GretagMacbeth

Operators & Service Manual
For
Spectralight Models SPL-65/SPL-75

Issue Date: 1987

Table of Contents

Section 1 - General Information

General Description

The Macbeth Spectralight is a color balanced ling system that provides 3 selectable light sources:

- Artificial Daylight
- Minus Red [Cool White Fluorescent]
- Horizon Sunlight

These light sources will enable critical color matching in accordance with ASTM specifications. A built in ultraviolet light source may be used by itself or with any of the 3 light sources for checking optical brighteners. Correlated color temperatures of the light sources provided in the Spectralight are:

- Daylight – 7500 +/- 200K [model SPL75] or Daylight – 6500 +/- 200K [model SPL65]
- Horizon Sunlight – 2300K
- Minus Red – 4400K

When ultraviolet is combined with the daylight source, the unit provides a close spectral energy distribution match to daylight extending though the CIE specified range of 300 to 830 nanometers.

> Note: Both Accurate color temperature and spectral energy distribution match to daylight are maintained by automatic phase control of lamp voltage. Through use of tungsten halogen lamps, color temperature and spectral energy distribution match are maintained throughout the life of the lamp.

The Spectralight is normally booth mounted to provide a controlled viewing environment. However, the unit may also be suspended; in these cases, special attention must be given to the surround. Illuminance provided by the Spectralight is uniform within +/-20% for:

- The entire enclosed viewing area of the viewing booth.
- Approximately 2 ½' x 6' viewing area under a dual unit suspended installation.

In dual suspended installation, the individual units are interconnected via cable and are centrally controlled. The Spectralight is fan cooled; air intake is through the fan itself and exhaust is through louvers in the top cover of the unit. The Spectralight is a well constructed unit that will render long and satisfactory service of the suggestions contained herein are followed.

Major Components and Construction Features

Construction Features

The housing of your Macbeth Spectralight and its associated viewing booth are both made of 20 gauge formed steel and finished with baked, vinyl textured enamel. For ease of removal and for ready access to lamps and reflectors, and aluminum framed prismatic lens is pin hinged to notched receptacles on one side of the housing and secured to the other side of the housing via spring loaded catches. Ballasts, transformers, fan and wiring are all located in the upper portion of the housing under a removable louvered to cover. Hinged filter frames that lock to the housing via winged, quarter turn fasteners facilitate removal of the daylight filters for cleaning or replacement. Conversion from 7500K to 6500K or vice versa is possible by changing both daylight filters.

Lamps

The Spectralight is furnished with:

- 2 – 750 watt tungsten halogen incandescent lamps [daylight]
- 4 - 500 watt tungsten halogen incandescent lamps [horizon]
- 2 – 36 watt cool white fluorescent lamps [Minus Red]
- 2 - 30 watt BLB [UV]

The daylight source lamps are criteria, and have an average rated life of 400 hours. Meticulous quality control assures the customer of highest quality performance and placement lamps should be obtained directly from Macbeth.

> Note: It is suggested that lamps be replaced in completer sets. For example, whenever one of the daylight lamps burns out, it is suggested that both lamps be replaced.

Important: In order to avoid wasteful usage of available lamp life and electrical energy, it I suggested that the daylight lamps be de-energized when not in actual use. Sample orientation and other make ready operation can be performed equally as well under cool whit lamps.

