TM 8-6515-006-24&P

TECHNICAL MANUAL

UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

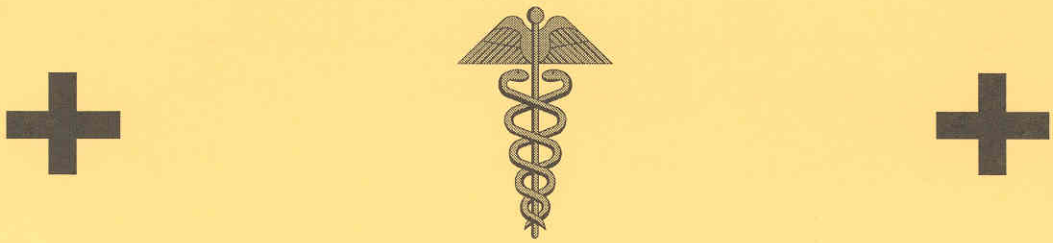
LIGHT, ENDOSCOPIC INSTRUMENT MODEL 52-1201

6515-01-153-9649

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

HEADQUARTERS, DEPARTMENT OF THE ARMY

JUNE 1994



SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

Do not try to pull or grab the individual.

If possible, turn off the electrical power.

If you cannot turn off the electrical power, pull, push, or lift the person to safety using a dry wooden pole or a dry rope, or some other insulating material.

Send for help as soon as possible.

After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately start artificial resuscitation.

ELECTRICAL AND ELECTRONIC HAZARDS

» Severe injury or death can result when any part of your body comes in contact with live electrical circuits. Medical Equipment Repairers must be especially alert to the dangers of exposed circuits, terminals, power panels, and the like.

» The electrical parameter that injures and kills is CURRENT; the force that caused current to flow is called VOLTAGE. Voltage ratings are normally assigned to live electrical circuits, power supplies, and transmission lines. You should consider all voltages of 30 or more to be hazardous.

» The physiological effect of current flowing through the human body is related to the following factors:

- The path of the current through the body.
- The magnitude of the current.
- The duration of the voltage shock or discharge that causes current flow.
- The frequency of the voltage if alternating current.
- The susceptibility of damage to your heart from the current and from repeated shocks.

» Alternating current tends to concentrate near the body's surface because of the phenomenon of "skin effect." The higher the frequency of the alternating current voltage source, the more likely the current will tend to flow in or near the skin and away from internal body organs.

» The effect of current becomes more severe with the length of time that it flows through the body; a prolonged current flow can cause severe internal burns, collapse, unconsciousness, or death.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC

UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) LIGHT, ENDOSCOPIC INSTRUMENT MODEL 52-1201

6515-01-153-9649

You can help improve this manual. If you find any mistakes or if you know a way to improve procedures, please let us know. Mail your memorandum, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 (Recommended Changes to Equipment Technical Publications) located in the back of this manual to: Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001. A reply will be furnished directly to you.

Approved for public release; distribution is unlimited.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

Throughout this manual are WARNINGS, CAUTIONS, and NOTES. Please take time to read these. They are there to protect you and the equipment.

WARNING

Procedures which must be observed to avoid personal injury, and even loss of life.

CAUTION

Procedures which must be observed to avoid damage to equipment, destruction of equipment, or long-term health hazards.

NOTE

Essential information that should be remembered.

HOW TO USE THIS MANUAL

This manual provides all the information needed to understand the capabilities, functions, and characteristics of this equipment. It describes how to set up, operate, test, and repair the equipment. You must familiarize yourself with the entire manual before operating or beginning a maintenance task.

The manual is arranged by chapters, sections, and paragraphs followed by appendixes, a glossary, an index, and DA Forms 2028-2. Use the table of contents to help locate the chapter or section for the general subject area needed. The index will help locate more specific subjects.

Multiple figures and tables are provided for your ease in using this manual. Words that are both capitalized and in quotation marks are names of components or words that you will actually see on the equipment.

Chapter 3 provides a systematic method of inspecting and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail. Make a habit of doing the checks and services in the same order each time and anything wrong will be detected quickly.

Only perform maintenance functions specified in the maintenance allocation chart for your level of maintenance. Maintenance functions specified for higher levels of maintenance frequently require additional training; test, measurement, and diagnostic equipment; or tools.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Overview.

This manual describes the light, endoscopic instrument (fig 1-1); provides equipment technical data; and provides operational and maintenance functions, services, and actions. Additional information follows:

a. Type of manual. Unit, direct support (DS), and general support (GS) maintenance (including repair parts and special tools list).

b. Model number and equipment name. Model number 52-1201, Light, Endoscopic Instrument.

c. Purpose of equipment. To provide a source of light for transmission through fiberoptic cables to an instrument which illuminates an internal medical treatment site.

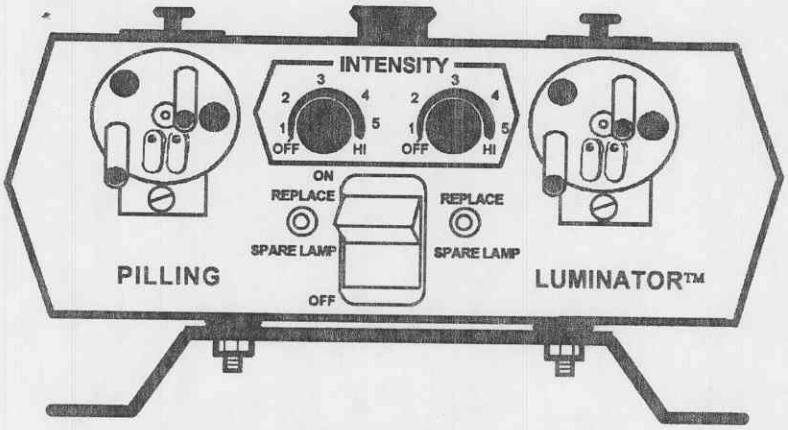

Figure 1-1. Light, endoscopic instrument.

1-2. Explanation of abbreviations and terms.

Special or unique abbreviations, acronyms, and terms used in this manual are explained in the glossary.

1-3. Maintenance forms, records, and reports.

TB 38-750-2 prescribes forms, records, reports, and procedures.

1-4. Destruction of Army materiel to prevent enemy use.

AR 40-61 contains instructions for destruction and disposal of Army medical materiel. Also, the SB 8-75 series provides periodic information and/or instructions on the destruction of medical materiel.

1-5. Administrative storage.

a. Place the endoscopic instrument light in administrative storage for only short periods of time when a shortage of maintenance effort exists. This equipment should be in mission readiness condition within 24 hours or within the time factors determined by the directing authority. During the storage period, keep appropriate maintenance records.

b. Perform preventive maintenance checks and services (PMCS) listed in tables 3-1 and 3-2 before placing Army equipment in administrative storage. When equipment is removed from storage, perform PMCS to ensure its operational readiness.

c. Inside storage is preferred for equipment selected for administrative storage.

1-6. Preparation for storage or equipment.

Procedures to prepare the endoscopic instrument light for storing or shipping are listed in chapter 3, section IX.

1-7. Quality control (QC).

TB 740-10/DLAM 4155.5/AFR 67-43 contains QC requirements and procedures.

1-8. Nomenclature cross-reference list.

Table 1-1 identifies official versus commonly used nomenclatures.

Table 1-1. Nomenclature cross-reference list.

Common name	*Official nomenclature*
Endoscopic instrument light	Light, endoscopic instrument
Intensity control	Intensity selector control switch (rotary)
Lamp cartridge assembly	Lampholder
Multiport faceplate	Faceplate, light
Power switch	Power switch/circuit breaker

NOTE

A fiberoptic bronchoscope is also referred to as an endoscopic instrument.

1-9. Reporting and processing medical materiel complaints and/or quality improvement reports.

AR 40-61 prescribes procedures for submitting medical materiel complaints and/or quality improvement reports for the endoscopic instrument light.

1-10. Warranty information.

A warranty is not applicable.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-11. Equipment characteristics, capabilities, and features.

a. The endoscopic instrument light is a portable unit capable of providing high intensity light for fiberoptic endoscopic instruments. The light incorporates dual multiport faceplates, dual illumination lamps, and dual intensity controls.

b. The endoscopic instrument light also incorporates two spare lamp cartridge assemblies for instant exchange with burned out lamps.

c. The two multiport faceplates accept fiberoptic cable assemblies from all major fiberoptic endoscope manufacturers.

d. The endoscopic instrument light operates from dual voltages and frequencies.

e. The two intensity controls allow for a wide range of lamp illuminations and permit the fans to cool the lamps in the "OFF" position.

f. Multiple endoscopic instruments (maximum of four) can be used simultaneously depending on fiberoptic cable end fittings.

1-12. Component descriptions.

a. Power switch/circuit breaker (fig 1-2). The spring-loaded rocker switch controls the electrical power to the endoscopic instrument light. The power switch in the "ON" position illuminates itself, provides electrical power to the intensity controls, and provides electrical power to the lamp cooling fans. The power switch also functions as a circuit breaker if an electrical malfunction occurs.

b. Intensity control (fig 1-3). Each of the two intensity controls is a seven-position rotary switch used to control lamp illumination from "OFF" to "HI" levels of illumination.

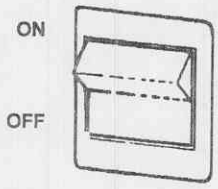

Figure 1-2. Power switch.

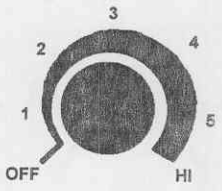

Figure 1-3. Intensity control.

c. Multiport faceplate (fig 1-4). Each of the two rotary multiport faceplates aligns the five types of fiberoptic cable connector ports with the endoscopic instrument light output.

NOTE

The endoscopic instrument light output is located at the 6 o'clock position of the multiport faceplate.

d. "REPLACE SPARE LAMP" indicator (fig 1-5). Each of the two amber indicators is used to indicate that a spare lamp is missing or defective.

e. Lamp cartridge assembly (fig 1-6). Each of the two active lamp cartridge assemblies is used to provide a source of light for transmission through fiberoptic cables to an endoscopic instrument. Two spare lamp cartridge assemblies are incorporated.

