22 from the power switch, then unclip wires 5 and 22 from the clip centered on the inside the hood (see Figure 6.4). It may be possible to lay the reflector down next to the hood to work on the bulb holder. (In older models, cut the wires or otherwise detach them.)
8. Remove the bulb holder:
   a. Remove the 6x32 nut and washer centered on top of the bulb holder, then pull off the bulb holder cover (see Figure 6.5).
   b. Remove the connector screws, then slide the two connectors off of the bulb holder (see Figure 6.5).
   c. Lift off the bulb holder.

Figure 6.5 Bulb holder and cover



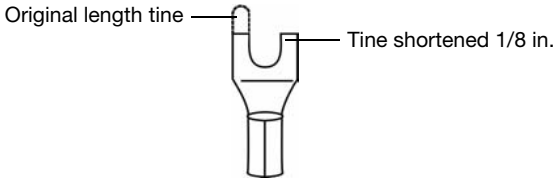
To install the new bulb holder:

1 Install the new bulb holder:

- **a** Place the new bulb holder into position.
- **b** Slide the two connectors under the connector screws, then tighten the screws.

NOTE The new bulb holder has a tighter area for the red connector. In older devices, to prevent the bulb holder from cracking as the screw is tightened, it may be necessary to shorten both tines of the red connector by 1/8 in. (0.3 cm)(see Figure 6.6).

Figure 6.6 Resizing the connector for older models



- **c** Place the bulb holder cover over the bulb holder. Place a drop of Loctite 222 on the screw, then place the washer and tighten the nut to secure the cover (see Figure 6.5 on page 6-9).

2 Place wires 5 and 22 into the clip centered on the inside the hood.

3 Insert the reflector into the hood.

4 Place the washers, then tighten the nuts that secure the reflector to the light hood.

5 Attach the fan shroud: Tighten the three Phillips-head screws and washers.

6 Attach the safety shield bracket: Tighten the two acorn nuts and two Phillips-head screws and washers.

7 Reattach the light hood (page 6-5).

8 Install the bulbs (for placement, see page 5-2).

9 Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.

> **CAUTION** The safety shield must always be in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

10 Perform the test procedure (see page 2-8).

Replacing the Starter

If the fan runs and the bulbs have been replaced but a bulb doesn't light, replace the starter.

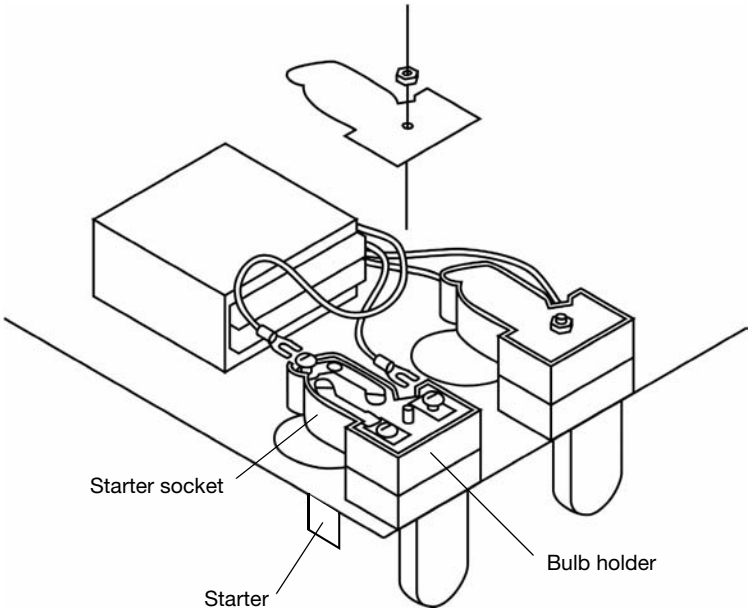
Required Items:

- Starter
- Nutdriver
- Screwdriver

To replace the starter:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
3. Rotate each bulb out of its socket; set the bulbs aside in a secure place.
4. Locate the starter for the bulb that does not light. Replace the damaged starter (see Figure 6.7):
   a. Push in and turn the starter to remove it from its locked position in the socket.
   b. Push in and turn the new starter to secure it into the locked position.

Figure 6.7 Bulb starter



5. Install the bulbs (for placement, see page 5-2).
6. Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.
7. Perform the test procedure (see page 2-8).