Daylight Filters

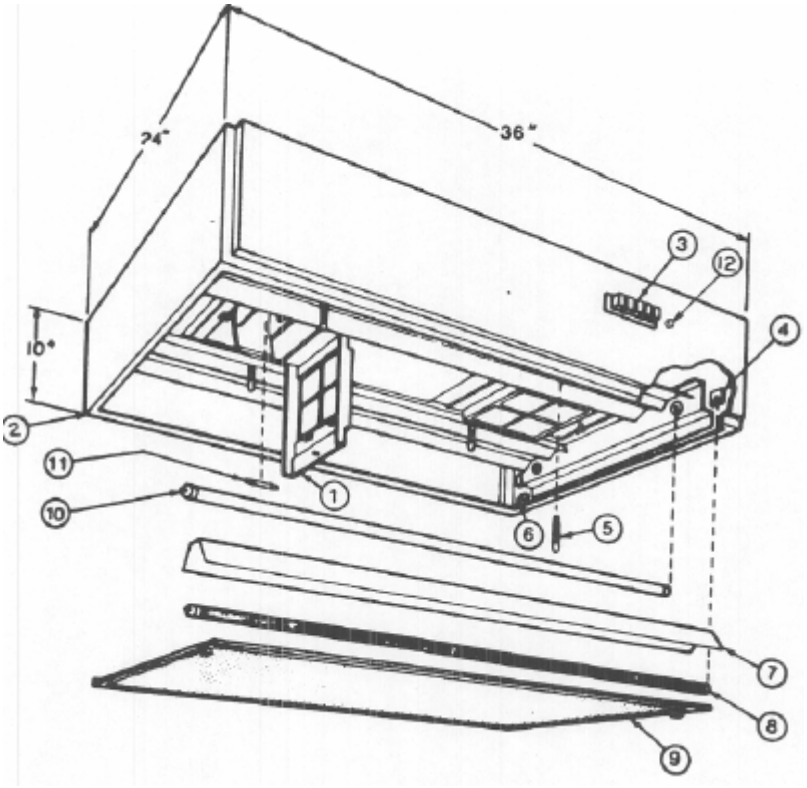
Each of the daylight filters employed in the Spectralight comprises 4 pieces of Corning 5900 glass carefully selected from a particular portion of a given melt in order to provide the spectral power distribut8ion of Daylight when combined with the lamp, reflector, and diffuser combination.

Ballasts

The SpectraLight contains 3 ballasts:

- 2 – 30/40 watt ballast and 2 – starters for the UV
- 1 – 2 lamp, 40 watt rapid start ballast for CWF

Unless otherwise specified, ballasts provided are designed for 120 vac/60Hz, 220 vac/50Hz, or 120 vac/50Hz operation; they have a high power factor and “A” sound rating, and are thermally protected [class P].



Prismatic Lens and Reflectors

The prismatic lens employed in the Spectralight is a frame mounted, single sheet [34.6” x 22.5”] of clear glass that provides controlled brightness, high transmission of ultraviolet to near infrared energy, and is resistant to the effects of age, moisture and heat. Pin hinges on the lens frame are designed to rest in notched receptacles of the housing so that the prismatic lens may be:

- Swung out of the war for access to lamps and reflectors
- Removed completely and easily for periodic cleaning of lens, filter, and reflectors.

All reflectors used in the Spectralight are constructed of 20 gauge aluminum with a special surface coating. Reflectors for the UV, Minus Red, and Horizon Sunlight have a Specular finish, whereas the daylight reflector has a diffuse type finish.

Daylight Color Temperature Control

Contained in the Spectralight is a continuously adjustable phase control circuit that controls the operating voltage applied to the daylight lamps. Proper

operation voltage is automatically obtained when the line voltage is within +/- 10% or rating, operating within the line voltage tolerance limit, will insure the specified daylight correlated color temperature of daylight sources. If the line voltage is more than +/-10% of the rated voltage, the warning light will come on. If bulbs are functional, the phase control Board should be replaced. Macbeth lighting personnel should be called to order the necessary parts of it you have and questions.