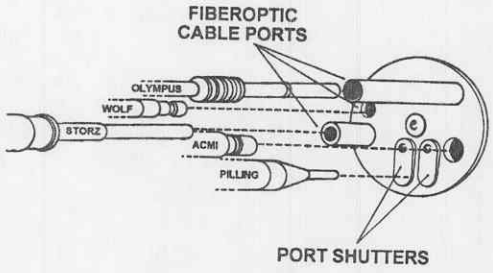

Figure 1-4. Multiport faceplate.

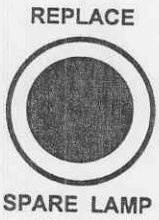

Figure 1-5. REPLACE SPARE LAMP indicator.

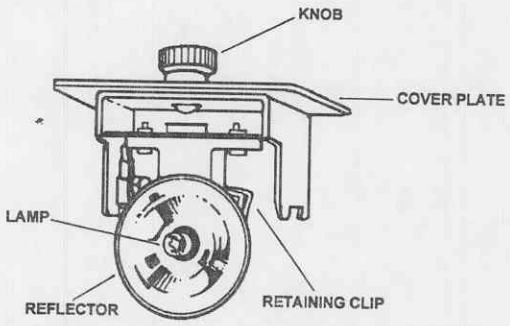

Figure 1-6. Lamp cartridge assembly.

NOTE

No accessories are provided with the endoscopic instrument light.

1-13. Tabulated data, decals, and data plates.

The tabulated data provides miscellaneous characteristics, specifications, and other information for the endoscopic instrument light.

a. Miscellaneous characteristics and specifications. Table 1-2 provides a broad range of miscellaneous characteristics and specifications to include operating voltages, dimensions, and weights.

Table 1-2. Characteristics and specifications.

Dimensions	
Height	7.625 in (19.4 cm)
Width	12.625 in (32.1 cm)
Depth	12.25 in (31.1 cm)
Weight	21 lb (9.5 kg)
Power cord length	12 ft (3.7 m)
Electrical requirements	
Voltage	120 VAC or 240 VAC
Frequency	50/60 Hz
Watts	420
Rated lamp life	25 hrs @ full intensity

b. Identification, instruction, and warning plates, decals, or markings.

(1) The endoscopic instrument light manufacturer military data plate (located on the back of the endoscopic instrument light) is depicted in figure 1-7.

(2) The manufacturer civilian data plate (located on the back of the endoscopic instrument light) is depicted in figure 1-8.

NSN: 6515-01-153-9649
DESC: Light, Endoscopic Instrument,
Fiber Optic.
120/240 Volt, 50/60 HZ
CONTRACT NO. DLA 120-87-C-8513
MFG. DATE: XXXX
FSCM: 47258
PILLING
FORT WASHINGTON, PA 19034

Figure 1-7. Manufacturer military data plate.

LISTED 13B1
FIBER OPTIC
ILLUMINATOR
CATALOG NO. 52-1201
INPUT VOLTS: 120/60 HZ
INPUT CURRENT: 3A
SERIAL NO: _____
PILLING
420 DELAWARE DRIVE
FORT WASHINGTON, PA 19034
MADE IN U.S.A.

Figure 1-8. Manufacturer civilian data plate.

(3) Imprinting providing hazard information (located on each side of the endoscopic instrument light) is depicted in figure 1-9.

CAUTION:	ELECTRICAL SHOCK HAZARD. DO NOT REMOVE COVER. REFER TO QUALIFIED SERVICE PERSONNEL.
DANGER:	EXPLOSION HAZARD. DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS.
	RISK CLASS 2G STD 22.2 NO. 125. AFTER USE OF EQUIPMENT, RUN FAN FOR 5 MINUTES TO COOL LAMP.
	THIS EQUIPMENT TO BE USED BY QUALIFIED PERSONNEL ONLY.

Figure 1-9. Hazard information.

(4) Imprinting (located on each side of the endoscopic instrument light) providing information about the power switch and lamp failure procedures is depicted in figure 1-10.

THIS UNIT IS EQUIPPED WITH A POWER SWITCH/CIRCUIT BREAKER FOR PROTECTION AGAINST ELECTRICAL HAZARD.
IN THE EVENT OF LAMP FAILURE, REPLACE CARTRIDGE WITH THE EMERGENCY SPARE CARTRIDGE, REPLACE THE DEFECTIVE LAMP WITH A TYPE DNF, PILLING CATALOG NO. 52-1118.

Figure 1-10. Operating information.

(5) A cardboard tag (fastened to the electrical power cable assembly) providing electrical ground information is depicted in figure 1-11.

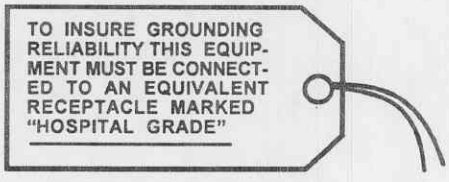

Figure 1-11. Cardboard instruction tag.

1-14. Model differences.

Model differences are not applicable since this manual covers a single model.

NOTE

The endoscopic instrument light model number (52-1201) and the manufacturer manual imply that the equipment is only for use on 120 VAC. Conversion procedures for 240 VAC use are provided in chapter 3, section VIII.

1-15. Safety, care, and handling.

a. Observe each WARNING, CAUTION, and NOTE in this manual.

b. Avoid looking into the open fiberoptic cable port when the endoscopic instrument light is turned on.

c. Do not use the endoscopic instrument light below the 5-foot level in the presence of flammable anesthetics.

d. Avoid long exposure of tissue to a bare fiberoptic cable end during use.

e. Connect the endoscopic instrument light only to grounded, hospital-grade electrical power receptacles.

f. Cool the endoscopic instrument light after use by letting the fans operate for approximately 5 minutes with the lamp(s) turned off.

g. Do not allow the air inlet vents (in the bottom of the case) or the fan exhaust vents (in the rear panel of the case) to become obstructed during use.

Section III. PRINCIPLES OF OPERATION

1-16. Theory of operation.

a. The endoscopic instrument light converts electrical energy to heat, light, and mechanical movement. It provides a source of light for transmission through fiberoptic cables to an endoscopic instrument for illumination of an internal patient site. The endoscopic instrument light provides for the minimum transmission of heat (infrared energy) and the maximum delivery of light.

b. The radiant energy from a tungsten filament lamp, operating on a halogen cycle, is directed to an integral ellipsoidal reflector with a dichroic coating. The reflected beam, directed at the output port, contains almost all of the light from the lamp. Most of the generated heat passes through the back of the reflector and is dissipated with the airflow of the exhaust fan.

c. An internal transformer allows the input voltage to vary from 16 VAC to 21 VAC for operation of the lamp(s). A lower lamp voltage will permit a smaller lamp filament and precise optical design which increases lamp efficiency.

CHAPTER 2

OPERATING INFORMATION AND INSTRUCTIONS

Section I. PREPARATION FOR OPERATION

2-1. Scope.

This manual is primarily intended to provide information, instructions, and procedures for the maintenance of the endoscopic instrument light. The operating information and instructions, while valid, do not provide sufficient information for use of the endoscopic instrument light. Only qualified medical personnel are trained in specific endoscopic instrument light techniques and procedures.

2-2. Assembly and interconnections.

a. Assembly. No assembly is required prior to operating the endoscopic instrument light.

b. Interconnections. The Bronchoscope, Flexible, Fiberoptic, Models F3 and F3G, NSN 6515-01-285-4617, (TM 8-6515-005-24&P) or other fiberoptic endoscopic instruments require connection to the endoscopic instrument light for a source of high intensity light for operation.

NOTE

The endoscopic instrument light can accommodate the five most common fiberoptic cables used in medical applications and up to four fiberoptic endoscopic instruments simultaneously.

Section II. OPERATING INFORMATION

2-3. Controls and indicators (fig 2-1).

a. Power switch. The red, self-illuminating rocker switch provides electrical power to the components of the endoscopic instrument light. When the upper section is depressed, the power switch is illuminated by an internal lamp. The power switch also functions as a circuit breaker when an electrical malfunction occurs.

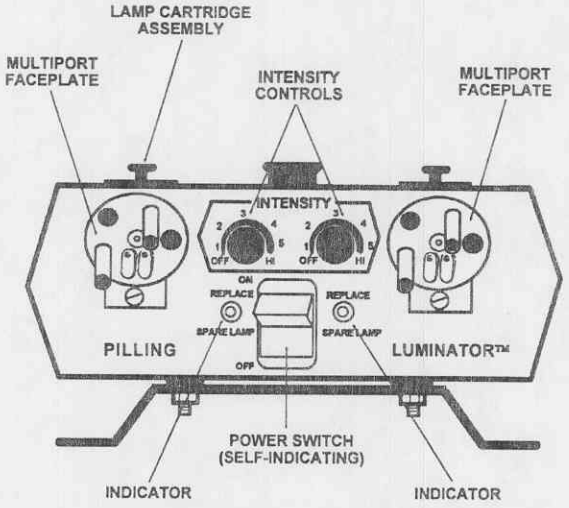

Figure 2-1. Controls and indicators.

b. Intensity controls. The two, seven-position rotary intensity controls function to vary the intensity of illumination from the multiport faceplates to the endoscopic instrument. The control is labeled for "OFF," "1," "2," "3," "4," "5," and "HI" positions. The intensity control on the left side provides variable light intensity to the multiport faceplate on the left side and the intensity control on the right side provides variable light intensity to the multiport faceplate on the right side.

CAUTION

The intensity controls should be turned to the "OFF" position when not in use to prolong lamp life.

c. "REPLACE SPARE LAMP" indicators. The two amber indicators illuminate when the endoscopic instrument light is turned on and the applicable lamp in the spare lamp cartridge assembly (fig 2-2) is missing, burned out, or broken. The spare lamp cartridge assemblies are located on top of the endoscopic instrument light behind the active lamp cartridge assemblies.

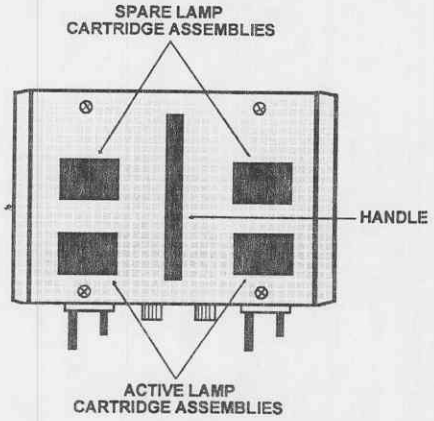

Figure 2-2. Lamp cartridge assemblies locations.

d. Multiport faceplates. The two rotary multiport faceplates rotate in a clockwise or counterclockwise direction to align one of the fiberoptic cable ports to approximately a 6 o'clock position. This position enables insertion of a corresponding fiberoptic cable and transmission of high intensity light to an endoscopic instrument.