Replacing the Ballast

If the starter, bulb holders, and connections work, but the bulb does not light or is dim or makes a loud humming sound, replace the ballast.

Required Items:

- Replacement ballast (part no. 200017)
- 5/16-in. nutdriver
- 3/8-in. nutdriver
- Medium-size Phillips-head screwdriver
- Wire cutter/stripper

To replace the ballast:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
3. Rotate each bulb out of its socket; set the bulbs aside in a secure place.

> **CAUTION**
> - The light hood is heavy. Installing or removing the light hood requires two people.
> - Tighten the support post height adjustment knob firmly before attempting to remove the light hood.

4. Remove the light hood from the support post (see page 6-5).
5. Remove the fan shroud: Loosen and remove the three Phillips-head screws and washers.
6. Remove the safety shield bracket: Loosen and remove the two acorn nuts and two Phillips-head screws and washers.
7. Remove the reflector:
   a. Remove the four nuts and washers securing the reflector to the light hood (see Figure 6.3 on page 6-6).
   b. Starting at one corner, carefully pull the reflector away from the hood. Pull the sides of the hood outward slightly to allow the reflector to clear the shield tab.
   c. Once the reflector is clear of the hood, unplug wires 5 and 22 from the power switch, then unclip wires 5 and 22 from the clip centered on the inside the hood (see Figure 6.4). It may be possible to lay the reflector down next to the hood to work on the bulb holder. (In older models, cut the wires or otherwise detach them.)
8. Cut the two wires near the ballast (see Figure 6.5), then remove old ballast.

To install the new ballast:

1. Place the new ballast, then reattach the wires and lamp holder (see *Drawings and Schematics* on page A-1).
2. Place wires 5 and 22 into the clip centered on the inside the hood.
3. Insert the reflector into the hood.
4. Place the washers, then tighten the nuts that secure the reflector to the light hood.
5. Attach the fan shroud: Tighten the three Phillips-head screws and washers.
6. Attach the safety shield bracket: Tighten the two acorn nuts and two Phillips-head screws and washers.
7. Reattach the light hood (page 6-5).
8. Install the bulbs (for placement, see page 5-2).
9. Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.

> **CAUTION** The safety shield must always be in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

10. Perform the test procedure (see page 2-8).

Replacing the Fan

The Bili-Lite contains a fan to help cool the bulbs and ballasts while they are on. If the power is on and the bulbs illuminate but the fan does not run, replace the fan.

Required Items:

- Cooling fan (part no. 200149)
- 5/16-in. nutdriver
- 3/8-in. nutdriver
- Medium-size Phillips-head screwdriver

To replace the fan:

1. Press the power switch to the **OFF** (O) position, then unplug the power cord.
2. Remove the safety shield: First, remove the two retaining screws and washers. Next, slide the safety shield out.
3. Rotate each bulb out of its socket; set the bulbs aside in a secure place.

> **CAUTION**
> - The light hood is heavy. Installing or removing the light hood requires two people.
> - Tighten the support post height adjustment knob firmly before attempting to remove the light hood.

4. Remove the light hood from the support post (see page 6-5).
5. Remove the safety shield bracket: Loosen and remove the two acorn nuts and two Phillips-head screws and washers.
6. Remove the fan shroud: Loosen and remove the three Phillips-head screws and washers.
7. Remove the reflector:
   a. Remove the four nuts and washers securing the reflector to the light hood (see Figure 6.3 on page 6-6).
   b. Starting at one corner, carefully pull the reflector away from the hood. Pull the sides of the hood outward slightly to allow the reflector to clear the shield tab.
   c. Once the reflector is clear of the hood, unplug wires 5 and 22 from the power switch, then unclip wires 5 and 22 from the clip centered on the inside the hood (see Figure 6.4). It may be possible to lay the reflector down next to the hood to work on the bulb holder. (In older models, cut the wires or otherwise detach them.)
8. Remove the four Phillips-head screws and star washers that attach the fan to the light hood.
9. Remove the ground wire and tapping screw.

Install the new fan:

1 Point the fan's directional arrow out of the light hood to assure proper operation.

2 Place the star washers, then securely tighten the 10-32 self-tapping Phillips-head screws on the outside of the light hood.