Section 2 - Installation

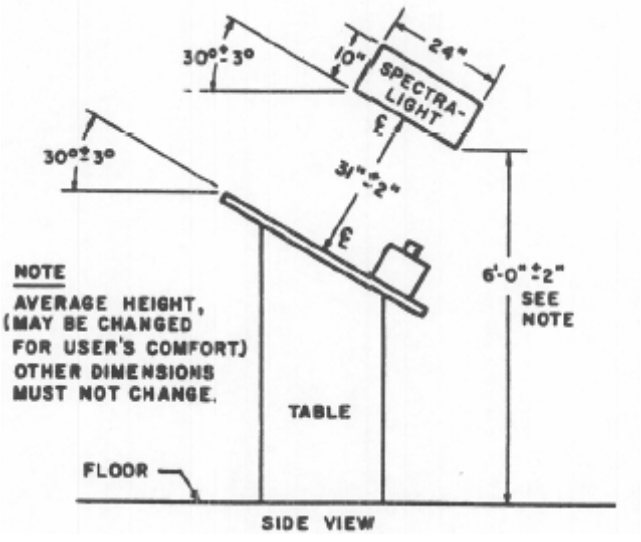
Input Requirements

Note that when the warning light is on, it may indicate an excessive line load condition. The Spectralight is factory wired to customer specification; specific input power requirements for each unit are indicated on the equipment label. For detailed factory wiring information, refer to the circuit diagrams in Section 5 of this manual.
Line consumption for each unit is 1900VA nominal. Voltage, current, and frequency requirements given on the equipment label must be met to assure optimum performance within specifications. It is recommended that the convenience outlet, made available for the Spectralight, terminate an unloaded line; line loading can cause slight intensity reduction with resultant changed in color temperature.

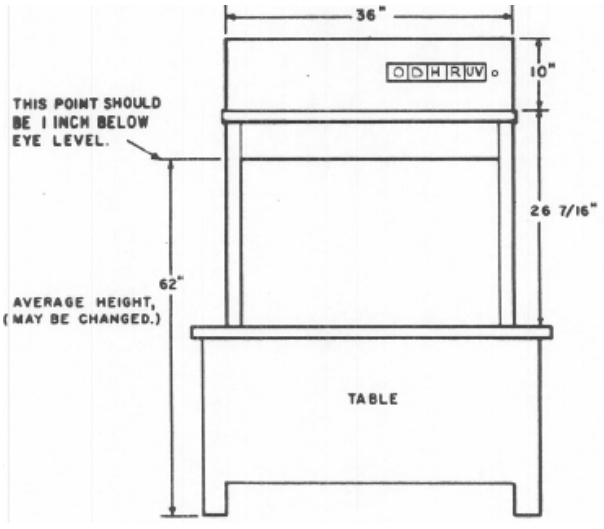
Caution: Do not operate or attempt to operate the SpectraLight on DC power.

Location of Spectralight

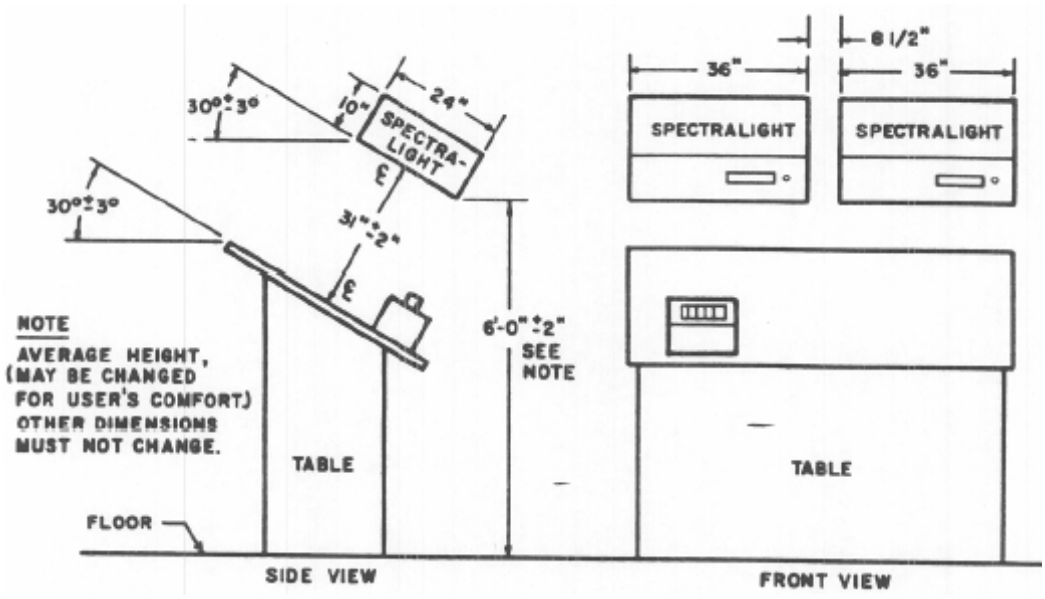
Information contained in the following illustrations encompass those installation requirements that assure best results.