Section III. OPERATING INSTRUCTIONS

2-4. Start-up and shut-down procedures.

a. Place the endoscopic instrument light in its operating position.

b. Rotate both intensity controls to their "OFF" positions.

c. Depress the lower section of the power switch to its "OFF" position.

d. Connect the power cable assembly to a 120-volt electrical receptacle.

e. Depress the upper section of the power switch to its "ON" position.

f. Verify that the power switch illuminates.

g. Check to ensure that both "REPLACE SPARE LAMP" indicators remain unlit. Refer to repair procedures contained in chapter 3, section VII if one or both lamps illuminate.

h. Turn both intensity controls to their "1" position.

i. Verify that both fiberoptic cable ports illuminate. Refer to repair procedures contained in chapter 3, section VII if one or both fiberoptic cable ports do not illuminate.

j. Turn the intensity controls to their "OFF" positions.

k. Depress the lower section of the power switch to its "OFF" position.

NOTE

After patient use, allow the cooling fans to operate approximately 5 minutes before depressing the power switch to its "OFF" position.

2-5. Fiberoptic cable connections.

a. Prepare the fiberoptic endoscopic instrument for use by following its TM or applicable manufacturer's manual.

b. Rotate either multiport faceplate so that the desired port (Pilling, ACMI, Olympus, Wolf, or Storz) is placed at approximately the 6 o'clock position.

NOTE

Each multiport faceplate can accommodate two Pilling cables, a Storz cable, a Wolf cable, an Olympus cable, or a Machida cable without photocontrol contact pins, or an ACMI fiberoptic cable.

c. Insert the fiberoptic cable connector into the port until it is properly seated.

NOTE

A "click" can be heard when an Olympus cable is properly seated.

Section IV. OPERATION OF AUXILIARY EQUIPMENT

2-6. Associated support items of equipment.

a. The endoscopic instrument light provides a source of high intensity illumination to fiberoptic endoscopic instruments such as the Bronchoscope, Flexible, Fiberoptic (TM 8-6515-005-24&P).

b. The endoscopic instrument light requires no associated support items of equipment other than an electrical power generator which is shared with multiple items of surgical equipment.

2-7. Associated materiel.

No associated materiel is applicable.

Section V. CLEANING, DISINFECTING, AND STERILIZING PROCEDURES

2-8. General.

a. The endoscopic instrument light requires periodic cleaning of the control panel, case, and air vents. It may also be necessary to remove contamination, disinfect, or sterilize the endoscopic instrument light.

b. Ensure that the intensity controls are turned to the "OFF" positions and the power switch is depressed to its "OFF" position.

2-9. Cleaning.

a. Fan vents. Brush or vacuum any accumulation of dust from the fan vents located on the rear panel and bottom of the endoscopic instrument light.

CAUTION

Notify your Medical Equipment Repairer if dust has accumulated inside the endoscopic instrument light.

b. External surfaces. Wipe all operational controls and external surfaces with a soft cloth dampened in a solution of warm water and liquid detergent.

CAUTION

Abrasive cleansers, scrubbing pads, and organic solvents will damage the imprinting for the operating controls and should never be used.

2-10. Disinfecting.

a. Use personal protective equipment (including goggles, mask, gloves, and gown or other suitable clothing) prior to removing contamination and disinfecting the endoscopic instrument light.

NOTE

Personal protective equipment is not required for periodic disinfecting in accordance with standard unit procedures.

b. Wipe all operational controls and external surfaces with a sterile 4-inch by 4-inch gauze pad dampened with disinfectant solution.

2-11. Sterilizing.

Sterilization of the endoscopic instrument light is not required unless it was contaminated by patient fluids during use. If sterilization should ever be needed, ethylene oxide (EtO) will be used. Procedures are as follows:

a. Clean the endoscopic instrument light by following the procedures in paragraph 2-9.

b. Sterilize the endoscopic instrument light by following the instructions from the EtO sterilizer manufacturer.

c. Aerate the endoscopic instrument light.

Section VI. OPERATION UNDER UNUSUAL CONDITIONS

2-12. General.

The endoscopic instrument light is a portable device designed to operate only under controlled conditions within a field medical treatment facility. Operation under unusual conditions such as wet environments is not possible. Operation in conditions such as in a dusty environment may require a more frequent PMCS interval.

2-13. Operating temperature/humidity ranges.

a. The endoscopic instrument light should not be operated when the temperature is outside the range of -34°C (-30°F) to 66°C (150°F).

b. The endoscopic instrument light should not be operated when the humidity is greater than 90% (noncondensing).

CHAPTER 3

UNIT LEVEL MAINTENANCE

Section I. GENERAL INFORMATION

3-1. Overview.

a. Unit level maintenance. This level of maintenance is the responsibility of and performed by a using unit on its assigned equipment. Responsibilities are stratified as follows:

(1) *Operator maintenance.* This segment of unit level maintenance is performed by operator/user personnel and consists of equipment operational functions; routine services like cleaning, dusting, washing, checking for frayed cables, and stowing items not in use; and checking for loose hardware, replacing operator accessories, and replacing operator repair parts. Replacing operator parts will not require extensive disassembly or assembly of the end item, critical adjustments after replacement, or the extensive use of tools.

(2) *Specialist maintenance.* This segment of unit level maintenance is performed only by trained Medical Equipment Repairers. The functions and services include—

(a) Scheduling and performing PMCS, electrical safety inspections and tests, and calibration/verification/certification (CVC) services.

(b) Performing unscheduled maintenance functions with emphasis on replacing assemblies, modules, and PCBs, when available.

(c) Operating a repair parts program to include Class VIII repair parts as well as other commodity class repair parts used on medical equipment.

(d) Maintaining a library of technical manuals (TMs), manufacturers' literature, repair parts information, and related materials.

(e) Conducting inspections on new or transferred equipment.

(f) Establishing administrative procedures for the control and administration of maintenance services in accordance with TB 38-750-2.

(g) Notifying support maintenance battalions of requirements and/or evacuating unserviceable equipment, assemblies, or modules.

b. Maintenance functions. Maintenance functions, both preventive and corrective, which are beyond the scope of the operator/user are assigned to unit level Maintenance Equipment Repairer personnel. These personnel will perform the majority of maintenance required for the equipment.

3-2. Tools and test equipment.

Common tools and test equipment required for unit level maintenance of the equipment are listed in appendix B, section III of this manual. Refer to your unit's modified table of organization and equipment (MTOE) for authorized items.

3-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III of this manual.

3-4. Expendable supplies.

Expendable and durable supplies and materials required for maintenance of the equipment are listed in appendix D, section II of this manual.

3-5. Repair parts.

Repair parts required for unit level maintenance are listed in appendix E, section II of this manual.

3-6. Special tools.

Special tools required for unit level maintenance of the equipment are listed in appendix E, section III of this manual.

3-7. Additional authorization list items.

An additional item required for storing and shipping the endoscopic instrument light is identified in appendix F, section II of this manual.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

3-8. Unpacking the endoscopic instrument light.

a. Open the commercial cardboard shipping carton or the reusable military case.

b. Remove the styrofoam insert. Set it aside.

c. Remove the endoscopic instrument light by grasping its handle and pulling upward.

d. Remove the two instruction manuals. Set them aside.

e. Remove the plastic bag from the endoscopic instrument light.

f. Replace the plastic bag and upper styrofoam insert back into the carton or case.

g. Inspect the endoscopic instrument light for damage.

h. Follow start-up and shut-down procedures contained in paragraph 2-4.

Section III. LUBRICATION INSTRUCTIONS

3-9. General.

No lubrication of the endoscopic instrument light is required.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-10. General.

a. The endoscopic instrument light must be inspected and serviced systematically to ensure that it is ready for operation at all times. Inspection will allow defects to be discovered and corrected before they result in serious damage or failure.

b. Table 3-1 contains a list of items to be performed by unit level operator/user personnel. This PMCS table is also referred to as "-10 PMCS" requirements. Preventive maintenance by operator/user personnel is not limited to performing the checks and services in table 3-1. There are things operator/user personnel should do any time they need to be done, such as checking general cleanliness, observing for improper operational indicators, and maintaining the proper quantities of accessories.

c. Table 3-2 contains a list of items to be performed by unit level Medical Equipment Repairers. This PMCS table is also referred to as "-20 PMCS" requirements.

d. Some items to be inspected will be listed in both table 3-1 and table 3-2 to stress their importance, to provide a quality control check on multiple operator/user personnel, and to identify more comprehensive procedures to be accomplished by unit level Medical Equipment Repairers.

e. The following is a list of both PMCS table column headings with a description of the information found in each column:

(1) *Item No.* This column shows the sequence in which to do the PMCS, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

(2) *Interval.* This column shows when each PMCS item is to be serviced: **B** - Before Operation, **D** - During Operation, **A** - After Operation, **Q** - Quarterly, and **S** - Semiannually. **B, D,** and **A** should be performed with daily use of the equipment.

(3) *Item to be Inspected and Procedure.* This column identifies the general area or specific part to be checked or serviced.

(4) *Equipment is not Ready/Available If:.* This column lists conditions that make the equipment unavailable or unusable.

Table 3-1. Operator preventive maintenance checks and services.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
1				X		**Power cable assembly.** Check for a frayed electrical cable or a damaged connector.	Damaged or broken power cable assembly prevents operation.
2						**Endoscopic instrument light.**	
	X			X		*a.* Ensure that the multiport faceplates rotate smoothly in either direction.	Defective operating controls prevent operation with specific fiberoptic cable ports.
	X			X		*b.* Intensity controls do not turn the lamps off or do not vary the intensity of the illumination.	Defective operating controls prevent proper operation.
	X		X			*c.* Verify that at least one "REPLACE SPARE LAMP" indicator is lit.	More than one spare lamp cartridge assembly is unserviceable.
	X	X	X	X		*d.* Ensure that an airflow can be detected from the rear exhaust fan vents.	The cooling fans are obstructed or inoperable.