3 Attach the green #14 ground wire using the self-tapping screw.

4 Place wires 5 and 22 into the clip centered on the inside the hood.

5 Insert the reflector into the hood.

6 Place the washers, then tighten the nuts that secure the reflector to the light hood.

7 Attach the fan shroud: Tighten the three Phillips-head screws and washers.

8 Attach the safety shield bracket: Tighten the two acorn nuts and two Phillips-head screws and washers.

9 Reattach the light hood (page 6-5).

10 Install the bulbs (for placement, see page 5-2).

11 Slide the safety shield back into the light hood, then secure it in place with the retaining screws and washers.

> **CAUTION** The safety shield must always be in place during phototherapy to protect the patient from ultraviolet radiation and broken bulbs.

12 Perform the test procedure (see page 2-8).

Returning for Service

When sending equipment to Olympic Medical for service:

NOTE For the Model 33/34, include the complete light hood and power cord. The support post, base assembly and casters are not required for factory service.

1. Clean the device, then securely package it, and its power cord, in the original shipping container, if possible, and include:
   a. A letter describing, in detail, the difficulties experienced.
   b. All warranty information; include a copy of the invoice or other applicable documentation.
   c. Purchase order (PO) number to cover the repair of any device not under warranty.
   d. Return address and bill-to information.
   e. Contact person (name and telephone number) for operational inquiries.
2. Ship the equipment prepaid to Olympic Medical.

Section

7

Replacement Parts

NOTE Only use Olympic Medical–approved parts with the Bili-Lite.

Ordering Information

To order parts and accessories contact:

Olympic Medical
Customer Service Department
5900 First Ave S
Seattle, WA 98108 USA

Toll-free: 1-800-426-0353 (US/Canada)
Phone: 206-767-3500 (worldwide)
Fax: 206-762-4200
Web: www.OlympicMedical.com

Parts and Accessories

When ordering, provide the item number to the customer service representative.

Table 7.1 Parts and accessories

Item Name / Description	Item Number
Bulbs	
Olympic Blue (Type OB), 20 watt bulbs	51418
Super Blue (Special Blue, Type BB), 20 watt bulbs	51413
Patient Eye Protection	
Bili-Mask, Quick-Stick style, regular size	52440
Bili-Mask, Quick-Stick style, premie size	52430
Bili-Mask, Regular style, regular size	52411
Bili-Mask, Regular style, premie size	52422
Bili-Mask, Easy-On style, regular size	52410
Bili-Mask, Easy-On style, premie size	52420
Repair Parts	
Ballast	200017
Bulb holder replacement kit	200018

Table 7.1 Parts and accessories, continued

Item Name / Description	Item Number
Caster wheels with brakes	100066
Fan	200149
Fuse, 5A	200021
Fuse holder	200020
Safety shield (hood shield)	400147
Switch (power)	200001
Accessories	
Bili-Meter with Type B-22 sensor	53822
Type B-22 sensor only	53860
Bili-Timer	55320
Bili-Timer mounting kit	55325
Tilt attachment	51415

Section

8

Specifications

Intended Use

The Olympic Bili-Lite™ Model 33/34 is a floorstand phototherapy light intended to provide therapeutic irradiance to treat neonatal hyperbilirubinemia.

Model 34: The Olympic Bili-Timer™ is intended to measure total phototherapy treatment time.

Irradiance

Average at 20 in. (51 cm)

- Eight Olympic Blue (Type OB) bulbs: 11.9 ±4 μW/cm²/nm
- Eight Super Blue (Type BB) bulbs: 22.4 ±7 μW/cm²/nm

Maximum at 20 in. (51 cm)

- Eight Olympic Blue bulbs: 13.8 ±5 μW/cm²/nm
- Eight Super Blue bulbs: 26.0 ±8 μW/cm²/nm

Dimensions

Size
64.8-in. high x 26-in. wide x 25-in. deep
165-cm high x 66-cm wide x 63.5-cm deep

Size (With Tilt)
66.3-in. high x 26-in. wide x 25-in. deep
168-cm high x 66-cm wide x 63.5-cm deep

Weight

Model 33:	67 lb	30 kg
Model 34:	69 lb	31 kg

Height Adjustment*

43.3–59.3 in.	110–151 cm

*Distance from bottom of light hood to floor.