Single unit suspended installation



Booth instrument installation



Dual instrument suspended installation

Recommendations for Surround

The Spectralight is designed for critical color matching and inspection, tasks that are inherently influenced by the immediate viewing environment. Booth mounted installations provide a standardized viewing environment; therefore, no consideration need be given to the surround. However, when the Spectralight is used as an overhead illuminator, it is very important that certain precautions be taken to insure optimum results. In most instances, extraneous illumination must be avoided. The location for the Spectralight is in a windowless room. If there are window, they should be painted; light tight curtains or Venetian blinds should be used. It is important that the background be a neutral gray; color, preferably light gray similar to Munsell notation N7. If the Spectralight is used for lighting of a localized area, then this area or table should be shielded from extraneous illumination by a curtain. In this instance, the curtain must also be of light neutral gray which, in addition to shielding the special area from extraneous illumination, will provide a second important factor, a neutral gray background, which is desirable to avoid brightness contrast and color reflections which might result if the curtain were anything but neutral.

Heat Considerations

Since all light sources add heat to the area in which they operate, thermal contribution should be a consideration during installation planning. Thermal contribution of the Spectralight during normal operation is 5560 BTU maximum.

Installation Instructions

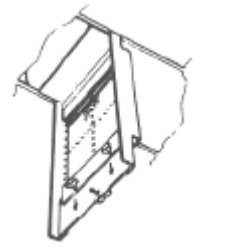
Booth Mounted Installation

The Spectralight and assembled viewing booth are shipped from the factory in one container; filters and prismatic lens have been removed from the unit and enclosed in accessory packages. The following instructions will guide you through the installation of your lighting system:

1. Carefully; unpack shipping container; remove Spectralight housing, prismatic lens, and booth from the container. Remove the contents of the accessory pack and set them aside.
2. Place the viewing booth on a table or bench at the operation location.
3. Position the Spectralight housing so that it is oriented with the viewing booth. Lift the Spectralight housing and set it upon the support flanges at the top of the booth.
4. Turn the winged, quarter turn fasteners counter-clockwise and then open the filter frames to access the daylight compartments. Using cotton gloves, install the 2 -750 watt lamps with the external bubble facing up by inserting into the clips provided.

   Caution: Incandescent lamps should not be touched with bare fingers; clean the laps with isopropyl alcohol if touched. Holding the lamps at the center during installation or removal may cause breakage.

5. Install the daylight filter packs in each filter frame; the metallic screen on the filter packs should be on the opposite end of the filter frame from the winged fasteners, and should face away from the bulb when the frame is closed. Secure the filter pack in the frame by sliding movable plate over the edge of the pack and tightening the small winged nuts. Raise the filter frames to the horizontal position and secure them with the quarter turn fasteners.



6. Using cotton gloves, install the 4 – 500 watt Horizon Sunlight lamps in their respective positions.
7. Mount the 2 – 30 watt Minus Red [Cool White Fluorescent] lamps and 2 – 30 watt BLB lamps. The BLB lamps are mounted at the outer edge of the reflector.

8. Insert hinge pins of the prismatic lens into the slotted receptacle located at the bottom rear corner of the housing. Raise the prismatic lens to the horizontal position and secure it by pushing the 2 – slide mounted fasteners to take their extended position.

Note: Make certain that the fasteners are engaged before letting go of the glass.

9. Ensure that the front panel OFF switch is depressed; connect the power cable to the single phase convenience outlet. Make sure that the voltage stamped on the serial plate of the unit and the outlet is the same.