Table 3-2. Repairer preventive maintenance checks and services.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
1					X	**Power cable assembly.**	
						a. Inspect the power cable assembly for cuts, deterioration, fraying, or other physical damage.	The condition of the power cable assembly prevents operation or causes a safety hazard.
						b. Verify that electrical safety tests have been completed as scheduled.	Electrical deficiencies preclude hazard-free operation.
2					X	**Endoscopic instrument light.** Inspect the endoscopic instrument light for proper operation by following the procedures in paragraphs 2-4 and 2-5.	Deficiencies prevent proper operation of the endoscopic instrument light.
3					X	**"REPLACE SPARE LAMP" indicators.** Verify that at least one "REPLACE SPARE LAMP" indicator is lit.	More than one spare lamp cartridge assembly is unserviceable.
4					X	**Fans.** Ensure that the two cooling fans are operable.	Either fan is inoperable or normal airflow from the exhaust vent is low.
5					X	**Lamp cartridge assemblies.** Verify that all four lamp cartridge assemblies are installed and properly seated.	Missing, damaged, or lamp cartridge assemblies prevent proper operation.

3-11. Reporting deficiencies.

Operator personnel will report problems with the endoscopic instrument light discovered during their "–10 PMCS" that they are unable to correct. Refer to TB 38-750-2 and report the deficiency using the proper forms. Consult with your unit Medical Equipment Repairer if you need assistance.

Section V. OPERATIONAL TESTING

3-12. General.

Operational testing beyond the operating instructions contained in paragraphs 2-4 and 2-5 is not required.

Section VI. TROUBLESHOOTING

3-13. General.

a. Troubleshooting information for endoscopic instrument light operator/user personnel and for Medical Equipment Repairer personnel is provided in this section. Corrective actions beyond the capability or authority of operator/user personnel will be indicated by the phrase "Notify your unit Medical Equipment Repairer."

b. This manual cannot list all possible malfunctions. If a malfunction is either not listed or is not determined by routine diagnostic procedures, notify your appropriate maintenance support unit.

3-14. Operator/user troubleshooting.

Operator/user troubleshooting procedures are provided in table 3-3. Each symptom is followed by possible causes and corrective actions.

Table 3-3. Operator/user troubleshooting.

SYMPTOM POSSIBLE CAUSE	CORRECTIVE MAINTENANCE
1. POWER SWITCH INDICATOR DOES NOT ILLUMINATE.	
Power switch not in "ON" position.	Depress power switch to the "ON" position.
Power cable assembly not connected to a 120-volt source of electrical power.	Connect the endoscopic instrument light to a 120-volt electrical receptacle.
Defective power switch or electrical component.	Notify your unit Medical Equipment Repairer.
2. LOW OR NO AIRFLOW FROM EXHAUST VENT.	
Airflow restricted.	Inspect air inlet vent or exhaust vent for obstructions or dust/dirt restricting vents. Remove obstruction or clean vents.
Fan defective or inoperable.	Notify your unit Medical Equipment Repairer.
3. LAMP INTENSITY NOT VARIABLE.	
Defective intensity control.	Notify your unit Medical Equipment Repairer.
4. MULTIPORT FACEPLATE INOPERABLE.	
Defective multiport faceplate.	Notify your unit Medical Equipment Repairer.
5. "REPLACE SPARE LAMP" INDICATOR(S) ILLUMINATED.	
Missing or broken lamp cartridge assembly.	Notify your unit Medical Equipment Repairer.

Table 3-3. Operator/user troubleshooting - continued.

Missing, broken, or burned out lamp(s).	Replace lamp cartridge(s).
Internal electrical problem.	Notify your unit Medical Equipment Repairer.

3-15. Medical Equipment Repairer troubleshooting.

a. Medical Equipment Repairer troubleshooting procedures are provided in table 3-4. Each symptom is followed by possible causes and corrective actions.

Table 3-4. Medical equipment repairer troubleshooting.

SYMPTOM POSSIBLE CAUSE	CORRECTIVE MAINTENANCE
1. NO ELECTRICAL POWER TO UNIT.	
Faulty 120-volt electrical receptacle.	Notify appropriate power distribution personnel or correct the problem in an ISO shelter.
Defective power cable assembly.	Replace the defective connector or the entire power cable assembly.
Defective power switch.	Replace the power switch.
Defective power transformer or circuitry.	Replace power transformer or repair defective circuitry.
2. LOW OR NO AIRFLOW FROM EXHAUST VENT.	
Airflow restricted.	Remove obstruction or clean internal fan blade(s), air passages, or vents.
3. INTENSITY CONTROL(S) INOPERABLE.	
Loose knob(s).	Tighten knobs.
Defective intensity control(s).	Repair or replace defective intensity control.
Defective power transformer or circuitry.	Replace transformer or repair circuitry.
4. MULTIPORT FACEPLATE INOPERABLE.	
Defective multiport faceplate.	Replace faceplate.
5. "REPLACE SPARE LAMP" INDICATOR(S) ILLUMINATED.	
Missing or broken lamp cartridge assembly.	Replace lamp cartridge assembly.

b. An electrical wiring diagram for troubleshooting is provided in figure 3-1.

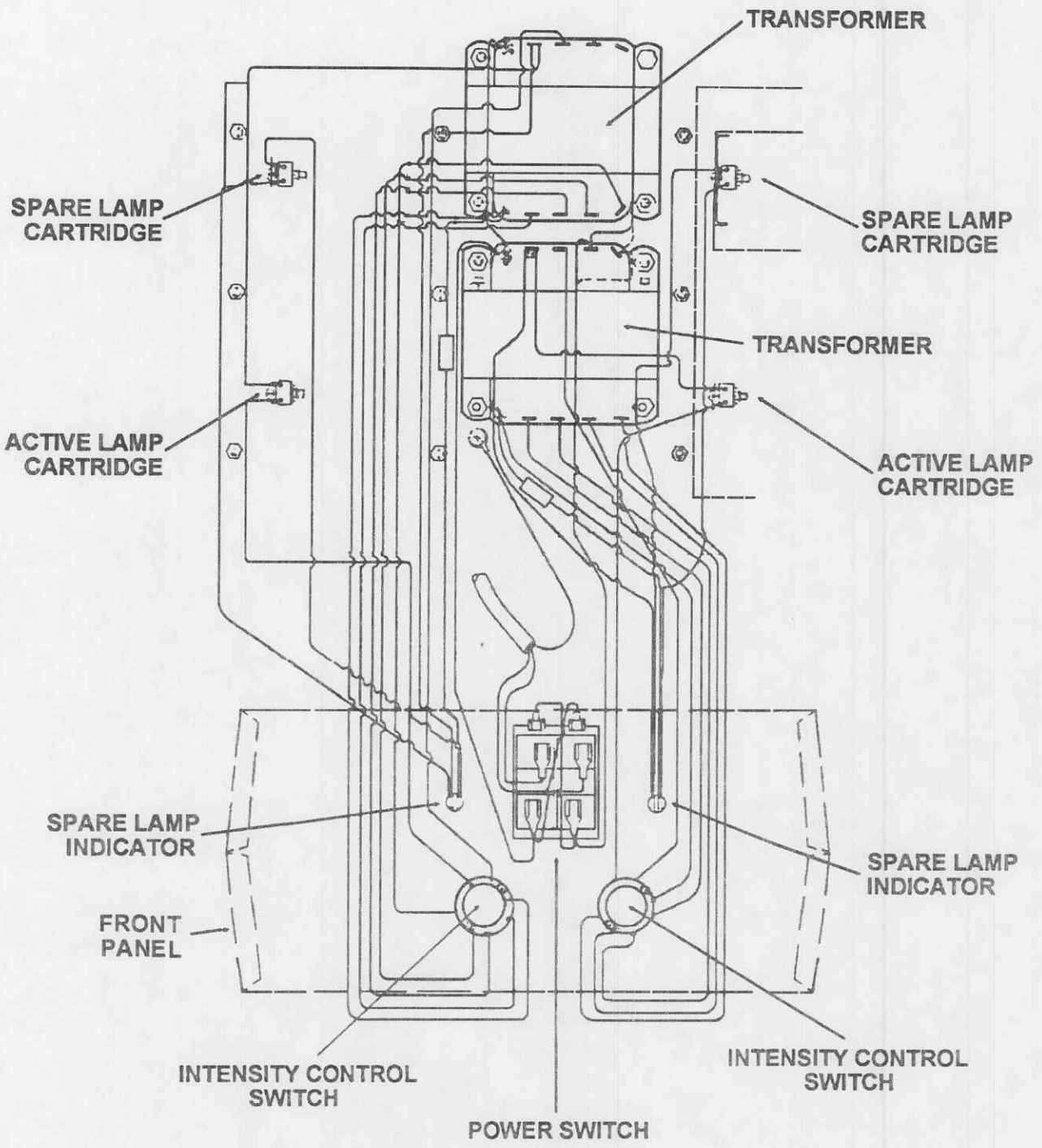

Figure 3-1. Wiring diagram.

c. Wiring connections to transformer #1 and transformer #2 are identical. Figure 3-2 is provided to assist in troubleshooting.

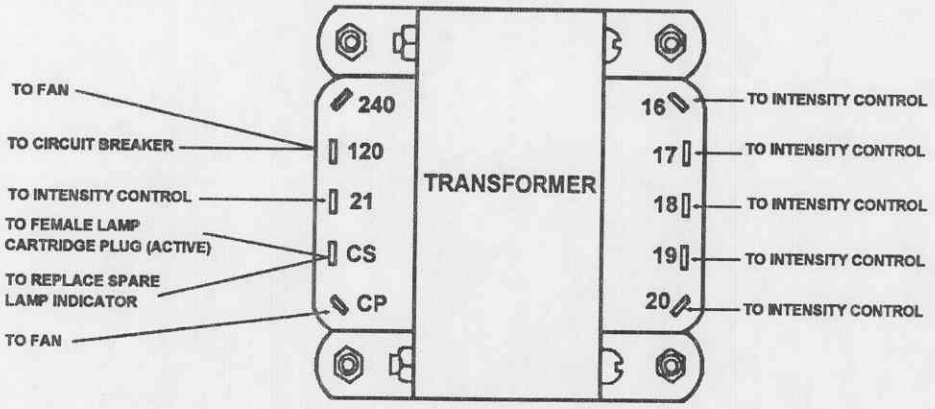

Figure 3-2. Power transformer connections.

Section VII. REPAIR PROCEDURES

3-16. General.

a. Procedures for disassembly, repair or replacement of components, services, and reassembly are provided in this section of the manual.

b. Repair procedures are continuous from the first disassembly step to the final reassembly step.