Electrical

Power Requirements
- Voltage: 120V~
- Consumption: 3.0A
- Frequency (current): 60 ±5Hz

Ground Impedance
Does not exceed 0.13Ω

Fuses
3AB or Type ABC, 5A, normal blo, UL approved or equivalent

Bulbs
Nominal bulb life (for 75% of initial irradiance): 3,000 hours

Environmental

Operating Temperature
50–85°F 10–29°C

Shipping Temperature
-40–158°F -40–70°C

Storage Temperature
- Model 33: -40–158°F -40–70°C
- Model 34: -4–113°F -20–45°C

Relative Humidity (RH)
- Operating: 10–95%, non-condensing
- Shipping/storage: 10–100%, condensing

Pressure

0.5–1.0 atm	500–1600 hPa

Altitude (Maximum)

10,000 ft	3,000 m

Noise
Maximum noise level: 50 dB(A)

Controls

MAINS POWER changes device state on (|) or off (O).

Bili-Timer (Model 34)

- **POWER:** Turns Bili-Timer on or off.
- **ZERO:** Resets the accumulated time to zero.

Display

Hour meter (bulbs): 9,999.9 hours

External Connections

Hospital-grade power cord

Products

Item	Catalog No.
Bili-Lite Model 33	51433
Bili-Lite Model 34 (includes Bili-Timer)	51434

For additional items, such as tilt assembly, see *Parts and Accessories* on page 7-1.

Regulatory, Electrical Safety, and Classifications

- FDA II/80 LBI
- Health Canada Class 2
- CSA 22.2 No. 60601-1
- UL 60601.1
- IEC 60601-1-2 (2001)
- IEC 60601-2-50
- Electrical shock protection: Class I Equipment
- Ordinary Equipment (IPXØ)
- Type B Equipment
- Not suitable for use in the presence of flammable anaesthetic mixtures with air, oxygen, or nitrous oxide

Service

Service can be performed by hospital technicians. Parts are often available on an overnight express basis. See *Ordering Information* on page 7-1 for more information.

Warranty

One-year warranty, includes parts and labor. Excludes bulbs.

Electromagnetic Compatibility

The Bili-Lite and Bili-Timer comply with the requirements of IEC 60601-1-2 (2001). For information, see pages 8-3–8-5.

Product Disposal

Disposal of the Bili-Lite does not require any special precautions. Dispose of according to your local disposal regulations.

The bulbs contain mercury. Dispose of according to your local disposal regulations.

Electromagnetic Specifications – Manufacturer's Declaration

The Olympic Bili-Lite Model 33/34 is intended for use in the electromagnetic environment specified below. The customer or the user of the Bili-Lite should assure that it is used in such an environment.

Table 8.1 Electromagnetic emissions

Emissions Test	Compliance	Electromagnetic Environment — Guidance
Radio Frequency (RF) Emissions CISPR 11	Group 1	The Bili-Lite uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The Bili-Lite is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

Table 8.2 Electromagnetic immunity

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment — Guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 seconds	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (>95% dip in U_T) for 5 seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Bili-Lite requires continued operation during power mains interruptions, it is recommended that the Bili-Lite be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE U_T is the alternating current (ac) mains voltage prior to the application of the test level.

Table 8.3 Electromagnetic immunity

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment — Guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the Bili-Lite, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: $d = 1.2\sqrt{P}$ $d = 0.35\sqrt{P}$ 80 MHz to 800 MHz $d = 0.7\sqrt{P}$ 800 MHz to 2.5 GHz ...where (*P*) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and (*d*) is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[1] should be less than the compliance level in each frequency range.[2] Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	10 V/m	

1. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Bili-Lite is used exceeds the applicable RF compliance level above, the Bili-Lite should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Bili-Lite.
2. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

NOTE

- At 80 MHz and 800 MHz, the higher frequency range applies.
- These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Bili-Lite

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

Table 8.4 Separation distances

Rated maximum output power of transmitter in watts (W)	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 0.35\sqrt{P}$	800 MHz to 2.5 GHz $d = 0.70\sqrt{P}$
0.01	0.012	0.0035	0.007
0.1	0.12	0.035	0.07
1	1.2	0.35	0.7
10	12	3.5	7
100	120	35	70