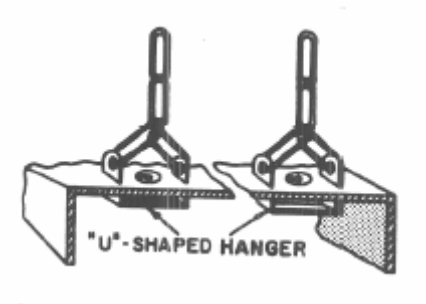
Caution: Make certain that the air flow through the intake filter and the exhaust louvers located on the top of the booth are not obstructed in any way. When replacing the top cover on the unit, the louvers must allow air to flow toward the back of the unit. Filter packs and lamps get extremely hot during normal operation. Do not touch tilter packs or lamps without allowing time to cool.

Single Unit Suspended Installation

Note: The weight of the Spectralight is 83 lbs. Maker sure this weight is considered during suspended mounting.

Perform the following steps for single unit suspended installation:

1. Carefully unpack the shipping containers; remove the Spectralight housing accessory pack, and prismatic lens. Remove the contents of the accessory pack.
2. Remove the top cover of the housing and set the cover aside. Remove the 4 narrow slot knockouts located at each end of the housing and install the 'U' shaped hangers. Connect the chains to the holes in the 'U' shaped hangers and replace the top cover.

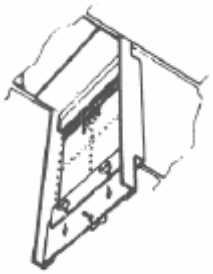


3. Suspend the Spectralight housing in the proper position over the work area; the housing should be horizontal to facilitate the installation of the prismatic lens, filter packs and lamps.

4. Turn the winged, quarter turn fasteners counter-clockwise and open the filter frames for access to the daylight compartments. Using cotton gloves, install 2 – 750 watt lamps with external glass bubble facing up, by inserting it into the clips provided.

    Caution: Incandescent lamps should not be touched with bare fingers; clean lamps with isopropyl alcohol if touched. Holding lamp at center during installation or removal may; caused breakage.

5. Install the daylight filter pack in each filter frame; he metallic screen on the filter pack should be on the opposite end of the filter frame from the winged quarter turn fasteners, and should face away from the bulb when the frame is closed. Secure the filter pack in the frame by sliding the movable plate over the edge of the pack, tightening the small winged nuts. Raise the filer frames to the horizontal position and secure them with the quarter turn fasteners.



6. Using cotton gloves, install the 4 – 500 watt Horizon Sunlight lamps in their respective positions.
7. Mount the 2 – 30 watt Minus Red [Cool White Fluorescent] lamps and the 2 – 30 watt BLB lamps. The BLB lamps are mounted at the outer edge reflectors.
8. Insert the hinge pins of the prismatic lens into the slotted receptacles located at the bottom rear corners of the housing. Raise the prismatic lens to the horizontal position and secure it by pushing the 2 slice mounted fasteners to their extended position.

    Note: Make certain that the fasteners are engaged before letting of or the glass.

9. Adjust the suspension chains until the Spectralight housing attains a 30° angle with horizontal.
10. Ensure that the front panel OFF switch is depressed; connect the power cable to the single phase convenience outlet. Make sure that the voltage marked on the serial plate of the unit and the voltage of the outlet are the same.

    Caution: Make certain that the air flow through the intake filter and exhaust louvers located on the top of the booth are not obstructed in any way. When replacing the top cover on the unit, the louvers must allow air to flow toward the back of the unit. The

filter packs and lamps get extremely hot during normal operation. Do not touch filter packs or lamps without allowing time to cool.

Dual Unit Suspended Installation

Note: The weight of the Spectralight is 83 lbs. Maker sure this weight is considered during suspended mounting.