WARNING

Hazardous voltages are accessible when the upper case is removed for testing and/or repairs.

3-17. Lamp cartridge assembly exchange.

NOTE

During a patient procedure, replace a burned out lamp by exchanging the lamp cartridge assembly.

a. Removal.

(1) Rotate the intensity control(s) to the "OFF" position(s).

(2) Depress the power switch to the "OFF" position.

NOTE

Both sections of the endoscopic instrument light may be in use and only the applicable intensity control can be placed in the "OFF" position.

(3) Grasp the knob on the burned out active lamp cartridge assembly (fig 3-3) and pull it upward to remove it from the top of the endoscopic instrument light. Set the lamp cartridge assembly aside (fig 3-4).

WARNING

DO NOT TOUCH THE LAMP! It can be extremely hot and cause a severe burn.

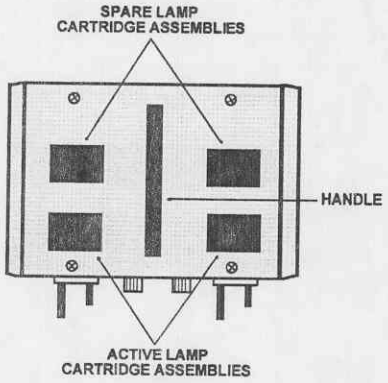

Figure 3-3. Lamp cartridge assemblies locations.

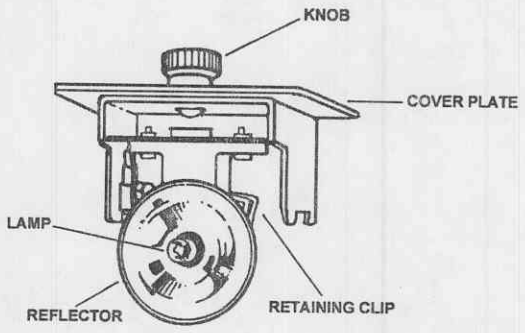

Figure 3-4. Lamp cartridge assembly.

(4) Grasp the knob of either spare lamp cartridge assembly and pull it upward to remove it from the top of the endoscopic instrument light.

b. Replacement.

(1) Insert the spare lamp cartridge assembly (removed in the preceding step) into the active lamp cartridge assembly position. Ensure that it is seated properly and its black metal cover plate is flush with the top of the case.

(2) Place the burned out lamp cartridge assembly, with the defective lamp, into the spare lamp cartridge assembly position.

NOTE

Either spare lamp cartridge assembly may be used providing that the other section of the endoscopic instrument light is not being used for another fiberoptic endoscopic instrument.

(3) Depress the power switch to the "ON" position.

NOTE

The applicable "REPLACE SPARE LAMP" indicator will be illuminated because the lamp in the spare lamp cartridge assembly is burned out.

3-18. Lamp replacement.

a. Disassembly.

(1) Turn the intensity control to the "OFF" position.

(2) Depress the power switch to the "OFF" position.

(3) Grasp the knob of the lamp cartridge assembly, with a defective lamp, and pull it upward to remove it from the endoscopic instrument light.

WARNING

Ensure that the lamp and lamp cartridge assembly are not too hot to touch.

(4) Position the lamp cartridge assembly in your left hand as illustrated in figure 3-5.

(5) Pull the retaining clip forward with the fingers of your right hand as illustrated in figure 3-6.

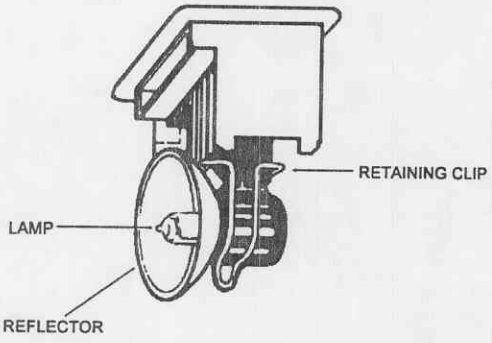

Figure 3-5. Positioning the lamp cartridge assembly.

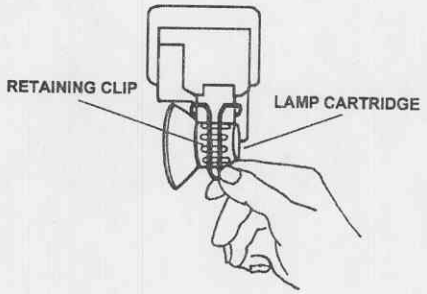

Figure 3-6. Opening/closing the retaining clip.

(6) Grasp the circular vented housing of the lamp cartridge and pull it outward to remove it from the assembly as illustrated in figure 3-7. Discard the lamp cartridge.

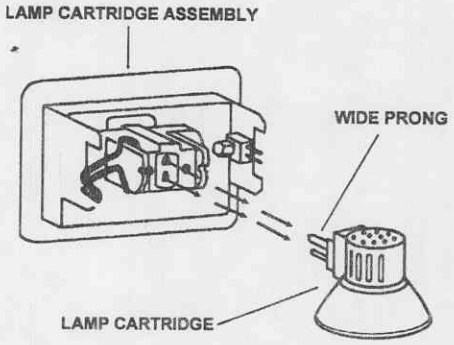

Figure 3-7. Removing the lamp cartridge.

b. Maintenance services.

(1) Acquire a replacement lamp cartridge from stock or requisition a replacement.

(2) Install a replacement lamp cartridge into the assembly by positioning the assembly and lamp cartridge as illustrated in figure 3-8 and pushing the lamp cartridge into the assembly.

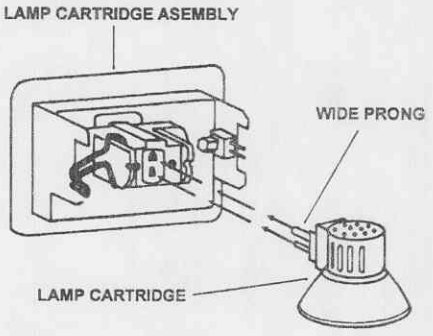

Figure 3-8. Installing the lamp cartridge.

c. Reassembly.

(1) Position the lamp cartridge assembly in your left hand as illustrated in figure 3-5 on the preceding page.

CAUTION

Do not touch the lamp or reflector with your hands to prevent damage from skin oil to the lamp or reflector.

(2) Push the retaining clip backward with the fingers of your right hand as illustrated in figure 3-6.

(3) Orient the lamp cartridge assembly as illustrated in figure 3-9 and insert it into the endoscopic instrument light.

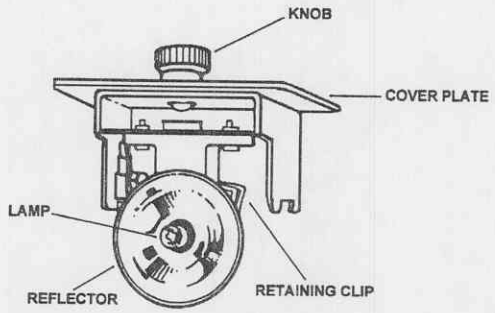

Figure 3-9. Lamp cartridge assembly.

(4) Depress the power switch to its "ON" position.

(5) Rotate the applicable intensity control to its "1" position to verify lamp operation.

(6) Turn the intensity control to its "OFF" position, then depress the power switch to its "OFF" position.

3-19. Electrical repairs.

a. Disassembly.

(1) Turn the intensity controls to their "OFF" positions.

(2) Depress the power switch to the "OFF" position.

(3) Remove the eight Phillips screws and washers from the top and sides of the upper case. Set them aside.

(4) Remove the four lamp cartridge assemblies by grasping each knob and then pulling each one upward. Set them aside.

(5) Remove the upper case. Set it aside.

(6) Access the internal assemblies or components by removing either the four Phillips screws and washers fastening the front panel or the rear panel. Set the Phillips screws and washers aside.

(7) Position the panel(s) to access each component as required.

CAUTION

Record or mark electrical wires/terminal connectors removed for access to components to ensure the correct replacement of electrical wires/terminal connectors.

b. Maintenance services.

(1) Test the component(s) suspected to be defective.

(2) Observe the component as installed.

(3) Remove the defective component.

(4) Acquire a replacement component and install it.

(5) Replace the electrical wires/terminal connectors.

c. Reassembly.

(1) Position the front or rear panel into place and reinstall the four Phillips screws and washers.

(2) Position the upper case into place.

(3) Reinstall the four lamp cartridge assemblies by grasping each knob and then pushing each lamp cartridge assembly into place. Ensure that the cover plate of each lamp cartridge assembly is flush with the top of the case.

(4) Reinstall the eight Phillips screws and washers into the top and sides of the upper case.

3-20. Multiport faceplate replacement.

a. Disassembly. The multiport faceplate is a sealed mechanical assembly which cannot be repaired. Remove the multiport faceplate by turning the slotted plastic knob counterclockwise until the multiport faceplate is free.

b. Maintenance service. Acquire a replacement multiport faceplate.

c. Reassembly. Position the multiport faceplate into place and fasten it by turning the slotted plastic knob until the multiport faceplate is tightly installed.

CAUTION

Do not excessively tighten the slotted plastic knob to prevent damage to the plastic threads.

Section VIII. VOLTAGE CONVERSION INSTRUCTIONS

3-21. General.

a. This section of the manual contains the procedures for changing the operating voltage of the endoscopic instrument light from 120 volts to 240 volts and from 240 volts to 120 volts.

b. The conversion requires substitution of the 120-volt power switch with a 240-volt power switch.

NOTE

The 240-volt power switch is not furnished with the endoscopic instrument light.

c. The conversion also requires the replacement of the power cable connector or power cable assembly and relabeling of the manufacturer data plate.

3-22. Conversion procedures (120 volts to 240 volts).

a. Turn the intensity controls and depress the power switch to their "OFF" positions.

b. Disconnect the power cable assembly from the electrical receptacle.

c. Remove the eight Phillips screws and washers from the top and sides of the upper case. Set them aside.

d. Remove the four lamp cartridge assemblies by grasping each knob and then pulling each one upward. Set them aside.

e. Remove the upper case. Set it aside.

f. Refer to figure 3-10 and locate the 120-volt and 240-volt terminals on each power transformer. Transfer the wires/terminals connectors from each 120-volt terminal to each 240-volt terminal.

g. Remove the four Phillips screws and washers from the sides and bottom of the lower case to unfasten the front panel.