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE

- At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
- These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Appendix

A

Drawings and Schematics

Figure A.1 Olympic Bili-Lite Model 33/34 — Wiring Diagram, Drawing No. 700230, Rev. A

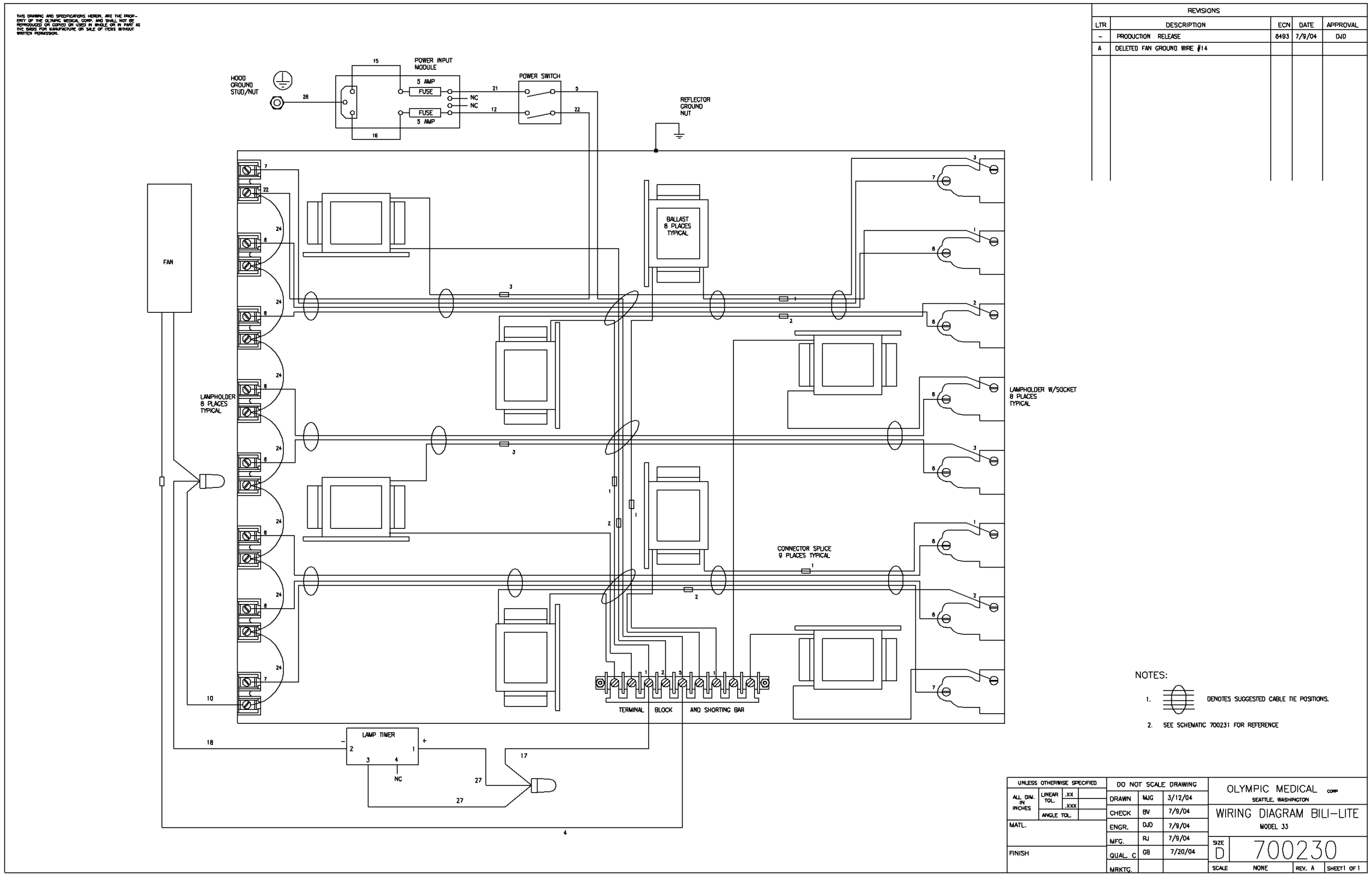


Figure A.2 Olympic Bili-Lite Model 33/34 – Schematic, Drawing No. 700231, Rev. –