1. Carefully open the shipping containers; remove the Spectralight housing; accessory package; and prismatic lenses. Open the accessory package and set the contents aside.
2. Remove the top cover of each of the Spectralight housings and set the covers aside. Remove the 4 narrow slot knockouts located at each end of the housing and install the 'U' shaped hangers. Connect the chains to the holes in the 'U' shaped hangers. Replace the top covers.
3. Suspend the Spectralight units in their proper positions over the work area; the housing should be horizontal to facilitate the installation of the lamps, jilter packs, and the prismatic lenses. Ensure that the 2 units are 81/2" apart.
4. Turn the winged, quarter turn fasteners counter-clockwise and open the filer frames to access the daylight compartments. Using cotton gloves, install the 2 – 750 watt lamps with the external glass bubble facing up by inserting the clips provided.

   Caution: Incandescent lamps should not be touched with bare fingers; clean lamps with isopropyl alcohol if touched. Holding lamp at center during installation or removal may; caused breakage.

5. Install the daylight filter packs in each filter frame; the metallic screen on the filter packs should be on the opposite end of the filter frame from the winged quarter turn fasteners and should face away from the bulb when the frame is closed. Secure the filter packs to the frames by sliding the movable plate over the edge of the pack and tightening the small winged nuts. Raise the filter frames to the horizontal position and secure with the quarter turn fasteners.
6. Using cotton gloves, install eh 4 – 500 watt Horizon Sunlight lamps in their respective positions.
7. Mount the 2 – 30 watt Minus Red [Cool White Fluorescent] lamps and the 2 – 30 watt BLB lamps. The BLB lamps are mounted at the outer edge reflector of each unit.
8. Insert the hinge pins of the prismatic lens into the slotted receptacles located at the bottom of the rear corners of the housing. Raise the

prismatic lens to the horizontal position and secure by pushing the 2 slide mounted fasteners to their extended position.

Note: Make certain that the fasteners are engaged before letting of or the glass.

9. Adjust the suspension chains until the Spectralight housing units attain a 30° angle to the horizontal.

Note: Dual unit suspended installation are remotely controlled and do not contain push button panels.

10. The cable from each Spectralight unit contains power and control leads and each is terminated at a 9 pin connector. Connect each of these to their respective connectors in the remote control unit.
11. Ensure that the OFF push button of the remote control unit is depressed, and replace the cover.
12. Mount the remote control unit in any convenient location, and connect the input power cable to the single phase power source. Make sure that the voltage marked on the serial plate of the unit and the outlet voltage is the same.

Caution: Make certain that the air flow through the intake filter and exhaust louvers located on the top of the booth are not obstructed in any way. When replacing the top cover on the unit, the louvers must allow air to flow toward the back of the unit. The filter packs and lamps get extremely hot during normal operation. Do not touch filter packs or lamps without allowing time to cool.

Section 3 - Maintenance

Caution: To avoid any possibility of electrical shock, disconnect the input power from the unit before proceeding with maintenance procedures.

Cleaning

With the exception of the air louvers located on the top of the unit, the Spectralight housing is completely enclosed; therefore, cleaning is kept to a minimum. However, an accumulation of dust, dirt, or lint will decrease the light intensity which may, in turn, result in a change in the illumination color temperature.

Caution: The filter packs and lamps get extremely hot during normal operation. Do not touch filter packs or lamps without allowing time to cool.

To clean the Spectralight proceed as follows:

1. Remove the prismatic lens from the housing by:
   - Releasing the slide mounted fasteners
   - Lowering the prismatic lens to the vertical position
   - Lifting the lens slightly so that the hinge pins slip out of the slotted receptacles in the housing

   The glass should be washed with soap and water and thoroughly rinsed and dried so that no film of soap remains.
2. Remove the daylight filter packs from the filer frames and remove all the lamps.

   Important: Incandescent lamps should not be touched with bare fingers; clean lamps with isopropyl alcohol if touched. Holding lamp at center during installation or removal may; caused breakage.

   Dust can be removed from the reflectors and lamps with a clean, dry, lint free cloth. The remove dirt, clean the reflectors and lamps with warm water and a mild detergent, or ammonia type window cleaner.

   Note: The filter packs should not be subjected to excessive moisture; therefore a spray type window cleaner should be used to clean them.

Caution: Filter packs and lamps get extremely hot during normal operation. Don not touch filter packs of lamps without allowing time to cool.