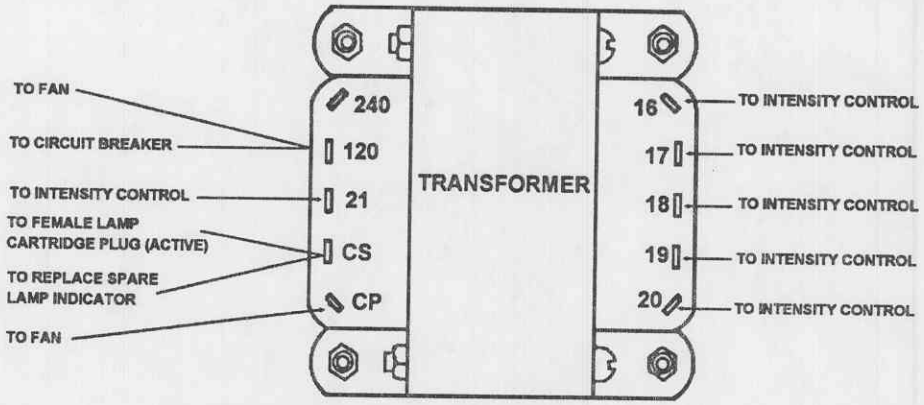

Figure 3-10. Power transformer connections.

h. Grasp the front panel and rotate it upward in an arc until the back of the power switch is exposed.

i. Draw a diagram of the electrical wire connections of the power switch.

j. Remove the wires.

k. Depress the black locking tab on either the bottom or top of the power switch to release it from its mounting holder.

l. Remove the power switch. Set it aside for future 120-volt use.

m. Install the 240-volt power switch and ensure that it locks in place.

n. Reinstall the electrical wires onto the 240-volt power switch and verify the correct connections by checking the diagram prepared in procedure *i* above.

o. Grasp the front panel and rotate it downward in an arc to reposition it for reassembly.

p. Reinstall the four Phillips screws and washers into the sides and bottom of the lower case to refasten the front panel.

q. Remove either the molded connector from the power cable assembly or open the back panel by removing the four Phillips screws and washers and then removing the complete power cable assembly.

r. Install either a 240-volt connector on the existing power cable assembly or install a 240-volt power cable assembly and then close the back panel by replacing the four Phillips screws and washers.

s. Reposition the upper case into place.

t. Reinstall the four lamp cartridge assemblies by grasping each knob and then pushing each lamp cartridge assembly into place. Ensure that the black cover plate of each lamp cartridge assembly is flush with the top of the case.

u. Reinstall the eight Phillips screws and washers into the top and sides of the upper case.

v. Mark the manufacturer data plate on the back panel to indicate conversion to 240-volt use.

w. Test the endoscopic instrument light by following the start-up and shut-down procedures contained in paragraph 2-4.

3-23. Conversion procedures (240 volts to 120 volts).

a. Turn the intensity controls and depress the power switch to their "OFF" positions.

b. Disconnect the power cable assembly from the electrical receptacle.

c. Remove the eight Phillips screws and washers from the top and sides of the upper case. Set them aside.

d. Remove the four lamp cartridge assemblies by grasping each knob and then pulling each one upward. Set them aside.

e. Remove the upper case. Set it aside.

f. Refer to figure 3-11 and locate the 120-volt and 240-volt terminals on each power transformer. Transfer the wires/terminal connectors from each 240-volt terminal to each 120-volt terminal.

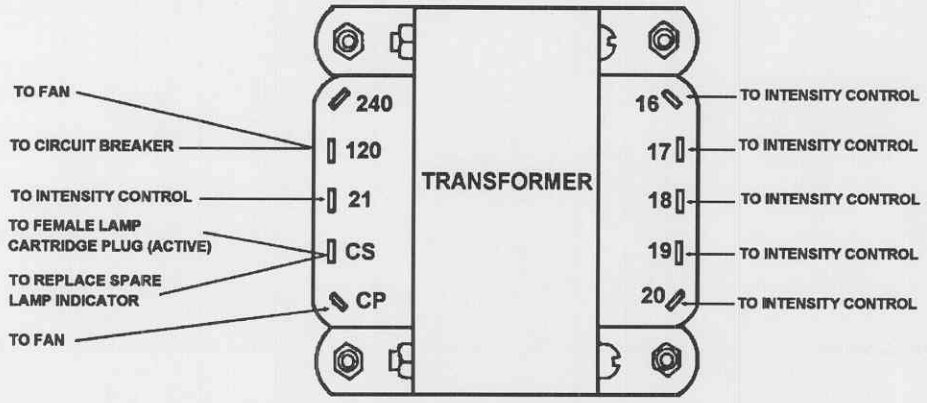

Figure 3-11. Power transformer connections.

g. Remove the four Phillips screws and washers from the sides and bottom of the lower case to unfasten the front panel.

h. Grasp the front panel and rotate it upward in an arc until the back of the power switch is exposed.

i. Draw a diagram of the electrical wire connections of the power switch.

j. Remove the wires.

k. Depress the black locking tab on either the bottom or top of the power switch to release it from its mounting holder.

l. Remove the power switch. Set it aside for future 240-volt use.

m. Install the 120-volt power switch and ensure that it locks in place.

n. Reinstall the electrical wires onto the 120-volt power switch and verify the correct connections by checking the diagram prepared in procedure *i* above.

o. Grasp the front panel and rotate it downward in an arc to reposition it for reassembly.

p. Reinstall the four Phillips screws and washers into the sides and bottom of the lower case to refasten the front panel.

q. Remove either the molded connector from the power cable assembly or open the back panel by removing the four Phillips screws and washers and then removing the complete power cable assembly.

r. Install either a 120-volt connector on the existing power cable assembly or install a 120-volt power cable assembly and then close the back panel by replacing the four Phillips screws and washers.

s. Reposition the upper case into place.

t. Reinstall the four lamp cartridge assemblies by grasping each knob and then pushing each lamp cartridge assembly into place. Ensure that the black cover of each lamp cartridge assembly is flush with the top of the case.

u. Reinstall the eight Phillips screws and washers into the top and sides of the upper case.

v. Remove the temporary marking indicating 240-volt use on the manufacturer data plate located on the back panel.

w. Test the endoscopic instrument light by following the start-up and shut-down procedures contained in paragraph 2-4.

Section IX. STORING AND SHIPPING PROCEDURES

3-24. General.

This section of the manual contains the procedures for preparing the endoscopic instrument light for storing or shipping.

3-25. Preparation for storing.

a. Turn the intensity control(s) to their "OFF" position.

b. Depress the power switch to its "OFF" position.

c. Disconnect any endoscopic instrument light carrier cable from the endoscopic instrument light in accordance with the procedures in its TM or manufacturer's manual.

d. Disconnect the power cable assembly from the electrical receptacle and wrap it around the leg brackets.

e. Clean the endoscopic instrument light by following the procedures in paragraph 2-9.

f. Place the endoscopic instrument light into its reusable container.

3-26. Preparation for shipping.

a. The endoscopic instrument light packed in its reusable container is suitable for shipping.

b. Notify your unit transportation point for assistance, if necessary.

CHAPTER 4

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

Section I. GENERAL INFORMATION

4-1. Overview.

This chapter provides for maintenance that is beyond the capability, capacity, and authorization for unit level maintenance personnel. The procedures in this chapter will not be attempted at the unit level.

4-2. Tools and test equipment.

Common tools and test equipment required for support maintenance of the equipment are listed in appendix B, section III. Refer to your unit's MTOE or installation table of distribution and allowances (TDA) for authorized items.

4-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III.

4-4. Expendable supplies.

Expendable and durable supplies and materials for support maintenance are listed in appendix D, section II.

4-5. Repair parts.

Repair parts required for support maintenance are listed in appendix E, section II.

4-6. Special tools.

Special tools required for support maintenance are listed in appendix E, section III.

4-7. Additional authorization list items.

An additional item required for storing and shipping the endoscopic instrument light is identified in appendix F, section II.

Section II. MAINTENANCE PROCEDURES

4-8. General.

a. There are no specific troubleshooting procedures for DS/GS levels of maintenance.

b. Repair procedures, except those identified in chapter 3, section VI, for the endoscopic instrument light are beyond DS and GS levels of maintenance.

APPENDIX A

REFERENCES

A-1. Army regulations.

AR 40-61	Medical Logistics Policies and Procedures
AR 710-2	Supply Policy Below the Wholesale Level
AR 725-50	Requisitioning, Receipt, and Issue System

A-2. Technical manuals.

TM-DPSC-6500-RPL	Medical Materiel: Medical Repair Parts Reference List
TM 8-6515-005-24&P	Bronchoscope, Flexible, Fiberoptic

A-3. Technical bulletins.

TB MED 7	Maintenance Expenditure Limits for Medical Materiel
TB 8-6500-MPL	Mandatory Parts List for Medical Equipment
TB 38-750-2	Maintenance Management Procedures for Medical Equipment
TB 740-10/DLAM 4155.5/AFR 67-43	Quality Control, Depot Storage Standards, Appendix M, Medical Supplies

A-4. Field manual.

FM 21-11	First Aid for Soldiers

A-5. Supply bulletin.

SB 8-75-( )-series	Army Medical Department Supply Information

A-6. Other publications.

(These publications may be obtained from Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001.)

Owner's Manual, Pilling Luminator Fiber Optic Light Source, Dual and Single Models, 420 Delaware Drive, P.O. Box 7514, Fort Washington, PA 19034.

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance levels.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance function.

B-2. Explanation of columns in section II.

a. Group Number, Column 1. The assembly group number (Group No.) column is a numerical group assigned to each assembly. The applicable assembly groups are listed in the maintenance allocation chart (MAC) in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Assembly Group, Column 2. This column contains a brief description of the components of each assembly group.

c. Maintenance Functions, Column 3. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance level authorized to perform these functions. The symbol designations for the various maintenance levels are as follows:

C - Operator or crew

O - Unit maintenance

F - Direct support maintenance

H - General support maintenance

D - Depot maintenance

The maintenance functions are defined as follows:

A - Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B - Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C - Service. To clean, to preserve, to charge, and to add lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

D - Adjust. To rectify to the extent necessary to bring into proper operating range.

E - Align. To adjust specified variable elements of an item to bring it to optimum performance.

F - Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

G - Install. To set for use in an operational environment such as tents or International Standards Organization shelters.

H - Replace. To replace unserviceable items with serviceable like items.

I - Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage to a specific failure. Repair may be accomplished at each level of maintenance.

J - Overhaul. Normally the highest degree of maintenance performed by the Army in order to minimize time work in process consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by a maintenance standard in technical publications for each item of equipment. Overhaul normally does not return an item to like new condition.

K - Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance level.

d. Tools and Equipment, Column 4. This column is provided for referencing by code, the tools and test equipment (sec III) required to perform the maintenance functions.

e. Remarks, Column 5. This column is provided for referencing by code, the remarks (sec IV) pertinent to the maintenance functions.

B-3. Explanation of columns in section III.

a. Reference Code, Column 1. This column correlates to section II, column 4.

b. Maintenance Level, Column 2. This column identifies the maintenance levels using the tools and test equipment.

c. Nomenclature, Column 3. This column identifies the tools and test equipment.

d. National Stock Number, Column 4. This column provides the national stock number of the specific tools or test equipment.

B-4. Explanation of columns in section IV.

a. Reference Code, Column 1. This column correlates to section II, column 5.

b. Remarks, Column 2. This column provides supplemental information or explanatory notes pertinent to the maintenance function in section II.

Section II. MAINTENANCE ALLOCATION CHART FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS A	B	C	D	E	F	G	H	I	J	K	(4) TOOLS AND EQUIPMENT	(5) REMARKS
00	Endoscopic Instrument Light	O 0.2	O 0.3	O 0.3					O 0.5	O 1.0	F 3.0	D 6.0	01,02,03, 04	A,B
01	Multiport Faceplate		O 0.1						O 0.2				01	
02	Intensity Control		O 0.2						O 0.5				01,02,03, 04	B
03	Power Switch		O 0.1						O 0.4				01,02,03 04	B
04	Indicator		O 0.2						O 0.3				01,02,03	B
05	Lamp Cartridge		O 0.2						O 0.2					
06	Lamp Cartridge Assembly		O 0.2						O 0.2					
07	Cooling Fan		O 0.1	O 0.3					O 0.4				01,02,03, 04	B

Section III. TOOLS AND TEST EQUIPMENT FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER
01	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Repairmans	5180-00-611-7923
02	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Organizational	5180-00-611-7924
03	O,F,H,D	Multimeter, UN/USM 486	6625-01-145-2430
		or	
		Multimeter, AN/PSM 45A	6625-01-265-6000
04	O,F,H,D	Tester, Current Leakage, TS 2514/P	6625-01-142-8233

Section IV. REMARKS FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) REFERENCE CODE	(2) REMARKS
A	Tools and test equipment are listed for each assembly group.
B	Perform an annual electrical safety inspection and test. Perform the inspection and test after repair or replacement of electrical/electronic components.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the equipment to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items lists are divided into the following sections.

a. Section II. Components of End Item. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the equipment in operation, to operate it, and to perform emergency repairs. Basic issue items must be with the equipment during operation and whenever it is transferred between property accounts. This manual is your authority to request or requisition basic issue items, based on MTOE authorization of the end item.

C-3. Explanation of columns.

The following provides an explanation of columns found in both listings:

a. Item Number, Column 1. This column indicates the item number assigned to the item.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the commercial and government entity (CAGE) code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation. These abbreviations are listed in the glossary.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) provided with the equipment.

Section II. COMPONENTS OF END ITEM FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
	THERE ARE NO COMPONENTS APPLICABLE FOR THIS END ITEM.			

Section III. BASIC ISSUE ITEMS FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1		Owner's Manual (47258) 300431	EA	2

APPENDIX D

EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope.

This appendix lists expendable and durable supplies and materials that are required to maintain the equipment. This listing is authorization to requisition and retain the items if not otherwise authorized.

D-2. Explanation of columns.

a. Item Number, Column 1. The item number (Item No.) is sequentially assigned.

b. Level, Column 2. This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. National Stock Number, Column 3. This column indicates the national stock number assigned to the item.

d. Description, Column 4. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. Unit of Measure, Column 5. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by an alphabetical abbreviation. These abbreviations are listed in the glossary.

f. Quantity, Column 6. This column indicates the quantity (QTY) of the item(s) provided with the equipment.

Section II. EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEASURE	(6) QTY
1	O	7920-01-004-7847	Cloth, Cleaning (97327) Rymple Cloth 301	RO	1
2	O	8530-01-315-8453	Toothbrush (64682) 665-0679	EA	1

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

E-1. Scope.

This manual lists spare and repair parts, special tools, special test equipment; and other special support equipment required for the performance of unit level, direct support, general support, and depot level maintenance. It authorizes the requisitioning and issue of spare and repair parts in consonance with the MAC (app B).

E-2. General.

The Repair Parts and Special Tools List is divided into the following sections:

a. Repair Parts, Section II. A list of repair parts authorized for the performance of maintenance in figure number and item number sequence.

b. Special Tools, Test, and Support Equipment, Section III. A list of special tools, test, and support equipment authorized for the performance of maintenance.

E-3. Explanation of columns in section II.

a. Illustration, Column 1.

(1) *Figure Number.* This column indicates the figure number (FIG NO.) of the illustration on which the item is shown.

(2) *Item Number.* This column indicates the item number (ITEM NO.) used to identify each item on the illustration.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name of the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) to be used with or on the illustrated component, assembly, module, or end item.

E-4. Explanation of columns in section III.

a. Item Number, Column 1. This number is sequentially assigned.

b. Level, Column 2. This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. National Stock Number, Column 3. This column indicates the national stock number assigned to the item.

d. Description, Column 4. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. Unit of Measure, Column 5. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

f. Quantity, Column 6. This column indicates the quantity (QTY) of the item(s) to be used with or on the illustrated component, assembly, module, or end item.

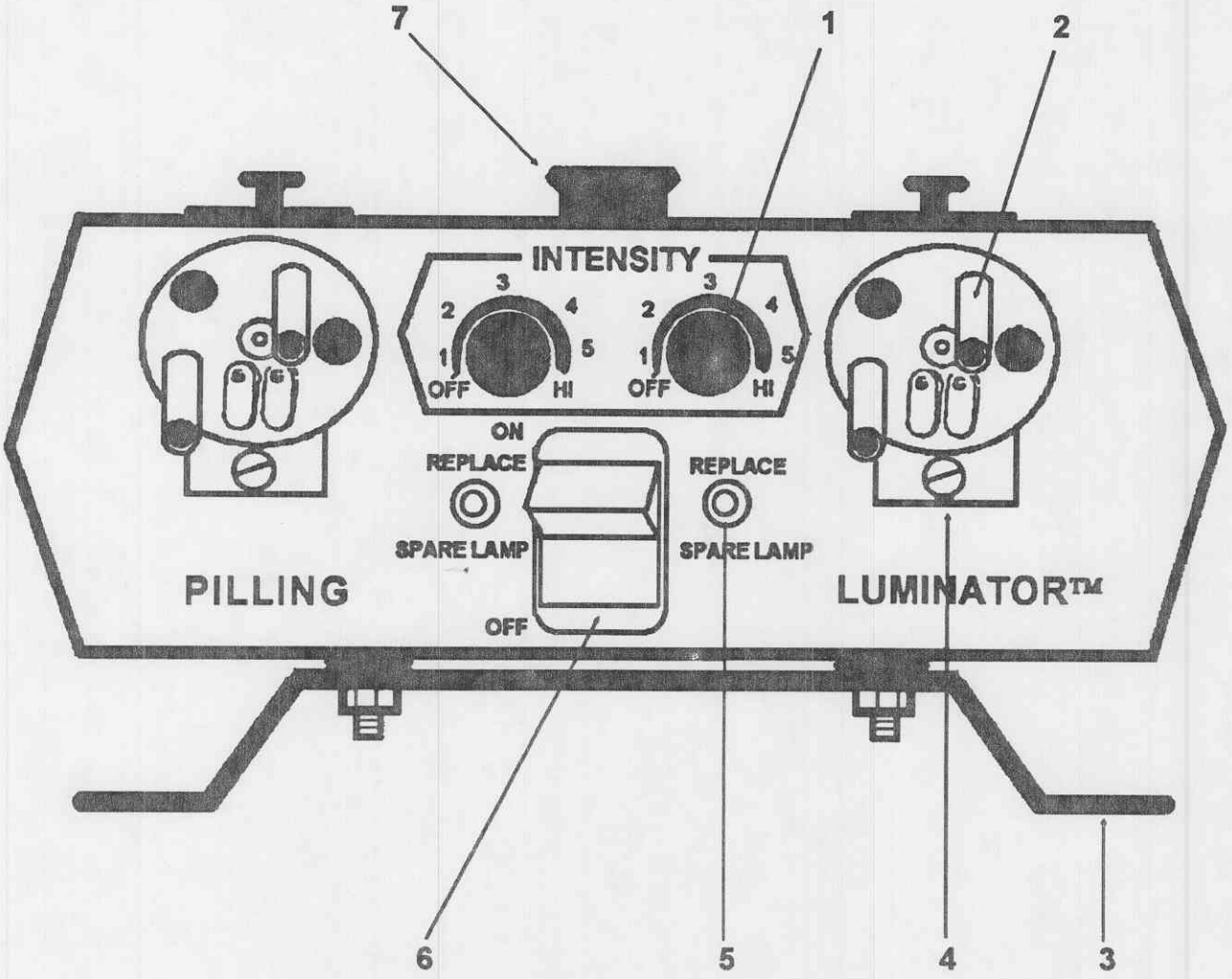

Figure E-1. Control panel.