3. Remove the slip mounted air filter from the top cover. Clean the filter with a small vacuum cleaner of any suitable cleaning solvent.

   Caution: Carbon Tetrachloride is highly toxic; its use should be avoided. Trichloroethylene has paint removing qualities; do not use on painted surfaces.

4. Using a small vacuum cleaner, clean the interior of the Spectralight housing.
5. Reassemble the Spectralight in reverse order of the disassembly. When replacing the filter packs, make certain that the metallic screen is places at the hinged side of the filter frame.

Removal and Replacement of Components

Lamp Replacement

Caution: Filter packs and lamps get extremely hot during normal operation. Do not touch filter packs of lamps without allowing time to cool.

Conventional lamp sockets have been used for the fluorescent lamps and the 4 Horizon Sunlight lamps. Once the prismatic lens has been lowered out of the way, replacement procedures for these lamps are obvious upon inspection. Special Spring loaded notched, ceramic sockets are provided for the 2 daylight lamps. Improper handling of these lamps during removal or installation may result in breakage. When removing the daylight lamps, proceed as indicated below; installation should be accomplished in a similar manner.

Important: To insure proper equipment performance, replacement lamps for all light sources should be ordered directly for Macbeth.

Note: Incandescent lamps should not be touched with bare fingers; clean lamps with isopropyl alcohol if touched.

1. With your thumb and forefinger, grasp the flat portion of the lamp immediately adjacent to the ceramic socket at either end.

2. Push the lamp in the direction of the ceramic socket with sufficient pressure to release the other end of the lamp. Lift the lamp clear of the sockets.

Replacement of Daylight Filter Packs

To replace the daylight filter packs, proceed as follows:

> Caution: Filter packs and lamps get extremely hot during normal operation. Do not touch filter packs or lamps without allowing time to cool.

1. Turn the winged quarter turn fasteners counter-clockwise and open the filter frame.
2. Loosen [do not remove] the small winged nuts and slide the movable plate so that the filter pack can be lifted free of the filter frame.
3. Remove the filter pack from the filter frame.
4. Install the new filter pack so that the metallic screen is placed at the hinged, exterior side of the filter frame. Slide the movable plate over the edge of the filter pack and then tighten the winged nuts.
5. Close the filter frame and secure it with the winged quarter turn fasteners.

Removal/Replacement of Electrical Components

When the top cover is removed from the SpectraLight housing, all of the electrical components [ballasts, transformer, switches, fan, etc.] and wiring are exposed and replacement procedures are obvious. The following information should be noted:

1. Greater accessibility to either the UV ballast can be obtained by 1st removing the associated reflector.
2. When wires are to be disconnected, carefully noting the color code and then labeling each wire.
3. Macbeth Spectralights have been designed so that most service requirements can be handled by the user. However, should a problem arise with the unit which cannot be easily solved, contact Macbeth.