Section II. REPAIR PARTS LIST FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ILLUSTRATION		(2)	(3)	(4)	(5)
FIG NO.	ITEM NO.	NATIONAL STOCK NUMBER	DESCRIPTION	UNIT OF MEASURE	QTY
E-1	1	5355-01-258-9613	Knob (47258) 300369A-000	EA	2
E-1	2	6515-01-357-6898	Multiport Faceplate (Faceplate, Light) (47258) 52-1182	EA	2
E-1	3		Leg Bracket (47258) 52-1233	EA	2
E-1	4	5305-01-259-6049	Slotted Knob (Machine Screw) (47258) 300023A-001	EA	2
E-1	5	6210-01-255-2828	Light, Indicator (47258) 300370A	EA	2
E-1	6	5925-01-255-8178	Power Switch (Circuit Breaker), 120 Volt (47258) 300357A-001	EA	1
			or		
		5925-01-255-8179	Power Switch (Circuit Breaker), 240 Volt (47258) 300357A-002	EA	1
E-1	7		Handle, Carrying (47258) 300346-000	EA	1
E-1	*	5930-01-255-8180	Intensity Control (Switch Rotary) (47258) 300356A-000	EA	2
E-1	*	5950-01-257-3151	Power Transformer, 120/240 Volt (47258) 300361C-000	EA	2
E-1	*	4140-01-240-2100	Fan, Circulating (47258) 30000B-001	EA	2
E-1	*		Ballast, Resistor, 220 Ohm, 2 Watts (47258) 300371A-000	EA	2

* Indicates a part not shown in the illustration.

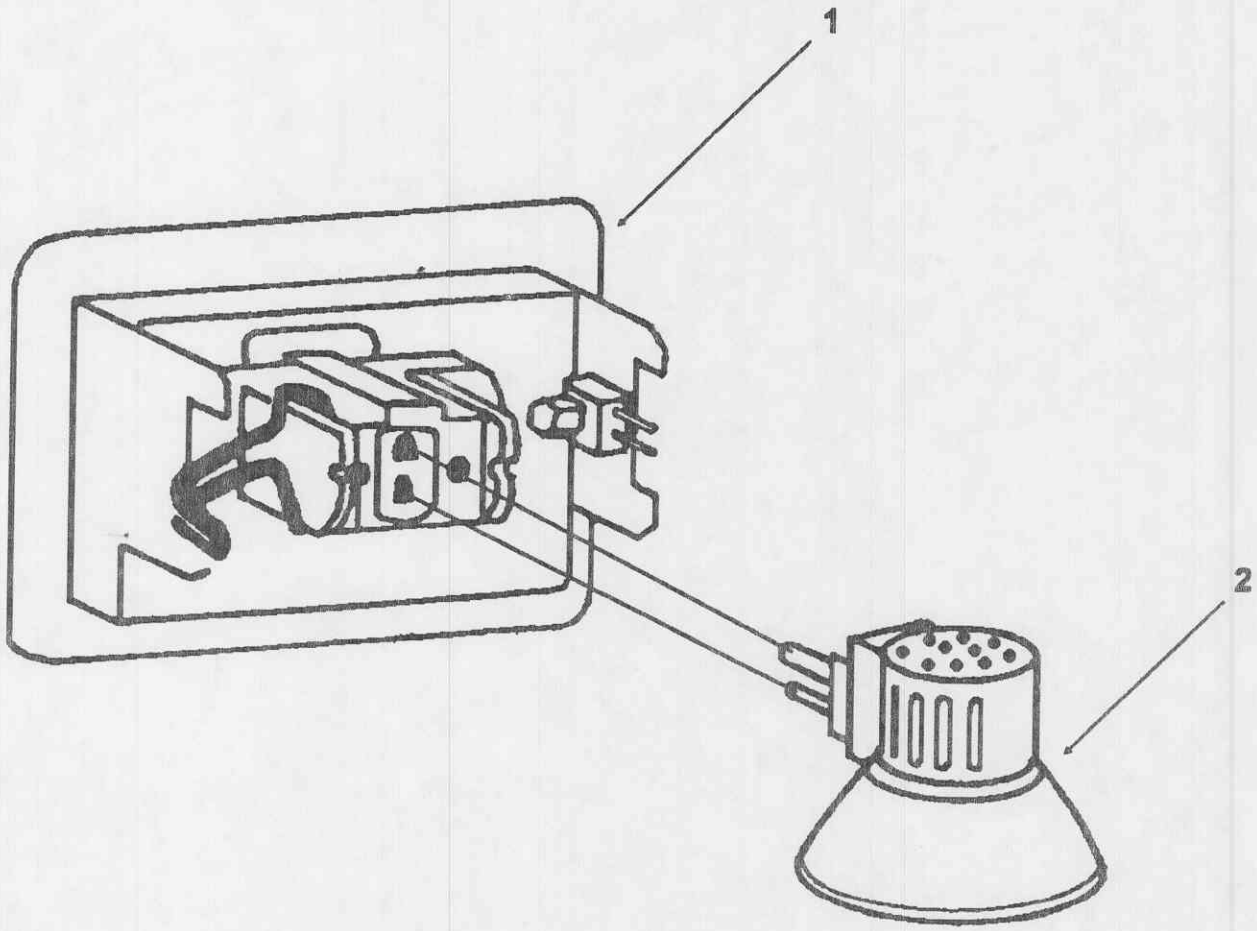

Figure E-2. Lamp cartridge assembly.

Section II. REPAIR PARTS LIST FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ILLUSTRATION		(2)	(3)	(4)	(5)
FIG NO.	ITEM NO.	NATIONAL STOCK NUMBER	DESCRIPTION	UNIT OF MEASURE	QTY
E-2	1	6250-01-255-2830	Lamp Cartridge Assembly (Lampholder) (47258) 52-1148	EA	4
E-2	2	6240-01-254-7598	Lamp Cartridge (47258) 52-1118	EA	4

Section III. SPECIAL TOOLS, TEST, AND SUPPORT EQUIPMENT FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
		THERE ARE NO SPECIAL TOOLS, TEST, OR SUPPORT EQUIPMENT APPLICABLE FOR THIS END ITEM.			

APPENDIX F

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

F-1. Scope.

This appendix lists additional items that are authorized for support of the endoscopic instrument light.

F-2. General.

This list identifies items that should not accompany the endoscopic instrument light and that will not be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

F-3. Explanation of columns in section II.

The following provides an explanation of columns found in the list:

a. Item Number, Column 1. This column indicates the item number assigned to the item.

b. National Stock Number, Column 2. This column indicates the national stock number assigned to the item.

c. Description, Column 3. This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

d. Unit of Measure, Column 4. This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

e. Quantity, Column 5. This column indicates the quantity (QTY) of the item(s) for optional use.

Section II. ADDITIONAL AUTHORIZATION LIST FOR ENDOSCOPIC INSTRUMENT LIGHT

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1		Case, Reusable (Storing/Shipping) (Not Available)	EA	1

INDEX

This index is organized alphabetically by topic and by subtopic. Topics and subtopics are identified by paragraph number.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

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Frederick, MD 21702

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 8-6515-006-24&P	6 Feb 88	Light, Endoscopic Instrument, Model 52-1201

BE EXACT. . . PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
2-7	2-5		
E-11		E-4	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Change electrical cable to electrical assembly.

REASON: Corrects nomenclature.

Reverse call-out numbers 4 and 8.

REASON: Correctly identifies part.

SAMPLE

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GLOSSARY

A	Ampere
AC	Alternating current
AFR	Air Force regulation
app	Appendix
AR	Army regulation
AR	As required
C	Operator or crew
CAGE	Commercial and government entity
chap	Chapter
cm	Centimeter
CTA	Common table of allowances
CVC	Calibration/verification/certification
D	Depot level maintenance
DA	Department of the Army
DLA	Defense Logistics Agency
DLAM	Defense Logistics Agency manual
DPSC	Defense Personnel Support Center
DS	Direct support
EA	Each
EtO	Ethylene oxide
F	Direct support maintenance
fig (FIG)	Figure
FM	Field manual
FSC	Federal supply class
FSCM	Federal supply code for manufacturers. This is an obsolete term. CAGE (commercial and government entity) is the correct acronym.

ft	Foot (feet)
GS	General support
H	General support maintenance
hrs	Hours
Hz	Hertz
in	Inch
ISO	International Standards Organization
JTA	Joint table of allowances
kg	Kilogram
m	Meter
MAC	Maintenance allocation chart
MAN	Manual
MED	Medical
MFD	Manufactured
MFG.	Manufactured
MPL	Mandatory parts list
MTOE	Modified table of organization and equipment
N/A	Not applicable
NO. (No.)	Number
NSN	National stock number
O	Unit maintenance
para	Paragraph
PCB	Printed circuit board
PMCS	Preventive maintenance checks and services
QC	Quality control
QTY	Quantity
RO	Roll

RPL	Repair parts list
S	Switch
SB	Supply bulletin
sec	Section
SER.	Serial
TB	Technical bulletin
TDA	Table of distribution and allowances
TM	Technical manual
VAC	Volts alternating current
VDC	Volts direct current
W	Watts
°C	Degrees Celsius
°F	Degrees Fahrenheit

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METRIC SYSTEM CONVERSIONS

CHANGE	TO	MULTIPLY
inches	centimeters	2.540
feet	meters	.305
yards	meters	.914
sq inches	sq centimeters	6.451
sq feet	sq meters	.093
cubic feet	cubic meters	.028
fluid ounces	milliliters	29.573
pints	liters	.473
quarts	liters	.946
gallons	liters	3.785
ounces	grams	28.349
pounds	kilograms	.454

CHANGE	TO	MULTIPLY
centimeters	inches	.394
meters	feet	3.280
meters	yards	1.094
sq centimeters	sq inches	.155
sq meters	sq feet	10.764
cubic meters	cubic feet	35.315
milliliters	fluid ounces	.034
liters	pints	2.113
liters	quarts	1.057
liters	gallons	.264
grams	ounces	.035
kilograms	pounds	2.205

TEMPERATURE CONVERSION

Degrees Fahrenheit to Degrees Celsius: (°F - 32) X .5555 = °C

Degrees Celsius to Degrees Fahrenheit: (°C X 1.8) + 32 = °F

WEIGHTS

1 gram = 10 decigrams = .035 ounce

1 dekagram = 10 grams = .35 ounce

1 hectogram = 10 dekagrams = 3.52 ounces

1 kilogram = 10 hectograms = 2.2 pounds

LINEAR MEASURE

1 centimeter = 10 millimeters = .39 inch

1 decimeter = 10 centimeters = 3.94 inches

1 meter = 10 decimeters = 39.37 inches

CUBIC MEASURE

1 cu centimeter = 1000 cu millimeters = .06 cu inch

1 cu decimeter = 1000 cu centimeters = 61.02 cu inches

1 cu meter = 1000 cu decimeters = 35.31 cu feet

LIQUID MEASURE

1 centiliter = 10 milliters = .34 fluid ounce

1 deciliter = 10 centiliters = 3.38 fluid ounces

1 liter = 10 deciliters = 33.81 fluid ounces