Section 4 – Replacement Parts List

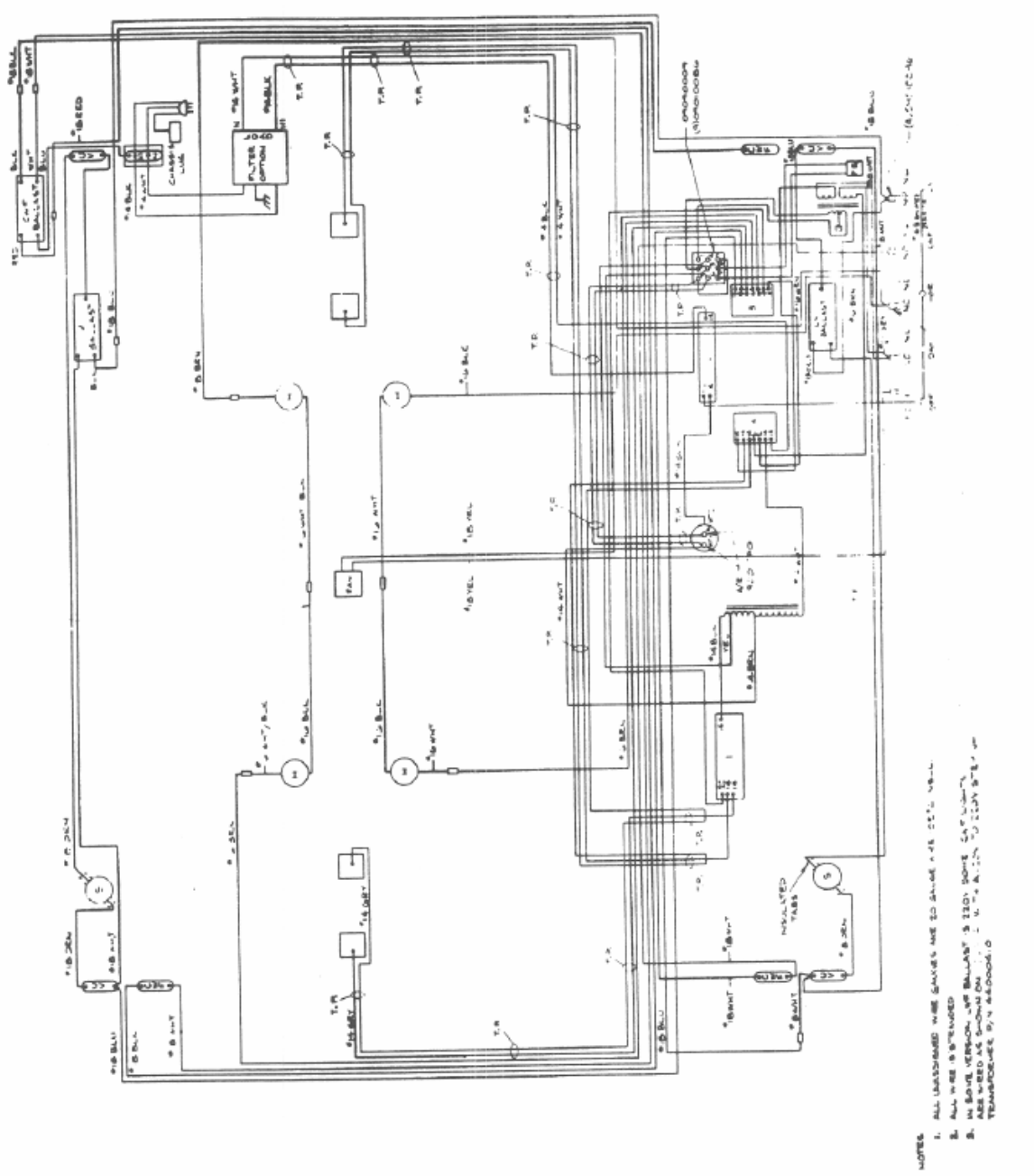
To expedite delivery when ordering any part, specify the following:

1. Name of part
2. Part Number
3. Model and serial number of the equipment containing the part being replaced; this can be obtained from the data plate
4. Be sure to include your compete address and phone number.

Spectralight Parts List

Part number	Description
23005910	Diffusing Glass, Frame and Latch Assembly
29003011	Daylight Filter Assembly [75L]
29003010	Daylight Filter Assembly [75B]
29003013	Daylight Filter Assembly [65L]
29003012	Daylight Filter Assembly [65B]
20120014	Lamp – Fluorescent BLB 30 watt [F30T8/BLB]
20115027	Lamp – Fluorescent CWF 30 watt [F36T12/CW]
20120020	Lamp – Tungsten Halogen 500 watt Horizon
20120027	Lamp – 750 watt Daylight
84004310	Starter [FS4]
22000004	Fan Filter Assembly
03100019	Fan Muffin [115v]
03000080	Fan Muffin [220v]
41200992	Triac
44000080	Ballast
44000120	Ballast
44000410	Transformer
44000370	Ballast
44000390	Ballast
44000420	Ballast
43010280	Micro switch
17005060	Operating Instructions

Section 5 – Circuit Diagram



Spectralight Wiring Diagram [115v]